

**PROJECT PLAN FOR SORPTION MODELING
FOR HIGH-LEVEL
WASTE PERFORMANCE ASSESSMENT**

Prepared for

**Nuclear Regulatory Commission
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CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES

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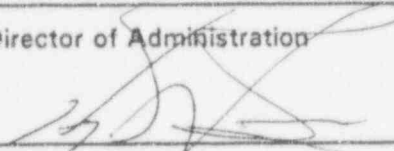
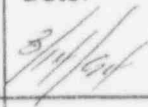
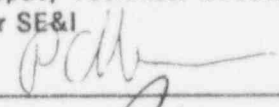
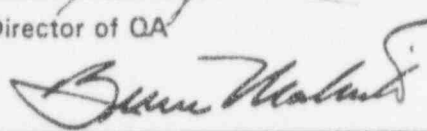

Title: PROJECT PLAN FOR SORPTION MODELING FOR HLW PERFORMANCE ASSESSMENT

EFFECTIVITY

Revision 2 of this document became effective on August 28, 1992.
This document consists of the pages and changes listed below.

<u>Page No.</u>	<u>Change No.</u>	<u>Date Effective</u>
Title Page	6	03/15/94
ii	6	03/15/94
iii-vi	3	07/30/93
1-7	0	08/28/92
8	1	01/14/93
9-13	3	07/30/93
14-16	6	03/15/94
17-18	3	07/30/93
19	0	08/28/92
20	3	07/30/93
21	6	03/15/94
22-24	0	08/28/92
25	6	03/15/94
26-28	0	08/28/92
A-1	4	09/25/93
A-2 - A-7	6	03/15/94
A-8 - A-13	5	12/10/93

Supersedes: Revision 2, Change 5 - December 1993

Director of Administration 	Date: 	Deputy Technical Director for SE&I 	Date: 3/12/94
Director of QA 	Date: 3/12/94	Technical Director 	Date: 3/12/94

sorption phenomena based on fundamental physicochemical principles, it is important to have knowledge of specific sorption reactions that may take place in the geologic system of interest. Otherwise, the transport models used for repository predictions may have no physical basis and may be little more than computerized guesses (Kelmers et al., 1987). Some investigators believe that a conservative approach would be to determine a defensible lower limit for radionuclide retardation (e.g., Meijer, 1990). However, even such an approach would require some mechanistic basis for justifying the use of a specific K_d or R_f value as a lower limit, unless a value of $K_d=0$ or $R_f=1$ is assumed.

Activities

Experiments will be conducted on actinide sorption on geologic media. Initial efforts will be focused on understanding the fundamental controls on the sorption behavior of uranium. Experiments will study the effects of pH, solution concentration, ionic strength, solid-mass to solution-volume ratio, and partial pressure of $\text{CO}_2(\text{g})$ on uranium sorption of different types of minerals, including zeolites, clays, and oxides. Design of the experiments and interpretation of the sorption data will be aided by aqueous speciation calculations using equilibrium geochemical codes such as EQ3/6. Interpretation of sorption data will use results from the molecular dynamics simulations being conducted in Task 2. The experimental data derived under this task will be input into the surface-complexation models being used in Task 2. Sorption experiments will also be conducted on other actinides, such as neptunium and plutonium.

3.2.4 Task 4: Semi-Annual Research Report and Topical Report Preparation

3.2.4.1 Objective

The objective of this task is to publish the results of research activities relevant to Sorption Modeling for HLW Performance Assessment in a relatively timely manner. This task is designed to support the cost of the preparation and production of this project's input into the CNWRA Semi-Annual Research Reports and special topical reports.

3.2.4.2 Justification

Timely dissemination of information generated by the CNWRA research projects to the scientific community, particularly those in HLW programs, is important because of the time constraints involved in site characterization and other studies leading up to licensing a HLW repository. This information may be useful to scientists and engineers in other parts of the program, particularly in support of prelicensing reviews, and can also provide CNWRA investigators with faster feedback from peers and other potential users regarding their work.

3.2.4.3 Activities

A report on the progress and results of the Sorption Modeling for HLW Performance Assessment Research Project will be prepared every six months. This report will be incorporated into the CNWRA Semi-Annual Research Report, which will be submitted to the NRC. After enough

information on specific research topics has been reported in semi-annual research reports, it will be compiled into topical reports and submitted to NRC.

3.3 SCHEDULES, MILESTONES, AND DELIVERABLES

The deliverables in the form of reports are listed in Table 3-1. The first three digits of the six-digit milestone numbers denote the project and task number (e.g., 071 indicates Task 1 of this, the seventh, specific research project); the remaining three digits identify the specific milestone within the task. Results of research activities conducted under the Sorption Modeling for HLW Performance Assessment Research Project will be reported in the form of semi-annual research reports and topical reports as discussed under Task 4 above. Upon approval, these milestones and activities will be incorporated into the integrated CNWRA schedule.

Detailed activities to be conducted under Subtask 3.2 (Saturated Sorption Experiments) have been discussed in the "Work Plan for Experimental Studies on Uranium Sorption on Geologic Media," which was approved by NRC on July 12, 1991. It is anticipated that experiments on uranium sorption kinetics and reversibility and those evaluating the effects of uranium concentration, pH, carbonate and fluoride complexation, competing cations, rock/water ratio, and whole rock versus powdered rock will be completed by the end of FY95. Experiments on the actinides neptunium and plutonium will be initiated during the 4th quarter of FY94. Additional experiments designed to understand the effects of dynamic conditions on actinide sorption and studies of actinide sorption on mixtures of minerals are anticipated to require an additional one and one-half to two years to complete.

Details on activities conducted under Task 2 (Simplified Coupled Hydrogeochemical Modeling) are discussed in the "Work Plan for Hydrogeochemical Modeling of Radionuclide Transport," approved by NRC on December 9, 1991. It is anticipated that construction of the necessary databases will be completed during FY93. Evaluation of simplified sorption models for incorporation in coupled hydrogeochemical models also will be conducted during FY93. It is anticipated that initial hydrogeochemical modeling at small scales will be reported on in FY94. Modeling at intermediate to larger scales will begin during FY94. Molecular dynamic simulation of sorption processes will be conducted through FY94.

The development of the work plan for unsaturated sorption experiments under Subtask 3.1 (Unsaturated Sorption Experiments) was postponed indefinitely upon request of the CNWRA and approval of NRC. The literature review conducted under Task 1 indicated that it is unlikely the effect of sorption processes on radionuclide transport can be isolated from that of other factors involved in experiments under variable hydrologic saturation.

Table 3-1. List of Milestones and Completion Dates

Milestone Number	Milestone Type	Deliverable Description	Completion Date
074162	Intermediate	Semi-Annual Report 1993—2	02/15/94
074163	Intermediate	Topical Report on Approaches to Radionuclide Sorption Modeling	09/30/93
074165	Intermediate	"CNWRA Perspective on the Importance of Uranium to Radionuclide Source Term and Transport Studies"	04/15/94
074181	Intermediate	Semi-Annual Report 1994—1	08/12/94
074183	Intermediate	Topical Report on Application of Geochemical Models to Performance Assessment	09/30/94
074184	Intermediate	Topical Report on Sorption Experiments	12/15/94
074182	Intermediate	Semi-Annual Report 1994—2	02/15/95
074191	Intermediate	Semi-Annual Report 1995-1	08/15/95
074193	Intermediate	Semi-Annual Report 1995-2	02/12/96

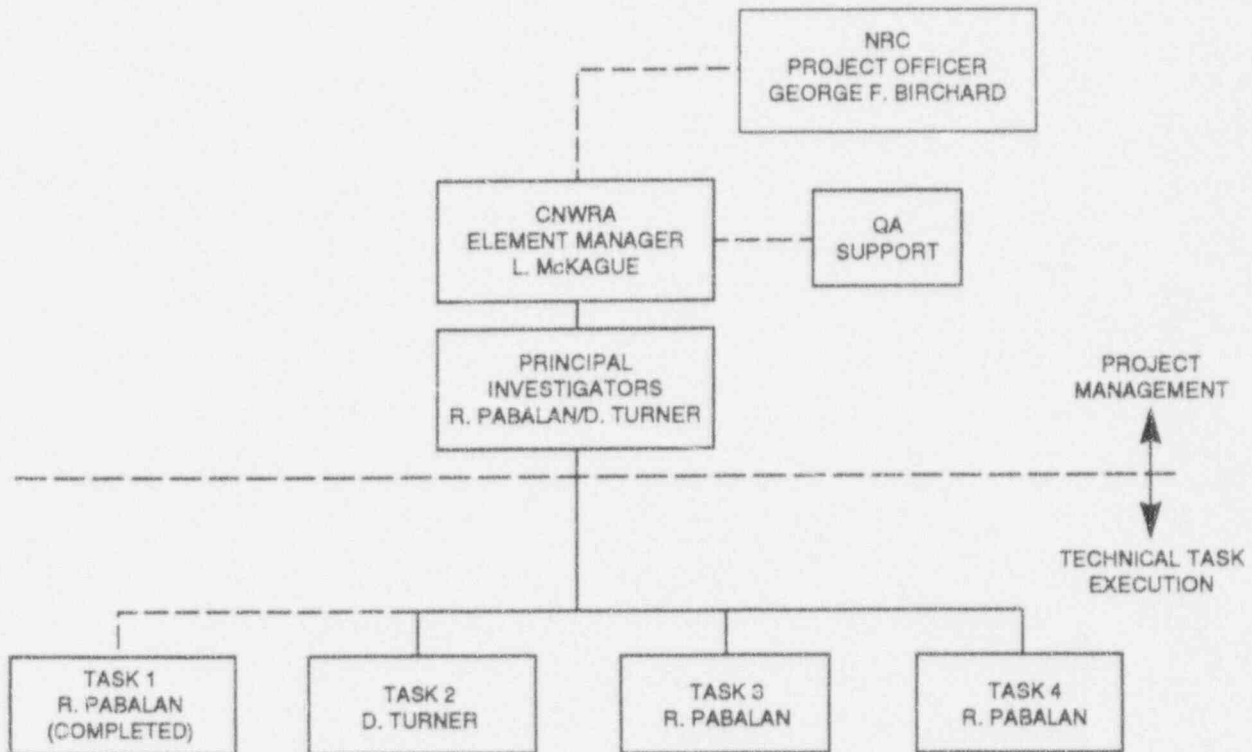


Figure 4-2. Project Staff Support

4.2.5 Nonconformance Control and Corrective Action

Nonconformances to specifications and procedural requirements will be identified, dispositioned, and controlled in accordance with QAP-009, "Nonconformance Control." Significant conditions adverse to quality will be corrected and reported as specified in QAP-010, "Corrective Action."

4.2.6 Reports and Records

Reports of project activities and results will be internally reviewed in accordance with QAP-002, "Review of CNWRA Documents, Reports, and Papers." Peer reviews, when necessary, will be performed consistent with the guidance of NUREG-1297, "Peer Review for High-Level Waste Repositories." Reports and supporting project documentation will be retained as QA records and maintained in accordance with QAP-012, "Quality Assurance Records Control."

Table 4-1. Travel Requirements

Purpose/Destination	FY94		FY95	
	No. Trips	No. Man-Days/Trip	No. Trips	No. Man-Days/Trip
TECHNICAL PROGRAM REVIEW				
NRC, Washington, DC			2	3
CONFERENCES, SEMINARS, WORKSHOPS				
MRS HLW Symposium, Boston	1	5		
MRS HLW Symposium, Kyoto, Japan			1	5
TECHNICAL INTERCHANGE				
TBD, USA	1	5	2	3
TBD, USA	1	3		

Table A-1. Sorption Estimated Spending Plan, FY94

	1	2	3	4	5	6	7	8	9	10	11	12	13	Total
Center PI-4	459	306	459	459	306	459	306	306	459	306	459	306	459	5,053
Center PI-3	231	349	232	232	232	232	232	349	232	232	349	232	232	3,485
Center PI-2	1,421	1,361	1,423	1,732	1,423	1,362	1,887	1,856	1,887	1,856	1,887	1,856	1,818	21,897
Center PI-1	6,421	6,426	6,414	8,034	6,457	6,383	6,883	6,736	6,841	6,841	6,819	6,841	6,862	86,038
Center Tech	1,748	1,735	1,745	2,166	1,745	1,745	4,594	4,594	4,594	4,594	4,594	4,594	4,574	43,001
Center Chemist	155	154	154	196	154	154	154	164	154	154	154	154	154	2,065
Center Labor	10,435	10,341	10,428	12,936	10,318	10,376	14,066	14,067	14,167	13,983	14,146	14,069	14,399	163,529
Center Burden	4,550	4,519	4,557	5,653	4,509	4,534	6,143	6,143	6,191	6,110	6,182	6,157	6,206	71,462
Center Overhead	10,046	9,966	10,040	12,454	9,904	9,990	13,533	13,534	13,640	13,462	13,619	13,565	13,671	157,443
SwRI PI-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SwRI PI-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SwRI PI-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SwRI PI-1	1,211	1,210	1,210	1,532	1,210	1,210	1,210	1,210	1,210	1,229	1,210	1,210	1,210	16,074
SwRI Tech	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SwRI Labor	1,211	1,210	1,210	1,532	1,210	1,210	1,210	1,210	1,210	1,229	1,210	1,210	1,210	16,074
SwRI Burden	529	529	529	669	529	529	529	529	529	529	529	529	529	7,024
SwRI Overhead	2,019	2,017	2,017	2,553	2,017	2,017	2,017	2,017	2,017	2,049	2,017	2,017	2,017	26,796
ADP Services	669	649	669	872	664	669	453	436	453	531	453	448	453	7,379
Machine Shop	151	151	189	189	150	151	1,577	1,577	1,577	1,577	1,577	1,577	1,577	11,942
Material/Supply	830	830	830	1,039	829	831	830	830	830	831	830	830	830	11,000
Quality Assur.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Report Services	38	37	38	47	38	38	38	37	38	38	38	37	38	500
Telephone & Togram	16	14	16	18	16	14	16	14	16	14	16	14	18	200
Travel	0	0	0	2,095	0	0	6,659	0	0	0	0	0	0	8,594
Consultants	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Car Prem Pay	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary Swis	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Est incl. CFC, Fee	30,496	30,253	30,476	40,067	30,204	30,350	46,902	40,383	40,668	40,362	40,617	40,473	40,745	481,985
Center CFC	657	652	657	815	650	654	866	866	853	861	862	868	866	10,306
SwRI CFC	138	138	138	175	138	138	138	138	138	140	138	138	138	1,833
Tot Estimate Cost	31,291	31,043	31,271	41,047	30,992	31,141	47,926	41,407	41,699	41,383	41,646	41,499	41,778	494,124
Fee	2,439	2,430	2,438	3,205	2,416	2,428	3,987	3,433	3,457	3,431	3,452	3,440	3,453	40,009
Tot Cost with Fee	33,730	33,463	33,709	44,251	33,408	33,569	51,912	44,840	45,156	44,814	45,099	44,939	45,241	534,133
% Completion	6.31%	6.26%	6.31%	8.28%	6.25%	6.28%	9.72%	8.39%	8.45%	8.39%	8.44%	8.41%	8.47%	100.00%
Cumulative Cost	33,730	67,193	100,502	145,154	178,562	212,131	264,044	308,883	354,039	398,853	443,952	488,891	534,133	
Cumulative Completion	6.31%	12.56%	18.89%	27.18%	33.43%	39.72%	49.43%	57.83%	66.28%	74.67%	83.12%	91.53%	100.00%	

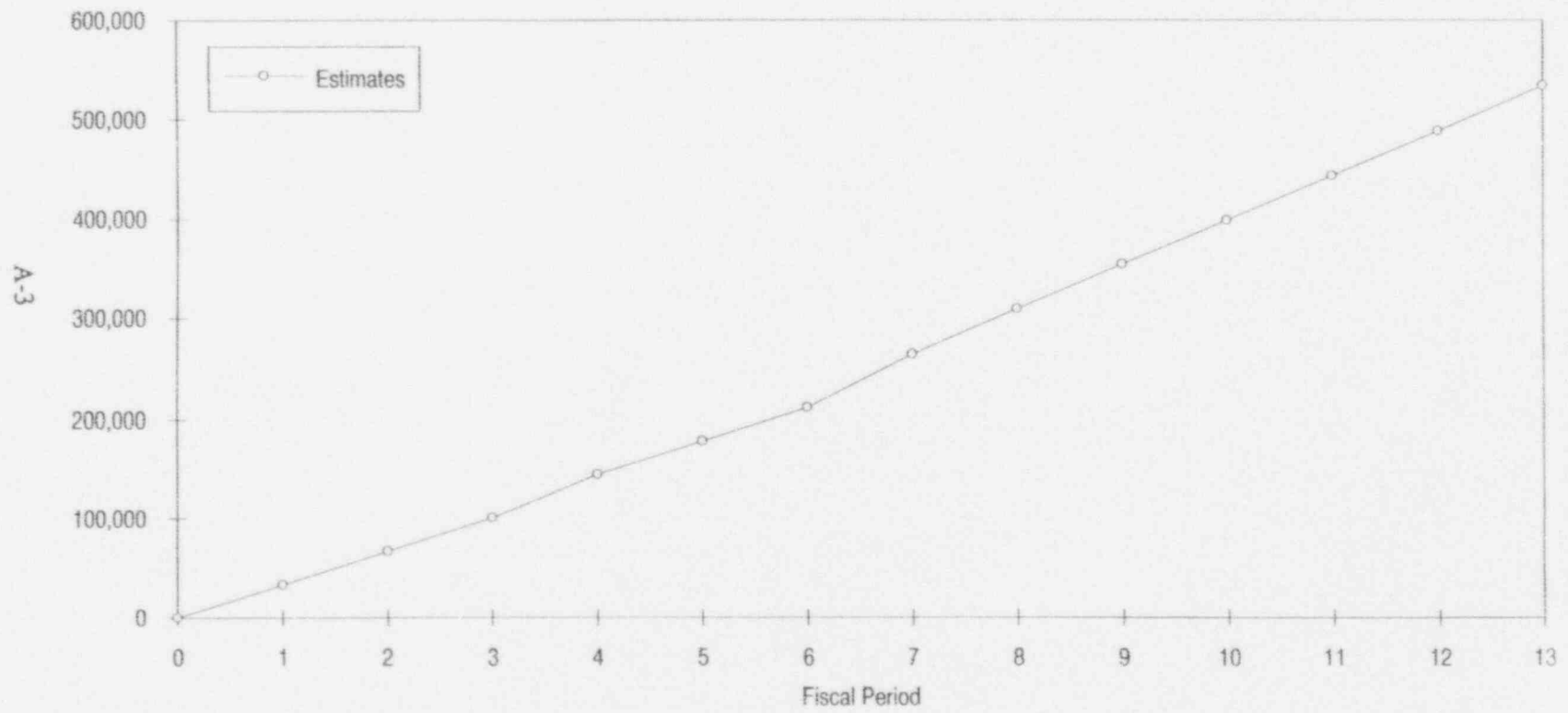


Figure A-1. Sorption Estimated Spending Plan, FY94

Table A-2. Sorption Estimated Labor Plan, FY94

Center Labor	1	2	3	4	5	6	7	8	9	10	11	12	13	Total
Center PI-4	9	6	9	9	6	9	6	6	6	9	9	6	9	99
Center PI-3	6	9	6	9	6	6	6	9	6	6	6	9	6	90
Center PI-2	46	44	46	56	46	45	61	60	61	60	61	60	62	708
Center PI-1	302	302	301	377	303	300	323	319	321	321	320	321	322	4,132
Center Tech	174	173	174	216	174	174	458	457	458	458	458	457	456	4,267
Center Chemical	15	15	15	19	15	15	15	16	15	15	15	15	15	200
Total Center Labor	552	549	551	696	550	549	969	967	870	866	869	868	870	9,516
SwRI Labor	1	2	3	4	5	6	7	8	9	10	11	12	13	Total
SwRI PI-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SwRI PI-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SwRI PI-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SwRI PI-1	64	64	64	81	64	64	64	64	64	65	64	64	64	850
SwRI Tech	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total SwRI Labor	64	64	64	81	64	64	64	64	64	65	64	64	64	850

Table A-3. Sorption Task 2 Estimated Spending Plan, FY94

	1	2	3	4	5	6	7	8	9	10	11	12	13	Total
Center Ph-4	153	102	153	153	102	153	102	102	153	102	153	102	153	1,684
Center Ph-3	77	116	77	116	77	77	77	116	77	77	77	116	77	1,162
Center Ph-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Center Ph-1	1,507	1,513	1,513	1,875	1,534	1,492	1,534	1,492	1,513	1,513	1,513	1,513	1,513	20,025
Center Clerical	382	371	381	471	381	381	381	371	381	381	381	371	381	5,016
Center Labor	155	154	154	195	154	154	154	164	154	154	154	154	154	2,055
Center Burden	2,273	2,256	2,279	2,811	2,249	2,257	2,249	2,245	2,279	2,278	2,279	2,256	2,279	29,941
Center Overhead	993	986	996	1,228	983	987	983	981	996	974	996	986	996	13,084
	2,188	2,173	2,194	2,707	2,165	2,173	2,165	2,162	2,194	2,145	2,194	2,173	2,194	28,827
SwRI Ph-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SwRI Ph-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SwRI Ph-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SwRI Ph-1	1,211	1,210	1,210	1,532	1,210	1,210	1,210	1,210	1,210	1,229	1,210	1,210	1,210	16,074
SwRI Tech	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SwRI Labor	1,211	1,210	1,210	1,532	1,210	1,210	1,210	1,210	1,210	1,229	1,210	1,210	1,210	16,074
SwRI Burden	529	529	529	669	529	529	529	529	529	537	529	529	529	7,024
SwRI Overhead	2,019	2,017	2,017	2,553	2,017	2,017	2,017	2,017	2,017	2,049	2,017	2,017	2,017	26,795
ADP Services	453	448	453	642	448	453	453	436	453	531	453	448	453	6,124
Machine Shop	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Material/Supply	75	76	75	95	75	76	75	76	75	76	75	76	75	1,000
Quality Assur.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Report Services	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Telephone & Tigram	8	7	8	9	8	7	8	7	8	7	8	7	8	100
Travel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Consultants	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clar Perm Pay	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary Svcs	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Est excl. CFC, Fee	9,750	9,703	9,761	12,247	9,685	9,710	9,690	9,654	9,761	9,775	9,761	9,703	9,761	126,970
Center CFC	143	142	144	177	142	142	142	142	144	140	144	142	144	1,867
SwRI CFC	138	138	138	175	138	138	138	138	138	140	138	138	138	1,833
Tot Estimate Cost	10,031	9,983	10,043	12,598	9,965	9,990	9,970	9,944	10,043	10,056	10,043	9,983	10,043	132,690
Fee	780	776	781	980	775	777	804	821	800	831	830	825	830	10,658
Tot Cost with Fee	10,811	10,759	10,824	13,578	10,739	10,767	10,783	10,765	10,872	10,887	10,872	10,807	10,872	143,348
% Completion	7.40%	7.51%	7.55%	9.47%	7.43%	7.51%	7.53%	7.51%	7.58%	7.59%	7.58%	7.54%	7.58%	100.00%
Cumulative Cost	10,811	21,570	32,394	45,972	56,711	67,478	78,271	89,036	99,909	110,795	121,668	132,475	143,348	
Cumulative %	7.40%	15.05%	22.80%	32.07%	39.56%	47.07%	54.60%	62.11%	69.70%	77.29%	84.86%	92.42%	100.00%	

Table A-4. Sorption Task 3 Estimated Spending Plan, FY94

	1	2	3	4	5	6	7	8	9	10	11	12	13	Total
Center PH-4	153	102	153	102	153	102	102	102	153	102	153	102	153	1,684
Center PH-3	77	116	77	77	77	77	77	116	77	77	77	116	77	1,162
Center PH-2	1,174	1,144	1,175	1,454	1,175	1,639	1,639	1,639	1,639	1,639	1,639	1,639	1,670	18,834
Center PH-1	4,531	4,539	4,518	5,690	4,518	4,944	4,944	4,944	4,944	4,944	4,923	4,944	4,965	62,942
Center Tech	1,368	1,364	1,364	1,695	1,364	1,364	4,213	4,213	4,213	4,213	4,213	4,213	4,193	37,966
Center Chemical	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Center Labor	7,302	7,266	7,288	9,108	7,237	7,309	10,975	11,014	11,026	10,975	11,005	11,014	11,069	122,578
Center Burden	3,191	3,175	3,185	3,980	3,162	3,194	4,796	4,813	4,819	4,796	4,809	4,813	4,833	53,567
Center Overhead	7,030	6,995	7,017	8,769	6,967	7,037	10,567	10,604	10,616	10,567	10,596	10,604	10,647	118,017
SwRI PH-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SwRI PH-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SwRI PH-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SwRI PH-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SwRI Tech	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SwRI Labor	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SwRI Burden	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SwRI Overhead	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ADP Services	206	201	206	230	206	206	0	0	0	0	0	0	0	1,255
Machine Shop	151	151	151	189	150	151	1,577	1,577	1,577	1,577	1,577	1,577	1,577	11,982
Material/Supply	755	754	755	944	754	755	755	754	755	755	755	754	755	10,000
Quality Assur	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Report Services	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Telephone & Tgram	8	7	8	9	8	7	8	7	8	7	8	7	8	100
Travel	0	0	0	2,065	0	0	6,499	0	0	0	0	0	0	8,594
Consultants	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Old Priem Pay	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary Svcs	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Est. incl. CFC Fee	18,644	18,549	18,609	25,324	18,485	18,659	35,177	28,770	28,301	28,678	28,750	28,770	28,878	326,054
Center CFC	480	458	459	574	456	461	662	664	665	662	664	664	667	7,725
SwRI CFC	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Estimate Cost	19,104	19,007	19,068	25,898	19,941	19,120	35,869	29,464	29,496	29,369	29,444	29,464	29,575	333,819
Fee	1,491	1,484	1,489	2,026	1,479	1,493	2,990	2,445	2,448	2,438	2,444	2,445	2,455	27,126
Total Cost with Fee	20,595	20,491	20,557	27,924	20,419	20,613	38,859	31,909	31,944	31,807	31,887	31,909	32,030	360,945
% Completion	7.27%	5.65%	5.70%	7.74%	5.65%	5.71%	10.77%	8.84%	8.85%	8.81%	8.83%	8.84%	8.87%	100.00%
Cumulative Cost	20,595	41,086	61,643	89,567	109,987	130,599	169,459	201,368	233,312	256,119	287,006	308,915	330,945	360,945
Cumulative Completion	7.27%	11.38%	17.08%	24.81%	30.47%	36.18%	46.95%	55.79%	64.64%	73.45%	82.29%	91.15%	100.00%	100.00%

Table A-5. Sorption Task 4 Estimated Spending Plan, FY94

	1	2	3	4	5	6	7	8	9	10	11	12	13	Total
Center P1-4	153	102	153	102	102	153	102	102	153	102	153	102	153	1,664
Center P1-3	77	116	77	77	77	116	77	116	77	77	77	116	77	1,162
Center P1-2	247	217	247	278	247	217	247	217	247	217	247	217	247	3,053
Center P1-1	383	384	384	469	465	362	405	362	384	384	384	364	384	5,071
Center Tech	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Center Clerical	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Center Labor	860	818	862	1,017	832	809	832	797	862	780	862	818	862	11,010
Center Burden	376	368	377	444	364	354	364	348	377	341	377	358	377	4,811
Center Overhead	828	788	800	979	801	779	801	767	800	751	800	788	800	10,600
SwRI P1-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SwRI P1-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SwRI P1-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SwRI P1-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SwRI Tech	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SwRI Labor	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SwRI Burden	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SwRI Overhead	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ADP Services	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Machine Shop	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Molecular Supply	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Quality Assur.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Report Services	38	37	38	47	38	38	38	37	38	38	38	37	38	530
Phones & Tngsm	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Travel	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Consultants	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Over Prim Pay	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Temporary Svc	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Est. excl. CFC Fee	2,102	2,001	2,106	2,486	2,034	1,980	2,034	1,950	2,106	1,909	2,106	2,001	2,106	26,921
Center CFC	54	52	54	64	52	51	52	50	54	49	54	52	54	694
SwRI CFC	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Estimate Cost	2,156	2,053	2,160	2,551	2,087	2,031	2,087	2,000	2,160	1,958	2,160	2,053	2,160	27,615
Fee	168	160	168	199	163	158	173	166	179	162	179	170	179	2,225
Total Cost with Fee	2,324	2,213	2,328	2,749	2,250	2,190	2,260	2,166	2,339	2,120	2,339	2,223	2,339	29,839
% Completion	7.81%	7.42%	7.80%	9.21%	7.54%	7.34%	7.57%	7.26%	7.84%	7.11%	7.84%	7.45%	7.84%	100.00%
Cumulative Cost	2,324	4,537	6,865	9,615	11,864	14,054	16,314	18,479	20,818	22,939	25,278	27,500	29,839	
Cumulative Completion	7.81%	15.20%	23.01%	32.22%	39.76%	47.10%	54.67%	61.93%	69.77%	76.87%	84.71%	92.16%	100.00%	