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MAMMALIAN TOXICOLOGY TESTING: PROBLEM DEFINITION STUDY, COMPARI--ETC(U)

FEB 81 R H REUTER, J P GLENNON, G E SCHIEFER DAMD17-81-C-1013

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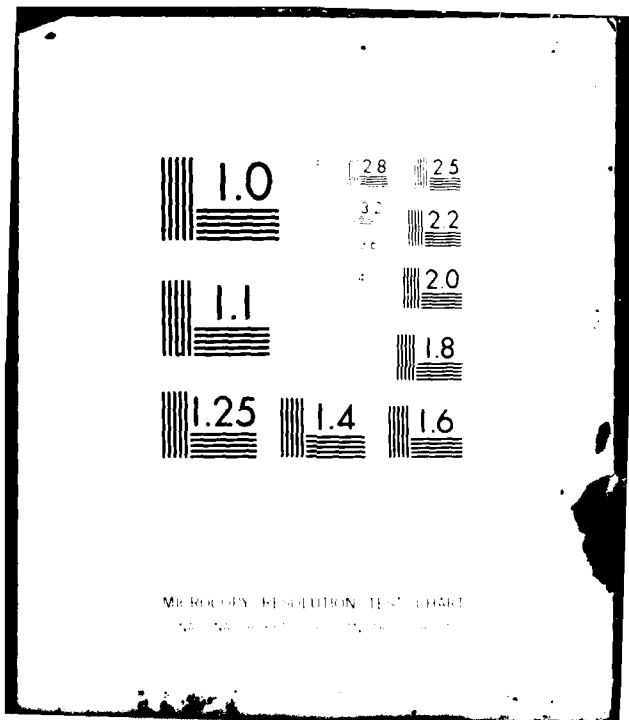
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# MAMMALIAN TOXICOLOGY TESTING: PROBLEM DEFINITION STUDY

## COMPARISON TOXICOLOGY TEST COSTS (U)

by

R. H. Reuter, J. P. Glennon and G. E. Schiefer

February, 1981

Supported by

U.S. ARMY MEDICAL RESEARCH AND DEVELOPMENT COMMAND  
Fort Detrick, Frederick, Maryland 21701

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*Life Systems, Inc.*  
Cleveland, OH 44122

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) A comparison of the costs for carrying out four specific mammalian toxicology tests are summarized in this report. The cost information was based upon recent Environmental Protection Agency reports generated according to specific protocols, prices arrived at through competitive bidding and are of recent origin. The four comparison tests were for chronic rodent inhalation, sub- chronic rodent oral, acute primate inhalation and subchronic primate inhalation.		

18. continued-

Report Subtitle

Life Systems, Inc.  
Report Number

Final Reports--

- Part 1. Comparative Analysis Report
- Part 2. Facility Installation Report
- Part 3. Impact of Future Changes Report

LSI-TR-477-2  
 LSI-TR-477-3  
 LSI-TR-477-4

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FOREWORD

Reports for this Contract, DAMD17-81-C-1013, consist of three major final reports and twelve supporting documents. The Contract title, MAMMALIAN TOXICOLOGY TESTING: PROBLEM DEFINITION STUDY, is the main title for all the reports. Individual reports are subtitled and referenced with Life Systems, Inc. report numbers as detailed below. Please note that the Life Systems report numbers in test references are shortened. In the Defense Technical Information Center (DTIC) data base the reports are identified by the complete report numbers (i.e., LSI-TR-477-XXX) and complete numbers must be used for retrieval.

<u>Report Subtitle</u>	<u>Life Systems, Inc. Report Number</u>
<b>Final Reports--</b>	
Part 1. Comparative Analysis Report	LSI-TR-477-2
Part 2. Facility Installation Report	LSI-TR-477-3
Part 3. Impact of Future Changes Report	LSI-TR-477-4
<b>Supporting Documents--</b>	
Technology Changes Impact on Testing Requirements	LSI-TR-477-14
Quality Assurance Plan	LSI-TR-477-17A
Capability Modules	LSI-TR-477-19B
Technical Plan	LSI-TR-477-20A
Equipment Plan	LSI-TR-477-21A
Personnel Plan	LSI-TR-477-23A
Inhalation Chambers and Supporting Equipment Survey	LSI-TR-477-26A
Equipment List for Modules	LSI-TR-477-28B
AMTR Protocol/Pricing Report	LSI-TR-477-29A
Global Army Toxicology Requirements	LSI-TR-477-31A
Comparison Toxicology Test Costs	LSI-TR-477-36A
Annual Testing Capacity	LSI-TR-477-38A

Summary

A comparison of the cost for carrying out mammalian toxicology testing was made. Four tests was utilized in the comparison: one chronic, two subchronic and one acute. The animals were rodents or primates and the route of exposure in three cases inhalation, in one oral.

The cost basis was based upon a standardized protocol.

As expected, the chronic rodent inhalation test is significantly more expensive than the others.

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## INTRODUCTION

Task 1.0 of the Problem Definition Study required the comparison of the costs for carrying out mammalian toxicology testing for specific tests identified for use in the cost comparison. They are:

1. Chronic rodent inhalation general toxicology study with one species
2. Subchronic rodent oral general toxicology study with one species
3. Acute primate inhalation general toxicology study with one species
4. Subchronic primate inhalation general toxicology study with one species

The present report summarizes the basis for the cost of having these studies completed through firms that do production-type mammalian toxicology testing.

## TEST COST

The cost information was obtained from a recent EPA report entitled "Cost Analysis Methodology and Protocol Estimates, TSCA Health Standards and FIFRA Guidelines," prepared by the Enviro Control, Inc., dated April 3, 1980. Life Systems was able to obtain an advanced, draft copy of this report.

The importance of this data is that it was generated according to specific protocols, prices arrived at through competitive competition and is of recent origin.

The protocol costs estimates are contained in Appendix 1.

## RESULTS

### Assumptions

The assumptions used for primate inhalation studies (acute & subchronic) are:

1. For labor hour estimates used:
  - a. Other inhalation studies for chamber dependent work--monitoring and dosing
  - b. Dog studies to get animal handling costs
2. Primate procurement costs provided from NIOSH, Mr. William Wagner and University of California, Davis, Dr. Keith Killam
3. Primate ration costs calculated @ 1.5 times cost of dog ration costs

Cost Data

The cost for the above four tests for general toxicology results in one species are:

<u>Test</u>	<u>Cost, (\$000)</u>
Chronic rodent inhalation	613
Subchronic rodent oral	56
Acute primate inhalation	39
Subchronic primate inhalation	196

CONCLUSION

An exceptional current, detailed and consistent set of toxicology testing prices were obtained and reported.

APPENDIX 1  
 PROTOCOL COST ESTIMATES

PROTOCOL ESTIMATE: CHRONIC RODENT TOXICITY INHALATION

DIRECT LABOR PERSONNEL

	<u>Hours</u>	<u>Wage,\$</u>	<u>Total \$</u>
Study Director	240	\$17.80	\$ 4,272.00
Veterinarian	60	14.00	840.00
Compound Prep. Technician	480	6.00	2,880.00
Senior Technician	4778	12.50	59,725.00
Study Set Up	(93.0)		
Randomization	(46.0)		
Observations	(2000.0)		
Function Tests	(77.0)		
Record Keeping	(1360.0)		
Audit Preparation	(148.0)		
Analytical Monitoring	(1054.0)		
Animal Technician	3935	8.25	32,463.75
Observations	(1181.0)		
Body Weights	(497.0)		
Food Consumption	(1025.0)		
Blood Collection	(61.0)		
Urine Collection	(16.0)		
Record Keeping	(867.0)		
Residue Analysis	(77.0)		
Chamber Maintenance	(211.0)		
Animal Caretaker	4325	4.00	17,300.00
Watering	(2940.0)		
Bedding Changes	(454.0)		
Feeding	(18.0)		
Cage Cleaning	(852.0)		
Room Cleaning	(61.0)		
Clinical Lab Supervisor	52.96	10.00	529.60
Clinical Lab Technician	158.82	6.00	952.92
Necropsy Supervisor	116	10.00	1,160.00
Necropsy Technician	348	5.00	1,740.00
Histology Supervisor	252.88	10.00	2,528.80
Histology Technician	1011.52	6.00	6,069.12
Board Certified Pathologist	841	24.00	20,184.00
Report Writing Supervisor	100	10.00	1,000.00
Report Writer	1000	6.00	6,000.00
Computer Programmer	160	8.50	1,360.00
Computer Coder	160	5.00	800.00
Report Typist	750	5.00	3,750.00
General Secretary	120	6.00	720.00
Quality Assurance Inspector	254	10.00	2,540.00
SUBTOTAL DIRECT LABOR			\$166,815.99
Salary Adjustment (16%)			26,690.43

TOTAL DIRECT LABOR  
 OVERHEAD (115% of Total Direct Labor)

\$193,505.62  
 222,531.46

continued-

Protocol Estimate: Chronic Rodent  
Toxicity Inhalation - continued

OTHER DIRECT COSTS

Overtime (683 Technician hours @ \$3.00)	\$ 2,050.00
(685 Caretaker hours @ \$2.00)	1,370.00
Animal Procurement (560 rats @ \$3.50)	1,960.00
Bedding (17,440 sheets @ \$0.15)	2,616.00
Animal Rations (20 g/day/rat x 10.25/50 lb)	3,202.31
Clinical Lab Supplies (384 samples @ \$9.09)	3,490.56
Histology Supplies (23,200 samples @ \$0.33)	7,656.00
Data Processing (104 Weeks @ \$50.00)	5,200.00
Laboratory Supplies (10% of total labor)	15,172.35
 SUBTOTAL OTHER DIRECT COSTS	 \$ 40,467.22
 INFLATION ADJUSTMENT (20% of Other Direct Costs)	 8,093.44
 TOTAL OTHER DIRECT COSTS	 \$ 48,560.66
 TOTAL COST BEFORE G&A	 \$464,597.74
 G&A (10% of Total)	 \$ 46,459.77
 TOTAL COST BEFORE FEE	 \$511,057.51
 FEE (20% of Total)	 \$102,211.50
 ESTIMATED FINAL COST	 \$613,269.01

No actual laboratory estimates provided.

PROTOCOL ESTIMATE: SUBCHRONIC RODENT ORAL DOSING STUDY  
GENERAL TOXICOLOGY, 1 SPECIES

DIRECT LABOR PERSONNEL

	<u>Hours</u>	<u>Wage, \$</u>	<u>Total \$</u>
Study Director	52	\$17.80	\$ 925.60
Veterinarian	8	14.00	112.00
Compound Prep. Technician	52	6.00	312.00
Senior Technician	208.5	7.70	1,605.45
Study Set Up	(32.0)		
Randomization	(16.0)		
Observations	(55.5)		
Blood Collection	(27.0)		
Urine Collection	(4.0)		
Record Keeping	(65.0)		
Audit Preparation	(9.0)		
Animal Technician	208.5	6.00	1,251.00
Observations	(72.5)		
Body Weights	(35.0)		
Food Consumption	(69.0)		
Blood Collection	(27.0)		
Urine Collection	(4.0)		
Animal Caretaker	227	4.00	908.00
Watering	(141.0)		
Bedding	(24.0)		
Feeding	(8.0)		
Cage Cleaning	(47.0)		
Room Cleaning	(7.0)		
Clinical Lab Supervisor	33.10	10.00	331.00
Clinical Lab Technician	99.26	6.00	595.56
Necropsy Supervisor	34	10.00	340.00
Necropsy Technician	102	5.00	510.00
Histology Supervisor	32.26	10.00	322.60
Histology Technician	111.62	6.00	669.72
Board Certified Pathologist	114	24.00	2,736.00
Report Writing Supervisor	24	10.00	240.00
Report Writer	320	6.00	1,920.00
Computer Programmer	26	8.50	221.00
Computer Coder	26	5.00	130.00
Report Typist	300	5.00	1,500.00
General Secretary	26	6.00	156.00
Quality Assurance Inspector	52	10.00	520.00

SUBTOTAL DIRECT LABOR

\$ 15,305.93

    Salary Adjustment (8%)

1,224.47

TOTAL DIRECT LABOR

\$ 16,530.40

OVERHEAD (115% of Total Direct Labor)

19,009.96

Protocol Estimate: Subchronic Rodent Oral Dosing  
Study, General Toxicology, 1 Species - continued

OTHER DIRECT COSTS

Overtime (15 Technician hours @ \$3.00)	\$	45.00
(15 Caretaker hours @ \$2.00)		30.00
Animal Procurement (192 rats @ \$3.50)		672.00
Bedding (1600 @ \$0.15)		240.00
Animal Rations (20 g/day/rat x 10.25/50 lb)		276.75
Clinical Lab Supplies (240 samples @ \$9.09)		2,181.60
Histology Supplies (2560 samples @ \$0.33)		844.80
Data Processing (13 weeks @ \$50.00)		650.00
Laboratory Supplies (10% of Total Labor)		1,653.04
 SUBTOTAL OTHER DIRECT COSTS	\$	6,593.19
 INFLATION ADJUSTMENT (5% of Other Direct Costs)	\$	329.66
 TOTAL OTHER DIRECT COSTS		\$ 6,922.85
 TOTAL COST BEFORE G&A	\$	42,463.21
 G&A (10% of Total)		\$ 4,246.32
 TOTAL COST BEFORE FEE	\$	46,709.53
 FEE (20% of Total)		\$ 9,341.91
 ESTIMATED FINAL COST		<u>\$ 56,051.44</u>
 ESTIMATED COST RANGE <sup>(a)</sup>		\$28,025.72 to \$84,077.16

(a) Based on laboratory survey by Enviro Control, Inc.

PROTOCOL ESTIMATE: ACUTE PRIMATE INHALATION STUDY  
GENERAL TOXICOLOGY, 1 SPECIES

Additional Assumptions

1. Using 10 Cynomalogus per dose or per control.
2. Four does levels and one control.
3. Include 20% extra animals for losses during study.

•• Using 60 Cynomalogus

DIRECT LABOR PERSONNEL	Hours	Wage \$	Total \$
Study Director	2	17.80	17.80
Compound Prep. Technician	8	6.00	48.00
Senior Tech. (Inhalation)	74	12.50	925.00
Study Setup (25)			
Randomization (10)			
Observations (21)			
Body Weights (16.4)			
Record Keeping (1.75)			
Animal Tech. (Inhalation)	26.3	8.25	217.00
Body Weights (3.3)			
Dosing (16.0)			
Analytical Monitoring (7.0)			
Animal Caretaker	105.2	4.00	420.80
(60 Animals):			
Cage Cleaning (18.9)			
Room Cleaning (1.5)			
Animal Husbandry (84.8)			
Necropsy Supervisor	54	10.00	540.00
Necropsy Technician	162	5.00	810.00
Histology Supervisor	35.5	10.00	355.00
Histology Technician	148	6.00	888.00
Board-Certified Pathologist	12.2	24.00	292.80
Report Writer	32	6.00	192.00
Report Typist	20	5.00	100.00
General Secretary	1	6.00	60.00
Quality Assurance Inspector	8	10.00	80.00
<b>TOTAL DIRECT LABOR</b>			<b>4892.40</b>
<b>OVERHEAD</b>			<b>5626.30</b>

Acute Inhalation Toxicity Studies w/Primates

OTHER DIRECT COSTS

Overtime (8 Technician hours @ \$3.00)	24.00
(8 Caretaker hours @ \$2.00)	16.00
Animal Procurement (60 Cynomalogus @ \$300)	1800.00
Bedding (240 sheets @ 15¢)	36.00
Animal Rations (472.5g/day/Cynomalogus x 15.38/50 lbs.)	276.80

Acute Primate Inhalation Study,  
General Toxicology, 1 Species - continued

OTHER DIRECT COSTS CONT'D

Histology Supplies (150 samples @ \$1.00)	\$ 150.00
Laboratory Supplies (10% of Total Labor)	<u>489.20</u>
TOTAL OTHER DIRECT COSTS	\$18,991.20
TOTAL COST BEFORE G&A	29,501.00
G&A (10% of Total)	<u>2,950.00</u>
TOTAL DIRECT COST BEFORE FEE	\$32,451.00
FEE (20% of Total)	<u>6,490.00</u>
ESTIMATED FINAL COST	\$38,941.00

PROTOCOL ESTIMATE: SUBCHRONIC PRIMATE INHALATION STUDY  
GENERAL TOXICOLOGY, 1 SPECIES

Assumptions

1. 90 day study
2. 20 animals per dose (10 of each sex) and 20 animals per control
3. Four dose levels (required)
4. No solvent except water - 1 control group
5. No sacrifices
6. 20% more animals for losses

# Animals = 96 - same as # of rats

	<u>Hours</u>	<u>Wage \$</u>	<u>Total \$</u>
DIRECT LABOR PERSONNEL			
Study Director	96	17.80	1,708.80
Veterinarian	16	14.00	224.00
Compound Prep. Technician	96	6.00	576.00
Senior Technician (Inhalation)	929	12.50	11,613.00
Study Setup (48)			
Randomization (20)			
Observations (378)			
Dosing (233)			
Record Keeping (100)			
Audit Preparation (20)			
Analytical Monitoring (130)			
Animal Technician (Inhalation)	971	8.25	8,011.00
Body Weights (63)			
Observations (113)			
Food Consumption (240)			
Blood Collection (98)			
Urine Collection (42)			
Dosing (285)			
Analytical Monitoring (130)			
Animal Caretaker	1925	4.00	7,700.00
Cage Cleaning (397)			
Room Cleaning (32)			
Animal Husbandry (1470)			
Chamber Maintenance (26)			
Clinical Lab Supervisor	17	10.00	166.00
Clinical Lab Technician	50	6.00	300.00
Necropsy Supervisor	90	10.00	900.00
Necropsy Technician	270	5.00	1,480.00
Board-Certified Pathologist	273	24.00	6,540.00
Report Writing Supervisor	50	10.00	500.00
Report Writer	500	6.00	3,000.00
Computer Programmer	40	8.50	340.00
Computer Coder	40	5.00	200.00
Report Typist	200	5.00	1,000.00
General Secretary	40	6.00	240.00
Quality Assurance Inspector	100	10.00	1,000.00
<b>SUBTOTAL DIRECT LABOR</b>			<b>44,739.00</b>
Salary Adjustment (6%)			2,684.00

Subchronic Primate Inhalation Study  
General Toxicology, 1 Species - continued

TOTAL DIRECT LABOR		\$ 47,423
OVERHEAD		54,537
OTHER DIRECT COSTS		
Overtime (30.2 Technician Hours @ \$300)	91.00	
(227 Caretaker Hours @ \$2.00)	455.00	
Animal Procurement (96 <u>Cynomalopus</u> @ \$300)	28,800.00	
Bedding (1300 sheets @ 15c)	195.00	
Animal Rations (472.5gm/day/ <u>Cynomalopus</u> x 15.38/50 lbs.)	2,768.00	
Clinical Lab Supplies (560 samples @ \$9.09)	5,090.00	
Histology Supplies (2960 @ \$1.00)	2,960.00	
Data Processing (12 weeks @ \$50.00)	600.00	
Laboratory Supplies (10% of Total Labor)	4,474.00	
SUBTOTAL OTHER DIRECT COSTS	45,433.00	
INFLATION ADJUSTED OTHER DIRECT COSTS (2.5%)		\$ 46,596
TOTAL COST BEFORE G&A		148,529
G&A (10% of Total)		<u>14,853</u>
TOTAL COST BEFORE FEE		\$163,382
FEE (20% of Total)		<u>32,676</u>
ESTIMATED FINAL COST		\$196,058

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