N-ACO-88-GWMON-R

CRR

SHIELDALLOY METALLURGICAL CORPORATION

WEST BOULEVARD
P.O. BOX 768
NEWFIELD, NJ 08344
TELEPHONE (609) 692-4200
TWX (510) 687-8918
FAX (609) 692-4017
ENVIRONMENTAL DEPARTMENT FAX
(609) 697-9025

Certified Mail: P 284 353 207
Return Receipt Requested

August 6, 1992

Ms. Donna L. Gaffigan
State of New Jersey
Department of Environmental Protection and Energy
Bureau of Federal Case Management
Division of Hazardous Waste Management
401 East State Street
CN-028
Trenton, New Jersey 08625

RE: Second Quarter 1992 Radiochemical Ground Water Sampling Report

Dear Ms. Gaffigan:

In accordance with ¶20(g) of the Shieldalloy Metallurgical Corporation (SMC) 1988 Administrative Consent Order, please find results of the subject sampling event. Monitoring Wells A, W2, SC12S, and SC13S were sampled on April 14, 1992 while Well SC14S was sampled on April 13, 1992. The locations of these monitoring wells are identified on Enclosure (1) Location of Monitoring Wells Sampled for Radiological Analysis. Well SC11S was unavailable for sampling due to damage from freezing weather. Well SC11S has since been repaired and will be available for sampling in the future.

The methodology for referenced sampling and analyses was consistent with previous subject sampling events. A one gallon sample was collected from each of the five wells while a duplicate one gallon sample was collected from Well SC13S and submitted for analysis as a quality control measure. After collection the samples were taken to the SMC laboratory to determine the Total Dissolved Solids (TDS) level for each sample. The TDS results are presented in Enclosure (2). The samples were then submitted to Teledyne Isotopes (TI) of Westwood, New Jersey for gross alpha analysis.

Results of the gross alpha activity of the subject samples were all less than the minimum detection limit (MDL) for the analysis (see Enclosure 3). However, four sample results (Wells A, SC12S, SC13S, and SC13S1) reported MDLs greater than the target of 5 pCi/ℓ. Therefore, these four samples were resubmitted for isotopic analysis. The results of the isotopic analysis can be found in Enclosure 4. Gross alpha and isotopic analyses for this sampling event indicate radiological levels comparable to background Well SC14S. This is consistent with past sampling events. The chain of custody, request for analysis and all available TI quality assurance, laboratory data sheets are found in Enclosure 5.

SMC has conducted the subject monitoring program, as requested by the NJDEPE and agreed to in the 1988 ACO, since December 1988 in an effort to determine if the storage of radioactive material at the SMC facility had any influence on the groundwater. Much data has been collected during this program which has shown consistently, to be comparable to background radiochemical levels for this area. Although the gross alpha results have not been elevated if compared to the Safe Drinking Water Act (SDWA) standards, SMC's contract laboratory has been unable to reach lower detection limits required per the ACO and subsequent related correspondence from the Department. Dissolved solids in the groundwater have caused analytical interference when TI attempts to reach lower detection limits. This analytical interference problem may prevent SMC from consistently obtaining gross alpha results with detection limits below 5 pCi/ℓ, required by the ACO before petitioning the Department for relief of the subject monitoring. SMC asserts that the requirements established under the ACO are arbitrary and more restrictive than the SWDA standards. Since the data collected to date have consistently shown compliance with the SDWA, SMC is hereby petitioning the Department for the discontinuation of the subject sampling program under the ACO.

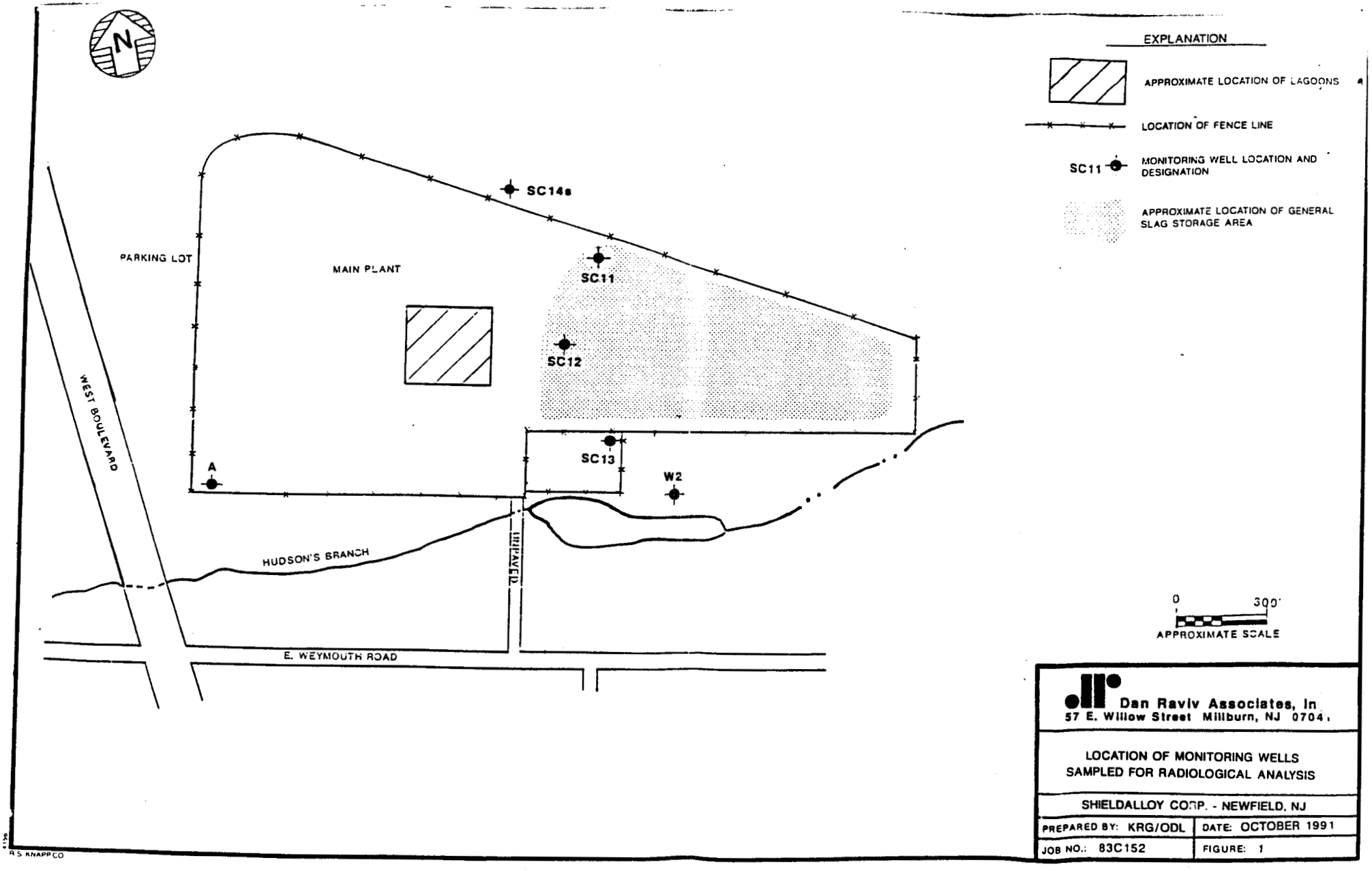
SMC feels strongly that the request to discontinue this programs is appropriate. We are agreeable to meeting with the Department to discuss results of the monitoring program to date and discuss other information concerning the management of the NRC-licensed material.

If you have any questions, please do not hesitate to contact me at 609-692-4200.

Sincerely,

Craig R. Rieman
Radiological Safety Manager

CRR:lms
Enclosure
CC: Richard D. Way
David R. Smith
James P. Valenti
Charles L. Harp, Jr., Esq.
Jay E. Silberg, Esq.
Carol D. Berger



Dan Raviv Associates, In
57 E. Willow Street Millburn, NJ 0704

LOCATION OF MONITORING WELLS
SAMPLED FOR RADIOLOGICAL ANALYSIS

SHIELDALLOY CORP. - NEWFIELD, NJ

PREPARED BY: KRG/ODL	DATE: OCTOBER 1991
JOB NO.: 83C152	FIGURE: 1

SHIELDALLOY METALLURGICAL CORPORATION

TDS Results

Date 02/06/92

SAMPLE WELL	TEST DESCRIPTION	RESULT	LIMIT	UNITS	DATE ANALYZED	BY
SC12S	TDS by Gravimetric	1750	0.01	ppm	05/12/92	GJ/of SMC
SC13S	TDS by Gravimetric	4200	0.01	ppm	05/12/92	GJ/of SMC
SC14S	TDS by Gravimetric	58	0.01	ppm	04/13/92	GJ/of SMC
A	TDS by Gravimetric	1025	0.01	ppm	05/12/92	GJ/of SMC
W-2	TDS by Gravimetric	225	0.01	ppm	05/12/92	GJ/of SMC

Enclosure 2

TELEDYNE ISOTOPES

REPORT OF ANALYSIS

RUN DATE 05/21/92

WORK ORDER NUMBER	CUSTOMER P.O. NUMBER	DATE RECEIVED	DELIVERY DATE	PAGE
3-1352		04/27/92	05/30/92	1

MR CRAIG RIEMAN
SHIELDALLOY CORP
PO BOX 768
NEWFIELD NJ 08344

WATER - GROUND

TELEDYNE SAMPLE NUMBER	CUSTOMER'S IDENTIFICATION	STA NUM	COLLECTION-DATE START DATE	START TIME	STOP DATE	STOP TIME	NUCLIDE	ACTIVITY (PCI/LITER)	NUCL-UNIT-% U/M *	MID-COUNT TIME DATE	MID-COUNT TIME TIME	VOLUME - UNITS ASH-WGHT-% *	L/
74251	A		04/14	1215			GR-A	L.T. 9. E 00		05/15			3
74252	W2		04/14	0838			GR-A	L.T. 4. E 00		05/15			3
74253	SC125		04/14	0925			GR-A	L.T. 1. E 01		05/15			3
74254	SC135		04/14	1015			GR-A	L.T. 4. E 01		05/15			3
74255	SC113S1		04/14	1015			GR-A	L.T. 6. E 01		05/15			3
74256	SC145		04/13	1025			GR-A	L.T. 2. E 00		05/15			3

LAST PAGE OF REPORT

APPROVED BY J. GUENTHER 05/21/92

SEND 1 COPIES TO SH300S MR CRAIG RIEMAN

2 - GAS LAB. 3 - RADIO CHEMISTRY LAB. 4 - GE(LI) GAMMA SPEC LAB. 5 - TRITIUM GAS/L.S. LAB. 6 - ALPHA SPEC LAB.

ENCLOSURE 3

TELEDYNE ISOTOPES

REPORT OF ANALYSIS

RUN DATE 06/11/92

WORK ORDER NUMBER	CUSTOMER P.O. NUMBER	DATE RECEIVED	DELIVERY DATE	PAGE
3-1627		05/19/92	06/21/92	1

MR CRAIG RIEMAN
SHIELDALLOY CORP
PO BOX 768
NEWFIELD NJ 08344

WATER - GROUND

TELEDYNE SAMPLE NUMBER	CUSTOMER'S IDENTIFICATION	STA NUM	COLLECTION-DATE START DATE	START TIME	STOP DATE	STOP TIME	NUCLIDE	ACTIVITY (PCI/LITER)	NUCL-UNIT-% U/M *	MID-COUNT TIME DATE	MID-COUNT TIME TIME	VOLUME - UNITS ASH-WGHT-% *	LAB.
74251	A		04/14	1215			RA-226	L.T. 1. E 00		06/09			2
74252	W2		04/14	0838			RA-226	L.T. 1. E 00		06/09			2
74253	SC125		04/14	0925			RA-226	L.T. 2. E 00		06/09			2
74254	SC135		04/14	1015			RA-226	L.T. 1. E 00		06/09			2
74255	SC11351		04/14	1015			RA-226	L.T. 2. E 00		06/10			2
74256	SC145		04/13	1025			RA-226	L.T. 2. E 00		06/10			2

LAST PAGE OF REPORT

APPROVED BY J. GUENTHER 06/11/92

SEND 1 COPIES TO SH300S MR CRAIG RIEMAN

2 - GAS LAB. 3 - RADIO CHEMISTRY LAB. 4 - GE(LI) GAMMA SPEC LAB. 5 - TRITIUM GAS/L.S. LAB. 6 - ALPHA SPEC LAB.

ENCLOSURE 4

TELEDYNE ISOTOPES

REPORT OF ANALYSIS

RUN DATE 08/05/92

WORK ORDER NUMBER	CUSTOMER P.O. NUMBER	DATE RECEIVED	DELIVERY DATE	PAGE
3-2380		06/30/92	08/02/92	1

MR CRAIG RIEMAN
SHIELDALLOY CORP
PO BOX 768
NEWFIELD NJ 08344

WATER - GROUND

TELEDYNE SAMPLE NUMBER	CUSTOMER'S IDENTIFICATION	STA NUM	COLLECTION-DATE START DATE	START TIME	STOP DATE	STOP TIME	NUCLIDE	ACTIVITY (PCI/LITER)	NUCL-UNIT-% U/M *	MID-COUNT TIME DATE	MID-COUNT TIME TIME	VOLUME - UNITS ASH-WGHT-% ±	LAB.
74251	A		04/14	1215			U-234	3.0 +-1.0 E-01		07/22			6
							TH-230	L.T. 4. E-01		07/23			6
							U-235	L.T. 1. E-01		07/22			6
							U-238	3.0 +-1.8 E-01		07/22			6
							TH-232	L.T. 2. E-01		07/23			6
							TH-228	L.T. 8. E-01		07/23			6
74253	SC125		04/14	0925			U-234	L.T. 5. E-01		07/22			6
							TH-230	L.T. 1. E-01		07/23			6
							U-235	L.T. 5. E-01		07/22			6
							U-238	L.T. 7. E-01		07/22			6
							TH-232	L.T. 2. E-01		07/23			6
							TH-228	L.T. 9. E-01		07/23			6
74254	SC135		04/14	1015			U-234	5.0 +-1.5 E 00		07/25			6
							TH-230	L.T. 3. E-01		07/24			6
							U-235	L.T. 5. E-01		07/25			6
							U-238	3.7 +-1.5 E 00		07/25			6
							TH-232	L.T. 1. E-01		07/24			6
							TH-228	L.T. 1. E 00		07/24			6
74255	SC11351		04/14	1015			U-234	6.2 +-2.4 E 00		07/25			6
							TH-230	L.T. 1. E 00		07/24			6
							U-235	L.T. 9. E-01		07/25			6
							U-238	7.3 +-2.5 E 00		07/25			6
							TH-232	L.T. 4. E-01		07/24			6
							TH-228	L.T. 2. E 00		07/24			6

LAST PAGE OF REPORT

APPROVED BY J. GUENTHER 08/05/92

SEND 1 COPIES TO SH300S MR CRAIG RIEMAN

2 - GAS LAB. 3 - RADIO CHEMISTRY LAB. 4 - GE(LI) GAMMA SPEC LAB. 5 - TRITIUM GAS/L.S. LAB. 6 - ALPHA SPEC LAB.

G2

Date	β Blank	∂ Blank	β Check Source Cs-137 (439-461)			∂ Check Source Am-241 (162-177)			Comm.	
			N	Δt	CPM	N	Δt	CPM		
1	1.12	.04	10001	22.0	454.25	8031	50	160.62*	165.12 RS	
2										
3										
4	1.84	.04	10001	21.8	458.76	8219	50	164.38		
5	1.66	.02	10001	22.1	453.22	8191	50	163.82		
6	1.08	.02	10001	21.9	456.67	7993	50	159.86*	163.12 RS	
7	1.04	.08	10001	22.4	446.14	8068	50	161.36*	164.32 RS	
8	1.44	.02	10001	22.2	450.50	8132	50	162.94		
9	1.56	.06	10001	22.4	446.81	8251	50	165.02	CG	
10										
11										
12										
13										
14	1.24	.02	10001	22.40	447.14	8114	50	162.28		
15	1.42	.02	10001	22.0	454.25	8023	50	160.46*	164.34	RS
16										
17										
18	1.64	.08	10001	22.3	449.48	8179	50	163.58		
19										problems with machine jamming
20										
21	1.94	.02	10001	22.10	453.22	8303	50	166.06		
22	1.88	.02	10001	22.10	449.82	8285	50	165.70		
23										
24										
25										
26	2.10	.06	10001	21.8	458.76	8231	50	164.62	[illegible]	
27			10001	21.8	459.46	7501	50	*150.02		NOT in use
28	1.18	.16	10001	22.6	443.50	6770	50	135.40		changed broken window
29										
30										
31										

KEY
* = Outside Control Limits
RS = Restart
CG = Change Gas

ENCLOSURE 5

RADIOCHEMICAL WORK SHEET - GROSS BETA/GROSS ALPHA

CUSTOMER Studsvik Eccy COLLECTION DATE ~~See below~~ 4/14 SAMPLE TYPE WG

ANALYST DMC PREPARATION DATE 5/15/92 ALIQUOT ~~300 mls~~ See below UNITS

COUNTER A- 62 COUNT DATE: START 5/15 STOP

SAMPLE NUMBER	ANALYSIS	WEIGHT OF MOUNT (grams)	Sequence Number	N (counts)	ΔT (min)	Bkg. (cpm)	E	VOLUME OR WEIGHT (gms) WET ASH 1%	ACTIVITY
300 mls 74251	GROSS-B	.5018	27	75	50	1.42	.202		L.T. 6. E 00
	-A			4		.06	.027		L.T. 9. E 00
5252	-B	.1459	28	284			.290		2.0 ± 0.4 E 01
	-A			6			.065		L.T. 4. E 00
5253	-B	.6833	29	2093			.199		3.4 ± 0.2 E 02
	-A			3			.021		L.T. 1. E 01
150 mls 5254	-B	1.5084	30	788			.128		3.4 ± 0.3 E 02
	-A			3			.011		L.T. 4. E 01
75 mls 5255	-B	.9479	31	621			.159		4.2 ± 0.4 E 02
	-A			1			.016		L.T. 6. E 01

UNITS _____ CODE A

CALC. BY ME DATE 5/18/92

CHECKED BY [signature] DATE 5-18

DATE ENTERED MAY 19 1992

FORM IWL-3B
Revised 06/15/81

RADIOCHEMICAL WORK SHEET - GROSS BETA/GROSS ALPHA

CUSTOMER Shield Alloy COLLECTION DATE 4/13 SAMPLE TYPE Vg

ANALYST DMC PREPARATION DATE 5/15/92 ALIQUOT 300 mL. UNITS

COUNTER A- G2 COUNT DATE: START 5/15 STOP

SAMPLE NUMBER	ANALYSIS	WEIGHT OF MOUNT (grams)	Sequence Number	N (counts)	ΔT (min)	Bkg. (cpm)	E	VOLUME OR WEIGHT (gms) WET / ASH / %	ACTIVITY
74256	Gross-B	.0551	32	191	50	1.42	.399		1.1 ± 0.3 E 01
	Gross-A			4	50	.06	.103		L.T. 2. E 00
									E
									E
									E
									E
									E
									E
									E
									E
									E

UNITS _____ CODE A

CALC. BY M DATE 5/18/92

CHECKED BY JM DATE 5-18

DATE ENTERED MAY 19 1992

FORM IWL-3B
Revised 06/15/81

TELEDYNE ISOTOPES

CALCULATION SHEET - Ra^{226} GAS COUNTING

CUSTOMER NAME	S-Alloy	T.I. NO.	74252
LAB CODE NO.	022	FLASK NO.	#1
DETECTOR NO.	R-4A	SCAVENGE DATE	6-3 @ 1530
DETECTOR EFF.	144	FILL DATE	6-9 @ 1041
DETECTOR BKGD.	.92 ±	SAMPLE SIZE	250 ml.
ELECTRONICS NO.	4P	MEASURED BY	J.L.
BACKGROUND COUNTS		BACKGROUND COUNT TIME (MIN)	

COUNTING DATA

Initial	Start Time	Δ t	Alpha Channel	α cpm
	1050	60	49	
	1327	〃	49	
	〃	〃	54	

^{226}Ra ACTIVITY =

$$\frac{(\text{cpm-bkgd})\ (e^{+\lambda T_2})\ (0.45)}{(\text{Eff})\ (1-e^{-\lambda T_1})\ (\text{Sample Size})}$$

CALCULATION DATA

Rn^{222} Ingrowth	.165	$(1-e^{-\lambda T_1})$
Rn^{222} Decay	1.03	$(e^{+\lambda T_2})$
Ra^{226} Activity	L.T. 1 pCi/l	±
Secondary Result	-.04 ± .69 pCi/l	±
Mid Count Time	6-9-92	
Calculated by	J-L	Date 6-9-92
Approved by	jm	Date 6-11

IWL-50
8/29/91

TELEDYNE ISOTOPES

CALCULATION SHEET - Ra^{226} GAS COUNTING

CUSTOMER NAME	S-Alloy	T.I. NO.	74255
LAB CODE NO.	022	FLASK NO.	924
DETECTOR NO.	R-1	SCAVENGE DATE	6-3 @ 1530
DETECTOR EFF.	236	FILL DATE	6-10 @ 1311
DETECTOR BKGD.	5.36 ±	SAMPLE SIZE	250 ml.
ELECTRONICS NO.	1	MEASURED BY	J.T.

BACKGROUND COUNTS _____ BACKGROUND COUNT TIME (MIN) _____

COUNTING DATA

Initial	Start Time	Δ t	Alpha Channel	α cpm
	1325	60	244	
	1515	↓	266	
	1620	↓	232	
		↓		

^{226}Ra ACTIVITY =

$$\frac{(\text{cpm-bkgd})\ (e^{+\lambda T_2})\ (0.45)}{(\text{Eff})\ (1-e^{-\lambda T_1})\ (\text{Sample Size})}$$

CALCULATION DATA

Rn^{222} Ingrowth	.71	$(1-e^{-\lambda T_1})$
Rn^{222} Decay	1.03	$(e^{+\lambda T_2})$
Ra^{226} Activity	L.T. 2 pci/l	±
Secondary Result	-1.7 ± .9 pci/l	±
Mid Count Time	6-10-92	

Calculated by JT Date 6-11-92

Approved by _____ Date 6-11

IWL-50
8/29/91

TELEDYNE ISOTOPES

CALCULATION SHEET - Ra^{226} GAS COUNTING

CUSTOMER NAME S-Alloy T.I. NO. 74256

LAB CODE NO. 022 FLASK NO. 07

DETECTOR NO. R-2 SCAVENGE DATE 6-3 @ 1530

DETECTOR EFF. 137 FILL DATE 6-10 @ 1313

DETECTOR BKGD. 2.97 ± _____ SAMPLE SIZE 250 ml.

ELECTRONICS NO. 2 MEASURED BY J.F.

BACKGROUND COUNTS _____ BACKGROUND COUNT TIME (MIN) _____

COUNTING DATA

Initial	Start Time	Δ t	Alpha Channel	α cpm
	1325	60	132	
	1510	/	131	
	1620	/	149	

^{226}Ra ACTIVITY =

$$\frac{(\text{cpm-bkgd})\ (e^{+\lambda T_2})\ (0.45)}{(\text{Eff})\ (1-e^{-\lambda T_1})\ (\text{Sample Size})}$$

CALCULATION DATA

Rn^{222} Ingrowth .71 $(1-e^{-\lambda T_1})$

Rn^{222} Decay 1.03 $(e^{+\lambda T_2})$

Ra^{226} Activity L.T. 2 pCi/l ± _____

Secondary Result -.92 ± 1.14 pCi/l ± _____

Mid Count Time 6-10-92 _____

Calculated by J.F. Date 6-11-92

Approved by JM Date 6-11

IWL-50
8/29/91

TELEDYNE ISOTOPES

ALPHA SPECTROSCOPY DATA

Th-229 1 ml | U-232 1 ml | CUSTOMER Shield Alloy

Am-243 ml | Cm-243 ml | ANALYST D.S.

Pu-236 ml | Pu-242 ml | PREP DATE 7/14/92

TI NO. 7425 | SAMPLE TYPE WG | ALIQUOT 150 ml

Det.	Nuclide	Mid Count MM/DD/HHMM	Counts	Pl. sec	Spike Counts	Spike Activity Pci	Bkg Counts	Bkg Pl. sec	Results
	Pu-242								
	Pu-239	↓		↓	↓	↓			
	Pu-238	↓		↓	↓	↓			
18	U-238	7/22 2349	13	60 000	1041	3.87	1	80 000	3.0 ± 1.8 E-01
	U-235	↓	2	↓	↓	↓	1	↓	L.T. 1. E-01
	U-234	↓	13	↓	↓	↓	1	↓	3.0 ± 1.8 E-01
	U-236	↓		↓	↓	↓			
	Am-243								
	Cm-246								
	Am-241								
	Cm-244								
	Cm-242								
27	Th-232	7/23 2050	5	80 000	1111	3.91	2	80000	L.T. 2. E-01
	Th-230	↓	29	↓	↓	↓	11	↓	L.T. 4. E-01
	Th-229	↓	Spike	↓	↓	↓	–	↓	–
	Th-228	↓	56	↓	↓	↓	57	↓	L.T. 8. E-01

Result Units pCi/L | Ash Fraction | Calc. by [signature] | Date 7/30

Code A | Checked by [signature] | Date 7-30

IWL-44 Revised 5/7/91

TELEDYNE ISOTOPES

ALPHA SPECTROSCOPY DATA

Th-229 1 ml | U-232 1 ml | CUSTOMER Shield Alloy

Am-243 ml | Cm-243 ml | ANALYST D.S.

Pu-236 ml | Pu-242 ml | PREP DATE 7/14/92

TI NO. 74253 | SAMPLE TYPE WG | ALIQUOT 150ml

Det.	Nuclide	Mid Count MM/DD/HHMM	Counts	Rt. sec	Spike Counts	Spike Activity Pci	Bkg Counts	Bkg Rt. sec	Results
	Pu-242								
	Pu-239	↓		↓	↓	↓			
	Pu-238	↓		↓	↓	↓			
19	U-238	7/22 2349	2	60 000	211	3.87	2	80 000	L.T. 2. E-01
	U-235	↓	1	↓	↓	↓	1	↓	L.T. 5. E-01
	U-234	↓	3	↓	↓	↓	1	↓	L.T. 5. E-01
	U-236	↓		↓	↓	↓			
	Am-243								
	Cm-246								
	Am-241								
	Cm-244								
	Cm-242								
28	Th-232	7/23 2050	2	80 000	1050	3.91	2	80 000	L.T. 2. E-01
	Th-230	↓	16	↓	↓	↓	1	↓	L.T. 1. E-01
	Th-229	↓	Spike	↓	↓	↓	—	↓	—
	Th-228	↓	38	↓	↓	↓	54	↓	L.T. 9. E-01

Result Units pCi/L | Ash Fraction | Calc. by [signature] | Date 7/30

Code A | Checked by [signature] | Date 7-30

IWL-44 Revised 5/7/91

TELEDYNE ISOTOPES

ALPHA SPECTROSCOPY DATA

Th-229 1 ml
Am-243 _____ ml
Pu-236 _____ ml
TI NO. 74255

U-232 1 ml
Cm-243 _____ ml
Pu-242 _____ ml
SAMPLE TYPE WG

CUSTOMER Shield Alloy
ANALYST D.S.
PREP DATE 7/14/92
ALIQUOT 150ml

Det.	Nuclide	Mid Count MM/DD/HHMM	Counts	Rt. sec	Spike Counts	Spike Activity Pci	Bkg Counts	Bkg Rt. sec	Results
	Pu-242								
	Pu-239	〃		〃	〃	〃			
	Pu-238	〃		〃	〃	〃			
10	U-238	7/25 1950	41	27306	134	3.87	3	80 000	7.3 ± 2.5 E00
	U-235	〃	2	〃	〃	〃	1	↓	L.T. 9. E-01
	U-234	〃	35	〃	〃	〃	3	↓	6.2 ± 2.4 E00
	U-236	〃		〃	〃	〃			
	Am-243								
	Cm-246								
	Am-241								
	Cm-244								
	Cm-242								
27	Th-232	7/24 2217	1	60 000	35-8	3.91	2	80 000	L.T. 4. E-01
	Th-230	〃	6	〃	〃	〃	11	〃	L.T. 1. E00
	Th-229	〃	Spike	〃	〃	〃	—	〃	—
	Th-228	〃	38	〃	〃	〃	57	〃	L.T. 2. E00

Result Units pCi/L
Code A
Ash Fraction
Calc. by _____ Date 7/30
Checked by _____ Date 7-30

IWL-44 Revised 5/7/91