

## 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.

OFFICIAL RECORD COPY

## Licensee

1. Hoechst Celanese Corporation  
Research Division, RIMTC2. 86 Morris Avenue  
Summit, New Jersey 07901In accordance with the letter dated  
March 13, 1997,3. License Number 29-08155-01 is amended in  
its entirety to read as follows:

4. Expiration Date March 31, 2004

5. Docket or  
Reference No. 030-053416. 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. Americium 241

A. Sealed sources  
(Amersham Model AMC. 2084)A. Not to exceed 10  
millicuries per source and  
30 millicuries total

9. Authorized use

A. For use in x-ray fluorescence analyzers.

## CONDITIONS

10. Licensed material may be used only at the licensee's facilities located at 86 Morris Avenue, Summit, New Jersey.

11. A. Licensed material shall be used by, or under the supervision of, Joshua Gurman, Ph.D., or Cheng Saw, Ph.D.

B. The Radiation Safety Officer for this license is Joshua Gurman, Ph.D.

12. A. Sealed sources and detector cells containing licensed material shall be tested for leakage and/or contamination at intervals not to exceed six months or at such other intervals as are specified by the certificate of registration referred to in 10 CFR 32.210, not to exceed three years.

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 three months.

C. In the absence of a certificate from a transferor indicating that a leak test has been made within six months prior to the transfer, a sealed source or detector cell received from another person shall not be put into use until tested.



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**MATERIALS LICENSE  
SUPPLEMENTARY SHEET**

License number

29-08155-01

Docket or Reference number

030-05341

Amendment No. 21

- D. Each sealed source fabricated by the licensee shall be inspected and tested for construction defects, leakage, and contamination prior to any use or transfer as a sealed source.
- E. Sealed sources and detector cells 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
  - (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 transfer 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.
- F. The 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 and the source or detector cell shall be removed immediately from service and decontaminated, repaired, or disposed of in accordance with Commission regulations. The report shall be filed within five days of the date the leak test result is known with the U.S. Nuclear Regulatory Commission, Region 1, ATTN: Chief, Nuclear Materials Safety Branch, 475 Allendale Road, King of Prussia, Pennsylvania 19406. The report shall specify the source or detector cell involved, the test results, and corrective action taken.
- G. The licensee is authorized to collect leak test samples for analysis by Radiation Detection Company. 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.
13. Sealed sources or detector cells containing licensed material shall not be opened or sources removed from source holders by the licensee.
14. The licensee shall conduct a physical inventory every six months to account for all sealed sources and devices containing licensed material received and possessed under the license.
15. The licensee shall not acquire licensed material in a sealed source or device unless the source or device has been registered with the U.S. Nuclear Regulatory Commission pursuant to 10 CFR 32.210 or equivalent regulations of an Agreement State.

**MATERIALS LICENSE  
SUPPLEMENTARY SHEET**

License number

29-08155-01

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Amendment No. 21

16. The licensee is authorized to transport licensed material in accordance with the provisions of 10 CFR 71, "Packaging and Transportation of Radioactive Material."
17. 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 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. Application dated November 12, 1993
  - B. Letter dated January 21, 1994
  - C. Letter dated March 13, 1997
  - D. Letter dated June 5, 1997

JUN 16 1997

Date \_\_\_\_\_

For the U.S. Nuclear Regulatory Commission

**ORIGINAL SIGNED BY:**

By **JAMES M. BONDICK**

Nuclear Materials Safety Branch  
Region I

King of Prussia, Pennsylvania 19406

JUN 16 1997

Joshua Gurman, Ph.D.  
Radiation Safety Officer  
Hoechst Celanese Corporation  
Research Division, RLMTTC  
86 Morris Avenue  
Summit, NJ 07901

Dear Dr. Gurman:

This refers to your license amendment request. Enclosed with this letter is the amended license. Please note that as part of this amendment, in accordance with 10 CFR 30.36, effective February 15, 1996, the expiration date of your license has been extended by a period of five years. Your new expiration date is stated in Item 4 of the license.

Please review the enclosed document carefully and be sure that you understand and fully implement all the conditions incorporated into the amended license. If there are any errors or questions, please notify the U.S. Nuclear Regulatory Commission, Region I Office, Licensing Assistance Team, (610) 337-5093 or 5239, so that we can provide appropriate corrections and answers.

Thank you for your cooperation.

Sincerely,

**ORIGINAL SIGNED BY:**  
**JAMES M. BONDICK**

James M. Bondick  
Health Physicist  
Division of Nuclear Materials Safety

License No. 29-08155-01  
Docket No. 030-05341  
Control No. 124431

Enclosure:  
Amendment No. 21

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J. Gurman, Ph.D  
Hoechst Celanese Corporation

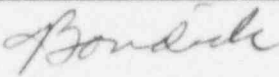
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OFFICE	DNMS/RI	<input checked="" type="checkbox"/> N	DNMS/RI	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
NAME	JBondick/jmb <i>JB</i>						
DATE	06/16/97	06/ /97	06/ /97	06/ /97	06/ /97	06/ /97	06/ /97

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<b>TELEPHONE CONVERSATION RECORD</b>	<b>Date:</b> 6/12/97	<b>Time:</b> 4:15 pm
<b>Mail Control No.:</b> 124431	<b>License No.:</b> 29-08155-01	<b>Docket No.:</b> 030-05341
<b>Person Called:</b> Dr. Gurman, RSO	<b>Organization:</b> Hoechst Celanese Corp.	<b>Telephone Number:</b> 908-522-7898
<b>Person Calling:</b> J Bondick	<b>Organization:</b> NRC	<b>Telephone Number:</b> 6951
<b>Subject:</b> Clarification of authorized users.		
<b>Summary:</b> Dr. Gurman stated that Ms. Cardo had left the organization that her name should also be removed from the list of authorized users.		
<b>Action Required/Taken:</b> Note to file		
<b>Signature:</b> J. Bondick 	<b>Date:</b> 6/12/97	



MS-16

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Corporate Research and Technology  
Hoechst Celanese Corporation  
86 Morris Avenue  
Summit, NJ 07901

June 5, 1997

U. S. Nuclear Regulatory Commission, Region 1  
Nuclear Materials Safety Section B  
475 Allendale Road  
King of Prussia, Pennsylvania 19406

Subject: Response to Memorandum Mail Control No. 124431

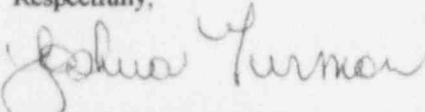
Mr. Bondick:

Attached please find summary information along with a copy of his professional resume for Dr. Cheng Saw, indicating his formal training and experience in the areas: a) principles and practices of radiation protection; b) radioactivity measurements, standardization and monitoring techniques and instruments; c) mathematics and calculations basic to the use and measurement of radioactivity, and d) biological effects of radiation. In addition, he has described the specific isotopes and maximum quantities of these materials handled and the specific type of use.

With the submission of this information, I am formally requesting that Dr. Saw be listed on our Nuclear Regulatory Commission License No. 29-08155-01, as an Authorized User, who will be able to use licensed material without supervision. As Radiation Safety Officer, I would like to delegate responsibility of back-up providing supervision over the use of licensed materials during my absences from site.

Hopefully this additional information will assist in completing your review of our submitted request for amendment of Nuclear Regulatory Commission License No. 29-08155-01. Please do not hesitate to contact me (908-522-7898), should you need any further information or clarifications.

Respectfully,



Joshua L. Gurman, Ph.D.  
Supervisor, Product Safety and Toxicology

Enclosures: Summary Training and Experience Statement for C. Saw, Ph.D.  
Resume for C. Saw, Ph.D.

JLG-39-97

**Training and Experiences of Cheng K. Saw, Ph.D.**  
(see also complete professional resume)

**Formal education and training.** (Incorporating principles and practices of radiation protection, radioactivity measurements, monitoring techniques and instruments, and biological effects of radiation.)

1980- Ph. D. Solid State Physics, University of Rhode Island, Kingston, RI.

**Relevant Courses at graduate level(1974-1980)**

Nuclear Physics - 1 semester, Quantum Mechanics - 2 semester  
Electrodynamics - 2 semesters, Modern Physics - 1 semester  
Health Physics - 1 semester, neutron physics - 1 semester

**Other Pertinant Training**

Radioactivity - A course by Oak Ridge Associated Universities, Oak Ridge, TN  
- Wrote a paper on long term radiation effect of cataract - Health Physics  
Division, Oak Ridge National Laboratory, Prof. M. Payne (1972-1973)

Neutron reactor training - Wrote a paper on Measurement of Gamma energies by  
Neutron Capture, Brookhaven National Laboratory- Physics Division.

Safety radiation training

- (1) Advanced Pulsed Neutron Source (Argonne National Lab.)
- (2) Reactor safety at National Institute of Science and Technology
- (3) National Synchrotron Light Source, Brookhaven National Laboratory.
- (4) Radiation training by HCC consultants (e.g. Byrnes Consulting Service)

**Experience with radioactive materials**

- (1) Use of radioactive materials for calibration purposes for the past 12 years in industry
- (2) Use of radioactive materials for 6 years at graduate school

Am 241, 10 mCi sealed source, for X-ray generation  
Co 55, ~ 100  $\mu$ Ci sealed source, for radiation calibration  
Cs 137, ~ 100  $\mu$ Ci sealed source, for radiation calibration  
Fe 55, 100  $\mu$ Ci sealed source, for radiation calibration



## RESUME

CHENG K. SAW

Hoechst Celanese Research Div.  
86 Morris Avenue  
Summit, NJ 07901  
1-908-522-7825

### PERSONAL DATA :

EDUCATION : Ph. D. (Physics) 1974-1980 Univ. of Rhode Island, Kingston, RI.,  
B. A. (Physics) 1970-1974 Berea Coll., Berea, KY

### RESEARCH AND PROFESSIONAL EXPERIENCE :

1992- Staff Scientist, Hoechst Celanese, 10 years industrial experience with HCC.

- Develop x-ray/synchrotron scattering techniques for use to solve HCC problems.
- Proposed projects in polymer science which use state-of-the-art scattering techniques and polymer expertise to gain understanding structure-property relationship.
- HCC coordinator in HCC involvement at the X11 PRT synchrotron beam line.
- Develop programs to help develop new products.
- Submit new ideas to align with RLMT's mission, champion the idea into a research program.

1985- Senior Research Physicist, Hoechst Celanese, Summit, NJ 07901

- Work with various groups on analytical techniques to solve material science problems.
- Analytical co-ordinator of Ceramic project.
- Responsible for all aspect of the x-ray lab. with 4 x-ray generators; 2 rotating anodes, 2 seal tubes; supervised 2 technicians, maintained state-of-the-art equipments, development various diffractometers, x-ray cameras and devices.
- Perform experiments coupled with results of other analytical techniques in order to gain understanding of the materials science problems.
- Active participant and carry out EXAFS, XANES, XRF and diffraction experiments at X11 beam line at NSLS synchrotron source.
- Champion of neutron scattering experiments to be carried out at national facilities.

1982-1985 : Postdoctoral research, MST, Argonne Nat. Lab., Argonne, IL 60439

- Developed and maintained the x-ray lab.; set up fully automated diffractometers, writing software for data collection and analysis for diffuse scattering in VOx.
- Performed x-ray and neutron scattering experiments on amorphous metals and analyze data for their scientific significance
- Planned and developed new experiments for possible divisional support and funding
- Developed and installed software for X18A instruments at the NSLS, BNL

1980-1982 : Postdoctoral research., Ames Lab., Iowa State Univ., Ames, IA

- Performed neutron scattering experiments on single crystal ScDx on double axis diffractometer at Oak Ridge Research Reactor and powder rare earth hydrides at the IPNS, Argonne Nat. Lab.
- Performed inelastic scattering experiments on the triple axis spectrometer at ORR, Oak Ridge, TN

1974-1980 : Teaching and research assistant, Univ. of Rhode Island, Kingston, RI

- Developed models to study the structure of amorphous rare earth-transition metal alloys (thesis)

- Deformed neutron scattering experiments on condensed matter
- Set up of scattering instruments at Rhode Island Nuclear Reactor and performed various experiments utilizing the neutron beam
- Taught undergraduate laboratories and tutored many selected students

1977(summer) student research at Brookhaven National Laboratory, Upton, NY

- Measured neutron radiative neutron captured gamma energies using Ge(Li) detectors

1970-1974 : Student, Berea College, Berea, KY

- Laboratory Instructor, electronic technician and photographer

1972 (summer): student, Oak Ridge National Laboratory, Oak Ridge, TN

- Studied radiation effects on eye cataract, underwent a course in radioactivity at the Oak Ridge Associated Universities.

SKILLS : good knowledge of Solid State Physics, polymer science, expert understanding of x-ray and neutron scattering, and computer simulations, computer software/hardware.

JOB REQUIREMENTS : Research & Development

#### RESEARCH INTERESTS

- 1)-Structural studies on condensed matter using scattering techniques
- 2)-Polymer Science: Structure-Property relationship
- 3)-Computer simulations to predict physical properties.

#### HONORS AND AWARDS

- 1970-1974 Tuition Scholarship, Freshman Scholarship(1970), Dean's list (1972), Berea College
- 1973 participant, Ambassador for Friendship Program (Macalester College, MN)
- 1993- Industrial Steering Committee, Neutron Scattering Society of America

PROFESSIONAL SOCIETY: APS, MRS

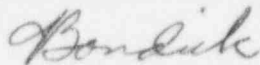
HOBBIES AND EXTRA CURRICULAR ACTIVITIES : Badminton

REFERENCES : available on request.

## PUBLICATIONS:

- C. K. Saw, M. L. Steits and R. C. Chrien, "Precision Measurements of Gamma Energies of N, Fe, Co, Al and Pb", Brookhaven Report 1976
- Y. P. Sharma, C. K. Saw and S. J. Pickart, "Structure Simulation of Amorphous Binary Alloys", *J. of Non-Cryst. Solids* 41, 287 (1980)
- S. J. Pickart, C. K. Saw and J. I. Budnick, "Atomic and Magnetic Ordering in  $\text{Fe}_{3-x}\text{V}_x\text{Si}$  Alloys", *J. Phys. Chem. Solids*, 42, 595 (1981)
- Y. P. Sharma, S. J. Pickart and C. K. Saw, "Computer Modeling of Spin Distribution in RE-TM Alloys", 20th Annual Conf. on Magnetism and Magnetic Materials, Dallas, TX, Nov 11-14, 1980, *J. Appl. Phys* 52, 1800 (1981)
- C. K. Saw and S. J. Pickart, "Aperiodicities in an Amorphous Dense Random Packed Model", *Phys. Stat. Sol. (b)* 106, K73(1981)
- S. J. Pickart and C. K. Saw, "Simulation of Dense Random Packed Models for Amorphous  $\text{Tb}_x\text{Fe}_{1-x}$  Alloy System", *J. of Non-Cryst. Solids*, 47, 385 (1982)
- C. K. Saw, B. J. Beaudry and C. Stassis, "Location of deuterium in a-scandium", *Phys. Rev. B* 27, 7013 (1983)
- R. C. Haushalter, C. J. O'Connor, A. M. Umarji, G. K. Shenoy and C. K. Saw, "Spin Glass Behavior in the new Amorphous Alloys  $\text{M}_2\text{SnTe}_4$ ,  $\text{M}=\text{Cr}, \text{Mn}, \text{Fe}$ ", *Solid State Commun.* 49, 929 (1984)
- R. C. Haushalter, C. J. O'Connor, A. M. Umarji, G. K. Shenoy and C. K. Saw, "Synthesis of new Amorphous Metallic Spin Glass from Oxidation of Zintl Anions by Transition Metal Cations", *Am. Chem. Soc. 187th Nat'l Mtg.*, St. Louis, MO., April 8-13, 1984 (Abstract INOR 235)
- R. B. Schwarz, R. R. Petrick and C. K. Saw, "The synthesis of Amorphous Ni-Ti Alloy powders by Mechanical Alloying", *J. of Non-Cryst. Solids* 76, 281 (1985)
- C. K. Saw and J. Faber Jr., "Number Fluctuations in DRP models", *Int. Conf. on the Theory of Non-Crystalline Solids*, Institute of Amorphous Studies, Bloomfield Hills, MI. June 3-6, 1985. *J. of Non-Cryst. Solids* 75, 347 (1985)
- C. K. Saw and R. B. Schwarz, "Dense Random Packed Model for  $\text{Ni}_{35}\text{Zr}_{65}$ : Influence of Heat of Mixing", *Int. Conf. on the Theory of Non-Crystalline Solids*, Institute of Amorphous Studies, Bloomfield Hills, MI. June 3-6, 1985, *J. of Non-Cryst. Solids* 75, 355 (1985)
- C. K. Saw and I. L. Kalnin, "X-Ray Diffraction Studies of Ferroelectric Lead Titanate Bismuth Ferrite Ceramic", *Proc. of the 6th IEEE International Symposium of Applications of Ferroelectrics*, pp. 309-313 (1986)
- I. L. Kalnin and C. K. Saw, "Domain Realignment in Poled Lead Titanate/Polymer Composites", *Proc. of the 6th IEEE International Symposium of Applications of Ferroelectrics*, pp. 429-431 (1986)
- C. K. Saw and R. B. Schwarz, "Chemical Short Range Order in Dense Random Packed Models", *J. of Less Common Metals* 140, (1988) 385
- C. K. Saw and O. R. Hughes, "Powder Diffraction Studies of Litidionite", (to be submitted)
- R. T. Cnen, C. K. Saw, M. G. Jamieson, T. R. Aversa and R. Callahan, "Structural Characterization of Celgard Microporous Membrane Precursors; Melt-Extruded Polyethylene Films", *J. Appl. Polymer Science*, 53 (1994) 471.
- Updated Nov 7, 1994

124431

<b>TELEPHONE CONVERSATION RECORD</b>		<b>Date:</b> 5/29/97	<b>Time:</b> 9:45 a.m.
<b>Mail Control No.:</b> 124431		<b>License No.:</b> 29-08155-01	<b>Docket No.:</b> 030-05341
<b>Person Called:</b> J. Bondick		<b>Organization:</b> NRC	<b>Telephone Number:</b> 6951
<b>Person Calling:</b> Joshua Gurman		<b>Organization:</b> Hoechst Celanese Corp. Res. Div.	<b>Telephone Number:</b> 908-522-7820
<b>Subject:</b> Request an extension to submit response to deficiency letter.			
<b>Summary:</b> Dr. Gurman requested an extension of two weeks to prepare the response to the deficiency letter. He needs the extra time because Dr. Cheng Saw has been out of the country and he was not able to obtain the required information from Dr. Saw. Two week extension granted.			
<b>Action Required/Taken:</b> MS 15			
<b>Signature:</b> J. Bondick 		<b>Date:</b> 5/29/97	

APR 29 1997

License No. 29-08155-01  
Docket No. 030-05341  
Control No. 124431

Lisa A. Cardo, CIH  
Supervisor, Industrial Hygiene  
Hoechst Celanese Corporation  
Research Division, RLMTTC  
86 Morris Avenue  
Summit, NJ 07901

Dear Ms. Cardo:

This is in reference to your letter dated March 13, 1997 requesting an amendment to Nuclear Regulatory Commission License No. 29-08155-01. In order to continue our review, we need the following additional information:

1. You requested the addition of Dr. Cheng Saw as Alternate Radiation Safety Officer. The NRC lists the name of one individual as the Radiation Safety Officer on the license, and does not recognize a position of alternate Radiation Safety Officer on a license. The RSO may delegate certain duties to be performed by a suitably qualified individual, however, the individual named as RSO is responsible for the radiation protection program. Also, it is unclear whether you wish to name Dr. Cheng Saw as an authorized user who will use licensed material without supervision. If you wish to list Dr. Cheng Saw as an authorized user on the license, please describe this individual's formal training in the following areas:
  - a. principles and practices of radiation protection;
  - b. radioactivity measurements standardization and monitoring techniques and instruments;

- c. mathematics and calculations basic to the use and measurement of radioactivity; and
- d. biological effects of radiation.

In addition, describe the specific isotopes the individual has handled, the maximum quantities of materials handled, where the experience was gained, the duration of the experience and the type of use.

Note that documents you provided with your letter contain private information for Dr. Cheng K. Saw and Joshua L. Gurman. Any document submitted in support of a licensing action is available to the public through the Freedom of Information Act. In the future, do not submit individual's private information such as, date of birth, social security number, home address, or home telephone number, in support of a licensing action unless it is specifically requested.

We will continue our review upon receipt of this information. Please reply in duplicate to my attention at the Region I Office and refer to Mail Control No. 124431. If you have any technical questions regarding this deficiency letter, please call me at (610) 337-6951.

If we do not receive a reply from you within 30 calendar days from the date of this letter, we shall assume that you do not wish to pursue your application.

Sincerely,

**ORIGINAL SIGNED BY:  
JAMES M. BONDICK**

James M. Bondick  
Health Physicist  
Division of Nuclear Materials Safety

License No. 29-08155-01  
Docket No. 030-05341  
Control No. 124431

Enclosures:

1. 10 CFR Parts 20 and 30
2. Regulatory Guide 10.7, Revision 1



L. Cardo, CIH  
Hoechst Celanese Corporation

-3-

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NAME	JBondick/jmb <i>JB</i>						
DATE	04/11/97	04/ /97	04/ /97	04/ /97	04/ /97	04/ /97	04/ /97

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030-05341

Corporate Research and Technology  
Hoechst Celanese Corporation  
86 Morris Avenue  
Summit, NJ 07901  
LAC-42-97  
March 13, 1997

U.S. Nuclear Regulatory Commission, Region 1  
Nuclear Materials Safety Section B  
475 Allendale Road  
King of Prussia, Pennsylvania 19406

Subject: Amendment Application to License 29-08155-01

To Whom it May Concern:

We hereby request an amendment to our Byproduct Materials License Number 29-08155-01. The requested change items are as follows:

Delete Ms. Lisa Cardo, CIH, as Radiation Safety Officer effective April 1, 1997, as she has moved to another job.

Move Dr. Joshua Gurman up from Alternate Radiation Safety Officer to Radiation Safety Officer, effective April 1, 1997. Dr. Gurman holds the title of Supervisor, Product Safety & Toxicology, and reports to the Manager of Environmental Health and Safety Affairs.

Add Dr. Cheng Saw as Alternate Radiation Safety Officer. In the event that Dr. Gurman is absent from the site, Dr. Saw will assume all of the duties and responsibilities of Radiation Safety Officer. Dr. Saw holds the title of Staff Scientist, and reports to the Manager of Materials Modeling and Characterization.

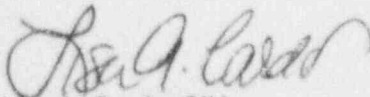
Delete the following two persons from the list of persons named on the license to use or supervise the use of licensed material: Charles Driscoll and Francis McAndrew, as they are no longer involved in any work/supervision of radiation work.

For Dr. Gurman (already reviewed and approved by NRC as Alternate RSO) and Dr. Cheng Saw, I have enclosed professional resumes and a description of their training and experience with radiation and radioactivity.

As per NRC regulations for our category (3P), enclosed please find a check for \$300.00 made out to the U.S. Nuclear Regulatory Commission for this license amendment.

Please call me at 908-522-7820 (until March 31, 1997) if you need further information or clarification. After that date, please deal directly with Dr. Gurman at 908-522-7898.

Sincerely,




Lisa A. Cardo, CIH  
Supervisor, Industrial Hygiene

Enclosures:

Resumes for J. Gurman, PhD, and C. Saw, PhD  
Statements of training and experience for J. Gurman and C. Saw  
Check for \$300.00

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124431  
Hoechst 

MAR 31 1997

## RESUME

CHENG K. SAW

Hoechst Celanese Research Div.  
86 Morris Avenue  
Summit, NJ 07901  
1-908-522-7825

### PERSONAL DATA

EDUCATION - Ph. D. (Physics) 1974-1980 Univ. of Rhode Island, Kingston, RI,  
B. A. (Physics) 1970-1974 Berea Coll., Berea, KY

### RESEARCH AND PROFESSIONAL EXPERIENCE :

1992- Staff Scientist, Hoechst Celanese, 10 years industrial experience with HCC.

- Develop x-ray/synchrotron scattering techniques for use to solve HCC problems.
- Proposed projects in polymer science which use state-of-the-art scattering techniques and polymer expertise to gain understanding structure-property relationship.
- HCC coordinator in HCC involvement at the X11 PRT synchrotron beam line.
- Develop programs to help develop new products.
- Submit new ideas to align with RLMTc's mission, champion the idea into a research program.

1985- Senior Research Physicist, Hoechst Celanese, Summit, NJ 07901

- Work with various groups on analytical techniques to solve material science problems.
- Analytical co-ordinator of Ceramic project.
- Responsible for all aspect of the x-ray lab. with 4 x-ray generators; 2 rotating anodes, 2 seal tubes; supervised 2 technicians, maintained state-of-the-art equipments, development various diffractometers, x-ray cameras and devices.
- Perform experiments coupled with results of other analytical techniques in order to gain understanding of the materials science problems.
- Active participant and carry out EXAFS, XANES, XRF and diffraction experiments at X11 beam line at NSLS synchrotron source.
- Champion of neutron scattering experiments to be carried out at national facilities.

1982-1985 : Postdoctoral research, MST, Argonne Nat. Lab., Argonne, IL 60439

- Developed and maintained the x-ray lab.; set up fully automated diffractometers, writing software for data collection and analysis for diffuse scattering in VOx.
- Performed x-ray and neutron scattering experiments on amorphous metals and analyze data for their scientific significance
- Planned and developed new experiments for possible divisional support and funding
- Developed and installed software for X18A instruments at the NSLS, BNL

1980-1982 : Postdoctoral research., Ames Lab., Iowa State Univ., Ames, IA

- Performed neutron scattering experiments on single crystal ScDx on double axis diffractometer at Oak Ridge Research Reactor and powder rare earth hydrides at the IPNS, Argonne Nat. Lab.
- Performed inelastic scattering experiments on the triple axis spectrometer at ORR, Oak Ridge, TN

1974-1980 : Teaching and research assistant, Univ. of Rhode Island, Kingston, RI

- Developed models to study the structure of amorphous rare earth-transition metal alloys (thesis)

- Deformed neutron scattering experiments on condensed matter
- Set up of scattering instruments at Rhode Island Nuclear Reactor and performed various experiments utilizing the neutron beam
- Taught undergraduate laboratories and tutored many selected students

1977(summer) student research at Brookhaven National Laboratory, Upton, NY

- Measured neutron radiative neutron captured gamma energies using Ge(Li) detectors

1970-1974 : Student, Berea College, Berea, KY

- Laboratory Instructor, electronic technician and photographer

1972 (summer): student, Oak Ridge National Laboratory, Oak Ridge, TN

- Studied radiation effects on eye cataract, underwent a course in radioactivity at the Oak Ridge Associated Universities.

SKILLS : good knowledge of Solid State Physics, polymer science, expert understanding of x-ray and neutron scattering, and computer simulations, computer software/hardware.

JOB REQUIREMENTS : Research & Development

#### RESEARCH INTERESTS

- 1)-Structural studies on condensed matter using scattering techniques
- 2)-Polymer Science: Structure-Property relationship
- 3)-Computer simulations to predict physical properties.

#### HONORS AND AWARDS

1970-1974 Tuition Scholarship, Freshman Scholarship(1970), Dean's list (1972), Berea College

1973 participant, Ambassador for Friendship Program (Macalester College, MN)

1993- Industrial Steering Committee, Neutron Scattering Society of America

PROFESSIONAL SOCIETY : APS, MRS

HOBBIES AND EXTRA CURRICULAR ACTIVITIES : Badminton

REFERENCES : available on request.

## PUBLICATIONS

- C. K. Saw, M. L. Stelts and R. C. Chrien, "Precision Measurements of Gamma Energies of N, Fe, Co, Al and Pb", Brookhaven Report 1976
- Y. P. Sharma, C. K. Saw and S. J. Pickart, "Structure Simulation of Amorphous Binary Alloys", J. of Non-Cryst. Solids 41, 287 (1980)
- S. J. Pickart, C. K. Saw and J. I. Budnick, "Atomic and Magnetic Ordering in  $\text{Fe}_{3-x}\text{V}_x\text{Si}$  Alloys", J. Phys. Chem. Solids, 42, 595 (1981)
- Y. P. Sharma, S. J. Pickart and C. K. Saw, "Computer Modeling of Spin Distribution in RE-TM Alloys", 20th Annual Conf. on Magnetism and Magnetic Materials, Dallas, TX, Nov 11-14, 1980, J. Appl. Phys 52, 1800 (1981)
- C. K. Saw and S. J. Pickart, "Aperiodicities in an Amorphous Dense Random Packed Model", Phys. Stat. Sol. (b) 106, K73(1981)
- S. J. Pickart and C. K. Saw, "Simulation of Dense Random Packed Models for Amorphous  $\text{Tb}_x\text{Fe}_{1-x}$  Alloy System", J. of Non-Cryst. Solids, 47, 385 (1982)
- C. K. Saw, B. J. Beaudry and C. Stassis, "Location of deuterium in  $\alpha$ -scandium", Phys. Rev. B27, 7013 (1983)
- R. C. Haushalter, C. J. O'Connor, A. M. Umarji, G. K. Shenoy and C. K. Saw, "Spin Glass Behavior in the new Amorphous Alloys  $\text{M}_2\text{SnTe}_4$ ,  $\text{M}=\text{Cr, Mn, Fe}$ ", Solid State Commun. 49, 929 (1984)
- R. C. Haushalter, C. J. O'Connor, A. M. Umarji, G. K. Shenoy and C. K. Saw, "Synthesis of new Amorphous Metallic Spin Glass from Oxidation of Zintl Anions by Transition Metal Cations", Am. Chem. Soc. 187th Nat'l Mtg., St. Louis, MO., April 8-13, 1984 (Abstract INOR 235)
- R. B. Schwarz, R. R. Petrick and C. K. Saw, "The synthesis of Amorphous Ni-Ti Alloy powders by Mechanical Alloying", J. of Non-Cryst. Solids 76, 281 (1985)
- C. K. Saw and J. Faber Jr., "Number Fluctuations in DRP models", Int. Conf. on the Theory of Non-Crystalline Solids, Institute of Amorphous Studies, Bloomfield Hills, MI. June 3-6, 1985. J. of Non-Cryst. Solids 75, 347 (1985)
- C. K. Saw and R. B. Schwarz, "Dense Random Packed Model for  $\text{Ni}_{35}\text{Zr}_{65}$ : Influence of Heat of Mixing", Int. Conf. on the Theory of Non-Crystalline Solids, Institute of Amorphous Studies, Bloomfield Hills, MI. June 3-6, 1985, J. of Non-Cryst. Solids 75, 355 (1985)
- C. K. Saw and I. L. Kalnin, "X-Ray Diffraction Studies of Ferroelectric Lead Titanate Bismuth Ferrite Ceramic", Proc. of the 6th IEEE International Symposium of Applications of Ferroelectrics, pp. 309-313 (1986)
- I. L. Kalnin and C. K. Saw, "Domain Realignment in Poled Lead Titanate/Polymer Composites", Proc. of the 6th IEEE International Symposium of Applications of Ferroelectrics, pp. 429-431 (1986)
- C. K. Saw and R. B. Schwarz, "Chemical Short Range Order in Dense Random Packed Models", J. of Less Common Metals 140, (1988) 385
- C. K. Saw and O. R. Hughes, "Powder Diffraction Studies of Litidionite", (to be submitted)
- R.T. Chen, C.K. Saw, M.G. Jamieson, T.R. Aversa and R. Callahan, "Structural Characterization of Celgard Microporous Membrane Precursors; Melt-Extruded Polyethylene Films", J. Appl. Polymer Science, 53 (1994) 471.

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## ABSTRACTS:

- Y. P. Sharma, C. K. Saw and S. J. Pickart, "Simple Approach to Structure Simulation of Amorphous Systems", Bull. APS 25, 96(1980)
- Y. P. Sharma, C. K. Saw and S. J. Pickart, "Structure Simulation of Amorphous Alloys", Bull. APS 25, 674 (1980)
- C. K. Saw, Y. P. Sharma and S. J. Pickart, "Aperiodicities in Dense Random Packed Models", Bull. APS 25, 674 (1980)
- C. K. Saw, S. J. Pickart and Y. P. Sharma, "Computer Modeling of Amorphous Tb-Fe Alloy System", Bull. APS 26, 674 (1981)
- Y. P. Sharma, S. J. Pickart and C. K. Saw, "Spin Modeling of Rare Earth-Iron Magnets", Bull. APS 26, 59 (1981)
- C. K. Saw and J. Faber Jr., "Number Fluctuations in DRP models", Int. Conf. on the Theory of Non-Crystalline Solids, Bloomfield Hill, MI. June 3-6, 1985
- C. K. Saw and R. B. Schwarz, "Dense Random Packed Model for Ni<sub>35</sub>Zr<sub>65</sub>: Influence of Heat of Mixing", Int. Conf. on the Theory of Non-Crystalline Solids, Institute of Amorphous Studies, Bloomfield Hills, MI. June 3-6, 1985
- C. K. Saw, J. Faber Jr. and G. S. Knapp, "Ion Chambers as Absolute Flux Monitors", Materials Research Society Meeting, San Francisco, CA. April 15-18, 1985
- C. K. Saw and I. L. Kalnin, "X-Ray Diffraction Studies of Ferroelectric Lead Titanate Bismuth Ferrite Ceramic", IEEE Ultrasonics, Ferroelectrics and Frequency Control Society meeting, Lehigh University, June 8-11, 1986
- I. L. Kalnin and C. K. Saw, "Domain Realignment in Poled Lead Titanate/Polymer Composites", IEEE Ultrasonics, Ferroelectrics and Frequency Control Society meeting, Lehigh University, June 8-11, 1986
- C. K. Saw, P. J. Harget and D. P. Karim, "Status Report of Diffraction capability on X11A", PRT meeting, NSLS, January 11-12, 1987
- D. P. Karim, P. Chen, P. J. Harget and C. K. Saw, "A Study of C<sub>60</sub> and Di-Bromine in Protic Solvents by EXAFS", PRT meeting, NSLS, January 11-12, 1987
- C. K. Saw and R. B. Schwarz, "Chemical Short Range Order in Dense Random Packed Models", Int'l Conf. of Solid State Amorphizing Transformations, Los Alamos National Laboratory, August 10-13, 1987
- C. K. Saw and G. L. Collins, "Structure/Morphology Characterization of CO and COTBP", Bull. APS 38 (1993) 420
- C. K. Saw, "2D Small Angle X-ray Scattering Using High Speed CCD Detector", APS 38 (1993) 485

Updated 11/7/94



**Training and Experience of Joshua Gurman, Ph.D.**  
(see also complete professional resume)

**Formal education and training.** (Incorporating principles and practices of radiation protection, radioactivity measurements, monitoring techniques and instruments, and biological effects of radiation.)

M.S., M.Ph. and Ph.D., Environmental Health Science, New York University Medical Center, Institute of Environmental Medicine, New York.

Relevant graduate courses taken at New York University Medical Center, Institute of Environmental Medicine, Tuxedo (Sterling Forest), New York.

Radiochemical Analysis, 1 semester.  
Environmental Radioactivity, 1 semester.  
Radiological Physics, 1 semester.

**Experience with radioactive materials.**

Tc-99m (Mo-99 generator), 1-5 mCi, radioactive aerosol pulmonary deposition experiments in donkeys, NYU.

Aerosol deposition studies in donkeys using Fe-59 neutron activated iron aerosols.

Ni-63, 10-15 mCi, sealed source, electron capture detector for gas chromatograph.

H-3, 100 mCi, sealed source, electron capture detector for gas chromatograph.

Pb-210 and Sr-90, graduate student laboratory experiments at NYU.

Natural radon-222 progeny air sampling and analysis, graduate student experiment at NYU.

JOSHUA L. GURMAN

Home Telephone:

Business Telephone: (908) 522-7898

**EDUCATION:**

Polytechnic Institute of  
Brooklyn  
Brooklyn, New York

B.S., Chemical Engineering, 1971

New York University  
Graduate School of Arts  
and Science  
New York, New York

M.S., Environmental Health Science, 1973

M.Ph., Environmental Health Science, 1978

Ph.D., Environmental Health Science, 1983

**EXPERIENCE:**

January 1990 - Present:

Hoechst Celanese Corporation, Inc.  
Dept. of Envrn., Sfty. & Hlth. Affairs  
R.L. Mitchell Tech. Cnt., Summit, NJ

Supervisor, Product Safety and Toxicology

Coordinate Robert L. Mitchell Technical Center Product Safety activities through initiation and implementation of risk assessment/risk management evaluation of technical research programs and projects. Responsible for technical and regulatory support in the experimental development and introduction of new materials for commercial application. Assist in assuring compliance with all applicable Product Safety/Stewardship federal, state and local regulations as well as corporate policies and practices.

Review, develop, prepare and disseminate health and safety information (i.e. Handling Procedures, Material Safety Data Sheets, Right-to Know Labeling, EPA Toxic Substances Control Act Documentation, training, etc.) as it relates to hazards associated with the introduction and development of new materials, products and processes for employees, customers and other appropriate personnel.

JOSHUA L. GURMAN

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EXPERIENCE: (Continued)

January 1988 - January 1990:

AT&T Bell Laboratories, Inc.  
Toxicology and Human Factors Department  
Murray Hill, New Jersey

Toxicology, Manager

Coordinated toxicological activities within AT&T and its business units involving: the evaluation of toxic hazards presented by chemical substances and products; overseeing the management of all contracted toxicity studies, and ensuring regulatory compliance with appropriate federal EPA and OSHA regulations.

Service the toxicologic review of all chemical substances and products being developed or considered for use within AT&T. Coordinate the preparation of all necessary regulatory documentation, eg. Material Safety Data Sheets, MSDS, Product Safety Warning Labels, and TSCA Pre-Manufacturing Notifications, PMN.

May 1983 - December 1988:

American Iron and Steel Institute  
Engineering Department  
Washington, D.C.

NBS Research Associate

Serve in a joint industry-government cooperative program as a Research Associate at the National Bureau of Standards' Center for Fire Research in the Combustion Toxicology Group. Assisted in the planning, design and conduct Combustion Product Toxicity research with the objective of developing predictive smoke toxicity model(s) for integration into a comprehensive Fire Risk Assessment Model.

January 1981 - December 1982:

Hazleton Laboratories America, Inc.  
Inhalation Toxicology Department  
Vienna, Virginia

Staff Scientist

Study Director responsible for study design, administrative and laboratory

**JOSHUA L. GURMAN**

**- 3 -**

**EXPERIENCE:(Continued)**

management, technical evaluation, and reporting of inhalation toxicology studies conducted on a variety of test materials including : industrial and agricultural chemicals; drug and cosmetic preparations, and petroleum products.

July 1972 - December 1980:

New York University Medical Center  
Department of Environmental Medicine  
Tuxedo, New York

Assistant Research Scientist

Study Supervisor on a number of inhalation toxicology and oncology studies. Involved in the planning, design and evaluation of experimental systems used in the generation and characterization of inhalation exposure atmospheres. Conduct and supervision of radioactive aerosol deposition and clearance studies.

**PUBLICATIONS AND PAPERS:**

Provided upon request.

**PROFESSIONAL MEMBERSHIPS:**

American Industrial Hygiene Association  
Society of Toxicology  
Society of Risk Assessment

**REFERENCES:**

Provided upon request.

## PUBLICATIONS AND PAPERS

- Doctoral Dissertation - Gurman, J.L. Particle Deposition Patterns in Human Upper Bronchial Airways Under Simulated Inspiratory Flow. New York University, January 1983.
- Gurman, Joshua and Sidney Laskin. Evaluation of Particle Size Distributions Using Different Instruments. American Industrial Hygiene Conference, May 1977, New Orleans, LA.
- Rusch, G., J.L. Gurman, A.R. Sellakumar, and S. Laskin. Combined Intubation Inhalation Studies with Sulfuric Acid Mist and Benzo(a)pyrene. American Industrial Hygiene Conference, May 1977, New Orleans, LA.
- Gurman, J.L., R.B. Schlesinger, and M. Lippmann. Intrabronchial Deposition Patterns Within Hollow Airway Casts of the Human Lung. American Industrial Hygiene Conference, May 1979, Chicago IL.
- Gurman, J.L., R.B. Schlesinger, and M. Lippmann.(1980) A Variable-Opening Mechanical Larynx for Use in Aerosol Deposition Studies. Amer. Ind. Hyg. Assoc. J. 41: 678.
- Schlesinger, R.B., J.L. Gurman, and L.C. Chen.(1980) The Production and Characterization of a Transition Metal Fe(III)-Sulfur(IV) Aerosol. Atmospheric Environment 4: 1279.
- Gurman, J.L., R.B. Schlesinger and M. Lippmann. Empirical Models for Particle Deposition in Hollow Airway Casts Under Constant and Simulated Inspiratory Flows. American Industrial Hygiene Conference, May 1981, Portland, OR.
- Leyko, M.A., and J.L. Gurman.(1981) A Sterile Method for Testing Dissolution of Radionuclides from Neutron Activated Coal Dust. Health Physics 41: 547.
- Schlesinger, R.B., J.L. Gurman, and M. Lippmann.(1982) Particle Deposition Within Bronchial Airways: Comparison using constant and cyclic inspiratory flow. Ann. Occup. Hyg. 26: 47.
- Lippmann, M., J.L. Gurman, and R.B. Schlesinger.(1983) The Role of Particle Deposition in Occupational Lung Disease. In Aerosol in Mining and Industrial Work Environment. (V. Marple and B. Lui, eds.) Vol. I, Pg. 119, Ann Arbor Science, Ann Arbor, MI.
- Gurman, J.L., M. Lippmann, and R.B. Schlesinger.(1984) Particle Deposition in Replicate Casts of the Human Upper Tracheobronchial Tree Under Constant and Cyclic Inspiratory Flow. I. Experimental. Aer. Sci. Technol. 3: 245.
- Gurman, J.L., F.J. Liroy, M. Lippmann, and R.B. Schlesinger.(1984) Particle Deposition in Replicate Casts of the Human Upper Tracheobronchial Tree Under Constant and Cyclic Inspiratory Flow. II. Empirical Model. Aer. Sci. Technol. 3: 253.



## PUBLICATIONS AND PAPERS: (Continued)

Gurman, J.L. Methodology for Measuring Blood Cyanide After Exposure to Combustion Products. Tenth International Conference on Fire Safety. January 1985, San Francisco, CA.

Levin, B.C., M. Paabo, J.L. Gurman, S.E. Harris, and C.S. Bailey.(1985) Toxicologic Effects of the Interactions of Fire Gases and Their Use in a Hazard Assessment Computer Model. The Toxicologist 5: 127.

Levin, B.C., V. Babrauskas, E. Braun, J. Gurman, and M. Paabo.(1985) An Exploration of Combustion Limitations and Alternatives to the NBS Toxicity Test Method. National Bureau of Standards NBSIR 85-3274.

Gurman, J.L., M. Paabo, and B.C. Levin.(1986) An Improved Gas Chromatographic Method for the Measurement of Blood Cyanide. The Toxicologist 6: 59.

Levin, B.C., M. Paabo, J.L. Gurman, and S.E. Harris.(1986) Toxicologic Effects of the Interaction of Fire Gases. Proceedings of the Smoke/Obscurants Symposium X, Volume II: 617, AMCPM-SMK-T-001-86.

Gurman, J.L., B.C. Levin, M. Paabo, and L. Baier. The Acute Inhalation Toxicity of Hydrogen Cyanide. Annual Conference on Fire Research, National Bureau of Standards, November 1986, Gaithersburg, MD.

Braun, E., B.C. Levin, M. Paabo, J. Gurman, T. Holt, and J.S. Steel.(1987) Fire Toxicity Scaling. National Bureau of Standards NBSIR 87-3510.

Levin, B.C., J.L. Gurman, M. Paabo, L. Baier, and T. Holt. Toxicologic Effects of Different Time Exposures to the Fire Gases: Carbon Monoxide or Hydrogen Cyanide or to Carbon Monoxide Combined With Hydrogen Cyanide or Carbon Dioxide. U.S.-Japan Panel on Fire Research and Safety, May 1987.

Gurman, J.L., L. Baier, and B.C. Levin.(1987) Polystyrene: A Review of the Literature on the Products of Thermal Decomposition and Toxicity. National Bureau of Standards Fire Mater. 11: 109.

Levin, B.C., M. Paabo, J.L. Gurman, and S. Harris.(1987) Effects of Exposure to Single or Multiple Combinations of Predominant Toxic Gases and Reduced Oxygen Atmospheres Produced in Fires. Fund. Appl. Tox. 9: 236.

Levin, B.C., M. Paabo, J.L. Gurman, S.E. Harris, and E. Braun.(1987) Toxicological Interaction Between Carbon Monoxide and Carbon Dioxide. Toxicology 47: 135.

Levin, B.C., M. Paabo, J.L. Gurman, H.M. Clark and M.F. Yoklavich.(1988) Further Studies of the Toxicological Effects of Different Time Exposures to the Individual and Combined Fire Gases - Carbon Monoxide, Hydrogen Cyanide, Carbon Dioxide and Reduced Oxygen. Polyurethane '88, Proceedings of the 31st Meeting of the Society of the Plastics Institute, October 1989 Philadelphia, Pa.



BETWEEN:

License Fee Management Branch: ARM  
and  
Regional Licensing Sections

: Program Code: 03122  
: Status Code: 0  
: Fee Category: 3P  
: Exp. Date: 20040331  
: Fee Comments: 3P EFF 2/28/94  
: Decom Fin Assur Req'd: N  
: .....

LICENSE FEE TRANSMITTAL

A. REGION

1. APPLICATION ATTACHED

Applicant/Licensee: HOECHST CELANESE CORPORATION  
Received Date: 970331  
Docket No: 3005341  
Control No.: 124431  
License No.: 29-08155-01  
Action Type: Amendment

2. FEE ATTACHED

Amount: \$300.00  
Check No.: 0097003045

3. COMMENTS

Signed R. J. Brown  
Date 4/4/97

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 \_\_\_\_\_

Log APR 10 (97)  
File # 0097003045  
Check No. 0097003045  
Amount \$300  
Fee Category 3P  
Type of Fee Renew  
Date Check Rec'd 4/4/97  
Date Completed \_\_\_\_\_  
By: EB

APR 10 AM 8:03