

THE BOOK - Carefull !!

GENERAL GUIDELINES

FOR RADIATION EMERGENCIES

STOP OPERATIONS

MOVE PERSONNEL AWAY FROM SOURCE

ASSESS THE SITUATION

Medical emergencies and other hazardous materials may take priority.

Establish A Restricted Area Around The Source

Call 206-NUCLEAR 206-682-5327

Wait until qualified help arrives if you lack necessary equipment or training to respond.

Keep your own exposure as low as possible. Use dosimeter or survey meter to monitor your exposure if these are available.

INDOORS: Close off ventilation system.

OUTDOORS: Stand upwind of loose radioactive material or fire involving radioactive material.

NOTES:

CHRONICALS

Nuclear Materials into Art

James L. Agard
sculptor

Washington State Radioactive Materials License

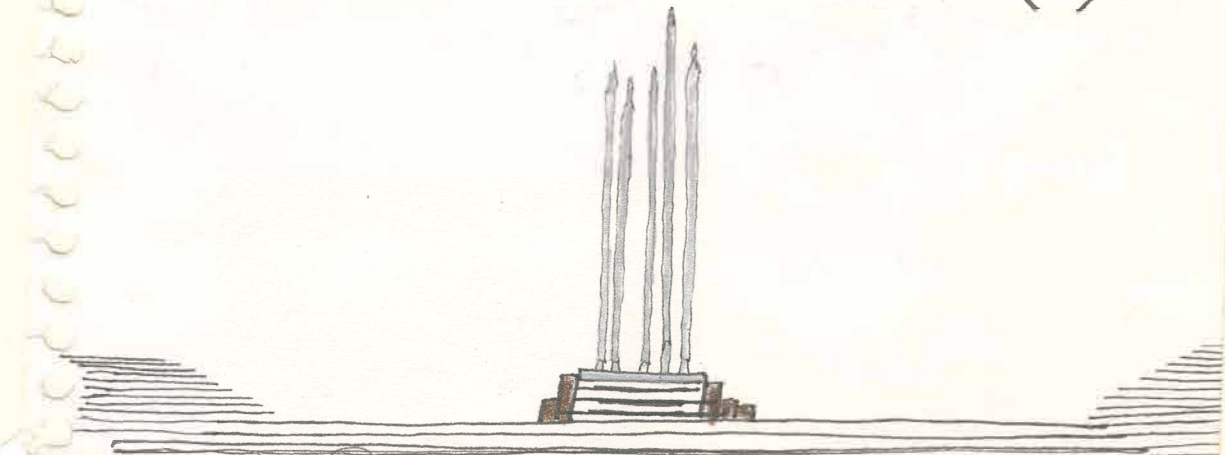
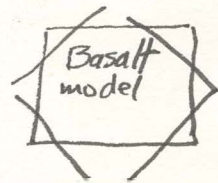
Special Nuclear Materials/Depleted Uranium

WN-10407-1

complete, with supporting material

James L. Agard
Radiation Safety Officer

want the steel high (from distance)



Agon

Model Table

1" = 1'

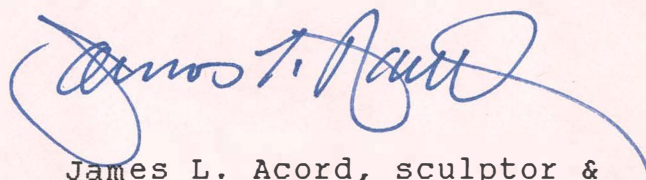
15 Oct 1992
Rickland

CHRONICALS
Nuclear Materials into Art

I moved to Richland (home of the Hanford Nuclear Reservation) in 1989 to create sculpture with advanced metal alloys associated with nuclear technology. A specific project became manifest in Spring of 1990 when the Fast Flux Test Facility (FFTF) Reactor became available to private users. I conceived the idea of creating a sculpture that would use non-radioactive metal (Ruthenium) transmuted in the core of this reactor from a long-lived radioactive by-product of Uranium fission (Technetium). I envisioned very small amounts of this transmuted material as part of a large sculpture incorporating advanced-metal alloy fabrications.

The latter half of 1990 and the first half of 1991 was devoted to securing permission to use FFTF from the owner (the U.S. Department of Energy) and Westinghouse Hanford Company, the operator. In the course of my out-reach to this nuclear community I gave a performance/presentation (slides, prepared video, etc.) about my idea to a international symposium on FFTF in May of 1991. At the symposium I was approached by representatives from Siemens AG of Germany who offered to donate advanced metal-alloy fabrications (such as I had used slides of in my performance/presentation) to my sculpture project. In subsequent meetings it was worked out that Siemens would donate 12 uranium-filled breeder-blanket assemblies (12-foot-long, beautiful objects) to use in the sculpture. Advanced Nuclear Fuels of Richland (recently purchased by Siemens) would take care of all shipping arrangements and I needed only to meet any licensing requirements to receive this million-plus-dollar donation. Thence began a concerted effort on my part to: 1) determine which nuclear regulating agency had licensing jurisdiction over my creating art with nuclear materials and; 2) securing this license.

CHRONICALS is of this License: WN-IO407-1. My exhibit at the Hoffman Gallery is a look at the year-and-a-half long effort to accomplishing this goal. I have included a small fraction of the letters, FAXs (and none of the telephone logs) of this period to give the flavor of this continuing project: a sculptor working with new materials and non-traditional communities.



James L. Acord, sculptor &
Radiation Safety Officer
Hanford Nuclear Sculpture Works

The Hoffman Gallery, January, 1993

Transcription of FAX of 14 February

SUBJECT SNR 300 Breeder Assemblies

Ref: Transport of 12 Assemblies to Richland
for integration into your sculpture of the
"Nuclear Age" - man's track from stone age to
nuclear age.

Dear Mr. Acord,

I hope the new year will offer new opportunities
to meet and to continue the direction of the
planned sculpture. For sure SBK's offer to use
as needed the 12 breeder assemblies of SNR 300
in the set-up of the final arrangement of
structures is an important contribution to your
work and will allow for additional public support
according to the shared cost (?...can't read).

Proceeding with the preparations to ship the
assemblies to the US we were instructed by the
national authority responsible for granting of
the export license, that we need a certified copy
of your license to take title of depleted uranium
in the quantities contained in the 12 breeder
assemblies (appr. 82 kg U metal per assembly,
U 235 content 0.2%). Important is that the
holder of the license, namely your name appears
on the transmitted copy.

Could you please send the required documents as
soon as possible.

(Certification of copy cannot be performed by an
unauthorized body or entity.)

Many thanks in advance and best regards.

H. Krinninger

Siemens AG
Power Generation Group (KWU)

D-5060 Bergisch Gladbach 1

Telephone 02204 - 84 3771 / Telefax 02204 - 84 3510

☐ Internal Memo
☒ Telefax Message

From KRINNINGER / N221

Our Ref.

To JAMES L. ACORD

Your Ref.

For the attention of

Fax - No. 001 509 946 8184

Date Feb. 14, 1992

Copy to RWE ENERGIE AG, H. KOTTEBROTT
SBK-B, KALLAR, d. Dir. KooP

Subject SNR 300 Breeder Assemblies
Ref: Transport of 12 Assemblies to Riedland
for integration into your sculpture in
the "Nuclear Age" - man's track from
stone age to nuclear age

Dear Mr. Acord,

I hope the new year will offer new opportunities
to meet and to continue the discussion on
the planned sculpture. For sure SBK's offer to
use as much as 12 breeder assemblies of SNR300
in the set-up of the final arrangement of
structures is an important contribution to your work
and will allow for additional public support
according to the shared cost approach.

Signed
Name

Dept. N221 Ext.
Sheet 1

Proceeding with the preparations to ship the assemblies to the US we were instructed by the national authority responsible for granting of the export license, that we have a certified copy of your license to take title of depleted Uranium in the quantities contained in the 12 break assemblies (appr. 82 kg U metal per assembly, U235 content 0.2%).

Important is that the holder of the license, namely your name appears on the transmitted copy.

Could you please send the required documents as soon as possible.

Certification of copy must be performed by an authorized body or entity.

Many thanks in advance and
best regards

H. Kieniger

James Acord, sculptor - P.O. Box 159
Richland, WA 99352 - (509) 946-2484
USA

February 19, 1992

Dr. Herbert Krinninger - N221
Siemens AG KWU
Friedrich-Ebert-Straße
Postfach 10 01 00
W - Bergisch Gladbach 1
Germany

Dear Dr. Krinninger:

Thank you for your FAX of 14 February, 1992, regarding
United States Nuclear Regulatory Commission licenses for
ownership of 12 Breeder-Blanket Assemblies to be the metal
components of my sculpture marking the 50th anniversary of the
nuclear age.

Here is the information you need for Import/Export Licenses
in order to ship 12 Breeder-blanket assemblies to me via Siemens
Nuclear Power Corporation, Richland, WA., USA.

My licenses for ownership (receipt of title) for breeder-
blanket assemblies is covered by United States Nuclear Regulatory
Commission - Rules and Regulations: TITLE 10, CHAPTER 1, PART
40.21 - GENERAL LICENSES. (a copy of the U.S. NRC rules and
regulations are included with this letter.)

I believe you could compress this, U.S.NRC - CFR - TITLE 10,
Chapter 1, Part 40.21. for the sake of your international
Import/Export form as being:

U.S.NRC - 40.21

As I explained to you, this license (40.21) covers only my
ownership and, somewhere in the future, before the sculpture is
completed, I will need to arrive at an agreement (with either/or/
both U.S. NRC and Washington State) that will give me a specific
license to create art with your breeder-blanket assemblies and,
finally, distribute them to the owner of the sculpture.

Of course I will keep you fully informed as to changes in my
licenses, as well as all other aspects of this important
sculpture.

Very truly yours,

James L. Acord, sculptor

enclosures: Photocopy of U.S.NRC rules (two pages)
Copy of letter from U.S. DOE on using FFTF for Art.
Copy of letter from, Westinghouse Hanford Corp.

James Acord, sculptor - P.O. Box 159
Richland, WA 99352 - (509) 946-1572
(hm) 946-2484

March 24, 1992

Debora McBaugh
Radiation Protection - Dept. of Health
Airdustrial Park - Building #5
P.O. Box 47827
Olympia, WA 98504-7827

Dear Debora McBaugh,

Thanks for all your help over the past month with the problems arising from my becoming the proud owner of 12 breeder-blanked assemblies. No sooner had I returned from my lecture in Alaska then my computer became sick and had to go to the Amiga hospital in Memphis, TN. Little did I realize how abjectly dependent I had become on my computer... I couldn't even find my old typewriter. Federal Express just returned it to me and I am writing you about securing a license for possession of depleted uranium.

From our telephone conversations in February I understand that my possession and eventual fine-art use of breeder-blanket assemblies containing depleted uranium might be covered under a WA State specific licenses for using depleted uranium for its mass and weight. This category sounds promising to me and I am asking you to send on to me all applicable application forms so that I may make a formal application to the State.

Mr. Jim Edgars of Siemens Nuclear Power Group (USA) has written me a letter (copy enclosed) describing the role his company will play in receiving the assemblies on my behalf. I am forwarding it on to the German National Authority concerned about Siemens AG's shipment of the assemblies to me and I am hoping this will prevent an expensive delay in the shipment from Germany. Yet, even if this works, I see the time-sensitive need to get a Washington State Licenses (recognized by U.S. NRC) for possession of depleted uranium in quantity.

In closing thanks for all the help you have been to date and for the time and consideration you may show in sending me all necessary information and forms toward a specific license.

Very truly yours,

enclosures: copy of letter from Siemens Nuclear Power Group.

JAMES L. ACORD, SCULPTOR

HANFORD NUCLEAR SCULPTURE WORKS - P.O. BOX 159
RICHLAND, WA - 99352 - (509) 946-1572

TELEFAX⁰⁰¹ (509) 946-8184

FAX COVER SHEET

To FAX Number: 011 49 (2204) 84-3045

Date: 6 April 1992

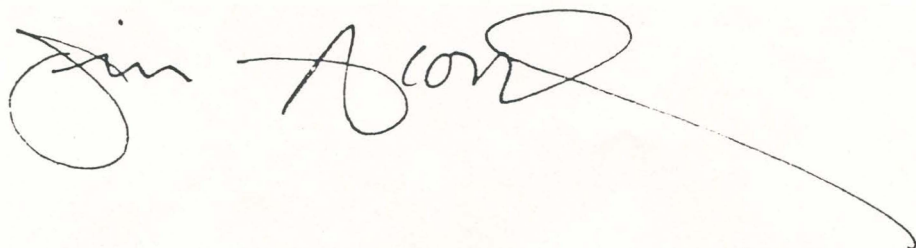
Attention: Dr. Krinninger

From: Jim Acord - sculptor

TOTAL PAGES INCLUDING COVER SHEET: 3

Additional Comments: Thank you for your call today.
My license is taking so long because government is
so slow. I hope letter from Mr. Jim Edgar
at Siemens Nuclear Power Corp. (ANF) will help for
now. I will send license by FAX as soon as it comes.
Good to talk to you and I hope to see you again
this year. I will write you soon with more details.

All best wishes





STATE OF WASHINGTON
DEPARTMENT OF HEALTH

Industrial Center, Bldg. 5 • Mail Stop LE-13 • Olympia, Washington 98504

TO: Radioactive Materials License Applicant

SUBJECT: LICENSE APPLICATION FEE.

Enclosed you will find a copy of the appropriate radioactive materials license application form, instructions and licensing fee information. Please check the fee category sheet included to determine the fee category which correctly describes your proposed operation. This will give your current annual license fee, which must be submitted with your application and a one-time new license fee of \$150. We cannot process your application until payment is received. Please make your check payable to the Department of Health and send it along with two complete copies of your radioactive materials license application and all supporting information.

Please submit the radioactive materials license application plus the total combined fee amount to:

DEPARTMENT OF HEALTH
Revenue Accounting
Post Office Box 1099
Olympia, Washington 98507 - 1099

If you have any questions, please feel free to contact us at (206) 753-4481.

TCF:amw

Enclosures



STATE OF WASHINGTON
DEPARTMENT OF HEALTH

Airdustrail Center, Bldg. 5, LE-13 • P.O. Box 47827 • Olympia, Washington 98504-7827

May 5, 1992

James Acord, sculptor
P.O. Box 159
Richland, Washington 99352

Dear Mr. Acord:

Enclosed please find the information requested for obtaining a license for possession of depleted uranium. Attached are the following:

1. The new application packet which has information on fees and where to send the fee and application. A depleted uranium license is fee category 24. I've highlighted it in the listing. You may also qualify for a small business discount. Without discount, the total fee would be $\$300 + \$150 = \$450$, initially and $\$300$ each year thereafter. With the small business discount, the fee would be $\$225 + \$150 = \$375$ initially, and $\$225$ each year thereafter.
2. 3-page application. Fill out with help from 3 below.
3. NRC Regulatory Guide 10.4 - Guide for the Preparation of Applications for Licenses to Process Source Material. This is an NRC document. Ignore references to "NRC" or "10 CFR". The information covered in this guide is similar to that requested in the application and requests information more specific to source material use. However, the numbered items do not correspond to the numbers on the application. It should still be easy to follow.

Sincerely,

Debra McBaugh
Radiation Health Physicist

encl



Debra McBaugh
Radiation Health Physicist
Radioactive Materials Section

Department of Health
Division of Radiation Protection
Airdustrail Park, Bldg. 5
P.O. Box 47827
Olympia, WA 98504-7827

206.586-8945
SCAN 321-8945
FAX 206.753-1496

FINE ART USE OF FAST FLUX TEST FACILITY SCULPTURE PROJECT

Radioactive Materials Licensing

BACKGROUND

All possession, ownership and use of radioactive materials is governed by State and Federal authorities. In 1988 the U.S. Nuclear Regulatory Commission ruled that my art work with granite (and certain uranium oxide ceramics) was covered by a State license [WAC 402-19-190 (1) (A)]. This license will not cover my new sculpture of the nuclear age.

Update - June 1991

In May of 1991 I was pledged breeder-blanket assemblies from Germany's most advanced reactor for this sculpture. These stainless steel objects perfectly fit the sculpture I envision. Additionally, they contain hundreds of kilograms of depleted uranium. This international support of my sculpture is most welcome and creates my need for a radioactive material license.

On 11 June I made inquiries to U.S. NRC on what licensing requirements will be necessary for using these breeder assemblies in sculpture. U.S. NRC determined that I will need a license with Washington State's Department of Radiation Control. U.S. NRC will recognize my State license for this sculpture, including any time that it falls outside the jurisdiction of Washington State.

Many State licenses cover work with depleted uranium, however, the least demanding license is my goal. I believe I have found one in WAC 402-21-030 (4); (requiring form RHF-20).

Securing a State license will be a challenge requiring some effort. I have photocopied the relevant page from the State's Statutes and Rules (enclosed) for your information. Briefly, however, my license will turn on two points:

1); That the uranium is safely packaged in durable, well-made containers (the assemblies) and that my use will not compromise their structural integrity. Engineering data from the manufacturer will help me meet this requirement.

2); That my (artistic) use of uranium will result in unique benefits accruing to the public (the importance of art).

I have high confidence that a satisfactory licensing arrangement will be arrived at with Washington State Radiation Control.

James Acord, sculptor - P.O. Box 159
Richland, WA 99352 - (509) 946-2484
USA

Lengthy telephone negotiations with the U. S. Nuclear Regulatory Commission and Washington State's Department of Radiation Protection determined that my ownership of uranium would not require a specific license until I actually began to work with the Breeder-Blanket Assemblies. In the interim, possession would be covered by Siemens Nuclear Power Corporation's (of Richland, USA) license.

This hesitance on the part of the regulators to issue me a specific license and the desire of Siemens AG to commence shipment reached criticality when the German government refused to grant Siemens an export license until I held an internationally recognized license to own nuclear materials.

Dear Mr. Acord,

I've been informed by SBK, that the shipment of the 12 breeder assemblies must occur in the 2 nd half of August, 1992. Prerequisite is that the WA State license is granted to you. Otherwise SBK would have to withdraw from the offer.

A relaxation is only possible, if SNP Corp. or any other US company could be persuaded to take over title of the assemblies (for final disposal or whatever other purpose). Cost for this operation needs to be arranged and a corresponding offer prepared and sent to us prior to the (? illegible) August '92 dead line.

Best regards

Krinninger

→ VERY URGENT !!

Siemens AG
Power Generation Group (KWU)

D-5060 Bergisch Gladbach 1

Telephone 02204 - 84 3771 / Telefax 02204 - 84 3510

☐ Internal Memo
☒ Telefax Message

From Krinninger / N221 Our Ref. _____
To HANFORD NUCL. SCRAPURE WORKS Your Ref. _____
For the attention of Mr. James Acord Fax - No. 001 509 943 2612
Date July 3, 1992

Copy to SIEMENS Nuc. Power Corp. Rickland
Attn. Mr. James B. Eger 001 509 375 8402
RWE ENERGIE AG, Essen H. HOFENROTT 0201 185 2882
SBK, KALKAR Dir. HOOP 02824 42103
Subject SHIPMENT OF BREEDER/BLANKET ASSEMBLIES
TO SNP Corp. Rickland

Dear Mr. Acord,

I've been informed by SBK, that the shipment of the 12 breeders and blankets must occur in the 2nd half of August, 1992. Prerequisite is that the WA state license is granted to you. Otherwise SBK would have to withdraw from the offer.

A relaxation is only possible, if SNP Corp. or any other US company would be prepared to take over title of the assemblies (for final disposal or whatever other purpose). Call for this operation needs to be amended and a corresponding offer prepared and sent to us prior to the mid-August '92 dead line.

Signed Best regards

Dept. N221 Extn. 3808

FACSIMILE TRANSMISSION SHEET

DATE: 13 July 1992

TIME: _____

TRANSMISSION FROM: Mr. James L. ACORD FAX PHONE: (509) 943-2612

COMPANY: Hanford Nuclear Sculpture Works

TRANSMISSION TO: H. Krinninger - N221 FAX PHONE: 011 49(2204)843045

COMPANY: Siemens AG KWL

NUMBER OF PAGES, INCLUDING COVER SHEET: 1

COMMENTS: Dear Dr. Krinninger

Thank you for your FAX's of 26 June and 3 July.
My license application is before State Radiation Control
Agency now. A copy of it is in the mail to you.

The State believes they can issue license in
August.

I will keep you fully informed and send
license copy as soon as available.

Best Regards,

J. Acord

copy sent: Jim Edgar - Siemens Nuclear Power Corp.

On July 8th, after considerable consultations with the Washington State Department of Radiation Protection, I filed the following 40 page application for a Special Nuclear Material / Depleted Uranium (fee code 24) license.

This license would take 4 to 6 weeks, I was told.

Hanford Nuclear Sculpture Works
P.O. Box 159 Richland, WA 99352
(509) 946-1572

8 July 1992

Debra McBaugh, Radioactive Materials Section
DOH - Division of Radiation Protection
Airdustrial Park, Bldg 5
P.O. Box 47827
Olympia, WA 98504-7827

Dear Ms. McBaugh,

Enclosed with this letter please find two (2) complete copies of my Application for Radioactive Materials License (Fee Code 24 - SNM/DU). Note my check for the fee accompanies copy # 1, on top.

I believe my Application is complete and will supply you and the Radioactive Materials Section with all needed information. If you find this Application insufficient in any way, please call it to my attention at once so that I may supply you with needed information in a timely way.

As you know from our earlier conversations there is a certain urgency to my Application as the German national authority (BAW) did not recognize my General License to take title to source material. Siemens AG has informed me that they wish to ship the 12 Breeder/Blanket Assemblies in August and BAW is insisting I hold a valid license before the ship will be allowed to sail.

Let me take a moment to thank you for all your help in this matter, especially all the supporting material (US NRC guidelines, information on Small Business Discount, etc.) that you included in my Application packet.

If I can be of any further help, answer any questions or supply you with any other relevant material, please don't hesitate to call me: hm (509) 946-2484, machine 946-1572.

Very truly yours,

James L. Acord, sculptor

enclosures: 2 copies; Application for Radioactive Materials License with fee enclosed.

APPLICATION
for
RADIOACTIVE MATERIALS LICENSE

SNM/DU

Fee Code 24

by
James L. Acord, sculptor

JULY 1992

Hanford Nuclear Sculpture Works
P.O. Box 159 - Richland, WA 99352
(509) 946-1572

Hanford Nuclear Sculpture Works
P.O. Box 159 - Richland, WA 99352
(509) 946-1572

APPLICATION

for

RADIOACTIVE MATERIALS LICENSE

Fee Code 24 - SNM/DU

by

James L. Acord, sculptor

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STATE OF WASHINGTON
DEPARTMENT OF HEALTH

Airdustrual Center, Bldg. 5, LE-13 • P.O. Box 47827 • Olympia, Washington 98504-7827

TO: New License Applicants
SUBJECT: CITY/COUNTY OFFICIAL NOTIFICATIONS

The Department of Health has adopted a Local Government Notification Policy as required by law. The Division of Radiation Protection notifies appropriate local government officials whenever a Radioactive Materials License application is received. In order to allow local officials time to comment if they wish, the Division of Radiation Protection is required to delay the issuance of licenses for at least 20 days from the date of such notification. In order to expedite this notification process, please supply the information requested below.

NOTE: If you have more than one facility, your answers must pertain to the facility(ies) where radioactive material is to be used and/or stored.

RETURN THIS DOCUMENT WITH YOUR RADIOACTIVE MATERIALS LICENSE APPLICATION

Name of License Applicant: James L. Acord

Name of County: Benton County - City of Richland

**Name of Mayor: Mr. Craig Buchan - Mayor of Richland

Complete Mailing Address of Mayor: 1422 Farrell Lane

Richland, WA 99352

City Zip

**If your facility is located outside city limits, please indicate:

Name of County Commissioner: _____

Complete Mailing Address of Commissioner: _____

City Zip

** Is your facility located on federal or Indian land: Yes ____ No X

Hanford Nuclear Sculpture Works
P.O. Box 159 - Richland, WA 99352
(509) 946-1572

7 July 1992

Debra McBaugh, Radioactive Materials Section
DOH - Division of Radiation Protection
Airdustrial Park, Bldg 5
P.O. Box 47827
Olympia, WA 98504-7827

Dear Debra McBaugh,

I write you at this time to make formal application for a twenty five percent (25%) Small Business Discount on my radioactive material fees.

As a sculptor doing business in the State of Washington under the registered trade name Hanford Nuclear Sculpture Works (Washington State Unified Business ID #: 601 392 833) I certify I am a sole proprietorship formed for the purpose of making a profit.

Additionally, I certify I am independently owned (by self) and not a subsidiary of a parent company. I always have less than fifty employees.

Attached to this letter, and included with my completed Application for a code 24 SNM/DU Radioactive Materials Licenses, please find a notarized SMALL BUSINESS CERTIFICATION form supplied with my application packet, photo-copy of my Washington State business license and my check for the sum of \$375.00 which reflects a small business discount of 25% on this radioactive materials license fee.

Thank you for what time and consideration you may continue to lend me in this matter.

Very truly yours,

James L. Acord, sculptor

chief executive officer
Hanford Nuclear Sculpture Works

attachments: Notarized Small Business Certification.
Copy of HNSW business license.
Check # 1045 for sum of \$375.00

SMALL BUSINESS CERTIFICATION

NAME OF LICENSEE/APPLICANT: James L. Acord, sculptor

ADDRESS: 322 Cullum Ave. (P.O. Box 159) Richland, WA 99352
Hanford Nuclear Sculpture Works - WA State U B I # 601 392 833

LICENSE NUMBER (IF ISSUED): _____

I understand that I or the independent small business I represent will receive the discount prescribed in wac 246-254-030 upon validation of the information to which I am attesting.

I fully understand that the Department of Health may verify this information at any time. I hereby authorize the departments of Revenue, Licensing, and/or Labor and Industries to provide the Department of Health such information as is directly applicable to verifying the information provided by this certification.

I hereby certify that the above-named licensee or license applicant is:

1. A corporation, partnership, sole proprietorship, or other legal entity formed for the purpose of making a profit.
2. Independently owned and operated from all other businesses, and
3. Employs 50 or fewer employees.

Furthermore, I certify that I am the chief executive officer of the licensee or license applicant (or other responsible official empowered to act on behalf of the above-named independent small business).

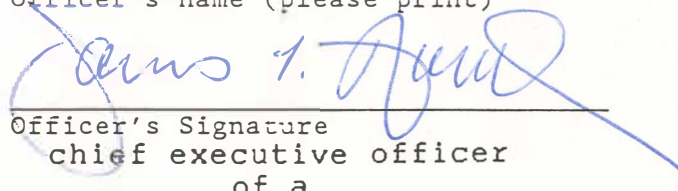
Subscribed and sworn to before me
this _____ day of _____ 19____

Notary Public in and for the
State of Washington

Residing at _____

James L. Acord

Officer's name (please print)



Officer's Signature
chief executive officer
of a
sole proprietorship

Title

Date: _____

WASHINGTON STATE DEPARTMENT OF HEALTH
DIVISION OF RADIATION PROTECTION

APPLICATION FOR RADIOACTIVE MATERIAL LICENSE

- 1.A. NAME AND STREET ADDRESS OF APPLICANT: James L. Acord
322 Cullum Ave. Richland, WA 99352 (509) 946-2484
- B. STREET ADDRESS(ES) AT WHICH RADIOACTIVE MATERIAL WILL BE USED
(if different from 1.a.): 2101 Horn Rapids Road - Richland, WA 99352
(Siemens Nuclear Power Corporation) - Site of finished sculpture
undetermined (Hanford Nuclear Reservation under consideration).
2. DEPARTMENT TO USE RADIOACTIVE MATERIAL:
Hanford Nuclear Sculpture Works
3. PREVIOUS LICENSE NUMBER(S). (If this is an application for renewal of a license,
please indicate and give number.): No Previous License
4. INDIVIDUAL USER(S). (Name and title of individual(s) who will use or directly
supervise use of radioactive materials. Give training and experience in Items 8 and
9.)
James L. Acord: sculptor/sole proprietor
(see Supplements 8 & 9 in Appendix)
5. RADIATION PROTECTION OFFICER (Name of person designated as radiation protection officer
if other than individual user. Attach resume of his training and experience as in
Items 8 and 9).
James L. Acord: sculptor
(see Supplements 8 & 9 in Appendix)
6. (a) RADIOACTIVE MATERIAL. (Elements and mass number of each).

Depleted Uranium: $_{92}\text{U}^{238}$ ($_{92}\text{U}^{235}$ less than 0.245%)

or

Depleted Uranium: U-238 (U-235 less than 0.245%)

(b) CHEMICAL AND OR PHYSICAL FORM AND MAXIMUM QUANTITY OF EACH CHEMICAL AND/OR PHYSICAL
FORM THAT YOU WILL POSSESS AT ANY ONE TIME. (If sealed source(s), also state name of
manufacturer, model number, number of sources and maximum activity per source.)

Uranium Oxide (UO_2) - metal/ceramic conversion U/ UO_2 : 88.13%
In the form of sintered, ceramic pellets

maximum quantity UO_2 : 1,111.022 kg (2,444 lbs, 4 oz)
maximum U metal mass: 986.4 kg (2,170 lbs)

Sealed sources are breeder-blanket assemblies manufactured
by Siemens AG (Germany), model number YM 20N C (001 through 012),
12 sources in number, maximum activity per source: 1521.11 MBq.

(see Supplement 6 (b) in Appendix)

APPLICATION FOR RADIOACTIVE MATERIAL LICENSE

Page Two

7. DESCRIBE PURPOSE FOR WHICH RADIOACTIVE MATERIAL WILL BE USED. (If radioactive material is in the form of sealed sources, include the make and model number of the storage container and/or device in which the source will be stored and/or used.) Attach extra sheets if necessary.

Fine Art: Sculpture

The radioactive material (DU) is in the form of 12 sealed sources. Make, Model, Serial Numbers and technical description are found in Supplement 6 (b) in the Appendix.

Purpose of use is addressed in Supplement 7.

TRAINING AND EXPERIENCE OF EACH INDIVIDUAL NAMED IN ITEM 4 (Use supplemental sheets if necessary).

(See Supplement 8 in Appendix)

8. TYPE OF TRAINING	WHERE TRAINED	DURATION OF TRAINING	ON THE JOB (CIRCLE ANSWER)	FORMAL COURSE (CIRCLE ANSWER)
a. Principles and practices of radiation protection.	U of W	1 h	YES ☐ NO ☒	☒ YES NO ☐
b. Radioactivity measurement standardization and monitoring techniques and instruments.	Tri-Cities University Center	15 h	YES ☐ NO ☒	☒ YES NO ☐
c. Mathematics and calculations basic to the use and measurement of radioactivity.	WSU Tri-Cities	18 h	YES ☐ NO ☒	☒ YES NO ☐

9. EXPERIENCE WITH RADIATION (Actual use of radioisotopes of equivalent experience). (This information must be submitted for each user.) (See Supplement 9 in Appendix)

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE	WHEN USED
Natural {	80 lbs	Seattle, WA	6 y	Sculpture	1983-89
Uranium {	275 lbs.	Richland, WA	3 y	Sculpture	1989-92

10. RADIATION DETECTION INSTRUMENTS (Use supplemental sheets if necessary.)

Type of Instruments (include make and model of each)	Number Available	Radiation Detection	Sensitivity Range (mR/hr)	Window Thickness	Use (Monitoring, Surveying, Measuring)
Heathkit Model RM-4 # 595-3475-04	1	Alpha > 2.5 MeV Beta > 50 KeV Gamma > 10 KeV	0.02 mR/hr to 50 mR/hr	mica 1.5 mg/cm ²	monitoring & surveying

(see Supplement 14 in Appendix)

11. METHOD, FREQUENCY, AND STANDARDS USED IN CALIBRATING INSTRUMENTS LISTED ABOVE.

Capable of calibration to ANSI by Cesium 137 standard. (I am currently negotiating for regular calibration services with a licensed private contractor)

12. FILM BADGES, DOSIMETERS, AND BIO-ASSAY PROCEDURES USED (For film badges, specify method of calibrating and processing, or name of supplier). **TLD 5-chip dosimeter**
Continuous personal dosimetry services with United States
Dosimetry Technology, Inc. (formerly U.S. Testing) since 1987.
PLEASE PROVIDE ATTACHMENTS FOR ITEMS 13-15. (see Supplement 12 in Appendix)

13. FACILITIES AND EQUIPMENT. Describe laboratory facilities and remote handling equipment, storage containers, shielding, fume hoods, etc.
(see Supplement 13 in Appendix)

14. RADIATION PROTECTION PROGRAM. Describe the radiation protection program including surveys, control measures, and training program. If application covers sealed sources, submit leak tests procedures where applicable, name training, and experience of person to perform leak tests and arrangements for performing initial radiation survey, servicing, maintenance and repair of source.
(see Supplement 14 in Appendix)

15. WASTE DISPOSAL. If a commercial waste disposal service is employed, specify name of company. Otherwise, submit detailed description of methods which will be used for disposing of radioactive wastes and estimates of the type and amount of activity involved.
(see Supplement 15 in Appendix)

CERTIFICATE
(This item must be completed by Applicant)

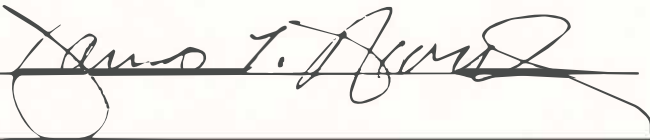
16. THE APPLICANT AND ANY OFFICIAL EXECUTING THIS CERTIFICATE ON BEHALF OF THE APPLICANT NAMED IN ITEM 1, CERTIFY THAT THIS APPLICATION IS PREPARED IN CONFORMITY WITH WASHINGTON STATE DEPARTMENT OF HEALTH, DIVISION OF RADIATION PROTECTION, RADIATION CONTROL REGULATIONS AND THAT ALL INFORMATION CONTAINED HEREIN, INCLUDING ANY SUPPLEMENTS ATTACHED HERETO, IS TRUE AND CORRECT TO THE BEST OF OUR KNOWLEDGE AND BELIEF.

James L. Acord

Applicant named in Item 1

Date: 7 July 1992

By:



Title of certifying official authorized to act on behalf of the applicant

chief executive officer
of a
sole proprietorship

Hanford Nuclear Sculpture Works
P.O. Box 159 - Richland, WA 99352
(509) 946-1572

APPLICATION

for

RADIOACTIVE MATERIALS LICENSE

Fee Code 24 - SNM/DU

by

James L. Acord, sculptor

JULY 1992

APPENDIX

SUPPLEMENT 6 (B); description of sealed sources.....	11
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James L. Acord, sculptor

SUPPLEMENT 6 (B)

DESCRIPTION OF 12 SEALED SOURCES

The following technical information, supplied by the manufacturer of the sealed sources (Siemens AG - INTERATOM), demonstrates fully the advanced corrosion-resistant materials and quality of craftsmanship that makes these 12 Breeder/Blanket Assemblies eminently qualified and suitable for placement in a permanent outdoor sculpture setting.

Breeder/Blanket Materials Inventories w/ serial numbers.....12

Data of Assemblies for Export Purposes, prepared
by Siemens AG (INTERATOM) - which includes
much good information on packaging,
activity, mass/weight/void arrangement, etc.....13

Copy of letter from INTERATOM (dated 13.09.91) describing
a large shipment of technical documents,
(including the above mentioned) as well as
large, fragile blueprints, long technical
reports in german, etc., any of which I
will send you upon request.....25

Breeder/Blanket Assembly Material Inventories

Assembly Identification Number	UC ₂ -weight [g]	U-weight [g]	U235-weight [g]	U235/U [%]	metal/ceramic conversion
					U/UO ₂ [%]
YM 20N 001 C	92626	81631	193	0,2365	88,13
YM 20N 002 C	92669	81669	193	0,2360	88,13
YM 20N 003 C	92507	81615	201	0,2463	88,13
YM 20N 004 C	92516	81622	194	0,2377	88,13
YM 20N 005 C	92586	81596	193	0,2360	88,13
YM 20N 006 C	92558	81571	193	0,2367	88,13
YM 20N 007 C	92633	81637	193	0,2360	88,13
YM 20N 008 C	92550	81564	199	0,2440	88,13
YM 20N 009 C	92617	81623	200	0,2451	88,13
YM 20N 010 C	92640	81644	193	0,2360	88,13
YM 20N 011 C	92584	81594	201	0,2464	88,13
YM 20N 012 C	92436	81464	202	0,2480	88,13

☒ Notiz / Note

☐ Protokoll / Minutes of Meeting

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Adressat/Adressee	OE/Dept	Ident.-Nr./No.	Datum/Date
Distribution		54.08106.*	06.08.91
Verfasser/Author	OE/Dept.	Auftrags-Nr./Cost Code	Projekturzz./Proj.Shortn.
Heyne	F413	4124-1100-01	SNR-300
	Tel.-Nr./No.	SK Sachschl./File-No.	TVS-Nr./No.
	35 76		152315
Gegenzeichnung/Approval	Unterschrift/Signature	Zusatz-Nr./Additional/No.	
<i>W. Heyne</i>	<i>C. Heyne</i>		
Verteiler/Distribution		Seiten/Pages	Anl./Encl.
F413		9	3
S113 Herr Krinninger (5x)			V-Kl./Class.
(F41)			2.1
		Betreff/Subject	UA
		Data of SNR-300 Blanket Assemblies	37

Prepared for Export Purposes
of 3 Assemblies to WHC/
Hanford, USA

Schutzbedürftiges Firmeneigentum

Summary

12 ~~Three~~ fresh blanket assemblies of the first SNR-300 core are planned to be exported to Hanford, Westinghouse Corporation, to be integrated into a special sculpture of the Nuclear Age.

This note provides the necessary technical information which is needed for this purpose.

Contents

1	Technical Description of the SNR-300 Blanket Assemblies
1.1	The Assembly Head
1.2	The Bundle and Duct Part
1.3	The Blanket Pin
1.4	The Foot
2	Description of Package and Transport Provisions
2.1	Customs data
2.2	Package and Transport Description
Tab. 1	Technical Assembly Data
Tab. 2	Steel Types
Fig. 1	Blanket Assembly
Fig. 3	Blanket Pin
Fig. 3	Transport Container

Ident-Nr./No. : 54.08106.*
V-Klasse/Class. : 2.1
TVS-Nr./No. : 152315
Datum/Date : 06.08.91
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1 Technical Description of the SNR-300 Blanket Assemblies

A description of the blanket assembly construction will be given on the basis of Fig. 1, Tab. 1.

The assembly consist of a head part, a pin bundle part inside a hexagonal duct (or wrapper tube) and a foot part. It is designed for use in the peripheral zone of a fast reactor core. For that purpose the assembly will be put in vertical position in the core zone inside the reactor tank with its foot fit into a spike fixing device.

The whole core together with the blanket assemblies is placed on the grid plate using the technical features described above.

1.1 The Assembly Head

The upper part of the head is in cylindrical form which changes to a conical intermediate part and is transformed finally into a hexagonal geometry to get adapted to the hexagonal form of the duct. At the outer part of this lower hexagonal head region are spacer-support pads on each face of the hexagon. The surface of the pads is covered by a friction resistant material. All other parts of the head are made from austenitic stainless steel.

The upper part of the head consist of an open tube which serves in the reactor as outlet of the cooling medium and during handling as the point where the gripper is fixed to the assembly.

In some of the blanket assemblies there is a mixing device inside the head which was thought to improve the homogeneity of the coolant and its temperature for measurement purposes.

The assembly head carries also a small piece of ferritic steel which was thought to be used for the azimuthal orientation control.

1.2 The Bundle and Duct Part

The duct is a tube with a hexagonal cross section and an equal wall thickness over the complete length. On its outside there is the so-called support level in the lower section of the duct.

This support level consists of a closed hexagonal ring which is fixed to the duct material. The corners of this hexagonal ring are plated with a friction resistant material.

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Inside of the duct is a pin bundle consisting of 61 blanket pins. The distance between pins as well as between the pins and the duct wall is maintained by a wire which is mounted in a helical form around each pin. The wire is fixed at both endplugs of the pin by a welding point.

The blanket pins are held at their lower end in the pin anchor plate. This plate itself is connected by means of a support piece to the assembly foot. This is the only fixing point of the pin bundle inside the surrounding hexagonal duct.

1.3 The Blanket Pin (Fig. 2, Tab. 1)

The pin is formed by a stainless steel tube with a wall thickness of 0.5 mm. This tube is closed at both sides by a steel plug which is gas tight welded to the tube ends. The pin contains a column of blanket pellets made from depleted uranium oxide powder.

The pellet column is held in place inside the pin by a spring at the upper pin end and a support tube at the lower pin end. The UO₂ pellets fill about 70 % of the inner volume of the pins. The rest is filled by the structure pieces as there are support tube and spring. An inert gas fill, mainly Helium and some Argon, fills the remaining empty volume.

On the outer surface of the pin is a stainless steel wire, wrapped helically around and fixed at the endplugs (see Fig. 2).

1.4 The Foot

The assembly foot is fixed to the lower end of the hexagonal duct. The outer form of the foot is at its upper part adapted to the hexagonal geometry of the duct. Further down the hexagon changes into a conical form which is followed by a cylindrical part. This cylinder ends again in a conical part with triangular formed coolant inlet openings.

Near the first conical part is a movable support ring on which the assembly is seated when put in the spike support of the reactor core grid plate.

About half way down the cylindrical part are two further rings. The first one is a piston ring which tightens the assembly foot against the grid plate avoiding unacceptable bypass flows of the cooling medium. The second one serves as centering device of the assembly in its grid plate position.

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Two metal spike-like pieces on the hexagonal upper part of the foot serve as orientation devices when the assembly is put into the reactor core.

A gagging system using diaphragms inside the cylindrical part of the foot serves for the control of the coolant flow which removes the heat of the assembly during its residence in the reactor core.

2 Description of Package and Transport Provisions

2.1 Customs Data

The export license might be handled concerning the German customs tariff no. (Zolltarifnummer) 8401 30000.

This covers fuel containing nuclear core assemblies.

As the blanket assemblies contains depleted Uranium this action has also to follow the regulations fixed in the export list (Ausfuhrliste) no. 0102.

2.2 Package and Transport description

It is foreseen to handle the assemblies and transport containers in the following way:

- a) The blanket assemblies are taken from their storage in vertical position and put into a special positioning device. They are wrapped in a polyethelene foil.
- b) The positioning device brings the assembly into horizontal position.
- c) In that position the assembly is packed into the specific container (wood).
It is supported at 3 levels, the two spacer-pad levels and the hexagonal part of the foot.
- d) The transport container for SNR-300 blanket assemblies is shown in drawing S-2-300-01 (Fig. 3).
- e) One container can take ~~8~~ ⁶ assemblies.
- f) The assembly fixations are screwed after positioning the assemblies in the container.
- g) There is no drying medium foreseen in the container.

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soweit nicht ausdrücklich zugestanden. Zuwiderhand-
lungen verpflichten zu Schadenersatz. Alle Rechte für den
Fall der Patentierung oder GM-Eintragung vorbehalten.

- h) The container will be closed by at least 3 steel belts.
- i) The container is supposed to be loaded by crane on an air-cushioned transport vehicle.
- j) The container is fixed on the vehicle with the assembly foot in travel direction.
- k) Assembly and transport container will be checked to be free of contamination.
- l) Transport
- m) Discharge and handling concerning the regulations in force at the destination point.

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use or communication of the contents thereof, are forbidden
without express authority. Offenders are liable to the pay-
ment of damages. All rights are reserved in the event of the
grant of a patent or the registration of a utility model or design.

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Component (Material)	Indications	Unit	Value
foot (1.4981) ¹⁾	length number of triangular cooling inlets outer diameter of the piston ring	mm - mm	~ 500 6 ~ 85
UO ₂	quantity/assembly quantity/pin	N	~ 925.5 ~ 15.2
U-5	enrichment (depleted uranium)	weight%	0.23 ~ 0.24
U-8		weight%	~ 99.76
UO ₂ -form: pellets	diameter density height	mm %theoret.	10.3 95
U-metal mass: max: 82.2 kg/ass.	max. activity of one fresh SNR-300 blanket assembly	MBq	1521.11

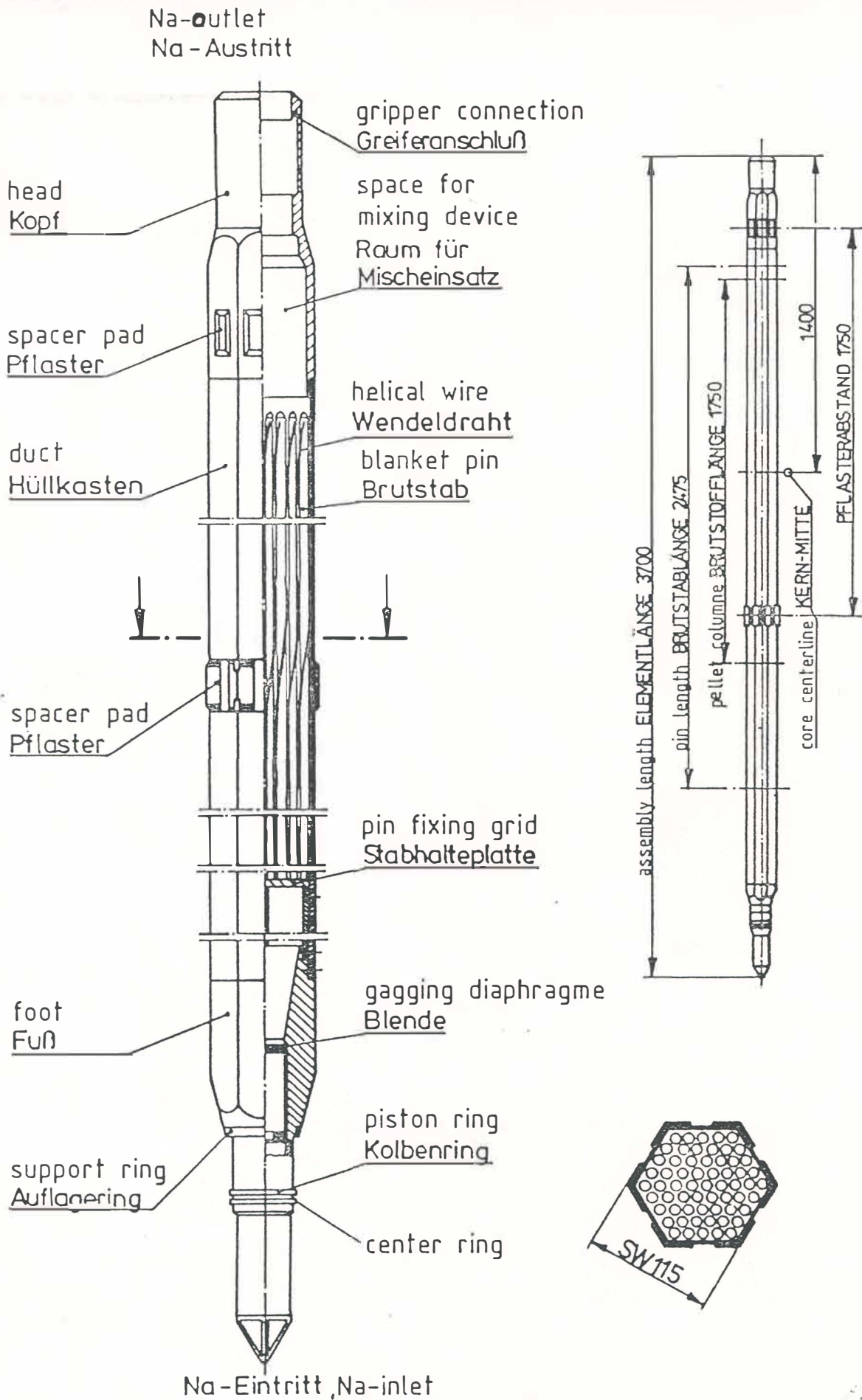
1) steel composition see Table 2

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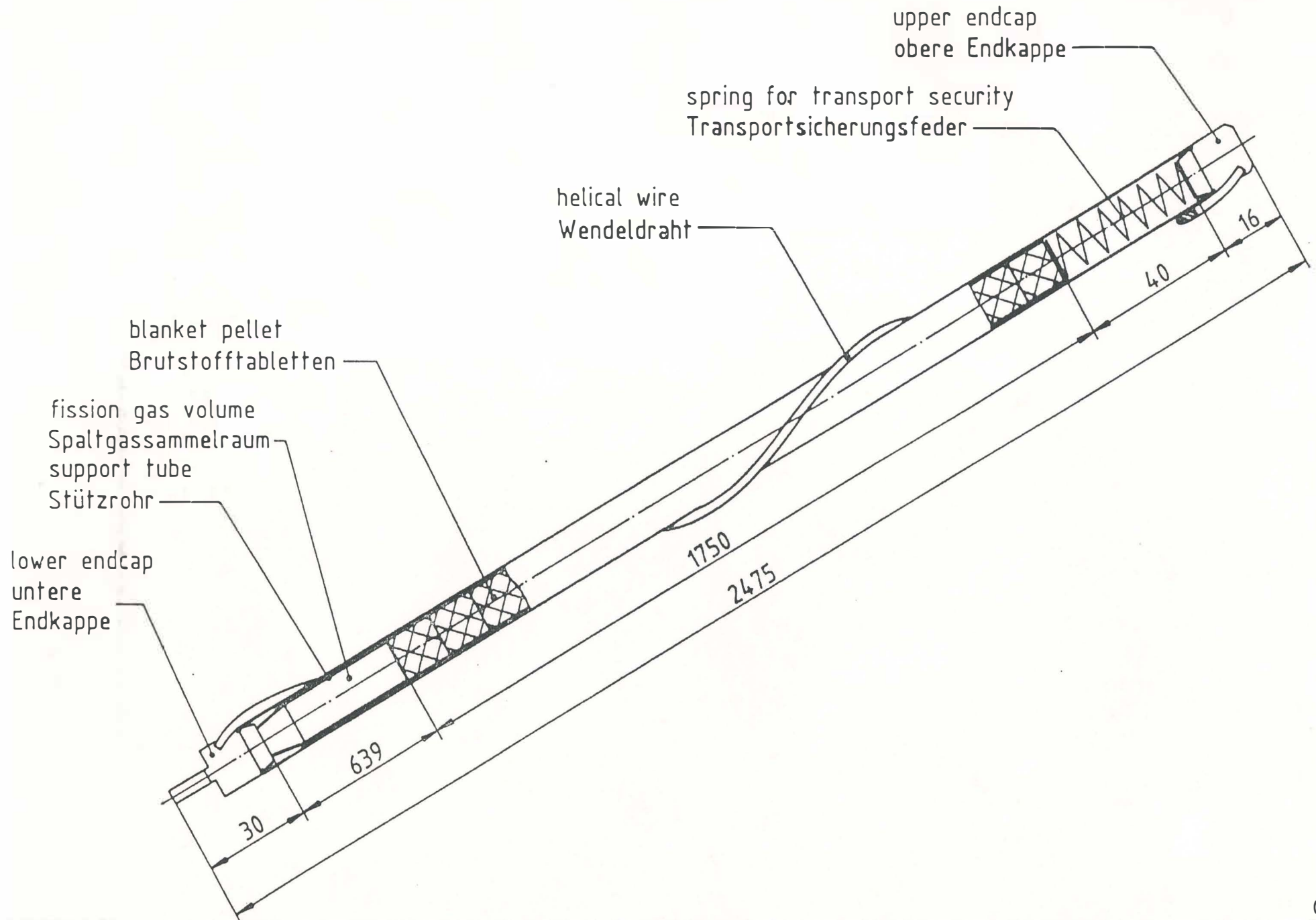
Material No. DIN	Composition	Assembly Part
1.4970 in cold worked condition	X 10 CrNiMoTiB 15 15	cladding tube, pin end plugs, helical wire
1.4981	X 8 CrNiMoNb 16 16	duct (wrapper tube) pin anchor grid
1.4541	X 10 CrNiTi 18 9	some small structure parts
1.4301	X 5 CrNi 17 9	some small structure parts

All steel types are austenitic stainless steels.



Blanket Assembly
Brutelement

Fig. 1



03.83/T263

SNR 300 Mk Ia Brutstab - Blanketpin

Agilent
Instrument
Sales Office

Transportbehälter für
SNR-Brutelemente

S-2 30001

INB

INTERNATIONALE NATRIUM-BRUTREAKTOR-BAU GESELLSCHAFT MBH

Mr. James Acord
P. O. Box 1 59

RICHLAND, WA 99352

U. S. A.

Ihre Zeichen und Ihre Nachricht vom

Unser Zeichen

Bearbeiter/Hausruf

Friedrich-Ebert-Straße
Bergisch Gladbach 1 (Bensberg)

0-9-91-16
Kri/do

Krinninger
38 08

13.09.91

Offer of SBK to integrate SNR 300 Breeder Assemblies into the
tri-cities "Nuclear Age Sculpture"
Ref: Your letter of June 15, 1991

Dear Mr. Acord,

As you know from our discussion in Richland, SBK and we are very pleased of the idea to make our Breeder Assemblies an integral part of the sculpture intended for inauguration at the fiftieth anniversary of Nuclear Activities at Hanford Area (begin of nuclear age!).

I am sorry for the late response to your letter, but we have been very busy with high priority matters in managing post-project-termination activities at SNR 300 site.

Inbetween we contacted the German subsidiary of Advanced Nuclear Fuel and got the impression, that the shipping to USA can be managed in a very cost effective operation (bypack to routine transports between ANF Lingen and ANF Richland (now Siemens Nuclear Power Group). Our contact point at ANF (Lingen, Germany) is Mr. Philippczyk, who knows very well Jim Edgar, your entry point at SNP, Richland.

Please, find attached for your assistance in the US licensing procedure the following documents:

Mr. James Acord

13.09.91

2

- 1 Interatom Note No. 54.08106.*, August 6, 1991
Data of SNR 300 Blanket Assemblies
- 2 Technical Specifications and Drawings (latest issues)
Remark: These documents have been used in the SNR 300
licensing process according to German Nuclear
Power Law, have been approved by the authorized
technical inspectorate (TÜV-Arge Kerntechnik West)
and are all in German.
 - 2.1 Spezifikation Brutelement (Blanket or Breeder Assembly)
Ident-No. 403.185.9
 - 2.2 Spezifikation Brutstab (Breeder rod)
Ident-No. 403.179.2
 - 2.3 Technische Einzelspezifikation "UO₂-Brutstofftabletten"
(Breeder pellets)
Ident-No. 403.179.2
 - 2.4 Übersichtszeichnung Brutelement mit Mischeinsatz
(general assembly drawing "Breeder Assembly with coolant
flow mixer")
Ident-No. 11.73596.2
 - 2.5 Übersichtszeichnung Brutstab
(general drawing "Breeder rod")
Ident-No. 11.73602.*
 - 2.6 Stückliste Brustab
(parts list "Breeder rod")
Ident-No. 11.73601.8
 - 2.7 Stückliste Brutelement mit Mischeinsatz
(parts list "Breeder assembly with coolant flow mixer")
Ident-No. 11.73612.3

Attached are also color photographs of the breeder assemblies while in fabrication. Additionally I add our Company Portrait 1991 telling you about the activities and businesses of Interatom.

Soon there will be an important change for us you should also know about. Becoming effective from October 1, 1991 Interatom will become fully integrated into the Siemens Power Generation Group KWU. Our new address is then

Siemens AG KWU
H. Krinninger N221
Friedrich-Ebert-Straße
Postfach 10 01 00
W - Bergisch Gladbach 1
Germany

Mr. James Acord

13.09.91

3

With respect to the US "Radioactive Material Licensing" and the requirements defined in the attachment (402-22-110) to your letter we shall give the following statements:

(12 (a) ii)

Quality Assurance Measures and Quality Control Procedures
in fabrication of Nuclear Plant Components (see attached comparison in German). In general the requirements in both countries are very similar and therefore there should be no reason for product reject by US authorities. Additionally attached is a draft of the report prepared for WHC "General description of the Quality Assurance System for the Core/Core Assembly Supply of SNR 300" Ident-No. 403.1089.3.

Design
is given in the attached documents

- Systembeschreibung "Brutelemente"
(System description for "Breeder assemblies")
Ident-No. 403.237.1
- Auslegungsbegründung "Brutelemente"
(Design report and justification "Breeder assemblies")
Ident-No. 403.266.0

Both notes are in German and were used in the German licensing procedure.

Labeling or marking
Each assembly carries on the handling socket a serial fabrication number of the following type

YM 20 N XXX C
XXX ... serial number

For the assemblies selected for transport to USA you will get timely these numbers.

Manufacture
has been performed according to specification requirements. Compliance with this requirements is certified.

(12 (a) ii (A))

The manufacturer of the product is Reaktor-Brennelement GmbH, Hanau, now Siemens Brennelementewerk, Hanau.

Mr. James Acord

13.09.91

4

We hope, that these informations with the attached set of documents will help you in getting the license to take ownership of these assemblies.

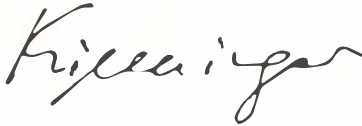
Please, let us know if you need more information and be sure of our full support.

Within the next days we shall transmit all documents needed at ANF Lingen to apply for the export license in Germany and to prepare for the transport. We suppose, that spring 1992 could be a reasonable time period for that.

Best regards

I N B

Project Management Core



Enclosures

cc without encl.

SBK-B Kalkar - Mr. Koop

RWE Energie AG Essen - Mr. Hottenrott

Hanford Nuclear Sculpture Works
P.O. Box 159 - Richland, WA 99352
(509) 946-1572

APPLICATION
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by

James L. Acord, sculptor

SUPPLEMENT 7

PURPOSE OF USE

The purpose of my ownership and possession of SNM/DU in sealed sources (i.e. 12 Breeder/Blanket Assemblies) is to create a work of art: In this case a permanent, durable, large, outdoor sculpture composed of land-formed earthworks, monolithic granite work and the 12 Assemblies. It is for this sculpture project, using these 12 Assemblies, that I am applying for a license.

The 12 Breeder/Blanket Assemblies were generously donated to this sculpture undertaking last year by Siemens AG (INTERATOM) in response to my need for superbly crafted stainless-steel sculptural elements (aesthetically related to FFTF Materials Open Test Assemblies), and reflecting the quality of material usage and excellence of craftsmanship associated with the nuclear age.

That the donated Assemblies contained Depleted Uranium seemed, at first, inconsequential (except for the possible inconvenience of requiring a License). Upon reflection I recognized the inherent appropriateness of DU in a sculpture: Its very Mass and weight gives it esteem. As symbol and metaphor, uranium was humankind's ticket into the Nuclear Age; and in its depleted form it speaks of the first 50 years of this Age (e.g. LWRs, enrichment, weapons production, etc.). Depleted Uranium, fabricated into the form of Breeder/Blanket Assemblies, however, speaks to the second generation (and the future) of the Nuclear Age. It is my belief that these Assemblies are even more appropriately suited for this major sculpture in their loading of DU than they would have been if empty.

(continued next page)

(SUPPLEMENT 7 continued from page 29)

Additionally, of all the radioactive materials (manmade and naturally occurring) that exist and are associated with our entrance into the Nuclear Age, Depleted Uranium (in ceramic form) surely is one of the safest. I put to you in this license application that the radioactive material (DU) is safely contained within the Assemblies, that the assemblies will be carefully handled during installation, protectively buttressed with monolithic granite work when in place, and securely fastened to the earth. Importantly (to this license application), the aesthetic of durability and permanence - timeless quietude and safe repose - is a fundamental concept for the "feel" of this sculpture. Also of importance to mention is the permanence inherent in works of art caused by the increasing care that successive civilizations bring to enduring works of art. I have long believed that Fine Art, in the form of sculpture, has a great deal to offer to long-term storage of radioactive materials (structures of containment, warning markers, aesthetic forms of communication and education such as symbol and metaphor, reliquaries, et al). I see the creation of this sculpture, incorporating permanently and safely 2,444 lbs 4 oz of DU Oxide, as an opportunity to demonstrate this.

Of course a meteor can strike anywhere on the surface of this planet (catastrophic occurrences and long-term safety to the community are addressed in detail under the appropriate Supplements in this License Application) so the subject of frivolous use must be addressed. After all, small as the risks are, they appear needless if the value of Fine Art is unrecognized.

For civilization to express itself in works of art, created with the most advanced process technology and from the wonder materials of the time, is a tradition three hundred and fifty centuries old. Of all life on Earth only we humans make art and I will observe that the creation of art marks the dawn of our becoming human: It is no mere impulse but rather a fundamental instinct. Long before recorded history, sculptors created art which both reflected and contributed to the values of the civilization that produced it. Today, in the Nuclear Age, the use of SNM/DU in sculpture is appropriate, aesthetically logical, and will supply something necessary toward civilization's understanding and mastery of the Nuclear Age in which we live. As an indivisible part of civilization, art integrates understanding into the fabric of the human state, as well as showing glimmers of the future.

Hanford Nuclear Sculpture Works
P.O. Box 159 - Richland, WA 99352
(509) 946-1572

APPLICATION
for
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Fee Code 24 - SNM/DU

by

James L. Acord, sculptor

SUPPLEMENT 8

TRAINING AND EDUCATION

a. Principles and practices of radiation protection.

In January of 1988 I completed the "Baby Class" in Radiation Safety in the University of Washington's Health-Science facility. The class ran something over one hour and was tailored to people working with low-activity isotopes commonly used in medicine and the biological sciences. It completely covered the basics of safely working with radioactive materials (e.g. time/shielding/distance, no coffee-cups on the lab table, etc.). The class was taught by Debora Robb.

b. Radioactivity measurement standardization and monitoring techniques and instruments.

February, 1989. Radiation Detection: Principles and Instruments. (for course description and copy of certificate of graduation see.....32

c. Mathematics and calculations basic to the use and measurement of radioactivity.

May, 1991. Introduction to Nuclear Systems. (for course description and copy of certificate of graduation see.....33

RADIATION DETECTION: PRINCIPLES AND INSTRUMENTS

January 24-February 7
Tuesday, Thursday
7:00 - 10:00 p.m.
(5 sessions)

Fee: \$235
Maximum Enrollment: 20
CE Units: 1.5
Registration Deadline: 01/10/89

INSTRUCTOR: Lowell Nichols

The Radiation Monitor uses many types of radiation detection, measuring, and counting equipment in the performance of his/her job. An understanding of the principles of operating of these instruments and their limitations is essential to their safe usage. This course is designed to provide this basic knowledge. The course assumes only minimal background in instrument principles and builds toward a deeper understanding of them. Examples and applications will be slanted toward the interest of class participants.

WHO SHOULD ATTEND:

Radiation Monitors who need to review and update the principles of operating radiation detection equipment.

COURSE CONTENT:

- Ionization Chambers
- Semiconductor Devices
- Scintillation Devices
- Chemical Devices
- Neutron Devices
- Instrument Operating Characteristics
- Health Physics Instruments
- Counting Statistics

TEXT:

"Radiation Safety Technician Training Course," by H. J. Moe, et.al. (Included in course fee).

LOWELL NICHOLS is a Senior Research Physicist with Battelle, Pacific Northwest Laboratory, in Richland. He has been involved in research and development of various efforts in the areas of radiation physics and radiation dosimetry. He is currently Chairman of the Standards Committee, Health Physics Society.

Tri-Cities University Center Continuing Education

presents this certificate to

JAMES L. ACORD

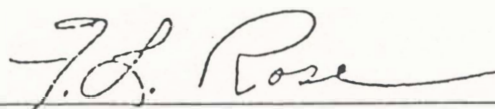
for successful completion of

RADIATION DETECTION: PRINCIPLES AND INSTRUMENTS

and has been awarded 1.5 Continuing Education Units

February 9, 1989

Date



Director of Continuing Education

INTRODUCTION TO NUCLEAR SYSTEMS

COURSE NUMBER: TP1960
May 10, 17, 31
Fridays
9:00 a.m. - 4:00 p.m.

Fee: \$290
Maximum Enrollment: 24
CE Units: 1.6
Registration Deadline: 04/26/91

INSTRUCTOR: Duaine Lindstrom

Nuclear systems apply principles of nuclear physics and several engineering disciplines to produce power or nuclear materials. In addition, the operation of these facilities leads to concerns outside the traditional topics of physics and engineering.

It is difficult to be familiar with all aspects of the design and operation of nuclear systems. This course surveys the field, from a qualitative introduction to nuclear physics to analyses of the Three Mile Island and Chernobyl accidents. It seeks to give attendees a balanced view of current and anticipated nuclear systems; how they function, and occasionally malfunction.

WHO SHOULD ATTEND:

Engineers, technicians, managers, individual contributors, others whose education was not primarily concerned with nuclear systems, but may now have responsibilities which deal with aspects of them. No technical background is required.

COURSE CONTENT:

- Basic Physics
 - Atomic and nuclear physics, a qualitative introduction
 - Neutrons and their interaction with matter
- General Introduction to Nuclear Reactors
 - Basic features
 - Environmental interaction
 - Emissions
 - Accident potential
- Commercial Nuclear Reactors
 - Pressurized water reactors
 - Boiling water reactors
 - Heavy water reactors
 - Gas-cooled reactors
- Uranium Resources and Fuel Cycles
 - Resources
 - Advanced systems
 - Fuel processing
 - Fuel cycles for weapons materials
- Advanced Systems
 - Fast breeders
 - Advanced thermal systems
 - Fusion
- World Experience
 - Present status in the world
 - The accidents at TMI and Chernobyl

WASHINGTON STATE UNIVERSITY C & I CONTINUING EDUCATION

presents this certificate to

JAMES L. ACORD

for successful completion of

INTRODUCTION TO NUCLEAR SYSTEMS

and awards 1.6 Continuing Education Units

May 31, 1991

Date

Twila Cooper

Assistant Director

Hanford Nuclear Sculpture Works
P.O. Box 159 - Richland, WA 99352
(509) 946-1572

APPLICATION
for
RADIOACTIVE MATERIALS LICENSE

Fee Code 24 - SNM/DU

by

James L. Acord, sculptor

SUPPLEMENT 9

EXPERIENCE WITH RADIATION

For the last nine years I have worked with tri-uranium oct-oxide (U_3O_8), reused whole or divided, in sculpture projects. I have appropriated this exempt source material (as a ceramic glaze) from certain orange-colored, uranium-bearing ceramic tableware (manufactured 1920's - 1940's) and available on the open market. Radio-chemical analyses of this material revealed uranium isotopes occurring in natural proportions, along with trace amounts of thorium.

From 1983 through 1988 I worked with this exempt source material (off and on) in a number of studio locations in and around the City of Seattle. In 1989 I moved to Richland, from where I still mount exhibits containing this exempt uranium-bearing source material.

Additional experience with radiation, if somewhat longer ago, was part-time employment at Ballard/Greenwood Veterinary Hospital (Seattle, WA - 1960-61) as an X-Ray Technician, and a high-school Science Fair project involving X-Ray radiation.

Hanford Nuclear Sculpture Works
P.O. Box 159 - Richland, WA 99352
(509) 946-1572

APPLICATION
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by

James L. Acord, sculptor

SUPPLEMENT 12

FILM BADGES, DOSIMETERS AND BIO-ASSAY PROCEDURES USED

I have maintained a personal dosimetry account (# S42) with United States Dosimetry Technology, Inc. (formerly U.S. Testing) since 1987. This account supplies me with a continuous dosimetry via a TLD 5-Chip (the "Hanford Standard"). My regular reporting period is quarterly, however I have gone monthly, maintained "visitors" badges, employed room monitors, etc. at various times on a "as needed" basis.

Throughout all the time of my possession and work with the SNM/DU (Assemblies) I will continue to contract my dosimetry needs to a licenses supplier of quality services in film badges, dosimeters and bio-assay procedures. In the likely event of employees and sub-contractors assisting my on this sculpture project at various times, I will assure each that they receive quality dosimetry services.

Photocopy; last three years dosimetry (# S42).....36

Certificate of Accreditation from National Bureau
of Standards (copy).....37

EMPLOYER: SEEMLESS SCULPTURE WORKS

1989 ANNUAL REPORT

PROCESSOR: US DOSIMETRY TECH., INC.

JAMES ACORD
P O BOX 159
RICHLAND08-Mar-90
S42660A GEORGE WASH WAY
RICHLAND WASHINGTON 993

WA 99352

DOSES IN REM

For ACORD J Badge Number 00001 Loc Type F SS# 532-40-8427 Birthday 10/19/44 Freq Q PAGE

QUARTER	SHALLOW	DEEP	TIMES PROCESS IN YEAR	LIFE TIME (SHALLOW DEEP)	LPD
1	Min.	Min.			
2	Min.	Min.			
3	Min.	Min.			
4	Min.	Min.			
ANNUAL	Min.	Min.	3	0.05	135

THIS REPORT IS FURNISHED TO YOU UNDER THE PROVISIONS OF YOUR STATE OFFICE FOR RADIATION PROTECTION.
YOU SHOULD PRESERVE THIS REPORT FOR FURTHER REFERENCE.

EMPLOYER: SEEMLESS SCULPTURE WORKS

1990 ANNUAL REPORT

PROCESSOR: US DOSIMETRY TECH., INC.

JAMES ACORD
P O BOX 159
RICHLAND13-Mar-91
S42660A GEORGE WASH WAY
RICHLAND WASHINGTON 993

WA 99352

DOSES IN REM

For ACORD J Badge Number 00001 Loc Type F SS# 532-40-8427 Birthday 10/19/44 Freq Q PAGE

QUARTER	SHALLOW	DEEP	TIMES PROCESS IN YEAR	LIFE TIME (SHALLOW DEEP)	LPD
1	Min.	Min.			
2	Min.	Min.			
3	Min.	Min.			
4	Min.	Min.			
ANNUAL	Min.	Min.	4	0.05	140

THIS REPORT IS FURNISHED TO YOU UNDER THE PROVISIONS OF YOUR STATE OFFICE FOR RADIATION PROTECTION.
YOU SHOULD PRESERVE THIS REPORT FOR FURTHER REFERENCE.

EMPLOYER: HANFORD NUC SCULPTURE WKS

1991 ANNUAL REPORT

PROCESSOR: US DOSIMETRY TECH., INC.

JAMES ACORD
P O BOX 159
RICHLAND10-Mar-92
S42660A GEORGE WASH WAY
RICHLAND WASHINGTON 993

WA 99352

DOSES IN REM

For ACORD J Badge Number 00001 Loc Type F SS# 532-40-8427 Birthday 10/19/44 Freq Q PAGE

QUARTER	SHALLOW	DEEP	TIMES PROCESS IN YEAR	LIFE TIME (SHALLOW DEEP)	LPD
1	0.01	Min.			
2	Min.	Min.			
3	Min.	Min.			
4	Min.	Min.			
ANNUAL	0.01	Min.	4	0.05	145

THIS REPORT IS FURNISHED TO YOU UNDER THE PROVISIONS OF YOUR STATE OFFICE FOR RADIATION PROTECTION.
YOU SHOULD PRESERVE THIS REPORT FOR FURTHER REFERENCE.

United States Department of Commerce
National Bureau of Standards



Certificate of Accreditation

UNITED STATES TESTING COMPANY, INC.
Richland, WA

is recognized under the National Voluntary Laboratory Accreditation Program
for satisfactory compliance with criteria established in Title 15, Part 7 Code of Federal Regulations for:

providing specific Personnel Radiation Dosimetry Processing Services



Effective until October 1, 1989


For the National Bureau of Standards

Hanford Nuclear Sculpture Works
P.O. Box 159 - Richland, WA 99352
(509) 946-1572

APPLICATION
for
RADIOACTIVE MATERIALS LICENSE

Fee Code 24 - SNM/DU

by

James L. Acord, sculptor

SUPPLEMENT 13

FACILITIES AND EQUIPMENT

Hanford Nuclear Sculpture Works will work "on site" with the Breeder/Blanket Assemblies, from the time of my taking possession through the completion of the sculpture. Facilities and equipment needed throughout the project will be contracted for, constructed, leased or purchased on a "as needed" basis.

Considering the inherent structural safety of the twelve assemblies I do not anticipate the need for any special radiological equipment beyond good quality detection instruments (regularly calibrated) for routine monitoring and surveying.

The 12 Assemblies will arrive in sturdy shipping crates (see Supplement 6 (b) for data) which will be used to transport the sealed sources to the site. I anticipate moving each Assembly from its shipping container directly into place in the sculpture. If further security is needed (depending in part upon the exact site) portable storage containers can be rented.

Siemens AG and Siemens Nuclear Power Corp. are assisting me in transport of the 12 Assemblies. Both companies routinely work with similar assemblies and are fully equipped for this aspect of the project.

In a larger sense, I have the resources of the Hanford Nuclear Reservation to draw on in the event of the unforeseen. Should meteor strike or plane crash disturb the integrity of the sealed sources I could count on the immediate assistance of a large and experienced work-force to help me control the problem.

Radiological equipment I routinely keep on hand includes protective clothing, respirators, lead foil and sheet and a glove box. Additionally, I am well equipped with general construction and manufacturing tools.

Hanford Nuclear Sculpture Works
P.O. Box 159 - Richland, WA 99352
(509) 946-1572

APPLICATION
for
RADIOACTIVE MATERIALS LICENSE

Fee Code 24 - SNM/DU

by

James L. Acord, sculptor

SUPPLEMENT 14

RADIATION PROTECTION PROGRAM

I subscribe to ALARA in all work with radioactive materials as a general principal. By the time I take personal possession of the Assemblies, move them to site and commence construction on the sculpture, I will have consulted with Certified Health Physicists as to a suitable Radiation Protection Program for this undertaking and abide by the expert advice supplied me.

Considering the inherent safety of the 12 sealed sources, I do not anticipate a complex Radiation Protection Program (beyond my own ability and training). I do intend to up-grade my detection instrumentation before the arrival of the Assemblies; for routine monitoring and surveying of the site, work areas and the exterior of the Assemblies. Workers at the site, myself included, will be equipped with personal dosimeters. Protective clothing, respirators and any other recommended supplies will be available.

To date, everyone involved in the manufacture of these Breeder/Blanket Assemblies was covered in the Radiation Protection Program of their employment, as will be the workers involved in the transportation, shipment and off-loading to a storage area, through their employment within the nuclear industry (Siemens AG, Siemens Nuclear Power Corporation, et al).

Quality Assurance and leak tests are performed by the manufacture (see Supplement 6 (b)). Siemens Nuclear Power Corp. is licensed to take possession of the Assemblies and transport them from Germany to Richland, additionally performing all required surveys during transit. The Assemblies require no maintenance and should catastrophe require repair to the sources, I will consult the manufacture.

Hanford Nuclear Sculpture Works
P.O. Box 159 - Richland, WA 99352
(509) 946-1572

APPLICATION
for
RADIOACTIVE MATERIALS LICENSE

Fee Code 24 - SNM/DU

by

James L. Acord, sculptor

SUPPLEMENT 15

WASTE DISPOSAL

No radioactive waste is anticipated at any time in the creation of this work of art. The 12 Breeder/Blanket Assemblies will be used whole, in their entirety. After the completion of the sculpture they will have become a permanent work of art: to be preserved, maintained and cared for in perpetuity.

KRISTINE M. GEBBIE
Secretary



STATE OF WASHINGTON
DEPARTMENT OF HEALTH

Airustrial Center, Bldg. 5, LE-13 • P.O. Box 47827 • Olympia, Washington 98504-7827

July 14, 1992

James A. Acord
Radiation Safety Officer
HANFORD NUCLEAR SCULPTURE WORKS
Post Office Box 159
Richland, Washington 99352

Dear Mr. Acord:

We have received your application dated 7 July 1992. Your request for a Radioactive Materials License has been logged and issued Licensing Action Number 92-07-37 and is awaiting complete review by licensing personnel.

The Department Health has adopted a Local Government Notification Policy in response to a code revision enacted by the Washington State Legislature during the 1984 Session (House Bill 1153). The enclosed copy of a letter to your local city or county official explains this process. The original letter has been sent to your local official (along with a copy of the cover page of your license), but if you wish to speed up the process, you may approach your local official yourself.

If you have any questions regarding your request, please feel free to contact this office at (206) 753-4481.

Sincerely,

Anna M. White, Secretary
Radioactive Materials Section

amw
Enclosures

The urgency grew. Siemens set
deadline after deadline, after which
their offer would be withdrawn.

04066 03. AUG 92 16:16

Schnell-Brüter-Kernkraftwerksgesellschaft mbH
Gemeinsames Europäisches Unternehmen

Essen, 03.08.1992
Ho/Lo

T E L E F A X

Mr. James B. Edgar
Siemens Nuclear Power Corporation, Richland
Fax: 001-509-375 8402

Mr. James Acord
Hanford Nuclear Sculpture Works
Fax: 001-509-943 2612

Re: Shipment of 12 Blanket Assemblies to Siemens Nuclear Power Corporation

Dear Sirs,

I refer to the talks we had together with Mr. Koop and Mr. Krinninger during the coffee break at Hanford in July 1991, where the idea was born to use 12 SNR blanket assemblies for the sculpture Mr. Acord intended to create.

I understand from the correspondence between you and Mr. Krinninger that Mr. Acord expects to obtain the licence to take title to 12 blanket assemblies in August 1992.

I also understand that SNP is prepared to accept the assemblies. This will very much facilitate the export procedure, because in that case the passing of title from SNP to Mr. Acord will take place in the U.S.A.

It should be certain by the end of August 1992 at the latest that SNP will accept 12 assemblies and the title will then pass to Mr. Acord, so that the assemblies may be shipped at the beginning of September 1992. Otherwise it will be impossible to postpone again the scrapping of the assemblies, which has already been done several times.

An application for an international import certificate should be made by SNP. SBK will apply for an export licence. Before filing an application with the competent authority, I propose that we exchange copies of the application documents in order to compare the data.

I trust that you will agree to such a procedure, and I wish Mr. Acord every success in obtaining the licence.

If you have any questions, please contact

Mr. Hottenrott	Telephone: 201-185-2308	Telefax: 201-185-4313
Mr. Andres	Telephone: 201-185-3250	Telefax: 201-185-4313

Kind regards,

G. Hottenrott

Schnell-Brüter-Kernkraftwerksgesellschaft mbH



cc. Mr. Koop
Mr. Krinninger
Mr. Andres

James L. Acord, sculptor

Hanford Nuclear Sculpture Works
P.O. Box 159, Richland, WA 99352
USA

Telephone: 001 (509) 946-1572
Telefax: 001 (509) 943-2612

TELEFAX - 26 August, 1992

TO: Dr. Krinninger, SBK - Germany
Mr. Hottenrott, SBK - Germany
Mr. Andres, SBK - Germany
Mr. Jim Edgar, SNPC - USA

Re: LICENSING UPDATE
Shipment of 12 Blanket Assemblies to James Acord via Siemens
Nuclear Power Corporation, USA.

Dear Sirs,

My application for a Radioactive Materials License is still under review. Today I will meet again with a member of State Radiation Control. My initial 40 page License Application has been supplemented with 6 additional pages and 2 letters in the past months and, to date, no reason to reject my application has been found or expressed.

However, in spite of my constant attention to this matter, no date has been promised me for receiving this license. Yesterday I was told that writing my license "...might start on September 3 and be finished that week". In today's meeting I will press again for a fast resolve to this matter, yet I have no way to speed up the government.

Therefore the first week of September may be the earliest I could receive a written license. This is the date Mr. Hottenrott said the ship will sail in his FAX of 3 August. I may learn by telephone that I have been assigned a license before I receive a copy in the mail. Would it help International Import/Export certificate if I fax you my License Number and expiration date before I have a printed copy? Also, would a telephone call from a member of State Radiation Control to you saying I will receive a License in another week or two help?

The 12 Blanket Assemblies are a most important part of what will be a very important sculpture to the nuclear age. I very much appreciate all the help you are giving me in this matter and know I am doing everything possible to expedite this licensing.

*my best FAX of 1992
August*

TELEFAX (continued)

page 2 of 2

In Mr. Hottenrott's FAX of 3 August he suggested that Siemens Nuclear Power Corporation (USA) accept title of the assemblies from SBK in Germany and transfer title to Acord in U.S.A. Unfortunately this is not possible as SNP does not have a license to own Special Nuclear Materials. SNP does have a license for possession and it is this license (Washington State License # WN-IO62-1) that will allow SNP to generously transport and hold the assemblies for me.

As only a few days may make all the difference is it possible that SBK could transfer title to me after shipping is underway? SBK would retain ownership of the 12 assemblies while shipping them to SNP and, with my license issued, title could be transferred to me before the assemblies arrived at Hanford.

I have investigated other contractors and companies working at Hanford (Westinghouse, Battelle) and none have a license for taking title to Special Nuclear Materials/Depleted Uranium in quantity.

To create art with nuclear materials and technology is a new and unusual idea for the governments. I believe all good ideas seem strange at first and it is much to the credit and farsightedness of people like Andres, Edgar, Hottenrott, Krinninger and Koop that this project is still alive. When the sculpture is finished everyone will recognize it as a great idea who's time had come.

In the meanwhile, as a last resort, would it save the project if I come to Germany, take title of assemblies there?

With many thanks to all for your past help and the very important help I need now in the next week. If you have any ideas or questions please call or FAX me. For over two years this is my most important project and I continue to believe it possible.

Every best regards,

James L. Acord, sculptor

page 2 of 2

END OF TELEFAX

My initial license application was not accepted. Consultations and meetings with Department of Radiation Protection continued through July and August. I ~~filed~~ filed addenda to my license application (which became a part of the license) in an effort to meet the requirements.

Meanwhile, General AG postponed shipment a week at a time. Deadlines came and went.

Hanford Nuclear Sculpture Works
P.O. Box 159 Richland, WA 99352
(509) 946-1572

6 August 1992

Debra McBaugh, Radioactive Materials Section
DOH - Division of Radiation Protection
Airdustrial Park, Bldg 5
P.O. Box 47827
Olympia, WA 98504-7827

Dear Debra McBaugh,

Enclosed with this letter please find copies of two (2) supplements I wish to add to my APPLICATION FOR A RADIOACTIVE MATERIALS LICENSE (Fee Code 24 - SNM/DU), submitted to your Department on 8 July of this year.

The first supplement I wish to add goes with my APPLICATION's SUPPLEMENT 8: TRAINING AND EDUCATION (pages 31-33). This addition of four (4) pages is retro-fit with page numbers 33 a, 33 b, 33 c and 33 d, and documents my having successfully completed GENERAL RADIATION WORKER TRAINING - INITIAL on August 5, 1992. This training meets the requirements of DOE 5480.11, 10 CFR 20 (1991) as well as Title 246 WAC and NRC Regulatory Guides.

Secondly, I wish to add a one (1) page supplement to question #11 on my APPLICATION (no supplement previously existed). This supplement (with added page number of 34 a) shows a photocopy of calibration decals (dated 8/6/92) on the Heath-Kit instrument described in question 10 of my APPLICATION. Let me reiterate my intention to purchase a more sophisticated radiation instrument before I take possession of the 12 Breeder-Blanket Assemblies.

Again, if I can be of any further help, answer any questions or supply you with any other relevant material, please don't hesitate to call me: hm (509) 946-2484, machine 946-1572.

Very truly yours,

James L. Acord, sculptor

enclosures: Addition to SUPPLEMENT 8; 4 pages (pp 33a, b, c & d).
Addition to APPLICATION question #11; 1 page (pp 34a)

To: To Whom it may concern

From: Grant Ceffalo
Instructor, Radiation Worker Training
Battelle PNL
MISN P7-78
(509) 376-8830

 **Battelle**
Pacific Northwest Laboratories
P.O. Box 999
Richland, Washington U.S.A. 99352
Telephone (509) **376-8830**
Telex 15-2874

In response to your inquiry, James L. Acord, attended our *General Radiation Worker Training - Initial* on August 5, 1992. The topics covered included all topics required by DOE 5480.11 and the TRADE Guide to Good Practices. In addition, use of survey instruments to perform self-surveys for radiation contamination and dressing and undressing in radiation protective clothing was covered. A review of the pertinent regulations shows that this training also meets all requirements of 10 CFR 20 (1991), Title 246 WAC and NRC Regulatory Guides on the topic.

As Mr. Acord successfully completed the course, he is now a qualified radiation worker. This training is transferable to other sites if accompanied with documentation of training. I hope that you will find this letter adequate, as Battelle PNL currently has no "certificate" of training.

Thank you,



Grant Ceffalo
ALARA Coordinator

Training Attendance

 Lesson Plan Number SAP-RS-004 Rev. 1 Date 8-5-92

 Lesson Plan Title General Radiation Safety - Initial

 Overall Course Time 4 hours Retraining Date 8-94

(USE BLACK INK)

Signature	Printed Name	Payroll Number	Department
<i>Andrea B Taylor</i>	Andrea B Taylor	36751	Lab Safety
<i>Kathy Whittington</i>	Kathy Whittington	36560	WTC
<i>C. SURIYANARAYANA</i>	C. SURIYANARAYANA	-	Material Science
<i>Michael E. Barrows</i>	Michael E. Barrows	36718	D7D70
<i>Hope A Droppa</i>	Hope A Droppa	36779	Toxicology
<i>James D Brown</i>	James D Brown	36703	EMC
<i>Shari J. Crowner</i>	Shari J. Crowner	367571	Toxicology
<i>James L. Accord</i>	James L. Accord	Ø	self
<i>M. Greg Holthoff</i>	M. Greg Holthoff	36597 36597	Lab Safety
<i>Marceto Collantes</i>	Marceto Collantes	36611	Summer HIRS
<i>Lorin Peterson</i>	Lorin Peterson	36627	CSD
<i>Mark A. Brusseau</i>	Mark A. Brusseau	221435	NORCIS - RTL
<i>S.V. SIMENSON</i>	S.V. SIMENSON	36659	D4DS
<i>W A Haisler Jr</i>	W A Haisler Jr	36338	Toxicology
<i>Simon Korman</i>	Simon Korman	36725	Gen Ed.
<i>MD RIPPIN/Gail</i>	MD RIPPIN/Gail	36806	D4DS
<i>FM Newman</i>	FM Newman	36094	POJ
<i>Marc J Bernan</i>	Marc J Bernan	36961	Fac. Eng.
<i>Tara K Oziel</i>	Tara K Oziel	36069	Environmental Science

 Conducted by GM Cettulo 3660
 (Print Name) (Payroll Number)
GM Cettulo 8-5-92
 (Signature) (Date)

☐ Check to obtain credit for trainer attendance (first time presented only).

General Radiation Safety Training
(Initial SAF-RS-004 Refresher SAF-RS-002 Challenge SAF-RS-002)

Name: James L. ACORD

Date: 5 Aug 1992

Signature: 

Score: 100 (pass = 70%)

Payroll #: ~~0~~

Test Form: A

Instructor Signature: 

For each Question, circle the letter corresponding to the most correct answer.

- | | | |
|----------------------------|----------------------------|-------------------------|
| 1. <u>A</u> B C D E | 21. A <u>B</u> C D E | 41. A B C D E |
| 2. A <u>B</u> C D E | 22. A B <u>C</u> D E | 42. A B C D E |
| 3. <u>A</u> B C D E | 23. A B <u>C</u> D E | 43. A B C D E |
| 4. A B <u>C</u> D E | 24. A <u>B</u> C D E | 44. A B C D E |
| 5. A B <u>C</u> D E | 25. A B <u>C</u> D E | 45. A B C D E |
| 6. A <u>B</u> C D E | 26. A B C D E | 46. A B C D E |
| 7. A <u>B</u> C D E | 27. A B C D E | 47. A B C D E |
| 8. A B <u>C</u> D E | 28. A B C D E | 48. A B C D E |
| 9. A B C <u>D</u> E | 29. A B C D E | 49. A B C D E |
| 10. A B C <u>D</u> E | 30. A B C D E | 50. A B C D E |
| 11. A B <u>C</u> D E | 31. A B C D E | |
| 12. A B C <u>D</u> E | 32. A B C D E | |
| 13. A B <u>C</u> D E | 33. A B C D E | |
| 14. <u>A</u> B C D E | 34. A B C D E | |
| 15. A <u>B</u> C D E | 35. A B C D E | |
| 16. A B <u>C</u> D E | 36. A B C D E | |
| 17. <u>A</u> B C D E | 37. A B C D E | |
| 18. A <u>B</u> C D E | 38. A B C D E | |
| 19. A B C <u>D</u> E | 39. A B C D E | |
| 20. A B <u>C</u> D E | 40. A B C D E | |

Self-Survey Checklist

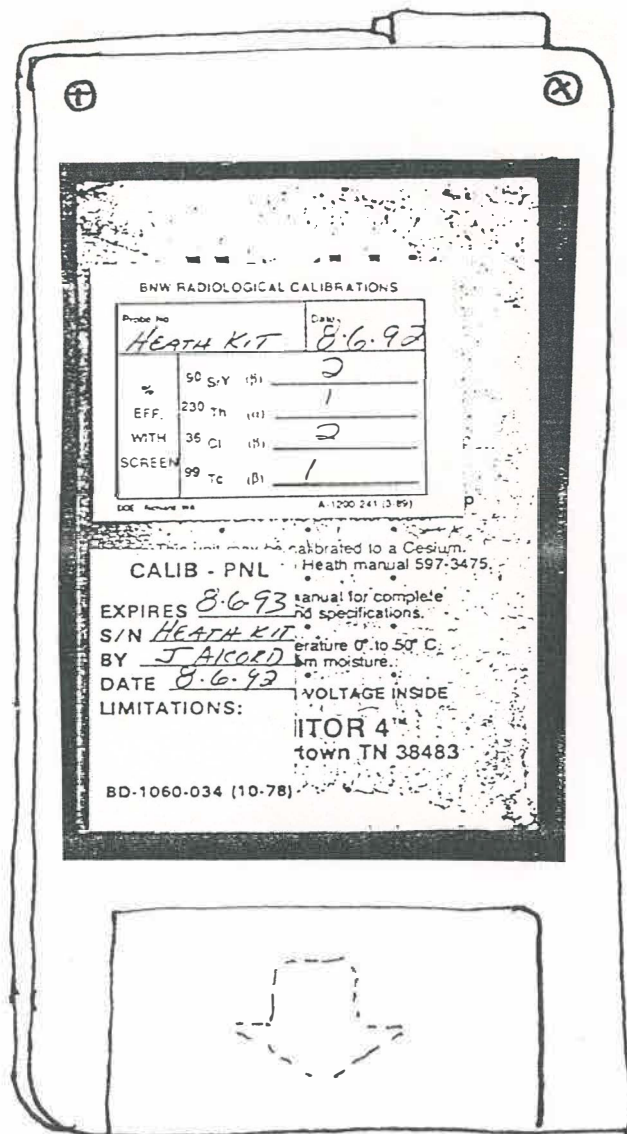
The instructor will place a mark in the blank when the objective is satisfactorily completed.

1. ✓ Checked and determined whether the instruments are within the calibration date.
2. ✓ Checked and determined whether the batteries are sufficient for operation.
3. ✓ Response checked the instruments to specifications.
4. ✓ Turned the instruments to the proper scale (X1) for self-survey.
5. ✓ Upon exiting, performed a hand survey without touching or cross contaminating the instruments.
6. ✓ Surveyed hands, feet, head, arms, legs and front properly.
7. ✓ Paid special attention to areas of contact, such as elbows, shoulders, rear, etc..
8. ✓ Performed survey at adequate rate and distance.
9. ✓ Turned instruments off when finished.
10. ✓ Used hand and foot monitor properly.
11. ✓ Knew response to a contamination alarm.

This radiation worker satisfactorily demonstrated and performed a proper self-survey.

Name: James L. Acord James L. Acord Date: 5 August 1992
Print Sign

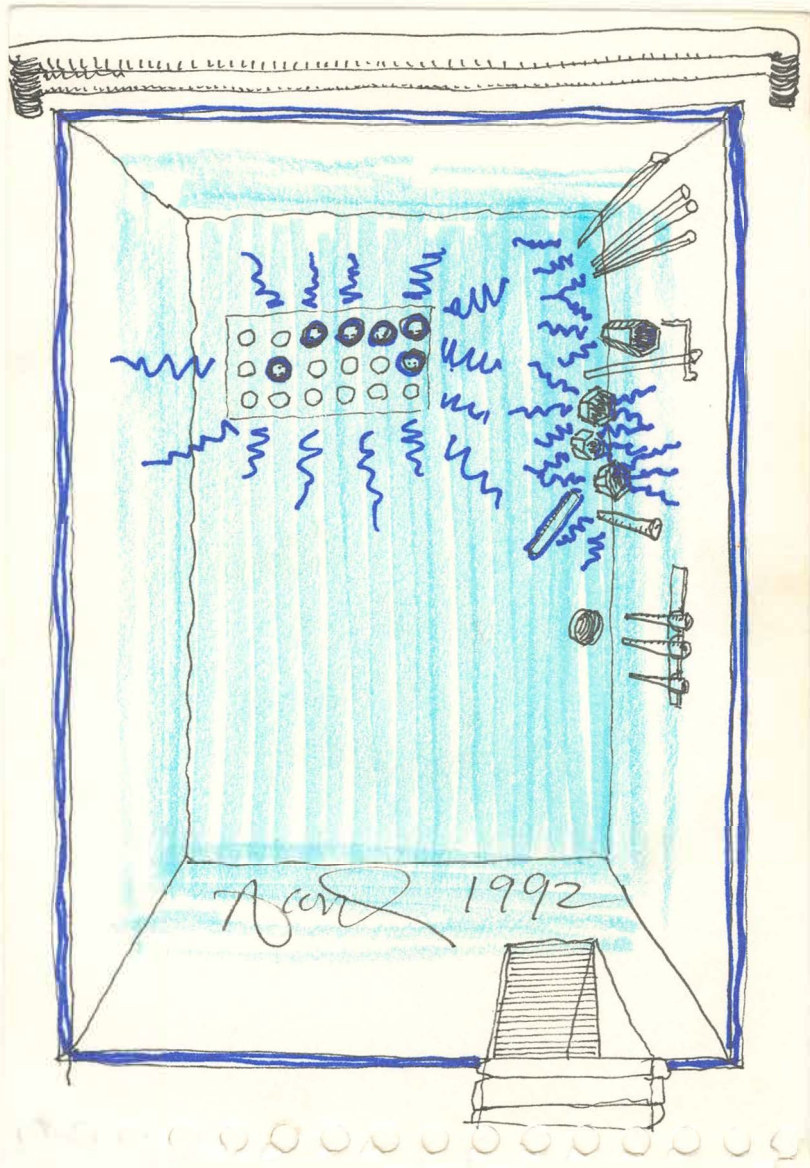
Instructor: Jean Buck Jean Buck
Print Sign



*This didn't fly.
Not the name of a
Registered Calibrator on
the sticker.*

HeathKit - Ratemeter 4

Calib - 8-6-92



Hanford Nuclear Sculpture Works
P.O. Box 159 Richland, WA 99352
(509) 946-1572

26 August 1992

Debra McBaugh, Radioactive Materials Section
DOH - Division of Radiation Protection
Airdustrial Park, Bldg 5
P.O. Box 47827
Olympia, WA 98504-7827

Dear Debra McBaugh,

Enclosed with this letter please find a copy of a letter from SIEMENS NUCLEAR POWER CORPORATION (S.N.P.C.) [dated February 25, 1992 and signed by James B. Edgar, Staff Engineer for Licensing] that supports my APPLICATION FOR A RADIOACTIVE MATERIALS LICENSE (Special Nuclear Material/Depleted Uranium), submitted to your Department on 8 July of this year and issued Licensing Action Number 92-07-37.

In our telephone conversation Monday (24 August, 1992) you suggested I supply your department with a statement from S.N.P.C. expressing their willingness to accept delivery of 12 Breeder-Blanket Assemblies from Siemens AG (Germany) and store them for me until I move them to the sculpture site. I believe the first sentence of this letter ("...Siemens Nuclear Power, ..., will take possession of (not title to) and store depleted uranium breeder blanket assemblies under its Washington State License, WN-1062-1.") clearly states this intention.

Additionally (also per our telephone conversation Monday) I hope to meet with you in Richland today to review my Application for a SNM/DU License. Again, if I can be of any help in expediting this matter, answer any questions or supply you with any other relevant material, please don't hesitate to call me: hm (509) 946-2484, machine 946-1572.

Very truly yours,

James L. Acord, sculptor

enclosure: Copy of letter from Siemens to Acord (25 Feb. '92)

CC: James B. Edgar, Siemens Nuclear Power (Richland)
Dr. Herbert Krinninger, SBK mbH (Germany)
Dr. Werner Koop, Siemens AG (Germany)
Mr. G. Hottenrott, SBK mbH (Germany)

James Acord, sculptor - P.O. Box 159
Richland, WA 99352 - (509) 946-1572
(hm) 946-2484

March 24, 1992

Debora McBaugh
Radiation Protection - Dept. of Health
Airdustrial Park - Building #5
P.O. Box 47827
Olympia, WA 98504-7827

COPY

Dear Debora McBaugh,

Thanks for all your help over the past month with the problems arising from my becoming the proud owner of 12 breeder-blanked assemblies. No sooner had I returned from my lecture in Alaska then my computer became sick and had to go to the Amiga hospital in Memphis, TN. Little did I realize how abjectly dependent I had become on my computer... I couldn't even find my old typewriter. Federal Express just returned it to me and I am writing you about securing a license for possession of depleted uranium.

From our telephone conversations in February I understand that my possession and eventual fine-art use of breeder-blanket assemblies containing depleted uranium might be covered under a WA State specific licenses for using depleted uranium for its mass and weight. This category sounds promising to me and I am asking you to send on to me all applicable application forms so that I may make a formal application to the State.

Mr. Jim Edgars of Siemens Nuclear Power Group (USA) has written me a letter (copy enclosed) describing the role his company will play in receiving the assemblies on my behalf. I am forwarding it on to the German National Authority concerned about Siemens AG's shipment of the assemblies to me and I am hoping this will prevent an expensive delay in the shipment from Germany. Yet, even if this works, I see the time-sensitive need to get a Washington State Licenses (recognized by U.S. NRC) for possession of depleted uranium in quantity.

In closing thanks for all the help you have been to date and for the time and consideration you may show in sending me all necessary information and forms toward a specific license.

Very truly yours,

enclosures: copy of letter from Siemens Nuclear Power Group.

SIEMENS

COPY

February 25, 1992

Mr. James Acord
P.O. Box 159
Richland WA 99352

Dear Mr. Acord:

Per our telephone conversation yesterday Siemens Nuclear Power, formerly Advanced Nuclear Fuels, will take possession of (not title to) and store depleted uranium breeder blanket assemblies under its Washington State License, WN-IO62-1. It is our understanding that there will be 12 such assemblies containing a total of approximately 984 kg of depleted uranium and they will be shipped during the first half of this year. It is also our understanding that you will take title to this material through a general license granted under the terms of 10 CFR 40.21 and that, prior to taking possession, you will obtain a Washington State License.

If I can be of further assistance, please contact me at 375-8663.

Very truly yours,



James B. Edgar
Staff Engineer, Licensing

JBE:clp

Siemens Nuclear Power Corporation

Regulatory Compliance

2101 Horn Rapids Road, PO Box 130 Richland, WA 99352-0130 Tel: (509) 375-8100 Fax: (509) 375-8402

Signed, duplicate, notarized copies
of Duties of the Radiation Safety Officer (RSO)
became the hurdle that would cause me to
miss my September 1st deadline from Siemens AG.
Days passed as the State tried to FAX
me a copy of this official form to one
Richland public FAX or another.

Hanford Nuclear Sculpture Works
P.O. Box 159 Richland, WA 99352
(509) 946-1572

August 31, 1992

Debra McBaugh, Radioactive Materials Section
DOH - Division of Radiation Protection
Airdustrial Park, Bldg 5
P.O. Box 47827
Olympia, WA 98504-7827

Dear Debra McBaugh,

Enclosed with this letter please find: 1); Two signed copies of ATTACHMENT B - DUTIES OF THE RADIATION SAFETY OFFICER (two pages, revision 1, April 1987) and, 2); Two signed copies of my two-page letter to you (dated 31 August 1992) in which I address the issues we discussed in our last meeting.

Regarding the problems your office experienced in FAXing me the RSO form, I'm at a loss as to all the explanations. The number I gave you Wednesday night was correct and the people at Eagle Printing claim to have had no trouble receiving other FAXs on both Friday and Monday (today). Anna M. White of your office was most helpful in continually re-trying to send this important document to me. After we began trying a different Richland FAX number (at Abadan on The Parkway) a power-outage shut down everyone for a few hours. In the end I received it just before the close of business hours.

Due to this delay, it is too late for this to go out in today's mail and I will express mail it to you tomorrow (September first). I hope it will be on your desk Wednesday although I understand you will not be able to start the writing of my license until Thursday, 3 September. I will telephone you on Thursday to be sure you have received this packet and to answer any questions you might have.

In closing, thank you for finding the time to meet with me on Wednesday, 26 August of last week. And thank you for your telephone calls of Friday, 28 August, 1992.

Very truly yours,

James L. Acord, sculptor

enclosures: Duties of RSO (2 signed copies).
License Application-supplemental letter (2 copies)

CC: J. Edgar, SNPC.
H. Krinninger, SBK.

Leave out the ones I've
crossed out

Revision 1
April 1987

ATTACHMENT B

DUTIES OF THE RADIATION SAFETY OFFICER

1. Make sure that all uses of radiation are conducted safely, adhere to the conditions of the license and license application, and result in exposures to personnel which are as low as reasonably achievable (ALARA).

2. Act as liaison agent with regulatory authorities, be available for assistance in inspection and audits, and notify the department:

A. In writing before making any change which would render the Application for Radioactive Materials License, Radioactive Materials License, Application for Registration (of radiation producing machines), or Notice of Registration no longer accurate.

B. Immediately in the event of any radiation accident or incident (including high dosimeter reading).

C. Within 5 days of any positive leak test result of a sealed source.

D. Within 30 days in a report stating remedial action taken after accident or incident.

3. Be familiar with all applicable regulations and regulatory guides, and assure that license applications are properly filled out and are submitted on time.

4. Make sure all ^{required} surveys, calibrations, and ^{per} leak tests are performed on time.

5. Establish and maintain record systems as applicable for radiation area surveys, wipe tests, leak tests, calibration of instruments, and personnel dosimetry reports.

~~6. If dosimetry is required, advise individual radiation workers of each high exposure report, and conduct a survey to determine the cause of all overexposures so as to preclude recurrence. Perform a quarterly review of occupational exposure to authorized users and workers to determine that the exposures are within the limits established for the ALARA program. Annually apprise each radiation employee of annual accrued dose.~~

7. Assure that individuals working with radiation have appropriate protective devices, ~~including shielding, ventilation, clothing, gloves, remote handling equipment (where necessary),~~ and facilities which aid in keeping exposures As Low As Reasonably Achievable (ALARA).

8. Procure and maintain an adequate number of operable and properly calibrated radiation survey instruments, of the appropriate range and type, and properly calibrated counting equipment (if applicant will assay contamination and leak tests).

~~9. Develop and maintain up-to-date operating and emergency procedures.~~

10. Perform, or cause to be performed, quarterly inventory of all sealed sources received or possessed.

Attachment B (Continued)

~~11. Post conspicuously "Notice to Employees" RHF-3 and notices of items of noncompliance resulting from department inspections.~~

~~12. Supply employers of terminated radiation personnel with radiation exposure records as required by regulation.~~

~~13. Establish and cause to be maintained inventory control of radioisotopes, making sure inventory never exceeds amounts licensed.~~

14. Keep, or cause to be kept, records of receipts of incoming isotopes and surveys of incoming and outgoing shipments.

15. Make sure that all incoming and outgoing radioactive shipments are properly packaged and labeled according to DOT requirements, and that shipments are accompanied by proper shipping papers.

~~16. Assure that radioactive materials are disposed of properly, and that records are maintained of all radioactive wastes disposed.~~

~~17. Perform an annual review of radiation safety program for adherence to ALARA concepts. Make sure that the safety program is followed by all workers dealing with radioactive materials. Investigate any deviation from the program, and take any remedial action necessary.~~

~~18. Schedule briefings and educational sessions to inform workers of radiation safety rules and procedures: 1) for all new personnel, 2) with each change in license condition or safety program, and 3) annually in a refresher course for all personnel. This includes instruction in the ALARA program and philosophy.~~

~~19. Apprise and inform management of radiation safety status and their responsibilities in maintaining an adequate radiation safety program.~~

20. *Contact Washington State Division of Rad. Protection in case of*
Take charge in all emergency situations (spills, or release of radioactive material, etc.) to make sure correct emergency decontamination and protection procedures are carried out. Also evaluate the situation that led to the emergency, to reduce the chance of further problems.

Emergency, including theft or fires
21. Assure that radioactive materials are used only by individuals authorized by the license.

22. Assure that radioactive materials are properly secured against unauthorized removal.

The RSD should have some formal training in radiological health (i.e., college level or its equivalent) and should have specific experience in radiation protection with the types, quantities, and use of the radioactive material to be used under the license.

you meet this so you could leave this in.

APPROVED BY

[Signature]
You sign it

DATE

Hanford Nuclear Sculpture Works
P.O. Box 159 Richland, WA 99352
(509) 946-1572

August 31, 1992

Debra McBaugh, Radioactive Materials Section
DOH - Division of Radiation Protection
Airdustrial Park, Bldg 5
P.O. Box 47827
Olympia, WA 98504-7827

RE: Licensing Action Number 92-07-37

Dear Debra McBaugh,

This letter is a supplement to my application for a Radioactive Materials License submitted to your department (Radioactive Materials Section) in July, this year. In this letter I will address the issues we discussed regarding my application for a SNM/DU License.

SURVEYS

Survey, prior to shipment: The 12 breeder-blanket assemblies (sealed sources) will be shipped from Germany packed 3 to a crate for a total shipment of 4 crates. The sealed sources and their packing crates will be surveyed before shipment by SBK (a subsidiary of Siemens AG) in compliance with all International Atomic Energy Agency and German National Authority survey requirements for export of special nuclear materials.

Survey upon arrival: Transportation and receiving of the 12 breeder-blanket assemblies (sealed sources) will be handled in Washington State by Siemens Nuclear Power Corporation (SNPC). SNPC will conduct a survey of the breeder-blanket assemblies upon arrival at SNPC's Richland, WA facility: 2101 Horn Rapids Road.

Periodic surveys: Siemens Nuclear Power Corporation will conduct surveys of the 12 breeder-blanket assemblies (sealed sources) on a quarterly (3 month) basis throughout the time SNPC has the sealed sources in their possession. I will keep detailed records of these quarterly surveys by SNPC (as well as the initial survey upon arrival) and assist the SNPC Radiation Safety Officer in any way requested. Furthermore, at such time as when the sealed sources pass into my physical control (moved from SNPC's Richland facility to the sculpture site for installation) I will continue with quarterly surveys and keep and maintain detailed records of these surveys. My surveys will be conducted with a new Beta-Gamma instrument (as yet to be purchased) that will receive regular licensed calibration from the manufacture.

SURVEY RECORDS

As the responsible Radiation Safety Officer (RSO) of *Hanford Nuclear Sculpture Works* (a sole proprietorship of James L. Acord, sculptor) I will keep and maintain detailed records of leak-test surveys on the 12 breeder-blanket assemblies (including the quarterly surveys conducted by SNPC while in their possession, the initial survey upon arrival in Washington State and the export survey by SBK prior to shipment from Germany) throughout the time they are in my ownership. Additionally, I will facilitate the eventual transfer of ownership of the 12 breeder-blanket assemblies, in the form of the finished sculpture, through supplying this (as yet unidentified) new owner with complete copies of the records of all leak tests on the 12 sealed sources. Also, I will give timely advance notice to the Radiative Materials Section of such transfer of ownership.

NOTIFICATION OF RADIOACTIVE MATERIALS SECTION

Let me state clearly at this time that I will keep Washington State Department of Health's Division of Radiation Protection - Radioactive Materials Section fully informed, in a timely fashion, as to the status, location, possession and ownership of the 12 breeder-blanket assemblies.

Arrival in Washington State: I will notify the Radioactive Materials Section (by letter and telephone) of the anticipated arrival date of the 12 breeder-blanket assemblies in Washington State as soon as shipping from Germany commences.

Movement from SNPC Facilities: I will give timely advance notification to the Radioactive Materials Section (by letter and telephone) of the movement of the 12 breeder-blanket assemblies from Siemens Nuclear Power Corporation's facility at 2101 Horn Rapids Road, Richland to the sculpture site; supplying additional information as to the method of transportation, radiation surveys in transit, security at the sculpture site, etc.

Accident: In the event of any accident, fire, loss or theft involving any of the 12 breeder-blanket assemblies, or any other event that threatens or calls into question the structural integrity of these sealed sources, I will notify the Division of Radiation Protection IMMEDIATELY by telephone and with a letter following.

Thank you for the time and consideration you continue to lend me in this matter.

Very truly yours,

James L. Acord, sculptor



Pursuant to the Nuclear Energy and Radiation Control Act, RCW 70.98, and the Radiation Control Regulations, Chapters 246-220 through 246-255 WAC, and in reliance on statements and representations heretofore made by the licensee designated below, a license is hereby issued authorizing such licensee to transfer, receive, possess and use the radioactive material(s) designated below; and to use such radioactive materials for the purpose(s) and at the place(s) designated below. **This license is subject to all applicable rules and regulations promulgated by the State of Washington Department of Health.**

1. Licensee Name	JAMES L. ACORD	3. License Number	WN-I0407-1
2. Address	P. O. Box 159 Richland, Washington 99352	4. Expiration Date	September 30, 1997
		5. Reference number(s)	92-07-37;92-08-12;92-08-40;92-09-04
6. Radioactive Material (element and mass number)	7. Chemical and/or Physical Form	8. Maximum quantity licensee may possess at any one time	

A. Uranium (Depleted in Uranium 235).

A. Uranium oxide, as sintered ceramic pellets, in breeder-blanket assemblies, manufactured by Siemens Brennelementewerk, a branch of Siemens AG Interatom. (Model/serial numbers YM 20N 001 C through YM 20N 012 C).

A. No single source to exceed 42 millicuries (1554 megabecquerels), 12 sources total.

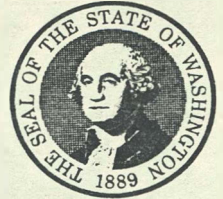
[illegible]

9. Authorized use.

A. For storage only.

10. Radioactive materials shall be stored at Siemens Power Corporation, 2101 Horn Rapids Road, Richland, Washington.
11. The licensee shall comply with the provisions of WAC 246-220 "General Provisions"; WAC 246-221 "Radiation Protection Standards"; WAC 246-222 "Radiation Protection - Worker Rights"; and WAC 246-235 "Specific Licenses".
12. The Radiation Safety Officer for this program shall be James L. Acord.
13. Radioactive material shall be stored under the supervision of James L. Acord and/or Siemens Power Corporation, operating under their Washington State Radioactive Materials license, WN-I062-1.

Radioactive Materials License



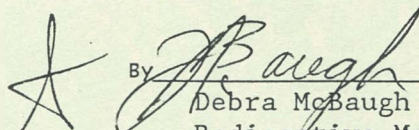
Page 2 of 2 Pages

License Number WN-I0407-1

14. The transport of licensed material by the licensee, or the delivery of licensed material to a carrier for transport, shall be in accordance with WAC 246-232-090 "Transportation."
15. The licensee's emergency procedures shall conform to procedures outlined in the Washington State Radiation Emergency Handbook revised November 1991, or subsequent revisions.
16. Contamination and dose rate surveys shall be done of each breeder/blanket assembly, upon receipt, and quarterly thereafter. Records of these surveys shall be kept by the Radiation Safety Officer and made available for inspection by the department upon request.
17. The Department shall be informed:
 - 1) prior to removal of the breeder/blanket assemblies from Siemens Power Corporation, and
 - 2) prior to any work on the assemblies including, machine work, processing, refabrication, or modification of the assemblies.
18. A physical inventory shall be done every 6 months to account for the 12 breeder assemblies. The records of these inventories shall be maintained for inspection by the department.
19. Except as specifically provided by this license, the licensee shall store radioactive material described in Items 6, 7, and 8 of this license in accordance with statements, representations and procedures contained in the documents listed below. The department's "Rules and Regulations for Radiation Protection" shall govern the licensee's statements in applications or letters, unless the statements are more restrictive than the regulations.
 - A. Application and attachments dated July 7, 1992.
 - B. Letter and attachments dated August 6, 1992; letter dated August 26, 1992 with attached letter dated February 25, 1992; and letter and attachments dated August 31, 1992, including another letter dated August 31, 1992, RE: Initial application.

FOR THE STATE OF WASHINGTON DEPARTMENT OF HEALTH

Date September 4, 1992

By 
Debra McBaugh
Radioactive Materials Licensing

RUSH - Most URGENT!!!

JAMES L. ACORD, SCULPTOR

HANFORD NUCLEAR SCULPTURE WORKS - P.O. BOX 159
RICHLAND, WA - 99352 - TELEPHONE (509) 946-1572
USA

TELEFAX (509) 943-2612

FAX COVER SHEET

To FAX Number: 011 49 (2204) 843045

Date: 4 September 1992 - Friday

Attention: Dr. H. Krinninger / N221

From: J. ACORD - Artist

TOTAL PAGES INCLUDING COVER SHEET: 2

LICENSE NUMBER: WN-10407-1

Additional Comments: Today I was issued this
License number for ownership of Special Nuclear
Materials / Depleted Uranium by State of
Washington, License also good with U.S. NRC.
Because of Weekend and U.S. Holiday on

FAX → ACORD to Krinninger - (page 2)

Monday, I will not receive official copy in the mail until late next week. I will mail you notarized copy of written license by fastest means available when I receive it in the mail.

Getting this license has taken much longer then it was suppose to and required great effort - I hope it has come in time.

I will write you soon but right now let me thank you for all your great help and patience in this matter.

Tonight I will drink a Beck's Beer to celebrate License # WN-10407-1.

All best regards,

J. Agon

Telefax 0201/185 - 4313
0201/185 - 4499
0201/185 - 2761
0201/185 - 3269

von Herrn ~~Reich~~ Gerhard Hottenrott
Abteilung KK-VN
Telefon 0201/185 - 2308

E I L T

Nachfolgendes Schreiben (.....6.....Seite(n) bitte sofort weiterleiten an

Herrn ~~Reich~~ James L. Acord
Hanford Nuclear Sculpture Works
Richland, Washington
Telefax-Nr. 001-509-943-2612

Vielen Dank.

Sollten Sie die Seiten nicht vollständig erhalten, rufen Sie uns
bitte zurück: Telefon 0201/185 - 2367

Should this telecopy be incomplete, please call
Telephone 0201/185 - 2367

Mit freundlichen Grüßen
Sincerely Yours



RWE ENERGIE AG

734 P01

SCHNELL-BRÜTER-KERNKRAFTWERKSGESELLSCHAFT

MIT BESCHRÄNKTER HAFTUNG

GEMEINSAMES EUROPÄISCHES UNTERNEHMEN

Mr. James L. Acord
Hanford Nuclear Sculpture Works
P. O. Box 159
Richland, Washington 99352
U.S.A.

Our Ref.: Ho/Lo
Telephone: (0201) 185-2308

Essen, 09.10.1992

Re: Transfer of Title and Ownership of Twelve SNR Blanket Assemblies

Dear Mr. Acord,

We are pleased to hear that you have succeeded in obtaining from the State of Washington the licence to receive, possess and use twelve SNR blanket assemblies. We know by our own experience with licensing authorities how difficult this procedure must have been.

In order to effect the formal transfer of title and ownership from SBK to you, we enclose an appropriate agreement, which is to be signed by you and SPC as a proof that they have knowledge of this agreement.

Mr. Andres has scheduled the shipment of the blanket assemblies about 4 to 6 weeks after receipt of the International Import Certificate for the U.S.A., i. e. probably early December 1992 (an application for the IIC will be made by SPC). We intend to ship the assemblies by air.

For formal reasons your consent to the transfer of title and ownership is required by 12 October 1992. We therefore ask you to send us by that date a facsimile of the agreement duly signed by you and SPC. Two original copies may be mailed to us later.

I received this on the 11th.

häftsführung:
er Koop (Vorsitzender)
aniel Koths
rich Mutschler

Sitz der Gesellschaft:
Essen - Eingetragen beim
Amtsgericht Essen
Handelregister-Nummer
HRB 2200

Essen:
Kruppstraße 5
4300 Essen 1
Telefon: (0201) 185-1
Telefax: (0201) 185-4313

Kalkar:
Postfach 1262
4192 Kalkar 1
Telefon: (028 24) 14-1
Telefax: (028 24) 14-21 09

Commerzbank AG, Essen
Deutsche Bank AG, Essen
Dresdner Bank AG, Essen
Westdeutsche Landesbank, Essen
Sparkasse Kleve
Volksbank e. G. Kalkar

Kto.-Nr. 1 429 778	BLZ 360 400 39
Kto.-Nr. 2 511 343	BLZ 360 700 50
Kto.-Nr. 4 223 044	BLZ 360 800 80
Kto.-Nr. 5 411 053	BLZ 360 500 00
Kto.-Nr. 5 105 606	BLZ 324 500 00
Kto.-Nr. 6 793 010	BLZ 324 634 07

We should appreciate if you would keep us informed about your project and submit to us a sketch of it. Has it been decided yet where your sculpture will be erected?

Yours sincerely,

Schnell-Brüter-Kernkraftwerksgesellschaft mbH
Gemeinsames Europäisches Unternehmen



ppa D

Enclosures

four original copies

Mr. James L. Acord
Hanford Nuclear Sculpture Works
P. O. Box 159
Richland, Washington 99352
U.S.A.

Our Ref.: Ho/Lo
Telephone: (0201) 185-2308
Essen, 09.10.1992

Re: Letter Agreement between SBK and Mr. James L. Acord for the Takeover of
Twelve SNR Blanket Assemblies

Dear Mr. Acord,

The subject of this Agreement is the takeover by Mr. James L. Acord of twelve
SNR blanket assemblies. The terms of this Agreement are as follows:

1. Quantity and Material Characteristics

The total number of fuel assemblies to be supplied under this Agreement are
twelve blanket assemblies designed for the Fast Breeder Reactor SNR 300,
fabricated by Siemens AG, Brennelementewerk Hanau, consisting of rods
filled with UO_2 pellets made of depleted uranium, hereinafter referred to
as the "Material", as described in Annex 1.

2. Delivery and Transportation

The Material shall be delivered to Siemens Power Corporation (SPC), 2101
Horn Rapids Road, Richland, Washington, in transport containers provided by
SBK.

SBK shall deliver the transport containers F.O.B. SPC. The date of delivery shall be notified to Mr. Acord and SPC not later than two weeks before delivery of the Material.

3. Transfer of Title and Ownership

Title to and ownership of the Material and its containers shall pass from SBK to Mr. Acord upon delivery of the Material at the SPC site.

4. Price

The Material shall be delivered to Mr. Acord free of all charge.

5. Transfer of Risk and Liability

Risk of loss or damage to the Material and its containers and third party liability shall pass from SBK to Mr. Acord at the moment the transport vehicle finally stops for unloading at the SPC site.

6. Governing Law

This Agreement is subject to German law.

If the terms of this Agreement are acceptable to you, please return two original copies to us duly signed by you and SPC.

Yours sincerely,

 Schnell-Brüter-Kernkraftwerksgesellschaft mbH
Gemeinsames Europäisches Unternehmen

 ppa 

I agree to the contents of this Agreement.

James L. Acord



Signature

28 October 1992

Date

We confirm that we have knowledge of this Agreement.

Siemens Power Corporation



Signature

10/28/92

Date

metal/cerami
conversion

Assembly Identification Number	UO ₂ -weight [g]	U-weight [g]	U235-weight [g]	U235/U [%]	U/UO ₂ %
YM. 20N 001 C	92626	81631	193	0,2365	38,13
YM. 20N 002 C	92669	81669	193	0,2360	38,13
YM. 20N 003 C	92607	81615	201	0,2463	38,13
YM. 20N 004 C	92616	81622	194	0,2377	38,13
YM. 20N 005 C	92586	81596	193	0,2360	38,13
YM. 20N 006 C	92558	81571	193	0,2367	38,13
YM. 20N 007 C	92633	81637	193	0,2360	38,13
YM. 20N 008 C	92550	81564	199	0,2440	38,13
YM. 20N 009 C	92617	81623	200	0,2451	38,13
YM. 20N 010 C	92640	81644	193	0,2360	38,13
YM. 20N 011 C	92584	81594	201	0,2464	38,13
YM. 20N 012 C	92436	81464	202	0,2480	38,13

James Acord, sculptor - P.O. Box 159
Richland, WA 99352 - (509) 946-1572
USA

October 28, 1992

Gerhard Hottenrott
RWE Energie - KK-VN
Postfach 10 31 65
4300 Essen 1
Germany

COPY

Dear Mr. Hottenrott,

Enclosed with this letter please find two signed copies of the three-page Agreement regarding my takeover of Title and Ownership of twelve SNR Blanket Assemblies. These are copies that arrived by mail this week in a package of four, all signed by representatives of SBK. Mr. James B. Edgar of Siemens Power Corporation (USA), and myself have signed all four today. Mr. Edgar has retained one copy as have I.

I am very pleased that the formal Licensing, Export and International Import Certificate will soon be completed and that shipment of the twelve assemblies will take place, possibly in December. The incorporation of the Assemblies into a sculpture of the Nuclear Age is a most important part of this art-work and has created many problems never before found in sculpture. Only the great help of you, Mr. Andres, Mr. Jim Edgar at SPC, Dr. Koop and Dr. Herbert Krinninger has made this generous transfer possible. I thank you for all your help in this complex and unusual matter of creating art.

As to your inquiry about the site for this sculpture: It has not been exactly decided on. It will be found somewhere on or near the Hanford Nuclear Reservation; an area associated with the history of the nuclear age. This, too, is complex and I am meeting with the County Commissioners (of Benton County which contains the Hanford Nuclear Reservation) next week. Also, I am working on a scale model of the sculpture and a set of presentation drawings. When this material is completed I will send you a full set of copies, along with all continuing information as it develops.

In the meanwhile thank you for all your help to me in this matter and let me know if I can supply you and Mr. Andres with any further information.

Yours sincerely,

James L. Acord, sculptor

CC: Mr. James B. Edgar, SPC



Internal Memo



Telefax Message

From Krinninger / N221

Our Ref.

To HANFORD NUCLEAR SCULPTOR WORKS

Your Ref.

For the attention of Mr. James Acord

Fax - No. 001 509 943 2612

Date Sept. 11, 1982

Copy to

Subject SNR 300 BREEDER / BLANKET ASSEMBLIES
FOR "NUCLEAR AGE SCULPTOR"

DEAR MR. ACORD,

CONGRATULATIONS TO YOUR SUCCESS IN
APPLYING FOR THE RADIOACTIVE MATERIAL'S
LICENSE.

THE DONATION OF 12 BREEDER ASSEMBLIES
TO YOUR SCULPTOR BY SBK IS NOW BECOMING
A REALITY. THAT'S A REAL BIG EVENT AND
WILL HOPEFULLY STIPULATE OTHER ORGANISATIONS
TO SUPPORT YOUR PROJECT.

RECENTLY ALL ACTIONS HAVE BEEN
LAUNCHED BY SBK AND ALSO BY SIEMENS POWER
CORPORATION, RICHMOND TO CLEAR THE
ADMINISTRATIVE PROCEDURES (EX-AND IMPORT
LICENCES) NECESSARY PRIOR TO SHIPMENT.

CURRENT PROJECTIONS PREDICT TRANSPORT
OF ASSEMBLIES TO SPK, RICHMOND FOR THE
SECOND HALF OF OCT. 92

Signed Det. Krinninger and J. Krinninger

Dept. N221 Extn. 3808

Name J. Krinninger

Sheet 1 of 1 Sheets

In December I managed to
trade art-work for the radiation
detection instruments and calibration
I needed to fulfill my
Jewish requirements.

Hanford Nuclear Sculpture Works
P.O. Box 159 Richland, WA 99352
(509) 946-1572
WN-IO407-1

December 15, 1992

Debra McBaugh, Radioactive Materials Section
DOH - Division of Radiation Protection
Airdustrial Park, Bldg 5
P.O. Box 47827
Olympia, WA 98504-7827

Dear Debra McBaugh,

I write you at this time to bring my license up to date with the addition of information on new radiation detection instruments available to me as Radiation Safety Officer (RSO).

CALIBRATED INSTRUMENTS: I am in possession of two (2) calibrated G-M instruments (a Victoreen model CD V-700 for contamination/count-rate survey and a Heathkit RM-4 for exposure rate survey). These instruments were calibrated by Northwest Radiation Instrument Calibration Facility and copies of both calibration reports accompany this letter. I will keep the calibration of these two instruments current with regular calibration at Northwest Radiation Instrument Calibration Facility.

ADDITIONAL INSTRUMENTS: Two (2) Victoreen model CD V-715 (ionization chamber) radiological survey meters, four (4) model CD V-742 pencil dosimeters and a model CD V-750-5b dosimeter charger. Enclosed with this letter please find a complete list of all radiation detecting instruments in my possession and related to my duties as Radiation Safety Officer.

As of this writing I have no dates on the expected arrival time of the twelve breeder-blanket assemblies. I received a telephone call from Dr. Hottenrott of *RWE Energie* (Germany) on November 23 saying the U.S. Department of Commerce International Import Certificate had been issued, arrived in his office and everything was now in order for issuance of a German export license. Dr. Hottenrott stated he believed this license would be issued within two weeks.

In closing, thank you for the copy of the Handbook of Radiation Emergency. I will call as soon as I hear something.

Very truly yours,

James L. Acord, RSO & sculptor

enclosures: Radiation Instruments Documentation - 4 pages.

Hanford Nuclear Sculpture Works
P.O. Box 159 Richland, WA 99352
(509) 946-1572
WN-IO407-1

December 15, 1992

RADIATION DETECTION INSTRUMENTS INVENTORY

Radiation Safety Department
James L. Acord, RSO

Detection Instruments

(1) Victoreen, model CD V-700, Count Rate Survey Meter.
Instrument calibrated for counts per minute (cpm), scale to
30,000 cpm, external geiger-tube probe with rotating beta window,
used for contamination surveys.

serial # 60875
calibration report number: 92-3280
current calibration expires: 12-09-93

(1) Heathkit, model Rate Meter 4, Exposure Rate Survey Meter.
Instrument calibrated mR/hr, scale to 50 mR/hr, internal geiger-
tube with open mica window of 1.5 mg/cm², used for exposure rate
surveys.

serial # 595-3475-04
calibration report number: 92-3707
current calibration expires: 12-09-93

(2) Victoreen, model CD V-715, High Level Radiological Survey
Meters. Internal ionization chamber, scale to 500 R/hr, these
instruments are in working order but not currently calibrated.

serial # 141537
serial # 171709

Dosimeters

(4) Bendix, model CD V-742, Pencil Dosimeters. Scale to 200 R.
All in working order.

serial # 0267959
serial # 0269186
serial # 0273213
serial # 0894646

(1) I.E.H. Corp., model CD V-750-5b, pencil dosimeter Charger.
In working order.

serial # 0128422

Account S42, United States Dosimetry Technology, Inc., personal
dosimetry services for Hanford Nuclear Sculpture Works (since
1987). TLD Hanford-style 5 chip, quarterly reporting period.

NORTHWEST RADIATION INSTRUMENT CALIBRATION FACILITY

NRICF FORM 00-04-00(6/86)

REPORT OF CALIBRATION

Count Rate Survey Meter

Please complete one form for each probe calibrated

Calibration Report Number: 92-3286

Calibration performed for: Accord
P.O. Box 159
Richland wa.
99352

Client Reference Number: _____

Detector Information

Manufacturer: Victoreen
Model: CBV 700
Serial Number: 60875

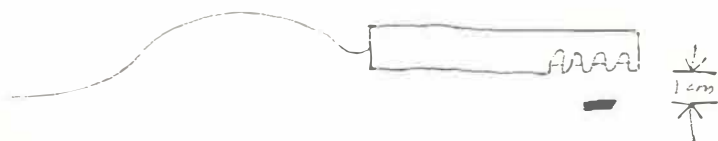
Probe Information

Manufacturer: _____
Model: _____
Serial Number: _____

Calibration Results

Battery OK on Delivery? Y N
Meter Response Linear (within $\pm 10\%$)? Y N
High voltage (bias) on chamber (volts): 739

Radiation Source	Radiation Emitted	Energy KeV	Activity (uCi)	Meter Reading cpm	Efficiency (CPM/DPM)	Efficiency (CPM/Nanocurie)
background	—	—	—	12	—	—
C-14	β	156.5	0.158	20	Can't detect	Can't detect
CS-137	β	714	0.0187	500	0.01	26
I-129	γ	40	0.101	30	0.0001	0.2
Setup: CS-137	γ	662	0.930	350	0.0002	0.4



Comments

"This calibration was performed using a procedure which is ☐ is not ☒ included in the Scope of Accreditation issued by the Conference of Radiation Control Program Directors, Inc."

(Please see back of report)

Calibration Performed By: Eric Smith Date: 12-9-92

NORTHWEST RADIATION INSTRUMENT CALIBRATION FACILITY

REPORT OF CALIBRATION

GM Exposure Rate Survey Meter

NRICF FORM 00-05-00(6/86)

Calibration Report Number: 92-3707

Calibration Performed For: Accord

PO Box 159

Richland W.V. 26352

Client Reference Number: _____

Detector Information Probe Information

Manufacturer: Hatch Kit
Model: RM-4
Serial Number: 595-3425-04

Manufacturer: _____
Model: _____
Serial Number: _____

Calibration Results

High voltage (bias) on chamber (volts): 468
Battery OK on delivery? ☒ Y ☐ N

Radiation Source	Beam Energy (keV)	Exposure Rate (mR/hr)	Range mR/hr	Observed Reading (mR/hr)	Correction Factor (true/observed)
Cs-137	662	35	50	34.0	1.03
		15		14.0	1.07
		35		3.40	1.06
		1.5		1.50	1.07

Background (units: mR/hr): 0.10

Setup: 1 meter



Comments:

"This calibration was performed using a procedure which is ☒ is not ☐ included in the Scope of Accreditation issued by the Conference of Radiation Control Program Directors, Inc."

(Please see back of report)

Calibration Performed By: Mike Smith Date: 12-9-92
Calibration Report Checked By: Mike Smith Date: 11 Dec 1992

Victoreen CD V-900 - serial number # 60875

Northwest Radiation Instrument Calibration Facility

CALIBRATED

Calibration Date 12-9-92 By S

Serial No. 60875

Source	Rad.	Energy	cpm/nanocuries
C-14	β	156.5	can't detect
C1-3C	β	714	26
E-129	γ	40	0.2
C1-137	γ	662	0.4

Source to Detector Distance—1 centimeter

Next Calibration Due 12-9-93

NRICF Form 04-04-00



Calibrated Instruments - as of December-15th 1992
Hanford Nuclear Sculpture Works - P.O. Box 159 - Richland, WA 99352
RML # WN-10407-1 - James L. Acord, RSO

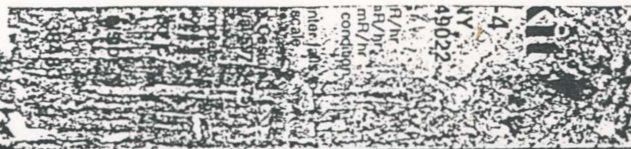
Northwest Radiation Instrument Calibration Facility

CALIBRATED

Calibration Date 12-9-92 By th

Serial No. Heathkit RM-4

NRICF Form 04-00-00



Heathkit RM4 - serial number # 595-3475-04

Jan, 1993

As I install Chronicals at the
Hoffman Gallery the shipment is
beginning in Germany.

James L. Acord, sculptor

Hanford Nuclear Sculpture Works
Radioactive Materials License: WN-IO407-1
P.O. Box 159, Richland, WA 99352
USA

Telephone: (509) 946-1572
Telefax: (509) 943-2612

December 20, 1992

Dear Dr. Krinninger,

I write you at this time to wish you all the best in the coming New Year. Your generous assistance to my art-work in the past two years has made a significant contribution to integrating the Nuclear Age into the broad fabric of human affairs, as well as my sculpture.

To date I have not heard any details about shipping arrangements of the 12 Assemblies although Mr. Hottenrott telephoned November 23 to say the U.S. Department of Commerce had issued the International Import License.

At present I am creating a scale model of the Nuclear Age Sculpture that will incorporate the 12 SBK Blanket Assemblies. When the model is finished I will send you photographs of it.

In the meanwhile I would like you to accept this 1/24th scale model of a Blanket Assembly as a token of my appreciation for all the help you have been and the honor you have shown me.

With every best wish for this holiday season, I remain

Very truly yours,

James L. Acord, sculptor

enclosure: 1 = 24 scale model of SBK Blanket Assembly.

30.12.92 13:59

RWE ENERGIE AG

850 P01

06145 30.DEZ 92 14:04

RWE Energie AG
KK-VN

Essen, 30.12.1992
Ho/Kt

T e l e f a x

Mr. James Acord
Hanford Nuclear Sculpture Works

Nr.: 001-509-943 2612

Dear James Acord,

Thank you very much for your letter of 20 December 1992 and the scale model.

All arrangements concerning the shipping of the 12 Assemblies have been made.
The export license is available.

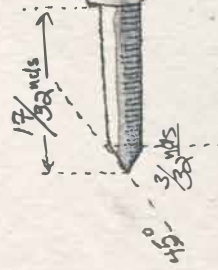
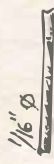
Transport will start on 6 January 1993. This date has been agreed with
Mr. James B. Edgar, SNPC, Richland.

With all best wishes for the year 1993.

Very truly yours,



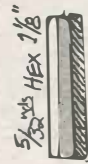
G. Hottenrott
RWE Energie, KK-VN



1/24th scale



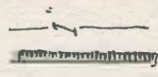
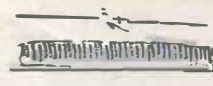
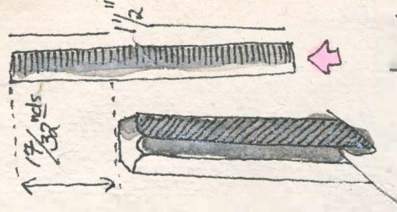
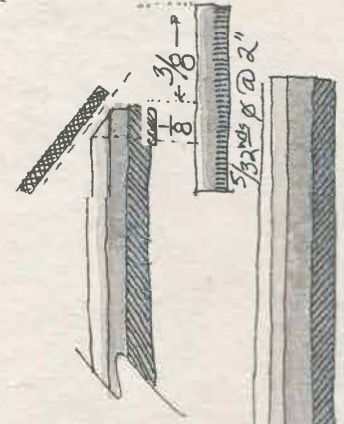
SBK Blanket Assemblies



PROD

3/16" Hex @ 5 9/16"

Body fitted @ 5 9/16"



Jan 1992

CK Sequence

① Trimmed paper conv

check for all good
orange paper

~~1 orange sheet~~
~~add 2 page K FAX of Feb~~ ★
6 pages of copy

1 orange sheet

2 FAX copy

1 orange sheet

initial licence (4 pages) check for order and orientation ✓

✓ orange sheet

2 - 2 page FAXs (4 pages)

1 orange sheet

6 pages of Supplement of 6 August Add new Heathkit 11 ★
1 sheet trimmed drawing paper ✓

Supp of 26 Aug (3 sheets)

1 orange sheet

Supp of 31 Aug (5)

green Licence (2)

my FAX (2 page)

Kriemhild FAX (1 page)

3 pager from Hottelrott (to make first) ★

1 orange sheet

supp of 15 Dec - (5)

1 orange

2 page - ~~let~~ lett to K and FAX in Dec on 6 JAN

1 drawing paper This one Block w/ word

BOOK 92

letterhead date - 5 October 92

7NF.8

nf. 9 - 16 Oct

March 24th 1992

Rebora. 2

Fax. 1 - 26 August

hottenrott. 1 15 Oct

notenrott. 1b 28 Oct

Kirner. 4 5 October

Krinninger. 6 - 4 October

Krinninger. 7 16 October

new92.1 (letter to Edgar - 30 May '92

Book - License

Look for Letters and FAX's that mention License s

Pre July 199 - (The K letters - Edger - McBarry)

License
Lettr to Del - 8 July

Transcription of FAX of 14 February

SUBJECT SNR 300 Breeder Assemblies

Ref: Transport of 12 Assemblies to Richland
for integration into your sculpture of the
"Nuclear Age" - man's track from stone age to
nuclear age.

Dear Mr. Acord,

I hope the new year will offer new opportunities
to meet and to continue the direction of the
planned sculpture. For sure SBK's offer to use
as needed the 12 breeder assemblies of SNR 300
in the set-up of the final arrangement of
structures is an important contribution to your
work and will allow for additional public support
according to the shared cost (?...can't read).

Proceeding with the preparations to ship the
assemblies to the US we were instructed by the
national authority responsible for granting of
the export license, that we need a certified copy
of your license to take title of depleted uranium
in the quantities contained in the 12 breeder
assemblies (appr. 82 kg U metal per assembly,
U 235 content 0.2%). Important is that the
holder of the license, namely your name appears
on the transmitted copy.

Could you please send the required documents as
soon as possible.

Certification of copy cannot be performed by an
unauthorized body or entity.

Many thanks in advance and best regards.

H. Krinninger

Lengthy telephone negotiations with the United States Nuclear Regulatory Commission and Washington State Department of Radiation Protection determined that my ownership of depleted uranium would not require a specific license until I actually began to work with the Breeder-Blanket Assemblies. In the interim, possession would be covered by Siemens Nuclear Power Corporation's (of Richland) license.

This hesitance on the part of regulators to issue me a specific license and the desire of Siemens AG to commence shipment reached criticality when the German government refused to grant Siemens an export license until I held an internationally recognized license to own nuclear materials.

An urgency grew for me to secure a license to take ownership and possession of the 12 Breeder Blanket Assemblies.

hand write one side of orange

*(cut and paste FAX translation
on other side)*

on July 8th

After considerable consultations with the state of WA dept. of Rad. Protection I filed the following application for a Special Nuclear Materials/~~Depleted Uranium~~ - fee code ~~24~~ license on ~~July 8th~~. This license, I was told, would take 4 to 6 weeks.

will hand write - sp ck once, no print.

My initial license application was not accepted. Consultations and meetings with Washington State Dept. of Radiation Protection commenced continued through July and August. I filed addenda to my initial license application (which became a part of the license) in an effort to meet the requirements.

Meanwhile Siemens postponed shipment a week at a time. ~~Finally and set deadlines. from Siemens grew.~~

deadlines came and went

hand write in Book

Signed, duplicate, notarized copies of Duties of the
Radiation Safety Officer (RSO) became the hurdle that would cause
me to miss my September 1 st deadline from Siemens AG. Days
passed as the State tried to FAX me a copy of this official form
to one Richland public FAX or another.

Hand write in book

The urgency grew. I learned that the French government (~~FRAMATOM, the wholly owned nuclear subsidiary of the French government~~) was vying to purchase all SBK breeder-blanket assemblies available. ~~My shipment of 12 assemblies was included with that of FRAMATOM, whose paper work was together, and now my lack of a license might be holding up a ship load of blanket assemblies.~~ Siemens AG set a deadline (again) after which their offer would be withdrawn.

had offered

and my 12 Assemblies would be sold to the French.

caused

were write, speak & print

In December I managed to trade art-work for the radiation detection instruments and calibration I needed to fulfill my license requirements.

Hand write

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Component (Material)	Indications	Unit	Value
foot (1.4981)1)	length number of triangular cooling inlets outer diameter of the piston ring	mm - mm	~ 500 6 ~ 85
UO ₂	quantity/assembly quantity/pin	N	~ 925.5 ~ 15.2
U-5	enrichment (depleted uranium)	weight%	0.23 - 0.24
U-8		weight%	~ 99.76
UO ₂ -form: pellets	diameter density height	mm &theoret.	10.3 95 1.4 x diameter
U-metal mass: max: 82.2 kg/ass.	max. activity of one fresh SNR-300 blanket assembly	MBq	1521.11

1) steel composition see Table 2

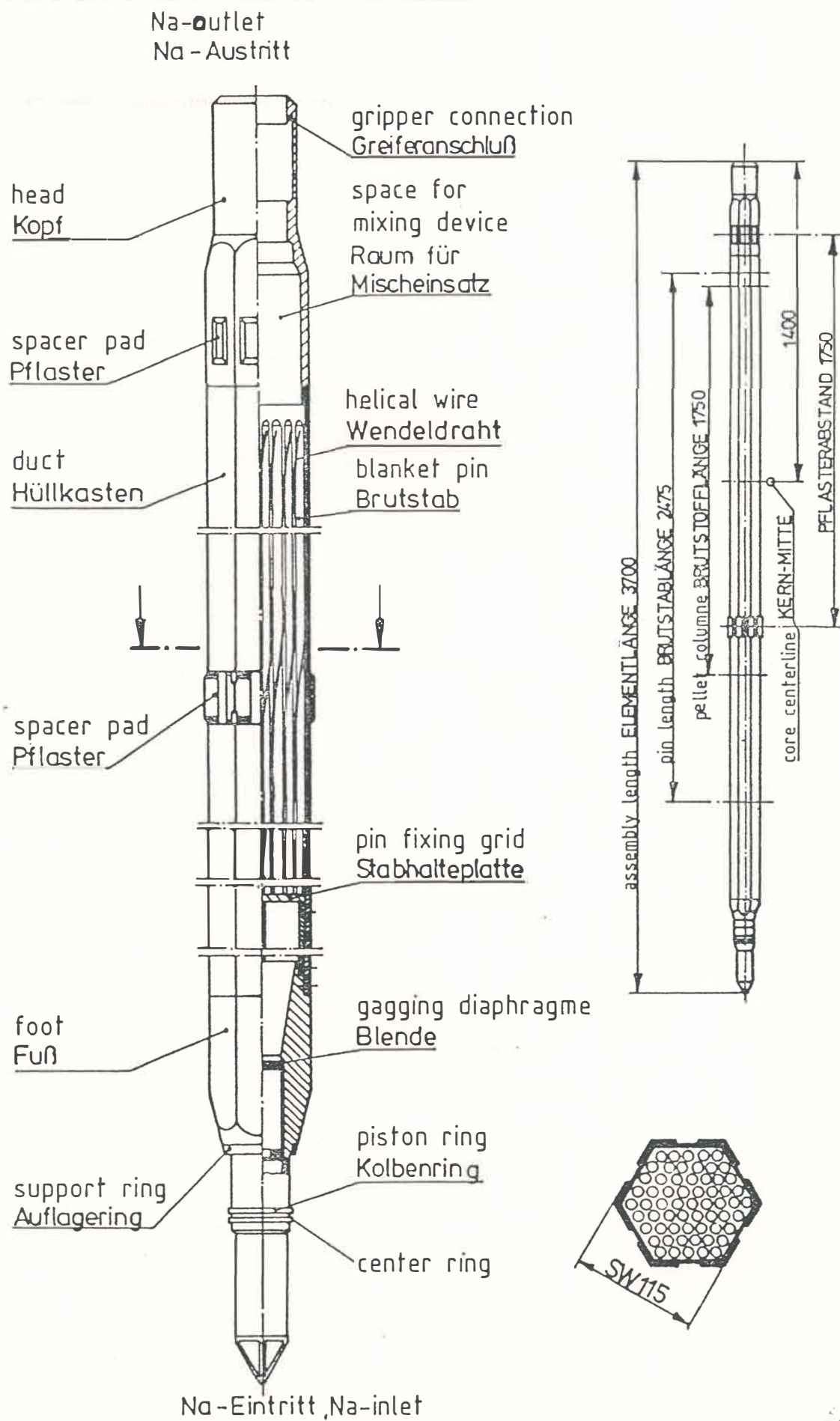
Ident-Nr./No. : 54.08106.*
V-Klasse/Class. : 2.1
TVS-Nr./No. : 152315
Datum/Date : 06.08.91
Seite/Page : 9

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soweit nicht ausdrücklich zugestanden. Zuwiderhand-
lungen verpflichten zu Schadenersatz. Alle Rechte für den
Fall der Patentierung oder GM Eintragung vorbehalten

Material No. DIN	Composition	Assembly Part
1.4970 in cold worked condition	X 10 CrNiMoTiB 15 15	cladding tube, pin end plugs, helical wire
1.4981	X 8 CrNiMoNb 16 16	duct (wrapper tube) pin anchor grid
1.4541	X 10 CrNiTi 18 9	some small structure parts
1.4301	X 5 CrNi 17 9	some small structure parts

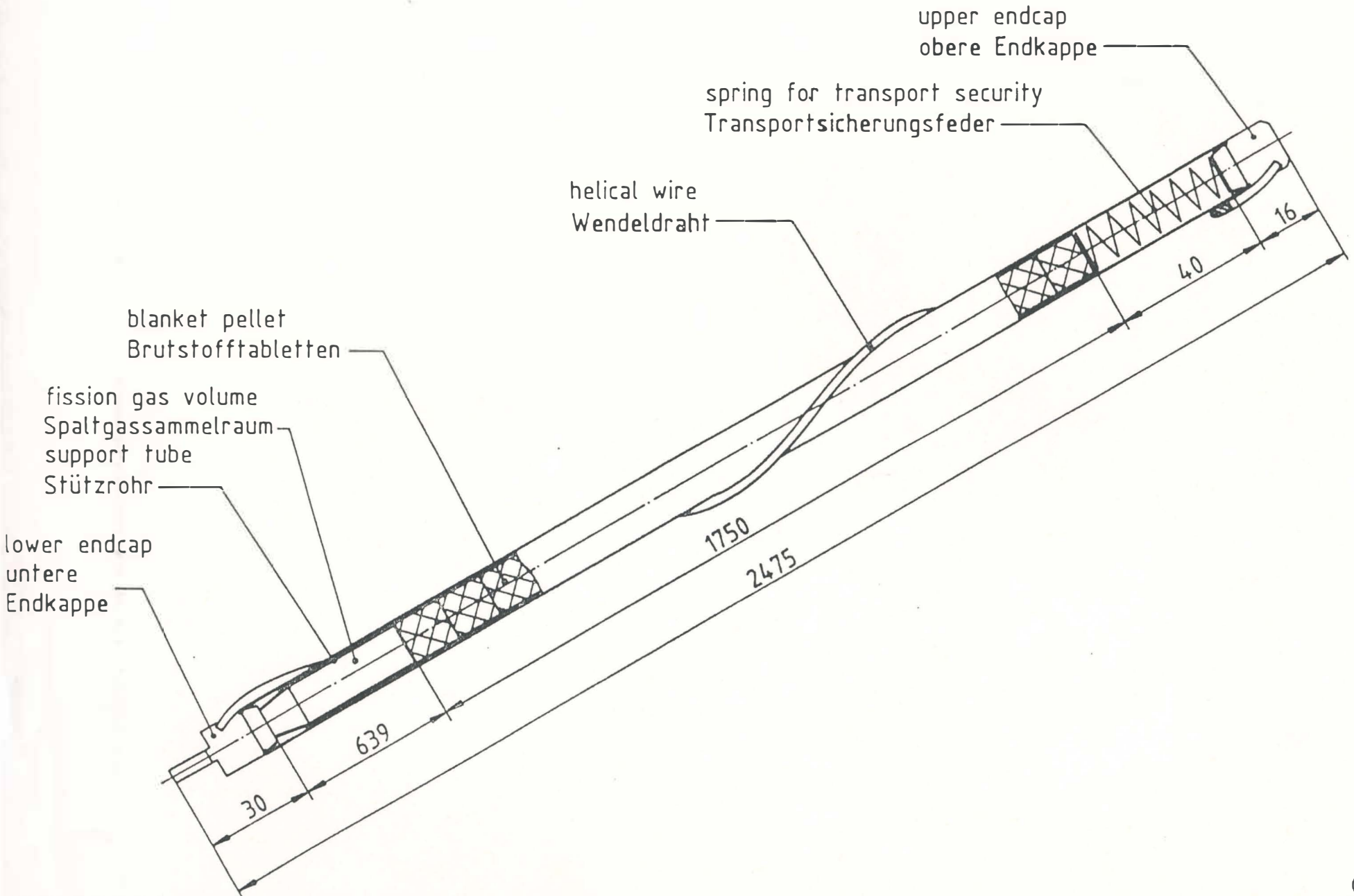
All steel types are austenitic stainless steels.

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use or communication of the contents thereof, are forbidden
without express authority. Offenders are liable to the pay-
ment of damages. All rights are reserved in the event of the
grant of a patent or the registration of a utility model or design



Blanket Assembly
Brutelement

Fig. 1



James Acord, sculptor - P.O. Box 159
Richland, WA 99352 - (509) 946-1572
USA

October 28, 1992

Gerhard Hottenrott
RWE Energie - KK-VN
Postfach 10 31 65
4300 Essen 1
Germany

COPY

Dear Mr. Hottenrott,

Enclosed with this letter please find two signed copies of the three-page Agreement regarding my takeover of Title and Ownership of twelve SNR Blanket Assemblies. These are copies that arrived by mail this week in a package of four, all signed by representatives of SBK. Mr. James B. Edgar of Siemens Power Corporation (USA), and myself have signed all four today. Mr. Edgar has retained one copy as have I.

I am very pleased that the formal Licensing, Export and International Import Certificate will soon be completed and that shipment of the twelve assemblies will take place, possibly in December. The incorporation of the Assemblies into a sculpture of the Nuclear Age is a most important part of this art-work and has created many problems never before found in sculpture. Only the great help of you, Mr. Andres, Mr. Jim Edgar at SPC, Dr. Koop and Dr. Herbert Krinninger has made this generous transfer possible. I thank you for all your help in this complex and unusual matter of creating art.

As to your inquiry about the site for this sculpture: It has not been exactly decided on. It will be found somewhere on or near the Hanford Nuclear Reservation; an area associated with the history of the nuclear age. This, too, is complex and I am meeting with the County Commissioners (of Benton County which contains the Hanford Nuclear Reservation) next week. Also, I am working on a scale model of the sculpture and a set of presentation drawings. When this material is completed I will send you a full set of copies, along with all continuing information as it develops.

In the meanwhile thank you for all your help to me in this matter and let me know if I can supply you and Mr. Andres with any further information.

Yours sincerely,

James L. Acord, sculptor

CC: Mr. James B. Edgar, SPC

INB

INTERNATIONALE NATRIUM-BRUTREAKTOR-BAU GESELLSCHAFT MBH

Mr. James Acord
P. O. Box 1 59

RICHLAND, WA 99352

U. S. A.

Ihre Zeichen und Ihre Nachricht vom

Unser Zeichen

Bearbeiter, Hausruf

Friedrich-Ebert-Straße
Bergisch Gladbach 1 (Bensberg)

0-9-91-16
Kri/do

Krinninger
38 08

13.09.91

Offer of SBK to integrate SNR 300 Breeder Assemblies into the
tri-cities "Nuclear Age Sculpture"
Ref: Your letter of June 15, 1991

Dear Mr. Acord,

As you know from our discussion in Richland, SBK and we are very pleased of the idea to make our Breeder Assemblies an integral part of the sculpture intended for inauguration at the fiftieth anniversary of Nuclear Activities at Hanford Area (begin of nuclear age!).

I am sorry for the late response to your letter, but we have been very busy with high priority matters in managing post-project-termination activities at SNR 300 site.

Inbetween we contacted the German subsidiary of Advanced Nuclear Fuel and got the impression, that the shipping to USA can be managed in a very cost effective operation (bypack to routine transports between ANF Lingen and ANF Richland (now Siemens Nuclear Power Group). Our contact point at ANF (Lingen, Germany) is Mr. Philippczyk, who knows very well Jim Edgar, your entry point at SNP, Richland.

Please, find attached for your assistance in the US licensing procedure the following documents:

Ident-Nr./No.	: 54.08106.*
V-Klasse/Class.	: 2.1
TVS-Nr./No.	: 152315
Datum/Date	: 06.08.91
Seite/Page	: 2

Contents

1	Technical Description of the SNR-300 Blanket Assemblies
1.1	The Assembly Head
1.2	The Bundle and Duct Part
1.3	The Blanket Pin
1.4	The Foot
2	Description of Package and Transport Provisions
2.1	Customs data
2.2	Package and Transport Description
Tab. 1	Technical Assembly Data
Tab. 2	Steel Types
Fig. 1	Blanket Assembly
Fig. 3	Blanket Pin
Fig. 3	Transport Container

Weitergabe sowie Vervielfältigung dieser Unterlage, Verwertung und Mitteilung ihres Inhalts nicht gestattet, soweit nicht ausdrücklich zugestanden. Zuwiderhandlungen verpflichten zu Schadenersatz. Alle Rechte für den Fall der Patentierung oder GM-Eintragung vorbehalten

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Mr. James Acord

13.09.91

3

With respect to the US "Radioactive Material Licensing" and the requirements defined in the attachment (402-22-110) to your letter we shall give the following statements:

(12 (a) ii)

Quality Assurance Measures and Quality Control Procedures in fabrication of Nuclear Plant Components (see attached comparison in German). In general the requirements in both countries are very similar and therefore there should be no reason for product reject by US authorities. Additionally attached is a draft of the report prepared for WHC "General description of the Quality Assurance System for the Core/Core Assembly Supply of SNR 300" Ident-No. 403.1089.3.

Design

is given in the attached documents

- Systembeschreibung "Brutelemente"
(System description for "Breeder assemblies")
Ident-No. 403.237.1
- Auslegungsbegründung "Brutelemente"
(Design report and justification "Breeder assemblies")
Ident-No. 403.266.0

Both notes are in German and were used in the German licensing procedure.

Labeling or marking

Each assembly carries on the handling socket a serial fabrication number of the following type.

YM 20 N XXX C
XXX ... serial number

For the assemblies selected for transport to USA you will get timely these numbers.

Manufacture

has been performed according to specification requirements. Compliance with this requirements is certified.

(12 (a) ii (A))

The manufacturer of the product is Reaktor-Brennelement GmbH, Hanau, now Siemens Brennelementewerk, Hanau.

Mr. James Acord

13.09.91

4

We hope, that these informations with the attached set of documents will help you in getting the license to take ownership of these assemblies.

Please, let us know if you need more information and be sure of our full support.

Within the next days we shall transmit all documents needed at ANF Lingen to apply for the export license in Germany and to prepare for the transport. We suppose, that spring 1992 could be a reasonable time period for that.

Best regards

I N B

Project Management Core



Enclosures

cc without encl.

SBK-B Kalkar - Mr. Koop

RWE Energie AG Essen - Mr. Hottenrott

Mr. James Acord

13.09.91

2

- 1 Interatom Note No. 54.08106.*, August 6, 1991
Data of SNR 300 Blanket Assemblies
- 2 Technical Specifications and Drawings (latest issues)
Remark: These documents have been used in the SNR 300
licensing process according to German Nuclear
Power Law, have been approved by the authorized
technical inspectorate (TÜV-Arge Kerntechnik West)
and are all in German.
 - 2.1 Spezifikation Brutelement (Blanket or Breeder Assembly)
Ident-No. 403.185.9
 - 2.2 Spezifikation Brutstab (Breeder rod)
Ident-No. 403.179.2
 - 2.3 Technische Einzelspezifikation "UO₂-Brutstofftabletten"
(Breeder pellets)
Ident-No. 403.179.2
 - 2.4 Übersichtszeichnung Brutelement mit Mischeinsatz
(general assembly drawing "Breeder Assembly with coolant
flow mixer")
Ident-No. 11.73596.2
 - 2.5 Übersichtszeichnung Brutstab
(general drawing "Breeder rod")
Ident-No. 11.73602.*
 - 2.6 Stückliste Brustab
(parts list "Breeder rod")
Ident-No. 11.73601.8
 - 2.7 Stückliste Brutelement mit Mischeinsatz
(parts list "Breeder assembly with coolant flow mixer")
Ident-No. 11.73612.3

Attached are also color photographs of the breeder assemblies while in fabrication. Additional I add our Company Portrait 1991 telling you about the activities and businesses of Interatom.

Soon there will be an important change for us you should also know about. Becoming effective from October 1, 1991 Interatom will become fully integrated into the Siemens Power Generation Group KWU. Our new address is then

Siemens AG KWU
H. Krinninger N221
Friedrich-Ebert-Straße
Postfach 10 01 00
W - Bergisch Gladbach 1
Germany

Hanford Nuclear Sculpture Works
P.O. Box 159 Richland, WA 99352
(509) 946-1572

August 31, 1992

Debra McBaugh, Radioactive Materials Section
DOH - Division of Radiation Protection
Airdustrial Park, Bldg 5
P.O. Box 47827
Olympia, WA 98504-7827

Dear Debra McBaugh,

Enclosed with this letter please find: 1); Two signed copies of ATTACHMENT B - DUTIES OF THE RADIATION SAFETY OFFICER (two pages, revision 1, April 1987) and, 2); Two signed copies of my two-page letter to you (dated 31 August 1992) in which I address the issues we discussed in our last meeting.

Regarding the problems your office experienced in FAXing me the RSO form, I'm at a loss as to all the explanations. The number I gave you Wednesday night was correct and the people at Eagle Printing claim to have had no trouble receiving other FAXs on both Friday and Monday (today). Anna M. White of your office was most helpful in continually re-trying to send this important document to me. After we began trying a different Richland FAX number (at Abadan on The Parkway) a power-outage shut down everyone for a few hours. In the end I received it just before the close of business hours.

Due to this delay, it is too late for this to go out in today's mail and I will express mail it to you tomorrow (September first). I hope it will be on your desk Wednesday although I understand you will not be able to start the writing of my license until Thursday, 3 September. I will telephone you on Thursday to be sure you have received this packet and to answer any questions you might have.

In closing, thank you for finding the time to meet with me on Wednesday, 26 August of last week. And thank you for your telephone calls of Friday, 28 August, 1992.

Very truly yours,

James L. Acord, sculptor

enclosures: Duties of RSO (2 signed copies).
License Application-supplemental letter (2 copies)

CC: J. Edgar, SNPC.
H. Krinninger, SBK.

Leave out the ones I've
Crossed out

Revision 1
April 1987

ATTACHMENT B

DUTIES OF THE RADIATION SAFETY OFFICER

1. Make sure that all uses of radiation are conducted safely, adhere to the conditions of the license and license application, and result in exposures to personnel which are as low as reasonably achievable (ALARA).

2. Act as liaison agent with regulatory authorities, be available for assistance in inspection and audits, and notify the department:

A. In writing before making any change which would render the Application for Radioactive Materials License, Radioactive Materials License, Application for Registration (of radiation producing machines), or Notice of Registration no longer accurate.

B. Immediately in the event of any radiation accident or incident (including high dosimeter reading).

C. Within 5 days of any positive leak test result of a sealed source.

D. Within 30 days in a report stating remedial action taken after accident or incident.

3. Be familiar with all applicable regulations and regulatory guides, and assure that license applications are properly filled out and are submitted on time.

4. Make sure all ^{required} surveys, calibrations, and ^{per} leak tests are performed on time.

5. Establish and maintain record systems as applicable for radiation area surveys, wipe tests, leak tests, calibration of instruments, and personnel dosimetry reports.

~~6. If dosimetry is required, advise individual radiation workers of each high exposure report, and conduct a survey to determine the cause of all overexposures so as to preclude recurrence. Perform a quarterly review of occupational exposure to authorized users and workers to determine that the exposures are within the limits established for the ALARA program. Annually apprise each radiation employee of annual accrued dose.~~

7. Assure that individuals working with radiation have appropriate protective devices, ~~including shielding, ventilation, clothing, gloves, remote handling equipment (where necessary),~~ and facilities which aid in keeping exposures As Low As Reasonably Achievable (ALARA).

8. Procure and maintain an adequate number of operable and properly calibrated radiation survey instruments, of the appropriate range and type, and properly calibrated counting equipment (if applicant will assay contamination and leak tests).

~~9. Develop and maintain up to date operating and emergency procedures.~~

10. Perform, or cause to be performed, quarterly inventory of all sealed sources received or possessed.

Attachment B (Continued)

~~11. Post conspicuously "Notice to Employees" RHF-3 and notices of items of noncompliance resulting from department inspections.~~

~~12. Supply employers of terminated radiation personnel with radiation exposure records as required by regulation.~~

~~13. Establish and cause to be maintained inventory control of radioisotopes, making sure inventory never exceeds amounts licensed.~~

14. Keep, or cause to be kept, records of receipts of incoming isotopes and surveys of incoming and outgoing shipments.

15. Make sure that all incoming and outgoing radioactive shipments are properly packaged and labeled according to DOT requirements, and that shipments are accompanied by proper shipping papers.

~~16. Assure that radioactive materials are disposed of properly, and that records are maintained of all radioactive wastes disposed.~~

~~17. perform an annual review of radiation safety program for adherence to ALARA concepts. Make sure that the safety program is followed by all workers dealing with radioactive materials. Investigate any deviation from the program, and take any remedial action necessary.~~

~~18. Schedule briefings and educational sessions to inform workers of radiation safety rules and procedures: 1) for all new personnel, 2) with each change in license condition or safety program, and 3) annually in a refresher course for all personnel. This includes instruction in the ALARA program and philosophy.~~

~~19. Apprise and inform management of radiation safety status and their responsibilities in maintaining an adequate radiation safety program.~~

20. *Contact Washington State Division of Rad. Protection in case of*
Take charge in all emergency situations (spills, or release of radioactive material, etc.) to make sure correct emergency decontamination and protection procedures are carried out. Also evaluate the situation that led to the emergency, to reduce the chance of further problems.

Emergency, including spill on floor
~~21. Assure that radioactive materials are used only by individuals authorized by the license.~~

22. Assure that radioactive materials are properly secured against unauthorized removal.

The RSO should have some formal training in radiological health (i.e., college level or its equivalent) and should have specific experience in radiation protection with the types, quantities, and use of the radioactive material to be used under the license.

you meet this so you could leave this in.

APPROVED BY

DATE

You sign it

The recommended check list appearing on the following pages is intended to verify shipments at origin.

Never accept or refuse a shipment before all items have been checked.

Is the following Information correct for each entry?

023-79893133

SHIPPER'S DECLARATION FOR DANGEROUS GOODS (DGD),

	YES	NO*	N/A
1. Two copies in English and in the IATA format (6.6.1, 6.6.2, 6.6.3, 9.1.1.2)	☒	☐	
2. Full name and address of Shipper (6.6.11.1)	☒	☐	
3. Full name and address of Consignee (6.6.11.2)	☒	☐	
4. If the Air Waybill number is not shown, enter it! (6.6.11.3)	☒		
5. The number of pages shown (6.6.11.4)	☒	☐	
6. If full name of Airport or City of Departure or Destination is not shown, enter it! (6.6.11.6 and 6.6.11.7)	☒		
7. The non-applicable Aircraft Type deleted (6.6.11.5) and the word "Non-Radioactive" deleted (6.6.11.8)	☒	☐	
Identification			
8. Proper Shipping Name (6.6.11.9, Step 1)	☒	☐	
9. Class 7 (6.6.11.9, Step 2)	☒	☐	
10. UN Number, preceded by prefix (6.6.11.9, Step 3)	☒	☐	
11. Subsidiary Risk (6.6.11.9, Step 4)	☐	☐	☒
Quantity and Type of Packing			
12. The words "Radioactive Material" if not included in the Proper Shipping Name (6.6.11.9, Step 5)	☐	☐	☒
13. Name or Symbol of Radionuclide(s) (6.6.11.9, Step 5)	☒	☐	
14. Description of physical and chemical form, or Special Form, if relevant and not included in Proper Shipping Name (6.6.11.9, Step 5)	☒	☐	☐
15. The group for LSA and SCO (6.6.11.9, Step 5)	☒	☐	☐
16. The number and type of packages and the activity in Becquerels in each package, or for Fissile Material the total weight in grams or kilograms of fissile material may be shown in place of activity (6.6.11.9, Step 6)	☒	☐	
17. Activity within limits for Type A packages (Table 6.1.B) or Type B (see attached competent authority certificate)	☒	☐	

18. Words "overpacked used" shown on the DGD, if applicable (6.6.11.9, Step 7)

YES NO* N/A

Packing Instructions

19. Category of package(s) or overpack (6.6.11.9, Step 8)

☒ ☐

20. Transport Index and dimensions for Category II and Category III only (6.6.11.9, Step 8)

☒ ☐ ☐

21. "Fissile Exempt", if applicable (6.6.11.9, Step 8)

☐ ☐ ☒

Authorizations

22. Identification marks shown and a copy of the document in English attached to DGD for the following:

— Special Form approval certificate (6.2.3.3)

☐ ☐ ☒

— Type B package design approval certificate (6.2.4.4)

☐ ☐ ☒

— Type B(M) package shipment approval certificate (6.2.4.5)

☐ ☐ ☒

— Fissile material package design approval certificate (6.2.5.13)

☐ ☐ ☒

— Fissile material package shipment approval certificate (6.2.5.13)

☐ ☐ ☒

— Special Arrangement shipment approval certificate (6.1.4.8)

☐ ☐ ☒

23. Additional Handling Information (6.6.11.11)

☐ ☐ ☒

24. Name and Title of Signatory, Place and Date indicated (6.6.11.13 and 6.6.11.14)

☒ ☐

25. Signature of Shipper (6.6.11.15)

☒ ☐

26. Amendment or alteration signed by Shipper (6.6.6)

☐ ☐ ☒

AIR WAYBILL

27. The Handling Information box shows: "Dangerous goods as per attached Shipper's Declaration" (6.7.2)

☒ ☐

28. Cargo Aircraft Only, if applicable (6.7.2)

☒ ☐ ☐

29. In Nature and Quantity of Goods box the commodity (general description) listed first (6.7.1)

☒ ☐

PACKAGE(S) AND OVERPACKS

30. Same number and type of packagings and overpacks delivered as shown on DGD

☒ ☐

31. Unbroken transportation seal (Type A) (6.8.4.3) and package in proper condition for carriage (9.1.1.3)

YES NO* N/A

☒ ☐ ☐

Markings

32. Package bears Type A (6.3.2.2)

☐ ☐ ☒

33. Package bears Type B(U) or Type B(M) and approval mark corresponding to the certificate (6.3.2.2)

☐ ☐ ☒

34. The Proper Shipping Name and UN Number (6.3.2.1)

☒ ☐

35. The Name and Address of the Shipper and Consignee (6.3.2.1)

☒ ☐

36. The permissible gross mass if it exceeds 50 kg (6.3.2.1)

☒ ☐ ☐

Labelling

37. Two correctly completed Radioactive labels on opposite sides (6.4.2.5)

☒ ☐

38. The Subsidiary Risk labels, without Class or Division Number (6.4.2.6)

☐ ☐ ☒

39. Cargo Aircraft Only label, if required, adjacent to the Hazard labels (6.4.3.2)

☒ ☐ ☐

40. All above labels correctly affixed and have all irrelevant marks and labels been removed (6.4.1, 6.4.3, 6.3.0.2, 6.4.0.2)

YES NO* N/A

☒ ☐ ☐

For Overpacks

☐ ☐ ☒

41. If "Type A", "Type B(U)" or "Type B(M)" not visible, the required statement shown (6.3.3)

42. Conditions of 6.4.2.5 complied with

☐ ☐ ☒

GENERAL

43. All applicable State and Operator variations complied with as per Subsection 2.9

☐ ☐ ☒

44. The Emergency Response Telephone Number as required by USG-17 appears on the Declaration where necessary (6.6.11.12)

☒ ☐ ☐

45. Advance arrangements made and confirmed (9.1.2, 9.1.3)

☐ ☐ ☒

46. For Cargo Aircraft Only shipments, a cargo aircraft operates on all sectors

☒ ☐ ☐

Comments:

Checked by: *B. PreBrick*

Place: *EU / FRA*

Signature: *[Signature]*

Date: *01.05.92*

Time: *2000 Z*

* If any question is answered with a "no" do not accept the shipment and give a duplicate copy of this completed form to the shipper.

SURVEY RECORDS

As the responsible Radiation Safety Officer (RSO) of *Hanford Nuclear Sculpture Works* (a sole proprietorship of James L. Acord, sculptor) I will keep and maintain detailed records of leak-test surveys on the 12 breeder-blanket assemblies (including the quarterly surveys conducted by SNPC while in their possession, the initial survey upon arrival in Washington State and the export survey by SBK prior to shipment from Germany) throughout the time they are in my ownership. Additionally, I will facilitate the eventual transfer of ownership of the 12 breeder-blanket assemblies, in the form of the finished sculpture, through supplying this (as yet unidentified) new owner with complete copies of the records of all leak tests on the 12 sealed sources. Also, I will give timely advance notice to the Radiative Materials Section of such transfer of ownership.

NOTIFICATION OF RADIOACTIVE MATERIALS SECTION

Let me state clearly at this time that I will keep Washington State Department of Health's Division of Radiation Protection - Radioactive Materials Section fully informed, in a timely fashion, as to the status, location, possession and ownership of the 12 breeder-blanket assemblies.

Arrival in Washington State: I will notify the Radioactive Materials Section (by letter and telephone) of the anticipated arrival date of the 12 breeder-blanket assemblies in Washington State as soon as shipping from Germany commences.

Movement from SNPC Facilities: I will give timely advance notification to the Radioactive Materials Section (by letter and telephone) of the movement of the 12 breeder-blanket assemblies from Siemens Nuclear Power Corporation's facility at 2101 Horn Rapids Road, Richland to the sculpture site; supplying additional information as to the method of transportation, radiation surveys in transit, security at the sculpture site, etc.

Accident: In the event of any accident, fire, loss or theft involving any of the 12 breeder-blanket assemblies, or any other event that threatens or calls into question the structural integrity of these sealed sources, I will notify the Division of Radiation Protection IMMEDIATELY by telephone and with a letter following.

Thank you for the time and consideration you continue to lend me in this matter.

Very truly yours,

James L. Acord, sculptor

Hanford Nuclear Sculpture Works
P.O. Box 159 Richland, WA 99352
(509) 946-1572

August 31, 1992

Debra McBaugh, Radioactive Materials Section
DOH - Division of Radiation Protection
Airdustrial Park, Bldg 5
P.O. Box 47827
Olympia, WA 98504-7827

RE: Licensing Action Number 92-07-37

Dear Debra McBaugh,

This letter is a supplement to my application for a Radioactive Materials License submitted to your department (Radioactive Materials Section) in July, this year. In this letter I will address the issues we discussed regarding my application for a SNM/DU License.

SURVEYS

Survey, prior to shipment: The 12 breeder-blanket assemblies (sealed sources) will be shipped from Germany packed 3 to a crate for a total shipment of 4 crates. The sealed sources and their packing crates will be surveyed before shipment by SBK (a subsidiary of Siemens AG) in compliance with all International Atomic Energy Agency and German National Authority survey requirements for export of special nuclear materials.

Survey upon arrival: Transportation and receiving of the 12 breeder-blanket assemblies (sealed sources) will be handled in Washington State by Siemens Nuclear Power Corporation (SNPC). SNPC will conduct a survey of the breeder-blanket assemblies upon arrival at SNPC's Richland, WA facility: 2101 Horn Rapids Road.

Periodic surveys: Siemens Nuclear Power Corporation will conduct surveys of the 12 breeder-blanket assemblies (sealed sources) on a quarterly (3 month) basis throughout the time SNPC has the sealed sources in their possession. I will keep detailed records of these quarterly surveys by SNPC (as well as the initial survey upon arrival) and assist the SNPC Radiation Safety Officer in any way requested. Furthermore, at such time as when the sealed sources pass into my physical control (moved from SNPC's Richland facility to the sculpture site for installation) I will continue with quarterly surveys and keep and maintain detailed records of these surveys. My surveys will be conducted with a new Beta-Gamma instrument (as yet to be purchased) that will receive regular licensed calibration from the manufacture.

INTRODUCTION TO NUCLEAR SYSTEMS

COURSE NUMBER: TP1960
May 10, 17, 31
Fridays
9:00 a.m. - 4:00 p.m.

Fee: \$290
Maximum Enrollment: 24
CE Units: 1.6
Registration Deadline: 04/26/91

INSTRUCTOR: Duaine Lindstrom

Nuclear systems apply principles of nuclear physics and several engineering disciplines to produce power or nuclear materials. In addition, the operation of these facilities leads to concerns outside the traditional topics of physics and engineering.

It is difficult to be familiar with all aspects of the design and operation of nuclear systems. This course surveys the field, from a qualitative introduction to nuclear physics to analyses of the Three Mile Island and Chernobyl accidents. It seeks to give attendees a balanced view of current and anticipated nuclear systems; how they function, and occasionally malfunction.

WHO SHOULD ATTEND:

Engineers, technicians, managers, individual contributors, others whose education was not primarily concerned with nuclear systems, but may now have responsibilities which deal with aspects of them. No technical background is required.

COURSE CONTENT:

- Basic Physics
 - Atomic and nuclear physics, a qualitative introduction
 - Neutrons and their interaction with matter
- General Introduction to Nuclear Reactors
 - Basic features
 - Environmental interaction
 - Emissions
 - Accident potential
- Commercial Nuclear Reactors
 - Pressurized water reactors
 - Boiling water reactors
 - Heavy water reactors
 - Gas-cooled reactors
- Uranium Resources and Fuel Cycles
 - Resources
 - Advanced systems
 - Fuel processing
 - Fuel cycles for weapons materials
- Advanced Systems
 - Fast breeders
 - Advanced thermal systems
 - Fusion
- World Experience
 - Present status in the world
 - The accidents at TMI and Chernobyl

WASHINGTON STATE UNIVERSITY C & I CONTINUING EDUCATION

presents this certificate to

JAMES L. ACORD

for successful completion of

INTRODUCTION TO NUCLEAR SYSTEMS

and awards 1.6 Continuing Education Units

May 31, 1991

Date

Quinta Cooper

Assistant Director

RADIATION DETECTION: PRINCIPLES AND INSTRUMENTS

January 24-February 7
Tuesday, Thursday
7:00 - 10:00 p.m.
(5 sessions)

Fee: \$235
Maximum Enrollment: 20
CE Units: 1.5
Registration Deadline: 01/10/89

INSTRUCTOR: Lowell Nichols

The Radiation Monitor uses many types of radiation detection, measuring, and counting equipment in the performance of his/her job. An understanding of the principles of operating of these instruments and their limitations is essential to their safe usage. This course is designed to provide this basic knowledge. The course assumes only minimal background in instrument principles and builds toward a deeper understanding of them. Examples and applications will be slanted toward the interest of class participants.

WHO SHOULD ATTEND:

Radiation Monitors who need to review and update the principles of operating radiation detection equipment.

COURSE CONTENT:

- Ionization Chambers
- Semiconductor Devices
- Scintillation Devices
- Chemical Devices
- Neutron Devices
- Instrument Operating Characteristics
- Health Physics Instruments
- Counting Statistics

TEXT:

"Radiation Safety Technician Training Course," by H. J. Moe, et.al. (Included in course fee).

LOWELL NICHOLS is a Senior Research Physicist with Battelle, Pacific Northwest Laboratory, in Richland. He has been involved in research and development of various efforts in the areas of radiation physics and radiation dosimetry. He is currently Chairman of the Standards Committee, Health Physics Society.

Tri-Cities University Center Continuing Education

presents this certificate to

JAMES L. ACORD

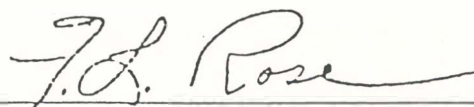
for successful completion of

RADIATION DETECTION: PRINCIPLES AND INSTRUMENTS

and has been awarded 1.5 Continuing Education Units

February 9, 1989

Date



Director of Continuing Education

Hanford Nuclear Sculpture Works
P.O. Box 159 Richland, WA 99352
(509) 946-1572
WN-IO407-1

December 15, 1992

Debra McBaugh, Radioactive Materials Section
DOH - Division of Radiation Protection
Airdustrial Park, Bldg 5
P.O. Box 47827
Olympia, WA 98504-7827

Dear Debra McBaugh,

I write you at this time to bring my license up to date with the addition of information on new radiation detection instruments available to me as Radiation Safety Officer (RSO).

CALIBRATED INSTRUMENTS: I am in possession of two (2) calibrated G-M instruments (a Victoreen model CD V-700 for contamination/count-rate survey and a Heathkit RM-4 for exposure rate survey). These instruments were calibrated by Northwest Radiation Instrument Calibration Facility and copies of both calibration reports accompany this letter. I will keep the calibration of these two instruments current with regular calibration at Northwest Radiation Instrument Calibration Facility.

ADDITIONAL INSTRUMENTS: Two (2) Victoreen model CD V-715 (ionization chamber) radiological survey meters, four (4) model CD V-742 pencil dosimeters and a model CD V-750-5b dosimeter charger. Enclosed with this letter please find a complete list of all radiation detecting instruments in my possession and related to my duties as Radiation Safety Officer.

As of this writing I have no dates on the expected arrival time of the twelve breeder-blanket assemblies. I received a telephone call from Dr. Hottenrott of *RWE Energie* (Germany) on November 23 saying the U.S. Department of Commerce International Import Certificate had been issued, arrived in his office and everything was now in order for issuance of a German export license. Dr. Hottenrott stated he believed this license would be issued within two weeks.

In closing, thank you for the copy of the Handbook of Radiation Emergency. I will call as soon as I hear something.

Very truly yours,

James L. Acord, RSO & sculptor

enclosures: Radiation Instruments Documentation - 4 pages.

Hanford Nuclear Sculpture Works
P.O. Box 159 Richland, WA 99352
(509) 946-1572
WN-IO407-1

December 15, 1992

RADIATION DETECTION INSTRUMENTS INVENTORY

Radiation Safety Department
James L. Acord, RSO

Detection Instruments

(1) Victoreen, model CD V-700, Count Rate Survey Meter.
Instrument calibrated for counts per minute (cpm), scale to
30,000 cpm, external geiger-tube probe with rotating beta window,
used for contamination surveys.

serial # 60875
calibration report number: 92-3280
current calibration expires: 12-09-93

(1) Heathkit, model Rate Meter 4, Exposure Rate Survey Meter.
Instrument calibrated mR/hr, scale to 50 mR/hr, internal geiger-
tube with open mica window of 1.5 mg/cm², used for exposure rate
surveys.

serial # 595-3475-04
calibration report number: 92-3707
current calibration expires: 12-09-93

(2) Victoreen, model CD V-715, High Level Radiological Survey
Meters. Internal ionization chamber, scale to 500 R/hr, these
instruments are in working order but not currently calibrated.

serial # 141537
serial # 171709

Dosimeters

(4) Bendix, model CD V-742, Pencil Dosimeters. Scale to 200 R.
All in working order.

serial # 0267959
serial # 0269186
serial # 0273213
serial # 0894646

(1) I.E.H. Corp., model CD V-750-5b, pencil dosimeter Charger.
In working order.

serial # 0128422

Account S42, United States Dosimetry Technology, Inc., personal
dosimetry services for Hanford Nuclear Sculpture Works (since
1987). TLD Hanford-style 5 chip, quarterly reporting period.

NORTHWEST RADIATION INSTRUMENT CALIBRATION FACILITY

REPORT OF CALIBRATION

GM Exposure Rate Survey Meter

NRICF FORM 00-05-00(6/86)

Calibration Report Number: 92-3707

Calibration Performed For: Acord
P.O. Box 159
Richland Wn. 99352

Client Reference Number: _____

Detector Information

Manufacturer: HealthKit
Model: R.M.-4
Serial Number: -595-3475-04

Probe Information

Manufacturer: _____
Model: _____
Serial Number: _____

Calibration Results

High voltage (bias) on chamber (volts): 468

Battery OK on delivery? ☒ Y ☐ N

Radiation Source	Beam Energy	Exposure Rate	Range	Observed Reading	Correction Factor
	(keV)	(mR/hr)	mR/hr	(mR/hr)	(true/observed)
<u>Cs-137</u>	<u>662</u>	<u>35</u>	<u>50</u>	<u>34.0</u>	<u>1.03</u>
		<u>15</u>		<u>14.0</u>	<u>1.07</u>
		<u>3.5</u>		<u>3.40</u>	<u>1.06</u>
		<u>1.5</u>		<u>1.50</u>	<u>1.07</u>

Background (units: $\mu\text{R/hr}$): 0.16

Setup: Point Source



Comments:

"This calibration was performed using a procedure which is ☒ is not ☐ included in the Scope of Accreditation issued by the Conference of Radiation Control Program Directors, Inc."

(Please see back of report)

Calibration Performed By: Steve Smith Date: 12-9-92

Calibration Report Checked By: St. G. / A. G. G. Date: 11 Dec 1992

NORTHWEST RADIATION INSTRUMENT CALIBRATION FACILITY

REPORT OF CALIBRATION

Count Rate Survey Meter

NRICF FORM 00-04-00(6/86)

Please complete one form for each probe calibrated

Calibration Report Number: 92-3286

Calibration performed for: Accord
P.O. Box 159
Richland wa.
99352

Client Reference Number: _____

Detector Information

Manufacturer: Victoreen
Model: CDV 700
Serial Number: 60875

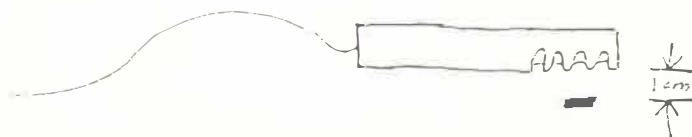
Probe Information

Manufacturer: _____
Model: _____
Serial Number: _____

Calibration Results

Battery OK on Delivery? ☒ N
Meter Response Linear (within $\pm 10\%$)? ☒ N
High voltage (bias) on chamber (volts): 739

Radiation Source	Radiation Emitted	Energy KeV	Activity (uCi)	Meter Reading cpm	Efficiency (CPM/DPM)	Efficiency (CPM/Nanocurie)
background	—	—	—	12	—	—
C-14	β	156.5	0.158	20	Can't detect	Can't detect
CS-137	β	714	0.0187	500	0.01	26
I-129	γ	40	0.101	30	0.0001	0.2
Setup: CS-137	γ	662	0.930	350	0.0002	0.4



Comments

"This calibration was performed using a procedure which is ☐ is not ☒ included in the Scope of Accreditation issued by the Conference of Radiation Control Program Directors, Inc."

(Please see back of report)

Calibration Performed By: Joe Smith

Date: 12-7-72

Victoreen CD V-900 - serial number # 60875

Northwest Radiation Instrument Calibration Facility

CALIBRATED

Calibration Date 12-9-92 By S

Serial No. 60875

Source Rad. Energy cpm/nanocuries

C-14 β 156.5 Count Detector

C-13C β 714 26

E-129 γ 40 0.2

CS-137 γ 662 0.4

Source to Detector Distance—1 centimeter

Next Calibration Due 12-9-93

NRICF Form 04-04-00



Calibrated Instruments - as of December-15th 1992
 Hanford Nuclear Sculpture Works - P.O. Box 159 - Richland, WA 99352
 RML # WN-10407-1 - James L. Acord, RSO

Northwest Radiation Instrument Calibration Facility

CALIBRATED

Calibration Date 12-9-92 By AK

Serial No. Heathkit RM-4

NRICF Form 04-00-00

Heathkit RM4 - serial number # 595-3475-04

☒ x

Notiz / Note

my working: **COPY**☐

Protokoll / Minutes of Meeting

Weitergabe sowie Vervielfältigung dieser Unterlage, Verwertung und Mitteilung ihres Inhalts nicht gestattet, soweit nicht ausdrücklich zugestanden. Zuwiderhandlungen verpflichten zu Schadenersatz. Alle Rechte für den Fall der Patentierung oder GM-Eintragung vorbehalten.

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Verfasser/Author	OE/Dept.	Auftrags-Nr./Cost Code	Projektkurzz./Proj.Shortn.
Heyne	F413	4124-1100-01	SNR-300
		SK Sachschl./File-No.	TVS-Nr./No.
			152315
Gegenzeichnung/Approval	Unterschrift/Signature	Zusatz-Nr./Additional No.	
<i>bluk</i>	<i>C. Heyne</i>		
Verteiler/Distribution		Seiten/Pages	Anl./Encl.
F413		9	3
S113 Herr Krinninger (5x)			
(F41)			
		V-Kl./Class.	UA
		2.1	37
		Betreff/Subject	
		Data of SNR-300 Blanket Assemblies	
		Prepared for Export Purposes of 1 Assemblies to SNR/ SNPG	
		Hanford, USA	
		(ANF)	
		Schutzbedürftiges Firmeneigentum	

Summary*12 X 82 kg. per = 984 kg total*

12 ~~Three~~ fresh blanket assemblies of the first SNR-300 core are planned to be exported to Hanford, Westinghouse Corporation, to be integrated into a special sculpture of the Nuclear Age.

This note provides the necessary technical information which is needed for this purpose.

Contents

1	Technical Description of the SNR-300 Blanket Assemblies
1.1	The Assembly Head
1.2	The Bundle and Duct Part
1.3	The Blanket Pin
1.4	The Foot
2	Description of Package and Transport Provisions
2.1	Customs data
2.2	Package and Transport Description
Tab. 1	Technical Assembly Data
Tab. 2	Steel Types
Fig. 1	Blanket Assembly
Fig. 3	Blanket Pin
Fig. 3	Transport Container

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V-Klasse/Class. : 2.1
TVS-Nr./No. : 152315
Datum/Date : 06.08.91
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1 Technical Description of the SNR-300 Blanket Assemblies

A description of the blanket assembly construction will be given on the basis of Fig. 1, Tab. 1.

The assembly consist of a head part, a pin bundle part inside a hexagonal duct (or wrapper tube) and a foot part. It is designed for use in the peripheral zone of a fast reactor core. For that purpose the assembly will be put in vertical position in the core zone inside the reactor tank with its foot fit into a spike fixing device.

The whole core together with the blanket assemblies is placed on the grid plate using the technical features described above.

1.1 The Assembly Head

The upper part of the head is in cylindrical form which changes to a conical intermediate part and is transformed finally into a hexagonal geometry to get adapted to the hexagonal form of the duct. At the outer part of this lower hexagonal head region are spacer-support pads on each face of the hexagon. The surface of the pads is covered by a friction resistant material. All other parts of the head are made from austenitic stainless steel.

The upper part of the head consist of an open tube which serves in the reactor as outlet of the cooling medium and during handling as the point where the gripper is fixed to the assembly.

In some of the blanket assemblies there is a mixing device inside the head which was thought to improve the homogeneity of the coolant and its temperature for measurement purposes.

The assembly head carries also a small piece of ferritic steel which was thought to be used for the azimuthal orientation control.

1.2 The Bundle and Duct Part

The duct is a tube with a hexagonal cross section and an equal wall thickness over the complete length. On its outside there is the so-called support level in the lower section of the duct.

This support level consists of a closed hexagonal ring which is fixed to the duct material. The corners of this hexagonal ring are plated with a friction resistant material.

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Inside of the duct is a pin bundle consisting of 61 blanket pins. The distance between pins as well as between the pins and the duct wall is maintained by a wire which is mounted in a helical form around each pin. The wire is fixed at both endplugs of the pin by a welding point.

The blanket pins are held at their lower end in the pin anchor plate. This plate itself is connected by means of a support piece to the assembly foot. This is the only fixing point of the pin bundle inside the surrounding hexagonal duct.

1.3 The Blanket Pin (Fig. 2, Tab. 1)

0.0200 in = twenty thousandths
The pin is formed by a stainless steel tube with a wall thickness of 0.5 mm. This tube is closed at both sides by a steel plug which is gas tight welded to the tube ends. The pin contains a column of blanket pellets made from depleted uranium oxide powder.

The pellet column is held in place inside the pin by a spring at the upper pin end and a support tube at the lower pin end. The UO₂ pellets fill about 70 % of the inner volume of the pins. The rest is filled by the structure pieces as there are support tube and spring. An inert gas fill, mainly Helium and some Argon, fills the remaining empty volume.

On the outer surface of the pin is a stainless steel wire, wrapped helically around and fixed at the endplugs (see Fig. 2).

1.4 The Foot

The assembly foot is fixed to the lower end of the hexagonal duct. The outer form of the foot is at its upper part adapted to the hexagonal geometry of the duct. Further down the hexagon changes into a conical form which is followed by a cylindrical part. This cylinder ends again in a conical part with triangular formed coolant inlet openings.

Near the first conical part is a movable support ring on which the assembly is seated when put in the spike support of the reactor core grid plate.

About half way down the cylindrical part are two further rings. The first one is a piston ring which tightens the assembly foot against the grid plate avoiding unacceptable bypass flows of the cooling medium. The second one serves as centering device of the assembly in its grid plate position.

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Two metal spike-like pieces on the hexagonal upper part of the foot serve as orientation devices when the assembly is put into the reactor core.

A gagging system using diaphragms inside the cylindrical part of the foot serves for the control of the coolant flow which removes the heat of the assembly during its residence in the reactor core.

2 Description of Package and Transport Provisions

2.1 Customs Data

The export license might be handled concerning the German customs tariff no. (Zolltarifnummer) 8401 30000.

This covers fuel containing nuclear core assemblies.

As the blanket assemblies contains depleted Uranium this action has also to follow the regulations fixed in the export list (Ausfuhrliste) no. 0102.

2.2 Package and Transport description

It is foreseen to handle the assemblies and transport containers in the following way:

- a) The blanket assemblies are taken from their storage in vertical position and put into a special positioning device. They are wrapped in a polyethelene foil.
- b) The positioning device brings the assembly into horizontal position.
- c) In that position the assembly is packed into the specific container (wood).
 It is supported at 3 levels, the two spacer-pad levels and the hexagonal part of the foot.
- d) The transport container for SNR-300 blanket assemblies is shown in drawing S-2-300-01 (Fig. 3).
- e) One container can take 3 assemblies.
- f) The assembly fixations are screwed after positioning the assemblies in the container.
- g) There is no drying medium foreseen in the container.

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- h) The container will be closed by at least 3 steel belts.
- i) The container is supposed to be loaded by crane on an air-cushioned transport vehicle.
- j) The container is fixed on the vehicle with the assembly foot in travel direction.
- k) Assembly and transport container will be checked to be free of contamination.
- l) Transport
- m) Discharge and handling concerning the regulations in force at the destination point.

12 assemblies = 46,200 lbs
plus packaging

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Component (Material)	Indications	Unit	Value
assembly, total	weight (including blanket pellets) length total width over flats, duct width over flats, outer pads	kg? (N)? mm mm mm	3850 lbs ~ 1750 3700 mm 110.25 114.8/115
blanket pin (-)	length of pin length of pellet column outer diameter wall thickness	mm mm mm mm	2475 1750 11.6 0.5
helical wire (1.4970)	diameter pitch	mm mm	1.34 175
bundle (-)	number of pins number of wires/pin pitch number/pin		61 1 14
pin anchor grid (1.4981)	grid thickness	mm	10
duct (or wrapper tube) (1.4981, cw)	width over flats, inside the duct wall thickness	mm	105.05 2.6
upper pads lower pads (stellite 6/ inconel 718)	width height	mm	~ 30/40 ~ 55/55
head (1.4981)	outer cylindrical ø length	mm	108 415
mixing device (1.4948)	total length	mm	200

1) steel composition see Table 2

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Component (Material)	Indications	Unit	Value
foot (1.4981) 1)	length number of triangular cooling inlets outer diameter of the piston ring	mm - mm	~ 500 6 ~ 85
UO ₂	quantity/assembly quantity/pin	N	~ 925.5 ~ 15.2
U-5	enrichment (depleted uranium)	weight%	0.23 - 0.24 65 lbs
U-8		weight%	~ 99.76
UO ₂ -form: pellets	diameter density height	mm %theoret.	10.3 95 1.4 x diameter
U-metal mass: max: 82.2 kg/ass. 180,84 lbs	max. activity of one fresh SNR-300 blanket assembly	MBq	1521.11 56,281,07 mCi

$180,84 \times 2,170 \text{ lbs} =$

1) steel composition see Table 2

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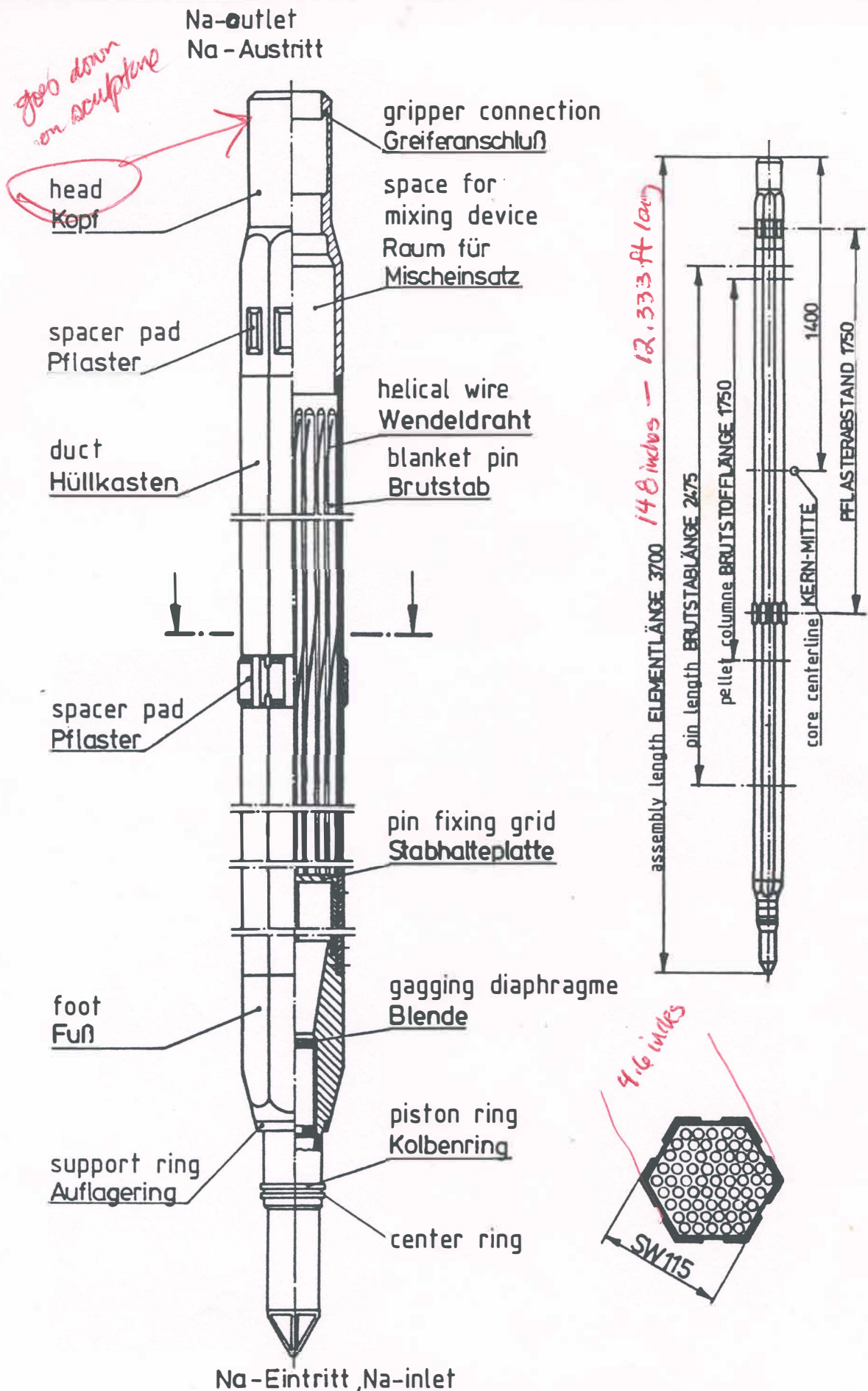
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Material No. DIN	Composition	Assembly Part
1.4970 in cold worked condition	X 10 CrNiMoTiB 15 15	cladding tube, pin end plugs, helical wire
1.4981	X 8 CrNiMoNb 16 16	duct (wrapper tube) pin anchor grid
1.4541	X 10 CrNiTi 18 9	some small structure parts
1.4301	X 5 CrNi 17 9	some small structure parts

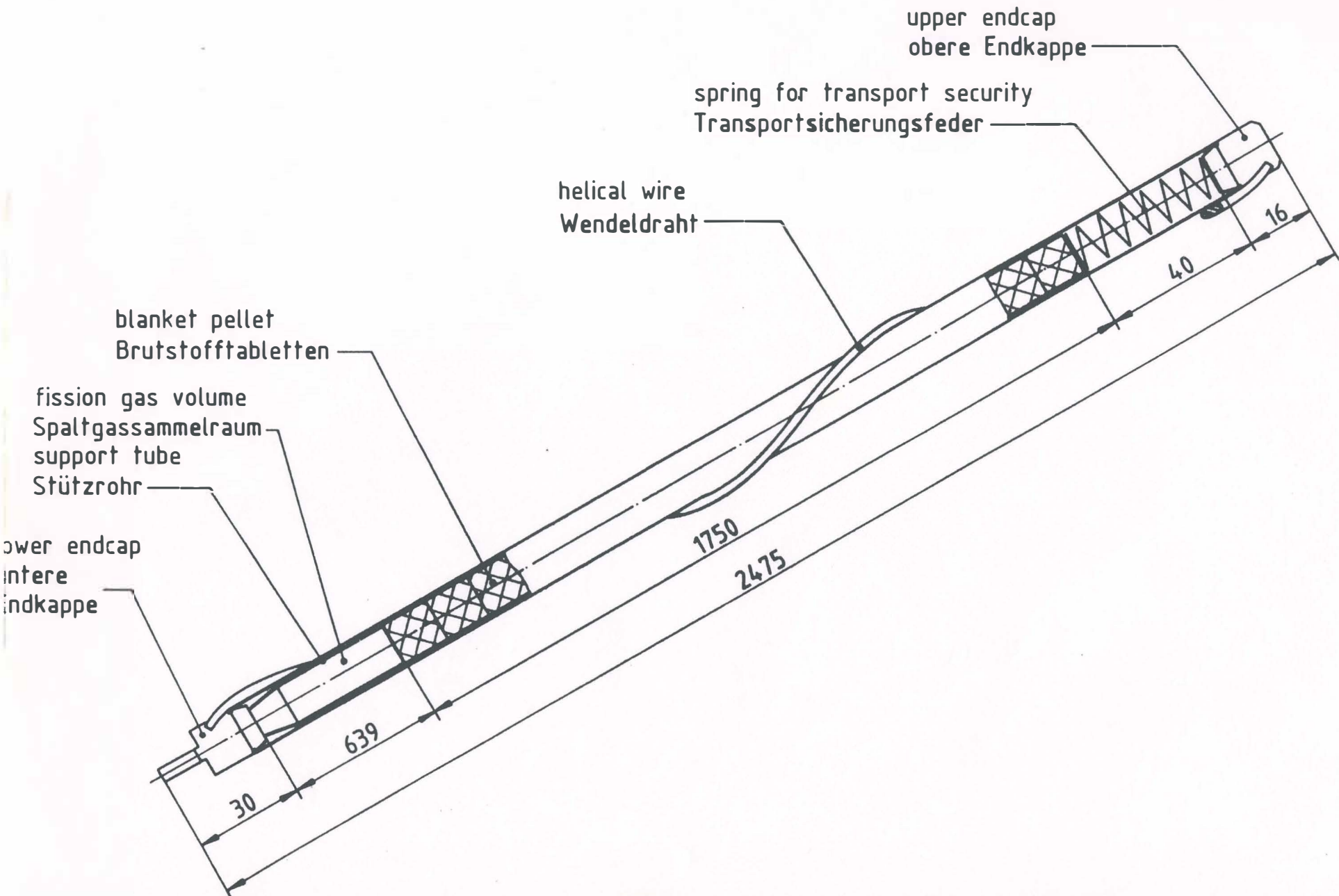
All steel types are austenitic stainless steels.

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Blanket Assembly
Brutelement

Fig. 1



03.03/T263

SNR 300 Mk Ia Brutstab - Blanketpin

Fig. 2

[illegible]

Technical drawing of a long, narrow wooden cabinet or wardrobe. The drawing shows a side view with a central door and two side doors. The central door has a large handle and a lock. The side doors have smaller handles. The cabinet is 1800 mm high and 600 mm wide. The top and bottom sections are decorated with a diamond pattern.

Technical drawing of a mechanical assembly, likely a pump or engine component, showing a cross-section. The drawing includes the following dimensions and labels:

- Dimensions:**
 - Overall width: 100
 - Overall height: 100
 - Internal width (left): 50
 - Internal width (right): 50
 - Internal height (left): 50
 - Internal height (right): 50
 - Internal width (center): 10
 - Internal height (center): 10
- Labels:**
 - distance piece** (with arrow pointing to the top flange)
 - Deckmutter** (with arrow pointing to the top flange)
 - Einbauelement** (with arrow pointing to the central assembly)
 - Einbauelement** (with arrow pointing to the central assembly)

Ausschnitt für Entwurf - section blanket
assembly
Zf-Pol 055

Assessmt for Student - Section Blanket
2007-2008
2008-2009

Q. 10	Q. 11	Q. 12	Q. 13	Q. 14	Q. 15	Q. 16	Q. 17	Q. 18	Q. 19	Q. 20	Q. 21	Q. 22	Q. 23	Q. 24	Q. 25	Q. 26	Q. 27	Q. 28	Q. 29	Q. 30	Q. 31	Q. 32	Q. 33	Q. 34	Q. 35	Q. 36	Q. 37	Q. 38	Q. 39	Q. 40	Q. 41	Q. 42	Q. 43	Q. 44	Q. 45	Q. 46	Q. 47	Q. 48	Q. 49	Q. 50	Q. 51	Q. 52	Q. 53	Q. 54	Q. 55	Q. 56	Q. 57	Q. 58	Q. 59	Q. 60	Q. 61	Q. 62	Q. 63	Q. 64	Q. 65	Q. 66	Q. 67	Q. 68	Q. 69	Q. 70	Q. 71	Q. 72	Q. 73	Q. 74	Q. 75	Q. 76	Q. 77	Q. 78	Q. 79	Q. 80	Q. 81	Q. 82	Q. 83	Q. 84	Q. 85	Q. 86	Q. 87	Q. 88	Q. 89	Q. 90	Q. 91	Q. 92	Q. 93	Q. 94	Q. 95	Q. 96	Q. 97	Q. 98	Q. 99	Q. 100									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100

Assessmt for Student - Section Blanket
2007-2008
2008-2009

Walls: wood plates 22 mm thick
Boden, Wände, Deckel: Fichtenspähle 38 dick gelammt

Year	A	B
1990	550	660
1991	350	260

Blank
Transport container, SNR-300, Assembly

[illegible]

FINE ART USE OF FAST FLUX TEST FACILITY SCULPTURE PROJECT

Radioactive Materials Licensing

BACKGROUND

All possession, ownership and use of radioactive materials is governed by State and Federal authorities. In 1988 the U.S. Nuclear Regulatory Commission ruled that my art work with granite (and certain uranium oxide ceramics) was covered by a State license [WAC 402-19-190 (1) (A)]. This license will not cover my new sculpture of the nuclear age.

Update - June 1991

In May of 1991 I was pledged breeder-blanket assemblies from Germany's most advanced reactor for this sculpture. These stainless steel objects perfectly fit the sculpture I envision. Additionally, they contain hundreds of kilograms of depleted uranium. This international support of my sculpture is most welcome and creates my need for a radioactive material license.

On 11 June I made inquiries to U.S. NRC on what licensing requirements will be necessary for using these breeder assemblies in sculpture. U.S. NRC determined that I will need a license with Washington State's Department of Radiation Control. U.S. NRC will recognize my State license for this sculpture, including any time that it falls outside the jurisdiction of Washington State.

Many State licenses cover work with depleted uranium, however, the least demanding license is my goal. I believe I have found one in WAC 402-21-030 (4); (requiring form RHF-20).

Securing a State license will be a challenge requiring some effort. I have photocopied the relevant page from the State's Statutes and Rules (enclosed) for your information. Briefly, however, my license will turn on two points:

1); That the uranium is safely packaged in durable, well-made containers (the assemblies) and that my use will not compromise their structural integrity. Engineering data from the manufacturer will help me meet this requirement.

2); That my (artistic) use of uranium will result in unique benefits accruing to the public (the importance of art).

I have high confidence that a satisfactory licensing arrangement will be arrived at with Washington State Radiation Control.

James Acord, sculptor - P.O. Box 159
Richland, WA 99352 - (509) 946-2484
USA

FACSIMILE TRANSMISSION SHEET

DATE: 13 July 1992

TIME: _____

TRANSMISSION FROM: Mr. James L. ACORD

FAX PHONE: (509) 943-2612

COMPANY: Hanford Nuclear Sculpture Works

TRANSMISSION TO: H. Krinninger - N221

FAX PHONE: 011 49(2204)843045

COMPANY: Siemens AG KWW

NUMBER OF PAGES, INCLUDING COVER SHEET: 1

COMMENTS: Dear Dr. Krinninger

Thank you for your FAX's of 26 June and 3 July.
My license application is before State Radiation Control
Agency now. A copy of it is in the mail to you.

The State believes they can issue license in
August.

I will keep you fully informed and send
license copy as soon as available.

Best Regards,

J. Acord

copy sent: Jim Edgar - Siemens Nuclear Power Corp.

→ VERY URGENT !!

Siemens AG
Power Generation Group (KWU)

D-5060 Bergisch Gladbach 1

Telephone 02204 - 84 3771 / Telefax 02204 - 84 3510

☐ Internal Memo
☒ Telefax Message

From Krinninger / N221 Our Ref. _____
To HANFORD NUCL. SAFETY WORK Your Ref. _____
For the attention of Mr. James Acord Fax - No. 001 509 9432612
Date July 3, 1992

Copy to SIEMENS NUCL. Power Corp. Rickland
Attn. Mr. James B. Eager 001 509 375 8402

RWE ENERGIE AG, Essen H. HINTERHOTT 0201 185 2842
SBK, KALKAR Dir. KooP 02824 142109

Subject SHIPMENT OF BREEDER BLANKET ASSEMBLIES
TO SNP Corp. Rickland

Dear Mr. Acord,

I've been informed by SBK, that the shipment of the 12 breeder blanket pieces must occur in the 2nd half of August, 1992. Prerequisite is that the WA state license is granted to you. Otherwise SBK would have to withdraw from the offer.

A relaxation is only possible, if SNP Corp. or any other US company would be prepared to take over title of the assemblies (for final disposal or whatever other purpose). Cost for this operation needs to be assessed and a corresponding offer prepared and sent to us prior to the mid August '92 dead line.

Signed Best regards
I Krinninger

Dept. N221 Extn. 3808

Proceeding with the preparations to ship the assemblies to the US we were instructed by the national authority responsible for granting of the export license, that we need a certified copy of your license to take title of depleted Uranium in the quantities contained in the 12 breach assemblies (appr. 82 kg U metal per assembly; U235 content 0.2%). Important is that the holder of the license, namely your name appears on the transmitted copy.

Could you please send the required documents as soon as possible.

Certification of copy must be performed by an authorized body or entity.

Many thanks in advance and
best regards

H. Kieninger

James Acord, sculptor - P.O. Box 159
Richland, WA 99352 - (509) 946-1572
(hm) 946-2484

March 24, 1992

Debora McBaugh
Radiation Protection - Dept. of Health
Airdustrial Park - Building #5
P.O. Box 47827
Olympia, WA 98504-7827

Dear Debora McBaugh,

Thanks for all your help over the past month with the problems arising from my becoming the proud owner of 12 breeder-blanked assemblies. No sooner had I returned from my lecture in Alaska then my computer became sick and had to go to the Amiga hospital in Memphis, TN. Little did I realize how abjectly dependent I had become on my computer... I couldn't even find my old typewriter. Federal Express just returned it to me and I am writing you about securing a license for possession of depleted uranium.

From our telephone conversations in February I understand that my possession and eventual fine-art use of breeder-blanked assemblies containing depleted uranium might be covered under a WA State specific licenses for using depleted uranium for its mass and weight. This category sounds promising to me and I am asking you to send on to me all applicable application forms so that I may make a formal application to the State.

Mr. Jim Edgars of Siemens Nuclear Power Group (USA) has written me a letter (copy enclosed) describing the role his company will play in receiving the assemblies on my behalf. I am forwarding it on to the German National Authority concerned about Siemens AG's shipment of the assemblies to me and I am hoping this will prevent an expensive delay in the shipment from Germany. Yet, even if this works, I see the time-sensitive need to get a Washington State Licenses (recognized by U.S. NRC) for possession of depleted uranium in quantity.

In closing thanks for all the help you have been to date and for the time and consideration you may show in sending me all necessary information and forms toward a specific license.

Very truly yours,

enclosures: copy of letter from Siemens Nuclear Power Group.

Siemens AG
Power Generation Group (KWU)

D-5060 Bergisch Gladbach 1

Telephone 02204 - 84 3771 / Telefax 02204 - 84 3510

☐ Internal Memo
☒ Telefax Message

From KRINNINGER / N221

Our Ref.

To JAMES L. ACORD

Your Ref.

For the attention of

Fax - No. 001 509 946 818A

Date Feb. 14, 1992

Copy to RWE ENERGIE AG, H. KOTTENROTT
SBK-B, KALLAR, d. Dir. KOOP

Subject SNR 300 Breeder Assemblies
Ref: Transport of 12 Assemblies to Riedland
for integration into your sculpture on
the "Nuclear Age" - man's track from
stone age to nuclear age

Dear Mr. Acord,

I hope the new year will offer new opportunities
to meet and to continue the discussion on
the planned sculpture. For sure SBK's offer to
use as much as 12 breeder assemblies of SNR300
in the set-up of the final arrangement of
structures is an important contribution to your work
and will allow for additional public support
according to the shared cost approach.

Signed

Name

Dept. N221 Extn. ..

Sheet 1

James Acord, sculptor - P.O. Box 159
Richland, WA 99352 - (509) 946-2484
USA

February 19, 1992

Dr. Herbert Krinninger - N221
Siemens AG KWU
Friedrich-Ebert-Straße
Postfach 10 01 00
W - Bergisch Gladbach 1
Germany

Dear Dr. Krinninger:

Thank you for your FAX of 14 February, 1992, regarding
United States Nuclear Regulatory Commission licenses for
ownership of 12 Breeder-Blanket Assemblies to be the metal
components of my sculpture marking the 50th anniversary of the
nuclear age.

Here is the information you need for Import/Export Licenses
in order to ship 12 Breeder-blanket assemblies to me via Siemens
Nuclear Power Corporation, Richland, WA., USA.

My licenses for ownership (receipt of title) for breeder-
blanket assemblies is covered by **United States Nuclear Regulatory
Commission - Rules and Regulations: TITLE 10, CHAPTER 1, PART
40.21 - GENERAL LICENSES.** (a copy of the U.S. NRC rules and
regulations are included with this letter.)

I believe you could compress this, U.S.NRC - CFR - TITLE 10,
Chapter 1, Part 40.21. for the sake of your international
Import/Export form as being:

U.S.NRC - 40.21

As I explained to you, this license (40.21) covers only my
ownership and, somewhere in the future, before the sculpture is
completed, I will need to arrive at an agreement (with either/or/
both U.S. NRC and Washington State) that will give me a specific
license to create art with your breeder-blanket assemblies and,
finally, distribute them to the owner of the sculpture.

Of course I will keep you fully informed as to changes in my
licenses, as well as all other aspects of this important
sculpture.

Very truly yours,

James L. Acord, sculptor
enclosures: Photocopy of U.S.NRC rules (two pages)
Copy of letter from U.S. DOE on using FFTF for Art.
Copy of letter from, Westinghouse Hanford Corp.

Hanford Nuclear Sculpture Works
P.O. Box 159 - Richland, WA 99352
(509) 946-1572

APPLICATION
for
RADIOACTIVE MATERIALS LICENSE

Fee Code 24 - SNM/DU

by

James L. Acord, sculptor

SUPPLEMENT 9

EXPERIENCE WITH RADIATION

For the last nine years I have worked with tri-uranium oct-oxide (U_3O_8), reused whole or divided, in sculpture projects. I have appropriated this exempt source material (as a ceramic glaze) from certain orange-colored, uranium-bearing ceramic tableware (manufactured 1920's - 1940's) and available on the open market. Radio-chemical analyses of this material revealed uranium isotopes occurring in natural proportions, along with trace amounts of thorium.

From 1983 through 1988 I worked with this exempt source material (off and on) in a number of studio locations in and around the City of Seattle. In 1989 I moved to Richland, from where I still mount exhibits containing this exempt uranium-bearing source material.

Additional experience with radiation, if somewhat longer ago, was part-time employment at Ballard/Greenwood Veterinary Hospital (Seattle, WA - 1960-61) as an X-Ray Technician, and a high-school Science Fair project involving X-Ray radiation.

Hanford Nuclear Sculpture Works
P.O. Box 159 - Richland, WA 99352
(509) 946-1572

APPLICATION
for
RADIOACTIVE MATERIALS LICENSE

Fee Code 24 - SNM/DU

by

James L. Acord, sculptor

SUPPLEMENT 12

FILM BADGES, DOSIMETERS AND BIO-ASSAY PROCEDURES USED

I have maintained a personal dosimetry account (# S42) with United States Dosimetry Technology, Inc. (formerly U.S. Testing) since 1987. This account supplies me with a continuous dosimetry via a TLD 5-Chip (the "Hanford Standard"). My regular reporting period is quarterly, however I have gone monthly, maintained "visitors" badges, employed room monitors, etc. at various times on a "as needed" basis.

Throughout all the time of my possession and work with the SNM/DU (Assemblies) I will continue to contract my dosimetry needs to a licenses supplier of quality services in film badges, dosimeters and bio-assay procedures. In the likely event of employees and sub-contractors assisting my on this sculpture project at various times, I will assure each that they receive quality dosimetry services.

Photocopy; last three years dosimetry (# S42).....36

Certificate of Accreditation from National Bureau
of Standards (copy).....37

EMPLOYER: SEEMLESS SCULPTURE WORKS

1989 ANNUAL REPORT

PROCESSOR: US DOSIMETRY TECH., INC.

JAMES ACORD
P O BOX 159
RICHLAND

WA 99352

08-Mar-90

S42

660A GEORGE WASH WAY
RICHLAND WASHINGTON 993

DOSES IN REM

For ACORD J Badge Number 00001 Loc Type F SS# 532-40-8427 Birthday 10/19/44 Freq Q PAGE

QUARTER	SHALLOW	DEEP	TIMES PROCESS IN YEAR	LIFE TIME (SHALLOW	DEEP)	LPD
1	Min.	Min.				
2	Min.	Min.				
3	Min.	Min.				
4	Min.	Min.				
ANNUAL	Min.	Min.	3		0.05	135

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EMPLOYER: SEEMLESS SCULPTURE WORKS

1990 ANNUAL REPORT

PROCESSOR: US DOSIMETRY TECH., INC.

JAMES ACORD
P O BOX 159
RICHLAND

WA 99352

13-Mar-91

S42

660A GEORGE WASH WAY
RICHLAND WASHINGTON 993

DOSES IN REM

For ACORD J Badge Number 00001 Loc Type F SS# 532-40-8427 Birthday 10/19/44 Freq Q PAGE

QUARTER	SHALLOW	DEEP	TIMES PROCESS IN YEAR	LIFE TIME (SHALLOW	DEEP)	LPD
1	Min.	Min.				
2	Min.	Min.				
3	Min.	Min.				
4	Min.	Min.				
ANNUAL	Min.	Min.	4		0.05	140

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EMPLOYER: HANFORD NUC SCULPTURE WKS

1991 ANNUAL REPORT

PROCESSOR: US DOSIMETRY TECH., INC.

JAMES ACORD
P O BOX 159
RICHLAND

WA 99352

10-Mar-92

S42

660A GEORGE WASH WAY
RICHLAND WASHINGTON 993

DOSES IN REM

For ACORD J Badge Number 00001 Loc Type F SS# 532-40-8427 Birthday 10/19/44 Freq Q PAGE

QUARTER	SHALLOW	DEEP	TIMES PROCESS IN YEAR	LIFE TIME (SHALLOW	DEEP)	L D P
1	0.01	Min.				
2	Min.	Min.				
3	Min.	Min.				
4	Min.	Min.				
ANNUAL	0.01	Min.	4		0.05	145

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United States Department of Commerce
National Bureau of Standards

NVLAP

Certificate of Accreditation

UNITED STATES TESTING COMPANY, INC.
Richland, WA

is recognized under the National Voluntary Laboratory Accreditation Program
for satisfactory compliance with criteria established in Title 15, Part 7 Code of Federal Regulations for:

providing specific Personnel Radiation Dosimetry Processing Services

replace w/ new one (1992 or 93)



Effective until

October 1, 1989


For the National Bureau of Standards

Hanford Nuclear Sculpture Works
P.O. Box 159 - Richland, WA 99352
(509) 946-1572

APPLICATION
for
RADIOACTIVE MATERIALS LICENSE

Fee Code 24 - SNM/DU

by

James L. Acord, sculptor

SUPPLEMENT 13

FACILITIES AND EQUIPMENT

Hanford Nuclear Sculpture Works will work "on site" with the Breeder/Blanket Assemblies, from the time of my taking possession through the completion of the sculpture. Facilities and equipment needed throughout the project will be contracted for, constructed, leased or purchased on a "as needed" basis.

Considering the inherent structural safety of the twelve assemblies I do not anticipate the need for any special radiological equipment beyond good quality detection instruments (regularly calibrated) for routine monitoring and surveying.

The 12 Assemblies will arrive in sturdy shipping crates (see Supplement 6 (b) for data) which will be used to transport the sealed sources to the site. I anticipate moving each Assembly from its shipping container directly into place in the sculpture. If further security is needed (depending in part upon the exact site) portable storage containers can be rented.

Siemens AG and Siemens Nuclear Power Corp. are assisting me in transport of the 12 Assemblies. Both companies routinely work with similar assemblies and are fully equipped for this aspect of the project.

In a larger sense, I have the resources of the Hanford Nuclear Reservation to draw on in the event of the unforeseen. Should meteor strike or plane crash disturb the integrity of the sealed sources I could count on the immediate assistance of a large and experienced work-force to help me control the problem.

Radiological equipment I routinely keep on hand includes protective clothing, respirators, lead foil and sheet and a glove box. Additionally, I am well equipped with general construction and manufacturing tools.

Hanford Nuclear Sculpture Works
P.O. Box 159 - Richland, WA 99352
(509) 946-1572

APPLICATION
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by

James L. Acord, sculptor

SUPPLEMENT 14

RADIATION PROTECTION PROGRAM

I subscribe to ALARA in all work with radioactive materials as a general principal. By the time I take personal possession of the Assemblies, move them to site and commence construction on the sculpture, I will have consulted with Certified Health Physicists as to a suitable Radiation Protection Program for this undertaking and abide by the expert advice supplied me.

Considering the inherent safety of the 12 sealed sources, I do not anticipate a complex Radiation Protection Program (beyond my own ability and training). I do intend to up-grade my detection instrumentation before the arrival of the Assemblies; for routine monitoring and surveying of the site, work areas and the exterior of the Assemblies. Workers at the site, myself included, will be equipped with personal dosimeters. Protective clothing, respirators and any other recommended supplies will be available.

To date, everyone involved in the manufacture of these Breeder/Blanket Assemblies was covered in the Radiation Protection Program of their employment, as will be the workers involved in the transportation, shipment and off-loading to a storage area, through their employment within the nuclear industry (Siemens AG, Siemens Nuclear Power Corporation, et al).

Quality Assurance and leak tests are performed by the manufacture (see Supplement 6 (b)). Siemens Nuclear Power Corp. is licensed to take possession of the Assemblies and transport them from Germany to Richland, additionally performing all required surveys during transit. The Assemblies require no maintenance and should catastrophe require repair to the sources, I will consult the manufacture.

Hanford Nuclear Sculpture Works
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APPLICATION
for
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Fee Code 24 - SNM/DU

by

James L. Acord, sculptor

SUPPLEMENT 15

WASTE DISPOSAL

No radioactive waste is anticipated at any time in the creation of this work of art. The 12 Breeder/Blanket Assemblies will be used whole, in their entirety. After the completion of the sculpture they will have become a permanent work of art: to be preserved, maintained and cared for in perpetuity.

KRISTINE M. GEBBIE
Secretary



STATE OF WASHINGTON
DEPARTMENT OF HEALTH

Airdustrual Center, Bldg. 5, LE-13 • P.O. Box 47827 • Olympia, Washington 98504-7827

July 14, 1992

James A. Acord
Radiation Safety Officer
HANFORD NUCLEAR SCULPTURE WORKS
Post Office Box 159
Richland, Washington 99352

Dear Mr. Acord:

We have received your application dated 7 July 1992. Your request for a Radioactive Materials License has been logged and issued Licensing Action Number 92-07-37 and is awaiting complete review by licensing personnel.

The Department Health has adopted a Local Government Notification Policy in response to a code revision enacted by the Washington State Legislature during the 1984 Session (House Bill 1153). The enclosed copy of a letter to your local city or county official explains this process. The original letter has been sent to your local official (along with a copy of the cover page of your license), but if you wish to speed up the process, you may approach your local official yourself.

If you have any questions regarding your request, please feel free to contact this office at (206) 753-4481.

Sincerely,

Anna M. White, Secretary
Radioactive Materials Section

amw
Enclosures

RUSH - Most URGENT!!!

JAMES L. ACORD, SCULPTOR

HANFORD NUCLEAR SCULPTURE WORKS - P.O. BOX 159
RICHLAND, WA - 99352 - TELEPHONE (509) 946-1572
USA

TELEFAX (509) 943-2612

FAX COVER SHEET

To FAX Number: 011 49 (2204) 843045

Date: 4 September 1992 - Friday

Attention: Dr. H. Krimminger / N221

From: J. ACORD - Artist

TOTAL PAGES INCLUDING COVER SHEET: 2

LICENSE NUMBER: WN-10407-1

Additional Comments: Today I was issued this
License number for ownership of Special Nuclear
Materials / Depleted Uranium by State of
Washington, License also good with U.S. NRC.
Because of Weekend and U.S. Holiday on

FAX → ACORD to Krinninger - (page 2)

Monday, I will not receive official copy in the mail until late next week. I will mail you notarized copy of written license by fastest means available when I receive it in the mail.

Getting this license has taken much longer then it was suppose to and required great effort - I hope it has come in time.

I will write you soon but right now let me thank you for all your great help and patience in this matter.

Tonight I will drink a Beck's Beer to celebrate License # WN-10407-1.

All best regards,

 J. Acord

Power Generation Group (KWU)

D-5060 Bergisch Gladbach 1

Telephone 02204 - 04 9771 / Telefax 02204 - 04 9910



Internal Memo



Telefax Message

From Krinninger / N221 Our Ref.

To HANFORD NUCLEAR SCULPTOR WORKS Your Ref.

For the attention of Mr. James Acord Fax - No. 001 509 943 2612

Date Sept. 11, 1982

Copy to

Subject SNR 300 BREEDER / BLANKET ASSEMBLIES
FOR "NUCLEAR AGE SCULPTOR"

DEAR MR. ACORD,

CONGRATULATIONS TO YOUR SUCCESS IN
APPLYING FOR THE RADIOACTIVE MATERIAL'S
LICENSE.

THE DONATION OF 12 BREEDER ASSEMBLIES
TO YOUR SCULPTOR BY SBK IS NOW BECOMING
A REALITY. THAT'S A REAL BIG EVENT AND
WILL HOPEFULLY STIPULATE OTHER ORGANISATIONS
TO SUPPORT YOUR PROJECT.

RECENTLY ALL ACTIONS HAVE BEEN
LAUNCHED BY SBK AND ALSO BY SIEMENS POWER
CORPORATION, RICHMOND TO CLEAR THE
ADMINISTRATIVE PROCEDURES (EX-AND-IMPORT
LICENSES) NECESSARY PRIOR TO SHIPMENT.

CURRENT PROJECTIONS PREDICT TRANSPORT
OF ASSEMBLIES TO SPC, RICHMOND FOR THE
SECOND HALF OF OCT. 92

Signed Best regards, Krinninger Dept. N221 Extn. 3808

Name Krinninger Sheet 1 of 1 Sheets

Ident-Nr./No. : 54.08106.*
 V-Klasse/Class. : 2.1
 TVS-Nr./No. : 152315
 Datum/Date : 06.08.91
 Seite/Page : 7

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Component (Material)	Indications	Unit	Value
assembly, total	weight (including blanket pellets) length, total width over flats, duct width over flats, outer pads	N mm mm mm	~ 1750 3700 110.25 114.8/115
blanket pin (-) cladding tube (1.4970) ¹⁾	length of pin length of pellet column outer diameter wall thickness	mm mm mm mm	2475 1750 11.6 0.5
helical wire (1.4970)	diameter pitch	mm mm	1.34 175
bundle (-)	number of pins number of wires/pin pitch number/pin		61 1 14
pin anchor grid (1.4981)	grid thickness	mm	10
duct (or wrapper tube) (1.4981, cw)	width over flats, inside the duct wall thickness	mm	105.05 2.6
upper pads lower pads (stellite 6/ inconel 718)	width height	mm	~ 30/40 ~ 55/55
head (1.4981)	outer cylindrical ø length	mm	108 415
mixing device (1.4948)	total length	mm	200

1) steel composition see Table 2

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Ident-Nr./No. : 54.08106.*
V-Klasse/Class. : 2.1
TVS-Nr./No. : 152315
Datum/Date : 06.08.91
Seite/Page : 3

1 Technical Description of the SNR-300 Blanket Assemblies

A description of the blanket assembly construction will be given on the basis of Fig. 1, Tab. 1.

The assembly consist of a head part, a pin bundle part inside a hexagonal duct (or wrapper tube) and a foot part. It is designed for use in the peripheral zone of a fast reactor core. For that purpose the assembly will be put in vertical position in the core zone inside the reactor tank with its foot fit into a spike fixing device.

The whole core together with the blanket assemblies is placed on the grid plate using the technical features described above.

1.1 The Assembly Head

The upper part of the head is in cylindrical form which changes to a conical intermediate part and is transformed finally into a hexagonal geometry to get adapted to the hexagonal form of the duct. At the outer part of this lower hexagonal head region are spacer-support pads on each face of the hexagon. The surface of the pads is covered by a friction resistant material. All other parts of the head are made from austenitic stainless steel.

The upper part of the head consist of an open tube which serves in the reactor as outlet of the cooling medium and during handling as the point where the gripper is fixed to the assembly.

In some of the blanket assemblies there is a mixing device inside the head which was thought to improve the homogeneity of the coolant and its temperature for measurement purposes.

The assembly head carries also a small piece of ferritic steel which was thought to be used for the azimuthal orientation control.

1.2 The Bundle and Duct Part

The duct is a tube with a hexagonal cross section and an equal wall thickness over the complete length. On its outside there is the so-called support level in the lower section of the duct.

This support level consists of a closed hexagonal ring which is fixed to the duct material. The corners of this hexagonal ring are plated with a friction resistant material.

Ident.-Nr./No. : 54.08106.*
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Inside of the duct is a pin bundle consisting of 61 blanket pins. The distance between pins as well as between the pins and the duct wall is maintained by a wire which is mounted in a helical form around each pin. The wire is fixed at both endplugs of the pin by a welding point.

The blanket pins are held at their lower end in the pin anchor plate. This plate itself is connected by means of a support piece to the assembly foot. This is the only fixing point of the pin bundle inside the surrounding hexagonal duct.

1.3 The Blanket Pin (Fig. 2, Tab. 1)

The pin is formed by a stainless steel tube with a wall thickness of 0.5 mm. This tube is closed at both sides by a steel plug which is gas tight welded to the tube ends. The pin contains a column of blanket pellets made from depleted uranium oxide powder.

The pellet column is held in place inside the pin by a spring at the upper pin end and a support tube at the lower pin end. The UO_2 pellets fill about 70 % of the inner volume of the pins. The rest is filled by the structure pieces as there are support tube and spring. An inert gas fill, mainly Helium and some Argon, fills the remaining empty volume.

On the outer surface of the pin is a stainless steel wire, wrapped helically around and fixed at the endplugs (see Fig. 2).

1.4 The Foot

The assembly foot is fixed to the lower end of the hexagonal duct. The outer form of the foot is at its upper part adapted to the hexagonal geometry of the duct. Further down the hexagon changes into a conical form which is followed by a cylindrical part. This cylinder ends again in a conical part with triangular formed coolant inlet openings.

Near the first conical part is a movable support ring on which the assembly is seated when put in the spike support of the reactor core grid plate.

About half way down the cylindrical part are two further rings. The first one is a piston ring which tightens the assembly foot against the grid plate avoiding unacceptable bypass flows of the cooling medium. The second one serves as centering device of the assembly in its grid plate position.

Ident-Nr./No. : 54.08106.*
V-Klasse/Class. : 2.1
TVS-Nr./No. : 152315
Datum/Date : 06.08.91
Seite/Page : 5

Two metal spike-like pieces on the hexagonal upper part of the foot serve as orientation devices when the assembly is put into the reactor core.

A gagging system using diaphragms inside the cylindrical part of the foot serves for the control of the coolant flow which removes the heat of the assembly during its residence in the reactor core.

2 Description of Package and Transport Provisions

2.1 Customs Data

The export license might be handled concerning the German customs tariff no. (Zolltarifnummer) 8401 30000.

This covers fuel containing nuclear core assemblies.

As the blanket assemblies contains depleted Uranium this action has also to follow the regulations fixed in the export list (Ausfuhrliste) no. 0102.

2.2 Package and Transport description

It is foreseen to handle the assemblies and transport containers in the following way:

- a) The blanket assemblies are taken from their storage in vertical position and put into a special positioning device. They are wrapped in a polyethelene foil.
- b) The positioning device brings the assembly into horizontal position.
- c) In that position the assembly is packed into the specific container (wood).
It is supported at 3 levels, the two spacer-pad levels and the hexagonal part of the foot.
- d) The transport container for SNR-300 blanket assemblies is shown in drawing S-2-300-01 (Fig. 3).
- e) One container can take 3 assemblies.
- f) The assembly fixations are screwed after positioning the assemblies in the container.
- g) There is no drying medium foreseen in the container.

Ident-Nr./No. : 54.08106.*
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Datum/Date : 06.08.91
Seite/Page : 6

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- h) The container will be closed by at least 3 steel belts.
- i) The container is supposed to be loaded by crane on an air-cushioned transport vehicle.
- j) The container is fixed on the vehicle with the assembly foot in travel direction.
- k) Assembly and transport container will be checked to be free of contamination.
- l) Transport
- m) Discharge and handling concerning the regulations in force at the destination point.

Hanford Nuclear Sculpture Works
P.O. Box 159 - Richland, WA 99352
(509) 946-1572

APPLICATION

for

RADIOACTIVE MATERIALS LICENSE

Fee Code 24 - SNM/DU

by

James L. Acord, sculptor

JULY 1992

APPENDIX

SUPPLEMENT 6 (B); description of sealed sources.....	11
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SUPPLEMENT 8; training and education.....	31
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SUPPLEMENT 6 (B)

DESCRIPTION OF 12 SEALED SOURCES

The following technical information, supplied by the manufacturer of the sealed sources (Siemens AG - INTERATOM), demonstrates fully the advanced corrosion-resistant materials and quality of craftsmanship that makes these 12 Breeder/Blanket Assemblies eminently qualified and suitable for placement in a permanent outdoor sculpture setting.

Breeder/Blanket Materials Inventories w/ serial numbers.....12

Data of Assemblies for Export Purposes, prepared
by Siemens AG (INTERATOM) - which includes
much good information on packaging,
activity, mass/weight/void arrangement, etc.....13

Copy of letter from INTERATOM (dated 13.09.91) describing
a large shipment of technical documents,
(including the above mentioned) as well as
large, fragile blueprints, long technical
reports in german, etc., any of which I
will send you upon request.....25

Breeder/Blanket Assembly Material Inventories

Assembly Identification Number	UC ₂ -weight [g]	U-weight [g]	U235-weight [g]	U235/U [%]	metal/ceramic conversion
					U/UO ₂ [%]
YM 20N 001 C	92626	81631	193	0,2365	88,13
YM 20N 002 C	92669	81669	193	0,2360	88,13
YM 20N 003 C	92507	81615	201	0,2463	88,13
YM 20N 004 C	92516	81622	194	0,2377	88,13
YM 20N 005 C	92586	81596	193	0,2360	88,13
YM 20N 006 C	92558	81571	193	0,2367	88,13
YM 20N 007 C	92633	81637	193	0,2360	88,13
YM 20N 008 C	92550	81564	199	0,2440	88,13
YM 20N 009 C	92617	81623	200	0,2451	88,13
YM 20N 010 C	92640	81644	193	0,2360	88,13
YM 20N 011 C	92584	81594	201	0,2464	88,13
YM 20N 012 C	92436	81464	202	0,2480	88,13

☒ Notiz / Note

☐ Protokoll / Minutes of Meeting

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Distribution		54.08106.*	06.08.91
Verfasser/Author	OE/Dept.	Auftrags-Nr./Cost Code	Projekturzz./Proj.Shortn.
Heyne	F413	4124-1100-01	SNR-300
		SK Sachschl./File-No.	TVS-Nr./No.
			152315
Gegenzeichnung/Approval	Unterschrift/Signature	Zusatz-Nr./Additional No.	
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F413		9	3
S113 Herr Krinninger (5x)			2.1
(F41)			37
		Betreff/Subject	
		Data of SNR-300 Blanket Assemblies	
		Prepared for Export Purposes of 3 Assemblies to WHC/Hanford, USA	

Schutzbedürftiges Firmeneigentum

Summary

Three fresh blanket assemblies of the first SNR-300 core are planned to be exported to Hanford, Westinghouse Corporation, to be integrated into a special sculpture of the Nuclear Age.

This note provides the necessary technical information which is needed for this purpose.

Hanford Nuclear Sculpture Works
P.O. Box 159 - Richland, WA 99352
(509) 946-1572

7 July 1992

Debra McBaugh, Radioactive Materials Section
DOH - Division of Radiation Protection
Airdustrial Park, Bldg 5
P.O. Box 47827
Olympia, WA 98504-7827

Dear Debra McBaugh,

I write you at this time to make formal application for a twenty five percent (25%) Small Business Discount on my radioactive material fees.

As a sculptor doing business in the State of Washington under the registered trade name Hanford Nuclear Sculpture Works (Washington State Unified Business ID #: 601 392 833) I certify I am a sole proprietorship formed for the purpose of making a profit.

Additionally, I certify I am independently owned (by self) and not a subsidiary of a parent company. I always have less than fifty employees.

Attached to this letter, and included with my completed Application for a code 24 SNM/DU Radioactive Materials Licenses, please find a notarized SMALL BUSINESS CERTIFICATION form supplied with my application packet, photo-copy of my Washington State business license and my check for the sum of \$375.00 which reflects a small business discount of 25% on this radioactive materials license fee.

Thank you for what time and consideration you may continue to lend me in this matter.

Very truly yours,

James L. Acord, sculptor

chief executive officer
Hanford Nuclear Sculpture Works

attachments: Notarized Small Business Certification.
Copy of HNSW business license.
Check # 1045 for sum of \$375.00

SMALL BUSINESS CERTIFICATION

NAME OF LICENSEE/APPLICANT: James L. Acord, sculptor

ADDRESS: 322 Cullum Ave. (P.O. Box 159) Richland, WA 99352

Hanford Nuclear Sculpture Works - WA State U B I # 601 392 833

LICENSE NUMBER (IF ISSUED): _____

I understand that I or the independent small business I represent will receive the discount prescribed in wac 246-254-030 upon validation of the information to which I am attesting.

I fully understand that the Department of Health may verify this information at any time. I hereby authorize the departments of Revenue, Licensing, and/or Labor and Industries to provide the Department of Health such information as is directly applicable to verifying the information provided by this certification.

I hereby certify that the above-named licensee or license applicant is:

1. A corporation, partnership, sole proprietorship, or other legal entity formed for the purpose of making a profit.
2. Independently owned and operated from all other businesses, and
3. Employs 50 or fewer employees.

Furthermore, I certify that I am the chief executive officer of the licensee or license applicant (or other responsible official empowered to act on behalf of the above-named independent small business).

Subscribed and sworn to before me
this ____ day of _____ 19__

Notary Public in and for the
State of Washington

Residing at _____

James L. Acord

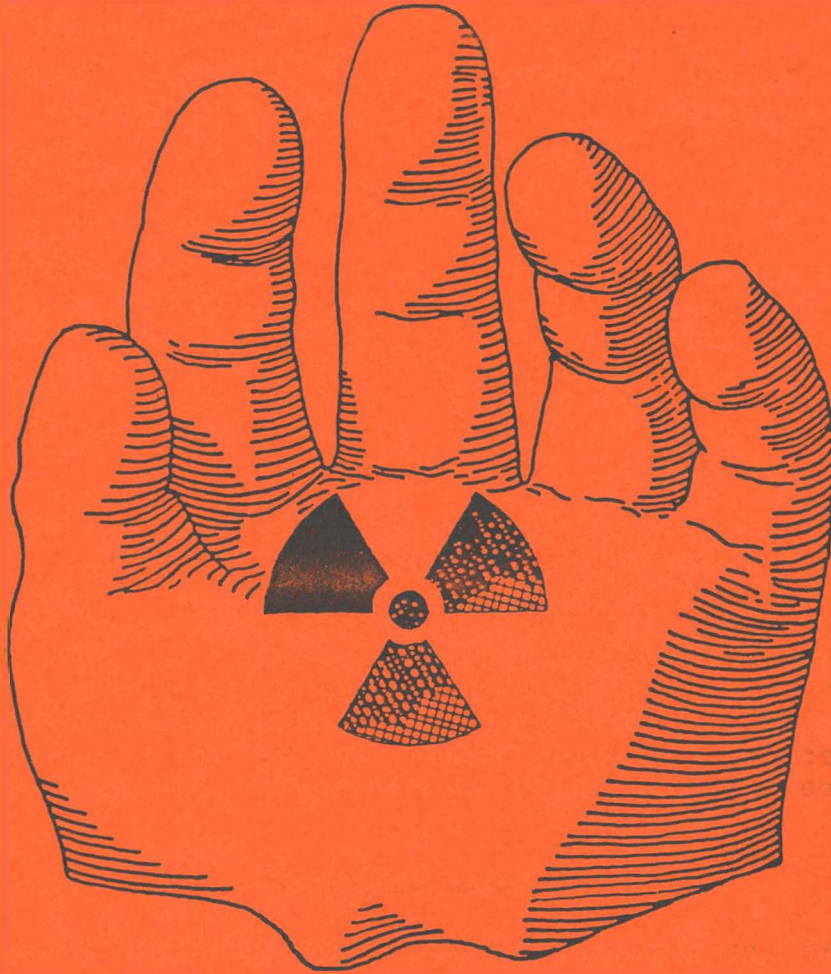
Officer's name (please print)

Officer's Signature
chief executive officer
of a
sole proprietorship

Title

Date: _____

TRANSMUTATIONS:
ART, NUCLEAR PROCESS AND
THE HUMAN ENVIRONMENT



presented by
SENIOR COLLOQUIUM
LOUISIANA SCHOLARS' COLLEGE

DECEMBER FIRST, 1992

JAMES L. ACORD, SCULPTOR
P.O. BOX 159 - RICHLAND, WA - 99352
USA

TRANSMUTATIONS:
ART, NUCLEAR PROCESS AND THE HUMAN ENVIRONMENT

1 December, 1992

SENIOR COLLOQUIUM
LOUISIANA SCHOLARS' COLLEGE

James L. Acord, sculptor - P.O. Box 159
Richland, WA 99352 - (509) 946-1572

PROLOGUE

Tomorrow marks the fiftieth anniversary of humankind's entrance into the nuclear age. To the scientists and engineers who have devoted that best portion of their lives to discovering and perfecting this technology, fifty years must seem a long time. However, measured against the long course of human events: the Stone Age, the Age of Bronze, and the Iron Age; the Nuclear Age is in it's infancy.

Although we stand at the advent of the Nuclear Age, it's coming has been foretold in art since earliest times (e.g. graphic depiction of "invisible rays" in ice-age times). Even in this century, before the first self-sustained chain reaction, film and literature predicted both the potential of abundant energy and the military applications of nuclear process. An indivisible part of civilization, art integrates understanding into the fabric of the human state, as well as showing glimmers of the future. Art is unique to our having become human.

A PERSONAL NARRATIVE

I walked into the nuclear age inadvertently, thinking of other things. Ideally, art and science is a pursuit of truth unfettered by practical considerations. Only when I got here did I realize where I was going.

Of the Fine Arts, sculpture is clearly an art of technology. The creation of this art involves the selection of materials and processes (as well as artistic vision) and is buttressed upon technology. My use of nuclear technology in art came about through a traditional pursuit of sculpture. In searching for durable materials to withstand today's polluted outdoor environment I arrived at granite (the most radioactive of the traditional sculpture materials) and the advanced metal-alloys associated with the technology of the nuclear age.

Some ten years ago, as an aesthetic consideration, I wished to use small amounts of uranium in my sculptures. After considering a variety of sources I selected the uranium oxide in the glaze of certain ceramic tableware manufactured before the Manhattan Project. Safely containing this radioactive material in my sculptures became an issue of considerable interest.

On the one hand, colleagues were alarmed at my using radioactive material in art. Concerns ranged from safety to the environment to the dire consequences of glorifying nuclear materials. As it happened, my studio at that time was located in a "nuclear-free zone".

On the other hand, radiation control agencies expressed great concern about an artist using radioactive materials in sculpture. All work with radioactive materials is regulated.

During this period a colloquia grew from the sculptures. I discovered that the addition of the word "nuclear", even when joined to "art", provoked an intensity of debate more akin to medieval theology than art or science. In 1989 I moved to Richland, home of the Hanford Nuclear Reservation, and a community unlikely to become a "nuclear-free zone".

Until I moved to Richland I had missed the whole point. What marks this as the Nuclear Age is not the adjunct advances in metallurgy and fabrication technology, but our understanding and control of nuclear process. The alteration of matter at the nuclear level, releasing primal energy of the universe, the creation of new elements; this is the reality of the Nuclear Age. As with every entrance into a new age this accomplishment has profoundly altered the human condition and profound changes in the human condition are the reality of art.

Sculpture can be thought of as the ordered arrangement of mass and void. It was an arrangement of mass and void, ordered by the science of physics fifty years ago, that marked the advent of the Nuclear Age. In some hard-to-define but fundamental way nuclear process and the art of sculpture have a profound commonality.

This compelling observation haunted me. How ~~could~~ the art of sculpture address nuclear process? The answer came in the spring of 1990 with the announcement that the Fast Flux Test Facility Reactor (FFTF) was to be made available to private users. The opportunity to use America's most advanced nuclear reactor for the creation of art was at hand.

With considerable help from a volunteer Technical Advisory Committee of physicists and engineers, I submitted a proposal for the first fine art use of nuclear process. My idea is to

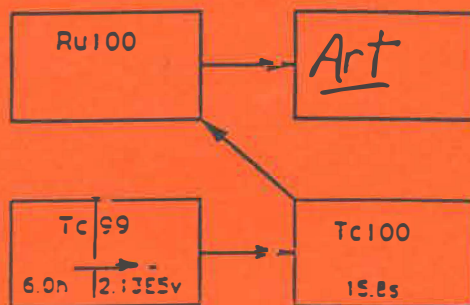
transmute Technetium ⁹⁹ to Ruthenium ¹⁰⁰ via fast neutron capture in FFTF. Technetium is not only the first 'manmade' element but, in isotope 99, is a very radioactive and long-lived product of the fissioning of Uranium and Plutonium. The milligrams of non-radioactive Ruthenium produced by my use of nuclear process will be incorporated in large works of sculpture created with granite, basalt and advanced metal alloys supplied by Siemens AG.

This use of America's most advanced reactor, for the transmutation of a fission by-product into a stable metal, may accomplish things in addition to the purpose of creating sculpture: It brings art and science together in important societal issues of technology; widens the possibilities for decisions on environmental restoration and gives symbol and metaphor to the Nuclear Age in which we all live.

SUMMARY

For civilization to express itself in works of art, created with the most advanced process technology and from the wonder materials of the time, is a tradition three hundred and fifty centuries old. Long before recorded history, sculptors created art which reflected and contributed to the values of the civilization that produced it. Today, the use of nuclear process for the creation of art is not only logical and inevitable - it may supply something necessary toward civilization's understanding and mastery of the Nuclear Age in which we live.

The pursuit of art and science is no mere impulse but rather a fundamental instinct inseparable from the human condition. The insights and truths thus gained become our culture; the accumulation of art, science and technology is our civilization. In art, as well as science, the future is not someplace we are going but one we are creating. The paths are not found but made. Now, at the advent of the Nuclear Age, I believe creating art with nuclear process can help make that path, changing both the makers and the destination.



James L. Acord, sculptor

Assembly Steps

all cut to length

Head end ① file prep head end @ $\frac{1}{8}$ " back

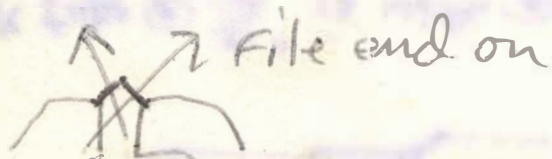
install $\frac{5}{32}$ ϕ in head end at $\frac{3}{8}$ " -- solder and clamp up.
Either

- ① cut body to length
- ② file prep foot end
- ③ install $\frac{5}{32}$ Hex

Foot end

- ① install $\frac{5}{32}$ Hex and solder
- ② Saw (or file if close) to length

- ③ Flat Bastard (large) angle the flats - 2 sides at a time



- ④ flip in vise and file ridges - Back to Front - back @ $\frac{3}{16}$ " and round.

- ⑤ smooth with coarse paper

- ⑥ smooth with fine paper

- ⑦ clean inside orifice

- ⑧ Solder all 3 ϕ at $\frac{1}{2}$ " + $\frac{1}{32}$

- ① install $\frac{5}{32}$ ϕ in ^{foot} head end and solder
- ② ~~file prep (doubled) head end~~

- ② saw body to length of $5\frac{3}{16}$ ($5\frac{9}{16}$ - with Head tube)

- ③ File taper on foot end (doubled hex) @ $\frac{3}{16}$

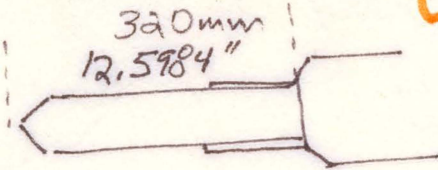
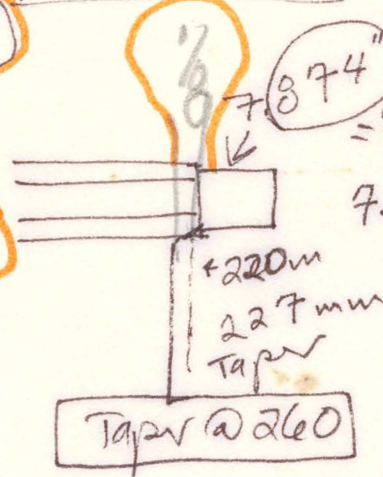
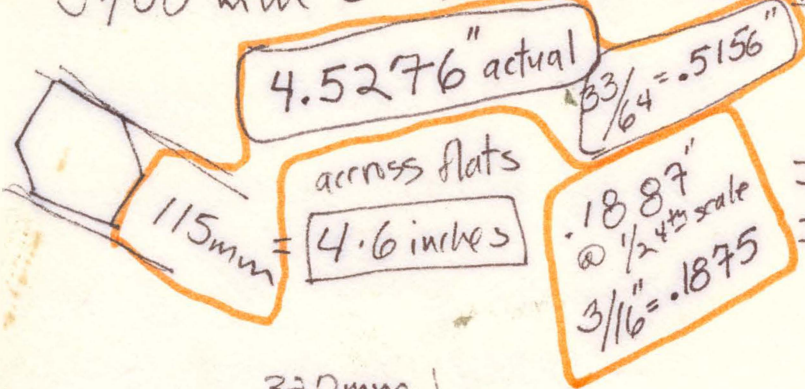
$\frac{1}{24}$ scale Work Sheet

6.0695 inches

$6 \frac{9}{128}$ or $6 \frac{1}{16} +$

$3700 \text{ mm} = 145.669 \text{ inches} = 12.139 \text{ ft.}$

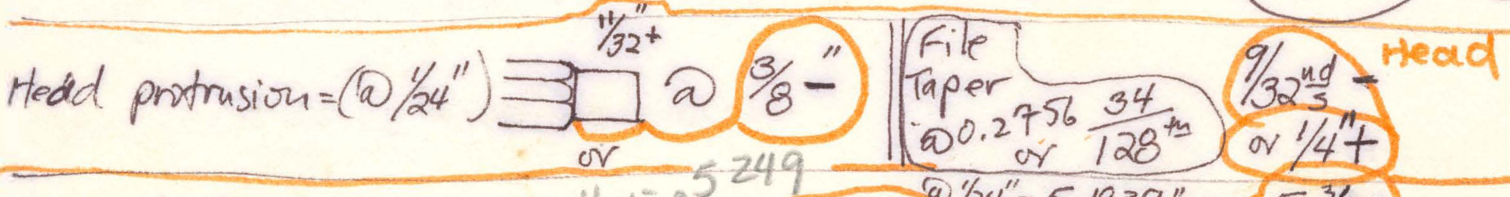
Head is $7 \frac{7}{8}$ "



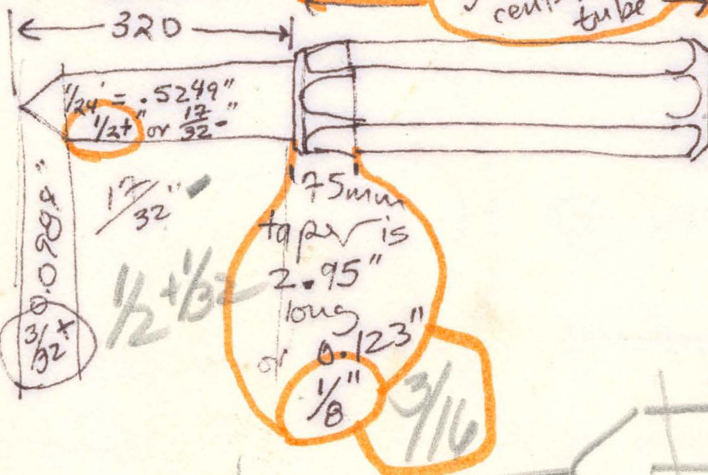
$220 = 8.6614$
 $= 0.3609$
 $0.3609 = \frac{23}{64}$
 or $\frac{11}{32}$ in.

Hex tube @ $\frac{3}{16}$ " is width @ $\frac{1}{24}$ th scale

$3700 \text{ mm} = 145.6690 \text{ @ } \frac{1}{24} \text{th} = 6.0695 = 6 \frac{9}{128}$ or $6 \frac{1}{16} +$ length of total assembly



Foot on treadles $12.5984 \text{ @ } \frac{1}{24} = 5.249$ $\frac{3160}{\text{central Hex tube}}$ $\text{at } \frac{1}{24} = 5.1837$ or $5 \frac{3}{16}$

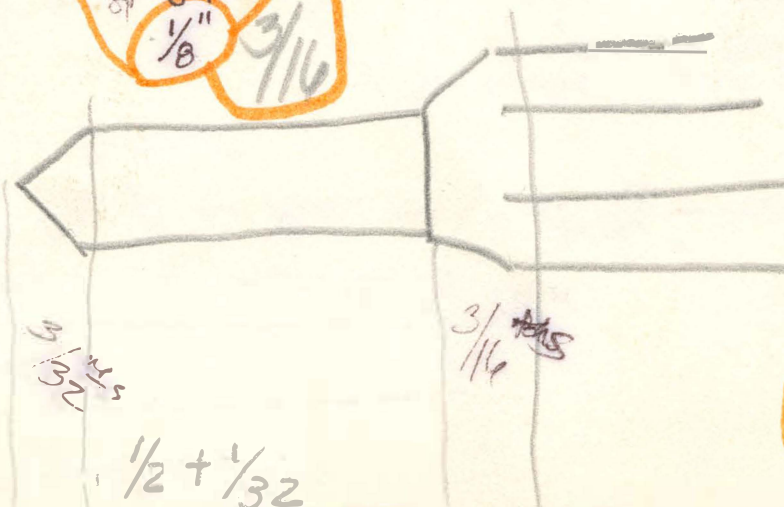


$5 \frac{35}{32}$ nd

$\frac{12}{32}$

$\frac{17}{32}$

(29)



$5 \frac{3}{16}$

Hex body

James L. Acord, sculptor

Hanford Nuclear Sculpture Works
Radioactive Materials License: WN-IO407-1
P.O. Box 159, Richland, WA 99352
USA

Telephone: (509) 946-1572
Telefax: (509) 943-2612

December 20, 1992

Dear Dr. Krinninger,

I write you at this time to wish you all the best in the coming New Year. Your generous assistance to my art-work in the past two years has made a significant contribution to integrating the Nuclear Age into the broad fabric of human affairs, as well as my sculpture.

To date I have not heard any details about shipping arrangements of the 12 Assemblies although Mr. Hottenrott telephoned November 23 to say the U.S. Department of Commerce had issued the International Import License.

At present I am creating a scale model of the Nuclear Age Sculpture that will incorporate the 12 SBK Blanket Assemblies. When the model is finished I will send you photographs of it.

In the meanwhile I would like you to accept this 1/24th scale model of a Blanket Assembly as a token of my appreciation for all the help you have been and the honor you have shown me.

With every best wish for this holiday season, I remain

Very truly yours,

James L. Acord, sculptor

enclosure: 1 = 24 scale model of SBK Blanket Assembly.



STATE OF WASHINGTON
DEPARTMENT OF HEALTH

Airdustril Center, Bldg. 5, LE-13 • P.O. Box 47827 • Olympia, Washington 98504-7827

TO: New License Applicants
SUBJECT: CITY/COUNTY OFFICIAL NOTIFICATIONS

The Department of Health has adopted a Local Government Notification Policy as required by law. The Division of Radiation Protection notifies appropriate local government officials whenever a Radioactive Materials License application is received. In order to allow local officials time to comment if they wish, the Division of Radiation Protection is required to delay the issuance of licenses for at least 20 days from the date of such notification. In order to expedite this notification process, please supply the information requested below.

NOTE: If you have more than one facility, your answers must pertain to the facility(ies) where radioactive material is to be used and/or stored.

RETURN THIS DOCUMENT WITH YOUR RADIOACTIVE MATERIALS LICENSE APPLICATION

Name of License Applicant: James L. Acord

Name of County: Benton County - City of Richland

**Name of Mayor: Mr. Craig Buchan - Mayor of Richland

Complete Mailing Address of Mayor: 1422 Farrell Lane

Richland, WA 99352

City Zip

**If your facility is located outside city limits, please indicate:

Name of County Commissioner: _____

Complete Mailing Address of Commissioner: _____

City Zip

** Is your facility located on federal or Indian land: Yes _____ No X

James Acord, sculptor - P.O. Box 159
Richland, WA 99352 - (509) 946-1572
(hm) 946-2484

March 24, 1992

Debora McBaugh
Radiation Protection - Dept. of Health
Airdustrial Park - Building #5
P.O. Box 47827
Olympia, WA 98504-7827

COPY

Dear Debora McBaugh,

Thanks for all your help over the past month with the problems arising from my becoming the proud owner of 12 breeder-blanked assemblies. No sooner had I returned from my lecture in Alaska then my computer became sick and had to go to the Amiga hospital in Memphis, TN. Little did I realize how abjectly dependent I had become on my computer... I couldn't even find my old typewriter. Federal Express just returned it to me and I am writing you about securing a license for possession of depleted uranium.

From our telephone conversations in February I understand that my possession and eventual fine-art use of breeder-blanket assemblies containing depleted uranium might be covered under a WA State specific licenses for using depleted uranium for its mass and weight. This category sounds promising to me and I am asking you to send on to me all applicable application forms so that I may make a formal application to the State.

Mr. Jim Edgars of Siemens Nuclear Power Group (USA) has written me a letter (copy enclosed) describing the role his company will play in receiving the assemblies on my behalf. I am forwarding it on to the German National Authority concerned about Siemens AG's shipment of the assemblies to me and I am hoping this will prevent an expensive delay in the shipment from Germany. Yet, even if this works, I see the time-sensitive need to get a Washington State Licenses (recognized by U.S. NRC) for possession of depleted uranium in quantity.

In closing thanks for all the help you have been to date and for the time and consideration you may show in sending me all necessary information and forms toward a specific license.

Very truly yours,

enclosures: copy of letter from Siemens Nuclear Power Group.

Hanford Nuclear Sculpture Works
P.O. Box 159 Richland, WA 99352
(509) 946-1572

26 August 1992

Debra McBaugh, Radioactive Materials Section
DOH - Division of Radiation Protection
Airdustrial Park, Bldg 5
P.O. Box 47827
Olympia, WA 98504-7827

Dear Debra McBaugh,

Enclosed with this letter please find a copy of a letter from SIEMENS NUCLEAR POWER CORPORATION (S.N.P.C.) [dated February 25, 1992 and signed by James B. Edgar, Staff Engineer for Licensing] that supports my APPLICATION FOR A RADIOACTIVE MATERIALS LICENSE (Special Nuclear Material/Depleted Uranium), submitted to your Department on 8 July of this year and issued Licensing Action Number 92-07-37.

In our telephone conversation Monday (24 August, 1992) you suggested I supply your department with a statement from S.N.P.C. expressing their willingness to accept delivery of 12 Breeder-Blanket Assemblies from Siemens AG (Germany) and store them for me until I move them to the sculpture site. I believe the first sentence of this letter ("...Siemens Nuclear Power,..., will take possession of (not title to) and store depleted uranium breeder blanket assemblies under its Washington State License, WN-IO62-1.") clearly states this intention.

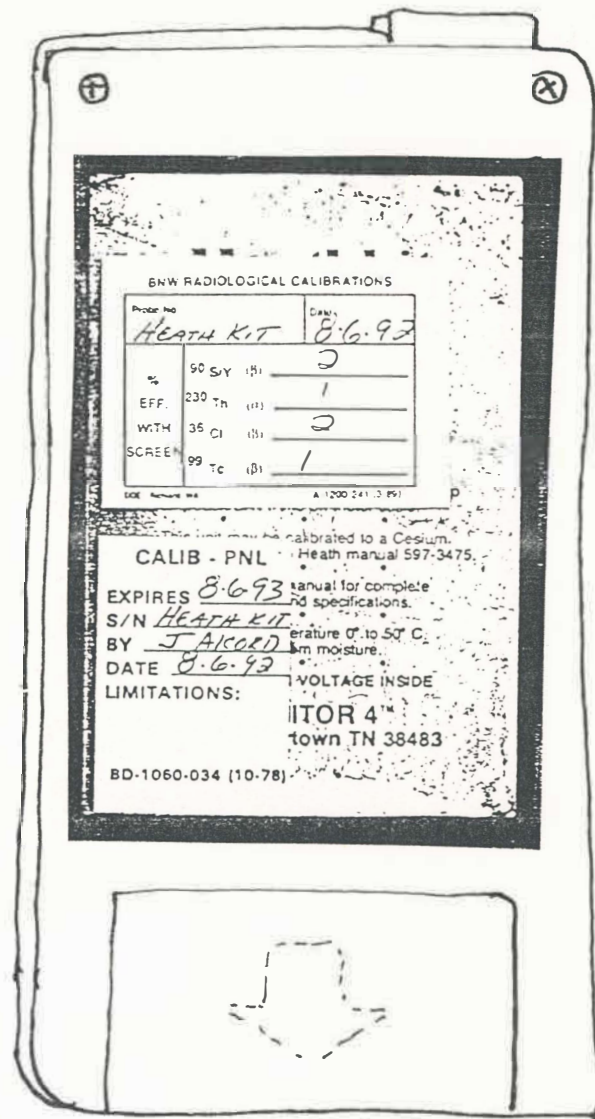
Additionally (also per our telephone conversation Monday) I hope to meet with you in Richland today to review my Application for a SNM/DU License. Again, if I can be of any help in expediting this matter, answer any questions or supply you with any other relevant material, please don't hesitate to call me: hm (509) 946-2484, machine 946-1572.

Very truly yours,

James L. Acord, sculptor

enclosure: Copy of letter from Siemens to Acord (25 Feb. '92)

CC: James B. Edgar, Siemens Nuclear Power (Richland)
Dr. Herbert Krinninger, SBK mbH (Germany)
Dr. Werner Koop, Siemens AG (Germany)
Mr. G. Hottenrott, SBK mbH (Germany)



HeathKit - Ratemeter 4

Calib - 8-6-92

30.12.92 13:59

RWE ENERGIE AG

850 P01

06145 30.DEZ 92 14:04

RWE Energie AG
KK-VN

Essen, 30.12.1992
Ho/Kt

T e l e f a x

Mr. James Acord
Hanford Nuclear Sculpture Works

Nr.: 001-509-943 2612

Dear James Acord,

Thank you very much for your letter of 20 December 1992 and the scale model.

All arrangements concerning the shipping of the 12 Assemblies have been made.
The export license is available.

Transport will start on 6 January 1993. This date has been agreed with
Mr. James B. Edgar, SNPC, Richland.

With all best wishes for the year 1993.

Very truly yours,



G. Hottenrott
RWE Energie, KK-VN

Hanford Nuclear Sculpture Works
P.O. Box 159 Richland, WA 99352
(509) 946-1572

6 August 1992

Debra McBaugh, Radioactive Materials Section
DOH - Division of Radiation Protection
Airdustrial Park, Bldg 5
P.O. Box 47827
Olympia, WA 98504-7827

Dear Debra McBaugh,

Enclosed with this letter please find copies of two (2) supplements I wish to add to my APPLICATION FOR A RADIOACTIVE MATERIALS LICENSE (Fee Code 24 - SNM/DU), submitted to your Department on 8 July of this year.

The first supplement I wish to add goes with my APPLICATION's SUPPLEMENT 8: TRAINING AND EDUCATION (pages 31-33). This addition of four (4) pages is retro-fit with page numbers 33 a, 33 b, 33 c and 33 d, and documents my having successfully completed GENERAL RADIATION WORKER TRAINING - INITIAL on August 5, 1992. This training meets the requirements of DOE 5480.11, 10 CFR 20 (1991) as well as Title 246 WAC and NRC Regulatory Guides.

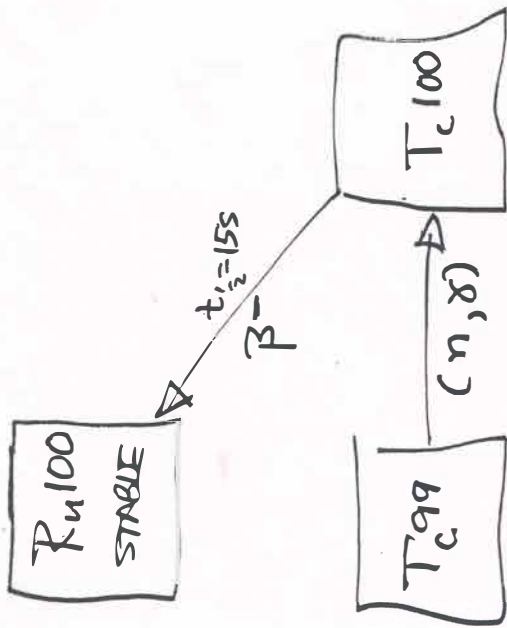
Secondly, I wish to add a one (1) page supplement to question #11 on my APPLICATION (no supplement previously existed). This supplement (with added page number of 34 a) shows a photocopy of calibration decals (dated 8/6/92) on the Heath-Kit instrument described in question 10 of my APPLICATION. Let me reiterate my intention to purchase a more sophisticated radiation instrument before I take possession of the 12 Breeder-Blanket Assemblies.

Again, if I can be of any further help, answer any questions or supply you with any other relevant material, please don't hesitate to call me: hm (509) 946-2484, machine 946-1572.

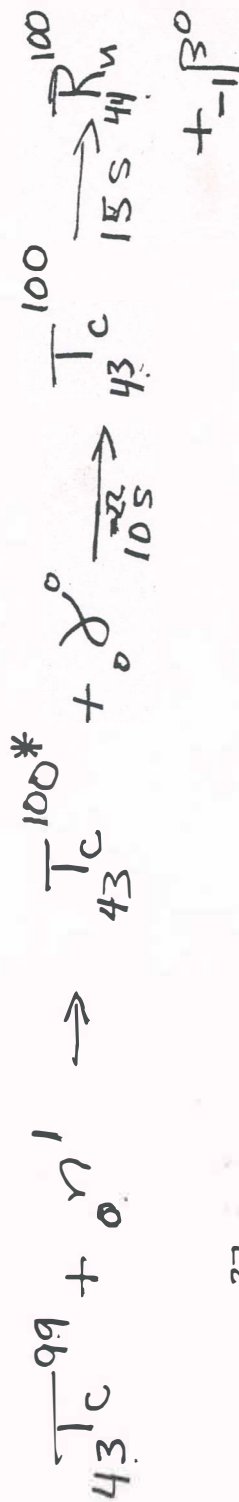
Very truly yours,

James L. Acord, sculptor

enclosures: Addition to SUPPLEMENT 8; 4 pages (pp 33a, b, c & d).
Addition to APPLICATION question #11; 1 page (pp 34a)



(very active)



$$10^{-22} = \frac{1}{\underbrace{1000000000}_{22 \text{ zeros}}}$$

Sealed $\rightarrow$ used for radiography
 (cf 252) $\rightarrow$ n + - -
 (cf 252) $\rightarrow$ n + - -
 largest / gm neutron
 source of reasonable $t_{1/2}$
 ~ 200 days

Medial

"putting
 well"

Gd153 $\leftarrow$ Final Product

Eu152 } long half lives
 Eu154 } very undesirable



Chemically Sep. (very sophisticated)

Eu from Gd several steps

chemist doing the work

Earl Wheelwright (PNL)

Leave Bros

running for office Idaho

99999.9

(99.99996 Gd153)

Fission Product
 $S_{n90} \rightarrow$ 790
 "Cow"

Cs137
 Blood Irradiation
 Similar to Co60

target - 100s to 1000s

Eu₂O₃ pellets

df

Gd₁₅₄
64

β^-

Eu₁₅₄
63

Eu₁₅₃
STABLE

(η, γ)

Eu₁₅₁

(η, γ)

Eu₁₅₂

used for Dual Photon Absorptometer

Gd₁₅₃
241.6d

(η, γ)

Gd₁₅₂

Osteoporosis Det.

Gd₁₅₃

Medical App.

$\beta^+ \epsilon$

Sm₁₅₄
62

2 X ramp
40 hrs, 60 min
Eu₁₅₃

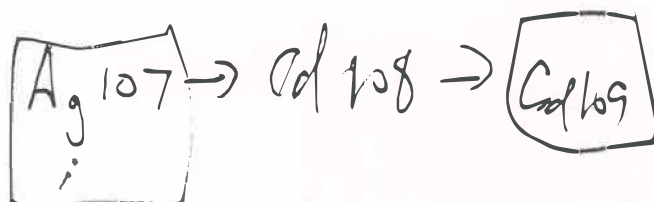
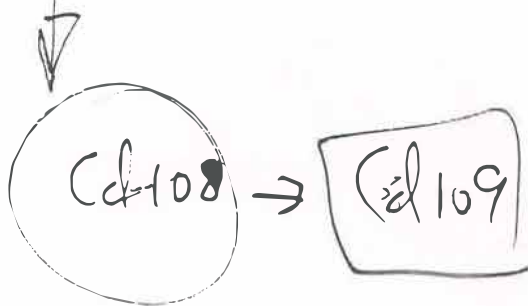
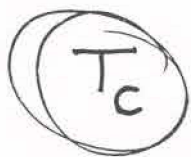


ϵ = Electron capture

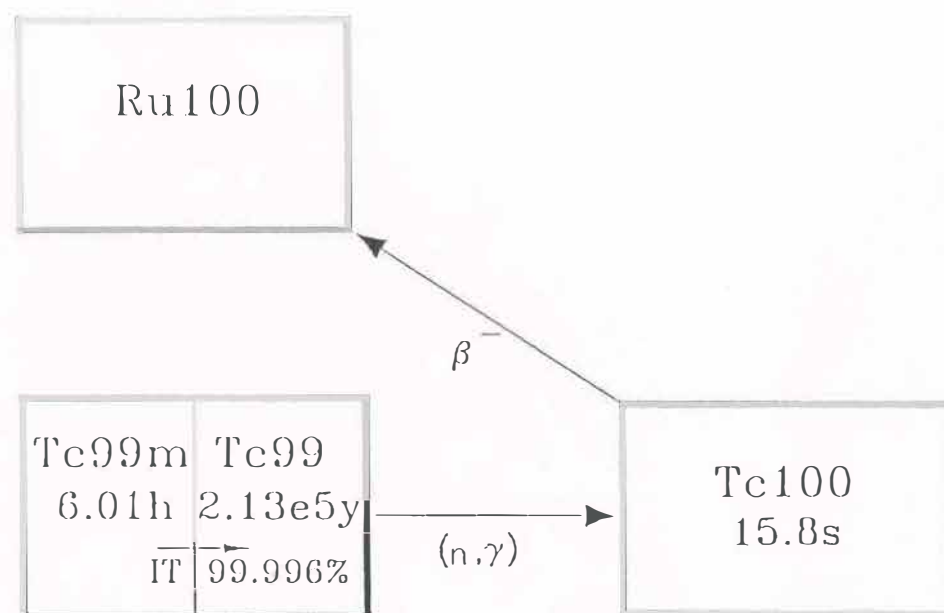
β^+ = Positron emission

β^- = electron or beta minus emission

11 days irradiation (the strips a medical isotope run)



TRANSMUTATION OF TC99 TO RU100



technetium (Tc), chemical element, synthetic radioactive metal of Group VIIb of the periodic table, the first element to be artificially produced. The isotope technetium-97 (2,600,000-year half-life) was discovered (1937) by the Italian mineralogist Carlo Perrier and the Italian-born American physicist Emilio Segrè in a sample of molybdenum that had been bombarded by deuterons in the Berkeley (California) cyclotron. This isotope is the longest lived member of a set from technetium-92 to technetium-107 that has since been produced. The most important isotope, because it is the only one available on a large scale, is technetium-99 (212,000-year half-life); it is produced in kilogram quantities as a fission product in nuclear reactors. Technetium metal looks like platinum but is usually obtained as a gray powder. It crystallizes in the hexagonal close-packed structure and is a superconductor below 11.2 K. Except for technetium-99, technetium-97, and technetium-98 (1,500,000-year half-life), technetium isotopes are short-lived.

Technetium occurs in the Earth's crust as minute traces from the spontaneous fission of uranium; the relatively short half-lives preclude the existence of any primordial technetium on Earth. The American astronomer Paul W. Merrill's discovery in 1952 that technetium-99 is present in S-type stars was a valuable piece of evidence concerning stellar evolution and nucleosynthesis. Technetium, chemically similar to rhenium (atomic number 75), exists in oxidation states of +7, +6, and +4 in compounds such as KTcO_4 , potassium technetate(VII), TcCl_6 , technetium(VI) chloride, and TcS_2 , technetium(IV) sulfide, respectively.

atomic number	43
commonest isotope	(99)
melting point	2,172° C (3,942° F)
boiling point	4,877° C (8,811° F)
specific gravity	11.5 (20° C)
valence	4, 6, 7
electronic config.	2-8-18-14-1 or (Kr)4d ⁵ 5s ¹

platinum (Pt), chemical element, synthetic radioactive metal of Group VIII of the periodic table, used as an alloying agent to harden platinum and palladium. Silver-gray ruthenium metal looks like platinum but is rarer, harder, and more brittle. The Russian chemist Karl Karlovich Klaus established (1844) the existence of this rare metal and retained the name his countryman Gottfried Wilhelm Osann had suggested earlier (1828) for a platinum group element the discovery of which had remained inconclusive. Elemental ruthenium occurs in native alloys of iridium and osmium: up to 14.1 percent in iridosmine and up to 18.3 percent in siserskite. It also occurs in sulfide

and other ores (e.g. in pentlandite of the Sudbury, Ont., nickel-mining region) in very small quantities that are commercially recovered.

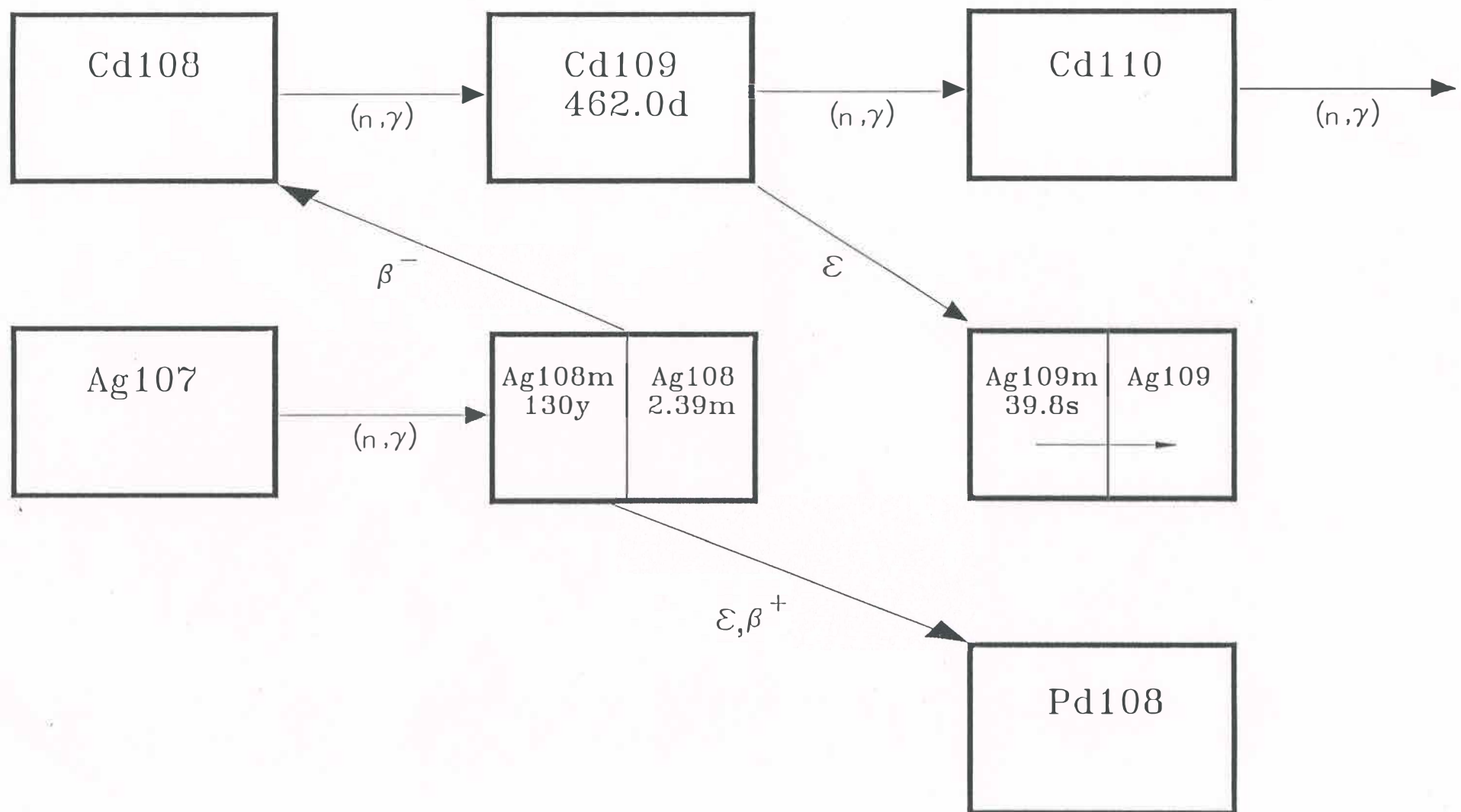
Because of its high melting point, ruthenium is not easily cast; its brittleness, even at white heat, makes it very difficult to roll or draw into wires. Thus, the industrial application of metallic ruthenium is restricted to use as an alloy for platinum and other metals of the platinum group. It serves the same function as iridium for the hardening of platinum and, in conjunction with rhodium, is used to harden palladium. Ruthenium-hardened alloys of platinum and palladium are superior to the pure metals in the manufacture of fine jewelry and of electrical contacts for wear resistance.

Ruthenium is found among the fission products of uranium and plutonium in nuclear reactors. Radioactive ruthenium-106 (one-year half-life) and its short-lived daughter rhodium-106 contribute an important fraction of the residual radiation in reactor fuels a year following their use. Recovery of the unused fissionable material is made difficult because of the radiation hazard and the chemical similarity between ruthenium and plutonium.

Natural ruthenium consists of a mixture of seven stable isotopes: ruthenium-96 (5.51 percent), ruthenium-98 (1.87 percent), ruthenium-99 (12.72 percent), ruthenium-100 (12.62 percent), ruthenium-101 (17.07 percent), ruthenium-102 (31.61 percent), and ruthenium-104 (18.58 percent). It has four allotropic forms. The metal does not tarnish in air at ordinary temperatures and resists attack by strong acids, even by aqua regia. Ruthenium is brought into soluble form by fusion with an alkaline oxidizing flux, such as sodium peroxide (Na_2O_2). The green melt contains the perruthenate ion, RuO_4^- ; on dissolving in water an orange solution containing the stable ruthenate ion, RuO_4^{2-} , usually results. Very volatile ruthenium tetroxide, RuO_4 , used in separating ruthenium from other heavy metals, contains the element in the +8 oxidation state. All states from zero through +8 are known, but +3, +4, +6, and +8 are most important. Numerous coordination complexes are known, including a unique series of nitrosyl (NO) complexes.

atomic number	44
atomic weight	101.07
melting point	2,250° C (4,082° F)
boiling point	3,900° C (7,052° F)
specific gravity	12.30 (20° C)
valence	1, 2, 3, 4, 5, 6, 7, 8
electronic config.	2-8-18-15-1 or (Kr)4d ⁷ 5s ¹

Cd109 Production and Decay



Isotope Production in the FFTF by Neutron Transmutation

R. E. Schenter
M. A. Myjak

Date Published
December 1987

Presented at
International Conference on
Nuclear Data for Science and Technology
Mito, Japan
May 30-June 3, 1988

Prepared for the U.S. Department of Energy
Assistant Secretary for Nuclear Energy



Westinghouse
Hanford Company

P. O. Box 1970
Richland, Washington 99352

Hanford Operations and Engineering Contractor for the
U.S. Department of Energy under Contract DE-AC06-87RL10930

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screened the complete table of isotopes resulted in the consideration of over 440 nuclides. Only the production of isotopes by neutron transmutation was considered (no fission product production) with predominantly (n, γ) reactions as the focus. Other reactions such as (n,p), (n,2n), and (n, α) will play a more important role in future studies. In addition, information on application and market value of the product isotopes was collected. These data, which primarily involved medical applications, were included in this study and used to help identify future candidates for FFTF production. It should be recognized that this study (survey) is a starting point for determining target/product isotopes. In-depth production analyses will be required for each individual case, as well as studies of reactor operation impact, post irradiation handling, etc. Detailed production analyses for FFTF have been made for the isotopes Gd-153 and Cf-252.

Most of the analysis for this study involved considering mainly the use of a "Hydride" assembly that was recently successful in producing the isotopes Co-60 and Gd-153.² Table 1 lists the most promising isotopes for production in FFTF. These 25 isotopes were obtained by considering both production efficiency and application importance or market value.¹ Table 2 lists the complete set of isotopes that this study indicates as possible

Table 1. Isotopes Efficiently Produced in the Fast Flux Test Facility with Significant Application Potential

	<u>Isotope</u>	<u>Application and/or Value*</u>
1.	C-14	Medical, Value = \$11,000/G
2. <i>Phosph</i>	P-33	Medical, Value = \$3,000,000,000/G
3. <i>Calcium</i>	CA-41	Value = \$2,000,000/G
4.	SC-46	Medical
5.	SE-75	Medical
6.	SR-85	Medical
7.	NB-95	Medical
8.	RU-103	Medical
9. <i>Sadmirium</i>	CD-109	Medical, Value = \$50,000,000/G
10.	I-125	Medical
11.	CE-141	Medical
12.	PM-147	Defense
13. <i>Gadolinium</i>	GD-153	Medical, Value = \$17,000,000/G
14.	EU-155	Medical
15.	HO-166M	Defense
16.	YB-169	Medical
17.	TM-170	Medical, Defense
18.	TM-171	Medical
19.	TA-182	Medical
20.	IR-192	Industrial, Value = \$12,000/G
21.	TL-204	Defense, Value = \$11,000,000/G
22.	Np-237	Defense
23.	Pu-238	Defense
24.	Pu-242	Defense
25.	CF-252	Medical, Defense

* Pure Gold Value = \$16/G