FORM NRC-313 I (6-78) 10 CFR 30

U.S. NUCLEAR REGULATORY COMMISSION

APPLICATION FOR BYPRODUCT MATERIAL LICENSE
INDUSTRIAL

See attached instructions for details.

Completed applications are filed in duplicate with the Division of Fuel Cycle and Material Safety, Office of Nuclear Material Safety, and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555 or applications may be filed in person at the Commission's office at 1717 H Street, NW, Washington, D. C. or 7915 Eastern Avenue, Silver Spring, Maryland.

1. APPLICATION FOR: *(Check and/or complete as appropriate)*

	a. NEW LICENSE
	b. AMENDMENT TO: LICENSE NUMBER
x	c. RENEWAL OF: LICENSE NUMBER 12-07367-01

2. APPLICANT'S NAME *(Institution, firm, person, etc.)*
The Metropolitan Sanitary District of Greater Chicago

TELEPHONE NUMBER: AREA CODE – NUMBER EXTENSION
751-5600 312 5600

3. NAME OF PERSON TO BE CONTACTED REGARDING THIS APPLICATION
R.A. Woll

TELEPHONE NUMBER: AREA CODE – NUMBER EXTENSION
312/242-3144. Ext. 311

4. APPLICANT'S MAILING ADDRESS *(Include Zip Code)*
100 East Erie St.
Chicago, Illinois 60611

5. STREET ADDRESS WHERE LICENSED MATERIAL WILL BE USED *(Include Zip Code)*
See Supplemental Sheet.

(IF MORE SPACE IS NEEDED FOR ANY ITEM, USE ADDITIONAL PROPERLY KEYED PAGES.)

6. INDIVIDUAL(S) WHO WILL USE OR DIRECTLY SUPERVISE THE USE OF LICENSED MATERIAL
(See Items 16 and 17 for required training and experience of each individual named below)

	FULL NAME	TITLE
a.	Casimir S. Wytaniec (1)	Associate Electrical Engineer
b.	James C. Moore III (2)	Principal Mechanical Engineer
c.		

7. RADIATION PROTECTION OFFICER
Ljerka M. Kristoff

Attach a resume of person's training and experience as outlined in Items 16 and 17 and describe his responsibilities under Item 15.

8. LICENSED MATERIAL

LINE NO.	A ELEMENT AND MASS NUMBER	B CHEMICAL AND/OR PHYSICAL FORM	C NAME OF MANUFACTURER AND MODEL NUMBER *(If Sealed Source)*	D MAXIMUM NUMBER OF MILLICURIES AND/OR SEALED SOURCES AND MAXIMUM ACTIVITY PER SOURCE WHICH WILL BE POSSESSED AT ANY ONE TIME
(1)	Cesium 137	Sealed Source	Ohmart Dwg.A-5771	100
(2)	Cesium 137	Sealed Source	Texas Nuclear Model 570-57157C	2000
(3)				
(4)				

	E DESCRIBE USE OF LICENSED MATERIAL
(1)	To be used on S-1 Sludge Conveyor Belt Scale.
(2)	To be used for Sludge Density Measurements in Putnam Township
(3)	
(4)	

FORM NRC-313 I (6-78)

8506110388 850524
REG3 LIC30
12-07367-01 PDR

9. STORAGE OF SEALED SOURCES

LINE NO.	A. CONTAINER AND/OR DEVICE IN WHICH EACH SEALED SOURCE WILL BE STORED OR USED.	B. NAME OF MANUFACTURER	C. MODEL NUMBER
(1)	Source Holder	Ohmart Corp.	SHRM
(2)	Source Holder	Texas Nuclear	5176
(3)			
(4)			

10. RADIATION DETECTION INSTRUMENTS

LINE NO.	A. TYPE OF INSTRUMENT	B. MANUFACTURER'S NAME	C. MODEL NUMBER	D. NUMBER AVAILABLE	E. RADIATION DETECTED (alpha, beta, gamma, neutron)	F. SENSITIVITY RANGE (milliroentgens/hour or counts/minute)
(1)	Automatic Well Counter	Nuclear-Chicago	---	1	Gamma	---
(2)	Cutie Pie	Nuclear-Chicago	2588	1	Beta-Gamma	0-2500 mr/hr
(3)	Ion Chamber	Eberline	RO-3	1	Beta-Gamma	0-5000 mr/hr
(4)	Count Rate Meter	Ludlum Measurements	12	1	Alpha, Beta Gamma	0-3 mr/hr

11. CALIBRATION OF INSTRUMENTS LISTED IN ITEM 10

☒ a. CALIBRATED BY SERVICE COMPANY

NAME, ADDRESS, AND FREQUENCY

See Supplemental Sheet

☒ b. CALIBRATED BY APPLICANT

Attach a separate sheet describing method, frequency and standards used for calibrating instruments.

See Supplemental Sheet

12. PERSONNEL MONITORING DEVICES

A. TYPE (Check and/or complete as appropriate.)	B. SUPPLIER (Service Company)	C. EXCHANGE FREQUENCY
☒ (1) FILM BADGE ☒ (2) THERMOLUMINESCENCE DOSIMETER (TLD) ☐ (3) OTHER (Specify): _____	R,S, Landauer, Jr, & Co, Glenwood, Illinois 60425	☒ MONTHLY ☐ QUARTERLY ☐ OTHER (Specify):

13. FACILITIES AND EQUIPMENT (Check were appropriate and attach annotated sketch(es) and description(s).

- ☐ a. LABORATORY FACILITIES, PLANT FACILITIES, FUME HOODS (Include filtration, if any), ETC.
- ☐ b. STORAGE FACILITIES, CONTAINERS, SPECIAL SHIELDING (fixed and/or temporary), ETC.
- ☐ c. REMOTE HANDLING TOOLS OR EQUIPMENT, ETC.
- ☐ d. RESPIRATORY PROTECTIVE EQUIPMENT, ETC. Does not apply

14. WASTE DISPOSAL

a. NAME OF COMMERCIAL WASTE DISPOSAL SERVICE EMPLOYED

Health Physics Associates, Ltd. Highland Park, Ill, 60035

b. IF COMMERCIAL WASTE DISPOSAL SERVICE IS NOT EMPLOYED, SUBMIT A DETAILED DESCRIPTION OF METHODS WHICH WILL BE USED FOR DISPOSING OF RADIOACTIVE WASTES AND ESTIMATES OF THE TYPE AND AMOUNT OF ACTIVITY INVOLVED. IF THE APPLICATION IS FOR SEALED SOURCES AND DEVICES AND THEY WILL BE RETURNED TO THE MANUFACTURER, SO STATE.

INFORMATION REQUIRED FOR ITEMS 15, 16 AND 17

Describe in detail the information required for Items 15, 16 and 17. Begin each item on a separate page and key to the application as follows:

15. RADIATION PROTECTION PROGRAM. Describe the radiation protection program as appropriate for the material to be used including the duties and responsibilities of the Radiation Protection Officer, control measures, bioassay procedures *(if needed)*, day-to-day general safety instruction to be followed, etc. If the application is for sealed source's also submit leak testing procedures, or if leak testing will be performed using a leak test kit, specify manufacturer and model number of the leak test kit.

16. FORMAL TRAINING IN RADIATION SAFETY. Attach a resume for each individual named in Items 6 and 7. Describe individual's formal training in the following areas where applicable. Include the name of person or institution providing the training, duration of training, when training was received, etc.

    a. Principles and practices of radiation protection.

    b. Radioactivity measurement standardization and monitoring techniques and instruments.

    c. Mathematics and calculations basic to the use and measurement of radioactivity.

    d. Biological effects of radiation.

17. EXPERIENCE. Attach a resume for each individual named in Items 6 and 7. Describe individual's work experience with radiation, including where experience was obtained. Work experience or on-the-job training should be commensurate with the proposed use. Include list of radioisotopes and maximum activity of each used.

18. CERTIFICATE

(This item must be completed by applicant)

The applicant and any official executing this certificate on behalf of the applicant named in Item 2, certify that this application is prepared in conformity with Title 10, Code of Federal Regulations, Part 30, and that all information contained herein, including any supplements attached hereto, is true and correct to the best of our knowledge and belief.

WARNING.–18 U.S.C., Section 1001; Act of June 25, 1948; 62 Stat. 749; makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.

a. LICENSE FEE REQUIRED *(See Section 170.31, 10 CFR 170)* Does not apply	b. CERTIFYING OFFICIAL *(Signature)* Raymond R Rimkus/pd
	c. NAME *(Type or print)* Raymond R. Rimkus
(1) LICENSE FEE CATEGORY:	d. TITLE Chief of Maintenance & Operations
(2) LICENSE FEE ENCLOSED: $	e. DATE

FORM NRC-313 I (6-78)

Control No. 01490

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO
APPLICATION FOR RENEWAL OF BYPRODUCT MATERIAL
LICENSE #12-07367-01

SUPPLEMENTAL SHEET

ITEM 5. Street Address Where Licensed Material Will Be Used

(1) 5901 West Pershing Road, Stickney, Illinois
Post Office Address: Cicero, Illinois 60650

(2) Section 13, T. 6 N-R Putnam Township,
Canton, Illinois Rt. #1, 61520

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO
APPLICATION FOR RENEWAL OF BYPRODUCT MATERIAL
LICENSE #12-07367-01

SUPPLEMENTAL SHEET

ITEM 11. Calibration of Instruments in Item 10

(a) Calibrated by Service Company

Line No.	Name	Address	Frequency
(2)	Nuclear Safety	Elgin, Ill. 60120	6 Months
(3)	Nuclear Safety	Elgin, Ill. 60120	6 Months
(4)	Manufacturer		6 Months

(b) Calibrated by Applicant - Line No. (1)

Energy Scale Calibration, Example: 0-1 MeV

Source: Nuclear-Chicago Model RT-1 Cs-137 of 0.077 uCi (Oct. '58) (A statement of the accuracy not given).

Procedure: The source is lowered into the well.
Attenuator is set to 4 (1 MeV).
Upper level discriminator (window) is set to 1 (0.1 MeV).
Lower level discriminator (base) is set to 6.11.
High voltage is found for which a maximum counting rate is obtained.

Efficiency of Counting Determination

Source: USEPA Environmental Monitoring and Support Laboratory of Las Vegas Standard Solution Ampoule #1827-2-50 Cs-137, 8.64 nCi±4.9% (12/1/77).

Procedure: The solution is diluted by weighing and dilution in volumetric flask - diluted fraction is counted in predetermined window. Counting rate/disintegration rate x 100 = percent counting efficiency.

Frequency of Calibration - Daily

Control No. 01490

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO
APPLICATION FOR RENEWAL OF BYPRODUCT MATERIAL
LICENSE #12-07367-01

SUPPLEMENTAL SHEET

ITEM 15. Radiation Protection Program

(A) Control Measures - The source holder is placed in ON position when process is started. If process is shut down, the source holder is placed in OFF position. The ON-OFF mechanism is tested approximately once a month.

(B) Leak Test Procedure - A leak test is performed on the surface of a source holder every three years by Ljerka M. Kristoff, as follows:

1. 2-3 Q-tips are moistened in isopropyl alcohol and used to wipe the seams of a source holder; the Q-tips are then placed into a counting vial.

2. Another 2-3 Q-tips are moistened in isopropyl alcohol and used to wipe a remote surface at the plant for the purpose of background determination.

3. The vials are counted by the use of calibrated, automatic gamma well counter in 200 KeV window for 100 min.

4. The efficiency of counting for Cs-137 (200 KeV window) was determined as being 19.8 percent.

5. The amount of removable contamination on wipe test -

   Gross counts/min of wipe test - Background count/min = Net counts/min of wipe test.

   $$\frac{\text{Net counts/min}}{0.198} = \text{Disintegrations/min}$$

   $$\text{Disintegrations/min} \times \frac{1 \text{ uCi}}{2.22 \times 10^6 \text{ disintegrations/min}} = \text{Microcuries of removable contamination.}$$

(C) A radiation survey of the gauges is conducted also every three years by Ljerka M. Kristoff according to the survey pattern sheets attached.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO
APPLICATION FOR RENEWAL OF BYPRODUCT MATERIAL
LICENSE #12-07367-01

SUPPLEMENTAL SHEET

ITEM 15. (cont'd)

(D) When any work is done in the immediate vicinity of the gauges, such as repair of the belt, pipefitting, etc., the shutter is placed in OFF position and the workers are given radiation dosimeters.

(E) Any future removal, relocation, and installation will be supervised by Ljerka M. Kristoff. Procedure for installation is given below.

1. The transportation container with a gauge is surveyed on the new site to determine if any damage has been done to the unit in moving.

2. The cover of the container is removed and the gauge is visually inspected for transportation damage to the locking mechanism, markings and labels.

3. The gauge is leak tested by the appropriate procedure.

   In case of any visible damage or any degree of contamination, the gauge is not installed but returned to the manufacturer.

4. With locking mechanism still in the closed position, the gauge is mounted in its proper location.

5. When mounting of the gauge is completed, a radiation survey is taken with locking mechanism in closed and open position, and pipe empty.

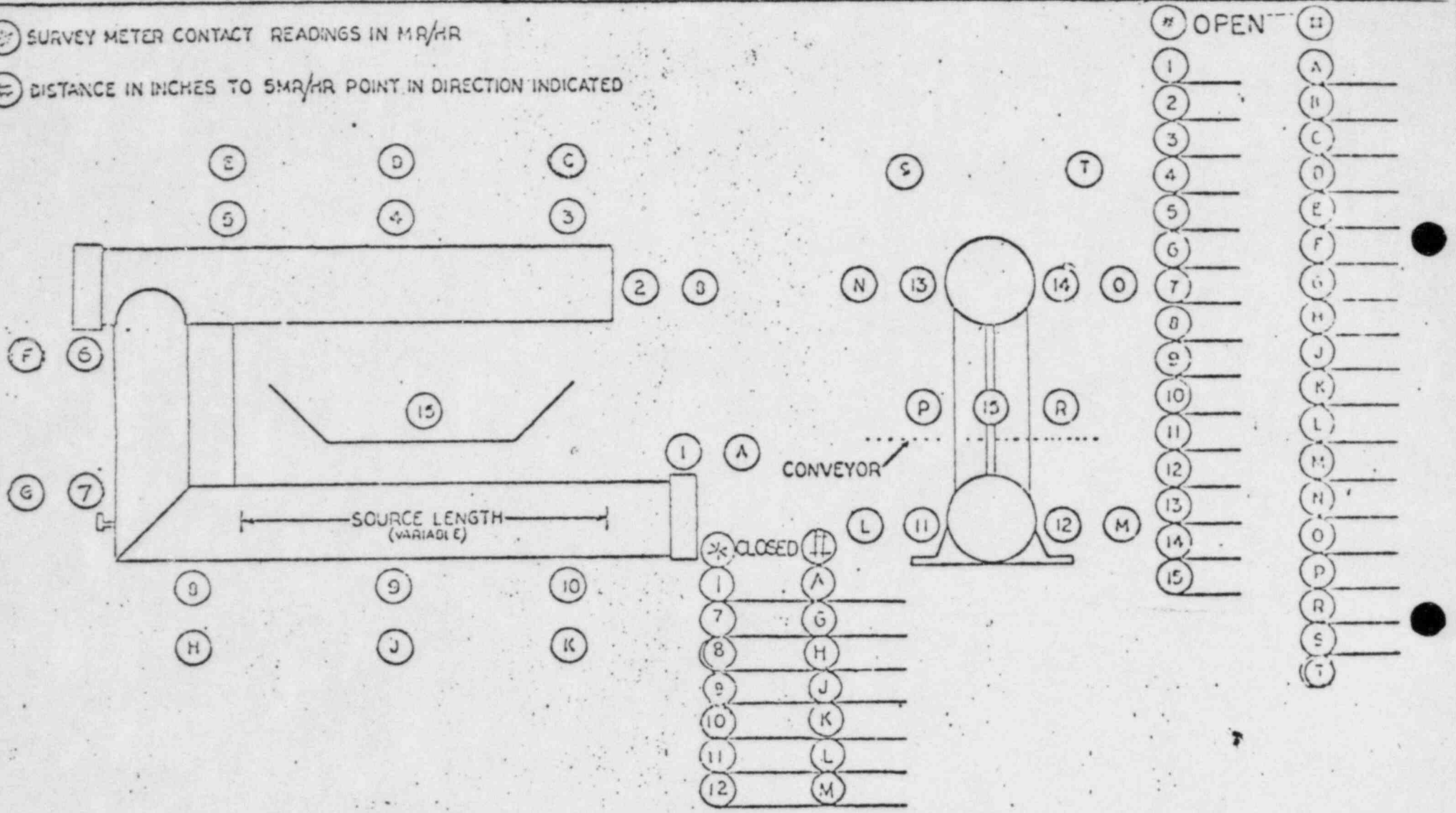
(F) In the event of an emergency involving a source holder, such that the shutter could not be placed in the OFF position, the area in the vicinity of the gage would be immediately barricaded and Ljerka M. Kristoff would be contacted to survey the area and take a leak test. Such an emergency might be a fire or explosion. The local Public Health Agency and the Regional Operations Office of the USNRC would be notified of the incident.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO
APPLICATION FOR RENEWAL OF BYPRODUCT MATERIAL
LICENSE #12-07367-01

ITEM 15 (c) Radiation Survey of Ohmart Nuclear Weigh-Scale -

(x) SURVEY METER CONTACT READINGS IN MR/HR

(#) DISTANCE IN INCHES TO 5MR/HR POINT IN DIRECTION INDICATED



SOURCE SHUTTER OPEN X CLOSED ____ CONVEYOR FULL X EMPTY ____

SOURCE MTR 100 MC Cs 137

Control No. 01490

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO
APPLICATION FOR RENEWAL OF BYPRODUCT MATERIAL
LICENSE #12-07367-01

ITEM 15 (c). Radiation Pattern Model 5176

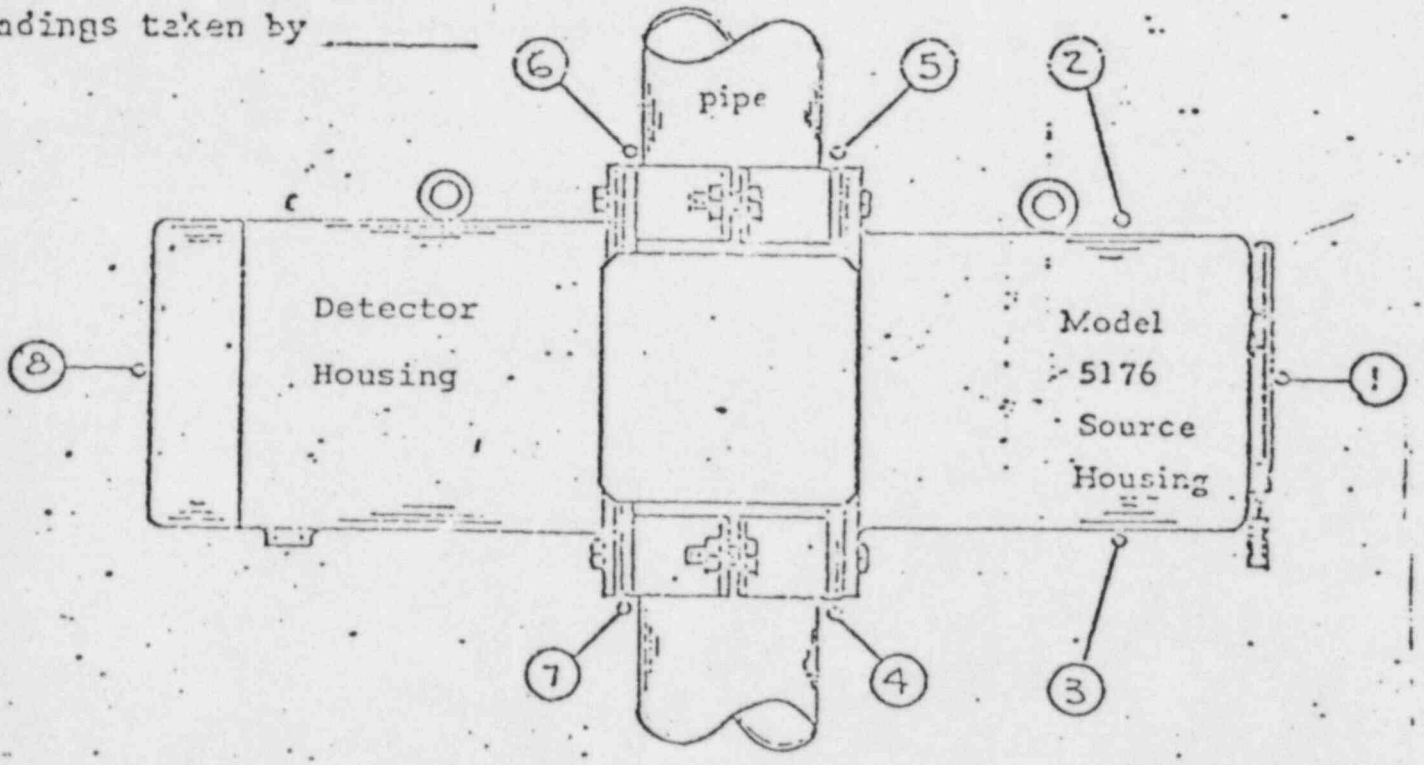
eading No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14		
hutter Open																
hutter Closed																

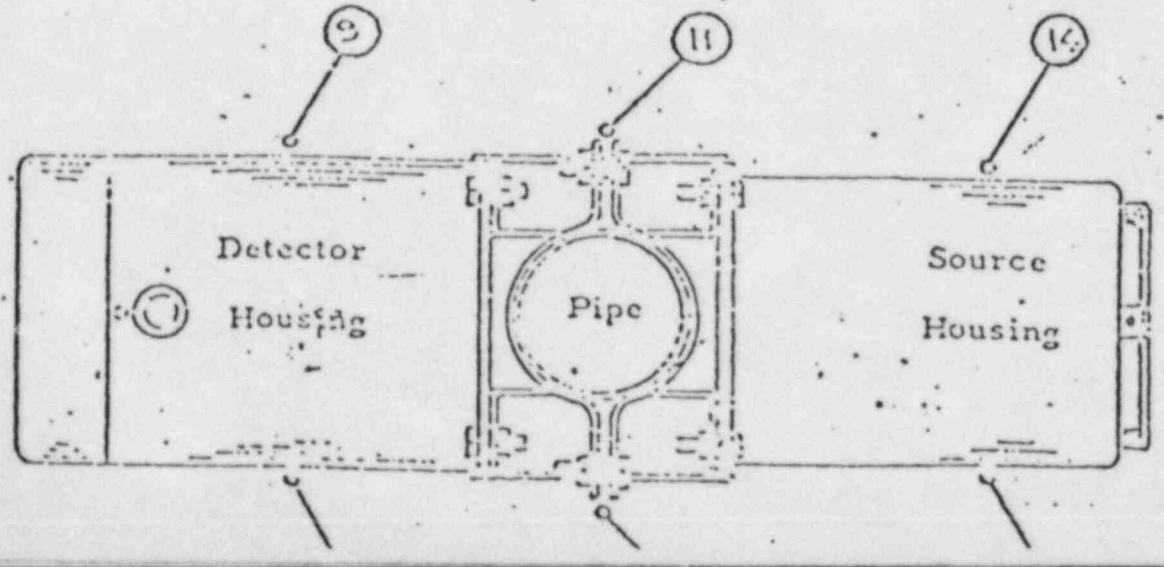
11 readings taken on surface of housings

cale _____

ate _____

eadings taken by _____





THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO
APPLICATION FOR RENEWAL OF BYPRODUCT MATERIAL
LICENSE #12-07367-01

Resume

of

Casimir S. Wytaniec

Item 16. Training

Casimir S. Wytaniec was trained by Ljerka M. Kristoff, Radiation Protection Officer for the Metropolitan Sanitary District of Greater Chicago. The training was conducted during March of 1976 and consisted of a study of Ohmart nuclear gauges manual and USNRC publications, discussions, and field trips. The discussions covered construction, operation and location of the nuclear devices used at the West-Southwest waste treatment plant, applicable USNRC and State of Illinois rules and regulations, procedures for personnel monitorng, leakage tests and radiation surveys.

Item 17. Experience

Casimir S. Wytaniec obtained his work experience with radiation at the West-Southwest waste treatment plant of the Metropolitan Sanitary District of Greater Chiacgo. Since April of 1976 he has been responsible for maintenance and operation of three Ohmart nuclear density gauges (covered by Ohmart general license) and the Ohmart nuclear weigh scale. Also, he has been responsible for maintenance and operation of the Kay-Ray density gauge installed under his supervision in August of 1977. Each Ohmart density gauge contains a Cs-137 sealed source of 1000 mCi. The Ohmart weigh scale contains a Cs-137 sealed source of 100 mCi, and the Kay-Ray density gauge contains a Cs-137 sealed source of 200 mCi.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO
APPLICATION FOR RENEWAL OF BYPRODUCT MATERIAL
LICENSE #12-07367-01

Resume

of

James C. Moore III

Item 16. Training

Mr. J.C. Moore, Principal Mechanical Engineer, was trained by Texas Nuclear Field Engineers during the installation and start up of a Texas Nuclear Corporation SG Density Gauge. This training took place June and July, 1976, when the gauge was installed on a hydraulic dredge at the Fulton County site. The training included the operation, maintenance, and safety of the unit which uses Cesium 137 as its radioactive source.

Item 17. Experience

Mr. Moore has been responsible for the operation and maintenance of the density gauge since the unit has been placed in operation by the Sanitary District in 1976. He is responsible for instructing operating personnel on the correct safety procedures in the care and operation of the unit in its day to day activity.

Control No. 01490

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO
APPLICATION FOR RENEWAL OF BYPRODUCT MATERIAL
LICENSE #12-07367-01

Resume

of

Ljerka M. Kristoff

Item 16. Training

Illinois Institute of Technology, 1955-56

Atomic Physics for Engineers, one semester undergraduate course;

Chemistry of Uranium and Transuranium Elements, one semester graduate course;

Radiation Chemistry, one semester graduate course.

Item 17. Experience

The Metropolitan Sanitary District of Greater Chicago, Chicago, Illinois, August, 1967 - present

Radiation Chemist - Radiology Section Leader and Radiation Protection Officer, Radiology Section of the Research and Development Department

Responsible for radiation protection programs: radiation monitoring of personnel and of working areas; leak testing and maintenance of nuclear gaging devices utilizing sealed sources of radioactive material.

Supervises work on radiological programs including radiological monitoring of wastewaters, Lake Michigan environment, river and well waters under the jurisdiction of the MSDGC; the use of activation analysis in water pollution and of radiotracers in the evaluation of waste treatment processes, the use of ionizing radiation in wastewater treatment.

The Enrico Fermi Institute for Nuclear Studies, The University of Chicago, Chicago, Illinois, March, 1965 - July, 1967.

Research Chemist for Professor Anthony L. Turkevich

Worked out a radiochemical procedure for quantitative determination of U-238 in meteorites.

Item 17. Experience (cont'd.)

IIT Research Institute, Chicago, Illinois, September, 1955 - March, 1965

Assistant Physicist, Nuclear Physics and Chemical Physics Sections

Conducted feasibility studies on the use of radiotracers in corrosion inhibition; participated in the compilation of data obtained in the classified research programs; devised a liquid scintillation counting procedure for the determination of C-14 (aqueous) resulting from (n,p) reactions in KN_3 and NaN_3; conducted experiments, as project leader, on the development of a new method of preparing high specific activity isotopes by use of the Szilard-Chalmers processes in clay minerals; investigated fundamental processes in radiation chemistry, radiation-induced synthesis of organic halogen-containing compounds, and the effect of low energy electrons on thin films; assisted with programs studying the application of radiotracers to the detection of leaks in heat exchangers and the method of separation of rare earth radionuclides by ion-exchange resins.

The work described under "Experience" involved a variety of radioisotopes in amounts ranging from a few picoCuries to many KiloCuries.