



Pratt & Whitney

A United Technologies Company

400 Main Street
East Hartford, Connecticut 06108

August 5, 2005

MS16

L-7

John Nicholson
Health Physicist
U.S. Nuclear Regulatory Commission, Region 1
Commercial and R&D Branch
475 Allendale Road
King of Prussia, PA 19406-1415

Ref: License No. SMB-151
Docket No. 04000791
Mail Control No.: 137125

Dear Mr. Nicholson:

Enclosed is Pratt & Whitney's revised License renewal application for our thoriated nickel operations. Per your request, we used the downloaded version of Appendix C from the NEREG-1556, Vol. 7 "Contents of an Application". If you have any questions or require any additional information please contact Sandy Soucy at (860) 565-5561.

Sincerely,

Kevin Doyle
Vice President, Environment Health & Safety

Enclosures:

Vol. 7 Appendix C renewal license SMB-151

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NMOS/RGNI MATERIALS-002

FAX RECEIVED 8/5/2005

Appendix C: Suggested Format for Providing Information Requested in Items 5 through 11 of NRC Form 313

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Suggested Format for Providing Information Requested in Items 5 through 11 of NRC Form 313

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The table below is designed to help applicants develop their applications. In some instances it is acceptable to simply indicate, by checking the box in the third column (Yes), that applicant commits to adopting the model procedures that are referenced. If the third column contains an asterisk (*), the licensee is expected to describe its program or submit its procedures for the particular item. In this instance, the applicant is requested to check the box in the fourth column indicating that the described program and/or procedures are attached to the application (NRC Form 313). If the third column contains an "N/A," the licensee is not required to describe or submit its programs and/or procedures during the licensing phase. However, these program areas may be reviewed during an inspection.

The table below may also be used as a License Reviewer Checklist for applications for ARDL licenses.			
Item No.	Suggested Response	Yes	Description Attached
5.	RADIOACTIVE MATERIAL		
	Unsealed and/or Sealed Sources		
	• For unsealed materials:	*	
	- Provide element name with mass number, chemical and/or physical form, and maximum requested possession limit.		[X]
	- For potentially volatile materials (e.g., I-125, I-131, H-3), specify whether the material will be free (volatile) or bound (non-volatile) and the requested possession limit for each form.		[] Not Required
	• For sealed materials:		Not Required
	- Identify each Radionuclide (element name and mass number) that will be used in each source.	*	
	- Provide the manufacturer's (distributor's) name and model number for each sealed source and device requested.		
	- Confirm that each sealed source, device, and source/device combination is registered as an approved sealed source or device by NRC or an Agreement State.		
	- Confirm that the activity per source and maximum activity in each device will not exceed the maximum activity listed on the approved certificate of registration issued by NRC or by an Agreement State.		
	• Provide an Emergency Plan (if required).		Not Required

Radioactive Material

Element and Mass Number	Chemical and/or Physical Form	Maximum Amount Which Will Be Possessed At Any One Time (Kilograms)
Natural Thorium-232	Solid thorium oxide not exceeding 4% dispersed in nickel	Not to exceed 910

This licensed material is alloyed into nickel and forms a solid mass of slightly radioactive metal. Pratt & Whitney possesses no thorium in loose or dispersible form. Therefore for purposes of this renewal application the licensed material fits into the "sealed material" category better than into the "unsealed material" category. Pratt & Whitney does not possess sealed or volatile material therefore no additional documentation is required.

Financial Assurance and Recordkeeping for Decommissioning		
No response is needed from most applicants. If F/A or a DFP is required, submit the required documents as described in Regulatory Guide 3.66.	N/A	[X]

Financial Assurance

The Surety Bond for \$225,000 was sent on June 2, 2005.

6. PURPOSE FOR WHICH LICENSED MATERIAL WILL BE USED		
List the specific use or purpose of each radioisotope.	*	[X]

Purpose For Which Licensed Material Will Be Used

Thoriated nickel alloy, because of its heat resistant properties, will be used in the hot (burner section) area of some jet engines. Source material will account for approximately 0.1% of the assembled engine. The product (jet engine) containing the thoriated nickel components will be distributed to the customers as finished parts in accordance with the exception provided in 10 CFR 40.13 (c)(8).

The TDNi material will be used to manufacture of aircraft engine components, the fabrication processes include:

- Trimming
- Pressing
- Shearing
- Wet Vibratory Bowl Deburring
- Draw and Roll Forming
- Riveting
- Cleaning/Degreasing
- Marking and Inspecting
- Scrap Disposal

Quality control test performed on the material include:

- Creep
- Thermal Fatigue
- Tensile Strength
- Bend
- Shear
- Etching
- Plating
- Oxidation and Coatings

7.	INDIVIDUALS RESPONSIBLE FOR RADIATION SAFETY PROGRAM AND THEIR TRAINING AND EXPERIENCE		
	RSO		
	Provide the name of the proposed RSO and information demonstrating that the proposed RSO is qualified by training and experience.	*	[X]
	Aus		Not Required
	Provide the name of each proposed AU, with the types and quantities of licensed material to be used. Also provide information demonstrating that each proposed AU is qualified by training and experience to use the requested licensed materials.	N/A	[]

Resume – Sandy J. Soucy, RSO, LSO

Education:

Certificate in Occupational Safety and Health, University of Connecticut

Radiation Safety Officer Training, Radiation Safety Associates, Inc., 2001.

Laser Safety Officer Training, Laser Institute of America 1995

EXPERIENCE

11/01 – Present **Senior EH&S Specialist, UTC Pratt & Whitney, East Hartford, CT.**

Ensure site-wide regulatory and company compliance for the ionizing and non-ionizing radiation program. Site Radiation Officer, Laser Officer and Safety Engineer. Duties under these programs include managing the TDNi Safety Program, training, audits and inspections and the State of CT Radiation Registration for X-Ray units, Electron Beam Welders and Analytical equipment. Additional programs include Asbestos Management, Powered Industrial Vehicle and Motor Vehicle Safety Program and various Health and Safety programs.

7/99 – 11/01

EH&S Engineer, UTC Pratt & Whitney, E Hartford CT.
Under the direction of the Pratt & Whitney's Radiation Safety Officer, conduct radiation surveys; conduct audits and inspections to ensure compliance with regulations and Pratt & Whitney's best management practices and procedures. Assist with the State of CT Radiation Registration and manage inventory of equipment including Lasers, Electron Beam Welders, X-Ray Units, and Analytical equipment and TDNi inventory.

8.	TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS (Occupationally Exposed Individuals and Ancillary Personnel)		
	Submit a description of the radiation safety training program, including topics covered, groups of workers, assessment of training, qualifications of instructors, and the method and frequency of training.	*	[X]

Training for individuals working in or frequenting restricted areas.

1) Description of the Radiation Safety Training Program:

Pratt & Whitney trains all production employees who work with thoriated nickel. TDNi training is not required for our janitorial staff or security personnel since our production employees are responsible for housekeeping of the work area and our security personnel is not required to enter into our TDNi areas. Although the janitorial and security personnel are not required to manage the TDNi production they are provided with hazardous communication training. Also hazard signs and placards have been posted in the immediate area to alert employees of the presence of TDNi parts and its associated hazards.

2) Assessment of Training:

In order to assess the effectiveness of our training, a set of review questions is presented by the instructor highlighting the important sections of the training. Also, during our annual audit of the TDNi areas the employees performing work in these respective areas are asked pertinent questions to determine if they have retained key elements of the training, and most importantly, complying with the procedure.

3) Qualification of Instructors:

Instructors have attended a 5-day Radiation Safety Officer course and have industrial hygiene training.

4) Course Outline, Method and Frequency of Training:

The Thoriated Nickel Radiation Safety Course outline is as follows:

Title: Thoriated Nickel Radiation Safety Course

Method: Instructor led classroom training

Length: 1.0 hrs

Topics Covered:

- Radiation Terms
- Radiation Hazards (routes of Entry)
- Personal Protection Equipment
- Safe Handling Techniques
- Material Safety Data Sheet
- Proper Disposal/Waste Handling
- Security measures of license material
- P&W Procedures
- Shipping protocols
- Summary and Questions Review

Attendees Include:

- Inspectors
- Tool & Die Makers
- Material Handlers
- Production Worker
- Heat Treat Operator
- Press Operators
- Supervisors
- Engineers

This training course is a one time training requirement with an annual toolbox talk performed by the area supervisor covering similar topics as discussed in the training course.

9.	FACILITIES AND EQUIPMENT		
	Describe the facilities and equipment to be made available at each location where radioactive material will be used. Include a description of the area(s) assigned for the receipt, storage, preparation and measurement of radioactive materials. Submit a diagram showing the locations of shielding, the proximity of radiation sources to unrestricted areas, and other items related to radiation safety. When applicable to facilities where radioactive materials may become airborne, the diagrams should contain schematic descriptions of the ventilation systems, with pertinent airflow rates, pressures, filtration equipment, and monitoring systems. Diagrams should be drawn to a specified scale, or dimensions should be indicated. For facilities where it is anticipated that more than one laboratory or room may be used, a generic laboratory or room diagram may be submitted.	*	[X]

Facilities and Equipment

Work is performed on thoriated nickel sheet stock only within the East Hartford manufacturing facility and could be performed at any of the production locations listed in Item 3 (i.e., Middletown, CT).

Currently there is no processing or storage of thoriated nickel in our Middletown facility. Prior to utilizing the Middletown facility for any thorium process we will ensure proper implementation of all requirements and techniques included in this license in its entirety.

Virgin thoriated nickel sheet stock is stored in its original container in a normally unoccupied portion of the storage area at the East Hartford facility. This material is kept segregated and identified. Material inventory and production scheduling is controlled by the materials department. The Environment, Health and Safety department assists in the implementation of all requirements and compliance to the regulations pertaining to thoriated nickel.

License material will be kept secured from unauthorized accessed unless being worked on by trained individuals.

Thoriated Nickel Operations and Controls

- **Trimming** – Not dust producing, done under general ventilation, e.g. shear operations.
- **Pressing** – Not dust producing, done under general ventilation.
- **Wet Vibratory Bowl Deburring** – Tumbling rocks are wetted which prevents dust production, done under general ventilation
- **Drawing and Roll Forming** – Not dust producing, done under general ventilation.
- **Riveting** – Not dust producing, done under general ventilation.
- **Cleaning/Degreasing** – Not dust producing, done under general ventilation.
- **Marking and Inspecting** – Not dust producing, done under general ventilation.
- **Scrap Disposal** – Scrap metal is packaged in a DOT specification package for shipment to a licensed waste disposal facility.

10.	RADIATION SAFETY PROGRAM		
	Audit Program		
	The applicant is not required to, and should not, submit its audit program to the NRC for review during the licensing phase.	N/A	N/A
	Radiation Monitoring Instruments	*	
	Describe the instrumentation that will be used to perform required surveys and state that: "We will use instruments that meet the radiation monitoring instrument specifications published in Appendix M to NUREG-1556, Vol. 7, 'Program-Specific Guidance About Academic, Research and Development, and Other Licenses of Limited Scope,' dated December 1999. We reserve the right to upgrade our survey instruments as necessary."		[X]
	OR		

Describe the instrumentation that will be used to perform required surveys and state that: "We will use instruments that meet the radiation monitoring instrument specifications published in Appendix M to NUREG-1556, Vol. 7, 'Program-Specific Guidance About Academic, Research and Development, and Other Licenses of Limited Scope,' dated December 1999. Additionally, we will implement the model survey meter calibration program published in Appendix M to NUREG-1556, Vol. 7, 'Program-Specific Guidance About Academic, Research and Development, and Other Licenses of Limited Scope,' dated December 1999. We reserve the right to upgrade our survey instruments as necessary."	Not Required
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We will use instruments that meet the radiation monitoring instrument specifications published in Appendix M to NUREG-1556, Vol. 7, 'Program-Specific Guidance About Academic, Research and Development, and Other Licenses of Limited Scope,' dated December 1999. We reserve the right to upgrade our survey instruments as necessary.

Radiation Detection Instruments and Instrument Calibration

Type of Instrument	Number Available	Radiation Detected	Sensitivity
Ludlum Model 3	3	Gamma, Beta, Alpha	0-200 mR/hr.
S.E. International Inspector	1	Gamma, Beta, Alpha	0-300,000 CPM / 0-100mR/hr.
Eberline E-520	1	Gamma, Beta, Alpha	0-20,000 CPM

Instruments are calibrated annually by Radiation Safety Associates, Inc. of Hebron, CT. Their NRC license number is 06-30007-01. We reserve the right to use another appropriate licensed vendor to perform calibrations.

Material Receipt and Accountability		
Develop and maintain procedures for ensuring material accountability,		
AND		
State that: "Physical inventories will be conducted at intervals not to exceed 6 months, to account for all sealed sources and devices received and possessed under the license."	*	[X]

Material Receipt and Accountability

Physical inventories will be conducted at intervals not to exceed 6 months, to account for all sealed sources and devices received and possessed under the license. Licensed material is received and inspected in accordance with the requirements of 10 CFR 20.1906. An inventory is automatically performed when we pull stock from our inventory with the use of a computerized system. In the

event that inventory is not pulled within a six-month period, a physical inventory will be conducted.

Occupational Dose		
State that: "we have done a prospective evaluation and determined that unmonitored individuals are not likely to receive, in one year, a radiation dose in excess of 10% of the allowable limits in 10 CFR Part 20," or "we will monitor individuals in accordance with the criteria in the section entitled 'Radiation Safety Program - Occupational Dose' in NUREG-1556, Vol. 7, 'Consolidated Guidance about Materials Licenses: Program-Specific Guidance about Academic, Research and Development and Other Licenses of Limited Scope,'" dated December 1999."	*	[X]
Public Dose		
No response is required from the applicant in a license application.	N/A	N/A
Safe Use of Radionuclides and Emergency Procedures		
Develop and maintain procedures for safe use and emergencies. State that such procedures have been developed.	*	[X]
If an emergency response plan is needed, submit it as a separate part of the application.	[N/A]	[]
Survey	*	
State that: "We will survey our facility and maintain contamination levels in accordance with the survey frequencies and contamination levels published in Appendix Q to NUREG-1556, Vol. 7, 'Program-Specific Guidance About Academic, Research and Development, and Other Licenses of Limited Scope,' dated December 1999. Leak tests will be performed at the intervals approved by NRC or an Agreement State and specified in the SSD Registration Certificate. Leak tests will be performed by an organization authorized by NRC or an Agreement State to provide leak testing services to other licensees or using a leak test kit supplied by an organization authorized by NRC or an Agreement State to provide leak test kits to other licensees and according to the sealed source or plated foil manufacturer's (distributor's) and kit supplier's instructions."	[]	[X]

Occupational Dose Plan

We have done a prospective evaluation and determined that unmonitored individuals are not likely to receive, in one year, a radiation dose in excess of 10% of the allowable limits in 10 CFR Part 20.

Surveys and Monitoring

We will survey our facility and maintain contamination levels in accordance with the survey frequencies and contamination levels published in Appendix Q to NUREG-1556, Vol. 7, 'Program-Specific Guidance About Academic, Research and Development, and Other Licenses of Limited Scope,' dated December 1999. On an annual basis, the Environment, Health and Safety department, will perform removable contamination, direct radiation surveys and air samples. These surveys will be performed annually during a time when TD-Ni operation is in process. The results from our last air sampling survey taken on June 1, 2005

indicated concentration values less than 1E-12 $\mu\text{Ci/ml}$. All air samples to date have been less than the derived air concentration value listed in 10 CFR 20, Appendix B, Table 1, Column 3 for ^{232}Th in the form of thorium oxide.

In a year when no TD-Ni work occurs, no air sampling will be performed. Contamination and radiation surveys will be performed in and around TDNi storage areas.

Wipe samples for removable activity were also taken on June 1, 2005 where thoriated material is used. These were analyzed using a Protean low-background gas-proportional gross alpha/beta counter. No activity distinguishable from background was detected on any of the wipe samples.

Previous sampling of our liquid effluent has shown no activity levels from our TDNi operations.

Exposure rates did not exceed 0.3 milliroentgens per hour when measured at a distance of 12 inches from the surface of the unpacked sheet stock. This measurement was performed on 05-05-2005, with a Ludlum Model 3 Geiger Counter serial number 94569 with a calibration date of 09-21-2004.

External radiation measurements on one piece of sheet stock sheet, Gamma emissions as measured on 05-05-2005.

<u>Distance</u>	<u>mR/hr (unpacked) 16 sq.ft.</u>
1 inch	0.7
12 inches	0.3

Instrument used: Ludlum Model 3 Geiger Counter serial number 94569 with a calibration date of 09-21-2004.

Pratt & Whitney possesses no sealed sources under this license, therefore no sealed source leak test will be performed.

OR		
State that: "We will survey our facility and maintain contamination levels in accordance with the survey frequencies and contamination levels published in Appendix Q to NUREG-1556, Vol. 7, 'Program-Specific Guidance About Academic, Research and Development, and Other Licenses of Limited Scope,' dated December 1999. Leak tests will be performed at the intervals approved by NRC or an Agreement State and specified in the SSD Registration Certificate. Leak tests will be performed by an organization authorized by NRC or an Agreement State to provide leak testing services to other licensees or using a leak test kit supplied by an organization authorized by NRC or an Agreement State to provide leak test kits to other licensees and according to the sealed source or plated foil manufacturer's (distributor's) and kit supplier's instructions. As an	[]	Not Required

	alternative, we will implement the model leak test program published in Appendix R to NUREG-1556, Vol. 7, "Consolidated Guidance about Materials Licenses: 'Program-Specific Guidance About Academic, Research and Development, and Other Licensees of Limited Scope,' dated December 1999."		
	Transportation		
	No response is needed from applicants during the licensing phase.	N/A	N/A
	Minimization of Contamination		
	The applicant does not need to provide a response to this item under the following condition. NRC will consider that the above criteria have been met if the applicant's responses meet the criteria in the following sections: "Radioactive Material - Unsealed and/or Sealed Sources," "Facilities and Equipment," "Radiation Safety Program - Safe use of Radioisotopes and Emergency Procedures," "Radiation Safety Program - Surveys," and "Radiation Safety Program - Waste Management."	N/A	N/A
11.	WASTE MANAGEMENT	*	
	State that: "We will use the model waste procedures published in Appendix T to NUREG-1556, Vol. 7, 'Program-Specific Guidance About Academic, Research and Development, and Other Licenses of Limited Scope,' dated December 1999."	[]	[X]

Waste Management

We will use the "General Waste Guidelines" in the model waste procedures published in Appendix T to NUREG-1556, Vol. 7, 'Program-Specific Guidance About Academic, Research and Development, and Other Licenses of Limited Scope,' dated December 1999.

Scrap generated during the manufacturing processes is segregated and secured from unauthorized access. The items are packaged in a DOT specification package for shipment with a manifest to an approved licensed waste disposal facility.

	OR		
	"We will use the (<i>specify either (1) Decay-In-Storage, (2) Disposal of Liquids Into Sanitary Sewerage</i>) model waste procedures that are published in Appendix T to NUREG-1556, Vol. 7, 'Program-Specific Guidance About Academic, Research and Development, and Other Licenses of Limited Scope,' dated December 1999."	[]	Not Required