U.S. NUCLEAR REGULATORY COMMISSION
REGION I

INSPECTION REPORT

Report No. 030-05337/94-001

Docket No. 030-05337

License No. 29-07694-01 Priority 1 Category E1A Program Code 03610

Licensee: American Cyanamid Company
Agricultural Research Division
P. O. Box 400
Princeton, New Jersey 08543-0400

Inspector: C. Thor Oberg, Health Physicist — Jan 8, 1994 date

Approved by: Mohamed M. Shanbaky, Ph.D., Chief — 6/8/1994 date
Research and Development Section

Inspection Summary: Routine, unannounced safety inspection conducted May 2, 3, 5, and 6, 1994, (Inspection Report No. 030-05337/94-001).

Areas Inspected: Licensee action on previous violations; Organization; scope of program; internal audits; training; facilities and equipment; licensed materials, receipt, transfer, and inventories; area surveys; personnel radiation protection - external and internal; radioactive effluents and waste disposal; posting and labeling; and independent measurements.

Results: No radiation safety issues or items of noncompliance were identified during this inspection.

DETAILS

1. Persons Contacted

* James V. Gramlich, Ph.D., President
* Lynn R. Miko, Vice President, Regulatory Compliance
* Karl A. Traul, Ph.D., Director, Regulatory compliance
* Robert P. Kreahling, Ph.D., Director of Operations and Chairperson, Radiation Safety Committee
* Philip A. Brindle, Ph.D., Metabolism, Group Leader and Member, Radiation Safety Committee
* George W. MacDurmon, Radiation Safety Officer, Regulatory

COMPLIANCE DEPARTMENT

Linda Ubry, Manager of Farm Operations

GROUP LEADERS

Deborah Chaleff, Ph.D.
Kathleen Heaney, V.D.M.
Don Kirsch, Ph.D.

AUTHORIZED USERS

Jalees Afzal, Ph.D.
Donald Barringer, Ph.D., Member, Radiation Safety Committee
William Baumbach, Ph.D.
Brendan Bingham
Lynn Brennan, Ph.D.
Craig Butfiloski, Member, Radiation Safety Committee
Brian Carpenter
Peter Dierks, Ph.D.
Mark C. Eppler, Ph.D.
Nancy Fleming
Eunice Froliger, Ph.D.
John Hadcock, Ph.D.
David Johnson, Ph.D.
Walter Krol, Ph.D.
Florence McCoy
Mark Schmitt, Ph.D.
Stephen Sturner
Ming Zeng, Ph.D.

* Those present at the exit interview

2. Licensee Action on Previous Violations

A. Enclosure 1 - Notice of Violation dated January 22, 1993

NRC Inspection No. 92-002 Violations:

(Closed)	A.1	License Condition 24 - failure to secure licensed material from unauthorized removal. Licensed materials were not stored under lock and key nor were rooms (laboratories), in which these materials were used and stored, maintained locked when no one was present.

All licensed materials were observed to be secure under lock and key when not in use. All rooms containing licensed materials were locked when no one was present. A few laboratories (Synthesis Laboratory No. C-216, Iodination Laboratory No. A-201, etc.) require a key card for access. The security and control of radioactive materials are verified during the licensee's quarterly audits.

(Closed)	A.2	License Condition 24 - failure to conduct carbon-14 (C-14) breath analysis bioassays when more than 1 millicurie (mCi) of C-14 was used and failure to conduct adequate breath analyses to determine uptake of C-14.

Although the licensee has submitted specific procedures, calculations, and a specific model for C-14 breath analysis bioassays, they have implemented a new Standard Operating Procedure (SOP) for C-14 bioassay by urine analysis. This SOP has been reviewed and approved by the NRC, Region I. The new procedure includes a minimum activity use level of 25 mCi to require the C-14 urine bioassay. The inspector noted that bioassays were performed in accordance with the new procedures (Details, Section 10).

(Closed)	A.3	License Condition 24 - individuals were using amounts of licensed materials for which they were not authorized.

Authorizations to use licensed materials have been reviewed and revised to more accurately reflect the quantities of licensed materials that the authorized users may need to use for research and experimentation. User authorization Forms 1 and 2 and the quarterly audits by the RSO or the RSO Auditor (RSOA) control and review the use of licensed materials and the quantities.

(Closed) A.4 License Condition 24 - failure of the Radiation Safety Committee (RSC) to include documentation of authorizations made by the committee.

All authorizations are reviewed and approved by the RSC. Monthly committee meeting minutes list those users who have been approved since the previous meeting.

(Closed) A.5 License Condition 24 - failure of authorized users to sign for the receipt of licensed material when delivered.

A SOP has been developed and implemented that provides a chain of custody control of licensed material receipts. Records and laboratory operations reviewed by the inspector confirmed that authorized users are signing for custody of packages that they receive.

(Closed) A.6 License Condition 24 - failure to adequately evaluate wipe test and sealed source leak test samples. Counting equipment was not properly calibrated.

The counting systems employed for the evaluation of wipe surveys and leak test samples have been calibrated with the appropriate standard radionuclides and under the conditions required to accurately evaluate the levels of removable contamination. The instruments are calibrated as required.

(Closed) B. License Condition 21 - failure to conduct the required bioassay within one week following handling operations with levels of hydrogen-3 (H-3) activity in excess of 100 millicuries.

SOPs have been amended and implemented that delineate the requirements for authorized use of licensed materials and the requirements for bioassays pursuant to the conditions of use, including radioactive waste handling, of the specific radionuclide. The use of licensed materials and bioassay requirements are reviewed during quarterly audits. Bioassays are performed within seven days of use for all individuals using greater than 100 millicuries of H-3.

B. Enclosure 2 - Additional Specific Items

(Closed) Item 1. SOPs to be implemented to ensure compliance with applicable regulations

Existing SOPs have been amended or revised and implemented. In addition to these, the licensee has developed and implemented some new SOPs and is working on several SOPs for revision and for various new applications. Implementation of these SOPs will ensure compliance with applicable regulations.

(Closed) Item 2. Specific procedures implementing the licensee's Audit Program.

The licensee has implemented procedures for a quarterly audit program to be conducted by the RSO or the RSOA. Briefly, the audits will review the individual authorized user and his/her laboratory facilities within a calendar quarter. Violations identified as a result of the audit require corrective action. Audit violation sanctions are based on a point system which could require the user to appear before the RSC and/or possibly lose their authorization to use licensed materials.

(Closed) Item 3. Confirm that user authorizations will be renewed every two years.

The licensee has established a requirement for a renewal of individual authorization to be completed every two years. This is annotated on their individual authorization/license.

(Closed) Item 4. Submit procedures and calculations for performing C-14 breath analysis. Include a description of the model used to determine compliance with 10 CFR 20.103.

Procedures and calculations have been submitted, however, a new procedure has been implemented employing urine analysis as specified in the above Violation A.2. (Closed), Section 2.A., Enclosure 1.,

(Closed) Item 5. Submit a description of your investigation of sampling effluent air at the rear floor of the fume hood during iodinations.

The licensee has modified the sampling procedure such that the effluent air is now sampled in the exhaust stack from the hood during iodinations. This sampling technique provides a representative sample of the effluent iodine released during an iodination.

3. Organization

The Global Quality Assurance and Regulatory Compliance Department of the American Cyanamid Company, Agricultural Research Division, manages the broad scope license and radiation safety program by the direction of the Radiation Safety Committee (RSC), Robert P. Kreahling, Ph.D., Chairperson, and the Radiation Safety Officer (RSO), George W. MacDurmon. The RSO reports directly to the Vice President of the Regulatory Compliance Department, Lynn R. Miko. The RSO spends 100% of his time on the duties of his position. The Vice President reports to the President of the Agricultural Division of American Cyanamid, James V. Gramlich, Ph.D. The management personnel, including Karl A. Traul, Ph.D., Director of Regulatory Compliance, and Robert P. Kreahling, Director of Operations and Chairperson of the RSC, with the concerted efforts of the RSC, have provided the incentive, resources, and the guidance for the licensee to correct and improve the licensed program, radiological control and radiation safety.

The inspector verified by a review of the past years meeting minutes, that the radiation Safety Committee (RSC) meets monthly and is a functioning committee. The committee has worked diligently with the licensee's management and the RSO to establish a licensed program that is responsive to the Commission's regulations, the conditions of their license, radiological controls, and the radiation protection of the workers and the public.

The new RSO has been with the licensee for five months. He has a very good understanding of the licensed program and an excellent rapport with the individual authorized users. The RSO has been working closely with the RSC and the licensee's management. The previous Assistant RSO (ARSO), a temporary employee, has resigned his position and left the company on May 5, 1994. Before the end of May 1994, a new and experienced individual will fill this position as a full time employee with the licensee. This individual will be given a new title as the RSO Auditor (RSOA).

No violations or safety concerns were identified.

4. Scope of Program

The licensee possesses a Broad Scope, Research and Development (R&D) License and maintains facilities for about 120 authorized users of licensed materials. These facilities are predominantly located at the licensee's Agricultural Research Division, West Winsor, New Jersey, site. A few of the users are located in leased facilities at a site in Ewing Township, Trenton, New Jersey.

The R&D programs primarily include animal an plant metabolism studies and site field studies as may occasionally be necessary. Most field studies are under contract with other licensees at their facilities.

The NRC Inspector inspected numerous laboratories and peripheral facilities (incinerators, sewerage treatment plant, field studies locations, etc.) at the Agricultural Research Division, West Winsor, New Jersey, site. About 25 user's laboratory facilities, the peripheral facilities, and the radioactive waste storage areas were inspected (Details, Section 7).

No violations or safety concerns were identified.

5. Internal Audits

Audit records reviewed by the inspector for the second and fourth quarters of 1993, showed that the members of the RSC conducted audits of each laboratory, or facility using licensed materials, and each authorized user. The deficiencies identified by these internal audits were corrected by the individual users. Results of these audits were reviewed by the Committee. The audits conducted during the fourth quarter of 1993 identified the kind, or type, and the number of deficiencies and weaknesses associated with operation of the licensed program and radiological control. The findings of these audits were used by the RSO and the RSC to develop the audit program currently in use.

In accordance with Section XVII of the new "Radioactive Materials Users Manual" (superseding the previously submitted "Radioisotope Manual"), the licensee has initiated and implemented a Radiation Safety Audit program. As reviewed by the inspector, the Radiation Safety Audits (audits) are conducted by the Radiation Safety Office on a quarterly frequency and will be unannounced. The intent of the audit is to review both the Authorized user, his/her training, record keeping, radiation protection, etc., and their laboratory operations. The audits include sanctions in the form of points that are assigned for each of 16 potential violations that could be identified and cited. The list of violations and the associated points is attached to this report as Exhibit I. A total of 35 points, or more, accumulated for violations identified during an audit, requires a written response within two weeks detailing corrective actions and the date compliance will be achieved. Repeat infractions will

double the point value and could result in an appearance before the RSC and/or subsequent loss of authorization to use licensed materials. The initial audits conducted to date during 1994 were announced and were essentially conducted for training purposes. No sanctions were assigned for violations that were identified during this initial audit. Users were required to correct the violations identified.

The Draft SOP currently in use for the program audits was reviewed by the inspector and is being reviewed by the licensee for release in final form.

No violations or safety concerns were identified.

6. Training

Prior to this year, the licensee provided generic safety orientation training for all new employees but did not include any training regarding radiation protection. Radiation safety awareness training is now part of the New Employee Safety Orientation (NESO).

Under the new program, all employees who are to be radiation workers (Authorized Users), or who may frequent areas in which licensed materials are used or stored, must have received radiation safety training, provided monthly by the RSO or his designee, before beginning work in areas with licensed materials. Records reviewed by the inspector showed that during 1993, a consultant Ph.D. Health Physicist was employed to provide this training. The training can be scheduled by the individual or his supervisor who is to ensure that the training is accomplished in a timely manner for the new employee and to complete Form 1 of the "Application for Authorization to use Radioisotopes." The application should be submitted to the RSO for review and approval prior to the next committee meeting. The RSC will review and approve all Authorized Users. The approved Form 1 is the individual's license to use licensed materials for a period of two years at which time it can be reapplied for, reviewed, and renewed and/or amended as necessary.

The inspector's review of the minutes of the RSC meetings confirmed that the RSC was reviewing and approving/disapproving users during the committee meetings. The licensee provides Annual Radiation Safety Refresher training for all Authorized Users, and individuals frequenting areas in which licensed materials are used or stored. This is accomplished by required attendance at one of the monthly Radiation Safety Training sessions. Compliance with this requirement is also verified during the quarterly audits. Those who have not participated in the scheduled training during the calendar quarter should receive a violation (accruing 10 points) and are advised to attend a training session before the next audit.

Training records reviewed by the inspector confirmed that personnel were receiving the required training. Both initial and refresher training has been provided to housekeeping, maintenance and security personnel this year.

During 1994, the RSO plans to provide radiation safety "Awareness Training" for all personnel employed at this division of American Cyanamid Company.

No violations or safety concerns were identified.

7. Facilities and Equipment

The inspector noted that security in the laboratories (labs) was excellent. Licensed materials not in use were maintained in storage (usually in refrigerators or freezers) under lock and key. Further, when no one is present in the labs, or areas in which licensed materials were used or stored, the entry door is locked.

The inspector examined the carbon-14 (C-14) synthesis "Hot Lab" areas, Rooms C-216 and 215A, and noted that access required the use of a key-card that is only issued to personnel requiring access to the area. The inspector also noted that the individuals working in the lab changed shoes when entering or exiting the lab. Work shoes remained in the lab. Personnel also donned lab coats and disposable gloves when entering the lab. These are left in the lab when the users exited.

Iodinations are performed only in Room No. A-201 which is also a key-card controlled access facility. A lab coat is required to be worn when in the lab but no shoe change or covers are required for entry. Gloves are required when working with radioiodine or any other licensed material. Iodinations performed are confined to the hood in this lab. Effluent air sampling is conducted in the hood stack exhaust air stream during each iodination. Breathing zone air sampling is conducted on occasion during the iodinations (Bioassays, See Section 10).

The licensee maintains two incinerators on site. The older of the two units is authorized to be used for the disposal of waste licensed materials. However, the licensee does not permit incineration of radioactive waste.

The licensee also maintains an on-site sanitary sewerage system. No licensed material is allowed to be released to their sewerage system.

The licensee is authorized to use C-14 in field applications. As observed by the inspector, the licensee maintains, for field studies, three small, fenced, and posted plots, of about 50 square feet each, within a field of about 2000 total square feet. The licensee had no field studies in progress during the inspection. Treated crops have been removed for analyses and the contaminated soil from these areas has been removed and replaced with clean soil. The soil removed was shipped for disposal as

radioactive waste. The licensee explained that the existing areas have had core samples taken for radioassay to verify that licensed material has not percolated into the soil.

The licensee provides portable radiation survey instruments for use by the users as necessary for work with beta and gamma emitting radionuclides. These instruments are required to be calibrated annually, and subsequent to any repairs. Calibration records reviewed by the inspector indicated that the instruments were being calibrated as required. During the inspection of the labs and area facilities the inspector noted that all of the survey instruments encountered had been calibrated within the past 12 months.

A review of the calibration records for the liquid scintillation counters (LSC) and gamma (Γ) counters established that these instruments were calibrated with the proper radionuclide standards [including phosphorous-32 (P-32) and nickel-63 (Ni-63) for the LSC and mock iodine-125 (I-125) (iodine-129) for the Γ counter] for accurate contamination survey and sealed sources leak testing sample evaluations.

No violations or safety concerns were identified.

8. Licensed Materials, Receipt, Transfer, and Inventories

Licensed materials are used by the licensee as authorized by and in accordance with License No. 29-07694-01. This is verified quarterly during the audits conducted by the Radiation Safety Office. Material types and quantities used and stored by the authorized user are compared with that which is specified in their application Forms 1 and 2 maintained as necessary for their authorizations to use licensed materials.

Form 1 applications, requesting approval to use licensed materials, are evaluated by the RSO and approved, or disapproved by the RSC. When approved, Form 1 becomes the user's license to use the designated licensed materials as indicated. As the users' license, Form 1 is valid for a period of two years at which time it is reviewed and renewed. This form may be changed by an amendment request submitted any time within the two year period.

Form 2, is an Application to Conduct Radioisotope Experiments and is required to obtain approval to begin each new experiment or procedure using licensed materials. An accounting of the material used during the experiment is recorded on the Form 2 which is subsequently returned to the RSO at the completion of the experimentation or procedure(s).

For most of the experimental work, minimal amounts of licensed materials are used. These amounts are usually microcurie (μCi) quantities while the stock solutions are usually about 1 to 5 millicurie (mCi) quantities.

Only Authorized Users holding an approved Form 2 may order licensed materials. All purchase orders for licensed materials must be approved by the RSO or his designee. Upon receipt of the material, the Authorized User must sign for it, verify the contents of the package, and then record the receipt information. Internal transfers of licensed material between users is permitted provided that each user has a valid Form 2 authorizing the licensed material and the quantity transferred. The information regarding the transfer (material and quantity, date, and names) must be recorded in the users records.

Off-site transfers of licensed materials to other licensees are handled through the RSO. The inspector confirmed that all transfers of licensed materials have been shipped by common carriers to specific licensees whose authorizations to receive the materials were verified by obtaining copies of the licenses. Since Inspection No. 92-002, all shipments have been in accordance with the DOT regulations for limited quantities of excepted radioactive materials and packaged in strong, tight containers that were appropriately labeled.

The inspector also noted that licensed materials have been inventoried monthly for presentation to the RSC. The inventories have been recorded in the RSC meeting minutes. The inventories include materials that are held in waste storage. The most recently completed inventory was for March 1994. This inventory, including those previously tabulated in the committee meeting minutes, confirmed that the materials possessed by the licensee were maintained within their authorized licensed limits. No radionuclides were in excess of 30% of the licensed limit and about 90% of the licensed materials possessed were less than 4% of the limits.

The new "Radioactive Materials Users' Manual" now requires the Authorized Users to maintain their own inventory of licensed materials. These inventories will be reviewed and verified during the quarterly audits. The licensee plans to establish and maintain a computerized, continuously updated, inventory system and will provide a copy to the RSC as requested and at least annually.

The only sealed sources maintained by the licensee are Ni-63 electron capture cells used in gas chromatograph devices for material analyses. The licensee has conducted the required physical inventories and leak test for these sources.

No violations or safety concerns were identified.

9. Area Surveys

The Radiation Safety Office will conduct radiation and contamination surveys once each quarter as part of the routine audits. During this audit, the requirement for the Authorized Users to conduct daily surveys, when using licensed materials, will be verified. A review of the licensee's survey records by the inspector confirmed that the daily survey logs have been maintained by the users and that the quarterly surveys are conducted by the RSO.

In addition to these quarterly and daily surveys, the licensee conducts weekly surveys in the radioactive waste and other storage facilities. Monthly surveys are conducted in the various rooms or labs where radioactive samples are counted.

Additional radiation surveys are conducted for various specific or special purposes such as:

- Surveys that are required prior to maintenance or repair work in a lab or facility in which licensed materials are used,
- surveys that are conducted at the termination of an experiment when licensed materials will not be used for a period of time (Terminal Surveys), and
- surveys that are required when licensed materials will no longer be used and the lab or area is decommissioned.

The inspector verified that these surveys were also being conducted and the records were maintained as required. The inspector pointed out that some of the special survey records needed clarification for a more concise determination of the reason for, and location of, the survey. The licensee said that the special survey records, for future surveys, will be upgraded to include all necessary survey information.

No violations or safety concerns were identified.

10. Personnel Radiation Protection - External and Internal

External

Authorized Users working with licensed materials, and personnel who may frequent areas in which these materials may be used or stored, are furnished thermoluminescent dosimeter (TLD) badges by the licensee for whole-body personnel monitoring. Individuals who work with high energy beta sources, e.g., P-32, and gamma emitting sources are also issued TLD extremity (ring) badges.

The personnel monitoring badges are supplied and processed monthly by a vendor that is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP).

For the years 1992 and 1993, the highest whole-body exposures were 70 millirem (mrem), for both shallow and deep doses, and a 230 mrem dose to the extremities. For the year 1994 to March 31, the highest dose recorded was 20 mrem, both deep and shallow, for the whole-body and m (minimal, 10 mrem or less) for the extremities. The vast majority of the badges' exposure results have been returned from processing as m. This reflects the small amounts of licensed materials used by the licensee's personnel, and good laboratory and radiological control practices.

Internal

The inspector found that the licensee was in compliance with bioassay requirements.

Tritium (H-3) users must be working with 100 mCi or more of H-3 before urinalysis bioassay is required. No one has been using or working with this amount of H-3 during the past year.

For C-14 bioassay studies, personnel must use 25 mCi or more before a urine bioassay is required. Although no one is using this amount of C-14, personnel working in the C-14 synthesis lab (usually using 5 mCi, or less, and occasionally 10 mCi) are having urine bioassays performed for C-14 by the licensee on a weekly frequency. No positive results indicating C-14 uptake have been identified by urine bioassay.

Regarding I-125 bioassays, only one individual is performing iodinations. The iodinations occasionally involve amounts of I-125 in excess of the 1 mCi limit and bioassay is required. The I-125 bioassay is conducted by thyroid monitoring within 3 to 7 days after the iodination. The individual performing the iodination has his thyroid monitored by an outside contractor who conducts the scan and calculates the I-125 uptake. The results of the thyroid scan are returned with the individual monitored. No positive results indicating I-125 uptake have been identified by thyroid monitoring.

Breathing zone samples taken while iodinations are conducted demonstrated that individuals were not exposed to air borne I-125 during the iodination of compounds. The results of the samples analyzed were equivalent to background activity measurements.

No violations or safety concerns were identified.

11. Radioactive Effluents and Waste Disposal

The licensee does not allow any radioactive liquid releases to their sanitary sewerage system. Analysis of a sludge sample from the sewerage system confirmed that there is no detectable residual radioactive contamination in the system.

Further, no licensed materials are permitted to be incinerated in either of the licensee's two incinerators. Therefore, no radioactive materials are released to the environment by incineration.

Because of its minimal use, there have been no significant releases of H-3.

Releases of C-14 are determined based on an activity balance calculated when, on occasion, volatile products are generated. For example, during the first quarter of 1994 one fermentation study was conducted that released carbon dioxide. Based on the initial C-14 activity used and the amount of C-14 remaining in the final fermentation broth, the amount of C-14 released as an effluent was calculated. For the first quarter of 1994, the effluent C-14 concentration was calculated to be 4.8E(-)11 μCi/milliliter (ml) of air. The regulatory limit in 10 CFR Part 20 for the concentration of carbon dioxide effluent in air is 3E(-)7 μCi/ml.

A breathing zone sample taken during this fermentation experiment confirmed that personnel were not exposed to concentrations of C-14 in the laboratory air. Sample analysis results were not significantly different from the background activity level.

Effluent releases of I-125 during iodinations are measured by sampling the exhaust air in the stack from the chemical fume hood. The effluent samples are taken from the stack through two charcoal impregnated filter papers, arranged in series, using a vacuum pump. The I-125, adsorbed on the charcoal filters during the sampling, is measured by counting the filters in a gamma scintillation counter. The amount of I-125 released through the stack to the environment is calculated from the counting data. During the first quarter of 1994, the licensee determined that a total of 144 μCi of I-125 was released from iodinations. Averaged over this period, the concentration of I-125 released to the environment was calculated to be 2.7E(-)11 μCi/ml of air. The regulatory effluent concentration limit for I-125 in air is 3E(-)10 μCi/ml

For ALARA purposes, the licensee's action levels for effluent concentrations has been set at 20% of the 10 CFR Part 20 levels, e.g., the regulatory effluent air concentration limit for I-125 is 3E(-)10 μCi/ml. The licensee's ALARA effluent concentration limit is 0.6E(-)10 μCi/ml. The releases of C-14 and I-125 for the first quarter of 1994 were less than the licensee's ALARA limit.

In the basement of the R and D Building, the licensee has five rooms that are maintained for radioactive waste handling and storage. One room is maintained for decay in storage (DIS) of short lived radioactive wastes; another room is being used for staging the last shipment of waste to be picked up by a licensed broker for transfer to the waste burial site; a third room is used for packing and compacting dry waste and for solidifying liquid radioactive waste; and two rooms are presently awaiting interim storage of waste as may be necessary when the burial site closes.

The waste storage rooms are open during specific hours and days of the week. At these times, the Authorized Users deliver their waste to this area for final disposition. The users segregate and record their waste in accordance with the requirements for DIS or interim storage. Waste sealed in clear, labeled, plastic bags, or plastic bottles of liquids, were properly labeled and brought in by the users to the storage rooms. The plastic bags of waste are deposited in open drums specified for the particular waste material(s). The cards, used to identify the licensed materials and the total radioactivity when the drum is full, are collected and combined for each 55 gallon drum of designated material.

The compactor is a totally enclosed unit with steel sides for shielding. The heavy steel door must be closed and the air handling system must be turned on, to maintain a negative pressure within the compactor, before the unit can be operated to compact dry lab waste.

Aqueous radioactive wastes are contained in plastic gallon bottles. The bottles used to contain long lived radionuclides, usually H-3 and C-14, are partially filled with cement prepared to receive the correct amount of liquid for proper mixing and curing to form a solid concrete block. The bottles of radioactive concrete are then deposited in a 55 gallon drum for final disposition. The plastic bottles with liquids containing specifically identified short lived radionuclides for DIS are held for 10 half lives, the activity is then checked, and the liquid disposed of to the sanitary sewerage system if no measurable activity is detected.

Animal tissue containing less than 0.05 μCi of H-3 or C-14/gram of tissue, is disposed of as not radioactive. Animal tissue with these, or other radionuclides, in greater concentrations of licensed materials are prepared for final disposition by the RSO.

Liquid scintillation (LS) fluids for H-3 and C-14 counting, containing less than 0.05 μCi/gram of fluid are segregated according to organic or nonorganic scintillation fluid, each type is combined 200 vials per sealed double plastic bag, and labeled to identify the user, date, type of fluid, and marked "DEREGULATED." All other LS fluids with greater than 0.05 μCi/gram of scintillation fluid are treated the same way except they are segregated by radioisotope as well as the type of fluid, labeled with the amount and type of activity, and not labeled as deregulated.

No violations or safety concerns were identified.

12. Posting and Labeling

The inspector noted that the labs inspected were properly posted. Areas in which licensed materials were used and stored were also posted and labeled as required.

The field study areas, presently free of radioactive contamination, remain posted for possible use in the near future.

No violations or safety violations were identified.

13. Independent Measurements

The inspector used an Eberline E-120 Geiger Counter survey instrument , NRC Identification No. 000906, calibrated April 5, 1994, with an end window GM probe to detect and measure radiation levels from gross contamination in labs and storage areas. No abnormal radiation levels were found.

No violations or safety concerns were identified.

14. Exit Interview

An exit interview was held with those individuals identified in Section 1. of this report. The scope and findings of the inspection were discussed.

The inspector stated that the violations and concerns identified during the previous inspection have been addressed and the issues are closed.

The inspector informed the licensee's representatives that, compared to the previous inspection findings, the licensed program shows much improvement in compliance with the conditions of their license, with radiological controls, and with radiation safety. The improvement appears to be due to the fact that the attention of the management personnel and the RSC is focused on program oversight and, with the aid of the RSO, is establishing the required radiological controls to ensure that licensed activities are conducted safely and in accordance with requirements. Proper implementation of the audit program should ensure that violations are promptly identified and corrected.

The licensee stated that they intend to continue to improve their licensed program.

EXHIBIT I

Quarterly Radiation Safety Audit Report

Licensee:	Date:
Group leader/manager:	Room(s):
Auditor:	

Total infraction points:

1.		Security	10
2.		Unauthorized use of radioactive materials	10
3.		Inventory records incomplete	10
4.		Radioactive materials received/transferred outside of approved channels	10
5.		Survey records incomplete	10
6.		Contamination	10
7.		Eating, drinking, or food in lab	10
8.		Protective clothing not worn while working with radioactive materials	10
9.		Personnel dosimeters improperly used, not worn, or not returned	10
10.		Training	10
11.		Waste records incomplete	10
12.		Improper disposal of radioactive materials	10
13.		Improper labeling/marking of containers or areas	5
14.		Appropriate survey meter/instrumentation inaccessible	10
15.		Radioisotope manual inaccessible	5
16.		Unsafe laboratory practices	10

Comments:

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_____ You have not been assessed points equaling or exceeding the 35 point trigger level. Please note and correct any deficiencies that are cited.

_____ You have been assessed points equaling or exceeding the 35 point trigger level. Please respond in writing with 2 weeks to detail your corrective actions and compliance date.

Repeat infractions will be assigned a double point value.