

MATERIALS LICENSE

Amendment No. 13

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

Solar Testing Laboratories, Inc.

In accordance with letter dated
August 26, 19963. License Number 34-16119-03 is amended in
its entirety as follows:

4. Expiration Date July 31, 2003

5. Docket or
Reference No. 030-183452. Resource Center I
5399 Lancaster Drive
Brooklyn Heights, OH 441316. Byproduct, Source, and/or
Special Nuclear Material7. Chemical and/or Physical
Form8. Maximum Amount that Licensee
May Possess at Any One Time
Under This License

A. Cesium-137

A. Sealed source (Troxler
Dwg. No. A-102112)A. No single source to
exceed 10 millicuries

B. Americium-241

B. Sealed source (Troxler
Dwg. No. A-102451)B. No single source to
exceed 50 millicuries

C. Cesium-137

C. Sealed source
(Humbolt's Model HSI
Dwg. 2200064)C. No single source to
exceed 11 millicuries

D. Americium-241

D. Sealed source
(Humbolt's Model HSI
Dwg. 2200067)D. No single source to
exceed 44 millicuries

E. Americium-241

E. Sealed source
(Troxler Dwg. No.
A-100337 or A-100608)E. No single source to
exceed 300 millicuries

9. Authorized Use:

A. and B. To be used in Troxler Model 3400 Series surface moisture/density gauges.

C. and D. To be used in Humbolt's Model 5001 Series moisture/density gauges.

E. To be used in Troxler Model 3241 Series asphalt content gauges.

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**MATERIALS LICENSE
SUPPLEMENTARY SHEET**

License Number

34-16119-03

Docket or Reference Number

030-18345

Amendment No. 13

CONDITIONS

10. Licensed material may be stored at Resource Center I, 5399 Lancaster Drive, Brooklyn Heights, Ohio; 4299 Reynolds Drive, Hilliard, Ohio; 3862 East Street, Pittsburgh, Pennsylvania, and may be used at temporary job sites of the licensee anywhere in the United States where the U.S. Nuclear Regulatory Commission maintains jurisdiction for regulating the use of licensed material.
11. The Radiation Safety Officer for this license is David Snethkamp.
12. Licensed material shall only be used by, or under the supervision and in the physical presence of, individuals who have received the training described in application dated November 20, 1995 and have been approved in writing by the Radiation Safety Officer. The licensee shall maintain records of individuals designated as users for five years following the last use of licensed material by the individual.
13.
 - 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
 - (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

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**MATERIALS LICENSE
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- (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 Troxler or Campbell Pacific. Alternatively, tests for leakage and/or contamination may be performed by persons specifically licensed by the Commission or an Agreement State to perform such services.
14. Sealed sources or detector cells containing licensed material shall not be opened or sources removed from source holders by the licensee.
15. When performing tests at temporary job sites, the authorized user shall not leave the moisture/density gauge unattended. Upon completion of tests the device shall be locked in the licensee's vehicle or a secure building to prevent unauthorized use, loss, or theft.
16. The licensee shall conduct a physical inventory every 6 months to account for all sources and/or devices received and possessed under the license. Records of inventories shall be maintained for 5 years from the date of each inventory, and shall include the quantities and kinds of byproduct material, manufacturer's name and model numbers, location of the sources and/or devices, and the date of the inventory.
17. The licensee is authorized to transport licensed material only in accordance with the provisions of 10 CFR Part 71, "Packaging and Transportation of Radioactive Material."

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MATERIALS LICENSE
SUPPLEMENTARY SHEET

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18. Any cleaning, maintenance, or repair of the gauge(s) that requires removal of the source rod shall be performed only by the manufacturer, David Snethkamp, Richard Blackburn or by other persons specifically licensed by the Commission or an Agreement State to perform such services.
19. In addition to the possession limits in Condition 8, the licensee shall further restrict the possession of licensed material to quantities below the minimum limit specified in 10 CFR 30.35(d) for establishing decommissioning financial assurance.
20. 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. Applications dated June 15, 1983, June 22, 1993; and
- B. Letters dated July 8, 1983, August 2, 1983, November 20, 1995, August 26, 1996 and November 15, 1996.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

Date November 19, 1996

By

Loren J. Hunter
Nuclear Materials Licensing Branch, Region III

COPY

BETWEEN:

License Fee Management Branch ARM
and
Regional Licensing Sections

(FOR LFMS USE)
INFORMATION FROM LTS

Program Code: 03121
Status Code: 0
Fee Category: 3P
Exp. Date: 20030731
Fee Comments:
Decon Fin Assur Req'd: N

R8
13

LICENSE FEE TRANSMITTAL

A. REGION

1. APPLICATION ATTACHED

Applicant/Licensee: SOLAR TESTING LABORATORIES, INC.
Received Date: 960903
Docket No: 3018345
Control No.: 301798
License No.: 34-16119-03
Action Type: Amendment

2. FEE ATTACHED

Amount: 360
Check No.: 030290

3. COMMENTS

Signed _____
Date 9-4-96

B. LICENSE FEE MANAGEMENT BRANCH (Check when milestone 03 is entered / /)

1. Fee Category and Amount: 3P \$300

2. Correct Fee Paid. Application may be processed for:

Amendment _____
Renewal _____
License _____

3. OTHER

Signed _____
Date 9/16/96

SEP 23 1996

Log	Sep 4 III
Remitter	
Check No.	30790
Amount	\$360 (\$300) Refund \$60
Fee Category	3P
Type of Fee	Am
Date Check Rec'd	9/12/96
Date Completed	9/16/96
By:	SC



SOLAR TESTING LABORATORIES, INC.

5399 Lancaster Drive, Brooklyn Heights, Ohio 44131

Telephone: (216) 741-7007 • FAX: (216) 741-7011

August 26, 1996

Region III
**UNITED STATES NUCLEAR
REGULATORY COMMISSION**
801 Warrensville Road
Lisle, IL 60532-4351

Ladies and Gentlemen:

**SUBJECT: LICENSE 34-16119-03
AMENDMENT TO LICENSE**

Please accept Solar Testing Laboratories, Inc.'s request for amendment to paragraph 18 of our license. We would like to change the paragraph to read as follows:

Any cleaning, maintenance, or repair of the gauge(s) that requires removal of the source rod shall be performed by the manufacturer, other persons specifically licensed by the Commission or an agreement state to perform such services, or Solar Testing Laboratories, Inc. employees who have completed generic training by Humboldt Scientific, Inc. or other approved agency to perform these services. A shielded storage container is available.

Enclosed is our "Certificate of Generic Training for Removal of Source Rods from Surface Moisture/Density Gauges," which indicates the course content. David Snethkamp and Richard Blackburn have attended and completed this course.

In addition, please accept this request for amendment to paragraph 10 of our license. We would like to change the paragraph to read as follows:

Licensed material may be stored at Resource Center I, 5399 Lancaster Drive, Brooklyn Heights, Ohio; 4299 Reynolds Drive, Hilliard, Ohio; and 3862 East Street, Pittsburgh, Pennsylvania, and may be used at temporary job sites of the licensee anywhere in the United States where the U.S. Nuclear Regulatory Commission maintains jurisdiction for regulating the use of licensed material.

RECEIVED

SEP 03 1996

GEOTECHNICAL & ENVIRONMENTAL ENGINEERING, MATERIAL TESTING & CONSTRUCTION INSPECTION

Division Offices

811 East Carson Street, Pittsburgh, PA 15203
4299 Reynolds Drive, Columbus, OH 43026

Telephone: (412) 381-4454 • FAX: (412) 381-6050
Telephone: (614) 777-6013 • FAX: (614) 777-6160

SEP 03 1996

Region III

**UNITED STATES NUCLEAR
REGULATORY COMMISSION**

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August 26, 1996

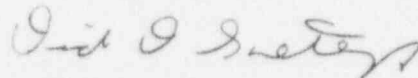
Enclosed is the floor plan showing storage location within the building as well as adjacent areas. The storage room only will be used for equipment storage with no continuous occupancy occurring. The storage room also will be posted with the appropriate warning signs. This facility is built and scheduled to be occupied no later than August 16, 1996.

We also request consideration for removal of our dosimetry requirements. This request is based on 10 CFR 20.1502 in that since personnel monitoring has been conducted in the company (1983 inception date), no employee has exceeded 10 percent of the annual occupational doses cited in 10 CFR 20.1201. (Records are available upon request.) In lieu of this, we request approval to use film badges on a monthly basis or TLD badges on a quarterly basis.

If you have any questions about this request, please contact me at 216-741-7007. Your consideration of these requests is appreciated.

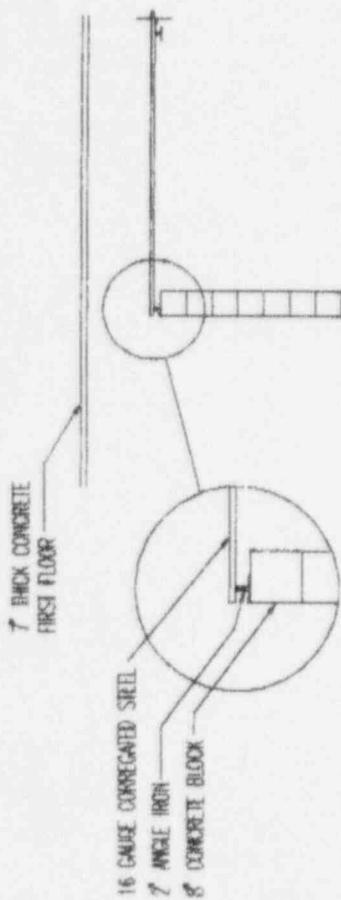
Sincerely,

SOLAR TESTING LABORATORIES INC.



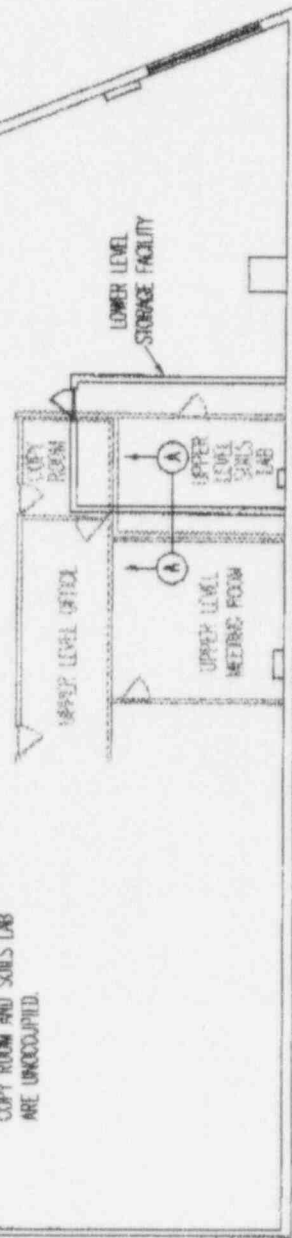
David D. Snethkamp
Radiation Safety Officer

DDS/mp
Enclosures



SECTION A-A

NOTE:
UPPER LEVEL MEETING ROOM,
COPY ROOM AND SOLUS LAB
ARE UNOCCUPIED.



SOLAR TESTING LABORATORIES

LOWER FLOOR PLAN

PROJECT NAME: SOLAR TESTING LABORATORIES

PROJECT NUMBER: R06116X10

CLIENT: McDONALD'S CORPORATION

DATE: 7-24-96



551-D Pylon Drive
Raleigh, North Carolina 27606
919.832.6509 FAX 919.833.5283
Division of Humboldt Mfg. Co.

18 March, 1996

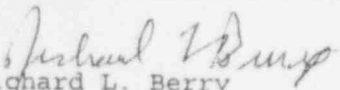
Certificate of Generic Training for Removal of Source Rods
from Surface moisture Density Gauges

On 11 - 12 March, 1996, the undersigned Radiation Safety Officer visited Solar Testing Laboratories, Inc. in Cleveland, Ohio for the purpose of demonstrating the safe removal and storage of the source rods containing between 8 to 11 mCi of Cs-137 that are used in both Troxler Electronic Laboratories, Inc. and Humboldt Scientific, Inc. portable moisture density gauges.

The 8 hour demonstration and training consisted of the following:

1. Removal of all restraining fitting such as screws or roll pins which restrict the removal of the source rod.
2. Transport of the source rod by the handle with the source end extended away from the operator's body and other personnel. The hand dose at the handle for an 11 mCi source is 1.6 mrem/hr and at mid-body is 0.8 mrem/hr.
3. Storage of the source rod in a lead shielded container 3.75 inches in diameter and 5.50 inches high and containing a 0.625 inch diameter hole to a depth of 3.75 inches. The surface dose rate on this container with an 11 mCi source is 11 mCi/hr and at 12 inches is 0.6 mCi/hr.
4. Replacement of the seals, wipers and scraper rings including lubrication of these items.
5. Re-installation of the source rod and restraining fittings to assure that the rod cannot be accidentally removed from the body of the gauge.

Humboldt Scientific, Inc.


Richard L. Berry
Vice President
Radiation Safety Officer

DIVISION OF ACCOUNTING AND FINANCE REQUEST FOR REFUND TO EMPLOYEE/VENDOR

THE EMPLOYEE/VENDOR IDENTIFIED BELOW HAS OVERPAID THE NUCLEAR REGULATORY COMMISSION FOR GOODS AND/OR SERVICES PROVIDED AND IS DUE A REFUND

EMPLOYEE/VENDOR/PAYEE CODE: _____

NAME: Solar Testing Laboratories, Inc.

ADDRESS: Attn: David L. Snethkamp, RSO

ADDRESS: 5399 Lancaster Drive

CITY: Brooklyn Heights STATE: OH ZIP: 44131

TRANS CODE: PX

TRANS TYPE: FE FUND: X5280 JOB CODE: _____ AMOUNT: \$60

TRANS TYPE: IR FUND: R1435 JOB CODE: INTR AMOUNT: _____

TRANS TYPE: IR FUND: R1099 JOB CODE: ADCH AMOUNT: _____

TRANS TYPE: IR FUND: R1099 JOB CODE: FINE AMOUNT: _____

TOTAL REFUND AMOUNT: \$60

COMMENTS: Lic 34-16119-03 / CK 30790 / Rfnd

8/26/96 Reg

(limit comments to 40 characters, including spaces)

PREPARED BY: Shirley Ruthfield DATE: Sept. 17, 1996

AUTHORIZED BY: Sandra Hambrick DATE: 9/19/96

ORIGINAL INV. NO: _____ DATE PAID: _____ AMOUNT: _____

REFUND ENTERED INTO COLLECT BY: _____

REFUND DETERMINED BY: _____ DATE: _____

PLEASE ATTACH APPROPRIATE SUPPORTING DOCUMENTATION

Sep 4 III
3P AMD #300
CK #30790 #360
301798

NOV 20 1996

David D. Snethkamp
Radiation Safety Officer
Solar Testing Laboratories, Inc.
Resource Center I
5399 Lancaster Drive
Brooklyn Heights, OH 44131

Dear Mr. Snethkamp:

Enclosed is Amendment No. 13 to your NRC Material License No. 34-16119-03 in accordance with your request.

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 at (630) 829-9887 so that we can provide appropriate corrections and answers.

Please note: we have added five years to the expiration date listed on your license. You should have recently received official notification from our headquarters office explaining the cause for the five-year extension. In the meantime, if you have any questions, please call me.

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 the 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 when you decide to terminate all activities involving materials authorized under the license.
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 owner: ~~ship~~ 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. Since serious consequences to employees and the public can result from failure to comply with NRC requirements,

D. Snethkamp

-3-

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
Loren J. Hueter
Nuclear Materials Licensing Branch

License No.: 34-16119-03

Docket No.: 030-18345

Enclosures: 1. Amendment No. 13
2. NRC Form 313

DOCUMENT NAME: M:\03018345.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	<i>N</i>							
NAME	LHUETER:jaw	<i>LH</i>							
DATE	11/19/96								

OFFICIAL RECORD COPY



SOLAR TESTING LABORATORIES, INC.

5399 Lancaster Drive, Brooklyn Heights, Ohio 44131

Telephone: (216) 741-7007 • FAX: (216) 741-7011

November 15, 1996

Mr. Loren Hueter

Region III

**UNITED STATE NUCLEAR
REGULATORY COMMISSION**

801 Warrensville Road

Lisle, IL 60532-4351

Dear Mr. Hueter:

**SUBJECT: ADDITIONAL INFORMATION
LICENSE 34-16119-03
CONTROL 301798**

Please accept this information relating to Solar Testing Laboratories, Inc.'s (STL) request for amendment dated August 15, 1996.

In reference to STL's new facility located at 3862 East Street, Pittsburgh, Pennsylvania, we would like to confirm the door to the gauge storage area will be locked at all times, with the exception of the removal or replacement of a gauge in the storage area. Also in reference to the decommissioning of our 811 East Carson Street, Pittsburgh, Pennsylvania, facility, we provide the following:

1. All sources at this facility have been removed.
2. During STL's storage of gauges at this site, no accidents or damage to sources occurred which may have resulted in leakage.
3. Wipe tests conducted on sources during the use of this facility did not exceed 0.005 microcuries at any time.
4. A copy of the leak test conducted during decommissioning on the floor of the storage room in the areas of the primary gauge storage is enclosed.

In reference to our badge status change request, we would like to commit to: Personnel conducting extended maintenance wearing TLD or film whole-body dosimeters any time they are working with gauges. During extended maintenance, these personnel will wear extremity monitors in addition to TLD or film badge whole-body dosimeters.

RECEIVED

GEOTECHNICAL & ENVIRONMENTAL ENGINEERING, MATERIAL TESTING & CONSTRUCTION DIVISION

Division Offices

811 East Carson Street, Pittsburgh, PA 15203

4299 Reynolds Drive, Columbus, OH 43026

Telephone: (412) 381-4454 • FAX: (412) 381-6050

Telephone: (614) 777-6013 • FAX: (614) 777-6160

REGION III

NOV 20 1996

Regarding our request for approval to conduct extended maintenance, please accept the following additional information:

1. **Type of work to be performed:** Work to be included in this item encompasses replacement of seal wipers, scraper rings, and related items including lubrication and maintenance. It does not include removal of cesium source from rod, removal of americium source from gauge, or any other maintenance which may compromise the integrity of the sealed sources. The extended maintenance will be performed on Humboldt 5000 series and Troxler 3400 series gauges. The manufacturers' instructions relating to these units are enclosed.
2. **Training and experience:** Training and experience in accordance with certificate of generic training submitted with original amendment request.
3. **Handling procedures:** Handling procedures will include and require that the source rod will only be handled at the end opposite to the source end; the source end will be immediately placed in a shielded container (e.g. lead shield); unauthorized individuals will not be allowed into the areas where extended maintenance is performed and where the source rod is located; containers shielding the source will be labeled "Caution: Radioactive Material"; the source will be under constant surveillance of an authorized user when not in storage and will be secured against unauthorized removal or access when in storage; and the manufacturer's instructions and recommendations for performing extended maintenance will be followed.
4. **Personnel monitoring:** Individuals performing extended maintenance on gauges will always wear both whole-body and extremity monitoring devices; extremity devices, like the whole-body devices, will be TLDs or film badges and exchanged at least quarterly or monthly. These badge readings will then be reviewed to ensure compliance with 10 CFR, Part 20, limits.
5. **Survey instruments:** Survey instruments capable of measuring between 0.1 microsievert per hour a 1 millisievert per hour will be used to perform surveys. The survey instrument will be calibrated annually by the manufacturer (S E International, Inc., 156 Drakes Lane, Summertown, TN 38483; NRC License R-51002-C00) or other licensed and NRC or agreement state approved facility. Before each use of the instrument, the survey meter response will be checked with a dedicated check source that has been supplied for the instrument. Should the survey instrument not respond properly, extended maintenance will not be performed until the unit is repaired or replaced.

Mr. Loren Hueter
Page 3
November 15, 1996

6. **Surveys:** To ensure radiation levels in extended maintenance area, to not exceed 10 CFR 20.1301 limits, the following procedures will be followed:
- a. Surveys will be performed using the above-mentioned equipment.
 - b. During extended maintenance procedures, surveys will be conducted adjacent to maintenance technicians work area, such that, readings will reflect actual dosage being received by maintenance technician.
 - c. Records of surveys (including who performed them, date performed, instrument used, measured radiation levels, and location of measurements) will be maintained for 3 years from the date of survey.

If you have any questions, please contact me at 216-741-7007. Your consideration of these requests is appreciated.

Sincerely,

SOLAR TESTING LABORATORIES, INC.



David D. Snethkamp
Radiation Safety Officer

DDS/mp
Enclosures

**TROXLER**

3008 Cornwallis Rd. P.O. Box 12057 Research Triangle Park,
North Carolina 27709, U.S.A.

TROXLER STORAGE ROOM @
Device - Model # _____, Serial # _____
Source(s) - Serial # _____, Serial # _____
Date of Test: 8-5-96

Please print legibly and firmly. This is your return address label.

- WM GROSS
- 811 EAST CALSON ST
- PGA PA 15203

Your Name: WM GROSS
Telephone: (412) 231-8600

ORIGINAL COPY

LEAK TEST ANALYSIS

This certifies that the sample accompanying this form has been analyzed using an approved monitoring method that measures both beta/gamma & alpha contamination; and, that the results of this analysis shows the removable activity to be less than 0.005 microcuries.

R. Kauppi

9-9-96

3400-B SERIES

SURFACE MOISTURE-DENSITY GAUGES

TROXLER ELECTRONIC LABORATORIES, INC.

and subsidiary

TROXLER INTERNATIONAL, LTD.

P.O. BOX 12057
RESEARCH TRIANGLE PARK, N.C., 27709
U.S.A.

TELEPHONE: (919) 549-8661
SHIPPING: Cornwallis Road at
Alexander Drive

TELEX: 579474
CABLE: TROXELFC

Branch Offices

Western Office
504-H College Oak Drive
Sacramento, California 95841
Phone (916) 332-7734

Rocky Mountain Office
900 Clarkson Court
Denver, Colorado 80229
Phone (303) 288-3196

Southwestern Office
2000 E. Rando Mill Rd.
Arlington, Texas 76011
Phone (817) 275-0571

Central Office
37635 North Rt. 59
Lake Villa, Illinois 60046
Phone (312) 587-7273

Southern Office
P.O. Box 110629
Nashville, Tennessee 37211
Phone (615) 331-8537

Northwestern Office
P.O. Box 312
Tualatin, Oregon 97062
Phone (503) 638-2523

CLEANING AND LUBRICATION

The source rod in the 3400-B Series is supported in linear bearings lubricated with a molybdenum disulfide grease (Molykote Type G Paste). The grease is retained within the bearings and soil kept out by a system of O-rings and seals at the top and the bottom of the bearings. The bearings require little or no service, unless the gauge is overhauled or excess soil is allowed to accumulate.

The bottom surface of the gauge is a removeable plate with a metal O-ring mounted in it. This ring will remove most of the soil from the source rod. However, under some soil conditions, small amounts will carry over into the sliding shield assembly. If allowed to build up, soil can cause wear in the shield cavity and can ultimately be carried into the bearings and ruin them.

Cleaning the cavity is relatively simple. Place the gauge on its side on a bench with the base away from the operator. The source rod should be held in the SAFE position. Using a Phillips screwdriver, remove the screws holding the bottom plate assembly in position and pry out the assembly using a flat blade screwdriver. Using the screwdriver, remove the sliding shield and spring.

The radiation dose rate at the entrance to the cavity (flush with the bottom surface) is approximately 300 mrem per hour, and the hands should not be exposed to this dose rate for more than four hours per week. The cleaning time should take no more than five minutes, so the procedure is safe.

Using a rag, stiff brush, and compressed air (if available) remove all soil and clean the cavity, sliding shield, and bottom plate assembly. Inspect all items for excessive wear and replace if required. Check the operation of the spring to insure that it is free to move in its groove. If the spring is damaged or worn excessively it should be replaced or replaced the assembly.

Lubricate all of these items, including the cavity and the inner surface of the bottom plate assembly with a bonded molybdenum disulfide lubricant (Molykote 32 Grease). Reassemble all items.

Using the rag, clean the source rod and index rod and coat the index rod with bonded lubricant. Using a cotton tipped stick (Q-Tip), lubricate the visible portions of the trigger and indexer with paste lubricant.

If the last items have soil embedded in the mechanism, they should be cleaned for cleaning. Lower the handle to the backscatter position and, using a 3/32 pin punch, remove the roll pin in the index rod. Remove the index rod cap by unscrewing.

VII-B. CLEANING AND LUBRICATION (cont'd)

Depress the trigger and lift the handle clear of the index rod. Before releasing the trigger, note the position of the indexer pin and trigger to facilitate replacement. With the trigger released, the indexer can be slid forward and sideways out of the handle. Clean all moving parts and the handle cavity. If the indexer shows signs of wear, it should be replaced. Lubricate these parts and reassemble.

To replace the index rod cap, latch the handle in the SAFE position, and screw the cap down until the neoprene bumper puts a light pressure on the handle. Drop the handle, look into the roll pin hole and line up the hole in the cap with the hole in the index rod by unscrewing the cap if necessary. These holes must be in alignment to replace the roll pin. If the cap is screwed too tightly, pressure against the bumper will prevent the indexer from latching in the SAFE position.

Using a mineral solvent, clean all of the outer surfaces of the instrument.

VII-C. FRONT PANEL MODULE REMOVAL

Unscrew the thumbscrews located at the front panel corners and lift the module from the opening. There is a cable connecting the module to the base assembly. Disconnect the cable, noting the relative position of polarizing key on the cable connector and the position of the slot in the mating connector.

When replacing this connector, it must be done carefully and in the proper orientation. The pins are small and can be easily bent if not aligned properly.

VII-D. INTERNAL CONDENSATION

Under some climatic conditions, changes in atmospheric pressure will cause some flow of moist air in and out of the gauge case since it is not pressure sealed. This will result in the formation of water inside the case due to condensation. This water must be removed or erratic operation and possibly failure may occur. The gauge cavity will dry if it is stored in a warm, dry room with the front panel electronic module removed.

TEST PROCEDURE

State and Federal laws require that the radioactive sources be leak tested every six months and records maintained of the results. Personnel responsible must be considered and leak tests performed to eliminate possible contamination by radioactivity materials.

It is also worthwhile noting that of over 10,000 sealed radioactive sources delivered by Troxler Electronics Laboratories, Inc. in this type of equipment during the past twenty years, not one has ever shown a positive leak test even though some instruments have been totally destroyed by fire or accident.

The leak test is performed by using the Troxler type 3880 Leak Test Kit (kit number 102868) or similar kit. The 3880 kit contains an instruction manual, pair of metal tongs, wood dowel, solvent, and five leak test kits. Each packet contains: 1) pre-addressed envelope, 2) leak test kit, 3) plastic bag, 4) self-adhesive label, and 5) 55mm filter paper. Instruction manual should be read prior to use of the kit.

With a ball point pen, write the gauge type, serial number and source identification numbers around the edge of the filter paper. Since this instrument contains two sealed sources, both areas must be wiped with the same piece of filter paper.

Remove the electronic module as noted in section D above. Wet the filter paper with solvent. Looking into the gauge cavity, a yellow and magenta color will be seen just forward of the printed circuit board assembly. Use the tongs and dowel to wipe this label with the filter paper. After wiping the first source, the filter must not be touched with any part of the hands.

Position the gauge on its side and base away from the operator, position the gauge in the 4 inch direct transmission position. Using the tongs and dowel for pressure, wipe the weld area above the source rod tip with the filter paper. Retract the source and sit the gauge in an upright position.

Place the filter paper on a paper towel and allow it to air dry in a flat position before sealing in the plastic envelope. While drying is taking place, complete all requested information on both the plastic bag label and the leak test analysis form. Please type or print legibly to insure that all information is readable. When dry, place the filter paper in the plastic bag using the tongs and press the seal to close. Attach the wetted plastic bag label to the bag. Retain the middle copy of the form as your record of having made the leak test. Place the plastic bag and the two remaining copies of the form in the pre-addressed envelope, add your return address on the outside, seal, stamp, and mail.

State regulations require that the factory leak test all sealed sources before entering our plant; therefore, this service will be performed on instruments returned for checkout and repair. The leak test report will be sent to the owner, and charges for the service will be included in other charges.

VII-F. SOURCE ROD REMOVAL

On occasion it may be necessary to remove the entire source rod assembly to facilitate repairs to the instrument. This is easily accomplished, but provision must be made for shielded storage of the rod while it is out of the gauge. The Troxler 100761 Source Rod Pig will provide this shielding but other similar storage may be used.

In an emergency, the rod can be stored for short periods, without shielding, at a distance of at least two meters (six feet) from all personnel.

The procedure is the same as noted in section VIII-B, which details the removal of the index rod roll pin and cap. At this point the source rod can be lifted entirely out of the gauge shield and stored in a separate shield. While handling the source rod, keep the tip away from the body and other personnel, and do not touch the tip of the rod. The dose rate at the handle with the rod removed is approximately 15 mrem per hour.

Replace the source rod assembly as outlined in section VII-B.

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100-100000
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6.5 Statistical Stability Test

This test is a simple method of testing the short term stability of the detectors and electronic counting circuits. The basis for it is explained in section 8.3 covering radiation statistics.

Radioactive decay is a binary process (an atom decays or it does not). The average rate of decay determines the half-life (the time for half of the material to disintegrate) of the material. For Cs-137 this is 30.17 years and for Am-241, it is 433 years. The decrease in the average rate of decay for Cs-137 is 2.3% per year and for Am-241 is 0.16% per year. The effect of this change on the measurement is eliminated by calibrating the Gage in terms of a ratio.

The short term fluctuation of binary decay is predictable. The standard deviation is the square root of the average count rate (m):

$$\sigma = m^{1/2}$$

The Gage electronics divide the actual events counted in a one minute period by a factor of 16 before using the number, so the above expression is actually:

$$\sigma = \frac{m^{1/2}}{4}$$

This equation can be used to predict the standard deviation of the count rate for a series of measurements. By taking a set of 16 measurements and computing the actual standard deviation, the value obtained can be compared as a ratio to the predicted value thus:

$$R = 4 \left[\frac{r(n-m)^2}{m(N-1)} \right]^{1/2}$$

Where: σ = Standard deviation of the count rate
 n = Individual count in a set
 N = Number of sets
 m = Mean of the set
 R = Statistical ratio

For $R > 0.6$ and < 1.4 Good
 $R < 0.5$ or > 1.5 Bad
Others -- Try Again

"SHIFT/STAT" automatically runs this test and "DC" and "MC" displays the R value for the density and moisture channels.

Pressing the "RD S" key repeatedly will display the individual measurement counts if they are desired. All 16 from each test are available.

The 5001 is designed for reliability and field service is kept to a minimum. Little, if any, test equipment is required and the only tools necessary are:

Hex Key, 1/16 inch
Hex Key, 3/32 inch
Hex Key, 1/8 inch
Hex Key, 9/64 inch
Hex Key, 3/16 inch
Phillips Screwdriver, #1 X 4 inch
Slotted Screwdriver, 3/16 X 6 inch

Your Radioactive Material License must specifically allow removal of the source rod if the rod bearings and seals are to be removed, cleaned or replaced.

7.1 Mechanical Disassembly/Assembly

7.11 Bottom Plate and Shield. The Bottom Plate Assembly (4200155) is held in place by two flat head hex socket screws (1001010). Removing them will allow the plate to pull away and the Sliding Shield (2200030) and spring (1000816) can be removed for cleaning. The scraper ring (1000806) in the plate (2200033) can be replaced by removing the retaining ring (1000811).

7.12 Source Rod. Other than replacing a set of bearings, it is not necessary to remove the source rod. A suitable shield must be available.

Drop the source rod to the backscatter position. Remove the two hex set screws (1001007) at the top and unscrew the Lift Cap (2200051) and the Lift Bumper (2200094) to allow complete removal of the source rod and handle. Hold the rod by the handle with the tip as far as possible from the body and store it in a shielded container with a minimum of 25 mm (1 inch) lead wall or in one of the calibration standards at least 3 m (10 ft) from personnel work areas. The rod must not be left unattended and should be replaced in the gage shield as soon as practical.

7.13 Indexer and Latch. This may be accomplished without removing the source rod from the Gage. Remove the Lift Cap as described in 7.12 and raise the handle off of the index rod. Rotate the handle and push the rod back into the shield. Loosen the two hex set screws (1001034) on the sides of the handle and slide the complete latch assembly out the rear of the handle. The Indexer

(2200041) will come out the slot in the side of the handle. The Index Latch Nut (2200125) may be screwed off of the Index Lock (2200126) for cleaning with silicon oil. These parts are lubricated by the teflon coating.

Remove the indexer spring (1000813) and the hex set screw (1001035) from the end of the Index Lock. Unscrew the Index Retainer (2200040) by inserting a long blade screwdriver through the Index Lock.

To reassemble, screw the retainer back into the lock, screw the nut back on the lock to the middle of the threaded section, and place the spring back over the retainer. Hold the indexer in the proper position in the handle slot and slide the latch assembly back into the handle engaging the hole in the indexer and allowing the pin in the lock to go into the groove in the handle.

Turn the knob fully clockwise and set the spacing between knob and handle at approximately 0.5 mm (0.02 inch), the padlock holes in the handle must be in alignment. Tighten the set screws in the handle to retain the latch assembly. Rotate the knob counterclockwise, press the indexer back and slide the handle down over the index rod.

To adjust the latch, place the handle in the backscatter position, turn the knob fully clockwise and while holding it, tighten the index retainer through the center of the lock firmly. With the latch released, the handle should move freely up and down the index rod.

7.14 Index Rod. The Index Rod may be removed without removing the source rod. Remove the lift cap as described in 7.12, lift the handle off the Index Rod and rotate it out of the way.

Loosen the Index Lock Nut (2200052) and unscrew the Index Rod (2200047, 48, 49 or 50) from the post. When replacing the Index Rod, latch the handle firmly in the backscatter position and screw the rod until the tip is flush to 0.05 mm (.002 inch) recessed within the bottom of the Gage. The rod must not protrude or backscatter measurements in the field could be in error.

7.15 Top Cover. First remove the processor or dual scaler module (5200115) by releasing the four thumbscrews (1001013). Lift the panel out and disconnect the Module Cable (2200105) from the base frame assembly.

Remove the six socket head cap screws (1001008) and washers (1001030) around the edge of the cover. The cover can be totally removed from the Gage by placing the handle partially between the backscatter and safe positions and working the cover over it. It will be easier if the Post Gasket (2200109) is removed from the hole.

If worn or damaged, the Shell Gasket (2200149) or Panel Gasket (2200150) should be replaced.

7.16 Top Post and Seals. Caution, the owners license must allow source rod removal before this service may be performed. With the source rod removed and safely stored as covered in 7.12 and the top cover removed, remove the six batteries from the holders. Remove the two center battery holder screws (1001016) and disconnect the Battery Cable (2200106) from the base frame assembly. Place the holders aside.

Remove the four socket head cap screws (1001009) and lock washers (1001031) from around the post. It may be lifted up over the tungsten bio shield.

The Wiper Plate (2200031) and Wiper Ring (1000803) may be removed from the inside of the post. When replacing them, the wiper goes into the top of the plate such that it cleans the source rod as it moves in an upward direction.

The Top Wiper Cap (2200032) may be removed from the Post by removing the two hex socket screws (1001007) from the side of the post. Pry up lightly on the Cap. The Wiper Ring (1000803) in the cap may be replaced by carefully prying it out of the top.

The two bearing Seals (1000805) may be removed by carefully prying them out of the center hole. The seals will be destroyed but be careful not to damage the Source Rod Bearing (2200136). When replacing the seals, they must be pushed or lightly tapped in place with a wood or soft metal dowel to prevent damage.

The bearing has recesses for soil to accumulate to prevent binding. Clean the bearing with a solvent and lubricate with a silicon grease. Lightly coat all of the seals and wipers with the same grease before reassembling.

Reassemble in reverse order and when replacing the batteries be certain that the positive anode is in the up direction.

7.17 Base Module. After removing the Top Cover as described in 7.15, remove the batteries from the holders and disconnect the Battery Cable. There are high voltage capacitors on the circuit board which may be charged to 1000 volts. The current available is low but injury may occur due to the surprise of receiving a severe shock. Discharge them by pressing and holding the pushbutton switch at the top of the circuit board for about one minute.

Remove the seven socket head cap screws (1001008) and lock washers (1001029) around the edge of the module. Carefully lift the Base Module up out of the Gage Base. The detectors may be replaced if necessary and the parts reassembled.

This completes the description of the removal of all the major modules of the Gage.

7.2 Battery Replacement

The batteries in this Gage will last a very long time if the Gage is not stored at a high temperature. The expected service life is one to three years depending on the intensity of use. Replacement will be required within one month after the "LO BAT" symbol appears in the Display while in use.

Replacement batteries should be high quality alkaline D size cells such as those made by Mallory (DURACELL). Do not replace with manganese zinc cells except in an emergency for a short period of time. They will not last as long and leakage may cause damage to the inside of the Gage.

Remove the screws and lift the top shell sufficiently to slip the batteries out of the holders. Replace the cells with the positive terminal at the top.

7.3 Seals and Wipers

The seals and wipers will wear due to soil abrasion and soil working into them as the source rod is moved up and down. Keeping the bottom cavity clean and lightly lubricating the source rod with silicon grease will help prolong their life. When the need occurs, follow the replacement instructions in 7.16.

7.4 Adjusting the Index Latch

The inner working parts of this mechanism are fully described in 7.13. These parts are extremely reliable and should never need replacing. At times some adjustment may be necessary to assure that the Latch securely locks the handle in the backscatter position.

Remove the hex head set screw from the center of the Index Lock and place the handle in the backscatter position. Insert a long slender blade screwdriver in the hole in the lock and screw the Index Retainer about one turn counterclockwise while holding the knob. Rotate the knob fully clockwise to engage the lock. Hold the knob and tightly screw the Index Retainer clockwise until the handle is firmly locked in position. When the knob is rotated counterclockwise, the handle should move freely up and down the index rod.

7.5 Module Adjustment/Replacement

In order to improve reliability and maintain ease of service, the 5001 electronics is divided into six modules which may be individually replaced. Two of them have adjustments which may need to be set. There are two different panel modules, Dual Scaler and Processor, only one of which may be in a Gage.

7.51 Dual Scaler Module (5200115). This front panel module contains two complete counting and displaying systems and an accurate timer. Field Service is impractical other than replacement. It is easily removed by means of four thumb screws located in the corners. The cable is disconnected from the Base Plane Module by releasing the latches at each end of the connector. Note that the cable, when properly installed, has no twists in it, only a 180° turn.

The Factory or Authorized Service Facility may repair or replace the module. No recalibration is necessary and the modules are completely interchangeable between Gages.

7.52 Processor Module (5200168). This front panel module contains two counting systems, a programmed microprocessor and dual displays for depth and data. Field service is impractical other than replacement. It is easily removed by means of four thumb screws located in the corners. The cable is disconnected from the Base Plane Module by releasing the latches at each end of the connector. Note that the cable, when properly installed, has no twists in it, only a 180° turn.

The Factory or Authorized Service Facility may repair or replace the module. No recalibration is necessary; however, the Gage calibration is stored in a memory module which must stay with the same Gage or recalibration will be necessary.

CONVERSATION RECORD

TIME

DATE

11-14-96

☐ VISIT☐ CONFERENCE☒ TELEPHONE☐ INCOMING☒ OUTGOING

NAME OF PERSON(S) CONTACTED OR IN CONTACT

ORGANIZATION (OFFICE, DEPT. ETC.)

TELEPHONE NO.

David D. Smithkamp, RSO

Solar Testing

216-

741-7007

SUBJECT

CN 301798

SUMMARY

1. Confirm that all trances to the gauge storage room, ^{will be locked.} at proposed new location at 3862 East Street, Pittsburgh, PA.
2. Confirm that there have been no incidents of "hacking" sources and that wipe tests of all sources have been ≥ 0.005 pCi for sources stored/moved at facility being deleted from license, 811 East Carson Street, Pittsburgh, Pennsylvania.
3. Regarding request for approval to remove source rod from moisture density gauges (Trojan & Humboldt) for cleaning, lubricating and replacement of seals, wipers and scraper rings, address item 1, 3, 4, 5 and 6. of Appendix F, "Extended Maintenance", to Draft Reg Guide DG-0008 dtd May 1995.
4. Ref. CN 301798 and respond in 15 days. Deal with FAX response by Nov 18, followed by hard copy.

ACTION REQUIRED

NAME OF PERSON DOCUMENTING CONVERSATION

SIGNATURE

DATE

Loren Hamer

11-14-96

ACTION TAKEN

SIGNATURE

TITLE

DATE