



February 28, 1992

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U. S. Nuclear Regulatory Commission  
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Washington, DC 20555

Subject: Arkansas Nuclear One - Unit 2  
Docket No. 50-368  
License No. NFP-6  
Annual Report For the Activity  
of the Primary Coolant - 1991

Gentlemen:

Arkansas Nuclear One, Unit 2 (ANO-2) Technical Specification 6.9.1.5.e requires an annual submittal of the results of the specific activity analysis in which the primary coolant exceeded the limits of Specification 3.4.8. The specific activity of the primary coolant, as required by Specification 3.4.8, shall be limited to a) less than or equal to 1.0 microcurie per gram DOSE EQUIVALENT I-131, and b) less than or equal to 100/1E (Average Disintegration Energy) microcuries per gram. The purpose of this letter is to provide this information for 1991.

The limits of Specification 3.4.8 were exceeded on October 9, 1991 at 2000 hours. ANO-2 primary coolant exceeded this limit for approximately eight hours. The cause for exceeding the limit is a failed fuel pin in the Cycle 9 core.

Radiochemistry data recorded over Cycle 9 shows that RCS concentration of I-131 decreased over the period from early July until late August, when it appeared to "stabilize". This period corresponds with a long run of steady full power operation for ANO-2. It is known that fuel pellets will thermally expand more than the pin cladding and will also swell under operation, closing the gap between the pellets and the inner surface of the fuel pin cladding. ANO believes that during this long run at steady power, the swelling of the fuel pellets closed off much of the free path available for fission products and their daughter fission products exit the fuel pin through the defect. This effect was further enhanced by the apparently small size of the defect. Although the amount of radioisotopes entering the RCS declined over this time, the amount being produced was not declining and was being stored up within the defective fuel pin. When the reactor was shutdown on October 9, 1991, the fuel pellets thermally contracted, opening up the gap area and allowing this inventory of radioisotopes to exit the fuel pin.

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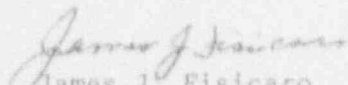
The coolant activity reached a maximum of 1,342 microcuries per milliliter (gram).

The following attachments provide the information as requested by Technical Specification 5.9.1.5.e:

- Attachment 1 provides the reactor power history starting 48 hours prior to the first sample in which the limit was exceeded.
- The results of the last isotopic analysis for radiiodine performed prior to exceeding the limit, the results of the analysis while the limit was exceeded, and the results of one analysis when the activity was reduced below the limits are provided in Attachment 2.
- The history of the letdown system flow is in Attachment 3. This history started 48 hours prior to the first sample exceeding the limit.
- Attachment 4 includes graphs of I-131 and I-132 concentration as a function of time for the duration of the specific activity was above steady state levels.

This letter completes the annual 1991 reporting requirements for Technical Specification 6.9.1.5.e. Should you have any questions regarding this submittal, please contact me.

Very truly yours,

  
James J. Fisicaro  
Director, Licensing

JJF/RWC/jt

Attachments

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ATTACHMENT 1  
REACTOR POWER HISTORY

DAY	ANO UNIT TWO					
07-Oct-91	ENTER	DELTA	CALCULATED	CORRECT	CORRECTED	EFPD
HOUR	EFPD	EFPD	RX POWER	RX POWER	EFPD	CORRECTION
0000	163.5789					
		0.0396	95.04	99.912	0.04163	0.00203
0100	163.6185					
		0.04166	99.984	NA	0	0
0200	163.6601					
		0.04162	99.888	NA	0	0
0300	163.7018					
		0.04126	99.024	99.912	0.04163	0.00037
0400	163.7430					
		0.04163	99.912	NA	0	0
0500	163.7847					
		0.04161	99.864	NA	0	0
0600	163.8263					
		0.04164	99.936	NA	0	0
0700	163.8679					
		0.04164	99.936	NA	0	0
0800	163.9095					
		0.0417	100.08	NA	0	0
0900	163.9512					
		0.04163	99.912	NA	0	0
1000	163.9929					
		0.0417	100.08	NA	0	0
1100	164.0346					
		0.04167	100.008	NA	0	0
1200	164.0762					
		0.04126	99.024	99.936	0.04164	0.00038
1300	164.1175					
		0.04171	100.104	NA	0	0
1400	164.1592					
		0.04167	100.008	NA	0	0
1500	164.2009					
		0.04164	99.936	NA	0	0
1600	164.2425					
		0.04164	99.936	NA	0	0
1700	164.2842					
		0.04167	100.008	NA	0	0
1800	164.3258					
		0.04167	100.008	NA	0	0
1900	164.3675					
		0.04164	99.936	NA	0	0
2000	164.4091					
		0.04133	99.192	99.912	0.04163	0.0003
2100	164.4505					
		0.04167	100.008	NA	0	0
2200	164.4921					
		0.04165	99.96	NA	0	0
2300	164.5338					
		0.04169	100.056	NA	0	0
0000	164.5755					

TOTAL RX POWER = 99.66  
RX POWER CORRECTIONS = 0.308  
CORRECTED RX POWER = 99.968

DAY 08-Oct-91	ENTER EFPD	DELTA EFPD	ANO UNIT TWO CALCULATED RX POWER	CORRECT RX POWER	CORRECTED EFPD	EFPD CORRECTION
0000	164.5755					
0100	164.6171	0.04161	99.864	NA	0	0
0200	164.6587	0.04164	99.936	NA	0	0
0300	164.7003	0.04161	99.864	NA	0	0
0400	164.7416	0.04126	99.024	99.912	0.04163	0.00037
0500	164.7833	0.04171	100.104	NA	0	0
0600	164.825	0.04164	99.936	NA	0	0
0700	164.8666	0.04162	99.888	NA	0	0
0800	164.9083	0.04172	100.128	NA	0	0
0900	164.9499	0.04164	99.936	NA	0	0
1000	164.9916	0.04164	99.936	NA	0	0
1100	165.0332	0.04167	100.008	NA	0	0
1200	165.0745	0.04178	99.072	99.836	0.041598	0.0003183
1300	165.1162	0.04169	100.056	NA	0	0
1400	165.1579	0.04164	99.936	NA	0	0
1500	165.1995	0.04162	99.888	NA	0	0
1600	165.2412	0.04171	100.104	NA	0	0
1700	165.2828	0.04165	99.96	NA	0	0
1800	165.3245	0.04169	100.056	NA	0	0
1900	165.3662	0.04166	99.984	NA	0	0
2000	165.4078	0.04162	99.888	NA	0	0
2100	165.4491	0.04129	99.096	99.836	0.041598	0.0003083
2200	165.4908	0.04167	100.008	NA	0	0
2300	165.5324	0.04168	100.032	NA	0	0
0000	165.5741	0.04167	100.008	NA	0	0

TOTAL RX POWER = 99.863  
RX POWER CORRECTIONS = 0.099666  
CORRECTED RX POWER = 99.96266

DAY 09-Oct-91 HOUR	ENTER EFPD	DELTA EFPD	ANO UNIT TWO CALCULATED RX POWER	CORRECT RX POWER	CORRECTED EFPD	EFPD CORRECTION
0000	165.5741					
		0.04167	100.008	NA	0	0
0100	165.6158					
		0.04166	99.984	NA	0	0
0200	165.6574					
		0.04119	98.856	99.77	0.041570	0.0003808
0300	165.6986					
		0.04162	99.888	NA	0	0
0400	165.7403					
		0.04168	100.032	NA	0	0
0500	165.7819					
		0.04164	99.936	NA	0	0
0600	165.8236					
		0.04169	100.056	NA	0	0
0700	165.8653					
		0.04166	99.984	NA	0	0
0800	165.9069					
		0.04165	99.96	NA	0	0
0900	165.9486					
		0.04171	100.104	NA	0	0
1000	165.9903					
		0.04127	99.048	99.936	0.04164	0.00037
1100	166.0316					
		0.04169	100.056	NA	0	0
1200	166.0732					
		0.04165	99.96	NA	0	0
1300	166.1149					
		0.0416	99.84	NA	0	0
1400	166.1565					
		0.04167	100.008	NA	0	0
1500	166.1982					
		0.04041	96.984	NA	0	0
1600	166.2386					
		0.02733	65.592	NA	0	0
1700	166.2659					
		0.01342	32.208	NA	0	0
1800	166.2793					
		0	0	NA	0	0
1900	166.2793					
		0	0	NA	0	0
2000	166.2793					
		0	0	NA	0	0
2100	166.2793					
		0	0	NA	0	0
2200	166.2793					
		0	0	NA	0	0
2300	166.2793					
		0	0	NA	0	0
0000	166.2793					
		0	0	NA	0	0

TOTAL RX POWER = 70.521

RX POWER CORRECTIONS = 0.075083

CORRECTED RX POWER = 70.59608

DAY	ENTER	DELTA	ANO UNIT TWO	CORRECT	CORRECTED	EFPD
10-Oct-91	EFPD	EFPD	CALCULATED	RX POWER	EFPD	CORRECTION
HOOR			RX POWER			
0000	166.2793					
		-166.279	-399070.	NA	0	0
0100	0			NA	0	0
		0	0	NA	0	0
0200	0			NA	0	0
		0	0	NA	0	0
0300	0			NA	0	0
		0	0	NA	0	0
0400	0			NA	0	0
		0	0	NA	0	0
0500	0			NA	0	0
		0	0	NA	0	0
0600	0			NA	0	0
		0	0	NA	0	0
0700	0			NA	0	0
		0	0	NA	0	0
0800	0			NA	0	0
		0	0	NA	0	0
0900	0			NA	0	0
		0	0	NA	0	0
1000	0			NA	0	0
		0	0	NA	0	0
1100	0			NA	0	0
		0	0	NA	0	0
1200	0			NA	0	0
		0	0	NA	0	0
1300	0			NA	0	0
		0	0	NA	0	0
1400	0			NA	0	0
		0	0	NA	0	0
1500	0			NA	0	0
		0	0	NA	0	0
1600	0			NA	0	0
		0	0	NA	0	0
1700	0			NA	0	0
		0	0	NA	0	0
1800	0			NA	0	0
		0	0	NA	0	0
1900	0			NA	0	0
		0	0	NA	0	0
2000	0			NA	0	0
		0	0	NA	0	0
2100	0			NA	0	0
		0	0	NA	0	0
2200	0			NA	0	0
		0	0	NA	0	0
2300	0			NA	0	0
		166.2793	399070.4	NA	0	0
0000	166.2793					

TOTAL RX POWER = 0  
RX POWER CORRECTIONS = 0  
CORRECTED RX POWER = 0



DAY	ENTER	DELTA	ANO UNIT TWO	CORRECT	CORRECTED	EFPD
11-Oct-91	EFPD	EFPD	CALCULATED	RX POWER	EFPD	CORRECTION
HR			RX POWER			
0000	166.2793					
		-166.279	-399070.	NA	0	0
0100	0			NA	0	0
		0	0	NA	0	0
0200	0			NA	0	0
		0	0	NA	0	0
0300	0			NA	0	0
		0	0	NA	0	0
0400	0			NA	0	0
		0	0	NA	0	0
0500	0			NA	0	0
		0	0	NA	0	0
0600	0			NA	0	0
		0	0	NA	0	0
0700	0			NA	0	0
		0	0	NA	0	0
0800	0			NA	0	0
		0	0	NA	0	0
0900	0			NA	0	0
		0	0	NA	0	0
1000	0			NA	0	0
		0	0	NA	0	0
1100	0			NA	0	0
		0	0	NA	0	0
1200	0			NA	0	0
		0	0	NA	0	0
1300	0			NA	0	0
		0	0	NA	0	0
1400	0			NA	0	0
		0	0	NA	0	0
1500	0			NA	0	0
		0	0	NA	0	0
1600	0			NA	0	0
		0	0	NA	0	0
1700	0			NA	0	0
		0	0	NA	0	0
1800	0			NA	0	0
		0	0	NA	0	0
1900	0			NA	0	0
		0	0	NA	0	0
2000	0			NA	0	0
		0	0	NA	0	0
2100	0			NA	0	0
		0	0	NA	0	0
2200	0			NA	0	0
		0	0	NA	0	0
2300	0			NA	0	0
		166.3102	399144.5	NA	0	0
0000	166.3102					

TOTAL RX POWER = 3.089

RX POWER CORRECTIONS = 0

CORRECTED RX POWER = 3.089

DAY 12-Oct-91 HOUR	ENTER EFPD	DELTA EFPD	ANO UNIT TWO CALCULATED RX POWER	CORRECT RX POWER	CORRECTED EFPD	EFPD CORRECTION
0000	166.3102					
0100	166.3181	0.00784	18.816	NA	0	0
0200	166.3255	0.00742	17.808	NA	0	0
0300	166.3333	0.00784	18.816	NA	0	0
0400	166.3413	0.00798	19.152	NA	0	0
0500	166.3492	0.0079	18.96	NA	0	0
0600	166.3570	0.00779	18.696	NA	0	0
0700	166.3648	0.00782	18.768	NA	0	0
0800	166.3725	0.00774	18.576	NA	0	0
0900	166.3802	0.00766	18.384	NA	0	0
1000	166.3879	0.00774	18.576	NA	0	0
1100	166.3957	0.00776	18.624	NA	0	0
1200	166.4035	0.00778	18.672	NA	0	0
1300	166.4119	0.00841	20.184	NA	0	0
1400	166.4214	0.00955	22.92	NA	0	0
1500	166.4328	0.01134	27.216	NA	0	0
1600	166.4446	0.0118	28.32	NA	0	0
1700	166.4565	0.01188	28.512	NA	0	0
1800	166.4683	0.01187	28.488	NA	0	0
1900	166.4802	0.01184	28.416	NA	0	0
2000	166.4921	0.01188	28.512	NA	0	0
2100	166.5039	0.01188	28.512	NA	0	0
2200	166.5159	0.01192	28.608	NA	0	0
2300	166.5279	0.01207	28.968	NA	0	0
0000	166.5408	0.01283	30.792	NA	0	0

TOTAL RX POWER = 23.054

RX POWER CORRECTIONS = 0

CORRECTED RX POWER = 23.054

DAY	ENTER	DELTA	ANO UNIT TWO	CORRECT	CORRECTED	EFPD
13-Oct-91	EFPD	EFPD	CALCULATED	RX POWER	EFPD	EFPD
HOUR			RX POWER			CORRECTION
0000	166.5408					
		0.015	36	NA	0	0
0100	166.5558					
		0.01743	41.832	NA	0	0
0200	166.5732					
		0.01925	46.2	NA	0	0
0300	166.5924					
		0.02149	51.576	NA	0	0
0400	166.6139					
		0.02334	56.016	NA	0	0
0500	166.6373					
		0.02553	61.272	NA	0	0
0600	166.6628					
		0.02742	65.808	NA	0	0
0700	166.5902					
		0.02808	67.392	NA	0	0
0800	166.7183					
		0.02835	68.04	NA	0	0
0900	166.7466					
		0.02832	67.968	NA	0	0
1000	166.7750					
		0.02829	67.896	NA	0	0
1100	166.8033					
		0.02867	68.808	NA	0	0
1200	166.8319					
		0.03059	73.416	NA	0	0
1300	166.8625					
		0.03185	76.44	NA	0	0
1400	166.8944					
		0.03285	78.84	NA	0	0
1500	166.9272					
		0.03435	82.44	NA	0	0
1600	166.9616					
		0.03564	85.536	NA	0	0
1700	166.9972					
		0.03687	88.488	NA	0	0
1800	167.0341					
		0.03709	89.016	NA	0	0
1900	167.0712					
		0.03716	89.184	NA	0	0
2000	167.1083					
		0.03764	90.336	NA	0	0
2100	167.146					
		0.0389	93.36	NA	0	0
2200	167.1849					
		0.04008	96.192	NA	0	0
2300	167.2249					
		0.04089	98.136	NA	0	0
0000	167.2658					

TOTAL RX POWER = 72.508

RX POWER CORRECTIONS = 0

CORRECTED RX POWER = 72.508

ATTACHMENT 2

RESULTS OF ISOTOPIC ANALYSIS

RESULTS OF ANALYSIS PERFORMED  
WHILE EXCEEDING THE LIMITS

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Configuration      : DRB200:[GSDATA]91-05286.CNF;1
Analyses by       : PEAK V16.0,PEAKEFF V2.2,NID V2.3
Sample date       : 9-OCT-1991 09:25:00 Acquisition date : 9-OCT-1991 11:06:13
Sample ID        : 2 RCS Liquid Sample quantity   : 10.000 ml
Sample type      : 60 ml bottle Sample geometry  : Table 202
Detector name    : HPGe 2 Detector geometry: 60 ml bottle 14
Elapsed live time: 0 00:30:00.00 Flapsed real time: 0 00:31:24.24 4.5%
Energy tolerance : 1.75 keV Half life ratio  : 8.00
Errors propagated: No Systematic Error : 0.00 %
Efficiency type  : Spline Efficiencies at : Peak Energy
Abundance limit  : 37.50
    
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Summary of Nuclide Activity

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Total number of lines in spectrum      133
Number of unidentified lines           15
Number of lines tentatively identified by NID 118      88.72%
    
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Nuclide Type : AP

Nuclide	Hlife	Decay	Uncorrected UCI/ml	Decay Corr UCI/ml	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
BE-7	53.40D	1.001	1.582E-03	1.584E-03	0.481E-03	30.35	
NA-24	15.03H	1.094	4.473E-03	4.894E-03	0.086E-03	1.75	
CR-51	27.70D	1.002	8.390E-04	8.407E-04	4.594E-04	54.64	
CO-56	77.30D	1.001	8.934E-03	8.941E-03	0.111E-03	1.24	K
MN-56	2.58H	1.688	9.024E-03	1.523E-02	0.019E-02	1.24	K
CO-58	70.78D	1.001	5.040E-04	5.044E-04	0.531E-04	10.53	
FE-59	45.10D	1.001	5.306E-04	5.313E-04	1.024E-04	19.28	K
CO-60	5.27Y	1.000	2.160E-04	2.160E-04	0.540E-04	24.99	
NB-94	20300.00Y	1.000	4.309E-04	4.309E-04	0.601E-04	13.96	K
ZR-95	64.40D	1.001	1.721E-04	1.722E-04	0.851E-04	49.38	
SB-122	2.70D	1.021	1.233E-04	1.259E-04	0.688E-04	54.70	
W-187	23.90H	1.058	6.963E-04	7.368E-04	2.236E-04	30.35	
Total Activity :			2.753E-02	3.421E-02			

Nuclide Type : AG

Nuclide	Hlife	Decay	Uncorrected UCI/ml	Decay Corr UCI/ml	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
AR-41	1.83H	2.089	3.182E-04	6.646E-04	0.850E-04	12.79	
Total Activity :			3.182E-04	6.646E-04			

Nuclide Type : FP

Nuclide	Hlife	Decay	Uncorrected UCI/ml	Decay Corr UCI/ml	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
RB-68	17.80M	89.249	1.680E-03	1.499E-01	0.346E-01	23.08	
Y-88	106.60D	1.001	2.591E-04	2.592E-04	0.598E-04	23.08	
Y-92	3.53H	1.466	4.978E-04	7.295E-04	3.532E-04	48.42	
NB-95	35.15D	1.002	6.030E-04	6.040E-04	0.653E-04	10.82	
RU-106	368.20D	1.000	1.404E-02	1.404E-02	0.064E-02	4.59	
CD-113M	14.60Y	1.000	3.505E+00	3.505E+00	0.771E+00	22.00	

Nuclide Type : FP

Nuclide	Hlife	Decay	Uncorrected UCI/ml	Decay Corr UCI/ml	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
SB-127	3.85D	1.015	2.496E-04	2.533E-04	1.176E-04	46.41	
TE-132	3.25D	1.017	8.81 E-05	8.969E-05	5.164E-05	57.58	
CS-134	2.06Y	1.000	5.822E-04	5.822E-04	0.745E-04	12.79	
CS-137	30.10Y	1.000	7.167E-04	7.167E-04	0.595E-04	8.30	
CS-138	32.20M	12.157	6.525E-03	7.932E-02	0.151E-02	1.91	
BA-139	1.42H	2.590	1.971E-03	5.106E-03	0.737E-03	14.43	
CE-139	137.50D	1.000	4.632E-04	4.634E-04	0.668E-04	14.43	
BA-140	12.79D	1.004	4.526E-04	4.546E-04	2.406E-04	52.94	
Total Activity :			3.534E+00	3.758E+00			

Nuclide Type : HFP

Nuclide	Hlife	Decay	Uncorrected UCI/ml	Decay Corr UCI/ml	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
I-131	8.04D	1.007	7.067E-03	7.117E-03	0.107E-03	1.50	
I-132	2.38M	1.762	1.673E-02	2.949E-02	0.019E-02	0.64	
I-133	20.30Y	1.069	2.178E-02	2.327E-02	0.012E-02	0.53	
I-134	52.60M	4.635	9.306E-03	4.313E-02	0.053E-02	1.24	
I-135	6.61H	1.227	2.642E-02	3.240E-02	0.043E-02	1.33	
Total Activity :			8.130E-02	1.354E-01			

Nuclide Type : FG

Nuclide	Hlife	Decay	Uncorrected UCI/ml	Decay Corr UCI/ml	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
XE-133	5.29D	1.011	1.562E-03	1.579E-03	0.140E-03	8.88	
XE-135	9.08H	1.160	3.637E-03	4.220E-03	0.088E-03	2.09	
XE-135M	15.60M	166.538	4.550E-03	7.578E-01	0.128E-01	1.69	
Total Activity :			9.750E-03	7.636E-01			

Grand Total Activity : 3.652E+00 4.692E+00

Flags: "K" = Keyline not found  
 "E" = Manually edited

"M" = Manually accepted  
 "A" = Nuclide specific abn. limit

Fission Product Report

Sample ID : 2 RCS Liquid

Sampled : 9-OCT-1991 09:25:00

Nuclide	Activity
I-131	7.117E-03 uCi/ml
I-132	2.949E-02 uCi/ml
I-133	2.326E-02 uCi/ml
I-134	4.313E-02 uCi/ml
I-135	3.240E-02 uCi/ml
Cs-134	5.822E-04 uCi/ml
Cs-137	7.035E-04 uCi/ml
I-131DE	1.792E-02 uCi/ml
I-131/I-133 ratio	3.059E-01
Cs-134/Cs-137 ratio	8.276E-01



RESULTS OF LAST ANALYSIS PERFORMED  
PRIOR TO EXCEEDING THE LIMITS

Configuration : DKB200:[GSDATA]91-05314.CNF;1  
 Analyses by : PEAK V16.0,PEAKEFF V2.2,NID V2.3  
 Sample title : 2 hr IDE and TSP IDE  
 Sample date : 9-OCT-1991 20:00:00 Acquisition date : 9-OCT-1991 20:28:37  
 Sample ID : 2 RCS Liquid Sample quantity : 10.000 ml  
 Sample type : 60 ml bottle Sample geometry : Table 104  
 Detector name : HPGe 1 Detector geometry: 60 ml bottle 33  
 Elapsed live time: 0 00:30:00.00 Elapsed real time: 0 00:32:33.43 7.9%  
 Energy tolerance : 1.75 keV Half life ratio : 8.00  
 Errors propagated: No Systematic Error : 0.00 %  
 Efficiency type : Spline Efficiencies at : Peak Energy  
 Abundance limit : 37.50

Summary of Nuclide Activity

Total number of lines in spectrum 147  
 Number of unidentified lines 18  
 Number of lines tentatively identified by NID 129 87.76%

Nuclide Type : AP

Nuclide	Hlife	Decay	Uncorrected UCI/ml	Decay Corr UCI/ml	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
NA-24	15.03H	1.035	5.128E-03	5.308E-03	0.521E-03	9.81	
CR-51	27.70D	1.001	2.636E-02	2.638E-02	0.524E-02	19.85	
CO-56	77.30D	1.000	3.949E-02	3.950E-02	0.078E-02	1.99	K
MN-56	2.58H	1.222	3.667E-03	4.481E-03	1.190E-03	26.55	
CO-58	70.78D	1.000	7.044E-02	7.046E-02	0.107E-02	1.52	
FE-59	45.10D	1.000	1.081E-02	1.082E-02	0.103E-02	9.56	K
CO-60	5.27Y	1.000	4.237E-03	4.237E-03	0.544E-03	12.84	
ZK-95	64.40D	1.000	5.033E-03	5.034E-03	0.921E-03	18.29	
AG-110M	249.90D	1.000	3.416E-02	3.416E-02	0.110E-02	3.22	
SB-122	2.70D	1.008	1.583E-02	1.595E-02	0.095E-02	5.96	
Total Activity :			2.151E-01	2.163E-01			

Nuclide Type : FP

Nuclide	Hlife	Decay	Uncorrected UCI/ml	Decay Corr UCI/ml	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
RB-88	17.80M	5.379	1.540E-02	8.284E-02	2.360E-02	28.49	
Y-88	106.60D	1.000	2.376E-03	2.376E-03	0.677E-03	28.49	
SR-91	9.67H	1.055	2.566E-03	2.708E-03	0.999E-03	36.89	K
Y-93	10.30H	1.052	2.547E-02	2.679E-02	0.696E-02	25.98	
NB-95	35.15D	1.001	4.786E-03	4.789E-03	0.614E-03	12.83	
NB-97	16.80H	1.031	8.747E-03	9.021E-03	0.599E-03	6.64	
ZR-97	16.80H	1.031	6.476E-03	6.679E-03	0.558E-03	8.35	
RU-106	368.20D	1.000	1.345E-01	1.345E-01	0.080E-01	5.93	
CD-109	1.24Y	1.000	1.114E-01	1.114E-01	0.140E-01	12.53	
CD-113M	14.60Y	1.000	1.428E+02	1.428E+02	0.101E+02	7.07	
TE-132	3.25D	1.007	3.774E-01	3.800E-01	0.014E-01	0.36	K
CS-134	2.06Y	1.000	1.322E-01	1.322E-01	0.012E-01	0.92	
CS-136	12.98D	1.002	4.563E-02	4.571E-02	0.162E-02	3.55	
CS-137	30.10Y	1.000	1.187E-01	1.187E-01	0.001E+00	0.83	
CS-138	32.20M	2.576	4.806E-03	1.238E-02	0.183E-02	14.74	

Nuclide Type : FP

Nuclide	Hlife	Decay	Uncorrected UCI/ml	Decay Corr UCI/ml	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
BA-140	12.79D	1.002	6.863E-02	6.874E-02	0.364E-02	5.30	
CE-144	284.20D	1.000	1.424E-02	1.424E-02	0.330E-02	23.15	
Total Activity :			1.438E+02	1.439E+02			

Nuclide Type : HFP

Nuclide	Hlife	Decay	Uncorrected UCI/ml	Decay Corr UCI/ml	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
I-131	8.04D	1.003	8.124E-01	8.146E-01	0.019E-01	0.23	
I-132	2.38H	1.242	3.774E-01	4.689E-01	0.017E-01	0.36	
I-133	20.30H	1.026	6.859E-01	7.036E-01	0.018E-01	0.26	
I-134	52.60M	1.793	4.113E-02	7.375E-02	0.005E-02	1.99	
I-135	6.61H	1.081	3.566E-01	3.857E-01	0.005E-01	1.02	
Total Activity :			2.273E+00	2.447E+00			

Nuclide Type : FG

Nuclide	Hlife	Decay	Uncorrected UCI/ml	Decay Corr UCI/ml	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
XE-131M	11.80D	1.002	1.018E-01	1.019E-01	0.201E-01	19.76	
XE-133	5.29D	1.004	6.067E-02	6.092E-02	0.160E-02	2.63	
XE-135	9.08H	1.059	1.432E-02	1.516E-02	0.066E-02	4.37	
XE-135M	15.60M	6.749	4.630E-02	3.125E-01	0.053E-01	2.02	
Total Activity :			2.230E-01	4.905E-01			

Grand Total Activity : 1.465E+02      1.471E+02

Flags: "K" = Keyline not found  
 "E" = Manually edited

"M" = Manually accepted  
 "A" = Nuclide specific abn. limit

Fission Product Report

Sample ID : 2 RCS Liquid

Sampled : 9-OCT-1991 20:00:00

Nuclide	Activity
I-131	6.146E-01 uCi/ml
I-132	4.689E-01 uCi/ml
I-133	7.035E-01 uCi/ml
I-134	6.697E-02 uCi/ml
I-135	3.857E-01 uCi/ml
Cs-134	1.322E-01 uCi/ml
Cs-137	1.187E-01 uCi/ml
I-131DE	1.055E+00 uCi/ml
I-131/I-133 ratio	1.158E+00
Cs-134/Cs-137 ratio	1.114E+00

```

Configuration      : DKB200:[GSDATA]91-05317.CNF;1
Analyses by       : PEAK V16.0,PEAKEFF V2.2,NID V2.3
Sample title      : 4 HR IDE
Sample date       : 9-OCT-1991 22:00:00   Acquisition date : 9-OCT-1991 22:38:42
Sample ID         : 2 RCS Liquid           Sample quantity  : 10.000 ml
Sample type       : 60 ml bottle           Sample geometry  : Table 104
Detector name     : HPGe 1                 Detector geometry: 60 ml bottle 33
Elapsed live time: 0 00:30:00.00           Elapsed real time: 0 00:32:35.09   7.9%
Energy tolerance  : 1.75 keV               Half life ratio  : 8.00
Errors propagated: No                       Systematic Error : 0.00 %
Efficiency type   : Spline                  Efficiencies at  : Peak Energy
Abundance limit   : 37.50
    
```

Summary of Nuclide Activity

```

Total number of lines in spectrum      140
Number of unidentified lines           23
Number of lines tentatively identified by NID 117      83.57%
    
```

Nuclide Type : AP

Nuclide	Hlife	Decay	Uncorrected UCI/ml	Decay Corr UCI/ml	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
NA-24	15.03H	1.043	5.375E-03	5.607E-03	0.551E-03	9.82	
CR-51	27.70D	1.001	1.689E-02	1.691E-02	0.527E-02	31.16	
CO-56	77.30D	1.000	1.002E-02	1.002E-02	0.063E-02	6.29	K
MN-56	2.58H	1.279	1.012E-02	1.293E-02	0.081E-02	6.29	K
CC-58	70.78D	1.000	5.751E-02	5.753E-02	0.092E-02	1.59	
FE-59	45.10D	1.001	8.108E-03	8.112E-03	0.952E-03	11.74	K
CO-60	5.27Y	1.000	3.547E-03	3.547E-03	0.391E-03	11.03	
ZR-95	64.40D	1.000	3.000E-03	3.002E-03	0.876E-03	29.20	
AG-110M	249.90D	1.000	9.761E-03	9.762E-03	0.735E-03	7.53	
SB-122	2.70D	1.010	1.893E-02	1.911E-02	0.108E-02	5.67	
Total Activity :			1.433E-01	1.465E-01			

Nuclide Type : FP

Nuclide	Hlife	Decay	Uncorrected UCI/ml	Decay Corr UCI/ml	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
RB-88	17.80M	7.971	1.233E-02	9.829E-02	2.650E-02	26.96	
Y-88	106.60D	1.000	1.902E-03	1.903E-03	0.513E-03	26.96	
SR-91	9.67H	1.068	4.147E-03	4.428E-03	0.879E-03	19.85	K
NB-95	35.15D	1.001	1.536E-03	1.537E-03	0.445E-03	26.96	
NB-97	16.80H	1.039	3.390E-03	3.520E-03	0.510E-03	14.49	
ZR-97	16.80H	1.039	2.799E-03	2.907E-03	0.612E-03	21.06	
MO-99	2.76D	1.010	9.955E-02	1.005E-01	0.041E-01	4.12	
TC-99M	2.76D	1.010	3.837E-03	3.874E-03	0.414E-03	10.68	
RU-106	368.20D	1.000	8.823E-02	8.824E-02	0.670E-02	7.59	
CD-109	1.24Y	1.000	1.088E-01	1.088E-01	0.130E-01	11.97	
CD-113M	14.60Y	1.000	1.210E+02	1.210E+02	0.092E+02	7.61	
TE-132	3.25D	1.008	7.811E-03	7.875E-03	0.577E-03	7.33	
CS-134	2.06Y	1.000	1.649E-01	1.649E-01	0.013E-01	0.78	
CS-136	12.98D	1.002	5.610E-02	5.622E-02	0.166E-02	2.95	
CS-137	30.10Y	1.000	1.479E-01	1.479E-01	0.010E-01	0.71	

Nuclide Type : FP

Nuclide	Hlife	Decay	Uncorrected UCI/ml	Decay Corr UCI/ml	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
BA-140	12.79D	1.002	7.982E-02	7.998E-02	0.328E-02	4.10	
Total Activity :			1.217E+02	1.218E+02			

Nuclide Type : HFP

Nuclide	Hlife	Decay	Uncorrected UCI/ml	Decay Corr UCI/ml	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
I-131	8.04D	1.003	9.825E-01	9.858E-01	0.020E-01	0.21	
I-132	2.38H	1.305	3.256E-01	4.248E-01	0.017E-01	0.39	
I-133	20.30H	1.032	7.721E-01	7.967E-01	0.019E-01	0.24	
I-134	52.60M	2.049	1.043E-02	2.137E-02	0.134E-02	6.29	
I-135	6.61H	1.101	3.487E-01	3.839E-01	0.043E-01	1.11	
Total Activity :			2.439E+00	2.612E+00			

Nuclide Type : FG

Nuclide	Hlife	Decay	Uncorrected UCI/ml	Decay Corr UCI/ml	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
XE-131M	11.80D	1.002	1.121E-01	1.123E-01	0.209E-01	18.57	
XE-133	5.29D	1.005	7.239E-02	7.276E-02	0.166E-02	2.28	
XE-135	9.08H	1.072	1.481E-02	1.588E-02	0.074E-02	4.68	
XE-135M	15.60M	10.573	4.891E-02	5.171E-01	0.098E-01	1.89	
Total Activity :			2.482E-01	7.181E-01			

Grand Total Activity : 1.246E+02      1.253E+02

Flags: "K" = Keyline not found  
 "E" = Manually edited

"M" = Manually accepted  
 "A" = Nuclide specific abn. limit

Fission Product Report

Sample ID : 2 RCS Liquid

Sampled : 9-OCT-1991 22:00:00

Nuclide	Activity
I-131	9.858E-01 uCi/ml
I-132	4.248E-01 uCi/ml
I-133	7.966E-01 uCi/ml
I-134	2.137E-02 uCi/ml
I-135	3.839E-01 uCi/ml
Cs-134	1.649E-01 uCi/ml
Cs-137	1.479E-01 uCi/ml
I-131DE	1.249E+00 uCi/ml
I-131/I-133 ratio	1.238E+00
Cs-134/Cs-137 ratio	1.115E+00

```

Configuration      : FRB200:[GSDATA]91-05319.CNF;1
Analyses by       : PEAK V16.0,PEAKEFF V2.2,NID V2.3
Sample title      : RCS IDE
Sample date       : 10-OCT-1991 00:00:00 Acquisition date : 10-OCT-1991 01:03:07
Sample ID         : 2 RCS Liquid      Sample quantity   : 5.0000 ml
Sample type       : 60 ml bottle      Sample geometry    : Table 204
Detector name     : HPGc 2            Detector geometry  : 60 ml bottle 33
Elapsed live time: 0 00:05:20.16      Elapsed real time: 0 00:05:30.59   3.2%
Energy tolerance  : 1.75 keV          Half life ratio    : 8.00
Errors propagated: No                  Systematic Error   : 0.00 %
Efficiency type   : Spline             Efficiencies at    : Peak Energy
Abundance limit   : 37.50
    
```

Summary of Nuclide Activity

```

Total number of lines in spectrum      92
Number of unidentified lines           7
Number of lines tentatively identified by NID 85      92.39%
    
```

Nuclide Type : AP

Nuclide	Hlife	Decay	Uncorrected UCI/ml	Decay Corr UCI/ml	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
NA-24	15.03H	1.052	4.043E-03	4.253E-03	3.406E-03	80.08	
CO-58	70.78D	1.000	4.540E-02	4.542E-02	0.308E-02	6.77	
FE-59	45.10D	1.001	5.706E-03	5.710E-03	2.406E-03	42.13	K
CO-60	5.27Y	1.000	2.206E-03	2.206E-03	0.606E-03	27.49	K
ZR-95	64.40D	1.000	5.080E-02	5.083E-02	0.523E-02	10.28	K
SB-122	2.70D	1.012	1.982E-02	2.005E-02	0.376E-02	18.76	
Total Activity :			1.280E-01	1.285E-01			

Nuclide Type : FP

Nuclide	Hlife	Decay	Uncorrected UCI/ml	Decay Corr UCI/ml	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
Y-92	3.53H	1.241	1.407E-02	1.745E-02	1.688E-02	96.70	
N9-95	35.15D	1.001	4.850E-03	4.954E-03	3.679E-03	74.26	
RJ-106	368.20D	1.000	8.865E-02	8.866E-02	2.415E-02	27.24	
CD-109	1.24Y	1.000	1.684E-01	1.684E-01	0.642E-01	38.10	
CD-113M	14.60Y	1.000	1.454E+02	1.454E+02	0.423E+02	29.11	
TE-132	3.25D	1.010	2.599E-01	2.625E-01	0.045E-01	1.70	K
CS-134	2.06Y	1.000	1.931E-01	1.931E-01	0.049E-01	2.56	
CS-136	12.98D	1.002	7.357E-02	7.375E-02	0.681E-02	9.23	
CS-137	30.10Y	1.000	1.672E-01	1.672E-01	0.045E-01	2.67	
BA-140	12.79D	1.002	7.547E-02	7.566E-02	1.233E-02	16.29	
Total Activity :			1.464E+02	1.464E+02			

Nuclide Type : HFP

Nuclide	Hlife	Decay	Uncorrected UCI/ml	Decay Corr UCI/ml	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
I-131	8.04D	1.004	1.085E+00	1.090E+00	0.008E+00	0.76	
I-132	2.38H	1.377	2.599E-01	3.578E-01	0.061E-01	1.70	



Summary of Nuclide Activity (continued)  
Sample ID : 2 RCS Liquid

Page : 0  
Acquisition date : 10-OCT-1991 01:03:07

Nuclide Type : HFP

Nuclide	Hlife	Decay	Uncorrected UCI/ml	Decay Corr UCI/ml	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
I-133	20.30H	1.038	7.823E-01	8.122E-01	0.073E-01	0.90	
I-135	6.61H	1.122	3.185E-01	3.574E-01	0.139E-01	3.90	
Total Activity :			2.446E+00	2.617E+00			

Nuclide Type : FG

Nuclide	Hlife	Decay	Uncorrected UCI/ml	Decay Corr UCI/ml	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
XE-133	5.29D	1.006	8.191E-02	8.240E-02	0.917E-02	11.13	
XE-135	9.08H	1.087	2.294E-02	2.495E-02	0.349E-02	13.98	
XE-135M	15.60M	18.635	4.656E-02	8.675E-01	0.589E-01	6.79	
Total Activity :			1.514E-01	9.749E-01			

Grand Total Activity : 1.491E+02      1.501E+02

Flags: "K" = Keyline not found  
"E" = Manually edited

"M" = Manually accepted  
"A" = Nuclide specific abn. limit

Fission Product Report

Sample ID : 2 RCS Liquid

Sampled : 10-OCT-1991 00:00:00

Nuclide	Activity
I-131	1.080E+00 uCi/ml
I-132	3.682E-01 uCi/ml
I-133	8.114E-01 uCi/ml
I-134	0.000E+00 uCi/ml
I-135	3.410E-01 uCi/ml
Cs-134	1.872E-01 uCi/ml
Cs-137	1.701E-01 uCi/ml
I-131DE	1.342E+00 uCi/ml
I-131/I-133 ratio	1.332E+00
Cs-134/Cs-137 ratio	1.100E+00

RESULTS OF ANALYSIS PERFORMED  
AFTER ACTIVITY WAS REDUCED TO LESS THAN LIMIT

VAX/VMS Nuclide Identification Report V2.7 Generated 5-FEB-1992 13:13:06

Configuration : DKB200:[GSDATA]91-05334.CNF;1  
 Analysis by : PEAK V16.0,PEAKEFF V2.2,NID V2.3  
 Sample title : tsp IDE  
 Sample date : 10-OCT-1991 04:00:00 Acquisition date : 10-OCT-1991 04:52:07  
 Sample ID : 2 RCS Liquid Sample quantity : 2.5000 ml  
 Sample type : 60 ml bottle Sample geometry : Table 103  
 Detector name : HPGe 1 Detector geometry: 60 ml bottle 18  
 Elapsed live time: 0 00:30:00.00 Elapsed real time: 0 00:31:31.37 4.8%  
 Energy tolerance : 1.75 keV Half life ratio : 8.00  
 Errors propagated: No Systematic Error : 0.00 %  
 Efficiency type : Spine Efficiencies at : Peak Energy  
 Abundance limit : 37.50

Summary of Nuclide Activity

Total number of lines in spectrum 131  
 Number of uncorrected lines 23  
 Number of lines tentatively identified by NID 108 82.44%

Nuclide Type : AP

Nuclide	Hlife	Decay	Uncorrected UCI/ml	Decay Corr UCI/ml	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
NA-24	15.03H	1.054	1.946E-03	2.051E-03	0.410E-03	20.00	
CR-51	27.70D	1.001	1.086E-02	1.087E-02	0.410E-02	37.72	
CO-56	77.30D	1.000	7.722E-04	7.726E-04	3.068E-04	39.71	K
MN-56	2.58H	1.355	7.800E-04	1.057E-03	0.420E-03	39.71	K
CO-58	70.78D	1.000	3.010E-02	3.011E-02	0.069E-02	2.30	
FE-59	45.10D	1.001	4.888E-03	4.892E-03	0.651E-03	13.31	K
CO-60	5.27Y	1.000	2.141E-03	2.141E-03	0.429E-03	20.04	
ZR-95	64.40D	1.001	3.319E-02	3.320E-02	0.103E-02	3.10	K
SB-122	2.70D	1.012	1.688E-02	1.708E-02	0.085E-02	4.95	
Total Activity :			1.015E-01	1.022E-01			

Nuclide Type : FP

Nuclide	Hlife	Decay	Uncorrected UCI/ml	Decay Corr UCI/ml	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
RB-88	17.60M	13.220	1.953E-03	2.582E-02	1.006E-02	38.95	K
Y-88	106.60D	1.000	4.822E-04	4.824E-04	1.879E-04	38.95	K
SR-91	9.67H	1.084	2.564E-03	2.781E-03	0.691E-03	24.85	K
Y-93	10.30H	1.079	1.731E-02	1.868E-02	0.468E-02	25.07	
NB-95	35.15D	1.001	1.104E-03	1.105E-03	0.275E-03	24.85	
ZR-97	16.80H	1.048	5.319E-04	5.573E-04	3.623E-04	65.00	
MO-99	2.76D	1.012	5.058E-02	5.118E-02	0.363E-02	7.09	
TC-99M	2.76D	1.012	1.460E-03	1.477E-03	0.311E-03	21.05	
RU-106	368.20D	1.000	4.817E-02	4.818E-02	0.550E-02	11.41	
CD-109	1.24Y	1.000	1.026E-01	1.026E-01	0.097E-01	9.48	
CD-113M	14.60Y	1.000	5.773E+01	5.773E+01	0.690E+01	11.94	
TE-132	3.25D	1.010	1.766E-01	1.784E-01	0.001E+00	0.55	K
CS-134	2.06Y	1.000	1.483E-01	1.483E-01	0.011E-01	0.77	
CS-136	12.98D	1.003	5.142E-02	5.155E-02	0.142E-02	2.76	
CS-137	30.10Y	1.000	1.317E-01	1.317E-01	0.010E-01	0.79	
BA-139	1.42H	1.736	1.185E-02	2.057E-02	0.325E-02	15.79	

Nuclide Type : FP

Nuclide	Hlife	Decay	Uncorrected UCI/ml	Decay Corr UCI/ml	Decay Corr 1-Sigma Error	1-Sigma Error	Flags
CE-139	137.50D	1.000	2.784E-03	2.785E-03	0.440E-03	15.79	
BA-140	12.79D	1.003	4.373E-02	4.384E-02	0.266E-02	6.07	
Total Activity :			5.852E+01	5.856E+01			

Nuclide Type : HFP

Nuclide	Hlife	Decay	Uncorrected UCI/ml	Decay Corr UCI/ml	Decay Corr 1-Sigma Error	1-Sigma Error	Flags
I-131	8.04D	1.004	7.556E-01	7.587E-01	0.017E-01	0.22	
I-132	2.38H	1.389	1.766E-01	2.453E-01	0.013E-01	0.55	
I-133	20.30H	1.039	4.940E-01	5.135E-01	0.015E-01	0.30	
I-134	52.60M	2.429	8.043E-04	1.954E-03	0.776E-03	39.71	
I-135	6.61H	1.126	1.462E-01	1.646E-01	0.027E-01	1.64	
Total Activity :			1.573E+00	1.684E+00			

Nuclide Type : FG

Nuclide	Hlife	Decay	Uncorrected UCI/ml	Decay Corr UCI/ml	Decay Corr 1-Sigma Error	1-Sigma Error	Flags
XE-131M	11.80D	1.003	1.137E-01	1.140E-01	0.180E-01	15.79	
XE-133	5.29D	1.006	5.761E-02	5.797E-02	0.137E-02	2.37	
XE-135	9.08H	1.090	7.892E-03	8.603E-03	0.557E-03	6.47	
XE-135M	15.60M	18.843	2.071E-02	3.902E-01	0.128E-01	3.27	
Total Activity :			1.999E-01	5.707E-01			

Grand Total Activity : 6.040E+01 6.092E+01

Flags: "K" = Keyline not found  
 "E" = Manually edited

"M" = Manually accepted  
 "A" = Nuclide specific abn. limit

Fission Product Report

Sample ID : 2 RCS Liquid

Sampled : 10-OCT-1991 04:00:00

Nuclide	Activity
I-131	7.587E-01 uCi/ml
I-132	2.453E-01 uCi/ml
I-133	5.134E-01 uCi/ml
I-134	0.000E+00 uCi/ml
I-135	1.646E-01 uCi/ml
Cs-134	1.483E-01 uCi/ml
Cs-137	1.316E-01 uCi/ml
I-131DE	9.201E-01 uCi/ml
I-131/I-133 ratio	1.478E+00
Cs-134/Cs-137 ratio	1.127E+00

```

Configuration      : DKB200:[GSDATA]91-05346.CNF;1
Analyses by       : PEAK V16.0,PEAKEFF V2.2,NID V2.3
Sample date       : 10-OCT-1991 06:00:00 Acquisition date : 10-OCT-1991 06:33:42
Sample ID        : 2 RCS Liquid      Sample quantity   : 2.5000 ml
Sample type      : 60 ml bottle      Sample geometry   : Table 303
Detector name    : HPGe 3           Detector geometry : 60 ml bottle 18
Elapsed live time: 0 00:30:00.00    Elapsed real time: 0 00:31:57.42  6.1%
Energy tolerance : 1.75 keV         Half life ratio   : 8.00
Errors propagated: No                Systematic Error  : 0.00 %
Efficiency type  : Spline            Efficiencies at   : Peak Energy
Abundance limit  : 37.50
    
```

Summary of Nuclide Activity

```

Total number of lines in spectrum      127
Number of unidentified lines          26
Number of lines tentatively identified by NID 101      79.53%
    
```

Nuclide Type : NP

Nuclide	Hlife	Decay	Uncorrected UCI/ml	Decay Corr UCI/ml	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.28E+09Y	1.000	4.829E-03	4.829E-03	2.143E-03	44.39	
U-235	7.04E+08Y	1.000	7.901E-04	7.901E-04	4.591E-04	58.11	K
Total Activity :			5.619E-03	5.619E-03			

Nuclide Type : AP

Nuclide	Hlife	Decay	Uncorrected UCI/ml	Decay Corr UCI/ml	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
CO-58	70.78D	1.000	2.567E-02	2.568E-02	0.054E-02	2.12	
FE-59	45.10D	1.001	7.260E-03	7.264E-03	0.973E-03	13.40	K
CO-60	5.27Y	1.000	1.936E-03	1.936E-03	0.277E-03	14.32	
ZR-95	64.40D	1.000	2.656E-02	2.657E-02	0.085E-02	3.22	K
SB-122	2.70D	1.009	1.313E-02	1.325E-02	0.068E-02	5.16	
Total Activity :			7.456E-02	7.470E-02			

Nuclide Type : FP

Nuclide	Hlife	Decay	Uncorrected UCI/ml	Decay Corr UCI/ml	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
SR-91	9.67H	1.061	4.271E-03	4.532E-03	0.676E-03	14.91	K
Y-93	10.30H	1.057	1.583E-02	1.674E-02	0.591E-02	23.37	
MO-99	2.76D	1.009	4.639E-02	4.679E-02	0.248E-02	5.30	
TC-99M	2.76D	1.009	1.471E-03	1.484E-03	0.262E-03	17.63	
RU-106	368.20D	1.000	4.082E-02	4.082E-02	0.407E-02	9.98	
CD-109	1.24Y	1.000	7.186E-02	7.186E-02	0.608E-02	8.46	
CD-113M	14.60Y	1.000	6.444E+01	6.444E+01	0.556E+01	8.63	
TE-132	3.25D	1.007	1.768E-01	1.781E-01	0.008E-01	0.43	K
CS-134	2.06Y	1.000	1.233E-01	1.233E-01	0.008E-01	0.63	
CS-136	12.98D	1.002	4.158E-02	4.165E-02	0.114E-02	2.74	
CS-137	30.10Y	1.000	1.135E-01	1.135E-01	0.007E-01	0.62	
Total Activity :			6.508E+01	6.508E+01			

Nuclide Type : HFP

Nuclide	Hlife	Decay	Uncorrected UCI/ml	Decay Corr UCI/ml	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
I-131	8.04D	1.003	6.265E-01	6.284E-01	0.014E-01	0.22	
I-132	2.38H	1.271	1.768E-01	2.247E-01	0.001E+00	0.43	
I-133	20.30H	1.029	3.920E-01	4.033E-01	0.011E-01	0.27	
I-135	6.61H	1.091	1.025E-01	1.117E-01	0.020E-01	1.77	
Total Activity :			1.298E+00	1.366E+00			

Nuclide Type : FG

Nuclide	Hlife	Decay	Uncorrected UCI/ml	Decay Corr UCI/ml	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
XE-131M	11.80D	1.002	9.215E-02	9.234E-02	1.326E-02	14.36	
XE-133	5.29D	1.005	4.322E-02	4.342E-02	0.010E-01	2.30	
XE-133M	2.26D	1.011	1.086E-02	1.097E-02	0.231E-02	21.06	
XE-135	9.08H	1.065	4.018E-03	4.280E-03	0.356E-03	8.32	
XE-135M	15.60M	8.371	1.792E-02	1.500E-01	0.090E-01	6.01	
Total Activity :			1.682E-01	3.010E-01			

Grand Total Activity : 6.662E+01 6.683E+01

Flags: "K" = Keyline not found  
 "E" = Manually edited

"M" = Manually accepted  
 "A" = Nuclide specific abn. limit



Fission Product Report

Sample ID : 2 RCS Liquid

Sampled : 10-OCT-1991 06:00:00

Nuclide	Activity
I-131	6.284E-01 uCi/ml
I-132	2.247E-01 uCi/ml
I-133	4.032E-01 uCi/ml
I-134	0.000E+00 uCi/ml
I-135	1.115E-01 uCi/ml
Cs-134	1.233E-01 uCi/ml
Cs-137	1.134E-01 uCi/ml
I-131DE	7.548E-01 uCi/ml
I-131/I-133 ratio	1.558E+00
Cs-134/Cs-137 ratio	1.088E+00

VAX/VMS Nuclide Identification Report V2.7 Generated 5-FEB-1992 13:13:46

Configuration : DKB200:[GSDATA]91-05394.CNF;1  
 Analyses by : PEAK V16.0,PEAKEFF V2.2,NID V2.3  
 Sample title : 24 HR IDE  
 Sample date : 10-OCT-1991 18:10:00 Acquisition date : 10-OCT-1991 18:44:32  
 Sample ID : 2 RCS Liquid Sample quantity : 10.000 ml  
 Sample type : 60 ml bottle Sample geometry : Table 203  
 Detector name : HPGe 2 Detector geometry: 60 ml bottle 13  
 Elapsed live time: 0 00:30:00.00 Elapsed real time: 0 00:32:25.58 7.5%  
 Energy tolerance : 1.75 keV Half life ratio : 8.00  
 Errors propagated: No Systematic Error : 0.00 %  
 Efficiency type : Spline Efficiencies at : Peak Energy  
 Abundance limit : 37.50

Summary of Nuclide Activity

Total number of lines in spectrum 131  
 Number of unidentified lines 23  
 Number of lines tentatively identified by NID 108 82.44%

Nuclide Type : AP

Nuclide	Hlife	Decay	Uncorrected UCI/ml	Decay Corr UCI/ml	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
NA-24	15.03H	1.040	5.285E-04	5.496E-04	1.088E-04	19.80	
CR-51	27.70D	1.001	4.170E-03	4.174E-03	1.360E-03	32.58	
CO-58	70.78D	1.000	2.333E-02	2.333E-02	0.025E-02	1.05	
FE-59	45.10D	1.001	3.139E-03	3.140E-03	0.202E-03	6.44	K
CO-60	5.27Y	1.000	1.697E-03	1.697E-03	0.107E-03	6.33	
CU-64	12.71H	1.047	7.953E-03	8.328E-03	13.94E-03	167.34	
ZK-95	64.40D	1.000	9.384E-04	9.387E-04	2.358E-04	25.12	
AG-110M	249.90D	1.000	9.368E-04	9.369E-04	2.103E-04	22.44	K
SB-122	2.70D	1.009	7.057E-03	7.121E-03	0.295E-03	4.15	
Total Activity :			4.974E-02	5.022E-02			

Nuclide Type : NP

Nuclide	Hlife	Decay	Uncorrected UCI/ml	Decay Corr UCI/ml	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
K-40	1.28E+09Y	1.000	1.224E-03	1.224E-03	0.488E-03	39.86	
Total Activity :			1.224E-03	1.224E-03			

Nuclide Type : AG

Nuclide	Hlife	Decay	Uncorrected UCI/ml	Decay Corr UCI/ml	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
AR-41	1.83H	1.375	1.940E-03	2.668E-03	0.133E-03	4.97	
Total Activity :			1.940E-03	2.668E-03			

Nuclide Type : FP

Nuclide	Hlife	Decay	Uncorrected	Decay Corr	Decay Corr	1-Sigma	Flags
			UCI/ml	UCI/ml	1-Sigma Error	%Error	
SR-91	9.67H	1.062	9.742E-04	1.035E-03	0.283E-03	27.33	K
NB-95	35.15D	1.001	8.389E-04	8.394E-04	1.534E-04	18.27	
NB-97	16.80H	1.035	9.038E-04	9.359E-04	2.100E-04	22.44	
ZR-97	16.80H	1.035	8.389E-04	8.686E-04	1.486E-04	17.11	
MO-99	2.76D	1.009	1.290E-02	1.302E-02	0.096E-02	7.39	
TC-99M	2.76D	1.009	8.569E-04	8.645E-04	1.295E-04	14.98	
RU-106	368.20D	1.000	2.604E-02	2.604E-02	0.167E-02	6.42	
CD-109	1.24Y	1.000	3.287E-02	3.287E-02	0.402E-02	12.24	
CD-113M	14.60Y	1.000	3.565E+01	3.565E+01	0.272E+01	7.64	
SB-125	2.77Y	1.000	1.693E-03	1.693E-03	0.744E-03	43.92	K
TE-132	3.25D	1.008	1.194E-01	1.203E-01	0.004E-01	0.33	K
CS-134	2.06Y	1.000	5.385E-02	6.385E-02	0.034E-02	0.53	
CS-136	12.98D	1.002	2.115E-02	2.119E-02	0.051E-02	2.41	
CS-137	30.10Y	1.000	5.778E-02	5.778E-02	0.032E-02	0.55	
BA-139	1.42H	1.509	4.986E-03	7.524E-03	1.014E-03	13.47	
BA-140	12.79D	1.002	1.113E-02	1.115E-02	0.099E-02	8.89	
Total Activity :			3.600E+01	3.601E+01			

Nuclide Type : HFP

Nuclide	Hlife	Decay	Uncorrected	Decay Corr	Decay Corr	1-Sigma	Flags
			UCI/ml	UCI/ml	1-Sigma Error	%Error	
I-131	8.04D	1.003	2.928E-01	2.937E-01	0.006E-01	0.20	
I-132	2.38H	1.278	1.194E-01	1.526E-01	0.005E-01	0.33	
I-133	20.30H	1.029	1.289E-01	1.327E-01	0.004E-01	0.32	
I-135	6.61H	1.093	1.403E-02	1.533E-02	0.051E-02	3.33	
Total Activity :			5.552E-01	5.944E-01			

Nuclide Type : FG

Nuclide	Hlife	Decay	Uncorrected	Decay Corr	Decay Corr	1-Sigma	Flags
			UCI/ml	UCI/ml	1-Sigma Error	%Error	
XE-131M	11.80D	1.002	4.783E-02	4.792E-02	0.646E-02	13.47	
XE-133	5.29D	1.005	2.176E-02	2.186E-02	0.058E-02	2.64	
XE-135	9.00H	1.067	4.247E-04	4.530E-04	1.727E-04	38.13	
XE-135M	15.60M	8.761	2.108E-03	1.846E-02	0.185E-02	10.03	
Total Activity :			7.211E-02	8.870E-02			

Grand Total Activity : 3.668E+01 3.675E+01

Flags: "K" = Keyline not found  
 "E" = Manually edited

"M" = Manually accepted  
 "A" = Nuclide specific abn. limit

Fission Product Report

Sample ID : 2 RCS Liquid

Sampled : 10-OCT-1991 18:30:00

Nuclide	Activity
I-131	2.937E-01 uCi/ml
I-132	1.526E-01 uCi/ml
I-133	1.327E-01 uCi/ml
I-134	0.000E+00 uCi/ml
I-135	1.533E-02 uCi/ml
Cs-134	6.385E-02 uCi/ml
Cs-137	5.774E-02 uCi/ml
I-131DE	3.364E-01 uCi/ml
I-131/I-133 ratio	2.213E+00
Cs-134/Cs-137 ratio	1.106E+00

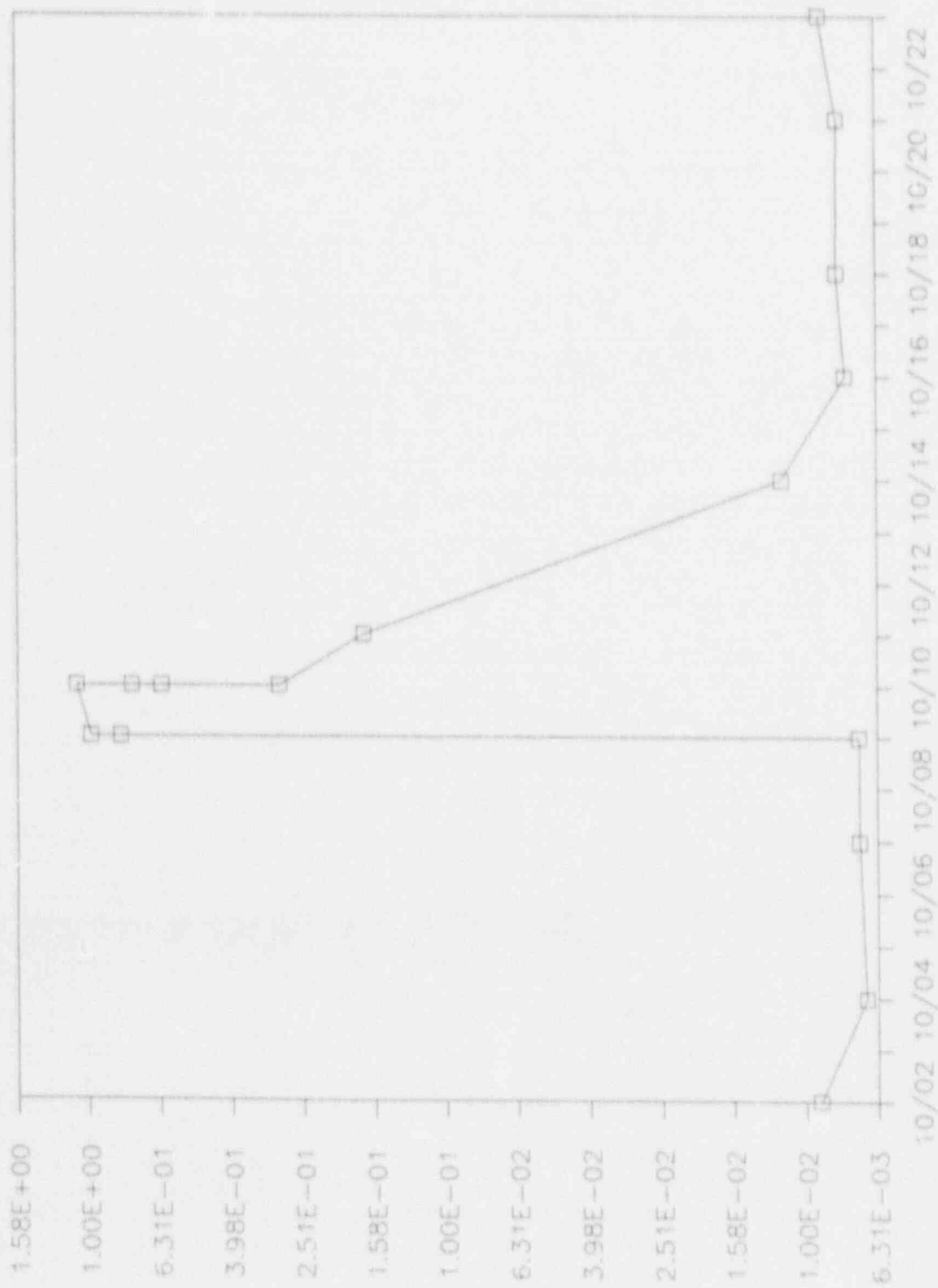
ATTACHMENT 3  
LETDOWN FLOW HISTORY

<u>DATE</u>	<u>TIME</u>	<u>FLOW RATE</u>
October 7, 1991	0927	38.5 gpm
October 9, 1991	0925	36.2 gpm
October 9, 1991	2000	36.2 gpm
October 9, 1991	2200	36.2 gpm
October 10, 1991	0000	82.4 gpm
October 10, 1991	0000	80.0 gpm
October 10, 1991	0600	80.0 gpm
October 10, 1991	1810	80.0 gpm
October 11, 1991	0910	80.0 gpm
October 13, 1991	0515	38.4 gpm

ATTACHMENT 4

GRAPH OF I-131 AND I-132 CONCENTRATION

# Unit 2 RCS Activity



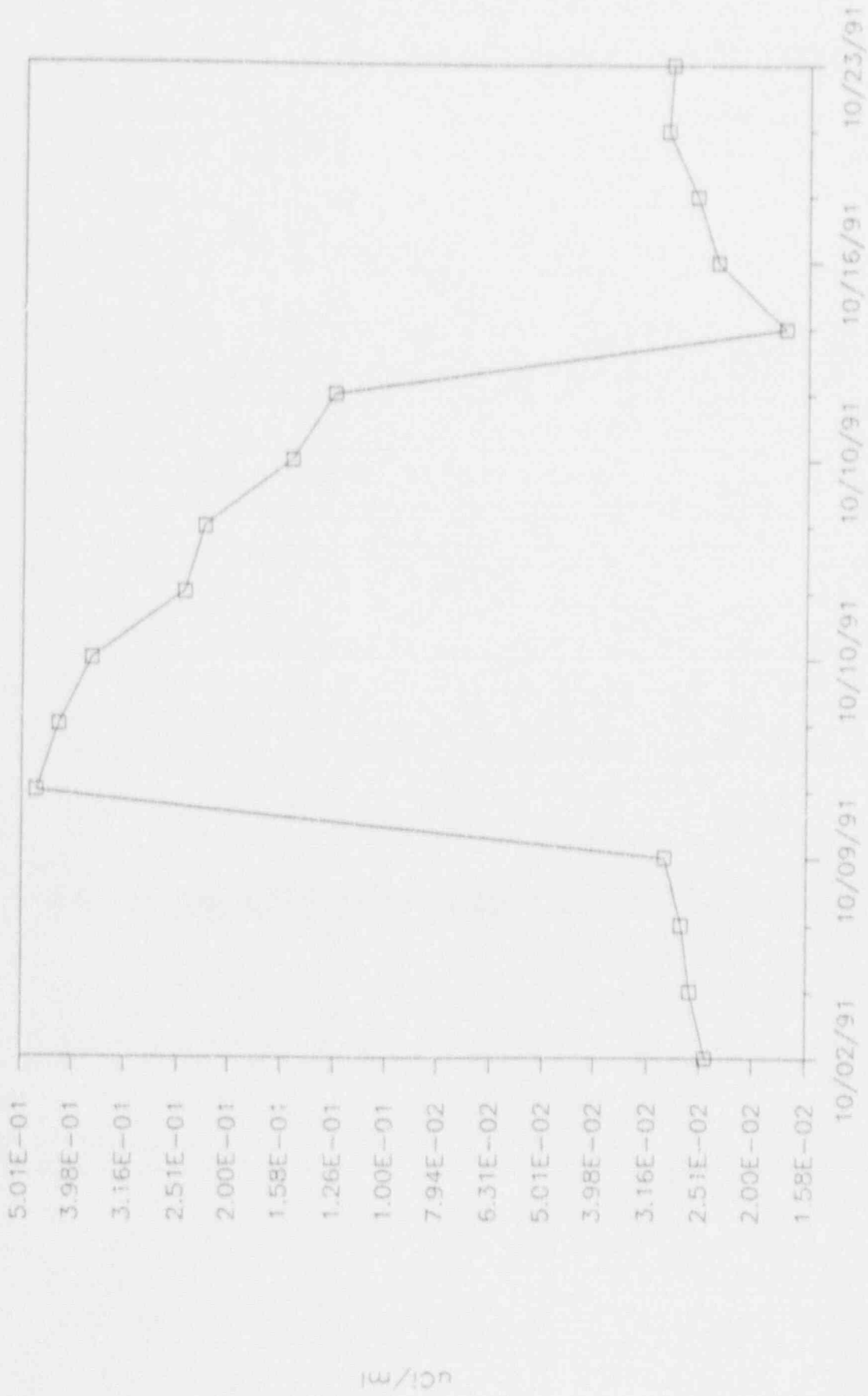
uCi/ml

Date 1991

□ 1-131



# 2 RCS ACTIVITY



1991

□ 1-132

uCi/m