APPENDIX A

U.S. MOX EXPERIENCE TABLE

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APPENDIX A. U.S. MOX EXPERIENCE TABLE

This appendix provides a map of the U.S. domestic PWR and BWR MOX experience. The experience has been organized by first categorizing the reactor in which the MOX was irradiated. For each plant, the experience was diagrammed for each major campaign conducted by the fuel fabricator or sponsor of the research. This is followed by irradiation characteristics and a description of the examinations that were conducted. The column titles are generally self-explanatory; however, the considerations and hints below may be helpful to the user. The reader will notice several columns that have little or no data in them (such as "Beyond Design Basis Testing"). This column was set up from the beginning to reserve a slot for information. However, the MOX rods in the reactor campaigns were not subjected to transient testing in the reactor used for steady-state irradiation. It is also noteworthy that the current Advanced Test Reactor irradiations on MOX fuel are not mentioned. As of this writing, the first of these MOX rods (which utilized WG plutonium) had just come out of the reactor and were, therefore, not mapped. Any future updates of the data base should include these rods as information becomes available. Two tables and a corresponding reference list are presented. One table is used for PWRs and another for BWRs. The following sheets comprising these tables can be taped together to provide a collective "map" of the U.S. MOX experience. ORNL maintains the electronic version of this data base.

ITEM: In the category marked "ITEM," a number was assigned to each plant arbitrarily. This number is followed by a decimal and then a "batch" number. The definition of a batch number is somewhat arbitrary. However, it was used to refer to a group of rods or assemblies that went into a reactor at the same time, or it could also be thought of as a testing campaign number. The item number within that campaign is then sequentially assigned.

The "ITEM DESCRIPTION" column is important. This field tells the user whether the input for the entire row is for a Batch of MOX Assemblies (B), a single assembly or an arbitrary grouping of rods (A), an individual rod (R), or an irradiation item summary (IS). This field governs the interpretation of the data columns all along the row.

The term "IS" in the ITEM DESCRIPTION column refers to a summary of a campaign that was previously mapped. This merely offers a means to provide the reader with an overview of previously presented material. As an example, if one wants to total the number of MOX rods, then the IS rods should be taken out, since the information would otherwise be counted twice. The use of the IS option is demonstrated in the Quad Cities irradiation merely to inform the reader that core-wide gamma scans were conducted on both MOX assemblies and UO_2 assemblies.

REACTOR SPECIFICS: The column titles are self-explanatory. Probably the most important column to note is the "No. of MOX Assys in this ITEM."

ITEM ASSY MOX DESIGN AND FUEL ISOTOPICS The column titles are self-explanatory. The idea is to give the reader a picture of the type of assembly design and fuel rod characteristics that were used in this irradiation.

FABRICATION ASPECTS: An attempt is made to describe briefly the plutonium and uranium oxide powder process and the pellet fabrication techniques used for the fuel.

MAX LHGR: This is the maximum linear heat generation rate for the rod or assembly that was found in the literature. The literature was searched for the maximum value that the rod or assembly was thought to have seen. In the creation of the table, some interpretation and selection of the literature values had to be conducted, and, sometimes, a value was judged simply to be "representative" or close to what the specific maximum heat generation rate was. Oftentimes, the authors in the literature will quote vague or somewhat nondescript values.

FIRST SET/SECOND SET MEASUREMENTS: In mapping an irradiation, up to two total examinations (at a specific burnup) can be used to describe the examinations. There are several options for the description. One example might be the case where assemblies have MOX rods that are pulled at the end of a cycle (the 1st set is used to describe this). The assembly could be reconstituted and put back into the core for more cycles. The 2nd set is used to describe a subsequent PIE when the assembly comes out. The 1st set could also be used just to point out a simple visual exam. The second set could be used to describe the final exams at discharge burnup. This also works for single rod descriptions. However, if the rod is destructively examined at the first set of measurements, obviously the second set of measurements is "NA". In the case of a single rod description, the "Peak MOX rod burnup" and the "Avg Assy" burnup were both simply set to the average MOX rod burnup. The peak pellet of this rod was then given. For assembly descriptions the column titles are more self-explanatory.

MISCELLANEOUS: The most important of these columns are the last and next to the last column. In the "Overall Performance Notes," a brief overview of what was found for the rod is given, paying particular attention to whether the rod failed or not. The last column provides any miscellaneous information thought to be useful to the reader.

REFERENCES: Just below each line, a reference key is given which provides the full reference where the information in the cell was found. This reference is very valuable to the reader that wants to know more about a specific MOX rod assembly or irradiation. This reference key is used in conjunction with the reference list.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1							DOMESTIC PWR IRRADIATION													
2	<<<<<<	ITEM	>>>>>>>>>>>>>>	<<<<<			REACTOR SPECIFICS				>>>>>>>>	<<<<<<<			ITEM ASSY MOX DESIGN AND					FUEL
3	NOTE: blank-irrad was not mapped, ?-no data found in refs for this column, #### -judgment made or incomplete data, NA-does not apply (or thought not to be performed) or nothing to report for (IS) summary																			
4	LINE ITEM (plant.batch)	IRRADIATION ITEM (in the batch)	ITEM DESCRIPTION B-Batch of Assys, A-Single Assembly or group of rods, R-Individual Rod, IS-Irradiation Summary (in commentary)	Reactor & Unit	Project Sponsors	Reactor Type	Year First Insertion	Year of Final Discharge	Reactor Cycle Inserted	No. of MOX Assys in this ITEM (NA if rod)	Batch, Assy or Rod Name	Assy Design	TOTAL No. of MOX rods in ITEM	Mass of MOX in ITEM	Mass of Pu in ITEM	Pu total % Pu/(U+Pu) in ITEM (Max if mult blends)	No. of MOX pin types/blends in ITEM	Pu fiss % Fissile	%Pu-238	%Pu-239
5																				
6			GINNA IRRADIATION																	
7																				
8	1.1	1	B	Ginna	EPRI	PWR	1980	1985	10	4	MP1-4	14X14	716	?	?	3.1	?	92.9	2.30	79.[illegible]
9							ORTIZ-1	ORTIZ-1	ORTIZ-1	ORTIZ-1	ORTIZ-1	SHEA-1	SHEA-1			VOIGT-1	VOIGT-1	VOIGT-1	VOIGT-1	VOIGT-1
10																				
11			San Onofre-1																	
12																				
13	2.1	1	A	San Onofre-1	EEI	PWR	1970	1973	2	1	[illegible]	14X14	180	?	?	2.65	?	85.8	?	86.8
14							WCAP-4167-7	WCAP-4167-7				WCAP-4167-2	WCAP-4167-2			WCAP-4167-2	WCAP-4167-2	WCAP-4167-2		WCAP-4167-2
15	2.1 *	2	B	San Onofre-1	EEI	PWR	1970	1973	2	3	[illegible]	14X14	540	?	?	2.65	?	85.8	?	86.8
16							WCAP-4167-7	WCAP-4167-7				WCAP-4167-2	WCAP-4167-2			WCAP-4167-2	WCAP-4167-2	WCAP-4167-2		WCAP-4167-2
17			END OF COMMERCIAL PWRS																	
18																				
19		START OF PWR TEST RX ROD IRRADS																		
20																				
21			SAXTON CORE II RODS																	
22			"Four Low Burnup Rods"																	
23	3.1	1	R	Saxton	AEC	PWR-TEST	1965	1965	2 (core II)	NA	2-1	[illegible]	1	?	?	6.6	1	91.4	?	90.40
24							WCAP-3385-1	WCAP-3385-12			WCAP-3385-	WCAP-3385-51				WCAP-3385-51		WCAP-3385-51	WCAP-3385-51	WCAP-3385-51

Row	U	V	W	X	Y	Z	AA	AB	AC
1									
2	I S O T O P I C S								
3								>>>>>>	<<<
4	%Pu-240	%Pu-241	%Pu-242	Diluent Uranium (D or N)	Fuel Designer	% of MOX in ITEM (rod %)	Rod Pattern Desc.	B. Poison (in U of assy)	Fuel Bundler (where)
5									
6									
7									
8	18.28	3.35	0.73	N	Exxon/West.	100	High avg. center/med/low on edge/corner	NA	Exxon
9	VOIGT-1	VOIGT-1	VOIGT-1	VOIGT-1	VOIGT-1	VOIGT-1	VOIGT-1		VOIGT-1
10									
11									
12									
13	19.4	5.2	0.9	N	West.	100	High fuels in center diamond, med and low interspersed and surrounding	NA	West. NFD Manuf
14	WCAP-4167-2	WCAP-4167-2	WCAP-4167-2	WCAP-4167-2	WCAP-4167-2	WCAP-4167-2	WCAP-4167-2		WCAP-4167-2
15	19.4	5.2	0.8	N	West.	100	High fuels in center diamond, med and low interspersed and surrounding	NA	West. NFD Manuf
16	WCAP-4167-2	WCAP-4167-2	WCAP-4167-2	WCAP-4167-2	WCAP-4167-2	WCAP-4167-2	WCAP-4167-2		WCAP-4167-2
17									
18									
19									
20									
21									
22									
23	8.87	0.80	0.54	N	West.	100	uniform MOX	NA	West.
24	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-5		WCAP-3385-51		

Row	AD	AE	AF	AG	AH	AI	AJ	AK
1								
2								
3	F A B R I C A T I O N A S P E C T S					>>>>	Max LHGR	<<<FIRST ?
4	PuO2 conversion process (where)	UO2 conversion process (where)	Pellet Fabrication process	Pellet Types (A-annular, S-solid, D-dished, U-undished)	Cladding utilized	Any Instrument.	Max LHGR (kW/ft)	(1st Set) Avg Assy BW/MT (single or X batch-Max assy)
5								
6								
7								
8	?	?	?	D	Zr-4	Two assy - incore det.; two assy - incore thermocouples	?	20,800
9								
10				VOIGT-1	VOIGT-1	VOIGT-1		ORTIZ-1
11								
12								
13	TOTAL [illegible] Kg Pu nitrate-[illegible] Kg-oxalate precipitating [illegible] with ammonia yielding 25% [illegible] (West. PFDL at Cheswick)	complied with Eldorado Specification [illegible]	12 Kg Vee blend, [illegible] compressed into 1" slugs, crushed and roll mixed, pressed and sintered, wet centerless ground, vacuum dried	?	Zr-4	Some in-core power comparisons were made-not clear exactly which Pu assys	8.91	8,400
14	WCAP-4167-2	WCAP-4167-2	WCAP-4167-2		WCAP-4167-2	WCAP-4167-3	WCAP-4167-7	WCAP-4167-7
15	TOTAL [illegible] Kg Pu nitrate-[illegible] Kg-oxalate precipitating [illegible] with ammonia yielding 25% [illegible] (West. PFDL at Cheswick)	complied with Eldorado Specification [illegible]	12 Kg Vee blend, [illegible] compressed into 1" slugs, crushed and roll mixed, pressed and sintered, wet centerless ground, vacuum dried	?	Zr-4	Some in-core power comparisons were made-not clear exactly which Pu assys	?	?
16	WCAP-4167-2	WCAP-4167-2	WCAP-4167-2		WCAP-4167-2	WCAP-4167-3		
17								
18								
19								
20								
21								
22								
23	Pu metal buttons to thin strips oxidized at 500C, calcined at 850C-powder through a 44 micron sieve	As-issued UO2 mixed with [illegible]	VIPAC-BNL's Hipac process-two size fractions sieved and mixed, vibrated and tamped at 50g scale	NA	? Zr-4	NA	10.6	4500
24	WCAP-3385-52	WCAP-3385-53	WCAP-3385-53, WCAP-3385-5		WCAP-3385-12		WCAP-3385-12	WCAP-3385-12

	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA
1																
2	ET BU>>>>>		<<< FIRST SET ME ASUREMENTS			>>>>>>>>>	<<<SECOND SET BU>>>>>			SECOND SET	M EASUREMENTS		>>>>>>> > >	<<<<<<<<<<		
3																
4	(1st Set) Peak MOX rod MWd/MT	(1st Set) Peak MOX Pellet MWd/MT	(1st Set) Non-dest. exams performed-description	(1st Set) No. MOX rods PIE	(1st Set) summary of PIE measurement	(1st Set) Where PIE performed	(2nd Set) Avg Assy MWd/MT (single or if batch-Max assy)	(2nd Set) Peak MOX rod MWd/MT	(2nd Set) Peak MOX Pellet MWd/MT	(2nd Set) Non-dest exams performed - description	(2nd Set) No. MOX rods PIE	(2nd Set) summary of PIE measurement	(2nd Set) Where PIE performed	Was any data made public?	Beyond design basis/transient tests performed? If so, which ones.	How transported to RX and to PIE?
5																
6																
7																
8	?	?	?	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	?	NA	?
9																
10																
11																
12																
13	?	8,700	assembly visual, 4 rods-visual,rod length,gamma scan, diameter	2	Visual, length, profilometry(at H.C.), Fission Gas, clad hydrogen, clad & fuel metallography, gamma scan, autoradiographs,fuel fissions, tensile/burst test, fuel dens & metallography, profilometry, burnup & transuranics-on 1 mash-mixed rod and 1 master mix	Battelle	16,000	?	21,500	assembly visual, 4 rods-visual, rod length,rod diameter	2	Visual, length, profilometry(at H.C.), Fission Gas, clad hydrogen, clad & fuel metallography, gamma scan, autoradiographs,fuel fissions, tensile/burst test, fuel dens & metallography, profilometry, burnup & transuranics-on 1 mash-mixed rod and 1 master mix	Battelle	Y	NA	shipped to San Onofre in West Container Serial 20
14		WCAP-4167-	WCAP-4167-7	WCAP-4167-7	WCAP-4167-7	WCAP-4167-7			WCAP-4167-7			WCAP-4167-7	WCAP-4167-7			WCAP-4167-[illegible]
15	?	?	assembly visual	NA	NA	NA	?	?	?	Assembly Visual	NA	NA	NA	Y	NA	shipped to San Onofre in West Container Serial 20 and Serial 21
16			WCAP-4167-7													WCAP-4167-7
17																
18																
19																
20																
21																
22																
23	4500	6100	Visual, microscope, dimensional, gamma, determine peak power	1	Fission gas release and analysis, metallography(photomicrographs), H2 content in clad, Cs-137, Sr-90, Nd148, U&Pu isotopes	1	NA	NA	NA	NA	NA	NA	[illegible] NA	Y	N	Y
24	CAP-3385-	CAP-3385-	WCAP-3385-12		WCAP-3385-12											

	BB	BC
1		
2		MISCELLANEOUS >>>
3		
4	Overall Performance notes (failure, cladding etc.)	Miscellaneous Info
5		
6		
7		
8	No fuel failures noted	NOTE: The actual fuel pellets were manufactured by Westinghouse, Exxon was responsible for rod loading and overall mox analysis; average particle size was 15 to 20 microns
9		VOI27-1
10		
11		
12		
13	No apparent anomalies, split and gaseous fission products visible in mech mixed above 4,000 Mwd/t and in master mix above 21,000. Fission gas release of <2%. Comparisons between master mix and mech mix were made, master mix showed advantages.	Manufacturing, Irradiation, and PIE were fairly well documented in WCAP 4167 series of reports. Measured instrumentation showed that MOX assy powers were higher than calculated.
14	WCAP-4167-7	WCAP-4167-2, MOMSEV-1
15	No fuel failures noted	Manufacturing, Irradiation, and PIE were fairly well documented in WCAP 4167 series of reports. Measured instrumentation showed that MOX assy powers were higher than calculated.
16	WCAP-4167-7	WCAP-4167-2, MOMSEV-1
17		
18		
19		
20		
21		
22		
23	No failure noted, cladding shows higher hydrogen content than pellet rod, inner surface of the cladding had 0.6 mil thick reaction layer. Mass moisture identified in the Vipac fuel. Slight increase in length.	difference in power discrepancy, calculated burnup higher than measured
24	WCAP-3385-56, WCAP-3385-70	WCAP-3385-56

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
2	<<<<<<	ITEM	>>>>>>>>>>>>>>	<<<<<			REACTOR SPECIFICS				>>>>>>>>	<<<<<<<			ITEM ASSY MOX DESIGN AND					FUEL
3	NOTE: blank-irrad was not mapped, ?-no data found in refs for this column, ##?##-judgment made or incomplete data, NA-does not apply (or thought not to be performed) or nothing to report for (IS) summary																			
4	LINE ITEM (prog).(batch)	IRRADIATION ITEM (in the batch)	ITEM DESCRIPTION B-Batch of Assys, A-Single Assembly or group of rods, R-Individual Rod, IS-Irradiation Summary (a commentary)	Reactor & Unit	Project Sponsors	Reactor Type	Year First Insertion	Year of Final Discharge	Reactor Cycle Inserted	No. of MOX Assys in this ITEM (NA if rod)	Batch, Assy or Rod Name	Assy Design	TOTAL No. of MOX rods in ITEM	Mass of MOX in ITEM	Mass of Pu in ITEM	Pu total % Pu/(U+Pu) in ITEM (Max if mult blends)	No. of MOX pin type/blends in ITEM	Pu fiss % Fissile	%Pu-238	%Pu-239
25	3.1	2	R	Saxton	AEC	PWR-TEST	1965	1966	2 (core II)	NA	X-8	3X3 subassy in 9X9 (mod)	1	?	?	6.6	1	91.4	?	90.49
26							WCAP-3385-1	WCAP-3385-12			WCAP-3385-	WCAP-3385-51				WCAP-3385-51		WCAP-3385-51	WCAP-3385-51	WCAP-3385-51
27	3.1	3	R	Saxton	AEC	PWR-TEST	1965	1966	2 (core II)	NA	D	3X3 subassy in 9X9 (mod)	1	?	?	6.6	1	91.4	?	90.49
28							WCAP-3385-1	WCAP-3385-12				WCAP-3385-51				WCAP-3385-51		WCAP-3385-51	WCAP-3385-51	WCAP-3385-51
29	3.1	4	R	Saxton	AEC	PWR-TEST	1965	1966	2 (core II)	NA	E	3X3 subassy in 9X9 (mod)	1	?	?	6.6	1	91.4	?	90.49
30							WCAP-3385-1	WCAP-3385-12				WCAP-3385-57				WCAP-3385-51		WCAP-3385-51	WCAP-3385-51	WCAP-3385-51
31			"Rod OverPower Test"																	
32	3.1	5	R	Saxton	AEC	PWR-TEST	1965	1967	2 (core II)	NA	A	3X3 rod w/increased lattice pitch in 9X9	1	?	?	6.6	1	91.4	?	90.49
33							WCAP-3385-56	WCAP-3385-57				WCAP-3385-56				WCAP-3385-51		WCAP-3385-51	WCAP-3385-51	WCAP-3385-51
34	3.1	6	R	Saxton	AEC	PWR-TEST	1965	1967	2 (core II)	NA	B	3X3 rod increased lattice pitch in 9X9	1	?	?	6.6	1	91.4	?	90.49
35							WCAP-3385-56	WCAP-3385-56				WCAP-3385-56				WCAP-3385-51		WCAP-3385-51	WCAP-3385-51	WCAP-3385-51
36	3.1	7	R	Saxton	AEC	PWR-TEST	1965	1967	2 (core II)	NA	D* (not same rod as above)	9X9 (mod)	1	?	?	6.6	1	91.4	?	90.49
37							WCAP-3385-56	WCAP-3385-56								WCAP-3385-51		WCAP-3385-51	WCAP-3385-51	WCAP-3385-51
38	3.1	8	A	Saxton	AEC	PWR-TEST	1965	1967	2 (core II)	NA	CH	9X9 (mod)	1	?	?	6.6	1	91.4	?	90.49
39							WCAP-3385-56	WCAP-3385-56								WCAP-3385-51		WCAP-3385-51	WCAP-3385-51	WCAP-3385-51
40			"14 Rod Core I: HE"																	

	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK
2	ISOTOPICS																
3								>>>>>>	<<<<	FABRICATION ASPECTS					>>>>	Max LHGR	<<<FIRST
4	%Pu-240	%Pu-241	%Pu-242	Diluent Uranium (D or N)	Fuel Designer	% of MOX in ITEM (rod %)	Rod Pattern Desc.	B. Poison (in U of assy)	Fuel Bundler (where)	PuO2 conversion process (where)	UO2 conversion process (where)	Pellet Fabrication process	Pellet Types (A-annular, S-solid, D-dished, U-undished)	Cladding utilized	Any Instrument.	Max LHGR (kW/ft)	(1st Set) Avg Assy MWd/MT (single or 8 batch-like assy)
25	8.57	0.89	0.04	N	West.	100	uniform MOX	NA	West.	Pu metal buttons in thin strips oxidized at 850C, oxidized at 950C; powder through a 44 micron sieve	Arc-fused UO2 mixed with/UO4	VIPAC-BNL's Hi-Ipot process-four size fractions sieved and mixed, vibrated and tamped at 50g load	NA	Zr-4	NA	10.6	4500
26	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-8		WCAP-3385-51			WCAP-3385-49	WCAP-3385-53	WCAP-3385-53, WCAP-3385-2		WCAP-3385-12		WCAP-3385-12	WCAP-3385-12
27	8.57	0.89	0.04	N	West.	100	uniform MOX	NA	West.	Pu metal cut into small cubes, steamed oxidized. Oxide was ball milled to pass through 325 mesh	ceramic grade oxide	Pellet-HUMBC, Vee blended treated in a Fitz mill, wet blended, pressed, no binder sintered and ground	D	Zr-4	NA	10.5	4500
28	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-8		WCAP-3385-51			WCAP-3385-53	WCAP-3385-53	WCAP-3385-53	WCAP-3385-53	WCAP-3385-12		WCAP-3385-12	WCAP-3385-12
29	8.57	0.89	0.04	N	West.	100	uniform MOX	NA	West.	Pu metal cut into small cubes, steamed oxidized. Oxide was ball milled to pass through 325 mesh	ceramic grade oxide	Pellet-HUMBC, Vee blended treated in a Fitz mill, wet blended, pressed, no binder sintered and ground	D	Zr-4	NA	10.6	4500
30	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-8		WCAP-3385-51			WCAP-3385-53	WCAP-3385-53	WCAP-3385-53	WCAP-3385-53	WCAP-3385-12		WCAP-3385-12	WCAP-3385-12
31																	
32	8.57	0.89	0.04	N	West.	100	uniform MOX	NA	West.	Pu metal cut into small cubes, steamed oxidized. Oxide was ball milled to pass through 325 mesh	ceramic grade oxide	Pellet-HUMBC, Vee blended treated in a Fitz mill, wet blended, pressed, no binder sintered and ground	D	Zr-4	flux wire, In/out T/C, flow meas for Overpower test	18.7	15,400
33	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-8		WCAP-3385-51			WCAP-3385-53	WCAP-3385-53	WCAP-3385-53	WCAP-3385-53	WCAP-3385-12	WCAP-3385-14	WCAP-3385-22	WCAP-3385-54
34	8.57	0.89	0.04	N	West.	100	uniform MOX	NA	West.	Pu metal cut into small cubes, steamed oxidized. Oxide was ball milled to pass through 325 mesh	ceramic grade oxide	Pellet-HUMBC, Vee blended treated in a Fitz mill, wet blended, pressed, no binder sintered and ground	D	Zr-4	flux wire, In/out T/C, flow meas for Overpower test	18.7	15,400
35	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-8		WCAP-3385-51			WCAP-3385-53	WCAP-3385-53	WCAP-3385-53	WCAP-3385-53	WCAP-3385-12	WCAP-3385-14	WCAP-3385-22	WCAP-3385-54
36	8.57	0.89	0.04	N	West.	100	uniform MOX	NA	West.	Pu metal cut into small cubes, steamed oxidized. Oxide was ball milled to pass through 325 mesh	ceramic grade oxide	Pellet-HUMBC, Vee blended treated in a Fitz mill, wet blended, pressed, no binder sintered and ground	D	Zr-4	?	?	9,350
37	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-8		WCAP-3385-51			WCAP-3385-53	WCAP-3385-53	WCAP-3385-53	WCAP-3385-53	WCAP-3385-12			WCAP-3385-54
38	8.57	0.89	0.04	N	West.	100	uniform MOX	NA	West.	Pu metal cut into small cubes, steamed oxidized. Oxide was ball milled to pass through 325 mesh	ceramic grade oxide	Pellet-HUMBC, Vee blended treated in a Fitz mill, wet blended, pressed, no binder sintered and ground	D	Zr-4	?	13.0	20,500
39	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-8		WCAP-3385-51			WCAP-3385-53	WCAP-3385-53	WCAP-3385-53	WCAP-3385-53	WCAP-3385-12		WCAP-3385-54	WCAP-3385-54
40																	

	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA
2	ET BU>>>>>		<<< FIRST SET MEASUREMENTS			>>>>>>>>	<<<SECOND SET BU>>>>>			SECOND SET	MEASUREMENTS		>>>>>>> >>	<<<<<<<<		
3																
4	(1st Set) Peak MOX rod MWd/MT	(1st Set) Peak MOX Pellet MWd/MT	(1st Set) Non-dest. exams performed-description	(1st Set) No. MOX rods PIE	(1st Set) summary of PIE measurement	(1st Set) Where PIE performed	(2nd Set) Avg Assy MWd/MT (Weighted Batch-Max assy)	(2nd Set) Peak MOX rod MWd/MT	(2nd Set) Peak MOX Pellet MWd/MT	(2nd Set) Non-dest exams performed - description	(2nd Set) No. MOX rods PIE	(2nd Set) summary of PIE measurement	(2nd Set) Where PIE performed	Was any data made public?	Beyond design basis/operation! Was it performed? If so, which ones.	How transported to ITC and to PIE?
25	4500	5100	Visual, microscope, dimensional, gamma, determine peak power	1	Fission gas release and analysis	?	NA	NA	NA	NA	NA	NA	NA	Y	N	?
26	WCAP-3385-[illegible]	WCAP-3385-[illegible]	WCAP-3385-12		WCAP-3385-12											
27	4500	5100	Visual, microscope, dimensional, gamma, determine peak power	1	Fission gas release and analysis, metallography(photomicrographs), H2 content in clad, Cs-137, Sr-90, Nd148, U/Pu isotopes	?	NA	NA	NA	NA	NA	NA	NA	Y	N	Y
28	WCAP-3385-[illegible]	WCAP-3385-[illegible]	WCAP-3385-12		WCAP-3385-12											
29	4500	5100	Visual, microscope, dimensional, gamma, determine peak power	1	Fission gas release and analysis	?	NA	NA	NA	NA	NA	NA	NA	Y	N	?
30	WCAP-3385-[illegible]	WCAP-3385-[illegible]	WCAP-3385-12		WCAP-3385-12											
31																
32	16,400	?	Extensive Visual, gamma scan, profilometry and length	1	Fission gas release and analysis, Metallography w/ alpha and beta/gamma autoradiographs,oxide thk.	West P/E Hot Cell	NA	NA	NA	NA	NA	NA	NA	Y	No, but this was a deliberate overpower test	?
33			WCAP-3385-55		WCAP-3385-55, WCAP-3385-20	WCAP-3385-10										
34	16,400	?	Extensive Visual, gamma scan, profilometry and length	1	Fission gas release and analysis, Metallography w/ alpha and beta/gamma autoradiographs,oxide thk.	West P/E Hot Cell	NA	NA	NA	NA	NA	NA	NA	Y	No, but this was a deliberate overpower test	?
35			WCAP-3385-55		WCAP-3385-55, WCAP-3385-20	WCAP-3385-10										
36	9,000	?	Extensive Visual, gamma scan, profilometry and length	1	Fission gas release and analysis, Metallography w/ alpha and beta/gamma autoradiographs,oxide thk.	West P/E Hot Cell	NA	NA	NA	NA	NA	NA	NA	Y	This was an Overpower test reference rod	?
37			WCAP-3385-55		WCAP-3385-55, WCAP-3385-20	WCAP-3385-10										
38	25,000	?	Extensive Visual, gamma scan, profilometry and length	1	Fission gas release and analysis, Metallography w/ alpha and beta/gamma autoradiographs,oxide thk.	West P/E Hot Cell	NA	NA	NA	NA	NA	NA	NA	Y	This was an Overpower test reference rod	?
39			WCAP-3385-54		WCAP-3385-54, WCAP-3385-20	WCAP-3385-10										
40																

	BB	BC
2		MISC ELLANEOUS >>>
3		
4	Overall Performance notes (failure, cracking etc.)	Miscellaneous Info
25	No failure noted	No comment
26		
27	No failure noted or significant performance characteristics	difference in power discrepancy; measured bumup higher than calculated
28	WCAP-3385-56	WCAP-3385-56
29	No failure noted	No comment
30	WCAP-3385-56	
31		
32	Light crud deposits, no failures noted. Fission product precipitates visible in high temperature central regions. Both overpower test rods showed higher fission gas release than reference rods	This rod was removed from the core during early 1967 shutdown (13,400 MWd/t est) and later placed in the test fixture for the overpower test. Overpower test was conducted in steps. Power steps followed by visual scans and fis sion measurements. The absence of columnar grain growth or well defined central void was not consistent with ~21.6 kw/ft, review lowered peak to 18.7 kw/ft
33	WCAP-3385-56	WCAP-3385-56, WCAP-3385-19
34	Light crud deposits, no failures noted. Fission product precipitates visible in high temperature central regions. Both overpower test rods showed higher fission gas release than reference rods	This rod was removed from the core during early 1967 shutdown (13,650 MWd/t est) and later placed in the test fixture for the overpower test. Overpower test was conducted in steps. Power steps followed by visual scans and fis sion measurements. The absence of columnar grain growth or well defined central void was not consistent with ~21.6 kw/ft, review lowered peak to 18.7 kw/ft
35	WCAP-3385-56	WCAP-3385-56, WCAP-3385-19
36	Surface was black and lustrous, little evidence of crud deposits	NOTE: This is an overpower reference rod, e.g. visible bumup and LHGR to rods A&B, prior to the overpower test
37	WCAP-3385-56	WCAP-3385-56
38	Free of anomalous surface conditions, except for stain-like areas probably from corrosion products	NOTE: This is an overpower reference rod, operated at higher than power levels outside the overpower test assembly
39		WCAP-3385-56
40		

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
2	<<<<<< ITEM		>>>>>>>>>>>>>>>>	<<<<<<			REACTOR SPECIFICS				>>>>>>>>>	<<<<<<<<			ITEM ASSY MOX DESIGN AND					FUEL
3	NOTE: blank-irrad was not mapped, ?-no data found in refs for this column, ##?##-judgment made or incomplete data, NA-does not apply (or thought not to be performed) or nothing to report for (IS) summary																			
4	LINE ITEM (blank but ok)	IRRADIATION ITEM (in the batch)	ITEM DESCRIPTION B-Batch of Assys, A-Single Assembly or group of rods, R-Individual Rod, Sb-Irradiation Summary (a commentary)	Reactor & Unit	Project Sponsors	Reactor Type	Year First Insertion	Year of Final Discharge	Reactor Cycle Inserted	No. of MOX Assys in this ITEM (NA if rod)	Batch, Assy or Rod Name	Assy Design	TOTAL No. of MOX rods in ITEM	Mass of MOX in ITEM	Mass of Pu in ITEM	Pu total % Pu/(U+Pu) in ITEM (Max if mult blends)	No. of MOX pin types/blends in ITEM	Pu fis % Ratio	%Pu-238	%Pu-239
41	3.1	9	R	Saxton	AEC	PWR-TEST	1965	1969	2 (core II)	NA	TT	5X5 (mod)	1	?	?	6.6	1	91.4	?	90.49
42							wCAP-3385-56	wCAP-3385-54								WCAP-3385-51		WCAP-3385-51	WCAP-3385-51	WCAP-3385-51
43	3.1	10	R	Saxton	AEC	PWR-TEST	1965	1969	2 (core II)	NA	T9	5X5 (mod)	1	?	?	6.6	1	91.4	?	90.49
44							wCAP-3385-56	wCAP-3385-54								WCAP-3385-51		WCAP-3385-51	WCAP-3385-51	WCAP-3385-51
45	3.1	11	R	Saxton	AEC	PWR-TEST	1965	1969	2 (core II)	NA	TT	5X5 (mod)	1	?	?	6.6	1	91.4	?	90.49
46							wCAP-3385-56	wCAP-3385-54								WCAP-3385-51		WCAP-3385-51	WCAP-3385-51	WCAP-3385-51
47	3.1	12	R	Saxton	AEC	PWR-TEST	1965	1969	2 (core II)	NA	OS	5X5 (mod)	1	?	?	6.6	1	91.4	?	90.49
48							wCAP-3385-56	wCAP-3385-54								WCAP-3385-51		WCAP-3385-51	WCAP-3385-51	WCAP-3385-51
49	3.1	13	R	Saxton	AEC	PWR-TEST	1965	1969	2 (core II)	NA	TE	5X5 (mod)	1	?	?	6.6	1	91.4	?	90.49
50							wCAP-3385-56	wCAP-3385-54			wCAP-3385-54					WCAP-3385-51		WCAP-3385-51	WCAP-3385-51	WCAP-3385-51
51	3.1	14	R	Saxton	AEC	PWR-TEST	1965	1969	2 (core II)	NA	LA	5X5 (mod)	1	?	?	6.6	1	91.4	?	90.49
52							wCAP-3385-56	wCAP-3385-54								WCAP-3385-51		WCAP-3385-51	WCAP-3385-51	WCAP-3385-51
53	3.1	15	R	Saxton	AEC	PWR-TEST	1965	1969	2 (core II)	NA	MY	5X5 (mod)	1	?	?	6.6	1	91.4	?	90.49
54							wCAP-3385-56	wCAP-3385-54								WCAP-3385-51		WCAP-3385-51	WCAP-3385-51	WCAP-3385-51
55	3.1	16	R	Saxton	AEC	PWR-TEST	1965	1969	2 (core II)	NA	RI	5X5 (mod)	1	?	?	6.6	1	91.4	?	90.49
56							wCAP-3385-56	wCAP-3385-54								WCAP-3385-51		WCAP-3385-51	WCAP-3385-51	WCAP-3385-51
57	3.1	17	R	Saxton	AEC	PWR-TEST	1965	1969	2 (core II)	NA	JF	5X5 (mod)	1	?	?	6.6	1	91.4	?	90.49
58							wCAP-3385-56	wCAP-3385-54								WCAP-3385-51		WCAP-3385-51	WCAP-3385-51	WCAP-3385-51

Dom Comm Irrads-Ps

	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK
2	I S O T O P I C S									F A B R I C A T I O N A S P E C T S							
3								>>>>>>	<<<						>>>>	Max LHGR	<<<FIRST
4	%Pu-240	%Pu-241	%Pu-242	Diluent Uranium (D or N)	Fuel Designer	% of MOX in ITEM (rod %)	Rod Pattern Desc.	B. Poison (w/o of assy)	Fuel Bundler (where)	PuO2 conversion process (where)	UO2 conversion process (where)	Pellet Fabrication process	Pellet Types (A-annular, S-solid, D-dished, U-undished)	Cladding utilized	Any Instrument	Max LHGR (kW/ft)	(1st fuel) Avg Assy MWd/MT (single or H batch-Max assy)
41	8.57	0.89	0.04	N	West.	100	uniform MOX	NA	West.	Pu metal cut into small cubes, steam oxidized. Oxide was ball milled to pass through 325 mesh	ceramic grade oxide	Pellet-NUMEC, Vac blended treated in a Fitz mill, wet blended, pressed, no binder-sintered and ground	D	Zr-4	?	?	17,400
42	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-8		WCAP-3385-51			WCAP-3385-53	WCAP-3385-53	WCAP-3385-53	WCAP-3385-53	WCAP-3385-12			WCAP-3385-[illegible]
43	8.57	0.89	0.04	N	West.	100	uniform MOX	NA	West.	Pu metal cut into small cubes, steam oxidized. Oxide was ball milled to pass through 325 mesh	ceramic grade oxide	Pellet-NUMEC, Vac blended treated in a Fitz mill, wet blended, pressed, no binder-sintered and ground	D	Zr-4	?	?	18,700
44	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-8		WCAP-3385-51			WCAP-3385-53	WCAP-3385-53	WCAP-3385-53	WCAP-3385-53	WCAP-3385-12			WCAP-3385-[illegible]
45	8.57	0.89	0.04	N	West.	100	uniform MOX	NA	West.	Pu metal cut into small cubes, steam oxidized. Oxide was ball milled to pass through 325 mesh	ceramic grade oxide	Pellet-NUMEC, Vac blended treated in a Fitz mill, wet blended, pressed, no binder-sintered and ground	D	Zr-4	?	?	20,000
46	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-8		WCAP-3385-51			WCAP-3385-53	WCAP-3385-53	WCAP-3385-53	WCAP-3385-53	WCAP-3385-12			WCAP-3385-[illegible]
47	8.57	0.89	0.04	N	West.	100	uniform MOX	NA	West.	Pu metal cut into small cubes, steam oxidized. Oxide was ball milled to pass through 325 mesh	ceramic grade oxide	Pellet-NUMEC, Vac blended treated in a Fitz mill, wet blended, pressed, no binder-sintered and ground	D	Zr-4	?	?	21,700
48	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-8		WCAP-3385-51			WCAP-3385-53	WCAP-3385-53	WCAP-3385-53	WCAP-3385-53	WCAP-3385-12			WCAP-3385-[illegible]
49	8.57	0.89	0.04	N	West.	100	uniform MOX	NA	West.	Pu metal cut into small cubes, steam oxidized. Oxide was ball milled to pass through 325 mesh	ceramic grade oxide	Pellet-NUMEC, Vac blended treated in a Fitz mill, wet blended, pressed, no binder-sintered and ground	D	Zr-4	?	?	20,700
50	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-8		WCAP-3385-51			WCAP-3385-53	WCAP-3385-53	WCAP-3385-53	WCAP-3385-53	WCAP-3385-12			WCAP-3385-[illegible]
51	8.57	0.89	0.04	N	West.	100	uniform MOX	NA	West.	Pu metal cut into small cubes, steam oxidized. Oxide was ball milled to pass through 325 mesh	ceramic grade oxide	Pellet-NUMEC, Vac blended treated in a Fitz mill, wet blended, pressed, no binder-sintered and ground	D	Zr-4	?	?	17,800
52	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-8		WCAP-3385-51			WCAP-3385-53	WCAP-3385-53	WCAP-3385-53	WCAP-3385-53	WCAP-3385-12			WCAP-3385-[illegible]
53	8.57	0.89	0.04	N	West.	100	uniform MOX	NA	West.	Pu metal cut into small cubes, steam oxidized. Oxide was ball milled to pass through 325 mesh	ceramic grade oxide	Pellet-NUMEC, Vac blended treated in a Fitz mill, wet blended, pressed, no binder-sintered and ground	D	Zr-4	?	?	14,000
54	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-8		WCAP-3385-51			WCAP-3385-53	WCAP-3385-53	WCAP-3385-53	WCAP-3385-53	WCAP-3385-12			WCAP-3385-[illegible]
55	8.57	0.89	0.04	N	West.	100	uniform MOX	NA	West.	Pu metal cut into small cubes, steam oxidized. Oxide was ball milled to pass through 325 mesh	ceramic grade oxide	Pellet-NUMEC, Vac blended treated in a Fitz mill, wet blended, pressed, no binder-sintered and ground	D	Zr-4	?	?	14,800
56	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-8		WCAP-3385-51			WCAP-3385-53	WCAP-3385-53	WCAP-3385-53	WCAP-3385-53	WCAP-3385-12			WCAP-3385-[illegible]
57	8.57	0.89	0.04	N	West.	100	uniform MOX	NA	West.	Pu metal cut into small cubes, steam oxidized. Oxide was ball milled to pass through 325 mesh	ceramic grade oxide	Pellet-NUMEC, Vac blended treated in a Fitz mill, wet blended, pressed, no binder-sintered and ground	D	Zr-4	?	?	14,800
58	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-8		WCAP-3385-51			WCAP-3385-53	WCAP-3385-53	WCAP-3385-53	WCAP-3385-53	WCAP-3385-12			WCAP-3385-[illegible]

	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA
2	SET BU>>>>>		<<< FIRST SET MEASUREMENTS			>>>>>>>>>	<<<SECOND SET BU>>>>>			SECOND SET	MEASUREMENTS		>>>>>>> > >	<<<<<<<<<		
3																
4	(1st Set) Peak MOX rod MWd/MT	(1st Set) Peak MOX Pellet MWd/MT	(1st Set) Non-dest. assays performed-description	(1st Set) No. MOX rods PIE	(1st Set) summary of PIE measurement	(1st Set) Where PIE performed	(2nd Set) Avg Assy MWd/MT (single or if batch-Max assy)	(2nd Set) Peak MOX rod MWd/MT	(2nd Set) Peak MOX Pellet MWd/MT	(2nd Set) Non-dest assays performed - description	(2nd Set) No. MOX rods PIE	(2nd Set) summary of PIE measurement	(2nd Set) Where PIE performed	Was any data made public?	Beyond design burnup/duration) burn performed? If so, which ones	How transported to PIE and to PIE?
41	17,400	?	Visual examination, Length, gamma scan	1	Fission gas release and analysis, some autoradiography, oxide film, clad hydrogen, clad tensile test, clad burst test	West PIE Hot Cell	NA	NA	NA	NA	NA	NA	NA	Y	No	?
42			WCAP-3385-56		WCAP-3385-56											
43	19,700	?	Visual examination, Length, gamma scan	1	Fission gas release, clad tensile test,clad burst	West PIE Hot Cell	NA	NA	NA	NA	NA	NA	NA	Y	No	?
44			WCAP-3385-56		WCAP-3385-56											
45	20,600	?	Visual examination, Length, gamma scan	1	Fission gas release, oxide film, fuel fue dustmetry, clad tensile, clad burst,	West PIE Hot Cell	NA	NA	NA	NA	NA	NA	NA	Y	No	?
46			WCAP-3385-56		WCAP-3385-56											
47	20,700	?	Visual examination, Length, gamma scan	1	Fission gas release, oxide film, clad hydrogen, fuel fue dustmetry,	West PIE Hot Cell	NA	NA	NA	NA	NA	NA	NA	Y	No	?
48			WCAP-3385-56		WCAP-3385-56											
49	20,700	?	Visual examination, Length, gamma scan	1	Fission gas, oxide film, tensile - failed clad burst, U/Pu isotopic, Nd-148	West PIE Hot Cell	NA	NA	NA	NA	NA	NA	NA	Y	No	?
50			WCAP-3385-56		WCAP-3385-56											
51	17,900	?	Visual examination, Length, gamma scan	1	Fission gas, oxide, fuel fue dustmetry,tensile test, clad burst test	West PIE Hot Cell	NA	NA	NA	NA	NA	NA	NA	Y	No	?
52			WCAP-3385-56													
53	14,500	?	Visual examination, Length, gamma scan	1	Fission gas, U/Pu, Nd-148,Pu-238,Pu238, Np-237, Am-241,Am-243	West PIE Hot Cell	NA	NA	NA	NA	NA	NA	NA	Y	No	?
54			WCAP-3385-56		WCAP-3385-56											
55	14,800	?	Visual examination, Length, gamma scan	1	Fission gas, tensile test, U/Pu, Nd-148,Pu-238,Pu-239/Np-237, Am-241, Am-243, Cs137,ru106,single channel gamma scan, macro-photo&auto-radiograph	West PIE Hot Cell	NA	NA	NA	NA	NA	NA	NA	Y	No	?
56			WCAP-3385-56		WCAP-3385-56											
57	14,800	?	Visual examination, Length, gamma scan	1	Fission gas,tensile test, U/Pu isotopic, Nd-148, Pu-238/Pu-239	West PIE Hot Cell	NA	NA	NA	NA	NA	NA	NA	Y	No	?
58			WCAP-3385-56		WCAP-3385-56											

	BB	BC
2		MISCELLANEOUS
3		>>>
4	Overall Performance notes (failures, cladding etc.)	Miscellaneous Info
41	For this 14 rod irradiation: No failures or other significant anomalies noted. Most rods covered with thin, dark-gray, crud film.	Fairly extensive performance comparison (based on the 14 rod irradiation) between pellet fuels and VIPAC fuels is in the literature.
42	WCAP-[illegible]	WCAP-[illegible]
43	For this 14 rod irradiation: No failures or other significant anomalies noted. Most rods covered with thin, dark-gray, crud film.	Fairly extensive performance comparison (based on the 14 rod irradiation) between pellet fuels and VIPAC fuels is in the literature.
44	WCAP-[illegible]	WCAP-[illegible]
45	For this 14 rod irradiation: No failures or other significant anomalies noted. Most rods covered with thin, dark-gray, crud film.	Fairly extensive performance comparison (based on the 14 rod irradiation) between pellet fuels and VIPAC fuels is in the literature.
46	WCAP-[illegible]	WCAP-[illegible]
47	For this 14 rod irradiation: No failures or other significant anomalies noted. Most rods covered with thin, dark-gray, crud film.	Fairly extensive performance comparison (based on the 14 rod irradiation) between pellet fuels and VIPAC fuels is in the literature.
48	WCAP-[illegible]	WCAP-[illegible]
49	For this 14 rod irradiation: No failures or other significant anomalies noted. Most rods covered with thin, dark-gray, crud film.	Fairly extensive performance comparison (based on the 14 rod irradiation) between pellet fuels and VIPAC fuels is in the literature.
50	WCAP-[illegible]	WCAP-[illegible]
51	For this 14 rod irradiation: No failures or other significant anomalies noted. Most rods covered with thin, dark-gray, crud film.	Fairly extensive performance comparison (based on the 14 rod irradiation) between pellet fuels and VIPAC fuels is in the literature.
52	WCAP-[illegible]	WCAP-[illegible]
53	For this 14 rod irradiation: No failures or other significant anomalies noted. Most rods covered with thin, dark-gray, crud film.	Fairly extensive performance comparison (based on the 14 rod irradiation) between pellet fuels and VIPAC fuels is in the literature. This rod was checked also because of rod [illegible] anomaly (see additional core 3 rods). It is from batch [illegible]
54	WCAP-[illegible]	WCAP-[illegible]
55	For this 14 rod irradiation: No failures or other significant anomalies noted. Most rods covered with thin, dark-gray, crud film.	Fairly extensive performance comparison (based on the 14 rod irradiation) between pellet fuels and VIPAC fuels is in the literature.
56	WCAP-[illegible]	WCAP-[illegible]
57	For this 14 rod irradiation: No failures or other significant anomalies noted. Most rods covered with thin, dark-gray, crud film.	Fairly extensive performance comparison (based on the 14 rod irradiation) between pellet fuels and VIPAC fuels is in the literature.
58	WCAP-[illegible]	WCAP-[illegible]

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
2	<<<<<<	ITEM	>>>>>>>>>>>>>>	<<<<<			REACTOR SPECIFICS				>>>>>>>>	<<<<<<<			ITEM ASSY MOX DESIGN AND					FUEL
3	NOTE: blank-irrad was not mapped, ?-no data found in refs for this column, ##?##-judgment made or incomplete data, NA-does not apply (or thought not to be performed) or nothing to report for (IS) summary																			
4	LINE ITEM (plant, batch)	IRRADIATION ITEM (in the batch)	ITEM DESCRIPTION (B-Batch of Assys, A-Single Assembly or group of rods, R-Individual Rod, IS-Irradiation Summary (a commentary))	Reactor & Unit	Project Sponsors	Reactor Type	Year First Insertion	Year of Final Discharge	Reactor Cycle Inserted	No. of MOX Assys in this ITEM (NA if rod)	Batch, Assy or Rod Name	Assy Design	TOTAL No. of MOX rods in ITEM	Mass of MOX in ITEM	Mass of Pu in ITEM	Pu total % Pu/(U+Pu) in ITEM (Max if mult blends)	No. of MOX pin types/blends in ITEM	Pu Wt % Pu-fis	%Pu-238	%Pu-239
59	3.1	18	R	Saxton	AEC	PWR-TEST	1965	1969	2 (core II)	NA	K4	9X9 (mod)	1	?	?	6.6	1	91.4	?	90.49
60							WCAP-3385-56	WCAP-3385-56								WCAP-3385-51		WCAP-3385-51	WCAP-3385-51	WCAP-3385-51
61	3.1	19	R	Saxton	AEC	PWR-TEST	1965	1969	2 (core II)	NA	N8	9X9 (mod)	1	?	?	6.6	1	91.4	?	90.49
62							WCAP-3385-56	WCAP-3385-56								WCAP-3385-51		WCAP-3385-51	WCAP-3385-51	WCAP-3385-51
63	3.1	20	R	Saxton	AEC	PWR-TEST	1965	1969	2 (core II)	NA	N8	9X9 (mod)	1	?	?	6.6	1	91.4	?	90.49
64							WCAP-3385-56	WCAP-3385-56								WCAP-3385-51		WCAP-3385-51	WCAP-3385-51	WCAP-3385-51
65	3.1	21	R	Saxton	AEC	PWR-TEST	1965	1969	2 (core II)	NA	S1	9X9 (mod)	1	?	?	6.6	1	91.4	?	90.49
66							WCAP-3385-56	WCAP-3385-56								WCAP-3385-51		WCAP-3385-51	WCAP-3385-51	WCAP-3385-51
67	3.1	22	R	Saxton	AEC	PWR-TEST	1965	1969	2 (core II)	NA	P0	9X9 (mod)	1	?	?	6.6	1	91.4	?	90.49
68							WCAP-3385-56	WCAP-3385-56								WCAP-3385-51		WCAP-3385-51	WCAP-3385-51	WCAP-3385-51
69		"End of Core II Additional Rods"																		
70	3.1	23	R	Saxton	AEC	PWR-TEST	1965	1969	2 (core II)	NA	R8	9X9 (mod)	1	?	?	6.6	1	91.4	?	90.49
71							WCAP-3385-56	WCAP-3385-56								WCAP-3385-51		WCAP-3385-51	WCAP-3385-51	WCAP-3385-51
72	3.1	24	R	Saxton	AEC	PWR-TEST	1965	1969	2 (core II)	NA	U	9X9 (mod)	1	?	?	6.6	1	91.4	?	90.49
73							WCAP-3385-56	WCAP-3385-56								WCAP-3385-51		WCAP-3385-51	WCAP-3385-51	WCAP-3385-51
74	3.1	25	R	Saxton	AEC	PWR-TEST	1965	1969	2 (core II)	NA	M0	9X9 (mod)	1	?	?	6.6	1	91.4	?	90.49
75							WCAP-3385-56	WCAP-3385-56								WCAP-3385-51		WCAP-3385-51	WCAP-3385-51	WCAP-3385-51
76	3.1	26	H	Saxton	AEC	PWR-TEST	1965	1969	2 (core II)	NA	RA	9X9 (mod)	1	?	?	6.6	1	91.4	?	90.49
77							WCAP-3385-56	WCAP-3385-56								WCAP-3385-51		WCAP-3385-51	WCAP-3385-51	WCAP-3385-51
78	3.1	27	R	Saxton	AEC	PWR-TEST	1965	1969	2 (core II)	NA	TM	9X9 (mod)	1	?	?	6.6	1	91.4	?	90.49

	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK
2	I S O T O P I C S									F A B R I C A T I O N A S P E C T S							
3								>>>>>>	<<<						>>>>	Max LHGR	<<<FIRST
4	%Pu-240	%Pu-241	%Pu-242	Diluent Uranium (D or N)	Fuel Designer	% of MOX in ITEM (rod %)	Rod Pattern Desc.	B. Poison (in U of assy)	Fuel Bundler (where)	PuO2 conversion process (where)	UO2 conversion process (where)	Pellet Fabrication process	Pellet Types (A-annular, S-solid, D-dished, U-undished)	Cladding utilized	Any Instrument	Max LHGR (kW/ft)	(1st Set) Avg Assy MWd/MT (single or # batch/avg assy)
59	8.57	0.89	0.04	N	West.	100	uniform MOX	NA	West.	Pu metal buttons to thin strips oxidized at 550C, calcined at 950C-powder through a 44 micron sieve	Arc-fused UO2 mixed w/U3O8	VIPAC-BNL's Nupac process-four size fractions sieved and mixed, vibrated and tamped at 50g accel	NA	Zr-4	?	?	20,400
60	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-8		WCAP-3385-51			WCAP-3385-53	WCAP-3385-53	WCAP-3385-53, WCAP-3385-8		WCAP-3385-17			WCAP-3385-56
61	8.57	0.89	0.04	N	West.	100	uniform MOX	NA	West.	Pu metal buttons to thin strips oxidized at 550C, calcined at 950C-powder through a 44 micron sieve	Arc-fused UO2 mixed w/U3O8	VIPAC-BNL's Nupac process-four size fractions sieved and mixed, vibrated and tamped at 50g accel	NA	Zr-4	?	?	19,300
62	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-8		WCAP-3385-51			WCAP-3385-53	WCAP-3385-53	WCAP-3385-53, WCAP-3385-8		WCAP-3385-17			WCAP-3385-56
63	8.57	0.89	0.04	N	West.	100	uniform MOX	NA	West.	Pu metal buttons to thin strips oxidized at 550C, calcined at 950C-powder through a 44 micron sieve	Arc-fused UO2 mixed w/U3O8	VIPAC-BNL's Nupac process-four size fractions sieved and mixed, vibrated and tamped at 50g accel	NA	Zr-4	?	?	23,700
64	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-8		WCAP-3385-51			WCAP-3385-53	WCAP-3385-53	WCAP-3385-53, WCAP-3385-8		WCAP-3385-17			WCAP-3385-56
65	8.57	0.89	0.04	N	West.	100	uniform MOX	NA	West.	Pu metal buttons to thin strips oxidized at 550C, calcined at 950C-powder through a 44 micron sieve	Arc-fused UO2 mixed w/U3O8	VIPAC-BNL's Nupac process-four size fractions sieved and mixed, vibrated and tamped at 50g accel	NA	Zr-4	?	?	18,700
66	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-8		WCAP-3385-51			WCAP-3385-53	WCAP-3385-53	WCAP-3385-53, WCAP-3385-8		WCAP-3385-17			WCAP-3385-56
67	8.57	0.89	0.04	N	West.	100	uniform MOX	NA	West.	Pu metal buttons to thin strips oxidized at 550C, calcined at 950C-powder through a 44 micron sieve	Arc-fused UO2 mixed w/U3O8	VIPAC-BNL's Nupac process-four size fractions sieved and mixed, vibrated and tamped at 50g accel	NA	Zr-4	?	?	15,300
68	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-8		WCAP-3385-51			WCAP-3385-53	WCAP-3385-53	WCAP-3385-53, WCAP-3385-8		WCAP-3385-17			WCAP-3385-56
69																	
70	8.57	0.89	0.04	N	West.	100	uniform MOX	NA	West.	Pu metal cut into small cubes, steam oxidized. Oxide was ball milled to pass through 325 mesh	ceramic grade oxide	Pellet-HUMBD, Vee blended treated in a Fitz mill, wet blended, pressed, no binder/sintered and ground	D	Zr-4	?	?	?
71	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-8		WCAP-3385-51			WCAP-3385-53	WCAP-3385-53	WCAP-3385-53	WCAP-3385-53	WCAP-3385-17			
72	8.57	0.89	0.04	N	West.	100	uniform MOX	NA	West.	Pu metal cut into small cubes, steam oxidized. Oxide was ball milled to pass through 325 mesh	ceramic grade oxide	treated in a Fitz mill, wet blended, pressed, no binder/sintered and ground	D	?	?	?	?
73	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-8		WCAP-3385-51			WCAP-3385-53	WCAP-3385-53	WCAP-3385-53	WCAP-3385-53				
74	8.57	0.89	0.04	N	West.	100	uniform MOX	NA	West.	Pu metal cut into small cubes, steam oxidized. Oxide was ball milled to pass through 325 mesh	ceramic grade oxide	Pellet-HUMBD, Vee blended treated in a Fitz mill, wet blended, pressed, no binder/sintered and ground	D	Zr-4	?	?	?
75	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-8		WCAP-3385-51			WCAP-3385-53	WCAP-3385-53	WCAP-3385-53	WCAP-3385-53	WCAP-3385-17			
76	8.57	0.89	0.04	N	West.	100	uniform MOX	NA	West.	Pu metal cut into small cubes, steam oxidized. Oxide was ball milled to pass through 325 mesh	ceramic grade oxide	treated in a Fitz mill, wet blended, pressed, no binder/sintered and ground	D	?	?	?	?
77	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-8		WCAP-3385-51			WCAP-3385-53	WCAP-3385-53	WCAP-3385-53	WCAP-3385-53	?			
78	8.57	0.89	0.04	N	West.	100	uniform MOX	NA	West.	Pu metal cut into small cubes, steam oxidized. Oxide was ball milled to pass through 325 mesh	ceramic grade oxide	treated in a Fitz mill, wet blended, pressed, no binder/sintered and ground	D	?	?	?	?

Dom Comm Irrads-Ps

	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA
2	SET 8U>>>>>		<<< FIRST SET MEASUREMENTS			>>>>>>>>>	<<<SECOND SET 8U>>>>>			SECOND SET	MEASUREMENTS			>>>>>>> > >	<<<<<<<<<	
3																
4	(1st Set) Peak MOX rod MWd/MT	(1st Set) Peak MOX Pellet MWd/MT	(1st Set) Non-dest. exams performed-description	(1st Set) No. MOX rods PIE	(1st Set) summary of PIE measurement	(1st Set) Where PIE performed	(2nd Set) Avg Assy MWd/MT (single or 8 batch-Mar core)	(2nd Set) Peak MOX rod MWd/MT	(2nd Set) Peak MOX Pellet MWd/MT	(2nd Set) Non-dest exams performed - description	(2nd Set) No. MOX rods PIE	(2nd Set) summary of PIE measurement	(2nd Set) Where PIE performed	Was any data made public?	Beyond design basis/transient tests performed? If so, which ones.	How transported to ITU and to PIE?
59	20,400	?	Visual examination, Length, gamma scan	1	Fission gas,plate film, dist hydrogen, tensile test, burst test.	West PIE Hot Cell	NA	NA	NA	NA	NA	NA	NA	Y	No	?
60			WCAP-3385-56		WCAP-3385-56											
61	19,300	?	Visual examination, Length, gamma scan	1	Fission gas, oxide film, tensile test, burst test	West PIE Hot Cell	NA	NA	NA	NA	NA	NA	NA	Y	No	?
62			WCAP-3385-56		WCAP-3385-56											
63	20,700	?	Visual examination, Length, gamma scan	1	Fission gas, oxide film, tensile test, burst test	West PIE Hot Cell	NA	NA	NA	NA	NA	NA	NA	Y	No	?
64			WCAP-3385-56		WCAP-3385-56											
65	18,700	?	Visual examination, Length, gamma scan	1	Fission gas,tensile test, U/Pu isotopic, Kr-148, Pu-235/Pu-239	West PIE Hot Cell	NA	NA	NA	NA	NA	NA	NA	Y	No	?
66			WCAP-3385-56		WCAP-3385-56											
67	15,200	?	Visual examination, Length, gamma scan	1	Fission gas, tensile test, U/Pu, Kr-148,Pu-239,Pu-238	West PIE Hot Cell	NA	NA	NA	NA	NA	NA	NA	Y	No	?
68			WCAP-3385-56		WCAP-3385-56											
69																
70	?	?	Fission gas collection	1	Fission gas, metallography	West PIE Hot Cell	NA	NA	NA	NA	NA	NA	NA	Y	No	?
71			WCAP-3385-56		WCAP-3385-56											
72	?	?	Visual?	1	Metallography, others?	West PIE Hot Cell	NA	NA	NA	NA	NA	NA	NA	Y	No	?
73																
74	?	?	Visual?	1	Metallography, others?	West PIE Hot Cell	NA	NA	NA	NA	NA	NA	NA	Y	No	?
75																
76	?	?	Visual?	1	Metallography, others?	West PIE Hot Cell	NA	NA	NA	NA	NA	NA	NA	Y	No	?
77																
78	?	?	Visual?	1	Metallography, others?	West PIE Hot Cell	NA	NA	NA	NA	NA	NA	NA	Y	No	?

	BB	BC
2		MISCELLANEOUS
3		
4	Overall Performance notes: (failure, cracking etc.)	Miscellaneous Info
59	For this 14 rod irradiation: No failures or other significant anomalies noted. Most rods covered with thin, dark-gray, oxid film.	Fairly extensive performance comparison (based on the 14 rod irradiation) between pellet fuels and VIPAC fuels is in the literature.
60	WCAP-3385-56	WCAP-3385-56
61	For this 14 rod irradiation: No failures or other significant anomalies noted. Most rods covered with thin, dark-gray, oxid film.	Fairly extensive performance comparison (based on the 14 rod irradiation) between pellet fuels and VIPAC fuels is in the literature.
62	WCAP-3385-56	WCAP-3385-56
63	For this 14 rod irradiation: No failures or other significant anomalies noted. Most rods covered with thin, dark-gray, oxid film.	Fairly extensive performance comparison (based on the 14 rod irradiation) between pellet fuels and VIPAC fuels is in the literature.
64	WCAP-3385-56	WCAP-3385-56
65	For this 14 rod irradiation: No failures or other significant anomalies noted. Most rods covered with thin, dark-gray, oxid film.	Fairly extensive performance comparison (based on the 14 rod irradiation) between pellet fuels and VIPAC fuels is in the literature.
66	WCAP-3385-56	WCAP-3385-56
67	For this 14 rod irradiation: No failures or other significant anomalies noted. Most rods covered with thin, dark-gray, oxid film.	Fairly extensive performance comparison (based on the 14 rod irradiation) between pellet fuels and VIPAC fuels is in the literature.
68	WCAP-3385-56	WCAP-3385-56
69		
70	Rod did not fail. However, local hydriding, thick oxide layer, shot cracked extending towards outer surface for 70% of wall thickness.	This rod predicted because of anomalous dimensions in zone III neutron flux. It led to closer looks at rods U, M3, RA, & TM. Cause of ML hydriding believed to be stray hydrogenous contamination.
71	WCAP-3385-55	WCAP-3385-55
72	?	Done because of rod ML anomaly
73		WCAP-3385-55
74	Like Rod ML, this pellet lot showed significant hydriding. It was from same manufacturing batch #3 as ML	Done because of rod ML anomaly
75		WCAP-3385-55
76	?	Done because of rod ML anomaly
77		WCAP-3385-55
78	?	Done because of rod ML anomaly

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
2	<<<<<<	ITEM	>>>>>>>>>>>>>>>	<<<<<			REACTOR SPECIFICS				>>>>>>>>	<<<<<<<			ITEM	ASSY MOX DESIGN AND				FUEL
3	NOTE: blank-lined was not mapped, ?-no data found in refs for this column, #??#-judgment made or incomplete data, NA-does not apply (or thought not to be performed) or nothing to report for (IS) summary																			
4	LINE ITEM (plant.batch)	IRRADIATION ITEM (in the batch)	ITEM DESCRIPTION B-Batch of Assys, A-Single Assembly or group of rods, R-Individual Rod, IS-Irradiation Summary (a commentary)	Reactor & Unit	Project Sponsors	Reactor Type	Year First Insertion	Year of Final Discharge	Reactor Cycle Inserted	No. of MOX Assys in this ITEM (NA if rod)	Batch, Assy or Rod Name	Assy Design	TOTAL No. of MOX rods in ITEM	Mass of MOX in ITEM	Mass of Pu in ITEM	Pu total % Pu/(U+Pu) in ITEM (Max if multi blends)	No. of MOX pin types/blends in ITEM	Pu fiss % Fissile	%Pu-238	%Pu-239
79							WCAP-3385-56	WCAP-3385-56								WCAP-3385-51		WCAP-3385-51	WCAP-3385-51	WCAP-3385-51
80	3.1	29	R	Saxton	AEC	PWR-TEST	1965	1969	2 (core II)	NA	MO	9X9 (mod)	1	?	?	6.6	1	91.4	?	90.49
81							WCAP-3385-56	WCAP-3385-56								WCAP-3385-51		WCAP-3385-51	WCAP-3385-51	WCAP-3385-51
82	3.1	30	R	Saxton	AEC	PWR-TEST	1965	1969	2 (core II)	NA	M2	9X9 (mod)	1	?	?	6.6	1	91.4	?	90.49
83							WCAP-3385-56	WCAP-3385-56								WCAP-3385-51		WCAP-3385-51	WCAP-3385-51	WCAP-3385-51
84			REMAINING Estimated Core II rods (arrived at by deduction: (638 total -[illegible] rods total that went to end of core II-39 rods accounted for above=[illegible] rods																	
85	3.1	30	A	Saxton	AEC	PWR-TEST	1965	1969	2 (core II)	NA	NA	9X9 (mod)	558	?	?	6.6	1	91.4	?	90.49
86							WCAP-3385-56	WCAP-3385-56								WCAP-3385-51		WCAP-3385-51	WCAP-3385-51	WCAP-3385-51
87		SAXTON CORE III "Loose Lattice" RODS																		
88			Middle Core III rods (includes RR -early core III and ? MOL rods from variety of assembly positions)																	
89	3.2	1	R	Saxton	AEC	PWR-TEST	1965	1972?	3 (core III)	NA	RR	9X9 (mod)	1	?	?	6.6	1	91.4	?	90.49
90							WCAP-3385-56	WCAP-3385-57								WCAP-3385-51		WCAP-3385-51	WCAP-3385-51	WCAP-3385-51
91	3.2	2	R	Saxton	AEC	PWR-TEST	1965	1972?	3 (core III)	NA	L2	9X9 (mod)	1	?	?	6.6	1	91.4	?	90.49
92							WCAP-3385-56	WCAP-3385-57								WCAP-3385-51		WCAP-3385-51	WCAP-3385-51	WCAP-3385-51
93	3.2	3	R	Saxton	AEC	PWR-TEST	1965	1972?	3 (core III)	NA	BO	9X9 (mod)	1	?	?	6.6	1	91.4	?	90.49
94							WCAP-3385-56	WCAP-3385-57								WCAP-3385-51		WCAP-3385-51	WCAP-3385-51	WCAP-3385-51
95	3.2	4	R	Saxton	AEC	PWR-TEST	1965	1972?	3 (core III)	NA	NI	9X9 (mod)	1	?	?	6.6	1	91.4	?	90.49
96							WCAP-3385-56	WCAP-3385-57								WCAP-3385-51		WCAP-3385-51	WCAP-3385-51	WCAP-3385-51
97	3.2	5	R	Saxton	AEC	PWR-TEST	1965	1972?	3 (core III)	NA	RO	9X9 (mod)	1	?	?	6.6	1	91.4	?	90.49
98							WCAP-3385-56	WCAP-3385-57								WCAP-3385-51		WCAP-3385-51	WCAP-3385-51	WCAP-3385-51

	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK
2	I S O T O P I C S							>>>>>>	<<<	F A B R I C A T I O N A S P E C T S							
3															>>>>	Max LHGR	<<<FIRST [illegible]
4	%Pu-240	%Pu-241	%Pu-242	Diluent Uranium (D or N)	Fuel Designer	% of MOX in ITEM (rod %)	Rod Pattern Desc.	B. Poison (in U of assy)	Fuel Bundler (where)	PuO2 conversion process (where)	UO2 conversion process (where)	Pellet Fabrication process	Pellet Types (A-annular, S-solid, D-dished, U-undished)	Cladding utilized	Any Instrument.	Max LHGR (kW/ft)	(1st Set) Avg Assy MWd/MT (single or if batch-like assy)
79	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-8		WCAP-3385-51			WCAP-3385-52	WCAP-3385-52	WCAP-3385-52	WCAP-3385-52				
80	0.57	0.89	0.04	N	West.	100	uniform MOX	NA	West.	Pu metal cut into small cubes, steam oxidized. Oxide was ball milled to pass through 325 mesh.	ceramic grade oxide	Pellet-NUMEC, Vac blended treated in a Fitz mill, wet blended, pressed, no binder sintered and ground	D	Zr-4	?	?	?
81	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-8		WCAP-3385-51			WCAP-3385-52	WCAP-3385-52	WCAP-3385-52	WCAP-3385-52	WCAP-3385-17			
82	0.57	0.89	0.04	N	West.	100	uniform MOX	NA	West.	Pu metal cut into small cubes, steam oxidized. Oxide was ball milled to pass through 325 mesh.	ceramic grade oxide	Pellet-NUMEC, Vac blended treated in a Fitz mill, wet blended, pressed, no binder sintered and ground	D	Zr-4	?	?	?
83	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-8		WCAP-3385-51			WCAP-3385-52	WCAP-3385-52	WCAP-3385-52	WCAP-3385-52	WCAP-3385-17			
84																	
85	0.57	0.89	0.04	N	West.	100	uniform MOX	NA	West.	This row represents both VIPAC and pellet fuels, do not know the mix.	This row represents both VIPAC and pellet fuels	This row represents both VIPAC and pellet fuels	?	This row represents both 304 stainless steel and zirc clad rods	?	?	?
86	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-8		WCAP-3385-51										
87																	
88																	
89	0.57	0.89	0.04	N	West.	100	uniform MOX	NA	West.	Pu metal cut into small cubes, steam oxidized. Oxide was ball milled to pass through 325 mesh.	ceramic grade oxide	Pellet-NUMEC, Vac blended treated in a Fitz mill, wet blended, pressed, no binder sintered and ground	D	Zirc4	?	16.9	25,100
90	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-8		WCAP-3385-51			WCAP-3385-52	WCAP-3385-52	WCAP-3385-52	WCAP-3385-52	WCAP-3385-17		WCAP-3385-[illegible]	WCAP-3385-[illegible]
91	0.57	0.89	0.04	N	West.	100	uniform MOX	NA	West.	Pu metal cut into small cubes, steam oxidized. Oxide was ball milled to pass through 325 mesh.	ceramic grade oxide	Pellet-NUMEC, Vac blended treated in a Fitz mill, wet blended, pressed, no binder sintered and ground	D	?	?	17.3	29,700
92	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-8		WCAP-3385-51			WCAP-3385-52	WCAP-3385-52	WCAP-3385-52	WCAP-3385-52			WCAP-3385-2[illegible]	WCAP-3385-5[illegible]
93	0.57	0.89	0.04	N	West.	100	uniform MOX	NA	West.	Pu metal cut into small cubes, steam oxidized. Oxide was ball milled to pass through 325 mesh.	ceramic grade oxide	Pellet-NUMEC, Vac blended treated in a Fitz mill, wet blended, pressed, no binder sintered and ground	D	?	?	21.6	28,800
94	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-8		WCAP-3385-51			WCAP-3385-52	WCAP-3385-52	WCAP-3385-52	WCAP-3385-52			WCAP-3385-2[illegible]	WCAP-3385-5[illegible]
95	0.57	0.89	0.04	N	West.	100	uniform MOX	NA	West.	Pu metal cut into small cubes, steam oxidized. Oxide was ball milled to pass through 325 mesh.	ceramic grade oxide	Pellet-NUMEC, Vac blended treated in a Fitz mill, wet blended, pressed, no binder sintered and ground	D	?	?	18.3	27,000
96	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-8		WCAP-3385-51			WCAP-3385-52	WCAP-3385-52	WCAP-3385-52	WCAP-3385-52			WCAP-3385-2[illegible]	WCAP-3385-5[illegible]
97	0.57	0.89	0.04	N	West.	100	uniform MOX	NA	West.	Pu metal cut into small cubes, steam oxidized. Oxide was ball milled to pass through 325 mesh.	ceramic grade oxide	Pellet-NUMEC, Vac blended treated in a Fitz mill, wet blended, pressed, no binder sintered and ground	D	?	?	17.7	28,100
98	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-8		WCAP-3385-51			WCAP-3385-52	WCAP-3385-52	WCAP-3385-52	WCAP-3385-52			WCAP-3385-2[illegible]	WCAP-3385-5[illegible]

	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA
2	ST BU>>>>>		<<< FIRST SET MEASUREMENTS			>>>>>>>>>	<<<SECOND SET BU>>>>>			SECOND SET	MEASUREMENTS		>>>>>>> > >	<<<<<<<<<		
3																
4	(1st Set) Peak MOX rod MWd/MT	(1st Set) Peak MOX Pellet MWd/MT	(1st Set) Non-dest. assays performed-description	(1st Set) No. MOX rods PIE	(1st Set) summary of PIE measurement	(1st Set) Where PIE performed	(2nd Set) Avg Assy MWd/MT (Weight or # batch Mox assy)	(2nd Set) Peak MOX rod MWd/MT	(2nd Set) Peak MOX Pellet MWd/MT	(2nd Set) Non-dest assays performed - description	(2nd Set) No. MOX rods PIE	(2nd Set) summary of PIE measurement	(2nd Set) Where PIE performed	Was any data made public?	Beyond design basis/Irradiant test performed? If so, which ones.	How transported to RE and to PIE?
79																
80	?	?	Visual?	1	Metallography, others?	West PIE Hot Cell	NA	NA	NA	NA	NA	NA	NA	Y	No	?
81																
82	?	?	Visual?	1	Metallography, others?	West PIE Hot Cell	NA	NA	NA	NA	NA	NA	NA	Y	No	?
83																
84																
85	?	?	?	?	?	?	NA	NA	NA	NA	NA	NA	NA	?	None noted	?
86																
87																
88																
89	35,100	39,200	Visual, profilometry, gamma scans	1	Fission gas releases, metallography, Beta/gamma autoradiograph, clad hydrogen, oxide thickness, Nd-148, U/Pu	West PIE Hot Cell	NA	NA	NA	NA	NA	NA	NA	Y	No	?
90		WCAP-8385-5	WCAP-8385-57		WCAP-8385-57	WCAP-8385-57										
91	35,700	41,100	Visual, profilometry, length, gamma scan	1	Fission Gas, Metallography, clad hydrogen, alpha, beta gamma autoradiography, Nd-148, U/Pu	Battelle Mem Inst. (Columbus Ohio)	NA	NA	NA	NA	NA	NA	NA	Y	No	?
92		WCAP-8385-5	WCAP-8385-57		WCAP-8385-57	WCAP-8385-57										
93	35,800	84,000	Visual, profilometry, length, gamma scan	1	Fission gas releases, metallography, tensile, burst, Mn-54 (fast flux), clad hydrogen, alpha&beta gamma, autoradiograph, Nd-148, U/Pu	Battelle Mem Inst. (Columbus Ohio)	NA	NA	NA	NA	NA	NA	NA	Y	No	?
94		WCAP-8385-5	WCAP-8385-57		WCAP-8385-57	WCAP-8385-57										
95	37,900	39,500	Visual, profilometry, length, gamma scan	1	Fission gas releases, metallography,Clad burst, Mn-54(fast flux), clad HG, alpha&beta gamma autoradiography, Nd-148, U/Pu	Battelle Mem Inst. (Columbus Ohio)	NA	NA	NA	NA	NA	NA	NA	Y	No	?
96		WCAP-8385-5	WCAP-8385-57		WCAP-8385-57	WCAP-8385-57										
97	35,100	32,600	Visual, profilometry, length, gamma scan	1	Fission gas releases, metallography, tensile, clad burst, Mn-54 (fast flux), clad hydrogen, Nd148,U/Pu	Battelle Mem Inst. (Columbus Ohio)	NA	NA	NA	NA	NA	NA	NA	Y	No	?
98		WCAP-8385-5	WCAP-8385-57		WCAP-8385-57	WCAP-8385-57										

Dom Conversheets-Fs

	BB	BC
2		MISC ELLANEOUS
3		
4	Overall Performance notes (failure, modding etc.)	Miscellaneous Info
79		WCAP-3385-53
80	Unlike Rod ML, this pellet fuel showed no significant hydriding; do not know if it was from same batch #3 as ML	Done because of rod ML anomaly
81	WCAP-3385-53	WCAP-3385-53
82	Unlike Rod ML, this pellet fuel showed no significant hydriding; do not know if it was from same batch #3 as ML	Done because of rod ML anomaly. This was known as an arabica rod (for ML)
83	WCAP-3385-53	WCAP-3385-53
84		
85	No failures noted	NOTE: THIS ROW REPRESENTS AN ESTIMATED 368 MOX RODS USED IN CORE II and removed following core II.
86		
87		
88		
89	No major defects noted. Good performance. Larger fraction but unregulated grain growth & fission product precipitate.	Removed early in Core III, as a lead indicator
90	WCAP-3385-57	WCAP-3385-57
91	No failure noted	No comment
92		
93	No failure noted	No comment
94		
95	No failure noted	No comment
96		
97	No failure noted	No comment
98		

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
2	<<<<<<	I T E M	>>>>>>>>>>>>>>>	<<<<<			R E A C T O R S P E C I F I C S				>>>>>>>>>	<<<<<<<			I T E M	A S S Y M O X D E S I G N A N D				F U E L
3	NOTE: blank-lined was not mapped, ?-no data found in refs for this column, ##??#-judgment made or incomplete data, NA-does not apply (or thought not to be performed) or nothing to report for (IS) summary																			
4	LINE ITEM (plant bat ch)	IRRADIATION ITEM (in the batch)	ITEM DESCRIPTION: B-Batch of Assys, A-Single Assembly or group of rods, R-Individual Rod, IS-Irradiation Summary in commentary)	Reactor & Unit	Project Sponsors	Reactor Type	Year First Insertion	Year of Final Discharge	Reactor Cycle Inserted	No. of MOX Assys in this ITEM (NA if rod)	Batch, Assy or Rod Name	Assy Design	TOTAL No. of MOX rods in ITEM	Mass of MOX in ITEM	Mass of Pu in ITEM	Pu total % Pu/(U+Pu) in ITEM (Max if mult blends)	No. of MOX pin types/blends in ITEM	Pu Wt % Fissile	%Pu-238	%Pu-239
99	3.2	6	R	Saxton	AEC	PWR-TEST	1965	1970?	2 (core III)	NA	FS	9X9 (mod)	1	?	?	6.6	1	91.4	?	90.49
100							WCAP-3385-56	WCAP-3385-57								WCAP-3385-51		WCAP-3385-51	WCAP-3385-51	WCAP-3385-51
101	3.2	7	R	Saxton	AEC	PWR-TEST	1965	1970?	2 (core III)	NA	GL	9X9 (mod)	1	?	?	6.6	1	91.4	?	90.49
102							WCAP-3385-56	WCAP-3385-57								WCAP-3385-51		WCAP-3385-51	WCAP-3385-51	WCAP-3385-51
103	3.2	8	R	Saxton	AEC	PWR-TEST	1965	1970?	2 (core III)	NA	MO	9X9 (mod)	1	?	?	6.6	1	91.4	?	90.49
104							WCAP-3385-56	WCAP-3385-57								WCAP-3385-51		WCAP-3385-51	WCAP-3385-51	WCAP-3385-51
105																				
106			End of Core III rods																	
107	3.2	9	R	Saxton	AEC	PWR-TEST	1965	1972	2 (core III)	NA	IM	9X9 (mod)	1	?	?	6.6	1	91.4	?	90.49
108							WCAP-3385-56	WCAP-3385-57								WCAP-3385-51		WCAP-3385-51	WCAP-3385-51	WCAP-3385-51
109	3.2	10	R	Saxton	AEC	PWR-TEST	1965	1972	2 (core III)	NA	FF	9X9 (mod)	1	?	?	6.6	1	91.4	?	90.49
110							WCAP-3385-56	WCAP-3385-57								WCAP-3385-51		WCAP-3385-51	WCAP-3385-51	WCAP-3385-51
111	3.2	11	R	Saxton	AEC	PWR-TEST	1965	1972	2 (core III)	NA	BE	9X9 (mod)	1	?	?	6.6	1	91.4	?	90.49
112							WCAP-3385-56	WCAP-3385-57								WCAP-3385-51		WCAP-3385-51	WCAP-3385-51	WCAP-3385-51
113	3.2	12	R	Saxton	AEC	PWR-TEST	1965	1972	2 (core III)	NA	BK	9X9 (mod)	1	?	?	6.6	1	91.4	?	90.49
114							WCAP-3385-56	WCAP-3385-57								WCAP-3385-51		WCAP-3385-51	WCAP-3385-51	WCAP-3385-51
115	3.2	13	R	Saxton	AEC	PWR-TEST	1965	1972	2 (core III)	NA	GM	9X9 (mod)	1	?	?	6.6	1	91.4	?	90.49
116							WCAP-3385-56	WCAP-3385-57								WCAP-3385-51		WCAP-3385-51	WCAP-3385-51	WCAP-3385-51
117	3.2	14	R	Saxton	AEC	PWR-TEST	1965	1972	2 (core III)	NA	LS	9X9 (mod)	1	?	?	6.6	1	91.4	?	90.49
118							WCAP-3385-56	WCAP-3385-57								WCAP-3385-51		WCAP-3385-51	WCAP-3385-51	WCAP-3385-51

	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK
2	I S O T O P I C S									F A B R I C A T I O N A S P E C T S							
3								>>>>>>	<<<						>>>>	Max LHGR	<<<FIRST
4	%Pu-240	%Pu-241	%Pu-242	Diluent Uranium (D or N)	Fuel Designer	% of MOX in ITEM (rod %)	Rod Pattern Desc.	B. Poison (in % of assy)	Fuel Bundler (where)	PuO2 conversion process (where)	UO2 conversion process (where)	Pellet Fabrication process	Pellet Types (A-annular, S-solid, D-dished, U-undished)	Cladding utilized	Any Instrument.	Max LHGR (kW/ft)	(1st Set) Avg Assy MWd/MT (single or # bundle-Max store)
99	8.57	0.89	0.04	N	West.	100	uniform MOX	NA	West.	Pu metal cut into small cubes, steam oxidized. Oxide was ball milled to pass through 325 mesh	ceramic grade oxide	Pellet-NUMEC, Vee blended treated in a Fitz mill, wet blended, pressed, no binder-sintered and ground	D	?	?	15.4	25,500
100	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-6		WCAP-3385-51			WCAP-3385-52	WCAP-3385-52	WCAP-3385-52	WCAP-3385-52			WCAP-3385-2/WCAP-3385-51	
101	8.57	0.89	0.04	N	West.	100	uniform MOX	NA	West.	Pu metal cut into small cubes, steam oxidized. Oxide was ball milled to pass through 325 mesh	ceramic grade oxide	Pellet-NUMEC, Vee blended treated in a Fitz mill, wet blended, pressed, no binder-sintered and ground	D	?	?	15.3	29,500
102	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-6		WCAP-3385-51			WCAP-3385-52	WCAP-3385-52	WCAP-3385-52	WCAP-3385-52			WCAP-3385-2/WCAP-3385-51	
103	8.57	0.89	0.04	N	West.	100	uniform MOX	NA	West.	Pu metal cut into small cubes, steam oxidized. Oxide was ball milled to pass through 325 mesh	ceramic grade oxide	Pellet-NUMEC, Vee blended treated in a Fitz mill, wet blended, pressed, no binder-sintered and ground	D	?	?	16.7	29,800
104	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-6		WCAP-3385-51			WCAP-3385-52	WCAP-3385-52	WCAP-3385-52	WCAP-3385-52			WCAP-3385-2/WCAP-3385-51	
105																	
106																	
107	8.57	0.89	0.04	N	West.	100	uniform MOX	NA	West.	Pu metal cut into small cubes, steam oxidized. Oxide was ball	ceramic grade oxide	Pellet-NUMEC, Vee blended treated in a Fitz mill, wet	D	?	?	?	28,500
108	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-6		WCAP-3385-51			WCAP-3385-52	WCAP-3385-52	WCAP-3385-52	WCAP-3385-52				WCAP-3385-51
109	8.57	0.89	0.04	N	West.	100	uniform MOX	NA	West.	Pu metal cut into small cubes, steam oxidized. Oxide was ball milled to pass through 325 mesh	ceramic grade oxide	Pellet-NUMEC, Vee blended treated in a Fitz mill, wet blended, pressed, no binder-sintered and ground	D	?	?	?	27,500
110	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-6		WCAP-3385-51			WCAP-3385-52	WCAP-3385-52	WCAP-3385-52	WCAP-3385-52				WCAP-3385-51
111	8.57	0.89	0.04	N	West.	100	uniform MOX	NA	West.	Pu metal cut into small cubes, steam oxidized. Oxide was ball milled to pass through 325 mesh	ceramic grade oxide	Pellet-NUMEC, Vee blended treated in a Fitz mill, wet blended, pressed, no binder-sintered and ground	D	?	?	?	30,200
112	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-6		WCAP-3385-51			WCAP-3385-52	WCAP-3385-52	WCAP-3385-52	WCAP-3385-52				WCAP-3385-51
113	8.57	0.89	0.04	N	West.	100	uniform MOX	NA	West.	Pu metal cut into small cubes, steam oxidized. Oxide was ball milled to pass through 325 mesh	ceramic grade oxide	Pellet-NUMEC, Vee blended treated in a Fitz mill, wet blended, pressed, no binder-sintered and ground	D	?	?	?	33,400
114	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-6		WCAP-3385-51			WCAP-3385-52	WCAP-3385-52	WCAP-3385-52	WCAP-3385-52				WCAP-3385-51
115	8.57	0.89	0.04	N	West.	100	uniform MOX	NA	West.	Pu metal cut into small cubes, steam oxidized. Oxide was ball milled to pass through 325 mesh	ceramic grade oxide	Pellet-NUMEC, Vee blended treated in a Fitz mill, wet blended, pressed, no binder-sintered and ground	D	?	?	?	31,800
116	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-6		WCAP-3385-51			WCAP-3385-52	WCAP-3385-52	WCAP-3385-52	WCAP-3385-52				WCAP-3385-51
117	8.57	0.89	0.04	N	West.	100	uniform MOX	NA	West.	Pu metal cut into small cubes, steam oxidized. Oxide was ball milled to pass through 325 mesh	ceramic grade oxide	Pellet-NUMEC, Vee blended treated in a Fitz mill, wet blended, pressed, no binder-sintered and ground	D	?	?	?	33,700
118	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-51	WCAP-3385-6	-	WCAP-3385-51			WCAP-3385-52	WCAP-3385-52	WCAP-3385-52	WCAP-3385-52				WCAP-3385-51

	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA
2	SET BU>>>>>		<<< FIRST SET		MEASUREMENTS	>>>>>>>>>	<<<SECOND SET BU		>>>>>	SECOND SET	MEASUREMENTS		>>>>>>> > >	<<<<<<<<<		
3																
4	(1st Set) Peak MOX rod MWd/MT	(1st Set) Peak MOX Pellet MWd/MT	(1st Set) Non-dest. exams performed-description	(1st Set) No. MOX rods PIE	(1st Set) summary of PIE measurement	(1st Set) Where PIE performed	(2nd Set) Avg Assy MWd/MT (single or if batch-Max assy)	(2nd Set) Peak MOX rod MWd/MT	(2nd Set) Peak MOX Pellet MWd/MT	(2nd Set) Non-dest exams performed - description	(2nd Set) No. MOX rods PIE	(2nd Set) summary of PIE measurement	(2nd Set) Where PIE performed	Was any data made public?	Beyond design test/exercises tests performed? If so, which ones.	How transported to RX and to PIE?
99	25,500	33,000	Visual, profilometry, length, gamma scan	1	Fission gas release, metallography, tensile, clad burst, Mn-54 (fast flux), clad hydrogen, Nd148,U/Pu	Battelle Mem Inst. (Columbus Ohio)	NA	NA	NA	NA	NA	NA	NA	Y	No	?
100		WCAP-3385-5	WCAP-3385-57		WCAP-3385-57	WCAP-3385-57										
101	28,800	31,000	Visual, profilometry, length, gamma scan	1	Fission gas release, metallography, tensile, clad burst, Mn-54 (fast flux), clad hydrogen, Nd148,U/Pu	Battelle Mem Inst. (Columbus Ohio)	NA	NA	NA	NA	NA	NA	NA	Y	No	?
102		WCAP-3385-5	WCAP-3385-57		WCAP-3385-57	WCAP-3385-57										
103	28,800	35,000	Visual, profilometry, length, gamma scan	1	Fission gas release, metallography, tensile, clad burst, Mn-54 (fast flux), clad hydrogen, alpha,beta gamma autoradiography Nd148,U/Pu (radially sampled)	Battelle Mem Inst. (Columbus Ohio)	NA	NA	NA	NA	NA	NA	NA	Y	No	?
104		WCAP-3385-5	WCAP-3385-57		WCAP-3385-57	WCAP-3385-57										
105																
106																
107	39,000	50,000	Visual, profilometry, length, gamma scan	1	Fission gas release,metallography,tensile, burst,	Battelle Mem Inst.	NA	NA	NA	NA	NA	NA	NA	Y	No	
108		WCAP-3385-5	WCAP-3385-57			WCAP-3385-57										
109	37,800	51,200	Visual, profilometry, length, gamma scan	1	Fission gas release,metallography,tensile, burst, Mn-54 (fast flux), clad hydrogen, alpha & beta gamma autoradiography, Nd148, U/Pu, Pu-239, Pu-238, Np-237, Am-241, Am-	Battelle Mem Inst. (Columbus Ohio)	NA	NA	NA	NA	NA	NA	NA	Y	No	
110		WCAP-3385-5	WCAP-3385-57			WCAP-3385-57										
111	35,200	43,900	Visual, profilometry, length, gamma scan	1	Fission gas release,metallography,tensile, burst, Mn-54 (fast flux), clad hydrogen, alpha & beta gamma autoradiography, Nd148, U/Pu	Battelle Mem Inst. (Columbus Ohio)	NA	NA	NA	NA	NA	NA	NA	Y	No	
112		WCAP-3385-5	WCAP-3385-57		WCAP-3385-57	WCAP-3385-57										
113	33,400	41,500	Visual, profilometry, length, gamma scan	1	Fission gas release,metallography,tensile, burst, Mn-54 (fast flux), clad hydrogen, alpha & beta gamma autoradiography, Nd148, U/Pu, Pu-239, Pu-238, Np-237, Am-241, Am-243, Cm-242,Cm-244	Battelle Mem Inst. (Columbus Ohio)	NA	NA	NA	NA	NA	NA	NA	Y	No	
114		WCAP-3385-5	WCAP-3385-57		WCAP-3385-57	WCAP-3385-57										
115	31,000	41,500	Visual, profilometry, length, gamma scan	1	Fission gas release,metallography,tensile, burst, Mn-54 (fast flux), clad hydrogen, Nd148, U/Pu	Battelle Mem Inst. (Columbus Ohio)	NA	NA	NA	NA	NA	NA	NA	Y	No	
116		WCAP-3385-5	WCAP-3385-57		WCAP-3385-57	WCAP-3385-57										
117	33,700	42,000	Visual, profilometry, length, gamma scan	1	Fission gas release,metallography,tensile, burst, Mn-54 (fast flux), clad hydrogen, Nd148, U/Pu,Pu-238, Pu-239, Np-237, Am-241, Am-243, Cm-242, Cm-	Battelle Mem Inst. (Columbus Ohio)	NA	NA	NA	NA	NA	NA	NA	Y	No	
118		WCAP-3385-5	WCAP-3385-57		WCAP-3385-57	WCAP-3385-57										

	BB	BC
2		MISC ELLANEOUS >>>
3		
4	Overall Performance notes (failure, shielding etc.)	Miscellaneous Info
99	No failure noted	No comment
100		
101	No failure noted	No comment
102		
103	Suspected failed rod based on low fission gas release	No comment
104	WCAP-3385-57	
105		
106		
107	No failure noted	Performance comparisons and results of End of Core III rods discussed in WCAP-3385-57
108		WCAP-3385-57
109	Several radial cracks originating from the inner surface, thick exterior oxide rim, axial hydrids, extensive inner clad oxide	Statement is made that this rod was examined as part of another program. Performance comparisons for end of core III rods discussed in WCAP-3385-57
110	WCAP-3385-57	WCAP-3385-57
111	Experienced abnormally high rapid oxidation outside of clad surface	Performance comparisons and results of End of Core III rods discussed in WCAP-3385-57
112	WCAP-3385-57	WCAP-3385-57
113	No failure noted, experienced odd inner grain growth	Performance comparisons and results of End of Core III rods discussed in WCAP-3385-57
114	WCAP-3385-57	WCAP-3385-57
115	No failure noted, external corrosion films were as expected	Performance comparisons and results of End of Core III rods discussed in WCAP-3385-57
116	WCAP-3385-57	WCAP-3385-57
117	No failure noted, external corrosion films were as expected	Performance comparisons and results of End of Core III rods discussed in WCAP-3385-57
118	WCAP-3385-57	WCAP-3385-57

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
2	<<<<<<	ITEM	>>>>>>>>>>>>>>	<<<<<			REACTOR SPECIFICS				>>>>>>>>	<<<<<<<			ITEM ASSY MOX DESIGN AND					FUEL
3	NOTE: blank-irrad was not mapped, ?-no data found in refs for this column, #?##-judgment made or incomplete data, NA-does not apply (or thought not to be performed) or nothing to report for (IS) summary																			
4	LINE ITEM (start.last ch)	IRRADIATION ITEM (in the batch)	ITEM DESCRIPTION B-Batch of Assys, A-Single Assembly or group of rods, R-Individual Rod, IS-Irradiation Summary (a commentary)	Reactor & Unit	Project Sponsors	Reactor Type	Year First Insertion	Year of Final Discharge	Reactor Cycle Inserted	No. of MOX Assys in this ITEM (NA if rod)	Batch, Assy or Rod Name	Assy Design	TOTAL No. of MOX rods in ITEM	Mass of MOX in ITEM	Mass of Pu in ITEM	Pu total % Pu/(U+Pu) in ITEM (Max if multi blends)	No. of MOX pin types/blends in ITEM	Pu Wt % Fissile	%Pu-238	%Pu-239
119	3.3	15	R	Saxton	AEC	PWR-TEST	1966	1972	2 (core III)	NA	FI	9X9 (mod)	1	?	?	6.6	1	91.4	?	90.49
120							WCAP-[illegible]	WCAP-[illegible]								WCAP-[illegible]		WCAP-[illegible]	WCAP-[illegible]	WCAP-[illegible]
121	3.3	16	R	Saxton	AEC	PWR-TEST	1966	1972	2 (core III)	NA	JX	9X9 (mod)	1	?	?	6.6	1	91.4	?	90.49
122							WCAP-[illegible]	WCAP-[illegible]								WCAP-[illegible]		WCAP-[illegible]	WCAP-[illegible]	WCAP-[illegible]
123		Rest of Core III rods (250-16=234)																		
124	3.3	17	A	Saxton	AEC	PWR-TEST	1966	1972	2 (core III)	NA	NR	9X9 (mod)	234	?	?	6.6	1	91.4	?	90.49
125																				
126		Japan's PNC MOX in Saxton Core III																		
127	3.3	1	R	Saxton	PNC (Japan)	PWR-TEST	1971	1972	Core III	NA	C-1	9X9(mod)	1	?	?	4.6	1	?	?	?
128									AKUTSU-1							AKUTSU-1				
129																				
130	3.3	2	R	Saxton	PNC (Japan)	PWR-TEST	1971	1972	Core III	NA	C-3	9X9(mod)	1	?	?	4.6	1	?	?	?
131									AKUTSU-1							AKUTSU-1				
132																				
133	3.3	3	R	Saxton	PNC (Japan)	PWR-TEST	1971	1972	Core III	NA	35	9X9(mod)	1	?	?	4.6	1	?	?	?
134									AKUTSU-1							AKUTSU-1				
135																				
136	3.3	4	R	Saxton	PNC (Japan)	PWR-TEST	1971	1972	Core III	NA	41	9X9(mod)	1	?	?	4.6	1	?	?	?
137									AKUTSU-1							AKUTSU-1				

	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK
2	I S O T O P I C S							>>>>>>	<<<	F A B R I C A T I O N	A S P E C T S						
3															>>>>	Max LHGR	<<<FIRST [illegible]
4	%Pu-240	%Pu-241	%Pu-242	Diluent Uranium (D or N)	Fuel Designer	% of MOX in ITEM (rod %)	Fuel Pattern Desc.	B. Poison (in U of entry)	Fuel Bundler (where)	PuO2 conversion process (where)	UO2 conversion process (where)	Pellet Fabrication process	Pellet Types (A-annular, S-solid, D-dished, U-undished)	Cladding utilized	Any instrument	Max LHGR (W/M?)	(1st Set) Avg Assy MWd/MT (single or 5' batch-Max entry)
119	[illegible]	[illegible]	0.04	N	West.	100	uniform MOX	NA	West.	Pu metal cut into small cubes, steam oxidized. Oxide was ball milled to pass through 325 mesh	ceramic grade oxide	Pellet-[illegible], Vee blended treated in a Fitz mill, wet blended, pressed, no binder sintered and ground	D	?	?	?	[illegible]
120	WCAP-[illegible]	WCAP-[illegible]	WCAP-[illegible]	WCAP-[illegible]	WCAP-[illegible]		WCAP-[illegible]			WCAP-[illegible]	WCAP-[illegible]	WCAP-[illegible]	WCAP-[illegible]				WCAP-[illegible]
121	[illegible]	[illegible]	0.04	N	West.	100	uniform MOX	NA	West.	Pu metal cut into small cubes, steam oxidized. Oxide was ball milled to pass through 325 mesh	ceramic grade oxide	Pellet-[illegible], Vee blended treated in a Fitz mill, wet blended, pressed, no binder sintered and ground	D	?	?	?	?
122	WCAP-[illegible]	WCAP-[illegible]	WCAP-[illegible]	WCAP-[illegible]	WCAP-[illegible]		WCAP-[illegible]			WCAP-[illegible]	WCAP-[illegible]	WCAP-[illegible]	WCAP-[illegible]				WCAP-[illegible]
123																	
124	[illegible]	[illegible]	0.04	N	West.	100	uniform MOX	NA	West.	This row represents both VIPAC and pellet fuels, do not know the mix	?	?	?	This row represents both 304 stainless steel and zirc clad rods, do not know mix	?	?	?
125																	
126																	
127	?	?	?	?	?	100	uniform MOX	NA	?	?	?	?	?	?	?	[illegible]	?
128																AKUTSU-1	
129																	
130	?	?	?	?	?	100	uniform MOX	NA	?	?	?	?	?	?	?	[illegible]	?
131																AKUTSU-1	
132																	
133	?	?	?	?	?	100	uniform MOX	NA	?	?	?	?	?	?	?	[illegible]	?
134																AKUTSU-1	
135																	
136	?	?	?	?	?	100	uniform MOX	NA	?	?	?	?	?	?	?	[illegible]	?
137																AKUTSU-1	

	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA
2	ET BU>>>>>		<<< FIRST SET ME		ASUREMENTS	>>>>>>>>>	<<<SECOND SET BU>>>>>			SECOND SET	MEASUREMENTS		>>>>>>> > >	<<<<<<<<<		
3																
4	(1st Set) Peak MOX rod MWd/MT	(1st Set) Peak MOX Pellet MWd/MT	(1st Set) Non-dest. exams performed-description	(1st Set) No. MOX rods PIE	(1st Set) summary of PIE measurement	(1st Set) Where PIE performed	(2nd Set) Avg Assy MWd/MT (single or if batch-Max assy)	(2nd Set) Peak MOX rod MWd/MT	(2nd Set) Peak MOX Pellet MWd/MT	(2nd Set) Non-dest exams performed - description	(2nd Set) No. MOX rods PIE	(2nd Set) summary of PIE measurement	(2nd Set) Where PIE performed	Was any data made public?	Beyond design basis/transient tests performed? If so, which ones.	How transported to RX and to PIE?
119	91,500	40,000	Visual, profilometry, length, gamma scan	1	Fission gas release,metallography,tensile, burst, Mn-54 (fast flux), clad hydrogen, Alpha and beta gamma autoradiography, Nd148, U/Pu	Battelle Mem. Inst. (Columbus Ohio)	NA	NA	NA	NA	NA	NA	NA	Y	No	
120		WCAP-3385-5	WCAP-3385-57		WCAP-3385-57	WCAP-3385-57										
121	?	44,000	Visual (profilometry, length, gamma scan?)	1	(No fission gas since it's a failed rod) Metallography, Mn-54 (fast flux), clad hydrogen, Nd148, U/Pu	Battelle Mem. Inst. (Columbus Ohio)	NA	NA	NA	NA	NA	NA	NA	Y	No	
122		WCAP-3385-5	WCAP-3385-57		WCAP-3385-57	WCAP-3385-57										
123																
124	?	?	Visual checks done at reconstitution at the end of core II. Approximately 250 rods in total selected for insertion in Core III for "extended burnup testing". Thus this line item represents app 250-[illegible] or approx [illegible] rods	NA	NA	NA	?	?	?	Leak testing and other non-destructive examinations, performed as part of a West. [illegible] program, identified 57 defected rods from high power locations	NA	NA	NA	Y	No	
125																
126																
127	?	9,050	Length	1	Fission gas, alpha &beta gamma autoradiograph, metallography, U/Pu burnup sample	Battelle Mem. Institute	NA	NA	NA	NA	NA	NA	NA	Y	No	?
128		AKUTSU-1	AKUTSU-1		AKUTSU-1	AKUTSU-1										
129																
130	?	5,865	Length	1	Fission gas, metallography, U/Pu burnup sample (not isotopic)	Battelle Mem. Institute	NA	NA	NA	NA	NA	NA	NA	Y	No	?
131		AKUTSU-1	AKUTSU-1		AKUTSU-1	AKUTSU-1										
132																
133	?	?	Length, profilometry	1	Fission gas, Mn-54 clad, clad hydrogen, clad burst	Battelle Mem. Institute	NA	NA	NA	NA	NA	NA	NA	Y	No	?
134		AKUTSU-1	AKUTSU-1		AKUTSU-1	AKUTSU-1										
135																
136	?	5,490	Length, profilometry	1	Fission gas, alpha, beta gamma autoradiograph, U/Pu burnup, metallograph, radial burnup	Battelle Mem. Institute	NA	NA	NA	NA	NA	NA	NA	Y	No	?
137		AKUTSU-1	AKUTSU-1		AKUTSU-1	AKUTSU-1										

	BB	BC
2		MISC ELLANEOUS >>>
3		
4	Overall Performance notes (failure, shuffling etc.)	Miscellaneous Info
119	No failure noted, external corrosion time were as expected	Performance comparisons and results of End of Core III rods discussed in WCAP-3385-87
120	WCAP-3385-87	WCAP-3385-87
121	Rod failed. Thick oxide spalling; extensive hydriding with cracks. Concluded that failure mode was penetration initiated from outside of clad between middle and end of life, columnar grain growth. Failure not attributed to MOX	Performance comparisons and results of End of Core III rods discussed in WCAP-3385-87
122	WCAP-3385-87	WCAP-3385-87
123		
124	There were 87 identified failed rods. One of these (JK) was selected for destructive PIE and is shown above. Thus, there were 86 failed rods out of 336. Many of these failed rods had operated at a high power level throughout Core III. Some failed rodshad linear power increases in excess of 18kw/ft over their Core II levels	NOTE: THIS ROW REPRESENTS AN ESTIMATED APPROXIMATE 336 MOX RODS USED IN CORE III consisting of both VIPAC and Mitsubishi Sphere-rods. Performance comparisons and results of End of Core III rods discussed in WCAP-3385-87
125	WCAP-3385-87	WCAP-3385-87
126		
127	No failure noted	No comment
128	AKUTSUI	
129		
130	No failure noted	No comment
131	AKUTSUI	
132		
133	No failure noted	No comment
134	AKUTSUI	
135		
136	No failure noted	No comment
137	AKUTSUI	

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
2	<<<<<<	ITEM	>>>>>>>>>>>>>>>	<<<<<<			REACTOR SPECIFICS				>>>>>>>>	<<<<<<<			ITEM ASSY MOX DESIGN AND					FUEL
3	NOTE: blank-irrad was not mapped, ?-no data found in refs for this column, #/???-judgment made or incomplete data, NA-does not apply (or thought not to be performed) or nothing to report for (IS) summary																			
4	LINE ITEM (#/ent.batch)	IRRADIATION ITEM (in the batch)	ITEM DESCRIPTION (B-Batch of Assys, A-Single Assembly or group of rods, R-Individual Rod, IS-Irradiation Summary (a commentary))	Reactor & Unit	Project Sponsors	Reactor Type	Year First Insertion	Year of Final Discharge	Reactor Cycle Inserted	No. of MOX Assys in this ITEM (NA if rod)	Batch, Assy or Rod Name	Assy Design	TOTAL No. of MOX rods in ITEM	Mass of MOX in ITEM	Mass of Pu in ITEM	Pu total % Pu/(U+Pu) in ITEM (Max if mult blends)	No. of MOX pin types/blends in ITEM	Pu Wt % Profile	%Pu-238	%Pu-239
138	3.3	5	R	Saxton	PNC (Japan)	PWR-TEST	1971	1972	Core III	NA	45	9X9(mod)	1	?	?	4.9	1	?	?	?
139									AN/TSU-1							AN/TSU-?				
140	3.3	6	R	Saxton	PNC (Japan)	PWR-TEST	1971	1972	Core III	NA	C-3	9X9(mod)	1	?	?	4.0	1	?	?	?
141									AN/TSU-1							AN/TSU-1				
142	3.3	7	R	Saxton	PNC (Japan)	PWR-TEST	1971	1972	Core III	NA	C-4	9X9(mod)	1	?	?	4.0	1	?	?	?
143									AN/TSU-1							AN/TSU-1				
144	3.3	8	R	Saxton	PNC (Japan)	PWR-TEST	1971	1972	Core III	NA	37	9X9(mod)	1	?	?	4.9	1	?	?	?
145									AN/TSU-1							AN/TSU-1				
146	3.3	9	R	Saxton	PNC (Japan)	PWR-TEST	1971	1972	Core III	NA	46	9X9(mod)	1	?	?	4.9	1	?	?	?
147									AN/TSU-1							AN/TSU-?				
148	Rem. Japan's PNC MOX - Saxton Core III (p534, [illegible] MOX fuel)																			
149	3.3	10	R	Saxton	PNC (Japan)	PWR-TEST	1971	1972	Core III	NA	NA	9X9(mod)	[illegible]	?	?	4.9	1	?	?	?
150									AN/TSU-1				AN/TSU-1			AN/TSU-?				
151																				
152		ADDITIONAL IRRADIATIONS TO BE MAPPED:																		
153																				
154		Plutonium Recycle Test Reactor																		
155																				
156																				
157																				
158		Capsules in GE Test Reactor, MTR, ETR																		
159																				

	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK
2	I S O T O P I C S									F A B R I C A T I O N A S P E C T S							
3								>>>>>>	<<<						>>>>	Max LHGR	<<<FIRST
4	%Pu-240	%Pu-241	%Pu-242	Diluent Uranium (D or N)	Fuel Designer	% of MOX in ITEM (vol %)	Rod Pattern Desc.	B. Poison (in U of assy)	Fuel Bundler (where)	PuO2 conversion process (where)	UO2 conversion process (where)	Pellet Fabrication process	Pellet Types (A-annular, S-solid, D-dished, U-undished)	Cladding utilized	Any Instrument.	Max LHGR (kW/ft)	(1st Bat) Avg Assy MWd/MT (single or 8 batch-Max assy)
138	?	?	?	?	?	100	uniform MOX	NA	?	?	?	?	?	?	?	11.3	?
139																[illegible]	
140	?	?	?	?	?	100	uniform MOX	NA	?	?	?	?	?	?	?	?	?
141																	
142	?	?	?	?	?	100	uniform MOX	NA	?	?	?	?	?	?	?	?	?
143																	
144	?	?	?	?	?	100	uniform MOX	NA	?	?	?	?	?	?	?	?	?
145																	
146	?	?	?	?	?	100	uniform MOX	NA	?	?	?	?	?	?	?	?	?
147																	
148																	
149	?	?	?	?	?	100	uniform MOX	NA	?	?	?	?	?	?	?	?	?
150																	
151																	
152																	
153																	
154																	
155																	
156																	
157																	
158																	
159																	

	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA
2	SET BU>>>>>		<<< FIRST SET MEASUREMENTS													
3						>>>>>>>>	<<<SECOND SET BU>>>>>			SECOND SET	MEASUREMENTS		>>>>>>> > >	<<<<<<<<<		
4	(1st Set) Peak MOX rod MWd/MT	(1st Set) Peak MOX Pellet MWd/MT	(1st Set) Non-dest. exams performed-description	(1st Set) No. MOX rods PIE	(1st Set) summary of PIE measurement	(1st Set) Where PIE performed	(2nd Set) Avg Assy MWd/MT (single or if batch-Max Assy)	(2nd Set) Peak MOX rod MWd/MT	(2nd Set) Peak MOX Pellet MWd/MT	(2nd Set) Non-dest exams performed - description	(2nd Set) No. MOX rods PIE	(2nd Set) summary of PIE measurement	(2nd Set) Where PIE performed	Was any data made public?	Beyond design tests/transient tests performed? If so, which ones.	How transported to RX and to PIE?
138	?	5.670	Length	[illegible]	Fission gas, clad burst, clad tensile, metallography, clad hydrogen	Battelle Mem. Institute	NA	NA	NA	NA	NA	NA	NA	Y	No	?
139		AKU/TSU-1	AKU/TSU-1		AKU/TSU-1	AKU/TSU-1										
140	?	?	Length at Battelle and GE Vallecitos, Length also via neutron radiograph	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Y	No	?
141			AKU/TSU-1		AKU/TSU-1	AKU/TSU-1										
142	?	?	Length at Battelle and GE Vallecitos, Length also via neutron radiograph	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Y	No	?
143			AKU/TSU-1		AKU/TSU-1	AKU/TSU-1										
144	?	?	Length at Battelle and GE Vallecitos, Length also via neutron radiograph, preliminary	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Y	No	?
145			AKU/TSU-1		AKU/TSU-1	AKU/TSU-1										
146	?	?	Length at GE Vallecitos based on neutron radiograph	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Y	No	?
147			AKU/TSU-1		AKU/TSU-1	AKU/TSU-1										
148																
149	?	?	Length at GE Vallecitos based on neutron radiograph	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Y	No	?
150			AKU/TSU-1		AKU/TSU-1	AKU/TSU-1										
151																
152																
153																
154																
155																
156																
157																
158																
159																

	BB	BC
2		MISC ELLANEOUS >>>
3		
4	Overall Performance notes (failure, cracking etc.)	Miscellaneous info
138	No failure noted	No comment
139	AKUTSU-1	
140	No failure noted	No comment
141	AKUTSU-2	
142	No failure noted	No comment
143	AKUTSU-3	
144	No failure noted	No comment
145	AKUTSU-4	
146	No failure noted	No comment
147	AKUTSU-5	
148		
149	No failure noted	Reference after 56 rods of 4.9% fitted. Subtracting the 5 rods, gives 51 rods for the remainder which were not examined at all for this fine item
150	AKUTSU-1	AKUTSU-1
151		
152		
153		
154		
155		
156		
157		
158		
159		

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
1							DOMESTIC BWR IRRADIATION																	
2	<<<<<<	ITEM	>>>>>>>>>>>>>>	<<<<<			REACTOR SPECIFICS				>>>>>>>>	<<<<<<<			ITEM ASSY MOX DESIGN AN				FUEL ISOTOPICS					
3	NOTE: blank-lined was not mapped, ?-no data found in refs for this column, ##??-judgment made or incomplete data, NA-does not apply (or thought not to be performed) or nothing to report for (IS) summary																							
4	LINE ITEM (plant,batch #)	IRRADIATION ITEM (in the batch)	ITEM DESCRIPTION (B-Batch of Assys, A-Single Assembly or group of rods, R-Individual Rod, IS-Irradiation Summary in commentary)	Reactor & Unit	Project Sponsors	Reactor Type	Year First Insertion	Year of Final Discharge	Reactor Cycle Inserted	No. of MOX Assys in this ITEM (NA if rod)	Batch, Assy or Rod Name	Assy Design	TOTAL No. of MOX rods in ITEM	Mass of MOX in ITEM	Mass of Pu in ITEM	Pu total % Pu/(U+Pu) in ITEM (Max if multi blends)	No. of MOX pin types/enrichments in ITEM	Pu Wt % Fissile	%Pu-238	%Pu-239	%Pu-240	%Pu-241	%Pu-242	Diluent Uranium (D or N)
5																								
6			QUAD CITIES EPRI																					
7	1.1	1	A	Quad Cities	EEI/EPRI	BWR	1974	1987	2	1	GEB-161	7X7	16	?	?	4.0	4	80.0/88.1	0.12/0.25	87.10/75.88	10.30/18.48	2.15/4.47	0.28/1.15	N
8	REF						EPRI-243		EPRI-243			EPRI-243	EPRI-243			EPRI-73-2	EPRI-73-2	EPRI-73-2	EPRI-73-2	EPRI-73-2	EPRI-73-2	EPRI-73-2	EPRI-73-2	EPRI-73-2
9	1.1	2	A	Quad Cities	EEI/EPRI	BWR	1974	1987	2	1	GEB-162	7X7	9	?	?	4.0	4	80.0/82.1	0.12/0.25	87.10/75.88	10.30/18.48	2.15/4.47	0.28/1.15	N
10	REF															EPRI-73-2		EPRI-73-2	EPRI-73-2	EPRI-73-2	EPRI-73-2	EPRI-73-2	EPRI-73-2	
11	1.1	3	A	Quad Cities	EEI/EPRI	BWR	1974	1987	2	1	GEB-158	7X7	16	?	?	4.0	4	80.0/80.1	0.12/0.25	87.10/75.88	10.30/18.48	2.35/4.47	0.28/1.15	N
12	REF															EPRI-73-2		EPRI-73-2	EPRI-73-2	EPRI-73-2	EPRI-73-2	EPRI-73-2	EPRI-73-2	
13	1.1	4	A	Quad Cities	EEI/EPRI	BWR	1974	1987	2	1	GEB-159	7X7	16	?	?	4.0	4	80.0/85.1	0.12/0.25	87.10/75.88	10.30/18.48	2.38/4.47	0.28/1.15	N
14	REF															EPRI-73-2		EPRI-73-2	EPRI-73-2	EPRI-73-2	EPRI-73-2	EPRI-73-2	EPRI-73-2	
15	1.1	5	A	Quad Cities	EEI/EPRI	BWR	1974	1991	2	1	GEB-160	7X7	16	?	?	4.0	4	80.0/84.1	0.12/0.25	87.10/75.88	10.04/18.48	2.38/4.47	0.28/1.15	N
16	REF															EPRI-73-2		EPRI-73-2	EPRI-73-2	EPRI-73-2	EPRI-73-2	EPRI-73-2	EPRI-73-2	
17	1.1	NA	B	Quad Cities	EEI/EPRI	BWR	1974	1991	2	5	NA	7X7	48	?	?	4	4	80.0/80.1	0.12/0.25	87.10/75.88	10.09/18.48	2.38/4.47	0.28/1.15	N
18	REF															EPRI-73-2		EPRI-73-2	EPRI-73-2	EPRI-73-2	EPRI-73-2	EPRI-73-2	EPRI-73-2	
19																								
20			BRP-32 ROD EEI																					
21																								
22	2.1	1	R	Big Rock Pt	EEI/EPRI	BWR	1969	1973	?	NA	DY0001	8X8	1	?	?	1.451	1	80	?	?	?	?	?	N
23	REF				EPRI 73-2		EPRI 73-2	EPRI 73-2	EPRI 73-2	EPRI 73-2	EPRI 73-2	EPRI 73-2	EPRI 73-2			EPRI 73-2	EPRI 73-2	EPRI 73-2						EPRI 73-2
24	2.1	2	R	Big Rock Pt	EEI/EPRI	BWR	1969	1970	?	NA	DY0002	8X8	1	?	?	1.49	1	80	?	87.23	9.92	2.40	0.37	N
25	REF				EPRI 73-2		EPRI 73-2	EPRI 73-2	EPRI 73-2	EPRI 73-2	EPRI 73-2	EPRI 73-2	EPRI 73-2			NEDC-10987	EPRI 73-2	NEDC-10987		NEDC-10987	NEDC-10987	NEDC-10987	NEDC-10987	NEDC-10987
26	2.1	3	R	Big Rock Pt	EEI/EPRI	BWR	1969	1973	?	NA	DY0003	8X8	1	?	?	?	1	80	?	?	?	?	?	N
27	REF				EPRI 73-2		EPRI 73-2	EPRI 73-2	EPRI 73-2	EPRI 73-2	EPRI 73-2	EPRI 73-2	EPRI 73-2				EPRI 73-2	EPRI 73-2						EPRI 73-2
28	2.1	4	R	Big Rock Pt	EEI/EPRI	BWR	1969	1973	?	NA	DY0004	8X8	1	?	?	?	1	80	?	?	?	?	?	N
29	REF				EPRI 73-2		EPRI 73-2	EPRI 73-2	EPRI 73-2	EPRI 73-2	EPRI 73-2	EPRI 73-2	EPRI 73-2				EPRI 73-2	EPRI 73-2						EPRI 73-2

	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI
1											
2				>>>>>>	<<<	FABRICATION ASPECTS					
3											>>>>
4	Fuel Designer	% of MOX in ITEM (vol %)	Rod Poison Desc.	B. Poison (in U of assy)	Fuel Bundles (where)	PuO2 conversion process (where)	UO2 conversion process (where)	Pellet Fabrication process	Pellet Types (A-annular, S-solid, D-dished, U-undished)	Cladding utilized	Any Instrument.
5											
6											
7	GE	20.4	blend	Gd in U	GE	?(Vallecitos)	?	cold pressed, mechanically mixed powder	A,S,D,U	Zr-2	No-but TIPS nearby
8	EPRI-240	EPRI-240	EPRI-240	EPRI-240							
9	GE	16.9	conven-tional	Gd in U	GE	?(Vallecitos)	?	cold pressed, mechanically mixed powder	A,S,D,U	Zr-2	No-but TIPS nearby
10											
11	GE	20.4	blend	Gd in U	GE	?(Vallecitos)	?	cold pressed, mechanically mixed powder	A,S,D,U	Zr-2	No-but TIPS nearby
12											
13	GE	20.4	blend	Gd in U	GE	?(Vallecitos)	?	cold pressed, mechanically mixed powder	A,S,D,U	Zr-2	No-but TIPS nearby
14											
15	GE	20.4	blend	Gd in U	GE	?(Vallecitos)	?	mechanically mixed powder	A,S,D,U	Zr-2	No-but TIPS nearby
16											
17	GE	20.4	blend	Gd in U	GE	?(Vallecitos)	?	cold pressed, mechanically mixed powder	A,S,D,U	Zr-2	No-but TIPS nearby
18											
19											
20											
21											
22	GE	NA	?	?	GE	?	?	?	?	Zr-2	?
23										GESMO-F	
24	GE	NA	?	?	GE	?	?	?	6	Zr-2	
25										GESMO-F	
26	GE	NA	?	?	GE	?	?	?	?	Zr-2	?
27										GESMO-F	
28	GE	NA	?	?	GE	?	?	?	?	Zr-2	?
29										GESMO-F	

	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS
1										
2										
3	Max LHGR	<<<FIRST SET B>>>>>>			<<< FIRST SET MEASUREMENTS			>>>>>>>>	<<<SECOND SET B	
4	Max LHGR (kW/ft)	(1st Set) Avg Assy MWd/MT (single or if batch-Max assy)	(1st Set) Peak MOX rod MWd/MT	(1st Set) Peak MOX Pellet MWd/MT	(1st Set) Non-dest. exams performed-description	(1st Set) No. MOX rods PIE	(1st Set) summary of PIE measurement	(1st Set) Where PIE performed	(2nd Set) Avg Assy MWd/MT (single or if batch-Max assy)	(2nd Set) Peak MOX rod MWd/MT
5										
6										
7	?	8165	?	15400	gamma scan-power dist,	4	burnup and transuranics	Battelle Columbus	28290	?
8		EPRI-2569		EPRI-2569	NP-2397LD, EPRI NP-214	3026, EPRI NP-	EPRI NP-3566, EPRI NP-2397LD, EPRI NP-214	3026, EPRI NP-	EPRI NP-3266	
9	?	2660	?	4060	gamma scan-power dist,	4	burnup and transuranics	Battelle Columbus	12600	?
10		EPRI-2569		EPRI-2569	[illegible] NP-2397LD, EPRI NP-	[illegible] 3016, EPRI	[illegible] 2397LD, EPRI NP-214	[illegible] 3016, EPRI	[illegible] 3266	
11	15.8	8165	?	?	gamma scan-power dist,	?	NA	NA	31560	?
12	EPRI-2569	EPRI-2569			[illegible] NP-2397LD, EPRI NP-				[illegible] 3266	
13	14	8165	?	?	gamma scan-power dist,	?	NA	NA	89900	?
14	E.RVC	EPRI-1569			[illegible] NP-2397LD, EPRI NP-				[illegible] 3266	
15	?	8165	?	?	gamma scan-power dist,	?	NA	NA	81350	?
16		EPRI-2569			[illegible] NP-2397LD, EPRI NP-				[illegible] 3266	
17	15.8	NA	NA	NA	scan of MOX and uranium bundles across core; many taken to obtain core wide measurements	NA	NA	NA	NA	NA
18	E.RVC		E.RVC							
19										
20										
21										
22	8.93	19,100	19,100	25,100	neutron radiography, gamma scans, rod length, rod diameter	?	?	?	NA	
23	EPRI 73-2	EPRI 73-2	EPRI 73-2	EPRI 73-2	EPRI 73-2					
24	11.7	?		2560	Visual, gamma scan, rod radiographs, rod diam & length,	?	fission gas release, burnup & Uranium/Plutonium isotopes, cladding samples	Vallecitos	NA	
25	NEDC-10367	NEDC-10367			NEDC-10367	NEDC-10367	NEDC-10367	NEDC-10367		
26	6-+101	?	?	?	?	?	?	?	?	
27	GESMO-F									
28	6-+102	?	?	?	?	?	?	?	?	
29	GESMO-F									

	AT	AU	AV	AW	AX	AY	AZ	BA	BB	BC
1										
2	<<<<<<	SECOND SET	MEASUREMENTS	>>>>>>> > >	<<<<<<<<<<					
3										MISCELLANEOUS >>>
4	(2nd Set) Peak MOX Pellet MWd/MT	(2nd Set) Non-dest. exams performed - description	(2nd Set) No. MOX rods PIE	? (2nd Set) summary of PIE measurement	(2nd Set) Where PIE performed	Was any data made public?	Beyond design basis/transient tests performed? If so, which ones.	How transported to RX and/or PIE?	Overall Performance notes (failure, cladding etc.)	Miscellaneous info.
5										
6										
7	?	gamma scan (EOC 2,3,4), rod length, visual	?	?	?	Y	NA	?	?	Annular & solid fuels tested
8		EPRI NP-[illegible]								
9	?	gamma scan (EOC 2,3,4), rod length, visual, profilometry, oxide thickness	?	?	?	Y	NA	?	?	Annular & solid fuels tested
10		EPRI NP-[illegible]								
11	31000	gamma scan (EOC 2,3,4), rod length, visual, neutrography-burn-up gamma (EOC5)	2	fission gas release at EOC5	Battelle Columbus	Y	NA	Nat. Lead Ind. 1/2 cask to hot cell	?	Annular & solid fuels tested
12	EPRI NP-[illegible]	EPRI NP-[illegible]		EPRI NP-[illegible]	EPRI NP-[illegible]			EPRI NP-[illegible]		
13	?	length, visual, neutrography-burnup gamma (EOC5), profilometry, oxide thickness	1	fission gas release at EOC5	Battelle Columbus	Y	NA	Nat. Lead Ind. 1/2 cask to hot cell	?	Annular & solid fuels tested
14		EPRI NP-[illegible]		EPRI NP-[illegible]	EPRI NP-[illegible]		-	EPRI NP-[illegible]		
15	38790	gamma scan (EOC 2,3,4), rod length, visual	?	?	?	Y	NA	?	?	Annular & solid fuels tested
16	EPRI NP-[illegible]	EPRI NP-[illegible]								
17	~57000	5 fission gas measurements taken, 3 MOX rods, the other 2 were on uranium rods	3	NA	NA	Y however, some GE prop. data may exist	Prompt transient failure tests at SPERT/TRA/Battelle & APx (prefails) size effects	?	Fission gas measurements showed that solid pellets performed better than annular. No fuel failures reported	Annular & solid fuels tested. Gd depletion (in annuals) which was near MOX rods was tested at four axial levels. Some of the rods subjected to fission gas release
18	EPRI/C						EPRI NP-[illegible]		EPRI NP-[illegible]	EPRI NP-[illegible]
19										
20										
21										
22	NA	NA	NA	NA	NA	Very little public information	NA	NA	No unusual problems identified for solid, dished, or annular pellets	Non-dest exams documented in NEDO-[illegible], do not know if dest exams conducted
23									EPRI 73-[illegible]	
24	NA	NA	NA	NA	NA	Y	?	spent fuel in AEC-owned TREXT-2 cask	?	
25								NEDO-[illegible]		
26	?	?	?	?	?	?	?	?	?	[illegible] reconstitutions, 2 different annular fuels tested ~20,000MWd/MT for many rods projected by EPRI 73-2
27										
28	?	?	?	?	?	?	?	?	?	[illegible] reconstitutions, 2 different annular fuels tested ~20,000MWd/MT for many rods projected by EPRI 73-2
29										

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
2	<<<<<<	ITEM	>>>>>>>>>>>>>>>	<<<<<			REACTOR SPECIFICS				>>>>>>>>	<<<<<<<			ITEM ASSY MOX DESIGN AN FUEL					ISOTOPICS				
3	NOTE: blank-irrad was not mapped, ?-no data found in refs for this column, ##??-judgment made or incomplete data, NA-does not apply (or thought not to be performed) or nothing to report for (IS) summary																							
4	LINE ITEM (blank data is)	IRRADIATION ITEM (in the batch)	ITEM DESCRIPTION: B-Batch of Assys, A-Single Assembly or group of rods, R-Individual Rod, IS-Irradiation Summary (a commentary)	Reactor & Unit	Project Sponsors	Reactor Type	Year First Insertion	Year of Final Discharge	Reactor Cycle Inserted	No. of MOX Assys in this ITEM (NA if rod)	Batch, Assy or Rod Name	Assy Design	TOTAL No. of MOX rods in ITEM	Mass of MOX in ITEM	Mass of Pu in ITEM	Pu total % Pu/(U+Pu) in ITEM (Max if small blends)	No. of MOX pin types/of rods in ITEM	Pu Wt % Fissile	%Pu-238	%Pu-239	%Pu-240	%Pu-241	%Pu-242	Diluent Uranium (D or N)
30	2.1	5	R	Big Rock Pt	GE/EPRI	BWR	1969	1970	?	NA	DY0005	9X9	1	?	?	1.40	1	90	?	87.35	8.92	2.46	0.27	N
31	REF				EPRI 72-2		EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2			NEDC-10367	EPRI 72-2	NEDC-10367		NEDC-10367	NEDC-10367	NEDC-10367	NEDC-10367	NEDC-10367
32	2.1	6	R	Big Rock Pt	GE/EPRI	BWR	1969	1970	?	NA	DY0006	9X9	1	?	?	1.409	1	90	?	?	?	?	?	N
33	REF				EPRI 72-2		EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2			EPRI 72-2	EPRI 72-2	EPRI 72-2						EPRI 72-2
34	2.1	7	R	Big Rock Pt	GE/EPRI	BWR	1969	1971	?	NA	DY0007	9X9	1	?	?	?	1	90	?	?	?	?	?	N
35	REF				EPRI 72-2		EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2				EPRI 72-2	EPRI 72-2						EPRI 72-2
36	2.1	8	R	Big Rock Pt	GE/EPRI	BWR	1969	1971	?	NA	DY0008	9X9	1	?	?	?	1	90	?	?	?	?	?	N
37	REF				EPRI 72-2		EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2				EPRI 72-2	EPRI 72-2						EPRI 72-2
38	2.1	9	R	Big Rock Pt	GE/EPRI	BWR	1969	1971	?	NA	DY0009	9X9	1	?	?	?	1	90	?	?	?	?	?	N
39	REF				EPRI 72-2		EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2				EPRI 72-2	EPRI 72-2						EPRI 72-2
40	2.1	10	R	Big Rock Pt	GE/EPRI	BWR	1969	1971	?	NA	DY0010	9X9	1	?	?	?	1	90	?	?	?	?	?	N
41	REF				EPRI 72-2		EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2				EPRI 72-2	EPRI 72-2						EPRI 72-2
42	2.1	11	R	Big Rock Pt	GE/EPRI	BWR	1969	1970	?	NA	DY0011	9X9	1	?	?	1.51	1	90	?	87.42	9.84	2.47	0.27	N
43	REF				EPRI 72-2		EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2			NEDC-10367	EPRI 72-2	NEDC-10367		NEDC-10367	NEDC-10367	NEDC-10367	NEDC-10367	NEDC-10367
44	2.1	12	R	Big Rock Pt	GE/EPRI	BWR	1969	1971	?	NA	DY0012	9X9	1	?	?	?	1	90	?	?	?	?	?	N
45	REF				EPRI 72-2		EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2				EPRI 72-2	EPRI 72-2						EPRI 72-2
46	2.1	13	R	Big Rock Pt	GE/EPRI	BWR	1969	1970	?	NA	DY0013	9X9	1	?	?	1.517	1	90	?	?	?	?	?	N
47	REF				EPRI 72-2		EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2			EPRI 72-2	EPRI 72-2	EPRI 72-2						EPRI 72-2
48	2.1	14	R	Big Rock Pt	GE/EPRI	BWR	1969	1971	?	NA	DY0014	9X9	1	?	?	?	1	90	?	?	?	?	?	N
49	REF				EPRI 72-2		EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2				EPRI 72-2	EPRI 72-2						EPRI 72-2
50	2.1	15	R	Big Rock Pt	GE/EPRI	BWR	1969	1971	?	NA	DY0015	9X9	1	?	?	?	1	90	?	?	?	?	?	N
51	REF				EPRI 72-2		EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2				EPRI 72-2	EPRI 72-2						EPRI 72-2
52	2.1	16	R	Big Rock Pt	GE/EPRI	BWR	1969	1971	?	NA	DY0016	9X9	1	?	?	?	1	90	?	?	?	?	?	N
53	REF				EPRI 72-2		EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2				EPRI 72-2	EPRI 72-2						EPRI 72-2
54	2.1	17	R	Big Rock Pt	GE/EPRI	BWR	1969	1971	?	NA	DY0017	9X9	1	?	?	?	1	90	?	?	?	?	?	N
55	REF				EPRI 72-2		EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2				EPRI 72-2	EPRI 72-2						EPRI 72-2
56	2.1	18	R	Big Rock Pt	GE/EPRI	BWR	1969	1971	?	NA	DY0018	9X9	1	?	?	?	1	90	?	?	?	?	?	N
57	REF				EPRI 72-2		EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2				EPRI 72-2	EPRI 72-2						EPRI 72-2
58	2.1	19	R	Big Rock Pt	GE/EPRI	BWR	1969	1971	?	NA	DY0019	9X9	1	?	?	?	1	90	?	?	?	?	?	N
59	REF				EPRI 72-2		EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2				EPRI 72-2	EPRI 72-2						EPRI 72-2

	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS
2				>>>>>>	<<<	FABRICATION ASPECTS					>>>>	Max LHGR	<<<FIRST SET BU>>>>>			<<< FIRST SET MEASUREMENTS			>>>>>>>>	<<<SECOND SET S	
3																					
4	Fuel Designer	% of MOX in BWR (rod %)	Rod Pattern Conc.	B. Poison (in U of assy)	Fuel Bundler (where)	PuO2 conversion process (where)	UO2 conversion process (where)	Pellet Fabrication process	Pellet Types (A-annular, S-solid, D-dished, U-undished)	Cladding utilized	Any instrument.	Max LHGR (kW/ft)	(1st Set) Avg Assy MWd/MT (single or if batch-Max assy)	(1st Set) Peak MOX rod MWd/MT	(1st Set) Peak MOX Pellet MWd/MT	(1st Set) Non-dest. exams performed description	(1st Set) No. MOX rods PIE	(1st Set) - summary of PIE measurement	(1st Set) Where PIE performed	(2nd Set) Avg Assy MWd/MT (single or if batch-Max assy)	(2nd Set) Peak MOX rod MWd/MT
30	GE	NA	?	?	GE	?	?	?	D	Zr-2		11.7	?		7000	Visual, gamma scan, rod radiography, rod diam & length.	?	fission gas release, burnup & Uranium/Plutonium isotopes	Vallecitos	NA	
31										GESMO-F		NEDC-[illegible]		NEDC-[illegible]		NEDC-[illegible]	NEDC-[illegible]	NEDC-[illegible]	NEDC-[illegible]		
32	GE	NA	?	?	GE	?	?	?	?	Zr-2	?	8.81	17,900	17,900	25,200	neutron radiography, gamma scans rod length, rod diameter	?	?	?	NA	
33										GESMO-F		EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2					
34	GE	NA	?	?	GE	?	?	?	?	Zr-2	?	5->15?	?	?	?	?	?	?	?	?	
35										GESMO-F		GESMO-F									
36	GE	NA	?	?	GE	?	?	?	?	Zr-2	?	5->15?	?	?	?	?	?	?	?	?	
37										GESMO-F		GESMO-F									
38	GE	NA	?	?	GE	?	?	?	?	Zr-2	?	5->15?	?	?	?	?	?	?	?	?	
39										GESMO-F		GESMO-F									
40	GE	NA	?	?	GE	?	?	?	?	Zr-2	?	5->15?	?	?	?	?	?	?	?	?	
41										GESMO-F		GESMO-F									
42	GE	NA	?	?	GE	?	?	?	A,(?D)	Zr-2		11.70	?	?	7000	Visual, gamma scan, rod radiography, rod diam & length.	1	fission gas release, burnup & Uranium/Plutonium isotopes	Vallecitos	NA	
43										GESMO-F		NEDC-[illegible]		NEDC-[illegible]		NEDC-[illegible]	NEDC-[illegible]	NEDC-[illegible]	NEDC-[illegible]		
44	GE	NA	?	?	GE	?	?	?	?	Zr-2	?	5->15?	?	?	?	?	?	?	?	?	
45										GESMO-F		GESMO-F									
46	GE	NA	?	?	GE	?	?	?	?	Zr-2	?	10.45	20,750	20,750	28,000	neutron radiography, gamma scans rod length, rod diameter	?	?	?	NA	
47										GESMO-F		EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2					
48	GE	NA	?	?	GE	?	?	?	?	Zr-2	?	5->15?	?	?	?	?	?	?	?	?	
49										GESMO-F		GESMO-F									
50	GE	NA	?	?	GE	?	?	?	?	Zr-2	?	5->15?	?	?	?	?	?	?	?	?	
51										GESMO-F		GESMO-F									
52	GE	NA	?	?	GE	?	?	?	?	Zr-2	?	5->15?	?	?	?	?	?	?	?	?	
53										GESMO-F		GESMO-F									
54	GE	NA	?	?	GE	?	?	?	?	Zr-2	?	5->15?	?	?	?	?	?	?	?	?	
55										GESMO-F		GESMO-F									
56	GE	NA	?	?	GE	?	?	?	?	Zr-2	?	5->15?	?	?	?	?	?	?	?	?	
57										GESMO-F		GESMO-F									
58	GE	NA	?	?	GE	?	?	?	?	Zr-2	?	5->15?	?	?	?	?	?	?	?	?	
59										GESMO-F		GESMO-F									

	AT	AU	AV	AW	AX	AY	AZ	BA	BB	BC
2	>>>>>>	SECOND SET	MEASUREMENTS		>>>>>>>>>	<<<<<<<<<				MISCELLANEOUS >>>
3										
4	(2nd Set) Peak MOX Pellet MWd/MT	(2nd Set) Non-dest exams performed - description	(2nd Set) No. MOX rods PIE	(2nd Set) summary of PIE measurement	(2nd Set) Where PIE performed	Was any data made public?	Beyond design basis/transient tests performed? If so, which ones.	How transported to RX and to PIE?	Overall Performance notes (failure, cladding etc.)	Miscellaneous Info
30 / 31	NA	NA	NA	NA	NA	?	?	[illegible] fuel in AEC-owned TREAT-2 cask NEDC-12387	?	
32 / 33	NA	NA	NA	NA	NA	Very little public information	NA	NA	No unique problems identified for solid, dished, or annular pellets EPRI 72-2	Non-dest exam documented in NEDO-12552, do not know if dest exam conducted
34 / 35	?	?	?	?	?	?	?	?	?	[illegible] reconstitutions, 2 different annular fuels tested; ~20,000MWd/MT for many rods-projected by EPRI 72-2
36 / 37	?	?	?	?	?	?	?	?	?	[illegible] reconstitutions, 2 different annular fuels tested; ~20,000MWd/MT for many rods-projected by EPRI 72-2
38 / 39	?	?	?	?	?	?	?	?	[illegible] spacing and external clad corrosion prevent further irradiation EPRI 72-2	[illegible] reconstitutions, 2 different annular fuels tested; ~20,000MWd/MT for many rods-projected by EPRI 72-2
40 / 41	?	?	?	?	?	?	?	?	?	[illegible] reconstitutions, 2 different annular fuels tested; ~20,000MWd/MT for many rods-projected by EPRI 72-2
42 / 43	NA	NA	NA	NA	NA	?	?	[illegible] AEC-owned TREAT-2 cask NEDC-12387	?	
44 / 45	?	?	?	?	?	?	?	?	?	[illegible] reconstitutions, 2 different annular fuels tested; ~20,000MWd/MT for many rods-projected by EPRI 72-2
46 / 47	NA	NA	NA	NA	NA	Very little public information	NA	NA	No unique problems identified for solid, dished, or annular pellets EPRI 72-2	Non-dest exam documented in NEDO-12552, do not know if dest exam conducted
48 / 49	?	?	?	?	?	?	?	?	?	[illegible] reconstitutions, 2 different annular fuels tested; ~20,000MWd/MT for many rods-projected by EPRI 72-2
50 / 51	?	?	?	?	?	?	?	?	?	[illegible] reconstitutions, 2 different annular fuels tested; ~20,000MWd/MT for many rods-projected by EPRI 72-2
52 / 53	?	?	?	?	?	?	?	?	?	[illegible] reconstitutions, 2 different annular fuels tested; ~20,000MWd/MT for many rods-projected by EPRI 72-2
54 / 55	?	?	?	?	?	?	?	?	?	[illegible] reconstitutions, 2 different annular fuels tested; ~20,000MWd/MT for many rods-projected by EPRI 72-2
56 / 57	?	?	?	?	?	?	?	?	?	[illegible] reconstitutions, 2 different annular fuels tested; ~20,000MWd/MT for many rods-projected by EPRI 72-2
58 / 59	?	?	?	?	?	?	?	?	?	[illegible] reconstitutions, 2 different annular fuels tested; ~20,000MWd/MT for many rods-projected by EPRI 72-2

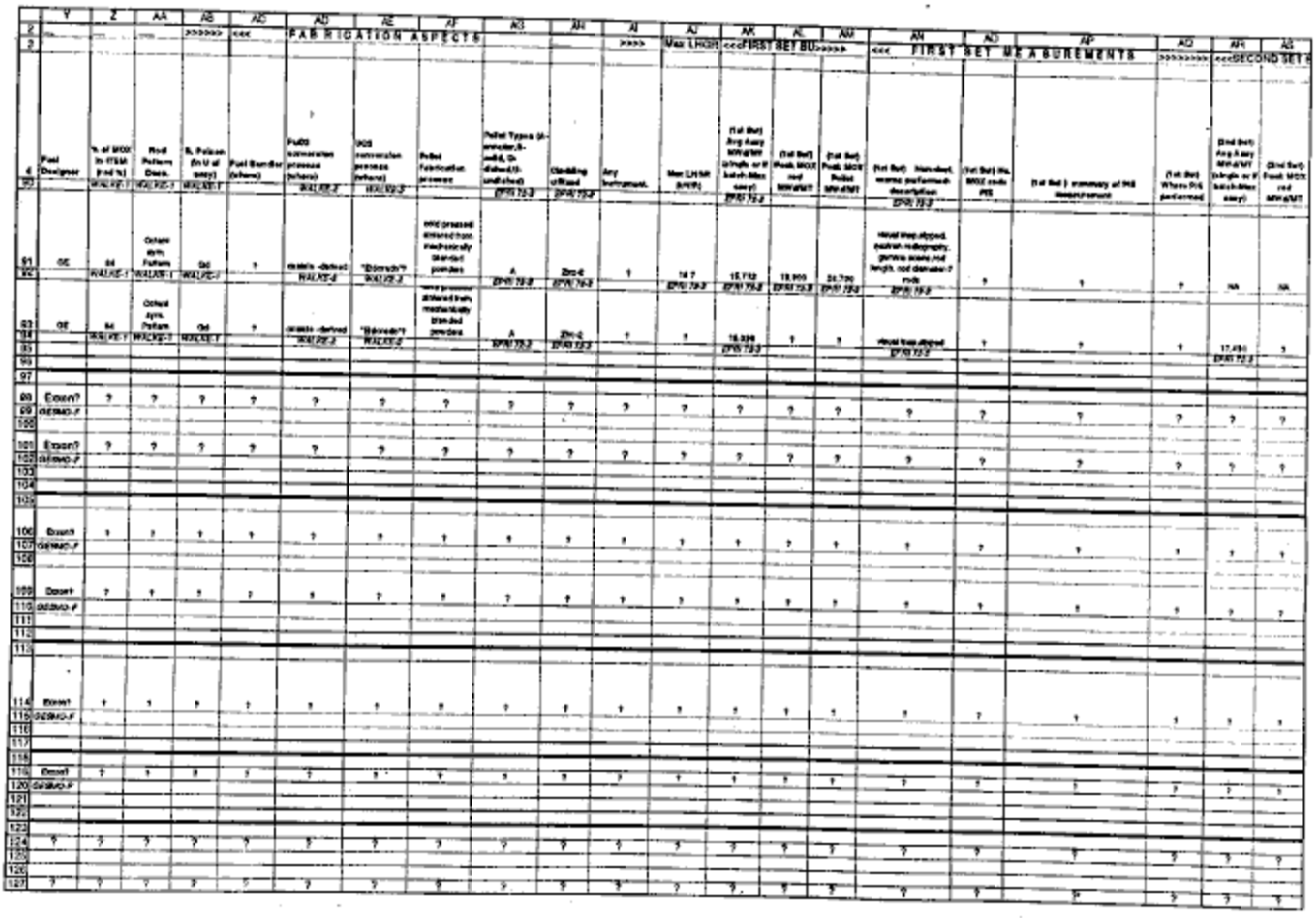
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
2	<<<<<< ITEM		>>>>>>>>>>>>>>	<<<<<			REACTOR SPECIFICS				>>>>>>>>	<<<<<<<			ITEM ASSY MOX DESIGN AN				FUEL	ISOTOPICS				
3	NOTE: blank-irrad was not mapped, ?-no data found in refs for this column, ##??-judgment made or incomplete data, NA-does not apply (or thought not to be performed) or nothing to report for (IS) summary																							
4	LINE ITEM (plant.batch)	IRRADIATION ITEM (in the batch)	ITEM DESCRIPTION B-Batch of Assys, A-Single Assembly or group of rods, R-Individual Rod, IS-Irradiation Summary in commentary)	Reactor & Unit	Project Sponsors	Reactor Type	Year First Insertion	Year of Final Discharge	Reactor Cycle Inserted	No. of MOX Assys in this ITEM (NA if rod)	Batch, Assy or Rod Name	Assy Design	TOTAL No. of MOX rods in ITEM	Mass of MOX in ITEM	Mass of Pu in ITEM	Pu total %, Puf (fissile) in ITEM (Max % and blends)	No. of MOX pin types/rods in ITEM	Pu Wt % Fissile	%Pu-238	%Pu-239	%Pu-240	%Pu-241	%Pu-242	Diluent Uranium (D or N)
60	2.1	20	R	Big Rock Pt	CE/EPRI	BWR	1969	1971	?	NA	DY0020	9X9	1	?	?	?	1	80	?	?	?	?	?	N
61	REF				EPRI 72-2		EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2				EPRI 72-2	EPRI 72-2						EPRI 72-2
62	2.1	21	R	Big Rock Pt	CE/EPRI	BWR	1969	1971	?	NA	DY0021	9X9	1	?	?	?	1	80	?	?	?	?	?	N
63	REF				EPRI 72-2		EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2				EPRI 72-2	EPRI 72-2						EPRI 72-2
64	2.1	22	R	Big Rock Pt	CE/EPRI	BWR	1969	1972	?	NA	DY0022	9X9	1	?	?	?	1	80	?	?	?	?	?	N
65	REF				EPRI 72-2		EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2				EPRI 72-2	EPRI 72-2						EPRI 72-2
66	2.1	23	R	Big Rock Pt	CE/EPRI	BWR	1969	1972	?	NA	DY0023	9X9	1	?	?	?	1	80	?	?	?	?	?	N
67	REF				EPRI 72-2		EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2				EPRI 72-2	EPRI 72-2						EPRI 72-2
68	2.1	24	R	Big Rock Pt	CE/EPRI	BWR	1969	1970	?	NA	DY0024	9X9	1	?	?	1.72	1	90	?	87.48	9.8	2.45	0.27	N
69	REF				EPRI 72-2		EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2			NEDC-10367	EPRI 72-2	NEDC-10367		NEDC-10367	NEDC-10367	NEDC-10367	NEDC-10367	NEDC-10367
70	2.1	25	R	Big Rock Pt	CE/EPRI	BWR	1969	1971	?	NA	DY0025	9X9	1	?	?	?	1	80	?	?	?	?	?	N
71	REF				EPRI 72-2		EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2				EPRI 72-2	EPRI 72-2						EPRI 72-2
72	2.1	26	R	Big Rock Pt	CE/EPRI	BWR	1969	1970	?	NA	DY0026	9X9	1	?	?	1.727	1	91	?	?	?	?	?	N
73	REF				EPRI 72-2		EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2			EPRI 72-2	EPRI 72-2	EPRI 72-2						EPRI 72-2
74	2.1	27	R	Big Rock Pt	CE/EPRI	BWR	1969	1971	?	NA	DY0027	9X9	1	?	?	?	1	80	?	?	?	?	?	N
75	REF				EPRI 72-2		EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2				EPRI 72-2	EPRI 72-2						EPRI 72-2
76	2.1	28	R	Big Rock Pt	CE/EPRI	BWR	1969	1973	?	NA	DY0028	9X9	1	?	?	?	1	80	?	?	?	?	1	N
77	REF				EPRI 72-2		EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2				EPRI 72-2	EPRI 72-2						EPRI 72-2
78	2.1	29	R	Big Rock Pt	CE/EPRI	BWR	1969	1977	?	NA	DY0029	9X9	1	?	?	?	1	80	?	?	?	?	?	N
79	REF				EPRI 72-2		EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2				EPRI 72-2	EPRI 72-2						EPRI 72-2
80	2.1	30	R	Big Rock Pt	CE/EPRI	BWR	1969	1977	?	NA	DY0030	9X9	1	?	?	?	1	80	?	?	?	?	?	N
81	REF				EPRI 72-2		EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2				EPRI 72-2	EPRI 72-2						EPRI 72-2
82	2.1	31	R	Big Rock Pt	CE/EPRI	BWR	1969	1971	?	NA	DY0031	9X9	1	?	?	?	1	80	?	?	?	?	?	N
83	REF				EPRI 72-2		EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2				EPRI 72-2	EPRI 72-2						EPRI 72-2
84	2.1	32	R	Big Rock Pt	CE/EPRI	BWR	1969	1971	?	NA	DY0032	9X9	1	?	?	?	1	80	?	?	?	?	?	N
85	REF				EPRI 72-2		EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2	EPRI 72-2				EPRI 72-2	EPRI 72-2						EPRI 72-2
86																								
87			BRP-3 BUNDLE REF																					
88																								
89	2.2	1	A	Big Rock Pt	CE/EPRI	BWR	1970	1973	6	1	CE-F1	9X9	69	?	?	8.1	3	80/80	0.10/0.27	[illegible]	[illegible]	[illegible]	0.29/1.18	N

*Dem Comm Irrads-Bs

	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS
2				>>>>>>	<<<	FABRICATION ASPECTS					>>>>	Max LHGR	<<<FIRST SET Bu>>>>>>			<<< FIRST SET MEASUREMENTS			>>>>>>>>	<<<SECOND SET B	
3																					
4	Fuel Designer	% of MOX in ITEM (rod %)	Rod Pattern Desc.	B. Poison (in U of assy)	Fuel Bundler (where)	PuO2 conversion process (where)	UO2 conversion process (where)	Pellet Fabrication process	Pellet Types (A-annular, S-solid, D-dished, U-undished)	Cladding utilized	Any Instrument.	Max LHGR (kW/ft)	(1st Set) Avg Assy MWd/MT (single or if batch-Max assy)	(1st Set) Peak MOX rod MWd/MT	(1st Set) Peak MOX Pellet MWd/MT	(1st Set) Non-dest. exams performed-description	(1st Set) No. MOX rods PIE	(1st Set) summary of PIE measurement	(1st Set) Where PIE performed	(2nd Set) Avg Assy MWd/MT (single or if batch-Max assy)	(2nd Set) Peak MOX rod MWd/MT
50	GE	NA	?	?	GE	?	?	?	?	Zr-2	?	6->15?	?	?	?	?	?	?	?	?	
51										GESMO-F		GESMO-F									
62	GE	NA	?	?	GE	?	?	?	?	Zr-2	?	6->15?	?	?	?	?	?	?	?	?	
63										GESMO-F		GESMO-F									
64	GE	NA	?	?	GE	?	?	?	?	Zr-2	?	6->15?	?	?	?	?	?	?	?	?	
65										GESMO-F		GESMO-F									
66	GE	NA	?	?	GE	?	?	?	?	Zr-2	?	6->15?	?	?	?	?	?	?	?	?	
67										GESMO-F		GESMO-F									
68	GE	NA	?	?	GE	?	?	?	A ([illegible])	Zr-2		11.76	?	?	7000	Visual, gamma scan, neut radiography, rod diam & length.	1	fission gas release, burnup & Uranium/Plutonium isotopes	Vallecitos	NA	
69										GESMO-F		NEDO-10997	NEDO-10997			NEDO-10997	NEDO-10997	NEDO-10997	NEDO-10997		
70	GE	NA	?	?	GE	?	?	?	?	Zr-2	?	6->15?	?	?	?	?	?	?	?	?	
71										GESMO-F		GESMO-F									
72	GE	NA	?	?	GE	?	?	?	?	Zr-2	?	16.77	21,700	21,700	30,200	neutron radiography, gamma scans, rod length, rod diameter	?	?	?	NA	
73										GESMO-F		EPRI 79-?	EPRI 79-?	EPRI 79-?	EPRI 79-?	EPRI 79-?					
74	GE	NA	?	?	GE	?	?	?	?	Zr-2	?	6->15?	?	?	?	?	?	?	?	?	
75										GESMO-F		GESMO-F									
76	GE	NA	?	?	GE	?	?	?	?	Zr-2	?	6->15?	?	?	?	?	?	?	?	?	
77										GESMO-F		GESMO-F									
78	GE	NA	?	?	GE	?	?	?	?	Zr-2	?	6->15?	?	?	?	?	?	?	?	?	
79										GESMO-F		GESMO-F									
80	GE	NA	?	?	GE	?	?	?	?	Zr-2	?	6->15?	?	?	?	?	?	?	?	?	
81										GESMO-F		GESMO-F									
82	GE	NA	?	?	GE	?	?	?	?	Zr-2	?	6->15?	?	?	?	?	?	?	?	?	
83										GESMO-F		GESMO-F									
84	GE	NA	?	?	GE	?	?	?	?	Zr-2	?	6->15?	?	?	?	?	?	?	?	?	
85										GESMO-F		GESMO-F									
86																					
87																					
88																					
89	GE	8A	Octant sym. Pattern	Gd	?	oxalate-derived	"B(pseudo?)"	[illegible] pressed from mechanically blended powders	A	Zirc-2	?	?	15,410	?	?	visual insp.,sipped	?	?	?	NA	NA

	AT	AU	AV	AW	AX	AY	AZ	BA	BB	BC
2	U>>>>>	SECOND SET	MEASUREMENTS	>>>>>>> > >	<<<<<<<<<					MISCELLANEOUS >>>
3										
4	(2nd Set) Peak MOX Pellet MWd/MT	(2nd Set) Non-dual exams performed - description	(2nd Set) No. MOX rods PIE	(2nd Set) summary of PIE measurement	(2nd Set) Where PIE performed	Was any data made public?	Beyond design basis/transient tests performed? If so, which, when,	How transported to RX and/or PIE?	Overall Performance notes (failure, swelling etc.)	Miscellaneous Info
60	?	?	?	?	?	?	?	?	?	GENERAL: [illegible] reconstitutions, 2 different annular fuels tested ~20,000MWd/MT for many rods-projected by EPRI 72-2
61										
62	?	?	?	?	?	?	?	?	?	GENERAL: [illegible] reconstitutions, 2 different annular fuels tested ~20,000MWd/MT for many rods-projected by EPRI 72-2
63										
64	?	?	?	?	?	?	?	?	?	GENERAL: [illegible] reconstitutions, 2 different annular fuels tested ~20,000MWd/MT for many rods-projected by EPRI 72-2
65										
66	?	?	?	?	?	?	?	?	?	GENERAL: [illegible] reconstitutions, 2 different annular fuels tested ~20,000MWd/MT for many rods-projected by EPRI 72-2
67										
68	NA	NA	NA	NA	NA	Y	?	spent fuel in AEC-owned [illegible] cask	?	
69								[illegible]		
70	?	?	?	?	?	?	?	?	?	GENERAL: [illegible] reconstitutions, 2 different annular fuels tested ~20,000MWd/MT for many rods-projected by EPRI 72-2
71										
72	NA	NA	NA	NA	NA	Very little public information	NA	NA	[illegible] identified for solid, dished, or annular pellets	Non-dual exam documented in NEDO-12532, do not know if dual exam conducted
73									EPRI 72-2	
74	?	?	?	?	?	?	?	?	[illegible] external-clad corrosion prevent further irradiation	GENERAL: [illegible] reconstitutions, 2 different annular fuels tested ~20,000MWd/MT for many rods-projected by EPRI 72-2
75									EPRI 72-2	
76	?	?	?	?	?	?	?	?	?	GENERAL: [illegible] reconstitutions, 2 different annular fuels tested ~20,000MWd/MT for many rods-projected by EPRI 72-2
77										
78	?	?	?	?	?	?	?	?	?	GENERAL: [illegible] reconstitutions, 2 different annular fuels tested ~20,000MWd/MT for many rods-projected by EPRI 72-2
79										
80	?	?	?	?	?	?	?	?	?	GENERAL: [illegible] reconstitutions, 2 different annular fuels tested ~20,000MWd/MT for many rods-projected by EPRI 72-2
81										
82	?	?	?	?	?	?	?	?	?	GENERAL: [illegible] reconstitutions, 2 different annular fuels tested ~20,000MWd/MT for many rods-projected by EPRI 72-2
83										
84	?	?	?	?	?	?	?	?	?	GENERAL: [illegible] reconstitutions, 2 different annular fuels tested ~20,000MWd/MT for many rods-projected by EPRI 72-2
85										
86										
87										
88										
89	NA	NA	NA	NA	NA	No	?	spent fuel shipped in [illegible] cask	Failed Rods in the bundle, spalling reported	Cobalt rods were placed for dual purpose: make Co60 and depress power in corner

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
2	<<<<<<	ITEM	>>>>>>>>>>>>>>>	<<<<<<			REACTOR SPECIFICS				>>>>>>>>>	<<<<<<<<			ITEM ASSY MOX DESIGN AN					FUEL	ISOTOPICS			
3	NOTE: blank-lined was not mapped, ?-no data found in refs for this column, ##?##-judgment made or incomplete data, NA-does not apply (or thought not to be performed) or nothing to report for (IS) summary																							
4	LINE ITEM (plant batch #)	IRRADIATION ITEM (in the batch)	ITEM DESCRIPTION B- Batch of Assys, A- Single assembly or group of rods, R- Individual Rod, IS- Irradiation Summary (a commentary)	Reactor & Unit	Project Sponsors	Reactor Type	Year First Insertion	Year of Final Discharge	Reactor Cycle Inserted	No. of MOX Assys in this ITEM (NA if rod)	Batch, Assy or Rod Name	Assy Design	TOTAL No. of MOX rods in ITEM	Mass of MOX in ITEM	Mass of Pu in ITEM	Pu total % Pu/(U+Pu) in ITEM (Max if multi blends)	No. of MOX pin types/diff enrich in ITEM	Pu fiss % Fissile	%Pu-238	%Pu-239	%Pu-240	%Pu-241	%Pu-242	Diluent Uranium (D or N)
90								EPRI 73-2	EPRI 73-2			WALKE-1	WALKE-1			EPRI 73-2	WALKE-1	EPRI 73-2	WALKE-1	WALKE-1	WALKE-1	WALKE-1	WALKE-1	EPRI 73-2
91	2.2	3	A	Big Rock Pt	CE/EPRI	BWR	1970	1973	6	1	CE-F2	9X9	68	?	?	6.1	8	90/90	0.10/0.27	86.93/75.36	11.14/19.24	2.53/4.94	0.26/1.16	N
92								EPRI 73-2	EPRI 73-2			WALKE-1	WALKE-1			EPRI 73-2	WALKE-1	EPRI 73-2	WALKE-1	WALKE-1	WALKE-1	WALKE-1	WALKE-1	EPRI 73-2
93	2.2	3	A	Big Rock Pt	CE/EPRI	BWR	1970	1973	6	1	CE-F3	9X9	68	?	?	6.1	8	90/90	0.10/0.27	86.93/75.36	11.14/19.24	2.53/4.94	0.26/1.16	N
94								EPRI 73-2	EPRI 73-2			WALKE-1	WALKE-1			EPRI 73-2	WALKE-1	EPRI 73-2	WALKE-1	WALKE-1	WALKE-1	WALKE-1	WALKE-1	EPRI 73-2
95																								
96		BRP-EXXON-3 9X9 BUNDLE																						
97																								
98	2.3	1	A	Big Rock Pt	Private?	BWR	1972	?	?	1	?	9X9	?	?	?	?	?	?	?	?	?	?	?	?
99							GESMO-F					GESMO-F												
100																								
101	2.3	2	A	Big Rock Pt	Private?	BWR	1972	?	?	1	?	9X9	?	?	?	?	?	?	?	?	?	?	?	?
102							GESMO-F					GESMO-F												
103																								
104		BRP-EXXON-4 11X11 BUNDLE																						
105																								
106	2.4	1	A	Big Rock Pt	Private?	BWR	1973	?	?	1	?	11X11	?	?	?	?	?	?	?	?	?	?	?	?
107							GESMO-F					GESMO-F												
108																								
109	2.4	2	A	Big Rock Pt	Private?	BWR	1973	?	?	1	?	11X11	?	?	?	?	?	?	?	?	?	?	?	?
110							GESMO-F					GESMO-F												
111																								
112		BRP-EXXON-COMMERCIAL Reload No. 1																						
113																								
114	2.5	1	B	Big Rock Pt	Private?	BWR	1974	?	?	18	?	11X11	432	?	?	?	?	?	?	?	?	?	?	?
115							GESMO-F			GESMO-F		GESMO-F	GESMO-F											
116																								
117		BRP-EXXON-COMMERCIAL Reload No. 2																						
118																								
119	2.6	1	B	Big Rock Pt	Private?	BWR	1976	?	?	8	?	11X11	192	?	?	?	?	?	?	?	?	?	?	?
120							GESMO-F			GESMO-F		GESMO-F	GESMO-F											
121																								
122		BRP-NFS-4 BUNDLE																						
123																								
124	2.7	1	A	Big Rock Pt	Private?	BWR	1979	?	?	1	?	?	73	?	?	?	?	?	?	?	?	?	?	?
125							GESMO-F			GESMO-F														
126																								
127	2.7	2	A	Big Rock Pt	Private?	BWR	1979	?	?	1	?	?	73	?	?	?	?	?	?	?	?	?	?	?



	AT	AU	AV	AW	AX	AY	AZ	BA	BB	BC
2	Un>>>>>	SECOND SET	MEASUREMENTS	>>>>>>>> > >	<<<<<<<<<				MISCELLANEOUS >>>
3										
4	(2nd Set) Peak MOX Pellet MWd/MT	(2nd Set) Non-dest exams performed - description	(2nd Set) No. MOX rods PIE	(2nd Set) summary of PIE measurement	(2nd Set) Where PIE performed	Was any data made public?	Beyond design basis/transient tests performed? If so, which ones.	How transported to RX and to PIE?	Overall Performance review (failure, cracking etc.)	Miscellaneous Info
90								VOLL-1	EPRI 73-2	
91	NA	NA	NA	NA	NA	No	?	spent fuel shipped to NFS (M130) cask	Failed MOX rods in the bundle, spalling. Axial fission product migration toward [illegible] upper and lower ends of rods for annular pellets in excess of 3wt% PuO2	Cobalt rods were placed for dual purpose: make Co60 and depress power in corners. PIE information provided in NEDO-12582, GE Proprietary
92								VOLL-1	EPRI 73-2	EPRI 73-2
93	?	skipped	NA	NA	NA	No	?	spent fuel shipped to NFS (M130) cask	Spalling reported, [illegible] was found upon final discharge from the core	Cobalt rods were placed for dual purpose: make Co60 and depress power in corners. Scrape of oxide nodule from fuel rods caused a breach. NOTE: This bundle was reconstituted at the end of cycle 10 and put in for an additional cycle using 2 rods from GEP1. This lowers the discharge burnup (MWd/MT)
94								VOLL-1	EPRI 73-2	EPRI 73-2, VOLL-1
95										
96										
97										
98	?	?	?	?	?	No	?	?	?	Expected to reach [illegible], variety of non-destructive and destructive exams were planned, do not know if they were actually done
99										VOLL-1, GESMO-F
100										
101	?	?	?	?	?	No	?	?	?	Expected to reach [illegible], variety of non-destructive and destructive exams were planned, do not know if they were actually done
102										VOLL-1, GESMO-F
103										
104										
105										
106	?	?	?	?	?	No	?	?	?	Expected to reach [illegible], variety of non-destructive and destructive exams were planned, do not know if they were actually done, [illegible] to all MOX [illegible]. Some short pellets tested, experiments aimed at fuel densification and PCI problems
107										VOLL-1, GESMO-F
108										
109	?	?	?	?	?	No	?	?	?	Expected to reach [illegible], variety of non-destructive and destructive exams were planned, do not know if they were actually done, [illegible] to all MOX [illegible]. Some short pellets tested, experiments aimed at fuel densification and PCI problems
110										VOLL-1, GESMO-F
111										
112										
113										
114	?	?	?	?	?	No	?	?	[illegible] primary system coolant activity from [illegible] was noted due to use of MOX	First U.S. commercial scale MOX reload which brought BRP to the [illegible] of plutonium
115									VOLL-1, GESMO-F	VOLL-1, GESMO-F
116										
117										
118										
119	?	?	?	?	?	No	?	?	?	Little information was found concerning this batch
120										VOLL-1, GESMO-F
121										
122										
123										
124	?	?	?	?	?	No	?	?	?	Expected to reach 25GWd/t, no plans for destructive examination
125										VOLL-1, GESMO-F
126										
127	?	?	?	?	?	No	?	?	?	Expected to reach 25GWd/t, no plans for destructive examination

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
2	<<<<<<	I T E M	>>>>>>>>>>>>>>	<<<<<			R E A C T O R S P E C I F I C S				>>>>>>>>	<<<<<<<			I T E M A S S Y M O X D E S I G N A N					F U E L	I S O T O P I C S			
3	NOTE: blank-lined was not mapped, ?-no data found in refs for this column, ##??-judgment made or incomplete data, NA-does not apply (or thought not to be performed) or nothing to report for (R) summary																							
4	Link ITEM (plant,batch)	IRRADIATION ITEM (in the batch)	ITEM DESCRIPTION B-Batch of Assys, A-Single Assembly or group of rods, R-Individual Rod, H-Irradiation Summary (a commentary)	Reactor & Unit	Project Sponsors	Reactor Type	Year First Insertion	Year of Final Discharge	Reactor Cycle Inserted	No. of MOX Assys in this ITEM (NA if rod)	Batch, Assy or Rod Name	Assy Design	TOTAL No. of MOX rods in ITEM	Mass of MOX in ITEM	Mass of Pu in ITEM	Pu total % Pu/(U+Pu) in ITEM (Max if multi blends)	No. of MOX pin types/all rods in ITEM	Pu Wt % Fissile	%Pu-238	%Pu-239	%Pu-240	%Pu-241	%Pu-242	Diluent Uranium (D or N)
128							GESMO-F			GESMO-F														
129																								
130	2.7	3	A	Big Rock P	Private	BWR	1973	?	?	1	?	?	72	?	?	?	?	?	?	?	?	?	?	?
131							GESMO-F			GESMO-F														
132																								
133	2.7	4	A	Big Rock P	Private	BWR	1973	?	?	1	?	?	72	?	?	?	?	?	?	?	?	?	?	?
134							GESMO-F			GESMO-F														
135																								
136		Dresden Unit No. 1-11 bundles																						
137																								
138	9.1	1	B	Dresden-1	[illegible]	BWR	1968	?	7	11	Type/II-Pu	6X6	88	?	?	2.80%	1	77.4	0.4	71.3	20.6	6.1	1.6	N
139					GESMO-F		[illegible]		GESMO-F		[illegible]	[illegible]	GESMO-F			GESMO-F	GESMO	GESMO-F	GESMO-F	GESMO-F	GESMO-F	GESMO-F	GESMO-F	[illegible]
140																								
141		Dresden Unit No. 1- 4 rod irradiation																						
142	9.2	1	B	Dresden-1	[illegible]	BWR	1967?	?	[illegible]	4	Type III-F	?	4	?	?	1.76%	2	90	?	75	19	5	1	N
143							HUGHES-1		HUGHES-1		HUGHES-1					HUGHES-1	HUGHES	HUGHES-1		HUGHES-1	HUGHES-1	HUGHES-1	HUGHES-1	HUGHES-1
144																								
145			END OF COMMERCIAL BWRS																					
146																								
147		ADDITIONAL IRRADIATIONS TO BE MAPPED:																						
148																								
149		Experimental Boiling Water Reactor (Test Rx)																						
150																								

Dom Comm Irrads-Bs

	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS
2				>>>>>>	<<<	FABRICATION ASPECTS															
3											>>>>	Max LHGR	<<<FIRST SET BU		>>>>>	<<< FIRST SET MEASUREMENTS			>>>>>>>>	<<<SECOND SET	
4	Fuel Designer	% of MOX in ITEM (vol %)	Rod Pattern Desc.	B. Poison (in U or assy)	Fuel Bundler (where)	PuO2 conversion process (where)	UO2 conversion process (where)	Pellet Fabrication process	Pellet Types (A-annular, S-solid, D-dished, U-undished)	Cladding utilized	Assy Instrument.	Max LHGR (kW/ft)	(1st Set) Avg Assy MWd/MT (single or if batch-Max assy)	(1st Set) Peak MOX rod MWd/MT	(1st Set) Peak MOX Pellet MWd/MT	(1st Set) Non-dest. exams performed-description	(1st Set) No. MOX rods PIE	(1st Set) summary of PIE measurement	(1st Set) Where PIE performed	(2nd Set) Avg Assy MWd/MT (single or if batch-Max assy)	(2nd Set) Peak MOX rod MWd/MT
128																					
129																					
130	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
131																					
132																					
133	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
134																					
135																					
136																					
137																					
138	[illegible]	28	central MOX blend	Gd	?	powder from ABC	NUKEM Natural powder	Master blend, cold form pellets, sintered, and centerless ground	?	Zr-2	5 in MOX Assy adjoining UO2	14	17,470	?	22,600	at end of cyc X, visual, all 11 assys sip-tested for fission gas leakage, 9 more leakers, both UO2 and MOX rods	?	?	?	<18,400	?
139	GESMO-7	ALISS-1	GU-5309	ALISS-1		GU-4166	GU-5308	GU-5308													
140												GU-2306	GESMO-7		GESMO-7	GESMO-7					
141																				GU-410812	
142	GE?	8	?	?	?	?	?	hot pressed	?	Zr-2	?	?	?	?	?	?	?	?	?	?	?
143		HUGHES-1						HUGHES-1		HUGHES-1											
144																					
145																					
146																					
147																					
148																					
149																					
150																					

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