

MAR 29 1994

Docket Nos. 030-05218 ✓
030-05219 ✓
030-08681 ✓
030-14482
070-00124

License Nos. 29-00055-02 ✓
29-00055-06
29-00055-14
29-00055-15
SNM-107

Control Nos. 113092 ✓
113093 ✓
113094
113095
113096

Teledyne Isotopes, Inc.
ATTN: Donald F. Schutz
President
50 Van Buren Avenue
Westwood, New Jersey 07675

Dear Mr. Schutz:

Subject: Financial Assurance for Decommissioning

This is in reference to your various submittals dated July 31, 1990, December 15, 1993, and February 28, 1994 to provide financial assurance for the above listed Licenses. We have reviewed these documents and have no further questions at this time.

Based on the information provided in the above referenced documents, you are presently in compliance with the financial assurance requirements outlined in the decommissioning rule in 10 CFR 30.35.

Please note that the decommissioning funding plan, including the cost estimate, should be updated at the time of license renewal or when the amounts/types of materials change at your facilities.

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113096

If you have any questions, please contact Anthony Dimitriadis, of my staff, at (610) 337-6953.

Your cooperation with us is appreciated.

Sincerely,
Original Signed By:
Mohamed M. Shanbaky

Mohamed M. Shanbaky, Chief
Research and Development Section
Division of Radiation Safety
and Safeguards

cc:

Teledyne, Inc.

ATTN: Marney E. Buchanan
Assistant General Counsel
Environment and Health

Suite 1800
1901 Avenue of the Stars
Los Angeles, California 90067-6046

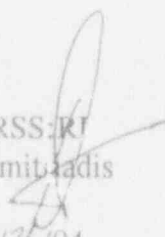
Teledyne Inc.

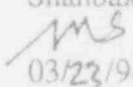
ATTN: Douglas J. Grant
Treasurer and Chief Financial Officer
1901 Avenue of the Stars
Los Angeles, California 90067-6046

Teledyne Isotopes, Inc.

ATTN: Steven A. Black, Manager
Radiological Services Department
50 Van Buren Avenue
Westwood, New Jersey 07675

bcc:
M. Shanbaky, RI
A. Dimitriadis, RI


DRSS:RI
Dimitriadis
03/21/94


DRSS:RI
Shanbaky
03/23/94

As per Dave, file this info in
lead folder, 29-00055-02.

TMT

March 4, 1994

Anthony Dimitriadis
U.S. Nuclear Regulatory Cc
Region I
475 Allendale Road
King of Prussia, PA 19406-1415

Re: Docket No. 030-05218	License No. 29-00055-02	Control No. 113092
Docket No. 030-05219	License No. 29-00055-06	Control No. 113093
Docket No. 030-08661	License No. 29-00055-14	Control No. 113094
Docket No. 030-14482	License No. 29-00055-15	Control No. 113095
Docket No. 070-00124	License No. SNM-107	Control No. 113096

Dear Sir/Madam :

I am the chief financial officer of Teledyne, Inc., 1901 Avenue of the Stars, Suite 180, Los Angeles, California 90067, a corporation. This letter is in support of this firm's use of the financial test to demonstrate financial assurance, as specified in 10 CFR Parts 30 and 70.

This firm guarantees, through the parent company guarantee submitted to demonstrate compliance under 10 CFR Parts 30 and 70, the decommissioning of the following facility owned or operated by a subsidiary of this firm. The current cost estimates or certified amounts for decommissioning, so guaranteed, are shown for each facility:

<u>Name of Facility</u>	<u>Locations of Facilities</u>	<u>Current Cost Estimates</u>
Teledyne Isotopes, Inc.	50 Van Buren Avenue and 103 Woodland Avenue Westwood, New Jersey	Total: \$693,230

The firm is required to file a Form 10K with the U.S. Securities and Exchange Commission for the latest fiscal year.

The fiscal year of this firm ends on December 31st. The figures for the following items marked with an asterisk are derived from this firm's independently audited, year-end financial statements and footnotes for the latest completed fiscal year, ended December 31, 1993.

113096

February 28, 1994

Docket No. 030-05218	License No. 29-00055-02	Control No. 113092
Docket No. 030-05219	License No. 29-00055-06	Control No. 113093
Docket No. 030-08681	License No. 29-00055-14	Control No. 113094
Docket No. 030-14482	License No. 29-00055-15	Control No. 113095
Docket No. 070-G, 124	License No. SNM-107	Control No. 113096

Mail Control No. 113092

Mr. Anthony Dimitriadis
U.S. Nuclear Regulatory Commission
Region I
475 Allendale Road
King of Prussia, PA 19406-1415

Subject : Financial Assurance

Dear Mr. Dimitriadis:

Our parent company has decided to fund our Decommissioning Funding Plan by the Parent Company Guarantee method. Enclosed is the original letter from Dr. D. F. Schutz, President of Teledyne Isotopes Inc. in support of the Parent Company Guarantee method of financial assurance for the above referenced licenses, and five additional copies. I have also enclosed six copies of the pages of our Plan that are changed.

Our parent company attorney, Ms. Marney Buchanan, will be furnishing you with the other required documents under separate cover.

All documents submitted should be inserted as Attachment E of our Decommissioning Funding Plan.

If you require additional information, please contact me directly.

Sincerely,

TELEDYNE ISOTOPES



Steven A. Black, Manager
Radiological Services Department

cc: Dr. D. F. Schutz, Mr. E. O'Brien - Teledyne Isotopes Inc.
Ms. M. Buchanan - Teledyne Inc.

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February 28, 1994

Docket No. 030-05218	License No. 29-00055-02	Control N. 113092
Docket No. 030-05219	License No. 29-00055-03	Control N. 113093
Docket No. 030-08681	License No. 29-00055-14	Control N. 113094
Docket No. 030-14482	License No. 29-00055-15	Control N. 113095
Docket No. 070-00124	License No. SNM-107	Control N. 113096

Mail Control No. 113092

Mr. Anthony Dimitriadis
U.S. Nuclear Regulatory Commission
Region I
475 Allendale Road
King of Prussia, PA 19406-1415

Subject : Financial Assurance

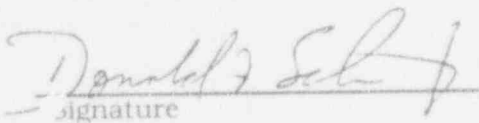
Dear Mr. Dimitriadis:

I am President of Teledyne Isotopes, Inc., 50 Van Buren Avenue, Westwood, NJ 07675, a corporation. This letter is in support of this firm's use of the financial test to demonstrate financial assurance, as specified in 10 CFR Parts 30 and 70.

I hereby certify that Teledyne Isotopes, Inc. is currently a going concern, and that it possesses positive tangible net worth in the amount of \$13,046,000 as of December 31, 1993.

This firm is not required to file a Form 10K with the U.S. Securities and Exchange Commission for the latest fiscal year. The fiscal year of this firm ends December 31.

I hereby certify that the content of this letter is true and correct to the best of my knowledge.


signature

Donald F. Schutz, President
Teledyne Isotopes, Inc.

2/28/94
Date

NOTE TO DMB:

THE ATTACHED DOCUMENTS ARE TO BE PROCESSED AS ONE FINANCIAL ASSURANCE FOR DECOMMISSIONING PACKAGE.

LICENSE NUMBER: SNM-107

DOCKET NUMBER: 070-00124

CONTROL NUMBER: 113096

THIS SHEET MAY BE DISCARDED AFTER PROCESSING.

THANK YOU!

December 15, 1993

Docket No. 030-05218	License No. 29-00055-02	Control No. 113092
Docket No. 030-05219	License No. 29-00055-06	Control No. 113093
Docket No. 030-08681	License No. 29-00055-14	Control No. 113094
Docket No. 030-14482	License No. 29-00055-15	Control No. 113095
Docket No. 070-00124	License No. SNM-107	Control No. 113096

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Mail Control No. 113092

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

Subject : Financial Assurance/Response to your letter dated August 23, 1993

Dear Mr. Kinneman:

Teledyne Isotopes submits the following response to the subject letter. Items are numbered as on your letter to provide a proper reference.

1. In evaluating the costs of decommissioning this facility, I drew upon my 17 years of experience in providing quotes to perform this type of work on a commercial basis for various clients. In almost every case, my estimate has been within 10 percent of the actual cost. I think that this first hand knowledge of the costs and problems involved in performing decommissioning services outweigh the estimates provided by the cited NUREG documents.

I haven't provided you with all the data as you have stated because I felt it to be non-essential. We survey the areas of this building where most of the radioactive work is done on a weekly basis. Other areas are surveyed on a monthly or quarterly basis, depending on the radioisotope use. As I review all of these surveys documents, I have an in-depth knowledge of what routinely becomes contaminated and what does not. I felt that presenting only those areas that are likely to be contaminated in the cost estimate was the appropriate way to do the cost estimate.

2. I have changed page 31 of Attachment F to reflect the maximum amount of waste that is routinely stored.
3. The costs for operating the compactor are included in the Radioactive Waste Packaging & Handling (Table 3). I have changed the cost estimate to reflect \$5,000 of miscellaneous costs to cover such items as detergents, rags, or other non-specified items (Table 4- Misc. Equipment & Supplies).
4. I have modified the estimate to remedy this error. I have also updated the disposal costs found in Table 5 to reflect the current values.
5. I have added a 10 percent contingency factor to the total cost estimate (Table 6). I have used 10 percent instead of the recommended 25 percent due to my first hand experience in quoting on and providing decommissioning services. Please also note that we did not include the salvage value for any item that could be sold after the decommissioning.

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*113096**REC'D IN LAS DEC 20 1993*

December 15, 1993

Mr. John Kinneman
U.S. Nuclear Regulatory Commission

Page 2

6-9. We will forward the executed Letter of Credit with the appropriate changes as detailed in item 7 and 8 and the Standby Trust Agreement as detailed in Item 9 when they are finalized by our corporate office.

There are five copies of the revised Attachment F - Decommissioning Cost Estimate enclosed. Please replace the current copies in your possession with these.

If you require additional information, please contact me directly.

Sincerely,

TELEDYNE ISOTOPES

A handwritten signature in black ink, appearing to read "S. Black".

Steven A. Black, Manager
Radiological Services Department

cc: Dr. D. F. Schutz, E. O'Brien

Attachment F

Decommissioning Cost Estimate

PLANNING AND PREPARATION TABLE 1	Facility Name:	TELEDYNE ISOTOPES
	Facility Address:	50 Van Buren Avenue, Westwood, NJ

Work Hours

Planning & Preparation Tasks	Manager	H.P. Supv.	H.P. Tech.	R.W. Tech.	Clerical	Total Hrs.	Total Cost
Preparation of documentation for Regulatory Agencies	20	40			40	100	\$2,996
Submittal of Decom. Plan to NRC when Required	40	120			20	180	\$6,468
Development of Work Plans	40	120			60	220	\$7,084
Procuring of Special Equip.	4	8	8		8	28	\$767
Staff Training	8	16	16			40	\$1,288
Characterization of Radiological Condition of the Facility (Including soil & water analyses)	8	16	320			344	\$7,672
TOTALS	120	320	344		128	912	\$26,275.20

Decommissioning Cost Estimate

TABLE 2
Salaries

Facility Name:

TELEDYNE ISOTOPES

Worker Classification:	Salaries (\$/hour)	Overhead Rate (%)	Worker Cost/Hour
Manager	\$35.00	140%	\$49.00
H.P. Supv.	\$25.00	140%	\$35.00
H.P. Tech.	\$15.00	140%	\$21.00
R.W. Tech.	\$15.00	140%	\$21.00
Clerical	\$11.00	140%	\$15.40

Attachment F

Decommissioning Cost Estimate

DECONTAMINATION and/or DISMANTLING
of RADIOACTIVE FACILITY COMPONENTS

Facility Name:

TELEDYNE ISOTOPES

Assumptions for this facility:

	Disposal
% Class A	98.0%
% Class B	1.0%
% Class C	1.0%

Volume Estimates for Facility:

(In cubic feet after compaction)

Total Vol.	10CFR Part 61 Waste Class		
	Class A	Class B	Class C
1974.94	1935.44	19.75	19.75

Volume reduction factor: 3

We have applied a 3:1 volume reduction for the waste generated from all decontamination activities. See the notes on the Itemization Worksheets which declare whether the wastes are non-compactible.

Attachment F

Decommissioning Cost Estimate

TABLE 3
Decom Dismantle Labor Estimate Facility Name: **TELEDYNE ISOTOPES**

	Manager	H.P. Supv.	H.P. Tech.	R.W. Tech.	Clerical	Total Hrs.	Total Labor Costs
Decontamination & Dismantling	20	40	640		40	740	\$16,436
Radioactive Waste Packaging/Handling	20	20		80	20	140	\$3,668
Re-characterization of Radiological Condition of the Facility (after D&D)	8	16	160		20	204	\$4,620
TOTALS	48	76	800	80	80	1084	\$24,724.00

Decommissioning Cost Estimate

TABLE 4
Equipment List

Facility Name:

TELEDYNE ISOTOPES

	Quantity	Unit Cost	Purchase Cost	Rental per day	Rental Total	Quantity Available
Misc. Equipment & Supplies:	1	\$5,000.00				
Total Cost:		\$5,000.00				

Decommissioning Cost Estimate

PACKAGING, SHIPPING, AND DISPOSAL OF RADIOACTIVE WASTES	Facility Name:	TELEDYNE ISOTOPES
TABLE 5		
Radioactive waste disposal costs.		

	Container	Transp.	Disposal	Surcharge	TOTAL
Estimated per cubic foot costs (Class A)	\$4.00	\$3.71	\$60.00	\$220.00	\$287.71
Total facility Class A waste disposal costs	1974.94	cu. ft. @	\$287.71	=	\$568,210.47 Class A Total
					\$6,000.00 Class B & C Total
			Total Disposal Costs		\$574,210.47

Decommissioning Cost Estimate

TABLE 6

Facility Name:

TELEDYNE ISOTOPES

Summary of Costs

	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
Sub-Total	\$630,209.67
Contingency factor (10%)	\$63,020.97
GRAND TOTAL DECOMMISSIONING COSTS	\$693,230.63

Attachment F

Decommissioning Cost Estimate

ITEMIZATION WORKSHEET FOR ROOM #102B Facility Name: TELEDYNE ISOTOPES

Item:	Quantity	X-Dimen.	Y-Dimen.	Z-Dimen.	Volume	Waste Volume
Fume Hood Type A					0.00	
Fume Hood Type B					0.00	
Fume Hood Type C					0.00	
Fume Hood Type D					0.00	
Lab Benches Type A					0.00	
Lab Benches Type B					0.00	
Sink and Drains					0.00	
Amount of Floor Space					0.00	
Ventillation Ductwork					0.00	
Amount of Wall Space					0.00	
Other: Sr-90 sources	2 sources				0.67	0.67
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
ROOM TOTALS:						0.67 cubic feet of radioactive waste

These items will not be volume reduced.

The only use is the Sr-90 source(s) use in our TLD badge readers. Class B Stable Waste.

Decommissioning Cost Estimate

ITEMIZATION WORKSHEET
FOR ROOM #108A

Facility Name:

TELEDYNE ISOTOPES

Item:	Quantity	X-Dimen.	Y-Dimen.	Z-Dimen.	Volume	Waste Volume
Fume Hood Type A					0.00	
Fume Hood Type B					0.00	
Fume Hood Type C					0.00	
Fume Hood Type D					0.00	
Lab Benches Type A					0.00	
Lab Benches Type B					0.00	
Sink and Drains					0.00	
Amount of Floor Space					0.00	
Ventillation Ductwork					0.00	
Amount of Wall Space					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
ROOM TOTALS:						0.00 cubic feet of radioactive waste

The only use is the Sr-90 source(s) which are covered under Room 102B.

Attachment F

Decommissioning Cost Estimate

ITEMIZATION WORKSHEET
FOR ROOM #124A

Facility Name:

TELEDYNE ISOTOPES

Item:	Quantity	X-Dimen.	Y-Dimen.	Z-Dimen.	Volume	Waste Volume
Fume Hood Type A					0.00	
Fume Hood Type B					0.00	
Fume Hood Type C					0.00	
Fume Hood Type D					0.00	
Lab Benches Type A					0.00	
Lab Benches Type B					0.00	
Sink and Drains					0.00	
Amount of Floor Space					0.00	
Ventillation Ductwork					0.00	
Amount of Wall Space					0.00	
Other: check sources and standards	1				1.00	0.33
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
ROOM TOTALS:						0.33 cubic feet of radioactive waste

The check sources and standards may amount to
1 cubic foot of radwaste combined.

Decommissioning Cost Estimate

ITEMIZATION WORKSHEET
FOR ROOM #201/203

Facility Name:

TELEDYNE IS JTOPES

	Quantity	X-Dimen.	Y-Dimen.	Z-Dimen.	Volume	Waste Volume
Item:						
Fume Hood Type A					0.00	
Fume Hood Type B					0.00	
Fume Hood Type C					0.00	
Fume Hood Type D					0.00	
Lab Benches Type A					0.00	
Lab Benches Type B					0.00	
Sink and Drains					0.00	
Amount of Floor Space					0.00	
Ventilation Ductwork					0.00	
Amount of Wall Space					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
					0.00	
ROOM TOTALS:						0.00 cubic feet of radioactive waste

We do not expect any waste from these operations.

Attachment F

Decommissioning Cost Estimate

ITEMIZATION WORKSHEET FOR ROOMS #202/204E Facility Name: TELEDYNE ISOTOPES

Item:	Quantity	X-Dimen.	Y-Dimen.	Z-Dimen.	Volume	Waste Volume
Fume Hood Type A					0.00	
Fume Hood Type B					0.00	
Fume Hood Type C					0.00	
Fume Hood Type D					0.00	
Lab Benches Type A					0.00	
Lab Benches Type B					0.00	
Sink and Drains					0.00	
Amount of Floor Space					0.00	
Ventillation Ductwork					0.00	
Amount of Wall Space					0.00	
Other: Standards and spikes	1				7.50	7.50
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
ROOM TOTALS:						7.50 cubic feet of radioactive waste

These items will not be volume reduced.

The standards and spikes will be solidified into a Class B stable waste.

Attachment F

Decommissioning Cost Estimate

ITEMIZATION WORKSHEET
FOR ROOM #202C

Facility Name:

TELEDYNE ISOTOPES

Item:	Quantity	X-Dimen.	Y-Dimen.	Z-Dimen.	Volume	Waste Volume
Fume Hood Type A					0.00	
Fume Hood Type B					0.00	
Fume Hood Type C					0.00	
Fume Hood Type D					0.00	
Lab Benches Type A					0.00	
Lab Benches Type B					0.00	
Sink and Drains					0.00	
Amount of Floor Space					0.00	
Ventillation Ductwork					0.00	
Amount of Wall Space					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
<div style="border: 1px solid black; padding: 5px; display: inline-block;"> Any wastes are included with room 202/202E. </div>						
ROOM TOTALS:					0.00	cubic feet of radioactive waste

Attachment F

Decommissioning Cost Estimate

ITEMIZATION WORKSHEET FOR ROOM #204D Facility Name: TELEDYNE ISOTOPES

	Quantity	X-Dimen.	Y-Dimen.	Z-Dimen.	Volume	Waste Volume
Item:						
Fume Hood Type A					0.00	
Fume Hood Type B					0.00	
Fume Hood Type C					0.00	
Fume Hood Type D					0.00	
Lab Benches Type A					0.00	
Lab Benches Type B					0.00	
Sink and Drains					0.00	
Amount of Floor Space					0.00	
Ventillation Ductwork					0.00	
Amount of Wall Space					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
<div style="border: 1px solid black; padding: 5px; display: inline-block;"> Any wastes are included with room 202/202E. </div>					0.00	
ROOM TOTALS:						0.00 cubic feet of radioactive waste

Decommissioning Cost Estimate

ITEMIZATION WORKSHEET
FOR ROOM #204

Facility Name:

TELEDYNE ISOTOPES

Item:	Quantity	X-Dimen.	Y-Dimen.	Z-Dimen.	Volume	Waste Volume
Fume Hood Type A					0.00	
Fume Hood Type B					0.00	
Fume Hood Type C					0.00	
Fume Hood Type D					0.00	
Lab Benches Type A					0.00	
Lab Benches Type B					0.00	
Sink and Drains					0.00	
Amount of Floor Space					0.00	
Ventillation Ductwork					0.00	
Amount of Wall Space					0.00	
Other: Sr-90 sources					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
ROOM TOTALS:						0.00 cubic feet of radioactive waste

We do not expect any waste from these operations.

Attachment F

Decommissioning Cost Estimate

ITEMIZATION WORKSHEET Facility Name: TELEDYNE ISOTOPES
 FOR ROOMS #207/209/209A/210/210A

	Quantity	X-Dimen.	Y-Dimen.	Z-Dimen.	Volume	Waste Volume
Item:						
Fume Hood Type A					0.00	
Fume Hood Type B					0.00	
Fume Hood Type C					0.00	
Fume Hood Type D					0.00	
Lab Benches Type A					0.00	
Lab Benches Type B					0.00	
Sink and Drains					0.00	
Amount of Floor Space					0.00	
Ventillation Ductwork					0.00	
Amount of Wall Space					0.00	
Other: Standards and spikes	1				4.01	1.34
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
ROOM TOTALS:						1.34 cubic feet of radioactive waste

The standards and spikes may amount to 4.01 cubic foot of radwaste combined.

Attachment F

Decommissioning Cost Estimate

ITEMIZATION WORKSHEET
FOR ROOM #208

Facility Name:

TELEDYNE ISOTOPES

	Quantity	X-Dimen.	Y-Dimen.	Z-Dimen.	Volume	Waste Volume
Item:						
Fume Hood Type A					0.00	
Fume Hood Type B					0.00	
Fume Hood Type C					0.00	
Fume Hood Type D					0.00	
Lab Benches Type A					0.00	
Lab Benches Type B					0.00	
Sink and Drains					0.00	
Amount of Floor Space					0.00	
Ventillation Ductwork					0.00	
Amount of Wall Space					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	

We do not expect any waste from these operations.

ROOM TOTALS: 0.00 cubic feet of radioactive waste

Decommissioning Cost Estimate

ITEMIZATION WORKSHEET Facility Name: TELEDYNE ISOTOPES
 FOR ROOMS #413/413A

Item:	Quantity	X-Dimen.	Y-Dimen.	Z-Dimen.	Volume	Waste Volume
Fume Hood Type A					0.00	
Fume Hood Type B					0.00	
Fume Hood Type C					0.00	
Fume Hood Type D					0.00	
Lab Benches Type A					0.00	
Lab Benches Type B					0.00	
Sink and Drains					0.00	
Amount of Floor Space					0.00	
Ventillation Ductwork					0.00	
Amount of Wall Space					0.00	
Other: Gamma check sources	1				0.67	0.22
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
ROOM TOTALS:						0.22 cubic feet of radioactive waste

The combined volume of radioactive waste would fill a 5-gallon pail.

Decommissioning Cost Estimate

ITEMIZATION WORKSHEET FOR ROOM #510 Facility Name: TELEDYNE ISOTOPES

Item:	Quantity	X-Dimen.	Y-Dimen.	Z-Dimen.	Volume	Waste Volume
Fume Hood Type A					0.00	
Fume Hood Type B					0.00	
Fume Hood Type C					0.00	
Fume Hood Type D					0.00	
Lab Benches Type A					0.00	
Lab Benches Type B					0.00	
Sink and Drains					0.00	
Amount of Floor Space		These items will not be volume reduced.			0.00	
Ventilation Ductwork					0.00	
Amount of Wall Space					0.00	
Other: un-releasable gemstones	1				0.67	0.67
Other:					0.00	
Other:					0.00	
Other:		The combined volume of radioactive waste would fill a 5-gallon pail.			0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
ROOM TOTALS:						0.67 cubic feet of radioactive waste

Decommissioning Cost Estimate

ITEMIZATION WORKSHEET Facility Name: TELEDYNE ISOTOPES
 FOR ROOMS #512/513/516

Item:	Quantity	X-Dimen.	Y-Dimen.	Z-Dimen.	Volume	Waste Volume
Fume Hood Type A					0.00	
Fume Hood Type B					0.00	
Fume Hood Type C					0.00	
Fume Hood Type D					0.00	
Lab Benches Type A					0.00	
Lab Benches Type B					0.00	
Sink and Drains					0.00	
Amount of Floor Space		These items will not be volume reduced.			0.00	
Ventilation Ductwork					0.00	
Amount of Wall Space					0.00	
Other: Check source, LSC standards, and microcurie calibration sources.	1				1.00	1.00
Other:					0.00	
Other:					0.00	
Other:		The combined volume of radioactive dry waste would fill a 5-gallon pail. The LSC standards would be disposed separately.			0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
ROOM TOTALS:						1.00 cubic feet of radioactive waste

Attachment F

Decommissioning Cost Estimate

ITEMIZATION# WORKSHEET
FOR ROOMS #602/604

Facility Name:

TELEDYNE ISOTOPES

Item:	Quantity	X-Dimen.	Y-Dimen.	Z-Dimen.	Volume	Waste Volume
Fume Hood Type A	4	3.5	4.0	5.0	280.00	93.33
Fume Hood Type B	1	3.5	3.0	5.0	52.50	17.50
Fume Hood Type C					0.00	
Fume Hood Type D					0.00	
Lab Benches Type A	7	3.5	15.0	0.8	306.25	102.08
Lab Benches Type B					0.00	
Sink and Drains	4	3.0	2.0	2.0	48.00	16.00
Amount of Floor Space					0.00	
Ventillation Ductwork	55	1.8	1.0	1.0	96.25	32.08
Amount of Wall Space					0.00	
Other: Additional ductwork	5				97.50	32.50
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
ROOM TOTALS:						293.50 cubic feet of radioactive waste

Floors and walls are assumed to be clean based on past surveys.

Attachment F

Decommissioning Cost Estimate

ITEMIZATION WORKSHEET
FOR ROOMS # 605/608

Facility Name: TELEDYNE ISOTOPES

Quantity X-Dimen. Y-Dimen. Z-Dimen. Volume Waste Volume

Item:

- Fume Hood Type A
- Fume Hood Type B
- Fume Hood Type C
- Fume Hood Type D
- Lab Benches Type A
- Lab Benches Type B
- Sink and Drains
- Amount of Floor Space
- Ventilation Ductwork
- Amount of Wall Space

0.00
0.00
0.00
0.00
0.00
0.00
0.00
0.00
0.00
0.00
0.00
0.00
0.00
0.00
0.00
0.00
0.00
0.00
0.00
0.00

Other:
Other:
Other:
Other:
Other:
Other:
Other:
Other:

We do not expect any waste from these operations.

ROOM TOTALS:

0.00 cubic feet of radioactive waste

Attachment F

Decommissioning Cost Estimate

ITEMIZATION WORKSHEET
FOR ROOM #605

Facility Name: TELEDYNE ISOTOPES

Quantity X-Dimen. Y-Dimen. Z-Dimen. Volume Waste Volume

Item:

Fume Hood Type A					0.00	
Fume Hood Type B					0.00	
Fume Hood Type C					0.00	
Fume Hood Type D					0.00	
Lab Benches Type A					0.00	
Lab Benches Type B					0.00	
Sink and Drains					0.00	
Amount of Floor Space					0.00	
Ventilation Ductwork					0.00	
Amount of Wall Space					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	

We do not expect any waste from these operations.

ROOM TOTALS:

0.00 cubic feet of radioactive waste

Attachment F

Decommissioning Cost Estimate

ITEMIZATION WORKSHEET
FOR ROOM #607

Facility Name: TELEDYNE ISOTOPES

Quantity X-Dimen. Y-Dimen. Z-Dimen. Volume Waste Volume

Item:

- Fume Hood Type A
- Fume Hood Type B
- Fume Hood Type C
- Fume Hood Type D
- Lab Benches Type A
- Lab Benches Type B
- Sink and Drains
- Amount of Floor Space
- Ventilation Ductwork
- Amount of Wall Space

- Other:
- Other:
- Other:
- Other:
- Other:
- Other:
- Other:

We do not expect any waste from these operations.

ROOM TOTALS:

0.00 cubic feet of radioactive waste

Attachment F

Decommissioning Cost Estimate

ITEMIZATION WORKSHEET FOR ROOM #614A Facility Name: TELEDYNE ISOTOPES

Item:	Quantity	X-Dimen.	Y-Dimen.	Z-Dimen.	Volume	Waste Volume
Fume Hood Type A	1	3.0	4.0	4.3	51.00	17.00
Fume Hood Type B	2	3.0	4.2	5.0	124.80	41.60
Fume Hood Type C					0.00	
Fume Hood Type D					0.00	
Lab Benches Type A	1	3.5	15.0	0.3	13.13	4.38
Lab Benches Type B	1	7.0	5.4	0.3	9.45	3.15
Sink and Drains	3				0.00	
Amount of Floor Space	1				15.00	5.00
Ventilation Ductwork	1	1.0	1.0	72.0	72.00	24.00
Amount of Wall Space	0				0.00	
Other: miscellaneous tables	2				4.00	1.33
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
ROOM TOTALS:						96.46 cubic feet of radioactive waste

Attachment F

Decommissioning Cost Estimate

ITEMIZATION WORKSHEET
FOR ROOM #617

Facility Name:

TELEDYNE ISOTOPES

	Quantity	X-Dimen.	Y-Dimen.	Z-Dimen.	Volume	Waste Volume
Item:						
Fume Hood Type A					0.00	
Fume Hood Type B					0.00	
Fume Hood Type C					0.00	
Fume Hood Type D					0.00	
Lab Benches Type A					0.00	
Lab Benches Type B					0.00	
Sink and Drains					0.00	
Amount of Floor Space					0.00	
Ventillation Ductwork					0.00	
Amount of Wall Space					0.00	
Other: Miscellaneous work surfaces	1				15.00	5.00
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
ROOM TOTALS:						5.00 cubic feet of radioactive waste

Attachment F

Decommissioning Cost Estimate

ITEMIZATION WORKSHEET
FOR ROOM #621A

Facility Name:

TELEDYNE ISOTOPES

Item:	Quantity	X-Dimen.	Y-Dimen.	Z-Dimen.	Volume	Waste Volume
Fume Hood Type A					0.00	
Fume Hood Type B					0.00	
Fume Hood Type C					0.00	
Fume Hood Type D					0.00	
Lab Benches Type A					0.00	
Lab Benches Type B					0.00	
Sink and Drains					0.00	
Amount of Floor Space					0.00	
Ventilation Ductwork					0.00	
Amount of Wall Space					0.00	
Other: Miscellaneous Sealed Sources	1				22.50	22.50
Other: safe	1				45.00	45.00
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
ROOM TOTALS:						67.50 cubic feet of radioactive waste

These items will not be volume reduced.

Attachment F

Decommissioning Cost Estimate

ITEMIZATION WORKSHEET Facility Name: TELEDYNE ISOTOPES
 FOR ROOMS #T00/T01/T02/T02A/T03/T04/T05/T07

Item:	Quantity	X-Dimen.	Y-Dimen.	Z-Dimen.	Volume	Waste Volume
Fume Hood Type A	5	3.0	4.0	5.0	300.00	100.00
Fume Hood Type B					0.00	
Fume Hood Type C					0.00	
Fume Hood Type D					0.00	
Lab Benches Type A	3				45.00	15.00
Lab Benches Type B					0.00	
Sink and Drains	2				15.00	5.00
Amount of Floor Space					0.00	
Ventillation Ductwork	1				200.00	66.67
Amount of Wall Space					0.00	
Other: HEPA filter banks & filters	6	2.5	2.5	2.5	93.75	31.25
Other: Water Scrubber	1	4.0	10.0	4.0	160.00	53.33
Other: Glove box train	1	4.0	35.0	5.0	384.00	128.00
Other: Shielded glovebox	1	4.0	5.0	5.0	100.00	33.33
Other: Water scrubber pipes & tanks	1				22.50	7.50
Other: holding tanks	2	2.0	2.0	4.0	32.00	10.67
Other:					0.00	
Other:					0.00	
ROOM TOTALS:						450.75 cubic feet of radioactive waste

Attachment F

Decommissioning Cost Estimate

ITEMIZATION WORKSHEET Facility Name: TELEDYNE ISOTOPES
 FOR RADWASTE STORAGE FACILITY

Item:	Quantity	X-Dimen.	Y-Dimen.	Z-Dimen.	Volume	Waste Volume
Fume Hood Type A					0.00	
Fume Hood Type B					0.00	
Fume Hood Type C					0.00	
Fume Hood Type D					0.00	
Lab Benches Type A					0.00	
Lab Benches Type B					0.00	
Sink and Drains					0.00	
Amount of Floor Space					0.00	
Ventillation Ductwork					0.00	
Amount of Wall Space					0.00	
Other: drums on hand	1				1500.00	1000.00
Other: compactor & associated air handling systems	1				150.00	50.00
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	

We have estimated that at any given time there will be a maximum of 1500 cubic feet of waste on hand. Approximately half will be capable of volume reduction. All spills in the warehouse have been thoroughly cleaned and past surveys indicate that the walls and floor will be clean.

ROOM TOTALS: 1050.00 cubic feet of radioactive waste

September 22, 1993

 **TELEDYNE
ISOTOPES**

50 VAN BUREN AVENUE

PO BOX 1235

WESTWOOD NJ 07675-1235

(201) 664-7070

Docket No. 030-05218	License No. 29-00055-02	Control No. 113092
Docket No. 030-05219	License No. 29-00055-06	Control No. 113093
Docket No. 030-08681	License No. 29-00055-14	Control No. 113094
Docket No. 030-14482	License No. 29-00055-15	Control No. 113095
Docket No. 070-00124	License No. SNM-107	Control No. 113096

Mail Control No. 113092

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

Subject : Financial Assurance/Response to your letter dates August 23, 1993

Dear Mr. Kinneman:

Due to the quantity of the requested information, Teledyne Isotopes requests an extension to respond. We will submit our complete response no later than November 25, 1993.

If you require additional information, please contact me directly.

Sincerely,

TELEDYNE ISOTOPES



Steven A. Black, Manager
Radiological Services Department

cc: Dr. D. F. Schutz

OFFICIAL RECORD COPY ML 10

113092/113093/113094/113095/113096

SEP 27 1993

AUG 23 1993

Docket Nos.	030-05218	License Nos.	29-00055-02
	030-05219		29-00055-06
	030-08681		29-00055-14
	030-14482		29-00055-15
	070-00124		SNM-107

Control Nos. 113092
113093
113094
113095
113096

Teledyne Isotopes, Inc.
ATTN: Steven A. Black, Manager
Radiological Services Department
50 Van Buren Avenue
Westwood, New Jersey 07675

Dear Mr. Black:

Subject: Financial Assurance

This is in reference to your submittals dated November 15, 1991 and November 22, 1991 to provide financial assurance for the above listed NRC licenses. We have reviewed your submittals and request that you modify these documents to address the specific items listed below:

1. You adapted the cost estimating tables in Appendix F of the Regulatory Guide 3.66 "Standard Format and Content of Financial Assurance Mechanisms Required for Decommissioning Under 10 CFR Parts 30, 40, 70, and 72," June 1990, to derive your cost estimate. However, you did not provide enough detail in your decommissioning funding plan to justify the estimate.

You provided limited information on the extent of the laboratory dimensions and the facility components (fume hoods, glove boxes, laboratory benches, ductwork, etc.) that need to be decontaminated. You did not explain why other areas are assumed not to require decontamination, and you provided no evidence that these areas are not presently contaminated (e.g., by including a summary of recent monitoring data). Without this information, we are unable to adequately evaluate your cost estimate.

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Please submit additional detail about the laboratory dimensions, lab facility components (fume hoods, glove boxes, laboratory benches, ductwork, etc.), and the extent of contamination so that the cost estimate can be adequately evaluated. Please consider using the tables found in Appendices A and E of NUREG/CR-1754, Addendum 1, to calculate the costs of decontaminating, dismantling, packaging and disposing of your individual laboratory components and to estimate the quantities of waste generated from decontaminating these components. NUREG/CR-1754, Addendum 1, provides tables for estimating the number of person-days required, the cost of equipment and supplies, and the quantity of waste generated in decontaminating or packaging and disposing of individual facility components (e.g., floors, ceilings, walls, fume hoods, laboratory benches, etc.). If you use other sources of information to make these estimates, please describe those sources and why you believe they are appropriate.

2. On page 31 of Attachment F to your letter dated November 22, 1991, you state, "We have estimated that at any given time there is an average of 1,000 cubic feet of waste on hand." You based your estimate of disposal costs on this average. Basing the estimate on the "average" amount of waste stored may lead to an underestimate of costs if the actual amount of waste stored at time of decommissioning is above this average. Consequently, if financial assurance is provided in the amount of the submitted cost estimate, there may be insufficient funds available to pay for all required decommissioning activities. Please base your waste disposal cost estimate on the maximum amount of waste that is commonly stored on-site.
3. Your cost estimate did not include all of the equipment costs required for decommissioning. You state on page 5 of your letter dated November 22, 1991, Attachment F, "All equipment is already owned by Teledyne Isotopes. No additional expenditures are necessary." You include no costs for equipment and supplies such as electricity, detergents, and scrubbing materials, or for operating costs of equipment such as the compactor. Regulatory Guide 3.66, pages 1-9 and 1-10, states that a decommissioning funding plan should include all costs incurred during the decommissioning. This is because the licensee may be completely unavailable to perform the decommissioning. Please include in your cost estimate the cost of all equipment and supplies.
4. The total amount of waste generated during decommissioning should sum to 1,641.61 cubic feet, rather than 1,545.15. Evidently, the total on page 3 does not include the wastes generated for Room 614A (page 27 of Attachment F). Correcting this apparent error leads to an increase in disposal costs of \$15,695. Please review this item and appropriately modify the estimate.

5. You have not made any allowance in your cost estimate for contingencies. Regulatory Guide 3.66 recommends that a contingency factor be included in the decommissioning cost estimate. Incorporating a contingency factor in cost estimates helps ensure that licensees are prepared for unexpected circumstances that could raise decommissioning costs. NUREG/CR-1754 uses a contingency factor of 25 percent in its cost estimates for each of six reference laboratories. Please incorporate a contingency factor of 25 percent into your decommissioning cost estimate. You may choose to use a lower contingency factor if you can show why a lower factor is appropriate. In addition, please confirm that you have not included in your cost estimate credit for any salvage value that may be realized from the sale of potential assets after decommissioning (see page 1-10 of the Regulatory Guide 3.66).
6. Although the submitted Letter of Credit follows the recommended wording in Regulatory Guide 3.66 almost exactly, it is an unexecuted draft and does not provide any financial assurance in its present form. In order to be effective, the Letter of Credit must specify the issuing financial institution, a letter of credit number, an expiration date, and an execution date, and must be signed by an authorized representative of the issuing financial institution. Please provide an originally signed duplicate of the Letter of Credit.
7. The Letter of Credit does not establish an aggregate withdrawal amount in the opening paragraph. The final paragraph, on the other hand, requires NRC to present a draft for withdrawal stating (in part) that "the total of this draft and all other drafts previously drawn under this letter of credit does not exceed \$22,000." The executed Letter of Credit should specify an aggregate amount in the opening paragraph, and should specify the same amount in the final paragraph, and both amounts should equal the correct amount of financial assurance.
8. The Letter of Credit requires a signed statement to draw on the letter of credit, reading as follows:

"I certify that the amount of the draft is payable pursuant to regulations issued under authority of 10 CFR Part 30."
[emphasis added]

Regulatory Guide 3.66, page 4-33, intends that, in lieu of the underlined phrase above, the letter of credit should read "the Nuclear Regulatory Commission." A signed statement reciting the submitted language should be adequate to draw on the instrument. However, the difference between the submitted language and the recommended language may invite error because a signed statement correctly

attributing the regulations to NRC would not be honored for this particular letter of credit. Modify the final letter of credit to replace the phrase underlined above with the phrase "the Nuclear Regulatory Commission."

9. Under 10 CFR 30.35(f)(2)(ii), a surety method of assurance, such as a Letter of Credit, must be payable to a trust established for decommissioning costs. The submitted Letter of Credit requires that funds withdrawn must be deposited into a Standby Trust Fund.

To avoid the possibility that a trust fund would not be readily available if and when needed, Regulatory Guide 3.66, page 3-2, states that a standby trust fund must be established if a letter of credit is used as a financial instrument. Please submit a Standby Trust Agreement, acknowledgement, and other related documents as recommended in Regulatory Guide 3.66, pages 4-18 through 4-27.

Satisfactory financial assurance is required for your licenses. Therefore, we request that you respond within 30 calendar days of the date of this letter. Please reply in duplicate to my attention at the Region I office and refer to Mail Control No. 113092.

If you have any questions regarding this letter please call Anthony Dimitriadis of my staff at (215) 337-6953.

Sincerely, Original Signed For
John D. Kinneman
John D. Kinneman, Chief
Research, Development and
Decommissioning Section
Division of Radiation Safety
and Safeguards


Enclosures:

1. Regulatory Guide 3.66
2. NUREG/CR-1754
3. NUREG/CR-1754, Addendum 1

See: J. Kinneman, RI

DRSS:RI
Dimitriadis/smh

08/20/93


NMSS
Pykoski

08/23/93


DRSS:RI
Kinneman

08/23/93



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

MAR 09 1993

MEMORANDUM FOR: Timothy C. Johnson
Decommissioning and Regulatory Issues Branch

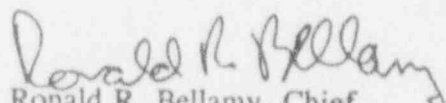
FROM: Ronald R. Bellamy, Chief
Nuclear Materials Safety Branch
Division of Radiation Safety
and Safeguards

SUBJECT: FINANCIAL ASSURANCE SUBMITTALS

Enclosed is the first group of financial assurance submittals for review by your staff. All of these proposals have been initially reviewed by my staff. A copy of the license has been inserted in each folder.

These documents are the official record file, so please return them with the proposed deficiency or approval letter to Anthony Dimitriadis, of my staff, the official contact for this project. If you or any members of your staff have any questions, do not hesitate to contact him at (215) 337-6953.

I appreciate your assistance with these actions.


Ronald R. Bellamy, Chief
Nuclear Materials Safety Branch
Division of Radiation Safety
and Safeguards

Enclosure: List of Files

cc:
J. Austin, NMSS
J. Glenn, NMSS
R. Bellamy, RI
S. Villar, RI

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113096

List of Files

<u>LICENSEE NAME</u>	<u>LICENSE NO.</u>	<u>DOCKET NO.</u>
EMR Photoelectric	29-08636-02	030-11318
Teledyne Isotopes, Inc.	29-00055-14	030-08681
Clean Harbors Environ Serv., Inc.	20-14082-02	030-07627
Afftrex, Ltd	37-28329-01	030-30941
Teledyne Isotopes	29-00055-06	030-05219
Teledyne Isotopes	29-00055-15	030-14482
Teledyne Isotopes	SNM-107	070-00124
Teledyne Isotopes	29-00055-02	030-05218
E.R. Squibb & Sons	29-00139-02	030-05222
Dana-Farber Cancer Institute	20-19761-02	030-20020
American Cyanamid	29-07694-01	030-05337
Harvard University	20-00297-53	030-00753
Defense Logistics Agency	STC-133	040-00341
Georgetown University	08-01709-04	030-01315
Worcester Foundation for Experimental Biology	20-01225-01	030-01834
Textron Defense System	20-02729-05	030-04624
Drexel University	37-04594-11	030-15139
SMH (US) Services, Inc.	37-03572-06	030-12704
Rohm & Haas Research Labs.	37-01665-01	030-06021

Smith Kline Beecham	37-00282-04	030-05986
Xenobiotic Labs., Inc.	29-28053-01	030-30067
Isomedix Operations, Inc.	29-19769-03	030-20466
Exxon Biomedical Sciences, Inc.	29-19396-01	030-17541
Textron Lycoming	STB-393	030-02917
Varian/Beverly Microwave Division	20-02237-04	030-10763



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

MEMORANDUM FOR: John J. Kinneman, Chief
Research, Development and
Decommissioning Section
Division of Radiation Safety
and Safeguards, Region I

FROM: Louis M. Bykoski
Decommissioning and Regulatory
Issues Branch
Division of Low-Level Waste Management
and Decommissioning, NMSS

SUBJECT: THE OFFICE OF GENERAL COUNSEL AND CONTRACTOR
COMMENTS ON NONSTANDARD FINANCIAL ASSURANCE
SUBMITTAL

OCT 16 1992

Our contractor, ICF Incorporated, and OGC have reviewed and provided comments on the Teledyne Isotopes nonstandard financial assurance submittal sent to us for review.

The ICF comments are presented in two parts. The first part deals with specific recommendations to current deficiencies. The second part (Other Issues) provides a discussion of changes to the standard wording that are acceptable and are not considered to be deficiencies. The OGC comments include additional deficiencies that need to be corrected by the licensee and comments for our internal use.

You should carefully review the comments before preparing the deficiency letter. We have enclosed more specific information to help you sort and consolidate the ICF and OGC comments.

Should you have any further questions with regard to the comments, please call me on FTS 964-2572 or David Futoma of OGC on FTS 964-1621.

Louis M. Bykoski
Decommissioning and Regulatory
Issues Branch
Division of Low-Level Waste Management
and Decommissioning, NMSS

Enclosures: As stated

LIST OF INSTRUCTIONS

OCT 1 6 1992

Teledyne Isotopes

In reviewing the comments the reviewer will note that there will be some overlap between ICF and OGC comments. The following comments should be included in the basis for the deficiency letter:

1. ICF comments 1 through 7 plus last paragraph.

2. All OGC comments.

All other comments and discussions are for reviewer information.

MEMO TO: Louis M. Bykoski, NMSS
FROM: OGC
RE: REVIEW OF NONSTANDARD SUBMITTALS

OCT 16 1992

-- Teledyne Isotopes: No Legal Objection to ICF Recommendations
(1)-(7).



ICF INCORPORATED

September 16, 1992

To: Dr. Lou Bykoski, NMSS/NRC

From: Larry Huffman and John Collier, ICF Incorporated

Subject: Review of Decommissioning Funding Plan and Letter of Credit
Submitted by Teledyne Isotopes

Teledyne Isotopes in Westwood, New Jersey, submitted a decommissioning funding plan, using an unexecuted letter of credit. The submission is intended to provide financial assurance for estimated decommissioning costs of \$302,411.10 for licenses 29-00055-02, 29-00055-06, 29-00055-14, 29-00055-15, and SNM-107 issued under 10 CFR Parts 30 and 70.¹ Upon review of the submission, ICF recommends that NRC Region I require the licensee to modify the submission in the following ways:

- (1) Submit additional detail to support the cost estimate (*Regulatory Guide 3.66*, Appendix F);
- (2) Revise cost estimate to reflect higher waste volume;
- (3) Account for all costs in the cost estimate (*Regulatory Guide 3.66*, Pages 1-9 and 1-10);
- (4) Incorporate a contingency factor into the total decommissioning cost estimate and clarify that no credit was taken for salvage value (*Regulatory Guide 3.66*, page 1-10);
- (5) Submit an executed copy of the letter of credit (10 CFR Part 30.35 and 10 CFR Part 70.25);
- (6) Modify the wording of the letter of credit to correctly specify that drafts are payable pursuant to regulations issued under NRC's authority (*Regulatory Guide 3.66*, Page 4-33); and
- (7) Submit a standby trust agreement (10 CFR 30.35(f)(2)(ii)).

These recommendations and other issues are discussed below.

¹ The submission replaces a previously submitted parent guarantee/financial test. ICF reviewed the previous submission and reported several recommendations to NRC in a memorandum dated December 21, 1990.

- (1) Submit Additional Detail to Support the Cost Estimate (*Regulatory Guide 3.66, Appendix F*)

The licensee adapted the cost estimating tables in Appendix F of the *Regulatory Guide 3.66 "Standard Format and Content of Financial Assurance Mechanisms Required for Decommissioning Under 10 CFR Parts 30, 40, 70, and 72,"* June 1990, to derive its cost estimate.² However, the licensee did not provide enough detail in its decommissioning funding plan to justify its estimate.

The licensee provided limited information on the extent of the laboratory dimensions and the facility components (fume hoods, glove boxes, laboratory benches, ductwork, etc.) that need to be decontaminated. The licensee also described items that are contaminated. The licensee did not explain why other areas are assumed not to require decontamination, and provided no evidence that these areas are not presently contaminated (e.g., by including monitoring data or wipe test results). Without this information, ICF is unable to adequately evaluate the licensee's cost estimate.

ICF recommends that NRC require the licensee to submit additional detail about the laboratory dimensions, lab facility components (fume hoods, glove boxes, laboratory benches, ductwork, etc.), and the extent of contamination so that the cost estimate can be adequately evaluated. ICF also recommends that the licensee use the tables found in Appendices A and E of NUREG/CR-1754, Addendum 1, to calculate the costs of decontaminating or packaging and disposing of its individual laboratory components and to estimate the quantities of waste generated from decontaminating these components.³ NUREG/CR-1754, Addendum 1, provides tables for estimating the number of person-days required, the cost of equipment and supplies, and the quantity of waste generated in decontaminating or packaging and disposing of individual facility components (e.g., floors, ceilings, walls, fume hoods, laboratory benches, etc.).

² ICF assumes that the licensee will not need to restore contaminated areas on facility grounds, stabilize the site, or perform long-term surveillance to properly decommission its facility because the licensee did not identify the need to conduct such activities in its decommissioning funding plan.

³ NUREG/CR-1754, Addendum 1, Technology, Safety and Costs of Decommissioning Reference Non-Fuel-Cycle Nuclear Facilities: Compendium of Current Information, Pacific Northwest Laboratory, October 1989 (see Appendices A and E).

(2) Revise Cost Estimate to Reflect Higher Waste Volume

The licensee based its estimate of disposal costs on the average amount of waste it possesses at any given time. On page 31 of Attachment F, the licensee states that "We have estimated that at any given time there is an average of 1,000 cubic feet of waste on hand." Basing the estimate on the "average" amount of waste stored may lead to an underestimate of costs if the actual amount of waste stored at time of decommissioning is above this average. Consequently, if financial assurance is provided in the amount of the submitted cost estimate, there may be insufficient funds available to pay for all required decommissioning activities. ICF recommends that the NRC require that the licensee base its waste disposal costs on the maximum amount of waste that is commonly stored on-site, rather than the average amount stored on-site.

(3) Account for All Costs in the Cost Estimate (*Regulatory Guide 3.66*, Pages 1-9 and 1-10)

The licensee's cost estimate did not include all of the equipment costs required for decommissioning. The licensee stated on page 5 of Attachment F that "All equipment is already owned by Teledyne Isotopes. No additional expenditures are necessary." The licensee includes no costs for equipment and supplies such as electricity, detergents, and scrubbing materials, or for operating costs of equipment such as the compactor. *Regulatory Guide 3.66*, pages 1-9 and 1-10, states that a decommissioning funding plan should include all costs incurred during the decommissioning. ICF recommends that NRC require the licensee to include in its cost estimate the cost of all equipment and supplies.

In addition, there is a math error in the decommissioning funding plan. The total amount of waste generated during decommissioning should sum to 1641.61 cubic feet. Evidently, the licensee did not include the wastes generated for Room 614A (page 27 of Attachment F). Correcting this error leads to an increase in disposal costs of \$15,695.

(4) Incorporate a Contingency Factor into the Total Decommissioning Cost Estimate and Clarify that No Credit Was Taken for Salvage Value (*Regulatory Guide 3.66*, page 1-10)

The licensee has not made any allowance in its cost estimate for contingencies. *Regulatory Guide 3.66* recommends that a contingency factor be included in the decommissioning cost estimate. Incorporating a contingency factor in cost estimates helps ensure that licensees are prepared for unexpected circumstances that could raise decommissioning costs. NUREG/CR-1754 uses a contingency factor of 25 percent in its cost estimates for each of six reference laboratories.⁴ ICF recommends that the licensee incorporate a contingency factor of 25 percent into its decommissioning cost estimate. The

⁴ *Ibid.*, Appendix B.

licensee may choose to use a lower contingency factor if it can show why a lower factor is appropriate. In addition, the licensee should clarify that it has not included in its cost estimate credit for any salvage value that may be realized with the sale of potential assets after decommissioning (see page 1-10 of the *Regulatory Guide 3.66*).

- (5) Submit an Executed Copy of the Letter of Credit (10 CFR Part 30.35 and 10 CFR Part 70.25)

Although the submitted letter of credit follows the recommended wording in *Regulatory Guide 3.66* almost exactly, it is an unexecuted draft and does not provide any financial assurance in its present form. In order to be effective, the letter of credit must specify the issuing financial institution, a letter of credit number, an expiration date, and an execution date, and must be signed by an authorized representative of the issuing financial institution. ICF recommends that NRC require the licensee to execute the letter of credit as required by 10 CFR 30.35 and 70.25, and to submit an originally signed duplicate to NRC as recommended in *Regulatory Guide 3.66* on page 3-20.

In addition, the letter of credit does not establish an aggregate withdrawal amount in the opening paragraph. The final paragraph, on the other hand, requires NRC to present a draft for withdrawal stating (in part) that "the total of this draft and all other drafts previously drawn under this letter of credit does not exceed \$22,000." The executed letter of credit should specify an aggregate amount in the opening paragraph, and should specify the same amount in the final paragraph, and both amounts should equal the correct amount of financial assurance.

- (6) Modify the Wording of the Letter of Credit to Correctly Specify that Drafts are Payable Pursuant to Regulations Issued Under NRC's Authority (*Regulatory Guide 3.66*, Page 4-33)

The submitted letter of credit requires a signed statement to draw on the letter of credit, reading as follows:

"I certify that the amount of the draft is payable pursuant to regulations issued under authority of 10 CFR Part 30." [emphasis added]

Regulatory Guide 3.66, page 4-33, intends that, in lieu of the underlined phrase above, the letter of credit should read "the Nuclear Regulatory Commission." A signed statement reciting the submitted language should be adequate to draw on the instrument. However, the difference between the submitted language and the recommended language may invite error because a signed statement correctly attributing the regulations to NRC would not be honored for this particular letter of credit. Because the submitted letter of credit is an unexecuted draft (see Recommendation 5), ICF recommends that NRC require the licensee to modify the final letter of credit to replace the phrase underlined above with the phrase "the Nuclear Regulatory Commission."

(7) Submit a Standby Trust Agreement (10 CFR 30.35(f)(2)(ii))

Under 10 CFR 30.35(f)(2)(ii), a surety method of assurance, such as a letter of credit, "must be payable to a trust established for decommissioning costs." The submitted letter of credit requires that funds withdrawn under the letter of credit must be deposited into a standby trust fund, but the licensee's submission does not include a standby trust agreement. Because it may not be possible to establish a trust fund at the time the letter of credit is drawn upon (e.g., if the licensee no longer exists), funds drawn from the letter of credit would be unlikely to be available for decommissioning activities. ICF recommends that NRC require the licensee to submit a standby trust agreement and related documents, as recommended in *Regulatory Guide 3.66*, pages 4-18 through 4-27.

Other Issues

Apart from editorial and non-substantive changes to the standard wording provided in the *Regulatory Guide 3.66*, the following modifications are noteworthy:

- (a) The licensee assumes that there will be a 3:1 volume reduction of waste generated from all decontamination activities. This volume reduction is to be achieved by using a licensee-owned super-compactor. ICF assumes that the licensee's assumption is valid.
- (b) The final paragraph of the draft letter of credit omits quotation marks. It should read

Each draft must bear on its face the clause:
'Drawn under Letter of Credit No. [insert no.],
dated [insert date], and the total of this draft
and all other drafts previously drawn under this
letter of credit does not exceed [insert
amount].'

This omission is not significant because the required clause is clearly stated.

Finally, the Region should ensure that documents submitted by the licensee are originally signed duplicates, as recommended in *Regulatory Guide 3.66*. Unless the documents have been properly signed, NRC cannot be certain that the financial assurance mechanism is enforceable. Because ICF does not possess the original submissions, we cannot verify compliance with these requirements.

attachments

REVIEW OF DECOMMISSIONING FUNDING PLAN (DFP)

Name of company or institution: Teledyne Isotopes

Number of licenses and applicable regulations: 5 10 CFR Part 30
 10 CFR Part 40
 1 10 CFR Part 70
 10 CFR Part 72

Isotopes handled and possession limits (specify units):
→ Attached (last page)

Total cost estimate for licenses listed above: \$ 302,411.10

General comments on DFP:

CHECKLIST FOR REVIEWING DECOMMISSIONING FUNDING PLANS (DFF's)

QUESTIONS

COMMENTS

<p>(1) Does the licensee provide supporting documentation for its cost estimates?</p> <p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p>	
<p>(2) Does the licensee use the Appendix F "Cost Estimating Tables?"</p> <p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p>	
<p>(3) Does the cost estimate include the following major cost elements?</p>	
<p>(i) Planning and Preparation?</p> <p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p>	
<p>(ii) Decontamination and/or Dismantling of Radioactive Facility Components?</p> <p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p>	
<p>(iii) Packaging, Shipping, and Disposal of Radioactive Wastes?</p> <p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p>	
<p>(iv) Restoration of Contaminated Areas on Facility Grounds?</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA</p>	
<p>(v) Final Radiation Survey?</p> <p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p>	
<p>(vi) Site Stabilization, Long-Term Surveillance?</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA</p>	

CHECKLIST FOR REVIEWING DFP's (continued)

QUESTIONS

COMMENTS

<p>(4) Is the total cost estimate reasonable for the type(s) and size(s) of facility licensed?</p> <p> <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Not Sure </p>	<p>We do not have enough information to confirm the extent of contamination. Therefore, we can not determine if the estimate is correct or not.</p>
<p>(5) Are the cost estimates for individual facility activities and/or components reasonable?</p> <p> <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Not Sure </p>	<p>Stated that all equipment is owned by Teledyne No additional expenditures are necessary. However, what about maintenance or electricity or supplies?</p> <p>Based disposal in Radwaste disposal facility on an average amount of waste in storage. Should have used a maximum amount.</p>

CHECKLIST FOR REVIEWING DFP's (continued)

QUESTIONS

COMMENTS

<p>(6) Do the computations seem correct?</p> <p>___ Yes <input checked="" type="checkbox"/> No</p>	<p>Did not add the volume of waste generated correctly.</p>
<p>(7) Does the licensee take credit for the potential salvage value of recovered materials or decontaminated equipment?</p> <p>___ Yes <input checked="" type="checkbox"/> No</p>	<p>Not clearly stated.</p>
<p>(8) Does the licensee include a contingency factor in the cost estimate?</p> <p>___ Yes <input checked="" type="checkbox"/> No</p>	<p>Did not include a contingency factor.</p>
<p>(9) Does the licensee provide a description of the methods that will be used to adjust the decommissioning cost estimate periodically over the life of the facility?</p> <p><input checked="" type="checkbox"/> Yes ___ No</p>	

APPENDIX A
CHECKLIST FOR DECOMMISSIONING FINANCIAL ASSURANCE

NAME OF LICENSEE OR APPLICANT

Teledyne Isotopes
MAILING ADDRESS

50 Van Buren Avenue

Westwood NJ 07675

A. Licensee Part (check one of the following):

- Part 30 Licensee or Applicant Part 70 Licensee or Applicant
 Part 40 Licensee or Applicant Part 72 Licensee or Applicant

B. Check appropriate item in each category (if applicable)

1. 11/18/91 Date of Financial Assurance Submission

2. Public Entity

Private Entity

3. Certification of Financial Assurance

Decommissioning Funding Plan \$322,411.10

4. (a) Prepayment Option (See Appendix B)
 Trust Fund
 Escrow Account
 Certificate of Deposit
 Government Fund
 Deposit of Government Securities

(b) Surety/Insurance/Other Guarantee (See Appendix C) *No amount specified*
 Surety bond
 Letter of Credit
 Line of Credit
 Parent Company Guarantee/Financial Test*

(c) External Sinking Fund, Sinking Account and Surety/
Insurance (See Appendix D)
 Trust Fund
 Escrow Account
 Certificate of Deposit
 Government Fund
 Deposit of Government Securities
 Surety Bond
 Letter of Credit
 Line of Credit

(d) Statement of Intent (public entities only)

*May not be used in combination with any other instrument.

APPENDIX C

CHECKLIST FOR SUBMISSION OF SURETY/INSURANCE/PARENT COMPANY GUARANTEE

A. Check Appropriate Form of Surety/Insurance/Guarantee

- Surety Bond
- Letter of Credit
- Line of Credit
- Parent Company Guarantee/Financial Test*
- Insurance

B. Check Documents Submitted for Surety/Insurance/Guarantee

1. Surety Bond
 - Surety Bond
 - Standby Trust Agreement
 - Acknowledgement
2. Letter of Credit
 - Letter of Credit *Identical wording Draft included (unsigned, unexecuted)*
 - Standby Trust Agreement → NOT Included
 - Acknowledgement
3. Line of Credit
 - Verification
 - Standby Trust Agreement
 - Acknowledgement
4. Parent Company Guarantee
 - Letter from Chief Executive Officer of Applicant or Licensee
 - Letter from Chief Financial Officer of Parent Company
 - Financial Test: Alternative [I or II]
 - Auditor's Special Report and Attached Schedule
 - Corporate Guarantee
 - Standby Trust Agreement
 - Acknowledgement
5. Insurance
 - Certificate of Insurance
 - Standby Trust Agreement
 - Acknowledgement

May not be used in combination with any other instrument.

EXHIBIT 3-7

CHECKLIST OF CRITERIA FOR REVIEW OF LETTERS OF CREDIT

- WA ✓ Copy of corporate by-laws or other evidence indicating that parties signing the financial instrument (for the applicant) are authorized to represent the organization in the transaction.
- NOT signed • Evidence that the financial instrument is an originally signed duplicate (e.g., an executed copy of the instrument).
- No Financial institution specified • Evidence that the financial institution is regulated by Federal or State agency (e.g., member of FDIC, Federal Reserve System, etc.).
- ✓ • The instrument must be entitled ^{irrevocable} ~~a~~ letter of credit.
- Amount not specified • The letter should be limited in amount.
- No dates • The letter of credit must contain a specified expiration date or be written for a definite term, + ^{automatically} renewable
- ✓ • The issuer's obligation to pay the beneficiary should arise only upon presentation of a draft or other documents specified in the letter of credit.
- ✓ • The bank must not be called upon to determine a question of fact or law at issue between the licensee and the Commission or State regulatory agency.
- ✓ • The licensee should have an unqualified obligation to reimburse the issuer for payments made under the letter of credit.
- Standard working, but no standby trust agreement included • The letter of credit must be payable to a standby trust

ATTACHMENT A
License Limits

2.9 The licensee shall not possess at any one time isotopes in excess of the following:

a) Normal Form:

<u>Radionuclide</u>	<u>Quantity (mCi)</u>	<u>Radionuclide</u>	<u>Quantity (mCi)</u>
Am-241	3.0	Nb-95	5,000.0
Sb-124	1,000.0	P-32	1,500.0
Ba-140	2,000.0	Pu-238	1.0
Cd-113m	1,500.0	Pu-239	1.0
Ca-45	8,000.0	Po-210	32.0
C-14	13,000.0	Pm-147	3,500.0
Cs-134	350.0	Ru-103	1,500.0
Cs-137	600.0	Ru-105	1,500.0
Cr-51	15,000.0	Sc-46	2,500.0
Co-60	4,000.0	Se-75	5,000.0
Cu-64	5,000.0	Ag-110m	500.0
Au-198	10,000.0	Sr-90	250.0
H-3	1,500,000.0	S-35	500.0
I-125	800.0	Ta-182	1,500.0
I-129	100.0	Tc-99m	20,000.0
I-131	330.0	Tl-204	3,000.0
Ir-192	5,000.0	Tm-170	1,000.0
Fe-55	3,000.0	Th-228	30.0
Fe-59	2,400.0	Sn-113	1,000.0
Kr-85	70,000.0	Sn-123	1,000.0
Mn-54	1,500.0	W-187	5,000.0
Mn-56	1,200.0	U-233	5.0
Mo-99	3,000.0	Xe-133	10,000.0
Np-237	2.0	Zn-65	2,500.0
Ni-63	5,000.0	Zr-93	5,000.0

b) Normal Form:

Any isotope Z-3 through Z-83 inclusive, not included in a) above limited to 1 curie each.

c) Special Form:

Any isotope Z-3 through Z-83 inclusive, limited to 10X the limits specified in a) above or 10 curies if not specified in a) above.

d) Any Form:

Source material not listed in a) above, limited to 12,500 lbs.

e) Any Form:

Special nuclear material not listed in a) above limited to 200 grams.

Date: _____ Initials: _____

Reviewed: _____

Revised: 11/91



JUL 06 1992

License Nos. 29-00055-02, 29-00055-06, 29-00055-14, 29-00055-15, and SNM-107
Docket Nos. 030-05218, 030-05219, 030-08681, 030-14482, and 070-00124
Control Nos. 113092, 113093, 113094, 113095, and 113096

MEMORANDUM: Louis M. Bykoski, NRC Project Officer
Low Level Waste Management, Low Level Regulatory Branch

FROM: John D. Kinneman, Site Decommissioning Management
Program Task Force, Division of Radiation Safety
and Safeguards

SUBJECT: FINANCIAL ASSURANCE SUBMITTAL TELEDYNE
ISOTOPES, INC.

Teledyne has provided the two documents listed as enclosures. Do these two documents meet the requirements for a decommissioning funding plan?

Please refer to the above docket and control numbers in your reply.

Original Signed By
John D. Kinneman

John D. Kinneman, Chief
Site Decommissioning Management
Program Task Force
Division of Radiation Safety
and Safeguards

Enclosures:

1. Letter and attachment (DFP) from Teledyne Isotopes, Inc. to Region I dated November 15, 1991
2. Letter and attachment (DFI) from Teledyne Isotopes, Inc. to Region I dated November 22, 1991

cc:
J. Glenn, NMSS

bcc:
J. Kinneman, RI
E. Reber, RI

DRSS/RI
~~Reber/gcb~~

DRSS/RI
Kinneman

5/18/92

3/1/92

November 22, 1991

Mr. John Kinneman
US Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

Licenses Nos. 29-00055-02, 29-00055-06, 29-00055-14, 29-00055-15, SNM-107, and SUB-1235

Docket Nos. 030-05218, 030-05219, 020-08681, 030-14482, 070-00124, and 040-08413

Control Nos. 113092, 113093, 113094, 113095, 113096, and 113097

Dear Mr. Kinneman:

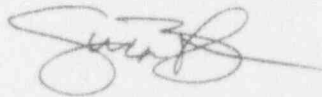
Continuing our response to your letter dated August 1, 1991, Teledyne Isotopes submits the following:

Item 1: Enclosed is Attachment F - Decommissioning Cost Estimate.

If you have any questions, please do not hesitate to contact me.

Sincerely,

TELEDYNE ISOTOPES



Steven A. Black, Manager
Radiological Services Department

SAB:jk
enc.

ATTACHMENT F

PLANNING AND PREPARATION
TABLE 1

Facility Name:

TELEDYNE ISOTOPES

Facility Address:

50 Van Buren Avenue, Westwood, NJ

Work Hours

Planning & Preparation Tasks	Manager	H.P. Supv.	H.P. Tech.	R.W. Tech.	Clerical	Total Hrs.	Total Cost
Preparation of documentation for Regulatory Agencies	20	40			40	100	\$2,996
Submittal of Decom. Plan to NRC when Required	40	120			20	180	\$6,468
Development of Work Plans	40	120			60	220	\$7,084
Procuring of Special Equip.	4	8	8		8	28	\$767
Staff Training	8	16	16			40	\$1,288
Characterization of Radiological Condition of the Facility (Inc. soil & water analyses)	8	16	320			344	\$7,672
TOTALS	120	320	344		128	912	\$26,275

TABLE 2
Salaries

Facility Name:

TELEDYNE ISOTOPES

Worker Classification:	Salaries (\$/hour)	Overhead Rate (%)	Worker Cost/Hour
Manager	\$35.00	140%	\$49.00
H.P. Supv.	\$25.00	140%	\$35.00
H.P. Tech.	\$15.00	140%	\$21.00
R.W. Tech.	\$15.00	140%	\$21.00
Clerical	\$11.00	140%	\$15.40

**DECONTAMINATION and/or DISMANTLING
of RADIOACTIVE FACILITY COMPONENTS**

Facility Name:

TELEDYNE ISOTOPES

Assumptions for this facility:

	Disposal
% Class A	98.0%
% Class B	1.0%
% Class C	1.0%

Volume Estimates for Facility:

(In cubic feet after compaction)

	10CFR Part 61 Waste Class			
	Total Vol.	Class A	Class B	Class C
	1545.15	1514.25	15.45	15.45

Volume reduction factor: 3

We have applied a 3:1 volume reduction for the waste generated from all decontamination activities. See the notes on the Itemization Worksheets which declare whether the wastes are non-compactible.

TABLE 3

Decon./Dismantle Labor Estimate

Facility Name: TELEDYNE ISOTOPES

	Manager	H.P. Supv.	H.P. Tech.	R.W. Tech.	Clerical	Total Hrs.	Total Labor Costs
Decontamination & Dismantling	20	40	640		40	740	\$16,436
Radioactive Waste Packaging/Handling	20	20		80	20	140	\$3,668
Re-characterization of Radiological Condition of the Facility (after D&D)	8	16	160		20	204	\$4,620
TOTALS	48	76	800	80	80	1084	\$24,724

TABLE 4
Equipment List

Facility Name:

TELEDYNE ISOTOPEs

Quantity	Unit Cost	Purchase Cost	Rental per day	Rental Total	Quantity Available
----------	-----------	---------------	----------------	--------------	--------------------

Equipment/Supply:

All equipment is already owned by Teledyne Isotopes. No additional expenditures are necessary.

PACKAGING, SHIPPING, AND DISPOSAL
OF RADIOACTIVE WASTES

Facility Name:

TELEDYNE ISOTOPES

TABLE 5
Radioactive waste disposal costs.

	Container	Transp.	Disposal	Surcharge	TOTAL
Average per cubic foot costs	\$4.00	\$3.71	\$35.00	\$120.00	\$162.71
Total facility waste disposal costs	1545.15	cu. ft. @	\$162.71	=	\$251,411.90

TABLE 6
Summary of Costs

Facility Name:

TELEDYNE ISOTOPES

	Cost
<i>Planning and Preparation Labor - Table 1</i>	\$26,275.20
<i>Decontam./Dismantling Labor - Table 3</i>	\$24,724.00
<i>Equipment - Table 4</i>	\$0.00
<i>Radioactive Waste Disposal - Table 5</i>	\$251,411.90

GRAND TOTAL DECOMMISSIONING COST \$302,411.10

**ITEMIZATION WORKSHEET
FOR ROOM #102B**

Facility Name:

TELEDYNE ISOTOPES

	Quantity	X-Dimen.	Y-Dimen.	Z-Dimen.	Volume	Waste Volume
Item:						
Fume Hood Type A					0.00	
Fume Hood Type B					0.00	
Fume Hood Type C					0.00	
Fume Hood Type D					0.00	
Lab Benches Type A					0.00	
Lab Benches Type B					0.00	
Sink and Drains					0.00	
Amount of Floor Space					0.00	
Ventillation Ductwork					0.00	
Amount of Wall Space					0.00	
Other: Sr-90 sources	2 sources				0.67	0.67
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
ROOM TOTALS:						0.67 cubic feet of radioactive waste

These items will not be volume reduced.

The only use is the Sr-90 source(s) use in our TLD badge readers. Class B Stable Waste.

ITEMIZATION WORKSHEET
FOR ROOM #102C

Facility Name: TELEDYNE ISOTOPES

Quantity X-Dimen. Y-Dimen. Z-Dimen. Volume Waste Volume

Item:

Fume Hood Type A				0.00	
Fume Hood Type B				0.00	
Fume Hood Type C				0.00	
Fume Hood Type D				0.00	
Lab Benches Type A				0.00	
Lab Benches Type B				0.00	
Sink and Drains				0.00	
Amount of Floor Space				0.00	
Ventilation Ductwork				0.00	
Amount of Wall Space				0.00	
Other:				0.00	
Other:				0.00	
Other:				0.00	
Other:				0.00	
Other:				0.00	
Other:				0.00	
Other:				0.00	
Other:				0.00	
Other:				0.00	

The only use is the Sr-90 source(s) which are covered under Room 102B.

ROOM TOTALS:

0.00 cubic feet of radioactive waste

ITEMIZATION WORKSHEET
FOR ROOM #108A

Facility Name:

TELEDYNE ISOTOPES

	Quantity	X-Dimen.	Y-Dimen.	Z-Dimen.	Volume	Waste Volume
Item:						
Fume Hood Type A					0.00	
Fume Hood Type B					0.00	
Fume Hood Type C					0.00	
Fume Hood Type D					0.00	
Lab Benches Type A					0.00	
Lab Benches Type B					0.00	
Sink and Drains					0.00	
Amount of Floor Space					0.00	
Ventillation Ductwork					0.00	
Amount of Wall Space					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
<div style="border: 1px solid black; padding: 5px; display: inline-block;"> The only use is the Sr-90 source(s) which are covered under Room 102B. </div>						
ROOM TOTALS:					0.00 cubic feet of radioactive waste	

ITEMIZATION WORKSHEET
FOR ROOM #124A

Facility Name:

TELEDYNE ISOTOPES

	Quantity	X-Dimen.	Y-Dimen.	Z-Dimen.	Volume	Waste Volume
Item:						
Fume Hood Type A					0.00	
Fume Hood Type B					0.00	
Fume Hood Type C					0.00	
Fume Hood Type D					0.00	
Lab Benches Type A					0.00	
Lab Benches Type B					0.00	
Sink and Drains					0.00	
Amount of Floor Space					0.00	
Ventillation Ductwork					0.00	
Amount of Wall Space					0.00	
Other: check sources and standards	1				1.00	0.33
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
ROOM TOTALS:					0.33 cubic feet of radioactive waste	

The check sources and standards may amount to 1 cubic foot of radwaste combined.

ITEMIZATION WORKSHEET
FOR ROOM #1201/203

Facility Name: TELEDYNE ISOTOPE

Quantity X-Dimen. Y-Dimen. Z-Dimen. Volume Waste Volume

Item:

Fume Hood Type A				0.00	
Fume Hood Type B				0.00	
Fume Hood Type C				0.00	
Fume Hood Type D				0.00	
Lab Benches Type A				0.00	
Lab Benches Type B				0.00	
Sink and Drains				0.00	
Amount of Floor Space				0.00	
Ventilation Ductwork				0.00	
Amount of Wall Space				0.00	
Other:				0.00	
Other:				0.00	
Other:				0.00	
Other:				0.00	
Other:				0.00	
Other:				0.00	
Other:				0.00	
Other:				0.00	
Other:				0.00	
Other:				0.00	

We do not expect any waste from these operations.

ROOM TOTALS:

0.00 cubic feet of radioactive waste

**ITEMIZATION WORKSHEET
FOR ROOMS #202/204E**

Facility Name:

TELEDYNE ISOTOPES

Quantity X-Dimen. Y-Dimen. Z-Dimen. Volume Waste Volume

Item:

Fume Hood Type A					0.00	
Fume Hood Type B					0.00	
Fume Hood Type C					0.00	
Fume Hood Type D					0.00	
Lab Benches Type A					0.00	
Lab Benches Type B					0.00	
Sink and Drains					0.00	
Amount of Floor Space					0.00	
Ventillation Ductwork					0.00	
Amount of Wall Space					0.00	
Other: Standards and spikes	1				7.50	7.50
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	

These items will not be
volume reduced.

The standards and spikes will be solidified
into a Class B stable waste.

ROOM TOTALS:

7.50 cubic feet of radioactive waste

ITEMIZATION WORKSHEET
FOR ROOM #202A

Facility Name:

TELEDYNE ISOTOPES

	Quantity	X-Dimen.	Y-Dimen.	Z-Dimen.	Volume	Waste Volume
item:						
Fume Hood Type A					0.00	
Fume Hood Type B					0.00	
Fume Hood Type C					0.00	
Fume Hood Type D					0.00	
Lab Benches Type A					0.00	
Lab Benches Type B					0.00	
Sink and Drains					0.00	
Amount of Floor Space					0.00	
Ventillation Ductwork					0.00	
Amount of Wall Space					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
					0.00	
ROOM TOTALS:						0.00 cubic feet of radioactive waste

We do not expect any waste from these operations.

ITEMIZATION WORKSHEET
FOR ROOM #202C

Facility Name:

TELEDYNE ISOTOPES

	Quantity	X-Dimen.	Y-Dimen.	Z-Dimen.	Volume	Waste Volume
Item:						
Fume Hood Type A					0.00	
Fume Hood Type B					0.00	
Fume Hood Type C					0.00	
Fume Hood Type D					0.00	
Lab Benches Type A					0.00	
Lab Benches Type B					0.00	
Sink and Drains					0.00	
Amount of Floor Space					0.00	
Ventilation Ductwork					0.00	
Amount of Wall Space					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
					0.00	
ROOM TOTALS:						0.00 cubic feet of radioactive waste

Any wastes are included with room 202/202E.

ITEMIZATION WORKSHEET
FOR ROOM #204D

Facility Name:

TELEDYNE ISOTOPE

Item:	Quantity	X-Dimen.	Y-Dimen.	Z-Dime	Volume	Waste Volume
Fume Hood Type A					0.00	
Fume Hood Type B					0.00	
Fume Hood Type C					0.00	
Fume Hood Type D					0.00	
Lab Benches Type A					0.00	
Lab Benches Type B					0.00	
Sink and Drains					0.00	
Amount of Floor Space					0.00	
Ventillation Ductwork					0.00	
Amount of Wall Space					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
ROOM TOTALS:						0.00 cubic feet of radioactive waste

Any wastes are included with room
202/202E.

ITEMIZATION WORKSHEET
FOR ROOM #204

Facility Name:

TELEDYNE ISOTOPES

Item:	Quantity	X-Dimen.	Y-Dimen.	Z-Dimen.	Volume	Waste Volume
Fume Hood Type A					0.00	
Fume Hood Type B					0.00	
Fume Hood Type C					0.00	
Fume Hood Type D					0.00	
Lab Benches Type A					0.00	
Lab Benches Type B					0.00	
Sink and Drains					0.00	
Amount of Floor Space					0.00	
Ventilation Ductwork					0.00	
Amount of Wall Space					0.00	
Other: Sr-90 sources					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
ROOM TOTALS:						0.00 cubic feet of radioactive waste

We do not expect any waste from these operations.

ITEMIZATION WORKSHEET	Facility Name:	TELEDYNE ISOTOPES
FOR ROOMS #207/209/209A/210/210A		

	Quantity	X-Dimen.	Y-Dimen.	Z-Dimen.	Volume	Waste Volume
Item:						
Fume Hood Type A					0.00	
Fume Hood Type B					0.00	
Fume Hood Type C					0.00	
Fume Hood Type D					0.00	
Lab Benches Type A					0.00	
Lab Benches Type B					0.00	
Sink and Drains					0.00	
Amount of Floor Space					0.00	
Ventillation Ductwork					0.00	
Amount of Wall Space					0.00	
Other: Standards and spikes	1				4.01	1.34
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
ROOM TOTALS:						1.34 cubic feet of radioactive waste

The standards and spikes may amount to
4.01 cubic foot of radwaste combined.

**ITEMIZATION WORKSHEET
FOR ROOM #208**

TELEDYNE ISOTOPES

Facility Name:

Quantity X-Dimen. Y-Dimen. Z-Dimen. Volume Waste Volume

Item:

- Fume Hood Type A
- Fume Hood Type B
- Fume Hood Type C
- Fume Hood Type D
- Lab Benches Type A
- Lab Benches Type B
- Sink and Drains
- Amount of Floor Space
- Ventilation Ductwork
- Amount of Wall Space

0.00
0.00
0.00
0.00
0.00
0.00
0.00
0.00
0.00
0.00
0.00
0.00
0.00
0.00
0.00
0.00
0.00
0.00
0.00
0.00

- Other:
- Other:
- Other:
- Other:
- Other:
- Other:
- Other:

We do not expect any waste from these operations.

ROOM TOTALS:

0.00 cubic feet of radioactive waste

**ITEMIZATION WORKSHEET
FOR ROOMS #413/413A**

Facility Name:

TELEDYNE ISOTOPES

	Quantity	X-Dimen.	Y-Dimen.	Z-Dimen.	Volume	Waste Volume
Item:						
Fume Hood Type A					0.00	
Fume Hood Type B					0.00	
Fume Hood Type C					0.00	
Fume Hood Type D					0.00	
Lab Benches Type A					0.00	
Lab Benches Type B					0.00	
Sink and Drains					0.00	
Amount of Floor Space					0.00	
Ventilation Ductwork					0.00	
Amount of Wall Space					0.00	
Other: Gamma check sources	1				0.67	0.22
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
ROOM TOTALS:						0.22 cubic feet of radioactive waste

The combined volume of radioactive waste would fill a 5-gallon pail.

ITEMIZATION WORKSHEET
FOR ROOM #510

Facility Name:

TELEDYNE ISOTOPES

	Quantity	X-Dimen.	Y-Dimen.	Z-Dimen.	Volume	Waste Volume
Item:						
Fume Hood Type A					0.00	
Fume Hood Type B					0.00	
Fume Hood Type C					0.00	
Fume Hood Type D					0.00	
Lab Benches Type A					0.00	
Lab Benches Type B					0.00	
Sink and Drains					0.00	
Amount of Floor Space					0.00	
Ventillation Ductwork					0.00	
Amount of Wall Space					0.00	
Other: un-releasable gemstones	1				0.67	0.67
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
ROOM TOTALS:						0.67 cubic feet of radioactive waste

These items will not be
volume reduced.

The combined volume of radioactive waste
would fill a 5-gallon pail.

**ITEMIZATION WORKSHEET
FOR ROOMS #512/513/516**

Facility Name:

TELEDYNE ISOTOPES

Quantity X-Dimen. Y-Dimen. Z-Dimen. Volume Waste Volume

Item:

Fume Hood Type A					0.00	
Fume Hood Type B					0.00	
Fume Hood Type C					0.00	
Fume Hood Type D					0.00	
Lab Benches Type A					0.00	
Lab Benches Type B					0.00	
Sink and Drains					0.00	
Amount of Floor Space					0.00	
Ventillation Ductwork					0.00	
Amount of Wall Space					0.00	

These items will not be
volume reduced.

Other: Check source, LSC standards, and microcurie calibration sources.

1

1.00 .00

Other:

0.00

Other:

0.00

Other:

0.00

Other:

0.00

Other:

0.00

Other:

0.00

Other:

0.00

The combined volume of radioactive dry waste would fill a 5-gallon pail. The LSC standards would be disposed separately.

ROOM TOTALS:

1.00 cubic feet of radioactive waste

ITEMIZATION WORKSHEET
FOR ROOMS #602/604

Facility Name:

TELEDYNE ISOTOPES

Item:	Quantity	X-Dimen.	Y-Dimen.	Z-Dimen.	Volume	Waste Volume	
Fume Hood Type A	4	3.5	4.0	5.0	280.00	93.33	← 1/3 compaction/vol reduces
Fume Hood Type B	1	3.5	3.0	5.0	52.50	17.50	←
Fume Hood Type C					0.00		
Fume Hood Type D					0.00		
Lab Benches Type A	7	3.5	15.0	0.8	306.25	102.08	← 1/3
Lab Benches Type B					0.00		
Sink and Drains	4	3.0	2.0	2.0	48.00	16.00	← 1/3
Amount of Floor Space					0.00		
Ventilation Ductwork	55	1.8	1.0	1.0	96.25	32.08	← 1/3
Amount of Wall Space					0.00		← 1/3
Other: Additional ductwork	5				97.50	32.50	
Other:					0.00		
Other:					0.00		
Other:					0.00		
Other:					0.00		
Other:					0.00		
Other:					0.00		
Other:					0.00		
Other:					0.00		
ROOM TOTALS:						293.50	cubic feet of radioactive waste

Floors and walls are assumed to be clean based on past surveys.

**ITEMIZATION WORKSHEET
FOR ROOMS # 605/608**

Facility Name:

TELEDYNE ISOTOPES

	Quantity	X-Dimen.	Y-Dimen.	Z-Dimen.	Volume	Waste Volume
Item:						
Fume Hood Type A					0.00	
Fume Hood Type B					0.00	
Fume Hood Type C					0.00	
Fume Hood Type D					0.00	
Lab Benches Type A					0.00	
Lab Benches Type B					0.00	
Sink and Drains					0.00	
Amount of Floor Space					0.00	
Ventillation Ductwork					0.00	
Amount of Wall Space					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
ROOM TOTALS:						0.00 cubic feet of radioactive waste

We do not expect any waste from these operations.

**ITEMIZATION WORKSHEET
FOR ROOM #606**

Facility Name:

TELEDYNE ISOTOPES

	Quantity	X-Dimen.	Y-Dimen.	Z-Dimen.	Volume	Waste Volume
Item:						
Fume Hood Type A					0.00	
Fume Hood Type B					0.00	
Fume Hood Type C					0.00	
Fume Hood Type D					0.00	
Lab Benches Type A					0.00	
Lab Benches Type B					0.00	
Sink and Drains					0.00	
Amount of Floor Space					0.00	
Ventillation Ductwork					0.00	
Amount of Wall Space					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
ROOM TOTALS:						0.00 cubic feet of radioactive waste

We do not expect any waste from these operations.

ITEMIZATION WORKSHEET
FOR ROOM #607

Facility Name:

TELEDYNE ISOTOPES

	Quantity	X-Dimen.	Y-Dimen.	Z-Dimen.	Volume	Waste Volume
Item:						
Fume Hood Type A					0.00	
Fume Hood Type B					0.00	
Fume Hood Type C					0.00	
Fume Hood Type D					0.00	
Lab Benches Type A					0.00	
Lab Benches Type B					0.00	
Sink and Drains					0.00	
Amount of Floor Space					0.00	
Ventilation Ductwork					0.00	
Amount of Wall Space					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
					0.00	
ROOM TOTALS:						0.00 cubic feet of radioactive waste

We do not expect any waste from these operations.

**ITEMIZATION WORKSHEET
FOR ROOM #614A**

Facility Name: **TELEDYNE ISOTOPIES**

Item:	Quantity	X-Dimen.	Y-Dimen.	Z-Dimen.	Volume	Waste Volume
Fume Hood Type A	1	3.0	4.0	4.3	51.00	17.00
Fume Hood Type B	2	3.0	4.2	5.0	124.80	41.60
Fume Hood Type C					0.00	
Fume Hood Type D					0.00	
Lab Benches Type A	1	3.5	15.0	0.3	13.13	4.38
Lab Benches Type B	1	7.0	5.4	0.3	9.45	3.15
Sink and Drains	3				0.00	
Amount of Floor Space	1				15.00	5.00
Ventilation Ductwork	1	1.0	1.0	72.0	72.00	24.00
Amount of Wall Space	0				0.00	
Other: miscellaneous tables	2				4.00	1.33
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	

96.46 cubic feet of radioactive waste

ROOM TOTALS:

**ITEMIZATION WORKSHEET
FOR ROOM #617**

Facility Name: TELEDYNE ISOTOPES

Quantity X-Dimen. Y-Dimen. Z-Dimen. Volume Waste Volume

Item:

- Fume Hood Type A
- Fume Hood Type B
- Fume Hood Type C
- Fume Hood Type D
- Lab Benches Type A
- Lab Benches Type B
- Sink and Drains
- Amount of Floor Space
- Ventilation Ductwork
- Amount of Wall Space

1

Other: Miscellaneous work surfaces				15.00	5.00
Other:				0.00	
Other:				0.00	
Other:				0.00	
Other:				0.00	
Other:				0.00	
Other:				0.00	
Other:				0.00	

ROOM TOTALS:

5.00 cubic feet of radioactive waste

**ITEMIZATION WORKSHEET
FOR ROOM #621A**

Facility Name: **TELEDYNE ISOTOPES**

Quantity X-Dimen. Y-Dimen. Z-Dimen. Volume Waste Volume

Item:

- Fume Hood Type A
- Fume Hood Type B
- Fume Hood Type C
- Fume Hood Type D
- Lab Benches Type A
- Lab Benches Type B
- Sink and Drains
- Amount of Floor Space
- Ventilation Ductwork
- Amount of Wall Space

These items will not be
volume reduced.

Other: Miscellaneous Sealed Sources	1				22.50	22.50
Other: safe	1				45.00	45.00
Other:					0.00	0.00
Other:					0.00	0.00
Other:					0.00	0.00
Other:					0.00	0.00
Other:					0.00	0.00
Other:					0.00	0.00

ROOM TOTALS:

67.50 cubic feet of radioactive waste

ITEMIZATION WORKSHEET	Facility Name:	TELEDYNE ISOTOPES
FOR ROOMS #700/701/702/702A/703/704/705/707		

	Quantity	X-Dimen.	Y-Dimen.	Z-Dimen.	Volume	Waste Volume
Item:						
Fume Hood Type A	5	3.0	4.0	5.0	300.00	100.00
Fume Hood Type B					0.00	
Fume Hood Type C					0.00	
Fume Hood Type D					0.00	
Lab Benches Type A	3				45.00	15.00
Lab Benches Type B					0.00	
Sink and Drains	2				15.00	5.00
Amount of Floor Space					0.00	
Ventillation Ductwork	1				200.00	66.67
Amount of Wall Space					0.00	
Other: HEPA filter banks & filters	6	2.5	2.5	2.5	93.75	31.25
Other: Water Scrubber	1	4.0	10.0	4.0	160.00	53.33
Other: Glove box train	1	4.0	35.0	5.0	384.00	128.00
Other: Shielded glovebox	1	4.0	5.0	5.0	100.00	33.33
Other: Water scrubber pipes & tanks	1				22.50	7.50
Other: holding tanks	2	2.0	2.0	4.0	32.00	10.67
Other:					0.00	
Other:					0.00	
ROOM TOTALS:						450.75 cubic feet of radioactive waste

**ITEMIZATION WORKSHEET
FOR RADWASTE STORAGE FACILITY**

Facility Name:

TELEDYNE ISOTOPES

Item:	Quantity	X-Dimen.	Y-Dimen.	Z-Dimen.	Volume	Waste Volume
Fume Hood Type A					0.00	
Fume Hood Type B					0.00	
Fume Hood Type C					0.00	
Fume Hood Type D					0.00	
Lab Benches Type A					0.00	
Lab Benches Type B					0.00	
Sink and Drains					0.00	
Amount of Floor Space					0.00	
Ventillation Ductwork					0.00	
Amount of Wall Space					0.00	
Other: drums on hand	1				1000.00	666.67
Other: compactor & associated air handling systems	1				150.00	50.00
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	
Other:					0.00	

We have estimated that at any given time there is an average of 1000 cubic feet of waste on hand. Approximately half will be capable of volume reduction. There have been no spills in the warehouse and past surveys indicate that the walls and floor will be clean.

ROOM TOTALS:

716.67 cubic feet of radioactive waste

OFFICIAL RECORD COPY ML 10

113096

MS #16
L3

November 15, 1991

Mr. John Kinneman
US Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

Licenses Nos. 29-00055-02, 29-00055-06, 29-00055-14, 29-00055-15, SNM-107, and SUB-1235
Docket Nos. 030-05218, 030-05219, 020-08681, 030-14482, 070-00124, and 040-08413
Control Nos. 113092, 113093, 113094, 113095, 113096, and 113097

Dear Mr. Kinneman:

In response to your letter dated August 1, 1991, Teledyne Isotopes submits the following:

We have decided to submit one plan covering all of the above referenced licenses with the exception of SUB-13235. This license does not require a plan and we had requested the termination of this license in September.

Item 1: I have enclosed our Decommissioning Plan for all of the other licenses. However, I have not enclosed Attachment F - Decommissioning Cost Estimate because due to other commitments to the NRC, I was unable to finish it on time. I will forward this item to you within one week (by November 22, 1991).

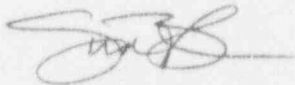
Item 2: We have not submitted the requested information as we have decided to fund the plan by Letter of Credit. We will obtain the Letter of Credit as detailed in the plan within 45 days of being notified by you of the acceptance of this plan.

Item 3: We do not choose to use the parent company guarantee as the financial instrument.

If you have any question, please do not hesitate to contact me.

Sincerely,

TELEDYNE ISOTOPES



Steven A. Black, Manager
Radiological Services Department

SAB:jk
enc.

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113096
11/12/91

DECOMMISSIONING FUNDING PLAN
FOR
TELEDYNE ISOTOPES

U.S. NRC LICENSE NOS.

29-00055-02

29-00055-06

29-00055-14

29-00055-15

29-00055-16E

SNM-107

PREPARED BY

 **TELEDYNE ISOTOPES**

STEVEN A. BLACK, R.S.O.

NOVEMBER 1991

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Floor Plans of 50 Van Buren Avenue (main building):	
Zones 1 & 2	
Zones 3 & 4	
Zones 5, 6, and 7	
Floor Plan of 103 Woodland Avenue (radioactive waste warehouse)	
Teledyne Isotopes RSC&QCM Pertinent Sections	Attachment H



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General Information & Overview

Teledyne Isotopes
50 Van Buren Avenue
Westwood, NJ 07675

U.S. NRC License Nos. 29-00055-02, 29-00055-06, 29-00055-14, 29-00055-15,
29-00055-16E, and SNM-107

Contact: Steven A. Black
Phone: 201-664-7070 ext.225

This document includes 1) a discussion of the site history and expected methods for performing the decommissioning of the facility; 2) a site-specific cost estimate for the decommissioning of the facility; 3) a description of the methods used to assure that there are adequate funds available for the decommissioning of the facility; and 4) a description of the methods that will be used to adjust the site-specific decommissioning cost estimate at periodic time intervals.



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2.0 Description of the Planned Decommissioning Activities

2.1 Decommissioning Objectives, Activities, Tasks, & Schedules

2.1.1 Decommissioning Objectives & Activities

The objective is to reduce radioactive contamination levels to below those specified in the U.S. Nuclear Regulatory Commission Regulatory Guide 1.86 entitled "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material", dated July 1982. The activities to be performed include the following:

- 1) Final update and review of the Decommissioning Plan
- 2) Disposal of any accumulated radioactive waste.
- 3) A preliminary survey to determine the extent of residual activity.
- 4) Decontamination, dismantling, demolition and/or packaging of contaminated objects & wastes from decontamination activities.
- 5) Disposal of any items which cannot be decontaminated and any waste produced from decommissioning activities.
- 6) A final survey for compliance with the above referenced document.
- 7) Submit a request for termination with a completed form NRC-314

2.1.2 Description

Teledyne Isotopes is a multi-faceted nuclear services company. We currently have six (6) U.S. Nuclear Regulatory Commission licenses covering a wide range of activities all involving the use of radioactive materials. These uses are performed mainly at 50 Van Buren Avenue and 103 Woodland Avenue in Westwood, NJ. However, the 29-00055-02, -06, and -14 licenses allow us to use licensed material at temporary job sites. Each license will be described in more detail in its individual section following the summary of uses table.

Summary of Authorized Uses - Table I

License No.	Authorized Use(s)
29-00055-02	<ul style="list-style-type: none"> a. To be used in the detection of movement of injected gas or hydrocarbon liquids in underground oil/gas, gas storage, and geothermal wells and reservoirs. b. To be used for determination of movement of injected water in underground oil/gas and geothermal wells and reservoirs. c. To be used for tracer studies on drilled core samples and for tagging oil-based drilling muds.
29-00055-06	<ul style="list-style-type: none"> a. For use in research & development as defined in Section 30.4(q), 10 CFR Part 30. b. Sample analysis. c. Calibration of instruments & dosimeters. d. Reference samples in tracer studies.
29-00055-14	<ul style="list-style-type: none"> a. For receipt, possession, and storage of packaged waste materials. b. For compaction and repackaging of packages of dry waste.
29-00055-15	<ul style="list-style-type: none"> a. For the decontamination of precious metals.
29-00055-16E	<ul style="list-style-type: none"> a. For the distribution of gemstones containing byproduct material in accordance with Section 32.11, 10 CFR Part 32, to persons exempt from licensing pursuant to Section 30.14, 10 CFR Part 30, or equivalent regulations of any Agreement State.
SNM-107	<ul style="list-style-type: none"> a. For use in research & development as defined in Section 70.4(j), 10 CFR Part 70 b. Sample analysis c. Calibration of instruments & dosimeters d. Reference samples in tracer studies

2.1.2.1 Description of 29-0055-02 Uses

As shown in the Table I above, all of the uses are for field services which we provide to oil/gas production and exploration companies. Licensed material rarely if ever is seen at our facility. Materials are only ordered for specific projects. Therefore, there is rarely any inventory of radioactive materials.

Prior to leaving a field site our technicians obtain sufficient smears to ensure there is no excessive residual contamination on any of the accessible surfaces. If a project is cancelled or modified prior to the injection(s), unused isotopes may be shipped to 50 Van Buren Avenue for storage until they can be used on another project or require disposal. Therefore, if this license required decommissioning, the estimated amount of waste is a maximum of two 55-gallon steel containers.

2.1.2.2 Description of 29-0055-06 Licensed Uses

This license covers a majority of our facility where licensed material is used. Included are all of the environmental and in-plant analysis laboratories, and the calibration room. Although this license covers a large area in terms of square feet, most of the activity is restricted to three areas: the in-plant lab, the alpha spectroscopy lab, and the calibration room. Please refer to Attachment H for diagrams of the areas in question.



2.1.2.3 Description of 29-0055-14 Licensed Uses

All of the materials licensed by our 29-00055-14 license are located at the 25 x 40 foot cinder block building located at 103 Woodland Avenue, Westwood, NJ. The uses include storage of pre-package radioactive wastes, and the compaction of properly prepared un-compacted radioactive wastes. As detailed in the license, only waste packaged in double 4-mil liners is acceptable for compaction. In this way, our technicians are not readily exposed to radioactive substances. Based on past surveys, which are done weekly, there will be little if any contamination to clean up. For our cost estimate for decommissioning purposes, we will assume that the compactor and associated ductwork must be disposed as radioactive waste. Also, we will assume that any given time that there is approximately 1000 cubic feet of waste in 55-gallon, 30-gallon and 5-gallon steel containers ready for transport to a disposal facility.

2.1.2.4 Description of 29-0055-15 Licensed Uses

This license covers the decontamination of precious metals. The amount of material on hand at any one time is extremely small. For decommissioning purposes we have estimated that there would be one 55-gallon container of miscellaneous radioactive waste. However, the glove box train and air handling systems will have to either be cleaned or disposed as waste. We have elected to use the disposal option utilizing supercompaction for cost estimation purposes. As most of the glove box and air handling volumes are empty, we expect at least a 10-to-1 volume reduction.

2.1.2.5 Description of 29-0055-16E Licensed Uses

This license covers the distribution of gemstones to persons exempt from licensing. As we must store any gemstones that cannot be released due to their activity, we estimate that there will be a maximum of one cubic foot of waste requiring disposal.

2.1.2.6 Description of SNM-107 Licensed Uses

Under this license we are limited to 250 grams of SNM. This material is used in six different hoods, in three different laboratories. Although there is usually a maximum of two or three 55-gallon drums of waste on hand at any one time, there will be wastes from decontamination or dismantling activities. We will use supercompaction on the fume hoods and ductwork to limit the final burial volumes.



2.1.3 Procedures

The written procedures which will be used will be approved by the persons specified in section 2.2 prior to the start of any hands-on Activities.

2.1.4 Schedules

The sequence of Activities is as follows:

- 1) Upon notification to proceed with the Decommissioning Plan, the persons specified in section 2.2 will determine if 1) the current Decommissioning Plan is still valid, 2) additional procedures will be written and approved, and 3) any additional training will be performed. Estimated time: 1 week.
- 2) Activities 2 & 3 will be performed within three weeks. Estimated time: 6 weeks. On-site waste materials may be held until all of the wastes from the decommissioning activities are packaged.
- 3) The results of the preliminary survey and a report should be processed within one month's time. At that time Activities 4 & 5 will commence. Estimated time: 4 weeks. Areas of concern will be decontaminated according to the enclosed procedures. It will be assumed that 50% of the material can be decontaminated. The volume of waste generated from the decontamination will be estimated to be 5% of the initial volume of the area or object. Walls or floors which cannot be decontaminated will be excavated to an approximate depth of three inches. These materials will be disposed as radioactive waste.
- 4) Activity 6 will follow all demolition, dismantling and disposal operations. Estimated time: 2 weeks.
- 5) The results of Activity 6 will be known and a final report prepared within two months of the completion of the survey. If the final survey indicates the need for additional decontamination, dismantling or disposal, then Activities 4, 5 and 6 will be repeated for the suspect areas.

2.2 Decommissioning Organization and Responsibilities

The person responsible for supervising the Decommissioning Plan is Steven A. Black of Teledyne Isotopes. He will be assisted by Scott Dennerlein and Michael Vala. Resumes can be found as Attachments B, C, and D. They will be responsible for every aspect of the Plan. If any one of these persons is unavailable at the time of the decommissioning, persons with similar experience and qualifications will be used. Further personnel descriptions can be found in sections 2.3 Training and 2.4 Contractor Assistance.

2.3 Training

Teledyne Isotopes personnel have been trained in accordance with the Radiation Safety Code & Quality Control Manual. See Attachment H for copies of the pertinent sections. In addition, all personnel involved in decommissioning activities that will wear respirators, will have had respirator training. Included in this training is the use and care of full face air purifying respirators and Self-Contained Breathing Apparatus (SCBA). If any new procedures are developed for use during the Decommissioning Plan, personnel will be trained accordingly prior to the implementation of the new procedure.



Contractor Assistance

Throughout this Plan, Teledyne Isotopes will rely on the expertise provided by Teledyne Isotopes personnel only. As we are actively involved in both decontamination and radioactive waste transport and processing, we have the appropriate expertise on staff to perform the necessary work. A team of one Health Physics supervisor and two Health Physics technicians will be used for on-site work. Waste removal operations will be performed by a Radwaste Supervisor and two Health Physics technicians.

All on-site operations will be conducted under Teledyne Isotopes's U.S. NRC licenses and the off-site radwaste operations will be performed under Teledyne Isotopes U.S. NRC License No. 29-00055-14. Laboratory analyses and material handling other than radwaste will be conducted under Teledyne Isotopes U.S. NRC license No. 29-00055-06.



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3.0 Description of Methods Used for the Protection of Occupational and Public Health and Safety

3.1 Facility Radiological History Information

Radiation surveys indicate that any contamination of the facility is limited in scope and area. Preliminary surveys indicate that most hood ductwork is not contaminated and will not require action under this plan. There have been no modifications to the facility which would have covered over residual radioactive contamination. Contamination is limited to certain hoods, glove boxes, air handling systems, and bench tops, all of which are readily identified.

There was an incident involving the spread of plutonium in 1983 in the precious metals decontamination area (license No. 29-00055-15) which was cleaned to below the limits specified in the U.S. Nuclear Regulatory Commission Regulatory Guide 1.86 "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material". This survey was reviewed first hand by L. Friedman of the U.S. NRC and it was fully documented to the U.S. NRC during the first quarter of 1984.

3.2 Ensuring that Occupational Exposures are As Low As Reasonably Achievable

All activities will be conducted in a manner which will keep exposures to personnel and the environment as low as reasonably achievable. There is little chance of an occupational exposure in excess of 10% of the limits to radiation workers based on the history of the facility. In addition, when taking into consideration whether an item should be decontaminated or disposed, more weight will be given to the disposal option where the costs are roughly equivalent.

3.3 Health Physics Program

Health Physics monitoring will include whole body TLD badges, urinalyses of radiation workers, air sampling for particulates, and the frisking of workers in and out of the exclusion zone during any dismantling or demolition. Smears will be taken around the exclusion zone at the end of each day that such activities are performed.

The preliminary contamination survey will be performed by first monitoring each piece of equipment identified in Table 3 for both fixed and removable radioactive contamination. The smears will be analyzed by appropriate counting techniques. All floors, benchtops, cabinets, drawers, and dust collecting surfaces in the designated areas will be surveyed for fixed and removable activity. Survey instruments available to be used for the fixed activity monitoring include Eberline Model PAC-4G's with AC-21 or 21B probes designed to reveal the presence of alpha or beta activity, respectively; and Ludlum Model 19 microR meters to determine dose rates. If these specific instruments are unavailable, instruments of comparable efficiency and effectiveness shall be used.

The disposal of all radioactive waste will be performed by Teledyne Isotopes personnel using the procedures found in Attachment A.

All decontamination, dismantling, demolition and/or packaging of contaminated objects and wastes from decontamination activities will be performed by Teledyne Isotopes personnel. It is assumed that the only procedures that will be used are the Equipment and Area Decontamination and radioactive waste packaging procedures. Air samples will be taken if any operations generate dust and they will be analyzed by the method most appropriate for the suspected radionuclides. If levels greater than 10% of the MPC are observed, personnel will be required to wear full face respirators fitted with radionuclide cartridges, and disposable coveralls, boots, and gloves.

A final survey for compliance with the "Guidelines for Decontamination..." will be done in selected areas if the preliminary survey indicates the need for any decontamination or dismantling. The same procedures identified previously in this section will be used here for the suspect areas.

3.4 **Contractor Personnel**

None.

3.5 **Radioactive Waste Management**

The disposal of all radioactive waste will be performed by Teledyne Isotopes personnel using the procedures found in Attachment A.



4.0

Planned Final Radiation Survey

All compliance surveys will consist of radiation monitoring of the walls, equipment, floor and dust collecting surfaces. Direct radiation surveys will be conducted with an Eberline Instrument PAC-4G gas proportional survey meter with a 50 cm² probe and a 500 cm² floor monitor designed to reveal the presence of alpha or low energy beta radiation. A micro-R meter, sensitive to gamma radiation, will be used to determine dose rates at representative areas of the facility. Removable radioactive contamination surveys will consist of smear samples taken by wiping approximately 200 cm² of surface area with an absorbant material in representative areas of the facility. Diagrams will be provided to identify where smear samples were taken. Smear samples will be analyzed by liquid scintillation counting or other appropriate methods with standards traceable to the National Institute of Standards and Technology.

Also see section 3.3.



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5.0

Funding

This Decommissioning Plan will be funded by providing a Letter of Credit. This value is the amount estimated to perform the complete decommissioning as detailed in this Plan. Annually the amount of the Letter of Credit will be adjusted according to the Consumer Price Index and any major change in the costs of disposal of radioactive waste.

The wording of the Letter of Credit will be comparable to that shown in Attachment E.

See Table 6 in Attachment F for the summary of costs.



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6.0

Physical Security Plan and Material Control And Accounting Plan Provisions in Place During Decommissioning

Due to the levels of activity allowed on this license and the security already in place to prevent unauthorized access to the facility, no additional precautions for security will be implemented during decommissioning activities.



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ATTACHMENT A



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III-2.0 RADIOACTIVE WASTE DISPOSAL

III-2.1 *Introduction to Radioactive Waste Licensing Section*

The procedures incorporated in this part cover provisions of Teledyne Isotopes' NRC License #29-00055-14 and New Jersey State License No. NJSL-10123, and other applicable local, state and federal laws, rules and regulations.

This license is for the pickup and transportation of prepackaged radioactive waste materials from customer's facilities. Dry waste packages may also be opened and compacted and repackaged in accordance with the procedures described herein.

III-2.2 *Licenses*

The following pages are copies of Teledyne Isotopes NRC License #29-00055-14 and New Jersey State License No. NJSL-10123, with the most recent amendments.

III-2.3 Training & Certification of Radioactive Waste Disposal Technicians

The purpose of this section is to establish procedures whereby individuals will be trained in all aspects of radioactive waste disposal regulations, techniques and procedures.

Due to the highly technical expertise required to enable an individual to perform a radioactive waste pickup-transfer, these procedures must be followed to insure the individual is qualified to perform these pickups/transfers. Due to the connection of DOT and NRC regulations both are covered in these procedures.

- 2.3.1 All radioactive waste technicians (drivers) are required to fill out the following forms before commencing work:

<u>Description</u>	<u>Form No.</u>
1. Application for employment	IWL-RW-217
2. State of violations	IWL-RW-218

- 2.3.2 An "Inquiry to State Agency for Driver's Record", Form IWL-RW-219 must be filled out by the supervisor and mailed along with the applicable fee.
- 2.3.3 Driver must take DOT written examination, Form IWL-RW-220, pp. 1-4. Upon completion of test, supervisor must grade and offer the correct answers to the driver. Supervisor must then issue a "Certificate of Written Examination", Form IWL-RW-221, to the driver.
- 2.3.4 Driver must be road tested on the equipment he is to use, documenting this on Form IWL-RW-222, "Driver Road Test".
- 2.3.5 Driver must be given a physical examination by a qualified physician using Form IWL-RW-223. Upon satisfactory completion of the physical, the driver will be given a copy of the bottom of Form IWL-RW-223 entitled "Medical Examiner's Certificate".
- 2.3.6 User Request Form IWL-HP-06 is to be completed by the individual, his supervisor, and the Health Physics Section as detailed on the form.
- 2.3.7 All drivers are then indoctrinated in the basics of radiation safety, including, but not limited to, atomic structure, radiation units and the interaction of radiation with matter. The outline of the classroom instruction is presented on Form IWL-HP-07. Additional training on the use and calibration of portable radiation survey instruments, taking smears of shipping containers, performing the direct and removable contamination surveys for the vehicles, and other radiation safety items pertaining to the driver's job is also performed. A minimum total of eight hours of formal training will be provided for each driver. Persons authorized to conduct this training are: 1) the Radiation Safety Officer; 2) the Alternate Radiation Safety Officer; 3) any individual so authorized by the Radiation Safety Committee who has a minimum of a bachelor's degree from an accredited university and has been a driver themselves for at least two years.

- 2.3.8 Each driver is given a copy of the current Radiation Safety Manual, including Section III-2. He is to study this section and then is tested on his knowledge of the material using Form IWL-RW-224 entitled "Radioactive Waste Procedure Examination". It is graded by his supervisor and any wrong answers are clarified to his satisfaction.
- 2.3.9 Subsequent to the items above, each driver is subject to on-the-job training for a period of at least one week. This requires that either the supervisor, or another senior person capable of instructing all facets of the job, is physically present with the new employee throughout all phases of the pickup operation.
- 2.3.10 The person performing the training reports to the Radiation Safety Officer as to the competence of the new employee. If so required, additional supervised on-the-job training and classroom training are performed. Otherwise, the new employee is allowed to perform his job function with periodic spot checks on his performance made by his supervisor.
- 2.3.11 Annual retraining of the most current NRC, DOT and burial site regulations are performed. This is documented using Form IWL-RW-208 or a copy of a memo which lists the items discussed is kept in the driver's training file.
- 2.3.12 An "Annual Review of Driving Record" is performed and documented using Form IWL-RW-225 during the anniversary of each new employee, or at a conveniently scheduled time not to exceed thirteen months.
- 2.3.13 Each individual authorized by the Radiation Safety Officer to operate the radioactive waste compactor must have a thorough understanding of the procedures found in Section III-2.4.12 of the manual and our Respiratory Safety Manual IWL-8214-482. This will be documented on Form IWL-RW-206.

III-2.4 *Receiving, Transportation and Storage of Radioactive Waste*

The danger involved in picking up radioactive wastes is very small; however, to insure that all conditions of the applicable NRC, Agreement State, DOT and burial site regulations are complied with, these procedures will be strictly adhered to by all personnel while in the process of picking up radioactive wastes from any facility. A copy of this section will be located in each of the vehicles and in the warehouse.

2.4.1 Preparation for Pickup

- 2.4.1.1 Use the following checklist to insure you have the proper equipment.

CHECKLIST FOR RADIOACTIVE WASTE PICKUP (FORM IWL-RW-207)

Table A - Health Physics Equipment

- TLD Badge
- GM Survey Meters:
 - 1 - 50 mR/hr range with thin end window (e.g. E-120)
 - 1 - 1000 mR/hr range (e.g. E-130G)
- Filter papers or other absorbant paper

Date:

Initials:

Reviewed: _____

Revised: _____

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Table B - Department of Transportation Equipment

Driver's Log Book
 Radioactive Waste Delivery/Pickup Forms
 Radioactive Waste Manifest Forms
 Appropriate maps
 Work gloves

2.4.1.2 Miscellaneous equipment (e.g. Security Seals, ratchet wrench, waste manifest forms, screwdriver, portable 5-gallon pail sealing tool, labels: Rad I, II, and III, Flammable Liquid, etc., cash, credit cards, nuts, bolts, marker, pens, etc.).

2.4.1.3 Map out the route you intend to use.

2.4.1.4 Special Precautions:

Assure that no unauthorized bridge or tunnel is used. Be sure that you have the telephone numbers of all bridges/tunnels you intend to use which require advance notification. See Form IWL-RW-205 for a listing.

2.4.2 Traveling

2.4.2.1 Before departing and at the beginning of each day, perform the vehicle inspection as detailed in your driver's log book.

2.4.2.2 Be aware of your fuel supply at all times.

2.4.3 Receiving Waste

2.4.3.1 Upon arrival at the facility, contact the person the material is to be received from. In no case will material be received without a representative of the facility being present. If no authorized person is available, call the office (201-664-7070).

2.4.3.2 Don gloves.

2.4.3.3 Inspect drum, noting contents and packaging requirements. If drum does not appear to be packaged according to proper procedures, refuse acceptance and call the office. See Section II-8.0 for packaging procedures.


2.4.3.4 Open and inspect all containers labeled DCS or DCR prior to sealing them for transport. If any item is found not to be "dry", "solid", or "compactible", the container will be refused as a dry solid compactible drum.

2.4.3.5 Check response of the survey meter against the check source provided.

2.4.3.6 Monitor each container with the survey meters. Containers reading in excess of 200 mR/hr at the surface, or 10 mR/hr at one meter, must be repackaged before acceptance.

Date: _____ Initials: _____

Reviewed: _____

Revised: 11/91 

- 2.4.3.7 Swipe approximately 300 cm² of each container with the filter paper. Read each swipe with the E-120 end window GM counter. Containers with removable contamination in excess of 500 cpm/100 cm² must be decontaminated before acceptance. Please note that it is the shipper's responsibility for ensuring that the container is within the DOT limits for removable contamination which are specified in 49 CFR 173.443.
- 2.4.3.8 Ensure from customer representative that containers are not overloaded. Amount allowed depends on the transport groups. Remember we only handle Type A packages. See Form IWL-RW-209.
- 2.4.3.9 From the information obtained above, determine the type of labels required (e.g. Class I, II, III; Part 61 Class A,B, or C; STABLE or UNSTABLE; Radioactive LSA; or Radioactive). See Section II-8.2 for external packaging requirements.
- 2.4.3.10 Ensure that the Radioactive Waste Manifest (RWM) form is properly filled out. Obtain the representative's signature and date the RWM. Sign where indicated, remove customer copy, and return all other copies to Teledyne Isotopes.
- 2.4.3.11 Obtain properly executed Radioactive Waste Certification Statement (Form IWL-RW-204) from the customer.
- 2.4.3.12 Label drum. If the drum has not been labeled in accordance with Section II-8.3 (e.g. DCS, VXN, ACR, etc.), do so.
- 2.4.3.13 Label drum with appropriate NRC Part 61 waste Class obtained from the customer if not already provided.
- 2.4.3.14 Label drum with mR/hr reading if in excess of 10 mR/hr.
- 2.4.3.15 Seal containers tightly. If material is either "normal - Type A" or "special" form, incorporate a security seal.
- 2.4.3.16 Once any radioactive material is placed into the vehicles, all four placards must read RADIOACTIVE. Exception: If all containers have Radioactive I or II labels, security seals and meet DOT 7A type A packaging requirements, or if all the drums on the vehicle are limited quantity.

2.4.4 Transportation

- 2.4.4.1 Do not leave vehicle except in an extreme emergency. See Section III-2.4.7 through 2.4.9.
- 2.4.4.2 Follow traffic laws completely. No speeding.

2.4.5 Storage

- 2.4.5.1 Upon arrival at the warehouse, the containers will be loaded into the warehouse or onto the transport vehicle destined for the disposal facility.

Date:

Initials:

Reviewed: _____

Revised: _____

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- 2.4.5.2 Segregate all compactible waste containers and put them into the warehouse on pallets. These wastes are to be compacted when sufficient quantities have been received. Follow special "Procedure for Compacting Radioactive Waste" in Section III-2.4.12.
- 2.4.5.3 Remove "Radioactive" placards.
- 2.4.5.4 Monitor warehouse with E-120. No radiation level in excess of 0.5 mR/hr is acceptable at the exterior of the building.
- 2.4.5.5 Monitor vehicle - See Section 2.7.4.

NOTE: If activity found is in excess of the limits specified, notify the Radiation Safety Officer, who will then supervise the decontamination of the vehicle.

2.4.6 Radioactive Waste Pickup Report

Bring all Manifests and Certification Statements to the office and place in the appropriate Radioactive Waste In-Box.

2.4.7 Spillage

- 2.4.7.1 In case of spillage, prevent further spreading of contamination. This can be accomplished by pouring some "approved" absorbant on any liquid present. Cover to prevent scatter by wind.
- 2.4.7.2 If spillage occurs within a facility being visited, notify the Radiation Safety Officer or other authorized individual.
- 2.4.7.3 Notify Teledyne Isotopes at 201-664-7070 and ensure that one of the following is reached:

The Company Health Physicist
 The Radiation Safety Officer
 The Alternate Radiation Safety Officer
 Manager of Radiological Services Department
 Chairman of the Radiation Safety Committee

If the office is closed for the day, use the home phone numbers found in Section II-3.4.

- 2.4.7.4 At least one person should be stationed at the site to keep unauthorized personnel away from the contaminated area.

2.4.8 Vehicle Breakdown

- 2.4.8.1 In the event a breakdown occurs while the vehicle is transporting radioactive materials, accomplish the following in the order given:

Place one red reflective triangle at each of the following locations:

100 feet behind the vehicle in the center of the lane the vehicle occupies.

100 feet in front of the vehicle in the center of the lane the vehicle occupies.

10 feet in front or back of the vehicle on the traffic side.

- 2.4.8.2 Notify the local police. This can be done by stopping a passing motorist and having him notify the police. Make sure they give the police a detailed description of where the breakdown occurred.

- 2.4.8.3 The driver will not leave the vehicle unattended unless in an extreme emergency in which case the vehicle will be locked and the wheels should be chocked to prevent movement.

- 2.4.8.4 Notify Teledyne Isotopes. See Section 2.4.7.3.

- 2.4.8.5 If necessary, another vehicle will be dispatched to the scene of the breakdown and the radioactive material will be transferred to the replacement vehicle for transportation to the warehouse.

- 2.4.8.6 The disabled vehicle will then be towed to a garage for repairs.

2.4.9 Vehicle Accident

In the event an accident occurs, accomplish the following in the order given:

- 2.4.9.1 Exit the cab of the vehicle and take the Radioactive Waste Manifest Forms with you.

- 2.4.9.2 Assist any injured.

- 2.4.9.3 Isolate the area. If you can prevent the spreading of contamination, do so.

- 2.4.9.4 Notify Teledyne Isotopes as in Section 2.4.7.3.

- 2.4.9.5 Advise police and/or firemen of load contents.

- 2.4.9.6 The Radiation Safety Officer will take appropriate actions based on the situation. These actions might be any of the following if required

Determine the extent of damage and the hazards involved.

Direct removal of any radioactive materials involved.

Monitor the area to determine the extent of any contamination.

Date:

Initials:

Reviewed: _____

Revised: 11/91

- Direct decontamination operations if required.
- Direct removal of vehicle.
- Assist police and/or firemen in any way possible.
- Notify NRC or State Offices as soon as possible.
- Notify American Nuclear Insurers at 203-677-7715.

2.4.10 General Responsibilities

It will be the responsibility of each individual to notify his supervisor, in writing, immediately upon observing any situation or action which could be instrumental in causing an accident or incident of any kind. In an extreme emergency, the vehicle should be driven to the nearest dealer and any repairs needed should be performed.

2.4.11 Special Procedure: Shipping Radioactive Waste to US Ecology in Richland, Washington

2.4.11.1 Prior Notification

- * Request Tri-State Motor Transit (TSMT) to supply vehicle.
State date, time, place and destination
Telephone: 800-641-7591
- * Notify the State of New Jersey
State when, what carrier, route, curies and primary isotopes.
Telephone: 609-292-5586.

Exception: All shipments under 20 curies total are exempt from this requirement.

2.4.11.2 Loading and Monitoring the Vehicle

- * Use Form IWL-RW-210, "Radioactive Waste Shipment Checklist (RWSC)", when loading the vehicle. Note the last three digits (e.g. Trailer No. 440123, note #123) on the copies of the Radioactive Waste Manifest (RWM) forms.
- * Follow the general radiation safety procedures outlines in Section II of the Radiation Protection Manual during all loading and unloading operations.
- * Ensure all placards are in place.
- * Ensure load is braced and secured.

2.4.11.3 Compilation of Shipping Papers & Release of Shipment

* Before carrier arrives:

Using the Radioactive Waste Shipment Checklist, compile all the RWM forms on the load. Number each consecutively, enter date of shipment, carrier, and shipper's number.

Using the Shipment portion of the Radwaste Program, ship out all drums to the designated receiving facility.

Separate the transporter copy from all completed RWM forms and discard.

Fill out four (4) State of Washington Certifications (Form IWL-RW-215) and have R.S.O. or other authorized individual approve each.

Fill out one (1) Statement of Certification for the shipment. Make three (3) copies and attach one to each of the four (4) State of Washington Certification.

* After the carrier arrives:

Have the driver inspect the load for bracing and attach security seals to all access doors. Note on the "Exclusive Use Statement" and the "Bill of Lading" the Security Seal Numbers which are used. Make two copies.

Using Forms IWL-RW-201 and IWL-RW-202, monitor the vehicle and record readings.

Have the driver remove the filled trailer and replace with the empty trailer.

Have the driver sign four (4) copies of the State of Washington Certification (Form IWL-RW-215), the Bill of Lading and each Manifest where indicated.

Complete the Bill of Lading using information supplied by the driver.

Complete "Exclusive Use Statement".

2.4.11.4 Give the following items to the T.S.M.T. driver for T.S.M.T.:

Original Bill of Lading

Original of "Exclusive Use Statement" (IWL-RW-214)

One copy of the Manifests

Original of Forms IWL-RW-201 and IWL-RW-202.

Two originals of State of Washington Certification with Statement of Certifications attached. (Forms IWL-RW-215 and IWL-RW-227)

Date:

Initials:

Reviewed: _____

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2.4.11.5 Give the following items to the T.S.M.T. driver for US Ecology:

Bill of Lading "This Memorandum"
Copy of "Exclusive Use Statement" (IWL-RW-214)
Two original white copies of Manifests
Copies of Forms IWL-RW-201 and IWL-RW-202
One original of State of Washington Certification with Statement of
Certification attached (Forms IWL-RW-215 and IWL-RW-227)

2.4.11.6 Teledyne Isotopes -- retain the following items for our records:

Bill of Lading "This Shipping Order"
Copy of "Exclusive Use Statement" (IWL-RW-214)
Copies of Manifests
Copies of Forms IWL-RW-201 and IWL-RW-202
One original of State of Washington Certification with Statement of
Certification attached (Forms IWL-RW-215 and IWL-RW-227)
Copy of Burial Verification Certification (IWL-RW-230)

2.4.11.7 Final Notification

Notify by phone the receiving facility of date of shipment, expected date of arrival, vehicle number, trailer company, freight bill number, shipper's number, drivers' names and carrier (TSMT).

Mail the fourth set of Manifests to US Ecology in order to comply with the notification requirements.

2.4.11.8 LLRWPA Surcharges

Mail a check in the appropriate amount to cover the Low Level Radioactive Waste Policy Act surcharges and copies of the Pages 1 through 3 of the Manifest Tabulation sheets to the State of Washington if appropriate.

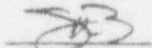
Date:

Initials:

Reviewed: _____

Revised: _____

11/91



2.4.12 Procedure for Compacting Waste

2.4.12.1 Description

The system consists of the Compacting Chamber, Control Panel, Air Exhaust & Filter System, Air Sampling System and Air Supply System. A diagram of our warehouse at 103 Woodland Avenue, Westwood, New Jersey is shown in Figure III-2.1. A list of the equipment is as follows:

- I. Compactor: Model 55AR-P RAM Flat with 21 CH compaction head and pneumatic controls - NEMA 4 Control Cabinet and explosion-proof motor, from S & G Enterprises
- II. Air Filter: Model CRN Air System from S & G Enterprises
- III. Air Supply System:
Series 605041 Portable Air Compressor and
Series 605003 Zephyair NIOSH Approved Constant flow compressed air masks.

Note: The wearing of a respirator is optional. See letter from U.S. NRC dated August 14, 1991 to S. Black signed by Glen Roberts for Thomas K. Thompson.

- IV. Air Sampling System:
Model AMS-3 with RAP-1 regulated pump from Eberline Corporation.

(NOTE: If the equipment listed is found to be unavailable, equivalent systems will be substituted.)

2.4.12.2 Waste

The waste to be compacted will be found in the area designated by floor markings in drums labeled DCS and DCR. Double check for labeling prior to opening drum.

2.4.12.3 Procedure

- 1) Put on protective clothing: disposable coveralls, rubber boots and/or shoe covers, and vinyl gloves.
- 2) *Turn on air supply system and put on respirator. *Optional - see 2.4.12.1.
- 3) Select a DCR or DCS container.
- 4) Inspect container for deformations, rust and holes. Any drum found unsatisfactory will not be used for compaction.
- 5) Place container onto drum dolly.
- 6) Remove cover.

Date:

Initials:

Reviewed: _____

Revised: _____

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- 7) Place into compaction chamber and close door.
- 8) Turn ON air sampling system and let it run until all compactions for the day are completed.
- 9) Turn ON compactor and let it cycle.
- 10) Enter on RadWaste Composite Compaction List (Form IWL-RW-216) the drum identification and generator id number.
- 11) Upon completion of cycle, select a new container and open.
- 12) Remove waste intact in the double 4 mil liners and place into the drum which is already in the compactor.

NOTE: If the waste from the new drum cannot all be compacted in the compacted drum, do not compact any additional waste into that drum. Seal the drum and select another drum in which to compact.

- 13) Continue with Step 9 until you have completed a drum.
- 14) Once all such drums have been compacted, all empty containers shall be swipe tested thoroughly inside and out. The swipes shall be analyzed for contamination by analysis appropriate for the isotopes contained.
- 15) Drums found to be clean shall have all markings and labels removed and put back into service. All drums which are found to be contaminated shall be decontaminated and resurveyed. The limits for contamination are as detailed in the US Nuclear Regulatory Commission's publication on the Decontamination of Facilities and Equipment prior to Release for Unrestricted Use or Termination of License for Byproduct, Source or Special Nuclear Material.
- 16) The decontamination area will consist of an area designated in the warehouse adjacent to the compaction area. It will have strippable paint applied to the surface which will be surveyed after each decontamination. Acceptable levels are as follows:

Fixed activity limits:

- Gross Alpha - 0.5 mR/hr at contact
- Gross Beta - 0.5 mR/hr at contact

Removable activity limits:

- Gross Alpha - 100 dpm/100 cm²
- Gross Beta - 500 dpm/100 cm²
- Tritium - 1000 dpm/100 cm²

- 17) Drums which have been completely compacted will be prepared for shipment. They will either be stored in the warehouse or loaded onto the transport vehicle.
- 18) General Notes:
- Only the compacted drum and one (1) other drum will be opened at any one time.
 - If a drum interior cannot be decontaminated to the designated levels, it will be used as a compaction drum.
 - There should be little chance of contamination as the waste will be contained within 8 mil of plastic (two 4 mil liners).
 - The air will be monitored continuously by the use of the Eberline AMS-3 air monitoring system during all compaction operations.
 - Any changes made concerning supplied air must be approved by the US Nuclear Regulatory Commission.
 - Filters will be changed on the CRN filter system at intervals recommended by the manufacturer or at intervals indicated by monitoring results.
 - The filter system is set up to exhaust to the outside of the building.
 - If there is any indication that a container has broken bags or other unsafe conditions, it will be resealed and shipped for burial as either a DMS or DMR drum.
 - Any decontamination materials will be placed in to 4 mil plastic bags and stored in a 30 gallon container for compaction at some future time.
 - For training, see Section III-2.3.13.

III-2.5 *Procurement of Supplies Related to Radioactive Waste Disposal*

The objective of this program is to assure that the materials and equipment meet with the specifications required by the NRC, DOT and/or burial site. Verification that what was ordered was actually received is performed by signing for the material on the packing slip which accompanies the shipment.

- 2.5.1 The drums are to be in compliance with DOT specification 7A. All drums ordered must be DOT 17H, DOT 17C, or DOT 6J. This is referenced on the Purchase Order and a copy of the same is to be kept on file by the Manager of the Radiological Services Department.
- 2.5.2 The absorbant used is one which is approved by the State of Washington for use at the US Ecology burial facility.
- 2.5.3 The poly liners ordered are to be a minimum of 4 mils thick. This is to be referenced on the Purchase Order, a copy of which is to be kept on file by the Manager of the Radiological Services Department.

III-2.6 *Management - Controlled Audits of Radioactive Material Packaging and Transport Activities*

Audits are required to maintain control and monitor compliance with company policy and regulatory agencies. Included in this Section are standardized auditing forms to comply with the auditing requirements.

- 2.6.1 These audits will be performed annually for each licensed activity which generates radioactive waste for disposal.
- 2.6.2 These audits will be performed by a sub-committee appointed by the the Chairman of the Radiation Safety Committee, comprised of at least two of the following:
 - Dr. D. F. Schutz, Chairman, Radiation Safety Committee
 - The Radiation Safety Officer
 - The Alternate Radiation Safety Officer
 - Any member of the Radiation Safety Committee
- 2.6.3 A checklist (Form IWL-RW-228) will be completed by the committee during a meeting with the manager or supervisor of the area of activity. The checklist is designed to establish quality assurance for:
 - Documentation
 - Training and Supervision
 - Operating Procedures
 - Working Conditions
- 2.6.4 Based on the entries on Form IWL-RW-228, an Evaluation of Audit (Form IWL-RW-229) is then completed. Actions required, actions completed, acceptance of audit, etc. are documented and then reviewed by the Radiation Safety Committee if appropriate.

	Date:	Initials:
	Reviewed: _____	_____
	Revised: <u>11/91</u>	<u>[Signature]</u>


III-2.7 *Procedures for Monitoring Radioactive Waste Facilities and Equipment*

- 2.7.1 Warehouse Survey - The warehouse is to be surveyed for both direct radiation levels and removable contamination approximately once each week. See limits for contamination listed in Section III-2.7.3. In addition to this routine survey, anytime a drum which has a radiation level in excess of 10 mR/hr at the surface is placed into the warehouse, an additional survey will be performed to determine that the radiation levels at the exterior of the building do not exceed 0.5 mR/hr @ six (6) inches.
- 2.7.2 Warehouse Air - The warehouse air will be sampled whenever compaction is being done. It will be analyzed for I-125, I-131, H-3, C-14, Gross Alpha and Gross Beta, if applicable. A sampler equipped with a charcoal filter, a millipore filter, and a bubbler will be used when required.

Air sampling will be performed at two locations: 1) in the vertical exhaust stack and 2) in the area the operator will usually occupy. The air sample for the effluent will be made by means of inserting copper tubing into the compactor exhaust duct after the filter, and making a downward bend. The average stack velocity (ASV) will be determined using the "center of equal area" technique. The tube will be placed at a point equalling the ASV. Using the ASV, the volume flow (CFM), and the velocity of the air sampling pump, the inside diameter of the sampling tube head will be determined. Note: based on an ASV of 800 CFM, a duct of 9" diameter and sampling pump rate of 1 CFM, the inside diameter of the sample tube would be approximately 5/16".

For the personnel sampler, sufficient volume flow will be used to detect, at a minimum, 10% of the values found in 10CFR Part 20 Appendix B for the major isotopes present. The instruments used to count the samples are Eberline models SAC-4 and MS-2, and Intertechnique Model SL-30. The SAC-4 alpha scintillation counter will be used for gross-alpha, the MS-2 gas proportional counter for gross beta, and the SL-30 liquid scintillation counter for C-14 and H-3. The charcoal tube will be analyzed for radioactive iodines by Teledyne Isotopes radiochemistry lab. All instruments are calibrated using standard sources traceable to the National Bureau of Standards (NBS).

- 2.7.3 Environmental Monitoring - Environmental TLD's are placed on the fence surrounding the building on each side at the closest point to the warehouse. These are evaluated every 3 months.

	Date:	Initials:
	Reviewed: _____	_____
	Revised: <u>11/91</u>	

2.7.4 Vehicle Surveys - Vehicles used to transport radioactive material will be surveyed at least monthly for both direct and removable contamination. Limits are as follows:

Fixed:

Gross Alpha - 0.5 mR/hr @ 1 cm
Gross Beta - 0.5 mR/hr @ 1 cm

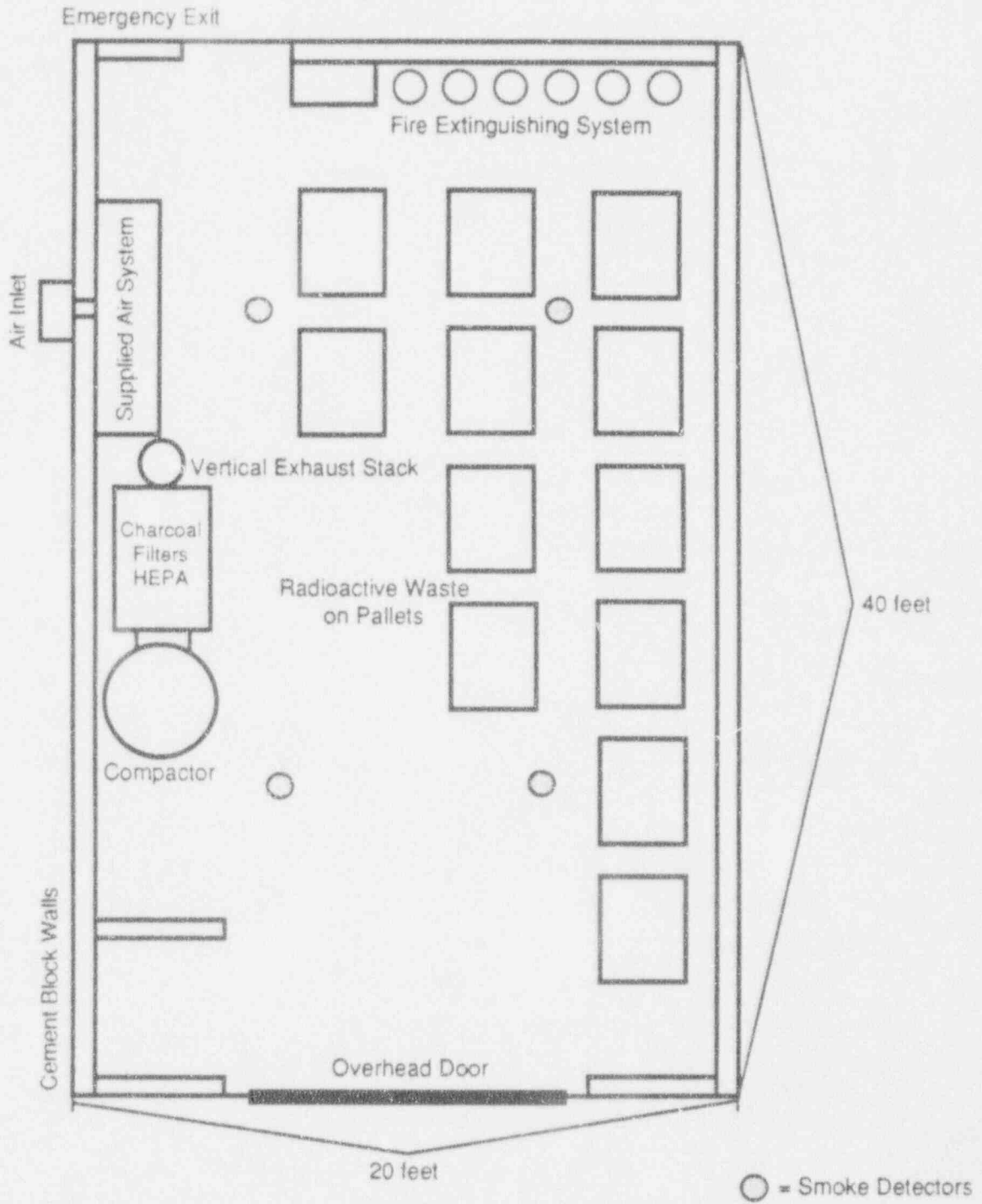
Removable:


Gross Alpha - 100 dpm/100 cm²
Gross Beta - 500 dpm/100 cm²
Tritium - 1000 dpm/100 cm²

III-2.8 *Operation of Automatic Fire System at Radioactive Storage Warehouse*

- 2.8.1 In the event of fire or smoke detection, the following sequence of events will occur:
- 2.8.1.1 Alarms inside and outside will ring.
 - 2.8.1.2 The warehouse door will close, the natural gas supply to the heat will be cut off, and exhaust fan will stop operating.
 - 2.8.1.3 Approximately 40 seconds time will elapse before CO2 is released to extinguish fire.
 - 2.8.1.4 The fire department is notified.
- 2.8.2 In the event that you are in the warehouse when the alarm sounds you should do one of the following:
- 2.8.2.1 Go to the emergency exit located at the left rear corner of the warehouse and:
 - 2.8.2.2 If you suspect that there is a fire, exit immediately and:
 - 2.8.2.3 Wait to direct fire department and notify the safety officer or company operator as soon as possible.
- 2.8.3 If the system has been inadvertently triggered by smoke from a vehicle you can stop the system CO2 release by:
- 2.8.3.1 Moving the timer control switch from "normal" to "hold " on box #2. The hold switch will hold the system indefinitely and reset the timer to 40 seconds.
 - 2.8.3.2 Slide the reset button in box #1 to the reset position. Alarm switch to silence.
 - 2.8.3.3 When the alarm stops you can now move the "hold " switch to "normal " and the "alarm" switch to "normal". The system is now reset.
 - 2.8.3.4 Call the police to cancel the false alarm.
- 2.8.4 SPECIAL NOTES:
- 2.8.4.1 Never park any of the diesel powered vehicles close to the warehouse door with the engine operating, this has been know to trigger the system.
 - 2.8.4.2 If a fire is detected and the system does not function, there is a manual pull station located on the outside wall of the warehouse on the right side. The system will follow the same sequence as above.
 - 2.8.4.3 Should the system become operational while you are outside of the warehouse, do not enter for any reason.
 - 2.8.4.4 Police: 664-7000
 - 2.8.4.5 Fire: 664-7007

Figure III-2.1



RSC & QCM 11/91
 III-2-18
 Date: _____
 Initials: _____
 Reviewed: _____
 Revised: 11/91 

ATTACHMENT A
License Limits

2.9 The licensee shall not possess at any one time isotopes in excess of the following:

a) Normal Form:

<u>Radionuclide</u>	<u>Quantity (mCi)</u>	<u>Radionuclide</u>	<u>Quantity (mCi)</u>
Am-241	3.0	Nb-95	5,000.0
Sb-124	1,000.0	P-32	1,500.0
Ba-140	2,000.0	Pu-238	1.0
Cd-113m	1,500.0	Pu-239	1.0
Ca-45	8,000.0	Po-210	32.0
C-14	13,000.0	Pm-147	3,500.0
Cs-134	5,000.0	Ru-103	1,500.0
Cs-137	5,000.0	Ru-105	1,500.0
Cr-51	10,000.0	Sc-46	2,500.0
Co-60	4,000.0	Se-75	5,000.0
Cu-64	5,000.0	Ag-110m	500.0
Au-198	10,000.0	Sr-90	250.0
H-3	1,500,000.0	S-35	500.0
I-125	800.0	Ta-182	1,500.0
I-129	100.0	Tc-99m	20,000.0
I-131	330.0	Tl-204	3,000.0
Ir-192	5,000.0	Tm-170	1,000.0
Fe-55	5,000.0	Th-228	30.0
Fe-59	5,000.0	Sn-113	1,000.0
Kr-85	7,000.0	Sn-123	1,000.0
Mn-54	1,500.0	W-187	5,000.0
Mn-56	1,200.0	U-233	5.0
Mo-99	3,000.0	Xe-133	10,000.0
Np-237	2.0	Zn-65	2,500.0
Ni-63	5,000.0	Zr-93	5,000.0

b) Normal Form:

Any isotope Z-3 through Z-83 inclusive, not included in a) above limited to 1 curie each.

c) Special Form:

Any isotope Z-3 through Z-83 inclusive, limited to 10X the limits specified in a) above or 10 curies if not specified in a) above.

d) Any Form:

Source material not listed in a) above, limited to 12,500 lbs.

e) Any Form:

Special nuclear material not listed in a) above limited to 200 grams.

Date:

Initials:

Reviewed: _____

Revised: 11/91




III-2.10 Forms Used in Describing and Controlling Radioactive Waste

DESCRIPTION	FORM NO.	ACTION
Certification of Radiation Survey	IWL-RW-201	Issued 3/80
Diagram of Survey Area (Truck)	IWL-RW-202	Issued 3/80
Radioactive Waste Delivery/Pickup Form	IWL-RW-203	Issued 3/80
Radioactive Waste Certification Statement	IWL-RW-204	Issued 3/80
Retraining of Personnel Regarding Processing of Generated Waste	IWL-RW-206	Issued 3/80
Checklist for Radioactive Waste Pickup	IWL-RW-207	Issued 3/80
Retraining DOT, NRC	IWL-RW-208	Issued
Radioactive Waste Shipment Checklist	IWL-RW-210	Issued 7/80
Shipment Record	IWL-RW-212a	Revised 6/88
Exclusive Use Statement	IWL-RW-214	Issued
State of Washington Certification	IWL-RW-215	Issued 6/80
RadWaste Composite Compaction List	IWL-RW-216	Issued 7/82
Application for Employment	IWL-RW-217	Issued 4/80
Statement of Violations	IWL-RW-218	Issued 4/80
Inquiry to State Agency	IWL-RW-219	Issued 4/80
Written Examination for Drivers (DOT) pg. 1-4	IWL-RW-220	Issued 4/80
Certification of Written Examination	IWL-RW-221	Issued 4/80
Driver Road Test	IWL-RW-222	Issued 4/80
Physical Examination	IWL-RW-223	Issued 4/80
Physical Certification	IWL-RW-223	Issued
Radioactive Waste Procedures Exam - 3 pages	IWL-RW-224	Issued 4/80
Annual Review of Driving Record	IWL-RW-225	Issued 4/80
Statement of Certification	IWL-RW-227	Issued 7/82
RAM Packaging & Transportation Audit Checklist	IWL-RW-228	Issued 12/80
Review & Evaluation of Radioactive Materials Activities Audit	IWL-RW-229	Issued 12/80
Burial Certification	IWL-RW-230	Issued 11/81
Packaging of Radioactive Waste Examination 2 pages	IWL-RW-231	Issued
User Request Form	IWL-HP-06	Issued 4/80
HP Basic Training Record	IWL-HP-07	Issued 4/80

Date: _____ Initials: _____

Reviewed: _____

Revised: 11/91 



ATTACHMENT B

Steven A. Black, Manager, R.S.O.

Employment Experience
1/77 - Current

TELEDYNE ISOTOPES

Mr. Black presently manages operations in the Radiological Services Department of Teledyne Isotopes 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 Protection 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 BASIC and UNIX based systems.
- Preparing and updating employee evacuation plans.
- Safety orientation training for all new employees prior to their starting to work.
- Plant Emergency Officer and the liaison with the local volunteer fire department.

Special Assignments

Mr. Black supervised the decontamination of the Department of Energy's New Brunswick laboratory located in New Brunswick, NJ and the removal and packing of approximately 21,000 cubic feet of thorium metal waste at a facility in New York. These projects 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.

Education

Brown University
Providence, Rhode Island
B.A. Biology 1975

Other: Has completed a course in Radiation Protection at Harvard School of Public Health (1977) and a Rutgers University Radiation Science introductory course for the Master's program in Health Physics (1980). He has also completed numerous short courses on the packaging and transport of radioactive waste.

Professional Affiliations

Nuclear Waste Brokers and Processors Association - founder & Secretary
National Health Physics Society - member since 1986
NJ Chapter of the Health Physics Society - member since 1980



ATTACHMENT C

Scott W. Dennerlein, Health Physicist

Employment Experience

2/90 - Current

TELEDYNE ISOTOPES

Health Physicist: Supervisor of technicians who perform radiological surveys both in-house and commercially. Responsible for operational compliance with specifications in five radioactive material licenses, including bioassay program, air and water effluent monitoring, and amendments. Also, supervision of laboratory decontaminations, instrument calibrations and substantiation of data output and the distribution of reports.

1/89 - 2/90

APPLIED RADIOLOGICAL CONTROL

Senior Health Physicist: Responsible for radiological surveys, job planning and supervision during refueling outages at several nuclear power plants in the U.S. Operated an oil decontamination system to remove radioactive particles from used reactor coolant pump oil.

9/86-11/88

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION

Radiation Physicist: Major responsibility was the assessment of public health risk and environmental impact due to radiologically contaminated sites. Lead Health Physicist for emergency drills with nuclear plants in N.J. Provided technical review of documents to support siting of low-level radioactive waste facility in the state.

1/85-9/86

TELEDYNE ISOTOPES

Health Physics Technician: Initial duties were calibration of instruments, monitoring of air and water effluents from TRU contaminated precious metals recovery lab, and radioactive waste shipments. Performed radiation safety surveys at pharmaceutical labs, including x-ray and sealed source monitoring. Radiation safety officer for radio-tracer studies at various oil refineries operated by Exxon.

9/81-12/83

HYDRO NUCLEAR SERVICES

Decontamination Specialist: Duties included decontamination of general areas, reactor cavity, steam generators, and torus at several nuclear power plants on the East Coast. Aided in the preparation of radioactive waste for shipment.

Education

Rutgers University
New Brunswick, New Jersey
M.S. Radiation Science, January 1991

University of Rhode Island
Kingston, Rhode Island
B.S. Biology, May 1981

Professional Affiliations

American Nuclear Society - member since 1987
American Public Health Association - member since 1990
National Health Physics Society - member since 1988
NJ Chapter of the Health Physics Society - member since 1989
Registered Radiation Protection Technologist - 1990

Training Received

OSHA 1910 Hazardous Waste Worker
Fire Brigade
Mixed Waste Identification
Groundwater Investigations
Air Surveillance of Hazardous Materials

ATTACHMENT D

**Michael J. Vala, Health Physicist**

Employment Experience

3/87 - Current

TELEDYNE ISOTOPES

Mr. Vala joined Teledyne Isotopes in March of 1987. Prior to his employment he attended Stevens Institute of Technology in Hoboken, New Jersey, where he received his Bachelors of Engineering degree in the engineering physics curriculum in May of 1986.

Mr. Vala's current responsibilities include preparing containers of radioactive waste for shipment to processing centers and burial facilities. He is also actively involved in performing decontaminations and radiation surveys of facilities and equipment for pharmaceutical clients, and in performing instrument calibrations. Mr. Vala has been designated as the person responsible for providing Hazard Communication Training to all the employees at Teledyne Isotopes under the New Jersey Right-To-Know law and under OSHA hazard communication standard.

Mr. Vala has been trained in the following:

- Department of Transportation regulations for the transport of radioactive materials.
- Radioactivity measurement, instrument operation, and monitoring techniques.
- Instrument calibration.
- Mathematics and calculations basic to the use and measurement of radioactivity.
- Nuclear Regulatory Commission regulations.
- US Ecology Richland, WA, radioactive waste disposal facility license requirements.
- Right-To-Know law and OSHA regulations.
- OSHA 29CFR1910.120 hazardous materials response.

Special Assignments

Teledyne Isotopes was a sub-contractor to Quadrex Recycle Center during the Radium Soil Disposal Project in Montclair, NJ, where over 5000 drums of contaminated soil were shipped for processing prior to final disposal. Mr. Vala was responsible for the inspection, removable contamination survey, direct radiation survey, identification, labeling, marking, overpacking, and tracking of over 4000 of these containers. In addition, he performed the vehicle radiation safety surveys of over eighty (80) shipments while on this assignment, and was in charge of the personnel and area radiation safety during the project.

Mr. Vala coordinated the packaging and disposal of over 400,000 lbs. of neutron activated material from Princeton University. During this project, Mr. Vala was responsible for all on-site operations including radiological safety and shipment paperwork preparation.

Education

Stevens Institute of Technology
Hoboken, New Jersey
Bachelor of Engineering - Engineering Physics 1986

Rutger's University Graduate School
28 Credits towards M.S. Health Physics
Estimated Degree award: January 1992

Professional Affiliations

NJ Chapter of the Health Physics Society - member since 1988
Nuclear Waste Brokers & Processors Association - member since 1989



ATTACHMENT E

Attachment E

Irrevocable Standby Letter of Credit No. [insert no.]

This Credit Expires [insert date]

Issued to: U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Sir or Madam:

We hereby establish our Irrevocable Standby Letter of Credit No. [insert no.] in your favor, at the request and for the account of Teledyne Isotopes, 50 Van Buren Ave., Westwood, NJ up to the aggregate amount of \$xxxxxxxxxxx, U.S. dollars available upon presentation of:

- (1) your sight draft, bearing reference to this letter of Credit No. [insert no.] , and
- (2) your signed statement reading as follows: "I certify that the amount of the draft is payable pursuant to regulations issued under authority of 10 CFR Part 30.

This letter of credit is issued in accordance with regulations issued under the authority of the U.S. Nuclear Regulatory Commission (NRC), an agency of the U.S. Government, pursuant to the Atomic Energy Act of 1954, as amended, and the Energy Reorganization Act of 1974. The NRC has promulgated regulations in Title 10, Chapter I of the Code of Federal Regulations, Part 30, which require that a holder of, or applicant for, a license issued under 10 CFR Part 30 provide assurance that funds will be available when needed for decommissioning.

This letter of credit is effective as of [date] and shall expire on [date at least one year later], but such expiration date shall be automatically extended for a period of [at least one year] on [date] and on each successive expiration date, unless, at least 90 days before the current expiration date, we notify you and Teledyne Isotopes, by certified mail, as shown on the signed return receipts. If Teledyne Isotopes is unable to secure alternative financial assurance to replace this letter of credit within 30 days of notification of cancellation the NRC may draw upon the full value of this letter of credit prior to cancellation. The bank shall give immediate notice to the applicant and the NRC of any notice received or action filed alleging (1) the insolvency or bankruptcy of the financial institution or (2) any violations of regulatory requirements that could result in the suspension or revocation of the bank's charter or license to do business. The financial institution also shall give immediate notice if the bank, for any reason, becomes unable to fulfill its obligation under the letter of credit.

Whenever this letter of credit is drawn on under and in compliance with the terms of this letter of credit, we shall duly honor such draft upon its presentation to us within 30 days, and we shall deposit the amount of the draft directly into the standby trust fund of Teledyne Isotopes in accordance with your instructions.

Each draft must bear on its face the clause: "Drawn under Letter of Credit No. [insert no.], dated [insert date], and the total of this draft and all other drafts previously drawn under this letter of credit does not exceed \$22,000.00.

[signature(s) and title(s) of official(s) of issuing institution]

[date]

This credit is subject to [insert "the most recent edition of the Uniform Customs and Practice for Documentary Credits, published by the International Chamber of Commerce", or "the Uniform Commercial Code"].



ATTACHMENT F

TO BE PROVIDED AT A LATER DATE.



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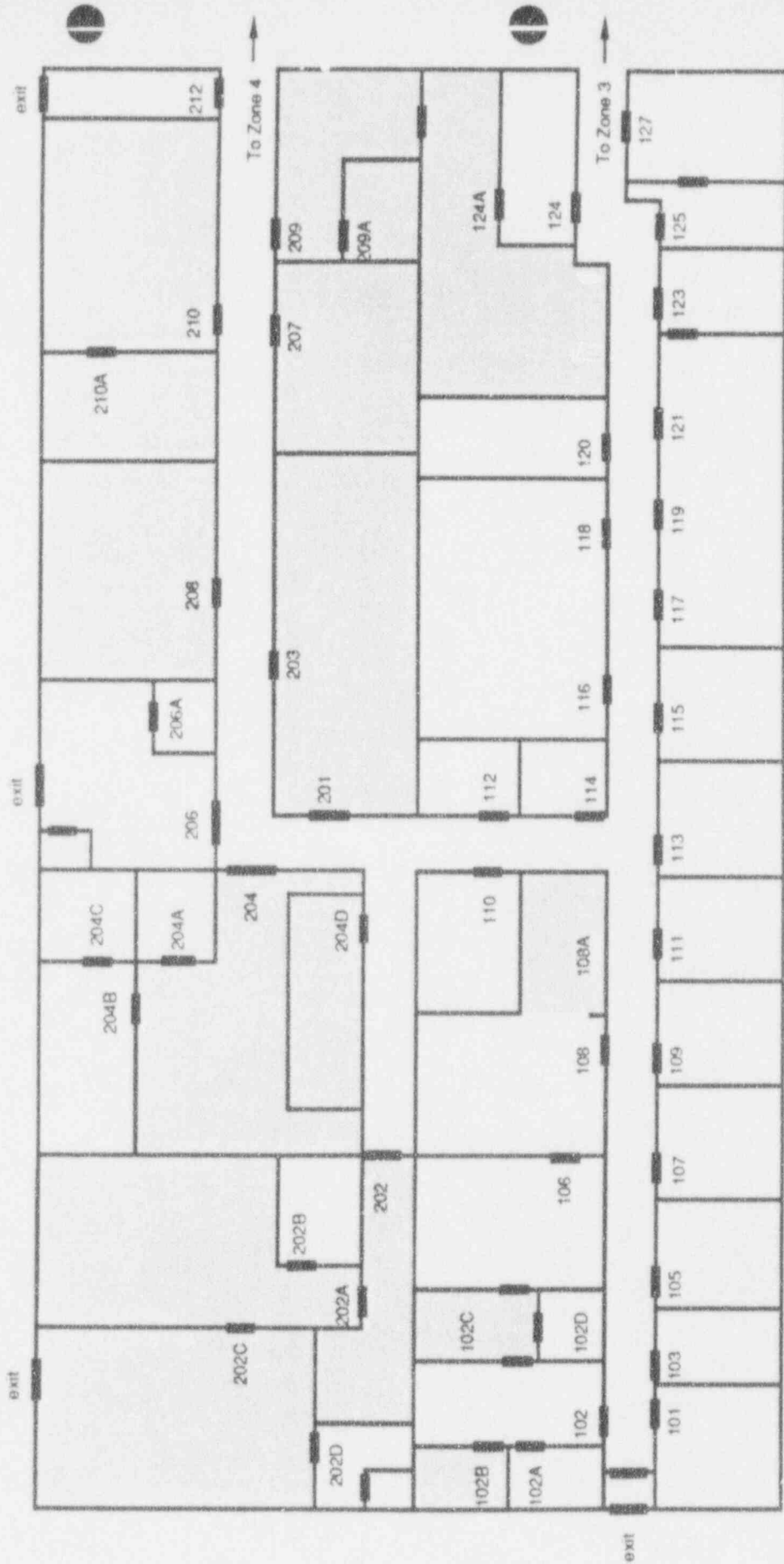


ATTACHMENT G



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Teledyne Isotopes Zones 1 & 2

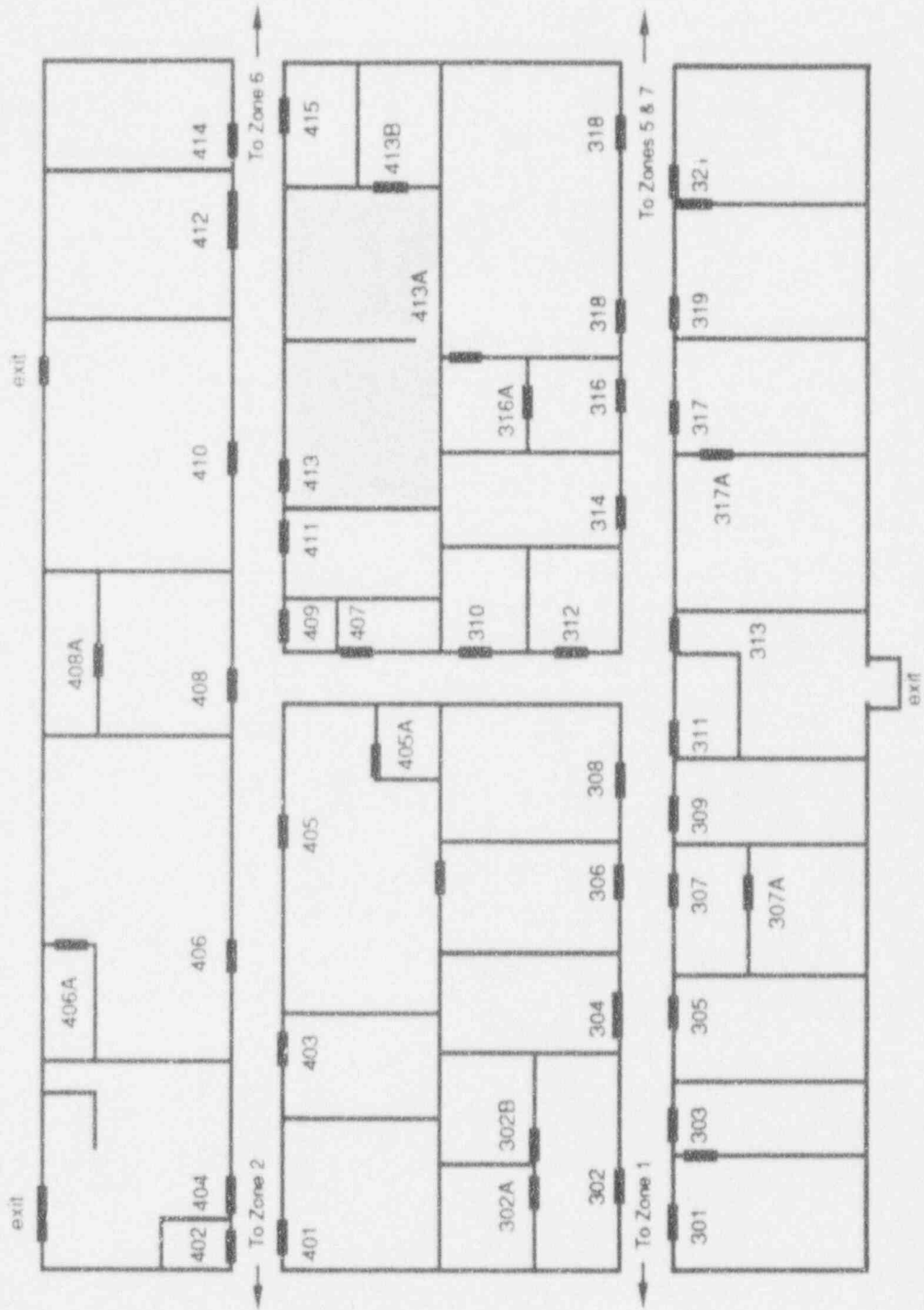




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Teledyne Isotopes Zones 3 & 4

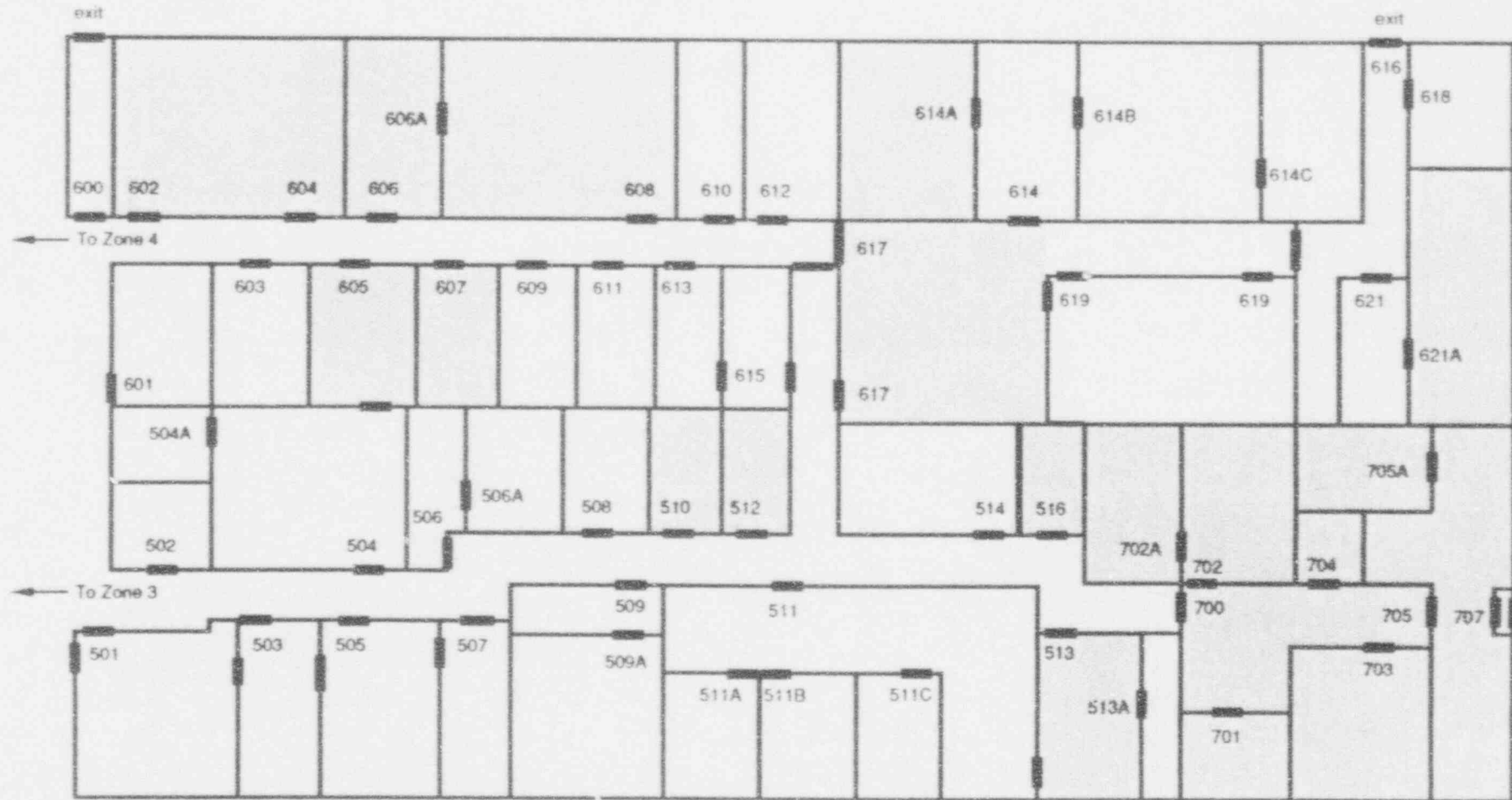




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Teledyne Isotopes Zones 5, 6, & 7

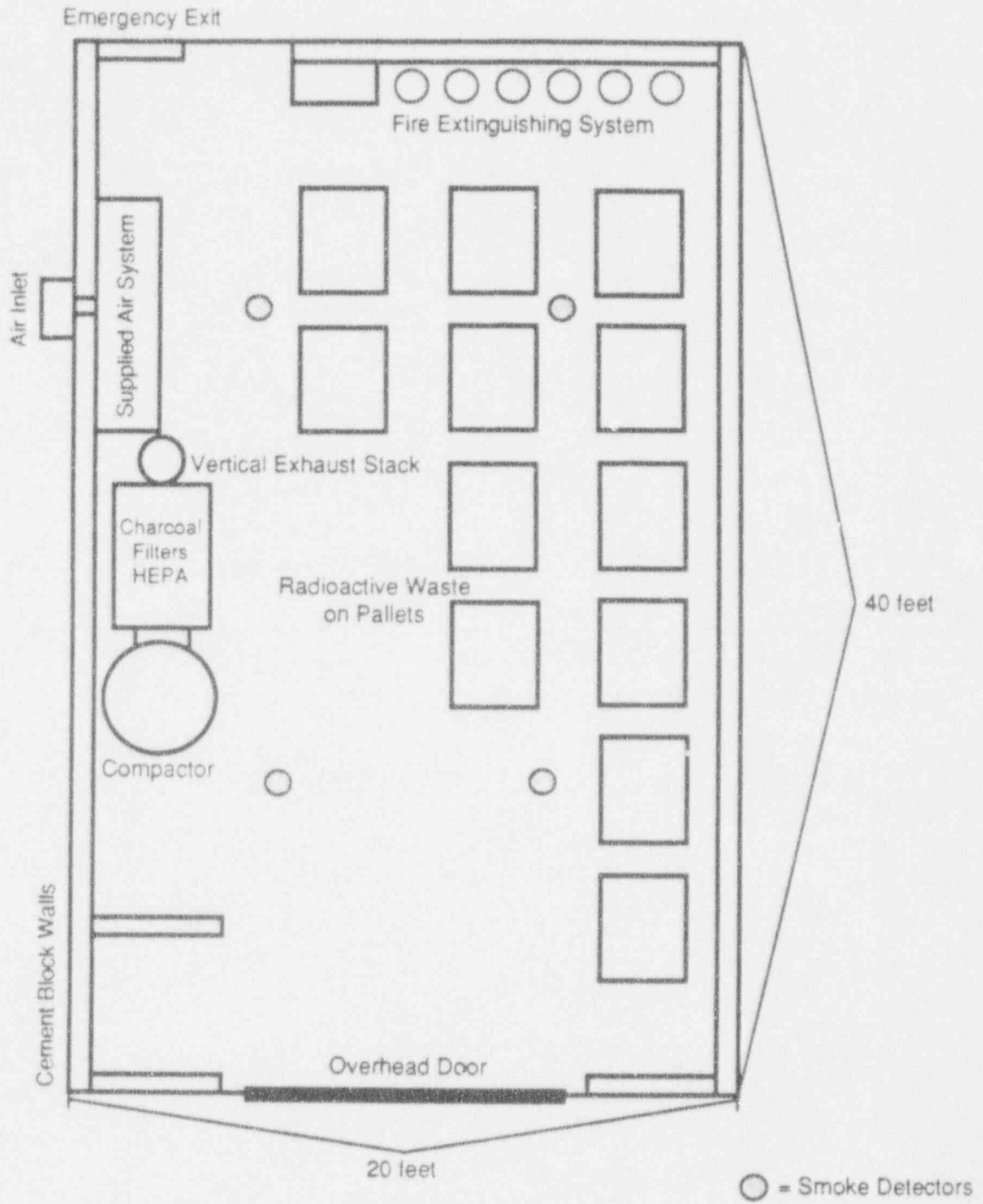




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Figure III-2.1



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ATTACHMENT H



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ISOTOPES**

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RADIATION SAFETY CODE
AND
QUALITY CONTROL MANUAL
NOVEMBER 1990

SECTION II

RADIATION SAFETY PROCEDURES

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 in some cases 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 Isotopes.

II-1.2 *Indoctrination of Personnel*

All persons starting to work with any radiation sources at Teledyne Isotopes 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.

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.

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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 Teledyne Isotopes are required to supply their supervisor and the Health Physics Office as complete a radiation exposure history as available. 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 20.405 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 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 10CFR 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 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.

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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 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 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 Violations", such notice must be posted in a conspicuous place for 5 days or until compliance is achieved, whichever period is longer.

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 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 company President 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 pipeting 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.

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	Reviewed: _____	_____
	Revised: <u>4/30/91</u>	<u>SB</u>

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.

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II-3.4 *List of Persons to Call in Radiation Emergency*

- 1) Person who is in charge of laboratory or area where emergency 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. 228
 Home: (201) 967-8837
- 3) Alternate Radiation Safety Officer Scott Dennerlein
 Office: (201) 664-7070 Ext. 257
 Home: (201) 488-1936 (weekdays)
 Home: (609) 298-6058 (weekends)
- 4) Maintenance Engineer Robert Pavese
 Office: (201) 664-7070 Ext. 205
 Home: (201) 262-4270
- 5) President - Chairman, Radiation Safety Committee Donald F. Schutz
 Office: (201) 664-7070 Ext. 213
 Home: (201) 391-2790
- 6) US Nuclear Regulatory Agency
 (215) 337-5000
- 7) NJ Dept. of Environmental Protection
 8AM - 5PM (609) 292-5586
 After Hours (609) 292-7172
- 8) 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:
 - a) Prepare a shallow tray by lining it with plastic-backed absorbant material.
 - b) Put the radioisotope container, the properly labeled receptacle and necessary tools into the tray.
 - c) Evaluate by calculation or measurement the extremity and whole body dose expected during the operation.
 - d) Consider that the radioisotope container top and the neck of the container is highly contaminated.
 - e) Perform the transfer operation in a hood wearing gloves and lab coat.
 - f) Remove and dispose of the absorbant liner, survey and dispose of or decontaminate any contaminated items.
 - g) 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 Teledyne Isotopes 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), TeleTrace License (NRC License #29-00055-02), Source Material License (NRC License #SUB-1235), and Special Nuclear Material License (NRC License #SNM-107), and Export Licenses.

II-5.0 PERSONNEL MONITORING

II-5.1 *External Dosimetry*

Every employee of, and visitor to, Teledyne Isotopes 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 Analysts 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, #SUB-1235 and #SNM-107
Source Room	-	Provisions of NRC Licenses #29-00055-02 and #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 Teledyne Isotopes Badge Service Department.

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 Teledyne Isotopes 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.

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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 forth 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).

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Revised: 4/30/91	

II-6.0 SURVEYS

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 Materials". 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 Teledyne Isotopes 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, in his absence, the Alternate R.S.O. 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.

	<u>Lab Surfaces</u> ¹	<u>Clothing</u> ¹	<u>Skin</u> 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 cm².

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).

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 $\pm 10\%$ of the calculated or known calibration point. If the reading cannot be adjusted within $\pm 10\%$ but is within $\pm 20\%$, the instrument will not be used unless a graph indicating the actual value is attached. If the reading is off by more than $\pm 20\%$, 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 charge. If the reading differs by more than the $\pm 20\%$ 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 *Training and Retraining of Personnel Involved With the Safe Packaging of Radioactive Material*

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:

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8.2.2 Proper Shipping Name and UN ID Number

Radioactive Material, Limited Quantity, 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, Instruments & Articles (UN2911)
 Uranyl Acetate (RQ-5000/2270) (NA9180)
 Uranyl Nitrate, solid (RQ-5000/2270) (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

8.3.1.1 Categories of Radioactive Waste:

There are three disposal facilities being used and the categories for each are listed below:

8.3.1.1.1 BURIAL AT RICHLAND, WASHINGTON

(DMR) Dry Material destined for Richland
 (DCR) Dry Compactibles destined for Richland
 (SVR) Small Volume liquids destined for Richland
 (LVR) Large Volume liquids destined for Richland
 (ACR) Animal Carcasses or biological waste destined for Richland

8.3.1.1.2 PROCESSING AT QUADREX HPS, GAINESVILLE, FLORIDA

(VXN) Scintillation Vials - NRC exempt - Non RCRA regulated
 (VRN) Scintillation Vials - NRC regulated - Non RCRA regulated
 (VXR) Scintillation Vials - NRC exempt and RCRA regulated
 (VRR) Scintillation Vials - NRC regulated and RCRA regulated

8.3.1.1.3 PROCESSING AT SCIENTIFIC ECOLOGY GROUP, OAK RIDGE, TENNESSEE

(DMS) Dry solid Material destined for S.E.G.
 (DCS) Dry solid Compactible destined for S.E.G.
 (SVS) Small Volume liquid destined for S.E.G.

RADIOACTIVE MATERIAL PACKAGING GUIDE

MATERIAL DESCRIPTION	CONTAINER TYPE	LABEL REQUIRED	SECURITY SEAL REQUIRED	INTERNAL PACKAGING REQUIRED	mR/hr LIMITS @ CONTACT	COMMENTS
DRY SOLID MATERIAL						
a. Radioactive Material, LSA, n.o.s. (exclusive-use)	Unspecified	Radioactive-LSA	no	Unspecified	0-200.0	
b. Radioactive Material, Limited Quantity, n.o.s.	Unspecified	Radioactive	no	Unspecified	0-0.5	
c. Radioactive Material, Instruments & Articles	Unspecified	Radioactive	no	Unspecified	0-2.0	mR/hr limits @ contact 0-2.0 if shipped exclusive-use
d. Radioactive Material, n.o.s.	DOT 7A-Type A	Radioactive White I	yes	Braced	0-0.5	Require weight printed on outside of package when in excess of 110 lbs.
		Radioactive Yellow II	yes	Braced	0.5-50.0	
		Radioactive Yellow III	yes	Braced	50.0-200.0	
e. Radioactive Material, special form, n.o.s.	DOT 7A-Type A	Radioactive White I	yes	Braced	0-0.5	Require weight printed on outside of package when in excess of 110 lbs.
		Radioactive Yellow II	yes	Braced	0.5-50.0	
		Radioactive Yellow III	yes	Braced	50.0-200.0	
SMALL VOLUME LIQUIDS						
a. Radioactive Material, LSA, n.o.s. (exclusive-use)	DOT 7A-Type A	Radioactive-LSA	no	*See instructions	0-200.0	
b. Radioactive Material, n.o.s.	DOT 7A-Type A	Radioactive White I	yes	*See instructions	0-0.5	Require weight printed on outside of package when in excess of 110 lbs.
		Radioactive Yellow II	yes	*See instructions	0.5-50.0	
		Radioactive Yellow III	yes	*See instructions	50.0-200.0	
* SPECIAL NOTE ON SMALL VOLUME LIQUIDS: Scintillation vials and fluids must be packaged separately from all other small volume liquids						
LARGE VOLUME LIQUIDS						
a. Radioactive Material, LSA, n.o.s. (exclusive-use)	DOT 7A-Type A	Radioactive-LSA	no	*See instructions	0-200.0	
b. Radioactive Material, n.o.s.	DOT 7A-Type A	Radioactive White I	yes	*See instructions	0-0.5	Require weight printed on outside of package when in excess of 110 lbs.
		Radioactive Yellow II	yes	*See instructions	0.5-50.0	
		Radioactive Yellow III	yes	*See instructions	50.0-200.0	
ANIMAL CARCASSES						
a. Radioactive Material, LSA, n.o.s. (exclusive-use)	DOT 7A-Type A	Radioactive-LSA	no	*See instructions	0-200.0	
b. Radioactive Material, n.o.s.	DOT 7A-Type A	Radioactive White I	yes	*See instructions	0-0.5	Require weight printed on outside of package when in excess of 110 lbs.
		Radioactive Yellow II	yes	*See instructions	0.5-50.0	
		Radioactive Yellow III	yes	*See instructions	50.0-200.0	

NOTE: n.o.s. means: "not otherwise specified."

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- 8.3.1.2 Items in different categories cannot be mixed in any one container unless specifically authorized.
- 8.3.1.3 The packaging procedure that is used is to be marked on the drum (e.g. DMR-8/87)
- 8.3.1.4 Transuranic and radium waste in excess of 10 nanocuries per gram is not acceptable unless specifically authorized.
- 8.3.1.5 Gaseous waste must meet certain provisions. Please see the burial site's license for details or call the Radiological Services Department Office.
- 8.3.1.6 Special Nuclear Material requires specific approval and will be accepted only upon special request to the Radiological Services Department Office.
- 8.3.1.7 All provisions of the destination facility's radioactive materials license must be adhered to. Particular attention is to be paid to Class B wastes, especially Class B tritium wastes.
- 8.3.1.8 DO NOT EXCEED THE FOLLOWING WEIGHTS UNLESS SPECIFICALLY AUTHORIZED:
 - 5 gallon container - 80 lbs.
 - 30 gallon container - 300 lbs.
 - 55 gallon container - 480 lbs.
- 8.3.1.9 Chemical Toxicity:

The chemical composition of the materials disposed must be compatible with the procedures which follow. Any additional hazards of the material must be evaluated to determine if additional packaging is required. If materials are listed in J. Irving Sax's "Dangerous Properties of Industrial Materials", Fifth Edition, Van Nostrand Reinhold, as having a THR=HIGH via any route, except IP or IV, specific approval must be obtained from the State of Washington Radiation Control Program. Contact the Radiological Services Department for details.

8.3.1.10 Prohibitions

8.3.1.10.1 Burial Prohibitions:

Lead and other U.S. EPA and State declared hazardous wastes are prohibited from land burial at the current radioactive waste disposal sites. Please ensure there are no Resource Conservation and Recovery Act (RCRA) wastes in your radioactive waste streams.

8.3.1.10.2 Scintillation Vial Processing

Only those isotopes listed in the Quadrex license are allowed for processing. In addition, strict control must be held over the packaging of scintillation vials. No other wastes of any kind are allowed in these containers.

8.3.1.10 Special Notes

Two 2 mil liners may be used in place of a single 4 mil liner.

Instead of lining the whole drum, individual 4 mil (or double 2 mil) bags may be substituted, provided each bag is layered as above.

For a list of approved absorbants, solidification and stabilization media for use with waste destined for Richland, please see the US Ecology license.

When layering, the absorbant must be the first layer on the bottom and the last layer on the top. Proper volume ratios must be determined by the generator to be used for the different absorbants.

The amount of absorbant must be capable of absorbing twice the amount of liquid present.

8.3.1.11 VOIDS - All voids in the containers must be filled to the extent practicable.

8.3.2 WASTE FOR BURIAL AT US ECOLOGY, RICHLAND, WASHINGTON

8.3.2.1 DRY SOLID MATERIAL FOR BURIAL AT RICHLAND, WASHINGTON (DMR-8/87)

8.3.2.1.1 Select a 5, 30 or 55 gallon drum.

8.3.2.1.2 Fill to capacity with only dry solid materials.

8.3.2.1.3 Fill in any voids to the extent practical.

8.3.2.1.4 Secure drum cover.

8.3.2.1.5 Label drum DMR-8/87, to designate that the drum has been packaged according to these directions.

8.3.2.2 DRY SOLID COMPACTIBLES FOR BURIAL AT RICHLAND, WASHINGTON (DCR-8/87)

8.3.2.2.1 Select a 30 or 55 gallon container.

8.3.2.2.2 Place waste into double 4 mil plastic liners. (Note: For 55 gallon drums, use two sets of double 4 mil bags, each set approximately 27 gallons. If heavy materials are used, please use additional double 4 mil liners and decrease the quantity put into each.)

8.3.2.2.3 Twist and seal liners.

8.3.2.2.4 Place double 4 mil bags into the selected container.

8.3.2.2.5 Replace lid and ring.

8.3.2.2.6 Secure ring. DO NOT BOLT.

8.3.2.2.7 Label drum DCR-8/87 to indicate it was packaged in accordance with these instructions.

NOTE: DO NOT DISPOSE OF UNPROTECTED SHARP OBJECTS.

NOTE: DO NOT DISPOSE OF NON-COMPACTIBLE ITEMS IN THESE TYPES OF CONTAINERS.

NOTE: ONLY LOW SPECIFIC ACTIVITY MATERIAL IS ACCEPTABLE IN COMPACTIBLE DRUMS. UNDER NO CIRCUMSTANCES SHOULD SOURCES BE PLACED INTO THESE CONTAINERS.

8.3.2.3 SMALL VOLUME LIQUID WASTE DESTINED FOR RICHLAND (SVR-8/87)

These drums can contain vials which contain liquids which are acceptable for burial, and each vial must contain less than 50 ml of liquid.

Liquid should not be absorbed directly onto the absorption media (e.i. do not open vials). Any tool or device which contains free standing liquid must be considered small volume liquid waste. Please reference the definition of free standing liquid as found in US Ecology's license.

8.3.2.3.1 Select only a 30 or 55 gallon drum; 5 gallon pails are not allowed.

8.3.2.3.2 Line the drum with 4 mil thick poly liner.

8.3.2.3.3 Using an approved absorbant, alternate layers of absorbant with layers of waste.

8.3.2.3.4 Twist and seal liner.

8.3.2.3.5 Secure drum cover.

8.3.2.3.6 Label drum SVR-8/87, to designate that the drum has been packaged according to these instructions.

8.3.2.3.7 Special Note: Toluene, Xylene and other flammable liquids in scintillation vials will not be accepted for burial. They must be packaged for reprocessing and meet the reprocessor's license criteria.

8.3.2.4 LARGE VOLUME LIQUID WASTE DESTINED FOR RICHLAND (LVR-8/87)

All items containing 50 ml or more of an aqueous liquid may not be disposed in SVR or SVS drums. The liquid must be packaged as follows while the container itself must be either (1) dried and placed in a DMR, DCR, DMS or DCS drum or (2) placed in an SVR or SVS drum once the bulk of the liquid is removed.

8.3.2.4.1 Select only the 55 gallon double-walled container for liquid waste.

8.3.2.4.2 Remove the 55 gallon drum cover.

- 8.3.2.4.3 Loosen and remove the bung from the 30 gallon drum which has been filled with an approved absorbant.
- 8.3.2.4.4 Pour up to 10 gallons of liquid (pH-6.0 - 9.0) into the absorbant in the 30 gallon drum through the 2-1/2" opening.
- 8.3.2.4.5 Replace bung and tighten.
- 8.3.2.4.6 Twist and seal poly liner.
- 8.3.2.4.7 Secure cover of 55 gallon drum.
- 8.3.2.4.8 Label drum LVR-8/87 to designate that the drum has been packaged according to these instructions.
- 8.3.2.4.9 SPECIAL NOTE

Toluene or Xylene and other liquids unacceptable at the burial site cannot be absorbed.

8.3.2.5 ANIMAL CARCASSES OR BIOLOGICAL WASTE (ACR-8/87)

Animal carcasses or biological waste must be disposed using a double-walled container. Be sure when ordering to specify a 55 gallon double-walled container for animal carcasses.

- 8.3.2.5.1 Select only a 55 gallon double-walled drum.
- 8.3.2.5.2 Remove inner 30 gallon container and absorbant.
- 8.3.2.5.3 Line 30 gallon drum with 4 mil poly liner. See Section 8.3.1.10.
- 8.3.2.5.4 Package waste into liner using at least one part slaked lime for every 10 parts of an approved absorbant. Fill completely.
- 8.3.2.5.5 Twist and seal liner.
- 8.3.2.5.6 Seal 30 gallon drum.
- 8.3.2.5.7 Place 30 gallon drum in 50 gallon drum.
- 8.3.2.5.8 Place absorbant around and covering 30 gallon drum.
- 8.3.2.5.9 Secure 55 gallon drum cover.
- 8.3.2.5.10 Label drum ACR-8/87 to designate that drum has been packaged according to these instructions.

	Date:	Initials:
	Reviewed: _____	_____
	Revised: <u>11/90</u>	<u>[Signature]</u>

8.3.3 RADIOACTIVE WASTE FOR PROCESSING AT S.E.G., OAK RIDGE, TENNESSEE

8.3.3.1 DRY SOLID MATERIAL DESTINED FOR S.E.G. (DMS-8/87)

8.3.3.1.1 See the procedure for DMR and follow exactly, except for labelling the container DMS-8/87, however, only Class A unstable materials are acceptable. Please see the S.E.G. license for further details on acceptable materials.

8.3.3.2 DRY SOLID COMPACTBLE DESTINED FOR S.E.G. (DCS-8/87)

8.3.3.2.1 See the procedure for DCR and follow exactly, except for labelling the container DCS-8/87, however, only Class A unstable materials are acceptable. Please see the S.E.G. license for further details on acceptable materials.

8.3.3.3 SMALL VOLUME LIQUIDS DESTINED FOR S.E.G. (SVS-8/87)

8.3.3.3.1 See the procedure for SVR and follow exactly, except for labelling the container SVS-8/87.

8.3.3.3.2 The liquids present must be strictly incidental. A couple of examples of incidental liquids are:

- a) A drop in the end of a pipette
- b) A couple of milliliters in the bottom of a vial
- c) Moisture on the sides of a beaker

8.3.3.3.3 Use the absorbant sparingly.

SPECIAL NOTE: In the SVS drum you may mix other dry waste which would be suitable for either the DMS or DCS container. You do not have to segregate these three types as long as the drum is classified as an SVS-8/87.

8.3.4 SCINTILLATION VIAL WASTE FOR REPROCESSING AT QUADREX,
GAINESVILLE, FLORIDA (VXN, VRN, VXR, VRR)

These drums may contain scintillation vials which contain Toluene or Xylene or any other flammable scintillation media acceptable according to Quadrex's License No. 1354-1 (State of Florida, Department of Health & Rehabilitative Services).

All drums to Quadrex are packaged identically using the procedure below, however, the labelling and manifesting are specific to the classification selected. The generator is responsible for identifying the isotopes, concentrations and chemical forms of the waste material.

Containers other than vials are authorized provided that the package is properly classified according to U.S. DOT regulations. Specifically, glass containers are authorized provided that they are less than 1 gallon in size and lab packed with enough absorbant to absorb twice the liquid present. These lab packs are packaged identically to the SVR procedure, except that instead of placing a layer of vials, a layer of containers is placed upright within the drum. Cardboard inserts can be used to help stabilize the loading of the container. The suffix "B" must be added to each drum packaged as a labpack (e.g. VXN-B).

- 8.3.4.1 Select only a 30 or 55 gallon drum.
- 8.3.4.2 Line the drum with 4 mil thick poly liner.
- 8.3.4.3 Add 12 inches of an approved absorbant.
- 8.3.4.4 Line drum again with another 4 mil thick poly liner.
- 8.3.4.5 Fill with vials or other containers of less than one pint capacity.
NOTE: With one pint containers, add absorbant to suitably cushion these to prevent breakage.
- 8.3.4.6 Twist and seal liners.
- 8.3.4.7 Top off the drum with additional absorbant.
- 8.3.4.8 Secure drum cover.
- 8.3.4.9 Label drum with the appropriate designation for the descriptions below.

8.3.4.10 Classification of Scintillation Vial Drums

There are many different types of scintillation fluids being used by the industry. The major differences between these fluids is their flashpoint. The state your facility is in may, or may not, regulate these fluids as hazardous waste. Although we have been and will continue to help identify when and where the RCRA regulations apply, it is the generator's responsibility under RCRA regulations to determine if his waste stream is a Hazardous Waste.

"V" - For marking purposes, all scintillation vial drums will have a first character of "V".

	Date:	Initials:
	Reviewed: _____	_____
	Revised: <u>4/30/91</u>	<u>[Signature]</u>

"X" or "R" - The second character will be either an "X" or and "R". If the drum contains only H-3/C-14 in less than 0.05 uCi/gram concentrations it is an "X". If the drum contains H-3/C-14 as above plus other isotopes listed in Quadrex's license, then it is an NRC "R"egulated material and would be an "R".

"N" or "R" - The third character indicates whether the drum is US EPA RCRA "R"egulated or "N"ot regulated. This classification is simple for those who use a high (greater than 140 F) flashpoint cocktail as these fluids are "N"ot RCRA regulated. If you have a cocktail with a lower flashpoint, the material may, or may not, be "R"egulated. This depends on each state. As the states are currently changing their positions rapidly, we have not included a listing in these procedures. Please call for further information.

II-9.0 INTERSTATE OPERATIONS

From time to time Teledyne Isotopes will engage in activities involving the use of radioisotopes in Agreement States. A list of such States is included in Table II-9.0 for reference so that appropriate regulations can be consulted regarding interstate operations.


TABLE II-1

LICENSING OFFICIALS IN AGREEMENT STATES

<p>ALABAMA (205) 261-5313 Mr. Aubrey Godwin, Director Bureau of Radiological Health State Department of Public Health Room 510, State Office Building Montgomery, AL 36130</p>	<p>FLORIDA (904) 487-2437 Dr. Lyle E. Jerrett, Director State of Florida Department of Health & Rehabilitative Services Radiological Health Program 1317 Winewood Boulevard Tallahassee, FL 32399</p>
<p>ARIZONA (606) 255-4845 Mr. Charles F. Tedford, Director Arizona Radiation Regulatory Agency 925 South 52nd Street, Suite 2 Tempe, AZ 85281</p>	<p>GEORGIA (404) 894-5795 Mr. Thomas E. Hill, Acting Director Radiological Health Section Department of Human Resources Room 600 878 Peachtree Street Atlanta, GA 30309</p>
<p>ARKANSAS (501) 661-2301 Ms. Greta Dicus, Director Division of Radiation Control & Emergency Management Arkansas Department of Health 4815 West Markham Street Little Rock, AR 72201</p>	<p>IDAHO (208) 334-5879 Mr. Ernest Ranieri, Supervisor Radiation Control Section Idaho Department of Health & Welfare Statehouse Boise, ID 83720</p>
<p>CALIFORNIA (916) 322-2073 Mr. Paul Szalinski, Chief Radiological Health Branch Department of Health 714 P Street, Building 498 Sacramento, CA 95814</p>	<p>KANSAS (913) 296-1542 Mr. Gerald W. Allen, Chief Bureau of Air Quality & Radiation Control Department of Health & Environment Forbes Field, Building 740 Topeka, KS 66620</p>

Date: _____ Initials: _____

Reviewed: _____

Revised: 11/90 

COLORADO (303) 331-8482

Mr. A. J. Hazle, Director
Radiation Control Division
Office of Health Protection
Department of Public Health
4210 East 11th Avenue
Denver, CO 80220

LOUISIANA (504) 925-4518

Mr. William Spell, Administrator
Nuclear Energy Division
Office of Air Quality and Nuclear Energy
Nuclear Energy Division
P.O. Box 14690
Baton Route, LA 70898

MARYLAND (301) 383-2744

Mr. Roland G. Fletcher, Administrator
Center for Radiological Health
Department of the Environment
2500 Broening Highway
Baltimore, MD 21224

MISSISSIPPI (601) 354-6657/6670

Mr. Eddie Fuente, Director
Division of Radiological Health
State Board of Health
3150 Lawson Street
P.O. Box 1700
Jackson, MS 39215

NEBRASKA (402) 471-2168

Mr. Harold Borchert, Director
Division of Radiological Health
State Department of Health
301 Centennial Mall, South
P.O. Box 95007
Lincoln, NE 68509

KENTUCKY (502) 564-3700

Mr. Donald Hughes, Manager
Radiation Control Branch
Department of Health Services
Cabinet for Human Resources
275 East Main Street
Frankfort, KY 40621

NEW HAMPSHIRE (603) 271-4588

Ms. Diane Tefft, Program Manager
Radiological Health Program
Bureau of Environmental Health
Division of Health Services
Health & Welfare Bldg.
Hazen Drive
Concord, NH 03301

NEW MEXICO (505) 827-2959

Mr. Benito J. Garcia, Chief
Community Services Bureau
Environmental Improvement Division
Department of Health & Environment
P.O. Box 968
Santa Fe, NM 87504-0968

NEW YORK (518) 474-2178

Mr. Jay Dunkleberger, Director
Bureau of Nuclear Operation
NY State Energy Office
Agency Building 2
2 Rockefeller Plaza
Albany, NY 12223

NORTH CAROLINA (919) 741-2283

Mr. Dayne H. Brown, Chief
Radiation Protection Section
Division of Facility Service
701 Barbour Drive
Raleigh, NC 27603

Date: _____ Initials: _____

Reviewed: _____

Revised: 11/90 

NEVADA (702) 885-5394

Mr. Stanley R. Marshall, Supervisor
Radiological Health Section
Health Division
Department of Human Resources
505 East King Street, Room 202
Carson City, NV 89710

OREGON (503) 229-5797

Mr. Ray Paris, Manager
Radiation Control Section
Department of Human Resources
1400 South West Fifth Avenue
Portland, OR 97201

RHODE ISLAND (401) 277-2438

Mr. James E. Hickey, Chief
Div. of Occupational Health &
Radiation Control
Rhode Island Dept. of Health
Cannon Building
75 Davis Street
Providence, RI 02908

SOUTH CAROLINA (803) 734-4700

Mr. Heyward Shealy, Chief
Bureau of Radiological Health
S.C. Department of Health &
Environmental Control
J. Marion Sims Building
2600 Bull Street
Columbia, SC 29201

TENNESSEE (615) 741-7812

Mr. Michael H. Mobley, Director
Division of Radiological Health
TERRA Building
150 9th Avenue, N.
Nashville, TN 37219

NORTH DAKOTA (701) 224-2348

Mr. Dana Mount, Director
Div. of Environmental Engineering
Radiological Health Program
State Department of Health
1200 Missouri Avenue
Bismarck, ND 58502

TEXAS (512) 835-7000

Mr. David K. Lacker, Chief
Bureau of Radiation Control
Texas Department of Health
1100 West 49th Street
Austin, TX 78756

UTAH (801) 538-6734

Mr. Larry Anderson, Director
Bureau of Radiation Control
State Department of Health
288 North 1460 West
P.O. Box 16690
Salt Lake City, UT 84116

WASHINGTON (206) 753-3468

Mr. Terry R. Strong, Chief
Office of Radiation Protection
Department of Social and
Health Service
MS LE-13
Olympia, WA 98504

ILLINOIS (217) 785-9868

Mr. Terry R. Lash, Director
Department of Nuclear Safety
1035 Outer Park Drive
Springfield, IL 62704

IOWA 515-281-4928

Donald A. Flater, Chief
Bureau of Radiological Health
Iowa Department of Health
Lucas State Office Building
Des Moines, IA 50319

II-10.0 FORMS

All forms referenced in Section I and II follow. Forms referenced in Sections III-1.0 through III-12.0 can be found at the end of each individual section.

<u>IWL FORMS</u>	<u>TITLE</u>
IWL-HP-04	Application for Radiation Source
IWL-HP-05	Shipping/Receiving Form
IWL-HP-06	User Request
IWL-HP-07	Basic HP Training Course
IWL-HP-08, 08a, 08b, & 08c	Calibrations
IWL-HP-11	Summary of Radiation Exposure
IWL-HP-18	Radiation Detection Instruments List
IWL-RW-206	Retraining in Regard to Processing Generated Waste
IWL-RW-231	Pack. of RADWASTE Exam Pg. 1
IWL-RW-231A	Pack. of RADWASTE Exam Pg. 2

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
the Radiation 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

RSC/QCM 4.80

Date

Approved

Rev'd:

Revs'd: 8/88

[Signature]

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 cm²):

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

RSC/QCM 480

	Date	Approved
Rev'd	_____	_____
Revs'd	_____	_____

Name _____ Social Security # _____
 Birth Date _____ Contact Lenses _____ Yes _____ No
 Highest level of education completed _____

TO BE FILLED OUT BY INDIVIDUAL

Type of Training	Where Trained	Duration of Training	On the Job	Formal Course
a. Principles and practices of radiation protection			Yes No	Yes No
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 FILLED OUT BY SUPERVISOR

Radiation work for which authorization is sought: _____

 Isotopes: _____ Physical & Chemical Form: _____
 Activity: _____ Supervisor Requesting Authorization: _____
 Safety Glasses Required: ___ Yes ___ No Date: _____

TO BE FILLED OUT BY THE SAFETY DEPT.

Health Physics Comments _____

 TLD Badge Required: ___ Yes ___ No Bioassay Required: ___ Yes ___ No
 Type _____ Analysis _____ Frequency _____
 Authorization Date _____ By _____
 Radiation Safety Officer

COPY DISTRIBUTION

Copies of this form are to be distributed as follows:
 _____ Health Physics _____ Supervisor _____ TLD Badge Service
 Original form to be returned to Personnel Department
 Form IWL-HP-06 (Rev. 4/86)

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

- A. Democritus
- B. Modern Theory
- C. Applications 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
 - 3) Discussion of Lauristan Taylor
- 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 _____

IWL-HP-07

Revised 8/88

RSC/OCM 4 80

	Date	Approved
Rev'd	_____	_____
Revs'd	_____	_____

CERTIFICATE OF CALIBRATION



TELEDYNE
ISOTOPES

CALIBRATED FOR:
MODEL No.:
SERIAL No.:

SOURCE USED:
SOURCE ID#:

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

*Calibration points were determined with a Victoreen Condenser R-meter
with a calibration traceable to the National Bureau of Standards.*

CALIBRATED BY:

DATE:

APPROVED BY: _____

DATE: _____

SPECIAL NOTES:

CERTIFICATE OF CALIBRATION



**TELEDYNE
ISOTOPES**

CALIBRATED FOR:
MODEL No.:
SERIAL No.:

SOURCE USED:
SOURCE ID#:

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

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

CALIBRATED BY:

DATE:

APPROVED BY: _____

DATE: _____

SPECIAL NOTES:

CERTIFICATE OF CALIBRATION



**TELEDYNE
ISOTOPES**

CALIBRATED FOR:

MODEL No.:

SOURCE USED:

SERIAL No.:

SOURCE ID#:

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

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

CALIBRATED BY:

DATE:

APPROVED BY: _____

DATE: _____

SPECIAL NOTES:

CERTIFICATE OF CALIBRATION



TELEDYNE
ISOTOPES

CALIBRATED FOR:

MODEL No.:

SOURCE USED: Ludlum model 500
pulse generator

SERIAL No.:

SOURCE ID#:

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

Calibration points were determined with an electronic pulse generator.

CALIBRATED BY:

DATE:

APPROVED BY: _____

DATE: _____

SPECIAL NOTES:

SUMMARY REPORT OF RADIATION EXPOSURE DOSE

TO:

In accordance with the provisions of 10 CFR Part 20 "Standards for Protection Against Radiation" the following information concerning the radiation exposure history of _____, Social Security Number _____ is given.

Our records show that the person identified above was with Teledyne Isotopes during the period of _____ to _____ and received a whole body radiation exposure during this period of _____ rem. To our knowledge, there were no overexposures to the (1) whole body; (2) skin of the whole body; or (3) hands and forearms; or (4) feet and ankles during this period.

Significant bioassay data (if any) is summarized by an attached report.

I certify that the exposure history above is correct and complete to the best of my knowledge and belief.

TELEDYNE ISOTOPES

Steven A. Black
Radiation Safety Officer

IWL-HP-11

RSC/QCM 4.80
Date

Approved

Rev'd:

Revs'd: 3/28SB

RADIATION DETECTION INSTRUMENTATION

The following instruments are currently available for field use or laboratory counting as Radiation Protection devices:

MANUFACTURER'S NAME	DESCRIPTION	MODEL NO.	NO. AVAILABLE	TYPE RADIATION DETECTABLE	RANGE	WINDOW THICKNESS	USE
Eberline	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 Surveying
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
Inertechneque	Liquid Scintillation	SL-30	1	low energy beta	0-1,000,000 total counts	none	Laboratory Counting
Eberline	Mini Scaler	MS-2	2	alpha, beta, gamma	0-5000,000 total counts	Mylar 0.9 mg/cm ²	Laboratory 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/cm ² Mica 1.4 to 2.0 mg/cm ² 30 mg/cm ²	Surveying/ Counting

IWL HP-18

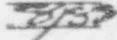
RSC/QCM 4 80

Date

Approved

Rev'd

Revs'd




**RETRAINING OF PERSONNEL
REGARDING PROCESSING OF GENERATED WASTE**

DATE: / /

INSTRUCTOR:

ATTENDEES: _____

SUBJECT OUTLINE:

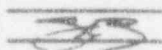
IWL-RW-206

Revised 8/88

RSC/QCM 4.80
Date

Approved

Rev'd: _____
Revs'd: 8/88



Packaging of Radioactive Waste Examination

- I. Fill in the blanks (3 pts. each)
1. List 5 characteristics of the material needed in order to determine the "proper shipping names":

 2. List 5 "proper shipping names":

 3. The radiation limit at contact with the container cannot exceed _____ mR/hr for a package of LSA material.
 4.

<u>Label</u>	<u>mR/hr limits @ contact</u>
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 SVL drums must be lined with a _____.
 11. The amount of absorbant added to any SVL 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 pt. 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. _____ 11 gallons of liquids are allowed in a DWLVL container.
4. _____ Two 2-mil liners is an acceptable substitute for a 4-mil liner.
5. _____ The pH range for liquids in a DWLVL container is 5.0-10.0.
6. _____ The animal carcass is to be completely surrounded with rock salt and absorbant.
7. _____ Cement is an acceptable solidification media.
8. _____ H-3 gas 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 requirements are of paramount consideration when determining how to package a given material.

AUG 01 1991

License Nos. 29-00055-02, 29-00055-06, 29-00055-14, 29-00055-15,
SNM-107, and SUB-1235

Docket Nos. 030-05218, 030-05219, 030-08681, 030-14482, 070-00124,
and 040-08413

Control Nos. 113092, 113093, 113094, 113095, 113096, and 113097

Teledyne Isotopes, Inc.
ATTN: Steven A. Black, Manager, RSO
50 Van Buren Avenue
Westwood, NJ 07675

Dear Mr. Black:

This is in reference to your submittal dated July 31, 1991 to provide financial assurance for decommissioning for License Nos. 29-00055-02, 29-00055-06, 29-00055-14, 29-00055-15, SNM-107 and SUB-1235. In order to continue our review, we need the following additional information:

1. For each of License Nos. 29-00055-06, 29-00055-15, and SNM-107 please guarantee the appropriate dollar amounts from the table contained in 10 CFR 30.35(d) or submit a Decommissioning Funding Plan (DFP) with a specific cost estimate and guarantee the amount of the estimate. For License Nos. 29-00055-02 and 29-00055-14 you are required to submit a DFP and specific cost estimate and provide financial assurance for the estimated cost. Financial assurance is not required for License No. SUB-1235 due to the fact that material authorized is not in a readily dispersible form.
2. Please submit evidence that Teledyne Isotopes, Inc. is a subsidiary of Teledyne, Inc. Teledyne Isotopes, Inc. is not listed as a subsidiary on p.22-2 of Exhibit 22 of the Form 10K which you submitted. Appropriate evidence includes incorporation agreements (e.g. copies of submissions to the appropriate State Corporation Commission) or a certified corporate resolution that Teledyne Isotopes, Inc. and Teledyne, Inc. are separate and distinct corporate entities.
3. If you wish to use a parent company guarantee as the financial instrument, please submit the appropriate documentation in Sections 4.3 and 4.7 of Regulatory Guide 3.66 (enclosed).

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. 113092, 113093, 113094, 113095, 113096 and 113097.

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07/31/91

ML 10

Teledyne Isotopes, Inc.

2

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,

Original Signed By:

John D. Kinneman

John D. Kinneman, Chief
Nuclear Materials Safety Section B
Division of Radiation Safety
and Safeguards

Enclosure: Regulatory Guide 3.66

bcc: J. Kinneman, RI

RIK/DRSS

Reber/mlb

RIK/DRSS

Kinneman

07/31/91

07/31/91

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ML 270 REBER - 0002.0.0
07/17/91

5nm-107
070-00124

LIST OF INSTRUCTIONS

TELEDYNE ISOTOPES

In reviewing the comments the reviewer will note that there will be some overlap between ICF and OGC comments. The following comments should be included in the basis for the deficiency letter:

1. ICF comments 1 through 3 plus last paragraph.
2. All OGC comments.

All other comments and discussions are for reviewer information.

February 6, 1991

Note to: Louis Bykoski, NMSS/LLWM
From: Mike Finkelstein, OGC/R&FC
Re: Review of ICF Comments in 5th Package dated 1/7/91

For each of the submittals listed below, the regional reviewers must verify that the document is a signed copy of the original and duly notarized.

Unless otherwise stated, the ICF comments and recommendations are correct and should be implemented.

Teledyne Isotopes (No DFP or Cert., Parent Company Guarantee)

ICF recommendations should be implemented because the analysis is correct. Teledyne is a prime candidate for an enforcement action after it responds to the deficiency letter.



ICF INCORPORATED

December 21, 1990

To: Dr. Lou Bykoski, NMSS/NRC

From: Rick Nevin, John Collier, and Michael Berg, ICF Incorporated

Subject: Review of Parent Guarantee/Financial Test Submitted by Teledyne Isotopes

Teledyne Isotopes of Westwood, New Jersey submitted documentation in support of a parent company guarantee/financial test to assure decommissioning costs for license number 29-00055-02, 29-00055-06, 29-00055-14, 29-00055-15, SNM-107, and SUB-1235 issued under 10 CFR Parts 30, 40, and 70. The submission included no information indicating the amount of the decommissioning cost estimate. With the exception of a letter from the licensee's president, the submission included none of the parent company guarantee/financial test documentation recommended in the draft *Regulatory Guide* to support the use of the guarantee.

Upon review of the entire submission, ICF recommends that NRC Region I require the licensee to modify the submission in the following ways:

- (1) Submit either a statement of certification or a decommissioning cost estimate; and
- (2) Demonstrate that a parent-subsidiary relationship exists between the guarantor and the licensee, or submit a different method of financial assurance.

If the licensee can demonstrate that it is eligible to use the parent guarantee, then it should also modify its submission in the following way:

- (3) Submit the required documents in support of the parent guarantee and financial test.

These recommendations and other issues are discussed below.

- (1) **Submit Either a Statement of Certification or a Decommissioning Cost Estimate**

The licensee did not submit either a certification statement or a decommissioning cost estimate. An important purpose of the certification and/or cost estimate is to indicate the minimum required amount of financial assurance. The submission provides no indication of the amount assured by the guarantee. The statement of certification, in addition to providing information that would allow NRC to verify the certification amount (e.g., the names and locations of the facilities for which financial assurance is provided and the amount and types of materials handled), certifies that the licensee is in compliance with the appropriate requirements. ICF recommends

that NRC require the licensee to submit either a statement of certification or a cost estimate to comply with NRC requirements (e.g., 10 CFR 30.35).

- (2) Demonstrate that a Parent-Subsidiary Relationship Exists Between the Guarantor and the Licensee, or Submit a Different Method of Financial Assurance

A parent-subsidiary relationship must exist between a guarantor and a licensee in order for the parent guarantee to be a valid method of financial assurance under NRC regulations. NRC regulations (e.g., 10 CFR 40.36(e)(2)) state that a parent company guarantee, like the surety and insurance methods of financial assurance, must "guarantee that decommissioning costs will be paid should the licensee default." This mechanism is only allowed when the parent company provides "an independent commitment beyond that of the licensee to expend funds" (53 Federal Register 24036, June 27, 1988).

The submission includes no information substantiating a parent-subsidiary relationship between the parent and the licensee. The cover letter written by the counsel of the parent company stated that an annual report of the parent company and a Form 10K, both submitted to the Securities and Exchange Commission, were attached to the submission. However, only the Form 10K was attached. The Form 10K included a listing of subsidiaries of Teledyne, Inc. in Exhibit 22 on pages 22-1 through 22-3. The alphabetical listing of the subsidiaries on these pages implies that Teledyne Isotopes should appear on page 22-2. But page 22-2 is missing, so ICF cannot determine if Teledyne Isotopes is a subsidiary.

ICF recommends that NRC require the licensee to demonstrate a parent-subsidiary relationship. Appropriate evidence includes incorporation agreements (e.g., copies of submissions to the appropriate State Corporation Commission) or a certified corporate resolution certifying that the licensee and its parent guarantor are separate and distinct corporate entities. If a parent-subsidiary relationship cannot be demonstrated, then a parent guarantee is not permitted by the regulations and the licensee must submit another type of financial assurance mechanism.

If, however, the licensee is able to demonstrate a parent-subsidiary relationship, then ICF also recommends that NRC require the licensee to modify its submission as described below.

- (3) Submit the Required Documents in Support of the Parent Guarantee and Financial Test

The documentation included in the licensee's current submission is clearly insufficient to substantiate a parent guarantee and financial test from the parent company. With the exception of the letter from the president of the licensee, none of the required documents specified in the draft *Regulatory Guide* are included in the submission. The cover letter notes that the auditor's special report and the letter from the chief financial officer of the parent company will be sent to NRC upon completion, and that the parent guarantee agreement will be sent as soon as it receives unanimous approval from the Board of Directors of the parent company. Without these documents,

NRC cannot verify either that the guarantor possesses the financial strength to cover the decommissioning costs of the licensee or that a valid guarantee exists. In addition to providing evidence that a parent-subsidary relationship exists, as discussed above, the guarantor should explicitly demonstrate its ability to pass the financial test in the letter from its chief financial officer.

ICF recommends that NRC require the licensee to submit the following documents substantiating a valid parent guarantee and financial test:

- Letter from the guarantor's chief financial officer, including demonstration of ability to pass the financial test (either Alternative I or II);
- Corporate guarantee agreement;
- Evidence that the guarantor is the parent company of the licensee, e.g., that the guarantor has majority control of the licensee's voting stock;
- Auditor's special report and schedule attachment to the special report;
- Evidence that parties signing the parent guarantee agreement for the guarantor are authorized to represent the company in the transaction; and
- Standby trust agreement and related documents.

These documents should be worded as recommended in the draft *Regulatory Guide* in Sections 4.3 and 4.7.

Other Issues

The draft *Regulatory Guide* recommends that the licensee include a letter from its chief executive officer stating that the licensee is a going concern. The licensee submitted such a letter signed by its president. ICF believes that the president has adequate authority to sign this letter.

Finally, NRC should ensure that documents submitted by the licensee are originally signed duplicates, as recommended in the draft *Regulatory Guide*. Unless the documents have been signed and notarized as appropriate, NRC cannot be certain that the financial assurance mechanism will be enforceable. Because ICF does not possess the original submissions, we cannot verify compliance with these requirements.

attachments

APPENDIX A
CHECKLIST FOR DECOMMISSIONING FINANCIAL ASSURANCE

license 2-21-wood-02
29-00055-06
29-00055-14
29-00055-15
SNM-107
SAB-1235

NAME OF LICENSEE OR APPLICANT

TELEDYNE ISOTOPES

MAILING ADDRESS

50 VAN BUREN AVE

WESTWOOD NEW JERSEY 07675

A. Licensee Part (check one of the following):

- Part 30 Licensee or Applicant Part 70 Licensee or Applicant
 Part 40 Licensee or Applicant _____ Part 72 Licensee or Applicant

B. Check appropriate item in each category (if applicable)

1. 8-1-90 Date of Financial Assurance Submission (No issue, effective, expiration dates)
2. _____ Public Entity
 Private Entity
3. Certification of Financial Assurance (No Certification Statement)
_____ Decommissioning Funding Plan
4. (a) _____ Prepayment Option (See Appendix B)
_____ Trust Fund
_____ Escrow Account
_____ Certificate of Deposit
_____ Government Fund
_____ Deposit of Government Securities
(b) Surety/Insurance/Other Guarantee (See Appendix C) (No mention of Amount of Assurance Mechanism)
_____ Surety bond
_____ Letter of Credit
_____ Line of Credit
 Parent Company Guarantee/Financial Test
(c) _____ External Sinking Fund, Sinking Account and Surety/Insurance (See Appendix D)
_____ Trust Fund
_____ Escrow Account
_____ Certificate of Deposit
_____ Government Fund
_____ Deposit of Government Securities
_____ Surety Bond
_____ Letter of Credit
_____ Line of Credit
(d) _____ Statement of Intent (public entities only)

*May not be used in combination with any other instrument.

APPENDIX C

CHECKLIST FOR SUBMISSION OF SURETY/INSURANCE/PARENT COMPANY GUARANTEE

A. Check Appropriate Form of Surety/Insurance/Guarantee

- Surety Bond
- Letter of Credit
- Line of Credit
- Parent Company Guarantee/Financial Test*
- Insurance

DCEO'S LETTER B. Check Documents Submitted for Surety/Insurance/Guarantee

- actually from President of firm, but wording is identical to recommended wording.

2) Cover letter indicated that - Auditor's Report, - CFO's letter, and - Guarantee were pending approval

- 1. Surety Bond
 - Surety Bond
 - Standby Trust Agreement
 - Acknowledgement
- 2. Letter of Credit
 - Letter of Credit
 - Standby Trust Agreement
 - Acknowledgement
- 3. Line of Credit
 - Verification
 - Standby Trust Agreement
 - Acknowledgement
- 4. Parent Company Guarantee
 - Letter from Chief Executive Officer of Applicant or Licensee
 - Letter from Chief Financial Officer of Parent Company
 - Financial Test: Alternative [I or II]
 - Auditor's Special Report and Attached Schedule
 - Corporate Guarantee
 - Standby Trust Agreement
 - Acknowledgement
- 5. Insurance
 - Certificate of Insurance
 - Standby Trust Agreement
 - Acknowledgement

May not be used in combination with any other instrument.

EXHIBIT 3-8

CHECKLIST OF CRITERIA FOR REVIEW OF PARENT COMPANY GUARANTEES

- YES* • Copy of letter from the chief executive officer of the licensee, verifying that it is a going concern* with positive tangible net worth (submitted annually at same time as parent company financial test in Sections 4.7.3 and 4.7.4 of this guide).
- NO* • Copy of corporate by-laws or other evidence indicating that parties signing the financial instrument (for the applicant) are authorized to represent the organization in the transaction. *Form 10-K that was submitted does not contain this information*
- NO* • Evidence that the financial instrument is an originally signed duplicate (e.g., an executed copy of the instrument).
- NO* • Evidence that the corporate parent has majority control of the applicant's voting stock. *Submitted Form 10-K lists subsidiaries of Teledyne Inc. however, one page is missing (22-2) thus we are unable to determine whether Teledyne Isotopes is a subsidiary.*
- YES* • Name and address of guarantor.
Teledyne
- YES* • Name and address of the licensee.
Teledyne Isotopes
- Company guarantee not submitted*
NO • Name and address of the regulatory agency.
- NO* • Recitation of the guarantor's authority to provide the guarantee, such as ownership of the licensee.
- NO* • Identification of the facilities for which the guarantee provides financial assurance and amounts guaranteed for decommissioning activities.

*A "going concern" is a firm that is expected to continue operating at least long enough for current expectations and plans to be carried out and for the reasonably foreseeable future period after that.

EXHIBIT 3-8 (Continued)

- No • Description of the primary obligation (decommissioning requirements).
- No • Unequivocal statement of guarantee.
 - a. Recitation of the consideration for the guarantee.
 - b. Liability of the guarantor.
 - a. Limitation of liability
 - b. Condition(s) of liability
 - c. Effect on liability of a change in the status of the licensee
- No • Statement that guarantor remains bound despite amendment or modification of license or decommissioning funding plan, reduction or extension of time of performance of required activities, or any other modification or alteration of an obligation of licensee.
- No • Notice requirements.
- No • Discharge of the guarantor.
- No • Termination and revocation.
 - 1. Termination on occurrence of contingency
 - 2. Voluntary revocation by guarantor
 - 3. Effective date of termination or revocation
- No • Date.
- No • Signatures.

TELEDYNE, INC
1901 AVENUE OF THE STARS
LOS ANGELES, CALIFORNIA 90067

July 31, 1990

U.S. Nuclear Regulatory Commission, Region 1
475 Allendale Road
King of Prussia, Pennsylvania 19406

Log	Chicago, Ill
Remitter	
Check No.	
Amount	12/10
Fee Category	Refund
Type of Fee	
Date of Fee	
To Whom	
By	AK

RECEIVED
AUG 13 1990
FEE NOT REQUIRED

Re: Financial Assurance for License Nos. 29-00055-02, 29-00055-06, 29-00055-14,
29-00055-15, SNM-107 and SUB-1235

Dear Sirs:

In response to the requirement for Financial Assurance for Decommissioning as set forth in 10 CFR Parts 30, 40 and 70, relating to six (6) Amended Materials Licenses (Licenses) issued to Teledyne Isotopes, the following materials are being submitted by Teledyne, Inc.:

1. A check in the amount of \$1,910.00 to cover the fees associated with further amending the following Licenses to reflect Financial Assurance:

License No.	Fee Categories	Fee
29-00055-02	5A/5B	\$430.00 plus Full Cost
29-00055-06	3L/3N/2C	\$400.00
29-00055-14	4B/4C	\$180.00
29-00055-15	3P/2C	\$360.00
SNM-107	1D	\$180.00
SUB-1235	2C	\$360.00
		<u>\$1,910.00 Total</u>

2. A "Letter from Chief Executive Officer of Licensee" certifying that the licensee is a going concern with a positive tangible net worth.
3. The Annual Report submitted to the Securities Exchange Commission for Teledyne, Inc. for the year 1989.
4. The Form 10-K submitted to the Securities Exchange Commission for Teledyne, Inc. for the year 1989.

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AUG 01 1990

Amendment fees are normally charged for voluntary amendments made to Licenses at the request of the Licensee. In this case, a amendment made to the License reflecting Financial Assurance for Decommissioning is at the insistence of the NRC and involuntary. Therefore, we believe it is appropriate that the fee listed above should be refunded to Teledyne Isotopes.

Renewals for License Numbers 29-00055-02 and 29-00055-14 are currently pending before Region I. The applications for renewal of these Licenses were filed in a timely manner accompanied by the appropriate renewal fees. We request that the above listed fees for these licenses be refunded as duplicative of the renewal fees currently held by the Region.

Because of the interrelationship and cross-referencing between the "Auditor's Special Report by Certified Public Accountant" and the "Letter of the Chief Financial Officer" of Teledyne, Inc., the corporate parent of Teledyne Isotopes, both of these documents will be forwarded as soon as our auditors are able to complete their review and issue their report.

Due to the need for a unanimous resolution of the Board of Directors authorizing the "Parent Company Guarantee", the Guarantee will be forwarded as soon as we are able to obtain such a resolution.

These two documents will be forwarded no later than August 15, 1990.

If you have any questions please call me at (213) 551-4252.

Sincerely,

A handwritten signature in black ink, appearing to read 'MB', with a long horizontal flourish extending to the right.

Marney Buchanan

MEB/jes

July 26, 1990
DFS-2390

U. S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

Subject: Financial Assuredness

Dear Sirs:

I am the President of Teledyne Isotopes, Inc, 50 Van Buren Avenue, Westwood, NJ 07675, a corporation. This letter is in support of this firm's use of the financial test to demonstrate financial assurance, as specified in 10 CFR Parts 30, 40 and 70. The following licenses are covered under this letter:

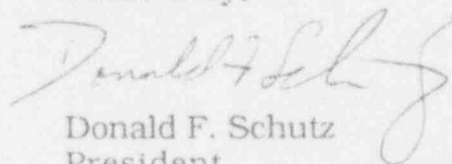
<u>License No.</u>	<u>Docket or Reference No.</u>
29-00055-02	030-05218
29-00055-06	030-05219
29-00055-14	030-08681
29-00055-15	030-14482
SNM-107	070-00124
SUB.-1235	040-08413

I hereby certify that Teledyne Isotopes, Inc. is currently a going concern, and that it possesses positive tangible net worth in the amount of \$15,000,674 as of 12/30/89.

This firm is not required to file a Form 10K with the U.S. Securities and Exchange Commission for the latest fiscal year. This year our fiscal year ends on December 29, 1990.

I hereby certify that the content of this letter is true and correct to the best of my knowledge.

Yours truly,



Donald F. Schutz
President

DFS/hp

FORM 10-K

SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

(X) ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE
SECURITIES EXCHANGE ACT OF 1934

For the Fiscal Year Ended December 31, 1989

() TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE
SECURITIES EXCHANGE ACT OF 1934

For the Transition Period From _____ to _____

Commission File Number 1-5212

TELEDYNE, INC.

(Exact Name of Registrant as Specified in its Charter)

Delaware

(State or Other Jurisdiction of
Incorporation or Organization)

95-2282626

(I.R.S. Employer
Identification Number)

1901 Avenue of the Stars
Los Angeles, California

(Address of Principal Executive Offices)

90067

(Zip Code)

Registrant's Telephone Number,
Including Area Code

(213) 277-3311

Securities registered pursuant to Section 12(b) of the Act:

TITLE OF EACH CLASS	NAME OF EACH EXCHANGE ON WHICH REGISTERED
Common Stock, \$1.00 Par Value	New York Stock Exchange Pacific Stock Exchange
6-1/2% Sinking Fund Debentures Due 1992	New York Stock Exchange
7% Subordinated Debentures Due 1999	New York Stock Exchange
7-7/8% Sinking Fund Debentures Due 1994	New York Stock Exchange Pacific Stock Exchange
10% Subordinated Debentures Due 2004, Series A	New York Stock Exchange
10% Subordinated Debentures Due 2004, Series C	New York Stock Exchange

Indicate by check mark whether Registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months, and (2) has been subject to such filing requirements for the past 90 days.
Yes No

At January 26, 1990, Registrant had outstanding 11,082,569 shares of its Common Stock. The aggregate market value of the Common Stock held by non-affiliates at this date was approximately \$2.8 billion, based on the closing price of \$345 7/8 as reported on the Composite Tape. For purposes of the foregoing calculation, all directors and officers of the registrant have been deemed to be affiliates, but the registrant disclaims that any of such directors or officers is an affiliate.

Documents Incorporated By Reference

Teledyne, Inc. annual report to shareholders for the year ended December 31, 1989 -
Part II

Teledyne, Inc. proxy statement for 1990 - Part III

PART I

Item 1. Business

(a) Teledyne, Inc. (Registrant) was incorporated in the state of Delaware in 1960. Registrant is a diversified corporation, the continuing operations of which are comprised of companies which manufacture a wide variety of products. During 1989, there have been no changes which in the aggregate would be significant in the kinds of products produced or services rendered by continuing operations of the Registrant, or in the markets or methods of distribution.

In January 1990, the Board of Directors approved a plan to spin off the insurance and finance subsidiaries to the Company's shareholders, subject to various regulatory procedures. The units involved, to be subsidiaries of a new company called Unitrin, Inc., are United Insurance Company of America and subsidiaries, Trinity Universal Insurance Company and subsidiaries and Fireside Securities Corporation and subsidiaries. These subsidiaries are presented as discontinued operations in the Teledyne, Inc. annual report to shareholders for the year ended December 31, 1989. It is anticipated that these companies will cease to be subsidiaries of Teledyne at the end of the first quarter of 1990.

(b) and (c)(1)(i) Information regarding business segments is presented in Note 8 on pages 24 through 25 in the Teledyne, Inc. annual report to shareholders for the year ended December 31, 1989 and is hereby incorporated by reference to such report. Teledyne's individual divisions are responsible for marketing their products. Additional information regarding the Company's products and services is presented in the Outline of Products and Activities on pages 33 through 35 in the Teledyne, Inc. annual report to shareholders for the year ended December 31, 1989 and is hereby incorporated by reference to such report.

(c)(1)(ii) There has been no public announcement about a new product or industry segment that would require the investment of a material amount of assets of the Registrant or that otherwise is material.

(c)(1)(iii) Substantially all parts and materials required in the manufacture of Registrant's products are available from more than one supplier and, in Registrant's opinion, the sources and availability of raw materials essential to its business are adequate.

(c)(1)(iv) Registrant owns a number of patents and trademarks and is a party to numerous patent, trademark and technical information license agreements. Although these have been and are expected to be of value, in the opinion of Registrant the loss of any single such item or technically related group of such items would not materially affect the conduct of its business.

(c)(1)(v) and (c)(1)(vi) Not applicable.

Item 1. Business (Continued)

(c)(1)(vii) For the year ended December 31, 1989, approximately 35 percent of Registrant's revenues was attributable to U.S. Government business. Registrant's sales to the U.S. Government by the aviation and electronics segment were \$1.0 billion in 1989 and \$1.1 billion in 1988 and 1987. Registrant has a large number of Government contracts at various of its divisions involving diverse products and services. Any material reduction in United States Government appropriations for defense programs could adversely affect Registrant's business. Government contracts are subject to termination by the Government without cause, but in the event of such termination, Registrant would ordinarily be entitled to reasonable compensation for work completed prior to termination. Additional information regarding U.S. Government business is included in Management's Discussion and Analysis of Financial Condition and Results of Operations on page 32 in the Teledyne, Inc. annual report to shareholders for the year ended December 31, 1989 and is hereby incorporated by reference to such report.

(c)(1)(viii) Registrant's backlog of confirmed orders was approximately \$2.0 billion at December 31, 1989 and \$2.3 billion at December 31, 1988. During the year ending December 31, 1990, it is anticipated that approximately 80 percent of confirmed orders on hand at December 31, 1989 will be filled. Backlog of confirmed orders of the aviation and electronics segment was \$1.4 billion at December 31, 1989 and \$1.6 billion at December 31, 1988. During the year ending December 31, 1990, it is anticipated that approximately 75 percent of the confirmed orders on hand at December 31, 1989 for this segment will be filled.

(c)(1)(ix) See (c)(1)(vii) above.

(c)(1)(x) Intense competition exists with respect to most of Registrant's products and services in each of its principal business segments. During the year ended December 31, 1989, there were no material changes in the competitive conditions in the various industries in which Registrant competes. In view of the number and variety of its products and services, Registrant believes that it is not meaningful to state its relative position with respect to the market for any particular product or service, or group of products or services.

(c)(1)(xi) Research and development is conducted by Registrant at its various operating locations both for its own account and for customers on a contract basis. Registrant estimates that approximately \$369.6 million in 1989, \$370.2 million in 1988 and \$354.5 million in 1987 for such expenses were incurred. Of these amounts, approximately \$69.2 million in 1989, \$79.3 million in 1988 and \$87.7 million in 1987 were attributable to company-sponsored research. Customer-sponsored research was approximately \$300.4 million in 1989, \$290.9 million in 1988 and \$266.8 million in 1987. Registrant estimates that approximately \$334.5 million in 1989, \$336.7 million in 1988 and \$317.2 million in 1987 for research and development expense was incurred by the aviation and electronics segment. Of those amounts, approximately \$42.7 million in 1989, \$51.4 million in 1988 and \$55.0 million in 1987 were attributable to company-sponsored research. Customer-sponsored research in this segment was approximately \$291.8 million in 1989, \$285.3 million in 1988 and \$262.2 million in 1987.

Item 1. Business (Continued)

(c)(1)(xii) In the opinion of Registrant, compliance with existing Federal, state and local provisions regulating the discharge of materials into the environment, or otherwise relating to the protection of the environment, will not have a material effect on the capital expenditures, earnings or competitive position of Registrant and its subsidiaries. Additional information regarding laws and regulations concerning the environment is included in Management's Discussion and Analysis of Financial Condition and Results of Operations on page 32 in the Teledyne, Inc. annual report to shareholders for the year ended December 31, 1989 and is hereby incorporated by reference to such report.

(c)(1)(xiii) Registrant and its subsidiaries employ approximately 35,100 persons in continuing operations. In addition, approximately 8,100 persons are employed in its insurance and finance operations.

(d)(1) During the years ended December 31, 1989, 1988 and 1987, Registrant and its subsidiaries did not engage in material manufacturing operations in foreign countries. Export sales by U.S. operations to customers in foreign countries represented approximately 11 percent in 1989 and 1988, and 8 percent in 1987 of Registrant's sales.

(d)(1)(i) and (d)(1)(ii) Not applicable.

(d)(2) In the opinion of Registrant, there is no significant risk attendant to its foreign operations.

(d)(3) Not applicable.

Item 2. Properties

Registrant owns manufacturing and research facilities at numerous locations as follows: aviation and electronics segment (3.6 million square feet), primarily in California; specialty metals segment (5.6 million square feet), primarily in Pennsylvania, Ohio and Oregon; industrial segment (5.4 million square feet), primarily in Michigan, Pennsylvania and Ohio; consumer segment (0.9 million square feet), primarily in Colorado and Pennsylvania.

Registrant leases facilities as follows: aviation and electronics segment (4.3 million square feet), primarily in Alabama and California; specialty metals segment (0.8 million square feet), primarily in Massachusetts; industrial segment (1.5 million square feet), primarily in California, Tennessee and Ohio; consumer segment (0.8 million square feet), primarily in California and New Jersey. The terms of these leases range from monthly tenancies to several years, and many may be renewed for additional periods at the option of Registrant.

Item 2. Properties (Continued)

Registrant believes that its property and equipment, substantially all of which is fully utilized in its operations, are well maintained and in good operating condition. Capital expenditures have increased in 1989 over previous years. It is probable that the 1989 level of capital expenditures will continue in 1990. Certain of the Company's units have initiated major technological improvements by which they intend to improve productivity.

Item 3. Legal Proceedings

Registrant is defending a class action brought in the Chancery Court of Delaware alleging that Registrant violated its fiduciary duties to Registrant's shareholders through various alleged actions, misrepresentations and failures to disclose facts in connection with Registrant's offer to repurchase shares of its common stock in February 1976. The action seeks compensatory and punitive damages in an indeterminate amount and, in the alternative, rescission. Registrant believes that the allegations made in this action are not meritorious and that Registrant has in all instances adequate legal defenses.

US Ecology, Inc., a wholly-owned subsidiary of Registrant from September 1975 through March 1984, monitors and maintains disposal sites for chemical waste in the State of Illinois. In July of 1988, the State of Illinois filed an action entitled State of Illinois v. Teledyne, Inc., US Ecology, Inc. and American Ecology Corporation, in which the State of Illinois alleges that contaminants from the disposal sites have migrated, or threaten to migrate, into ground and surface waters. The State of Illinois claims violation of its Environmental Protection Act, as well as common law nuisance, and seeks injunctive relief and penalties. The action was filed in the Circuit Court for the Thirteenth Judicial Circuit in Bureau County, Illinois following dismissal of a substantially similar lawsuit among the parties filed by the State of Illinois in May 1980 and dismissed by the same court in March 1988 for the State's failure to respond to discovery. It is impossible at this time to assess either the extent of injunctive relief or the amount of penalties which might be awarded in the current action, if any. Nevertheless, Registrant does not believe that the case will have a material adverse effect on its consolidated financial statements.

On February 23, 1989, Rodney B. Shields filed a purported shareholder's derivative action in the Superior Court of the State of California, County of Los Angeles, entitled Shields v. Singleton, et al. Among other things, Mr. Shields alleges that the Company's Teledyne Electronics unit obtained a contract with the U.S. government by illegal means. The complaint names twenty individual defendants, including five directors and eight officers of Registrant as well as one employee and three former employees of Teledyne Electronics. Mr. Shields alleges that these individuals breached their fiduciary duties to Registrant, and seeks a judgment requiring them to pay

Item 3. Legal Proceedings (Continued)

Registrant those amounts by which it has allegedly been damaged, and to return to Registrant all salaries and other remuneration paid to them during the time periods they were allegedly acting in breach of their fiduciary duties. Mr. Shields also seeks attorneys' fees and costs. The Company does not believe that the case will have a material adverse effect on its consolidated financial statements.

On May 5, 1989, agents of the Federal Bureau of Investigation and the Defense Criminal Investigative Service executed a search warrant on and removed a number of documents relating to contracts and pricing from the Company's Teledyne Systems unit. In addition, several Teledyne Systems employees received subpoenas to testify before a federal grand jury. Based on an ongoing internal review, and after consultation with counsel, the Company does not possess sufficient information to determine whether the Company will sustain a loss as a result of the investigation, or to reasonably estimate the amount of any such loss. Consequently, the Company has not been able to identify the existence of a material loss contingency arising from the investigation.

The following described proceeding is reported here in accordance with Instruction 5.C. to Item 103 of Regulation S-K promulgated by the Securities and Exchange Commission pursuant to the Securities Exchange Act of 1934. In January, 1987 and February, 1989, the California Department of Health Services issued two reports of violation alleging that Registrant's Teledyne McCormick Selph unit had violated hazardous waste treatment and storage requirements at its Hollister, California facility. In a letter dated February 27, 1989, the California Attorney General's office advised that the Department of Health Services had asked the Attorney General to seek civil penalties and injunctive relief in connection with the reports of violation. On November 9, 1989, the matter was settled upon payment of civil penalties to the Department of Health Services in the amount of \$100,000, and upon Teledyne's further agreement to fund a multidisciplinary environmental education program for San Benito High School in the amount of \$80,000.

Registrant is subject to ongoing Federal tax audits, discussed in Note 10 to the consolidated financial statements of Teledyne, Inc. and its subsidiaries.

Item 4. Submission of Matters to a Vote of Security Holders

No applicable.

PART II

Item 5. Market for the Registrant's Common Equity and Related Stockholder Matters

This information is presented on page 32 in the Teledyne, Inc. annual report to shareholders for the year ended December 31, 1989 and is hereby incorporated by reference to such report.

Item 6. Selected Financial Data

This information is presented on page 30 in the Teledyne, Inc. annual report to shareholders for the year ended December 31, 1989 and is hereby incorporated by reference to such report.

Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations

This information is presented on pages 30 through 32 in the Teledyne, Inc. annual report to shareholders for the year ended December 31, 1989 and is hereby incorporated by reference to such report.

Item 8. Financial Statements and Supplementary Data

This information is presented on pages 14 through 28 and page 29 in the Teledyne, Inc. annual report to shareholders for the year ended December 31, 1989 and is hereby incorporated by reference to such report.

Item 9. Disagreements on Accounting and Financial Disclosure

Not applicable.

PART III

Item 10. Directors and Executive Officers of the Registrant

This information will be included in the Teledyne, Inc. proxy statement for 1990 which will be filed within 120 days of Registrant's year end and is hereby incorporated by reference to such proxy statement.

Item 11. Executive Compensation

This information will be included in the Teledyne, Inc. proxy statement for 1990 which will be filed within 120 days of Registrant's year end and is hereby incorporated by reference to such proxy statement.

Item 12. Security Ownership of Certain Beneficial Owners and Management

This information will be included in the Teledyne, Inc. proxy statement for 1990 which will be filed within 120 days of Registrant's year end and is hereby incorporated by reference to such proxy statement.

Item 13. Certain Relationships and Related Transactions

This information will be included in the Teledyne, Inc. proxy statement for 1990 which will be filed within 120 days of Registrant's year end and is hereby incorporated by reference to such proxy statement.

PART IV

Item 14. Exhibits, Financial Statement Schedules, and Reports on Form 8-K

(a)(1) The following consolidated financial statements of Teledyne, Inc. and subsidiaries, in response to Item 8 of this Form 10-K, have been incorporated by reference to the Teledyne, Inc. annual report to shareholders for the year ended December 31, 1989.

Consolidated Balance Sheets - December 31, 1989 and 1988

Consolidated Statements of Income for the Years Ended December 31, 1989, 1988 and 1987

Consolidated Statements of Cash Flows for the Years Ended December 31, 1989, 1988 and 1987

Consolidated Statements of Shareholders' Equity for the Years Ended December 31, 1989, 1988 and 1987

Report of Independent Public Accountants

Notes to Consolidated Financial Statements

(a)(2) See the index preceding the financial statement schedule.

Financial Statement Schedule A - schedule supporting the consolidated financial statements of Teledyne, Inc. and subsidiaries.

(a)(3) See the exhibit index.

(b) Registrant did not file any reports on Form 8-K during the last quarter of the year ended December 31, 1989.

(c) Included in 14(a)(3) above.

(d) Included in 14(a)(2) above.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, Registrant has duly caused this annual report to be signed on its behalf by the undersigned, thereunto duly authorized.

TELEDYNE, INC.

(Registrant)

Date: January 31, 1990

By /S/ George Roberts
George A. Roberts
Director, President and Chief
Executive Officer

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of Registrant and in the capacities and on the date indicated.

Date: January 31, 1990

By /S/ Henry E. Singleton
Henry E. Singleton
Chairman of the Board

Date: January 31, 1990

By /S/ George Roberts
George A. Roberts
Director, President and Chief
Executive Officer

Date: January 31, 1990

By /S/ Arthur Rock
Arthur Rock
Director

Date: January 31, 1990

By /S/ Gordon J. Bean
Gordon J. Bean
Treasurer
(Principal Financial Officer)

Date: January 31, 1990

By /S/ Douglas J. Grant
Douglas J. Grant
Controller
(Principal Accounting Officer)

TELEDYNE, INC. AND SUBSIDIARIES

FINANCIAL STATEMENT SCHEDULE A

SCHEDULE SUPPORTING THE CONSOLIDATED FINANCIAL STATEMENTS OF

TELEDYNE, INC. AND SUBSIDIARIES

INDEX

	<u>Page</u>
Report of Independent Public Accountants	A-2
Schedule I - Marketable Securities - Other Investments	A-3

All other schedules are not submitted because they are not applicable or not required or because the required information is included in the consolidated financial statements of Teledyne, Inc. and subsidiaries or notes thereto.

REPORT OF INDEPENDENT PUBLIC ACCOUNTANTS

TO TELEDYNE, INC.:

We have audited, in accordance with generally accepted auditing standards, the consolidated financial statements included in Teledyne, Inc.'s annual report to shareholders incorporated by reference in this Form 10-K, and have issued our report thereon dated January 25, 1990. We did not audit the consolidated financial statements of United Insurance Company of America and subsidiaries and the investee companies. Those statements were audited by other auditors whose reports have been furnished to us and our opinion, insofar as it relates to amounts included for United Insurance Company of America and subsidiaries and the investee companies, is based on the reports of the other auditors.

Our audit was made for the purpose of forming an opinion on the basic financial statements taken as a whole. The schedule listed in the accompanying index is presented for purposes of complying with the Securities and Exchange Commission's rules and is not part of the basic financial statements. This schedule has been subjected to the auditing procedures applied in the audit of the basic financial statements and, in our opinion, based on our audit and the reports of other auditors, fairly states in all material respects the financial data required to be set forth therein in relation to the basic financial statements taken as a whole.

ARTHUR ANDERSEN & CO.

Los Angeles, California
January 25, 1990

TELEDYNE, INC. AND SUBSIDIARIES

SCHEDULE I - MARKETABLE SECURITIES - OTHER INVESTMENTS

December 31, 1989

(In millions except share amounts)

Name of Issuer and Title of Each Issue	Number of Shares or Principal Amount of Bonds and Notes	Cost of Each Issue	Market Value of Each Issue at Balance Sheet Date	Amount at Which Shown in the Balance Sheet
Cash				\$ 8.7
United States Treasury notes, at amortized cost	\$ <u>111.4</u>	\$ <u>118.1</u>	\$ <u>115.0</u>	114.6
Litton common stock, at cost plus cumulative earnings	<u>838,100</u>	<u>11.2</u>	<u>64.7</u>	43.5
Bankers acceptances, at amortized cost	\$ <u>43.0</u>	<u>42.3</u>	<u>42.3</u>	42.6
Other marketable securities	\$ <u>28.0</u>	<u>26.3</u>	<u>27.8</u>	<u>27.0</u>
Total Cash and Marketable Securities				<u>\$236.4</u>

TELEDYNE, INC. AND SUBSIDIARIES

INDEX TO EXHIBITS

	<u>Number</u>
Articles of incorporation and by-laws	3
Teledyne, Inc. annual report to shareholders for the year ended December 31, 1989, portions of which are incorporated herein by reference.	13
Subsidiaries of registrant	22
Consent of independent public accountants	24
Independent auditors' report on subsidiary statements	28

NOTICE TO SHAREHOLDERS

The version of the Teledyne 1989 Annual Report on Form 10-K ("Teledyne 10-K") being provided you does not include Exhibit 3. Exhibit 3 to the Teledyne 10-K consists of the Company's Restated Certificate of Incorporation and Restated By-Laws.

If you wish to receive an actual copy of Exhibit 3 to the Teledyne 10-K, please send a written request along with a cashier's check or money order made out to Teledyne, Inc. in the amount of \$1.50 to cover handling and duplicating expenses. All such requests should be sent to Teledyne, Inc., 1901 Avenue of the Stars, Los Angeles, CA 90067, Attention: Public Relations.

TELEDYNE, INC. AND SUBSIDIARIESSUBSIDIARIES OF REGISTRANT

December 31, 1989

The following table shows the name and place of incorporation of each subsidiary, except those subsidiaries which, when considered in the aggregate, would not constitute a significant subsidiary. Unless otherwise indicated, each subsidiary is wholly-owned as to voting securities. Also shown are the names under which each subsidiary does business.

<u>Name and Place of Incorporation</u>	<u>Names Under Which Subsidiaries Do Business</u>
Teledyne Industries, Inc. (California) subsidiary of Teledyne, Inc.	Teledyne Aero-Cal Teledyne Aerospace Systems Teledyne Allvac Teledyne Analytical Instruments Teledyne Ansonia Teledyne Avionics Teledyne Battery Products Teledyne Big Beam Teledyne Brown Engineering Teledyne CAE Teledyne Cast Products Teledyne Casting Service Teledyne CME Teledyne Columbia-Summerill Teledyne Continental Motors - Aircraft Products Teledyne Continental Motors - General Products Teledyne Controls Teledyne Coordinators Teledyne Crittenden Teledyne Crystalonics Teledyne Economic Development Teledyne Efficient Industries Teledyne Electro-Mechanisms Teledyne Electronics Teledyne Engineering Services Teledyne Farris Engineering Teledyne Firth Sterling Teledyne Geotech

TELEDYNE, INC. AND SUBSIDIARIES

SUBSIDIARIES OF REGISTRANT

December 31, 1989

<u>Name and Place of Incorporation</u>	<u>Names Under Which Subsidiaries Do Business</u>
Teledyne Industries, Inc. - Continued	Teledyne Getz
	Teledyne Gurley
	Teledyne Hanau
	Teledyne Hastings-Raydist
	Teledyne Howell Penncraft
	Teledyne Hydra-Power
	Teledyne Hyson
	Teledyne Inet
	Teledyne International Marketing
	Teledyne Irby Steel
	Teledyne Kinetics
	Teledyne Laars
	Teledyne Landis Machine
	Teledyne Lewisburg
	Teledyne McCormick Selph
	Teledyne McKay
	Teledyne MEC
	Teledyne Mecca
	Teledyne Merla
	Teledyne Metal Finishers
	Teledyne Metal Forming
	Teledyne Microelectronics
	Teledyne Microwave
	Teledyne Minerals
	Teledyne Monarch Rubber
	Teledyne Monolithic Microwave
	Teledyne National Tracing Paper
	Teledyne Neosho
	Teledyne Ohio Steel
	Teledyne Osco Steel
	Teledyne Owen
	Teledyne Peer
	Teledyne Penn-Union
	Teledyne Philbrick
	Teledyne Picco
	Teledyne Pines
	Teledyne Pittsburgh Tool Steel
	Teledyne Portland Forge
	Teledyne Post
	Teledyne Powder Alloys

TELEDYNE, INC. AND SUBSIDIARIES

SUBSIDIARIES OF REGISTRANT

December 31, 1989

<u>Name and Place of Incorporation</u>	<u>Names Under Which Subsidiaries Do Business</u>
Teledyne Industries, Inc. - Continued	Teledyne Precision-Cincinnati Teledyne Readco Teledyne Relays Teledyne Republic Teledyne Rodney Metals Teledyne Ryan Aeronautical Teledyne Ryan Electronics Teledyne SC Teledyne Semiconductor Teledyne Solid State Teledyne Sprague Engineering Teledyne Still-Man Teledyne Taber Teledyne TAC Teledyne Thermatics Teledyne Total Power Teledyne Vasco Teledyne Wah Chang Albany Teledyne Wah Chang Huntsville Teledyne Water Pik Teledyne Wirz
Teledyne Canada, Limited (Ontario) subsidiary of Teledyne, Inc. (75.9%)	Teledyne Canada Firth Sterling Teledyne Canada Harfac-McKay Teledyne Canada Metal Products Teledyne Canada Mining Products
Teledyne Exploration Company (Texas) subsidiary of Teledyne, Inc.	Teledyne Exploration

TELEDYNE, INC. AND SUBSIDIARIES

SUBSIDIARIES OF REGISTRANT

December 31, 1989

<u>Name and Place of Incorporation</u>	<u>Names Under Which Subsidiaries Do Business</u>
Teledyne Industries Canada Limited (Ontario) subsidiary of Teledyne, Inc.	Farris Industries Canada Teledyne Industries Canada Limited Teledyne Precision Canada Teledyne Still-Man Canada Teledyne Water Pik Canada
Teledyne Isotopes, Inc. (California) subsidiary of Teledyne, Inc.	Teledyne Energy Systems Teledyne Isotopes
Teledyne Movable Offshore, Inc. (Delaware) subsidiary of Teledyne, Inc.	Teledyne Movable Offshore
Teledyne Princeton Inc. subsidiary of Teledyne Canada, Limited	Teledyne Princeton
Teledyne Systems Company, Inc. subsidiary of Teledyne Industries, Inc.	Teledyne Systems Company

TELEDYNE, INC. AND SUBSIDIARIES

SUBSIDIARIES OF REGISTRANT - DISCONTINUED

December 31, 1989

<u>Name and Place of Incorporation</u>	<u>Names Under Which Subsidiaries Do Business</u>
Financial Indemnity Company (California) subsidiary of Trinity Universal Insurance Company	Financial Indemnity Company
Fireside Securities Corporation (California) subsidiary of Teledyne, Inc.	Fireside Securities
Fireside Thrift Co. (California) subsidiary of Fireside Securities Corporation	Fireside Thrift Co.
General Life Insurance Corporation of Wisconsin (Wisconsin) subsidiary of United Insurance Company of America	General Life Insurance Corporation
The Pyramid Life Insurance Company (Kansas) subsidiary of United Insurance Company of America	Pyramid Life Insurance Company
Trinity Universal Insurance Company (Texas) subsidiary of Teledyne, Inc.	Trinity Universal Insurance Company
United Insurance Company of America (Illinois) subsidiary of Teledyne, Inc.	United Insurance Company of America

CONSENT OF INDEPENDENT PUBLIC ACCOUNTANTS

As independent public accountants, we hereby consent to the incorporation of our reports included or incorporated by reference in this Form 10-K, into the Company's previously filed Registration Statement File No. 2-52617.

ARTHUR ANDERSEN & CO.

Los Angeles, California
January 25, 1990

INDEPENDENT AUDITORS' REPORT

To the Shareholder and Board of Directors of United Insurance Company of America:

We have audited the accompanying consolidated balance sheets of United Insurance Company of America and subsidiaries as of December 31, 1989 and 1988, and the related consolidated statements of income for each of the years in the three-year period ended December 31, 1989. These consolidated financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these consolidated statements based on our audits.

We conducted our audits in accordance with generally accepted auditing standards. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for our opinion.

The Company declined to present consolidated statements of cash flows and shareholder's equity for the three-year period ended December 31, 1989. Presentation of such statements summarizing the Company's operating, investing, and financing activities and changes in the components of shareholder's equity is required by generally accepted accounting principles.

In addition, the Company's financial statements do not disclose sufficient detail on investments, reinsurance, long term debt, related party transactions, and pension plans or the pro forma operating results reflecting the acquisition of Union National Life Insurance Company in the notes to consolidated financial statements as is required by generally accepted accounting principles.

In our opinion, except that the omission of the information discussed in the preceding paragraphs results in an incomplete presentation, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of United Insurance Company of America and subsidiaries at December 31, 1989 and 1988 and the results of their operations for each of the years in the three year period ended December 31, 1989, in conformity with generally accepted accounting principles.

Los Angeles, California
January 5, 1990

KPMG Peat Marwick



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

DEC 19 1990

Teledyne, Inc.
ATTN: Marney Buchanan
1901 Avenue of the Stars
Los Angeles, CA 90067

REFUND OF APPLICATION FEE

1. BACKGROUND:

Check Received August 13, 1990
Application Dated July 31, 1990
Check Number 46598
Check Amount \$1,910

2. REFUND:

Amount \$1,910

This refund is now being processed and will be sent as soon as possible.

3. REASON FOR REFUND:

Fee for application dated July 31, 1990, for License Nos. 29-00055-02, 29-00055-06, 29-00055-14, 29-00055-15, SNM-107, and SUB-1235 is being refunded in accordance with Information Notice 90-38, Supplement 1.

NOTE: ENCLOSED IS A COPY OF THE MAY 23, 1990 FEDERAL REGISTER NOTICE CONTAINING THE COMMISSION'S REVISED FEE REGULATIONS WHICH WENT INTO EFFECT JULY 2, 1990. IF YOU HAVE ANY QUESTIONS CONCERNING THE FEES TO BE SUBMITTED WITH FUTURE APPLICATIONS, PLEASE CONTACT US AT 301-492-4650.

Maurice Messier
Maurice Messier
License Fee and Debt Collection Branch
Division of Accounting and Finance
Office of the Controller

Enclosure: May 23, 1990
Federal Register notice

(FOR LFMS USE)
INFORMATION FROM LTS

BETWEEN:

LICENSE FEE MANAGEMENT BRANCH, ARM
AND
REGIONAL LICENSING SECTIONS

PROGRAM CODE: 22111
STATUS CODE: 0
FEE CATEGORY: 1D
EXP. DATE: 19920731
FEE COMMENTS:

LICENSE FEE TRANSMITTAL

4. REGION

1. APPLICATION ATTACHED

APPLICANT/LICENSEE: TELEDYNE ISOTOPES, INC.
RECEIVED DATE: 900801
DOCKET NO: 7000124
CONTROL NO.: 113096
LICENSE NO.: SNM-107
ACTION TYPE: AMENDMENT

2. FEE ATTACHED

AMOUNT: \$1,410.00 *
CHECK NO.: 46578

3. COMMENTS

* Also - 113092, 113093,
113094, 113095 & 113097

SIGNED R. J. Brown
DATE 90 08 07

B. LICENSE FEE MANAGEMENT BRANCH (CHECK WHEN MILESTONE 03 IS ENTERED 1__1)

1. FEE CATEGORY AND AMOUNT: ID

FEE NOT REQUIRED

2. CORRECT FEE PAID. APPLICATION MAY BE PROCESSED FOR: IN IN 90-38

AMENDMENT _____
RENEWAL _____
LICENSE _____

3. OTHER _____

SIGNED _____
DATE _____