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|--|--|--|--|--|--|
| <b>NRC Form 313 I</b><br>(12-81)<br>10 CFR 30  |  | <b>U.S. NUCLEAR REGULATORY COMMISSION</b>    |  | <b>1. APPLICATION FOR:</b><br><i>(Check and/or complete as appropriate)</i><br><div style="text-align: right; font-size: 1.5em; margin-top: 10px;">03225</div> |  |
| <b>APPLICATION FOR BYPRODUCT MATERIAL LICENSE</b><br><b>INDUSTRIAL</b>   |  |  |  | <input checked="" type="checkbox"/> <b>a. NEW LICENSE</b>  |  |
| <i>See attached instructions for details.</i><br><br>Completed applications are filed in duplicate with the Division of Fuel Cycle and Material Safety, Office of Nuclear Material Safety, and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555 or applications may be filed in person at the Commission's office at 1717 H Street, NW, Washington, D. C. or 7915 Eastern Avenue, Silver Spring, Maryland. |  |  |  | <input type="checkbox"/> <b>b. AMENDMENT TO:</b><br>LICENSE NUMBER   |  |
|  |  |  |  | <input type="checkbox"/> <b>c. RENEWAL OF:</b><br>LICENSE NUMBER   |  |
| <b>2. APPLICANT'S NAME</b> <i>(Institution, firm, person, etc.)</i><br><br>ASK, INC. 215-327-4373<br>TELEPHONE NUMBER: AREA CODE - NUMBER EXTENSION  |  |  | <b>3. NAME AND TITLE OF PERSON TO BE CONTACTED</b><br><b>REGARDING THIS APPLICATION</b><br>Martin W. Bourquin, R.S.O. 215-948-9696<br>TELEPHONE NUMBER: AREA CODE - NUMBER EXTENSION |  |  |
| <b>4. APPLICANT'S MAILING ADDRESS</b> <i>(Include Zip Code)</i><br><i>(Address to which NRC correspondence, notices, bulletins, etc., should be sent.)</i><br><br>135 Walnut Street<br>Pottstown, Pa. 19464  |  |  | <b>5. STREET ADDRESS WHERE LICENSED MATERIAL WILL BE USED</b><br><i>(Include Zip Code)</i><br><br>See Attachment   |  |  |
| (IF MORE SPACE IS NEEDED FOR ANY ITEM, USE ADDITIONAL PROPERLY KEYED PAGES.)   |  |  |  |  |  |
| <b>6. INDIVIDUAL(S) WHO WILL USE OR DIRECTLY SUPERVISE THE USE OF LICENSED MATERIAL</b><br><i>(See Items 16 and 17 for required training and experience of each individual named below)</i>  |  |  |  |  |  |
| FULL NAME  |  |  | TITLE  |  |  |
| a. See Attachment  |  |  |  |  |  |
| b.   |  |  |  |  |  |
| c.   |  |  |  |  |  |
| <b>7. RADIATION PROTECTION OFFICER</b><br><br>Martin W. Bourquin (resume Attached)   |  |  | Attach a resume of person's training and experience as outlined in Items 16 and 17 and describe his responsibilities under Item 15.  |  |  |
| <b>8. LICENSED MATERIAL</b>  |  |  |  |  |  |
| L<br>I<br>N<br>E<br><br>NO.  | ELEMENT<br>AND<br>MASS NUMBER<br><br>A | CHEMICAL<br>AND/OR<br>PHYSICAL FORM<br><br>B | NAME OF MANUFACTURER<br>AND<br>MODEL NUMBER<br><i>(If Sealed Source)</i><br><br>C  | MAXIMUM NUMBER OF<br>MILLICURIES AND/OR SEALED<br>SOURCES AND MAXIMUM ACTI-<br>VITY PER SOURCE WHICH WILL<br>BE POSSESSED AT ANY ONE TIME<br><br>D             |  |
| (1)  | See Attachment                         |  |  |  |  |
| (2)  |  |  |  |  |  |
| (3)  | RECEIVED BY LFMB                       |  |  |  |  |
| (4)  | Date... 1/23/85                        |  |  |  |  |
| (1)  | Log... Jan 11                          |  |  |  |  |
| (2)  | By... Brown                            |  |  |  |  |
| (3)  | Orig. To... 1/24/85                    |  |  |  |  |
| (4)  | Action Compl...                        |  |  |  |  |
| (1)  | 8505290332 850506                      |  |  |  |  |
| (2)  | REG1 LIC30                             |  |  |  |  |
| (3)  | 37-20803-01                            | PDR  |  |  |  |
| (4)  |  |  |  |  |  |

### 9. STORAGE OF SEALED SOURCES

| LINE NO. | CONTAINER AND/OR DEVICE IN WHICH EACH SEALED SOURCE WILL BE STORED OR USED.<br>A. | NAME OF MANUFACTURER<br>B. | MODEL NUMBER<br>C. |
|----------|---|----------------------------|--------------------|
| (1)      | Not Applicable  |                            |                    |
| (2)      |   |                            |                    |
| (3)      |   |                            |                    |
| (4)      |   |                            |                    |

### 10. RADIATION DETECTION INSTRUMENTS

| LINE NO. | TYPE OF INSTRUMENT<br>A | MANUFACTURER'S NAME<br>B | MODEL NUMBER<br>C | NUMBER AVAILABLE<br>D | RADIATION DETECTED<br>(alpha, beta, gamma, neutron)<br>E | SENSITIVITY RANGE<br>(milliroentgens/hour or counts/minute)<br>F |
|----------|-------------------------|--------------------------|-------------------|-----------------------|--|--|
| (1)      | Geiger-Mueller          | Ludlum                   | Model 3           | 1 or more             | Beta-Gamma   | 0-200Mr/Hour   |
| (2)      | Geiger-Mueller          | Johnson                  | RML-2             | 1 or more             | Beta-Gamma   | 0-50,000 CPM   |
| (3)      |                         |                          | OR EQUIVALENT     |                       |  |  |
| (4)      |                         |                          |                   |                       |  |  |

### 11. CALIBRATION OF INSTRUMENTS LISTED IN ITEM 10

|   |   |
|---|---|
| <input type="checkbox"/> a. CALIBRATED BY SERVICE COMPANY<br>NAME, ADDRESS, AND FREQUENCY<br><br>See Attachment | <input type="checkbox"/> b. CALIBRATED BY APPLICANT<br>Attach a separate sheet describing method, frequency and standards used for calibrating instruments. |
|---|---|

### 12. PERSONNEL MONITORING DEVICES

| TYPE<br>(Check and/or complete as appropriate.)<br>A   | SUPPLIER<br>(Service Company)<br>B   | EXCHANGE FREQUENCY<br>C  |
|--|--|--|
| <input type="checkbox"/> (1) FILM BADGE<br><br><input checked="" type="checkbox"/> (2) THERMOLUMINESCENCE DOSIMETER (TLD)<br><br><input type="checkbox"/> (3) OTHER (Specify): _____<br><br> | Teledyne Isotopes<br>Westwood Laboratory<br>50 Van Buren Avenue<br>Westwood, New Jersey 07675<br><br>OR EQUIVALENT | <input checked="" type="checkbox"/> MONTHLY<br><br><input type="checkbox"/> QUARTERLY<br><br><input type="checkbox"/> OTHER (Specify): _____<br> |

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

- ☒ a. LABORATORY FACILITIES, PLANT FACILITIES, FUME HOODS (Include filtration, if any), ETC.  
☐ b. STORAGE FACILITIES, CONTAINERS, SPECIAL SHIELDING (fixed and/or temporary), ETC.  
☐ c. REMOTE HANDLING TOOLS OR EQUIPMENT, ETC.  
☐ d. RESPIRATORY PROTECTIVE EQUIPMENT, ETC.

### 14. WASTE DISPOSAL

a. NAME OF COMMERCIAL WASTE DISPOSAL SERVICE EMPLOYED

See Attachment

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

# **INFORMATION REQUIRED FOR ITEMS 15, 16 AND 17**

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

15. **RADIATION PROTECTION PROGRAM.** Describe the radiation protection program as appropriate for the material to be used including the duties and responsibilities of the Radiation Protection Officer, control measures, bioassay procedures (if needed), day-to-day general safety instruction to be followed, etc. If the application is for sealed source's also submit leak testing procedures, or if leak testing will be performed using a leak test kit, specify manufacturer and model number of the leak test kit.
16. **FORMAL TRAINING IN RADIATION SAFETY.** Attach a resume for each individual named in Items 6 and 7. Describe individual's formal training in the following areas where applicable. Include the name of person or institution providing the training, duration of training, when training was received, etc.
  - a. Principles and practices of radiation protection.
  - b. Radioactivity measurement standardization and monitoring techniques and instruments.
  - c. Mathematics and calculations basic to the use and measurement of radioactivity.
  - d. Biological effects of radiation.
17. **EXPERIENCE.** Attach a resume for each individual named in Items 6 and 7. Describe individual's work experience with radiation, including where experience was obtained. Work experience or on-the-job training should be commensurate with the proposed use. Include list of radioisotopes and maximum activity of each used.

## **18. CERTIFICATE**

*(This item must be completed by applicant)*

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

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

a. LICENSE FEE REQUIRED  
(See Section 170.31, 10 CFR 170)

\$ 930.00

b. CERTIFYING OFFICIAL (Signature)

c. NAME (Type or print)  
John J. Allen

(1) LICENSE FEE CATEGORY:  
10 CFR 170.31 .3 .N

d. TITLE  
President

(2) LICENSE FEE ENCLOSED: \$  
930.00

e. DATE  
11/30/84

ATTACHMENT

Item 5: Street address where licensed material will be used.

Licensed material will be used primarily at the licensed facility located at 135 Walnut Street, Pottstown, Pa. 19464.

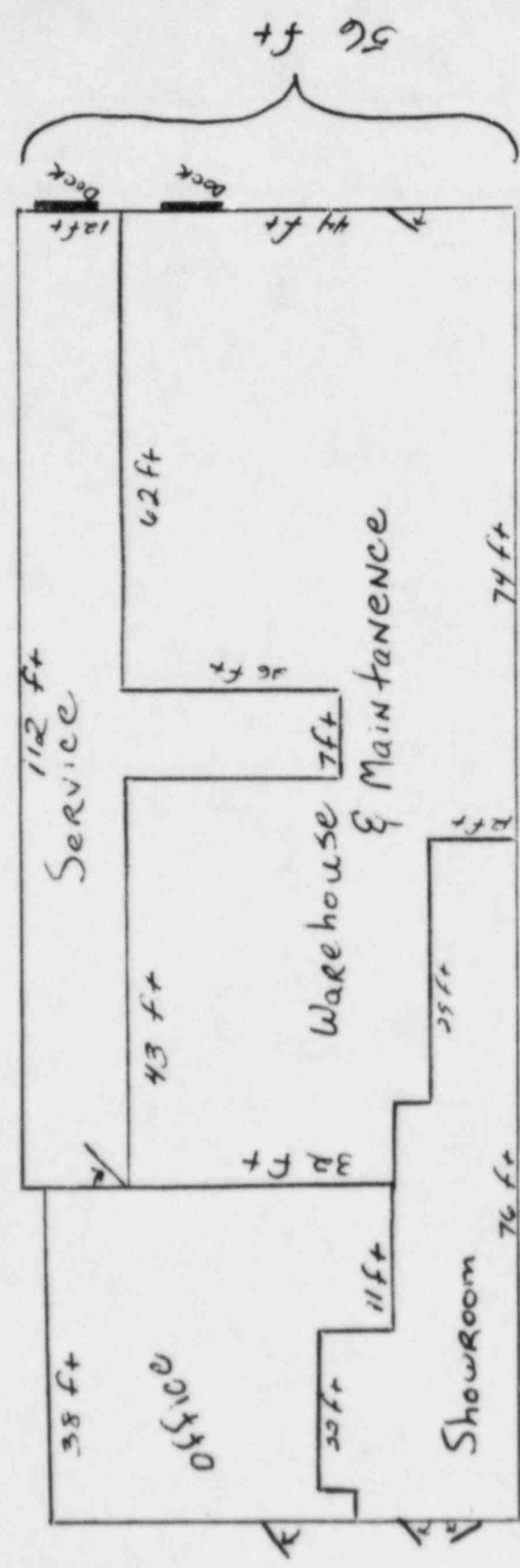
Licensed material may also be used at the temporary job sites of the licensee anywhere in the United States where the Nuclear Regulatory Commission maintains jurisdiction for regulating the use of licensed material.

A floor plan of the facility has been included as figure 1 to this attachment.



ASK, INC  
 Floorplan  
 Ground Floor  
 135 Walnut St.  
 Pottstown, Pa  
 19464

150 ft



150 ft

\* Decon will be performed in  
 the Warehouse & Maintenance  
 AREA.

Walnut St  
 Walnut St

ATTACHMENT

Item 6: Individuals who will use or directly supervise the use of licensed material.

Radioactive materials are to be used by or under the direct supervision of individuals designated by the Radiation Safety Officer. The Radiation Safety Officer shall insure that all designated users have received training commensurate with the types and quantities of materials being used.

## ATTACHMENT

Item 7: Martin W. Bourquin

### Experience

Apr. 1984-  
Present

President, Bortek Systems, Royersford, Pa.

Provided a wide range of health physics and related services to the nuclear industry. These included consulting services in areas such as radioactive waste reduction, respiratory protection, transportation of radioactive material, facility decommissioning, and exposure control (ALARA programs). Also provided sales and service of various pieces of decontamination equipment.

Jan. 1983-  
Feb. 1984

Corporate Radiation Safety Officer, Tri-State Industrial Laundries, Inc., Royersford, Pa.

Responsible for the implementation of the Radiation Safety Program for a radioactive decontamination laundry with facilities in New York State and Pennsylvania. Duties included obtaining all necessary licenses and permits (NRC, DEC, DER, ect.), developing and implementing all operating and health physics procedures as well as developing a training program and conducting training for all employees. Acted as liason between the company and all regulatory agencies for New York and Pennsylvania facilities. Conducted audits and inspections of both facilities to insure procedural and regulatory compliance.

Jan. 1980-  
Dec. 1982

Radiation Safety Officer, Tri-State Industrial Laundries, Inc., Utica Ny.

Responsible for the implementation of the Radiation Safety Program of a decontamination laundry. Routine duties included the supervision and review of all surveys, training, personnel monitoring, environmental surveillance and transporattion of radioactive material. Set up, ran and trained new technicians to operate all Canberra Geli system. Was liason between all New York State regulatory agencies(New York is an agreement state). Retained duties as co-ordinator of all on-site services offered to the nuclear industry.

ATTACHMENT

Item 7 Continued:

Experience

Aug. 1976-  
Jan. 1980

Production Manager, Tri-State Industrial Laundries  
Inc., Utica, Ny.

Supervised the day to day operations of a nuclear decontamination laundry. Initial responsibilities included all staffing, production and maintenance scheduling, and customer contracts. As the company expanded additional duties included sales and marketing and the coordination of teams of workers on-site at various nuclear power plants.

Jan. 1976-  
Jun. 1976

Radiological Controls Supervisor, USS. Fulton AS-11  
New London, Ct.

Performed duties as Radiological Controls Supervisor and monitor on maintenance projects involving ten different nuclear powered submarines.

Nov. 1984-  
Jan. 1976

Leading Engineering Laboratory Technician, USS.  
Kamehameha SSBN 642, New London, Ct.

Responsible for maintaining proper radiological and chemistry controls on a naval nuclear submarine including the maintenance of all records. Duties included supervising all technicians in areas such as routine and special surveys, radio-chemistry, personal dosimetry, decontamination techniques and training. Developed and implemented a shipwide training program that resulted in a superior rating in both radiation protection and radio-chemistry from Naval Reactors during their biannual inspection.

Oct. 1972-  
Oct. 1974

Instructor, US. Navy Nuclear Power Training Unit  
DTG Prototype, West Milton, NY.

Responsibilities included the training of perspective operators in the theory and operation of a naval nuclear reactor with special emphasis on radio-chemistry and all aspects of radiological controls, as well as performing all day to day health physics duties. Participated in various operations such as radiography, refueling and decontamination of the reactor compartment.

ATTACHMENT

Item 7 Continued:  
Education

|            |  |
|------------|--|
| June 1968  | Graduate Brentwood High School Brentwood, NY.    |
| Oct. 1970- | Graduate of Naval Nuclear Power Training Program |
| Oct. 1972  | including:                                       |
|            | Basic Propulsion Engineering                     |
|            | Machinist Mate "A"                               |
|            | Basic Nuclear Power School                       |
|            | D1G Prototype                                    |
|            | Engineering Laboratory Technician                |
| Aug. 1975  | Sub-safe Certification (Quality Assurance)       |
| Jan. 1982  | A.A.S. in Business Administration from Mohawk    |
|            | Valley Community College, Utica NY.              |

Memberships

Health Physics Society  
American Nuclear Society

Certification

Certified by National Registry of Radiation  
Protection Technologists-Janurary 1977

ATTACHMENT

Item 8: Licensed Material

This is an application for a "Type B specific license of broad scope".

Item 8A: Element and Mass Number

Line 1: Any byproduct material specified in 33.100, Schedule A of 10CFR33.

Line 2: Any byproduct source, or special nuclear material between Atomic Numbers 84 & 98 inclusive.

Item 8B: Chemical and/or Physical form.

Line 1: Any

Line 2: Any

Item 8C: Name of Manufacturer and Model Number

Line 1: Any

Line 2: Any

Item 8D: Maximum Number of Millicuries and/or Sealed Sources and Maximum Activity per Source Which Will Be Possessed At Any One Time.

Line 1: As specified in section 33.11(b) of 10CFR33 (Type B Broad License) but no more than 100 millicuries total as contamination.

Line 2: No more than 100 millicuries total as contamination which includes no more than 100 milligrams special nuclear material.

Item 8E: Describe Use of Licensed Material.

All licensed material shall be used in accordance with safety evaluations that have been prepared in accordance with 33.14(b)(2)(iii) of 10CFR33.

ASK, INC., provides a variety of services to the the nuclear industry. These include, but are not limited to; rental of various types of decontamination of equipment (HEPA equipped vacuums, high pressure washers, tool cleaning machines, etc), repairing & refurbishing of various pieces of customer owned equipment, and area decontamination services.



ATTACHMENT

Item 8E continued:

Although this equipment has been designed to facilitate decontamination, there will be a certain amount of fixed and loose contamination that will remain internal to the equipment.

The principle use of licensed material will be the receipt, storage and refurbishment of this equipment. However it is not intended that ASK, INC., be precluded from any other use that would comply with 10CFR33.14(b).

ATTACHMENT

Item 11: Calibration of Instruments listed in Item 10.

- a. All instruments will be calibrated at a frequency not to exceed 6 months. The service company used will be:

RAD Services  
500 Penn Center  
Pittsburgh, Pa. 15235

or equivalent

ATTACHMENT

Item 13: Facilities and Equipment.

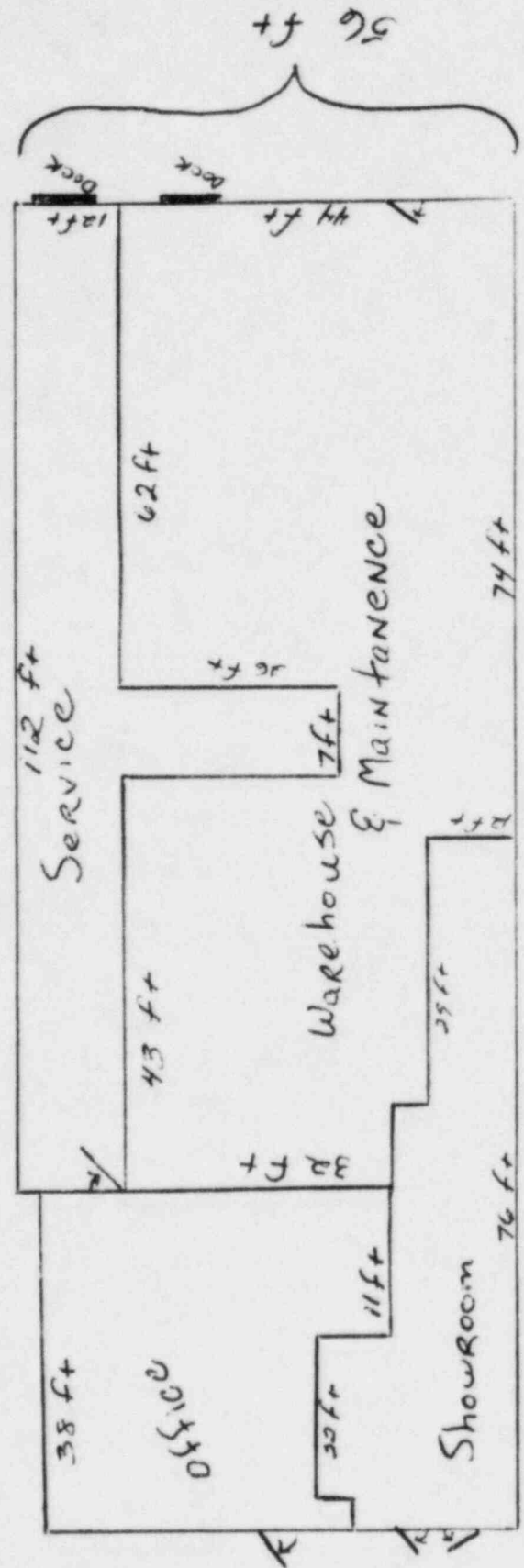
The primary location where licensed material will be used and stored will be the maintenance area of the building located at 135 Walnut Street Pottstown, Pa. 19464. A floor plan is included as figure 1 to this attachment.

The proposed work area is approximately 3500 square feet. It is physically separated from the remainder of the building and access is restricted to those persons involved in this phase of the company. All work performed in this area will be performed in accordance with the ASK Health Physics Manual which has been submitted as Item 15 of this application.

Security will be maintained on a level that will insure the protection of the equipment stored there as well as prevent unauthorized use and/or exposure to licensed materials.

ASK, INC.  
 Floorplan  
 Ground Floor  
 135 Walnut St.  
 Pottstown, Pa  
 19464

150 ft



150 ft

\* Decon will be performed in the Warehouse & Maintenance AREA.

Walnut St  
 Walnut St

ATTACHMENT

Item 14: Waste Disposal

All radioactive waste will be packaged, surveyed and labeled in accordance with all applicable regulations (NRC, DOT, burial site, etc.) and disposed of by transfer to a person licensed to receive such material. The company currently scheduled to receive this waste is:

Chem Nuclear Systems  
P.O. Box 726  
Barnwell, S.C. 29812

## ATTACHMENT

### Item 15: Radiation Protection Program

#### 1.0 Introduction

##### 1.1 Purpose and Scope

This radiation Protection Program sets forth the policies and standards of ASK, INC., as they relate to the operation of its licensed facilities. It includes radiation safety practices, regulatory and administrative standards, precautionary and emergency measures, personnel training policies and management's position regarding adherence to the plan.

##### 1.2 Organization and Responsibilities

1.2.1 The ultimate responsibility for the safe use of all licensed material rests with the President, ASK, INC.

1.2.2 Reporting directly to the President, the Radiation Safety Officer is responsible for implementing and maintaining the Radiation Safety Program as described in this manual. These duties include, but are not limited to:

- \* Establishing radiation protection policies interpreting regulations established by Federal and State agencies and insuring compliance with these regulations.
- \* Provide radiation protection training for all persons who work with sources of ionizing radiation.
- \* Furnishing consulting service on all aspects of radiation protection to all persons or groups, at any time.
- \* General surveillance of all activities involving radioactive material or radiation including assisting designated users in discharging their responsibilities.
- \* Distribution and processing of personnel monitoring equipment including the maintenance of all exposure records and the training of individuals in their proper use.
- \* Conducting a continuing program on the evaluation and elimination of environmental hazards.



## ATTACHMENT

### 1.2.2 Continued

- \*Review each proposed use and user of licensed material and grant approval where appropriate. No person shall use licensed material without this approval. This review shall be performed before the initial use and annually thereafter.
- \*Establish policies and procedures for safe management of all radioactive wastes and maintain radioactive waste records.
- \*Maintain an inventory of all approved users of licensed materials.
- \*Ordering, receiving, storing, and dispensing all sources and maintaining records as appropriate.
- \*Performing leak tests on all sealed sources and maintaining records.
- \*Performing periodic audits of all operations involving licensed materials.

1.2.3 Due to the varied and unpredictable nature of the operations being performed by ASK, INC., the Radiation Safety Officer has been given a broad latitude in determining the procedures which will apply on a case to case basis, the individuals who will use or directly supervise the use of licensed material and the uses of the licensed material.

1.2.4 It is the responsibility of each approved user to insure all work is being performed in accordance with approved procedures and in a manner that will result in exposures to personnel being maintained as low as reasonably achievable (ALARA).

## 2.0 Safe Handling of Radioactive Material

As indicated by the title it is the purpose of this section to acquaint personnel with the required procedures for first obtaining approval to use radioactive material and secondly to provide general guidelines for its use.

### 2.1 Obtaining Approval to Use Licensed Material

2.1.1 All uses and users of licensed material at ASK, INC., must have the prior written approval of the Radiation Safety Officer. Each new proposed use or user of licensed material must be submitted in writing to the Radiation Safety Officer. The application must include as a minimum; a description of the material, the

## ATTACHMENT

### 2.1.1 Continued

proposed use, the precautions to be taken to minimize the exposure of personnel and to prevent the spread of contamination, the minimum protective clothing required and the procedures for handling any waste generated. An application for a new user of licensed material shall also include a description of training received and of all prior uses of licensed material.

- 2.1.2 The Radiation Safety Officer will review the application prior to any work commencing and at least annually thereafter. Records of all approved uses and users of licensed materials shall be maintained. The Radiation Safety Officer will make periodic unannounced inspections of the job to insure all work is being performed in accordance with approved procedures.

### 2.2 General Guidelines for Use of Licensed Material

- 2.2.1 Each person who works with radioactive material has a responsibility to:

- \*Keep their own and others exposure to ionizing radiation as low as reasonably achievable (ALARA).
- \*Prevent the ingestion and inhalation, or other modes of entry, of radioactive materials into the body.
- \*Prevent the spread of radioactive contamination.

- 2.2.2 Thermoluminescent Dosimeters (TLD'S) and/or self reading dosimeters shall be worn by personnel at all times in controlled areas.

- 2.2.3 There will be no eating, drinking, smoking or chewing in any controlled area.

- 2.2.4 The protective clothing and equipment required for the job shall be worn at all times in the controlled area. These items shall be donned, worn and removed in accordance with procedures.

- 2.2.5 Hands, face, hair, clothing, shoes, etc., shall be monitored at intervals during the day and always prior to leaving the controlled area.

- 2.2.6 Maximum practical distance and shielding and minimum working time shall be observed in working with sources of radiation. This may involve use of special handling tools, lead bricks, etc.

## ATTACHMENT

- 2.2.7 Read and comply with all postings, labels and other warnings.
- 2.2.8 Always comply with the approved procedures for the specific task being performed.
- 2.2.9 Notify radiation protection personnel if any of the following conditions occur:
  - A. The failure or malfunction of any radiation protection equipment.
  - B. A significant change (or suspected change) in the radiological conditions at the worksite.
  - C. An actual or suspected incident of personnel contamination.
  - D. Any radiological situation occurs (no matter how minor) in which the user is either unsure of what steps to take or for any reason feels the need for additional guidance.
- 2.2.10 Keep track personal radiation dose so as not to exceed federal or administrative limits. Report promptly the loss or damage of any assigned dosimetry device.

### 2.3 Procedures and Procedural Compliance

- 2.3.1 This Radiation Protection Manual provides general guidelines for the safe handling of licensed materials. The specific techniques and applications of these guidelines are found in the procedures covering each specific approved use.
- 2.3.2 These procedures shall provide adequate guidance to insure that all tasks are performed in accordance with sound radiation protection principles and are in full compliance with all applicable regulations.
- 2.3.3 All procedures involving work in radiologically controlled areas shall be reviewed by the Radiation Safety Officer. The purpose of this review is to insure that sufficient attention has been paid to the radiological considerations inherent to the task and that the activity will be performed in a manner that will support the principle of ALARA.
- 2.3.4 All personnel shall be indoctrinated in all procedures which directly relate to their task and of the need to comply to them.

## ATTACHMENT

### 2.4 Management Policy.

- 2.4.1 As a matter of company policy, ASK, INC., is committed to the principle of maintaining exposures to ionizing radiation and radioactive material as low as reasonably achievable.(ALARA) This ALARA policy applies not only to the exposure of individuals, but also to the collective dose (man-rem) to all personnel.
- 2.4.2 Since the responsibility for radiation safety must be shared with each individual, the ultimate success of the Radiation Protection Program is highly dependent upon the degree of cooperation received from each worker. Each worker is charged with the responsibility to observe all procedures and guidelines. Any items of non-compliance will result in appropriate disciplinary action.

### 3.0 Training

#### 3.1 Purpose

- 3.1.1 The purpose of the training program of ASK, INC., is divided into three major sections:
  - a. To insure that all personnel are instructed in the biological effects of work involving exposure to ionizing radiation and the risks associated with that work.
  - b. To provide each worker with sufficient training and information in order to allow them to handle licensed material in a safe and responsible manner.
  - c. To insure each worker has sufficient information and training to help maintain both their own and their fellow workers exposure to ionizing radiation as low as reasonably achievable.(ALARA)

#### 3.2 Description

- 3.2.1 All persons who receive permission for unescorted access to the restricted areas of the ASK facility shall receive training in elementary radiation effects and in basic radiation protection procedures. The level and quantity of training received will be sufficient to insure the safe and efficient performance of their work.

## ATTACHMENT

3.2.2 The training program shall consist of the following:

- a. Sources of Radiation Exposure
- b. Nature and Properties of Radiation
- c. Biological Effects of radiation
- d. Quantities and Units of Radiation
- e. Procedures and Procedural Compliance
- f. Exposure Control and Limits
- g. ALARA
- h. Control of Radioactive Material
- i. Protective Clothing
- j. Emergency Procedures
- k. 10CFR19
- l. Prenatal Exposure (Regulatory Guide 8.13)

3.2.3 The responsibility for the development and implementation of the training program lies with the radiation Safety Officer. It should be flexible enough to take into consideration the individual's background, previous training, and the task to be performed.

3.2.4 Successful completion of a written examination is required prior to receiving unescorted access.

3.2.5 From time to time it may be necessary for a individual who has not received the appropriate training to have access to a controlled area. The training requirement may be waived at the discretion of the Radiation safety Officer provided a qualified escort is provided for the individual.

3.2.6 It is the responsibility of the escort to maintain full control over the movements and activities of this individual during the period he is in a controlled area. The escort will insure that all procedures and regulations are complied with.

## 4.0 Exposure Control

This section provides the specific guidance necessary to keep exposure of all personnel as low as reasonably achievable.(ALARA)

### 4.1 Definitions

4.1.1 Restricted Area- a restricted area is any area to which access is controlled for purposes of protection of individuals from exposure to radiation and radioactive materials. Restricted areas shall not include any areas used as residential quarters, although a seperate room or rooms in a residential building may



## ATTACHMENT

- 4.1.1 Continued  
be set apart as a restricted area.
- 4.1.2 Unrestricted Area- a unrestricted area is any area to which access is not controlled for purposes of protecting individuals from exposure to radiation and radioactive materials, and any area used as residential quarters.
- 4.1.3 Controlled Area- a controlled area is any area inside a restricted area that has access to it controlled for purposes of keeping personnel exposure to radiation and radioactive material as low as reasonably achievable. A controlled area may include radiation areas, high radiation areas, surface contamination areas, etc.
- 4.1.4 Radiation Area- a radiation area is any area, accessible to personnel, in which there exists radiation such that a major portion of the body could receive in any one hour a dose in excess of 5millirem, or in any 5 consecutive days a dose in excess of 100 millirems.
- 4.1.5 High Radiation Area- a high radiation area is any area accessible to personnel in which there exists radiation at such levels that a major portion of the body could receive in any one hour a dose in excess of 100 millirem.
- 4.1.6 Airborne Radioactivity Area- any room, enclosure, or operating area in which airborne radioactive materials, composed wholly or in part of licensed material, (1) exist in concentrations in excess of amounts specified in 10CFR20 Appendix B, Table I, Column I or (2) exists in concentrations which, averaged over the number of hours in any week during which individuals are in the area, exceed 25% of the amounts specified in 10CFR20 Appendix B, Table I, Column I.
- 4.1.7 Personnel Monitoring Equipment- any devices designed to be worn or carried by an individual for the purpose of measuring the dose received. (ie. film badges, TLDs , pocket dosimeters, etc.)
- 4.2 Postings
  - 4.2.1 Restricted Area- There are no specific posting requirements for a restricted area. The area shall be posted in accordance with the other paragraphs of this section as required.



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- 4.2.2 Radiation Area- Each radiation area shall be conspicuously posted with a sign or signs bearing the radiation caution symbol and the words:

CAUTION

RADIATION AREA

The word DANGER may replace CAUTION.

- 4.2.3 High Radiation Area- Each high radiation area shall be conspicuously posted with a sign or signs bearing the radiation caution symbol and the words:

CAUTION

HIGH RADIATION AREA

The word DANGER may replace CAUTION. Each high radiation area shall be maintained locked except during periods when access to the area is required, with positive control over each individual entry.

- 4.2.4 Airborne Radioactivity Area- Each airborne radioactivity area shall be conspicuously posted with a sign or signs bearing the radiation caution symbol and the words:

CAUTION AIRBORNE RADIOACTIVITY AREA

The word DANGER may replace CAUTION.

- 4.2.5 Other

- a. Each area or room in which licensed material is used or stored and which contains (1) any radioactive material in any amount exceeding 10 times the quantity of such material specified in 10CFR20 Appendix C or (2) natural uranium or thorium in any amount exceeding 100 times the quantity specified in 10CFR20 Appendix C, shall be conspicuously posted with a sign or signs bearing the radiation caution symbol and the words:

CAUTION

RADIOACTIVE MATERIAL(S)

The word DANGER may replace CAUTION.

- 4.2.6 General

All postings, when appropriate, shall provide sufficient additional information to permit individuals working in the area to take precautions to keep their exposure ALARA. This information might include items such as radiation levels, kinds of materials, estimates of activity, etc.

## 4.3 Access Control

- 4.3.1 Routine access to the restricted area shall be authorized only for those persons whose job functions require them to enter. There shall be a suitable physical

## ATTACHMENT

### 4.3.1 Continued

barrier such as gate or door to prevent the access of unauthorized persons.

Access to the controlled area will be through a established control point. There shall be no restricted or controlled areas outside of the facility except on a temporary basis as authorized by the Radiation Safety Officer provided such areas incorporate a suitable physical barrier such as a fence or door.

### 4.3.2 Entry and Exit Requirements

#### A. Controlled Area

No person shall enter the controlled area unless the entry is necessary and for a specific purpose.

Each person entering the controlled area shall have completed the necessary training.

Each person entering the controlled area shall be wearing their personally issued TLD.

All persons will adhere to all procedures affecting their task and follow good health physics practices.

#### B. Radiation Areas

Since all radiation areas will be located inside of controlled areas, access to radiation areas will be controlled by controlling access to the controlled area.

Since radiation areas may exist at various locations inside the controlled area and frequently changing due to incomming and outgoing equipment, if any radiation area exists inside the controlled area itself will be posted as a radiation area.

#### C. High Radiation Areas

The entrance to the high radiation areas shall be equipped with devices such as doors which shall remain locked except:

1. Areas which cannot be locked will be guarded until such time as they can be locked.
2. Areas in which personnel are present shall not be locked but a guard shall be present at the entrance to prevent the unauthorized entry of personnel. He shall have in his

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2. Continued possession a list of persons authorized, by the Radiation Safety Officer, to enter the area.

All persons entering the high radiation area shall have in their possession, in addition to their TLD, a self-reading pocket dosimeter and a radiation dose rate measuring device with a range suitable to measure the expected dose rates.

All keys to high radiation areas shall be controlled by the Radiation Safety Officer.

### 4.4 Personnel Monitoring

- 4.4.1 The personnel monitoring program at ASK, INC., shall be conducted in a manner that is consistent with title 10, Code of Federal Regulations Part 20. The program shall consist of both thermoluminescent dosimeters (TLDs) and self-reading pocket dosimeters. The permanent record shall be provided by the TLD. The self-reading pocket dosimeter shall be used to give estimates of exposure between reading of the TLD and to augment and verify the TLD reading.
- 4.4.2 Dose information from sources other than the TLD may be used to replace or supplement the TLD results. This may be necessary in the event that the TLD is lost or damaged, the results are suspect, etc. In these cases the action taken and its justification shall be documented in accordance with good health physics practices.
- 4.4.3 All individuals entering the restricted area of ASK, INC., are required to have in their possession a personal monitoring device capable of measuring exposure to ionizing radiation. Whenever licensed materials are contained in the maintenance area, the boundary walls of the facility shall be the boundary of the restricted area.
- 4.4.4 Personnel monitoring equipment shall be issued to and worn by :
  - A. Each individual who enters a restricted area under such circumstances that he receives, or is likely to receive a dose in any calendar quarter in excess of 25% of the applicable value specified in 4.6.2A.
  - B. Each individual, under the age of 18 years, who enters a restricted area under such circum-

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### B. Continued

stances that he receives or is likely to receive a dose in any calendar quarter in excess of 5% of the applicable value specified in 4.6.2A. Due to the extremely limited dose allowed to individuals under 18 years of age, no one in this age group will be allowed into the restricted area without the permission of the Radiation Safety Officer.

- 4.4.5 Each individual, prior to their first entry into the restricted area during each employment or work assignment under such circumstances that the individual will receive or is likely to receive in any period of one calendar quarter an occupational dose in excess of 25% of the applicable limit specified in 4.6.2A shall disclose in a written signed statement either:
- A. The Individual had no prior occupational dose during the current calendar quarter, or...
  - B. The nature and amount of any occupational dose which the individual may have received during the current calendar quarter from sources of radiation possessed or controlled by other persons.
- 4.4.6 Any individual who is likely to receive an occupational dose in excess of 1.25 REM to whole body shall complete an NRC form 4, or equivalent, prior to exceeding 1.25 REM.
- A. Any individual who does not have a complete and up to date form 4 on file will not be permitted to exceed 750 Millirem for the quarter.
- 4.4.7 All individuals will complete an NRC form 4 prior to being issued a TLD.
- 4.4.8 Any individual who had previously been issued dosimetry at ASK, INC., shall prior to reissue of dosimetry, be required to complete an updated NRC form 4 if they were monitored for occupational exposure to radiation while they were away from ASK, INC.
- 4.4.9 All TLDs shall be worn between the shoulders and waist on the front of the body. The beta window will be facing away from the body. All persons will receive instruction in the proper wearing of dosimetry during initial issue.

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4.4.10 All TLDs shall be sent for processing on a monthly basis as a minimum. More frequent processing may be necessary at the discretion of the Radiation Safety Officer. Situations which might necessitate more frequent processing would include:

- A. An individual is approaching or is suspected of having reached the maximum permissible administrative limit for exposure.
- B. An individual's dosimeter is off-scale or lost. (The results of an investigation would determine if processing was necessary.)

4.4.11 The use of self-reading pocket dosimeters shall conform to the following:

- A. It shall be worn adjacent to the TLD.
- B. It shall be read frequently when the individual is in a controlled area. The frequency should be consistent with the levels of radiation present.
- C. It shall be re-zeroed when it reaches 75% of full scale.
- D. If it reads off-scale or is lost, the individual shall immediately leave the controlled area and report the problem to radiation protection personnel.

4.4.12 The exposure records shall be maintained current and shall be retained until their disposal is authorized by the NRC. Reports of exposure, to individuals and regulatory agencies, shall be provided in accordance with Title 10 Code Of Federal Regulations Parts 19 and 20.

### 4.5 Bioassay Program

- 4.5.1 In order to insure that individuals are not ingesting excessive quantities of radioactive materials a urine analysis sample program will be conducted.
- 4.5.2 All personnel who perform work in the controlled area on a routine basis will submit a one liter urine sample collected within a 24 hour period on an annual basis.
- 4.5.3 Prior to the employment of individuals in the controlled areas, a urine sample will be required. This will be utilized to serve as base line and control



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- 4.5.3 continued  
sample for comparison with future samples.
- 4.5.4 Whenever possible a termination urine sample will be collected from any individual who worked in the controlled area and is leaving ASK, INC.
- 4.5.5 All samples will be packaged and sent to a qualified laboratory for analysis.
- 4.5.6 More frequent sampling may be required, in certain instances, at the discretion of the Radiation Safety Officer.
- 4.6 Exposure Limits
  - 4.6.1 All persons working within the restricted area of ASK, INC., shall be subject to the maximum permissible exposures as specified in title 10 Code Of Federal regulations Part 20. This regulation specifies the maximum permissible exposure; all individuals should strive to maintain their exposure as low as reasonably achievable.(ALARA)
  - 4.6.2 The occupational exposure limits for personnel 18 years of age and over are as follows:
    - A. REMS per Calendar Quarter
      - 1. Whole body, head and trunk, active blood forming organs, lens of eye, or gonads. 1.25
      - 2. Hands and forearms, feet and ankles. 18.75
      - 3. Skin of whole body. 7.5
    - B. An individual in a restricted area may receive a total occupational dose to the whole body greater than that specified in 4.6.2A provided.
      - 1. During any occupational quarter the total occupational dose to the whole body shall not exceed 3 REMs; and
      - 2. The dose to whole body, when added to the accumulated occupational dose to the whole body, shall not exceed  $5(N-18)$  REM where "N" equals the age in years at his last birthday; and



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### 4.6.2B continued

3. The individual's accumulated occupational dose to the whole body has been determined and accumulated on an NRC form 4, or on a clear and legible record containing all the information required in that form.

- 4.6.3 The occupational exposure limits for any individual under 18 years of age shall be 10% of the limits specified in 4.6.2A.

### 4.7 Administrative Guidelines for Exposure Control

- 4.7.1 In order to maintain the occupational radiation exposure to individuals within the limits specified in 4.6.2A it is necessary it apply certain administrative guidelines to control the rate of accumulation of dose over the period for which the limits apply. All persons working within the restricted area of ASK, INC., shall comply with these guidelines.

- 4.7.2 The weekly administrative limit for the whole body, for personnel over 18 years of age will be 200MREM per calendar week.

- A. Prior authorization from the Radiation Safety Officer is required before any individual is permitted to exceed 200 MREM per week.

- 4.7.3 The quarterly administrative limit for exposure to the whole body is broken down into 3 increments.

- A. The quarterly administrative limit for exposure to the whole body is 750 MREM per quarter.
- B. Written authorization is required from the Radiation Safety Officer prior to any individual receiving a whole body exposure in excess of 750 MREM for the calendar quarter.

1. Also required at this point are a complete and up to date NRC form 4 and the individual's TLD shall be processed and the results evaluated.

- C. Written authorization is required from the Radiation Safety Officer prior to any individual receiving a whole body exposure in excess of 1250 MREM for the calendar quarter.

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### 4.7.3C continued

1. The individual's TLD shall be processed and the results evaluated prior to granting this extension. This extension will allow the worker to receive up to 2000 MREM for the quarter. The worker's TLD shall be processed at a frequency selected by the Radiation Safety Officer to insure the individual does not exceed the upper limits. This section applies only if the individual has sufficient remaining exposure using 5(N-18).

- 1) No individual working in the ASK, INC., facility will be allowed to exceed 2000 MREM per quarter.

4.7.4 Any individual who receives an occupational exposure of more than 1000 MREM in any calendar quarter of the calendar year shall be limited to 750 MREM per quarter for each remaining quarter in the calendar year.

4.7.5 Any individual who was 18 years of age on his last birthday shall have an administrative limit of 750 MREM per calendar quarter.

4.7.6 Persons under 18 years of age will not be permitted routine access to the restricted area. In the event a situation arises such that a minor does require access to the restricted area the administrative limit shall be 75 MREM per quarter.

4.7.7 In accordance with the recommendations of the NRC, NCRP and the ICRP concerning the radiation dose received by pregnant women, the administrative dose limit at ASK, INC., is 500 MREM during the entire gestation period. This limit is based on the concern for reducing the radiation exposure to the fetus, which is particularly sensitive to radiation effects, especially during the first trimester. While the dose limit during pregnancy is 500 MREM, it should be understood that radiation dose is to be maintained as low as reasonably achievable within this limit. Instructions to all female employees, their supervisors and their co-workers will be provided in the training program as specified in Section 3.

### 4.8 Emergency Limits

4.8.1 In order to effectively combat an extreme emergency situation involving the potential for loss of human

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### 4.8.1 continued

life or extensive property damage, or both, it is necessary to have certain pre-selected emergency exposure limits. It is considered that an emergency whole body dose of 100REM to save a life; or 25 REM to prevent serious damage to equipment that could result in the potential for additional significant injury to personnel or significant releases of radioactive material to the environment, may be acceptable provided that:

- A. The Radiation Safety Officer is fully aware and approves of the action about to be taken.
- B. Individuals will be selected on a voluntary basis and will be briefed on the possible consequences of the exposure.
- C. Exposures authorized under this section will be considered a once in a lifetime occurrence.
- D. Individuals receiving these exposures will not be permitted any additional occupational exposure until a medical examination and consultation have been completed.

### 4.9 ALARA

- 4.9.1 It is of prime importance that the use of radioactive materials at ASK, INC., be conducted in a manner, that unnecessary and inadvertent exposures are eliminated to the maximum extent possible and that all exposures are kept as low as reasonably achievable. (ALARA)
- 4.9.2 The authority, and ultimately the responsibility the responsibility, for the implementation of the ALARA program rests with the President with ASK, INC. This individual shall insure that all persons, both management and workers, understand and comply with the principle of ALARA.
- 4.9.3 Reporting directly to the President, the Radiation Safety Officer shall be responsible for implementing the plan on a day to day basis.
- 4.9.4 The implementation of the ALARA program shall include, as a minimum; 1) Instilling in all employees a belief and understanding of ALARA ; 2) Review of all work procedures, prior to the commencement of work, to insure that the principle of ALARA was taken into consideration; 3) Periodic inspections of jobs to

4.9.4 continued

insure work is being performed in a manner that maintains exposures ALARA.

A. Instilling a belief and understanding of ALARA in all employees is accomplished by utilizing the following steps:

1. Training- During initial training all employees are made familiar with the principle of ALARA and with the importance of exposure reduction efforts both on a company-wide basis and on a personal basis.
2. Worker Input- All personnel are encouraged to recommend changes and improvements in procedures, work habits and equipment that will result in reduction of exposure.
3. Procedural Compliance- All personnel shall comply with work procedures and shall implement all exposure reduction techniques instituted by radiation protection personnel.

B. Prior to obtaining approval for a use or user of licensed material the work procedures for the task must be approved by the Radiation Safety Officer. As a part of this review, the Radiation Safety Officer shall examine the procedure for compliance with the principle of ALARA. This review shall include, but not necessarily be limited to, the following:

1. The use of temporary shielding. The estimated exposure to install and remove the shielding should be weighed against the exposure reduction anticipated.
2. Changing the job location to an area with lower radiation levels.
3. Reduce radiation levels by removing nearby hot spots. (relocate portable equipment, flush piping, etc.)
4. Conduct mock-up training .
5. Holding pre-work briefings. These should detail any potential problems, higher radiation areas, changes in work conditions since the job was performed last.
6. Changing the size of the work crew. Keep excess and relief personnel in an area of lower radiation levels.

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### 4.9.4B continued

7. Decontamination- By decontaminating areas and equipment, it will not only reduce exposures but will also minimize the potential for personnel contamination and the production of airborne radioactivity.

C. The radiation protection staff, including the Radiation Safety Officer shall perform periodic unannounced inspections of work sites. These inspections are for the purpose of insuring compliance with both work procedures and good health physics practices as well as determining if work is proceeding in a manner consistent with ALARA. This determination will be based on those requirements that were placed on the job before work commenced as well as any new observations made. If any new techniques are discovered that will help to reduce exposures they shall be implemented as soon as possible.

## 5.0 Contamination Control

### 5.1 General

- 5.1.1 Surface contamination can exist in one of two forms; loose (or removable) contamination or fixed contamination. Loose contamination is generally defined as material which can be removed by swiping the surface with a dry, absorbant material using moderate pressure. Quite often surface contamination will have a combination of loose and fixed contamination. Fixed contamination is that portion of surface contamination which is not easily removed in the manner described above.
- 5.1.2 Since removable contamination is more readily dispersed than fixed contamination the limits for contamination permitted in uncontrolled areas differentiates between the two forms, with loose contamination having the more restrictive limit.
- 5.1.3 The objectives of the contamination control program at ASK, INC., are threefold:
  - A. To minimize the possible spread and release of radioactive material to uncontrolled areas or to the surrounding environment.
  - B. To minimize the possible ingestion or inhalation of radioactive material by individuals coming in contact with contaminated surfaces.

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### 5.1.3 continued

C. Although the levels of contamination will not normally be high enough to constitute a significant external radiation hazard, the maintaining of contamination levels as low as reasonably achievable will contribute to maintaining ambient radiation levels as low as reasonably achievable.

5.1.4 A contamination control program must incorporate various measures in order to be successful. These measures include access control, protective clothing, contamination devices, surveys (personnel & area) control of potentially contaminated material and decontamination.

## 5.2 Definitions

### 5.2.1 Clean Area

A. The limits for surface contamination in a clear or uncontrolled area are as follows:

1. Beta-Gamma contamination loose - less than 1000 dpm/100cm<sup>2</sup>
2. Alpha contamination loose - less than 100 dpm/100cm<sup>2</sup>
3. Fixed contamination - less than 0.1 mr/hr

### 5.2.2 Contaminated Area

A. Any area, accessible to personnel in which the levels of surface contamination exceed those listed in 5.2.1 shall be classified as a contaminated area.

B. Any area classified as a contaminated area shall be conspicuously posted with a sign bearing the radiation symbol and the words:

#### CONTAMINATED AREA

C. Whenever reasonable, the contamination in the controlled areas should be maintained below the levels specified in 5.2.1 and should always be maintained as low as reasonably achievable.

## 5.3 Access Control

5.3.1 Contaminated areas shall be segregated from clean areas by the use of appropriate barriers (rope, railings, etc.)

5.3.2 Access to contaminated areas shall be through an access control point. The access control point shall incorporate a step off pad at the boundary between the contaminated area and a clear area.



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### 5.3.2 continued

Access control points shall be established within the following general guidelines.

- A. The control points should be located as close to the contaminated area as possible.
- B. The control point should be located in an area with background radiation levels as low as possible.
- C. It should be large enough to handle the expected amount of traffic.
- D. The entrance should be roped off and posted as a contaminated area.
- E. Appropriate receptacles should be provided for the handling of used protective clothing and radioactive waste.

5.3.3 No individual shall enter a contaminated area unless his assigned task specifically requires it.

5.5.4 All individuals entering a contaminated area shall comply with all procedures that have been established for working in that area.

### 5.4 Control Measures

5.4.1 There are certain control measures that shall be taken to minimize, to the maximum extent possible, the contamination of areas, equipment and personnel. These measures include, but are not limited to:

- A. Training of all personnel in techniques to minimize the release and spread of contamination.
- B. Training of personnel in the proper use of protective clothing and equipment as well as the proper techniques for monitoring for personnel contamination.
- C. Preplanning of work involving contamination to carefully consider the use of contamination containment devices such as glove boxes, tents, etc in order to avoid the release and spread of contamination.
- D. Increasing the frequency of contamination surveys during heavy work load periods to promptly detect any releases or spread of contamination.

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### 5.4.1 continued

E. Decontaminate equipment and areas which have become contaminated as expeditiously as possible to avoid the spread of contamination.

F. Establish procedures controlling the release of tools, equipment and other material from contaminated areas.

G. When leaving a contaminated area, protective clothing will be carefully removed and a thorough check will be made by self-frisking for any areas on the body or personal clothing which might have become contaminated.

5.4.2 The application of these control measures will be described in the procedures covering the specific task being performed.

### 5.5 Protective Clothing

5.5.1 Protective clothing is worn by individuals in contaminated areas to prevent the contamination of the individual and to minimize the spread of contamination.

5.5.2 The selections of which items of protective clothing are necessary shall be made by radiation protection personnel. The selection shall be based on the contamination levels, the type of task to be performed and the duration of the task.

5.5.3 Even though the selection of protective clothing must be job specific, the following general guidelines should be followed:

- |   |  |
|---|--|
| A. less than 1000 dpm/100cm <sup>2</sup>  | no PCs required                                |
| B. less than 10,000 dpm/100cm <sup>2</sup>  | lab coat,                                      |
| for inspection and survey only  | gloves, shoe covers                            |
| no work performed   |  |
| C. less than 100,000 dpm/100cm <sup>2</sup>   | one set PCs                                    |
|   | (coverall, head covering, gloves, shoe covers) |
| D. greater than 100,000 dpm/100cm <sup>2</sup>  | two sets PCs                                   |
| E. When working in a contaminated wet area, or when contaminated liquid could spray on clothing a plastic wet suit should be worn over the protective clothing. |  |

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- 5.5.4 Each individual prior to entering a contaminated area shall be responsible to determine from the appropriate procedure, what items of protective clothing are required.
  - 5.5.5 Prior to donning the protective clothing each item shall be inspected to insure that it is not damaged. Damaged items shall be removed from service.
  - 5.5.6 If disposable garmets are being used they shall be disposed of as radioactive waste after each use.
  - 5.5.7 If reusable garmets are used each garmet shall be laundered prior to re-use.
  - 5.5.8 After being laundered each garmet shall be individually surveyed prior to being accepted for re-use.
    - A. If the garmet has less than 1000DPM/cm<sup>2</sup> loose contamination and less than 0.25MR/hr at 1 inch fixed contamination it is suitable for re-use.
    - B. Garmets with fixed contamination greater than 0.25MR/hr at 1 inch but less than 1.0MR/hr at 1 inch may be used in the outer set of garmets when more than one set of PCs are required.
    - C. Garmets with fixed contamination in excess of 1.0MR/hr at 1 inch shall be disposed of as rad waste.
  - 5.6 Personnel Contamination Control
    - 5.6.1 All persons exiting in a contaminated area shall remove all protective clothing, following the correct procedures, prior to entering a clean area.
    - 5.6.2 A self frisking station shall be set up as close to the control point as background radiation levels will permit. All personnel shall perform a whole body frisk at the closest frisking station. In no event shall an individual exit the controlled area without performing a whole body frisk.
    - 5.6.3 The Radiation Protection Staff shall be notified if any individual is found to be contaminated in excess of the following:
      - A. Beta-Gamma Contamination 1000DPM/100cm<sup>2</sup>
      - B. Alpha Contamination 100DPM/100cm<sup>2</sup>
- A 1000DPM/100cm<sup>2</sup> reading is present when a reading

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### 5.6.3 continued

of 100CPM is received when using a HP-210 probe, or equivalent, at  $\frac{1}{2}$  inch. Personnel monitoring for alpha contamination is not normally performed unless the individual is in a area known to have alpha contamination present. This can be justified by checking routine smear surveys for alpha contamination.

- 5.6.4 If contamination is found on the facial areas in the vicinity of the mouth or nose nasal swabs shall be taken and analyzed to determine the possibility of internal contamination. If contamination is found on the nasal smear a bioassay sampling program shall be initiated.

### 5.7 Tools & Equipment Contamination Control

- 5.7.1 All tools, equipment and other material shall be surveyed for contamination prior to being released to a clean area.

- 5.7.2 The following limits must be met before any item is given an unconditional release for use in uncontrolled areas:

A. Loose Beta-Gamma Contamination less than 1000DPM/100cm<sup>2</sup>

B. Loose Alpha Contamination less than 100DPM/hr @ 1 inch

C. Fixed Beta-Gamma Contamination less than 0.1MR/hr @ 1inch

- 5.7.3 Tools and equipment routinely used in contaminated areas do not require decontamination provided the item is plainly marked "Caution-Radioactive Material" or is painted yellow and is used and stored in a contamination controlled area. These tools however will require decontamination if they are to be taken into a clean area.

- 5.7.4 All decontamination shall be performed in accordance with good health physics practices.

### 5.8 Surveys

- 5.8.1 All contamination surveys shall be performed in accordance with section 7.3.

## 6.0 Control of Airborne Radioactivity

### 6.1 General

- 6.1.1 The primary reason to control airborne radioactivity is to minimize the internal exposure of personnel from the inhalation of airborne radioactive materials.

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- 6.1.2 The concentrations of radioactive materials in air are limited by the use of measures such as process controls, proper ventilation, contamination control, respiratory protection equipment and frequent sampling during procedures that have a high probability of producing airborne contamination.

### 6.2 Airborne Radioactivity Limits

- 6.2.1 The maximum permissible exposure to airborne radioactive material by inhalation in a restricted area in any period of one calendar quarter shall be that quantity which would result from inhalation for 40 hours per week for 13 weeks at uniform concentrations of radioactive material in air specified in appendix B, Table I, Column 1 of 10CFR20.

A. For radioactive materials designated as "sub" in the isotope column of the table, the concentration value specified is based on exposure to the material as an external radiation source. Individual exposures to these materials shall be accounted for as part of the limitation on individual dose in section 4.

- 6.2.2 If it is known that Alpha emitters are not present, an airborne radioactivity concentration of  $3 \times 10^{-10}$  uci/cc, as measured by gross Beta-Gamma analysis shall be considered to be the most restrictive maximum permissible concentration of 10CFR20, appendix B, Table I, Column 1. The value shall be the value at which actions are required (postings, wearing of respirators, etc.) unless isotopic analysis indicates that a less restrictive MPC is applicable.

### 6.3 Definition

- 6.3.1 An airborne radioactivity area is defined as any area in which airborne radioactive materials exist in concentrations in excess of the amounts specified in 10CFR20 appendix B, Table I, Column 1, or which airborne radioactive material exists in concentrations which, averaged over the number of hours in any week during which individuals are in the area, exceed 25% of the amounts specified in 10CFR20 appendix B, Table I, Column 1.
- 6.3.2 Each airborne radioactivity area shall be conspicuously posted with a sign or signs bearing the radiation caution symbol and the words:
- Caution  
Airborne Radioactivity Area



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- 6.4.1 Every effort shall be taken to maintain the intake of radioactive material by an individual within any period of seven consecutive days as far below that intake of radioactive material which would result from inhalation of such material for 40 hours at the uniform concentrations specified in 10CFR20 appendix B, Table I, Column 1 as is reasonably achievable.
- 6.4.2 To the maximum extent possible the concentrations of airborne radioactivity shall be minimized through the use of engineering and processing control. These would include, but are not limited to:
  - A. The use of filtered ventilation systems.
  - B. The use of containment devices such as, glove boxes and tents.
  - C. Decontamination of equipment and areas to reduce high contamination levels prior to performing work.
  - D. The training of all individuals in work practices that minimize the production of airborne radioactivity.
- 6.4.3 When the implementation of the techniques are either not practical or insufficient other precautionary procedures shall be used. These include:
  - A. Increased surveillance.
  - B. Limitation of working times.
  - C. Use of respiratory protective equipment.
  - D. Combinations of the above.
- 6.4.4 In order to have an effective program of exposure control to airborne radioactive material based on the limitation of working time it is necessary to have a effective air sampling program. The air sampling program for each task will be specified in the associated procedures.
- 6.4.5 If an individual is entering a area with a known level of airborne radioactivity he shall be given a maximum stay time that will insure that he does not exceed 2MPC-hours per day.



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- 6.4.6 Individuals performing a task that generates airborne radioactivity, as recorded by air sampling during the task, shall have his MPC-hours tracked.
- 6.4.7 When assessment of an individual's intake of radioactive material is necessary, intakes less than those which would result from inhalation for two hours in any one day (2MPC-hours) or 10 hours in any one week (10MPC-hours) at uniform concentrations specified in 10CFR20 appendix B, Table I Column I need not be included in such assessment, provided that for any assessment in excess of these amounts the entire amount is included.
- 6.4.8 If any individual receives an exposure in excess of 2MPC-hours in any one day or 10MPC-hours in one week records shall be maintained showing the amount of exposure and including all related information (name, date, time, etc)

### 6.5 Access Control

- 6.5.1 No individual shall enter an airborne radioactivity area unless his job specifically requires it.
- 6.5.2 Airborne radioactivity areas shall be physically separated from adjacent areas through the use of appropriate boundaries.
- 6.5.3 Since all airborne radioactivity areas shall be inside the controlled area, access is limited to those persons with access to the controlled area.

### 6.6 Surveys

- 6.6.1 Airborne radioactivity surveys shall be performed in accordance with section 7.4 and the appropriate work procedure.

## 7.0 Surveys

### 7.1 General

- 7.1.1 The survey program has been established in order to closely monitor the radiological conditions in both the restricted and unrestricted areas of ASK, in order to allow the implementation of appropriate control measures that will result in keeping exposures to all personnel as low as reasonable achievable.
- 7.1.2 Surveys should be performed in a manner that is consistent with the radiological conditions expected, the use of the survey, and the reasons for performing it.

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- 7.1.3 Precautions to be taken (protective clothing, stay times, etc.) during the performance of the survey shall be determined by radiation protection personnel.
- 7.1.4 All survey and survey requirements shall be established and performed in a manner that complies with the principle of ALARA. Requirements should not be established that are likely to cause a significant increase in the total exposure necessary to perform the job.

### 7.2 Radiation Surveys

- 7.2.1 Radiation surveys are a useful tool in helping workers maintain their exposures ALARA. The pre-work survey should be detailed enough to allow radiation protection personnel to evaluate the use of various techniques for reducing exposures (shielding, decontamination, use of mock-ups, etc).
- 7.2.2 Routine surveys provide necessary information about the general radiological conditions both inside and outside the restricted area. These surveys monitor the effectiveness of the restricted area boundaries as well as provide the data needed for access control and postings.
- 7.2.3 Radiation surveys shall be performed at the following frequencies:
  - A. Daily in any area in which work is being performed that involves the use of licensed material.
  - B. Weekly in any area in which material is being stored but no work is being performed.
  - C. Weekly in all areas adjacent to the restricted area.
  - D. No surveys shall be required during those periods in which no licensed material is being used or stored in the facility.
- 7.2.4 All routine radiation surveys shall be made at waist level except for contact readings on various hot spots.
- 7.2.5 Prior to using a portable radiation monitoring instrument, the following checks shall be made:
  - A. Insure instrument has been calibrated within the six months.

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### 7.2.5continued

B. Insure instrument has been source checked within one week.

C. Perform battery check.

D. Check for any obvious physical damage (broken wires, dents, etc).

7.2.6 The frequency, number and detail of routine and job specific surveys may be varied at the discretion of the Radiation Safety Officer.

### 7.3 Contamination Surveys

7.3.1 Contamination surveys shall be performed both inside and outside the controlled area in order to detect contamination build-up, possible spread & tracking before significant contamination levels are reached.

7.3.2 Routine surveys provide the data necessary for radiation protection personnel to evaluate the radiological conditions both inside and outside the controlled area. These surveys monitor the effectiveness of the controlled area boundaries as well as provide data needed for access control and postings.

7.3.3 Surveys shall be performed on all tools, equipment and other material prior to their being removed from the restricted area.

7.3.4 A determination of the loose surface contamination of an item or area is made by wiping (smearing) the surface with a piece of filter paper (smear) and then measuring the amount of radioactivity on the filter paper using an appropriate radiation detection instrument. The smear is wiped with moderate pressure over an area of 100cm<sup>2</sup>. If the surface is such that a smear of this size is not feasible, smaller areas may be used, provided the results are recorded accordingly.

7.3.5 A determination of the total (loose & fixed) surface contamination or just the fixed portion, if loose is known not to be present, can be made by direct survey using a suitable radiation detection instrument with an open window detector.

7.3.6 Routine contamination surveys shall be performed at the following frequencies:

A. Daily in any area in which work is being performed that involves the use of licensed material.

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### 7.3.6 continued

- B. Daily on the clean side of the access control point when work involving the use of licensed material is being performed in the controlled area.
- C. Weekly in any area in which licensed material is being stored but no work is being performed.
- D. Monthly in all areas adjacent to the restricted area.
- E. No surveys shall be required during those periods in which no licensed material is being stored or used in the facility.

7.3.7 All instruments used to measure surface contamination must be sensitive enough to detect the levels specified in 5.2.1 if the data is to be used for releasing an area or equipment or to determine if protective clothing is necessary.

7.3.8 The frequency, number and detail of specific job and routine surveys may be varied at the discretion of the Radiation Safety Officer.

### 7.4 Airborne Radioactivity Surveys

7.4.1 The purpose of the airborne radioactivity sampling program at ASK, INC., is to monitor and document the exposure of individuals to concentrations of airborne radioactive material. It also provides the data necessary to evaluate the protective measures taken (ventilation systems, containment devices, etc) and to determine if postings are necessary.

7.4.2 Air samples, to maximum extent possible, shall be representative of the air in the worker's breathing zone. General air samples may also be required at the discretion of radiation protection personnel.

7.4.3 Due to the varied nature of each task, the air sampling program for each job shall be specified in the work procedures for that job.

7.4.4 A general area air sample shall be performed daily in the restricted area whenever any work involving licensed material is being performed.

7.4.5 Airborne contamination shall be determined by taking an air sample filter paper, through which a known volume of air has been drawn, and measuring the amount of



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### 7.4.5 continued

radioactivity present using a properly calibrated instrument. The sensitivity of the instrument shall be sufficient to insure the limits of section 6.2 are not being exceeded.

### 7.5 Job Specific Surveys

7.5.1 The survey requirements for each specific job shall be contained in the work procedures.

7.5.2 These requirements shall include the frequency and type of surveys to be performed. The following items should be taken into consideration when determining survey requirements:

A. Pre-work surveys to determine what protective measures, equipment, and clothing are needed.

B. The potential for the creation of airborne contamination.

C. Contamination levels of the equipment involved.

D. The potential for significant changes in the radiological conditions occurring.

E. Radiation levels in the work area.

F. Post-work surveys to determine radiological conditions after work has been completed in order to determine what, if any, requirements (decontamination, posting, etc) should be placed on the area.

### 7.6 Qualifications

7.6.1 All personnel performing surveys, either routine or job specific, shall have received instruction in this area and will be authorized by the Radiation Safety Officer.

### 8.0 Control and Accountability of Radioactive Material

#### 8.1 General

8.1.1 The control of radioactivity material at ASK, INC., plays an important part in keeping exposure to individuals as low as reasonably achievable.

8.1.2 Radioactive material at ASK, INC., will normally be in the form of contamination on equipment coming from customer sites.

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- 8.1.3 Some radioactive material may be generated at ASK, by the transferring of contamination from one piece of equipment to others. This material will normally be in the form of waste or tools. It is important, therefore, to maintain an accountability system for all radioactive material at the facility.
- 8.1.4 The control and accountability of radioactive material at ASK is accomplished through the use of various techniques which may include:

- A. Access Control
- B. Surveys & Documentation of incoming and outgoing material.
- C. Inventories
- D. Labeling & marking
- E. Proper waste disposal
- F. Storage requirements
- G. Procedural compliance

## 8.2 Definitions

- 8.2.1 Radioactive Material Area-1. Any area or room in which licensed material is used or stored and which contains any radioactive material (other than natural uranium or thorium) in an amount exceeding 10 times the quantity of such material specified in 10CFR20 Appendix C. or 2. Any area or room in which natural uranium or thorium is used or stored in any amount exceeding one hundred times the quantity specified in 10CFR20 Appendix C.

## 8.3 Postings and Labeling

- 8.3.1 All radioactive materials areas shall be posted with a sign or signs bearing the radiation caution symbol and the words:  
CAUTION RADIOACTIVE MATERIAL(S)  
unless they meet the requirement of 10CFR20 section 20.204.
- 8.3.2 Each container of licensed material shall bear a durable, clearly visible label identifying the radioactive contents. The label shall bear the radiation caution symbol and the words, "CAUTION, RADIOACTIVE MATERIAL". It shall also provide sufficient information to permit individuals handling or using the containers, or working in the vicinity thereof, to take precautions to avoid or minimize exposures.
- A. This information may include such items as:
    - 1. Radiation levels
    - 2. Types of material
    - 3. Estimates of activity
    - 4. Isotopes present



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- A. This information may include such items as:
    - 1. Radiation levels
    - 2. Types of material
    - 3. Estimates of activity
    - 4. Isotopes present

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### 8.3.2 continued

B. Labeling of the containers is not required if:

1. The container does not contain licensed material in quantities greater than the applicable quantities listed in 10CFR20 Appendix C.
2. The container does not contain licensed material greater than the applicable concentrations listed in 10CFR20 Appendix B Table I, Column 2.
3. The container is packaged and labeled for transport in accordance with the regulations of the Department of Transportation.
4. The container meets any of the other requirements as specified in 10CFR20 section 20.203.F.3.

8.3.3 Prior to disposing of an empty uncontaminated container to unrestricted areas, all radioactive material labels shall be removed or defaced or the container shall clearly indicate that it no longer contains radioactive materials.

### 8.4 Receipt of Radioactive Material

8.4.1 All requests for radioactive materials shall require the prior approval of the Radiation Safety Officer. This requirement applies even if the material is an exempt quantity.

8.4.2 If the radioactive material is in excess of Type A quantities as specified in 10CFR20 section 20.205 the following shall be performed:

- A. If the package is being delivered by the carrier, arrangements shall be made to receive that package upon it's arrival.
- B. If the package is to be picked up at the carrier's terminal, arrangements shall be made to notify the radiation protection staff upon it's arrival at the terminal.
- C. Upon notification from the carrier that a package of radioactive material has arrived it shall be picked up from the terminal as expeditiously as possible.

8.4.3 Unless specifically exempted by 10CFR20 section 20.205.b all incoming packages of radioactive material shall be monitored for radioactive contamination caused by leakage of the contents.

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### 8.4.3 continued

A.If removable radioactive contamination in excess of 22,000 disintegrations per minute per 100cm<sup>2</sup> is found on the external surfaces of the package the final delivering carrier and the NRC shall be notified in Accordance with 10CFR20 section 20.205.b.2.

B.The monitoring shall be performed as soon as possible after receipt and within three hours during normal working hours and 18 hours if outside of normal working hours.

### 8.4.4 Each incoming package containing radioactive materials in excess of Type A quantities, other than those transported by exclusive use vehicles, shall be surveyed for external radiation levels.

A.If the radiation levels on the external surface of the package exceeds 200mr/hr or 10mr/hr at three feet from the external surface, the NRC shall be notified in accordance with 10CFR20 section 20.205.c.2.

B.The monitoring shall be performed as soon as possible after receipt and within three hours of receipt within normal working hours and 18 hours if outside of normal working hours.

## 8.5 Radioactive Material Storage

8.5.1 All radioactive material shall be stored in designated locations within the restricted area.

8.5.2 Access to these materials shall be controlled to prevent their unauthorized use or removal. The level of security of each storage location shall be comensurate with the type and quantity of licensed material inside.

8.5.3 All licensed radioactive sources(calibration sources, etc.) shall be stored and locked in a location designated by the Radiation Safety Officer. Access to sources of this type shall be restricted to individuals authorized by their work procedures only.

## 8.6 Radioactivity Material Accountability

8.6.1 It is a necessary part of any program to insure that licensed material is not lost, stolen, used or transferred incorrectly. This is accomplished at ASK by the following:

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### 8.6.1 continued

A. The use of all radioactive material is under the control of the Radiation Safety Officer.

B. All incoming and outgoing shipments of radioactive material are properly documented and an inventory is maintained showing the quantity of licensed material currently at the facility.

C. An inventory control system shall be established for all licensed sources to maintain control of these sources.

### 8.7 Transfer of Radioactive Material

8.7.1 Prior to the transfer of radioactive material to another company or individual a copy of their radioactive materials license shall be on file.

8.7.2 The receiving facility will be notified of shipment prior to it's leaving ASK, INC.

8.7.3 The shipment shall comply with all applicable regulations (U.S. Postal Service, 10CFR, 49CFR, etc.).

8.7.4 All shipping papers, including surveys, shall be maintained on file.

8.7.5 Shipping papers shall be signed by the Radiation Safety Officer or an individual designated by him.



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### 9.0 Radioactive Waste Disposal

#### 9.1 General

- 9.1.1 Radioactive wastes at ASK, INC., will consist mainly of disposable items that have become contaminated during a job. These would include rags, smears, plastic bags, etc. A smaller portion of the wastes may include solidified liquids, small tools & piping, defective equipment, etc.
- 9.1.2 The generation of radioactive waste shall be maintained as low as reasonably achievable at all times.
- 9.1.3 Radioactive waste shall be placed in waste containers that are kept as close to the worksite as possible to allow for the convenient disposal of radioactive waste and to minimize the possibility of spillage during the transfer of the waste into the container.
- 9.1.4 The waste containers shall be placed inside controlled areas.

#### 9.2 Solid Radioactive Waste

- 9.2.1 Solid radioactive waste shall be collected in appropriately labeled containers.
- 9.2.2 No liquid, even in bottles or other sealed containers, may be disposed of in a solid waste container at any time.
- 9.2.3 When the waste container is almost full, radiation protection personnel should be notified.

#### 9.3 Liquid Radioactive Waste

- 9.3.1 Liquid radioactive waste must be properly stored to prevent spills.
- 9.3.2 All containers used to store liquid radioactive wastes shall be designed to resist breaking and shall have a tight fitting leak resistant lid.
- 9.3.3 All radioactive liquids shall be solidified using an approved solidification media prior to transferring them to an approved radioactive material burial site.

#### 9.4 Transfer and/or Burial of Radioactive Waste

- 9.4.1 All containers used to hold radioactive material in preparation for disposal shall comply with all applicable regulatory and burial site requirements.

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- 9.4.2 There shall be no free standing liquid in any package that has been prepared for shipment.
  - 9.4.3 Sufficient radiation and contamination surveys shall be performed to insure compliance with all regulations.
  - 9.4.4 Any vehicle used to transport radioactive waste shall be inspected and surveyed prior to loading to insure that it is in proper condition for carrying hazardous material and is not contaminated.
  - 9.4.5 All containers shall be properly labeled and the transport vehicle properly placarded, if necessary, to insure compliance with all regulations.
  - 9.4.6 The shipment of radioactive waste shall be documented and the appropriate forms provided to all parties as required.
- 9.5 Disposal by Release into the Sanitary Sewer
- 9.5.1 The only material that is acceptable for release into the sanitary sewer is aqueous waste in which the licensed material is readily soluble or dispersible.
  - 9.5.2 Samples of the liquid being discharged shall be taken and analyzed prior to a discharge occurring.
  - 9.5.3 All discharges shall be in compliance with 10CFR20 section 20.303.
  - 9.5.4 Records shall be maintained of all releases to the sanitary sewer system to document compliance with all applicable regulations.



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### 10.0 Emergency Procedures

#### 10.1 General

- 10.1.1 Emergency planning for casualties and incidents involving radioactive materials is focused primarily on situations that may cause, or threatens to cause, radiological hazards affecting the health and safety of workers, or the public, or resulting in damage to property.
- 10.1.2 These procedures are directed toward mitigating the consequences of radiological casualties and incidents, and provide reasonable assurance that appropriate measures will be taken in an expeditious manner to protect the health and safety of personnel and minimize damage to property.

#### 10.2 Spill of Radioactive Material

##### 10.2.1 Immediate actions should include:

- A. Stop the spill or release of contamination.
- B. Warn other individuals in the area to stay clear.
- C. Isolate the area.
- D. Notify radiation protection personnel.
- E. Minimize the spread of contamination by all available means.

##### 10.2.2 Initiate clean-up and decontamination work following good health physics practices.

##### 10.2.3 A follow-up investigation should be performed to minimize the possibility of the incident recurring.

#### 10.3 Fire

##### 10.3.1 A fire will normally be much more of a hazard to life and property than the radioactivity, therefore, the fire fighting effectiveness should take precedence over radiological controls.

##### 10.3.2 The Radiation Safety Officer shall be notified as soon as possible.

##### 10.3.3 The fire chief should be briefed on the radiological aspects of the fire.

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10.3.4 Since the type and quantity of the radioactive material in the facility will vary from one day to the next the specific procedures for combatting the incident must be left up to the radiation protection staff, but the following guidelines should be considered during the recovery phase.

A. The area should carefully surveyed for contamination.

B. All personnel and equipment used should be accumulated in one area for surveying.

C. If extensive contamination was involved, consider utilizing specialized outside assistance.

### 10.4 Personnel Contamination

10.4.1 If an individual is found to be contaminated, immediately notify radiation protection personnel.

10.4.2 Radiation protection personnel shall supervise the decontamination effort.

10.4.3 Decontamination will be performed in accordance with good health physics practices.

10.4.4 The Radiation Safety Officer shall be notified prior to using any chemical decontaminants (other than mild detergents) or if contamination is beneath the skin or in any body orifices.

10.4.5 Medical assistance shall be called in at the direction of the Radiation Safety Officer.

### 10.5 Injuries to Personnel in Controlled Areas

10.5.1 Medical attention takes precedence over the immediate radiological problem if serious injuries are involved.

10.5.2 Immediate and necessary first aid should be administered to the victim at the scene.

10.5.3 Notify the Radiation Safety Officer.

10.5.4 Additional actions should be carried out in accordance with good health physics and medical practices.

### 10.6 Incidents Requiring Notification of Authorities

10.6.1 Various incidents require the notification of the appropriate regulatory agencies. These incidents include, but are not limited to:

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10.6.1 continued

- A. Overexposure of an individual to radiation.
- B. Release of radioactive material in excess of applicable limits.
- C. Damage to property.
- D. Exposure to airborne radioactivity in excess of applicable limits.

10.6.2 It shall be the responsibility of the Radiation Safety Officer to be cognizant of all incidents requiring such reports and to make said reports within the allotted time frame.

10.7 Any incident, abnormal occurrence or emergency which occurs, shall require an investigation in order to establish the sequence of events, the extent of the problem, corrective action taken at the scene and make recommendations to prevent its recurrence.