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			Name (printed)	Signature	
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Other Program/Project	<input type="checkbox"/>	<input checked="" type="checkbox"/>			

Information conforms to all applicable requirements. The above information is certified to be correct.

References Available to Intended Audience <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Transmit to DOE-HQ/Office of Scientific and Technical Information <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Author/Requestor (Printed/Signature) <u>S. A. Szendre</u> Date <u>10/8/93</u>	INFORMATION RELEASE ADMINISTRATION APPROVAL STAMP Stamp is required before release. Release is contingent upon resolution of mandatory comments.  
Intended Audience <input type="checkbox"/> Internal <input type="checkbox"/> Sponsor <input checked="" type="checkbox"/> External Responsible Manager (Printed/Signature) <u>E. M. Greager</u> Date	
Date Cancelled	Date Disapproved

Lead Author	Phone 6-7776	MSIN H6-30	Other Author(s) or Requestor Steve A. Szendre		
Project or Program	Lead Org Code		Sponsor Agency (DOE, DOT, NRC, USGS, etc.)		
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Mandatory Comments (Only mandatory comments are to be documented. All other comments should be made on a copy of the information submitted for review and returned to the author.)	Reviewer Name & Signature	Date	Resolution	Reviewer Name & Signature	Date

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Patent Status	[]	[]			

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Additional Information _____

Index

Title

DOE FFTFPO/RL APPRAISAL OF FFTF RADIOACTIVE EFFLUENT MONITORING AND CONTROL PROGRAM DATED 12/4/81 DOCUMENT NUMBER 8153956

300/400 AREAS EFFLUENT SUMMARY FOR THE FOURTH QUARTER CALENDAR YEAR 1992 DATED APRIL 22, 1993 DOCUMENT NUMBER 88420-93-043

300/400 AREAS EFFLUENT SUMMARY FOR THE FIRST QUARTER CY 1993 DATED JUNE 17, 1993 DOCUMENT NUMBER 88420-93-082

**Westinghouse
Hanford Company**

**Internal
Memo**

From: Effluent and Emission Monitoring
Phone: 3-1716 T1-30
Date: June 17, 1993
Subject: 300/400 AREAS EFFLUENT SUMMARY FOR THE FIRST QUARTER CY 1993

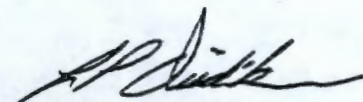
88420-93-082

To: B. G. Erlandson H6-20

cc: H. L. Benny L7-09 M. J. McCarthy L6-79
L. D. Berneski L4-96 J. M. McGee N1-58
F. J. Carvo N1-41 F. H. Nunamaker L6-36
N. R. Dahl N2-04 J. K. Perry H6-20
W. E. Davis H6-30 D. L. Powell L4-32
T. N. Draper L6-79 D. E. Rassmussen L4-30
D. S. Dutt L6-39 J. W. Rich N1-40
K. A. Gano X0-21 M. J. Silvia H6-35
J. L. Gilbert L6-40 D. J. Swaim B3-51
E. M. Greager H6-60 M. D. Talbot G6-06
G. B. Griffin N2-34 R. L. Watts L6-52
V. G. Johnson H6-06 LPD:JKP File/LB
R. J. Landon H6-22

This report summarizes liquid and airborne effluent discharges in the 300 and 400 Areas during the first quarter of calendar year 1993.

Any questions regarding this report should be directed to Mr. Jon Perry of my staff on 6-9349.


Larry P. Diediker
Manager

kmt

Attachment

1st
~~2nd~~
1993

QUARTERLY EFFLUENT REPORT-FOURTH QUARTER CY 1992

Airborne Effluents

Stack sampling of radioactive airborne emissions in the 300 and 400 areas is performed in accordance with WHC-CM-7-5, Section 2.5. Record samples are collected weekly and analyzed at Pacific Northwest Laboratory's Analytical Chemistry Laboratory (325 Building).

In accordance with WHC-CM-7-5, Section 2.5.2.2 (1), the ACV for airborne radioactive effluents released to the environment is the Derived Concentration Guide (DCG). The DCG is a nuclide-specific value, and in the 300 and 400 Areas, releases from facilities operated by WHC are very low when compared to the DCG. For this reason, specific nuclide analysis is not performed. In accordance with WHC-CM-7-5, Section 2.5.4 (10) (b), total alpha and total beta measurements are assumed to represent the most restrictive radionuclides which could be present in the effluent streams.

Noble gas releases at FFTF are monitored using real-time instruments. Noble gases other than Argon 41 are not normally present in the effluent. Noble gases such as Xenon and Krypton would be present only if a fuel failure were to occur. Releases of Argon-41 from FFTF are calculated based on measurements taken upstream of the effluent release points. These measurements consistently show that at 100 percent (%) power, FFTF releases approximately 2.0 uCi/Sec of Argon-41 to the environment. The rate of Argon-41 production (and release) is directly related to plant power level (neutron flux). Therefore, at 75% power, the release rate is approximately 1.5 uCi/Sec.

Liquid Effluents

Sampling and monitoring of liquid effluents discharged to the 300 and 400 Area Process Sewers and 300 Area Sanitary sewer are performed in accordance with WHC-CM-7-5, Section 8.0. Sample analyses for liquid effluents discharged to these sewer systems are performed monthly by Pacific Northwest Laboratory's Analytical Chemistry Laboratory. The ACV's for these sewer systems are discussed below.

In accordance with WHC-CM-7-5, Section 8.4.2.4 (9), the ACVs for radionuclides released to the 300 Area Process Trenches are 20% of the DCG. Since radiological releases to the 300 Area Process Trenches are small relative to the radionuclide specific DCG values, gross alpha and gross beta measurements are assumed to be representative of the most restrictive radionuclides which could be present in the liquid effluent.

In accordance with WHC-CM-7-5, Section 8.4.2.1 (1), the ACVs for radionuclides released to the 400 Area Process Sewer and 300 Area Sanitary Sewer systems are 4% of the DCG. Additionally, gross alpha measurements shall not exceed $1.5E-8$ uCi/ml (excluding radon and uranium). As discussed above, gross alpha and gross beta measurements are assumed to represent the most restrictive radionuclides which could be present in the liquid effluents.

The nonradiological ACV's for both the 300 and 400 Area Process Sewers are provided in WHC-CM-7-5, Table 8.1. Both radiological and nonradiological ACVs have been included in the attached tables which summarize the 1st quarter and the year to date releases for CY 1993.

400 AREA AIRBORNE EFFLUENTS

Isotope	ACV	Average Constituent Concentration (uCi/cc)		Release (Ci)	
		1st Quarter	Year to Date	1st Quarter	Year to Date

FFTF-CB-EX

Gross Alpha ¹	2.0E-14	4.4E-16	4.4E-16	2.0E-7	2.0E-7
Gross Beta ²	4.0E-10	1.0E-14	1.0E-14	8.9E-7	8.9E-7
I-131	4.0E-10	< 4.2E-15	< 4.2E-15	ND	ND
H-3	1.0E-7	5.8E-9	5.8E-9	5.2E-1	5.2E-1
AR-41 ³	1.0E-5	0	0	0	0

FFTF-RE-SB

Gross Alpha ¹	2.0E-14	1.0E-14	1.0E-14	4.8E-7	4.8E-7
Gross Beta ²	4.0E-10	3.8E-14	3.8E-14	1.8E-6	1.8E-6
I-131	4.0E-10	< 4.9E-15	< 4.9E-15	ND	ND

FFTF-HT-TR

Gross Alpha ¹	2.0E-14	2.6E-15	2.6E-15	4.0E-8	4.0E-8
Gross Beta ²	4.0E-10	1.1E-14	1.1E-14	1.7E-7	1.7E-7

437-MN&ST

Gross Alpha ¹	2.0E-14	6.4E-16	6.4E-16	3.8E-8	3.8E-8
Gross Beta ²	4.0E-10	2.1E-15	2.1E-15	1.3E-7	1.3E-7

1. The most restrictive and prevalent alpha emitting radionuclide assumed to be present is Pu-239.

2. The most restrictive and prevalent beta emitting radionuclide assumed to be present is Cs-137.

3. The FFTF reactor is shutdown due to FFTF Standby Order. Since Ar-41 production is directly proportional to the plant power level (neutron flux), the average concentration and total release for the 1st quarter of 1993 is zero.

ND Parameter was not detected for the indicated time period.

FOR APPROVAL OF NAME	APPROVED	DATE
PR Prevo, Author	<i>R. E. Peterson</i>	11/24/81
GD Carpenter	<i>GD</i>	11/24/81
RO Budd	<i>ROB for ROB</i>	12/3/81
LG Daggert	<i>LG Daggert</i>	11/24/81
RP Warrick	<i>RP Warrick</i>	11/24/81
SO Arneson	<i>SO Arneson</i>	1/25/81
CL Peckinpaugh	<i>CL Peckinpaugh</i>	12/1/81

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- CJ Ward/W/B119
- RP Warrick/W/D-56
- Corres. Process/W/C123 (2)
- SO Arneson W/D-38

8153956

Jack L. Rhoades, Director
 Safety and Environmental
 Protection Division
 U. S. Department of Energy
 Richland, Washington 99352

DEC 8 1981

FFTF HEALTH & SAFETY

DOE FFTFPO/RL APPRAISAL OF FFTF RADIOACTIVE EFFLUENT MONITORING AND CONTROL PROGRAM

- References:
1. Letter, C. S. Carlisle to E. W. Pottmeyer, Same Subject, dated November 19, 1980.
 2. Letter, R. E. Peterson to Director, FFTFPO, "Evaluation of FFTF Exhaust Monitoring Program," dated November 21, 1980.
 3. Letter, E. W. Pottmeyer to C. S. Carlisle, Same Subject, dated January 16, 1981.

Attached is a status report on the DOE appraisal of the FFTF Radioactive Effluent Monitoring and Control Program (Reference 1). Reference 2 was HEDL's response to the procedural changes related to the use of existing HEPA filters. This response was completed by HEDL prior to RP-3 as requested. Reference 3 provided a schedule for resolution of your recommendations. The attached status report should close out all appraisal items except Finding #1. A current status of and schedule for resolution of Finding #1 is submitted in the attachment.

ORIGINAL SIGNED BY
 R. E. PETERSON

R. E. Peterson, Manager
 Safety

PRP:ge

Attachment
 As stated

R. J. Myjak, Operations Officer, AMAR

APPRAISAL STATUS

DOE Recommendation with Regard to Finding #1

HEDL is requested to evaluate and respond to the proposed procedural change prior to RP-3. HEDL is also requested to initiate an evaluation of possible long-term solutions to sample line inadequacies to ensure permanent corrections are in place prior to unrestricted operation.

Previous HEDL Response

Reference 2 was HEDL's response to the proposed procedural changes related to the use of existing HEPA filters. This response was completed by HEDL prior to RP-3 as requested.

It is recognized that the validity of the particulate exhaust sampling is questionable in some cases. Methods for improving the accuracy of the sampling have been under study, and this effort is being intensified. An evaluation and recommendation addressing the different aspects of the problem at each exhaust duct will be provided by April 30, 1981.

Current HEDL Response

Considerable effort has been expended in the evaluation of the sample line loss problem. References 5 and 6 provide documentation of a portion of the total effort. The remainder of the documentation (e.g., sample line loss calculations, cost estimates and drawings) is available in Safety and Engineering files. A current status summary follows:

A method utilizing filter paper weight and radioactivity gain was used to test effluent radiation monitoring sample line loss.

System 96 effluent radiation monitoring channels were tested for particulate line loss. Test results are presented in Table 1. The results in Table 1 under the heading "% by Weight" were obtained by comparing the weight of the particles collected on the System 96 instrument filter paper to the weight of the particles collected on a filter paper located close to the exhaust duct; i.e., one without significant line loss. The results in Table 1 under the heading "% by Alpha" were obtained by comparing the alpha radioactivity of the particles collected on the System 96 instrument filter paper to the alpha radioactivity collected on a filter paper located close to the exhaust duct. The results in Table 1 under the heading "% by Beta" were obtained by comparing the beta radioactivity of the particles collected on the System 96 instrument filter paper to the beta radioactivity collected on a filter paper located close to the duct.

TABLE 1

PERCENTAGE OF WEIGHT OR RADIOACTIVITY REACHING FILTER PAPER

Exhaust Path	% by Weight	% by Alpha	% by Beta	Calculated %	
				Safety	Engineering
HTS-S	17	30	20	-	29
Combined exhaust Beta	63	76	96	54	49
Combined exhaust Beta	48	88	92	54	49
Combined exhaust Alpha	50	74	63	54	48
RSB, Lower	--	--	--	--	40
RSB, Upper	(The requirement to monitor the Upper RSB is being deleted, Reference 4)				
Ideal Installation (Based on 10 feet of straight horizontal sample line)					81

The weight measurements used in deriving the results in Table 1 were normalized to unit volume of air sampled.

The alpha and beta radioactivity measurements used in deriving the results in Table 1 utilized natural radioactivity of radon and thoron daughters and were normalized to unit flow rate of the air sampled. Radioactivity measurements were normalized to unit flow rate, as opposed to total flow, because the radon and thoron daughters with half lives that are short (about 30 minutes) compared to the sampling period (one week) were in equilibrium. Thus, the amount of radioactivity on a filter paper was proportional to the flow rate -- not the volume sampled.

The action plan below is based on the "% by Weight" values of Table 1. The weight values were used because: (1) the weight values are precisely measured, (2) the weight values do not involve any assumptions or extrapolations, (3) the alpha and beta activity values involve assumptions; e.g., that plant generated radioactivity would behave like the natural radioactivity, (4) the alpha and beta radioactivity values had to be corrected to the time at which the sampling was terminated -- this involved an assumption on the half-life, and (5) use of the weight values is conservative since the alpha and beta radioactivity values are larger in all cases.

Action Plan

The following actions, based upon the "% by Weight" results of Table 1, are being made.

Short-Term; i.e., prior to RP-6

1. Hardware changes need not be made in any of the effluent monitoring sample lines.
2. The beta particulate activity alarm setpoints for the combined exhaust should be lowered by a factor of two (current setpoint 1600 cpm).
3. The beta particulate activity alarm setpoints for the lower RSB exhaust should be lowered by a factor of two (current setpoint 1600 cpm).
4. The beta particulate activity alarm setpoints for the HTS-South exhaust should be lowered by a factor of five (current setpoint 1600 cpm). Alternatively, the basis for the alarm setpoints could be changed if the adjusted setpoint would result in spurious alarms.

5. The alpha particulate activity alarm setpoint for the Combined Exhaust cannot be lowered without risking spurious alarms. Therefore, the basis for the setpoint should be changed. The current basis for this alarm setpoint is to detect 1/100 of the nonoccupational MPC for Pu-239 at the 4.5-mile site boundary within four hours. This should be changed to eight hours.
6. The sample line loss factors given above will be used to adjust positive (above minimum detectable levels) results reported by radiochemical analysis.

Long-Term; i.e., prior to end of FY 1982

1. The HTS-South exhaust sampling line should be modified with the goal of minimizing the total length and the number of bends and maximizing the radii of the bends.
2. Additional sample line loss measurements should be made as a part of a formal test program. The results of this formal test program would be reviewed and sample line loss factors would be adjusted as necessary.

DOE Recommendation with Regard to Finding #2

HEDL is requested to evaluate effluent monitoring data obtained during the 2-day power run to establish beta particulate and noble gas background levels at full power operation. Utilizing this and previous data, HEDL is requested to lower the gaseous effluent monitor alarm setpoints to the lowest practicable level prior to unrestricted operation.

Previous HEDL Response

HEDL will, by February 28, 1981, evaluate the effluent monitoring data obtained during the 2-day power run and revise alarm setpoints to the lowest practicable level. These setpoints will be changed formally by the revision of several applicable procedures by March 30, 1981.

Current HEDL Response

The effluent monitoring data obtained during the initial 2-day power run were evaluated, Reference 1. This evaluation was completed prior to the February 28, 1981 commitment date. The actual alarm setpoints have not yet been changed in the applicable procedures for the following reasons:

1. The evaluation did not include effluent monitoring background data during the fall and winter months of the year when meteorological conditions could result in higher background level due to the presence of natural radioactivity.

2. A large measure of conservatism exists in the currently used alarm setpoints. The current high alarm setpoint is based upon detecting 1/100 of the applicable off-site radioactivity concentration guide at the site boundary which is the FFTF FSAR Chapter 18 technical specification limit. In the case of the noble gas monitors, this concentration is detected immediately; in one hour for beta particulate activity and in four hours (eight hours if based on current sample line loss determinations) for alpha particulate activity. Even eight hours is small compared to 8760 hours in a year.
3. It is highly desirable to minimize the number of changes which are made to the procedures. The evaluation being performed to resolve Finding #1 has not been completed and could affect the alarm setpoints.

Thus, the plan is to arrive at agreement on the resolution of Finding #1 and then change the applicable procedures. This would be accomplished prior to unrestricted operation as requested.

DOE Recommendation with Regard to Observation #1

HEDL is requested to perform an ALATEP analysis of potential ex-containment gaseous particulate effluent releases. As part of this analysis, HEDL should evaluate the applicability of NUREG 0472-0473 to the FFTF effluent control program.

Previous HEDL Response

HEDL will re-evaluate the release of particulate radioactivity in the light of NUREG 0472-0473 by March 13, 1981.

Current HEDL Response

This evaluation was completed prior to the March 13, 1981, commitment date, Reference 3.

DOE Recommendation with Regard to Observation #2

As part of the ALATEP analysis referred to in Observation #1, determine the need for an in-place procedure for HEPA filtration of any ex-containment particulate release. If indicated by this analysis, prepare and approve such a procedure.

Previous HEDL Response

HEDL will perform a feasibility analysis to determine the need for an in-place procedure for HEPA filtration of ex-containment particulate release. This analysis will be completed by March 31, 1981.

Current HEDL Response

The applicable operating procedures were changed such that, upon confirmation of a high particulate effluent monitor alarm, the affected exhaust would be diverted through the appropriate HEPA filter. This was accomplished by March 20, 1981, Reference 3.

DOE Recommendation with Regard to Observation #3

Observation #3 - The FFTF does not have a program in place for the periodic sampling of H&V exhaust ducting to measure any build-up of radioactive contamination, as required by HEDL guidance. . HEDL is requested to initiate this program for periodic sampling of exhaust ducting for contamination build-up prior to unrestricted operation.

Previous HEDL Response

HEDL will evaluate and implement a program for monitoring H&V exhaust ducting by June 22, 1981.

Current HEDL Response

The periodic exhaust duct sampling program is in place. The June 22, 1981, commitment date was met.

Safety and Engineering performed a joint study to: (1) establish criteria for the selection of sampling points and (2) identify the locations, Reference 4.

Operational Health Physics has implemented a quarterly routine survey program based on Reference 4.

REFERENCES

1. Letter, D. O. Hess to P. R. Prevo, "Evaluation of Effluent Monitoring Data Obtained During the 2-Day Power Demonstration," dated February 12, 1981.
2. Letter, R. E. Peterson to FFTFPO, "Evaluation of FFTF Exhaust Monitoring Program," dated November 21, 1980.
3. Letter, P. R. Prevo to W. C. Moffitt, "Operational Proficiency-Open Items," dated March 4, 1981.
4. Letter, P. R. Prevo to R. S. Hammond, "Plant Walk-Through of H&V Exhaust Ducting," dated January 22, 1981.
5. Letter, P. R. Prevo to L. G. Daggert, "Upper RSB Radiation Monitoring," dated October 27, 1981.
6. Letter, P. R. Prevo to L. G. Daggert, "FFTF Radioactive Effluent Monitoring and Control Program," dated April 14, 1981.

Westinghouse
Hanford Company

Internal
Memo

From: Effluent and Emission Monitoring
Phone: 3-1716 T1-30
Date: April 22, 1993
Subject: 300/400 AREAS EFFLUENT SUMMARY FOR THE FOURTH QUARTER
CALENDAR YEAR 1992

88420-93-043

To: B. G. Erlandson H6-21

cc: F. J. Carvo N1-41
N. R. Dahl N2-04
T. N. Draper L6-79
K. A. Gano X0-21
J. L. Gilbert L6-40
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M. J. Silvia H6-25
D. J. Swaim N2-51
M. D. Talbot N2-30
R. L. Watts L6-52
LPD:JKP File/LB

H6-21

*Winnemaka
Held 372
10/22/93*

This report summarizes liquid and airborne effluent discharges in the 300 and 400 Areas during the fourth quarter of calendar year 1992.

Any questions regarding this report should be directed to Mr. J. K. Perry of my staff on 6-9349.


Larry P. Diediker
Manager

kmt

Attachment

QUARTERLY EFFLUENT REPORT-FOURTH QUARTER CALENDAR YEAR 1992

Airborne Effluents

Stack sampling of radioactive airborne emissions in the 300 and 400 areas is performed in accordance with WHC-CM-7-5, Section 2.5. Record samples are collected weekly and analyzed at Pacific Northwest Laboratory's Analytical Chemistry Laboratory (325 Building).

In accordance with WHC-CM-7-5, Section ~~2.5.2.2 (2)~~^{2.5.2.2(1)}, the ACV for airborne radioactive effluents released to the environment is the Derived Concentration Guide (DCG). The DCG is a nuclide-specific value, and in the 300 and 400 Areas, releases from facilities operated by WHC are very low when compared to the DCG. For this reason, specific nuclide analysis is not performed. In accordance with WHC-CM-7-5, Section 2.5.4 (10) (b), the total alpha and total beta values are assumed to represent the most restrictive radionuclides which could be present in the effluent streams.

Noble gas releases at FFTF are monitored using real-time instruments.

Noble gases other than Argon 41 are not normally present in the effluent. Noble gases such as Xenon and Krypton would be present only if a fuel failure were to occur. Releases of Argon-41 from FFTF are calculated based on measurements taken upstream of the effluent release points. These measurements consistently show that at 100 percent (%) power, FFTF releases approximately 2.0 uCi/Sec of Argon-41 to the environment. The rate of Argon-41 production (and release) is directly related to plant power level (neutron flux).

Therefore, at 75% power, the release rate is approximately 1.5 uCi/Sec.

9 The Ar-41 release indicated in the attached tables for the FFTF-CB-EX stack, occurred during the 1st quarter of CY 1992. This release resulted in an air concentration at the point of release which exceeded the ACV specified in WHC-CM-7-5, Section 2.5.2.2 (1). Because the release resulted from routine operations, EEM has requested an adjustment to the FFTF-CB-EX Ar-41 ACV which both accomodates releases which occur during routine operations and ensures that environmental impacts are minimized.

400 AREA AIRBORNE EFFLUENTS

Isotope	ACV	Average Constituent Concentration (uCi/cc)		Release (Ci)	
		4th Quarter	Year to Date	4th Quarter	Year to Date

FFTF-CB-EX

Gross Alpha ¹	2.0E-14	4.6E-15	3.1E-15	4.1E-7	1.1E-6
Gross Beta ²	4.0E-10	3.3E-14	1.9E-14	3.0E-6	6.7E-6
I-131	4.0E-10	< 1.1E-14	< 6.9E-15	ND	ND
AR-41 ³	1.0E-5	0	2.4E-8	0	8.5

FFTF-RE-SB

Gross Alpha ¹	2.0E-14	4.0E-15	4.1E-15	1.3E-7	7.8E-7
Gross Beta ²	4.0E-10	3.3E-14	2.8E-14	1.8E-6	5.2E-6
I-131	4.0E-10	< 9.3E-15	< 6.4E-15	ND	ND

FFTF-HT-TR

Gross Alpha ¹	2.0E-14	5.6E-16	1.2E-15	8.7E-9	7.5E-8
Gross Beta ²	4.0E-10	6.0E-15	7.4E-15	9.3E-8	4.6E-7

437-MN&ST

Gross Alpha ¹	2.0E-14	3.5E-16	8.0E-16	2.7E-8	1.9E-7
Gross Beta ²	4.0E-10	1.7E-15	3.1E-15	1.0E-7	7.4E-7

1. The most restrictive and prevalent alpha emitting radionuclide assumed to be present is Pu-239.
2. The most restrictive and prevalent beta emitting radionuclide assumed to be present is Cs-137.
3. The FFTF reactor is shutdown due to FFTF Standby Order. Since Ar-41 production is directly proportional to the plant power level (neutron flux), the average concentration and total release for the 4th quarter of 1992 is zero.

ND Parameter was not detected for the indicated time period.