NRC FORM 374 (7-94)

U.S. NUCLEAR REGULATORY COMMISSION

MATERIALS LICENSE

Amendment No. 11

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 36, 39, 40, and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations, and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

OFFICIAL RECORD COPY

Licensee	
1. Teledyne Environmental, Inc. dba Teledyne Brown Engineering - Environmental Services 2. 50 Van Buren Avenue P.O. Box 1235 Westwood, New Jersey 07675-1235	In accordance with the application dated November 27, 1996 3. License Number 29-00055-15 is amended in its entirety to read as follows: 4. Expiration Date January 31, 2006 5. Docket or Reference No. 030-14482

6. Byproduct, Source, and/or Special Nuclear Material	7. Chemical and/or Physical Form	8. Maximum Amount that Licensee May Possess at Any One Time Under This License
A. Any byproduct material	A. Any	A. No single nuclide to exceed 1 millicurie and 25 millicuries total
B. Americium-241	B. Any	B. 3 millicuries
C. Curium-242	C. Any	C. 25 micrograms
D. Curium-244	D. Any	D. 60 micrograms
E. Berkelium-249	E. Any	E. 25 micrograms
F. Californium-252	F. Any	F. 50 micrograms

9. Authorized use

A. through F. Decontamination of precious metals

CONDITIONS

10. Licensed material may be used only at the licensee's facilities located at 50 Van Buren Avenue, Westwood, New Jersey and the Degussa Corporation facility at 3601 South Clinton Avenue, Plainfield, New Jersey.

11. A. Licensed material shall be used by, or under the supervision of, individuals designated by the licensee's Radiation Safety Committee and authorized in writing by the Radiation Safety Officer.

B. The Radiation Safety Officer for this license is Steven A. Black.

12. Licensed material shall not be used in or on human beings.

030014

9707030146 970124
PDR ADOCK 03014482
B PDR

ML 10

Printed on recycled paper

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License Number: 29-00055-15

Docket or Reference Number: 030-14482

Amendment No. 11

13. The licensee shall not use licensed material in field applications where activity is released except as provided otherwise by specific condition of this license.

14. The licensee is authorized to transport licensed material in accordance with the provisions of 10 CFR Part 71, "Packaging and Transportation of Radioactive Material."

15. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents, including any enclosures, listed below. The Nuclear Regulatory Commission's regulations shall govern unless the statements, representations, and procedures in the licensee's application and correspondence are more restrictive than the regulations.

    A. Application dated April 28, 1995
    B. Letter dated November 17, 1995
    C. Letter dated November 27, 1996
    D. Letter dated January 17, 1997

For the U.S. Nucle Regulatory Commission

Date JAN 24 1997

By Original Signed By
Richard Gibson
Nuclear Materials Safety Branch
Region I
King of Prussia, Pennsylvania 19406

JAN 24 1997

Eugene O'Brien, Assistant Secretary
Teledyne Environmental, Inc.
Teledyne Brown Engineering-
Environmental Services
50 Van Buren Avenue
Westwood, New Jersey 07675-1235

Dear Mr. O'Brien:

This refers to your license amendment request. Enclosed with this letter is the amended license. Please note that as part of this amendment, in accordance with 10 CFR 30.36, effective February 15, 1996, the expiration date of your license has been extended by a period of five years. Your new expiration date is stated in Item 4 of the license.

Please review the enclosed document carefully and be sure that you understand and fully implement all the conditions incorporated into the amended license. If there are any errors or questions, please notify the U.S. Nuclear Regulatory Commission, Region I Office, Licensing Assistance Team, (610) 337-5093 or 5239, so that we can provide appropriate corrections and answers.

Thank you for your cooperation.

Sincerely,

Original Signed By:

Richard Gibson, Jr.
Division of Nuclear Materials Safety

License No. 29-00055-15
Docket No. 030-14482
Control No. 123956

Enclosure:
Amendment No. 11

OFFICIAL RECORD COPY ML 10

DOCUMENT NAME: R:\WPS\MLTR\L2900055.15

To receive a copy of this document, indicate in the box: "C" = Copy w/o attach/encl "E" = Copy w/ attach/encl "N" = No copy

OFFICE	DNMS/RI	N	DNMS/RI					
NAME	RGibson/rxg							
DATE	01/24/97		01/ /97		01/ /97		01/ /97	

OFFICIAL RECORD COPY

030-14482
MS-16
J2

TELEDYNE ENVIRONMENTAL

Radiological Services FAX...

To: Richard Gibson
Company: U.S. NRC
FAX No: 601-337-5393

From: TELEDYNE ENVIRONMENTAL, Inc.
Radiological Services Department
50 Van Buren Avenue
Westwood, NJ 07675
Main Telephone Number: 201-664-7070

Fax Number: 201-664-6921

Date: January 24, 1997
Sender: Steve Black
Phone/Ext.: 201-664-7070 x225

Richard,

I have made changes in the manual to reflect your the concerns in your fax of 1/23/97. Please review them and let me know if they're OK.

Call me when you get a chance.

If the changes are OK, please let me know so I can get a hard copy to you vial US Mail.

Thanks...

Steve Black

Total Sheets, including this coversheet: 5

If you do not receive the above number of pages, please contact the sender identified above.

This facsimile message and any enclosures are intended only for the use of the addressee shown above. Information that is confidential or privileged may be contained. If you are not the addressee, you are hereby notified that any distribution, review, or use of this message or enclosed items, is strictly prohibited. If you received this message in error, please notify us by telephone immediately and return the original to us.

123956

JAN 24 1997

OFFICIAL RECORD COPY ML 10

Instructions for Updating RSC&QCM v5.0 to v5.01 (*Revised 1/24/97)

Replace The following Pages:

Cover Pages
Authorization & Approval Page
Revision Control Form
ToC Pages ii and iii
ToC Page v *
Page II-2
Page II-5
Page II-12
Page II-20
Page III/4-2*
Page III/4-12
In Section II Forms:
Page 2 of Form IWL-RW-231
Diagram I - Degussa Corporation

Insert the following Pages:

Section III/4-14*
Section III Forms after Page III/4-14*

Table of Contents (Continued)

SECTION III-4 - SPECIAL PROCEDURES FOR PRECIOUS METALS DECONTAMINATION
U.S. NRC License No. 29-00055-15

		Page No.
III-4.1	Introduction	III/4-1
III-4.2	Facilities & Equipment	III/4-1
III-4.3	Training & Retraining	III/4-2
III-4.4	Radiation Survey Program	III/4-2
	III-4.4.1 Weekly Surveys	III/4-2
	III-4.4.2 Contamination Limits	III/4-4
	III-4.4.3 Procedure for Exiting the PM Area	III/4-5
	III-4.4.4 Air Monitoring	III/4-6
	III-4.4.5 Respiratory Protection Program	III/4-7
III-4.5	Shipments	III/4-8
III-4.6	Records Management	III/4-8
III-4.7	Material Control Provisions	III/4-8
III-4.8	Safety Rules	III/4-9
III-4.9	Waste Management	III/4-11
III-4.10	Decontamination Guidelines	III/4-11
III-4.11	Isotope Possession Limits	III/4-12
III-4.12	Disposal to the Sanitary Sewer	III/4-13
III-4.13	Transfer of Material from TBE-ES to Degussa	III/4-13
III-4.14	Release of Processed Material	III/4-13
III-4.15	Security	III/4-14
III-4.16	Contractual Arrangements	III/4-14

SECTION III/4 FORMS

The ceramic vacuum filters are over-sized "buchner" funnels, about 2 feet in diameter, and are used to filter and collect various purified metals during the last step of the process. The collected metals are then washed, dried and fired to a stoichiometric sponge form.

The furnace used to melt the alloy in the beginning of the process is called a "speedy-melt". It is a floor-mounted gas fired furnace in which the crucible resides. From past experience, this crucible is the only piece of equipment on which any activity has ever been detected. For this reason, this crucible is designated for this work only and will be bagged and sealed when not in use.

In addition to the Health Physics equipment listed in Section II, a Ludlum Model 2929 alpha/beta counter (or comparable instrument) will be kept in the office area of the Degussa Facility and will be used to count smears.

III-4.3 Training and Retraining

All employees working under this license are required to attend the Basic Radiation Safety course as outlined in Section II-1.2 "Indoctrination of Personnel". TBE-ES employees are required to have an additional 80 hours of supervised on-the-job training. Employees at the Degussa facility are not required to have any additional training due to the limited quantities they will have on hand. All specific written procedures and health and safety factors are to be learned to the supervisor's satisfaction. The items of health and safety are listed in Sections III-4.4, 4.8 and 4.9. An annual refresher course will be given to all employees working under this license. Documentation will be kept in each person's Health Physics file.

All employees who work under this license are required to read this section of the Radiation Safety Code & Quality Control Manual, and are tested on their knowledge using Form IWL-PM-02, "29-00055-15 Licensed Activities Exam".

III-4.4 Radiation Survey Program

The radiation safety program is, in general, that found in Sections II-5.0, II-6.0 and II-7.0. The following is a further description of the procedures to be performed for this license.

4.4.1 Weekly Surveys

Radiation contamination surveys of the Buffer Zone and Precious Metals lab at TBE-ES are performed weekly. Surveys include monitoring for surface contamination on all laboratory bench tops, chairs, tables, sinks, floors, exposed portions of hoods and glove boxes, and general laboratory equipment. Surveys of the Degussa facility will be performed on a quarterly frequency. An Eberline Instrument PAC-4G or PAC-4G3 gas proportional survey instrument is used to measure direct surface contamination.

General radiation levels in the rooms are measured with an Eberline Instrument E-120 GM counter with end window probe or comparable instrument. Smear surveys for removable surface contamination are taken

III-4.15 Security

The TBE-ES Precious Metals decontamination laboratory can only be entered by authorized personnel using a magnetic card key . The laboratory has a safe where all materials not in process are stored. In addition, a motion detection security system is installed that alarms off-site to a central station.

The Degussa facility is a precious metals processing facility that processes much more than just the limited amount of contaminated metal we will be sending there. As such, they are very security conscious and have armed guards at every door, metal detectors for personnel leaving the facility, an x-ray inspection system for packages and briefcases, a video/motion detection security system, and two large walk-in vaults. The lead/precious metal button will be stored in one of these vaults when not being processed.

III-4.16 Contractual Arrangements

TBE ES and the Degussa Corporation will enter into a Contract and/or Purchase Order where the following items will be addressed:

1. Authorization of Degussa personnel to work with licensed material will be made by the TBE-ES Radiation Safety Committee.

2. Degussa Corporation agrees to abide by all the applicable constraints, conditions, requirements, commitments and representations identified in TBE-ES' U.S. NRC License Nos. 29-00055-15 and SNM-107.

3. Degussa Corporation will agree to notify TBE-ES of changes in personnel that are either a) assigned to radiation safety matters or, b) authorized as a radioactive materials user.

OFFICIAL RECORD COPY ML 10

TELEPHONE CONVERSATON RECORD	Date: 1/23/97	Time: 3:30 p.m.
Mail Control No.: 123956 & 123957	License No.: 29-00055-15 & SNM-107	Docket No.: 030-14482 070-00124
Person Called: Steven Black, RSO	Organization: Teledyne Environmental Inc.	Telephone Number: 201-664-7070
Person Calling: Richard Gibson Jr.		
Subject: Licensing action/amend license to add the Degussa Corporation facility to the license.		
Summary: I informed Mr. Black that in order for me to continue with the amendment request, I will need additional information. - The correction for the Manual Table of Contents for Section III was not submitted with the correspondence dated January 17,1997. Submit correction. - Your manual did not state how you will secure from unauthorized removal or access licensed materials that are stored in controlled or unrestricted areas at the Degussa facility. In addition, control and maintain constant surveillance of licensed material not in storage in a controlled or unrestricted. - Describe fully the agreement between the personnel at the Degussa Corporation facility and Teledyne Environmental Inc., having control over licensed activities at the Degussa facility. Is there any changes in personnel such as authorized users responsible for radiation safety of use of licensed material? A complete, clear description of the agreement and that the personnel at the Degussa facility agree to abide by all constraints, conditions, requirements, commitments and representations identified in the license.		
Action Required/Taken: Faxed information to Region I		
Signature: Richard Gibson, Jr.	Date: 1/23/97	

OFFICIAL RECORD COPY

ML 10

January 17, 1997

TELEDYNE
BROWN ENGINEERING
Environmental Services
50 VAN BUREN AVENUE
P.O. BOX 1235
WESTWOOD, NEW JERSEY 07675-1235
(201) 664-7070 FAX (201) 664-5586

MSIS
J-2

Re: License No. SNM-107
License No. 29-00055-15
Docket No. 030-14482
Docket No. 070-00124
Control No. 123956
Control No. 123957

PLEASE EXPEDITE

Mr. John D. Kinneman, Chief
U.S. Nuclear Regulatory Commission, Region I
Nuclear Materials Safety Branch 2
475 Allendale Road
King of Prussia, PA 19406-1415

Dear Mr. Kinneman:

This letter is in response to your letter as cited above dated January 11, 1997. We have referenced our response with respect to your numbered items.

Item 1: Decommissioning Plan

We wish to confirm that there was no decontamination performed prior to the final release survey and we intend to run the operation at the Degussa facility as before. I have added $5,000 (plus 10% contingency) to our Decommissioning Cost Estimate to cover any possible decommissioning costs for the Degussa facility. See the enclosed revision to Table 6 of our Decommissioning Cost Estimate.

Item 2: Radiation Safety Code & Quality Control Manual Corrections

a) I have corrected the page numbers in the Table of Contents of the RSC&QCM.

b) The Degussa facility where the radioactive materials will be used is located at 3601 (Building D) South Clinton Avenue, Plainfield, NJ. I have corrected the RSC&QCM to reflect this. There is a Degussa office located at 3900 South Clinton Avenue, Plainfield, NJ, but for the purposes of this license only the 3601 address will be used.

c) Section II-1.3.1 incorrectly referenced 10 CFR 20.1203. The correct reference is 10 CFR Part 20.2203. I have corrected the RSC&QCM to reflect this.

123956/123957

OFFICIAL RECORD COPY IML 10

JAN 21 1997

TELEDYNE
BROWN ENGINEERING
Environmental Services

January 17, 1997

Mr. John D. Kinneman
U.S. Nuclear Regulatory Commission

d) Section II-5.0 incorrectly referenced 10 CFR Subpart C - Occupational Dose Limits. The correct reference is 10 CFR Part 20 Subpart C - Occupational Dose Limits. I have corrected the RSC&QCM to reflect this.

e) The spelling of the word "scintillation" has been corrected in Item 11 of the Packaging of Radioactive Waste Exam.

f) Section III-4.2 incorrectly states that the diagram of the Degussa facility is in the Forms Section of Section III. It is actually located as the last form in the Forms Section following Section II. I have revised the diagram to include the cross-hatching and changed the reference in III-4.2.

Item 3: Quarterly Radiation Protection Guide Values

Section II-2.2 and II-2.4 - "Radiation Protection Guide Values": These references should have been to the current 10 CFR Part 20 limits found in Appendix B, Table 1. I have corrected the RSC&QCM to reflect this.

If the information provided herein is satisfactory, please process the amendment as soon as possible. We would appreciate an advanced copy by FAX (201-664-6921 Attn: S. Black) so that we can continue negotiations with the U.S. DOE to provide them with this specialized service in the very near future.

Thank you for your assistance in expediting the processing of this request. It is greatly appreciated.

If you have any questions, please call me or Mr. Steven Black, RSO at the above phone number.

Sincerely,

TELEDYNE ENVIRONMENTAL Inc.

Eugene O'Brien, Assistant Secretary

cc: Donald F. Schutz, Chairman RSC
Steven A. Black, RSO

Attachment F

Decommissioning Cost Estimate

TABLE 6
Summary of Costs

Facility Name: **TELEDYNE BROWN ENGINEERING - Env. Ser.**

	Cost
Planning and Preparation Labor- Table 1	$26,275.20
Decontam./Dismantling Labor - Table 3	$24,724.00
Equipment - Table 4	$5,000.00
Radioactive Waste Disposal - Table 5	$574,210.47
Degussa Decommissioning Survey	$5,000.00
Sub-Total	$635,209.67
Contingency factor (10%)	$63,520.97
GRAND TOTAL DECOMMISSIONING COSTS	$698,730.63

TELEDYNE
BROWN ENGINEERING
Environmental Services

Instructions for Updating RSC&QCM v5.0 to v5.01

Replace The following Pages:

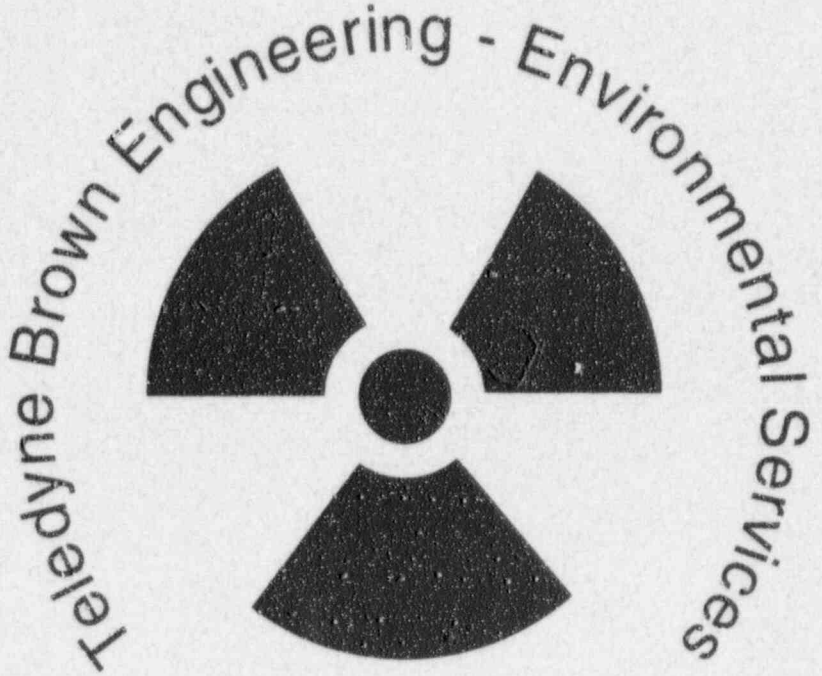
Cover Pages
Authorization & Approval Page
Revision Control Form
ToC Pages ii and iii
Page II-2
Page II-5
Page II-12
Page II-20
Page III/4-12

In Section II Forms:

Page 2 of Form IWL-RW-231
Diagram I - Degussa Corporation

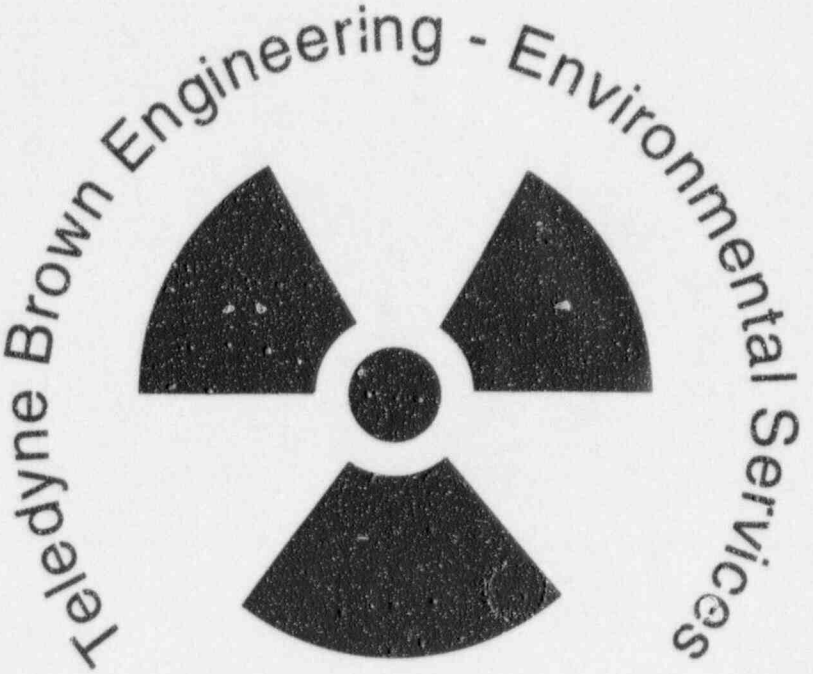
Insert the following Pages:

Section III Forms after Page III/4-13



Radiation Safety Code & Quality Control Manual

Version 5.01



Radiation Safety Code & Quality Control Manual

Version 5.01

Authorization & Approval Page

The Radiation Safety Code & Quality Control Manual defined herein has been approved by the Management of Teledyne Brown Engineering - Environmental Services. This program manual defines the employer and employee's responsibilities to protect the environment and to provide a safe working environment for all employees.

Radiation Safety Officer: _____
Steven A. Black

General Manager (Chairman of Radiation Safety Committee): _____
for Donald F. Schutz

Please note: Paragraphs marked with a vertical line on the right margin have been revised as of the date shown either in the margin or the bottom of the page. If there is no date next to the vertical line, all changes are of the date in the footer.

Revision Control Form

Issue & Revisions	Date Issued	Affected Pages	Effective Date	Prepared By	Approved By
5.0	11/26/96	All	11/26/96	Steven A. Black	
5.01	1/17/97	TOC, II-2,5,12	1/17/97	Steven A. Black	

Table of Contents (Continued)

SECTION II - GENERAL PROCEDURES FOR CONTROLLING RADIOACTIVE MATERIALS AND RADIATION EXPOSURES

Page No.

II-1.0 INDOCTRINATION OF PERSONNEL EXPOSED TO IONIZING RADIATION II-1
1.1 Company Policy on Matters Involving Radiation Exposure II-1
1.2 Indoctrination & Training of Personnel II-1
1.3 Rights and Responsibilities of Radiation Workers and the Company Regarding NRC Licensed Activities II-2
1.3.1 Exposure History II-2
1.3.2 Notification of Violations During Inspection II-2
1.3.3 Notice of Violations, Adverse Conditions, or Potential Violations or Conditions Prior to an Inspection II-3
1.3.4 Procedure for Reporting Violations and/or Potential Violations II-3
1.3.5 Requirement for Posting NRC "Notice of Violations" II-4

II-2.0 MEDICAL EXAMINATIONS AND EMERGENCIES II-5
2.1 Pre-Employment Medical Examination II-5
2.2 Follow-Up Medical Examination II-5
2.3 Termination Medical Examination II-5
2.4 Accidents Involving Radiation II-5
2.5 Emergencies and Decontamination of Equipment II-6
2.6 Fire II-6
2.7 Security II-6

II-3.0 LABORATORY PRACTICES II-7
3.1 Personnel Directives II-7
3.2 Minor Spills II-8
3.3 Major Spills II-8
3.4 List of Persons to Call In Radiation Emergency II-9
3.5 Contamination Control Directives II-10

II-4.0 ORDER, TRANSFER, RECEIPT AND SHIPMENT OF RAD. MATERIALS II-11
4.1 Order II-11
4.2 Transfer II-11
4.3 Receipt II-11
4.4 Shipment II-11

II-5.0 PERSONNEL MONITORING II-12
5.1 External Dosimetry II-12
5.2 Internal Dosimetry II-13

II-6.0 SURVEYS II-14
6.1 Area Surveys II-14
6.2 Decontamination II-14
6.3 Survey Review II-15

Table of Contents (Continued)

Page No.

II-7.0 INSTRUMENT CALIBRATION II-16
7.1 General II-16
7.2 Gamma Calibration II-16
7.3 Beta Calibration II-16
7.4 Alpha Calibration II-16
7.5 Frequency of Calibration II-16
7.6 Standards II-16

II-8.0 RADIOACTIVE WASTE PACKAGING AND DISPOSAL II-17
8.1 Safe Packaging of Radioactive Material - Training and Retraining II-17
8.2 Classification of Radioactive Waste to be Packaged for Shipment II-18
8.3 Packaging Procedures for Radioactive Waste II-18
8.4 Radioactive Waste Interim Storage Plan II-19

II-9.0 FACILITIES & EQUIPMENT II-20

II-10.0 INTERSTATE OPERATIONS II-21
Licensing Officials in Agreement States II-21

SECTION II FORMS

Form IWL-HP-06 is given to the supervisor of the employee who then fills in the section requesting authorization for the employee. This form is sent to the Radiation Safety Officer who will determine what additional training or monitoring is required for the employee to begin work utilizing radioactive materials. If an employee's job function changes where new procedures involving radiation or radioactive materials occur, the supervisor is responsible for preparing a revised Form IWL-HP-06 and submitting it to the RSO for approval. No new job functions are allowed until this approval is obtained.

Persons who through their work attitudes and habits show a disregard for safe operating procedures with radioactive material are recommended for transfer out of radiation work or, if such alternative work is not available, may be terminated from employment.

II-1.3 Rights and Responsibilities of Radiation Workers and the Company Regarding NRC Licensed Activities

1.3.1 Exposure History

All personnel starting work with radioactive materials at TBE-ES are required to supply their supervisor and the Health Physics Office as complete a radiation exposure history as available. Each new employee will also have their estimated current year's exposure entered into their exposure file. Pursuant to 10 CFR Part 19.13(c), a worker may request his/her exposure history from a previous licensed employer.

Pursuant to 10 CFR Part 19.13(b), a worker may request, and each licensee (company) shall furnish annually, the radiation exposure that the worker has received.

When the company (licensee) is required pursuant to 10 CFR Part 20.2203 to report to the NRC an exposure of an individual to radiation or radioactive material, the company (licensee) must also report to the individual.

1.3.2 Notification of Violations During Inspections

Pursuant to 10 CFR Part 19.14(b) the NRC inspector may consult privately with workers concerning matters of occupational radiation protection and other matters as deemed necessary by the inspector. During the course of these consultations, any worker may bring privately to the attention of the inspector, either orally or in writing, any past or present condition which he has reason to believe may have contributed to or caused any violation of the act, the regulations of 10 CFR Parts 19, 20, and 21, or license condition, or any unnecessary exposure of any individual to radiation from licensed radioactive material under the licensee's control.

II-2.0 MEDICAL EXAMINATIONS AND EMERGENCIES

II-2.1 Pre-Employment Medical Examination

New company personnel who will be exposed to, or potentially exposed to ionizing radiation may be required to submit to a medical examination at the discretion of the company Radiation Safety Officer or the Company Health Physicist. The results of this examination become a part of each person's pre-employment record and is kept on file in the Personnel Department.

II-2.2 Follow-Up Medical Examination

Routine medical examinations are not presently required for those persons who are working with ionizing radiation due to the low permissible limits and excellent detection methods now available for external and internal radiation protection. At present, physical methods of detection of radiation are much more sensitive than signs or symptoms of deleterious biological effects identifiable in a routine medical examination. However, if a person receives an exposure in any one quarter in excess of the limits specified in Appendix B, Table 1, of 10 CFR Part 20 but less than twice the limit, he may be required to take a medical examination at the discretion of the company Radiation Safety Officer or Company Health Physicist. If the exposure is in excess of twice the limit, a medical examination is mandatory.

II-2.3 Termination Medical Examination

Persons who are leaving the employment of the company may be required to submit to a medical examination as directed by the Company Health Physicist or Radiation Safety Officer. A radiobioassay examination is required for all personnel having worked with ionizing radiation.

II-2.4 Accidents Involving Radiation

Every incident involving exposure of company personnel to radiation in excess of the limits specified in Appendix B, Table 1, of 10 CFR Part 20, is classified as an accident and a report of the accident must be made to the Radiation Safety Committee by the Radiation Safety Officer. An accident involving exposure of company personnel to more than twice the limit must be immediately reported to the Radiation Safety Committee and General Manager of the Westwood, NJ facility at the earliest practical date on its findings.

Every incident involving contamination of equipment and requiring disposal or decontamination in excess of $100 or 1 man-day cleanup time must be investigated by the Radiation Safety Officer and a report made to the Radiation Safety Committee. Incidents with equipment losses in excess of $1,000 or 5 man-days for decontamination must be investigated by an Investigating Subcommittee appointed by the Radiation Safety Committee.

II-5.0 PERSONNEL MONITORING

Internal and external personnel monitoring will be in accordance with 10 CFR Part 20 Subpart C - Occupational Dose Limits.

II-5.1 External Dosimetry

Every employee of, and visitor to, TBE-ES laboratories and plants must wear personnel monitoring devices such as TLD badges and/or pocket dosimeters if their work or tour involves entry to radiologically controlled areas containing sources of penetrating radiation.

Radiologically controlled areas are defined as specified by Part 20 of Title 10 of the Code of Federal Regulations and consist of the following areas:

Environmental Analysis Standard Solution Storage Room	-	Provisions of NRC License #29-00055-06
Laboratory Room 614A	-	Provisions of NRC License #SNM-107
Metals Processing & Nuclear Fuels Laboratory	-	Provisions of NRC Licenses #29-00055-15 & #SNM-107
Source Room	-	Provisions of NRC Licenses #29-00055-06
Warehouse	-	Provisions of NRC License #29-00055-14 and NJ License #10123

A list of those persons monitored by TLD badges is maintained by the Health Physics Office. The TLD badges are read out by TBE-ES Badge Service Department.

TLD whole body badges are changed quarterly. A formal investigation by the RSO will be done whenever a badge receives a dose in excess of ten percent of the applicable limit.

Quality control of TLD dosimetry is set forth in the TLD personnel Badge Service Quality Control Manual (IWL-03420-416) and TLD Badge Service Quality Assurance Manual (IWL-0792-442).

II-9.0 FACILITIES & EQUIPMENT

Please see the diagrams in the Forms section at the end of this Section. A list of the Health Physics equipment that is available for use can also be found in the Forms section.

Construction of 103 Woodland Avenue

Please refer to the diagram that is included with Section II-Forms "Diagram of Warehouse - 103 Woodland Avenue". This building is constructed of cement block walls. There is a flat roof that is covered by sheet-rock on the inside. The overhead door is wooden and the other exit/entrance is steel.

Construction of 50 Van Buren Avenue

Please refer to the diagrams that are included with Section II-Forms. This building is constructed of cement block walls. There is a flat roof covered with a synthetic membrane.

Construction of the Degussa Facility - 3601 South Clinton Avenue, South Plainfield, NJ

Please refer to the diagrams that are included with Section II-Forms.

III-4.11a Isotope Possession Limits - License 29-00055-15

A. For possession and use at 50 Van Buren Avenue, Westwood, NJ:

	Element & Mass No.		Chemical & Physical Forms		Maximum Possession Limits
Item 6	(a) Any By-Product material (Z3-Z83)	Item 7	(a) Any	Item 8	(a) No single nuclide to exceed one millicurie and 25 millicuries total
	(b) Any Transuranic Isotope (Z93 and higher, excluding plutonium)		(b) Any		(b) No single nuclide to exceed one millicurie and 25 millicuries total

B. For possession and use at 3601 South Clinton Avenue, South Plainfield, NJ:

1/100th of the limits in the above table.

III-4.11b Isotope Possession Limits - License SNM-107 (This is a subset of the SNM-107 Isotope Possession Limits found in Section III-3)

For possession and use at 3901 South Clinton Avenue, South Plainfield, NJ:

	Element & Mass No.		Chemical & Physical Forms		Maximum Possession Limits
Item 6	(a) U-235	Item 7	(a) Any	Item 8	(a) 1 gram (2.0×10^{-3} mCi)
	(b) Pu-238		(b) Any		(b) 0.00006 gram (1.0×10^{-2} mCi)
	(c) Pu-239		(c) Any		(c) 0.01 gram (6.0×10^{-1} mCi)
	(d) Any other SNM not detailed above		(d) Any		(d) 0.01 gram

9. Items in different categories _____ be mixed.

10. All scintillation vial drums must be lined with a _____ .

11. The amount of absorbant added to any scintillation vial drum must be capable of absorbing _____ the volume of liquid in the drum.

12. Liquid Special Nuclear Material has to be _____ before disposal.

II. True or False (1 point each)

1. _____ All drums which have a Radioactive I, II or III label require security seals.

2. _____ 400 lbs is the maximum weight allowed in a 55-gallon container.

3. _____ Class A Stable is a DOT classification.

4. _____ Two 2-mil liners is an acceptable substitute for a single 4-mil liner.

5. _____ The pH range for acceptable liquids for incineration is 5.0-10.0.

6. _____ Animal carcasses are to be completely surrounded with rock salt and absorbant.

7. _____ Cement is an acceptable solidification media.

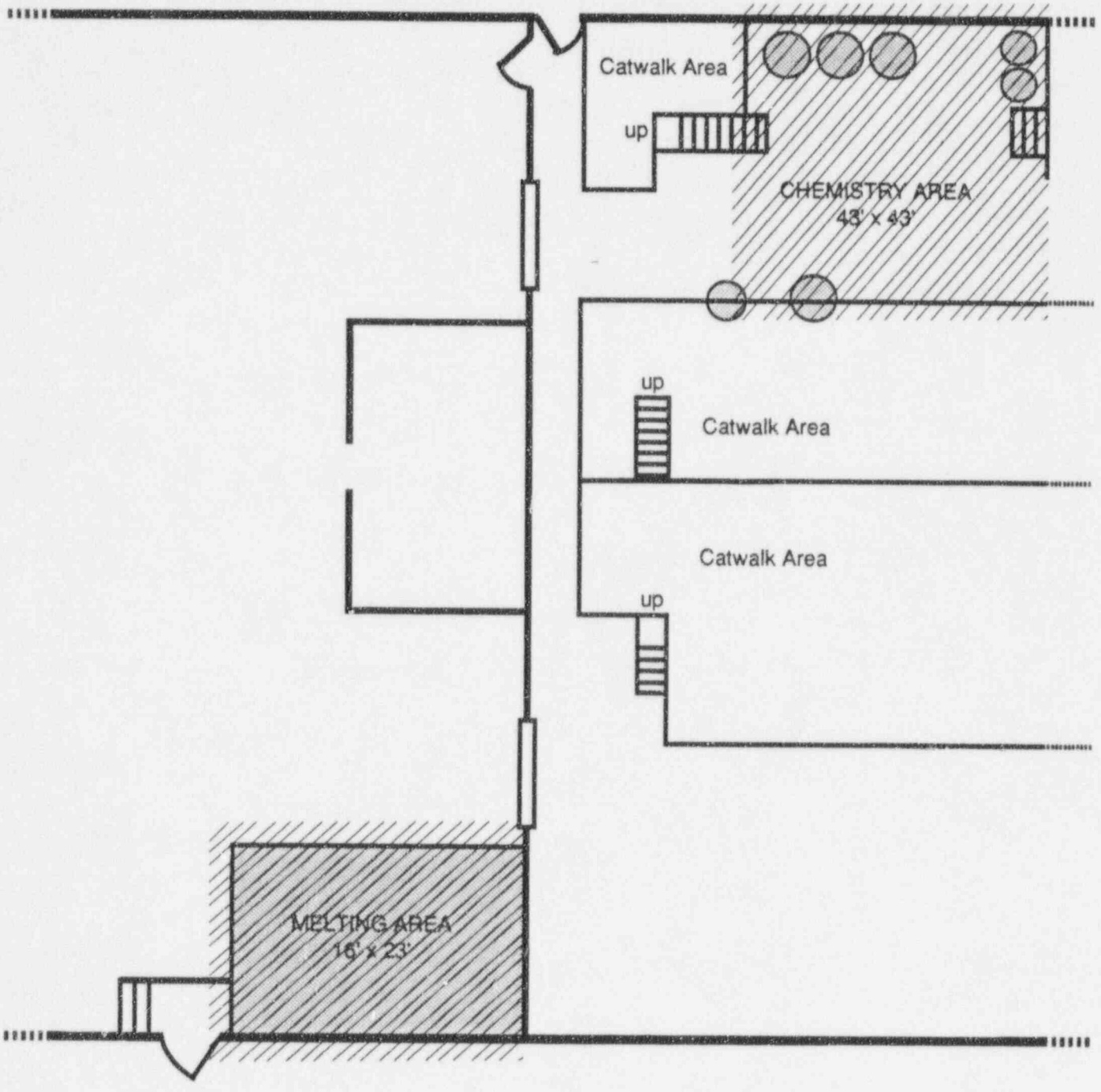
8. _____ Ra-226 is acceptable at the Washington burial site under certain conditions.

9. _____ Packaging regulations are under the direct control of the NRC only.

10. _____ The burial site's (or processor's) license requirements are of paramount consideration when determining how to package a given material.

DIAGRAM I

Degussa Corporation
3601 South Clinton Avenue
South Plainfield, New Jersey



Partial Diagram of Building "D"

Scale: 3/32" = 1'

SECTION III FORMS

All forms referenced in Section III follow. Forms referenced in Sections I & II can be found at the end of each section.

FORM NUMBER	TITLE
IWL-PM-01	PM Radwaste Form
IWL-PM-02	29-00055-15 Licensed Activities Exam

JAN 1 1 1997

License Nos. 29-00055-15
SNM-107
Docket Nos. 030-14482
070-00124
Control Nos. 123956
123957

Eugene O'Brien, Assistant Secretary
Teledyne Environmental, Inc.
Teledyne Brown Engineering-
Environmental Services
50 Van Buren Avenue
Westwood, New Jersey 07675-1235

Dear Mr. O'Brien:

This is in reference to your letter dated November 27, 1996 requesting to amend Nuclear Regulatory Commission License Nos. 29-00055-15 and SNM-107. In order to continue our review, we need the following additional information:

1. In your letter dated November 27, 1996, you stated that a revision to your Decommissioning Funding Plan (DFP), to cover the new facility was not submitted because a survey confirmed the lack of radioactive contamination in your last decommissioning of that facility. In your response to this letter, confirm that the previous facility actually required no decontamination prior to the final survey and confirm that you plan to operate the facility as before. Even if no decontamination is likely to be necessary, your DFP must include sufficient funding to dispose of the maximum amount of radioactive waste and other licensed material likely to be on hand at any time and to fund a survey adequate to demonstrate that the facility is suitable for release for unrestricted use. Please modify the cost estimate in your Decommissioning Funding Plan so that it includes sufficient funding for these items or provide justification that they can be accomplished for a small increase in cost (less than $2,000). You must include all costs, including labor, equipment, overhead and a contingency in the cost estimates.

2. Some information in your Radiation Safety Code & Quality Control Manual (RSC & QCM), version 5.0, dated November 27, 1996 appears to be in error. Please provide correct information or provide additional information concerning the following:

OFFICIAL RECORD COPY ML 10

a. The Manual Table of Contents incorrectly indicates the page numbers for parts of Section II and Section III (i.e. Section II-8.0 is not on page II-18, Section II-9.0 is not on page II-21, Section III-4.9 is not on page III/4-10, and Section III-4.10 is not on page III/4-10).

b. Your letter lists the address to the Degussa Corporation facility as 3601 South Clinton Avenue, South Plainfield, New Jersey. Section II-9.0 and Section III-4.11(a) and (b) of the manual, list the place of use as 3901 South Clinton Avenue, South Plainfield, New Jersey. Please clarify the apparent contradiction of the two addresses.

c. Section II-1.3.1 of the manual, you referenced 10 CFR Part 20.1203 as the requirement to report to the NRC an exposure of an individual to radiation or radioactive material, and in addition, a report to the individual. 10 CFR 20.1203 of our regulations requires determination of external dose from airborne radioactive material and it is not a requirement to report to the NRC an exposure of an individual to radiation or radioactive material. Did you meant to reference 10 CFR 20.2203? Please clarify the correct reference to our regulations.

d. Section II-5.0 of the manual, you stated that internal and external personnel monitoring will be in accordance with 10 CFR Subpart C - Occupational Dose Limits. That is an incorrect listing of our regulations. The correct listing is 10 CFR Part 20 Subpart C - Occupational Dose Limits. Please make the necessary correction in the manual.

e. In Item 11 of the Packaging of Radioactive Waste Exam of the manual, the word "scintillation" is misspelled. Please make the necessary correction.

f. Section III-4.2 of the manual, you stated that the area where material is used under this license is identified on facility diagram (in the Forms Section at the end of this Section) by the cross-hatched area. The manual does not have any Form Section at the end of Section III that identify facility diagrams. Please submit the Forms Section for Section III of the manual.

3. Section II-2.2 and Section II-2.4 of the manual, you mentioned a quarterly radiation protection guide value. Please described your quarterly radiation protection guide value and tell how does it relate to the limits required by our regulations.

We will continue our review upon receipt of this information. Please reply in duplicate to my attention at the Region I Office and refer to Mail Control Nos. 123956 and 123957. If you have any technical questions regarding this deficiency letter, please call Richard Gibson, Jr. at (610) 337-5071.

If we do not receive a reply from you within 30 calendar days from the date of this letter, we shall assume that you do not wish to pursue your application.

Sincerely,

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

License Nos.	29-00055-15
	SNM-107
Docket Nos.	030-14482
	070-00124
Control Nos.	123956
	123957

Enclosures:
1. 10 CFR Parts 19, 20, 21 and 30

DOCUMENT NAME: R:\WPS\DLTR\L2900055.15
To receive a copy of this document, indicate in the box: "C" = Copy w/o attach/encl "E" = Copy w/ attach/encl "N" = No copy

OFFICE	DNMS/RI	N	DNMS/RI	N				
NAME	RGibson/rxg		JKinneman					
DATE	01/08/97		01/9/97		01/ /97		01/ /97	

OFFICIAL RECORD COPY

November 27, 1996

TELEDYNE
BROWN ENGINEERING
Environmental Services

50 VAN BUREN AVENUE
P.O. BOX 1235
WESTWOOD, NEW JERSEY 07675-1235
(201) 664-7070 FAX (201) 664-5586

030-14482

Nuclear Materials Safety Branch
U.S. Nuclear Regulatory Commission, Region I
475 Allendale Road
King of Prussia, PA 19406-1415

Re: License No. SNM-107 Amendment
License No. 29-00055-15 Amendment

Dear Sir/Madam,

Through 1991 Degussa Corporation and Teledyne had an arrangement where Teledyne would perform the gross decontamination of precious metals and then send the material to Degussa for refining. The U.S. DOE contract expired and the Degussa radioactive materials license was terminated because of the expense of maintaining it.

We are in the process of finalizing a contract with the U.S. DOE to start-up this process again but would like to license the Degussa facility under our existing licenses. There are two licenses that are affected because the NRC made us move all the SNM onto one license.

Therefore, Teledyne Environmental Inc. requests that the above licenses be amended as follows:

License SNM-107:

1) Add place of use: Degussa Corporation facility at 3601 South Plainfield, NJ. See single page revision to the SNM-107 RSC&QCM (III-3.1 - Introduction).

2) Note Licensed Material Restrictions: See RSC&QCM Section III-4, page III/4-12.

License 29-00055-15:

1) Complete revision of RSC&QCM to incorporate the Degussa Facility. See revised RSC&QCM - Section III-4.0.

I have also enclosed revisions to sections I & II of the RSC&QCM as there have been various changes to them since the -15 license renewal.

I have enclosed two checks in the amounts of $290 and $300 to cover the amendment fees for categories 1D and 3P respectively.

It should be noted that we have not submitted a revision to our Decommissioning Funding Plan to cover the new facility because when we decommissioned it the last time all it took was a survey to confirm the lack of radioactive contamination. If you feel we need to add this minor cost (less than $1000) to the documentation, please notify us and we will comply.

If you have any questions, please call me or Mr. Steven Black, RSO at the above phone number.

Sincerely,

TELEDYNE ENVIRONMENTAL Inc.

Eugene O'Brien, Assistant Secretary

cc: Donald F. Schutz, Chairman RSC
Steven A. Black, RSO

123956
NOV 29 1996

OFFICIAL RECORD COPY ML 10

III-3.0 SPECIAL PROCEDURES FOR NRC LICENSE NO. SNM-107 LICENSED ACTIVITIES

III-3.1 Introduction

This section of the Radiation Safety Code & Quality Control Manual covers specific items related to our US NRC License SNM-107. The place of use for all materials under this license will be 50 Van Buren Avenue, Westwood, NJ 07675. In addition, certain small quantities of SNM will be used at the Degussa Corporation facility located at 3601 South Clinton Avenue, South Plainfield, NJ. Refer to Section III-4.0 for details. The possession and uses of the special nuclear materials are:

a) The analysis of un-irradiated enriched uranium for uranium content and isotopic composition by mass spectrometry. Samples are prepared for analysis in the Uranium Hexafluoride Laboratory, Uranium-Plutonium Laboratory, and the Low Level Uranium Preparation Laboratory for analysis in the Mass Spectrometry area (see diagrams in Appendix A). All samples are stored either in the Low Level Uranium Preparation Laboratory, the Uranium-Hexafluoride Laboratory or the Uranium-Plutonium Laboratory;

b) Use of U-235 as a tracer to determine uranium concentration of geological samples by isotope dilution. Standard solutions of microgram quantities of U-235 are kept in a cabinet in the Low Level Uranium Preparation Laboratory;

c) The analysis of samples for isotopic content by alpha spectroscopy;

d) As contaminants of precious metals sent to Teledyne Isotopes to decontaminate as detailed in our 29-00055-15 license (See Section III-4.0);

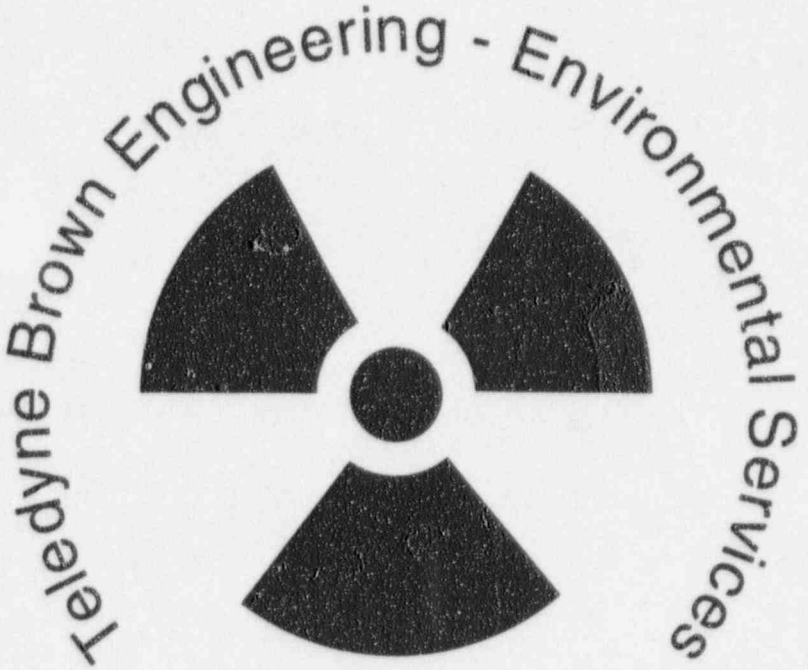
e) Calibration of instruments and dosimeters for clients;

f) For use in research and development as defined in Section 70.4(j) of 10 CFR Part 70.

III-3.2 Training and Re-training

All employees working under this license are required to attend the Basic Radiation Safety Course as outlined in Section II-1.2 "Indoctrination of Personnel." Only employees working with greater than 50 milligram quantities are mandatorily required to have additional training. This additional training consists of more than 80 hours of supervised on-the-job training. All specific procedures and health and safety factors are to be learned to the supervisor's satisfaction. The items of health and safety are listed in Section III-3.8. A refresher course will be given at one year intervals.

The employees are required to read this section of he Radiation Safety Code and Quality Control Manual, and will be tested on their knowledge using Form IWL-HP-30, "SNM-107 Licensed Activities Exam."



Radiation Safety Code & Quality Control Manual

Version 5.0

OFFICIAL RECORD COPY ML 10

1 2 3 9 5 6

Authorization & Approval Page

The Radiation Safety Code & Quality Control Manual defined herein has been approved by the Management of Teledyne Brown Engineering - Environmental Services. This program manual defines the employer and employee's responsibilities to protect the environment and to provide a safe working environment for all employees.

Radiation Safety Officer: _____

Steven A. Black

General Manager (Chairman of Radiation Safety Committee): _____

for Donald F. Schutz

Revision Control Form

Issue & Revisions	Date Issued	Affected Pages	Effective Date	Prepared By	Approved By
5.0	11/26/96	All	11/26/96	Steven A. Black	

SECTION I - MANAGEMENT POLICY AND ORGANIZATION

Page No.

I-1.0 INTRODUCTION I-1
1.1 Statement of Basic Policy - ALARA I-1
1.2 Implementation of Policy I-1
1.3 Philosophy of Radiation Safety: Risk versus Benefit I-1

I-2.0 RADIATION SAFETY COMMITTEE I-2
2.1 Responsibilities I-2
2.2 Membership & Qualifications I-2
2.3 Executive Subcommittee I-3
2.4 Safety Committee I-3
2.5 Records I-3
2.6 Qualifications of the Company Health Physicist and the Radiation Safety Officer I-3

I-3.0 HEALTH PHYSICS OFFICE I-4
3.1 Personnel I-4
3.2 Duties I-4
3.3 Records I-5
3.4 Reference Material I-6
3.5 Professional Association I-6

I-4.0 PROCEDURE FOR REVISING RADIATION SAFETY CODE AND QUALITY CONTROL MANUAL I-7
4.1 Writing a Procedure or Producing a Form I-7
4.2 Submission and Review I-7

SECTION I FORMS

Table of Contents (Continued)

SECTION II - GENERAL PROCEDURES FOR CONTROLLING RADIOACTIVE MATERIALS AND RADIATION EXPOSURES

Page No.

II-1.0 INDOCTRINATION OF PERSONNEL EXPOSED TO IONIZING RADIATION II-1
1.1 Company Policy on Matters Involving Radiation Exposure II-1
1.2 Indoctrination & Training of Personnel II-1
1.3 Rights and Responsibilities of Radiation Workers and the Company Regarding NRC Licensed Activities II-2
1.3.1 Exposure History II-2
1.3.2 Notification of Violations During Inspection II-2
1.3.3 Notice of Violations, Adverse Conditions, or Potential Violations or Conditions Prior to an Inspection II-3
1.3.4 Procedure for Reporting Violations and/or Potential Violations II-3
1.3.5 Requirement for Posting NRC "Notice of Violations" II-4

II-2.0 MEDICAL EXAMINATIONS AND EMERGENCIES II-5
2.1 Pre-Employment Medical Examination II-5
2.2 Follow-Up Medical Examination II-5
2.3 Termination Medical Examination II-5
2.4 Accidents Involving Radiation II-5
2.5 Emergencies and Decontamination of Equipment II-6
2.6 Fire II-6
2.7 Security II-7

II-3.0 LABORATORY PRACTICES II-8
3.1 Personnel Directives II-8
3.2 Minor Spills II-9
3.3 Major Spills II-9
3.4 List of Persons to Call In Radiation Emergency II-10
3.5 Contamination Control Directives II-11

II-4.0 ORDER, TRANSFER, RECEIPT AND SHIPMENT OF RAD. MATERIALS II-12
4.1 Order II-12
4.2 Transfer II-12
4.3 Receipt II-12
4.4 Shipment II-12

II-5.0 PERSONNEL MONITORING II-13
5.1 External Dosimetry II-13
5.2 Internal Dosimetry II-13

II-6.0 SURVEYS II-15
6.1 Area Surveys II-15
6.2 Decontamination II-15
6.3 Survey Review II-16

Table of Contents (Continued)

Page No.

II-7.0	**INSTRUMENT CALIBRATION**	II-17
7.1	General	II-17
7.2	Gamma Calibration	II-17
7.3	Beta Calibration	II-17
7.4	Alpha Calibration	II-17
7.5	Frequency of Calibration	II-17
7.6	Standards	II-17
II-8.0	**RADIOACTIVE WASTE PACKAGING AND DISPOSAL**	II-18
8.1	Safe Packaging of Radioactive Material - Training and Retraining	II-18
8.2	Classification of Radioactive Waste to be Packaged for Shipment	II-19
8.3	Packaging Procedures for Radioactive Waste	II-19
8.4	Radioactive Waste Interim Storage Plan	II-20
II-9.0	**FACILITIES & EQUIPMENT**	II-21
II-10.0	**INTERSTATE OPERATIONS**	II-22
	Licensing Officials in Agreement States	II-22
	SECTION II FORMS	

Table of Contents (Continued)

SECTION III-4 - SPECIAL PROCEDURES FOR PRECIOUS METALS DECONTAMINATION
U.S. NRC License No. 29-00055-15

Page No.

III-4.1 Introduction III/4-1

III-4.2 Facilities & Equipment III/4-1

III-4.3 Training & Retraining III/4-1

III-4.4 Radiation Survey Program III/4-2
- III-4.4.1 Weekly Surveys III/4-2
- III-4.4.2 Contamination Limits III/4-3
- III-4.4.3 Procedure for Exiting the PM Area III/4-4
- III-44.4 Air Monitoring III/4-5
- III-4.4.5 Respiratory Protection Program III/4-6

III-4.5 Shipments III/4-6

III-4.6 Records Management III/4-7

III-4.7 Material Control Provisions III/4-7

III-4.8 Safety Rules III/4-8
- III/4.8.1 General Safety Rules III/4-8
- III/4.8.2 General Safety Instructions for Glove Box Use III/4-9

III-4.9 Waste Management III/4-10

III-4.10 Decontamination Guidelines III/4-10

III-4.11 Isotope Possession Limits III/4-11

III-4.12 Disposal to the Sanitary Sewer III/4-11

III-4.13 Transfer of Material from TBE-ES to Degussa III/4-12

III-4.14 Release of Processed Material III/4-12

SECTION III/4 FORMS

SECTION I - MANAGEMENT POLICY AND ORGANIZATION

I-1.0 INTRODUCTION

In January, 1994, Teledyne Isotopes had changed its business name to Teledyne Brown Engineering - Environmental Services (TBE-ES). Although still incorporated as Teledyne Isotopes, Inc., all naming references within this document will be to TBE-ES. Subsequently, in 1996, Teledyne Isotopes, Inc. was re-incorporated under the name of Teledyne Environmental Inc.. however we continue to use the business name of Teledyne Brown Engineering - Environmental Services and are continuing the use of TBE-ES in this document.

I-1.1 Statement of Basic Policy - ALARA

The basic policy underlying this Radiation Safety Code and Quality Control Manual is that the health and safety of personnel working with ionizing radiation and the prevention of any release of radioactive contaminants which could adversely affect the environment are of paramount importance to TBE-ES. All decisions, rules and recommendations will be made with the basic premise that levels of radiation exposure are to be minimized to the lowest level that can be reasonably achieved (ALARA). The Radiation Safety Officer will make recommendations to the Radiation Safety Committee at least annually concerning any changes or modifications of procedures that would further reduce exposures.

I-1.2 Implementation of Policy

The policy is enunciated by a Radiation Safety Committee composed of members drawn from various company departments who use or manage the use of sources of ionizing radiation. The implementation of decisions of the Radiation Safety Committee is the responsibility of the Health Physics Office.

I-1.3 Philosophy of Radiation Safety: Risk versus Benefit

The benefits to be derived from the use of ionizing radiation may require some risk of exposure to radiation. In such instances it is necessary to strike a balance between risk and benefit in keeping with basic company policy. This decision is part of the function of the Radiation Safety Committee together with the Health Physics Office. Though strict objective criteria cannot be drawn up to apply in all circumstances, objective guidelines and established regulations will be followed whenever possible.

I-2.0 RADIATION SAFETY COMMITTEE

I-2.1 Responsibilities

The Radiation Safety Committee is responsible to the General Manager of TBE-ES. The responsibilities of this Committee are:

1) Formulate special company policy in the area of radiation safety.

2) Make decisions on the uses and approve the users of radioactive material (only for the 29-00055-06 license).

3) Approve new facilities and major equipment for the use of radioactive material by the company (only for the 29-00055-06 license).

4) Approve changes for existing facilities and major equipment (only for the 29-00055-06 license).

5) Enforce the safety requirements of international, federal, state, and local agencies as well as the procedures and policies as set forth by the Radiation Safety Code and Quality Control Manual.

I-2.2 Membership & Qualifications

The Committee is composed of members from the following divisions, sections or areas of responsibility:

1) Health Physics
2) Services
3) Products
4) Administration

Membership may be changed as necessary. The membership of this Committee as of the date of this revision is shown in Section I Forms. The overall TBE-ES organization is shown in Section I Forms.

All members of the Radiation Safety Committee must have a college level degree and be familiar with radiation safety procedures and regulations. They must also be of management level or higher, or a member of the Health Physics Department with a minimum of 2 years experience.

I-2.3 Executive Subcommittee

An Executive Subcommittee comprised of the Chairman, the company Health Physicist, R.S.O. and Alternate R.S.O. is authorized to act on behalf of the committee for approval of necessary actions between regular meetings of the Radiation Safety Committee. A quorum shall consist of any combination of two of the following persons: the Chairman of the RSC, the Company Health Physicist, the R.S.O. and the Alternate R.S.O.

I-2.4 Safety Committee

A Safety Committee comprised of various representatives of operational and administration departments will make recommendations to the R.S.C. for implementation of safety programs beyond the specific scope of radiation safety but within the requirements for general health and safety. Membership may be changed as necessary. The Safety Committee reports directly to the Radiation Safety Officer and the current membership is shown in Section I Forms.

I-2.5 Records

The Radiation Safety Committee is required to keep minutes of all quarterly meetings and any meetings of an Executive Subcommittee.

I-2.6 Qualifications of the Company Health Physicist and the Radiation Safety Officer

2.6.1 The Company Health Physicist must have a B.S. degree in Health Physics or related field and have at least 4 years of practical health physics experience. Unless certified by the American Board of Health Physics, 8 or more years practical experience is required. In the absence of the RSO, the Company Health Physicist serves as the Alternate RSO.

2.6.2 The Radiation Safety Officer must have a college degree in Health Physics or related field, and have at least 3 years practical health physics experience.

I-3.0 HEALTH PHYSICS OFFICE

I-3.1 Personnel

This office is headed by a person qualified in the field of health physics and radiation protection. This person's title is Radiation Safety Officer (R.S.O.) and he performs or supervises others so that the duties required of the Radiation Safety Program are performed in a timely manner. The person designated as Company Health Physicist is available to the RSO for support and for auditing purposes. In the absence of the RSO, the Company Health Physicist serves as the Alternate RSO. The R.S.O. is assisted by sufficient staff to carry out the Radiation Safety Program as set forth in this manual

I-3.2 Duties

The duties of this office are:

1) Approve all requests for the purchase or use of radioisotopes (IWL-HP-04).

2) Survey all radioisotopes received by or shipped by TBE-ES (IWL-HP-05).

3) Maintain radiation histories of all TBE-ES personnel working with or exposed to sources of ionizing radiation (NRC Form 5 or equivalent, or other form required by law).

4) Periodically (generally weekly) survey and make recommendations concerning TBE-ES radiologically controlled areas.

5) Dispose of all radioactive waste generated on TBE-ES property or under TBE-ES licenses.

6) Prepare emergency procedures in case of an accident involving ionizing radiation.

7) Indoctrinate all new TBE-ES personnel who will be working with, or be exposed to sources of ionizing radiation (IWL-HP-07).

8) Perform quarterly calibrations of all radiation survey instruments (IWL-HP-08).

9) Perform semiannual leak tests of all licensed sealed sources owned by TBE-ES.

10) Assure compliance with all effective licenses and apply for amendments and renewals in a timely manner as approved by the Radiation Safety Committee.

11) Formulate procedures for, revise, and maintain the Radiation Safety Code and Quality Control Manual.

12) Serve as technical advisor to the Safety Committee. Provides liaison with the Radiation Safety Committee and submit recommendations for approval.

13) Approve all users of radioactive materials (IWL-HP-06).

14) The Company Health Physicist and the Radiation Safety Officer each have the authority to shut down any operation involving the use of radioactive materials if they feel the continuation of such activities could pose a hazard to the health and well-being of the employees or the general public.

15) The Radiation Safety Officer will review all survey and personnel monitoring data and report to the Radiation Safety Committee, at periods not exceeding one year, his recommendations to reduce exposure with respect to ALARA.

16) Serve as the company liaison to the U.S. Nuclear Regulatory Commission on license and inspection matters.

17) Establish and maintain a leak test program for sealed sources.

18) Conduct semiannual physical inventory of radioactive material.

19) Investigate the cause of any incident and determine the proper preventive actions.

I-3.3 *Records are maintained by the Health Physics Office on the following:*

- Licenses and license applications.
- License inspection reports and responses.
- Radiation history, past and present, on all TBE-ES personnel.
- All requests for sources of ionizing radiation.
- Waste disposal.
- Surveys and recommendations.
- Calibration results.
- Surveys of all sealed sources.

All records will be maintained a minimum of five (5) years after the expiration date of any licensed activity to which they pertain.

I-3.4 *Reference Material*

1) The Health Physics Office maintains a current file of all domestic and foreign regulations pertinent to activities under the various licensed activities.

2) The Health Physics Office maintains a reference library of health physics, radiation protection and related measurement technology as required for support of licensed activities, license revisions, and expansion of business in related areas.

I-3.5 *Professional Associations*

The Health Physics Office maintains membership in appropriate local, state, national and international professional societies as required to remain current in development of radiation protection philosophy, regulation, and techniques, and to enhance our professional reputation and explore opportunities for future business.

I-4.0 PROCEDURE FOR REVISING RADIATION SAFETY CODE AND QUALITY CONTROL MANUAL

To ensure that any procedure or form complies with all of the laws, rules, and regulations governing the safe handling of radioactive materials, a procedure whereby a person directly involved in the manipulation of the materials may submit a procedure or form for approval by the Radiation Safety Committee and the Company Health Physicist must be followed. The following lists the steps to be followed to ensure such compliance.

I-4.1 Writing a Procedure or Producing a Form

4.1.1 The person who writes the procedure will generally be the supervisor or manager of the area.

4.1.2 A general outline will be followed in the writing of a procedure as follows:

- General Information
- Detailed Procedures
- Conclusions (when necessary)
- Forms Used (Documentation)

4.1.3 The numbering system will be as follows:

1.0 General Information
1.1
1.1.2
1.1.2.1

1.2

2.0
2.1

etc....

Forms are numbered by IWL (Isotopes Westwood Laboratories), plus a two letter code designating the license area (e.g. RW=Radiological Waste) and a consecutive two or three digit serial number. Each page of each manual or procedure must be identified by a code which indicates the manual or procedure, the date of revision, and an indication of approval.

I-4.2 Submission and Review

4.2.1 Once drafted, the procedure will be reviewed by the Department Manager with respect to general safety practices and fulfillment of objectives.

4.2.2 Once reviewed by the Department Manager, he will submit it to the company Radiation Safety Officer (R.S.O.) for review with respect to compliance with all the applicable laws, rules and regulations.

4.2.3 The R.S.O. will make any changes deemed necessary and return the draft to the Department Manager for review. This is done to ensure that any changes made will not appreciably alter the scope or purpose of the procedure.

4.2.4 The Manager will then submit the draft to the Executive Subcommittee. The Executive Subcommittee will make a determination on the draft and if acceptable, the Chairman of the R.S.C. will approve the draft. He will endorse the procedure to verify acceptance.

4.2.5 If the procedure does not meet with approval by the Executive Subcommittee, the changes will be made and resubmitted.

4.2.6 Upon final acceptance, the procedure and/or forms will be incorporated into the appropriate section of the Radiation Safety Code and Quality Control Manual.

4.2.7 Review of Radiation Safety Code and Quality Control Manual.

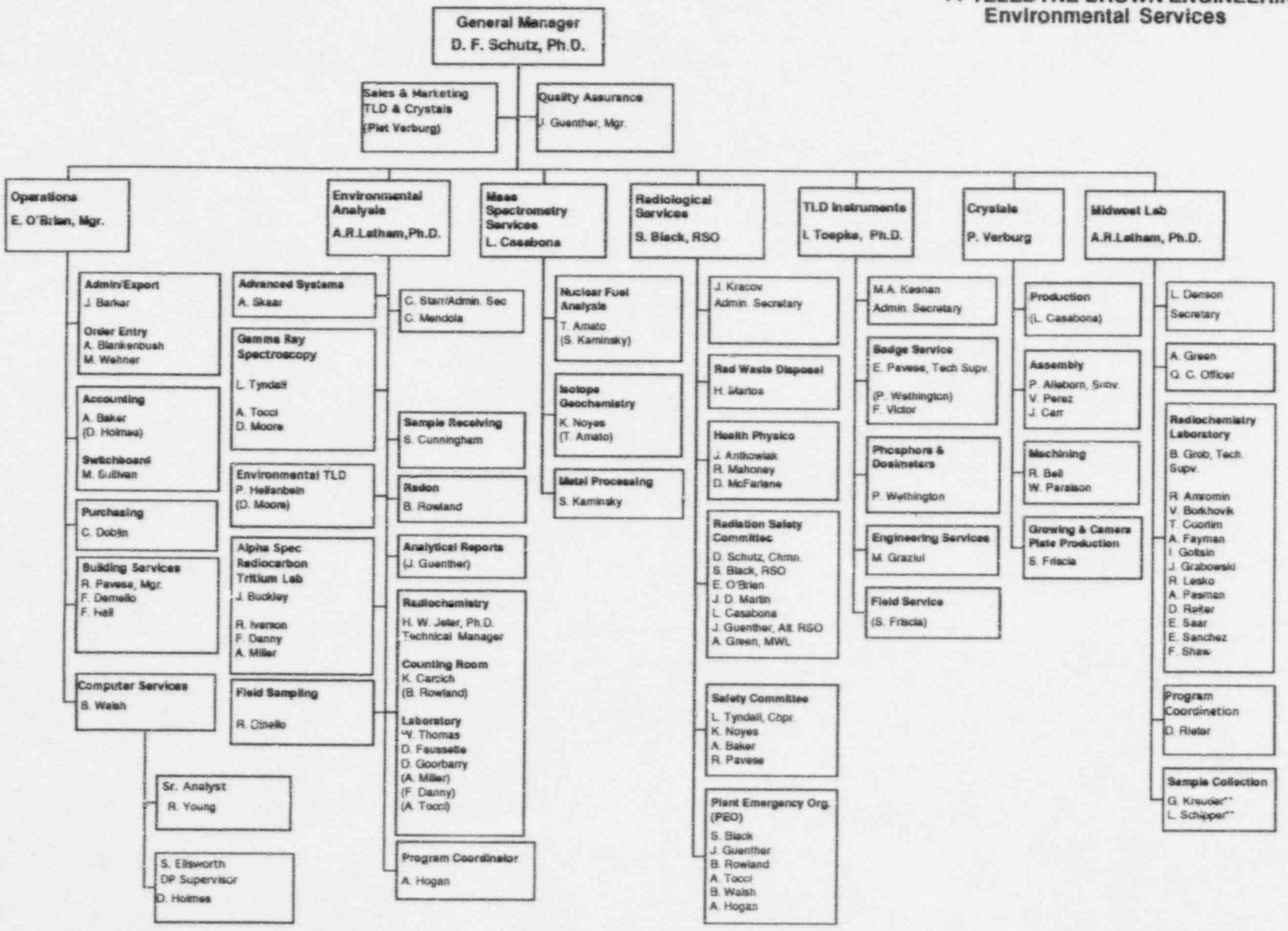
The entire Radiation Safety Code and Quality Control Manual will be reviewed and approved by the R.S.O. at intervals not to exceed five years. Upon complete review and revision, all previously issued copies will be replaced. Significant interim changes will be issued for insertion into issued copies as they occur.

SECTION I FORMS

All forms referenced in Section I follow. Forms referenced in Sections II & III can be found at the end of each individual section.

Organization Chart
Members of Radiation Safety Committee
Members of Safety Committee
Dr. Donald F. Schutz Resumé
Steven A. Black Resumé

TELEDYNE BROWN ENGINEERING
Environmental Services



Effective 12-6-96

MEMBERS OF RADIATION SAFETY COMMITTEE

Donald F. Schutz, Chairman	General Manager
Steven A. Black, Radiation Safety Officer	Manager, Radiological Services
Jeffrey M. Guenther, Company Health Physicist	Manager, Quality Control
Alan Latham	Manager, Environmental Analysis
Lewis F. Casabona	Manager, Mass Spectrometry Services
Eugene B. O'Brien	Manager, Administration & Finance
Arlene Baker	Personnel Director

Note: This Table is subject to change without notification to Regulatory Authorities.

MEMBERS OF SAFETY COMMITTEE

Diahann McFarlane, Chairperson	Radiological Services Department
Linda Tyndall	Environmental Analysis Department
Arlene Baker	Personnel Department
Al Hogan	Environmental Analysis Department
Robert Pavese	Maintenance Department
Keith Noyes	Mass Spectrometry Department

Note: This Table is subject to change without notification to Regulatory Authorities.

RESUME

Donald F. Schutz, Ph.D.
General Manager - TBE-ES

Dr. Schutz is General Manager of Teledyne Brown Engineering - Environmental Services in which capacity he has overall responsibility for all activities of the company. These include products, services, and research in environmental radioactivity monitoring, thermoluminescent dosimetry, sodium iodide crystal manufacture, radiological waste disposal, nuclear fuel analysis, geochronometry, and isotope geochemistry. Dr. Schutz is actively engaged in the technical direction and marketing of TeleTrace - a subsurface fluid tracing procedure offered to the petroleum industry to enable them to obtain more meaningful data in their enhanced secondary recovery operations. He is the Chairman of the Radiation Safety Committee and is responsible for the Quality Assurance Program of the company.

From 1970 to 1975 Dr. Schutz was Vice President of Teledyne Isotopes in charge of the Westwood Laboratories. Prior assignments have included Manager of Nuclear Operations from 1968 to 1970, with responsibility for projects carried out for the Nuclear Monitoring Research Office of the Defense Advanced Research Projects Agency (DARPA), the Arms Control and Disarmament Agency (ACDA), and the Atomic Energy Commission for the study of radioactive products of underground nuclear explosions. His responsibilities ranged from laboratory studies of inert gas extraction and radioassay techniques to engineering development of sampling and detection systems. He participated in, and directed numerous field operations at the Nevada Test Site and various off-site nuclear test areas in Mississippi, New Mexico, Colorado, Nevada, and Alaska. Dr. Schutz was principal investigator on Department of Energy projects concerned with the application of nuclear techniques to the exploration for uranium ore deposits.

Prior to joining Teledyne Isotopes in 1964, Dr. Schutz was a Research Staff Geologist in the Department of Geology at Yale University where he received the Ph.D. degree in geology. He was primarily concerned with development of analytical techniques for the determination of trace elements in seawater and stream water by neutron activation, X-ray fluorescent and emission spectrographic analysis. The techniques developed were applied to a worldwide sampling of seawater which included samples taken by Dr. Schutz in the Antarctic during the summer of 1963-1964.

At Rice University Dr. Schutz completed a statistical study of regional variations in the chemical composition of basaltic rocks for which he received the M.A. in geology in 1958. Dr. Schutz received the B.S. (cum laude) in geology from Yale University in 1956. Prior field experience includes work for the Bear Creek Mining Company on geochemical prospecting projects in the states of Maine and Arizona.

Professional and technical memberships include Sigma Xi, Geochemical Society, Geological Society of America, American Geophysical Union, American Nuclear Society, Society of Petroleum Engineers of A.I.M.E., Society of Petroleum Exploration, American Association of Petroleum Geologists, Energy Minerals Division of AAPG, Air Pollution Control Association, Atomic Industrial Forum, American Public Health Association, and Scientists & Engineers for Secure Energy.

RESUME

Steven A. Black, B.A.
Manager, Radiological Services

Mr. Black presently manages operations in the Radiological Services Department of Teledyne Brown Engineering - Environmental Services and is responsible for implementation of the facility's health physics program as the company's Radiation Safety Officer, and the facility's industrial/laboratory safety program as the Chairman of the Safety Committee. He has also been named the Plant Emergency Officer and is in charge of all evacuation and emergency procedures.

Specific duties include the following:

- Operational control of the Health Physics & Radioactive Waste product lines.
- Determining prices, preparing bids, and designing brochures.
- Maintaining the chemical inventory and proper hazardous waste disposal.
- Radioactive & hazardous materials shipping compliance.
- Compliance with N.J. Dept. of Environmental Prot. Divisions of Air & Water Quality.
- Compliance and maintenance of six U.S. Nuclear Regulatory Commission licenses for the possession and use of radioactive materials.
- Compliance and maintenance of an Illinois state license and a New Jersey state license for the possession and use of radioactive materials.
- Implementing the facility's Right-To-Know program for employees and for emergency service personnel.
- Computerization of all facets of the business using both Macintosh, BASIC and UNIX based systems.
- Preparing and updating employee evacuation plans.
- Safety orientation training for all new employees prior to their starting to work.
- Fire Brigade leader and the liaison with the local volunteer fire department.

Mr. Black supervised the decontamination of the Department of Energy's New Brunswick laboratory located in New Brunswick, NJ. This project included the coordination of decontamination procedures, maintaining radiation safety records, and packaging radioactive wastes according to U.S. Department of Transportation, U.S. Nuclear Regulatory Commission, and burial site laws, rules, and regulations.

Mr. Black also supervised the removal and packing of approximately 21,000 cubic feet of thorium metal waste at the IBM facility in Owego, NY. During this operation he was in charge of all transportation coordination, health physics monitoring, and regulatory considerations of the transporting of large amounts of low specific activity radioactive materials.

While attending Brown University, Mr. Black obtained a Bachelor of Arts degree in Biology. He has taken numerous short courses on the packaging and transport of radioactive waste. He also successfully completed the Rutger's University Radiation Science introductory course for the Master's program in Health Physics. He has acquired detailed computer programming skills in BASIC and FORTRAN, and is an experienced Macintosh computer user.

SECTION II - GENERAL PROCEDURES FOR CONTROLLING RADIOACTIVE MATERIALS AND RADIATION EXPOSURES

This section deals with the general procedures for radiation protection which apply to the activities carried on under the several licenses currently in effect. Specific procedures relating to activities under particular licenses are included as sub-sections of Section III of this manual.

II-1.0 INDOCTRINATION OF PERSONNEL EXPOSED TO IONIZING RADIATION

II-1.1 Company Policy on Matters Involving Radiation Exposure

Work performed under the various licensed activities treated in this manual require some degree of exposure to radiation by operating personnel. It is necessary, therefore, to classify these individuals in the population subgroup of occupational radiation workers. For individuals classified in this group, radiation exposure must be recorded on the employee's radiation exposure history while in the employ of Teledyne Brown Engineering - Environmental Services (TBE-ES).

Minors:
Employees under the age of 18 will be limited to an occupational exposure as detailed in 10 CFR Part 20.1207 (10 percent of the annual dose limits for adult workers specified in 10 CFR Part 20.1201).

Declared pregnant women:
A declared pregnant woman will be limited to an occupational exposure as detailed in 10 CFR Part 20.1208 (500 mRem during entire pregnancy). Where possible and upon request by the employee, it is TBE-ES policy to transfer a declared pregnant woman to a position where there is little, if any, exposure to the individual.

II-1.2 Indoctrination & Training of Personnel

All persons starting to work with any radiation sources at TBE-ES are required to read this Radiation Safety Code and this is documented on Form IWL-HP-07. In addition, each employee is required to furnish as complete a history as possible of their training in the principles and practices of radiation protection. This is documented on Form IWL-HP-06. A basic radiation safety course is then presented to each employee. Included is the showing of a ten part film series entitled "The Story of Radiation", distributed by Training Resources, a division of Nuclear Support Services. The outline of this course is given on Form IWL-HP-07 and this form is used as documentation of the presentation. These records are kept in the person's health physics folder. Periodically, lectures and films on radiation safety are shown to keep all personnel apprised of the necessity for safe operating procedures.

Form IWL-HP-06 is given to the supervisor of the employee who then fills in the section requesting authorization for the employee. This form is sent to the Radiation Safety Officer who will determine what additional training or monitoring is required for the employee to begin work utilizing radioactive materials. If an employee's job function changes where new procedures involving radiation or radioactive materials occur, the supervisor is responsible for preparing a revised Form IWL-HP-06 and submitting it to the RSO for approval. No new job functions are allowed until this approval is obtained.

Persons who through their work attitudes and habits show a disregard for safe operating procedures with radioactive material are recommended for transfer out of radiation work or, if such alternative work is not available, may be terminated from employment.

II-1.3 Rights and Responsibilities of Radiation Workers and the Company Regarding NRC Licensed Activities

1.3.1 Exposure History

All personnel starting work with radioactive materials at TBE-ES are required to supply their supervisor and the Health Physics Office as complete a radiation exposure history as available. Each new employee will also have their estimated current year's exposure entered into their exposure file. Pursuant to 10 CFR Part 19.13(c), a worker may request his/her exposure history from a previous licensed employer.

Pursuant to 10 CFR Part 19.13(b), a worker may request, and each licensee (company) shall furnish annually, the radiation exposure that the worker has received.

When the company (licensee) is required pursuant to 10 CFR Part 20.1203 to report to the NRC an exposure of an individual to radiation or radioactive material, the company (licensee) must also report to the individual.

1.3.2 Notification of Violations During Inspections

Pursuant to 10 CFR Part 19.14(b) the NRC inspector may consult privately with workers concerning matters of occupational radiation protection and other matters as deemed necessary by the inspector. During the course of these consultations, any worker may bring privately to the attention of the inspector, either orally or in writing, any past or present condition which he has reason to believe may have contributed to or caused any violation of the act, the regulations of 10 CFR Parts 19, 20, and 21, or license condition, or any unnecessary exposure of any individual to radiation from licensed radioactive material under the licensee's control.

1.3.3 Notice of Violations, Adverse Conditions, or Potential Violations or Conditions Prior to an Inspection

If an employee becomes aware of any condition which may cause a violation of 10 CFR Parts 19, 20, or 21 or a license condition or any unnecessary radiation exposure of an individual, the employee is responsible for the reporting of such a condition. The procedures for reporting can be found in Section II-1.3.4.

1.3.4 Procedure for Reporting Items of Non-Compliance, Violations and/or Potential Violations

1.3.4.1 Supervisor Contact

The first person to be notified is the supervisor of the area in question. This notification is to be in writing and as detailed as possible.

The supervisor is then to take the necessary steps to follow up the report. If the problem is of sufficient severity, he will report it to the company Radiation Safety Officer.

1.3.4.2 Radiation Safety Officer Contact

The Radiation Safety Officer will be notified by the individual if they feel the supervisor has not handled the situation in a prompt and efficient manner. This report is to be in writing and as detailed as possible.

The Radiation Safety Officer is then to take the necessary steps to follow up the report. If the problem is of sufficient severity, he will report it to the Radiation Safety Committee.

1.3.4.3 Radiation Safety Committee Contact

The Radiation Safety Committee will be notified by the individual if they feel the R.S.O. has not handled the situation in a prompt and efficient manner. This report is to be in writing and as detailed as possible.

The R.S.C. is then to take the necessary steps to follow up the report. If in the estimation of the Radiation Safety Committee, the situation warrants it, they will notify the Nuclear Regulatory Commission. See 10 CFR Part 19.5 for whom to contact.

1.3.4.4 Nuclear Regulatory Commission Contact

The Nuclear Regulatory Commission will be notified in writing by the individual as detailed in 10 CFR Part 19.5 if he feels the Radiation Safety Committee has not handled the situation in a prompt and efficient manner. The report shall include appropriate identifying data such as the name of the licensee, the name of the individual, and a detailed description of the suspected violation.

1.3.4.5 Review of Reports on Violations

In all cases where the report reaches the Radiation Safety Committee, the actions required, the actions taken, and the results obtained will be kept with the minutes of the Radiation Safety Committee. If the report does not warrant the Radiation Safety Committee's review, it will be deemed of not sufficient importance and therefore no written record shall be required.

1.3.5 Requirement for Posting NRC "Notice of Violations"

If subsequent to an NRC inspection the licensee is given a "Notice of Violation", such notice must be posted in a conspicuous place for 5 days or until compliance is achieved, whichever period is longer. Any written response required pursuant to a "Notice of Violation" will also be posted in a like manner.

II-2.0 MEDICAL EXAMINATIONS AND EMERGENCIES

II-2.1 Pre-Employment Medical Examination

New company personnel who will be exposed to, or potentially exposed to ionizing radiation may be required to submit to a medical examination at the discretion of the company Radiation Safety Officer or the Company Health Physicist. The results of this examination become a part of each person's pre-employment record and is kept on file in the Personnel Department.

II-2.2 Follow-Up Medical Examination

Routine medical examinations are not presently required for those persons who are working with ionizing radiation due to the low permissible limits and excellent detection methods now available for external and internal radiation protection. At present, physical methods of detection of radiation are much more sensitive than signs or symptoms of deleterious biological effects identifiable in a routine medical examination. However, if a person receives an exposure in any one quarter in excess of the radiation protection guide value but less than two times this value, then he may be required to take a medical examination at the discretion of the company Radiation Safety Officer or Company Health Physicist. If the exposure is in excess of two times the radiation protection guide value, a medical examination is mandatory.

II-2.3 Termination Medical Examination

Persons who are leaving the employment of the company may be required to submit to a medical examination as directed by the Company Health Physicist or Radiation Safety Officer. A radiobioassay examination is required for all personnel having worked with ionizing radiation.

II-2.4 Accidents Involving Radiation

Every incident involving exposure of company personnel to radiation in excess of the quarterly radiation protection guide value is classified as an accident and a report of the accident must be made to the Radiation Safety Committee by the Radiation Safety Officer. An accident involving exposure of company personnel to two times the quarterly radiation protection guide must be immediately reported to the Radiation Safety Committee and General Manager of the Westwood, NJ facility at the earliest practical date on its findings.

Every incident involving contamination of equipment and requiring disposal or decontamination in excess of $100 or 1 man-day cleanup time must be investigated by the Radiation Safety Officer and a report made to the Radiation Safety Committee. Incidents with equipment losses in excess of $1,000 or 5 man-days for decontamination must be investigated by an Investigating Subcommittee appointed by the Radiation Safety Committee.

Reports to federal, state, county and city authorities as required by law are the responsibility of the company Radiation Safety Officer.

II-2.5 Emergencies and Decontamination of Equipment

The Health Physics Office is equipped with the necessary tools and protective clothing to handle all foreseeable incidents on company property. Specially trained teams are available to handle most anticipated incidents involving company personnel and property.

II-2.6 Fire

Every precaution must be taken by all personnel to eliminate the possibility of fire on company property. This involves personal habits in regard to smoking and housekeeping. All electrical connections and electrical equipment installation are made only with the approval of company Maintenance Department.

The presence of radioisotopes can complicate the control of a fire once started. Therefore, sources must not be left unattended except for standard sources used in instrument calibration containing an insignificant amount of activity (less than ten microcuries). Overnight, all sources except as noted must be locked in fire-resistant containers. Those sources under active preparation are excluded from this requirement as long as adequate safeguards are instituted and cleared with the Health Physics Office. Also excluded are those sources which are permanently mounted in a shielded source holder.

In case of a fire the emergency evacuation procedure which can be found in the Safety Manual is to be followed. In the case of restricted labs, reentry will not be made unless accompanied by a Health Physicist.

Fires at night in company buildings will be controlled by the local Fire Department, but company personnel will be alerted by the Fire Department and be present to direct them in fires involving radioactive material. The list of persons to call is included in Section II-3.4 and is posted in easily accessible locations at the front and rear entrances of the main building and radiological warehouse. The local Fire Department will be updated every three years with the location of different sources of radioactive material at our facility. An "Introduction to Radiation" training program will also be presented at these times.

II-2.7 Security

Any radioactive material misplaced, lost or stolen must be immediately reported to the Health Physics Office. An immediate investigation will be made by this office to locate the radioactive material. If it is not immediately found, steps must be taken to alert other persons in the company to this fact as well as federal, state, county, and city officials as required by law.

II-3.0 LABORATORY PRACTICES IN THE SAFE HANDLING OF RADIOACTIVE MATERIALS

II-3.1 Personnel Directives

3.1.1 Wear laboratory coats or other protective clothing at all times in areas where loose radioactive materials are used.

3.1.2 Wear disposable gloves at all times while handling loose radioactive materials.

3.1.3 Do not eat, drink, smoke, or apply cosmetics in any area where radioactive materials are stored or used.

3.1.4 Wear a TLD badge at all times if you have been assigned one. If you are entering an area where the suspected radiation levels can be in excess of 0.5 mR/hr., the entry will be posted that TLD badges are required. If you don't have a TLD badge, please contact the Health Physics Office prior to entry into a posted area.

3.1.5 Confine radioactive materials in covered containers plainly identified and labeled with identification number and if applicable, a "radioactive material" label bearing the radionuclide, activity, date and radiation level.

3.1.6 Always transport radioactive material in shielded containers if required by the character of radiation and strength of source.

3.1.7 Dispose of radioactive wastes only in specifically designated receptacles. See Section II-8.0 for packaging and disposal procedures.

3.1.8 Remove your lab coat when you leave an area where loose radioactive material were used. No lab coats are to be worn outside the restricted areas.

3.1.9 Never pick up an unshielded radioactive container with your hands. Even short tongs may make a significant difference in exposure.

3.1.10 Remember the inverse square law: Dose Rate is proportional to $1/d^2$ where d = distance

3.1.11 Mouth pipetting is strictly prohibited.

II-3.2 Minor Spills

3.2.1 Notify persons in the area that a spill has occurred.

3.2.2 Cover the spill with absorbant material.

3.2.3 Use disposable gloves and remote handling tongs. Carefully fold the absorbant paper and pad. Insert into a plastic bag and dispose of in the radioactive waste container. Also insert into the plastic bag all other contaminated materials such as disposable gloves.

3.2.4 Report the incident to the Radiation Safety Officer for follow-up survey.

II-3.3 Major Spills

3.3.1 Notify all persons not involved in the spill to vacate the room.

3.3.2 Cover the spill with absorbant material, but do not attempt to clean it up. Confine the movement of all personnel potentially contaminated to prevent the spread.

3.3.3 If possible, and warranted by the characteristics of the isotope(s) involved, the spill should be shielded, but only if it can be done without further contamination or without significantly increasing your radiation exposure.

3.3.4 Leave the room and lock the door(s) and prevent entry.

3.3.5 Notify the Radiation Safety Officer immediately.

3.3.6 Contaminated clothing should be removed and stored for further evaluation by the Radiation Safety Officer. If the spill is on the skin, flush thoroughly and then wash with mild soap and lukewarm water.

II-3.4 List of Persons to Call in Radiation Emergency

1) Person who is in charge of laboratory or area where emergenc has occurred. This Person's name will be on the hazard sign for the laboratory area.

2) Radiation Safety Officer — Steven A. Black

Office: (201) 664-7070 Ext. 225
Home: (201) 666-4588
Cellular Phone: (201) 294-0546

3) Maintenance Engineer — Robert Pavese

Office: (201) 664-7070 Ext. 205
Home: (201) 262-4270

4) General Manager - Chairman, Radiation Safety Committee — Donald F. Schutz

Office: (201) 664-7070 Ext. 213
Home: (201) 391-2790

5) US Nuclear Regulatory Agency

(610) 337-5000
(301) 816-5100 After Hours

6) NJ Dept. of Environmental Protection

8 AM - 5 PM (609) 292-5586
After Hours (609) 292-7172

7) NJ State Police Emergency Management

(609) 882-2000

II-3.5 Contamination Control Directives

3.5.1 Never consider the outside surface of the inner container of radioactive material to be free of contamination.

3.5.2 Always survey the inner container surface for contamination by taking a smear and checking it with the proper instrument. Only packages of radioactive material which contain greater than "limited quantities" are subject to this directive.

3.5.3 Always use gloves and fume hood when working with unsealed radioactive materials in excess of exempt quantities.

3.5.4 Never open a container unnecessarily without a definite purpose.

3.5.5 In transferring any liquids, the following steps must be taken:

- Prepare a shallow tray by lining it with plastic-backed absorbant material.
- Put the radioisotope container, the properly labeled receptacle and necessary tools into the tray.
- Evaluate by calculation or measurement the extremity and whole body dose expected during the operation.
- Consider that the radioisotope container top is highly contaminated.
- Perform the transfer operation in a hood wearing gloves and lab coat.
- Remove and dispose of the absorbant liner, survey and dispose of or decontaminate any contaminated items.
- Decontaminate the original container unless it is to be disposed of, seal it in a plastic bag and return it to storage.

3.5.6 Notify Health Physics whenever work is to be done with finely divided powders or especially hazardous substances.

II-4.0 ORDER, TRANSFER, RECEIPT AND SHIPMENT OF RADIOACTIVE MATERIALS

II-4.1 Order

All purchase requests for radioisotopes must be forwarded to the Health Physics Office on a standard TBE-ES Purchase Requisition form and Form IWL-HP-04.

II-4.2 Transfer

No radioisotopes can be transferred from the user(s) as recorded on Form IWL-HP-04 for the specific radioisotope or radiation source unless another Form IWL-HP-04 is submitted and approved indicating the new user(s), use, and location of the radioisotope.

II-4.3 Receipt

All incoming radioactive material must be checked and recorded by the Health Physics Officer or designated representative on Form IWL-HP-05. Prior to delivery of radioisotopes from the Receiving Department to a user, the shipment must be checked by the Health Physics Office.

II-4.4 Shipment

Shipment of all radioactive material is under the supervision of the Health Physics Office. Each shipment must be checked and approved by the Health Physics Office on Form IWL-HP-05. Shipment procedures are dealt with in detail in subsections on Radiological Waste Disposal License (NRC License #29-00055-14), State of New Jersey License (#10123), Precious Metals Decontamination License (NRC License #29-00055-15, and Special Nuclear Material License (NRC License #SNM-107).

II-5.0 PERSONNEL MONITORING

Internal and external personnel monitoring will be in accordance with 10 CFR Subpart C - Occupational Dose Limits.

II-5.1 External Dosimetry

Every employee of, and visitor to, TBE-ES laboratories and plants must wear personnel monitoring devices such as TLD badges and/or pocket dosimeters if their work or tour involves entry to radiologically controlled areas containing sources of penetrating radiation.

Radiologically controlled areas are defined as specified by Part 20 of Title 10 of the Code of Federal Regulations and consist of the following areas:

Environmental Analysis Standard Solution Storage Room	-	Provisions of NRC License #29-00055-06
Laboratory Room 614A	-	Provisions of NRC License #SNM-107
Metals Processing & Nuclear Fuels Laboratory	-	Provisions of NRC Licenses #29-00055-15 & #SNM-107
Source Room	-	Provisions of NRC Licenses #29-00055-06
Warehouse	-	Provisions of NRC License #29-00055-14 and NJ License #10123

A list of those persons monitored by TLD badges is maintained by the Health Physics Office. The TLD badges are read out by TBE-ES Badge Service Department.

TLD whole body badges are changed quarterly. A formal investigation by the RSO will be done whenever a badge receives a dose in excess of ten percent of the applicable limit.

Quality control of TLD dosimetry is set forth in the TLD personnel Badge Service Quality Control Manual (IWL-03420-416) and TLD Badge Service Quality Assurance Manual (IWL-0792-442).

II-5.2 Internal Dosimetry

Some radioisotopes do not emit radiation capable of penetrating 1 millimeter of tissue but are extremely toxic if taken internally. In this case, the standard monitoring technique is to analyze urine, feces, breath or blood of the person exposed to the particular radioisotope. This analysis is called bioassay and approximate equations permit an estimate of the internal body burden and whole body dose.

Bioassay samples are collected from all TBE-ES personnel working with alpha emitters, carbon-14, hydrogen-3 (tritium) and such other radioisotopes as indicated by the Health Physics Office on a quarterly basis. Whole or partial body counts can also be used to estimate the body burden. Direct thyroid counting is done on employees using quantities in excess of 0.1 mCi of any of the iodine isotopes. Bioassays for company personnel are carried out under the same procedures and controls employed for commercial service under Clinical Laboratory License #29-1012 by the New Jersey and New York State Departments of Health.

The action levels for tritium and iodine bioassay are equal to 10 percent of the Annual Limits of Intake (ALI's). When these action levels are exceeded, an investigation into the actions and possible mode of intake is performed. Additional bioassays are performed to determine the committed dose.

Procedures are set forth in the Environmental Analysis Analytical Procedures Handbook (IWL-0032-419) with Quality Assurance as set fort in Section IV of IWL-0052-420, Radiocarbon Age Determination Quality Control Procedures. Bioassays are also performed in the Health Physics Department under the Health Physics Analytical Procedures Handbook (IWL-0312-452).

II-6.0 SURVEYS

Unless otherwise specified in Section III, contamination surveys will be performed as follows:

I.	Low-Level	:	At least quarterly
II.	Medium-Level	:	At least monthly
III.	High-Level	:	At least weekly

Depending on the nature of the radiation emitted and the level of radioactivity, the area is checked for external radiation as well as airborne and surface contamination. NOTE: See Reference Table 2, p. 12 NCRP report No. 30 "Safe Handling of Radioactive Material". We use a factor of ten (10) lower than those listed as a guideline for determining low, medium or high hazard.

II-6.1 Area Surveys

Areas are checked with the properly calibrated instrument for intensity of external radiation. In addition, smears are taken on all accessible surfaces to check for transferable radioactivity. Particulate air and gas samples are collected with the appropriate sampling device to check for airborne contamination when required. The operation of all safety devices incorporated in laboratories and work areas for safe work with ionizing radiation such as interlocks, hoods and area radiation alarms are periodically checked as well. If the results of these surveys are in excess of the contamination levels listed in Section II-6.3, the person responsible for the area is notified. A copy of the Health Physics Survey is kept in the Health Physics Office for future reference. Non-compliance with these recommendations is cause for removal from work with sources of ionizing radiation in TBE-ES facilities.

II-6.2 Decontamination

Periodically, areas will become contaminated with radioactive material. The above-mentioned periodic surveys attempt to control this contamination hazard but will not eliminate it. Therefore, the Health Physics Office is equipped with decontamination clothing, respirators, tools, and cleaning solutions to assist in the decontamination of equipment and buildings in case the need arises. In most cases, the Health Physics Office will merely supervise the decontamination operation because of the educational value of decontamination experience by personnel responsible for the contamination. Request for permission to deviate from this rule must be made to the Health Physics Office.

II-6.3 Survey Review

All survey results are reviewed by the Radiation Safety Officer or his designee. Results are evaluated according to the action limits designated below. Items found to be in excess of 25% of these limits will be reported to the laboratory manager. Items in excess of 50% will be decontaminated as soon as practicable.

	Lab Surfaces[1]	Clothing[1]	Skin[2]
Alpha fixed:	1000	100	50
Alpha removable:	200	20	N/A
Beta-gamma fixed:	5000	500	250
Beta-gamma removable:	1000	100	N/A

NOTE: All values are dpm/100 cm^2.

[1]All areas in excess will be decontaminated or disposed of as radioactive waste.

[2]If any area cannot meet these levels after vigorous cleansing, additional Health Physics review is necessary.

II-7.0 INSTRUMENT CALIBRATION

II-7.1 General

A number of instruments listed in Section II-10.0 (Form IWL-HP-18) are available to perform surveys and must be calibrated in accordance with the instrument calibration procedures below. On each company instrument a label must be placed indicating date of calibration, instrument serial number, and the initials of the person doing the calibration. Instrument calibration records traceable to NIST standardized sources are maintained by the Health Physics Office (Form IWL-HP-08). Most of our instruments e calibrated by TBE-ES under our 29-00055-06 license.

Each scale of the instrument is calibrated using two points. One point is in each half of the scale and they are separated by approximately 35% of the full scale. Log scale instruments are calibrated with one point near the mid-point of each scale. All instruments used must read within ± 10% of the calculated or known calibration point. If the reading cannot be adjusted within ± 10% but is within ± 20%, the instrument will not be used unless a graph indicating the actual value is attached. If the reading is off by more than ± 20%, the instrument will be declared out of service and repaired.

A reference check source with a specific geometry shall be utilized after calibration, before use, after use, after maintenance and after a battery change. If the reading differs by more than the ± 20% of the reading measured after calibration, the instrument will be recalibrated.

II-7.2 Gamma Calibration

All gamma sensitive radiation survey instruments are calibrated quarterly utilizing standard sources traceable to NIST. The sources are approximate point sources.

II-7.3 Beta Calibration

All instruments used to measure beta radiation during radiation surveys are calibrated quarterly with sources traceable to NIST.

II-7.4 Alpha Calibration

All instruments used to measure alpha radiation during radiation surveys are calibrated quarterly with sources traceable to NIST.

II-7.5 Frequency of Calibration

All survey instruments are calibrated on a quarterly basis.

II-7.6 Standards

The standards utilized depend on the radiation to be detected. Generally, we use Cs-137, Co-60, Tc-99 or Pu-239 sources. All standards are traceable to NIST.

II-8.0 RADIOACTIVE WASTE PACKAGING & DISPOSAL

Radioactive waste materials are disposed of by the Radiological Services Department in accordance with all federal, state and local regulations. The generators of the waste are trained in the proper method of packaging the waste and then tested on their knowledge to ensure compliance. The materials will be packaged using the "Classification of Radioactive Waste to be Packaged for Shipment" as a guide, and in conformance with the "Packaging Procedure for Radioactive Waste".

II-8.1 Safe Packaging of Radioactive Material - Training and Retraining

Any person engaged in the preparation of waste for disposal must be properly trained in all the DOT, NRC and burial site requirements for proper packaging. The training program is as follows:

8.1.1 Each person is given a copy of the current Radiation safety Code and Quality Control Manual. He is to study these procedures (II-8.2 and II-8.3) and then be tested on his knowledge of the material using Form IWL-RW-231, "Packaging of Radioactive Waste Examination".

8.1.2 Subsequent to the examination, each person will be physically supervised in the proper classification and packaging of waste in his area. Using Form IWL-RW-206, the supervisor will document such on-the-job training.

8.1.3 When the supervisor is satisfied the person has demonstrated a complete understanding of the procedures, he will notify the Radiation Safety Officer, who will authorize the individual to perform these procedures unsupervised and will document this on Form IWL-RW-206.

8.1.4 Retraining of the individual in the most current DOT, NRC, and burial site packaging requirements is to be performed at a maximum one year interval unless significant changes require immediate review. Retraining and review will be documented using Form IWL-RW-206, or by filing a memorandum in each trainee's training folder.

II-8.2 Classification of Radioactive Waste to be Packaged for Shipment

8.2.1 Characteristics of Material to be Packaged

- Isotope
- Activity (mCi)
- Physical State (solid, liquid, vials, carcasses, biological matter or gas)
- Concentration (mCi/gram)
- A1, A2 Values
- Form (Normal or Special)
- 10CFR Part 61 Class A, B, C Stable or Unstable
- Chemical Form

8.2.2 Proper Shipping Name and UN ID Number

- Radioactive Material, Excepted Package - Limited Quantity of Material, n.o.s. (UN2910)
- Radioactive Material, Low Specific Activity or LSA, n.o.s. (UN2912)
- Radioactive Material, n.o.s. (UN2982)
- Radioactive Material, Special Form, n.o.s. (UN2974)
- Radioactive Material, fissile, n.o.s. (UN2918)
- Radioactive Material, Excepted Package - Instruments *Or* Articles (UN2910)
- Uranyl Nitrate, solid (RQ-100 lbs.) (UN2981)

8.2.3 Determination of Shipment Specification

- What specification container is required.
- What labels are required.
- Whether a security seal is needed or not.
- mR/hr limits @ contact.
- Additional requirements.

II-8.3 Packaging Procedures for Radioactive Waste

8.3.1 General - All radioactive waste packaging procedures are in compliance with the current applicable regulations and license criteria of the respective processor or burial site to whom the package is intended. These procedures can be found as a separate document entitled, "Teledyne Brown Engineering - Environmental Services Radioactive Waste Packaging Procedures."

II-8.4 Radioactive Waste Interim Storage Plan

Radioactive waste will be placed into interim storage only if disposal is not available. As disposal is currently unavailable to facilities in NJ, it will be stored until it can economically be shipped off-site for volume reduction processing. After return from processing, the waste will be stored in our radioactive waste storage facility (see NRC License No. 29-00055-14 for details) until disposal becomes available. All interim stored wastes will have a 5 year storage limit (after return from processing). If at that time disposal is not available, we will discuss our options with the U.S. NRC at that time. When disposal becomes available, the materials will be shipped for final disposal within 6 months of that date.

All interim storage wastes will be stored in U.S. DOT approved steel containers. The containers will not be exposed to the weather except during movement to and from the facility. The facility is surveyed weekly for both direct radiation and removable contamination levels. All interim stored wastes will be physically removed from the facility every three months so that each pallet of four drums can be visually inspected. We will have over-pack containers readily available should one be needed.

All other considerations for security and safety of the materials are addressed in our U.S. NRC No. 29-00055-14 license.

II-9.0 FACILITIES & EQUIPMENT

Please see the diagrams in the Forms section at the end of this Section. A list of the Health Physics equipment that is available for use can also be found in the Forms section.

Construction of 103 Woodland Avenue

Please refer to the diagram that is included with Section II-Forms "Diagram of Warehouse - 103 Woodland Avenue". This building is constructed of cement block walls. There is a flat roof that is covered by sheet-rock on the inside. The overhead door is wooden and the other exit/entrance is steel.

Construction of 50 Van Buren Avenue

Please refer to the diagrams that are included with Section II-Forms. This building is constructed of cement block walls. There is a flat roof covered with a synthetic membrane.

Construction of the Degussa Facility - 3901 South Clinton Avenue, South Plainfield, NJ

Please refer to the diagrams that are included with Section II-Forms.

II-10.0 INTERSTATE OPERATIONS

From time to time TBE-ES will engage in activities involving the use of radioisotopes in Agreement States. The following is a list the licensing officials in the agreement states as of the date of this issue.

LICENSING OFFICIALS IN AGREEMENT STATES

Alabama
205-613-5391
Mr. Kirksey E. Whatley, Director
Div. of Radiation Control
State Dept. of Public Health
State Office Building
572 East Patton Avenue
Montgomery, AL 36111

Arizona
602-255-4845
Aubrey V. Godwin, Director
Arizona Radiation Regulatory Agency
4814 South 40th Street
Phoenix, AZ 85404

Arkansas
501-661-2301
Ms. Greta J. Dicus, Director
Div. of Radiation Control & Emergency Mgmt.
Dept. of Health
4815 West Markham Street, Slot 30
Little Rock, AR 72205-3876

California
916-322-3482
916-322-2308 - Licensing & Inspection
Mr. Edgar Bailey, Chief
Environmental Health Div.
State Dept. of Health Services
601 North 7th Street
P. O. Box 942732
Sacramento, CA 94234-7320

Mr. Ruben Junkert
Low-Level Radioactive Waste Prog.
State Dept. of Health Services
601 North 7th Street
P. O. Box 942732
Sacramento, CA 94234-7320

Colorado
303-692-3030
Mr. Robert Quillin, Director
Radiation Control Div.
(RCD-DO-B1)
Dept. of Health
4300 Cherry Creek Drive South
Denver, CO 80222-1530

Florida
904-487-1004
Lyle E. Jerrett, Chief
Office of Radiation Control
Dept. of Health & Rehabilitative Services
1317 Winewood Boulevard
Tallahassee, FL 32399-0700

Georgia
404-362-2675
Mr. Thomas Hill, Manager
Radioactive Materials Program
Dept. of Natural Resources
4244 International Parkway, Suite 114
Atlanta, GA 30354

Illinois
217-785-9868
Mr. Thomas W. Ortciger, Director
Dept. of Nuclear Safety
1035 Outer Park Drive
Springfield, IL 62704

Mr. G. Wayne Kerr
Dept. of Nuclear Safety
1035 Outer Park Drive
Springfield, IL 62704

Iowa
515-281-3478
Mr. Donald A. Flater, Chief
Bureau of Environmental Health
Iowa Dept. of Public Health
Lucas State Office Building
Des Moines, IA 50319

Kansas
913-296-1562
Mr. Gerald W. Allen, Chief
KS. Dept. of Health & Environment
Bureau of Air and Radiation
Radiation Control Program
Building 283
Forbes Field
Topeka, KS 66620

Kentucky
502-564-3700
John Volpe, Ph.D., Manager
Radiation Control Branch
Cabinet for Human Resources
275 East Main Street
Frankfort, KY 40621-0001

Louisiana
504-765-0112
Mr. William H. Spell, Administrator
Radiation Protection Div.
Office of Air Quality & Radiation Protection
7290 Bluebonnet Road
2nd Floor
P. O. Box 82135
Baton Rouge, LA 70884-2135

Maine
207-289-5676
Mr. W. Clough Toppan, Mgr.
Radiological Health Program
State House, Station 10
Augusta, ME 04333

Maryland
410-631-3300
Mr. Roland G. Fletcher, Administrator
Radiological Health Program
Office of Toxics, Environmental Science & Health (TESH)
Dept. of the Environment
2500 Browning Highway
Baltimore, MD 21224

Mississippi
601-354-6657
Mr. Eddie S. Fuente, Director
Div. of Radiological Health
State Dept. of Health
3150 Lawson Street
P. O. Box 1700
Jackson, MS 39215-1700

Nevada
702-687-5394
Mr. Stanley R. Marshall, Supervisor
Radiological Health Section
Health Div.
Dept. of Human Resources
505 East King Street
Carson City, NV 89710

New Hampshire
603-271-4588
Ms. Diane E. Tefft, Administrator
Radiological Health Bureau
Div. of Public Health Services
Health & Welfare Building
6 Hazen Drive
Concord, NH 03301-6527

New Mexico
505-827-4358
Mr. Benito Garcia, Chief
Bureau of Hazardous & Radioactive Materials
Water & Waste Mgmt. Div.
Dept. of Environment
525 Camino de los Marquez
P. O. Box 26110
Santa Fe, NM 87502

New York
518-473-0048
Ms. Donna Ross, Energy Planner
Div. of Policy Analysis & Planning
2 Rockefeller Plaza
Albany, NY 12223

Mr. Robert Kulikowski, Director
Bureau of Radiological Health
New York City Dept. of Health
111 Livingston Street
20th Floor
Brooklyn, NY 11201

Karim Rimawi, Director
Bureau of Environmental Rad. Pro.
New York State Health Dept.
Two University Place
Albany, NY 12203

Paul Merges, Director
Bureau of Radiation
Dept. of Environmental Conserv.
50 Wolf Road, Room 506
Albany, NY 12233-7255

OFFICIAL RECORD COPY ML 10 123956

(New York - continued)

Rita Aldrich, Principal Radiologist
New York State Dept. of Labor
Radiological Health Unit
Building 12, Room 457
State Office Campus
Albany, NY 12240

North Carolina
919-571-4141
Mr. Dayne H. Brown, Director
Div. of Radiation Protection
Dept. of Environment, Health & Natural Resources
3825 Barrett Drive
P. O. Box 27687
Raleigh, NC 27611-7687

North Dakota
701-221-5188
Dana K. Mount, Director
Div. of Environmental Eng.
Dept. of Health
1200 Missouri Ave., Room 304
P. O. Box 5520
Bismarck, ND 58502-5520

Oregon
503-731-4014
Mr. Ray D. Paris, Mgr.
Radiation Control Section
State Health Div.
Dept. of Human Resources
800 N.E. Oregon St. #21
Suite 705
P. O. Box 14450
Portland, OR 97232

Rhode Island
401-277-2438
Marie Stoeckel, Chief
Div. of Occupational & Radiological Health
Dept. of Health
206 Cannon Building
3 Capital Hill
Providence, RI 0[illegible]-5097

South Carolina
803-734-4700
Mr. Max Batavia, Chief
Bureau of Radiological Health
Dept. of Health & Environmental Control
2600 Bull Street
Columbia, SC 29201

Virgil Autry, Director
Div. of Rad. Waste Mgmt.
Dept. of Health & Environmental Control
2600 Bull Street
Columbia, SC 29201

Tennessee
615-532-0364
Mr. Michael H. Mobley, Director
Div. of Radiological Health
L&C Annex, 3rd Floor
401 Church Street
Nashville, TN 37243-1532

Texas
512-834-6688
Mr. Richard A. Ratliff, P.E., Chief
Bureau of Radiation Control
1100 West 49th Street
Austin, TX 78756-3189

512-908-6065
Susan Ferguson, Director
Texas Natural Resource Conversation Comm.
Uranium & Rad. Waste Section
Industrial & Hazardous Waste Div.
P. O. Box 13087
Austin, TX 78711-3087

Utah
801-536-4250
Mr. William Sinclair, Director
Div. of Radiation Control
Dept. of Environmental Quality
168 North 1950 West
P. O. Box 144850
Salt Lake City, UT 84114-4850

Washington
206-586-8949
Mr. Terry R. Strong, Director
Div. of Radiation Protection
Dept. of Health, LE-13
Airdustrial Center Building #5
P. O. Box 47827
Olympia, WA 98504-7827

SECTION II FORMS

All forms referenced in Section II follow. Forms referenced in Sections I & III can be found at the end of each individual section.

FORM NUMBER	TITLE
IWL-HP-04	Application for Radiation Source
IWL-HP-05	Shipping/Receiving Survey Form
IWL-HP-06	Isotope User Request Form
IWL-HP-07	Basic HP Training Course
IWL-HP-08, 08a, 08b, & 08c	Sample Calibration Forms
IWL-HP-18	Radiation Detection Instruments List
IWL-RW-206	Retraining in Regard to Processing Generated Waste
IWL-RW-231	Packaging of Radwaste Exam
	Diagram of Warehouse - 103 Woodland Avenue
	Diagram of Zones 1 & 2 - 50 Van Buren Avenue
	Diagram of Zones 3 & 4 - 50 Van Buren Avenue
	Diagram of Zones 5, 6 & 7 - 50 Van Buren Avenue
	Diagram of Degussa Corporation - 3601 South Clinton Avenue, South Plainfield, NJ

TELEDYNE
BROWN ENGINEERING
Environmental Services

APPLICATION FOR RADIATION SOURCE(S)

Name _____ Date _____

Building _____ Position _____

Isotope(s) _____ Telephone Number _____

Quantity(ies) _____ Chemical Form _____

Present Inventory _____ Physical Form _____

Location of Use (Bldg. & Rm.) _____ Location of Storage _____

Proposed use (activity levels, special hazards, method of disposal of wastes, safety measures) Attach supplementary sheet if necessary.

_____

_____

_____

_____

Applicant's training and experience (relevant to use of radioisotopes):

_____

_____

Radiation detection instruments, facilities, and equipment that will be used: _____

_____

The applicant agrees to abide by the letter and spirit of all applicable regulations as recorded in theRadiation Safety Code & Quality Control Manual.

_____
Applicant's Signature

For Use of Health Physics Office Only

Comments of Health Physics Office _____

_____

Decision: _____

Date: _____ Signature _____

Please complete and return with Purchase Request to: Health Physics Office

IWL-HP-04 Revised 8/88

TELEDYNE
BROWN ENGINEERING
Environmental Services

SHIPPING/RECEIVING SURVEY RECORD

Date Shipped _____ Date Received _____

From _____

To _____

Owner of Transport _____

Type of Package _____

Proper Shipping Name _____

Label Used: I, II, III, N/A

Nuclide	Activity (mCi)	Nuclide	Activity (mCi)
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Reading at Contact _____ Reading at 3 ft. _____

Instrument _____ Ser. # _____ Cal. Date _____

Smear Survey (dpm/100 cm^2):

Gross Alpha _____ Gross Beta _____

Package Shipped Properly? Yes _____ No _____

If no, specify problem: _____

Routing:

White: No further Health Physics required
Green: Health Physics survey of inner package required
Blue: Health Physics survey of inner package required
Red: Store in cave (notify Health Physics prior to opening)

White ____ Green ____ Blue ____ Red _____ (Check One)

Surveyed By _____ Date _____

Approved By _____ Date _____

FORM IWL-HP-05 Revised 8/88

ISOTOPE USER REQUEST FORM

TO BE COMPLETED BY EMPLOYEE

Name _____ Social Security # _____

Birth Date _____ Contact Lenses: Yes_____ No_____

Highest Level of Education Completed ____ Teledyne Isotopes Employee # _____

Type of Training	Where Trained	Duration of Training	On the Job		Formal Course	
			Yes	No	Yes	No
a. Principles and practices of radiation protection						
b. Radioactive measurement standardization and monitoring techniques and instruments			Yes	No	Yes	No
c. Mathematics and calculations basic to the use and measurement of radioactivity			Yes	No	Yes	No
d. Biological effects of radiation			Yes	No	Yes	No

EXPERIENCE WITH RADIATION (Actual use of radioisotopes or equivalent experience)

Isotope	Maximum Amount	Where Experience Was Gained	Duration of Experience	Type of Use

TO BE COMPLETED BY SUPERVISOR

Radiation work for which authorization is sought: _____

Isotopes: _____ Physical & Chemical Form: _____

Activity: _____ millicuries Supervisor Requesting Authorization: _____

Safety Glasses Required: Yes ___ No ___

Safety Shoes Required: Yes ___ No ___ Date: _____

RAD. SAFETY OFFICE USE ONLY

Health Physics Comments _____

TLD Badge Required: Yes ___ No ___ Bioassay Required: Yes ___ No ___

Type _____ Analysis _____ Frequency _____

Authorization Date _____ By _____

Radiation Safety Officer

COPY DISTRIB.

Health Physics _____ Supervisor _____ TLD Badge Service _____

Original to Personnel Department _____ Chemical Safety Trainer _____

Form IWL-HP-06 (Rev. 9/91)

RSC/QCM 4.80

Date Approved

Rev'd: _____ _____

Rev'd: _____ _____

TELEDYNE
BROWN ENGINEERING
Environmental Services

BASIC HEALTH PHYSICS TRAINING COURSE

Name _____ Length of Course _____

Presented by _____ Test _____ _____

Course Outline

I. Introduction

- A. Electromagnetic Spectrum
- B. Ionizing Radiation
  - 1) Alpha
  - 2) Beta
  - 3) Gamma
  - 4) X-rays

II. History of Uses

- A. Consumer Reports
- B. Medical
- C. Industry

III. Nuclear Constituents, Properties & Production

- A. Alpha Particles
- B. Beta Particles
- C. Fission
- D. Gamma & X-rays

IV. History of the Atom

- B. Modern Theory
- C. Application for Radiation

V. Radiation Protection

- A. Monitoring Instrumentation
  - 1) Film Badges
  - 2) Thermoluminescent dosimeters
  - 3) Portable survey meters
  - 4) Bioassay
- B. Effects
  - 1) Chemical change
  - 2) Biological
  - 3) High doses
  - 4) Low doses
  - 5) Incidence of disease
- C. Cause & Effect Relationships
- D. Risk Assessment
- E. Regulations
  - 1) ICRP
  - 2) NCRP
- F. Organizational Groups
- G. Prenatal Exposure: Regulatory Guide 8.13

I have received the training outline above, read the Radiation Safety Manual and Regulatory Guide 8.13 "Instruction concerning Prenatal Radiation Exposure", and understand its implications. Any questions I may have had were answered to my satisfaction.

Employee's Signature _____ Date _____

Remarks _____

CERTIFICATE OF CALIBRATION

CALIBRATED FOR:

MODEL No.: SOURCE USED:

SERIAL No.: SOURCE ID#:

RANGE (mR/hr)	CALIBRATION POINT (millirem per hour)	READING (millirem per hour)

SAMPLE

Calibration points were determined with a Victoreen Condenser R-meter with a calibration traceable to the National Institute of Standards and Technology

CALIBRATED BY: *DATE:*

APPROVED BY: _____ *DATE:* _____

SPECIAL NOTES:

CERTIFICATE OF CALIBRATION

CALIBRATED FOR:

MODEL No.: SOURCE USED:

SERIAL No.: SOURCE ID#:

RANGE	CALIBRATION POINT (microrem per hour)	READING (microrem per hour)
	(counts per minute)	(microrem per hour)

SAMPLE

Calibration points were determined with the pulse generator and a Victoreen Condenser R-meter with a calibration traceable to the National Institute of Standards & Technology.

CALIBRATED BY: *DATE:*

APPROVED BY: _____ *DATE:* _____

SPECIAL NOTES:

CERTIFICATE OF CALIBRATION

CALIBRATED FOR:

MODEL No.: SOURCE USED:

SERIAL No.: SOURCE ID#:

RANGE	CALIBRATION POINT (counts per minute)	2 Pi READING (counts per minute)	EFFICIENCY (percent)

SAMPLE

Calibration points are taken from electroplated disk sources with certification traceable to the National Institute of Standards and Technology.

CALIBRATED BY: *DATE:*

APPROVED BY: _____ *DATE:* _____

SPECIAL NOTES:

CERTIFICATE OF CALIBRATION

CALIBRATED FOR:

MODEL No.: SOURCE USED:

SERIAL No.: SOURCE ID#:

RANGE	CALIBRATION POINT (counts per minute)	READING (counts per minute)

SAMPLE

Calibration points were determined with an electronic pulse generator.

CALIBRATED BY: *DATE:*

APPROVED BY: _____ *DATE:* _____

SPECIAL NOTES:

CERTIFICATE OF CALIBRATION

CALIBRATED FOR:

MODEL No.: SOURCE USED:

SERIAL No.: SOURCE ID#:

HIGH VOLTAGE	GROSS COUNTS (CPM)	BACKGROUND COUNTS (CPM)	NET COUNTS (CPM)

SAMPLE

CALIBRATED BY: *DATE:*

APPROVED BY: _____ *DATE:* _____

SPECIAL NOTES:

High Voltage: *Background:*

Threshold: *Source:*

Window: *Source Check:*

Efficiency:

TELEDYNE
BROWN ENGINEERING
Environmental Services

RADIATION DETECTION INSTRUMENTATION

The following instruments are currently available for field use or laboratory counting:

MANUFACTURER'S NAME	DESCRIPTION	MODEL NO.	NO. AVAILABLE	TYPE RADIATION DETECTABLE	RANGE	WINDOW THICKNESS	USE
Eberline Eberline Surveying	Lin-Log Gas Proportional Alpha Counter	PAC-4G FM-4G	3	alpha beta	0-500,000 cpm	Aluminize Mylar 0.85 mg/cm^2	Surveying Floor
Eberline	Lin-Log Gas Proportional Alpha Counter	PAC-4G-3	1	Tritium beta alpha	0-500,000 cpm	Aluminized Mylar 0.85 mg/cm^2	Surveying
Eberline	Beta-Gamma Survey Meter	E-120	4	alpha beta gamma	0-50 mR/hr	Mica 1.4 to 2 mg/cm^2	Surveying
Eberline	Gamma Radiographic Survey Meter	E-120G	1	gamma	0-1000 mR/hr	none	Surveying
Eberline	Gamma Radiographic Survey Meter	E-130G	3	gamma	0-1000 mR/hr	none	Surveying
Eberline	Beta-Gamma Survey Meter	E-530	1	alpha beta gamma	0-200 mR/hr	Mica 1.4 to 2.0 mg/cm^2	Surveying
Eberline	Beta-Gamma Survey Meter	E-140	2	alpha beta gamma	0-50 mR/hr	Mica 1.4 to 2.0 mg/cm^2	Surveying
Victoreen	Ion Chamber Survey Meter	V-440/V-440RF	2	alpha beta gamma x-ray	0-300 mR/hr	Mylar 1/4 mil	Surveying
Victoreen	Ion Chamber Survey Meter	V-471	1	alpha beta gamma x-ray	0-300 R/hr	Mylar 1.1 mg/cm^2	Surveying
Intertechnique	Liquid Scintillation	SL-30	1	low energy beta	0-1,000,000 total counts	none	Laboratory Counting
Eberline	Mini Scaler Laboratory	MS-2	2	alpha, beta, gamma	 total counts	0-5000,000 0.9 mg/cm^2	Mylar Counting
Eberline	Alpha Counter	SAC-4	1	alpha	0-1,000,000 total counts	none	Laboratory Counting
Eberline	Alpha/Beta/Gamma Survey Meter/ Scaler	ESP-1	2	alpha beta gamma	0-50,000 cps 0-1000,000 cps 0-3R/hr	Aluminized Mylar 0.5 mg/cm2 Mica 1.4 to 2.0 mg/cm^2 30 mg/cm^2	Surveying/ Counting

IWL-HP-18

RSC/QCM 4.80

Rev'd: _____ Date _____ Approved _____

Revs'd: _____ _____

TELEDYNE
BROWN ENGINEERING
Environmental Services

RETRAINING OF PERSONNEL
REGARDING PROCESSING OF GENERATED WASTE

DATE: / / INSTRUCTOR:

ATTENDEES: _____

_____

_____

_____

_____

SUBJECT OUTLINE:

TELEDYNE
BROWN ENGINEERING
Environmental Services

Packaging of Radioactive Waste Exam

Section I. Fill in the blanks - 3 points each

1. List 5 characteristics of the waste needed in order to determine the proper U.S. DOT "Proper Shipping Name":

_____ _____

_____ _____

_____

2. List 5 "Proper Shipping Names" typically used for radioactive waste shipments:

_____ _____

_____ _____

_____

3. The radiation limit at contact with the outside of a container cannot exceed _____ mR/hr.

4. Enter the appropriate numbers:

Label	mR/hr limits @ Contact
Radioactive White I	_____ to _____
Radioactive Yellow II	_____ to _____
Radioactive Yellow III	_____ to _____

5. The marking (label) needed on a package of LSA material (exclusive-use) should read _____.

6. The marking (label on a package of Radioactive devices should read _____.

7. The weight is required to be printed on a container when it is in excess of _____lbs., and it is a DOT-7A TYPE A container.

8. List the 6 categories of radioactive waste:

_____ _____

_____ _____

_____

9. Items in different categories_____be mixed.

10. All scintillation vial drums must be lined with a_____.

11. The amount of absorbant added to any cintillation vial drum must be capable of absorbing _____ the volume of liquid in the drum.

12. Liquid Special Nuclear Material has to be _____ before disposal.

II. True or False (1pt. each)

1. _____ All drums which have a Radioactive I, II or III label require security seals.

2. _____ 400 lbs is the maximum weight allowed in a 55-gallon container.

3. _____ Class A Stable is a DOT classification.

4. _____ Two 2-mil liners is an acceptable substitute for a single 4-mil liner.

5. _____ The pH range for acceptable liquids for incineration is 5.0-10.0.

6. _____ Animal carcasses are to be completely surrounded with rock salt and absorbant.

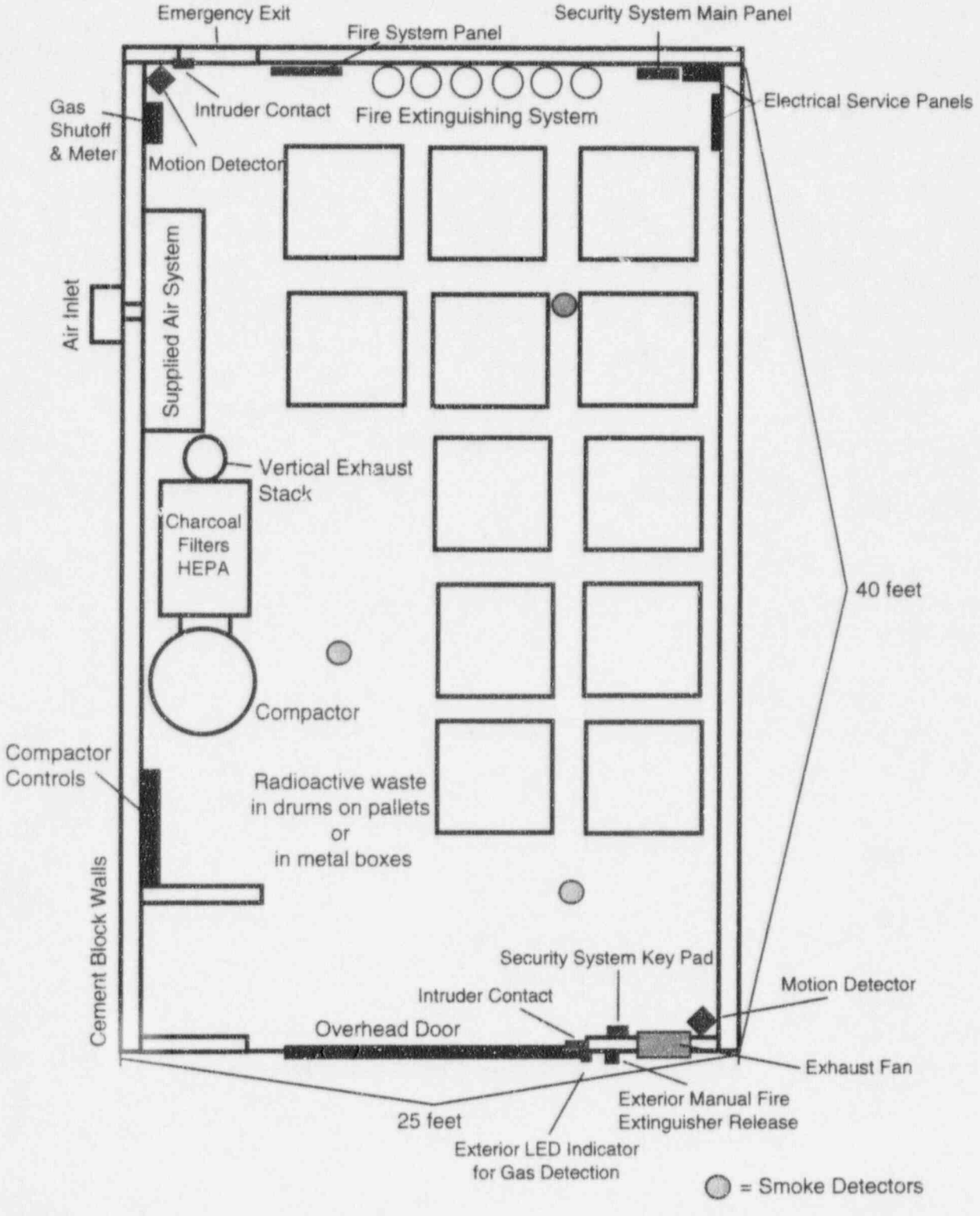
7. _____ Cement is an acceptable solidification media.

8. _____ Ra-226 is acceptable at the Washington burial site under certain conditions.

9. _____ Packaging regulations are under the direct control of the NRC only.

10. _____ The burial site's (or processor's) license requirements are of paramount consideration when determining how to package a given material.

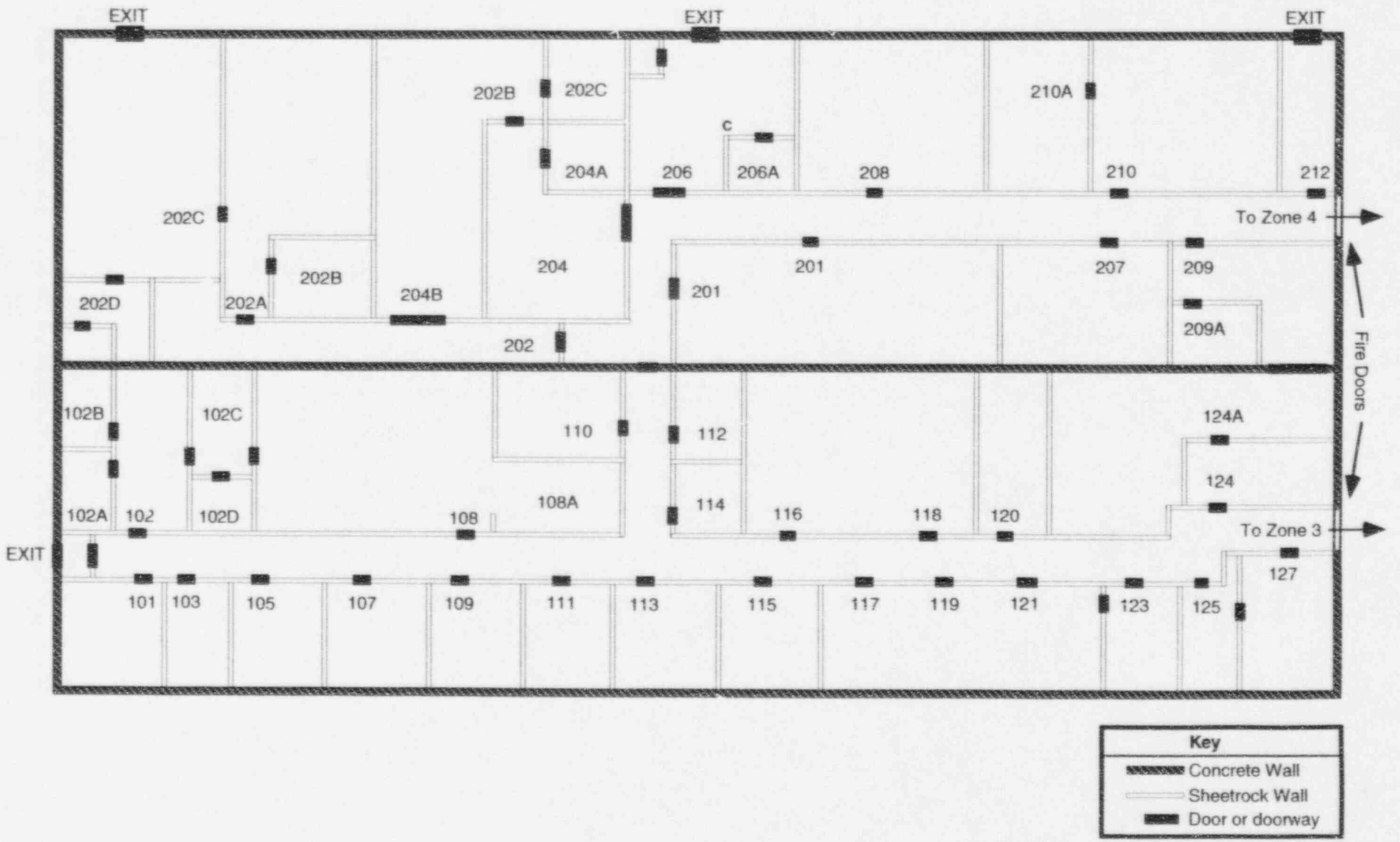
TELEDYNE
BROWN ENGINEERING
Environmental Services



103 Woodland Avenue
Westwood • NJ

TELEDYNE BROWN ENGINEERING
Environmental Services

Zones 1 & 2
50 Van Buren Avenue
Westwood, NJ



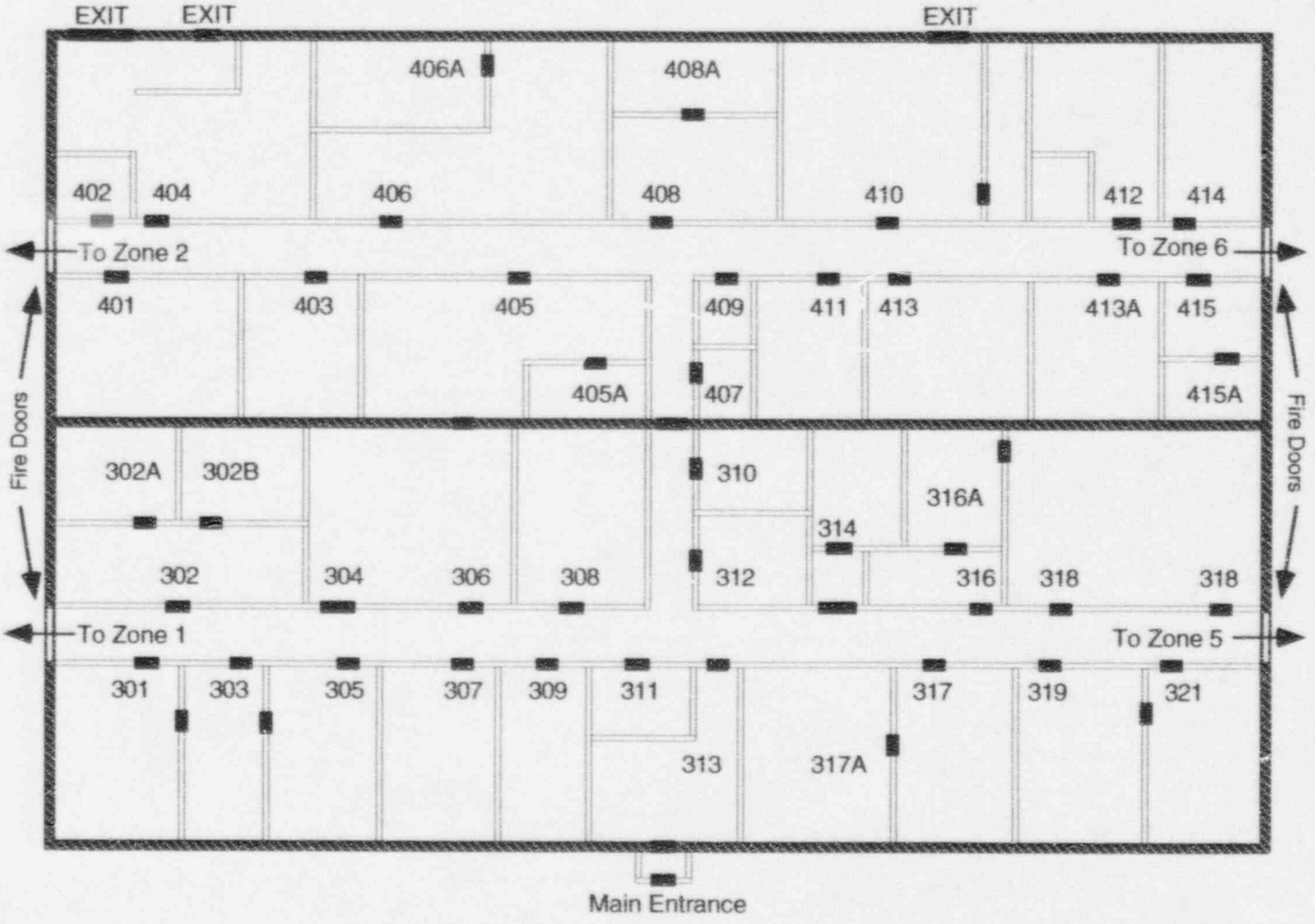
11/2/94

OFFICIAL RECORD COPY ML 10

1 2 3 9 5 6

TELEDYNE BROWN ENGINEERING
Environmental Services

Zones 3 & 4
50 Van Buren Avenue
Westwood, NJ



TELEDYNE BROWN ENGINEERING
Environmental Services

Zones 5, 6 & 7
50 Van Buren Avenue
Westwood, NJ

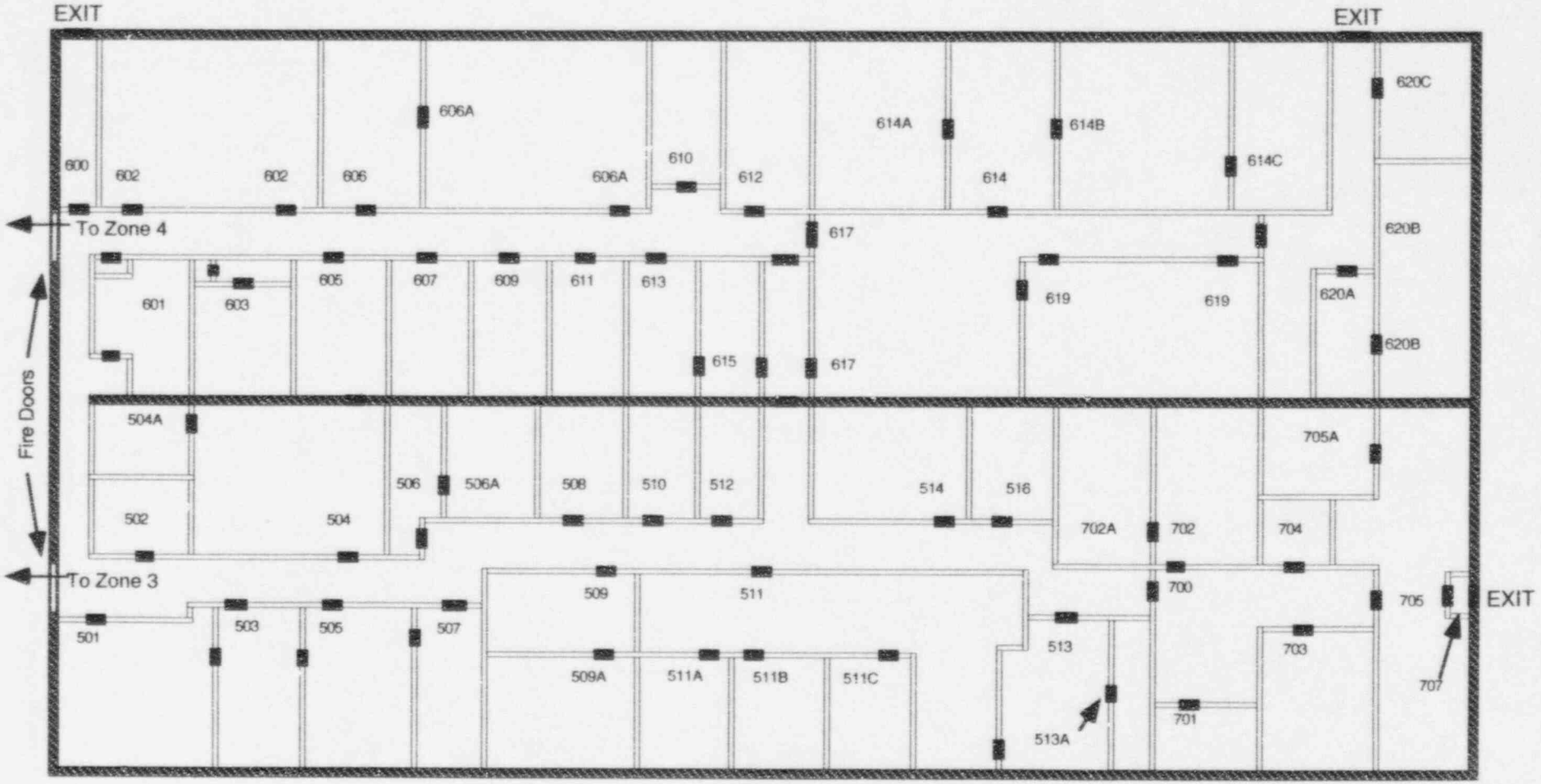
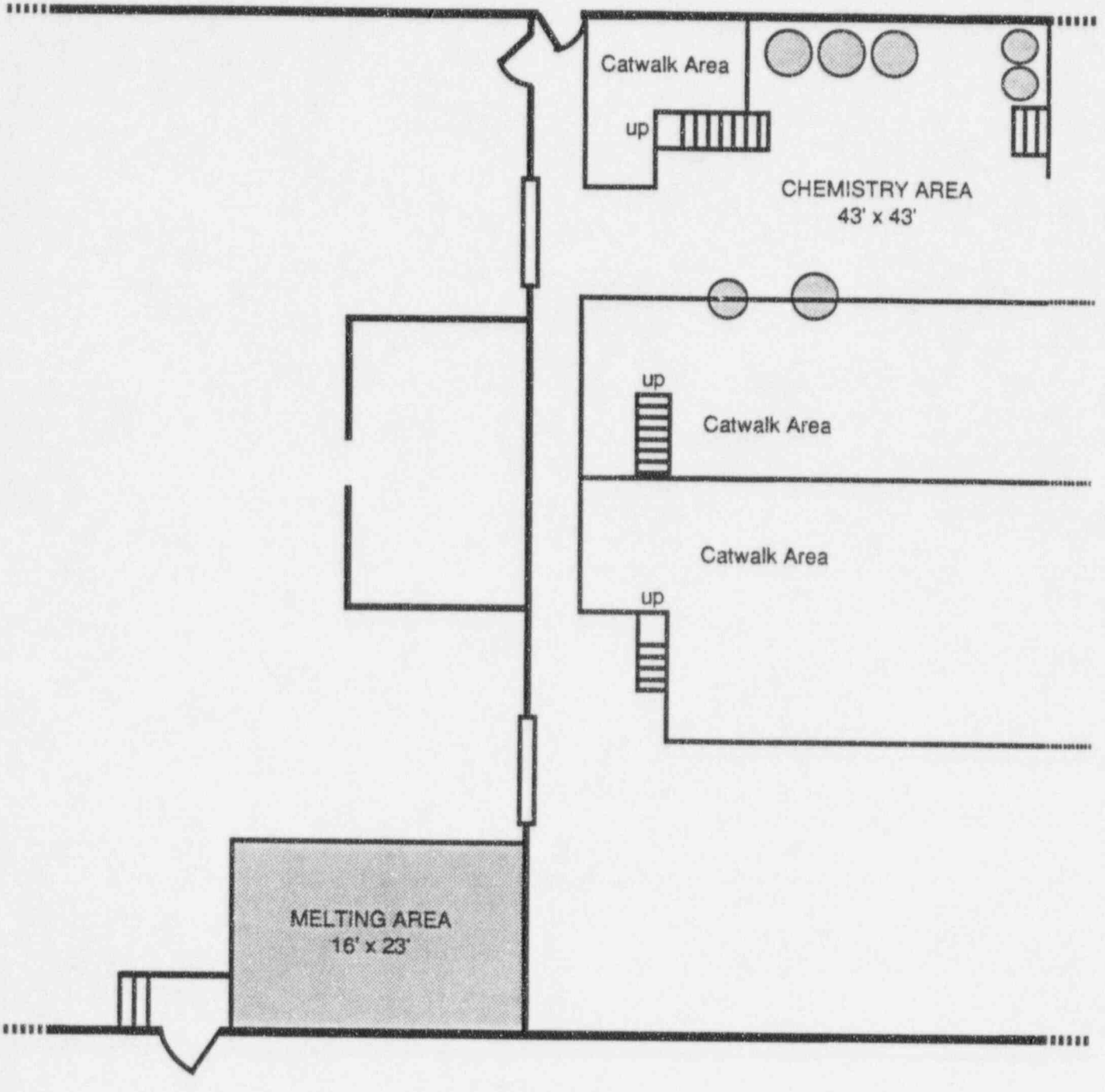


DIAGRAM I

Degussa Corporation
3601 South Clinton Avenue
South Plainfield, New Jersey



Partial Diagram of Building "D"

Scale: 3/32" = 1'

SECTION III-4.0 SPECIAL PROCEDURES FOR PRECIOUS METALS DECONTAMINATION - U.S. NRC License No. 29-00055-15/SNM-107

III-4.1 Introduction

This section includes items specific to the decontamination of precious metals. The metals come in a variety of shapes and sizes. The contaminants are generally special nuclear material (SNM), transuranics and, in some cases, Co-60 and Cs-137. Most of the metal processed is received through Lockheed-Martin, Oak Ridge, Tennessee, who are under contract to the U.S. Department of Energy (DOE). The material is generally of DOE origin and shipped directly to us from their various sites. The use of SNM is covered under our SNM-107 license. The material is received in lots and processed alone or in combination with other lots, depending on the physical size of the individual shipments.

Once decontaminated to pre-designated levels through the smelting process, the lead-metal alloy is sent for processing to a precious metal refinery to recover the precious metals. The refinery used for this purpose is Degussa Corporation, located at 3601 South Clinton Avenue, South Plainfield, NJ. We will limit the amount of radioactive material used at the Degussa facility to 1/100th of the license limits found in Section III-4.11.

III-4.2 Facilities & Equipment

There will be two facilities where licensed material will be possessed and used. The first facility, located at 50 Van Buren Avenue, Westwood, New Jersey, will be referred to as the TBE-ES Facility. The second facility is the Degussa Corporation facility located at 3601 South Clinton Avenue, South Plainfield, NJ, and will be referred to as the Degussa Facility.

The TBE-ES Facility is a one story cement block construction. The area where material is used under this license is identified on facility diagram (in the Forms Section at the end of this Section) by the cross-hatched area.

The major equipment used under this license is a glove box train where the precious metals are processed. The glove box exhausts through two separate systems. Glove box number 4 in the train is the furnace box and it exhausts through a water scrubber and then through a roughing and HEPA filter system. All the other sections of the glove box train are exhausted through a separate roughing and HEPA filter system.

Once the materials have been processed at the TBE-ES Facility to remove a majority of the contaminants, the materials will be shipped to the Degussa Facility for final purification. A Diagram of this facility can be found in the forms area following this section. The glass-lined jacketed "reactor" vessels are 50-gallon inner-glass lined tanks that are heated by an outer jacket that contains hot water or heated oil. These tanks have hinged lids to provide access from above and enable liquids to be pumped from one tank to another.

The ceramic vacuum filters are over-sized "buchner" funnels, about 2 feet in diameter, and are used to filter and collect various purified metals during the last step of the process. The collected metals are then washed, dried and fired to a stoichiometric sponge form.

The furnace used to melt the alloy n the beginning of the process is called a "speedy-melt". It is a floor-mounted gas fired furnace in which the crucible resides. From past experience, this crucible is the only piece of equipment on which any activity has ever been detected. For this reason, this crucible is designated for this work only and will be bagged and sealed when not in use.

In addition to the Health Physics equipment listed in Section II, a Ludlum Model 2929 alpha/beta counter (or comparable instrument) will be kept in the office area of the Degussa Facility and will be used to count smears.

III-4.3 Training and Retraining

All employees working under this license at the TBE-ES Facility are required to attend the Basic Radiation Safety course as outlined in Section II-1.2 "Indoctrination of Personnel". They are required to have an additional 80 hours of supervised on-the-job training. All specific written procedures and health and safety factors are to be learned to the supervisor's satisfaction. The items of health and safety are listed in Sections III-4.4, 4.8 and 4.9. A refresher course, which is documented by memorandum, will be given at one year intervals.

All employees who work under this license are required to read this section of the Radiation Safety Code & Quality Control Manual, and are tested on their knowledge using Form IWL-PM-02, "29-00055-15 Licensed Activities Exam".

III-4.4 Radiation Survey Program

The radiation safety program is, in general, that found in Sections II-5.0, II-6.0 and II-7.0. The following is a further description of the procedures to be performed for this license.

4.4.1 Weekly Surveys

Radiation contamination surveys of the Buffer Zone and Precious Metals are performed weekly. Surveys include monitoring for surface contamination on all laboratory bench tops, chairs, tables, sinks, floors, exposed portions of hoods and glove boxes, and general laboratory equipment. Surveys of the Degussa facility will be performed on a quarterly frequency. An Eberline Instrument PAC-4G or PAC-4G3 gas proportional survey instrument is used to measure direct surface contamination.

General radiation levels in the rooms are measured with an Eberline Instrument E-120 GM counter with end window probe or comparable instrument. Smear surveys for removable surface contamination are taken of areas designated to be representative of contamination on floors, benches, and equipment. Smear surveys are

assayed using an Eberline Instrument Model MS-2 Mini-Scaler Single Channel Analyzer with a Model FC-1 Proportional Flow Counter or comparable instrument.

All survey results are reviewed by the RSO or the Alternate RSO. Results are evaluated according to the contamination limits designated in section III-4.2.2. Items found to be in excess of 25% of these limits will be reported to the laboratory manager. Items in excess of 50% will be decontaminated as soon as practicable, Insides of hoods and glove boxes are assumed to be contaminated and are not included in the above.

The TBE-ES Precious Metals Decontamination Labs have access restricted to authorized personnel only. Entrance to these areas may only be obtained through use of a magnetic card key.

Laboratory coats and laboratory equipment are of the disposable type whenever possible, and must be removed prior to leaving the area. They must also be monitored. If contamination is found, they must be put in the appropriate waste container and a call must be made to the Health Physics Department.

Workers must monitor hands and shoes before leaving the area with radiation monitors equipped with alpha and beta-gamma probes.

Gloves in glove boxes are inspected routinely during surveys. Gloves are changed immediately if deterioration or rupture is noticed. Even if deterioration is not noticed, gloves will be changed at least every second year. When high specific activity alpha emitters are present, more frequent changes may be necessary.

Common laboratory equipment is monitored routinely during the weekly survey. Any equipment that may contain radioactive contamination is reported to the laboratory workers and department managers for appropriate remedial action.

A general survey of the entire TBE-ES facility, including lunchroom areas, entrances, exits, halls, offices and lavatories is performed monthly.

4.4.2 Contamination Limits

The following limits for radioactive material contamination will not be exceeded on lab surfaces or equipment outside of hoods or glove boxes without prompt clean-up being initiated:

4.4.2.1 Alpha Contamination

Fixed	-	1,000 dpm/100 cm^2	average
		3,000 dpm/100 cm^2	maximum
Removable	-	200 dpm/100 cm^2	maximum

4.4.2.2 Beta Contamination

Fixed	-	5,000 dpm/100 cm^2	average
		15,000 dpm/100 cm^2	maximum
Removable	-	1,000 dpm/100 cm^2	maximum

4.4.3 Procedure for Exiting the Precious Metals Decontamination Labs at TBE-ES

- All workers must monitor their hands, feet and clothing prior to leaving the area with radiation monitors equipped with alpha and beta-gamma probes. If levels greater than twice background are detected, decontaminate, re-survey and contact the Health Physics Office. Under no circumstances should an individual who is contaminated in excess of twice background leave the controlled area without prior approval of the company Health Physicist, Radiation Safety Officer or Alternate Radiation Safety Officer.

- Remove gloves and disposable clothing. Place contaminated items in the waste container.

- Using the proper instrument for the isotope present, monitor hands while probe is still in the holder. If the detector reading is greater than twice background, clean your hands and monitor them again.

- If your hands are clean, check the response of the meter against the check source provided.

- Monitor the bottom of your shoes. If the detector reading is greater than twice background, clean your shoes and monitor them again.

- Proceed to monitoring your clothing using the same procedure outlined above.

- Replace the detector in its holder.

- EXIT ONLY if you have completed the above.

SPECIAL PRECAUTIONS

- DO NOT place the probe face directly on the object to be surveyed.

- DO NOT touch the probe handle without checking your hands for contamination.

- DO NOT wear disposable clothing outside of the area.

4.4.4 Air Monitoring

4.4.4.1 An air sampling system is set up to sample both breathing zone and effluent air at the TBE-ES facility. Millipore filter air samples are used. Sampling locations are situated at breathing zone heights at or near glove boxes and hood faces to provide sampling points representative of the exposure that workers may receive. Sampling is performed continuously. An Eberline Instrument Alpha-1 air monitor with built-in single channel analyzer and audible alarm is also available and may supplement the stationary air monitoring system for projects where the possibility of airborne contamination could contribute to significant internal exposure. Air samples are assayed using an Ludlum 2929 Alpha/Beta dual scaler or other comparable instrument. When an isotopic analysis is required, samples may be counted by alpha spectroscopy or gamma spectroscopy.

Air samples are assayed for the particular isotopes used during the preceding time interval. In the case where a mixture of nuclides was used, air samples are evaluated using the isotope with the most stringent maximum permissible concentration allowed. If airborne levels greater than 50 percent of the DAC's are detected, isotopic analysis of the sample will be performed and additional bioassays will be required. Calculation of internal deposition and exposure will be performed by the Health Physics Section using the most current assumptions and models available. Any incident requiring a detailed investigation will be discussed with the employee involved prior to the resumption of work.

4.4.4.2 Effluent air monitoring of the stacks coming from the glovebox train will be performed. All are monitored continuously. Effluent air is filtered using a roughing prefilter and absolute filter rated 99.9% or better efficiency against D.O.P. smoke to 0.3 micron diameter.

Sample points for effluent monitoring are located beyond the HEPA filters at a point which represents the average air velocity. Sampling points employ fittings which curve in the direction of air movement. In the case of an emergency release or filter rupture, calculations for effluent release will be made using air sampling data and estimating the magnitude of particulate release that may have bypassed the sampling tube.

4.4.5 Respiratory Protection Program

A respiratory protection program will be instituted for certain work being done under this license. Respirators fitted with radionuclide filter canisters will be used during the following procedures:

1) Bagging any material out of the glove boxes.
2) Opening any radwaste container.
3) Decontaminating the inside of a glove box or hood.
4) Changing the HEPA and roughing filters.
5) Decontaminating any contaminated area in excess of the limits specified in III-4.4.2.
6) Any other procedure the Radiation Safety Committee designates.

The respirators will be fit-tested using irritant smoke to ensure a good fit. Personnel will be instructed as to the proper care, wear and maintenance of the respirator assigned to them.

III-4.5 Shipments

Incoming and outgoing shipments of samples are controlled by the Manager, Mass Spectrometry Services. The drums are surveyed for compliance with all applicable laws, rules and regulations prior to opening.

III-4.6 Records Management

The data received from all surveys, inventories, personnel dosimetry, and documentation pertaining to the receipt, use and disposal of radioactive materials are evaluated and retained by the Health Physics Office or the Office of the Manager, Mass Spectrometry Services of TBE-ES.

It is the primary responsibility of the Health Physics Office to obtain information of the exposure of each individual, location, or procedure employing radioactive material. The Health Physics Office is also responsible for observing trends or changes in the working habits of a single individual or department, and thus to measure the effectiveness of the radiation safety program.

Qualified members of the Health Physics Office responsible for these functions include the Alternate Radiation safety Officer and the Radiation Safety Officer.

III-4.7 Material Control Provisions

The procurement, receipt, use and disposal of all radioactive materials is maintained and controlled through strict administrative procedures by the Health Physics Department. All records and documents pertaining to these functions reside in appropriate files and are the responsibility of the Manager of the Mass Spectrometry Services Department.

The responsibility for maintenance of the radioactive material inventory for this license resides with the Manager of Mass Spectrometry Services Department.

III-4.8 Safety Rules

4.8.1 General safety rules for work with radioactive materials are listed below. General safety instructions for glove box use may be found in Section 4.8.2.

4.8.1.1 The doors to the laboratory and between individual labs should remain closed to ensure proper air flow.

4.8.1.2 The blowers in all hoods and glove boxes shall be run continuously.

4.8.1.3 Work involving plutonium in excess of 1.0 micrograms must be performed in a glove box.

4.8.1.4 Hoods should not opened to a point beyond the 100 lfm mark which is posted.

4.8.1.5 All work should be performed at least seven inches for the front of the hood, unless the size of the equipment placed in the hood prevents it.

4.8.1.6 Large objects placed into the hood will affect air flow. Contact the Health Physics Office for a re-evaluation if any large object is moved around or put into the hood.

4.8.1.7 Never place your head in the hood unless you are wearing a respirator and your work requires such placement.

4.8.1.8 Do not rapidly rush up to or away from the hood as it may affect the air flow significantly.

4.8.1.9 Do not use explosive substances in any hood.

4.8.1.10 Upon noticing any deviation or deficiency in Items 4.8.1.1 through 4.8.1.9, please contact the Manager of Mass Spectrometry Services or the Health Physics Department.

4.8.2 General Safety Instructions for Glove Box Use

4.8.2.1 Work involving plutonium in excess of 1.0 micrograms must be performed in the glove box unless written approval to the contrary is obtained from the Health Physics Section.

4.8.2.2 All material to be used in the glove box must be bagged in and bagged out. A Health physics representative must be present during bag-out operation.

4.8.2.3 Any time glove box containment is to be broken (i.e. a glove removed or a door opened without bagging), a Health Physics representative must be contacted.

4.8.2.4 Explosive or flammable material must not be taken into glove box.

4.8.2.5 An open flame cannot be used in the glove box without prior Health Physics approval.

4.8.2.6 Material which could produce fumes which could damage the glove box filter or containment seals must not be taken into the glove box.

4.8.2.7 Disposable gloves must be worn when inserting hands into the glove box gloves and when performing bagging operations. Gloved hands must be checked with the alpha contamination monitor (or beta-gamma monitor, where appropriate) whenever removed from the glove box gloves.

4.8.2.8 Upon loss of a glove, or containment in any manner, or upon detecting contamination, notify the Health Physics Department immediately.

III-4.9 Waste Management

In addition to the Radioactive Waste Procedures in Section II, additional waste management procedures are to be used for Precious Metals radwaste.

When bagging out the waste from the glove box, extreme care should be taken when transferring the waste to the radwaste container to ensure the poly liner does not rupture or tear. A respirator, shoe covers, lab coat and gloves are to be worn during this process. Immediately seal the radwaste container and make no attempt at compressing or compacting the poly liners as this could rupture the bag and release airborne contamination.

Form IWL-PM-01 will be attached to each container on which the following is listed:

1) Lot Numbers
2) Isotopes
3) Quantities
4) Concentrations
5) Dates
6) Physical forms
7) Chemical forms

All by-products from the chemical processes will be stored in the U.S. DOT approved containers provided by TBE-ES and segregated from all other materials. These containers shall be removed by TBE-ES waste disposal personnel and transferred to TBE-ES . At TBE-ES these materials will be analyzed and properly disposed or re-used. Please note that the reason that the materials are not disposed as radioactive waste is that they are usually recyclable.

III-4.10 Decontamination Guidelines

The release of equipment and/or materials for unrestricted use will be in accordance with Appendix A of the NRC's "Guidelines for the Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source or Special Nuclear Materials", latest issue.

III-4.11a Isotope Possession Limits - License 29-00055-15

A. For possession and use at 50 Van Buren Avenue, Westwood, NJ:

	Element & Mass No.		Chemical & Physical Forms		Maximum Possession Limits
Item 6	(a) Any By-Product material (Z3-Z83)	Item 7	(a) Any	Item 8	(a) No single nuclide to exceed one millicurie and 25 millicuries total
	(b) Any Transuranic Isotope (Z93 and higher, excluding plutonium)		(b) Any		(b) No single nuclide to exceed one millicurie and 25 millicuries total

B. For possession and use at 3901 South Clinton Avenue, South Plainfield, NJ:

1/100th of the limits in the above table.

III-4.11b Isotope Possession Limits - License SNM-107 (This is a subset of the SNM-107 Isotope Possession Limits found in Section III-3)

For possession and use at 3901 South Clinton Avenue, South Plainfield, NJ:

	Element & Mass No.		Chemical & Physical Forms		Maximum Possession Limits
Item 6	(a) U-235	Item 7	(a) Any	Item 8	(a) 1 gram (2.0×10^{-3} mCi)
	(b) Pu-238		(b) Any		(b) 0.00006 gram (1.0×10^{-2} mCi)
	(c) Pu-239		(c) Any		(c) 0.01 gram (6.0×10^{-1} mCi)
	(d) Any other SNM not detailed above		(d) Any		(d) 0.01 gram

III-4.12 Disposal to the Sanitary Sewer

Disposal of any liquids generated under this license will be done in accordance with the provisions of 10CFR Part 20.2003. As there is only one source of liquid under this license (an enclosed water scrubber) and no planned discharges, there is no current data on the solubility of the materials in the water. Upon request to discharge, the Manager of the Precious Metals Decontamination Lab will determine the solubility of the contaminants using a method approved in Information Notice 94-07 or by another suitable methodology. This written evaluation must be presented to the Radiation Safety Committee for approval. Any variation on an approved method must be submitted to the U.S. NRC for approval prior to the release.

III-4.13 Transfer of Material from TBE-ES to Degussa

Prior to release from the TBE-ES facility, each precious metals-lead button is monitored in the following manner. Sample drillings are taken and analyzed for gross alpha and gross beta activity. Maximum activity acceptable activity levels are less than 20 dpm per gram. In addition, the entire surface of the button is surveyed with a Eberline Instruments PAC-4G gas flow proportional survey meter and must no have any discernible activity above background. The buttons are then smeared and each smear is counted to determine removable surface activity. These levels will not exceed 20 dpm/100cm^2.

Each shipment to Degussa would be comprised of approximately eight (8) lead-platinum buttons weighing about 6 kg each. The ratio of Lead:Platinum is approximately 5:1 which results in approximately 42 kg of lead and 8 kg of platinum. The residual radioactive contaminants that were not removed by the TBE-ES processing are homogeneously dispersed in a mass of roughly 50 kg of metal.

III-4.14 Release of Processed Material from Degussa

TBE-ES will assay the final precious metals product for compliance with the Releasability Criteria shown below prior to unrestricted release by the Degussa Corporation.

During possession by the Degussa Corporation, all precious metals received from TBE-ES pursuant to the license will be segregated from all other precious metals at the facility.

The below Releasability Criteria are based on contract specifications by the U.S. Department of Energy.

Limits for Alpha:	0.10 dpm/cm^2 at a t 95% confidence level.
Limits for Beta:	0.40 dpm/cm^2 at a 95% confidence level.
Limits for Gamma:	The count rate for 50 grams of material distributed over the face of a NaI crystal shall not exceed 10% above virgin material at 95% confidence level.

PM RADWASTE FORM

Manifest Number: _____

Drum Identification: _____

Lot Numbers: _____

Isotope	nCi	Concentration	Date	Physical Form	Chemical Form

IWL-PM-01

29-00055-15 LICENSED ACTIVITIES EXAM

Multiple Choice

1. _____ hours of on-the-job training are required to satisfy the training requirements.
   a. 20
   b. 40
   c. 60
   d. 80

2. The Precious Metals area is surveyed on a_____basis.
   a. daily
   b. weekly
   c. monthly
   d. quarterly

3. Benches, floors, sinks and chairs are surveyed for fixed and _____ contamination.
   a. removable
   b. direct
   c. radioactive
   d. hot

4. A_____ is used to determine general radiation levels in the laboratory.
   a. PAC-4G
   b. PAC-4G-3
   c. MS-2
   d. E-120 GM

5. Items found in excess of _____ of the limits for contamination will be decontaminated as soon as practicable.
   a. 10%
   b. 25%
   c. 50%
   d. 100 %

6. A general survey of the entire TBE-ES facility is performed _____.
   a. daily
   b. weekly
   c. monthly
   d. quarterly

7. The limit established for removable alpha activity is _____
   a. 20 dpm/100cm^2
   b. 50 dpm/100cm^2
   c. 100 dpm/100cm^2
   d. 200 dpm/100cm^2

8. The limit established for removable beta-gamma activity is _____
   a. 100 dpm/100cm^2
   b. 500 dpm/100cm^2
   c. 1000 dpm/100cm^2
   d. 2000 dpm/100cm^2

9. Air sampling of breathing zone and effluent air is done _____ .
   a. sporadically
   b. occasionally
   c. when required
   d. continuously

10. The HEPA filters have a rating of____ efficiency against D.O.P. smoke to 0.3 microns.
   a. 9.99 %
   b. 99.9%
   c. 99.997%
   d. 100%

11. Air flow characteristics on hood and glove boxes are done on a_____ basis.
   a. daily
   b. weekly
   c. monthly
   d. quarterly

12. Respirators will be fit-tested using_____ .
   a. DOP smoke
   b. amyl acetate
   c. benzol acetate
   d. irritant smoke

13. The doors between laboratories should be _____ to ensure proper air flow.
    a. open
    b. closed
    c. blocked
    d. none of the above

14. Hoods should not be moved above the _____ lfm mark.
    a. 50
    b. 100
    c. 110
    d. 150

15. Do not use_____ substances in hoods.
    a. explosive
    b. acidic
    c. corrosive
    d. all of the above

16. _____ of the materials to be used in the glove box must be bagged out.
    a. all
    b. most
    c. some
    d. none

17. Compressing or compacting of waste _____.
    a. is allowed
    b. can be done with HP approval
    c. must never be done
    d. none of the above

True or False

18. A respirator, shoe covers, lab coat and gloves must be worn at all times. _____

19. A form must be attached to each waste drum listing lot numbers, isotopes, quantities, concentration, dates, etc. _____

20. Physical and chemical forms are also required on the form to be attached to each waste container. _____

TEST DATE: _____

TAKEN BY: _____

REVIEW WITH EXAMINER ON: _____

EXAMINER: _____

SCORE: _____

ANSWERS TO IWL-PM-02

1.	d	11.	c
2.	b	12.	d
3.	a	13.	b
4.	d	14.	b
5.	c	15.	d
6.	c	16.	a
7.	d	17.	c
8.	c	18.	False
9.	d	19.	True
10.	b	20.	True

BETWEEN:

LICENSE FEE MANAGEMENT BRANCH, ARM
AND
REGIONAL LICENSING SECTIONS

(FOR LFMS USE)
INFORMATION FROM LTS

PROGRAM CODE: 03620
STATUS CODE: 0
FEE CATEGORY: 3P
EXP. DATE: 20060131
FEE COMMENTS: 2C DEL PER 4/95 REQ
DECOM FIN ASSUR REQD: Y

LICENSE FEE TRANSMITTAL

A. REGION

1. APPLICATION ATTACHED
APPLICANT/LICENSEE: TELEDYNE ENVIRONMENTAL INC.
RECEIVED DATE: 961129
DOCKET NO: 3014482
CONTROL NO.: 123956
LICENSE NO.: 29-00055-15
ACTION TYPE: AMENDMENT

1996 DEC 16 AM 9:29

2. FEE ATTACHED
AMOUNT: $300.00
CHECK NO.: 415284

3. COMMENTS

SIGNED R. J. Brown
DATE 12/16/96

B. LICENSE FEE MANAGEMENT BRANCH (CHECK WHEN MILESTONE 03 IS ENTERED / √ /)

1. FEE CATEGORY AND AMOUNT: 3P $300

2. CORRECT FEE PAID. APPLICATION MAY BE PROCESSED FOR:
AMENDMENT ____
RENEWAL ____
LICENSE ____

3. OTHER ____
____

SIGNED ____
DATE ____

I (97)

Log Dec 10
Remitter TELEDYNE BROWN ENGINEERING
Check No. 415284
Amount $300
Fee Category 3P
Type of Fee Amd
Date Check Rec'd 12/14/96
Date Completed
By: BB