



AUDIT OF HNU SYSTEMS
RADIATION SAFETY PROGRAM

July 10, 1995

I Introduction

At this writing the Radiation Safety Program at HNU Systems is in a state of transition. In response to management's recognition that the program had deteriorated, I (Abe Berger) was retained in February 1995 as a consultant, initially to evaluate the program and make necessary recommendations. Since I had been the RSO until February 1993, it was relatively simple to propose an 18 point action list to restore program discipline. As a result of limited financial resources and the presence of Don Wilson whom I had designated as an assistant RSO in 1992, it was agreed that I would provide three days/month consultation and work with Mr. Wilson and Mr. Adar of Quality Control.

Therefore, in the three months of March, April and May, the most pressing items were undertaken, viz,

- 1) A physical inventory of all radiation sources was performed.
- 2) Wipe tests were sent out for evaluation.
- 3) A radiation survey of the facilities was conducted; as expected no contamination was detected.
- 4) Radiation Badge discipline was reestablished - all workers who deal with instruments containing radiation sources were provided with current badges. Old badges were collected and sent out for evaluation.
- 5) A calibrated survey meter was obtained and an HNU survey meter sent out for recalibration.
- 6) Arrangements were made for disposal or storage of sealed sources from our closed Oak Ridge facility.

Then on June 7th and 8th the NRC unannounced inspection was conducted. It became clear to management that we had run out of time for corrective actions and that a more urgent drive for compliance was necessary.

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Accordingly I suggested to management that the consultation effort be expanded immediately to three days/week at least through September 15th, which was my estimated target date for full implementation and reduction of my level-of-effort to about one day/week. This proposal was accepted and we have now, necessarily, been dividing our time between replying to the NRC and moving forward with the program.

II Radiation Safety Program Audit

A. Duties of the RSO

The duties of the RSO have been outlined in the HNU Radiation Safety Manual and are summarized in Attachment 1 to this audit. The RSO for HNU Systems is Abraham W. Berger who is named in the NRC Licences held by HNU Systems, Newton, MA. Dr. Berger is now actively pursuing implementation of all 23 items in Attachment 1. The present status of the principal activities is outlined below.

B. Training of Personnel

A major step was begun the week of June 26, 1995 with a 90 minute presentation of the Radiation Safety Program to the first group of employees. This will be continued until all employees who deal with instruments containing radiation sources are trained.

The outline of the subject material is given in attachment #2. Each participant received a copy of HNU Radiation Safety Procedures Manual and a copy of NRC Regulatory Guide 8.29, "...Occupational Radiation Exposure". At the conclusion of the presentations, scheduled for the week beginning July 10, a 15 question, multiple choice examination will be given.

The few workers who are directly engaged in the installation and removal of the sealed sources will participate in an additional 90 minute seminar based upon a detailed discussion of the Radiation Safety Procedures manual and demonstration of good practice.



Refresher courses will be given on an annual basis. Radiation Safety courses will be provided for all new workers who are engaged with instrumentation containing sealed sources or with receipt, use, or storage of the sources.

C. Radiological Safety Policies and Procedures, including purchase, receipts, use, storage and disposal of sealed sources.

The HNU Radiological Safety Procedures Manual outlines the HNU Radiation Control Program. Personnel are now in training to ensure that all activities involving sealed sources, including purchase, receipt, storage and disposal, must be authorized and supervised by the RSO. Use of sealed sources at HNU is restricted to receipt, installation and removal of sources from instruments. It is restricted (at present) to three people, all of whom have received radiological safety training. Only these people have access to the source storage area.

A copy of the HNU Radiation Safety Procedures Manual has been furnished to the NRC (attachment #1, letter of 6-23-95, John Marshall to Charles W. Hehl), and will be given to each employee who receives Radiation Safety training.

D. Inventory

A physical inventory of sealed sources has been completed as outlined in attachment #2 to the above referenced letter (in item C). HNU is now assembling the documentation to permit the detailed accounting by quarter of all sources received and shipped since 6-30-93, including the customer location and responsible officer. At this writing it is not known how complete the document will be. HNU will provide the NRC by 8-1-95 with a complete set of reports, if possible, or a status report.

E. Personnel Dosimetry and Radiological Surveys

HNU Systems is at present in consultation with Siemens Consulting Service (Hoffman Estates, IL) to obtain complete documentation of personnel



dosimetry records for the 1993-1994 period. These records will be assembled by employee and estimates provided where gaps are found. A status report will be provided by 8-1-95.

Am Radiological surveys are now scheduled to be conducted every ~~two~~ months. Please note that HNU deals only with sealed sources and has never encountered contamination from a leaking source.

F. Wipe Testing

We have scheduled a review of wipe test status for all sources and instruments containing sources to determine currency. Any source not in current status will be wiped and evaluated by 8-1-95. Note that all sources brought in from the Oak Ridge facility were wiped and evaluated before shipment.

G. Instrument Calibration

In order to obtain radiological surveys with calibrated instruments we obtained a Ludlum Model 9 (ion chamber) survey meter, S/N 117113, calibrated by the manufacturer on 3-24-95. We have recently received our Victoreen Model 471 (ion chamber) survey meter from calibration by Nuclear Measurement Corp, Rockland, MA. We will be sending our Ludlum Model 3 survey meter with Model 44-3 scintillation probe for calibration.

III Conclusion

We believe that HNU Systems Inc. Radiation Protection Program is rapidly coming into compliance with NRC Regulations. We shall make every effort to bring records up to date and to maintain a vigorous and responsive program. A status report will be prepared as of 8-1-95 and presented to the NRC for comment.

Am

Abe Berger
Radiation Safety Officer



ATTACHMENT #1 TO RSP AUDIT

Radiation Safety Officer

The minimum duties of the RSO include the following:

1. Provide overall coordination of the radiation safety program;
2. Serve as the licensee's liaison officer with the NRC on licensed or inspection matters;
3. Control procurement and disposal of licensed material, maintain associated records, and ensure that licensed materials that are possessed or used by the applicant are limited to those specified in the license;
4. Establish and conduct the training program;
5. Examine and determine the competence of personnel;
6. Ensure that the licensed materials are used only by those individuals who have satisfactorily completed appropriate training programs or who are authorized by the license;
7. Establish and maintain a personnel monitoring program and ensure that all users wear personnel monitoring equipment, such as film badges or thermoluminescent dosimeters (TLD);
8. Establish and maintain storage facilities;
9. Ensure that licensed material is properly secured against unauthorized removal at all times;
10. Establish and maintain the leak test program and supervise leak testing of sealed sources;
11. Procure and maintain radiation survey instruments;
12. Establish and maintain a survey instrument calibration program;
13. Develop and maintain up-to-date operating and emergency procedures;



14. Ensure that the terms and conditions of the license are met and that required records, such as personnel exposure records, leak test records, etc., are periodically reviewed for compliance with NRC regulations and license conditions;
15. Conduct semi-annual inventories and maintain utilization logs;
16. Review and ensure maintenance of those records kept by others;
17. Establish and maintain proper transportation labels, placards, forms, and records;
18. Establish and maintain the annual internal inspection program;
19. Conduct radiation safety inspections of licensed activities periodically to ensure compliance with the regulations and license conditions;
20. Serve as a point of contact and give assistance in case of emergency, (for example, theft of licensed materials, fire, etc.) and ensure that proper authorities for example, NRC, local police, and State personnel are notified promptly in case of accident or other incident that may involve the release of licensed material;
21. Investigate the cause of incidents and determine necessary preventive action;
22. Act in an advisory capacity to the licensee's management and personnel;
23. Establish a procedure for evaluating and reporting equipment defects and non-compliance pursuant to 10 CFR Part 21.



ATTACHMENT #2 TO RSP AUDIT

Outline of Subject Material

Regulations: Federal
State

Definitions: Activity - Curies/Bequerels
Exposure - Roentgens
Dose - Rads/Grays
Dose Equivalent - Rems/Sieverts
Ionizing Radiation

Maximum Permissible Exposures

Alarms

Biological Effects

Sources of Exposure

Natural Background

Radon

Protective Measures

Instrumentation and Monitoring