Evaluation Group EG23

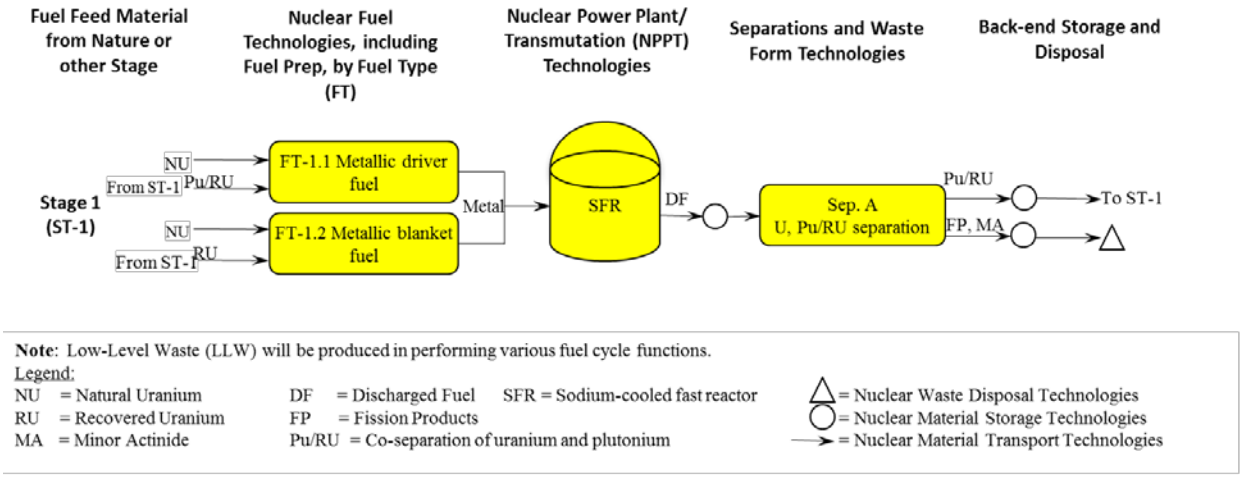

Figure B34. Material Flow Data of Analysis Example for EG23.

Table B58. Reactor and Fuel Information of Analysis Example for EG23.

Technology category	Parameter		Stage Number	
Nuclear Power Plant/ Transmutation (NPPT)	**Stage**		**1**	
	NPPT Technology Identifier		SFR	
	Core Configuration		SFR-Pu	
	Core Thermal Power, MWth		1000	
	Net Thermal Efficiency, %		40	
	Electrical Energy Generation Sharing, %		100	
Nuclear Fuel	**Fuel Type**		**1.1**	**1.2**
	Fuel Technology Identifier		SFR-Metallic	SFR-Metallic
	Purpose		Driver	Blanket
	Average Discharge Burnup, GWd/t		81.5	23.5
	Fuel Composition	Initial Nuclear Material(s)	Pu/RU	NU
		(U-235+ U-233)/Total U, %	~0	0.71
		Th/Total HM, %		
		TRU/Total HM, %	15.3 [a)]	0
	Fuel Residence Time in Reactor, EFPY		3.6	5.4

a) Average TRU content in driver fuel, including axial blanket.

Table B59. Mass Flow Data of Analysis Example for EG23.

Stage		**1**			**Sum** [b]
Technology		**Fuel**	**NPPT**	**Rep/Sep**	
Electricity, GWe-yr		100			100
Feed or product of nuclear materials (metric ton) [a]					
Natural resource	NU	- 110.6			- 110.6
	Th				-
Products from fuel or NPPT technology	DU				
	U	+ 1,095.2	- 1,095.2		0.0
	Pu	[c] + 162.2	- 162.2		0.0
	MA				0.0
	DF		+ 1,257.4	- 1,257.4	0.0
Products from Rep/Sep technology	RU	- 987.1		+ 987.1	+ 0.0
	Pu	[c] - 162.2		+ 163.1	[d] + 0.9
	MA			+ 1.5	+ 1.5
	FP			+ 93.1	+ 93.1
Loss		+ 2.5		+ 12.6	+ 15.1

a) Mass flow in metric ton was developed to produce 100.0 GWe-year from whole nuclear fleet and the signs (-) and (+) indicate the feed and production to or from each technology category, respectively.
b) Summation of each row indicates the required resource (-) or produced nuclear materials (+) per year to generate electricity of 100 GWe-yr.
c) Pu, including its decay daughters.
d) Not zero because Pu breeding ratio is slightly higher than break-even. The extra Pu was treated as HLW.

Evaluation Group EG24

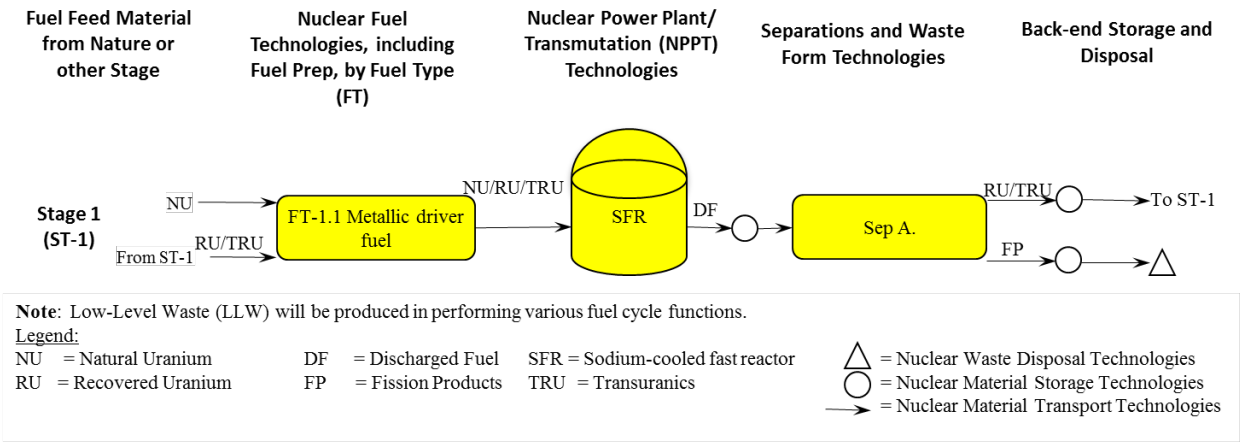

Figure B35. Material Flow Data of Analysis Example for EG24.

Table B60. Reactor and Fuel Information of Analysis Example for EG24.

Technology category	Parameter		Stage Number
Nuclear Power Plant/ Transmutation (NPPT)	Stage		1
	NPPT Technology Identifier		SFR
	Core Configuration		SFR with U-TRU-Zr
	Core Thermal Power, MWth		1000
	Net Thermal Efficiency, %		40
	Electrical Energy Generation Sharing, %		100
Nuclear Fuel	**Fuel Type**		**1.1**
	Fuel Technology Identifier		SFR-Metallic
	Purpose		Driver
	Average Discharge Burnup, GWd/t		73
	Fuel Composition	Initial Nuclear Material(s)	TRU/RU/NU
		(U-235+ U-233)/Total U, %	~0
		Th/Total HM, %	0
		TRU/Total HM, %	13.9
	Fuel Residence Time in Reactor, EFPY		3.6

Table B61. Mass Flow Data of Analysis Example for EG24.

Stage		**1**			**Sum** [b]
Technology		**Fuel**	**NPPT**	**Rep/Sep**	
Electricity, GWe-yr		100.0			100
Feed or product of nuclear materials (metric ton) [a]					
Natural resource	NU	-113.2			-113.2
	Th				
Products from fuel or NPPT technology	U	+1,078.7	-1,078.7		0.0
	TRU	+172.5	-172.5		0.0
	DF		+1,251.2	-1,251.2	0.0
Products from Rep/Sep technology	RU	-967.7		+967.7	0.0
	TRU	-172.9		+172.9	0.0
	FP			+98.1	+98.1
Loss		+2.5		+12.5	+15.0

a) Mass flow in metric ton was developed to produce 100.0 GWe-year from whole nuclear fleet and the signs (-) and (+) indicate the feed and production to or from each technology category, respectively.
b) Summation of each row indicates the required resource (-) or produced nuclear materials (+) per year to generate electricity of 100 GWe-yr.
c) Uranium includes recovered uranium (RU) and natural uranium (NU).

Evaluation Group EG29

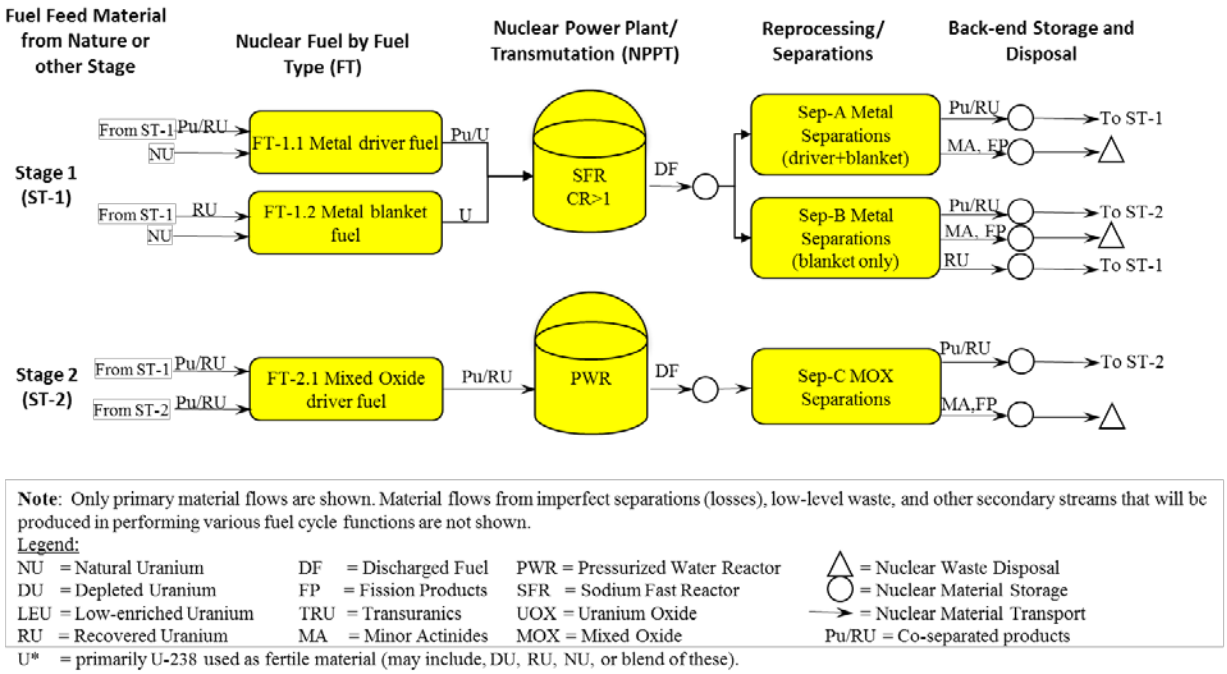

Figure B40. Material Flow Data of Analysis Example for EG29.

Table B70. Reactor and Fuel Information of Analysis Example for EG29.

Technology category	Parameter		Stage Number		
Nuclear Power Plant/ Transmutation (NPPT)	**Stage**		**1**		**2**
	NPPT Technology Identifier		SFR-Breeder		PWR
	Core Configuration		SFR with (UPu) metal fuel		PWR with (UPu)O2, i.e. MOX
	Core Thermal Power, MWth		1000		3000
	Net Thermal Efficiency, %		40		33
	Electrical Energy Generation Sharing, %		61.1		38.9
Nuclear Fuel	**Fuel Type**		**1.1**	**1.2**	**2.1**
	Fuel Technology Identifier		SFR-Metal	SFR-Metal	PWR-MOX
	Purpose		Driver	Blanket	Driver
	Average Discharge Burnup, GWd/t		96.8	20.7	50
	Fuel Composition	Initial Nuclear Material(s)	Pu/RU/NU	RU/NU	Pu/RU
		(U-235+ U-233)/Total U, %	~0.2	~0.2	~0.2
		Th/Total HM, %	0	0	0
		TRU/Total HM, %	21.4	0	9.11
	Fuel Residence Time in Reactor, EFPY		4.75	9.5	3.9

Table B71. Mass Flow Data of Analysis Example for EG29.

Stage		**1**			**2**			**Sum** [b]
Technology		**Fuel**	**NPPT**	**Rep/Sep**	**Fuel**	**NPPT**	**Rep/Sep**	
Electricity, GWe-yr		61.08			38.92			100
Feed or product of nuclear materials (metric ton) [a]								
Natural resource	NU	-133.4 [c]						-133.4
	Th							
Products from fuel or NPPT technology	DU							
	U	+1,121.8	-1,121.8		+782.9	-782.9		
	Th							
	Pu	+85.1	-85.1		+78.5	-78.5		
	MA							
	DF		+1,206.9 [d]	-1,206.9		+861.4	-861.4	
Products from Rep/Sep technology	RU	-990.7		+1,028.1	-784.5		+747.1	
	Pu	-85.2		+108.9	-78.6		+54.9	
	MA			+1.5			+7.5	+9.0
	FP			+56.3			+43.3	+99.6
Loss		+2.4		+12.1	+1.7		8.6	24.8

a) Mass flow in metric ton was developed to produce 100.0 GWe-year from whole nuclear fleet and the signs (-) and (+) indicate the feed and production to or from each technology category, respectively.

b) Summation of each row indicates the required resource (-) or produced nuclear materials (+) per year to generate electricity of 100 GWe-yr.

c) The use of NU is only necessary when the legacy DU has been fully utilized, i.e. if DU is available it can be used.

d) About 1/3 is driver fuel and 2/3 is blanket.

Evaluation Group EG30

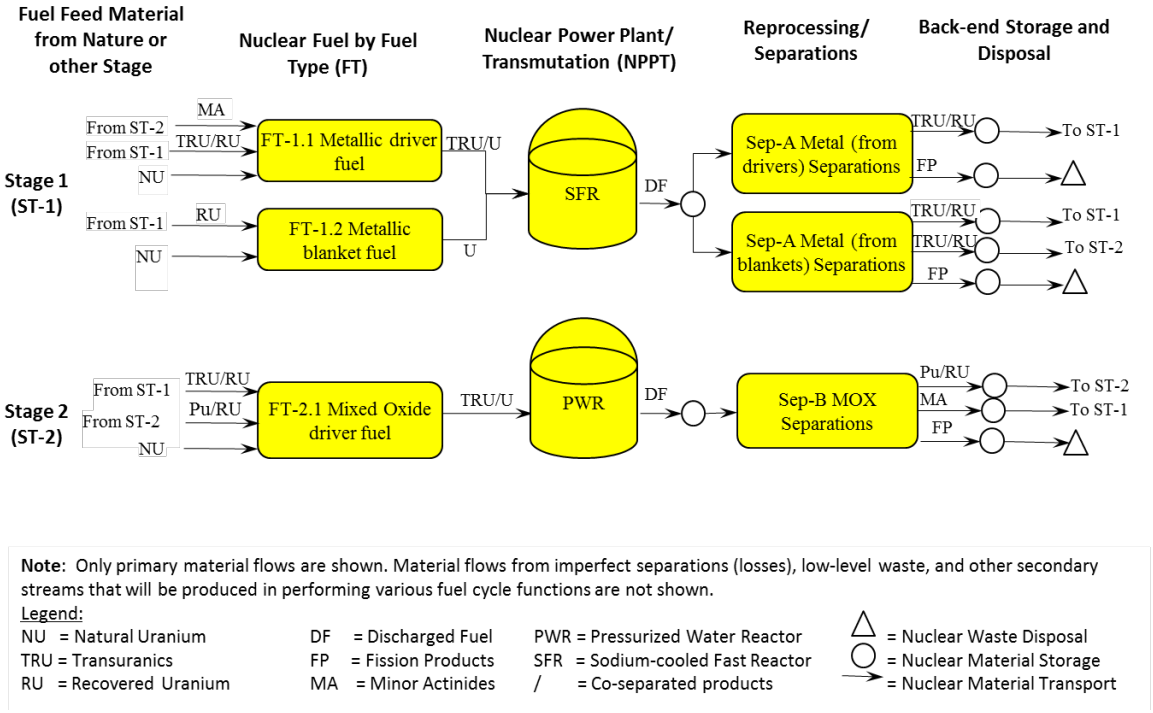

Figure B41. Material Flow Data of Analysis Example for EG30.

Table B72. Reactor and Fuel Information of Analysis Example for EG30.

Technology category	Parameter		Stage Number		
Nuclear Power Plant/ Transmutation (NPPT)	**Stage**		**1**		**2**
	NPPT Technology Identifier		SFR		PWR
	Core Configuration		SFR with UPuZr		PWR with MOX
	Core Thermal Power, MWth		1000		3000
	Net Thermal Efficiency, %		40		33
	Electrical Energy Generation Sharing, %		87.0		13.0
Nuclear Fuel	**Fuel Type**		**1.1**	**1.2**	**2.1**
	Fuel Technology Identifier		SFR-Metallic	SFR-Metallic	PWR-MOX
	Purpose		Driver	Blanket	Driver
	Average Discharge Burnup, GWd/t		107	23	50
	Fuel Composition	Initial Nuclear Material(s)	TRU/RU/NU	RU/NU	TRU/RU/NU
		(U-235+ U-233)/Total U, %	0.19	0.15	0.04
		Th/Total HM, %	0	0	0
		TRU/Total HM, %	24.4	0.0	10.4
	Fuel Residence Time in Reactor, EFPY		4.9	4.9	4.1

Table B73. Mass Flow Data of Analysis Example for EG30.

Stage		**1**			**2**			**Sum** [b]
Technology		**Fuel**	**NPPT**	**Rep/Sep**	**Fuel**	**NPPT**	**Rep/Sep**	
Electricity, GWe-yr		87.0			13.0			100
Feed or product of nuclear materials (metric ton) [a]								
Natural resource	NU	-109.9			-3.0			-112.9
	Th							-
Products from fuel or NPPT technology	DU							-
	U	+1,076.3	-1,076.3		+257.3	-257.3		0.0
	Pu	+129.9	-129.9		+29.6	-29.6		0.0
	MA	+12.1	-12.1		+0.1	-0.1		0.0
	DF		+1,218.3	-1,218.3		+287.0	-287.0	0.0
Products from Rep/Sep technology	RU	-968.5		+977.1	-254.8		+246.2	0.0
	Pu	-130.2		+138.7	-29.7		+21.2	0.0
	MA	-12.1		+9.9	-0.1		+2.3	0.0
	FP			+80.4			+14.4	+94.8
Loss		+2.4		+12.2	+0.6		+2.9	+18.1

a) Mass flow in metric ton was developed to produce 100.0 GWe-year from whole nuclear fleet and the signs (-) and (+) indicate the feed and production to or from each technology category, respectively.

b) Summation of each row indicates the required resource (-) or produced nuclear materials (+) per year to generate electricity of 100 GWe-yr.