

PUE “INSTITUTE OF RADIATION SAFETY “BELRAD”

APPROVED

Director of PUE “Institute of Radiation
Safety “Belrad”

_____ A.V. Nesterenko

“ ____ ” _____ 20__

SHORT REPORT

**UNDER THE CONTRACT No. 36 (ATLAS-2) DATED TO JUNE 25, 2008
(STAGES 11 AND 12)**

Deputy director
for international cooperation

_____ V.I. Babenko

« ____ » _____ 20__

MINSK

2010

According to the Contract No. 36 dated to June 25, 2008 following actions given in the table 1 were performed in framework of the stages 11 and 12.

Table 1 – Data on the number of measurements and the quantity of the preparation VITAPECT given in framework of the stages 11 and 12 to the Contract No. 36.

Settlement	Date	Number of measurements			Quantity of VITAPECT		Notes
		expected	all	children	expected	actual	
Borovoye secondary school and kindergarten of Lelchitsy district of Gomel region	18.11.2009	-	58	51	-	-	Control measurement
Glushkovichi secondary school and kindergarten of Lelchitsy district of Gomel region	15-16.09 and 21.10.2009	476	441	411	952	-	
	04-11.05.2010	-	-	-	-	952	
	12-13.05.2010	476	394	359	-	-	
Dzerzhinsk secondary school and kindergarten of Lelchitsy district of Gomel region	08.09.2009	194	160	140	388	-	
	04.05.2010	-	-	-	-	388	
	14.05.2010	194	152	140	-	-	
Stodolichi secondary school and kindergarten of Lelchitsy district of Gomel region	19.11.2009	-	77	64	-	-	Control measurement
TOTAL:		1340	1282	1165	1340	1340	

Hereafter there is a statistical data processing.

BOROVOYE

Characteristics	Value	Source
¹³⁷ Cs contamination density of the territory	1.88 Ci/km ²	Dose catalogue of the Ministry for Public Health Services of the Republic of Belarus, 2004
Number of inhabitants	1090 persons	Borovoye village council, dated to September 2009
External dose	0.23 mSv/a	Dose catalogue of the Ministry for Public Health Services of the Republic of Belarus, 2004
Internal dose	1.50 mSv/a	-----<-----
Cumulative dose	1.73 mSv/a	-----<-----

According to the data dated to September 2009 in the Borovoye secondary school there are 171 children, 26 teachers and 13 persons of other staff; in the kindergarten there are 40 children and 15 persons of other staff.

Children from following settlements go to the Borovoye secondary school and kindergarten: Borovoye, Tartak, Slobodka and Rudnishchi.

November 18, 2009

The control measurement of children in the Borovoye secondary school of Lelchitsy district of Gomel region was performed in the school building. A total of measured persons was 58 persons (51 children and 7 adults).

Average ^{137}Cs specific activity in the whole group (n = 51): (42.1 ± 9.1) Bq/kg.

Average ^{137}Cs specific activity in the critical group (n = 15): (81.8 ± 28.8) Bq/kg.

Median value in the whole group: 31.5 Bq/kg.

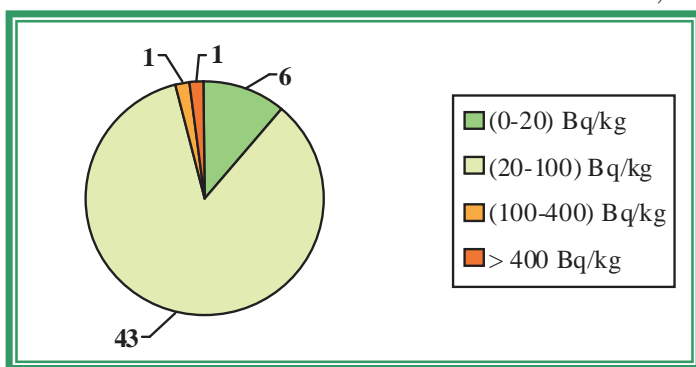
Median value in the critical group: 51.4 Bq/kg.

The table 2 demonstrates the maximal levels of ^{137}Cs specific activity (the critical group) according to the results of measurements dated to November 18, 2009.

Table 2

No.	Surname Name Patronymic	Occupation	Sex	Weight, kg	Year of birth	Sp. activity, Bq/kg
1.	G.A.S.	SCHOOLBOY	M	43	1997	480.3
2.	A.A.A.	CHILD PRESCHOOL AGE	F	21	2004	105.9
3.	L.V.N.	CHILD PRESCHOOL AGE	M	23	2004	71.9
4.	L.S.N.	CHILD PRESCHOOL AGE	M	15	2005	65.6
5.	B.M.N.	SCHOOLBOY	M	44	1998	58.2
6.	S.R.S.	CHILD PRESCHOOL AGE	M	13	2006	54.9
7.	L.A.A.	CHILD PRESCHOOL AGE	F	17	2005	54.6
8.	S.R.K.	CHILD PRESCHOOL AGE	F	20	2004	51.4
9.	A.N.N.	CHILD PRESCHOOL AGE	M	15	2004	44.9
10.	T.A.G.	CHILD PRESCHOOL AGE	M	18	2006	43.2
11.	Sh.M.P.	SCHOOLGIRL	F	49	1997	41.7
12.	G.A.A.	CHILD PRESCHOOL AGE	M	14	2006	40.4
13.	D.D.V.	CHILD PRESCHOOL AGE	F	22	2005	38.4
14.	D.M.V.	CHILD PRESCHOOL AGE	F	15	2005	38.2
15.	G.A.L.	SCHOOLGIRL	F	31	2000	37.0

The figure 1 contains the diagram of the interval ^{137}Cs specific activity distribution in children in the Borovoye secondary school of Lelchitsy district of Gomel region in accordance with the results of measurements dated to November 18, 2009.



←Figure 1 – Diagram of the interval ^{137}Cs specific activity distribution in children in the Borovoye secondary school of Lelchitsy district of Gomel region in accordance with the results of measurements dated to November 18, 2009

GLUSCHKOVICHI

Characteristics	Value	Source
^{137}Cs contamination density of the territory	1.92 Ci/km ²	Dose catalogue of the Ministry for Public Health Services of the Republic of Belarus, 2004
Number of inhabitants	2335 persons	-----<-----
External dose	0.23 mSv/a	-----<-----

Internal dose	1.20 mSv/a	-----<-----
Cumulative dose	1.43 mSv/a	-----<-----

According to the data dated to September 2009 in the Glushkovichi secondary school there are 376 children, 48 teachers and 22 persons of other staff; in the kindergarten there are 100 children and 42 persons of other staff.

September 15-16, 2009 and October 21, 2009

The first measurement of children in the Glushkovichi secondary school and kindergarten of Lelchitsy district of Gomel region consisted of two stages. The children from the secondary school were measured in the school building on September 15 and 16, 2009. The children from the kindergarten were measured in the kindergarten building on October 21, 2009. A total of measured persons was 441 persons (411 children and 30 adults).

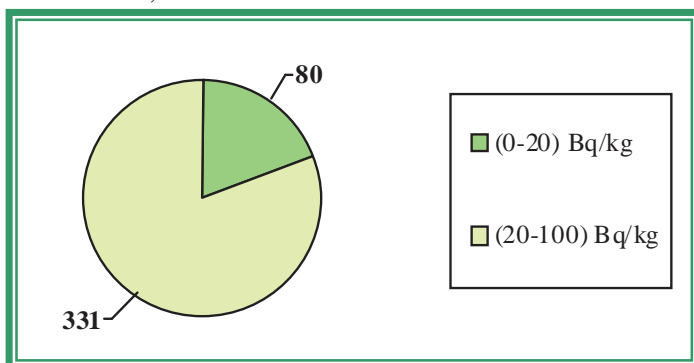
Average ^{137}Cs specific activity in the whole group (n = 411): $(31.6 \pm 0.7) \text{ Bq/kg}$.
 Average ^{137}Cs specific activity in the critical group (n = 15): $(68.4 \pm 2.8) \text{ Bq/kg}$.
 Median value in the whole group: 29.9 Bq/kg.
 Median value in the critical group: 64.0 Bq/kg.

The table 3 demonstrates the maximal levels of ^{137}Cs specific activity (the critical group) according to the results of measurements dated September 15 and 16, 2009 and October 21, 2009.

Table 3

No.	Surname Name Patronymic	Occupation	Sex	Weight, kg	Year of birth	Sp. activity, Bq/kg
1.	Sh.O.F.	SCHOOLGIRL	F	59	1992	91.2
2.	Sh.K.S.	SCHOOLBOY	M	17	2001	87.7
3.	S.R.V.	CHILD PRESCHOOL AGE	M	15	2006	82.7
4.	K.M.A.	SCHOOLGIRL	F	47	1996	78.9
5.	B.N.D.	SCHOOLGIRL	F	42	1995	66.2
6.	G.M.P.	SCHOOLBOY	M	54	1994	66.0
7.	Z.N.S.	SCHOOLBOY	M	39	1997	64.5
8.	Sh.N.M.	SCHOOLGIRL	F	41	1995	64.0
9.	Sh.A.V.	SCHOOLBOY	M	45	1994	63.4
10.	K.A.I.	SCHOOLBOY	M	31	1999	61.6
11.	K.A.V.	SCHOOLBOY	M	64	1993	61.6
12.	Sh.I.V.	SCHOOLBOY	M	29	1996	60.4
13.	B.V.N.	SCHOOLBOY	M	33	1997	60.3
14.	Sh.A.V.	SCHOOLBOY	M	51	1992	59.6
15.	Sh.V.I.	SCHOOLBOY	M	51	1995	58.6

The figure 2 contains the diagram of the interval ^{137}Cs specific activity distribution in children in the Glushkovichi secondary school and kindergarten of Lelchitsy district of Gomel region in accordance with the results of measurements dated to September 15 and 16, 2009 and October 21, 2009.



←Figure 2 contains the diagram of the interval ^{137}Cs specific activity distribution in children in the Glushkovichi secondary school and kindergarten of Lelchitsy district of Gomel region in accordance with the results of measurements dated September 15 and 16, 2009 and October 21, 2009.

On completion of the work 925 packings of the pectin preparation VITAPECT were given for children.

May 12-13, 2010

The second measurement of children in the Glushkovichi secondary school and kindergarten of Lelchitsy district of Gomel region consisted was performed in the school building. A total of measured persons was 394 persons (359 children and 35 adults).

Average ^{137}Cs specific activity in the whole group (n = 359): (23.8 ± 0.6) Bq/kg.

Average ^{137}Cs specific activity in the critical group (n = 15): (52.9 ± 2.4) Bq/kg.

Median value in the whole group: 22.1 Bq/kg.

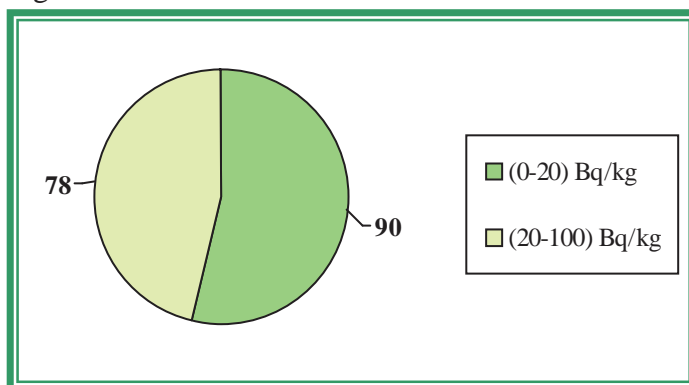
Median value in the critical group: 48.5 Bq/kg.

The table 4 demonstrates the maximal levels of ^{137}Cs specific activity (the critical group) according to the results of measurements dated to May 12 and 13, 2010.

Table 4

No.	Surname Name Patronymic	Occupation	Sex	Weight, kg	Year of birth	Sp. activity, Bq/kg
1.	R.M.G.	SCHOOLGIRL	F	33	1999	71.3
2.	Sh.K.A.	SCHOOLGIRL	F	24	2003	68.9
3.	K.Yu.A.	SCHOOLGIRL	F	40	1998	67.5
4.	R.S.G.	SCHOOLGIRL	F	29	2002	59.8
5.	Ch.K.A.	SCHOOLGIRL	F	24	2003	54.3
6.	B.A.A.	SCHOOLBOY	M	20	2003	53.5
7.	P.S.I.	SCHOOLBOY	M	32	2001	49.0
8.	S.K.V.	SCHOOLBOY	M	19	2001	48.5
9.	V.E.I.	SCHOOLBOY	M	33	2000	48.0
10.	M.V.V.	CHILD PRESCHOOL AGE	M	15	2008	47.1
11.	S.A.S.	SCHOOLGIRL	F	22	2003	46.1
12.	M.A.A.	SCHOOLBOY	M	40	1999	45.1
13.	Sh.V.I.	SCHOOLBOY	M	57	1995	45.0
14.	Z.R.S.	SCHOOLBOY	M	31	1999	44.9
15.	B.A.V.	CHILD PRESCHOOL AGE	M	16	2005	44.6

The figure 3 contains the diagram of the interval ^{137}Cs specific activity distribution in children in the Glushkovichi secondary school and kindergarten of Lelchitsy district of Gomel region in accordance with the results of measurements dated to May 12 and 13, 2010.



←Figure 3 contains the diagram of the interval ^{137}Cs specific activity distribution in children in the Glushkovichi secondary school and kindergarten of Lelchitsy district of Gomel region in accordance with the results of measurements dated May 12 and 13, 2010

To demonstrate the efficiency of the effects of pectin preparations there are comparative data on interval distribution of the specific activity of ^{137}Cs in children having taken VITAPECT and having passed two WBC measurements (on September 15 and 16, 2009 and October 21, 2009 and on May 12 and 13, 2010). This group consists of 300 children.

September 15-16, 2009 and October 21, 2009 May 12-13, 2010

The first measurement of children in the Glushkovichi secondary school and kindergarten of Lelchitsy district of Gomel region consisted of two stages. The children from the secondary school were measured in the school building on September 15 and 16, 2009. The children from the

kindergarten were measured in the kindergarten building on October 21, 2009. A total of measured persons was 441 persons (411 children and 30 adults).

The second measurement of children in the Glushkovichi secondary school and kindergarten of Lelchitsy district of Gomel region consisted was performed in the school building. A total of measured persons was 394 persons (359 children and 35 adults).

The data of statistical processing of the results of measurements of the group of children having passed two WBC measurements and having taken VITAPECT-T (300 children).

Average specific activity of ^{137}Cs :

after the first measurement: (31.6 ± 0.8) Bq/kg,

after the second measurement: (23.7 ± 0.6) Bq/kg.

Decrease of average specific activity of ^{137}Cs was 25%.

Increase of specific activity: in 28% children.

The same level of specific activity: in 11% children.

Reduction of specific activity: in 61% children.

The evaluation of the scientific significance according to T-Student criterion ($n = 300$): $t=11.16$. The received criterion $t > 1.96$; $p < 0.01$.

Median value after the first measurement: 29.8 Bq/kg.

Median value after the second measurement: 22.1 Bq/kg.

Decrease of median value of specific activity of ^{137}Cs was 26%.

The figure 4 contains the diagram of the interval ^{137}Cs specific activity distribution in children in the Glushkovichi secondary school and kindergarten of Lelchitsy district of Gomel region in accordance with the results of measurements dated to September 15 and 16, 2009, October 21, 2009 and May 12 and 13, 2010.

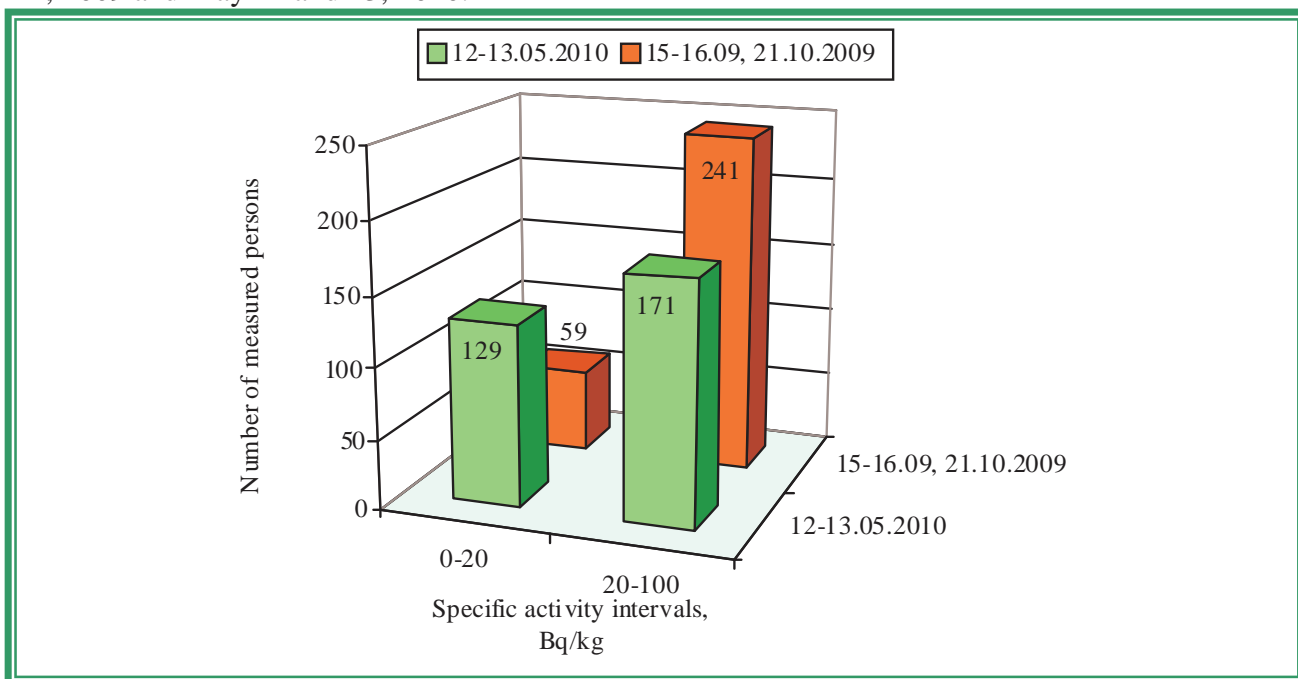


Figure 4 - Diagram of the interval ^{137}Cs specific activity distribution in children in the Glushkovichi secondary school and kindergarten of Lelchitsy district of Gomel region in accordance with the results of measurements dated to September 15 and 16, 2009, October 21, 2009 and May 12 and 13, 2010

DZERZHISK

Characteristics	Value	Source
^{137}Cs contamination density of the territory	3.47 Ci/km ²	Dose catalogue of the Ministry for Public Health Services of the Republic of Belarus, 2004
Number of inhabitants	900 persons	Dzerzhisk village council, dated to

		September 2009
External dose	0.42 mSv/a	Dose catalogue of the Ministry for Public Health Services of the Republic of Belarus, 2004
Internal dose	2.00 mSv/a	-----«-----
Cumulative dose	2.42 mSv/a	-----«-----

According to the data dated to September 2009 in the Dzerzhinsk secondary school there are 159 children, 25 teachers and 20 persons of other staff; in the kindergarten there are 36 children and 21 persons of other staff.

September 08, 2009

The first measurement of children in the Dzerzhinsk secondary school and kindergarten of Lelchitsy district of Gomel region consisted was performed in the school building. A total of measured persons was 160 persons (140 children and 20 adults).

Average ^{137}Cs specific activity in the whole group (n = 140): (48.2 ± 2.1) Bq/kg.

Average ^{137}Cs specific activity in the critical group (n = 15): (105.3 ± 7.7) Bq/kg.

Median value in the whole group: 41.9 Bq/kg.

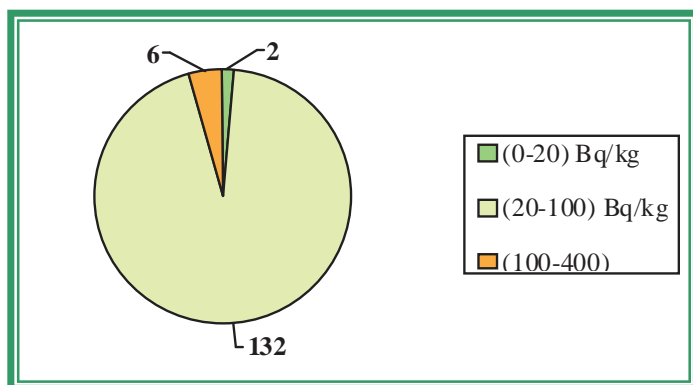
Median value in the critical group: 92.6 Bq/kg.

The table 5 demonstrates the maximal levels of ^{137}Cs specific activity (the critical group) according to the results of measurements dated to September 08, 2009.

Table 5

No.	Surname Name Patronymic	Occupation	Sex	Weight, kg	Year of birth	Sp. activity, Bq/kg
1.	L.A.V.	SCHOOLGIRL	F	30	2000	154,9
2.	L.D.N.	SCHOOLBOY	M	34	1997	152,4
3.	C.A.D.	SCHOOLBOY	M	54	1994	151,8
4.	L.L.N.	SCHOOLGIRL	F	48	1994	134,5
5.	C.S.D.	SCHOOLBOY	M	44	1996	123,3
6.	L.O.V.	SCHOOLGIRL	F	46	1999	106,7
7.	P.S.M.	SCHOOLBOY	M	27	2001	93,5
8.	L.S.V.	SCHOOLBOY	M	26	2002	92,6
9.	Sh.S.V.	SCHOOLBOY	M	25	2000	89,5
10.	K.I.A.	SCHOOLGIRL	F	62	1997	86,4
11.	Sh.G.V.	SCHOOLGIRL	F	49	1996	80,7
12.	G.Yu.M.	SCHOOLBOY	M	54	1994	80,0
13.	K.D.A.	SCHOOLBOY	M	75	1995	79,3
14.	Yu.G.A.	SCHOOLGIRL	F	50	1995	78,1
15.	N.N.V.	SCHOOLBOY	M	32	1998	76,3

The figure 5 contains the diagram of the interval ^{137}Cs specific activity distribution in children in the Dzerzhinsk secondary school and kindergarten of Lelchitsy district of Gomel region in accordance with the results of measurements dated to September 08, 2009.



←Figure 5 - Diagram of the interval ^{137}Cs specific activity distribution in children in the Dzerzhinsk secondary school and kindergarten of Lelchitsy district of Gomel region in accordance with the results of measurements dated to September 08, 2009

On completion of the work 388 packings of the pectin preparation VITAPECT were given for children.

May 14, 2010

The second measurement of children in the Dzerzhinsk secondary school of Lelchitsy district of Gomel region was performed in the school building. A total of measured persons was 152 persons (140 children and 12 adults).

Average ^{137}Cs specific activity in the whole group (n = 140): (35.0 ± 1.7) Bq/kg.
 Average ^{137}Cs specific activity in the critical group (n = 15): (74.2 ± 10.4)

Bq/kg.

Median value in the whole group: 33.1 Bq/kg.

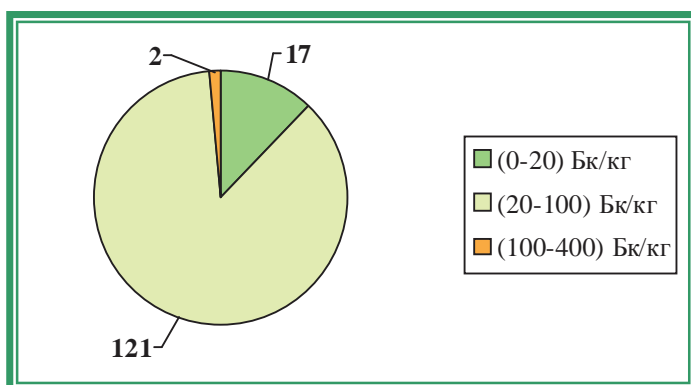
Median value in the critical group: 61.6 Bq/kg.

The table 6 demonstrates the maximal levels of ^{137}Cs specific activity (the critical group) according to the results of measurements dated to May 14, 2010.

Table 6

No.	Surname Name Patronymic	Occupation	Sex	Weight, kg	Year of birth	Sp. activity, Bq/kg
1.	A.D.V.	SCHOOLBOY	M	67	1995	193.2
2.	C.S.D.	SCHOOLBOY	M	48	1996	136.1
3.	N.N.V.	SCHOOLBOY	M	36	1998	86.1
4.	P.V.P.	SCHOOLBOY	M	26	2000	82.5
5.	K.D.A.	SCHOOLBOY	M	85	1995	71.0
6.	L.E.S.	SCHOOLBOY	M	52	1997	65.2
7.	A.V.N.	SCHOOLGIRL	F	58	1995	62.0
8.	L.A.V.	SCHOOLGIRL	F	32	2000	61.6
9.	P.A.M.	SCHOOLBOY	M	42	1997	57.2
10.	M.A.N.	SCHOOLBOY	M	52	1996	53.2
11.	D.E.N.	SCHOOLBOY	M	43	2000	50.9
12.	K.R.A.	SCHOOLBOY	M	34	2000	50.0
13.	P.E.P.	SCHOOLGIRL	F	40	1997	49.2
14.	P.V.M.	SCHOOLBOY	M	58	1995	47.6
15.	L.D.N.	SCHOOLBOY	M	37	1997	47.4

The figure 6 contains the diagram of the interval ^{137}Cs specific activity distribution in children in the Dzerzhinsk secondary school and kindergarten of Lelchitsy district of Gomel region in accordance with the results of measurements dated to May 14, 2010.



←Figure 6 - Diagram of the interval ^{137}Cs specific activity distribution in children in the Dzerzhinsk secondary school and kindergarten of Lelchitsy district of Gomel region in accordance with the results of measurements dated to May 14, 2010

To demonstrate the efficiency of the effects of pectin preparations there are comparative data on interval distribution of the specific activity of ^{137}Cs in children having taken VITAPECT and having passed two WBC measurements (on September 08, 2009 and May 14, 2010). This group consists of 105 children.

September 08, 2009

May 14, 2010

The first measurement of children in the Dzerzhinsk secondary school and kindergarten of Lelchitsy district of Gomel region consisted was performed in the school building. A total of measured persons was 160 persons (140 children and 20 adults).

The second measurement of children in the Dzerzhinsk secondary school of Lelchitsy district of Gomel region was performed in the school building. A total of measured persons was 152 persons (140 children and 12 adults).

The data of statistical processing of the results of measurements of the group of children having passed two WBC measurements and having taken VITAPECT-T (105 children).

Average specific activity of ^{137}Cs :

after the first measurement: (47.4 ± 2.3) Bq/kg,

after the second measurement: (34.5 ± 1.7) Bq/kg.

Decrease of average specific activity of ^{137}Cs was 27%.

Increase of specific activity: in 15% children.

The same level of specific activity: in 20% children.

Reduction of specific activity: in 65% children.

The evaluation of the scientific significance according to T-Student criterion ($n = 105$): $t=6.49$. The received criterion $t > 1.96$; $p < 0.01$.

Median value after the first measurement: 42.6 Bq/kg.

Median value after the second measurement: 33.2 Bq/kg.

Decrease of median value of specific activity of ^{137}Cs was 22%.

The figure 7 contains the diagram of the interval ^{137}Cs specific activity distribution in children in the Dzerzhinsk secondary school and kindergarten of Lelchitsy district of Gomel region in accordance with the results of measurements dated to Septemeber 08, 2009 and May 14, 2010.

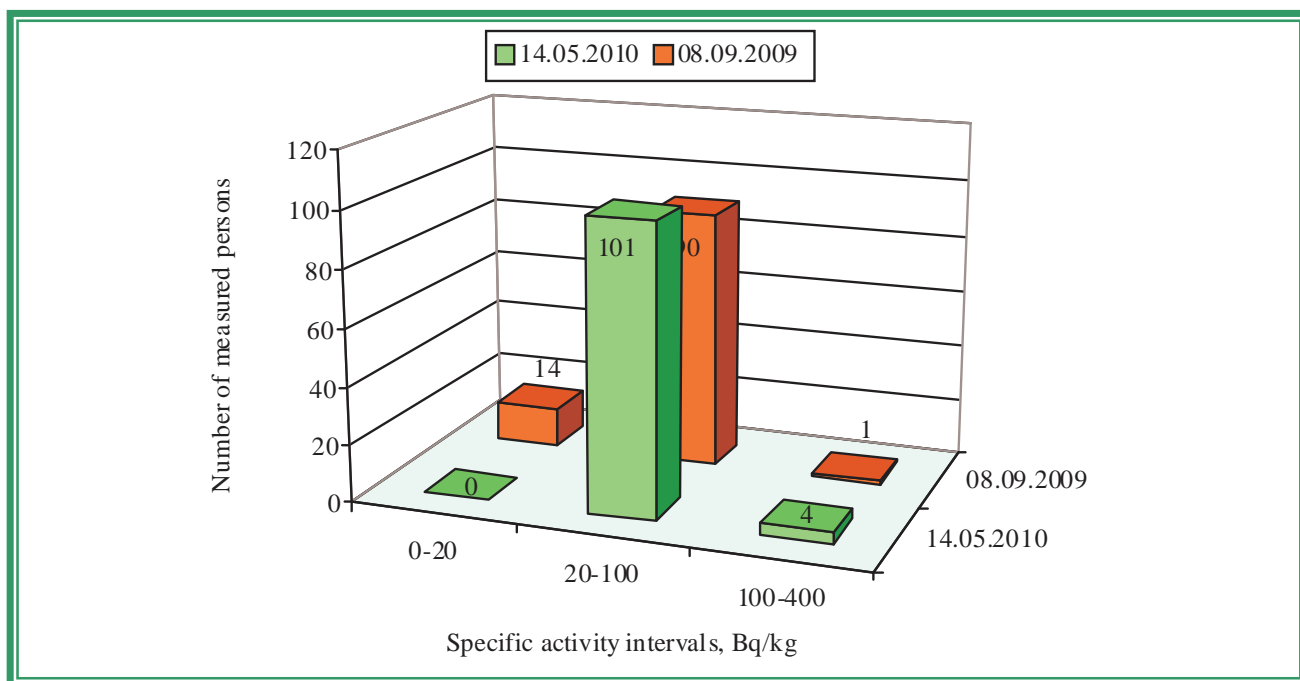


Figure 7 – Diagram of the interval ^{137}Cs specific activity distribution in children in the Dzerzhinsk secondary school and kindergarten of Lelchitsy district of Gomel region in accordance with the results of measurements dated to Septemeber 08, 2009 and May 14, 2010

STODOLICHI

Characteristics	Value	Source
^{137}Cs contamination density of the territory	2.44 Ci/km ²	Dose catalogue of the Ministry for Public Health Services of the

		Republic of Belarus, 2004
Number of inhabitants	831 persons	Stodolichi village council, dated to 17.09.2009
External dose	0.29 mSv/a	-----«-----
Internal dose	0.40 mSv/a	-----«-----
Cumulative dose	0.69 mSv/a	-----«-----

According to the data dated to September 2009 in the Stodolichi secondary school there are 119 children, 24 teachers and 16 persons of other staff; in the kindergarten there are 23 children and 7 persons of other staff.

November 19, 2009

The control measurement of children in the Stodolichi secondary school of Lelchitsy district of Gomel region was performed in the school building. A total of measured persons was 77 persons (64 children and 13 adults).

Average ^{137}Cs specific activity in the whole group (n = 64): (35.2 ± 2.2) Bq/kg.

Average ^{137}Cs specific activity in the critical group (n = 15): (54.4 ± 7.0) Bq/kg.

Median value in the whole group: 31.3 Bq/kg.

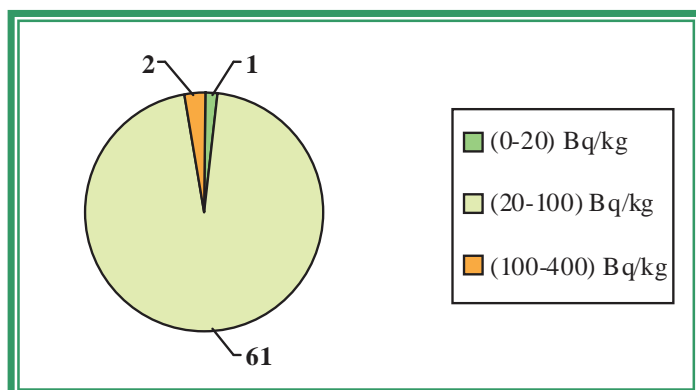
Median value in the critical group: 42.3 Bq/kg.

The table 7 demonstrates the maximal levels of ^{137}Cs specific activity (the critical group) according to the results of measurements dated to November 19, 2009.

Table 7

No.	Surname Name Patronymic	Occupation	Sex	Weight, kg	Year of birth	Sp. activity, Bq/kg
1.	L.O.S.	SCHOOLGIRL	F	56	1994	130.1
2.	Sh.V.A.	SCHOOLGIRL	F	55	1996	101.5
3.	P.M.V.	SCHOOLBOY	M	48	1995	74.5
4.	J.E.N.	SCHOOLBOY	M	51	1996	54.1
5.	Sh.M.V.	SCHOOLGIRL	F	40	1997	48.9
6.	N.V.D.	SCHOOLGIRL	F	23	2002	44.6
7.	N.A.I.	SCHOOLBOY	M	25	2001	43.2
8.	L.V.Yu.	SCHOOLBOY	M	27	2001	42.3
9.	J.A.N.	SCHOOLBOY	M	26	2001	41.8
10.	H.E.S.	CHILD PRESCHOOL AGE	F	24	2003	40.9
11.	N.V.D.	SCHOOLBOY	M	24	2001	39.6
12.	Yu.E.N.	SCHOOLGIRL	F	29	1999	39.2
13.	L.D.A.	SCHOOLBOY	M	43	1997	38.7
14.	G.L.S.	SCHOOLGIRL	F	37	1997	38.6
15.	B.M.V.	SCHOOLGIRL	F	48	1993	38.2

The figure 8 contains the diagram of the interval ^{137}Cs specific activity distribution in children in the Stodolichi secondary school and kindergarten of Lelchitsy district of Gomel region in accordance with the results of measurements dated to November 08, 2009.



←Figure 8 – Diagram of the interval ^{137}Cs specific activity distribution in children in the Stodolichi secondary school and kindergarten of Lelchitsy district of Gomel region in accordance with the results of measurements dated to November 08, 2009

Senior engineer

I.V. Krasnopyorov