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MARYLAND DEPARTMENT OF THE ENVIRONMENT

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(410) 631-3000 • 1-800-633-6101 • http://www.mde.state.md.us

Parris N. Glendening
Governor

Jane T. Nishida
Secretary

JUL 26 2001

CERTIFIED MAIL: NOTICE OF VIOLATION

Jackson A. Ransohoff, President
Neutron Products, Inc.
22301 Mt. Ephraim Road
P.O. Box 68
Dickerson MD 20842

RE: Radioactive Material License #MD-31-025-01

Dear Mr. Ransohoff:

This letter refers to the radioactive materials inspection conducted by Messrs. Alan Jacobson, Ray Manley, Bob Nelson, Carl Trump, Jr., and Leon Rachuba of the Maryland Department of the Environment's (MDE) Radiological Health Program (RHP) on June 13 and 28, 2001. The inspection examined radiation safety, compliance with conditions of your license, adherence to procedures and proper maintenance of records, interviews with personnel, general observations, and independent measurements.

As a result of the inspection, the following concerns were identified:

1. NPI possesses five (5) teletherapy heads with "stuck" cobalt-60 sealed sources (in the shielded position) located in the courtyard area of the Limited Access Area (LAA). Please include with your compliance response, what NPI plans to do about this situation. Include what measures will be taken to try and recover the sources or plans for disposal of the units. According to the Radiation Safety Officer (RSO) some of these sources have been in storage for over 10 years. Radioactive material once determined to be useless and of no demonstrated economic value, is considered waste and should be treated accordingly. Furthermore, NPI currently stores in the main pool stellite corners containing approximately 25,000 curies of cobalt-60. Since this material does not have any apparent economic value, it should be declared as radioactive waste and shipped for disposal within four (4) years in accordance with license criteria. This is an unresolved concern identified during September 2000 inspection.

2. Inspectors identified poor radioactive waste storage practices and conditions such as rusted drums, drums lacking retaining rings, open waste containers, waste stored in plastic bags instead of drums, inadequate containment of contamination and eight (8) damaged drums caused by over compaction.

3. On June 13, 2001, NPI personnel issued MDE Inspectors written visitor safety instructions that were missing pages 2, 4 and 6 of 7 pages.

4. It appears that NPI does not have the sufficient trained personnel, financial resources and commitment of management necessary to establish compliance with Maryland Regulations, License Conditions and Court Orders.

5. NPI has not implemented a Quality Assurance Program, for manufacturing of sealed sources, in accordance with USNRC Reg. Guide 6.9.

During the inspection, certain activities were found to be in violation of the Department's requirements. The findings were discussed with Messrs. Jeff Williams, Bill Ransohoff, Marvin Turkanis and you on June 28, 2001. The violations found are listed in the enclosed "Description of Violations."

As a result of these findings, you are required to take immediate action to correct the violations and to respond to this letter and the enclosed "Description of Violations" within twenty (20) calendar days of your receipt of this notice. Written statements should be provided for the concerns and each of the violations indicating:

a. Corrective steps, which have been or will be taken by you to remedy the present violations and the results achieved or anticipated;

b. Corrective steps which will be taken to avoid further violations, who will undertake these steps, and who will supervise them; and

c. The date when full compliance will be achieved.

Failure to provide these statements in the required time frame may result in the Department taking escalated enforcement action under Maryland Radiation Regulations to:

(a) modify, revoke or suspend your license,

(b) issue a Departmental Order under the Annotated Code of Maryland, Environment Article, Sections 1-301 and 8-101 through 8-601, and

(c) seek an administrative penalty of up to $1,000 per violation, per day [Section 8-150(b)], or a civil penalty in Circuit Court in an amount not exceeding $10,000 per violation, per day [Section 8-509(b)].

Please be reminded that Departmental compliance letters and licensee responses shall be posted pursuant to the requirements of the Maryland regulations, Section J.11(d) titled, "Posting of Notices to Workers." If you have any questions concerning this letter, please call Messrs. Alan Jacobson or Carl Trump, Jr. at (410) 631-3301. You may also reach our office toll-free (in Maryland only) by dialing 1-800-633-6101 and requesting extension 3301. Also, you may contact this office via facsimile at (410) 631-3198.

Sincerely,

Roland G. Fletcher

Roland G. Fletcher, Program Manager III
Radiological Health Program

RGF/ADJ/cc

Enclosures: Description of Violations

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DESCRIPTION OF VIOLATIONS

Neutron Products, Inc.
22301 Mt. Ephraim Road
P.O. Box 68
Dickerson MD 20842

RE: Radioactive Material License #MD-31-025-01

Certain activities conducted under your license were found to be in violation of the Code of Maryland Regulations 26.12.01.01 titled, "Regulations for Control of Ionizing Radiation." These violations are presented below:

1. Section C.31 titled, "Specific Terms and Conditions of License" and License Condition 22.B(2) which requires, in part, that all soils, wherever found contaminated by NPI licensed activities and exhibiting levels of cobalt-60 contamination exceeding 8 picocuries per gram above background must be removed by NPI and properly stored/disposed of as radioactive waste.

   Contrary to Section C.31 and License Condition 22.B(2), NPI failed to remove cobalt-60 contaminated soil exceeding the above-specified limit. Specifically, on September 20, 2000 RHP inspectors collected soil samples at sites located both on and off of the NPI facility. Maryland Radiation Laboratory sampling results from these samples indicated that of the 10 samples taken, all indicated soil having cobalt-60 concentrations exceeding 8 picocuries per gram. The range was from 28 – 610 picocuries per gram of soil. NPI failed to remove the contaminated soils from the areas exceeding the license limit. This is a **REPEAT** violation from the Departmental inspections of November 1999 and September 2000. Furthermore, NPI has still not removed the soil contaminated with cobalt-60 from the adjacent railroad property to establish compliance with the 8.0 picocurie per gram concentration limit. Monthly soil samples collected and analyzed by NPI personnel in February, March, April and May 2001 indicate that soil concentrations continue to exceed the license limit. The Stipulation and Settlement (Civil Case No. 76639 in the Circuit Court of Montgomery County) dated January 3, 1994 required NPI to clean these contaminated areas by June 15, 1994. NPI has missed this deadline and has refused to remediate this property.

2. Section D.101 titled, "Radiation Protection Programs" states that in addition to complying with all other provisions of these regulations, a licensee shall use all means to maintain radiation exposures and releases of radioactive material as low as reasonably achievable (ALARA).

   Contrary to Section D.101, the licensee failed to use all means necessary to maintain release of radioactive material as low as reasonably achievable. Specifically, NPI has failed to use means necessary such as the adequate containment of radioactive materials,

proper waste storage practices and regular shipments of radioactive waste, to a licensed repository. One only has to review the soil sample results referred to in violation #1 to determine that NPI is not maintaining control over their radioactive material and it is continuing to be released. In spite of curtailed source-manufacturing activities, NPI continues to release cobalt-60 into the environment in an uncontrolled manner.

3. Section C.31 titled, "Specific Terms and Conditions of License" and License Condition 21.B requires that within 90 days of the issuance of the license, NPI must submit to the Department for approval a comprehensive plan for disposal of all low level radioactive wastes in accordance with those specifications defined in this condition.

   Contrary to Section C.31 and License Condition 21.B, NPI's low level radioactive waste plan was submitted to MDE on December 10, 1999; however, upon review it was found to be inadequate and as of this date a comprehensive plan acceptable to the Department has not been submitted. Deficiencies in the plan were discussed in a Departmental letter dated March 20, 2000, but NPI has not adequately responded to it. On October 20, 2000 the RHP received NPI's Decommissioning Plan dated October 27, 2000 which included a planned schedule for radioactive waste shipments. The RHP has reviewed this plan and determined that it is inadequate because it does not demonstrate compliance with the current radioactive material license waste disposal criteria. Table 2.1 of this plan describes a 12 year shipment schedule for only a small fraction of the total activity of current radioactive waste inventory. The plan did not describe the shipment schedule and protocol for the disposal of the contaminated soil in storage. All radioactive waste that was generated prior to August 1999 is required to be shipped for disposal by August 2004. This is a **REPEAT** violation from the Departmental inspection of November 1999 and September 2000.

4. Section C.29(c)(2) titled, "Financial Assurance and Recordkeeping for Decommissioning" requires, in part, that each licensee who is a holder of a specific license issued before October 15, 1998 and of a type described in paragraph (a) of C.29 must submit, on or before October 15, 1998 a decommissioning funding plan or a certification of financial assurance for decommissioning in an amount of at least equal to $750,000. Also, the requirements of Section C.29(g)(2) requires that no person shall receive, possess, use, transfer, own, or acquire radioactive material of a type described in paragraphs (a) and (b) of C.29 for more than 180 days following the dates prescribed in the section for submittal of a decommissioning funding plan or certification, if the decommissioning funding plan or certification has not been approved by the Agency.

   Contrary to Section C.29(c)(2), NPI has not met the $750,000 certification by the specified dates of this regulation. Furthermore, NPI's decommissioning funding plan has not been approved by the Agency. Pursuant to NPI's failure to provide an adequate decommissioning funding plan or the $750,000 certification by April 13, 1999 (180 days post October 15, 1998) NPI has continued to receive, possess, use, transfer, own, or acquire radioactive material of a type described in paragraphs (a) after the 180 day (April 13, 1999) deadline. This is a **REPEAT** violation from the Departmental inspection of November 1999 and the February 2000.

5. Section J.11(a)(4) titled, "Posting of Notices to Workers" requires, in part, that the licensee post any notice of violation involving radiological working conditions and any response from the licensee.

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Contrary to Section J.11(a)(4), NPI failed to post their February 12, 2001 compliance response to the January 19, 2001 Departmental letter-Notice of Violation which described numerous violations found during the September18-20, 2000 radioactive materials inspection.

6. Section D.101 titled, "Radiation Protection Programs" requires in part, that each licensee review the radiation protection program content and implementation at intervals not to exceed 12 months.

   Contrary to Section D.101, NPI failed to conduct the annual review of the radiation protection program content and implementation for the calendar year 2000. Specifically, NPI has not conducted a review of the radiation protection program, content and implementation within the last 12 months.

7. Section D.302(b)(ii)(1) titled, "Compliance with Dose Limits for Individual Members of the Public" requires the licensee to show compliance with the annual dose limit for individual members of the public.

   Contrary to Section D.302(b)(ii)(1), NPI failed to demonstrate by measurement, or calculation, or appropriate simulation model that the total effective dose equivalent to the individual likely to receive the highest dose from the licensed source of radiation does not exceed the annual dose limit as described in Section D. 301 for the calendar year of 2000.

8. Section D.902 titled, "Posting Requirements" which requires the licensee to post each radiation area with a conspicuous sign or signs bearing the radiation symbol and the words "CAUTION, RADIATION AREA" (CRA). Section D.902 requires the radiation symbol to use the colors magenta, purple or black on a yellow background.

   a. Contrary to Section D.902, NPI failed to post the required "CAUTION, RADIATION AREA" sign in the radiation area located near the windows of the welding shop.

   b. Contrary to Sections D.901 and D.901, NPI failed to properly post the radiation area located near the blue Sealand type container in the courtyard area of the LAA. The CRA sign was not conspicuous because it was rusted out and almost illegible. The sign did not have a yellow background and the radiation symbol was not visible.

9. Section D.904(a) titled, "Labeling Containers and Radiation Machines" requires in part, the licensee to ensure that each container of licensed radioactive material bears a clearly visible label bearing the radiation symbol and the words "CAUTION, Radioactive Material or "Danger, Radioactive Material".

   NPI failed to properly label drums of soil containing cobalt-60 located in the courtyard area of the Limited Access Area with a clearly visible label bearing the radiation symbol and the words "CAUTION, Radioactive Material" or DANGER, Radioactive Material." Inspectors observed drums with no labels at all. Furthermore, the drums were stored outside, unprotected from the sun, wind, rain, snow, ice and extreme temperatures.

10. Section D.501 titled, "Surveys and Monitoring-General" requires a licensee to make or cause to be made, surveys that are necessary under the circumstances to evaluate radiation

levels, concentrations or quantities of radioactive material and the potential radiological hazards that could be present. License condition 22.C. requires NPI to conduct floor monitoring surveys on all surfaces within the facility outside of the LAA.

Contrary to the requirements of Section D.501 and License Condition 22.C, NPI failed to conduct floor monitoring surveys of the welding shop during the calendar year of 2000 and the first five months of 2001. Furthermore, no floor monitoring survey records of the welding shop were available for inspection.

11. Section D.1101 titled "Records-General Provisions" requires the licensee to use units of becquerel, grey, sievert, coulomb per kilogram, disintegrations per minute, rad, rem and roentgen and clearly indicate the units of all quantities on records required by Part D.

Contrary to the requirements of Section D.1101, the results soil sample surveys dated February 1, and 21, 2001, March 9, 2001, April 25, 2001, and May 16, 2001 were maintained in units of gross counts instead of picocuries. Furthermore, the efficiency of the counting system was not documented on the survey records. As a result, the records did not identify the samples which exceeded the 8.0 picocurie per gram limit.

12. Section C.31 titled "Specific Terms and Condition of License" and License Condition 17.A. require in part, a Health Physics Technician to ensure the proper use of the portal monitor, hand held frisker and any other devices employed to detect levels of radioactivity present on person or items which exit the LAA. License Condition 37 and Procedure R 2029 dated June 14, 1989 titled "Procedure For Exit From The Limited Access Area" requires in part, for one to frisk themselves or have a Health Physics Technician frisk them at the pancake probe frisking station located at the entrance to the clean shower room. Procedure R 2028 dated February 7, 1991 requires in part, for one to verify that the rate meter and the pancake probe in the clean room is operational prior to entering the LAA.

Contrary to the requirements of Sections C.31 and License Condition 17.A., the technician failed to ensure the proper use of the hand held frisker. The RSO failed to verify that the rate meter and the pancake probe located at the frisking station at the entrance to the clean shower room, were operational prior to entering the LAA. Upon exiting the LAA on June 13, 2001, MDE Inspectors identified that the hand held frisker was not operational, and it failed to respond to a radiation check source. Upon further review, it was determined that the detector was broken. Although a back up system was available, the RSO bypassed the clean shower room frisking station instead of replacing the defective detector. Then he walked through the clean shower room and used the frisking station located at the Helguson monitor.

13. Section C.31 titled, "Specific Terms and Conditions of License", License Condition 37 and Procedure 2028 titled "Procedure For Entrance To The Limited Access Area" prohibits eating, drinking, and smoking in all parts of the LAA. The June 23, 1988 Departmental Order states that the licensee shall immediately stop all eating, drinking and smoking in the offices and work areas of the LAA.

Contrary to Section C.31 and License Condition 27, on June 13, 2001, RHP inspectors found evidence that NPI employees were feeding a cat and a litter of kittens in the courtyard area of the LAA. Specifically, the inspectors observed a plate with chocolate cake that was passed through a window from the welding shop into the LAA. The RHP inspectors instructed the RSO to remove the feline family

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from the LAA; however, on June 28, 2001 the cat and her litter were still living in this area where radioactive materials are stored.

Furthermore, on June 28, 2001 inspectors found evidence of food and drink in the Helguson monitor counting room, a room adjacent to and with direct access to the LAA. Specifically, a cracker wrapper was found on the floor and circular stained rings were found on the top of a cabinet. Also, disposable coffee cups, cracker wrappers and paper towels soaked in coffee were found in the waste can.

14. Section C.31 and License Condition 21.B.5. require NPI to provide the RHP and MDE's Hazardous and Solid Waste Management Administration copies of radioactive waste shipment records within 14 days of shipment dates.

NPI failed to provide the RHP and MDE's Hazardous and Solid Waste Management Administration copies of the June 23, 1001 radioactive waste shipment records within 14 days of shipment.

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MARYLAND DEPARTMENT OF THE ENVIRONMENT
AIR AND RADIATION MANAGEMENT ADMINISTRATION
RADIOLOGICAL HEALTH PROGRAM
RADIOACTIVE MATERIALS LICENSING AND COMPLIANCE DIVISION
2500 Broening Highway
Baltimore, Maryland 21224
410-631-3300

RADIOACTIVE MATERIALS INSPECTION REPORT

Neutron Products, Inc.
22301 Mt. Ephraim Road
P.O. Box 68
Dickerson MD 20842

Radioactive Material License Number: MD-31-025-01

Phone Number: 301-349-5001

FAX Number: 301-349-5007

Alan Jacobson — 8-7-2001
Alan Jacobson, Health Physicist Supervisor — Date

Carl E. Trump Jr. — 8/9/2001
Carl Trump, Jr., Program Manager — Date

Ray Manley — 8-7-2001
Ray Manley, Health Physicist Supervisor — Date

Leon Rachuba — 8-8-2001
Leon Rachuba, Lead Health Physicist — Date

Bob Nelson — 8/9/01
Bob Nelson, Lead Health Physicist — Date

MARYLAND DEPARTMENT OF THE ENVIRONMENT
AIR & RADIATION MANAGEMENT ADMINISTRATION

Radiological Health Program

MEMORANDUM

TO: Alan Jacobson, Health Physicist Supervisor Radioactive Material Inspection & Compliance Section

FROM: Ray Manley, Health Physicist Supervisor Radioactive Materials Licensing Section, Radiological Health Program (RHP)

DATE: June 14, 2001

SUBJECT: **INSPECTOR SUMMARY FOR June 13, 2001 NEUTRON PRODUCTS, INC. INSPECTION**

The following subject matter was reviewed at NPI pursuant to licensee activities conducted in the Limited Access (LAA) and surrounding areas.

1. Compactor
2. Radioactive material waste management
3. Previous inspection violations and concerns
4. Status of operational systems in the LAA
5. LAA surveys (documentation by RKN)

COMPACTOR

Compacting at NPI is being conducted by authorization of NPI procedures as permitted by amendment 44 of the 01 license. NPI started use of the new compactor on 10/21/2000. The licensee is using the compactor in the assistance of meeting current Circuit Court shipping deadline requirements and 01-license condition 21 shipping deadlines. The licensee stated that they intend to meet the Court Order June 30, 2001 deadline. The shipping deadlines are reviewed in the subsequent item in this report. To the date of this inspection, the licensee has compacted 12 drums at a compaction rate between 5-1 an 7-1. Discussions with the RSO indicate unsuccessful attempts by the licensee to increase the compaction rate higher than 7-1 however, these attempts resulted in bulging drums and failure of the inner retention devices (**concern**). The licensee admits that eight out of the first 12 drums NPI compacted sustained some level of damage (imperfections) pursuant to this attempt to overstuff the drums. The licensee has desisted in this overstuffing technique. The

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RSO stated that he anticipated an approximate total of 19 compacted 55 gallon drums with approximately 229 millicuries of C0-60 to be included in the prior to June 30th shipment. Current NPI individuals trained for and conducting compacting activities are Jeffrey Williams, Richard Demory, Bill Ransohoff and Brad Young. As per the procedures, all operators are using full-face respirators. High volume air sampling conducted during compactor operations indicates low airborne concentrations (average concentrations in 10^{-10} uCi/cc range). No lapel samplers are being used during operations to evaluate breathing zone (**concern**). Licensee states their evaluation by counting respirator filters is unreliable because of transfer of hand contamination to the filter. Initial meter surveys are conducted prior to and during operations. Eight contamination smears taken in areas around the compactor by the licensee following operations have indicated levels of contamination below operational procedure limits. There was one contamination incident pursuant to pre-compacted waste. On June 4, 2000, compactor operators sorted through uncompacted boxes of waste to remove disposed of aerosol cans. This activity was conducted without the knowledge of the RSO who was not at the site at the time. The operation created significant level of personnel contamination (**concern**). Dose-rates of compacted drums average 130 mR/hr at a meter with a maximum contact dose-rate of 1200 mR/hr. All operators use extremity dosimetry. The RSO stated that the compactor has had no malfunction problems of any kind since the inception of its use. The RSO stated that when waste of multiple generation dates is compacted the drum is labeled with the date of the oldest waste. However, this inspector was not able to visually inspect any compacted drum for labeling or potential damage because the licensee has stored the compacted drums in the rear of the South waste room with approximately a dozen empty drums in front of them and with a dose-rate at the waste room door of approximately 1 R/hr (**concern**).

RADIOACTIVE MATERIAL WASTE MANAGEMENT

Summary of NPI shipping requirements:

NPI must ship by Court Order, 600 cubic feet of low activity waste by June 30, 2001. By June 30, 2002, NPI must ship at least 80 % of the remaining low activity waste activity waste stored at the facility. NPI must by 01 license condition 21 ship out all RAM waste (stored outside the pool) generated after August 1999 within two years of its generation date (first deadline August 2001). For waste generated after August 1999 (stored in the pool) the licensee must ship this waste within three years of its generation (first deadline August 2002). All the radioactive material waste generated by the licensee prior to August 1999 must be removed from the facility by August 2004.

Summary of proposed prior to June 30, 2001 waste shipment

The RSO indicated that the waste shipment would include 19 drums of compacted waste in 55-gallon drums with activity of 229 mCi and boxes containing uncompacted waste. The total estimate of shipped activity is 500 mCi. The RSO indicated that the waste shipped would include some of the prior to August 1999 waste and waste generated after August 1999. The waste is to be loaded into a NPI lead shielded exclusive use truck container and shipped as LAA to ATG for reduction by incineration (50-1 to 100-1) and subsequently shipped for burial to Envirocare. This container will be locked and stored in the unrestricted parking lot during loading and prior to NPI transport (**concern**).

PREVIOUS INSPECTION VIOLATIONS AND CONCERNS

An interview was held with Mat Repp in the LAA. Mr. Repp indicated that he was now familiar with the roughing filter change procedure. He showed a number of documents in the hot cell log indicating proper documentation of a roughing filter change in accordance with the procedures. He showed that a copy of the procedure is now located in the LAA.

STATUS OF OPERATIONAL SYSTEMS IN THE LAA

Mr. Williams as RSO indicated that he is getting into the LAA only 4 times a month (**concern**). An interview with Jeff Corun (hot cell operator) indicated that the current activity in the hot cell was the recycling of radiation processing sources prior to transfer into the D-1 irradiator. He indicated he can process approximately 14 of these sources in two days. He also indicated that the recycle process and transfer had recently been completed for the D-II irradiator.

The licensee has a daily LAA checklist that includes check of the LAA for stray animals in the area. NPI has had previous problems with potential animal vectors through dogs and birds. The LAA inspection team observed a female cat and litter located in the rear of the LAA courtyard area adjacent to the North wall of the welding shop (**concern**). Adjacent to the cats was evidence (food containers) that NPI personnel from the welding shop had been feeding the animals. Inspection of the welding shop indicated two uncontrolled entrances into the LAA from the shop via large windows that crank open. This appears to show a lack of control by NPI management regarding access into the LAA. (**concern**). The welding shop is a restricted area, however, surveys at the window indicated a dose rate of 7 mR/hr. There was no "CRA" sign posted in the area (**concern**).

When exiting the LAA it was determined that the initial contamination frisker was not operational (**concern**). The RSO indicated that the initial frisking activities had been moved to the frisker outside of the HECM because of temporary activities in the LAA raising the background in the frisker area and he was unaware of the fact the unit was nonoperational. Use of the HECM area frisker appears to potentially allow transport of significant contamination past the shower area (**concern**). The RSO subsequently determined that the initial frisking station could be made operational by replacing the detector.

<u>LAA parameters 2001</u>

pH 5-6
conductivity 1-5 u/Siemens-cc
pool activity max 8×10^{-4} uCi/cc avg. 6×10^{-5} uCi/cc
large volume air sampling maximum 1.7×10^{-7} uCi /cc
monthly dumpster surveys—background
minipump airborne (hot cell) 1.1×10^{-13} uCi /cc
since 9/2000 all meters calibrated on quarterly frequency
inventory and leak test of sealed sources last conducted 3/28/2001 all <.005 uCi
contamination smears maximum noted in March 2001 to rear of hot cell door 606,000

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INTRODUCTION

On June 13 and 28, 2001, Messrs. Alan Jacobson, Ray Manley, Bob Nelson, Carl Trump, Jr., and Leon Rachuba of the Maryland Department of the Environment's (MDE) Radiological Health Program (RHP) conducted a routine unannounced radioactive materials inspection at the Neutron Products Incorporated (NPI) Dickerson facility. The purpose of the inspection was to examine the licensee's use and control of licensed radioactive material relative to Maryland Radiation Protection Regulations and specific license conditions. The inspection examined radiation safety, compliance with conditions of the license, adherence to procedures and proper maintenance of records, interviews with personnel, general observations, and independent measurements. As a result of the inspection 15 violations and 5 concerns were identified. These findings were discussed with Messrs. Jackson Ransohoff, Jeffrey Williams, Marvin Turkanis and Bill Ransohoff at the licensee management exit interview held on June 28, 2001 at the conclusion of the inspection. A Departmental Letter-Notice of Violation dated July 26, 2001 was sent to the licensee.

PROGRAM

The licensee manufactures and distributes cobalt-60 sealed sources for teletherapy and radiation processing. Currently, NPI possess 806,900 curies of cobalt-60 under this license. In addition, their radioactive waste inventories were 3635 curies in the main pool, 128 curies in the north canal and 206 curies in dry storage. Four to eight employees work in the Limited Access Area (LAA) on a regular basis. NPI employs approximately 60 persons. A November 3, 2000 Montgomery County Circuit Court Order required NPI to cease and desist from conducting all activities under this license. However, a December 21, 2000, Court Order permits NPI to resume licensed activities under specified conditions.

SPECIFIC AREAS OF REVIEW:

The following areas were inspected and reviewed: Dosimetry, Occupational Exposures, Random Inspections, Quarterly Audits, Radiation Safety Committee Minutes, Respiratory Protection Program, Inventory, General Operations in the Limited Access Area (LAA), Implementation of Radiation Safety Program, Boundary Monitoring, One Kilometer Surveys, Shipping and Receiving Records, Floor Monitoring, Health Physics Monthly Reports, Disposal of Radioactive Waste, Training, Air Monitoring, Survey Meter Calibration, Water Monitoring, Sealed Source and Device Sheets, Whole Body Counting Records, Exposure to Members of the General Public, Posting of Required Documents, Waste Compaction, Soil Contamination and Waste Storage.

INTERVIEWS

Interviews were conducted with the following NPI employees:

Jackson Ransohoff	President
Marvin Turkanis	Vice President
Jeffrey Williams	Radiation Safety Officer
Kathy Bupp	Health Physics Technician
Jeff Corun	Hot Cell Manager
Bill Ransohoff	Project Engineer
Matt Repp	LAA Technician

CONCERNS

1. NPI possesses five (5) teletherapy heads with "stuck" cobalt-60 sealed sources (in the shielded position) located in the courtyard area of the Limited Access Area (LAA). According to the Radiation Safety Officer (RSO) some of these sources have been in storage for over 10 years. Radioactive material once determined to be useless and of no demonstrated economic value, is considered waste and should be treated accordingly. Furthermore, NPI currently stores in the main pool stellite corners containing approximately 25,000 curies of cobalt-60. Since this material does not have any apparent economic value, it should be declared as radioactive waste and shipped for disposal within four (4) years in accordance with license criteria. This is an unresolved concern identified during September 2000 inspection.
2. Inspectors identified poor radioactive waste storage practices and conditions such as rusted drums, drums lacking retaining rings, open waste containers, waste stored in plastic bags instead of drums, inadequate containment of contamination and eight (8) damaged drums caused by over compaction. Furthermore, NPI is storing radioactive waste containers in the courtyard area of the LAA, unprotected from the wind, rain, snow, ice, sun and extreme temperatures.
3. On June 13, 2001, NPI personnel issued MDE Inspectors written visitor safety instructions that were missing pages 2, 4 and 6 of 7 pages.
4. It appears that NPI does not have the sufficient trained personnel, financial resources and commitment of management necessary to establish compliance with Maryland Regulations, License Conditions and Court Orders.
5. NPI has not implemented a Quality Assurance Program, for manufacturing of sealed sources, in accordance with USNRC Reg. Guide 6.9.

VIOLATIONS

1. Section C.31 titled, "Specific Terms and Conditions of License" and License Condition 22.B(2) which requires, in part, that all soils, wherever found contaminated by NPI licensed activities and exhibiting levels of cobalt-60 contamination exceeding 8 picocuries per gram above background must be removed by NPI and properly stored/disposed of as radioactive waste.

   Contrary to Section C.31 and License Condition 22.B(2), NPI failed to remove cobalt-60 contaminated soil exceeding the above-specified limit. Specifically, on September 20, 2000 RHP inspectors collected soil samples at sites located both on and off of the NPI facility. Maryland Radiation Laboratory sampling results from these samples indicated that of the 10 samples taken, all indicated soil having cobalt-60 concentrations exceeding 8 picocuries per gram. The range was from 28 – 610 picocurie per gram of soil. NPI failed to remove the contaminated soils from the areas exceeding the license limit. This is a **REPEAT** violation from the Departmental inspection of November 1999 and September 2000. Furthermore, NPI has still not removed the soil contaminated with cobalt-60 from the adjacent railroad property to establish compliance with the 8.0 picocurie per gram concentration limit. Monthly soil samples collected and analyzed by NPI personnel in February, March, April and May 2001 indicate that soil concentrations continue to exceed the license limit. The Stipulation and Settlement (Civil Case No. 76639 in the Circuit Court of Montgomery County) dated January 3, 1994 required NPI to clean these contaminated areas by June 15, 1994. NPI has missed this deadline and has refused to remediate this property. NPI estimates that there is 840 cu. ft. of contaminated soil in the dry pond, 300 cu. ft. down stream within the fence, 70 cu. ft. in

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the stone trap and 600 cu. ft. down stream off site. Inspectors observed dry pond soil remediation in progress during the inspection. No contaminated soil has been removed from the railroad property since the September 2000 inspection. On 4/24/2001, NPI collected 16 soil samples from the dry pond and areas down stream. Results ranged from 2.1 to 399 picocuries per gram. 6 samples were below the 8.0 picocurie per gram license limit and 10 were above.

2. Section D.101 titled, "Radiation Protection Programs" states that in addition to complying with all other provisions of these regulations, a licensee shall use all means to maintain radiation exposures and releases of radioactive material as low as reasonably achievable (ALARA).

Contrary to Section D.101, the licensee failed to use all means necessary to maintain release of radioactive material as low as reasonably achievable. Specifically, NPI has failed to use means necessary such as the adequate containment of radioactive materials, proper waste storage practices and regular shipments of radioactive waste, to a licensed repository. On June 13, 2001, Inspectors collected 21 wipe samples in the LAA. Results ranged from 4 dpm to 129,980 dpm. Nine wipe samples were over 2000 dpm. This contaminated area lacks adequate containment when the doors are open to the courtyard and radioactive materials are potentially released. One only has to review the soil sample results referred to in violation #1 to determine that NPI is not maintaining control over their radioactive material and it is continuing to be released. In spite of curtailed source-manufacturing activities, NPI continues to release cobalt-60 into the environment in an uncontrolled manner. On November 2, 2000, NPI identified 0.4 microcuries of cobalt-60 in approximately 10 gallons of soil during a residential property survey of 21821 Big Woods Road in Dickerson, Maryland. NPI has not removed any contaminated soil from the railroad spur since the September 2000 inspection. The contamination in the courtyard contributes to both waterborne and airborne effluent releases. Neither of these two courtyard release pathways are controlled or monitored by NPI to demonstrate compliance with applicable regulatory effluent release limits. Evidence of releases is identified in the dry pond, railroad spur, areas down stream and residential properties within a one kilometer radius of the plant. The facility lacks adequate containment in areas where radioactive materials are used and stored. The failure to implement appropriate controls to eliminate quantities of contamination in outdoor, unrestricted areas is a significant programmatic weakness.

3. Section C.31 titled, "Specific Terms and Conditions of License" and License Condition 21.B requires that within 90 days of the issuance of the license, NPI must submit to the Department for approval a comprehensive plan for disposal of all low level radioactive wastes in accordance with those specifications defined in this condition.

Contrary to Section C.31 and License Condition 21.B, NPI's low level radioactive waste plan was submitted to MDE on December 10, 1999 however, upon review it was found to be <u>inadequate</u> and as of this date a comprehensive plan has not been submitted. Deficiencies in the plan were discussed in a Departmental letter dated March 20, 2000, but NPI has not adequately responded to it. On October 27, 2000 the RHP received NPI's Decommissioning Plan dated October 20, 2000 which included a planned schedule for radioactive waste shipments. The RHP has reviewed this plan and determined that it is <u>inadequate</u> because it does not demonstrate compliance with the current radioactive material license waste disposal criteria. Table 2.1 of this plan describes a 12 year shipment schedule for only a small fraction of the total activity of current radioactive

NPI waste storage practices in the LAA

This inspector identified a number of concerns with waste storage practices in the LAA. There is a significant amount of radioactive material waste and/or sources being stored in the courtyard and not in the two radioactive material waste rooms (**concern**). Outside of the storage rooms is the following storage:

18 B-25 boxes of radioactive material soil (approximately 96 cubic feet apiece)

54 55-gallon drums of radioactive material soil (approximately 7.5 cubic feet apiece)

2 locked truck trailers (Sealand type) containing a portion of the above drums.

Large locked blue trailer (Sealand type) containing 46 boxes of uncompacted waste. (for prior to June 30, 2001 shipment and six C0-60 sources jammed in teletherapy heads.

55-gallon waste container of uncompacted waste removed from south waste storage room to allow for storage of empty compactor drums (labeled as Yellow-II).

B-25s All soil in the B-25s was not secured (**concern**). B-25s filled post to August 1999 are tag labeled with isotope, date of removal and estimate of activity (all .2 mCi) and a "CRAM". B-25s filled prior to August 1999 were stenciled on the side indicating radioactive soil. One of the B-25 lids was slid open approximately 5-inches (reason unknown by RSO) (**concern**). This would appear to allow water access into the unit during a rainstorm. Other evidence of this was noted in another B-25 that had approximately 3-inches of water on top of the soil in the container (**concern**).

55-gallon drums. No retaining rings were noted on any drums containing soil (**concern**). There was a significant level of rust on the drums some to the point of the entire drum being brown instead of the usual black color (**concern**). Many drums were not labeled as to any aspect of their contents (**concern**).

Large blue Sealand type. Dose rate at contact was 90 mR/hr. Dose rate at 30 cm was 50 mR/hr. The only labeling was almost nonlegible (rusted) CRA sign on front of the unit. No radiation signage coloration was visible and the radiation symbol was totally illegible (**concern**).

Approximately 4 yellow plastic bags containing LLW were noted stuffed in the rear of the North Waste room. NPI had previously indicated that all bagged waste of this type would be drummed due to a history of deterioration of the plastic. The RSO stated that all other bags had been drummed, however during the waste room cleanout they had discovered more. No explanation was given as to why the bags were not subsequently drummed (**concern**).

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waste inventory. The plan did not describe the shipment schedule and protocol for the disposal of the contaminated soil in storage. All radioactive waste that was generated prior to August 1999 is required to be shipped for disposal by August 2004. This is a **REPEAT** violation from the Departmental inspection of November 1999 and September 2000.

4. Section C.29(c)(2) titled, "Financial Assurance and Recordkeeping for Decommissioning" requires, in part, that each licensee who is a holder of a specific license issued before October 15, 1998 and of a type described in paragraph (a) of C.29 must submit, on or before October 15, 1998 a decommissioning funding plan or a certification of financial assurance for decommissioning in an amount of at least equal to $750,000. Also, the requirements of Section C.29(g)(2) requires that no person shall receive, possess, use, transfer, own, or acquire radioactive material of a type described in paragraphs (a) and (b) of C.29 for more than 180 days following the dates prescribed in the section for submittal of a decommissioning funding plan or certification, if the decommissioning funding plan or certification has not been approved by the Agency.

   Contrary to Section C.29(c)(2), NPI has not met the $750,000 certification by the specified dates of this regulation. Furthermore, NPI's decommissioning funding plan has not been approved by the Agency. Pursuant to NPI's failure to provide an adequate decommissioning funding plan or the $750,000 certification by April 13, 1999 (180 days post October 15, 1998) NPI has continued to receive, possess, use, transfer, own, or acquire radioactive material of a type described in paragraphs (a) after the 180 day (April 13, 1999) deadline. This is a **REPEAT** violation from the Departmental inspection of November 1999 and the February 2000.

5. Section J.11(a)(4) titled, "Posting of Notices to Workers" requires, in part, that the licensee post any notice of violation involving radiological working conditions and any response from the licensee.

   Contrary to Section J.11(a)(4), NPI failed to post their February 12, 2001 compliance response to the January 19, 2001 Departmental letter-Notice of Violation which described numerous violations found during the September18-20, 2000 radioactive materials inspection. According to Bill Ransohoff and Jeff Williams, NPI maintains 4 posting locations to comply with Section J.11, the Accounting Office, Jeff William's Office, Jack Ransohoff's Office and the Administrative Office on the first floor near the visitor log. All four of these locations were inspected on June 13, 2001.

6. Section D.101 titled, "Radiation Protection Programs" requires in part, that each licensee review the radiation protection program content and implementation at intervals not to exceed 12 months.

   Contrary to Section D.101, NPI failed to conduct the annual review of the radiation protection program content and implementation for the calendar year 2000. Specifically, NPI has not conducted a review of the radiation protection program, content and implementation within the last 12 months. The previous review was conducted on 6/2/01. The RSO stated that the review for the year of 2000 was still in the draft form, however, it was not available for inspection upon request on 6/13 and 6/28/01.

7. Section D.302(b)(ii)(1) titled, "Compliance with Dose Limits for Individual Members of the Public" requires the licensee to show compliance with the annual dose limit for individual members of the public.

Contrary to Section D.302(b)(ii)(1), NPI failed to demonstrate by measurement, or calculation, or appropriate simulation model that the total effective dose equivalent to the individual likely to receive the highest dose from the licensed source of radiation does not exceed the annual dose limit as described in Section D. 301 for the calendar year of 2000.

Mr. Carroll Fisk has been the "individual most likely to receive the highest dose" for the years of 1996, 1997, 1998 and 1999. He died during the year of 2000. NPI estimated that Mr. Fisk received 66 millirem during the year of 1999 from NPI. A TLD that was placed inside his home and exchanged at a quarterly frequency measured 66 millirem for the year. A TLD placed at his portico measured 105 millirem for the year of 1999. For the year of 2000, the inside TLD measured 43 millirem and the portico TLD measured 88.6 millirem. Currently, there are new tenants living in the Fisk house. The TLD inside the Lamsom house measured 21.4 millirem and 45 millirem outside. Background has been subtracted from the Fisk and Lamson results. Background is measured by a TLD, exchanged quarterly at the Lytle Barn. Background for the year 2000 was determined to be 65.2 millirem. It appears that NPI will be able to demonstrate compliance with the 100 millirem per year limit. However, during the inspection, they could not exactly identify the specific individual likely to receive the highest dose from NPI.

8. Section D.902 titled, "Posting Requirements" which requires the licensee to post each radiation area with a conspicuous sign or signs bearing the radiation symbol and the words "CAUTION, RADIATION AREA" (CRA). Section D.901 requires the radiation symbol to use the colors magenta, purple or black on a yellow background.

   a. Contrary to Section D.902, NPI failed to post the required "CAUTION, RADIATION AREA" sign in the radiation area located near the windows of the welding shop.
   b. Contrary to Sections D.901 and D.902, NPI failed to properly post the radiation area located near the blue Sealand type container in the courtyard area of the LAA. The CRA sign was not conspicuous because it was rusted out and almost illegible. The sign did not have a yellow background and the radiation symbol was not visible at all.

9. Section D.904(a) titled, "Labeling Containers and Radiation Machines" requires in part, the licensee to ensure that each container of licensed radioactive material bears a clearly visible label bearing the radiation symbol and the words "CAUTION, Radioactive Material or "Danger, Radioactive Material".

NPI failed to properly label drums of soil containing cobalt-60 located in the courtyard area of the Limited Access Area with a clearly visible label bearing the radiation symbol and the words "CAUTION, Radioactive Material" or DANGER, Radioactive Material". Inspectors observed drums with no labels at all. Furthermore, the drums were stored outside, unprotected from the sun, wind, rain, snow, ice and extreme temperatures.

10. Section D.501 titled, "Surveys and Monitoring-General" requires a licensee to make or cause to be made, surveys that are necessary under the circumstances to evaluate radiation levels, concentrations or quantities of radioactive material and the potential radiological

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hazards that could be present. License condition 22.C. requires NPI to conduct floor monitoring surveys on all surfaces within the facility outside of the LAA.

Contrary to the requirements of Section D.501 and License condition 22.C, NPI failed to conduct floor monitoring surveys of the welding shop during the calendar year of 2000 and the first five months of 2001. Furthermore, no floor monitoring survey records of the welding shop were available for inspection.

11. Section D.1101 titled "Records-General Provisions" requires the licensee to use units of becquerel, grey, sievert, coulomb per kilogram, disintegrations per minute, rad, rem and roentgen and clearly indicate the units of all quantities on records required by Part D.

Contrary to the requirements of Section D.1101, the results soil sample surveys dated 2/1/01, 2/21/01, 3/09/01, 4/25/01 and 5/16/01 were maintained in units of gross counts instead of picocuries. Furthermore, the efficiency of the counting system was not documented on the survey records. As a result, the records did not identify the samples which exceeded the 8.0 picocurie per gram limit.

12. Section C.31 titled "Specific Terms and Condition of License" and License Condition 17.A. require in part, a Health Physics Technician to ensure the proper use of the portal monitor, hand held frisker and any other devices employed to detect levels of radioactivity present on person or items which exit the LAA. License Condition 37 and Procedure R 2029 dated June 14, 1989 titled "Procedure For Exit From The Limited Access Area" requires in part, for one to frisk themselves or have a Health Physics Technician frisk them at the pancake probe frisking station located at the entrance to the clean shower room. Procedure R 2028 dated February 7, 1991 requires in part, for one to verify that the rate meter and the pancake probe in the clean room is operational prior to entering the LAA.

Contrary to the requirements of Sections C.31 and License Condition 17.A., the technician failed to ensure the proper use of the hand held frisker. The RSO failed to verify that the rate meter and the pancake probe located at the frisking station at the entrance to the clean shower room, were operational prior to entering the LAA. Upon exiting the LAA on 6/13/2001, MDE Inspectors identified that the hand held frisker was not operational and it failed to respond to a radiation check source. Upon further review, it was determined that the detector was broken. Although a back up system was available, the RSO bypassed the clean shower room frisking station instead of replacing the defective detector. Then he walked through the clean shower room and used the frisking station located at the Helguson monitor.

13. Section C.31 titled, "Specific Terms and Conditions of License", License Condition 37 and Procedure 2028 titled "Procedure For Entrance To The Limited Access Area" prohibits eating drinking and smoking in all parts of the LAA. The June 23, 1988 Departmental Order states that the licensee shall immediately stop all eating, drinking and smoking in the offices and work areas of the LAA.

Contrary to Section C.31 and License Condition 27, on June 13, 2001, RHP Inspectors found evidence that NPI employees were feeding a cat and a litter of kittens in the courtyard area of the LAA. Specifically, the inspectors observed a plate with chocolate cake that was passed through a window from the welding shop into the LAA. The RHP Inspectors instructed the RSO to remove the feline family from the LAA however, on June 28, 2001 the cat and her litter were still living in this area where radioactive materials are stored.

Furthermore, on June 13, 2001 Inspectors found empty soda cans, coffee cups and food wastes in a waste can located in the Helguson monitor counting room. On June 28, 2001 Inspectors found evidence of food and drink in this same room which is adjacent to and with direct access to the LAA pool area. Specifically, a cracker wrapper was found on the floor and circular stained rings were found on the top of a cabinet. Furthermore, disposable coffee cups, cracker wrappers and paper towels soaked in coffee were found in this waste can.

14. Section C.31 and License Condition 21.B.5. require NPI to provide the RHP and MDE's Hazardous and Solid Waste Management Administration copies of radioactive waste shipment records within 14 days of shipment dates.

NPI failed to provide the RHP and MDE's Hazardous and Solid Waste Management Administration copies of the June 23, 1001 radioactive waste shipment records within 14 days of shipment.

MISCELLANEOUS NOTES

- On 6/23/2001, NPI shipped approximately 520 millicuries, 595.5 cubic feet, 7675 lbs. of radioactive waste to Allied Technology Group, Inc. in Richland, Washington.
- 1999 collective whole body occupational exposure was 14.9 person-rem
- 1998 collective whole body occupational exposure was 32.3 person-rem
- For 1999, 2 employees exceeded 2 rem
- Results of interviews indicated that the RSO enters the LAA approximately 2-6 times per month.
- Inspectors conducted a dose rate survey using an Eberline PIC 6, SN 2237, calibrated 8/31/2000 by RSO Inc.
  Measured:

500 mR/hr	at contact with a drum in the South Waste Room
1050 mR/hr	at contact with a second drum in the South Waste Room
1000 mR/hr	at contact with a drum in the North Waste Room
2000 mR/hr	at contact with a second drum in the North Waste Room

- Inspectors conducted a dose rate survey with an Eberline E-520, SN 389 calibrated 5/27/2001 by RSO Inc.
  Measured:

2.0 mR/hr	at contact with hot cell window
15.0 mR/hr	at contact with shipping cask containing a returned teletherapy source
50.0 mR/hr	at contact with the North Waste Room door closed
100.0 mR/hr	at the space between the two North Waste Room doors
70.0 mR/hr	at contact with the South Waste Room door
100 mR/hr	at 1 ft. from blue Sealand Waste Storage container
40.0 mR/hr	at 1 meter from North Canal resin bottle

- Dick Demory conducted the annual cleaning of the pools and canals during the week of 12/26/2000.
- The Washington Suburban Sanitary Commission has determined that mop water is industrial discharge and, as a result, may not be discharged into the sanitary sewerage. NPI has since reduced the frequency of mopping the floor of the LAA. Furthermore, when they are mopping, they are using less water. The mop water is stored in drums. The dose rate at contact with the drums is reported to be 200 mR/hr. As the water in the

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uncovered drum evaporates, the cobalt-60 concentration becomes higher. As the volume of the water in the drum becomes lower, due to evaporation, NPI personnel add more mop water to the drum. NPI has no plans to dispose of this contaminated water.

- Cathy Bupp and Dave Baker conduct monthly surveys of floors in unrestricted areas using an Eberline 600. No contamination has been found during the year of 2000 and year to date 2001.
- Dose rates behind the hot cell range from 25 to over 200 mR/hr.
- One Kilometer Survey Results

22175 Dickerson School Road	04/26/2001	No Contamination Found
20120 Mouth of Monocacy Road	03/30/2001	No Contamination Found
22341 Mt. Ephraim Road	02/26/2001	No Contamination Found
21375 Martinsburg Road	01/29/2001	No Contamination Found
19700 Barnesville Road	12/26/2000	No Contamination Found
21821 Big Woods Road	11/02/2000	0.4 uCi Co-60 in 10 gal. soil
Rachel Property	10/27/2000	No Contamination Found
21700 Big Woods Road	09/29/2000	No Contamination Found

- On 10/11/2000, Helguson Scientific Services Inc. (925-846-3453) conducted whole body Counting on 16 of NPI's LAA employees at the Barnesville Fire Department. 4 employees tested positive for Cobalt-60. Results ranged from 3 –10 (+ or – 1) nanocuries.
- NPI received 187,526 curies cobalt-60 from Empressa, Argentina on 2/22/01.
- Sealed source shipment records were inspected and reviewed and customers' licenses were spot-checked. No deficiencies were found.
- Monthly Health Physics Reports are prepared by R.E. Alexander, CHP. On page 4, section 4.2 of the May 2001 report, Mr. Alexander states that NPI now conducts one of the best contamination control programs that he has ever seen.
- Mr. Alexander conducts quarterly training for employees who work in the LAA. On March 30, 2001 provided LAA employees with a course on "Time, Distance and Shielding". During the fourth quarter of 2000, the subject was "Occupational Radiation Protection Regulatory Controls and 12 employees attended.
- Three LAA workers received 1.87, 2.00 and 2.88 Rem TEDE for the year of 2000.
- Historic Waste Disposal Records were reviewed

02/16/98	100 cu. ft.	36 millicuries
09/05/96	1280 cu. ft.	100 millicuries
12/19/90	78.3 cu. ft.	
05/21/90	62.7 cu. ft.	0.99 curies
07/21/88	65.4 cu. ft.	0.99 curies

- On June 21, 2000, Bob Nelson assisted an inspector from the Maryland Occupational Safety and Health Administration (MOSH) in conducting a safety inspection of NPI's LAA. The MOSH Inspector identified numerous violations including the construction of a temporary makeshift scaffold on top of the 20-foot high moveable crane where an 8 foot step ladder was used to change burned out light bulbs in the LAA near the main pool. Other violations and concerns included exposed belts on the drill press, no safety guards on the lathe, uncovered electrical boxes, lack of a railing around the main pool, stairs without handrails, inadequate eye protection and blocked fire exits. MOSH issued a proposed penalty of $3825.00. On 9/22/200, an informal settlement agreement was signed and on 10/13/2000, NPI paid a $1450.00 penalty.

ATTACHMENTS

06/28/2001 Radioactive Material Inspection Finding and Licensee Acknowledgement Form
06/23/2001 Waste Manifest-Shipping Paper
06/15/2001 Inventory
11/02/2000 Court Order, Cease and Desist, Permanent Injunction
12/21/2000 Order Modifying Permanent Injunction Pending Appeal
06/14/2001 Memorandum-LAA Inspection Summary
07/05/2001 Maryland Laboratory Administration-Report

MARYLAND STATE DEPARTMENT OF HEALTH AND MENTAL HYGIENE
RADIATION LABORATORY REPORT
(410) 767-5537

SAMPLE SOURCE: NPI COLLECTOR: R. Nelson SAMPLE TYPE: Wipe

COLLECTION DATE: 06/13/01 RECEIPT DATE: 06/14/01 REPORT DATE: 07/05/01 ANALYSES BY: S. Wise

S. Wise

RKN
7/10/01

Activity (pCi/wipe)

LAB. No.	Wipe#		CO-60	
3744	1	hot cell table	< 1.74 x 10	- 4 DPM
3745	2	floor by table	$1.092 \times 10^2 \pm 9.881$	- 242 DPM
3746	3	mezzanine steps	$5.462 \times 10 \pm 6.668$	- 12 DPM
3747	4	step off area	$1.024 \times 10^2 \pm 9.529$	~ 226 DPM
3748	5	cabinet welding lab	$4.070 \times 10 \pm 5.679$	- 9 DPM
3749	6	lab paper dispenser	$6.726 \times 10^2 \pm 3.661 \times 10$	- 1493 DPM
3750	7	lab work bench	< 1.85 x 10	4 DPM
3751	8	Hot cell door	$4.644 \times 10^2 \pm 2.727 \times 10$	- 1031 DPM
3752	9	RAM 35	$6.245 \times 10^2 \pm 3.861 \times 10$	- 1386 DPM
3753	10	roll up door	< 2.46 x 10	5 DPM
3754	11	machine shop table	$1.023 \times 10^3 \pm 5.682 \times 10$	2271 DPM ★
3755	12	Anteroom door	$8.361 \times 10^2 \pm 4.821 \times 10$	1856 DPM
3756	13	light anti room	$2.4234 \times 10^4 \pm 1.0784 \times 10^3$	53799 DPM ★
3757	14	crane block	$2.691 \times 10^3 \pm 1.307 \times 10^2$	- 5974 ★
3758	15	hot cell door	$9.252 \times 10^2 \pm 5.221 \times 10$	- 2053 DPM ★
3759	16	floor by Hot cell	$3.123 \times 10^3 \pm 1.499 \times 10^2$	- 6933 DPM ★
3760	17	cabinet behind cell	$3.332 \times 10^3 \pm 1.590 \times 10^2$	- 7392 DPM ★
3761	18	hot tool room door	$5.8549 \times 10^4 \pm 2.5872 \times 10^3$	129980 DPM ★
3762	19	compactor	$5.824 \times 10^2 \pm 3.639 \times 10$	1292 DPM
3763	20	desk by main panel	$3.3366 \times 10^3 \pm 1.5947 \times 10^2$	7407 DPM ★
3764	21	amp panel south cell	$7.235 \times 10^3 \pm 3.312 \times 10^2$	16062 DPM ★

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MARYLAND STATE DEPARTMENT OF HEALTH AND MENTAL HYGIENE
RADIATION LABORATORY REPORT
(410) 767-5537

SAMPLE SOURCE: NPI - Main Pool COLLECTOR: R. Nelson SAMPLE TYPE: Water

COLLECTION DATE: 06/13/01 RECEIPT DATE: 06/14/01 REPORT DATE: 07/05/01 ANALYSES BY: S. Wise

S. Wise

LAB. No.	Activity (pCi/Liter) CO-60
3765	$5.0611 \times 10^4 \pm 2.6496 \times 10^3$

112,360 DPM / Liter

RKN
7/05/01

Main pool

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MARYLAND DEPARTMENT OF THE ENVIRONMENT
Air and Radiation Management Administration
Radiological Health Program

2500 Broening Highway
Baltimore Maryland 21224
(410) 631-3300

RADIOACTIVE MATERIAL
INSPECTION FINDINGS AND LICENSEE ACKNOWLEDGEMENT

I. Licensee	II. License No.
Neutron Products Inc. 22301 Mt. Ephraim Road P.O. Box 68 Dickerson, MD 20842	MD-31-025-01
	III. Date of Inspection 6/13/2001 6/28/2001

IV. Inspection Findings and Licensee Action

The inspection was an examination of the activities conducted under your license as they relate to radiation safety and to compliance with the Code of Maryland (COMAR) 26.12.01 "Regulations for Control of Ionizing Radiation", and the conditions of your license. The inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observations by the inspector. The findings of this inspection are as follows:

A. [ ] No current use or storage of licensed radioactive material (no program). The licensee was informed that upon receipt of radioactive material RHP must be notified.

B. [ ] Issuance of an Agency E-1: Within the scope of the agency inspection no items of noncompliance or unsafe conditions were found. No action is required by the licensee.

C. [ ] Issuance of an Agency E-2: Within the scope of the inspection, violations of minor significance were found. For any violation, corrective action must be immediately initiated. Within the 20 calendar days of your receipt of this notice you are to provide the Department with written statements of explanation describing:

(1) corrective steps which have been or will be taken by you, and the results achieved or anticipated; (2) corrective steps which will be taken to avoid further violations; and (3) the date when full compliance will be achieved. Such a statement or explanation must be provided or each of the items listed.

D. [✓] Issuance of an Agency E-1 with a letter sent to the licensee further describing Agency requirements. For any violation, corrective action must be immediately initiated.

V. Licensee Acknowledgement

The Inspector has explained and I understand any items of noncompliance identified during this agency inspection. Furthermore, I acknowledge that, if an Agency E-2 Description of Violations was issued, failure to comply may result in the revocation, suspension or modification of the license and possible fines for each day the violations continue.

6/28/2001	Alan Jacobson	
Date	RAM Inspector	Licensee Representative - Title or Position

MDER E-1 (Yellow) Licensee File Copy

dpm/100cm^2 (licensee states due to radioprocessing recycle for D-II)
respirator maintenance check conducted monthly

MISCELLANEOUS

The licensee provided training documentation upon sign in to the facility. All visitors must initial that they have reviewed this documentation. Three pages of the intended documentation was not issued to the inspectors or other recent visitors **(concern)**

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neutron PRODUCTS inc

22301 Mt. Ephraim Road, P. O. Box 68
Dickerson, Maryland 20842 USA
301-349-5001 FAX: 301-349-2433
e-mail: neutronprod@erols.com

20 August 2001

Via FAX (410) 631-3198

Mr. Roland G. Fletcher
Manager
Radiological Health Program
Maryland Department of the Environment
2500 Broening Highway
Baltimore, MD 21224

RECEIVED
AUG 2 2001
RADIOLOGICAL HEALTH PROGRAM

Re: Licenses MD-31-025-01

Dear Mr. Fletcher,

This letter is in timely response to your letter dated July 26, 2001 which arrived here on July 30.

Alleged Violation #1 states:

"1. Section C.31(c) titled, 'Specific Terms and Conditions of License' and License Condition 22.B(2) which requires, in part, that all soils, wherever found contaminated by NPI licensed activities and exhibiting levels of cobalt-60 contamination exceeding 8 picocuries per gram above background must be removed by NPI and properly stored/disposed of as radioactive waste:

"Contrary to Section C.31 and License Condition 22.B(2), NPI failed to remove cobalt-60 contaminated soil exceeding the above-specified limit. Specifically, on September 20, 2000 RHP inspectors collected soil samples at sites located both on and off of the NPI facility. Maryland Radiation Laboratory sampling results from these samples indicated that of the 10 samples taken, all indicated soil having cobalt-60 concentrations exceeding 8 picocuries per gram. The range was from 28 - 610 picocurie per gram of soil. NPI failed to remove the contaminated soils from the areas exceeding the license limit. This is a **REPEAT** violation from the Departmental inspection of November 1999 and September 2000. Furthermore, NPI has still not removed the soil contaminated with cobalt-60 from the adjacent railroad property to establish compliance with the 8.0 picocurie per gram concentration limit. Monthly soil samples collected and analyzed by NPI personnel in February, March, April and May 2001 indicate that soil concentrations continue to exceed the license limit. The Stipulation and Settlement (Civil Case No. 76639 in the Circuit

Court of Montgomery County) dated January 3, 1994 required NPI to clean these contaminated areas by June 15,1994. NPI has missed this deadline and has refused to remediate this property."

Response

1.1 As a preliminary matter, from the wording of the alleged violation ("of the 10 samples taken, all indicated [contamination]") a person unfamiliar with our facility could get the impression that the entire property is contaminated and that, wherever one puts a shovel in the ground, one will find contamination. Clearly, that is not the case. In fact, monthly samples taken from randomly selected areas around the plant rarely show unexpected areas of contamination. It is well known to the Department which areas are contaminated and it is only those areas which were sampled during the referenced inspection, so it is not surprising that all of the samples exhibited some degree of contamination.

1.2 Secondly, your statement that Neutron "missed ...[the June 15, 1994]...deadline and has refused to remediate this property" is materially misleading. Specifically, it is well known to the Department:

that Neutron performed its periodic removal of contaminated soil from the dry pond and the areas downstream thereof, and cleaned both the downstream rip-rap and the upstream stone trap at the earliest practical opportunity that spring, which had been unusually wet;

that the effort resulted in a substantive, and far more than ALARA optimum, reduction of radioactivity throughout the area of interest; and

that no additional work was either required by the settlement or likely to benefit persons, property or the environment in any credible way.

1.3 Neutron is appealing the validity of this license condition, largely because it is much more stringent than applicable state and federal regulations for an operating facility, without any demonstrable public health and safety or environmental benefit. While there does exist a very low level of radioactive contamination in the modest sized areas at issue, the most recent area survey shows that the highest dose rate in the area is approximately 0.06 mrem/hr., which is about 3 % of the regulatory limit of 2 mrem/hr for dose rate in an unrestricted area. In addition, it is important to keep in mind that less than 70% of the waist-high dose rate in the most contaminated area is due to contamination, with the balance due to skyshine and natural background. A comparison of the regulatory limit with the dose rate in the affected area is graphically demonstrated in Figure 1.

1.4 In accordance with good health physics practices, Neutron has performed several evaluations to determine the likely dose received by any member of the public from the

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contamination referenced in Alleged Violation #1. Such evaluations have repeatedly shown that it is not credible that any member of the public could receive in excess of 2 mrem/year from the referenced contamination, a mere 2% of the limit set by duly promulgated regulations for annual exposure to members of the public, and less than 1% of average sea-level exposure from nature. RHP has never disputed these evaluations, nor are there any grounds for dispute of which Neutron is aware.

1.5 Moreover, your citation materially misrepresents the Stipulation and Settlement of 1994. As you well know, the referenced terms of settlement render the cited license condition unenforceable until 60 days after the courtyard has been enclosed, an event that has been indefinitely delayed by acts and omissions of MDE.

1.6 Finally, the written Stipulation and Settlement was supplemented by an oral agreement which provided that even after the source of continuing contamination has been removed, the level of decontamination then required shall be governed by ALARA because:

-- the levels of contamination do not present any credible health and safety concern, nor do they result in dose rates which even approach regulatory limits of 2 mrem/hr in any unrestricted area and 100 mrem/year of exposure received by any member of the public; and,

-- for whatever reason, the abandoned rail spur area has acted to remove contamination from the stormwater, thereby helping to prevent its spread downstream, and unnecessary disturbance of the rail siding could lead to contamination (however inconsequential) moving further downstream.

Corrective Action

1.7 Because the construction of the Courtyard Enclosure has been stymied by the concerted efforts of MDE and a few vocal members of the community, Neutron has undertaken alternative means of reducing the very low levels of contamination leaving the site. As a result, the contamination along the abandoned rail siding has been substantially reduced even before the courtyard has been enclosed. The alternative measures have primarily focused on reducing the amount of incidental contamination reaching the courtyard, and improving the efficiency of the stone trap and dry pond lying between the open courtyard and Neutron's southwest property line.

1.8 As RHP is well aware, since well before 1994 Neutron has, on numerous occasions, removed contaminated soil from the dry pond and areas downstream thereof. In addition, we have periodically cleaned portions of the stone trap in order to reduce the amount of contamination reaching the dry pond, a small fraction of which moves downstream therefrom.

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1.9 Furthermore, we have invested in, and initiated the use of, a nuclear grade vacuum cleaner (with HEPA filter), the use of which is intended to reduce the amount of removable contamination within the LAA, thereby further reducing the amount of contamination reaching the courtyard and, ultimately, the drypond.

1.10 Our efforts also include periodic remediation of contaminated areas. Regarding your reference to the soil samples collected in September, 2000, our remediation efforts have been focused on the areas with the highest levels of contamination found during that inspection, namely the drypond. At the time of your most recent inspection, we had conducted some remediation of that area (as well as some areas downstream thereof), and you are well aware that our efforts in that regard are ongoing. Since your inspection, we have continued to remove contaminated soil from that area.

1.11 Over the years, all of these efforts have proven effective in reducing the dose rates along the referenced rail siding, as is depicted graphically in Figure 2. Jeffrey Williams and Bill Ransohoff will be responsible for ensuring that these corrective action efforts continue.

Corrective Action Requested of MDE

1.12 We are both well aware of the facts and allegations:

that MDE has never justified the excessive stringency of what has become ERLC 22.B(2), nor has Neutron ever agreed that compliance with it is practical until the LAA Courtyard has been enclosed, perhaps not even then;

that MDE agreed in July, 1989 that Neutron had achieved "substantial compliance" with that and other excessively stringent ERLCs then imposed by MDE upon its 01 License, and that it would "work with Neutron" on any of the ERLCs then imposed, the full compliance with which Neutron believed to be illegal or impractical;

that instead of performing as promised in that regard, MDE sought to enforce the letter of all the ERLCs then imposed, citing Neutron for alleged violations of no credible consequence to the public health and safety, demanding the payment of $60,000 in allegedly "reduced" fines, with every indication of more to come, and suing Neutron for more than $90 million when Neutron refused to succumb to MDE's unreasonable demands;

that in the course of said litigation, MDE sought the support of NRC Headquarters for the justification of its extraordinary stringency circa 1993, only to be turned down by letter dated January 4, 1994;

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that instead of either adjusting your policies, ERLCs, and demands accordingly, or otherwise working with Neutron to implement more practical License Conditions that merely require compliance with duly promulgated regulations, you have continued to cite and fine Neutron for its failure to comply in full with License Conditions far more stringent than ever justified by either NRC or MDE, and have either retained or made more stringent each of the ERLCs that have yet to be justified on the merits; and

that you have done so in egregious defiance of both the spirit and the letter of Executive Order 01.01.1996.03 which requires you to rigorously justify any regulations (which you have always insisted include License Conditions) more stringent than their federal counterparts.

1.13 The time has long since passed for MDE to either rigorously justify or relax the excessive stringency of ERLC 22.B(2); and after you have done so, we would be pleased to work with MDE as necessary to define a License Condition duly mindful of the public health and safety, with which it is practical for Neutron to comply.

Alleged Violation #2 states:

"2. Section D.101 titled, 'Radiation Protection Programs' states that in addition to complying with all other provisions of these regulations, a licensee shall use all means to maintain radiation exposures and releases of radioactive material as low as reasonably achievable (ALARA):

"Contrary to Section D.101, the licensee failed to use all means necessary to maintain release of radioactive material as low as reasonably achievable. Specifically, NPI has failed to use means necessary such as the adequate containment of radioactive materials, proper waste storage practices and regular shipments of radioactive waste, to a licensed repository. One only has to review the soil sample results referred to in violation #1 to determine that NPI is not maintaining control over their radioactive material and it is continuing to be released. In spite of curtailed source-manufacturing activities, NPI continues to release cobalt-60 into the environment in an uncontrolled manner."

Response

2.1 The dispute between Neutron and MDE regarding ALARA is well documented. Neutron submits that it arises primarily out of MDE's working interpretation of ALARA to mean "as low as possible", thereby effectively reducing to zero all numerical regulatory limits and removing the need for any quantitative analysis which is required to determine what is "reasonable" as defined in NUREG 1530. This citation, as well as citation #1 are illustrative of the severe damages arising from MDE's insistent misinterpretation of ALARA.

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2.2 Both Neutron and MDE agree that, in addition to complying with numerical limits in the regulations, licensees must also keep personnel exposures and releases of radioactive material ALARA. In this case, Neutron is in compliance with the numerical limits, such as radiation dose rates in unrestricted areas, doses received by members of the public, etc., so that ALARA clearly applies.

2.3 However, in order to perform an ALARA analysis to determine whether or not a licensee must further reduce releases or exposures, some dollar figure must be assessed to a person-rem of exposure saved, so that the cost of a particular proposed action can be compared with the benefit to be realized by the performance of that action. NUREG 1530 states that 1 person-rem of exposure saved is equivalent in value to a monetary cost of $2,000. In other words, if the licensee can reduce personnel exposures by 1 person-rem by taking action which costs $2,000 or less, then the ALARA clause of the regulations requires that licensee to take that action. If the action would cost more than $2,000 per person-Rem saved, the licensee is not so obligated.

2.4 In this case, MDE is claiming that the soil sample results discussed in alleged violation #1 constitute *prima facie* evidence of an ALARA violation. However, Neutron has repeatedly shown that the person receiving the highest dose from the contaminated soil receives less than 3 millirem per year therefrom. For the purposes of this analysis, assume that the cumulative exposure attributable to the soil for all members of the public is 10 mrem/year, a number which is higher than credible. If Neutron could entirely eliminate its releases and remove all of the contaminated soil, as MDE requires, then it would reduce exposures by 10 mrem/year. Using the $2,000 per person-rem figure provided in NUREG 1530, ALARA dictates that if Neutron could do this for less than $20 per year, it is obliged to do so.

2.5 In fact, even though there is no off-setting public health and safety benefit to be derived therefrom, by the measures noted in 1.5 through 1.8 above, Neutron has devoted many times the $20/year of human and material resources required by ALARA in a dedicated effort to ameliorate its inability to comply with the extra-regulatory license condition at issue here (22.B).

2.6 MDE also claims that Neutron's shipment of radioactive waste is not ALARA. Again, MDE's claims are not supported by facts or analysis. Neutron's previous analysis was based on experience gained during the two significant RadWaste shipments of 1990, during which Neutron employees received more than 60 person-rem of exposure. The schedule proposed by MDE in License Condition 21 would require several similar shipments, thereby causing Neutron's employees to incur significant additional occupational exposure. Neutron estimates that, as a result of these shipments, approximately 0.5 person-rem/year of public exposure would be saved. Thus, MDE's requirement would be clearly counter-ALARA based on radiation exposures alone, and when monetary costs are factored into the equation, it would be even more so.

2.7 Again, the measures which Neutron has taken over the past few years have been effective

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at steadily reducing both the material exposures of employees and the inconsequential exposures of members of the public. The data for the past several years of the Dickerson resident receiving the highest exposure from Neutron's operations are presented graphically in Figure 3. The significant decrease in the year 2000 is primarily attributable to the North Waste Room reorganization conducted in December, 1999 at a cost in terms of employee exposures and dollars expended which was much higher than justified by ALARA.

2.8 We are concerned by MDE's final statement in alleged violation #2, which reads:

> "In spite of curtailed source-manufacturing activities, NPI continues to release cobalt-60 into the environment in an uncontrolled manner."

From this statement, it appears that MDE believes that the best way to eliminate the release of off-site contamination is to minimize Neutron's source fabrication activities, a pretext which has no factual support and which leads MDE to acts and omissions which violate the Atomic Energy Act, Section 8-102 of the Environment Article, and Executive Order 01.01.1996.03. Neutron's alternative approach, which has been to attempt to reduce the amount of contamination in the LAA and to improve the efficiency of the portions of the facility designed to capture that contamination if it does leave the courtyard, allows Neutron to operate its business in moderate-to-wide margin conformance with the regulations (including ALARA) prudently directed to protecting the public health, employee safety and the quality of the environment without unduly discouraging the production and use of atomic energy in the public interest.

Corrective Action

2.9 Although not obligated to do so by ALARA as described above, Neutron will continue its efforts to further reduce its inconsequential releases of radioactive material and exposures of members of the public. However, it cannot do so in good conscience at the expense of significant, unnecessary radiation exposures of its own employees, or unreasonable financial cost. The ALARA program will continue to be administered by the Radiation Safety Officer for the -01 license and reviewed by top management.

Corrective Action Requested of MDE

2.10 We respectfully suggest that MDE perform a cost-benefit analysis to quantify:

> the benefit to the public health and safety (at $2,000 per person-Rem saved) to be derived if Neutron were to literally comply with the limits imposed by ERLC 22.B(2); and
>
> the cost of such compliance to Neutron, vis-a-vis its cost of maintaining a more or

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less status quo rate of decrease by the performance of periodic stone trap, dry-pond and downstream soil removal, and rip-rap decontamination maintenance.

We are confident that the result would be edifying to MDE, to the Dickerson public, and to the NRC and EPA, and we would cheerfully cooperate in such an effort to whatever extent is required to effect a constructive and eye-opening result for all interested parties.

Alleged Violation #3 states:

"3. Section C.31 titled, 'Specific Terms and Conditions of License' and License Condition 21.B requires that within 90 days of the issuance of the license, NPI must submit to the Department for approval a comprehensive plan for disposal of all low level radioactive wastes in accordance with those specifications defined in this condition:

"Contrary to Section C.31 and License Condition 21.B, NPI's low level radioactive waste plan was submitted to MDE on December 10, 1999; however, upon review it was found to be inadequate and as of this date a comprehensive plan acceptable to the Department has not been submitted. Deficiencies in the plan were discussed in a Departmental letter dated March 20, 2000, but NPI has not adequately responded to it. On October 20, 2000 the RHP received NPI's Decommissioning Plan dated October 27, 2000 which included a planned schedule for radioactive waste shipments. The RHP has reviewed this plan and determined that it is inadequate because it does not demonstrate compliance with the current radioactive material license waste disposal criteria. Table 2.1 of this plan describes a 12 year shipment schedule for only a small fraction of the total activity of current radioactive waste inventory. The plan did not describe the shipment schedule and protocol for the contaminated soil in storage. All radioactive waste that was generated prior to August 1999 is required to be shipped for disposal by August 2004. This is a **REPEAT** violation from the Departmental inspection of November 1999."

Response

3.1 As you know, Neutron is contesting this license with particular emphasis upon Condition 21 because, as written, it would cause Neutron to incur inordinate financial costs and expose its employees to unnecessarily high levels of radiation exposure, thereby forcing Neutron into clear violations of ALARA as defined in both NRC and Maryland regulations. At the present time, Neutron recognizes that this license is in effect, it is attempting to abide by those conditions which it is practical to satisfy, and we will require State cooperation for those which cannot be satisfied.

3.2 The only facility currently available for much of our RadWaste is the Chem-Nuclear facility in Barnwell, South Carolina, and its continued availability to Maryland licensees is far from certain. As you know, Maryland (as well as most of the other states in the country) has failed to

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comply with the Low Level Waste Policy Amendments Act of 1985 (the "LLWPAA") which obligated each state to provide disposal facilities for low level RadWaste generated within its borders or region. This failure on the part of the states has produced a tenuous situation which places our future ability to send RadWaste to Barnwell in doubt and which has emboldened the State of South Carolina to impose a tax on out-of-state RadWaste that is clearly designed to punish the licensees of other states for the failure of their State Governments to comply with the LLWPAA, and considerably increase the cost of disposal for licensees such as Neutron. Although we are encouraged by the attempts made by Envirocare of Utah to accept all Class A waste, they are not yet accepting such waste in their containerized Class A disposal cell, and they have not finalized their pricing structure.

3.3 Despite all of the uncertainties, both the waste disposal plan and the decommissioning plan we submitted are practical, and explain how we would dispose of waste generated by continuing operations as well as waste currently on-site. We would welcome an opportunity to meet together with MDE, the NRC, and other appropriate parties to arrive at a mutually agreeable remedy.

3.4 It is true that although Table 2.1 of the decommissioning plan addresses the largest volume component of Neutron's RadWaste inventory, it only addresses a small fraction of the activity component of that inventory. This is primarily due to the high curie surcharge associated with disposal at Barnwell, which is structured in such a way as to encourage licensees such as Neutron to maximize the extent of disposal by decay and minimize the number of shipments. For example, as graphically illustrated in Figure 4, the cost of one shipment containing 4,500 Ci has a small fraction of the surcharge associated with 90 shipments containing 50 Ci each, as suggested at one time by MDE. Thus, Neutron has planned the "Big Shipment" at the end of its decommissioning plan, rather than a series of moderate activity shipments in the interim. Such an approach is clearly ALARA because:

> most of the activity at issue is encapsulated and stored in pools and canals where it is well-shielded and contributes nothing to the radiation dose rate or the level of risk within the facility or in the community;
>
> any time we ship significant amounts of high activity waste, we are likely to incur increased personnel exposures, so consolidating all the high activity waste in one such shipment helps to minimize personnel exposures; and,
>
> allowing the waste to decay for as long as practical before shipping it for disposal will reduce the occupational exposure of our employees in preparing the shipment, reduce the hazards of the transport itself, and will reduce the handling hazard and any associated occupational exposure at the disposal site.

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3.5 In this NOV, MDE is insisting that all RadWaste generated before August, 1999 be shipped by August, 2004. By taking this inflexible position, MDE puts Neutron in an impossible situation because either it must defy MDE's wishes and not ship all of its waste by that deadline, or it must violate the ALARA provision of the regulations and cause its employees to incur significant, unnecessary, easily avoidable radiation exposures and cause itself to incur unbearable financial costs. Given that choice, we will risk the license violation to the extent required to conserve our material and human resources at no credible risk to the public health and safety. Preferably, as you know, we will appeal this and other extra-regulatory license conditions to higher authorities as necessary and, in the interim, we are always available to negotiate genuinely practical alternative License Conditions.

3.6 Regarding the shipment of contaminated soil, as MDE is aware, the contained activity is so low that the packaged soil provides effective shielding, and we have been using it in that capacity for several years. Among other things, it has been an effective tool in our efforts to reduce exposures to members of the public and our own employees.

3.7 Furthermore, guidance provided by the NRC in its License Termination Rule indicates that ALARA should be used when determining the extent of remediation and waste disposal to be conducted, including the oft-repeated statement that:

> "[d]etermination of the levels which are ALARA must take into account consideration of any detriments, such as traffic accidents, expected to potentially result from decontamination and waste disposal."

An ALARA analysis shows that shipping the contaminated soil would cost a substantial amount of money with no off-setting radiation health benefit because shipment of all contaminated soil would actually increase dose rates both within the facility and in the community due to loss of convenient and inexpensive shielding. When other detriments (such as the increased potential for traffic accidents) are considered, the ALARA analysis recommends even more strongly against shipping the soil for disposal, as distinguished from allowing it to decay to inconsequence and using it constructively in the interim.

3.8 That said, in order to attempt to satisfy what it considers to be unreasonable demands on the part of MDE, Neutron has been in discussion with Envirocare regarding the possible shipment of contaminated soil and, in the event that becomes necessary or desirable, Neutron has provided for such shipments in its decommissioning plan. RHP's insinuations that unshipped RadWaste constitutes an ALARA violation are strongly contradicted by available data which indicates that both occupational and public exposure have been significantly and more or less continuously reduced over the last 5 years pursuant to Neutron's much more viable approach to both ultimate decommissioning and interim waste disposal.

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Corrective Action

3.9 As you know, we will file an appeal with the Court of Special Appeals concerning the validity and appropriateness of this condition. We recognize this as a major point of contention between MDE and Neutron and we hereby request a face to face meeting, preferably in the presence of mutually agreeable people from NRC and DBED, to attempt to explain our position, better understand your position, and hopefully resolve our differences. Recognizing that your inspectors are not authorized to change this condition, in order to have a useful meeting, MDE top management should be present.

3.10 At some point, the State of Maryland may well have to come to grips with the consequences of MDE's errors and omissions in all of this, and at that point, it may well become as interested as Neutron in a truly viable approach to RadWaste Management and ultimate disposal. In that regard, we have presented a series of proposals, all arbitrarily rejected by MDE without well reasoned cause. Nevertheless, each of them were technically and economically viable in both the short term and long term, and were well designed to cope with the technical and economic uncertainties arising from the fact that the field of RadWaste management and disposal still lacks sound standards and effective competition for the safe and efficacious long term management and ultimate disposal of the type of RadWaste at issue between us.

3.11 Meanwhile, based upon inapplicable assumptions rather than a rational and clearly described plan of attack, your chosen consultants have proposed an inordinately expensive and destructive approach to the timely decommissioning of the facilities used under the 01 License, and have failed to consider and include much more viable alternatives. All things considered, we respectfully suggest that the public would be best served if you would accept our invitation for a meeting without further delay to discuss practical ways and means of making our clearly more viable alternative acceptable to RHP or some other regulatory authority more constructively inclined.

Alleged Violation #4 states:

> "4. Section C .29(c)(2) titled, 'Financial Assurance and Recordkeeping for Decommissioning' requires, in part, that each licensee who is a holder of a specific license issued before October 15, 1998 and of a type described in paragraph (a) of C.29 must submit, on or before October 15, 1998 a decommissioning funding plan or a certification of financial assurance for decommissioning in an amount of at least equal to $750,000. Also, the requirements of Section C.29(g)(2) requires that no person shall receive, possess, use, transfer, own, or acquire radioactive material of a type described in paragraphs (a) and (b) of C.29 for more than 180 days following the dates prescribed in the section for submittal of a decommissioning funding plan or certification, if the decommissioning funding plan or certification has not been approved by the Agency:

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> "Contrary to Section C.29(c)(2), NPI has not met the $750,000 certification by the specified dates of this regulation. Furthermore, NPI's decommissioning funding plan has not been approved by the Agency. Pursuant to NPI's failure to provide an adequate decommissioning funding plan or the $750,000 certification by April 13, 1999 (180 days post October 15, 1998) NPI has continued to receive, possess, use, transfer, own, or acquire radioactive material of a type described in paragraphs (a) after the 180 day (April 13,1999) deadline. This is a **REPEAT** violation from the Departmental inspection of November 1999 and the February 2000 [*sic*]."

Response

4.1 As MDE is well aware, its adamant refusal to replace C.32 with the NRC's License Termination Rule ("LTR") made it totally impractical for Neutron to post a cash equivalent deposit of $750,000 as required by C.29(c)(2). Moreover, MDE's equally adamant refusal to adopt Appendix D prevented Neutron from complying with the financial assurance regulations, even though it had demonstrated the wherewithal to satisfy the financial strength requirements of the NRC's then newly adopted regulation.

4.2 Finally, had Neutron posted the required $750,000 deposit, MDE's arbitrary rejection of its $650,000 to $1.3 million Decommissioning Plan, combined with MDE's ostensible adoption of its consultant's plan (estimated to cost of $6.5 million to $21 million) would have enabled it to demand that Neutron post an additional $6 million to $20 million of cash equivalent funding assurance or forfeit its $750,000 deposit, a set of circumstances clearly designed to discourage both initial and continuing compliance.

4.3 Thus, we are contesting MDE's ongoing attempt (based on the provisions of C.29) to prematurely terminate our -01 License and confiscate our property without any credible prospect of benefit to the public health and safety or the environment. Initially, Judge McGuckian issued an Order as a result of a Hearing on our Cross Motions for Preliminary Injunction, under which we operated for nearly a year and a half to the well-demonstrated benefit of all affected parties including the State and its taxpayers.

4.4 Subsequently, MDE successfully prosecuted a Motion for Summary Judgment to obtain a Permanent Injunction preventing continued operations from being conducted under Neutron's -01 License. That Motion was modified by Judge Rupp to allow Neutron to continue to operate under conditions similar to those Ordered by Judge McGuckian, pending the outcome of its appeal; and we will continue to operate in accordance with those modifications to the best of our ability.

4.5 Regarding the decommissioning funding plan which has not been approved by the Agency, we submit that a face to face meeting to discuss the plan submitted by Neutron last October is

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long overdue and we hereby request such a meeting, preferably including prospectively helpful third parties and MDE top management, so that we can better understand each other's position and hopefully arrive at a practical course of action.

Corrective Action

4.6 Under all of the circumstances, the best corrective action we can take is to put the facility in a better position to be decommissioned and to put the company in a better position to perform that decommissioning (if, as and when it becomes necessary). Meanwhile, against all odds, we have continued to generate a positive cash flow, retire debt, improve the radiological condition of the facility, and demonstrate our on-going ability to self assure with the hope that, at some point, MDE will work with us to benefit the public interest, as is required by common sense, all duly promulgated laws and regulations, and its pledge as part of the 1994 Settlement.

Alleged Violation #5 states:

> "Section J.11(a)(4) titled, "Posting of Notices to Workers" requires, in part, that the licensee post any notice of violation involving radiological working conditions and any response from the licensee.
>
> "Contrary to Section J.11(a)(4), NPI failed to post their February 12, 2001 compliance response to the January 19, 2001 Departmental letter-Notice of Violation which described numerous violations found during the September 18-20, 2000 radioactive materials inspection."

Response

5.1 The provisions of Section J.11 require that employees have access to:

- -- applicable regulations;
- -- radioactive materials licenses, including amendments and incorporated documents;
- -- operating procedures;
- -- notices of violations, proposed fines, orders, etc.; and,
- -- our response to the notice of violation.

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As MDE is aware, proper postings have been made so that Neutron employees have access to the regulations, the licenses and the operating procedures. Specific to this alleged violation, the Notice of Violation itself, which described the violations, was posted on 4 different bulletin boards throughout the plant, providing ample access to all employees. While it is true that our response to those violations was not posted, copies of such documents are available to any employee requesting to see them.

Corrective Action

5.2 We will be more vigilant in our efforts to include our responses on the bulletin boards. Checking the postings on a monthly basis has been added to the corporate calendar and is the responsibility of Cathy Bupp.

Alleged Violation #6 states:

> "Section D.101 titled, "Radiation Protection Programs" requires in part, that each licensee review the radiation protection program content and implementation at intervals not to exceed 12 months.
>
> Contrary to Section D.101, NPI failed to conduct the annual review of the radiation protection program content and implementation for the calendar year 2000. Specifically, NPI has not conducted a review of the radiation protection program, content and implementation within the last 12 months."

Response

6.1 As MDE is aware, the review of the radiation protection program is an on-going process which is fairly extensive for the 01 license. The annual review for the year 1997 was completed on August 7, 1998; the report for the year 1998 was completed on August 7, 1999; and the report for the year 1999 was completed on June 2, 2000. The review for the year 2000 was completed on August 16, 2001. It is true that this is slightly more than 12 months since the last review. However, it is in keeping with the timeframe by which the review has historically been conducted.

Corrective Action

6.2 The review for the year 2000 has been completed, a copy of which is available for inspection.

6.3 In future years, the target date for completion of the annual review will be June 30, and the RSO for the 01 license will be responsible for ensuring that the review is completed on

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schedule.

Alleged Violation #7 states:

> "Section D.302(b)(ii)(1) titled, "Compliance with dose limits for Individual Members of the Public" requires the licensee to show compliance with the annual dose limit for individual members of the public.
>
> "Contrary to Section D.302(b)(ii)(1), NPI failed to demonstrate by measurement, or calculation, or appropriate simulation model that the total effective dose equivalent to the individual likely to receive the highest dose from the licensed source of radiation does not exceed the annual dose limit as described in Section D.301 for the calendar year of 2000."

Response

7.1 It is obvious to anyone making the most cursory review of the dosimetry and with knowledge of the pertinent facts as were afforded RHP during the inspection that not only was Neutron in wide margin compliance with the 100 mrem limit, but that dose to the most highly exposed cohort was significantly reduced from that experienced in 1999 and previous years.

7.2 In fact, such an evaluation was performed and included in Figure 3 of Neutron's letter to MDE dated February 12, 2001, which estimates the dose to the most highly exposed member of the public for the year 2000 to have been 43 mrem, if he had resided in the house at issue for the entire year, which he did not. So, as of February 12, MDE was aware that Neutron had performed the necessary calculations to demonstrate that it was in compliance with the annual dose limit as described in Section D.301 for the calendar year of 2000.

7.2 The final evaluation included in the annual review shows the highest exposed member of the public actually received 30 mrem for the year 2000.

Corrective Action

7.3 No corrective action is required. Please rescind the citation.

Alleged Violation #8

Section D.902 titled, "Posting Requirements" which requires the licensee to post each radiation area with a conspicuous sign or signs bearing the radiation symbol and the words "CAUTION, RADIATION AREA" (CRA). Section D.902 requires the radiation symbol to use the colors magenta, purple or black on a yellow background.

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a. Contrary to Section D.902 and D.901, NPI failed to post the required "CAUTION, RADIATION AREA" sign in the radiation area located near the windows of the welding shop.

b. Contrary to Sections D.901 and D.901, NPI failed to properly post the radiation area located near the blue Sealand type container in the courtyard area of the LAA. The CRA sign was not conspicuous because it was rusted out and almost illegible. The sign did not have a yellow background and the radiation symbol was not visible.

Response

8.1 As MDE is well aware, the blue Sealand container is within the Limited Access Area and its contents are well known to the few people who have access to the container. Consequently, although the markings on the posted sign were worn, there were no potential adverse consequences as a result. The sign has now been reposted.

8.2 Due to preparations for the RadWaste shipment in June, some waste was temporarily stored in such a way as to increase the dose rate at the weld shop windows to above 5 mr/hr. We had been periodically surveying the area and the previous survey had shown the dose rates below 5 mr/hr, so the "Radiation Area" signs had been removed. However, they were evidently removed prematurely as subsequent developments again created radiation areas around the windows as your inspectors observed on June 13. Although the increased exposure received by weld shop personnel was minimal, in retrospect, the signs should not have been removed until the shipment had been made.

Corrective Action

8.4 We have reposted the blue Sealand container and the windows in the weld shop were reposted until after the RadWaste shipment, at which time the radiation areas were no longer present. No additional corrective action is contemplated at this time.

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Alleged Violation #9

Section D.902(a) titled, "Labeling Containers and Radiation Machines" requires in part, the licensee to ensure that each container of licensed radioactive material bears a clearly visible label bearing the radiation symbol and the words "CAUTION, Radioactive Material or "Danger, Radioactive Material".

NPI failed to properly label drums of soil containing cobalt-60 located in the courtyard area of the

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Limited Access Area with a clearly visible label bearing the radiation symbol and the words "CAUTION, Radioactive Material" or DANGER, Radioactive Material." Inspectors observed drums with no labels at all. Furthermore, the drums were stored outside, unprotected from the sun, wind, rain, snow, ice and extreme temperatures.

Response

9.1 As RHP is well aware, the contamination levels in the soil are so low that, far from being a source of increased dose rate, the drums of soil actually provide effective shielding. In addition, all of the drums are within the LAA, and the few people who actually have access to the drums are well aware of their contents.

9.2 That said, drums and/or areas have been relabeled in accordance with COMAR D.901-905.

9.3 In addition, inspection of the physical condition of the drums has shown their integrity to be intact, despite the visual appearance of rust on some of them.

Corrective Action

9.4 No additional corrective action is anticipated at this time.

Alleged Violation #10

Section D.501 titled, "Surveys and Monitoring-General" requires a licensee to make or cause to be made, surveys that are necessary under the circumstances to evaluate radiation levels, concentrations or quantities of radioactive material and the potential radiological hazards that could be present. License condition 22.C. requires NPI to conduct floor monitoring surveys on all surfaces within the facility outside of the LAA.

Contrary to the requirements of Section D.501 and License Condition 22.C, NPI failed to conduct floor monitoring surveys of the welding shop during the calendar year of 2000 and the first five months of 2001. Furthermore, no floor monitoring survey records of the welding shop were available for inspection.

Response

10.1 As RHP is aware, the original portal monitor used to frisk those leaving the LAA was designed to detect 1 μCi of contamination, which is the exempt quantity for cobalt-60. Therefore, at that time it was not unusual or unexpected to find contamination less than 1 μCi

outside the LAA.

10.2 After RHP gave Neutron permission to install the new, much more sensitive portal monitor (the HECM) in 1989, our contamination control program was substantially improved. Initially, the monthly floor survey schedule made sense because we were still finding contamination which presumably left the LAA before the HECM was installed. However, it has now been more than 5 years since the monthly surveys have revealed contamination in the parts of the building outside the LAA attributable to ongoing LAA operations and we hereby request that the monthly requirement be changed to quarterly.

10.3 Regarding the specific violation, the weld shop is not part of the contiguous building floor plan upon which the floor survey schedule was developed and it was simply an oversight to leave it off the survey schedule. The area in question represents approximately 3% of the building area.

10.4 Furthermore, it is not as if the radiological condition of the weld shop is never assessed. In the fall of 1999, extensive smears were taken of surfaces in the weld shop and no contamination was found. Those records are enclosed for your review.

Corrective Action

10.5 A thorough floor survey was conducted in the weld shop. No contamination was found. In addition, the weld shop has been added to the routine monthly surveys. Cathy Bupp is responsible for ensuring that floor surveys are conducted.

Alleged Violation #11

Section D.1101 titled "Records-General Provisions" requires the licensee to use units of becquerel, grey, sievert, coulomb per kilogram, disintegrations per minute, rad, rem and roentgen and clearly indicate the units of all quantities on records required by Part D.

Contrary to the requirements of Section D.1101, the results soil sample surveys dated February 1, and 21, 2001, March 9, 2001, April 25, 2001, and May 16, 2001 were maintained in units of gross counts instead of picocuries. Furthermore, the efficiency of the counting system was not documented on the survey records. As a result, the records did not identify the samples which exceeded the 8.0 picocurie per gram limit.

Response

11.1 Historically, data from the routine soil samples taken each month have been recorded in units of net counts per minute. Although this method does not distinguish cobalt-60 from

naturally occurring radionuclides present in the soil, evidence of cobalt-60 contamination was readily apparent simply due to increased counts. This method has been in use for several years and, as far as we know, has never been objectionable to RHP. However, we have now implemented a program to count the routine monthly soil samples using the multichannel analyzer, thereby allowing us to distinguish cobalt-60 contamination and use RHP's desired units of pCi/g.

11.2 In addition, when RHP inspectors expressed their desire to have the soil sample data expressed in pCi/g, Neutron representatives performed the necessary calculations within approximately 15 minutes for those samples which had been counted on the multichannel analyzer. These soil samples were in addition to the routine monthly samples referenced in the citation.

11.3 It is common health physics practice for certain types of surveys (e.g., "frisking") to be conducted with instruments reporting in counts per minute ("cpm"). In these cases the survey is used to indicate the presence of contamination by comparison to background and/or historical precedent. Such surveys are not used to establish exposure records or otherwise show compliance with regulatory limits and a requirement to reduce count rates to standard units is neither warranted, useful, nor generally practiced. These surveys are of a more qualitative than quantitative nature. Our monthly sampling of soil serves much the same purpose as a qualitative alert to the presence of contamination in unexpected areas, or unexpected changes in levels of contamination. Neither of these functions is necessarily better served by reporting in standard units.

Corrective Action

11.4 The health physics technician responsible for soil samples has been trained on the operation of the multichannel analyzer and the routine July samples were analyzed in that manner, so that the results are expressed in terms of pCi/g. Bill Ransohoff is responsible for ensuring that this practice continues.

Alleged Violation #12

Section C.31 titled "Specific Terms and Condition of License" and License Condition 17.A. require in part, a Health Physics Technician to ensure the proper use of the portal monitor, hand held frisker and any other devices employed to detect levels of radioactivity present on persons or items which exit the LAA. License Condition 37 and Procedure R 2029 dated June 14, 1989 titled "Procedure For Exit From The Limited Access Area" requires in part, for one to frisk themselves or have a Health Physics Technician frisk them at the pancake probe frisking station located at the entrance to the clean shower room. Procedure R 2028 dated February 7, 1991 requires in part, for one to verify that the rate meter and the pancake probe in the clean room is

operational prior to entering the LAA.

Contrary to the requirements of Sections C.31 and License Condition 17.A., the technician failed to ensure the proper use of the hand held frisker. The RSO failed to verify that the rate meter and the pancake probe located at the frisking station at the entrance to the clean shower room, were operational prior to entering the LAA. Upon exiting the LAA on June 13, 2001, MDE Inspectors identified that the hand held frisker was not operational, and it failed to respond to a radiation check source. Upon further review, it was determined that the detector was broken. Although a back up system was available, the RSO bypassed the clean shower room frisking station instead of replacing the defective detector. Then he walked through the clean shower room and used the frisking station located at the Helguson monitor.

Response

12.1 At the time of the inspection, we were preparing for the waste shipment and there was additional RadWaste temporarily stored in the LAA, thereby increasing the background in the cave. The RSO mistakenly attributed the higher readings on that frisker to those unusual circumstances and we appreciate RHP's role in identifying the actual problem.

12.2 However, we believe the seriousness of this infraction (and that of the RSO bypassing the clean shower room) should not be elevated to an actual violation for the following reasons:

1) by the time the LAA entrants reach the frisking station on their way out, they have already removed their coveralls and changed their shoe covers, so the most likely sources of contamination have been removed; and,

2) the effectiveness of this system is demonstrated every working day, when at least 6 smears are taken from the clean room/transition room area, which includes the entrance room, the HECM and shower area, the area around the frisker, and the transition room/locker room which borders the LAA proper. If any smear is found to have removable contamination in excess of the 440 dpm/100 sq.cm clean room standard, it is promptly decontaminated.

12.3 So, the cleanliness requirement throughout the entire clean room/transition room area is the same stringent standard of 440 dpm/100 sq.cm. Finding removable contamination in any of these areas is a rare event. Since there were 2 additional friskers located in the clean room in different locations, the RSO's decision to use one of the other ones was perfectly reasonable and, by moving to one of the other frisker locations, he did not increase the risk of the spread of contamination in any material way.

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12.4 Upon finding that the instrument was, in fact, not working correctly, the RSO immediately

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undertook an investigation and determined that the Ludlum 177 itself was sporadically malfunctioning.

Corrective Action

12.5 The ratemeter was returned to the manufacturer for diagnosis and repair, and, in the interim, was replaced with an alternate meter. No additional corrective action is contemplated at this time. Please rescind the citation.

Alleged Violation #13

Section C.31 titled, Specific Terms and Conditions of License", License Condition 37 and Procedure 2028 titled "Procedure For Entrance To The Limited Access Area" prohibits eating, drinking, and smoking in all parts of the LAA. The June 23, 1988 Departmental Order states that the licensee shall immediately stop eating, drinking and smoking in the offices and work areas of the LAA.

Contrary to Section C.31 and License Condition 27, on June 13, 2001, RHP inspectors found evidence that NPI employees were feeding a cat and a litter of kittens in the courtyard area of the LAA. Specifically, the inspectors observed a plate with chocolate cake that was passed through a window from the welding shop into the LAA. The RHP inspectors instructed the RSO to remove the feline family from the LAA; however, on June 28, 2001 the cat and her litter were still living in this area where radioactive materials are stored.

Furthermore, on June 28, 2001 inspectors found evidence of food and drink in the Helguson monitor counting room, a room adjacent to and with direct access to the LAA. Specifically, a cracker wrapper was found on the floor and circular stained rings were found on the top of a cabinet. Also, disposable coffee cups, cracker wrappers and paper towels soaked in coffee were found in the waste can.

Response

13.1 The cat and her kittens were in an area of the LAA isolated from routine use, and unlikely to have appreciable levels of contamination. The kittens were trapped, counted out on the HECM, found to be free from contamination, and given a new home off the property. The cat was trapped, counted out on the HECM, found to be free of contamination, spayed, and returned to Dickerson.

13.2 Eating and drinking within the LAA, even the clean room, is not permitted. Knowing this, entrants to the clean room will often finish their snacks and/or drinks outside the door and throw

the trash in the trash can in the clean room. This is not *prima facie* evidence of eating or drinking within the LAA.

13.3 If the clean room were contaminated to any extent, and if we had been experiencing a significant number of ingestion incidents, then there might be some basis for RHP inspectors to sift through our trash in an effort to establish a causal violation. However, considering the circumstances which have actually existed for several years, focusing inspection efforts on such minutiae is terribly counterproductive for our Radiation Protection Program because it degrades our regulators and forces us to divert our attention from what could be a significant radiological issue to something which so clearly is not.

Corrective Action

13.4 No additional corrective action is contemplated at this time, other than to respectfully request that this citation be withdrawn.

Alleged Violation #14

Section C.31 and License Condition 21.B.5. require NPI to provide the RHP and MDE's Hazardous and Solid Waste Management Administration copies of radioactive waste shipment records within 14 days of shipment date.

NPI failed to provide the RHP and MDE's Hazardous and Solid Waste Management Administration copies of the June 23, 2001 radioactive waste shipment records within 14 days of shipment.

Response

14.1 After making the shipment, we reviewed the COMAR regulations and found no notification requirement. However, as correctly cited above, there is such a requirement in our license. When the RHP inspector called to request the information, it was promptly faxed to him.

14.2 The RHP inspection occurred on June 13 and June 28, between which dates we made the referenced waste shipment. We made no secret of the shipment and RHP was well aware of it during the second day of the inspection. Yet instead of requesting the information at that time, the inspectors waited until the 14 days had passed so that an NOV could be issued.

Corrective Action

14.3 The required documentation has been sent to RHP. No additional corrective action is

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contemplated at this time. Kindly downgrade the citation to an observation.

Concern #1 states:

"NPI possesses five (5) teletherapy heads with 'stuck' cobalt-60 sealed sources (in the shielded position) located in the courtyard area of the Limited Access Area (LAA). Please include with your compliance response, what NPI plans to do about this situation. Include what measures will be taken to try and recover the sources or plans for disposal of the units. Radioactive material once determined to be useless and of no demonstrated economic value, is considered waste and should be treated accordingly. Furthermore, NPI currently stores in the main pool stellite corners containing approximately 25,000 curies of cobalt-60. Since this material does not have any apparent economic value, it should be declared as radioactive waste and shipped for disposal within four (4) years in accordance with license criteria."

Response

C1.1 We have not yet performed the additional work required to attempt to extract the 'stuck' sources, but will do so at our earliest opportunity consistent with other priorities. We expect to get them into the cell during the next few months.

C1.2 Although MDE has prevented us from making useful sources out of the stellite bearings as we had originally intended, we have resumed our efforts to explore the feasibility of revitalizing the stellite program. Clearly, the program should be supported by MDE as it would convert hundreds of thousands of curies of radioactive material, now considered to be RadWaste, into useful sources.

Concern #2 states:

"Inspectors identified poor radioactive waste storage practices and conditions such as rusted drums, drums lacking retaining rings, open waste containers, waste stored in plastic bags instead of drums, inadequate containment of contamination and eight (8) damaged drums caused by over compaction."

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Response

C2.1 Inspectors did not "identify" eight damaged drums, nor did they inspect them. Rather, they falsely concluded that slight irregularities in some drums previously identified by Neutron's internal reviews were significant, despite the fact that further evaluation previously conducted by Neutron verified that the package integrity was not affected. Furthermore, there is no evidence

that the irregularities in the drums were caused by "overcompaction", as Neutron's use of the compactor is in compliance with the manufacturer's instructions and specifications.

C2.2 Due to the nature and very low activity of the RadWaste in "rusted drums" and "drums lacking retaining rings", etc., Neutron submits that these issues do not represent a health or safety issue. However, Neutron also recognizes the benefits of improving the appearance of this portion of its facility and will undertake to do so in the coming months.

Concern #3 states:

"On June 13, 2001, NPI personnel issued MDE Inspectors written safety instructions that were missing pages 2, 4 and 6 of 7 pages."

Response

C3.1 The safety instructions had formerly been printed on both sides of the page, and, the copies given to the Inspectors were only copied on one side. We appreciate RHP's assistance in identifying this error.

C3.2 Those packets with missing information have been removed and replaced with packets containing complete information.

Concern #4 states:

"It appears that NPI does not have the sufficient trained personnel, financial resources and commitment of management necessary to establish compliance with Maryland Regulations, License conditions and Court Orders."

Response

C4.1 As summarized in part C4.3, the management and employees of this tiny little company, only four in number when it accepted the invitation of Montgomery County to move to Maryland, has, with a paid in capital of less than $2 million, created, developed, maintained and applied the human and financial resources reasonably required to safely and successfully implement the constructive purposes of the Atomic Energy Act of 1954, As Amended (the "Act"). In doing so, it has generated more than $175 million in gross revenues and more than $20 million in cash flow which it has reinvested in plant, processes, equipment and human skills which it has used to produce goods and services that extend and/or upgrade the lives of millions of end-use beneficiaries to whom the retail value of said goods and services have been worth many billions of dollars.

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C4.2 Conversely, as documented in part C4.4, your program has imposed upon our operations excessively stringent, inordinately expensive, and counterproductive policies, practices, regulations, license conditions and Court Orders which do nothing to advance the public health and safety, while deny this company, its employees and all who depend upon it the legitimate fruits of our endeavors.

C4.3 The Salient Facts of Neutron's Performance Under The Act

C4.3.1 During the past thirty-five years, the management and senior staff of this company, and the employees we have hired to help us, have designed, developed, financed, built, operated, maintained and managed the complex equipment and processes required to work safely and efficiently with industrial quantities of potentially hazardous radioactive materials and chemicals to produce and deliver good and valuable products and services, all of which have extended and/or improved the quality of life for millions of people here and abroad in one way or another.

C4.3.2 Although a few of our employees have suffered conventional workplace injuries, and property damage, injury or death from the motor vehicle accidents that abound in our society, we have produced and delivered the products we make and the services we render without suffering a single radiation or chemical injury or illness in the course of several million person-hours devoted to working intensively with, and/or in the immediate vicinity of, the potentially hazardous materials which we have safely managed and used to produce and deliver a wide variety of useful products and services, each of which requires extensive quality control and quality assurance.

C4.3.3 Nor have we ever endangered our neighbors, or adversely impacted the quality of our environment (or theirs) in any credible way. In fact, we are relatively unique in the success of our experience. Whatever our shortcomings, they haven't resulted in a stuck source, an irradiator fire, a carrier-source collision, or a personal injury arising out of an entry to a hot cell or radiation processing plant. Nor have we experienced serious mishaps in the transfer of cancer therapy sources, or delivered radiation processing sources that have rusted, suffered serious pitting corrosion, or failed in routine service. Nor have those treated with our cancer therapy equipment suffered fatal accidents. Nor have our employees been seriously exposed by entering high radiation fields without due care. Nor have we released radioactive materials or chemicals to the environment in quantities, or under circumstances, that could conceivably be hazardous to persons or property.

C4.3.4 Moreover, there are few, if any, companies in our field that have not suffered, or been responsible for, one or more of the significant mishaps listed above. In fact, one of the reasons such a small and lightly financed company as Neutron has survived, is that we have a good record among those who have relied upon us, for safety, quality, reliability and the ability to commercialize genuine advances in the art of what we do.

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C4.3.5 Finally, where physically possible, we have always sought to establish and maintain a wide margin of compliance with duly constituted regulations, and, with rare and inconsequential exception, we did so until the limits changed a few years ago. Moreover, even under the new regulations, we manage to maintain decent-to-wide margins of compliance with all applicable and duly promulgated regulations, and - with RHP's cooperation - we could further improve our margins of compliance.

C4.3.6 We did not achieve the record cited above by accident, or by failing to timely address matters of genuine importance that were ours to control; and on such occasions, we have had little or no disagreement with you or any other regulator at the outset of those instances where one of us has directed the attention of the other to a genuine deficiency, however large or slight, in Neutron's program, plant or equipment. Rather, we have responded to all such occasions (and there have been several of substance) with candor, skill and alacrity, being careful to:

accurately determine and assess relevant facts; and,

evaluate the alternatives available to us, always seeking to optimize the inherently competing interests of safety, efficacy and economic viability.

C4.4 The Salient facts of MDE's Performance Under The Act

C4.4.1 Fundamentally, MDE has the right and duty to regulate Neutron as reasonably required to protect public and employee health and safety without unduly discouraging the use of atomic energy in the public interest, and we respectfully submit that MDE has failed to perform on both obligations. Specifically with regard to the public health and safety, by adopting the twin doctrines (both of them false):

a) that there is no safe level of exposure to ionizing radiation; and

b) your interpretation of the principle of ALARA to require licensees to maintain radiation exposures As Low As Possible, regardless of the cost

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you have effectively rationalized the negation of all regulatory limits, and put yourself and your inspectors in a position to be only as satisfied with licensee performance as you wish, thereby establishing a realm that is inherently arbitrary and capricious. Then, expanding upon that excess, you have imposed upon our 01 License, but never justified, Extra Regulatory License Conditions ("ERLCs") that have placed us in a more or less permanent state of non-compliance with the ERLCs throughout a period in which, with rare exception, we have been in moderate to wide margin compliance with all duly promulgated regulations.

C4.4.2 Although we have been able to weather that abuse without physical harm to other

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persons or property, RHP acts and omissions:

> have forced upon Neutron substantive financial waste, higher than justifiable employee exposures, and a gross misallocation of human and material resources from high priority matters to matters of no credible consequence to the public health and safety;
>
> have disrupted scheduled performance under Neutron's Reorganization Plan of 1987, destroyed its ability to receive unqualified audit opinions and attract outside capital; and
>
> have slandered its management and aroused unwarranted concerns among the body politic.

Further aggravating the abuse, MDE requires Neutron to receive individual authorizations for routine events and minor changes in its licensed operations, but then either delays interminably, or refuses to grant, the required authorizations except in the rare cases when it chooses to do so.

C4.4.3 Thus, with no demonstrated prospect of an offsetting benefit to the public health and safety, MDE has worked a hardship on numerous third parties, and severely compromised Neutron's ability to maximize its contributions to the common defense, the general welfare, the standard of living, and the role of competitive free enterprise in the development and commercialization of atomic energy in the public interest. As a result, we respectfully submit that, by regulating Neutron in the way that it has, MDE has flagrantly and boastfully violated both The Act and an increasing number of other state and federal laws; and we believe that you are well advised to address our concerns in that regard.

C4.4.4 Fundamentally, you have established for Neutron a licensee's permanent nightmare. In MDE Concern #4, you allege that Neutron does not appear to have the human and financial resources required to satisfy the "Maryland regulations, License conditions and Court Orders" which have been imposed upon it, and perhaps that is true. However, we respectfully submit that our inability to satisfy your demands flows not from the deficiencies you allege but from a combination of factors not of our making which comprise:

> your refusal to be satisfied by Neutron's ability to safely perform more than 3,500 high activity shipments without adverse incident, and to receive, process, fabricate, manage, ship and even recycle thousands of high activity sources containing about 50 million curies of cobalt-60 in toto, without injurious or property damage causing incident;
>
> your unfettered willingness and ability to adopt and enforce regulations and Extra Regulatory License Conditions, some of which are clearly impractical to satisfy, all of which are far more stringent than reasonably required to protect the public health and safety and/or reasonably assure compliance with duly promulgated regulations; and

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the reluctance of the lower Courts to believe that they have both the authority and the knowledge to "second guess" the State's official experts on the issue of impractical extra-regulatory stringency that has divided us with increasing hostility for more than a decade.

Regardless of our inability or unwillingness to perform the impractical, we submit that thirty four years of no-harm-done performance have amply demonstrated that Neutron has indeed developed and maintained the human and material resources reasonably required to enable it to engage in the creative, safe and efficacious use of atomic energy in the public interest for more than three decades.

C4.5 Proposed Course of Action

C4.5.1 We believe that our differences, though major, can be readily reconciled by a little more work on the part of MDE. What we strongly recommend is that you perform the analyses required by Executive Order 01.01.1996.03 on each of the contested ERLCs, and submit your written findings to Neutron and to the Department of Business and Economic Development ("DBED"), after which we propose that MDE and Neutron meet with DBED to discuss whatever differences we may have in our respective conclusions. If necessary, we could also bring in mutually agreeable representatives from NRC headquarters. The objective would be to arrive at a set of mutually agreeable License Conditions which would provide for ample protection of the public health and safety without unduly interfering with the ability of Neutron's management and employees to use their skills and creativity to further develop and commercialize the use of by-product materials in the public interest and fund the timely decommissioning of the facilities operated under its 01 license.

C4.5.2 Neither you nor we have a more legitimate objective; and more than seven years ago, as part of the January 3, 1994 Settlement package, we both pledged our cooperation in the public interest to Judge Pincus. Although MDE/OAG declared victory and salted our wounds, we have delivered on our part of that pledge as best we could in the circumstances. We respectfully submit that the time is more than ripe for you to join us in that endeavor before more damage is done.

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Concern #5 states:

"NPI has not implemented a Quality Assurance Program, for manufacturing of sealed sources, in accordance with USNRC Reg. Guide 6.9."

Response and Corrective Action

C5.1 We will soon submit the evaluation required by MDE/NRC regarding the status of our Sealed Source and Device registrations vis-a-vis the guidance provided in NUREG 1556 (Vol.3),

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after which we will revise our Quality System to comply with the requirements of USNRC Reg. Guide 6.9.

I trust that you will find this reply to be totally responsive to your letter. If, however, you require additional information or wish to discuss any of this, please give me a call.

Very truly yours,

Neutron Products, inc.

J.A. Ransohoff
President

Attachments

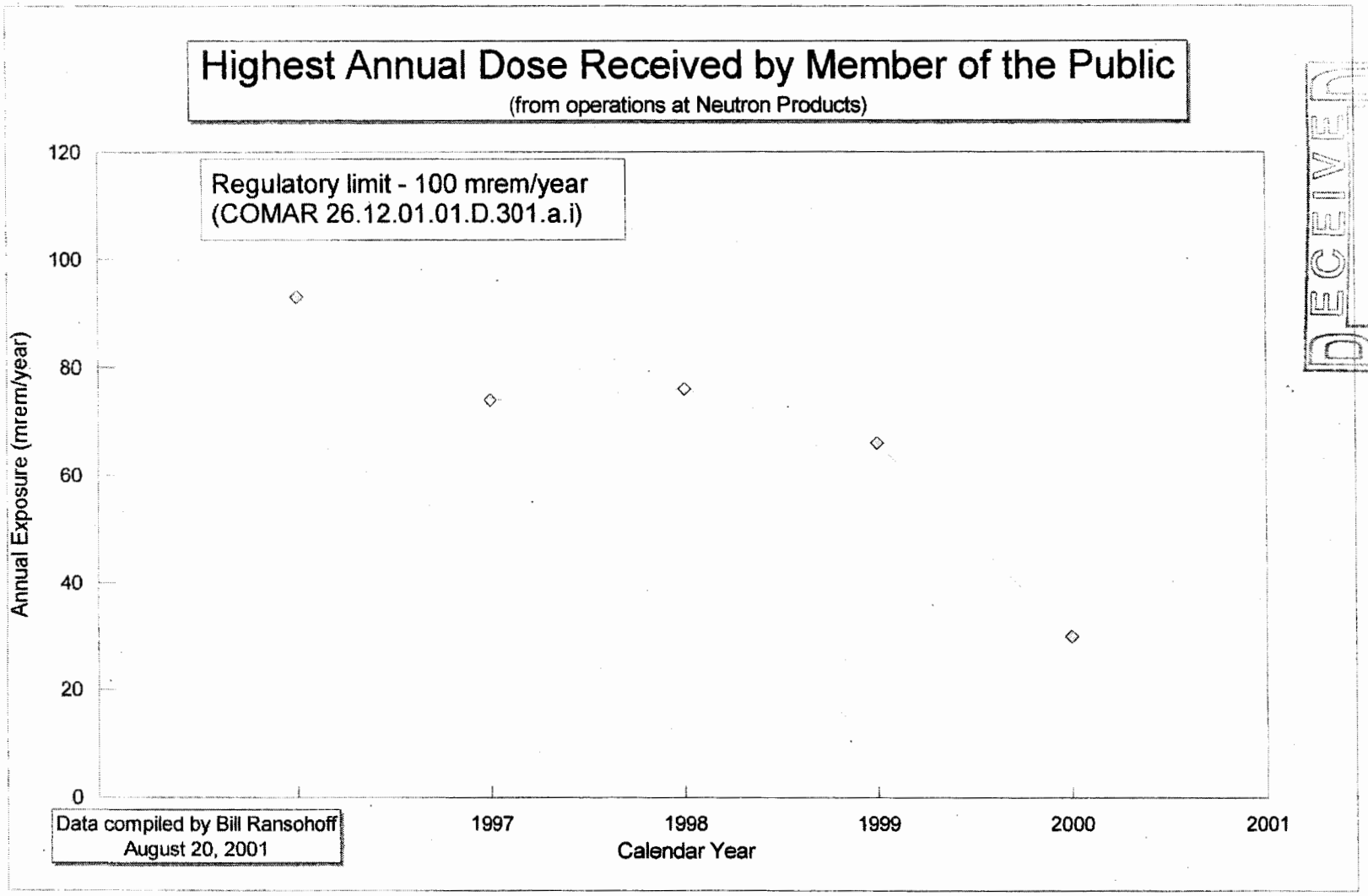

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FIGURE 3

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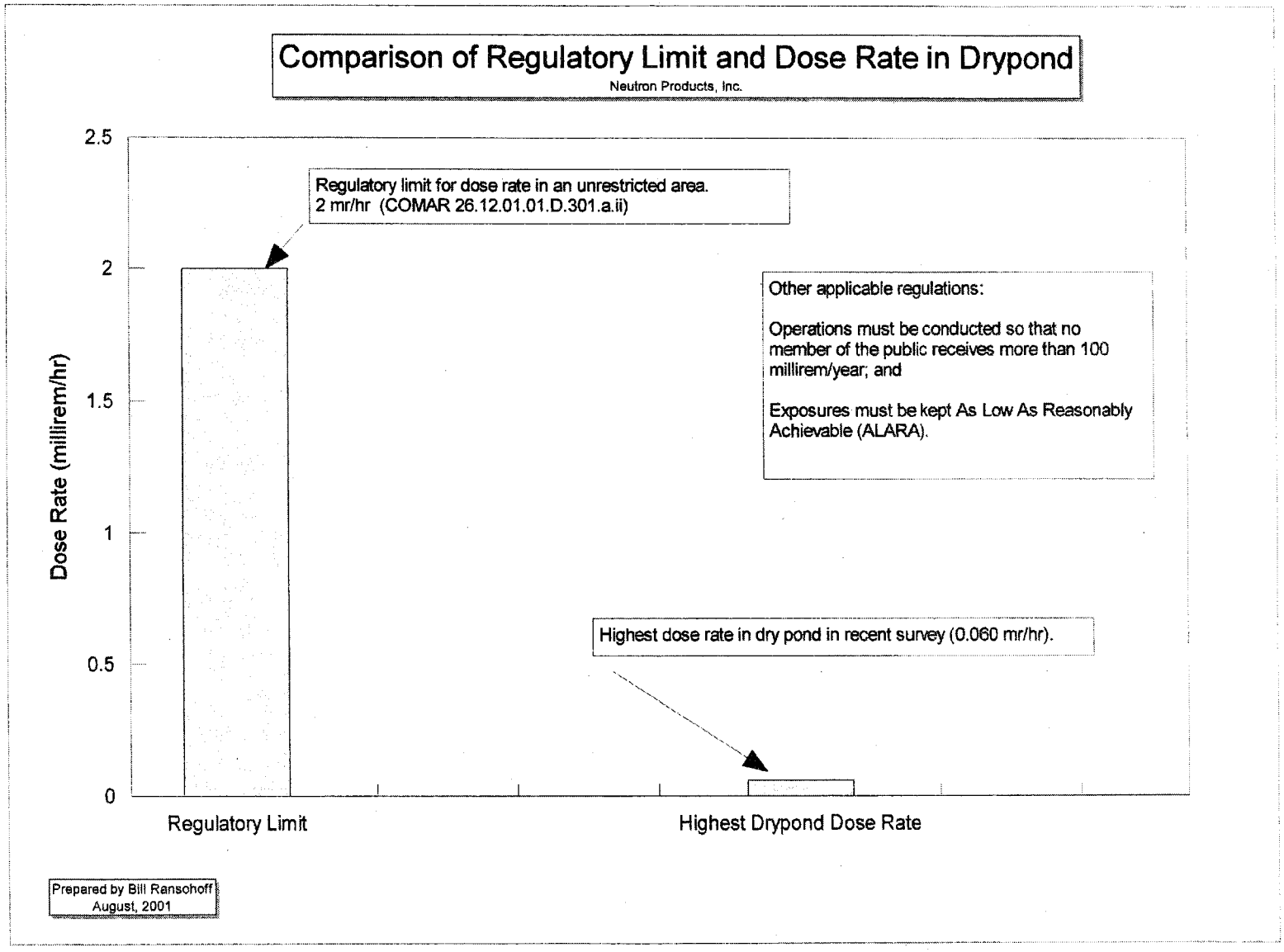

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FIGURE 1

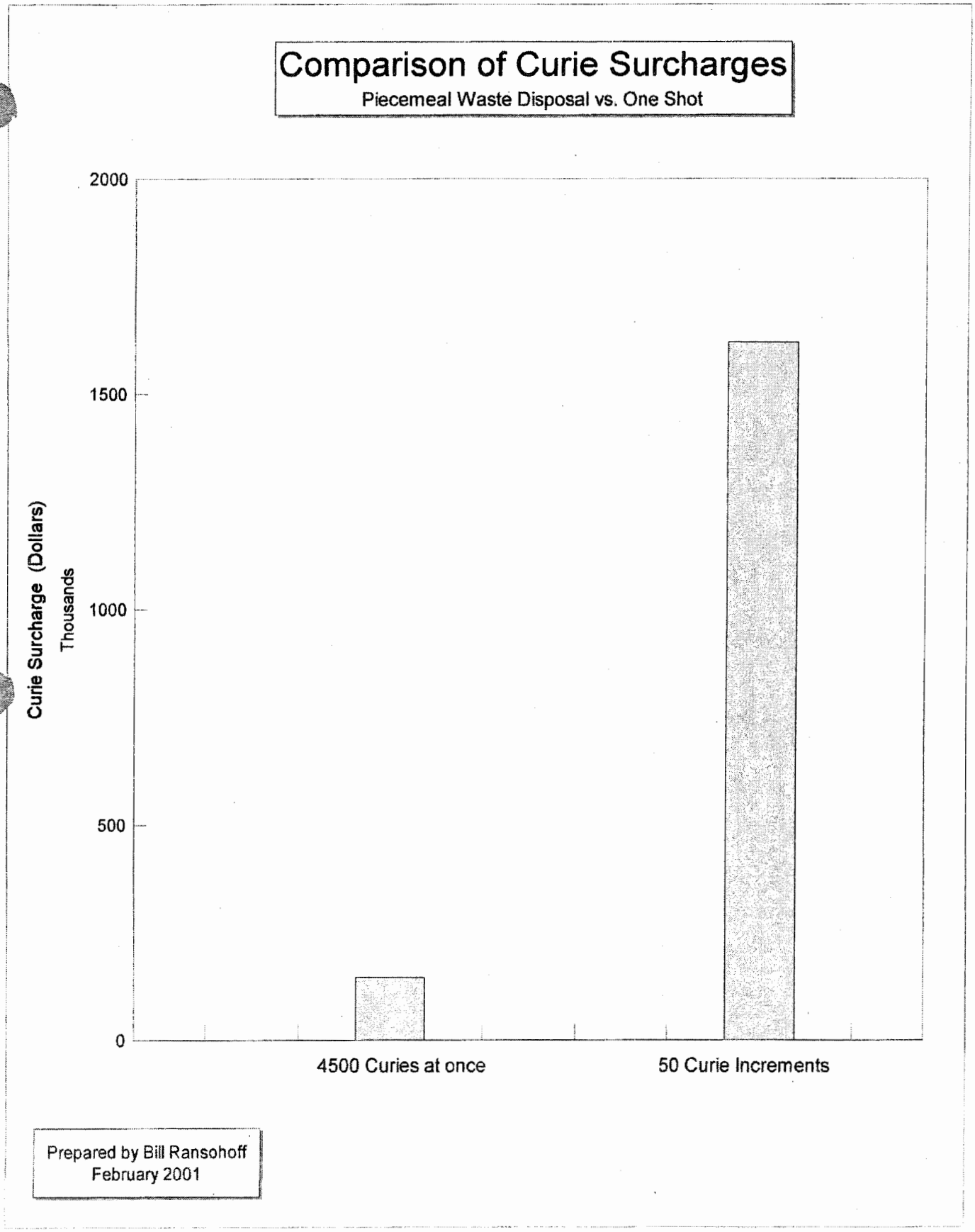

FIGURE 4

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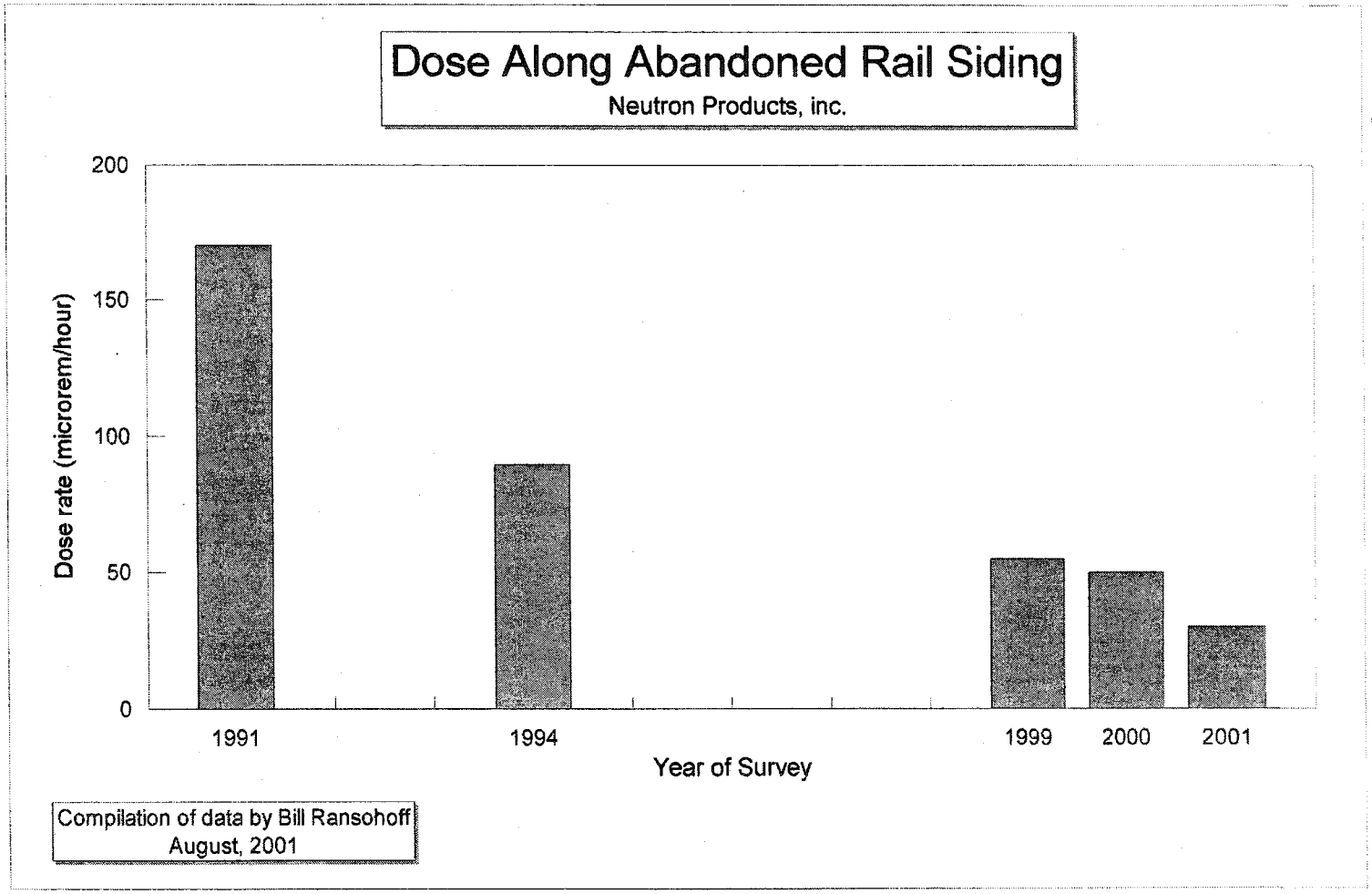

FIGURE 2

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MARYLAND DEPARTMENT OF THE ENVIRONMENT

2500 Broening Highway • Baltimore, Maryland 21224
(410) 631-3000 • 1-800-633-6101 • http://www.mde.state.md.us

Parris N. Glendening
Governor

MAR 21 2002

Jane T. Nishida
Secretary

CERTIFIED MAIL: NOTICE OF VIOLATION

Jackson A. Ransohoff, President
Neutron Products, Inc.
22301 Mt. Ephraim Road
P.O. Box 68
Dickerson MD 20842

RE: Radioactive Material License #MD-31-025-01

Dear Mr. Ransohoff:

This letter refers to the radioactive materials inspection conducted by Messrs. Alan Jacobson, Ray Manley, Bob Nelson, and Leon Rachuba of the Maryland Department of the Environment's (MDE) Radiological Health Program (RHP) on December 12 and 13, 2001. The inspection examined radiation safety, compliance with conditions of your license, adherence to procedures and proper maintenance of records, interviews with personnel, general observations, and independent measurements.

During the inspection, the RHP identified poor radioactive waste storage practices and conditions such as waste stored in plastic bags instead of drums and inadequate containment of contamination. In addition, certain activities were found to be in violation of the Department's requirements. The findings were discussed with Messrs. Jeff Williams, Bill Ransohoff, Marvin Turkanis on December 13, 2001. The violations found are listed in the enclosed "Description of Violations."

As a result of these findings, you are required to take immediate action to correct the violations and to respond to this letter and the enclosed "Description of Violations" within twenty (20) calendar days of your receipt of this notice. Written statements should be provided for the concerns and each of the violations indicating:

a. Corrective steps, which have been or will be taken by you to remedy the present violations and the results achieved or anticipated;

b. Corrective steps which will be taken to avoid further violations, who will undertake these steps, and who will supervise them; and

c. The date when full compliance will be achieved.

Failure to provide these statements in the required time frame may result in the Department taking escalated enforcement action under Maryland Radiation Regulations to:

(a) modify, revoke or suspend your license,

(b) issue a Departmental Order under the Annotated Code of Maryland, Environment Article, Sections 1-301 and 8-101 through 8-601, and

(c) seek an administrative penalty of up to $1,000 per violation, per day [Section 8-150(b)], or a civil penalty in Circuit Court in an amount not exceeding $10,000 per violation, per day [Section 8-509(b)].

Please be reminded that Departmental compliance letters and licensee responses shall be posted pursuant to the requirements of the Maryland regulations, Section J.11(d) titled, "Posting of Notices to Workers." If you have any questions concerning this letter, please call Messrs. Alan Jacobson, Carl Trump, Jr., or Raymond E. Manley at (410) 631-3301. You may also reach our office toll-free (in Maryland only) by dialing 1-800-633-6101 and requesting extension 3301. Also, you may contact this office via facsimile at (410) 631-3198.

Sincerely,

Roland G. Fletcher, Program Manager III
Radiological Health Program

RGF/ADJ/cc
LET

Enclosures: Description of Violations

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DESCRIPTION OF VIOLATIONS

Neutron Products, Inc.
22301 Mt. Ephraim Road
P.O. Box 68
Dickerson MD 20842

RE: Radioactive Material License #MD-31-025-01

Certain activities conducted under your license were found to be in violation of the Code of Maryland Regulations 26.12.01.01 titled, "Regulations for Control of Ionizing Radiation." These violations are presented below:

1. Section C.31 titled, "Specific Terms and Conditions of License" and License Condition 22.B(2) which requires, in part, that all soils, wherever found contaminated by NPI licensed activities and exhibiting levels of cobalt-60 contamination exceeding 8 picocuries per gram above background must be removed by NPI and properly stored/disposed of as radioactive waste.

   Contrary to Section C.31 and License Condition 22.B(2), NPI failed to remove cobalt-60 contaminated soil exceeding the above-specified limit. Specifically, on September 20, 2000 RHP inspectors collected soil samples at sites located both on and off of the NPI facility. Maryland Radiation Laboratory sampling results from these samples indicated that of the 10 samples taken, all indicated soil having cobalt-60 concentrations exceeding 8 picocuries per gram. The range was from 28 – 610 picocuries per gram of soil. NPI failed to remove the contaminated soils from the areas exceeding the license limit. NPI has been in continuous violation of this requirement since May 23, 1989. Furthermore, NPI has still not removed the soil contaminated with cobalt-60 from the adjacent railroad property to establish compliance with the 8.0 picocurie per gram concentration limit. Monthly soil samples collected from the dry pond area and analyzed by NPI personnel in October, November and December 2001 also exceeded the regulatory limit. The Stipulation and Settlement (Civil Case No. 76639 in the Circuit Court of Montgomery County) dated January 3, 1994 required NPI to clean these contaminated areas by June 15, 1994. NPI has missed this deadline and has refused to remediate this property. This is a violation of item 2 of the November 3, 2000 Montgomery County Circuit Court Order.

2. Section D.101 titled, "Radiation Protection Programs" states that in addition to complying with all other provisions of these regulations, a licensee shall use all means to maintain radiation exposures and releases of radioactive material as low as reasonably achievable (ALARA).

   Contrary to Section D.101, the licensee failed to use all means necessary to maintain release of radioactive material as low as reasonably achievable. Specifically, NPI has failed to use means necessary such as the adequate containment of radioactive materials, proper waste storage practices and regular shipments of radioactive waste, to a licensed repository. One only has to review the soil sample results referred to in violation #1 to determine that NPI is not maintaining control over their radioactive material and it is continuing to be released. In spite of curtailed source-manufacturing activities, NPI

continues to release cobalt-60 into the environment in an uncontrolled manner. Contaminated areas of the LAA lack adequate containment and release pathways are not continuously monitored. This is a violation of item 2 of the November 3, 2000 Montgomery County Circuit Court Order.

3. Section C.31 titled, "Specific Terms and Conditions of License" and License Condition 21.B requires that within 90 days of the issuance of the license, NPI must submit to the Department for approval a comprehensive plan for disposal of all low level radioactive wastes in accordance with those specifications defined in this condition.

   Contrary to Section C.31 and License Condition 21.B, NPI's low level radioactive waste plan was submitted to MDE on December 10, 1999; however, upon review it was found to be inadequate and as of this date a comprehensive plan acceptable to the Department has not been submitted. Deficiencies in the plan were discussed in a Departmental letter dated March 20, 2000, but NPI has not adequately responded to it. On October 20, 2000 the RHP received NPI's Decommissioning Plan dated October 27, 2000, which included a planned schedule for radioactive waste shipments. The RHP has reviewed this plan and determined that it is inadequate because it does not demonstrate compliance with the current radioactive material license waste disposal criteria. Table 2.1 of this plan describes a 12-year shipment schedule for only a small fraction of the total activity of current radioactive waste inventory. The plan did not describe the shipment schedule and protocol for the disposal of the contaminated soil in storage. All radioactive waste that was generated prior to August 1999 is required to be shipped for disposal by August 2004. NPI has been in continuous violation of this requirement since the November 1999 inspection. This is a violation of the November 3, 2000 Montgomery County Circuit Court Order.

4. Section C.29(c)(2) titled, "Financial Assurance and Recordkeeping for Decommissioning" requires, in part, that each licensee who is a holder of a specific license issued before October 15, 1998 and of a type described in paragraph (a) of C.29 must submit, on or before October 15, 1998 a decommissioning funding plan or a certification of financial assurance for decommissioning in an amount of at least equal to $750,000. Also, the requirements of Section C.29(g)(2) requires that no person shall receive, possess, use, transfer, own, or acquire radioactive material of a type described in paragraphs (a) and (b) of C.29 for more than 180 days following the dates prescribed in the section for submittal of a decommissioning funding plan or certification, if the decommissioning funding plan or certification has not been approved by the Agency.

   Contrary to Section C.29(c)(2), NPI has not met the $750,000 certification by the specified dates of this regulation. Furthermore, NPI's decommissioning funding plan has not been approved by the Agency. Pursuant to NPI's failure to provide an adequate decommissioning funding plan or the $750,000 certification by April 13, 1999 (180 days post October 15, 1998) NPI has continued to receive, possess, use, transfer, own, or acquire radioactive material of a type described in paragraphs (a) after the 180 day (April 13, 1999) deadline. NPI has been in continuous violation of this requirement since the November 1999 inspection.

5. Section J.11 titled, "Posting of Notices to Workers" requires, in part, that the licensee post any notice of violation involving radiological working conditions and any response from the licensee.

ORIGINAL

a. The licensee failed to post the November 3, 2000 Montgomery County Circuit Court "Cease and Desist" Order.

b. The licensee failed to post the December 21, 2000 Montgomery County Circuit Court Order Modifying Permanent Injunction Pending Appeal.

c. The licensee failed to post documents, notices and forms pursuant to J.11(a) in a sufficient number of places to permit individuals engaged in work under the license to observe them on the way to or from any particular work location to which the document applies. Specifically, the licensee failed to post required document near the entrance to the Limited Access Area. According to the October 16, 2001 NPI Letter, page 11, item Q17.1, LAA workers principally use the ground level door, near the underground wastewater holding tank, to report to work. They generally use the walkway between the door and the parking lot. NPI used three boards in other areas of the plant to post required documents. Principally, LAA workers cannot observe required documents as they report to and leave the LAA. These are violations of item 2 of the November 3, 2000 Montgomery County Circuit Court Order.

6. Section D.1101 titled "Records-General Provisions" requires the licensee to use units of becquerel, grey, sievert, coulomb per kilogram, disintegrations per minute, rad, rem and roentgen and clearly indicate the units of all quantities on records required by Part D.

Contrary to the requirements of Section D.1101, the results of soil sample surveys dated June26, 2001, August 28, 2001 and December 5, 2001 were maintained in units of gross counts instead of picocuries. Furthermore, the efficiency of the counting system was not documented on the survey records. As a result, the records did not identify the samples that exceeded the 8.0 picocurie per gram limit. This is a **REPEAT** violation from the June 2001 inspection and a violation of item 2 of the November 3, 2000 Montgomery County Circuit Court Order.

7. Section C.31 titled, "Specific Terms and Conditions of Licenses" and item 1.d. of the November 3, 2000 Montgomery County Circuit Court Order prohibits NPI from receiving, transferring or acquiring any radioactive material except as specifically approved by the Department.

On January 2, 2002 the licensee received a Cobalt-60 source, stored it on the parking lot of NPI's Dickerson facility until January 29, 2002 and then transferred it to a licensed facility in San Antonio, Texas.

8. Section C.31 titled, "Specific Terms and Conditions of Licenses" and License Condition 21(B) prohibits NPI from storing radioactive waste in areas other than the main pool/canals for a period exceeding 2 years.

a. The licensee stored a 12' x 1.5" waste tube containing Argentine cladding from January 2000 to February 2002, a time period greater than 2 years. The licensee has refused to ship this radioactive waste for disposal.

b. The licensee stored approximately 600 cubic feet of soil contaminated with cobalt-60 from November 2000 to February 2002, a time period greater than 2 years. The licensee has refused to ship this radioactive waste for disposal.

ORIGINAL

SOIL SAMPLES

Multi-Channel Analyzer

DATE 12/7/01 SIGNATURE Dany Wirebolt

STANDARD 197

BACKGROUND 75

RESULT 122

Standard: 787.9 pCi @ 5/
2776 days = 290 pCi
@ 12/7/2001

0.0158 pCi/g / count (for 150g, 10 min) ← = 1.93 pCi/g

1.58×10⁻⁸ µCi/cc / count ← = 1.93×10⁻⁶ µCi

	LOCATION	COUNTS	NET COUNT TIME	500 ml Marinelli BEAKER	µCi/cc. pCi/g SAMPLE Wet	Dry
1	WELL (1)	108	33	150 mL	5.2×10⁻⁷	
2	WELL (2)	117	42	150 mL	6.6×10⁻⁷	
3	WELL (3) 10 min.	91	16	150 mL	2.5×10⁻⁷	
4	WELL (4)	87	12	150 mL	1.9×10⁻⁷	
5	N1	14	6.5	108		1.4
6	N2	17	9.5	141		1.6
7	N3	7	—	127		—
8	N4	16	8.5	131		1.5
9	SS1 1 min.	31	23.5	151		3.7
10	SS2	21	13.5	147		2.2
11	DP1	47	39.5	115		8.1
12	DP2	98	90.5	142		15.1
13						
14						
15						

RECEIVED
APR 22 2002
RADIOLOGICAL HEALTH PROGRAM
BY

RECEIVED
APR 22 2002
RADIOLOGICAL
HEALTH PROGRAM
BY

Reviewed by: WZK

Date: 1/24/2002

NEUTRON PRODUCTS, INC.

NAME: Danny Winchell

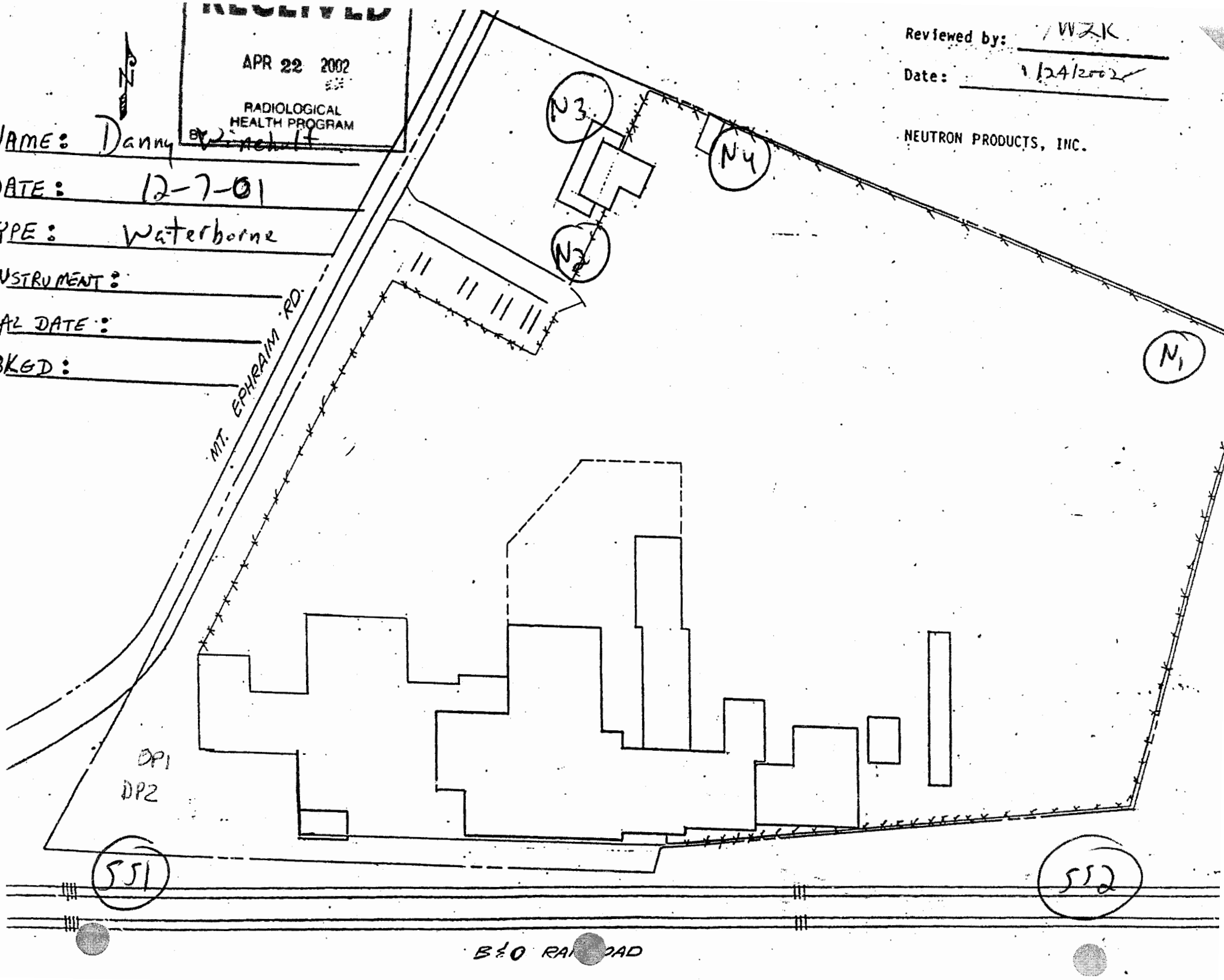
DATE: 12-7-01

TYPE: Waterborne

INSTRUMENT:

CAL DATE:

BKGD:



ORIGINAL

SOIL SAMPLES

Multi-Channel Analyzer

DATE 1/29/02 SIGNATURE Danny Virebolt

STANDARD 182

BACKGROUND 58

RESULT 124

284.3 pCi - 1/29/02

124 COUNTS = 2.3 pCi

WATER

SOIL

	LOCATION	COUNTS	TIME	500 ml Marinelli BEAKER	SAMPLE Wet	SAMPLE Dry
1	W1	75	17	150mL	2.6×10^{-7}	
2	W2	119	61	150mL	9.4×10^{-7}	
3	W3	60	2	150mL		
4	W4	69	11	150mL	1.7×10^{-7}	
5	N1	13	1.2	116		1.4
6	N2	7	1.2	127		.22
7	N3	10	4.2	147		.66
8	N4	11	5.2	151		.79
9	DP1	765	159.2	140		125
10	DP2	90	84.2	157		12
11	SS1	20	14.2	126		2.6
12	SS2	8	2.2	178		.28
13						
14						
15						

ORIGINAL

SOIL SAMPLES

Multi-Channel Analyzer

DATE 2-28-02 SIGNATURE [illegible]

STANDARD 185

BACKGROUND 68

RESULT 117

281.3

2.4 pCi/COUNT

SAMPLES 1-4 = 600 SECONDS
5-12 = 60 SECONDS

	LOCATION	COUNTS	NET COUNTS TIME	500 ml Marinelli BEAKER	SAMPLE Wet (µCi/cc)	SAMPLE Dry (pCi/g)
WATER 1	WELL (1)	124	56	150mL	9×10^{-7}	
2	WELL	121	53	150mL	8.5×10^{-7}	
3	WELL	98	30	150mL	4.8×10^{-7}	
4	WELL	66	—	150mL	~~1×10^{-7}~~	MXR 3/1/02
SOIL 5	SS1	36	29.2	134 grams		~~.52~~ 5.2
6	SS2	21	14.2	145 grams		~~.23~~ 2.3
7	DP1	98	~~[illegible]~~ 92.2	143 grams		~~[illegible]~~ 15.[illegible]
8	DP2	237	230.2	115 grams		~~[illegible]~~ 48
9	N1	35	28.2	123 grams		~~[illegible]~~ 5.5
10	N2	9	2.2	141 grams		~~.39~~ .3
11	N3	8	1.2	143 grams		~~.02~~ .00
12	N4	10	3.2	115 grams		~~.07~~ .00
13						
14						
15						

Reviewed by: MZR

Date: 3/1/2002

NEUTRON PRODUCTS, INC.

NAME: Danny Wenholt

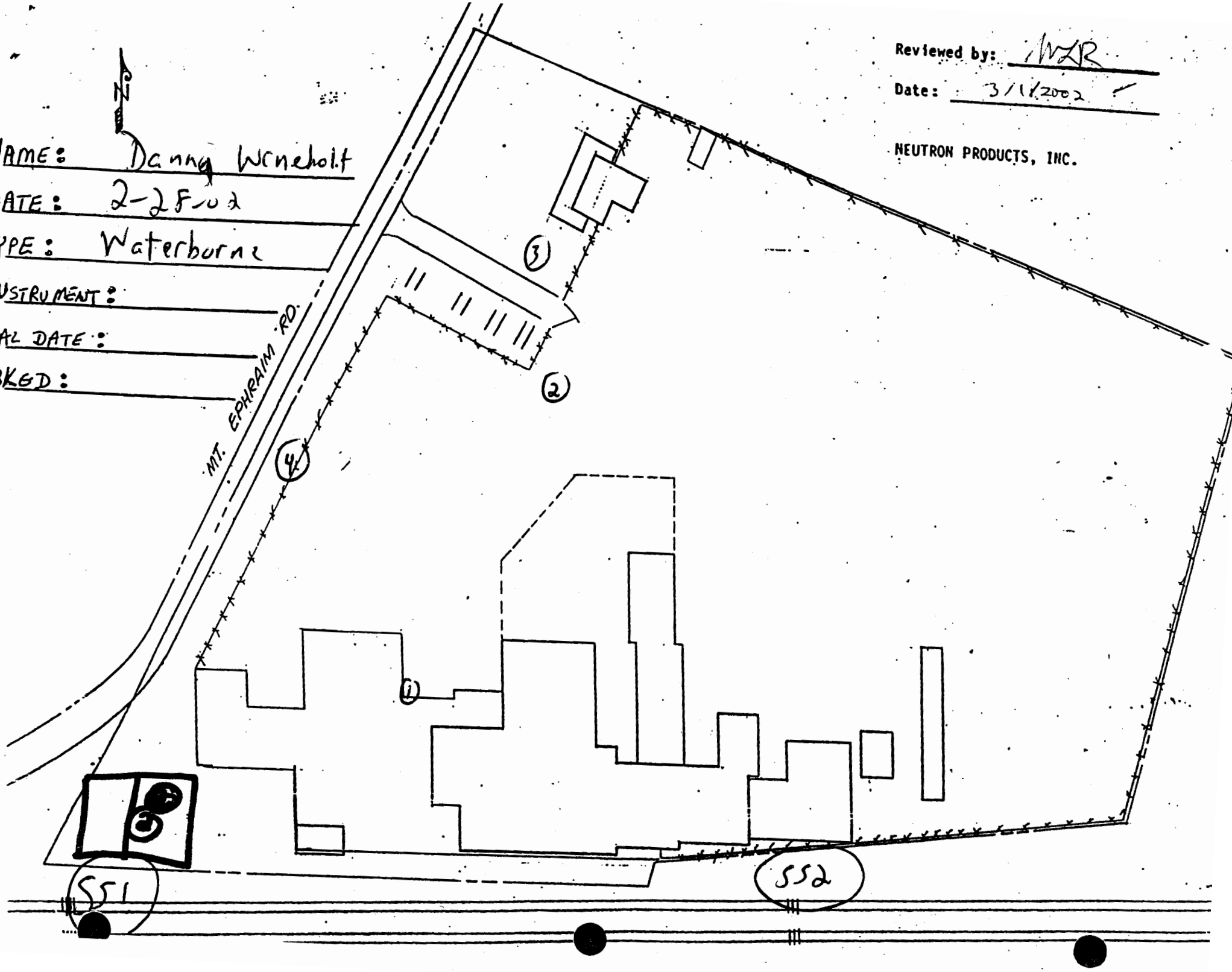
DATE: 2-28-02

TYPE: Waterborne

INSTRUMENT:

CAL DATE:

BKGD:



ORIGINAL

MARCH SAMPLES

SOIL SAMPLES

Multi-Channel Analyzer

DATE 4-2-02 SIGNATURE Danny Winchell

STANDARD 172

BACKGROUND 69

RESULT 103

278 / 103 = 2.7

	LOCATION	COUNTS	NET COUNTS ~~TIME~~	~~500 ml Marinelli~~ BEAKER	(uCi/cc) SAMPLE ~~Wet~~	(pCi/g) SAMPLE ~~Dry~~
WATER 1	WELL 1	82	13	150mL	2.3×10^{-7}	
2	WELL 2	83	14	150mL	2.5×10^{-7}	
3	WELL 3	80	11	150mL	2×10^{-7}	
4	WELL 4	73	4	150mL	1×10^{-7}	
SOIL 5	N1	11	4.1	157		.71
6	N2	8	1.1	116		.26
7	N3	11	4.1	108		1.03
8	N4	13	6.1	160		1.03
9	DP1	65	58.1	116		13.5
10	DP2	178	171.1	152		30.4
11	SS1	40	33.1	202		4.4
12	SS2	19	12.1	163		2.0
13						
14						
15						

NAME: Danny Winebolt

DATE: 4-2-02

TYPE: Waterborne

INSTRUMENT: N/A

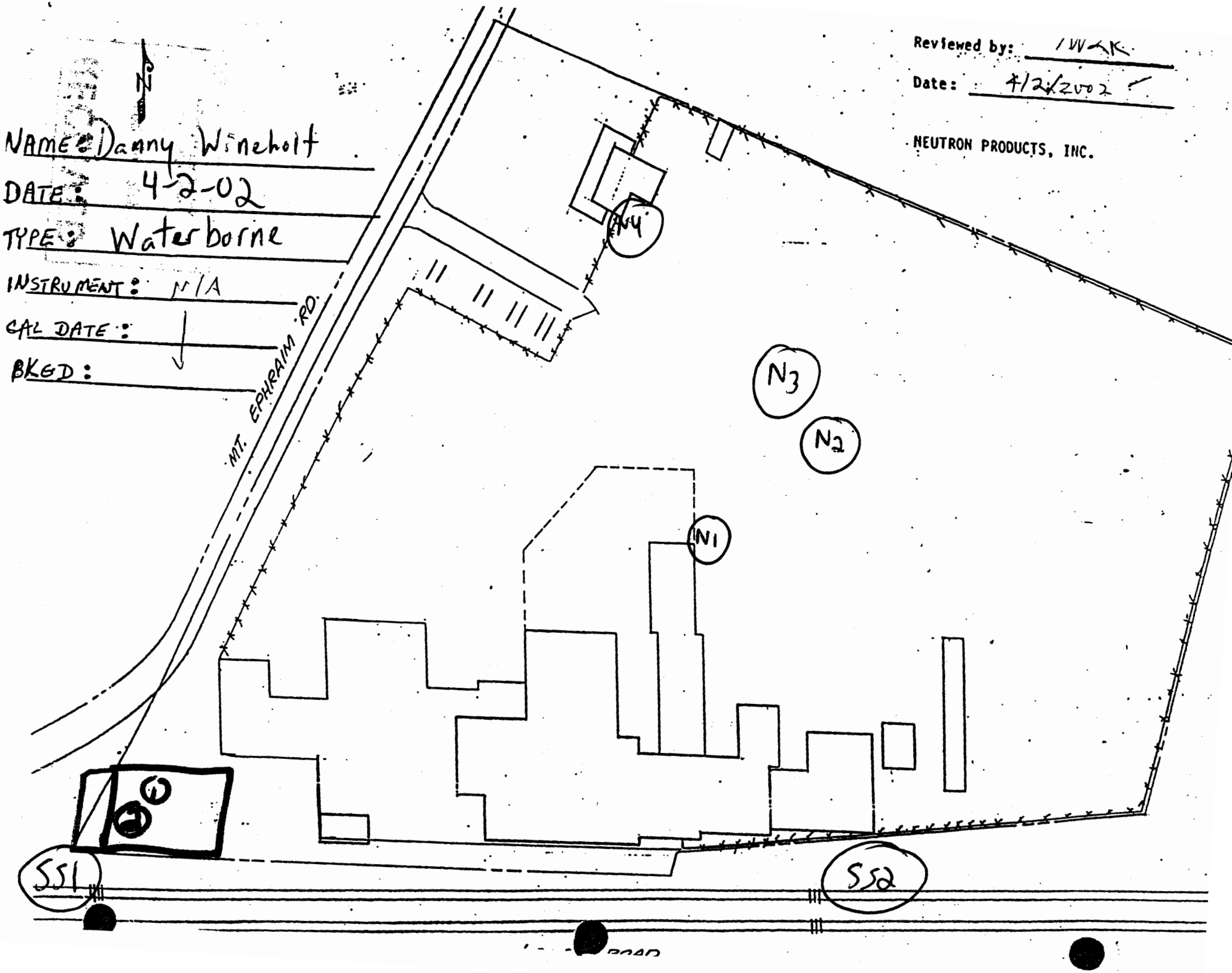
CAL DATE:

BKGD:

Reviewed by: WK

Date: 4/24/2002

NEUTRON PRODUCTS, INC.



ORIGINAL

MARYLAND DEPARTMENT OF THE ENVIRONMENT
AIR AND RADIATION MANAGEMENT
2400 Broening Highway
Baltimore, Maryland 21224

MEMORANDUM

TO: Neutron Products Inc, MD-31-025-01 File
Accident/Incident File

THRU: Alan Jacobson, Health Physicist Supervisor

FROM: Bob Nelson, Health Physicist III

DATE: June 28, 2002

SUBJECT: NPI Dumpster sets off Radiation Alarm

On June 27, 2002, Jeff Williams, the Radiation Safety Officer for Neutron Products, Inc. called me while I was at NPI conducting an inspection with MOSH, to report that Montgomery County's Shady Grove Trash Transfer station had their radiation detection alarm set off by a dumpster from NPI. He stated the readings were 60 uR/hr on the side of the dumpster according to the county's detector. He said he was there but he did not have a meter with him and asked how soon someone from MDE could respond. He said the county had already called MDE. I called our office and was told that Alan Jacobson was responding.

At approximately 8:45 am, Mike Sharon of TARSA relayed to Roland Fletcher of ARMA a notification he had received from the Montgomery County Department of Environmental Protection that a "roll off" refuse container from Neutron Products Incorporated, set off the radiation alarms at the Shady Grove Solid Waste Transfer Station in Rockville, Maryland. Alan Jacobson, an ARMA Health Physicist responded to the incident, conducted independent

measurements, verified that the load contained cobalt-60, interviewed personnel on site and ensured that the load could be safely transported back to Neutron. The Transfer Station rejected the load and it was transported back to Neutron for further evaluation. Bob Nelson, an ARMA Health Physicist was at Neutron assisting a Maryland Occupational Health and Safety (MOSH) Inspector who was investigating unsafe working conditions. Mr. Nelson assisted Neutron employees in locating the radioactive material in the container. A plastic bag containing paper towels and rags measuring 0.5 millirem per hour was identified, removed and placed in storage as radioactive waste at Neutrons Dickerson facility. Mr. Nelson determined that Neutron failed to comply with Maryland Regulations governing disposal of radioactive waste, performance of surveys and monitoring of items for disposal. Further Departmental as a result of this incident is being pursued. The MOSH Inspector also identified a list of occupational safety and health violations, some of which were considered serious.

Reviewed

ORIGINAL

NEUTRON PRODUCTS INC

22301 Mt. Ephraim Road, P. O. Box 68
Dickerson, Maryland 20842 USA
301-349-5001 FAX: 301-349-5007
e-mail: neutronprod@erols.com

February 13, 2007

Mr. Roland Fletcher
Radiological Health Program
Maryland Department of the Environment
1800 Washington Blvd.
Baltimore, MD 21230

Via Fax: 410-537-3198 *** Original to be mailed ***

Dear Mr. Fletcher,

This letter is to update the monthly cobalt-60 inventory on the 01 license.

As of January 31, 2007 the inventory was 314,600 Ci. In addition, as of January 31, 2007, the radwaste inventories were:

Main Pool	1600 Ci
North Canal II	56 Ci
Dry Storage	110 Ci

If you have any questions, or require additional information, please do not hesitate to contact us.

Sincerely,

Neutron Products, inc.

Edmond J. DeRosa
Manager, Teletherapy Operations

MARYLAND DEPARTMENT OF THE ENVIRONMENT
1800 Washington Boulevard ● Baltimore Maryland 21230
(410) 537-3000 ● 1-800-633-6101 ● http://www.mde.state.md.us

FORM E-1

RADIOACTIVE MATERIAL
INSPECTION FINDINGS AND LICENSEE ACKNOWLEDGEMENT

I. Licensee
Neutron Products, Inc.
22301 Mt. Ephraim Road
P.O. Box 68
Dickerson, MD 20842

II. License No.
MD-31-025-01

III. Date of Inspection 1/10 & 1/11/2007

IV. Inspection Findings and Licensee Action

The inspection was an examination of the activities conducted under your license as they relate to radiation safety and compliance with the Code of Maryland (COMAR) 26.12.01 "Regulations for Control of Ionizing Radiation", and the conditions of your license. The inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observations by inspector. The findings of this inspection are as follows:

A. [ ] No current use or storage of licensed radioactive material (no program). The licensee was informed that upon receipt of radioactive material RHP must be notified.

B. [ ] Issuance of an Agency E-1: Within the scope of the agency inspection, no items of noncompliance or unsafe conditions were found. No action is required by the licensee.

C. [ ] Issuance of an Agency E-2: Within the scope of the inspection, violations of minor significance were found. For any violation, corrective action must be immediately initiated. Within the 20 calendar days of your receipt of this notice, you are to provide the Department with written statements of explanation describing:

1. corrective steps which have been or will be taken by you, and the results achieved or anticipated;
2. corrective steps which will be taken to avoid further violations; and
3. the date when full compliance will be achieved.

Such a statement or explanation must be provided on each of the items listed.

D. [✓] Issuance of an Agency E-1 with a letter sent to the licensee further describing Agency requirements. For any violation, corrective action must be immediately initiated.

V. Licensee Acknowledgement

The Inspector has explained and I understand any items of noncompliance identified during this agency inspection. Furthermore, I acknowledge that, if an Agency E-2 Description of Violations was issued, failure to comply may result in the revocation, suspension or modification of the license and possible fines for each day the violations continue.

1/11/2007	Alan Jacobsen	
Date	RAM Inspector	Licensee Representative-Title or Position

(Yellow) Licensee File Copy

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Estimated RadWaste Inventory for Meeting of 4/12/2006

Contaminated Cladding and RadWaste in Stainless Steel Tubes in Underwater Storage

Quantity	80 waste tubes in addition to contaminated cladding
Volume	20 - 30 cu.ft.
Weight	Less than 1,000 #s
Description	Most of the waste tubes are likely Class B waste, while the cladding is Class A. Total activity is approximately 1800 Ci.

X **Sealed Sources and Raw Material for Sealed Sources**

Total inventory is approximately 350,000 Ci, which is approximately the same amount of activity removed from Permagrain during the decommissioning of that facility, although all of the Permagrain sources were doubly encapsulated. Neutron's inventory has once encapsulated sources as well as those which are doubly encapsulated. Neutron believes this material to be useful.

X **Stellite Bearings**

There are two containers of corners from control rod followers, which include stellite bearings, which are stored in the main pool. None of this material is encapsulated, and it has a total activity of approximately 20,000 Ci.

Polytubes

Quantity	16 (13 in N.Canal 2, 3 in NWR)
Volume	10 cu.ft.
Weight	The polytubes in North Canal 2 likely weigh less than 200 #s. The ones in the NWR are stored in a shielded container, and likely have a combined net weight of less than 50 #s.
Description	The polytubes in North Canal 2 contain approximately 70 Ci. Those in the NWR are likely less than 10 Ci.

Contaminated Soil

Quantity	24 B-25's and 156 drums
Volume	3470 cu.ft.
Weight	Probably on the order of 250,000 #s
Description	The vast majority of this material is exceedingly low in activity, with dose rates less than 2 mR/hr. There are a few drums with dose rates in the 40 mR/hr range.

Fiber Drums

Quantity	30
Volume	260 cu.ft.
Est. weight	2100 #s
Description	In general, the material in the fiber drums is very low activity DAW. The majority of the drums are less than 200 mR/hr on contact. If it is to be incinerated, it will first have to be sorted to remove high dose rate material, in addition to any metal or PVC, then it will have to be repackaged in clear plastic bags and cardboard boxes. It is likely that more than 90% of the DAW in fiber drums is suitable for incineration.

Fiber Boxes

Quantity	16
Volume	200 cu.ft.
Est. weight	1400 #s
Description	Similar to material in fiber drums

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Innerpacks

Quantity	6
Volume	230 cu.ft.
Est. weight	1700 #s
Description	3 of these are in the shielded condo, and contain DAW in plastic bags. This material is likely to be similar to that in the fiber drums and boxes. The remaining innerpacks contain modestly higher activity DAW, resulting from sorting activities from the previous waste shipment. Boxes resulting from the repackaging of this material will likely have dose rates on the order of 500 mR/hr at contact.

Steel Drums

Quantity	130
Volume	975 cu.ft.
Est. weight	26,000 #s, not including the drums which have been filled with concrete.
Description	This component of our waste is highly variable. Contents include compacted DAW, uncompacted DAW, cartridge filters, resin, mopheads, metal pieces, rubble, etc. The highest dose rates are likely on the order of 20 R/hr on contact, while others are less than 500 mR/hr.

Drum Shields

Quantity	26
Volume	200 cu.ft.
Weight	The 8 which contain resin likely weigh approximately 4,000 #s total. The contents of two of them are solidified in concrete and likely weigh 700 #s each, with the remaining 16 probably weighing a total of 4,000 #s, for a total weight of nearly 10,000 #s.

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Description	Each drum shield contains either a drum or a 60 gallon HIC. The 8 drums of resin contain an estimated total activity of 10 Ci. The other 18 drum shields contain a total activity of approximately 50 Ci.

Miscellaneous

Miscellaneous additional waste includes 2 B-25s containing metallic waste; 11 HEPA filters; 11 5 gallon pails; a melt furnace in a shielded container; some plastic bags of DAW; some bags of leaves, dirt, etc. from the courtyard; a large wooden box containing used manipulators; various brooms, ladders, etc.

ORIGINAL

neutron PRODUCTS inc

22301 Mt. Ephraim Road, P.O. Box 68, Dickerson, MD 20842

301-349-5001 Fax: 301-349-2433

E-mail: neutronprod@erols.com

FAX LEAD PAGE

Company:	MDE (RHP)	**From:**	S. A. RANSOHOFF
To:	ROLAND FLETCHER	**Pages:**	20 (incl. Lead Pg.)
VIA Fax:	410 537 3198	**Date:**	6/7/04
CC:		**REF NO:**	04233
Re:			

- **Comments:**

If Fax is incomplete of illegible, please contact us at 301-349-5001

Specific Responses to Concerns and Alleged Violations Described in Letter from Roland G. Fletcher Dated May 17, 2004

Alleged Violation #1 states:

"Section C.31 titled, 'Specific Terms and Conditions of License', License Condition 22.B(2), require, in part, that all soils, wherever found, contaminated by NPI licensed activities and exhibiting levels of cobalt-60 contamination exceeding 8 picocuries per gram above background, must be removed by NPI and properly stored/disposed of as radioactive waste. The Montgomery County Circuit Cort Order-Civil Case 199036 (Montgomery County Circuit Court Order) dated November 3, 2000 requires NPI to comply with al of the current requirements of the applicable statues, regulations and the provisions of the license. The Stipulation and Settlement of Civil Case No. 76639 in the Circuit Court of Montgomery County dated January 3, 1994 further required NPI to demonstrate compliance with these requirements by June 15, 1994.

"Contrary to the above, NPI failed to remove cobalt-60 contaminated soil exceeding the above-specified limit. NPI has been in continuous violation of this requirement since May 23, 1989. For example, NPI still has not removed the soil contaminated with cobalt-60 from the adjacent railroad property to establish compliance with the 8.0 picocurie per gram concentration limit. Furthermore, monthly soil samples collected from the dry pond area and analyzed by NPI personnel in January, February, March, June, July, September and November, 2003 also exceeded this regulatory limit and were not removed by NPI. On March 4, 2004, MDE Inspectors collected 12 soil samples from the dry pond and adjacent areas. Results of laboratory analysis indicate soil concentrations that ranged from 10-304 picocuries per gram. NPI has missed the June 15, 1994 deadline and deliberately continues to refuse remediation this property."

Response

1.1 MDE's continuing concern with the low levels of soil contamination in the dry pond and its immediate environs remains a transparent attempt by the agency to build a mountain out of a molehill.

1.2 A review of the pertinent facts and issues:

1.2.1 Neutron monitors all stationary point sources of radioactive emissions including hot cell exhaust and sewage. Compliance with applicable standards is typically achieved by a margin of two to three orders of magnitude and is therefore *prima facie* in compliance with the ALARA standard . No member of the public is credibly subject to effective radiation exposures from these sources in excess of 1 millirem per year.

ORIGINAL

1.2.2 Releases of cobalt-60 to the dry pond can not be attributed to any known stationary source despite our best efforts to identify one. Rather they appear to be transitory in nature. Our best hypothesis as of this writing is that very small concentrations of contamination upon migrating to the LAA courtyard are concentrated on humic material by the process of ion exchange. This material is carried by stormwater to the drainage system, and that minor fraction which escapes the stone trap is eventually deposited at the western end of the dry pond. From there, it continues to migrate slowly; however, the area of significant contamination has always remained relatively small and finite. Moreover, the depth of contamination is confined to the topsoil layer extending only a few inches.

1.2.3 NRC acknowledges that certain licensees, and here Neutron is by no means unique, experience non-stationary releases which are generally treated on a case-by-case basis. The applicable standard remains the 100 mrem per year limit on the TEDE to any member of the public, a limit with which Neutron is in wide margin compliance.

1.2.4 In the case at issue, the area of highest contamination is fenced and posted, and those minimally contaminated areas which are outside of the fence are only occupied on very rare occasions. We have previously demonstrated that dry pond contamination results in no measurable exposure to any member of the public other than those employed by Neutron to periodically mow the grass in that area, and exposure to those limited individuals is far below 10% of the 100 mrem per year standard. Under NRC doctrine, this would be considered as evidence that the ALARA standard was met without the further requirement for a detailed analysis.

1.2.5 The continual removal and disposal of all known contamination would have no effect on public or occupational exposures, because the exposure resulting from this source is negligible. Yet the cost to achieve this goal would likely be on the order of $100,000, which might in the course of ten years result in reducing collective exposure by 0.02 person·rem. This works out to 5 million dollars per person·rem or 2500 thousand times greater than the $2000 per person·rem justified as ALARA by the NRC in NUREG 1530.

1.2.6 Both the EPA and the CDC after evaluating this issue at MDE's request concluded that there is no current health and safety risk to the public derived from these minor levels of substantially contained contamination.

1.2.7 Nevertheless, Neutron has removed and containerized contaminated soil during several campaigns since 1989, a portion of which now serves as effective supplementary shielding of radwaste in dry storage. The goal and net effect of

these campaigns have been to remove the most contaminated materials to mitigate off-site migration and to keep the area of contamination within the existing envelope.

1.2.8 Dose rates in the affected areas have continued to decline over the last 17 years. Dose rates above plant background are now in substantial compliance with License Condition 22A(1).

1.2.9 Condition 22A(2) establishes the soil concentration limit for cobalt-60 as 8 picograms per gram *for an area* (italics ours) without establishing what is meant by "area" other than perhaps by inference to the 20' x 20' area given in Condition 22A(1). By their actions MDE's staff have clearly interpreted "area" to mean any contamination, anywhere regardless of the extent. We have time and again witnessed their practice of using sensitive survey meters to identify and isolate "sampling" points. In short, they go prospecting for a worst case analysis. True random sampling of the entire area, for instance in accordance with MARSSIM guidelines would probably not show compliance but would at least establish a more accurate and less inflammatory data base.

1.3 In light of RHP's concerns as to our resources, it seems the height of folly for you to insist we squander a large amount of manpower and money to address what, at this time, appears to be a non-problem that (in the absence of the courtyard enclosure) will inevitably recur.

- Removing all the contaminated soil would have no appreciable effect on occupational or public exposure.
- No knowledgeable person has suggested that there exists any danger to public health at this time.
- The contaminated zone has stabilized to a limited and rather small area.
- Waist height dose rates in the effected areas continue to decline and are now approaching plant background.

1.4 Accordingly, we believe that the ultimate decontamination of the dry pond and its environs is rightly prioritized way down the list of radiation protection tasks. Furthermore, we submit that it is long since time for RHP to rescind Condition 22A in favor of the existing regulatory limits governing public exposure with which Neutron remains in compliance. Given the current conditions, we propose that the ultimate decontamination of soil is best addressed near the very end of the facility's eventual decommissioning. In the meantime, we will:

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1.4.1 continue to monitor dose rates and soil activities to assure that radiological conditions remain stable.

1.4.2 continue our practice of limited decontamination of the stone trap and dry pond to mitigate against the migration of contamination.

1.4.3 continue testing reasonable innovations designed to improve the efficiency of contamination removal components and/or limit the migration of contamination from the LAA, and

1.4.4 propose, under separate cover, a reasonable alternative for the final disposition of existing containerized soil.

Alleged Violation #2 states:

"Section D.101(a) titled, 'Radiation Protection Programs' states that in addition to complying with all other provisions of these regulations, a licensee shall use all means to maintain radiation exposures and releases of radioactive material as low as reasonably achievable (ALARA). The Montgomery County Circuit Court Order requires NPI to comply with all of the current requirements of the applicable statutes, regulations and the provisions of the license.

- *"Contrary to the above, NPI failed to use all means necessary to maintain releases of radioactive material as low as reasonably achievable. Specifically, NPI has failed to use reasonable means such as the adequate containment of radioactive materials, proper waste storage practices and regular shipments of radioactive waste, to a licensed repository. On March 4, 2003, MDE inspectors collected 12 soil samples from the dry pond and adjacent areas that exceeded regulatory limits. Furthermore, MDE inspectors identified two contaminated areas on a residential property. As a result, NPI is not maintaining control over their radioactive material and it is releasing it in an uncontrolled manner. Contaminated areas of the LAA still lack adequate containment and release pathways are not continuously monitored. NPI still refuses to adequately clean all contaminated areas, remove all contaminated soils, ship radioactive waste as required and install engineering containment necessary to prevent uncontrolled releases of radioactive material.*

- *"Contrary to the above, NPI failed to use all means necessary to maintain radiation exposures to levels as low as reasonably achievable. Specifically, NPI failed to use all reasonable means such as shielding of*

> *radioactive waste in storage and shipment of radioactive waste in accordance with license conditions. As a result NPI employees and residents living near the plant are exposed to unnecessary levels of radiation emitted from the waste storage areas that are not ALARA."*

Response

2.1 By law, your definition of ALARA (contained in COMAR Sec. A.2) must be identical to that of the NRC:

> "As low as reasonably achievable (ALARA)" means making every *reasonable* effort to maintain exposures to radiation as far below the dose limits in these regulations *as is practical*, consistent with the purpose for which the licensed or registered activity is undertaken, taking into account the state of technology, the economics of improvements in relation to the state of technology, and other societal and socioeconomic considerations, and in relation to utilization of nuclear energy and licensed or registered sources of radiation in the public interest [italics added].

2.2 Citing NRC Regulatory Guide 8.29

> "reasonably achievable" also means "to the extent practicable." What is practicable depends on the purpose of the job, the state of technology, the costs of averting doses, and the benefits. Although implementation of the ALARA principle is a required integral part of each licensee's radiation protection program, it does not mean that each radiation exposure be kept to an absolute minimum, but rather that "reasonable" efforts must be made to avert dose.

2.3 The problem with the above definitions is that they fail to define "reasonable." Webster's Ninth New Collegiate Dictionary offers, in part, that "reasonable" means, not extreme or excessive, moderate, fair, inexpensive. Still open for debate is the fact that RHP has a far different opinion as to what constitutes reasonableness than does Neutron. Fortunately, the NRC has published guidance for the benefit of both parties which is useful in determining whether or not any particular effort to maintain exposures to radiation is, in fact, as far below the dose limits as is reasonable. NUREG 1530 establishes an economic value of a person·rem at $2,000. Clearly a useful tool in judging *the economics of improvements in relation to the to the benefits to the public health and safety*. In addition, Regulatory Guide 8.37, *ALARA Levels for Effluents from Materials Facilities*, provides that licensees should set ALARA goals for effluents at a modest fraction of the values in 10CFR Part 20, Appendix B, Table 2, indicating a range of 10 to 20 percent. For our monitored point source emissions, we are operating well under these reasonable goals.

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2.4 For the transient stormwater contamination which is the subject of part A of the citation, a concentration goal is clearly not appropriate. The regulatory guide suggests that licensees choosing to demonstrate compliance with the regulation through a calculation of the total effective dose equivalent to the individual likely to receive the highest dose, the licensee should set the ALARA goal at a modest fraction of the dose limit to the public suggesting 10 mrem per year as practicable. Further, "licensees need not assume worst case models when calculating dose, but rather should make assumptions that will result in realistic estimates of the actual dose by the member of the public likely to receive the highest dose. The exposure to any member of the public resulting from Neutron's off-site contamination does not realistically approach 10 mrem per year. Accordingly, with regard to plant effluents, Neutron has long demonstrated compliance with D.101(a) by meeting recognized reasonable goals by wide margins. Nevertheless and despite the very limited benefits derived therefrom, Neutron has installed and tested reasonable improvements for further controlling stormwater contamination which have been well documented in previous correspondence.

2.5 RHP would have us misapply tens of thousands of dollars to reduce public exposure by a small fraction of a person·rem, where NUREG 1530 suggests a reasonable expenditure to achieve the benefits derived would be closer to $40. Although we routinely spend far in excess of the dollar values recommended by the application of NUREG 1530, the NUREG provides very useful guidance.

2.6 Regarding the two contaminated areas discovered by your inspectors on residential property, we note that they are typical of the spots we have ourselves found and removed during our monthly environmental surveys with declining frequency over recent years. The dispersed nature of the contamination in each instance, would indicate the presence of the cobalt-60, originally in insoluble form, for some considerable period of time. Arguably, the one bucketful of contaminated soil located on the Meem's property found on previously surveyed ground, limits the date of its deposit, but the survey procedures used by RHP, EPA, and Neutron require some luck in distinguishing dispersed contamination on the order of one microcurie, and it is just as likely that the spot had been overlooked in previous surveys.

2.7 Part B of the Citation contends that Neutron failed to use reasonable means such as shielding and shipment of radioactive waste in storage thereby exposing employees and residents living near the plant to unnecessary levels of radiation.

2.7.1 Regarding occupational exposure, dosimetry records indicate that the majority of employees do not receive measurable exposure from radwaste. Direct shielding of the waste remains substantial in most directions and it is further shielded by our plant's materials of construction. We calculate from survey data that the typical employee might receive about 15 mrem per year (0.3% of the annual TEDE limit for WBE) from radwaste. (TLDs have a minimum detectable dose of 10 mrem.)

Applying the 10% ALARA goal to occupational exposure would argue against any further improvements unless they were very low cost in terms of both dollars and employee exposure.

2.7.2 Dosimetry data for 2003 reflects that a realistic estimate for the most highly exposed member of the public was 28 mrem during that year. Admittedly in excess of the 10 mrem per year ALARA goal, but less than 10% of typical background exposure and on par with the additional exposure expected if the recipient relocated to Denver, Colorado for just four months.

2.7.3 Again from Regulatory Guide 8.37, "if the circumstances of a particular case are such that a licensee cannot ... demonstrate by calculation that the TEDE to the individual likely to receive the highest dose is less than 10 mrem/year, the ALARA philosophy continues to apply, and the licensee should demonstrate compliance ... by evaluating procedures, engineering controls, and process controls." The combined annual public exposure is on the order of 0.200 person·rem. NUREG 1530 establishes a reasonable expenditure of $400 per year to totally eliminate that collective dose. RHP's suggested shielding and shipment would cost many orders of magnitude more, and ironically would substantially increase occupational exposures far more than any reduction in public exposure.

2.7.4 In fact, Neutron employees and others would receive collective occupational dose two or more orders of magnitude greater than the dose saved to members of the public.

2.8 We submit that Citation #2 was issued either in error and should be rescinded.

Alleged Violation #3 states:

"Section C.31 titled, 'Specific Terms and Conditions of License' and License Condition 21.B requires that within 90 days of the issuance of the license, NPI must submit to the Department for approval a comprehensive plan for disposal of all low level radioactive wastes in accordance with those specifications defined in the condition. Furthermore, the Montgomery County Circuit Court Order requires NPI to comply with all of the current requirements of the applicable statutes, regulations and the provisions of the license.

"Contrary to the above, NPI's low-level radioactive waste disposal plan was submitted to MDE on December 10, 1999. The Department reviewed the plan and determined it to be inadequate. Deficiencies in NPI's low-level radioactive waste disposal plan were defined in a March 20, 2000 Departmental letter. Specifically, the plan submitted by NPI failed

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to include a waste shipment schedule that met required deadlines described in License Condition 21.B. As of this date, NPI has not submitted an acceptable comprehensive plan to the Department nor adequately responded to the Department's deficiency letter."

Response

3.1 When License Condition 21 was first proposed by MDE it was clear to both MDE and Neutron that we would not be able to comply with its terms as written. MDE refused to consider any modifications, forcing us to develop a practical alternative, which we submitted as our Waste Disposal Plan. As you know, Condition 21, as written, would cause Neutron to incur inordinate financial costs and expose its employees to unnecessarily high levels of radiation, thereby forcing Neutron into clear violations of ALARA as defined in both NRC and Maryland regulations.

3.2 The waste disposal plan preceded (and was largely incorporated into) our On-Line Decommissioning Plan. At the time we submitted the waste disposal plan, we were still operating under our -01 license, thereby enabling us to generate sufficient cash flow to perform the first two years of our On-Line Plan. As you are aware, your decision to discontinue our -01 license operations makes it much more difficult, if not impossible, for us to fund and perform on either of our Plans.

3.3 Moreover, the only facilities currently able to accept much of our RadWaste are the Chem-Nuclear facility in Barnwell, South Carolina, (the continued availability of which to Maryland licensees is far from certain), and the containerized Class A cell at Envirocare. As you know, Maryland (as well as most of the other states in the country) has failed to comply with the Low Level Waste Policy Amendments Act of 1985 (the "LLWPAA") which obligated each state to provide disposal facilities for low level RadWaste generated within its borders or region. This failure on the part of the states has produced a tenuous situation which places our future ability to send RadWaste to Barnwell in doubt and which has emboldened the State of South Carolina, and now, apparently, the State of Utah, to impose a tax on out-of-state RadWaste that is clearly designed to punish the licensees of other states for the failure of their State Governments to comply with the LLWPAA, and considerably increase the cost of disposal for licensees such as Neutron.

3.4 Despite all of the uncertainties, the plans we submitted (though unacceptable to you) have thus far proven to be practical, and describe how we would dispose of waste generated by continuing -01 licensed operations as well as waste currently on-site. Our Plan, though viable, is not a sacred cow, and is subject to mutually agreeable modification for good cause. Thus,we would welcome an opportunity to meet together with MDE, the NRC, and other appropriate parties to arrive at a mutually agreeable course of viable action.

Corrective Action

3.5 At some point, the State of Maryland may well become as interested as Neutron in a truly viable approach to RadWaste Management and ultimate disposal. Meanwhile, we have presented a series of proposals which were technically and economically viable in both the short term and long term, and were well designed to cope with the technical and economic uncertainties arising from the fact that the field of RadWaste management and disposal still lacks sound standards and effective competition for the safe and efficacious long term management and ultimate disposal of the type of RadWaste at issue between us.

3.6 We recognize this as a major point of contention between MDE and Neutron and we hereby repeat our request for a face to face meeting, preferably in the presence of mutually agreeable people from NRC, EPA and DBED, to attempt to explain our position, better understand your position, and hopefully resolve our differences. Recognizing that your inspectors are not authorized to change this condition, we hope that MDE top management will be present in order for the meeting to be efficient and constructive. We have requested such a meeting several times in the past, and MDE has refused to participate. We hope you will reconsider your position in that regard.

Alleged Violation #4 states:

> *"Section C.29(C)(2) titled, 'Financial Assurance and Recordkeeping for Decommissioning' requires the licensee to submit a Decommissioning funding plan and financial assurance in accordance with dates and criteria set forth in this section. Furthermore, the Montgomery County Circuit Court Order requires NPI to comply with all current requirements of the applicable statutes, regulations and the provisions of the license.*
>
> *"Contrary to the above, NPI failed to provide an adequate decommissioning funding plan and financial assurance instrument necessary to pay for decommissioning of the license in accordance with the criteria set forth in this regulation. On October 20, 2000, the RHP received NPI's Decommissioning Plan dated October 27, 2000, which included a planned schedule for radioactive waste shipments. The Department reviewed this plan and determined that it was <u>inadequate</u> because if failed to demonstrate compliance with current radioactive material license waste disposal criteria. For example, Table 2.1 described a 12-year shipment schedule resulting in only a small fraction of the total activity of current radioactive waste inventory being shipped. As NPI is aware, all radioactive waste specific to the manufacturing license generated prior to August 1999 is required to be shipped for disposal on or before August 2004. The plan also failed to describe the shipment schedule and protocol for the disposal of all contaminated soil in storage. NPI has been in continuous violation of the above requirements since April 13,*

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1999 as upheldby the Maryland Court of Special Appeals Case No. 2338 filed September 19, 2001."

Response

4.1 As you are well aware, MDE has discontinued operations conducted under Neutron's -01 license because we could not meet your requirement to post at least $15 million to cover what you believe will be the future cost of decommissioning our facility by your shut-down approach. As an alternative, we developed an On-Line Decommissioning Plan which we could fund out of a portion of the cash flow generated by continuing operations. We had completed the first two years of this Plan ahead of schedule and under budget, when you discontinued the Plan's implementation. Now, you cite us for not having an approved plan and ask for corrective action. Clearly, if we could provide corrective action which would satisfy you, we would not be in this situation.

4.2 Regarding some of the specifics, it is true that although Table 2.1 of the decommissioning plan addresses the largest volume component of Neutron's RadWaste inventory, it only addresses a small fraction of the activity component of that inventory. This is primarily due to the high curie surcharge associated with disposal at Barnwell, which is structured in such a way as to encourage licensees such as Neutron to maximize the extent of disposal by decay and minimize the number of shipments. For example, the cost of one shipment containing 4,500 Ci has a small fraction of the surcharge associated with 90 shipments containing 50 Ci each, as suggested at one time by MDE. Thus, Neutron has planned the "Big Shipment" at the end of its decommissioning plan, rather than a series of moderate activity shipments in the interim. Such an approach is clearly ALARA because:

most of the activity at issue is encapsulated and stored in pools and canals where it is well-shielded and contributes nothing to the radiation dose rate or the level of risk within the facility or in the community;

any time we ship significant amounts of high activity waste, we are likely to incur increased personnel exposures, so consolidating all the high activity waste in one such shipment helps to minimize personnel exposures; and,

allowing the waste to decay for as long as practical before shipping it for disposal will reduce the occupational exposure of our employees in preparing the shipment, reduce the hazards of the transport itself, and will reduce the handling hazard and any associated occupational exposure at the disposal site.

4.3 In this NOV, MDE is insisting that all RadWaste generated before August, 1999 be shipped by August, 2004. By taking this inflexible position, MDE has simply created another

unachievable demand whereby Neutron must either not ship all of its waste in the manner prescribed (thereby violating your interpretation of the license condition), or it must violate ALARA because implementation of condition 21 would result in significant, unnecessary, easily avoidable radiation exposures to our employees and would severely misallocate the company's financial resources. Preferably, we can negotiate genuinely practical License Conditions which allow us to remain compliant with ALARA.

4.4 Regarding the shipment of contaminated soil, as MDE is aware, the contained activity is so low that the packaged soil provides effective shielding, and we have been using it in that capacity for several years. Among other things, it has been an effective tool in our efforts to reduce exposures to members of the public and our own employees.

4.5 Furthermore, guidance provided by the NRC in its License Termination Rule indicates that ALARA should be used when determining the extent of remediation and waste disposal to be conducted, including the oft-repeated statement that:

> "[d]etermination of the levels which are ALARA must take into account consideration of any detriments, such as traffic accidents, expected to potentially result from decontamination and waste disposal."

Our ALARA analysis shows that shipping the contaminated soil would cost a substantial amount of money with no off-setting radiation health benefit because shipment of all contaminated soil would actually increase dose rates both within the facility and in the community due to loss of convenient and inexpensive shielding. When other detriments (such as the increased potential for traffic accidents) are considered, the ALARA analysis recommends even more strongly against shipping the soil for disposal, as distinguished from allowing it to decay to inconsequence and using it constructively in the interim.

4.6 That said, in order to attempt to satisfy what it considers to be unreasonable demands on the part of MDE, Neutron has been investigating disposal at Envirocare, as well as other options, regarding the possible shipment of contaminated soil and, in the event that becomes necessary or desirable, Neutron has provided for such shipments in its decommissioning plan. RHP's insinuations that unshipped RadWaste constitutes an ALARA violation are strongly contradicted by available data which indicates that both occupational and public exposure have been significantly and more or less continuously reduced over the last 5 years pursuant to Neutron's much more viable approach to both ultimate decommissioning and interim waste disposal.

Alleged Violation #5 states:

> *"Section C.29(g)(2) titled 'Financial Assurance and Recordkeeping for Decommissiong' states that no person shall receive, possess, use, transfer, own, or acquire radioactive*

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material of a type described in paragraphs (a) and (b) of C.29 for more than 180 days following the dates prescribed in the section for submittal of a decommissioning funding plan or certification, if the decommissioning funding plan or certification has not been approved by the Agency. Furthermore, the Montgomery County Circuit Court Order requires NPI to comply with all of the current requirements of the applicable statutes, regulations and the provision of the license.

"Contrary to the above, NPI continues to violate financial assurance requirements. NPI's submitted decommissioning funding plan is inadequate and has not been approved by the Agency. Failure to provide an adequate decommissioning funding plan and failure to commence required activities necessary to decommission the facility in a timely, safe and predictable manner, results in NPI remaining in continuous violation of this requirement since April 13, 1999."

Response

5.1 This alleged violation is essentially the same as the previous one. We were unsuccessful in getting you to approve our approach to self-funded decommissioning. We do not have the financial resources to immediately decommission our facility as you would like. Our facility is still viable and we had no business reason to decommission it at this time. Thus, our plan relied on revenue generated from its continuing operation to fund its ultimate decommissioning. By prematurely discontinuing its operation, you have removed our source of revenue and, it follows that the progress we were making on facility decommissioning has been severely compromised.

Corrective Action

5.2 The most viable mechanism whereby we can resume our decommissioning progress is to get authorization to resume -01 licensed operations. The court has given you the authority to grant us the necessary authorization, our customers assure us that there is still demand for our sources from hospitals both at home and abroad, and we believe we could be operational within a matter of weeks of receiving the necessary authorizations.

Alleged Violation #6 states:

"Section C.31 titled, 'Specific Terms and Conditions of Licenses' and License Condition 21(B) prohibits NPI from storing radioactive material waste generated after August 1999 in the main pool/canals for periods of time exceeding 4 years and radioactive material waste stored in areas other than the main pool/canals for periods of time exceeding 2 years. Neutron has refused, in an apparently willful manner, to ship for disposal the following containers of radioactive waste in accordance with licensed waste shipment requirements. Furthermore, the Montgomery County Circuit Court Order requires NPI

to comply with all of the current requirements of the applicable statutes, regulations and the provisions of the license.

"Contrary to the above, NPI failed to ship the following radioactive waste by the required shipment due dates. (see Table in NOV)"

Response

6.1 Much of our response to alleged violation 4 above (sections 4.3 - 4.5 in particular) are applicable to this alleged violation as well. In short, the implementation of the schedule in condition 21 requires us to choose to either violate the license condition or to violate ALARA, which is a regulation, by misallocating our human and material resources. Faced with such a situation, we have no choice but to comply with ALARA.

6.2 In addition, as discussed in several other places in this response, the implementation of our waste disposal plan requires a means of funding. When you halted our ability to generate revenue under the -01 license and disabled our hot cell, you severely impacted our ability to ship waste.

6.3 Despite this setback, we are contemplating additional waste shipments in the future, and - meanwhile - have worked to reduce the impact of the RadWaste in storage on the annual doses received by our employees and members of the public. We are encouraged by the results of these efforts.

Alleged Violation #7 states:

"Section C.32 titled, 'Expiration and Termination of Licenses and Decommissioning of Sites and Separate Buildings or Outdoor Areas' requires, in part, that each licensee begin decommissioning its site, buildings and outdoor areas in accordance with Agency requirements or submit a decommissioning plan within 12 months subsequent to when the licensee's right to operate has been terminated either by court action or by action of law or regulation. Section C.32(g)(1) requires a licensee to complete decommissioning as soon as practicable but no later than 24 months following the initiation of decommissioning. Section C.32(g)(2) requires the licensee to request license termination as soon as practicable but no later than 24 months following the initiation of decommissioning. MDE's right and obligation to enforce Section C.29(g)(2) requirements was upheld by the Maryland Court of Special Appeals in December 2001. Furthermore, The Montgomery County Circuit Court Order requires NPI to comply with all of the current requirements of the applicable statutes, regulations and the provisions of the license.

"Contrary to the above, NPI failed to submit a license termination plan and adequate

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decommissioning plan to the Department as required by paragraphs (f) and (g) of these regulations. Furthermore, NPI has not begun to decommission the site, buildings and outdoor areas as defined by these regulations."

Response

7.1 We take issue with your claim that the Court of Special Appeals insisted on MDE's "*obligation* to enforce Section C.29(g)(2)." The way you have phrased it, it sounds as though MDE had no choice but to proceed with its shut down of Neutron's -01 licensed operations. As you have asserted repeatedly in the past, MDE has broad discretion in the enforcement of its regulations and, in the Second Modification to Permanent Injunction, the Court gave MDE express permission to approve further -01 licensed operations without securing additional approvals from the Court.

7.2 By mid-June, 2002, Neutron had received orders for two dozen sources, the fulfillment of which would have afforded cancer treatment to hundreds of additional patients, and would have funded at least two additional years of our On Line Decommissioning Plan. If MDE had approved Neutron's requests at the time in 2002, those two years of decommissioning progress would be completed by now. It is not that MDE was somehow prevented from granting Neutron the authorization to proceed with its Plan, it is that MDE did not want to do so. Instead, MDE has simply tried to foist the responsibility to pay for the facility decommissioning off on the EPA. We have no interest in seeing the decommissioning of this facility funded by taxpayer dollars, but rather believe that we have a viable plan to do so ourselves assuming a modicum of cooperation from our regulators, which has not been forthcoming thus far.

7.3 We also take issue with your claim that no decommissioning progress has taken place. Under separate cover, we have documented this progress, the highlights of which include the consolidation of hundreds of sources into a few dozen useful sources and the shipment of a significant volume of RadWaste. It is not unreasonable to expect that such progress will be interrupted if the means to fund it is disrupted, and that is what has happened in this case.

Alleged Violation #8 states:

"COMAR 26.12.03.02 paragraph E titled, 'Annual Fees for Licenses to Possess or Use Radioactive Materials' requires a person with a license to possess or use radioactive material, to pay to the Department an annual licensing fee in accordance with a fee schedule set forth in Regulation .03C of this chapter. The fee shall be paid on or before the first day of the month in which the anniversary of the license date occurs. Furthermore, the Montgomery County Circuit Court Order requires NPI to comply with all of the current requirements of the applicable statutes, regulations and the provisions of the license.

> *"Contrary to the above, for the years 2003 and 2004, NPI failed to pay their annual licensing fee regarding the current storage and oversight of radioactive materials on premise pursuant to remaining activities conducted by NPI under the former MD-31-025-01 license. Although the Maryland Court of Special Appeal upheld all regulatory requirements associated with Section C.29(g)(2), the payment of the annual fee is required by NPI until its manufacturing facilityis fully decommissioned and the license is terminated in accordance with the criteria specified in Section C.32 titled, 'Expiration and Termination of licenses and Decommissioning of Sites and Separate Buildings or Outdoor Areas.'"*

Response

8.1 On April 23, 2003, we wrote a letter to Ms. Audra Mack at MDE explaining our position on the annual licensing fee. In short, we have been improperly invoiced and we are entitled to a refund going back to 1999. A copy of the letter has been enclosed for your information, and an update of our position will follow.

Concern #1 states:

> *"Inspection findings reveal that NPI still does not have sufficient trained personnel, financial resources and management commitment to decommission the Limited Access Area (LAA) in a timely, safe and predictable manner as required."*

Response

We take issue with the findings described in this concern. The decommissioning of the LAA is addressed in our responses to alleged violations 4, 5 and 7.

Concern #2 states:

> *"NPI continues to release radioactive materials into the environment in an uncontrolled manner."*

Response

Please see our response to alleged violation #2.

Concern #3 states:

> *"Dickerson residents living near the plant are being exposed to unnecessary levels of radiation caused by radioactive waste stored on site. NPI has consistently and*

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irresponsibly missed many waste shipment deadlines. NPI still does not have a written plan or a commitment from management to ship approximately 2500 curies of radioactive waste prior to the August 2004 deadline."

Response

Please see our response to alleged violations 2, 3, 4, and 6.

Concern #4 states:

"NPI has still not submitted an adequate decommissioning plan or waste disposal plan prepared in accordance with licensed waste shipment criteria."

Response

Please see our response to alleged violations 3 and 4.

Concern #5 states:

"Specific to the long ongoing and unclosed nature of many violations, NPI management and their Health Physics Consultant have not been effective in resolving these violations and concerns. Most of these violations and concerns are not being addressed in either the monthly radiation protection audits or the annual review of the radiation protection program-content and implementation. The monthly audits were often found to address issues unrelated to problems at the Dickerson facility and appear to provide only minimal improvement to the radiation safety program at NPI."

Response

Your concern regarding the work of Neutron personnel and the Health Physics Consultant got me thinking about the effectiveness of their efforts. You remark that they have been spectacularly ineffective because, essentially, they have not been able to satisfy your staff on the three issues described above - which are all major impasses between our two organizations. On the other hand, I am encouraged that there were essentially no findings arising out of this inspection which were not directly related to our big 3 administrative impasses, a fact which leads me to believe that they must be doing a good job on all of their health physics and regulatory responsibilities, which your staff always investigates so thoroughly.

I am confused by your statement regarding the monthly audits addressing "issues unrelated to problems at the Dickerson facility." As you know, we have two monthly audit programs. The

internal audits conducted by Neutron management deal almost exclusively with the Dickerson facility. The other program, conducted by the Health Physics Consultant, is also focused primarily on the Limited Access Area. His monthly report always addresses topics related directly to his audit of the LAA. It is true that his training sessions and reports often also address broader subjects which are not unique to our facility, a practice which is totally consistent with a consultant's role in presenting a fresh perspective.

Finally, the annual review of the radiation protection program is focused on many of the items addressed in this response, including dose to members of the public, dose to employees, compliance with regulatory limits concerning the release of radioactive material in air and sewer, RadWaste management, etc, although it does not address alternative means for funding the decommissioning project, as that is outside of the scope of a health physics review.

Concern #6 states:

> *"NPI continues to operate under a court order-permanent injunction without an approved waste disposal plan and an approved decommissioning plan. Furthermore, NPI still has not implemented corrective actions necessary to comply with ongoing violations regarding waste disposal, soil concentration limits, radiation levels, releases of radioactive material, financial assurance for decommissioning and license termination."*

Response

This concern is essentially a summary of your letter and its attached list of alleged violations. It is addressed in the cover letter, as well as in specific responses to alleged violations 1 through 7.

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Neutron Products, Inc.
Dickerson, Maryland
Radiation Protection Program Review
Maryland License MD-31-025-01
2003

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June 30, 2004

Introduction

Maryland's revised *Regulations for the Control of Ionizing Radiation (1994)*, COMAR 26.12.01.01, Section D.101.c, requires licensees to "review the radiation protection program content and implementation" at intervals not to exceed 12 months. This review covers the entire period of 2003.

Overview of Radiation Protection in 2002

The entirety of 2003 was spent operating under court injunction which severely curtailed activities conducted under the 01 license. No cobalt-60 sources were manufactured, shipped, received, or transferred at Dickerson at any time 2003. Health physics and radiation protection activities continued.

In January, the long-time manager of the LAA, citing the lack of meaningful work, resigned to pursue other opportunities. His duties and responsibilities have been taken on by the Pool Operations Manager without apparent problems. The regular LAA staff now numbers three, although members are frequently detailed to other operations. Despite the reduced staffing, radiation protection activities have not suffered to any extent. Routine health physics, maintenance, and housekeeping activities have continued at or above their historical levels.

Occupational Exposure

A total of 55 employees were monitored by thermoluminescent personal dosimetry during part or all of 2003. The collective occupational WB exposure for these employees was 2.839 person•rem DDE. Full-time LAA staff (3 employees) accounted for 1.754 person•rem DDE, 61.8% of the total collective exposure. Employees with short-term assignments in the LAA accounted for 0.0461 person•rem DDE or 1.6% of the total exposure. Teletherapy (3 employees) accounted for 0.850 person•rem DDE or 29.9% of the total. Irradiator operators and other employees received 0.024 person•rem and 0.165 person•rem DDE, respectively.

The collective exposure for 2003 was 31% lower than that for 2002 and only about one-fourth of what would be expected under normal operations.

Of the 55 monitored employees, 44 or 80% received no measurable[1] occupational exposure in 2002. 6 or 11% received between 0 and 100 mrem; 1 between 100 and 300 mrem, and 4 between 300 and 1000 mrem. No employee received more than 1 rem.

The highest individual annual exposure in 2003 was 850 mrem, compared to 1059 rem for the previous year. For 2003 the highest exposure resulted not from LAA/hot cell operations, but from teletherapy. However, there is some suspicion as to the accuracy of this exposure, because it is significantly higher than that derived from SRD readings and higher than expected from historical precedent. The individuals teletherapy duties required frequent air travel at a time when X-ray surveillance of luggage, both checked and carry-on, has greatly increased. It has been hypothesized that at least a portion of the 850 mrem is attributed to exposure from this source and not occupational exposure. The matters remains under investigation and results so far have been

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[1] The minimum detectable exposure for a single TLD is said to be 10 mrem, exposure less than the minimum detectable are reported as 0.

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inconclusive. Lacking authoritative data to make an administrative correction, the 850 mrem remains the WB DDE of record. The highest exposure for a LAA regular in 2003 was 634 mrem.

Major Operations of Radiological Significance

There were no operations involving collective exposure in excess of 1 person-rem or individual doses greater than 500 mrem conducted in 2003.

Exposure to Members of the Public

Exposure to members of the public residing close to the Dickerson facility were determined on the basis of dosimetry, surveys, and information provided by individual neighbors regarding their living habits. Of the closest residences, the Fisk house usually receives the highest exposure. However, the house was unoccupied for the first half of the year.

TLDs were placed inside and outside the Fisk house and collected quarterly. Additional dosimeters were placed inside and outside at the Lamson residence, and at Neutron's rental property, currently being occupied by the Carter family.

In addition, a Neutron employee occupied the "white house" located on the site for a period of 139 days in 2003. Routine dosimetry located in the house was used to determine his dose as a member of the public, as distinguished from his occupational exposure. For the period in which the employee occupied the house (January 1 through May 19) background corrected dosimetry results were 18 mrem (inside) and 26 mrem (outside). The employee was assumed to be present as a member of the public for 118 hours per week and so his estimated background corrected exposure as a member of the public for 2002 is 14 mrem.

The occupants of the rental property are assumed to be away from the home an average of 50 hours per week and to spend an average of two hours per day outside at the higher dose rate. Background corrected dosimetry results for 2002 were 43 mrem (inside) and 60 mrem (outside). The estimated exposure for each member of the household was 32 mrem making them the highest exposed cohort for last year.

For the half year that the Fisk house was occupied, background corrected dosimetry results were 27 mrem (inside) and 24 mrem (outside). Year long results for the Lamson house were 22 mrem (inside) and 28 mrem (outside).

Internal exposure to the most highly exposed cohort from airborne release from the hot cell exhaust is less than 1 mrem CEDE as determined using EPA's COMPLY V1.5d program.

Contamination and Housekeeping

With the cessation of productive activities, typical removable contamination levels on floors and elevated surfaces has been markedly reduced as might be expected. By December, almost all smears collected outside of Contamination Control Zones were below the minimum detectable concentration for a 1 minute count (113 dpm/100 cm^2). Only in the room behind the cell do some samples still exceed 1000 dpm/100 cm^2; however they are an order of magnitude less than were previously typical for the same area in 2001.

Monthly floor surveys of the plant outside the LAA were negative for removable contamination during the 12-month period This remains evidential that the transition zones and LAA entry/exit procedures are effective in controlling the migration of contamination from the LAA.

Perimeter Monitoring

Twenty-five perimeter locations surrounding Neutron's Dickerson site were monitored using TLDs throughout 2003. One additional location was monitored at Lytle's warehouse and was used as a background reference. The control badge data was analyzed but no background correction was made for the perimeter dosimetry. Natural background was measured at 85 mrem.

No perimeter location exceeded 500 mrem gross dose in 2003. The highest dose points on the perimeter were badge 2013, located on the south fence near the bulk chemical unloading off-loading station, with a gross dose of 256 mrem (net dose of 171 mrem) for the year, and badge 2019, located on the south fence at the dry pond, with a gross dose of 253 mrem (net dose of 168 mrem) for the year. These points have consistently had the highest readings of any of the perimeter locations monitored and are essentially unchanged from the previous year. The 2019 position is located directly above contaminated soil which is downstream from the dry pond discharge. The 2013 location has a direct line of sight to the waste rooms and therefore has a significant dose contribution from direct as opposed to scattered (skyshine) radiation.

Internal Radiation Exposures for LAA Operations

The estimated CEDE for LAA entrants was derived using available air sampling data and entry records and the methodology adopted for the 1996 review; however, total occupancy in the LAA was assumed to be 1200 hours. This assumption was made to simplify our analysis, and is consistent current LAA staffing patterns. The conservative nature of this methodology has been discussed previously. As in previous years, internal exposure from airborne activity did not exceed the regulatory requirements for summation. The average airborne activity for samples collected in the LAA during 2003 was 2.12×10^{-11} $\mu Ci/cm^3$, which is approximately

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0.2% of the Derived Air Concentration for Cobalt-60, Class Y. Assuming all activity as Class Y, the CEDE for inhalation would be 6.4 mrem, or 1.2% of the action level for summation. Because of the conservative nature of the assumptions used to derive this estimate, it is unlikely that the routine internal exposure actually approaches 6 mrem.

The annual whole body count data corroborated the air sampling findings. None of the twelve persons evaluated had body burdens of Co-60 above the 2 nCi minimum detectable activity. The ALI (inhalation) for Class-Y cobalt-60 is 30,000 nCi.

The mini-HECM portal monitor is capable of detecting internal Co-60 contamination of about 100 nm or more. No ingestions or inhalations were detected during 2002.

Off-Site Surveys

In 2003, 12 offsite surveys were conducted covering approximately 19 acres. No activity was detected. One "spot" was found on-site.

Employee Home and Vehicle Surveys

No contamination was detected in vehicle or home surveys during 2003.

Releases of Radioactivity

During 2003, the average concentration of radioactivity from the hot cell exhaust system as determined from mini-sampler data was 2.57×10^{-13} µCi/cm^3. This is only 0.5% of the Part D, Appendix B, Table II limit of 5×10^{-11} µCi/cm^3 for Class Y cobalt-60. Total release of activity from the hot cell exhaust during 2002 is estimated to be 3.7 µCi, assuming all activity to be cobalt-60. About 10% of the measured activity attributed to cobalt-60 is, in fact, naturally occurring radon daughters, mostly bismuth-214.

During 2003, a total of 339,000 gallons of sewage was shipped to the WSSC, the average release of activity to the WSSC was 1.67×10^{-6} µCi/ml. No monthly average exceeded 3.0×10^{-5} µCi/ml. The release to the WSSC for 2003 was 2.137 mCi or 0.21 % of the 1 Ci annual limit for release.

Despite the a marked reduction in contamination levels within the LAA, we are still seeing some transient release of cobalt-60 to the LAA courtyard. This activity is ionically bound to humic matter and swept by storm water to the courtyard drains. While the majority of the activity is removed by the stone trap, approximately 25% escapes downstream, ultimately to the dry pond and its environs. Survey and dosimetric data indicate that the

Evaluation of Program Components

Neutron's Radiation protection program was previously documented as a number of policies, programs, and procedures. Each of these addressed different aspects of radiation protection and taken as a whole where adequate documentation. However, it was desirable to have a master document which encompassed the totality of radiation protection at Neutron. A comprehensive *Radiation Protection Program*, which ties the various existing programs and procedures which embody our protection program into a cohesive whole was approved and adopted in December 2002. This program is analogous to a Quality Assurance Program. It specifies 21 elements which are reviewed here.

Section	Title	Status
4	Review	Requires an annual program review pursuant to COMAR 26.12.01.01, D.101.c and specifies minimum requirements for inclusion. This review was completed within the 12-month period.
5	ALARA	Requires a documented ALARA program conforming to NRC Reguides 8.10 and 8.37 and NUREG 1530. We have documented and implemented a compliant ALARA program.
6	Management Oversight	Specifies a Radiation Safety Committee and its duties with minimum requirements for meetings and requires a documented program for internal reviews. The RSC and Internal Review programs are adequately implemented.
7	Occupational Exposure...	Requires a documented program for controlling and monitoring occupational exposure and minimum provisions for such. Our program, now at Revision 7, and its implementation are compliant.
8	Public Exposure...	Requires a documented program for controlling and monitoring public exposure and minimum provisions for such. Our program's implementation is compliant.
9	Planned Special Exposures	Requires documented procedures to be established and maintained prior to any PSE. We have not conducted any PSEs, have no current plans to do so, and seriously doubt whether RHP would authorize one, thus we have not yet written a procedure.

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Section	Title	Status
10	Leak Testing	Requires documented procedures for leak testing sources and targets. Implementation is adequate.
11	Control of Access	Specifies Restricted Areas and the Limited Access Area and requirements for access control, entry/exit, posting, etc. and gives requirements for High and Very High Radiation Areas. Implementation is effective
12	Respiratory Protection	Requires a documented respiratory protection program compliant Sec.D.703, 29CFR 1910.134, and ANSI Z.88.2. The *Radioactive Respiratory Protection Program* is in compliance. Implementation is addressed below
13	Storage and Control of Licensed Material	Establishes the LAA as repository for "01" licensed material and exceptions to such. Requires a documented inventory. Implementation is adequate. A physical inventory, which can not be completed without access to the hot cell would be very desirable.
14	Precautionary Procedures	Requires surveys to identify radiation areas and posting of such and documented procedures for receiving packages. All radiation areas were posted in 2003. We have no general procedure for package receipt, but adequate instructions in procedures for individual containers. No radioactive material was received at Dickerson in 2003.
15	Waste Management	Requires a documented program for waste management. Such a program was submitted in our decommissioning plan which was rejected by RHP.
16	Contamination Control	Establishes various procedures for contamination control including CCZs, clean room, transition area and portal monitoring. Implementation is adequate.
17	Process Safety Control	Requires procedures/RWP's for certain operations involving potential for exposure or release of radioactivity. Implementation is adequate. RWP's were revised in 2003 to reflect personnel changes.
18	Environmental	Requires a documented procedure for the regular surveillance of the Dickerson property and the surrounding area. Implementation is adequate.

Section	Title	Status
19	Irradiators	Requirements for irradiators. (See annual report for 04/05 licenses.)
20	Teletherapy	Requirements for teletherapy. (See annual report for 03 license.)
21	Measurements	Specifies RAMs, RSMs, counters; requires calibration procedures and schedules; minimum requirements for dosimetry services. Implementation is adequate.
22	Training	Requires a documented training program and specifies elements thereof. A draft revision of the a new training program has been submitted to RHP. No action has been taken. In the interim we continue quarterly training by the HPC augmented by additional training from the RSO and staff.
23	Document Control	Requires a procedure for distribution and control of documents. We use the corporate wide procedure. Implementation is adequate.
24	Recordkeeping	Requirements for the retention and storage of relevant records. Implementation is mostly adequate.

Regulatory Compliance - Adequacy of Content and Implementation of the Radiation Protection Program

COMAR Section	Adequacy of RPP Content for Compliance	Adequacy of Implementation
D.101a ALARA	The ALARA program as written meets NRC guidelines for ALARA for occupational exposure and release.	See below

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COMAR Section	Adequacy of RPP Content for Compliance	Adequacy of Implementation
D.101b RPP	The RPP was previously documented as a number of policies, programs, and procedures. A comprehensive Radiation Protection Program, which ties the various existing programs and procedures which embody our protection program into a cohesive whole was approved and adopted in December. This program adequately addresses the requirements of Part D.	See above
D.101c Annual Review		This annual review for 2002 is in compliance.
D.201 Occupa-tional Exposure	Revision 7 of the Control of Occupational Exposure was approved in December 1999. Many of the elements of Rev. 7 were already in practice. The program is compliant.	Implementation of the RPP is adequate for compliance with occu-pational dose limits
D.202 Summation	Under current conditions, internal occupational exposure is well below the level requiring summation of internal and external doses, and the WBE TLD serves as the dose of record.	Under current conditions the RPP provides adequate means to keep routine internal exposures significant-ly below the summation requirement. Accidental exposure exceeding 500 mrem TEDE, has occurred only once, in 1991.
D.203 External dose from airborne	External dose from airborne activity is inconsequential, but nevertheless, would be adequately determined by existing procedures	Adequate.

COMAR Section	Adequacy of RPP Content for Compliance	Adequacy of Implementation
D.204 Determination of Internal Exposure	Although not required pursuant to D.502, the RPP dictates a variety of methods for evaluating airborne activity and for monitoring internal exposure. Personnel sampling is not used routinely (and at typical airborne concentrations would not be practical) but is used for high airborne exposure operations requiring respiratory protection. Site sampling is used to estimate routine exposure. While this sampling method may not be completely representative of the breathing zone, the assumptions applied in the estimation are conservative, and whole body and HECM counts confirm CEDEs are an order of magnitude below the D.502 sampling requirement.	Implementation of existing practice is in compliance. Any significant intake is readily detected with existing instrumentation and practices.
D.205 Prior Dose	The existing practice is compliant with the D.205a requirement to determine dose within the year and to obtain records of lifetime accumulated dose.	We have not conducted planned special exposures, nor have we hired any employee with a previous planned special exposure elsewhere.
D.206 Planned Special Exposures	The RPP requires that a documented program for planned special exposures be implemented prior to conducting planned special exposures.	Not applicable. Planned special exposures have not been conducted.
D.207 Occupational Dose to Minors	While the revised COMAR allows minors to receive occupational dose at 10% of that allowed for adult workers, elsewhere Maryland labor law specifically forbids the employment of anyone under age eighteen in occupations involving exposure to radiation.	Neutron employs no one under eighteen.

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COMAR Section	Adequacy of RPP Content for Compliance	Adequacy of Implementation
D.208 Dose to Embryo/ Fetus	The new employee checklist includes the notification to women of the provisions of D.208.	All women employees have received written and oral instruction on the provisions of D.208. However, no woman is currently assigned to duties with expected exposures in excess of 500 mrem in any 9-month period. There were no pregnancies, declared or otherwise, in 2003.
D.301 Members of the Public	The RPP reflects the 100 mrem annual limit to members of the public and the 2 mrem per hour limit in unrestricted areas.	We were in compliance in 2003. The highest exposed cohort received approximately 32 mrem, based on TLD data and conservative assumptions. No area outside of the restricted areas exceeded 2 mrem per hour.
D.302 Compliance with...	The draft revision of the RPP documents measures established to demonstrate compliance with public dose limits.	With TLD measurements at the more highly exposed homes we can demonstrate compliance consistent with D.302b.ii(1).
D.401 Leak Testing	The RPP and enabling procedures adequately consider D.401 as modified by our licenses	Corrective action undertaken in 1998 has remained effective, and implementation is adequate. All required wipe tests were conducted.
D.501 Surveys and Monitoring	The RPP is in compliance for 01 operations.	Corrective action was taken in 2001 to include the welding shop.

COMAR Section	Adequacy of RPP Content for Compliance	Adequacy of Implementation
D.502 Conditions Requiring Monitoring	The RPP is in compliance. Under the provisions of D.502b, we are not required to routinely monitor for internal exposure. The draft RPP provides for annual evaluation of internal exposure from available air sampling and other data to assure we remain below the 10% action limit. An unlikely intake in excess of 10% of the ALI would be readily detected by the HECM and quantified by follow up whole body counts.	Implementation is adequate
D.601 Access to High Radiation Areas	The RPP is in compliance.	All high radiation areas are accessible only from the LAA with exception of the waste storage roof. Access to these areas is locked when not under the direct control of authorized and knowledgeable personnel.
D.602 Very High Radiation Areas	The RPP is in compliance.	The three potentially very high radiations are the hot cell and the irradiators. All three units have access control systems which are compliant with D.602
D.701 Respiratory Protection Engineering Controls	The RPP and respiratory protection program are in compliance.	To the extent practicable, engineering controls are used to limit concentrations of airborne radioactivity. Under routine conditions these controls are effective. Average airborne concentrations of Co-60 in the LAA were less than 1% of the DAC for Class Y.

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COMAR Section	Adequacy of RPP Content for Compliance	Adequacy of Implementation
D.702 Respiratory Protection Other Controls	The Radioactive Respiratory Protection Program has been revised to reflect regulatory changes in both Part D and 29CFR 1910.134. Implementing procedures are under draft review.	Minor recordkeeping nonconformances were noted in 2000. Corrective action has been undertaken to correct areas of noncompliance.
D.703 Respiratory Protection Equipment	The respiratory protection program revision was completed in December 2001 (and approved in March 2002.	Implementation is adequate. No use of RPE was required in 2003.
D.801 Security of Stored Sources	The RPP is compliant.	The security of cobalt-60 sources is unquestioned. However, on several occasions, the RHP found DU in an unlocked cargo container outside of the LAA. Corrective action has been undertaken, no non-compliances occurred in 2002. Additional security measures have been implemented post 9/11 in response to NRC communiques.
D.802 Control when not in Storage	The RPP is compliant.	Implementation is adequate.
D.901 Caution Signs	The RPP is compliant.	Implementation is adequate.
D.902 Posting	The RPP is compliant.	Implementation remains adequate.
D.904 Labeling	The RPP is compliant.	Implementation is for the most part adequate, however, labeling of DU containing parts was missing or insufficient. Corrective action was undertaken and no non-compliances were noted in 2003.

COMAR Section	Adequacy of RPP Content for Compliance	Adequacy of Implementation
D.906 Receiving and Opening Packages	The RPP is compliant	Implementation is adequate. No radioactive material was received in 2003.
D.1001 Waste Disposal	The RPP is compliant	Implementation is adequate. No radioactive waste shipments were made in 2003.
D.1003 Sanitary Sewage	The RPP is compliant	Implementation is adequate. (See Page 4)
D.1007 Transfer and Manifests	The RPP is compliant	Implementation is adequate.
D.1101 - D.1111 Records	The RPP is compliant	Previous recordkeeping problems have been resolved and no non-compliances were noted in 2003.
D.1201 - D.1206 Reports	The RPP is compliant	Implementation is adequate.

ALARA

The collective exposure for 2003 was 2.839 person•rem, a 31% decrease from the previous year. This decrease is largely attributed to the court ordered injunction against productive activities in the LAA..

Neutron deploys 16 environmental dosimeters at fixed locations within the facility. (These are additional to the perimeter dosimeters.) These dosimeters continue to show a downward trend for ambient dose rates throughout the plant.

The sources of occupational exposure at Neutron for 2002 are estimated to be:

Hot Cell operations and support 0%

Radwaste operations	3%
Pool and Canal Operations	20%
Health Physics	40%
Teletherapy	30%
Ambient exposure outside the LAA to direct and skyshine	7%

Planned modification of the north canal ion exchange system was effected in June (see above).

The exposure to the most highly exposed members of the public was determined to be 32 mrem, a 29% reduction from that for 2002. It must be noted that the 95% confidence interval for the dosimetric methods used is ±28 mrem which is large in comparison to the annual background corrected dose rates at these low exposures.

Airborne emissions remain less than 1% of Appendix B, Table II, Column 1, effluent concentrations and account for an insignificant fraction of public exposure.

Respiratory Protection Program

Respiratory protection equipment for radiation protection was not needed in 2002. Maintenance, training, and medical clearance programs remain in effect.

Review of Selected Radiation Protection Related Procedures

Proc. No.	Title	Analysis
R1001	*Counting Procedures*	The procedure has been revised to improve QA methodology and to allow flexibility in the selection of standards. HP staff were trained on the revision and its implementation has been adequate.
R1002	*Sampling Procedure*	The procedure is adequate for its intended purpose and is properly implemented. A planned revision is in draft form.
R1003	*Procedure for Entrance to and Exit from Contamination Control Areas to the LAA Working Area*	The procedure is adequate for its intended purpose. Its provisions are generally adhered to, but occasional lapses (for log entries) have been observed.

R1006	*Disposal of Sewage*	This procedure is adequate for its intended purpose and is properly implemented.
R1007	*Radiation Detection Instrument Calibration Procedure*	The procedure is adequate for its intended purpose
R1010	*Radiation and Contamination Levels*	The procedure is adequate for its intended purpose, and is properly implemented.
R1011	*Procedure for the Limits for the Decontamination and Release of People and Personal Effects from The Limited Access Area*	The procedure is adequate for its intended purpose, and is properly implemented. A new form has been devised to expedite recordkeeping
R1012	*Procedure for Daily Operating Checkout and Routine Maintenance of the Helgeson Mini-HECM Booth Monitor*	The procedure is adequate for its intended purpose, and is properly implemented.
R2028	*Procedure for Entrance to the Limited Access Area*	The procedure is adequate for its intended purpose, and despite an occasional lapse in log entries is properly implemented. In order to reduce the number of procedures which we must maintain, this procedure could be effectively combined with R2029.
R2029	*Procedure for Exit to the Limited Access Area*	See R2028 above.

Kay

MARYLAND DEPARTMENT OF THE ENVIRONMENT
1800 Washington Boulevard • Baltimore MD 21230
410-537-3000 • 1-800-633-6101

Robert L. Ehrlich, Jr.
Governor

Michael S. Steele
Lt. Governor

Kendl P. Philt
Secre

Jonas A. Jacob
Deputy Secre

August 19, 2004

Jeffrey D. Williams, Radiation Safety Officer
Neutron Products Inc.
22301 Mt. Ephraim Road
P.O. Box 68
Dickerson, Maryland 20842

Dear Mr. Williams:

This letter responds to your June 1, 2004 written request to conduct certain hot cell activities in the Limited Access Area of Neutron's Dickerson facility. Specifically, you are requesting that the Maryland Department of the Environment (MDE) Radiological Health Program (RHP) remove seals placed on the hot cell door and manipulators to prevent activities not authorized under the Permanent Injunction, so that Neutron may conduct certain maintenance activities and other projects.

RHP staff has previously acknowledged the need to authorize Neutron to enter the cell to conduct such activities that would immediately or potentially impact radiation safety at your facility. Certain maintenance actions presented in your request, such as the replacing of light bulbs, changing of the roughing filter, calibration of the radiation monitors, exercising the manipulators and evaluating contamination levels and the contents of the hot cell tank are reasonable and will be allowed under direct Departmental oversight.

In fact, the RHP inspection staff had offered to dedicate such time during its February 2004 inspection of the former manufacturing license. However, at that time Neutron's Radiation Safety Officer acknowledged that the company did not have any personnel who were current on their respiratory fit testing certification. It is expected that the above-authorized activities could be completed in one or two days, and the manipulators and door resealed at that time, once your personnel become current. Please call us to schedule a date, if you wish to proceed to address these concerns.

Regarding the use of the radioactive waste compactor, the MDE contingently will allow its use if and when Neutron reveals its intent to ship radioactive waste and submits a written plan with specific upcoming shipment dates. To date, Neutron has failed to submit a plan containing a commitment to a shipment timetable, and so MDE will not allow its use at this time. Also, Neutron should submit to the MDE supporting documentation--a reasonable radiation safety evaluation--showing that current uncompacted waste is creating a hazardous condition at the facility.

The MDE does not accept Neutron's definition of a decommissioning project. Activities in the Neutron proposal that address this purpose are therefore not authorized because they fail to meet even the most basic requirements of the Maryland Radiation Regulations. The other items in your request are too vague in nature and scope to adequately evaluate, so those activities will not be allowed at this time. When Neutron clearly and reasonably outlines, in writing, that the specific need for entering into the hot cell and working with the manipulators is to address a potentially detrimental impact on the radiation safety or security of the facility, the MDE will respond appropriately.

Should you have specific questions regarding this letter please refer them to Roland Fletcher, Manager of the RHP, at 410-537-3300. In Maryland, you may also call toll free at 1-800-633-6101 and ask for extension number 3300.

Sincerely,

Thomas C. Snyder

Thomas C. Snyder, Director
Air and Radiation Management Administration

cc: Roland G. Fletcher
Rosewin Sweeney

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neutron PRODUCTS inc

22301 Mt. Ephraim Road, P. O. Box 68
Dickerson, Maryland 20842 USA
301-349-5001 FAX: 301-349-2433
e-mail: neutronprod@erols.com

1 June 2004

Via FAX (410) 537-3198

Mr. Roland G. Fletcher
Manager III
Radiological Health Program
Maryland Department of the Environment
1800 Washington Blvd.
Baltimore, MD 21230

Dear Mr. Fletcher,

I am writing to request authorization to enter the hot cell to perform several operations necessary either to properly maintain our -01 licensed facilities, or to advance our Decommissioning Project.

As you know, your inspectors have put seals on the hot cell door and the manipulators, thereby preventing even the most basic maintenance. Specifically, we would like to:

- replace the light bulbs and/or light fixtures in the cell so that we can see the condition of the cell, the window, etc.;
- change the roughing filter on the air exhaust system;
- calibrate the hot cell RAM;
- exercise the manipulators to determine whether or not they are still operable;
- operate the RadWaste compactor;
- evaluate contamination levels of the surfaces in the cell and decontaminate as appropriate;
- evaluate the condition of the hot cell tank and take appropriate action based upon that evaluation;
- calibrate the activity of various items in the pool and canals in order to audit our estimates; and,

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HEALTH PROGRAM

- conduct any other non-revenue-generating work designed to advance the safety and security of the facility, and/or the Decommissioning Project.

Clearly, your inspectors will have to be present to remove the seals initially. At that time, they can also observe the conduct of several of the tasks described above if they would like to do so. We anticipate that many of the other tasks will be on-going and will require extended periods of time to complete.

The opening of the cell is in the common interest of both parties and we look forward to your response so that we can schedule a visit from your inspectors and can proceed with the necessary work.

Very truly yours,

Jeffrey D. Williams
Radiation Safety Officer

cc: Charles Howland - USEPA
Chris Wagner - USEPA
John Darnell - Office of the Hon. Roscoe Bartlett

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HEALTH PROGRAM

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Neutron Products, Inc.
Dickerson, Maryland
Radiation Protection Program Review
Maryland License MD-31-025-01
2004

Prepared by
J. Williams, RSO - Facility
C. Bupp, Dosimetry Records Tech.

June 30, 2005

Introduction

Maryland's revised *Regulations for the Control of Ionizing Radiation (1994)*, COMAR 26.12.01.01, Section D.101.c, requires licensees to "review the radiation protection program content and implementation" at intervals not to exceed 12 months. This review covers the entire period of 2004.

Overview of Radiation Protection in 2004

The entirety of 2004 was spent operating under the continuing court injunction which severely curtailed activities conducted under the 01 license. No cobalt-60 sources were manufactured, shipped, received, or transferred at Dickerson at any time during 2004. Health physics and radiation protection activities continued.

Routine LAA staffing continues with only three employees who are frequently detailed to other operations. Despite the reduced staffing, radiation protection activities have not suffered to any extent. Routine health physics, maintenance, and housekeeping activities have continued at or above their historical levels.

Occupational Exposure

The TLD collective exposure results for 2004 are skewed by measurements for a single employee whose dosimetry was in all likelihood significantly influenced by x-radiation used in airplane baggage checks. The employee, a senior teletherapy installer[1], flew frequently to job sites and as was his typical practice carried dosimeters in checked luggage which is now often subjected to x-ray scanning as a counter terrorism measure. As a result his annual reported WBE may be inflated by around 200 percent. This is treated in greater detail in the following section.

A total of 40 employees were monitored by thermoluminescent personal dosimetry during part or all of 2005. The collective occupational WB exposure for these employees was 2.998 person•rem DDE. Full-time LAA staff (3 employees) accounted for 1.230 person•rem DDE. Employees with short-term assignments in the LAA accounted for 0.080 person•rem DDE. Teletherapy (3 employees) accounted for 1.626 person•rem DDE, although, as noted, this number is probably artificially high. Irradiator operators and other employees received 0.024 person•rem and 0.038 person•rem DDE, respectively.

The collective exposure for 2004 was slightly greater than the 2.839 person•rem for 2003. However, when the installer's exposure is ignored, the collective exposure for 2004 was 1.411 person•rem, 29% lower than the 1.989 person•rem for 2003. Several factors contribute to the continuing downward trend in collective dose at Dickerson.

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1 As a teletherapy installer, most or all measurable occupational radiation exposure would have been received in the course of work performed under the 03 license. When not traveling, the employee was routinely assigned to Ranson where dosimetry is not required. However, on frequent visits to Dickerson, he was required to wear TLD's when in the restricted area. It is unlikely that he received any significant exposure while at Dickerson.

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1) In past years, the majority of collective occupational exposure at Dickerson was attributed to doses received in high radiation areas from routine and non-routine operations. The injunction halted all manufacturing operations, which had caused in the major portion of exposure to LAA personnel. The cessation of melting eliminated the requirement for post-melt hot cell decontamination, which was historically the most significant source of exposure to other employees taking part in non-routine operations. The hot cell and hot tool room are sealed. The only accessible permanent high radiation areas are the waste rooms, entries to which are infrequent and usually of short duration.

2) LAA personnel not only make fewer entries to high radiation areas, they are spending less time in the LAA which has the highest ambient dose rates in the facility.

3) Only one major activity of radiological concern was performed in 2004; a ion exchange resin change-out for both the Main Pool and North Canal I. The collective dose for this operation which involved four employees was 0.257 person•rem. This is a small fraction of the exposures encountered for similar change-outs in the past which were typically in excess of 1.0 person•rem for the Main Pool alone. Specific activity of pool and canal waters has remained in the range of 7×10^{-6} to 3×10^{-5} $\mu Ci/cm^3$, and the resin change was predicated on increasing conductivity alone. Spent resin bottles measured only about 5 R/hr on contact, compared to 20 R/hr or more. Low waterborne and exchange resin activity give further evidence that the major vector for pool and canal water activity was from the hot cell via the elevators.

4) Ambient dose rates throughout the plant continue to decline with decaying activity of waste in dry storage.

5) Fifteen fewer employees were monitored during 2004 than 2005.

Of the 40 monitored employees, 28 or 70% received no measurable[2] occupational exposure in 2004. 7 or 17% received between 0 and 50 mrem; 1 between 50 and 100 mrem, and 1 between 100 and 300, 2 between 300 and 1000 mrem, and 1 employee measured dose was more than 1 rem although this suspect.

Other than the installer's measured exposure of 1.626 rem, the highest individual annual WBE in 2004 was 553 mrem for the HP technician. The highest exposure for a LAA regular in 2003 was 634 mrem. The LAA employee who historically tracked the highest exposure in the past few years received only 147 mrem.

As in previous years no summation of for internal exposure (CEDE) was required (see below) and all whole body TEDE's are based on external DDE alone.

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2 The minimum detectable exposure for a single TLD is said to be 10 mrem, exposures less than the minimum detectable are reported as 0.

X-Radiation Exposure to Occupational Dosimeters During Air Travel

This problem first came to light during preparation of the 2003 annual report. For that year the affected employee's TLD's indicated an annual WBE of 850 mrem, significantly higher than that derived from SRD readings and higher than expected from historical precedent. At the time it was postulated that increasing X-ray surveillance of luggage, both checked and carry-on for airline passengers was in part responsible for the higher than expected dose.

During the first 4 months of 2004 the employee's WBE dosimetry (based on the monthly account totaled 598 mrem. In May 2004, the employee began carrying a WBE TLD as a control. This badge was packed with other dosimeters but kept outside of the radiation area during teletherapy operations. For the 8 months this protocol was followed, the installer's TLD's totaled 989 mrem; and the control TLD's totaled 673 mrem. No dose was reported for months in which the installer did not travel. The installer's whole body electronic SRD (MGP Instruments DMC 2000 S) totaled only 46 mrem for the entire year.

The discrepancy between TLD's and SRD's can in part be explained by the collimated nature of the radiation fields in teletherapy operations. Whole body TLD's are worn at the location of predicted highest exposure, as is required by regulation. The whole body SRD is worn proximal to the TLD's and may be shielded from some collimated fields. However, it is clear that a large fraction of the measured WBE for the installers badges came from airport inspection of luggage. Using the spare badge as a control the corrected exposure for the last 8 months of 2004 would be 316 mrem. Applying the ratio of corrected to uncorrected dose to the annual total results in an adjusted exposure of 519 mrem, which is more in line with historical expectations.

As of this writing no administrative correction has been applied to the employee's exposure record. Any such adjustment would be inherently inaccurate (although more accurate than the dose of record). Using an additional badge as a control to subtract travel exposure is problematic because it is unlikely that the radiation flux is very uniform throughout a checked bag. The dose of record is still well below the regulatory limit, and the employee is well aware of the problem and not alarmed by the reported higher exposures.

We are currently investigating with TSA whether installers might be allowed to carry on dosimeters without x-ray inspection, perhaps in a clear plastic bag with a note explaining what they are and why they should not be x-rayed.

Major Operations of Radiological Significance

There were no operations involving collective exposure in excess of 1 person-rem or individual doses greater than 500 mrem conducted in 2004. The ion exchange resin change-out conducted on November 4, 2004 would have historically qualified as a major operation of radiological significance; however, for reasons discussed above, the collective dose for this

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operation was only 0.257 person·rem and the maximum WBE to any single employee was 77 mrem. The highest extremity exposure (ring TLD) for this operation was 188 mrem.

Exposure to Members of the Public

Exposure to members of the public residing close to the Dickerson facility were determined on the basis of dosimetry, surveys, and information provided by individual neighbors regarding their living habits. Of the closest residences, the Fisk house usually receives the highest exposure. However, the house was unoccupied for the first half of the year.

TLDs were placed inside and outside the Fisk house and collected quarterly. Additional dosimeters were placed inside and outside at the Lamson residence, and at Neutron's rental property, currently being occupied by the Carter family.

The occupants of the rental property and the Fisk residence are assumed to be away from the home an average of 50 hours per week and to spend an average of two hours per day outside at the higher dose rate.

In 2004, the Fisk house background corrected dosimetry results were 43 mrem (inside) and 47 mrem (outside). The estimated exposure for each member of the household was 31 mrem making them the highest exposed cohort for last year.

Background corrected dosimetry results for the rental propety were 39 mrem (inside) and 55 mrem (outside). The estimated exposure for each member of the household was 29 mrem.

Year long results for the Lamson house were 16 mrem (inside) and 33 mrem (outside).

Internal exposure to the most highly exposed cohort from airborne release from the hot cell exhaust is less than 1 mrem CEDE as determined using EPA's COMPLY V1.5d program.

Contamination and Housekeeping

With the cessation of productive activities, typical removable contamination levels on floors and elevated surfaces has been markedly reduced as might be expected. By December, almost all floor smears collected outside of Contamination Control Zones were below the minimum detectable concentration for a 1 minute count (113 dpm/100 cm^2). Only in the room behind the cell do some samples still exceed 1000 dpm/100 cm^2, although rarely and they are an order of magnitude less than were previously typical for the same area in 2001. Some high surface contamination was detected on elevated surfaces on objects which had clearly not been cleaned in some time. These objects were decontaminated to well under 1000 dpm/100 cm^2.

Monthly floor surveys of the plant outside the LAA were negative for removable contamination during the 12-month period This remains evidential that the transition zones and LAA entry/exit procedures are effective in controlling the migration of contamination from the LAA.

Perimeter Monitoring

Twenty-five perimeter locations surrounding Neutron's Dickerson site were monitored using TLDs throughout 2003. One additional location was monitored at Lytle's warehouse and was used as a background reference. The control badge data was analyzed but no background correction was made for the perimeter dosimetry. Natural background was measured at 85 mrem.

No perimeter location exceeded 500 mrem gross dose in 2004. The highest dose points on the perimeter were badge 2013, located on the south fence near the bulk chemical unloading off-loading station, with a gross dose of 245 mrem (net dose of 150 mrem) for the year, and badge 2019, located on the south fence at the dry pond, with a gross dose of 271 mrem (net dose of 176 mrem) for the year. These points have consistently had the highest readings of any of the perimeter locations monitored. The 2019 position is located directly above contaminated soil which is downstream from the dry pond discharge. The 2013 location has a direct line of sight to the waste rooms and therefore has a significant dose contribution from direct as opposed to scattered (skyshine) radiation.

Internal Radiation Exposures for LAA Operations

The estimated CEDE for LAA entrants was derived using available air sampling data and entry records and the methodology adopted for the 1996 review; however, total occupancy in the LAA was assumed to be 1200 hours. This assumption was made to simplify our analysis, and is consistent current LAA staffing patterns. The conservative nature of this methodology has been discussed previously. As in previous years, internal exposure from airborne activity did not exceed the regulatory requirements for summation. The average airborne activity for samples collected in the LAA during 2004 was 1.23×10^{-11} $\mu Ci/cm^3$, which is approximately 0.1% of the Derived Air Concentration for Cobalt-60, Class Y. Assuming all activity as Class Y, the CEDE for inhalation would be 3.6 mrem, or 0.7% of the action level for summation. Because of the conservative nature of the assumptions used to derive this estimate, it is unlikely that the routine internal exposure actually approaches 3.6 mrem.

The annual whole body count data corroborated the air sampling findings. None of the nine persons evaluated had body burdens of Co-60 above the 2 nCi minimum detectable activity. The ALI (inhalation) for Class-Y cobalt-60 is 30,000 nCi.

The mini-HECM portal monitor is capable of detecting internal Co-60 contamination of about 100 nm or more. No ingestions or inhalations were detected during 2004.

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Off-Site Surveys

In 2003, 12 offsite surveys were conducted covering approximately 20 acres. One "spot" was found following discovery of two nearby spots by MDE. All three spots were fairly dispersed as is typical of material present in the environment for at least several years.

Employee Home and Vehicle Surveys

No contamination was detected in vehicle or home surveys during 2003.

Releases of Radioactivity

During 2004, the average concentration of radioactivity from the hot cell exhaust system as determined from mini-sampler data was 3.09×10^{-13} µCi/cm^3. This is only 0.6% of the Part D, Appendix B, Table II limit of 5×10^{-11} µCi/cm^3 for Class Y cobalt-60. Total release of activity from the hot cell exhaust during 2004 is estimated to be 4.4 µCi, assuming all activity to be cobalt-60. About 10% of the measured activity attributed to cobalt-60 is, in fact, naturally occurring radon daughters, mostly bismuth-214.

During 2004, a total of 240,000 gallons of sewage was shipped to the WSSC, the average release of activity to the WSSC was 1.84×10^{-6} µCi/ml. No monthly average exceeded 3.0×10^{-5} µCi/ml. The release to the WSSC for 2003 was 1.672 mCi or 0.17 % of the 1 Ci annual limit for release.

Despite the a marked reduction in contamination levels within the LAA, we are still seeing some transient release of cobalt-60 to the LAA courtyard. This activity is ionically bound to humic matter and swept by storm water to the courtyard drains. While the majority of the activity is removed by the stone trap, approximately 25% escapes downstream, ultimately to the dry pond and its environs.

Evaluation of Program Components

Neutron's Radiation protection program was previously documented as a number of policies, programs, and procedures. Each of these addressed different aspects of radiation protection and taken as a whole where adequate documentation. However, it was desirable to have a master document which encompassed the totality of radiation protection at Neutron. A comprehensive *Radiation Protection Program*, which ties the various existing programs and procedures which embody our protection program into a cohesive whole was approved and adopted in December 2003. This program is analogous to a Quality Assurance Program. It specifies 21 elements which are reviewed here.

Section	Title	Status
4	Review	Requires an annual program review pursuant to COMAR 26.12.01.01, D.101.c and specifies minimum requirements for inclusion. This review was completed within the 12-month period.
5	ALARA	Requires a documented ALARA program conforming to NRC Reguides 8.10 and 8.37 and NUREG 1530. We have documented and implemented a compliant ALARA program.
6	Management Oversight	Specifies a Radiation Safety Committee and its duties with minimum requirements for meetings and requires a documented program for internal reviews. The RSC and Internal Review programs are adequately implemented.
7	Occupational Exposure...	Requires a documented program for controlling and monitoring occupational exposure and minimum provisions for such. Our program, now at Revision 7, and its implementation are compliant.
8	Public Exposure...	Requires a documented program for controlling and monitoring public exposure and minimum provisions for such. Our program's implementation is compliant.
9	Planned Special Exposures	Requires documented procedures to be established and maintained prior to any PSE. We have not conducted any PSEs, have no current plans to do so, and seriously doubt whether RHP would authorize one, thus we have not yet written a procedure.
10	Leak Testing	Requires documented procedures for leak testing sources and targets. Implementation is adequate.
11	Control of Access	Specifies Restricted Areas and the Limited Access Area and requirements for access control, entry/exit, posting, etc. and gives requirements for High and Very High Radiation Areas. Implementation is effective
12	Respiratory Protection	Requires a documented respiratory protection program compliant Sec.D.703, 29CFR 1910.134, and ANSI Z.88.2. The *Radioactive Respiratory Protection Program* is in compliance. Implementation is addressed below

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Section	Title	Status
13	Storage and Control of Licensed Material	Establishes the LAA as repository for "01" licensed material and exceptions to such. Requires a documented inventory. Implementation is adequate. A physical inventory, which can not be completed without access to the hot cell, would be very desirable.
14	Precautionary Procedures	Requires surveys to identify radiation areas and posting of such and documented procedures for receiving packages. All radiation areas were posted in 2004. We have no general procedure for package receipt, but adequate instructions in procedures for individual containers. No radioactive material was received at Dickerson in 2004.
15	Waste Management	Requires a documented program for waste management. Such a program was submitted in our decommissioning plan which was rejected by RHP.
16	Contamination Control	Establishes various procedures for contamination control including CCZs, clean room, transition area and portal monitoring. Implementation is adequate.
17	Process Safety Control	Requires procedures/RWP's for certain operations involving potential for exposure or release of radioactivity. Implementation is adequate. RWP's were revised in 2003 to reflect personnel changes.
18	Environmental	Requires a documented procedure for the regular surveillance of the Dickerson property and the surrounding area. Implementation is adequate.
19	Irradiators	Requirements for irradiators. (See annual report for 04/05 licenses.)
20	Teletherapy	Requirements for teletherapy. (See annual report for 03 license.)
21	Measurements	Specifies RAMs, RSMs, counters; requires calibration procedures and schedules; minimum requirements for dosimetry services. Implementation is adequate.

Section	Title	Status
22	Training	Requires a documented training program and specifies elements thereof. A draft revision of the a new training program has been submitted to RHP. No action has been taken. In the interim we continue quarterly training by the HPC augmented by additional training from the RSO and staff.
23	Document Control	Requires a procedure for distribution and control of documents. We use the corporate wide procedure. Implementation is adequate.
24	Recordkeeping	Requirements for the retention and storage of relevant records. Implementation is mostly adequate.

Regulatory Compliance - Adequacy of Content and Implementation of the Radiation Protection Program

COMAR Section	Adequacy of RPP Content for Compliance	Adequacy of Implementation
D.101a ALARA	The ALARA program as written meets NRC guidelines for ALARA for occupational exposure and release.	See below
D.101b RPP	The RPP was previously documented as a number of policies, programs, and procedures. A comprehensive Radiation Protection Program, which ties the various existing programs and procedures which embody our protection program into a cohesive whole was approved and adopted in December. This program adequately addresses the requirements of Part D.	See above
D.101c Annual Review		This annual review for 2004 is in compliance.

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COMAR Section	Adequacy of RPP Content for Compliance	Adequacy of Implementation
D.201 Occupa-tional Exposure	Revision 7 of the Control of Occupational Exposure was approved in December 1999. Many of the elements of Rev. 7 were already in practice. The program is compliant.	Implementation of the RPP is adequate for compliance with occu-pational dose limits
D.202 Summation	Under current conditions, internal occupational exposure is well below the level requiring summation of internal and external doses, and the WBE TLD serves as the dose of record.	Under current conditions the RPP provides adequate means to keep routine internal exposures significant-ly below the summation requirement. Accidental exposure exceeding 500 mrem TEDE, has occurred only once, in 1991.
D.203 External dose from airborne	External dose from airborne activity is inconsequential, but nevertheless, would be adequately determined by existing procedures	Adequate.
D.204 Deter-mination of Internal Exposure	Although not required pursuant to D.502, the RPP dictates a variety of methods for evaluating airborne activity and for monitoring internal exposure. Personnel sampling is not used routinely (and at typical airborne concentrations would not be practical) but is used for high airborne exposure operations requiring respiratory protection. Site sampling is used to estimate routine exposure. While this sampling meth-od may not be completely representative of the breathing zone, the assumptions applied in the estimation are conservative, and whole body and HECM counts confirm CEDEs are an order of magnitude below the D.502 sampling requirement.	Implementation of existing practice is in compliance. Any significant intake is readily detected with existing instrumentation and practices. With the acquisition of a Helgesen DIYS whole body counter usually available at Ranson, accurate and reliable measurements for internal Co-60 can be made within 24 hours of detection most of the time.

COMAR Section	Adequacy of RPP Content for Compliance	Adequacy of Implementation
D.205 Prior Dose	The existing practice is compliant with the D.205a requirement to determine dose within the year and to obtain records of lifetime accumulated dose.	We have not conducted planned special exposures, nor have we hired any employee with a previous planned special exposure elsewhere.
D.206 Planned Special Exposures	The RPP requires that a documented program for planned special exposures be implemented prior to conducting planned special exposures.	Not applicable. Planned special exposures have not been conducted.
D.207 Occupational Dose to Minors	While the revised COMAR allows minors to receive occupational dose at 10% of that allowed for adult workers, elsewhere Maryland labor law specifically forbids the employment of anyone under age eighteen in occupations involving exposure to radiation.	Neutron employs no one under eighteen.
D.208 Dose to Embryo/ Fetus	The new employee checklist includes the notification to women of the provisions of D.208.	All women employees have received written and oral instruction on the provisions of D.208. However, no woman is currently assigned to duties with expected exposures in excess of 500 mrem in any 9-month period. There were no pregnancies, declared or otherwise, in 2004.
D.301 Members of the Public	The RPP reflects the 100 mrem annual limit to members of the public and the 2 mrem per hour limit in unrestricted areas.	We were in compliance in 2004. The highest exposed cohort received approximately 31 mrem, based on TLD data and conservative assumptions. No area outside of the restricted areas exceeded 2 mrem per hour.
D.302 Compliance with...	The draft revision of the RPP documents measures established to demonstrate compliance with public dose limits.	With TLD measurements at the more highly exposed homes we can demonstrate compliance consistent with D.302b.ii(1).

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COMAR Section	Adequacy of RPP Content for Compliance	Adequacy of Implementation
D.401 Leak Testing	The RPP and enabling procedures adequately consider D.401 as modified by our licenses	Corrective action undertaken in 1998 has remained effective, and implementation for the most part is adequate. In 2005, a Co-60 source in a Type A container was discovered to have been inadvertently omitted from the leak test list. Corrective action has been undertaken.
D.501 Surveys and Monitoring	The RPP is in compliance for 01 operations.	Corrective action was taken in 2001 to include the welding shop.
D.502 Conditions Requiring Monitoring	The RPP is in compliance. Under the provisions of D.502b, we are not required to routinely monitor for internal exposure. The draft RPP provides for annual evaluation of internal exposure from available air sampling and other data to assure we remain below the 10% action limit. An unlikely intake in excess of 10% of the ALI would be readily detected by the HECM and quantified by follow up whole body counts.	Implementation is adequate
D.601 Access to High Radiation Areas	The RPP is in compliance.	All high radiation areas are accessible only from the LAA with exception of the waste storage roof. Access to these areas is locked when not under the direct control of authorized and knowledgeable personnel.
D.602 Very High Radiation Areas	The RPP is in compliance.	The three potentially very high radiations are the hot cell and the irradiators. All three units have access control systems which are compliant with D.602.

COMAR Section	Adequacy of RPP Content for Compliance	Adequacy of Implementation
D.701 Respiratory Protection Engineering Controls	The RPP and respiratory protection program are in compliance.	To the extent practicable, engineering controls are used to limit concentrations of airborne radioactivity. Under routine conditions these controls are effective. Average airborne concentrations of Co-60 in the LAA were less than 1% of the DAC for Class Y.
D.702 Respiratory Protection Other Controls	The Radioactive Respiratory Protection Program has been revised to reflect regulatory changes in both Part D and 29CFR 1910.134.	Minor recordkeeping nonconformances were noted in 2000. Corrective action has been undertaken to correct areas of noncompliance.
D.703 Respiratory Protection Equipment	The respiratory protection program revision was completed in December 2001 (and approved in March 2002).	Implementation is adequate. No use of RPE was required in 2004..
D.801 Security of Stored Sources	The RPP is compliant.	
D.802 Control when not in Storage	The RPP is compliant.	Implementation is adequate.
D.901 Caution Signs	The RPP is compliant.	Implementation is adequate.
D.902 Posting	The RPP is compliant.	Implementation remains adequate.

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COMAR Section	Adequacy of RPP Content for Compliance	Adequacy of Implementation
D.904 Labeling	The RPP is compliant.	Implementation is for the most part adequate, however, labeling of DU containing parts was missing or insufficient. Corrective action was undertaken and no non-compliances were noted in 2004.
D.906 Receiving and Opening Packages	The RPP is compliant	Implementation is adequate. No radioactive material was received in 2004.
D.1001 Waste Disposal	The RPP is compliant	Implementation is adequate. No radioactive waste shipments were made in 2004.
D.1003 Sanitary Sewage	The RPP is compliant	Implementation is adequate. (See Page 6)
D.1007 Transfer and Manifests	The RPP is compliant	Implementation is adequate.
D.1101 - D.1111 Records	The RPP is compliant	Previous recordkeeping problems have been resolved and no non-compliances were noted in 2004.
D.1201 - D.1206 Reports	The RPP is compliant	Implementation is adequate.

ALARA

The collective exposure for 2004 was 2.998 person•rem, however, the majority of this aggregate is attributable to one teletherapy installer and is apparently overestimated by 1 rem or more (see above). Ignoring this one employee the collective exposure for 2004 was 1.411 person•rem, 29% lower than the 1.989 person•rem for 2003.

Neutron deploys 16 environmental dosimeters at fixed locations within the facility. (These are additional to the perimeter dosimeters.) These dosimeters continue to show a downward trend for ambient dose rates throughout the plant.

The sources of occupational exposure at Neutron's Dickerson facility for 2004 are estimated to be:

Hot Cell operations and support	0%
Radwaste operations	30%
Pool and Canal Operations	20%
Health Physics	35%
Ambient exposure outside the LAA to direct and skyshine	15%

Modification of the north canal ion exchange system was effected in June of 2003. This was intended to reduce dose to the pool operator by increasing the shielding of the NC1 resin column. However, since the resin mostly raised dose rates in the area of the south canal pass through and there has been no traffic of sources between the canal and the main pool, there has been no real reduction in exposure to date.

The exposure to the most highly exposed members of the public was determined to be 31 mrem, a 3% reduction from that for 2003. It must be noted that the 95% confidence interval for the dosimetric methods used is ±28 mrem which is large in comparison to the annual background corrected dose rates at these low exposures.

Airborne emissions remain less than 1% of Appendix B, Table II, Column 1, effluent concentrations and account for an insignificant fraction of public exposure.

Respiratory Protection Program

Respiratory protection equipment for radiation protection was not needed in 2004. Maintenance, training, and medical clearance programs remain in effect.

Review of Selected Radiation Protection Related Procedures

Proc. No.	Title	Analysis
R1001	*Counting Procedures*	The procedure was revised in 2003 to improve QA methodology and to allow flexibility in the selection of standards. HP staff were trained on the revision and its implementation has been adequate.

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R1002	*Sampling Procedure*	The procedure is adequate for its intended purpose and is properly implemented.
R1003	*Procedure for Entrance to and Exit from Contamination Control Areas to the LAA Working Area*	The procedure is adequate for its intended purpose. Its provisions are generally adhered to, but occasional lapses (for log entries) have been observed.
R1006	*Disposal of Sewage*	This procedure is adequate for its intended purpose and is properly implemented.
R1007	*Radiation Detection Instrument Calibration Procedure*	The procedure is adequate for its intended purpose
R1010	*Radiation and Contamination Levels*	The procedure is adequate for its intended purpose, and is properly implemented.
R1011	*Procedure for the Limits for the Decontamination and Release of People and Personal Effects from The Limited Access Area*	The procedure is adequate for its intended purpose, and is properly implemented. A new form has been devised to expedite recordkeeping
R1012	*Procedure for Daily Operating Checkout and Routine Maintenance of the Helgeson Mini-HECM Booth Monitor*	The procedure is adequate for its intended purpose, and is properly implemented.
R2028	*Procedure for Entrance to the Limited Access Area*	The procedure is adequate for its intended purpose, and despite an occasional lapse in log entries is properly implemented. In order to reduce the number of procedures which we must maintain, this procedure could be effectively combined with R2029.
R2029	*Procedure for Exit to the Limited Access Area*	See R2028 above.

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Neutron Products, Inc.
Dickerson, Maryland
Radiation Protection Program Review
Maryland License MD-31-025-01
2005

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June 30, 2006

Introduction

Maryland's revised *Regulations for the Control of Ionizing Radiation (1994)*, COMAR 26.12.01.01, Section D.101.c, requires licensees to "review the radiation protection program content and implementation" at intervals not to exceed 12 months. This review covers the entire period of 2005.

Overview of Radiation Protection in 2005

As with the previous two years, the entirety of 2005 was spent operating under court injunction which severely curtailed activities conducted under the 01 license. No cobalt-60 sources were manufactured, shipped, received, or transferred at Dickerson at any time during 2005. Health physics and radiation protection activities continued.

In November, Dick Demory retired. Thus far, the impact of his leaving has been minimal, because of the lack of meaningful work in the LAA. For much of 2005 Dick had been detailed to Ranson. The regular LAA staff now numbers two, although members are frequently detailed to other operations. Despite the reduced staffing, radiation protection activities have not suffered to any extent. Routine health physics, maintenance, and housekeeping activities have continued at or above their historical levels.

Occupational Exposure

A total of 41 employees were monitored by thermoluminescent personal dosimetry during part or all of 2005. The collective occupational WB exposure for these employees was 4.153 person•rem DDE. Full-time LAA staff (3 employees) accounted for 0.919 person•rem DDE, 22% of the total collective exposure. Employees with short-term assignments in the LAA accounted for 0.882 person•rem DDE or 21.2% of the total exposure, almost all of which was associated with the replacement of the hot waste room roof. Teletherapy (3 employees) accounted for 2.321 person•rem DDE or 55.9% of the total. Irradiator operators and other employees received 0.031 person•rem and 0.0 person•rem DDE, respectively.

The collective exposure for 2005 was 38% higher than that for 2004. The majority of the increase was due to exposure during the roof replacement, although a significant fraction may be attributed to exposure of dosimeters during airline flights.

Of the 41 monitored employees, 32 or 78% received no measurable[1] occupational exposure in 2005. Four or 9.7% received between 0 and 100 mrem; none between 100 and 300 mrem, and 3 between 300 and 1000 mrem. One employee's dosimeters measured more than 1 rem.

The highest individual annual exposure in 2005 was 1.979 mrem, compared to 1.587 rem for the previous year. For 2005 the highest exposure resulted not from LAA/hot cell operations, but from teletherapy. However, as noted in previous reviews, we believe that a significant fraction of the measured exposure is due to x-ray exposure in checked baggage. The TLD measurements are significantly higher than those derived from SRD readings and higher than expected from historical precedent. The individual's teletherapy duties required frequent air travel at a time when X-ray

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[1] The minimum detectable exposure for a single TLD is said to be 10 mrem, exposures less than the minimum detectable are reported as 0.

surveillance of luggage, both checked and carry-on, has greatly increased. A spare badge used as a control during air travel had a dose of 1716 mrem. A simple correction, which may not be valid, would indicate actual occupation exposure to the employee as 263 mrem and collective exposure for the year of 2437 person•rem. Use of a single dosimeter as a control is probably not very accurate because the dose distribution in x-rayed luggage may not be very uniform. Teletherapy installers have been asked to carry on their dosimeters in the future, requesting that TSA personnel not expose them to radiation.

Major Operations of Radiological Significance

There were no operations involving collective exposure in excess of 1 person·rem or individual doses greater than 500 mrem conducted in 2005. Replacement of the roof over the hot waste rooms involved a collective exposure of 0.869 person•rem.

Exposure to Members of the Public

Exposure to members of the public residing close to the Dickerson facility were determined on the basis of dosimetry, surveys, and information provided by individual neighbors regarding their living habits. Of the closest residences, the Fisk house received the highest exposure,as is usually the case when it is occupied year round.

TLDs were placed inside and outside the Fisk house and collected quarterly. Additional dosimeters were placed inside and outside at the Lamson residence, and at Neutron's rental property.

The occupants of the Fisk property are assumed to be away from the home an average of 50 hours per week and to spend an average of two hours per day outside at the higher dose rate. Background corrected dosimetry results for 2005 were 41 mrem (inside) and 46 mrem (outside). The estimated exposure for each member of the household was 32.6 mrem making them the highest exposed cohort for last year.

Background corrected dosimetry results for the rental house were 38 mrem (inside) and 53 mrem (outside). Year long results for the Lamson house were 14 mrem (inside) and 22 mrem (outside), although the house was unoccupied from September on.

Internal exposure to the most highly exposed cohort from airborne release from the hot cell exhaust is less than 1 mrem CEDE as determined using EPA's COMPLY V1.5d program.

Contamination and Housekeeping

Typical removable contamination levels on floors and elevated surfaces continue to be much lower than historically encountered as might be expected. Almost all smears collected outside of Contamination Control Zones were below the minimum detectable concentration for a 1 minute

count (113 dpm/100 cm^2). Only in the room behind the cell do some samples still exceed 1000 dpm/100 cm^2; however they are an order of magnitude less than were previously typical for the same area in 2001.

Monthly floor surveys of the plant outside the LAA were negative for removable contamination during the 12-month period This remains evidential that the transition zones and LAA entry/exit procedures are effective in controlling the migration of contamination from the LAA.

Perimeter Monitoring

Twenty-five perimeter locations surrounding Neutron's Dickerson site were monitored using TLDs throughout 2005. One additional location was monitored at Lytle's warehouse and was used as a background reference. The control badge data was analyzed but no background correction was made for the perimeter dosimetry. Natural background was measured at 88 mrem.

No perimeter location exceeded 500 mrem gross dose in 2005 The highest dose points on the perimeter were badge 2013, located on the south fence near the bulk chemical unloading off-loading station, with a gross dose of 218 mrem (net dose of 130 mrem) for the year, and badge 2019, located on the south fence at the dry pond, with a gross dose of 240 mrem (net dose of 152 mrem) for the year. These points have consistently had the highest readings of any of the perimeter locations monitored and are essentially unchanged from the previous year. The 2019 position is located directly above contaminated soil which is downstream from the dry pond discharge. The 2013 location has a direct line of sight to the waste rooms and therefore has a significant dose contribution from direct as opposed to scattered (skyshine) radiation.

Internal Radiation Exposures for LAA Operations

The estimated CEDE for LAA entrants was derived using available air sampling data and entry records and the methodology adopted for the 1996 review; however, total occupancy in the LAA was assumed to be 1200 hours. This assumption was made to simplify our analysis, and is consistent current LAA staffing patterns. The conservative nature of this methodology has been discussed previously. As in previous years, internal exposure from airborne activity did not exceed the regulatory requirements for summation. The average airborne activity for samples collected in the LAA during 2005 was 2.12×10^{-11} $\mu Ci/cm^3$, which is approximately 0.2% of the Derived Air Concentration for Cobalt-60, Class Y. Assuming all activity as Class Y, the CEDE for inhalation would be 4.3 mrem, or 0.8% of the action level for summation. Because of the conservative nature of the assumptions used to derive this estimate, it is unlikely that the routine internal exposure actually approaches 4 mrem.

The annual whole body count data corroborated the air sampling findings. None of the nine persons evaluated had body burdens of Co-60 above the 2 nCi minimum detectable activity. The ALI (inhalation) for Class-Y cobalt-60 is 30,000 nCi.

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The mini-HECM portal monitor is capable of detecting internal Co-60 contamination of about 100 nm or more. No ingestions or inhalations were detected during 2005.

Off-Site Surveys

In 2005, 12 offsite surveys were conducted covering approximately 15½ acres. No activity was detected.

Employee Home and Vehicle Surveys

No contamination was detected in vehicle or home surveys during 2005.

Releases of Radioactivity

During 2005, the average concentration of radioactivity from the hot cell exhaust system as determined from mini-sampler data was 4.03×10^{-13} µCi/cm^3. This is only 0.8% of the Part D, Appendix B, Table II limit of 5×10^{-11} µCi/cm^3 for Class Y cobalt-60. Total release of activity from the hot cell exhaust during 2005 is estimated to be 5.8 µCi, assuming all activity to be cobalt-60. In the past, about 10% of the measured activity attributed to cobalt-60 was, in fact, naturally occurring radon daughters, mostly bismuth-214.

During 2005, a total of 115,000 gallons of sewage was shipped to the WSSC, the average release of activity to the WSSC was 2.23×10^{-6} µCi/ml. No monthly average exceeded 3.0×10^{-5} µCi/ml. The release to the WSSC for 2005 was 0.990 mCi or less than 0.1 % of the 1 Ci annual limit for release.

Despite the marked reduction in contamination levels within the LAA, we are still seeing some transient release of cobalt-60 to the LAA courtyard. This activity is ionically bound to humic matter and swept by storm water to the courtyard drains. While the majority of the activity is removed by the stone trap, approximately 25% escapes downstream, ultimately to the dry pond and its environs.

Radioactive Waste

No radioactive waste shipments were made in 2005. However, in November we began discussions with Duratek (now Energy Solutions) about processing waste at their Bear Creek Facility in Oak Ridge. We previously made two shipments to this incineration/super-compaction facility when it was owned by SEG. After the second shipment, SEG's management changed as did their waste acceptance criteria and in became impractical to continue shipments. With the acquisition by Duratek and the further consolidation and reduction of alternatives in the radwaste industry, we believed it was timely to take a second look.

It appears that Duratek's services can be utilized to process a significant volume of waste in dry storage, although not much activity. For incineration, a contact dose rate limit of 200 mR/hr is imposed. For super-compaction, higher contact dose rates (up to 1 R/hr) are accepted although at a premium.) Activity restrictions not withstanding, Duratek's "milk run" service could provide a cost effective means for markedly reducing combustible DAW, a primary management goal. Also, since this waste is lightly shielded, the impact on ambient dose rates and skyshine will be much greater than the fractional reduction in total waste activity. (The highest activity waste is heavily shielded and does not significantly influence radiation levels.)

Optimum use of Duratek's processing services will require sorting and repackaging of existing waste inventories. Plans are to send about 20 boxes at a time during periodic milk runs.[2]

Evaluation of Program Components

Neutron's Radiation protection program was previously documented as a number of policies, programs, and procedures. Each of these addressed different aspects of radiation protection and taken as a whole where adequate documentation. However, it was desirable to have a master document which encompassed the totality of radiation protection at Neutron. A comprehensive *Radiation Protection Program*, which ties the various existing programs and procedures which embody our protection program into a cohesive whole was approved and adopted in December. This program is analogous to a Quality Assurance Program. It specifies 21 elements which are reviewed here.

Section	Title	Status
4	Review	Requires an annual program review pursuant to COMAR 26.12.01.01, D.101.c and specifies minimum requirements for inclusion. This review was completed within the 12-month period.
5	ALARA	Requires a documented ALARA program conforming to NRC Reguides 8.10 and 8.37 and NUREG 1530. We have documented and implemented a compliant ALARA program.
6	Management Oversight	Specifies a Radiation Safety Committee and its duties with minimum requirements for meetings and requires a documented program for internal reviews. The RSC and Internal Review programs are adequately implemented.

[2] As of this writing the first of these shipments have been completed without any problems. Two or three more are anticipated for 2006.

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Section	Title	Status
7	Occupational Exposure...	Requires a documented program for controlling and monitoring occupational exposure and minimum provisions for such. Our program, now at Revision 7, and its implementation are compliant.
8	Public Exposure...	Requires a documented program for controlling and monitoring public exposure and minimum provisions for such. Our program's implementation is compliant.
9	Planned Special Exposures	Requires documented procedures to be established and maintained prior to any PSE. We have not conducted any PSEs, have no current plans to do so, and seriously doubt whether RHP would authorize one, thus we have not yet written a procedure.
10	Leak Testing	Requires documented procedures for leak testing sources and targets. Implementation is adequate. In 2005, we discovered a low activity, unencapsulated Co-60 casting in a pig. This source was not previously listed on our inventory.
11	Control of Access	Specifies Restricted Areas and the Limited Access Area and requirements for access control, entry/exit, posting, etc. and gives requirements for High and Very High Radiation Areas. Implementation is effective
12	Respiratory Protection	Requires a documented respiratory protection program compliant Sec.D.703, 29CFR 1910.134, and ANSI Z.88.2. The *Radioactive Respiratory Protection Program* is in compliance. Implementation is addressed below
13	Storage and Control of Licensed Material	Establishes the LAA as repository for "01" licensed material and exceptions to such. Requires a documented inventory. Implementation is adequate. A physical inventory, which can not be completed without access to the hot cell would be very desirable.
14	Precautionary Procedures	Requires surveys to identify radiation areas and posting of such and documented procedures for receiving packages. All radiation areas were posted in 2005. We have no general procedure for package receipt, but adequate instructions in procedures for individual containers. No radioactive material was received at Dickerson in 2005.

Section	Title	Status
15	Waste Management	Requires a documented program for waste management. Such a program was submitted in our decommissioning plan which was rejected by RHP.
16	Contamination Control	Establishes various procedures for contamination control including CCZs, clean room, transition area and portal monitoring. Implementation is adequate.
17	Process Safety Control	Requires procedures/RWP's for certain operations involving potential for exposure or release of radioactivity. Implementation is adequate. RWP's were revised in 2003 to reflect personnel changes. The RWP's will need to be modified once more to reflect the departure of Mr. Demory.
18	Environmental	Requires a documented procedure for the regular surveillance of the Dickerson property and the surrounding area. Implementation is adequate.
19	Irradiators	Requirements for irradiators. (See annual report for 04/05 licenses.)
20	Teletherapy	Requirements for teletherapy. (See annual report for 03 license.)
21	Measurements	Specifies RAMs, RSMs, counters; requires calibration procedures and schedules; minimum requirements for dosimetry services. Implementation is adequate.
22	Training	Requires a documented training program and specifies elements thereof. A draft revision of the a new training program has been submitted to RHP. No action has been taken. In the interim we continue quarterly training by the HPC augmented by additional training from the RSO and staff.
23	Document Control	Requires a procedure for distribution and control of documents. We use the corporate wide procedure. Implementation is adequate.
24	Recordkeeping	Requirements for the retention and storage of relevant records. Implementation is mostly adequate.

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Regulatory Compliance - Adequacy of Content and Implementation of the Radiation Protection Program

COMAR Section	Adequacy of RPP Content for Compliance	Adequacy of Implementation
D.101a ALARA	The ALARA program as written meets NRC guidelines for ALARA for occupational exposure and release.	See ALARA section below
D.101b RPP	The RPP was previously documented as a number of policies, programs, and procedures. A comprehensive Radiation Protection Program, which ties the various existing programs and procedures which embody our protection program into a cohesive whole was approved and adopted in December. This program adequately addresses the requirements of Part D.	See previous section.
D.101c Annual Review	Requires annual review of RPP.	This annual review for 2005 is in compliance.
D.201 Occupa-tional Exposure	Revision 7 of the Control of Occupational Exposure was approved in December 1999. Many of the elements of Rev. 7 were already in practice. The program is compliant.	Implementation of the RPP is adequate for compliance with occu-pational dose limits
D.202 Summation	Under current conditions, internal occupational exposure is well below the level requiring summation of internal and external doses, and the WBE TLD serves as the dose of record.	Under current conditions the RPP provides adequate means to keep routine internal exposures significant-ly below the summation requirement. Accidental exposure exceeding 500 mrem TEDE, has occurred only once, in 1991.
D.203 External dose from airborne	External dose from airborne activity is inconsequential, but nevertheless, would be adequately determined by existing procedures	Adequate.

COMAR Section	Adequacy of RPP Content for Compliance	Adequacy of Implementation
D.204 Deter-mination of Internal Exposure	Although not required pursuant to D.502, the RPP dictates a variety of methods for evaluating airborne activity and for monitoring internal exposure. Personnel sampling is not used routinely (and at typical airborne concentrations would not be practical) but is used for high airborne exposure operations	Implementation of existing practice is in compliance. Any significant intake is readily detected with existing instrumentation and practices.

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COMAR Section	Adequacy of RPP Content for Compliance	Adequacy of Implementation
D.208 Dose to Embryo/ Fetus	The new employee checklist includes the notification to women of the provisions of D.208.	All women employees have received written and oral instruction on the provisions of D.208. However, no woman is currently assigned to duties with expected exposures in excess of 500 mrem in any 9-month period. There were no pregnancies, declared or otherwise, in 2005.
D.301 Members of the Public	The RPP reflects the 100 mrem annual limit to members of the public and the 2 mrem per hour limit in unrestricted areas.	We were in compliance in 2005. The highest exposed cohort received approximately 33 mrem, based on TLD data and conservative assumptions. No area outside of the restricted areas exceeded 2 mrem per hour.
D.302 Compliance with...	The RPP documents measures established to demonstrate compliance with public dose limits.	With TLD measurements at the more highly exposed homes we can demonstrate compliance consistent with D.302b.ii(1).
D.401 Leak Testing	The RPP and enabling procedures adequately consider D.401 as modified by our licenses	Corrective action undertaken in 1998 has remained effective, and implementation is adequate. All required wipe tests were conducted.
D.501 Surveys and Monitoring	The RPP is in compliance for 01 operations.	Corrective action was taken in 2001 to include the welding shop.

COMAR Section	Adequacy of RPP Content for Compliance	Adequacy of Implementation
D.502 Conditions Requiring Monitoring	The RPP is in compliance. Under the provisions of D.502b, we are not required to routinely monitor for internal exposure. The RPP provides for annual evaluation of internal exposure from available air sampling and other data to assure we remain below the 10% action limit. An unlikely intake in excess of 10% of the ALI would be readily detected by the HECM and quantified by follow up whole body counts.	Implementation is adequate
D.601 Access to High Radiation Areas	The RPP is in compliance.	All high radiation areas are accessible only from the LAA with exception of the waste storage roof. Access to these areas is locked when not under the direct control of authorized and knowledgeable personnel.
D.602 Very High Radiation Areas	The RPP is in compliance.	The three potentially very high radiation areas are the hot cell and the irradiators. All three units have access control systems which are compliant with D.602
D.701 Respiratory Protection Engineering Controls	The RPP and respiratory protection program are in compliance.	To the extent practicable, engineering controls are used to limit concentrations of airborne radioactivity. Under routine conditions these controls are effective. Average airborne concentrations of Co-60 in the LAA were less than 1% of the DAC for Class Y.

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COMAR Section	Adequacy of RPP Content for Compliance	Adequacy of Implementation
D.702 Respiratory Protection Other Controls	The Radioactive Respiratory Protection Program has been revised to reflect regulatory changes in both Part D and 29CFR 1910.134. Implementing procedures are under draft review.	Minor recordkeeping nonconformances were noted in 2000. Corrective action has been undertaken to correct areas of noncompliance.
D.703 Respiratory Protection Equipment	The respiratory protection program revision was completed in December 2001 (and approved in March 2002.)	Implementation is adequate. No use of RPE was required in 2005.
D.801 Security of Stored Sources	The RPP is compliant.	The security of cobalt-60 sources is unquestioned. However, on several occasions, the RHP found DU in an unlocked cargo container outside of the LAA. Corrective action has been undertaken, no non-compliances occurred in 2005. Additional security measures have been implemented post 9/11 in response to NRC communiques and orders.
D.802 Control when not in Storage	The RPP is compliant.	Currently no sources are shipped or received at Dickerson
D.901 Caution Signs	The RPP is compliant.	Implementation is adequate.
D.902 Posting	The RPP is compliant.	Implementation remains adequate.
D.904 Labeling	The RPP is compliant.	Implementation is for the most part adequate, however, labeling of DU containing parts was missing or insufficient. Corrective action was undertaken and no non-compliances were noted in 2005.

COMAR Section	Adequacy of RPP Content for Compliance	Adequacy of Implementation
D.906 Receiving and Opening Packages	The RPP is compliant	Implementation is adequate. No radioactive material was received in 2005.
D.1001 Waste Disposal	The RPP is compliant	Implementation is adequate. No radioactive waste shipments were made in 2005.
D.1003 Sanitary Sewage	The RPP is compliant	Implementation is adequate. (See Page 4)
D.1007 Transfer and Manifests	The RPP is compliant	Implementation is adequate.
D.1101 - D.1111 Records	The RPP is compliant	Previous recordkeeping problems have been resolved and no non-compliances were noted in 2005.
D.1201 - D.1206 Reports	The RPP is compliant	Implementation is adequate.

ALARA

The reported collective exposure for 2005 was 4.153 person•rem, nominally a 38% increase from the previous year. However, for reasons stated above a substantial portion of this measured exposure was likely dose to badges no one was wearing at the time. While uncertainties in using control dosimeters to account for exposure during luggage x-rays make adjustments to exposure histories problematic, for the purpose of this evaluation we will use the corrected collective exposure of 2.437 person•rem.

The sources of occupational exposure at Neutron for 2005 are estimated to be:

Hot Cell operations and support	0%
Radwaste operations	3%

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Pool and Canal Operations	10%
Maintenance and Repair	36%
Health Physics	35%
Teletherapy	25%
Ambient exposure outside the LAA to direct and skyshine	1%

Neutron deploys 16 environmental dosimeters at fixed locations within the facility. (These are additional to the perimeter dosimeters.) These dosimeters continue to show a downward trend for ambient dose rates throughout the plant.

The exposure to the most highly exposed members of the public was determined to be 32.6 mrem. It must be noted that the 95% confidence interval for the dosimetric methods used is ±28 mrem which is large in comparison to the annual background corrected dose rates at these low exposures.

Airborne emissions remain less than 1% of Appendix B, Table II, Column 1, effluent concentrations and account for an insignificant fraction of public exposure.

Respiratory Protection Program

Respiratory protection equipment for radiation protection was not needed in 2005. Maintenance, training, and medical clearance programs remain in effect.

Review of Selected Radiation Protection Related Procedures

Proc. No.	Title	Analysis
R1001	*Counting Procedures*	The procedure has been revised to improve QA methodology and to allow flexibility in the selection of standards. HP staff were trained on the revision and its implementation has been adequate.
R1002	*Sampling Procedure*	The procedure is adequate for its intended purpose and is properly implemented. A planned revision is in draft form.
R1003	*Procedure for Entrance to and Exit from Contamination Control Areas to the LAA Working Area*	The procedure is adequate for its intended purpose.
R1006	*Disposal of Sewage*	This procedure is adequate for its intended purpose and is properly implemented.

R1007	*Radiation Detection Instrument Calibration Procedure*	The procedure is adequate for its intended purpose
R1010	*Radiation and Contamination Levels*	The procedure is adequate for its intended purpose, and is properly implemented.
R1011	*Procedure for the Limits for the Decontamination and Release of People and Personal Effects from The Limited Access Area*	The procedure is adequate for its intended purpose, and is properly implemented. A new form has been devised to expedite recordkeeping
R1012	*Procedure for Daily Operating Checkout and Routine Maintenance of the Helgeson Mini-HECM Booth Monitor*	The procedure is adequate for its intended purpose, and is properly implemented.
R2028	*Procedure for Entrance to the Limited Access Area*	The procedure is adequate for its intended purpose, and despite an occasional lapse in log entries is properly implemented
R2029	*Procedure for Exit to the Limited Access Area*	See R2028 above.

MARYLAND DEPARTMENT OF THE ENVIRONMENT
1800 Washington Boulevard ● Baltimore Maryland 21230
(410) 537-3000 ● 1-800-633-6101 ● http://www.mde.state.md.us

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FORM E-1

RADIOACTIVE MATERIAL
INSPECTION FINDINGS AND LICENSEE ACKNOWLEDGEMENT

I. Licensee	II. License No.
Neutron Products Inc. 22301 Mount Ephraim Rd Dickerson MD 20842	MD-31-025-01 November 29 + December 1, 2005 III. Date of Inspection

IV. Inspection Findings and Licensee Action

The inspection was an examination of the activities conducted under your license as they relate to radiation safety and compliance with the Code of Maryland (COMAR) 26.12.01 "Regulations for Control of Ionizing Radiation", and the conditions of your license. The inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observations by inspector. The findings of this inspection are as follows:

A. [ ] No current use or storage of licensed radioactive material (no program). The licensee was informed that upon receipt of radioactive material RHP must be notified.

B. [ ] Issuance of an Agency E-1: Within the scope of the agency inspection, no items of noncompliance or unsafe conditions were found. No action is required by the licensee.

C. [ ] Issuance of an Agency E-2: Within the scope of the inspection, violations of minor significance were found. For any violation, corrective action must be immediately initiated. Within the 20 calendar days of your receipt of this notice, you are to provide the Department with written statements of explanation describing:

1. corrective steps which have been or will be taken by you, and the results achieved or anticipated;
2. corrective steps which will be taken to avoid further violations; and
3. the date when full compliance will be achieved.

Such a statement or explanation must be provided on each of the items listed.

D. [✓] Issuance of an Agency E-1 with a letter sent to the licensee further describing Agency requirements. For any violation, corrective action must be immediately initiated.

V. Licensee Acknowledgement

The Inspector has explained and I understand any items of noncompliance identified during this agency inspection. Furthermore, I acknowledge that, if an Agency E-2 Description of Violations was issued, failure to comply may result in the revocation, suspension or modification of the license and possible fines for each day the violations continue.

12/2/05	Alan Jacobson Robert Nelson	
Date	RAM Inspector	Licensee Representative-Title or Position

(Yellow) Licensee File Copy

MARYLAND DEPARTMENT OF THE ENVIRONMENT
AIR AND RADIATION MANAGEMENT ADMINISTRATION
RADIOLOGICAL HEALTH PROGRAM
RADIOACTIVE MATERIALS ENFORCEMENT AND COMPLIANCE UNIT
1800 WASHINGTON BLVD.
BALTIMORE, MARYLAND 21230
410-537-3302

RADIOACTIVE MATERIALS INSPECTION REPORT

Licensee: Neutron Products, Inc.
22301 Mt. Ephraim Road
P.O. Box 68
Dickerson MD 20842

Radioactive Materials License Number: MD-31-025-01
Phone: 301-349-5001
FAX: 301-349-5007

Dates of Inspection: November 29, 2005
December 1, 2005

Alan Jacobson — 12/22/2005
Alan Jacobson, Health Physicist Supervisor — Date

Robert K Nelson — 12/15/05
Bob Nelson, Health Physicist III — Date

Danny R. Adams — 12/15/2005
Danny Adams, Health Physicist I — Date

Adeyemo — 12/15/2005
Fatima Adeyemo, Health Physicist Trainee — Date

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PROGRAM

NPI's license to manufacture and distribute cobalt-60 sealed sources for teletherapy and radiation processing is currently under a permanent injunction. A November 2, 2000 Montgomery County Court Order requires NPI to cease and desist from conducting any activities under the license except as specifically approved by the Department. Currently, NPI possess 510,600 Curies of cobalt-60. In addition, the radioactive waste inventories were, 2376 Curies-Main Pool, 93 Curies-North Canal and 142 Curies-Dry Storage (137 drums, 23 B-25s, plastic bags and cardboard boxes). Only approximately 70,000 Curies has a specific activity sufficient for teletherapy grade sources. Current authorized activities include maintenance of safety systems, survey meter calibration, Health Physics sampling and storage of cobalt-60. NPI employs 62 workers, with 4 of these employees working in the Limited Access (LAA). Members of this LAA crew are spending progressively more time working outside of the LAA. By regulation and confirmed by the Maryland Court of Special Appeals, NPI's LAA must be decommissioned in a safe and timely manner. Private consultants contracted by MDE estimated the cost of this process to be between 6 and 21 million dollars. In a February 4, 2004 letter to the Department, Jackson Ransohoff estimates decommissioning costs to range between 30 and 40 million dollars. Currently, NPI and MDE have approximately $60,000 in escrow for the shipment of radioactive waste. Apparently, NPI has limited resources and/or they lack a commitment from their management to facilitate the decommissioning process. The United States Environmental Protection Agency has verbally indicated that they would step in and immediately maintain safety systems and stabilize potential hazards in the event of an accident or if the company decided to abandon the site. NPI's senior Management has both, verbally and in writing, stated that they will only comply with those radiation regulations that they agree with and will continue to violate requirements that they disagree with.

SCOPE OF INSPECTION

Ms. Fatima Adeyemo, Messrs. Danny Adams, Bob Nelson and Alan Jacobson of the Maryland Department of the Environment's (MDE) Radiological Health Program (RHP) conducted a radioactive materials inspection of NPI's 01 license on November 29 and December 1, 2005. The inspection examined radiation safety, compliance with conditions of your license, adherence to procedures and proper maintenance of records, interviews with personnel, general observations, and independent measurements. As a result of the inspection, the Inspection Team identified specific concerns and certain activities that were found to be in violation of the Department's requirements. These findings were discussed with Ms. Kathy Bupp, Messrs. Jack Ransohoff, Jeffrey Williams, and William Ransohoff during the licensee management exit interview held on March 4, 2004. The Inspectors prepared and issued MDER E-1, Radioactive Material Inspection Findings and Licensee Acknowledgement Form. A Departmental letter-Notice of Violation will be sent to NPI.

INTERVIEWS

Interviews were conducted with the following NPI employees:

Jeffrey Williams	Radiation Safety Officer
Billy Ransohoff	Project Engineer
Kathy Bupp	Health Physics Technician
Danny Wineholt	LAA-Health Physicist

SPECIFIC AREAS OF REVIEW

The following areas were inspected and reviewed: Dosimetry, Occupational Exposures, Random Inspections, Quarterly Audits, Radiation Safety Committee Minutes, Respiratory Protection Program, Inventory, Pool Water Quality, General Operations in the Limited Access Area (LAA), Implementation of Radiation Safety Program, Boundary Monitoring, One Kilometer Surveys, Shipping and Receiving Records, Floor Monitoring, Health Physics Monthly Reports, Disposal of Radioactive Waste, Training, Air Monitoring, Survey Meter Calibration, Water Monitoring, Whole Body Counting Records, Exposure to Members of the General Public, Posting of Required Documents, Soil Contamination, Compliance with the License Termination Rule, Financial Assurance for Decommissioning, ALARA (D.101 requirements), Review of the Radiological Sample Counting System, Review of the Main Pool Inventory Record and Waste Storage. Soil samples were collected from the dry pond and adjacent areas and analyzed by the Maryland Laboratory Administration. Inspectors collected pool water samples and conducted a contamination survey (wipe survey) of the LAA.

STATUS OF HOT CELL

The Hot Cell manipulators, Hot Cell door and Hot Tool Room door were locked and sealed by MDE Inspectors on September 19, 2002. The Hot Cell has not been used or entered since then. The RSO states that NPI personnel need access to the Hot Cell to replace a light bulb and a roughing filter. MDE Inspectors planned to remove the locks and the seals during the inspection so this could be accomplished. During the inspection, NPI did not have any LAA personnel fit-tested for respiratory protection. As a result, no one was qualified to enter the Hot Cell and the entry had to be delayed. Billy Ransohoff stated that NPI would like to use the Hot Cell for other activities including inventory, testing for leakage of sources and fabricating sources for transport

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into the irradiators. The RSO agreed to provide the RHP a written request for Hot Cell entry describing the exact activities that need to be conducted. MDE Inspectors agreed to schedule a day to be on site so the Hot Cell light bulb and roughing filter could be replaced.

INDEPENDENT PHYSICAL MEASURMENTS

Inovision 451 P #736 Calibrated 4/7/05

Admin Window-1 2nd Floor	300 uR/hr
Admin Window-2 2nd Floor	240 uR/hr
Records Room	4-7 uR/hr
Helguson Chamber	5-13 uR/hr
Helguson Control Room	50-68 uR/hr
Counting Lab	5-11 uR/hr
BKG	4-7 uR/hr

Eberline E-520 #4925 Calibrated 5/5/05

4 uR/hr	President's Office
25 uR/hr	NPI Parking Lot
7 mRem/hr	LAA-Hot Cell Window
23 mR/hr	Hot Tool Cart
19 mR/hr	Hot Tool Room Door
4 mR/hr	1-meter over Main Pool
20 mR/hr	1-meter over South Canal
5 mR/hr	1-meter over North Canal
270 mR/hr	North Waste Room Door-Open
82 mR/hr	South Waste Room Door-Open
16 mR/hr	Fan Room/HEPA/2nd Floor
330 uR/hr	Center of Courtyard @ 1-meter

CONCERNS

1. Inspection findings indicate that NPI does not have the trained personnel, Financial resources and management commitment to decommission the Limited Access Area (LAA) in a timely, safe and predictable manner as required. Trained and experience personnel such as John Verdin, Plant Manager and Jeff Corun, Hot Cell Manager have resigned during the past years and have not been replaced.

2. The inspection team identified numerous violations of the November 3, 2000 Montgomery County Circuit Court Order. Several of these violations are repetitive in nature and adequate corrective actions have still not been implemented.

3. NPI continues to release radioactive materials into the environment in an uncontrolled manner. The dry pond and adjacent areas are contaminated with concentrations of cobalt-60 that exceed regulatory limits and corrective action has still not been implemented. NPI conducts monthly surveys of residential properties within a one-kilometer radius of the plant, however they have not found any cobalt-60 contamination in the past years.

4. Dickerson residents living near the plant are exposed to unnecessary levels of

radiation caused by radioactive waste stored on site. NPI has missed many waste shipment deadlines. NPI estimates the highest radiation exposure to a member of the general public to be (46 millirem above background) cause by radiation that is emitted from the dry waste storage buildings.

5. NPI has still not submitted an adequate decommissioning plan or waste disposal Plan prepared in accordance with licensed waste shipment criteria and State Regulations. NPI's position on this issue is clear, documented and on file with the Department. NPI does not intend to comply until a compromise is reached with the Department or the requirements are changed.

6. NPI management and their Health Physics Consultant have not been effective in correcting ongoing violations and concerns. Most of these violations and concerns are not being addressed in either the monthly radiation protection audits or the annual review of the radiation protection program-content and implementation. The monthly audits often address issues unrelated to problems at the Dickerson facility and appear to provide only a minimal improvement to the radiation safety program at NPI.

7. NPI continues to own, store, possess cobalt-60 sources and waste under a court order-permanent injunction without an approved waste disposal plan and an approved decommissioning plan. In addition, NPI continues to acquire teletherapy sources (for profit) and ship them to Southwest Research in San Antonio Texas for storage thereby avoiding disposal costs. NPI continues to acquire depleted uranium (for profit) and store this licensed material at a NRC licensed facility in West Virginia, once again, avoiding disposal costs. Furthermore, NPI still has not implemented corrective actions necessary to comply with ongoing violations regarding waste disposal, soil concentration limits, radiation levels, releases of radioactive material, financial assurance for decommissioning and license termination. NPI has missed numerous Court Ordered radioactive waste shipment deadlines. NPI has still not taken the first steps necessary to comply with Section C.29. Section A.16 (a)(1) titled, "Deliberate Misconduct" prohibits a licensee, an employee of a licensee from engaging in deliberate misconduct that causes a licensee to be in violation of any rule, regulation, order or any term, condition or limitation of a license issued by the Department. Section A.16(c) describes deliberate misconduct to by a person to be an intentional act or omission that a person knows, would cause a licensee to be in violation of any rule, regulation, order or any term, condition or limitation of any license issued by the Department. Section A.16 is a new regulation that became effective on October 27, 2003. NPI has a very contentious relationship with the Department. Over the years, the RHP has documented thousands of violations at NPI, which have resulted in a number of enforcement actions against the company. One of the apparent problems with NPI is that its President, Jackson A. Ransohoff, is unwilling comply with certain regulations that MDE has cited repeatedly, year after year. In addition, Jackson Ransohoff has refused to pay NPI's annual licensing fee. He has repeatedly stated that he will comply with only those regulations and requirements that he likes.

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DESRCIPTION OF VIOLATIONS

1. Section C.31 titled, "Specific Terms and Conditions of License" and License Condition 22.B(2), require, in part, that all soils, wherever found, contaminated by NPI licensed activities and exhibiting levels of cobalt-60 contamination exceeding 8 picocuries per gram above background must be removed by NPI and properly stored/disposed of as radioactive waste. The Montgomery County Circuit Court Order-Civil Case 199036 (Montgomery County Circuit Court Order) dated November 3, 2000, requires NPI to comply with all of the current requirements of the applicable statutes, regulations and the provisions of the license. The Stipulation and Settlement of Civil Case No. 76639 in the Circuit Court of Montgomery County dated January 3, 1994, further required NPI to demonstrate compliance with these requirements by June 15, 1994.

Contrary to the above, NPI failed to remove cobalt-60 contaminated soil exceeding the above-specified limit. NPI failed to remove the contaminated soils from the areas exceeding the license limit. NPI has been in continuous violation of this requirement since May 23, 1989. For example, NPI still has not removed the soil contaminated with cobalt-60 from the adjacent railroad property to establish compliance with the 8.0 picocurie per gram concentration limit. Furthermore, monthly soil samples collected from the dry pond area and analyzed by NPI personnel during the calendar year of 2005 also exceeded this regulatory limit, however these soils were not removed. On December 1, 2005, MDE Inspectors collected 6 soil samples from the dry pond and adjacent areas. Results of laboratory analysis indicate soil concentration the samples that ranges from 9-87 picocuries per gram. NPI has missed this June 15, 1994 deadline and continues to refuse to remediate this property.

2. Section D.101(a) titled, "Radiation Protection Programs" states that in addition to complying with all other provisions of these regulations, a licensee shall use all means to maintain radiation exposures and releases of radioactive material as low as reasonably achievable (ALARA). The Montgomery County Circuit Court Order requires NPI to comply with all of the current requirements of the applicable statutes, regulations and the provisions of the license.

Contrary to the above, NPI failed to use all means necessary to maintain releases of radioactive material as low as reasonably achievable. Specifically, NPI has failed to use means such as the adequate containment of radioactive materials, proper waste storage practices and regular shipments of radioactive waste, to a licensed repository. On December 1, 2005, MDE Inspectors collected 6 soil samples from the dry pond and adjacent areas that exceeded regulatory limits. As a result, NPI is not maintaining control over their radioactive material and it is continuing to be released. In spite of curtailed source-manufacturing activities, NPI continues to release cobalt-60 into the environment in an uncontrolled manner. Contaminated areas of the LAA lack adequate containment and release pathways are not continuously monitored. NPI has refused to adequately clean these contaminated areas, remove contaminated soils, ship radioactive waste as required and install containment necessary to prevent uncontrolled releases of radioactive material.

Contrary to the above, NPI failed to use all means necessary to maintain radiation exposures to levels as low as reasonably achievable. Specifically, NPI failed to use means such as shielding of radioactive waste in storage and shipment of radioactive waste in accordance with license conditions. As a result, NPI employees and residents living near the plant are exposed to unnecessary levels of radiation emitted from the waste storage areas.

Section C.31(c) titled, "Specific Terms and Conditions of Licenses" and License Condition 21.B require that, within 90 days of the issuance of the license, NPI must submit to the Department for approval, a comprehensive plan for disposal of all low level radioactive wastes in accordance with those specifications defined in this condition. The Montgomery County Circuit Court Order requires NPI to comply with all of the current requirements of the applicable statutes, regulations and the provisions of the license.

Contrary to the above, NPI's low level radioactive waste plan was submitted to MDE on December 10, 1999; however, upon review it was found to be inadequate and as of this date a comprehensive plan acceptable to the Department has not been submitted. Deficiencies in the plan were discussed in a Departmental letter dated March 20, 2000, but NPI has not adequately responded to it. Specifically, the plan submitted by NPI did not include a waste shipment schedule that met the deadline described in License Condition 21.B.

3. Section C.29 (c)(2) titled, "Financial Assurance and Recordkeeping for Decommissioning" requires the licensee to submit a Decommissioning funding plan and financial assurance in accordance with dates and criteria set forth in this section. The Montgomery County Circuit Court Order requires NPI to comply with all of the current requirements of the applicable statutes, regulations and the provisions of the license.

Contrary to the above, NPI failed to provide an adequate decommissioning funding plan and financial assurance in accordance with the criteria set forth in this regulation. On October 20, 2000, the RHP received NPI's Decommissioning Plan dated October 27, 2000, which included a planned schedule for radioactive waste shipments. The RHP has reviewed this plan and determined that it is inadequate because it did not demonstrate compliance with the current radioactive material license waste disposal criteria. Table 2.1 of this plan described a 12-year shipment schedule for only a small fraction of the total activity of current radioactive waste inventory. The plan did not describe the shipment schedule and protocol for the disposal of the contaminated soil in storage. All radioactive waste that was generated prior to August 1999 was required to be shipped for disposal by August 2004. NPI has been in continuous violation of this requirement since April 13, 1999 as upheld by the Maryland Court of Special Appeals Case No. 2338 filed September 19, 2001.

4. Section C.29(g)(2) titled "Financial Assurance and Recordkeeping for Decommissioning" states that that no person shall receive, possess, use, transfer, own, or acquire radioactive material of a type described in paragraphs (a) and (b) of C.29 for more than 180 days following the dates prescribed in the section for submittal of a decommissioning funding plan or certification, if the decommissioning funding plan or certification has not been approved by the Agency. The Montgomery County Circuit Court Order requires NPI to comply with all of the current requirements of the applicable statutes, regulations and the provisions of the license

Contrary to the above, NPI has still not met the financial assurance requirements. Furthermore, NPI's decommissioning funding plan has not been approved by the Agency. Despite NPI's failure to provide an adequate decommissioning funding plan, the company has continued to possess radioactive material of a type described in C.29(a) after the April 13, 1999 deadline. NPI has been in continuous violation of this requirement since April 13, 1999. NPI has refused to initiate the steps necessary to decommission the facility in a timely, safe and predictable manner as required.

5. Section C.31(c) titled, "Specific Terms and Conditions of Licenses" and License Condition 21(B) prohibits NPI from storing radioactive waste in areas other than the main

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pool/canals for a period exceeding 2 years. The Montgomery County Circuit Court Order requires NPI to comply with all of the current requirements of the applicable statutes, regulations and the provisions of the license.

Contrary to the above, NPI missed the August 2004 deadline to ship approximately 1900 curies of radioactive waste store in the main pool and North Canal II.

Contrary to the above, NPI failed to ship for disposal the following containers of radioactive waste in accordance with waste shipment requirements.

Resin from the main pool, 3 cubic ft, containing 1 curie of cobalt-60, generated 8/10/2001
Approximately 600 cubic feet of soil contaminated with cobalt-60 generated in November 2000
Box # 88, 16 cubic ft, 134 lbs, 1.5 mR/hr at contact, generated 4/20/2001
Box # 90, 16 cubic ft, 67 lbs, 2.0 mR/hr at contact, generated 4/28/2001
Box # 91, 16 cubic ft, 114 lbs, 400 mR/hr at contact, generated 5/9/2001
Box# 94, 16 cubic ft, 78 lbs, 500 mR/hr at contact, generated 5/8/2001
Box # 95, 16 cubic ft, 55 lbs, 400 mR/hr at contact, generated 5/10/2001
Box # 96, 16 cubic ft, 53 lbs, 500 mR/hr at contact, generated 5/10/2001
Box# 100, 16 cubic ft, 60 lbs, 450 mR/hr at contact, generated 5/11/2001
Box # SWR05, 16 cubic ft, 65 lbs, 700 mR/hr at contact, generated 6/6/2001
Box # 062298-2, 16 cubic ft, 78 lbs, 20 mR/hr at contact, generated 6/6/2001
Box# FD-001, 8 cubic ft, 88 lbs, 50 mR/hr at contact, generated 7/16/2001
Box# FD-002, 8 cubic ft, 85 lbs, 450 mR/hr at contact, generated 7/16/2001
Box# FD-003, 7 cubic ft, 84 lbs, 140 mR/hr at contact, generated 9/7/2001
Box# FD-004, 8 cubic ft, 65 lbs, 13 mR/hr at contact, generated 9/7/2001
Box# FD-005, 8 cubic ft, 72 lbs, 100 mR/hr at contact, generated 10/10/2001
Box# FD-006, 8 cubic ft, 53 lbs, 400 mR/hr at contact, generated 11/30/2001
Box # FD-007, 8 cubic ft, 70 lbs, 7 mR/hr at contact, generated 11/30/2001
Box# FD-008, 8 cubic ft, 60 lbs, 5 mR/hr at contact, generated 11/30/2001

6. Section C.32 titled, "Expiration and Termination of Licenses and Decommissioning of Sites and Separate Buildings or Outdoor Areas" requires, in part, that each licensee shall either begin decommissioning its site, buildings and outdoor areas in accordance with Agency requirements or submit a decommissioning plan within 12 months when the licensee's right to operate has been terminated either by court action or by action of law or regulation. Section C.32(g)(1) requires a licensee to complete decommissioning as soon as practicable but no later than 24 months following the initiation of decommissioning. Section C.32(g) (2) requires the licensee to request license termination as soon as practicable but no later than 24 months following the initiation of decommissioning. The Montgomery County Circuit Court Order requires NPI to comply with all of the current requirements of the applicable statutes, regulations and the provisions of the license.

In accordance with the above, NPI's right to operate in accordance with the 01 license was terminated by the Maryland Court of Special Appeals in December 2001. NPI failed to submit an adequate decommissioning plan in accordance with paragraphs (f) and (g) of these regulations. Furthermore, NPI has not yet begun to decommission the site, buildings and outdoor areas. Finally, NPI has still not submitted an adequate decommissioning plan in accordance with the criteria specified in paragraphs (f) and (g).

7. COMAR 26.12.03.02 paragraph E titled, "Annual Fees for Licenses to Possess or Use Radioactive Materials" requires a person with a license to possess or use radioactive material to

pay to the Department an annual licensing fee in accordance with a fee schedule set forth in Regulation .03C of this chapter. The fee shall be paid on or before the first day of the month in which the anniversary of the license date occurs. The Montgomery County Circuit Court Order requires NPI to comply with all of the current requirements of the applicable statutes, regulations and the provisions of the license.

Contrary to the above, NPI failed to pay their annual licensing fee. Although the Maryland Court of Special Appeal terminated NPI's ability to operate under this radioactive materials license, the payment of the annual fee is required until the facility is decommissioned and the license is terminated in accordance with the criteria specified in Section C.32 titled, "Expiration and Termination of licenses and Decommissioning of Sites and Separate Buildings or Outdoor Areas."

MISCELLANEOUS NOTES

-NPI monitors 62 employees using whole body monthly badges and quarterly TLDs provided by ICN-Global Dosimetry Solutions Inc.
-In accordance with J.11 (e), NPI sent individual monitoring reports to terminate employees during the year.
-NPI monitors 25 locations on the perimeter of the facility. The maximum annual exposure was 286 in the dry pond. No location exceeded or approached the 500 mRem per year limit.
-Whole Body Counting, 9 employees who are authorized to work in the LAA were counted. All were less than MDA (2 nCi). The ALI for class Y cobalt-60 is 30,000 nCi. There were no ingestions or inhalations.
-NPI monitors several residential homes continuously with TLDs, collects data and adequately demonstrated compliance with the 100 mRem per year dose limit for individual members of the public by measurement and calculation. NPI estimates that the highest exposed member of the general public received 46 mRem for the year.
-NPI test pool water activity, pH and conductivity on a weekly basis. Conductivity ranged between 1.5 and 3.5 uohms/cm. The pH ranged between 4.9 and 5.76.
-Residential Homes-Continuous Monitoring Results for the year, Fisk 134 mRem outside, Fisk 65 mRem inside, Carter 145 mRem outside, Carter 128 mRem inside.
-NPI reports that the internal exposure to the most likely cohort from airborne release from the hot cell exhaust is less than 1 mRem CEDE as determined by the EPA's Comply program.
-NPI reports the disposal of approximately 300, 000 gal sewage to WSSC for the year, 1.86 E-6 uCi/ml. No monthly average exceeded 3.0 E-5 uCi/ml.
-NPI's maximum perimeter monitors are #2013 Left Fence by Rail Road 256 mRem and 32019 Dry Pond 253 mRem.
-NPI conducts monthly surveys of residential properties located within a 1 kilometer radius of the plant. No activity was detected in this year.
-NPI Soil Sample Data- Most Dry Pond samples exceeded the 8 pCi per gram limit, See attached DHMH radiation Laboratory report.
-Drums of contaminated soil are stored outside, not protected from weather. Rusted lids are suspected.
-MDE Inspector Danny Adam's SRD went off scale in the LAA during the inspection. His TLD was sent for an emergency reading. The result was 2 millerem.

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ATTACHMENTS

MDER Form E-1, Inspection Finding and Licensee Acknowledgement
Inventory/Wipe Test For Sources in Dry Storage
Monthly Cobalt-60 Inventory Record
Laboratory Report-Soil Samples
Laboratory Report-Pool Water Samples
Wipe and meter Survey of LAA
Radioactive Waste-Dry Storage Log
Restricted Area Surveys
Annual RSO reviews

MARYLAND STATE DEPARTMENT OF HEALTH AND MENTAL HYGIENE
RADIATION LABORATORY REPORT
(410) 767-5537

SAMPLE SOURCE: Neutron Products, Inc. COLLECTOR: A. Jacobson/D. Adams SAMPLE TYPE: Soil

COLLECTION DATE: 10/14/05 RECEIPT DATE: 10/14/05 REPORT DATE: 10/24/05 ANALYSES BY: Romero/Wise

S. Wise

Lab. No.	Sample	Co-60 (pCi/Gg)	
0806	1	$8.1949 \times 10 \pm 3.049$	Dry Pond by Outlet
0807	2	$1.6723 \times 10^2 \pm 6.389$	Dry Pond, 8 ft, left side of the outlet
0808	3	$2.1479 \times 10^2 \pm 6.304$	Dry Pond, 12 ft, left side of the outlet
0809	4	$1.9309 \times 10^2 \pm 6.972$	Dry Pond 8 ft, right side of the outlet
0810	5	$2.9319 \times 10^2 \pm 9.950$	Dry Pond Corner, cement walls, 2 ft in by 2 ft. in
0811	6	$6.2016 \times 10 \pm 2.219$	Adjacent area, downstream 3 ft outside fence