

UNIVERSITY *of* MISSOURI

RESEARCH REACTOR CENTER

August 31, 2016

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Mail Station P1-37
Washington, DC 20555-0001

REFERENCE: Docket 50-186
University of Missouri-Columbia Research Reactor
Amended Facility Operating License R-103

SUBJECT: Written communication as specified by 10 CFR 50.4(b)(1) regarding responses to the
"University of Missouri at Columbia - Request for Additional Information RE:
Financial Information for Renewal of Facility Operating License No. R-103 for the
University of Missouri at Columbia Research Reactor (TAC No. ME1580)," dated
August 24, 2016

On August 31, 2006, the University of Missouri-Columbia Research Reactor (MURR) submitted a request to the U.S. Nuclear Regulatory Commission (NRC) to renew Amended Facility Operating License No. R-103.

By letter dated May 6, 2010, the NRC requested additional information and clarification regarding the renewal request in the form of nineteen (19) Complex Questions. By letter dated September 3, 2010, MURR responded to seven (7) of those Complex Questions.

By letter dated June 1, 2010, the NRC requested additional information and clarification regarding the renewal request in the form of one hundred and sixty-seven (167) 45-Day Response Questions. By letter dated July 16, 2010, MURR responded to forty-seven (47) of those 45-Day Response Questions.

On July 14, 2010, via electronic mail (email), MURR requested additional time to respond to the remaining one hundred and twenty (120) 45-Day Response Questions. By letter dated August 4, 2010, the NRC granted the request. By letter dated August 31, 2010, MURR responded to fifty-three (53) of the 45-Day Response Questions.

On September 1, 2010, via email, MURR requested additional time to respond to the remaining twelve (12) Complex Questions. By letter dated September 27, 2010, the NRC granted the request.



On September 29, 2010, via email, MURR requested additional time to respond to the remaining sixty-seven (67) 45-Day Response Questions. On September 30, 2010, MURR responded to sixteen (16) of the remaining 45-Day Questions. By letter dated October 13, 2010, the NRC granted the extension request.

By letter dated October 29, 2010, MURR responded to sixteen (16) of the remaining 45-Day Response Questions and two (2) of the remaining Complex Questions.

By letter dated November 30, 2010, MURR responded to twelve (12) of the remaining 45-Day Response Questions.

On December 1, 2010, via email, MURR requested additional time to respond to the remaining 45-Day Response and Complex Questions. By letter dated December 13, 2010, the NRC granted the extension request.

On January 14, 2011, via email, MURR requested additional time to respond to the remaining 45-Day Response and Complex Questions. By letter dated February 1, 2011, the NRC granted the extension request.

By letter dated March 11, 2011, MURR responded to twenty-one (21) of the remaining 45-Day Response Questions.

On May 27, 2011, via email, MURR requested additional time to respond to the remaining 45-Day Response and Complex Questions. By letter dated July 5, 2011, the NRC granted the request.

By letter dated September 8, 2011, MURR responded to six (6) of the remaining 45-Day Response and Complex Questions.

On September 30, 2011, via email, MURR requested additional time to respond to the remaining the remaining 45-Day Response and Complex Questions. By letter dated November 10, 2011, the NRC granted the request.

By letter dated January 6, 2012, MURR responded to four (4) of the remaining 45-Day Response and Complex Questions. Also submitted was an updated version of the MURR Technical Specifications.

On January 23, 2012, via email, MURR requested additional time to respond to the remaining the remaining 45-Day Response and Complex Questions. By letter dated January 26, 2012, the NRC granted the request.

On April 12, 2012, via email, MURR requested additional time to respond to the remaining the remaining 45-Day Response and Complex Questions.

By letter dated June 28, 2012, MURR responded to the remaining six (6) 45-Day Response and Complex Questions. With that set of responses, all 45-Day Response and Complex Questions had been addressed.

On December 20, 2012, the NRC requested a copy of the current Physical Security Plan (PSP) and Operator Requalification Program.

By letter dated January 4, 2013, MURR provided the NRC a copy of the current PSP and Operator Requalification Program.

By letter dated February 11, 2013, the NRC requested updated financial information in the form of four (4) questions because the information provided by the September 14, 2009 response had become outdated.

By letter dated March 12, 2013, MURR responded to the four (4) questions.

By letter dated December 3, 2014, the NRC requested additional information in the form of two (2) questions regarding significant changes to the MURR facility since submittal of the licensing renewal application in August 2006.

By letter dated January 28, 2015, MURR responded to the two (2) questions.

By letter dated April 17, 2015, the NRC requested additional information in the form of ten (10) questions.

On May 29, 2015, via email, MURR requested additional time to respond to the ten (10) questions.

By letter dated June 18, 2015, the NRC requested additional information in the form of two (2) questions.

By letter dated July 31, 2015, MURR responded to the two (2) questions from the June 18, 2015 request.

On September 14, 2015, via telephone, the NRC requested a copy of the Emergency Plan (EP).

By letter dated September 14, 2015, the NRC requested additional information in the form of sixteen (16) questions regarding the PSP.

By letter dated September 15, 2015, MURR provided the NRC a copy of the current EP.

By letter dated October 1, 2015, MURR responded to the ten (10) questions from the April 17, 2015 request.

By letter dated October 28, 2015, the NRC requested additional information regarding the proposed Technical Specifications.

By letter dated December 2, 2015, MURR responded to the fifteen (15) questions from the September 14, 2015 request regarding the PSP.

By letter dated December 17, 2015, the NRC requested additional information in the form of thirteen (13) questions regarding follow-up information from MURR's October 1, 2015 responses to the NRC's April 17, 2015 request for additional information.

By letter dated February 8, 2016, MURR responded to the thirteen (13) questions from the December 17, 2015 request.

By letter dated February 8, 2016, the NRC requested updated financial information in the form of four (4) questions because the information provided by the March 12, 2013 response had become outdated.

By letter dated March 23, 2016, the NRC requested additional information in the form of twenty-one (21) questions regarding follow-up information from MURR's February 8, 2016 responses to the NRC's April 17, 2015 request for additional information.

By letter dated April 15, 2016, MURR responded to the twenty-one (21) questions from the March 23, 2016 request.

By letter dated May 31, 2016, MURR responded to questions from the October 28, 2015 request. Additionally, Technical Specification changes, as issued by Amendment No. 37 to the current facility operating license (NRC letter dated March 11, 2016), were incorporated into the revised proposed Technical Specifications.

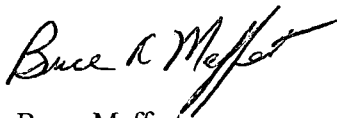
On June 28, 2016, via a conference call between MURR and NRC staff, the NRC requested additional information/clarification regarding MURR's May 31, 2016 responses to the October 28, 2015 NRC request.

By letter dated July 1, 2016, MURR responded to the request for additional information/clarification from the June 28, 2016 conference call as well as submitted the revised proposed Technical Specifications.

By letter dated August 24, 2016, the NRC requested financial information in the form of one (1) question. Below is the question and MURR's response to that question.

If there are any questions regarding this response, please contact me at (573) 882-5118 or MeffertB@missouri.edu. I declare under penalty of perjury that the foregoing is true and correct.

Sincerely,



Bruce Meffert
Reactor Manager

ENDORSEMENT:

Reviewed and Approved, Subscribed and sworn to before me this



Ralph A. Butler, P.E.
Director

State of Missouri
County of Boone

31 day of August, 2016
Jacqueline L. Matyas
JACQUELINE L. MATYAS, Notary Public
My Commission Expires: March 26, 2019



JACQUELINE L. MATYAS
My Commission Expires
March 26, 2019
Howard County
Commission #15634308

xc: Reactor Advisory Committee
Reactor Safety Subcommittee
Dr. Garnett S. Stokes, Provost
Dr. Mark McIntosh, Vice Chancellor for Research, Graduate Studies and Economic Development
Mr. Alexander Adams Jr., U.S. Nuclear Regulatory Commission
Mr. Geoffrey Wertz, U.S. Nuclear Regulatory Commission
Mr. Johnny Eads, U.S. Nuclear Regulatory Commission

Enclosure:

1. Research Direct vs. Commercial Direct Expense Analysis for FY15

1. *The NRC staff request that MU provide an update to the information provided in the LRA SAR, Chapter 15, "Financial Qualifications," Table 15-1, "Costs of Operation of MU Research Reactor FY:05," on page 15-2, or confirm the statement made in SAR section 15.2, "Financial Ability to Operate a Non-Power Reactor," on page 15-1, that "the cost of conducting the [MURR's] commercial activities is less than 50% of the cost of owning and operating the facility."*

In response to the request for additional information, Enclosure 1, *Research Direct vs. Commercial Direct Expense Analysis for FY15*, confirms that the statement made in SAR Section 15.2, "Financial Ability to Operate a Non-Power Reactor," on page 15-1, that "the cost of conducting the [MURR's] commercial activities is less than 50% of the cost of owning and operating the facility" is valid. The percent of total expenditures for owning and operating the MU Research Reactor Facility, based on the University fiscal year 2015, devoted to the production of materials, products, or energy for sale or distribution, or to the sale of services, other than research and development or education or training was 32%. The percent of total expenditures for the same period devoted to research and development or education or training was 68%. Enclosure 1 provides supporting information detailing these expenditures.

	A	B	D	E	F	G	H
1	UNIVERSITY OF MISSOURI RESEARCH REACTOR (MURR)						
2	Research Direct vs. Commercial Direct Expense Analysis Report for FY15						
3							
4							
5							
6	<u>General Notes:</u>						
7	This analysis categorizes MURR's FY 2015 expenditures as research direct or commercial direct. It is used to verify MURR's Class 104 license with the NRC.						
8	With a Class 104 license, at least 50% of MURR's expenditures must be research related. The table below reflects MURR's expense categorization and percent calculation.						
9	Note that some of MURR's expenditures are not directly related to research or commercial. Such expenditures are categorized as indirect. Indirect						
10	expenditures are allocated in aggregate to either research direct and commercial direct based upon the percentage of such direct expenditures to total direct						
11	expenditures. Also note that some of the expenditures listed below include negative revenues as these should be interpreted as expenditures for purposes						
12	of this analysis. Furthermore, some expenditures are excluded as they are transfers out instead of real expenditures.						
13							
14							
15							
16	<u>DeptID</u>	<u>Short Description</u>	<u>Purpose of DeptID</u>	<u>Research Direct</u>	<u>Commercial Direct</u>	<u>Indirect</u>	<u>Total</u>
17	0000-Operations						
18	C4540036	MURR FUEL	To fund fuel purchases from DOE	\$ 80,000	\$ -	\$ -	\$ 80,000
19	C4545002	RIF	To provide a portion of grant indirect costs to researcher.	3,217	-	-	3,217
20	C4545006	P&R-RESEARCH REACTOR	Reflects revenue from patents and royalties and funds expenditures to maintain them.	7,084	26,012	20,745	53,841
21	C4545010	RIF	To provide a portion of grant indirect costs to researcher.	-	-	-	-
22	C4545012	RIF	To provide a portion of grant indirect costs to researcher.	31	-	-	31
23	C4545015	RIF	To provide a portion of grant indirect costs to researcher.	-	-	-	-
24	C4545024	RIF	To provide a portion of grant indirect costs to researcher.	4,470	-	-	4,470
25	C4545025	RIF	To provide a portion of grant indirect costs to researcher.	2,389	-	-	2,389
26	C4545028	RIF	To provide a portion of grant indirect costs to researcher.	-	-	-	-
27	C4545037	RIF	To provide a portion of grant indirect costs to researcher.	-	-	-	-
28	C4545046	ME:LS FY00 RADPHARM	One time allocation from Campus to fund special research projects.	108,000	-	-	108,000
29	C4545047	FPC - RR	Used to accumulated remaining balances from fixed price grants which have been closed.	-	-	-	-
30	C4545054	RIF	To provide a portion of grant indirect costs to researcher.	726	-	-	726
31	C4545093	RO-SW	Reflects General Revenue Allocation from Campus and is used to fund salaries, wages and benefits. Allocated amounts are based on employee duties.	2,139,543	81,265	437,317	2,658,125
32	C4545158	RIF - RESEARCH	To provide a portion of grant indirect costs to Associate Director, Research & Education.	67,829	-	-	67,829
33	C4545165	RIF-MURR	To provide a portion of grant indirect costs to Executive Director.	86,702	-	-	86,702
34	C4545166	RIF	To provide a portion of grant indirect costs to researcher.	4,834	-	-	4,834
35	C4545167	RIF	To provide a portion of grant indirect costs to researcher.	480	-	-	480
36	C4545192	RIF	To provide a portion of grant indirect costs to researcher.	2,979	-	-	2,979
37	C4545193	RIF	To provide a portion of grant indirect costs to researcher.	185	-	-	185
38	C4545194	RIF	To provide a portion of grant indirect costs to researcher.	2,642	-	-	2,642
39	C4545195	RIF	To provide a portion of grant indirect costs to researcher.	952	-	-	952
40	C4545196	MURR PRIME FUND	Reflects special one time funding from Campus for capital expenditures.	98,521	-	-	98,521
41	C4545200	RIF	To provide a portion of grant indirect costs to researcher.	370	-	-	370
42	C4545205	RIF	To provide a portion of grant indirect costs to researcher.	-	-	-	-
43	C4545219	RESEARCH BOARD	Reflects special one time funding from Campus for research initiatives.	10,322	-	-	10,322
44	C4545222	RIF	To provide a portion of grant indicate costs to researcher.	-	-	-	-
45	0570-Research Reactor						
46	C4545032	LU-177 cGMP	To fund operating costs for L-177 cGMP process	-	84,831	-	84,831
47	C4545034	MURRPI	To account for a special research award to investigator.	1,170	-	-	1,170
48	C4545040	MURR PUBLIC RELATIONS	To fund non labor costs related to public relations.	-	-	3,294	3,294
49	C4545041	MURR SAFETY	To fund non labor costs related to facility safety.	-	-	3,524	3,524
50	C4545042	MURR QUALITY CONTROL	To fund non labor costs related to quality control.	-	-	87,087	87,087
51	C4545043	MURR CLEAN ROOM	To fund non labor cost related to clean room.	-	-	52,052	52,052
52	C4545049	MURR CENTER	To fund administrative and department wide expenditures (utilities, dataports, institutional support, etc.)	1,739,392	154,462	1,409,195	3,303,049
53	C4545084	MURR RESERVE ACCOUNT	To accumulate year end remaining balances (net operating income)	-	-	-	-
54	C4545086	DO RESERVE	To fund special expenditures as approved by the Executive Director.	-	-	29,883	29,883
55	C4545087	DO CENTRAL	To fund fiscal operation departmental expenditures.	-	-	9,260	9,260
56	C4545089	DO Commitments	To manually set up expenditures as accounts payable.	-	-	171,323	171,323
57	C4545091	HOT CELL OPS	To fund non labor costs related to hot cell operations.	-	18,415	-	18,415
58	C4545100	RO-REACTOR OPERATIONS	To fund non labor costs related to reactor operations.	160,185	-	-	160,185
59	C4545101	HEALTH PHYSICS	To fund non labor costs related to health physics.	-	-	89,073	89,073
60	C4545102	QUALITY ASSURANCE	To fund non labor costs related to quality assurance.	-	-	7,802	7,802

See Attachment 1 for details of splits.

See Attachment 2 for details of splits.

	A	B	D	E	F	G	H
16	DeptID	Short Description	Purpose of DeptID	Research Direct	Commercial Direct	Indirect	Total
61	C4545103	MURR ENGINEERING	To fund non labor costs related to engineering support.	-	-	5,675	5,675
62	C4545104	MECHANICAL SUPPORT	To fund non labor costs related to mechanical support.	-	-	9,351	9,351
63	C4545105	INSTRUMENTATIONS SUPPORT	To fund non labor costs related to instrumentations support.	-	-	6,141	6,141
64	C4545106	COMPUTING SUPPORT	To fund non labor costs related to computing support.	-	-	49,010	49,010
65	C4545114	RESEARCH-TRACE ANALYSIS PROG	To fund non labor costs related to trace analysis program.	784	-	-	784
66	C4545116	RESEARCH-MATL SCI PROG	To fund non labor costs related to material science program.	6	-	-	6
67	C4545117	BIOMEDICAL PROGRAM	To fund non labor costs related to biomedical program.	23,130	-	-	23,130
68	C4545120	PSO-RESERVE	To fund non labor costs related to products/services operation per Assoc. Director's request.	-	1,554	-	1,554
69	C4545121	PSO-CENTRAL	To fund non labor costs related to products/services operation.	-	1,632	-	1,632
70	C4545122	MURR-SW	Reflects salaries, wages and benefits expense not funded from DeptID C4545093. Allocated amounts are based on employee duties.	3,526,680	2,402,971	4,113,967	10,043,618
71	C4545128	ANALYTICAL CHEMISTRY	To fund non labor costs related to analytical chemistry.	-	41,421	-	41,421
72	C4545129	SHIPPING	To fund shipping related expenditures	-	88,132	-	88,132
73	C4545130	IRRADIATIONS	To fund non labor costs related to irradiations.	-	8,519	-	8,519
74	C4545131	RADIOCHEMICAL PRODUCTION	To fund non labor costs related to radiochemical production.	-	27,268	-	27,268
75	C4545132	TOPAZ	To fund non labor costs related to the gemstones program.	-	405	-	405
76	C4545133	SILICON	To fund non labor costs related to the neutron transmutation doping silicon program.	-	37,219	-	37,219
77	C4545136	Special Proj- N-Gamma Moly	To fund non reimbursable non labor costs related to the n-gamma moly-99 project.	-	-	-	-
78	C4545143	RESEARCH-EXT COMMUNICATIONS	To fund non labor costs related to communications.	602	-	-	602
79	C4545160	COO-WORK CONTROL	To fund non labor costs related to work control.	-	-	966	966
80	C4545161	COO-DOCUMENT CONTROL	To fund non labor costs related to document control.	-	-	4,170	4,170
81	C4545163	COO-CGMP	To fund non labor costs related to current good manufacturing practices.	-	-	3,434	3,434
82	C4545164	BEAMPORT FL RESERVE	To fund non labor costs related to the beam port per Assoc. Director's request.	19,592	-	-	19,592
83	C4545170	MURR TRAINING	To fund non labor costs related to training.	-	-	8,934	8,934
84	C4545171	CSSI	To fund non labor costs related to customer services.	-	13,639	-	13,639
85	C4545173	MURR SHIPPING REBILL	To fund shipping costs which are rebillable to customers.	-	204,364	-	204,364
86	C4545174	MURR REVENUE	To account for revenues from the sale of products and services.	-	17,473	-	17,473
87	C4545176	SHIPPING CONTAINER	To account for shipping container use charges.	-	0	-	0
88	C4545177	ISOTOPE SUBSIDY	To account for the subsidized costs for select products and services.	-	-	194,982	194,982
89	C4545178	R&E DEVELOPMENT	To fund non labor research and education development costs per Assoc. Director request.	78,152	-	-	78,152
90	C4545181	NAA	To fund expenditures related to the archaeology laboratory.	233,086	-	-	233,086
91	C4545182	MURFA	To account for a special research award to investigator.	1,931	-	-	1,931
92	C4545186	CCG	To fund the debt service on the North Office Building Addition.	-	-	372,589	372,589
93	C4545188	R&E ACG	To fund expenditures related to the analytical chemistry laboratory.	6,816	-	-	6,816
94	C4545190	BUSINESS DEVELOPMENT	To fund expenditures related to business development.	-	24,512	-	24,512
95	C4545197	ICP-RESEARCH	To account for expenditures related to inductively coupled plasma for research.	38,601	-	-	38,601
96	C4545201	MURR PARTNERSHIPS	To account for proceeds and disbursements related to the cyclotron partnership	-	110,250	-	110,250
97	C4545202	MURR - SPECIAL PROJECTS	To fund non labor expenditures related to special projects.	-	-	12,130	12,130
98	C4545203	MURR - STOREROOM SUPPLIES	To fund non labor expenditures related to storeroom supplies.	-	-	53,634	53,634
99	C4545204	N-GAMMA MOLY	To fund reimbursable non labor costs related to the n-gamma moly-99 project.	-	74,184	-	74,184
100	C4545206	I-131	To account for the Iodine-131 program.	-	36,790	-	36,790
101	C4545207	MURR START UP	To account for start up funding allocated to researcher.	1,381	-	-	1,381
102	C4545212	RFO CENTRAL	To fund non labor expenditures related to reactor and facilities operation per Assoc. Director request.	-	-	7,730	7,730
103	C4545213	RESEARCH SALARY SAVINGS	To account for the researcher salary savings program.	25,164	-	-	25,164
104	C4545214	FISSION MOLY	To fund non labor expenditures related to the fission moly project.	-	4,865	-	4,865
105	C4545216	FERGUSON-RESEARCH	To fund expenditures related to the archaeology research program.	5,132	-	-	5,132
106	C4545218	NON CARRIER ADDED LU-177	To fund non labor expenditures related to the non carrier added Lutetium-177 project.	-	17,089	-	17,089
107	C4545220	Bi-209	To fund non labor expenditures related to the Bismuth-209 project.	-	15,618	-	15,618
108	C4545221	START UP	To account for start up funding allocate to researcher.	191	-	-	191
109	1025-Unrestricted Plant-FY budget						
110	C4545142	RSRCH REACTOR PLANT PROJECTS	To fund capital and other non annual operating expenditures.	216,944	209,958	325,088	751,991
111	C4545189	MURR SHIPPING CONTAINERS	To fund the purchase of new Type B shipping containers.	-	1,113,274	-	1,113,274
112	C4545215	I-131 Infrastructure	To account for campus funding related to the I-131 infrastructure.	-	112,234	-	112,234
113	C4545217	MURR I-131 INFRASTRUCTURE	To account for campus funding related to the I-131 infrastructure.	-	133,333	-	133,333
114	2000-Restr Expend Gifts & Endow Inc						
115	C4545139	MURR GIFT ACCOUNT	To account for gifts donated to MURR.	-	-	-	-
116	C4545155	NUCLEAR EDUCATIONAL PROGRAMS	To account for nuclear education programs.	2,656	-	-	2,656
117	2100-Restr Grants & Appropriations						
118	C4545156	GRANTS RESEARCH REACTOR 22	To account for research grants.	448,447	-	-	448,447
119	C4545156	RR53	To account for research grants.	-	-	-	-
120	C4545183	GRANTS MURR PUBLIC SER 32	To account for other sponsored activity grants.	505,448	-	-	505,448

See Attachment 3 for details of splits.

16	A	B	D	E	F	G	H
	DeptID	Short Description	Purpose of DeptID	Research Direct	Commercial Direct	Indirect	Total
121	C4545187	GRANTS MURR INST 11	To account for instruction grants.	99,773	-	-	99,773
122	2221-LOC NRC Nuclear Regulatory Com						
123	C4545156	GRANTS RESEARCH REACTOR 22	To account for research grants.	48,081	-	-	48,081
124	C4545187	GRANTS MURR INST 11	To account for instruction grants.	-	-	-	-
125	2223-LOC - USDOL						
126	C4545156	GRANTS RESEARCH REACTOR 22	To account for research grants.	-	-	-	-
127	2225-Loc Nsf						
128	C4545156	GRANTS RESEARCH REACTOR 22	To account for research grants.	168,974	-	-	168,974
129	C4545183	GRANTS MURR PUBLIC SER 32	To account for other sponsored activity grants.	-	-	-	-
130	2270-LOC USDOE Chicago						
131	C4545139	RESEARCH REACTOR 2100	To account for research grants.	-	-	-	-
132	C4545156	GRANTS RESEARCH REACTOR 22	To account for research grants.	-	-	-	-
133	C4545172	DOE DEFG02 01CH11098	To account for research grants.	-	-	-	-
134	C4545183	GRANTS MURR PUBLIC SER 32	To account for other sponsored activity grants.	215,807	-	-	215,807
135	C4545187	GRANTS MURR INST 11	To account for instruction grants.	347,976	-	-	347,976
136	2300-Restricted Expend Plant-Proj B						
137	C4545172	DOE DEFG02 01CH11098	To account for research grants.	-	-	-	-
138	C4545172	DOE DEFG02 01CH11098	To account for research grants.	-	-	-	-
139	6015-Agency(Gen Inv Pool) No Budget						
140	C4545140	AGENCY-MURR-TRTR	To account for the Test, Research & Training Reactors annual conference held at MURR.	-	-	-	-
141	C4545191	AGENCY-CUSTOMER SEC DEPOSITS	To account for customer security deposits.	-	-	-	-
142	C4545208	HEATH PHYSICS SOCIETY MEETING	To account for the Health Physics Society annual conference hosted at MURR	17	-	-	17
143							
144	TOTAL DIRECT EXPENDITURES			\$ 10,537,394	\$ 5,061,688	\$ 7,488,359	\$ 23,087,440
145							
146	ALLOCATION OF INDIRECT EXPENDITURES			5,058,489	2,429,870		
147							
148	TOTAL DIRECT AND INDIRECT EXPENDITURES			\$ 15,595,883	\$ 7,491,558		
149							
150	PERCENTAGE OF RESEARCH vs. COMMERCIAL EXPENDITURES			68%	32%		