FC (3 10	FORM NRC-313 I U.S. NUCLEAR REGULATORY COMMISSION (3-80) 10 CFR 30				1. APPLICATION FOR: (Check and/or complete as appropriate)		
APPLICATION FOR BYPRODUCT MATERIAL LICENSE INDUSTRIAL					. NEW LICENSE		
Sec	e attached instructions for details.	A Contraction of the Contract			5. AMENDMENT TO:		
Con Offi Was 171	npleted applications are filed in du ce of Nuclear Material Safety, and hington, DC 20555 or applications 7 H Street, NW, Washington, D. C.	plicate with the Division of Safeguards, U.S. Nuclear Re may be filed in person at ti or 7915 Eastern Avenue, S	Fuel Cycle and Material Safety, egulatory Commission, he Commission's office at ilver Spring, Maryland.	x	C. RENEWAL OF LICENSE NUMBER 06-17111-01		
2. A	PPLICANT'S NAME (Institution, fil	m, person, etc.)	3. NAME AND TITLE OF PER REGARDING THIS APPLIC	RSON	N TO BE CONTACTED		
TE	lorden Systems, Inc. LEPHONE NUMBER: AREA CODE (203) 852-5000	- NUMBER EXTENSION	John Lavallee - Supv. Safety & Health Eng TELEPHONE NUMBER: AREA CODE - NUMBER EXTENSION				
4. A (A st	PPLICANT'S MAILING ADDRESS address to which NRC correspondence hould be sent.)	(Include Zip Code) e, notices, bulletins, etc.,	5. STREET ADDRESS WHERE (Include Zip Code)	LIC	CENSED MATERIAL WILL BE USER		
N N	orden Place orwalk, CT 06856		See Supplemental	Sh	neet No. 1		
6 11	IF MORE SPACE IS N	EEDED FOR ANY ITEM	USE ADDITIONAL PROPER	RLY	KEYED PAGES.)		
6. 11	See Items 16 and 17 for required trai	E OR DIRECTLY SUPER ning and experience of each in	VISE THE USE OF LICENSED dividual named below)	D M.	ATERIAL		
	FULL NAM	AE		TI	TLE		
. τ <u>)</u>	r. Denis S. Longo		Senior Materials Design Engineer				
ь.			승규는 감독은 영국을 가				
c.,							
7. RA D	ADIATION PROTECTION OFFICED r. Denis S. Longo		Attach a resume of person's train 16 and 17 and describe his respon	ning i nsibil	and experience as outlined in Items lities under Item 15.		
		8. LICENSE	DMATERIAL				
LINE NO.	ELEMENT AND MASS NUMBER	CHEMICAL AND/OR PHYSICAL FORM B	NAME OF MANUFACTURER AND MODEL NUMBER (If Sealed Source)	E	MAXIMUM NUMBER OF MILLICURIES AND/OR SEALED SOURCES AND MAXIMUM ACTI- VITY PER SOURCE WHICH WILL BE POSSESSED AT ANY ONE TIME D		
1)	SEE SUDDIEWENTAL OUT	ET NO 2		+			
21	SEL SUITERIAL SH	121 NO. 2.		+			
3)	7			+			
4)				1			
		DESCRIBE USE OF	LICENSED MATERIAL	-			
1)	Research and Development as defined in Title 10, code of Federal Regulations						
2)	Part 30.4.						
3)	8801140281 87070 REG1 LIC30	2					

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			9. STORAGE OF	SEALED SOURCE	ES 🔮	
N-ZWZ	CONTAINER AND/O SOURCE WILL BE ST	R DEVICE IN WHICH I FORED OR USED. A.	EACH SEALED NAME OF MANUFACTURER B.		B.	MODEL NUMBER
(1)	N/A					
21						
3)						
(4)				1		1
		10. RA	DIATION DETE	CTION INSTRUM	ENTS	
L-ZHO	TYPE OF INSTRUMENT	NAME	NUMBER	AVAILABLE	PADIATION DETECTED (sipha, beta, gamma, neutron)	(milliroentgens/hour or counts/minute)
	Ionization	D				
1).	Chamber	Victoreen	440	11	Gamma	3-300 mR/hr
2)	Geiger-Mueller	Eberline	E-520	2	Beta, Gamma	0.2-2000 mR/hr
3)	1.1.1	机拉油				
4)						
		11. CALIBR	ATION OF INST	RUMENTS LISTE	D IN ITEM 10	1
	TYPE (Check and/or complete	12. PE as appropriate.)	RSONNEL MONI	TORING DEVICE SUPPLIER Service Company)	S	EXCHANGE FREQUENC
	A			В		CC
S (1) FILM BADGE		ICN Dosimer	try Service		S MONTHLY
(2) THERMOLUMINESCENCE			Cleveland, OH 44128			D QUARTERLY
(3) OTHER (Specify):						OTHER (Specify):
-						
		NO FOLIPMENT /C	herk were approp	riate , d'attach ac	inotated slietch(es) an	d description(s)
2	LABORATORY FAC	LITIES PLANT FACIL	ITIES FUME HOC	DS (Include filtratio	in, if any) ETC	
	STORAGE FACILITI	ES. CONTAINERS, SPE	CIAL SHIELDING	(fixed and/or tempor	aryl, ETC. See	Supplemental
Dd	RESPIRATORY PRO	TECTIVE SQUIPMENT	ETC		Shee	
N: 4		WASTE DISPOSAL SE	14. WASTE	DISPOSAL		
. 78.8	the or commenciat	THE PIPE OF COME OF				
BE TH	COMMERCIAL WASTE USED FOR DISPOSIN TE APPLICATION IS FO	DISPOSAL SERVICE G OF RADIOACTIVE A OR SEALED SOURCES	IS NOT EMPLOYED NASTES AND ESTI AND DEVICES AN	D, SUBMIT A DETAI MATES OF THE TY D THEY WILL BE R	LED DESCRIPTION OF PE AND AMOUNT OF A ETURNED TO THE MA	METHODS WHICH WILL ACTIVITY INVOLVED. IF INUFACTURER, SO STA
	See Supplemen	ital Sheet No.	3.			

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	INFORMATION REQUIR	ED FOR ITEMS 15, 16 AND 17					
Describe separate	in detail the information required for Items page and key to the application as follows:	15, 16 and 17. Begin each item on a					
	See Supplemental Sheets 4 and 5						
15.	15. RADIATION PROTECTION PROGRAM. Describe the radiation protection program as appropriate for the material to be used including the duties and responsibilities of the Radiation Protection Officer, control measures, bioassay procedures (# needed), day-to-day general safety instruction to be followed, etc. If the application is for sealed source's also submit leak testing procedures, or if kok testing will be performed using a leak test kit, specify manufacturer and model number of the leak test kit.						
16.	FORMAL TRAINING IN RADIATION SAF Items 6 and 7. Describe individual's formal t the name of person or institution providing received, etc.	ETY. Attach a resume for each individual named in saining in the following areas where applicable. Include the training, duration of training, when training was					
	e. Principles and practices of radiation prote	ction.					
	 Badioactivity measurement standardization and monitoring techniques and instruments. 						
	c. Mathematics and calculations basic to the use and measurement of radioactivity.						
	d. Biological effects of radiation.						
17.	EXPERIENCE. Attach a resume for each in	ndividual named in tems 6 and 7. Describe individual's					
	work experience with radiation, including wr the job training should be commensurate with maximum activity of each used.	nere experience was obtained. Work experience or on- h the proposed use. Inclure list of radioisotopes and					
	the-job training should be commensurate with maximum activity of each used.	nere experience was obtained. Work experience or on- h the proposed use. Inclure list of radioisotopes and					
	18. CE (This item must b	RTIFICATE e completed by applicant!					
VARNING	The applicant and any official executing this of ceicify that this application is prepared in con Part 30, and that all information contained he and correct to, the best of our knowledge and 518 U.S.C., Section 1001; Act of June 25, 1948; 52 tion to any department or agency of the United States	There experience was obtained. Work experience or on- In the proposed use. Inclurie list of radioisotopes and ERTIFICATE e completed by applicant! mertificate on baball of the applicant named in Item 2, iormity with Title 10, Code of Federal Regulations, trein, including any supplements attached hereto, is true belief. Stat. 749; -makes it a criminal offense to make a willfully false statement as to any matter within its jurisdiction.					
	The applicant and any official executing this of certify that this application is prepared in contained he and correct to, the best of our knowledge and S18 U.S.C., Section 1001; Act of June 25, 1948; 52 tion to any department or agency of the United States	ERTIFICATE e completed by applicant) Ertificate on bubalf of the applicant named in Item 2, formity with Title 10, Code of Federal Regulations, rein, including any supplements attached hereto, is true belief, Stat. 749; makes it a criminal offense to make a willfully false statement at to any matter within its jurisdiction,					
ARNING presentet	The applicant and any official executing this of celluly that this application is prepared in con Part 30, and that all information contained he and correct to, the best of our knowledge and 018 U.S.C., Section 1001; Act of June 25, 1948, 52 tion to any department or agency of the United States FEE REQUIRED tion 170.31, 10 CFR 170)	ERTIFICATE e completed by applicant/ ERTIFICATE e completed by applicant/ pertificate on bubalf of the applicant named in Item 2, iormity with Title 10, Code of Federal Regulations, rein, including any supplements attached hereto, is true i belief. Stat. 749; wakes it a criminal offense to make a willfully false statement is at to any matter within its jurisdiction.					
ARNING presented LICENSE See Sect	The applicant and any official executing this of celluly that this application is prepared in con Part 30, and that all information contained he and correct to, the best of our knowledge and 018 U.S.C., Section 1001: Act of June 25, 1948, 52 tion to any department or egency of the United States FEE REQUIRED tion 170.31, 10 CFR 170) \$150.00	ERTIFICATE e completed by applicant! Ertificate on behalf of the applicant named in Item 2, iormity with Title 10, Code of Federal Regulations, trein, including any supplements attached hereto, is true belief. Stat. 749; makes it a criminal offense to make a willfully false statement is at to any matter within its jurisdiction. b. CERTIFYING OFFICIAL (Signature) c. NAME (Trype or print) R. A. Belmont					
ARNING presentet LICENSE LICENS	The applicant and any official executing this of their observes of the line o	ERTIFICATE e completed by applicant/ ERTIFICATE e completed by applicant/ formity with Title 10, Code of Federal Regulations, rein, including any supplements attached hereto, is true i belief. Stat. 749; makes it a criminal offense to make a willfully false statement at to any matter within its jurisdiction. b. CERTIFYING OFFICIAL (Konsture) c. NAME (Trype or print) R. A. Belmont d. TITLE Director-Personnel & Industrial Relations					

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Supplemental Sheet No. 1

Reference Item 5 - Street address where licensed material will be used.

In addition to use on their own premises at Norwalk, CT, and Melville, N.Y., Norden Systems will make use of byproduct material with Atomic Numbers 1 to 83, inclusive, for research and development as defined in Title 10, Code of Federal Regulations, Part 30.4 at other United Technologies Corporation divisions as follows:

> Hamilton Standard Division Windsor Locks, Connecticut 06096

United Technologies Research Center East Hartford, Connecticut 06108

In addition to use on their premises, Norden Systems will also make use of byproduct material with Atomic Numbers 1 to 83, inclusive, at any location under the jurisdiction of the U.S. Nuclear Regulatory Commission.

In order to accomplish the above, Norden 's granted permission to transport byproduct license material throughout the United States, subject to compliance with U.S. Nuclear Regulatory Commission regulations.

Supplemental Sheet No. 2

Reference Item 8 - Licensed Material

(A)	(E)	(C)	(D)
Element and Mass Number	Chemical and/or Physical Form	Name of Manufact- urer and Model Number	Maximum Number of Millicuriers and/or sealed sources and Maximum Activity per source which will be possessed at any one time.
Any byproduct material with Atomic Numbers 1 to 83, inclusive.	Electronic Component Materials	N/A	Total activity of all electronic component byproduct materials not to exceed one (1) millicurie.

Reference Item 11 - Calibration of Instruments listed in item 10.

The monitoring and survey instruments will be calibrated by use of either a Cesium 137 or Cobalt 60 source or by some other similar procedure. Calibration will be determined at various distances from the source and subsequent calibrations will be performed at least every six (6) months. Calibrations will be performed either by the vendor of the instrument, by a service company such as Nuclear Instrument Co., 65 Grove Street, Rockland, Massachusetts 02370, or by United Technologies Research Center, East Hartford, Connecticut 06108.

Reference Item 13 - Facilities and Equipment

The byproduct material will be produced by neutron bombardment of semiconductor devices at a reactor facility such as the U.S. Army White Sands Missile Range Nuclear Weapon Effects Facility. These activated semiconductor devices will be subjected to electrical testing in an isolated, well ventilated materials laboratory room approximately 12 ft. x 15 ft.

Supplemental Sheet No. 3

Reference Item 14 - Waste Disposal

Activated semiconductor devices which are no longer needed will be stored until the activity is not measureable above background radiation, at which time they will be recorded and disposed as non-radioactive waste. Because of the small quantities of material involved in semiconductor device construction and the relatively low neutron fluences used ($\leq 10^{12}$ /cm²) a storage time of 1-2 years is deemed sufficient.

Calibration sources will be returned to the vendor if disposal is required.

Supplemental Sheet No. 4

Reference Item 15 - Radiation Protection Program

- The Radiation Protection Officer shall be responsible for maintaining a log of all licensed material stored at Norden Systems.
- The Radiation Protection Officer shall work with the Health and Safety Officer to maintain control over all radioactive material at Norden Systems.
- All licensed material will be used according to the provisions set forth in the NRC Byproduct Material License.
- All licensed material shall be used by or under the supervision of a user as specified in the NRC Byproduct Material License.
- 5. Records shall be maintained for:
 - a. Inventory of Radioactive Material
 - b. Waste Disposal
 - c. Radiation Exposure
- Licensed material will be stored in a manner consistent with the provisions of the Regulations.
- Personnel assigned to work with the radioactive materials described in Item 8 shall wear film badges in accordance with the provisions of the Regulations.
- Radiation sources, containers and locations where radiation is present shall be identified and posted.

Supplemental Sheet No. 5

Reference Items 16 and 17

Resume Dr. Denis S. Longo Senior Materials Design Engineer (Radiation Protection Officer)

Dr. Longo joined Norden in 1974 and is presently supervising research and development work in the Materials Engineering Department. His areas of involvement include: nuclear radiation effects on materials and semiconductor devices, the development of an integrated laser cartridge with a bonded passive Q-switch; thin film deposition; adhesive and potting material studies; failure analysis for various in-house systems; and flat panel display development and process improvement.

Prior to joining Norden, Dr. Longo was z graduate research assistant at the University of Notre Dame for five years, where he studied gamma-ray spectroscopy of medium-mass nuclei. His publications include:

"Gamma-Ray Transitions in ²⁰F"; "Spin and Parity of ²⁰F Levels from Gamma-Ray Linear-Polarization Measurements"; "Levels of ³⁸K: the ⁴⁰Ca (d, a), ⁴⁰Ca (d, ay) and ³⁶Ar(³He, pr) Reactions"; and "Laser Cartridge Concept Development Study".

Dr. Longo has had on-the-job training for 5 years at the University of Notre Dame in:

- a. principles and practices of radiation protection;
- b. radioactivity measurement standardization and monitoring techniques;
- c. mathematics and calculations basic to the use and measurement of
- radioactivity; and,
- d. biological effects of radiation.

Dr. Longo's radiation-related research experience includes:

- Design, development and contruction of a system for handling rare gas as a target material for bombardment by a charged particle beam;
- Vacuum evaporation of thin films of various elements by resistance heating and electron beam bombardment;
- Design, development and construction of a system for transporting thin films of reactive metal under vacumm from evaporation apparatus to in-beam scattering chamber;
- Operation and maintenance of the Notre Dame FN Tandem Van de Graaff Accelerator, 4 MV Electrostatic Generator and ancillary equipment;
- Use of nuclear particle detectors of various types;
- Handling of radioactive materials, as well as radiation monitoring for personnel safety. (Used Survey Meter Model 14 by Ludlum Meas. Inc., Dos. Meter Model 9146 by Texas Nuclear and various other measuring detectors, and film badges supplied by G.D. Searle & Co.).
- Nuclear Survivability Manager for Norden Systems (1976 present),



REMITTANCE STATEMENT

U.S. NUCLEAR REGULAROTY COMMISSION VENDOR NO. A9509 OFFICE OF RESOURCE MANAGEMNT, ACCOUNTING & FINANCECK DATE 11;17;86 WASHINGTON, D.C. 20555

CHECK NO. 22526

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PAY TO THE ORDER OF U.S. NUCLEAR REGULATORY COMMISSION OFFICE OF RESOURCE MANAGEMENT ACCOUNTING & FINANCE WASHINGTON, DC. 20555

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NBD Dearborn Bank, N.A.

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