

A study on decreasing the radioactive waste and the radioactive waste occurrence present condition in HANARO

150

	1996	2002	
			69,598 l
263,530 가	RCI		
Ar-41	1,161.9 Ci, I-131	8.8E-3 Ci, H-3	137.7 Ci
			40%
	PTS(Pneumatic Transfer System:)		
. PTS	가		Ar-41

Abstract

The quantity of radioactive waste generated from HANARO operation for the years from 1996 to 2002 has been investigated. It was found that the solid waste of 69,599 l and liquid waste of 263,530 가 have been generated for the past 7 years. The amounts of Ar-41, I-131 and H-3 exhausted to the environment were 1,161.9 Ci, 8.8×10^{-3} Ci and 137.7 Ci, respectively. A spent resin dry equipment was developed and its use brought the reduction of spent resin volume by about 40%. The sealing of leak points in Pneumatic Transfer System and the continuous feed of nitrogen gas to the system contribute to the reduction of Ar-41 concentration in the exhaust air.

1.

가 가 , , , , ,

가 , , , , 가

가 가

가 Hot shower sump

가 Reactor

sump , RCI(Reactor Concrete Island)

1996

2002

RCI

가

2.

2.1

1

2.2

가

2.2.1

1) 가

2) 가

3)

1

HEPA, Medium, Charcoal

4)

3

가

가

가

가

2.2.2

23

Reactor sump) 10

(Hot shower sump)

1)

가. 1

1

가

NTD(Neutron Transmutation Doping)

2) Hot shower sump

가

2.2.3

(Confinement)

1

, 가 ,

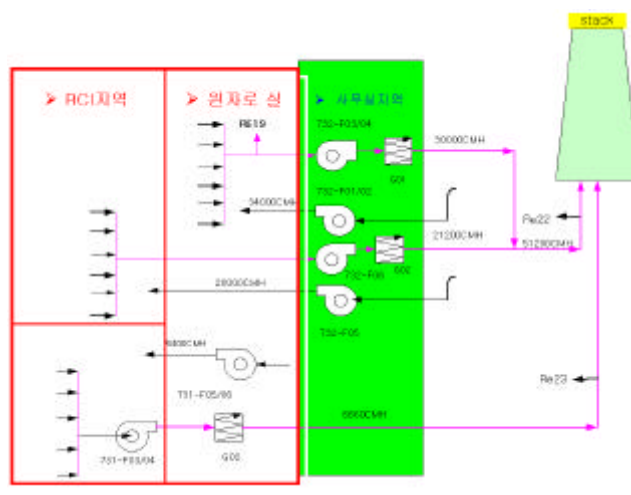
RCI

1

RCI

RCI

51,200 CMH, 6,660 CMH



1.

2.3

2.3.1

1 1996 2002 , 2

69,598 , 60,600 (349) 1,730 2

1996 가

1 가 BNCT (boron neutroncapture therapy)

1999 가 가

2001 BNCT , 가

2002 가

가

가 9.11 가

58%, 가 5%, 가 20%, 가 17% 가

가

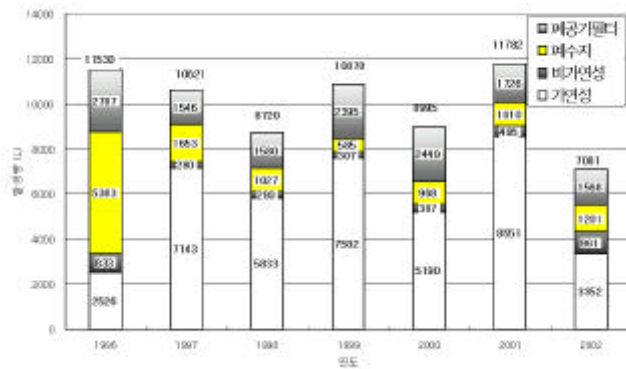
가

1.

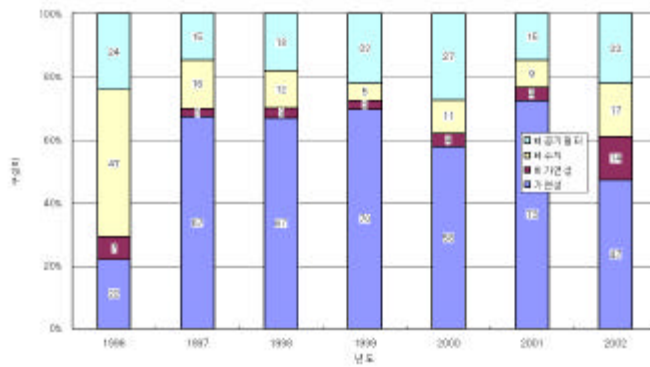
	가 ()	가 ()	()	()	()
1996	2,526	833	2,787	5,383	11,530
1997	7,143	280	1,546	1,653	10,621
1998	5,833	280	1,580	1,027	8,720
1999	7,582	307	2,395	585	10,870
2000	5,190	387	2,449	968	8,995
2001	8,551	495	1,726	1,010	11,782
2002	3,352	961	1,568	1,201	7,081
	40,177	3,542	14,053	11,827	69,598

2.

	가 ()	가 ()	()	()	()	()	()
1996	1,400	800	2,400	4,000	8,600	55	1,674,000
1997	7,400		1,600	2,800	11,800	67	3,162,000
1998	5,400			1,200	6,600	33	2,046,000
1999	7,400	800	2,000	400	10,600	53	3,286,000
2000	4,200				4,200	21	1,302,000
2001	10,400	800	5,200		16,400	108	5,084,000
2002	2,400				2,400	12	744,000
	38,600	2,400	11,200	8,400	60,600	349	17,298,000



1.



2.

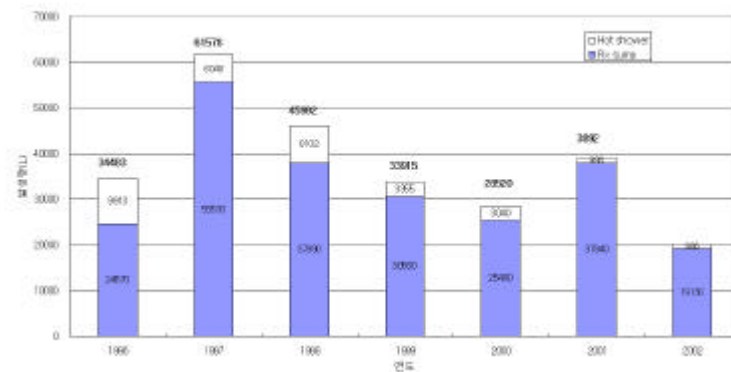
2.

2.3.2

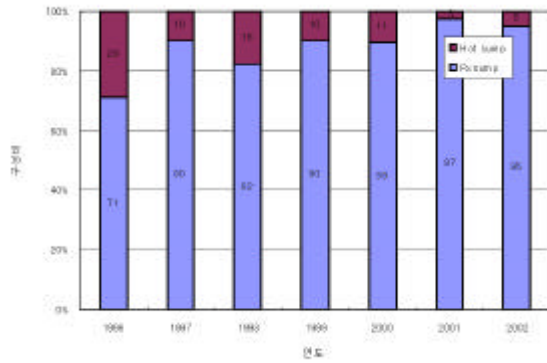
3 1996 2002
 263,530 8,169 3
 4
 2 1999 Hot sump
 가
 1997 Inlet plenum
 1 , 가 2001 Rx
 Sump 가 , 가 2001
 가 가 2001

3.

	Rx Sump()	Hot Sump()	()	()
1996	24,570	9,913	34,483	10,689,686
1997	55,530	6,048	61,578	19,089,326
1998	37,890	8,102	45,992	14,257,530
1999	30,560	3,355	33,915	10,513,699
2000	25,480	3,040	28,520	8,841,135
2001	37,940	986	38,926	12,067,027
2002	19,130	986	20,116	6,235,927
	231,100	32,430	263,530	81,694,330



3.



4.

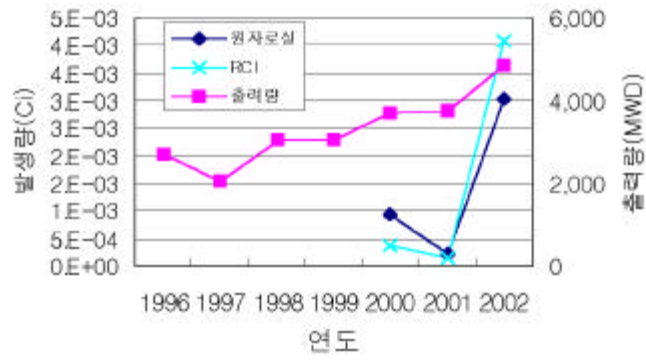
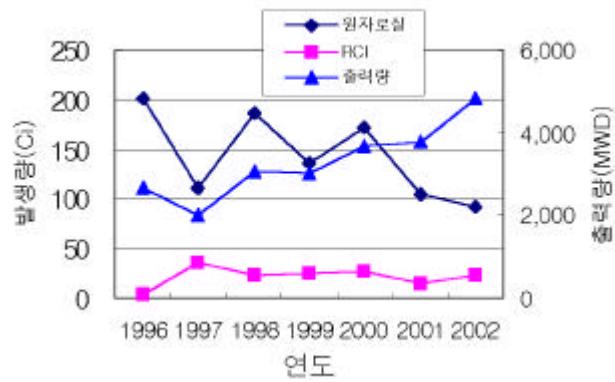
2.3.3

Ar-41, I-131, H-3
RCI

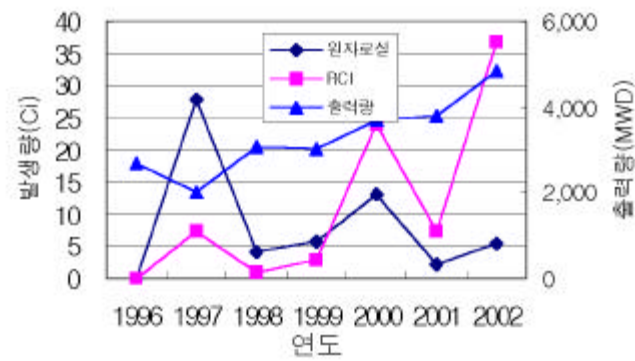
4 1996 2002
Ar-41 1,161.9 Ci, I-131 8.80E-3 Ci, H-3 137.7 Ci 5
RCI
2000 Ar-41 가
가 2001
Ar-41 2002 I-131
가 TeO₂ I-131

4.

	(Ci)			RCI (Ci)		
	Ar-41	I-131	H-3	Ar-41	I-131	H-3
1996	201.6	*	0	5.2	*	0
1997	110.8	*	27.8	35.1	*	7.2
1998	185.9	*	4.1	23.4	*	1.1
1999	137.6	*	5.6	25.9	*	3.0
2000	172.7	9.52E-4	13.1	27.8	3.7E-4	24
2001	105.5	2.24E-4	2.3	13.7	1.53E-4	7.2
2002	92.7	3.03E-3	5.6	23.9	4.07E-3	36.7
	1006.9	4.21E-3	58.5	155	4.59E-3	79.2



2. I- 131



3. H- 3

5. , RCI

2.4

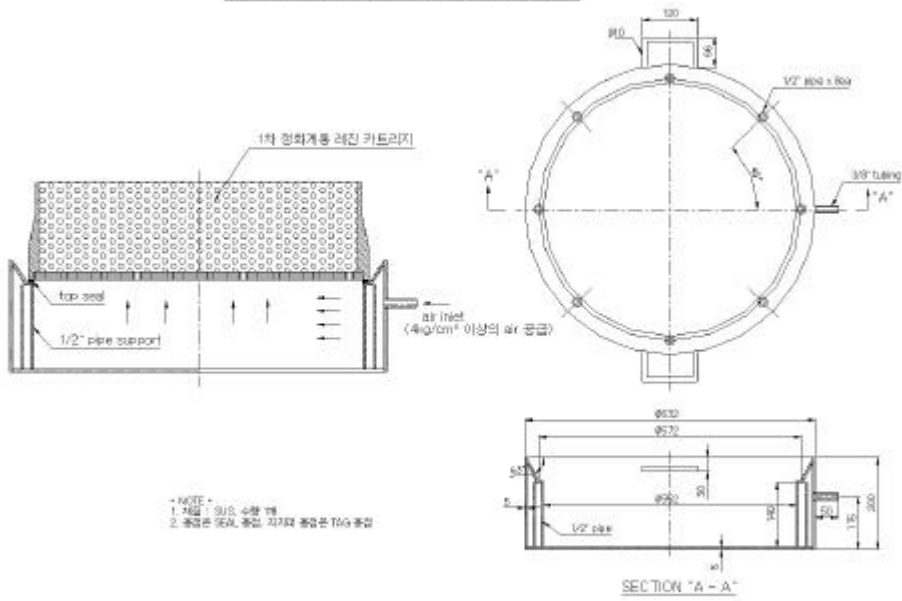
6

1)

40%

6

1차 정화 계통 레진 카트리지 드라이 장치



6.

2)

(

)

1

NTD

3)

2001

PTS(Pneumatic Transfer System:

가

Ar-41

가

Ar-41

PTS-2/3

3

Ar-41

Ar-41

가

$2.37 \times 10^{-5} \mu\text{Ci/cc}$

$5.03 \times 10^{-6} \mu$

Ci/cc

(7).

PTS

가

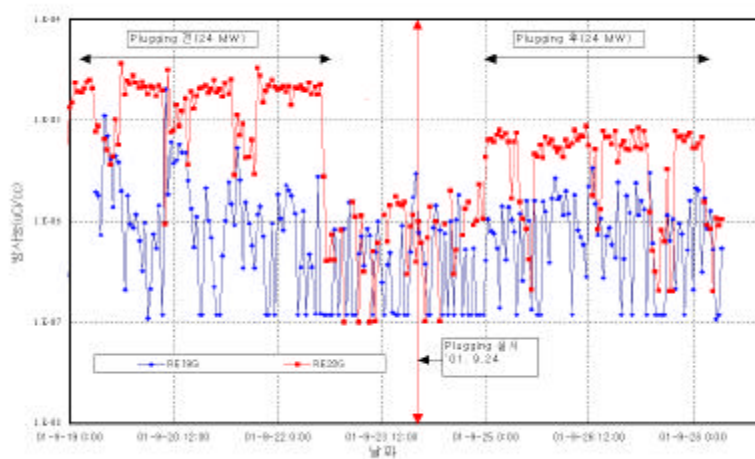
Ar-41

$8.87 \times 10^{-7} \mu\text{Ci/cc}$

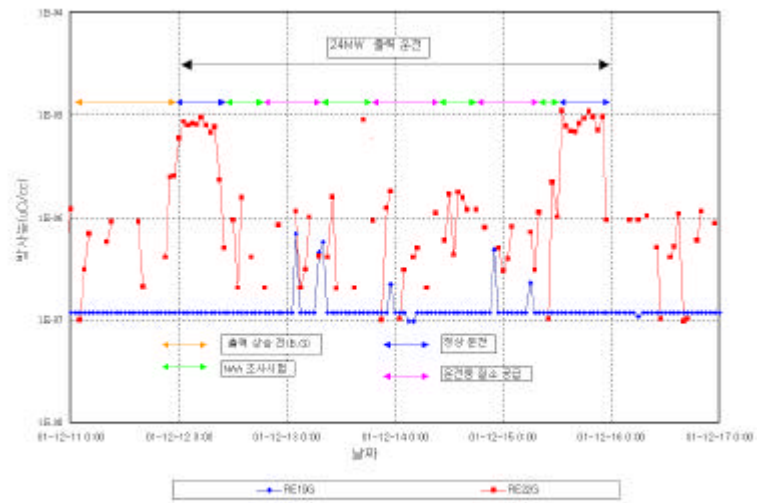
$8.92 \times 10^{-6} \mu\text{Ci/cc}$

1/ 10

(8).



7. NAA plugging , Ar-41



8. NAA

4)

가

,

,

가

가

,

가

가

,

가

,

5.

1996 2002
69,598 , 263,530 , 130.97 Ci .
1,730 , 8,169 .
40%
()
1
NTD
(PTS) , 가
Ar-41 $2.37 \times 10^{-5} \mu$
Ci/cc $8.87 \times 10^{-7} \mu$ Ci/cc .

- [1] , KAERI/TR-708/96,
- [2] , KAERI/TR-710/96,
- [3] , “ PTS
 ”, 2002 , 2002. 5.
- [4] “2002 ”, , KAERI/MR-395/2002
- [5] “ “, ,KAERI/MT - 390/2002
- [6] 가, KAERI/CR-149/02,