

MATERIALS LICENSE

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 36, 39, 40, and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations, and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

301371

Licensee		3. License Number 22-26732-01
1. Lakehead Pipe Line Company, Inc.		
2. 21 West Superior Street Duluth, MN 55802-2067		4. Expiration Date July 31, 2000
		5. Docket or Reference No. 030-34160\48-13457-01
6. Byproduct, Source, and/or Special Nuclear Material	7. Chemical and/or Physical Form	8. Maximum Amount that Licensee May Possess at Any One Time Under This License
A. Cesium-137	A. Sealed source (Berthold P-2623-100)	A. Twelve sources not to exceed 350 millicuries each
B. Cesium-137	B. Sealed source (Berthold P-2645-100-000)	B. Five sources not to exceed 2000 millicuries each
C. Americium-241	C. Sealed source (Amersham/Searle Model AMC 17)	C. One source not to exceed 550 millicuries
D. Cesium-137	D. Sealed source (Berthold P-2623-100, P-2645-100, or Amersham Model CDC.93)	D. Three sources not to exceed 1000 millicuries each

9. Authorized Use:

- A. or B. To be used in Berthold Model No. LB 7400 D/L density/level gauge.
- C. To be used in Yokogawa Model PS6 Sulfur-In-Oil Analyzer to measure the percent of sulfur by weight in crude oil.
- D. To be used in Berthold Model LB 7400 D/F series density gauge for measurement of density of material flow through a pipeline.

220039

9610220369 960920
PDR ADOCK 03034160
C PDR230
COPY

**MATERIALS LICENSE
SUPPLEMENTARY SHEET**

License Number

22-26732-01

Docket or Reference Number

030-34160/48-13457-01

CONDITIONS

10. A. Licensed materials listed in item 6.A. and 6.B. shall be used only at the licensee's facilities located as follows:

Saxon Station, Saxon, Wisconsin
Iron River Station, Iron River, Michigan
Gould City Station, Gould City, Michigan
North Straits, North Straits of Mackinac, MI
Lewiston Station, Lewiston, Michigan
Bay City Station, Bay City, Michigan

Plummer Station, Plummer, MN
Clearbrook Station, Clearbrook, MN
Deer River Station, Deer River, MN
Superior Terminal, Superior, WI

- B. Licensed material listed in items 6.C. and 6.D. shall be used only at the licensee's facilities located as follows:

2800 East 21st Street
Superior, WI

Station Site
Rapid River, MI

Mainline Densitometer Site
Perkins, MI

11. A. Licensed materials listed in item 6.A. and 6.B. shall be used by, or under the supervision of, Robert F. Pollock, Mike Burnis, Kurt Castle, Dennis DeYoung, Lewis Gotham, Gary Haubrich, Harvey Miles, Joe Shafer, Jerry Snobeck, Thomas Smith, Rich Szeplakay, John Sobojinski.
- B. Licensed material listed in items 6.C. and 6.D. shall be used by, or under the supervision of, Robert F. Pollock, Joel A. Korhonen, Dave P. Friberg.
- C. Radiation Safety Officer: Robert F. Pollock.
12. A. Sealed sources and detector cells shall be tested for leakage and/or contamination at intervals not to exceed 6 months or at such other intervals as specified by the certificate of registration referred to in 10 CFR 32.210.
- B. In the absence of a certificate from a transferor indicating that a leak test has been made within 6 months prior to the transfer, a sealed source or detector cell received from another person shall not be put into use until tested.
- C. Sealed sources need not be leak tested if:
- (i) they contain only hydrogen-3; or
 - (ii) they contain only a radioactive gas; or

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MATERIALS LICENSE
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- (iii) the half-life of the isotope is 30 days or less; or
- (iv) they contain not more than 100 microcuries of beta and/or gamma emitting material or not more than 10 microcuries of alpha emitting material; or
- (v) they are not designed to emit alpha particles, are in storage, and are not being used. However, when they are removed from storage for use or transferred to another person, and have not been tested within the required leak test interval, they shall be tested before use or transfer. No sealed source or detector cell shall be stored for a period of more than 10 years without being tested for leakage and/or contamination.
- D. The leak test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample. If the test reveals the presence of 0.005 microcurie or more of removable contamination, a report shall be filed with the U.S. Nuclear Regulatory Commission in accordance with 10 CFR 30.50(b)(2), and the source shall be removed immediately from service and decontaminated, repaired, or disposed of in accordance with Commission regulations. The report shall be filed within 5 days of the date the leak test result is known with the U.S. Nuclear Regulatory Commission, Region III, ATTN: Chief, Nuclear Materials Safety Branch, 801 Warrenville Road, Lisle, Illinois 60532-4351. The report shall specify the source involved, the test results, and corrective action taken.
- E. The licensee is authorized to collect leak test samples for analysis by persons specifically licensed by the Commission or an Agreement State to perform such services.
13. Sealed sources containing licensed material shall not be opened or removed from their respective source holders by the licensee.
14. Installation, initial radiation survey, relocation, or removal from service of devices containing sealed sources shall be performed by John Sobojinski or by persons specifically licensed by the Commission or an Agreement State to perform such services. Maintenance and repair of devices and installation, replacement, and disposal of sealed sources shall be performed only by persons specifically licensed by the Commission or an Agreement State to perform such services.
15. Prior to initial use and after installation, relocation, dismantling, alignment, or any other activity involving the source or removal of the shielding, the licensee shall assure that a radiological survey is performed to determine radiation levels in accessible areas around, above and below the gauge with the shutter open. This survey shall be performed only by persons authorized to perform such services by the Commission or an Agreement State.

COPY

**MATERIALS LICENSE
SUPPLEMENTARY SHEET**

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16. The licensee shall assure that the shutter mechanism is locked in the closed position during periods when a portion of an individual's body may be subject to the direct radiation beam. The licensee shall review and modify as appropriate its "lock-out" procedures whenever a new gauge is obtained to incorporate the device manufacturer's recommendations.
17. Each gauge shall be tested for the proper operation of the on-off mechanism and indicator, if any, at no longer than 6-month intervals or at such longer intervals as specified by the manufacturer and approved by NRC.
18. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents, including any enclosures, listed below. The U.S. Nuclear Regulatory Commission's regulations shall govern unless the statements, representations, and procedures in the licensee's application and correspondence are more restrictive than the regulations.
- A. Letters dated August 27, 1993, October 26, 1993 and June 30, 1994; and
 - B. Application dated January 4, 1995 with attachments.
 - C. Letter dated July 29, 1996 with attachments.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

Date

Sept. 20, 1996

By *Patricia M. Vacherlon*

Nuclear Materials Licensing Branch, Region III

COPY

BETWEEN:

LICENSE FEE MANAGEMENT BRANCH, ARM
AND
REGIONAL LICENSING SECTIONS

(FOR LFMS USE)
INFORMATION FROM LTS

R7

PROGRAM CODE: _____
STATUS CODE: 3
FEE CATEGORY: _____
EXP. DATE: 0
FEE COMMENTS: _____
DECOM FIN ASSUR REQD: _____

1996 SEP 20 AM 11:56
JUN -5 AM 11:03

LICENSE FEE TRANSMITTAL

A. REGION

1. APPLICATION ATTACHED
APPLICANT/LICENSEE: LAKEHEAD PIPE LINE COMPANY, INC.
RECEIVED DATE: 960530
DOCKET NO: 3034160
CONTROL NO.: 301371
LICENSE NO.:
ACTION TYPE: NEW LICENSE

Cooperate w/c

Robert Pollock
715 398-8335
8/8/96

2. FEE ATTACHED
AMOUNT: 0
CHECK NO.: 0

** mailing address*
change from WI to MN

3. COMMENTS

SIGNED S. Hersey
DATE 5-31-96

B. LICENSE FEE MANAGEMENT BRANCH (CHECK WHEN MILESTONE 03 IS ENTERED) ☒

1. FEE CATEGORY AND AMOUNT: 3P FEE NOT REQUIRED

2. CORRECT FEE PAID. APPLICATION MAY BE PROCESSED FOR:
AMENDMENT _____
RENEWAL _____
LICENSE ☒

ABANDONED FEE UNPAID

3. OTHER _____

SIGNED _____
DATE _____

AUG 26 1996

Log	<u>June 2 III</u>
Remitter	_____
Check No.	<u>76178</u>
Amount	<u>(290)</u>
FEE NOT REQUIRED	
Date Check Rec'd	_____
Date Completed	<u>8/9/96</u>
By	<u>SC</u>

Returned
9/24/96
SC

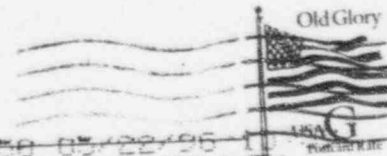
Mailing Address Chg. only
FEEL NO NEED TO RETURN



**SPEED MAIL DIRECTLY
TO YOUR NEW ADDRESS**

Mail this postcard to friends, family
members, businesses, and publishers
to inform them of your move.

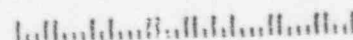
Enter Name of Correspondent, Name of Business (if applicable), Complete Street Address, PO Box No.,
or Rural Route No. and Box No., Apt./Suite Number, City or Post Office, State, ZIP Code or ZIP+4.



U.S. NUCLEAR REGULATORY COMMISSION
REGION III

RECEIVED 801 WARRENVILLE ROAD
MAY 30 1996 Lisle, ILLINOIS 60532-4351

REGION III |||||



AUG 19 1996

301371

Mail this postcard to people and businesses that send you mail

Please send mail to my new address beginning:

0 5 2 1 9 6
Month Day Year

My Name (Last Name, First Name, Middle Initial)

LAKEHEAD PIPE LINE COMPANY INC

OLD Complete Street Address, PO Box, or Rural Route and RR Box No.

P.O. BOX 787, 119 N 25TH ST. EAST

Apt./Suite No.

City or Post Office

SUPERIOR, WI 54880

State

WI

ZIP Code or ZIP+4

54880

NEW Complete Street Address, PO Box, or Rural Route No. and Box No.

21 W SUPERIOR ST STE 400

Apt./Suite No.

City or Post Office

DULUTH

State

MN

ZIP Code or ZIP+4

55802-2085

Account Number (If Applicable)

New Telephone No. (Optional)

()

Signature

[Signature]

MAY 30 1996

REGION III

Today's Date

0 5 2 1 9 6
Month Day Year

PS Form 3576, February 1995

Recipient: Be sure to record the above new address.

LICENSE FEE REQUIREMENTS

LICENSE FEE AND DEBT COLLECTION BRANCH
DIVISION OF ACCOUNTING AND FINANCE
OFFICE OF THE CONTROLLER
U.S. NUCLEAR REGULATORY COMMISSION
WASHINGTON, DC 20555-0001LAKEHEAD PIPE LINE COMPANY
21 W. SUPERIOR STREET
SUITE 400
DULUTH, MINNESOTA 55802-2085

FOR CHANGE IN ADDRESS FROM WISCONSIN TO MINNESOTA

TYPE OF ACTION

- ☒ NEW LICENSE
☐ RENEWAL OF LICENSE
☐ AMENDMENT TO LICENSE

REQUESTED DATE

5-21-96

LICENSE NUMBER

CONTROL NUMBER

301371

I. APPLICATION FEE DUE

Your request for a licensing action is subject to the fee(s) in the category(ies) noted below in accordance with Section 170.31 of the enclosed Federal Register notice. Payment of the fee is required prior to the issuance of the license, renewal, or amendment.

FEE CATEGORY	APPLICATION	RENEWAL	AMENDMENT
3P	\$	\$	\$ 290.00
	\$	\$	\$
	\$	\$	\$
	\$	\$	\$
	\$	\$	\$
	\$	\$	\$
	\$	\$	\$
	\$	\$	\$
	\$	\$	\$

FEE(s) DUE \$ 290.00
PAYMENT RECEIVED \$ 0.00
AMOUNT DUE \$ 290.00

- ☒ Your request was received without the prescribed application fee.
- ☐ We received your Check No. _____ in the amount of \$ _____. Payment of the additional fee noted above is required.
- ☐ Your request will increase the scope of your license program. Therefore, your request is subject to the application fee(s) noted above. Refer to Section 170.31 and Footnote 1(d)(2).
- ☐ Your license expired prior to the receipt of your application for renewal. Therefore, your request is subject to the application fee(s) noted above. Refer to Section 170.31 and Footnote 1(a).

MAKE PAYMENT OF THE FEE(S) TO THE U.S. NUCLEAR REGULATORY COMMISSION AND MAIL THE PAYMENT TO THE ADDRESS LISTED AT THE TOP OF THIS FORM. IF WE DO NOT RECEIVE A REPLY FROM YOU WITHIN 30 CALENDAR DAYS FROM THE DATE LISTED BELOW, WE SHALL ASSUME THAT YOU DO NOT WISH TO PURSUE YOUR APPLICATION AND WILL VOID THIS ACTION.

II. FEE NOT REQUIRED

- ☐ Enclosed is Check No. _____ which accompanied your request. The fee is not required because:
- ☐ We received your Check No. _____ in payment of the fee.
- ☐ The Licensing staff has informed us that your request is to be considered as a continuation of your request dated _____, Control No. _____.
- ☐ Your request was combined, prior to review, with your request, Control No. _____.

III. CHECK RETURNED

- ☐ Enclosed is Check No. _____ which was returned to us by the bank for:
- ☐ INSUFFICIENT FUNDS
- ☐ ACCOUNT CLOSED
- ☐ OTHER

MAIL THE REPLACEMENT CHECK TO THE ADDRESS LISTED AT THE TOP OF THIS FORM AND REFERENCE THE ABOVE CONTROL NUMBER.

IV. LICENSE ISSUED WITHOUT THE REQUIRED FEE

- ☐ License No. _____ Amendment No. _____, issued on _____, was issued without the required fee being collected. The fee required is noted in Section I of this form.
- ☐ The scope of your licensed program was increased. Therefore, your request is subject to the application fee(s) noted in Section I of this form. Refer to Section 170.31 and Footnote 1(d)(2).
- ☐ Because of the urgency of your request, the license was issued without remittance of the prescribed fee noted in Section I of this form.

SIGNATURE - LICENSE FEE ANALYST

DATE

SHIRLEY CRUTCHFIELD

(LEAVE BLANK)

June 13, 1996

SEP 24 1996

Eric A. Williams
Lakehead Pipe Line Company
P.O. Box 630
Griffith, IN 46319

Dear Mr. Williams:

Enclosed is License No. 22-26732-01 replacing License No. 48-13457-01 which has been terminated with Amendment No. 22. As discussed by phone on September 18, 1996, this action is necessary because your corporate address has changed from the state of Wisconsin to the state of Minnesota. The change of states necessitates a change of license number.

We have extended your expiration date by five years. Please refer to our letter to you dated May 7, 1996 for further details.

We have not added the additional users (Messrs. M. Skaggs, D. Rosoenbrock, R. Kimball, S. Bellefy, M. Monson and J. Sokja) to your license at this time. It appears that these users have been trained using an in-house training course. Your license does not authorize in-house training of users although the subject matter appears to be adequate for training users. If you wish to establish an in-house training program for users, please send us a formal outline of the course curriculum, the name of the person conducting the course and a synopsis of his/her training and experience which qualifies him/her to teach the course. In addition, we will need a description of the methods you will use to determine if the participants have passed the course (ie. a test with the correct answers).

The last page of your application designates individuals other than John Sobojinski to perform installation and relocation of the gauges. Please be aware that unless these individuals are named on your license, the Commission does NOT consider them to be authorized to perform these services. You would be in violation of license condition 14. if these individuals performed these services. You will need to add their names to condition 14. of your license. Provide us with a copy of the Berthold training certificate the individuals received after completing the 8 hour class in installation and relocation of gauges, then we can add these individuals to your license.

Please review the enclosed document carefully and be sure that you understand all conditions. If there are any errors or questions, please notify the U.S. Nuclear Regulatory Commission, Region III office so that we can provide appropriate corrections and answers.

301371
301372

Please be advised that your license expires at the end of the day, in the month, and year stated in the license. Unless your license has been terminated, you must conduct your program involving byproduct materials in accordance with the conditions of your NRC license, representations made in your license application, and NRC regulations. In particular, note that you must:

1. Operate in accordance with NRC regulations 10 CFR Part 19, "Notices, Instructions and Reports to Workers; Inspections," 10 CFR Part 20, "Standards for Protection Against Radiation," and other applicable regulations.
2. Notify NRC, in writing, within 30 days:
 - a. When Radiation Safety Officer permanently discontinues performance of duties under the license or has a name change; or
 - b. When the licensee's mailing address changes (no fee is required if the location of byproduct material remains the same).
3. In accordance with 10 CFR 30.36(b) and/or license condition, notify NRC, promptly, in writing, and request termination of the license:
 - a. When you decide to terminate all activities involving materials authorized under the license; or
 - b. If you decide not to complete the facility, acquire equipment, or possess and use authorized material.
4. Request and obtain a license amendment before you:
 - a. Change Radiation Safety Officers;
 - b. Order byproduct material in excess of the amount, or radionuclide, or form different than authorized on the license;
 - c. Add or change the areas of use or address or addresses of use identified in the license application or on the license; or
 - d. Change ownership of your organization.
5. Submit a complete renewal application with proper fee or termination request at least 30 days before the expiration date of your license. You will receive a reminder notice approximately 90 days before the expiration date. Possession of

byproduct material after your license expires is a violation of NRC regulations. A license will not normally be renewed, except on a case-by-case basis, in instances where licensed material has never been possessed or used.

In addition, please note that NRC Form 313 requires the applicant, by his/her signature, to verify that the applicant understands that all statements contained in the application are true and correct to the best of the applicant's knowledge. The signatory for the application should be the licensee or certifying official rather than a consultant.

You will be periodically inspected by NRC. Failure to conduct your program in accordance with NRC regulations, license conditions, and representations made in your license application and supplemental correspondence with NRC will result in enforcement action against you. This could include issuance of a notice of violation, or imposition of a civil penalty, or an order suspending, modifying or revoking your license as specified in the General Policy and Procedures for NRC Enforcement Actions, 10 CFR Part 2, Appendix C. Since serious consequences to employees and the public can result from failure to comply with NRC requirements, prompt and vigorous enforcement action will be taken when dealing with licensees who do not achieve the necessary meticulous attention to detail and the high standard of compliance which NRC expects of its licensees.

Sincerely,

Original Signed By
Patricia M. Vacherlon
Nuclear Materials Licensing Branch

License Nos.: 22-26732-01, 48-13457-01
Docket Nos.: 030-34160, 030-06781

Enclosures: 1. License No. 22-26732-01
2. Amendment No. 22

DOCUMENT NAME: M:\03034160.CL6

To receive a copy of this document, indicate in the box: "C" = Copy without attachment/enclosure "E" = Copy with attachment/enclosure "N" = No copy

OFFICE	DNMS/RIII								
NAME	PVacherlon:jaw								
DATE	09/19/96 <i>PV</i>								

OFFICIAL RECORD COPY

Lakehead Pipe Line Company, Inc.

Mark S. Sitek
Chicago District Manager

P.O. Box 630
1500 West Main Street
Griffith, Indiana 46319
Telephone (219) 922-3133
Fax (219) 922-3128



July 29, 1996

Dr. Peter Lee
Nuclear Materials Licensing
United States Nuclear Regulatory Commission
801 Warrenville Road
Lisle, IL 60532-4351

Dear Dr. Lee:

Re: Request for License Amendment
Control Number 301371

Lakehead Pipe Line Company hereby requests the attached amendments to be included in our June 10, 1996 request for amendment to our current license #48-13457-01. We would appreciate your expedition of this application so that we may maintain our current construction schedule.

If you have any questions regarding this application, please contact Eric A. Williams at (219) 922-3133, ext. 124.

Sincerely,

Mark Sitek

EAW/vsm

c/att: Marc Kincs
Bob Pollock

JUL 30 1996

RECEIVED
JUL 30 1996
REGION III

~~RECEIVED~~
~~AUG 1 - 1996~~
~~REGION III~~

DN: 7-29-96

An Affiliate of IPL Energy

APPLICATION FOR MATERIAL LICENSE

ITEM 2

Lakehead Pipe Line Company has relocated their corporate office to the following address:

21 West Superior Street
Duluth, MN 55802-2067

ITEM 3

Lakehead is proposing to install two (2) nuclear density gauges manufactured by Berthold Systems at the following locations:

Mainline Densitometer Site
Perkins, Michigan

Station Site
Rapid River, Michigan

Site maps are provided in Attachment #1 giving detailed information on the location of each gauge and showing access roads to each site. Both sites are remote facilities for which there are no street addresses.

ITEM 4

Eric A. Williams
P.O. 630
Griffith, IN 46319
(219) 922-3133

ITEM 5

Attachment #5 contains the material data sheets from Berthold Systems, manufacturers of the gauges, and has information on the element, mass numbers and chemical form. The maximum amount of nuclear material which will be possessed at any one time by Lakehead Pipe Line is the sum total of two (2) sources requested under this amendment, plus the seventeen (17) density gauges and one (1) sulphur monitoring gauge currently licensed, for a total of 10,700 millicurie of Cesium-137 and 550 millicuries of Americium-241. It should be noted that these devices are located at various sites throughout a three (3) state area.

Section 8. B. on the Materials License incorrectly lists four (4) sources not to exceed 2000 mCi. It should read five (5) sources not to exceed 2000 mCi. The error was recognized in reviewing all sources, past amendments and the radiation safety plan. It seems to have occurred in the initial development of the Materials License for the gauge upstream of Lewiston, MI, inadvertently being listed as a 350 mCi source as opposed to the actual source size of 500 mCi.

ITEM 6

The purpose of the nuclear gauges is to provide information on the density of the products flowing through our pipeline system. This data is then used to locate or track various product batches and also provide information which is critical to our leak detection system.

ITEM 7

The Radiation Safety Officer for Lakehead Pipe Line is Mr. Robert F. Pollock. Mr. Pollock has attended a 40 hour training program administered by Engelhardt and Associates, Inc. 2800 South Fish Hatchery Road, Madison, Wisconsin, 53711. The subjects covered in the training are detailed in Attachment #2. Mr. Pollock has also received eight (8) hours of device specific training from Berthold Systems in the installation and maintenance of their nuclear density gauges.

Mr. Mark Gerlach is no longer with Lakehead Pipe Line and his name in sections 11.A. and 11.B. shall be removed from the license. Mr. Eric A. Williams, Lakehead's Safety and Compliance Coordinator, has replaced Mark Gerlach in the administration of Lakehead Pipe Line's Radiation Safety Program. Mr. Williams has received his Bachelor's Degree in Environmental Health which included course work in radiation safety and has also had prior experience with radiation safety from previous employers.

ITEM 8

It has been determined that because of the types of materials used and the size of the nuclear sources, the installation sites of Berthold's Nuclear Gauges currently do not meet the NRC's definition of restricted areas. However, Lakehead Pipe Line has provided training to the following individuals and they should be added to section 11. A. The content of their training is outlined in Attachment #6.

Mike Skaggs
Dale Rosenbrock
Rick Kimball
Scott Bellefy
Mike Monson
James Sokja

The following individuals are no longer with Lakehead Pipe Line. Their names should be removed from section 11. A. of the license.

Gene LaDouceur
Larry Nolan

Mr. John Sobojinski will be responsible for the installation of all devices under this Amendment. Mr. John Sobojinski has attended an eight (8) hour training course in given by Berthold Systems on the installation and maintenance of their gauges. Alternately, in Mr. Sobojinski absence, the gauges may be installed by licensed representatives of Berthold Systems.

ITEM 9

Attachment #7 details the construction of the source and shielding.

The gauges will be installed below grade in concrete pits around the pipeline. The pits are designed to be resistant to influx of water, but will also be equipped with sump pumps to prevent water accumulation. A representative drawing of the proposed installation is shown in Attachment #3.

All gauges will be located on Lakehead Pipe Line property of right-of-way. Each installation will be fully enclosed by a seven (7) foot chain-link fence with three (3) strands of barb wire around the top (see Attachment #4- Standard Fence Drawing). In addition, the pits within which the gauges be fitted with locked covers to prevent unauthorized access.

A Ludlum Model 3 portable survey meter will be located at each site. Surveys will be conducted in accordance with Lakehead Pipe Line's Radiation Safety Plan (see Attachment #8).

ITEM 10

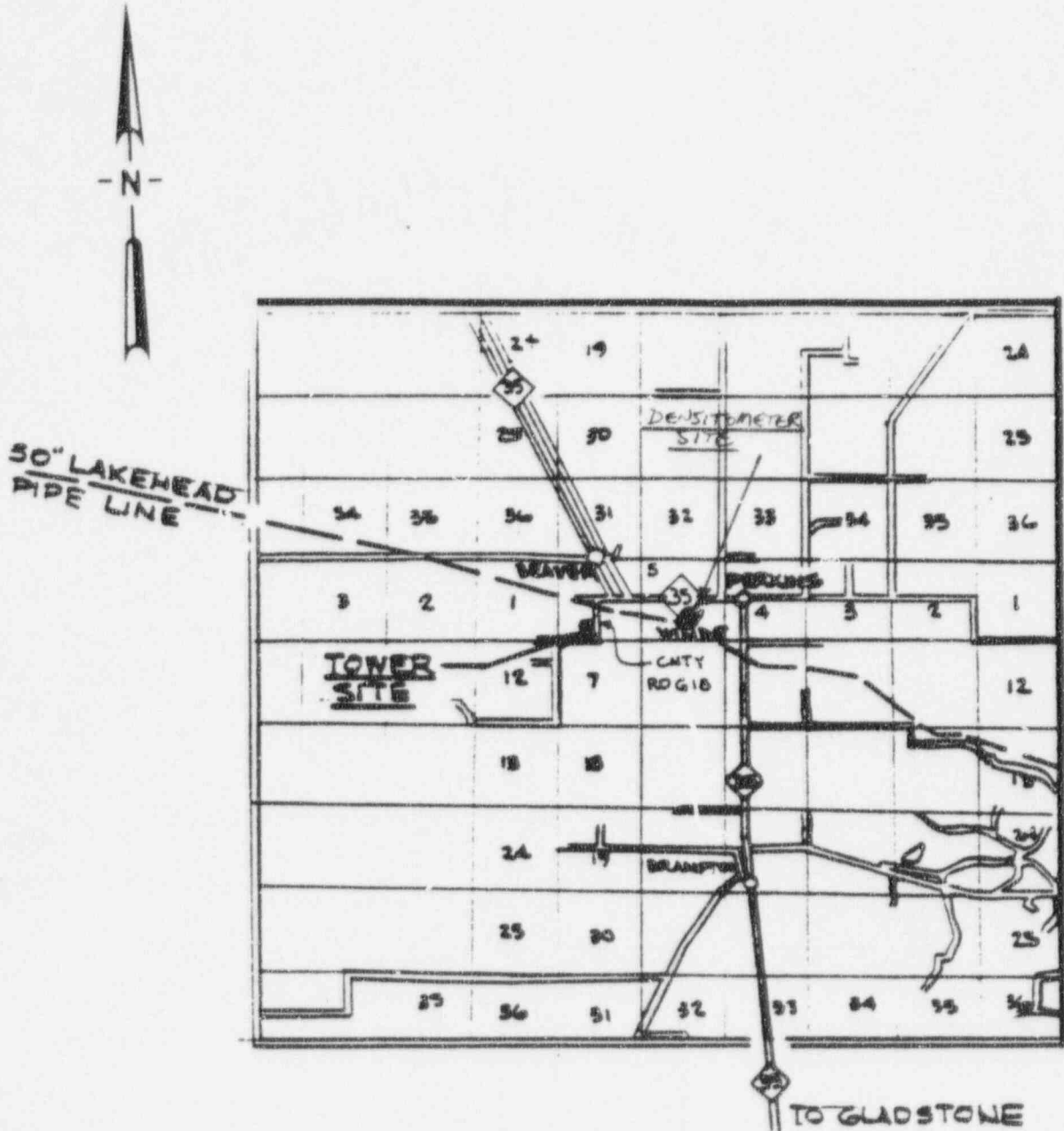
Lakehead Pipe Line's Radiation Safety Plan (see Attachment #8) will be updated to include the two (2) new sources once the license amendment is approved. The update will also reflect the following changes:

Title page	Reflects current administrator and phone number.
Table of Contents (I)	Reflect addition of Lockout Procedures.
1996 Calendar and page 4 (sec 4.1.6) Leak/Wipe Testing	Berthold densitometer wipe test due in 1996, 1999, 2002 has been changed from December to September.
Attachment #1	Title and instructions have been changed from annual to semi-annual shutter test.
Attachment #7	Includes correct current information on the shielding models, authorized users, and source sizes.
Page 5 (sec 4.1.9) Lockout Procedures	Inclusion of lockout procedures for Berthold Systems
Pages 1 and 6	Corrects Yokogawa Model from P56 to PS6
Page 7 (sec 5.2) Survey Instrument Calibration	Reflects new contact for survey calibration.
Page 9 (sec 8.1) Exposure Monitoring	Deletion of second paragraph through historical data.

ITEM 11

Nuclear Sources will be disposed of by returning them to the manufacturer or by contracting a NRC approved disposal agency.

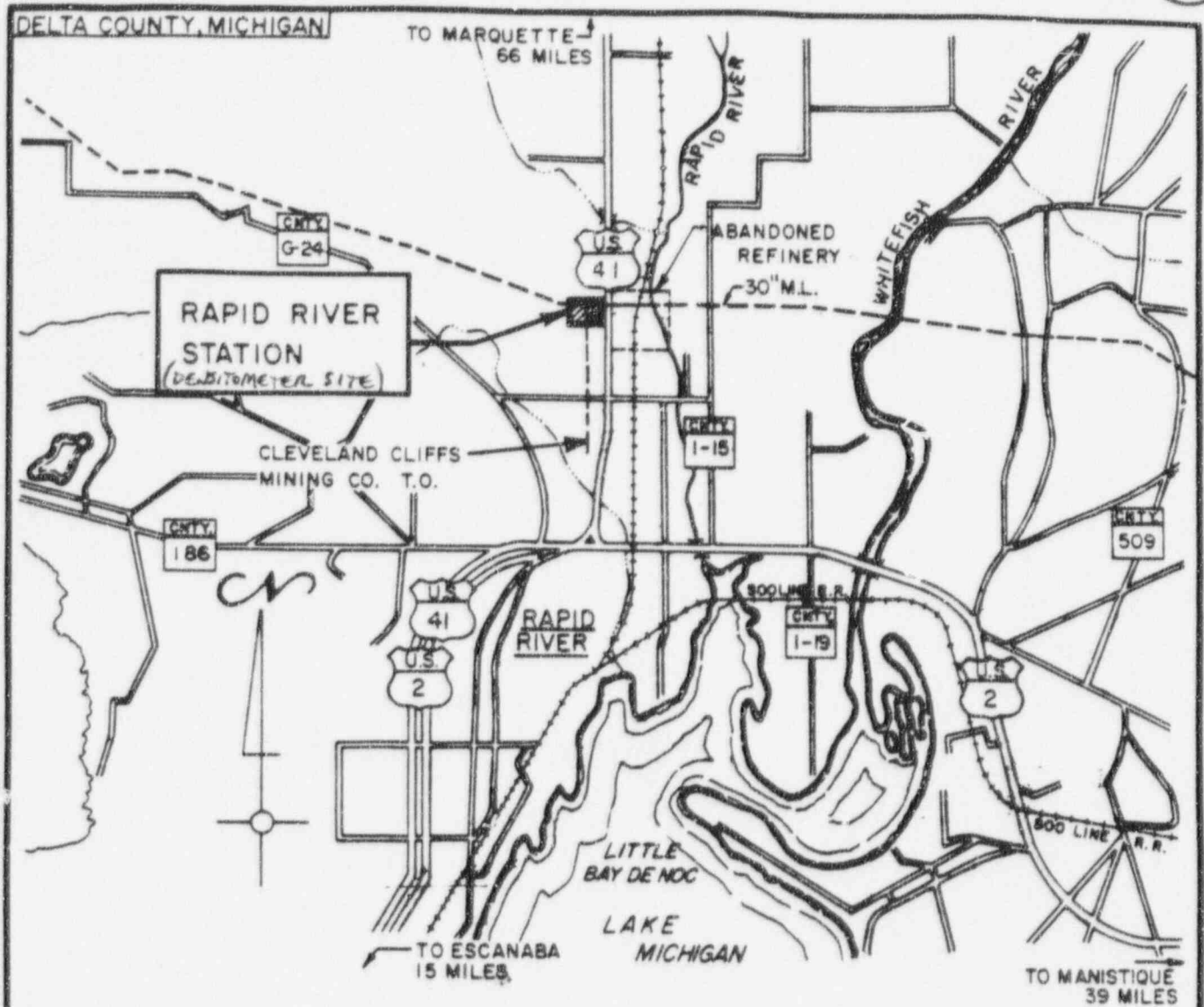
① $\frac{1}{3}$



LOCATION PLAN

(TOWER) SEC. 6, T41N, R22W, DELTA CO. MICH.
 (DENSITOMETER) SEC. 5, T41N, R22W, DELTA CO. MICH.

LAKEHEAD PIPE LINE COMPANY, INC. SUPERIOR WISCONSIN	SCALE NONE	DRAWN AFD DATE 8-21-89	CHECKED S.A.S
PERKINS, MICHIGAN RADIO TOWER SITE & WINDE LAKE RD. DENSITOMETER		APPROVED <i>KRB</i> A-05-10173-0-150	



MAILING ADDRESS:
 LAKEHEAD PIPE LINE CO., INC.
 P.O. BOX 25A
 RAPID RIVER, MICH. 49878
 TELEPHONE:
 906-474-6614

SUPERIOR TO RAPID RIVER—APPROX. 285 MILES

SEC. 18, T41N, R21W, DELTA CO. MICH.

1	General Revision	Dec. 21, 1982	T.D. Moen
LAKEHEAD PIPE LINE COMPANY, INC.			
SUPERIOR		WISCONSIN	
SCALE 1" = 1 MILE			
DRAWN G.T.A. DATE 4-19-74			
CHECKED KOB			
APPROVED			
A-0.5-10065-1-155			

RAPID RIVER (MICH.) STATION
 LOCATION MAP

RSO TRAINING FOR LAKEHEAD PIPELINE

Monday, 23 August, 1993

8:30-9:00	Introduction to the course; description of the manuals; description of the course goals/objectives;
9:00-9:30	Historical perspectives; why the fear factor? How did we get where we are from a regulatory point of view; Regulatory rationale--who regulates what?
9:30-10:00	Principles of gauging operations; where are gauges used? How are they used? How gauges work.
10:00-10:15	Break
10:15-10:45	Video on "Introduction to Radiation"
10:45-11:30	Introduction to radiation theory -Overview of the atom -Why is something radioactive -Types of radiation -Half-life -Definitions-Decay, contamination, source, radioactive, etc.
11:30-11:45	Questions
11:45-1:00	Lunch
1:00-1:45	Interactions of radiation with matter Radiation terminology -Rads -Rems -Roentgens -LET, RBE, QF -Curie
1:45-2:30	Introduction to radiation protection standards

Where they come from
-Time, distance and shielding
-Badges and other personnel monitoring equipment
Demonstration

2:30-2:45

Break

2:45-3:15

Ohmart video

3:15-3:30

Questions

Homework Assignment:

Read the radiation theory section of your manual and
do the assigned homework

Tuesday, 24 August, 1993

8:30-8:45

Discussion of the homework assignment

8:45-9:30

ALARA principles
Allowable radiation limits for radiation vs
nonradiation workers
Dose calculations/inverse square
Sample problems

9:30-10:00

Introduction to sources of radiation exposure--how
much? from what?

10:00-10:15

Break

10:15-11:30

Concept of risk--what is it?
How does radiation fit into this?
Examples of typical radiation worker exposures
Uses of radiation and risk--
medical/industrial/research.

11:30-11:45

Questions

11:45-1:00

Lunch

1:00-2:00

Introduction to radiation measurements/detection
equipment

	<ul style="list-style-type: none"> -diagram of a survey instrument -appropriate uses of a meter -Resolving times, dead time, voltage plateaus, saturation problems
2:00-2:15	Break
2:15-2:45	Instrument calibrations Check sources What does a meter reading really mean Reliability of meters Precautions--cold weather, dirt, dust, etc Demonstration of use of a meter--each person to take some measurements
2:45-3:15	Ohmart video
3:15-3:45	Questions
Homework Assignment:	Read the section in your manual on radiation protection and radiation instrumentation. Do the assigned homework problems.
<u>Wednesday, 25 August, 1993</u>	
8:30-8:45	Discussion of the homework assignment
8:45-9:30	Radiation biology <ul style="list-style-type: none"> -Chemical/cellular effects -Somatic/genetic effects of radiation -Acute radiation syndrome -Delayed effects of radiation
9:30-9:45	Break
9:45-10:45	Introduction to radiation protection programs--what constitutes a good program <ul style="list-style-type: none"> -RSO/responsibilities -Types of radiation safety programs -Management oversight/audits of a program -Regulatory oversight/license compliance
10:45-11:30	Types of NRC licenses Overview of the regulations 10CFR

What regulations pertain to you

11:30-11:45

Questions

11:45-1:00

Lunch

1:00-1:45

What records must you keep; incident reporting;
Emergency response

-What is an emergency

-Can you have an emergency with a gauge

-What do you do/not do?

-When do you notify the NRC?

2:00-2:15

Break

2:15-3:00

Discussion of the specific gauges that you will
have/already have at Lakehead

-Do's/don't's with them

-What sort of service/maintenance can you do, if any

3:00-4:00

Regulatory rationale behind leak testing and shutter
checks

Homework:

Read the assigned sections of the regulations in your
manual and do the homework problems

Thursday, 26 August, 1993

8:30-8:45

Discussion of the homework assignment

8:45-9:30

How to write an NRC license

9:30-11:30

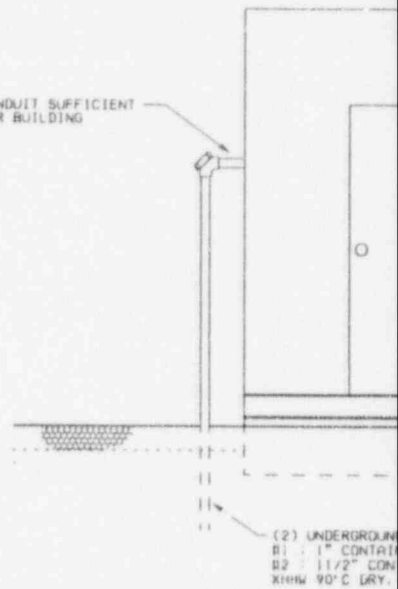
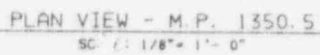
Leak testing/go out to the line and do some actual
measurements; how to check the shutter mechanism
and what to do if you suspect that a source is leaking.

11:30-1:00

Audit of the program with the RSO of the facility

12:00

Closeout

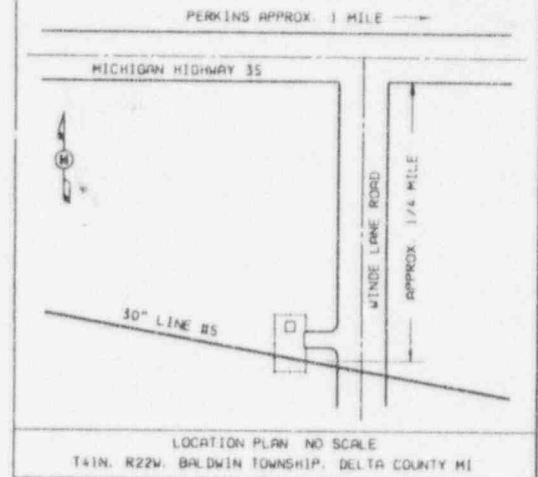


(2) UNDERGROUND
 B1 : 1" CONTAIN
 B2 : 1 1/2" CON
 XHHW 90°C DRY.

ELEV
SCALE: 1

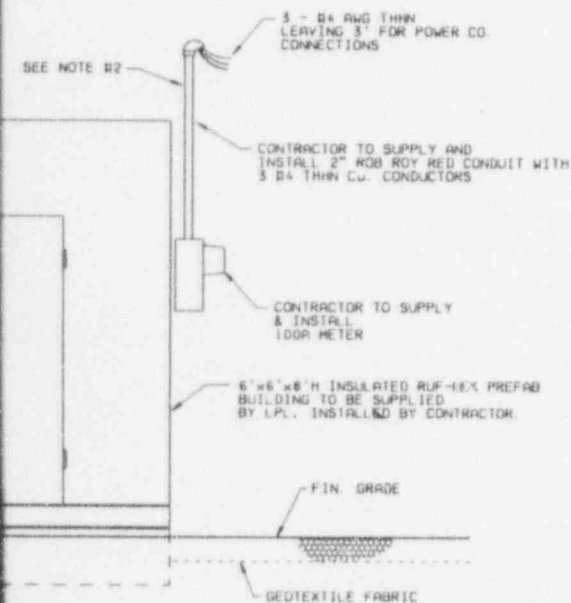
ANSTEC APERTURE CARD

Also Available On
Aperture Card



CONSTRUCTION NOTES

- 1) CONTRACTOR TO SIZE, SUPPLY AND INSTALL CABLE, CONDUIT & FITTINGS BETWEEN METERBASE AND 100 AMP 1-PHASE SERVICE PANEL.
- 2) CONTRACTOR TO INSTALL CONDUIT TO INCOMING SERVICE CONDUCTORS IF OVERHEAD. SERVICE CONDUCTORS BY UTILITY COMPANY.
- 3) CONTRACTOR TO SUPPLY AND INSTALL ALL EQUIPMENT TO MAKE THIS INSTALLATION OPERATIONAL. THIS INCLUDES INSTALLATION OF ALL EQUIPMENT SUPPLIED BY L.P.L. AS MENTIONED IN NOTE #9 AND THE FOLLOWING:
 - * CONSTRUCT 6' x 6' FOUNDATION PAD, 6" THICK WITH WIRE MESH (OR EQUIVALENT) REINFORCEMENT.
 - * SET BUILDING ON FOUNDATION PAD.
 - * MOUNT EQUIPMENT ON BUILDING WALL.
 - * TERMINATE ALL CABLES.
 - * WORK INSIDE THAT IS NOT SHOWN (BUT NOT LIMITED TO) CONSISTS OF SIZING AND INSTALLING CABLE AND ENT CONDUIT. THE CONDUIT FROM OUTSIDE IS TO COME INTO THE CONTROL PANEL.
- 4) CONTRACTOR TO SUPPLY AND INSTALL 2-GROUNDING RODS 10 FT x 5/8 IN DIA. AT LEAST 6' APART. TO BE CONNECTED AT SERVICE ENTRANCE.
- 5) CONTRACTOR TO SUPPLY AND INSTALL 1 - 1" & 1 - 1 1/2" ROD ROD THREADED RIGID CONDUIT FROM SHELTER TO DENSITOMETER PIT.
- 6) CONTRACTOR TO ACQUIRE LOCAL ELECTRICAL INSPECTORS APPROVAL BEFORE POWER IS APPLIED.
- 7) CONTRACTOR TO SUPPLY AND INSTALL A 4" LAYER OF 3/4" CRUSHED ROCK OVER A LAYER OF STRUCTURAL REINFORCEMENT TYPE GEOTEXTILE FABRIC FOR AREA INSIDE FENCE AND EXTENDING 1' OUTSIDE FENCED PERIMETER.
- 8) CONTRACTOR TO SUPPLY AND INSTALL 20' x 35' (APPROX.) FENCED AREA ACCORDING TO L.P.L. STANDARD FENCE DWG. RD-1.02-10245-5-0
- 9) SUPPLIED BY L.P.L.
 - * 6' x 6' RUF-NEK PREFAB BUILDING COMPLETE WITH LIGHTING, HEAT, VENTILATION, RECEPTACLES AND EQUIPMENT SHELF.
 - * PHYSICAL INSTALLATION OF DENSITOMETER UNIT.
 - * PLC CONTROL PANEL SUPPLIED BY L.P.L. WALL MOUNTED AS SHOWN BY CONTRACTOR.

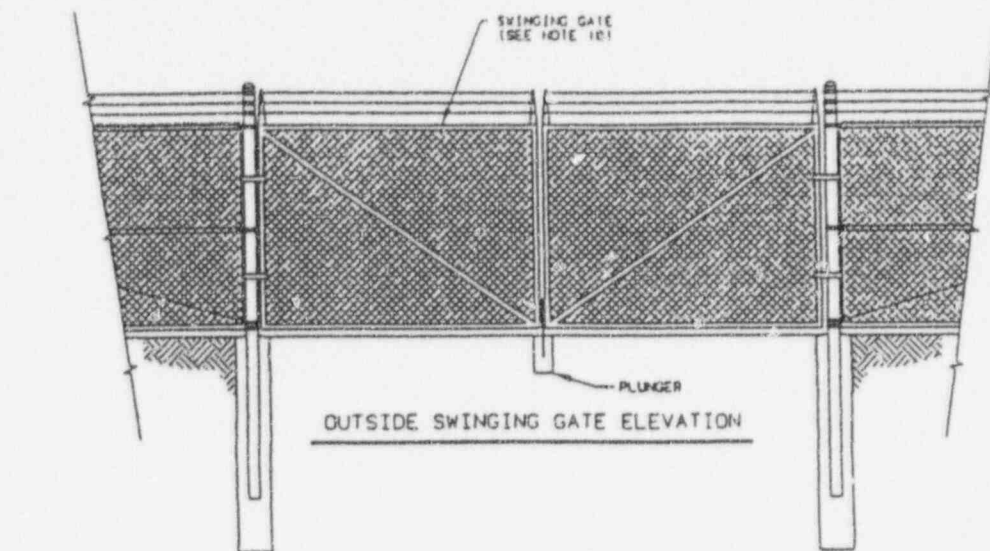


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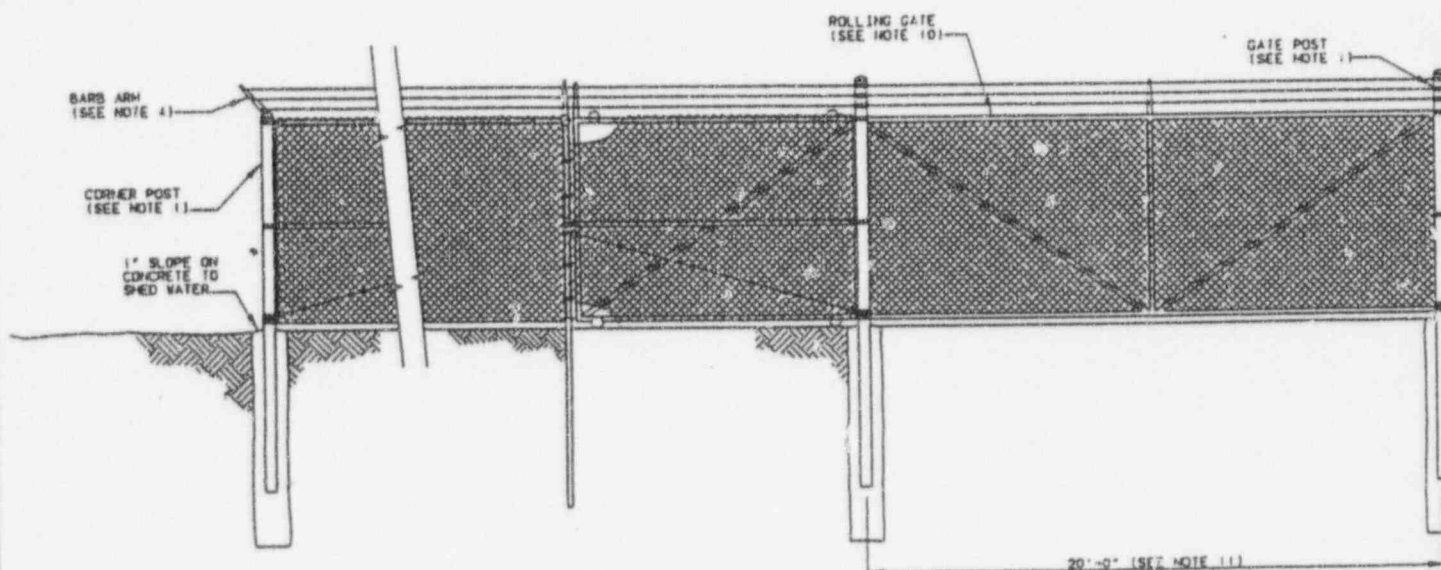
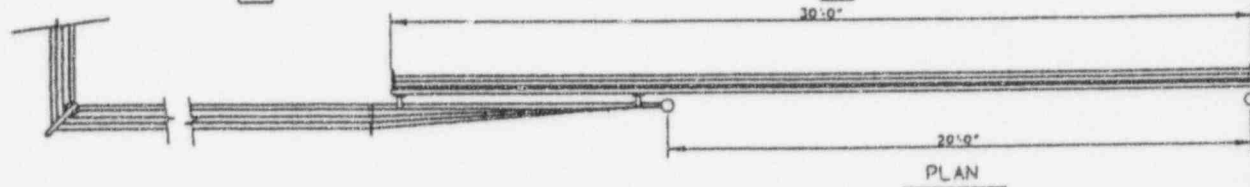
NO	REVISION	BY DATE	APP	DATE
CADD GENERATED DRAWING - DO NOT REVISE MANUALLY				
LAKEHEAD PIPE LINE COMPANY, L.P.				
DULUTH MINNESOTA				
SUPERIOR TO SARNIA				
LINE 5 - M.P. 1350.5 WINDE LANE RD.				
MAIN LINE REMOTE DENSITOMETER				
SITE DETAILS				
PROJECT: AFE 95-3-229 - RAPID RIVER DE-PROPANIZER				
SCALE: AS NOTED	DATE: 7-8-96	DRAWN: KWS		
CHECK:	APP:	DATE:		
APP:	D-5-4.72-XXXXX-0-1??			

CONDUIT - R2000Y RED
AND (1) 7/8" B16 SHIELDED
RAINING (3) 3/4" B12
75°C MET W/PVC OVERALL JACKET

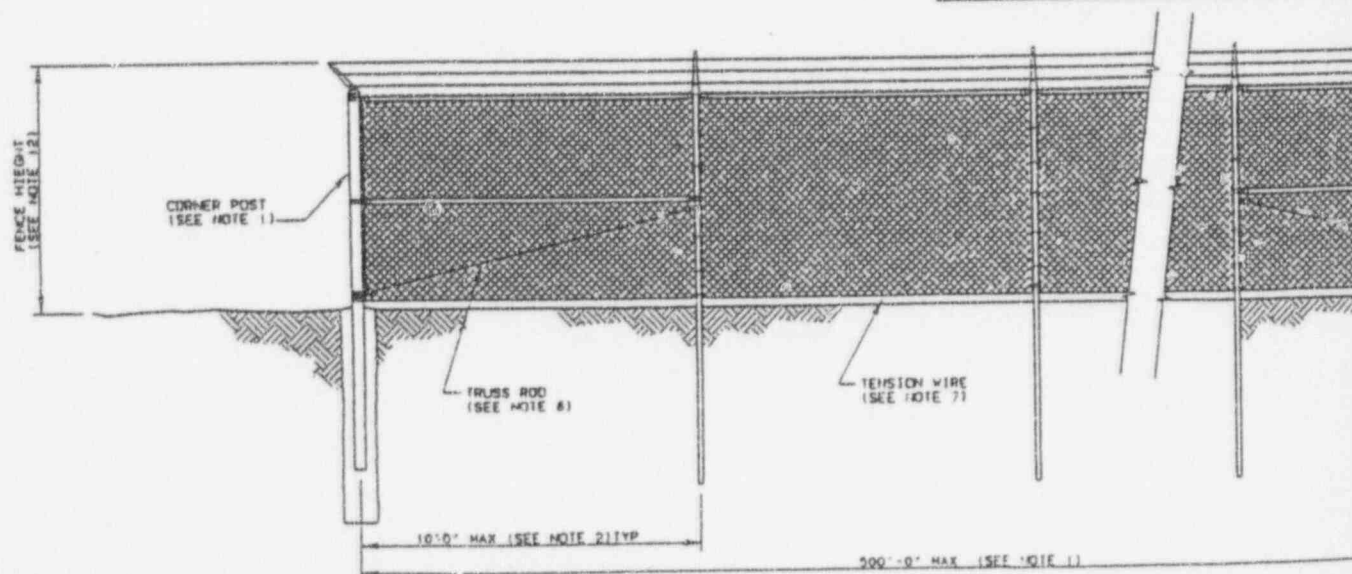
TION
2" x 1" - 0"



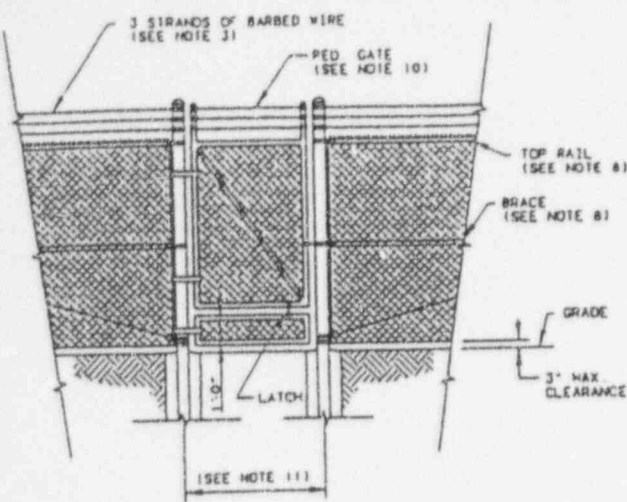
OUTSIDE SWINGING GATE ELEVATION



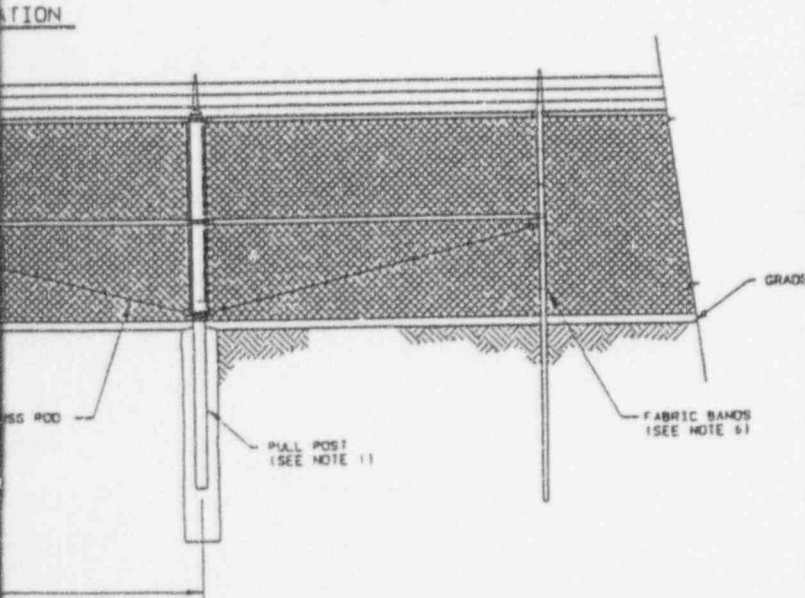
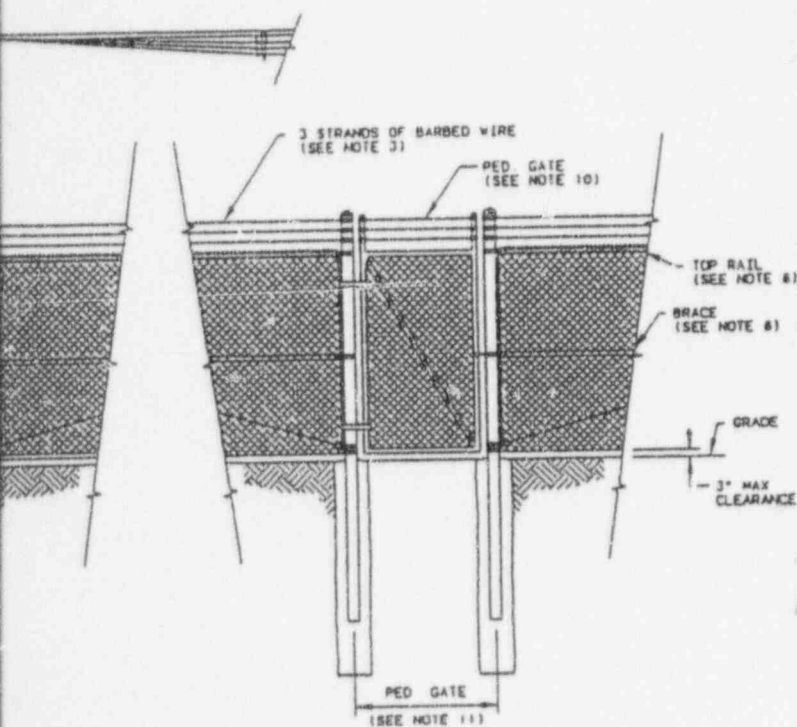
OUTSIDE ROLLING & PED GATE ELEVATION



INSIDE FENCE ELEVATION



PED. GATE
FOR SNOW PROBLEM AREAS



1. POSTS: ALL END CORNER, GATE AND PULL POSTS SHALL BE 3" O.D. 11'-0" LONG GALVANIZED PIPE (SCH 40) AND SHALL CONFORM TO THE LATEST ASTM DESIGNATION. POSTS SHALL BE SET 4'-6" IN A 6" DEEP 12" O.D. CONCRETE FOOTING. PULL POST SPACING SHALL NOT EXCEED 300'.
- GATE POSTS:

WIDTH	PIPE DIA.	PIPE LENGTH
SWINGING GATE LESS THAN 7'	3"	11'-0"
7' TO 13'-0"	4"	11'-0"
13'-0" TO 18'-0"	6"	11'-0"
OVER 18'-0"	8"	11'-0"

 ROLLING GATE POST ALL 4" 11'-0"
2. LINE POSTS: SHALL BE 2.0 OZ. GALVANIZED COATED C-SECTION (1.875" X 1.425", 2.30 #/FT) OR 2 1/2" SCH 40 PIPE (3.45 #/FT.) DRIVE SET - DRIVEN A MINIMUM OF 5' DEEP. CONCRETE SET - CONCRETE SHALL BE 10" DIA. (MIN.) X 3'-4" DEEP.
3. BARBED WIRE: SHALL BE THREE 12 1/2 GAUGE GALVANIZED COATED STRANDED LINE WIRE, BARBS TO BE 14 GAUGE GALVANIZED IN A 4 POINT PATTERN ON 5" CENTERS.
4. BARBED ARMS: GALVANIZED 45° ARMS TO CARRY THREE STRANDS OF BARBED WIRE. TOP WIRE TO BE APPROXIMATELY 12" ABOVE FABRIC AND 12" OUT FROM FENCE LINE.
5. FABRIC: FABRIC SHALL BE 9 GAUGE 1.2 OZ GALVANIZED COATED CHAIN LINK WITH 2" MESH AND SHALL CONFORM TO THE LATEST ASTM DESIGNATION. TOP OF FABRIC BARBED, BOTTOM KNUCKLED.
6. FABRIC BANDS: BANDS SPACED 14" O.C. ON POSTS AND TIE WIRED EVERY 18" MINIMUM O.C. ON TAILS.
7. TENSION WIRE: 7 GAUGE GALVANIZED COATED SECURED WITH HOG RINGS EVERY 18", BOTTOM ONLY.
8. TOP RAIL & BRACES: SHALL BE 2.0 OZ. GALVANIZED COATED C-SECTION (1.425" X 1.25", 1.35 #/FT) OR 1 5/8" SCH 40 PIPE (2.27 #/FT.) BRACE ASSEMBLY INCLUDES A 3/8" TRUSS ROD.
9. FITTINGS: ALL FITTINGS SHALL BE GALVANIZED STEEL PER ASTM A-123 OR A-153 (WHICHEVER IS APPLICABLE). ALL BOLTED FITTINGS TO BE INSTALLED SO AS TO PREVENT TAMPERING FROM OUTSIDE THE FENCED AREA.
10. GATES: GATE FRAMES SHALL BE 2" GALVANIZED PIPE WELDED AT EACH CORNER WITH ADDITIONAL HORIZONTAL & VERTICAL MEMBERS TO INSURE PROPER GATE OPERATION AND FOR ATTACHMENT OF FABRIC. HARDWARE AND ACCESSORIES WELDED JOINTS SHALL BE WIRE BRUSHED CLEAN AND PRIMED WITH A COAT OF ZINC OXIDE. FINISH COAT SHALL BE ALUMINUM PAINT 65% BY WEIGHT OF PURE ALUMINUM FLAKES. THE GATE SHALL HAVE A POSITIVE TYPE LATCHING DEVICE WITH PROVISION FOR PADLOCKING. ROLLING GATES SHALL HAVE SEMI-AUTOMATIC OUTER CATCHES. THE GATE SHALL BE ADEQUATELY SUPPORTED ON ROLLERS WHICH ALLOW FOR NON JAMMING OPERATION. THE PED. GATE SHALL HAVE A 270° SWING. SWINGING GATES SHALL HAVE A CENTER PLUNGER ROD WITH DOUBLE LATCH & HAVE A 270° SWING.
11. GATE WIDTH: ALL VEHICLE GATES TO BE 20'-0" UNLESS OTHERWISE SPECIFIED. IF A ROLLING GATE IS OVER 24'-0" WIDE IT WILL BE A 2 PIECE GATE ROLLING IN OPPOSITE DIRECTIONS. PEDESTRIAN GATES TO BE 4'-0" WIDE UNLESS SPECIFIED.
12. HEIGHT: FENCE TO STAND 7'-0" ABOVE GRADE WHEN ERECTED (INCLUDING BARBED WIRE).
13. ALTERNATIVES: ALTERNATES WILL BE ACCEPTED WITH PRIOR COMPANY APPROVAL.

ANSTEC
APERTURE
CARD
Also Available On
Aperture Card

9610220369-02

ISSUED FOR
APR 19 1994
CONSTRUCTION

5	REVISED AND UPDATED	KMS 5/7/92	RJS	
4	REVISED AND REDRAWN ON CADD	KDE 5/23/91	JAJ	
NO	REVISION	BY DATE	APPR	MICRO DATE
CADD GENERATED DRAWING - DO NOT REVISE MANUALLY				
LAKEHEAD PIPE LINE COMPANY, L.P.				
SUPERIOR			WISCONSIN	
L P L. GENERAL				
STANDARD SECURITY FENCE				
PROJECT: AFE #				
SCALE	SCALE	DATE	5/23/91	DRAWN: KDE
CHECK	JAJ	APPR	JOC	DATE: 7/11/91
APPR	RJS	D-1.02-10245-5-0		
APPR				

June 7, 1996

BSI LOG # 4337 Operator RK

Send to Fax # 715-394-1405

ATTACHMENT #5

1/3

BERTHOLD SYSTEMS, INC.**Process Control Instruments**

Hoopewell Business & Industrial Park
101 Corporation Drive
Alliquippa, Pennsylvania 15001-4863
Telephone: (412) 378-1900
Telefax: (412) 378-1926

Mr. Robert Pollack
Lakehead Pipeline
2811 27th Avenue North
Escanaba, MI 48829

Customer Purchase Order 155-48-3304-96 - Berthold's File Reference 96-321

Subject: Pre-Shipment NRC Licensing Information

Dear Safety Officer:

We wish to inform you that Berthold Systems, Inc. (BSI) has received the above referenced purchase order from Lakehead Pipeline, which requires installation of a radiation device at Escanaba, MI. We require receipt of the attached license return form, completed and signed, prior to shipment.

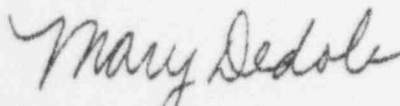
All Berthold Systems, Inc. devices have been safety-registered with the Nuclear Regulatory Commission (NRC) for distribution under a "Specific" or "General" license.

1. If you receive your device under a General License (automatic licensing - no application required), please follow the "Guide for Receipt under General License."
2. If you receive your device under a Specific license, please follow the "Guide for Receipt under Specific License." In this case, BSI must have a copy of your Specific License before shipment of the radioactive source can be made.

Please complete the attached form selecting the type of NRC License your plant will use, and telefax or mail to us.

The guides will be mailed to you separately. Please follow guides to prepare you for receipt of your device(s). Telephone us if you have any questions, toll free at 800 274-9851, or 412/378-7877.

Sincerely,



Mary Dedola
Radiation Safety Officer
Berthold Systems, Inc.

JRD_____

- Enc: I - License Return Form
 II - Guide for Receipt Under General License (with NRC Regulation 10cfr31.5)
 III - Guide for Receipt Under Specific License (please obtain your own personal copy of the "Code of Federal Regulations"). Refer to Section 10cfr20.

cc: File

berthold systems.

Return To:
TeleFax # 412 375-1926
ATTN: Mary Dedola

LICENSE RETURN FORM

Berthold File Reference: 96-321

Customer: Lakehead Pipeline

Purchase Order #: 155-48-3304-96

The following sources will be shipped in it's designated shielding.

Device #1: Quantity: 2

- a) Device name: Clamp-On Density
- b) Device Model #: LB 7400 D/F (series)
- c) NRC Registration #: NR-112-D-102-B
- d) Isotope Type: Cs-137 [X]Point Source
- e) Up To Maximum Activity: 1000 mCi
- f) Source Drawing #: P-2645-100.000 or CDC.93
- g) Leak test frequency: 3 years

SHUTTER TESTS ON EACH SHIELDING REQUIRED EVERY 6 MONTHS TO ENSURE PROPER OPERATION.

NOTE: For Belt Weigher, Micro-Moist and Ash Analyzer devices, access to the primary beam will be prevented by a protective barrier (fence) or by conditions at a particular installation which cause access to the beam highly unlikely.

THIS IS YOUR RESPONSIBILITY; DSI is prepared to offer guidance.

The following License selection must be received by Berthold Systems prior to shipment. PLEASE CHOOSE YOUR OPTION:

Customer request that the gauge(s) be shipped and installed under the following license:

- 1) The General License referred to in Section 31.5 of U.S. Nuclear Regulatory Commission Rules, or The Equivalent Regulations of your Agreement
State _____

OR

- 2) Your Specific License Michigan No. 48-13457-01

NOTE: Please attach a copy of your Specific License showing the Berthold device.

Signature of Radiation Safety Officer/Authorized Person: Boke C Olson

Date: 6-25-96

Enclosure III

Page 1 of 1

Guide for Receipt
under Specific License

This _____ device(s), manufactured in Germany, has been registered with the Nuclear Regulatory Commission (NRC) and has been designated for specific license use only in the United States.

The operation manual (which you will receive with your device) provides a brief statement on radiation protection which we encourage you to read.

We ask that you refer to NRC Regulations 10cfr20, (Please obtain your own copy of the "Code of Federal Regulations"), when statements in this manual referring to the regulation of the Federal Republic of Germany are made.

We ask also that you familiarize yourself with the labels and cautions on this device.

An installation lecture will be provided by Berthold prior to commissioning on Radiation Safety and operational aspects of this device, at your request and expense. You are obliged to provide this lecture as your responsibility as a Specific Licensee.

Startup and device commissioning can also be provided by Berthold Systems, Inc.

A. If you receive under a Specific License:

- 1) Please amend your present license or apply for an original license as soon as possible (the process can take from 2 to 4 months). We can help here, if necessary. BSI must have a copy of your Specific License before shipment of the radioactive source can be made.
- 2) Below are specifications of the Berthold device needed for an amendment or original license (You will have to provide this information to the licensing agency).
- 3) Forward a copy of your original or amended license to Berthold as soon as possible. Berthold is required by regulations to be in possession of your license for examination prior to shipment.
- 4) Please read enclosed "Guide for Receipt Under Specific License."

If you have any questions regarding this guide, call Berthold Systems, Inc., 800 274-9851.

LAKEHEAD PIPE LINE COMPANY
NUCLEAR DENSITOMETER SAFETY AND
OPERATION TRAINING AGENDA

January 17&18, 1995

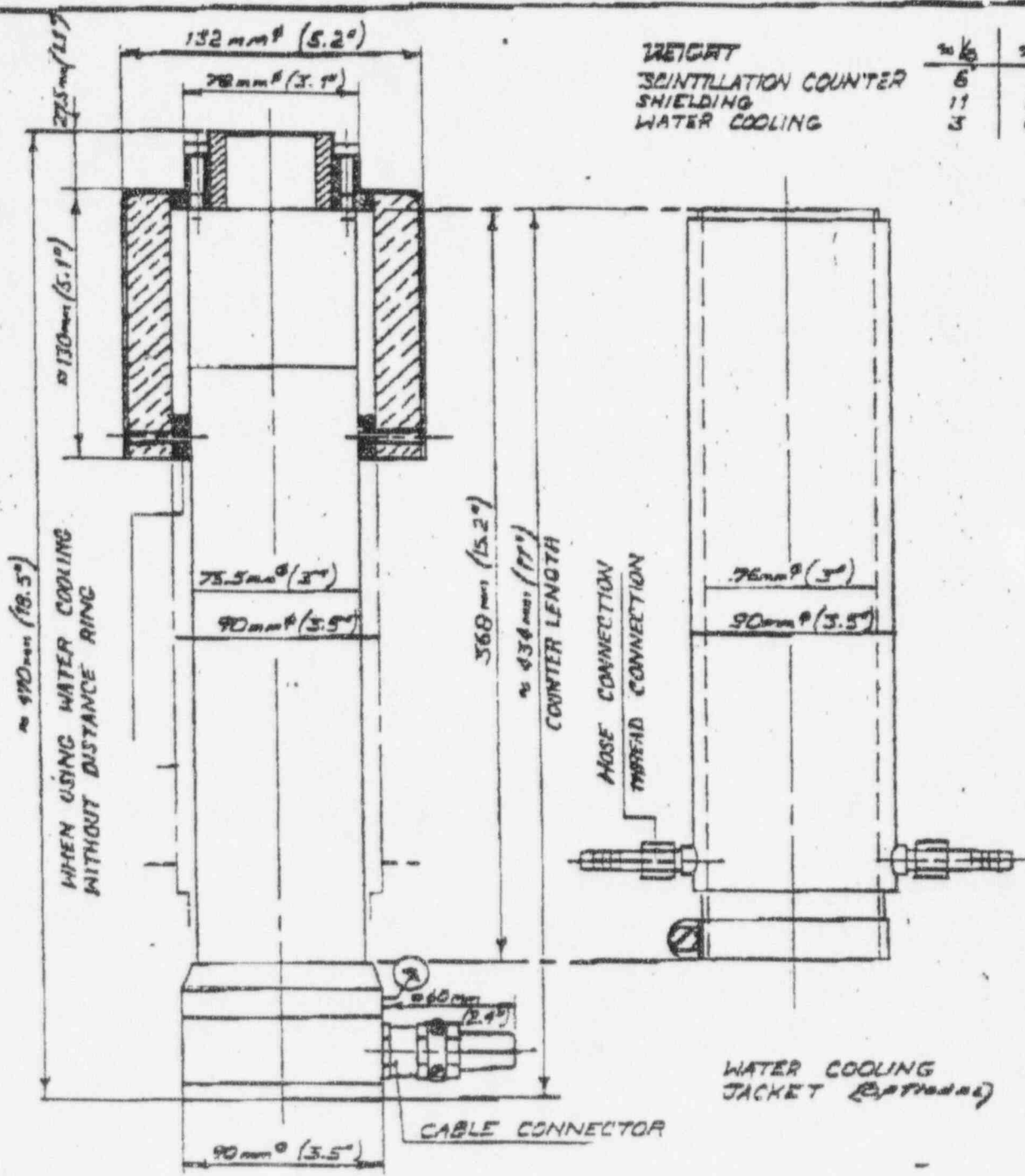
Tuesday January 17 -

Barkers Island Inn

- | | |
|-------------------------|--|
| 8:00 a.m. - 10:00 a.m. | What is Radiation and the Hazards of Radiation Exposure
Radiation dose, dose limits, background [RSP 8.0]
Radiation regulation, the LPL Radiation Safety Plan [RSP 3.0] |
| 10:00 a.m. - 10:20 a.m. | Break |
| 10:20 a.m. - 11:20 a.m. | Radiation survey instrument use and upkeep [RSP 5.0]
Shutter tests [RSP 4.1.5]
Leak tests [RSP 4.1.6] |
| 11:20 a.m. - 12:00 p.m. | Assorted regulations
Transport [RSP 7.0]
Disposal [RSP 9.0]
Emergency Procedures [RSP 10.0]
NRC Posting [RSP 11.0]
Recordkeeping [RSP 12.0]
Annual Audit [RSP 13.0]
Program Calendar [RSP Attachment 6] |
| 12:00 p.m. - 1:00 p.m. | Lunch |
| 1:00 p.m. - 4:00 p.m. | Nuclear Densitometer Operation [RSP 4.1.1 to 4.1.4]
Programming Berthold LB-386-IC
Amplifiers
Troubleshooting |

Wednesday January 18 - Superior Terminal

- | | |
|------------------|---|
| 8:30 a.m. - Noon | Troubleshooting continued
Sampling Procedures and Data Point Entry
Survey Instrument Use
Test Survey |
|------------------|---|

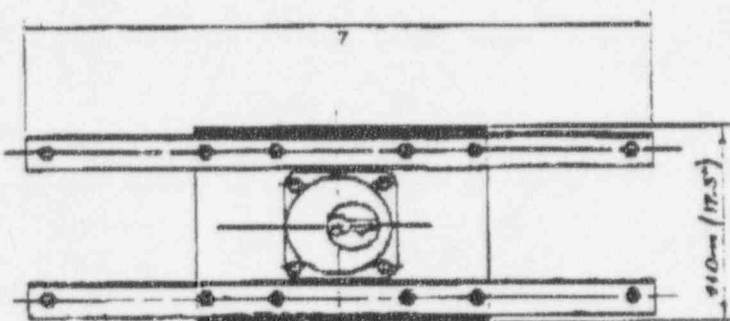
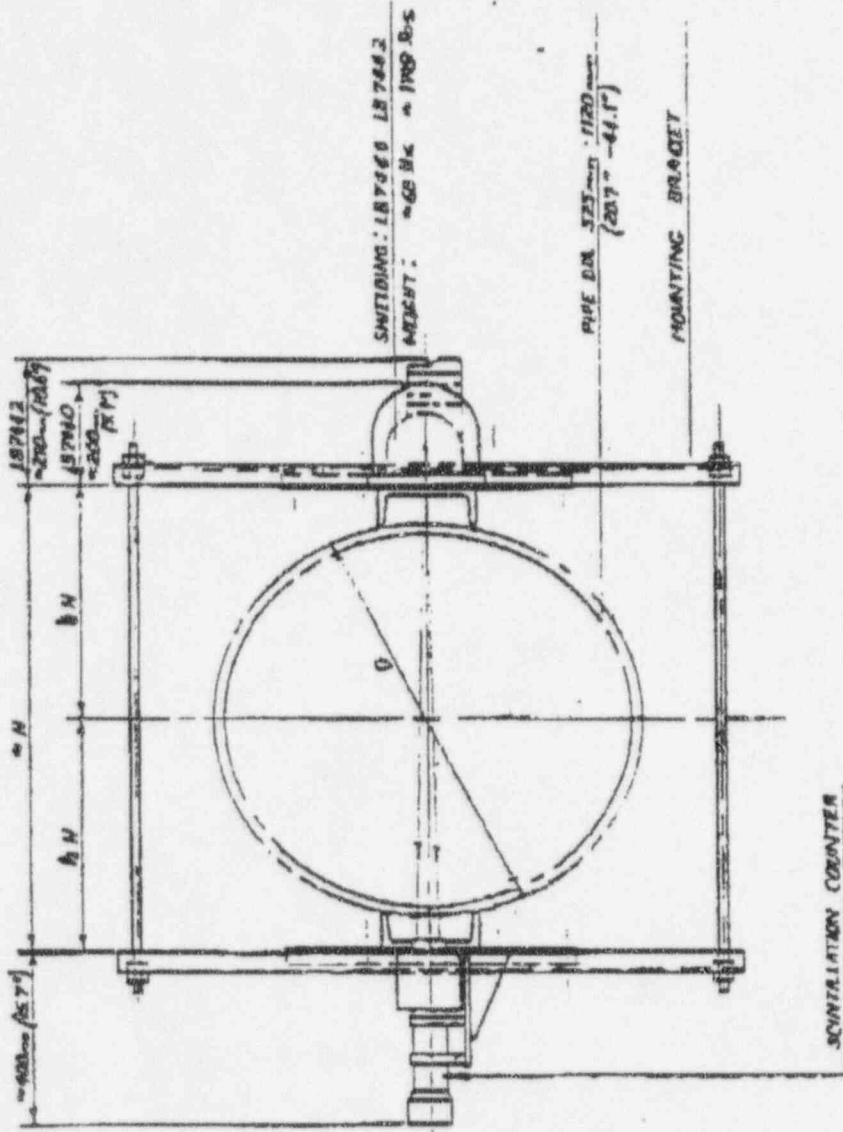


WEIGHT	kg	lb
SCINTILLATION COUNTER	6	13
SHIELDING	11	24
WATER COOLING	3	6.6

Ø = DIAMETER

EXPLOSIONPROOF DESIGN

HOPKINSON BUS. AND IND. PARK PITTSBURGH, PA 15001-4853	BY	DATE	REF
	DRAWN	M.E. N.	10/24/87
	CHECKED	C.R.E.	1/16/87
	APPROVED	RJK	12/1/87
	SAFETY		
DENSITY SCINTILLATION COUNTERS: SZ5-DI-40/35; SZ5-DI-50/60	SCALE	DRAWING No.	
	1:2.5	19191.004	



DATE	BY	REF
1/15/67	W.F.H.	
CHECKED	S.P.E.	
APPROVED	R.J.A.	
SHEET		
SCALE	DRAWING FILE	
1:10	15168	ON

HOPKINS BLDG. 900 2ND. PARK
PITTSBURGH, PA 15201-4863

CLAMPING DEVICE FOR
PIPE DIA 307" - 46.1"

PIPE DIA. (IN)	W	H
323	20.7	60.8
360	22.1	64.0
400	24.0	67.1
450	26.0	71.0
500	28.0	75.0
550	30.0	79.0
600	32.0	83.0
650	34.0	87.0
700	36.0	91.0
750	38.0	95.0
800	40.0	99.0
850	42.0	103.0
900	44.0	107.0
950	46.0	111.0
1000	48.0	115.0
1050	50.0	119.0
1100	52.0	123.0
1150	54.0	127.0
1200	56.0	131.0
1250	58.0	135.0
1300	60.0	139.0
1350	62.0	143.0
1400	64.0	147.0
1450	66.0	151.0
1500	68.0	155.0
1550	70.0	159.0
1600	72.0	163.0
1650	74.0	167.0
1700	76.0	171.0
1750	78.0	175.0
1800	80.0	179.0
1850	82.0	183.0
1900	84.0	187.0
1950	86.0	191.0
2000	88.0	195.0
2050	90.0	199.0
2100	92.0	203.0
2150	94.0	207.0
2200	96.0	211.0
2250	98.0	215.0
2300	100.0	219.0
2350	102.0	223.0
2400	104.0	227.0
2450	106.0	231.0
2500	108.0	235.0
2550	110.0	239.0
2600	112.0	243.0
2650	114.0	247.0
2700	116.0	251.0
2750	118.0	255.0
2800	120.0	259.0
2850	122.0	263.0
2900	124.0	267.0
2950	126.0	271.0
3000	128.0	275.0
3050	130.0	279.0
3100	132.0	283.0
3150	134.0	287.0
3200	136.0	291.0
3250	138.0	295.0
3300	140.0	299.0
3350	142.0	303.0
3400	144.0	307.0
3450	146.0	311.0
3500	148.0	315.0
3550	150.0	319.0
3600	152.0	323.0
3650	154.0	327.0
3700	156.0	331.0
3750	158.0	335.0
3800	160.0	339.0
3850	162.0	343.0
3900	164.0	347.0
3950	166.0	351.0
4000	168.0	355.0
4050	170.0	359.0
4100	172.0	363.0
4150	174.0	367.0
4200	176.0	371.0
4250	178.0	375.0
4300	180.0	379.0
4350	182.0	383.0
4400	184.0	387.0
4450	186.0	391.0
4500	188.0	395.0
4550	190.0	399.0
4600	192.0	403.0
4650	194.0	407.0
4700	196.0	411.0
4750	198.0	415.0
4800	200.0	419.0
4850	202.0	423.0
4900	204.0	427.0
4950	206.0	431.0
5000	208.0	435.0
5050	210.0	439.0
5100	212.0	443.0
5150	214.0	447.0
5200	216.0	451.0
5250	218.0	455.0
5300	220.0	459.0
5350	222.0	463.0
5400	224.0	467.0
5450	226.0	471.0
5500	228.0	475.0
5550	230.0	479.0
5600	232.0	483.0
5650	234.0	487.0
5700	236.0	491.0
5750	238.0	495.0
5800	240.0	499.0
5850	242.0	503.0
5900	244.0	507.0
5950	246.0	511.0
6000	248.0	515.0
6050	250.0	519.0
6100	252.0	523.0
6150	254.0	527.0
6200	256.0	531.0
6250	258.0	535.0
6300	260.0	539.0
6350	262.0	543.0
6400	264.0	547.0
6450	266.0	551.0
6500	268.0	555.0
6550	270.0	559.0
6600	272.0	563.0
6650	274.0	567.0
6700	276.0	571.0
6750	278.0	575.0
6800	280.0	579.0
6850	282.0	583.0
6900	284.0	587.0
6950	286.0	591.0
7000	288.0	595.0
7050	290.0	599.0
7100	292.0	603.0
7150	294.0	607.0
7200	296.0	611.0
7250	298.0	615.0
7300	300.0	619.0
7350	302.0	623.0
7400	304.0	627.0
7450	306.0	631.0
7500	308.0	635.0
7550	310.0	639.0
7600	312.0	643.0
7650	314.0	647.0
7700	316.0	651.0
7750	318.0	655.0
7800	320.0	659.0
7850	322.0	663.0
7900	324.0	667.0
7950	326.0	671.0
8000	328.0	675.0
8050	330.0	679.0
8100	332.0	683.0
8150	334.0	687.0
8200	336.0	691.0
8250	338.0	695.0
8300	340.0	699.0
8350	342.0	703.0
8400	344.0	707.0
8450	346.0	711.0
8500	348.0	715.0
8550	350.0	719.0
8600	352.0	723.0
8650	354.0	727.0
8700	356.0	731.0
8750	358.0	735.0
8800	360.0	739.0
8850	362.0	743.0
8900	364.0	747.0
8950	366.0	751.0
9000	368.0	755.0
9050	370.0	759.0
9100	372.0	763.0
9150	374.0	767.0
9200	376.0	771.0
9250	378.0	775.0
9300	380.0	779.0
9350	382.0	783.0
9400	384.0	787.0
9450	386.0	791.0
9500	388.0	795.0
9550	390.0	799.0
9600	392.0	803.0
9650	394.0	807.0
9700	396.0	811.0
9750	398.0	815.0
9800	400.0	819.0
9850	402.0	823.0
9900	404.0	827.0
9950	406.0	831.0
10000	408.0	835.0



1949, 1950, 1951, 1952, 1953, 1954, 1955, 1956, 1957, 1958, 1959, 1960, 1961, 1962, 1963, 1964, 1965, 1966, 1967, 1968, 1969, 1970, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1979, 1980, 1981, 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 26

LAKEHEAD PIPE LINE COMPANY

**RADIATION
SAFETY
PLAN**

Radiation Safety Officer (RSO) - Robert Pollock
Safety & Compliance Coordinator - Eric Williams

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(219) 922-3133

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RADIATION SAFETY PROGRAM

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1.0 SCOPE AND PURPOSE

This document establishes policies, procedures and responsibilities for the safe use of radiation sources within Lakehead Pipe Line Company. Adherence to the contents of this document will ensure worker safety and compliance with federal and state radiation regulations.

2.0 ASSOCIATED DOCUMENTS

- 2.1 U.S. Code of Federal Regulations (CFR) 10, Parts 19, 20, 31 and 32.
- 2.2 Lakehead Pipe Line NRC Materials Use License (Appendix B) and Associated Submittals.
- 2.3 Yokogawa Model PS6 Sulfur-in-Oil Analyzer Instruction Manual.
- 2.4 Berthold systems Nuclear Density Gauge Operating Manual. Model LB386-1C.
- 2.5 U.S. Nuclear Regulatory Commission booklet - Working Safely with Nuclear Gauges.

3.0 RESPONSIBILITIES - GENERAL

- 3.1 Radiation Safety Officer - Robert Pollock shall be responsible for:
 - 3.1.1 Coordination of leak test wipe tests every 3 years for all users of oil density gauge.
 - 3.1.2 Coordination of semi-annual (every 6 months) shutter test on oil density gauge.
 - 3.1.3 Semi-annual leak test wipe testing of sulfur-in-Oil analyzers.
 - 3.1.4 Calibration of on-site radiation survey equipment and keeping of a calibration log.
 - 3.1.5 Collection and filing of the following completed forms from each site using a nuclear densitometer:
 - Density gauge semi-annual shutter test survey forms
 - Sulfur-in-Oil analyzer wipe test results
 - Radiation dose exposure monitoring results
 - Survey instrument calibration log
 - Post-installation radiation survey and wipe test results
 - Training records including training content and sign-off sheets
 - Shipping and receiving survey forms

- 3.1.6 Distribution, collection and review of Annual Nuclear Density Gauge Audit Survey every December. The RSO will provide a summary of audit results to Safety & Compliance each January.
- 3.2 Authorized Users (see listing Attachment #7) of density detectors shall be responsible for:
 - 3.2.1 Performance of semi-annual device shutter test surveys, and documenting them on the form provided in Attachment 1.
 - 3.2.2 Performance of leak test wipe tests on density gauges every 3 years and submittal of wipe test package to Radiation Safety Officer.
 - 3.2.3 Assuring the security of the source, including assurance that the housing over the detector is locked.
 - 3.2.4 Annual calibration of radiation survey meters kept at a site they supervise and documentation on log sheet.
 - 3.2.5 Posting of warning or caution labels and the NRC3 Form.
 - 3.2.6 Removal/reinstallation of density gauges when necessary to accommodate work on pipeline.
 - 3.2.7 Completion of Annual Nuclear Density Gauge Audit Survey and submittal to RSO each December.
- 3.3 Authorized Installers (see Attachment #7) - shall be responsible for:
 - 3.3.1 Installation of the density detectors in accordance with manufacturers instructions.
 - 3.3.2 Performance of a leak (wipe) test and survey (attachment 1) on newly installed devices.
 - 3.3.3 Filing out proper forms (attachments 3,4) for transportation of nuclear devices.
 - 3.3.4 Removal/reinstallation of density gauges when necessary to accommodate work on pipeline.
- 3.4 District Management - shall be responsible for:
 - 3.4.1 Ensuring that District employees named within this document comply with the policies and procedures contained herein.

- 3.4.2 Ensuring that only Authorized Users and Installers are allowed to work on the density gauge and detector.
- 3.4.3 Filling out proper paperwork for transportation of nuclear devices (if performing transportation).
- 3.5 Lakehead Safety and Compliance Personnel - shall be responsible for:
 - 3.5.1 Coordinating annual refresher training for Authorized Users and Installers.
 - 3.5.2 Evaluating exposure concerns on an as requested basis.
 - 3.5.3 Auditing procedures and records as part of the annual Safety Review.
 - 3.5.4 Payment of annual license fees to the Nuclear Regulatory Commission.
 - 3.5.5 Ensuring company compliance with federal radiation regulations, Lakehead's NRC Materials Use License, and the policies set forth in this document.
 - 3.5.6 Review of proposed license amendments. (Amendments typically prepared by project engineers.)

4.0 RADIATION SOURCES - GENERAL

4.1 Berthold Systems Nuclear Density Gauges

4.1.1 Description

Nuclear density gauges are comprised of two parts: the enclosed nuclear source and the detector. The source is placed directly upon the pipeline with radiation directed through the pipe via a shuttered opening. Radiation is captured on the opposite side of the pipe by a detector that is also attached directly to the pipe.

4.1.2 Locations and Source Size - (see listing Attachment #7)

4.1.3 Security

All gauges are located on Lakehead Pipe Line property. Pump stations are fully enclosed by 7' chain link fence with three strands of barbed wire across the top. In addition, each gauge will be placed within a locked enclosure to protect it from the weather and as a further measure of security.

The only density gauge not within a station is upstream of Lewiston. This gauge will be secured underground in a corrugated metal culvert. The culvert is covered by 1/4" plate steel secured by a 3/8" thick metal locking bar. This site is also surrounded by a security fence with a locking gate.

4.1.4 Labeling and Signage

Radiation sources themselves are labeled by the manufacturer with the radiation symbol and certain information required by federal law. Device use areas are exempt from requirements for radiation warning signs (10 CFR §20.1903) if exposure is below 5 mRem/hr at a distance of 30 cm. (calculated exposure to LPLs' largest source is <1 mRem/hr). In order to alert employees to the presence of radioactive sources, radiation warning signs will be placed inside or outside the entrances to the gauge enclosures.

4.1.5 Semi-Annual Inventory and Shutter Test (on-off) Procedures

Shutter testing will be performed on each density gauge twice a year. Testing will be performed by "Authorized Users" assigned to the site where the device is used. Testing will include surveying the device at a specific location while the shutter is open, and again when it is closed. Survey locations are shown on, and recorded on, the "Shutter Test Survey Form" (Attachment 1). The original survey form is to be kept at the site where the device is located and a copy is to be sent to the Radiation Safety Officer.

Results from this will typically range from 0 to 15 mRem/hr. If survey results exceed 25 mRem/hr contact the RSO to discuss your findings. If high levels are observed verify proper survey instrument operation by using the check source (see section 5.3).

Shutter tests shall be performed each March and September and results submitted to the RSO by the last day of the month.

4.1.6 Leak Testing (Wipe Testing)

Leak wipe tests must be performed upon installation of the device and then every 3 years thereafter. In order to simplify the tracking of this requirement leak testing will be coordinated by the RSO and performed at every densitometer location by Authorized Users in December 1996, 1999, 2002, 2005... Leak test analysis results will be kept on file at the location where the device is used and by the RSO.

Follow the instructions provided in the leak (wipe) test package. Wipe the surfaces shown in figure 1.

Wipe test kits shall be obtained from and analyzed by a radiological laboratory approved by the NRC for this. Leak test results must be kept as long as Lakehead has the source.

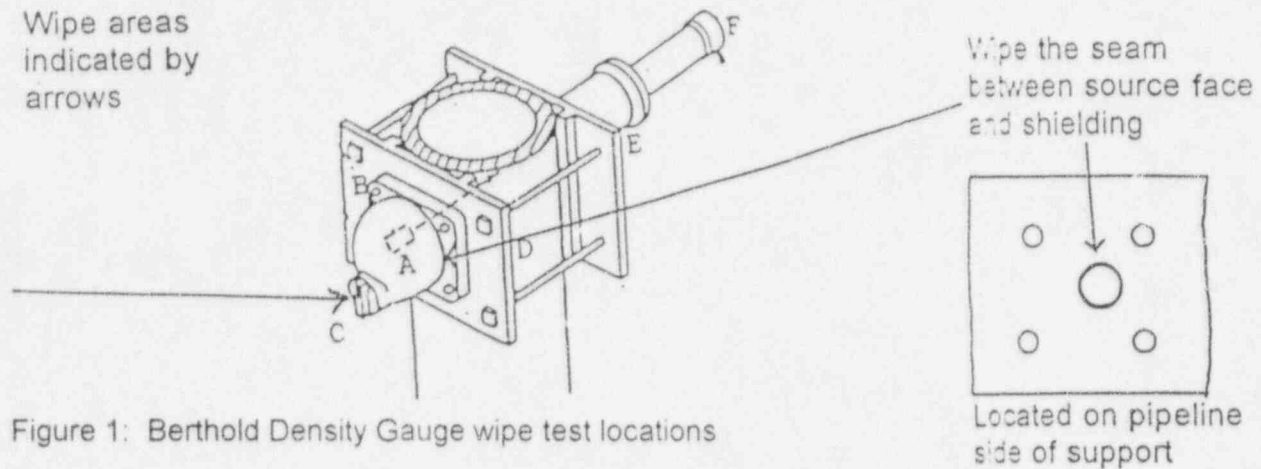


Figure 1: Berthold Density Gauge wipe test locations

4.1.7 Post Installation Radiation Survey

In order to ensure proper device installation and that radiation isn't leaking from the source, the Authorized Installer will perform a radiation survey upon installation of any nuclear device. The Semi-Annual Inventory and Shutter Test Form shall be used to document this survey. (Attachment 1.) A copy of this survey form is to be kept at the device location and a copy is to be sent to the Radiation Safety Officer.

4.1.8 Maintenance and Calibration

Whenever maintenance is to be performed on the detector, electronics or pipe or if the source and shielding is removed, ensure that the shielding is closed and locked in the closed position. Use a radiation survey instrument and follow the procedures in 4.1.9 to ensure that the shutter is properly closed and locked out.

Lakehead employees are not to perform maintenance activities on the source or it's shielding.

4.1.9 Lock Out Procedures

Insert the Nuclear Gauge key into the shutter operating mechanism and turn until the lock cylinder pops up. Next remove the key, and rotate the shutter operating mechanism until the arrow on the knob aligns with the close indication on the body of the nuclear gauge. Once aligned, press the lock cylinder down until latched. Check the operating mechanism to see if the knob turns from the close position. If it does not rotate, then the source is effectively locked out. The authorized user will keep the key in their possession.

4.2 Yokogawa Sulfur-in-Oil Analyzer

4.2.1 Description and Location

The Yokogawa Model PS6 Sulfur-in-Oil analyzer is used to analyze the present sulfur by weight in crude oil. It is only used at the Lakehead Superior, Wisconsin Terminal.

4.2.2 Labeling and Signage

The radiation source itself is labeled by the manufacturer with the radiation symbol and certain information required by law. Due to the low potential for exposure from the device, it is exempt from radiation warning posting requirements (10 CFR §20.1903).

4.2.3 Leak Testing (Wipe Tests)

Leak testing is performed semi-annually by the Radiation Safety Officer. Leak test results will be kept on file by the RSO. Leak tests will be performed using a leak (wipe) test kit provided by an NRC approved radiological lab. Follow the instructions provided in the leak (wipe) test package. Wipe the surfaces shown in figure 2.

4.2.4 Maintenance Safety Procedures

See the instruction manual for safety procedures to use when performing maintenance on the device.

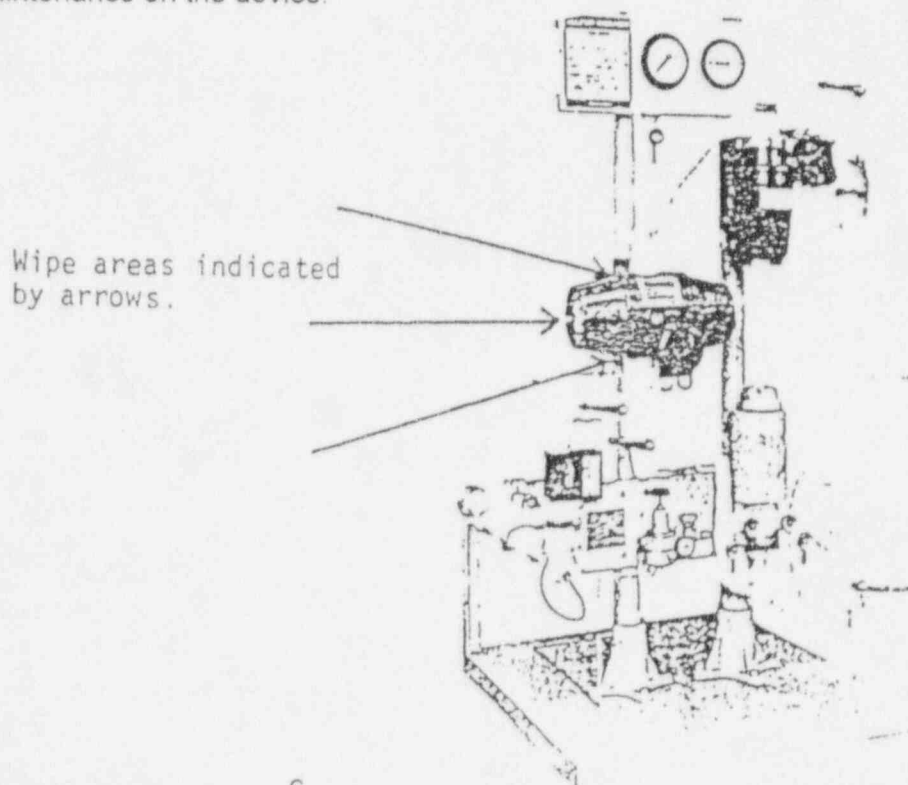


Figure 2. Yokogawa Sulfur-in-Oil Analyzer wipe test locations.

4.3 Princeton Gamma Tech (PGT) Sulfur-in-Oil Analyzer

4.3.1 Description/Permit Status

The above referenced instrument is located in the Superior Terminal lab. The instrument is not included in the Lakehead NRC License since it is covered under a Princeton Gamma Tech NRC General License. Due to its short half-life, the PGT is returned to the manufacturer every 2½ years for a source retrofit. Follow manufacturers instructions on packaging and shipping when doing this.

4.3.2 Labeling and Signage

The radiation source itself is labeled by the manufacturer with the radiation symbol and certain information required by law. Due to the low potential for exposure from the device, it is exempt from radiation warning posting requirements (10 CFR §20.1903).

4.3.3 Leak Testing (Wipe Tests)

Leak testing is performed semi-annually by the RSO. Leak test results will be kept on file using a leak (wipe) test kit provided by PGT. The RSO is responsible for adhering to the semi-annual leak test procedure, PGT doesn't notify Lakehead when the test is due.

5.0 **RADIATION SURVEY INSTRUMENTS**

5.1 Description

The authorized user of a nuclear densitometer will either have their own survey instrument or share it with others in their District. The owner of each survey instrument is required by the NRC to have it calibrated annually.

5.2 Survey Instrument Calibration

Survey instruments shall be calibrated at least annually, with calibration occurring on a two point scale. To arrange calibration, contact:

Bob Kaiser
Engelhardt and Associates, Inc.
2800 S. Fish Hatchery Road
Madison, WI 53711
(608) 274-4227

Records of calibration shall be kept on the log sheet found in Attachment 2.

5.3 Survey Instrument Use

Read the instrument manual to familiarize yourself with its operation. Before completing a survey use the check source to verify proper operation. Check source readings should be taken for a 45 second minimum and should read 0.5 m Rem/hr. (Reminder - with Ludlum instruments use side of probe with holes to take readings, probe shield can be kept closed since this is gamma source).

6.0 TRAINING

6.1 Regulatory requirements

Radiation regulations applicable to Lakehead do not specify training requirements although they do require "...a radiation program commensurate with the scope and extent of licensed activities...".

6.2 Initial Training

The RSO and Authorized Users were provided with 40 hours of radiation safety training in 1993. Authorized Installers were provided 8 hours of training by the device manufacturer in 1993. Training records are kept by the RSO.

6.3 Refresher Training

Lakehead's Safety Department will coordinate annual refresher training for the RSO and Authorized Users. Training records will be kept on file by the RSO.

7.0 TRANSPORTATION OF SOURCES

7.1 Receiving Sources Through the Mail

Packages containing radiation sources shall, upon receipt, be surveyed by the RSO or an Authorized User. Packages shall be surveyed on the surface of each side and 1 meter away. Survey results will be recorded on the Shipping and Receiving Survey Form (Attachment 3). A copy of the completed form will be kept at the location of use, and another copy sent to the RSO.

Packaging Survey results will typically range from 0 to 15 m Rem/hr. Contact the RSO if a reading exceeds 25 m Rem/hr. If high levels are observed verify proper survey instrument operation by using check source.

7.2 Transporting of Sources by Lakehead Personnel

Prior to transporting the source, perform a radiation survey on the package as outlined in the Lakehead Shipping and Receiving Survey Form (Attachment 3). Whenever the source is in transit, the driver must carry a hazardous materials shipping paper. Use a copy of the shipping paper in Attachment 4 for this purpose. Complete the form according to instructions on the bottom of the form. While in transit, keep the radiation source package as far from the driver as possible: in the truck bed or car truck. Secure the package so it doesn't move during transit.

Upon delivery of the package to designated site, perform another Shipping and Receiving Survey (Attachment 3) on the package.

7.3 Offering Radiation Sources for Transport by Non-Lakehead Personnel

Additional regulations apply when offering hazardous materials for transport to a for hire transporter.

Under such circumstances, contact Safety, Environment & Compliance for information on proper package and shipping paper preparation.

8.0 RADIATION EXPOSURE MONITORING AND DOSE CALCULATION

8.1 Exposure Monitoring

Radiation exposures from devices used by Lakehead are low enough that federal regulations do not require an exposure monitoring program.

8.2 Dose Calculations

If necessary, the following equations can be used to calculate dose at a given distance from the source.

$$1. \quad \text{Rate (mRem/hr)} = \frac{(0.35A)}{(d^2)(s)}$$

when A = activity in mCi
d = distance from source in meters
s = 760 for Berthold shielding model 7440
11,000 for Berthold shielding model 7442

$$2. \quad \text{Dose (mRem)} = (\text{Dose Rate}) (\text{Time of Dose in Hours})$$

If the source is several years old, its strength will be diminished. Half of the strength will be gone in 30 years (the half life). If that is the case, the Activity (A) used in equation 1 can be calculated using

$$3. \quad \text{Source Strength } A = (A_0) \frac{(e^{(-0.693)(T)})}{(30)}$$

where A_0 = the activity of the source (in mCi) when it was new
 T = age of source in years

Finally, if the dose intensity is known at one distance, the level at any other distance can be calculated using

$$4. \quad \text{Inverse Square Law } I, r^2 = I_2 r_2^2$$

where r = distance from the source in meters
 I = intensity in mRem

8.3 Doses and Dose Limits

Naturally occurring sources of external (e.g. cosmic rays, rocks and minerals, radon gas) and internal (radioactive atoms in our body, bones, tissue...) radiation account for an average annual exposure of 500 mRem/yr per person. We are also exposed to an average of 100 mRem/yr of man-made radiation from the following sources:

- Medical X-rays - 90 mRem/yr
- Consumer products (e.g TV, smoke detectors, airport X-rays, etc...) - 5 mRem/yr
- Nuclear weapons fallout - 5 mRem/yr
- 6,000 mile jet flight - 5 mRem (cosmic rays)
- Nuclear power plant operation - 0.3 mRem/yr

When considering all of the various sources of "background radiation" the average human is exposed to about 600 mRem/yr.

The occupational exposure limit for a person working with radiation is 5 Rem (5,000 mRem) per year. According to the NRC, the average occupational exposure for a person working with nuclear gauges is about 100 mRem/yr, well below the occupational limit. This average exposure is well below exposure limits due to the use of weak radiation sources and the lead shielding provided for the device.

9.0 DISPOSAL

Extensive federal regulations exist for the proper disposal of a nuclear radiation source. If disposal of such a source is necessary, contact LPL, Environment Department for assistance.

10.0 EMERGENCY PROCEDURES

In the event of an accident (fire or explosion) or any condition which may lead to questionable integrity of the radiation device, the following procedures must be followed.

1. Cease all activity in the immediate area, notify the RSO and District Management. Clear all personnel within 20 feet of the immediate area.
2. The RSO or other qualified individual (including Authorized Users) will assess the situation by measuring the radiation level in the area, with a survey instrument.
3. If radiation appears to be leaking, then the immediate area (20 feet in diameter) must be secured and marked off to prevent any access to the area.
4. A qualified handling and disposal company will be contacted for clean-up and disposal of contaminated devices.
5. Berthold Systems, Inc. (manufacturer of source) must be notified of any incident involving a density detector, 1-800-274-9851 or 412-378-1900.
6. If a radiation leak is detected, it must be reported to the NRC by the Radiation Safety Officer.

11.0 NRC REQUIRED POSTING

The NRC3 form (Appendix D) must be posted at every location where a radiation source is used. The form should be located where it is easily viewed by employees at the site (similar to the OSHA form).

12.0 RECORDKEEPING

Documentation of leak testing, shutter tests, post installation tests etc..., will be kept both at the site where the source is located and with the RSO. A suggested filing system for the RSO is included in Appendix C.

Records will be kept for as long as the device is present on the site, and for 3 years after it is removed.

13.0 ANNUAL AUDIT SURVEY

NRC regulations require Lakehead to annually review the content and implementation of this plan. In order to fulfill this requirement, the RSO will send out an annual audit survey form (Attachment 6) to each site using Nuclear Density Gauges (Attachment 5) in December of each year. Responsible personnel will complete and return the form by December 31 of each year. The RSO will compile the results of the audit survey each January and submit them to Safety & Compliance.

RADIATION TERMS

Excerpts from

"Nuclear Terms, A Brief Glossary"

absorbed dose	When IONIZING RADIATION passes through MATTER, some of its energy is imparted to the matter. The amount absorbed per unit mass of irradiated material is called the absorbed dose, and is measured in rems and rads.
absorber	Any material that absorbs or diminished the intensity of ionizing RADIATION. Neutron absorbers, like boron, hafnium, and cadmium, are used in control rods for reactors. Concrete and steel absorb gamma rays and neutrons in reactor shields. A thin sheet of paper or metal will absorb or attenuate alpha particles and all except the most energetic beta particles.
atom	A particle of matter indivisible by chemical means. It is the fundamental building block of the chemical elements. The elements, such as iron, lead, and sulfur, differ from each other because they contain different kinds of atom. There are about six sextillion (6 followed by 21 zeros, or 6×10^{21}) atoms in an ordinary drop of water. According to present-day theory, an atom contains a dense inner core (the nucleus) and a much less dense outer domain consisting of electrons in motion around the nucleus. Atoms are electrically neutral.
atomic number	(Symbol Z) The number of protons in the nucleus of an atom, and also its positive charge. Each chemical element has its characteristic atomic number, and the atomic numbers of the known elements form a complete series from 1 (hydrogen) to 103 (lawrencium).
atomic weight	The mass of an atom relative to other atoms. The present-day basis of the scale of atomic weights is carbon; the commonest isotope of this element has arbitrarily been assigned an atomic weight of 12. The unit of the scale is 1/12 the weight of the carbon-12 atom, or roughly the mass of one proton or one neutron. The atomic weight of any element is approximately equal to the total number of protons and neutrons in its nucleus.

background radiation	The radiation in man's natural environment, including cosmic rays and radiation from the naturally radioactive elements, both outside and inside the bodies of men and animals. It is also called natural radiation. The term may also mean radiation that is unrelated to a specific experiment.
biological shield	A mass of absorbing material placed around a reactor or radioactive source to reduce the radiation to a level that is safe for human beings.
collimator	A device for focusing or confining a beam of particles or radiation, such as X-rays.
curie	(Symbol Ci) The basic unit to describe the intensity of radioactivity in a sample of material. The curie is equal to 37 billion disintegrations per second, which is approximately the rate of decay of 1 gram of radium. A curie is also a quantity of any nuclide having 1 curie of radioactivity. Named for Marie and Pierre Curie, who discovered radium in 1898.
detector	Material or a device that is sensitive to radiation and can produce a response signal suitable for measurement or analysis. A radiation detection instrument.
dose rate	The radiation dose delivered per unit time and measured, for instance, in rems per hour.
dosimeter	A device that measures radiation dose, such as a film badge or ionization chamber.
electromagnetic radiation	Radiation consisting of associated and interacting electric and magnetic waves that travel at the speed of light. Examples: light, radio waves, gamma rays, X-rays. All can be transmitted through a vacuum.
electron	(Symbol e^-) An elementary particle with a unit negative electrical charge and a mass $1/1837$ that of the proton. Electrons surround the positively charged nucleus and determine the chemical properties of the atom. Positive electrons, or positrons, also exist.
element	One of the 103 known chemical substances that cannot be divided into simpler substances by chemical means. A substance whose atoms all have the same atomic number. Examples: hydrogen, lead, uranium. (Not to be confused with fuel element.)

film badge	A light-tight package of photographic film worn like a badge by workers in nuclear industry or research, used to measure possible exposure to IONIZING RADIATION. The absorbed dose can be calculated by the degree of film darkening caused by the irradiation.
gamma rays	(Symbol γ) High-energy, short wavelength electromagnetic radiation. Gamma radiation frequently accompanies alpha and beta emissions and always accompanies fission. Gamma rays are very penetrating and are best stopped or shielded against by dense materials, such as lead or depleted uranium. Gamma rays are essentially similar to X-rays, but are usually more energetic, and are nuclear in origin.
gauging	The measurement of the thickness, density or quantity of material by the amount of radiation it absorbs. This is the most common use of radioactive isotopes in industry. Also spelled gaging.
half-life	The time in which half the atoms of a particular radioactive substance disintegrate to another nuclear form. Measured half-lives vary from millionths of a second to billions of years.
isotope	One of two or more atoms with the same ATOMIC NUMBER (the same chemical element) but with different ATOMIC WEIGHTS. An equivalent statement is that the nuclei of isotopes have the same number of protons but different numbers of neutrons. Thus, ^{12}C , ^{13}C , and ^{14}C are isotopes of the element carbon, the symbols denoting their common ATOMIC NUMBERS, the superscripts denoting the differing MASS NUMBERS, or approximate atomic weights. Isotopes usually have very nearly the same chemical properties, but somewhat different physical properties.
neutron	(Symbol n) An uncharged ELEMENTARY PARTICLE with a mass slightly greater than that of the PROTON, and found in the NUCLEUS of every atom heavier than hydrogen. A free neutron is unstable and decays with a half-life of about 13 minutes into an electron, proton, and neutrino. Neutrons sustain the fission CHAIN REACTION in a NUCLEAR REACTOR.
radiation source	Usually a man-made, sealed source of RADIOACTIVITY used in a teletherapy, radiography, as a power source for batteries, or in various types of industrial gauges. Machines such as accelerators, and radioisotopic generators and natural radionuclides may also be considered as sources.

radioisotope

A radioactive isotope. An unstable isotope of an element that decays or disintegrates spontaneously, emitting radiation. More than 1300 natural and artificial radioisotopes have been identified.

rem

(Acronym for Roentgen Equivalent Man.) The unit of dose of any ionizing radiation which produces the same biological effect as a unit of ABSORBED DOSE of X-rays. The equivalent dose (in REMS) = QF x absorbed dose (in RADS).

roentgen

(Abbreviation R) A unit of exposure to IONIZING RADIATION. It is that amount of gamma or X rays required to produce ions carrying 1 electrostatic unit of electrical charge (either positive or negative) in 1 cubic centimeter of dry air under standard conditions. Named after Wilhelm Roentgen, German scientist who discovered X-rays in 1895.

MATERIALS LICENSE

Amendment No. 21

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 36, 39, 40, and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations, and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee	In accordance with application dated January 4, 1995
1. Lakehead Pipe Line Company, Inc.	3. License Number 48-13457-01 is amended in its entirety to read as follows:
2. 119 N. 25th St. E. P.O. Box 789 Superior, WI 54880-0789	4. Expiration Date July 31, 1995
	5. Docket or Reference No. 030-06781

6. Byproduct, Source, and/or Special Nuclear Material	7. Chemical and/or Physical Form	8. Maximum Amount that Licensee May Possess at Any One Time Under This License
A. Cesium-137	A. Sealed source (Berthold P-2623-100)	A. Twelve sources not to exceed 350 millicuries each
B. Cesium-137	B. Sealed source (Berthold P-2645-100-000)	B. Four sources not to exceed 2000 millicuries each
C. Americium-241	C. Sealed source (Amersham/Searle Model AMC 17)	C. One source not to exceed 550 millicuries
D. Cesium-137	D. Sealed source (Berthold P-2623- 100)	D. One source not to exceed 350 millicuries

9. Authorized Use:

- A. or B. To be used in Berthold Model No. LB 7400 D/L density/level gauge.
- C. To be used in Yokogawa Model PS6 Sulfur-In-Oil Analyzer to measure the percent of sulfur by weight in crude oil.
- D. To be used in Berthold Model LB 7400 D/F series density gauge for measurement of density of material flow through a pipeline.

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License Number

48-13457-01

Docket or Reference Number

030-06781

Amendment No. 21

CONDITIONS

10. A. Licensed materials listed in item 6.A. and 6.B. shall be used only at the licensee's facilities located as follows:
- | | |
|--|------------------------------------|
| Saxon Station, Saxon, Wisconsin | Plummer Station, Plummer, MN |
| Iron River Station, Iron River, Michigan | Clearbrook Station, Clearbrook, MN |
| Gould City Station, Gould City, Michigan | Deer River Station, Deer River, MN |
| North Straits, North Straits of Mackinac, MI | Superior Terminal, Superior, WI |
| Lewiston Station, Lewiston, Michigan | |
| Bay City Station, Bay City, Michigan | |
- B. Licensed material listed in items 6.C. and 6.D. shall be used only at the licensee's facilities located at 2800 East 21st Street, Superior, Wisconsin.
11. A. Licensed materials listed in item 6.A. and 6.B. shall be used by, or under the supervision of, Robert F. Pollock, Mike Burnis, Kurt Castle, Dennis DeYoung, Lewis Gotham, Gary Haubrich, Gene LaDouceur, Harvey Miles, Larry Nolan, Joe Shafer, Jerry Snobeck, Thomas Smith, Rich Szeplakay, John Sobojski, or Mark Gerlach.
- B. Licensed material listed in items 6.C. and 6.D. shall be used by, or under the supervision of, Robert F. Pollock, Joel A. Korhonen, Dave P. Friberg or Mark Gerlach.
- C. Radiation Safety Officer: Robert F. Pollock.
12. A. Sealed sources and detector cells shall be tested for leakage and/or contamination at intervals not to exceed 6 months or at such other intervals as specified by the certificate of registration referred to in 10 CFR 32.210.
- B. Notwithstanding Paragraph A of this Condition, sealed sources designed to emit alpha particles shall be tested for leakage and/or contamination at intervals not to exceed 3 months.
- C. In the absence of a certificate from a transferor indicating that a leak test has been made within 6 months prior to the transfer, a sealed source or detector cell received from another person shall not be put into use until tested.
- D. Sealed sources need not be leak tested if:
- (i) they contain only hydrogen-3; or
 - (ii) they contain only a radioactive gas; or

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License Number

48-13457-01

Docket or Reference Number

030-06781

Amendment No. 21

- (iii) the half-life of the isotope is 30 days or less; or
- (iv) they contain not more than 100 microcuries of beta and/or gamma emitting material or not more than 10 microcuries of alpha emitting material; or
- (v) they are not designed to emit alpha particles, are in storage, and are not being used. However, when they are removed from storage for use or transferred to another person, and have not been tested within the required leak test interval, they shall be tested before use or transfer. No sealed source or detector cell shall be stored for a period of more than 10 years without being tested for leakage and/or contamination.

E. The leak test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample. If the test reveals the presence of 0.005 microcurie or more of removable contamination, a report shall be filed with the U.S. Nuclear Regulatory Commission in accordance with 10 CFR 30.50(b)(2), and the source shall be removed immediately from service and decontaminated, repaired, or disposed of in accordance with Commission regulations. The report shall be filed within 5 days of the date the leak test result is known with the U.S. Nuclear Regulatory Commission, Region III, ATTN: Chief, Nuclear Materials Safety Branch, 801 Warrenville Road, Lisle, Illinois 60532-4351. The report shall specify the source involved, the test results, and corrective action taken.

F. The licensee is authorized to collect leak test samples for analysis by persons specifically licensed by the Commission or an Agreement State to perform such services.

- 13. Sealed sources containing licensed material shall not be opened or removed from their respective source holders by the licensee.
- 14. Installation, initial radiation survey, relocation, or removal from service of devices containing sealed sources shall be performed by John Sobojski or by persons specifically licensed by the Commission or an Agreement State to perform such services. Maintenance and repair of devices and installation, replacement, and disposal of sealed sources shall be performed only by persons specifically licensed by the Commission or an Agreement State to perform such services.
- 15. Prior to initial use and after installation, relocation, dismantling, alignment, or any other activity involving the source or removal of the shielding, the licensee shall assure that a radiological survey is performed to determine radiation levels in accessible areas around, above and below the gauge with the shutter open. This survey shall be performed only by persons authorized to perform such services by the Commission or an Agreement State.

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License Number

48-13457-01

Docket or Reference Number

030-06781

Amendment No. 21

16. The licensee shall assure that the shutter mechanism is locked in the closed position during periods when a portion of an individual's body may be subject to the direct radiation beam. The licensee shall review and modify as appropriate its "lock-out" procedures whenever a new gauge is obtained to incorporate the device manufacturer's recommendations.
17. Each gauge shall be tested for the proper operation of the on-off mechanism and indicator, if any, at no longer than 6-month intervals or at such longer intervals as specified by the manufacturer and approved by NRC.
18. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents, including any enclosures, listed below. The U.S. Nuclear Regulatory Commission's regulations shall govern unless the statements, representations, and procedures in the licensee's application and correspondence are more restrictive than the regulations.
- A. Letters dated August 27, 1993, October 26, 1993 and June 30, 1994; and
- B. Application dated January 4, 1995 with attachments.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

Date April 12, 1995By Patricia M. Vachulson
Materials Licensing Section, Region III

APPENDIX C

RADIATION RECORDKEEPING - RSO

Written Radiation Safety Program

NRC Materials Use License (and associated submittals)

Test Records (individual folders for each location) - Superior Terminal RSO

- Semi-Annual Shutter Test Results (Berthold)

- Wipe Test Results - Yokogawa

- Wipe Test Results - Berthold

- Wipe Test Results - PGT

- Post Installation Device Survey Results

- Transport Package Survey Results

- Service and Installation Site Report

- Annual Audit Survey

Survey Instrument Calibration Log - Site of Instrument Use
Calibration Certification

Training

Initial

- Course Outline
- Book/Materials
- Personnel Job Description
- Training Sign-Off Sheet

Refresher

- Course Outline
- Books/Materials
- Training Sign-Off Sheets

Yokogawa Sulfur-in-Oil Analyzer Instruction Manual

Berthold Density Gauge Instruction Manual

HOW AM I PROTECTED FROM DISCRIMINATION?

If you believe that you have been discriminated against for bringing violations or safety concerns to the NRC or your employer, you may file a complaint with the U.S. Department of Labor pursuant to Section 711 of the Energy Reorganization Act of 1974 (42 U.S.C. 5855). Your complaint must describe the living or discrimination and must be filed within 180 days of the occurrence.

Send complaints to

Office of the Administrator
Wage and Hour Division, Room 5350
Employment Standards Administration
U.S. Department of Labor
200 Constitution Avenue, NW
Washington, DC 20210

or any local office of the Department of Labor, Wage and Hour Division.
Check your telephone directory under U.S. Government listings.

WHAT CAN THE DEPARTMENT OF LABOR DO?

The Department of Labor will notify the employer that a complaint has been filed and will investigate the case.

If the Department of Labor finds that your employer has unlawfully discriminated against you, it may order that you be reinstated, receive back pay, or be compensated for any injury suffered as a result of the discrimination.

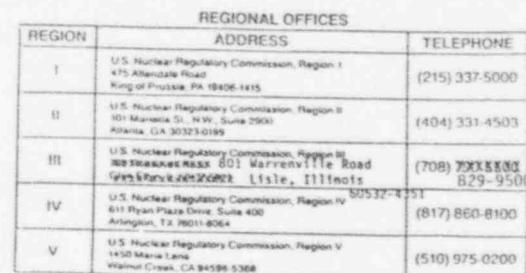
WHAT WILL THE NRC DO?

It is unlawful for an employer to fire you or discriminate against you with respect to pay, benefits, or working conditions because you help the NRC or raise a safety issue, or otherwise discourage you from engaging in protected activities.

The NRC may assist the Department of Labor in its investigation. NRC may conduct its own investigation where necessary to determine whether unlawful discrimination has occurred.

Also if the NRC or Department of Labor finds that unlawful discrimination has occurred, the NRC may issue a Notice of Violation to your employer, impose a fine, or suspend, modify, or revoke your employer's NRC license.

A representative of the Nuclear Regulatory Commission can be contacted at the following addresses and telephone numbers. The Regional office will accept collect telephone calls from employees who wish to register complaints or concerns about radiological working conditions or other matters regarding compliance with Commission rules and regulations.



To report incidents involving fraud, waste, or abuse by an NRC employee or NRC contractor.

telephone

OFFICE OF THE
INSPECTOR GENERAL

HOTLINE

1-800-233-3497

LAKEHEAD PIPE LINE COMPANY

Post Installation and Semi-Annual Shutter Test Survey Form Berthold Nuclear Density Gauge

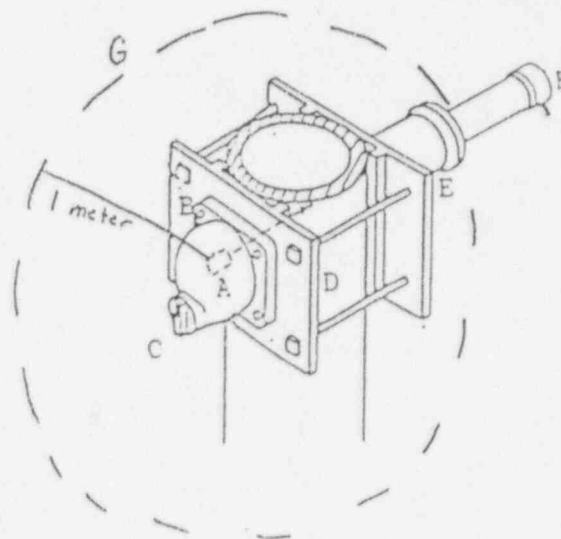
Instructions: For Post Installation Survey - complete entire form (sections 1&2).

For Semi-Annual Shutter Test Survey - complete Section 1 and Section 2 location D.

Sign and distribute copies to appropriate locations.

Section 1	
Location:	Date:
Is source still present at site ? yes / no	Isotope: Cs-137
Activity in mCi (circle one) 100 150 250 350 500 1,000 2,000	Source serial # (see ID tag)
Caution radiation label on shielding ? yes / no	Metal ID tag on shielding ? yes / no
Survey meter type/ serial # /last calibration date / /	Probe type / serial # / last calibration date / /
Does the shutter open and close smoothly ? yes / no	

Section 2		
Location Points	Measurements mR/Hr	
	Shutter Open	Shutter Closed
A		
B		
C		
D		
E		
F		
G (highest reading 1 meter from source)		
Station Gate		



Signature _____

4/96

Copies: one on-site, one to RSO in Superior

LAKEHEAD PIPE LINE COMPANY

Radiation Survey Meter Annual Calibration Log

Meter Type and Model #:

Meter Serial #:

Meter Location:

Personnel Responsible for Calibration:

Calibration Date

Calibration Lab Name

Comments

Keep at site where survey instrument is kept.

LAKEHEAD PIPE LINE COMPANY
Shipping and Receiving Survey Form
Berthold Systems Nuclear Density Detector

Location: _____ Date: _____

SOURCE INFORMATION

Isotope: Cs - 137 Activity in mCi: 150 250 350 500 1,000 2,000
Serial # of Source: (circle one)
Barill TI: mRem (see radiation warning label)

SHIPPING (only)

1. Ensure following labels on package:
 - DOT Yellow Radiation II (on 2 sides) Y/N
 - Not on passenger airline (orange) Y/N
 - DOT shipping number Y/N
2. Complete radiation survey below

RECEIVING (only)

1. Complete radiation survey below.

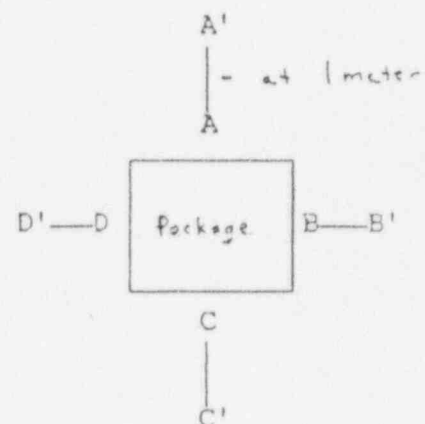
RADIATION SURVEY

SURVEY METER TYPE & SN:

LAST CALIBRATION:

LOCATION POINTS	MEASUREMENTS mR/Hr
A	
B	
C	
D	
E	
F	
A'	
B'	
1 meter } C'	
D'	
E'	
F'	

TOP = E & E'
BOTTOM = F & F'



Signature of Person Completing Survey _____

Copies: 1 at site source is located, 1 to RSO in Superior

STRAIGHT BILL OF LADING

ORIGINAL - NOT NEGOTIABLE

Shipper's No.

Carrier's No.

Nº

0008

Date

CARRIER: LAKEHEAD PIPE LINE CO

SCAC

TO:
Consignee
Street
Destination

Zip

FROM:
Shipper
Street
Origin

Zip

Route:

Vehicle Number

U.S. DOT Hazmat Reg. No.

No. Shipping Units	HM	Kind of Packages, Description of Articles (IF HAZARDOUS MATERIALS - PROPER SHIPPING NAME)	HAZARD CLASS	LD. Number	Packing Group	WEIGHT (subject to correction)	RATE	LABELS REQUIRED (or exemption)
	X	Radioactive Material N.O.S.	7	UN 2982	Type A			Radiation Yellow II
					in overpack			
		CS-137 Point Source						
		Cesium Chloride						
		Solid Material						
		MBq(mCi) ToT						
		Yellow II, III =						
		Package Dimensions						
		cm X cm X cm						

Remit C.O.D. to:

Address:

City:

State:

Zip:

COD

Amt: \$

C. O. D. FEE:

Prepaid

Collect

\$

NOTE - Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property. The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding \$ Per

Subject to Section 7 of the conditions, if the shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
The carrier shall not make delivery of the shipment without payment of freight and all other lawful charges.
(Signature of Consignor)

FREIGHT CHARGES

☐ PREPAID ☐ COLLECT

Where the applicable tariff provisions specify a limitation of the carrier's liability NMFC Item 172, if there is no release or value declaration by the shipper, and the shipper does not declare a value or release the carrier's liability, that liability shall be limited to the extent provided by NMFC Item 172. California intrastate shipments must comply with NMFC Item 173.

RECEIVED, subject to the classifications and lawfully filed tariffs in effect on the date of issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the bill of lading terms and conditions in the governing classification on the date of shipment.

Shipper hereby certifies that he is familiar with all the bill of lading terms and conditions in the governing classification and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

This is to certify that the above-named materials are properly classified, described, packaged, marked and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.

PLACARDS REQUIRED

PLACARDS SUPPLIED

☐ YES ☐ NO - FURNISHED BY CARRIER
DRIVERS SIGNATURE:

SHIPPER:

PER:

DATE:

CARRIER:

PER:

DATE:

EMERGENCY RESPONSE

TELEPHONE NUMBER: 1 (800) 424-9300 Chemtrec

Monitored at all times the Hazardous Material is in transportation including storage incidental to transportation (172.604).

CONTAINS HAZARDOUS MATERIALS

INSTRUCTIONS

1. Fill in only the following information: (All other information is not required unless transport is for hire).

- * Number of shipping units
- * Weight
- * Items with a blank under shipping description

2. Carry in vehicle, cab (front seat) whenever transporting radiation sources.

NOTE: This shipping paper may only be used by Lakehead employees transporting a radiation source between Lakehead facilities. Contact S-E-C- for assistance in other transport situations.

Attachment 4

**LAKEHEAD PIPE LINE COMPANY
RADIATION SAFETY PLAN
NUCLEAR DENSITY GAUGE ANNUAL AUDIT SURVEY**

Note: One form should be completed for each site where the gauge is used. **Return to Lakehead Radiation Safety Officer by December 31.**

Location: _____

Responsible Person (Print): _____

Signature: _____

Date: _____

1. Is the building around the gauge in good condition and locked?
Yes _____ No _____ Comments: _____
 2. Is the Radiation Warning sign still on the inside of the door leading to the gauge, and is it in good condition?
Yes _____ No _____ Comments: _____
 3. What is the last survey instrument calibration date? _____
 4. Is there a calibration certification on-site to support the data in #3?
Yes _____ No _____
 5. Is the NRC3 form posted in a conspicuous location on-site?
Yes _____ No _____
 6. Describe any maintenance performed on the gauge or source in the past year.
(Include names of person doing the work)
- _____

This section to be completed by the Radiation Safety Officer.

Check if on file:

- _____ March shutter test form (1 per source)
_____ September shutter test form (1 per source)
_____ Initial wipe test results
_____ 3 year wipe test results
_____ Documentation of initial or refresher training

RSO - Provide summary of audit results to
Safety & Compliance in January (following December audit)

1996

Radiation Safety Program

January						
S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

February						
S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	

March						
S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

April						
S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

May						
S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

June						
S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

January

31

RSO annual audit survey results due to Safety Department

March

31

Semiannual density guage shutter test due (copy of results to RSO)
Semiannual PGT and Yokogawa wipe test due (Superior Terminal only)

May

31

Annual survey meter calibration due (Do in May or June or July)

June

28

Annual survey meter calibration due (Do in May or June or July)

July

31

Annual survey meter calibration due (Do in May or June or July)

September

30

Berthold densitometer wipe test due 1996, 1999, 2002, 2005...
Semiannual density guage shutter test due (copy of results to RSO)
Semiannual PGT and Yokogawa wipe test due (Superior Terminal only)

December

2

RSO mails annual audit survey form to sites using nuclear densitometers

July						
S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

August						
S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

September						
S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

October						
S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

November						
S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

December						
S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

LAKEHEAD RADIATION SOURCE LIST

<u>LOCATIONS</u>	<u>AUTHORIZED USERS</u>	<u>TELEPHONE</u>	<u>SOURCE SIZES</u>	<u>BERTHOLD</u>
				<u>SHIELDING MODEL #</u>
Saxon, WI	Joe Shafer*	715-893-2475	350 mCi	7440
Iron River, MI	Mike Skaggs	906-265-3722	350 mCi	7440
Gould City, MI	Mike Burnis*	906-477-6722	350 mCi	7440
North Straights, MI	Mike Burnis	906-643-8212	350 mCi	7440
Lewiston, MI (2 sources)	Lewis Gotham*	517-786-2771	350, 350 mCi	7440
Lewiston, MI (N. of station)	Lewis Gotham	517-786-2771	500 mCi	7440
Bay City, MI	Dale Rosenbrock	517-684-6510	250 mCi	7440
Superior, WI	Bob Pollock (RSO)	715-398-8335	350, 350, 1000 mCi	7440, 7442
Superior, WI	Bob Pollock (RSO)	715-398-8335	550 mCi (Americium-241)	
Plummer MN	Jerry Snobeck/Rick Kimball	218-465-4265	150 mCi	7440
Clearbrook MN	Scott Bellefy	218-776-3115	350, 1000 mCi	7440, 7442
Deer River MN	Dennis DeYoung*	218-246-8570	150, 500, 2000 mCi	7440, 7442
Buffalo NY	George Barth	716-877-3888	100 mCi	7440
Sheldon, WI	Kurt Castle	715-452-5121		
Rio, WI	Mike Monson	414-992-3424		
Walworth, WI	Jim Sojka	414-275-3917		
Griffith, IN	Rick Szeplakay	219-922-3133		
Griffith, IN	Thomas Smith	219-922-3133		

D(s) values for Berthold Gauges
 Model 7440 - 760
 Model 7442 - 11,000

* Denotes personnel also considered to be authorized installers.
 Other authorized installers includes: Dan Heldt, Rick Samec,
 Joel Korhonen, John Sobojinski. (Personnel that attended
 1994 Berthold 8-hour course are Authorized Installers).

JUN 27 1996

Robert F. Pollock
Radiation Safety Officer
Lakehead Pipe Line Co., Inc.
1 W. Superior St., Ste. 400
Duluth, MN 55801-2085

Dear Mr. Pollock:

We have reviewed your correspondence dated May 21, 1996, requesting a change of address and find that we will need additional information as follows:

In order for us to complete the amendment, we will need a letter signed by a member of corporate management requesting the change. Please state if the change in address is only for the mailing address or if we should also change the location of where material is used and stored.

We will continue our review of your application upon receipt of this information. Please reply in duplicate, within 30 days, and refer to Control Number 301372.

Upon failure to file an answer within the specified time, we will consider that you have abandoned your request and will void this action. This is without prejudice to resubmission of the application.

If you have any questions or require clarification on any of the information stated above, you may contact us at (708) 829-9887.

Sincerely,

Original Signed By
Patricia M. Vacherlon
License Reviewer

License No. 48-13457-01
Docket No. 030-06781

DOCUMENT NAME: M:\03006781.DF6

To receive a copy of this document, indicate in the box: "C" = Copy without attachment/enclosure "E" = Copy with attachment/enclosure "N" = No copy

OFFICE	DNMS/RIII								
NAME	PMVacherlon:brt								
DATE	06/25/96 <i>PMV</i>								

OFFICIAL RECORD COPY