UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
475 ALLENDALE ROAD
KING OF PRUSSIA, PENNSYLVANIA 19406-1415

October 23, 2001

Docket No. 04006940 License No. SMB-920

Martin O'Neill, Director
Safety, Health and
Environmental Affairs
Cabot Corporation
P. O. Box 1608
County Line Road
Boyertown, PA 19512

SUBJECT: INSPECTION 04006940/2001001, CABOT CORPORATION, BOYERTOWN, PENNSYLVANIA SITE AND NOTICE OF VIOLATION

Dear Mr. O'Neill:

On August 15 and 16, 2001, Eric H. Reber of this office conducted a safety inspection at the above address of activities authorized by the above listed NRC license. The inspection was an examination of your licensed activities as they relate to radiation safety and to compliance with the Commission's regulations and the license conditions. The inspection consisted of observations by the inspector, interviews with personnel, and a selected examination of representative records. Additional information provided in telephone conversations on August 29, and September 4, 5, and 24, 2001, between Timothy Knapp of your organization and this office was also examined as part of the inspection. The findings of the inspection were discussed with you, Timothy Knapp, and Matt Campbell of your organization at the conclusion of the inspection.

Based on the results of this inspection, it appears that your activities were not conducted in full compliance with NRC requirements. A Notice of Violation is enclosed that categorizes each violation by severity level in accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions, "(Enforcement Policy), NUREG 1600. You are required to respond to this letter and should follow the instructions specified in the enclosed Notice when preparing your response. In your response, you should document the specific actions taken and any additional actions you plan to prevent recurrence. Your response may reference or include previous docketed correspondence, if the correspondence adequately addresses the required response. After reviewing your response to this Notice, including your proposed corrective actions and the results of future inspections, the NRC will determine whether further NRC enforcement action is necessary to ensure compliance with NRC regulatory requirements.

In accordance with 10 CFR 2.790, a copy of this letter will be placed in the NRC Public Document Room and will be accessible from the NRC Web site at http://www.nrc.gov/NRC/ADAMS/index.html.

Your cooperation with us is appreciated.

Sincerely,

Original signed by John D. Kinneman

John D. Kinneman, Chief
Nuclear Materials Safety Branch 2
Division of Nuclear Materials Safety

Enclosure:
Notice of Violation

cc:
Timothy Knapp, Radiation Safety Officer
Commonwealth of Pennsylvania

Distribution:
D. J. Holody, RI

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OFFICE	DNMS/RI	N	DNMS/RI		DNMS/RI			
NAME	EReber/er		JKinneman/jdk					
DATE	10/18/01		10/18/2001					

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NOTICE OF VIOLATION

Cabot Corporation
Boyertown, PA

Docket No. 04006940
License No. SMB-920

During an NRC inspection conducted on August 15 and 16, 2001, three violations of NRC requirements were identified. In accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions," (Enforcement Policy), NUREG-1600, the violations are listed below:

A. 10 CFR 20.1703 (c)(2) requires that licensees who assign or permit the use of respiratory protection equipment to limit the intake of radioactive material shall implement and maintain a respiratory protection program that includes surveys and bioassays, as necessary, to evaluate actual intakes of radioactive material.

Contrary to the above, as of August 15, 2001, the licensee assigned the use of respiratory protection equipment to limit the intake of radioactive material and did not implement and maintain a respiratory protection program that included surveys and bioassays, as necessary, to evaluate actual intakes. Specifically, the licensee performs annual whole body counts of individuals exposed to airborne radioactive materials. However, because of the minimum detectable activity of these counts and the behavior of Th-232 when it is deposited in the body, these counts are not adequate to detect a hypothetical intake of Th-232 if the intake occurred greater than several days before the whole body count.

This is a Severity Level IV violation (Supplement IV).

B. 10 CFR 20.1501 requires that each licensee make or cause to be made surveys that may be necessary for the licensee to comply with the regulations in Part 20 and that are reasonable under the circumstances to evaluate the extent of radiation levels, concentrations or quantities of radioactive materials, and the potential radiological hazards that could be present. Pursuant to 10 CFR 20.1003, *survey* means an evaluation of the radiological conditions and potential hazards incident to the production, use, transfer, release, disposal, or presence of radioactive material or other sources of radiation.

Contrary to the above, since at least 1999, the licensee did not make adequate surveys to assure compliance with 10 CFR 20.1201(a)(1)(ii), which limits the annual occupational dose to individual adults to the sum of the deep-dose equivalent and the committed dose equivalent to any individual organ or tissue other than the lens of the eye to 50 rems (0.5 Sv).

Specifically, the licensee failed to adequately assess airborne concentrations of natural uranium and thorium to which workers were exposed in Building 73. Lapel air samplers were not used to estimate the airborne radioactive material concentration in the breathing zones of workers that performed duties in Building 73. The licensee used airborne concentration levels measured at a single general area air sampler located on the first floor of Building 73 to calculate the concentrations of airborne radioactivity that

workers were exposed to throughout the building. The air sampler is located between two stations where barrels of ore are dumped. The distance from these two areas of elevated airborne radioactivity concentration to the air sampler is approximately 20 feet. Therefore, this air sample was not being drawn in the breathing zones of the individuals who dumped barrels of ore at these stations. Further, the cleaning of Building 73 and the opening of process lines are two examples of activities that are performed periodically throughout the building that may subject workers to elevated airborne radioactivity concentrations that would not be adequately measured by the area air sampler on the first floor.

This is a Severity Level IV violation (Supplement IV).

C. Condition 10 of License No. SMB-920 requires that the receipt, possession, and processing of licensed material at the Boyertown facility will be in accordance with the statements, representations, and conditions specified in part, in the letter dated April 10, 1996.

The Appendix to the Air Sampling Program that was submitted with the letter dated April 10, 1996, indicates that a self-absorption factor, F of 0.85 will be used when analyzing air samples.

Contrary to the above, from at least 1999 to August 15, 2001, the licensee did not use a self-absorption factor, F of 0.85 when analyzing air samples. Specifically, the licensee did not incorporate the self-absorption factor into their analysis of air samples from Building 73, so these samples underestimated the amount of airborne radioactivity by 15%. Also, the licensee misapplied this factor to air samples from their background air sampler at Walker Road (i.e.,upwind from the facility) and to air samples drawn at the Boiler House and County Line Road which are located at the site boundary. In these cases, the licensee used a factor of 1.15 and airborne radioactivity concentrations were underestimated by 26%.

This is a Severity Level IV violation (Supplement VI).

Pursuant to the provisions of 10 CFR 2.201, Cabot Corporation is hereby required to submit a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555, with a copy to the Regional Administrator, Region I, within 30 days of the date of the letter transmitting this Notice of Violation (Notice). This reply should be clearly marked as a “Reply to a Notice of Violation” and should include for each violation: (1) the reason for the violation, or, if contested, the basis for disputing the violation, (2) the corrective steps that have been taken and the results achieved, (3) the corrective steps that will be taken to avoid further violations, and (4) the date when full compliance will be achieved. Your response may reference or include previous docketed correspondence, if the correspondence adequately addresses the required response. If an adequate reply is not received within the time specified in this Notice, an order or a Demand for Information may be issued as to why the license should not be modified, suspended, or revoked, or why such other action as may be proper should not be taken. Where good cause is shown, consideration will be given to extending the response time.

If you contest this enforcement action, you should also provide a copy of your response to the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001. Under the authority of Section 182 of the Act, 42 U.S.C. 2232, any response which contests an enforcement action shall be submitted under oath or affirmation.

Your response will be placed in the NRC Public Document Room (PDR) and on the NRC Web site at http://www.nrc.gov/NRC/ADAMS/index.html. To the extent possible, it should, therefore, not include any personal privacy, proprietary, or safeguards information so that it can be made publically available without redaction. However, if you find it necessary to include such information, you should clearly indicate the specific information that you desire not to be placed in the PDR, and provide the legal basis to support your request for withholding the information from the public.

In accordance with 10 CFR 19.11, you may be required to post this Notice within two working days.

Dated This _23_ day of _October_ 2001

APPENDIX A MATERIALS PROCESSOR/MANUFACTURER INSPECTION RECORD (IP 87111)												
REGION I												
Insp. Report #	2001-001	License #	SMB-920	Docket #	040-06940							
Licensee Name	Cabot Corporation											
Street Address	County Line Road											
City, State, Zip	Boyertown, PA 19512											
Location (Authorized Site) Being Inspected	Same address as above											
Licensee Contact Name		Timothy M. Knapp		Phone #	610-369-8520							
Priority	3	Program Code	11700	Description	U and Th ore processor							
Date of Last Inspection:		12/7 & 8/98		Date of This Inspection		8/15 & 16/01						
Type of Insp.	Announced		Routine	x	Initial							
	Unannounced	x	Special									
Next Insp. Date	8/2004	Normal	x	Reduced		Extended						
Justification for change in normal inspection frequency:												
Summary of Findings and Actions												
No violations, Clear 591 or letter issued			Non-cited violations									
Violation(s), 591 issued		Violation(s), letter issued	x									
Follow up on previous violations:	See Part I, Item 2											
Inspector - Printed Name	Eric H. Reber											
- Signature	**/RA/**			Date	**10/2/01**							
Approved - Printed Name	John D. Kinneman											
- Signature	**/RA/**			Date	**10/18/01**							

PART I-LICENSE, INSPECTION, INCIDENT/EVENT, AND ENFORCEMENT HISTORY

1. AMENDMENTS AND PROGRAM CHANGES

License amendments issued since last inspection, or program changes noted in the license.

Amendment No.	Date	Subject
3	11/8/99	RSO Change

2. INSPECTION AND ENFORCEMENT HISTORY

Unresolved issues; previous and repeat violations; Confirmatory Action Letters; and orders.

Previous Violations	Insp. No.	Status
1. Failure to maintain decommissioning records	98-001	Closed - See Part II, Item 10
2. Failure to fit test employees who wear respirators	98-001	Closed - See Part II, Item 8
3. LSA material shipped in packages that were not strong/tight	97-002	Closed - See Part II, Item 11

Unresolved Issue	Insp. No.	Status
Building 73 Baghouse issues	96-002	Closed - See Part II, Item 3

3. INCIDENT/EVENT HISTORY

List any incidents or events reported to NRC since the last inspection. Citing "None" indicates that regional event logs, event files, and the licensing file have no evidence of any incidents or events since the last inspection.

None

PART II - INSPECTION DOCUMENTATION

NOTE: References that correspond to each inspection documentation topic are in Inspection Procedure 87111, Appendix B, "Materials Processor/Manufacturer Inspection References."

The inspection documentation part is to be used by the inspector to assist with the performance of the inspection. Note that not all areas indicated in this part are required to be addressed during each inspection. However, for those areas not covered during the inspection, a notation ("Not Reviewed" or "Not Applicable") should be made in each section, where applicable.

All areas covered during the inspection should be documented in sufficient detail to describe what activities and procedures were observed and/or demonstrated. In addition, the types of records that were reviewed and the time periods covered by those records should be noted. If the licensee demonstrated any practices at your request, describe those demonstrations. The observations and demonstrations you describe in this report, along with measurements and some records review, should substantiate your inspection findings. Attach copies of all licensee documents and records needed to support violations.

1.	ORGANIZATION AND SCOPE OF PROGRAM

Management organizational structure; authorized locations of use, including field offices and temporary job sites; type, quantity, and frequency of material use.

President of Cabot (off-site) - Cabot Corp. HQ is in Boston

↑

Tom Odle, General Manager of Cabot Performance Materials in Boyertown

↑

Martin O'Neill, Director of
Safety, Health and Environmental Affairs

↑ ↑

Timothy Knapp
Radiation Safety Officer

Brad Okoniewski
Mgr, Environmental Programs

Mr. Knapp is the only individual responsible for radiation safety on site. Approximately 480 people employed @ Boyertown. The company extracts tantalum (Ta) and niobium (Nb) from ore that is received at the facility. These materials are supplied to the electronics industry. Ta is used to manufacture capacitors. Business has increased approximately 35% since 1998.

2.	MANAGEMENT OVERSIGHT

Management support to radiation safety; Radiation Safety Committee; Radiation Safety Officer; program audits, including annual reviews; as low as is reasonably achievable (ALARA) reviews; control and supervision by authorized users.

Tim Knapp is the RSO.

3.	FACILITIES

Facilities as described; uses; control of access; engineering controls; calibration facilities; shielding; air flow:

Cabot has central facilities on either side of County Line Road in Boyertown, PA. The central facilities include processing buildings, chemistry laboratories, warehouses, administrative offices, and a waste water treatment facility.

One major source of potential airborne exposure is the dumping of barrels of incoming ore in Building 73. Laminar air flow away from the worker dumping the barrels is established by suction of air in the area where the barrels are dumped. Also, workers wear respirators during this activity.

Building 73 has an air handling system that pulls air that potentially contains airborne source material to either a Baghouse in which the dust is collected on bags or a Torrit that uses screw-in filters. The Baghouse has demonstrated problems with contamination which were documented during Inspection No. 96-002 and a problem with the system not properly containing the dust. Also noted has been a problem with difficulty in determining when the dust collection barrel is full and should be emptied. Dust collected from the Baghouse was historically removed by a corkscrew type conveyer. Because of problems with this system clogging, it was replaced with a drum that is emptied once per shift. One employee stated that the drum has never been filled completely at the time it is emptied. The dust from the drum is recycled back into the system. The dust collection system does not appear to be leaking and no unexpected contamination above facility action limits has been detected during surveys of the area performed by the RSO. Air from the baghouse and the Torrit is exhausted up stacks that are not monitored. The baghouse has a differential pressure monitor which monitors the pressure drop across the bags and will provide an indication if one of the bags fails. This monitor is checked once per shift. The licensee relies on air monitoring at the site boundary to determine its unrestricted area air effluents. The benefit of monitoring air effluents specifically from Building 73 was discussed with the RSO and should be reviewed during the next license renewal.

Quantities of source material become airborne and subsequently settle out on horizontal surfaces in Building 73. When the building is cleaned, this material becomes re-suspended in the air. The RSO is pursuing an improvement to their vacuum system which would reduce the amount of material that is re-suspended during this procedure.

Filtercake from Building 73 and other contaminated equipment are stored in the Mausoleum - a concrete building with 8 bins, each 110 x 110 ft. This building was mostly full when it was emptied in the fall of 2000. Before material is put in new bins, the surfaces are cleaned and sand is put down. Then a rubber liner is put down which extends six feet up the walls. Currently, one bin is filled and they are starting on a second. The RSO estimated that it would take 25 years to completely fill the mausoleum with filtercake.

The licensee maintains a small QC laboratory. Small quantities of material are crushed in a fume hood in the lab. This area is surveyed monthly by the RSO.

4.	EQUIPMENT AND INSTRUMENTATION

Operable survey instruments; procedures; 10 CFR Part 21 procedures; process and storage systems.

A F & J air pump is used to pull air through a cellulose filter in Building 73. The pump was last calibrated by JRT Calibration Services, 1200 East High, Suite 111, Pottstown, PA 19464, on March 29, 2001.

Air sample filters and wipe test samples are counted with a Ludlum Model 2929 phoswich detector. A Th-230 alpha source is used to calibrate this detector and it is checked daily.

The licensee also maintains several hand-held, calibrated instruments for monitoring surface contamination.

5.	MATERIAL USE, CONTROL, AND TRANSFER

Materials and uses authorized; security and control of licensed materials; and procedures for receipt and transfer of licensed material.

Ta and Nb ore are shipped to Cabot from around the world, but primarily from Canada and Australia. The ore has been processed before it arrives in Boyertown and appears to be large-grained sand upon arrival. The ore is received at the facility in drums.

A simplified overview of Cabot's processing of Tantalum/Niobium ore:

1. Barrels of ore are received in Boyertown. This ore typically contains 0.5 to 1.5% source material. Generally, all incoming material is classified as source material.
2. Ore is ground up to further in Building 73
3. This material is put in 1 of 6 digesters where it is mixed with acids (primarily HF) and heated in Building 73.
4. As part of the process, the solution is put through a series of filters. The solids that are removed (filtercake) contain U and Th and are stored in the mausoleum.
5. Ta and Nb are put into a solution stream that is piped to Building 74. This solution stream does not typically have much U and Th.
6. In Building 74, the material is processed further through a double extraction process and they end up with Ta salts and Nb salts. The remainder of the solution containing HF is recycled or sent to the waste water treatment plant.
7. At the waste water treatment plant, the solution is neutralized with lime.
8. The solution is then pumped to the Waste Water Filter house where it is further treated and filtered. Filtercake that is accumulated at this facility normally has a low concentration of U and Th. Cabot is authorized to dispose of this material without regard to its radioactive content if it contains less than 10 pCi/g of source material.
9. The liquid from the Waste Water Filter house is pumped to Lagoon 5. The lime that was added to the solution increased the pH to 11 or 12. In Lagoon 5, sulphuric acid is added to reduce the pH to around 7. The liquid from Lagoon 5 is then pumped to Lagoon 6 which is then discharged to a stream at Outfall 001.

One small part of Cabot's activities involves the addition of Th to tantalum powder. Approximately 100 g of Th is used one time per month in this activity. The room in which this activity occurs is maintained under negative air pressure and workers wear air purifying respirators when performing this activity.

An inventory is performed at the end of every year. Three to four tons of U and Th in filtercake is generated per year.

6.	AREA RADIATION SURVEYS AND CONTAMINATION CONTROL
Radiological surveys; air sampling; leak tests; inventories; handling of radioactive materials; contamination controls; records; and public doses.	

Restricted area air sampling is performed in Building 73. The air sampler is located between the two barrel dumping stations and runs continuously. Air sample filters are counted with a Ludlum Model 2929 phoswich detector. A Th-230 alpha source is used to calibrate this detector and it is checked daily.

Violation: The licensee uses a factor of 0.85 to account for the self-absorption of alpha particles in air samples that are counted on their Ludlum Model 2929 phoswich detector. The self-absorption factor was discussed in a in report that was submitted as an attachment to Cabot's letter to the NRC dated April 10, 1996. However, since at least 1999, the licensee did not incorporate this factor into their analysis of air samples from Building 73, so these samples underestimated the amount of airborne radioactivity by 15%. Also, the licensee misapplied this factor to air samples from their background air sampler at Walker Road (i.e.,upwind) and to air samples drawn at the Boiler House and County Line Road which are located at the site boundary. In these cases, the licensee used a factor of 1.15, so the air concentrations were underestimated by 26%.

As stated in the licensee's letter dated April 10, 1996, the use of a self-absorption factor of 0.85 for alpha counting was based "... on discussions with engineers and radiation protection personnel in the nuclear power industry ..." Generally, the amount of particulate matter present in ambient air in power plants will be significantly less, and of a differently quality than at the Cabot facility. As discussed with the RSO during the inspection, the self-absorption of alpha particles in air samples can vary widely with the material sampled and the type of filter paper used. Therefore, the self-absorption of alpha particles in air samples with Cabot-specific material should be determined. The licensee should also consider developing a method for correcting alpha self-absorption with increasing density of material collected on the filter sample. This issue should be re-visited when the Cabot license is renewed.

Respirators are worn when containers of material are dumped or when process lines are opened. Generally, no one is in the building when the plant is operating.

Background environmental air samples are collected upwind from Building 73 (Walker Road). Unrestricted area air effluent samples are collected weekly from two locations downwind of Building 73 at the fence line (County Line Road and Boiler House). These samples are counted on the licensee's phoswich detector and compared with Cabot's calculated effluent limit. Based on the percentage of U and Th in the ore in use at the facility and the air effluent concentration limits in Table 2, Col. 1 of App. B. of 10 CFR 20, Cabot a concentration of 6.47 E-15uCi/ml is derived. Twenty percent (Constraint Rule limit) of this value is 1.29E-15 uCi/ml. Air effluent samples over the past several years have generally been ranged around 20 percent of the air effluent concentration limits from Table 2, Col. 1 of App. B. of 10 CFR 20. The weekly air samples are collected and sent as a composite sample for alpha analysis on a quarterly basis. The results of this analysis were entered by the RSO into the COMPLY code which indicated compliance with the constraint rule under Level 1 (worst case scenario).

Printouts for the past two years were reviewed by the inspector.Five groundwater monitoring wells are located near the Mausoleum - one is upgrade and four downgrade. All monitoring wells are sampled quarterly. None of the monitoring wells have indicated radiation above background since 1998 except for well MMW3 near the Mausoleum. As documented in the RSO memo to file dated June 29, 2001 (attached), well MMW3 had elevated readings during the 18 months prior to the memo date. The well was evaluated by Environmental Standards who indicated that the well is susceptible to surface water runoff and rainfall infiltration due to the design of the well pad. The RSO believes that it is likely that the well may have been struck by a piece of machinery during the packaging of waste from he mausoleum when there was much truck and machinery traffic in the area. Also, ground contamination in the area of the well may been washed into the well. This issue should be reviewed during future inspections.

The groundwater monitoring wells which are designed to measure potential groundwater contamination from the Mausoleum are in very close proximity to the potential source of contamination - i.e., 10 to 20 feet from the buildings. Therefore, the wells may not be able to adequately assess whether groundwater contamination is coming from the mausoleums because radioactive material potentially entering the groundwater from the Mausoleum may not have had sufficient horizontal distance to migrate to the sampling point (i.e., 360 feet below grade) because the wells are so close to the buildings.

Four other groundwater monitoring wells are located: 1) upgrade from the Mausoleum at the site boundary; 2) Near the Engineering Building; 3) between the Mausoleum and Outfall 001; and 4) 20 feet from the creek. These wells may be able to assess groundwater from the Mausoleum as well as other sources of potential groundwater contamination on the site. These wells are sampled quarterly and no RAM above background has been detected since 1998.

Release of equipment for unrestricted use: It is rare that equipment from Buildings 73 or 74 is released for unrestricted use. However, if it is, the RSO performs surveys with a NE Technology Electra Plus which was last calibrated by JRT Calibration Services on 5/8/01. This device is calibrated with Sr-90, Si-32, Am-241 and Th-230 standards. The RSO uses Reg. Guide 1.86 to establish release criteria.

Liquid effluents from Lagoon 6 are pumped into a stream at Outfall 001. Water in this stream is sampled quarterly at Outfall 001 and upstream and downstream of this location. No radioactive material above background was detected in these samples since at least 1998. One upstream and two downstream sediment samples are taken quarterly from the creek bed. No radioactive material above background has been detected in these samples since at least 1998.

7.	TRAINING AND INSTRUCTIONS TO WORKERS

Training and retraining requirements and documentation; interviews and observations of routine work; staff knowledge of all routine activities; 10 CFR Parts 19 and 20 requirements; emergency situations; and supervision by authorized users.

All employees on site receive 45 min. to 1 hour of radiation safety training as part of two days of training that they receive when they commence employment. This radiation safety training covers the different types of radiation, respiratory protection, biological effects of radiation exposure, and the ALARA concept. Annual retraining is also given and records are maintained.

OJT is also given to workers whose work involves licensed materials.

Workers that were interviewed confirmed that the licensee performs training as described above and were knowledgeable about the radiation issues and the licensee's radiation safety procedures.

8.	RADIATION PROTECTION

Radiation protection program with ALARA provisions; external and internal dosimetry; exposure evaluations; dose and survey records and reports; annual notifications to workers; bulletins and other generic communications.

Violation: The only air sampling currently being performed in Building 73 is at an area air sampler on the first floor located between two dumping stations where barrels of ore are dumped. The distance from these two areas of elevated concentration to the air sampler is approximately 20 feet. Therefore, air is not being drawn in the breathing zone of individuals that dump barrels of ore. Also, the cleaning of Building 73 is performed periodically and this is a high airborne radioactivity job. The results of air samples from the one air sampler would not accurately reflect the airborne radioactive material concentrations that workers were exposed to because workers perform this activity at various locations throughout the Building. Therefore, airborne radioactivity concentrations that workers are exposed to are not being adequately accessed.

Doses are assigned to workers who work in Building 73 on the basis of air samples taken at the one location. The air sampling results from 2000 for Building 73 indicated that a worker present for 40 hours a week would have been exposed to 254 DAC-hrs (this figure incorporates the correct alpha self-absorption factor). A protection factor of 50 is then applied to the samples.

Cabot assigns respirators to workers a means of limiting their intake of licensed materials. Physicals and fit testing of respirators are performed on an annual basis. Respirators are used to reduce intake of airborne source material. Respiratory function tests and respirator fit tests are performed by the Cabot Safety Department annually for employees that wear respirators. The results of the respiratory function test are provided to a physician who performs a physical annually. A TSI Portacount Plus is used to measure the protection factor of respirators during fit tests. A database is used by an Administrative Assistant to ensure that all employees that use respirators receive fit tests and physicals annually. The Administrative Assistant stated that she reviews the database at least weekly. Individuals that are due are sent written notification. If the workers do not schedule fit tests and physicals in a timely manner, the names of the individuals are announced in management meetings and supervisors are held accountable for the people in their departments. The RSO may also get involved if employees are overdue with fit tests or physicals. The database was queried for several individuals chosen at random. All these individuals were up to date with their fit tests and physicals. Several employees that have respirator work assigned to them were interviewed and all indicated that they had been fit tested and had undergone a physical in the last year. Workers use a particular respirator for one shift only before it is cleaned. Respirator filters are changed every 30 days.

As stated in the licensee's letter dated April 10, 1996, whole body counting is performed on-site by Canberra one time per year as a check to verify that the air sampling and respiratory protection programs are effective. The RSO and the Canberra Sr. HP indicated that they were not aware of any positive lung counts by Canberra in the past. The Sr. HP indicated that the critical level for their detection system: L_c= 0.15 nCi for Th-232 exposure. The ALI for the results of the scan are provided to each individual. The inspector reviewed records of scans performed in August 2000, which indicated no in vivo radioactive material.

Violation: The whole body counting described above would only detect an acute intake of an ALI of Th-232 if the count was taken within several days of the exposure. 10 CFR 20.1703 (c) requires licensee's that implement a respiratory protection program to perform surveys and bioassays, as necessary, to evaluate actual uptakes. Cabot is not performing such surveys.

9.	RADIOACTIVE WASTE MANAGEMENT

Disposal; effluent pathways and control; storage areas; transfer; packaging, control, and tracking procedures; equipment; incinerators, hoods, vents and compactors; license conditions for special disposal method.

The filtercake from Building 73 and other waste material from Cabot's operations has been historically stored in the Mausoleum. A letter dated October 13, 2000, to the RSO from Philip Ting, of NMSS indicated that 750 cubic meters of this material could be treated as an unimportant quantity of source material per 10 CFR 40.13. Subsequently, 25 truckloads of this material were shipped to Waste Control Specialists LLC (WCS) in Andrews, Texas for processing. The shipments, which were made without regard to their radioactive content, were made in October and November of 2000. Records of these shipments were reviewed by the inspector. A State of Texas Uniform Hazardous Waste Manifest was filled out for each truck. Cabot received back Ta that was extracted from the material by WCS.

Currently, one bin in the Mausoleum is filled with filtercake and another bin is partially filled. The RSO estimated that it would take 25 years to completely fill the mausoleum with filtercake. Cabot does not consider this material to be a waste product because it contains recoverable amount of Ta and Nb. Currently, they are in discussions with two firms that are developing a process to remove Ta/Nb from this material. During the exit meeting, the inspector informed Cabot Management that the NRC would closely monitor their progress in disposing of/processing filtercake that accumulates in the Mausoleum.

In addition to the filtercake stored in the Mausoleum, Bin 8 contains 3 or 4 drums of material of unknown origin. The RSO stated that it may be slag material from Cabot's Reading facility. This material was not shipped out in Fall 2000 to Texas because it is greater than 0.05% source material. The RSO stated that he is hoping to ship this material to WCS for processing in the future.

Bin 4 of the mausoleum is used as a storage facility for potentially contaminated material.

Filtercake from the Waste Water Filter House is surveyed before being disposed of as non-radioactive waste if sample results indicate a radioactive content of less than 10 pCi/g. 3 - 5 pCi/g is the typical radioactive content of the filtercake. Composite samples are collected weekly and sent are sent quarterly for isotopic analysis to General Engineering Laboratories, Charleston, SC. The inspector reviewed records of sample analysis from 2000 and 2001.

10.	DECOMMISSIONING

Records relevant to decommissioning; decommissioning plan/schedule; notification requirements; cost estimates; funding methods; financial assurance; and Timeliness Rule requirements; changes in radiological conditions since decommissioning plan was submitted.

Decommissioning records are collected in the RSO's office. These records include records/surveys of current use areas. The RSO stated that he found some records relating to the historical use of licensed material at the facility when he performed a diligent search for decommissioning records when he was hired with the company. He continues to collect records relating to the historical use of licensed material at the facility when he comes across them. The RSO stated that the processing of ore has not changed much over the years. He stated that he is considering having a contractor survey a portion of the facility between Buildings 73 and 74 where contaminated material was stored in the past.

On 9/29/00, Cabot's DFP was reviewed by the RSO and found to be adequate. Since the RSO's review, 25 trucks of contaminated material were removed from the Mausoleum. By September 2001, the RSO intends to have in place an entirely new decommissioning cost estimate that is performed by a consultant. The completely new decommissioning cost estimate will be performed because of the time that has passed since the original estimate in 1993 and so that costs can be evaluated by a third party.

Cabot currently has a Letter of Credit with Fleet National Bank. Current bills from the bank were reviewed by the inspector and assumed to be evidence that Cabot's financial assurance is current.

11.	TRANSPORTATION

Quantities and types of licensed material shipped; packaging design requirements; shipping papers; hazardous materials (HAZMAT) communication procedures; return of sources; procedures for monitoring radiation and contamination levels of packages; HAZMAT training; and records and reports.

A violation was identified during Inspection No. 97-002 concerning Cabot's failure to transport LSA material in strong/tight containers in September and October 1997. Since that time, Cabot has made most of their shipments of ore in steel drums [UN 1A2 drums] that qualify as strong/tight containers. None of these containers have leaked. Approximately 24 shipments were made YTD in 2001. This violation is closed.

12.	NOTIFICATIONS AND REPORTS

Reporting and followup of theft; loss; incidents; overexposures; change in RSO; authorized user; and radiation exposure reports to individuals.

The licensee informs workers annually of the results of the whole body scan and their calculated doses.

13.	POSTING AND LABELING

Notices; license documents; regulations; bulletins and generic information; posting of radiation areas; and labeling of containers of licenses material.

Building 73 is posted as an airborne radioactivity area. Form NRC-3 is posted at the facility at appropriate locations in the facility.

14.	INDEPENDENT AND CONFIRMATORY MEASUREMENTS

Areas surveyed and measurements made; comparison of data with licensee's results and regulations; and instrument type and calibration date.
An Eberline Model RO-2 Ion Chamber (S/N 18522, calibrated 5/23/01) was used to make the following measurements: @ contact with incoming Ta/Nb ore barrel: 1.7 mR/hr. @ contact with a Roura Hopper filled with filter cake from Building 73: 0.5 mR/hr. @ gate to full bin in mausoleum: 0.2 mR/hr

15.	VIOLATIONS, NON-CITED VIOLATIONS (NCVs), AND OTHER SAFETY ISSUES
State requirement and how and when licensee violated the requirement. For NCVs, indicate why the violation was not cited. Attach copies of all licensee documents needed to support violations.	
A. The licensee performs annual whole body counts of individuals exposed to airborne radioactive materials. However, because of the minimum detectable activity of these counts and the behavior of Th-232 when it is deposited in the body, these counts are not adequate to detect a hypothetical intake of Th-232 if the intake occurred greater than several days before the whole body count. B. The licensee failed to adequately assess airborne concentrations of natural uranium and thorium to which workers were exposed in Building 73. C. The licensee did not use a self-absorption factor, F of 0.85 when analyzing air samples.	

16.	SOURCE OR DEVICE REVIEW
Device registration documents; changes; quality assurance/quality control program. Contact Material Safety Branch (NMSS/IMNS) and supervisor if unregistered equipment is identified.	
N/A	

17.	PERSONNEL CONTACTED
Identify licensee personnel contacted during the inspection (including those individuals contacted by telephone). Use # to indicate individual present at entrance meeting. Use * to indicate individual present at exit meeting.	

Name	Title	Phone No.	In Person or By phone

Timothy Knapp #* Bradley Okoniewski* Martin O'Neill* Matt Campbell* Eric Tilman Karen Fedor Todd Mest Tina Dorward David Groff Adriene Flewhardy Betty Levingood Sandy Weller	Radiation Safety Officer Mgr, Environmental Programs Director of Safety, Health and Environmental Affairs Operations Manager QC Technician Operator Solvent Extraction Operator Bld. 73 & 74 Supervisor Sr. HP - Canberra Registered Nurse Admin. Asst. Safety Specialist	610-369-8393 610-369-8175 610-369-8212	

18.	PERFORMANCE EVALUATION FACTORS						
A.	Lack of senior management involvement with the radiation safety program and/or RSO oversight.			Y		N	X
B.	RSO too busy with other assignments.			Y		N	X
C.	Insufficient staffing.			Y		N	X
D.	RSC fails to meet or functions inadequately.	N/A		Y		N	X
E.	Inadequate consulting services or inadequate audits conducted.	N/A		Y		N	X

REMARKS :(Consider the above assessment and/or other pertinent Performance Evaluation Factors (PEFs) with regard to the licensee's oversight of the radiation safety program)

19.	SPECIAL CONDITIONS OR ISSUES	
NONE		Special license conditions

See above.

PART III - POST- INSPECTION ACTIVITIES

1.	REGIONAL FOLLOWUP ON PEFs

None

2.	DEBRIEF WITH REGIONAL STAFF

Post-inspection communication with supervisor, regional licensing staff, Agreement State Officer; and/or State Liaison Officer.

Issues discussed with Branch Chief.							
APPENDIX A - ATTACHMENT A							
RADIOACTIVE DRUG DISTRIBUTORS							
Licensee:			Date of Inspection:				
1.	Indicate type of operation:						
	A.	Registered or licensed with U.S. Food and Drug Administration as a drug manufacturer:	Y		N		
	B.	Registered or licensed with State Agency as a Drug Manufacturer:	Y		N		
2.	Licensee distributes:						
	•	Sealed Sources	Y		N		
	•	Alpha and beta emitters	Y		N		
	•	Generators	Y		N		
	•	Photon emitters	Y		N		
Basis for Findings:							
3.	Licensee periodically reviews work of supervised individuals preparing drugs, and records kept to reflect work. [License condition(L/C)]		Y		N		
Basis for findings:							
4.	Radioactive drugs are measured (assayed) by direct measurement or combination of measurement and calculation before commercial distribution. [10 CFR 32.72(c)]		Y		N		
Basis for findings:							
5.	Instrumentation Used to measure Radioactivity of Drugs						
	A.	List type of equipment used to assay alpha and beta particles:					
	B.	Procedures for instrument use developed and implemented. [10CFR 32.72(c)]	Y		N		

	C.	Calibration tests performed before initial use, periodically, and following repair for accuracy, linearity, and geometry dependence, as appropriate for use of the instrument. [10 CFR 32.72(c)(1); L/C]	Y		N	
	D.	Adjustment to instrumentation made when necessary. [10CFR 32,72(c)(1); L/C]	Y		N	
	E.	Instruments are checked for constancy and proper operation at the beginning of each day of use. [10 CFR 32.72(c)(2); L/C]	Y		N	
Basis for findings:						
6.		Transport radiation shield (on transfers for distribution) labeled with radiation symbol, “CAUTION [or DANGER] RADIOACTIVE MATERIAL”, name, and quantity at specified date and time*: [10 CFR 32.72(a)(4)(I); L/C] *Time may be omitted for drugs with a half-life > 100 days.	Y		N	
Basis for findings:						

7.	Syringes, vials, or other containers labeled with radiation symbol,“CAUTION [or DANGER] RADIOACTIVE MATERIAL,” and an identifier to correlate with the information on the transport radiation shield label: [10 CFR 32.72(a)(4)(ii); L/C]	Y		N	
Basis for findings:					

TO ADVANCE TO NEXT SECTION OF FORM - PRESS **PAGE DOWN** KEY

APPENDIX A - ATTACHMENT B DECOMMISSIONING TIMELINESS INSPECTION ATTACHMENT			
Licensee:		Date of Inspection:	

1.	COMPLIANCE WITH DECOMMISSIONING TIMELINESS RULE						
(NOTE: Repeat the answers given in Section 12 of the main body of the inspection record. The issues in subsequent sections are dependent on the answers to these questions.)							
	A.	License to conduct a *principal activity* has expired or been revoked:	Y		N		
	B.	Licensee has made a decision to permanently cease *principal activities* at the entire site, or any separate buildings, or any outdoor areas, including inactive burial grounds:	Y		N		
	C.	A 24-month duration has passed in which no *principal activities* have been conducted under the license at the site, or at any separate buildings, or any outdoor areas, including inactive burial grounds:	Y		N		
	D.	If "Yes" to either A or B or C above:					
		(1) Identify Site/Bldg./Area:					
		(2) Date of occurrence of A, B, or C:					

2.	NOTIFICATION REQUIREMENTS								
	A.	Licensee has provided written notification to U.S. NRC within 60 days of the occurrence of 1.A., 1.B., or 1.C. above.				Y		N	
	If "Yes," date of notification:								
	B.	If the licensee is requesting to delay initiation of the decommissioning process, the licensee has provided written notification to NRC within 30 days of occurrence of 1.A., 1.B., or 1.C. above:	N/A		Y		N		
	If "Yes," date of notification:								
Basis for Findings:									

3.	DECOMMISSIONING PLAN/SCHEDULE REQUIREMENTS						
	A.	Licensee is required to submit a decommissioning plan per 10 CFR 30.36(g), 40.42(g), 70.38(g), or 10 CFR Part 72?	N/A		Y		N	
	If "No" to 3.A., answer the following items B - F:							

	B.	The decommissioning work scope is covered by current license conditions.			Y		N	
	C.	Decommissioning has been initiated within 60 days of notification to NRC, or NRC has granted a delay.			Y		N	
	D.	If licensee has initiated decommissioning, give date the decommissioning was initiated:						
	E.	If decommissioning has been completed, it was completed within 24 months of notification to NRC.	N/A		Y		N	
	F.	If decommissioning is still scheduled to be completed, it is on schedule to be completed within 24 months of notification to NRC.	N/A		Y		N	
Basis for Findings:								
	If "Yes" to 3.A., answer the following items G - J:							
	G.	The decommissioning plan has been submitted to NRC within 12 months of notification.			Y		N	
	If "Yes," date of submittal:							
	If NRC approved, date of NRC approval:							
	H.	Has the licensee submitted an alternative schedule request?			Y		N	
	If "Yes," date of submittal:							
	I.	If decommissioning has been completed, it was completed within 24 months after approval of the decommissioning plan.	N/A		Y		N	
	J.	If decommissioning is still scheduled to be completed, it is on schedule to be completed within 24 months after approval of the decommissioning plan.	N/A		Y		N	
Basis for Findings:								
Violations identified, if any:								

END

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