LOADING DIAGRAMS OF EXPERIMENTAL SUBASSEMBLIES
STARTING IRRADIATION IN EBR-II RUNS 43-50

Compiled by
J. C. Case

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LOADING DIAGRAMS OF EXPERIMENTAL SUBASSEMBLIES
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INTRODUCTION

This report contains the loading diagrams for all experimental sub-assemblies as they were fabricated for irradiation starting in EBR-II runs 43 through 50. It supplements a similar report, ANL/EBR-015, which covered loading diagrams for subassemblies fabricated for irradiation before run 43. Each diagram, with its accompanying table, gives the location, identification number, and content of each capsule (or element) in the subassembly. The arrow on each diagram shows the direction to the EBR-II core center at the time of the initial loading of the subassembly into the reactor grid. (Directions to the core center after any subsequent relocations are not shown.) Information with each diagram gives the type of hardware, orifice size, results of flow-testing of the fabricated assembly (where applicable), date and place* of assembly, and date placed into the reactor. (All dimensions are in inches.)

The following loading diagrams are included in this report in the order shown:

XG03A	X071A	X086	X095	X106	X117	X129
XG04A	X074A	X087	X097	X107	X118	X130
X043A	X078A	X087A	X098	X108	X119	X131
X055A	X080	X088	X099	X110	X119A	X132
X056A	X081	X089	X100	X111	X120	X133
X065D	X082	X090	X101	X112	X123	XX03
X065E	X082A	X091	X102	X113	X125	
X065F	X083	X092	X103	X114	X126	
X068A	X084	X093	X104	X115	X127	
X069A	X085	X094	X105	X116	X128	

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* An "FEF" location designates assembly in the air cell of the Fuels and Examination Facility (formerly Fuel Cycle Facility) at the EBR-II site. An "ITF" location designates assembly in the Inspection and Test Facility at the EBR-II site.

Position	Sponsor	Ident. No.	Comments
1		Dummy	
2		Dummy	
3		Dummy	
4		Dummy	
5		Dummy	
6		Dummy	
7		Dummy	
8		Dummy	
9	GE	FOA	Oxide Fuel
10		Dummy	
11		Dummy	
12		Dummy	
13		Dummy	
14		Dummy	
15	GE	FOC	Oxide Fuel
16		Dummy	
17		Dummy	
18		Dummy	
19		Dummy	

Subassembly No. XG03A

Type Hardware: MK-A-19A

Orifice: No. of Holes Open ; Dia. of Holes _____

Lower Adapter Modifications: None

Flow Test Data: ~14 gpm in row 8

Date Assembled: 9/ 4/70 ; Location FEF

Date Loaded in Reactor: 9/14/70 ; for Run 46

Initial Grid Position: 8D2

Position	Sponsor	Ident. No.	Comments
1		Dummy	
2		Dummy	
3		Dummy	
4		Dummy	
5	GE	FOB	Oxide Fuel
6		Dummy	
7		Dummy	
8		Dummy	
9		Dummy	
10		Dummy	
11	GE	FOD	Oxide Fuel
12		Dummy	
13		Dummy	
14		Dummy	
15		Dummy	
16		Dummy	
17		Dummy	
18		Dummy	
19		Dummy	

Subassembly No. XG04A

Type Hardware: MK-A-19A

Orifice: No. of Holes Open; Dia. of Holes

Lower Adapter Modifications: None

Flow Test Data: 14 gpm in row 8

Date Assembled: 9/4/70; Location FEF

Date Loaded in Reactor: 9/15/70; for Run 46

Initial Grid Position: 8A7

Position	Sponsor	Ident. No.	Comments
1	GE	F9A- 4	Oxide Fuel
2		10	
3		9	
4		15	
5		25	
6		36	
7		27	
8		18	
9		13	
10		5	
11		35	
12		37	
13		7	
14		26	
15		6	
16		20	
17		30	
18		34	
19		29	
20		11	
21		16	
22		21	
23		1	
24		38	
25		39	
26		3	
27		28	
28		2	
29		22	
30		31	
31		23	
32		14	
33		19	
34		8	
35		24	
36		F9C- 7	
37		F9A-17	

Subassembly No. X043A (F9A)

Type Hardware: MK-F-37

Orifice: No. of Holes Open ; Dia. of Holes _____

Lower Adapter Modifications: None

Flow Test Data: ~ 67 gpm in row 6

Date Assembled: 10/23/70 ; Location FEF

Date Loaded in Reactor: 10/27/70 ; for Run 47

Initial Grid Position: 6D3

NOTE: Orientation holes on the fuel elements face the front of the grid.

Position	Sponsor	Ident. No.	Comments
1	UNC	130	Carbide Fuel
2		129	
3		135	
4		131	
5		132	
6		134	
7		144	
8		133	
9		136	
10		143	
11		140	
12		147	
13		142	
14		141	
15		145	
16		138A	
17		146A	
18		139	
19		137	

Subassembly No. X055A

Type Hardware: MK-A-19

Orifice: No. of Holes 1; Dia. of Holes 0.480

Lower Adapter Modifications: Row-7 holes 0.375

Flow Test Data: ~30 gpm in row 6 or 7

Date Assembled: 2/19/71; Location FEF

Date Loaded in Reactor: 3/16/71; for Run 48A

Initial Grid Position: 7E5

Position	Sponsor	Ident. No.	Comments
1	GE	F9C-13	Oxide Fuel
2		19	
3		22	
4		25	
5		10	
6		15	
7		18	
8		21	
9		24	
10		6	
11		9	
12		12	
13		17	
14		20	
15		23	
16		3	
17		5	
18		8	
19		14	
20		16	
21		33	
22		30	
23		2	
24		4	
25		38	
26		11	
27		31	
28		32	
29		1	
30		26	
31		27	
32		37	
33		35	
34		29	
35		28	
36		34	
37		36	

Subassembly No. X056A (F9C)

Type Hardware: MK-F-37

Orifice: No. of Holes Open; Dia. of Holes _____

Lower Adapter Modifications: None

Flow Test Data: ~ 67 gpm in row 6

Date Assembled: 10/23/70; Location FEF

Date Loaded in Reactor: 10/27/70; for Run 47

Initial Grid Position: 6B2

NOTE: Orientation holes on the fuel elements face the front of the grid.

Position	Sponsor	Ident. No.	Comments
1	ANL	P-36	Structural
2	ANL	P-2	Structural
3	ANL	P-38	Structural
4		Dummy	
5		Dummy	
6	ANL	P-34	Structural
7		Dummy	
8	ANL	P-21	Structural
9	ANL	P-35	Structural
10	ANL	P-32	Structural
11	ANL	P-45	Structural
12	ANL	P-4	Structural
13	ANL	P-30	Structural
14		Dummy	
15		Dummy	
16		Dummy	
17	ANL	P-22	Structural
18	ANL	P-44	Structural
19	ANL	P-19	Structural
20	ANL	P-39	Structural
21	ANL	P-48	Structural
22		Dummy	
23	ANL	P-41	Structural
24	ANL	P-49	Structural
25		Dummy	
26	ANL	P-57	Structural
27		Dummy	
28		Dummy	
29		Dummy	
30	ANL	P-37	Structural
31	ANL	P-7	Structural
32	ANL	P-23	Structural
33	ANL	P-43	Structural
34	ANL	P-42	Structural
35	ANL	P-9	Structural
36	ANL	P-40	Structural
37	ANL	P-29	Structural

Subassembly No. XO65D

Type Hardware: MK-B-37

Orifice: No. of Holes 1 3; Dia. of Holes 0.375
(In series) 0.216

Lower Adapter Modifications: None

Flow Test Data: ~ 17 gpm in row 7

Date Assembled: 6/24/70; Location FEF

Date Loaded in Reactor: 6/25/70; for Run 44

Initial Grid Position: 7E5

Position	Sponsor	Ident. No.	Comments
1	ANL	P-36	Structural
2		Dummy	
3	ANL	P-21	Structural
4		Dummy	
5		Dummy	
6	ANL	P-34	Structural
7	ANL	P-2	Structural
8	ANL	P-38	Structural
9	ANL	P-35	Structural
10	ANL	P-32	Structural
11	ANL	P-45	Structural
12	ANL	P-4	Structural
13	ANL	P-30	Structural
14		Dummy	
15		Dummy	
16		Dummy	
17	ANL	P-22	Structural
18	ANL	P-44	Structural
19	ANL	P-19	Structural
20	ANL	P-39	Structural
21	ANL	P-48	Structural
22		Dummy	
23	ANL	P-41	Structural
24	ANL	P-49	Structural
25		Dummy	
26	ANL	P-57	Structural
27		Dummy	
28		Dummy	
29		Dummy	
30	ANL	P-37	Structural
31	ANL	P-7	Structural
32	ANL	P-23	Structural
33	ANL	P-43	Structural
34	ANL	P-42	Structural
35		Dummy	
36	ANL	P-40	Structural
37	ANL	P-29	Structural

Subassembly No. X065E

Type Hardware: MK-B-37

Orifice: No. of Holes 1 3; Dia. of Holes 0.375
(In series) 0.216

Lower Adapter Modifications: None

Flow Test Data: ~ 17 gpm in row 7

Date Assembled: 10/16/70; Location FEF

Date Loaded in Reactor: 10/27/70; for Run 47

Initial Grid Position: 7E5

Position	Sponsor	Ident. No.	Comments
1	ANL	P-36	Structural
2		Dummy	
3	ANL	P-21	Structural
4		Dummy	
5		Dummy	
6	ANL	P-34	Structural
7	ANL	P-2	Structural
8	ANL	P-38	Structural
9		Dummy	
10	ANL	P-32	Structural
11	ANL	P-45	Structural
12		Dummy	
13	ANL	P-30	Structural
14		Dummy	
15		Dummy	
16		Dummy	
17	ANL	P-22	Structural
18	ANL	P-44	Structural
19	ANL	P-19	Structural
20	ANL	P-39	Structural
21	ANL	P-48	Structural
22		Dummy	
23	ANL	P-41	Structural
24	ANL	P-49	Structural
25		Dummy	
26	ANL	P-57	Structural
27		Dummy	
28		Dummy	
29		Dummy	
30		Dummy	
31	ANL	P-7	Structural
32		Dummy	
33	ANL	P-43	Structural
34	ANL	P-42	Structural
35		Dummy	
36	ANL	P-40	Structural
37	ANL	P-29	Structural

Subassembly No. X065F

Type Hardware: MK-B-37

Orifice: No. of Holes 1 3; Dia. of Holes 0.375
(In series) 0.216

Lower Adapter Modifications: None

Flow Test Data: 17 gpm in row 7

Date Assembled: 4/9/71; Location FEF

Date Loaded in Reactor: 4/22/71; for Run 48D

Initial Grid Position: 7B5

Subassembly No. XO68A
 Type Hardware: MK-B-61
 Orifice: No. of Holes 7; Dia. of Holes 0.250
 Lower Adapter Modifications: None
 Flow Test Data: ~48 gpm in row 6
 Date Assembled: 12/29/70; Location FEF
 Date Loaded in Reactor: 2/23/71; for Run 47B
 Initial Grid Position: 6B4

Pos.	Sponsor	Ident. No.	Pos.	Sponsor	Ident. No.
1	ANL	E-26	32	ANL	E-107*
2		E-1	33		E-15
3		E-10	34		E-66*
4		E-16	35		E-56
5		E-3	36		E-88
6		E-96	37		E-57
7		E-27	38		E-73
8		E-91*	39		E-110
9		E-25*	40		E-70
10		E-63*	41		E-136
11		E-45	42		E-19
12		E-134	43		E-6
13		E-78	44		E-127
14		E-37*	45		E-128
15		E-84*	46		E-75
16		E-29*	47		E-95
17		E-101*	48		E-44
18		E-154	49		E-21
19		E-125	50		E-40
20		E-135	51		E-94
21		E-103	52		E-102
22		E-142	53		E-76
23		E-59	54		E-48
24		E-31*	55		E-114
25		E-36	56		E-65
26		E-13	57		E-98
27		E-129	58		E-85
28		E-99	59		E-86
29		E-77	60		E-139
30		E-80	61		E-46
31		E-157			

NOTE: XO68A contains ANL MK-1A driver-fuel capsules. Those with no asterisk were also irradiated in XO68.

Position	Sponsor	Ident. No.	Comments
1	WADCO	7-1	Oxide Fuel
2		7-2	
3		7-3	
4		7-4	
5		7-5	
6		7-6	
7		7-7	
8		7-8	
9		7-9	
10		7-39	
11		7-11	
12		7-12	
13		7-13	
14		7-14	
15		7-15	
16		7-16	
17		7-17	
18		7-18	
19		7-19	
20		7-20	
21		7-21	
22		7-22	
23		7-23	
24		7-24	
25		7-25	
26		7-26	
27		7-27	
28		7-28	
29		7-29	
30		7-30	
31		7-31	
32		7-32	
33		7-33	
34		7-34	
35		7-35	
36		7-36	
37		7-37	

Subassembly No. X069A (PNL-7)

Type Hardware: MK-H-37A

Orifice: No. of Holes Open; Dia. of Holes _____

Lower Adapter Modifications: None

Flow Test Data: ~ 55 gpm in row 6

Date Assembled: 2/10/71; Location FEF

Date Loaded in Reactor: 4/22/71; for Run 48D

Initial Grid Position: 6F4

Position	Sponsor	Ident. No.	Comments
1	ANL	288	MK-II Driver
2		234	
3		266	
4		265	
5		209	
6		267	
7		E-12	
8		264	
9		237	
10		225	
11		E-10	
12		205	
13		E-16	
14		E-1	
15		E-15	
16		277	
17		289	
18		275	
19		224	
20		230	
21		232	
22		203	
23		E-3	
24		E-7	
25		E-6	
26		284	
27		263	
28		E-17	
29		269	
30		223	
31		202	
32		200	
33		256	
34		274	
35		276	
36		287	
37		270	

Subassembly No. XO71A

Type Hardware: MK-B-37

Orifice: No. of Holes 7; Dia. of Holes 0.250

Lower Adapter Modifications: None

Flow Test Data: ~ 48 gpm in row 6

Date Assembled: 10/ 5/70; Location FEF

Date Loaded in Reactor: 3/29/71; for Run 48

Initial Grid Position: 604

Position	Sponsor	Ident. No.	Comments
1	WADCO	8-44	Oxide Fuel
2		8-2	
3		8-39	
4		8-4	
5		8-5	
6		8-6	
7		8-7	
8		8-8	
9		8-9	
10		8-10	
11		8-11	
12		8-12	
13		8-13	
14		8-14	
15		8-15	
16		8-16	
17		8-17	
18		8-18	
19		8-19	
20		8-20	
21		8-21	
22		8-22	
23		8-23	
24		8-24	
25		8-25	
26		8-26	
27		8-40	
28		8-28	
29		8-29	
30		8-30	
31		8-31	
32		8-32	
33		8-33	
34		8-34	
35		8-35	
36		8-36	
37		8-37	

Subassembly No. KO74A (PNL-8)

Type Hardware: MK-H-37A

Orifice: No. of Holes 7; Dia. of Holes 0.349

Lower Adapter Modifications: Increased-flow Type

Flow Test Data: ~ 60 gpm in row 6

Date Assembled: 5/5/71; Location FEF

Date Loaded in Reactor: 5/16/71; for Run 49

Initial Grid Position: 6A5

Pos.	Sponsor	Ident. No.	Pos.	Sponsor	Ident. No.
1	ANL	MK-IA	32	ANL	MK-IA
2		MK-IA	33		MK-IA
3		MK-IA	34		Dummy
4		MK-IA	35		MK-IA
5		MK-IA	36		MK-IA
6		MK-IA	37		Dummy
7		Dummy	38		MK-IA
8		Dummy	39		MK-IA
9		Dummy	40		MK-IA
10		Dummy	41		MK-IA
11		MK-IA	42		Dummy
12		MK-IA	43		MK-IA
13		Dummy	44		MK-IA
14		MK-IA	45		Dummy
15		MK-IA	46		MK-IA
16		MK-IA	47		MK-IA
17		Dummy	48		MK-IA
18		MK-IA	49		Dummy
19		MK-IA	50		MK-IA
20		Dummy	51		MK-IA
21		MK-IA	52		Dummy
22		MK-IA	53		Dummy
23		MK-IA	54		Dummy
24		MK-IA	55		Dummy
25		Dummy	56		MK-IA
26		MK-IA	57		MK-IA
27		MK-IA	58		MK-IA
28		Dummy	59		MK-IA
29		MK-IA	60		MK-IA
30		MK-IA	61		MK-IA
31		BF-11			

NOTE: Deencapsulated element from capsule BF-11 is in position 31; other nondummy positions are occupied by standard MK-IA driver-fuel elements.

Subassembly No. XO78A

Type Hardware: MK-E-61

Orifice: No. of Holes Open ; Dia. of Holes _____

Lower Adapter Modifications: None

Flow Test Data: ~64 gpm in row 6

Date Assembled: 10/28/70 ; Location FEF

Date Loaded in Reactor: 2/24/71 ; for Run 47B

Initial Grid Position: 6B3

Position	Sponsor	Ident. No.	Comments
1	NUMEC	C-3	Oxide Fuel
2	GE	L15B	Structural
3	NUMEC	C-12	Oxide Fuel
4	GE	L15C	Structural
5	NUMEC	C-9	Oxide Fuel
6	NUMEC	C-16	Oxide Fuel
7	GE	L15A	Structural
8	NUMEC	C-17	Oxide Fuel
9	NUMEC	C-14	Oxide Fuel
10	GE	L15D	Structural
11	NUMEC	C-13	Oxide Fuel
12	NUMEC	C-4	Oxide Fuel
13	GE	MT-4	Structural
14	NUMEC	C-18	Oxide Fuel
15	NUMEC	C-10	Oxide Fuel
16		Dummy	
17	NUMEC	C-19	Oxide Fuel
18		Dummy	
19	NUMEC	C-2	Oxide Fuel

Subassembly No. X080

Type Hardware: MK-A-19

Orifice: No. of Holes 1; Dia. of Holes 0.407

Lower Adapter Modifications: None

Flow Test Data: ~25 gpm in row 6

Date Assembled: 8/24/70; Location FEF

Date Loaded in Reactor: 9/11/70; for Run 46

Initial Grid Position: 6E5

NOTE: The diameter between shroud-tube dimples was enlarged to 0.390 in. in the lower 20 in. of all shroud tubes; diameter between upper dimples remained 0.379 in.

Position	Sponsor	Ident. No.	Comments
1		Solid	
2		Solid	
3		Solid	
4	GE	F8K	Oxide Fuel
5		Solid	
6		Dummy	
7		Solid	
8	GE	F8M	Oxide Fuel
9	GE	F8L	Oxide Fuel
10		Dummy	
11		Solid	
12		Solid	
13	GE	F4M	Oxide Fuel
14	GE	F8J	Oxide Fuel
15	GE	F4C	Oxide Fuel
16		Solid	
17	GE	F8P	Oxide Fuel
18	GE	F4B	Oxide Fuel
19	GE	F8I	Oxide Fuel

Subassembly No. X081

Type Hardware: MK-A-19

Orifice: No. of Holes 1; Dia. of Holes 0.306

Lower Adapter Modifications: Upper holes 0.375

Flow Test Data: ~12 gpm in row 7

Date Assembled: 5/15/70; Location FEF

Date Loaded in Reactor: 5/24/70; for Run 43

Initial Grid Position: 7C5

NOTE: The diameter between shroud-tube dimples was enlarged to 0.390 in. in the lower 20 in. of all shroud tubes; diameter between upper dimples remained 0.379 in.

Pos.	Sponsor	Ident. No.	Pos.	Sponsor	Ident. No.
1	ANL	86-70	32	ANL	87-67
2		87-19	33		88-24
3		88-26	34		86-60
4		86-14	35		87-42
5		87-73	36		88-6
6		88-43	37		86-15
7		86-83	38		87-31
8		87-9	39		88-1
9		88-27	40		86-16
10		86-9	41		87-1
11		87-58	42		88-3
12		88-25	43		86-58
13		86-78	44		87-40
14		87-85	45		88-81
15		88-56	46		86-56
16		86-79	47		87-64
17		87-22	48		88-53
18		88-20	49		86-66
19		86-12	50		87-15
20		87-25	51		88-11
21		88-9	52		86-18
22		86-10	53		87-50
23		87-74	54		88-87
24		88-68	55		86-47
25		86-61	56		87-89
26		87-17	57		88-83
27		88-15	58		86-26
28		86-37	59		87-13
29		87-34	60		88-32
30		88-34	61		88-50
31		86-90			

NOTE: X082 contains standard MK-IA driver-fuel elements taken from controlled-flow subassemblies C-2186S, C-2187S, and C-2188S. The elements do not have identification marks; they are located by the positions they occupied in C-2186S, C-2187S, and C-2188S.

Subassembly No. X082

Type Hardware: MK-E-61

Orifice: No. of Holes 7; Dia. of Holes 0.218

Lower Adapter Modifications: None

Flow Test Data: ~42 gpm in row 5

Date Assembled: 5/22/70; Location FEF

Date Loaded in Reactor: 5/24/70; for Run 43

Initial Grid Position: 5E2

Pos.	Sponsor	Ident. No.	Pos.	Sponsor	Ident. No.
1	ANL	97-61	32	ANL	87-67
2		87-19	33		88-24
3		88-26	34		86-60
4		86-14	35		87-42
5		87-73	36		88-6
6		88-43	37		86-15
7		86-83	38		97-67
8		87-9	39		88-1
9		88-27	40		86-16
10		86-9	41		87-1
11		87-58	42		88-3
12		88-25	43		86-58
13		97-64	44		87-40
14		87-85	45		88-81
15		88-56	46		86-56
16		86-79	47		97-69
17		87-22	48		88-53
18		88-20	49		86-66
19		86-12	50		97-73
20		87-25	51		88-11
21		88-9	52		86-18
22		86-10	53		87-50
23		87-74	54		88-87
24		88-68	55		86-47
25		86-61	56		97-91
26		87-17	57		88-83
27		88-15	58		86-26
28		86-37	59		87-13
29		87-34	60		88-32
30		88-34	61		88-50
31		86-90			

NOTE: X082A contains standard MK-IA driver-fuel elements taken from controlled-flow subassemblies C-2186S, C-2187S, C-2188S, and C-2197S. The elements do not have identification marks; they are located by the positions they occupied in C-2186S, C-2187S, C-2188S, and C-2197S.

Subassembly No. X082A

Type Hardware: MK-E-61

Orifice: No. of Holes 7; Dia. of Holes 0.266

Lower Adapter Modifications: None

Flow Test Data: ~54 gpm in row 5

Date Assembled: 12/15/70; Location FEF

Date Loaded in Reactor: 2/23/71; for Run 47B

Initial Grid Position: 5A4

Pos.	Sponsor	Ident. No.	Pos.	Sponsor	Ident. No.
1	ANL	17	32	AGC	43228
2	AGC	05495	33		10099
3		38513	34		39379
4		10085	35		10196
5		38094	36		40092
6		09792	37	ANL	57
7		39412	38	AGC	05104
8		09819	39		40667
9		38535	40		10138
10		08281	41		38117
11		37619	42		08478
12		05276	43		39820
13	ANL	26	44		05149
14	AGC	05529	45		39499
15		37507	46		10181
16		10135	47		39807
17		33675	48		09691
18		08476	49	ANL	82
19		39149	50	AGC	05288
20		05424	51		41159
21		39250	52		10155
22		09444	53		38949
23		39988	54		10247
24		08393	55		38183
25	ANL	45	56		05281
26	AGC	05094	57		38519
27		10272	58		09501
28		38200	59		40522
29		09362	60		07593
30		40007	61	ANL	90
31		05296			

NOTE: All elements contain unirradiated MK-IA driver fuel.

Subassembly No. X083

Type Hardware: MK-E-61

Orifice: No. of Holes 7; Dia. of Holes 0.266

Lower Adapter Modifications: None

Flow Test Data: 56.5 gpm in row 5

Date Assembled: 8/25/70; Location ITF

Date Loaded in Reactor: 9/15/70; for Run 46

Initial Grid Position: 5E2

Position	Sponsor	Ident. No.	Comments
1	ANL	EW-26	Oxide Fuel
2	↓	"-27	↓
3		"-28	
4		"-29	
5		"-31	
6		"-32	
7		"-33	
8		"-34	
9		"-35	
10	ANL/NUMEC	D-5	Deencapsulated Oxide Fuel
11	ANL	EW-36	Oxide Fuel
12	↓	"-37	↓
13		"-38	
14		"-39	
15		"-40	
16		"-41	
17		"-43	
18		"-44	
19		"-45	

Subassembly No. X084 (ANL Failure Test B)

Type Hardware: MK-E-19E

Series 1 0.652

Orifice: No. of Holes 2; Dia. of Holes 0.461

(In series)

Lower Adapter Modifications: None

Flow Test Data: ~26 gpm in row 5

Date Assembled: 2/ 8/71; Location FEF

Date Loaded in Reactor: 2/24/71; for Run 47B

Initial Grid Position: 5C2

NOTES:

1. Orificed per sketch ID 1A18016.
2. Wire wrap on 2-in. pitch.

Position	Sponsor	Ident. No.	Comments
1		Dummy	
2		Dummy	
3		Dummy	
4		Dummy	
5		Dummy	
6	ANL	EW-1	Oxide Fuel
7	↓	EW-2	↓
8	↓	EW-3	↓
9		Dummy	
10		Dummy	
11	ANL	EW-4R	Oxide Fuel
12	↓	EW-5	↓
13	↓	EW-7	↓
14	↓	EW-9	↓
15		Dummy	
16		Dummy	
17	ANL	EW-10	Oxide Fuel
18	↓	EW-12	↓
19	↓	EW-23	Predefected ↓
20	↓	EW-13	
21	↓	EW-14	
22		Dummy	
23		Dummy	
24	ANL	EW-15	Oxide Fuel
25	↓	EW-16	↓
26	↓	EW-17	↓
27	↓	EW-18	↓
28		Dummy	
29		Dummy	
30	ANL	EW-19	Oxide Fuel
31	↓	EW-20	↓
32	↓	EW-21	↓
33		Dummy	
34		Dummy	
35		Dummy	
36		Dummy	
37		Dummy	

Subassembly No. X085 (ANL Failure Test A)

Type Hardware: MK-E-37A

Orifice: No. of Holes 7; Dia. of Holes 0.219

Lower Adapter Modifications: None

Flow Test Data: 43 gpm in row 4

Date Assembled: 10/23/70; Location ITF

Date Loaded in Reactor: 10/28/70; for Run 47A

Initial Grid Position: 4E2

NOTE: Spacer disc per drawing EB-1-50594-A.

Position	Sponsor	Ident. No.	Comments
1	LASL	K-39B	Carbide Fuel
2	BMI	1-2	Nitride Fuel
3	BMI	2-5	Nitride Fuel
4	LASL	K-38B	Carbide Fuel
5	LASL	K-44	Carbide Fuel
6	BMI	2-3	Nitride Fuel
7	WARD	W-3-F	Carbide Fuel
8	LASL	K-37B	Carbide Fuel
9	LASL	K-43	Carbide Fuel
10	BMI	2-2	Nitride Fuel
11	BMI	2-8	Nitride Fuel
12	WARD	W-10-F	Carbide Fuel
13	BMI	1-1	Nitride Fuel
14	BMI	2-1	Nitride Fuel
15	BMI	2-7	Nitride Fuel
16	WARD	W-7-F	Carbide Fuel
17	BMI	1-4	Nitride Fuel
18	BMI	2-6	Nitride Fuel
19	WARD	W-4-F	Carbide Fuel

Subassembly No. X086

Type Hardware: MK-A-19

Orifice: No. of Holes 1; Dia. of Holes 0.750

Lower Adapter Modifications: None

Flow Test Data: 50.5 5
53.4 gpm in row 4

Date Assembled: 7/29/70; Location ITF

Date Loaded in Reactor: 8/7/70; for Run 45

Initial Grid Position: 4D3

NOTE: Diameter between shroud-tube dimples was enlarged to 0.390 in. in lower 20 in. of all 19 shroud tubes; diameter between upper dimples remained 0.379 in.

Pos.	Sponsor	Ident. No.	Pos.	Sponsor	Ident. No.
1	WADCO	9-1	32	WADCO	9-32
2		9-62	33		9-33
3		9-3	34		9-34
4		9-63	35		9-35
5		9-5	36		9-67
6		9-6	37		9-37
7		9-7	38		9-38
8		9-8	39		9-39
9		9-9	40		9-40
10		9-64	41		9-41
11		9-11	42		9-42
12		9-12	43		9-43
13		9-13	44		9-44
14		9-14	45		9-45
15		9-15	46		9-46
16		9-16	47		9-47
17		9-17	48		9-48
18		9-18	49		9-68
19		9-19	50		9-50
20		9-20	51		9-51
21		9-21	52		9-52
22		9-22	53		9-53
23		9-23	54		9-54
24		9-24	55		9-55
25		9-25	56		9-56
26		9-65	57		9-57
27		9-27	58		9-58
28		9-28	59		9-59
29		9-66	60		9-60
30		9-30	61		9-61
31		9-31			

NOTE: All mixed-oxide fuel elements.

Subassembly No. XO87 (PNL-9)
Type Hardware: MK-B-61A
Orifice: No. of Holes Open ; Dia. of Holes
Lower Adapter Modifications: None
Flow Test Data: 69 gpm in row 5
Date Assembled: 5/18/70 ; Location ITF
Date Loaded in Reactor: 5/24/70 ; for Run 43
Initial Grid Position: 5B4

Pos.	Sponsor	Ident. No.	Pos.	Sponsor	Ident. No.
1	WADCO	9-1	32	WADCO	9-32
2		9-62	33		9-33
3		9-3	34		9-34
4		9-63	35		9-35
5		9-5	36		9-67
6		9-6	37		9-37
7		9-7	38		9-38
8		9-8	39		9-39
9		9-9	40		9-40
10		9-64	41		9-41
11		9-11	42		9-42
12		9-12	43		9-43
13		9-13	44		9-44
14		9-14	45		9-45
15		9-15	46		9-46
16		9-16	47		9-47
17		9-17	48		9-48
18		9-18	49		9-68
19		9-19	50		9-50
20		9-20	51		9-51
21		9-21	52		9-52
22		9-22	53		9-53
23		9-23	54		9-54
24		9-24	55		9-55
25		9-25	56		9-56
26		9-65	57		9-57
27		9-27	58		9-58
28		9-28	59		9-59
29		9-66	60		9-60
30		9-30	61		9-61
31		9-31			

NOTE: All mixed-oxide fuel elements.

Subassembly No. XO87A (PNL-9)
Type Hardware: MK-B-61A
Orifice: No. of Holes 7; Dia. of Holes 0.219
Lower Adapter Modifications: None
Flow Test Data: ~42 gpm in row 6
Date Assembled: 10/13/70; Location FEF
Date Loaded in Reactor: 10/27/70; for Run 47
Initial Grid Position: 6C2

Position	Sponsor	Ident. No.	Comments
1	WARD	W1-14	Oxide Fuel
2		W1-9	
3		W1-12	
4		W1-13	
5		W1-8	
6		W1-15	
7		W1-11	
8		W1-7	
9		W1-6	
10		W1-18s	
11		W1-10	
12		W1-19s	
13		W1-3	
14		W1-17s	
15		W1-2	
16		W1-4	
17		W1-16s	
18		W1-5	
19		W1-1	

Subassembly No. X088

Type Hardware: MK-A-19

Orifice: No. of Holes 1; Dia. of Holes 0.308

Lower Adapter Modifications: Upper holes 0.375

Flow Test Data: 13.3 gpm in row 6

Date Assembled: 5/19/70; Location ITF

Date Loaded in Reactor: 5/24/70; for Run 43

Initial Grid Position: 6F4

Position	Sponsor	Ident. No.	Comments
1	WADCO	B-49	Structural
2	WADCO	B-44	Structural
3	WADCO	B-48	Structural
4	WADCO	B-50	Structural
5	WADCO	B-45	Structural
6	WADCO	B-47	Structural
7	WADCO	B-46	Structural

Subassembly No. X089

Type Hardware: MK-B-7A

Orifice: No. of Holes 3; Dia. of Holes 0.162

Lower Adapter Modifications: None

Flow Test Data: 11.5 gpm in row 2

Date Assembled: 8/28/70; Location ITF

Date Loaded in Reactor: 9/15/70; for Run 46

Initial Grid Position: 2F1

Position	Sponsor	Ident. No.	Comments
1	BMI	C4-3	Structural
2	WADCO	B-43	Tantalum
3	INC	I-15-1	Structural
4	BMI	C4-1	Structural
5	ORNL	O-2	Ceramic
6	BMI	C4-2	Structural
7	BMI	C4-4	Structural

Subassembly No. XO90

Type Hardware: MK-B-7A

Orifice: No. of Holes 3; Dia. of Holes 0.162

Lower Adapter Modifications: None

Flow Test Data: ~ 12 gpm in row 7

Date Assembled: 8/28/70; Location ITF

Date Loaded in Reactor: 9/15/70; for Run 46

Initial Grid Position: 7D5

Position	Sponsor	Ident. No.	Comments
1	WADCO	BT5	Thermocouple
2	WADCO	BT6	Thermocouple
3	WADCO	BT7	Thermocouple
4	WADCO	BT8	Thermocouple
5	WADCO	BT9	Thermocouple
6	WADCO	BT10	Thermocouple
7	WADCO	BT11	Thermocouple

Subassembly No. K091

Type Hardware: MK-B-7A

Orifice: No. of Holes 3 ; Dia. of Holes 0.162

Lower Adapter Modifications: None

Flow Test Data: 11.5 gpm in row 4

Date Assembled: 8/28/70 ; Location ITF

Date Loaded in Reactor: 9/11/70 ; for Run 46

Initial Grid Position: 4E3

Position	Sponsor	Ident. No.	Comments
1		Dummy	
2		Dummy	
3		Dummy	
4		Dummy	
5		Dummy	
6		Dummy	
7	LASL	K-2	Thermionic Insulator

Subassembly No. X092

Type Hardware: MK-B-7A

Orifice: No. of Holes 3; Dia. of Holes 0.162

Lower Adapter Modifications: None

Flow Test Data: ~12 gpm in row 7

Date Assembled: 8/28/70; Location ITF

Date Loaded in Reactor: 9/15/70; for Run 46

Initial Grid Position: 7B3

Pos.	Sponsor	Ident. No.	Pos.	Sponsor	Ident. No.
1	WADCO	10-1	32	WADCO	10-32
2		10-2	33		10-33
3		10-62	34		10-34
4		10-63	35		10-69
5		10-5	36		10-36
6		10-6	37		10-37
7		10-7	38		10-38
8		10-8	39		10-70
9		10-9	40		10-40
10		10-10	41		10-41
11		10-11	42		10-42
12		10-12	43		10-43
13		10-13	44		10-44
14		10-14	45		10-45
15		10-15	46		10-71
16		10-64	47		10-47
17		10-17	48		10-48
18		10-18	49		10-49
19		10-19	50		10-50
20		10-20	51		10-51
21		10-21	52		10-72
22		10-66	53		10-53
23		10-23	54		10-54
24		10-24	55		10-55
25		10-25	56		10-56
26		10-26	57		10-57
27		10-27	58		10-58
28		10-28	59		10-74
29		10-67	60		10-60
30		10-68	61		10-61
31		10-31			

NOTE: All mixed-oxide fuel elements.

Subassembly No. X093 (PNL-10)

Type Hardware: MK-B-61A

Orifice: No. of Holes Open; Dia. of Holes _____

Lower Adapter Modifications: None

Flow Test Data: 62.5 gpm in row 6

Date Assembled: 10/13/70; Location ITF

Date Loaded in Reactor: 10/27/70; for Run 47

Initial Grid Position: 6E4

Position	Sponsor	Ident. No.	Comments
1	GGA	G-7	Oxide Fuel
2	GGA	G-5	
3	GGA	G-6	
4	GGA	G-4	
5	GGA	G-3	
6	GGA	G-2	
7	GGA	G-1	

NOTE: Capsules oriented so that arrows on them point toward front of the T-bar grid.

Subassembly No. X094

Type Hardware: MK-B-7B

Orifice: No. of Holes 2; Dia. of Holes 0.311
1; Dia. of Holes 0.440

(In series)
 Lower Adapter Modifications: None

Flow Test Data: 17.5 gpm in row 7

Date Assembled: 11/6/70; Location ITF

Date Loaded in Reactor: 11/16/70; for Run 47B

Initial Grid Position: 7B4

<u>Position</u>	<u>Sponsor</u>	<u>Ident. No.</u>	<u>Comments</u>
1	NRL	H-1	Structural

Subassembly No. X095

Type Hardware: MK-M-1

Orifice: No. of Holes 2/plate; Dia. of Holes 0.099
(3 plates in series)

Lower Adapter Modifications: None

Flow Test Data: 2.3 gpm in row 7

Date Assembled: 9/10/70; Location ITF

Date Loaded in Reactor: 9/18/70; for run 46

Initial Grid Position: 7A5

Pos.	Sponsor	Ident. No.	Pos.	Sponsor	Ident. No.
1	WADCO	N-161	32	WADCO	N-058
2		N-101	33		N-087
3		N-139	34		N-024
4		N-112	35		N-030
5		N-081	36		N-092
6		N-167	37		N-192
7		N-174	38		N-154
8		N-137	39		N-126
9		N-152	40		N-063
10		N-088	41		N-078
11		N-056	42		N-035
12		N-177	43		N-003
13		N-189	44		N-153
14		N-117	45		N-175
15		N-149	46		N-129
16		N-123	47		N-106
17		N-050	48		N-037
18		N-020	49		N-019
19		N-165	50		N-005
20		N-127	51		N-115
21		N-169	52		N-158
22		N-163	53		N-085
23		N-082	54		N-083
24		N-195	55		N-027
25		N-045	56		N-011
26		N-013	57		N-104
27		N-185	58		N-069
28		N-180	59		N-051
29		N-119	60		N-014
30		N-070	61		N-012
31		N-159			

NOTE: Elements contain UO_2 -25 wt % PuO_2 fuel; uranium 77% enriched.

Subassembly No. X097 (NUMEC-F)

Type Hardware: MK-B-61A

Orifice: No. of Holes 7; Dia. of Holes 0.349

Lower Adapter Modifications: Increased Flow (3 holes 0.375)

Flow Test Data: 75 gpm in row 5

Date Assembled: 11/18/70; Location ITF

Date Loaded in Reactor: 3/18/71; for Run 48A

Initial Grid Position: 5A2

Position	Sponsor	Ident. No.	Comments
1	GE	LP2F	Structural
2		LP2B	
3		LP2D	
4		LP2K	
5		LP2E	
6		LP2A	
7		LP2C	
8		LP2I	
9		LP2J	
10		LP2M	
11		LP2G	
12		LP2H	
13		LP2Q	
14		LP2O	
15		LP2L	
16		LP2N	
17		LP2P	
18		LP2R	
19		LP2S	

Subassembly No. K098

Type Hardware: MK-A-19

Orifice: No. of Holes 1; Dia. of Holes 0.311

Lower Adapter Modifications: None

Flow Test Data: 11.6 gpm in row 4

Date Assembled: 11/6/70; Location ITF

Date Loaded in Reactor: 11/16/70; for Run 47B

Initial Grid Position: 4C2

Position	Sponsor	Ident. No.	Comments
1	ORNL	0-9	Boron Carbide
2	ORNL	0-5	Boron Carbide
3	ORNL	0-7	Boron Carbide
4	ORNL	0-10	Boron Carbide
5	ORNL	0-6	Boron Carbide
6		Dummy	
7	ORNL	0-8	Boron Carbide

Subassembly No. X099

Type Hardware: MK-B-7A

Orifice: No. of Holes 3; Dia. of Holes 0.162

Lower Adapter Modifications: None

Flow Test Data: ~13 gpm in row 7

Date Assembled: 10/29/70; Location ITF

Date Loaded in Reactor: 11/16/70; for Run 47B

Initial Grid Position: 7F5

Position	Sponsor	Ident. No.	Comments
1	ORNL	OE-3	Structural
2		OG-3	
3		OB-3	
4		OD-3	
5		OF-3	
6		OA-3	
7		OC-3	

Subassembly No. X100

Type Hardware: MK-B-7A

Orifice: No. of Holes 3; Dia. of Holes 0.162

Lower Adapter Modifications: None

Flow Test Data: 11.3 gpm in row 2

Date Assembled: 9/30/70; Location ITF

Date Loaded in Reactor: 10/7/70; for Run 46B

Initial Grid Position: 2D1

Position	Sponsor	Ident. No.	Comments
1	ANL	EA-2	Structural
2		EA-98	
3		EA-72	
4		EA-25	
5		EA-100	
6		EA-75	
7		EA-5	
8		EA-62	
9		EA-103	
10		EA-79	
11		EA-23	
12		EA-48	
13		EA-943	
14		EA-27	
15		EA-71	
16		EA-12	
17		EA-49	
18		EA-321	
19		EA-30	
20		EA-101	
21		EA-65	
22		EA-21	
23		EA-83	
24		EA-16	
25		EA-45	
26		EA-86	
27		EA-18	
28		EA-76	
29		EA-69	
30		EA-102	
31		EA-9	
32		EA-74	
33		EA-601	
34		EA-15	
35		EA-41	
36		EA-945	
37		EA-29	

Subassembly No. X101

Type Hardware: MK-L-37

Orifice: No. of Holes 3; Dia. of Holes 0.162

Lower Adapter Modifications: None

Flow Test Data: 14.3 gpm in row 6 or 7

Date Assembled: 5/4/71; Location ITF

Date Loaded in Reactor: 5/16/71; for Run 49

Initial Grid Position: 7B3

<u>Position</u>	<u>Sponsor</u>	<u>Ident. No.</u>	<u>Comments</u>
1	ANL	S-11 (Top)	Chromium Corr.
		S20	
		S25	
		S30	
		S1	
		S6	
		S12	
		S21	
		S26	
		S31	
		S2	
		S7	
		S13	
		S22	
		S27	
		S32	
		S3	
		S8	
		S14	
		S23	
		S28	
		S33	
		S4	
		S9	
		S15	
		S24	
		S29	
		S34	
		S5	
		S10 (Bottom)	

Subassembly No. XL02

Type Hardware: MK-P-1

Orifice: No. of Holes 1/plate; Dia. of Holes 0.125
(3 plates in series)

Lower Adapter Modifications: None

Flow Test Data: 4.6 gpm in row 6 or 7

Date Assembled: 12/9/70; Location ITF

Date Loaded in Reactor: 2/22/71; for Run 47B

Initial Grid Position: 7F1

- NOTE: 1. Stamped identification number on each ring is aligned with identification notch on the subassembly.
2. ANL silicon carbide capsule 10-1 was loaded at top of spindle holding chromium-corrosion samples; ANL silicon carbide capsule 10-2 was loaded at bottom of spindle.

Position	Sponsor	Ident. No.	Comments
1		Dummy	
2		Dummy	
3		Dummy	
4		Dummy	
5	WADCO	B-57	Tantalum
6		Dummy	
7		Dummy	

Subassembly No. X103

Type Hardware: MK-B-7A

Orifice: No. of Holes 3; Dia. of Holes 0.162

Lower Adapter Modifications: None

Flow Test Data: 11.8 gpm in row 2

Date Assembled: 9/30/70; Location ITF

Date Loaded in Reactor: 10/7/70; for Run 46B

Initial Grid Position: 2BI

Position	Sponsor	Ident. No.	Comments
1	ANL	E-J-1	Gamma Heat
2		Dummy	
3		Dummy	
4	ANL	E-J-2	Gamma Heat
5		Dummy	
6		Dummy	
7	ANL	E-J-3	Gamma Heat

Subassembly No. X104

Type Hardware: MK-B-7

Orifice: No. of Holes 2/plate; Dia. of Holes 0.125
(3 plates in series)

Lower Adapter Modifications: None

Flow Test Data: 2.8 gpm in row 1 or 2

Date Assembled: 3/11/71; Location ITF

Date Loaded in Reactor: 3/29/71; for Run 48A

Initial Grid Position: 2D1

Position	Sponsor	Ident. No.	Comments
1		Dummy	
2		Dummy	
3	ANL	E-J-6	Gamma Heat
4	ANL	E-J-5	Gamma Heat
5	ANL	E-J-4	Gamma Heat
6		Dummy	
7		Dummy	

Subassembly No. X105

Type Hardware: MK-B-7

Orifice: No. of Holes 1/plate; Dia. of Holes 0.125
(3 plates in series)

Lower Adapter Modifications: None

Flow Test Data: 1.6 gpm in row 6 or 7

Date Assembled: 3/11/71; Location ITF

Date Loaded in Reactor: 3/29/71; for Run 48A

Initial Grid Position: 7A5

Position	Sponsor	Ident. No.	Comments
1	ANL	A-003	Oxide Fuel
2	ANL	A-004	Oxide Fuel
3	ANL	A-011	Oxide Fuel
4	ANL	A-024	Oxide Fuel
5	ANL	A-016	Oxide Fuel
6	ANL	A-014	Oxide Fuel
7	ANL	A-018	Oxide Fuel

NOTES:

1. Fuel elements taken from X040.
2. Orifice per sketch ID-1A-17987.

Subassembly No. X106

Type Hardware: MK-E-7B

Orifice: No. of Holes 1 3; Dia. of Holes 0.375
(In series) 0.216

Lower Adapter Modifications: None

Flow Test Data: ~15.7 gpm in row 6

Date Assembled: 2/ 4/71; Location FEF

Date Loaded in Reactor: 2/23/71; for Run 47B

Initial Grid Position: 6D5

Fcs.	Sponsor	Ident. No.	Pos.	Sponsor	Ident. No.
1	WADCO	PNL 11-1R	32	WADCO	-32
2		-2	33		-73*
3		-62	34		-34
4		-4R	35	**	-D3
5		-5	36		-36
6		-6	37		-37
7		-7	38		-38
8		-8R	39		-39
9		-9R	40		-40R
10		-10R	41		-41
11		-63*	42		-76*
12		-12	43		-43
13		-13	44		-44
14		-14	45		-45R
15		-15	46		-78*
16		-16R	47		-47
17		-17	48		-48A*
18		-18	49		-49
19		-19	50		-50
20		-20R	51		-51
21		-21	52		-52
22		-22	53		-53
23		-23	54		-54
24		-64*	55		-55
25		-65*	56		-56
26		-26	57		-57
27		** -D1	58		-58
28		-28	59		-59A*
29		-29	60		-60
30		-71*	61		-61
31		** -D2			

* Wire wrap 180° out of phase with identification flat.
 ** Dosimetry capsule; all others mixed-oxide elements.

Subassembly No. X107 (PNL-11)

Type Hardware: MK-B-61A

Orifice: No. of Holes 7; Dia. of Holes 0.375

Lower Adapter Modifications: None

Flow Test Data: 90 gpm in row 3

Date Assembled: 6/14/71; Location ITF

Date Loaded in Reactor: 8/1/71; for Run 50G

Initial Grid Position: 3D2

Position	Sponsor	Ident. No.	Comments
1	WADCO	P19-20	Oxide Fuel
2		P19-5	
3		P19-24R	
4		PNL 2-16	
5		P19-2	
6		P19-33	
7		P19-7R	
8		P19-8	
9		P19-13	
10		PNL 1-11	
11		P19-30	
12		P19-28	
13		P19-35	
14		P19-6	
15		P19-25R	
16		PNL 2-18	
17		P19-3R	
18		P19-26R	
19		P19-27R	

Subassembly No. X108

Type Hardware: MK-A-19

Orifice: No. of Holes 1; Dia. of Holes 0.750

Lower Adapter Modifications: None

Flow Test Data: ~64 gpm in row 2

Date Assembled: 4/8/71; Location FEF

Date Loaded in Reactor: 5/6/71; for Run 48E

Initial Grid Position: 2H1

NOTE: Dosimeter filler strips (WADCO sketch SK-3-16089) located around subassembly center as shown; notched and down.

Position	Sponsor	Ident. No.	Comments
1	INC	I-15-6	Structural
2		I-15-8	
3		I-15-3	
4		I-15-5	
5		I-15-7	
6		I-15-2	
7		I-15-4	

Subassembly No. XL10

Type Hardware: MK-B-7A

Orifice: No. of Holes 3; Dia. of Holes 0.162

Lower Adapter Modifications: None

Flow Test Data: 12.5 gpm in row 6 or 7

Date Assembled: 2/4/71; Location ITF

Date Loaded in Reactor: 2/22/71; for Run 47B

Initial Grid Position: 7C5

Subassembly No. X111

Type Hardware: MK-B-7A

Orifice: No. of Holes 3; Dia. of Holes 0.162

Lower Adapter Modifications: None

Flow Test Data: 4 gpm in row 8 or 9

Date Assembled: 2/4/71; Location ITF

Date Loaded in Reactor: 2/24/71; for Run 47B

Initial Grid Position: 8D5

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Position	Sponsor	Ident. No.	Comments
1	INC	I-5-2A	Fission Yield
2	INC	I-5-4	Fission Yield
3	INC	I-5-1	Fission Yield
4		Dummy	
5		Dummy	
6	INC	I-5-3	Fission Yield
7		Dummy	

Position	Sponsor	Ident. No.	Comments
1	B&W	D-2	Oxide Fuel
2	ORNL	OP-7	
3	ORNL	OS-4	
4	ORNL	OS-9	
5	B&W	D-30	
6	ORNL	OS-8	
7	ORNL	OS-12	
8	B&W	D-9	
9	ORNL	OP-5	
10	ORNL	OP-3	
11	B&W	D-20	
12	B&W	D-10	
13	ORNL	OS-2	
14	ORNL	OS-6	
15	B&W	D-22	
16	ORNL	OS-11	
17	B&W	D-21	
18	B&W	D-31	
19	ORNL	OS-7	
20	B&W	D-17	
21	ORNL	OS-1	
22	ORNL	OS-13	
23	ORNL	OS-10	
24	B&W	D-12	
25	B&W	D-19	
26	B&W	D-18	
27	ORNL	OS-3	
28	B&W	D-14	
29	B&W	D-27	
30	B&W	D-4	
31	ORNL	OS-5	
32	B&W	D-25	
33	ORNL	OP-2	
34	ORNL	OP-1	
35	B&W	D-29	
36	ORNL	OP-6	
37	B&W	D-5	

Subassembly No. X112

Type Hardware: MK-N-37

Orifice: No. of Holes 7; Dia. of Holes 0.250

Lower Adapter Modifications: None

Flow Test Data: 49 gpm in row 6 or 7

Date Assembled: 4/22/71; Location ITF

Date Loaded in Reactor: 5/12/71; for Run 49

Initial Grid Position: 6B2

Position	Sponsor	Ident. No.	Comments
1	NUMEC/ANL	B-8	Oxide Fuel
2	↓	B-4	↓
3	↓	B-10	↓
4	ANL	ASOV-14	↓
5	NUMEC/ANL	B-3	↓
6	↓	B-5	↓
7	ANL	ASOV-16	↓
8	↓	ASOPC-9	↓
9	↓	ASOPC-2	↓
10	↓	A03-D1	Structural
11	↓	ASOPC-6	Oxide Fuel
12	↓	ASOPC-4	↓
13	↓	ASOVG-19	↓
14	↓	ASOPC-8	↓
15	↓	ASOVG-20	↓
16	↓	ASOPC-7	↓
17	↓	ASOVG-21	↓
18	↓	ASOPC-10	↓
19	↓	ASOVG-18	↓

Subassembly No. X113

Type Hardware: MK-A-19

Orifice: No. of Holes 1; Dia. of Holes 0.438

Lower Adapter Modifications: Row-7 holes 0.376

Flow Test Data: ~25 gpm in row 6 or 7

Date Assembled: 3/31/71; Location FEF

Date Loaded in Reactor: 4/22/71; for Run 48D

Initial Grid Position: 6F1

Position	Sponsor	Ident. No.	Comments
1	WADCO/ANL	PNL 5-20	Oxide Fuel
2		PNL 5-28	
3		PNL 5-26	
4		PNL 5-23	
5		PNL 5-27	
6		PNL 5-33	
7		PNL 5-32	
8		PNL 5-10	
9		PNL 5-21	
10		PNL 5-40	
11		PNL 5-34	
12		PNL 5-1	
13		PNL 5-11	
14		PNL 5-9	
15		PNL 5-14	
16		PNL 5-2	
17		PNL 5-19	
18		PNL 5-16	
19		PNL 5-7	

Subassembly No. XL14 (PNL-5)

Type Hardware: MK-E-19D (F-37A Elements)

Orifice: No. of Holes 7; Dia. of Holes 0.250

Lower Adapter Modifications: None

Flow Test Data: ~40 gpm in row 6

Date Assembled: 3/24/71; Location: FEF

Date Loaded in Reactor: 4/22/71; for Run 48D

Initial Grid Position: 6C3

Position	Sponsor	Ident. No.	Comments
1	WARD	W3-34	Oxide Fuel
2		W3-29	
3		W3-23	
4		W3-16	
5		W3-35	
6		W3-30	
7		W3-24	
8		W3-17	
9		W3-10	
10		W3-36	
11		W3-31	
12		W3-25	
13		W3-18	
14		W3-11	
15		W3-5	
16		W3-37	
17		W3-32	
18		W3-26	
19		W3-19	
20		W3-12	
21		W3-6	
22		W3-1	
23		W3-33	
24		W3-27	
25		W3-20	
26		W3-13	
27		W3-7	
28		W3-2	
29		W3-28	
30		W3-21	
31		W3-14	
32		W3-8	
33		W3-3	
34		W3-42	
35		W3-15	
36		W3-9	
37		W3-4	

Subassembly No. X115

Type Hardware: WSA-3 Grid Type

Orifice: No. of Holes 7; Dia. of Holes 0.198

Lower Adapter Modifications: None

Flow Test Data: 35 gpm in row 6 or 7

Date Assembled: 3/31/71; Location ITF

Date Loaded in Reactor: 4/21/71; for Run 48D

Initial Grid Position: 6D1

Position	Sponsor	Ident. No.	Comments
1	WADCO/ANL	PNL 5-25	Oxide Fuel
2		PNL 5-50	
3		PNL 5-30	
4		PNL 5-24	
5		PNL 5-29	
6		PNL 5-37	
7		PNL 5-61	
8		PNL 5-71	
9		PNL 5-70	
10		PNL 5-41	
11		PNL 5-36	
12		PNL 5-3	
13		PNL 5-12	
14		PNL 5-18	
15		PNL 5-15	
16		PNL 5-4	
17		PNL 5-13	
18		PNL 5-17	
19		PNL 5-6	

Subassembly No. XL16 (PNL-5)

Type Hardware: MK-E-19D (F-37A Elements)

Orifice: No. of Holes 7; Dia. of Holes 0.250

Lower Adapter Modifications: None

Flow Test Data: ~40 gpm in row 6

Date Assembled: 3/29/71; Location FEF

Date Loaded in Reactor: 4/21/71; for Run 48D

Initial Grid Position: 6F3

Position	Sponsor	Ident. No.	Comments
1	GE	8B-15	Oxide Fuel
2	GE	8B-14	Oxide Fuel
3		Solid	
4	GE	8B-3	Oxide Fuel
5	GE	8B-17	Oxide Fuel
6	GE	8B-7	Oxide Fuel
7		Solid	
8	GE	8B-11	Oxide Fuel
9	GE	8B-10	Oxide Fuel
10	GE	8B-4	Oxide Fuel
11		Solid	
12		Dummy	
13	GE	8B-16	Oxide Fuel
14		Solid	
15		Solid	
16		Dummy	
17		Solid	
18		Solid	
19		Dummy	

Subassembly No. X117 (GE F8B)

Type Hardware: MK-A-19

Orifice: No. of Holes 1; Dia. of Holes 0.750

Lower Adapter Modifications: None

Flow Test Data. ~12.6 gpm in row 8

Date Assembled: 2/15/71; Location FEF

Date Loaded in Reactor: 2/24/71; for Run 47B

Initial Grid Position: 8B2

Position	Sponsor	Ident. No.	Comments
1	GE	8B-2	Oxide Fuel
2	GE	8B-18	Oxide Fuel
3		Solid	
4	GE	8B-9	Oxide Fuel
5	GE	8B-13	Oxide Fuel
6	GE	8B-6	Oxide Fuel
7		Solid	
8	GE	8B-8	Oxide Fuel
9	GE	8B-19	Oxide Fuel
10	GE	8B-5	Oxide Fuel
11		Solid	
12		Dummy	
13	GE	8B-12	Oxide Fuel
14	GE	8B-1	Oxide Fuel
15		Solid	
16		Solid	
17		Solid	
18		Solid	
19		Dummy	

Subassembly No. X118 (GE F8B)

Type Hardware: MK-A-19

Orifice: No. of Holes 1; Dia. of Holes 0.750

Lower Adapter Modifications: None

Flow Test Data: 12.6 gpm in row 8

Date Assembled: 2/16/71; Location FEF

Date Loaded in Reactor: 2/24/71; for Run 47B

Initial Grid Position: 8D7

Position	Sponsor	Ident. No.	Comments
1	BMI	3-6	Nitride Fuel
2	BMI	3-5	Nitride Fuel
3	BMI	3-2	Nitride Fuel
4	WARD	W8F	Carbide Fuel
5	BMI	3-7	Nitride Fuel
6	ORNL	S1C	Oxide Fuel
7	BMI	3-3	Nitride Fuel
8	LASL	K-49	Carbide Fuel
9	WARD	W5F	Carbide Fuel
10	BMI	3-8	Nitride Fuel
11	ORNL	S1B	Oxide Fuel
12	BMI	3-4	Nitride Fuel
13	LASL	K-50	Carbide Fuel
14	WARD	W6F	Carbide Fuel
15	LASL	K-45	Carbide Fuel
16	ORNL	S1D	Oxide Fuel
17	LASL	K-51	Carbide Fuel
18	WARD	W12F	Carbide Fuel
19	LASL	K-46	Carbide Fuel

Subassembly No. X119

Type Hardware: MK-A-19

Orifice: No. of Holes 1; Dia. of Holes 0.750

Lower Adapter Modifications: None

Flow Test Data: ~50 gpm in row 5

Date Assembled: 5/ 6/71; Location FEF

Date Loaded in Reactor: 5/16/71; for Run 49

Initial Grid Position: 5F4

Position	Sponsor	Ident. No.	Comments
1	BMI	3-6	Nitride Fuel
2	BMI	3-5	Nitride Fuel
3	BMI	3-2	Nitride Fuel
4	WARD	W8F	Carbide Fuel
5	BMI	3-7	Nitride Fuel
6	ORNL	S1C	Oxide Fuel
7	BMI	3-3	Nitride Fuel
8	LASL	K-49	Carbide Fuel
9	WARD	W5F	Carbide Fuel
10	BMI	3-8	Nitride Fuel
11	ORNL	S1B	Oxide Fuel
12	BMI	3-4	Nitride Fuel
13	LASL	K-50	Carbide Fuel
14	WARD	W6F	Carbide Fuel
15	LASL	K-45	Carbide Fuel
16	ORNL	S1D	Oxide Fuel
17	LASL	K-51	Carbide Fuel
18	WARD	W12F	Carbide Fuel
19	LASL	K-46	Carbide Fuel

Subassembly No. X119A

Type Hardware: MK-A-19

Orifice: No. of Holes 1; Dia. of Holes 0.750

Lower Adapter Modifications: None

Flow Test Data: ~50 gpm in row 5

Date Assembled: 7/23/71; Location FEF

Date Loaded in Reactor: 8/1/71; for Run 50G

Initial Grid Position: 5F4

Position	Sponsor	Ident. No.	Comments
1	WADCO	BCM-1-5	Boron Carbide
2	WADCO	BCM-1-8	Boron Carbide
3	WADCO	BCM-1-2	Boron Carbide
4	WADCO	BCM-1-Ta	Tantalum
5	WADCO	BCM-1-1	Boron Carbide
6	WADCO	BCM-1-7	Boron Carbide
7	WADCO	BCM-1-4	Boron Carbide

NOTE: Orientation of the index hole on the boron carbide capsules indicated by an "x".

Subassembly No. X120

Type Hardware: MK-B-7A

Orifice: No. of Holes 3; Dia. of Holes 0.162

Lower Adapter Modifications: None

Flow Test Data: 13.7 gpm in row 6 or 7

Date Assembled: 4/27/71; Location ITF

Date Loaded in Reactor: 5/6/71; for Run 48E

Initial Grid Position: 7E3

<u>Position</u>	<u>Sponsor</u>	<u>Ident. No.</u>	<u>Comments</u>
1	WADCO	B-65	Structural

Subassembly No. XL23
 Type Hardware: MK-M-1A
 Orifice: No. of Holes 3; Dia. of Holes 0.162
 Lower Adapter Modifications: None
 Flow Test Data: 13 gpm in row 2
 Date Assembled: 6/28/71; Location: ITF
 Date Loaded in Reactor: 7/1/71; for Run 50A
 Initial Grid Position: 2B1

Position	Sponsor	Ident. No.	Comments
1		Dummy	
2	ANL	EX-67	Dosimeter
3		Dummy	
4		Dummy	
5		Dummy	
6		Dummy	
7		Dummy	
8		Dummy	
9		Dummy	
10	ANL	EX-64	Dosimeter
11		Dummy	
12		Dummy	
13		Dummy	
14		Dummy	
15		Dummy	
16		Dummy	
17		Dummy	
18	ANL	EX-53	Dosimeter
19		Dummy	

Subassembly No. XL25

Type Hardware: MK-B-19

Orifice: No. of Holes 3¹; Dia. of Holes 0.216
(In series) 0.375

Lower Adapter Modifications: None

Flow Test Data: 16.5 gpm in row 2

Date Assembled: 6/8/71; Location ITF

Date Loaded in Reactor: 8/4/71; for Run 50H

Initial Grid Position: 2B1

Subassembly No. XL26

Type Hardware: Core Driver

Orifice: No. of Holes Open; Dia of Holes _____

Lower Adapter Modifications: None

Flow Test Data: ~123 gpm in row 3

Date Assembled: 6/10/71; Location ITF

Date Loaded in Reactor: 8/4/71; for Run 50H

Initial Grid Position: 3B2

<u>Position</u>	<u>Sponsor</u>	<u>Ident. No.</u>	<u>Comments</u>
21	ANL	EX-70	Dosimeters
46	ANL	EX-71	Dosimeters
89	ANL	EX-73	Dosimeters
All			
Others	ANL	None	MK-1A Driver

NOTE: Two dosimeter capsules loaded in the
modified trifiute reflectors as follows:
EX-74, upper trifiute
EX-75, lower trifiute.

Subassembly No. X127

Type Hardware: Core Driver

Orifice: No. of Holes Open; Dia. of Holes

Lower Adapter Modifications: None

Flow Test Data: ~ 94 gpm in row 4

Date Assembled: 6/8/71; Location ITF

Date Loaded in Reactor: 8/5/71; for Run 50H

Initial Grid Position: 4F/2

Position	Sponsor	Ident. No.	Comments
21	ANL	EX-68	Dosimeters
46	ANL	EX-72	Dosimeters
62	ANL	EX-69	Dosimeters
ALL			
Others	ANL	None	MK-1A Driver

Position	Sponsor	Ident. No.	Comments
1		Dummy	
2		Dummy	
3		Dummy	
4		Dummy	
5		Dummy	
6		Dummy	
7	ANL	EX-55	Dosimeter
8		Dummy	
9		Dummy	
10	ANL	EX-50	Dosimeter
11		Dummy	
12		Dummy	
13	ANL	EX-58	Dosimeter
14		Dummy	
15		Dummy	
16		Dummy	
17		Dummy	
18		Dummy	
19		Dummy	

Subassembly No. XL28

Type Hardware: MK-B-19

Orifice: No. of Holes 3 1; Dia. of Holes 0.216
(In series) 0.375

Lower Adapter Modifications: None

Flow Test Data: 15.8 gpm in row 4

Date Assembled: 6/10/71; Location ITF

Date Loaded in Reactor: 8/1/71; for Run 50G

Initial Grid Position: 4E3

Position	Sponsor	Ident. No.	Comments
1	ANL	EX-57	Dosimeter
2		Dummy	
3		Dummy	
4		Dummy	
5		Dummy	
6		Dummy	
7		Dummy	
8		Dummy	
9		Dummy	
10	ANL	EX-66	Dosimeter
11		Dummy	
12		Dummy	
13		Dummy	
14		Dummy	
15		Dummy	
16		Dummy	
17		Dummy	
18		Dummy	
19	ANL	EX-62	Dosimeter

Subassembly No. XL29

Type Hardware: MK-B-19

Orifice: No. of Holes 3 1; Dia. of Holes 0.216
(In series) 0.375

Lower Adapter Modifications: None

Flow Test Data: 16 gpm in row 5

Date Assembled: 6/10/71; Location ITF

Date Loaded in Reactor: 7/31/71; for Run 50G

Initial Grid Position: 5B2

Position	Sponsor	Ident. No.	Comments
1	ANL	EX-54	Dosimeter
2		Dummy	
3		Dummy	
4		Dummy	
5		Dummy	
6		Dummy	
7		Dummy	
8		Dummy	
9		Dummy	
10	ANL	EX-52	Dosimeter
11		Dummy	
12		Dummy	
13		Dummy	
14		Dummy	
15		Dummy	
16		Dummy	
17		Dummy	
18		Dummy	
19	ANL	EX-63	Dosimeter

Subassembly No. XL30

Type Hardware: MK-B-19

Orifice: No. of Holes 3 1; Dia. of Holes 0.216
(In series) 0.375

Lower Adapter Modifications: None

Flow Test Data: 16.5 gpm in row 6 or 7

Date Assembled: 6/10/71; Location ITF

Date Loaded in Reactor: 8/1/71; for Run 50G

Initial Grid Position: 7E3

Fosition	Sponsor	Ident. No.	Comments
1	ANL	EX-65	Dosimeter
2		Dummy	
3		Dummy	
4		Dummy	
5		Dummy	
6		Dummy	
7		Dummy	
8		Dummy	
9		Dummy	
10	ANL	EX-56	Dosimeter
11		Dummy	
12		Dummy	
13		Dummy	
14		Dummy	
15		Dummy	
16		Dummy	
17		Dummy	
18		Dummy	
19	ANL	EX-51	Dosimeter

Subassembly No. XL31

Type Hardware: MK-B-19

Orifice: No. of Holes 3 1; Dia. of Holes 0.216
(In series) 0.375

Lower Adapter Modifications: None

Flow Test Data: 5.1 gpm in row 8 or 9

Date Assembled: 6/10/71; Location ITF

Date Loaded in Reactor: 8/3/71; for Run 50H

Initial Grid Position: 8E4

Position	Sponsor	Ident. No.	Comments
1		Dummy	
2	ANL	EX-60	Dosimeter
3		Dummy	
4		Dummy	
5		Dummy	
6		Dummy	
7		Dummy	
8		Dummy	
9		Dummy	
10	ANL	EX-61	Dosimeter
11		Dummy	
12		Dummy	
13		Dummy	
14		Dummy	
15		Dummy	
16		Dummy	
17		Dummy	
18	ANL	EX-59	Dosimeter
19		Dummy	

Subassembly No. XL32

Type Hardware: MK-B-19

Orifice: No. of Holes 3 0.216
(In series) 1; Dia. of Holes 0.375

Lower Adapter Modifications: None

Flow Test Data: 16.5 gpm in row 2

Date Assembled: 6/10/71; Location ITF

Date Loaded in Reactor: 8/1/71; for Run 50G

Initial Grid Position: 2B1

Position	Spensor	Ident. No.	Comments
1	ANL	EA-4	Structural
2		EA-93	
3		EA-59	
4		EA-88	
5		EA-53	
6		EA-104	
7		EA-7	
8		EA-47	
9		EA-40	
10		EA-43	
11		EA-26	
12		EA-57	
13		EA-67	
14		EA-32	
15		EA-60	
16		EA-20	
17		EA-94	
18		EA-87	
19		EA-107	
20		EA-99	
21		EA-78	
22		EA-85	
23		EA-52	
24		EA-6	
25		EA-55	
26		EA-105	
27		EA-19	
28		EA-89	
29		EA-58	
30		EA-81	
31		EA-24	
32		EA-54	
33		EA-46	
34		EA-35	
35		EA-44	
36		EA-37	
37		EA-14	

Subassembly No. XL33

Type Hardware: MK-L-37

Orifice: No. of Holes 3; Dia. of Holes 0.162

Lower Adapter Modifications: None

Flow Test Data: 12.5 gpm in row 6 or 7

Date Assembled: 6/14/71; Location ITF

Date Loaded in Reactor: 7/1/71; for Run 50A

Initial Grid Position: 7B3

Subassembly No. XX03

Type Hardware: Instrumented Creep Subassembly

Orifice: No. of Holes 2/plate; Dia. of Holes 0.205
(3 plates in series)

Lower Adapter Modifications: Control-rod Type

Flow Test Data: ~7 gpm in row 5

Date Assembled: 12/70; Location ANL-I11.

Date Loaded in Reactor: 5/14/71; for Run 49

Initial Grid Position: 5F3

<u>Position</u>	<u>Sponsor</u>	<u>Ident. No.</u>	<u>Comments</u>
1	WADCO	B-51	Creep Structural