4

August 20, 1992

Mr. Brian Kooiker
Permits, Compliance, and Protection
Department of Environmental Conservation
Agency of Natural Resources
State of Vermont
103 South Main Street-The Annex
Waterbury, VT 05671-0405

Subject: NPDES unplanned discharge, August 14, 1992.

Reference: NPDES Permit No. 3-1199, VT0000264.

Dear Mr. Kooiker:

This letter is written to document an incident which occurred at the Vermont Yankee Nuclear Power Station on August 14, 1992 which resulted in an unplanned release to the Connecticut River at Vernon of a limited amount of water slightly contaminated with radionuclides.

The incident was verbally reported to Ms Nancy Manley of the Agency on August 18th at 8:30 a.m. and earlier to Mr William Sherman, Vermont State Nuclear Engineer, on August 17th at 10:00 a.m.

A description of the event is attached. The incident is still under evaluation by Vermont Yankee personnel and will result in a Corrective Action Report.

Current radiological analyses show that limits established by the Nuclear Regulatory Commission have not been exceeded. The event will be reported in the semiannual Radiological Effluent Report.

In the event you should require further information, please do not hesitate to call.

Sincerely,

Daniel J. Marx, Ph.D.
Environmental Scientist

Attachment, VYNPC, 8/20/92.

Attachment, VYNPC, 8/20/92

Overflow of Condensate Demineralizer Backwash Receiving Tank

On August 14, 1992 at approximately 1330, while backwashing the B condensate demineralizer and transferring the contents to the condensate demineralizer backwash tank, the electric pump which transfers the water from the tank to radwaste failed, resulting in the backwash receiving tank overflowing onto the floor. The water was radioactively contaminated and contained some resin material. The floor in the vicinity of the tank was flooded to a depth of approximately 1-2 inches.

Samples taken in a nearby sump indicated the presence of radioactive Iodine and Tritium.

The sump pumps are designed to cycle if required by level so it is possible that some contaminated water was discharged to the river by way of the service water system (10,000 gpm) and then into the main circulating water system (360,000 gpm) before entering the Connecticut River.

The precise volume of contaminated water that may have been discharged to the river is estimated to be less than 15 gallons. Radiation monitors and samples at the point of discharge did not record any evidence of radioactivity and remained normal during the entire event.

Vermont Yankee personnel isolated the sump pumps and terminated the potential discharge at approximately 1430.

Based on radiological analysis of samples taken from the floor, sumps, and the discharge structure, and assuming bounding conditions, Vermont Yankee calculated that Technical Specifications and NRC 10CFR requirements and limits were not exceeded and the event was not reportable to the NRC. The calculated parameter values were also below Vermont Department of Health Radiological Health limits and the NPDES Permit limits.

The calculated values were based on the extremely conservative assumption that radioactive water was pumped out of the sumps and discharged through the normal flow path to the river continuously during the event. The calculation assumes dilution by the flow of the circulating water system (360,000 gpm) occurring concurrently with the discharge.

The actual volume of radioactive water discharged is estimated to be three orders of magnitude below the bounding calculated values, or less than 15 gallons. Connecticut River flow at the time of the incident was approximately 6000 cfs.

DJM.8/20/92

SUMMARY OF APPLICABLE LIMITS AND "JUSTIFIABLE" CALCULATED VALUES FOR LIQUID RELEASE OF 8/14/92

Bases - The "Calculated Value is based upon the assumption that 1000 gallons of radioactive water was pumped out of the TB Clean Sump and discharged, through the normal flow path, to the river. The calculation assumes dilution by the flow of Circulating Water(360000 gpm) occurring concurrently with this discharge.

APPLICABLE LIMITS	LIQUID RELEASE CalculatedValue
TECHNICAL SPECIFICATIONS	
Liquid Effluents: Concentrations	
1)T.S.3.8.A.1 - ≤ 1 MPC as determined by 10CFR20, App.B, Table II, Col. 2 conc.(Noble Gases excluded)	2.92E-3 MPC's
2)T.S.3.8.A.1 - Total Noble Gases Conc. ≤ 2E-4 uci/cc	1.16E-9 uci/cc
Liquid Effluents: Dose	
1)Total Body Dose -T.S.3.8.B.1 - 1.5 mrem in any quarter, 3 mrem total for year	1.27E-7 mrem
2)Organ Dose - T.S.3.8.B.1 - 5 mrem in any quarter, 10 mrem total for year	6.23E-5 mrem
10CFR50.72 REPORTING REQUIREMENTS	
2 times MPC when averaged over one hour	2.43E-4 MPC's
NPDES REPORTING REQUIREMENTS	
Unplanned Releases	Yes
10CFR20 App B, Table II, Col.2 (≤ 1 MPC)	2.92E-3 MPC's
Total Radionuclides(excluding tritium) shall be ≤ 5 curies per year	3.57E-5 curies
Total Tritium shall be ≤ 5 curies per year	4.02E-5 curies
Dose	
Calendar quarter - ≤ 1.5 mrem total body	1.27E-7 mrem
- ≤ 5 mrem to any organ	6.23E-5 mrem
Calendar year - ≤ 3 mrem total body	1.27E-7 mrem
- ≤ 10 mrem to any organ	6.23E-5 mrem
pH - 6.5 to 8.5 Standard Units	7.6
Flow - 14.4 million gallons per day	1000gallons

VERMONT STATE RAD HEALTH REGULATIONS(Part 5, Chap. 3)

1. Radioactive Material(except tritium and dissolved noble gases ≤ 1E-7 uci/ml* — 4.10E-9 uci/ml

   Additional action levels*

   >2% of 1E-7(or 2E-9)uci/ml* — 4.10E-9 uci/ml
   Requires investigation, programs to reduce releases and report to Vt. Board of Health within 14 days (see regulation for additional details)

   >4% of 1E-7(or 4E-9)uci/ml* — 4.10E-9 uci/ml
   Requires investigation, immediate report to the Vt. Board of Health and then, < 14days later, followup report to Vt. Board of Health(see regulation for additional details)

2. Tritium - ≤ 3E-3 uci/ml — 5.72E-9 uci/ml
   (see regulation for additional quarterly limits)

3. Dissolved noble gases - ≤ 4E-5 uci/ml — 1.16E-9 uci/ml
   (see regulation for additional quarterly limits)

Performed by Debbie Volandi 8/18/92

Reviewed by [illegible] 8/18/92

* These action levels only apply if the release was not evaluated on an isotopic basis. Since this release was, the limits of 10CFR20, App.B. Table II, column 2. apply.

[illegible]
8/18/92

SUMMARY OF APPLICABLE LIMITS AND "JUSTIFIABLE" CALCULATED VALUES FOR LIQUID RELEASE OF 8/14/92

Bases - The "Calculated Value is based upon the assumption that 1000 gallons of radioactive water was pumped out of the TB Clean Sump and discharged, through the normal flow path, to the river. The calculation assumes dilution by the flow of Circulating Water(360000 gpm) occurring concurrently with this discharge.

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TECHNICAL SPECIFICATIONS	
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2 times MPC when averaged over one hour	2.43E-4 MPC's
NPDES REPORTING REQUIREMENTS	
Unplanned Releases	Yes
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Total Tritium shall be ≤ 5 curies per year	4.02E-5 curies
Dose	
Calendar quarter - ≤ 1.5 mrem total body	1.27E-7 mrem
- ≤ 5 mrem to any organ	6.23E-5 mrem
Calendar year - ≤ 3 mrem total body	1.27E-7 mrem
- ≤ 10 mrem to any organ	6.23E-5 mrem
pH - 6.5 to 8.5 Standard Units	7.6
Flow - 14.4 million gallons per day	1000gallons

VERMONT STATE RAD HEALTH REGULATIONS(Part 5, Chap. 3)

1. Radioactive Material(except tritium and dissolved noble gases ≤ 1E-7 uci/ml* — 4.10E-9 uci/ml

   Additional action levels*

   >2% of 1E-7(or 2E-9)uci/ml* — 4.10E-9 uci/ml
   Requires investigation, programs to reduce releases and report to Vt. Board of Health within 14 days (see regulation for additional details)

   >4% of 1E-7(or 4E-9)uci/ml* — 4.10E-9 uci/ml
   Requires investigation, immediate report to the Vt. Board of Health and then, < 14days later, followup report to Vt. Board of Health(see regulation for additional details)

2. Tritium - ≤ 3E-3 uci/ml — 5.72E-9 uci/ml
   (see regulation for additional quarterly limits)

3. Dissolved noble gases - ≤ 4E-5 uci/ml — 1.16E-9 uci/ml
   (see regulation for additional quarterly limits)

Performed by Debbie Voland, 8/18/92

Reviewed by A C Klikiewicz 8/18/92

* These action levels only apply if the release was not evaluated on an isotopic basis. Since this release was, the limits of 10CFR20, App.B. Table II, column 2. apply.

A C Klikiewicz
8/18/92

SUMMARY OF APPLICABLE LIMITS AND "JUSTIFIABLE" CALCULATED VALUES FOR LIQUID RELEASE OF 8/14/92

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1)Total Body Dose -T.S.3.8.B.1 - 1.5 mrem in any quarter, 3 mrem total for year	1.27E-7 mrem
2)Organ Dose - T.S.3.8.B.1 - 5 mrem in any quarter, 10 mrem total for year	6.23E-5 mrem
10CFR50.72 REPORTING REQUIREMENTS	
2 times MPC when averaged over one hour	2.43E-4 MPC's
NPDES REPORTING REQUIREMENTS	
Unplanned Releases	Yes
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Total Tritium shall be ≤ 5 curies per year	4.02E-5 curies
Dose	
Calendar quarter - ≤ 1.5 mrem total body	1.27E-7 mrem
- ≤ 5 mrem to any organ	6.23E-5 mrem
Calendar year - ≤ 3 mrem total body	1.27E-7 mrem
- ≤ 10 mrem to any organ	6.23E-5 mrem
pH - 6.5 to 8.5 Standard Units	7.6
Flow - 14.4 million gallons per day	1000gallons

VERMONT STATE RAD HEALTH REGULATIONS(Part 5, Chap. 3)

1. Radioactive Material(except tritium and dissolved noble gases ≤ 1E-7 uci/ml* — 4.10E-9 uci/ml

   Additional action levels*

   >2% of 1E-7(or 2E-9)uci/ml* — 4.10E-9 uci/ml
   Requires investigation, programs to reduce releases and report to Vt. Board of Health within 14 days (see regulation for additional details)

   >4% of 1E-7(or 4E-9)uci/ml* — 4.10E-9 uci/ml
   Requires investigation, immediate report to the Vt. Board of Health and then, < 14days later, followup report to Vt. Board of Health(see regulation for additional details)

2. Tritium - ≤ 3E-3 uci/ml — 5.72E-9 uci/ml
   (see regulation for additional quarterly limits)

3. Dissolved noble gases - ≤ 4E-5 uci/ml — 1.16E-9 uci/ml
   (see regulation for additional quarterly limits)

Performed by Debbie Voland, 8/18/92

Reviewed by A C Klikiewicz 8/18/92

* These action levels only apply if the release was not evaluated on an isotopic basis. Since this release was, the limits of 10CFR20, App.B. Table II, column 2. apply.

A C Klikiewicz
8/18/92

SUMMARY OF APPLICABLE LIMITS AND "OUTER BOUNDS" CALCULATED VALUES FOR LIQUID RELEASE OF 8/14/92

Bases - The "Calculated Value is based upon the assumption that 12000 gallons of radioactive water was pumped out of the TB Clean Sump and discharged, through the normal flow path, to the river. The calculation assumes dilution by the flow of Circulating Water(360000 gpm) occurring concurrently with this discharge.

APPLICABLE LIMITS	LIQUID RELEASE CalculatedValue
TECHNICAL SPECIFICATIONS	
Liquid Effluents: Concentrations	
1)T.S.3.8.A.1 - ≤ 1 MPC as determined by 10CFR20, App.B, Table II, Col. 2 conc.(Noble Gases excluded)	2.92E-3 MPC's
2)T.S.3.8.A.1 - Total Noble Gases Conc. ≤ 2E-4 uci/cc	1.16E-9 uci/cc
Liquid Effluents: Dose	
1)Total Body Dose -T.S.3.8.B.1 - 1.5 mrem in any quarter, 3 mrem total for year	1.52E-6 mrem
2)Organ Dose - T.S.3.8.B.1 - 5 mrem in any quarter, 10 mrem total for year	7.47E-4 mrem
10CFR50.72 REPORTING REQUIREMENTS	
2 times MPC when averaged over one hour	2.92E-3 MPC's
NPDES REPORTING REQUIREMENTS	
Unplanned Releases	Yes
10CFR20 App B, Table II, Col.2 (≤ 1 MPC)	2.92E-3 MPC's
Total Radionuclides(excluding tritium) shall be ≤ 5 curies per year	4.42E-4 curies
Total Tritium shall be ≤ 5 curies per year	4.82E-4 curies
Dose	
Calendar quarter - ≤ 1.5 mrem total body	1.52E-6 mrem
- ≤ 5 mrem to any organ	7.47E-4 mrem
Calendar year - ≤ 3 mrem total body	1.52E-6 mrem
- ≤ 10 mrem to any organ	7.47E-4 mrem
pH - 6.5 to 8.5 Standard Units	7.6
Flow - 14.4 million gallons per day	12000 gallons

VERMONT STATE RAD HEALTH REGULATIONS(Part 5, Chap. 3)

1. Radioactive Material(except tritium and dissolved noble gases ≤ 1E-7 uci/ml* — 4.10E-9 uci/ml

   Additional action levels *

   >2% of 1E-7(or 2E-9)uci/ml* — 4.10E-9 uci/ml
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   >4% of 1E-7(or 4E-9)uci/ml* — 4.10E-9 uci/ml
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   (see regulation for additional quarterly limits)

3. Dissolved noble gases - ≤ 4E-5 uci/ml — 1.16E-9 uci/ml
   (see regulation for additional quarterly limits)

Reviewed + Approved
J C Chilmonczyk 8/18/92

* These action levels only apply if the release was not evaluated on an Isotopic basis. Since this release was, the limits of 10CFR20, App. B, Table II, column 2. apply.
J C Chilmonczyk
8/18/92

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10CFR50.72 REPORTING REQUIREMENTS	
2 times MPC when averaged over one hour	2.92E-3 MPC's
NPDES REPORTING REQUIREMENTS	
Unplanned Releases	Yes
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Calendar year - ≤ 3 mrem total body	1.52E-6 mrem
- ≤ 10 mrem to any organ	7.47E-4 mrem
pH - 6.5 to 8.5 Standard Units	7.6
Flow - 14.4 million gallons per day	12000 gallons

VERMONT STATE RAD HEALTH REGULATIONS(Part 5, Chap. 3)

1. Radioactive Material(except tritium and dissolved noble gases ≤ 1E-7 uci/ml* — 4.10E-9 uci/ml

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   (see regulation for additional quarterly limits)

Reviewed + Approved
A C Shilinworthy 8/18/92

* These action levels only apply if the release was not evaluated on an Isotopic basis. Since this release was, the limits of 10CFR20, App. B, Table II, column 2. apply.
A C Shilinworthy
8/18/92

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10CFR50.72 REPORTING REQUIREMENTS	
2 times MPC when averaged over one hour	2.92E-3 MPC's
NPDES REPORTING REQUIREMENTS	
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Calendar quarter - ≤ 1.5 mrem total body	1.52E-6 mrem
- ≤ 5 mrem to any organ	7.47E-4 mrem
Calendar year - ≤ 3 mrem total body	1.52E-6 mrem
- ≤ 10 mrem to any organ	7.47E-4 mrem
pH - 6.5 to 8.5 Standard Units	7.6
Flow - 14.4 million gallons per day	12000 gallons

VERMONT STATE RAD HEALTH REGULATIONS(Part 5, Chap. 3)

1. Radioactive Material(except tritium and dissolved noble gases ≤ 1E-7 uci/ml* — 4.10E-9 uci/ml

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   (see regulation for additional quarterly limits)

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   (see regulation for additional quarterly limits)

Reviewed + Approved
A C Shilinworthy 8/18/92

* These action levels only apply if the release was not evaluated on an Isotopic basis. Since this release was, the limits of 10CFR20, App. B, Table II, column 2. apply.
A C Shilinworthy
8/18/92

OPERATIONS DEPARTMENT
MEMORANDUM

TO: S.Skibniowsky **DATE:** 8/18/92

FROM: J.T.Herron **FILE:**

SUBJECT: Condensate spill

On 8/14/92 R. Gerdus and I needed to evaluate if the notification requirements of 10CFR50.72 had been met which would require us to contact the NRC via the NRC red phone. In order to make the determination with respect to the applicable release limits we assumed that 12000 gallons of water was pumped out of the clean sump to the circ water discharge block. This is an extremely conservative value in that the we assumed one hour of continuous sump pump operation at the capacity of the pump @ 200 gpm.

After further review, a more realistic value of the amount of water discharged from the sump to the circ water discharge block would be @ 1000 gallons. This is, in my opinion, still very conservative in that at no time during the spill had the water reached the sump enclosure. Operation personnel, in the area at the time of the spill, have stated that the only source of contamination believed to have migrated to the sump was from the floor drains. It is our belief that the floor drain plugs, that are present to prevent the intrusion of contamination into the clean sump, were not water tight. The conservative 1000 gallons figure was based on the following.

1- The TBCCW clean sump pump timer readings have shown an average of @ 7 hours of operation per week over the past month.

2- Based on #1 above the TBCCW clean sump pumps operate @ 1 hour per day which in turn correlate to 1 pump down per hour.

3- The sump volume is @500 gal.

4- Since the event went on for @ 45 min. a conservative approach of 2 pump downs in the 45 min. would be appropriate.

5- The float system in the sump is set up to pump @ half of the tank volume or @ 250 gallons.

In conclusion I would concur with your assumption to use 1000 gallons of radioactive water to calculate the liquid release values for the 8/14/92 liquid release.

Summary of Calculations and Applicable Limits
for Liquid Release of 8/14/92

Technical Specification	12,000 gal release Calculated Value at Discharge
Liquid Effluents: Concentration	
1) 10CFR 20, App. B, Table II, Col. 2 concentrations	2.92 E-3 MPC's
2) 2×10^{-4} μCi/ml total activity for noble gases	1.16 E-9 μCi/ml noble gases
Reporting Limit	
10CFR 50.72	
2 x MPC averaged over one hour	2.92 E-3 MPC's

Technical Specification	
Liquid Effluents: Dose	
1) 1.5 mrem in any quarter total body dose, 3 mrem per year total body dose	1.52 E-6 mrem total body dose
2) 5 mrem to any organ in any quarter, 10 mrem to any organ per year	7.47 E-4 mrem organ dose

Vermont State Limits	
* 1) Radioactive material except tritium and dissolved noble gases shall not exceed 1×10^{-7} μCi/ml	4.10 E-9 μCi/ml at Discharge
2) Tritium shall not exceed 3×10^{-3} μCi/ml	Tritium = 5.72 E-9 μCi/ml at Discharge
3) Dissolved noble gases shall not exceed 4×10^{-5} μCi/ml	Noble gases = 1.16 E-9 μCi/ml at Discharge

* The calculated activity of radioactive material except tritium and dissolved noble gases exceeds 4% of the limit. When the concentration of radioactive material in liquid effluents exceeds 4% of this limit, when averaged over a calendar quarter, certain actions are required of Vermont Yankee. These actions include an investigation to identify the cause and to report the quarterly average to the Vermont Board of Health. These actions are required as soon as it becomes evident that the quarterly average of discharges will exceed these levels.

EVALUATION OF TBCCW SUMP RELEASE PATHWAY - 8/14/92

Calculations Assumptions

The TBCCW sump pump is rated at 200 gpm. The worst case scenario is that this sump ran for one hour while radioactive liquid from the backwash receiving tank was overflowing onto the floor and leaking into the sump.

The one hour duration was based upon the fact that the SW rad monitor alarm came in high at 1338 and the TBCCW clean sump was secured at 1430.

Chemistry technicians sampled the clean sump at 1410 and the TBCCW area floor at 1405. Isotopic analyses of both the floor and the sump are attached. A tritium analysis was performed on the sump sample and found to be 1.06E-5 uci/ml at 1410.

Only ~~four~~ five radionuclides were identified in the clean sump(I-131, I-132, I-133, I-134 and I-135) probably due to the shorter count time of this sample. Therefore, the floor sample data was used to extrapolate the probable concentrations of all identified radionuclides possible in the sump sample. This ratio was set at 600 to 1 based upon the worst case radioiodine ratio.

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To Dean Weyman	From D. Voland
Co.	Co.
Dept.	Phone #
Fax #	Fax #

page 2

Nuclide	Activity (μCi/ml) in Sump
I-131	9.13 E-7
I-132	4.19 E-7
I-133	1.75 E-6
I-134	2.80 E-7
I-135	1.92 E-6
H-3	1.06 E-5

Tc-99m	1.995E-5/600 =	3.33 E-8
Sr-91	2.034E-4/600 =	3.39 E-7
Sr-92	6.188E-5/600 =	1.03 E-7
Y-91m	1.236E-4/600 =	2.06 E-7
Ru-106	2.509E-4/600 =	4.18 E-7
Ba-139	3.536E-4/600 =	5.89 E-7
Ba-140	1.853E-4/600 =	3.09 E-7
La-140	1.473E-4/600 =	2.46 E-7
Ce-141	3.788E-5/600 =	6.31 E-8

Calculated activity based on 1:600 dilution between activity on floor and activity in the sump.

Xe-135	2.131E-7	
Xe-135m	8.495E-7	
Xe-131m	5.739E-4/~~400~~ 600 =	~~1.43 E-6~~ 9.57E-7
Xe-133	7.835E-5/~~400~~ 600 =	~~1.96 E-7~~ 1.31E-7

Calculated activity based on 1:600 dilution as above

Service Water Discharge	= 10,000 gpm
Circ Water Discharge	= 360,000 gpm
TBCCW Clean Sump Discharge	= 200 gpm

$\frac{200}{370,000}$ = dilution factor of 5.4 E-4

Nuclide activity x 5.4 E-4 = activity at discharge structure (ADS)

	ADS µCi/ml	MPC	Fraction of MPC
-131	4.93 E-10	3 E-7	1.64 E-3
-132	2.26 E-10	8 E-6	2.83 E-5
-133	9.45 E-10	1 E-6	9.45 E-4
-134	1.51 E-10	2 E-5	7.55 E-6
-135	1.04 E-9	4 E-6	2.53 E-4
H-3	5.72 E-9	3 E-3	1.91 E-6
Tc-99m	1.80 E-11	6 E-3	3.00 E-9
Sr-91	1.83 E-10	7 E-5	2.61 E-6
Sr-92	5.56 E-11	7 E-5	7.94 E-7
Y-91m	1.11 E-10	3 E-3	3.70 E-8
Ru-106	2.26 E-10	1 E-5	2.26 E-5
Ba-140	1.67 E-10	2 E-5	8.35 E-6
La-140	1.33 E-10	2 E-5	6.65 E-6
Ce-141	3.41 E-11	9 E-5	3.79 E-7
			2.92 E-3 MPC's

Entrained/Dissolved Gases

Xe-135	1.15 E-10
Xe-135m	4.59 E-10
Xe-131m	5.17 E-10
Xe-133	7.07 E-11
	1.16 E-9 µCi/ml noble gases at Discharge Structure

Tech. Spec. Limit is 2×10^{-4} µCi/ml total activity concentration for all dissolved or entrained noble gases.

10CFR50.72 Reporting Limit - 2x MPC averaged over one hour.

Sr-139 3.18 E-10

ADS Totals µCi/ml

~~Total Tritium~~	~~5.72 E-9~~	Tritium	5.72 E-9
~~Total ADS~~	~~9.50 E-9~~	Noble gases	1.16 E-9
~~Total ADS without H-3~~	~~4.10 E-9~~	All, except tritium + ng	4.10 E-9
~~Total~~		All	1.10 E-8

Reviewed + Approved [illegible] 8/17/01

Nuclides for Dose Assessment Only

Nuclide	Activity (μCi/ml) in Sump	Ci released (1)	Ci released (2)
I-131	9.13 E-7	4.15 E-5	3.46 E-6
I-132	4.19 E-7	1.90 E-5	1.58 E-6
I-133	1.75 E-6	7.95 E-5	6.63 E-6
I-134	2.80 E-7	1.27 E-5	1.06 E-6
I-135	1.92 E-6	8.72 E-5	7.27 E-6
H-3	1.06 E-5	4.82 E-4	4.02 E-5
Tc-99m	3.33 E-8	1.51 E-6	1.26 E-7
Ba-140	3.09 E-7	1.40 E-5	1.17 E-6
Ce-141	6.31 E-8	2.87 E-6	2.39 E-7

1) Activity (μCi/ml) x 200 gpm x 3785 $\frac{cc}{gal}$ x 60 min x $\frac{Ci}{10^6 \mu Ci}$ = Ci released

This calculation was used to determine the upper maximum of activity that may have been released (12,000 gal)

2) Activity (μCi/ml) x 200 gpm x 3785 cc/gal x 5 min x $\frac{Ci}{10^6 \mu Ci}$ = Ci released

This calculation was used to determine a more probable level of activity that may have been released based on an assessment of the operation of the sump pump. (1,000 gal)

TOTAL BODY AND MAXIMUM ORGAN DOSES FROM LIQUID RADWASTE RELEASES

Based on 12,000 gal release

MONTH_____
YEAR_____

Radionuclide	Curies Released	X	Total Body Dose Factor	=	(2A) mRem:	(then Ci) X	Max. Organ Dose Factor	=	(2B) mRem
H-3	4.82E-4	X	2.06E-04	=	9.93E-8		X 2.06E-04	=	9.93E-8 *
Na-24		X	3.38E-02	=			X 3.38E-02	=	
Cr-51		X	3.10E-04	=			X 6.96E-02	=	
Mn-54		X	2.08E-01	=			X 3.00E+00	=	
Mn-56		X	8.53E-06	=			X 5.29E-03	=	
Fe-59		X	2.49E-01	=			X 1.84E+00	=	
Co-58		X	5.97E-02	=			X 4.34E-01	=	
Co-60		X	2.13E-01	=			X 1.28E+00	=	
Zn-64		X	8.06E+00	=			X 1.64E+01	=	
Sr-89(1)		X	2.55E-01	=			X 8.91E+00	=	
Sr-90(1)		X	4.23E+01	=			X 1.67E+02	=	
Zr-95		X	4.21E-04	=			X 1.36E-01	=	
Mo-99		X	4.79E-03	=			X 4.51E-02	=	
Tc-99m	1.51E-6	X	5.04E-06	=	7.61E-12		X 2.33E-04	=	~~7.17E-9~~ 3.52E-10
Sb-124		X	8.44E-03	=			X 2.22E-01	=	
I-131	4.15E-5	X	2.57E-02	=	1.07E-6		X 1.47E+01	=	6.10E-4
I-132	1.90E-5	X	3.10E-06	=	5.89E-11		X 1.29E-04	=	2.45E-9
I-133	7.95E-5	X	3.31E-03	=	2.63E-7		X 1.63E+00	=	1.30E-4
I-135	8.72E-5	X	3.16E-04	=	2.76E-8		X 5.90E-02	=	5.15E-6
Cs-134		X	1.28E+02	=			X 1.60E+02	=	
Cs-137		X	7.58E+01	=			X 1.21E+02	=	
Ba-140	1.40E-5	X	4.08E-03	=	5.71E-8		X 9.72E-02	=	1.36E-6
Ce-141	2.87E-6	X	2.31E-05	=	6.63E-11		X 4.10E-02	=	1.18E-7
W-187		X	1.18E-02	=			X 8.90E+00	=	

D_{tb}^{liq} = (SUM) = 1.52E-6 mRem(3A)

D_{mo}^{liq} = (SUM) = 7.47E-4 mRem(3B)

(1) Use most recent data available for Sr-89 and Sr-90.
(2A) T.S. 3.8.B.1 Limits: 1.5 mRem in any quarter, 3.0 mRem per year. (See also 3.8.C.1 and 3.8.M.1.)
(3A) ODCM EQ 3-1.

(2B) T.S. 3.8.B.1 Limits: 5 mRem in any quarter, 10 mRem per year.
(3B) ODCM EQ 3-3

Reviewed By_____

page 5

Nuclide	Activity (μCi/ml) in Sump	(1) Ci released	(2) Ci released
I-131	9.13 E-7	4.15 E-5	3.46 E-6
I-132	4.19 E-7	1.90 E-5	1.58 E-6
I-133	1.75 E-6	7.95 E-5	6.63 E-6
I-134	2.80 E-7	1.27 E-5	1.06 E-6
I-135	1.92 E-6	8.72 E-5	7.27 E-6
H-3	1.06 E-5	4.82 E-4	4.02 E-5
Tc-99m	3.33 E-8	1.51 E-6	1.26 E-7
Sr-91	3.39 E-7	1.54 E-5	1.28 E-7
Sr-92	1.03 E-7	4.68 E-6	3.90 E-7
Y-91m	2.06 E-7	9.36 E-6	7.80 E-7
Ru-106	4.18 E-7	1.90 E-5	1.58 E-6
Ba-139	5.89 E-7	2.68 E-5	2.23 E-6
Ba-140	3.09 E-7	1.40 E-5	1.17 E-6
La-140	2.46 E-7	1.12 E-5	9.31 E-7
Ce-141	6.31 E-8	2.87 E-6	2.39 E-7
Xe-135	2.13 E-7	9.67 E-6	8.06 E-7
Xe-135m	8.50 E-7	3.86 E-5	3.22 E-6
Xe-131m	9.57 E-7	4.35 E-5	3.62 E-6
Xe-133	1.31 E-7	5.95 E-6	4.96 E-7
Total Ci released, excluding tritium		4.42 E-4	3.57 E-5

1) See notes p. 4 (12,000 gal)
2) See notes p. 4 (1,000 gal)

Add to Liquid Release Doses for August 1992

Turbine Sump Sample LLD's

Co-60 1.013 E-7 μCi/ml
Cs-137 5.946 E-8 μCi/ml

Condemin Resin Data for Sr 89
"A" 190 E-3 μCi/g
"B" 565 E-3 μCi/g
Ave 377.5 E-3 μCi/g

Isotope	Scaling Factor Co-60	Scaling Factor Cs-137	Projected Value (in Turbine Sump) Compared to Turbine Sump LLD's μCi/ml
Fe-55	5.439E-1		5.51 E-8
Sr-89		9.509E-1	5.65 E-8
Sr-90		7.922 E-2	4.71 E-9
Pu-238	4.727E-5		4.79 E-12
Pu-239	3.395E-5		3.44 E-12
Pu-241	5.107 E-2		5.17 E-9
Am-241	7.257E-5		5.33 E-11
Cm-242	3.728 E-5		3.78 E-12
Cm-244	3.129 E-5		3.17 E-12
Np-237	6.724 E-4		6.81 E-11

ISOT	analyzed value	expon.	uCi/g	Calculated MDA	Value Used	Co60 Scaling Factor	Pu239 Scaling Factor
Waste Demin Resin Data							
Co60	73	1E-05	7.300E-04	5.60E-04	7.300E-04	1.000E+00	
C 14	45	1E-06	4.500E-05	2.90E-05	4.500E-05	6.164E-02	
Fe55	503	1E-06	5.030E-04	5.10E-05	5.030E-04	6.890E-01	
Ni59	-36	1E-07	-3.600E-06	2.20E-05	2.200E-05	3.014E-02	
Ni63	376	1E-06	3.760E-04	1.20E-04	3.760E-04	5.151E-01	
Pu238	1	1E-07	1.000E-07	4.50E-06	4.500E-06	6.164E-03	1.25E+00
Pu239	19	1E-07	1.900E-06	3.60E-06	3.600E-06	4.932E-03	1.00E+00
Pu241	55	1E-06	5.500E-05	1.90E-04	1.900E-04	2.603E-01	5.28E+01
Am241	46	1E-07	4.600E-06	5.30E-06	5.300E-06	7.260E-03	1.47E+00
Cm242	4	1E-07	4.000E-07	3.80E-06	3.800E-06	5.205E-03	1.06E+00
Cm244	-68	1E-09	-6.800E-08	2.60E-06	2.600E-06	3.562E-03	7.22E-01
Np237	-24	1E-06	-2.400E-05	5.70E-05	5.700E-05	7.808E-02	1.58E+01
						Cs Scaling Factor	
Cs137	595	1E-05	5.950E-03	5.00E-04	5.950E-03	1.000E+00	
Sr90	134	1E-07	1.340E-05	1.40E-05	1.400E-05	2.353E-03	
Tc99	-36	1E-07	-3.600E-06	8.00E-06	8.000E-06	1.345E-03	
I129	8	1E-07	8.000E-07	1.20E-05	1.200E-05	2.017E-03	

ISOT	analyzed value	expon.	uCi/g	Calculated MDA	Value Used	Co60 Scaling Factor	Pu239 Scaling Factor
Condemin Resin Data(Avg of A & B)							
Co60	751	1E-03	7.510E-01	6.15E-01	7.510E-01	1.000E+00	
C 14	111.5	1E-05	1.115E-03	3.95E-04	1.115E-03	1.485E-03	
Fe55	408.5	1E-03	4.085E-01	4.25E-03	4.085E-01	5.439E-01	
Ni59	-1	1E-05	-1.000E-05	1.55E-03	1.550E-03	2.064E-03	
Ni63	1552	1E-04	1.552E-01	8.85E-03	1.552E-01	2.067E-01	
Pu238	15	1E-06	1.500E-05	3.55E-05	3.550E-05	4.727E-05	1.39E+00
Pu239	32.5	1E-07	3.250E-06	2.55E-05	2.550E-05	3.395E-05	1.00E+00
Pu241	383.5	1E-04	3.835E-02	1.00E-02	3.835E-02	5.107E-02	1.50E+03
Am241	9	1E-06	9.000E-06	5.45E-05	5.450E-05	7.257E-05	2.14E+00
Cm242	54	1E-07	5.400E-06	2.80E-05	2.800E-05	3.728E-05	1.10E+00
Cm244	17.8	1E-07	1.780E-06	2.35E-05	2.350E-05	3.129E-05	9.22E-01
Np237	-183.	1E-06	-1.835E-04	5.05E-04	5.050E-04	6.724E-04	1.98E+01
						Cs Scaling Factor	
Cs137	397	1E-03	3.970E-01	6.50E-02	3.970E-01	1.000E+00	
Sr90	314.5	1E-04	3.145E-02	2.55E-03	3.145E-02	7.922E-02	
Tc99	-4	1E-04	-4.000E-04	4.75E-03	4.750E-03	1.196E-02	
I129	2	1E-05	2.000E-05	4.50E-04	4.500E-04	1.134E-03	
Sr89	377.5	1E-3	3.775E-1	5.40E-3	3.775E-1	9.509E-1	

MAILED

APR 30 1992

YANKEE ATOMIC ELECTRIC COMPANY ENVIRONMENTAL LABORATORY

10 CFR Part 50/61 Analysis Report

Laboratory Sample Number: 203032#
Sample Submission Code: VRES0580992
Media Type: Resin
Total Amt of Sample Sent: 0.11 g

Customer: Vermont Yankee
Sample Reference Date: February 26, 1992
Date Sample Received: March 5, 1992
Report Date: April 29, 1992

Sample Description: "B" Condensate Resin

Analysis Requested	Aliquot Weight Processed [g]	Analysis Date	Activity Concentration ± 1σ Overall on Reference Date [µCi/g]	Minimum Detectable Concentration (A) on Reference Date CALCULATED [µCi/g]	REQUIRED [µCi/g]	Note(s)
H-3	9.6000E-04	04/03/92	(29 ± 29)E-04	49 E-04	4.0E-01	
C-14	1.2200E-02	03/28/92	(149 ± 19)E-05	45 E-05	8.0E-02	B
Fe-55	2.1000E-03	03/18/92	(421 ± 35)E-03	40 E-04	7.0E+00	B
Ni-59	8.4000E-04	03/27/92	(-23 ± 41)E-05	15 E-04	2.2E+00	C
Ni-63	1.0000E-03	03/23/92	(222 ± 19)E-03	88 E-04	3.5E-02	B
Sr-89	2.1000E-03	04/02/92	(565 ± 43)E-03	52 E-04		B
Sr-90	2.1000E-03	04/02/92	(202 ± 19)E-04	21 E-04	4.0E-04	B
Tc-99	9.2000E-04	04/23/92	(-9 ± 17)E-04	57 E-04	3.0E-02	
Np-237	2.1200E-03	03/18/92	(-176 ± 82)E-06	48 E-05	1.0E-03	
Pu-238	2.1100E-03	03/17/92	(13 ± 21)E-06	51 E-06	1.0E-03	
Pu-239,240	2.1100E-03	03/17/92	(-39 ± 22)E-07	33 E-06	1.0E-03	
Pu-241	4.9000E-04	04/07/92	(726 ± 70)E-04	11 E-03	3.5E-02	B
Am-241	2.1100E-03	03/16/92	(10 ± 16)E-06	56 E-06	1.0E-03	
Cm-242	2.1100E-03	03/16/92	(124 ± 95)E-07	21 E-06	2.0E-01	
Cm-243,244	2.1100E-03	03/16/92	(48 ± 62)E-07	21 E-06	1.0E-03	
I-129	6.5000E-03	04/13/92	(9 ± 13)E-05	53 E-05	8.0E-04	

Note(s):

A - Calculated MDCs are a-posteriori values.
B - Results are statistically positive at the 99.9% confidence level (activity is greater than three times the standard deviation).
C - Required MDC is for activated metal.

Reviewed by

E. M. Moreno

James C. Murray

- Updated to include all requested 10 CFR 61 analyses.

MAILED

APR 30 1992

YANKEE ATOMIC ELECTRIC COMPANY ENVIRONMENTAL LABORATORY

10 CFR Part 50/61 Analysis Report

Laboratory Sample Number: Z03032
Sample Submission Code: VRES05B0992
Media Type: Resin
Total Amt of Sample Sent: 0.11 g

Customer: Vermont Yankee
Sample Reference Date: February 26, 1992
Date Sample Received: March 5, 1992
Count Date: March 9, 1992
Report Date: April 29, 1992

Sample Description: "B" Condensate Resin

Analysis Requested	Aliquot Weight Processed [g]	Isotope	Activity Concentration ± 1σ Overall on Reference Date [µCi/g]	Minimum Detectable Concentration (A) on Reference Date CALCULATED [µCi/g]	REQUIRED [µCi/g]	Note(s)
Gamma Scan	0.0424	Cr-51	(12 ± 21)E-02	85 E-02		
		Mn-54	(125 ± 19)E-03	61 E-03	7.0E+00	B
		Co-57	(13 ± 23)E-03	89 E-03	7.0E+00	
		Co-58	(-27 ± 25)E-03	10 E-02	7.0E+00	
		Fe-59	(-50 ± 54)E-03	23 E-02	7.0E+00	
		Co-60	(946 ± 54)E-03	67 E-03	7.0E+00	B
		Zn-65	(1086 ± 82)E-03	17 E-02	7.0E+00	B
		Nb-94	(-44 ± 25)E-03	11 E-02	2.0E-03	C
		Zr-95	(-6 ± 38)E-03	16 E-02	7.0E+00	
		Nb-95	(12 ± 25)E-03	10 E-02	7.0E+00	
		Ru-103	(18 ± 22)E-03	90 E-03	7.0E+00	
		Ru-106	(-6 ± 19)E-02	79 E-02	7.0E+00	
		Ag-108m	(5 ± 19)E-03	77 E-03	7.0E+00	
		Ag-110m	(34 ± 33)E-03	14 E-02	7.0E+00	
		Sb-124	(29 ± 23)E-03	84 E-03	7.0E+00	
		Sb-125	(4 ± 58)E-03	24 E-02	7.0E+00	
		Cs-134	(350 ± 24)E-03	75 E-03	7.0E+00	B
		Cs-137	(995 ± 59)E-03	75 E-03	1.0E-02	B
		Ba-140	(8 ± 14)E-02	56 E-02		
		La-140	(334 ± 38)E-03	13 E-02		B
		Ce-141	(62 ± 55)E-03	21 E-02	7.0E+00	
		Ce-144	(-50 ± 19)E-02	72 E-02	7.0E+00	

Note(s):

A - Calculated MDCs are a-posteriori values.
B - Results are statistically positive at the 99.9% confidence level (activity is greater than three times the standard deviation).
C - Required MDC is for activated metal.

Reviewed by

E.M. Moreno

E. M. Moreno

James C. Murray

MAILED

APR 30 1992

YANKEE ATOMIC ELECTRIC COMPANY ENVIRONMENTAL LABORATORY

10 CFR Part 50/61 Analysis Report

Laboratory Sample Number: Z03031 #
Sample Submission Code: VRE\$05A0992
Media Type: Resin
Total Amt of Sample Sent: 0.174 g

Customer: Vermont Yankee
Sample Reference Date: February 26, 1992
Date Sample Received: March 5, 1992
Report Date: April 29, 1992

Sample Description: CONDENSATE RESIN "A"

Analysis Requested	Aliquot Weight Processed [g]	Analysis Date	Activity Concentration ± 1σ Overall on Reference Date [µCi/g]	Minimum Detectable Concentration (A) on Reference Date CALCULATED [µCi/g]	REQUIRED [µCi/g]	Note(s)
H-3	1.4200E-03	04/10/92	(31 ± 10)E-04	17 E-04	4.0E-01	B
C-14	1.6600E-02	03/28/92	(74 ± 13)E-05	34 E-05	8.0E-02	B
Fe-55	1.9600E-03	03/18/92	(396 ± 33)E-03	45 E-04	7.0E+00	B
Ni-59	7.7000E-04	03/25/92	(21 ± 47)E-05	16 E-04	2.2E+00	C
Ni-63	1.0000E+03	03/23/92	(884 ± 82)E-04	89 E-04	3.5E-02	B
Sr-89	1.9600E-03	04/02/92	(190 ± 13)E-03	56 E-04		B
Sr-90	1.9600E-03	04/02/92	(427 ± 32)E-04	30 E-04	4.0E-04	B
Tc-99	1.3700E-03	04/23/92	(1 ± 12)E-04	38 E-04	3.0E-02	
Np-237	1.9800E-03	03/18/92	(-191 ± 90)E-06	53 E-05	1.0E-03	
Pu-238	1.9600E-03	03/17/92	(17 ± 10)E-06	20 E-06	1.0E-03	
Pu-239,240	1.9600E-03	03/17/92	(118 ± 80)E-07	18 E-06	1.0E-03	
Pu-241	6.5000E-04	04/07/92	(41 ± 29)E-04	91 E-04	3.5E-02	
Am-241	1.9600E-03	03/16/92	(8 ± 17)E-06	53 E-06	1.0E-03	
Cm-242	1.9600E-03	03/16/92	(-16 ± 90)E-07	35 E-06	2.0E-01	
Cm-243,244	1.9600E-03	03/16/92	(-125 ± 89)E-08	26 E-06	1.0E-03	
I-129	1.0800E-02	04/10/92	(101 ± 71)E-06	29 E-05	8.0E-04	

Note(s):

A - Calculated MDCs are a-posteriori values.
B - Results are statistically positive at the 99.9% confidence level (activity is greater than three times the standard deviation).
C - Required MDC is for activated metal.

Reviewed by

E. M. Moreno

James C. Murray

- Updated to include all requested 10 CFR 61 analyses.

MAILED

APR 30 1992

YANKEE ATOMIC ELECTRIC COMPANY ENVIRONMENTAL LABORATORY

10 CFR Part 50/61 Analysis Report

Laboratory Sample Number: Z03031
Sample Submission Code: VRES05A099Z
Media Type: Resin
Total Amt of Sample Sent: 0.174 g

Customer: Vermont Yankee
Sample Reference Date: February 26, 1992
Date Sample Received: March 5, 1992
Count Date: March 9, 1992
Report Date: April 29, 1992

Sample Description: CONDENSATE RESIN "A"

Analysis Requested	Aliquot Weight Processed [g]	Isotope	Activity Concentration ± 1σ Overall on Reference Date [µCi/g]	Minimum Detectable Concentration (A) on Reference Date CALCULATED [µCi/g]	REQUIRED [µCi/g]	Note(s)
Gamma Scan	0.0387	Cr-51	(8 ± 17)E-02	67 E-02		
		Mn-54	(86 ± 15)E-03	52 E-03	7.0E+00	B
		Co-57	(-4 ± 15)E-03	59 E-03	7.0E+00	
		Co-58	(-29 ± 20)E-03	84 E-03	7.0E+00	
		Fe-59	(8 ± 42)E-03	18 E-02	7.0E+00	
		Co-60	(556 ± 33)E-03	56 E-03	7.0E+00	B
		Zn-65	(432 ± 48)E-03	15 E-02	7.0E+00	B
		Nb-94	(-1 ± 18)E-03	74 E-03	2.0E-03	C
		Zr-95	(15 ± 29)E-03	12 E-02	7.0E+00	
		Nb-95	(-11 ± 21)E-03	90 E-03	7.0E+00	
		Ru-103	(16 ± 17)E-03	67 E-03	7.0E+00	
		Ru-106	(0 ± 15)E-02	60 E-02	7.0E+00	
		Ag-108m	(-12 ± 15)E-03	60 E-03	7.0E+00	
		Ag-110m	(-60 ± 27)E-03	12 E-02	7.0E+00	
		Sb-124	(43 ± 21)E-03	84 E-03	7.0E+00	
		Sb-125	(-35 ± 45)E-03	18 E-02	7.0E+00	
		Cs-134	(166 ± 14)E-03	58 E-03	7.0E+00	B
		Cs-137	(444 ± 30)E-03	55 E-03	1.0E-02	B
		Ba-140	(23 ± 10)E-02	39 E-02		
		La-140	(220 ± 30)E-03	14 E-02		B
		Ce-141	(71 ± 35)E-03	14 E-02	7.0E+00	
		Ce-144	(-23 ± 12)E-02	47 E-02	7.0E+00	

Note(s):

A - Calculated MDCs are a-posteriori values.
B - Results are statistically positive at the 99.9% confidence level (activity is greater than three times the standard deviation).
C - Required MDC is for activated metal.

Reviewed by

E. M. Moreno

James C. Murray

MEMORANDUM

To: Distribution September 8, 1992
From: D. Voland D. Voland Vernon

Subject: Offsite Dose Calculations - August 1992

Attached is a copy of the offsite doses calculated for the month of August 1992. If you have any questions concerning this information, please contact me at your earliest convenience.

copy with attachments:

J.T. Herron
R.D. Pagodin
J.T. McCarthy
S.P. Skibniowsky
M.S. Strum (YNSD-Bolton)
G.D. Weyman
Chemistry Correspondence Files
Chemistry Completed Forms Files

TOTAL BODY AND MAXIMUM ORGAN DOSES FROM LIQUID RADWASTE RELEASES

MONTH AUG.
YEAR 1992

Radionuclide	Curies Released	X	Total Body Dose Factor	=	(2A) mRem:	(then Ci) X	Max. Organ Dose Factor	=	(2B) mRem
H-3	4.02E-5	X	2.06E-04	=	8.28E-9		X 2.06E-04	=	8.28E-9
Na-24		X	3.38E-02	=			X 3.38E-02	=	
Cr-51		X	3.10E-04	=			X 6.96E-02	=	
Mn-54		X	2.08E-01	=			X 3.00E+00	=	
Mn-56		X	8.53E-06	=			X 5.29E-03	=	
Fe-59		X	2.49E-01	=			X 1.84E+00	=	
Co-58		X	5.97E-02	=			X 4.34E-01	=	
Co-60		X	2.13E-01	=			X 1.28E+00	=	
Zn-64		X	8.06E+00	=			X 1.64E+01	=	
Sr-89(1)	<2.14E-7	X	2.55E-01	=	<5.46E-8		X 8.91E+00	=	<1.91E-6
Sr-90(1)	<1.78E-8	X	4.23E+01	=	<7.53E-7		X 1.67E+02	=	<2.97E-6
Zr-95		X	4.21E-04	=			X 1.36E-01	=	
Mo-99		X	4.79E-03	=			X 4.51E-02	=	
Tc-99m	1.26E-7	X	5.04E-06	=	6.35E-13		X 2.33E-04	=	2.94E-11
Sb-124		X	8.44E-03	=			X 2.22E-01	=	
I-131	3.46E-6	X	2.57E-02	=	8.89E-8		X 1.47E+01	=	5.09E-5
I-132	1.58E-6	X	3.10E-06	=	4.90E-12		X 1.29E-04	=	2.04E-10
I-133	6.63E-6	X	3.31E-03	=	2.19E-8		X 1.63E+00	=	1.08E-5
I-135	7.27E-6	X	3.16E-04	=	2.30E-9		X 5.90E-02	=	4.29E-7
Cs-134		X	1.28E+02	=			X 1.60E+02	=	
Cs-137		X	7.58E+01	=			X 1.21E+02	=	
Ba-140	1.17E-6	X	4.08E-03	=	4.77E-9		X 9.72E-02	=	1.14E-7
Ce-141	2.39E-7	X	2.31E-05	=	5.52E-12		X 4.10E-02	=	9.80E-9
W-187		X	1.18E-02	=			X 8.90E+00	=	

D^{liq}_{tb} = (SUM) = <9.35E-7 mRem(3A)

D^{liq}_{mo} = (SUM) = <6.72E-5 mRem(3B)

(1) Use most recent data available for Sr-89 and Sr-90.
(2A) T.S. 3.8.B.1 Limits: 1.5 mRem in any quarter, 3.0 mRem per year. (See also 3.8.C.1 and 3.8.M.1.)
(3A) ODCM EQ 3-1.

(2B) T.S. 3.8.B.1 Limits: 5 mRem in any quarter, 10 mRem per year.
(3B) ODCM EQ 3-3

Reviewed By [signature]

VYOPF 4609.01
OP 4609 Rev. 8
Page 1 of 1
RT No. 11.F01.163

MONTH AUG.

BETA AND GAMMA AIR DOSES FROM NOBLE GASES - TURBINE BUILDING VENTILATION* YEAR 1992

Radionuclide	Curies Released	X	Beta Dose Factor	=	(1A) mRad:	(then Ci) X	Gamma Dose Factor	=	(1B) mRad
Ar-41		X	3.28E-3	=			X 9.30E-3	=	
Kr-83m		X	2.88E-4	=			X 1.93E-5	=	
Kr-85m	2.45E-2	X	1.97E-3	=	4.83E-5		X 1.23E-3	=	3.01E-5
Kr-85		X	1.95E-3	=			X 1.72E-5	=	
Kr-87	1.81E-1	X	1.03E-2	=	1.87E-3		X 6.17E-3	=	1.12E-3
Kr-88	9.23E-2	X	2.93E-3	=	2.70E-4		X 1.52E-2	=	1.40E-3
Xe-131m		X	1.11E-3	=			X 1.56E-4	=	
Xe-133m		X	1.48E-3	=			X 3.27E-4	=	
Xe-133	1.02E-2	X	1.05E-3	=	1.08E-5		X 3.53E-4	=	3.62E-6
Xe-135m	1.01E0	X	7.39E-4	=	7.43E-4		X 3.36E-3	=	3.38E-3
Xe-135	1.47E-1	X	2.46E-3	=	3.62E-4		X 1.92E-3	=	2.83E-4
Xe-137		X	1.27E-2	=			X 1.51E-3	=	
Xe-138	4.37E0	X	4.75E-3	=	2.07E-2		X 9.21E-3	=	4.02E-2

D^{β}_{airg} = 0.55 X (SUM) 2.40E-2 =

D^{β}_{airg} = 1.32E-2 mRad(2A)

D^{γ}_{airg} = 0.13 X (SUM) 4.64E-2 =

D^{γ}_{airg} = 6.04E-3 mRad(2B)

(1A) T.S.3.8.F.1 Limit = 10 mRad any quarter, 20 mRad per year.
(2A) ODCM EQ 3-43.

(1B) T.S.3.8.F.1 Limit = 5 mRad any quarter, 10 mRad per year.
(2B) ODCM EQ 3-41.

Reviewed By [signature]

MEMORANDUM

VERMONT YANKEE - VERNON

To File Date October 14, 1992

From Deborah Voland D. Voland

Subject REVISION OF AUGUST 1992 DOSE CALCULATIONS

Enclosed are 2 pages from the monthly dose calculations from August that have been revised. The revision of the "Beta and Gamma Air Doses from Noble Gases - Turbine Building Ventilation" was due to a minor error caused by unfamiliarity in using the spreadsheet designed to perform the calculation when the doses were calculated by someone filling in for me when I was on vacation. The other revision is the result of calculating values for Sr-89 and Sr-90 for the liquid release that occurred in August. The values were derived from the LLD levels of the Turbine Sump sample and the scaling factors typical in the associated waste stream.

EVALUATION OF TBCCW SUMP RELEASE PATHWAY - 8/14/92

Calculations Assumptions

The TBCCW sump pump is rated at 200 gpm. The worst case scenario is that this sump ran for one hour while radioactive liquid from the backwash receiving tank was overflowing onto the floor and leaking into the sump.

The one hour duration was based upon the fact that the SW rad monitor alarm came in high at 1338 and the TBCCW clean sump was secured at 1430.

Chemistry technicians sampled the clean sump at 1410 and the TBCCW area floor at 1405. Isotopic analyses of both the floor and the sump are attached. A tritium analysis was performed on the sump sample and found to be 1.06E-5 uci/ml at 1410.

Only ~~four~~ Five radionuclides were identified in the clean sump(I-131, I-132, I-133, I-134 and I-135) probably due to the shorter count time of this sample. Therefore, the floor sample data was used to extrapolate the probable concentrations of all identified radionuclides possible in the sump sample. This ratio was set at 600 to 1 based upon the worst case radioiodine ratio.

Nuclide	Activity (µCi/ml) in Sump
I-131	9.13 E-7
I-132	4.19 E-7
I-133	1.75 E-6
I-134	2.80 E-7
I-135	1.92 E-6
H-3	1.06 E-5

Tc-99m	1.995E-5/600	= 3.33 E-8	Calculated activity based on 1:600 dilution between activity on floor and activity in the sump.
Sr-91	2.034E-4/600	= 3.39 E-7	
Sr-92	6.188E-5/600	= 1.03 E-7	
Y-91m	1.236E-4/600	= 2.06 E-7	
Ru-106	2.509E-4/600	= 4.18 E-7	
Ba-139	3.536E-4/600	= 5.89E-7	
Ba-140	1.853E-4/600	= 3.09 E-7	
La-140	1.473E-4/600	= 2.46 E-7	
Ce-141	3.788E-5/600	= 6.31 E-8	

Xe-135	2.131E-7		
Xe-135m	8.495E-7		
Xe-131m	5.739E-4/~~400~~ 600	= ~~1.43 E-6~~ 9.57E-7	Calculated activity based on 1:600 dilution as above
Xe-133	7.835E-5/~~400~~ 600	= ~~1.96 E-7~~ 1.31E-7	

Service Water Discharge	= 10,000 gpm
Circ Water Discharge	= 360,000 gpm
IBCCW Clean Sump Discharge	= 200 gpm

$\frac{200}{370,000}$ = dilution factor of 5.4 E-4

Nuclide activity x 5.4 E-4 = activity at discharge structure (ADS)

ADS µCi/ml		MPC	Fraction of MPC
-131	4.93 E-10	3 E-7	1.64 E-3
-132	2.26 E-10	8 E-6	2.83 E-5
-133	9.45 E-10	1 E-6	9.45 E-4
-134	1.51 E-10	2 E-5	7.55 E-6
-135	1.04 E-9	4 E-6	2.53 E-4
-3	5.72 E-9	3 E-3	1.91 E-6
c-99m	1.80 E-11	6 E-3	3.00 E-9
r-91	1.83 E-10	7 E-5	2.61 E-6
Sr-92	5.56 E-11	7 E-5	7.94 E-7
Y-91m	1.11 E-10	3 E-3	3.70 E-8
u-106	2.26 E-10	1 E-5	2.26 E-5
Ba-140	1.67 E-10	2 E-5	8.35 E-6
a-140	1.33 E-10	2 E-5	6.65 E-6
e-141	3.41 E-11	9 E-5	3.79 E-7
			2.92 E-3 MPC's

Entrained/Dissolved Gases

Ke-135	1.15 E-10
Ke-135m	4.59 E-10
Ke-131m	5.17 E-10
Xe-133	7.07 E-11
	1.16 E-9 µCi/ml noble gases at Discharge Structure

ech. Spec. Limit is 2 x 10-4 µCi/ml total activity concentration for all dissolved or entrained noble gases.

10CFR50.72 Reporting Limit - 2x MPC averaged over one hour.

Reviewed + Approved [illegible]
8/17/92

Nuclide	Activity(μCi/ml) in Sump	Ci released
I-131	9.13 E-7	4.15 E-5
I-132	4.19 E-7	1.90 E-5
I-133	1.75 E-6	7.95 E-5
I-134	2.80 E-7	1.27 E-5
I-135	1.92 E-6	8.72 E-5
H-3	1.06 E-5	4.82 E-4
Tc-99m	3.33 E-8	1.51 E-6
Ba-140	3.09 E-7	1.40 E-5
Ce-141	6.31 E-8	2.87 E-6

$$\text{Activity}(\mu Ci/ml) \times 200\,gpm \times 3.785\,\frac{cc}{gal} \times 60\,min \times \frac{Ci}{10^6\,\mu Ci} = \text{Ci released}$$

TOTAL BODY AND MAXIMUM ORGAN DOSES FROM LIQUID RADWASTE RELEASES

MONTH_____
YEAR_____

Radionuclide	Curies Released	X	Total Body Dose Factor	=	(2A) mRem:	(then Ci) X	Max. Organ Dose Factor	=	(2B) mRem
H-3	4.82E-4	X	2.06E-04	=	9.93E-8		X 2.06E-04	=	9.93E-8 *
Na-24		X	3.38E-02	=			X 3.38E-02	=	
Cr-51		X	3.10E-04	=			X 6.96E-02	=	
Mn-54		X	2.08E-01	=			X 3.00E+00	=	
Mn-56		X	8.53E-06	=			X 5.29E-03	=	
Fe-59		X	2.49E-01	=			X 1.84E+00	=	
Co-58		X	5.97E-02	=			X 4.34E-01	=	
Co-60		X	2.13E-01	=			X 1.28E+00	=	
Zn-64		X	8.06E+00	=			X 1.64E+01	=	
Sr-89(1)		X	2.55E-01	=			X 8.91E+00	=	
Sr-90(1)		X	4.23E+01	=			X 1.67E+02	=	
Zr-95		X	4.21E-04	=			X 1.36E-01	=	
Mo-99		X	4.79E-03	=			X 4.51E-02	=	
Tc-99m	1.51E-6	X	5.04E-06	=	7.61E-12		X 2.33E-04	=	~~1.17E-9~~ 3.52E-10
Sb-124		X	8.44E-03	=			X 2.22E-01	=	
I-131	4.15E-5	X	2.57E-02	=	1.07E-6		X 1.47E+01	=	6.10E-4
I-132	1.90E-5	X	3.10E-06	=	5.89E-11		X 1.29E-04	=	2.45E-9
I-133	7.95E-5	X	3.31E-03	=	2.63E-7		X 1.63E+00	=	1.30E-4
I-135	8.72E-5	X	3.16E-04	=	2.76E-8		X 5.90E-02	=	5.15E-6
Cs-134		X	1.28E+02	=			X 1.60E+02	=	
Cs-137		X	7.58E+01	=			X 1.21E+02	=	
Ba-140	1.40E-5	X	4.08E-03	=	5.71E-8		X 9.72E-02	=	1.36E-6
Ce-141	2.87E-6	X	2.31E-05	=	6.63E-11		X 4.10E-02	=	1.18E-7
W-187		X	1.18E-02	=			X 8.90E+00	=	

D_{tb}^{liq} = (SUM) = 1.52E-6 mRem(3A)

D_{mo}^{liq} = (SUM) = 7.47E-4 mRem(3B)

(1) Use most recent data available for Sr-89 and Sr-90.
(2A) T.S. 3.8.B.1 Limits: 1.5 mRem in any quarter, 3.0 mRem per year. (See also 3.8.C.1 and 3.8.M.1.)
(3A) ODCM EQ 3-1.

(2B) T.S. 3.8.B.1 Limits: 5 mRem in any quarter, 10 mRem per year.
(3B) ODCM EQ 3-3

Reviewed By_____

page 5

VYOPF 4609.01
OP 4609 Rev. 8
Page 1 of 1
RT No. 11.F01.163

```
*****************      14-AUG-92 15:01:15      *****************
*************************************************************

 VERMONT YANKEE NUCLEAR POWER CORPORATION

SAMPLE DATE..........:  14-AUG-92 14:10:00
SAMPLE IDENTIFICATION:  TB CLEAN SUMP
TYPE OF SAMPLE.......:  LIQUID MARINELLI
SAMPLE QUANTITY......:  1000.000        UNITS:  ML
SAMPLE GEOMETRY......:  VY2005
OPERATOR.............:  SCM
EFFICIENCY FILE NAME.:  EFF.VY2005,,
*************************************************************
                                     *
ACQUIRE DATE: 14-AUG-92 14:24:21     * FWHM(1332)          1.867
PRESET TIME(LIVE):      2000. SEC    * SENSITIVITY:        5.000
ELAPSED REAL TIME:      2001. SEC    * SHAPE PARAMETER :  10.0 %
ELAPSED LIVE TIME:      2000. SEC    * NBR ITERATIONS:    10.
*************************************************************
                                     *
DETECTOR..:  20% HPGE                * LIBRARY          NUCL .LIB1
CALIB DATE:  14-AUG-92 00:56:29      * ENERGY TOLERANCE   1.500KV
KEV/CHNL..:  0.5001629               * HALF LIFE RATIO      8.00
OFFSET....: -0.1059622 KEV           * ABUNDANCE LIMIT    80.00%
Q. COEFF..:  0.000E-01 KEV/C**2      * DECAY TIME (MIN)      14.0
*************************************************************
```

1st sample after spill, longer count time

ENERGY WINDOW 24.90 TO 2048.56
1.00-SIGMA %ERR

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	0	249.91	264.	425.	1.21	499.87	494	12	1.32E-01	17.3	
2	0	284.07	71.	228.	1.45	568.17	565	8	3.56E-02	40.7	
3	0	364.45	826.	167.	1.26	728.88	724	9	4.13E-01	4.6	
4	0	417.86	86.	125.	1.11	835.67	829	12	4.28E-02	30.0	
5	0	511.04	3455.	168.	2.53	1021.96	1014	22	1.73E 00	2.0	
6	2	526.51	158.	54.	1.53	1052.88	1049	17	7.88E-02	10.8	1.36E 00
7	2	529.91	1239.	45.	1.33	1059.68	1049	17	6.19E-01	3.0	
8	0	546.81	84.	43.	1.49	1093.49	1089	12	4.20E-02	20.2	
9	0	637.41	37.	38.	1.27	1274.62	1268	10	1.86E-02	38.0	
10	0	667.81	240.	37.	1.53	1335.40	1329	15	1.20E-01	9.0	
11	0	772.69	146.	16.	1.75	1545.09	1538	13	7.28E-02	11.5	
12	0	836.86	53.	22.	2.11	1673.38	1668	11	2.65E-02	24.3	
13	0	847.23	61.	52.	1.13	1694.12	1687	14	3.03E-02	27.2	
14	0	875.46	58.	18.	1.32	1750.57	1743	15	2.90E-02	20.8	
15	0	884.18	62.	19.	1.01	1768.00	1763	11	3.08E-02	20.8	
16	0	953.99	30.	18.	1.74	1907.56	1902	11	1.50E-02	40.4	
17	0	1038.59	76.	26.	1.87	2076.71	2069	17	3.80E-02	20.6	
18	0	1131.46	132.	9.	1.70	2262.40	2258	10	6.58E-02	10.1	
19	0	1260.30	195.	4.	1.51	2519.99	2511	18	9.73E-02	8.0	
20	0	1298.49	13.	9.	1.42	2596.36	2592	10	6.52E-03	52.6	
21	0	1457.57	80.	0.	2.44	2914.40	2905	22	4.00E-02	13.1	
22	0	1677.60	50.	0.	1.86	3354.32	3348	15	2.50E-02	14.1	
23	0	1790.53	42.	4.	1.75	3580.10	3573	13	2.11E-02	19.4	

PEAK SEARCH COMPLETED (REV 15.7)

SUMMARY OF NUCLIDE ACTIVITY

TOTAL PEAKS IN SPECTRUM 23
UNIDENTIFIED PEAKS 9
IDENTIFIED, IN SUMMARY REPORT 14 60.87%

FISSION GAS

NUCLIDE	SBHR	HLIFE	DECAY	UCI /UNIT	1.00-SIGMA ERROR	1.00-SIGMA %ERR
XE-135	FG	9.08H	1.040	2.131E -7	3.690E -8	17.32
XE-135M	FG	15.65M	3.614	8.495E -7	9.141E -8	10.76

FISSION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /UNIT	1.00-SIGMA ERROR	1.00-SIGMA %ERR
I-131	FP	8.04D	1.002	9.131E -7	4.185E -8	4.58
I-132	FP	2.30H	1.167	4.189E -7	3.750E -8	8.95
I-133	FP	20.80H	1.017	1.753E -6	5.285E -8	3.02
I-134	FP	52.60M	1.493	2.799E -7	5.830E -8	20.83
I-135	FP	6.61H	1.056	1.920E -6	1.527E -7	7.96

```
*****************      14-AUG-92 14:20:22      *****************
*****************************************************************

 VERMONT YANKEE NUCLEAR POWER CORPORATION

SAMPLE DATE..........:  14-AUG-92 14:05:00
SAMPLE IDENTIFICATION:  TB 222 SPILL
TYPE OF SAMPLE.......:  23ML SCINT. VIAL
SAMPLE QUANTITY......:  23.00000        UNITS:  ML
SAMPLE GEOMETRY......:  VY2004
OPERATOR.............:  GR
EFFICIENCY FILE NAME.:  EFF.VY2004,,
*****************************************************************
                                        *
ACQUIRE DATE: 14-AUG-92 14:11:45        * FWHM(1332)          1.867
PRESET TIME(LIVE):      500. SEC        * SENSITIVITY:        5.000
ELAPSED REAL TIME:      508. SEC        * SHAPE PARAMETER :  10.0 %
ELAPSED LIVE TIME:      500. SEC        * NBR ITERATIONS:    10.
*****************************************************************
                                        *
DETECTOR..:  20% HPGE                   * LIBRARY          NUCL .LIB1
CALIB DATE:  14-AUG-92 00:56:04         * ENERGY TOLERANCE   1.500KV
KEV/CHNL..:  0.5001629                  * HALF LIFE RATIO      8.00
OFFSET....: -0.1059622 KEV              * ABUNDANCE LIMIT    80.00%
Q. COEFF..:  0.000E-01 KEV/C**2         * DECAY TIME (MIN)       6.0
*****************************************************************
```

From floor near elevator

ENERGY WINDOW 24.90 TO 2048.56
1.00-SIGMA %ERR

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	0	80.30	1079.	3153.	1.52	160.75	155	12	2.16E 00	10.9	
2	0	140.56	643.	2543.	0.94	281.24	277	9	1.29E 00	14.7	
3	0	145.55	671.	1928.	1.13	291.21	288	7	1.34E 00	11.6	
4	6	162.74	372.	1985.	1.13	325.59	322	15	7.44E-01	20.5	1.49E 00
5	6	165.88	1891.	1654.	1.04	331.86	322	15	3.78E 00	4.1	
6	0	220.46	432.	2262.	1.15	440.98	437	8	8.64E-01	19.5	
7	0	249.77	4786.	2705.	1.12	499.59	494	11	9.57E 00	2.6	
8	5	284.27	752.	1685.	1.13	568.58	562	20	1.50E 00	9.7	6.33E-01
9	5	288.46	596.	1775.	1.12	576.94	562	20	1.19E 00	12.2	
10	0	328.80	433.	2218.	1.00	657.60	654	8	8.66E-01	19.6	
11	0	364.49	8637.	2304.	1.19	728.94	722	14	1.73E 01	1.6	
12	0	417.86	563.	1040.	1.21	835.66	832	11	1.13E 00	12.2	
13	0	423.50	156.	855.	1.01	846.94	842	9	3.11E-01	34.4	
14	0	434.28	204.	1498.	4.49	868.48	862	16	4.08E-01	44.0	
15	0	487.07	933.	998.	1.27	974.03	968	13	1.87E 00	7.7	
16	0	511.00	28700.	2006.	2.62	1021.88	1014	19	5.74E 01	0.7	
17	2	522.60	399.	414.	1.29	1045.07	1042	24	7.98E-01	9.2	1.78E 00
18	2	526.62	2118.	599.	1.43	1053.11	1042	24	4.24E 00	3.1	
19	2	529.92	13207.	448.	1.31	1059.70	1042	24	2.64E 01	0.9	
20	0	537.21	537.	636.	1.25	1074.28	1069	11	1.07E 00	10.4	
21	0	546.52	821.	464.	1.33	1092.90	1088	10	1.64E 00	6.2	
22	0	555.57	1134.	546.	1.30	1110.99	1105	12	2.27E 00	5.1	
23	0	595.47	194.	416.	1.39	1190.76	1186	10	3.87E-01	21.7	

ENERGY WINDOW 24.90 TO 2048.56
1.00-SIGMA %ERR

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	FW	CTS/SEC	%ERR	FIT
24	0	621.60	249.	579.	1.83	1243.01	1237	13	4.98E-01	21.8	
25	0	630.29	351.	595.	1.27	1260.38	1254	13	7.03E-01	15.7	
26	0	637.08	355.	428.	1.40	1273.95	1269	10	7.10E-01	12.6	
27	0	652.91	114.	344.	1.18	1305.61	1303	7	2.28E-01	29.8	
28	0	667.67	2190.	792.	1.39	1335.12	1327	16	4.38E 00	3.6	
29	7	677.47	93.	272.	1.21	1354.71	1351	13	1.85E-01	31.9	1.53E 00
30	7	679.90	76.	291.	1.21	1359.58	1351	13	1.51E-01	38.9	
31	0	707.04	251.	356.	1.75	1413.83	1409	11	5.03E-01	16.4	
32	0	722.98	129.	330.	1.65	1445.71	1440	11	2.57E-01	28.6	
33	0	728.08	101.	439.	4.73	1455.90	1451	14	2.03E-01	45.6	
34	0	749.99	469.	437.	1.66	1499.70	1494	15	9.38E-01	10.7	
35	0	772.67	1371.	314.	1.59	1545.05	1540	11	2.74E 00	3.8	
36	0	816.00	262.	378.	1.52	1631.68	1628	11	5.24E-01	15.9	
37	0	836.91	502.	260.	1.64	1673.49	1669	11	1.00E 00	7.8	
38	0	847.05	1290.	365.	1.62	1693.77	1685	16	2.58E 00	4.4	
39	0	856.82	203.	306.	1.69	1713.28	1707	13	4.06E-01	19.4	
40	0	875.28	477.	286.	1.60	1750.21	1745	12	9.54E-01	8.7	
41	0	884.26	836.	306.	1.60	1768.15	1762	13	1.67E 00	5.8	
42	0	925.78	97.	322.	1.46	1851.17	1843	13	1.95E-01	41.4	
43	0	954.31	350.	271.	1.95	1908.21	1900	16	6.99E-01	12.1	
44	0	973.39	136.	363.	3.37	1946.35	1940	15	2.71E-01	31.6	
45	0	1024.33	393.	232.	1.71	2048.20	2043	12	7.86E-01	9.8	
46	0	1038.71	552.	323.	1.85	2076.96	2068	15	1.10E 00	8.3	
47	0	1072.91	150.	178.	1.63	2145.33	2139	13	3.00E-01	20.6	
48	0	1101.64	168.	189.	2.25	2202.78	2195	17	3.35E-01	22.3	
49	0	1123.98	220.	229.	1.34	2247.44	2240	15	4.40E-01	17.5	
50	2	1131.61	1273.	124.	1.75	2262.70	2257	21	2.55E 00	3.4	1.81E 00
51	2	1136.11	165.	127.	2.09	2271.69	2257	21	3.31E-01	19.5	
52	0	1237.85	200.	220.	5.48	2475.11	2463	22	4.00E-01	21.5	
53	0	1260.56	1670.	128.	1.81	2520.50	2514	15	3.34E 00	2.9	
54	0	1298.36	154.	165.	1.98	2596.09	2590	13	3.08E-01	19.6	
55	0	1384.30	239.	91.	1.68	2767.91	2761	13	4.78E-01	10.5	
56	0	1398.81	88.	69.	0.78	2796.92	2793	10	1.76E-01	23.1	
57	0	1457.50	440.	155.	2.05	2914.27	2906	19	8.80E-01	8.4	
58	0	1502.24	36.	77.	1.56	3003.72	2996	14	7.28E-02	54.5	
59	0	1566.36	42.	53.	1.11	3131.90	3128	11	8.31E-02	36.6	
60	0	1596.33	552.	38.	1.97	3191.84	3184	17	1.10E 00	5.0	
61	0	1678.22	436.	42.	1.75	3355.57	3349	14	8.71E-01	5.9	
62	0	1706.72	173.	33.	1.52	3412.54	3405	16	3.46E-01	11.3	
63	0	1791.32	369.	11.	1.97	3581.69	3574	15	7.38E-01	5.9	
64	0	1808.01	46.	21.	2.23	3615.05	3606	18	9.16E-02	31.5	
65	0	1831.43	23.	5.	0.61	3661.87	3659	9	4.61E-02	33.1	

PEAK SEARCH COMPLETED (REV 15.7)

SUMMARY OF NUCLIDE ACTIVITY

TOTAL PEAKS IN SPECTRUM 65
UNIDENTIFIED PEAKS 31
IDENTIFIED IN SUMMARY REPORT 34 52.31%

Floor Sample

FISSION GAS

NUCLIDE	SBHR	HLIFE	DECAY	UCI /UNIT	1.00-SIGMA ERROR	1.00-SIGMA %ERR
XE-131M	FG	11.90D	1.000	5.739E -4	1.176E -4	20.50
XE-133	FG	5.25D	1.001	7.835E -5	8.579E -6	10.95
XE-135	FG	9.08H	1.014	2.349E -4	6.013E -6	2.56
XE-135M	FG	15.65M	1.617	3.579E -4	1.102E -5	3.08

FISSION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /UNIT	1.00-SIGMA ERROR	1.00-SIGMA %ERR
TC-99M	FP	6.02H	1.021	1.995E -5	2.934E -6	14.71
I-131	FP	8.04D	1.001	6.398E -4	1.019E -5	1.59
I-132	FP	2.30H	1.057	2.487E -4	8.926E -6	3.59
I-133	FP	20.80H	1.006	1.296E -3	1.191E -5	0.92
I-134	FP	52.60M	1.155	2.216E -4	1.286E -5	5.81
I-135	FP	6.61H	1.019	1.220E -3	3.537E -5	2.90
SR-91	FP	9.50H	1.013	2.034E -4	1.991E -5	9.79
SR-92	FP	2.71H	1.048	6.188E -5	6.479E -6	10.47
Y-91M	FP	49.71M	1.165	1.236E -4	6.291E -6	5.09
RU-106	FP	368.20D	1.000	2.509E -4	5.458E -5	21.75
BA-139	FP	82.71M	1.096	3.536E -4	1.458E -5	4.12
BA-140	FP	12.79D	1.000	1.853E -4	1.934E -5	10.44
LA-140	FP	40.22H	1.003	1.473E -4	7.407E -6	5.03
CE-141	FP	32.00D	1.000	3.768E -5	4.407E -6	11.64

POTENTIAL REPORTABLE OCCURENCE

Description of Event / Condition / Pertinent Information : (Include cause if know and corrective actions taken)

On August 14, 1992 at approximately 1330 the condensate demineralizer backwash receiving tank overflowed and covered the TBCCW area floor with radioactively contaminated water and resin to a level of 1-2 inches. A sample taken from the clean sump indicated the presence of statistically significant iodine activity. Since the sump pumps were on at the time, some of this activity may have been discharged to the river. Operations was requested isolate the sump pumps; absorbent material was placed around the sump to prevent further contaminated material from getting into the sump.

1510

Originator: Richard Cordes 8/14/92

Plant Conditions Effecting Event: While an operator was backwashing the B condensate demineralizer and transfering to the condensate demineralizer backwash receiving tank, the pump which transfers water from the tank to radwaste failed causing the backwash receiving tank to overflow.

Notifications / Reviews: (Check all blocks that apply)

NRC	AP 3125	State	Other
[ ] 1 Hour [ ] 4 Hour [ ] Other	[ ] EAL _____	[ ] Notification Made [ ] Corp. Responsibility	[ ] DCO Notified [ ] Resident Insp Notified [ ] Log Entry Made [ ] Other

Comments:

Shift Supervisor: _____ / _____

[ ] Not Reportable	[ ] 20.405 (a)(1)(i)	[ ] 50.36 (c)(2)	[ ] 50.73 (a)(2)(iv)	[ ] 50.73 (a)(2)(viii)(B)
[ ] NPDES	[ ] 20.405 (a)(1)(ii)	[ ] 50.73 (a)(2)(i)	[ ] 50.73 (a)(2)(v/vi)	[ ] 50.73 (a)(2)(x)
[ ] Fire Report	[ ] 20.405 (a)(1)(iii)	[ ] 50.73 (a)(2)(ii)	[ ] 50.73 (a)(2)(vii)	[ ] 73.71 (b)
[ ] 50.9	[ ] 20.405 (a)(1)(iv)	[ ] 50.73 (a)(2)(iii)	[ ] 50.73 (a)(2)(viii)(A)	[ ] 73.71 (c)
[ ] Part 21	[ ] 20.405 (a)(1)(v)			
[ ] 20.402 (b)	[ ] 20.405 (c)			
[ ] 40.302	[ ] 50.36 (c)(1)			
[ ] Other _____				

ESS: _____ / _____

Comments / Evaluation :

Agree / Disagree with ESS Evaluation

Comments:

TSS: _____ / _____

Additional Corrective Action Process Required:

Sig. CAR [ ] Routine CAR [ ] NCR [ ] None [ ]

Due Date _____

Agree / Disagree with TSS Recommendation

PM : _____ / _____

Comments / Other Actions Desired :

If event is reportable, submit copy of PRO to Sr. V.P., Ops.

ESRC _____ / _____ / _____

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*****************************************************************
*****************     14-AUG-92 14:20:22     *****************
*****************************************************************
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VERMONT YANKEE NUCLEAR POWER CORPORATION

From floor near elevator

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SAMPLE DATE..........:  14-AUG-92 14:05:00
SAMPLE IDENTIFICATION:  TB 222 SPILL
TYPE OF SAMPLE.......:  23ML SCINT. VIAL
SAMPLE QUANTITY......:  23.00000        UNITS:  ML
SAMPLE GEOMETRY......:  VY2004
OPERATOR.............:  GR
EFFICIENCY FILE NAME.:  EFF.VY2004,,
*****************************************************************
                                        *
ACQUIRE DATE: 14-AUG-92 14:11:45        * FWHM(1332)          1.867
PRESET TIME(LIVE):      500. SEC        * SENSITIVITY:        5.000
ELAPSED REAL TIME:      508. SEC        * SHAPE PARAMETER :  10.0 %
ELAPSED LIVE TIME:      500. SEC        * NBR ITERATIONS:    10.
*****************************************************************
                                        *
DETECTOR..:  20% HPGE                   * LIBRARY          NUCL .LIB1
CALIB DATE:  14-AUG-92 00:56:04         * ENERGY TOLERANCE   1.500KV
KEV/CHNL..:  0.5001629                  * HALF LIFE RATIO      8.00
OFFSET....: -0.1059622 KEV              * ABUNDANCE LIMIT    80.00%
Q. COEFF..:  0.000E-01 KEV/C**2         * DECAY TIME (MIN)       6.0
*****************************************************************
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ENERGY WINDOW 24.90 TO 2048.56
1.00-SIGMA %ERR

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	0	80.30	1079.	3153.	1.52	160.75	155	12	2.16E 00	10.9	
2	0	140.56	643.	2543.	0.94	281.24	277	9	1.29E 00	14.7	
3	0	145.55	671.	1928.	1.13	291.21	288	7	1.34E 00	11.6	
4	6	162.74	372.	1985.	1.13	325.59	322	15	7.44E-01	20.5	1.49E 00
5	6	165.88	1891.	1654.	1.04	331.86	322	15	3.78E 00	4.1	
6	0	220.46	432.	2262.	1.15	440.98	437	8	8.64E-01	19.5	
7	0	249.77	4786.	2705.	1.12	499.59	494	11	9.57E 00	2.6	
8	5	284.27	752.	1685.	1.13	568.58	562	20	1.50E 00	9.7	6.33E-01
9	5	288.46	596.	1775.	1.12	576.94	562	20	1.19E 00	12.2	
10	0	328.80	433.	2218.	1.00	657.60	654	8	8.66E-01	19.6	
11	0	364.49	8637.	2304.	1.19	728.94	722	14	1.73E 01	1.6	
12	0	417.86	563.	1040.	1.21	835.66	832	11	1.13E 00	12.2	
13	0	423.50	156.	855.	1.01	846.94	842	9	3.11E-01	34.4	
14	0	434.28	204.	1498.	4.49	868.48	862	16	4.08E-01	44.0	
15	0	487.07	933.	998.	1.27	974.03	968	13	1.87E 00	7.7	
16	0	511.00	28700.	2006.	2.62	1021.88	1014	19	5.74E 01	0.7	
17	2	522.60	399.	414.	1.29	1045.07	1042	24	7.98E-01	9.2	1.78E 00
18	2	526.62	2118.	599.	1.43	1053.11	1042	24	4.24E 00	3.1	
19	2	529.92	13207.	448.	1.31	1059.70	1042	24	2.64E 01	0.9	
20	0	537.21	537.	636.	1.25	1074.28	1069	11	1.07E 00	10.4	
21	0	546.52	821.	464.	1.33	1092.90	1088	10	1.64E 00	6.2	
22	0	555.57	1134.	546.	1.30	1110.99	1105	12	2.27E 00	5.1	
23	0	595.47	194.	416.	1.39	1190.76	1186	10	3.87E-01	21.7	

COPY

ENERGY WINDOW 24.90 TO 2048.56
1.00-SIGMA %ERR

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	FW	CTS/SEC	%ERR	FIT
24	0	621.60	249.	579.	1.83	1243.01	1237	13	4.98E-01	21.8	
25	0	630.29	351.	595.	1.27	1260.38	1254	13	7.03E-01	15.7	
26	0	637.08	355.	428.	1.40	1273.95	1269	10	7.10E-01	12.6	
27	0	652.91	114.	344.	1.18	1305.61	1303	7	2.28E-01	29.8	
28	0	667.67	2190.	792.	1.39	1335.12	1327	16	4.38E 00	3.6	
29	7	677.47	93.	272.	1.21	1354.71	1351	13	1.85E-01	31.9	1.53E 0(
30	7	679.90	76.	291.	1.21	1359.58	1351	13	1.51E-01	38.9	
31	0	707.04	251.	356.	1.75	1413.83	1409	11	5.03E-01	16.4	
32	0	722.98	129.	330.	1.65	1445.71	1440	11	2.57E-01	28.6	
33	0	728.08	101.	439.	4.73	1455.90	1451	14	2.03E-01	45.6	
34	0	749.99	469.	437.	1.66	1499.70	1494	15	9.38E-01	10.7	
35	0	772.67	1371.	314.	1.59	1545.05	1540	11	2.74E 00	3.8	
36	0	816.00	262.	378.	1.52	1631.68	1628	11	5.24E-01	15.9	
37	0	836.91	502.	260.	1.64	1673.49	1669	11	1.00E 00	7.8	
38	0	847.05	1290.	365.	1.62	1693.77	1685	16	2.58E 00	4.4	
39	0	856.82	203.	306.	1.69	1713.28	1707	13	4.06E-01	19.4	
40	0	875.28	477.	286.	1.60	1750.21	1745	12	9.54E-01	8.7	
41	0	884.26	836.	306.	1.60	1768.15	1762	13	1.67E 00	5.8	
42	0	925.78	97.	322.	1.46	1851.17	1843	13	1.95E-01	41.4	
43	0	954.31	350.	271.	1.95	1908.21	1900	16	6.99E-01	12.1	
44	0	973.39	136.	363.	3.37	1946.35	1940	15	2.71E-01	31.6	
45	0	1024.33	393.	232.	1.71	2048.20	2043	12	7.86E-01	9.8	
46	0	1038.71	552.	323.	1.85	2076.96	2068	15	1.10E 00	8.3	
47	0	1072.91	150.	178.	1.63	2145.33	2139	13	3.00E-01	20.6	
48	0	1101.64	168.	189.	2.25	2202.78	2195	17	3.35E-01	22.3	
49	0	1123.98	220.	229.	1.34	2247.44	2240	15	4.40E-01	17.5	
50	2	1131.61	1273.	124.	1.75	2262.70	2257	21	2.55E 00	3.4	1.81E 0(
51	2	1136.11	165.	127.	2.09	2271.69	2257	21	3.31E-01	19.5	
52	0	1237.85	200.	220.	5.48	2475.11	2463	22	4.00E-01	21.5	
53	0	1260.56	1670.	128.	1.81	2520.50	2514	15	3.34E 00	2.9	
54	0	1298.36	154.	165.	1.98	2596.09	2590	13	3.08E-01	19.6	
55	0	1384.30	239.	91.	1.68	2767.91	2761	13	4.78E-01	10.5	
56	0	1398.81	88.	69.	0.78	2796.92	2793	10	1.76E-01	23.1	
57	0	1457.50	440.	155.	2.05	2914.27	2906	19	8.80E-01	8.4	
58	0	1502.24	36.	77.	1.56	3003.72	2996	14	7.28E-02	54.5	
59	0	1566.36	42.	53.	1.11	3131.90	3128	11	8.31E-02	36.6	
60	0	1596.33	552.	38.	1.97	3191.84	3184	17	1.10E 00	5.0	
61	0	1678.22	436.	42.	1.75	3355.57	3349	14	8.71E-01	5.9	
62	0	1706.72	173.	33.	1.52	3412.54	3405	16	3.46E-01	11.3	
63	0	1791.32	369.	11.	1.97	3581.69	3574	15	7.38E-01	5.9	
64	0	1808.01	46.	21.	2.23	3615.05	3606	18	9.16E-02	31.5	
65	0	1831.43	23.	5.	0.61	3661.87	3659	9	4.61E-02	33.1	

PEAK SEARCH COMPLETED (REV 15.7)

NUCLIDE IDENTIFICATION SYSTEM (REV JUN 87)
SUMMARY OF NUCLIDE ACTIVITY

TOTAL PEAKS IN SPECTRUM 65
UNIDENTIFIED PEAKS 31
IDENTIFIED IN SUMMARY REPORT 34 52.31%

FISSION GAS

NUCLIDE	SBHR	HLIFE	DECAY	UCI /UNIT	1.00-SIGMA ERROR	1.00-SIGMA %ERR
XE-131M	FG	11.90D	1.000	5.739E -4	1.176E -4	20.50
XE-133	FG	5.25D	1.001	7.835E -5	8.579E -6	10.95
XE-135	FG	9.08H	1.014	2.349E -4	6.013E -6	2.56
XE-135M	FG	15.65M	1.617	3.579E -4	1.102E -5	3.08

FISSION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /UNIT	1.00-SIGMA ERROR	1.00-SIGMA %ERR
TC-99M	FP	6.02H	1.021	1.995E -5	2.934E -6	14.71
I-131	FP	8.04D	1.001	6.398E -4	1.019E -5	1.59
I-132	FP	2.30H	1.057	2.487E -4	8.926E -6	3.59
I-133	FP	20.80H	1.006	1.296E -3	1.191E -5	0.92
I-134	FP	52.60M	1.155	2.216E -4	1.286E -5	5.81
I-135	FP	6.61H	1.019	1.220E -3	3.537E -5	2.90
SR-91	FP	9.50H	1.013	2.034E -4	1.991E -5	9.79
SR-92	FP	2.71H	1.048	6.188E -5	6.479E -6	10.47
Y-91M	FP	49.71M	1.165	1.236E -4	6.291E -6	5.09
RU-106	FP	368.20D	1.000	2.509E -4	5.458E -5	21.75
BA-139	FP	82.71M	1.096	3.536E -4	1.458E -5	4.12
BA-140	FP	12.79D	1.000	1.853E -4	1.934E -5	10.44
LA-140	FP	40.22H	1.003	1.473E -4	7.407E -6	5.03
CE-141	FP	32.00D	1.000	3.788E -5	4.407E -6	11.64

********** 14-AUG-92 14:29:56 **********

VERMONT YANKEE NUCLEAR POWER CORPORATION

1st - Sample after spill

SAMPLE DATE.....: 14-AUG-92 14:10:00
SAMPLE IDENTIFICATION: TB CLEAN SUMP
TYPE OF SAMPLE.....: LIQUID MARINELLI
SAMPLE QUANTITY.....: 1000.000 UNITS: ML
SAMPLE GEOMETRY.....: VY2005
OPERATOR.....: SCM
EFFICIENCY FILE NAME.: EFF.VY2005,,

ACQUIRE DATE: 14-AUG-92 14:24:21		* FWHM(1332)	1.867
PRESET TIME(LIVE):	2000. SEC	* SENSITIVITY:	5.000
ELAPSED REAL TIME:	326. SEC	* SHAPE PARAMETER :	10.0 %
ELAPSED LIVE TIME:	326. SEC	* NBR ITERATIONS:	10.

DETECTOR..:	20% HPGE	* LIBRARY	NUCL .LIB1
CALIB DATE:	14-AUG-92 00:56:29	* ENERGY TOLERANCE	1.500KV
KEV/CHNL..:	0.5001629	* HALF LIFE RATIO	8.00
OFFSET....:	-0.1059622 KEV	* ABUNDANCE LIMIT	80.00%
Q. COEFF..:	0.000E-01 KEV/C**2	* DECAY TIME (MIN)	14.0

ENERGY WINDOW 24.90 TO 2048.56
1.00-SIGMA %ERR

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	0	249.61	39.	31.	1.71	499.26	497	6	1.21E-01	29.0	
2	0	364.48	132.	30.	1.21	728.93	724	10	4.05E-01	12.1	
3	0	489.82	7.	7.	1.15	979.53	978	6	2.07E-02	89.5	
4	0	511.06	625.	8.	2.57	1022.00	1014	18	1.92E 00	4.3	
5	0	529.93	204.	13.	1.34	1059.73	1056	9	6.27E-01	8.2	
6	0	667.92	39.	4.	2.34	1335.62	1327	16	1.19E-01	19.7	
7	0	772.51	27.	2.	1.32	1544.72	1538	12	8.37E-02	25.1	
8	0	846.74	19.	4.	1.00	1693.15	1690	8	5.68E-02	30.1	
9	0	884.87	13.	0.	1.16	1769.38	1764	12	3.99E-02	27.7	
10	0	1131.80	14.	16.	0.71	2263.07	2253	13	4.25E-02	56.7	
11	0	1260.39	36.	0.	0.77	2520.17	2511	18	1.10E-01	20.8	

PEAK SEARCH COMPLETED (REV 15.7)

COPY

NUCLIDE IDENTIFICATION SYSTEM (REV JUN 87)
SUMMARY OF NUCLIDE ACTIVITY

TOTAL PEAKS IN SPECTRUM 11
UNIDENTIFIED PEAKS 4
IDENTIFIED IN SUMMARY REPORT 7 63.64%

FISSION GAS

NUCLIDE	SBHR	HLIFE	DECAY	UCI /UNIT	1.00-SIGMA ERROR	1.00-SIGMA %ERR
XE-135	FG	9.08H	1.022	1.914E -7	5.553E -8	29.01

FISSION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /UNIT	1.00-SIGMA ERROR	1.00-SIGMA %ERR
I-131	FP	8.04D	1.001	8.944E -7	1.084E -7	12.12
I-133	FP	20.80H	1.010	1.761E -6	1.436E -7	8.15
I-134	FP	52.60M	1.252	3.045E -7	8.445E -8	27.73
I-135	FP	6.61H	1.030	2.127E -6	4.432E -7	20.83

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*************************************************************
*************          14-AUG-92 15:01:15          ****************
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VERMONT YANKEE NUCLEAR POWER CORPORATION

1st sample after spill, longer count time

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SAMPLE DATE..........:  14-AUG-92 14:10:00
SAMPLE IDENTIFICATION:  TB CLEAN SUMP
TYPE OF SAMPLE.......:  LIQUID MARINELLI
SAMPLE QUANTITY......:  1000.000        UNITS:  ML
SAMPLE GEOMETRY......:  VY2005
OPERATOR.............:  SCM
EFFICIENCY FILE NAME.:  EFF.VY2005,,
*************************************************************
                                      *
ACQUIRE DATE: 14-AUG-92 14:24:21      * FWHM(1332)          1.867
PRESET TIME(LIVE):      2000. SEC     * SENSITIVITY:        5.000
ELAPSED REAL TIME:      2001. SEC     * SHAPE PARAMETER :  10.0 %
ELAPSED LIVE TIME:      2000. SEC     * NBR ITERATIONS:    10.
*************************************************************
                                      *
DETECTOR..:  20% HPGE                 * LIBRARY          NUCL .LIB1
CALIB DATE:  14-AUG-92 00:56:29       * ENERGY TOLERANCE   1.500KV
KEV/CHNL..:  0.5001629                * HALF LIFE RATIO      8.00
OFFSET....: -0.1059622 KEV            * ABUNDANCE LIMIT    80.00%
Q. COEFF..:  0.000E-01 KEV/C**2       * DECAY TIME (MIN)      14.0
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ENERGY WINDOW 24.90 TO 2048.56
1.00-SIGMA %ERR

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	FW	CTS/SEC	%ERR	FIT
1	0	249.91	264.	425.	1.21	499.87	494	12	1.32E-01	17.3	
2	0	284.07	71.	228.	1.45	568.17	565	8	3.56E-02	40.7	
3	0	364.45	826.	167.	1.26	728.88	724	9	4.13E-01	4.6	
4	0	417.86	86.	125.	1.11	835.67	829	12	4.28E-02	30.0	
5	0	511.04	3455.	168.	2.53	1021.96	1014	22	1.73E 00	2.0	
6	2	526.51	158.	54.	1.53	1052.88	1049	17	7.88E-02	10.8	1.36E 0(
7	2	529.91	1239.	45.	1.33	1059.68	1049	17	6.19E-01	3.0	
8	0	546.81	84.	43.	1.49	1093.49	1089	12	4.20E-02	20.2	
9	0	637.41	37.	38.	1.27	1274.62	1268	10	1.86E-02	38.0	
10	0	667.81	240.	37.	1.53	1335.40	1329	15	1.20E-01	9.0	
11	0	772.69	146.	16.	1.75	1545.09	1538	13	7.28E-02	11.5	
12	0	836.86	53.	22.	2.11	1673.38	1668	11	2.65E-02	24.3	
13	0	847.23	61.	52.	1.13	1694.12	1687	14	3.03E-02	27.2	
14	0	875.46	58.	18.	1.32	1750.57	1743	15	2.90E-02	20.8	
15	0	884.18	62.	19.	1.01	1768.00	1763	11	3.08E-02	20.8	
16	0	953.99	30.	18.	1.74	1907.56	1902	11	1.50E-02	40.4	
17	0	1038.59	76.	26.	1.87	2076.71	2069	17	3.80E-02	20.6	
18	0	1131.46	132.	9.	1.70	2262.40	2258	10	6.58E-02	10.1	
19	0	1260.30	195.	4.	1.51	2519.99	2511	18	9.73E-02	8.0	
20	0	1298.49	13.	9.	1.42	2596.36	2592	10	6.52E-03	52.6	
21	0	1457.57	80.	0.	2.44	2914.40	2905	22	4.00E-02	13.1	
22	0	1677.60	50.	0.	1.86	3354.32	3348	15	2.50E-02	14.1	
23	0	1790.53	42.	4.	1.75	3580.10	3573	13	2.11E-02	19.4	

PEAK SEARCH COMPLETED (REV 15.7)

NUCLIDE IDENTIFICATION SYSTEM (REV JUN 87)
SUMMARY OF NUCLIDE ACTIVITY

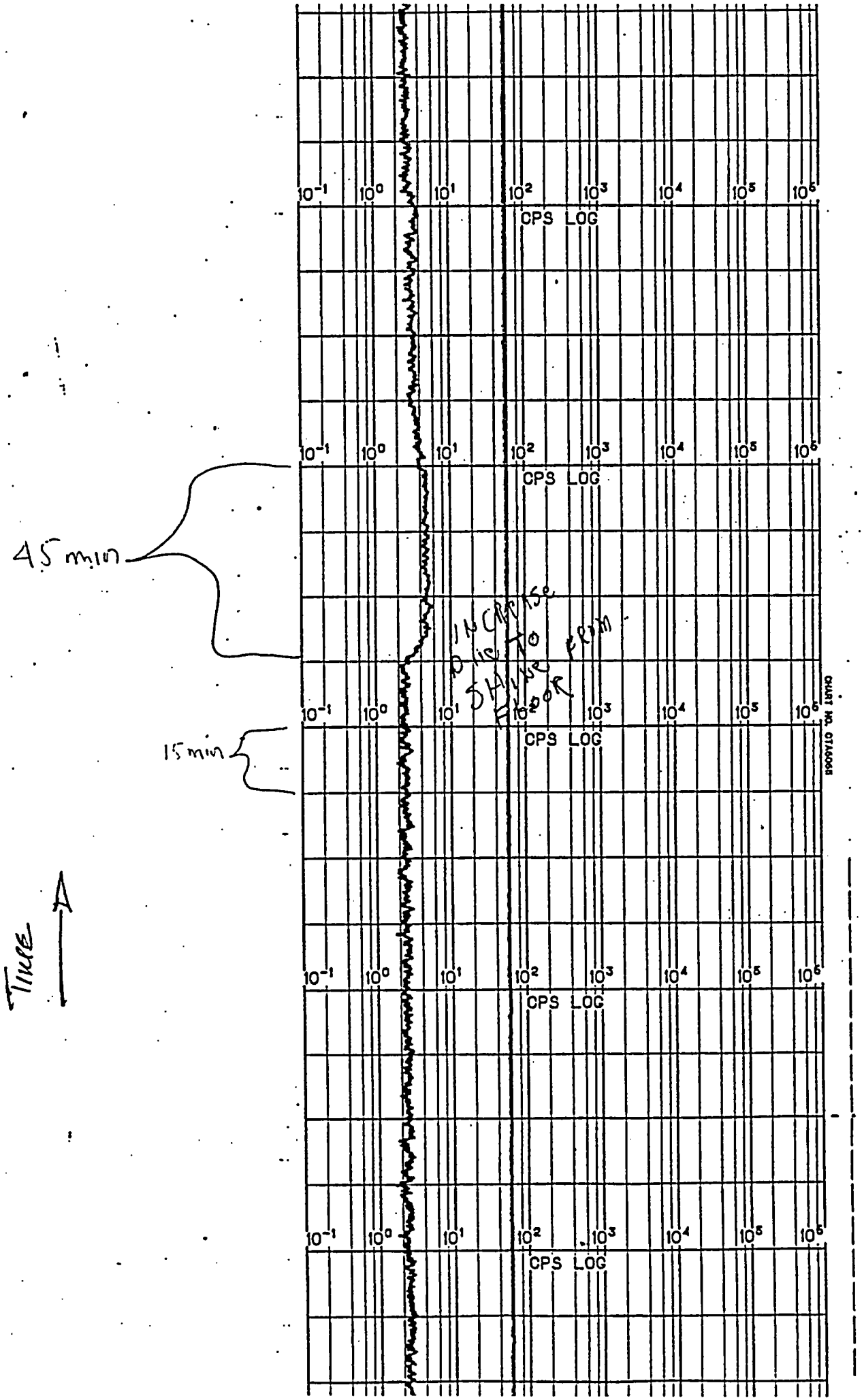
TOTAL PEAKS IN SPECTRUM	23	
UNIDENTIFIED PEAKS	9	
IDENTIFIED IN SUMMARY REPORT	14	60.87%

FISSION GAS

NUCLIDE	SBHR	HLIFE	DECAY	UCI /UNIT	1.00-SIGMA ERROR	1.00-SIGMA %ERR
XE-135	FG	9.08H	1.040	2.131E -7	3.690E -8	17.32
XE-135M	FG	15.65M	3.614	8.495E -7	9.141E -8	10.76

FISSION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /UNIT	1.00-SIGMA ERROR	1.00-SIGMA %ERR
I-131	FP	8.04D	1.002	9.131E -7	4.185E -8	4.58
I-132	FP	2.30H	1.167	4.189E -7	3.750E -8	8.95
I-133	FP	20.80H	1.017	1.753E -6	5.285E -8	3.02
I-134	FP	52.60M	1.493	2.799E -7	5.830E -8	20.83
I-135	FP	6.61H	1.056	1.920E -6	1.527E -7	7.96


10^{-1} 10^{0} 10^{1} 10^{2} 10^{3} 10^{4} 10^{5} 10^{6}
CPS LOG
45 min
INCREASE DUE TO SHIVE FROM FLOOR
15 min
TIME
CHART NO. CTA6068

8/14/92

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*************************************************************
*****************     14-AUG-92 14:29:56     *****************
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 VERMONT YANKEE NUCLEAR POWER CORPORATION

SAMPLE DATE..........:  14-AUG-92 14:10:00
SAMPLE IDENTIFICATION:  TB CLEAN SUMP
TYPE OF SAMPLE.......:  LIQUID MARINELLI
SAMPLE QUANTITY......:  1000.000        UNITS:  ML
SAMPLE GEOMETRY......:  VY2005
OPERATOR.............:  SCM
EFFICIENCY FILE NAME.:  EFF.VY2005,,
*************************************************************
                                   *
ACQUIRE DATE: 14-AUG-92 14:24:21   * FWHM(1332)          1.867
PRESET TIME(LIVE):      2000. SEC  * SENSITIVITY:        5.000
ELAPSED REAL TIME:       326. SEC  * SHAPE PARAMETER : 10.0 %
ELAPSED LIVE TIME:       326. SEC  * NBR ITERATIONS:    10.
*************************************************************
                                   *
DETECTOR..:  20% HPGE              * LIBRARY          NUCL .LIB1
CALIB DATE:  14-AUG-92 00:56:29    * ENERGY TOLERANCE   1.500KV
KEV/CHNL..:  0.5001629             * HALF LIFE RATIO      8.00
OFFSET....: -0.1059622 KEV         * ABUNDANCE LIMIT    80.00%
Q. COEFF..:  0.000E-01 KEV/C**2    * DECAY TIME (MIN)      14.0
*************************************************************
```

1st - sample after spill

ENERGY WINDOW 24.90 TO 2048.56
1.00-SIGMA %ERR

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	FW	CTS/SEC	%ERR	FIT
1	0	249.61	39.	31.	1.71	499.26	497	6	1.21E-01	29.0	
2	0	364.48	132.	30.	1.21	728.93	724	10	4.05E-01	12.1	
3	0	489.82	7.	7.	1.15	979.53	978	6	2.07E-02	89.5	
4	0	511.06	625.	6.	2.57	1022.00	1014	18	1.92E 00	4.3	
5	0	529.93	204.	13.	1.34	1059.73	1056	9	6.27E-01	8.2	
6	0	667.92	39.	4.	2.34	1335.62	1327	16	1.19E-01	19.7	
7	0	772.51	27.	2.	1.32	1544.72	1538	12	8.37E-02	25.1	
8	0	846.74	19.	4.	1.00	1693.15	1690	8	5.68E-02	30.1	
9	0	884.87	13.	0.	1.16	1769.38	1764	12	3.99E-02	27.7	
10	0	1131.80	14.	16.	0.71	2263.07	2253	13	4.25E-02	56.7	
11	0	1260.39	36.	0.	0.77	2520.17	2511	18	1.10E-01	20.8	

PEAK SEARCH COMPLETED (REV 15.7)

NUCLIDE IDENTIFICATION SYSTEM (REV JUN 87)
SUMMARY OF NUCLIDE ACTIVITY

TOTAL PEAKS IN SPECTRUM 11
UNIDENTIFIED PEAKS 4
IDENTIFIED IN SUMMARY REPORT 7 63.64%

FISSION GAS

NUCLIDE	SBHR	HLIFE	DECAY	UCI /UNIT	1.00-SIGMA ERROR	1.00-SIGMA %ERR
XE-135	FG	9.08H	1.022	1.914E -7	5.553E -8	29.01

FISSION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /UNIT	1.00-SIGMA ERROR	1.00-SIGMA %ERR
I-131	FP	8.04D	1.001	8.944E -7	1.084E -7	12.12
I-133	FP	20.80H	1.010	1.761E -6	1.436E -7	8.15
I-134	FP	52.60M	1.252	3.045E -7	8.445E -8	27.73
I-135	FP	6.61H	1.030	2.127E -6	4.432E -7	20.83

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****************     14-AUG-92 14:20:22     ****************
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VERMONT YANKEE NUCLEAR POWER CORPORATION

From floor near elevator

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SAMPLE DATE..........:  14-AUG-92 14:05:00
SAMPLE IDENTIFICATION:  TB 222 SPILL
TYPE OF SAMPLE.......:  23ML SCINT. VIAL
SAMPLE QUANTITY......:  23.00000        UNITS:  ML
SAMPLE GEOMETRY......:  VY2004
OPERATOR.............:  GR
EFFICIENCY FILE NAME.:  EFF.VY2004,,
*************************************************************
                                   *
ACQUIRE DATE: 14-AUG-92 14:11:45   * FWHM(1332)          1.867
PRESET TIME(LIVE):      500. SEC   * SENSITIVITY:        5.000
ELAPSED REAL TIME:      508. SEC   * SHAPE PARAMETER : 10.0 %
ELAPSED LIVE TIME:      500. SEC   * NBR ITERATIONS:    10.
*************************************************************
                                   *
DETECTOR..:  20% HPGE              * LIBRARY          NUCL .LIB1
CALIB DATE:  14-AUG-92 00:56:04    * ENERGY TOLERANCE   1.500KV
KEV/CHNL..:  0.5001629             * HALF LIFE RATIO      8.00
OFFSET....: -0.1059622 KEV         * ABUNDANCE LIMIT    80.00%
Q. COEFF..:  0.000E-01 KEV/C**2    * DECAY TIME (MIN)       6.0
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ENERGY WINDOW 24.90 TO 2048.56

1.00-SIGMA %ERR

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	FW	CTS/SEC	%ERR	FIT
1	0	80.30	1079.	3153.	1.52	160.75	155	12	2.16E 00	10.9	
2	0	140.56	643.	2543.	0.94	281.24	277	9	1.29E 00	14.7	
3	0	145.55	671.	1928.	1.13	291.21	288	7	1.34E 00	11.6	
4	6	162.74	372.	1965.	1.13	325.59	322	15	7.44E-01	20.5	1.49E 00
5	6	165.88	1891.	1654.	1.04	331.86	322	15	3.78E 00	4.1	
6	0	220.46	432.	2262.	1.15	440.98	437	8	8.64E-01	19.5	
7	0	249.77	4786.	2705.	1.12	499.59	494	11	9.57E 00	2.6	
8	5	284.27	752.	1685.	1.13	568.58	562	20	1.50E 00	9.7	6.33E-01
9	5	288.46	596.	1775.	1.12	576.94	562	20	1.19E 00	12.2	
10	0	328.80	433.	2218.	1.00	657.60	654	8	8.66E-01	19.6	
11	0	364.49	8637.	2304.	1.19	728.94	722	14	1.73E 01	1.6	
12	0	417.86	563.	1040.	1.21	835.66	832	11	1.13E 00	12.2	
13	0	423.50	156.	855.	1.01	846.94	842	9	3.11E-01	34.4	
14	0	434.28	204.	1498.	4.49	868.48	862	16	4.08E-01	44.0	
15	0	487.07	933.	998.	1.27	974.03	968	13	1.87E 00	7.7	
16	0	511.00	28700.	2006.	2.62	1021.88	1014	19	5.74E 01	0.7	
17	2	522.60	399.	414.	1.29	1045.07	1042	24	7.98E-01	9.2	1.78E 00
18	2	526.62	2118.	599.	1.43	1053.11	1042	24	4.24E 00	3.1	
19	2	529.92	13207.	448.	1.31	1059.70	1042	24	2.64E 01	0.9	
20	0	537.21	537.	636.	1.25	1074.28	1069	11	1.07E 00	10.4	
21	0	546.52	821.	464.	1.33	1092.90	1088	10	1.64E 00	6.2	
22	0	555.57	1134.	546.	1.30	1110.99	1105	12	2.27E 00	5.1	
23	0	595.47	194.	416.	1.39	1190.76	1186	10	3.87E-01	21.7	

ENERGY WINDOW 24.90 TO 2048.56
1.00-SIGMA %ERR

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	FW	CTS/SEC	%ERR	FIT
24	0	621.60	249.	579.	1.83	1243.01	1237	13	4.98E-01	21.8	
25	0	630.29	351.	595.	1.27	1260.38	1254	13	7.03E-01	15.7	
26	0	637.08	355.	428.	1.40	1273.95	1269	10	7.10E-01	12.6	
27	0	652.91	114.	344.	1.18	1305.61	1303	7	2.28E-01	29.8	
28	0	667.67	2190.	792.	1.39	1335.12	1327	16	4.38E 00	3.6	
29	7	677.47	93.	272.	1.21	1354.71	1351	13	1.85E-01	31.9	1.53E 00
30	7	679.90	76.	291.	1.21	1359.58	1351	13	1.51E-01	38.9	
31	0	707.04	251.	356.	1.75	1413.83	1409	11	5.03E-01	16.4	
32	0	722.98	129.	330.	1.65	1445.71	1440	11	2.57E-01	28.6	
33	0	728.08	101.	439.	4.73	1455.90	1451	14	2.03E-01	45.6	
34	0	749.99	469.	437.	1.66	1499.70	1494	15	9.38E-01	10.7	
35	0	772.67	1371.	314.	1.59	1545.05	1540	11	2.74E 00	3.8	
36	0	816.00	262.	378.	1.52	1631.68	1628	11	5.24E-01	15.9	
37	0	836.91	502.	260.	1.64	1673.49	1669	11	1.00E 00	7.8	
38	0	847.05	1290.	365.	1.62	1693.77	1685	16	2.58E 00	4.4	
39	0	856.82	203.	306.	1.69	1713.28	1707	13	4.06E-01	19.4	
40	0	875.28	477.	286.	1.60	1750.21	1745	12	9.54E-01	8.7	
41	0	884.26	836.	306.	1.60	1768.15	1762	13	1.67E 00	5.8	
42	0	925.78	97.	322.	1.46	1851.17	1843	13	1.95E-01	41.4	
43	0	954.31	350.	271.	1.95	1908.21	1900	16	6.99E-01	12.1	
44	0	973.39	136.	363.	3.37	1946.35	1940	15	2.71E-01	31.6	
45	0	1024.33	393.	232.	1.71	2048.20	2043	12	7.86E-01	9.8	
46	0	1038.71	552.	323.	1.85	2076.96	2068	15	1.10E 00	8.3	
47	0	1072.91	150.	178.	1.63	2145.33	2139	13	3.00E-01	20.6	
48	0	1101.64	168.	189.	2.25	2202.78	2195	17	3.35E-01	22.3	
49	0	1123.98	220.	229.	1.34	2247.44	2240	15	4.40E-01	17.5	
50	2	1131.61	1273.	124.	1.75	2262.70	2257	21	2.55E 00	3.4	1.81E 00
51	2	1136.11	165.	127.	2.09	2271.69	2257	21	3.31E-01	19.5	
52	0	1237.85	200.	220.	5.48	2475.11	2463	22	4.00E-01	21.5	
53	0	1260.56	1670.	128.	1.81	2520.50	2514	15	3.34E 00	2.9	
54	0	1298.36	154.	165.	1.98	2596.09	2590	13	3.08E-01	19.6	
55	0	1384.30	239.	91.	1.68	2767.91	2761	13	4.78E-01	10.5	
56	0	1398.81	88.	69.	0.78	2796.92	2793	10	1.76E-01	23.1	
57	0	1457.50	440.	155.	2.05	2914.27	2906	19	8.80E-01	8.4	
58	0	1502.24	36.	77.	1.56	3003.72	2996	14	7.28E-02	54.5	
59	0	1566.36	42.	53.	1.11	3131.90	3128	11	8.31E-02	36.6	
60	0	1596.33	552.	38.	1.97	3191.84	3184	17	1.10E 00	5.0	
61	0	1678.22	436.	42.	1.75	3355.57	3349	14	8.71E-01	5.9	
62	0	1706.72	173.	33.	1.52	3412.54	3405	16	3.46E-01	11.3	
63	0	1791.32	369.	11.	1.97	3581.69	3574	15	7.38E-01	5.9	
64	0	1808.01	46.	21.	2.23	3615.05	3606	18	9.16E-02	31.5	
65	0	1831.43	23.	5.	0.61	3661.87	3659	9	4.61E-02	33.1	

PEAK SEARCH COMPLETED (REV 15.7)

NUCLIDE IDENTIFICATION SYSTEM REV. 88.07

SUMMARY OF NUCLIDE ACTIVITY

TOTAL PEAKS IN SPECTRUM 65
UNIDENTIFIED PEAKS 31
IDENTIFIED IN SUMMARY REPORT 34 52.31%

Floor Sample

FISSION GAS

NUCLIDE	SBHR	HLIFE	DECAY	UCI /UNIT	1.00-SIGMA ERROR	1.00-SIGMA %ERR
XE-131M	FG	11.90D	1.000	5.739E -4	1.176E -4	20.50
XE-133	FG	5.25D	1.001	7.835E -5	8.579E -6	10.95
XE-135	FG	9.08H	1.014	2.349E -4	6.013E -6	2.56
XE-135M	FG	15.65M	1.617	3.579E -4	1.102E -5	3.08

FISSION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /UNIT	1.00-SIGMA ERROR	1.00-SIGMA %ERR
TC-99M	FP	6.02H	1.021	1.995E -5	2.934E -6	14.71
I-131	FP	8.04D	1.001	6.398E -4	1.019E -5	1.59
I-132	FP	2.30H	1.057	2.487E -4	8.926E -6	3.59
I-133	FP	20.80H	1.006	1.296E -3	1.191E -5	0.92
I-134	FP	52.60M	1.155	2.216E -4	1.286E -5	5.81
I-135	FP	6.61H	1.019	1.220E -3	3.537E -5	2.90
SR-91	FP	9.50H	1.013	2.034E -4	1.991E -5	9.79
SR-92	FP	2.71H	1.048	6.188E -5	6.479E -6	10.47
Y-91M	FP	49.71M	1.165	1.236E -4	6.291E -6	5.09
RU-106	FP	368.20D	1.000	2.509E -4	5.458E -5	21.75
BA-139	FP	82.71M	1.096	3.536E -4	1.458E -5	4.12
BA-140	FP	12.79D	1.000	1.853E -4	1.934E -5	10.44
LA-140	FP	40.22H	1.003	1.473E -4	7.407E -6	5.03
CE-141	FP	32.00D	1.000	3.788E -5	4.407E -6	11.64

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*************************************************************
****************     17-AUG-92 14:43:10     ****************
*************************************************************
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VERMONT YANKEE NUCLEAR POWER CORPORATION

SAMPLE DATE.....: 17-AUG-92 14:00:00
SAMPLE IDENTIFICATION: TB SUMP LLD
TYPE OF SAMPLE.....: LIQUID MARINELLI
SAMPLE QUANTITY.....: 1000.000 UNITS: ML
SAMPLE GEOMETRY.....: VY2005
OPERATOR.....: SCM
EFFICIENCY FILE NAME.: EFF.VY2005,,

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*************************************************************
                                    *
ACQUIRE DATE: 17-AUG-92 14:09:38    * FWHM(1332)          1.845
PRESET TIME(LIVE):      2000. SEC   * SENSITIVITY:        5.000
ELAPSED REAL TIME:      2002. SEC   * SHAPE PARAMETER : 10.0 %
ELAPSED LIVE TIME:      2000. SEC   * NBR ITERATIONS:    10.
*************************************************************
                                    *
DETECTOR..:  20% HPGE               * LIBRARY          NUCL .LIB1
CALIB DATE:  17-AUG-92 00:27:05     * ENERGY TOLERANCE   1.500KV
KEV/CHNL..:  0.5001556              * HALF LIFE RATIO      8.00
OFFSET....: -0.1080463 KEV          * ABUNDANCE LIMIT    80.00%
Q. COEFF..:  0.000E-01 KEV/C**2     * DECAY TIME (MIN)       9.0
*************************************************************
```

ENERGY WINDOW 24.90 TO 2048.53
1.00-SIGMA %ERR

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	0	80.69	2549.	1459.	1.44	161.55	156	10	1.27E 00	3.5	
2	0	141.18	150.	1617.	2.32	282.48	276	11	7.50E-02	53.1	
3	0	145.45	912.	1028.	1.09	291.03	288	7	4.56E-01	6.8	
4	0	162.48	475.	1522.	1.11	325.08	321	9	2.38E-01	16.0	
5	0	249.92	169.	577.	1.11	499.91	496	8	8.43E-02	26.0	
6	0	284.39	1336.	545.	1.15	568.82	564	11	6.68E-01	4.5	
7	0	304.71	149.	430.	1.19	609.44	606	8	7.43E-02	26.3	
8	0	328.80	894.	382.	1.18	657.60	654	8	4.47E-01	5.2	
9	0	364.49	14625.	396.	1.22	728.96	723	13	7.31E 00	0.9	
10	0	423.81	120.	127.	1.18	847.58	844	9	5.99E-02	20.2	
11	0	432.38	91.	162.	0.76	864.70	859	11	4.53E-02	30.9	
12	0	438.21	56.	150.	0.97	876.37	872	10	2.79E-02	44.6	
13	0	487.03	1438.	113.	1.34	973.97	968	14	7.19E-01	3.1	
14	0	510.50	79.	93.	1.79	1020.90	1017	9	3.97E-02	26.7	
15	0	529.91	2326.	137.	1.30	1059.72	1053	13	1.16E 00	2.3	
16	0	537.27	700.	98.	1.41	1074.41	1067	15	3.50E-01	4.9	
17	0	636.96	836.	54.	1.43	1273.74	1266	13	4.18E-01	4.0	
18	0	722.91	185.	46.	1.21	1445.59	1442	10	9.27E-02	10.9	
19	0	751.52	113.	35.	1.32	1502.79	1497	11	5.65E-02	16.1	
20	0	815.79	568.	41.	1.79	1631.29	1624	15	2.84E-01	5.0	
21	0	857.56	26.	57.	3.58	1714.81	1709	19	1.30E-02	81.0	
22	0	867.86	137.	21.	1.28	1735.39	1730	12	6.87E-02	12.3	
23	0	875.13	91.	21.	1.52	1749.93	1742	14	4.55E-02	15.9	

ENERGY WINDOW 24.90 TO 2048.53
1.00-SIGMA %ERR

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	FW	CTS/SEC	%ERR	FIT
24	0	919.38	63.	22.	1.38	1838.41	1831	13	3.13E-02	21.4	
25	0	925.31	180.	16.	1.47	1850.26	1844	14	8.99E-02	9.3	
26	0	1596.12	1104.	15.	2.18	3191.47	3183	19	5.52E-01	3.1	

PEAK SEARCH COMPLETED (REV 15.7)

NUCLIDE IDENTIFICATION SYSTEM (REV JUN 87)
SUMMARY OF NUCLIDE ACTIVITY

TOTAL PEAKS IN SPECTRUM 26
UNIDENTIFIED PEAKS 8
IDENTIFIED IN SUMMARY REPORT 18 69.23%

FISSION GAS

NUCLIDE	SBHR	HLIFE	DECAY	UCI /UNIT	1.00-SIGMA ERROR	1.00-SIGMA %ERR
XE-131M	FG	11.90D	1.001	1.151E -5	1.839E -6	15.98
XE-133	FG	5.25D	1.002	3.511E -6	1.217E -7	3.47
XE-135	FG	9.08H	1.034	1.352E -7	3.519E -8	26.03

ACTIVATION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /UNIT	1.00-SIGMA ERROR	1.00-SIGMA %ERR
ZN-69M	AP	13.80H	1.022	6.205E -8	2.765E -8	44.56

FISSION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /UNIT	1.00-SIGMA ERROR	1.00-SIGMA %ERR
TC-99M	FP	6.02H	1.052	8.007E -8	4.249E -8	53.06
I-131	FP	8.04D	1.002	1.616E -5	1.423E -7	0.88
I-133	FP	20.80H	1.015	3.282E -6	7.609E -8	2.32
BA-140	FP	12.79D	1.001	3.445E -6	1.678E -7	4.87
LA-140	FP	40.22H	1.008	3.826E -6	1.182E -7	3.09
CE-141	FP	32.00D	1.000	8.469E -7	5.718E -8	6.75

VERMONT YANKEE QUANTITATIVE RADIOISOTOPIC
LLD ANALYSIS
17 AUG 1992 14:46:48

LIQUID SAMPLE

NEXT TO LLD LIMIT INDICATES LLD NOT MET

NUCLIDE	LLD UCI/ML	LLD LIMIT UCI/ML	
XE-133	3.745E-07	1.0E-05	
			**** ISOTOPE POSITIVELY IDENTIFIED ****
XE-133M	7.360E-07	1.0E-05	
XE-135	9.533E-08	1.0E-05	
			**** ISOTOPE POSITIVELY IDENTIFIED ****
XE-138	3.637E-07	1.0E-05	
KR-87	1.173E-07	1.0E-05	
KR-88	3.200E-07	1.0E-05	
MN-54	4.928E-08	5.0E-07	

MO-99	3.922E-07	5.0E-07		
FE-59	1.143E-07	5.0E-07		
CO-58	5.024E-08	5.0E-07		
CO-60	1.013E-07	5.0E-07		
ZN-65	1.431E-07	5.0E-07		
I-131	6.245E-07	1.0E-06		**** ISOTOPE POSITIVELY IDENTIFIED ****
CS-134	5.400E-08	5.0E-07		
CS-137	5.946E-08	5.0E-07		
CE-141	1.903E-07	5.0E-07		**** ISOTOPE POSITIVELY IDENTIFIED ****
CE-144	6.142E-07	5.0E-07	#	

Preliminary Work

The TBCCW sump pump is rated at 200 gpm. The worse case scenario is that this pump ran for one hour while radioactive liquid from the backwash receiving tank was overflowing onto the floor and leaking into the sump.

The one hour duration was based on the fact that the SW radmonitor alarm came in high at 1338 and the TBCCW clean sump pump was secured at 1430

Chemistry sampled the clean sump at 1415 and the TBCCW area floor at 1405 - isotopic analyses of both the floor and the sump are attached. a tritium analysis was performed on the TBCCW clean sump and found to be 1.06 E-5 uci/cc at 1410.

Only 4 nuclides I-131, I 133, I-134 I 135 were found in the clean-sump however, based on the count time it might not have been long enough to identify some of the other nuclides. Therefore some of the data was extrapolated from the activity of nuclides found in the floor sample.

The amount of micro curies of each nuclide released was calculated as follows:

$$\left(\begin{matrix}\text{Nuclide Activity}\\ \text{uci/cc}\end{matrix}\right)\left(200\ \frac{\text{gal}}{\text{min}}\right)\left(3785\ \frac{\text{cc}}{\text{gal}}\right)\left(60\ \text{min duration}\right) = \text{uci}$$

I-131	(8.94E-7)	=	40.61 uci
I-133	(1.76 E-6)	=	~~3.85~~ 79.94 uci
I-134	~~(8.44 E-8)~~ (3.04E-7)	=	~~20.12~~ 13.81 uci
I-135	~~(4.43 E-7)~~ (2.13 E-6)	=	~~10.49~~ 96.74 uci
Ba-140	~~(2.31 E-7)~~ (3.08 E-7)	=	~~2.15~~ 10.49 uci 13.95
Ce-141	~~(4.74 E-8)~~ (6.32 E-8)	=	~~14.13~~ 2.15 uci 2.86
I-132	~~(3.11 E-7)~~ (4.15 E-7)	=	~~2.15~~ 14.13 uci 18.79
TC-99m	~~(4.74 E-8)~~ 2.50 E-8	=	~~481.4~~ 1.44 uci 1.51
H_3	(1.06 E-5)	=	481.5 uCi

Calculated activity based on a ~~1,000~~ 600 dilution between activity on the floor and activity in the sump.

Service water discharge = 10,000 gpm
Circ water discharge = 360,000 gpm
TBCCW clean sump discharge = 200 gpm

$\frac{200}{370,000}$ = dilution factor of 5.4E-4

Nuclide Activity x 5.4 E-4 = Activity at discharge structure (ADS)

	A.D.S. µCi/cc	MPC	fraction of MPC
I-131 =	4.83 E-10	3 x 10-7	1.61 E-3
I-133 =	9.50 E-10	1 x 10-6	9.50 E-4
I-134 =	~~4.55 E-11~~ 1.64 E-10	2 x 10-5	~~2.27 E-6~~ 8.20 E-6
I-135 =	~~2.39 E-10~~ 1.15 E-9	4 x 10-6	~~5.98 E-5~~ 2.88 E-4
Ba-140 =	~~1.25 E-10~~ 1.66 E-10	3 x 10-5	~~4.17 E-6~~ 5.53 E-6
Ce-141 =	~~2.56 E-11~~ 3.41 E-11	9 x 10-5	~~2.84 E-7~~ 3.79 E-7
I-132 =	~~1.70 E-10~~ 2.24 E-10	8 x 10-6	~~2.12 E-6~~ 2.80 E-5
TC-99m =	~~2.56 E-11~~ 1.35 E-11	6 x 10-3	~~4.27 E-9~~ 2.25 E-9
H-3 =	~~1.06 E~~ 5.72 E-9	3 x 10-3	1.91 E-6
La-140 -	(1.47E-4)(1/~~800~~ 600)(5.4E-4)	2 x 10-5	~~4.96 E-6~~ 6.62E
Ru-106	(2.51E-4)(1/~~800~~ 600)(5.4E-4)	1 x 10-5	~~1.69 E-5~~ 2.26E-
Y-91m	(1.23E-4)(1/~~800~~ 600)(5.4E-4)	3 x 10-3	~~2.77 E-8~~ 3.69E-
Sr-92	(6.18E-5)(1/~~800~~ 600)(5.4E-4)	7 x 10-5	~~5.46 E-7~~ 2.95E
Sr-91	(2.03E-4)(1/~~800~~ 600)(5.4E-4)	7 x 10-5	~~1.96 E-6~~ 2.61E-
			2.92 E-3 MPC's

Total is < 2 mpc

RPG 7/14/92

NOTE: Dan Marx Notified at 2115
Controll room informed at 2100 that no

RPG

Reviewed + Approved -
A C Chilmonczyk
8/17/92

Summary of Calculations and Applicable Limits for Liquid Release of 8/14/92

Technical Specification	Calculated Value at Discharge
Liquid Effluents: Concentration	
1) 10CFR20, App. B, Table II, Col. 2 concentrations	2.92 E-3 MPC's
2) 2×10^{-4} µCi/ml total activity for noble gases	1.16 E-9 µCi/ml noble gases
Reporting Limit	
10CFR50.72	
2 x MPC averaged over one hour	2.92 E-3 MPC's
Technical Specification	
Liquid Effluents: Dose	
1) 1.5 mrem in any quarter total body dose, .3 mrem per year total body dose	1.52 E-6 mrem total bod dose
2) 5 mrem to any organ in any quarter, 10 mrem to any organ per year	7.47 E-4 mrem organ dose
Vermont State Limits	
* 1) Radioactive material except tritium and dissolved noble gases shall not exceed 1×10^{-7} µCi/ml	4.10 E-9 µCi/ml at Discharge
2) Tritium shall not exceed 3×10^{-3} µCi/ml	Tritium = 5.72 E-9 µCi/ml at Discharg
3) Dissolved noble gases shall not exceed 4×10^{-5} µCi/ml	Noble gases = 1.16 E-9 µCi/ml at Discharge

* The calculated activity of radioactive material except tritium and dissolved noble gases exceeds 4% of the limit. When the concentration of radioactive material in liquid effluents exceeds 4% of this limit, when averaged over a calendar quarter, certain actions are required of Vermont Yankee. These actions include an investigation to identify the cause and to report the quarterly average to the Vermont Board of Health. These actions are required as soon as it becomes evident that the quarterly average of discharges will exceed these levels.

Summary of Calculations and Applicable Limits for Liquid Release of 8/14/92

Technical Specification	Calculated Value at Discharge Based on Release of 1000 gal in One Hour
Liquid Effluents: Concentration	
1) 10 CFR 20, App. B, Table II, Col. 2 concentrations	2.92 E-3 MPC's
2) 2×10^{-4} μCi/ml total activity for noble gases	1.16 E-9 μCi/ml noble gas activity
Liquid Effluents: Dose	
1) 1.5 mrem total body dose in any quarter, 3 mrem total body dose per year	1.27 E-7 mrem total body dose
2) 5 mrem to any organ in any quarter, 10 mrem to any organ per year	6.23 E-5 mrem organ dose
Reporting Limit	
10 CFR 50.72 2x MPC averaged over one hour	2.43 E-4 MPC's averaged over one hour
Vermont State Limits	
1) Radioactive material except tritium and dissolved noble gases shall not exceed 1×10^{-7} μCi/ml	4.10 E-9 μCi/ml at Discharge
2) Tritium shall not exceed 3×10^{-3} μCi/ml	5.72 E-9 μCi/ml at Discharge
3) Dissolved noble gases shall not exceed 4×10^{-5} μCi/ml	1.16 E-9 μCi/ml at Discharge

→ RICH PAGE N. DRAFT #2

Attachment, VYNPC, 8/20/92 DAN MARX

Overflow of Condensate Demineralizer Backwash Receiving Tank

On August 14, 1992 at approximately 1330, while backwashing the B condensate demineralizer and transferring the contents to the condensate demineralizer backwash tank, the electric pump which transfers the water from the tank to radwaste failed, resulting in the backwash receiving tank overflowing onto the floor. The water was radioactively contaminated and contained some resin material [illegible] e floor in the vicinity of the tank was flo[illegible]d to a depth of approximately 1-2 inches.

Samples taken in a nearby sump indicated the presence of [illegible]active Iodine and Tritium.

The sump pumps are designed to cycle if required by level so it is possible that some contaminated water was discharged to the river by way of the service water system (10,000 gpm) and then into the main circulating water system (360,000 gpm) before entering the Connecticut River.

The precise volume of contaminated water that may have been discharged to the river is estimated to be less than 15 gallons. Radiation monitors and samples at [illegible] point of discharge did [illegible] record any evidence of radioactivity and remained normal durin[illegible]

[illegible]e personnel isolated the sump pumps and terminated the potential [illegible]arge at [illegible]v 1430.

[illegible]gical analysis of samples taken from the floor, sumps, and the discharge [illegible] suming bounding conditions, Vermont Yankee calculated that Technical [illegible] NRC 10CFR requirements and limits were not exceeded and the event was [illegible] re[illegible] the NRC. The calculated parameter values were also below [illegible]ermont Depart[illegible] Health Radiological Health limits and the NPDES Permit limits.

[illegible]ed values were based on the extremely conservative assumption that rad[illegible] wate[illegible] pumped out of the sumps and discharged through the normal flow path to the [illegible]er continuously during the event. The calculation assumes dilution by the flow of the Circulating Water system (360,000 gpm) occurring concurrently with the discharge.

The actual volume of radioactive water discharged is estimated to be three orders of magnitude below the bounding calculated values, or less than 15 gallons. Connecticut River flow at the time of the incident was approximately 6000 cf[illegible]

DJM.8/20/92

SUMMARY OF APPLICABLE LIMITS AND "OUTER BOUNDS" CALCULATED VALUES FOR LIQUID RELEASE OF 8/14/92

Bases - The "Calculated Value is based upon the assumption that 12000 gallons of radioactive water was pumped out of the TB Clean Sump and discharged, through the normal flow path, to the river. The calculation assumes dilution by the flow of Circulating Water(360000 gpm) occurring concurrently with this discharge.

APPLICABLE LIMITS	LIQUID RELEASE CalculatedValue
TECHNICAL SPECIFICATIONS	
Liquid Effluents: Concentrations	
1)T.S.3.8.A.1 - ≤ 1 MPC as determined by 10CFR20, App.B, Table II, Col. 2 conc.(Noble Gases excluded)	2.92E-3 MPC's
2)T.S.3.8.A.1 - Total Noble Gases Conc. ≤ 2E-4 uci/cc	1.16E-9 uci/cc
Liquid Effluents: Dose	
1)Total Body Dose -T.S.3.8.B.1 - 1.5 mrem in any quarter, 3 mrem total for year	1.52E-6 mrem
2)Organ Dose - T.S.3.8.B.1 - 5 mrem in any quarter, 10 mrem total for year	7.47E-4 mrem
10CFR50.72 REPORTING REQUIREMENTS	
2 times MPC when averaged over one hour	2.92E-3 MPC's
NPDES REPORTING REQUIREMENTS	
Unplanned Releases	Yes
10CFR20 App B, Table II, Col.2 (≤ 1 MPC)	2.92E-3 MPC's
Total Radionuclides(excluding tritium) shall be ≤ 5 curies per year	4.42E-4 curies
Total Tritium shall be ≤ 5 curies per year	4.82E-4 curies
Dose	
Calendar quarter - ≤ 1.5 mrem total body	1.52E-6 mrem
- ≤ 5 mrem to any organ	7.47E-4 mrem
Calendar year - ≤ 3 mrem total body	1.52E-6 mrem
- ≤ 10 mrem to any organ	7.47E-4 mrem
pH - 6.5 to 8.5 Standard Units	7.6
Flow - 14.4 million gallons per day	12000 gallons

VERMONT STATE RAD HEALTH REGULATIONS(Part 5, Chap. 3)

1. Radioactive Material(except tritium and dissolved noble gases ≤ 1E-7 uci/ml* — 4.10E-9 uci/ml

   Additional action levels *

   >2% of 1E-7(or 2E-9)uci/ml* — 4.10E-9 uci/ml
   Requires investigation, programs to reduce releases and report to Vt. Board of Health within 14 days (see regulation for additional details)

   >4% of 1E-7(or 4E-9)uci/ml* — 4.10E-9 uci/ml
   Requires investigation, immediate report to the Vt. Board of Health and then, < 14days later, followup report to Vt. Board of Health(see regulation for additional details)

2. Tritium - ≤ 3E-3 uci/ml — 5.72E-9 uci/ml
   (see regulation for additional quarterly limits)

3. Dissolved noble gases - ≤ 4E-5 uci/ml — 1.16E-9 uci/ml
   (see regulation for additional quarterly limits)

Reviewed + Approved
A C Shilmowthy 8/18/92

* These action levels only apply if the release was not evaluated on an Isotopic basis. Since this release was, the limits of 10CFR20, App. B, Table II, column 2. apply.
A C Shilmowthy
8/18/92

ALARM RESPONSE SHEET

PROCESS RADIATION MONITORING		3-F-6 Page 1 of 1
SERVICE WATER EFFLUENT RAD HI		Rev. 3
Causes: 1. High background radiation levels.	Setpoints: 5.1 cps	Actuating Devices: 1. RM-17-351 References: CWD 983 ON 3153

Confirmation:

1. Service water rad monitor reading on RR-17-353 on CRP 9-2.
2. Service water rad monitor RM-17-351 on CRP 9-10.

Automatic Actions:

None

Operator Actions:

1. Verify radiation level is high in the service water system.
2. Check service water and rad. monitor lineup.
3. Check for high background area radiation near service water rad. monitor.
4. Refer to ON 3153.

MEMORANDUM

To: Van Bowman Vernon August 20, 1992
From: Steve Skibniowsky Vernon

Subject: Analysis of Station Air Compressor Blowdown to determine Appropriate Flow Pathway

Attachment: Memo from Steve McAvoy to Steve Skibniowsky, dated August 20, 1992, "TB Clean Sump"

As a follow up to our discussion concerning the appropriate flow pathway for blowdown of condensed water from the Station Air Compressor, I have evaluated the attached memo from Steve McAvoy concerning the analysis of some of the input sources to the TB Clean Sump. I have concluded that, given the radionuclides identified in the compressor blowdown sample, the only appropriate method for disposal of this water is to send it to Radwaste. The concentration of tritium and other nuclides exceeds, in this sample, the lower limit of detection for tritium and the "statistically significant" levels of the other nuclides.

If you have questions concerning this conclusion, please contact me at your earliest convenience.

M E M O R A N D U M

To : Steve Skibniowsky
From : Steve McAvoy

Date: August 20, 1992
File: 17.2

Subject: TB Clean Sump

Following the contamination incident of the Turbine Building Clean Sump at the 222' level on August 14, 1992, sources of water feeding that sump were checked to Environmental Release limits for gamma emitters and tritium. The following statistically significant radionuclides were quantified:

Source	Nuclide	Activity (uCi/ml)
Service Water	Gamma, H-3	<Env. LLD
Circ. Water	Gamma, H-3	<Env. LLD
Station Air Compressor Blowdown	H-3	5.7 E-5
	I-133	1.05 E-8
	Cs-138	7.53 E-7
	Ba-139	5.37 E-7
	Y-91m	5.22 E-8
	Xe-135	7.89 E-9

Although the dilution factors are great and would probably result in the total activity in the sump being below allowable release limits, the discharge of the Air Compressor Blowdown to the TB Clean Sump should be discontinued as it would constitute a release of radioactive liquid from the RCA.

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*****************     19-AUG-92 20:08:15     *****************
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VERMONT YANKEE NUCLEAR POWER CORPORATION

[redacted]

SAMPLE DATE.....: 19-AUG-92 14:00:00
SAMPLE IDENTIFICATION: [redacted]
TYPE OF SAMPLE.....: LIQUID MARINELLI
SAMPLE QUANTITY.....: 1000.000 UNITS: ML
SAMPLE GEOMETRY.....: VY2005
OPERATOR.....: KLH
EFFICIENCY FILE NAME.: EFF.VY2005,,

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*************************************************************
                                        *
ACQUIRE DATE: 19-AUG-92 14:34:41        * FWHM(1332)          1.897
PRESET TIME(LIVE):    20000. SEC        * SENSITIVITY:        5.000
ELAPSED REAL TIME:    20000. SEC        * SHAPE PARAMETER : 10.0 %
ELAPSED LIVE TIME:    20000. SEC        * NBR ITERATIONS:    10.
*************************************************************
                                        *
DETECTOR..:  20% HPGE                   * LIBRARY          NUCL .LIB1
CALIB DATE:  19-AUG-92 00:39:05         * ENERGY TOLERANCE    1.500KV
KEV/CHNL..:  0.5001647                  * HALF LIFE RATIO       8.00
OFFSET....: -0.1161263 KEV              * ABUNDANCE LIMIT     80.00%
Q. COEFF..:  0.000E-01 KEV/C**2         * DECAY TIME (MIN)       34.0
*************************************************************
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ENERGY WINDOW 24.89 TO 2048.56
1.00-SIGMA %ERR

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	0	46.39	155.	286.	1.01	92.98	89	10	7.76E-03	22.3	
2	0	62.81	111.	259.	1.09	125.82	121	9	5.54E-03	28.7	
3	0	93.24	249.	374.	1.32	186.66	181	14	1.24E-02	17.9	
4	0	165.97	506.	242.	0.96	332.07	328	10	2.53E-02	7.4	
5	0	185.70	92.	145.	1.34	371.52	368	8	4.59E-03	26.0	
6	0	238.42	33.	154.	0.86	476.91	474	8	1.65E-03	66.4	
7	0	249.84	79.	106.	1.30	499.74	495	9	3.97E-03	27.6	
8	0	462.79	141.	52.	1.33	925.51	922	9	7.04E-03	13.1	
9	0	510.80	205.	104.	2.19	1021.49	1014	16	1.03E-02	13.3	
10	0	529.46	67.	40.	4.34	1058.81	1052	14	3.37E-03	27.8	
11	0	546.45	40.	48.	0.68	1092.76	1087	12	1.99E-03	41.1	
12	0	555.30	52.	54.	0.92	1110.47	1108	9	2.58E-03	30.8	
13	0	583.24	24.	34.	1.29	1166.32	1163	7	1.20E-03	47.1	
14	0	871.41	30.	28.	0.76	1742.47	1736	10	1.51E-03	39.8	
15	0	1009.08	85.	37.	1.77	2017.72	2009	14	4.27E-03	16.4	
16	0	1435.37	127.	23.	1.49	2870.02	2865	13	6.33E-03	13.4	
17	0	1460.02	23.	9.	1.82	2919.32	2916	7	1.16E-03	33.3	

PEAK SEARCH COMPLETED (REV 15.7)

NUCLIDE IDENTIFICATION SYSTEM (REV JUN 87)
SUMMARY OF NUCLIDE ACTIVITY

TOTAL PEAKS IN SPECTRUM 17
UNIDENTIFIED PEAKS 8
IDENTIFIED IN SUMMARY REPORT 9 52.94%

FISSION GAS

NUCLIDE	SBHR	HLIFE	DECAY	UCI /UNIT	1.00-SIGMA ERROR	1.00-SIGMA %ERR
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	175E -9	27.57

FISSION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /UNIT	1.00-SIGMA ERROR	1.00-SIGMA %ERR
[redacted]	FP	20.80H	1.117	[redacted]	2.912E -9	27.80
[redacted]	FP	49.71M	7.612	[redacted]	1.608E -8	30.79
[redacted]	FP	32.20M	15.150	[redacted]	1.009E -7	13.39
[redacted]	FP	82.71M	3.979	[redacted]	3.973E -8	7.40

VERMONT YANKEE QUANTITATIVE RADIOISOTOPIC
LLD ANALYSIS
19 AUG 1992 20:11:36

NEXT TO LLD LIMIT INDICATES LLD NOT MET

NUCLIDE	LLD UCI/ML	LLD LIMIT UCI/ML	
MN-54	5.651E-09	1.5E-08	
FE-59	9.619E-09	3.0E-08	
CO-58	4.578E-09	1.5E-08	
CO-60	5.855E-09	1.5E-08	
ZN-65	1.191E-08	3.0E-08	
ZR-95	7.436E-09	1.5E-08	
NB-95	5.347E-09	1.5E-08	
I-131	4.580E-09	1.5E-08	
CS-134	5.577E-09	1.5E-08	
CS-137	4.816E-09	1.8E-08	
BA-140	1.605E-08	1.5E-08	#
LA-140	4.579E-09	1.5E-08	

Service, circ. water
all < lower LLD for
isotopic and < 1.9E-6 uCi/ml H^3