ROMANIA

National Commission for Nuclear Activities Control (CNCAN)

Report on Progress in Decommissioning Activities

Dr. Lucian BIRO Director General

IAEA R²D²P Workshop on Cost Estimates Manila, 30 March - 03 April 2009



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- ***Conclusions**



Up to date information on the regulatory body

CNCAN Responsibilities (1)

By Law CNCAN is responsible for:

- Nuclear Legislation & Regulations
- Nuclear Safety
- Radiation Protection
- Quality Assurance
- Safeguards
- Emergency Preparedness
- Physical Protection
- Nuclear and Radiological Security
- Nuclear Liability
- Transportation
- Radioactive Waste Management
- Operators Certification
- International Treaties and Conventions

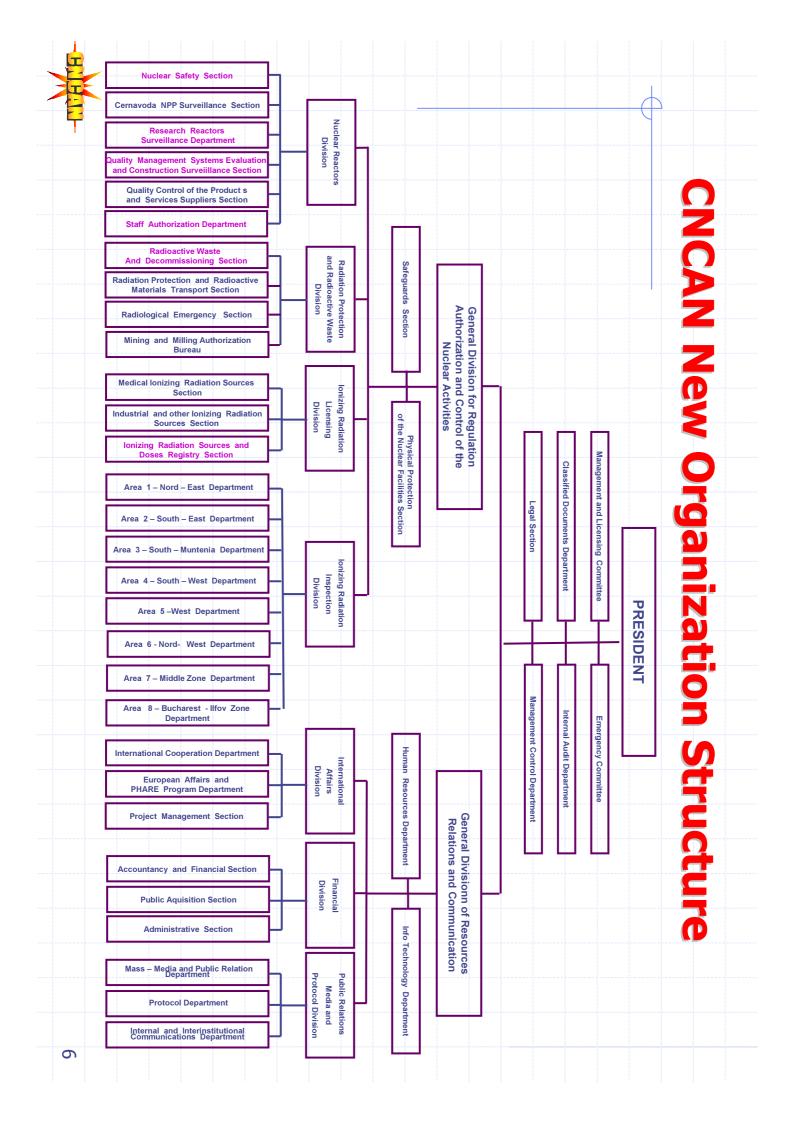


CNCAN Responsibilities (2)

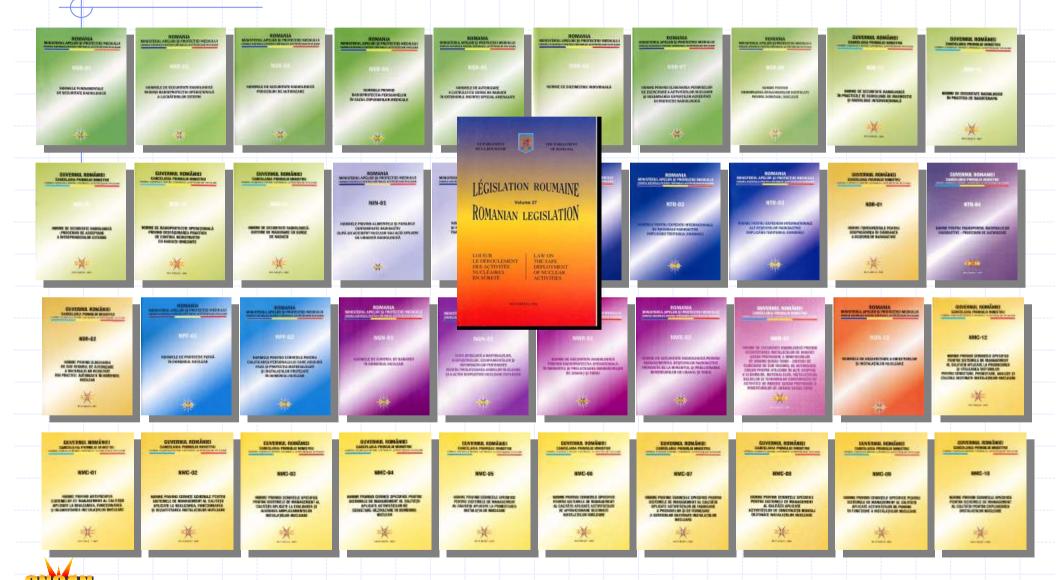
CNCAN maintains regulatory control over:

- Power reactors
- Research reactors
- Nuclear research and test establishments
- Uranium mines and mills
- Uranium refining and conversion facilities
- Fuel fabrication facilities
- * Heavy water production facilities
- * Radioactive waste management facilities
- Prescribed substances and items, and
- * Radioisotopes & ionising radiation applications





Legal Framework - Basic Pillars for CNCAN Activities -



CNCAN Regulation for Decommissioning

ROMANIA

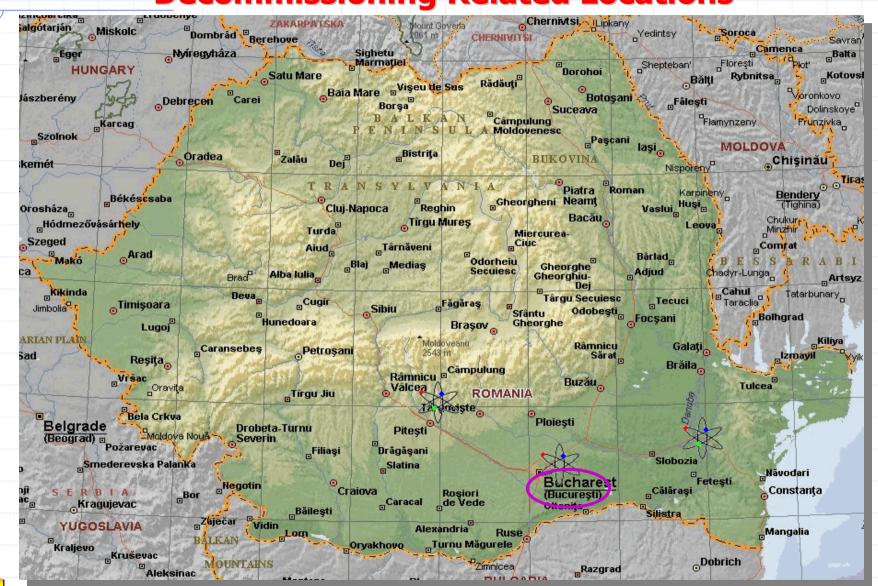
MINISTERUL APELOR ȘI PROTECȚIEI MEDIULUI COMISIA NAȚIONALĂ PENTRU CONTROLUL ACTIVITĂȚILOR NUCLEARE

NSN-15

NORMELE DE DEZAFECTARE A OBIECTIVELOR ŞI INSTALAȚIILOR NUCLEARE



Main Nuclear Installations in Romania - Decommissioning Related Locations -





National Strategy for Nuclear Safety



GUVERNUL ROMANIEI CANCELARIA PRIMULUI MINISTRU COMISIA NATIONALA PENTRU CONTROLUL ACTIVITATILOR NUCLEARE



STRATEGIA NATIONALA
DE
SECURITATE NUCLEARA

2006-2009



Report issued by CNCAN in September 2005



Decommissioning Related Events Organized by CNCAN - Few Examples -

Event Poster Layout (1)



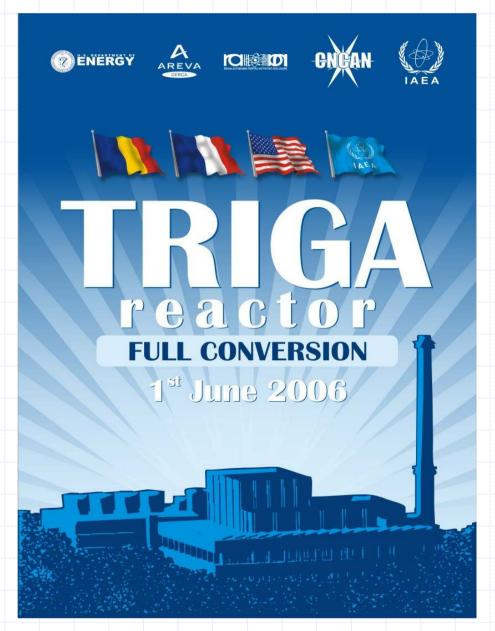


Event Poster Layout (2)





Event Poster Layout (3)





IAEA Project ROM/4/024 15

TRIGA Reactor





IAEA Project ROM/4/024 - Key Actors Involved (1) -





IAEA ROM/4/024

- Key Actors Involved (2) -

***** US:

- Department of Energy (DOE);
- General Atomics (GA);
- Permanent Mission in Vienna;

France:

- AREVA/CERCA;
- Permanent Mission in Vienna;

***** IAEA:

- -Technical Co-operation Department;
- Procurement Department;
- Research Reactor Department;
- Legal Department;
- Safeguards Department;

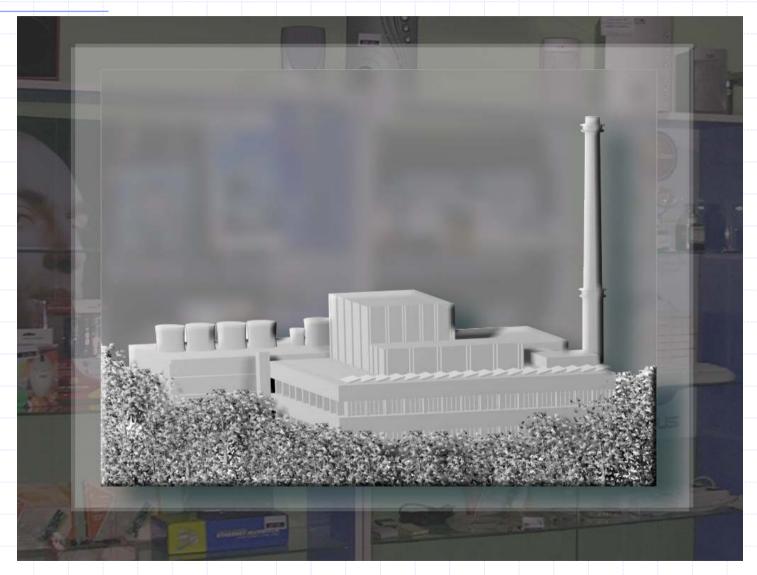
* Romania:

- Permanent Mission in Vienna;
- RAAN/SCN
- CNCAN



TRIGA Reactor Celebration Ceremony

- 01.06.2006 -





VVR-S Reactor Decommissioning Status

VVR-S Reactor Hall





Successfully Shipping Fresh Fuel From Romania to Russia (1)



Successfully Shipping Fresh Fuel From Romania to Russia... the Experience

C. Toma, M. Ciocanescu, Dr. L. Biro, Dr. A. Smirnok, J. Thomas - Authors

Presenter

8th Topical Meeting Research Reactor Fuel Management (RRFM) Munich, Germany March 21-24, 2004

Russian Research Reactor Fuel Return Program





Successfully Shipping Fresh Fuel From Romania to Russia (2)



Conclusions

- Excellent coordination between the INR, CNCAN, MinAtom, SOSNY, the IAEA, and the U.S.
- map Planned and completed in only nine weeks
- m No incidents or delays
- m Legal process now defined









IAEA Signing Fuel Contract for VVR-S - 21.08.2003 -





VVR-S Spent Fuel Amendment Signing Ceremony

- Washington 03.12.2008 -





IAEA End of Mission Report - September 2007



IAEA-TCR-03692

INTERNATIONAL ATOMIC ENERGY AGENCY

END OF MISSION REPORT

ON

"Review the draft Decommissioning Plan for the VVR-S Research Reactor, Magurele, Romania"

10 to 14 September 2007

by

Mr Joseph Edgar Carignan Mr John J. Hayes Mr Stefan Gerd Thierfeldt Mr Luis Antonio Valencia-Chawez Ma Virginie Wasselin Ms Borialava Ivanova Batandjieva

(IAEA-TCR-03692)

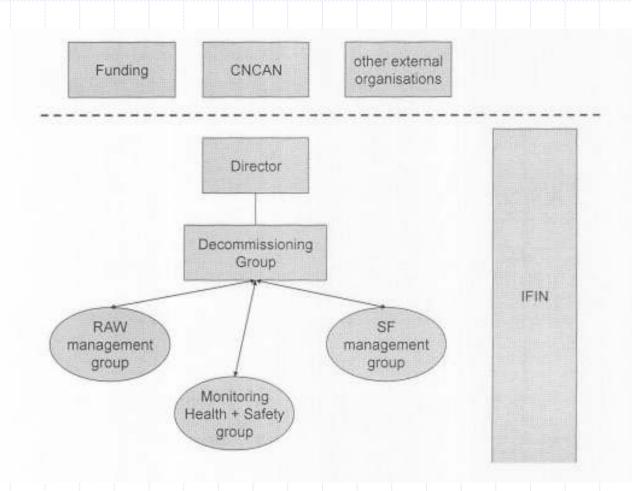
TC Project ROM/4/029

"Strengthening the Infrastructure for the Decammissioning of the Research Reactor at Magazele - Bucharea"

Division for Europe

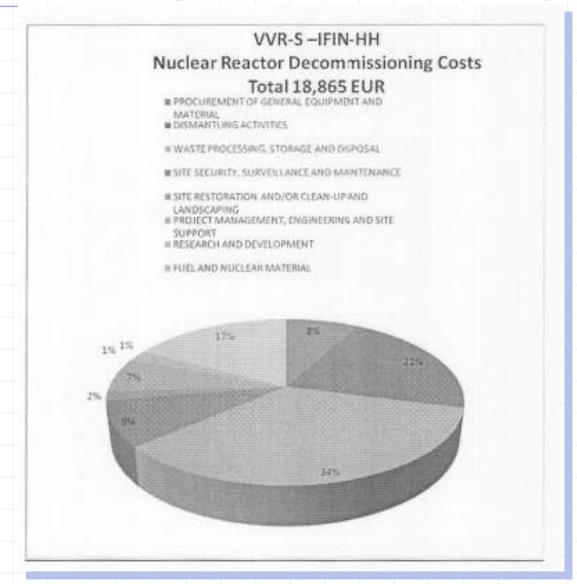


Main internal and external groups and organisations related to VVR-S decommissioning





Decommissioning Costs Estimated by IFIN-HH





VVR-S Level 1 Decommissioning Schedule (1)

)	T		Y	ear 1												Yea	ar 2			
ID	0	Task Name	Jun	Ju	l Aug	g Se	р (Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
1	4	1. IFIN-HH internal activities	0					ĺ	1. IFIN	HH inte	ernal ac	tivities					•	 2 <mark>85 day</mark>	s S	
2	4	1.1 Compile the drawings and verify they reflect the current status of the reactor and associated fac			— ⊘₁′	0 days	·													
3	4	1.2 Define the safety and environmental principles			O -6	10 d	ays													
4	4	1.3 Prepare the inventory of radiological and toxically materials in the facility				>(days		<u> </u>										
5	4	1.4 Establish the waste management procedures				4	<u> </u>		35	days										
6	4	1.5 Assess the alternative decommissioning options						4	****	15 d	ays									
7	4	1.6 Justify the proposed option							•) <u>—()</u> 1	0 days									
8	4	1.7 Prepare the detailed work packages, including the required resources								> ©		○ 40) days							
9	4	1.8 Define the equipment and staff requirements								<u> </u>		O	20	days						
10	4	1.9 Perform the safety and environmental assessments										A	<u> </u>	1	40 d	ays				
11	4	1.10 Prepare the cost estimates, determine the source of found and obtain approval														20 da	ys			
12	4	1.11 Prepare the decommissioning plan from the above data													1			40 day	/s	
13	4	1.12 Submission of decommissioning plan to CNCAN																1.12 S	ubmissi	ion of
14	4	2. CNCAN authorization process															2. CNC		horizatio	on pro
15	4	2.1 Start-up CNCAN related activities																	rt-up C	NCAN
16	4	2.2 Regulatory assessment/compliance and permits															•			
17	4	2.3 License applications, licence documentation, environmental compatibility assessment								<u> </u>							L _®	<u> </u>	20 days	S



VVR-S Level 1 Decommissioning Schedule (2)

					Yea	ar 2													Yea	ar 3	
ID	0	Task Name	Apr	May	Jun	Jı	ıl /	٩ug	Sep	C	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
13	4	1.12 Submission of decommissioning plan to CNCAN					1	.12 S	ubmis	sion	of de	comm	issionii	ng plan	to CNC	AN					
14	4	2. CNCAN authorization process					NCAI	N autl	horiza	tion	proce	ss 70 da	ıys								
15	4	2.1 Start-up CNCAN related activities				4	2	.1 Sta	rt-up	CNC	AN re	lated a	ctivitie	s							
16	4	2.2 Regulatory assessment/compliance and permits				,	(····	70 da	ıys								
17	4	2.3 License applications, licence documentation, environmental compatibility assessment					(20 da	ys											
18	4	2.4 Expenditures incurred by the authority in processing the licence							⊛ 10	day	s										
19	4	2.5 Operation and maintenance procedures						,	•		•	⊢40 da	ıys								
20	4	2.6 Radiological surveys for planning and licensing				•	(30	day											
21	4	2.7 Radiological surveys in the installations									20 da	ys									
22	4	2.8 Determination of release criteria and its impact on decontamination methods and decommissioni						<u> </u>	⊙⊙												
23	4	2.9 Hazardous-material surveys and analyses				,	(20 da												
24	4	2.10 Chemical, explosive, combustible material surveys and analysis, to be carried out for the nuclea				4	(<u>@</u> -	20 da	ys											
25	4	2.11 CNCAN License										ի 2.11 (CNCAN	Licens	e						
26	4	3. IFIN-HH prime contracting selection process						3.	. IFIN-I	НН р	rime	contra	cting se	election 50	proces days	s					
27	4	3.1 Evaluation of approaches from licensee self-management to turnkey contracting										<mark>⊙</mark> 5 da	ays								
28	4	3.2 Consideration of available resources and options										CO 5									
29	4	3.3 Identification of companies interested in making a tender for decommissioning operations) CO	5 days								



VVR-S Level 1 Decommissioning Schedule (3)

													Yea	ar 3						
ID	0	Task Name	Sep	Oct	Nov	De	Jar	Fel	b Ma	r A	\pr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
28	4	3.2 Consideration of available resources and options			CO 5	days														
29	4	3.3 Identification of companies interested in making a tender for decommissioning operations				5 day	s													
30	4	3.4 Drafting of tender specifications				10) days													
31	4	3.5 Qualification of companies interested in making a tender by auditing their QMS					5 days													
32	4	3.6 Technical and financial analysis of tenders of candidate prime contractors) 10 d	ays												
33	4	3.7 Examination of capability and acceptance of subcontractors				 	(() 5 d	ays												
34	4	3.8 Final selection of prime contractor					○○ 15	days												
35	4	3.9 Signing of contract	-						ning of	contra	act									
36	4	4. Implement the approved decommissioning plan	-				>			4	4. Imp	lement	the ap	proved	decom	missio	ing pla	n		
37	4	CNCAN surrveillance of IFIN-HH site activities					•				CN	ICAN s	urrveill	ance o	f IFIN-H	H site a	ctivities			
38	4	4.1 IFIN-HH Personnel authorization					+			50 (days									
39	4	4.2 Facility shutdown activities					•					83 da	ays							
40	(4.2.1 Facility shutdown and inspection					-	2	0 days											
41	(4.2.2 Removal of fuel/or nuclear-fuel materials] 10 d	******										
42	(4.2.3 Drainage and drying or blowdown of all systems not in operation] 10 d											-
43	(4.2.4 Sampling for radiological inventory characterization after facility shutdown, defueling and drains							> ⊘1		s									
44		CNCAN Hold Point - HP 1	<u> </u>			1		<u> </u>				d Point	. HP 1				 	ļ		



VVR-S Level 1 Decommissioning Schedule (4)

			<u> </u>			1		?		Y	ar 3	1							1	
ID	0	Task Name	Dec	Jan	Feb	Ma	ar .	Apr	May			Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
43	(4.2.4 Sampling for radiological inventory characterization after facility shutdown, defueling and draina			⊘ -	<mark>⊘</mark> 1	l0 da	ys												
44		CNCAN Hold Point - HP 1			<u>,</u>	<u> </u>	CNCA	N Ho	ld Poir	nt - HP	I									
45		4.2.5 Removal of system fluids (water, oil, etc,)			Þ	<u>•</u>	10	days												
46	(4.2.6 Removal of special fluids (moderator, cooling water, etc.)			ļ	O -0	10	days												
47		4.2.7 Decontamination of systems for dose reduction				Ļ) ≡⊘	10 d	ays											
48		4.2.8 Removal of waste from decontamination					Þø	<u> </u>	0 days											
49		4.2.9 Removal of combustible material					•	_ <u></u>	0 days	•										
50		4.2.10 Removal of spent resins					Þø	<u>0</u> 1	0 days											
51		4.2.11 Removal of other waste from facility operations					,	1	0 days											
52		4.2.12 Isolation of electricity equipment							days											
53		4.2.13 Asset recovery: Resale/transfer of facility equipment and components as well as surplus inver					4	O =0	10 c	lays										
54	4	4.3 Procurement of general equipment and material		~					į.	100	days									
55		4.3.1 General site-dismantling equipment		•					į.	100	days									
56		4.3.2 Hiring of special lifting gear		O						100	days									
57	(4.3.3 Equipment for personnel/tooling decontamination								100	days									
58		4.3.4 Radiation protection and health physics equipment		•					(100	days									
59	@	4.3.5 Security and maintenance equipment for long-term storage		<u> </u>						100	days									



VVR-S Level 1 Decommissioning Schedule (5)

ID	_	Task Name								ar 3			a :		_				
	0		Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Ap
58		4.3.4 Radiation protection and health physics equipment		<u> </u>				(100 d	ays									
59		4.3.5 Security and maintenance equipment for long-term storage		O				•	100 d	ays									
60		CNCAN Hold Point - HP 2						Ĭ	Ĭ		Point -	HP 2							
61	4	4.4 Dismantling activities						•								4.4 Di	smant	ling acti	ivitie
62	(4.4.1 Decontamination of areas and equipment in all rooms of the building to facilitate dismantling						•	1		50	days							
63	(4.4.2 Preparation for dormancy										20 c	lays						
64	(4.4.3 Removal/disposition of inventory not suitable for long-term storage								,	O					100 da	ys		
65		4.4.4 Dismantling and transfer of contaminated equipment and material to containment structure for							ģ		O				O	100 da	ys		
66	(4.4.5 Sampling for radiological inventory characterization in the installation after zoning in view of doi														⊙ 1	Ī	s	
67		CNCAN Hold Point - HP 3															CNCA	N Hold F	Poin
68	(4.4.6 Site reconfiguration, isolating and securing structures														→ ⊘=	(20 days	5 5
69	(4.4.7 Facility (controlled area) hardening, isolation on entombment														→	~	20 days	} }
70	(4.4.8 Radiological inventory categorisation for decommissioning and decontamination														₩	•	20 days	} }
71	(4.4.9 Preparation of temporary waste storage area						<u> </u>			+	<u> </u>		•	60 day	/S	 		
72	(4.4.10 Removal of fuel-handling equipment													J	⊘ 30 c	days		
73	(4.4.11 Design, procurement, and testing of special tooling/equipment for remote dismantling									1	<u> </u>					100 da	ys	
74	(4.4.12 Dismantling operations on reactor vessel and internals														10	İ		



VVR-S Level 1 Decommissioning Schedule (6)

														ar 4					
D	0	Task Name	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	D
3		4.4.11 Design, procurement, and testing of special tooling/equipment for remote dismantling		•				O	100 da	ys									
4	(4.4.12 Dismantling operations on reactor vessel and internals						↓ ⊘=					_ <mark></mark> _10	0 days					ľ
5	(4.4.13 Removal of primary and auxiliary systems												20					ľ
6		4.4.14 Removal of biological/thermal shield;												20					ľ
7		4.4.15 Removal of other material and equipment form containment structure and all other rooms of the												20					1
3	(4.4.16 Removal and disposal of asbestos												20					Ì
)	(4.4.17 Removal of primary circuit linings												20					-
)		4.4.18 Building decontamination													20 c	lays			***************************************
1	(4.4.19 Environmental cleanup													O	ļ	ays		
2	(4.4.20 Final radioactivity survey															20 da	ys	+
3	(4.4.21 Radioactive material characterization																	У
4	(4.4.22 Decontamination for recycling and reuse																	t
;	(4.4.23 Asset recovery: Sale/transfer of metal or materials, and salvaged equipment or components for															•		†
3		4.4.24 Training of new personnel									<u> </u>		*						
7		CNCAN Hold Point - HP 4																	
3	∅ \$	4.5 Waste processing, storage and disposal – activities aiming at preparing the dismantled co	aiming	at prep	paring t	he dism	antled (compo	nents e	ither fo	r final d	isposal	as radi	oactive	waste,	or for r	elease f		4
)	%	4.6 Site security, surveillance and maintenance					4.6 S	ite sec	urity, sı	ırveillar	ice and	mainte	nance						***************************************
									-						фицип	•	•		f



VVR-S Level 1 Decommissioning Schedule (7)

				Ye	ar 4											Yea	ır 5		
ID	0	Task Name	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
77		4.4.15 Removal of other material and equipment form containment structure and all other rooms of the		O	20	days													
78	(4.4.16 Removal and disposal of asbestos		<u> </u>	20	days													
79	(4.4.17 Removal of primary circuit linings		<u> </u>	20	days													
80	(4.4.18 Building decontamination		4	O	20 (days												
81	(4.4.19 Environmental cleanup			ļ ,	<u> </u>	20 c	lays			-								
82	(4.4.20 Final radioactivity survey						20 da	ays										
83	(4.4.21 Radioactive material characterization					Þ	T	20 da	ys	-								
84		4.4.22 Decontamination for recycling and reuse					L	•		1	-								
85		4.4.23 Asset recovery: Sale/transfer of metal or materials, and salvaged equipment or components for						→ g		30	days								
86		4.4.24 Training of new personnel		O						13	0 days								
87		CNCAN Hold Point - HP 4									NCAN H	old Poi	nt - HP	4					
88	∅ ₽	4.5 Waste processing, storage and disposal – activities aiming at preparing the dismantled co	sal – ac	tivities	aiming	at prep	aring th	ne dism	antled c	ompor	ents eit	her for	final dis	sposal a	s radio	active v	vaste, c	r for re	lease
89	∅ \$	4.6 Site security, surveillance and maintenance							4.6 Si	te secu	rity, sur	veillan	ce and ı	mainten	ance				
90	©	4.7 Site restoration and/or cleanup and landscaping																	
91	4	Obtain approval of the final radiological survey plan from CNCAN																	
92	4	Complete the final site cleanup and radiological survey																	
93	<u></u>	Obtain approval from CNCAN to be released from responsibility for the site	ļ	l	ļ		ł	-	 	-	-	 	ļ	ļ					



VVR-S Level 1 Decommissioning Schedule (8)

										Yea	ar 6		-		-			-	
ID	0	Task Name	-	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
77		4.4.15 Removal of other material and equipment form containment structure and all other rooms of the																	
78	(4.4.16 Removal and disposal of asbestos																	
79		4.4.17 Removal of primary circuit linings																	
80		4.4.18 Building decontamination																	1
81		4.4.19 Environmental cleanup																	1
82	(4.4.20 Final radioactivity survey																	
83	(4.4.21 Radioactive material characterization																	
84	(4.4.22 Decontamination for recycling and reuse																	
85	(4.4.23 Asset recovery: Sale/transfer of metal or materials, and salvaged equipment or components for		***************************************								<u></u>							
86	(4.4.24 Training of new personnel																	
87		CNCAN Hold Point - HP 4																	
88	⊚ ₽	4.5 Waste processing, storage and disposal – activities aiming at preparing the dismantled co	paring	the disr	nantled	compo	nents e	either fo	or final c	lisposa	l as rac	lioactive	waste	or for i	elease f	or resti	ricted o	r unres	stricted
89	⊚ ₽	4.6 Site security, surveillance and maintenance			4.6	Site sec	urity, s	urveilla	nce and	l mainte	enance				900				-
90	⊚ ₽	4.7 Site restoration and/or cleanup and landscaping														-			
91	4	Obtain approval of the final radiological survey plan from CNCAN																	
92	4	Complete the final site cleanup and radiological survey																	
93	4	Obtain approval from CNCAN to be released from responsibility for the site						ļ	l		ļ				-			ļ	-





Conclusions

- *CNCAN regulatory practices for decommissioning activities of the VVR-S reactor are in line with the IAEA safety standards;
- * VVR-S decommissioning funds should be covered by the national fund for radioactive waste management and decommissioning;
- The decommissioning process for VVR-S research reactor represent an important step to create a national school for the decommissioning the Cernavoda NPP and TRIGA research reactor;
- The IAEA R²D²P workshop on cost estimates and other similar events organized by the IAEA represent a strong support for the MS whits decommissioning plans under way.

