

## APPLICATION FOR MATERIALS LICENSE

Estimated burden per response to comply with this mandatory collection request: 4.3 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.resource@nrc.gov](mailto:infocollects.resource@nrc.gov), and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-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.

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:

OFFICE OF FEDERAL & STATE MATERIALS AND  
ENVIRONMENTAL MANAGEMENT PROGRAMS  
DIVISION OF MATERIALS SAFETY AND STATE AGREEMENTS  
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, 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, MONTANA, NEBRASKA, NEVADA, NEW MEXICO, NORTH  
DAKOTA, OKLAHOMA, OREGON, PACIFIC TRUST TERRITORIES, SOUTH DAKOTA, TEXAS,  
UTAH, WASHINGTON, OR WYOMING, 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, MISSISSIPPI, 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  
612 E. LAMAR BOULEVARD, SUITE 400  
ARLINGTON, TX 76011-4125

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

24-32839-01

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

PAGUA, JonCris  
1340 N. DYNAMICS ST., SUITE A  
ANAHEIM, CA 92806

## 3. ADDRESS WHERE LICENSED MATERIAL WILL BE USED OR POSSESSED

10727 TRENTON AVE  
ST. LOUIS, MO 63132

## 4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION

JONCRIS PAGUA

## TELEPHONE NUMBER

619 991 7179

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 F.C.

AMOUNT  
ENCLOSED

\$ 2700.00

## 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, 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

JONCRIS PAGUA RSD CNMT

## SIGNATURE

*JonCris*

## DATE

10/31/11

## FOR NRC USE ONLY

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

DATE

RECEIVED NOV 08 2011

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PROFESSIONALS

"VIP TREATMENT WITHOUT VIP PRICES"

October 31, 2011

U.S. Nuclear Regulatory Commission  
Regional Administrator  
Division of Nuclear Mater Safety  
ATTN: New License

To whom it may concern:

5.
  - a. Element Tc mass number 98.
  - b. Liquid Form
  - c. Maximum amount that will be possessed at any one time is around 700 mCi
6. The purpose for this licensed material is to be used as a tracer in medical tests that image the heart, Nuclear Perfusion Imaging.
7. Jon-Cris Pagua, CNMT, RSO the current RSO and lead NMT will be responsible for the Radiation Safety Program and their training experience. I have been the RSO for Vascular Imaging Professionals for the last 3 years and went through a Nuclear Medicine Program Associate program in Largo, MD.
8. Annual and refresher ; See included documents.
9. The address of the facility below where RAM is delivered and stored.

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10727 TRENTON AVE.  
ST. LOUIS , MO 63132

Equipment that we currently use is a Cardius 1 M to image patients heart  
To detect radiation we use Ludlum 2241-2 serial number 255561 with additional probes 44-3 and 44-38.

10. Radiation Safety Program; see included documents about ALARA



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11. Waste Management is done with Stericycle, they pick up all of our waste periodically at our base office.
12. Fees; included check to NRC

Sincerely,

Jon-Cris Pagua, CNMT , RSO  
(619) 991-7179  
[jon-cris@vipimaging.com](mailto:jon-cris@vipimaging.com)

## Introduction

The following training material is provided for personnel that work directly with or in close proximity to radioactive materials in medical imaging facilities.

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## Outline

The material covers topics such as:

- Sources of radiation
- Radiation risks
- Terms to describe risk from radiation
- Radiation protection methods
- Dosimetry & Dose Records
- Regulatory Limits
- Radiation safety policies
- Patient Procedures (pregnancy, shielding, holding)

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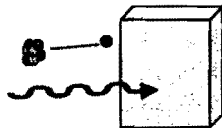
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## Definition of Radiation

Radiation can be defined as energy that travels through space or material, in the form of waves or particles.

The energy and strength of the radiation varies, depending on the source of the radiation.



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## Examples of Radiation

Radiation can be found in many forms as part of our daily lives. Examples of different types of radiation are listed below.

- Electricity
- Light
- Sound
- Power Lines
- Cellular Phone Transmissions
- Microwaves
- Radio Waves
- Microwaves
- Heat
- Gamma Rays
- Alpha Particles
- X-rays
- Magnetic Fields

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## Ionizing Versus Non-Ionizing

### Ionizing Radiation

- Has the ability to ionize materials
- Examples: X-rays, Gamma-rays, Cosmic-rays

### Non-Ionizing Radiation

- Does not have enough energy to ionize
- Examples: Magnetic fields, Microwave, Light

While there are dangers from non-ionizing radiation, it will not be the focus of the remainder of this training material. Our concern is the ionizing radiation that has the ability to alter the atomic structure of parts of our bodies.

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## Radiation Risks

Almost all daily activities involve some sort of risk associated with the chance of illness, injury or death.

Exposure to radiation must be considered as an everyday part of life and part of the risk associated with existing on Earth.

Unless we are working in direct contact with nuclear reactors or bombs (which most of us are not), the risk refers to the possibility of developing cancer in a part of our bodies.

Regulations are in place to ensure that risks to both radiation workers and members of public remain below the naturally occurring risk of developing cancer.

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## Radiation Sources - Natural

Certain radiation sources exist on Earth. Everyone is exposed to the following:

- Cosmic – exposure amount varies with altitude
- Terrestrial – amount varies with position on Earth
- People – have a slight radioactive component
- Intake – food, water and air have radioactivity

The average exposure to each person in the U.S. from background radiation is approximately 300 millirem.

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## Radiation Sources – Man-Made

X-ray, Fluoroscopy & CT Machines

- X-rays only emitted when exposure button pushed
- Operated in shielded rooms
- Persons in the room use fixed or portable shielding
- May have a portable machine in various rooms

Radioactive Materials

- Liquids, capsules or gases given to patients for disease diagnosis or therapy
- Materials typically held in shields in the Hot Lab
- Always “on”, can only shield patient or materials

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## Radiation Terms

When we talk or write about distances, we need to quantify the distances by associated units, such as miles, feet and inches. The terms below were derived to help us quantify the risk associated with radiation.

Roentgen (pronounced *rain-kin*)

- Referred to as “R” or “mR”
- Measure of exposure in air for x-rays

RAD

- Measure of Radiation Absorbed Dose
- Amount of energy absorbed by any material

REM

- Measure of radiation absorbed dose in tissues
- Includes information about biological effects

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## Radiation Terms (continued)

**Roentgen**

**RAD**

**REM**

These terms are often used interchangeably.

Easy to measure Roentgen with an instrument while regulatory limits are listed in REM.

For x-ray, CT, Fluoroscopy and most nuclear medicine, we can assume that  
Roentgen = RAD = REM

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## Fractionated Terms

Fractions of the radiation terms may be written in various forms.

The most common form is milliRoentgen, millirad or millirem.  
Examples of these may be found on the dosimeter reports or the radiation survey meter within the nuclear medicine department.

$$1 \text{ millirem} = \frac{\text{rem}}{1000}$$

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## Ambient Levels & Limits



U.S. Average  
Background Exposure  
300 millirem.



Annual Regulatory Limit  
Member of Public  
100 millirem.

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## Annual Regulatory Dose Limits

- ◆ Listed in state and federal regulations.
- ◆ Derived so as to minimize the risk of adverse effects.



Whole Body  
5,000 mrem



Hand/Skin  
50,000 mrem



Eye  
15,000 mrem

## Declared Pregnant Workers

### Declaration of Pregnancy

Voluntary, declaration must be in writing to management

### Extra monitoring

Fetal monitor assigned to wear over abdomen

Limit to fetus per entire pregnancy = 500 mrem

## Radiation Dosimeters

Each person deemed a "Radiation Worker" has been assigned a whole body badge. The badge tracks the amount of radiation received by the person wearing the badge.

Badges are also posted on walls adjacent to public or non-monitored worker areas to ensure exposures in these areas stay below the limits for the public.



Your facility may currently use the Landauer Luxel dosimeters to measure whole body dose equivalents to employees and public areas. These dosimeters are capable of detecting dose equivalents from 1 mrem up to 1,000,000 mrem.



## Whole Body Dose Monitoring

Each radiation worker is responsible for

- wearing the badge at collar level during activities associated with radiation producing machines
- Exchanging the dosimeter at the required interval
- Keeping the dosimeter at the facility in a designated low background area when not in the facility.
- Reviewing their monthly dosimetry reports and initialing where dose equivalents are recorded.

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## Further Dosimeter Information

Please review the document from Landauer entitled "Landauer Service Guide", which explains the dosimeters and how to read dosimetry reports.

Please contact the person within your facility that is responsible for dosimeters if you have further questions or if users are to be added or deleted from the system.

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## The to Radiation Protection

Keep exposures to radiation:

As

Low

As

Reasonably

Achievable

**ALARA**

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## ALARA Principles

The most effective means of protection are to:

- Minimize the **TIME** around sources of radiation
- Maximize the **DISTANCE** from sources of radiation
- Maximize the **SHIELDING** between people and sources of radiation

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## ALARA Planning

Facilities are designed with ALARA principles:

- X-rays only produced when machine is "on", decreasing exposure **TIME**
- X-ray and nuclear medicine rooms are sized so as to increase the **DISTANCE** between the sources and members of the public
- The walls of x-ray rooms are lead-lined to provide **SHIELDING** between the source and the public.

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## ALARA – Avoiding Contamination

- Always wear disposable gloves when handling radioactive materials or patients injected with radioactive materials.
- Do not store personal items within the use and storage areas (restricted area).
- Take caution when opening or touching object(s) labeled as radioactive.
- Do not eat or drink anything within the restricted areas.

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## ALARA – Pregnant Patients

- Signs must be posted to remind patients to inform staff of pregnancy
- Technologists and staff shall ask female patients of possibility of pregnancy prior to examination.
- If patient unsure, postpone until verified.
- If pregnant patient receives radiopharmaceuticals, call your in-house or consulting physicist.

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## Recognizing Restricted Areas

Areas where radiation producing machines or radioactive materials are used are defined as Restricted Areas.

Each Restricted Area will have a sign posting:

“ Caution – Radiation Area ”

OR

“ Caution – Radioactive Materials “



X-ray, CT & Fluoroscopy rooms may also have a sign that lights when the machine is “on”.

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## Commitment to Radiation Safety

Your facility must be committed to protect employees, customers and members of the public.

Your facility has developed policies and procedures that will keep doses from radiation producing machines as low as reasonably achievable (ALARA)

Each employee within your facility must also be committed to ensuring doses to individuals are kept ALARA.

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## Radiation Safety Regulations

The Radiation Workers and the facility Radiation Safety Officer are responsible for radiation safety and enforce the regulations held by the state in which your imaging center is located.

Contact information for both the Nuclear Medicine Technologist and the Radiation Safety Officer is posted on the door to the nuclear medicine storage room (Hot Lab). The location of the applicable radiation safety regulations is also posted on the door.

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## Investigational Levels Overview

The management and RSO of your facility have established Investigational Levels for exposures to workers.

The Investigational Levels are set lower than the regulatory limits.

Action is required by the employee and the local management to investigate occurrences of exceeding the levels.

These occurrences are discussed those exceeding the levels, the Radiation Safety Officer and the facility management.

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## Investigational Level Values

The first Investigational Level is set at one tenth of the total allowable yearly limit, or 500 millirem for whole body. The doses must be looked at at least quarterly, therefore the quarterly level is one quarter of the level above, or 125 mrem.

The second level for your facility is 1,500 mrem per year, or 375 mrem per quarter.

The actions required differ when exceeding the first or second investigational level.

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## Radiation Safety Questions & Issues

Should you have any questions regarding radiation safety, either general or specific to your facility, please contact your management or the Radiation Safety Officer.

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### **3 ALARA Program**

All individuals have responsibility for ALARA. Furthermore, the management of VIP Imaging is committed to the program as described herein for keeping individual and collective doses as low as is reasonably achievable (ALARA). In accord with this commitment we hereby describe an administrative organization for radiation safety and will develop the necessary written policy, procedures, and instructions to foster the ALARA concept within our institution.

We will perform a formal review of the radiation safety program, including ALARA considerations, on at least an annual basis. This will include reviews of operating procedures, past dose records, inspections, and consultations with the radiation safety staff or outside consultants.

Modifications to operating and maintenance procedures and to equipment and facilities will be made if they will reduce exposures unless the cost, in our judgment, is considered unjustified. We will be able to demonstrate, if necessary, improvements have been sought, that modifications have been considered, and that they have been implemented when reasonable. If modifications have been recommended but not implemented, we will be prepared to describe the reasons for not implementing them.

In addition to maintaining doses to individuals as far below the limits as is reasonable achievable, the sum of the doses received by all exposed individuals will also be maintained at the lowest practicable level. It would not be desirable, for example, to expose some individuals consistently to higher doses while others would receive lower exposures.

Management delegates the authority to the RSO for enforcement of the ALARA concept.

Management will support the RSO when it is necessary for the RSO to assert authority.

Designees may be appointed to assist with the duties of the RSO but not the responsibility.

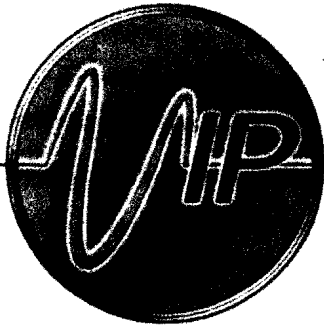
#### **3.1 Review of ALARA Program**

The RSO will encourage all users to review current procedures and develop new procedures as appropriate to implement the ALARA concept.

The RSO will evaluate our institution's overall efforts for maintaining doses ALARA on an annual basis.

#### **3.2 Annual and Quarterly Review**

The RSO will perform an annual review of the radiation safety program for adherence to ALARA concepts. Reviews of specific methods of use may be conducted on a more frequent basis.



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The RSO will review at least quarterly the occupational radiation exposure of monitored employees with particular attention to instances in which the Investigational Levels in Table 1 are exceeded.

**Table 1. ALARA Investigational Levels**

Body Part	Investigational Levels (mrem/Q)	
	Level I	Level II
Whole body; head and trunk; Active blood-forming organs; Lens of eyes; or gonads	250	400
Hands and forearms; feet and ankles	1875	5625
Skin of whole body	750	2250

The RSO will review radiation surveys in unrestricted and restricted areas to determine that dose rates and amounts of contamination were at ALARA levels during the previous quarter.

### **3.3 Education Responsibilities for ALARA Program**

The RSO will schedule briefings and educational sessions to inform workers of ALARA program efforts.

The RSO will ensure that authorized users, workers, and ancillary personnel who may be exposed to radiation will be instructed in the ALARA philosophy and informed that management and the RSO are committed to implementing the ALARA concept.

### **3.4 Cooperative Efforts for Development of ALARA Procedures**

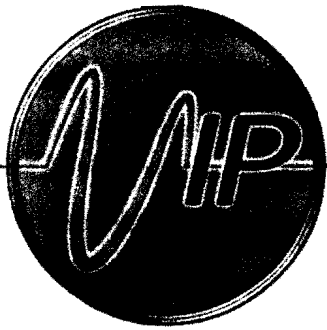
Radiation workers will be given opportunities to participate in formulating the procedures that they will be required to follow.

The RSO will be in close contact with all users and workers in order to develop ALARA procedures for working with radioactive materials.

The RSO will receive and evaluate the suggestions of individual workers for improving health physics practices, and will encourage suggestions.

### **3.5 Reviewing Instances of Deviation from Good ALARA Practices**

The RSO will investigate all known instances of deviation from good ALARA practices and, if possible, will determine the causes. When the cause is known, the RSO will implement changes in the program to maintain doses ALARA.



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### **3.6 Individuals Who Receive Occupational Radiation Doses**

Workers will be instructed in the ALARA concept and its relationship to work procedures and work conditions.

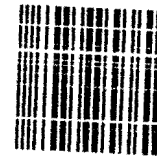
Workers will be instructed in recourses available if they feel that ALARA is not being promoted on the job.



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ANAHEIM, CA 92806



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ARLINGTON, TX 76011-4125

