Additional Soil and Water Sampling

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The Brandeis-Bardin Institute and Santa Monica Mountains Conservancy

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TABLE OF CONTENTS

Section	n		Page
EXEC	CUTIVE	E SUMMARY	ix
1.0	INTR	ODUCTION	. 1-1
	1.1	Background	. 1-1
	1.2	Scope of Work	. 1-6
2.0	SAME	PLING APPROACH	. 2-1
	2.1	Sampling Areas	. 2-1
		2.1.1 Sampling Areas	. 2-2
		2.1.2 Background Sampling Areas	. 2-3
	2.2	Sampling Approach Overview	. 2-4
		2.2.1 Soil	. 2-4
		2.2.2 Surface Water	. 2-5
3.0	SAMI	PLING METHODOLOGY AND QUALITY ASSURANCE PROGRAM .	. 3-1
	3.1	Decontamination Procedures	. 3-1
		3.1.1 Disposal	. 3-2
	3.2	Sample Identification and Labeling	. 3-2
		3.2.1 Sample Identification	. 3-2
		3.2.2 Sample Labeling	. 3-4
		3.2.3 Sample Documentation	. 3-5
	3.3	Soil Sampling	. 3-6
		3.3.1 Soil Sampling Strategy	. 3-6
		3.3.2 Soil Sample Location Identification	. 3-8

		3.3.3	Soil Sampling	Procedure	
			3.3.3.1	Surface Soil Sampling Procedure	. 3-11
			3.3.3.2	Subsurface Soil Sampling Procedures	3-12
		3.3.4	Split Samples		. 3-14
		3.3.5	Soil Sampling	Documentation	. 3-15
		3.3.6	Soil Sample I	Handling, Shipping, and Storage	. 3-15
	3.4	Surfac	e Water Sampl	ling	. 3-16
		3.4.1	Surface Water	r Sampling Procedure	. 3-17
		3.4.2	Split Samples		3-18
		3.4.3	Surface Wate	r Sample Documentation	3-18
		3.4.4	Surface Wate	r Sample Handling, Shipping, and Storage	. 3-19
	3.5	Qualit	y Assurance/Q	uality Control (QA/QC)	. 3-19
		3.5.1	Field Docume	entation	. 3-19
		3.5.2	QA/QC Samp	oling	. 3-20
			3.5.2.1	Field Rinsate Blanks	. 3-20
			3.5.2.2	Blind Field Duplicate Samples	. 3-21
			3.5.2.3	Trip Blanks	
			3.5.2.4	Field Blanks	. 3-22
			3.5.2.5	Pre-spiked Blind Duplicate Samples	. 3-22
			3.5.2.6	Matrix Spike/Matrix Spike Duplicate (MS/MSD) San	
					. 3-23
			3.5.2.7	Split Samples	
	3.6	Labor	atory Analysis		
4.0	OUA	LITY A	.SSURANCE/(DUALITY CONTROL SAMPLING RESULTS	. 4-1
	4.1	Oualit	v Assurance/O	uality Control Results Summarized by Sample Type .	. 4-1
		4.1.1	=		
		4.1.2	_	Samples	
		4.1.3		<u>-</u>	
		4.1.4		ontrol Blanks	
		4.1.5	-	Matrix Spike Duplicate Samples	
			_	ouplicates	

5.1. Statistical Evaluation of Background Soil Samples					
4.2 QA/QC Results Summarized by Analysis Type 4-8 4.2.1 Metals (Mercury) 4-8 4.2.2 Radionuclides 4-8 4.2.2.1 Strontium-90 4-9 4.2.2.2 Tritium 4-9 4.2.2.3 Gross Alpha and Gross Beta Analysis 4-9 4.2.2.4 Isotopic Plutonium 4-9 4.2.2.5 Gamma Scan 4-10 4.3 Conclusion 4-10 5.0 STATISTICAL ANALYSIS OF SAMPLE RESULTS 5-1 5.1 Statistical Evaluation of Background Soil Samples 5-2 5.2 Statistical Evaluation of Sampling Areas 5-5 5.0 SAMPLING RESULTS FROM BACKGROUND AREAS 6-1 6.1 Background Area Descriptions 6-1 6.1 Rocky Peak (BG-01) 6-2 6.1.1 Rocky Peak (BG-02) 6-2 6.1.2 Santa Susana Park (BG-02) 6-3 6.1.3 Halp by Camp (BG-05) 6-3 6.1.4 Wildwood Regional Park (BG-09) 6-3 6.1.5 Wildwood Regional Park (BG-01) 6-4 6.1.6 Ta			4.1.7	Pre-spiked Blind Duplicate Samples	1-4
4.2.1 Metals (Mercury) 4-8 4.2.2 Radionuclides 4-8 4.2.2.1 Strontium-90 4-9 4.2.2.2 Tritium 4-9 4.2.2.3 Gross Alpha and Gross Beta Analysis 4-9 4.2.2.4 Isotopic Plutonium 4-9 4.3 Conclusion 4-10 5.0 STATISTICAL ANALYSIS OF SAMPLE RESULTS 5-1 5.1 Statistical Evaluation of Background Soil Samples 5-2 5.2 Statistical Evaluation of Sampling Areas 5-5 5.0 SAMPLING RESULTS FROM BACKGROUND AREAS 6-1 6.1 Background Area Descriptions 6-1 6.1.1 Rocky Peak (BG-01) 6-2 6.1.2 Santa Susana Park (BG-02) 6-2 6.1.3 Happy Camp (BG-05) 6-3 6.1.4 Wildwood Regional Park (BG-09) 6-3 6.1.5 Wildwood Regional Park Ravine (BG-10) 6-4 6.1.6 Tapia County Park (BG-11) 6-5 6.1.8 Rocky Peak Ravine (BG-14) 6-6 6.2 Background Analysis Summary 6-6 6.3 Summary of Background Results 6-7 6.3.1 Cesium-137 6-8 6.3.2 Strontium-90 6-8			4.1.8	Blind Field Duplicate and Split Samples	1-6
4.2.2.1 Radiomuclides 4.8 4.2.2.1 Strontium-90 4.9 4.2.2.2 Tritium 4.9 4.2.2.3 Gross Alpha and Gross Beta Analysis 4.9 4.2.2.4 Isotopic Plutonium 4.9 4.2.2.5 Gamma Scan 4-10 4.3 Conclusion 4-10 5.0 STATISTICAL ANALYSIS OF SAMPLE RESULTS 5-1 5.1 Statistical Evaluation of Background Soil Samples 5-2 5.2 Statistical Evaluation of Sampling Areas 5-5 6.0 SAMPLING RESULTS FROM BACKGROUND AREAS 6-1 6.1 Background Area Descriptions 6-1 6.1.1 Rocky Peak (BG-01) 6-2 6.1.2 Santa Susana Park (BG-02) 6-2 6.1.3 Happy Camp (BG-05) 6-3 6.1.4 Wildwood Regional Park (BG-09) 6-3 6.1.5 Wildwood Regional Park (BG-09) 6-3 6.1.6 Tapia County Park (BG-11) 6-5 6.1.7 Tapia County Park (BG-12) 6-5 6.1.8 Rocky Peak Ravine (BG-14) 6-6 6.2 Background Analysis Summary 6-6 6.3 Summary of Background Results 6-7 6.3.1 Cesium-137 6-8 6.3.2 Strontium-90 6-8		4.2	QA/Q	C Results Summarized by Analysis Type 2	1- 8
4.2.2.1 Strontium-90 4-9 4.2.2.2 Tritium 4-9 4.2.2.3 Gross Alpha and Gross Beta Analysis 4-9 4.2.2.4 Isotopic Plutonium 4-9 4.2.2.5 Gamma Scan 4-10 5.0 STATISTICAL ANALYSIS OF SAMPLE RESULTS 5-1 5.1. Statistical Evaluation of Background Soil Samples 5-2 5.2 Statistical Evaluation of Sampling Areas 5-5 6.0 SAMPLING RESULTS FROM BACKGROUND AREAS 6-1 6.1 Background Area Descriptions 6-1 6.1.1 Rocky Peak (BG-01) 6-2 6.1.2 Santa Susana Park (BG-02) 6-2 6.1.3 Happy Camp (BG-05) 6-3 6.1.4 Wildwood Regional Park (BG-09) 6-3 6.1.5 Wildwood Regional Park (BG-11) 6-5 6.1.6 Tapia County Park (BG-11) 6-5 6.1.8 Rocky Peak Ravine (BG-14) 6-6 6.2 Background Analysis Summary 6-6 6.3 Summary of Background Results 6-7 6.3.1 Cesium-137 6-8 6.3.2			4.2.1	Metals (Mercury)	1-8
4.2.2.2 Tritium 4-9 4.2.2.3 Gross Alpha and Gross Beta Analysis 4-9 4.2.2.4 Isotopic Plutonium 4-9 4.2.2.5 Gamma Scan 4-10 4.3 Conclusion 4-10 5.0 STATISTICAL ANALYSIS OF SAMPLE RESULTS 5-1 5.1 Statistical Evaluation of Background Soil Samples 5-2 5.2 Statistical Evaluation of Sampling Areas 5-5 5.0 SAMPLING RESULTS FROM BACKGROUND AREAS 6-1 6.1 Background Area Descriptions 6-1 6.1.1 Rocky Peak (BG-01) 6-2 6.1.2 Santa Susana Park (BG-02) 6-2 6.1.3 Happy Camp (BG-05) 6-3 6.1.4 Wildwood Regional Park (BG-09) 6-3 6.1.5 Wildwood Regional Park (BG-09) 6-3 6.1.6 Tapia County Park (BG-11) 6-5 6.1.7 Tapia County Park Ravine (BG-12) 6-5 6.1.8 Rocky Peak Ravine (BG-14) 6-6 6.2 Background Analysis Summary 6-6 6.3 Summary of Background Results 6-7			4.2.2	Radionuclides	1-8
4.2.2.3 Gross Alpha and Gross Beta Analysis 4.9 4.2.2.4 Isotopic Plutonium 4.9 4.2.2.5 Gamma Scan 4-10 4.3 Conclusion 4-10 5.0 STATISTICAL ANALYSIS OF SAMPLE RESULTS 5-1 5.1. Statistical Evaluation of Background Soil Samples 5-2 5.2 Statistical Evaluation of Sampling Areas 5-5 5.0 SAMPLING RESULTS FROM BACKGROUND AREAS 6-1 6.1 Background Area Descriptions 6-1 6.1.1 Rocky Peak (BG-01) 6-2 6.1.2 Santa Susana Park (BG-02) 6-2 6.1.3 Happy Camp (BG-05) 6-3 6.1.4 Wildwood Regional Park (BG-09) 6-3 6.1.5 Wildwood Regional Park (BG-10) 6-4 6.1.6 Tapia County Park Ravine (BG-12) 6-5 6.1.8 Rocky Peak Ravine (BG-14) 6-6 6.2 Background Analysis Summary 6-6 6.3 Summary of Background Results 6-7 6.3.1 Cesium-137 6-8 6.3.2 Strontium-90 6-8				4.2.2.1 Strontium-90	1-9
4.2.2.4 Isotopic Plutonium 4-9 4.2.2.5 Gamma Scan 4-10 4.3 Conclusion 4-10 5.0 STATISTICAL ANALYSIS OF SAMPLE RESULTS 5-1 5.1. Statistical Evaluation of Background Soil Samples 5-2 5.2 Statistical Evaluation of Sampling Areas 5-5 6.0 SAMPLING RESULTS FROM BACKGROUND AREAS 6-1 6.1 Background Area Descriptions 6-1 6.1.1 Rocky Peak (BG-01) 6-2 6.1.2 Santa Susana Park (BG-02) 6-2 6.1.3 Happy Camp (BG-05) 6-3 6.1.4 Wildwood Regional Park (BG-09) 6-3 6.1.5 Wildwood Regional Park Ravine (BG-10) 6-4 6.1.6 Tapia County Park (BG-11) 6-5 6.1.7 Tapia County Park Ravine (BG-12) 6-5 6.1.8 Rocky Peak Ravine (BG-14) 6-6 6.2 Background Analysis Summary 6-6 6.3 Summary of Background Results 6-7 6.3.1 Cesium-137 6-8 6.3.2 Strontium-90 6-8				4.2.2.2 Tritium	1-9
4.2.2.5 Gamma Scan 4-10 4.3 Conclusion 4-10 5.0 STATISTICAL ANALYSIS OF SAMPLE RESULTS 5-1 5.1 Statistical Evaluation of Background Soil Samples 5-2 5.2 Statistical Evaluation of Sampling Areas 5-5 6.0 SAMPLING RESULTS FROM BACKGROUND AREAS 6-1 6.1 Background Area Descriptions 6-1 6.1.1 Rocky Peak (BG-01) 6-2 6.1.2 Santa Susana Park (BG-02) 6-2 6.1.3 Happy Camp (BG-05) 6-3 6.1.4 Wildwood Regional Park (BG-09) 6-3 6.1.5 Wildwood Regional Park Ravine (BG-10) 6-4 6.1.6 Tapia County Park (BG-11) 6-5 6.1.7 Tapia County Park Ravine (BG-12) 6-5 6.1.8 Rocky Peak Ravine (BG-14) 6-6 6.2 Background Analysis Summary 6-6 6.3 Summary of Background Results 6-7 6.3.1 Cesium-137 6-8 6.3.2 Strontium-90 6-8				4.2.2.3 Gross Alpha and Gross Beta Analysis	1-9
4.3 Conclusion 4-10 5.0 STATISTICAL ANALYSIS OF SAMPLE RESULTS 5-1 5.1 Statistical Evaluation of Background Soil Samples 5-2 5.2 Statistical Evaluation of Sampling Areas 5-5 6.0 SAMPLING RESULTS FROM BACKGROUND AREAS 6-1 6.1 Background Area Descriptions 6-1 6.1.1 Rocky Peak (BG-01) 6-2 6.1.2 Santa Susana Park (BG-02) 6-2 6.1.3 Happy Camp (BG-05) 6-3 6.1.4 Wildwood Regional Park (BG-09) 6-3 6.1.5 Wildwood Regional Park Ravine (BG-10) 6-4 6.1.6 Tapia County Park (BG-11) 6-5 6.1.8 Rocky Peak Ravine (BG-12) 6-5 6.1.8 Rocky Peak Ravine (BG-14) 6-6 6.2 Background Analysis Summary 6-6 6.3 Summary of Background Results 6-7 6.3.1 Cesium-137 6-8 6.3.2 Strontium-90 6-8				4.2.2.4 Isotopic Plutonium	1-9
5.0 STATISTICAL ANALYSIS OF SAMPLE RESULTS 5-1 5.1 Statistical Evaluation of Background Soil Samples 5-2 5.2 Statistical Evaluation of Sampling Areas 5-5 6.0 SAMPLING RESULTS FROM BACKGROUND AREAS 6-1 6.1 Background Area Descriptions 6-1 6.1.1 Rocky Peak (BG-01) 6-2 6.1.2 Santa Susana Park (BG-02) 6-2 6.1.3 Happy Camp (BG-05) 6-3 6.1.4 Wildwood Regional Park (BG-09) 6-3 6.1.5 Wildwood Regional Park Ravine (BG-10) 6-4 6.1.6 Tapia County Park (BG-11) 6-5 6.1.8 Rocky Peak Ravine (BG-14) 6-6 6.2 Background Analysis Summary 6-6 6.3 Summary of Background Results 6-7 6.3.1 Cesium-137 6-8 6.3.2 Strontium-90 6-8				4.2.2.5 Gamma Scan	-10
5.1. Statistical Evaluation of Background Soil Samples 5-2 5.2 Statistical Evaluation of Sampling Areas 5-5 5.0 SAMPLING RESULTS FROM BACKGROUND AREAS 6-1 6.1 Background Area Descriptions 6-1 6.1.1 Rocky Peak (BG-01) 6-2 6.1.2 Santa Susana Park (BG-02) 6-2 6.1.3 Happy Camp (BG-05) 6-3 6.1.4 Wildwood Regional Park (BG-09) 6-3 6.1.5 Wildwood Regional Park Ravine (BG-10) 6-4 6.1.6 Tapia County Park (BG-11) 6-5 6.1.7 Tapia County Park Ravine (BG-12) 6-5 6.1.8 Rocky Peak Ravine (BG-14) 6-6 6.2 Background Analysis Summary 6-6 6.3 Summary of Background Results 6-7 6.3.1 Cesium-137 6-8 6.3.2 Strontium-90 6-8		4.3	Conclu	asion	.10
5.2 Statistical Evaluation of Sampling Areas 5-5 6.0 SAMPLING RESULTS FROM BACKGROUND AREAS 6-1 6.1 Background Area Descriptions 6-1 6.1.1 Rocky Peak (BG-01) 6-2 6.1.2 Santa Susana Park (BG-02) 6-2 6.1.3 Happy Camp (BG-05) 6-3 6.1.4 Wildwood Regional Park (BG-09) 6-3 6.1.5 Wildwood Regional Park Ravine (BG-10) 6-4 6.1.6 Tapia County Park (BG-11) 6-5 6.1.7 Tapia County Park Ravine (BG-12) 6-5 6.1.8 Rocky Peak Ravine (BG-14) 6-6 6.2 Background Analysis Summary 6-6 6.3 Summary of Background Results 6-7 6.3.1 Cesium-137 6-8 6.3.2 Strontium-90 6-8	5.0	STAT	TISTICA	L ANALYSIS OF SAMPLE RESULTS	5-1
5.0 SAMPLING RESULTS FROM BACKGROUND AREAS 6-1 6.1 Background Area Descriptions 6-1 6.1.1 Rocky Peak (BG-01) 6-2 6.1.2 Santa Susana Park (BG-02) 6-2 6.1.3 Happy Camp (BG-05) 6-3 6.1.4 Wildwood Regional Park (BG-09) 6-3 6.1.5 Wildwood Regional Park Ravine (BG-10) 6-4 6.1.6 Tapia County Park (BG-11) 6-5 6.1.7 Tapia County Park Ravine (BG-12) 6-5 6.1.8 Rocky Peak Ravine (BG-14) 6-6 6.2 Background Analysis Summary 6-6 6.3 Summary of Background Results 6-7 6.3.1 Cesium-137 6-8 6.3.2 Strontium-90 6-8		5.1.	Statist	cal Evaluation of Background Soil Samples 5	5-2
6.1 Background Area Descriptions 6-1 6.1.1 Rocky Peak (BG-01) 6-2 6.1.2 Santa Susana Park (BG-02) 6-2 6.1.3 Happy Camp (BG-05) 6-3 6.1.4 Wildwood Regional Park (BG-09) 6-3 6.1.5 Wildwood Regional Park Ravine (BG-10) 6-4 6.1.6 Tapia County Park (BG-11) 6-5 6.1.7 Tapia County Park Ravine (BG-12) 6-5 6.1.8 Rocky Peak Ravine (BG-14) 6-6 6.2 Background Analysis Summary 6-6 6.3 Summary of Background Results 6-7 6.3.1 Cesium-137 6-8 6.3.2 Strontium-90 6-8		5.2	Statist	cal Evaluation of Sampling Areas	5-5
6.1.1 Rocky Peak (BG-01) 6-2 6.1.2 Santa Susana Park (BG-02) 6-2 6.1.3 Happy Camp (BG-05) 6-3 6.1.4 Wildwood Regional Park (BG-09) 6-3 6.1.5 Wildwood Regional Park Ravine (BG-10) 6-4 6.1.6 Tapia County Park (BG-11) 6-5 6.1.7 Tapia County Park Ravine (BG-12) 6-5 6.1.8 Rocky Peak Ravine (BG-14) 6-6 6.2 Background Analysis Summary 6-6 6.3 Summary of Background Results 6-7 6.3.1 Cesium-137 6-8 6.3.2 Strontium-90 6-8	6.0	SAM	PLING 1	RESULTS FROM BACKGROUND AREAS	5-1
6.1.2 Santa Susana Park (BG-02) 6-2 6.1.3 Happy Camp (BG-05) 6-3 6.1.4 Wildwood Regional Park (BG-09) 6-3 6.1.5 Wildwood Regional Park Ravine (BG-10) 6-4 6.1.6 Tapia County Park (BG-11) 6-5 6.1.7 Tapia County Park Ravine (BG-12) 6-5 6.1.8 Rocky Peak Ravine (BG-14) 6-6 6.2 Background Analysis Summary 6-6 6.3 Summary of Background Results 6-7 6.3.1 Cesium-137 6-8 6.3.2 Strontium-90 6-8		6.1	Backg	round Area Descriptions	5-1
6.1.3 Happy Camp (BG-05) 6-3 6.1.4 Wildwood Regional Park (BG-09) 6-3 6.1.5 Wildwood Regional Park Ravine (BG-10) 6-4 6.1.6 Tapia County Park (BG-11) 6-5 6.1.7 Tapia County Park Ravine (BG-12) 6-5 6.1.8 Rocky Peak Ravine (BG-14) 6-6 6.2 Background Analysis Summary 6-6 6.3 Summary of Background Results 6-7 6.3.1 Cesium-137 6-8 6.3.2 Strontium-90 6-8			6.1.1	Rocky Peak (BG-01)	5-2
6.1.4 Wildwood Regional Park (BG-09) 6-3 6.1.5 Wildwood Regional Park Ravine (BG-10) 6-4 6.1.6 Tapia County Park (BG-11) 6-5 6.1.7 Tapia County Park Ravine (BG-12) 6-5 6.1.8 Rocky Peak Ravine (BG-14) 6-6 6.2 Background Analysis Summary 6-6 6.3 Summary of Background Results 6-7 6.3.1 Cesium-137 6-8 6.3.2 Strontium-90 6-8			6.1.2	Santa Susana Park (BG-02)	5-2
6.1.5 Wildwood Regional Park Ravine (BG-10) 6-4 6.1.6 Tapia County Park (BG-11) 6-5 6.1.7 Tapia County Park Ravine (BG-12) 6-5 6.1.8 Rocky Peak Ravine (BG-14) 6-6 6.2 Background Analysis Summary 6-6 6.3 Summary of Background Results 6-7 6.3.1 Cesium-137 6-8 6.3.2 Strontium-90 6-8			6.1.3	Happy Camp (BG-05)	5-3
6.1.6 Tapia County Park (BG-11) 6-5 6.1.7 Tapia County Park Ravine (BG-12) 6-5 6.1.8 Rocky Peak Ravine (BG-14) 6-6 6.2 Background Analysis Summary 6-6 6.3 Summary of Background Results 6-7 6.3.1 Cesium-137 6-8 6.3.2 Strontium-90 6-8			6.1.4	Wildwood Regional Park (BG-09)	5-3
6.1.7 Tapia County Park Ravine (BG-12) 6-5 6.1.8 Rocky Peak Ravine (BG-14) 6-6 6.2 Background Analysis Summary 6-6 6.3 Summary of Background Results 6-7 6.3.1 Cesium-137 6-8 6.3.2 Strontium-90 6-8			6.1.5	Wildwood Regional Park Ravine (BG-10)	5-4
6.1.8 Rocky Peak Ravine (BG-14) 6-6 6.2 Background Analysis Summary 6-6 6.3 Summary of Background Results 6-7 6.3.1 Cesium-137 6-8 6.3.2 Strontium-90 6-8			6.1.6	Tapia County Park (BG-11)	5-5
6.1.8 Rocky Peak Ravine (BG-14) 6-6 6.2 Background Analysis Summary 6-6 6.3 Summary of Background Results 6-7 6.3.1 Cesium-137 6-8 6.3.2 Strontium-90 6-8			6.1.7	Tapia County Park Ravine (BG-12)	5-5
6.3 Summary of Background Results			6.1.8		
6.3.1 Cesium-137 6-8 6.3.2 Strontium-90 6-8		6.2	Backg	round Analysis Summary	5-6
6.3.2 Strontium-90		6.3	Summ	ary of Background Results	5-7
			6.3.1	Cesium-137	5-8
6.3.3 Tritium			6.3.2	Strontium-90	5-8
			6.3.3	Tritium	5-9

7.0	SAM	PLING RESULTS FROM OFF-SITE LOCATIONS 7-1					
	7.1	Dormitory Area (BB-02)					
	7.2	Campsite Area 1 (BB-03)					
	7.3	Campsite Area 2 (BB-04)					
	7.4	Picnic Area (BB-05)					
	7.5	House of the Book (BB-06)					
	7.6	Main House Orchard (BB-12) 7-5					
	7.7	Avocado Grove (BB-13)					
	7.8	Old Well Campsite (BB-14) 7-6					
	7.9	Former Rocketdyne Employee Shooting Range (SM-03) 7-7					
	7.10	RD-51 Watershed (BB-15)					
	7.11	Radioactive Materials Disposal Facility Watershed (BB-16) 7-8					
	7.12	Building 59 Watershed (BB-17)					
	7.13	Sodium Burn Pit Watershed (BB-18)					
	7.14	Sodium Reactor Experiment Watershed (BB-19)					
	7.15	Campsite Area 1 Drainage (BB-20)					
8.0	DISC	DISCUSSION OF RESULTS 8-1					
	8.1	Quality Assurance/Quality Control 8-1					
	8.2	Results by Analysis					
		8.2.1 Mercury					
		8.2.2 Tritium					
		8.2.3 Strontium-90					
		8.2.4 Cesium-137					
		8.2.5 Plutonium-238					
9.0	CONO	CLUSIONS 9-1					

TABLES

Table 1	Summary of Soil Sampling
Table 2	Sample Container and Preservation Specifications
Table 3	Field Quality Assurance Control Sample Requirements
Table 4	QA/QC Soil Sample Locations
Table 5	Matrix Spike/Matrix Spike Duplicate Data
Table 6	Radioanalytical Results of Pre-spiked Blind Duplicate Samples
Table 7	Significant Difference Between Duplicate Soil/Sediment Samples
Table 8	Withdrawn Tritium Data Summary
Table 9	Soil Sample QA/QC Summary
Table 10	Water Sample QA/QC Summary
Table 11	Radionuclide Results for Soil Samples at Rocky Peak (BG-01)
Table 12	Radionuclide Results for Soil Samples at Santa Susana Park (BG-02)
Table 13	Radionuclide Results for Soil Samples at Happy Camp (BG-05
Table 14	Radionuclide Results for Soil Samples at Wildwood Regional Park (BG-09)
Table 15	Radionuclide Results for Sediment Samples at Wildwood Regional Park Ravine
	(BG-10)
Table 16	Radionuclide Results for Soil Samples at Tapia County Park (BG-11
Table 17	Radionuclide Results for Sediment Samples at Tapia County Park Ravine
	(BG-12)
Table 18	Radionuclide Results for Sediment Samples at Rocky Peak Ravine (BG-14)
Table 19	Summary of the Results of the Analysis of Variance (ANOVA) and Tukey
	Honest Significant Difference (HSD) Test for the Background Sample Areas
Table 20	Background Levels of Radionuclides in Soil
Table 21	Radionuclide Results for Soil Samples at the Dormitory Area (BB-02)
Table 22	Radionuclide Results for Soil Samples at Campsite Area 1 (BB-03)
Table 23	Radionuclide Results for Soil Samples at Campsite Area 2 (BB-04)
Table 24	Radionuclide Results for Surface Water Samples at Campsite Area 2 (BB-04)
Table 25	Radionuclide Results for Soil Samples at the Picnic Area (BB-05)
Table 26	Radionuclide Results for Soil Samples at the House of the Book (BB-06)
Table 27	Radionuclide Results for Soil Samples at the Main House Orchard (BB-12)

Table 28	Avocado Grove (BB-13)
Table 29	Radionuclide Results for Soil Samples at the Old Well Campsite (BB-14)
Table 30	Radionuclide Results for Soil Samples at the Former Rocketdyne Employee
	Shooting Range (SM-03)
Table 31	Radionuclide Results for Sediment Samples at the RD-51 Watershed (BB-15)
Table 32	Radionuclide Results for Sediment Samples at the Radioactive Materials
	Disposal Facility (RMDF) Watershed (BB-16)
Table 33	Radionuclide Results for Sediment Samples at the Building 59 Watershed
	(BB-17)
Table 34	Mercury Results for Sediment Samples at the Sodium Burn Pit Watershed
	(BB-18)
Table 35	Radionuclide Results for Sediment Samples at the Sodium Reactor Experiment
	(SRE) Watershed (BB-19)
Table 36	Radionuclide Results for Sediment Samples at the Campsite Area 1 - Drainage
	(BB-20)
Table 37	Radionuclide Results for Surface Water Samples at the Campsite Area 1 -
	Drainage (BB-20)
Table 38	Comparison of Statistical Results for Background Sample Data
	FIGURES
Figure 1	Summary of Previous Multi-Media Sampling
Figure 2	Additional Sample Areas: Brandeis-Bardin Institute and Santa Monica
1 15010 2	Mountains Conservancy
Figure 3	Previous and Additional Background Sample Areas
Figure 4	Register Label Example
Figure 5	QA/QC Soil/Sediment Sample Summary
Figure 6	QA/QC Water Sample Summary
Figure 7	Rocky Peak (BG-01) Sample Locations
Figure 8	Santa Susana Park (BG-02) Sample Locations
Figure 9	Happy Camp (BG-05)
Figure 10	Wildwood Regional Park (BG-09) Sample Locations

Figure 11	Wildwood Regional Park Ravine (BG-10) Sample Locations
Figure 12	Tapia County Park (BG-11) Sample Locations
Figure 13	Tapia County Park Ravine (BG-12) Sample Locations
Figure 14	Rocky Peak Ravine (BG-14) Sample Locations
Figure 15	Dormitory Area (BB-02) Sample Locations
Figure 16	Campsite Area 1 (BB-03) Sample Locations
Figure 17	Campsite Area 2 (BB-04) Sample Locations
Figure 18	Picnic Area (BB-05) Sample Locations
Figure 19	House of the Book (BB-06) Sample Locations
Figure 20	Main House Orchard (BB-12) Sample Locations
Figure 21	Avocado Grove (BB-13) Sample Locations
Figure 22	Old Well Campsite (BB-14) Sample Locations
Figure 23	Former Rocketdyne Employee Shooting Range (SM-03) Sample Locations
Figure 24	RD-51 Watershed (BB-15) Sample Locations
Figure 25	Radioactive Materials Disposal Facility (RMDF) Watershed (BB-16) Sample
	Locations
Figure 26	Radioactive Materials Disposal Facility (BB-16) and Building 59 (BB-17)
	Watersheds Sample Locations
Figure 27	Building 59 Watershed (BB-17) Sample Locations
Figure 28	Sodium Burn Pit Watershed (BB-18) Sample Locations
Figure 29	Sodium Reactor Experiment (SRE) Watershed (BB-19) Sample Locations
Figure 30	Campsite Area 1 - Drainage (BB-20) Sample Locations
Figure 31	Summary of Sampling

APPENDICES

Appendix A	USEPA Comments Letter
Appendix B	Grid Random Number Tables
Appendix C	Random Number Tables for Blind Field Duplicates
Appendix D	Summary of Analytical Results by Analysis
Appendix E	Data Comment Letters from Teledyne Isotopes Laboratory and
	Brandeis-Bardin Consultant
Appendix F	Graphical Evaluation of Results
Appendix G	Radiation Survey Results
Appendix H	Written Comments to Draft Report, November 18, 1994

EXECUTIVE SUMMARY

This document presents the results of the Additional Off-Site Soil and Water Sampling at the Brandeis-Bardin Institute and Santa Monica Mountains Conservancy. This additional sampling was conducted in 1994 as a follow-up to the multi-media sampling program conducted in 1992. This program was conducted to determine if chemicals or radionuclides had migrated or had been deposited on two properties adjacent to the north/northwest property line of Rockwell International Corporation, Rocketdyne Division's Santa Susana Field Laboratory (SSFL). The two properties (referred to as study areas) were the Brandeis-Bardin Institute and the Santa Monica Mountains Conservancy. Results from this 1992 investigation indicated that additional sampling would be required to try to address a number of issues.

The issues that were recommended to be addressed, and their action items, are the following:

- 1) Re-evaluation of tritium in areas where the original data were analyzed by the gas counting method and later withdrawn by the laboratory because the laboratory could not validate the data. Ten areas were resampled and samples were analyzed for tritium.
- 2) Confirmation of the State of California Department of Health Services laboratory reported values of 2,470 ±197 and 392 ±153 picocuries per liter (pCi/L) for tritium at Campsite Area 2. The area was resampled.
- 3) Remediation of mercury from the Sodium Burn Pit Watershed. The site containing mercury-bearing sediment, identified in 1992, was excavated and resampled after excavation to confirm the removal of sediment containing mercury.

- 4) Determination whether the plutonium-238 reported in the vicinity of the RD-51 and Building 59 Watersheds is statistically different from background. Additional samples were collected in the watersheds and results were statistically compared to background.
- Determination whether the strontium-90 and cesium-137 reported in the Sodium Reactor Experiment Watershed is statistically different from background. Additional samples were collected in the watershed and results were statistically compared to background.
- Determination whether the concentrations of tritium, cesium-137, and strontium-90 reported at Radioactive Materials Disposal Facility (RMDF) Watershed are greater than background. Additional samples were collected in the watershed and the results were compared to background.
- 7) Further characterization of tritium and cesium-137 at the Building 59 Watershed to determine if tritium and cesium-137 concentrations were greater than background.

 Additional samples were collected in the watershed and the results were compared to background.
- 8) Characterization of the distribution of tritium, strontium-90, and cesium-137 in the drainages between the RMDF/Building 59 Watersheds and Campsite Area 1. Samples were collected in the drainages and the results were evaluated.
- 9) Collection of additional background data, at the request of the Work Group, from sites away from the SSFL.

Number and Types of Analyses. To address these issues 40 soil/sediment samples were collected from background areas and 124 soil/sediment samples were collected from the study areas. All the background area samples were analyzed for tritium, strontium-90, isotopic plutonium, and gamma emitting radionuclides. The samples collected in the study areas were primarily analyzed for tritium with additional analyses for strontium-90, isotopic plutonium, and gamma emitting radionuclides conducted to address the issues listed above. In addition seven soil samples collected in the Sodium Burn Pit Watershed were analyzed for mercury.

Two surface water samples were collected from the Campsite Area 1 and Campsite Area 2 - Drainage. The surface water samples were analyzed for tritium and for gross alpha and gross beta radiation.

Quality Assurance/Quality Control. A rigorous quality assurance/quality control (QA/QC) program was implemented during the sampling to assure that the data are valid. Comparison of the QA/QC samples (blind field duplicates, pre-spiked blind duplicates, laboratory duplicates, field splits samples, rinsate samples, and matrix spike samples) to their respective scheduled sample showed an overall agreement of approximately 94 percent. This level of agreement demonstrated that the data are valid.

Data Evaluation. Soil radionuclide data from the study areas were evaluated statistically by comparing to background data. Surface water samples were not evaluated statistically because there were no background data points.

Radionuclide Results and Conclusions. The investigation was conducted during March 4 and March 15 of 1994 and revealed that with the exception the Building 59 and RMDF Watersheds, none of the other sites had radionuclides present at concentrations statistically higher than background values. Tritium was found at concentrations significantly above background values in sediment samples collected from the ravine of the Building 59 Watershed. Cesium-137 concentrations in samples collected from the Building 59 Watershed are statistically different from background levels established for this study. However the cesium-137 levels are below the literature values for background cesium (see Table 20).

Strontium-90 concentrations measured in sediment samples collected from the RMDF Watershed are statistically different from background values established for this study. However, the level of strontium-90 is below literature values for background level (see Table 20).

Plutonium-238 was not detected in any samples collected in RD-51 and Building 59 watersheds in 1994. The 1994 study results therefore do not confirm 1992 study results and plutonium-238 is therefore not a concern.

Mercury Results and Conclusions. Based on the sample results from the four sediment samples collected within the excavation area within the Sodium Burn Pit Watershed, mercury present in the watershed (0.35 mg/kg detected during the 1992 study) was removed during the excavation. Mercury was not detected (<0.1 mg/kg) in the four samples collected within the excavation area. A concentration of 0.12 mg/kg of mercury, slightly above the detection limit, was reported in one of the samples upgradient from the excavation. Analysis of a laboratory duplicate of the sample and analysis of an interlaboratory duplicate by USEPA were below the detection limit. Analysis of the interlaboratory duplicate by Brandeis-Bardin indicated a concentration of 0.14 mg/kg. Thus, the mercury (0.35 mg/kg) detected in the Sodium Burn Pit Watershed in 1992 was removed by excavation. Mercury at near detection level may be present upgradient from the excavation.

The Study Participants would like to acknowledge the accomplishments of Dennis Dineen, draft author of this report. Dennis put a great deal of effort into this project by contributing his expertise, organizational, logistical, and report preparational skills. The spirit of cooperation he showed during the preparation of the first report and this report coordinating the many comments and changes suggested by study participants and the SSFL Work Group kept this study together.

1.0 INTRODUCTION

On March 10, 1993, the results of the investigation at the Brandeis-Bardin Institute (Brandeis-Bardin) and the Santa Monica Mountains Conservancy (Conservancy) were presented to the Santa Susana Field Laboratory (SSFL) Work Group public meeting at the Simi Valley Public Library. The results of the multi-media sampling were described in a report entitled "Multi-Media Sampling Report for the Brandeis-Bardin Institute and the Santa Monica Mountains Conservancy", March 10, 1993. Section 1.1 summarizes the results of the March 10, 1993 report.

Upon the review of the results reported, further work was determined to be justified by Rockwell International Corporation, Rocketdyne Division and the SSFL Work Group and McLaren/Hart was instructed to carry out the recommendations. Section 1.2 and the rest of this document describes the additional sampling performed at Brandeis-Bardin, the Conservancy, and three background locations as a follow-up to this earlier work.

1.1 BACKGROUND

A multi-media sampling program was conducted in 1992 to determine if chemicals or radionuclides had migrated or had been deposited on two properties adjacent to the north/northwest property line of Rockwell International Corporation, Rocketdyne Division's Santa Susana Field Laboratory (SSFL). The two properties (referred to as study areas) were the Brandeis-Bardin Institute and the Santa Monica Mountains Conservancy (hereafter, Brandeis-Bardin and the Conservancy, respectively). In addition to the study areas, six background locations between 1.5 to 12.5 miles from the SSFL were sampled to provide data on background concentrations of chemicals and radionuclides.

Number and Types of Analyses. Eighteen soil samples were collected from background areas and 118 soil/sediment samples were collected from the study areas in 1992. All soil/sediment

samples were analyzed for: 37 volatile organic compounds (VOCs), 67 semi-volatile organic compounds (SVOCs), 13 priority pollutant metals, 75 naturally occurring and man made radionuclides as a gamma scan¹ as well as, tritium, isotopic plutonium (*i.e.*, plutonium-238 and plutonium-239), iodine-129, and strontium-90. One surface water sample was collected from a background area and seven surface water samples were collected from the study areas. All surface water samples were analyzed for the same chemicals and radionuclides cited for soils/sediments as well as for gross alpha and gross beta radioactivity. Groundwater was sampled from two private wells, owned and operated by the Conservancy, (a minimum of two times each) and analyzed for the same analytes as surface water except for metals. Fifteen fruit samples were collected from background areas. Nine fruit samples were collected from the study areas. All fruit samples were analyzed for the full suite of radionuclides listed above.

Quality Assurance/Quality Control. A rigorous quality assurance/quality control (QA/QC) program was implemented during sampling to produce valid data or to allow the identification of suspect data. Comparison of the QA/QC samples (blind field duplicates, field split samples, and interlaboratory split samples) to their respective scheduled sample showed an overall agreement of approximately 97 percent. This level of agreement demonstrated that the data were valid and acceptable for use in this analysis.

Data Evaluation. Radionuclide and heavy metal data from soil samples in the human use areas were evaluated statistically by comparison to background data. Sediment data from the Watersheds were not evaluated statistically because they were not randomly selected. All chemical and radionuclides measured above background concentrations are shown in Figure 1. Organic chemical data were not compared to background because organic chemicals are generally not naturally occurring. Fruit and water samples were not evaluated statistically because there were not enough background data points.

Results of Chemical Analyses. No VOCs or SVOCs associated with activities at the SSFL were detected in any of the 118 soil/sediment samples collected in the study areas.

Cesium-137 was the only man-made gamma-emitting radionuclide detected in the samples; thus, only Cesium-137 was reported in tabular form in the report.

Groundwater at an irrigation well (the Well by the Gate at the Conservancy, located approximately 800 feet north of the SSFL property line) had trichloroethene (TCE) in both samples at 10 micrograms per liter of water (μ g/L) and 9 μ g/L. It appears that the source of the TCE is located at SSFL because elevated levels have also been detected beneath the SSFL and no other likely sources are currently known to exist between SSFL and the irrigation well in question. The Well by the Gate has been added to Rocketdyne's on-going groundwater monitoring program. No other chemicals which are known to be associated with Rocketdyne's activities were detected in the surface water or groundwater samples collected.

Some organic chemicals that were not associated with Rocketdyne activities were reported in this study. Toluene was detected in two soil samples at the Visitor Center Parking Lot at the Conservancy at 7 and 9 micrograms per kilogram of soil (μ g/kg). Toluene is a component of gasoline and is found in partially combusted gasoline such as car exhaust.

At Brandeis-Bardin, 4-methylphenol, a chemical found in disinfectants and pesticides, was detected in one soil sample at the Dormitory Area at 670 μ g/kg; bis(2-ethylhexyl)phthalate, one of the most abundantly produced plasticizers, was found in five soil samples at the Counselor-in-Training Area ranging from 370 to 8,500 μ g/kg; and 4,4'-dichlorodiphenyl-dichloroethene (4,4'-DDE), a breakdown product of the pesticide 4,4'-dichlorodiphenyl-dichloroethane (4,4'-DDT), was detected in one soil sample at the Vegetable Garden at 340 μ g/kg.

Heavy metals above background and associated with Rocketdyne's activities were reported at two locations: lead in all five soil samples taken from the Former Rocketdyne Employee Shooting Range at the Conservancy ranging from 59 to 280 milligrams per kilogram of soil (mg/kg) and mercury in one of nine sediment samples at the Sodium Burn Pit Watershed at Brandeis-Bardin (located approximately 230 feet from the SSFL property line) at 0.35 mg/kg. The Former Rocketdyne Employee Shooting Range was previously used for skeet and trap shooting practice and lead shot was visible on the ground throughout the area. Rocketdyne began cleanup of the lead shot on October 19, 1992. Mercury was known to be contained in the former Sodium Burn Pit, which is currently undergoing excavation, cleanup and closure.

Zinc was detected in one of six sediment samples taken at the Radioactive Materials Disposal Facility (RMDF) Watershed at a concentration of 120 mg/kg, which was greater than the ninety-fifth percentile² of the measured background concentration for zinc of 112 mg/kg. Although this value was outside of the criteria established in the report, the concentration was the same as two soil samples collected at one of the background areas.

Radionuclide Results. Four radionuclides were detected in sediment samples in the watersheds at Brandeis-Bardin which exceeded the ninety-fifth percentile of the measured background concentrations (i.e., above measured background) in soil: tritium, strontium-90, cesium-137, and plutonium-238. Two radionuclides were detected above measured background in two surface water samples from the RMDF Watershed: tritium and strontium-90. Radionuclide data from the fruit from the study areas were not above background. No radionuclides were detected above measured background in any of the human activity areas at either the Conservancy or Brandeis-Bardin. Radionuclides were not detected in groundwater in the two private wells that were sampled.

Tritium exceeded the ninety-fifth percentile of the measured background [552 picocuries per liter of water (pCi/L)] in seven of the 118 soil/sediment samples. Tritium concentrations in these sediment samples were: $1,100 \pm 100$ pCi/L, 990 ± 150 pCi/L, $1,300 \pm 300$ pCi/L, $1,300 \pm 200$ pCi/L, and $1,500 \pm 200$ pCi/L in the RMDF Watershed and $10,800 \pm 300$ pCi/L and $9,810 \pm 330$ pCi/L in the Building 59 Watershed. Of the seven surface water samples, tritium was detected in one sample from the RMDF Watershed at a concentration of $1,500 \pm 100$ pCi/L. [The maximum contaminant limit (MCL) for tritium in drinking water is 20,000 pCi/L.] It was concluded that the tritium was from off-site migration from the SSFL.

Of the 118 soil/sediment samples collected, strontium-90 was detected above the ninety-fifth percentile of the measured background [0.07 pCi/g(dry)] in three sediment samples at the RMDF Watershed [0.08 ± 0.01 pCi/g(dry), 0.09 ± 0.01 pCi/g(dry), and 0.15 ± 0.02 pCi/g(dry)] and two sediment samples at the Sodium Reactor Experiment Watershed [0.08 ± 0.002 pCi/g(dry) and 0.09 ± 0.02 pCi/g(dry)]. Strontium-90 was also detected in two

The ninety-fifth percentile is equal to the mean of all background area samples plus two times the standard deviation.

associated surface water samples at the RMDF Watershed at 1.1 ± 0.03 pCi/L and 1.8 ± 0.05 pCi/L. (The MCL for strontium-90 in drinking water is 8.0 pCi/L).

Cesium-137 and plutonium-238 were also detected in the Brandeis-Bardin Watersheds along the SSFL property line at concentrations above the ninety-fifth percentile of the measured background [0.21 pCi/g(dry) for cesium-137 and 0.10 pCi/g(dry) for plutonium-238]. Cesium-137 was detected in four of the 118 soil/sediment samples collected in this study at a concentration of 0.34 ±0.04 pCi/g(dry) in the RMDF Watershed, 0.24 ±0.06 pCi/g(dry) and 0.30 ±0.05 pCi/g(dry) in the Sodium Reactor Experiment Watershed, and 0.23 ±0.03 pCi/g(dry) in the Building 59 Watershed. Plutonium-238 was detected in two of the 118 soil/sediment samples at 0.19 ±0.06 pCi/g(dry) and 0.22 ±0.07 pCi/g(dry) in the Building 59 and RD-51 Watersheds, respectively. Because the data from the ravines³ were not statistically evaluated, it could not be determined if the presence of strontium-90, cesium-137 and plutonium-238 in the sediment at concentrations above the ninety-fifth percentile of the measured background were due to off-site migration or can be attributed to background. When the t-tests were run (statistical comparisons of the area samples to background), the concentrations of these radionuclides in the ravines appear similar to background levels and therefore may be present at naturally occurring levels.

Conclusions. The purpose of the 1992-93 study was to assess whether chemicals and/or radionuclides were present on Brandeis-Bardin or the Conservancy as a result of activities at the SSFL. The study identified the following chemicals and radionuclides at the study site which may be attributed to past SSFL activities:

- Trichloroethene (TCE) in the groundwater at the Well by the Gate at the Conservancy;
- Lead in the Former Rocketdyne Employee Shooting Range at the Conservancy;
- Mercury in one sediment sample at the Sodium Burn Pit Watershed at Brandeis-Bardin;
 and
- Tritium in the Radioactive Materials Disposal Facility Watershed and in the Building 59 Watershed at Brandeis-Bardin.

Ravines, watersheds, and drainage ways are used synonymously throughout this workplan.

Recommendations. It was recommended that the sediment deposit containing the mercury be removed by Rocketdyne and properly disposed. Additional sampling was recommended to monitor the RMDF and Building 59 Watersheds. Recommendations were obtained from the regulatory agencies, the SSFL Work Group, and the public after the release of the March 10 report. The following section describes the follow-up activities formulated with the input from these groups.

1.2 SCOPE OF WORK

This section describes the additional sampling that was proposed to follow up on the March 10, 1993 results. Recommendations were received from the USEPA, the consultant for the Brandeis-Bardin Institute and other(s) in their report and in a letter dated March 26, 1993 (Appendix A). Based on the March 10 report and input from the participating groups, the following issues or questions were identified to be addressed by follow-up activities.

- 1) Re-evaluation of tritium in areas where the original data were analyzed by the gas counting method and later withdrawn by the laboratory because the laboratory could not validate the data. Ten areas were resampled and samples were analyzed for tritium.
- Confirmation of the State of California Department of Health Services laboratory reported values of 2,470 ±197 and 392 ±153 picocuries per liter (pCi/L) for tritium at Campsite Area 2. The area was resampled.
- Remediation of mercury from the Sodium Burn Pit Watershed. The site identified in 1992 to be with mercury-bearing sediment was excavated and resampled after excavation to confirm the removal of sediment containing mercury.
- 4) Determination whether the plutonium-238 reported in the vicinity of the RD-51 and Building 59 Watersheds is statistically different from background. Additional samples were collected in the watersheds and results were statistically compared to background.

- Determination whether the strontium-90 and cesium-137 reported in the Sodium Reactor Experiment Watershed is statistically different from background. Additional samples were collected in the watershed and results were statistically compared to background.
- Determination whether the concentrations of tritium, cesium-137, and strontium-90 reported at Radioactive Materials Disposal Facility (RMDF) Watershed were greater than background. Additional samples were collected in the watershed and the results were compared to the background.
- 7) Further characterization of tritium and cesium-137 at the Building 59 Watershed to determine if tritium and cesium-137 concentrations were greater than background.

 Additional samples were collected in the watershed and the results were compared to background.
- 8) Characterization of the distribution of tritium, strontium-90, and cesium-137 in the drainages between the RMDF/Building 59 Watersheds and Campsite Area 1. Samples were collected in the drainages and the results were evaluated.
- 9) Collection of additional background data, at the request of the Work Group, from sites away from the SSFL.

A description of the procedures used to conduct the additional work required to address the issues listed above are in the Work Group approved workplan, dated October, 1993. This report describes how these recommendations were carried out. Figure 2 shows the current sample locations in the study areas. Figure 3 shows the original and the current sample locations for the background areas.

The additional sampling work is summarized below:

1) Additional tritium samples - A total of 50 soil samples were collected from the areas where the original tritium results that were analyzed by the gas counting method (Section 2.0, Table 1) and later withdrawn by the laboratory.

- 2) Campsite Area 1 and 2 Seven new samples were randomly taken from Campsite Area 2 and analyzed for tritium.
- 3) Sodium Burn Pit Watershed Four samples were taken from the Sodium Burn Pit Watershed for mercury analysis. These samples were collected after the sediments containing mercury were removed.
- 4) Plutonium-238 reported in the RD-51 and Building 59 Watersheds Twenty-seven additional soil samples were taken from the runoff channels and the results were statistically analyzed to evaluate whether the findings exceeded background levels.
- 5) Strontium-90 and cesium-137 reported in the Sodium Reactor Experiment Watershed Five additional soil samples were taken from the runoff channel in the watershed and the significance of the results compared against background levels was determined.
- Tritium, strontium-90, and cesium-137 in the RMDF Watershed Five additional soil sample locations were selected for sampling in the runoff channels. Subsurface samples were collected from five locations along the property boundary. A statistical analysis was performed to evaluate whether the reported concentrations were significantly above background levels.
- 7) Tritium and cesium-137 in the Building 59 Watershed As a follow-up to the finding of tritium in the Building 59 Watershed, additional characterization of tritium in the watershed was accomplished by collecting 22 additional soil samples within the watershed. The samples were also analyzed for cesium-137 to evaluate whether the cesium-137 detected in 1992 was statistically significant above background concentrations.
- 8) Campsite Area 1 Drainage way Ten new samples were taken from the drainage way between Campsite Area 1 and the RMDF/Building 59 Watersheds and analyzed for tritium, strontium-90, and cesium-137.

9) Additional background data - Ten additional samples were taken from each of two new background sites (Wildwood Regional Park and Tapia County Park) and seven samples from Happy Camp. The background samples were collected both from areas with a relatively flat slope, similar to the original study area and from ravines similar to those found on Brandeis-Bardin near the SSFL. Samples from these areas were analyzed for radionuclides.

In addition, up to five additional samples were collected from each of the ravines if the study participants encountered obvious sediment deposits that might suggest that radionuclides could have been deposited in that location. The procedure for identifying additional sample locations in the field was based on a consensus of the work group participants. This was the same procedure used in the initial sampling.

Soil samples were analyzed only for those radionuclides specified. Surface water samples were analyzed for gross alpha and beta emitting radionuclides, strontium-90, tritium, and gamma emitting radionuclides. Strontium-90, tritium, and cesium-137 (a gamma emitter) isotopes are generally from man-made sources (e.g., nuclear fission, neutron activation, and weapons test fallout), but all had a history of usage/production at the Rocketdyne-Santa Susana Field Laboratory facility.

2.0 SAMPLING APPROACH

This section presents the sample locations, sample analyses, and the sampling protocols for soil/sediment (hereafter referred to as soil) and surface water.

2.1 SAMPLING AREAS

This section describes the areas sampled within Brandeis-Bardin and the Conservancy and the background sampling areas.

For the purposes of clarity in this discussion, the following terms are used:

<u>Study Participants</u>: This term is used to refer to those parties which were actively involved in the field activities and sample analysis, which include Rocketdyne, USEPA, California Department of Health Services, and the consultant for the Brandeis-Bardin Institute.

Study Areas: This term is used to refer to Brandeis-Bardin and the Conservancy.

<u>Background Areas</u>: This term is used to refer to the locations which were sampled to establish background levels of the radionuclides (*i.e.*, Wildwood Regional Park, Tapia County Park, Happy Camp, and Santa Susana Park).

<u>Sampling Area</u>: This term refers to an area within one of the study areas or background areas from which samples were collected (e.g., the Building 59 Watershed at Brandeis-Bardin).

<u>Sampling Block</u>: This term refers to the randomly selected blocks within a sampling area grid (refer to Section 3.3.1 for a complete description) from which discrete soil samples were collected.

<u>Sampling Location</u>: This term refers to a specific point within a sampling block or at a designated location in a drainage sampling area where a soil or surface water sample was collected.

<u>Scheduled Sample</u>: This term refers to the primary sample collected, analyzed and reported. All other sample descriptions refer to QA/QC samples further described in Section 3.6.2.

2.1.1 Sampling Areas

Sampling areas described in Section 1.0 were selected based on the results of the March 10 report and subsequent input from the USEPA and discussion at the March 10, 1993 SSFL Work Group public meeting. The sampling areas in this study used the same designations as the original study. (The italicized sample areas were resampled for tritium only):

Background (BG):

- Santa Susana Park (BG-02)
- ► Happy Camp (BG-05)

Brandeis-Bardin Institute (BB):

- ► Dormitory Area (BB-02)
- ► Campsite Area 1 (BB-03)
- ► Campsite Area 2 (BB-04)
- ► Picnic Area (BB-05)
- ► House of the Book (BB-06)
- ► Main House Orchard (BB-12)
- ► Avocado Grove (BB-13)
- ► Old Well Campsite (BB-14)
- RD-51 Watershed (BB-15)
- Radioactive Materials Disposal Facility Watershed (BB-16)
- Building 59 Watershed (BB-17)
- Sodium Burn Pit Watershed (BB-18)
- Sodium Reactor Experiment Watershed (BB-19)
- Campsite Area 1 Drainage Way (BB-20)

Santa Monica Mountains Conservancy (SM):

Former Rocketdyne Employee Shooting Range (SM-03)

Five additional sample areas were also sampled during this study and have the following designations:

Background (BG):

- Wildwood Regional Park (BG-09)
- Wildwood Regional Park Ravine (BG-10)
- Tapia County Park (BG-11)
- ► Tapia County Park Ravine (BG-12)
- Rocky Peak Ravine (BG-14)

The sample locations and the analyses performed at each location are discussed in Section 2.2.

2.1.2 Background Sampling Areas

The statistical analysis of the original background data showed the original background locations were not statistically different from each other. At the request of the SSFL Work Group, two additional background areas at least 10 miles from the SSFL were also sampled to provide additional documentation of background radionuclide concentrations. The new locations include ravine areas as well as level areas similar to the original background sampling areas. The new background areas are:

- 1) Wildwood Regional Park (located 13 miles west of the SSFL)
- 2) Tapia County Park (located 10 miles south of the SSFL)

These additional background areas were selected for their distance from the SSFL (at least 10 miles from the SSFL were specified by the SSFL Public Work Group) and because these areas exhibit topographic characteristics similar to the topography of the SSFL/Brandeis-Bardin

ravine areas (Figure 3). Additionally, soil samples were collected from the ravine at Rocky Peak, (from which surface water samples were collected in the previous study).

To reduce confounding factors, reasonable judgement was used to collect samples from areas that did not appear disturbed by human activities. Only soil samples were collected from the background areas. Surface water was not observed at Wildwood Regional Park, Tapia County Park, or Rocky Peak during sampling in 1994.

2.2 SAMPLING APPROACH OVERVIEW

The additional off-site sampling was limited to those areas where chemicals or radionuclides were documented (e.g., tritium in the Building 59 Watershed and mercury in the Sodium Burn Pit Watershed), where individual radionuclide samples were higher than the ninety-fifth percentile of the measured background (e.g., Sr-90 and Cs-137 in the RMDF Watershed), where tritium samples were withdrawn by the laboratory (e.g., House of the Book) or where the duplicate tritium analysis was significantly higher than the original sample result (Campsite Area 2).

This section provides a brief overview of the sampling approach used to collect the soil and surface water samples. The sample locations, analyses conducted for each sample, and the rationale for the selections of the sample locations are summarized in Table 1. A technical description of the sampling methods is provided in Section 3.0 (Sampling Methodology and Quality Assurance Program). The USEPA, the California Environmental Protection Agency (Cal-EPA), the California Department of Health Services (DHS), the Conservancy, and Brandeis-Bardin participated in this joint sampling effort to collect split samples.

2.2.1 Soil

Soil samples for the reanalysis of tritium were collected from areas where previous samples could not be validated by the laboratory and which were subsequently withdrawn due to the use of the gas counting method. The original randomly selected grid blocks were resampled one foot towards the SSFL from the original sampling locations (the XY coordinates). These tritium sample locations are located in grid areas consisting of numerous sample blocks of

equal size. In most cases, some of the stakes denoting the sampling grid or location were still in place and were successfully used to closely relocate the original sample locations. Discrete, undisturbed soil samples were collected from the designated sample locations. The new sample locations are considered closely representative of the original sampling locations.

Soil samples were purposefully collected in ravine areas and drainage ways. Each ravine and drainage way area was sampled at a minimum of five locations. Samples were taken from the soil surface to a depth of approximately 6 inches and analyzed as shown on Table 1.

The new background sampling locations were collected from ravines as well as from a relatively undisturbed flat area similar in topography to the locations from which the original background samples were collected. Wildwood Regional Park and Tapia County Park were sampled at five locations in the ravines and in five undisturbed flat areas using a grid system. Five soil samples, from two additional and three at previous sample locations, were collected from the original sampling area at Happy Camp and Santa Susana Park using the random number table generated during the original sampling. Five soil samples, from five additional sample locations, were also collected at Rocky Peak using the next five random blocks on the random number table generated during the original sampling (Appendix B). In addition, five locations were sampled in the ravine at Rocky Peak, where a surface water sample had previously been collected. Soil samples were collected from each location as described in Section 3.3.2.

2.2.2 Surface Water

Surface water was sampled only at Campsite 1 and Campsite 2 where a sufficient flow of surface water was present. All other sites were either dry or did not contain enough running water to collect a representative sample from the location.

3.0 SAMPLING METHODOLOGY AND QUALITY ASSURANCE PROGRAM

This section provides an outline of each of each sampling protocol and the associated quality assurance procedures.

3.1 DECONTAMINATION PROCEDURES

All sampling equipment in direct contact with soil or surface water was decontaminated prior to use in the field to prevent or minimize cross-contamination between field samples and external sources, in accordance with the following procedure:

- 1) Scrub equipment in non-phosphate detergent
- 2) Rinse or soak in 10% nitric acid (trace metal or higher grade nitric acid diluted with distilled/deionized water)
- 3) Rinse in distilled/deionized water
- 4) Air dry

In the areas where subsurface samples were collected using a drill rig, the hollow-stem drilling augers were steam cleaned between each boring or sampling location.

Sampling equipment was generally used immediately after decontamination to avoid cross-contamination during storage. If decontaminated sampling equipment was transported between locations, the equipment was wrapped in aluminum foil so no portion was exposed. Disposable gloves were worn when handling cleaned sampling equipment. Soil sampling equipment was not decontaminated between soil sample collections at the same depth at a

single sample location, because these samples are taken adjacent to each other and represent a single sample.

Decontamination waste water was placed in 5-gallon buckets and transported to the SSFL where the water was transferred to 55-gallon Department of Transportation approved drums. A drum inventory was maintained containing information on drum contents and date. Drum inventory information was written on the drum labels with indelible ink. All drums were sampled and held at the SSFL until analytical results were available.

3.1.1 Disposal

Since other chemicals were not detected above background concentrations during the Brandeis-Bardin and Santa Monica Mountains Conservancy multi-media sampling investigation, March-April in 1992, the decontamination waste water contained in the two 55-gallon drums generated during the 1994 sampling event, were only analyzed for radionuclides to determine appropriate methods of disposal. Results of the analyses indicated that tritium, gross alpha radiation, Strontium-90, isotopic plutonium, and cesium-137 were not detected in the samples collected from each drum. Gross beta radioactivity was detected at a level of 40 ± 9 pCi/L and 13 ± 7 pCi/L from Drums 1 and 2, respectively. These levels are below the MCL for Gross Beta radioactivity (50 pCi/L). Rocketdyne subsequently disposed of the drums in an appropriate manner.

3.2 SAMPLE IDENTIFICATION AND LABELING

3.2.1 Sample Identification

Soil and surface water samples were identified using an appropriate site-specific sample identification code as described below.

The site-specific sample identification code is a 9-digit code designed to provide a clear indication of the location from which the sample was collected and the intended analysis. An identical, preprinted label and a photocopy of the label were generated to identify each specific site and maintained in a sample label binder (Figure 4). The label was affixed to the sample

container and covered with clear plastic tape. The photocopy served as a record to identify the sample location and description. The site-specific sample identification codes consists of the following components:

Digit 1 and 2: A two-letter code describes the facility of the samples' origin:

BG: Background Sampling Area

BB: Brandeis-Bardin Institute

SM: Santa Monica Mountains Conservancy

Digit 3 and 4: A two-digit number describes the sampling area of its origin (Table 1).

Digit 5, 6, and 7: A three digit code, further describing sample location which vary depending on the matrix being sampled:

Soil - code indicates the sampling block number.

Surface water - code indicates the number of the sample in the order of collection (i.e., 001, 002, 003, etc.)

Blind Field Duplicates

- blind field duplicates were designated by successive numbers reflecting the order in which they were collected. The relationship to the original sample was documented in the field label book. The purpose of blind field duplicate samples is discussed in Section 3.5 (Quality Assurance/Quality Control).

Digits 8 and 9: This two letter code indicates the medium sampled and the analysis conducted.

Soil - SS = strontium-90

SP = isotopic plutonium

SG = gamma scan

ST = tritium

SM = mercury

Surface water - WS = strontium-90

WG = gamma scan

WA = gross alpha and beta scans

WT = tritium

Pre-Spiked Samples - PS = strontium-90

PP = isotopic plutonium

PG = gamma scan

PT = tritium

Subsurface samples have two additional numbers at the end of the sample code to distinguish the depth from which the sample was collected:

Digits 10 and 11: This two letter code indicates the depth in feet at which the soil

sample was collected from subsurface sample locations. All surface samples that are collected at these locations have a two

digit number code of "00".

3.2.2 Sample Labeling

All samples received a descriptive site-specific sample label which along with identifying the sample location and intended analysis also included the following information:

- Project name,
- Date and time of collection,
- Requested analytical method, and
- Sampler's initials.

This same information was recorded in the field label book for all samples.

3.2.3 Sample Documentation

A bound field log book was maintained by the sampling team leader. Daily entries were made in ink to document the following:

- the date,
- the names of the field teams,
- weather conditions,
- location-specific entries for grid setup and sample locations, and
- sample area-specific entries for sample collection activities.

The field log book remained in the possession of the sampling team leader at all times. At the end of each day's activities, the sampling team leader reviewed all of the day's entries for accuracy and completeness. Each day's entries were photocopied and retained in a file at the McLaren/Hart office. This precaution was taken to provide backup should the field log book be lost or destroyed.

All corrections in the field log book observed the followed guidelines:

- Under no circumstances was "white out" or other correction materials used.
- A single line was drawn through the incorrect information and the corrected statement or information was written in the next available space. Both were initialed and dated by the person making the entry. Notations running along the margins were not acceptable.
- If there was insufficient space to place the correction at the point of the deletion, then a reference was provided to the location where the corrected information was presented.
- If a correction was made after the file photocopies had been made, copies of the corrected pages were appended to the original file copy.

3.3 SOIL SAMPLING

Soil samples were collected from 14 areas at Brandeis-Bardin, from one area at the Conservancy, and from eight background areas (Table 1). This section presents the protocols for the grid and random sampling, as well as the protocol for the collection, handling, and documentation of soil samples. Soil sample containers, container size, sample handling procedures, appropriate preservatives, and holding times are presented in Table 2.

3.3.1 Soil Sampling Strategy

This section presents the methods used for identifying the soil sampling locations at all sampling areas. Samples collected from the human activity areas in 1994 utilized the same grids designated in the March 10, 1993 report.

The random grid sampling protocol used a measure of the mean radioactivity level in an area and is appropriate for the purposes of comparing these levels to background levels. Predetermined sampling grids were originally described in the March 1993 report contained randomly selected sampling blocks and locations (X- and Y-coordinates). The random number tables from the March 1993 report were reused as necessary in this study and are included in Appendix B.

The generic sampling grids are 10,000 square feet in area and divided into 100 sampling blocks, each 100 square feet in area (10 feet by 10 feet), wherever possible. Site specific sampling grids may be smaller in size if the sample area could not accommodate a 100 foot by 100 foot grid. In general, the grid sampling blocks had assigned numbers starting with the number "001" in the southwest corner and numbered sequentially to the east, then north in rows so that the lowest number in any given row is always in the western end of the row. The only exception is the grid sampling block for the Dormitory Area (Figure 15) where the "001" corner originates in the southeast corner. Random numbers for each grid sampling area were used to identify the blocks to be sampled. Tables containing the randomly generated sample block numbers and X and Y coordinates for the specific sample locations, for the areas sampled during this investigation are presented in Appendix B.

Figures showing sampling areas are presented in the Figures Section for the background areas and study areas. Selected sample locations within the grid areas were resampled. At Campsite Areas 1 and 2 (BB-03 and BB-04), samples were collected from original locations and from five additional locations. At Rocky Peak (BG-01), five additional samples were collected within the original sampling grid area and combined with the original data. At Happy Camp (BG-05) and Santa Susana Park (BG-02), two additional samples were collected and the original sample locations were resampled. These additional randomly generated sampling locations in each grid were selected from the random number tables in Appendix B. The sample locations were determined from the next random block numbers and X-Y coordinates that followed the random block numbers that were selected for the original investigation.

Ravines were sampled using a non-randomized sampling approach. The ravines at RD-51 (BB-15) and the RMDF (BB-16) were sampled at intervals of approximately 50 feet beginning at the last location sampled in the original sampling (i.e., at the location furthest downstream from the Rocketdyne property line) and continuing down the ravine. Additional samples were taken from locations closer to the Rocketdyne property line (i.e., within the area previously sampled) in the Building 59 Watershed (BB-17), the Sodium Burn Pit Watershed (BB-18), and in the Sodium Reactor Experiment (SRE) Watershed (BB-19). Ten samples in the Campsite Area 1 Drainage Way (BB-20) were collected at approximately 250-foot intervals between Campsite Area 1 and the previously sampled ravine areas.

Sampling points for all ravine samples met the following criteria:

- The sampling point was a point of potential soil deposition,
- The sampling point contained enough soil to supply all of the soil necessary for the analytical requirements without compromising the sampling method,
- The sampling point was accessible with the required sampling equipment and without exceptional risk to the sampling crew.

In sample areas were these criteria could not be met, alternate locations, which met the above mentioned criteria, were sampled. At the Building 59 Watershed (BB-17) additional soil samples were also collected on both sides of the drainage way to further characterize tritium, cesium-137, and plutonium-238.

The sampling crew collected soil samples from the designated locations within each of the designated blocks or at locations within the ravines agreed upon by the study participants as described in Section 3.3.3. Prior to beginning each day's field operations, the sampling team leader was responsible for having all of the necessary equipment available and functioning properly.

3.3.2 Soil Sample Location Identification

The following procedure were followed to reestablish the previous grid locations. The sampling team upon arriving at a sampling area examined the sample area and determined if the marked sample stakes placed during the original investigation were still present. At most areas, one or more stakes were present facilitating the reidentification of all previous sampling locations.

In areas where the grid sample stakes were absent from locations at which resampling was required, the sampling crew conducted the following procedures to establish the sampling grid and mark the appropriate sampling locations.

- 1) Using the existing sample grid diagrams (generated during the original investigation), the southwest corner of the sampling area was remarked. The southwest corner was generally the starting point for sampling grids and the origin of the X and Y axes for locating the sample locations within the sample blocks.
- The four corners of the predetermined sampling grid were measured and marked with stakes tied with colored tape. The stakes were marked with their orientation to the origin (e.g., northeast, northwest, southeast, or southwest). A compass was used to ensure the grid was square. The sample team leader noted any changes to the sampling grid map and attached a copy to the field map book.

- 3) Each of the predetermined (randomly identified) sampling blocks that were sampled during this investigation, were located on the ground by measuring the appropriate footage along the X and Y axes starting at the grid origin. A compass was used to ensure the blocks were located in the appropriate orientation to the grid. The southwest corner of each block was marked with a stake labeled with the appropriate block number and tied with colored tape.
- 4) Each predetermined (randomly identified) sampling location within a sampling block was located using the values for the X and Y coordinates (increments of 1 foot). The sample location were measured and marked with a stake, labeled with the block number and the location coordinates (i.e., block number, X-coordinate, Y-coordinate) and tied with colored tape.
- 5) If the sampling location fell on an obstruction, the sample was collected at the nearest point south of the obstruction, towards the SSFL.
- 6) The placement of the grid and the sampling locations was documented photographically, and an entry in the field log book was made describing each photograph.
- 7) Before leaving a sampling area, the sample team leader verified the following information was recorded in the field log book:
 - Sample area name and location
 - Date and time
 - Team personnel
 - Sketch of grid location and layout, including the blocks and sample locations clearly marked
 - Documentation of the bearings and landmarks used to establish the grid
 - Documentation of the random numbers, bearings and coordinates used to locate the predetermined sampling blocks and locations
 - Documentation for all photographs taken.

For the additional soil locations which were collected at Campsite Area 1 and 2 and the background areas, the sample crew followed Steps 3 through 8 to mark the additional sample locations.

The following procedure were followed to implement the ravine sampling at the designated sampling areas. The sampling team upon arriving at a sampling area walked the ravine to determine the locations of the previous ravine sampling.

After the location of the furthest downgradient sample was identified, the sampling crew conducted the following procedures to establish and mark the appropriate sampling locations:

- The drainage ways were marked approximately every fifty feet with a stake to designate the sample locations. If the specific block location did not contain soil or was inaccessible, that specific location was not marked. At the Campsite Area 1 Ravine, sample locations were marked every 250 feet.
- 2) The sampling team proceeded to the first downstream sample location, and collected the appropriate soil samples.
- 3) Soil samples were collected as described in Section 3.3.3.
- 4) The location of the sample collected was documented in the field log book and photographed.
- 5) Before leaving a sampling location, the sample team leader verified the following information was recorded in the field log book:
 - Sample area name and the area and location numbers
 - Date and time of sampling
 - A sketch of the sampling location depicting the soil sampling points.
 - Documentation of the bearings and landmarks used to establish the location.
 - Documentation of photographs taken.

3.3.3 Soil Sampling Procedure

3.3.3.1 Surface Soil Sampling Procedure

The sampling team leader was responsible for the availability and decontamination of the necessary equipment before entering the field. The sampling team leader consulted the sampling workplan for the locations, maps and coordinates for the sampling areas which were sampled each day. The procedures described below were followed for soil sampling, sample identification and documentation, and shipping and handling. Prior to collecting soil samples from an area, the EPA's consultant conducted a radiation survey using a Ludlum Model 19 Micro-R meter.

The volume of material collected at each sample location was adequate for radionuclide or mercury analysis for the specified locations. The soil samples were analyzed for one or more of the following radionuclides: strontium-90, isotopic plutonium, tritium, and gamma emitting radionuclides. At the Sodium Burn Pit Watershed, samples were analyzed only for mercury. One sample volume was required for each analysis.

Soil samples were collected using an impact driven hand-coring sampler at specific grid locations. The coring head was fitted with a 6-inch long brass tube. Soil samples were collected in the following manner:

- 1) A pre-cleaned coring head and brass tube were assembled and connected to the coring device. Clean latex gloves were worn at all times.
- The sampling location was cleared of surface rocks, sticks and other loose debris. The sample location stake were not removed.
- 3) The cutting head was placed directly on the surface soil and the impact hammer was dropped on the coring head repeatedly until the top of the coring head was flush with the soil surface.
- 4) The corer was pulled from the ground and the coring head disassembled.

- 5) For surface samples, the brass tube was removed, a Teflon sheet and plastic end caps were placed at the end of each tube. The end caps were taped to the brass tube using duct tape or plastic tape.
- The laboratory was directed to analyze the soil as marked. For tritium samples, the soil was to be extruded from the brass tube into a glass jar, closed and sealed with custody tape. If split samples were requested, the soil from the necessary number of cores was to be placed into a resealable plastic bag and mixed for one minute. The mixed soil was then divided and placed into the appropriate number of brass tubes (or jars for tritium) with a Teflon sheet and a plastic end cap placed on each end of the brass tube.
- A label was filled out for each sample as described in Section 3.2.2 and placed on the plastic bag or jar. Clear plastic label tape was placed over the label to protect against water damage. The surface soil samples were put into clean, resealable plastic bags and placed in a cooler for the appropriate laboratory.

The sample identification number, the location, time, date, depth of sampling, analyses requested and name of sampler was recorded in the McLaren/Hart field log book.

At ravine locations the same sampling procedure was used with the exception that a drive sampler was not always used to collect the soil samples. In the ravines a trowel was used to scoop the surficial soil into the sample containers. All other procedures were followed as described above.

3.3.3.2 Subsurface Soil Sampling Procedures

Subsurface soil samples were collected at eight locations between the Building 59 and RMDF watersheds. Because of the rugged terrain in the ravine areas, three sampling methods were employed during the course of this investigation.

Five locations (B001 through B005) were sampled in the RMDF watershed using an all-terrain drill rig. Soil samples were collected at the surface at all five locations using sampling method described in Section 3.3.3.1.

Following surface sample collection a borehole was drilled to a depth of five feet. Soil samples were collected at a depth of 5 feet at all five RMDF watershed boring locations. The subsurface soil samples collected in the RMDF watershed were collected using three methods as a result of subsurface conditions at each boring location. The three sample collection methods were as follows:

- 1) Soil was collected off the end of the drill bit. The drill bit was advanced to a depth of five feet then retrieved out of the borehole. The soil material on the end of the drill bit consisted of soil from the bottom of the borehole (five feet). This method was employed at sample location B001 where the subsurface soil was too hard for a sampling device to penetrate.
- 2) Undisturbed samples were collected at B003 and B005 using a 12-inch long split-spoon sampler. The sampler was fitted with two 6-inch long brass tubes and driven into the subsurface using a hydraulic hammer mounted on the drill rig.
- 3) Soil samples were collected using a hand auger at B002 and B004. A hand auger was lowered down the borehole to collect soil from a depth of five feet. The soil material within the bucket of the hand auger was then manually transferred into the appropriate sample containers.

Three subsurface soil locations (B001 through B003) were sampled in the Building 59 watershed. Soil samples were initially collected at the surface at all three locations using sampling method described in Section 3.3.3.1. Three subsurface soil samples collected in the Building 59 watershed were all collected using a hand auger. A drill rig was not used as a result of the steep terrain at the subsurface sample locations in the Building 59 watershed and also due to the shallow depth to bedrock at these sample locations. The subsurface samples were collected at different depths at each location due to the varying depth to bedrock

conditions. Soil samples were collected at depths of 2.5, 1.5, and 3.5 feet at sample locations B001, B002, and B003, respectively.

All samples collected at the subsurface sample locations in the RMDF and Building 59 watersheds were prepared and labeled per the procedures described in Section 3.3.3.1. The boreholes generated from drilling and hand auguring activities were backfilled with the excavated soil.

3.3.4 Split Samples

The USEPA, the California Department of Health Services (DHS), the California Environmental Protection Agency (Cal-EPA), the Santa Monica Mountains Conservancy, and the Brandeis-Bardin Institute were invited to analyze split samples. McLaren/Hart collected all samples and split the samples with the study participants as requested. True split samples were collected, *i.e.*, the medium being sampled was mixed prior to being placed in the appropriate sample container so that subsamples could be sent to different laboratories for analysis. Ideally, the results of these analyses can be compared to give an indication of the variability between laboratories on the same sample. However, environmental media, especially soil, are very difficult to homogenize and the results may differ due to the variability of the media, rather than the laboratories. In the event that the field split or adjacent sample results appear different, the blind duplicates, the laboratory spikes and the statistical variability of the data were evaluated to determine whether the apparent difference in split or adjacent samples is real.

The study participants determined the number and locations of the split samples they received. For all split samples collected, the location, date, time, depth of sampling, sample identification number, analyses requested and name of sampler was recorded in the McLaren/Hart field log book.

It was strongly recommended that all participants used the same analytical methodologies for duplicate samples so that the results could be compared to the scheduled samples. Since the results for tritium had the most methodological variability in the original off-site sampling, the

methodology that was considered standard for this project was included in Appendix E of the Workplan (October 1993).

3.3.5 Soil Sampling Documentation

It was the responsibility of the sampling team leader to have appropriate information recorded in the field log book or field label book. Upon completion of soil sampling, the field log book and field label book contained:

- Project name
- Date and time of sample collection
- Sample location description
- Sample method description
- Description of sample conditions (e.g., depth, unified soil classification, percentage of gravel, sand, silt or clay, color using Munsell number, plasticity, grain size, grading, density, and moisture). This information was only recorded at new locations in the ravines that were not described in 1992 investigation.
- Personnel collecting samples
- Description of environmental conditions
- Sample handling, containers, and preservation methods, register numbers and sitespecific sample identification codes, and corresponding chain-of-custody numbers.
- Split sample documentation (e.g., identification numbers and methods).

It was also the responsibility of the sampling team leader to ensure that the chain-of-custody forms were appropriately filled out and in complete agreement with the field log book.

3.3.6 Soil Sample Handling, Shipping, and Storage

Soil samples that had been sealed, labeled, and placed in appropriate containers were placed into the cooler without ice (with the exception of samples analyzed for mercury), for shipment to the laboratory. The chain of custody forms were placed in a sealed plastic bag and placed inside the cooler. All samples were shipped for overnight delivery.

It was the responsibility of the sampling team leader for the following:

- The chain-of-custody forms were properly filled out and accounted for every sample contained in the cooler.
- The samples and documentation being shipped coincided with the information contained in the field log book.
- The samples contained in the cooler were destined for the appropriate laboratory and that all of the samples were destined for the same laboratory.
- The samples were securely packed and no empty space remains within the cooler.
- The cooler was appropriately addressed and sealed with duct tape.

Appropriate QA/QC samples were shipped with the field samples. The protocols for the collection, shipping, and handling of QA/QC samples are presented in Section 3.5.

3.4 SURFACE WATER SAMPLING

Surface water grab samples were collected from surface water sources where possible (Campsite Area 1 and 2). Surface water is seasonal in the Simi Valley area and was only collected in areas where running water was present in sufficient quantities to collect the volume of sample required for all analyses. One round of sampling was conducted at each surface water source. Surface water samples were analyzed for the following radionuclides:

- strontium-90
- gamma scan
- tritium
- gross alpha and beta scan

Surface water sample containers, container size, sample handling procedures, appropriate preservatives, and holding time are presented in Table 2.

3.4.1 Surface Water Sampling Procedure

In general, when sampling surface waters, every reasonable effort was made to not disturb the bottom sediments in the water sample collection area or upstream from that area. As such, surface water samples were collected before sediment samples. The exact location of the sampling location was at the discretion of the sampling team and study participants, and its selection was based primarily on the need to submerge the sampling equipment. The location was marked with a stake tied with a colored ribbon, and its proximity to nearby landmarks recorded in the field log book. Upon arriving at the surface water sampling point, the appropriate sample bottles were set aside and labels prepared. Care was taken to approach each sampling location from below that point (i.e., downstream). The following procedures were used for the collection of surface water samples.

- 1) Use a clean stainless-steel bucket to collect all surface water samples being analyzed for radionuclides.
- 2) Rinse the bucket thoroughly with sampling source water and discard the rinse water away from the sampling point.
- 3) Place a clean 0.45 micron Whatman glassfiber filter into the filter apparatus. Apply a small quantity (5 milliliters) of distilled/deionized water to the filter. Apply suction to seat the filter. Discard the rinse water from the filtrate flask.
- 4) Collect the surface water sample in the bucket.
- 5) Shake or swirl the sample and then pour it slowly into the filter funnel. Apply and maintain suction on the filter until the water has passed through the filter and the filter appears to be drying out.
- Turn off the suction and disconnect the filtrate flask from the filter apparatus. Transfer the sample filtrate from the flask to an appropriate, labeled sample bottle (i.e., a 1-liter glass bottle for tritium or a 1-liter plastic bottle for the other radionuclide analyses) with preservative as required (see Table 2).

- 7) Cap the sampling bottles and seal the lid with Teflon and clear plastic tape. Place a chain-of-custody sticker across the seal.
- 8) The filtration apparatus and the collection buckets were decontaminated between sampling areas. The filtration apparatus and the collection bucket were not decontaminated between samples at the same location.
- 9) Discard the used filter, and repeat steps 1 through 8 for the remaining samples from the same location.

The sample identification number, the location, time, date, analyses requested and the name of the sampler was recorded in the McLaren/Hart field log book.

3.4.2 Split Samples

Some study participants requested split samples for analysis at some or all of the surface water sampling locations. The filtrate was transferred to a large, clean stainless steel bucket and mixed. The contents were then divided between McLaren/Hart and the person or persons requesting a split sample. Notation of all split samples collected was recorded in the field label book.

3.4.3 Surface Water Sample Documentation

The following information was recorded in the field log book for each surface water sample collected.

- Project name
- Date and time of sample collection
- Sample area description
- Sample method description
- Surface water sample identification numbers and corresponding site-specific sample identification codes (see Section 3.2.2)

3 - 18

Chain-of-custody reference numbers

- Filtered and preserved samples
- Location where the sample was collected on the sample area diagram
- ▶ Split sample documentation (e.g., identification numbers and methods)
- Pertinent field notes (e.g., weather conditions)
- Personnel collecting samples
- Description of sample conditions

It was also the responsibility of the sampling team leader that the chain-of-custody forms were appropriately filled out and in agreement with the field log book.

3.4.4 Surface Water Sample Handling, Shipping, and Storage

Surface water samples both in glass and plastic containers were sealed in resealable plastic bags and encased in bubble wrap to prevent breakage. All radionuclide samples were placed in a cooler without ice and shipped to the laboratory via overnight courier. The chain-of-custody documentation was sealed inside a plastic bag taped to the underside of the cooler lid.

Appropriate QA/QC samples were shipped with the field samples. The protocols for the collection, shipping and handling of QA/QC samples are presented in Section 3.5.

3.5 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

Quality assurance and quality control (QA/QC) samples were included in the sampling program to provide quality control over the collection of environmental measurements and their subsequent review, interpretation and validation of the field collection methodologies and radionuclide measurements conducted by the analytical laboratories.

3.5.1 Field Documentation

Field documentation and quality control checks were made by the sampling team leader. At the end of each day's field activities, all of the day's field log book entries were reviewed for completeness, accuracy, reporting format, and thoroughness. The team leader initialed the last page of each day's entry as an indication that this review had been undertaken and that the

entries in the log book were acceptable. It was the responsibility of the team leader to check that the chain-of-custody documentation agreed with the field log book entries.

3.5.2 QA/QC Sampling

The types, frequency, and numbers of QA/QC samples were collected during the field sampling are shown in Table 3. The specific sample block where QA/QC samples were collected is presented in Table 4. Several different types of QA/QC samples were used to account for variability and sources of contamination in various stages of the sampling and analytical process. The objectives and purpose of the sample types are outlined in the following sections.

3.5.2.1 Field Rinsate Blanks

Field rinsate blanks provided a check on contamination from various sources and from sampling instruments used to collect and transfer samples from the point of collection into sample containers. Field rinsate blank samples were collected following the decontamination procedure for field sampling equipment. A field rinsate blank was collected at a rate of one per 20 sampling events. A sampling event is defined to be the sampling that occurs for a medium at a single sampling block for soil or sampling location for water. The field rinsate blanks were prepared with analyte free distilled/deionized water. The field rinsate blank samples were collected in the required sample bottles for each analytical method. The following protocol was implemented to collect field rinsate blanks:

- 1) Decontaminate all sampling equipment.
- Prior to any sampling, pour the required volume of analyte-free distilled/deionized water (i.e., 5.5 liters for a soil field rinsate blank) over the precleaned sampling equipment into a precleaned (i.e., decontaminated) basin. Split the sample into the appropriate 0.5-liter and 1-liter containers, each containing the appropriate preservative for the specific analyte group.

- 3) Affix a label to each rinsate container and assign a water sample register sample identification number. Seal the bottles with custody tape and store in cooler without ice.
- 4) Note in the field log book the date and the register sample number for each of the rinsate samples. Ship samples consistently with the methods for other field samples.

3.5.2.2 Blind Field Duplicate Samples

The collection of blind field duplicate samples provides for the evaluation of the laboratory's performance by comparing analytical results for two identical or nearly identical samples. As such, all blind field duplicate samples were taken as described for split samples in the previous sections. The blind samples were placed in separate containers and given distinct sample numbers to allow for "blind" receipt by the analytical laboratory. The true identity was concealed from the laboratory, but the identity of the samples was thoroughly documented in the field label book.

Blind field duplicates were collected at a target rate of one per 20 samples sent for laboratory analysis on a radionuclide group-specific basis. The total number of blind field duplicates prepared is summarized in Table 3. Blind field duplicates were designated by the number "00" in the 3rd and 4th digit of the site-specific sample identification code. Blind field duplicates were numbered successively in the 5th, 6th, and 7th digits as they were collected from new sampling areas.

Blind field duplicates were collected from randomly chosen sampling locations. For example, a total of 147 soil samples were taken and analyzed for tritium (see Table 1). This represents seven groups of 20 and one group of 7 samples. As shown in Table 3, eight blind field duplicates were submitted for the tritium analysis. For each group of samples, a computer generated random number table was used to select the location for each blind field duplicate. For example, if the random number generator produced the number "6" for tritium, then the location at which the sixth sample taken within this group of twenty samples was used for the corresponding blind field duplicate. A summary of the computer generated random numbers used for blind field duplicates is presented in Appendix C.

3.5.2.3 Trip Blanks

Trip blanks were not collected. Trip blanks were collected during the previous sample investigation (1992) to evaluate the cross-contamination of volatile organic compound samples during transport. Since volatile organic compounds were not analyzed during this investigation, trip blanks were not necessary.

3.5.2.4 Field Blanks

Field blanks are used to evaluate the cleanliness of the sample collection bottles and possible sources of contamination related to the field sampling environment. Field blanks consist of sample bottles that are filled with analyte-free distilled/deionized water in the field. The samples are then capped, sealed, and shipped to each of the appropriate analytical laboratories along with the other field samples. Field blanks were collected for radionuclide groups for which sample bottles are required (i.e., surface water samples analyzed for the radionuclides of concern). Field blanks were collected at a rate of one per 20 samples surface water samples. Field blanks were assigned a site-specific sample identification code.

3.5.2.5 Pre-spiked Blind Duplicate Samples

Pre-spiked blind duplicate samples are QA/QC samples that were used to test the accuracy of the laboratory by submitting samples with known concentrations. The pre-spiked sample contains a known level of one or more of the radionuclides of concern which is added to the sample by another analytical laboratory. The spiked samples were sent back to the sampling crew then sent on with the other collected samples at a rate of one per 20 samples sent for laboratory analysis on a radionuclide group-specific basis. The total number of pre-spiked blind duplicates prepared is summarized in Table 3. Pre-spiked blind duplicates were designated by the number "00" in the 3rd and 4th digit of the site-specific sample identification code and a "P" in the 8th digit. Pre-spiked blind field duplicates were numbered successively in the 5th, 6th, and 7th digits as they were collected from new sampling areas. Only pre-spiked water samples were sent to the laboratory for gamma scan, tritium, gross alpha and beta radiation, strontium, and isotopic plutonium analyses because the study participants agreed that soil samples could not be effectively homogenized. Pre-spiked soil and water

samples were submitted for tritium analyses. All study participants analyzed at least one prespiked sample for each analysis and media.

3.5.2.6 Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

Matrix spike and matrix spike duplicate samples are QA/QC analyses performed by the analytical laboratory. The matrix spike is a sample to which one or more of the radionuclides of potential concern or a surrogate (spike) is added to an aliquot of the sample by the analytical laboratory. The matrix spike duplicate is an analysis of a second aliquot, spiked separately, of the original sample. The results of the spike analyses are expressed in terms of the percent recovery with regard to the amount of chemical added, and the results of the duplicate analyses are expressed in relative percent difference from the original sample. These results are used to evaluate the laboratory's precision in the analysis of that sample and to determine whether the sample matrix interfered with the extraction or analyses. The MS/MSD samples were collected at a rate of one per 20 samples (including other QA/QC samples) on an analyte-specific basis (Table 3). MS/MSD samples were assigned a site-specific sample identification code. For the purposes of conducting these analyses, the laboratories require a complete set of sample volumes. Therefore, soil samples were collected specifically for the purpose of running the MS/MSD analyses.

3.5.2.7 Split Samples

The USEPA, the DHS, Cal-EPA, and Brandeis-Bardin were present to observe the collection of split samples for QA/QC purposes. True split samples were collected by McLaren/Hart, i.e., the medium being sampled was mixed so that subsamples were given to those requesting split samples and then were sent to different laboratories for analysis.

As noted previously, the results of the analyses from split samples can be compared to provide an indication of the variability between laboratories on the same sample. However, since environmental media, especially soil, are very difficult to homogenize, the results may differ due to variability of the media rather than in the laboratories. In the event that the field split or adjacent sample results appear to be different, the laboratory duplicates, the laboratory

3-23

spikes, and the statistical variability of the data were evaluated to determine whether the apparent difference in split or adjacent samples is real.

3.6 LABORATORY ANALYSIS

Soil and water samples were analyzed for all radionuclides of concern (gamma-emitting radionuclides, tritium, isotopic plutonium, strontium-90) were submitted to Teledyne Isotopes.

Teledyne Isotopes 50 Van Buren Avenue Westwood, New Jersey 07675 1-201-664-7070

Soil samples from the Sodium Burn Pit. Watershed were analyzed for mercury at MBT Environmental Laboratories.

MBT Environmental Laboratories 3083 Gold Canal Drive Rancho Cordova, CA 95670 1-916-852-6600

All adjacent/split samples taken were sent to certified laboratories identified by the study participants, independently.

4.0 QUALITY ASSURANCE/QUALITY CONTROL SAMPLING RESULTS

The following sections discuss the results of the Quality Assurance/Quality Control (QA/QC) sampling. The results are presented in separate sections for each QA/QC sample type and a summary section presents conclusions regarding the validity of data presented in this report.

The QA/QC sampling was designed to validate the analytical results and to identify discrepancies within the data set. When anomalous results were identified, the source of the anomaly was determined. Samples with inexplicable anomalies were identified and reanalyzed, as necessary, to locate the source or cause of the anomaly.

4.1 QUALITY ASSURANCE/QUALITY CONTROL RESULTS SUMMARIZED BY SAMPLE TYPE

The results for the QA/QC samples collected in 1994 are summarized in the following sections. Seven of the eight sample types were also collected in 1992. Pre-spiked duplicate samples were only used in 1994. The QA/QC samples included in this phase of work and discussed in this section include:

- Trip Blanks
- Field Rinsate Samples
- Field Blanks
- Laboratory Control Blanks
- Matrix Spike/Matrix Spike Duplicates
- Laboratory Duplicates
- Pre-spiked Duplicate Samples
- Blind Field Duplicate and Split Samples

4.1.1 Trip Blanks

Trip blanks were collected during previous 1992 sampling to evaluate potential cross-contamination of volatile organic compound samples during shipment to the laboratory. No samples were analyzed for volatile organic compounds during this sampling; therefore, no trip blanks were collected.

4.1.2 Field Rinsate Samples

Field rinsate samples contained distilled water used to rinse the sampling equipment after the decontamination procedure. No rinsate samples contained a reportable level of radionuclides or mercury. The rinsate analytical results can be found in Appendix D.

4.1.3 Field Blanks

Field blanks were used to evaluate the cleanliness of the water sample collection bottles and possible sources of contamination related to the field sampling environment. One field blank sample was collected and analyzed for mercury and the appropriate radionuclides. No mercury or radionuclides were found in the field blanks (only one field blank was taken in 1994). The field blank analytical results can be found in Appendix D.

4.1.4 Laboratory Control Blanks

Laboratory blank samples contained deionized water used at the time the samples were analyzed and measure whether the laboratory equipment contributed to concentrations of detectable mercury or radionuclides. Laboratory blank samples were run by the laboratory concurrently with soil/sediment and water samples. No mercury or radionuclides were detected in the laboratory blanks.

4.1.5 Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike and matrix spike duplicates (MS/MSD) are QA/QC samples used to determine whether the sample matrix (i.e., the soil/sediment or water) interfered with the extraction or

analysis. MS/MSD samples were prepared in the laboratory by injecting a known amount of a mercury or radionuclide into the sample matrix and measuring how much of the injected mercury or radionuclide was recovered in the analysis. The matrix spike is an original sample aliquot from the original spiked sample; the matrix spike duplicate is a second aliquot of the same sample matrix, spiked separately. The results of the spike analyses are expressed as percent recovery of the added chemical. The results of the MS and the MSD are indicators of accuracy (how closely the results reflect the actual amount of the mercury(s) or radionuclide(s) injected). The results of the MS and the MSD analyses are compared and expressed as the relative percent difference (RPD). The RPD is then used to evaluate the precision (consistency) of a particular analysis. The MS/MSD samples were collected at a rate of one per 20 samples (including other QA/QC samples) for each analyte group.

Each analyte has an acceptable range of recovery (for both mercury and radionuclide analyses) and an acceptable RPD (for mercury analyses only). All but one of the radionuclide analyses were within the acceptable percent recovery. Sample number BG-20 010-MG analyzed for Cesium-137 exhibited a high recovery (128 percent) in the MSD sample. This is slightly above the MSDs upper control limit of 125 percent. Laboratory blank samples MS/MSD data is presented in Table 5. The MS/MSD analytical results can be found in Appendix D.

Matrix interference in soil/sediment and water samples is not uncommon due to the effects of the media on the analysis. Because matrix interference is the result of highly variable soil/sediment and water chemistry, the sample results reported by the laboratory were not adjusted to account for the interference measured in the one plutonium-238 sample. It would not be appropriate to assume that the percent recovery for one sample would be applicable to a second sample. Since the percent recoveries are within an order of magnitude of the control limit, the conclusions of this study would remain the same if the sample results were adjusted to account for the recovery outside the control range.

4.1.6 Laboratory Duplicates

Laboratory Duplicates consist of extracting a second aliquot from the original sample and analyzing for the same analyte. This is an internal laboratory duplicate analysis conducted to measure the reproducibility of the laboratory method. Results from the laboratory duplicates

were below the reporting limits similar to the original sample or contained levels of radionuclides in the same range as the original sample levels (see Table 9).

4.1.7 Pre-spiked Blind Duplicate Samples

Pre-spiked blind duplicate samples consist of local soil from a background location or deionized water spiked with a known amount of a radionuclide, These samples are then submitted to participating laboratories to assess and compare the analyte recoveries. Prespiked blind duplicate sample results may indicate if a particular laboratory method generates results inconsistent with the actual spiked amount. The pre-spiked samples were prepared at the NAREL by the USEPA consultant. The samples were placed in identical containers and labeled similarly to other field samples so that the samples would be blind to the analyzing laboratories. Pre-spiked water samples were spiked and analyzed for gross alpha/gross beta radiation, tritium, plutonium-239, strontium-90, and gamma emitting radionuclides (cadmium-109, cobalt-57, cerium-139, mercury-203, tin-113, cesium-137, yttrium-88, and cobalt-60). Pre-spiked soil samples were spiked and analyzed for tritium. The results of the pre-spiked samples are presented in Table 6. For the purpose of comparison, a 25 percent deviation or less between the measured concentration and the pre-spiked concentration was considered acceptable. The pre-spiked blind duplicate analytical results for the samples analyzed by McLaren/Hart can be found in Appendix D.

As shown in Table 6, positive (containing analyte) tritium results were not erroneously reported in the five blank samples analyzed. Although detected amounts varied between the spiked amount and the analytical results, erroneous negative results were not reported. Based on this information, it is unlikely that a sample result was incorrectly identified as positive or below the method detection limit. Except one, all USEPA results were within the acceptance limit of 25 percent difference. The one exception was a deviation of 27.7 percent below the actual spiked amount for gross alpha radiation.

Recoveries for 19 out of 21 McLaren/Hart samples analyzed by Teledyne Isotopes for gross, alpha/gross beta radiation, tritium, plutonium-239 and strontium-90 were within the acceptance limit. One out of four samples spiked with tritium was below the spiked amount by 38.6 percent. Strontium-90 was initially reported below detection limits in all four pre-spiked

samples. McLaren/Hart contacted Teledyne Isotopes to determine why strontium-90 was not detected since the spiked samples contained a level of 2.2 pCi/L. Teledyne indicated in a letter that the initial results indicated concentrations of strontium-90 at 2.2 to 2.3 pCi/L in three of the four samples. Since the concentrations were near the detection limits the samples were reanalyzed which produced the reported non-detectable results. The initial detectable concentrations of strontium-90 which are in agreement with the spiked concentration are presented in Table 6. The Teledyne Isotopes letter discussing the pre-spiked strontium-90 results is presented in Appendix E.

Only two (cesium-137 and cobalt-57) of the eight gamma emitting radionuclides spiked in the sample were initially identified and reported by Teledyne Isotopes. These analytes were not initially reported since these specific radionuclides are not part of Teledyne's standard suite of analytes reported for gamma scan. The Teledyne Isotopes' letter discussing the pre-spiked gamma scan results is presented in Appendix E. The complete pre-spiked gamma scan results are listed in Table 6. All four samples analyzed for gamma emitting radionuclides contained amounts of one or more of the eight radionuclides above or below a 25 percent deviation of the spiked amounts. The results for the gamma scan analysis with greater than 25 percent deviations were: cadmium-109, two of the four sample results were above the spiked amount by 29.2 and 31.5 percent; cobalt-57, one of the four sample results were 35.7 percent above the spiked amount; cerium-139, one of the four sample results were 27 percent above the spiked amounts; tin-113 of four sample results were below the spiked amount by 28.9 percent; cesium-137, one of four sample results were below the spiked amount by 31.7 percent.

The initial gamma-emitting radionuclide results reported by Brandeis-Bardin's consultant were in error as a result of a calculation error at the lab resulting in isotopic concentrations being under reported by a factor of two. After the error was identified, the values were corrected. The corrected values for Brandeis-Bardin pre-spiked results for gamma-emitting radionuclides are presented in Table 6. A letter discussing this revision is included in Appendix E. One of the two samples analyzed for gamma-emitting radionuclides contained two radionuclides outside the acceptance limit (25 percent deviation between measured and pre-spiked concentrations). The recovery of mercury-203 was 54.3 percent above the spiked amount and the recovery of yttrium-88 was 48.5 percent below the spiked amount. The other six gamma-emitting radionuclides reported for this sample were within the acceptance limit. One sample

also contained an amount of strontium-90 below the spiked amount by 25.9 percent.

DHS analytical results were consistent with the spiked amount and within the acceptance limit for the isotopic plutonium analysis. For tritium the percent deviation for both of the water samples was 40.6 and 41.1 percent, which is outside the acceptance limit. For strontium-90 the percent deviation for both samples were 66.4 and 81.1 percent, which is outside the acceptance limit. One of the two samples analyzed for gamma-emitting radionuclides contained radionuclides outside the acceptance limit. Cadmium-109, cobalt-57, and yttrium-88 were 36.1 percent, 26.4 percent, and 36.1 percent above the spiked amount. The other five gamma-emitting radionuclides reported for this sample were within the acceptance limit.

4.1.8 Blind Field Duplicate and Split Samples

Blind field duplicate samples were evaluated by comparing the results of the duplicate sample with the scheduled sample. Split samples collected by the USEPA, the consultant to Brandeis-Bardin, and the DHS were evaluated in the same manner as blind field duplicate samples. The values for radionuclide analyses were not in agreement if the difference between the two sample results was greater than the sum of the standard deviations for the analyses (i.e., if the range [±] of the two results did not overlap). The values for the mercury analyses were not in agreement if the sample results differed by greater than 50 percent. Table 7 summarizes the results of the blind field duplicates and split samples that were not in agreement with the scheduled sample for soil/sediment. The blind field duplicate analytical results can be found in Appendix D.

Differences between duplicate soil/sediment samples were observed in 5 samples for tritium, 4 samples for cesium-137, and one sample for strontium-90. (Table 7). (It should be noted that isotopic plutonium was not detected by any lab in this round of sampling and that the detection limits for strontium by USEPA and Brandeis-Bardin were above those for Teledyne Isotopes. This resulted in agreement between samples although the analytes were not detected.) Three of the tritium differences (BG-02-074, BB-17-006, and BB-17-007) and two of the cesium-137 differences (BB-17-005, and BB-16-007) were only slightly (less than 10 percent) beyond the acceptance criteria. In one of the remaining sample sets (BB-20-001), both cesium-137 results are below background and, therefore, unlikely to impact the

conclusions from the results. In two of the instances where differences in results were above (greater than 10 percent) the acceptance criteria (BB-17-008 and BB-17-009), both results indicate an impact from tritium above background levels and are not likely to change conclusions from the study.

An additional QA/QC comparison for tritium at BG-12-005 (background, split sample with Brandeis-Bardin) was not in agreement. The scheduled tritium result at BG-12-005 contained a high result with associated high uncertainty (1200 \pm 600 pCi/L). The entire data set was reviewed for similar instances where a high uncertainty (greater than 30 percent the value of the result) was associated with a result, particularly for background samples. Four similar additional occurrences were identified although there were no associated QA/QC samples for these results (BG-12-001, BG-14-003, BG-14-004, and BG-14-005). McLaren/Hart reviewed the analytical data with the laboratory to attempt to determine the source of these anomalous readings. The results of that review are shown in Table 8. Two possible causes were evaluated: cross-contamination by a previous sample and low water yield (less than 3 ml). As shown in Table 8, low yield seems to have consistently occurred with these samples resulting in a high degree of uncertainty in the analytical result. A separate aliquot from sample BG-14-003 was reanalyzed for tritium, and the result was <300 pCi/L. Other sample tritium results where yields were below 3 ml, were withdrawn from the study by the laboratory (BG-2-001, BG-12-005, BG-14-004, and BG-14-005). A letter from Teledyne Isotopes Laboratory documenting the withdrawal of these samples is included in Appendix E.

Only one significant difference was observed between duplicate surface water samples. Surface water results from Campsite 1 Drainage (BB-20-002) were different for gross beta radiation between the McLaren/Hart sample (15 ± 3 pCi/L) and the USEPA sample (<9.6 pCi/L). These results are below drinking water Maximum Contaminant Limit (MCL) of 50 pCi/L for gross beta radiation and do not impact the study results.

One hundred and ninety-seven of the 208 blind field duplicate, interlaboratory duplicate, and split sample results for all compounds confirmed the scheduled sample laboratory results. Many of the comparisons were made between as many as four different laboratories each with different equipment, technicians, and other variables, yet the interlaboratory results were comparable for 93 percent of the duplicate samples. Additionally, the comparison criteria

used for this report for radionuclides are considered conservative because the standard deviation only accounts for the error in the counting statistics. Other sources of error, including sample preparation, sample weight, and technician variance, are not accounted for in the standard deviation of the counting statistics.

4.2 OA/OC RESULTS SUMMARIZED BY ANALYSIS TYPE

In this section, the results of the QA/QC samples are organized and discussed by analysis to evaluate whether any trends were evident in the QA/QC for individual analyses.

4.2.1 Metals (Mercury)

QA/QC samples were not collected for metals analysis as only seven soil samples were collected during the 1994 sampling investigation. The seven soil samples were collected from the Sodium Burn Pit Watershed (BB-18) and only analyzed for mercury. A concentration of 0.12 mg/kg of mercury, slightly above the detection limit (0.1 mg/kg), was measured in one (BB-18-006B) of the seven samples. This result prompted some limited QA/QC analysis in the form of analysis of a lab duplicate of this sample and submitting interlaboratory duplicates to the USEPA and the consultant for the Brandeis-Bardin Institute for mercury analysis. Results of these QA/QC analyses indicated that mercury was not detected in the laboratory duplicate or the USEPA interlaboratory duplicate (<0.1 and <0.09, respectively). Mercury was detected at a concentration of 0.14 mg/kg in the Brandeis-Bardin interlaboratory duplicate sample. These QA/QC results for mercury are in agreement (the difference between the scheduled sample results and the QA/QC results was less than 50 percent). Since only limited QA/QC analysis was conducted for mercury the results are not summarized in Table 9 or illustrated in Figures 5.

4.2.2 Radionuclides

The QA/QC data for the radionuclide analyses conducted by the Teledyne Isotopes Laboratory (New Jersey and Illinois) are discussed in this section. A summary of the results are presented in Table 9 (soil samples) and Table 10 (surface water samples), and Figures 5 (soil samples) and 6 (surface water samples).

4-8

4.2.2.1 Strontium-90

QA/QC results for strontium-90 were in agreement in 97 percent of all the duplicate and split soil/sediment samples and in three of four of the pre-spiked water samples. All other QA/QC results, e.g., matrix spikes, and field rinsate blanks were consistent and met the acceptance criteria for soil/sediment and water.

4.2.2.2 Tritium

QA/QC results for tritium in soil/sediment samples were in agreement 94 percent of the time. Of the five samples that were not in agreement, three differed greater than 10 percent from the acceptance criteria. In four of these cases, the conclusion that the Building 59 Watershed was impacted with tritium holds in spite of the differences in the sample results. In two of the five samples, the concentration of tritium detected by Teledyne Isotopes was less than that measured by USEPA.

All other QA/QC results for tritium, e.g., matrix spikes and field rinsate blanks, were consistent and considered acceptable for soil/sediment and water.

4.2.2.3 Gross Alpha and Gross Beta Analysis

One of the two split water samples analyzed for alpha- and beta-emitting radionuclides was not in agreement with the sample results for beta-emitting radionuclides. Alpha- and beta-emitting radionuclides were not detected in the water rinsate sample indicating that sampling methods did not affect the analytical results. Matrix spike samples were within control limits.

4.2.2.4 Isotopic Plutonium

All duplicate and split soil/sediment and water samples analyzed for isotopic plutonium (Pu-238 and Pu-239) were all in agreement. Isotopic plutonium was not detected in any of the field samples collected during the study. Matrix spike samples were within control limits. Plutonium-238 and plutonium-239 was not detected in field rinsate blanks.

4.2.2.5 Gamma Scan

Cesium-137 was the only analyte detected in the gamma scan analysis that was not naturally occurring and, therefore, the only radionuclide from the gamma scan analysis evaluated in this study. Naturally occurring radionuclides (i.e., potassium-40, and radium-226, and thorium-228) were detected in most of the soil samples, but are not discussed.

Four out of thirty-five (11 percent) QA/QC split/duplicate samples for soil/sediment were not in agreement with their respective scheduled sample. The split or duplicate soil/sediment samples not in agreement were at Wildwood Regional Park Ravine (BG-10-004), the Building 59 watershed (BB-17-005), the Campsite 1 drainage (BB-20-001) and the Radioactive Materials Disposal Facility (BB-16-007). Although these sample results were 3 to 40 percent outside the acceptance criteria, the results are within the range considered representative of background and the criteria do not impact the conclusions from the study. These results are consistent with the pre-spiked sample results where Teledyne Isotopes generally obtained greater sample recoveries than the original spiked amount.

Matrix spike, field rinsates and field blanks for all other soil/sediment and water samples were within control limits.

4.3 CONCLUSION

Overall agreement (based on the acceptance criteria described in Section 4.1) for this project for the primary QA/QC soil samples (i.e., blind field duplicates, interlaboratory split duplicates, split samples, and pre-spiked samples) was 96 percent for the following analyses: tritium, cesium-137, plutonium-238, plutonium-239, and strontium-90. The overall agreement is based on all QA/QC results including results that were reported as less than the detection limit. The overall agreement for the primary QA/QC water samples was 88 percent. However, this agreement percentage is due to small number of QA/QC samples for water and one split sample analyzed for beta-emitting radiation. Beta-emitting radiation was not detected in field samples above background levels. Thus, the results of the water QA/QC samples are acceptable and support the conclusions from the field data.

5.0 STATISTICAL ANALYSIS OF SAMPLE RESULTS

This section discusses the statistical evaluation methods used in this study. Because radionuclides are naturally occurring and because certain radionuclides are deposited throughout the world as a result of nuclear weapons testing, the goal of the statistical evaluation was to determine whether chemicals or radionuclides in the study areas were different from background concentrations. The statistical evaluation of the background areas and the study areas was conducted in three steps. First, the background area data were evaluated to determine the background concentration range and mean. Second, the study area data were evaluated relative to background to determine whether the study areas were different from background. Finally, if a study area had a concentration that was statistically higher than background, possible explanations for the elevated concentrations were evaluated. Section 5.1 describes the methods used to analyze the background sampling areas and to develop the range of naturally occurring levels of radionuclides. Section 5.2 discusses the methods used to compare analytical results for each sampling area to the results of the statistical analysis of the background samples.

Mercury was not evaluated statistically because the majority of background values were below the detection limit, and, thus, there were insufficient positive numbers on which to perform meaningful statistical analyses. The majority of background samples for tritium and isotopic plutonium were also below detection limits; statistical analysis was not used to evaluate concentrations of these radionuclides. However, twice the maximum detection limit was used as a benchmark to assess concentrations of tritium detected in 1994. This benchmark was established for tritium to account for laboratory variability before declaring a sample above background.

Surface water data were not evaluated statistically because there was only one background sample from both rounds of sampling.

Since the sample grids or the ravine sampling were considered to be representative of an entire area and since the sample locations were randomly selected, it was assumed that if the mean concentration of all samples from a sampling area was statistically at or below the mean concentration of the background areas, then the area had not been impacted by activities at the SSFL. If radionuclides were below the detection limit, a value of one-half the detection limit was used to calculate the mean and standard deviation for that area. The use of one-half the detection limit is based on the conservative assumption that some level of the chemical is present throughout the area and is consistent with USEPA's Risk Assessment Guidance for Superfund (United States Environmental Protection Agency, 1989).

5.1. STATISTICAL EVALUATION OF BACKGROUND SOIL SAMPLES

In accordance with the Workplan, an analysis of variance (ANOVA) was used to evaluate whether all of the eleven background soil sampling areas (six from 1992 and five from 1994) were representative of general background levels of the radionuclides of interest. Using the ANOVA results, any background areas where the levels of radionuclides in soil were significantly different from the other background area soils could be identified. If an area was identified as different, the appropriateness of including the sample area in the group of background sample areas was further evaluated.

The purpose of collecting background samples was to determine the range and distribution of metals and radionuclides in soil that was similar to the soil in the study areas (i.e., of similar geologic origin and composition) but that was physically removed from the SSFL. Because all background were a minimum of 1.5 miles from the SSFL and none of the background locations were in the predominant wind direction (based on a windrose for the SSFL), it was assumed that soils should not have been measurably impacted by activities at the SSFL. Background locations were also chosen to have no impact from surface water runoff from SSFL.

The eleven background sample areas within a 1.5 to 12.5-mile radius of the SSFL were selected as representative of the background. In some cases, a background area was sampled in both 1992 and 1994. In these cases, data from 1994 was used whenever available for a specific location. If the location was not sampled in 1994, the 1992 data was used.

A Type I (random effects) ANOVA was used to evaluate background sample areas for each analyte. A separate ANOVA was calculated for the following radionuclides:

- Cesium-137
- Strontium-90

Each of the background areas was treated as a separate sample set for each analyte. A computer program, Systat (Systat, Inc., 1989), was used to perform the ANOVA calculations. The Type I (fixed effects) ANOVA was used to determine whether all eleven background areas were from the same population (i.e., general background) or whether one or more of the six sample sets was statistically different from the others. The hypothesis being tested in this analysis is that the sample sets have the same mean concentration as background. A significance probability (p-value) less than 0.05 indicates that under the hypothesis that all background sample areas are from the same population, the chance of seeing differences as great as those observed between sample areas is less than 5 percent. Therefore, when the p-value calculated in the ANOVA was less than or equal to 0.05, the hypothesis was rejected and the eleven background areas were considered not to have the same mean. When the p-value was greater than 0.05, the hypothesis that the eleven background areas were from the same population was accepted.

To determine if and which of the background sample areas was different, the results of the Tukey "honest significant difference" (HSD) output (part of the *Systat* ANOVA output) were evaluated. In the Tukey HSD, each of the background sample areas was compared to the other background sample areas resulting in 55 comparisons. Each comparison was characterized by a p-value. As with the ANOVA for the group of background sample areas, if p-values were greater than 0.05, the hypothesis that the sample areas were from the same population was accepted. If the p-value is less than or equal to 0.05, the chance of seeing differences as great as those observed between sample groups is less than 5 percent and the hypothesis is rejected.

To further evaluate the appropriateness of deleting a background location based on the statistical results, Dr. Max Layard of Layard Associates, was consulted. According to Dr. Layard, an "appropriate benchmark (for background) would be the overall average from all the

sites, and this average would be interpreted as an estimate of the average in all possible background sites. This assumes that there are no identifiable reasons for considering the measurements from any location to be nonrepresentative, such as known analytical errors" (personal communication, 1992). In other words, because the background sites were specifically identified to be representative of the general area and if there were no identifiable reasons for considering measurements at any background area to be nonrepresentative of the full spectrum of possible background measurements, all six 1992 background sites were considered representative and used to evaluate the results at the sampling areas. Dr. Layard also indicated that the fixed effects ANOVA would not adequately represent the variability of the overall mean because it does not account for variability between sample areas. Because the sampling areas were relatively small (i.e., 10,000 square feet) when compared with the entire background area population (i.e., all soil within a 12.5 mile radius of the SSFL), the variance between background sample areas would be expected to be larger than the variance within background sample areas. If the variance within a sample area and the variance between sample areas differed substantially, the ANOVA would result in a p-value less than 0.05 when in actuality the sample areas are all representative of background. Based on this analysis in the 1992 report, all sample areas were retained as representative of the full range of background levels of metals and radionuclides, based on Dr. Layard's recommendation and with the consensus of the USEPA representative and the consultant for Brandeis-Bardin.

However, in evaluating the more robust data set from the 1992 and 1994 data, one area for cesium-137 and one area for strontium-90 appeared to be different from the general background areas. For cesium-137, Wildwood Regional Park Ravine (BG-10) was shown to be statistically different from the other background areas. A reevaluation of the cesium-137 data without including the Wildwood Regional Park Ravine, resulted in the acceptance of the hypothesis that the remaining areas were from the same population. For strontium-90, Wildwood Regional Park (BG-09) was shown to be statistically different from the other background areas. A reevaluation of the strontium-90 data without including the Wildwood Regional Park data, resulted in the acceptance of the hypothesis that the remaining areas were from the same population. As a result, Wildwood Regional Park Ravine data was excluded from the cesium-137 analysis, and the Wildwood Regional Park data was excluded from the strontium-90 analysis. By excluding these two background data sets (cesium-137: Wildwood Regional Park Ravine, and strontium-90: Wildwood Regional Park) more conservative

background values were established. A graphical evaluation of cesium-137 and strontium-90 background results from sample areas distinguishable from background is presented on Figures 1 through 9 in Appendix F.

5.2 STATISTICAL EVALUATION OF SAMPLING AREAS

Due to the more robust data set including the 1992 and 1994 data, all sampling data, including ravine data, was assessed as randomly collected data. Each area sampled was statistically evaluated on an area-by-area basis because it was assumed that the sampling area represented a separate and distinct "population". The sample results from the randomly sampled areas were described by a mean, range, and a standard deviation.

Initial comparisons between the randomly sampled areas and background data were made using the Behrens-Fisher t-Test. This test provides a statistical comparison of the means between two data sets assuming the data are normally distributed. The t-Test is an appropriate procedure because the test is known to be only slightly affected by departures from normality. The data at a sample area were considered to be the same as background if the p-value was greater than 0.05. A p-value less than 0.05 indicated that, assuming the sample area is within the range of background, the probability of seeing a difference as great as those observed between the sample area and background is less than 5 percent.

Dr. Layard was also contacted regarding the appropriateness of using the Behrens-Fisher t-Test to identify when a sample area was different from background. Dr. Layard indicated that the use of the Behrens-Fisher t-Test may be overly conservative since the variance within the background sample areas is not considered.

6.0 SAMPLING RESULTS FROM BACKGROUND AREAS

This section presents the results of the multi-media sampling program at the Background Areas. The results are presented in two parts. Section 6.1 describes the sites and sampling locations and Section 6.2 describes the statistical data analysis.

6.1 BACKGROUND AREA DESCRIPTIONS

Eight background areas were sampled.

- ▶ BG-01: Rocky Peak
- ▶ BG-02: Santa Susana Park
- ► BG-05: Happy Camp
- ▶ BG-09: Wildwood Regional Park
- ▶ BG-10: Wildwood Regional Park Ravine
- BG-11: Tapia County Park
- BG-12: Tapia County Park Ravine
- BG-14: Rocky Peak Ravine

This section is a brief description of the Background Areas sampled in 1994 (Figure 3). The analytical results for each sample area are presented in the form of tables and figures. The table summarizes the results for the radionuclide analyses. The detection limit preceded by a "less than" symbol (<) is used to represent radionuclide results below detection limits⁴. The figure is used to present all the data above the detection limit. The sample grid and sample locations as well as relevant landmarks are noted on the figures. Only the original sample results (the scheduled sample, not QA/QC results) collected by McLaren/Hart (the scheduled sample) above background levels for metals and radionuclides are shown on these figures. In

6-1

⁴Minimum detectable activity.

some cases, all the results for a particular analyte are presented on a figure, although some of those results are not considered representative of background, to show the trend in that particular area. Results of splits, duplicate counts, and interlaboratory samples are only reported in the tables as they were used solely for quality assurance/quality control (QA/QC) purposes.

6.1.1 Rocky Peak (BG-01)

The Rocky Peak background sample area is approximately 4.9 miles northeast of the SSFL, north of the 118 Freeway, at the Rocky Peak exit. The sample grid was located along the north side of a fire road directly above the parking area. The grid was on a steeply sloping area near the northern edge of the grid and on a more level area along the southern margin of the grid. The grid was partially covered by grasses with some shrubs. Numerous sandstone outcroppings and boulders were also present along the slope. The grid location was originally selected in 1992 because the distance and height above the freeway was considered sufficient to avoid the majority of the chemical deposition from freeway traffic.

Soil samples were collected on March 15, 1994 at five sampling locations, in addition to the three locations sampled in 1992, from the grid according to the approved Workplan. Four blind field duplicate samples were collected: isotopic plutonium at Block 087, gamma scan at Block 090, strontium-90 at Block 016, and tritium at Block 034. In addition, three rinsate blanks were collected at this location. The sampling grid is shown on Figure 7. Summaries of radionuclide analytical results for the soil samples are presented in Table 11.

6.1.2 Santa Susana Park (BG-02)

Santa Susana Park is located approximately 2 miles south of the 118 Freeway and approximately 3 miles north of the SSFL main gate. The area that was sampled was a plateau south of the main park area. The plateau was bounded on the north by a short slope and to the south by a gradual hill leading to a steeper hill. The area was partially devoid of grass or plants except around the perimeter; several trees were present. A small drainage area from the eastern slope appeared to run through the center of the sampling area, which was dry at the time of sampling.

On March 10, 1994, five locations were sampled from the grid according to the approved Workplan. Three areas were previously sampled in 1992 and two additional blocks were identified based on the random number tables. In addition one rinsate sample and one matrix spike sample was collected at Block 017 and Block 085, respectively. A sample split with Brandeis-Bardin was collected at Block 074. The radiation survey of the area by the USEPA showed an ambient radiation field of 12 (micro Roentgen/hr $[\mu R/hr]$ is a unit of exposure rate of X-ray or gamma radiation). Results from all radiation surveys conducted by the USEPA at each sample area are presented in Appendix F. The sampling grid is shown on Figure 8. A summary of the radionuclide analytical results for soil samples are presented in Table 12.

6.1.3 Happy Camp (BG-05)

The Happy Camp background area is located in Moorpark approximately 12.5 miles northwest of the SSFL. The sampling area was a relatively flat area located between two plateaus seemingly created by erosion off the Middle Ridge Fire Road approximately one mile from the main gate. A stream bed cuts through the center of the Happy Camp Area and west of the sampling area (the stream bed was dry during the sampling). The northeast corner of the sampling grid was located 60 feet west of a large double-trunked oak tree. The area was sparsely covered by grasses and small shrubs.

On March 11, 1994, five sets of soil samples were collected from the grid according to the approved Workplan. Based on stakes still in place at the sampling location, the sample identified as BG-05-026 in 1992 was actually collected at BG-05-027. The sample collected in 1994 was appropriately labeled as BG-05-027. A blind field duplicate sample for gamma scan was collected at Block 017. A split sample with USEPA was collected at Block 056. In addition, a matrix spike was collected at Block 050. The radiation survey of the area by the USEPA showed an ambient radiation field of 16 μ R/hr. The sampling grid is shown on Figure 9. A summary of the radionuclide analytical results for soil samples is presented in Table 13.

6.1.4 Wildwood Regional Park (BG-09)

The Wildwood Regional Park background area is located approximately 2 miles north of Highway 101 and approximately 12.5 miles west of the SSFL facility. The sampling area was

a large open field located west of the main parking lot. The sampling area was adjacent to and south of a dirt access road and northwest of a dirt hiking trail. The sampling grid was located on a flat area covered by grasses and forbs. A few shrubs were located west of the sampling area.

On March 11, 1994, five sets of soil samples were collected from the grid according to the approved Workplan. Blind field duplicates were collected at Block 003 for isotopic plutonium and at Block 013 for strontium-90. A split sample with USEPA was collected at Block 003. A split sample with DHS was collected at Block 005. Three rinsate blanks were collected at this site. The radiation survey of the area by USEPA showed an ambient radiation field of $12~\mu\text{R/hr}$. The sampling grid is shown on Figure 10. A summary of the radionuclide analytical results for soil samples is presented in Table 14.

6.1.5 Wildwood Regional Park Ravine (BG-10)

The Wildwood Regional Park Ravine background area is located approximately 2 miles north of Highway 101 and approximately 12.5 miles west of the SSFL facility. The sampling area was a ravine located adjacent to the Santa Rosa trail. Both the Santa Rosa trail and the ravine cross the dirt access road that leads from the main road. The ravine had a shallow grade and spanned approximately 750 feet. The ravine was covered with grasses and contained large rocks at various locations along the ravine.

On March 14, 1994, five sets of soil samples were collected from the ravine, randomly spaced approximately 150 feet apart according to the approved Workplan. A blind field duplicate sample was collected at Block 002 for gamma scan. A split sample with USEPA was collected at Block 003. A split sample with DHS was collected at Block 004. A split sample with Brandeis-Bardin was collected at Block 001. One rinsate blank was collected at this sampling area. The radiation survey of the area by USEPA showed an ambient radiation field of $12~\mu\text{R/hr}$. The sampling grid is shown on Figure 11. A summary of the radionuclide analytical results for soil samples is presented in Table 15.

6.1.6 Tapia County Park (BG-11)

The Tapia County Park background area is located in Malibu Canyon approximately 4 miles south of Highway 101 and approximately 10 miles south of the SSFL facility. The sampling area was a large open field adjacent to a dirt road. The western edge sloped to a creek located below. The area was bordered to the north and the south by trees and shrubs. The sampling grid was located on a flat, sloping area covered by grasses and forbs.

On March 14, 1994, five sets of soil samples were collected from the sampling grid according to the approved Workplan. A blind field duplicate sample was collected at Block 036 for strontium-90. A split sample with USEPA was collected at Block 011. A matrix spike sample was collected at Block 010 and Block 031. The radiation survey of the area by USEPA showed an ambient radiation field of $7 \mu R/hr$. The sampling grid is shown on Figure 12. A summary of the radionuclide analytical results for soil samples is presented in Table 16.

6.1.7 Tapia County Park Ravine (BG-12)

The Tapia County Park Ravine background area is located approximately 4 miles north of Highway 101 and approximately 10 miles south of the SSFL facility. The sampling area was a ravine that crosses the Tapia Spur Trail approximately 450 feet from the intersection of the trail with the paved road. Sample locations 003, 004, and 005 were south of the trail, approximately 50 feet apart. Samples locations 001 and 002 were approximately 25 feet apart; Sample location 002 was approximately 60 feet from the trail. The ravine had a steep grade above the trail and a more shallow grade below the trail. The steep section of the ravine was divided into two arms. One arm of this section of the ravine exhibited signs of soil disturbance (rock slides), therefore; the undisturbed arm of the ravine was selected for sampling.

On March 14, 1994, five sets of soil samples were collected from the ravine according to the approved Workplan. A split sample with USEPA was collected at Block 003. A split sample with Brandeis-Bardin was collected at Block 005. A matrix spike sample was collected at Block 001 and Block 004. The radiation survey of the area by USEPA showed an ambient

radiation field of 7 μ R/hr. The sampling grid is shown on Figure 13. A summary of the radionuclide analytical results for soil samples is presented in Table 17.

6.1.8 Rocky Peak Ravine (BG-14)

The Rocky Peak Ravine background area is located approximately 4.9 miles northeast of the SSFL, north of the 118 Freeway, at the Rocky Peak exit. Sample location 005 in the ravine was located approximately 165 feet northeast of the grid location. The ravine began as a steep slope amidst very narrow rocky terrain. Sample locations 001 and 002 were in the steep section of the ravine. From sample location 003 to 004, the terrain became broader, but remained rocky. The ravine gently sloped from sample location 004 toward a culvert below sample location 005 and was less rocky.

On March 14, 1994, five sets of soil samples were collected from the ravine according to the approved Workplan. A matrix spike sample was collected at Blocks 001 and 003. One rinsate sample was also collected at this sample location. The sampling grid is shown on Figure 14. A summary of the radionuclide analytical results for soil samples is presented in Table 18.

6.2 BACKGROUND ANALYSIS SUMMARY

Soil/sediment samples were collected to provide data on the naturally occurring levels of radionuclides in the soil within a fifteen-mile radius of the SSFL. These data were compared to the data from the Brandeis-Bardin Institute and the Santa Monica Mountains Conservancy to determine whether these sites had significantly higher radionuclide concentrations, which may have been due to activities at the SSFL. The measured data were tabulated for all of the background areas. A complete summary of all the data by analysis is included in Appendix D.

Low levels of radionuclides are ubiquitous as a result of two sources: naturally occurring radionuclides such as radon and uranium and fallout from atmospheric testing of nuclear weapons since 1945.

The radionuclides that were evaluated and discussed are limited to the following man-made radionuclides detected in the samples:

- Cesium-137 (Cs-137)
- ► Strontium-90 (Sr-90)
- Tritium (H-3) (also naturally produced in the upper atmosphere)

Plutonium-238 and plutonium-239 man-made radionuclides were not detected in any of the samples and, therefore, are not discussed.

6.3 SUMMARY OF BACKGROUND RESULTS

The measured background data sets for metals and radionuclides were evaluated using analysis of variance (ANOVA) and Tukey's "honest significant difference" (HSD) statistical methods to determine if all of the background data sets had the same mean and therefore considered to be from the same population. The ANOVA was used to indicate whether or not any of the data sets were different and Tukey's HSD was used, if necessary, to indicate which sample area(s) was significantly different.

As the majority of the background sample results for tritium were below the detection limit, an analysis of variance was not conducted on the data. Site samples were compared with a background concentration near the detection limits of 100 to 400 pCi/L.

As discussed previously, the significance probability (p-value) was used to determine if one or more background sample areas were different from the other background sample areas. As shown in Table 19, the p-values for cesium-137 and strontium-90 were less than 0.05. Upon review of Tukey's HSD, Wildwood Regional Park Ravine (BG-10) was the source of the significant differences between mean background concentrations of cesium-137. Reanalysis of the remaining data was consistent with the hypothesis that remaining Background Areas were not from different populations. Therefore, the statistical comparison of the sampling areas to background was based on all samples from 10 of the 11 background areas for cesium-137. Upon review of Tukey's HSD, Wildwood Regional Park (BG-09) was the source of the significant differences between mean background concentrations of strontium-90. Reanalysis

of the remaining data was consistent with the hypothesis that remaining Background Areas were not from different populations. Therefore, the statistical comparison of the sampling areas to background was based on all samples from 10 of the 11 background areas for strontium-90.

The following sections describe the background results for cesium-137 and strontium-90 for soil/sediment samples. Table 20 summarizes the statistical parameters (mean, standard deviation, and range) defining measured background for each analyte as well as background values found in the literature for soil samples.

6.3.1 Cesium-137

Cesium-137 in the 1994 background soil samples 10 of 11 Background Areas ranged from less than 0.03 picocuries per gram of soil dried [pCi/g(dry)] at several background locations to 0.213 ± 0.072 pCi/g(dry) at Santa Susana Park (BG-02) with an arithmetic mean concentration of approximately 0.087 ± 0.062 pCi/g(dry). [Background cesium-137 concentrations at Wildwood Regional Park Ravine ranged from 0.215 ± 0.039 to 0.456 ± 0.052 pCi/g(dry), but were not included in the background statistical analysis.] Their exclusion resulted in the lowering of the Cesium-137 background and a bias toward a lower background concentration. Cesium-137 in all Background Areas was well within the background cesium-137 range from published reports, which range from 0.001 pCi/g(dry) (Layton, 1990) to 1.3 pCi/g(dry) (Ritchie and McHenry, 1977 and 1982).

6.3.2 Strontium-90

Strontium-90 in the measured background soil samples ranged from <0.01 pCi/g(dry) at several background locations to 0.13 ± 0.1 pCi/g(dry) at Santa Susana Park (BG-02) with an arithmetic mean concentration of approximately 0.052 ± 0.031 pCi/g(dry). [Background strontium-90 concentrations at Wildwood Regional Park ranged from <0.1 to 0.13 \pm 0.05 pCi/g(dry). The strontium-90 in the Background Areas was less than the published background levels of strontium-90 in soil [0.16-0.32 pCi/g(dry), which were calculated based on inventories from above-ground nuclear weapons testing through 1965 (Eisenbud, 1987).

6.3.3 Tritium

Tritium in the measured background soil samples ranged from less than 100 picocuries per liter of water (pCi/L) at several background locations to 750 \pm 200 pCi/L at the Western site (BG-04). Scheduled results for tritium in background soil samples BG-12-001, BG-12-005, BG-14-004, and BG-14-005 indicated high levels with associated uncertainty greater than 50 percent of the sample result uncertainty. These samples also had low water yield (3 ml or less) and the results were subsequently withdrawn by the laboratory. A level of 2000 \pm 700 pCi/l also measured at BG-14-003. This sample also contained a water yield of 1 ml and a separate aliquot was reanalyzed and the result was < 300 pCi/L. Background levels of tritium in soil were not available in the literature.

7.0 SAMPLING RESULTS FROM OFF-SITE LOCATIONS

Fifteen off-site locations were sampled during the sampling program, nine human activity areas and six Watershed (ravine) areas. Eight of the human activity areas were located at the Brandeis-Bardin Institute and one was located at the Santa Monica Mountains Conservancy. All six of the Watershed areas were along the Brandeis-Bardin/Rocketdyne property boundary. The sampling locations were shown on Figure 2. The results from each location are discussed in the following sections. A summary of all data from the off-site locations is presented in Appendix D.

The nine human activity sampling areas were resampled for tritium only to supplement 1992 sampling results. As 76 percent (including 1992 data) of tritium results for the background areas were below detection limits an analysis of variance was not conducted on the data. Therefore, a statistical comparison of the data to measured background concentrations would not be appropriate. The, concentrations detected in sampling areas were compared with the range of concentrations detected in the background areas. Isotopic plutonium (plutonium-238 and 239) and mercury were not detected in background areas. For this reason, 1994 sampling results in the off-site areas were noted when above the detection limit. Gamma scan and strontium-90 results were evaluated using the statistical criteria described in Section 5.0.

The analytical results for each sample area are presented in the form of tables and figures. The tables summarize the results for radionuclide analyses. The detection limit preceded by a "less than" (<) symbol is used to represent radionuclide results at or below detection limits. The sample grid and sample locations are noted on the figures as well as relevant landmarks. Buildings and areas on the Rocketdyne property are referenced as landmarks only and are not intended to suggest a source of any chemicals detected. Sample results from 1992 and only 1994 results distinguishable from background are shown on each figure. Only the original sample results (from 1992 and/or 1994) are presented on each figure because the duplicate split and confirmatory samples were used for QA/QC purposes.

7.1 DORMITORY AREA (BB-02)

The Dormitory area is approximately 7,000 feet north of the Rocketdyne property line. The area to be sampled was located between dormitory buildings to the north and the creek (partially dry) to the south. The sampling area was nearly level and the top layer of soil was a silty sand. Many boulders and rocks were present leading to the assumption that the area had been washed out by the creek during heavy storms in February 1994. The area was surrounded by trees, but was devoid of other vegetation.

On March 7, 1994, five soil samples were collected at the previously sampled grid locations according to the approved Workplan. The five locations were resampled for tritium. The Brandeis-Bardin consultant collected a split sample at Block 075. The USEPA radiation survey of the area ranged from 15 to 16 μ R/hr. The sampling locations are shown on Figure 15.

Tritium was below detection limits in all ten samples collected at the Dormitory Area in 1994. Table 21 summarizes the radionuclide results for soil.

7.2 CAMPSITE AREA 1 (BB-03)

Campsite Area 1 is approximately 3,500 feet northwest of the Rocketdyne property line and is connected by stream beds to the runoff from the Building 59, RMDF, and the Sodium Burn Pit watersheds. Samples were taken from a relatively flat area approximately 250 feet north/northeast of a large red water tank. A creek ran through the center of the sampling area and a water sample was collected downstream. The access road ran along the southwest side of the sampling area. The area was covered with grasses and forbs, including abundant growth of poison oak. Several trees were located on both sides of the creek; three trees were used as landmarks to anchor the grid. Several of the stakes from the previous sampling round were relocated when the grid was reestablished.

On March 8, 1994, ten soil samples were collected from the grid according to the approved Workplan. Four samples were collected from locations sampled in 1992, and six samples were collected from the next five sampling locations in the random number table. Block 092

7-2

was not resampled due to growth of poison ivy making access extremely difficult. All samples were analyzed for tritium. Split samples were collected by the Brandeis-Bardin consultant at Block 025 and Block 081. A lab duplicate was analyzed at BB-03. The radiation survey of the area by the USEPA showed an ambient radiation field of 15 to 16 μ R/hr. The sampling grid is shown on Figure 16. The relationship of Campsite Area 1 to the watersheds is shown in Figure 30.

Tritium was below detection limits in all ten samples collected at Campsite Area 1 in 1994. Table 22 summarize the radionuclide data for soil samples.

7.3 CAMPSITE AREA 2 (BB-04)

Campsite Area 2 was an amphitheater with concrete bleachers in the center of the hillside soil. Samples were collected from the level area in front of the bleachers in an area with picnic benches and fire pits. One area in the center of the amphitheater was used for camp fires. A small creek ran along the north side of the sampling area and a larger stream ran down from the RD-51 Watershed on the south side. The area was sparsely vegetated and trees were present to the north and northwest.

Campsite Area 2 is approximately 2,400 feet north of the Rocketdyne property line, near the vicinity of the RD-51 Watershed (BB-15). Campsite Area 2 is hydrologically connected to the RD-51 Watershed by the stream that passes through the southwest portion of the area approximately 150 feet from the grid which potentially carries runoff from the SSFL.

On March 4, 1994, five soil samples were collected from the grid according to the approved Workplan. Five samples were collected from locations sampled in 1992, and five samples were collected from the next five sampling locations in the random number table. All samples were analyzed for tritium. The radiation survey of the area by the USEPA showed an ambient radiation field of 16 to 18 uR/hr. The USEPA collected split samples at Blocks 021, 023, 078, 082, and 097. The Brandeis-Bardin consultant collected split samples at Blocks 084 and 097. A rinsate blank was collected at Block 021. The sampling grid is shown on Figure 17.

Tritium was below detection limits in all ten samples collected at Campsite Area 2 in 1994. Radionuclide analytical results for soil samples are presented in Table 23.

A surface water sample was collected from the creek approximately 500 feet upstream from the sampling grid. Water collected for the gross alpha radiation, gross beta radiation, and tritium analyses was filtered prior to placement in the sample bottle. The USEPA collected a split of the surface water at this location and also analyzed the sample for gamma radiation. The Brandeis-Bardin consultant collected a split sample, which was analyzed for tritium. A rinsate sample was also collected at this location. Gross beta activity was 12 ±4 picocuries per liter of water (pCi/L) for the scheduled sample and < 10 for the USEPA split. Cesium-137 was below detection limits in the USEPA sample analyzed for gamma radiation. Table 24 summarizes the radionuclide data for surface water samples at Campsite Area 2.

7.4 PICNIC AREA (BB-05)

The Picnic Area is approximately 7,000 feet north of the Rocketdyne property line. The sampling area was located on a sloped area under several trees. Picnic tables, a fire pit, a sink, and a drinking fountain were located in the area. An amphitheater was located to the west. The sampling area was generally devoid of vegetation at the southern end of the slope and was sparsely vegetated at the top. Stakes from the 1992 round of sampling were identified when reestablishing the grid.

On March 7, 1994, five soil samples were collected from the previously sampled grid locations according to the approved Workplan. All samples were analyzed for tritium. A blind field duplicate sample was collected at Block 089. The Brandeis-Bardin consultant collected a split sample at Block 057. The radiation survey of the area by the USEPA showed an ambient radiation field of 15 to 16 μ R/hr. The sampling grid is shown on Figure 18.

Tritium was below detection limits in all five samples collected at the Picnic Area in 1994. Radionuclide analytical data for soil samples is summarized in Table 25.

7.5 HOUSE OF THE BOOK (BB-06)

The House of the Book is approximately 6,500 feet north of the Rocketdyne property line. The area sampled was a flat grassy area located across the parking lot north of the House of the Book. The sampling area was bordered by an access road to the south. One tree was present in a depression west of the sampling grid. The area was uniformly covered with annual grasses and forbs. Several stakes from the 1992 round of sampling were identified while reestablishing the grid.

On March 7, 1994, five soil samples were collected from previously sampled grid locations according to the approved Workplan. All samples were analyzed for tritium. The Brandeis-Bardin consultant collected a split sample at Block 066. The USEPA radiation survey of the area was 16 μ R/hr. The sampling grid is shown on Figure 19.

Tritium was below detection limits in all five samples collected at House of the Book in 1994. Radionuclide analytical results are summarized in Table 26.

7.6 MAIN HOUSE ORCHARD (BB-12)

The Main House Orchard is approximately 9,800 feet north of the Rocketdyne property line. The sampling area encompassed the entire orchard and extended slightly beyond on the northwestern side. Several trees had fruit (lemons, tangerines and grapefruit) while others were barren. There were large gaps between adjacent trees. A house was located to the south of the sampling area. The main road ran alongside the northern edge of the sampling area. The soil was devoid of vegetation. Several stakes from the 1992 round of sampling were identified while reestablishing the grid.

On March 7, 1994, five soil samples were collected from previously sampled grid locations according to the approved Workplan. The Brandeis-Bardin consultant collected a split soil sample at Block 023. A lab duplicate was analyzed at Block 023. All samples were analyzed for tritium. The radiation survey of the area by the USEPA showed an ambient radiation field of 14 to 15 uR/hr. The sampling grid is shown on Figure 20.

Tritium was below detection limits in all five samples collected at the Main House Orchard in 1994. Radionuclide analytical results for soil samples are included in Table 25.

7.7 AVOCADO GROVE (BB-13)

The Avocado Grove is approximately 7,100 feet north of the Rocketdyne property line. The sampling area encompassed the southeastern portion of the avocado grove, that was ten trees long and three trees wide. A wire hutch was located near Block 034. Samples were collected from the soil underneath the trees (within the drip line). A production bee hive was located adjacent to the road leading up to the southeastern part of the grove. The area between the trees was vegetated with grasses and forbs. Several stakes from 1992 round of sampling were identified while reestablishing the grid.

On March 7, 1994, five soil samples were collected from previously sampled grid locations according to the approved Workplan. All samples were analyzed for tritium. The Brandeis-Bardin consultant collected a split sample at Block 039. A rinsate sample was also collected. The radiation survey of the area by the USEPA showed an ambient radiation field of 13 to μ R/hr. The sampling grid is shown on Figure 21.

Tritium was below detection limits in all five samples collected at the Avocado Grove in 1994. A summary of radionuclide analytical results is presented in Table 28.

7.8 OLD WELL CAMPSITE (BB-14)

The Old Well Campsite is approximately 4,200 feet north of the Rocketdyne property line. The sampling area was located adjacent to, but at least 10 feet above, the run-off creek bed. An old pump house was located in the center of the sampling area. Stagnant, standing water surrounding the pump house on the southern, western, and eastern sides that had been present in 1992 was not present. The southern side of the sampling area was located on a steeply sloping hill. Oak trees and other trees and shrubs surrounded the sampling area; two trees were selected for use as landmarks in addition to the fixed piping. Grasses of various heights were present in areas. Several stakes from the 1994 round of sampling were identified when reestablishing the grid.

On March 7, 1994, five soil samples were collected from previously sampled grid locations according to the approved Workplan. The USEPA collected a split sample at Block 094. The Brandeis-Bardin consultant collected a split sample at Block 079. The radiation survey of the area by the USEPA showed an ambient radiation field of 15 to 17 μ R/hr. The sampling grid is shown on Figure 22.

Tritium was below detection limits in all five samples collected at the Old Well Campsite in 1994. Radionuclide data for soil samples is summarized in Table 29.

7.9 FORMER ROCKETDYNE EMPLOYEE SHOOTING RANGE (SM-03)

The Former Rocketdyne Employee Shooting Range was approximately 1,700 feet west of the main Rocketdyne gate, bordering the property line. The soil sampling grid was located on a level area on the north/northeast side of the dirt road where lead shot was observed and was only one block wide. The area had moderate growth of annual grasses and forbs. Several stakes from the 1992 round of sampling were identified when reestablishing the grid.

On March 7, 1994, five soil samples were collected from previously sampled grid locations according to the approved Workplan. A lab duplicate was analyzed from the sample collected at Block 012. A rinsate sample was also collected at Block 012. The radiation survey of the area by the USEPA showed an ambient radiation field of 15 μ R/hr. The sampling grid is shown on Figure 23.

Tritium was below detection limits in all five samples collected at the Former Rocketdyne Employee Shooting Range in 1994. A summary of the analytical results is presented in Table 30.

7.10 RD-51 WATERSHED (BB-15)

The RD-51 Watershed is approximately 4,800 to 5,600 feet northeast of Building 59. This area represents the watershed northwest of the well WS-13. The sampled area was a narrow creek bed that connected to the main ravine which appeared to be connected to the stream bed near Campsite 2.

The drainage area was vegetated with tall grasses and some woody scrub. The drainage channel was followed from the top of the hill (near the east end of the parking lot where the cluster wells RD-51 A, B, and C are located) to the edge of the cliff where the water falls off into the main ravine that originates to the northwest of WS-13. An attempt was made to locate the property line from tanks on the Rocketdyne facility and the fence. The tanks were not always visible and the location of the sample points relative to the fence line is only an approximation. Some stakes from the 1992 round of sampling were identified when reestablishing the grid.

On March 10, 1994, ten sediment samples were collected from the creek bed according to the approved Workplan. Five samples were collected from locations 001 through 005, which were previously sampled in 1992, and reanalyzed for tritium. Five new locations upgradient from the 1992 samples (closer to the Rocketdyne property boundary) were sampled for isotopic plutonium. In addition, location 001 was resampled for isotopic plutonium because plutonium-238 was detected at location 001 at 0.22 picocuries per gram of dry soil [pCi/g(dry)] in 1992. A split sediment sample was collected for the USEPA at location 001 and location 007 for isotopic plutonium. The USEPA also collected a split sediment sample at location 001 for tritium. A split sediment sample was collected for the Brandeis-Bardin consultant at location 006 and 009 for isotopic plutonium. A field duplicate sample was collected at location 009 for isotopic plutonium. A rinsate sample for isotopic plutonium was also collected. The radiation survey of the area by the USEPA showed an ambient radiation field of 16 to 17 μ R/hr. The sample locations and the results are shown on Figure 24.

Tritium was below detection limits in all five samples collected at the RD-51 Watershed in 1994. One split sample collected at location 003 and analyzed by the Brandeis-Bardin consultant indicated a tritium level of 550 ± 350 pCi/l. Isotopic plutonium was below detection limits in all six samples collected at the RD-51 Watershed in 1994. Radionuclide analytical results for the sediment samples are summarized in Table 31.

7.11 RADIOACTIVE MATERIALS DISPOSAL FACILITY WATERSHED (BB-16)

The Radioactive Materials Disposal Facility (RMDF), consists of Buildings 075, 621, 021, 022, 044, and 034. The watershed was sampled approximately 200 feet north of the north-

west corner of the RMDF, immediately below the Rocketdyne property line. The sediment samples were collected in the creek bed directly downstream from the RD-30 well, located on Rocketdyne property, and the cluster wells RD-34, A, B, and C (hereafter RD-34 located on Brandeis-Bardin). The RMDF is on the top of a hill overlooking the ravine.

Downstream from RD-34 was heavily vegetated with woody scrub, trees, and intermittent areas of thick growths of poison ivy and poison oak. A path was made along the more level southern side of the creek bed with sample points at turns in the stream where sediments had accumulated. The property line at this location was clearly marked with surveyor stakes. Some stakes from the 1992 round of sampling were identified when reestablishing the sample locations.

On March 9, 1994, five sediment samples were collected from the creek bed downstream of RD-34 and the 1992 sample locations according to the approved Workplan. The samples (locations 006 through 010) were analyzed for tritium, strontium-90, and gamma scan. A split sediment sample was collected at locations 007 and 010 for the USEPA. A split sediment sample was collected at locations 008 and 009 for the Brandeis-Bardin consultant. A split sediment sample was collected from locations 008 and 010 for the DHS. Field duplicate samples were collected at location 007 (tritium and strontium-90) and at Block 006 (gamma scan). A lab duplicate sample was analyzed for gamma scan at location 008. He radiation survey of the area by the USEPA showed an ambient radiation field of 17 to 18 μ R/hr. The sample locations and all the 1992 results and the 1994 results distinguishable from background are shown on Figure 25.

Tritium was detected in the five sediment samples from the ravine at concentrations ranging from <100 to 230 \pm 100 picocuries per liter of water (pCi/L). Tritium had been detected in five of the six samples collected in 1992 at concentrations from 990 to 1,500 pCi/L. Strontium-90 was detected in the RMDF Watershed in all five of the 1994 sediment samples at 0.08 \pm 0.044, 0.11 \pm 0.05, 0.15 \pm 0.09, 0.24 \pm 0.04, and 0.14 \pm 0.07 pCi/g(dry) at locations 006 through 010, respectively. (Location 010 is the furthest sample down gradient from the Rocketdyne property border.) The USEPA and the consultant for Brandeis-Bardin were not able to detect strontium-90 at these levels as their detection limits were in the range of 0.5 to 0.74 pCi/g(dry). Strontium-90 had been detected in three of the six samples collected in 1992

at concentrations from 0.08 to 0.15 pCi/g(dry). Cesium-137 was detected in three of three of the five samples collected. The concentrations were 0.046 ± 0.022 at location 006, 0.199 ± 0.044 at location 009, and 0.075 ± 0.028 at location 010. Cesium-137 was detected in one of the six samples previously collected in 1992 at 0.34 pCi/g(dry). Radionuclide sediment sample results are presented in Table 32. Sample results are further discussed in Section 8.0.

On March 9, 1994, samples were also collected from five boring locations along the Rocketdyne property boundary at surface and at five feet below ground surface. The borings were designated as BB-16-B001 through B005. These samples were also analyzed for tritium, strontium-90, and gamma scan. The Brandeis-Bardin consultant collected split samples at B002 at surface and B002 at 5 feet. A lab duplicate was analyzed for tritium at B004 at approximately 5 feet below ground surface. The sample locations and results distinguishable from background are shown on Figure 26 and Table 32.

Tritium was detected at one of the five boring locations. The only tritium concentration reported was at B004 at 5 feet below ground surface. The concentration was 270 ± 150 pCi/L. This result was confirmed by lab duplicate result. Tritium was not detected in the sample collected at B004 at the surface. Strontium-90 was detected at 5 feet below surface in one of the five boring locations. The strontium-90 concentration reported at B001 was 0.093 ± 0.042 pCi/g(dry). Strontium-90 was not detected in the sampled collected at B001 at the surface. Cesium-137 was detected at three of the five boring locations. The cesium-137 concentrations reported were 0.147 ± 0.051 pCi/g(dry) at B001 at the surface, 0.109 ± 0.044 pCi/g(dry) at B002 at the surface, and 0.087 ± 0.0415 pCi/g(dry) at B003 at the surface. The Brandeis-Bardin consultant's result at B002 at the surface was < 0.07 pCi/g(dry). Cesium-137 was not detected in the samples collected at 5 feet below ground surface at these locations. Radionuclide sediment sample results are presented in Table 32. The results distinguishable from the background are in Figure 26. Sample results are further discussed in Section 8.0.

7.12 BUILDING 59 WATERSHED (BB-17)

In 1992, four samples were collected from the Building 59 Watershed. The 1992 sample locations (Block 001, 002, 003 and 004) was approximately 200 to 400 feet north of Building

59. There were two arms of drainage in this area. Block 001 was located closest to Building 59, within 20 feet of a sample collected during a previous study (Cehn, 1991) by the Brandeis-Bardin consultant. The block was in the arm of drainage originating north of Building 59. Additional samples were not collected here because of heavy growth of poison oak in the drainage. A second arm originated northeast of Building 59 and more approximate to Building 012. Block 003 and 004 were located beyond the confluence of the two drainages just below where emergent water appeared. The area downstream of Block 004 could not be sampled due to thick vegetation (mostly poison oak) and a steep drop. Some stakes from the 1992 sampling round were identified when the sampling locations were reestablished.

On March 9, 1994, sixteen additional samples were collected from the Building 59 Watershed to further evaluate locations where tritium, cesium-137, and plutonium-238 were detected and to collect samples further down gradient from previous sampling. One sample was collected at location 001 (named 010 in 1994). The remaining fifteen samples were collected in five sets of three across the ravine. The primary sample (locations 006 through 009) were collected down the center of the ravine. Samples were collected at all three 1992 locations (002 through 004). Two additional locations down gradient were also sampled. Two additional samples were collected at each location approximately five feet on either side of the ravine on the embankment. Samples designated as "A" were collected on the east side of the ravine, and samples designated as "B" were collected on the west side of the ravine. Sample location 009 was approximately 150 feet down gradient of sample location 004.

Several QA/QC samples were collected from the Building 59 Watershed. Split sediment samples were collected at locations 005, 006, 007, 008, and 009 for the USEPA. A split sediment sample was collected at location 010 for the Brandeis-Bardin consultant. A field duplicate sample for tritium was collected at location 008A. A matrix spike sample was collected at location 009. Two rinsate samples were collected. Lab duplicate samples for plutonium-238 were analyzed at locations 006 and 010. A lab duplicate sample for tritium was analyzed at 009A. The radiation survey of the area by the USEPA showed an ambient radiation field of $18~\mu\text{R/hr}$. The sample locations and the results distinguishable from background are shown on Figure 27.

Tritium was not detected in the sediment at locations 005, 005A, 005B, or 010, which is consistent with previous non-detect results at location 002. Tritium was not detected (<100 pCi/l) at 010, which was collected at the former location of 001 (1992), which contained 130±80 pCi/L. Tritium was detected at the four remaining locations within the ravine: 3,500 ±200 pCi/L at 006 (10,800 ±300 pCi/L was detected in 1992 at 003); 2,900 ±200 pCi/L at 007 (9,810 ±330 pCi/L was detected in 1992 at 004); 5,400 ±200 pCi/L at 008 (not previously sampled); and 3,900 ±200 pCi/L at 009. Tritium was below detection limits in all samples on either side of the ravine. USEPA split samples at locations 005, 006, 007, 008, and 009 confirmed these results although USEPA's results at 008 and 009 were approximately 1,000 pCi/L greater.

Cesium-137 was detected at the following sample locations in pCi/g(dry): 005 (0.22 \pm 0.04), 005A (0.15 \pm 0.05), 005B (0.39 \pm 0.05), 006 (0.19 \pm 0.03), 006A (0.16 \pm 0.04), 006B (0.23 \pm 0.06), 007 (0.22 \pm 0.04), 007A (0.12 \pm 0.04), 007B (0.30 \pm 0.05), 008 (0.12 \pm 0.05), 008A (0.25 \pm 0.05), 008B (0.24 \pm 0.02), 009 (0.15 \pm 0.02), 009A (0.19 \pm 0.04), and 009B (0.36 \pm 0.05). These results were consistent with USEPA's results and with results of sampling in 1992.

Plutonium-238 and plutonium-239 were below detection limits in all samples analyzed in 1994. The plutonium-238 result of 0.19 ± 0.06 pCi/g(dry) at location 001 (location 010 in 1994) was not confirmed.

Radionuclide sample results are summarized in Table 33. Sample results are discussed further in Section 8.0.

On March 9, 1994, samples were also collected from three boring locations along the Rocketdyne property boundary at surface and at 2.5 feet below ground surface. The borings were designated as BB-17-B001 through B003. These samples were also analyzed for tritium, strontium-90, and gamma scan. A field duplicate sample was collected at B003 at surface for isotopic plutonium. USEPA collected split samples at B001 at the surface and at 2.5 feet below ground surface. A lab duplicate for tritium was analyzed of a sample collected from B003 at 2.5 feet below ground surface. The sample locations and results distinguishable from background are shown on Figure 26.

Tritium was not detected at 7,600 \pm 300 pCi/L in sample B002 at 2.5 feet below ground surface. Tritium was not detected in the surface sample at B002. Tritium was also detected at 300 \pm 110 pCi/L in sample B001 at 2.5 feet below ground surface. This result was confirmed by the USEPA result. Tritium was not detected in the surface sample at B001. Tritium was not detected in either sample at B003. Cesium-137 was detected at 0.12 \pm 0.04 pCi/g(dry) in the surface sample at B001 and at 0.13 \pm 0.04 pCi/g(dry) in the surface sample at B002. Cesium-137 was below detection limits in all samples at 2.5 feet below ground surface and in the surface sample at B003. Isotopic plutonium was below detection limits at all boring sample locations.

Sampling results are discussed further in Section 8.0. Radionuclide results are summarized in Table 33.

7.13 SODIUM BURN PIT WATERSHED (BB-18)

In 1992, the former Sodium Burn Pit Watershed was sampled approximately 600 to 1,300 feet north/northeast of the former Sodium Burn Facility. The sampled area was directly down stream of two run-off channels from the Facility. The natural drainage slopes away from the Sodium Burn Facility toward the north (toward the Brandeis-Bardin Institute); any runoff would collect into one of two channels. The first runs from the center of the former Sodium Burn Pit Facility and crosses the property line approximately 400 feet toward the north/northeast. The initial sampling location (Block 001B) in this channel was approximately 150 feet beyond the Rocketdyne property line. The second channel collects runoff from the eastern area of the former Sodium Burn Facility and crosses the property line approximately 650 feet towards the northeast. The initial sampling location (Block 001A) in this channel was approximately 25 feet beyond the Rocketdyne property line. At the location where these two channels converged on the Brandeis-Bardin property, the initial sediment sample was collected at Block 001. These drainage channels are hydrologically connected to Campsite Area 1 (located downgradient).

Leg B of the drainage area (Blocks 001B, 002B, and 003B) was a very narrow channel with relatively steep rock outcrops on either side. Leg A (Blocks 001A, 002A, and 003A) was less narrow but heavily vegetated with woody scrub, trees, and poison oak. The area around

Block 001 was the most level and open, and below this point, the ravine narrowed again (Blocks 002 and 003).

Samples were collected in 1994 to confirm that mercury detected in the 1992 round of sampling had been removed from the area where legs A and B of the drainage converged. In January and February 1994, the area was excavated and soil was collected in three 55-gallon drums. (The drums were observed during the sampling in 1994.) Several stakes from the 1992 round of sampling were identified when identifying sampling locations.

On March 10, 1994, seven sediment samples were collected from the watershed in the vicinity of the excavation according to the approved Workplan. Three samples, two upgradient (006A and 006B) and one downgradient (004), were collected beyond the limits of the excavation. Four samples (005, 005A, 005B, and 005C) were collected within the excavated area and near sample location 001 where mercury was previously detected at 0.35 mg/kg. USEPA and the Brandeis-Bardin consultant analyzed sample 006B for mercury. The sample locations and the results are shown on Figure 28.

Mercury was not detected in the samples within the excavated area. Mercury was detected at 0.12 mg/kg at Block 006B, which was beyond the limits of the excavated area. A laboratory duplicate of the sample was analyzed by the McLaren/Hart laboratory was below detection limits (0.10 mg/kg). A split sample from Block 006B were analyzed by the USEPA and Brandeis-Bardin. The result from the USEPA analysis indicated mercury was below detection limits (0.09 mg/kg). Mercury was detected in the split sample analyzed by the Brandeis-Bardin consultant at a concentration of 0.14 mg/kg. (See Section 8.0 for further discussion.) Mercury results are summarized in Table 34.

7.14 SODIUM REACTOR EXPERIMENT WATERSHED (BB-19)

Building 143, the Sodium Reactor Experiment (SRE) Watershed was sampled immediately below the Rocketdyne property line. The sampled area was directly downstream from the SRE in the run-off creek bed. The SRE is surrounded on three sides by rock outcrops and any surface runoff from the area drained to the northeast.

McLaren/Hart

The drainage area was heavily vegetated with woody scrub and large areas of poison oak. A path was made along the less vegetated western side of the ravine until the property line was reached. A path was cut along the creek bed between the property line and the cliff dropping off toward Brandeis-Bardin Institute. The sample locations relative to the property line were only an approximation, since the actual property line was not easy to ascertain from this area. Samples were collected in 1994 to assess the strontium-90 and cesium-137 previously detected in two samples in the watershed. Several stakes from the 1992 round of sampling were identified when identifying sample locations.

On March 10, 1994, five sediment samples were collected along the creek bed according to the approved Workplan. Samples collected in 1994 were approximately from the same locations as 1992, with the addition of one sample approximately 100 feet upgradient (closer to the Rocketdyne property) from the previous upgradient sample. Samples were analyzed for strontium-90 and gamma scan. The USEPA collected split sediment samples at locations 005 and 006. The Brandeis-Bardin consultant collected a split sediment sample at location 007. Rinsate samples were collected at locations 005 and 006. The radiation survey of the area by the USEPA showed an ambient radiation field of 16 to 17 μ R/hr. The sample locations and the results distinguishable from background are shown on Figure 29.

Cesium-137 was detected in three samples (005, 006, and 008) at concentrations of 0.045 to 0.056 pCi/g(dry). The USEPA split samples confirmed these results (0.05 \pm 0.01 pCi/g(dry) at 005 and 0.06 \pm 0.02 pCi/g(dry) at 006). These 1994 results did not match the concentrations detected in 1992 (0.30 \pm 0.05 pCi/g(dry) at 001 and 0.24 \pm 0.06 pCi/g(dry) at 002). Strontium-90 was detected at 0.12 \pm 0.08 pCi/g(dry) at 006 and 0.061 \pm 0.041 pCi/g(dry) at 009. These results are consistent with concentrations detected in 1992.

Sample results are discussed further in Section 8.0. Radionuclide results are summarized in Tables 35.

7.15 CAMPSITE AREA 1 DRAINAGE (BB-20)

The Campsite Area 1 Drainage is a continuation of the drainage from the Building 59 Watershed to Campsite Area 1. (Originally it was believed to be continuous with the

Radioactive Materials Disposal Facility (RMDF) Watershed, but a separate drainage to Campsite Area 1 from the RMDF was identified during sampling. Accessibility to the entire drainage was impeded by steep slopes; sampling in the drainage was initiated approximately 1200 feet downgradient of the northern-most sample in the Building 59 Watershed. Sample 001 was collected adjacent to an abandoned water tank. From sample locations 001 to 003, the drainage channel flows to the west. A second drainage joined the main drainage between location 001 and 002. At location 003 a third drainage (which was sampled at location 004) joined the main drainage channel and the drainage turned sharply to the north. The drainage from the RMDF joined the main drainage approximately 50 feet south of location 009. Samples were collected from the Campsite Area 1 Drainage to evaluate whether radionuclides detected in the Building 59 Watershed were present further downgradient on the Brandeis-Bardin property.

On March 8, 1994, ten sediment samples were collected along the drainage area leading to Campsite Area 1 according to the approved Workplan. Samples were spaced approximately 250 feet apart, except when conditions prohibited collecting a sample at that distance. Samples were analyzed for tritium, gamma scan, and strontium-90. The USEPA collected split sediment samples at locations 001, 003, 004, 006, and 007. The Brandeis-Bardin consultant collected split sediment samples at locations 001, 003, and 009. Field duplicate samples were collected at locations 003 (tritium) and 005 (gamma scan). A matrix spike sample was collected at 010 for gamma scan and at 008 for strontium-90. Rinsate samples were collected at locations 001, 002, and 006. Lab duplicate samples were analyzed at 004 (strontium-90), 005 (tritium), and 010 (strontium-90). The radiation survey of the area by the USEPA showed an ambient radiation field of 17 to 20 μ R/hr. The sample locations are shown on Figure 30.

Tritium results in the Campsite Area 1 Drainage were all below detection limits. Cesium-137 was detected at location 001 at 0.11 ± 0.037 pCi/g(dry) and at 009 at 0.076 ± 0.036 pCi/g(dry). The cesium-137 results were confirmed by the Brandeis-Bardin consultant results at both locations. Strontium-90 was detected at one location 004 at 0.18 pCi/g(dry). Sample results are further discussed in Section 8.0. Radionuclide results are summarized in Table 36.

A surface water sample was collected from a pool of running water near sample location 010. The water flowed along the rock and collected in a pool at the point where the samples were

collected. Samples were analyzed for gross alpha/beta activity and tritium. USEPA collected a split sample which they also analyzed for gamma scan. Gross beta activity was detected at 15 ± 3 pCi/L. Tritium and gross alpha activity was below detection limits in the sample collected, which was confirmed by the USEPA results. Cesium-137 results for USEPA were also below detection limits. Radionuclide results are summarized in Table 37.

8.0 DISCUSSION OF RESULTS

In Section 4.0, the quality assurance/quality control (QA/QC) results were presented, and in Sections 6.0 and 7.0, the sampling results were discussed by Sampling Area. After summarizing the results of the QA/QC samples, a generalized discussion of all the results by analysis and sampling media is presented in this section.

8.1 QUALITY ASSURANCE/QUALITY CONTROL

As discussed in Section 3.0, quality assurance/quality control (QA/QC) samples were collected throughout the project so that the results of the study represent the concentrations of chemicals and radionuclides in the sampling areas. Although six types of QA/QC samples were collected and analyzed, the blind field duplicates and split samples (including interlaboratory split samples) are key representations of data quality because the samples were analyzed blindly as if they came from different sources and, in the case of split samples, were analyzed by entirely different laboratories. Laboratory duplicate samples, while not analyzed blindly, also provide perspective on the consistency of the data. A summary of the percentage that blind field duplicate, split samples, pre-spiked samples, and laboratory duplicates were in agreement⁵ or not in agreement with the respective scheduled sample for each analyte is presented in Figure 5 for soil/sediment samples and Figure 6 for surface water samples.

As shown in Figure 5, the soil/sediment samples were in 100 percent agreement for plutonium-238 and plutonium-239. For the strontium-90 analysis, the detection limits used by USEPA and the Brandeis-Bardin consultant were approximately an order of magnitude greater than that used by Teledyne Isotopes, resulting in the Teledyne results being below the detection limits reported for the split samples. One split sample analyzed by DHS for

In agreement for samples analyzed for radionuclides means that the difference between the scheduled sample results and the QA/QC results was less than the sum of the standard deviations of the sample results.

strontium-90 was not in agreement with the Teledyne Isotopes result. Strontium-90 samples were in agreement 98 percent of the time. For plutonium-239 and plutonium-239, DHS was the only lab to detect plutonium-238 in two split samples, but, due to DHS's low detection limit, their results were below the detection limit of the Teledyne Isotopes results. Tritium samples were in agreement 94 percent of the time. Cesium-137 samples were in agreement 91 percent of the time.

As shown in Figure 6, the surface water samples were in 100 percent agreement for tritium, gross alpha radioactivity scan, plutonium-238, and plutonium-239. Plutonium-238 was in 100 percent agreement as results at all labs were below detection limits. Gross beta radioactivity and strontium-90 samples were 83 percent in agreement, and gamma scan samples were 82 percent in agreement.

As shown in Figure 5, 96 percent of the QA/QC soil/sediment samples, *i.e.*, field duplicates, rinsate samples, split samples, pre-spiked samples, and lab duplicates compared to their respective scheduled sample, were in agreement. Matrix spike/matrix spike duplicates (MS/MSD) indicated that matrix interferences did not impact sample results. Equipment rinsates indicated that cross contamination between samples analyzed did not occur. The QA/QC soil/sediment samples validate the data.

As shown in Figure 6, 88 percent of the QA/QC water samples compared to their respective scheduled sample were in agreement. The QA/QC water samples validate the data.

The tritium results presented in this report were validated by the laboratory and by the QA/QC protocol established for this project. Four of the original 147 soil/sediment samples at the study areas and background areas analyzed for tritium, were withdrawn by the laboratory because the laboratory could not validate the tritium concentration as a low yield of water (2 ml or less) had been extracted from the original sample. The low yield of water impacted the reported value and associated error. An adjacent sample to one of the four samples was reanalyzed and a significantly better yield was obtained. The result of this reanalysis was used in this report upon the consensus of the representative of the USEPA, the DHS, and the consultant to Brandeis-Bardin.

8.2 RESULTS BY ANALYSIS

8.2.1 Mercury

Mercury was below detection limits in the four sediment samples collected from the area of Sodium Burn Pit Watershed (BB-18) that had been excavated following the results of sampling in 1992. Mercury was found in one (0.12 mg/kg) of the three sediment samples collected outside but in the vicinity of the excavated area. The results from this sample were not confirmed by an analysis of a laboratory duplicate of the sample or by interlaboratory split samples with the USEPA. The interlaboratory split with the Brandeis-Bardin consultant indicated a concentration of 0.14 mg/kg.

8.2.2 Tritium

Tritium was not detected in any of the 50 samples collected in the human activity areas in 1994. Tritium samples were collected in four ravine/drainage areas in 1994. Tritium was not detected in samples collected from the RD-51 Watershed or Campsite Area 1 Drainage. The majority of tritium concentrations in background samples were below detection limits. For this reason, twice the maximum detection limit was used as a benchmark to assess concentrations of tritium detected in 1994 to account for laboratory variability before declaring a sample above background. The detection limit for tritium ranged from less than 100 to 300 pCi/L, therefore; the background concentration used to assess the tritium detected in 1994 was 600 pCi/L.

Sample results in the Radioactive Materials Disposal Facility (RMDF) Watershed (BB-16) sediments indicated that concentrations of tritium were not present further downgradient from the RMDF than previously detected in 1992. Concentrations in the RMDF Watershed in 1994 ranged from less than 100 to $230 \pm pCi/L$. Tritium was only detected one order of magnitude above the detection limits in the Building 59 Watershed (BB-17) and borings located upgradient from the watershed. Concentrations of tritium in the Building 59 Watershed in 1994 ranged from less than 100 to $5,400 \pm 200 \, pCi/L$. Tritium was only detected in samples in the ravine and not on either side as indicated by the results from the samples that spanned the ravine five feet on either side. In a boring located above the Building 59 Watershed,

8-3

tritium was detected at $7,600 \pm 300$ pCi/L. Because tritium was not detected in samples in the Campsite Area 1 Drainage, which is directly downgradient of the Building 59 Watershed, the impact of tritium in the Building 59 Watershed is limited to the area sampled near Rocketdyne property boundary. The results in these Watersheds were confirmed by split samples by the USEPA, the DHS, and the Brandeis-Bardin consultant.

Tritium was not detected above the detection limits in the surface water samples collected at Campsite Area 2 and at the Campsite Area 1 Drainage. The California drinking water standard for tritium is 20,000 pCi/L (22 California Code of Regulations (CCR) 64443).

8.2.3 Strontium-90

Strontium-90 samples were collected in three of the ravine/drainage sampling areas. The results in these Watersheds were confirmed by split samples by the USEPA, the DHS, and the Brandeis-Bardin consultant. Strontium-90 results from 1994 and 1992 (one result for each unique sampling location) were compared statistically to background results using the Behrens-Fisher t-Test for each of the three ravines. As a result of the analysis, the strontium-90 results at the Sodium Reactor Watershed Building 59 Watershed and Campsite Area 1 Drainage were not identified as statistically different from the background sampling results. The strontium-90 results for the borings at the RMDF Watershed were also not identified as statistically different from the background sampling results. The strontium-90 results for the RMDF Watershed were considered statistically different with a mean of 0.103 pCi/g(dry) compared to the mean of strontium-90 in background samples of 0.052 pCi/g(dry). A summary of background versus sample areas that are statistically different is presented in Table 38. Strontium-90 was detected in all five of the samples collected in 1994 and five of the six samples collected in 1992. A graphical evaluation of the strontium-90 data obtained from samples collected in the RMDF Watershed is presented in Figure 8 of Appendix F. However, strontium-90 was not detected in the samples collected by the USEPA or the Brandeis-Bardin consultant because the detection levels used ranged from 0.5 to 0.74 pCi/g(dry), values two to three times higher than the highest concentration of strontium-90 detected in soil or sediment in the RMDF watershed. Strontium-90 concentrations were detected in one of the DHS split samples in the same range as the scheduled result.

It should also be noted that had the Wildwood Regional Park Strontium-90 results been included in the aggregate background data, the RMDF Watershed results would have become statistically insignificant. It may be noted that a cleanup of a spill of Strontium-90 bearing radioactive materials near RMDF Watershed was completed in 1978. Potential exposure pathways and doses were evaluated and the results summarized in an environmental evaluation report in February, 1982. The evaluation concluded that the potential doses of residual radionuclides in the soil were orders-of-magnitude lower than the release limits for unrestricted use.

8.2.4 Cesium-137

Four of the ravines/drainages were sampled and a gamma scan analysis conducted. The results in these Watersheds were confirmed by split samples by the USEPA, the California Department of Health Services (DHS), and the Brandeis-Bardin consultant. Cesium-137 results from 1994 and 1992 (one result for each unique sampling location) were compared statistically to background results using the Behrens-Fisher t-Test for each of the three ravines. As a result of the analysis, the cesium-137 results at the Radioactive Materials Disposal Facility (RMDF) Watershed, the Sodium Reactor Experiment, and Campsite Area 1 Drainage were not identified as statistically different from the background sampling results. The cesium-137 results for the borings above the RMDF and Building 59 Watersheds were also not statistically different from the background sampling results. The cesium-137 results in the Building 59 Watershed were considered statistically different with a mean of 0.20 pCi/g(dry) compared to the mean of cesium-137 in background samples of 0.087 pCi/g(dry). A summary of background versus sample areas that are statistically different is presented in Table 38. Cesium-137 was detected in all sixteen of the samples collected in 1994 and in all five of the samples collected in 1992. Unlike tritium, concentrations of cesium-137 in the 1994 samples spanned an approximately 10-foot cross-section of the ravine in five locations. Concentrations of cesium-137 in samples on the southwest side of the ravine (designated with a "B") were consistently higher than samples in the center of the ravine (no designation) or northeast of the ravine (designated "A"). Concentrations of cesium-137 detected at the top of the ravine were consistent with comparable samples (i.e., samples on the same side) at the bottom of the ravine. Because concentrations of cesium-137 in the Campsite Area 1 Drainage, which is directly downgradient of the Building 59 Watershed, were not significantly different than

background, the impact of cesium-137 in the Building 59 Watershed is limited to the area sampled near the Rocketdyne property boundary. A graphical evaluation of the cesium-137 data collected in the Building 59 Watershed is presented in Figure 9 of Appendix F. It should also be noted that all cesium-137 values are within the range of cesium-137 found at Wildwood Park Ravine background location.

8.2.5 Plutonium-238

Isotopic plutonium samples were collected in two ravines during the 1994 sampling. Plutonium-238 and plutonium-239 were below detection limits in all samples collected in 1994. Thus, the plutonium-238 results from the 1992 study were not confirmed indicating that plutonium-238 is not an issue in these ravines. The results in these Watersheds were confirmed by split samples by the USEPA, the California Department of Health Services (DHS), and the Brandeis-Bardin consultant.

9.0 CONCLUSIONS

In this study, soil/sediment and surface water samples were collected from nine human activity areas and six ravines/drainages at the Brandeis-Bardin Institute or the Santa Monica Mountains Conservancy. The sample locations and analyses were selected to address specific issues or questions raised after completion of the original study in 1992. Samples were also collected from five additional background areas to provide a more robust data set for the comparison of sample results. The soil/sediment samples were analyzed for tritium, isotopic plutonium (plutonium-238 and plutonium-239), strontium-90, and a gamma scan which measured 75 other radionuclides, both naturally occurring (e.g., potassium-40) and man made (e.g., cesium-137). Surface water was analyzed for the tritium and for gross alpha/beta radioactivity, which would serve as an indicator for the other radionuclides. The 1992 and 1994 soil/sediment results at the designated sampling areas were compared to the results from 11 background areas (sampled in 1992 and 1994) to determine if the values in the Study Areas exceeded the values in the Background Areas.

In reviewing QA/QC results, there was a high agreement between blind field duplicates, split samples, pre-spiked samples, and the laboratory duplicate samples with their respective scheduled sample. A comparison of the split samples, the blind field duplicates, the prespiked samples and the laboratory duplicates with the scheduled samples indicated that the overall agreement of these QA/QC samples with the scheduled samples was 96 percent (soil/sediment) and 88 percent (water). The data in this report, thus, were determined to be valid and representative.

The issues raised following the 1992 sampling activity and which were addressed by the additional 1994 sampling and the conclusions based on the data in this report are summarized in the rest of this chapter. The data presented are illustrated on Figure 31.

Issue 1. Re-evaluation of locations for which tritium results were withdrawn or dried by the Teledyne Isotopes laboratory. Results of resampling and analyses.

Tritium samples were collected in nine human activity areas and one ravine to replace the 1992 data withdrawn by Teledyne Isotopes. All tritium results in the nine human activity areas and one ravine were below detection limits.

Issue 2. Confirmation of the 1992 DHS sample result of 2,470 \pm 197 pCi/L at Campsite Area 2. Results of resampling.

Tritium in all samples collected at Campsite Area 2 in 1994, was below detection limits.

Issue 3. Remediation of mercury present in the Sodium Burn Pit Watershed (BB-18) at Brandeis-Bardin in the vicinity of previously detected mercury. Results of excavation and follow-up sampling.

Based on the sample results within the excavation, mercury previously measured in the watershed (0.35 mg/kg) has been removed within the area subsequently excavated. Mercury was not detected (<0.1 mg/kg) in the four samples collected from within the excavation area. A concentration of 0.12 mg/kg of mercury, slightly above the detection limit, was reported in one of the samples upgradient from the excavation. However, an analysis of a laboratory duplicate of the sample and analysis of an interlaboratory duplicate by the USEPA were below the detection limit (<0.1 and <0.09 mg/kg, respectively). Analysis of the interlaboratory duplicate by Brandeis-Bardin indicated a concentration of 0.14 mg/kg. Thus, the mercury (0.35 mg/kg) detected in the Sodium Burn Pit Watershed in 1992 was removed by excavation. Mercury at near detection level may be present upgradient from the excavation.

Issue 4. Determination whether the plutonium-238 detected in 1992 in the RD-51 and Building 59 Watersheds is representative of a concentration distinguishable from background plutonium-238. Results of additional sampling and statistical comparison.

Plutonium-238 was not detected in any samples collected in either watershed in 1994. The results of the 1992 study were not confirmed by 1994 study results.

Issue 5. Determination whether strontium-90 in the Sodium Reactor Experiment
Watershed is statistically different than background. Results of additional
sampling and statistical comparison.

The collection of additional data in 1994 allowed for a statistical comparison of strontium-90 concentrations in the Sodium Reactor Experiment Watershed. Based on these results, watershed concentrations were not considered statistically different than background.

Issue 6. Determination whether concentrations of tritium, cesium-137, and strontium-90 in the Radioactive Materials Disposal Facility Watershed are greater than background. Results of additional sampling and comparison of the results with the background data.

Since a significant number of background results for tritium were below the detection limit, an analysis of variance for tritium was not conducted on the data set. Tritium results for the RMDF watershed samples collected in 1994 indicate that the RMDF is not significantly different from background results. Strontium-90 results are statistically different from the background results. Cs-137 results were not statistically different from background results.

Issue 7. Determination whether concentrations of tritium and cesium-137 in the Building 59 Watershed are greater than background. Results of additional sampling and comparison of the results with the background data.

Since significant number of background results for tritium were below the detection limit an analysis of variance for tritium was not conducted on the data set. Tritium at elevated levels, but about 50 percent or more below the MCL for drinking water (20,000 pCi/l), was measured in the samples collected in the ravine of the Building 59 Watershed. These elevated tritium levels were confirmed by split samples by the USEPA and the Brandeis-Bardin consultant, and are significantly different than background. Based on results using the Behrens-Fisher t-Test cesium-137 results are statistically different from background sampling.

Issue 8. Determination of whether tritium, cesium-137, or strontium-90 impacted the Campsite Area 1 Drainage Area leading to Campsite Area 1. Results of additional sampling in the drainage and comparison of results with the background data.

Tritium was not detected in samples collected in the Campsite Area 1 Drainage Area. Cesium-137 and strontium-90 was detected in two of the 10 samples collected in the Campsite Area 1 Drainage Area. The results were compared statistically to background results using the Behrens-Fisher t-Test. Cesium-137 and strontium-90 results were not statistically different from background sampling results. A 1,200-foot section of drainageway from the lowest sampling point of the Building 59 Watershed (009, Figure 27) and the uppermost sample (001, Figure 30) of the Campsite Area 1 Drainage was not sampled due to the steepness of the terrain and vegetation constraints.

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Tables

TABLE 1
SUMMARY OF ADDITIONAL (1994) SOIL SAMPLING

Sample Area	Analysis	Number of Samples	Retionale
Background Areas			
Rocky Peak (BG-01)	Tritium Strontium-90 Gamma Scan Isotopic Plutonium	5 5 5 5	Background site located 2 miles from SSFL. Five additional locations were sampled in the original gridded area. Both the original and new data are used as background.
Santa Susana Park (BG-02)	Tritium Strontium-90 Gamma Scan Isotopic Plutonium	. 5 5 5 5	Background site located 1.5 miles from SSFL. Original tritium data analyzed by the gas counting method were withdrawn by the laboratory in 1992. Two additional locations and three of the original locations were sampled in the original gridded area.
Happy Camp (BG-05)	Tritium Strontium-90 Gamma Scan Isotopic Plutonium	5 5 5 5	Background site located 12.5 miles from the SSFL. Two additional locations were sampled in the original gridded area. Both the original and new data are used as background.
Wildwood Regional Park (BG-09)	Tritium Strontium-90 Gamma Scan Isotopic Plutonium	5 5 5 5	Background site located 13 miles from the SSFL to indicate background levels of radionuclides in an undisturbed flat area.
Wildwood Regional Park - Ravine (BG-10)	Tritium Strontium-90 Gamma Scan Isotopic Plutonium	5 5 5 5	Background site located 13 miles from the SSFL to indicate background levels of radionuclides in a ravine.
Tapia County Park (BG-11)	Tritium Strontium-90 Gamma Scan Isotopic Plutonium	5 5 5 5	Background site located 10 miles from the SSFL to indicate background levels of radionuclides in an undisturbed flat area.
Tapia County Park - Ravine (BG-12)	Tritium Strontium-90 Gamma Scan Isotopic Plutonium	5 5 5 5	Background site located 10 miles from the SSFL to indicate background levels of radionuclides in a ravine.
Rocky Peak Ravine (BG-14)	Tritium Strontium-90 Gamma Scan Isotopic Plutonium	5 5 5 5	Background site located 2 miles from the SSFL to indicate background levels of radionuclides in a ravine.
Brandeis-Bardin Institute		111 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
Dormitory Area (BB-02)	Tritium	5	Original tritium data analyzed by the gas counting method were withdrawn by the laboratory in 1992.
Campsite Area 1 (BB-03)	Tritium Tritium	5 5	Original tritium data analyzed by the gas counting method were withdrawn by the laboratory in 1992. Five additional blocks were selected to provide additional characterization.

TABLE 1 (continued)

SUMMARY OF SOIL SAMPLING

Sample Area	tAnalysis	Number of Samples	Rationale
Campsite Area 2 (BB-04)	Tritium	5	Original sample blocks were resampled to evaluate the validity of the 1992 DHS sample result.
	Tritium	5	Five additional blocks were selected to evaluate the validity of the 1992 DHS sample result.
Picnic Area (BB-05)	Tritium	5	Original tritium data analyzed by the gas counting method were withdrawn by the laboratory in 1992.
House of the Book (BB-06)	Tritium	5	Original tritium data analyzed by the gas counting method were withdrawn by the laboratory in 1992.
Main House Orchard (BB-12)	Tritium	5	Original tritium data analyzed by the gas counting method were withdrawn by the laboratory in 1992.
Avocado Grove (BB-13)	Tritium	5	Original tritium data analyzed by the gas counting method were withdrawn by the laboratory in 1992.
Old Well Campsite (BB-14)	Tritium	- 5	Original tritium data analyzed by the gas counting method were withdrawn by the laboratory in 1992.
RD-51 Watershed (BB-15)	Tritium	5	Original tritium data analyzed by the gas counting method were withdrawn by the laboratory in 1992.
	Isotopic Plutonium	5	Five samples were collected to determine whether plutonium-238 reported in the vicinity of the RD-51 watershed is statistically different from background.
Radioactive Materials Disposal Facility Watershed	Tritium Strontium-90	15 15	Five samples collected to determine whether tritium, strontium-90, and cesium-137 reported in the vicinity of the RMDF Watershed are
(BB-16)	Gamma Scan	15	statistically different from background. Five samples were collected at surface and at depth at locations between the RMDF and Building 59 watersheds.
Building-59 Watershed (BB-17)	Tritium Gamma Scan	22 22	Sixteen samples collected to characterize tritium in the soil in the Building-59 Watershed. Sixteen samples collected to determine
(== = -/	Isotopic Plutonium	22	whether cesium-137 and plutonium-238 reported in the vicinity of the Building-59 Watershed are statistically different from background. Three additional samples were collected at the surface and at depth at locations between the RMDF and Building 59 watersheds.
Sodium Burn Pit Watershed (BB-18)	Mercury	7	Seven samples were collected to document that mercury within the Sodium Burn Pit Watershed was removed.
Sodium Reactor Experiment Watershed (BB19)	Gamma Scan Strontium-90	5 5	Five samples were collected to determine whether strontium-90, and cesium-137 reported in the vicinity of the Sodium Reactor Experiment Watershed are statistically different from background.
Campsite-1 Drainage Way (BB-20)	Tritium Strontium-90 Gamma Scan	10 10 10	Ten sample locations within the drainage way between Campsite Area 1 and the Building 59/RMDF Watersheds to determine potential impact below the areas documented in 1992.

TABLE 1 (continued)

SUMMARY OF SOIL SAMPLING

Sample Area	Analysis	:Number of Samples	Rationale
Santa Monica Mountains Con	servancy		
Former Rocketdyne Employee Shooting Range (SM-03)	Tritium	5	Original tritium data analyzed by the gas counting method were withdrawn by the laboratory in 1992.

TABLE 2 SAMPLE CONTAINER AND PRESERVATION SPECIFICATIONS

Analytical Parameter	Container Size	Container Type	Sample Handling	Preservative	Holding Time
Soil Samples					
Мегсшту	6-inch	brass tube ^b	N/A	none	28 days
Strontium-90	6-inch	brass tube ^b	N/A	none	N/A
Isotopic Plutonium	6-inch	brass tube ^b	N/A	none	N/A
Gamma Scan	6-inch	brass tube ^b	N/A	none	N/A
Tritium	1 quart	glass jar	N/A	none	N/A
Water Samples					
Strontium-90	1 liter	plastic bottle	filtered ^c	4 mi HNO3d	N/A
Gamma Scan	1 liter	plastic bottle	filtered ^c	4 ml HNO ₃ 4	N/A
Tritium	1 liter	glass bottle	filtered ^e	none	N/A
Gross alpha and beta scan	1 liter	plastic bottle	filtered	2 ml HNO ₃ d	N/A

N/A = Not Applicable

- Holding time from day of collection to extraction.
 A 1-gallon resealable plastic bag was used for split samples.
 Samples are filtered in the field using a 0.45 micron Whatman glass fiber filter.
 1:1 solution of 16 molar nitric acid and distilled/deionized water.

TABLE 3
FIELD QUALITY ASSURANCE CONTROL SAMPLE REQUIREMENTS*

with the second	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	nsate Blank	.Blind Field. Duplicate		Pre-spiked Blind Duplicate	MS/MSD
Analytical Parameter	Required : Volume	Noof Analyses	No.:of Analyses	No. of Analyses	No. of Analyses	No. of Analyses
Soil Samples			· •·			
Strontium-90	2 liters	4	4	N/A	0	4
Isotopic Plutonium	2 liters	4	4	N/A	0	4
Gamma Scan	2 liters	5	4	N/A	0	5
Tritium	1 liter	8	8	N/A	7	8
Water Samples						
Isotopic Plutonium	2 liters	0	0	0	4	0
Strontium-90	2 liters	1	0	1	4	0
Gamma Scan	2 liters	1	0	1	4	0
Tritium	1 liter	1	0	1	2	0
Gross alpha and beta	1 liter	1	0	1	4	0
scan		- 1				

N/A = Not Applicable (Field blanks are for water samples only and consist of distilled water placed in sample containers at a field location)

MS/MSD = Matrix Spike/Matrix Spike Duplicate

= Based on the following number of soil analyses

Tritium - 147
Strontium-90 - 70
Cesium-137 - 92
Isotopic Plutonium - 67

TABLE 4 QUALITY ASSURANCE/QUALITY CONTROL SOIL/ SEDIMENT SAMPLE LOCATIONS

Sample Location	Sample Block Number	Field Rinsate Blank	Blind Field Duplicate	Matrix Spike/Matrix Spike Duplicate
Dormitory Area (BB-02)	045	· · · · · · · · · · · · · · · · · ·		Tritium
Campsite 1 (BB-03)	026			Tritium
Campsite 2 (BB-04)	021	Tritium	Tritium	
Picnic Area (BB-05)	089		Tritium	
House of the Book (BB-06)	092			Tritium
Avocado Grove (BB-13)	024	Tritium		
RD-51 Watershed (BB-15)	001			Tritium
	. 006	Pu		
	009		Pu	
RMDF Watershed (BB-16)	006		Cs-137	
	007		Tritium, Sr-90	
Building 59 Watershed (BB-17)	B001-Surface	Tritium		
	B003-Surface		Pu	
	005	Pu		
	006A			Tritium
	007B			Pu
	008A	Cs-137	Tritium	· "
	009A	'		Cs-137
Sodium Reactor Experiment Watershed (BB-1	005	Sr-90		
	006	Cs-137		
Campsite 1 Drainage (BB-20)	001	Sr-90		
<u> </u>	002	Cs-137	Tritium	
	005		Cs-137	
	006	Tritium		
	008			Sr-90
	010			Cs-137
Shooting Range (SM-03)	012	Tritium		
Rocky Peak (BG-01)	016	Pu	Sr-90	
	034		Tritium	•
	082			
	087	Cs-137	Pu	
	090	Sr-90	Cs-137	
Santa Susana Park (BG-02)	017			Cs-137
·	076	Tritium		
	085			Pu
Happy Camp (BG-05)	017		Cs-137	
-	027			Tritium
	050			Sr-90

Pu - Isotopic Plutonium (Plutonium-238 and -239)

Sr-90 - Strontium-90

Cs-137 - Cesium-137

TABLE 4 (continued) QUALITY ASSURANCE/QUALITY CONTROL SOIL/ SEDIMENT SAMPLE LOCATIONS

Sample Location	Sample Block Number	Field Rinsate Blank	Blind Field Duplicate	Matrix Spike/Matrix Spike Duplicate
Wildwood Regional Park (BG-09)	003		Sr-90, Pu	
-	005	Cs-137		
	013		Sr-90	
	057	Pu	Tritium	
	096	Sr-90		
Wildwood Regional Park Ravine (BG-10)	001	Tritium		
-	002		Cs-137	
Tapia County Park (BG-11)	010			Sr
	031			Tritium
	036		Tritium	·
Tapia County Park Ravine (BG-12)	001		<u> </u>	Pu
	004			Cs-137
Rocky Peak Ravine (BG-14)	001	Tritium		Sr-90
. , ,	002			Pu
	003			Cs-137
	- 005			Tritium

MATRIX SPIKE/MATRIX SPIKE DUPLICATE DATA TABLE 5

				_				-					-	-							-
Relative Diffe	7	10	1	-	29	12	6 0	10	3	0	3	5	0	7	13	10	14	19	9	9	9
Spike Duplicate Recovery	101	128	113	125	117	94	85	88	76	100	103	105	105	107	121	122	109	121	106	120	86
Spike Recovery	92	117	114	124	84	106	95	26	24	100	100	100	105	114	107	111	26	100	100	113	105
3rd Run (pCl/g)	0.764	0.822	0.866	0.949	0.761	0.31	0.58	0.29	0.32	3.9	3.9	4.1	4	2900	17000	3300	3800	1700	3700	8400	15000
2nd Run (pCVg)	0.715	0.746	0.877	0.943	0.57	0.35	0.63	0.32	0.31	3.9	3.8	3.9	4	3100	15000	3000	3300	1400	3500	1900	16000
1st Run (pCl/g)	0.199	<0.005	0.168	0.0741	0.0846	< 0.008	<0.02	<0.006	< 0.001	0.11	<0.2	0.099	<0.07	< 200	<100	<100	<300	× 100	<300	< 700	1300
Spike Concentration (pCl/g)	0.56	0.64	0.62	2.0	0.58	0.33	99.0	0.33	0.33	3.8	3.8	3.8	3.8	2700	14000	2700	3500	1400	3500	7000	14000
Spike Identiffcation	Cs-137	Cs-137	Cs-137	Cs-137	Cs-137	Pu-239	Pu-239	Pu-239	Pu-239	Sr-90	Sr-90	Sr-90	Sr-90	Tritium	Tritium	Tritium	Tritium	Tritium	Tritium	Tritium	Tritium
	BB-17-009A-MG	BB-20-010-MG	BG-02-017-MG	BG-12-004-MG	BG-14-003-MG	BB-17-007B-MP	BG-02-085-MP	BG-12-001-MP	BG-14-002-MP	BB-20-008-MS	BG-05-050-MS	BG-11-010-MS	BG-14-001-MS	BB-02-045-MT	BB-03-026-MT	BB-06-092	BB-15-001-MT	BB-17-006A-MT	BG-05-027-MT	BG-11-031-MT	BG-14-005-MT

Spike Recovery = (2nd run - 1st run/spike amount x 100)

Spike Duplicate Recovery = (3rd run - 1st run/spike amount) x 100

Relative Percent Difference = $(2nd run - 3rd run)(2nd run + 3rd run) \times .50) \times 100$

1st Run: Aliquot from original sample analysed prior to spiking sample.

2nd Run: Additional aliquot extracted from original sample and spiked with specified concentration of analyte. 3rd Run: Third aliquot extracted from original sample and spiked with specified concentration of analyte.

TABLE 6

PRE-SPIKED BLIND DUPLICATE SAMPLE RESULTS

		USEPA Results	Results	McLaren/Hart Results	art Results	Brandeis-Bardin Results	din Results	California Department of Health Services Results	artment of es Results
Radionicilde*	PCVI.	Activity	% Deviation	Activity pCVL	% Deviation	Activity povt.	% Deviation	Activity	% Deviation
Gross Aloha	43.7	38.1 ± 8.1	-12.8	41 ± 5	-6.2	NR		79.8 ± 6.7	82.6
Radiation		31.6 ± 7.5	-27.7	41 ± 5	-6.2	NR		41.6 ± 3.7	8.4
Gross Beta Radiation	84.0	M.1 ± 11.1	12.1	00 ₹ 10	19.1	NR		114,8 ± 5,4	36.7
		\$1.7 ± 10.5	2.1	s∓%	14.3	NR		75.7 ± 5.5	-9.0
Tritium in Soil	Blank	< 260	0	< 200	0	< 400	0	NS	
		SN		< 200	0	NS	1	NS	
		NS		< 100	0	NS		SN	
Tritlum Is Soil	1933	1600 ± 210	-18.1	1700 ± 200	-13.0	1600 ± 340	-18.1	SZ	
		SN	•	1700 ± 200	-13.0	NS	•	2	
		SN		1200 ± 100	-38.6	NS	•	NS	
		SN	•	1500 ± 200	.23.2	NS	-	NS	
Tritium in Water	1953	1800 ± 210	-7.8	1700 ± 100	-13.0	2000 ± 300	2.4	1160±140	-40.6
		1900 ± 210	-2.7	1800 ± 200	-7.8	1900 ± 300	-2.7	1150±140	41.1

Radionuclides were spiked into water samples unless otherwise noted.
 NS - Not sampled , NR - Not reported, NI - Not Identified
 USEPA - United States Environmental Protection Agency

Less than the minimum detectable concentration (MDC) [i.e., the detection limit (DL)].

[%] Deviation - The percent variance from the true value.

Values in () indicate a second result reported by the study participant after the source of error in the intial result was determined.

		USEPA	USEPA Results	McLaren/Hart Results	art Regults	Brandels-Bardin Results	din Results	California Department of Health Service: Results	partment of cos Results
Radiomicide	pCVL	Activity pCi/L	% Deviation	Activity pCI/L	* Deriation	Activity pCI/L	S. Deviation	Activity pcut.	% Deviation
Plutonium-239	2.88	3.1 ± 0.42	7.6	2.9 ± 0.7	7.0	3.02 ± 0.43	67	3;178±0:338	10.3
	i E	3.0 ± 0.33		3.0 ± 0.8	14.6	2.43 ± 0.36	-15.6	3,143±0,254	9.11
San		X.		2.5 ± 0.7	.13.2	NS		NS	•
		NS.		2.6 ± 0.7	9.7	NS	•	NS.	
Strontium-90	2.2	2.1 ± 0.94	Ť	<2 (2.2 ± 1.0)	(0)	1.63 ± 0.78	-25.9	3.66±0.73	66.4
		2.4 ± 0.59	9.1	<1 (2.2 ± 1.6)	(0)	2.62 ± 0.94	19.1	4.06±0.60	61.1
		SN		1>	(-54.5)	NS	ŧ	SN	1
		NS	1	<3 (2.3 ± 1.2)	(4.5)	SN	1	SN	•
Cadmium-109	7377	6860 ± 150	97.0	NI (9530 ± 250)	(Z 6Z)	8200 ¥ 230	11.2	8211 ± 286	:
		7040 ± 190	97	N1 (7970 ± 240)	(8.9)	4100±160 (\$200 ± 320)	4.4 (1.13)	10040 ± 134	38.
		9	ţ	021 ¥ 0188	(*9)	ÑŜ	-		
		ž	•	NI (9700 ± 310)	GID.	2	1	2	

Radionaclides were spiked into water samples unless otherwise noted.

NS - Not sampled, NR - Not reported, NI - Not Identified

USEPA - United States Environmental Protection Agency

Less than the minimum detectable concentration (MDC) [i.e., the detection limit (DL)].
Sovietion - The percent variance from the true value.
Values in () indicate a second result reported by the study participant after the source of error in the intial result was determined.

		USEPA Results	Results	McLaren/Hart Results	art Results	Brandels-Bardin Results	din Results	California Department of Health Services Results	partment of
Radiomedide		Activity	% Deviation	Activity	% Deviation	Activity pCVL	% Deviation	Activity pC//L	% Deviation
Cobalt-57	168	163 ± 4.55	-3.0	209 ± 21	24.4	187.8 ± 5.8	11.8	177.5 ± 7.2	5.7
		157 ± 5.59	-6.5	194 ± 19	15.5	97.8 ± 7.9 (196 ± 16)	-41.8 (16.7)	212.4 ± 5.2	26.4
		SN	1	210 ± 21	25.0	NS	1	NS	1
		SZ	•	228 ± 23	35.7	SN	1	NS	:
Cerhum-139	163	156 ± 4.66	4. 3	NI (207 ± 7)	(21)	180.1 ± 8.4	10.5	162 ± 7.5	9.0-
		166 ± 6.05	*	NI (167 ± 7)	(2.5)	(81 ¥ 0/81)	-44.8 (10.4)	182:3 ± 4.6	• • • • • • • • • • • • • • • • • • •
		NS		NI NI (200 ± 6)	(22.7)	SN	-	NS	
		SN	1	(8 ∓ 661)	(122.1)	SN.		SN	
Mercury-203	162	158 ± 6.1	-2.5	NI (186 ± 7)	(14.8)	250 ± 13	54.3	153 ± 9.2	-5.5
		155 ± 8.34	4.3	NI (169 ± 7)	(4.3)	87 ± 12 (174 ± 24)	-46.3 (7.4)	171.2 ± 5.5	5.7
		NS	:	NI (188 ± 7)	(16.0)	SN	:	NS	:
		NS	1	NI (8 ± 581)	(14.2)	SN	;	SN	:

^{* -} Radionuclides were spiked into water samples unless otherwise noted. NS - Not sampled, NR - Not reported, NI - Not Identified

USEPA - United States Environmental Protection Agency

Less than the minimum detectable concentration (MDC) [i.e., the detection limit (DL)].

[%] Deviation - The percent variance from the true value.

Values in () indicate a second result reported by the study participant after the source of error in the initial result was determined.

		USEPA Results	Results	McLaren/Hart Results	art Results	Brandeis-Bardin Results	din Results	California Department of Health Services Resulta	partment of tes Resulta
Radionucilide*	Don't	Activity	% Deviation	Activity pCI/L	% Deviation	Activity pCUL	% Deviation	Activity	% Deviation
Tm-113	308	302 ± 8.1	61-	N (340 ± 6)	(22.1)	330 ± 17	11	323.3 ± 12.8	\$.0
		292 ± 12.3	÷	(8 ± 612)	(-28:9)	170 ± 15 (340 ± 30)	44.8 (10.4)	349.3 ± 8.8	13.4
		SN.		NI (7.± 36.5)	(+ CC -)	NS	_	NS	
		S. Z.	1	N N E252 ± 80	(28.7)	SN	1	NS	
Cecium-147	221	211 ± 7.47	4.5	291 ± 29	31.7	250 ± 13	13.1	237.2 ± 12.7	7.3
		220 ± 12.5	-0.5	261 ± 26	18.1	110 ± 12 (220 ± 24)	-50.2 (-0.5)	235.7 ± 8.0	6.7
		SN		250 ± 28	13.1	NS	*	NS	1
		SX	:	264 ± 26	19.5	NS		NS	1
Yttrium-88	*	513 ± 8.75	-87	NI NI (661 ± 13)	(51.5)	280 ± 26	-48.5	664.6 ± 18.5	22.1
		\$15 ± 14.9	6.83	NI (606 ± 20)	610	290 ± 24 (580 ± 48)	(9'9)	740.4 ± 16.7	.
		S	-	N (81 H (89)	(25:0)	Š	•	SN.	1 8
		SX	1	NI (650 ± 21)	(2.61)	SN		S.X.	

^{* .} Radiomichides were spiked into water samples unless otherwise noted.

NS - Not sampled, NR - Not reported, NI - Not Identified

USEPA - United States Environmental Protection Agency

Less than the minimum detectable concentration (MDC) [i.e., the detection limit (DL)].

[%] Deviation - The percent variance from the true value. Values in () indicate a second result reported by the study participant after the source of error in the inital result was determined.

		Pass	USEPA Results	McLaren/h	McLaren/Hart Results	Brances-Bardin Results	rdin Results	California Department of Health Services Results	partment of ces Results
Radionaciide	DCUT.	Activity	% Deviation	Adirity	% Deviation	Activity pCl/L	% Deviation	Activity	% Deviation
Cobalt-60	302	294 ± 6.42	-6.0	386 ± 39	27.8	340 ± 18	12.6	278.9 ± 11.3	-7.6
		295 ± 10.9	-2.3	229 ± 34	12.3	160 ± 15 (320 ± 30)	-47 (6.0)	315.4 ± 9.5	4.4
		SN		376 ± 38	24.5	SN	1	NS	1
		NS	:	370 ± 37	22.5	NS	:	NS	1

Radionaclides were spiked into water samples unless otherwise noted.
 NS - Not sampled , NR - Not reported, NI - Not identified USEPA - United States Environmental Protection Agency

Less than the minimum detectable concentration (MDC) [i.e., the detection limit (DL)].

[%] Deviation - The percent variance from the true value.

Values in () indicate a second result reported by the study participant after the source of error in the initial result was determined.

TABLE 7

SIGNIFICANT¹ DIFFERENCES BETWEEN THE SCHEDULED SAMPLE AND THE RESPECTIVE DUPLICATE AND/OR SPLIT SOIL/SEDIMENT SAMPLE

Sample Location	Grid Block	Laboratory	Radionuclide	Quantity
Santa Susana Park	BG-02-074	Brandeis-Bardin Teledyne	Tritium Tritium	430 ±150 pCi/L < 200 pCi/L
Wildwood Regional Park	BG-09-005	DHS Teledyne	Strontium-90 Strontium-90	0.20 ± 0.04 pCi/g <0.1 pCi/g
Wildwood Regional Park Ravine	BG-10-004	DHS Teledyne	Cesium-137 Cesium-137	0.147 ± 0.014 pCi/g 0.215 ± 0.039 pCi/g
Radioactive Materials Disposal Facility Watershed	BB-16-007	USEPA Teledyne	Cesium-137 Cesium-137	0.06 ±0.01 pCi/g < 0.04 pCi/g
Campsite 1	BB-20-001	USEPA Teledyne	Cesium-137 Cesium-137	0.04 ±0.01 pCi/g 0.11 ±0.037 pCi/g
Building 59 Watershed	BB-17-005	USEPA Teledyne	Cesium-137 Cesium-137	0.15 ±0.02 pCi/g 0.218 ±0.043 pCi/g
	BB-17-006	USEPA Teledyne	Tritium Tritium	3970 ±262 pCi/L 3500 ±200 pCi/L
	BB-17-007	USEPA Teledyne	Tritium Tritium	3360 ±253 pCi/L 2900 ±200 pCi/L
	BB-17-008	USEPA Teledyne	Tritium Tritium	6700 ±316 pCi/L 5400 ±200 pCi/L
	BB-17-009	USEPA Teledyne	Tritium Tritium	4790 ±282 pCi/L 3900 ±200 pCi/L

pCi/g - Picocuries per gram

pCi/l - Picocuries per liter

DHS - Department of Health Services

Teledyne - Teledyne Isotopes (New Jersey)

USEPA - United States Environmental Protection Agency

Significant means that the sum of the standard error did not account for the difference between the two analytical values for radiomiclide samples.

 \pm - Pius or minus

< - Less than

TABLE 8
WITHDRAWN TRITIUM DATA SUMMARY

Sample Location (sequence order for analysis)	Sample Type	Tritium (pCi/L)	Water Yield (ml)
BG-11-031 BG-11-031 BG-11-031	Matrix Spike (1st Run) Matrix Spike (2nd Run) Matrix Spike (3rd Run)	< 700 7900 ± 600 8400 ± 600	2 1 1
BG-12-001*	Sample	720 ± 340	2
BG-12-005*	Sample	1200 ± 600	1
FB-00-001 BG-11-010 BG-11-075	Field Blank-Water Sample Sample	< 100 < 100 < 200	10 10 10
BG-01-016 BG-01-034 BG-01-082	Sample Sample Sample	< 100 < 100 < 200	10 9 5
BG-14-005*	Sample	370 ± 220	3
BG-14-005 BG-14-005 BG-14-005	Matrix Spike (1st Run) Matrix Spike (2nd Run) Matrix Spike (3rd Run)	1300 ± 600 16000 ± 1000 15000 ± 1000	1 1 1
BG-14-003**	Sample	2000 ± 700	1
BG-14-004*	Sample	520 ± 320	2
BG-14-001 BG-14-001 BG-14-002	Sample Rinsate Sample	< 100 < 100 < 100	10 10 10

^{*} Withdrawn tritum results

^{**} Second aliquot of sample (5 ml) reanalyzed, result concentration was below detection limits (<300) ml milliters

< 'less than

TABLE 9
ROCKETDYNE
SOIL/SEDIMENT SAMPLE QA/QC SUMMARY

	Trittium	ım	Cesturn-137	n-137	Plutonium-238*	m-238*	Plutonium-239*	m-239*	Stonti	Stontium-90
	meet criteria	total	meet criteria	total	meet criteria	total	meet criteria	total	meet criteria	total
RINSATE	8	8	5	5	4	4	4	4	4	4
MATRIX SPIKE	∞	8	4	5	4	4	4	4	4	4
BLIND FIELD DUPLICATE	œ	œ	\$	5	4	4	4	4	4	4
LABORATORY DUPLICATE	10	10	4	4	9	9	9	9	4	4
SPLIT SAMPLES	37	42	31	35	22	22	22	22	25	26
PRE-SPIKED BLIND DUPLICATE	7	7	0	0	0	0	0	0	0	0
TOTAL	78	83	49	54	40	40	40	40	41	42
PERCENT IN AGREEMENT	94%	1 00	91%	8 %	701	. %001	100%	%	6 6	98%

than the sum of the standard deviations of the sample results. For pre-spiked samples a result of 25 percent deviation or "In agreement" for samples analyzed for radionuclides means that the difference between the sample results was less less from the spiked value were considered "in agreement". All "less than" values were considered "in agreement".

* All sample results were below method detection limits.

TABLE 10 ROCKETDYNE WATER SAMPLES QA/QC SUMMARY

	Tritium	E	Gamma Scan	Scan	Gross alpha	lpha	Gross beta	eta	Plutonit	Plutonium-238	Plutonium-239	m-239	Stontium-90	96-tm
	meet	Total	meet	total	meet	fotal	meet criteria	total	meet criteria	total	meet criteria	total	meet criteria	total
RINSATE	1	-	1		1	1	-	-	1	1	1	1	-	-
PRE-SPIKED RI IND DIPLICATE	7	2	26	32	2	7	2	2	0	0	4	4	€	4
SPI IT SAMPLES	2	2	0	0	2	2	1	2	0	0	0	0	0	•
SANY IN G. ISLAND	-		1	-		1	-		-	1	-1	-	-	
TOTAL	9	9	28	34	9	9	5	9	2	2	9	9	5	9
PERCENT IN	100%	100	82%	ro.	100%	8 %	83%		100%	%(100%	8 %	83%	8
ACKEENIENI											***************************************			

than the sum of the standard deviations of the sample results. For pre-spiked samples a result of 25 percent deviation or "In agreement" for samples analyzed for radionuclides means that the difference between the sample results was less less from the spiked value were considered "in agreement". All "less than" values were considered "in agreement".

Matrix spike and blind field duplicates not collected for water samples.

Gamma Scan: Cadmium-109, Cobalt-57, Cerium-139, Mercury-203, Tin-113, Cesium-137, Yttrium-88, and Cobalt-60.

TABLE 11

Radionuclide Results for Soil Samples at Rocky Peak (BG-01)

	Cestum-137 [pCi/g(dry)]	Plutonium-238 [pCi/g(dry)]	Plutonium-239 [pCi/g(dry)]	Strontlum-90 [pCi/g(dry)]	lodine-129 [pCl/g(dry)]	Triklum (pCl/L)
BG-01-005 Sample*	0.092 +/- 0.027	< 0.07	> 0.01	0.03 +/- 0.01	< 0.2	220 +/- 80
BG-01-008 Sample*	< 0.04	< 0.04	< 0.01	0.01 +/- 0.01	< 0.2	001 >
BG-01-016 Sample Fletd Duplicate	> 0.04	< 0.03	< 0.01	< 0.09 < 0.09		001 > .
BG-01-034 Sample Field Duplicate	0.1 +/- 0.032	< 0.01	< 0.01	< 0.1		< 100 < 200
BG-01-082 Sample?	< 0.04	> 0.01	> 0.01	< 0.08		< 200
BG-01-087 Sample Field Duplicate Lab Duplicate	0.158 +/- 0.038	< 0.007 < 0.02	< 0.01 < 0.02	< 0.07		< 200
BG-01-090 Sample Field Duplicate	0.175 +/- 0.026 0.209 +/- 0.03	< 0.009	< 0.009	< 0.1		< 200
BG-01-100 Sample*	0.18 +/- 0.04	< 0.02	< 0.01	0.05 +/- 0.01	< 0.1	380 +/- 100

pCi/g(dry) -- Picocuries per gram of undried sample pCi/L -- Picocuries per liter of water < -- Less than

• ... 1992 Sample
• ... 1994 Sample
Blant - Not analyzed
+/-.. Plus or minus

BBI -- Brandeis-Bardin Institute split sample
DHS -- Department of Health Services split sample
USEPA -- United States Environmental Protection Agency
split sample

Field Duplicate -- A duplicate sample is collected in the field and submitted under an anonymous sample identifier. Lab Duplicate -- A reanalysis of the sample including extraction and counting.

TABLE 12

Radionuclide Results for Soil Samples at Santa Susana Park (BG-02)

	Cestum-137 [pCi/g(dry)]	Plutonium-238 [pCi/g(dry)]	Plutonium-239 [pCi/g(dry)]	Strontium-90 [pCi/g(dry)]	Iodine-129 [pCi/g(dry)]	Tritium (pCi/L)
BG-02-007 Sample*	0.17 +/- 0.04	< 0.02	< 0.01	0.02 +/- 0.01	< 0.1	360 +/- 90
Interlab Duplicate* USEPA* Sample*	0.19 +/- 0.01 > 0.06	0.05 +/-0.05 < 0.007	0.06 +/- 0.06 < 0.007	< 0.68 0.13 +/- 0.08	< 0.37	
BG-02-017 Sample	0.213 +/- 0.04	< 0.007	< 0.007	0.12 +/- 0.05		< 200
BG-02-074 Sample* Sample BBI	^ ^ 0.00 0.00 0.00 0.00		< 0.007 < 0.01 < 0.05	< 0.01 < 0.08 < 0.5	< 0.3	W < 200 430 +/- 150
BG-02-076 Sample* Sample* Lab Duplicate*	0.099 +/- 0.032 < 0.04	< 0.02 < 0.01	< 0.01 < 0.01	0.03 +/- 0.01 < 0.09	< 0.1	420 +/- 90 < 200 < 200
BG-02-065 Sample^	< 0.04	< 0.007	< 0.007	0.13 +/- 0.1		< 200

pCUg(dry) -- Picocuries per gram of undried sample pCUL -- Picocuries per liter of water < -- Less than

* -- 1992 Sample
-- 1994 Sample
Blank -- Not analyzed
+/- -- Plus or minus

BBI -- Brandels-Bardin Institute split sample
DHS -- Department of Health Services split sample
USEPA -- United States Environmental Protection Agency
split sample

W. .. Samples results could not be verified by the laboratory and subsequently were withdrawn by the laboratory. Lab Duplicate ... A regnalysis of the sample including extraction and counting.

TABLE 13
Radionuclide Results for Soil Samples at Happy Camp (BG-05)

	Cestum-137 [pCi/g(dry)]	Plutonium-238 {pCi/g(dry)]	Plutonium-239 [pCi/g(dry)]	Strontlum-90 [pCi/g(dry)]	fodine-129 [pCt/g(dry)]	Tritium (pCi/L)
BG-05-016 Sample*	0.074 +/- 0.029	< 0.02	< 0.005	10:02 +/- 0:01	< 0.2	260 +/- 160
BG-05-917 Sample Field Duplicate	0.147 +/- 0.033 0.1 +/- 0.035	< 0.02	< 0.02	0.088 +/- 0.056		< 200
BG-05-026 Sample* Interlab Duplicate*	0.067 +/- 0.025	< 0.03	< 0.006	0.08 +/- 0.02	< 0.2	380 +/- 160 200 +/- 70
BG-65-027 Sample	0.099 +/- 0.0214	> 0.01	< 0.01	0.1 +/- 0.04		< 200
BG-05-050 Sample^	0.101 +/- 0.022	< 0.02	< 0.02	0.069 +/- 0.046		< 200
BG-05-056 Sample? USEPA^	0.148 +/-0.028 0.08 +/-0.04	< 0.01 < 0.06	< 0.01 < 0.03	0.097 +/-0.055 < 0.79		< 200 < 270
BG-05-074 Sample* Field Duplicate* Sample* Lab Duplicate*	0.10 +/- 0.03 0.073 +/- 0.026 0.153 +/- 0.028	< 0.02 < 0.02	< 0.005 < 0.02	0.05 +/- 0.01 0.084 +/- 0.04	< 0.3	490 +/- 180 140 +/- 80 < 500 < 500

pCi/g(dry) -- Picocuries per gram of undried sample pCi/L -- Picocuries per liter of water < -- Less than

• -- 1992 Sample
-- 1994 Sample
Blank -- Not analyzed
+/- -- Plus or minus

BBI -- Brandeis-Bardin Institute split sample
DHS -- Department of Health Services split sample
USEPA -- United States Environmental Protection Agency
split sample

Lab Duplicate -- A reunalysis of the sample including extraction and counting.

TABLE 14

Radionuclide Results for Soil Samples at Wildwood Regional Park (BG-09)

	Ceslum-137 [raCi/o(drv)]	Plutonium-238 [pCi/g(dry)]	Plutonium-239 [pCi/g(dry)]	Strontium-90 [pCi/g(dry)]	Tritium (pCi/L)
	[ko::8/1/1				
BG-09-003	< 0.05	< 0.008	< 0.008	0.13 +/- 0.05	< 200
Sample Field Duplicate	0.05 +/- 0.04	> 0.006 > 0.04	^ \ 0.00 0.04	< 0.69	< 270
BG-09-005	190 0 / 1 001 0	00 >	< 0.01	< 0.1	< 200
Sample Lab Duplicate	0.16 +/- 0.014	< 0.01 < 0.019	< 0.01 0.0069 +/- 0.0016	0.2 +/- 0.04	
DHS					
BG-09-013 Sample^	0.198 +/- 0.072	< 0.008	> 0.008	0.12 +/- 0.05 0.14 +/- 0.06	< 200
Field Duplicate Lab Duplicate	0.088 +/- 0.0421				
BG-09-057 Sample	> 0.06	< 0.008	< 0.008	0.11 +/- 0.05	< 200 < 200
Field Duplicate					
BG-09-096	0.079 +/- 0.0296	< 0.02	< 0.02	0.12 +/- 0.05	< 200
Sample					

pCi/g(dry) -- Picocuries per gram of undried sample pCi/L -- Picocuries per liter of water <-- Less than

^ -- 1994 Sample Blank -- Not analyzed +/- -- Plus or minus

BBI -- Brandeis-Bardin Institute split sample
DHS -- Department of Health Services split sample
USEPA -- United States Environmental Protection Agency
split sample

Field Duplicate -- A duplicate sample is collected in the field and submitted under an anonymous sample identifier. Lab Duplicate -- A reanalysis of the sample including extraction and counting.

TABLE 15

Radionuclide Results for Soil Samples at Wildwood Regional Park Ravine (BG-10)

					979
	Cestum-137 [pCi/g(dry)]	Plutonium-238 [pCi/g(dry)]	Plutonium-239 [pCi/g(dry)]	Strontium-90 [pCi/g(dry)]	Tritium (pCi/L)
BG-16-001 Sample^	0.245 +/- 0.037	> 0.01	0.0 >	0.098 +/- 0.048	< 100
Lab Duplicate BBI	0.21 +/- 0.08	< 0.03	< 0.05	< 0.5	< 700
BG-10-002 Sample Field Duplicate	0.276 +/- 0.029 0.306 +/- 0.041	< 0.908	< 0.008	< 0.09	< 100
BG-10-003 Sample USEPA	0.257 +/- 0.034 0.29 +/- 0.02	< 0.007 < 0.05	< 0.01 < 0.02	< 0.09 < 0.60	< 100 < 270
BG-10-004 Sample DHS	0.215 +/- 0.039 0.147 +/- 0.014	< 0.009 < 0.0015	< 0.009 0.0051 +/- 0.0012	< 0.04 0.07 +/- 0.03	< 100
BG-10-005 Sample^	0.456 +/- 0.052	< 0.01	< 0.01	< 0.09	< 100
*					

pCi/g(dry) -- Picocuries per gram of undried sample pCi/L -- Picocuries per liter of water < -- Less than

^ -- 1994 Sample Blank -- Not analyzed +/- -- Plus or minus

BBI -- Brandeis-Bardin Institute split sample
DHS -- Department of Health Services split sample
USEPA -- United States Environmental Protection Agency
split sample

Field Duplicate -- A duplicate sample is collected in the field and submitted under an anonymous sample identifier. Lab Duplicate -- A reanalysis of the sample including extraction and counting.

TABLE 16

Radionuclide Results for Soil Samples at Tapia County Park (BG-11)

	Cesium-137 [pCi/g(dry)]	Plutonium-238 [pCi/g(dry)]	Plutonium-239 [pCi/g(dry)]	Strontium-90 [pCi/g(dry)]	Tritium (pCi/L)
BG-11-010 Sample^	0.158 +/- 0.035	< 0.01	< 0.01	0.089 +/- 0.041	< 200
BG-11-011 Sample^ USEPA^	0.109 +/- 0.029 0.14 +/- 0.01	< 0.006 < 0.03	< 0.006 < 0.02	< 0.1 < 0.61	< 100 < 270
BG-11-031 Sample Lab Duplicate^	0.059 +/- 0.0234	< 0.007 < 0.03	< 0.009 < 0.03	< 0.09	< 1000
BG-11-036 Sample^ Field Duplicate^	0.067 +/- 0.0338	< 0.008	< 0.008	< 0.1	< 100 < 100 < 100
BG-11-075 Sample^	0.113 +/- 0.043	> 0.006	< 0.009	< 0.09	< 200

pCi/g(dry) -- Picocuries per gram of undried sample pCi/L -- Picocuries per liter of water < -- Less than

^ -- 1994 Sample Blank -- Not analyzed +/- -- Plus or minus

BBI -- Brandeis-Bardin Institute split sample
DHS -- Department of Health Services split sample
USEPA -- United States Environmental Protection Agency
split sample

Field Duplicate -- A duplicate sample is collected in the field and submitted under an anonymous sample identifier. Lab Duplicate -- A reanalysis of the sample including extraction and counting.

TABLE 17

Radionuclide Results for Soil Samples at Tapia County Park Ravine (BG-12)

			600	90	Teffices
	Cesium-137 [pCi/g(dry)]	Piutonium-238 [pCi/g(dry)]	Flutonium-239 [pCi/g(dry)]	[pCi/g(dry)]	(pCi/L)
BG-12-001 Sample^	< 0.03	> 0.006	> 0.006	< 0.08	Μ
BG-12-002 Sample Lab Duplicate	0.031 +/- 0.018	< 0.02 < 0.008	< 0.02 < 0.008	< 0.09	< 100
BG-12-003 Sample^ USEPA^	0.042 +/- 0.016 0.04 +/- 0.01	< 0.007 < 0.03	< 0.007 < 0.01	< 0.09 : < 0.70	< 100 < 270
BG-12-004 Sample^	0.097 +/- 0.0202	< 0.008	< 0.01	< 0.09	< 100
BG-12-005 Sample Lab Duplicate	0.030.020.07	< 0.007	< 0.007	< 0.05 < 0.5	W < 380
Igg	7				

pCi/g(dry) -- Picocuries per gram of undried sample pCi/L -- Picocuries per liter of water < -- Less than

^ -- 1994 Samples^ -- 1994 Sample Blank -- Not analyzed +/- -- Plus or minus

BBI -- Brandeis-Bardin Institute split sample
DHS -- Department of Health Services split sample
USEPA -- United States Environmental Protection Agency
split sample

W -- Samples results could not be verified by the laboratory and subsequently were withdrawn by the laboratory. Lab Duplicate -- A reanalysis of the sample including extraction and counting.

TABLE 18

Radionuclide Results for Soil Samples at Rocky Peak Ravine (BG-14)

	Cesium-137 [pCi/g(dry)]	Plutonium-238 [pCi/g(dry)]	Plutonium-239 [pCi/g(dry)]	Strontlum-90 [pCi/g(dry)]	Tritium (pCi/L)
BG-14-001 Sample^	< 0.04	< 0.009	< 0.009	0.082 +/- 0.043	< 100
BG-14-002 Sample^	0.085 +/- 0.0426	< 0.01	< 0.01	< 0.09	< 100
BG-14-003 Sample^	0.080 +/- 0.0375	< 0.007	< 0.007	< 0.08	< 300
BG-14-004 Sample [^] Lab Duplicate [^]	< 0.03	< 0.008	< 0.008	< 0.07 0.093 +/- 0.051	≱
BG-14-005 Sample^ Lab Duplicate^	0.040.03	< 0.008	< 0.008	< 0.05	W

pCi/g(dry) -- Picocuries per gram of undried sample pCi/L -- Picocuries per liter of water <-- Less than

^ -- 1994 Sample
Blank -- Not analyzed
+/- -- Plus or minus

BBI -- Brandeis-Bardin Institute split sample
DHS -- Department of Health Services split sample
USEPA -- United States Environmental Protection Agency
split sample

W -- Samples results could not be verified by the laboratory and subsequently were withdrawn by the laboratory. Lab Duplicate -- A reanalysis of the sample including extraction and counting.

TABLE 19

Summary of the Results of the Analysis of Variance (ANOVA) and the Tukey Honest Significant Difference (HSD) Test for the Background Sample Areas

Radionuclides ³ (Soil)	Significance Probability (P value) ¹	Background Areas² Differing from More Than Two Other Background Locations
Cesium-137	0.024	BG-10
Strontium-90	0.031	BG-09

P values less than 0.05 indicate At least one background sample area differs from the others

² BG-09 – Wildwood Regional Park

BG-10 - Wildwood Regional Park Ravine

The majority of background samples for tritium and plutonium-238 were below detection limits; statistical analysis was not used to evaluate concentrations of these radionuclides

TABLE 20

Background Levels of Radionuclides in Soil

		Measured Background Areas	round Areas		7	Literature Values		
	Range	Arithmetic Mean	as	5'11 to 95'h Percentile?	Range	Arithmetic Mean	Geometic Mean ± SD	Reference
Radionuclides (pCl/g(dry))	Vg(dry))							
Cesium-137	< 0.03-0.213	0.087	0.062	< 0.03-0.21	0.1-0.8¹ 0.01-0.39 0.024-0.253 0.005-0.24 0.3-1.3	0.5 0.09 0.10 0.8	0.5	Gustafson, 1969 and 1070 Eisenbud, 1987 Layton, 1990 Dinnel, 1985 USEPA, 1992a Ritchie and McHenry, 1977 and 1982
Strontium-90	<0.005-0.13	0.052	0.031	<0.005-0.11	0.16-0.32	0.24		Eisenbud, 1987 UNSCEAR, 1969 and 1972 Ritchic and McHenry, 1977 and 1982

Adjusted for decay over-time.

The fifth percentile equals the mean minus two times the standard deviation (mean + 2 SD)

The ninety-fifth percentile equals the mean plus two times the standard deviation (mean + 2 SD).

The majority of background samples for tritium and plutonium-238 were below detection limits; statistical analysis was not used to evaluate concentrations of these radionuclides pCVg(dry) - Picocuries per gram of dried sample water

SD - Standard deviation

- less than

- Plus or minus v +ı

TABLE 21
Radionuclide Results for Soil Samples at the Dormitory Area (BB-02)

	Cestum-137 [pCl/g(dry)]	Plutonium-238 [pCl/g(dry)]	Pletonium-239 [pCi/g(dry)]	Strontlum-90 [pCt/g(dry)]	lodine-129 [pCl/g(dry)]	Trkiem (pCVL)
BB-02-045 Sample* Sample*	< 0.05	> 0.01	> 0.004	< 0.01	< 0.2	W < 200
BB-62-069 Sample* Fleid Duplicate* Sample*	< 0.05 < 0.05	< 0.02	> 0.006	0.01 +/- 0.01	< 0.2	200 200 200 200
BB-02-071 Sample* BBH* Sample*	0.038 +/- 0.032 < 0.3	< 0.01	< 0.003	0.01 +/-0.01	< 0.3	W < 200
BB-02-075 Sample* Sample BBI	0.048 +/- 0.025	< 0.03	< 0.007	0.01 +/- 0.01	< 0.3	200 200 750
BB-62-078 Sample* Sample	0.10 +/- 0.04	< 0.05	< 0.02	. 0.02 +/- 0.01	< 0.3	< 200 < 200

pCi/g(dry) - Procuries per gram of undried sample pCi/L. - Procuries per liter of water < - Less than

• ... 1992 Sample
• ... 1994 Sample
Blank - Not smalyzed
+/- ... Plus or minus

BBI -- Brandeis-Bardin Institute spilt sample
DHS -- Department of Health Services spilt sample
USEPA -- United States Environmental Protection Agency
spilt sample

W -- Samples results could not be verified by the laboratory and subsequently were withdrawn by the laboratory.

TABLE 22

Radionuclide Results for Soil Samples at Campsite Area 1 (BB-03)

	Cestum-137 InCMeday ii	Plutonium-238 [pCl/g(dry)]	Plutonium-239 [pCl/g(dry)]	Strontium-90 [pCl/g(dry)]	lodine-129 [pCi/g(dry)]	Tritium (pCI/L)
BB-63-003 Sample						< 200
BB-03-005 Sample* USEPA* Sample	0.20 +/- 0.04 0.26 +/- 0.02	< 0.08 0.04 +/- 0.05	< 0.02 < 0.023	0.06 +/-0.01 < 0.66	< 0.2 < 0.28	< 200 < 209 < 200
BB-03-017 Sumple* Field Duplicate* Sample*	0.085 +/- 0.038 0.057 +/- 0.028	< 0.007	< 0.007	0.05 +/- 0.01	< 0.3	< 300 < 400 < 200
BB-03-025 Sample* Interab Duplicate* Sample* BBI*	0.20 +/- 0.05	< 0.2	< 0.05	0.09 + /- 0.01	< 0.2	340 +1-120 240 +1-120 < 200 < 710
BB-43-626 Sample Lab Duplicate						> > 89 80 81
BB-63-029 Sample^						× 100

pCUg(dry) - Picocuries per gram of undried sample pCUL - Picocuries per liter of water < -- Less than

. -- 1994 Sample Blank -- Not analyzed +/. -- Plus or minus

BBI -- Brandela-Bardin Institute split sample
DHS -- Department of Health Services split sample
USEPA -- United States Environmental Protection Agency
split sample

Lab Duplicate -- A reanalysis of the sample including extraction and counting.

TABLE 22 (continued)

Radionuciide Results for Soil Samples at Campsite Area 1 (BB-03)

	Cesium-137	Plutonium-238	Plutonium-239	Strontlem-90	lodine-129	Trklem
	[bCi/g(dry)]	{pCi/g(dry)]	[pCi/g(dry)]	[pCt/g(dry)]	[bc:/g(ary)]	(PCI/L)
BB-03-679 Sample* Sample*	> 0.04	< 0.01	< 0.01	0.03 +/- 0.01	< 0.2	< 200 < 100
BB-03-081 Sample? BBI						> V 926 200
BB-63-092 Sample*	0.38 +/- 0.06	< 0.1	> 0.04	0.04 +/- 0.01	< 0.2	< 200
BB-03-896 Sample^						< 100
BB-03-097 Sample^						< 100

pCifg(dry) -- Picocuries per gram of undried sample pCift -- Picocuries per liter of water < -- Less than

+ ... 1992 Sample
-... 1994 Sample
Blank -. Not analyzed
+/- -- Plus or minus

BBI -- Brandels-Bardin Institute split sample
DHS -- Department of Health Services split sample
USEPA -- United States Environmental Protection Agency
split sample

TABLE 23

Radionuciide Results for Soil Samples at Campsite Area 2 (BB-04)

	Ceslum-137 [pCi/g(dry)]	Plutonium-238 [pCi/g(dry)]	Plutonium-239 [pCi/g(dry)]	Stronthum-90 [pCi/g(dry)]	Iodine-129 [pCi/g(dry)]	Tritium (pCI/L)
BB-04-021 Sample* USEPA* Sample* Field Duplicate* USEPA*	< 0.03 0.034 +/- 0.018	< 0.02 0.025 +/- 0.020	< 0.007 < 0.016	0.03 +/- 0.01 < 0.71	< 0.2 < 0.29	390 +/- 200 < 200 < 100 < 100 < 260
BB-04-023 Sampie* Intertab Dupitone* Sample* USEPA*	0.099 + /- 0.040	< 0.01	< 0.006	0.02 +/- 0.01	< 0.3	310 +/- 160 230 +/- 90 < 100 < 260
BB-84-026 Sample* Sample*	0.15 +/- 0.03	< 0.009	< 0.006	0.03 +/- 0.01	< 0.2	660 +/- 210 < 100
BB-04-649 Sample						< 100
BB-04-062 Sample^						< 100
BB-04-678 Sample? USEPA^		·				< 100 < 260
BB-04-079 Sample^						< 100

pCl/g(dry) -- Picocuries per gram of undried sample pCl/L -- Picocuries per liter of water < -- Less than

• ... 1992 Sample • ... 1994 Sample Blank -- Not analyzed +/- -- Plus or minus

BBI -- Brandels-Bardin Institute split sample
DHS -- Department of Health Services split sample
USEPA -- United States Environmental Protection Agency
split sample

Field Duplicate -- A duplicate sample is collected in the field and submitted under an anonymous sample identifier.

Cesium-137 was the only man-made radionuclide detected in the gamma scan analysis.

• A second analysis was conducted three months later by DHS with the result of the 392 +/-153 pC//L, which was lower than the initial analysis. The DHS attributed this to loss during long-term storage.

TABLE 23(continued)

Radionuclide Results for Soil Samples at Campsite Area 2 (BB-04)

	Cestum-137 [pCi/g(dry)]	Plutonium-238 [pCi/g(dry)]	Plutonium-239 [pCi/g(dry)]	Strontlum-90 [pCl/g(dry)]	Iodine-129 [pCi/g(dry)]	Trition (pCVL)
BB-04-062 Sample Fred Dublicate* Sample* USEPA*	< 0.03	< 0.02	< 0.007	0.01+7-0.01	< 0.3 < 0.3	\$10 +/· 180 < 100 < 260
BB-04-084 Sample BBI						99 V V
BB-44-697 Sample* DHS* USEPA* Sample* BBI*	0.03 ++ 0.00	< 0.02	< 0.005	0.01 +7-0.01	< 0.3	 2470 +7. 197 2470 +7. 192 192 192 430 430 5430 5260

pCi/g(dry) -- Picocuries per gram of undried sample pCi/L -- Picocuries per liter of water < -- Less than

• -- 1992 Sample • -- 1994 Sample Blank -- Not analyzed +/- -- Plus or minus

BBI -- Brandeis-Bardin Institute spiit sample
DHS -- Department of Health Services split sample
USEPA -- United States Environmental Protection Agency
spiit sample

Cesium-137 was the only man-made radionuclide detected in the gamma scan analysis.

* A second analysis was conducted three months later by DHS with the result of the 392 +/-153 pCl/L, which was lower than the initial analysis. The DHS attributed this to loss during long-term storage.

TABLE 24

Radionuclide Results for Surface Water Samples at Campsite Area 2 (BB-04)

	Cestum-137 (pCI/L)	Plutonium-238 (pCi/L)	Plutonium-239 (pCi/L)	Stroutlem-99 (pCi/L)	lodine-129 (pCi/L)	Tritium (pCVL)	Gross Alpha (pCi/L)	Gross Beta (pCVL)
BB-04-001								
Sample* USEPA*	4 8.1	< 0.2 < 0.027	< 0.2 < 0.016	< 0.4 < 0.99	× 0.8 × 3.3	<u>≘</u> 88 ∨∨∨	. ^ ^ ^ ^ ^ ^ ^ ^ ^ ^ _	<4 4.2 +/- 1.3 12 +/- 4
Sample BBI USEPA^	< 5.90					> × \$2,93	< 7.8	\$1 >

pCI/L... Picocuries per liter of water < ... Less than +/... Plus or minus

Cesium-137 was the only man-made radionaciide detected in the gamma scan analysis.

• ... 1992 Sample • ... 1994 Sample Blank -- Not analyzed

BBI -- Brandets-Bardin Institute spilt sample
DHS -- Department of Heath Services split sample
USEPA -- United States Environmental Protection Agency
split or intertaboratory duplicate sample

TABLE 25
Radionuclide Results for Soil Samples at the Picnic Area (BB-05)

	Ceslum-137	Plutonium-238	Plutonium-239	Strontlam-90	Iodine-129	Triffiem
	[pCl/g(dry)]	[pCi/g(dry)]	lbc:/8(ary.)	[fcn2(m))]	[[v~1,8(m.j.)]	(a.p.)
BB-05-003 Sample* Field Duplicate* Sample*	0.22 +/- 0.03	< 0.01 < 0.02	< 0.005 < 0.02	0.02 +/- 0.01	< 0.2	280 +/- 130 < 100
BB-05-006 Sample* Sample	0.11 +/- 0.02	< 0.03	< 0.008	0.02 +/- 0.01	< 0.2	200 +/- 110 < 100
BB-05-057 Sample* Sample Sample	0.052 +/- 0.030	> 0.006	< 0.006	0.03 +/- 0.01	< 0.2	^ ^ 200 700 700 700
BB-45-677 Sample* USEPA* Sample*	0.16 +/- 0.04	< 0.008 0.03 +/- 0.03	< 0.01 0.015 +/- 0.02	0.06 +/- 0.01 < 0.71	< 0.23	< 200 < 200 < 100
BB-05-089 Sample* Sample* Field Duplicate*	0.14 +/- 0.04	< 0.03	< 0.02	0.02 +/- 0.01	< 0.2	200 100 100

pCi/g(dry) -- Picocuries per gram of undried sample pCi/L -- Picocuries per liter of water < -- Less than

• -- 1992 Sample
• -- 1994 Sample
Blank -- Not analyzed
+/- -- Plus or minus

BBI -- Brandeis-Bardin Institute split sample
DHS -- Department of Health Services split sample
USEPA -- United States Environmental Protection Agency
split sample

TABLE 26
Radionuclide Results for Soil Samples at the House of the Book (BB-06)

	Ceslum-137 [pCi/g(dry)]	Plutonium-238 [pCi/g(dry)]	Plutondum-239 [pCi/g(dry)]	Strontium-90 [pCi/g(dry)]	Iodine-129 [pCi/g(dry)]	Trikium (pCi/L)
BB-06-007 Sample Duplicate* Interlab Duplicate* Sample	< 0.05	< 0.02	< 0.004	< 0.01	< 0.3	480 +/- 90
BB-66-013 Sample* Sample*	< 0.05	< 0.02	< 0.01	0.01 +/- 0.01	< 0.2	< 300 < 200
BB-06-017 Sample* Lab Duplicate* Sample	0.03 0.04	< 0.01	< 0.004	0.01 +/- 0.01	< 0.2	W < 200
BB-06-066 Sample* Sample* BBI	× 0.04	< 0.01	< 0.009	< 0.01	< 0.2	300200480
BB-06-892 Sample* USEPA* Sample^	< 0.04 < 0.033	< 0.006 0.031 +/- 0.05	< 0.006 < 0.022	< 0.01 < 0.70	< 0.2 < 0.28	190 +/- 100 < 210 < 100

pCi/g(dry) -- Picocuries per gram of undried sample pCi/L -- Picocuries per liter of water < -- Less than

• ... 1992 Sample
• ... 1994 Sample
Blank -. Not analyzed
+/- ... Plus or minus

BBI -- Brandeis-Bardin Institute split sample
DHS -- Department of Health Services split sample
USEPA -- United States Environmental Protection Agency
split sample

W -- Samples results could not be verified by the laboratory and subsequently were withdrawn by the laboratory.

TABLE 27

Radionuclide Results for Soil Samples at the Main House Orchard (BB-12)

	Ceslum-137 [pCi/g(dry)]	Plutonium-238 [pCi/g(dry)]	Plutonium-239 [pCi/g(dry)]	Strontlem-90 [pCl/g(dry)]	lodine-129 [pCi/g(dry)]	Triklem (pCi/L)
BB-12-003 Sample* Sample	< 0.04	< 0.08	< 0.03	0.01 +/- 0.01	< 0.2	000 V V
9B-12-806 Sumple* Sumple*	0.091 +7-0.027	< 0.07	< 0.02	0.03 +/- 0.01	< 0.2	000 V > 100
BB-12-019 Sample* BBI* Sample^	0.15 +7-0.03	< 0.1	< 0.09	0.04 +/- 0.01 < 1.1	< 0.2	200 200
BB-12-029 Sample* Lab Duplicate* Interlab Duplicate* USEPA* Sample*	0.15 +7- 0.03 0.091 +7- 0.030 0.084 +7- 0.017	< 0.1	0.040.019	0.03 +/-0.01 < 0.74	< 0.2 < 0.23	W < 200 < 200 < 200 < 200
BB-12-023 Sample* BBI* USEPA* Sample* Lab Duplicate*	0.12 +/- 0.03 < 0.3 0.130 +/- 0.016	< 0.07	< 0.02	0.02 +/- 0.01	< 0.3	< 200 < 200 < 200 < 700

pCl/g(dry) -- Picocuries per gram of undried sample pCl/L -- Picocuries per liter of water < -- Less than

• .. 1992 Sample
... 1994 Sample
Blank -- Not analyzed
+/. -- Plus or minus

BBI -- Brandels-Bardin Institute split sample
DHS -- Department of Health Services split sample
USEPA -- United States Environmental Protection Agency
split sample

W -- Samples results could not be verified by the laboratory and subsequently were withdrawn by the laboratory.

TABLE 28

Radionuclide Results for Soil Samples at the Avocado Grove (BB-13)

	Ceslum-137 [pCl/g(dry)]	Plutonlum-238 [pCl/g(dry)]	Plutonium-239 [pCi/g(dry)]	Strontium-90 [pCi/g(dry)]	fodine-129 [pCi/g(dry)]	Trittium (pCi/L)
BB-13-010 Sample* Sample	< 0.03	< 0.05	0.0 >	< 0.01	< 0.2	< 200 < 200
BB-13-011 Sample* Sample*	0.098 +/- 0.039	< 0.05	< 0.02	0.01 +/- 0.01	< 0.2	520 +/- 110 < 200
BB-13-024 Sample First President	< 0.05	< 0.09 < 0.05	< 0.02 < 0.01	10.0 +/- 0.01	< 0.2	760 +/- 200
Incid Duplicate* USEPA* Sample*	0.030 +/- 0.011	< 0.03	< 0.021	< 0.65	< 0.29	× 200 × 200 × 200
BB-13-037 Sample* Sample^	0.10 +/- 0.04	< 0.03	< 0.01	0.01 +/- 0.01	< 0.2	400 +/- 130 < 200
BB-13-639 Sample* Lab Duplicate* Interlab Duplicate* Sample RR1*	0.077 +/- 0.018 0.059 +/- 0.033	. 0 1.0	A0.0 A	0.01 +/- 0.01	< 0.2	< 200 < 200 170 +/- 80 < 200 < 590

pCi/g(dry) -- Picocuries per gram of undried sample pCi/L -- Picocuries per liter of water < -- Less than

+ ... 1992 Sample
-... 1994 Sample
Blank ... Not analyzed
+/-... Plus or minus

BBI -- Brandels-Bardin Institute split sample
DHS -- Department of Health Services split sample
USEPA -- United States Environmental Protection Agency
split sample

TABLE 29
Radionuclide Results for Soil Samples at the Old Well Campsite (BB-14)

	Cestum-137	Plutonium-238 [pCi/g(dry)]	Plutonium-239 [pCi/g(dry)]	Stronthum-90 [pCl/g(dry)]	iodine-129 [pCl/g(dry)]	Tritium (pCi/L)
BB-14-004 Sample* Field Duplicate*	0.20 +f- 0.04	< 0.07	< 0.02	0.05 +/- 0.01	< 0.3 < 0.2	< 200
Sample Sample* Sample*	0.17 +/- 0.04	< 0.01	< 0.009	0.02 +/- 0.01	< 0.2	W < 100
BB-14-441 Sample* Sample*	0.27 +/- 0.05	> 0.06	< 0.008	0.06 +/- 0.01	< 0.2	w > 100
BB-14-079 Samule*	> 0.0	0.12 +/- 0.03	> 0.006	0.03 +/- 0.01	< 0.3	140 +/- 80
Lab Duplicate* Duplicate Count* USEPA* Sample*	0.015 +/- 0.008	< 0.08 0.10 +/- 0.03 < 0.02	< 0.011	< 0.71	< 0.28	
BB-14-094 Sample* Sample*	¥0:0 ×	< 0.05	< 0.01	0.02 +/- 0.01	< 0.2	W × 1800

pCi/g(dry) -- Picocuries per gram of undried sample pCi/L -- Picocuries per liter of water < -- Less than

• .. 1992 Sample

• .. 1994 Sample
Blank -. Not analyzed

+/- .. Plus or minus

BBI -- Brandeis-Bardin Institute spili sample
DHS -- Department of Health Services spilt sample
USEPA -- United States Environmental Protection Agency
split sample

W -- Samples results could not be verified by the laboratory and subsequently were withdrawn by the laboratory.

TABLE 30

Radionuclide Results for Soil Samples at the Former Rocketdyne Employee Shooting Range (SM-03)

	Ceslum-137 [pCi/g(dry)]	Plutonium-238 [pCi/g(dry)]	Plutonism-239 [pCi/g(dry)]	Strontlum-90 [pCi/g(dry)]	Iodine-129 [pCi/g(dry)]	Tritium (pCs/L)
SM-03-001 Sample* USEPA* Sample^	0.19 +/· 0.05 0.17 +/· 0.02	< 0.02 < 0.029	< 0.02 < 0.027	0.07 +/- 0.01 < 0.69	< 0.27 < 0.27	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
SM-43-009 Sample* Sample	0.13 +/- 0.04	< 0.02	< 0.005	10:0 -/+ 80:0	< 0.2	9 <u>9</u>
SM-03-012 Sample* Sample* Lab Duplicate*	0.13 + /- 0.03	< 0.02	< 0.004	0.02 +/- 0.01	< 0.1	\$8.88 ***
SM-03-014 Sample* Field Duplicate* Sample*	0.10 +/- 0.03 0.083 +/- 0.026	< 0.02	< 0.005	0.02 +/- 0.01	< 0.1	888 >>>
SM-03-015 Sample* Interlab Duplicate* Sample*	0.27 +/- 0.04	> 0.04	> 0.01	0.05 +/- 0.01	< 0.1	200 869 100

pCi/g(dry) -- Picocuries per gram of undried sample pCi/L -- Picocuries per liter of water < -- Less than

• .. 1992 Sample

• .. 1994 Sample
Blank -. Not analyzed

+/- .. Plus or minus

BBI -- Brandeis-Bardin Institute spili sample
DHS -- Department of Health Services split sample
USEPA -- United States Environmental Protection Agency
split sample

Lab Duplicate -- A reanalysis of the sample including extraction and counting.

TABLE 31
Radionuclide Results for Sediment Samples at the RD-51 Watershed (BB-15)

	Ceslum-137 [pCi/g(dry)]	Plutonlum-238 [pCi/g(dry)]	Plutonium-239 [pCl/g(dry)]	Strontium-90 [pCi/g(dry)]	lodine-129 [pCl/g(dry)]	Tritium (pCi/L.)
BB-15-001 Sample* Field Duplicate*	0.045 +/- 0.026	0.22 +/- 0.07	> 0.01	0.01 +/- 0.01 0.02 +/- 0.02	< 0.3 < 0.3	W 316 +/- 152
DHS• Sample^ USEPA^	10.04 +/- 0.01	< 0.01 < 0.03	< 0.01 < 0.03			< 200 < 270
BB-15-002 Sample* Field Duplicate* Sample* BB1*	0.044 +/- 0.022 < 0.04	0.067 +/- 0.025	< 0.005	< 0.01	< 0.3	< 200 < 100 < 200 550 +/- 350
BB-15-003 Sample Duplicate* Interlab Duplicate*	0.039 +/- 0.020	> 0.05	< 0.01	0.01 +/- 0.01	< 0.3	< 200 < 200
58-15-004 Sample* Barmple* Sample* BBI*	0.043 +/-0.025 < 0.3	< 0.05	< 0.01	< 0.01 < 0.6	< 0.2	* < 200 < 400
BB-15-005 Sample* USEPA* Sample^	0.052 +/-0.025 0.041 +/-0.013	0.055 +/- 0.042 < 0.02	< 0.01 < 0.011	< 0.01 < 0.73	< 0.2 < 0.17	W < 171 < 200

pCl/g(dry) -- Picocuries per gram of undried sample pCl/L -- Picocuries per liter of water < -- Less than

• ... 1992 Sample • ... 1994 Sample Blank -- Not analyzed +/. .. Plus or minus

BBI -- Brandeis-Bardin Institute split sample
DHS -- Department of Health Services split sample
USEPA -- United States Environmental Protection Agency
split sample

W -- Samples results could not be verified by the Inboratory and subsequently were withdrawn by the Inboratory.

TABLE 31 (continued)

Radionuclide Results for Sediment Samples at the RD-51 Watershed (BB-15)

					1 1 1 1 1 1	Telefores
	Cestum-137 [pCi/g(dry)]	Plutonium-238 [pCi/g(dry)]	Platonium-239 [pCi/g(dry)]	Strontium-90 [pCi/g(dry)]	[pCi/g(dry)]	(pCI/L.)
BB-15-006 Sample BB1		0.01 0.05	> 0.01 0.05			
BB-15-007 Sample,		0.0 ×	0.01 0.03			
BB-15-006		100 >	< 0.01			
Sample		,				
BB-13-009 Sample Field Duplicate		× 0.009	0.00 0.01 0.01 0.03			
BBI		56 /				
BB-15-010	. 	< 0.009	< 0.009			

pCI/g(dry) -- Picocuries per gram of undried sample pCI/L -- Picocuries per liter of water < -- Less than

• .. 1992 Sample • .. 1994 Sample Blank - Not analyzed +/- .. Plus or minus

BBI -- Brandeis-Bardin Institute spilt sample
DHS -- Department of Health Services spilt sample
USEPA -- United States Environmental Protection Agency
spilt sample

Field Duplicate -- A duplicate sample is collected in the field and submitted under an anonymous sample identifier.

TABLE 32

Radionuclide Results for Sediment Samples at Radioactive Materials Disposal Facility Watershed (BB-16)

	Ceslum-137 [pC]/e(dry)]	Plutonlum-238 [pCl/g(dry)]	Plutonium-239 [pCi/g(dry)]	Strontium-90 [pCt/g(dry)]	Iodine-129 [pCl/g(dry)]	Tritium (pCi/L)
BB-16-001A Sample* Interlab Duplicate*	0.070 +/- 0.028	> 0.04	< 0.008	0.08 +/- 0.01	< 0.3	990 +/- 150 955 +/- 100
BB-16-001B Sample* Interfab Duplicate* USEPA*	< 0.04 < 0.017	< 0.03 < 0.02	< 0.01 < 0.019	0.03 +/-0.01 < 0.63	< 0.3 < 0.17	< 200 220 +/- 120 < 190
BB-16-802 Sample* Field Duplicate* Lab Duplicate* Interlab Duplicate*	× 0.04	0.066 +/- 0.061 > 0.04	< 0.02	0.09 +/- 0.01	< 0.3 < 0.2	1100 +/- 100
BB-16-003 Sample* Interlab Duplicate* USEPA*	< 0.03	< 0.02	< 0.009	0.02 +/- 0.01	< 0.3	1300 +/- 300 1500 +/- 200
BB-16-004 Sample* Interlab Duplicate* DHS*	0.34 +/- 0.04	< 0.07	< 0.03	0.15 +/- 0.02	< 0.3	1300 +/- 200 1600 +/- 200 1902 +/- 186
BB-16-005 Sample* Interlab Duplicate* BBI*	< 0.04 < 0.3	< 0.02	< 0.005	0.04 +/- 0.01 < 1	< 0.3	1300 +/- 200

pCi/g(dry) -- Picocuries per gram of undried sample pCi/L -- Picocuries per liter of water < -- Less than

• .. 1992 Sample
• .. 1994 Sample
Blank - Not analyzed
+/. -- Plus or minus

BBI -- Brandeis-Bardin Institute split sample DHS -- Department of Health Services split sample USEPA -- United States Environmental Protection Agency split sample

TABLE 32(continued)

Radionuclide Results for Sediment Samples at Radioactive Materials Disposal Facility Watershed (BB-16)

	Cestum-137	Plutonium-238 IpCi/g(dry)]	Plutonlum-239 [pCi/g(dry)]	Strontium-90 [pCl/g(dry)]	Fodine-129 [pCi/g(dry)]	Tritium (pCI/L)
, un	(Constant)		-			W1 /
Sample Sample Eield Diralicate	0.046 +/- 0.0216 0.076 +/- 0.0315			U.U8 +1- U.U44		
DHS	0.034 +/- 0.01			80.0		
BB-16-007 Sample	< 0.04			0.11 +/- 0.05		· 230 +/- 100 210 +/- 100
Field Duplicate	0.06 +/- 0.01			< 0.66		< 270
BB-16-008				0.15 +/- 0.09		× 100
Sample? Lab Duplicate?	× × ×			< 0.5		< 390
BBI	0.034 +/- 0.01			< 0.06		
BB-16-009 Sarple	0.199 +/- 0.044			0.24 +/- 0.04 < 0.5		< 100 < 2300
881~	0.14 417 0.03					
BB-16-010	0.075 ±7.0.0283			0.14 +/-0.07		901 ×
Sample DHS*	0.043 +/- 0.011			0.15 +/-0.03 < 0.74		> 270
Usera						

pCi/g(dry) -- Picocuries per gram of undried sample pCi/L -- Picocuries per liter of water < -- Less than

• ... 1992 Sample

• ... 1994 Sample
Blank -- Not analyzed

+/- -- Plus or minus

BBI -- Brandets-Bardin Institute split sample
DHS -- Department of Health Services split sample
USEPA -- United States Environmental Protection Agency
split sample

Field Duplicate -- A duplicate sample is collected in the field and submitted under an anonymous sample identifier. Lab Duplicate -- A reanalysis of the sample including extraction and counting.

TABLE 32(continued)

Radionuclide Results for Sediment Samples at Radioactive Materials Disposal Facility Watershed (BB-16)

0.147 +/- 0.051 < 0.08 < 0.07 < 0.04 < 0.07 < 0.05 < 0.05 < 0.04 < 0.05 < 0.04 < 0.05 < 0.04 < 0.05		Cestum-137 [PCJ/g(dry)]	Plutonium-238 [pCl/g(dry)]	Plutonium-239 {pCi/g(dry)]	Strontlum-90 [pCi/g(dry)]	Iodine-129 [pCi/g(dry)]	Tritlem (pCi/L)
<pre></pre>	BB-16-B001/0.0 Samole^	0.147 +/- 0.051			< 0.05	,	< 200
0.109 +/-0.044 < 0.07 < 0.04 < 0.05 < 0.05 < 0.04 < 0.05 < 0.04 < 0.05	BB-16-B001/5.0 Sample^	< 0.08			0.093 +/- 0.042		> 200
<pre>< 0.04 < 0.07 < 0.087 +/- 0.0415 < 0.05 < 0.04 < 0.04 < 0.07 < 0.05 </pre>	BB-16-B002/0.0 Sample BB1	0.109 +/-0.044 < 0.07			< 0.08 < 0.5		> 100 > 620
 0.087 +/- 0.0415 < 0.05 < 0.04 < 0.07 < 0.05 	BB-16-B002/5.0 Sample BBI	< 0.04 < 0.07			< 0.07 < 0.5		× 100 × 380
 < 0.05 < 0.04 < 0.07 < 0.05 	BB-16-B003/0.0 Sample	0.087 +/- 0.0415			< 0.07		> 100
< 0.04 < 0.07 < 0.05 < 0.05	BB-16-B003/5.0 Sample?	> 0.05			< 0.07		< 100
. < 0.03	BB-16-B004/0.0 Sample	< 0.04			< 0.1		> 100
: < 0.05	BB-16-B004/5.0 Sample Lab Duplicate	< 0.07			< 0.09		270 +/- 150 290 +/- 150
200	BB-16-B005/0.0 : Sample	< 0.05			< 0.05		> 100
	BB-16-B005/5.0 Sample	> 0.06			< 0.08		< 200

pCU/L -- Picocuries per gram of undried sample curl pCUL -- Picocuries per liter of water pCUL -- Picocuries per liter properties from porting locations (B001 through B005) were collected at the surface (0.0) or at a depth of 5 feet (5.0).

BBI -- Brandeis-Bardin Institute split sample
DHS -- Department of Health Services split sample
USEPA -- United States Environmental Protection Agency
split sample

TABLE 33
Radionuclide Results for Sediment Samples at the Building 59 Watershed (BB-17)

	Cestum-137 [pCi/g(dry)]	Plutonium-238 [pCi/g(dry)]	Plutonium-239 [pCi/g(dry)]	Strontium-96 [pCi/g(dry)]	iodine-129 [pCi/g(dry)]	Trittlum (pCVL)
BB-17-001 Sample*	0.077 +/- 0.032	0.19 +/- 0.06	< 0.02	10.01 +/- 0.01	< 0.3	08 -/+ 061
Lao Dupitane Dupitane Count* USEPA*	910.0 -/+ 980.0	0.15 +/- 0.05	< 0.008	> 0.66	< 0.17	061 >
BB-17-002 Sample* Interlab Duplicate* USEPA*	0.16 +/- 0.04	0.055 +/- 0.024	< 0.005	0.02 +/- 0.01	< 0.2	200 00 00 00 00 00 00 00 00 00 00 00 00
BB-17-003 Sample* Duplicate Count* DHS* USEPA*	0.13 +/- 0.03	0.055 +/- 0.031	< 0.007	0.01 +1-0.01	< 0.2	10800 +/- 300 11000 +/- 1000 10700 +/- 371 12380 +/- 371
BB-17-604 Sample* Field Ouplicate*	0.23 +/- 0.03	< 0.04 0.33 +/-0.08 < 0.06	< 0.007 < 0.01	0.03 +/- 0.01	< 0.2 < 0.2	9810 +/- 330
Duplicate Count* BBI* USEPA*	< 0.3	0.27 +/- 0.07		0 >		12720 +/- 4300 9855 +/- 325
BB-17-005 Sumple? USEPA^	0.218 +/- 0.043 0.15 +/- 0.02	< 0.01 < 0.01	< 0.02 < 0.01			

pCi/g(dry) -- Picocuries per gram of undried sample pCi/L -- Picocuries per liter of water < -- Less than

* .. 1992 Sample
... 1994 Sample
Blank -- Not analyzed
+/... Plus or minus

BBI -- Brandeis-Bardin Institute split sample
DHS -- Department of Health Services split sample
USEPA -- United States Environmental Protection Agency
split sample

TABLE 33(continued)

Radionuclide Results for Sediment Samples at the Building 59 Watershed (BB-17)

	Cestum-137 [pCl/g(dry)]	Plutonium-238 [pCi/g(dry)]	Plutonium-239 [pCi/g(dry)]	Strontlum-90 [pCi/g(dry)]	[odine-129 [pCi/g(dry)]	Tritium (pCVL)
BB-17-005A Sample^	0.148 +/- 0.05	< 0.02	< 0.02			> 100
BB-17-005B Sample^	0.385 +/- 0.053	> 0.04	> 0.04	-		89 >
BB-17-006 Sample Lab Duplicate USEPA	0.193 +/- 0.03	< 0.02 < 0.02 < 0.07	0.020.04			3500 +/- 200 3970 +/- 262
BB-17-006A Sample^	0.164 +/- 0.035	< 0.01	< 0.01			180 +/- 90
BB-17-006B Sample ²	0.23 +/- 0.056	< 0.02	< 0.03			× 100
BB-17-007 Sample^ USEPA^	0.22 +/- 0.04 0.19 +/- 0.02	< 0.02 0.03 +/- 0.03	× 0.02 × 0.04			2900 +/- 200 3360 +/- 253
BB-17-007A Sample^	0.123 +/- 0.041	< 0.01	< 0.02			230 +/- 100
BB-17-007B Sample^	0.299 +/- 0.051	< 0.02	< 0.02			220 +/- 100
BB-17-008 Sample? USEPA^	0.124 +/- 0.047 0.13 +/- 0.02	< 0.03 < 0.04	< 0.03 < 0.02			\$400 +/- 200 6700 +/- 316

pCI/g(dry) -- Picocuries per gram of undried sample pCi/L -- Picocuries per filer of water < -- Less than

• .. 1992 Sample • .. 1994 Sample Blank -- Not analyzed +/. .. Plus or minus

BBI -- Brandeis-Bardin Institute split sample
DHS -- Department of Health Services split sample
USEPA -- United States Environmental Protection Agency
split sample

Lab Duplicate -- A reanalysis of the sample including extraction and counting.

TABLE 33(continued)

Radionuclide Results for Sediment Samples at the Building 59 Watershed (BB-17)

	Cestum-137 [pC/g(dry)]	Plutonium-238 [pCi/g(dry)]	Plutonium-239 [pCi/g(dry)]	Strontluns-90 [pCi/g(dry)]	lodine-129 [pCi/g(dry)]	Tritium (pCI/L)
BB-17-008A Sample? Field Duplicate	0.249 +/- 0.047	< 0.02	< 0.02			300 +/- 110 \$10 +/- 110
BB-17-008B Sample^	0.242 +/- 0.024	< 0.04	< 0.05			< 100
BB-17-009 Sample? USEPA^	0.149 +/- 0.018 0.12 +/- 0.02	< 0.03 < 0.04	< 0.03 < 0.03			3900 +/- 200 4790 +/- 282
BB-17-609A Sumple? Lab Duplicate?	0.187 +/-0.04	< 0.01	< 0.01			< 200 < 200
BB-17-009B Sample^	0.36 +/- 0.045	> 0.008	< 0.01			
BB-17-010 Sample* Lab Dupticate* BB1	0.116 +/- 0.046 0.15 +/- 0.07	50.0 0.0 0.0 0.0 0.0 0.0 0.0	0.00 < 0.02 < 0.03			> 100

pCI/g(dry) -- Procuries per gram of undried sample pCI/I. -- Procuries per liter of water < -- Less than

• .. 1992 Sample • .. 1994 Sample Blank -- Not analyzed +/- -- Plus or minus

BBI -- Brandeis-Bardin Institute spilt sample
DHS -- Department of Health Services split sample
USEPA -- United States Environmental Protection Agency
split sample

Field Duplicate -- A duplicate sample is collected in the field and submitted under an anonymous sample identifier. Lab Duplicate -- A reanalysis of the sample including extraction and counting.

TABLE 33(continued)

Radionuclide Results for Sediment Samples at the Building 59 Watershed (BB-17)

	Cestum-137	Plutonium-238	Plutonium-239	Strontlum-90	Iodine-129 (pCl/s(dry))	Tritium (pC//L)
	{pCi/g(dry)]	[pCi/g(dry)]	[pcng(uty)]	I from Bland 18		
BB-17-B001/0.0 Sample 11SEPA	0.115 +/-0.041 0.13 +/-0.02	< 0.01 < 0.05	< 0.01 < 0.02			< 200 < 270
BB-17-B001/2.5 Sample USEPA^	< 0.03 < 0.02	< 0.008 < 0.03	< 0.008 < 0.02			300 +/- 110 480 +/- 180
BB-17-B002/0.0 Samole	0.13 +/- 0.04	10.0 >	> 0.01			< 200
BB-17-B002/2.5 Sample	< 0.05	< 0.009	< 0.009			7600 +/- 300
8B-17-B003/0.0 Sample	< 0.05	< 0.01 < 0.009	< 0.02 < 0.009			< 200
BB-17-B003/2.5 Sumple	< 0.05	< 0.01	< 0.01			< 200 < 200
TTO Dobucine						

pCI/g(dry) -- Picocuries per gram of undried sample

-- 1992 Sample

-- 1994 Sample

-- 1994 Sample

-- 1994 Sample

-- 1995 Sample

Samples collected at boring locations (B001 through B003) were collected at the surface (0.0) or at at a depth of 2.5 feet (2.5).

BBI -- Brandels-Bardin Institute split sample
DHS -- Department of Health Services split sample
USEPA -- United States Environmental Protection Agency
split sample

Field Duplicate -- A duplicate sample is collected in the field and submitted under an anonymous sample identifier. Lab Duplicate -- A reanalysis of the sample including extraction and counting.

TABLE 34

Mercury Results for Soil Samples at Sodium Burn Pit Watershed (BB-18)

Sample Location	Mercury (mg/kg)
BB-18-004	-
Sample	< 0.1
BB-18-005	
Sample	< 0.1
BB-18-005A	
Sample	< 0.1
BB-18-005B	
Sample	< 0.1
BB-18-005C	
Sample	< 0.1
BB-18-006A	
Sample	< 0.1
BB-16-006B	0.12
Sample	0.12 <0.1
Lab Duplicate	< 0.09
USEPA BBI	0.14

< - Less than 0.1 mg/kg

USEPA - United States Environmental Protection Agency split sample

BBI - Brandeis-Bardin Institute split sample

Lab Duplicate - A reanalysis of the sample including extraction

TABLE 35

Radionuclide Results for Sediment Samples at the Sodium Reactor Experiment Watershed (BB-19)

	Cesium-137 (pC/g(dry))	Plutonium-238 [pCi/g(dry)]	Plutonium-239 [pCi/g(dry)]	Strontlum-96 [pCl/g(dry)]	lodine-129 [pCl/g(dry)]	Triklens (pCi/L)
BB-19-001 Sample*	0.30 +/- 0.05	< 0.05	< 0.03	0.08 +/- 0.02	< 0.3	
BB-19-002 Sample* DHS*	0.24 +/-0.06 0.28 +/-0.03	> 0.06	< 0.01	0.09 +/- 0.02	< 0.3	< 100 444 +/- 153
BB-19-003 Sample* 11SEPA*	< 0.04	< 0.07 0.03 +/- 0.05	< 0.01 < 0.020	0.02 +/- 0.01 < 0.74	< 0.3 < 0.17	200 +/- 100 < 200
BB-19-004 Sample* Field Duplicate*	0.18 +/- 0.03	< 0.04 0.03 +/- 0.02	< 0.01 < 0.005	0.03 +/- 0.0t < 0.6	< 0.3	< 100 < 4500
BB-19-005 Sample Lab Duplicate	0.056 + /- 0.0258			< 0.08 < 0.08 < 0.78		
BB-19-006 Sample USEPA^	0.051 +/-0.028			0.12 +/- 0.08 < 0.62		

pCl/g(dry) -- Picocuries per gram of undried sample pCl/L -- Picocuries per liter of water <- -- Less than

• .. 1992 Sample
• .. 1994 Sample
Blank - Not analyzed
+/- .. Plus or minus

BBI -- Brandeis-Bardin Institute split sample
DHS -- Department of Health Services split sample
USEPA -- United States Environmental Protection Agency
split sample

Lab Duplicate -- A reanalysis of the sample including extraction and counting.

TABLE 35(continued)

Radionuclide Results for Sediment Samples at the Sodium Reactor Experiment Watershed (BB-19)

	Cestum-137	Plutonium-238	Plutonium-239 [pCi/g(dry)]	Strontium-90 [pCt/g(dry)]	fodine-129 [pCi/g(dry)]	Trititum (pCI/L)
	الإيهاقياكما	Illowers and I				
88-19-007 Sample^ BBI	< 0.04 < 0.07			< 0.1 < 0.5		
BB-19-906 Sample DHS*	0.045 +/- 0.0257 0.052 +/- 0.011			< 0.1 < 0.08		
8B-19-009 Sample	< 0.03			0.061 +/- 0.041		

pCi/g(dry) -- Picocuries per gram of undried sample pCi/L -- Picocuries per liter of water < -- Less than

+ ... 1992 Sample

-.. 1994 Sample
Blank -. Not analyzed

+/- -- Plus or minus

BBI — Brandeis-Bardin Institute split sample
DHS — Department of Health Services split sample
USEPA — United States Environmental Protection Agency
split sample

TABLE 36

Radionuclide Results for Sediment Samples at Campsite 1 Drainage (BB-20)

	Ceslum-137 [pCi/g(dry)]	Platonium-238 {pCi/g(dry)]	Plutonium-239 [pCi/g(dry)]	Strontlum-90 [pCl/g(dry)]	lodine-129 [pCl/g(dry)]	Tritlem (pCi/L)
BB-20-001 Sample? BBI USEPA^	0.11 +/- 0.037 0.1 +/- 0.05 0.04 +/- 0.01			2 0 .1 2 0 .3 5 0 .8		> > 10 520 270 270
BB-20-002 Sample	> 0.04			< 0.09		> 100
BB-2e-003 Sample? Field Duplicate? BBI? USEPA*	< 0.04 < 0.07 0.04 +/- 0.02			< 0.06 < 0.3 < 0.64		> 150 > 150 > 150 > 275 > 275
BB-20-004 Surple Lab Duplicate USEPA	0.040.04			0.18 +/- 0.04 0.088 +/- 0.036 < 0.71		< 100
BB-20-065 Sample Sample Field Duplicate Lab Duplicate	0.030.04			< 0.06		001 >
BB-29-006 Sample? USEPA^	< 0.05 0.02 +/- 0.01			< 0.05 < 0.75		< 100 < 270

pCL/g(dry) -- Picocuries per gram of undried sample pCL/L -- Picocuries per liter of water < -- Less than

• .. 1992 Sample • 1994 Sample Blank -- Not analyzed +/. -- Plus or minus

BBI -- Brandels-Bardin Institute split sample
DHS -- Department of Health Services split sample
USEPA -- United States Environmental Protection Agency
split sample

Field Duplicate -- A duplicate sample is collected in the field and submitted under an anonymous sample identifier. Lab Duplicate -- A remalysis of the sample including extraction and counting.

TABLE 36(continued)

Radionuclide Results for Sediment Samples at Campsite 1 Drainage (BB-20)

	Cestum-137 [pCi/g(dry)]	Plutontum-238 [pCi/g(dry)]	Plutonium-239 [pCi/g(dry)]	Strontlum-90 (pCi/g(dry))	lodine-129 [pCi/g(dry)]	Tritium (pCl/L)
BB-20-007 Sample? USEPA^	< 0.05 0.04 +/- 0.02			< 0.05 < 0.65		< 100 < 270
BB-20-008 Sample?	< 0.05			< 0.06		> 100
BB-20-009 Sample BBI	0.076 +/- 0.0364 < 0.07			< 0.06 < 0.3		< 100 < 310
BB-20-010 Sample Lab Duplicate	< 0.05			< 0.1 < 0.06		001 >

pCi/g(dry) -- Phocuries per gram of undried sample pCi/L -- Phocuries per liter of water < -- Less than

• ... 1992 Sample

• ... 1994 Sample
Blank -- Not analyzed

+/. -- Plus or minus

BBI -- Brandels-Bardin Institute split sample
DHS -- Department of Health Services split sample
USEPA -- United States Environmental Protection Agency
split sample

Lab Duplicate -- A reanalysis of the sample including extraction and counting.

TABLE 37

Radionuclide Results for Surface Water Samples at Campsite 1 Drainage (BB-20)

	Cestum-137 (pCi/L)	Tritium (pCi/L)	Gross Alpha (pCi/L)	Gross Beta (pCi/L)
BB-20-002				
Sample		< 200	9 >	15 +/-3
BBI [¢] USEPA [°]	< 7.18	< 300 < 260 < 260	4.8 >	9.6 >

pCi/L -- Picocuries per liter of water ^ -- 1994 Sample < -- Less than +/- -- Plus or minus

BBI -- Brandeis-Bardin Institute split sample
DHS -- Department of Health Services split sample
USEPA -- United States Environmental Protection Agency
split or interlaboratory duplicate sample

TABLE 38

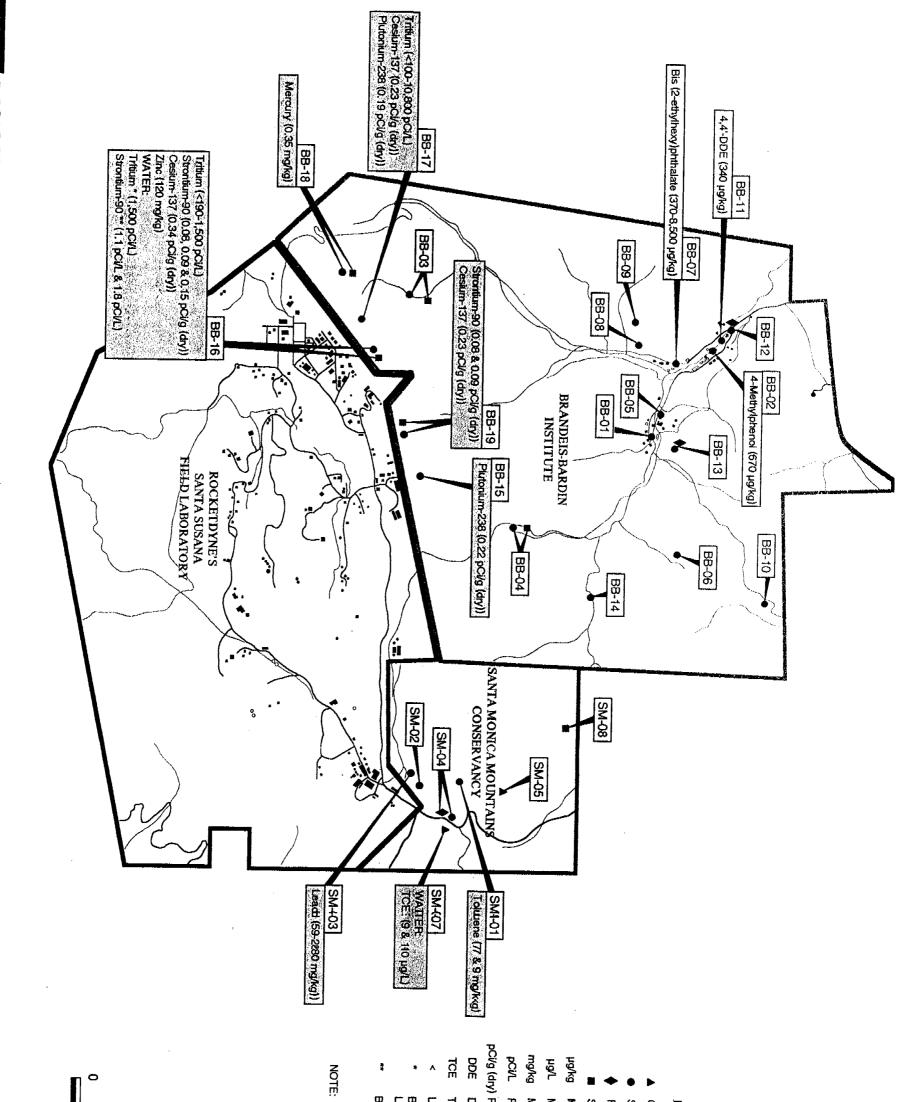
Sample Area Levels Statistically Different From Background Levels

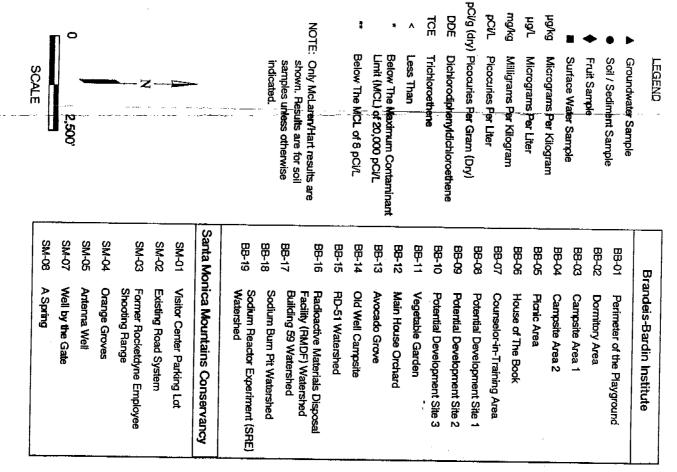
Radionuclide ¹ (pCi/g (dry))	Range	Arithmetic Mean	as	5th to 95th Percentile ²
Cesium-137 Background Areas Building 59 Watershed (BB-17)	<0.03-0.213 0.077-0.385	0.087	0.062	<0.03-0.21 0.04-0.36
Strontium-90 Background Areas RMDF Watershed (BB-16)	<0.005-0.13 0.02-0.24	0.052 0.103	0.031	<0.005-0.11 <0.005-0.227

The majority of the background samples for tritium and plutonium-238 were below detection limits; statistical analysis was not used to evaluate concentrations of these radionuclides.

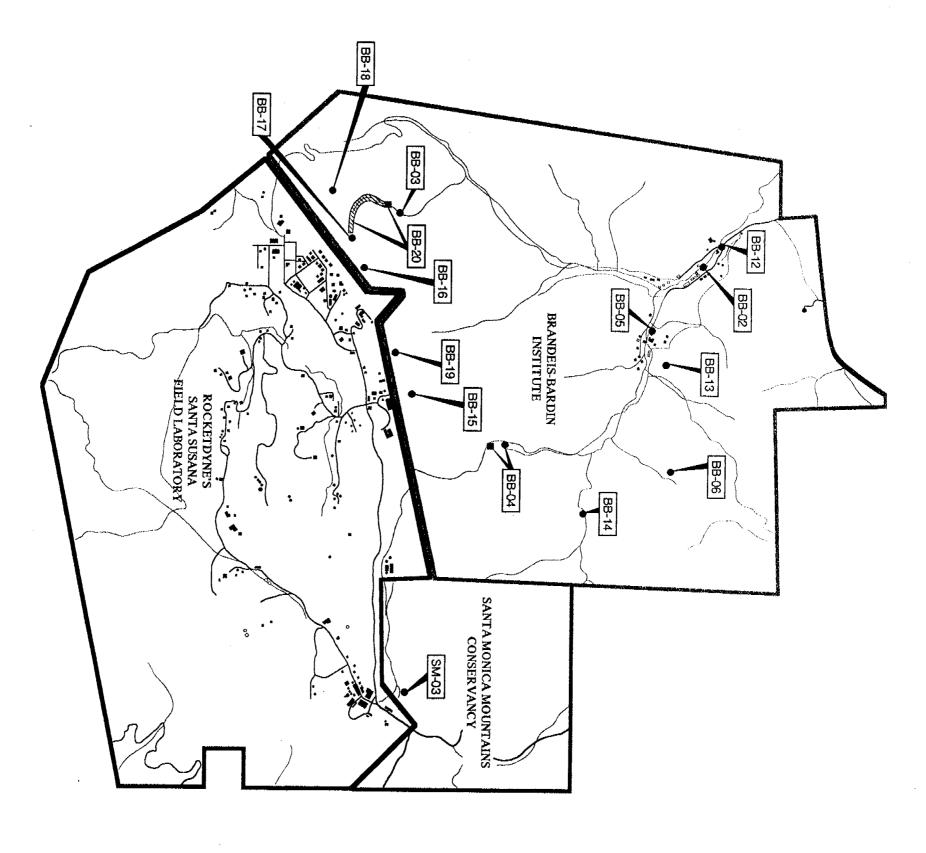
The fifth percentile equals the mean minus two times the standard deviation (mean - 2 x SD) The ninety-fifth percentile equals the mean plus two times the standard deviation (mean + 2 x SD)

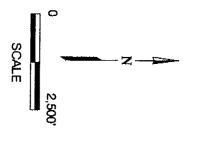
Figures











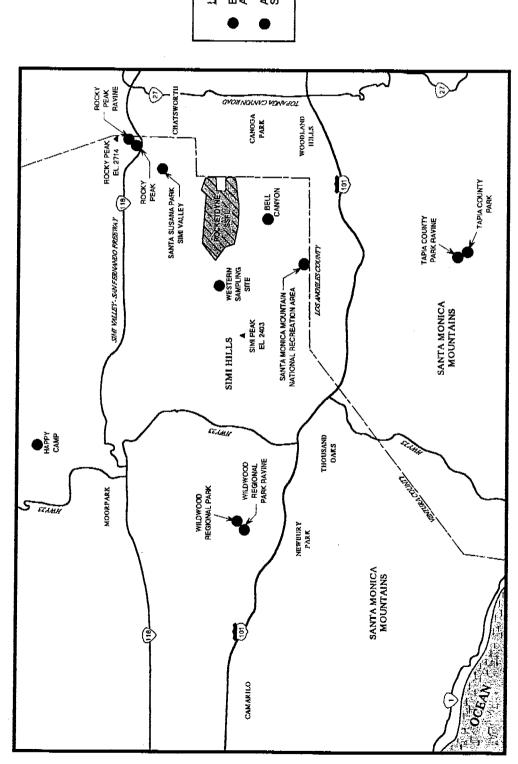
LEGEND

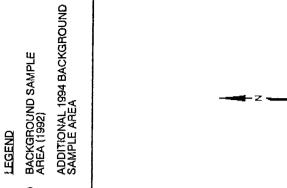
FIGURE 2
ADDITIONAL SAMPLE AREAS
BRANDEIS-BARDIN INSTITUTE AND
SANTA MONICA MOUNTAINS CONSERVANCY

- Soil / Sediment Sample
- Surface Water Sample

SM-03	Santa Mo	BB-20	BB-19	BB-18	88-17	BB-16	BB-15	B8-14	BB-13	BB-12	BB-06	BB-05	BB-04	BB-03	BB-02	Bra
Former Rocketdyne Employee Shooting Range	Santa Monica Mountains Conservancy	Camp Site Area 1 - Drainage	Sodium Reactor Experiment (SRE) Watershed	Sodium Burn Pit Watershed	Building 59 Watershed	Radioactive Materials Disposal Facility (RMDF) Watershed	RD-51 Watershed	Old Well Campsite	Avocado Grove	Main House Orchard	House of The Book	Picnic Area	Campsite Area 2	Campsite Area 1	Dormitory Area	Brandeis-Bardin Institute

FIGURE 3
PREVIOUS AND ADDITIONAL
BACKGROUND SAMPLE AREAS





4 MILES

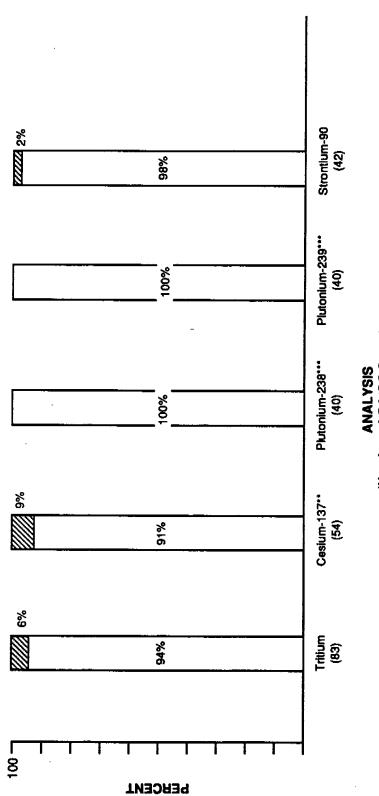
2 SCALE



Soils Label Register

	# s - 80418
Project and Task #:	
SB/MW#: HA#:	_ Field Log #:
Gs#: Date:	
Analysis:	
Depth:	
C-O-C #:	
Initials:	
Notes:	
MCIaren Hart	11101 White Rock Road Rancho Cordova, CA 95670 916.638.3696
#S- 80418 Project:	SB#:
Depth: Date:	HA#:
Analysis:	-

Figure 5 Quality Assurance / Quality Control (QA/QC) Summary · (Soil/Sediment Samples)



(Number of QA/QC Samples)

Rinsate matrix spike, field duplicate, field split, and pre-spiked duplicate QA/QC samples compared to their respective scheduled sample

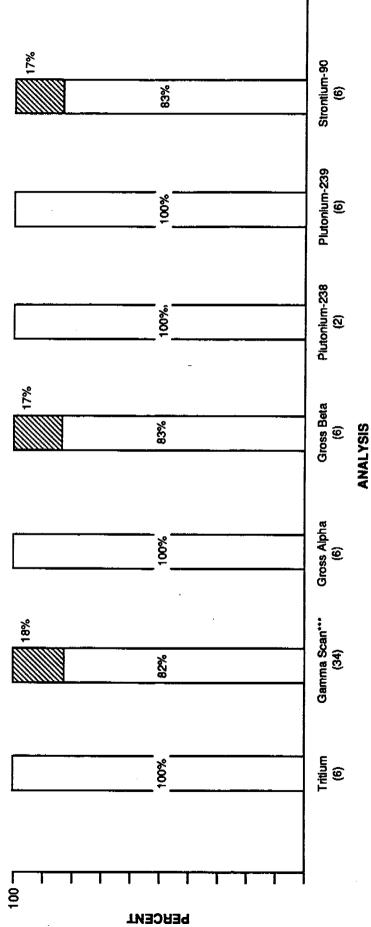
In Agreement
Not in Agreement

- ** Cesium-137 was the only man-made radionuclide detected in the gamma-scan analysis.
 - *** All values were below detection limits.
- For pre-spiked samples a result of 25 percent deviation or less from the spiked valve were considered "in agreement". Matrix sipke results were considered "in agreement" if they were within acceptable percent recovery. the sample results was less than the sum of the standard deviations of the sample results. "In agreement" for samples analyzed for radionuclides means that the difference between All "less than" values were considered "in agreement".

E9408001

In Agreement 1

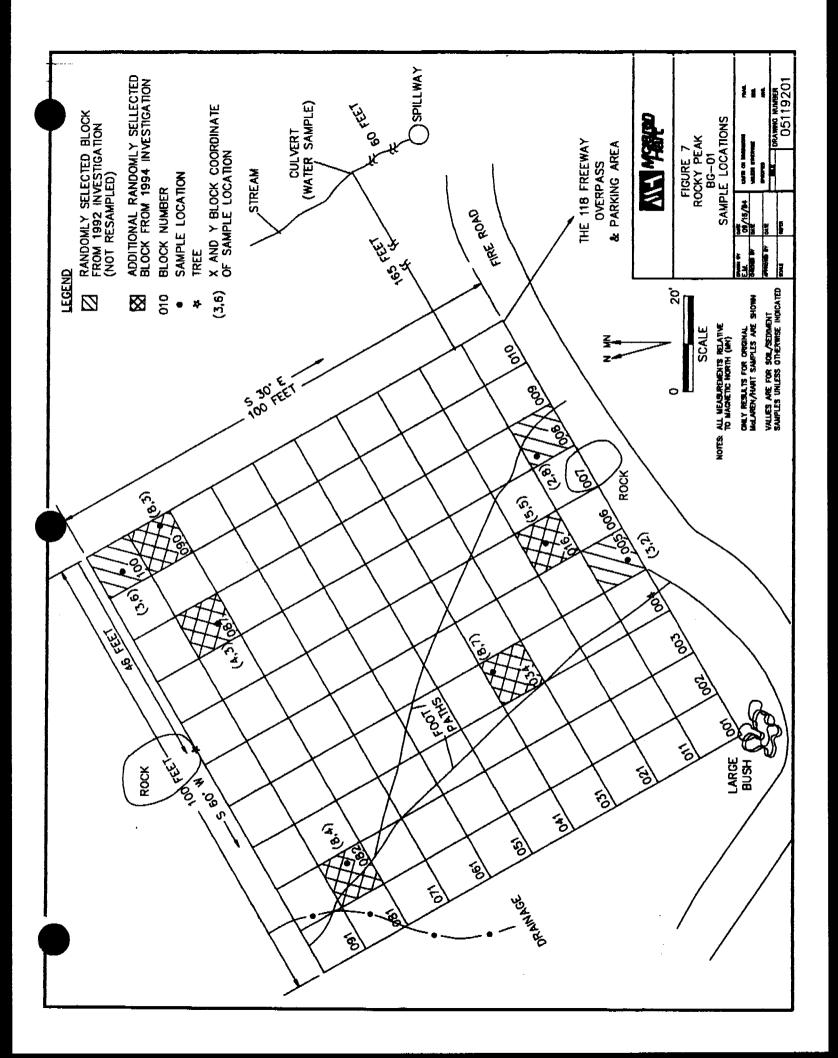
Figure 6 Quality Assurance / Quality Control (QA/QC) Summary · (Water Samples)···

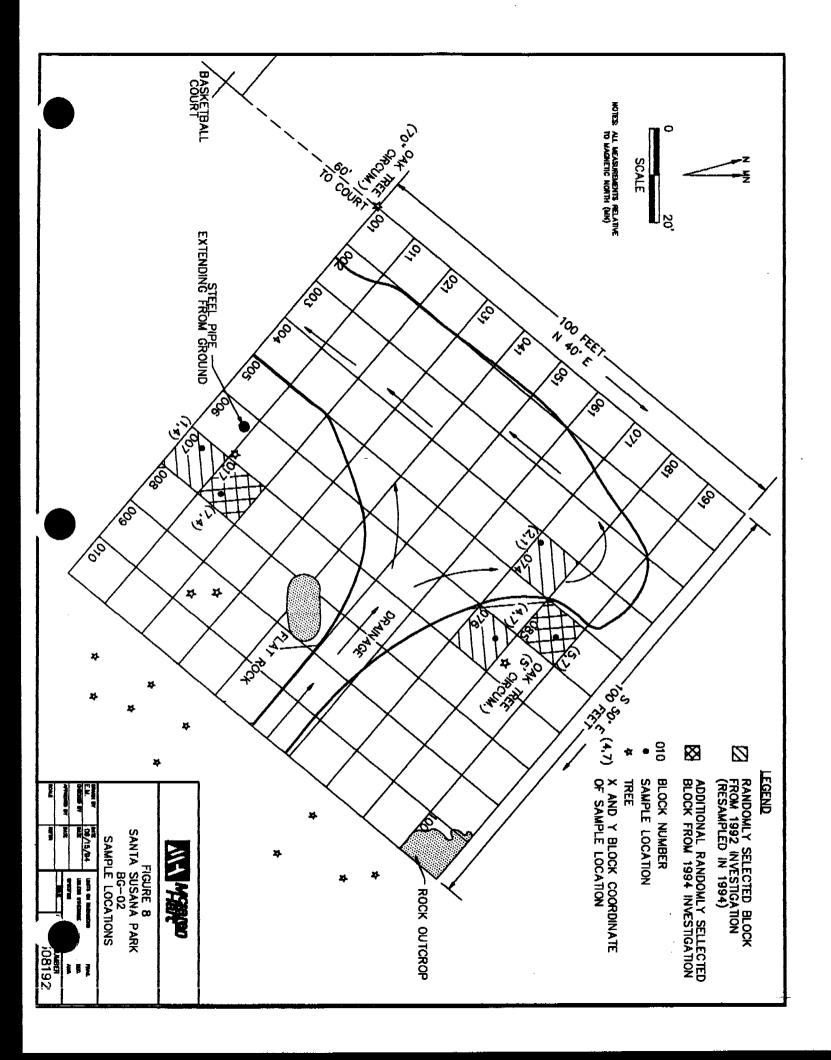


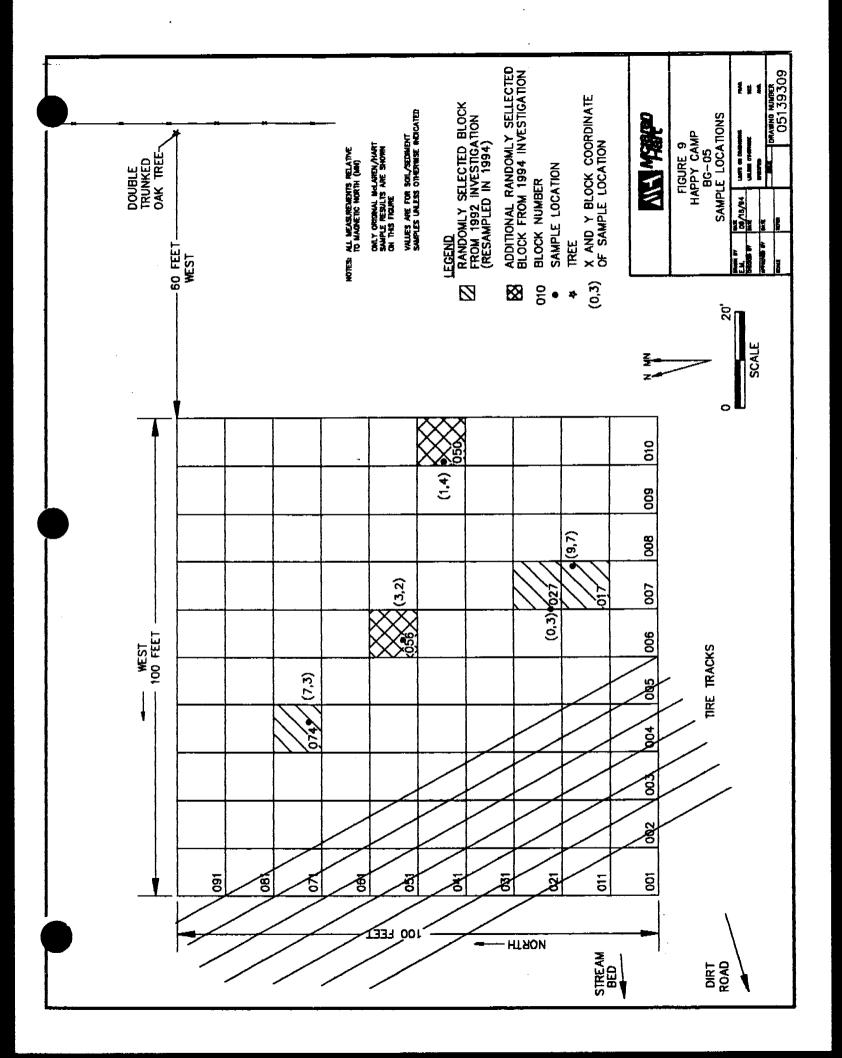
ANALYSIS (Number of QA/QC Samples)

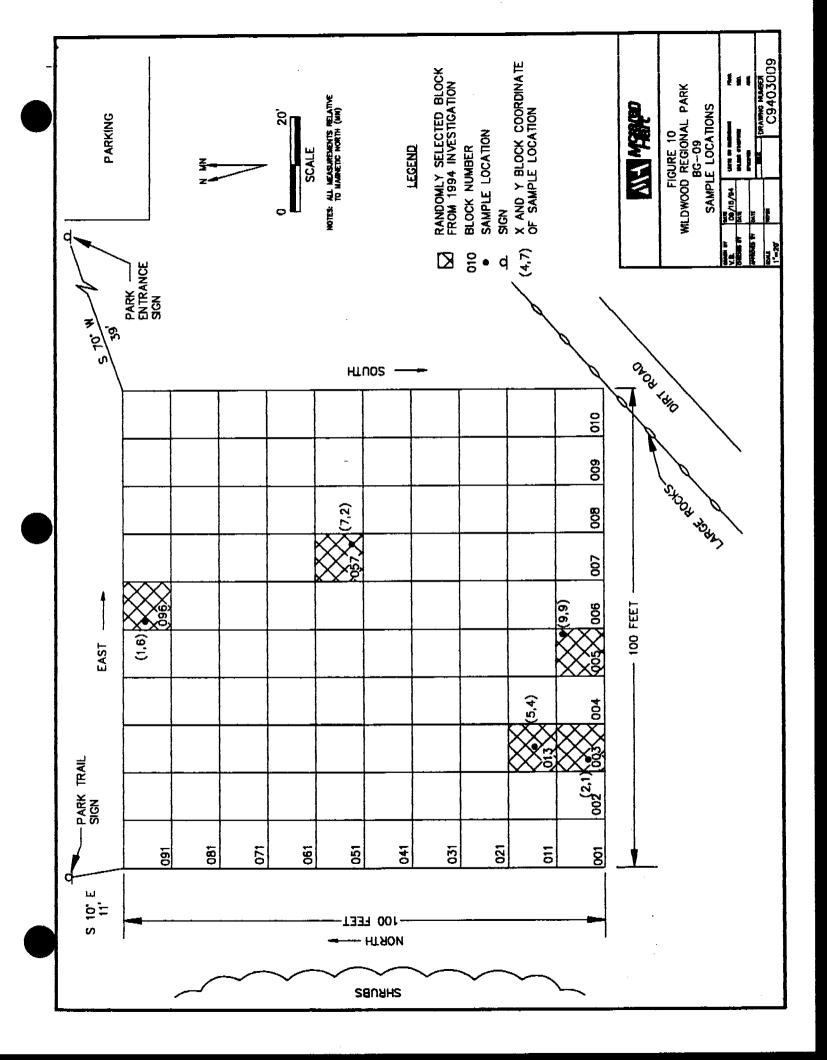
- Includes surface water.
- ** Rinsate, pre-spiked blind duplicate, field split, and field blank
- QA/QC samples compared to their respective scheduled sample.
- *** Gamma Scan: Cadmium-109, Cobalt-57, Cerium-139, Mercury-203, Tin-113, Ceslum-173, Yttrium-88, and Cobalt-60.
- "In agreement" for samples analyzed for radionucildes means that the difference between the sample results was less than the sum of the standard deviations of the sample results. For pre-spiked samples a result of 25 percent deviation or less from the spiked valve were considered "in agreement".

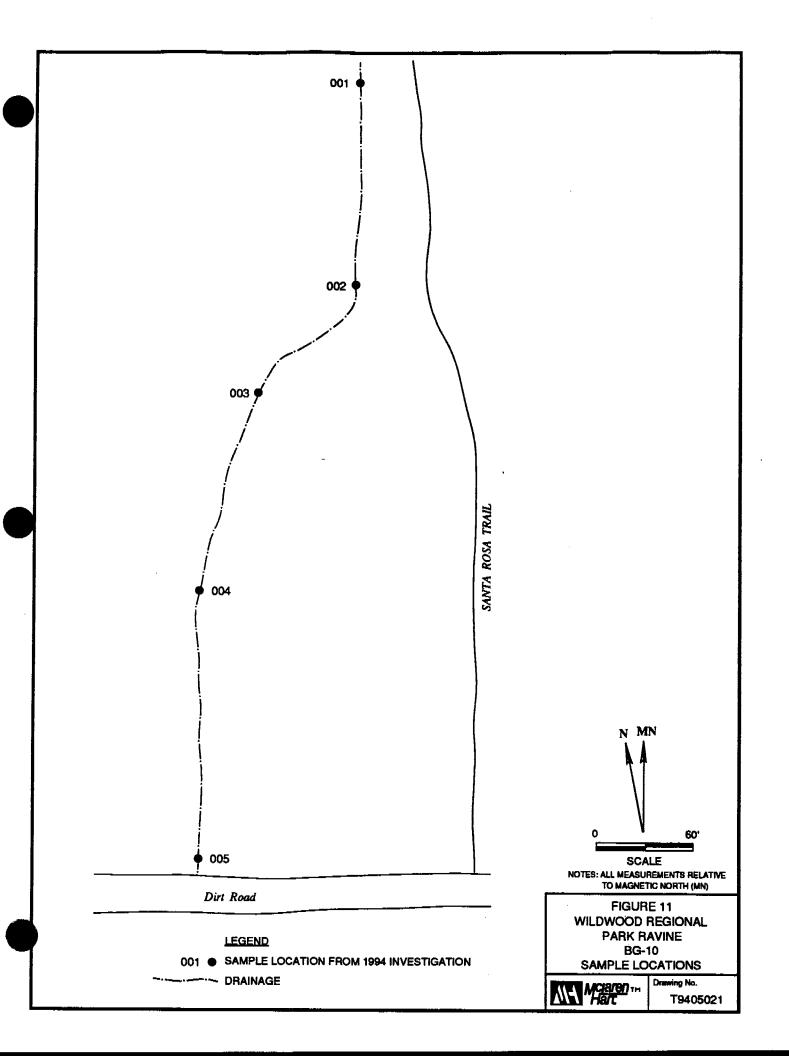
All "less than" values were considered "in agreement".

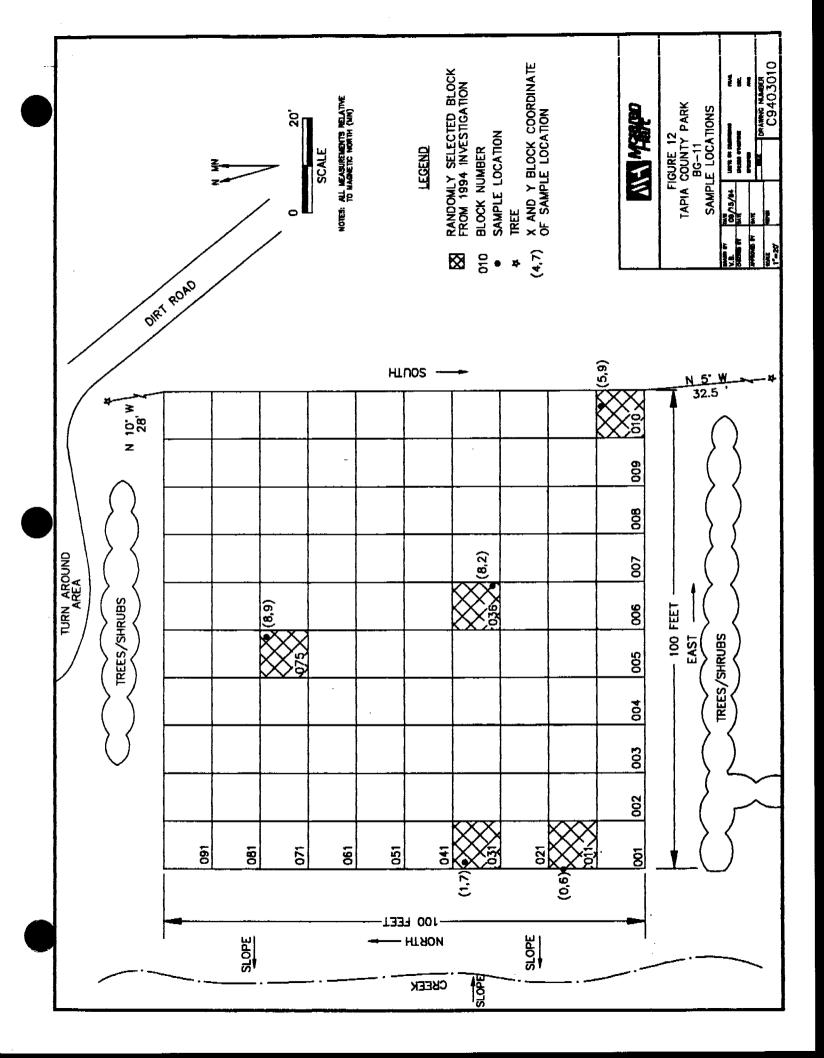


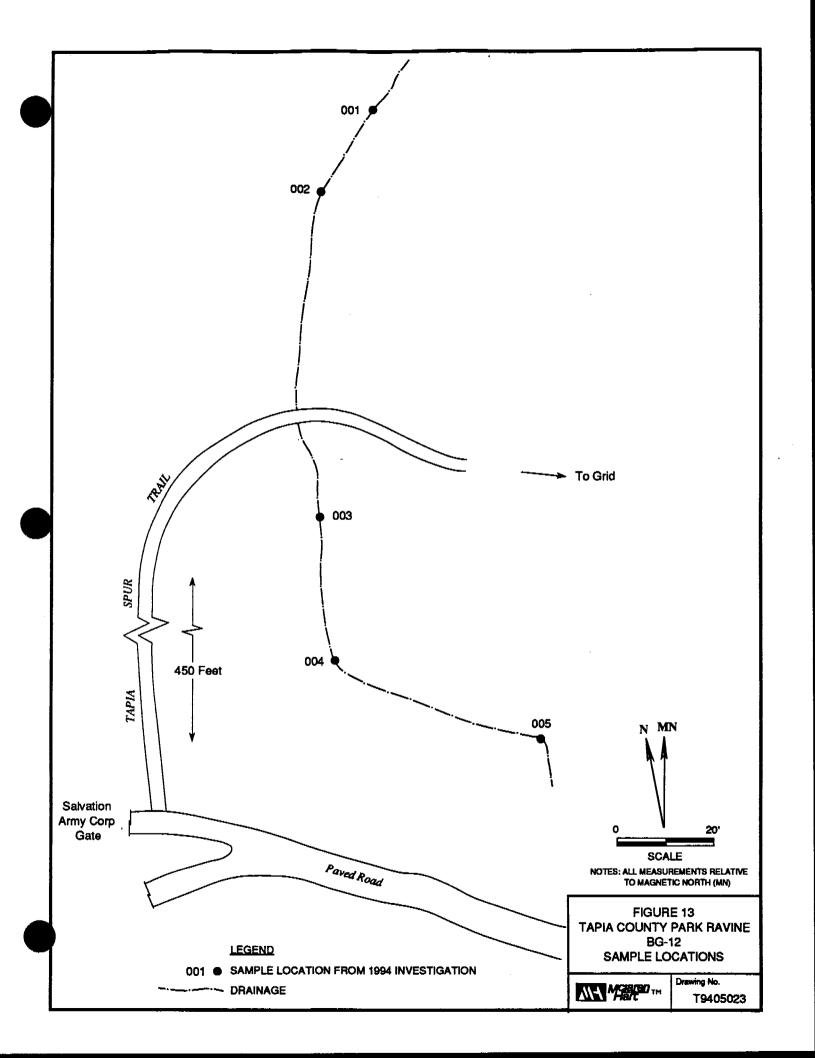


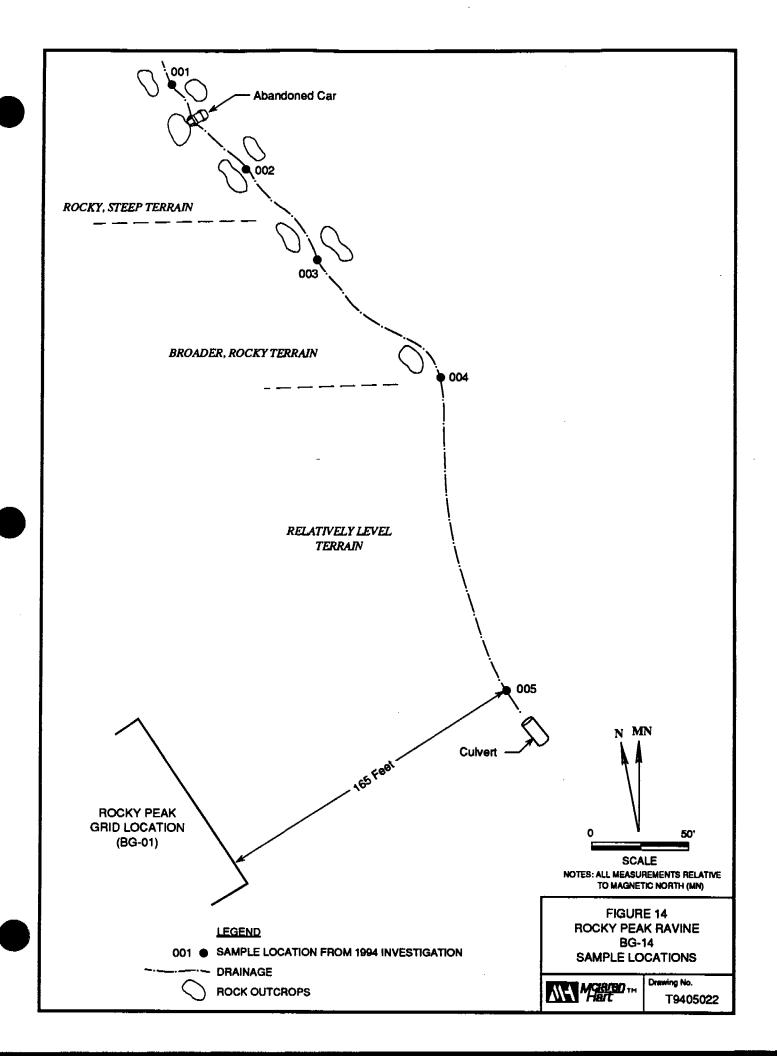


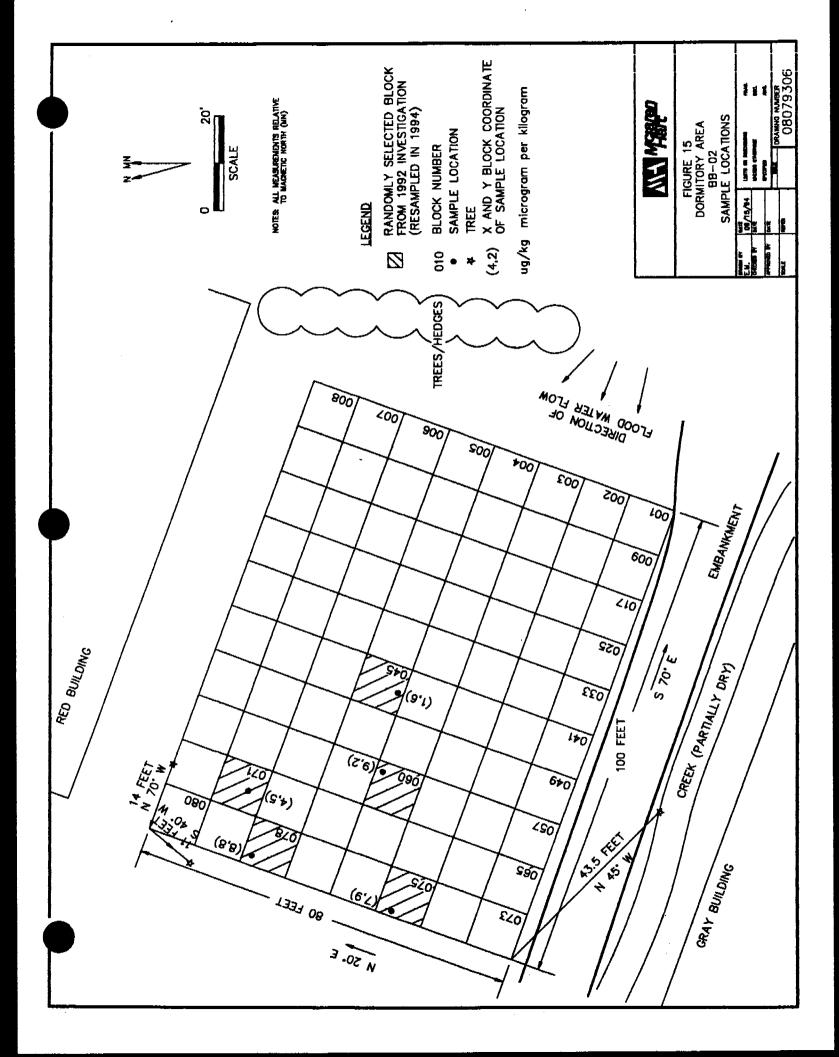


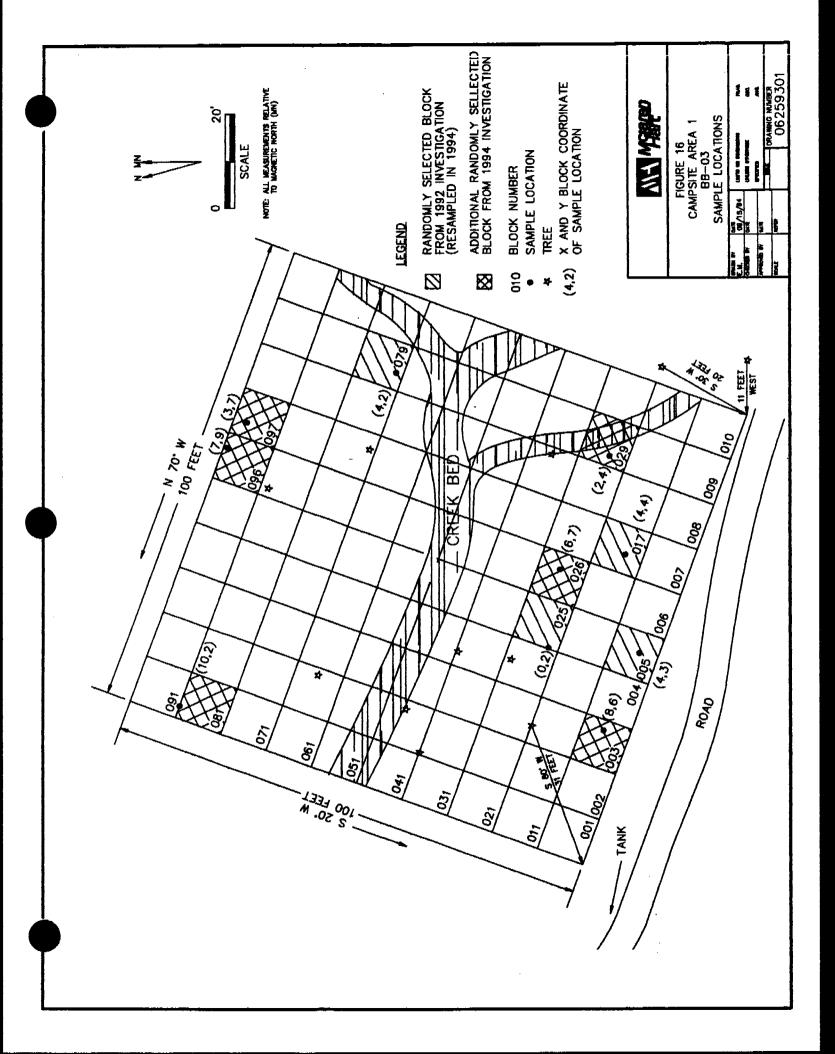


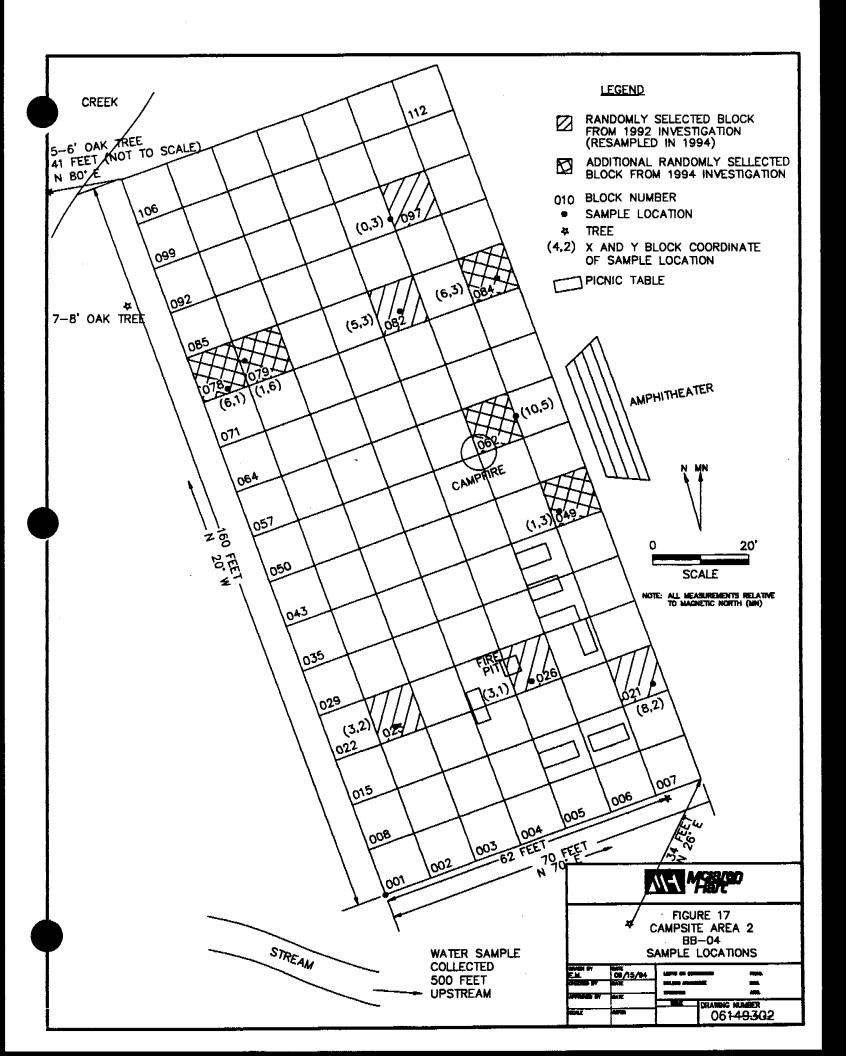


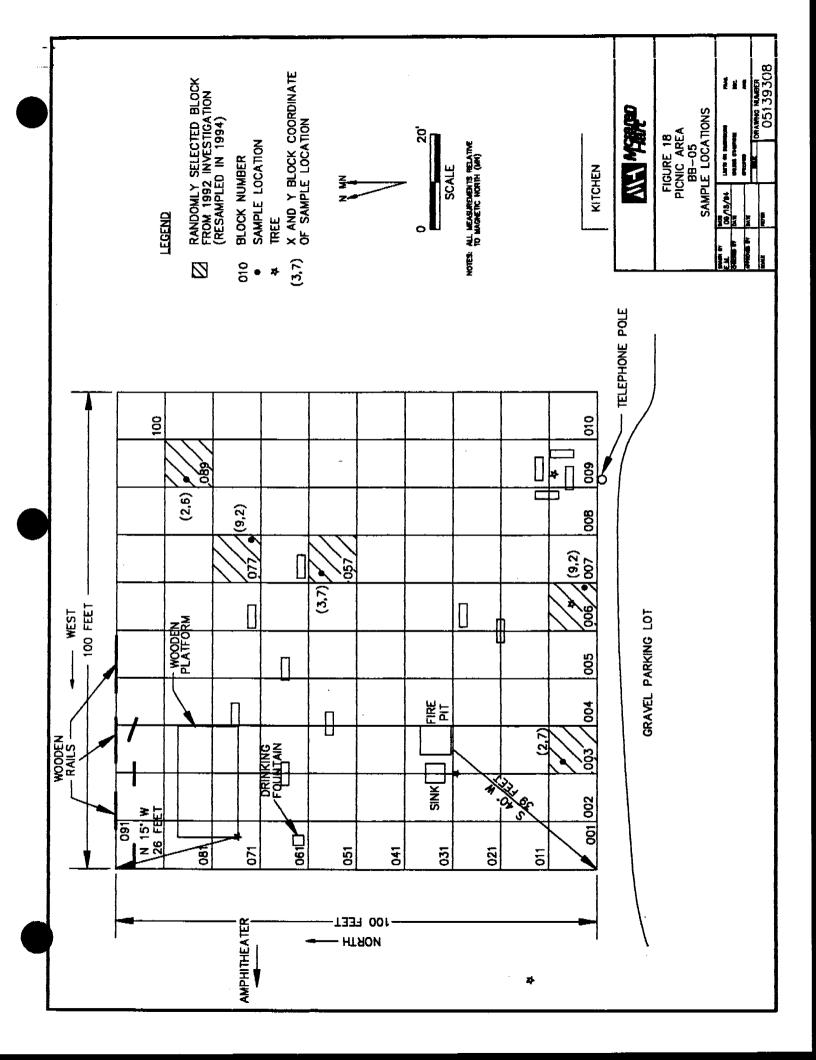


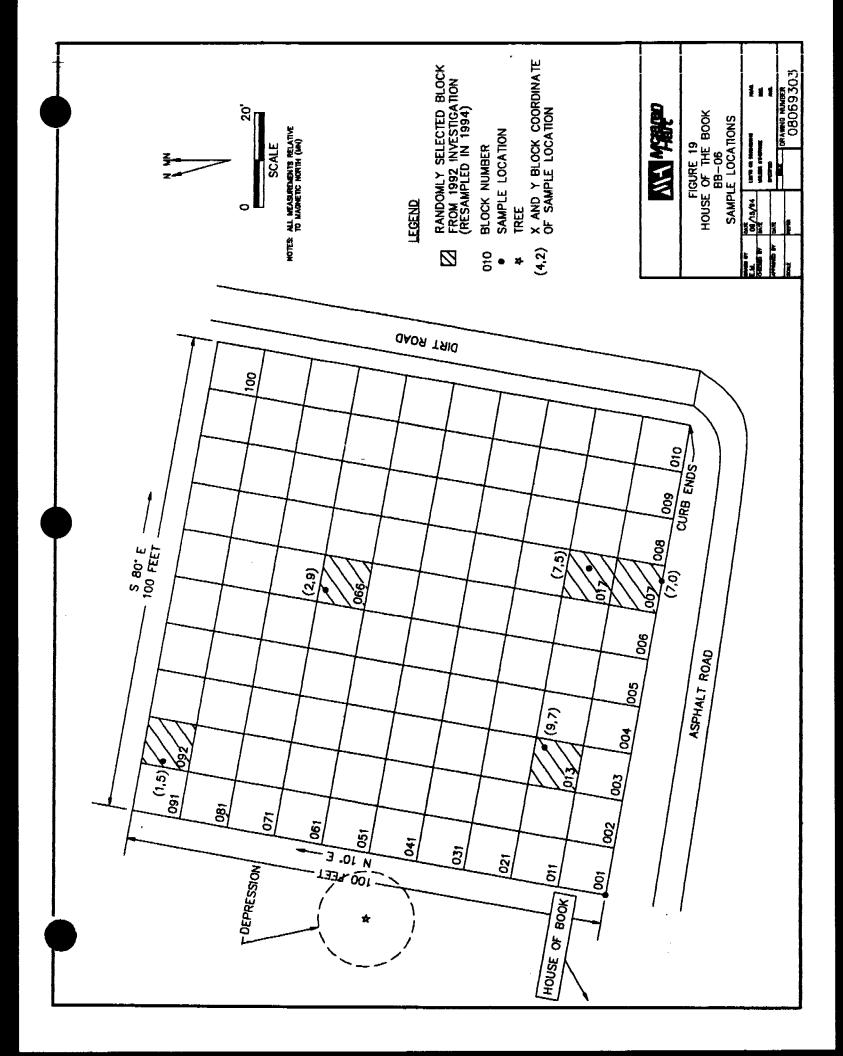


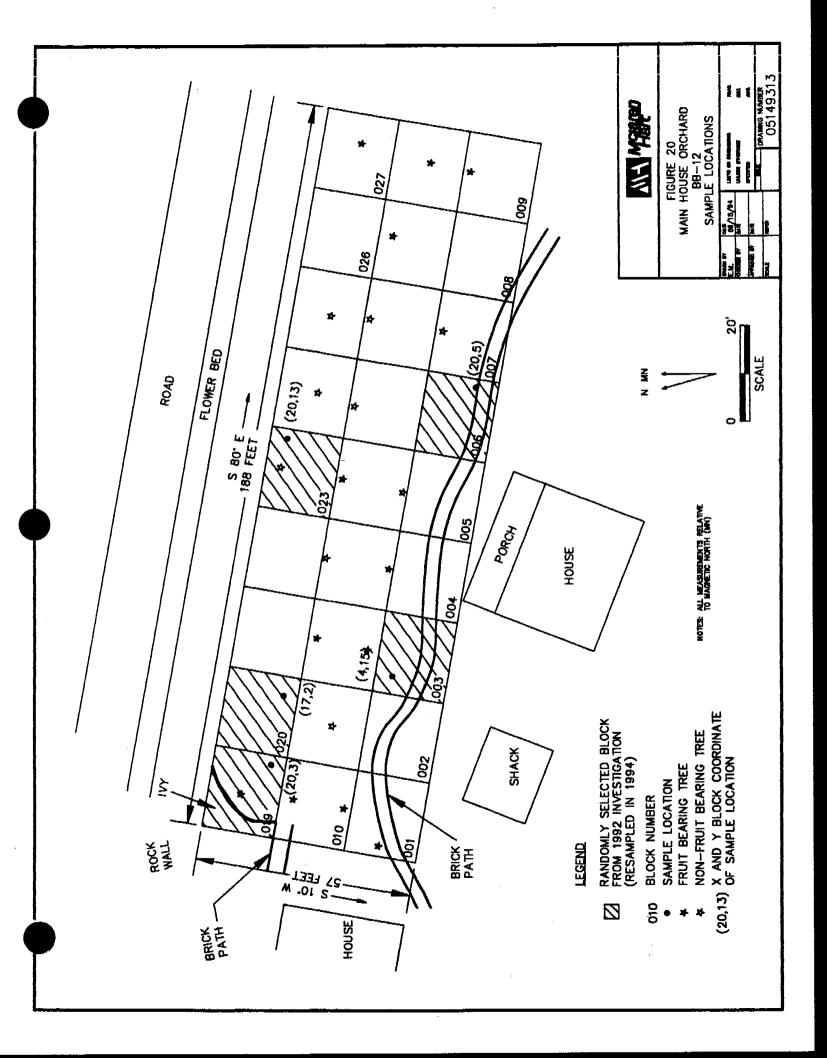


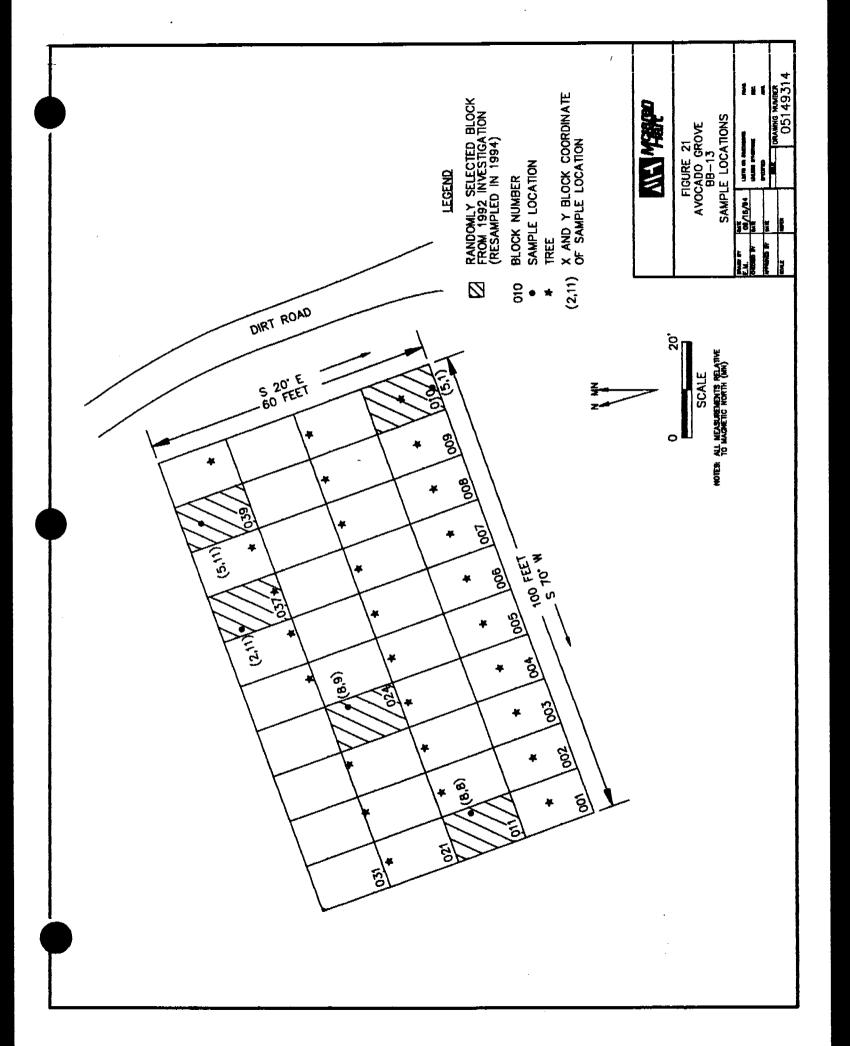


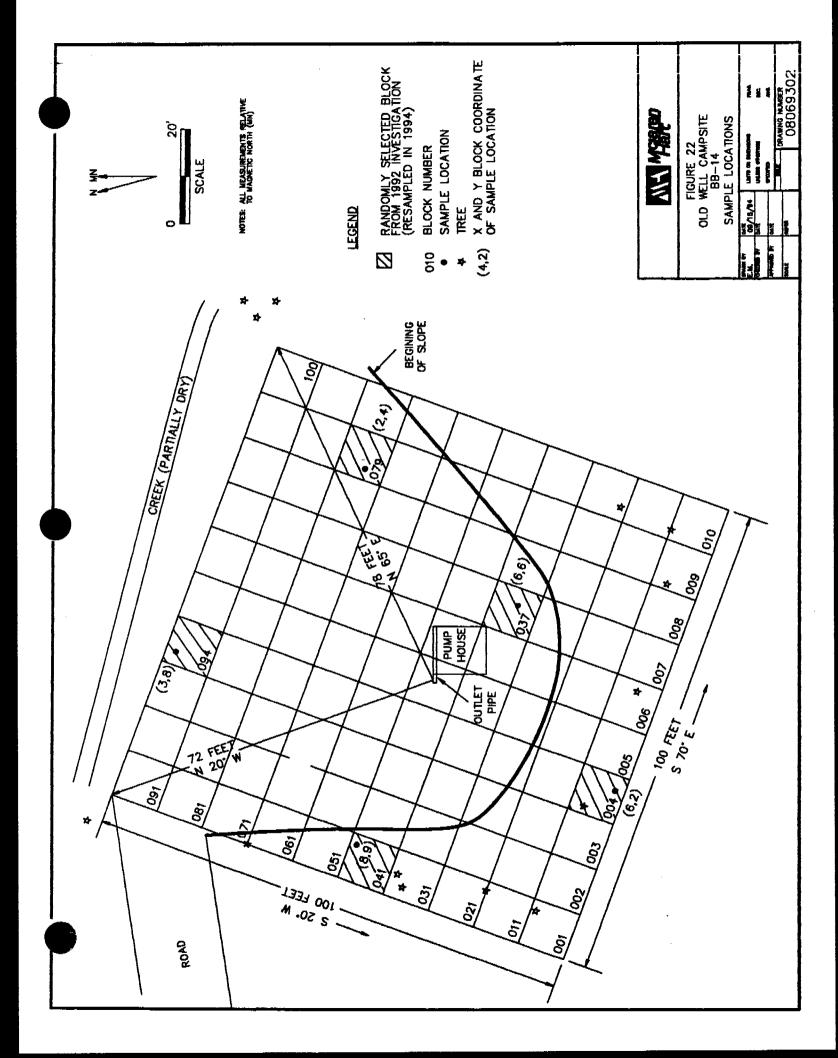


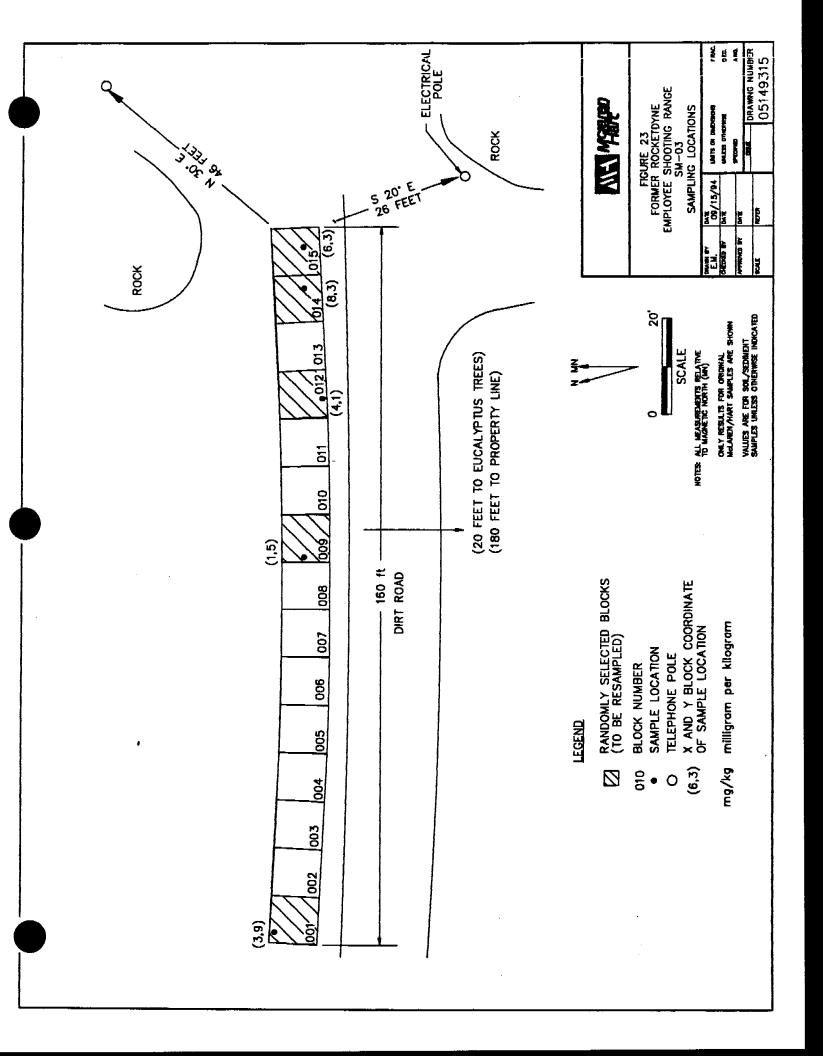


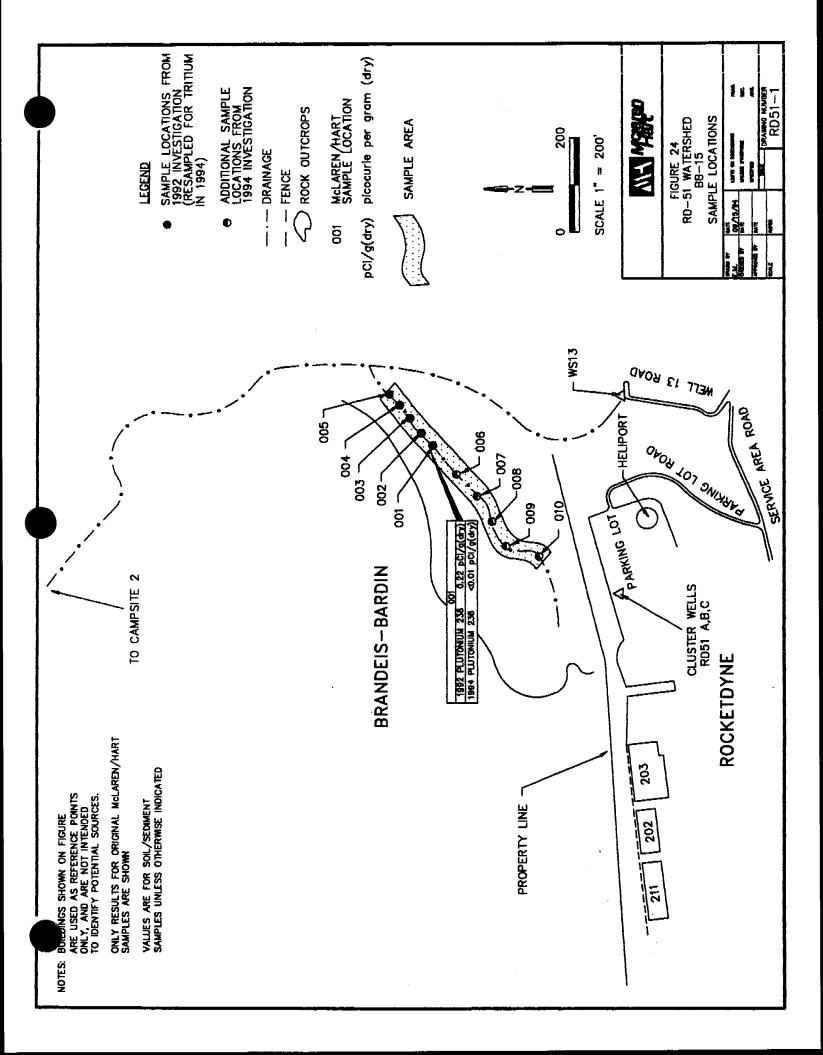


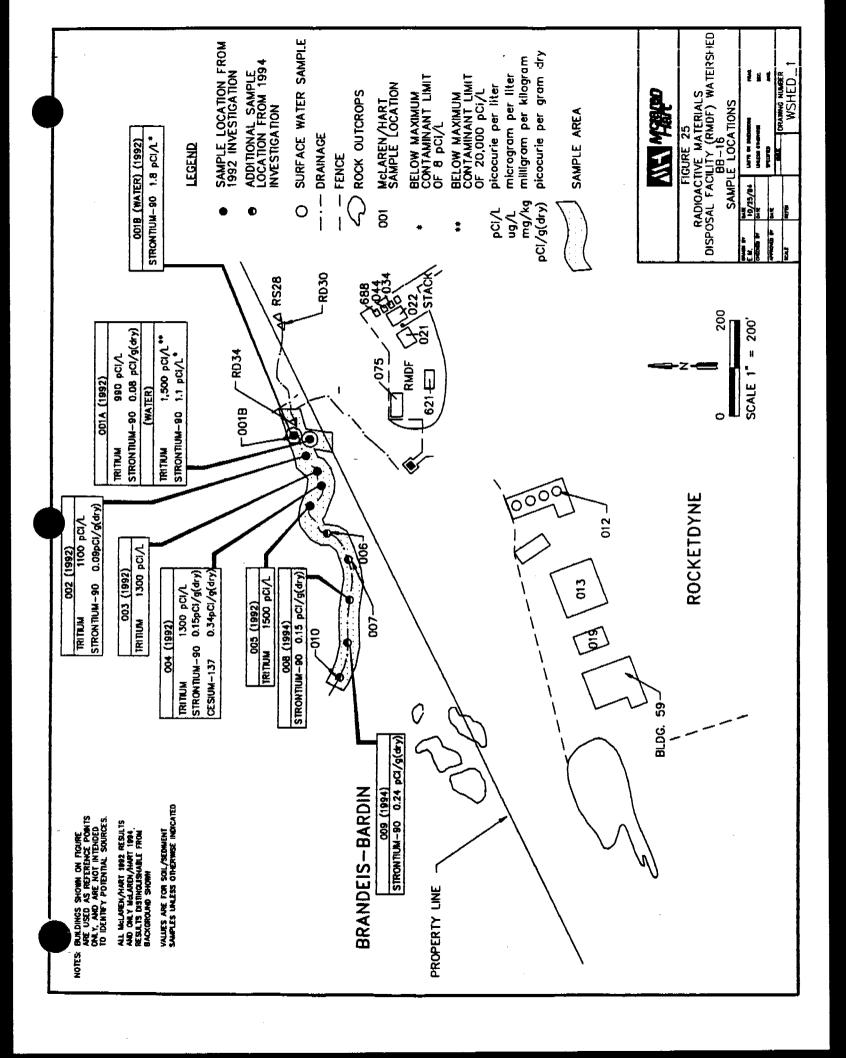


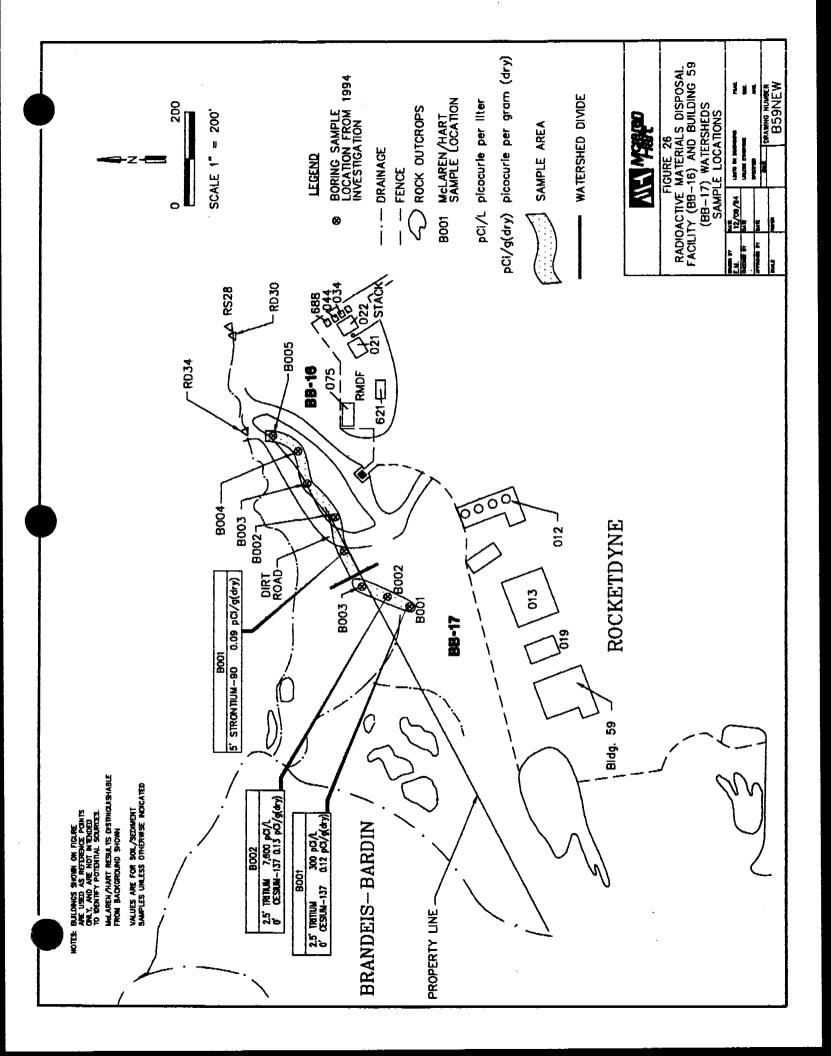


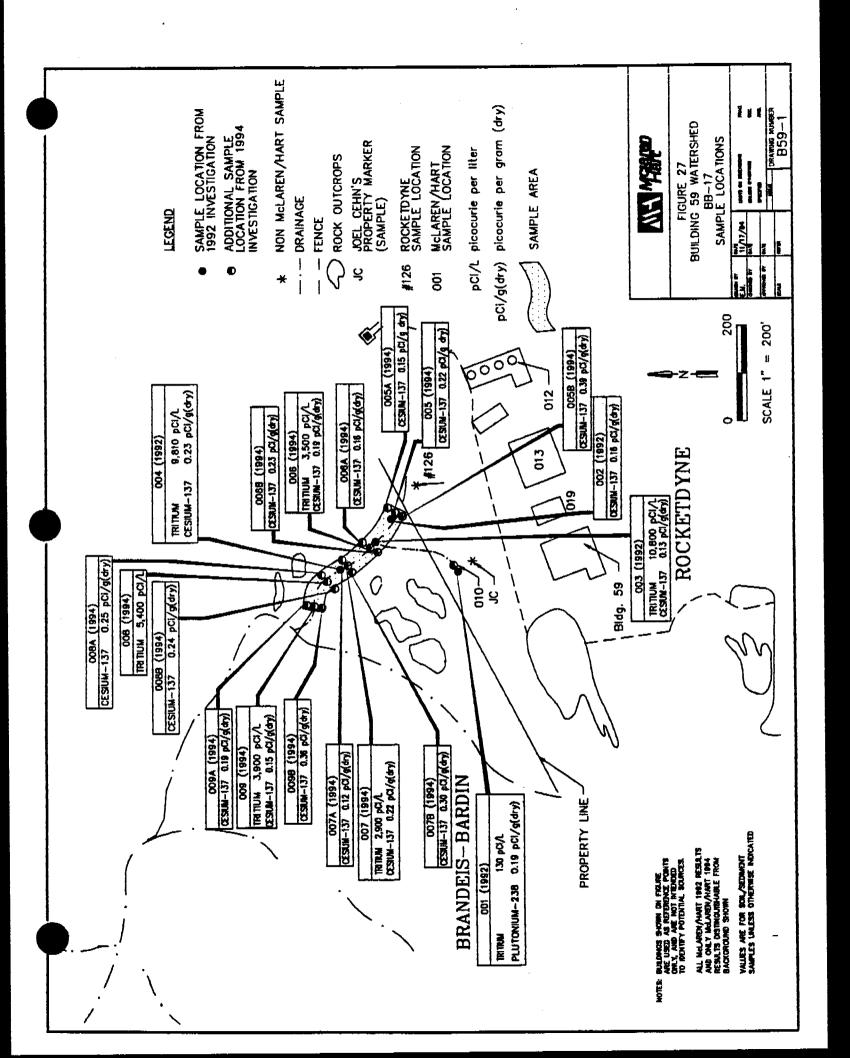


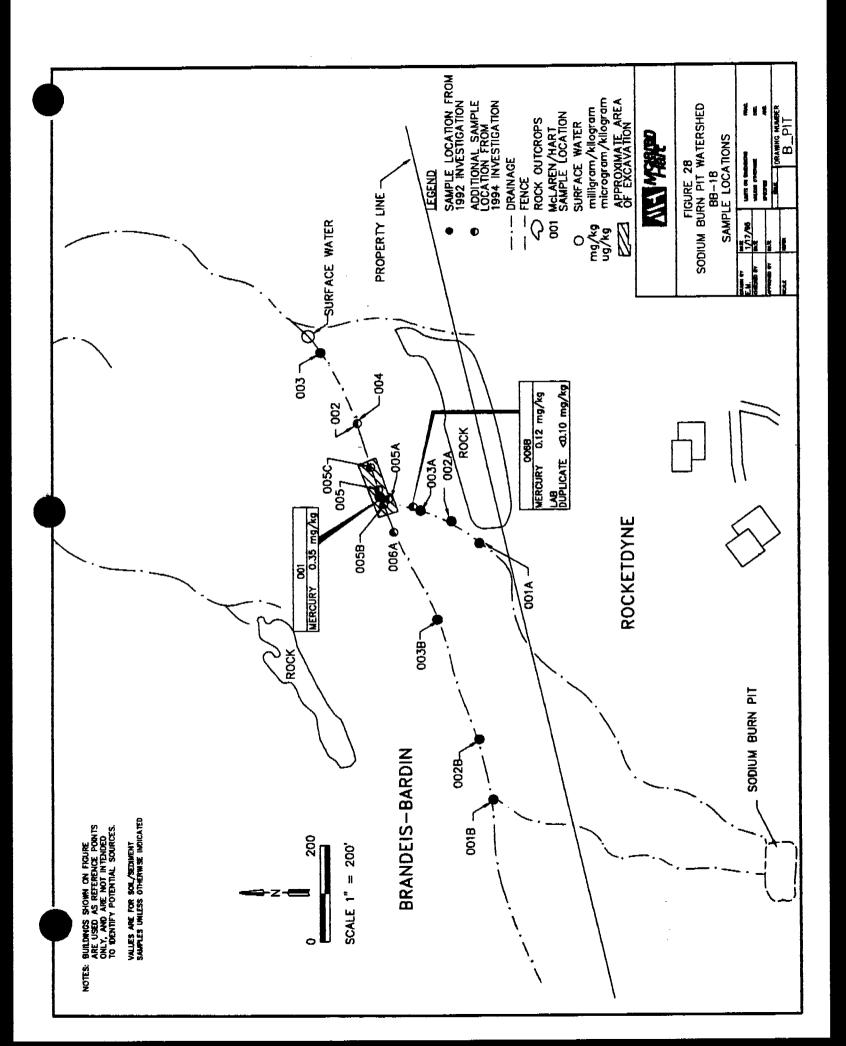


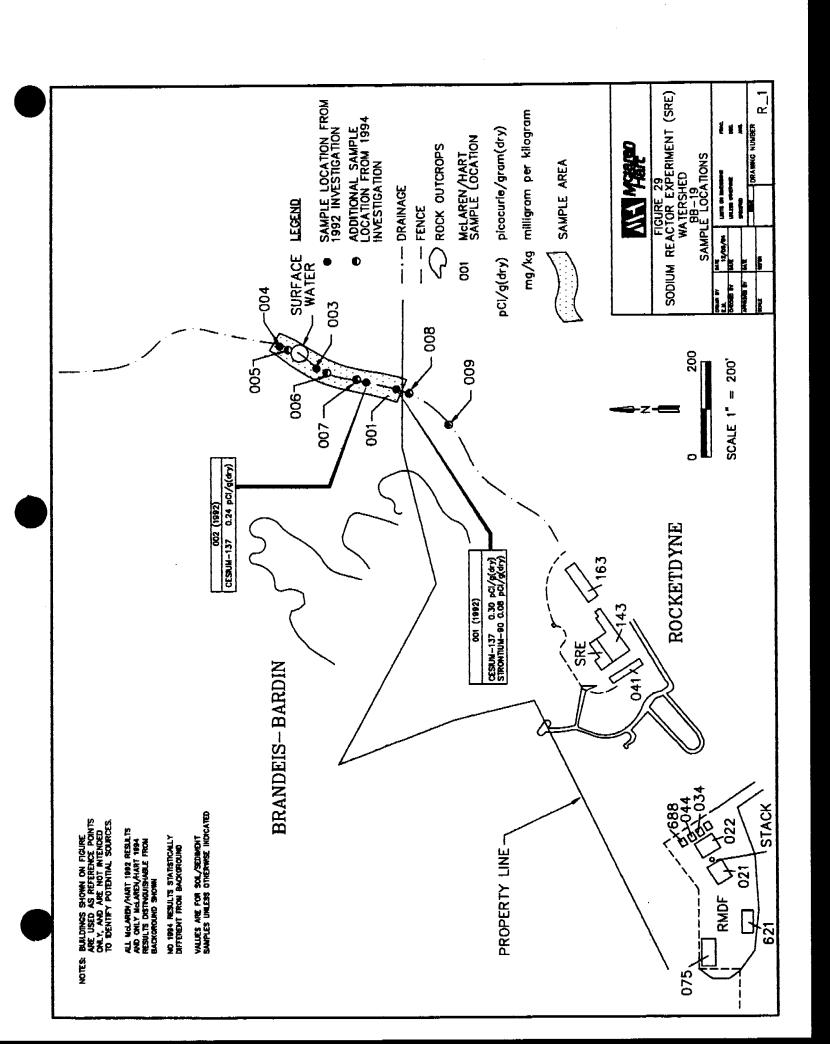


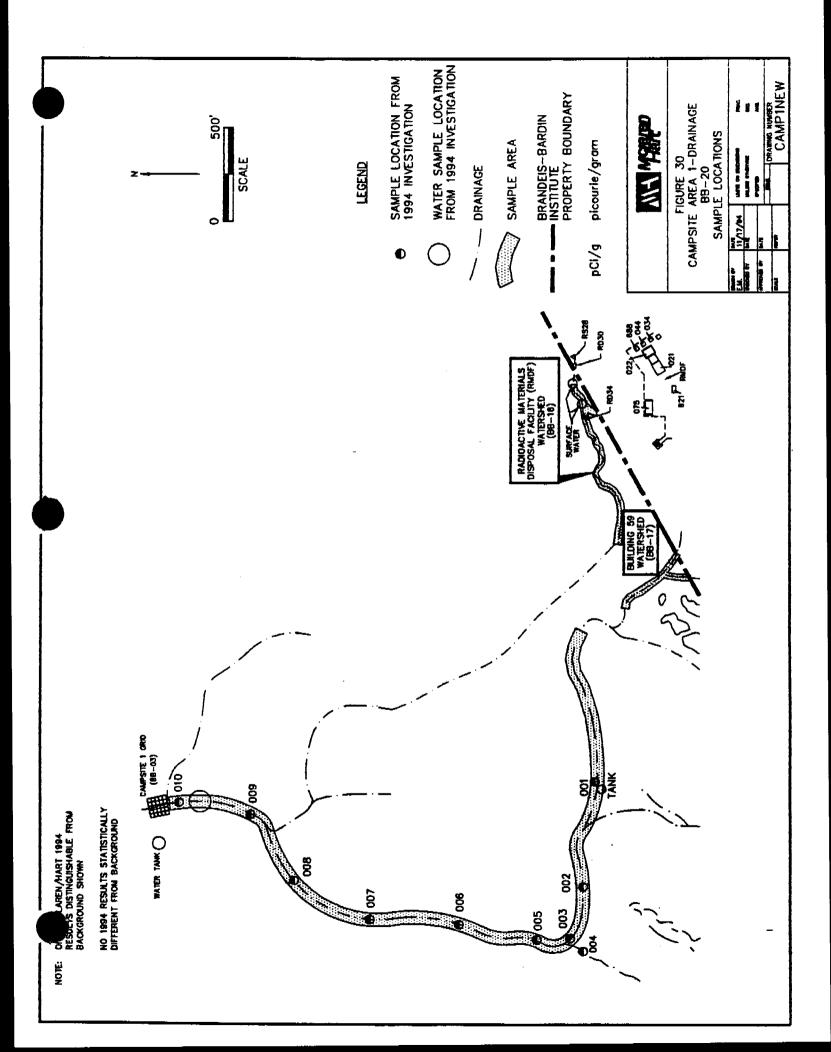












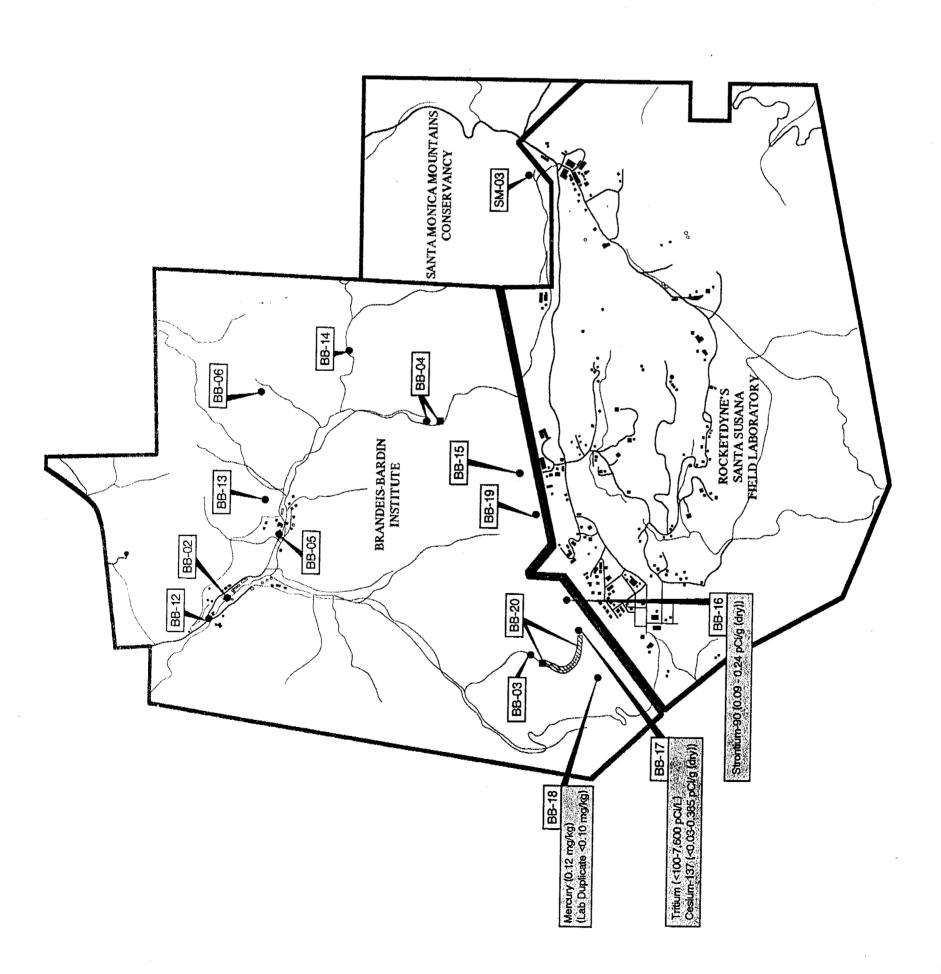


FIGURE 31 SUMMARY OF 1994 RADIONUCLIDE SAMPLING RESULTS DISTINGUISHABLE FROM BACKGROUND AND MERCURY SAMPLING RESULTS

LEGEND

- Soil / Sediment Sample
- Surface Water Sample
 - Milligrams Per Kilogram mg/kg
- Picocuries Per Litter PCi/L
- pCi/g (dry) Picocuries Per Gram (Dry)

Less Than

- NOTE: Only McLaren/Hart results are shown. Results are for soil samples.

	à	Brandeis-Bardin Institute
	BB-02	Dormitory Area
	BB-03	Campsite Area 1
	88-04 40-4	Campsite Area 2
	B B-06	Picnic Area
	9B-06	House of The Book
	88-12	Main House Orchard
	BB-13	Avocado Grove
	BB-14	Old Well Campsite
•	BB-15	RD-51 Watershed
	BB-16	Radioactive Materials Disposal Facility (RMDF) Watershed
	BB-17	Building 59 Watershed
	BB-18	Sodium Burn Pit Watershed
	BB-19	Sodium Reactor Experiment (SRE) Watershed
	BB-20	Camp Site Area 1 - Drainage
	Santa Mo	Santa Monica Mountains Conservancy
	SM-03	Former Rocketdyne Employee Shooting Range

2,500

SCALE

APPENDIX C
RANDOM NUMBER
TABLES FOR
BLEND FIELD DUPLICATES

Appendix C

Random Number Tables for Blind Field Duplicates

RANDOM NUMBERS USED TO SELECT BLIND FIELD DUPLICATES

SOIL SAMPLES

	Sequential Num	nber in QA/QC Gro	oup to be used for	Blind Field Duplicate
QA/QC Group	Tritium	Gamma Scan	Strontium-90	Isotopic Plutonium
1 (n=20)	1	5	12	18
2 (n=20)	7	11	20	4
3 (n=20)	17	13	4	5
4 (n=20)	16	7	4	1
5 (n=20)	7	7		-
6 (n=20)	13	-	-	-
7 (n=20)	9	-	-	-
8 (n=7)	1	-	-	-

QA/QC = Quality Assurance/ Quality Control.

n = Number of samples in each group.

Note: As a result of only two water samples being collected during the 1994 sampling no blind field duplicate water samples were required.

Appendix D

Summary of Analytical Results by Analysis

REPORT OF ANALYSIS

RUN DATE 06/03/94

										-	
				WORK	WORK ORDER NUMBER	SNO	CUSTOMER P.O. NUMBER	DATE RECEIVED	DELIVERY DATE		PAGE
ANN MARIE HOLBROW	TE HOLB	ROW			4-0472		030225/030600829	03/21/94	04/23/94		
MCLAREN/HART 16755 VON KARMAN AVE IRVINE CA	/HART JN KARM JA	AN AVE 92714	114								
						2016					
TELEDYNE Sample Number		CUSTOMER'S IDENTIFICATION	STA		COLLECTION-DATE START STOP DATE TIME DATE TI	IP TIME NUCLIDE	ACTIVITY (PCI/LITER	NUCL-UNIT-# D	MID-COUNT TIME ATE TIME	VOLUME - UNITS ASH-WGHT-% 0	LAB.
45032	1058	BG-01-090-ST	72	03/1	03/15 0841	H-3	L.T. 2. E	02	05/26		الاس
45033	10583	BG-01-090-5P	ē.	1/50	03/15 0841	PU-238 U-234 TH-230 PU-239 U-238 TH-230	3.81 4.64 1.02 4.03 4.03 4.03 4.03 4.03 4.03 4.03 4.03 4.03 6.94	-03 PCI/GM DRY 0-01 PCI/GM DRY 0-03 PCI/GM DRY 0-02 PCI/GM DRY 0-01 PCI/GM DRY	05/09 05/10 05/13 05/09 05/10 05/13		~~~~~~
4 5 0 3 4 4 6 0 3 4	10585	86-01-090-56	ى	750	03/15 0841	8 E L L L L L L L L L L L L L L L L L L	L. 1. 4. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2.	-01 PCI/GH DRY • -02 PCI/GH DRY • -02 PCI/GH DRY • -01 PCI/GH DRY • -02 PCI/GH DRY • -02 PCI/GH DRY • -02 PCI/GH DRY • -01 PCI/GH DRY •	04/25 04/25 04/25 04/25 04/25 04/25 04/25 04/25 04/25 04/25		*****

REPORT OF ANALYSIS

RUN DATE 06/03/94

			¥0¥	WORK ORDER NUMBER	CUSTOMER	P.O. NUMBER	DATE RECEIVED	DELIVERY DATE	•	PAGE
ANN MAR	ANN MARIE HOLBROW	32		4-0472	030225/	030225/030600829	03/21/94	04/23/94		
MCLAREN/HART 16755 von ka Irvine ca	MCLAREN/HART 16755 von Karman Irvine ca	AVE 92714								
					3 0 1 L					
TEL EDYNE				COLLECTION-DATE	•		;	IN		_
SAMPLE		CUSTOMER'S STA	•	START STOP DATE TIME DATE TIME	NUCL 1DE	ACTIVITY (PCI/LITER)	NUCL-UNIT-M U/M 0	TIME VOLUME DATE TIME ASH-WGHT	L UNITS	LAB.
45036	10588	8G-01-087-ST	03	03/15 0905	H-3	L.T. 2. E 0	2	05/26		S.
45037	10588DUP	8G-01-087-ST	03	03/15 0905	н-3	L.T. 2. E 0	2	05/26		~
45038	10589	BG-01-087-SS	0	03/15 0905	SR-90	L.T. 7. E-0	2 PCI/GM DRY &	04/28		E.
0 2 0 3 7	0030	07-780-10-38	ć	2080 81/20	PU-238	L.T. 7. E-0	PC1/GM ORY	60/50		9
45034	0.00	16-10-10-00	ģ		U-234	•1 +-0	PCI/GM ORY &	05/10		9
-					TH-230	8.0-+	PCI/GM DRY &	05/13		•
				_	PU-239	:	PCI/GM DRY .	05/09		φ,
				_	J-235	+-1.2	PCI/GM DRY &	05/10		φ,
					U-238	9-0-+	PCI/GH DRY 4	05/10		0 4
					2	A.Z. 4-0-8 E-01	PCI/GH UR!	05/13		o •o
					77-1	-1-				,
04040	10592	BG-01-087-56	Ö	03/15 0905	86-7	L.T. 4. E-01	PCI/GM DRY	04/26		4
•			•		K-40	7+-0-22E	PCI/GM DRY	04/26		•
					MN-54	*	PCI/GM DRY	04/26		.
					00-58		PCI/GM DRY	04/26		.
					FE-59	:	PCI/GH DRY	04/26		• •
					09-00	М	2 PC1/68 URT #	97/50		
					20-07 70-05	1.1. 6. F-02	PCT/GM DRY	04/26		• •
					RU-103		PCI/GM DRY	04/26		•
					RU-106	. 3. E	PCI/GM ORY	04/26		•
					[-13]	. I. E	PCI/GH DRY	04/26		4
					CS-134	E	PCI/GH DRY	04/26		.
					CS-137	8+-0-38E	PC1/GM DRY	04/26		•
					8A-140	3. E-	PCI/GM DRY	04/26		
					CE-141	. 1. E-	PCI/GM DRY	04/26		· •
					CE-144	•T• 2• E-	1 PCI/GM DRY	4/2		٠.
					?	3+-0.55E	O PCI/GM ORY	•		•
					TH-228	.484-0.15	0 PC[/GM	04/26		r

REPORT OF ANALYSIS

RUN DATE 06/03/94

PAGE 3 DATE RECEIVED DELIVERY DATE 04/23/94 03/21/94 CUSTOMER P.O. NUMBER 030225/030600829 WORK ORDER NUMBER 4-0472 92714

> ANN MARIE HOLBROW MCLAREN/HART 16755 VON KARMAN AVE IRVINE CA

LAB.	SU.	m	00000000	*****
VOLUME - UNITS ASH-WGHT-X *				
MID-COUNT TIME DATE TIME	92/50	04/28	05/09 05/10 05/13 05/09 05/10 05/13	04/26 04/26 04/26 04/26 04/26 04/26 04/26 04/26 04/26 04/26 04/26
ACTIVITY NUCL-UNIT-X (PCI/LITER) U/M &	L.T. 1. E 02	L.T. 9. E-02 PCI/GM DRY &	L.T. 3. E-02 PCI/GM DRY 0 2.7 +r0.4 E-01 PCI/GM DRY 0 3.0 +-0.5 E-01 PCI/GM DRY 0 L.T. 1. E-02 PCI/GM DRY 0 L.T. 1. E-02 PCI/GM DRY 0 3.1 +-0.5 E-01 PCI/GM DRY 0 4.4 +-0.6 E-01 PCI/GM DRY 0	L.T. 4. E-O1 PCI/GM ORY 3 2.23+-0.22E 01 PCI/GM ORY 3 L.T. 3. E-O2 PCI/GM ORY 3 L.T. 1. E-O2 PCI/GM ORY 3 L.T. 3. E-O2 PCI/GM ORY 3 L.T. 5. E-O2 PCI/GM ORY 3 L.T. 5. E-O2 PCI/GM ORY 4 L.T. 5. E-O2 PCI/GM ORY 4 L.T. 5. E-O2 PCI/GM ORY 4 L.T. 1. E-O0 PCI/GM ORY 4 L.T. 1. E-O1 PCI/GM ORY 6 L.T. 2. E-O1 PCI/GM ORY 6 L.T. 3. E-O1 PCI/GM ORY 6 L.T. 4. 5. E-O1 PCI/GM ORY 6 L.T. 5. E-O1
COLLECTION-DATE START STOP DATE TIME DATE TIME NUCLIDE	41 H-3	41 SR-90	41 PU-238 U-234 TH-230 PU-239 U-235 U-238 TH-232	41
OLLECI ART E TIP	03/15 0841	03/15 0841	03/15 0841	03/15 0841
	03/	03/	03/	03/
STA	-	s	Q.	u
CUSTOMER*S IDENTIFICATION	86-01-016-ST	86-01-016-55	86-01-016-SP	86-01-016-56
21	10595	10596	10597	10599
TELEDYNE Samplé Number	45042	45043	45044	45045 10599

REPORT OF ANALYSIS

RUN DATE 06/03/94

PAGE 4

DATE RECEIVED DELIVERY DATE 04/53/94 03/21/94 CUSTOMER P.O. NUMBER 030225/030600829 WORK ORDER NUMBER 4-0472 92714 ANN MARIE HOLBROW MCLAREN/HART 16755 VON KARMAN AVE IRVINE CA

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LAB.	rv.	m	0000000	
VOLUME - UNITS ASH-MGHT-X 0				
MID-COUNT TINE DATE TIME	05/56	04/28	05/09 05/12 05/13 05/09 05/12 05/13	04/26 04/26 04/26 04/26 04/26 04/26 04/26 04/26 04/26 04/26 04/26 04/26 04/26
NUCE-UNIT-X	02	DI PCI/GM DRY *	-02 PCI/GM DRY * -01 PCI/GM DRY * -02 PCI/GM DRY * -02 PCI/GM DRY * -02 PCI/GM DRY * -01 PCI/GM DRY * -01 PCI/GM DRY *	-01 PCI/GM DRY -02 PCI/GM DRY -02 PCI/GM DRY -01 PCI/GM DRY -02 PCI/GM DRY -01 PC
ACTIVITY (PCI/LITER)	L.T. 1. E	L.T. 1. E-01	1.1. 1. E-02 3.5 +-0.5 E-01 3.1 +-0.6 E-01 L.T. 1. E-02 2.2 +-1.2 E-02 3.9 +-0.5 E-01 3.7 +-0.9 E-01 5.9 +-1.3 E-01	L.T. 5. E-01 L.T. 4. E-02 L.T. 4. E-02 L.T. 5. E-02 L.T. 4. E-01 L.T. 7. E-01 L.T. 7. E-02 L.T. 7. E-01 L.T. 5. E-01 L.T. 6. E-02 L.T. 7. E-01 L.T. 6. E-01 L.T. 7. E-01 L.T. 7. E-01
S DP TIME NUCLIDE	H-3	SR-90	PU-236 U-234 TH-230 PU-239 U-233 TH-232	BE-47 MN-50 CO-58 CO-58 CO-58 CO-60 2N-65 2N-95 2N-106 I-131 CS-134 CS-134 CE-140 CE-141
COLLECTION-DATE START STOP DATE TIME DATE TI	03/15 0908	03/15 0908	03/15 0908	03/15 0908
STA	_			
CUSTOMER'S IDENTIFICATION	86-01-034-51	BG-01-034-SS	BG-01-034-SP	86-01-034-56
	10602	10603	10604	10606
FELEDYNE SAMPLE NUMBER	45047	45048	45049	0 s 0 s 1

REPORT OF ANALYSIS

RUN DATE 06/03/94

	WORK ORDER NUMBER	CUSTOMER P.O. NUMBER	DATE RECEIVED	DATE RECEIVED DELIVERY DATE	PAGE	~
ANN MARIE HOLBROW HCLAREN/HART 16755 von Karman ave Irvine ca	4-0472	030225/030600829	03/21/94	04/23/94		

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LAB.	'n	m	*****	FU.	m	•••••
VOLUME - UNITS ASH-WGHT-# *						
MID-COUNT TIME DATE TIME	05/26	04/28	004/26 04/26 04/26 04/26 04/26 04/26 04/26 04/26 04/26 04/26 04/26 04/26	05/56	04/28	05/09 05/12 05/18 05/09 05/12
NUCL-UNIT-X U/M &	02	-02 PCI/GM DRY #	01 PCI/GM DRY 002 PCI/GM DRY 003 PCI	02	02 PC1/GM DRY 0	-03 PCI/GH DRY +01 PCI/GH DRY +01 PCI/GH DRY +03 PCI/GH DRY +03 PCI/GH DRY +01 PC
ACTIVITY PCI/LITER)	2. E (8. E-(3.7 +-2.2 E	5. E-02	
. P. C.	L.T.	L.T.	2001-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1	3.7	L.T.	140 140 140 140
E DP TIME NUCLIDE	H-3	SR-90	BE-7 MN-54 MN-54 CO-58 CO-60 2N-65 2N-65 RU-103 RU-103 CS-134 CS-134 CR-140 CR-144 TH-226	Ę-‡	SR-90	PU-238 U-234 TH-230 PU-239 U-235 U-238
COLLECTION-DATE START STOP DATE TIME DATE T	03/15 0920	03/15 0920	03/15 1031	03/15 1026	03/15 1026	03/15 1026
STA						
CUSTOMER'S IDENTIFICATION	BG-01-082-ST	86-01-082-55	86-14-004-56	8G-14-005-ST	BG-14-005-SS	86-14-005-SP
	10608	10609	10637	10639	10640	10641
TELEDYNE Sample Number	45051	45052	45053	48084	45055	45056

REPORT OF ANALYSIS

RUN DATE 06/03/94

PAGE 12

	WORK ORDER NUMBER	CUSTOMER P.O. NUMBER	DATE RECEIVED	DATE RECEIVED DELIVERY DATE
ANN MARIE HOLBROW Mclaren/Hart 16755 von Karman ave Irvine ca	4-0472	030225/030600829	03/21/94	04/23/94

SOIL

TELEDYNE Sample Number		CUSTOMER'S Identification	STA	COLLECTION-DATE START STOP DATE TIME DATE TIME	NUCLIDE	ACTIVITY NUCL	NUCL-UNIT-X U/M #	MIO-COUNT TIME OATE TIME	VOLUME - UNITS ASH-WGHT-X &	LAB.
45080	10635	BG-14-004-SP	_	03/15	PU+238 U-234 TH-230 PU-239 U-235 U-238 TH-232	L.T. 8. E-03 2.0 +-0.4 E-01 2.7 +-0.6 E-01 L.T. 8. E-03 L.T. 5. E-03 2.2 +-0.4 E-01 6.4 +-1.0 E-01 4.0 +-0.9 E-01		05/10 05/12 05/18 05/12 05/12 05/18		***
45081	10610	8G-01-082-SP		03/15 0920	PU-238 U-234 TH-230 PU-239 U-238 TH-232	L.T. 4.4 + -0.6 E-01 3.9 + -0.7 E-01 L.T. 1. E-02 3.4 + -1.5 E-02 4.3 + -0.6 E-01 7.5 + -1.0 E-01 8.2 + -1.0 E-01		05/09 05/12 05/18 05/12 05/12 05/18		~~~~~~
45082	10612	86-01-082-56		03/15 0920	BE-7 MN-54 MN-54 MN-54 CO-50 CO-60 CO-60 CO-60 RU-103 RU-103 RU-103 RU-134 CS-137 CS-137	L.T. 5. E-01 L.T. 4. E-02 L.T. 5. E-02 L.T. 3. E-02 L.T. 4. E-01 L.T. 7. E-02 L.T. 7. E-02 L.T. 3. E-02 L.T. 3. E-02 L.T. 3. E-02 L.T. 3. E-02 L.T. 3. E-01 L.T. 3. E-01		04/27 04/27 04/27 04/27 04/27 04/27 04/27 04/27		*****

REPORT OF ANALYSIS

RUN DATE 06/03/94

PAGE 13 DATE RECEIVED DELIVERY DATE 04/23/94 03/21/94 CUSTOMER P.O. NUMBER 030225/030600829 WORK ORDER NUMBER 4-0472 92714 ANN MARIE HOLBROW MCLAREN/HART 16755 VON KARMAN AVE IRVINE CA

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LAB.	444	1 0	0000000	<i>4444444444444</i>
VOLUME - UNITS ASH-WGHT-# *				
MID-COUNT TIME DATE TIME	04/27 04/27 04/27	05/27	05/09 05/12 05/18 05/09 05/12 05/18	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
NUCL-UNIT-X U/M +		PCI/LITER *		
ACTIVITY (PCI/GM DRY)	L.T. 2. E-01 2.13+-0.54E 00 2.08+-0.21E 00	L.T. 1. E 02	2.3 +-0.4 E-0.1 3.0 +-0.5 E-0.1 L.T. 9. E-0.3 1.1 +-0.8 E-0.2 2.1 +-0.4 E-0.1 8.7 +-1.0 E-0.1 5.3 +-0.8 E-0.1	1.1. 5. E-01 2.05+-0.20E 01 1.1. 4. E-02 1.1. 1. E-01 1.1. 5. E-02 1.1. 6. E-02 1.1. 6. E-02 1.1. 6. E-02 1.1. 1. E-01 1.1. 4. E-02 1.1. 1. E-01 1.1. 2. E-01
IE NUCLIDE	CE-144 RA-226 TH-228	H-3	PU-238 U-234 TH-239 PU-239 U-235 U-238 TH-232	BE-1 K-40 MN-54 CO-58 FE-59 CO-60 2N-65 2N-65 2N-65 2N-103 RC-103 RC-103 RC-103 RC-104 CS-134 CS-134 CS-134 CR-141 CE-144
COLLECTION-OATE START STOP DATE TIME DATE TIME	03/15 0920	03/15 1000	03/15 1000	03/15 1000
STA				
CUSTOMER'S IDENTIFICATION	BG-01-082-SG	BG-14-001-ST	BG-14-001-SP	BG-14-001-SG
	10612	10614	10615	10617
TELEDYNE Sample Number	45082	45083	4 5 0 8 4 4 8 4	4 5 0 8 5

RUN DATE 05/12/94

DELIVERY DATE 04/16/94 DATE RECEIVED 03/14/94 CUSTOMER P.O. NUMBER 030225/030600829 REPORT OF ANALYSIS WORK ORDER NUMBER 4-0409

92714 HCLAREN/HART 16755 von Karman ave Irvine ca ANN MARIE HOLBROW

SOIL

tAB. YOLUME - UNITS ASH-WGHT-X & DATE TIME HID-COUNT TIRE 1.2 +-0.5 E-01 PCI/GM DRY 0 04/14 02/00 60/40 04/09 04/09 04/09 04/09 60/40 04/09 60/10 60/10 04/09 90/10 60/10 90/50 04/14 04/09 E-02 PCI/GM DRY • E-02 PCI/GM DRY • L.T. 1. E 00 PCI/GH DRY 1.37+-0.14E 00 PCI/GH DRY NUCL-UNIT-# E-02 PCI/GH DRY * #/ PC1/GM PC1/6M PC1/6M PC1/GH PC1/GM PC1/GM PC1/GM PC1/6M PC1/GH PC1/6H PC1/6M E 02 E-03 E-03 E-01 E-03 E-03 L.T. 2. E 02 E-01 1.32+-0.23E 01 E-01 I PCI/LITERI L.T. 2. ACTIVITY : ... :: -1: 1.1 -1 -... 1:1 ... 1:1: L. T. -1:1 L. T. -DATE TIME DATE TIME NUCLIDE PU-238 PU-239 CS-134 CS-137 BA-140 CE-141 RA-226 TH-228 28-95 RU-103 RU-106 SR-90 CE-144 1-131 MN-54 CO-58 FE-59 09-03 **59-N**2 SR-90 £-1 두 CDLLECTION-DATE 03/10 1622 03/10 1622 03/10 1617 03/10 1617 03/10 1617 03/10 1617 START STA Ž 86-02-017-55 BG-02-017-ST BG-02-074-SP 86-02-014-56 86-02-074-55 BG-02-014-ST IDENT IF ICATION CUSTOMER'S 44156 10344 44154 10340 44155 10343 44153 10342 44151 10338 44152 10339 TELEDYNE SAMPLE Number

The analysis (as shown on the Acknowledgement) of TI#44159, 44180 and 44201 were canceled by the customer and then later, reinstated. The results will be reported on a different Report of Analysis.

REPORT OF ANALYSIS

LIDE (PCI/GH DRY) LIDE (PCI/GH DRY) LOTE 4-6-02 LOTE 5-6-01 LOTE 5-6-02 LOTE 5-6-01 LOTE 5-6-02 LOTE 5-6-01 LOTE 5-6-01 LOTE 5-6-01 LOTE 5-6-01 LOTE 5-6-02 LOTE 5-6-03 LOTE 5	
TOTAL STATE OF THE PART OF THE	444
THE COLSTONER NUMBER CUSTONER P.G. NUMBER DATE RECEIVED RHAN AVE 92714 COLECTION-DATE STATEMENT THE DATE THE NUCLIDE (PC1/GM DRY) U/M °	
THEORY OF THE PART	04/09
THEORY AVE 1.05 TO 1.	
LENDY LENDY A-0409 COSTONER 92714 COLLECTION-DATE COLLECTION-DATE COLLECTION-DATE COLLECTION-DATE THE NUCLIDE THOUSE THOUSE	***
### AVE 4-0409 ##################################	er 20.00
LBROW RMAN AVE 92714 CUSTOMER'S STA IDENTIFICATION NUM D 7 BG-02-017-SG 0 6 BG-02-076-ST 6 17 BG-02-076-SF 6 19 BG-02-076-SG 6 10 BG-02-076-SG 6	
CUSTOMER'S CUSTOMER'S IDENTIFICATION 7 BG-02-017-SG 6 BG-02-076-ST 17 BG-02-076-SS 19 BG-02-076-SG 19 BG-02-076-SG	
135 ARR 135 VI 135 VI 135 VI 136 VI 137 VI 158 VI 159 VI 159 VI 160 VI 163 VI 163 VI	

REPORT OF ANALYSIS

	PAGE 3				S LAB.	•	•	• •	•	.	•	• •	• •	• •		• 🖛		m.	••	•	•	•	• •	• •	• •	• •	٠ ٦	r 🕩	⊦ ⊲	- ◀	• 🖛	-	4
	DATE	46/			VOLUME - UNITS ASH-WGHT-X *																												
	DELIVERY DATE	04/16/94			MID-COUNT TIME DATE TIME	60/40	60/10	04/09	60/40	04/0	60/40	60/40	60/40	04/03	60/10	60/40	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	04/16	04/14	04/14			60/40	04/03	60/40	60/40	04/00	04/0	60/10	60/40	60/40	00/10	
	DATE RECEIVED	03/14/94			NUCL-UNIT-X U/M *																		_	_	~	~	_	2	_	~	~ •	-	
	MBER	29			ACTIVITY PCI/GN DRY)	4. E-02		6. E-02	5. E-02					1. E-01		.55€	0.14E 00	0.8 E-01		7. E-03	ANALY 2ED		5. E-01	0.21	5. E-02					6. E-02			6. F-0.
2	CUSTOMER P.O. NUMBER	030225/030600829			ACTIN (PCI/6)	1-1-1									۱	1.61+-	1.42+-0	1.3 +-0.8	-	::	LON	•	1.1.	2.15+-	1:1		1.1	L.T.	L.T.	1.1	L•1.		-1-1
KEFUKI OF ANALISIS	CUSTONER	03022		0 1 1	NUCL 10E		7N-65	2R-95	10-103	RU-106	I-131 [4-134	5-137	3A-140	CE-141	CE-144	RA-226	TH-228	SR-90		PU-239	4 1 1 1		85-7	K-40	XN-54	CO-58	FE-59	09-03	2N-65	2R-95	RU-103	RU-106	1-121
# #	NORK ORDER NUMBER	4-0409		v	COLLECTION-DATE START STOP		03/10 1605	~								_		03/10 1610		03/10 1610		03/10 1610	0171 01740	0101 01/60									
			92714		STA		86-02-076-56											25-200-60-94		8G-02-007-SP		86-02-001-56		BG-05-001-26									
		JLBROW	I ARMAN AVE		CUSTOMER'S	IDENTIFICATION														10334 86-02		10335 86-0		10336 BC-0						-			
		ANN MARIE HOLBROW	MCLAREN/HART 16755 von Karman ave Irvine ca	•	TELEDYNE Sample	NUMBER	44163 10330												44164 10333	44165 103		44166 103		44167 103									

REPORT OF ANALYSIS

RUN DATE 05/12/94

PAGE 4 +6/91/10 DATE RECEIVED DELIVERY DATE 03/14/94 CUSTOMER P.O. NUMBER 030225/030600829 WORK DRDER NUMBER 4-0409 ANN MARIE HOLGROW McLaren/Hart 16755 von Karman ave Irvine ca

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LAB.	****	***	
VOLUME - UNITS ASH-WGHT-R 0			
MID-COUNT TIME DATE TIME	04/09 04/09 04/09 04/09 04/09	00000000000000000000000000000000000000	00400 00400
NUCL-UNIT-X U/M *			
ACTIVITY (PCI/GH DRY)	L.T. 6. E-02 L.T. 3. E-01 L.T. 1. E-01 L.T. 3. E-01 2.44+-0.69E 00 1.37*-0.14E 00	2.26+-0.28	++++++++++++++++++++++++++++++++++++++
 E NUCLIDE	CS-137 BA-140 CE-141 CE-144 RA-226 TH-228	2	CCF-14-1 CCF-14-1 RA-12-24-14-1 CCF-14-1 CN-54-14-1 CN-54-14-1 CN-54-14-1 CN-54-14-14-14-14-14-14-14-14-14-14-14-14-14
COLLECTION-DATE START STOP DATE TIME DATE TIME	03/10 1610	03/10 1622	
STA NUM D			40
CUSTOMER'S IDENTIFICATION	BG-D2-007-SG	86-02-017-96	BG-02-017-MG
CU	10336	10348	44169 10348MS
TELEDYNE Sample Number		4 16 6	44 169

REPORT OF ANALYSIS

					REPORT OF ANALYSIS	YSIS				KUN UATE C	100/16/74
			¥OR	WORK ORDER NUMBER	CUSTONER	P.O. NUMBER	e	DATE RECEIVED) DELIVERY DATE		PAGE 6
ANN MARIE HO MCLAREN/HART 16755 von Ka	ANN MARIE HOLBROW MCLAREN/HART 16755 von Karkan	DW N AVE 92714		4-0409	030225	030225/030600829		03/14/94	04/16/94	+6/9	
1 × 4 1 1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	5	•			S 0 1 L						
TELEOYNE Sample Number		CUSTOMER'S STA	S 4	COLLECTION-DATE START STOP DATE TIME DATE TI	IP TIME NUCLIDE	ACTIVITY (PCI/GM DRY)		NUCL-UNIT-% U/H + I	MIO-COUNT TIME DATE TIME	VOLUME - UNITS ASH-WGHT-X &	LAB.
44171	10345	86-02-017-SP	03	03/10 1622	PU-238 PU-239	L.T. 7. L.T. 7.	E-03		04/14		••
44172	10349	8G-02-085-ST	03	03/10 1632	H-3	1.1. 2.	E 03	PCI/LITER +	05/08		•
44173	11199	BG-02-085-SS	60	03/10 1632	SR-90	1.3 +-1.0 E-01	E-01		04/16		w
44174	10353	86-02-065-56	60	03/10 1632			E-02		04/15 04/15 04/15		****
					76-59 28-69 28-69 28-199 31-106				04/15 04/15 04/15 04/15 04/15		
					CS-1137 CS-1137 CE-1141 CE-1144 TA-226 TH-228	11	E-01 E-01 E-01 2E 00		04/15 04/15 04/15 04/15		****
44175	10351	BG-02-085-SP	8	03/10 1632	PU-238 PU-239	L.T. 7. L.T. 7.	E-03		04/14		••

REPORT OF ANALYSIS

DATE RECEIVED DELIVERY DATE CUSTOMER P.O. NUMBER

RUN DATE 06/03/94

PAGE 14

04/23/94 03/21/94 030225/030600829 WORK DRDER NUMBER 4-0472 92714 ANN MARIE HOLBROW MCLAREN/HART 16755 von Karman ave Irvine ca

LAB.	m	m	m	r.	m	.	•	D 4	0 4	9 4	9	w	m	r.	m	u	n
VOLUME - UNITS ASH-WGHT-X *																	
MID-COUNT TIME DATE TIME	04/28	05/02	04/30	05/27	04/30	05/09	02/00	21/50	05/12	05/18	05/18	04/30	04/30	12/50	01/10		05/27
NUCL-UNIT-X U/M &				PCI/LITER 0										PCI/LITER &			PCI/LITER .
	E-02	E 00	E 00	E 02	E-02		E-03	E-03		E 00	E-01	E-02	E-01	E 02	6	70-3	E 02
ACTIVITY (PCI/GM DRY)	L.T. 7. E-02	4.0 +-0.3 E 00	4.0 +-0.2 E 00	L.T. 1.	•	L.T. 1. 3.1 +-0.4	1.1	1-1-0	+-0.5	+-0-1	4-0-9	•	:	L.T. 2.	•	70-3 C**-+ 7*R	L.T. 1.
ACI (PCI)	1:1	0.4	0.	L.1.	t.1.	1.1.	. L. J	1.8	•••	1.2	7.8	L.1.	1.1	1.1	•	7 • R	1:1:
JATE STOP FE TIME NUCLIDE	SR-90	SR-90	SR-90	H-3	SR-90	PU-238 U-234	TH-230 PU-239	U-235	U-238	TH-232	TH-228	SR-90	SR-90	€-I		SR-90	H-3
COLLECTION-DA START STARE DATE	03/15 1000	•		03/15 1000	03/15 1000	03/15 1000						03/15 0841	03/15	03/15 0908		03/15 1000	03/10 1610
STA												6		, ,	_	S	-
CUSTOMER'S	#6-14-001-#S			96-14-002-ST	86-14-002-55	BG-14-002-SP					٦	0 0 0 0 0 0 0 F S	22-050-10-34	A COLOR	1-900-00-99	86-14-001-55	86-02-007-ST
	61.401	1061985	10619#50	10620		10622						11225			11227	11229	10332
TELEUYNE Sample				45090	45091	45092						71137	*****	45115	45116	45117	45490

ANN HARIE HOLBROW HCLAREN/HART 16755 VON KARMAN AVE
92714

	LAB.	•	r	m
	TIME VOLUME - UNITS DATE TIME ASH-WGHT-X o			
MID-COUNT	TIME DATE TIME	02/03	02/08	04/16
	NUCL-UNIT-X	: 02	: 02	L.T. 8. E-02 PCI/GH DRY # 04/16
	VITY LITE	2.	7 -	
	ACTIVITY N	L.T. 2. E 02	L.T. 2. E 02	t.T.
ATE	STOP Date time nuclide	H-3	H-3	SR-90
COLLECTION-DATE	START DATE TIME DAT	03/09 1610	03/10 1605	03/10 1136
	STA			
	CUSTOMER'S IDENTIFICATION	44019 111830UP88-17-8003-ST	44159 10326DUP8G-02-076 -ST	44180 10302DUP88-17-005 -SS
TEL FOYNE	SAMPLE	44019	44159	44180

REPORT OF ANALYSTS

RUN DATE 05/25/94
BER DATE RECEIVED DELIVERY DATE PAGE 24

DELIVERY DATE 04/11/94 DATE RECEIVED 03/15/94 CUSTOMER P.O. NUMBER 030225/030600829 WORK ORDER NUMBER 4-0514 92714 AMN MARIE HOLBROW HCLAREN/HART 16755 VON KARMAW AVE IRVINE CA

SOIL

LAB.	++	•	*	*	*	-	•	8 0	₽	.	•	•	٠	•	•	۰	Φ.	۰	.	₩.	₩.	
VOLUME - UNITS ASH-MGHT-% *																						
MID-COUNT TIME DATE TIME	04/26	04/26	97/50	04/26	04/26	04/26	04/26	05/23	05/23	04/20	05/02	05/02	05/01	05/02	05/02	05/02	20/50	05/01	05/23	05/23	04/50	
NUCL-UNIT-X U/M **								PCI/LITER .	PCI/LITER #										PCI/LITER *	PCI/LITER *		
ACTIVITY NI (PCI/GM DRY)	L.T. 2. E 00	•	L.T. 5. E-01	T. 2.	÷	1.T. 1. E 00	3.85+-0.55E-01	L.T. 2. E 02	L.T. 2. E 02	1.2 +-0.5 E-01		+-0-3	2.3 +-0.4 E-01		L.T. 7. E-03	1.3 +-0.3 E-01		2.1 +-0.5 E-01	L.T. 5. E 02	L.T. 5. E 02	8.4 +-4.0 E-02	
P TIME NUCLIDE	1-131	CS-137	84-140	CE-141	CE-144	RA-226	TH-228	н-3	Н-3	SR-90	PU-238	U-234	TH-230	PU-239	U-235	U-238	TH-232	TH-228	H-3	H-3	SR-90	
COLLECTION-DATE STARI STOP DATE TIME DATE TIME	03/11 1404							03/11 1404	03/11 1420	03/11 1420	03/11 1420								03/11 1037	03/11 1037	03/11 1037	
STA																				_		
CUSTOMER'S IDENTIFICATION	BG-09-057-SG				<	<u>ح</u>	؟ `ک _ت	8G-00-006-FT	BG-09-013-ST	BG-09-013-SS	86-09-013-SP								86-65-074-51	10360DUP BG-05-074-ST	86-05-074-55	
I DE	10448							11031	10458	10451	10452	1							10360	103600U	10361	
TELEDYNE Sample Number	44715 10448							44716	44719	44720	44721								44722	44723		

REPORT OF ANALYSIS

	PAGE 25			
	DATE RECEIVED DELIVERY DATE	04/11/94		
	DATE RECEIVED	03/15/94		
	CUSTOMER P.O. NUMBER	030225/030600829		1 1 0 5
•	WORK ORDER NUMBER	4-0514	14	
			92714	
		ANN MARIE HOLBROW McLaren/Hari Maras von Karman ave	IRVINE CA	

LAB.	****	• •••••••	*
VOLUME - UNITS ASH-MGHT-X 0			
MID-COUNT TIME DATE TIME	04/26 04/26 04/26 04/26 04/26 04/26 04/26 04/26 04/26 04/26	05/05 05/05 05/05 05/05 05/05 05/05 05/05	¢ 05/23
NUCL-UNIT-X U/M *			PCI/LITER
		6-02 6-01 6-02 6-01 6-01 6-01	E 02
ACTIVITY (PCI/GM DRY)	· •	1 20021000	.T. 2.
100	2.00.2 		ٺ
NUCL FDE	RE-140 RE-130 RE-150 RE-150 RE-150 RE-1100 RE-140 CE-141 CE-144	TH-228 PU-238 U-234 TH-230 PU-239 U-238 TH-232	н-3
MATE STOP E TIME			
COLLECTION-DATE TART STO TE TIME DATE	~ m	F	245
COLLEC START DATE TI	03/11 1037	03/11 1037	03/11 1045
STA S NUM DA	60	Ö	0
	© %	- SP	27-57
CUSTOMER'S Identification	86-05-074-56	8G-05-074-SP	86-05-027-51
	10364	10362	10366
TELEDYNE Sample Number	44725 10364	44726	44727

REPORT OF AMALYSTS

			2	WORK ORDER NUMB	NUMBER	CUSTOMER	P.O. NUMBER	DATE RECEIVED	D DELIVERY	DATE	PAGE 26
ANN MARIE HU Mclaren/Hart 16755 von Ka Irvine ca	ANN MARIE HOLBROW MCLAREN/HARI 16755 von Karman Ave Irvine ca	AVE 92714		4-0514	.	030225	0225/030600829	03/15/94	04/11/94	1/94	•
					•	S 0 1 L					
TELEOYNE Sample Number	CUS IDENT	CUSTOMER'S STA		COLLECTION-DATE START STOIL DATE TIME DATE	ION-DATE Stop E DATE TIME	NUCL FOE	ACTIVITY (PCI/LITER)	NUCL-UNIT-X U/M &	HIO-COUNT TIME DATE TIME	VOLUME - UN!TS ASH-WGHT-X 0	LAB.
44728	10371	RG-05-027-MT	J	03/11 1045		H-3	L.T. 3. E 02		05/23		m
44729	10371MS	BG-05-027-MT		. ~		H-3	3.5 +-0.3 E 03		05/23		•
44730	10371MSD	10371MSD 8G-05-027-MT		`		H-3	3.7 +-6.3 E 03		05/23		•
44731	10367	86-05-027-55	_	03/11 1045	•	SR-90	1.0 +-0.4 E-01	PCI/GM DRY \$	04/50		m
44732	10370	86-05-027-56	_	03/11 1045		8E-7	L.I. 4. E-01	PCI/GM DRY *	04/26		44
						X - 40	2.0/+-0.21E 01	PCI/GM DRY	04/26		• 🕶
						CO-58	L.T. 4. E-0	PCI/GM ORY	04/26		.
						FE-59	L.T. 1. E-01	PCI/GM DRY	04/26		•
						09-00	e e	PCI/GM DRY	04/26		• •
						59-NZ	σ.	PC1/6M	04/26		• •
						28-95 011-101	L.T. 6. E-0.	PCI/GH URI	04/26		•
						RU-106		PCI/GM DRY	04/26		•
						1-131	-	PC1/GM DRY	04/26		• •
						CS-134	m :		04/20		· •
						CS-137	7 7 - 4 1	PC1/GH DRY	04/26		4
		,				CE-141	: -:	PCI/GM DRY	04/26		•
						_	. 2.	PCI/GH DRY	92/50		•
						RA-226	+-0.46E	PC1/	7.		• •
						_	8.02+-0.80E-01	PC1/GM DRY	04/26		•
				2101 11760	y	901-238	L.T. 1. E-0		05/02		•
44733	10368	16-130-60-99			<u>.</u>		4-0-8	PCI/GM DRY			۰ م
	i					TH-230	9-0-+	PCI/GH DRY			۰.
						PU-239	-	PC1/6M			o •c
						U-235	2.1 +-1.3 E-UZ	PC1/GM UKT	05/07		.
						0-7-0	0				

REPORT OF ANALYSIS

PAGE DELIVERY DATE DATE RECEIVED CUSTOMER P.O. NUMBER

RUN DATE 05/25/94

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TIME VOLUME - UNITS

DATE TIME ASH-WGHT-X ** 04/11/94 MID-COUNT TIME 05/19 05/19 05/19 05/19 05/19 05/19 05/19 05/19 05/09 05/09 05/23 04/20 05/19 05/19 PCI/LITER & 03/15/94 NUCL-UNIT-X L.T. 2. E 02 E-02 E-01 E-01 €-02 L.T. 4. E-02 E-03 5.58+-0.60E 00 E-02 E-03 E-01 E-01 E 01 3.52+-C.46E-01 -0 1.5 +-0.4 E-01 1.1 +-0.6 E-01 1.2 +-0.5 E-01 (PCI/GH DRY) ACTIVITY 030225/030600829 :: L . 1 . .1.1 = -----... -: . . . START STOP
DATE TIME DATE TIME NUCLIDE 3 0 1 1 CO-60 ZN-65 ZR-95 RU-103 RU-106 I-131 84-140 CE-141 CE-144 RA-226 TH-228 CS-134 CS-137 TH-232 TH-228 CO-58 FE-59 SR-90 HN-54 8E-7 K-40 H-3 COLL ECTION-DATE WORK ORDER NUMBER 03/11 1045 03/11 1329 03/11 1329 03/11 1329 STA 92714 BG-09-096-SS 96-06-09-06 BG-09-096-ST BG-05-027-SP CUSTOMER'S 1DENTIFICATION MCLAREN/HART 16755 von Karman ave ANN MARIE HOLBROW 10435 44733 10368 10432 10431 IRVINE CA TELEDYNE SAMPLE 44734 44737 NUMBER 44735

05/02 05/05 05/09

4-3.9 8-02

PU-238 U-234 TH-230 PU-239

03/11 1329

8C-09-096-SP

44738 10433

+-0.6 E-01

= •

05/02 05/05 05/05 05/09

L.1. 2. E-02 L.T. 3. E-02 3.1 +-0.4 E-01 L.2 +-0.6 E-01

U-235 U-238 TH-232

REPORT OF ANALYSIS

			Ō	RK ORC	WORK ORDER NUMBER	CUSTOMER	CUSTOMER P.O. NUMBER	DATE RECEIVED	DELIVERY DATE		PAGE 29
ANN MARIE HO	ANN MARIE HOLBROW MCLAREN/HART	3		1	4-0514	030225/	030225/030600829	03/15/94	04/11/94	7,94	
16755 VUN IRVINE CA	16755 YON KARMAN AVE IRVINE CA	AVE 92714									
						S 0 1 L					
TELEDYNE Sample Number		CUSTOMER'S STA IDENTIFICATION NUM	Þ	COLLI START ATE 1	COLLECTION-DATE START STOP DATE TIME DATE TIME	: NUCLIDE	ACTIVITY (PCI/GH DRY)	NUCL-UNIT-X U/M * D	HID-COUNT TIME DATE TIME	VOLUME - UNITS ASH-WGHI-% &	LAB.
44244	10440DUP	44744 104400UP BG-09-005-SP	0	03/11 1320	1320	PU-238 U-234			05/02		
						TH-230 PU-239	. 1.		05/09 05/02		o •o
						U-235	, , ,		05/04		-o -c
						U-238 TH-232	1.4 +-0.4 E-01		05/09		• •
						TH-228	9-0-+ 6-	_	60/50		•
44745	10372	86-05-017-ST	0	03/11 1053	1053	H-3	L.T. 2. E 02	2 PCI/LITER *	05/24		u n
44146	10373	86-03-017 \$\$	0	03/11 1053	1053	SR-90	8.8 +-5.6 E-02	~	04/21		m
17177	10176	AC-05-017-5G	0	03/11 1053	1053	BE-7	L.T. 4. E-01	-	04/25		.
; ;			•			K-40	0+-0.21 4		04/25		• •
						CO-58		. ~	04/25		•
						FE-59	. 1:	_	04/25		-
						09-03	m c	~ 1	04/25		
						28-82 28-82	Lele 9. E-02	~ ~	04/25		•
						RU-103	•	. 2	04/25		.
						RU-106			04/25		
						1-131	:	0	04/25		• •
						CS-134	1 474-0-33E-01	~ -	04/25		•
						D4-140			04/25		*
						CE-141			04/25		.
						CE-144	2. E-		04/25		.
						RA-226	384-0-+-6	00	67/50		• •
						822-H1	4.484-U.45E-U	-			•

REPORT OF ANALYSIS

PAGE 30		
DELIVERY DATE	04/17/94	
DATE RECEIVED DELIVERY DATE	03/15/94	
CUSTOMER P.D. NUMBER	030225/030600829	
WORK ORDER NUMBER	4-0514	
	92714	
	ANN MARIE HOLBROW MCLAREN/HART 16755 von Karman ave Irvine ca	

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C	•
·	,

LAB.	***********	sr	m	m	m	m	44	- -	4 4	•	4	•	• •	•	-	4
VOLUME - UNITS ASH-WGHT-X &																
MID-COUNT TIME DATE TIME	05/04 05/04 05/09 05/04 05/04 05/09	05/24	04/21	04/25	04/21	04/21	04/25	04/25	04/25	04/25	04/25	04/25	04/25	04/25	04/25	04/25
NUCL-UNIT-X U/M &		PC1/LITER .														
ACTIVITY NU	1.T. 2. E-02 5.6 +-0.7 E-01 4.1 +-0.7 E-01 L.72. E-02 2.1 +-1.3 E-02 5.9 +-0.8 E-01 2.0 +-0.4 E-01 2.0 +-0.5 E-01	L.T. 2. E 02	6.9 +-4.6 E-02	L.T. 2. E-01	3.8 +-0.2 E 00	3.9 +-0.2 E 00	4.	L.T. 3. E-02 L.T. 4. E-92	<u>.</u> ,	. ~	ľ,				3.22	L.T. 3. E-01
NUCL IDE	PU-238 U-234 TH-230 PU-239 U-238 U-238 TH-232	H-3	SR-90	SR-90	SR-90	SR-90	8E-7 K-40	MN-54 CO-58	FE-59	2N-65	2R-95	RU-103	RU-106	CS-134	CS-137	BA-140
COLLECTION-DATE START STOP DATE TIME DATE TIME		03/11 1057	03/11 1057	03/11	`	,	03/11									
STA																
CUSTOMER'S IDENTIFICATION	86-05-017-SP	BG-05-050 ST	86-05-050-55	8G-050-050-MS	BG-05-050-MS	44753 10383MSD 86-05-050-MS	BG-05-050-SG									
CU	10374	10378	10379	10383	10383MS	10383MSC	10382							-		
TELEDYNE Sample Number	44748 10374	64149	44750 10379	14731	44752	44753	44754 10382									

REPURT OF ANALYSIS

			2	RK ORD	WURK ORDER NUMBER	CUSTOMER P.O. NUMBER	P.0.	UMBER	DATE RECEIVED	D DELIVERY DATE		PAGE	31
ANN MARIE HOM MCLAREN/HART 16755 VON KAI IRVINE CA	ANN MARIE HOLBROW MCLAREN/HART 16755 von Karman Irvine ca	DW N AVE 92714		-	4-0514	. 030225	030225/030600829	3829	03/15/94	04/11/94	+6/1		
						1105							
TELEDYNE Sample Number		CUSTOMER'S ST	STA NUM D	COLLE START DATE T	COLLECTION-DATE TART STOP TE TIME DATE TIME	NUCLIDE	ACT (PCI/	ACTIVITY PCI/GM DRY)	NUCL-UNIT-X U/A a	MID-COUNT TIME DATE TIME	VOLUME - UNITS ASH-WGHT-X *	LAB.	
44754	10382	86-05-050-56	0	03/11		CE-141 CE-144 RA-226 TH-228	L.T. L.T. 1.52+ 7.84+	•T• 1• E-01 •T• 2• E-01 •52+-0•47E 00 •84+-0•78E-01		04/25 04/25 04/25 04/25		***	
44755	10380	86-05-050-SP	•	03/11		PU-238 U-234	L.T. 3.6 +		2	05/04		••	
						TH-230 PU-239	2.7 + L.T.	+-0.6 E-01	- 2	05/09		• •	
						0-235	.:		m •	05/04		•	
						U-238 TH-232		9.00		05/09		• • •	
						027.41	:						
44756	10384	BG-05-056-ST	0	03/11 1105	1105	H-3	t.1.	2. E 02	2 PCI/LITER #	05/24		•	
44757	10385	BG-05-056-SS	0	03/11 1105	1105	SR-90	4 1.6	+-5.5 E-0	2	04/21		m	
44758	10386	86-05-056-86	•	03/11 1105	1105	86-7 K-40	L.T.	5. E-01		04/25		* *	
						#N-N#	:	4. E-02	7	04/25		*	
						65-00	<u>:</u> .	5. E-02		04/25		• •	
						FE-59	:::		- ~	04/25		•	
					•	2N-65	-			04/25		•	
						2R-95	1:1		2	04/25		*	
						RU-103	1.1		N	04/25			
						RU-106	<u>:</u> .		6	04/25		• •	
						[-13] [-13]	<u>.</u> .			04/25		•	
						CS-134 CS-134	1.43+	Æ	v =	04/25		•	
						BA-140		•		04/25		4	
						CE-141	r • T •		-	04/25		4	

REPURT OF ANALYSIS

RUN DATE 05/25/94

32	
PAGE 32	
DATE RECEIVED DELIVERY DATE	04/11/94
DATE RECEIVED	03/15/94
CUSTOMER P.O. NUMBER	030225/030600829
WORK ORDER NUMBER	4-0514
	92714
	ANN MARIE HOLBROW McLaren/Hart 16755 von Karman ave Irvine ca

S 0 1 L

LAB.	444	~~~~~~
VOLUME - UNITS ASH-WGHT-X &		
MID-COUNT 11ME DATE TIME	04/25 04/25 04/25	05/04 05/05 05/10 05/10 05/05 05/10
NUCL-UNIT-X U/M *		222
ACTIVITY (PCI/GM DRY)	L.T. 2. E-01 2.45+-0.55E 00 7.30+-0.73E-01	L.T. 1. E-02 7.4 +-0.8 E-01 5.2 +-0.8 E-01 L.T. 1.8 E-02 3.7 +-1.5 E-02 9.2 +-0.8 E-01 1.5 +-0.6 E-01 2.0 +-0.6 E-01
IME NUCLIDE	CE-144 RA-226 TH-228	PU-238 U-234 TH-230 PU-239 U-235 TH-232
COLLECTION-DATE START STOP DATE TIME DATE TIME	03/11 1105	93/11 1105
STA S	0	Ö
CUSTOMER'S S	86-05-056-86	BG-05-056-SP
	1038	10396
TELEDYNE Sample Number	44758 10388	44759 10386

REPORT OF ANALYSIS

RUN DATE 05/25/94

PAGE 20 DELIVERY DATE 04/11/94 CATE RECEIVED 03/15/94 CUSTOMER P.O. NUMBER 030225/030600829 5 0 I L WORK ORDER NUMBER 4-0514 92714 ANN MARIE HULBROW McLaren/Hart 16755 von Karman ave Irvine ca

7 Y	m	•	•	9 4	•	•	9 4	•	•	4	*	4	•	- 4	- 4	•	•	•	•	•	•	•	•
ASH-WGHT-X *																							
DATE TIME	04/16	05/02	05/02	05/01	05/02	20/50	05/02	20/50	10/50	96/90	01/10		97/40	92/40	04/56	04/56	04/56	04/56	04/56	04/56	04/56	04/56	*****
																						. ~	
(PC1/GM DRY)	L.T. 9. E-02	F0-9 . 7 . 1	3.8 +-1.7 E-02	5.0 +-2.4 E-02	L.T. 9. E-03	L.T. 7. E-03	4.1 +-1.8 E-02	5.0 +-2.5 E-02	L.T. 6. E-02		L.T. 1. E 00	7.74+-1.02E UU	L.T. 8. E-02	L.T. 1. E-01	L.T. 3. E-01	1.1. 7. E-02	1.1. 2. E-01	1.1. 1. E-01	1.1. 2. E-01	1. T. B. E-01	1. 4. F OC	1 4 4 H	
IE NUCLIDE	SR-90										86-7	K-40	MX-54	50-53	7 () () () () () () () () () ((- U - U - U - U - U - U - U - U - U -	20-03- 84-18-	10-U7	CK 17.7	201.0%		1-1-1	- T - C - C - C - C - C - C - C - C - C
START STOP OATE TIP	03/14 1205		03/14 1205								03/11 1420												
STA		r r	-SP								1	•											
USTOMER'S NT FETCATION		66-11-013	86-11-075-								610-00-00	010-0-00											
		10518	61501									10424											
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CCC-58 FE-59 CC-60 2N-65 2N-95 RU-106 I-131 CS-134 CS-134 CS-134 CS-134

REPORT OF ANALYSIS

RUN DATE 05/25/94

7 **~~~~~~~** LAB. VOLUME - UNITS ASH-WGHT-X ** DELIVERY DATE 04/11/04 DATE TIME HID-COUNT TIME 05/02 05/09 05/02 05/02 05/09 04/27 04/27 04/27 04/27 04/27 04/27 04/27 04/27 04/50 04/16 05/05 04/27 05/53 E 02 PCI/LITER * DATE RECEIVED 03/15/94 NUCL-UNIT-# e M/D 2.3 +-0.3 E-01 2.3 +-0.7 E-01 1.T. 8. E-03 1.T. 7. E-03 9.9 +-2.8 E-02 2.6 +-0.7 E-01 2.0 +-0.8 E-01 L.T. 7. E-01 4.62+-0.59E 00 L.T. 4. E-02 1.3 +-0.5 E-01 1.4 +-0.6 E-01 5-03 E-01 E 00 E-02 E-01 E-01 3.09+-0.62E-01 E-02 E-05 10-3 E-01 E-01 ACTIVITY (PCI/GM DRY) 8.83+-4.21 CUSTOMER P.O. NUMBER 2. 030225/030600829 1.1. L: 1: :: 1.1 1.1 : : 1.1 L. 1. 1.1 L.T. DATE TIME DATE TIME NUCLIDE CE-144 RA-226 PU-238 5011 TH-228 BA-140 CS-134 CE-141 SR-90 RU-103 RU-106 **CS-137** SR-90 0-234 MN-54 CO-58 FE-59 09-03 28-82 1-131 H-3 8E-7 K-40 STOP COLLECTION-DATE WORK DRDER NUMBER 03/11 1430 03/11 1430 03/11 1430 03/11 1420 03/11 1420 4-0514 START STA BG-09-003-SP BG-09-003-ST 86-09-c03-SS BG-00-003-FS 92714 44702 10454DUP 86-69-013-56 Co.60 CUSTOMER'S IDENTIFICATION ANN MARIE HOLBROW MCLAREN/HART 16755 VGN KARMAN AVE IRVINE CA 10457 11034 10458 10456

TELEDYNE SAMPLE NUMBER U-236 TH-232 TH-228

PU-239 TH-230

44103

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U-235

REPORT OF ANALYSIS

RUN DATE 05/25/94

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PAGE DELIVERY DATE 04/11/104 DATE RECEIVED 03/15/94 CUSTOMER P.O. NUMBER 030225/030600829 HORK ORDER NUMBER 4-0514 ANN MARIE HOLBROW MCLAREN/HART 16755 VON KARMAN AVE IRVINE CA

92714

VOLUME - UNITS ASH-WGHT-X * TIME Date Time MID-COUNT 04/26 04/26 04/26 04/22 04/26 04/22 04/50 04/26 04/26 04/26 04/26 04/26 04/26 92/40 04/56 04/26 04/26 04/26 04/26 04/26 NUCL-UNIT-X U/M # E-03 E-03 8.8 +-4.5 E-02 L.T. 5. E-01 2.11+-0.21E 01 E-01 E-01 E-02 E-02 -01 E-01 E-01 5.87+-0.76E-01 ACTIVITY (PCI/GH DRY) t.T. 1.1. L. T. :: l.1 l • T • -::-1.1 L.1. ... :: 1.1 1.1 START STOP DATE TIME DATE TIME NUCLIDE 0 1 1 CO-60 2N-65 2R-95 RU-103 PU-238 PU-239 8A-140 RA-226 TH-228 RU-106 CS-134 CE-144 CS-137 CE-141 SR-90 CO-58 FE-59 1-131 MN-54 BE-7 W-40 COLLECTION-DATE 03/11 1430 03/11 1430 03/11 1430 STA 47/60/20 86-00-602-55 A 8G-00-003-FP 86-09-003-56 CUSTOMER'S IDENTIFICATION 44709 11032 44708 11035 44707 10460 TELEDYNE SAMPLE

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REPORT OF ANALYSIS

RUN DATE 05/25/94 PAGE DELIVERY DATE DATE RECEIVED

LAB. TIME VOLUME - UNITS
DATE TIME ASH-WGHT-X ** 04/11/94 HID-COUNT 04/26 05/01 04/26 04/26 04/26 05/02 04/26 04/26 05/02 05/05 05/23 04/26 05/02 05/02 04/26 04/26 04/26 04/26 04/26 04/26 04/26 PCI/LITER * 03/15/94 NUCL-UNIT-X U/M # E-02 E-01 E-02 E-02 E-02 . 8. E-03 . 7. E-03 +-0.3 E-01 +-0.4 E-01 E-02 L.T. 5. E-01 5.81+-0.65E 00 E 02 10-3 1.1 +-0.5 E-01 .2 +-0.3 E-01 1.4 +-0.4 E-03 E-01 .T. 3. E-01 1.00+-0.35E-01 L.T. 5. E-01 E-01 8.44+-0.846-01 E-02 IPCI/GM DRY) CUSTOMER P.O. NUMBER +-0-3 ACTIVITY L.T. 2. 030225/030600829 ... L. J. t.1. L.T. -1 ... L . T . 1.1. -1 DATE TIME DATE TIME NUCLIDE CO-58 FE-59 CO-60 ZN-65 ZR-95 RU-103 RU-106 U-235 U-238 TH-232 TH-223 CS-134 CS-137 BA-140 CE-141 CE-144 RA-226 0 1 6 PU-239 RU-106 1-131 TH-230 PU-238 HN-54 B.E-7 SK-90 0-234 K-40 #-3 STOP COLLECTION-DATE NORK ORDER NUMBER 03/11 1404 03/11 1404 03/11 1404 03/11 1404 03/11 1053 4-0514 START STA 96-09-057-56 92714 86-09-051-55 86-09-057-SP BG-09-057-ST BG-00-003-FG IDENTIFICATION CUSTOMER'S ANN MARIE HOLBROW MCLAREN/HART 16755 von Karman Ave IRVINE CA 44715 10448 10445 44714 10446 10444 44710 11030 TELEDYNE SAMPLE 44712 44713

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REPORT OF ANALYSIS

PAGE 24	
DELIVERY DATE	10/11/00
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RUN DATE 05/25/94

			ĬON.	WORK DRDER MUMBER	CUSTOMER P.O.	P.O. NUMBER	_	UAIE KELEIVED	0561116		
				7130	752010	010725/030600829		03/15/94	16/11/40	16/	
ANN MARIE HO	ANN MARIE HOLBROW Mei Aben/Hart	-		† T C O I †							
16755 YON IRVINE CA	16755 VON KARMAN AVE IRVINE CA	AVE 92714									٠.
					S n I t						
TELEDYNE		CUSTOMER'S S'	STA ATA	COLLECTION-DATE START STOP DATE TIME DATE TIME	NUCL TOE	ACTIVITY (PCI/GH DRY	•	NUCE-UNIT-# DO	MID-COUNT TIME DATE TIME	VOLUME - UNITS ASH-WGHT-X &	148.
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		(RA-226	L.T. 1. E	E 93		04/20		
		<u>,</u> 2 ^c			TH-228	3.85+-0.556-01	-01		97/40		•
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07/44	10401		,				•				•
44331	10452	AG-09-013-SP	Ģ	03/11 1420	PU-238		E-03		03/05		•
17144					U-234		10-4		05/01		•
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					11-235		E-03	٠	05/02		۰ ،
					U-238	+-0.3	E-01		02/05		.
					TH-232	+-0-+	E-01		20/50		•
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44722					;		F 02	PCI/LITER +	05/23		I n
44723		10360DUP BG-05-074-ST	-	03/11 1037	H - 5		,				•
46134	10361	96-05-014-55	_	03/11 1037	SR-90	R.4 +-4.0 E-02	E-02		02/50		•
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REPORT OF ANALYSIS

RUN DATE 05/25/94
DATE RECEIVED DELIVERY DATE PAGE 27

DELIVERY DATE 04/11/94 DATE RECEIVED 03/15/94 CUSTOMER P.O. NUMBER 030225/030600829 S 0 1 L HORK ORDER NUMBER 4-0514 92714 ANN MARIE HOLBROW MCLAREN/HART 16755 VON KARMAN AVE IRVINE CA

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VOLUME - UNITS ASH-WGHT-X &																										
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NUCL-UNIT-# U/H &		PCI/LITER #																								
	E-01	E 02	E-01	7. E-01 0.60E 00	E-02	E-02	10-01	E-02 F-01	E-02	E-01	E-01	E 01	E-02	E-02	E 00	E-01	E-01	E-01	.46E-01	E-02	E-03	E-01	E-03	E-02	E-01	E-01
ACTIVITY (PCI/GM DRY)	4-0-+	۶.	+-0.5	7.	;	•	· .	<u>.</u>		:	ë.	-:	÷	+-2.96	-	5	3.		C	2.	4-3.9	9-0-+	~		4-0-+	9-0-
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COLLECTION-DATE START STOP DATE TIME DATE TIME		I		60 %	•	•	_	·			•		•	•	•		•	_	•	_	_			_		
ECTIO TIME	1045	1329	1329	1329																1329	:					
COLL STARI DATE	03/11 1045	03/11 1329	03/11 13	03/11 13																11/20						
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CUSTOMER'S IDENTIFICATION	8G-05-027-SP	BG-09-096-ST	SS-960-60-98	98-960-60-98																9 - 100 - 00	5-00-00-00					
901	10368	10431	10432	10435																	10403					
TELEDYNE Sample Number		44734		44737																	44.38					
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REPORT OF ANALYSIS

RUN DATE 05/25/94

PAGE 28 DATE RECEIVED DELIVERY DATE 04/11/94 03/15/94 CUSTOMER P.O. NUMBER 030225/030600829 SOIL WOPK ORDER NUMBER 4-0514 92714 ANN MARIE HOLBROW MCLAREN/HART 16755 VON KARMAN AVE IRVINE CA

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VOLUME - UNITS ASH-WGHI-X *																											
MID-COUNT TIME DATE TIME	69/50	05/24	04/23	04/26	04/26	04/20	04/26	04/56	04/56	04/26	04/26	04/26	04/26	04/56	97/50	04/56	04/26	92/50	04/26	05/02	05/04	60/50	20/50	05/04	40/50	60/50	60/50
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NUCL IPE	TH-228	H-3	SR-90	BE-7 K-40	#N-54	CO-58	FE-39 FD-60	28-65 28-65	ZR-95	RU-103	RU-106	1-131	CS-134	CS-137	BA-140	CE-141	CE-144	RA-226	TH-228	PU-238	U-234	TH-230	PU-239	11-245	11-238	TH-242	TH-228
N-DATE STOP DATE TIME																											
ECT 16 TIME	1329	1320	1320	1320																1320	1						
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STA	_																				_						
CUSTOMER'S IDENTIFICATION	45-960-60-8P	BG-09-005-ST	86-09-005-55	86-09-005-56																	0.00-60-90						
	10433	10438	10439	10442																•	04401 84249						
TELEDYNE SAMPLE NUMBER	44738	44739	44740 10439	44741 10442																	24743						

REPORT OF ANALYSIS

WORK DRDER NUMBER CUSTOMER P.O. NUMBER	BER CUSTOMER P.G. NUMBER DATI	BER CUSTOMER P.G. NUMBER		OATE RECE	IVED 94	DELIVERY DATE	ATE PAGE
ANN MARIE HOLBROW 4-0514 030225/030600829 MCLAREN/HART 16755 von Karman ave 92714	030225/03060082	030225/030600829	030225/030600829		03/15/94	6.1.7.60 1.7.60	•
S 0 1 L	0 1	0 1	_				
COLLECTION-DATE CUSTOMER'S STA START STOP LDENTIFICATION NUM DATE TIME DATE TIME NUCLIDE (PCI/GM DRY)	COLLECTION-DATE START STOP DATE TIME DATE TIME NUCLIDE	I'ME NUCLIDE			NUCL-UNIT-X U/M * D	MID-COUNT TIME VO DATE TIME AS	VOLUME - UNITS ASH-WGHT-X O
B LeTe 1e	PU-238 L-T- 1-	B LeTe 1e	LeTe 1e	E-02	Α.	05/02	
#*0-+ K*I	#*0-+ K*I	#*0-+ K*I	#*0-+ K*I	0 9		02/04	
	1.1. 1.	1.1. 1.	1.1. 1.	9 0	• •	05/02	
L.1. 9.	L.1. 9.	L.1. 9.	L.1. 9.	9		05/04	
1.0 +-	1.0 +-0.3	1.0 +-0.3	1.0 +-0.3	o		05/04	
1.4 +-0.4 1.9 +-0.6	1.4 +-0.4 1.9 +-0.6	1.4 +-0.4 1.9 +-0.6	1.4 +-0.4 1.9 +-0.6	10-	سے منو	05/09 05/09	
BG-05-017-ST 03/11 1053 H-3 L.T. 2. E	H-3 L.T. 2.	L.T. 2.	L.T. 2.	0	02 PCI/LITER &	05/24	
86-65-017 \$\$ 03/11 1053 \$R-90 8.8 +-5.6	SR-90 8.8 +-5	8 + 8 + -5	8 +-5	E-0	2	04/21	
L.T.	BE-7 L.T.	E-7 L.T.		ш	-	04/25	
K-40 2+10+-	K-40 2-10+-	2+10+-	2+10+-	0.21E 01	- 6	04/25	
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2N-65 Lete 3e	1.1.	1.1.	1.1.	F-02	~ ~	04/25	
t.T. 6	t.T. 6	t.T. 6	t.T. 6		•	04/25	
L.T.	L.T. 3	L.T. 3	L.T. 3		<u>-</u>	04/25	
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	L.T.	L.T.	L.T.	F-01	=	04/25	
				E-01	_	22/50	
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PAGE			
DELIVERY DATE	DATE RECEIVED DELICES	04/11/54	
	DATE RECEIVED	03/15/94	
REPORT OF ANALYSIS	CUSTCMER P.O. NUMBER	030225/030600829	
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			N MARIE HOLBROW

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	VOLUME - UNITS ASH-MGHT-% &		
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S 0 1 L	IME NUCLIDE H-3 SR-90 SR-90 PU-238 U-235 U-238 TH-232 TH-228	PU-238 U-234 IH-230 PU-239 U-235 U-238 IH-232	BE-7 K-40 MN-54 CO-58 FF-59 CC-60 ZN-65 ZR-95 RU-103 RU-106
4-0514	COLLECTION-DATE START STOP DATE TIME DATE TI 03/14 0920 03/14 0920	03/14 0920	03/14 0920
OLBROW I Arman ave 92714	CUSTOMER'S STA ENTIFICATION NUM BG-10-001-ST BG-10-001-SS BG-10-001-SP	10474DUP 86-10-001-5P	10476 BG-16-061-5G
ANN MARIE HOLBROW HCLAREN/HART 16755 von Karman Ave Irvine ca	TELEDYNE SAMPLE NUMBER 10 44615 10472 44616 10473 44617 10474	44618 10	44619

REPORT OF ANALYSIS

DELLVERY DATE DATE PECETVED

RUN DATE 05/25/94

PAGE 2 04/11/94 03/15/94 CUSTOMER P.O. NUMBER 030225/030600829 SOIL WORK ORDER NUMBER 4-0514 92714 ANN MARIE HÖLBRÖM MCLAREN/HART 16755 VON KARMAN AVE IRVINE CA

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ELEDYNE Sample	NUMBER	44619 10476							44621		44622		44623								46.244	-									

REPORT OF ANALYSIS

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PAGE 3		
DATE RECEIVED DELIVERY DATE	96/11/90	
DATE RECEIVED	03/15/94	
CUSTOMER P.O. NUMBER	030225/030600829	SOIL
HORK ORDER NUMBER	4-0514	•
	4110	7,7
	ANN HARIE HOLBROW MCLAREN/HART 16755 von Karman ave	IRVINE CA

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NUCL-UNIT-X U/A &																										PC1/LITER		
	E-01	E-01	E-01	E-01	E-01		E-01	E 00	E-03	E-02	E-01	E-02	E-02	E-02	E-02	E-01	E 00	E-02	LE-01	E-01	E-01	E-01	E-01	E-02		E 02	E-02	
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CUSTOMER'S IDENTIFICATION	86-10-004-56				\$	ر بخ	3	94-400-00-98																		BG-10-003-ST		86-10-003-55
0 10€	10482							11036																		10485	•	10486
TELEDYNE SAMPLE NUMBER	44624 10482							44625																		46434		44627

REPORT OF ANALYSIS

RUN DATE 05/25/94

PAGE 4 DATE RECEIVED DELIVERY DATE 04/11/94 CUSTOMER P.O. NUMPER WORK ORDER NUMBER

03/15/94 030225/030600829 1 1 0 S 4-0514 92714 ANN MARIE HOLBROW MCLAREN/HART 16755 VON KARMAN AVE IRVINE CA

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VOLUME - UNITS ASH-WGHT-% *		•																					
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S S S S S S S S S S S S S S S S S S S	PU-238 U-234	TH-230 PU-239	U-235 U-238	TH-232 TH-228	B	K-40	MN-54	CO-58	FE-57	20 - 27 - 20 - 20 - 20 - 20 - 20 - 20 -	78-95	RU-103	RU-106	1-131	CS-134	CS-137	BA-140	CE-141	CE-144	RA-226	TH-228	, 1 2	` :
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CUSTOMER'S	-58					86-10-003-86																	8G-10-002-ST
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TELEDYNE SAMPLE						44629																	44630

REPORT OF ANALYSIS

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PAGE DATE RECEIVED DELIVERY DATE CUSTOMER P.O. NUMBER WORK ORDER NUMBER

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107	***			VOLUME - UNITS ASH-WGHT-X 0																							
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	030225/0		S 0 1 L	JP TIME NUCLIBE	SR-90		0.0		U-238	TH-232 TH-228		BE-7) de	4 C C C	50-13-1 50-13-1	09-00	59-NZ	2R-95	RU-103	401-0x	1-131	C2-124	0.51.160	7 H - H - H - H - H - H - H - H - H - H	441-11	RA-226	TH-228
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7		92714		× ± ₹	<u> </u>	86-10-002-SP						RG-10-002-56															
	ANN MARIE HOLBROW	MCLAREN/HAK! 16755 von Karman Ave Irvine ca		E CUSTOMER'S	IDEN	10491						10404	10+3+														
	ANN MAR	MCLAREN/HARI 16755 VON KA IRVINE CA		TELEDYNE Sample	NUMBER	44631							44033														

TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SFRVICES REPORT OF ANALYSIS

PAGE 6

PAGE			LAB.	. Rv W	~~~~	იიი იიიიი	• ****
			VOLUME - UNITS ASH-WGHT-X &				
	DELIVERT DAIE 04/17/94	TID-COUNT		04/16 05/22 04/18	04/20 04/26 05/04 04/20	04/26 05/04 05/04 05/06 05/06 05/26 04/26	05/06 05/06 04/25 04/25 04/25 04/25
	DATE RECEIVED 03/15/94			E-02 PCI/GM ORY * E 02 E-02 PCI/GM ORY *	E-02 PCI/GM DRY • E-02 PCI/GM DRY • E-02 PCI/GM DRY • E-02 PCI/GM DRY •	PCI/GH DRY PCI/GH DRY PCI/GH DRY PCI/GH DRY PCI/GH DRY PCI/GH DRY PCI/GH DRY PCI/GH DRY	CI/GH DRY CI/GH DRY CI/GH DRY PCI/GH DRY PCI/GH DRY PCI/GH DRY PCI/GH DRY PCI/GH DRY
ANALYSIS	10MER P.O. NUMBER 30225/030600829		ACTIVITY (PCI/LITER) L.T. 1. E	L.T. 9. E- L.T. 1. E L.T. 9. E-	L.T. 2. E. 3.5 +-1.5 E. 2.7 +-1.4 E-	4 - 1 - 4 - 4 - 1 - 4 - 4 - 4 - 4 - 4 -	
REPORT OF AN	CUSTOMER 030225/	\$ 0 1 L	P TIME NUCLIDE H-3	SR-90 H-3	PU-238 U-234 TH-230	U-235 U-235 U-238 TH-228 TH-228 U-234 U-239 U-239 U-239	1H-232 1H-232 1H-228 R-40 MN-54 CD-58 FE-59 CD-60
•	WORK DRDER NUMBER 4-0514		COLLECTION-DATE STAP STAP DATE TIME DATE TI	03/14 0925	03/14 1150	03/14 1150	03/14 1150
		ARMAN AVE 92714	CUS	86-10-005-5 86-10-005-5 86-12-002-5	10552 BG-12-002-55 10553 BG-12-002-5P	105530UP RG-12-002-SP	10555 66-12-002-56
	ANN MARIE HOLBROW	HCLAREN/HART 16755 VON KARMAN AVE IRVINE CA	ш	44634 10495 44635 10496 44636 10551	44637 105	4.639 10	44040

REPORT OF ANALYSIS

RUN DATE 05/25/94

			3	011 M		CUSTOMER P.O. NUMBER	P.0.	LUMBER	DATE RECEIVED	DELIVERY DATE		PAGE	17
INN MAR	ANN MARIE HOLBROW		t	j.		03022	030225/030600829	0829	03/15/94	04/11/94	1/94		
MCLAREN/HART 16755 von Kai 1rvine ca	RMAN AVE	92714											
					v	. 0 ! L							
TELEDYNE Sample Number	FE CUSTOMER'S I IDENTIFICATION	STA		COLLECTION-DATE START STOP DATE TIME DATE T	E OP TIME	NUCLIDE	ACT (PCI/	ACTIVITY (PCI/GH DRY)	NUCL-UNIT-3 U/M &	MID-COUNT TIME Date Time	VOLUME - UNITS ASH-WGHT-% &	tAB.	
44680	10571 86-12-005-56	3-SG		03/14 1245		L-131 CS-134 CS-137		***	E-01 E-02 E-02	04/26 04/26 04/26	·	***	
						BA-140 CE-141	֡֝֝֓֜֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֡֝֝֡֓֓֓֓֡֝֡֓֡֓֓֓֡֝֡֓֜֝֡֓֡֓֡֝֡֓֜֝֡֡֓֡֓֡֝֡֡֡֓֜֝֡֡֓֜֝֡֡֡֡֝֡֡֡		E-01 E-02	04/26 04/26			
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						X-40 3N-54	1.31+ L.T.	-0-2 2•	E-02	04/27		.	
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PU-236 U-234 TH-230 PU-239 U-235

03/14 0925

8G-10-005-SP

44685 10497

REPORT OF ANALYSIS

S O I L S O I L TIME NUCLIDE (PCI/GH DRY) NUCL- THE NUCLIDE (PCI/GH DRY) NUCL- TH-23				WORK ORDER NUMBE	œ	CUSTONER	CUSTGMER P.O. NUMBER	18ER	DATE RECEIVED	DELIVERY DATE	Y DATE	PAGE	2
## ACTIVITY NUCL-UNIT-# DATE TIME ASH-WGHT-# 0.00 THE NUCLIDE PCI/CH DRY U/H ** DATE TIME ASH-WGHT-# 0.00 TH-238 9.2 *-0.4 E-01 05/06 6 TH-238 1.2 *-0.4 E-01 05/06 6 TH-239 1.2 *-1.5 E-02 05/06 6 TH-239 1.2 *-1.5 E-02 05/02 6 TH-230 1.2 *-1.5 E-0.5 05/02 6 TH-230 1.2 *-1.5 E-0.5 05/02 6 TH-230 1.2 *-1.5 E-0.5 05/05 6 TH-230 1.2 *-1.5 E-0.5 05/05 6 TH-230 1.2 *-1.5 E-0.5 05/05 6 TH-230 1	ANN MARIE HOLBROW MCLAREN/HARI 16755 von Rarman ave 18vine ca	_		4-0514		030225	5/0306008;	62	03/15/94	04/1	1/94		
NETTYTY NUCL-UNIT-X NUCL-UNIT-X NUCL-UNIT-X					S	0							
U-238 9.2 +-2.7 E-02 05/06 TH-228 1.5 +-0.4 E-01 05/06 TH-228 1.2 +-0.5 E-01 05/06 K-40	CUSTOMER'S STA STA IDENTIFICATION NUM DATE		CO STA DATE	COLLECTION-DAT START DATE TIME DATE	w D	NUCL TDE	ACTIV:			MID-COUNT TIME ATE TIME	VOLUME - UNITS ASH-WGHT-X *	LAB	
BE-7 L-T. 6. E-01 04/26 K-40 1.20+-0.12E 01 04/26 CO-58 L-T. 6. E-02 04/26 CO-60 L-T. 7. 2. E-01 04/26 ZN-65 L-T. 4. E-02 04/26 ZN-65 L-T. 7. E-02 04/26 ZN-65 L-T. 7. E-02 04/26 ZN-103 L-T. 7. E-02 04/26 RU-103 L-T. 7. E-02 04/26 L-T. 9. E-02 04/26 04/26 CS-134 L-T. 7. E-02 04/26 CE-137 L-T. 9. E-02 04/26 CE-141 L-T. 9. E-02 04/26 CE-141 L-T. 9. E-01 04/26 TH-228 4.31+-0.69E 01 TH-228 4.31+-0.49E 02 PU-238 L-T. 2. E 02 05/02 TH-230 B.9 +-4.1 E-02 05/02 PU-234 3.3 +-1.8 E-02 05/02 PU-238 L-T. 1. E-02 05/02 PU-238 L-T. 1. E-02 05/02 PU-238 L-T.	8G-10-005-SP 03/1	03/1	03/1	03/14 0925	>⊢ ►	-238 -232 -228				05/02 05/06 05/06		•••	
H-228 4.31+-0.45E-01 04725 H-3 L.T. 2. E 02 PCI/LITER # 05/23 SR-90 8.9 +-4.1 E-02 04/16 U-234 3.3 +-1.8 E-02 05/06 IH-230 3.3 +-2.0 E-02 05/06 PU-239 L.T. 1. E-02 05/06 U-235 L.T. 1. E-02 05/06 U-235 L.T. 1. E-02 05/02	86-10-005-56 03/1	03/10	03/1/	03/14 0925	● 火 M ○ 〒 ○ 2 2 2 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8			# - 01 # - 02 # - 03 # - 03		04/26 04/26 04/26 04/26 04/26 04/26 04/26 04/26 04/26			
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PU-238 L.T. 1. E-02 05/06 U-234 3.3 +-1.8 E-02 05/02 TH-230 3.3 +-2.0 E-02 05/06 PU-239 L.T. 1. E-02 05/06 U-235 L.T. 1. E-02 05/02 U-238 2.2 +-1.5 E-02	86-11-010-55 03/1	03/1/	03/1	03/14 1310	(A	1R-90	6.			04/16		m	
	86-11-010-SP 03/14	03/1/	03/14	03/14 1310		20-238 1-234 11-230 1-239 1-235				05/06 05/05 05/06 05/06 05/02		00000	

REPORT OF ANALYSIS

			-	HORK OF	HORK ORDER NUMBER	CUSTOMER	P.O. NUMBER	IBER	DATE RECEIVED	DELIVERY DATE		PAGE
ANN HARI	ANN MARIE HOLBROW	2		4	4-0514	030225,	030225/03060082	6	03/15/94	04/11/94	16/1	
MCLAREN/HART 16755 von Kai Irvine Ca	MCLAREN/HART 16755 von Karman Irvine ca	4 AVE 92714	•									
						S 0 1 L						
TELEDYNE Sample Number		CUSTOMER'S IDENTIFICATION	STA	COLI STARI DATE	COLLECTION-DATE START STOP DATE TIME DATE TIME	4E NUCLIDE	ACTIVITY {PCI/GM URY	_	NUCL-UNIT-X U/M & I	MID-COUNT TIME DATE TIME	VOLUME - UNITS Ash-wght-% **	LAB.
4 4 4	10560	86-12-003-SG		03/14 1210	1210	RU-103 RU-106 I-131 CS-134 CS-137 GE-140 CE-141 CE-144 RA-226	L. 1. 2. 2. 2. 4. 1. 2. 4. 1. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2.	60E-02 60E-02 60E-02 60E-02 6-01 6-01 21E-01		04/25 04/25 04/25 04/25 04/25 04/25 04/25 04/25	·	****
44645	10561	BG-12-004-ST		03/14 1225	1225	#-3	1.1. 1	• E 02	PCI/LITER #	05/22		٩n
44646	10562	86-12-004-SS		03/14 1225	1225	SR-90	L.T. 9.	• E-02		04/16		m
**************************************	10521	86-11-075-56		03/14 1205	1205	0 E - 7 0 E - 7 0 E - 7 0 E - 50 0 E - 50 0 E - 50 0 E - 50 0 E - 100 0 E - 100	1	5. E-01 5. E-02 5. E-02 2. E-02 4. E-02 4. E-02 4. E-02 6. 43E-01 6. 43E-01 6. 6-01 7. E-02 6. 6-01 6. 6-02 7. E-02 6. 6-01 7. E-02 6. 6-01 7. E-02 6. 6-01 7. E-02 7. E-02 8. E-02 8. E-02 9. E-03 9. E-03		04/25 04/25 04/25 04/25 04/25 04/25 04/25 04/25 04/25 04/25 04/25 04/25		****

REPORT OF ANALYSIS

			7	WORK ORDER NUMBER	JMBER	CUSTOMER	P.0.	NUMBER	DATE	RECE IVED	DELIVERY	' DATE	-
ANN MAR	ANN MARIE HOLBROW	3		4-0514		030225,	030225/030600829	829	03	03/15/94	04/11/94	1/94	
MCLAREN/HART 16755 von Kai Irvine ca	MCLAREN/HART 16755 von Karman ave Irvine ca	4 AVE 92714											
					S	011							
TELEDYNE Sample Number		CUSTOMER'S S IDENTIFICATION N	STA	COLLECTION-DATE STAR1 DATE TIME DATE	ON-DATE STOP DATE TIME	NUCLIDE	ACTIN (PCI/4	ACTIVITY PCI/LITER)	NUCL-UNIT-X U/H o		MID-COUNT TIME DATE TIME	VOLUME - UNITS ASH-WGHI-X \$	_
44648	10523	86-11-036-ST		03/14 1215		H-3	L.T.	1. E 0	02		05/22		
44649	10524	BG-11-036-SS		03/14 1215	ψı	SR-90	L.T.	1. E-01	1 PCI/6M	DRY &	04/18		
46650	10525	BG-11-036-SP		03/14 1215	<u>.</u>	PU-238		8. E-03	3 PCI/GM		04/20		
200	14701					U-234	5.7 +-)2 PC1/GR	DRY S	97/40		
					,- I	TH-230	3.9	+-2.2 E-0	02 PC1/6M	2 6 2 5	05/04		
						PU-239	• <u>-</u>		10/11/07 14 PC1/68	, ac	04/26		
						U-233	1	2:2		DRY	04/26		
						TH-232					05/04		
					<u>. </u>	TH-228					05/04		
				21/14 1215	•	7-1		5. E-01	01 PC1/GM		04/25		
44651	10527	95-950-11-9A			-	0+-X	+0	44.0		DRY	04/25		
						MN-54	L.T.		02 PC1/GM	OR	04/25		
					-	60-58				08.Y	04/25		
						FE-59	<u>:</u> .			- X - C - X - X	27/40		
					<i>-</i> '	09-00	• •		10/11/07 10/11/08	¥ 2	04/25		
						55-86		6. E-02		ORY	04/25		
						RU-103	֡֡֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֡֓֓֡֓֓֓֓֡֡֝֓֓֡֡֝֡֡֜֝֡֡֡֓֓֓֡֡֡֝֡֡֓֓֡֡֡֡֜֝֓֡֡֡֡֜֝֡֡֡			DRY	04/25		
						RU-106	L.T.				04/25		
						1-131	L.T.]. E		ORY	04/25		
					-	CS-134	1:1:		_	ORY.	04/25		
						CS-137	6.67+-	3.3			67/50		
						BA-140	• ·			, K	04/50		
						CE-141	<u>.</u> .]. E-01	10 PC1/67	* * *	04/25		
						C F = 14 4	<u>.</u> .			, A	04/25		
						7 A - 2 2 0	•	- FU		7	04/25		
						,		1					

REPORT OF ANALYSIS

WORK OKOER NOMBER
s
COLLECTION-DATE START STOP DATE TIME DATE TIME NUCLIDE
F-13
H-3
SR-90
PU-23
TH-230
U-235
<u>.</u>
TH-228
9E-7
K-40
HN-54
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CD-60
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28-95
RU-103
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1-131
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CE-141
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TH-22

REPORT OF ANALYSIS

	MORK ORDER NUMBER	CUSTOMER P.O. NUMBER	DATE RECEIVED	DATE RECEIVED DELIVERY DATE	PAGE	PAGE 11
	4-0514	030225/030600829	03/15/94	04/11/94		
92714						

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LAB.	ĸ	m		•••••••	***
VOLUME - UNITS ASH-WGHT-X *				·	
MID-COUNT TIME DATE TIME	05/58	91/40	04/20 04/26 04/26 04/26 04/26 05/06	04/20 04/26 05/06 04/20 04/26 05/26 05/06	04/25 04/25 04/25 04/25 04/25 04/25 04/25
ACTIVITY NUCL-UNIT-X (PCI/LITER) U/H **	L.T. 1. E 03	L.T. 9. E-02 PCI/GM DRY 0	L.T. '7. E-03 PCI/GM ORY \$ 2.7 +-1.7 E-02 PCI/GM ORY \$ 2.9 +-1.7 E-02 PCI/GM ORY \$ L.T. 9. E-03 PCI/GM ORY \$ L.T. 9. E-03 PCI/GM ORY \$ 5.8 +-2.3 E-02 PCI/GM ORY \$ 2.7 +-1.6 E-02 PCI/GM ORY \$ L.T. 7. E-02 PCI/GM ORY \$	L.T. 3. E-02 PCI/GM DRY \$3.6 +-1.7 E-02 PCI/GM DRY \$3.7 +-1.7 E-02 PCI/GM DRY \$1.7 .3. E-02 PCI/GM DRY \$1.7 .8. E-03 PCI/GM DRY \$1.7 .8. E-03 PCI/GM DRY \$1.7 .7. \$1.5 E-02 PCI/GM DRY \$1.5 E-02 PCI/GM D	L.T. 4. E-01 PCI/GH DRY 0 2.64+-0.34E 00 PCI/GH DRY 0 L.T. 3. E-02 PCI/GH DRY 0 L.T. 1. E-02 PCI/GH DRY 0 L.T. 3. E-02 PCI/GH DRY 0 L.T. 7. E-02 PCI/GH DRY 0 L.T. 4. E-02 PCI/GH DRY 0 L.T. 6. E-02 PCI/GH DRY 0 L.T. 6. E-02 PCI/GH DRY 0 L.T. 6. E-02 PCI/GH DRY 0 L.T. 3. E-01 PCI/GH DRY 0 L.T. 1. E 00 PCI/GH DRY 0
E DP TIME NUCLIDE	H-3	SR-90	PU-238 U-234 TH-230 PU-239 U-238 U-238 TH-232	PU-238 U-234 TH-230 PU-235 U-235 U-238 TH-232	8E-7 K-40 HN-54 CO-56 CO-60 2N-65 2R-95 RU-103 I-131
COLLECTION-DATE START STOP DATE TIME DATE T	03/14 1250	03/14 1250	03/14 1250	03/14 1250	03/14 1250
CUSTOMER'S STA IDENTIFICATION NUM	10534 BG-11-031-St	10535 86-11-031-55	10536 BG-11-031-SP	10536DUP BG-11-031-SP	10539 BG-11-031-SG
TELEDYNE Sample Number	44657	44658 1		44660	44661

REPORT OF ANALYSIS

RUN DATE 05/25/94

4-0514 LLEC710
S O I
ION-DATE
START DATE TIME DATE TIME NUCLIDE
03/14 1250 CS-134 CS-137 BA-140 CE-141 CE-144 RA-226
03/14 1250 H-3
03/14 1250 H-3
03/14 1250 H-3
03/14 1200 H-3
03/14 1200 SR-90
03/14 1200 PU-238 U-234 TH-230 PU-238 U-235 U-235 TH-232

04/25 04/25 04/25 04/25 04/25

L.T. 3. E-01 1.72+-0.26E 00 L.T. 3. E-02 L.T. 3. E-02 L.T. 9. E-02 L.T. 2. E-02

M - 54 CO - 58 FE - 59 CO - 60

03/14 1200

BG-12-001-SG

44668 10549

REPORT OF ANALYSIS

			3	HORK ORDER NUMBER	CUSTOMER	CUSTOMER P.O. NUMBER	DATE RECEIVED	D DELIVERY DATE	r DATE	PAGE	18
ANN MARIE HO	ANN MARIE HOLBROW MCLAREN/HART	AD S		4-0514	030225	030225/030600829	03/15/94	04/11/94	1/94		
16755 VON IRVINE CA	16755 VON KARMAN AVE IRVINE CA	N AVE 92714									
					S 0 1 L				·		
TELEDYNE Sample Number		CUSTOMER'S ST IDENTIFICATION NU	STA	COLLECTION-DATE START STOP DATE TIME DATE TIME	E NUCLTOE	ACTIVITY (PCI/GM DRY)	NUCL-UNIT-# U/M &	MID-COUNT TIME DATE TIME	VOLUME UNITS ASH-WGHT-X *	LAB.	
44685	10497	BG-10-005-SP		03/14 0925	U-238 TH-232 TH-228	9.2 +-2.7 E-02 1.5 +-0.4 E-01 1.2 +-0.5 E-01		05/02 05/06 05/06		999	
44686	10499	86-10-005-56		03/14 0925	86-7	L.T. 6. E-01		04/26		4 4	
					NN-54	L.T. 5. E-02		04/26		**	
					CO+58	L.T. 6. E-02		04/26		• •	
					CD-60	: ;		04/26		.	
					29-N2	L.T. 1. E-01		04/26		• •	
					2R-95 B11-103			04/26		•	
					RU-106	÷		04/26		.	
					1-131			04/26		• •	
					CS-134	L.T. 5. E-02	. .	04/20		•	
					BA-140	*		04/26		4	
					CE-141	:		04/26		.	
					w	•T• 3• E		04/26		• •	
					RA-226 TH-228	1.31+-0.60E 00 4.31+-0.49E-01	n =	04/26		•	
44687	10511	8G-11-010-ST		03/14 1310	H-3	L.T. 2. E 0	2 PCI/LITER *	05/23		īv	
44688		86-11-010-55		03/14 1310	SR-90	8.9 +-4.1 E-0	2	04/16		6 0	
						•	•	40/50		4	
44689	10513	86-11-010-SP		03/14 1310	PU-238	2.3 4-1.8 F-02	,	05/02		φ.	
					TU-330	1 - 2	. ~	05/06		•0	
					P11-239		. ~	90/50		•	
					U-235	:	2	05/05		•	
					U-238	-1.5	2	05/02		ø	

REPORT OF ANALYSIS

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			HORK	WORK ORDER NUMBER	CUSTOMER	P.O. NUMBER	DATE RECEIVED	DELIVERY DATE		7 A C E . 1 4	_
ANN MARI	ANN MARIE HOLBROW	3	~	4-0514	030225	030225/030600829	03/15/94	04/11/94	•		
MCLAREN/HART 16755 von Ka IRVINE CA	MCLAREN/HARI 16755 von Karman ave Irvine ca	AVE 92714						,			
					S 0 1 L						
TELEDYNE				COLLECTION-DATE		ACTIVITY	M NUCL-UNIT-%	_	VITS		
NUMBER		IDENTIFICATION NUM		DATE TIME DATE TIME	ME NUCLIDE	7		DATE TIME AS	ASH-WGHT-X *	LAB.	
	•		02/1	03/14 1310	TH-232	+-2.5		2/06		9	
44084	10513	16-010-11-99		2401	TH-228	5.0 +-3.1 E-02		05/06		•	
0	31301	32-010-11-38	03/1	03/14 1310	BE-7	L.T. 4. E-01		04/26		•	
04044		25.212-11-22	1		K-40	2+-0-49E		97/50		•	
					MN-54			04/26		.	
					CO-58	;		04/26		•	
					FE-59			04/26			
					09-00	m		97/40		• •	
					59-N2	~ 1		97/50		• •	
		•			28-95	, ,		97/60		•	
					RU-103	•		97/40		٠.	
					RU-106	Lele 3. E-UI		04/26		•	
					151-1			04/26	•	*	
					CS-137	8+-0-35		97/50		.	
					BA-140	L.T. 2. E-01		97/50		.	
					CE-141	:		14/26		• 4	
					CE-144	L.T. 2. E-01		04/20		r •#	
					TH-228	+-0.39		04/26		•	
										•	
44691	10516	86-11-910-MS	03/1	03/14 1310	SB-90	9.9 +-5.8 E-02		04/20		m	
44692	10516MS	BG-11-010-MS	`		SR-90	3.9 +-0.2 E 00		04/20		m	
,	200	OM-CIC-LI-Ja Sons as	`		56-90	4.1 +-0.2 E 00		04/20		m	
44043	1031601	511 ATA TT-00 O	•					9		•	
76975	10517	86-11-075-51	03/1	03/14 1205	H-3	L.T. 2. E 02	PCI/LITER *	05/23		n	

REPORT OF ANALYSIS

PAGE 20			LAB.	en.	***	••••	~~	
	* 6/2		VOLUME - UNITS ASH-WGHT-X o					
DELIVERY DATE	04/11/94		MID-COUNT TIME DATE TIME	04/16	05/02 05/02 05/07	05/02 05/02	05/02 05/07 05/07	04/26 04/26 04/26 04/26 04/26 04/26 04/26 04/26 04/26 04/26 04/26
CATE RECEIVED	03/15/94		NUCL-UNIT-# 04					
R P.O. NUMBER	030225/030600829		ACTIVITY (PCI/GM DRY)	L.T. 9. E-02	L.T. 6. E-03 3.8 +71.7 E-02 5.0 +-2.4 E-02	÷.	4.1 +-1.8 E-02 5.0 +-2.5 E-02 L.T. 6. E-02	L.T. 1. E 00 1.74+-1.02E 00 1.T. 1. E-01 1.T. 3. E-01 1.T. 2. E-01 1.T. 2. E-01 1.T. 4. E-01 1.T. 4. E-01 1.T. 4. E-01 1.T. 9. E-01
CUSTOMER	03022	SOIL	NUCLIDE	SR-90	PU-238 U-234 TH-230	PU-239 U-235	U-238 TH-232 TH-228	BF-7 K-46 CG-56 CG-58 CG-60 ZN-65 ZN-65 ZN-65 ZN-65 CG-103 CS-134 CS-134 CS-134 CE-144 CF-144
WORK ORDER NUMBER	4-0514		COLLECTION-DATE START STOP DATE TIME DATE TIME	03/14 1205	03/14 1205			03/11 1420
	10W IN AVE 92714		CUSTOMER'S STA	86-11-075-55	8G-11-075-SP			86-09-013-56
	ANN MARIE HOLBROW McLaren/Hart 16755 von Karman Ave Irvine ca		TELEDYNE Sample Number 10E	44695 10518	61501 96944			44701 10454

REPORT OF ANALYSIS

	WOPK ORDER NUMBER	CUSTOMER P.O. NUMBER	DATE RECEIVED	DATE RECEIVED DELIVERY DATE	PAGE 16	9
ANN MARIE HOLBROW McLaren/Hart 16755 von Karman ave Irvine ca	4-0514	030225/330600829	03/15/94	04/11/94	-	

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VOLUME - UNITS ASH-WGHT-X *					
MIO-COUNT TIME DATE TIME	05/13 05/13 05/13 05/13 05/13 05/13	05/22	04/16	05/02 05/02 05/02 05/02 05/02 05/02 05/06 04/26 04/26 04/26 04/26 04/26	
NUCL-UNIT-T U/M o		PCI/LITER #			
ACTIVITY NU	L.T. 3. E-01 L.T. 3. E-02 9.49+-0.95E-01 L.T. 7. E-01 L.T. 2. E-01 L.T. 2. E-01 L.T. 5. E-01 L.T. 5. E-01 L.T. 5. E-01	1.2 +-0.6 E 03	L.T. 5. E-02	Lorent 2. E-03 Lorent 2. E-03 Lorent 2. E-03 Lorent 3. E-03 Lorent	
P NUCLEDE	RU-106 I-131 CS-134 CS-137 GE-141 CE-141 RA-226 TH-228	Н-3	SR-90	PU-238 U-234 TH-230 PU-235 U-235 U-236 TH-238 TH-238 TH-238 CC-56 CC-56 CC-56 RN-95 RU-103	
COLLECTION-DATE START STOP DATE TIME DATE T		03/14 1245	03/14 1245	03/14 1245 03/14 1245	
CUSTOMER'S STA	10566MSD BG-12-004-MG	BG-12-005-ST	86-12-005-55	BG-12-005-SP	
	10566MSD E	10567	10568	10571	
TELEDYNE Sample Number	44676	44677	44678	44680	

REPORT OF ANALYSIS

			Ď.	WORK ORDER NUMBER	CUSTOMER P.O. NUMBER	P.0.	UMBER	DATE RECEIVED	ED DELIVERY DATE		PAGE 17
ANN MARIE HOLGROW HCLAREN/HART 16755 VON KARMAN AVE 18VINE CA	MARIE HOLGROW Ren/Hart 15 von Karman Ne Ca	OW AVE 92714		4-0514	030225	030225/030600829	3829	03/15/94	04/1	04/11/94	
					S 0 1 L						•
TELEDYNE Sample Number		CUSTOMER'S ST	STA	COLLECTION-DATE START STOP DATE TIME DATE TIME	NUCL FOE	ACT)	ACTIVITY (PCI/GM DRY)	NUCL-UNIT-%	MIO-COUNT TIME DATE TIME	VOLUME - UNITS ASH-WGHT-% *	LAB.
4 + 6 8 O	10571	86-12-005-56	0	03/14 1245	1-131 CS-134 CS-134 BA-140 CE-141	+++++		E-01 E-02 E-01 E-01	04/26 04/26 04/26 04/26 04/26		****
					RA-226 TH-228	::		-01 -02	04/26 04/26		**
4 4 6 8 1	105710UP	JP 86-12-005-56	S	03/14 1245	M N - 54 M N - 54 C O - 56 C O - 56 C O - 60 C N - 65 C N - 103 R U - 103 R U - 103 C S - 134 C S - 134 C S - 134 C S - 134 C S - 140 C E - 141 C E - 144 C E - 144				04/27 04/27 04/27 04/27 04/27 04/27 04/27 04/27 04/27 04/27		***
44685	10497	86-10-005-SP	Ü	03/14 0925	PU-238 U-234 TH-230 PU-239 U-235	1.03.	1. 0.3 7.	E-02 E-01 E-03 E-03	05/02 05/02 05/06 05/02 05/02		~~~~

REPORT OF ANALYSIS

RUN DATE 05/25/94

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WORK ORDER NUMBER CUSTOMER
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COLLECTION-DATE START STOP DATE TIME DATE TIME
03/14 0925 H-3
03/14 0925
03/14 1150
03/14 1150 SR
03/14 1150 PU-234 U-234 TH-230 PU-239 U-239 U-235 U-235 U-235 U-235 U-232 TH-228
03/14 1150 PU-238 U-234 TH-230 PU-239 U-235 U-235 U-235 TH-232 TH-232
03/14 1150 BE-7 K-40 MN-54 CO-58 FE-59 FE-59 ZN-65

REPORT OF ANALYSIS

RUN DATE 05/25/94

	WORK ORDER NUMBER	CUSTOMER P.O. NUMBER	DATE RECEIVED DELIVERY DATE	DELIVERY DATE	PAGE	~
ANN MARIE HOLBROW McLaren/Hart 16755 vom Karman ave 1ryine ca	4-0514	030225/030600829	03/15/94	04/11/94		

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LAB.	क्कक्षक्षक्षक्षक्ष	RV.	m	~~~~~	***
YOLUME - UNITS ASH-WGHT-% **					
MID-COUNT TIME DATE TIME	04/25 04/25 04/25 04/25 04/25 04/25 04/25	05/22	04/18	04/20 04/26 04/26 04/26 04/26 05/06	04/25 04/25 04/25 04/25 04/25 04/25
NUCL-UNIT-X U/M &		PCI/LITER *			
	80 E-01 80 E-01 80 E-02 80 E-02 80 E-02	€ 02	E-02	6 E E E E E E E E E E E E E E E E E E E	32E 00 E - 02 E - 02 E - 02 E - 02 E - 02
ACTIVITY (PCI/GH DRY)	- 1 W441-040844	L.T. 1.	L.T. 9.	1.9 +-1.1 3.2 +-1.6 L.T. 7. L.T. 6. 2.2 +-1.0 4.2 +-2.0 L.T. 3.	1.01.00.00.00.00.00.00.00.00.00.00.00.00
		:	ن	1007767	ن ئىنىدىن سىن
NUCL IDE	2R-95 RU-103 RU-106 I-131 CS-134 CS-137 BA-140 CE-141 CE-144 TH-226	H-3	SR-90	PU-238 U-234 TH-230 PU-239 U-235 U-238 TH-232	2
ATE STOP TE TIME					
COLLECTION-DATE START STO DATE TIME DATE	O	01	10	01	10
COLLEC STAPT ATE TI	03/14 1150	03/14 1210	03/14 1210	03/14 1210	03/14 1210
STA S NUM DA	60	6	03	0	Ö
CUSTOMER'S S	BG-1 2-002-5G	BG-1 2-003-ST	BG-12-003-SS	BG-12-003-SP	BG-12-003-SG
CUS	10555	10556	10557	25 55 56 57 58	10560
TELEDYNE Sample Number	44640	44641	44642	44643	44644 10560

REPORT OF ANALYSIS

	HORK ORU	JORK ORDER NUMBER	CUSTOMER P.O. NUMBER	DATE RECEIVED DELIVERY DATE	DELIVERY DATE	PAGE
ANN MARIE HOLBROW McLaren/Hart 16755 von Karman ave		4-0514	030225/030600829	03/15/94	04/11/94	
IRVINE CA	*1177					

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LAB.	*****	I C	e n	****
VOLUME - UNITS ASH-WGHT-X &				
MID-COUNT TIME DATE TIME	04/25 04/25 04/25 04/25 04/25 04/25 04/25	05/22	04/16	04/25 04/25 04/25 04/25 04/25 04/25 04/25 04/25 04/25
NUCL-UNIT-X U/M a		PCI/LITER 4		
	E-02 606-02 606-02 6-01 6-01 6-01 6-01 6-01	E 02	E-02	6 - 01 6 - 02 6 - 02 6 - 02 6 - 02 6 - 02 6 - 02 6 - 01 6 - 01 6 - 01 6 - 01 6 - 01 6 - 01 7 - 02 8 - 01 8 - 01 8 - 01 8 - 01 8 - 01 8 - 01 9 - 01
ACTIVITY (PCI/GM DRY)	40-0-08040	:	•	NO4N440F84HN04V4H0
. ∢ Ω		1.1.	1:1	1.6. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.
NUCL IDE	RU-103 RU-106 CS-131 CS-134 CS-137 BA-140 CE-141 CE-144 TH-226	H-3	SR-90	BE-7 NN-54 CCO-58 CCO-58 CCO-50 2N-65 2N-65 2N-95 1-131 CS-134 CS-137 CE-140 CE-144 TH-228
IN-DATE STOP DATE TIME		-		
ECTION TIME O		1225	1225	1205
COLLECTION- START DATE TIME DA	03/14 1210	03/14 1225	03/14 1225	03/14 1205
STA				
CUSTOMER'S IDENTIFICATION	86-12-003-56	86-12-004-51	86-12-004-55	86-11-075-SG
0 106	10560	10561	10562	10521
FELEDYNE Sample Number	* 9 *	44645	44646	44647 10521

REPORT OF ANALYSIS

			WORK	WORK DRDER NUMBER	CUSTONER	P.O. HUMBER	DATF RECEIVED	DELIVERY DATE	r DATE	PAGE	12
ANN MARIE HO MCLAREN/HART 16755 VON KA IRVINE CA	ANN MARIE HOLBROW MCLAREN/HARI 16755 von Karman ave Irvine ca	AVE 92714		4-0514	030225.	30225/030600829	03/15/94	04/17/94	* 6/2		
					S 0 1 L						
TELEDYNE Sample Number		CUSTOMER'S STA IDENTIFICATION NUM		COLLECTION-DATE START STOP DATE TIME DATE TIME	E NUCLIDE	ACTIVITY N	NUCL-UNIT-#	MID-COUNT TIME DATE TIME	VOLUME - UNITS ASH-WGHT-X **	LAB.	
44661	10538	86-11-031-56	03/1	03/14 1250	CS-134 CS-137 BA-140 CE-141 CE-144 RA-226 TH-228	L.T. 3. E-02 5.87+-2.34E-02 L.T. 3. E-01 L.T. 1. E-01 L.T. '2. E-01 L.T. 6. E-01 L.T. 6. E-01		04/25 04/25 04/25 04/25 04/25 04/25		*****	
44662	10539	86-11-031-MT	03/1	03/14 1250	H-3	L.T. 7. E 02	PCI/LITER #	05/25		₩.	
44663	10539MS	8G-11-031-MT	03/1	03/14 1250	H-3	7.9 +-0.6 E 03	PCI/LITER #	05/22		I O	
44664	10539MSD	BG-11-031-MT	03/1	03/14 1250	H-3	8.4 +-0.6 E 03	PCI/LITER *	05/22		r ^	
44665	10545	BG-12-001-ST	03/1	03/14 1200	H-3	7.2 +-3.4 E 02	PCI/LITER #	05/22		1 0	
44666	10546	86-12-001-55	03/1	03/14 1200	SR-90	L.T. 8. E-02		04/16		m	
14667	10547	86-12-001-SP	03/1	03/14 1200	PU-238 U-234 TH-230 PU-238 U-235 U-238 TH-232	1.1. 6. E-03 2.2 +-1.7 E-02 L.T. 6. E-03 L.T. 6. E-03 3.3 +-1.4 E-02 2.4 +-1.5 E-02 L.T. 4. E-02		04/22 04/26 05/06 04/22 04/26 05/06			
\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	10549	BG-12-001-SG	03/1	03/14 1200	86-7 K-40 4N-54 CG-58 FE-59	1.72+-0.26E 00 1.72+-0.26E 00 1.70 30 E-02 1.70 90 E-02 1.70 90 E-02		04/25 04/25 04/25 04/25 04/25		****	

ANALYSIS	
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REPORT	
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PAGE 13	
DATE RECEIVED DELIVERY DATE	04/17/94
DATE RECEIVED	03/15/94
CUSTOMER P.O. NUMBER	030225/030600829
MORK ORDER NUMBER	4-0514
	927
	ANN MARIE HOLBROW McLaren/Hart 16755 von Karman ave Irvine ca

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	VOLUME + UNITS ASH-WGHT-% ®					
	NID-COUNT TIME DATE TIME	04/25 04/25 04/25 04/25 04/25 04/25 04/25 04/25	04/22	04/22	04/22	04/23 04/26 05/03 04/23 04/26 05/03
	NUCE-UNIT-X U/M &					
		E - 01 E - 01 E - 02 E - 03 E	E-03	3.2 +-0.4 E-01	E-01	E-03 E-02 E-02 E-03 E-03 E-03 E-02
	ACTIVITY (PCI/6M DRY)	**************************************	•••	4-0-+	2.9 +-0.5	+ - 1 - 3 - 0 - 1 - 1 - 3 - 0 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1
	AC (PCI		::	3.2	5.9	- 6 - 1 - 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
) ,	ME NUCLIDE	2N-65 2R-95 RU-103 RU-106 I-131 CS-134 CS-137 CF-140 CF-141	PU-238 PU-239	PU-239	PU-239	PU-238 U-234 TH-230 PU-239 U-235 TH-232
	COLLECTION-DATE STARF STOP DATE TIME DATE TIME	03/14 1200	03/14 1200	`	•	03/14 1225
	STA					
	CUSTOMER'S IDENTIFICATION	BG-12-001-5G	86-12-001-HP	8G-12-001-MP	10550MSD 8G-12-001-MP	eG-12-004-SP
		10549	10550	10550MS		10563
	TELEDYNE Sample Number	4 6 6 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	44669	44670	44671	44672

REPORT OF ANALYSTS

		WORK ORDER NUMBER	CUSTOMER P.O. NUMBER	DATE RECEIVED	DATE RECEIVED DELIVERY DATE	PAGE 1
ANN MARIE HOLBROW		4-0514	030225/030600829	03/15/94	04/11/94	
MCL AREN/HART						
16755 VON KARMAN AVE						
IRVINE CA	92714					

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	LAB.	******	****
	VOLUME - UNITS ASH-WGHT-X &		
	MID-COUNT TIME DATE TIME	04/26 04/26 04/26 04/26 04/26 04/26 04/26 04/26 04/26 04/26	04/26 04/26 04/26 04/26 04/26 04/26 04/26 04/26 04/26
	NUCL-UNIT-X U/M 0		
	ACTIVITY (PCI/GM DRY)	Lorent Beneficial Services of the control of the co	L.T. 4. E-01 L.T. 3. E-02 L.T. 3. E-02 L.T. 9. E-02 L.T. 9. E-02 L.T. 5. E-02 L.T. 5. E-02 L.T. 5. E-02 L.T. 5. E-01 L.T. 2. E-02
- 0 6	IP TIME NUCLIDE	### PER	BE-7 K-6-0 M -4-0 CO-58 CO-58 CO-58 2R-59 RU-103 RU-103 CS-134 CS-134
	COLLECTION-DATE START STOP DATE TIME DATE TIE	03/14 1225	03/14 1225
	CUSTOMER'S STA IDENTIFICATION MUM	86-12-004-56	BG-12-004-MG
	TELEDYNE Sample Number Id	44673 10565	44674 10566

REPORT OF ANALYSIS

PAGE 5 RUN DATE 06/03/94 DATE RECEIVED DELIVERY DATE 04/23/94 03/21/94 CUSTOMER P.O. NUMBER 030225/030600829 WORK ORDER NUMBER 4-0472 92714 ANN MARIE HOLBROW MCLAREN/HART 16755 von Karman ave Irvine ca

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VOLUME - UNITS ASH-WGHT-X 0						
MID-COUNT TIME Date time	05/26	04/28	004/26 04/26 04/26 04/26 04/26 04/26 04/26 04/26 04/26 04/26 04/26	05/56	04/28	05/09 05/12 05/18 05/09 05/12
NUCL-UNIT-X U/M &	02	D2 PCI/GM DRY 0	-01 PCI/GM DRY -02 PCI/GM DRY -02 PCI/GM DRY -02 PCI/GM DRY -02 PCI/GM DRY -03 PCI/GM DRY -04 PCI/GM DRY -05 PCI/GM DRY -06 PCI/GM DRY -07 PCI/GM DRY -08 PCI/GM DRY -08 PCI/GM DRY -09 PCI/GM DRY -09 PCI/GM DRY -01 PC	02	-02 PCI/GH DRY &	03 PCI/GM DRY 0 01 PCI/GM DRY 0 01 PCI/GM DRY 0 03 PCI/GM DRY 0 03 PCI/GM DRY 0 01 PCI/GM DRY 0
ACTIVITY (PCI/LITER)	L.T. 2. E	L.T. 8. E-02	2.10+-0.21E 01 L.1. 3. E-02 L.1. 3. E-02 L.1. 3. E-02 L.1. 8. E-02 L.1. 5. E-02 L.1. 5. E-02 L.1. 3. E-02 L.1. 4. 6. 6. 6. 6. 6. 6. 6. 6. 6. 6. 6. 6. 6.	3.7 +-2.2 E	t.T. 5. E-	L.T. 8. E-03 1.4 +-0.3 E-01 2.0 +-0.5 E-01 L.T. 8. E-03 7.4 +-7.2 E-03 1.8 +-0.3 E-01
NUCLIDE	H-3	SR-90	MBE-7 K-40 HN-54 CO-58 CO-60 CO-60 ZN-65 ZN-65 ZN-65 ZN-95 ZN-95 ZN-95 ZN-95 ZN-95 ZN-95 ZN-103 ZN-1	H-3	SR-90	PU-238 U-234 TH-230 PU-239 U-238 U-238
COLLECTION-DATE START STOP ATE TIME DATE TIME	20	50		97	97	
COLLECTION-D START DATE TIME DAT	03/15 0920	03/15 0920	03/15 1031	03/15 1026	03/15 1026	03/15 1026
STA	_	6		_	s	D .
CUSTOMER*S IDENTIFICATION	8G-01-082-ST	86-01-082-55	86-14-004-56	8G-14-005-ST	86-14-005-55	86-14-005-SP
	10608	10609	10637	10639	10640	10641
TELEOYNE Sample Number	45051	45052	45053	45054	45055	45056

REPORT OF ANALYSIS

RUN DATE 06/03/94

X 0.3	WORK ORDER NUMBER	CUSTOMER P.O. NUMBER	DATE RECEIVED DELIVERY DATE	DELIVERY DATE	PAGE	•
ANN MARIE HOLBROW MCLAREN/HART 16755 von Karman ave Irvine ca	4-0472	030225/030600829	03/21/94	04/23/94		

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LA8.	49 49	*****	****
VOLUME - UNITS ASH-WGHT-R 0			
HID-COUNT TIME DATE TIME	05/16 05/18	04/27 04/27 04/27 04/27 04/27 04/27 04/27 04/27 04/27	04/28 04/28 04/28 04/28 04/28 04/28 04/28
NUCL-UNIT-X U/M &			
	6 E-01	E-01 E-02 E-03 E-03 E-03 E-01	20 6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
ACTIVITY (PCI/GM DRY)	1-0-6		
16	2.3		
NUCLIDE	TH-232 TH-228	BE-7 MN-40 CON-56 CON-56 CON-60 2N-65 2N-65 2N-65 2N-65 2N-95 CO-60 CO-134 CO-140	8E-7 MN-40 CN-54 CN-58 CO-60 2N-65 ZN-65 ZR-95 ZR-95 I-131
COLLECTION-DATE START STOP DATE TIME DATE TIME	03/15 1026	03/15 1026	03/15 1026
STA			
CUSTOMER'S Joentification	86-14-005-SP	BG-14-005-SG	1UP BG-14-005-SG
	10641	10643	106430UP
TELEDYNE Sample Number	45056	45057	45058

REPORT OF ANALYSIS

RUN DATE 06/03/94

PAGE 7

DATE RECEIVED DELIVERY DATE 04/23/94 03/21/94 CUSTOMER P.O. NUMBER 030225/030600829 WORK ORDER NUMBER 4-0472 92714 ANN MARIE HOLBROW MCLAREN/HART 16755 von Karman ave Irvine ca

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LAB.	*****	6	ev.	RV.	****
VOLUME - UNITS ASH-WGHI-X &					
MID-COUNT TIME DATE TIME	04/28 04/28 04/28 04/28 04/28	05/26	05/56	05/26	04/27 04/27 04/27 04/27 04/27 04/27 04/27 04/27 04/27
NUCL-UNIT-X U/M o		PCI/LITER #	PCI/LITER #	PCI/LITER &	
ACTIVITY N	L.T. 4. E-02 L.T. 3. E-01 L.T. 1. E-01 L.T. 2. E-01 1.25+-0.43E 00 8.61+-0.86E-01	1.3 +-0.6 E 03	1.6 +-0.1 E 04	1.5 +-0.1 E 04	L.T. 4. E-01 2.28+-0.23E 01 L.T. 3. E-02 L.T. 1. E-01 L.T. 7. E-02 L.T. 7. E-02 L.T. 5. E-02 L.T. 6. E-02 L.T. 6. E-02 L.T. 4. E-01 L.T. 2. E-01
(E NUCLIDE	CS-134 CS-137 CS-140 CE-141 CE-144 RA-226	H-3	H-3	H-3	## ## ## ## ## ## ## ## ## ## ## ## ##
COLLECTION-DATE START STOP DATE TIME DATE TIME	03/15 1026	03/15 1026	`		03/15 0841
STA					
CUSTOMER'S IDENTIFICATION	10643DUP BG-14-005-SG	BG-14-005-MT	S 8G-14-005-MT	10644MSD 8G-14-005-MT	86-00-005-FG
106	1064301	10644	10644MS	10644M!	11213
TELEDYNE SAMPLE NUMBER	\$ 0 5 8 5 0 5 8	45059	45060	45061	45063

REPORT OF ANALYSIS

RUN DATE 06/03/94

PAGE 8 DATE RECEIVED DELIVERY DATE 04/23/94 03/21/94 CUSTOMER P.O. NUMBER 030225/030600829 WORK ORDER NUMBER 4-0472 92714 ANN MARIE HOLBROW MCLAREN/HART 16755 VON KARMAN AVE IRVINE CA

SOIL

LAB.	9 9	******	o •o	99	.
VOLUME - UNITS ASH-WGHT-X *					
MID-COUNT TIME DATE TIME	60/50 02/03	04/27 04/27 04/27 04/27 04/27 04/27 04/27 04/27 04/27	02/03	05/09	02/09 05/09
NUCL-UNIT-X U/M *	E-02 E-02	6-01 6-01 6-02 6-02 6-02 6-02 6-01 6-01 6-01	E-02 E-02	E-03 E-01	E-03 E-01
/LTY 1 ORY)	2. E-	N OH	 		7. E. 0.5 E.
ACTIVITY (PC1/GH DRY)	::	L.T. 5. E- L.T. 4. E- L.T. 5. E- L.T. 7. E- L.T. 7. E- L.T. 7. E- L.T. 8. E- L.T. 8. E- L.T. 5. E- L.T. 5. E- L.T. 4. E- L.T. 4. E- L.T. 3. E- L.T. 4. E-	::1	L.T. 9. 3.1 +-0.6	1.T. 7. 3.2 +-0.5
E DP TIME NUCLIDE	PU-238 PU-239	BE-7 HN-50 CO-58 CO-58 CO-58 RC-159 RC-103 CS-131 CS-134 CE-144 CE-144 CE-144	PU-238 PU-239	PU-238 PU-239	PU-238 PU-239
COLLECTION-DATE START STOP DATE TIME DATE T	03/15 0905	03/15	03/15	`	•
STA			Δ.	۵.	a .
CUSTOMER'S IDENTIFICATION	86-00-004-FP	BG-14-002-SG	BG-14-002-HP	BG-14-002-HP	10626MSD BG-14-002-MP
	11223	10624	10626	10626MS	10626MSI
TELEDYNE Sample Number	45065	45066	45067	45068	45069

REPORT OF ANALYSIS

RUN DATE 06/03/94

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P A G R	LAB.	•	~~~~~~	
D4/23/94 UNT VOLIME - HATTE	÷			
DEL MID-CO	DATE TIME 05/26	04/28	05/10 05/12 05/18 05/10 05/12 05/12 05/18	04/27 04/27 04/27 04/27 04/27 04/27 04/27 04/27
DATE RECEIVED 03/21/94		PCI/GH DRY &	PCI/GM DRY PCI/GM DRY PCI/GM DRY ** PCI/GM DRY ** PCI/GM DRY ** PCI/GM DRY **	PCI/GH DRY
	(PCI/LITER) 2.0 +-0.7 E 03	L.T. 8. E-02	2.7 +-0.4 E-01 2.4 +-0.5 E-01 L.T. 7 E-03 1.2 +-0.9 E-02 3.1 +-0.9 E-02 5.6 +-0.9 E-01 5.7 +-0.9 E-01	L.T. 6. E-01 L.T. 5. E-02 L.T. 5. E-02 L.T. 1. E-01 L.T. 1. E-01 L.T. 1. E-01 L.T. 3. E-02 L.T. 3. E-02 L.T. 3. E-02 L.T. 4. E-02 L.T. 4. E-02 L.T. 4. E-02 L.T. 4. E-01 L.T. 3. E-01 L.T. 5. E-02 L.T. 1. E-01
CUSTONER 030225/ S D I L	NUCL 10E H-3	SR-90	PU-238 U-234 TH-230 PU-239 U-238 U-238 TH-232	BE-7 N-54 CO-58 FE-59 CO-60 2N-65 2N-103 RC-103 RC-103 CS-134 CS-134 CS-134 CS-134 CS-134 CS-134
WORK ORDER NUMBER 4-0472 COLLECTION-DATE	DATE TIME DATE TIME 03/15	03/15	03/15	03/15
3	IN TO	ö	ö	•
AVE 92714	DENTIFICATION N 7 BG-14-003-ST	86-14-003-55	86-14-003-SP	86-14-003-56
უ დ. 20 2E	10E 10627	10628	10629	10631
ANN MARIE HO MCLAREN/HART 16755 von Ka IRVINE CA	NUMBER 45070		45072	45073

REPORT OF ANALYSIS

REVISED 08/02/94 RUN DATE 06/03/94 PAGE 9

DELIVERY DATE 04/23/94 DATE RECEIVED 03/21/94 CUSTOMER P.O. NUMBER 030225/030600829 WORK ORDER NUMBER 4-0412 92714 ANN MARIE HOLBROW McLaren/Hart 16755 von Karman Ave Irvine ca

SOIL

ELEDYNE Sample Number		CUSTOMER'S Identification	STA	COLL START DATE	COLLECTION-DATE STARI STOP DATE TIME DATE TIME NUCLIDE	ACTIVITY NUCL-UNIT-X (PCI/LITER) U/H o	MID-COUNT TIME DATE TIME	VOLUME - UNITS ASH-WGHT-X &	LAB.
45070	10627	BG-14-003-ST		03/15	H-3	L.T. 3. E 02	07/24		ĸ
45071	10628	86-14-003-55		03/15	SR-90	L.T. 8. E-02 PCI/GH DRY #	04/28		m
45072	10629	BG-14-003-SP		03/15	PU-238 U-234 TH-230 PU-239 U-235 U-238 TH-232	L.T. 7. E-03 PCI/GM DRY & 2.7 +-0.4 E-01 PCI/GM DRY & 2.4 +-0.5 E-01 PCI/GM DRY & 1.1. 7. E-03 PCI/GM DRY & 1.2 +-0.9 E-02 PCI/GM DRY & 3.1 +-0.5 E-01 PCI/GM DRY & 5.6 +-0.9 E-01 PCI/GM DRY & 5.7 +-	05/10 05/12 05/18 05/18 05/12 05/18	·	0000000
£5073	10631	66-14-003-56		03/15	BE-7 MN-54 CO-58 CO-58 RR-65 RR-103 RC-1	2.03+-0.20E 01 PC1/GH DRY 9 L.T. 5. E-02 PC1/GH DRY 9 L.T. 1. E-02 PC1/GH DRY 9 L.T. 1. E-01 PC1/GH DRY 9 L.T. 1. E-02 PC1/GH DRY 9 L.T. 1. E-02 PC1/GH DRY 9 L.T. 1. E-02 PC1/GH DRY 9 L.T. 3. E-02 PC1/GH DRY 9 L.T. 5. E-02 PC1/GH DRY 9 L.T. 1. E-01 PC1/GH DRY 9 L.T. 2. E-01 PC1/GH DRY 9 L.T. 3. E-01 PC1	004/27 004/27 004/27 004/27 004/27 004/27 004/27	-	****
					077_UI	L9/174 00 341.0-425.	17/50		۲

The reanalysis of Teledyne #45070 did not confirm the original result, thus this revision. A), Mathi 8-1-44

REPORT OF ANALYSIS

RUN DATE 06/03/94

	WORK ORDER NUMBER	CUSTOMER P.D. NUMBER	DATE RECEIVED DELIVERY DATE	DELIVERY DATE	PAGE 11	
ANN MARIE HOLBROW MCLAREN/HART 16755 von Karman Ave Irvine ca	4-0472	030225/030600829	03/21/94	04/23/94		•

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TELEDYNE Sample Nimber		CUSTOMER'S	STA	COLLECTION-DATE START STOP DATE TIME DATE TIME	4E NUCLIDE	ACTIVITY NUCL-	NUCL-UNIT-% U/M &	MID-COUNT TIME DATE TEME	VOLUME - UNITS ASH-WGHT-% &	LAB.
			,			•				4
45075	10632MS	86-14-003-MG		•	CE-141	• 7		21750		•
,					CE-144	L.T. 3. E-01		05/12		•
					RA-226	1-0.64E		05/12		4
					TH-228	1.41+-0.14E 00		05/12		4
										,
45076	10632MSD	10632MSD 8G-14-003-MG		•	8E-7	L.T. 7. E-01		05/13		•
•					K-40	2		05/13		•
					#N-54	_		05/13		*
					CO-58	L.T. 6. E-02		05/13		*
					FE-59	L.T. 2. E-01		05/13		*
					09-00	L.T. 4. E-02		05/13		*
					2N-65	L.T. 1. E-01		05/13		4
					2R-95	.		05/13		4
					RU-103	<u>:</u>		05/13		*
					RU-106	;		05/13		*
					1-131	L.T. 6. E 00		05/13		•
					CS-134	L.T. 5. E-02		05/13		∢ .
					CS-137	7.61+-0.76E-01		05/13		•
					BA-140	L.T. 8. E-01		05/13		•
					CE-141	. 2.		05/13		•
					CE-144	L.T. 3. E-01		05/13		•
					RA-226	1.564-0.64E 00		05/13		•
					TH-228	1.42+-0.14E 00		05/13		4
45077	10633	8G-14-004-ST		03/15	H-3	5.2 +-3.2 E 02 PC	PCI/LITER .	05/50		6
45078	10634	BG-14-004-SS		03/15	SR-90	L.T. 7. E-02		04/28		m
45079		10634DUP BG-14-004-SS		03/15	SR-90	9.3 +-5.1 E-02		04/30		6

REPORT OF ANALYSIS

RUN DATE 06/03/94

ATE PAGE 12	
DELIVERY DA	04/23/94
DATE RECEIVED DELIVERY DATE	03/21/94
CUSTOMER P.O. NUMBER	030225/030600829
WORK ORDER NUMBER	4-0472
	ANN MARIE HOLBROW McLaren/Hart 16755 von Karman ave Irvine ca

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VOLUME - UNITS ASH-MGHT-% &			
MID-COUNT TIME DATE TIME	05/10 05/12 05/18 05/10 05/12 05/18	05/09 05/12 05/18 05/18 05/12 05/12 05/18	04/27 04/27 04/27 04/27 04/27 04/27 04/27 04/27
NUCE-UNIT-X U/M \$			
ACTIVITY (PCI/GH DRY)	2.0 + -0.4 E-01 2.7 + -0.6 E-01 L.T. 8. E-03 L.T. 5. E-03 2.2 + -0.6 E-01 6.4 + -1.0 E-01 4.0 + -0.9 E-01	4.4 + -0.6 E-01 3.9 +-0.7 E-01 L.T. 1. E-02 3.4 +-1.5 E-02 4.3 +-0.6 E-01 7.5 +-1.0 E-01	L.T. 5. E-01 L.T. 5. E-02 L.T. 5. E-02 L.T. 1. E-01 L.T. 1. E-01 L.T. 1. E-02 L.T. 1. E-02 L.T. 7. E-02 L.T. 7. E-02 L.T. 1. E-02 L.T. 1. E-02 L.T. 5. E-02 L.T. 1. E-02 L.T. 1. E-02 L.T. 1. E-02 L.T. 1. E-02
NUCLIDE	PU+238 U-234 TH-230 PU-239 U-235 U-238 TH-232	PU-238 U-234 TH-230 PU-239 U-235 U-238 TH-232	BE-7 MN-54 CO-58 CO-58 CO-60 CO-60 2N-65 2N-65 RU-103 I-131 CS-134 CS-134
COLLECTION-DATE START STOP DATE TIME DATE TIME	03/15	03/15 0920	03/15 0920
STA			
CUSTOMER'S IDENTIFICATION	BG-14-004-SP	86-01-082-SP	BG-01-082-5G
	10635	10610	10612
TELEDYNE Sample Number	45080	18064	45082

REPORT OF ANALYSIS

RUN DATE 06/03/94

		WORK ORDER NUMBER	CUSTOMER P.O. NUMBER	DATE RECEIVED DELIVERY DATE	DELIVERY DATE	PAGE 13	13
ANN MARIE HOLBROW McLaren/Hart 16755 von Karman ave Irvine ca	92714	4-0472	030225/030600829	03/21/94	04/23/94		
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LAB.	***	~	****	<i>чечечечечечечече</i>
VOLUME - UNITS ASH-WGHT-% *				
MID-COUNT TIME DATE TIME	04/27 04/27 04/27	05/27	05/09 05/12 05/18 05/09 05/12 05/18	04/27 04/27 04/27 04/27 04/27 04/27 04/27 04/27 04/27
NUCL-UNIT-X U/M &		PCI/LITER *		
ACTIVITY P	L.T. 2. E-01 2.134-0.54E 00 2.084-0.21E 00	L.T. 1. E 02	2.3 +-0.4 E-01 3.0 +-0.5 E-01 L.T. 9. E-03 1.1 +-0.8 E-02 2.1 +-0.4 E-01 8.7 +-1.0 E-01 5.3 +-0.8 E-01	L.T. 5. E-01 L.T. 4. E-02 L.T. 4. E-02 L.T. 1. E-01 L.T. 9. E-02 L.T. 6. E-02 L.T. 6. E-02 L.T. 4. E-02 L.T. 4. E-02 L.T. 4. E-02 L.T. 4. E-02 L.T. 4. E-02 L.T. 1. E-01 L.T. 1. E-01
P TIME NUCLIDE	CE-144 RA-226 TH-228	Н-3	PU-238 U-234 TH-230 PU-239 U-238 TH-232	BE-7 AN-154 CO-58 CO-58 CO-60 2N-65 2N-65 NU-103 RU-106 I-131 CS-134 CS-134 CR-140 CR-141
COLLECTION-DATE START STOP DATE TIME DATE TI	03/15 0920	03/15 1000	03/15 1000	03/15 1000
STA NUM 0	6	•	6	
CUSTOMER'S IDENTIFICATION	86-01-082-56	86-14-001-51	BG-14-001-SP	86-14-001-SG
	10612	10614	10615	10617
TELEDYNE Sample Number	45082	45083	45084	2 8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

REPORT OF ANALYSIS

RUN DATE 06/03/94

		WORK ORDER NUMBER	CUSTOMER P.O. NUMBER	DATE RECEIVED	DATE RECEIVED DELIVERY DATE	PAGE 14
ANN MARIE HOLBROW McLaren/Hart 16755 von Karman ave 1841ne ca	92714	4-0472	030225/030600829	03/21/94	04/23/94	
	!		1 I O S			

LAB.	m	m	m	٠	6	. 0	•	•	•	9	•	•	m	ĸ.	.	•	εν.
VOLUME - UNITS ASH-WGHT-X *																	
MID-COUNT TIME DATE TIME	04/28	05/02	04/30	05/27	04/30	05/09 05/12	05/18	60/50	05/12	05/12	05/18	05/18	04/30	04/30	05/27	04/30	05/27
NUCL-UNIT-X				PCI/LITER &											PC1/LITER *		PCI/LITER *
ACTIVITY N (PCI/GM DRY)	L.T. 7. E-02	4.0 +-0.3 E 00	4.0 +-0.2 E 00	L.T. 1. E 02	L.T. 9. E-02	1.T. 1. E-02 3.1 +-0.4 E-01	3.8 +-0.5 E-01	L.T. 1. E-02	1.8 +-1.0 E-02	4.0 +-0.5 E-01		7.8 +-0.8 E-01	L.T. 9. E-02	L.T. 1. E-01	L.T. 2. E 02	8.2 +-4.3 E-02	L.T. 1. E 02
TE TOP TIME NUCLIDE	SR-90	SR-90	SR-90	H-3	SR-90	PU-238 U-234	TH-230	PU-239	U-235	U-238	TH-232	TH-228	SR-90	SR-90	H-3	SR-90	H-3
COLLECTION-DATE START STOP OATE TIME DATE TI	03/15 1000	`	`	03/15 1000	03/15 1000	03/15 1000							03/15 0841	03/15	03/15 0908	03/15 1000	03/10 1610
STA																	
CUSTOMER'S EDENTIFICATION	8G-14-001-MS	BG-14-001-MS	10619MSD 8G-14-001-MS	96-14-002-51	86-14-002-55	86-14-002-SP					3	76. _,	0 86-00-004-FS	86-01-090-55	86-00-008-FT	BG-14-001-SS	BG-02-007-ST
LDEN	10619	10619MS	10619450	10620	10621	10622							11225	11226	11227	11229	10332
TELEUYNE Sample Number	45037	45088	45089	45090	45091	45092							45114	45115	45116	45117	45490

REPORT OF ANALYSIS

RUN DATE 04/06/94

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		WORK ORDER NUMBER	CUSTOMER P.O. NUMBER	DATE RECEIVED	DATE RECEIVED DELIVERY DATE	PAGE	m
ANN MARIE HOLBROW MCLAREN/HART 16755 VON KARMAN AVE IRVINF CA	92714	4-0185	030225/030600829	03/08/94	03/18/94		
		W	S 0 I t				
TEL EDYNE		COLLECTION-DATE		x	MID-COUNT		

	VOLUNE - UN
MID-COUNT	TIME
	NUCL-UNIT-#
	ACTIVITY
ION-DATE	START STOP
COLLECT	START
	STA
	CUSTOMER'S
TELEDYNE	SAMPLE

TELEDYNE Sample Number		CUSTOMER'S IDENTIFICATION	STA	COLL START DATE	COLLECTION-DATE START STOP DATE TIME DATE TIME	NUC L I DE	ACTIV (PCI/L	ACTIVITY PCI/LITER)	NUCL-UNIT-X	MID-COUNT TINE DATE TIME	VOLUME - UNITS ASH-WGHT-% 0	LAB.
43203 10031	10031	88-06-066-51		03/07 0926		H-3	t.T. 2	2• E (02	03/26		ιń
43204	10033	88-06-017-51		03/07 0910		H-3	L.T. 2	2. E (02	03/27		•
43205	10034	88-06-013-51		03/07 0930		H-3	L.T. 2	2. E (02	03/27		un.
43206 10056	10056	88-12-006-51		03/07 1308		H-3	L.T. 2	2• E (02	03/27		ŧ٨
43207 10057	10057	BB-12-019-ST		03/07, 1311		H-3	L.T. 2	2. E (02	03/27		ľ
43208	10058	88-12-023-51		03/07 1313		н-3	L.T. 2	2. E (02	03/27		I n
43209	10060	88-12-020-ST		03/07 1320		H-3	t.1. 2	2. E	02	03/27		₩.
43210 10061	10061	88-12-003-ST		03/07 1326		H-3	L.T. 2	2. E	02	03/27		ın.
43212 10038	10038	88-13-011-51		03/07 1018		H-3	L.T. 2	2. E	02	03/27		ľ
43213	10039	BB-13-010-ST		03/07 1023		H-3	L.T. 2	2. E	02	03/27		١'n
43214	10040	BB-13-037-ST		03/07 1007		H-3	L.T. 2	2. E	02	03/27		ľ
43215	10041	BB-13-039-ST		03/07 1010		H-3	L.T. 2	2. E	02	03/27		۲n
43216	10035	68-13-024-ST		03/07 1004		H-3	L.T. 2	2. E	02	03/27		ľ
43217	10049	88-02-071-ST		1811 10/60		H-3	L.T. 2	2. E	02	03/28		₩
43218 10050	10050	BB-02-045-5T		03/07 1133		H-3	L.T. 2	2. E	02	03/28		ĸ

REPORT OF ANALYSIS

RUN DATE 04/06/94

PAGE 4 DELIVERY DATE 03/18/94 DATE RECEIVED 46/80/60 CUSTOMER P.O. NUMBER 030225/030600829 MORK ORDER NUMBER 4-0185 92714 ANN MARIE HOLBROW McLaren/Hart 16755 von Karman ave Irvine ca

SOIL

TELEDYNE Sample			STA	COLLECTION-DATE START STOP		ACTIVITY NUCL-I	X-LIND-TONN	MID-COUNT TIME	VOLUME - UNITS	5
NCABER	IDEN	IDENT I FICATION	E S	DATE FIME DATE	TIME NUCLIDE				* 4-1E9M-EC	- 20
43219	10051MS	BB-02-045-MT		03/07 1133	H-3	3.1 +-0.3 E 03		03/30		sv.
43220	10052	BB-02-060-ST		03/07 1134	H-3	L.T. 2. E 02		03/28		īv
43221	10053	BB-02-075-ST		03/07 1140	H-3	L.T. 2. E 02		03/28		ır.
43222	10055	88-02-078-ST		03/07 1139	H-3	L.T. 2, E 02		03/28		īv
43262	1006200P	100620UP SM-03-012-ST		03/07 1422	H-3	L.T. 2. E 02		03/30		RV.
43263	10030MSD	10030MSD 88-06-092-MT		•	H-3	3.3 +-0.3 E 03		03/30		I O
43264	10058DUP	100580UP 8B-12-023-ST		03/07 1313	H-3	L.T. 2. E 02		03/27		ır
43265	10051MSD	10051MSD 88-02-045-MT		`	H-3	2.9 +-0.2 E 03		03/30		8 0
43368	10030	BB-06-092-MT		03/07 0918	Н-3	L.T. 1. E 02		03/30		•
43369	10051	BB-02-045-MT		03/07 1133	H-3	2.3 +-1.4 E 02		03/30		æ

H-3 activity added to prepare matrix spikes

H-3_pCi/1	2.7 +- 0.3 E 03	2.7 +- 0.3 E 03	+- 0.3 E	0.3 B
TI#	43202	43263	43219	43265

PAGE 12

RUN DATE 04/20/94

DELIVERY DATE	DATE RECEIVED DELITE.	7, 711, 10	
	DATE RECEIVED	\$6/60/60	
REPORT OF ANALYSIS	CUSTOMER P.O. NUMBER	928009020757020	
	SHOW CHICAGO ACC.	בסגא מייניי אייניי	4-0353
			LBROW

,_	0	PCI/LITER & 04/08 FCI/LITER % 04/08
	ACTIVITY NU- (PCI/GM DRY) L.T. 4. E-02 L.T. 7. E-02 L.T. 7. E-02 L.T. 2. E-01 L.T. 2. E-01 1.92+-0.54E 00 9.63+-0.96E-01	
4-0353 S O I L	COLLECTION-DATE START STOP START DATE TIME DATE TIME NUCLIDE CS-137 03/08 1126 CE-141 CE-144 RA-226	03/08 1421 H-3 03/08 1415 H-3
ANN MARIE HOLBROW HCLAREN/HART 16755 von Karman Ave 92714 Irvine ca	TELEDYNE CUSTOMER'S STA SAMPLE IDENTIFICATION NUM NUMBER 106NTIFICATION NUM 43743 88-00-001-FG	43796 11138 88-03-081-51 43797 10076 88-03-029-51

RUN DATE 04/20/94

PAGE

REPORT OF ANALYSIS

DELIVERY DATE 04/11/94 DATE RECEIVED 96/60/60 CUSTOMER P.O. NUMBER NORK ORDER NUMBER

LAB. YOLUNE - UNITS ASH-WGHI-X + DATE TIME HID-COUNT 90/40 04/08 04/08 118 04/07 04/08 90/40 04/04 04/07 10/10 10/10 04/03 40/40 40/40 04/03 04/03 NUCL-UNIT-X # H/A E 02 E 02 1.5 +-0.1 E 04 1.7 +-0.1 € 04 E 02 E 02 E 05 E 02 E 02 £ 05 E 02 E 02 E 02 1.7 +-0.2 E 03 1.7 +-0.2 E 03 (PCI/LITER) <u>:</u> ACTIVITY ? 030225/030600829 ... ניין : ... L • T • 1.1 **.**.. . . -: DATE TIME DATE TIME NUCLIDE 5 0 1 L H-3 H-3 H-3 F-3 F-3 H-3 Ŧ-3 H-3 £-3 H-3 1-3 F-3 H-3 H-3 H-3 COLLECTION-DATE 03/08 1400 03/08 1428 03/08 1428 03/08 1359 03/08 1423 03/08 1410 03/08 1407 03/08 1405 03/08 1358 4-0353 START 03/08 03/08 03/08 03/0B STA NUM BB-03-096-ST 11019MSD 88-03-026-MT 88-03-026-MT 88-03-026-MT 100810UP BB-03-026-ST 88-03-005-ST BE-03-003-ST 88-03-026-ST 88-03-017-57 BB-03-025-ST BR-03-079-ST 92714 88-00-003-PT 88-00-00-88 88-00-001-PT RB-00-002-PT 10ENT IFICATION CUSTOMER'S MCLAREN/HART 16755 VON KARMAN AVE 11019MS ANN MARIE HOLBROW 43699 10070 11019 10074 10081 10078 10068 1001 10072 43677 11043 11045 11044 11042 IRVINE CA 43697 43698 43693 43695 43696 43694 **TEL EDYNE** NUMBER 43692 43689 43690 43691 SAMPLE 43678 43684 43685

5

REPORT OF ANALYSIS

RUN DATE 04/20/94

S 0 1 L

LAB.	* ^	w	E	~ ~ •	- 4	• •	•	•	4		.	•	• •	•	•	٠.	•	•	EC.	•	
VOLUME - UNITS Ash-Wght-X *																					
MID-COUNT TIME DATE TIME	90/40	10/40	03/28.	03/21	03/21 03/21	03/21	12/50	03/21	03/21	03/21	03/21	03/21	03/21	03/21	03/21	03/21	03/21	03/21	10/40	03/50	
ACTIVITY NUCL-UNIT-X (PC[/LITER) U/M *	L.T. 1. E 02	L.T. 1. E 02	L.T. 1. E-01 PCI/GM ORY 9		L.T. 4. E-02 PCI/GM DRY 4 + T. 4. E-02 PCI/GM DRY 4	1. E-01 PC1/6H	4. E-02 PC1/GM	1. E-01 PCI/GH	5. E-02	PC1/64	1. F-01 PC1/GM	5. E-02 PC1/GH	0+-0.37E-01 PCI/GM	7. E-02 PC1/6M	7. E-02	PCI/GM	1.76+-0.58E 00 PCI/GM DRY #	8.10+-0.81E-01 PCI/GM DRY &	L.T. 1. E 02	L.T. 9. E-32 PCI/GM DRY #	
DATE STOP IE TIME NUCLIDE	H-3	H-3	SR-90	88 1 − 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 +	A COLOR	FE-59	09-00	59-NZ	2R-95	RU-103	RU-106	761-1	CC - CC	84-140	CE-141	441-10	RA-226	TH-228	E-I	SR-90	;
COLLECTION-DATE START STOP DATE TIME DATE TIME	03/08 1416	03/08 1000	03/08 1010	03/08 1010															03/08 1030	0401 007 60	00700 100760
CUSTOMER'S STA	BB-03-097-ST	88-20-001-ST	88-20-001-55	88-20-001-56															T8-200-00-84		BB-20-002-SS
TELEDYNE SAMPLE NUMBER	1007																		10001		43706 10088

NVIRONMENTAL SERVICES TELEDYNE BROWN ENGINEER

REPORT OF ANALYSIS

REVISEL 21/94 RUN DATE 04/20/94

92714 ANN MARIE HOLBROW MCLAREN/HART 16755 VON KARMAN AVE IRVINE CA

4-0353

WORK ORDER NUMBER

030225/030600829

03/09/94 CUSTOMER P.O. NUMBER

DATE RECEIVED DELIVERY DATE 04/11/94

PAGE 12

VOLUME - UNITS ASH-WGHT-% ⇔			
MID-COUNT TIME DATE TIME	03/21 03/21 03/21 03/21 03/21	80/40	04/08
NUCL-UNIT-% U/M &		PCI/LITER *	PCI/LITER ¢
ACTIVITY 1	L.T. 4. E-02 L.T. 7. E-02 L.T. 7. E-02 L.T. 2. E-01 1.92+-0.54E 00 9.63+-0.96E-01	L.T. 1. E 02 PCI/LITER #	L.T. 1, E 02 PCI/LITER \$ 04/08
IME NUCLIDE	CS-137 BA-140 CE-141 CE-144 RA-226 TH-228	H-3	H-3
COLLECTION-DATE START STOP DATE TIME DATE TIME	03/08 1126	03/08 1421	03/08 1415
STA			
CUSTOMER'S IDENTIFICATION	88-00-001-FG 11021	38 BB-03-081-ST	76 BB-03-029-ST
TELEDYNE Sample Number	43743 BB-1	43796 11138	43797 10076

REPORT OF ANALYSIS

RUN DATE 04/06/94

PAGE 1 DELIVERY DATE 03/18/94 DATE RECEIVED 46/80/60 CUSTOMER P.G. NUMBER 030225/030600829 WORK ORDER NUMBER 4-0185 92714 ANN MARIE HOLBROW MCLAREN/HART 16755 VON KARMAN AVE IRVINE CA

	LAB.	ۍ	rv.	₩.	₩.	ur.	'n	er)	ĸ	ι ν	f.	'n	IL.	r.	ĸ	'n
	VOLUME - UNITS ASH-WGHT-% &															
	HID-COUNT TIME DATE TIME	03/19	03/19	03/50	03/26	03/56	03/50	03/20	03/20	03/50	03/50	03/50	03/20	03/50	03/50	03/20
	NUCL-UNIT-X U/M &										a .	•	~	8	2	~
	2	E 02	€ 02	E 02												
	ACTIVITY PCI/LITER)	:	:	:	-	:	:	-	:	:	:	:	-	-	1.	÷
	ACT PCI	£.T. 1. E 02	1.1.	1.1.	1.1.	L.T.	L.T.	L.1.	1.1.	L.T.	1.1.	L.T.	1.1.	L.1.	t.T.	1:1
SOIL	COLLECTION-DATE START STOP DATE TIME DATE TIME NUCLIDE	H-3	H-3	H-3	H-3	H-3	H~3	H-3	H-3	H-3	H-3	H-3	E-1	E-1	H-3	H-3
	COLLECTION-DATE TART STO TE TIME DATE	20	60	115	115	.20	135	135	145	450	200	200	603	200	605	625
	JLLEC ART E TI	03/04 1405	03/04 1405	03/04 1415	03/04 1415	03/04 1420	03/04 1435	03/04 1435	03/04 1445	03/04 1450	03/04 1500	03/04 1500	03/04 1603	03/04 1500	03/04 1605	03/04 1625
	STAU	03/	03/	03/	03/	03/	03/	03/	03/	03/	03/	03/	03/	03/	03,	03,
	STA				_	_	_	_	_	_	_	_	-	+-	-	-
	CUSTOMER'S IDENTIFICATION	BB-04-021-ST	88-04-021-FT	BB-04-023-ST	BB-04-097-ST	88-04-082-ST	BB-04-026-ST	BB-04-062-ST	BB-04-019-SI	68-04-084-ST	88-04-078-ST	BB-04-049-ST	88-14-037-ST	88-14-041-51	BB-14-079-ST	88-14-094-ST
	0 101	10001	10004	10005	10001	1001	10013	11009	10015	10016	10018	10020	10051	10022	10023	10025
	TELEOYNE Sample Number												43183	\$8TE\$	43185	43186

REPORT OF ANALYSIS

RUN DATE 04/06/94

			3	ORK OR	HORK ORDER NUMBER	CUSTOMER P.O. NUMBER	A P.O. N	UNBEI		DATE RECEIVED	DELIVERY DATE		PAGE 5
ANN MARIE HOLBROW MCLAREN/HART 16755 VON KARMAN AVE IRVINE CA	IE HOLE /Hart jn kart ca	BROW Man ave 92714		4	4-0185	03022	030225/030600829	9829		03/08/94	03/18/94		
						¥ A T E R							
TELEOYNE Sample Number		CUSTOMER'S S IDENTIFICATION N	STA	COLL START DATE	COLLECTION-DATE START STOP DATE TIME DATE TIME NUCLIDE	ME NUCLIDE	ACTI	ACTIVITY PCI/LITER)		NUCL-UNIT-%	MID-COUNT TIME YOU DATE TIME ASH	VOLUME - UNITS ASM-WGHT-X *	LAB.
43170	10003	88-04-021-RT		03/04 1445	1445	H-3	L.T. 1. E 02	- :	E 02		03/20		RV.
43181	11001	88-04-001-WT		03/04 1440	1440	H-3	L.T. 2. E 02	2	02		03/21		1 0
43182	11002	88-04-001-HA		03/04 1450	1450	68 - A	L.T. 4. E 00 1.2 +-0.4 E 01	+ 0	010		03/14 03/14		m m
43189	10063	SM-03-012-RT		03/07 1420	1420	H-3	L.1. 2.	-~	£ 02		03/21		8 0
43211	10036	88-13-024-RT		03/07 1000	1000	H-3	L.T.	2.	E 02		03/27		'n
SEN		SEND I COPIES TO MC480S ANN MARIE HOLBROW	Š	RIE HO		LAST PAGE OF REPORT	1			APPROVED B	APPROVED BY 5. GUENTHER 04/06/94	46/90/40	
2 - GAS LAB.	S LAB.	3 - RADIO CHEMISTRY LAB.	4EM I S	TRY LA		4 - GE(LI) GAMNA SPEC LAB.	PEC LAB	•	1 0	5 - TRITIUM GAS/L.S. LAB.		6 - ALPHA SPEC LAB.	LAB.

REPORT OF ANALYSIS

RUN DATE 04/06/94

	WORK ORDER NUMBER	NUMBER	CUSTOMER P.O. NUMBER	DATE RECEIVED DELIVERY DATE	DELIVERY DATE	PAGE
ANN MARIE HOLBROW MCLAREN/HART 16755 von Karman ave Irvine ca	4-0185		030225/030600829	98/08/86	03/18/94	

SOIL

TELEDYNE	μι			COLLEC	T10N-DATE				HID-COUNT	4 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	
SAMPLE		CUSTOMER'S S IDENTIFICATION N	STA	START DATE TIME O	TART STOP TE TIME DATE TIME NUCLIDE	NUCLIDE	ACTIVITY (PCI/LITER)	NUCL-UNIT-X R) U/M &	TIME DATE TIME	VOLUME - UNIIS ASH-WGHT-X *	LAB.
43187	1007	88-14-004-ST	-	03/04 1625	25 H-3	m	L.T. 2.	E 02	03/50		₩.
43188	10062	SM-03-012-5T	-	03/07 1422	22 H-3	m	L.T. 1.	E 02	03/30		S
43190 10064	10064	SM-03-015-ST		03/07 1420	20 H-3	m	L.T. 1.	E 02	03/21		'n
43191 10065	10065	SM-03-009-51		03/07 1423	23 H-3	E	: -	E 02	03/21		N.
43192	10066	SM-03-001-ST		03/07 1425	25 H-3	ψ.	:	E 02	03/21		L
43193	10067	SM-03-014-ST		03/07 1430	30 H-3	ı.	1.1. 1.	E 02	03/21		s r\
43194	10047	BB-05-003-ST		03/07 1050	50 H-3	ŵ	:	E 02	03/30		L V
43195	10043	BB-05-089-ST		03/07 1052	.52 H-3	ŵ	L.T. 1.	E 02	03/21		₽v.
43196		BB-05-089FDT		03/07 1052	152 H-3	ŵ	L.T. 1.	E 02	03/21		L V
43197	10048	88-05-006-51		03/07 1102	02 H-3	ώ.	t.T. 1.	E 02	03/21		EV.
43198	10044	88-05-057-ST		03/07 1112	12 н-3	ú.	L.T. 1.	E 02	03/21		L V
43199	10046	88-05-077-ST		03/07 1110	10 H-3	ŵ.	L.T. 1.	E 02	03/21		u n
43200	10028	88-06-007-ST		03/07 0910	110 H-3	ŵ.	L.T. 1.	€ 02	03/21		E C
43201	10029	BB-06-092-ST		03/07 0918	118 H-3	ŵ	t.T. 1.	E 02	03/21		ĸ
43202	43202 10030MS	BB-06-092-MT		`	H-3	ω,	3.0 +-0.2 E 03	E 03	03/30		ι.

REPORT OF ANALYSIS

RUN DATE 04/06/94

			3	WORK ORDER NUM	ER NUMBER	CUSTOME	CUSTOMER P.O. NUMBER	VUMBER	DATE RECEIVED	DELIVERY DATE		PAGE	~
ANN MARIE HO MCLAREN/HART 16755 von Ka	ANN MARIE HOLBROW MCLAREN/HARI 16755 von Karman Povine Ca	W AVE 92714		4-0	4-0185	03022	030225/030600829	3829	03/08/94	03/18/94			
	.					S 0 I L							
TELEDYNE Sample Number		CUSTOMER'S S IDENTIFICATION N	STA	COLLE START DATE T	COLLECTION-DATE TART STOP TE TIME DATE TIME	E NUCLIDE	ACT.	ACTIVITY PCI/LITER!	NUCL-UNIT-X U/M &	MID-COUNT TIME VOLL DATE TIME ASH-	VOLUME - UNITS ASH-WGHT-X **	LAB.	
43187	10027	88-14-004-ST		03/04 1625	625	H-3	L: 1.	2. €	02	03/20		ŧv.	
43188	10062	SM-03-012-ST		03/07 1422	422	H-3	1:1:]. E	02	03/30		~	
43190	10064	SM-03-015-ST		03/07 1420	420	H-3	1.1.	 m	02	03/21			
43191	10065	SM-03-009-ST		03/07 1423	423	H-3	t.1.	 	02	03/21		ľ	
43192	10066	SM-03-001-ST		03/07 1425	425	H-3	1.1.	1. E	02	03/21		v	
69164	10067	SM-03-014-ST		03/07 1430	430	H-3	1:1		02	03/21		ľ	
43194	10047	88-05-003-51		03/07 1050	050	H-3	l. j.]. E	0.2	03/30		6	
43195	10043	88-05-089-51		03/07 1052	052	H-3	t • T •	1. F	02	03/21		K V	
43196	10042	B8-05-089FDT		03/07 1052	052	#-3	1.1.]. E	0.2	03/21		\$	
43197	10048	88-05-006-ST		03/07 1102	102	H-3	1.1.]. E	02	03/21		1 0	
43198	10044	88-05-057-ST		03/07 1112	.112	H-3	1.1.	1. E	02	03/21		.	
43199	10046	88-05-077-ST		03/07 1110	110	H-3	1.1.	F	02	03/21		•	
43200	10028	BB-06-007-ST		03/07 0910	016	H-3	L.T.	E	02	03/21		₩.	
43201	10029	BB-06-092-ST		03/07 0918	918	H-3	1:1	J. E	02	03/21		₩.	
43202	10030MS	BB-06-092-MT		`		H-3	3.0 +-0.2	-0.2 E	63	03/30		v	

REPORT OF ANALYSIS

RUN DATE 04/06/94

	WORK CROER NUMBER	CUSTOMER P.O. NUMBER	DATE RECEIVED	DATE RECEIVED DELIVERY DATE	PAGE
ANN MARIE HOLBROW McLaren/Hart 16755 von Karman ave Irvine ca	4-0185	030225/030600829	03/08/94	03/18/94	

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TELEDYNE	ılı.			COLLECTION-	DATE		:		M 10-COUNT	4	
SAMPLE		CUSTOMER'S Identification	STA	START DATE TIME DA	START STOP DATE TIME DATE TIME NUCLIDE	ACTI (PCI/	VJTY LITERI	ACTIVITY NUCL-UNIT-X PCI/LITER! U/M &	DATE TIME	ASH-WGHT-X &	LAB.
43203	10031	BB-06-066-ST		03/07 0926	E - 3	L.T. 2.	ш	02	03/26		5
43204	10033	BB-06-017-ST		03/07 0910	H-3	1.1.	2. E 0	02	03/27		ĸ
43205	10034	BB-06-013-ST		03/07 0930	H - H	L.T.	2. E 0	02	03/27		ın
43206	10056	88-12-006-51		03/07 1308	H-3	1.1.	2. E 0	02	03/27		r.
43207	10057	88-12-019-51		03/07 1311	E-13	L.T.	2. E 0	02	03/27		ĸ
43208	10058	88-12-023-ST		03/07 1313	H-3	1:1	2. E 0	02	03/27		5
43209	10060	88-12-020-51		03/07 1320	H-3	L.1.	2. E (02	03/27		ĸ
43210	10001	BB-12-003-ST		03/07 1326	H-3	1.1.	2. E (02	03/27		I O
43212	10038	88-13-011-ST		03/07 1018	H-3	1.1.	2. E (0.2	03/27		rv.
43213	10039	BB-13-010-ST		03/07 1023	H-3	t.T.	2. E (02	03/27		en.
43214	10040	BB-13-037-ST		1001 10/60	K-7	L - T -	2. E (02	03/27		ĸ
43215	10041	88-13-039-51		03/07 1010	H-3	1.1.	2. E (02	03/27		rv.
43216	10035	BB-13-024-ST		03/07 1004	H-3	1.1.	2. E (02	03/27		ľ
43217	10049	88-02-071-ST		1811 70/60	H-3	1.1.	2. E (02	03/58		€.
43218	43218 10050	8B-02-045-ST		03/07 1133	H-3	t.1.	2. E (02	03/58		r.

REPORT OF ANALYSIS

RUN DATE 04/06/94

PAGE

DELIVERY DATE 03/18/94 DATE RECEIVED 03/08/94 CUSTOMER P.O. NUMBER 030225/030600829 WORK ORDER NUMBER 4-0185 ANN MARIE HOLBROW MCLAREN/HART 16755 von Karman ave Irvine ca

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TELEOYNE Sample Nimber		CUSTOMER'S	STA	COLLECTION-DATE START STOP DATE TIME DATE T	COLLECTION-DATE START STOP DATE TIME DATE TIME NUCLIDE	ACTIVITY NUCL-UNIT-Z 4 PCI/LITER) U/M &	MID-COUNT TIME DATE TIME	VOLUME - UNITS ASH-WGHT-X ◆	LAB.
43219	1005	BB-02-045-MT		03/07 1133	H-3	3.1 +-0.3 E 03	03/30		₩.
43220				03/07 1134	H-3	£.T. 2. E 02	03/28		In
43221	10053	BB-02-075-ST		03/07 1140	H-3	L.T. 2. E 02	03/28		ev.
43222	10055	88-02-078-ST		03/07 1139	H-3	L.T. 2, E 02	03/28		r.
43262	1006200P	100620UP SM-03-012-ST		03/07 1422	H-3	L.T. 2. E 02	03/30		'n
43263	10030MSD	10030MSD BB-06-092-MT		`	H-3	3.3 +-0.3 E 03	03/30		ĸ
43264		100580UP BB-12-023-ST		03/07 1313	H-3	t.T. 2. E 02	03/27		en
43265	10051MSD	10051HSD 88-02-045-HT		`	E-1	2.9 +-0.2 E 03	08/80		r r
43368	10030	BB-06-092-MT		03/07 0918	H-3	L.T. 1. E 02	08/80		r.
43369	10051	BB-02-045-MT		03/07 1133	E-1	2.3 +-1.4 E 02	03/30		N.

H-3 activity added to prepare matrix spikes

H-3 pci/l	2.7 +- 0.3 E 03	2.7 +- 0.3 E 03	+	2.7 +- 0.3 E 03
11#	43202	43263	43219	43265

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RUN DATE 04/06/94

REPORT OF ANALYSIS

DELIVERY DATE DATE RECEIVED CUSTOMER P.O. NUMBER

PAGE 3 03/18/94 MID-COUNT 96/90/60 030225/030600829 SOIL WORK ORDER NUMBER 4-0185 92714 ANN MARIE HOLBROW MCLAREN/HART 16755 VON KARMAN AVE IRVINE CA

LAB.	ın	ĸ	1	'n	'n	€	īv	u	n i	r	ĸ	5	•	U.	ın	s.	٠	•	I	
VOLUME - UNITS ASH-WGHT-% *																				
MIO-COUNT TIME DATE TIME	03/56	11/10	13/60	03/27	03/27	03/27	12/27		03/27	03/27	03/27	***	03/20	03/27	03/27	63/27		03/28	03/28	
NUCL-UNIT-X U/M \$			٥.	~	2	~		7	02	02		<u>v</u>	02	02	0.2		N 5	02	02	
ACTIVITY PCI/LITER)	E 02	,	E 02	E 02	E 02	F 0.2	, (E 02	п	ш	U		ш	ш	m	U	u	w	W	ı
1V17 /L11	,	i	2•	2.	3.			2.	7.	2.		•	2•	7.	2.		•	2.	,	
ACT			t.T.	L.T.	1.1.	-		1.1	L.T.	1.1		::	L:1	L.T.	1.1		:	1.1.	-	
NICI THE		C-H	H-3	H-3		· •	H=3	н-3	H-3	r :	•	E-3	H-3	H-3	7 1	, =	H-3	H-3	•	n I
COLLECTION-DATE START STOP											•	•	E.	7.0		2	40	, r		E0
ECT I	Ĕ	0926	0910	76 90		561	131	131	132		132	101	1 102	100		101	7 100	-		7
COLL	ATE	03/07 0926	03/07 0910	0490 40740		03/0/ 1308 03/0/ 1308	03/07 1311	03/07 1313	03/07 1320		03/07 1326	03/07 1018	03/07 1023	7001 1007		03/07 1010	03/07 1004	1331		03/07 1133
	o En	0	0	•	•	•	Ü	Ī	_		_									
		066-ST	12-510		18-610	006-ST	88-12-019-ST	TS-50-01-00	1000	15-070-71-99	68-12-003-ST	BB-13-011-ST	TS-010-F (-88		18-18-18-18-18-18-18-18-18-18-18-18-18-1	88-13-039-51	BB-13-024-ST	;	88-05-011-31	88-02-045-ST
CUSTOMER'S	IDENT IF 1C AT ION	EB-06-066-ST	12-710-90-88		88-06-013-31	BB-12-006-ST	98-12-	-61-00	31 - 00	-71-49	68-12-	88-13-			6 T-88	88-13	68-13		88-05	89-02
	106	10031		55001	10034	10056	10057	0	9 < 0.0 T	10060	10061	10038		66001	10040	10041	10035		10049	10050
IEL EDYNE Sampi e	NUMBER	43203		* 0254	43205	43206	43207		43208	43209	43210	43212		43213	43214	43215	412214	0126	43217	43218

REPORT OF ANALYSIS

RUN DATE 04/06/94

	MORK ORDER NUMBER	CUSTOMER P.O. NUMBER	DATE RECEIVED DELIVERY DATE	DELIVERY DATE	PAGE
ANN MARIE HOLGROW HCLAREN/HART 16755 von Karman Ave 18vine ca	4-0185	030225/030600829	03/08/94	03/18/94	

MID-COUNT TIME VOLUME - UNITS DATE TIME ASH-WGHT-% ¢ LAB.	20	21 5	14 14	21 5	27	APPROVED BY J. CUENTHER 04/06/94		LAB. 6 - ALPHA SPEC LAB.
	03/20	03/21	03/14	03/21	03/27	160 BY &		:45/L.S.
NUCL-UNIT-X U/H a	2	~	9.1	~	7	APPROV		S - TRITTUM GAS/L.S. LAB.
TY TER)	L.T. 1. E 02	L.T. 2. E 02	L.T. 4. E 00 1.2 +-0.4 E 01	L.T. 2. E 02	L.T. 2. E 02			ď
ACTIVITY PCI/LITER)	•	. 5	• 0	2	· 2•			4
₹ ₽	ו:		1.2	Ξ	3	-		- 7202
COLLECTION-DATE START STOP DATE TIME DATE TIME NUCLIDE	H-3	H-3	68 - A 8	H-3	H-3	LAST PAGE OF REPORT		TOT LUGU TARTO TO THE
COLLECTION-DATE STOP TE TIME DATE T						LAS	3	•
ECT 10	1445	1440	1450	1420	1000		OLBRO	•
COLI STAR DATE	03/04 1445	03/04 1440	03/04 1450	03/07 1420	03/07 1000		RIE H	:
STA							NN MA	
CUSTOMER'S IDENTIFICATION	BB-04-021-RT	BB-04-001-WT	88-04-001-WA	SM-03-012-RT	BB-13-024-RT		SEND 1 COPIES TO MC480S ANN MARIE HOLBROW	
CC 10E	10003	110011	11002	10063	10036		1 COP	
FELEDYNE Sample Number	43170 1	43181 1		43189			SEND	

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REPORT OF ANALYSIS

PAGE 3

RUN DATE 04/06/94

9466	1				,	
	DATE RECEIVED DELIVERY DATE	03/18/94				
	DATE RECEIVED	03/08/94				
KEYUKI GI AMALUSI	CUSTOMER P.O. NUMBER	030225/030600829				
	NUMBER NUMBER		CD 10 -+			
					92714	
			ANN MARIE HOLBROW	MCL AREN/HART	16755 VON KAKMAN ATE	

	LAB.	ī.	ĸ	Į.	r.	£.	ĸ	K r	R.	ī	R.V	ĸ	ស	s n	s n	ę,	
	VOLUME - UNITS ASH-WGHT-X *																
MID-COUNT	TIME DATE TIME	03/56	75/20	03/27	03/27	03/27	03/27	03/27	03/27	03/27	03/27	03/27	03/27	12/60	03/50	03/28	
	ACTIVITY NUCL-UNIT-X PCI/LITER) U/M \$			2. E	L.T. 2. E 02	, 44	, s	5		2. E					L.T. 2. E 02	L.T. 2. E 02	
7 I D S	COLLECTION-DATE START STOP	DATE TIME DATE TIME NUCLIDE	03/07 0926 H-3	03/07 0910 H-3	03/07 0930 H-3						03/07 1018 H=5			.	•		03/07 1133 H-5
	ATS	LOENTIFICATION NUM	BB-06-066-ST			8B-12-006-ST	88-12-019-57	86-12-023-57	BB-12-020-ST	88-12-003-ST	8 86-13-011-ST	9 BB-13-010-ST	0 BB-13-037-5T		5 BB-13-024-ST	9 BB-02-071-ST	0 BB-02-045-ST
	TELEDYNE		10031			43206 10056	43207 10057	43208 10058	43209 10060	43210 10061	43212 10038	43213 10039	43214 10040	43215 10041	43216 10035	43217 10049	43218 10050

RUN DATE 04/06/94

PAGE 1

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			NUMBER	CUSTOMER P.O. NUMBER	DATE RECEIVED	DELIVER! ORIC	
NO September 1	0 8 0	*	Ur)	030225/030600829	03/08/94	03/10/74	
ANN MARIC MOLAREN/HART 16755 VON KARMAN AVE IRVINE CA	HART N KARMAN A	1 AVE 92714		S 0 1 L		•	
TELEDYNE Sample		CUSTOMER'S STA	COLLECTION-DATE START STOP 4 DATE TIME DATE TIME NUCLIDE		4UCL-UNIT-X U/M a	MID-COUNT VOLUME - UNITS ITHE ASH-WGHT-% *	ITS LAB
NUMBER 43169	1000	-51		L.T. 1. E		03/19	L C
		B8-04-021-FT	03/04 1405		02	03/20	un 16
43172	10005	BB-04-023-ST	03/04 1415	L.1. 1. E	0.2	03/26	L a
43173	10001	BB-04-097-ST	03/04 1415	L.T. 1. E	02	03/26	, u
43174	1001	BB-04-082-5T	03/04 1420		02	03/20	n w
43175	10013	BB-04-026-ST	03/04 1435		02	03/20	n 4
43176	11009	BB-04-062-ST	03/04 1435		02	03/50	r =
43177	10015	88-04-019-51	03/04 1445		02	03/50	
43178	10016	88-04-084-ST	03/04 1450		0.5	03/50	
43179	1001		03/04 1500		0.2	03/20	
43180	10020	88-04-049-51	03/04 1500	H-3 L.T. 1. E	: 02	03/20	
43183	10021		٠ ،	L.T. 1.	E 02	03/20	
43184	43184 10022	88-14-041-ST	03/04 1500	1.1. 1.	E 02	03/20	
		12-640-34-00	03/04 1605	•		03/20	

03/20

E 02

L.T. 1.

H-3

03/04 1605 03/04 1625

> 88-14-079-51 EB-14-094-ST

REPORT OF ANALYSIS

PAGE 2 RUN DATE 04/06/94 DATE RECEIVED DELIVERY DATE CUSTOMER P.O. NUMBER

03/18/94 03/08/94 030225/030600829 WORK ORDER NUMBER 4-0185 92714 ANN HARIE HÖLBROW MCLAREN/HART 16755 VON KARMAN AVE IRVINE CA

SOIL

FEL EDYNE SAMPLE	20 2	CUSTOMER'S	STA	COLL START DATE	COLLECTION-DATE START STOP DATE TIME DATE TIME NUCLIDE	NUCLIDE	ACTIVITY (PCI/LITER)	NUCL-UNIT-X U/A &	MID-COUNT TIME DATE TIME	VOLUME - UNITS ASH-WGHT-X 0	LAB.
	1003	-51		03/04 1625	1625	H-3	L.T. 2. E	0.2	03/50		r.
	10063	Z - 2 10 - 2 - 2 2		03/07 1422	1422	н-3	L.T. 1. E	02	03/30		r.
43100	10001	SM-03-015-ST		03/07 1420	1420	H-3	t.1. 1. E	02	03/21		F.
	10065	SM-03-009-ST		03/07 1423	1423	H-3	t.T. 1. E	02	03/21		rv.
	10066	SM-03-001-ST		03/07 1425	1425	H-3	L.T. 1. E	02	03/21		ro i
	10067	SM-03-014-ST		03/07 1430	1430	H-3	L.T. 1. E	E 02	03/21		ır ı
	10047	BB-05-003-ST		03/07 1050	1050	H-3	L.T. 1. E	02	03/30		ו יחו
	10043	BB-05-089-ST		03/07 1052	1052	H-3	t.T. 1. E	0.2	03/21		en e
	10042	BB-05-089FDT		03/07 1052	1052	H-3	L.T. 1. E	0.2	03/21		ın (
43197	10048	88-05-006-ST		03/07 1102	1102	H-3	L.T. 1. E	0.2	03/21		en e
43198	10044	BB-05-057-ST		03/07 1112	1112	H-3	L.T. 1. E		03/21		n w
43199	10046	88-05-077-ST		03/01	03/07 1110	H-3	L.T. 1. E	02	03/21		, ec
43200	10028	BB-06-007-ST		03/01	03/07 0910	H-3	:		03/21		, (
43201	10029	88-06-092-ST		03/01	03/07 0918	H-3	L.T. 1. E		03/21		, <u>r</u> c
43202	10030MS	5 BB-06-092-MT		`		H-3	3.0 +-0.2 E	03	05/50		•

REPORT OF ANALYSIS

PAGE 10 DELIVERY DATE DATE RECEIVED CUSTOMER P.O. NUMBER

RUN DATE 05/12/94

LAB. • YOLUME - UNITS DATE TIME ASH-WGHT-X * 04/16/94 #10-C0UNT 11 76 04/15 04/15 04/15 04/15 04/15 60/40 04/09 04/09 04/09 60/40 60/40 04/15 04/15 04/15 04/15 04/15 04/15 04/15 04/15 04/58 04/15 04/15 03/14/94 NUCL-UNIT-X L.T. 3. E-01 2.37+-0.24E 01 L.T. 3. E-02 L.T. 3. E-02 L.T. 1. E-01 E-02 E-02 E-02 E-02 E-02 E-02 1.00+-0.34E 00 6.60+-0.66E-01 E-01 E-02 E-02 -01 E-05 6.1 +-4.1 E-02 (PCI/GM ORY) ACTIVITY 030225/030600829 ::: ... 1:1: 1.1 1:1 -1.1. : <u>.</u> <u>:</u> ... : <u>:</u> ... • DATE TIME DATE TIME NUCLIDE PU-238 PU-239 PU-239 MN-54 CO-58 FE-59 CO-60 2N-65 2R-95 RU-103 RU-106 PU-238 CS-134 CS-137 RA-226 TH-228 PU-238 PU-239 S 0 1 L CE-144 84-140 CE-141 SR-90 BE-7 04-X STOP COLLECTION-DATE WORK DRDER NUMBER 03/10 1016 03/10 0930 03/10 1010 03/10 1228 03/10 1228 4-0409 START STA 88-15-008-SP 88-15-007-SP 88-15-006-SP 92714 88-19-009-56 88-19-009-SS CUSTOMER'S IDENTIFICATION MCLAREN/HART 16755 VON KARMAN AVE IRVINE CA ANN MARIE HOLBROW 44205 10291 44202 10288 44204 10290 44191 10313 10312 TELEDYNE Sample Number 44190

REPORT OF ANALYSIS

RUN DATE 05/12/94

11		
PAGE 11		
DATE RECEIVED DELIVERY DATE	04/16/94	
DATE RECEIVED	03/14/94	
CUSTOMER P.O. NUMBER	030225/030600829	•
WORK ORDER NUMBER	4-0409	
		92714
	ANN MARIE HOLBROW	ICTSENTIFE I 16755 YON KARMAN AVE

TIME VOLUME - UNITS	
MID-COUNT TIME	
ACTIVITY NUCL-UNIT-X	200
COLLECTION-DATE	
COLLE	
	,
TELEDYNE	

SUS	CUSTOMER'S STA	∨ 40	COLLECTION-DATE START STOP DATE TIME DATE TIME NUCLIDE	NUCL IDE	ACTIVITY (PCI/GM DRY)	ACTIVITY CI/GM DRY		NUCL-UNIT-X U/M 0	NID-COUNT TIME DATE TIME	VOLUME - UNITS ASH-WGHT-X *	LAB.
EB-15-009-5P	-50			PU-238 PU-239	:::	 	E-03		04/09		• •
88-15-010-SP	0-SP	03/1	03/10 1030 P	PU-238 PU-239	.: ::::	, e e	E-03		04/09		• •
89-00-002-FP)2-FP	03/1	03/10 1025 P	PU-238 PU-239	::: :::	::	E-03		60/40		• •
88-15-001-ST	01-ST	03/1	03/10 0945 F	H-3	t.T. 2.		E 02 P	PCI/LITER *	02/08		₩.
BB-15-001-MT	11-HT	03/1	03/10 0945 +	H-3	L.T. 3.	3. E	E 02 f	PCI/LITER *	60/50		₩.
88-15-601-MT	01-HT	`	•	H-3	3.3 +-0.3 E 03	0+3 E		PCI/LITER *	60/50		E.
10284KN 88-15-001-MT	11-MT	`	•	H-3	3.8 +-0.3 E 03	9 €.0.		PCI/LITER #	60/50		I
AB-15-002-ST	02-ST	03/1	93/10 0935	H-3	L.T. 2.		E 02 1	PCI/LITER #	60/50		₩.
RR-15-003-ST	03-ST	03/1		11-3	1.1. 2.	2. E	E 05	PCI/LITER +	60/50		I
88-15-004-ST	004-ST	03/1		H-3	L.T.	2. E	E 02	PCI/LITER &	60/50		I
88-15-005-ST	005-ST	03/1	03/10 0910	H-3	1:1:	2.	E 05	PC1/LITER *	60/50		I
88-15-001-SP	001-SP	03/	03/10 0945	PU-238 PU-239	1:1:	::	E-02 E-02		04/10		. •

RUN DATE 05/04/94

PAGE

REPORT OF ANALYSIS

STAC SCREENING	DELIVER! DAIL	04/13/94
	IMBER DATE RECEIVED DELIVERI DATE	70711111
	CUSTOMER P.O. NUMBER DAT	
		K ORDEK NUMBER
		<u>×</u>

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VOLUME - UNITS ASH-HGHT-% &	
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ASH-WGHT-X & DATE TIME 04/01 04/01 04/01 10/50 04/01 10/40 10/40 10/40 04/01 04/01 04/01 04/01 TIME 04/01 10/40 04/01 04/01 10/40 04/01 04/01 10/50 04/01 04/01 10/50 04/01 10/40 04/01 04/01 04/01 NUCL-UNIT-% ¢ ₩/∩ 2.99+-0.51E-01 L.T. 2. Lore 9. E-02 Lore 2. E-01 4.14+0.74E 00 1.33+-0.13E 00 E-02 E-01 E-02 E-02 E-01 2.62+-0.26E 01 E-02 E-01 E-02 E-02 E-01 E-02 E-02 E-01 E-02 E-01 .0.24E 01 (PC1/GM DRY) ACTIVITY :: 1.1 1.1. 1.1. 1.1 L.1. DATE TIME DATE TIME NUCLIDE RA-226 TH-228 CS-134 CS-137 BA-140 K-40 MN-54 FE-59 59-NZ 28-95 09-03 CE-144 85-03 RU-103 CE-141 8E-7 K-40 MN-54 CO-58 FE-59 CO-60 1-131 28-95 STOP COLLECTION-DATE 03/09 1410 03/09 1401 STA NUM 88-16-B004-5G 43949 10172 88-17-0078-56 10ENTIFICATION CUSTOMER'S 43950 10278 SAMPLE TELEDYNE

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PAGE 14

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TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES REPORT OF ANALYSIS

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		HOLBRU ART Karman	11148 11149 11150	10270 10271 10272
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PAGE 17

RUN DATE 05/04/94

04/13/94 03/11/94 030225/030600829 5011 NORK ORDER NUMBER 4-0354 ANN MARIE HOLBROW MCLAREN/HART 16755 VON KARMAN AVE IRVINE CA

ы VOLUME - UNITS ASH-WGHT-% & DATE TIME MID-COUNT 04/02 04/05 04/05 TIME 05/02 04/02 05/02 04/02 04/02 04/02 04/02 04/02 04/02 04/02 04/02 04/02 04/02 04/02 PCI/LITER * PCI/LITER # NUCL-UNIT-% E 02 E 02 L.T. 5. E-01 2.04+-0.20E 01 E-02 E-02 3.49+-0.79E 00 2.05+-0.21E 00 E-01 E-02 E-01 1.09+-0.44E-01 -02 E-01 IPCI/GM BRY! ACTIVITY 1.1. ۲۰۱. ... <u>.</u> ٠ L.T. L. T. 1.1. • 1:1 1.1 DATE TIME DATE TIME NUCLIDE PU-238 PU-239 BA-140 CE-141 CE-144 RA-226 TH-228 2N-65 2R-95 RU-103 RU-106 1-131 CS-134 CS-137 F-3 H-3 STOP COLLECTION-DATE 03/09 1650 03/09 1650 03/09 1330 03/09 1320 STA 88-17-010-SP 88-17-010-ST BB-16-B002-ST 98-16-8002-SG 1 DENTIFICATION CUSTOMER'S 11135 11154 11137 43969 10272 TELEDYNE 43970 SAMPLE NUMBER 43972 43971

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REPORT OF ANALYSIS

DATE RECEIVED DELIVERY DATE CUSTOMER P.O. NUMBER

PAGE 18

RUN DATE 05/04/94

04/13/94 03/11/94 030225/030600829 S 0 1 L WORK ORVER NUMBER 4-0354 92714 ANN MARIE HOLBROW MCLAREN/HART 16755 von Karman Ave Irvine Ca

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DELIVERY DATE DATE RECEIVED CUSTOMER P.O. NUMBER REPORT OF ANALYSIS

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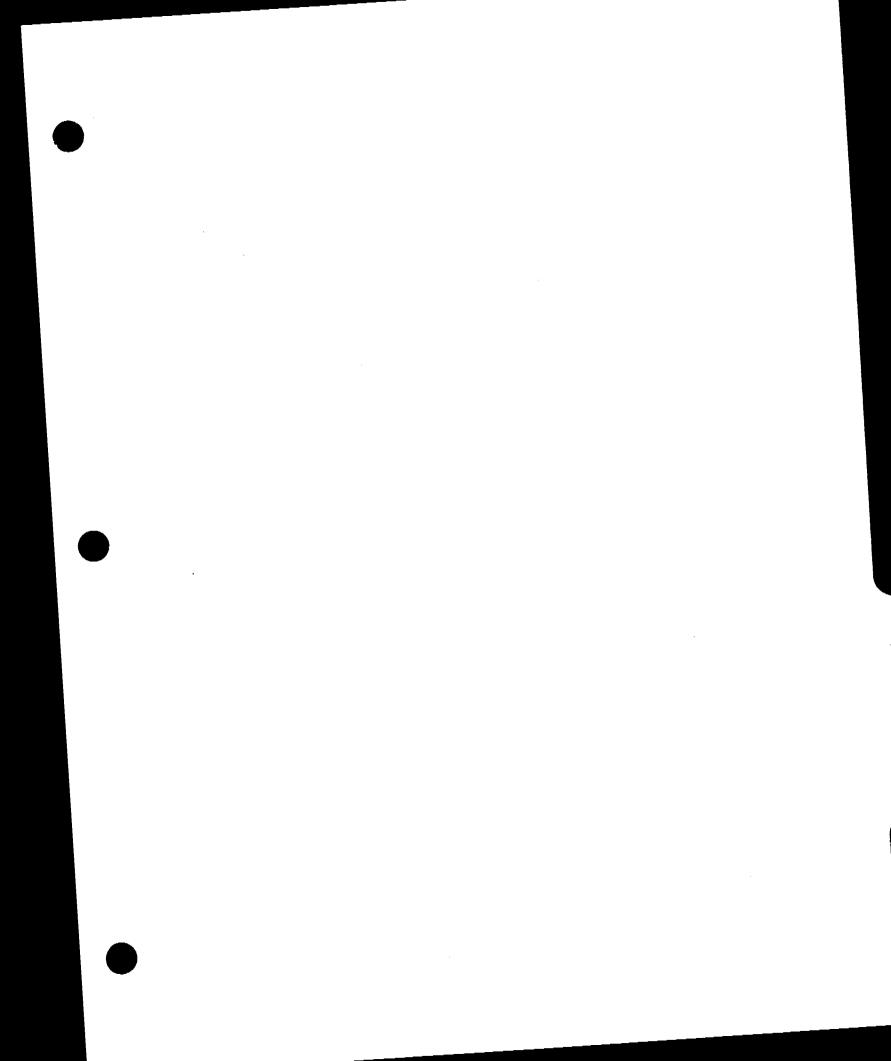
REPORT OF ANALYSIS

RUN DATE 05/26/94

PAGE 1 DATE RECEIVED DELIVERY DATE 96/111/90 03/11/94 CUSTOMER P.O. NUMBER 030225/030600829 WORK ORDER NUMBER 4-1294 92714 ANN MARIE HOLBROW MCLAREN/HART 16755 VON KARMAN AVE IRVINE CA

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ELEOYNE Sample Number	CUSTOMER'S IDENTIFICATION	STA	COLL STA#T DATE	COLLECTION-DATE STAPT STOP DATE TIME DATE T	:: 114E	NUCLIDE	ACT (PCI/	ACTIVITY (PCI/GH DRY)		NUCL-UNIT-X U/F o	MID-COUNT TIME DATE TIME	VOLUME - UNITS ASH-WGHT-% *	LAB.
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43973	11137DUP88-17-010 -SP		03/04 1650	1650	مَمَ	PU-239 PU-238	 	2:	E-02 E-02		04/05		••
43997	101925UP8R-17-009A-ST		03/00		Ĭ	H-3	:	2.	E 02	PCI/LITER *	05/02		•



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F & 0000000000000	R \$ 04/50 03/29 03/29 03/31 03/31 03/31 03/31 03/31 03/31 03/31 03/31
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S 0 I L P NUCLIDE 2N-65 2R-95 2R-95 RU-108 I-131 CS-134 CS-134 CS-134 CS-134 CS-141 CE-141 CE-144	H-3 PU-238 PU-239 BE-7 K-40 MN-54 CU-58 FE-59 CU-60 2N-65 2R-95 RU-103 RU-104 I-131 CS-134 CS-137 BA-140
COLLECTION-DATE START DATE TIME DATE TIME 03/09 0945 R	03/09 1615 03/09 1615 03/09 1615
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RUN DATE 05/04/94

REPORT OF ANALYSIS

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RUN DATE 05/04/94

TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES

PAGE 7 STIND - SMILLS DELIVERY DATE 04/13/94 MID-COUNT DATE RECEIVED 96/11/60 CUSTOMER P.O. NUMBER 030225/030600829 REPORT OF ANALYSIS S 0 1 L WORK ORDER NUMBER 4-0354 92714 ANN MARIE HOLBROW McLaren/Hart 16755 von Karman ave Irvine ca

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ララ	3.5 +-0.2 E 03 PLI/LILES L.T. 5. E-01 L.T. 5. E-02 L.T. 5. E-02 L.T. 5. E-02 L.T. 5. E-02 L.T. 6. E-01 L.T. 6. E-02 L.T. 7. E-02
4E NUCLIDE PU-238 PU-239 PU-239 CO-58 FE-59 CO-60 ZN-65 ZR-95 RU-106 1-131 CS-134 CS-134 CS-134 CS-134 TH-228	H-3 1355 R-40 MN-54 CO-58 FE-59 CO-60 ZN-65 ZR-95 RU-103
COLLECTION-DATE STOP START THE DATE TIME	03/09 1540
CUSTOMER*S STA IDENTIFICATION NUM 2 BB-17-005B-SP 53 BB-17-005B-SG	BB-17-006-5T BB-17-007A-5G
TELEDYNE CU SAMPLE IDEN NUMBER 43926 10152 43927 10153	43928 10154 43929 10169

RUN DATE 05/04/94

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TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES
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TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES REPORT OF ANALYSIS

PAGE 10

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TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES

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PAGE 17

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PAGE 19

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PAGE 24

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PAGE 27					LAB.
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RUN DATE 05/04/94

TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES

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RUN DATE 05/04/94

TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES REPORT OF ANALYSIS

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H-3

03/09 1355

ربي 44029 10199 88-17-8002-ST

RUN DATE 05/04/94 DELIVERY DATE REPORT OF ANALYSIS

PAGE 31

04/13/94 DATE RECEIVED 03/11/94 CUSTOMER P.O. NUMBER 030225/030600829 WORK ORDER NUMBER

4-0354 16755 VON KARMAN AVE

ANN MARIE HOLBROW MCL AREN/HART IRVINE CA

VOLUME - UNITS ASH-WGHT-% & TIME DATE TIME MID-COUNT NUCL-UNIT-% U/M & (PCI/GM DRY) ACTIVITY START STOP DATE TIME DATE TIME NUCLIDE COLLECTION-DATE STOR STA NUM CUSTOMER'S

S 0 1 L

Φ 04/09 04/05 60/40 60/50 E-02 E-02 E-01 2.28+-0.23E 01 -1: PU-238 PU-239 03/09 1355 03/09 1355 44031 10201 BB-17-B002-SG 44030 10200 8B-17-B002-SP IDENTIFICATION TELEDYNE SAMPLE

60/40 60/40 60/50 04/00 04/09 04/09 60/40 04/09 60/50 60/50 60/40 60/40 04/09 L.T. 1. E-01 L.T. 3. E-01 2.04+-0.62E 00 1.16+-0.12E 00 L.T. 5. E-01 L.T. 5. E-02 1.30+-0.40E-01 L.T. 2. E-01 E-01 E-02 E-02 E-02 E-01 E-01 E-02 E-01 E-02 ---t.T. 1:1 RA-226 TH-228 BA-140 CE-141 CS-137 CE-144 RU-103 RU-106 CS-134 K-40 MN-54 CO-58 FE-59 CO-60 ZN-65 1-131

Activity added to spiked samples

ACLIVITY	1.4 E 04 pCi/l 1.4 E 04 pCi/l 5.6 E-01 pCi/g 5.6 E-01 pCi/g 3.3 E-01 pCi/g 3.3 E-01 pCi/g
Isotope	H-3 H-3 Cs-137 Cs-137 Pu-239 Pu-239
11#	43937 43938 43994 43995 44000

RUN DATE 06/02/94

5016

_	NUCL-UNIT-% TIME ASH-WGHT-% C LAB. 3 05/28 5 2 05/28 5 3 05/28 5 2 05/28 5 4 05/28 5 5 05/28 5	5 - TRITIUM GAS/L.S. LAB. 6 - ALPHA SPEC LAB.
	ACTIVITY THE NUCLIDE (PC1/LITER) H-3	4 - GE(LI) GAMMA SPEC LAB. 5 - TR
	CUSTOMER'S STA ENTIFICATION NUM BB-00-005-PT BB-00-007-PT BB-17-010-ST	SEND I COPIES TO MC480S ANN MARIE HULBROW
	TELEUYNE SAMPLE NUMBER ID 46247 11046 46248 11047 46249 11048	SEND

4 - GELLII GAMMA SPEC LAB.

3 - RADIO CHEMISTRY LAB.

2 - GAS LAB.

RUN DATE 05/26/94

REPORT OF ANALYSIS

PAGE DELIVERY DATE 04/13/94 DATE RECEIVED 03/11/60 CUSTOMER P.O. NUMBER 030225/030600829 WORK ORDER NUMBER 4-1294

TIME YOLUME - UNITS
DATE TIME ASH-WGHT-X * MID-COUNT E 02 PCI/LITER 9 05/02 04/05 04/05 03/29 05/01 03/29 04/13 04/13 04/13 04/13 04/13 04/13 04/13 04/13 04/13 04/13 04/13 PCI/LITER . NUCL-UNIT-X 2.9 +-1.5 E 02 E-02 E-02 E-02 E-02 E-01 8.63+-0.86E-01 E-02 E-03 E-02 E-01 E-01 E-02 E-02 E-02 E-01 E-01 E-01 L.T. 6. E-01 2.33+-0.23E 01 IPCI/GM ORY! ACTIVITY .1. L.1. <u>.</u> 1.1 ... ÷ ۲, Ť DATE TIME DATE TIME NUCLIDE PU-239 PU-238 PU-239 PU-238 BA-140 CE-144 RA-226 TH-228 RU-106 RU-103 CS-134 CS-137 CE-141 5 0 I L CO-58 CO-60 CO-60 ZN-65 ZR-95 1-131 F-3 H-3 1N-24 K-40 COLLECTION-DATE STOP 03/09 1650 03/09 1420 03/09 1540 \$101 60/E0 03/00 STA NUM 43997 101920UPBR-17-009A-ST 43973 111370UP88-17-010 -SP 101550UP 88-17-006-SP 43952 11160DUP88-16-B004-ST 92714 43910 102360UP BB-16-008-5G IDENTIFICATION CUSTOMER'S ANN MARIE HOLBROW MCLAREN/HARI 16755 VON KARMAN AVE TELEDYNE Sample 43931 IRVINE CA NUMBER

RUN DATE 05/26/94 DATE RECEIVED DELIVERY DATE 46/11/40 \$6/11/60 TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES CUSTOMER P.O. NUMBER 030225/030600829 REPORT OF ANALYSIS WORK DRDER NUMBER

PAGE 2

S 0 1 L 92714 ANN MARIE HOLBROW McLaren/Hart 16755 von Karman ave Irvine Ca

4-1294

IRVINE CA	#176 ¥		301		MID-COUNT	VOLUME - UNITS	•
			COLLECTION-DATE	ACTIVITY NUCL-UNIT-X	TIME OATE TIME AS	E ASH-WGHT-X a L	LAB.
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44180	44180 10302DUP86-19-005 -55	v					

REPORT OF ANALYSIS

RUN DATE 05/26/94

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PAGE DELIVERY DATE 04/13/94 DATE RECEIVED 03/11/94 CUSTOMER P.O. NUMBER 030225/030600829 WORK ORDER NUMBER 4-1294 92714 ANN MARIE HOLBROW MCLAREN/HART 16755 von Karman ave Irvine ca

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APPROVED BY 3. GUENTHER 05/26/94 LAST PAGE OF REPORT

04/01 04/01 04/01 04/01

04/01

5 - TRITTUM GAS/L.S. LAB. 6 - ALPHA SPEC LAB.

SEND 1 COPIES TO MC480S ANN MARIE HOLBROW 3 - RADIO CHEMISTRY LAB.

2 - GAS LAB.

4 - GELLIJ GAMMA SPEC LAB.

RUN DATE 06/02/94

REPORT OF ANALYSIS

PAGE DELIVERY DATE 05/04/94 DATE RECEIVED CUSTOMER P.O. NUMBER YORK ORDER NUMBER

04/01/94 030225/030600829 4-0595 MCLAREN/HART 16755 von Karman ave Irvine ca ANN MARIE HOLBROW

92714

148. TIME YOLUME - UNITS
DATE TIME ASH-WGHT-X ** APPROVED BY J. GUENTHER 06/02/94 HID-COUNT TIME 05/28 05/50 05/28 05/28 NUCL-UNIT-X U/M * L.T. 1. E 02 1.5 +-0.2 E 03 1.2 +-0.1 E 03 L.T. 1. E 02 ACTIVITY (PCI/LITER) LAST PAGE OF REPORT DATE TIME DATE TIME NUCLIDE H-3 H-3 H-3 H-3 COLLECTION-DATE STAR 03/09 1650 03/09 1200 03/09 1200 03/09 1200 STA 88-17-010-51 BB-00-007-PT 88-00-006-PT 88-00-005-PT IDENTIFICATION CUSTOMER & S 46247 11046 46248 11047 46249 11048 46250 11182 TELEDYNE NUMBER SAMPLE

5 - TRITIUM GAS/L.S. LAB. 6 - ALPHA SPEC LAB. 4 - GEILII GAMMA SPEC LAB. SEND I COPIES TO MC480S ANN MARIE HULBROW 3 - RADIO CHEMISTRY LAB. 2 - GAS LAB.

Preparation Method: {a}

Project Name:

Rocketdyne-SSFL

Project Number:

030600829003

Sample

Description: BB-18-004-SM 0

Lab Project-ID Number:

Sample

Number: 11200 Date Sampled: 03/10/94

8918-7

Date Digested:

03/25/94

Date

03/16/94 Received:

Batch

940325-2201 Number:

Analyte (Symbol)/EPA Method

Date Analyzed Concentration mg/Kg (ppm)

Reporting Limit mg/Kg (ppm)

Mercury (Hg)/7471

03/27/94

< 0.10

0.10

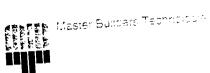
Comments

The cover letter and enclosures are integral parts of this report.

{a} EPA Method 7471 was used for digestion.

UM Approved by:

_ Date: 3-30-94



Preparation Method: {a}

Project Rocketdyne-SSFL Name:

Project Number: 030600829003

Sample Description: BB-18-005-SM 0

Lab Project-ID Number: 8918-1

Sample

Date

03/10/94 Sampled:

Number:

11193

Date

Digested:

03/25/94

Date Received:

03/16/94

Batch Number:

940325-2201

Analyte (Symbol)/EPA Method

Date **Anaiyzed** Concentration mg/Kg (ppm)

Reporting Limit mg/Kg (ppm)

Mercury (Hg)/7471

03/27/94

< 0.10

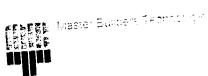
0.10

Comments

The cover letter and enclosures are integral parts of this report.

{a} EPA Method 7471 was used for digestion.

Date: 3.30.94 NM Approved by:



Preparation Method: {a}

Project Name:

Rocketdyne-SSFL

Sample

Description: BB-18-005A-SM 0

Sample

11195 Number:

Date

03/16/94 Received:

Project

030600829003 Number:

Lab Project-

8918-3 ID Number:

Date

03/10/94 Sampled:

Date

03/25/94 Digested:

Batch

940325-2201 Number:

Analyte (Symbol)/EPA Method

Date Analyzed Concentration mg/Kg (ppm)

Reporting Ĺimit mg/Kg (ppm)

Mercury (Hg)/7471

03/27/94

< 0.10

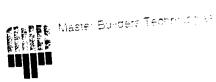
0.10

Comments

The cover letter and enclosures are integral parts of this report.

{a} EPA Method 7471 was used for digestion.

Date: 3,30-94 NW Approved by:



Preparation Method: {a}

Project Name:

Rocketdyne-SSFL

Project Number:

030600829003

Sample

Description: BB-18-005B-SM 0

Lab Project-ID Number:

8918-2

Sample Number:

11194

Date Sampled:

03/10/94

Date Digested:

03/25/94

Date Received:

03/16/94

Batch

Number:

940325-2201

Analyte (Symbol)/EPA Method

Date Analyzed Concentration mg/Kg (ppm)

Reporting <u>Limit</u> mg/Kg (ppm)

Mercury (Hg)/7471

03/27/94

< 0.10

0.10

Page 1

Comments

The cover letter and enclosures are integral parts of this report.

{a} EPA Method 7471 was used for digestion.

Date: 3-30-94. OM Approved by: _

Master Builders Technic 0,44.

Preparation Method: {a}

Project Rocketdyne-SSFL Name:

Project 030600829003 Number:

Sample Description: BB-18-005C-SM 0 Lab Project-

8918-5 ID Number:

Sample

Date

03/10/94

Number:

Sampled:

Date

03/25/94 Digested:

Date Received: 03/16/94

11197

Batch 940325-2201 Number:

Date Analyzed Concentration mg/Kg (ppm)

Reporting <u>Limit</u> mg/Kg (ppm)

Analyte (Symbol)/EPA Method

Mercury (Hg)/7471

03/27/94

< 0.10

0.10

Comments

The cover letter and enclosures are integral parts of this report.

{a} EPA Method 7471 was used for digestion.

Date: 3-30-94 UM Approved by:

> MBT Environmental Laboratories

Master Builders Technologies

Preparation Method: {a}

Project Name:

Rocketdyne-SSFL

Project Number:

030600829003

Sample

Description: BB-18-006A-SM 0

Lab Project-ID Number:

8918-4

Sample

Date

03/10/94 Sampled:

Number:

11196

Date

03/25/94 Digested:

Date

03/16/94 Received:

Batch

940325-2201 Number:

Analyte (Symbol)/EPA Method

Date **Analyzed** Concentration mg/Kg (ppm)

Reporting Limit mg/Kg (ppm)

Mercury (Hg)/7471

03/27/94

< 0.10

0.10

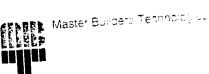
Page 1

Comments

The cover letter and enclosures are integral parts of this report.

{a} EPA Method 7471 was used for digestion.

Date: 3-30-94 UM Approved by:



Preparation Method: {a}

Project Rocketdyne-SSFL Name:

Project Number: 030600829003

Sample

Lab Project-ID Number:

8918-6

Description: BB-18-006B-SM 0

Sample Number:

11198

Date Sampled:

03/10/94

Date

03/25/94

Date Received:

03/16/94

Batch

Digested:

940325-2201 Number:

Analyte (Symbol)/EPA Method

Date Analyzed Concentration mg/Kg (ppm)

Reporting Limit mg/Kg (ppm)

Mercury (Hg)/7471

03/27/94

0.12

0.10

Page 1

Comments

The cover letter and enclosures are integral parts of this report.

{a} EPA Method 7471 was used for digestion.

NM Approved by:

Date: 3-30-94

編集 Master Burgers Teorif 3 () 。 (情報)

Preparation Method: {a}

Project

Rocketdyne-SSFL Name:

Project Number:

030600829003

Sample

Description: BB-18-006B-SM

Lab Project-ID Number:

9066-1

Sample Number:

11198

Date

Sampled:

03/10/94

Date

03/12/94 Received:

Date

Digested:

04/25/94

Batch

Number:

940425-4304

Analyte (Symbol)/EPA Method

Date Analyzed Concentration mg/Kg (ppm)

Reporting Limit mg/Kg (ppm)

Mercury (Hg)/7471

04/25/94

BRL

0.10

Comments

The cover letter and enclosures are integral parts of this report.

{a} EPA Method 7471 was used for Mercury digestion.

Approved by:

Date: 4-29-94



RUN DATE 05/12/94 DATE RECEIVED DELIVERY DATE TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES REPORT OF ANALYSIS

PAGE 7

04/16/94

03/14/94 CUSTOMER P.D. NUMBER 030225/030600829 WORK ORDER NUMBER 6040-4 ANN MARIE HOLBROW MCLAREN/HART 16755 VON KARMAN AV IRVINE CA

LAB.	00 00 00 m ««««««««««««««««««««««««««««
VOLUME - UNITS	
MID-COUNT TIME	04/14 04/14 04/16 04/16 04/16 04/15 04/15 04/15 04/15 04/15 04/15 04/15 04/15 04/15 04/15 04/15 04/15
	LoTo Be E-02 LoTo Be E-03 LoTo
\$ 0 1 L	COLLECTION-DATE START START 1 TIME DATE TIME NUCLIDE 03/10 1632 PU-238 PU-238 PU-239 P
ANN MARIE TOUCH MCLAREN/HART 16755 VON KARMAN AVE 92714 IRVINE CA	TELEOTNE CUSTOMER'S STA SAMPLE IDENTIFICATION NUM NUMBER 44176 10354 8G-02-085-MP 44177 10354MS 8G-02-085-MP 44179 10302 88-19-005-SS 44182 10303 88-19-005-SG
42	

RUN DATE 05/12/94 TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES

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ERY DATE 1/16/94 NT		04/15 04/15 04/15 04/15 04/15 04/15 04/15
DATE RECEIVED 03/14/94	OL UNIT-X U/H * U/	5. E-01 5. E-01 5. E-02 5. E-02 6. E-02 6. E-02 7. E-01 7. E-02 6. E-02 7. E-02 7. E-02 8. E-02 8. E-01
OF ANALYSIS CUSTOMER P.O. NUMBER 030225/030600829 I L	ACTIVITY NUC (PCI/GH DRY) 1.2 +-0.8 E-01 2.31+-0.23E 01 2.31+-0.23E 01 2.31+-0.23E 01 1.T. 4. E-02 1.T. 5. E-02 1.T. 1. E-02 1.T. 5. E-01 1.T. 5. E-01 1.T. 5. E-01 1.T. 3. E-01	1.1. 2.13*- 1.5.13*- 1.1.1. 1.1.1. 1.1.1.
P CRT	TIME NUCLIDE SR-90 BE-7 K-40 MN-54 CO-58 FE-59 CO-60 ZN-65 ZN-105 RU-105 RU-105 RU-105 ZN-105 Z	SR-90 BE-7 K-40 MN-54 CO-58 FE-59 CO-60 ZR-65 RU-103 RU-103
TELEDYNE DROWNE RE WORK ORDER NUMBER 4-0409	COLLECTION-DATE STOP STOP STORE THE DATE THE DATE TINE DATE TO 03/10 1150	03/10 1205
92714	CUSTOMER'S STA 1DENTIFICATION NUM 15 88-19-006-55 16 88-19-006-56	88-19-007-55 88-19-007-5G
HOLBROW RT Karman	CUS 10505 10306	10308
ANN MARIE HOLBROW McLaren/Hart 16755 von Karman ave Irvine ca	TELEDYNE SAMPLE NUMBER 44184 1	44186

TELEDYNE BROWN ENGINEERING STELEDYNE BROWN ENGINEERY OATE
REPORT OF ANALYSIS
AMERICAN DATE RECEIVED DELIVERY DATE

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PAGE

RUN DATE 05/12/94

46/91/40 MID-COUNT TIME 03/14/94 CUSTOMER P.O. NUMBER 030225/030600829 S 0 1 L WORK URDER NUMBER 4-0409 92714 ANN MARIE HOLBROW MCLAREN/HART 16755 von Karman ave Irvine ca

LAB. TIME VOLUME - UNITS
DATE TIME ASH-WGHT-X * 04/15 04/15 04/15 04/15 04/15 04/15 04/15 04/15 04/15 04/15 04/16 04/15 04/15 04/15 04/15 04/19 04/15 04/15 04/15 04/15 NUCL-UNIT-X # #/n E-03 4.47+-2.57E-02 E-01 E-02 E-02 E-02 E-02 E-01 E-01 L.T. 3. E-01 L.T. 3. E-01 1.06+-0.52E 00 E-03 E-02 E-01 E-01 2.36+-0.24E 01 5.52+-0.55E-01 E-02 E-01 IPCI/GH DRY) ACTIVITY 1.1 L.T. 1.1 ... L.T. 1.1 L.1. : : L.T. DATE TIME DATE TIME NUCLIDE CS-134 CS-137 RU-103 RU-106 1-131 2N-65 2R-95 8A-140 CE-141 CE-144 RA-226 FE-59 85-03 09-03 TH-228 SR-90 CS-134 CS-137 18-2E BE-1 K-40 1-131 STOP COLL ECTION-DATE 03/10 1220 03/10 1220 03/10 1205 STA 88-19-008-55 BB-19-008-SG 98-19-007-56 IDENTIFICATION CUSTOMER'S 44188 10310 44189 10311 10309 TELEOYNE Sample Number 44187

04/15 04/15 04/15 04/15

> 1.32+-0.49E 00 8.63+-0.86E-01

CE-144 RA-226

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8A-140

CE-141

RUN DATE 05/12/94

PAGE 10 DATE RECEIVED DELIVERY DATE REPORT OF ANALYSIS

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04/16/94 MID-COUNT TIME DATE TIME ASH-WGHT-% 0 04/15 04/15 04/15 04/15 04/15 04/15 04/15 04/15 04/15 04/15 04/15 04/15 04/15 04/15	04/15	60/40	60/40	60/40
03/14/94 03/14/94 03/14/94 03/14/94 03/14/94 03/14/94 03/14/94 03/14/94 03/14/94 03/14/94 03/14/94	-01	E-02	E-02	E-02 E-02
CUSTOMER P.D. NUMBER 030225/030600829 I L ACTIVITY VCLIDE (PCI/GH DRY) 90 6-1 4-4-1 E-02 90 6-1 4-4-1 E-02 90 1-1- 3- E-01 1-1- 3- E-01 1-1- 3- E-02 1-1- 10- 1-1- 1-1- 1-1- 1-1- 1-1- 1-1-	1.00+-0.34E 00 6.60+-0.66E-01	L.T. 1. E. L.T. 1. E	L.T. 1. E	7:1
	CE-144 RA-226 TH-228	PU-238 PU-239	PU-238 PU-239	PU-238 PU-239
WORK GRDER NUMBER 4-0409 COLLECTION-DATE START DATE TIME DATE TIME 03/10 1228 03/10 1228		03/10 0930	03/10 1010	03/10 1016
92714 ER'S STA CATION NUM -19-009-SS		88-15-006-SP	88-15-007-SP	88-15-008-SP
E HOLBROW THART TO STATE TO ST		10288	10290	
ANN MARIE HOLBROW HCLAREN/HART 16755 VON KARMAN AVE IRVINE CA TELEDYNE CUSTOM SAMPLE LOENTIFI A4190 10312 88-		44202	44204	44205

RUN DATE 05/26/94

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	DATE RECEIVED DELIVERY DATE	04/13/94
	DATE RECEIVED	03/11/94
KEPUKI UT AMPLIATA	CUSTOMER P.O. NUMBER	030225/030600829
	STREET STREET	WURN ONOTH TOTAL

ANN HAR	ANN MARIE HOLBROW		4-1594	030225	030225/030600829	111/50		
MCLAREN/HA 16755 VON 1001NF CA	MCLAKEN/HAK! 16755 VON KARMAN AVE 92714 10VINE CA							
				\$ 0 1 L				
							MID-COUNT	•
TELEDYNE Sample	CUSTOMER'S	STA	COLLECTION-DATE START STOP START TIME NUCLIDE	NUCLIDE	ACTIVITY (PCI/LITER)	NUCL-UNIT-X U/M 0	TINE DATE TIME	VOLUME - UNITS ASH-WGHT-X *
NUMBER	1DENTIFICATION		URIE IINC VAIL		,		05/03	
44019	44019		03/09 1610	H-3	70 2 ° 2 ° 1° 1			
			01/10 1605	H-3	L.T. 2. E 02		90/60	
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44180	44180 103020UPB8-17-005 -SS		03/10 1136	SK-40				

RUN DATE 05/26/94

REPORT OF ANALYSIS

PAGE 3 DELIVERY DATE 04/13/94 DATE RECEIVED 03/11/94 CUSTOMER P.O. NUMBER 030225/030600829 WORK ORDER NUMBER 4-1594

	5	~ ~
	NID-COUNT TIME VOLUME - UNITS DATE TIME ASH-WGHT-X 9 L	
	MID-COUNT TIME DATE TIME	03/31
	NUCL-UNIT-X U/M 0	
20000000000000000000000000000000000000	ACTIVITY 1 PCI/LITER1	
4-1294 050267 4-1294 050267	COLLECTION-DATE START START	DATE TIME DATE TIME NOCESTON
92714	\$1,	Ž
ANN MARIE HOLBROW McLaken/Hart 16755 von Karman ave Irvine ca	* a u x c i	10ENTIFICATION
ANN MARIE HOLBROW MCLAREN/HART 16755 von Karman A Irvine ca	TELEDYNE	NUMBER

LAB.	.	, .		-	.	•	•	.	•	◄ .	•	•	•	• •	•	• •		•	•	
VOLUME - UNITS ASH-WGHT-X &																				•
TINE DATE TIME	03/31	03/31	04/01	10/10	04/01	04/01	04/01	10/10	04/01	04/01	04/01	04/01	04/01	04/01	10/40	04/01	10/40	10/40	04/01	
NUCL-UNIT-X U/M &																	-	4 10	→ C	•
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v11Y L1TE	,	2.	m m	÷		m •	•	÷.	÷	÷.	•	m		•	ก็เ	•	٠.	•	ė	'n
ACTIVITY I PCI/LITERI	-	::	<u>.</u>	L:1	L.T.	L.T.	1.1.	t.1.	1.1.	L • T •	1.1	1.1	• · ·	••••	• ·	• • • • • • • • • • • • • • • • • • • •	•	֡֝֜֜֝֓֜֜֝֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֡֓֓֓֓֓֓֡֓֜֝֡֓֡֓֡֓֡֓	• • • • • • •	• • •
DATE STOP TE TIME NUCLIDE	; :	PU-239 PU-238	967	. 4 - 0	10-NI	05-00	0 m	09-03	59-NZ	2R-95	RU-103	RU-106	1-131	CS-134	CS-137	BA-140	CE-141	CE-144	RA-226	TH-228
COLLECTION-D START STAR TIME DAT		٠ <u>٠</u>	:	0.0																
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STAI	i Y	03/0		03/1																
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CUSTOMER'S	10ENT IFICATION	43921 111270UP 88-17-005-RP		44201 111920UP88-19-006 -RG																
TELEDYNE Sample	NUMBER	43921		44201	•															

APPROVED BY J. GUENTHER 05/26/94 LAST PAGE OF REPORT

5 - TRITTUM GAS/L.S. LAB. 6 - ALPHA SPEC LAB. 4 - GE(LI) GAMMA SPEC LAB. SEND 1 COPIES TO MC480S ANN MARIE HOLBROM 3 - RADIO CHEMISTRY LAB. 2 - GAS LAB.

RUN DATE 04/20/94

TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES

PAGE 2 VOLUME - UNITS DELIVERY DATE 04/11/94 MID-COUNT TIME DATE RECEIVED \$6/60/60 CUSTOMER P.O. NUMBER 030225/030600829 REPORT OF ANALYSIS 5016 MORK ORDER NUMBER 4-0353 ANN MARIE HOLBROW MCLAREN/HART 16755 von Karman ave Irvine ca

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# # #	
TINE TO TENE (1) O O O O O O O O O O O O O O O O O O O	DRY # 03/28
01 PCI/GH DR 01 PCI/GH DR 01 PCI/GH DR 01 PCI/GH DP 02 PCI/GH DP 02 PCI/GH DP 04 PCI/GH DP 04 PCI/GH DP 05 PCI/GH DP 06 PCI/GH DP 07 PCI/GH DP 07 PCI/GH DP 07 PCI/GH DP 08 PCI/GH DP 08 PCI/GH DP 08 PCI/GH DP 09 PCI/GH DP 00 PC	ښ ښ
ACTIVITY (PCI/LITE) (.T. 1. (.T. 1. 2.08+-0.2 (.T. 4. (.T. 4. 2.08+-0.2 (.T. 4. (.T. 4	1.1. 1.
ON-DATE STOP DATE TIME NUCLIDE H-3 H-3 N-40 R-40 MN-54 CO-58 FE-59 CO-60 ZN-65 ZN	H-3 SR-90
COLLECTION-DATE START START DATE TIME DATE 03/08 1416 03/08 1010 03/08 1010	03/08 1030
CUSTOMER'S STA 1DENTIFICATION NUM 9 BB-03-097-ST 13 BB-20-001-ST 84 BB-20-001-SS 85 BB-20-001-SG	RB-20-002-ST BB-20-002-SS
CUS 10079 10083 10084 10085	43705 10067 43706 10088
TELEDYNE SAMPLE NUMBER 43700 43702 43703	437

RUN DATE 04/20/94

	TELEDINE DROFT				
		REPORT OF ANALYSIS	E	DEI IVERY DATE	PAGE
	•	CHSTOMER P.O. NUMBER	DAT	46/11/70	
	HORK ORDER NUMBER	030225/030600829	6 03/09/94		
ANN MARIE HOLBROW MCLAREN/HART 16755 VON KARMAN AVE 92714		, o 1 t		Miles	·
	COLLECTION-)	HUCL-UNIT-X U/H * I	TIME ASH-WGHT-X O	LAB.
TELEOYNE CUSTONER'S SAMPLE IDENTIFICATION NUMBER	STA STAR! NUM DATE TIME DATE	ME NUCLIUE BE-7	L-T- 3- E-01 - A04-0-24E 01	03/21 03/21 03/21	क्रम के !
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			8 E-02	03/21	* * *
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		CS-134 L.T.	4. E-02	03/21 03/21	* *
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03/21 03/21 03/21 03/21 03/21 03/21 03/21 03/21

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8E-7 K-40 MN-54 CO-58 FE-59

03/08 1048 03/08 1048 03/08 1048

> BB-20-003-5G 88-20-003-55 88-20-003-51

> > 10094

43711

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CO-60 ZN-65 ZR-95 RU-103 RU-106

04/07 03/26

E 02 PCI/LITER 9

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E-05

SR-90 H-3

RUN DATE 04/20/94 06/59/94 ADDITIONAL

PAGE

TELEDYNE BROWN L JINE

DATE RECEIVED 96/60/80

DELIVERY DATE 04/11/94

CUSTOMER P.O. NUMBER 030225/030600829 REPORT OF ANALYSIS WORK ORDER NUMBER 4-0353 92714 HCLAREN/HART 16755 VON KARMAN AVE ANN MARIE HULBROW IRVINE CA

VOLUME - UNITS ASH-WGHT-% &

DATE TIME

11ME

MID-COUNT

NUCL-UNIT-X 0 H/O E-02 -02 E-02 (PCI/GM DRY) ACTIVITY 1.1 1.1. 1.1

1-131

03/08 1048

68-20-003-SG

43711 10094

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TELEUYNE SAMPLE NUMBER

STA N.W.

STOP

COLLECTION-DATE

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03/21

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1.10+-0.11E 00

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04/01

PCI/LITER *

1. E 02

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1.8 +-0.4 E-01

5R-90 1-38

#8-NH K-40

03/08 1115 03/08 1115 03/08 1115

> 88-20-004-56 88-20-004-55 BB-2C-004-ST

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CO-58

09-00 FE-59

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L.T. 5. E-02 L.T. 6. E-02 L.T. 2. E-01 2.004-0.56E 00 9.604-0.96E-01

Breatin 6-29-94

The second analysis of TI#43713 for Sr-90 gave result of 8.8 \pm 3.6 E-02.

RUN DATE 04/20/94 DATE RECEIVED DELIVERY DATE TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES REPORT OF ANALYSIS

PAGE

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DATE RECEIVED 03/09/94	NUCL-UNIT-X U/M a U/M a 0.2 0.2 0.2 0.0 0.0 0.0 0.0	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
CUSTOMER P.O. NUMBER 030225/030600829	ACTIVITY NV (PCI/GM DRY) L.T. 1. E-01 L.T. 5. E-02 L.T. 4. E-02 L.T. 8. E-01 L.T. 8	L.T. 1. E 1.8 +-0.5 2.42+-0.2 1.1. 3. 1.1. 4. 1.1. 5. 1.1. 5. 1.2. 0. 1.3. 0. 1.4. 0. 1.5. 0
CUSTOME COSTOME 03022	TIME NUCLIDE 1-131 CS-134 CS-137 BA-140 CE-141 CE-141 CE-141 TH-226	H-3 SR-9C BE-7 K-40 MN-54 CO-58 FE-59 CO-65 2N-65 2R-95 RU-103 RU-106 1-131 CS-137 CS-137 CE-141
WORK ORDER NUMBER 4-0353	COLLECTION-DATE START START TIME DATE TIN DATE TIME DATE TIN	03/08 1115 03/08 1115 03/08 1115
AVE 92714	CUSTOMER'S STA IDENTIFICATION NUM 14 BB-20-003-SG	88-20-004-ST 88-20-004-SS 88-20-004-SG
ANN MARIE HOLBROW HCLAREN/HART 16755 von Karman ave Irvine ca	1004	43712 10095 43713 10096 43714 10097
ANN MARIE HOUMCLAREN/HART 16755 von Kai 1871NE CA	TELEUYNE SAMPLE NUMBER 43711	43712 43713 43714

PAGE 5

RUN DATE 04/20/94

MID-COUNT VOLUME - UNITS DELIVERY DATE 04/11/94 DATE RECEIVED 46/60/60 CUSTOMER P.O. NUMBER 030225/030600829 REPORT OF ANALYSIS 5 0 1 L WORK DROER NUMBER 4-0353 92714 ANN MARIE HOLBROW McLaren/Hart 16755 von Karman ave Irvine ca

80 N W W 444444444444444 N	m
ASH-WGHT-R	
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TELEDYNE C SAMPLE IDE NUMBER 43715 10098 43715 10099 43716 10100 43718 10100	43719 10101

RUN DATE 04/20/94 DELIVERY DATE 04/11/94 DATE RECEIVED 46/60/60 TELEDYNE BROWN ENGINETRING ENVIRONMENTAL SERVICES CUSTOMER P.O. NUMBER 030225/030600829 REPORT OF ANALYSIS WORK ORDER NUMBER

YOLUME - UNITS ASH-WGHT-R . 03/21 03/21 03/21 03/21 DATE TIME 03/21 03/21 03/21 03/21 M10-COUNT 03/21 10/40 03/21 03/56 03/21 03/21 03/51 03/21 03/21 03/21 03/21 03/21 TIME 03/21 12/60 03/21 03/21 03/21 03/21 E 02 PCI/LITER & NUCL-UN11-% E-02 E-01 E-02 E-02 E-03 2.04+-0.69E 00 1.10+-0.11E 00 E-05 2.26+-0.23E 01 E-03 E-02 E-02 E-03 E-01 E-03 E-01 E-01 E-02 E-01 E-02 2.46+-0.25E 01 5. (PC1/GM DRY) : ACTIVITY 1.1. ٠. : ֚֚֚֚֚֚֚֡֝֜֜֜֜֜֝֜֝֜֜֝֓֜֝֜֜֝֜֜֝֜֜֜֜֜֝֜֜֜֜֜֜֝֡<u>֚֚</u> ٠ :: יי ٠ 1.1 ... ۲۰ 09-03 59-NZ DATE TIME DATE TIME NUCLIDE HIV-54 CO-58 FE-59 CS-137 BA-140 CE-141 1H-228 SR-90 RA-226 CE-144 MN-54 CO-58 FE-59 CO-60 ZN-65 ZR-95 RU-103 1-38 4-40 CS-134 RU-106 H-3 1-131 S 0 1 L K-40 COLLECTION-DATE STUR 03/08 1210 03/08 1210 03/08 1210 03/08 1142 4-0353 STA 88-20-001-56 BB-20-007-SS 88-20-007-51 88-20-006-56 92714 10ENT IF ICATION CUSTOMER'S ANN MARIE HOLBROW MCLAREN/HART 16755 von Karman ave Irvine ca 10101 43723 10105 10106 43721 10103 43725 43154 TEL EDYNE NUMBER SAMPLE

ZR-95 RU-103 RU-106

ME RROWN ENGINEERING ENVIRONMENTAL SERVICES

RUN DATE 04/20/94

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		ANN HARIE HOLBROW MCLAREN/HART 16755 VON KARMAN IRVINE CA	TELEDYNE Sample Number 43725	43726 43727 43728

RUN DATE 04/20/94

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TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES

CEIVED DELIVERY DATE REPORT OF ANALYSIS

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ANN MARIE HOLBROW	TELEDYNE CA IRVINE CA IRVINE CA FARPLE NUMBER 43730 10111 43731 10111 43734 10111 43734 10111

RUN DATE 04/20/94

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PCI/GH DRY PCI/GM DAY

E-01

03/21

PAGE 11 RUN DATE 04/20/94 REVISED 8

TELEDYNE BROWN ENGINEER NVIROHMENTAL SERVICES

REPORT OF ANALYSIS

MORK ORDER NUMBER

4-0353

DATE RECEIVED DELIVERY DATE 04/11/94 96/60/60 CUSTOMER P.O. NUMBER 030225/030600829

LAB	4444
MID-COUNT VOLUME - UNITS LAB	i e
FID-COUNT	04/15 04/15 04/15 04/15
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92714	× -
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I KATUA	TELEDYNE SAMPLE	43741 I						

03/21 03/21 03/21 03/21 03/21 03/21 03/21 03/21 E-01 E-02 E-02 E-01 E-02 E-02 E-01 E-02 E-02 נ•1• 1.1 ... :: • FE-59 CO-60 ZN-65 ZR-95 RU-103 RU-106 I-131 CS-134 K-40 HN-54 CO-58 8E-7 H-3 03/08 1126 03/08 1010 43742 11018 88-20-003-FT BB-00-001-FG 11021 500-02-88 43143

1.1. 1.

The customer's identification for Teledyne #43743 has been corrected. Application 4-11-44

RUN DATE 04/19/94

PAGE

TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES

DELIVERY DATE DATE RECEIVED REPORT OF ANALYSIS

04/18/94 MID-COUNT 03/16/94 CUSTOMER P.O. NUMBER 030225/030600829 M A T E R NORK ORCER NUMBER 4-0638 92714 MCLAREN/HART 16755 VUN KARMAN AVE ANN MARIE HOLBROW IRVINE CA

148. APPROVED BY J. GUENTHER 04/19/94 TINE YOLUNE - UNITS 41/10 60/10 60/40 04/13 04/13 04/13 04/13 04/13 04/13 04/13 04/13 04/13 04/13 04/15 04/13 04/13 04/13 04/13 04/13 04/13 04/13 04/13 NUCL-UNIT-X £ 02 L.T. 6. E (1.5 +-0.3 E ((PCI/LITER) L.T. 2. ACTIVITY 1.1 ... L.1. -LAST PAGE OF REPORT DATE TIME DATE TIME NUCLIDE RA-226 TH-228 CE-141 CE-144 RU-106 CS-134 **cs-131** 8A-140 RU-103 -131 GR-A GR-B 28-95 09-03 59-NZ H-3 HN-54 CO-58 FE-59 SR-90 BE-7 0+-X STOP COLLECTION-DATE START 0011 80/60 03/08 1400 03/08 0854 03/08 0854 STA NUM 88-20-0C2-NT 88-20-002-WA BB-20-002-RG 88-20-001-RS CUSTOMER'S IDENTIFICATION 45718 11126 45717 11032 45716 11039 45715 11040 TELEDYNE NUMBER SAMPLE

SEND I COPIES TO HC480S ANN MARIE HULBROM 3 - RADIO CHEMISTRY LAB. 2 - GAS LAB.

4 - GEILII GAMMA SPEC LAB.

5 - TRITTUM GAS/L.S. LAB. 6 - ALPHA SPEC LAB.

EMPLOYEE SHOOTING RANGE (SM03)

DELIVERY DATE 03/18/94 DATE RECEIVED REPORT OF ANALYSIS

LAB. 'n 5 Ś 'n Ś ħ. TIME VOLUME - UNITS
DATE TIME ASH-WGHT-X P 03/30 03/21 03/21 03/51 03/21 03/21 03/30 03/21 03/21 03/21 03/21 03/51 03/30 03/21 03/50 NUCL-UNIT-Z 46/80/60 3.0 4-0.2 E 03 E 02 E 05 E 02 E 05 E 02 E 05 E 02 1. E 02 E 05 E 02 E 05 E 02 E 02 2. E 02 I PCI/LITER! ACTIVITY CUSTOMER P.O. NUMBER 1.1. 1.1 <u>י</u> 030225/030600829 1.1 1.1 1.1 ... : 1.1 DATE TIME DATE TIME NUCLIDE H-3 H-3 F-3 F-3 H-3 S 0 1 L F-3 H-3 H-3 H-3 H-3 H-3 F-3 H-3 Ŧ-3 H-3 COLLECTION-DATE 03/07 0918 WORK ORDER NUMBER 03/07 0910 03/07 1110 03/07 1112 03/07 1102 03/07 1052 03/07 1052 03/07 1050 03/07 1430 03/07 1425 03/07 1423 03/07 1420 03/07 1422 03/04 1625 4-0185 43202 10030MS 88-06-092-MT STA BB-06-092-ST BB-06-007-ST BB-05-017-ST BB-05-057-ST 88-05-089FDT 88-05-006-ST BB-05-089-ST 88-05-003-51 SM-03-014-ST SH-03-001-ST SH-03-009-ST SH-03-015-ST SH-03-012-ST BB-14-004-ST 92714 CUSTOMER'S IDENTIFICATION 16755 VON KARMAN AVE IRVINE CA 43201 10029 43200 10028 43198 10044 10046 43197 10048 43196 10042 ANN MARIE HOLBROW 43195 10043 43193 10067 43194 10047 43192 10066 43191 10065 43190 10064 43188 10062 43187 10027 MCLAREN/HART 43199 TELEDYNE SAMPLE Number

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REPORT OF ANALYSIS

RUN DATE 04/20/94

		HORK ORGER NUMBER	CUSTOMER P.O. NUMBER	DATE RECEIVED DELIVERY DATE	DELIVERY DATE	PAGE
ANN MARIE HOLGROW MCLAREN/HART 16755 VON KARMAN AVE IRVINE CA	92714	4-0353	030225/030600829	03/09/94	04/11/94	

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VOLUME - UNITS ASM-WGHT-X *																											
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NUCL-UNIT-# U/M &	02	E-01 PC1/GM DRY &	E-02 PCI/GM DRY ❖	PCI/GM PCI/GM	E-02 PC[/GM DRY &	PCI/GM DRY	PCI/GM DRY	PCI/GH DRY	PCI/GM DRY	PCI/GM DRY	PCI/GM DRY	PC1/GM DRY	PC1/GH ORY	PC1/GM DRY	PC1/GM	PCI/GM		00 PCI/GM DRY &	-01 PCI/GM DRY &	PC1/6H	E OI PCI/GN ORY &	PC1/6H		PCI/GM DRY	PC1/6#	PC1/GH DRY	-02 PCI/GM DRY &
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CUSTOMER'S IDENTIFICATION	88-20-010-51	BB-20-010-SS	101160UP 38-20-010-55	8B-20-010-SG																FR-20-0:0-MC							
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TELEDYNE Sample Number	43735	43736	43737	43738 10117																43730							

RUN DATE 04/20/94

REPORT OF ANALYSIS

PAGE 10 DATE RECEIVED DELIVERY DATE

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DATE RECEIVED	96/60/60		NUCL-UNIT-X U/M *											(
CUSTOMER P.O. NUMBER	030225/030600829		ACTIVITY N	L.T. 3. E-02 L.T. 3. E-01		L.T. 6. E-02 L.T. 2. E-01	1.07+-0.48E 00 9.80+-0.98E-01	+		L.T. 4. E-02 L.T. 1. E-01		L.T. 5. E-0.	L.T. 3. E-01	[.T. 2. E-01	1.14+-U.60E VO 9.39+-0.94E-01
CUSTOMER P	03022\$/(1105	NUCL 1DE			8A-140 CE-141 TE-144		8E-7 K-40	1 N - 1 N -	20-65 04-65 20-65	2R-95 RU-103 RU-106	1-131 CS-134	12-12-1 BA-140	CE-141 CF-144	RA-226 TH-228
WORK ORDER NUMBER	4-0353		COLLECTION-DATE START STOP NATE TIME DATE TIME	03/08 1340				,							
0*	ANN MARIE HOLBROM	MCLAREN/HART 16755 von Karman ave 1rvine ca	CUSTOMER'S STA					42740 10113HS BB-20-010-MG							

REPORT OF ANALYSIS

RUN DATE 04/20/94

PAGE 11				
DELIVERY DATE	04/11/94			
DATE RECEIVED DELIVERY DATE	03/09/94			•
CUSTOMER P.D. NUMBER	030225/030600829		S 0 1 L	
WORK ORDER NUMBER	4-0353			
		92714		
	ANN MARIE HOLBROW	MCLAREN/HART 16755 von Karman ave Irvine ca		

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VOLUME - UNITS ASH-WGHT-X 0		
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ELEDYNE Sample Minder	43741 	4 3 4 2 3 4 5 4 5

REPORT OF ANALYSIS

PAGE 10

DATE RECEIVED 96/60/60 CUSTOMER P.O. NUMBER NORK ORDER NUMBER

DELIVERY DATE

04/11/94

RUN DATE 04/20/94

030225/030600829 4-0353 92714 ANN MARIE HOLBROW MCLAREN/HART 16755 VON KARMAN AVE IRVINE CA

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	NUCL-UNIT-X U/M &								_		_			~	~		~	_		~	_		2		_	_		. 0	-
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		011										SASTIOL DATES																	
	TELEDYNE Sample Number	43739 10118										41140	2+10+																

RUN DATE 04/20/94

REPORT OF ANALYSIS

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PAGE			
DELIVERY DATE	04/11/94		
DATE RECEIVED	46/60/60		
CUSTONER P.O. NUMBER	030225/030600829		S O 1 L
WORK ORDER NUMBER	4-0353		
		92714	
	ANN MARIE HOLBROW	MCLAREN/HART 16755 von Karman ave 1871nf ca	

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VOLUME UNITS ASH-WGHT-X *									
MID-COUNT TIME DATE TIME 04/07	04/01	03/30	03/21 03/21 03/21	03/21 03/21 03/21	03/21	03/21		03/21 03/21 03/21 03/21	03/21 03/21 03/21 03/21 03/21 03/21 03/21 03/21
ACTIVITY NUCL-UNIT-X (PCI/LITER) U/M \$		E-02 PC1/GM	L.T. 3. E-01 PCI/GH DRT W 2.27+-0.23E 01 PCI/GH DRY P I.T. 4. E-02 PCI/GH DRY P	4. E-02 PCI/GH 1. E-01 PCI/GH 4. E-02 PCI/GH	4. E-02 PCI/CH DRY 4. E-02 PCI/CH DRY 4. E-02 PCI/CH DRY	3. E-01 1. E-01	E-02 PCI/GM DRY F-02 PCI/GM DRY	7. E-02 PCI/GH 2. E-01 PCI/GH +-0.60E 00 PCI/GH +-0.97E-01 PCI/GH	1.1. 3. E-O1 PCI/GM DRY 3. E-O2 PCI/GM DRY 4. L.T. 4. E-O2 PCI/GM DRY 5. L.
COLLECTION-DATE START STOP DATE TIME DATE TIME NUCLIDE	03/08 1340 H=3 03/08 1340 SR-90	03/08 1340 SR-90	03/08 1340 8E-7 K-40	**************************************	2N-65 2N-95 RU+103	RU-106 I-131	CS-134 CS-137	04-140 CE-141 CE-144 RA-226 TH-228	03/08 1340 8E-7 K-40 MN-54 CO-58 FE-59 CO-60 ZN-65 ZR-95
STA	88-20-010-ST		10117 88-20-010-56						10118 BB-20-010-MG
TELEDYNE Sample Number		43737 10							43739

NVIRONMENTAL SERVICES TELEDYNE BROWN ENGINEER

REPORT OF ANALYSIS

CUSTOMER P.O. NUMBER

DATE RECEIVED DELIVERY DATE

REVISED U 1/94 RUN DATE 04/20/94

PAGE 11

92714 ANN MARIE HOLBROW MCLAREN/HART 16755 VON KARMAN AVE IRVINE CA

4-0353

WORK ORDER NUMBER

030225/030600829

96/60/60

04/11/94

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VOLUME - UNITS ASH-WGHT-% *																																
MID-COUNT TIME DATE TIME	04/15	04/15	04/15	04/15	04/15	04/15	04/15	04/15	04/15	04/15	04/15	04/15	04/15	04/15	04/15	04/15	04/15	51/90		10/40	03/21	03/21	03/21	03/21	03/21	03/21	03/21	03/21	03/21	03/21	2	03/21
NUCL-UNIT-X U/M *																				PCI/LITER *												
ACTIVITY NU (PCI/GM DRY)	L.T. 5. E-01	1-0.25	÷	5.	L.T. 1. E-01	*	-	L.T. 6. E-02	٠.	44	.6	٠.	2+-0-82	~	L.T. 1. E-01	2.	-0.52	100000000000000000000000000000000000000	9.86+-0.995-01	L.T. 1. E 02	(.1. 4. E-01	+-0-24		*		•	L.T. 9. E-02	5.	÷	3.]. E	L.T. 5. E-02
IIME NUCLIDE	85-7				FE-59				•				CS-137					0 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	TH-228	H-3	E 60	- C	4 C		FE-53	09-00	2017	28-95	RU-103	RU-106	1-131	CS-134
COLLECTION-DATE START DATE TIME DATE TIM	`	•																		03/08 1010	701100750	0311 00100										
STA	ی	•																		-												
CUSTOMER'S IDENTIFICATION	24-010-02-84 GAMOLIOL 1744-7	. Ata as as asserting																		11018 88-20-003-FT	;	88-00-001-rv 11021										
TELEDYNE Sample Number		40.4																		43742		43743										

The customer's identification for Teledyne #43743 has been corrected. Amadu 4-11-94

REPORT OF ANALYSIS

RUN DATE 06/03/94

PAGE 10 DELIVERY DATE 04/23/94 DATE RECEIVED 03/21/94 CUSTOMER P.O. NUMBER 030225/030600829 WORK ORDER NUMBER 4-0472

ANN MARIE HOLBROW MCLAREN/HART 16755 von Karman ave Irvine ca

92714

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r,	****	*****
VOLUME - UNITS ASH-WGHT-% 0		
MID-COUNT TIME DATE TIME	04/27 04/27 04/27 04/27 04/27 04/27 04/27 04/27 04/27 04/27	05/12 05/12 05/12 05/12 05/12 05/12 05/12 05/12 05/12 05/12
ACTIVITY NUCL-UNIT-X (PCI/GM DRY) U/M &	L.T. 7. E-01 L.T. 5. E-02 L.T. 6. E-02 L.T. 2. E-02 L.T. 7. E-02 L.T. 7. E-02 L.T. 9. E-02 L.T. 9. E-02 L.T. 6. E-01	L.T. 7. E-01 2.14+-0.21E 01 1.T. 4. E-02 1.T. 6. E-02 1.T. 4. E-01 1.T. 9. E-02 1.T. 9. E-02 1.T. 9. E-02 1.T. 9. E-02 1.T. 8. E-01
COLLECTION-DATE STARI STARI SATE TIME DATE TIME NUCLIDE	15	# # # # # # # # # # # # # # # # # # #
	03/15	
E CUSTOMER'S STA IDENTIFICATION NUM	10632 BG-14-003-MG	10632MS BG-14-003-MG
TELEDYNE Sample Number	45074	45075

REPORT OF ANALYSIS

RUN DATE 06/03/94

PAGE 11

		WORK ORDER NUMBER	CUSTOMER P.O. NUMBER	DATE RECEIVED DELIVERY DATE	DELIVERY DATE
ANN MARIE HOLBROW		4-0472	030225/030600829	03/21/94	04/23/94
MCLAREN/HART 16755 von Karman ave					
IRVINE CA	92714				
			5011		

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VOLUME - UNITS ASH-WGHT-% *																									
MID-COUNT TIME DATE TIME	05/12	05/12	71/60	05/13	05/13	05/13	05/13	05/13	05/13	05/13	05/13	05/13	05/13	05/13	05/13	05/13	05/13	05/13	05/13	05/13	05/13	¢ 05/56	***	87/60	04/30
NUCL-UNIT-X U/M &																						PCI/LITER '			
ACTIVITY NI (PCI/GM DRY)	L.T. 2. E-01	-0.64E	1.41+-0.146 00	L.T. 7. E-01	+-0-21	÷	L.T. 6. E-02	5•	L.T. 4. E-02	-	L.T. 8. E-02	L.T. 1. E-01	÷	•	٠.	7.61+-0.76E-01	L.T. 8. E-01	2.		1.56+-0.64E 00	1.42+-0.146 00	5.2 +-3.2 E 02	ı	L.T. 7. E-02	9.3 +-5.1 E-02
: DP TIME NUCLIDE	CE-141	RA-226	TH-228	BE-7	K-40	FN-54	65-03	FE-59	09-00	2N-65	2R-95	RU-103	RU-106	1-131	CS-134	CS-137	BA-140	CE-141	CE-144	RA-226	TH-228	E-H		SR-90	SR-90
COLLECTION-DATE START STOP DATE TIME DATE TIME	`			,	•																	03/15		03/15	03/15
STA					_																	-		S	v
CUSTOMER'S IDENTIFICATION	BG-14-003-MG			SM-COC-41-70	5U-500-+1-89 05H25901																	16-14-004-ST		BG-14-004-SS	106340UP BG-14-004-SS
	10632MS				06036901																	10633		10634	10634DUP
TELEDYNE Sample Number	45075				42076																	18033		45078	45079

REPORT OF ANALYSIS

CUSTOMER P.O. NUMBER

REVISED 07/20/94 RUN DATE 05/04/94

PAGE 31

WORK ORDER NUMBER ANN MARIE HOLBRUW MCLAREN/HART 16755 von Karman ave Irvine ca

4-0354

030225/030600829

03/11/94

DATE RECEIVED DELIVERY DATE

04/13/94

LAB.	0 0	****	~ ~	* 4 4	444	***	444
VOLUME - UNITS ASH-WGHT-% *						-	
MID-COUNT TIME DATE TIME	04/05	04/09 04/09 04/09	04/09	04/09 04/09 04/09	04/09	04/09	04/09
NUCL-UNIT-% U/M &			0	~ el f	·	7 - 1 - 1	
ACTIVITY (PCI/GM DRY)	L.T. 1. E-02 L.T. 1. E-02	2.28+-0.23E 01 1.1. 5. E-02	L.T. 1. E-01	L.T. 6. E-02	t.T. 4. E-01	0-40 2-	L.T. 3. E-01 2.04+-0.62E 00 1.16+-0.12E 00
P TIKE NUCLIDE	PU-238 PU-239	866-7 7 - 40 7 - 50 8 -	FE+59	ZN-65 ZR-95	RU-103 RU-106 I-131	CS-134 CS-137 BA-140	CE-141 CE-144 RA-226 TH-228
COLLECTION-DATE STOP START DATE TIME DATE TI	03/09 1355	03/09 1355					
STA							
CUSTOMER'S 10ENTIFICATION	68-17-8002-SP	88-17-8002-56					
	050	10201					
TELEDYNE Sample Number	44030	44031					

Activity added to spiked samples

5.6 E-01 pci/9 5.6 E-01 pci/9 3.3 E-01 pci/9 3.3 E-01 pci/9 1.4 E 03 pCi/l 1.4 E 03 pCi/l Activity Isotope Cs-137 Cs-137 Pu-239 Pu-239 H-3 44001 44000 43995 43937 43938 43994

The exponent for the H-3 added to Teledyne #43937 and 43938 has been corrected. , preti 7-20-at

TELEDYNE BROWN ENGINEERING Environmental Services

July 20, 1994

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

Ms. Ann Marie Holbrow ChemRisk A Division of McLaren/Hart 16755 Von Karman Avenue Irvine, CA 92714

Reference: W.O. 4-0514

Dear Ms. Holbrow:

Activity added to spike samples:

TELEDYNE #	<u>ISOTOPE</u>	<u>ACTIVITY</u>
44663 44664 44729 44730 44670 44671 44692 44693 44752 44753 44675	H-3 H-3 H-3 H-3 Pu-239 Pu-239 Sr-90 Sr-90 Sr-90 Sr-90 Cs-137 (a) Cs-137 (a)	7.0 E 03 pCi/l 7.0 E 03 pCi/l 3.5 E 03 pCi/l 3.5 E 03 pCi/l 0.33 pCi/g 0.33 pCi/g 3.8 pCi/g 3.8 pCi/g 3.8 pCi/g 3.8 pCi/g 0.70 pCi/g 0.70 pCi/g

(a) The sample had 0.074 pCi/g of Cs-137 activity before the spike was added.

Sincerely.

J. David Martin, Ph.D.

Manager, Environmental Analysis

JDM:cs

TELEDYNE BROWN ENGINEERING Environmental Services

50 VAN BUREN AVENUE P.O. BOX 1235

WESTWOOD, NEW JERSEY 07675-1235 (201) 664-7070 FAX (201) 664-5586

July 20, 1994

Ms. Ann Marie Holbrow ChemRisk A Division of McLaren/Hart 16755 Von Karman Avenue Irvine, CA 92714

Reference: W.O. 4-0409

Dear Ms. Holbrow:

Activity added to spike samples:

44212H-344213H-344177Pu-23944178Pu-23944169Cs-137 (a)44170Cs-137 (a)	3.5 E 03 pCi/l 3.5 E 03 pCi/l 0.33 pCi/g 0.33 pCi/g 0.62 pCi/g 0.62 pCi/g

(a) The sample had 0.17 pCi/g of Cs-137 activity before the spike was added.

Sincerely, J. Savid Martin

J. David Martin, Ph.D.

Manager, Environmental Analysis

JDM:cs



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

July 26, 1994

Ms. Ann Marie Holbrow ChemRisk A Division of McLaren/Hart 16755 Von Karman Avenue Irvine, CA 92714

Reference: W.O. 4-0409

Dear Ms. Holbrow:

Activity added to spike samples:

TELEDYNE #	<u>ISOTOPE</u>	<u>ACTIVITY</u>
44212	H-3	3.5 E 03 pCi/l
44213	H-3	3.5 E 03 pCi/l
44177	Pu-239	0.66 pCi/g (b)
44178	Pu-239	0.66 pCi/g (b)
44169	Cs-137 (a)	0.62 pCi/g
44170	Cs-137 (a)	0.62 pCi/g

(a) The sample had 0.17 pCi/g of Cs-137 activity before the spike was added.

(b) The incorrect activity of 0.33 pCi/g was listed in the letter dated July 20, 1994.

Sincerely. Indevid Martin

J. David Martin, Ph.D.

Manager, Environmental Analysis

JDM:cm

.

Gamma Scan

TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES REPORT OF ANALYSIS

PAGE 4

RUN DATE 05/12/94

					REPO	REPORT OF ANALYSIS	\$18			NELIVERY DATE	DATE	PAGE	-
			Ď	WORK ORDER NUMBER	ĒR	CUSTOMER P.O. NUMBER 030225/030600829	STOMER P.O. NUMBE 030225/030600829	18ER 19	DATE RECEIVED 03/14/94	04/16/94	46		
ANN MARIE HOLBROW	HOLBROW			4-0409									
MCLAREN/HART 16755 von Ka IRVINE CA	RHAN AVE	92714			•	. O 1 L			_	HID-COUNT	¥ 1 3 1		
		i	418	COLLECTION-OATE STOP	OATE	10E	ACTIVITY (PCI/GM DRY)		NUCL-UNIT-X U/M * D	TIME DATE TIME	VOLUME - ONITS ASH-MGMT-M &	LAB.	_
SAMPLE	CUSTONER'S IDENTIFICATION	5		DATE TIME DA 03/10 1610	Ę	.S-137 3A-140	• • •	6. E-02 3. E-01		04/09 04/09 04/09		***	
44167 10336					_	CE-141 CE-144 RA-226	1.1. 3. E. 2. 44+-0.69E	.3. E-01 -0.69E 00 -0.14E 00		04/09		** *	
44168	10348 BG-02-017-MG)1 7-HG		03/10 1622		TH-228 R-40 NN-55	2.26 1.1.	5. E-01 0.23E 01 5. E-02 5. E-02		04/09 04/09 04/09 04/09		****	
						CO-58 CD-60 ZN-65			1 2 31 32	04/09		****	
						2R-95 RU-103 RU-106 1-131		_	2001	04/09		****	
						CS-134 CS-137	1.68+-0		E-01 E-01	04/09		444	
						84-140 CE-141 CE-144		· ·	E-01 E-01 F 00	04/09		. 4 4	-
						RA-226 TH-228	1.23	.23+-0-12E	00	04/14			**

04/14 04/14 04/14 04/14 04/14

1.T. 5. E-01 2.21+-0.22E 01 L.T. 4. E-02 L.T. 5. E-01 L.T. 1. E-01 L.T. 4. E-01 L.T. 1. E-01

8E-7 K-40 MN-54 CO-58 FE-59 CO-60 ZN-65

44169 10348MS BG-02-017-MG

TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES REPORT OF ANALYSIS

PAGE 5

RUN DATE 05/12/94

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DATE	467				VOLUME - UNITS ASH-MGHT-M P																		-									
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\$15	CUSTONER P.O. NUMBER	030225/030600829			ACTIVITY (PCI/GM DRY)		: "		L.T. 4. E-02	L.T. 2. E-01	.	3.4	2.36+=0.60c v		1.T. 7. E-01	1-0-1	L.1. 5. E-02	•	. 2.		.	∴,	•	;	•		0.7	•		9.0-+	1.24+-0.12E	
REPORT OF ANALYSIS	CUSTOMER	030225		\$ 0 1 L	P TIME NUCLIDE	26-82	RU-103	1-131	CS-134	CS-137	741-17	CE-144	RA-226	1H-22B	•	- L	0 t - X	+ C Z C		7017	29-N-	2R-95	RU-103	RU-106	1-131	CS-134	CS-137	BA-140	CE-141	CE-144	RA-220 14-228)] =
_	NUMBER	MUKA CACA	60 P		LECTION-DATE T STO	UAIT I AND THE	•							-		•	•															
			HOLBROW	MCLAREN/HARI 16755 von Karman ave 92714 Irvine ca	STA	E D N	44169 10348MS BG-02-017-MG										10348MSD BG-02-011-H															-
			ANN MARIE HOLBROW	MCLAREN/HARI 16755 VON KA IRVINE CA	TELEDYNE	NUMBER	44169	1									44170															

RUN DATE 05/25/94

REPORT OF ANALYSIS

PAGE 14 DELIVERY DATE 04/11/104 DATE RECEIVED 03/15/94 CUSTOMER P.O. NUMBER WORK ORDER NUMBER

030225/030600829 4-0514 ANN MARIE HOLBROW MCLAREN/HART 16755 von Karman ave Irvine ca

SOIL

LAB. TIME VOLUME - UNITS
DATE TIME ASH-NGHT-X 9 MID-COUNT 04/26 04/26 04/26 04/26 04/26 04/26 04/26 04/26 04/26 04/26 NUCL-UNIT-X \$ W/O L.T. 3. E-02 L.T. 3. E-02 L.T. 9. E-02 L.T. 9. E-02 L.T. 3. E-02 L.T. 5. E-02 3. E-01 1.79+-0.32E 00 L.T. 2. E-01 E-01 E-00 E-02 1.16+-0.29E-01 E-02 E-02 E-02 E-02 E-01 E-01 E-02 E-02 -2.02E-02 10-3 E-02 ACTIVITY (PCI/GM DRY) L.T. 9.714-1.1 ١٠١. 1:1: 1:1 ... 1:1: 1.1. START STOP DATE TIME DATE TIME NUCLIDE TH-228 RA-226 K-40 MN-54 CO-58 RU-106 CS-134 BA-140 441-30 CS-137 CE-141 RU-103 -131 2N-65 ZR-95 60-58 BE-7 HN-54 FE-59 09-03 BE-7 K-40 COLLECTION-DATE 03/14 1225 03/14 1225 STA BG-12-004-MG 86-12-004-56 CUSTOMER*S IDENTIFICATION 44674 10566 44673 10565 TELEDYNE SAMPLE NUMBER

04/26

BA-140

04/26

04/26

04/26

04/56

E-03 E-02 E-01

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> RU-103 RU-106 CS-134 CS-137 [-131]

2R-95

FE-59 09-00 2N-65

04/26 04/26

04/26

05/25/94	PAGE 15						ت	4 4	• •	*	•	· •	- -	4	٠ پ	•	•	, 4	r 4 *	•	4	4	*	•	.	•	•	•	•	4	~	•	•	r u f	. 🖛		
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	DEI TVERY DATE					MID-COUNT	TIME Date Time	04/26	04/26	04/26	04/26	05/12	05/12	05/12	05/12	05/16	05/12	05/12	05/12	05/12	05/12	05/12	05/12	05/16	05/16	05/12	05/12	,	05/13	05/13	05/13	05/13	05/13	05/13	05/13	05/13	
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BROWN ENGINEERING ENVIRONMENTAL SERVICES		P.O. NUMBER	0829				ACTIVITY N			: .	4. E-02	_		• •	• •	: -		•	. 5. E-02	.	m,	•	-		: ::	7.	5. E	.21+-0.31E-0	,	10-1 0 1-1 10-3-6 0. E-01	7	· ·		 	~:		
FRING ENVIR	ANALYSIS	CUSTOMER P.O.	030225/030600829			_	-	•				•	1-1	1.67	 - -					_							پ	-)							•	•
OWN ENGINE	REPORT OF ANALYSIS	CUS	0			S 0 1		TIME NUCLIUE		CE-144	RA-226	27-H1	9.E-7	0 1 1 ×	AN-54	85-00	FE-59	09-00	50-07)[-110	RU-106	1-131	CS-1:	CS-1	BA-140	CE-1+1	CE-144	X 4 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1		198-1	K-40	N	65-00	<u>.</u>	- N	28-95 01-10	
TELEDYNE BR				+1 co - +			COLLECTION-DATE	DATE TIME DATE		03/14 1225				•																	,						
			3	ANN MARIE HOLBROW	MCLAKENTHAN AVE 92714				IDENTIFICATION		10566				1056683																3H-400-21-38 G37777	44676 10566M3U 30 12					
				ANN HAR	16755 VON KA	IRVINE	1	SAMPLE	NUMBER		44674				44675																	446					

RUN DATE 05/25/94

PAGE 16					
DELIVERY DATE	04/11/94				F-11-12-0
DATE RECEIVED DELIVERY DATE	03/15/94				;
REPORT OF ANALYSIS	CUSTOMER PAGE MOTOR	030225/030600829			S 0 1 L
	HOPK ORDER NUMBER	4-0514			
				92714	1
			ANN MARIE HOLBROW	16755 VON KARMAN AVE	IRVINE CA

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VOLUME - UNITS ASH-WGHT-% *																													
MID-COUNT TIME DATE TIME	05/13	05/13	05/13	61/50	05/13	05/13	05/13	05/22	04/16	:	05/02	05/05	90/50	05/05	05/02	05/05	02/06	90/50	,	04/26	97/40	36,40	97/40	92/40	07/40	97/40	04/26	04/26	
NUCL-UNIT-X U/M o								PCI/LITER *													•	~	2	7	2	2	? ?	70	•
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	36		L.T. 3				, n		•	L•T•							5.5		•	_	• -							•	_
	TIME NUCLIDE	1-131	CS-134	CS-137	CE-141	CE-144	RA-226 TH-228		€- H	SR-90		PU-238	U-234	TH-230	PU-239	U-235	U-238	TH-232	TH-22	1	BF-7		+C-NE	86-22	66-34	99-00	78-95	RU-103	RU-106
COLLECTION-DATE	DATE TIME DATE TIME				•				03/14 1245	9766	03/14 1642	A111 1345	C+31 +1								n3/14 1245								
	SIA SIA NUM DATE	`	•						03/	,	03/		03/																
	CUSTOMER'S S 10ENTIFICATION N								AC-12-005-51		BG-12-005-SS		BG-12-005-SP									BCC00-7I-98							
			103601							1026	10568		10569									10571							
	SAMPLE		44676						1	44677	86777	•	2777									44680	•						

RUN DATE 05/04/94

23				
PAGE 23				
DELIVERY DATE	04/13/94			M 10-COUNT
DATE RECEIVED DELIVERY DATE	03/11/94			1
CUSTOMER P.O. NUMBER	030225/030600829		5011	
MORK ORDER NUMBER	4-0354			
		92714		
	ANN MARIE HOLBROW	MCLAREN/HART 16755 VON KARMAN AVE IRVINE CA		

LAB.	****	
VOLUME - UNITS ASH-WGHT-% 0		
MID-COUNT TIME DATE TIME	05/02 05/02 05/02 05/02 05/02 05/02 05/02 05/02 05/02	05/02 05/02 05/03 05/03 05/03 05/03 05/03 05/03 05/03 05/03
ACTIVITY NUCL-UNIT-% (PCI/GM DRY) U/M **	5. 23. 4. 4. 4. 4. 5. 5. 5. 5. 5. 5. 5. 5. 5. 5. 5. 5. 5.	L.T. 2. E-01 2.68+-0.48E 00 1.14+-0.11E 00 L.T. 7. E-01 2.25+-0.22E 01 L.T. 5. E-02 L.T. 4. E-02 L.T. 9. E-02 L.T. 9. E-01 L.T. 9. E-01 L.T. 5. E-01 L.T. 5. E-01 L.T. 5. E-01 L.T. 5. E-01 L.T. 5. E-01 L.T. 9. E-01 L.T. 9. E-01
COLLECTION-DATE START DATE TIME DATE TIME NUCLIDE	03/09 K-40 MN-54 CO-58 FE-59 CO-60 2N-65 2R-95 RU-103 RU-106 I-131 CS-134 CS-134	CE-144 RA-226 TH-228 TH-228 WN-54 CO-58 FE-59 CO-58 FE-59 CO-60 ZN-65 ZN-65 ZN-65 ZN-65 ZN-65 ZN-103 RU-103 RU-106 L-131 CS-137
SAMPLE CUSTOMER'S STA	10191 BB-17-009A-MT	43994 10191MS 8B-17-009A-MT

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			WORK O	WORK ORDER NUMBER	CUSTOMER P.O. NUMBER	P. 0. NU	MBER	DATE RECEIVED	DELIVERY DATE		PAGE 24	
ANN MARIE HO HCLAREN/HARI	ANN MAKIE HOLBROW HCLAREN/HART 1175 YON KADMAN AVE	u > 3	4	4-0354	030225/03060082	0306008	5-3-	96/11/60	04/13/94			
IRVINE CA	**************************************	92714		•	-							
					-							
TELEUYNE Sample Number		CUSTOMER'S STA	٠	COLLECTION-DATE START STOP NATE TIME DATE TIME	NUCLIDE	ACTIVITY (PCI/6M ORY)	11TY 1 ORY)	NUCL-UNIT-% DA	MID-COUNT TIME VOLUME DATE TIME ASH-WGH	- UNITS	LAB.	
		•				-	6-01		5/03		•	
43664	10191MS	10191HS BB-17-009A-MT	03/04		141		3. E-01		05/03		.	
		MG			RA-226 TH-228	1 1	1.66E 00		05/03 05/03		4 4	
								•			4	
43995	10191MSC	10191HSD88-17-0094-147	03/09		BE-7	1:1	9. E-01	o c	05/03		• •	
				-	K-40	•	77.		20/20			
		S Z		_	NN-54	_ • T • _			20/20		•	
					CO-58				03/03			
					FE-59				20,40		4	
					09-00		3. E-02		E0/50			
					2N-65	• <u>•</u>	1. E-01		05/03		•	
					RII-103				05/03		.	
					RU-106	::	Ÿ		05/03		• •	
					1-131				05/03		. 4	
					CS-134		7. E-02		05/03		• •	
					CS-137	7.66+-	-		05/03		•	
					BA-140	•	3 6101		05/03		•	
						<u>.</u> .			05/03		•	
					CE-144	,,,,	1		10/10		4	
					25	7.00.7			20/50		4	
					TH-228	1.23+-	*53+-0*12E U					
43996	10192	BB-17-009A-ST	03/09	60	H-3	1:1	2. E 0	02 PCI/LITER * (05/02		r.	
					911-23-8	1.			04/05		•	
43999	10173	88-17-0078-MP	03/(1041 40/60	PU-239	1:1:	8. E-03		04/05		•	

Isotopic Plutonium

RUN DATE 05/12/94

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PAGE

REPORT OF ANALYSIS

DELIVERY DATE 04/16/94 DATE RECEIVED 03/14/94 CUSTOMER P.O. NUMBER 030225/030600829 WORK DRDER NUMBER 4-0409

92714

ANN MARIE HOLBROW

LAB. VOLUME - UNITS ASH-WGHT-X & MID-COUNT TIME DATE TIME 04/15 04/15 04/15 04/15 04/15 04/15 04/15 04/15 04/15 04/15 04/15 04/15 04/15 04/15 04/14 04/16 04/14 04/15 04/15 04/15 04/16 04/16 04/16 41/10 NUCL-UNIT-R • ¥/∩ L.T. 2. E-01 L.T. 8. E-02 L.T. 2. E-01 1.07+-0.40E 00 5.88+-0.59E-01 E-02 5.61+-2.58E-02 E-02 E-02 E-02 E-01 E-01 E-05 E-01 E-02 2. E-02 2. E-02 L.T. 1. E-02 5.8 +-0.9 E-01 2.39+-0.24E 01 E-03 6.3 +-1.0 E-01 (PC1/GH DRY) ACTIVITY ÷ L. T. L.T. -:1: ... : ... -: -• ٠. : DATE TIME DATE TIME NUCLIDE CE-144 RA-226 TH-228 CS-137 BA-140 RU-103 RU-106 CS-134 CE-141 PU-239 PU-238 PU-239 SOIL PU-238 PU-239 BE-1 K-40 HN-54 CO-58 FE-59 [-13] CD-60 2N-65 2R-95 PU-238 SR-90 COLLECTION-DATE STOP 03/10 1136 03/10 1136 03/10 1632 STA 88-19-005-56 88-19-002-88 44178 10354MSD 8G-02-085-MP 44177 10354MS BG-02-085-MP BG-02-085-MP CUSTOMER'S IDENTIFICATION HCLAREN/HART 16755 VON KARMAN AVE IRVINE CA 10302 10303 44176 10354 TELEOYNE Sample 44182 NUMBER 44119

RUN DATE 05/04/94

REPORT OF ANALYSIS

PAGE 24 DATE RECEIVED DELIVERY DATE 04/13/94 96/11/60 CUSTOMER P.O. NUMBER 030225/030600829 WORK ORDER NUMBER 4-0354

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92714 ANN MARIE HOLBROW MCLAREN/HART 16755 VON KARMAN AVE IRVINE CA

LAB.	- ₹ -		•	•	•	•	•	4	•	•	r •	• •	•	• •	• •	٠.	٠.	٠.	• •	۲ 4	٠.	•	•	4	n	• •	٥
VOLUME - UNITS ASH-WGHI-% *																											
MIO-COUNT TIME DATE TIME	05/03	05/03	05/03	05/03	05/03	05/03	08/03	60/60	60/60	05/03	05/03	05/03	05/03	02/03	05/03	05/03	05/03	05/03	05/03	05/03	05/03	05/03	05/03		05/05	04/05	04/05
NUCL-UNIT-X U/M &																									PCI/LITER *		
	E-01	-01	00	00	10-2	5 6	- ·	E-05	E-02	E-01	E-02	E-01	E-01	E-01	E-01	E 00	E-02	0.77E-01	E-01	E-01	E-01	00 H	00 3		E 02	6-03	E-03
ACTIVITY (PCI/GH DRY)	2.		-0-66	1.11+-0.11E	o	10 10 10 10 10 10 10 10 10 10 10 10 10 1	77.0	÷	.	÷	5.	-	:	-		ģ	,	•				2.60+-0.39E	1.23+-0.12E		.	ď	
AC 1 (PC 1 /	1.1		1.92+	1.11	•		7		1.1	L • T •				-	_	1:1	-	7-64+	1.1	-	-	2.60	1.23	1	L.T.	-	L. T.
NUCL 10E	1787	7 4 7 10 10 10 10 10 10 10 10 10 10 10 10 10	1111	KA-660 TH-228	1	BE-7	K-40	MN-54	ro-58	77.79	0-40	2 P C C C C C C C C C	10-07	1 1 1 0 2 1 1 1 0 2 1 1 1 1 1 1 1 1 1 1	401-110	1-141	1-131	101127	01-10	140	1112	0.6-224	TH-228		¥-3		PU-239
COLLECTION-DATE TARI STOP FE TIME DATE TIME																											401
COLLECTION START DATE TIME O		03/00				03/09																			03/09		03/09 1401
STA		_				_																			15		L
CUSTOMER*S	101141141	10191MS BB-17-009A-MT				10101HCDRB-17-009A-MT																			TS-4900-11-84		88-17-0078-MP
	101	10191MS				DA LO 101	511101																			26101	10173
TELEDYNE SAMPLE	NUMBER	76667				200	43772																			43440	43999

REPORT OF ANALYSIS

RUN DATE 05/04/94

				•	in the same						
			3	WORK GROER NUMBER	CUSTOMER	CUSTOMER P.O. NUMBER	DATE RECEIVED	DELIVERY DATE		PAGE	52
ANN MAR!	TE HOLBRO	3		4-0354	030225	030225/030600829	03/11/94	46/13/04	194		
MCLAREN/H 16755 VON IRVINE CA	MCLAREN/HART 16755 von Karman ave Irvine ca	AVE 92714									
					S 0 1 L						
TELEDYNE Sample Number		CUSTOMER'S ST 10ENTIFICATION NU	STA	COLLECTION-DATE START STOP DATE TIME DATE TIME	ME NUCLIDE	ACTIVITY (PCI/GM DRY)	NUCL-UNIT-*	MID-COUNT Time Date time	VOLUME - UNITS ASH-WGHT-% *	LAB.	
70004		10173MS 88-17-0078-MP		•	PU-238 PU-239	NOT ANALYZED 3.5 +-0.6 E-01		04/05		. 0	
44001	10173MSG	10173HS088-17-0078-MP		,	PU-238 PU-239	NOT ANALYZED 3.1 +-0.6 E-01	0	04/05		.	
44002	10174	68-17-008-51		03/09 1415	H-3	5.4 +-0.2 E 03	3 PCI/LITER *	05/02		m ,	
44003		89-17-008-SP		03/09 1415	PU-238 PU-239	L.T. 3. E-02 L.T. 3. E-02	2.2	04/05		• •	
**************************************	10176	88-17-008-56		03/09 1415	- ふしょうふうさんココモのの4世世代	L.T. 5. E-01 2.17+0.2E 01 L.T. 5. E-02 L.T. 5. E-02 L.T. 5. E-02 L.T. 7. E-02 L.T. 7. E-02 L.T. 7. E-02 L.T. 7. E-02 L.T. 5. E-01 L.T. 2. E-01 L.T. 3. E-01	001 001 001 001 001 001 001	04/07 04/07 04/07 04/07 04/07 04/07 04/07 04/07 04/07		*****	
					TH-228		00	04/01		*	

REPORT OF ANALYSIS

RUN DATE 05/25/94

PAGE 13 DELIVERY DATE 46/11/40 DATE RECEIVED 03/15/94 CUSTOMER P.O. NUMBER 030225/030600829 S 0 1 L WORK ORDER NUMBER 4-0514 92714 ANN MARIE HOLBROW MCLAREN/HART 16755 von Karman ave Irvine ca

LAB.	***	* *	r 🖝	4 4	*	• •	r -	۲	• •	•	4	P	ب م	o vo	•	•	•	•	٥
VOLUME - UNITS ASH-WGHT-% 0																			
HID-COUNT TIME DATE TIME	04/25	04/25	04/25	04/25	04/25	04/25	04/25	04/25	04/22	04/22	22/10	04/22	04/23	04/26	02/03	04/26	04/26	05/03	05/03
NUCL-UNIT-X U/M &											_	_	•	2	~	~ ~	n •	. 2	7
	E-02 E-02	E-02	E-01	E-02	E-01	E-01	E-01	E-02	E-03	, ,	3.2 +-0.4 E-01	S E-01						7 6-02	
ACTIVITY (PCI/GM DRY)	• •		-	•	:. ::	I . 2 .		T. 5.	1. 6.		2 +-0•	2.9 +-0.5	L.T. 8.	9 +-1.7	2 +-3.0		֡֝֜֜֜֜֜֜֜֜֝֓֜֜֜֜֝֓֓֓֜֜֜֜֓֓֓֓֓֓֓֜֜֜֜֓֓֓֓֜֜֜֜֓֓֓֜֜֜֜֓֓֓֜֜֜֜	5.8 +-1.5 6.3 +-2.2	
4 P.	1.1.		3.		֓֞֜֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֡֓֓֓֓֓֡֓֜֝֡֓֡֓֡֓֜֝֡֓֡֓֡֓֜֝֡֡֓֡֓֡֓֜֜֝֡֓֡֓֡֡֡֡֡֡֡֡	ָּרָ: -	ٺ	L.1.		;	e,	2.	:	6.4	8.2	. ئـ	،ن	7. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4.	
S U I L IP TIME NUCLIDE	2N-65	RU-103	1-131	CS-134 CS-137	8A-140	CE-144	R4-226	TH-228	PU-238		PU-239	PU-239	PU-238	U-234	TH-230	PU-239	0-235	U-238	TH-228
COLLECTION-DATE START STOP DATE TIME DATE TI									03/14 1200		•	`	1111 1116	03/14 1223					
STA									۵		:	۔		a.					
CUSTOMER'S	BG-12-001-56								BG-12-001-HP		10550MS BG-12-001-MP	10450MS0 8G-12-001-MP		8G-12-004-SP					
	1054	ı							44669 10550		10550HS			10563					
TELEDYNE	NUMBEX								69944		44670	16444		44672					

RUN DATE 06/03/94

REPORT OF ANALYSIS

PAGE 8 DATE RECEIVED DELIVERY DATE 04/23/94 03/21/94 CUSTONER P.O. NUMBER 030225/030600829 SOIL WORK DROER NUMBER 4-0472 92714 ANN MARIE HOLBROW MCLAREN/HART 16755 von Karman ave Irvine ca

						S 0 ! L					•
ELEDYNE CUSTOMER'S STA	STA		-	COLLECTION-DA' START S' DATE TIME DATE	COLLECTION-DATE START STOP SATE TIME DATE TIME	NUCLIDE	ACTIVITY (PCI/GM ORY)	NUCL-UNIT-X U/M a	MID-COUNT TIME DATE TIME	VOLUME - UNITS ASH-WGHT-X **	LAB.
٠ -	٠ -		6	03/15 0905		PU-238 PU-239	L.T. 2. E-02 L.T. 2. E-02)2)2	60/50 05/09		~ ~
10624 96-14-002-56 03		69	63	03/15		861-7 1 0 4 0 4 1 4 1 4 1 4 1 4 1 4 1 4 1 4 1	L.T. 5. E-01 2.03+-0.20E 01 L.T. 4. E-02	31 31 02	04/27		
						CO-58 FE-59		0.1	04/27		
						CD-60 2N-65	; :	0.2 0.1	04/27		
						28-95 BII-103	L.T. 7. E-02 L.T. 8. E-02	02 02	04/27		
						RU-106	÷ ?	00	04/2/		
						CS-134	.	05	04/27		
						CS-137	8.45+-4.26E-02	02 01	04/27		
						CE-140	: :	10	04/27		
						CE-144	3. E-	01	04/27		
						RA-226		00	12/40		
						TH-228	1.51+-0.15E	00	- 7 / 6		
		•	;			846-110	:	.02	60/50		
45067 10626 8G-14-002-MP 03/15		03/	03/	15		PU-239		E-02	02/03		
10626MS BG-14-002-MP						PU-238 PU-239	1.T. 9. E- 3.1 +-0.6 E-	E-03 E-01	02/09 05/09		
45069 10626MSD 8G-14-002-MP	5D 8G-14-002-MP /	`				PU-238 PU-239	L.T. 7. E. 3.2 +-0.5 E-	E-03 E-01	05/09		

REVISED 20/94 RUN DATE 05/04/94

PAGE 31

REPORT OF ANALYSIS

CUSTOMER P.O. NUMBER

030225/030600829

WORK ORDER NUMBER

4-0354

DATE RECEIVED DELIVERY DATE 03/11/94

04/13/94

VOLUME - UNITS ASH-WGHT-% *

DATE TIME HID-COUNT

NUCL-UNIT-X

04/05

04/05

1. E-02 1. E-02

-:1

DATE TIME DATE TIME NUCLIDE

STOP

COLLECTION-DATE STOF

... ...

PU-239

03/09 1355

BE-7 K-40

PU-238

(PCI/GH DRY) ACTIVITY

5016

5. E-01 2.28+-0.23E 01

60/40

60/40 04/09

TIME

16755 VON KARMAN AVE ANN MARIE HOLBROW MCLAREN/HART

92714 IRVINE CA

TELEDYNE Sample

STA NUM IDENTIFICATION CUSTOMER'S

NUMBER

44030 10200 8B-17-8002-SP

44031 10201 88-17-8002-56

03/09 1355

2N-65 28-95 MN-54 CO-58 FE-59 09-00

cs-134 RU-106 RU-103 -131

CS-137 BA-140

CE-141

RA-226 £-144

TH-228

2.04+-0.62E 00 1.16+-0.12E 00 E-01

60/40 60/40

60/40

60/40

E-01

... --:

E-01 E-02

1.30+-0.40E-01

60/40

04/09

04/09 60/40 04/09 04/09

E-02

E-01 E-01

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60/40 60/40 60/90

E-03 E-02 E-01

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L • T •

E-02

E-02

60/40 04/09

The exponent for the H-3 added to Teledyne #43937 and 43938 has been corrected.

Enlatin 7-20-94

3.3 E-01 pci/9

5.6 E-01 pCi/9 3.3 E-01 pci/g

> Cs-137 Pu-239 Pu-239

> > 44000

44001

43994

43938 43937

43995

Cs-137

H-3 H-3

5.6 E-01 pci/g 1.4 E 03 pci/1 1.4 E 03 pCi/1

Activity

Isotope

Activity added to spiked samples



July 20, 1994

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

Ms. Ann Marie Holbrow ChemRisk A Division of McLaren/Hart 16755 Von Karman Avenue Irvine, CA 92714

Reference: W.O. 4-0514

Dear Ms. Holbrow:

Activity added to spike samples:

Activity added to spike	e samples:	ACTIVITY
	ISOTOPE	
TELEDYNE #		$7.0 \pm 03 \text{ pCi/l}$
	H-3	7.0 E 03 pCi/l
44663	H-3	3.5 E 03 pCi/l
44664	H-3	3.5 E 03 pCi/l
44729	н-3	0.33 pCi/g
44730	Pu-239	0.33 pC1/g
44670	Pu-239	3.8 pCi/g
44671	Sr-90	3.8 pCi/g
44692	Sr-90	3.8 pCi/g
44693	Sr-90	3.8 pCi/g
44752	Sr-90	0.70 pC1/g
44753	Cs-137 (a)	$0.70 \mathrm{pCi/g}$
44675	Cs-137 (a)	=
44676	- 107	activity before the spi
• • •	4 -0:/d of Cs-13/	acura

(a) The sample had 0.074 pCi/g of Cs-137 activity before the spike was added.

Sincerely.

Wavid Martin J. David Martin, Ph.D.

Manager, Environmental Analysis

JDM:cs



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

July 20, 1994

Ms. Ann Marie Holbrow ChemRisk A Division of McLaren/Hart 16755 Von Karman Avenue Irvine, CA 92714

Reference: W.O. 4-0409

Dear Ms. Holbrow:

Activity added to spike samples:

•	TOOTOPE	ACTIVITY
TELEDYNE #	ISOTOPE	
44212 44213 44177 44178 44169 44170	H-3 H-3 Pu-239 Pu-239 Cs-137 (a) Cs-137 (a)	3.5 E 03 pCi/l 3.5 E 03 pCi/l 0.33 pCi/g 0.33 pCi/g 0.62 pCi/g 0.62 pCi/g
441/0		

(a) The sample had 0.17 pCi/g of Cs-137 activity before the spike was added.

Sincerely, J. Savid Martin

J. David Martin, Ph.D.

Manager, Environmental Analysis

JDM:cs



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

July 26, 1994

Ms. Ann Marie Holbrow ChemRisk A Division of McLaren/Hart 16755 Von Karman Avenue Irvine, CA 92714

Reference: W.O. 4-0409

Dear Ms. Holbrow:

Activity added to spike samples:

TELEDYNE #	<u>ISOTOPE</u>	<u>ACTIVITY</u>
44212	H-3	3.5 E 03 pCi/l
44213	H-3	3.5 E 03 pCi/l
44177	Pu-239	0.66 pCi/g (b)
44178	Pu-239	0.66 pCi/g (b)
44169	Cs-137 (a)	0.62 pCi/g
44170	Cs-137 (a)	0.62 pCi/g

(a) The sample had 0.17 pCi/g of Cs-137 activity before the spike was added.

(b) The incorrect activity of 0.33 pCi/g was listed in the letter dated July 20, 1994.

Sincerely. J. David Martin

J. David Martin, Ph.D.

Manager, Environmental Analysis

JDM:cm

Strontium

RUN DATE 04/20/94

•			
PAGE			
DATE RECEIVED DELIVERY DATE	04/11/94	·	
DATE RECEIVED	03/09/94		
CUSTOMER P.O. NUMBER	030225/030600829		5011
WORK ORDER NUMBER	4-0353	±	
		92714	
	ANN MARIE HOLBROW	MCLAREN/HART 16755 VON KARMAN AVE IRVINE CA	

LAB.	.	•	m\	en.	•	e 0	•	• •	•	٠.	• •	- 4	• •		•							•	• •	r =	•	
VOLUME - UNITS ASH-WGHT-X *																										
HID-COUNT TIME DATE TIME	03/29	,	10/40	10/40	10/40	C 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	200	03/21	17/60	12/60	12/60	12/60	03/21	12/60	17/60	17/60	12/60	12/50	17/60	12/50	12/50	03/21	03/51	03/21	03/21	
NUCL-UNIT-X U/M &			0		9 PC1/11168 &		2			2	~	_	~	_	~	~	_		~	~	~	~	10	00	00	
ACTIVITY (PCI/GH DRY)	10-2 4 6-4	10-3 +-0-+ 1-1	3.9 +-0.2 E 00	3.9 +-0.2 E 00		•	L.T. 6. E-02	L.T. 4. E-01	2.53+-0.25E 0	L.T. 4. E-02	÷	L.T. 1. E-0	L.T. 4. E-02	:	L.T. 5. E-02	L.1. 5. E-0		:	٠.	7.56+-3.64E-02	L.T. 7. E-02	L.T. 7. E-02	. 2.	4+-0.54E	1.41+-0.146	
NUCL 10E		SR-90	SR-90	05-85		F - 3	SR-90	85-7	04-3	NN-54	ro-58	FF-59	ro-60	2N-65	2R-95	RU-103	9 n- 106	1-131	CS-134	(4-137	94-140	7.141	10.	0.1-276	4 H - 2 3 B	277-41
COLLECTION-DATE START STOP		03/08 1316	•		•	03/08 1326	03/08 1326	708 1 3 2 4	0361 9076																	
STAS		8				ö	0	Č	5																	
CUSTOMER'S		88-20-008-MS	SELECTION OF THE PROPERTY OF T		10111MSD BE-20-008-MS	88-20-009-51	BB-20-009-55		95-600-02-88																	
	10EN	10111		c ut 1101	10111MSD	10112	10113		10114																	
TELEDYNE Sample	NUMBER	43339		93/30	43731	43732	43733		43734 10114																	

REPORT OF ANALYSIS

PAGE 30 RUN DATE 05/25/94 DATE RECEIVED DELIVERY DATE

04/11/94 03/15/94 CUSTOMER P.D. NUMBER 030225/030600829 HORK ORDER NUMBER 4-0514 92714 ANN MARIE HOLBROW MCLAREN/HART 16755 VON KARMAN AVE IRVINE CA

S 0 1 L

					2 0 1 1					
ELEDYNE Sample		CUSTOMER'S	STA	COLLECTION-DATE START STOP DATE TIME DATE TIME	E NUCLIDE	ACTEVITY (PCI/GM DRY)	NUCL-UNIT-# U/M *	MID-COUNT TIME DATE TIME	VOLUME - UNITS ASH-WGHT-% **	LAB.
NOMBER						•		05/04		•
44748 10374	10374	BG-05-017-SP		03/11	PU-238	E 4 4-0.7 F-01		05/04		•
:					0-634	-		60/50		ø
					1H-23U			05/04		•
					PU-239	L.I. 2. E-UZ		40/90		9
					U-235	2.1 +-1.3 E-0		1070		٠.
					U-238			\$0.7CD		, 4
					TH-232	2.0 +-0.4 E-01		62/03		,
					TH-228	2.0 +-0.5 E-01	_	60/50		Þ
;		12 050-20-24		03/11 1057	H-3	L.T. 2. E 02	2 PCI/LITER *	05/24		IC.
64/44	10378							04/21		m
44750	10379	BG-05-050-SS		03/11 1057	SR-90	70-3 0*4-+ 6*9	•	:		,
		2M-030:30-30		03/11	SR-90	L.T. 2. E-01		04/25		rin.
44(21	10303					00 3 6 6 6		04/21		m
44752	10383MS	BG-05-050-MS		•	SR-90		•	:		,
1		SM-030-30-30 Camento.		,	SR-90	3.9 +-0.2 E 0	00	04/21		n
60)44	Tence co.				1	10-3 4 1	_	04/25		*
44754	10382	86-05-050-86		03/11	9E-/	2.20+-0.22E 01	• •	04/25		.
					4.17	L.T. 3. E-0	2	04/55		• •
					58		~	04/25		+ 4
					FE-59		_	04/25		• •
					09-03		-5	04/25		r ч
					ZM-65		2	62/50		٠ ٦
					2R-95	5	2	04/25		r <
					RU-103	•	2	04/25		٠ ٩
					RU-106	2.	=	04/25		
					1-131	÷	2	57/4D		- •
					CS-134	4	75	04/25		- 4
					CS-137	1.01+-0.22E-01	=	67/40		- 4
					BA-140	.,	-	67/60		•

REPORT OF ANALYSIS

RUN DATE 06/03/94

)A	WORK ORDER NUMBER	CUSTOMER P.O. NUMBER	DATE RECEIVED DELIVERY DATE	DELIVERY DATE	PAGE 14	=
ANN MARIE HOLBROW		4-0472	030225/030600829	03/21/94	04/23/94		
MCLAREN/HART							
16755 VON KARMAN AVE IRVINE CA	92714						
			-				

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_	٠
C	
U	•

TELEUYNE SAMPLE		CUSTOMER'S	STA	COLLECTION-DATE START STOP DATE TIME DATE TIME	P TIME NUCLIDE	ACTIVITY NUCL.	NUCL-UNIT-X U/M *	NIO-COUNT TIME DATE TIME	VOLUME - UNITS ASH-WGHT-X &	LAB.
NO BER		10 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			SR-90	L.I. 7. E-02		04/58		m
45037	10619	CH-100-41-99			. !			05/07		m
45088	10619MS	86-14-001-MS			SR-90	4.0 +-U.3 E UU				
45089	10619MSD	10619MSD 8G-14-001-MS			SR-90	4.0 +-0.2 E 00		04/30		m
	10620	AG-14-002-ST		03/15 1000	H-3	L.T. 1. E 02 PC	PCI/LITER 0	05/27		L V
		46-14-003-55			SR-90	L.T. 9. E-02		04/30		€0
16064	1 790 1							04/09		•
45092	10622	8G-14-002-SP		03/15 1000	PU-238	1.1. I. E-UZ		05/12		•
)					U-634 TH-240	3.8 +-0.5 E-01		05/18		•
					PII-239	-:		02/00		٥ ،
					0-235	1.8 +-1.0 E-02		05/12		D 4
					U-238	+-0.5		05/12		•
					TH-232			05/18		5 4
					TH-228	7.8 +-0.8 E-01		05/18		D
	30011	AG-00-004-FS		03/15 0841	SR-90	L.T. 9. E-02		04/30		m
11C	73311				06-85	1.1. 1. E-01		04/30		m
45115	11226	86-01-090-55		51/50	, _ v			•		ď
41.134	11227	8G-00-008-FT	_	03/15 0908	H-3	L.T. 2. E 02 PI	PCI/LITER *	05/27		`
					06-02	8-2 +-4-3 E-02		04/30		m
45117	11229	86-14-001-55	.	03/12 1000	2					V ^
45490	10332	BG-02-007-ST	_	03/10 1610	H-3	L.T. 1. E 02 P	PCI/LIIER *			•

RUN DATE 05/25/94

PAGE 19 DATE RECEIVED DELIVERY DATE 04/11/94 10/31/60 CUSTOMER P.O. NUMBER REPORT OF ANALYSIS WORK ORDER NUMBER

ANN MARIE HOLBROW	HOLBROW			0-4	4-0514		030225,	030225/030600829	03/15/94	04/11/94	*6/	
MCLAREN/HART 16755 von Karman ave 1941ne ca	HART 4 KARMAN 5	AVE 92714										•
	į					S	011					
TELEOYNE SAMPLE			STA	COLLE START ATE 1	COLLECTION-DATE START STOP DATE TIME DATE TIME	7. TIME	NUCL IDE	ACTIVITY NI (PCI/GN DRY)	NUCL-UNIT-X U/M *	MID-COUNT TIME DATE TIME	VOLUME - UNITS ASH-WGHT-% *	LAB.
NUMBER 44689	10513	3 86-11-010-SP		03/14 1310	1310		TH-232 TH-228	6.4 +-2.5 E-02 5.0 +-3.1 E-02		02/06 03/06		• •
	10515	86-11-010-56	J	03/14 1310	1310	خدقة	BE-7 K-40	1.T. 4. E-01 3.12+-0.49E 00		04/26		* * *
						Ĭ.	サルースエ	1.1. 3. E-02		04/26		•
						.	CU-58 FE-59	L.T. 1. E-01		04/26		• •
						٠	09-0	1.T. 3. E-UZ		04/26		.
						~ ~	2N-65			04/26		• •
						. 02	R11-103			97/50		•
						: ex	RU-106	L.1. 3. E-01		04/26		•
						-	1-131	L.T. I. E 00		04/26		-
						. ·	CS-134	1.58+-0.35E-01		04/26		• •
						ه ر	LS-131 B4=140	L.T. 2. E-01		04/56		•
							74-140	L.T. 1. E-01		92/40		•
							CE-144	2.		94/40		•
							RA-226 TH-228	L.T. 7. E-01 1.24+-0.39E-01		04/26		*
				•	•	•	06-00	9.9 +-5.8 E-02		04/50		m
44691	10516	86-11-910-KS		03/14 151	1510		: :	00 11 6 0 0 6		04/20		m
64447	10516MS	BG-11-010-MS		`			SR-90			01/10		•
		X		`			SR-90	4.1 +-0.2 E 00	_	0 1 1 0		•
44693		10516MSD 8G-11-010-H3					# I	L.T. 2. E 02	PC1/L1TER	e 05/23		r
44694	11501	8G-11-075-ST		03/14	03/14 1205		`	ı				

TELEDYNE BROWN ENGINEERING Environmental Services

July 20, 1994

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

Ms. Ann Marie Holbrow ChemRisk A Division of McLaren/Hart 16755 Von Karman Avenue Irvine, CA 92714

Reference: W.O. 4-0514

Dear Ms. Holbrow:

Activity added to spike samples:

TELEDYNE #	<u>ISOTOPE</u>	<u>ACTIVITY</u>
44663 44664	H-3 H-3	7.0 E 03 pCi/l 7.0 E 03 pCi/l
44729	H-3	3.5 E 03 pCi/l
44730	H-3 Pu-239	3.5 E 03 pCi/l 0.33 pCi/g
44670 44671	Pu-239	0.33 pCi/g
44692	Sr-90	3.8 pCi/g
44693 44752	Sr-90 Sr-90	3.8 pCi/g 3.8 pCi/g
44753	Sr-90	3.8 pCi/g
44675 44676	Cs-137 (a) Cs-137 (a)	0.70 pCi/g 0.70 pCi/g
110.0	· · · ·	1 .

(a) The sample had 0.074 pCi/g of Cs-137 activity before the spike was added.

Sincerely.

I word Martin

J. David Martin, Ph.D.

Manager, Environmental Analysis

JDM:cs

Tritium

REPORT OF ANALYSIS

RUN DATE 05/25/94

· !	PAGE 26				LAB.	ľ	ľ	K	m	4 4	•	4	4	•	•	• •		•	• •	.	.	•	• •	•	•	40 ·	۰ م	۰.	o 4	o •0	,
	ш	1/94			VOLUME - UNITS ASH-WGHI-X 0																										
	DELIVERY DAT	04/11/94			MID-COUNT TIME DATE TIME	05/23	05/23	05/23	04/20	04/26	04/26	04/26	04/26	04/26	04/26	04/26	04/26	04/26	04/26	04/26	04/26	04/26	04/26	04/26	04/50	05/02	20/50	60/50	05/02	05/02	70/50
	DATE RECEIVED	03/15/94			NUCL-UNIT-X U/M & D	2	ĸ	•	1 PCI/GM DRY 4	PCI/GM DRY &	PC1/6M 087	PCI/GH DRY	PCI/GM DRY	PCI/GM DRY	PC1/6M	PC1/GM DRY	PC1/GM DRY	PCI/GM DRY		PCI/GM DRY	PC1/GM DRY	PC1/6M	PCI/GM DRY	PC1/	PCI/GM DRY	PC1/GM	PC1/GM	PCI/GM DRY	PC1/6#	PCI/GM ORY	PCI/GM ORY
ANALYSIS	R P.O. NUMBER	030225/030600829			ACTIVITY (PCI/LITER)	L.T. 3. E 0	3.5 +-0.3 E 0	3.7 +-0.3 E 03	1.0 +-0.4 E-01	**	77.	• •	-	• •	6	•	•	m	L.T. 3. E 0	;		:	2. E	2.74+-0.46E 00	+-0.80	1	9-0-+	4-0-6		2.1 +-1.3 E-02	8 •0-+
REPORT OF ANAU	CUSTOMER	03022		S 0 1 L	E NUCLIDE	H-3	H-3	H-3	SR-90	8E-7	K-40	4 N - N - N - N - N - N - N - N - N - N		FE-37	7N-65	ZR-95	RU-103	RU-106	1-131	CS-134	EA-160	CE-141	CE-144	RA-226	H-22	# C - 11 0		TH-230	PU-239	U-235	U-238
28	WGRK DRDER NUMBER	4-0514			COLLECTION-DATE START STOP DATE TIME DATE TIME	03/11 1045	•	•	03/11 1045	03/11 1045																	03/11 1045				
	*	ROW	AN AVE 92714		CUSTOMER'S STA IDENTIFICATION NUM	BG-05-027-MT		10371MSD BG-05-027-MT	86-05-027-85																	;	BG-05-027-SP				
		ANN MARIE HOLBROW	MCLAREN/HART 16755 von Karman Ave Irvine ca		TELEDYNE Sample Number Io	1037																	٠				44733 10368				

REPORT OF ANALYSIS

RUN DATE 05/25/94

S O I L S O I L S O I L S O I L ACTIVITY NUCL-UNIT-X TIME NUCLIDE (PCI/GH ORY) CC-134 CC-137 CC-134 CC-137 CC-134 CC-137	
S 0 1 L S 0 1 L S 0 1 L ACTIVITY NUCL-UNIT-X TIME NUCLIDE (PCI/CH DRY) U/M 9 TIME NUCLIDE (PCI/CH DRY) U/M 9 TIME NUCLIDE (CS-134 CS-134 CS	HORK ORDER NUMBE
S 0 1 L	4-0514
S O I L MID-COUNT MID-COUNT TIME NUCLIDE (PCI/GH DNY) U/M % DATE TIME ASH-WGHT-X % LAB CS-134	
HID-COUNT TIME NUCLIDE (PCI/GN DNY) CS-134	
-134	STA START START STUM STUM DATE
L.T. 6. E-01 L.T. 6. E-01 L.T. 7. E 02 PCI/LITER © 05/25 L.T. 7. E 02 PCI/LITER © 05/25 7.9 +-0.6 E 03 PCI/LITER © 05/22 7.2 +-3.4 E 02 PCI/LITER © 05/22 7.2 +-3.4 E 02 PCI/LITER © 05/22 L.T. 8. E-02 04/26 2.2 +-1.7 E-02 1.T. 6. E-03 04/26 2.2 +-1.7 E-02 1.T. 6. E-03 04/26 2.4 +-1.5 E-02 04/26 2.5 +-1.5 E-02 04/26 1.T. 9. E-01 04/25 1.T. 9. E-02 04/25	03/14 1250
Lorente de control de	
Lorento e e e e e e e e e e e e e e e e e e e	
L.T. 6. E-01 1.81+-0.45E-01 1.81+-0.45E-01 1.9 +-0.6 E 03 PCI/LITER © 05/25 7.9 +-0.6 E 03 PCI/LITER © 05/22 7.2 +-3.4 E 02 PCI/LITER © 05/22 1.1. 8. E-02 1.2 +-1.8 E-03 2.2 +-1.7 E-02 1.1. 6. E-03 3.3 +-1.8 E-02 1.1. 6. E-03 3.3 +-1.8 E-02 1.1. 6. E-03 3.4 +-1.8 E-02 1.1. 6. E-03 3.4 +-1.8 E-02 1.1. 6. E-03 3.7 +-1.9 E-02 1.1. 72 +-0.26E 00 1.1. 73 E-02 1.1. 74 E-02 1.1. 75 E-03 1.	
L.T. 7. E 02 PCI/LITER & 05/25 7.9 +-0.6 E 03 PCI/LITER & 05/22 8.4 +-0.6 E 03 PCI/LITER & 05/22 7.2 +-3.4 E 02 PCI/LITER & 05/22 L.T. 8. E-02 8.9 +-7.8 E-03 6.72 +-1.7 E-02 L.T. 6. E-03 8.9 +-7.8 E-03 8.41.5 E-02 8.9 +-7.8 E-02 8.7 +-7.8 E-02 8.7 +-7.8 E-02 8.7 +-7.8 E-02 8.9 +-7.8 E-03	
L.T. 6. E - 03 PCI/LITER © 05/22 8.4 +-0.6 E 03 PCI/LITER © 05/22 7.2 +-3.4 E 02 PCI/LITER © 05/22 L.T. 8. E-02 04/26 2.2 +-1.7 E-02 L.T. 6. E-03 3.3 +-1.4 E-02 1.T. 6. E-02 2.4 +-1.5 E-02 L.T. 3. E-02 L.T. 3. E-02 L.T. 3. E-02 L.T. 4. E-02 05/06 L.T. 9. E-02 05/26 05/26 05/26 05/26 05/26 05/26 05/26 05/26 1.T. 9. E-02 05/26 05/26 1.T. 9. E-02 05/25 1.T. 9. E-02 05/25 1.T. 9. E-02 05/25	
7.9 +-0.6 E 03 PCI/LITER 0 05/22 8.4 +-0.6 E 03 PCI/LITER 0 05/22 7.2 +-3.4 E 02 PCI/LITER 0 05/22 L.T. 8. E-02 8.9 +-7.8 E-03 8.9 +-7.8 E-03 6.4/26 2.2 +-1.7 E-02 L.T. 6. E-03 8.9 +-7.8 E-03 8.9 +-7.8 E-03 8.9 +-7.8 E-03 8.9 +-7.8 E-02 8.9 +-1.9 E-02 8.4 +-1.5 E-03 8.4 +-1.5	03/14 1250
8.4 +-0.6 E 03 PCI/LITER # 05/22 7.2 +-3.4 E 02 PCI/LITER # 05/22 L.T. 8. E-02 04/16 L.T. 6. E-03 04/26 2.2 +-1.7 E-02 L.T. 6. E-03 04/26 1.T. 6. E-03 04/26 2.2 +-1.7 E-02 L.T. 6. E-03 04/26 1.T. 6. E-03 04/26 1.T. 6. E-02 04/26 1.T. 3. E-02 05/06 L.T. 3. E-02 05/26 L.T. 3. E-02 05/25 L.T. 3. E-02 04/25 L.T. 3. E-02 04/25	03/14 1250
7.2 +-3.4 E 02 PCI/LITER * 05/22 L.T. 8. E-02 04/16 L.T. 6. E-03 8.9 +-7.8 E-03 04/22 2.2 +-1.7 E-02 1.1. 6. E-03 04/26 1.1. 6. E-03 04/26 2.4 +-1.5 E-02 2.4 +-1.5 E-02 1.7. 3. E-02 04/25 1.72+-0.26E 00 04/25 1.72+0.26E 00 04/25	03/14 1250
L.T. 8. E-02 L.T. 6. E-03 8.9 +-7.8 E-03 2.2 +-1.7 E-02 L.T. 6. E-03 1.T. 6. E-03 2.4 +-1.5 E-02 2.5 +-1.5 E-02 2.6 +-1.5 E-02 2.7 +-1.5 E-02 2.71.5 E-03 2.7	03/14 1200
L.T. 6. E-03 8.9 +-7.8 E-03 2.2 +-1.7 E-02 L.T. 6. E-03 0.4/26 1.T. 6. E-02 0.4/26 2.4 +-1.5 E-02 0.4/26 1.T. 4. E-02 0.5/06 L.T. 3. E-01 0.4/25 L.T. 3. E-02 0.4/25	03/14 1200
8.9 +-7.8 E-03 04/26 2.2 +-1.7 E-02 05/06 L.1. 6. E-03 04/22 L.1. 6. E-03 04/26 2.4 +-1.5 E-02 05/06 L.1. 4. E-02 05/06 L.T. 3. E-01 04/25 L.T. 3. E-02 04/25	03/14 1200
2.2 +-1.7 E-02 L.T. 6. E-03 04/22 L.T. 6. E-03 04/26 2.4 +-1.5 E-02 05/06 L.T. 3. E-01 04/25 L.T. 3. E-02 04/25 L.T. 3. E-02 04/25 L.T. 3. E-02 04/25 L.T. 3. E-02 04/25	
L.T. 6. E-03 L.T. 6. E-03 3.3 +-1.5 E-02 2.4 +-1.5 E-02 L.T. 4. E-02 05/06 L.T. 3. E-01 L.T. 3. E-02 L.T. 3. E-02 04/25 L.T. 3. E-02 04/25 L.T. 3. E-02 04/25 L.T. 3. E-02 04/25	
L.T. 6. E-03 3.3 +-1.4 E-02 2.4 +-1.5 E-02 L.T. 4. E-02 1.72+0.26E 00	
3.3 +-1.4 f -0.2 2.4 +-1.5 E-0.2 L.T. 4. E-0.2 L.T. 3. E-0.2 L.T. 3. E-0.2 L.T. 3. E-0.2 L.T. 9. E-0.2 04/25 L.T. 9. E-0.2 04/25	
L.T. 4. E-02 05/06 L.T. 3. E-01 04/25 L.T. 3. E-02 04/25 L.T. 3. E-02 04/25 L.T. 9. E-02 04/25	
L.T. 3. E-01 04/25 1.72+-0.26E 00 04/25 L.T. 3. E-02 04/25 L.T. 9. E-02 04/25 L.T. 9. E-02 04/25	
1.72+-0.26E 00 04/25 L.T. 3. E-02 04/25 L.T. 9. E-02 04/25 L.T. 9. E-02 04/25	
L.T. 3. E-02 04/25 L.T. 3. E-02 04/25 L.T. 9. E-02 04/25	03/14 1200
L.T. 3. E-02 04/25 L.T. 9. E-02 04/25	
Late 9. E-02 04/25	

REPORT OF ANALYSIS

RUN DATE 06/03/94

O DELIVERY DATE	04/23/94
DATE RECEIVED	49/1/1/04
CUSTOMER P.O. NUMBER	0/8070404040404040404040404040404040404040
WORK ORDER NUMBER	,

ANN MARIE HOLBROW		ORK OKU.	WORK ORDER NUMBER	CUSTOMER	CUSTOMER P.O. NUMBER	18 E.R	DATE RECEIVED	D DELIVERY DATE	Y DATE	PAGE	-
		4-0472	472	030225,	030225/03060082	e .	03/21/94	04/23/94	3/94		
MCLAREN/HART 16755 von Karman ave 1rvine ca											
			•1	S 0 1 L							
CUSTOMER'S S1	STA NUM 0	COLLE START DATE T	COLLECTION-DATE START STOP SATE TIME DATE TIME	NUCLIDE	ACTIVITY (PCI/GH DRY)		NUCE-UNIT-X U/M *	MID-COUNT TIME DATE TIME	VOLUME - UNITS ASH-WGHT-X &	LAB.	
106430UP 8G-14-005-SG	-	03/15 1026		CS-134 CS-137 CS-137 CE-140 CE-144 TA-226	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	6-02 6-02 6-01 6-01 6-01 7-43 6-01		04/28 04/28 04/28 04/28 04/28 04/28		*****	
8G-14-005-MT	~	03/15 1026		H-3	1.3 +-0.6	•6 E 03	PCI/LITER .	05/26		₽	
86-14-005-HT		`	-		1.6 +-0.1	.1 E 04	PCI/LITER .	92/50		1 0	
10644MSD BG-14-005-MT		`	-	H-3	1.5 +-0.1	.1 E 04	PCI/LITER +	05/26		e 0	
86-00-005-FG	-	03/15 0841		86-7 86-7 60-56 60-60 60-6	2.28.4.0.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1	4.		04/27 04/27 04/27 04/27 04/27 04/27 04/27 04/27 04/27		**************************************	·

REPORT OF ANALYSIS

RUN DATE 04/06/94

PAGE 4 DATE RECEIVED DELIVERY DATE 03/18/94 03/08/94 CUSTOMER P.D. NUMBER 030225/030600829 HORK ORDER NUMBER 4-0185 92714 ANN HARIE HOLBROW MCLAREN/HART 16755 VON KARMAN AVE IRVINE CA

SOIL

TELEDYNE SAMPIF		CUSTOMER'S	STA	COLL	COLLECTION-DATE START STOP			ACTIVITY NUCL-UNIT-X	NUCL-UNIT-X	MID-COUNT TIME	VOLUME - UNITS	
NUMBER	IDENI	IDENTIFICATION	NOW	DATE	TIME DATE T	IME	JC F T DE	(PCI/LITER)	0/H 0	DATE TIME	ASH-WGHT-M &	LAB.
43519	1005148	BB-02-045-MT		03/07 1133	1133	H-3		3.1 +-0.3 E 03	m	03/30		en.
43220	10052	88-02-060-51		03/07 1134	1134	H-3		L.T. 2. E 02	~	03/50		ın.
43221	10053	BB-02-075-ST		03/07 1140	1140	H-3		L.T. 2. E 02	2	03/28		I
43222	10055	BB-02-078-ST		03/07 1139	1139	H-3		L.T. 2, E 02	2	03/28		5
43262	100620UP	10062DUP SM-03-012-ST		03/07 1422	1422	H-3		L.T. 2. E 02	~	03/30		~
43263	10030MSD	10030MSD 88-06-092-MT		`		H-3		3.3 +-0.3 E 03	m	03/30		1 0
43264	10058DUP	10058DUP BB-12-023-ST		03/07 1313	1313	H-3		L.T. 2. E 02	~	03/27		•
43265	10051450	10051MSD 88-02-045-MT		`		H-3		2.9 +-0.2 E 03	•	03/30		₩.
43368	10030	BB-06-092-MT		03/07 0918	0918	#-3		L.T. 1. E 02	2	03/30		
43369 10051	10021	BB-02-045-MT		03/07 1133	1133	H-3		2.3 +-1.4 E 02	2	03/30		ın.

H-3 activity added to prepare matrix spikes

H-3 pci/l		+- 0.3 E	0.3	+- 0.3 E
TI	43202	43263	43219	43265

REPORT OF ANALYSIS

RUN DATE 04/06/94

4-0185 030225/030600829 03/08/94 03/18/94	WORK ORDER NUMB	ER NUMBER	CUSTOMER P.O. NUMBER	DATE RECEIVED DELIVERY DATE	DELIVERY DATE	PAGE 2	~
	4-01	581	030225/030600829	96/80/60	03/18/94		
			•				

S 0 I L

TELEDYNE Sample Niimrer		CUSTOMER'S	STA	COLL. START DATE	COLLECTION-DATE START STOP DATE TIME DATE TIME NUCLIDE	NUCLIDE	ACT PC1	ACTIVITY PCI/LITER)	NUCL-UNIT-X	MID-COUNT TIME DATE TIME	VOLUME - UNITS ASH-WGHT-X **	LAB.
43187	1002	BB-14-004-5T		03/04 1625	1625 H	H-3	L.T.	2. E	02	03/50		•
43188	10062	SM-03-012-ST		03/07 1422		H-3	1:1		02	03/30		v n
43190	10064	SM-03-015-ST		03/07 1420		H-3	1:1:). E	02	03/21		w n
43191	10065	SM-03-009-ST		03/07 1423		H-3	1:1		0.2	03/21		σ.
43192	10066	SM-03-001-ST		03/07 1425		H-3	1:1:	1. E	02	03/21		•
43193	10067	SM-03-014-ST		03/07 1430		н-3	1:1		02	03/21		N.
43194	10047	88-05-003-ST		03/07 1050		н-3	1.1.]. E	02	03/30		٠,
43195	10043	B8-05-089-ST		03/07 1052		H-3	1:1:	1. E	02	03/21		I O
43196	10042	B8-05-089FDT		03/07 1052		H-3	L.1.	1. E	0.2	03/21		s n
43197	10048	88-05-006-ST		03/07 1102		H-3	t. T.	F	02	03/21		.
43198	10044	88-05-057-51		03/07 1112		H-3	1:1	1. E	02	03/21		, L n
43199	10046	88-05-077-51		03/07 1110		H-3	1:1	1. E	0.2	03/21		in.
43200	10028	88-06-007-51		03/07 0910		H-3	t.T.	:	02	03/21		Įn.
43201	10029	88-06-092-51		03/07 0918		H-3	1:1	1. E	02	03/21		r.
43202	10030MS	4S BB-06-092-HT		`	∓	#-3	3.0 +	3.0 +-0.2 E 03	03	03/30		50

REPORT OF ANALYSIS

RUN DATE 04/20/94

	WORK ORDER NUMBER	CUSTOMER P.O. NUMBER	DATE RECEIVED	DATE RECEIVED DELIVERY DATE	PAGE
ANN MARIE HOLBROW	4-0353	030225/030600829	03/09/94	04/11/94	
MCLAREN/HART					
IRVINE CA	92714				

S 0 1 L

TELEDYNE Sample Number		CUSTOMER'S IDENTIFICATION	STA	COLL START DATE	COLLECTION-DATE TART STOP TE TIME DATE TIME NUCLIDE	ACTIVITY NUCL-UNIT-X (PCI/LITER) U/M &	MID-COUNT TIME VO DATE TIME AS	VOLUME - UNITS Ash-ught-x 0	LAB.
43677	11043	PB-00-002-PT		03/08	E-I	1.7 +-0.2 E 03	60/40		•
43678	11042	88-00-001-PT		03/08	H-3	L.T. 2. E 02	04/03		₩.
43684	11045	88-00-004-PT		03/08	H-3	L.T. 2. E 02	04/03		5
43685	11044	88-00-003-PT		03/08	H-3	1.7 +-0'.2 E 03	40/40		.
43689	10068	BB-03-025-ST		03/08 1358	1358 H-3	L.T. 2. E 02	+0/+0		1 0
43690	1001	BB-03-079-ST		03/08 1405	1405 H-3	L.T. 1. E 02	40/40		F
43691	10072	BB-03-017-ST		03/08 1407	1407 H-3	t.T. 2. E 02	40/40		S
43692	10074	88-03-005-ST		03/08 1410	1410 H-3	L.T. 2. E 02	40/40		K
43693	10078	BB-03-003-ST		03/08 1423	1423 H-3	L.T. 2. E 02	04/04		₩.
43694	10001	88-03-026-ST		03/08 1428	1428 H-3	L.T. 1. E 02	10/10		80
43695	10081DUP	JUP BB-03-026-ST		03/08 1428	1428 H-3	L.T. 1. E 02	10/40		8 0
43696	11019	BB-03-026-MT		03/08 1359	1359 H-3	L.T. 1. E 02	04/08		L r
43697	11019MS	45 BB-03-026-MT		`	#-3	1.5 +-0.1 E 04	04/08		K
43698	11019	11019MSD BB-03-026-MT		`	н-3	1.7 +-0.1 E 04	04/08		₩.
43699	10070	BB-03-096-ST	•	03/08 1400	1400 H-3	L.T. 1. E 02	90/90		•

	VOLUME - UNITS ASH-WGHT-X & CAB. 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	
	L-UNIT-X THE TIME U/M a 04/09 04/09 04/09 04/09 04/09 04/09 04/09 04/09 04/09 04/09 04/09 04/09 04/09 04/09 04/09 04/09 06/11TER a 05/09 06/110 06/110 06/110 06/110	
4-0404	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	AVE 92714 STONER'S TIFICATION BB-15-010-SP BB-15-010-SP BB-15-001-S BB-15-001-S	
	ANN MARIE HOLBROW 16755 VON KARMAN 18755 VON KARMAN 1RVINE CA SAMPLE 10592 44206 10292 44206 11029 44210 10283 44213 102834 44213 102834 44213 102834 44215 1028834 44215 1028834	

TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES REPORT OF ANALYSIS

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PAGE

RUN DATE 05/04/94

DELIVERY DATE 96/11/50 DATE RECEIVED 03/11/94 CUSTOMER P.O. NUMBER 030225/030600829 5011 NORK OKUER NUMBER 4-0354 92714 ANN MARIE HOLBROW MCLAREN/HART 16755 VON KARMAN AVE IRVINE CA

140. 'n TIME VOLUME - UNITS
DATE TIME ASH-MGHT-X * MID-COUNT TIME 05/01 05/01 05/01 04/01 04/01 04/01 04/01 04/01 04/01 04/01 04/01 10/40 10/40 04/01 04/01 04/01 04/01 04/01 04/01 05/01 L-T. 2. E-01 PCI/GH DRY 9 2.37+-0.51E 00 PCI/GH DRY 9 1.36+-0.14E 00 PCI/GH DRY & E-01 PCI/GM DRY & E-02 PCI/GM DRY * 1. E-02 PCI/GM DRY 4 1. E-02 PCI/GM DRY 9 L.T. 4. E-01 PCI/GM DRY & 2.22+-0.22E 01 PCI/GM DRY & E-02 PCI/GM DRY -0.35E-01 PC1/GM DRY PCI/GM DRY NUCL-UNIT-X PC1/6M PC1/6M PC1/6M PC1/6M PC1/6M PC1/6M PC1/6M 1.7 +-0.2 E 03 1.4 +-0.1 E 03 L.T. 1. £ 02 E-02 E-02 E-01 E-01 E-01 E-02 E-02 1.9 +-0.9 E 02 ACTIVITY (PCI/LITER) 1.66+ 1.1. 1.1 ... 1.1. --... DATE TIME DATE TIME NUCLIDE CE-144 RA-226 CS-137 1H-228 CS-134 BA-140 CE-141 RU-103 RU-106 [-13] PU-238 PU-239 H-3 2R-95 09-03 H-3 H-3 FE-59 2N-65 CO-58 4N-54 8E-7 K-40 H-3 STOP COLLECTION-DATE START 03/03 1600 03/09 1600 03/03 1600 03/09 1600 STA 43938 10160MSD88-17-006A-MT 88-17-006A-MT 43937 10160MS BB-17-006A-MT 88-17-006A-SG 88-17-006A-SP 88-17-006A-ST 10ENTIFICATION CUSTOMER S 43936 10160 43933 10157 43934 10158 43935 10159 **TELEDYNE** SAMPLE

REVISED 05/04/94

REPORT OF ANALYSIS

CUSTOMER P.O. NUMBER

DATE RECEIVED

DELIVERY DATE

ANN MARIE HOLBROW

04/13/94 03/11/94 030225/030600829 WORK ORDER NUMBER

TIME VOLUME - UNITS
DATE TIME ASH-WGHT-X * MID-COUNT 04/05 04/05 NUCL-UNIT-X E-02 (PCI/GH DRY) ACTIVITY DATE TIME DATE TIME NUCLIDE 3016 STOP COLLECTION-DATE S T A NUM CUSTOMER'S IDENTIFICATION 16755 VON KARMAN AVE MCLAREN/HART IRVINE CA TELEDYNE SAMPLE NUMBER

2.28+-0.23E 01 1.1 PU-239 PU-238 03/09 1355

8E-7 K-40 MN-54 CO-58 FE-59

03/09 1355

88-17-8002-56

44031 10201

68-17-8002-SP

44030 10200

09-03

2N-65 2R-95

RU-103 RU-106 1-131

60/40 60/40

04/03

60/40 04/09

> E-02 E-01

E-02 E-02 04/09

04/09

60/40 04/09

60/40 60/40

E-01

04/09 60/40

04/09 60/40 60/40

E-01 E-01 E-05 E-01

60/10

BA-140 CS-134 CS-137

1.30+-0.40E-01

...

CE-144 CE-141

RA-226 TH-228

...

L.T. 3. E-01 2.04+-0.62E 00 1.16+-0.12E 00

The exponent for the H-3 added to Teledyne #43937 and 43938 has been corrected. ,

gnletin 7-20-94

Activity added to spiked samples

1.4 E 03 pCi/l 1.4 E 03 pCi/l Pu-239 Pu-239 CB-137 Cs-137 H-3 H-3 43938 43994 43995 44000 43937

ACEIVITY Isotope

3.3 E-01 pCi/g 3.3 E-01 pCi/9 5.6 E-01 pCi/g 5.6 E-01 pC1/9

44001

PAGE 31



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

July 20, 1994

Ms. Ann Marie Holbrow ChemRisk A Division of McLaren/Hart 16755 Von Karman Avenue Irvine, CA 92714

Reference: W.O. 4-0514

Dear Ms. Holbrow:

Activity added to spike samples:

Ci/l
Ci/1
Ci/l
Ci/l
,
ξ
•
g
g
0
spi
•

(a) The sample had 0.074 pCi/g of Cs-137 activity before the spike was added.

Sincerely.

Wavid Martin J. David Martin, Ph.D.

Manager, Environmental Analysis

JDM:cs

TELEDYNE BROWN ENGINEERING Environmental Services

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

July 20, 1994

Ms. Ann Marie Holbrow ChemRisk A Division of McLaren/Hart 16755 Von Karman Avenue Irvine, CA 92714

Reference: W.O. 4-0409

Dear Ms. Holbrow:

Activity added to spike samples:

TELEDYNE #	ISOTOPE	ACTIVITY
44212	H-3	3.5 E 03 pCi/l
44213	H-3	3.5 E 03 pCi/l
44177	Pu-239	0.33 pCi/g
44178	Pu-239	0.33 pCi/g
44169	Cs-137 (a)	0.62 pCi/g
44170	Cs-137 (a)	0.62 pCi/g

(a) The sample had 0.17 pCi/g of Cs-137 activity before the spike was added.

Sincerely,

J. David Martin, Ph.D.

Manager, Environmental Analysis

JDM:cs

TELEDYNE BROWN ENGINEERING Environmental Services

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

July 26, 1994

Ms. Ann Marie Holbrow ChemRisk A Division of McLaren/Hart 16755 Von Karman Avenue Irvine, CA 92714

Reference: W.O. 4-0409

Dear Ms. Holbrow:

Activity added to spike samples:

TELEDYNE #	<u>ISOTOPE</u>	ACTIVITY
44212	H-3	3.5 E 03 pCi/l
44213	H-3	3.5 E 03 pCi/l
44177	Pu-239	0.66 pCi/g (b)
44178	Pu-239	0.66 pCi/g (b)
44169	Cs-137 (a)	0.62 pCi/g
44170	Cs-137 (a)	0.62 pCi/g

(a) The sample had 0.17 pCi/g of Cs-137 activity before the spike was added.

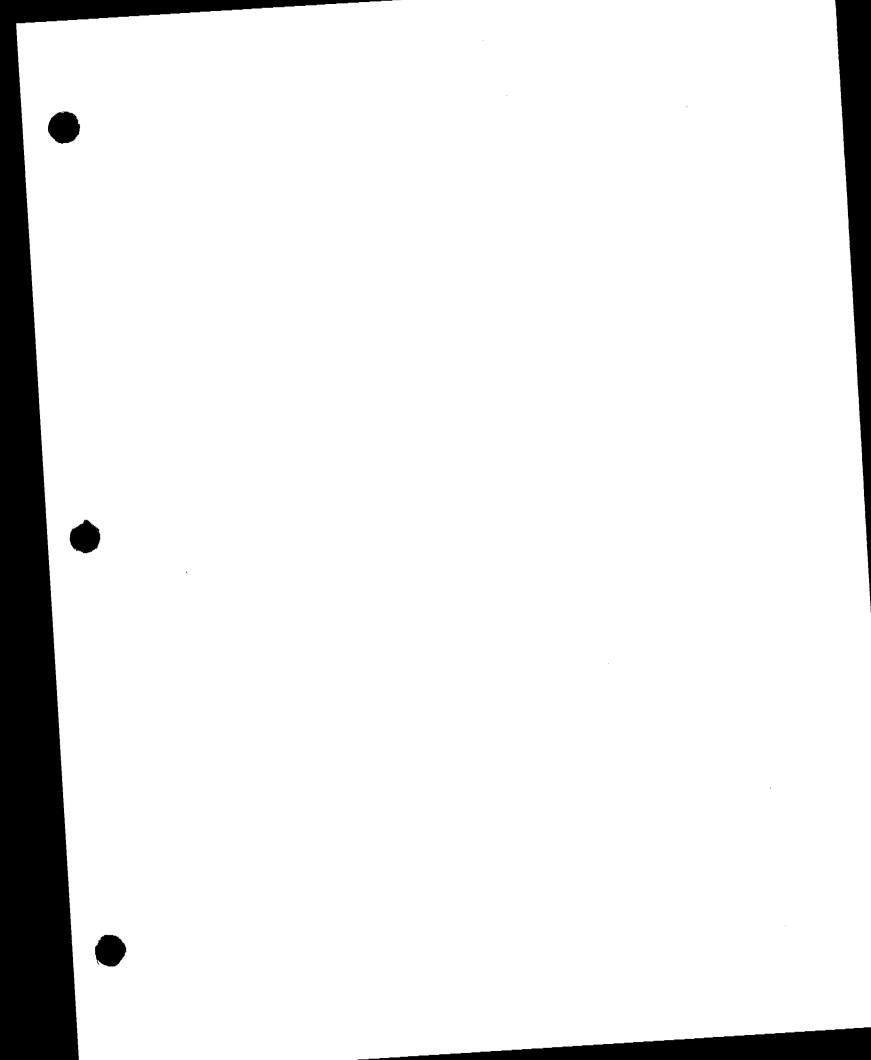
(b) The incorrect activity of 0.33 pCi/g was listed in the letter dated July 20, 1994.

Sincerely,

J. David Martin, Ph.D.

Manager, Environmental Analysis

JDM:cm



Gamma Scan

REPORT OF ANALYSIS

.U. NUMBER DATE RECEIVED DELIVERY DATE

RUN DATE 05/12/94

PAGE 12

	NUMBER NUMBER	CUSTOMER P.D. NUMBER	DATE RECEIVED DELIVERT DA	DELIVERT UA
		97800404073	03/14/94	04/16/94
MOLBROW NASTE HOLBROW	4-0409	, 30000 (C 2700)		
MCLAREN/HART				
16755 VON KARMAN AVE				
IRVINE CA	*1176			

	1.48.	•	. •	•	•	•	•	•	*	•	-	•	•	*	•	-	*	*	*	4	4	•	m	•	•	•	• •	• •		•	•	• 4		•	
	VOLUME - UNITS ASH-WGHT-% 0																																		
	MID-COUNT TIME DATE TIME	***	80/40	04/19	61/40	04/19	01/40	04/19	01/40	61/10	617.0	41/40	04/14	01/10	64710	04/17	41/40	41/40	61/10	· 1 / 1 / 1	61/10	61/40	80/40		03/59	03/50	03/29	03/29	03/59	03/29	03/50	03/59	03/50	03/59	
	NUCL-UNIT-X U/M 8		_	_			5 (_		0	8	0	0.	~	00	90	01	10	10	01	00	9	2	-	: =						00	00	10	
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	ACTIVITY PCI/LITER)		:	4	֓֞֜֞֜֞֜֞֜֞֜֓֓֓֓֓֓֓֓֓֓֓֟֜֟ ֓֓֓֞֞֞֓֞֓֓֓֞֞֞֜֞֓֓֓֞֓֓֞֓֓֞֓֓֓֞֞	٠.	•	'n	<u>:</u>	÷	÷	ŗ.	÷		<u>:</u>	÷	÷		:		÷	~		:	-			•			٠ 4	· ·		m	
	ACT (PCI		1:1	•	:	• • • • • • • • • • • • • • • • • • • •	::	L: T:	r.1.	L.T.	L • T •	1.1.		L.T.	L:T:	1:1	1:1	L.1.	1.1	1.1	1.1	1.1	•	1.1	-		· ·	<u>.</u> .	• •		•		-	1.1	
T E &	NUCL TO E		SR-90	•	86-7	K-40	#N-24	CO-58	FE-59	09-03	2N-65	7R-95	RU-103	RU-106	1-131	CS-134	CS-137	84-140	CE-141	CF-144	P 4-226	TH-228		SR-90		BE-7	Q+-Y	NN-24	CO-58	FE-59	09-00	CO-N2	C - 1 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2	RU-106	
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	۵. د	AT 100	79-700-01-00		0	94-900-61-93																		78-500-01-00	6	34-10-00-RG									
	TOME	I F IC	9	100		101																		9	400	4	0								
	CUSTOMER*S	IDEN	•	<u>*</u>	,	-																		5	÷	6	1111								
	.,,,			10304		10367																			11189										
	Teleoyne Sample	NINER		44181		44185																		•	44192	•	44193								

RUN DATE 05/04/94

PAGE 32

REPORT OF ANALYSIS

DELIVERY DATE DATE RECEIVED CUSTOMER P.II. NUMBER

04/13/94 03/11/94 030225/030600829 WORK ORDER NUMBER 4-0354

			LAB.	•	•		• •	٠.	٠ -	r 4	- 4	٠ -	• <	, .	•	• •	• •	- -	- 4	•		•	٠ -	٠	ď	•			
		STIME - SAULTON																									th.	HER 05/04/94	
		<u>u</u>	TIME VE	,	03/31	03/31	40/40	40/40	40/40	40/40	40/40	40/40	40/40	40/40	40/40	40/40	40/40	40/40	40/40	40/40	40/40	40/40	+0/+0	40/40		05/03	D. 16	SOUTHER BY J. GUENTHER	
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030225/030600829				_	, <u></u>	::	•	, . , .	- (<u>.</u> .	:	<u>.</u>	1.1	-	1:1	L.1.		1:1	֖֖֖֖֖֖֖֖֖֖֖֖֖֖֖֖֖֖֡֝֝֓֓֓֓֓֝֓֓֓֓֝֝֓֓֓֓֓֝	֓֞֞֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֡֓֓֓֓֓֡֓֡֓֡֓	<u>.</u> .	<u>.</u> .	•••	<u>.</u>	:	LeTe		E PORT	
030	₩ ₩ ₩			TIME NUCLIDE		PU-238 PU-239		8E-7	K-40	HN-54	CO-58	FE-59	09-00	59-NZ	2R-95	RU-103	RU-106	1-131	CS-134	CS-137	BA-140	CE-141	CE-144	RA-226	TH-228	5	n E	LACT DAGE OF REPORT	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
4-0354	_		COLLECTION-DATE	DATE TIME DATE TI		03/09 0155		75.00 07.60	03/07 01/2																		03/09 1120	-	7
	E 92714			CUSTOMER'S STA	S	BB-17-005-RP			BA-17-008A-RG																		88-17-8001-RT		
HOLBROW	CARMAN AVI			CUSTO	IDENTIF	10147 88			10181 88-																		10198 8		
ANN MARIE HOLBROW	MCLAREN/HART 16755 VON KARMAN AVE IRVINE CA		TOTOTAL	SAMPLE	NUMBER	01 01011	01 07664		01 58657																		44025		
4	2222		-	-																							Ħ	سم	

LAST PAGE OF REPORT

9 Duentle 05/04/94

5 - TRITTUM GAS/L.S. LAB. 6 - ALPHA SPEC LAB. 4 - GEILII CAMMA SPEC LAB. SEND & CUPIES TO MC480S AND MARIE HULBROW 3 - RADIO CHEMISTRY LAB. 2 - GAS LAB.

REPORT OF ANALYSIS

RUN DATE 04/20/94

PAGE 17

DELIVERY DATE DATE RECEIVED CUSTOMER P.O. NUMBER WORK ORDER NUMBER

> 92714 ANN MARIE HOLBROW MCLAREN/HART 16755 von Karman Ave IRVINE CA

030225/030600829

03/09/94

96/11/40

4-0353

LAB.	* *	€0	
VOLUME - UNITS ASH-WGHT-X +			APPROVED BY 3. GUENTHER 04/20/94
MID-COUNT TIME DATE TIME	03/11	04/14	D BY J. GUENT
NUCL-UNIT-X U/M &			AP PROVE
	E 01	E 02	
ACTIVITY PCI/LITERI	÷	2.	-
ACTIVITY (PCI/LITER)	L.T. 6. E 01 L.T. 5. E 00	L.T. 2. E 02	
DN-DATE STOP DATE TIME NUCLIDE	RA-226 TH-228	Н-3	LAST PAGE OF REPORT
COLLECTION-DATE START STOP DATE TIME DATE T	03/08 0854	03/08 0854	2
STA			
CUSTOMER'S IDENTIFICATION	88-20-002-RG	88-20-006-RT	
	1009	43722 10104	
TELEDYNE Sample Number	43708	43722	

SEND 1 COPIES TO MC480S ANN MARIE HOLBRUM

3 - RADIO CHEMISTRY LAB. 2 - GAS LAB.

5 - TRITIUM GAS/L.S. LAB. 6 - ALPHA SPEC LAB. 4 - GEILLI GAMMA SPEC LAB.

Activity added to spiked samples

Activity	1.4 E 04 pci/l 1.4 E 04 pci/l 3.8 pci/g 0.64 pci/g 0.64 pci/g
Isotope	H-3 H-3 Sr-90 Sr-90 Cs-137
TI	43697 43698 43730 43731 43740

REPORT OF ANALYSIS

DATE RECEIVED DELIVERY DATE PAG

RUN DATE 05/12/94

LAB. TIME VOLUME - UNITS
DATE TIME ASH-WGHT-X * & Buender 46/91/40 MID-COUNT TIME 04/09 60/40 60/40 03/29 60/40 03/29 03/29 03/29 03/29 03/14/94 NUCL-UNIT-# E-01 E-01 8 100 E-01 E-01 (PCI/LITER) CUSTOMER P.O. NUMBER ACTIVITY 030225/030600829 L.T. L.T. 1.1. **...** 1:1 ... ---DATE TIME DATE TIME NUCLIDE P-U-239 TH-228 WATER CE-144 RA-226 PU-238 PU-239 CS-134 CS-137 PU-238 8A-140 CE-141 1-131 STOP COLLECTION-DATE STOF WORK DRDER NUMBER 03/10 0755 03/10 0755 03/10 1050 4-0409 STA 88-15-006-RP 92714 BB-15-006-RP 68-19-006-RG IDENTIFICATION CUSTOMER*S ANN MARIE HULBROW HCLAREN/HART 16755 VON KARMAN AVE 44209 11188 44203 10289 44193 11192 IRVINE CA TELEDYNE NUMBER SAMPLE

5 - TRITTIUM GAS/L.S. LAB. 6 - ALPHA SPEC LAB.

4 - GEILI) GAMMA SPEC LAB.

SENU I COPIES TO MC480S ANN MARIE HDLBROM

3 - RADIO CHEMISTRY LAB.

2 - GAS LAB.

LAST PAGE OF REPORT

APPROVED BY J. GUENTHER 05/12/94

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RUN DATE 05/25/94

			¥	MOPK OR	ORDER NUMBER	BER	CUSTOMER		P.O. NUMBER	5.	DATE RECEIVED	DELIVERY DATI	DATE	PAGE	34
ANN MARIE HOLBROW MCLAREN/HART 16755 VOM KARMAN AVE IRVINE CA	ANN MARIE HOLBROW MCLAREN/HART 16755 von Karman IRVINE CA	IRDW IAN AVE 92714		+	4-0514		0302	30225/03060082	90829		03/15/94	04/11/94	+6/		
						3	ATER								
TELEDYNE Sample Number		CUSTOMER'S S IDENTIFICATION N	STA	COLL START Date	COLLECTION-DATE START STOP ATE TIME DATE TIME	DATE STOP TE TIM	E NUCLIDE	P.O.	ACTIVITY PCI/LITER!		NUCL-UNIT-X U/H a D	MID-COUNT TIME DATE TIME	VOLUME - UNITS ASM-WGHI-X 0	LAB.	
44100	11203	BG-09-005-RG	-	03/11 1313	1313		BE-7 K-40	::	÷ •	E 01		04/29		**	
							MN-54		3.			04/29		4	
							CO-58	<u>.</u> ,	<u>.</u>			04/29		.	
							re-57		•			04/29		•	
							2N-65	::	ν •			04/29		*	
							28-95	1:1				04/29		.	
							RU-103	L.T.	•			04/29		•	
							RU-106		w •			04/29		+ 4	
							1-131					04/29		•	
							CS-137		, w			04/29		•	
							BA-140	1.1.				04/29		*	
							CE-141	1.1.	:			04/29		+	
							CE-144	L.1.	7:			62/50		.	
							RA-226	1:1	.	E 01		04/59		•	
							TH-228	1.1	ŗ.			62/50		*	
44711	11202	BG-09-096-RS	_	03/11 1313	1313		SR-90	L.T.	:	£ 00		04/21		m	
44.717	10449	96-09-057-RP	_	03/11	1313		PU-238	1.1		E-01		04/19		•	
) - -			PU-239	1.1.	m	E-01		04/19		•	
44736	10436	8G-09-096-RS	-	03/11 1313	1313		SR-90	1.1.	-	E 00		04/21		m	
44742	10443	86-09-005-RG		03/11 1313	1313		BE-7	1.1	8.			04/29		•	
•							K-40	L.T.				04/59		+	
							MN-54	L.T.	*			04/29		•	
	•						CO-58	L.T.	÷			04/59		•	
							FE-59	- - -	÷			04/29			
							09-00	•••••••••••••••••••••••••••••••••••••••		90		04/29		• •	
							C9-N7		ċ			67/60		r	

16/	35	
RUN DATE 05/25/94	PAGE 35	
_	DATE RECEIVED DELIVERY DATE	04/11/94
	DATE RECEIVED	03/15/94
REPORT OF ANALYSIS	CUSTOMER P.O. NUMBER	030225/030600829
	MORK ORDER NUMBER	4-0514
		92714
		ANN HARIE HOLBROW McLaren/Hart 16755 von Karman ave Irvine ca

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ш	CHATOMER'S	S.T.A	COLL	0-N	<u>a</u>		ACTI	IVITY		UCL-UNIT-#	MID-COUNT TIME	VOLUME - UNITS	
	DENTIFICATION	Š	DATE	0	11 ME	NUCL IDE	I PCI	/L116		0 H/O	DATE TIME	ASH-WGHT-X o	LAB.
10443			03/11	1313	3.2	56-1	L.T.	÷	E 00		04/29		*
					~	1-103	L . T .	•	E 00		67/50		*
					₹	J-106	L.1.		E 01		04/59		*
					÷	-131	L:1		E 02		04/59		*
					ິບ	1-134	L. T.		E 00		04/59		.
					ວິ	3-137	1.1.		E 00		04/59		*
					2	1-140	L.1.		E 01		62/40		*
					ວ	-141	L.1.		E 01		62/40		*
					5	-144	t.T.		E 01		04/59		+
					2	1-226	L. T.		E 01		04/29		•
					Ē	1-228	L:1:	•	Е 00		04/59		*
						6 6 1					5	-4	
				LA	- PAG	UP KEPUK	_			APPROVE			
) I C	OPIES TO MC480S	ANN	TARIE HC	JEBROW							;		
SAMPLE Number 44742 44742 Sen	SAMPLE NUMBER I 44742 10443	SAMPLE CUSTOMER'S SAMPLE CUSTOMER'S NUMBER IDENTIFICATION 44742 10443 BG-09-005-RG 44742 10443 BG-09-005-RG	CUSTONER'S STA IDENTIFICATION NUM 10443 BG-09-005-RG	CUSTONER'S STA S IDENTIFICATION NUM DA 10443 BG-09-005-RG 03	CUSTONER'S STA START IDENTIFICATION NUM DATE TIME DAT 10443 BG-09-005-RG 03/11 1313	CUSTONER'S STA START IDENTIFICATION NUM DATE TIME DAT 10443 BG-09-005-RG 03/11 1313	CUSTONER'S STA START IDENTIFICATION NUM DATE TIME DAT 10443 BG-09-005-RG 03/11 1313	COLLECTION—DATE CUSTOMER'S STA START STOP IDENTIFICATION NUM DATE TIME DATE TIME NUCLIDE [10443 BG-09-005-RG 03/11 1313 ZR-95 L- RU-103 L- RU-106 L- CS-134 L- CS-137 L-	COLLECTION—DATE CUSTOMER'S STA START IDENTIFICATION NUM DATE TIME DATE TIME NUCLIDE (PCI/LITT 10443 BG-09-005-RG 03/11 1313 ZR-95 L-T- 4- RU-103 L-T- 3- RU-106 L-T- 3- CS-134 L-T- 3- CS-137 L-T- 3-	CUSTOMER'S STA START STOP 10443 BG-09-005-RG 03/11 1313 ZR-95 L-7: 4: E 00 RU-106 L-7: 3: E 01 RU-106 R	CUSTOMER'S STA START STOP LOCATION NUM DATE TIME DATE TIME NUCLIDE (PCI/LITER) U/ LOCATION NUM DATE TIME DATE TIME NUCLIDE (PCI/LITER) U/ LOCATION NUM DATE TIME DATE TIME NUCLIDE (PCI/LITER) U/ RU-103 L.T. 6. E 00 RU-1043 BG-09-005-RG 03/11 1313 RU-106 L.T. 3. E 00 CS-137 L.T. 3. E 00 CE-141 L.T. 3. E 01 CE-144 L.T. 5. E 01 CE-144 L.T. 6. E 01 LAST PAGE OF REPORT	CUSTOMER'S STA START STOP IDENTIFICATION NUM DATE TIME DATE TIME NUCLIDE (PCI/LITER) U/M ** DATE IDENTIFICATION NUM DATE TIME DATE TIME NUCLIDE (PCI/LITER) U/M ** DATE IDENTIFICATION NUM DATE TIME DATE TIME NUCLIDE (PCI/LITER) U/M ** DATE IDENTIFICATION NUM DATE TIME DATE TIME NUCLIDE (PCI/LITER) U/M ** DATE IDENTIFICATION NUM DATE TIME DATE TIME NUCLIDE (PCI/LITER) U/M ** DATE IDENTIFICATION NUM DATE HOLDROW IDENTIFICATION ACTIVITY NUCL-UNIT-X TIME OF	CUSTOMER'S STA START STOP LOENTIFICATION NUM DATE TIME DATE TIME NUCLIDE (PCI/LITER) U/M 9 LOENTIFICATION NUM DATE TIME DATE TIME NUCLIDE (PCI/LITER) U/M 9 LOENTIFICATION NUM DATE TIME DATE TIME NUCLIDE (PCI/LITER) U/M 9 LOENTIFICATION NUM DATE TIME DATE TIME NUCLIDE (PCI/LITER) U/M 9 RU-103 Lot. 6. E 01 CS-134 Lot. 3. E 00 CS-137 Lot. 3. E 01 CS-137 Lot. 4. E 00 CS-137 Lot. 5. E 01 CS-137 Lot. 6. E 01 TH-228 Lot. 6. E 01 TH-229 Lot. 6. E 01 APPROVED

6 - ALPHA SPEC LAB.

5 - TRITIUM GAS/L.S. LAB.

4 - GEILEI GAMMA SPEC LAB.

3 - RADIO CHEMISTRY LAB.

2 - GAS LAB.

		REPORT OF ANALYSIS		RUN	RUN DATE 06/03/94	
	WORK ORDER NUMBER	CUSTCMER P.O. NUMBER	DATE RECEIVED	DELIVERY DATE	PAGE 15	
ANN MARIE HOLBROW McLaren/Hart 16735 von Karman ave Irvine ca	4-0472	030225/030600829	03/21/94	04/23/94	,	

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TELEUYNE Sample Number		CUSTOMER'S IDENTIFICATION	STA	COLL START Date	COLLECTION-DATE START STOP DATE TIME DATE TIME	NUCLIDE	ACT 1 PC1	ACTIVITY PCI/LITER)		NUCL-UNIT-X U/# *	MID-COUNT TIME DATE TIME	VOLUME - UNITS ASH-NGHT-X 0	. FAB.
45035	10586	8G-01-090-RS		03/15 0816		SR-90	1:1:	-:	E 00		04/08		m
45041	10593	8G-01-087-RG		03/15 0916		TREE TO STAND TO STAN		4 4 4 4 5 4 4 4 4 4 4 5 5 6 6 6 6 6 6 6			03/30 03/30 03/30 03/30 03/30 03/30 03/30 03/30 03/30 03/30 03/30 03/30 03/30	·	******
45046 10600	10600	86-01-016-RP	_	03/15 0016		PU-238 PU-239	1:1	-:	E-01		90/50		••
45062	11212	BG-01-090-RS		03/15 0816		SR-90	t.T.	:	E 00		04/08		Е.
43064	11214	BG-01-087-RG		03/15 0816		7 C C C C C C C C C C C C C C C C C C C	*******				04/04 04/04 04/04 04/04 04/04		

REPORT OF ANALYSIS

RUN DATE 06/03/94

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		WORK ORDER NUMBER	CUSTOMER P.O. NUMBER	DATE RECEIVED OELIVERY DATE	OELIVERY DATE	PAGE
ANN MARIE HOLBROW MCLAREN/HART 16755 VON KARMAN AVE		4-0472	030225/030600829	03/21/94	04/23/94	
IKVINE CA	• 1176	3	6 0 1			
			_			

- 4

LAB.	44	- •	. 🚁	*	•	•	*	*	•	*	In.	m	m	*	•	*	*	•	.	* •	•	*	-	•	•	•	4	-
VOLUME - UNITS ASH-WGHT-X &																												
HID-COUNT TIME DATE TIME	40/40	40/40	04/04	40/40	\$0/50	40/40	40/40	40/40	40/40	04/04	05/27	60/40	60/50	04/04	40/40	04/04	04/04	40/40	04/04	04/04	40/40	40/40	04/04	04/04	40/40	04/04	04/04	40/40
NUCL-UNIT-X U/M 0																												
	000		56							00	0.5	E 00	00							m 1								0
ACTIVITY PCI/LITER)											•	•																- -
CT 1V		•			-	•			_			-		4	. 1	4	*		•		• •		. 2		•	-		
₹ <u>6</u> .		֓֡֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֡֓֜֓֓֓֡֓֡֓֡֓֡֓֡֓֡	٠,٠	-	:	ב	:	L.1	L.T.	r. 1	L.T.	1.1.	۲•٦		L.T.	֡ <u>֡</u>	L:1	L.1	1.1	٠,	: -	-	-	:	:	L. T.	L •1	1:
FE FOP TIME NUCLIDE	28-95	40110X	1-131		CS-137	BA-140	CE-141	CE-144	RA-226	TH-228	H-3	GR-A	GR-8	BE-7	K-40	オジーンド	C0-58	FE-59	CO-60	2N-65	2K-73	RU-106	1-131	CS-134	CS-137	BA-140	E-1	CE-144
COLLECTION-DATE START STOP DATE TIME DATE T	03/15 0816										03/15 0940	03/15 1057		03/15 1057														
STA																												
CUSTOMER'S IDENTIFICATION	86-01-087-RG										8G-14-001-RT	88-04-001-RA		88-04-001-RG														
106	11214										10618	11236		11237												-		
TELEDYNE Sample Number	45064 11214										45086	45103		45104														

			REPORT OF ANALYSIS			RUN DATE 06/03/94	_
	3	MORK ORDER NUMBER	CUSTOMER P.O. NUMBER	DATE RECEIVED	DELIVERY DATE	PAGE 17	_
ANN MARIE HOLBROW MCLAREN/HART		4-0472	030225/030600829	03/21/94	04/23/94		
16755 VON KARMAN AVE Irvine ca	92714						

WATER

CUSTOMER'S STA START STOP IDENTIFICATION NUM DATE TIME DATE TIME NUCLIDE	STA S NUM DA	× 2	LLECTION-DATE ST STOP TIME DATE TIME NUCLTD	TIME NUCLIO	m	ACT.	ACTIVITY PCI/LITER)	NUCL-UNIT-X	HID-COUNT TIME DATE TIME	VOLUME - UNITS Ash-mgmt-7 0	LAB.
11237 BB-04-001-RG 03/15 1057		03/15 1057	s 1057		RA-226 TH-228	:::	7. E 01 6. E 00	00	\$0/\$0 04/0¢		•
11224 BG-01-016-RP 03/15 0816		03/15 0816	5 0816		PU-238 PU-239	:::	2.	E-01	05/06 05/06		••
11230 BB-04-001-RT 03/15 1057		03/15 1057	5 1057		E-T	L.T. 1.		E 02	12/50		₩.
11231 88-04-001-RS 03/15 1057		03/15 1057	5 1057		SR-90	1.1	2.	E 00	90/50		m
11233 88-04-001-RP 03/15 1057	03/15 1057				PU-238 PU-239	1.1.	::	E-01 E-01	05/10 05/10		99
10331 8G-02-076-RT 03/10 1558	03/10 1558				H-3	L.T. 2.		E 02	05/27		1 0
LAST PA Send I copies to mc480s ann marie Holbrow				IST PA	LAST PAGE OF REPORT			APPROVE	Dollatin	APPROVED BY J. GUENTHER 06/03/94	
2 - GAS LAB. 3 - RADIO CHEMISTRY LAB. 4 - GEO				- GEC	4 - GECLII GAMNA SPEC LAB.	EC LAB		5 - TRITTUM GAS/L.S. LAB.	3/L.S. LAB.	6 - ALPHA SPEC LAB.	LAB.

Activity added to spiked samples

04 pc1/1	04 pc1/1	pC1/q) 	=			F
1.4 E	1.4 E	0.33	0.33	0.58	0.58	3.8	3.8
H-3	н-3	Pu-239	Pu-239	CB-137	Cs-137	Sr-90	Sr-90
45060	45061	45068	45069	45075	45076	45088	45089
	H-3	H-3	H-3 1.4 E H-3 1.4 E Pu-239 0.33	H-3 H-3 Pu-239 Pu-239	H-3 H-3 Pu-239 Pu-239 Ce-137	H-3 H-3 Pu-239 Ca-137 Ca-137	H-3 H-3 Pu-239 Ce-137 Cs-137 Sr-90

Gross Alpha/Beta Scan

REPORT OF ANALYSIS

RUN DATE 06/03/94

PAGE 16 DELIVERY DATE 04/23/94 DATE RECEIVED 03/21/94 CUSTOMER P.O. NUMBER 030225/030600829 WORK ORDER NUMBER 4-0472

									ı		
ANN MARIE HO MCLAREN/HART	ANN MARIE HOLBROW MCLAREN/HART	ROM		4-0472	030225	030225/030600829	0829	03/21/94		04/23/94	
16735 VUN IRVINE CA	16755 VUN KARMAN AVE Irvine ca	IAN AVE 92714	. 4								
					HATER						
TELEDYNE Sample Number		CUSTOMER'S IDENTIFICATION	STA	COLLECTION-DATE START STOP DATE TIME DATE T	P TIME NUCLIDE	ACT.	ACTIVITY PCI/LITER)	NUCL-UNIT-X	AID-COUNT TINE DATE TIME	VOLUME - UNITS ASH-WGHT-X 0	LAB.
45064	11214	86-01-087-RG		03/15 0616	2R-95 RU-103 RU-103 I-131 CS-134 CS-134 CE-141 CE-141	+++++++++	*****		00000000000000000000000000000000000000		****
45086	10618	8G-14-001-RT		03/15 0940	H-3	1:1:	:	E 02	05/27		ın.
45103	11236	BB-04-001-RA		03/15 1057	6.0 6.0 6.0 6.0 6.0 6.0 6.0 6.0 6.0 6.0	1:1:	**	E 00	04/09		m m
45104	11237	88-04-001-RG		03/15 1057	0 X X X X X X X X X X X X X X X X X X X		4-44-40004-4-4-4-4-4-4-4-4-4-4-4-4-4-4-		11111111111111111111111111111111111111		****

Isotopic Plutonium

TELEDYNE BROWN ENGINEFRING ENVIRONMENTAL SERVICES REPORT OF ANALYSIS

PAGE 13

RUN DATE 05/12/94

DATE RECEIVED DELIVERY DATE 04/116/94 03/14/94 CUSTOMER P.O. NUMBER 030225/030600829 WORK ORDER NUMBER

WATER 41126 ANN MARIE HULBROW MCLAREN/HART 16755 von Karman ave Irvine ca

6040-4

9			4
VOLUME - UNITS		;	05/12/94
MID-COUNT VOLUE	¥	04/09 04/09 04/09	APPROVED BY J. GUENTHER 05/12/94
	NUCL-UNIT-X 0/M % 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		APPROVED B
	ACTIVITY NUCL (PCI/LITER! U L-T- 2- E 01 L-T- 3- E 00 L-T- 3- E 00 L-T- 3- E 00 L-T- 6- E 01 L-T- 6- E 01 L-T- 6- E 01 L-T- 6- E 01 L-T- 6- E 01	L.T. 4. E-01 L.T. 4. E-01 L.T. 2. E-01 L.T. 2. E-01	5
***	IME NUCLIDE 1-131 CS-134 CS-134 CS-137 BA-140 CE-141 CE-141 RA-226 TH-228	PU-238 PU-239 PU-238 PU-239	LAST PAGE OF REPORT
	COLLECTION-DATE START STAP START STAP OATE TIME DATE TIME NUCLIDE O3/10 1050 C5-134 C5-137 BA-140 CE-141 CE-144 RA-226 TH-228	03/10 0755	2
÷1176	CUSTONER'S STA 1DENTIFICATION NUM 12 BB-19-006-RG	BB-15-006-RP BB-15-006-RP	
<	111	44203 10289	
IRVINE CA	TELEDYNE Sample Number 44193	44203	4407

5 - TRITTUM GAS/L.S. LAB. 4 - GELLII GAMMA SPEC LAB. SEND 1 COPIES TO MC480S ANN MARIE HOLBROW 3 - RADIO CHEMISTRY LAB.

2 - GAS LAB.

6 - ALPHA SPEC LAB.

RUN DATE 05/04/94

TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES

22	7 Pac 7 1			ITS LAB•
	DELIVERY DATE	04/13/94		HID-COUNT VOLUME - UNITS LAB.
	OSKIE OFCETVED	03/11/94		H10-COUN
	REPORT OF ANALYSIS	CUSTOMER P.II. NUMBER	03050	72 44 17: 17: 17:
TELEDYNE BKU		WORK ORDER NUMBER	4-0354	
				92714
				ANN MARIE HOLBROW MCLAREN/HART 16755 VON KARMAN AVE IRVINE CA

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	46/4
# L H S H - H S H S	AL 1THER 05/0
TIME 03/31 03/31 04/04 04/04 04/04 04/04 04/04 04/04 04/04 04/04 04/04 04/04 04/04 04/04 04/04 04/04 04/04 04/04 04/04 04/04	APPROVED BY J. GUENTHER 05/04/94
11/11/17 2. E-01 2. E-01 3. E-01 3. E-01 4. E-01 1. 3. E-01 1. 5. E-01 1. 5. E-01 1. 6. E-01 1. 7. E-01 1. 8. E-01 1. 8. E-01 1. 9. E-01 1. 10 E-01	L.T. 2. E 02
NUCLIDE 1-238 1-239 1-239 1-239 1-239 1-239 1-239 1-34 1-131 1-131 1-131 1-131 1-131 1-131 1-131 1-131 1-131 1-131 1-131 1-131 1-131 1-131 1-131 1-131 1-131	H-3
COLLECTION-DATE START DATE TIME DATE TIME 03/09 0755 Pt 03/09 0755 K	03/09 1120
CUSTOMER'S STA IDENTIFICATION NUM 47 BB-17-005-RP 81 BR-17-008A-RG	88-17-8001-RT
<u>ي</u> کي	44025 10198
TELEDYNE SAMPLE NUMBER 43920 10147 43985 10181	
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SEND I COPIES TO MC480S ANN MARIE HULBROW 3 - RADIO CHEMISTRY LAB.

5 - TRITIUM GAS/L.S. LAB. 6 - ALPHA SPEC LAB.

2 - GAS LAB.

4 - GEILII GAMMA SPEC LAB.

DELIVERY DATE DATE RECEIVED TELEDYNE BROWN ENGINEFPING ENVIRONMENTAL SERVICES REPORT OF ANALYSIS

PAGE 34

RUN DATE 05/25/94

LAB MID-COUNT VOLUME - UNITS TIME ASH-WGHT-X & 04/11/94 61/40 04/19 04/21 04/13 04/59 04/29 04/59 04/13 04/59 04/59 04/29 04/59 04/59 04/59 04/59 04/29 04/29 04/29 04/29 NUCL-UNIT-X 46/51/60 E-01 E 00 00 9 5 ACTIVITY (PCI/LITER) CUSTOMER P.O. NUMBER 030225/030600829 1.1 1.1 1.1 ֝<u>֓</u>֡֡֡֜֝֡֡֡֡֜֜֝֡֡֡֡֜֜֜֝֡֡֡֡֡֡֡֡ 1.1 ... 1.1 :: :: 1.1 1.1 :: :-1.1 1.1. 1.1 1.1 START STOP NUCLIDE DATE TIME NUCLIDE CE-144 RA-226 TH-228 SR-90 RU-103 RU-106 84-140 CS-134 CS-131 CE-141 WATER CO-60 ZN-65 ZR-95 8E-7 K-40 AN-54 CO-58 1-131 COLLECTION-DATE STOP WOFK ORDER NUMBER 03/11 1313 03/11 1313 4-0514 STA BG-09-096-RS 86-09-005-RG 92714 CUSTOMER'S 10ENTIFICATION ANN MARIE HOLBROW MCLAREN/HART 16755 von Karman ave IRVINE CA 44700 11203 TELEDYNE SAMPLE

04/29 04/29

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FE-59 CO-60 2N-65

CO-58

¥6-21 BE-7 K-40

03/11 1313 03/11 1313

BG-09-005-RG

BG-09-096-RS

10436

44136

44142 10443

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04/59 04/29 04/29

04/21 04/59

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SR-90

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PU-239

03/11 1313

BG-09-057-RP

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44717

44711 11202

PU-238

REPORT OF ANALYSIS

PAGE 15

RUN DATE 06/03/94

DATE RECEIVED DELIVERY DATÉ CO P.O. NUMBER

		m	m चचचचचचच
*6/		# H H H H H H H H H H H H H H H H H H H	
04/23/94	MID-COUNT	04/08 04/08 03/30 03/30 03/30 03/30 03/30 03/30 03/30 03/30 03/30 03/30 03/30 03/30 03/30	04/08 04/04 04/04 04/04 04/04 04/04
P.O. NUMBER 03/21/94	,		Loto 1 - E-01 Loto 1 - E-01 Loto 3 - E 01 Loto 3 - E 00
CUSTCMER P.G. NUMB 030225/030600829	α ⊢ «	SR-90 L SR-90 L SR-90 L SR-90 L SR-90 CO-60 ZN-65 ZR-95 ZR-95 ZR-95 ZR-95 ZR-95 ZR-95 ZR-95 ZR-95 ZR-140 CE-141 CE-144 ZR-228	PU-238 PU-239 SR-90 R-40 R-40 CO-58 FE-59 CO-60
WORK ORDER NUMBER		COLLECTION-DATE START DATE TIME DATE 03/15 0816 03/15 0916	03/15 0816 03/15 0816 03/15 0816
	н AVE 92714	CUSTOMER'S STA 10ENTIFICATION NUM 16 BG-01-090-RS 33 BG-01-087-RG	8G-01-016-RP 2 BG-01-090-RS 4 BG-01-087-RG
	ANN MARIE HOLBRUM MCLAREN/HART 16755 von Karman ave Irvine ca	TELEUYNE CO SAMPLE 10E NUMBER 45035 10586 45041 10593	45046 10600 45062 11212 45064 11214

REPORT OF ANALYSIS

RUN DATE 06/03/94

			WORK OR	WORK ORDER NUMBER		CUSTGMER P.O. NUMBER	P.0.	NUMBE	e c	DATE RECEIVED) OELIVERY DATE	DATE	PAGE 17	<u>-</u>
ANN MARIE HOLBROW HCLAREN/HART 16755 VON KARMAN IRVINE CA	ANN MARIE HOLBROW MCLAREN/HART 16755 von Karman ave Irvine ca		.	4-0472		030225	030225/030600829	0829		03/21/94	04/23/94	46/		
					*	ATER								
TELEOYNE Sample Number 10	CUSTONER'S IDENTIFICATION	STA	COLL START DATE	COLLECTION-DATE START DATE TIME DATE	P TIME	NUCLIDE	ACT +	ACTIVITY Pci/Literi		NUCL-UNIT-X U/M 0 C	MID-COUNT TIME DATE TIME	VOLUME - UNITS Ash-Wght-2 o		
45104 11237	88-04-001-RG		03/15 1057	1057	4 K	RA-226 TH-228	L.T. 7. L.T. 6.		E 01		04/04		++	
11224	8G-01-016-RP		03/15 0816	0816	2.5	PU-238 PU-239	::	2.5	E-01		05/06 05/06		••	
11230	B8-04-001-RT		03/15 1057	1057	H-3	ŵ	L.T. '1.		E 02		05/27		EV.	
11231	88-04-001-RS		03/15 1057	1057	S	SR-90	1.1.	2.	E 00		90/50		6 0	
11233	88-04-001-RP		03/15 1057	1057	22	PU-238 PU-239	::	::	E-01 E-01		05/10 05/10			
10331	BG-02-076-RT		03/10 1558	1558	H-3	ŵ	1.1.	2.	E 02		05/27		₩.	
,					ST PAGE	LAST PAGE OF REPORT				APPROVED 6	Dollatin 1. CUENTHER	Dollatin APPROVED BY J. CUENTHER 06/03/94		
֓֞֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜														

Activity added to spiked samples

6 - ALPHA SPEC LAB.

S - TRITIUM GAS/L.S. LAB.

4 - GEILII GAMMA SPEC LAB.

SEND I COPIES TO MC480S ANN MARIE HOLBROW

3 - RADIO CHEMISTRY LAB.

2 - GAS LAB.

Activity	1.4 E 04 pCi/1	1.4 E 04 pCi/1	0.33 pci/q	0.33 "	0.58 "	0.58 *	3.8	. E.E.
Isotope	H-3	Н-3	Pu-239	Pu-239	Cs-137	Cs-137	Sr-90	Sr-90
11#	45060	45061	45068	45069	45075	45076	45088	45089

Strontium

REPORT OF ANALYSIS

RUN DATE 05/12/94

PAGE 12

DATE RECEIVED DELIVERY DATE 04/16/94 03/14/94 CUSTOMER P.O. NUMBER

030225/030600829

WORK ORDER NUMBER 4-0409 92714 ANN MARIE HOLBRDW MCLAREN/HART 16755 von Karman Ave IRVINE CA

WATER

-													
ELEDYNE					COLLECTION-DATE		ACT	1 V I T Y		NUCL-UNIT-X	MID-COUNT TIME	VOLUME - UNITS	
SAMPLE		CUSTOMER'S IDENTIFICATION	Z S		TIME DATE T	TIME NUCLIDE	104	PCI/LITER)		0/W #	DATE TIME	ASH-WGHT-N &	
44181	10304	BB-19-005-RS		03/10 1150	1150	SR-90	1.1.	:	E 00		80/40		# 0
	•			;			1.1.	ď	F 01		04/19		•
44185	10307	PB-19-006-RG		03/10 1050	1050	- 4			E 01		61/40		
						0 1 1 1 1					04/19		•
						#X-24	• • •	•			01/10		4
						CO-58	1.1				41.40		
						FE-59	1.1	<u>:</u>			04/19		٠,
						04-01	L.T.		E 00		04/19		•
						24 LN F	-				61/40		•
				٠		50-06		4			61/10		•
•						EN-103					04/19		4
						201-08					04/19		•
						KU-175		: -			04/19		*
						1-131	• · ·	<u>.</u>			61/40		*
						CS-134	-1	•			01/10		•
						CS-137	t.T.	;	E 00		61/40		•
						BA-140	r. T.	÷			61/40		٠.
						CE-141	L.T.	-	E 01		04/19		•
						141-17	1.1.	3.	E 01		04/19		• •
						0.4-226	1.1	•			04/19		•
						11.23 B	-1-				04/19		4
						77_1		:					
44197	11189	9 EB-19-005-RS		03/10	03/10 1050	SR-90	1.1.	-	E 00		04/08		•
•	 				000	BF-7	1.1	9.	E 01		03/29		•
44193	11192	2 BB-19-006-RG		03/16	03/10 1030	- 6		•	E 01		03/29		•
						7 4 3	, ,				03/50		•
											03/29		*
						ES-03	•				04/20		*
						FE-59	:						4
						09-00	L.T.	÷	E 00		03/29		٠ ٩
						2N-65	L•1	÷			03/59		r 4
						2R-95	1.1.				3/2		
						611-103	1.1.	*	E 00		3/2		•
						RU-106	L.T.	3.	E 01		03/29		•

REPORT OF ANALYSIS

RUN DATE 04/19/94

			3	HORK ORCER NUMBER	CUSTOMER	P.O. NUMBER	MBER	DATE RECEIVED	D DELIVERY DATE		PAGE
ANN MARIE HOMELART	ANN MARIE HOLBROW MCLAREN/HART	36		4-0638	030225	030225/03060082	53	03/16/94	04/1	04/18/94	
16755 YON IRYINE CA	16755 YON KARMAN AVE IRVINE CA	N AVE 92714									
					WATER						
TELEDYNE Sample Number		CUSTOMER'S S1	STA	COLLECTION-DATE START STOP DATE TIME DATE TI	P TIME NUCLIDE	ACTIVITY (PCI/LITER)	11Y 11ER)	NUCL-UNIT-X U/A a	MID-COUNT TIME DATE TIME	VOLUME - UNITS ASH-WGHT-X *	LAB.
45715	11040	BB-20-001-RS		03/08 0854	SR-90	1.1.]. E	00	04/15		m
		30-00-00-00		03/08 0854	BE-1	1.1. 5	• m	01	04/13		•
42710	11037	200-03-00			K-40	-	_	02	04/13		
					#N-54	•		00	04/13		* 4
					CO-58	· · · ·		00	04/13		
					FE-59			100	61/10		•
					09-00		•	000	64/13		- 4
					59-NZ			56	61/10		
					2R-95	•••		5 6	64/13		•
					KU-103			8 6	04/13		•
					1-131			01	04/13		+
					CS-134			00	04/13		.
					CS-137	1.1.		00	04/13		
					BA-140	L.T. 3		01	04/13		•
•					CE-141			10	04/13		• •
					CE-144			10	61/10		-
					RA-226 TH-228	.1:	 	100	04/13		• •
								,			-
45717	11032	BB-20-002-WA		03/08 1400	4 Q	1.5 +-0	6. 0.3 E	010	04/03		'n
45718	11126	88-20-002-WT		03/08 1400	H-3	 	2. E	02	04/14		'n
				LAST	LAST PAGE OF REPORT	.		APPROVED	Dynes-de BY J. GUENTHER	de 19794	
SER	SEND 1 COF	1 COPIES TO HC480S ANN MARIE HULBRON	I Z Z	ARIE HULBROW							
2 - 64	- GAS LAB.	3 - RADIO CHEMISTRY LAB	HEMI	STRY LAB. 4 -	GEILLI GAMMA SPEC	PEC LAB.		5 - TRITIUM GAS/L.S. LAB.	/L.S. LAB.	6 - ALPHA SPEC LAB.	C LAB.

04/20/94 PAGE 16	N
RUN DATE 04/20/94 DELIVERY DATE 04/11/94	1-COUNT VOLUME - UNITS 1/23 1/23 1/23 1/29
	HID-COUNT TIME 03/23 03/23 03/23 03/29 04/06 04/06 04/06 03/23 03/23 03/23 03/23 03/11 03/11 03/11 03/11 03/11
SERVICES PATE RECEIVED 03/09/94	R1 U/H A U/H
INEERING ENVIRONMENTAL OF ANALYSIS CUSTOMER P.O. HUMBER 030225/030600829	ACTIVITY 1.1. 2. 6 1.5. 4-0.7 1.5. 4-0.7 1.8 4-0.5 1.8 4-0.5 1.9 4-0.5 1.1. 1.0
ROWN ENGINEERING ENVIRONMENTAL SERVICES REPORT OF ANALYSIS CUSTOMER P.O. NUMBER PATE R 030225/030600829	P
TELEDYNE BROWN Re Work trder number 4-0353	60N-DATE STO
WORK	T 4 N 5 S
	BROW HAN AVE 92714 CUSTOMER'S ST CUSTOMER'S NU IDENTIFICATION NU 10 BG-00-002-PP 11 BG-00-002-PS 11 BG-00-002-PS 10 BG-00-002-PS 10 BG-00-002-PS 10 BG-00-002-PS 10 BG-00-002-PS 10 BG-00-002-PS 10 BG-00-002-PP 090 BG-00-002-PP 090 BG-00-002-PP
	VA 111
	TELEDYNE CUSTON SARMAN AVE 16755 VON KARMAN AVE 18755 VON KARMAN AVE 18756 A3681 11091 B6 43682 11110 B6 43682 11110 B6 43682 11110 B6 43682 110957 B6 43688 11090 B6 43704 10086

TELECYNE BROWN ENGINEFRING ENVIRONMENTAL SERVICES Report of Analysis

PAGE 34

RUN DATE 05/25/94

DATE RECEIVED DELIVERY DATE 04/11/94 46/51/60 CUSTOMER P.O. NUMBER 030225/030600829 HOPK GROER NUMBER 4-0514

HATER

ANN MARIE MOLBROW MCLAREN/HART 16755 von Karman ave 92714 Irvine ca

	148.	- -		• •	•	.	• •	•	+	→•			•	*	,	•	•	۰ ۹	•	m	•	• •	→	•	•	-	,	
	VOLUME - UNITS																											
MID-COUNT	TINE DATE TINE	04/29	04/29	04/29	62/40	67/40	04/29	64/50	62/40	67/50	04/50	62/40	04/59	04/59	04/50		17/40	04/19	61/10	•	04/21	04/59	04/29	62/50	62/40	04/29	04/59	
	NUCL-UNET-% U/M &	01 01		o 	•	0	9	2 =			2			; =	00		00	•	E-01	10	00					10		
	ACTIVITY PCI/LITER)	4. ff 91	ш		ш	ш	÷.			 			∴.	: .			E		'n,	en en	. I. E	,	ท่า				÷	• D
	ACT	1-1-	::			: :	L.T.	<u>.</u> .			1.1.	1:1	 	<u>:</u> ,		•	1.1.		1:1	. · ·	1.1		. .			::	<u>:</u> :	:
₩	E NUCLIDE	BE-1	* 1 * 0 * 1 * 1 * 1 * 1 * 1 * 1 * 1 * 1	CO-58	FE-59	09-03	56-W	RU-103	RU-106	1-131	CS-134	BA-140	CE-141	CE-144	RA-226	1H-228	0	200	PU-238	PU-239	0	26186	1-36	K-40	FN-54	00-56 6-15-15-15-15-15-15-15-15-15-15-15-15-15-	09-00	59-NZ
3	COLLECTION-DATE START STOP DATE TIME DATE TIME	03/11 1313																03/11 1313		03/11 1315		03/11 1313	1113	03/11 1313				
	STA STA																											
	CUSTOMER'S	;	86-09-005-RG															28-A80-00-12		8G-09-057-RP		SA-090-00-00		BG-09-005-RG				
		10EX	11203														•		11202	64401			44736 10436	10443				
	TELEDYNE Sample	NUMBER	44700 11203																44711	•			44736		74144			

REPORT OF ANALYSIS

RUN DATE 06/03/94

	WORK ORD	HORK ORDER NUMBER	CUSTCHER P.G. NUMBER	DATE RECEIVED DELIVERY DATE	DELIVERY DATE	PAGE 15	2
ANN MARIE HOLBRUW McLaren/Hari 16755 von Karman ave Irvine ca	4-0472	472	030225/030600829	03/21/94	04/23/94		

WATER

TELEUYNE Sample Number		CUSTOMER'S IDENTIFICATION	STA	COLL START DATE	COLLECTION-DATE START STOP DATE TIME DATE TIME	NUCL I DE	ACT PC1	ACTIVITY PCI/LITER)	NUCL-UNIT-X	•	MID-COUNT TIME DATE TIME	VOLUME - UNITS ASH-WGHT-R *	148.
45035	10586	8G-01-090-RS		03/15 0816	0816	SR-90	1.1.	-:	E 00	•	80/108		en.
14061	10593	96-01-087-R6		03/15 0916		TRUE TO THE TENT T					03/30 03/30 03/30 03/30 03/30 03/30 03/30 03/30 03/30 03/30 03/30 03/30	· ·	*****
45046	45046 10600	86-01-016-RP		03/15 0816		PU-238 PU-239	:::		E-01		90/50 92/06		••
45062	45062 11212	BG-01-090-RS		03/15 0816	0816	SR-90	L.T.	:	E 00		04/08		•
+905+	11214	86-01-087-RG		03/15 0816	0816	BE-7 K-40	.:.	w 10			04/04		
			•			MN-54 CO-56 CO-60 CO-60		*****			04/04		****

REPORT OF ANALYSIS

RUN DATE 06/03/94

	WORK ORDER NUMBER	NUMBER	CUSTGMER P.O. NUMBER	DATE RECEIVED DELIVERY DATE	DELIVERY DATE	PAGE 17	11
ANN HARIE HOLBROW McLaren/Hart 16755 von Karman ave Irvine ca	4-0472		030225/030600829	03/21/94	04/23/94		
IRVINE CA	92714						

M A T E R

LAB.	**	••	r v	eñ.	••	F		LAB.
VOLUME - UNITS ASH-WGHT-# &							Orlander O6/03/94	6 - ALPHA SPEC LAB.
MID-COUNT TIME DATE TIME	04/04	90/50	05/27	90/50	05/10 05/10	05/27	De Br G. CUENTHER	5 - TRITIUM GAS/L.S. LAB.
NUCL-UNIT-# U/M *							APPROVE	- TRITIUM GA
	E 01	E-01 E-01	E 02	E 00	E-01 E-01	E 02		.
ACTIVITY PCI/LITER}		2.		2.		2.		•
ACT (PCI,	L.T. 7. E 01 L.T. 6. E 00	1:1:	t.T. '1.	1.1.	L.T. 1.	1.1.	±.	SPEC LAB
DATE STOP IE TIME NUCLIDE	RA-226 TH-228	PU-238 PU-239	H-3	SR-90	PU-238 PU-239	H-3	LAST PAGE OF REPORT	4 - GEILIF GAMMA SPEC LAB.
COLLECTION-O/ START DATE TIME DATE	03/15 1057	03/15 0816	03/15 1057	03/15 1057	03/15 1057	03/10 1558		
STA NUM			Ū	•	•		N MA	HEM IS.
CUSTOMER'S IDENTIFICATION N	BB-04-001-RG	8G-01-016-RP	BB-04-001-RT	BB-04-001-RS	BB-04-001-RP	8G-02-076-RT	SEND 1 COPIES TO MC480S ANN MARIE HOLBROW	3 - RADIO CHEMISTRY LAB.
	11237	11224	11230	11231	11233	10331	1 COP	LAB.
TELEDYNE Sample Number	42104	45113 11224	45118 11230	45119	45122	45489 10331	SEND	2 - GAS LAB.

Activity added to spiked samples

Activity	1.4 E 04 pci/1	1.4 E 04 pC1/1	0.33 pci/g	0.33 "	. 85.0	. 85.0	3.8	3.8
Isotope	H-3	н-3	Pu-239	Pu-239	Cs-137	C8-137	Sr-90	Sr-90
11#	45060	45061	45068	45069	45075	45076	45088	45089

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RUN DATE 05/25/94

REPORT OF ANALYSIS

PAGE 33					٠
	DELIVERT DATE	04/11/94			
	DATE RECEIVED DELIVERT DATE	03/15/94			
REPORT OF ANALYSIS	CUSTOMER P.O. NUMBER	030225/030600829			
	SHEET OF THE SERVICE SHEET	44000	+ W C O I I		
					92714
			N MARIE HOLBROW	LAREN/HART	JOS VON KARTAN XII. Kine ca

. N N W 4444444444444444	wo m	ev.
VOLUME - UNITS		
MID-CDUNT TIME 05/21 05/23 04/29 04/29 04/29 04/29 04/29 04/29 04/29 04/29 04/29 04/29 04/29 04/29	04/18	05/19
ACTIVITY NUCL-UNIT-X PCI/LITER	L.T. 6. E-01 L.T. 6. E-01	L.1. 1. E 30 5.0 +-2.3 E 00
COLLECTION-DATE START START START 03/14 0900 03/14 1315 03/14 1315 03/14 1315 03/14 1315 CO-60 CO-60 2N-65 2N	1315 PU-238	03/14 1315 GR-A
	03/14 1315	4 1/£0
ANN MARIE HOLBRUW HCLAREN/HART 16755 VON KARMAN AVE 16755 VON KARMAN AVE 18716 CUSTOMER'S SAMPLE 10677 BG-10-001-RT 44682 11215 F8-00-001-WT 44684 11218-19 F8-00-001-WG	11220-21 F8-00-001-WP	
ANN MARIE HOLBRUH MCLAREN/HART 16755 VON KARMAN IRVINE CA SAMPLE SAMPLE 10EN1 44682 11215 44683 11216-17 44684 11218-19	44697	4698

RUN DATE 06/03/94

REPORT OF ANALYSIS

PAGE 16 DELIVERY DATE 04/53/94 DATE RECEIVED 03/21/94 CUSTOMER P.O. NUMBER 030225/030600829 WORK ORDER NUMBER 4-0472

92714 ANN MARIE HOLBROW McLaren/Hart 16755 von Karhan ave Irvine ca

WATER

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	YOLUME - UNITS ASH-WGHT-X *																																
	MID-COUNT TIME DATE TIME	707.70	\$0/\$0 \$0/\$0	04/04	****	10/10	70.00	40/40	+0/+0	*0/*0	\$0/\$0	*0 / *0	05/27		60/10	60/40		40/40	40/40	*0/*0	40/40	*0.40	10/10	***	10/10	40/40	40/40	40/40	40/40	40/40	40/40	90/90	•
	NUCL-UNIT-X U/H 0															_			6 1		0	_	0	•	0	٥.		(3 6	00	10	2 :	:
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	/11Y			_			_				•			•	_			*	-	•	÷	:	•	6	٠.		•	5	•	•	∴.	D	
	ACTIVITY					l.T.				L.1.	- -	1.1		[:]	1,1			1.1.		1.1	1.1	1.1	L.T.	1.1	L. T.	L•1•	L.I.	::	L.T.			•••	L•T•
:		NUCLINE	2R-95	KU-103	1-131	CS-134	re-137	6.5-15.1 6.4-16.0	F-141	CE 144	04-226	TH-228		H-3	•	4 0	1 2	£ 7			K 10 1	- C - C - C - C - C - C - C - C - C - C	09-00	78-15-5	7R-95	RU-103	RU-106	1-131	CS-134	CS-137	BA-140	CE-141	CE-144
	STO	DATE TIME					-												_														
	CT10	INE	0816											0940		105			1051														
	COLLI	DATE TIME DAT	03/15 0816											03/15 0940		03/15 1057			03/15 1057														
	AT 2	Š												•																			
		TOENT IFICATION	0.01-087-RG											1 4-1001-P	1 100 - 1 1 9 G	BB-04-001-RA			BB-04-001-RG														
		10E		41711											10618	11326			11337													-	
	TELEDYNE	SAMPLE		42064 11617											45086		45103			10164													

RUN DATE 06/03/94

PAGE 17

DELIVERY DATE DATE RECEIVED CUSTGMER P.O. NUMBER REPORT OF ANALYSIS NORK ORDER NUMBER

030225/030600829 4-0472

03/21/94

04/23/94

92714 ANN MARIE HOLBROW McLaren/Hart 16755 von Karman ave Irvine ca

WATER

					•				Talles con		
EL EDYNE Sample			STA	COLLECTION-DATE STOP	ITE ITOP ITIME NUCLIOE	_	ACTIVITY NU PCI/LITER)	NUCL-UNIT-Z U/M #	MID-COONI TIME DATE TIME	VOLUME - UNITS ASH-WGHT-% **	LAB.
NUMBER	IOEA	IDENTIFICATION N	5	UAIE LING DATE					40/40		٠,
45104	11237	BB-04-001-RG		03/15 1057	RA-226 TH-228	: :	L.T. 6. E 00		40/40		•
	11224	8G-01-016-RP		03/15 0816	PU-238 PU-239	l.1.	L.T. 2. E-01 L.T. 2. E-01		05/06		۰ موم
		•		1057	H-3	1:1	L.T. 1. E 02		12/50		r ·
45118	11230	88-04-001-K1		1001 01160	000	L.T. 2.	2. E 00		90/50		m
45119	11231	88-04-001-RS		03/15 1057		<u>, , , , , , , , , , , , , , , , , , , </u>	1. 6-01		02/10		.
45122	11233	88-04-001-RP		03/15 1057	PU-239	1.1.	L.T. 1. E-01		05/10		, ,
45489	10331	8G-02-076-RT		03/10 1558	E-3	1.1.	L.T. 2. E 02		Ordeter	t	n
					LAST PAGE OF REPORT	PORT		APPROVE	D BY J. GUEN	APPROVED BY J. GUENTHER 06/03/94	
SEN	0 1 COF	SEND I COPIES TO MC480S ANN MARIE HOLBROW	Z Z	C4805 ANN MARIE HOLBROW	4 - GEILI) GAMMA SPEC LAB.	A SPEC LAB		. TRITIUM GA	5 - TRITIUM GAS/L.S. LAB.	6 - ALPHA SPEC LAB.	LAB.

2 - GAS LAB.

4 - GEILII GAMMA SPEC LAB. 3 - RADIO CHEMISTRY LAB.

Activity added to spiked samples

Activity	1.4 E 04 pCi/	1.4 E 04 pCi/	0.33 pci/g	0.33	0.58 "	0.58 "	3.8	3.8
Laotope	H-3	H-3	Pu-239	Pu-239	Cs-137	Cs-137	Sr-90	Sr-90
TI#	45060	45061	45068	45069	45075	45076	45088	45089

REPORT OF ANALYSIS

RUN DATE 04/06/94

	WORK ORDER NUMBER	CUSTONER P.O. NUMBER	DATE RECEIVED	DATE RECEIVED DELIVERY DATE	PAGE
ANA MADIE HOLBROW	5810-4	030225/030600829	03/08/94	03/18/94	
MCLAREN/HART					
16755 VON KARMAN AVE					
IRVINE CA	92714				

- 4 3

TEL EOYNE				COLL	COLLECTION-DATE	-DATE	=		ACT	YIIY		M 10-COUNT T 1ME	YOLUME - UNITS	!
SAMPLE		CUSTOMER'S IDENTIFICATION	STA NGM	STAKT ATE	STAKT DATE TIME DAT	SATE TI	TI ME	TE TIME NUCLIDE	(PC1/	PCI/LITER)	U/H 0	DATE TIME		LAB.
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19160 10042	1001	TH-010-01	Ŭ	03/07 1420	1420		Ī	H-3	1.1.	L.T. 2'. E 02	25	03/21		r
	60001	T8-450 -1-00		03/07 1000	1000		I	H-3	1:1:	L.T. 2. E 02	75	03/27		8 0
11754	2					LA	T PAG	LAST PAGE OF REPORT	_		APPROVED	BY S. CUENTHER	APPROVED BY J. GUENTHER 04/06/94	
SEND	- -	SEND I COPIES TO AC480S ANN MARIE HOLBROW	INN HA	RIE HO	LBROW							:		4

5 - TRITIUM GAS/L.S. LAB. 6 - ALPHA SPEC LAB.

4 - GEILIF GANNA SPEC LAB.

3 - RADIO CHEMISTRY LAB.

2 - GAS LAB.

REPORT OF ANALYSIS

RUN DATE 05/04/94

PAGE 32 DATE RECEIVED DELIVERY DATE 04/13/94 03/11/94 CUSTOMER P.I. NUMBER 030225/030600829 WORK ORDER NUMBER 4-0354 ANN MARIE HOLBROW McLaren/Hart 16755 vom Karman ave Irvine ca

92714

WATER

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VOLUME - UNITS ASH-WGHT-X e													9 Duenther J. GUENTHER 05/04/94
MID-COUNT TIME DATE TIME	03/31 03/31	04/04	**************************************	04/04 04/04	04/04	40/40	04/04	04/04	*0/*0 *0/*0	40/40	40/40	60/50	APPROVED BY J. GUENTH
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NUCL TO E	PU-238 PU-239	86-7 K-40 R-54	CO-58 FE-59	20-02 20-65 70-65	RU-103	1-131	CS-134	BA-140	CE-141	CE-144	KA-460 TH-228	H-3	PAGE OF REPORT
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STA												-	
CUSTOMER'S	88-17-005-RP	88-17-008A-RG										88-17-8001-RT	
	† 101	10181										10198	
TELEDYNE Sample Number	43920 10147	43985										44025	

6 - ALPHA SPEC LAB.

5 - TRITIUM GAS/L.S. LAB.

4 - GEILLI GAMMA SPEC LAB.

SEND I CUPIES TO MC480S ANN MARIE HULBROW

سنميه

3 - RADIO CHEMISTRY LAB.

2 - GAS LAB.

REPURT OF ANALYSIS

DELIVERY DATE DATE RECEIVED

RUN DATE 04/20/94

PAGE 17 04/11/94 CUSTOMER P.D. NUMBER HORK ORDER NUMBER

03/09/94 030225/030600829

92714 16755 VON KARMAN AVE

4-0353

ANN MARIE HULBROW

MCLAREN/HART IRVINE CA

K A T E R

LAB. TIME VOLUME - UNITS
DATE TIME ASH-WGHT-X ** APPROVED BY 5. GUENTHER 04/20/94 MID-COUNT TIME 04/14 03/11 03/11 NUCL-UNIT-X U/M * E 01 (PCI/LITER) ACTIVITY L.T. t. T. LAST PAGE OF REPORT START STOP DATE TIME DATE TIME NUCLIDE RA-226 TH-228 H-3 COLLECTION-DATE STAR 03/08 0854 03/08 0854 STA 88-20-006-RT BB-20-002-RG CUSTOMER'S IDENTIFICATION 43708 10090 43722 10104 TELEDYNE Sample Number

5 - TRITTIUM GAS/L.S. LAB. 6 - ALPHA SPEC LAB. 4 - GEILII GAMMA SPEC LAB. SEND I COPIES TO MC480S ANN MARIE HOLBRUH 3 - RADIO CHEMISTRY LAB.

2 - GAS LAB.

Activity added to spiked samples

Activity	1.4 E 04 pci/l 1.4 E 04 pci/l 3.8 pci/g 0.64 pci/g 0.64 pci/g
Isotope	H-3 H-3 Sr-90 Sr-90 C8-137
11#	43697 43698 43730 43731 43740

Gamma Scan

RUN DATE 04/20/94 PAGE 11 DATE /94	ASH-WGHT-X a ASH-W	3/21 33/21 33/21 03/21 03/21 03/21 03/21 03/21 03/21 03/21
DELIVERY DATE 04/11/94	HID-COUNT 11 HE 04/15 04/15 04/15 04/15 04/15 04/15 04/15 04/15 04/15 04/15 04/15 04/15 04/15 04/15 04/15	**************************************
L SERVICES DATE RECEIVED 03/09/94	22.2	
N ENGINEERING ENVIRONMENTA LEPORT OF ANALYSIS CUSTOMER P.O. NUMBER 030225/030600829	1 L ACT 4UCLIDE (PCI) 40-7 40-58 L-7 60-58 L-7 60-58 L-7 80-103 L-7 80-104 80-105 L-1 80-141 L-141 L-1	H-3 H-3 H-3 K-40 K-40 L-1 K-40 K-54 L-1 CO-58 L-1 CO-58 L-1 CO-60 L-1 ZN-65 L-1 ZN-65 L-1 ZN-95 L-1 ZN-103 L-1 L-1 L-1 L-1 L-1 ZN-103
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REPORT OF ANALYSIS TELEDYNE BROWN ENGINEER

04/11/94

46/60/60

DATE RECEIVED DELIVERY DATE

CUSTOMER P.O. NUMBER 030225/030600829 S 0 1 L MORK ORDER NUMBER 4-0353 92714 MCLAREN/HART

ANN MARIE HOLBROW

IRVINE CA

NUCL-UNIT-# (PCI/GH DRY) ACTIVITY DATE TIME DATE TIME NUCLIDE

LAB.

VOLUME - UNITS

DATE TIME ASH-WGHT-% &

03/21 03/21

MID-COUNT TIME

E-03 1.1

CS-137

03/08 1126

43743 BB-00-001-FG 11021

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CUSTONER'S IDENTIFICATION

TELEDYNE Sample NUMBER

COLLECTION-DATE

L.T. 7. E-02 L.T. 2. E-01 1.92+-0.54E 00 9.63+-0.96E-01

03/21 03/21

BA-140 CE-141 CE-144 RA-226 TH-228

'n Б.

L.T. 1. E 02 PC1/LITER # 04/08

L.T. 1. E 02 PCI/LITER # 04/08

H-3

H-3

03/08 1415 03/08 1421

> 88-03-029-51 BB-03-081-ST

> > 43197 10076

43796 11138

PAGE 18 RUN DATE 05/04/94 DELIVERY DATE 96/113/84 DATE RECEIVED 03/11/94 JELEOYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES CUSTOMER P.O. NUMBER 030225/030600829 REPORT OF ANALYSIS HORK ORVER NUMBER 4-0354

م م LAB. TIME VOLUME - UNITS
DATE TIME ASH-WGHT-% & 04/02 04/05 04/14 04/02 04/05 41/40 04/02 04/02 04/05 04/02 04/02 04/02 04/05 04/02 04/02 04/02 04/02 04/02 04/02 04/02 04/02 04/02 04/05 04/02 04/02 04/05 04/05 04/02 04/02 NUCL-UN11-% ¢ H/N 10-3 E-02 L.T. 3. E-01 1.42+-0.57E 00 E-01 E-03 E-05 7.554-0.76E-01 E-02 1.64+-3.156-02 E-02 E-02 E-01 E-01 E-32 E-01 E-02 E-01 E-05 E-05 1.44+-0.14E 00 E-01 2.41+-0.24E 01 1.55+-0.86E 00 E-01 ACTIVITY (PCI/GM DRY) 1.1 ... <u>.</u> : 1.1. 1.1 1.1 : ... 1.1. 1.1 ... PU-239 CO-58 FE-59 8A-140 CE-141 CE-144 RA-226 PU-238 18-24 CS-133 DATE TIME DATE TIME NUCLIDE TH-228 K-40 1-38 RU-106 CS-134 RU-103 09-03 1-131 CE-141 CE-144 RA-226 TH-228 2R-95 FE-59 59-NZ BA-140 45-NH 66-03 5 0 1 6 04-X 86-7 STOP COLLECTION-DATE 03/09 1420 03/03 1450 03/04 1100 03/09 1650 98-00-002-FG BB-17-009B-SG STA NUN 88-17-0098-SP 88-11-010-56 CUSTOMER'S IDENTIFICATION MCLAREN/HART 16755 VON KARMAN AVE 10193 43917 10194 ANN MARIE HOLBROW 43975 11025 43974 11139 IRVINE CA TELEDTNE SAMPLE NUMBER

REPORT OF ANALYSIS

RUN DATE 05/25/94

PAGE 22 DELIVERY DATE 46/11/40 DATE RECEIVED 96/51/60 CUSTOMER P.O. NUMBER NORK ORDER NUMBER

030225/030600829 4-0514 92714 ANN MARIE HOLBROW McLaren/Hart 1675s von Rarhan ave Irvine ca

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OF CUS	NUCLIDE NUCLIDE RU-106 1-131 1-131 CE-134 CE-134 CE-134 RA-226 TH-228 TH-239 U-239 U-239 U-239 U-239 TH-23 TH-23 TH-23 RE-7 RE-7 RE-7 RE-7 RE-7 RE-7 RE-7 RE-7 RE-7
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BROWN ENGINEERING ENVIRONMENTAL SERVICES REPORT OF ANALYSIS CUSTOMER P.O. NUMBER DATE F	S J ME C C C C C C C C C C C C C C C C C C
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RUN DATE 05/25/94 PAGE TIME YOLUME - UNITS DELIVERY DATE 04/11/94 91/50 05/21 04/25 04/12 04/25 67/10 04/25 04/12 04/125 04/25 04/25 04/25 04/25 62/40 04/25 04/25 04/25 04/25 04/25 04/25 04/25 04/25 04/25 04/25 PC1/LITER # DATE RECEIVED 03/15/94 NUCL-UNIT-# 0 4/0 E 02 TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES E-05 E-01 E-01 E-01 3.06+-0.416-01 9 E-02 10-3 E-01 E-02 E-02 E-02 00 369°0 E-03 4. E-01 E-01 4.02+-0.54E-01 E-01 2.15+-0.396-01 (PC1/GH DRY) ACTIVITY : י CUSTOMER P.O. NUMBER 1.1 1.1 1:1 030225/030600829 : : 1.1 :: REPORT OF ANALYSIS RA-226 5R-90 CE-144 1H-228 CE-141 BA-140 CS-134 CS-137 START STOP STOP DATE THE NUCLIDE RU-103 901-Na 1-131 09-03 59-N7 28-95 CE-144 RA-226 TH-228 FE-59 161-83 BA-140 CO-58 #N-54 5 0 1 L BE-1 K-40 COLLECTION-DATE STOF 03/14 1010 03/14 1010 MORK ORDER NUMBER 03/14 0945 03/14 0945 4-0514 86-10-003-55 STA 86-10-003-ST BG-00-004-FG 96-10-004-86 92714 CUSTOMER'S IDENTIFICATION ANN HARIE HOLBROW HCLAREN/HART 16755 VON KARMAN AVE 44626 10485 44627 10486 44625 11036 44624 10482 IRVINE CA TELEDYNE NUMBER SAMPLE

PAGE

TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES REPORT OF ANALYSIS

DELIVERY DATE 04/53/04 DATE RECEIVED 03/21/94 CUSTOMER P.O. NUMBER

030225/030600829 S 0 1 L WORK ORDER NUMBER 4-0472 16755 VON KARMAN AVE ANN MARIE HOLBROW MCLAREN/HART IRVINE CA

VOLUME - UNITS ASH-MGHT-X & DATE TINE HID-COUNT 04/27 04/27 04/27 04/27 04/27 04/27 05/50 05/50 3H11 04/28 04/28 04/59 04/28 04/28 04/58 PCI/LITER * PCI/LITER # PCI/LITER * NUCL-UNIT-X 1.3 +-0.6 E 03 1.6 +-0.1 E 04 1.5 +-0.1 E 04 -02 -01 1.25+-,0.43E 00 8.61+-0.86E-01 E-01 E-01 E-02 E-01 ACTIVITY (PCI/GH DRY) -:-÷. DATE TIME DATE TIME NUCLIDE RA-226 TH-228 8A-140 CS-137 N-24 CS-134 CE-144 CE-141 1-38 K-40 H-3 H-3 H-3 STOP COLLECTION-DATE 03/15 0841 03/15 1026 03/15 1026 STA BG-00-005-FG 10644MSD 8G-14-005-MT BG-14-005-HT 45060 10644MS 8G-14-005-MT 45058 106430UP 8G-14-005-5G CUSTOMER'S IDENTIFICATION 45063 11213 45059 10644 45061 TELEDYNE SAMPLE

04/27 04/27 04/27 04/27 04/27 04/27 04/27 04/27 04/27 2.15+-0.42E GO 1.92+-0.19E GO E-01 E-01 E-0] E-02 2.09+-0.30E-01 E-02 E-05 E-02 CE-144 RA-226 CE-141 CS-137 BA-140 CS-134 RU-106 RU-103 1-131 2N-65 2R-95 CO-58 FE-59 09-03

Isotopic Plutonium

RUN DATE 05/04/94

PAGE 28 YOLUME - UNITS DATE TIME ASH-WGHT-% & DELIVERY DATE 96/11/40 04/01 10/40 10/40 H10-COUNT TIME 04/05 10/40 05/03 04/05 10/40 04/05 04/05 04/01 04/03 10/50 04/01 10/40 10/40 04/03 10/40 04/07 10/40 10/40 10/40 10/40 10/40 04/01 10/40 10/40 E 02 PCI/LITER # 96/11/60 NUCL-UNIT-X 0 W/O E-01 E-03 E-02 1.92+-0.19E 01 E-02 E-02 6-03 E-03 E-02 E-05 E-01 E-01 E-01 L.T. 5. E-01 2.13+-0.21E 01 E-02 E-02 E-01 E-01 E-05 10-3 1.28+-0.13E ACTIVITY (PCI/GM DRY) CUSTOMER P.O. NUMBER -:-... <u>.</u> 1:1 1.1. 1.1 <u>:</u> 030225/030600829 :: 1.1 ׃ ٠. ֝֡׃ PU-239 FE-59 CU-60 PU-238 PU-238 PU-239 **CD-58** HN-54 DATE TIME DATE TIME NUCLIDE CE-144 RA-226 TH-228 BE-7 C+-* CS-137 CS-134 BA-140 CE-141 RU-103 H-3 RU-106 1-131 FE-59 CO-60 Sn 1 L 28-45 59-NZ CO-59 HN-54 K-40 COLLECTION-DATE 0191 60/60 NORK ORDER NUMBER 0191 60/60 03/09 1610 03/09 1600 03/04 1600 4-0354 6.70 C 88-11-8003-56 STA 88-17-8003-SP 88-17-8003-51 BB-00-001-FP (ub 4401b 10204 BB-17-B003-SG 92714 IDENTIFICATION CUSTOMER'S HCLAKEN/HART 16755 VON KARHAN AVE 1871NE CA 44021 11187 44020 11185 44018 11183 44017 11145 ANN MARIE HOLBROW TELEDYNE SAMPLE

RUN DATE 05/12/94

PAGE 11

TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES

DELIVERY DATE 04/16/94 DATE RECEIVED 46/41/60 CUSTOMER P.O. NUMBER REPORT OF ANALYSIS

030225/030600829 1 1 0 8 HORK ORDER NUMBER 4-0409 92714 ANN MARIE HOLBROW MCLAREN/HARI 16755 von Karman ave IRVINE CA

-D -O * 9 TIME ASH-WGHT-X & DATE TIME ASH-WGHT-X & 04/10 04/10 L.I. 2. E 02 PCI/LITER \$ 05/09 05/09 L.T. 2. E 02 PCI/LITER # 05/09 E 02 PCI/LITER \$ 05/09 3.8 +-0.3 E 03 PCI/LITER + 05/09 3.3 +-0.3 E 03 PCI/LITER * 05/09 L.I. 3. E 02 PCI/LITER \$ 05/09 2. E 02 PCI/LITER # 05/08 60/40 60/40 60/40 60/40 60/40 60/40 L.1. 2. E 02 PCI/LITER * NUCL-UNIT-X L.T. 1. E-02 L.T. 1. E-02 £-03 E-03 E-02 E-03 9. E-03 (PCI/GH DRY) L.T. 2. ACTIVITY ٠.٠ ו•1• L.1. 1.1 1.1 ... pU-239 PU-238 DATE TIME DATE TIME NUCLIDE PU-239 H-3 PU-238 PU-239 PU-239 PU-238 F-3 PU-238 H-3 F-3 H-3 #-3 H-3 F-3 COLLECTION-DATE STOR 03/10 0045 03/10 0910 03/10 001/60 03/10 0915 03/10 0935 03/10 0945 03/10 0945 03/10 1025 03/10 1030 03/10 1025 STA 88-15-001-SP BB-15-005-ST 88-15-004-51 88-15-003-51 BB-15-002-5T 44213 10283HSD 88-15-001-MT 44212 10283MS 88-15-001-MT BB-15-001-MT 89-00-002-FP 88-15-001-51 88-15-010-SP EB-15-009-SP CUSTOMER'S IDENTIFICATION 44218 11190 44217 10287 44216 10286 44214 10284 44215 10285 44211 10283 44210 10282 44207 11191 44208 11029 44206 10292 TELEDYNE Sample NUMBER

RUN DATE 05/25/94 DATE RECEIVED DELIVERY DATE 04/11/94 03/15/94 TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES CUSTOMER P.O. NUMBER 030225/030600829 REPORT OF ANALYSTS HORK ORDER NUMBER

PAGE 22

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- o d
04/26 04/26 04/26
Lote 4. E-01 Lote 1. E-01 Lote 7. E-02 Lote 8. E-02
FE-59 CO-60 ZN-65 ZR-95 RU-103

		4-0472				
ANN MARIE HOLBROW McLaren/Hart 16755 von Karman ave Irvine ca	92714	u	0 1 L	K-11ND-12114	MID-COUNT TIME	VOLUME - UNITS ASH-WGHT-R &
TELEDYNE CUSTOMER'S SAMPLE IDENTIFICATION	STA SATION NUM	COLLECTION-DATE START DATE TIME DATE TIME 1 03/15 0905	NUCL TOE PU-238 PU-239	RY1 E-0.	05/09 05/09 05/09	:
11223	BG-00-004-FF		BE-7	L.T. 5. E-01 2.03+-0.20E 01	04/21 04/21 04/27	
45066 10624 8G-	BG-14-002-SG		MN-54 CO-58		04/27	
			FE-59 CG-60	; ::	04/27	
			2N-65 2R-95	L-1 - 7 - E-02 L-1 - 6 - E-02	04/27	
			RU-105 RU-106	÷ ~ .	04/27	
			CS-134	L.T. 3. C. 2. 8. 454-4.26E-02	04/27	
			CS-137		04/21	
			CE-141		04/27	
			CE-144 RA-226	2.19+-0.67E 00 1.51+-0.19E 00	.2/60	
			pu-238	Lote 10 E-02	02/08	
	M-600-11	03/15	PU-239		90/50	
45067 10626	100141100		PU-238	3.1 +-0.6 E-01	60730	
10626MS	86-14-002-MP	•	PU-239	L.T. 7. E-03	60/50	
	10626MSD 8G-14-002-MP	•	PU-239			
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RUN DATE 05/04/94	. UNITS LAB.
DELIVERY DATE 04/13/94	HID-COUNT VOLUME - UNITS TIME ASH-WGHT-% &
SERVICES DATE RECEIVED 03/11/94	NUCL-UNIT-2 U/M &
BROWN ENGINEERING ENVIRONMENTAL SERVICES REPORT OF ANALYSIS CUSTOMER P.O. NUMBER 030225/030600829 03/	S O 1 L ACTIVITY
TELEDYNE BROWN Ri Work Order Number 4-0354	FOLTECTION-DATE.
	92714
	ANN MARIE HOLBROW McLaren/Hart 16755 von Karman ave Irvine ca

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VOLUME - UNITS ASH-MGHT-X A	
ACTIVITY NUCL-UNIT-% DATE TIME (PCI/LITER)	
COLLECTION-DATE START DATE TIME DATE TIME NUCLIDE 03/09 1410 03/09 1410 03/09 1014 03/09 1014 03/09 1014 SR-90 10-58 FE-59 CO-60 ZN-65 ZN-6	
CUSTOMER'S STA IDENTIFICATION NUM 6 88-16-8004-ST 7 88-16-8004-SS 27 88-16-008-ST 34 88-16-008-ST 35 88-16-008-SS 35 88-16-008-SS	
TELEDYNE CA SAMPLE SAMPLE SAMPLE SAMPLE 10276 43904 10276 43905 110277 43907 10234 43908 10235 43909 10235	

RUN DATE 05/25/94

DELIVERY DATE TELEDYNE BROWN ENGINEFRING ENVIRONMENTAL SERVICES REPURT OF ANALYSIS

VOLUME - UNITS ASH-WGHT-X * 46/11/40 DATE TINE HID-COUNT 11HE 04/27 04/27 04/27 04/27 04/27 04/27 04/27 04/27 04/27 04/27 DATE RECEIVED 03/15/94 NUCL-UNIT-X E 00 E-02 E-01 E-02 L.T. 7. E-01 4.62+-0.59E 00 IPCI/GH DRY! ACTIVITY CUSTOMER P.O. NUMBER 030225/030600829 -:-... 1:1 DATE TIME DATE TIME NUCLIDE RU-103 RU-106 5011 71-76 78-40 78-56 78-59 78-60 78-60 STOP COLLECTION-DATE HURK ORDER NUMBER 03/11 1420 44702 104540UP 8G-09-013-5G 92714 1 DENT IFICATION CUSTOMER'S ANN MARIE HOLBROW MCLAREN/MART 16755 von Karman ave Irvine ca SAMPLE NUMBER TELEDYNE

00000000 05/02 02/09 05/02 05/02 05/02 04/50 05/02 05/23 04/10 L.I. 2. E 02 PCI/LITER ® 1.0 +-2.8 E-03 2.6 +-0.7 E-01 2.0 +-0.8 E-01 E-03 1.0 +-0.3 E-01 2.3 +-0.7 E-01 1.3 +-0.5 E-01 1.4 +-0.6 E-01 3.09+-0.62E-01 1.1. 8. :: PU-239 U-235 U-238 TH-232 1H-230 PU-238 TH-228 SR-90 1-234 SR-90 H-3 03/11 1430 03/11 1430 03/11 [430 03/11 1450 BG-09-003-SP BG-09-003-ST 86-09-603-85 96-00-003-FS 10457 44106 10458 44104 10456 44103 11034 44105

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CS-137

CS-134 8A-140 ++1-30

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04/27

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RUN DATE 05/25/94

ATE PAGE 22	ASH-WGHT-X o LAB.
	HID-COUNT TIME 11HE A 04/26
OF ANALYSIS CUSTOMER P.O. NUMBER 03/15/94 030225/030600829	ACTIVITY NUCL-UNIT-X Loring DRY) U/M 0 5.611-0.64E 00 5.611-0.64E 00 Loring E-02 Loring E-03 Loring E-
TELEDYNE BROWN ENGINEKING CHANYSIS REPORT OF ANALYSIS WORK ORDER NUMBER 030225/030	S D I L COLLECTION-DATE START START 11ME DATE TIME NUCLIDE DATE TIME DATE TIME NUCLIDE CO-58 FE-59 CO-58 FE-59 CO-58 FE-59 CO-58 FE-59 CO-58 FE-59 CO-58 FE-59 CS-134 CS-137 BA-140 CS-134 CS-137 BA-140 CS-144 RA-228 PU-238 PU-238 PU-238 PU-238 PU-238 CO-58 FE-59 CO-58
	CUSTOMER'S STA STA STA STA STA STA STA STA STA ST

DATE RECEIVED DELIVERY DATE REPORT OF ANALYSIS

PAGE 14

RUN DATE 06/03/94

04/23/94 46/12/60 CUSTOMER P.O. NUMBER

TINE VOLUME - UNITS
DATE TIME ASH-MGHT-X * HID-COUNT TIME 04/30 L.T. 1. E 02 PC1/LITER # 05/27 04/30 PC1/LITER # 05/27 04/30 02/10 05/18 05/12 60/60 05/12 04/30 90/50 05/12 05/16 04/30 05/27 04/58 05/02 PCI/LITER & NUCL-UNIT-X U/H & L.T. 2. E 02 8.2 +-4.3 E-02 1.1. 1. E-02 1.8 +-1.0 E-02 4.0 +-0.5 E-01 L.T. 1. E-01 L.T. 9. E-02 L.T. 1. E 02 +-0.1 E 00 7.8 +-0.8 E-01 E-01 E-01 E-03 E-02 4.0 +-0.3 E 00 4.0 +-0.2 E 00 L.T. 7. E-02 (PCI/GN DRY) 3.8 +-0.5 ACT I VITY 030225/030600829 1.1. -1-1 DATE TIME DATE TIME NUCLIDE TH-228 1H-230 SR-90 SR-90 PU-239 TH-232 SR-90 PU-238 U-235 U-238 H-3 S 0 1 L SR-90 H-3 U-234 SR-90 SR-90 SR-90 # ± STOP COLLECTION-DATE STOP WORK ORDER NUMBER 03/10 1610 03/15 1000 03/15 0908 03/15 0841 03/15 1000 03/15 1000 03/15 1000 03/15 1000 4-0472 03/15 STA BG-02-007-ST 86-14-001-55 86-00-008-FT 86-01-090-55 86-00-004-FS 8G-14-002-SP 86-14-002-55 8G-14-002-ST 45089 10619MSD BG-14-001-MS 92714 BG-14-001-MS BG-14-001-MS IDENTIFICATION CUSTONER'S ANN MARIE HOLBROW MCLAREN/HART 16755 von Karman Ave 45088 10619MS 45490 10332 11229 45115 11226 11227 45114 11225 10620 10621 45092 10622 45037 10619 45117 45116 IRVINE CA 45090 45091 TELEUYNE SAMPLE

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RUN DATE 05/04/94

PAGE 26

TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES REPORT OF ANALYSIS

DELIVERY DATE 46/11/40 DATE RECEIVED 03/11/60 CUSTOMER P.O. NUMPER 030225/030600829 HORK ORDER NUMBER 4-0354

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	ACTIVITY NUCL-UNII-% DATE TIME BELLLIER
4-0354 1 0 S	COLLECTION-DATE START START START 03/09 1415
ANN MARIE HOLBRUW McIaren/Hart 16755 von Karman ave 92714 Irvine Ca	TELEDYNE CUSTOMER'S STA SAMPLE IDENTIFICATION NUMBER 44005 10177 88-17-008A-SP 44007 10179 88-17-008A-SG 44007 10179 88-17-008A-SG 44008 11022 88-00-004-FT 44009 10182 88-17-0088-ST 44010 10183 88-17-0088-SP 44010 10183 88-17-0088-SP

RUN DATE 05/04/94

REPORT OF ANALYSIS

PAGE 20 DELIVERY DATE 04/13/94 DATE RECEIVED 03/11/94 CUSTOMER P.O. NUMBER MORK ORDER NUMBER

TIME VOLUME - UNITS
DATE TIME ASH-WGHT-X * MID-COUNT TIME 05/05 04/02 04/02 04/02 04/02 04/02 04/02 04/02 04/02 04/02 04/02 04/02 04/02 04/02 04/02 04/02 04/02 04/08 04/02 04/02 04/02 04/02 05/02 2.1 +-1.0 E 02 PCI/LITER & PCI/LITER ¢ NUCL-UNIT-X 1.06+-0.42E 00 7.49+-0.75E-01 E-01 E-02 E-02 E-01 E-03 L.T. 3. E-01 1.65+-0.62E 00 2.3 +-1.0 E 02 1.91+-0.79E-01 -05 E-02 E-02 E-02 E-01 E-01 E-01 2.31+-0.23E 01 1.1 +-0.5 E-01 (PC1/GM DRY) ACTIVITY 030225/030600829 L.T. L.T. L• T• L. T. 1:1 . . :: ... -DATE TIME DATE TIME NUCLIDE CS-134 CS-137 84-140 CE-144 RA-226 TH-228 RU-106 SOIL CF-144 RA-226 TH-228 20-103 CE-141 [-131 2N-65 FE-59 09-03 45-NH CO-58 SR-90 BE-7 K-40 H-3 F-3 STOP COLLECTION-DATE 03/09 1037 1501 60/60 03/09 1037 03/09 1037 03/09 1100 4-0354 START STA 88-00-005-FT 92714 88-16-007-55 88-16-007-56 88-16-007-51 88-16-006-56 10ENTIFICATION CUSTONER'S ANN HARIE HOLBROW MCLAREN/HART 16755 vum Karman Ave Irvine ca 43984 11025 10232 10228 10230 10231 **TELEDYNE** SAMPLE 43980 43983 43981 43982

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RUN DATE 05/25/94

REPORT OF ANALYSIS

PAGE 24 DELIVERY DATE 04/11/94 DATE RECEIVED 03/15/94 CUSTOMER P.O. NUMBER 030225/030600829 HORK DROER HUMBER **\$150-\$**

5016 92714 ANN MARIE HOLBROW McLaren/Hart 1675s von Karmam ave Irvine ca TELE SAN NUM

VOLUME - UNITS ASH-WGHT-X & LAB. 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	K W P P P P P P P P P P P P P P P P P P P	en m
MID-COUNT TIME DATE TIME 04/26 04/26 04/26 04/26 04/26 04/26		e 05/23 e 05/23 04/20
UCL-UNIT-X U/M •		E 02 PCI/LITER E 02 PCI/LITER E-02
Lot 2. E 00 Lot 4. E-02 Lot 6. E-02 Lot 6. E-02 Lot 7. E-01 Lot 7. E-01 Lot 7. E-01 Lot 4. E-01 Lot 4. E-01 Lot 4. E-01 Lot 4. E-01 Lot 4. E-01 Lot 4. E-01 Lot 6. E-01 Lot 7. E-01 Lot 7. E-01 Lot 7. E-01 Lot 7. E-01 Lot 8. E-01 Lot 9.	L.T. 2. E 02 L.T. 2. E 02 1.2 +-0.5 E-01 L.T. 8. E-03 1.3 +-0.9 E-01 2.9 +-0.4 E-01 L.T. 8. E-09 L.T. 8. E-09 L.T. 8. E-09 L.T. 9. E-09 L.T. 7. E-09	L.T. 5. E 02 L.T. 5. E 02 8.4 +-4.0 E-02
S 0 1 C 1-131 CS-134 CS-134 CS-137 CS-137 CE-141 CE-144 CE-144 CE-144	H-3 H-3 SR-90 PU-236 U-234 TH-230 PU-239 U-235 TH-232	H-3 H-3 SR-90
COLLECTION-DATE START DATE TIME DATE TIME 03/11 1404	03/11 1404 03/11 1420 03/11 1420 03/11 1420	03/11 1037 03/11 1037 03/11 1037
A TO		F E S
CUSTOMER'S IDENTIFICATION B 66-09-057-56	86-09-013-51 86-09-013-55 86-09-013-55	10360 86-05-074-57 10360DUP 86-05-074-57 10361 86-05-074-55
10 E P 6 8 4 4 8	11031 10458 10451 10452	44724 10360 44724 10360D 44724 10361
ELEDYNE Sample Number 44715 10448	44716 11031 44720 10458 44720 10451 44721 10452	44724 10360 44724 10360

RUN DATE 05/25/94

TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES

PAGE 10 LAB. TIME VOLUME - UNITS
DATE TIME ASH-WGHT-X 0 DELIVERY DATE 04/11/94 MID-COUNT 04/25 04/25 04/25 04/25 04/25 04/25 04/25 04/25 04/25 04/26 04/26 05/04 05/04 04/50 97/50 04/19 05/22 05/22 L.T. 6. E-03 PCI/GM DRY 9 L.T. 6. E-03 PCI/GM DRY 9 5.3 +-1.8 E-02 PCI/GM DRY 9 2.6 +-2.3 E-02 PCI/GM DRY 9 L.T. 8. E-02 PCI/GM DRY 9 1.09+-0.29E-01 PCI/GH DRY . E-02 PCI/GH DRY 0 PCI/GH DRY * E-01 PCI/GH DRY 9 L.T. 4. E-01 PCI/GM DRY 0 2.85+-0.35E 00 PCI/GM DRY 0 PCI/GM ORY 4 DATE RECEIVED PCI/GH ORY 4 PCI/GH DRY PCI/GH DRY PCI/GH DRY PCI/GM DRY E-03 PCI/GM DRY 03/15/94 L.T. 1. E-01 PC1/GH DRY NUCL-UNIT-X PC1/6M PC1/6M E-01 E-03 E-03 E-02 E-02 E-05 E-02 E-05 5.1 +-1.8 E-02 3.1 +-2.2 E-02 1. E 02 L.T. 1. E 02 ACTIVITY 1 PCI/LITER1 CUSTOMER P.O. NUMBER 030225/030600829 1:1 :-1:1 1.1 1.1. :: :: 1.1. : REPORT OF ANALYSIS CO-60 ZN-65 ZR-95 RU-103 RU-106 DATE TIME DATE TIME NUCLIDE 1-131 TH-232 TH-228 CO-58 TH-230 PU-239 PU-238 #N-24 0 1 1 U-238 1-38 **U-235** K-40 U-234 SR-90 H-3 Ę STOP COLLECTION-DATE WORK DRDER NUMBER 03/14 1230 03/14 1230 03/14 1230 03/14 1230 03/14 1215 4-0514 STA 86-11-011-56 86-11-011-55 86-11-011-SP 8G-11-011-ST 92714 8G-00-007-FT CUSTOMER'S IDENTIFICATION MCLAREN/HART 16755 VON KARMAN AVE ANN MARIE HOLBROW 44656 10533 10531 44653 10529 10530 44652 11038 44655 SAMPLE **TELEOTNE** 44654

04/25 04/25 04/25 04/25

PCI/GH DRY *

E-03

PC1/6M E-01 PC1/GH E-01 PC1/GH

1-1. 5. E-01 PCI/GH DRY 9.04--2.40E-02 PCI/GH DRY

RA-226

TH-228

CE-144

CS-137

CS-134 84-140 CE-141

E-01 PCI/GM DRY *

REPORT OF ANALYSIS

PAGE 14

RUN DATE 06/03/94

DATE RECEIVED DELIVERY DATE 04/23/94 03/21/94 CUSTOMER P.O. NUMBER 030225/030600829 WORK ORDER NUMBER 4-0472 92714

ANN MARIE HOLBROW MCLAREN/HART 16755 VON KARMAN AVE IRVINE CA

M10-COUNT

EL EUYNE				COLLECTION-DATE	ACTIVITY NUCL-UNIT-R	TINE DATE TIME	VOLUME - UNITS ASH-WGHT-% *	LAB.
SAMPLE		CUSTOMER'S S	Y E	DATE TIME DATE TIME NUCLIDE	(PCI/GH UNI)	******		m
NOMBEX	1			08-90 CCC 31/20	L.T. 7. E-02	97/40		
45037	10619	BG-14-001-MS		0001 01/60	4.0 +-0.3 E 00	05/05		E0
45088	10619MS	8G-14-001-MS		0 1 4 5	4.0 +-0.2 E 00	04/30		m
45089	10619MSD	10619MSD 8G-14-001-MS			PC1/LITER	05/27		1 0
45090	10620	96-14-002-51		03/15 1000 H=3		04/30		m
45091	10621	BG-14-002-55			1.1. 1. E-02	60/50		. •
45092	10622	BG-14-002-SP		03/15 1000 PU-234 U-234 14-330	4.0	05/18		• •
				PU-239	L+T- 1- E-02	05/03		•
				U-235	0.0	05/12		ο •ο
				2 (C) - C) - C (C) - C) - C (C) - C) - C (C) - C) -	1.2 +-0.1 E 00 7.8 +-0.6 E-01	05/18		•
					1.1. 9. E-02	04/30		m
45114	11225	86-00-004-FS		03/15 0841 SR-90	: :	04/30		m
45115	11226	86-01-090-58			L.T. 2. E 02 PCI/LITER	4 05/27		s n (
45116	11227	BG-00-008-FT	_		8.2 +-4.3 E-02	04/30		m (
45117	11229	BG-14-001-55	v.		L.T. 1. E 02 PCI/LITER *	a 05/27		r
45490	10332	BG-02-001-ST	_	0191 01/60				

REPORT OF ANALYSIS

RUN DATE 04/06/94

PAGE 2

DELIVERY DATE	03/18/94	
DATE RECEIVED	03/08/94	
CUSTOMER P.O. NUMBER	030225/030600829	
MORK ORDER NUMBER	4-0185	92714
	ANN MARIE HOLBROW MCLAREN/HARI 16755 VON KARMAN AVE	•

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VOLUME - UNITS															
MID-COUNT TIME	2017	03/60	03/50	03/21	03/21	03/21	04/40	03/21	13/60	13/60	13/60	13/51	03/21	17/50	03/30
ACTIVITY NUCL-UNIT-X (PCI/LITER) U/H a															·
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17/13 17/13	L.T. 2.	:				:	÷	-	;	-	-			-	3.0 +-0.2 E 03
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NUCL IDE	н-3	H-3	ė.	ŵ.	m)	ξij.	m	т.	m	m	m		-	-	
)ATE STOP E TIME	İ	÷	H-3	#-#	#-#	H-3	H-3								
COLLECTION-DATE START STOP DATE TIME DATE TIME NUCLIDE	03/04 1625	1422	1420	1423	1425	1430	1050	1052	1052	1102	1112	1110	0160	0918	
COLL START DATE	03/04	03/07 1422	03/07 1420	03/07 1423	03/07 1425	03/07 1430	03/07 1050	03/07 1052	03/07 1052	03/07 1102	03/07 1112	03/07 1110	03/07 0910	03/07 0918	
STA				-		_	Ī	Ū		O	•	•	•	•	
CUSTOMER'S Identification	88-14-004-ST	SM-03-012-ST	SM-03-015-ST	SM-03-009-ST	SM-03-001-ST	SM-03-014-ST	88-05-003-57	BB-05-089-ST	BB-05-089FDT	18-900-50-88	BB-05-057-ST	18-11-01-01	BB-06-007-ST	BB-06-092-ST	88-06-092-MT
	1005	10062	10064	10065	10066	10067	10047	10043	10042	10048	10044	10046	10028	10029	10030MS
TELEDYNE Sample Number	43187	43108	43190	43191	43192	43193	43194	43195	43196	43197	43198	43199	43200	43201	43202

REPORT OF ANALYSIS

RUN DATE 05/25/94

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	04/11/94	03/15/94	030225/030600829	WORK ORDER NUMBER 4-0514
1 2 1 -	DELIVERT DATE	R DATE RECEIVED DELIVERT DATE	CUSTOMER P.O. NUMBER	-

ANN MARIE HOLBRUW	4-0514	030225/330600829		03/15/94		
MCLAREN/HART 16755 VON KARMAN AVE 1891NF CA						
	_ x x	س م		i	•	
TELEDYNE CUSTOMER'S STA	COLLECTION-DATE START STOP DATE TIME DATE TIME	ACT NUCLIDE (PC)	ACTIVITY NUCL-UNIT-X PCI/LITER) U/M &	8	COUNT HE TIME	VOLUME - UNITS ASH-WGHT-X 9
Š	03/14 0900 H-3	3 L.T.	1. E 02	05/21	12	
44620 10411 50-10 001	H-3	3 L.T.	2. E 02	05/23	23	
44682 11215 F8-00-001-WT	1777	SR-90 L.T.	. 2. E 00	04/23	23	
44683 11216-17 FB-00-001-WS			4. F 01	04/59	53	
44464 11218-19 FR-00-001-WG	03/14 1315 BE		. ш	04/29	. 59	
	Z		÷.	04/29	29	
	00	CO-58 LeTe		04/29	.29	
		CO-60 L-T	 	04/29	04/29	
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	60		• -	10	04/29	
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05/19

04/18

6. E-01 6. E-01

1:1:

PU-238 PU-239

03/14 1315

L.T. 1. E 00 5.0 +-2.3 E 00

GR-A

03/14 1315

44698 11222 F8-00-C01-WA

44697 11220-21 F8-00-001-WP

PAGE 1 RUN DATE 04/20/94 DELIVERY DATE 04/11/40 DATE RECEIVED 46/60/60 TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES CUSTOMER P.O. NUMBER 030225/030600829 REPORT OF ANALYSIS MORK ORDER NUMBER 4-0353

VOLUME - UNITS ASH-WGHT-X 0 DATE TIME 04/09 90/10 90/40 HID-COUNT 10/40 04/08 04/04 04/01 40/40 40/40 04/04 40/40 TIME 04/04 04/03 64/03 04/03 NUCL-UNIT-# E 05 1.5 4-0.1 E 04 1.7 +-0.1 E 04 £ 02 E 02 E 02 E 02 1.7 +-0.2 E 03 E 02 2. E 02 1.7 +-0.2 E 03 (PCI/LITER) ACTIVITY . 1.1 : : ניי ... 1.1. 1.1. 1.1 ... DATE TIME DATE TIME NUCLIDE E-H Ę H-3 H-3 S 0 1 L H-3 H-3 H-3 <u>F</u> H-3 Ŧ £-3 H-3 E-F Ŧ, F-3 COLLECTION-DATE 03/08 1400 03/08 1359 03/08 1428 03/08 1428 03/08 1423 03/08 1410 03/08 1407 03/08 1358 03/08 1405 03/08 03/08 03/08 03/08 STA 88-03-096-ST 43697 11019MS BB-03-026-MT 11019MSD 88-03-026-MT 43696 11019 88-03-026-MT 43695 100810UP 88-03-026-ST BB-03-026-ST 88-03-003-51 88-03-005-ST 88-03-017-51 BB-03-079-ST 88-03-025-51 BB-00-00-1 88-00-00+# 92714 88-00-002-F 88-00-001-BB CUSTONER'S IDENTIFICATION 16755 VON KARMAN AVE 43699 10070 43694 10081 ANN MARIE HOLBROW MCLAREN/HART 1001 43693 10078 10012 43690 10071 43689 10068 43685 11044 43684 11045 43678 11042 43677 11043 43698 43695 43691 IRVINE CA TEL EDYNE NUMBER SAMPLE

RUN DATE 06/02/94 PAGE DELIVERY DATE 46/40/50 DATE RECEIVED \$6/10/\$0 TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES CUSTOMER P.O. NUMBER 030225/030600829 REPORT OF ANALYSIS YORK ORDER NUMBER

TIME ASH-WGHT-R * MID-COUNT TIME NUCL-UNIT-# 92714 ANN MARIE HOLBROW MCLAREN/HART 16755 von Karman ave Irvine ca

LAB.

5 - TRITIUM GAS/L.S. LAB. 6 - ALPHA SPEC LAB. Officential 06/02/94 APPROVED BY J. GUENTHER 06/02/94 02/50 05/50 05/58 05/50 # #/n L.T. 1. E 02 1.5 +-0.2 E 03 1.2 +-0.1 E 03 PCI/LITER! ACTIVITY 1.1. 19 LAST PAGE OF REPORT DATE TIME DATE TIME NUCLIDE H-3 H-3 H-3 H-3 COLLECTION-DATE STOP 03/09 1650 03/09 1200 03/09 1200 03/09 1200 STA 88-17-010-51 BB-00-001-PT BB-00-006-PT 88-00-005-PT CUSTONER'S IDENTIFICATION 46250 11182 46248 11047 46249 11048 46247 11046 TELEUYNE SAMPLE

SEND 1 COPIES TO MC480S ANN MARIE HOLBROW 4 - GEILL! GAMMA SPEC LAB.

2 - GAS LAB. 3 - RADIO CHEMISTRY LAB.

RUN DATE 04/20/94 DELIVERY DATE 46/11/40 DATE RECEIVED 46/60/60 TELEDYNE BROWN ENGINEFRING ENVIRONHENTAL SERVICES CUSTOMER P.O. NUMBER 030225/030600829 REPORT OF ANALYSIS NORK ORDER NUMBER 4-0353

PAGE 13

LAB VOLUME - UNITS DATE TIME ASH-WGHT-K * 03/11 03/11 MID-COUNT TIME 03/11 64/03 03/11 03/11 03/11 03/11 NUCL-UNIT-R Lore 1 6 02 1 07 1 1 6 01 1 94+0 196 02 9299999 3.86+-0-396 1.7 +-0.1 E 03 ACTIVITY 1 PCI/LITER) 2.61+-0.26E 3.394-0.346 <u>:</u> • • • • 1.1 L.T. : :: ۲۰۱ -1.1 RU-103 RU-106 1-131 18-95 RA-226 TH-228 CG-57 FE-59 START STOP STARE NUCLIDE DATE TIME NUCLIDE CE-144 66-03 09-03 59-NZ 12-24 RU-103 RU-106 CS-137 BA-140 CE-141 cs-134 9E-7 K-40 K-40 MN-54 CO-58 FE-59 59-NZ 1-131 2R-95 KATER 86-1 COLLECTION-DATE STOP 03/06 03/08 24-100-00-38 STA BG-00-00-98 BG-00-001-PT CUSTOMER'S IDENTIFICATION HCLAREN/HART 16755 VON KARMAN AVE 43670 11072 ANN MARIE HOLBROW 43668 11056 43669 11073 IRVINE CA TELEDYNE SAMPLE NUMBER

DELIVERY DATE TELEDYNE BROWN FRGINEERING ENVIRONMENTAL SERVICES REPORT OF ANALYSIS

PAGE 14

RUN DATE 04/20/94

04/11/94 DATE RECEIVED 46/60/60 CUSTOMER P.O. NUMBER 030225/030600829 WORK DROER NUMBER 4-0353 ANN MARIE HOLBROW ACLAREN/MART 16755 VON KARMAN AVE IRVINE CA

TELEDYNE SAMPLE NUMBER

TIME VOLUNE - UNITS
DATE TIME ASM-MGHT-R * #1D-COUNT 03/11 90/40 03/11 03/11 03/11 90/40 03/11 03/11 03/11 03/31 04/00 03/23 90/40 03/11 03/11 03/11 03/23 03/23 03/23 03/11 03/11 03/11 03/11 03/11 NUCL-UNIT-X E 01 E 00 E 00 E 01 E 02 4.1 +-0.5 E 01 1.0 +-0.1 F 02 E 00 E 00 E 00 L.T. 6. E 00 2.91+-0.29E 02 L.T. 9. E 00 L.T. 9. E 01 L.T. 5. E 01 2.9 +-0.7 E 00 1.1. 2. E-01 3.3 +-0.8 E 00 L.T. 2. E-01 05 06 06 2.09+-0.21E I PCI/LITER! t.1. 1. AC11V1TY L.T. ... ֡<u>֡</u> 1.1. • L . T . .1. DATE TIME DATE TIME NUCLIDE FE-59 CD-60 PU-239 CO-58 NN-54 PU-239 SR-90 SR-90 PU-238 SR-90 6 - 49 1-38 0 ¥ - ¥ TH-228 CO-57 PU-238 CR-A BA-140 CE-144 RA-226 HATER CE-141 cs-134 CS-137 COLLECTION-DATE 03/08 03/08 90/60 03/08 03/08 03/08 03/08 03/08 STA BG-00-005-PG BG-00-001-PS BC-00-001-42 44-100-00-98 BG-00-001-PF 43674 110090UP 86-00-001-PS 86-00-001-44 43670 11072 8G-00-001-86-CUSTOMER'S 10ENT1FICATION 43679 11075 43675 11108 43673 11009 43676 11064 43671 11089 43672 11088

03/11

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20-103 24-65 28-95

RUN DATE 04/20/94

OT OF ANALYSIS

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16755 VON KARMAN AVE IRVINE CA	TELEOYNE SAMPLE NUMBER 10 43679 11075	43680	

REPORT OF ANALYSIS

RUN DATE 04/20/94

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¥		ANN MARIE	MCLAREN/HART 16755 von Karman ave Irvine ca		TELEDYNE Sample Number	43681	43682	43683	43686	43687		43704	43708											

PAGE 1

TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES

REPORT OF ANALYSIS

					REPORT OF ANALYSIS	OF ANALYSIS	DATE RECEIVED	DELIVERY DATE		PAGE
			20	WORK ORGER NUMBER	CUSTOMER 030225/	030225/030600829	03/21/94	04/23/94	+6/1	
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45097	11251					L.T. 8. E	: 01	03/26		•
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					CO-56	L.T. 2.	E 01	03/50		• •
					09-00	L.T. 1.	E 01	03/26		
					22-63 20-93		E 00	03/50		• •
					RU-103	••••	20	03/26		*
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					141140	L.T. 2.	E 01	03/26		• •
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					RA-226	L.T. 2.	E 01	03/56		•
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RUN DATE 04/14/94

PAGE 2

REPORT OF ANALYSIS

DELIVERY DATE 04/53/94 DATE RECEIVED CUSTOMER P.O. NUMBER

03/21/94 030225/030600829 MORK DRDER NUMBER 4-0459 92714 ANN MARIE HOLBROW MCLAREN/HART 16755 von Karman Ave Irvine ca

ACTIVITY NUCL-UNIT-R TIME ASM-WGHT-R LAB.	(PC1/LITER) U/n 03/26		L-T- 2. E U1 03/28 5 5 4.0 +-0.9 E 01 03/28		L-T. 2. E-01 04/10 6	2. E-01	L.T. 1. E 02 03/26 4 1.T. 3. E 02 03/26 6	1. E 01
COLLECTION-DATE	START SATE TIME NUCLIDE	03/15 1050 H-3	03/15 1150 GR-A GR-B	SR-90		03/15 1150 PU-239	03/15 1150 86-7	401ZE
	CUSTONER'S STA	TN-10N	WD1-WA		HO1-HS	WDI-NP	9R-1103	6+711
	SAMPLE	#Under 11249	45100 11240		45108 11241	45110 11243		45112 11

LAST PACE OF REPORT

5 - TRITIUM GAS/L.S. LAB. 6 - ALPHA SPEC LAB.

APPROVED BY J. GUENTHER 04/14/94

03/26 03/26 03/26

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BA-140 CE-141 CE-144

RA-226 TH-228

1.1. 1:1

RU-106 \$61-53 :5-137

10-103 -131

59-N2 2R-95 09-03

03/26 03/26

03/26

03/26 03/50

03/26

03/56

SEND I COPIES TO MC480S ANN MARIE HOLDROW 3 - RADIO CHEMISTRY LAB. 2 - GAS LAB.

4 - GEILII GAMMA SPEC LAB.

Appendix E

Data Comment Letters
from Teledyne Isotopes
Laboratory and
Brandeis-Bardin Consultant

12016645586→

BROWN ENGINEERING Environmental Services

30 VAN BUREN AVENUE
P.O. BOX 1235
WESTWOOD, NEW JERSEY 07675-1235
1201) 684-7070 FAX (201) 684-5588

September 7, 1994

Mr Eric Smith
McLaren/Hart
FAX: 714-756-8460

Attached are the data sheets for the four Sr-90 results of which you inquired. A brief discussion is provided in the letter to help decipher our reporting.

TI# 43673:

The first count gave result of 2.2 +-1.6. When we get a positive result we count it approximately two days later to check for the radioactive decay of Y-90. That gave L.T. 4. We then "remilked" which means we reprocessed it to separate Sr from Y and then recounted to try to improve the detection limit. That time the two counts did not show radioactive decay. Thus we reported a L.T. 1.

TI# 43675:

The first count gave result of 2.2 +-1.0. The activity was close to our detection limit so when we counted it two days later we got L.T. 2. which we reported.

TI# 43682:

The first count gave result of L.T. 1. so we did not perform additional counts.

TI# 43683:

The first count gave result of 2.3 +-1.3. Upon recount we got L.T. 3 and reported that.

So you can see that we measured a result close to the spiked value on the first count of three out of four samples but did not report them because the second counts were below our detection limit.

Sincerely,

J. David Martin

Manager, Environmental Analysis

LADIOCHIBICAL BORK SHEET

0 那門 ナノケ ALIQUOT SUDALS 833011ER E 00 8911-7 10.1 0.3 customen McLaren Nart conception parte 3/8 SAMPLE TTPE WO CHECKED BY AND DATE PATE ASH M. (100) . 3 لد NET M. ASH WT. け ACTIVITY OR HOL CALC. N とて、 10 T. 18 7 (eff.) HOLMTING DATE 3-38-94 TIM DECAY FACTOR , "THY (HELE TO COURT) , HUS TIELD (00.0 MUCLIPE 8 TIELD 67.6 MICLIDE 5 2 (cbm) ENTERED 88 UNITS (cpm) X VOLLBE (3) (B) Siltsi 1 Siltsi 90 S. S. (CPE) */" MAINT ALA DACT INCHONTH FACTOR 1779 B g (E) 0930 1315 COLIN to CE to CE 6 10/51/5 Postand (COUNTS) MUCLIPA % |∕` MIKING MTE 3-28-94 TIM SCAVENCE DATE 3-32-94 TIME Xach COUNTER χ X 080 7 RE RE 11 PORT 181-SA COURT 1 MG SAPLE HUBER Factor 100 3/6 38 3 31 1116

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Berfand 3/15/81

RADIOCHENICAL WORL SHEET

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ACTIVITY OR HOL

PORM 1111-3A

Revised 3/15/81



50 WAN BUREN AVENUE
P.O. BOX 1235
WESTWOOD, NEW JERSEY 07675-1235

(201) 664-7070 FAX (201) 664-5586

September 23, 1994

Mr. Eric Smith McLaren/Hart 16755 Von Karman Avenue Irvine, California 92714

Dear Mr. Smith:

We did not initially report the isotopes listed below for four samples since the isotopes are not ones expected to be found (or requested to be analyzed for) in field samples but instead can be used for detector calibrations.

Our convention is to report the greater of 10% or two standard deviations of the counting statistics for gamma ray spectroscopy. All of the measurements listed below had two standard deviations (which are also listed) of less than 10%. Results are in pCi/l.

Nuclide	TI# 43669	<u>TI# 43670</u>	TI# 43679	<u>TI# 43680</u>
Y-88	606+-20	661+-13	650+-21	680+-18
Cd-109	7970+-240	9530+-250	9700+-310	8510+-170
Sn-113	219+-8	240+-6	232+-8	236+-7
Ce-139	167+-7	207+-7	199+-8	200+-6
Hg-203	169+-7	186+-7	185+-8	188+-7

Sincerely,

J. David Martin

David Martin

JOEL I. CEHN
CERTIFIED HEALTH PHYSICIST
1036 HUBERT ROAD
OAKLAND, CA 94610
(510) 200-1571

August 26, 1994

Mr. Dennis Dineen McLaren/Hart 16755 Von Karman Ave. Irvine, CA 92714

Dear Dennis;

I have some changes in results for one Brandeis QC sample. These are shown on the attached table. This table was prepared by Joe Stinson to summarize some of the laboratory quality control data. In case you are including this table in your report, I wanted you to have the corrected copy.

The correction was a result of a calculational error at the lab. Prior to gamma spec. analysis, water samples (2 only) were supposed to be evaporated from 1000 ml to 500 ml. The goal was to decrease the detection limit by a factor of 2. However, in the lab the evaporation wasn't done, but the factor of 2 was still applied (for sample BBG-00-002PG). This resulted in isotopic concentrations for that sample being reported too low, by a factor of 2.

Yours truly,

cc:

Niel Mukherjee, Rockwell Joe Stinson, SC&A Mike McWilliams, SC&A SENT BY: XEROX Telecopier 7017; 8- 5-84 ; 14:28 ;

TELEDYNE BROWN ENGINEERING Environmental Services

SO VAN SLIREN AVENUE

P.O. BOX 1235

WESTWOOD, NEW JERGEY 07675-1235

(201) 964-7070 FAX (201) 964-5586

To: Mr. Eric Smith McLaren/Hart

FAX: 714-756-8460

PAT: 174		www.samples	•	
Sequence for	Conntrug Some	Tritium Samples Water	Soil	Mass
Data	_TI#	Volume (ml)	Wet (g)	<u>Dry(g)</u>
Count Date	62	2		
05-22-94	64	1		
•	63	1		
	44665	2	314	300
	44677	1	186	177
	82.	10		
	87	10		
	94	10		
05-26-94	42	10		
	47 -	9		
	51	5		225
•	45054	3	321	315
	59	1		
	60	1		•
	61	1		053
	45070	1	260	253 250
	45077	2	356	350
	83	10		
	86	10		
	90	10		inde TT#

The five samples for which the entire five digit TI# is expressed are the ones requested by the customer for us to provide the samples counted before and after. The counting sequence seems to be unimportant. However, the volume of sample available and counted seems to be. After the water, removable by the procedure, was separated, the soil was further dried (and recorded in the event that later the results needed to be expressed on a dry mass basis). That mass is given in the right-hand column. The volume of water extracted is not known exactly but is close to the volume counted.

Sincerely,

J. David Martin



50 VAN BUREN AVENUE
P.O. BOX 1235
WESTWOOD, NEW JERSEY 07675-1235
(201) 564-7070 FAX (201) 664-5586

September 14,1994

Mr. Eric Smith McLaren/Hart 16755 Von Karman Avenue Irvine, California 92714

Dear Mr. Smith:

Upon review of the tritium data for this project we noticed that in a few cases we reported a relatively high tritium activity (also with a large counting error) for samples for which we extracted a relatively small quantity of water. For those samples we counted 1 or 2 ml of water. We now suspect that those results do not reflect the actual tritium activity and thus we retract those results. The phenomenon for causing this apparent activity is not known. An equivalent volume of water removed from a water sample does not exhibit this effect. The samples for which we are retracting the tritium results are identified by our numbering system as:

TI# 44665, 44677, 45054, 45070, and 45077.

If you have any questions please contact me.

Sincerely,

ງ. David Martin

I David Martin

12018845586→

17147568460;# 1

BROWN ENGINEERING Environmental Services

P.O. BOX 1876

WESTWOOD, NEW JEWEY SPE75-1235

(201) 684-7670 PAX (501) 684-5586

October 21, 1994

Mr. Eric Smith McLaren/Hart

FAX: 714-756-8460

TI# Water Extracted (ml) Water Counted (ml)

44657

2.3

1.0

44722 & 44723

14.1

2.0 each TI#

TI# 44722 & 44723 were two aliquots from the same sample. There remains 10 ml of sample which could be counted to improve the reliability.

Sincerely,

J. David Martin

I David Martin

Appendix F

Graphical Evaluation of Results

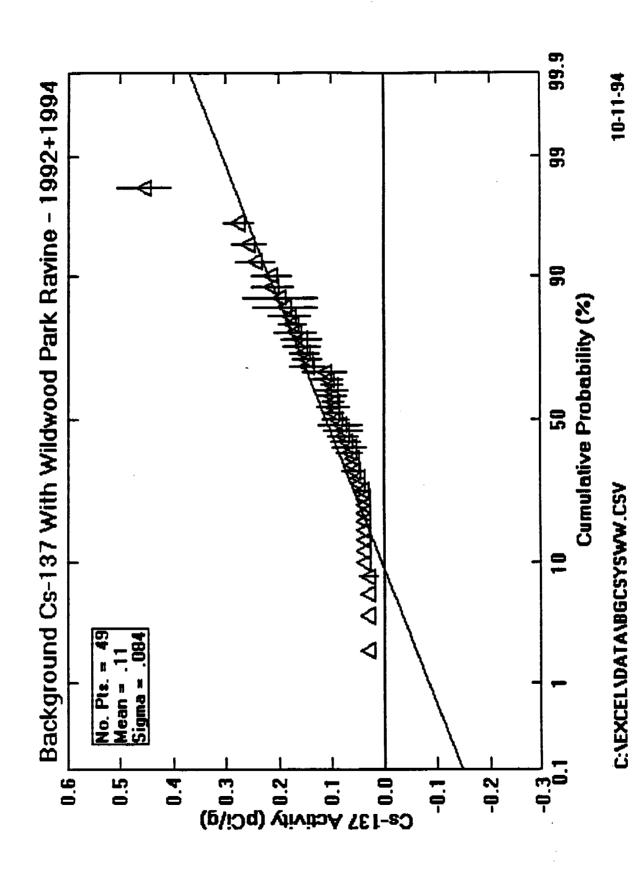
APPENDIX F

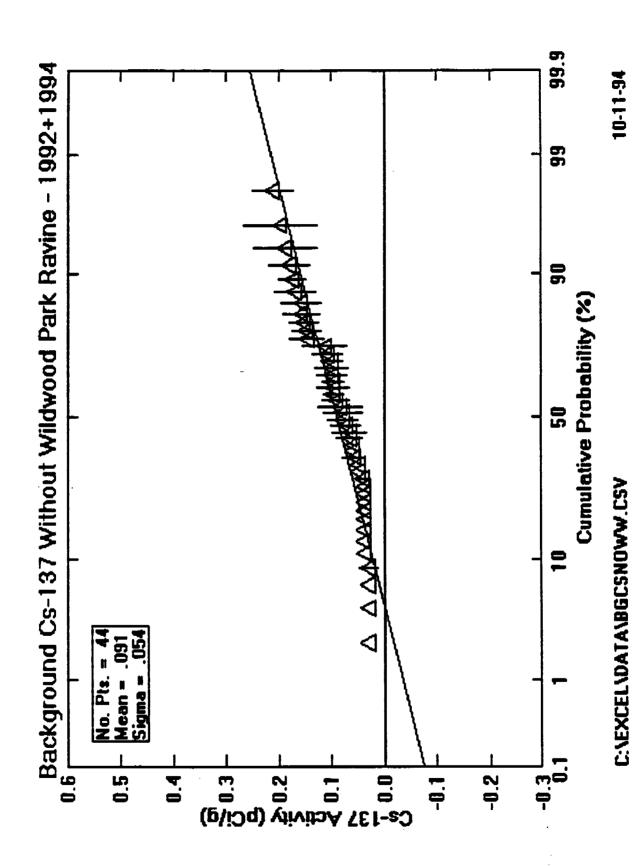
GRAPHICAL EVALUATION OF RESULTS

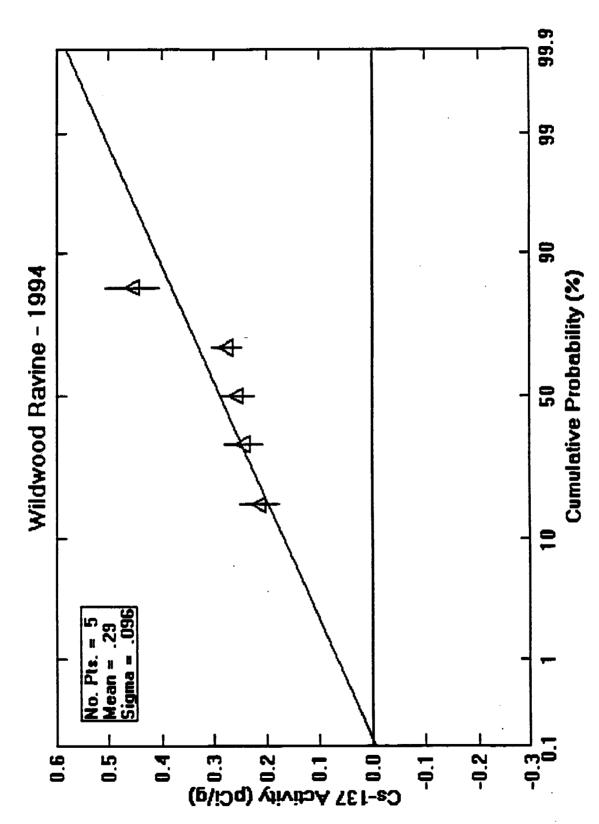
Figures 1 to 4 illustrate the distribution of 1992 plus 1994 data for cesium-137 at Building 59 Watershed and at the background areas. The distributions have been linearized on a cumulative probability plot. Note that the range of the Building 59 Watershed cesium-137 is similar to the Wildwood park ravine cesium-137 (compare Figure \$\frac{1}{2}\$ to Figure 4). Both Building 59 Watershed and Wildwood park ravine cesium-137 are statistically distinguishable from the other aggregate backgrounds.

Figures 6 to 8 illustrate the distribution of 1992 plus 1994 data for strontium-90 at the Radioactive Materials Disposal Facility (RMDF) Watershed and at the background areas. Note that removing the "Wildwood Park" background dataset from the aggregate background does not significantly change the mean or the standard deviation (compare Figures 6 to Figure 7). Even though the slope (standard deviation) of the RMDF Watershed data is larger than the background data of the aggregate background, the large error bars in the individual measurements overlap, suggesting comparable data.

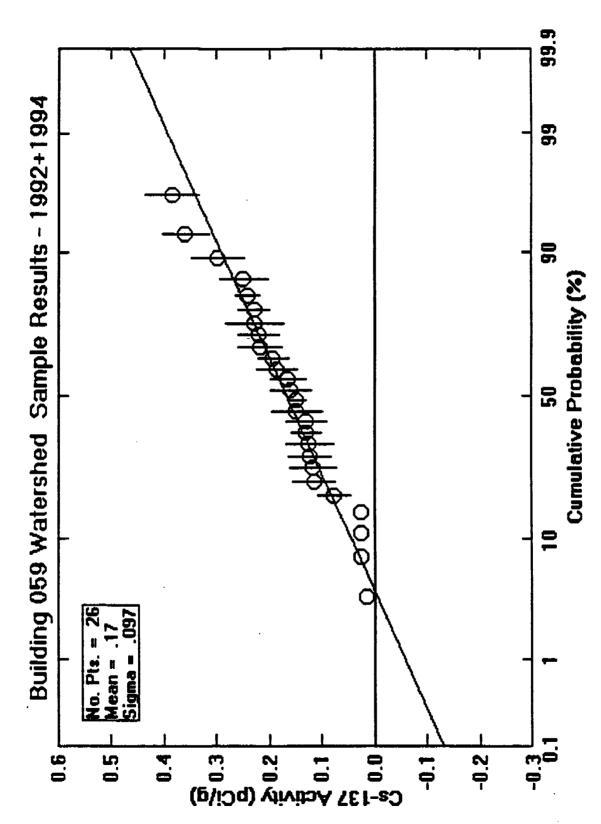
Figures 5 and 9 compare the range of 1994, Cs-137 and strontium-90 data collected from background areas (including and excluding Wildwood), and sampled areas (McLaren/Hart, EPA, DHS, and BBI). All cesium-137 data is comparable with overlapping 2-sigma ranges. All measurements are significantly less than the proposed EPA soil cleanup standards for radiation site cleanup. This cleanup standard is based on a dosage rate of 50 mrens/year for residential area. Most strontium-90 data is comparable with overlapping 2-sigma ranges. Note that the EPA and BBI measurements were all "less than detect" at around 0.7 pCi/gm, far in excess of other measured data, and far in excess of differences between sampled areas and background areas. All measurements were significantly less than the proposed EPA soil cleanup standards for radiation site cleanup.



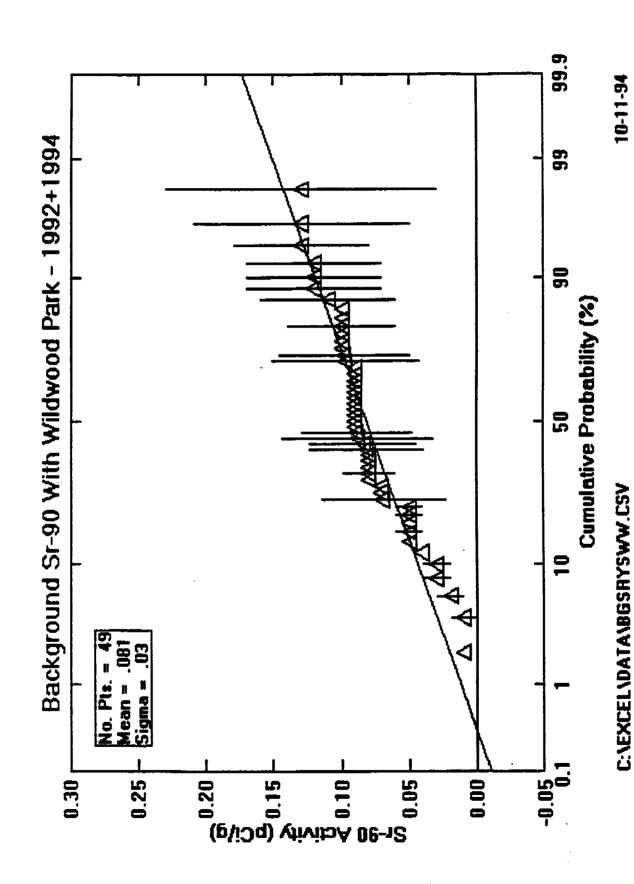


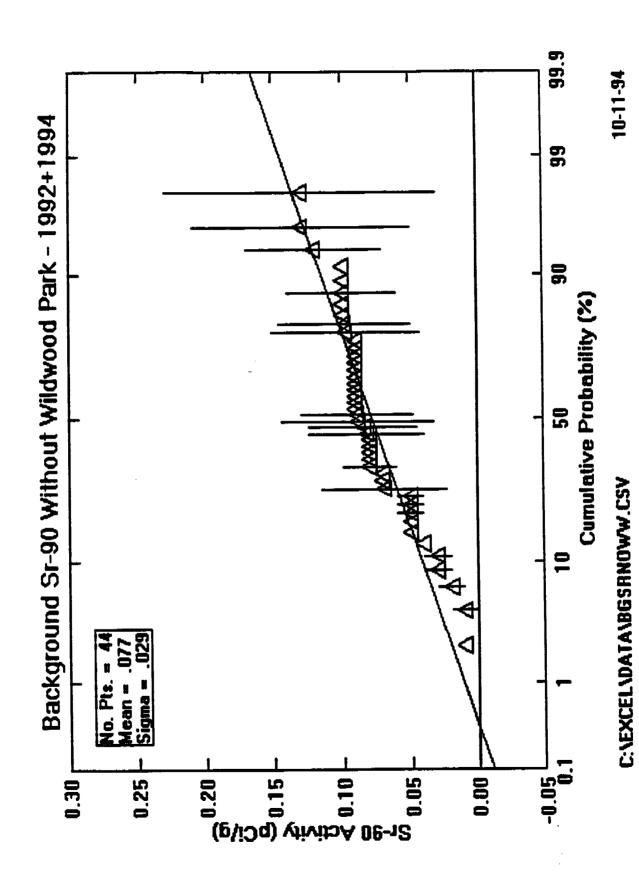


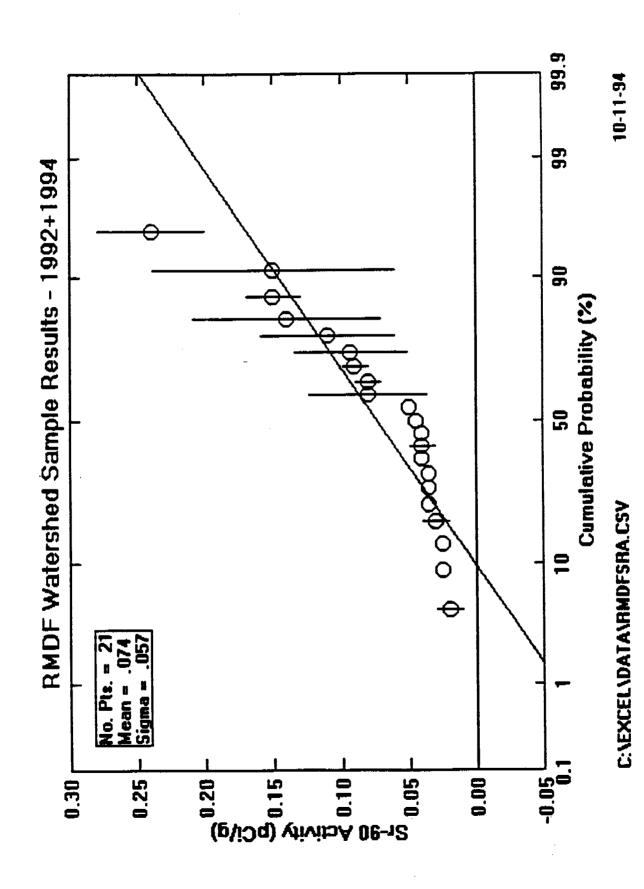
C:\EXCEL\DATA\WWRAVINE.CSV



C:\EXCEL\DATA\B59CS.CSV







Appendix G

Radiation Survey Results

Table 6.1 Radiation Measurement Results

Survey Date	Sample Area	Sample Area Code	Bleck Number	Radiation Measurement (approximately 30 inches from the ground) µR/Hr
3/4/94	Campsite Area 2	04	21	18
		04	23	17
		04	26	18
:		04	49	17
		04	62	17
		04	78	16
		04	79	16
		04	82	17
		04	84	17
		04	97	17
3/4/94	Old Well Campsite	14	04	17
		14	37	16
		14	79	15
		14	89	17
		14	94	17
3/7/94	House of The Book	06	07	16
		06	13	16
		06	17	16
		06	66	16
3/7/94	Avocado Grove	13	10	13
		13	11	14
		13	24	14
		13	37	14
		13	39	15
3/7/94	Picnic Area	05	Œ	15
i		05	06	15
		05	57	15
ļ		05	77	16
		05	89	16

Table 6.1 Radiation Measurement Results (continued)

Survey Date	Sample Area	Sample Area Code	Block Number	Radintion Measurement (approximately 30 inches from the ground) µR/Hr
3/7/94	Donnitory Area	02	45	15
		02	60	15
		02	71	16
		02	75	15
		02	78	15
3/7/94	Main House Orchard	12	Œ	15
		12	Œ	15
		12	06	15
		12	19	15
	-	12	20	15
		12	23	14
3/7/94	Former Rocketdyne Employee Shooting Range	03	o1	15
		03	04	15
:		03	09	15
·		03	14	15
		03	15	15
3/8/94	Campsite Area 1	Œ	Œ	15
		03	05	15
		03	17	16
		03	25	16
		03	26	15
		03	29	16
		03	79	15
		03	81	15
		03	96	16
		03	97	16

Table 6.1 Radiation Measurement Results (continued)

Sarvey Date	Sample Area	Sample Area Code	Block Number	Radiation Measurement (approximately 30 inches from the ground) µR/Hr
3/8/94	Campaite 1 Drainage	20	01	17
		20	02	18
		20	03	20
	·	20	04	20
		20	05	20
		20	06	19
		200	0 7	18
3/9/94	Building 59 Watershed	17	04	18
		17	07	18
	•	17	08	18
		17	09	18
3/9/94	Radioactive Materials Disposal Facility Watershed	16	06	18
		16	07	18
	·	16	08	17
		16	09	18
		16	10	17
3/10/94	RD-51 Watershed	15	01	17
		15	02	16
		15	03	17
		15	04	17
ľ		15	05	17
		15	08	16
		15	09	16
		15	10	16
3/10/94	Sodium Reactor Experiment Watershed	19	06	16
	·	19	07	16
		19	08	16
		19	09	17

Table 6.1 Radiation Measurement Results (continued)

Survey Date	Sample Area	Sample Area Code	Riock Number	Radiation Measurement (approximately 30 inches from the ground) µR/Hr
3/10/94	Sodium Burn Fit Watershed	18	05	15
3/10/94	Santa Susana Park	02	76	12
3/11/94	Нарру Сатр	05	16	14
3/11/94	Wildwood Regional Park	09	05	12 "_
3/14/94	Wildwood Regional Park Ravine	10	01	12
3/14/94	Tapia County Park	11	10	7
		11	11	7
		11	31	7
		11	36	7
	-	11	75	7
3/14/94	Tapia County Park Ravine	12	04	7

APPENDIX H WRITTEN COMMENTS TO DRAFT REPORT NOV 18, 1994 Appendix H

Written Comments to Draft Report November 18, 1994 Radiation Physicist

(510) 268-1571

December 8, 1994

Mr. Eric Smith McLaren/Hart 16755 Von Karman Ave. Irvine, CA 92714 via FAX

Dear Eric;

In response to your letter of November 18, 1994, attached are my comments on McLaren/Hart's November draft of the Soil and Water Sampling Report. These are in addition to my comments on an earlier draft, transmitted October 17.

Yours truly.

cc:

Arthur Pinchev, Brandeis Bardin Institute Helen Zukin, Simke Chodos Silberfield & Anteau Dr. Neil Mukherjee, Rockwell/Rocketdyne

Comments on Additional Soil & Water Sampling at the Brandeis-Bardin Institute and Santa Monica Mountains Conservancy

<u>Page 5-1</u> This section of the report describes the statistical analyses used on the data. You state that these analyses are not used on the tritium data. However, no method of analysis is described for these data. By leaving this out, it appears that no analysis was performed on this data set (see next comment.)

Page 8-3 You discuss the tritium data in this results section. A background cutoff of 600 pCi/L is used to separate elevated tritium results from background results. This is twice the detection limit of 300 pCi/L. Can you discuss the basis for using this?

<u>Page 8-1</u> The footnote on this page refers to quality control results for mercury analyses. Where do these results appear? They are not in the QC requirements table (Table 3), nor in Figures 5 & 6 (QC results.) Were any QC samples actually submitted for mercury analysis?

Page 9-2 Pockets of mercury contamination still exist on BBI property, below the sodium burn pit. This is acknowledged in the Executive Summary but not in the body of the report. I believe this should be discussed here, under Issue 3.

Page 9-4 Regarding the Campsite Area 1 drainage investigation, please acknowledge the limitations of that work. There is a 1,200 ft. gap between the lowest soil sample at the top of the hill (BB-17) and the highest soil sample at the bottom (BB-20). This area was not explored. Thus, we cannot confirm that only one ravine is involved, nor how far down the hill the contamination extends. Recall that both tritium and cesium-137 were detected at the bottom of BB-17. Samples further down the hill could not be collected due to steep terrain, resulting in this 1,200 ft. gap.

Joel I. Cehn, CHP December 8, 1994

CE OF ENVIRONMENTAL HEALTH HAZARD ASSESSMENT



December 6, 1994

McLaren-Hart Environmental Engineering Corp. 16755 Von Karman Avenue Irvine, CA 92714

RE: Draft Additional Soil and Water Sampling at the Brandeis-Bardin Institute and Santa Monica Mountains Conservancy Report, Rockwell International Corporation - Rocketdyne Division

Dear Mr. Smith:

In general the document seemed well organized and understandable. However, I found the Chapter 4 discussion about "outside of acceptance limits" difficult to follow. In fairness this is a subject area wherein I have very limited knowledge. Nonetheless, it may be possible to provide more simplistic language and conceptualization for your less technical audience.

Thank you for the opportunity to review the document.

Sincerely,

Robert L. Holtzer, M.D.

Public Health Medical Officer III

Hazardous Waste Toxicology Section

cc: Arnold Robbins, USEPA