



nxl Engineers, Surveyors
Construction Managers

February 23, 2006

Licensing Assistance Team
Division of Nuclear Material Safety
U.S. Nuclear Regulatory Commission Region 1
475 Allendale Road
King Of Prussia, PA. 19406-1415

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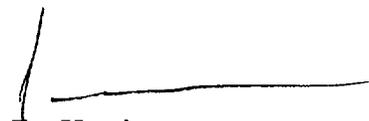
REFERENCE: APPLICATION FOR MATERIAL LICENSE

Dear Sir or Madam:

I am pleased to submit NXL, Inc.'s application for a Material License. Upon review of the application, if any additional information is needed, you may contact our office at anytime. Thank you for your time and consideration in this matter.

Sincerely,

NXL CONSTRUCTION SERVICES, INC.


Jim Harpine
Director of CEI Services

2006 FEB 24 PM 12: 52

RECEIVED
REGION 1

138477

NMCS/RCNI MATERIALS-002

Estimated burden per response to comply with this mandatory collection request: 4.4 hours. Submittal of the application is necessary to determine that the applicant is qualified and that adequate procedures exist to protect the public health and safety. Send comments regarding burden estimate to the Records and FOIA/Privacy Services Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NE08-10202, (3150-0120), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

APPLICATION FOR MATERIAL LICENSE

INSTRUCTIONS: SEE THE APPROPRIATE LICENSE APPLICATION GUIDE FOR DETAILED INSTRUCTIONS FOR COMPLETING APPLICATION. SEND TWO COPIES OF THE ENTIRE COMPLETED APPLICATION TO THE NRC OFFICE SPECIFIED BELOW.

APPLICATION FOR DISTRIBUTION OF EXEMPT PRODUCTS FILE APPLICATIONS WITH:

DIVISION OF INDUSTRIAL AND MEDICAL NUCLEAR SAFETY
OFFICE OF NUCLEAR MATERIALS SAFETY AND SAFEGUARDS
U.S. NUCLEAR REGULATORY COMMISSION
WASHINGTON, DC 20555-0001

ALL OTHER PERSONS FILE APPLICATIONS AS FOLLOWS:

IF YOU ARE LOCATED IN:

ALABAMA, CONNECTICUT, DELAWARE, DISTRICT OF COLUMBIA, FLORIDA, GEORGIA, KENTUCKY, MAINE, MARYLAND, MASSACHUSETTS, MISSISSIPPI, NEW HAMPSHIRE, NEW JERSEY, NEW YORK, NORTH CAROLINA, PENNSYLVANIA, PUERTO RICO, RHODE ISLAND, SOUTH CAROLINA, TENNESSEE, VERMONT, VIRGINIA, VIRGIN ISLANDS, OR WEST VIRGINIA, SEND APPLICATIONS TO:

LICENSING ASSISTANCE TEAM
DIVISION OF NUCLEAR MATERIALS SAFETY
U.S. NUCLEAR REGULATORY COMMISSION, REGION I
475 ALLENDALE ROAD
KING OF PRUSSIA, PA 19406-1415

IF YOU ARE LOCATED IN:

ILLINOIS, INDIANA, IOWA, MICHIGAN, MINNESOTA, MISSOURI, OHIO, OR WISCONSIN, SEND APPLICATIONS TO:

MATERIALS LICENSING BRANCH
U.S. NUCLEAR REGULATORY COMMISSION, REGION III
2443 WARRENVILLE ROAD, SUITE 210
LISLE, IL 60532-4352

ALASKA, ARIZONA, ARKANSAS, CALIFORNIA, COLORADO, HAWAII, IDAHO, KANSAS, LOUISIANA, MONTANA, NEBRASKA, NEVADA, NEW MEXICO, NORTH DAKOTA, OKLAHOMA, OREGON, PACIFIC TRUST TERRITORIES, SOUTH DAKOTA, TEXAS, UTAH, WASHINGTON, OR WYOMING, SEND APPLICATIONS TO:

NUCLEAR MATERIALS LICENSING BRANCH
U.S. NUCLEAR REGULATORY COMMISSION, REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TX 76011-4005

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PERSONS LOCATED IN AGREEMENT STATES SEND APPLICATIONS TO THE U.S. NUCLEAR REGULATORY COMMISSION ONLY IF THEY WISH TO POSSESS AND USE LICENSED MATERIAL IN STATES SUBJECT TO U.S. NUCLEAR REGULATORY COMMISSION JURISDICTIONS.

1. THIS IS AN APPLICATION FOR (Check appropriate item)

- A. NEW LICENSE
- B. AMENDMENT TO LICENSE NUMBER _____
- C. RENEWAL OF LICENSE NUMBER _____

2. NAME AND MAILING ADDRESS OF APPLICANT (include ZIP code)

NXL Construction Services, Inc.
114 East Cary Street
Suite 200
Richmond, VA. 23219

3. ADDRESS WHERE LICENSED MATERIAL WILL BE USED OR POSSESSED

NXL Construction Services, Inc.
114 East Cary Street Suite 200
Richmond, VA. 23219
Anywhere NRC maintains jurisdiction for regulating the use of radioactive material.

4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION

James E. Harpine

TELEPHONE NUMBER
(804) 644-4600

SUBMIT ITEMS 5 THROUGH 11 ON 8-1/2 X 11" PAPER. THE TYPE AND SCOPE OF INFORMATION TO BE PROVIDED IS DESCRIBED IN THE LICENSE APPLICATION GUIDE.

5. RADIOACTIVE MATERIAL
a. Element and mass number; b. chemical and/or physical form; and c. maximum amount which will be possessed at any one time.

6. PURPOSE(S) FOR WHICH LICENSED MATERIAL WILL BE USED.

7. INDIVIDUAL(S) RESPONSIBLE FOR RADIATION SAFETY PROGRAM AND THEIR TRAINING EXPERIENCE.

8. TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS.

9. FACILITIES AND EQUIPMENT.

10. RADIATION SAFETY PROGRAM.

11. WASTE MANAGEMENT.

12. LICENSE FEES (See 10 CFR 170 and Section 170.31)

FEE CATEGORY 3T AMOUNT ENCLOSED \$ 1,100.00

13. CERTIFICATION. (Must be completed by applicant) THE APPLICANT UNDERSTANDS THAT ALL STATEMENTS AND REPRESENTATIONS MADE IN THIS APPLICATION ARE BINDING UPON THE APPLICANT.

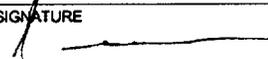
THE APPLICANT AND ANY OFFICIAL EXECUTING THIS CERTIFICATION ON BEHALF OF THE APPLICANT, NAMED IN ITEM 2, CERTIFY THAT THIS APPLICATION IS PREPARED IN CONFORMITY WITH TITLE 10, CODE OF FEDERAL REGULATIONS, PARTS 30, 32, 33, 34, 35, 36, 38, 39, AND 40, AND THAT ALL INFORMATION CONTAINED HEREIN IS TRUE AND CORRECT TO THE BEST OF THEIR 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.

CERTIFYING OFFICER - TYPED/PRINTED NAME AND TITLE

James E. Harpine Director CEI Services

SIGNATURE



DATE

1/23/06

FOR NRC USE ONLY

TYPE OF FEE	FEE LOG	FEE CATEGORY	AMOUNT RECEIVED	CHECK NUMBER	COMMENTS
			\$		
APPROVED BY				DATE	



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5. Radioactive Material- Sealed Sources and Devices

a. Element & mass number	b. Chemical and/or physical form	c. Maximum amount that will be possessed at one time
A. Am-241:Be	Sealed source Troxler Dwg. A-102451	44mCi
B. Am-241:Be	Sealed source Troxler Dwg. A-100337 or A-100608	300mCi or 100mCi
C. Cs 137 Am-241:Be	Sealed source Troxler Dwg. A-102112 A-102451	9mCi 44mCi
D. Cs-137 Cf-252	Sealed source Troxler Dwg. A-102112 A-105560	9mCi 66 μ Ci
E. Cs-137 Am-241: Be	Sealed source Troxler Dwg A-102112 A-102451	9McI 44McI
F. Cf-252	Sealed source Troxler Dwg A-105162,A105862	100 μ Ci
G. Am-241:Be Cs-137	Sealed source Troxler Dwg A-102700 A-102112	11mCi 9mCi
H. Cs-137	Sealed source Troxler Dwg A-102112	9mCi



6. Purpose for Which Licensed Material Will Be Used

A.	To be used in Troxler model 3216 series gauges for measurement of physical properties of materials.
B.	To be used in Troxler models 3241-C & 3241-G series gauges for measurement of physical properties of materials.
C.	To be used in Troxler model 3242 series gauges for measurement of physical properties of materials.
D.	To be used in Troxler model 3400 series gauges for measurement of physical properties of materials.
E.	To be used in Troxler models 3430-M & 3440-M series gauges for measurement of physical properties of materials.
F.	To be used in Troxler model 3450 series gauges for measurement of physical properties of materials.
G.	To be used in Troxler model 3432 series gauges for measurement of physical properties of materials.
H.	To be used in Troxler model 4300 series gauges for measurement of physical properties of materials.
I.	To be used in Troxler models 4640 & 4640-B series gauges for measurement of physical properties of materials.



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7. Individual Responsible for Radiation Safety Program and Their Training Experience

Mr. James E. Harpine is the designated RSO for NXL and has successfully completed all the necessary training for Radiation Safety Officer. Also any individual before being named as RSO will have successfully all required training.

Mr. Harpine as NXL's RSO is responsible for ensuring the following:

- Stopping licensed activities that the RSO considers unsafe.
- Possession, use, storage, and maintenance of sources and gauges are consistent with the limitations of the license, the Sealed Source and Device Registration sheet(s), and manufacturer's recommendations and instructions.
- Individuals using gauges are properly trained.
- When necessary, personnel monitoring devices are used and exchanged at the proper intervals; records of the results of such monitoring are maintained.
- Gauges are properly secured.
- Proper authorities are notified in case of accident, damage to gauges, fire, or theft.
- Unusual occurrences involving the gauge (e.g., accident, damage) are investigated, causes(s) and appropriate corrective action are identified, and corrective action is taken.
- Audits are performed at least annually and documented, and corrective actions taken.
- Licensed material is transported in accordance with all applicable DOT requirements.
- Licensed material is disposed of properly.
- Appropriate records are maintained.
- Up-to-date license is maintained and amendment and renewal requests submitted in a timely manner.



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8. Training for Individuals Working in or Frequenting Restricted Areas

Before using licensed materials all gauges users must meet the following requirements:

- Successfully completed the Troxler safety training class.
- Received copies of, and been trained in, the applicant's gauge operating and emergency procedures
- Been designated as an authorized user by the RSO



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10. RADIATION SAFETY PROGRAM

Personnel Monitoring

All personnel will wear a personnel monitoring device, such as a TLD badge, to measure radiation exposure when using or transporting gauges. The badges shall be exchanged at intervals not to exceed 3 months. Dosimetry badges shall be provided by Troxler Radiation Monitoring Services 3008 Cornwallis Rd, Research Triangle Park, NC 27709 or a firm accredited by the National Voluntary Laboratory Accreditation Program (NVLAP).

Radiation Detection Instruments

NXL will maintain the survey meter listed below for use in the event of an incident involving the gauge. The survey meter will be calibrated annually by the manufacturer and checked for functionality before use (e.g., with the gauge sources or a check source)."

Manufacturer: Troxler Electronic Laboratories, Inc.

Model: TroxAlert

Type: G-M survey meter

Radiation detected: alpha, beta, gamma, and x-ray

Sensitivity range: 0-100mrem/hr

Window thickness: 1.4 mg/cm²

The firm that will calibrate the survey meter is as follows:

Troxler Electronic Laboratories, Inc.

3008 Cornwallis Road

Research Triangle Park, NC 27709

North Carolina License No. 032-0182-1

Sealed Source Leak Testing

Leak tests will be performed at intervals not to exceed 6 months or other interval specified in the license using an approved kit, such as Troxler Leak Test Kit 3880, in accordance with the kit supplier's instructions. Leak test samples will be analyzed by an organization authorized by the NRC or Agreement State to provide leak test services, such as Troxler Electronic Laboratories, Inc. (North Carolina license no. 031-0182-1).



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Material Receipt and Accountability

Radioactive materials will be tracked from cradle to grave. Records of receipt, transfer, and disposal of gauges will be maintained for at least 3 years. Physical inventories of sealed sources will be conducted at intervals not to exceed 6 months.

See attached Gauge Utilization Log and Physical Inventory Log that will be used by NXL.

Public Dose

NXL will ensure that gauges are used, transported, and stored in such a way that no member of the public receives a dose of more than 100 mrem in one year. NXL will also ensure that the dose in unrestricted areas does not exceed 2 mrem in any one hour. NXL will control and maintain constant surveillance over gauges that are not in storage and secure gauges from unauthorized use or removal.

NXL will ensure that radiation levels in areas adjacent to gauge storage locations will not exceed the dose limits for members of the public or unrestricted areas. This can be done by determining the radiation levels in areas adjacent to gauge storage areas by using the attached Public Dose Worksheet.



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Operating and Emergency Procedures

The following are NXL's operating and emergency procedures which are given to each operator of the nuclear gauge:

1. Always wear assigned personnel dosimetry devices (e.g., TLD badge) when using or transporting the gauge.
2. Never wear another person's dosimeter.
3. Never store a dosimeter near the gauge or other radiation source.
4. Before removing the gauge from its place of storage, ensure that in gauges with movable source rods, the rod is locked in the shielded position, and the transport case is locked.
5. Sign out the gauge in a logbook, stating the date(s) of use, name(s) of authorized user(s) who will be responsible for the gauge, and the temporary job site(s) where the gauge will be used.
6. Block and brace the gauge to prevent movement during transport and lock the gauge in or to the vehicle. Follow all Department of Transportation requirements when transporting the gauge.
7. Use the gauge according to the manufacturer's instructions and recommendations.
8. Do not touch the end of the source rod with your fingers, hands, or any part of your body or place any part of the body in the radiation field of the unshielded source.
9. Unless absolutely necessary, do not look under the gauge when the source rod is being lowered into the ground. If you must look under the gauge to align the source rod with hole, keep all body parts as far from the unshielded source as possible to minimize radiation exposure.
10. After completing each measurement in which the source is unshielded, immediately return the source to the shielded position.
11. Always maintain constant surveillance and immediate control of the gauge when it is not in storage or secured in the transport vehicle. Never leave the gauge unattended. Protect the gauge and yourself from danger of moving heavy equipment.
12. Always keep unauthorized persons away from the area where the gauge is being used.
13. Perform routine cleaning and maintenance according to the manufacturer's instructions and recommendations.
14. When the gauge is not in use at a temporary job site, place the gauge in a secured storage location (e.g., locked in the trunk of a car or locked in a storage shed).
15. Prior to transporting the gauge, ensure that each gauge source is in the fully shielded position. Ensure that the source rod is locked in the shielded position and that the gauge is placed into the case and lock the case. Block and brace the gauge to prevent movement during transportation. Lock the case in or to the vehicle.
16. Return the gauge to its proper storage location at the end of the work
17. Log the gauge into the daily use log when it is returned to storage.



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18. If gauges are used for measurements with the unshielded source extended more than 3 feet below the surface, use piping, tubing or other casing material to line the hole from the lowest depth to 12 inches above the surface. If the piping, tubing, or other casing material cannot extend 12 inches above the surface, cap the hole liner or take other steps to ensure that the hole is free of debris (and it is unlikely that debris will enter the cased hole), so that the unshielded source can move freely (e.g., use a dummy probe to verify that the hole is free of obstructions).
19. After making changes affecting the gauge storage area (e.g., changing the location of gauges within the area, removing shielding, adding gauges, changing the occupancy of adjacent areas, moving the storage area to a new location), reevaluate compliance with public dose limits and ensure proper security of gauges.

Emergency Procedures

The following procedures apply when the source fails to return to the shielded position (e.g., as a result of being damaged, source becomes stuck below the surface) or if any other emergency or unusual situation arises (e.g., the gauge is struck by a moving vehicle or is in an accident involving a vehicle):

1. **Immediately secure the area and keep people at least 15 feet away from the gauge until the situation is assessed and radiation levels are known. However, perform first aid for injured individuals and remove them from the area only when medically safe to do so.**
2. **If any heavy equipment is involved, detain the equipment and operator until it is determined there is no contamination present.**
3. **Gauge users and other potentially contaminated individuals should not leave the scene until emergency assistance arrives.**
4. **Visually inspect the gauge to determine the position of the source rod (exposed or shielded), and the position of the source shutter (open or closed), and the extent of damage, if any, to the source housing and/or shielding.**
5. **Notify the persons in the order listed below:**

Name	Work Phone Number	Home Phone Number
RSO		
Troxler Labs		
NRC		



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6. Follow the directions provided by the person contacted above.
7. RSO and Licensee management will:
 - a. Arrange for a radiation survey to be conducted as soon as possible by a knowledgeable person using appropriate radiation detection instrumentation by a person competent in use of the survey meter.
 - b. Make necessary notifications to local authorities as well as the NRC or Agreement State licensing agency as appropriate.
 - c. Reports to the NRC or Agreement States must be made within the reporting timeframes specified in regulations. Reporting requirements are found in 10 CFR 20.2201-2203 and 10 CFR 30.50 or corresponding Agreement State regulations.
 - d. Before shipping a damaged gauge the following must be completed:
 - » Send close-up photographs of the damaged gauge to Troxler.
 - » Send a leak test sample to Troxler for analysis or send leak test results.
 - » Obtain a Returned Goods Authorization (RGA) number from Troxler.

Maintenance

NXL will implement and maintain procedures for routine maintenance (cleaning and lubrication) of our gauges according to the manufacturer's recommendations and instructions. We will send the gauge to the manufacturer to perform non-routine maintenance or repair operations that require removal of the source or source rod from the gauge.

Transportation

NXL will comply with the attached Troxler Transportation Guide which is in accordance with U.S. Department of Transportation (DOT) hazardous material (hazmat) regulations and International Air Transport Association (IATA) Dangerous Goods Regulation.

Audit Program

An audit of the radiation safety program content and implementation will be performed and documented annually. Records of audits will be maintained for at least 3 years. Corrective actions will be taken promptly to prevent recurrence of deficiencies. The audit checklist as provided by the U.S. Nuclear Regulatory Commission will be used to perform the yearly audit.

PUBLIC DOSE CALCULATION WORKSHEET

To demonstrate compliance, you must show that the maximum dose to any *member of the public* will be less 100 millirem in a year and that the maximum dose in any *unrestricted area* will be less than 2 millirem in any one hour. The typical limiting case involves the storage of gauges. Several simplifying and conservative assumptions are made in this calculation method:

- ◆ No shielding other than the shielding in the gauge is assumed to be present.
- ◆ All gauges are assumed to be at the same distance as the closest gauge.
- ◆ Sources are assumed to remain in the shielded position within the gauge.
- ◆ Each gauge is assumed to be a point source and dose rates are assumed to decrease with the inverse square of distance from the gauge.
- ◆ Gauges are assumed to be in storage all of the time.

More realistic assumptions can be made or actual measured dose rates can be used if necessary to demonstrate compliance.

Step	Instruction	Result
DOSE TO MEMBER OF PUBLIC IN ONE YEAR		
1	Identify the individual member of the public likely to receive the highest dose from gauges in storage. This will be the person who spends the most time in the vicinity of the stored gauges or who is closest to the gauges. This individual will be the focus of the calculation.	
2	Determine the maximum dose rate in mrem/hr at a distance of three feet (1 meter) for each gauge kept in the storage location. This value may be obtained from the radiation profile in the gauge operation manual, from the manufacturer, or from Transport Index on the Yellow II label on the transport case. Calculate the sum of the dose rate values for all of the gauges that may be stored at this location and enter the result. Remember to include both gamma and neutron dose.	
3	Enter the distance in feet from the position occupied by the person identified in step 1 to the nearest gauge in the storage area.	
4	Calculate the square of the distance from step 3 and enter the result.	
5	Divide the value from step 4 by 9 and enter the result. This is a factor that accounts for the difference between the dose rate at 3 feet and the dose rate at the distance at which the person is located.	
6	Divide the dose rate (mrem/hr) from step 2 by the result from step 5 and enter the result.	
7	Enter the number of hours in a year that the individual will be present in the vicinity of the gauges. For example, an individual working full-time near the gauges, would be present approximately 2000 hrs in a year (8 hrs per day x 5 days per week x 50 weeks per year).	
8	Multiply the result from step 6 by the result from step 7 and enter the result. This is the maximum dose in mrem the individual could receive in one calendar year. If this value is less than 100 mrem, the annual dose limit is met; continue with step 9 to determine if the unrestricted area dose rate limit is met.	

DOSE IN UNRESTRICTED AREAS IN ONE HOUR		
9	Determine the minimum distance in feet to any unrestricted area outside the gauge storage area and record the value. This could be an area above, below, or adjacent to the storage area that is unrestricted for the purpose of radiation control . The area need not be occupied, just accessible to members of the public, which may include company employees.	
10	Calculate the square of the distance from step 9 and enter the result.	
11	Divide the value from step 10 by 9 and enter the result. This is a factor that accounts for the difference between the dose rate at 3 feet and the dose rate at the distance in step 9.	
12	Divide the dose rate (mrem/hr) from step 2 by the result from step 11 and enter the result. This is the maximum dose in mrem that could be received in one hour in the closest unrestricted area. If this value is less than 2 mrem, the dose limit for unrestricted areas is met.	
Calculations performed by		Date

If either dose limit is exceeded, you should either recalculate that dose using more realistic assumptions and data or take steps to reduce the dose received by members of the public using the principles of time, distance, and shielding.

- ♦ Limit the time personnel spend in the vicinity of the gauges
- ♦ Increase the distance between the gauges and personnel
- ♦ Add shielding to reduce the dose rate

OCCUPANCY FACTORS

The following occupancy data may be used when data for specific personnel are not available:

Area	Occupancy Factor (T)
Work areas such as offices, laboratories, shops, wards, nurses' stations; living quarters; children's play areas; and occupied space in nearby buildings.	Full Occupancy (T=1)
Corridors, rest rooms, elevators using operators, unattended parking lots.	Partial Occupancy (T=1/4)
Waiting rooms, toilets, stairways, unattended elevators, janitor's closets, outside areas used only for pedestrians or vehicular traffic.	Occasional Occupancy (T=1/16)

Reference: NCRP Report No. 49, *Structural Shielding Design and Evaluation for Medical Use of X-Rays and Gamma Rays of Energies Up to 10 MeV*, 1976

SHIELDING HALF-VALUES*

Material	Cs-137 Gamma Radiation	Am:Be Neutron Radiation
Lead	¼ in.	N/A
Concrete	2 in.	4 in.

* The half-value is the thickness of material that will reduce the dose rate by one-half.

This is to acknowledge the receipt of your letter/application dated

1/23/2006, and to inform you that the initial processing which includes an administrative review has been performed.

NEW LICENSE APPLICATION (030 37148)
There were no administrative omissions. Your application was assigned to a technical reviewer. Please note that the technical review may identify additional omissions or require additional information.

Please provide to this office within 30 days of your receipt of this card

A copy of your action has been forwarded to our License Fee & Accounts Receivable Branch, who will contact you separately if there is a fee issue involved.

Your action has been assigned **Mail Control Number** 138477.
When calling to inquire about this action, please refer to this control number.
You may call us on (610) 337-5398, or 337-5260.

