



Radiation Exposure Monitoring

1. Company Policy

Hbar Technologies, LLC, is committed to providing a safe work environment for all its employees. Based on the nature of the research and development work performed, exposure to radiation and/or radioactive materials may be likely. In all work activities, exposure shall be maintained as low as reasonably achievable (ALARA), requiring pre-planning of work and the active participation of each employee.

To demonstrate compliance with the occupational dose limit regulations and adherence to the ALARA principles, Hbar Technologies, LLC, has established this radiation exposure monitoring program. Compliance with the requirements is the responsibility of all affected employees of Hbar Technologies, but will be coordinated by the Sr. Health Physicist. In addition, a copy of the applicable portions of the Illinois Administrative Code accompanies this program and is also available for review.

2. Dose Limits

Nuclear Regulatory Commission (NRC) regulations promulgated in 10CFR20 and then adopted by Illinois, an agreement state, require all employers whose employees are exposed to radiation and radioactive materials to assess the level of hazard and then implement monitoring if required.

Section 340.210 Occupational Dose Limits for Adults of the Illinois Administrative Code sets the occupational dose limits at:

- 1) An annual limit, which is the more limiting of:
 - a. The total effective dose equivalent being equal to 0.05 Sv (5 rem); or
 - b. The sum of the deep dose equivalent and the committed dose equivalent to any individual organ or tissue other than the lens of the eye being equal to 0.5 Sv (50 rem).

- 2) The annual limits to the lens of the eye, to the skin and to the extremities which are:
 - a. An eye dose equivalent of 0.15 Sv (15 rem), and
 - b. A shallow dose equivalent of 0.5 Sv (50 rem) to the skin or to any extremity.

More restrictive limits are imposed for minors and declared pregnant workers at 10% of the annual limits for adult radiological workers. These limits are set forth in Sections 340.270 and 340.280 of the Illinois Administrative Code.

Personnel are to be monitored if the likelihood exists that the individual will exceed 10% of the occupational dose limit in one year or an individual enters a high or very high radiation area.

3. Exposure Assessment

Presently, there is only one radioactive source at the Hbar Technologies facility in West Chicago. The source is a 10 μ Ci Tl-204 beta source and is exempt. There is not the possibility of a staff member being exposed to 5 mSv (500 mrem), the monitoring threshold.

Upon receipt of radioactive materials, the Sr. Health Physicist will evaluate the potential magnitude of exposure. As low as reasonably achievable (ALARA) principles will be employed by staff members to minimize exposure. If the evaluation indicates a potential exposure of 5 mSv (500 mrem), the Sr. Health Physicist will arrange for the monitoring of personnel on-site. Administrative controls will be imposed to limit exposure of minors to below the monitoring threshold.

The nature of the work conducted at the Hbar Technologies requires personnel to visit other radiological facilities where they may be exposed to radiation and/or radioactive materials. Generally, those facilities will provide dosimetry appropriate for the facility to visitors.

If an individual's occupational exposure history is such that there is the possibility of additional exposures exceeding any of the occupational limits, the dose limits for that individual will be adjusted accordingly.

4. Employee Training and Information

Hbar Technologies staff will be trained in the requirements of this program and procedure.

Prior to the use of dosimetry devices at another facility, the Hbar Technologies staff member should be oriented as to the use and limitations of the device. If clarification is needed, please contact the Sr. Health Physicist.

Should a staff member receive formal radiological training at another facility, documentation of completion of the course shall be provided to the Sr. Health Physicist along with the course objectives. This will allow for the use of reciprocity available at many radiological facilities.

5. Declared Pregnancy

Hbar Technologies has established a policy and procedures to allow a radiation worker to make a knowledgeable decision regarding the risk to her unborn child. The option of declaring her pregnancy for radiological purposes is available to all female Hbar Technology employees. If an Hbar Technologies employee chooses to declare her pregnancy, the employee and the embryo/fetus will be subject to the more restrictive occupational dose limit of 5 mSv (500 mrem) for the entire gestation period.

The Sr. Health Physicist is available to answer questions and concerns regarding prenatal radiation exposure raised by any radiological worker. In addition, assistance in implementing prudent measures to minimize exposure of the unborn child will be provided upon request.

Upon declaration of pregnancy, an evaluation will be performed of the radiological work performed by the employee and an estimate made of the dose to the embryo/fetus. After this information is available, the Hbar Technologies employee may:

- (1) terminate her employment; or
- (2) limit her exposure to radiation and/or radioactive materials; or
- (3) request a leave of absence which is subject to management approval.

Efforts will be made to avoid a substantial variation above a uniform monthly exposure rate to satisfy the dose limit. Monitoring will be required for personnel with the potential to exceed 1 mSv (100 mrem) for the gestation period. The Sr. Health Physicist will work with affiliates to ensure appropriate monitoring is performed.

6. Reports

Hbar Technologies employees are required to report to the Sr. Health Physicist if they were monitored at another facility. A request will be made of the exposure received at that site. Annually the exposures received by personnel will be summed by the Sr. Health Physicist. If an exposure was reported, the Hbar Technologies employee will receive a summary in writing of exposure received. The summary report will include contact information for Hbar Technologies, the name of the employee and his/her Social Security Number. The report will also include the statement:

“This report is furnished to you under the provisions of the Division of Nuclear Safety Regulations for Radiation Protection (32 Ill. Adm. Code 400). You should preserve this report for further reference.”

Employees shall be provided the opportunity to review their individual records upon request.

Requests for an employee's previous exposure will be made by the Sr. Health Physicist and incorporated into the employee's records. The Sr. Health Physicist will also respond in writing to any requests for actual or estimates of exposures provided that a release is signed by the employee.

If at any time Hbar Technologies is required to make a report to a governing agency, i.e. the Nuclear Regulatory Commission, the Department of Energy, or Illinois Emergency Management Agency, the affected employee(s) will be provided a copy of the report.

7. Recordkeeping

All exposure records shall be maintained confidential and kept under lock and key. Only the Sr. Health Physicist and the President shall have access to cabinet.

Records of such monitoring shall be maintained by Hbar Technologies during its operation. These records shall be transferred to the Illinois Emergency Management Agency Division of Nuclear Safety if Hbar Technologies can not meet this requirement.

These records shall include the employee's name and his/her Social Security Number.

Elaine Marshall, Sr. Health Physicist

Date

Gerry Jackson, President

Date



"Making Antimatter Matter"

1275 W. Roosevelt Road
Suite 103
West Chicago, IL 60185
Phone: (630) 231-7077
Fax: (630) 231-7086
www.hbartech.com

Date: _____

To: Dosimetry Manager

SUBJECT: Request for Previous Occupational Exposure

To ensure Hbar Technologies, LLC is in compliance with the applicable regulations regarding occupational radiation exposure limits, occupational dose records for

_____ are being requested.

Please complete this form and return it within 30 days to me at the address above. Thank you for your assistance in this matter. If you have any questions, please contact me at (630) 231-7077.

Sincerely,

Elaine Marshall
Sr. Health Physicist

Encl.



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REQUEST FOR PRIOR OCCUPATIONAL DOSE

Name: _____ ID # _____

Estimated dates of Employment: _____ to _____

I authorize the release of my dosimetry records to Hbar Technologies.

Signature: _____

	Calendar Year (Sv)	Prior Years (Sv)
Deep Dose Equivalent		
Lens of the Eye Dose Equivalent		
Shallow Dose Equivalent Whole Body		
Shallow Dose Equivalent Maximum Extremity		
Committed Effective Dose Equivalent		
Committed Dose Equivalent Maximally Exposed Organ		
Total Effective Dose Equivalent		
Total Organ Dose Equivalent Max Organ		

Total Planned Special Exposure: _____ (Sv)

Printed Name of Individual Completing Form: _____

Signature of Individual Completing Form: _____

Name and Address of Record Holder: _____



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ESTIMATE OF OCCUPATIONAL DOSE

Date: _____

Name: _____

I was monitored for radiation exposure during the course of my employment or educational studies at the following facilities:

Facility Name	Estimated Dates of Employment/Study

For this calendar year, I estimate my exposure to be:

	Calendar Year (Sv)
Deep Dose Equivalent	
Lens of the Eye Dose Equivalent	
Shallow Dose Equivalent Whole Body	
Shallow Dose Equivalent Maximum Extremity	
Committed Effective Dose Equivalent	
Committed Dose Equivalent Maximally Exposed Organ	
Total Effective Dose Equivalent	
Total Organ Dose Equivalent Max Organ	



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ANNUAL EXPOSURE REPORT

Date: _____ Monitoring Period: _____ to _____

Employee: _____

Report Type: _____ Employee ID: _____ SSN _____

	Calendar Year (Sv)	Permanent (Sv)
Deep Dose Equivalent		
Lens of the Eye Dose Equivalent		
Shallow Dose Equivalent Whole Body		
Shallow Dose Equivalent Maximum Extremity		
Committed Effective Dose Equivalent		
Committed Dose Equivalent Maximally Exposed Organ		
Total Effective Dose Equivalent		
Total Organ Dose Equivalent Max Organ		

Total Planned Special Exposure: _____ (Sv)

Comments: _____

“This report is furnished to you under the provisions of the Division of Nuclear Safety Regulations for Radiation Protection (32 Ill. Adm. Code 400). You should preserve this report for further reference.”

If you have any questions or comments regarding this report, please contact Elaine Marshall.

 Elaine Marshall, Sr. Health Physicist

 Date