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# THE OPERATION OF EXPERIMENT HFR-B1 IN THE PETTEN HIGH FLUX REACTOR

R. D. Burnette
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MARTIN MARIETTA ENERGY SYSTEMS, INC.
FOR THE UNITED STATES
DEPARTMENT OF ENERGY

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Metals and Ceramics Division

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# THE OPERATION OF EXPERIMENT HFR-B1 IN THE PETTEN HIGH-FLUX REACTOR*

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## ABSTRACT

This is the final operation report on the HFR-B1 experiment. This experiment was conducted at the Joint Research Centre (JRC), The Petten Establishment of the Commission of European Communities in collaboration with the Forschungszentrum Jülich (KFA) and General Atomics (GA) under the US/FRG‡ Umbrella Agreement for Cooperation in Gas-Cooled Reactor Development. The experiments were designed to provide for measurement of fission gas release and metallic fission product transport in simulated, prismatic core, fuel elements over the range of normal operating conditions and in the presence of significant quantities of water vapor. The irradiation was begun in April 1987 and ended in July 1989, during which 444 effective full-power days (EFPD) were accumulated. In this report, the following topics are addressed: the objectives and experimental configuration; the high-flux reactor (HFR) facility at Petten, The Netherlands; the test specimens; quality assurance; the irradiation history of the three capsules irradiated; the experimental data comprising temperatures, nuclear quantities, fission gas release, reactor, and process data; neutron metrology; methods of conducting the water-vapor injection tests; and gas chromatographic results. The total number of data accumulated during the HFR experiment is so large as to preclude presenting most of them in a single report. The data on tape consist of 270,464 blocks, and there are, in addition, laboratory recorded data, chart records, additional graphical presentations, correspondence among the involved laboratories, and periodic summaries. Nevertheless, a basic set of the irradiation data is assembled and presented in textual and graphical form in Sect. 6 of this report; this assemblage will be a convenient source in the process of analyzing the results of the HFR-B1 experiment.

## 1. INTRODUCTION

This report is the final operation report for the HFR-B1 experiment. The experiment designation D214.01 was used within The Petten Establishment. This experiment was conducted

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†Research sponsored by the Commission of European Communities at The Petten Establishment, The Netherlands.

‡Previously the Federal Republic of Germany.

at the Joint Research Centre (JRC), The Petten Establishment of the Commission of European Communities, in collaboration with the Forschungszentrum Jülich (KFA) and General Atomics (GA) under the US/FRG Umbrella Agreement for Cooperation in Gas-Cooled Reactor Development. The experiment was designed[1,2] to provide for measurement of fission gas release and metallic fission product transport in simulated, prismatic core, fuel elements over the range of normal operating conditions and in the presence of significant quantities of water vapor. The Petten staff designed[3] and assembled the irradiation rig using fuel elements and other samples fabricated by GA. The overall management was the responsibility of the KFA; the supervision and conduction of the experiment were the responsibility of the JRC. The irradiation was begun in April 1987 and ended in July 1989 during which 444 effective full-power days (EFPD) were accumulated. After completion, the irradiation rig was disassembled and the contents sent to KFA in December 1991. The postirradiation examination (PIE) is being conducted at the KFA.

## 1.1 OBJECTIVES

The main objectives of the HFR-B1 experiment involved the transport of metallic fission products and the release of fission gas in fuel elements under conditions simulating those of the high-temperature gas-cooled reactor (HTGR) in the presence and absence of water vapor. Experiments were conducted in three separate capsules contained within the irradiation rig.[3] The temperature range was between 820 and 1230°C, and in one capsule, water vapor was injected at partial pressures between 18 and 1060 Pa.

The main objectives of the HFR-B1 experiment were as follows:

1. measurement of the transport and distribution of condensible fission products in a fuel element representative of the HTGR;

2. measurement of the release of fission gases at temperatures near and above the upper limit of HTGR normal operating temperatures;

3. measurement of the effect of hydrolysis on coated fuel particles with exposed uranium oxycarbide (UCO) kernels and on the surrounding fuel compact matrix material and graphite;

4. measurement of fission product release from and distribution in coated fuel particles with different artificial defects encapsulated under a controlled atmosphere;

5. provision of irradiated fuel compacts for use in postirradiation heating tests simulating accident conditions and of unbonded, coated fuel particles for postirradiation tests;

6. measurement of the irradiation response of grades H-451 and H-451I graphite and SiC samples and of inert compacts fired in alumina and silicon carbide molds; and

7. measurement of the fraction of iodine isotopes whose decay products could be detected and of the amount of iodine released in volatile form.

The last objective was adopted only after the beginning of the irradiation.

## 1.2 EXPERIMENTAL CONFIGURATION

The irradiation rig has been described in detail.[3] The rig contained three vertically arrayed capsules designated as 1, 2, and 3 or A, B, and C, respectively. Each capsule consisted of a fueled graphite body within a sealed, stainless steel container. In each container there were thermocouples (TCs), self-powered neutron (SPN) detectors, fluence detectors, and gamma scan wires; the first two detectors could be monitored. Each container also had separate inlet and outlet gas lines; the composition of the influent and effluent gases was monitored. The temperature of each capsule was finely controlled by adjusting the neon content of the helium-neon carrier gas.

In the graphite body of each capsule, there were 12 fuel compacts and various piggyback samples. The fuel compacts contained TRISO-coated fissile and fertile particles; the kernels of the particles were $ThO_2$ and low-enriched uranium (LEU) UCO, respectively.[4] Of the fissile particles, 8.9% by number were specially fabricated as "designed to fail" (dtf) particles; these particles had a UCO kernel coated with a 23-μm pyrocarbon layer. Within several hundred hours of the beginning of irradiation, the pyrocarbon coating cracked and thereby provided a known source of exposed kernels from which fission products could escape. A detailed description of the coated fuel particles, the fuel compacts, the graphite bodies, and the nature of the piggyback samples has been presented.[4]

The relation between the capsules and the objectives was as follows: capsule 1 was devoted to meeting objective 1; capsule 2 to objectives 2 and 6; and capsule 3 to objectives 3, 4, and 6. All capsules were devoted to meeting objectives 5 and 7.

## 1.3 PURPOSE AND SCOPE OF THE REPORT

The purpose of this report is the documentation of the operational data from experiment HFR-B1 and the provision of a data base with which the analysis of the experimental results may proceed. Discussions and conclusions regarding fuel performance and fission product behavior are beyond the scope of this report.

The topics addressed in this report include the objectives and experimental configuration; the HFR facility at Petten, The Netherlands; the test specimens; quality assurance (QA); the irradiation history of the three capsules irradiated; experimental data comprising temperatures, nuclear quantities, fission gas release, reactor, and process data; neutron metrology; methods of conducting water-vapor injection tests; and gas chromatographic results. More specifically, the data presented include the following:

1. nuclear data including neutron fluxes and fluences, nuclear heating, burnups, and fuel loadings;

2. thermal data including temperatures measured by the 18 TCs per compact at selected times during each cycle and the temperature profiles of selected TCs during each cycle;

3. fission gas release data in terms of the R/B, the ratio of the release rate to the birth rate, in both numerical and graphical form;

4. the composition of the influent and effluent gases including He, Ne, $H_2O$, $H_2$, CO, $CO_2$, and $CH_4$; and

5. selected profiles of the reactor power, the capsule positions, the downstream activity, temperatures, flow rates, and system pressures.

The data files are contained in Disk DUA3:[CONRAD.RUBY_214] with Tape format 6250 Bpi. These files are possessed by both the JRC and the Oak Ridge National Laboratory (ORNL). These files contain 3 directories, 1457 files, and 270,464 blocks of data.

# 2. DESCRIPTION OF EQUIPMENT

## 2.1 HFR PETTEN

The HFR at Petten, The Netherlands, is a materials test reactor which contains water as coolant and moderator. The normal operating power is 45 MW. The core lattice is a 9 by 9 array (729 by 750.4 mm), containing 33 fuel assemblies, 6 control members, 19 experimental positions, and 23 beryllium reflector elements. The reactor is normally operated at full power for 11 cycles per year of 25.7 d each, with 2- to 6-d shutdown between cycles for refueling, maintenance, and for installation or removal of test rigs. There are two month-long shutdowns for extended maintenance and holidays per year, in March and in August. In-core test positions can provide a thermal flux up to $2.1 \times 10^{18} m^{-2} s^{-1}$ and a fast flux up to $5.1 \times 10^{18}$ $m^{-2} s^{-1}$. The HFR staff provides all activities associated with the reactor and also the 24-h operation of all irradiation experiments.

## 2.2 TEST FACILITY

### 2.2.1 In-Pile Rig

The irradiation rig was completely designed and fabricated at JRC Petten.[5-8] The rig, designated D214.01, was a modification of the Brennelementsegment (BEST) rig type, which was successfully used in the irradiation of German high-temperature reactor (HTR) fuel spheres.[7-10] The D214.01 in-pile rig was connected to the out-of-pile equipment, called the Sweeploop,[10] which has provision for controlling and monitoring up to 6 independent capsules. The rig consisted of three capsules, in-line, each of which was independently temperature controlled and monitored, and had independent gas purge lines for the introduction of various gas mixtures, including He, Ne, $H_2$, and $H_2O$. Temperatures were adjusted by the introduction of He-Ne mixtures in the sweep gas. The capsules were contained by a stainless steel tube of 74 mm diam, which ended at approximately 975 mm above the core center line. This tube served as a protection tube and bounded the cooling water channel on the interior. Capsules 1 and 2 were connected to each other and could be adjusted vertically by means of an electrically driven vertical displacement unit (VDU) for the purpose of changing temperature or flux. Capsule 3 could be moved by an independent VDU.

Of primary importance in this test was the monitoring of individual gas lines for the measurement of fission gas release and the gaseous products of fuel hydrolysis and graphite oxidation. Figure 2.2.1 is a schematic of the gas lines within the rig and rig head, showing the separate lines in and out for each capsule. Two gas lines enter each capsule, the inlet at the bottom and the exit at the top. The exit gas could flow directly to the sampling stations, or before entering the sampling station in the case of elevated radioactivity levels, through an empty 360-$cm^3$ delay tank or through a 360-$cm^3$ charcoal delay bed. These flow paths could be chosen by means of remotely operated solenoid valves within the rig head.

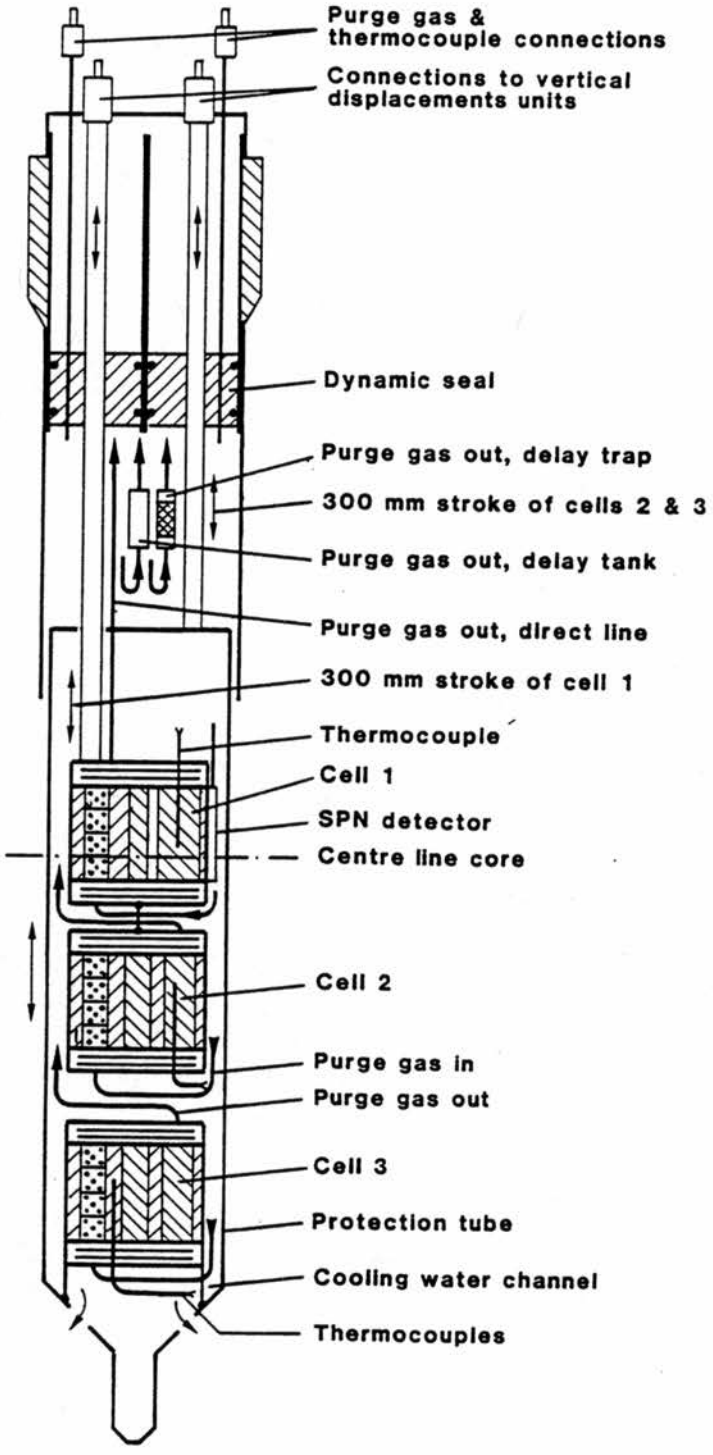



Fig. 2.2.1. Schematic drawing of the irradiation rig, D214.01.
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

### 2.2.2 Out-of-Pile Facility

The out-of-pile system, the Sweeploop,[10] was designed and constructed specifically for the irradiation of HTR fuel and graphite specimens. Before the HFR-B1 test, the Sweeploop had been used in a number of irradiations of German pebble bed fuel.[7-10]

The major component of the Sweeploop system[3,11] is a "once-through" system which provides purified gases at controlled pressures and flows and permits the sampling and monitoring of fission gases and gaseous products of hydrolysis and oxidation in as many as six separate capsules.

The major components of the Sweeploop include:

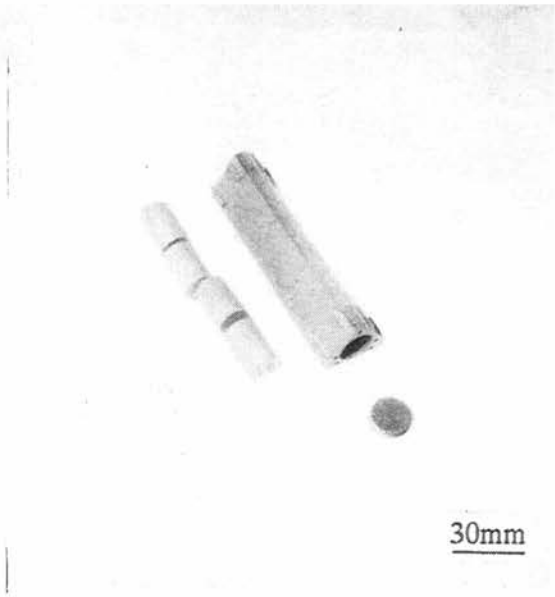
1. liquid-nitrogen-cooled filters for purification of inlet He and Ne;
2. provision for injection of controlled concentrations of neon, hydrogen, and other gases of choice;
3. a system for the steady injection and analysis of known concentrations of water vapor (see Appendix A for details);
4. flow, pressure, and temperature control systems;
5. sampling and counting stations for quantitative analysis of fission product gases;
6. activity monitors for safety provisions and semi-quantitative analysis;
7. gas chromatography for analysis of effluent gases (see Appendix B for details);
8. computer and trend recorder data acquisition and storage; and
9. application of transgression limits on flow, pressure, temperature, and radioactivity.

## 2.3 TEST SPECIMENS

### 2.3.1 Fueled Graphite Bodies

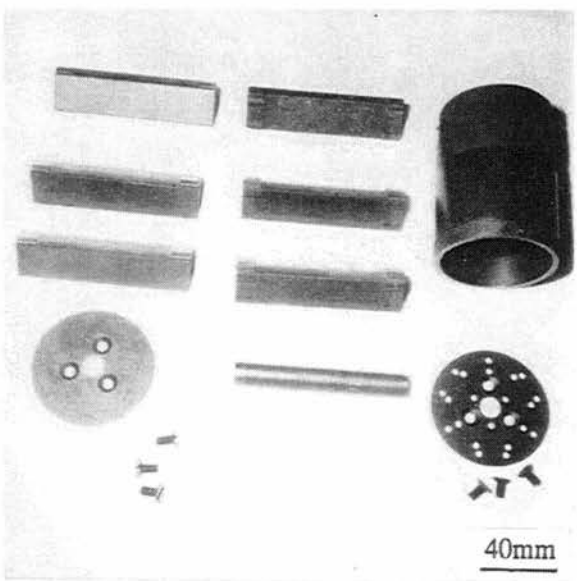
The H-451 graphite bodies, depicted in Figs. 2.3.1 and 2.3.2, contained the primary fuel dispersed in 12 fuel compacts; four compacts each were placed in 3 holes, 120° apart. Figure 2.3.1 shows that capsule 1 contained six graphite wedges held in place by inner and outer graphite annuli. The non-fueled wedges are impregnated graphite and serve as sorptive sinks for condensible fission products. Between each pair of wedges are gaps which simulate gaps in the reactor. During PIE, the concentrations of fission products in the graphite body of capsule 1 will be measured as a function of spacial location. Capsules 2 and 3 differed from capsule 1 in having a solid graphite body with three holes in which the fuel compacts were placed; see Fig. 2.3.2. The measurements in these two capsules were of fission gas release mainly as a function of

N85024



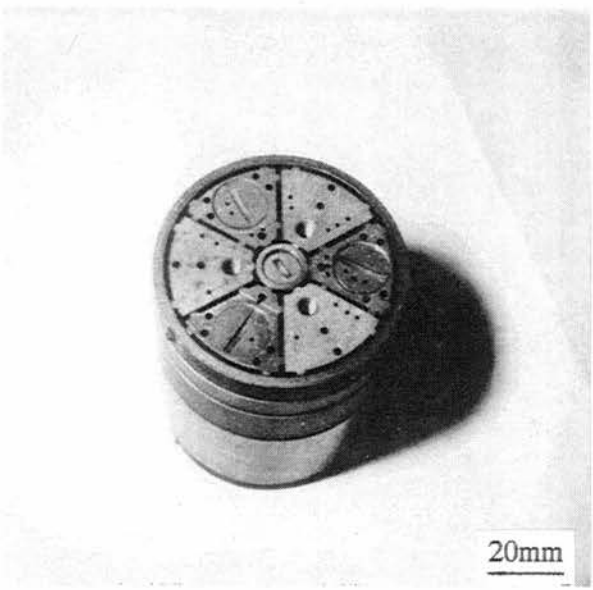

FUEL WEDGE WITH COMPACTS AND CAP

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SEPARATE PARTS OF FUEL BODY 1

N85026

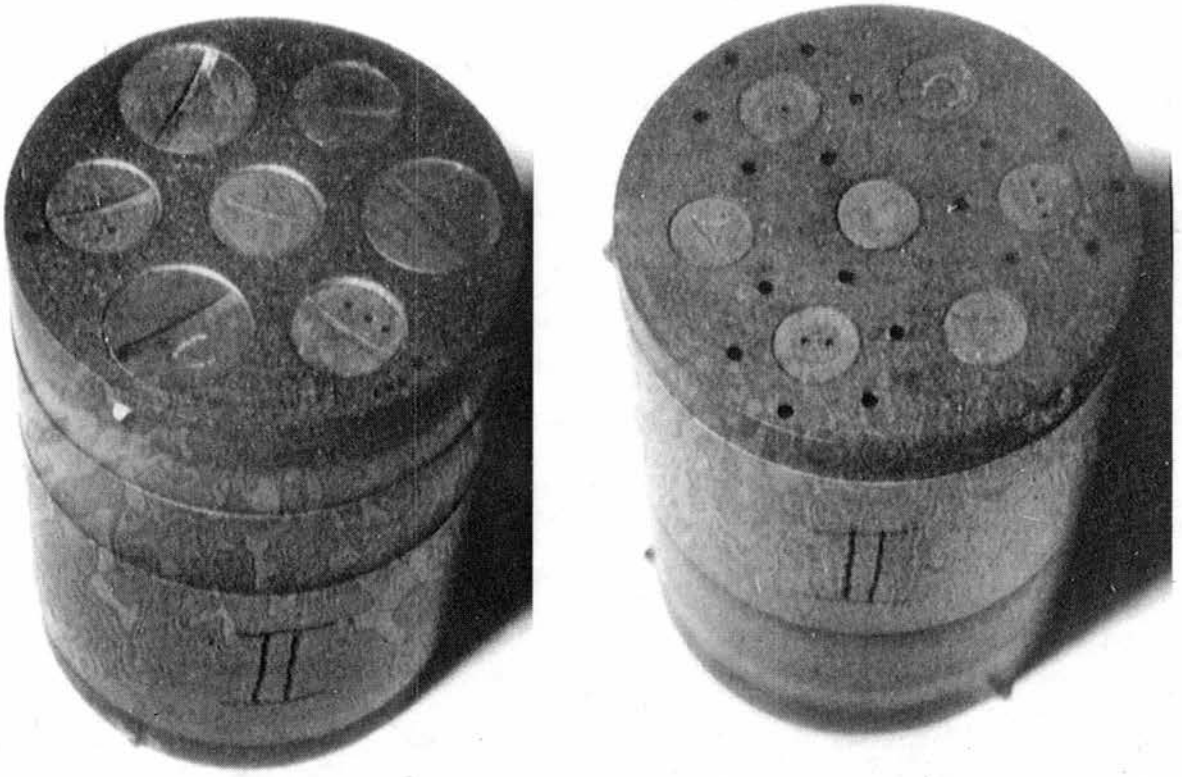



TOP END VIEW OF COMPLETED ASSEMBLY

Figure 2.3.1. Capsule 1 graphite fuel body with components separately and collectively shown.

YP20585

YP20584



TOP VIEW

BOTTOM VIEW

Figure 2.3.2. Capsule 2 graphite fuel body assembled.

temperature in capsule 2 and as a function of water vapor pressure and temperature in capsule 3. All three capsules contained, in addition, so-called piggyback samples located in the central hole of capsule 1 and in simulated coolant holes, displaced alternately by 60° from the fuel holes, in capsules 2 and 3. Details of the piggyback samples are given in ref. 4.

### 2.3.2 Fuel Compacts

The fuel compacts consisted of fissile and fertile coated fuel particles plus graphite shim particles compacted with a carbonaceous matrix into cylinders of 12.85 mm diam and 19 mm length. Within a mold, the contained fuel and graphite particles and the fluid matrix material were carbonized at 800°C and then heated for 1 h at 1500°C in an argon atmosphere. Four fuel compacts were stacked in each of the three fuel holes of the graphite bodies. Initially, the gap between the fuel compacts and the wall of the fuel holes was about 0.2 mm. During irradiation, the gap increased at first but eventually decreased to a distance comparable to the initial gap size. The loading of the compacts in terms of the uranium and thorium isotopes, as well as the number of fissile and fertile particles, is given in Table 2.3.1.

### 2.3.3 Coated Fuel Particles

The coated fuel particles contained in the fuel compacts consist of fissile and fertile particles with TRISO coatings and of dtf particles having only a single pyrocarbon coating. The TRISO coating on the fuel kernels consists of four layers; from the innermost to the outer, the layers are of a buffer or low-density carbon, a pyrocarbon, SiC, and an outer pyrocarbon. The TRISO-coated fissile particles have a UCO kernel with the initial composition $UC_{0.5}O_{1.5}$, a nominal diameter of 350 μm, and are enriched in $^{235}U$ to 19.6%. The fertile particles have a $ThO_2$ kernel with a nominal diameter of 450 μm. The dtf particles have an initial composition of $UC_{0.4}O_{1.6}$, an enrichment of 19.6%, and are coated only with a pyrocarbon layer of 23 μm. The dtf particles fail from fission fragment damage within several hundred hours of the beginning of irradiation and thus provide a known source of exposed kernels. Earlier experience with the behavior of these particles is described in ref. 12.

### 2.3.4 Piggyback Samples

The piggyback samples in capsule 1 consisted of: (1) SiC rings in a graphite crucible and (2) niobium-encapsulated coated fuel particles of various configurations including the dtf particles, all contained in a graphite crucible; in capsules 2 and 3 of (1) cylindrical graphite samples of grade H-451 and H-451I, (2) inert compacts fired in $Al_2O_3$ and in SiC, and (3) unbonded, fissile and fertile, normally coated fuel particles. The loading of the encapsulated and unbonded fuel particles is given in Table 2.3.2.

### 2.3.5 Metallic Components

In capsule 3, in which significant amounts of water vapor were added, the possible reaction with or adsorption of water vapor on the metallic components of the capsule has to be considered. The metallic components included (1) the stainless steel container, (2) the heat shields at the ends of the capsule consisting of one molybdenum and two stainless steel shields, (3) the niobium tubes protecting the TCs, and (4) the niobium tubes containing the piggyback samples. These metallic components were in all three capsules. In another experiment,[12] niobium tubes were attached by

Table 2.3.1. The uranium and thorium loading of the fuel compacts

| Capsule | Isotope | Fissile Particles[a] loading (g/compact) | dtf-Particles[b] loading (g/compact) | Fertile Particles[c] loading (g/compact) |
|---|---|---|---|---|
| 1 | U | 0.1715 | 0.0185 | |
| 2 | U | 0.1715 | 0.0185 | |
| 3 | U | 0.1715 | 0.0185 | |
| 1 | $^{235}U$ | 0.0336 | 0.0036 | |
| 2 | $^{235}U$ | 0.0336 | 0.0036 | |
| 3 | $^{235}U$ | 0.0336 | 0.0036 | |
| 1 | $^{238}U$ | 0.1379 | 0.0149 | |
| 2 | $^{238}U$ | 0.1379 | 0.0149 | |
| 3 | $^{238}U$ | 0.1379 | 0.0149 | |
| 1 | $^{232}Th$ | | | 0.2168 |
| 2 | $^{232}Th$ | | | 0.2168 |
| 3 | $^{232}Th$ | | | 0.2168 |
| Number of particles/compact | | 896 | 87 | 500 |
| Number of particles/capsule | | 10752 | 1044 | 6000 |

[a] Particles from batch number 6157-11-010
[b] Particles from batch number 6450-00-010
[c] Particles from batch number 6252-12 COMP

Table 2.3.2. The uranium and thorium loading of the unbonded and piggyback fuel particles

| Capsule | Isotope | Unbonded Fissile Particles[a] loading (g/capsule) | Unbonded Fertile Particles[c] loading (g/capsule) | Piggyback Fissile Particles[a] loading (g/capsule) | Piggyback dtf-Particles[b] loading (g/capsule) | Piggyback Depleted$UO_2$[d] loading (g/capsule) |
|---|---|---|---|---|---|---|
| 1 | U | 0.0000 | | 5.7E-04 | 6.4E-04 | 1.59E-02 |
| 2 | U | 0.1053 | | | 6.4E-04 | 6.13E-03 |
| 3 | U | 0.1053 | | | 6.4E-04 | 6.74E-03 |
| 1 | $^{235}U$ | 0.0000 | | 1.1E-04 | 1.3E-04 | 1.11E-04 |
| 2 | $^{235}U$ | 0.0207 | | | 1.3E-04 | 4.29E-05 |
| 3 | $^{235}U$ | 0.0207 | | | 1.3E-04 | 4.72E-05 |
| 1 | $^{238}U$ | 0.000 | | 4.6E-04 | 5.1E-04 | 1.58E-02 |
| 2 | $^{238}U$ | 0.0847 | | | 5.1E-04 | 6.08E-03 |
| 3 | $^{238}U$ | 0.0847 | | | 5.1E-04 | 6.69E-03 |
| 1 | $^{232}Th$ | | 0.0000 | | | |
| 2 | $^{232}Th$ | | 0.1084 | | | |
| 3 | $^{232}Th$ | | 0.1084 | | | |
| Number of particles/capsule | | 550 | 250 | 3 (1)[e] | 3 | 26 (1)[e]<br>10 (2)<br>11 (3) |

[a] Particles from batch number 6157-11-010
[b] Particles from batch number 6450-00-010
[c] Particles from batch number 6252-12 COMP
[d] Particles of KFA type EUO-2428
[e] The number of particles, p, in capsule c is p (c)

water vapor and did swell to the extent that it made their removal from a hole in the graphite body difficult; similar samples under the same conditions, but not exposed to the water vapor, did not swell. The consequence of the reaction between water vapor and the metallic components, particularly niobium, must be assessed in the complete analysis of the present experiment. It is likely that this is important only in capsule 3 and not in capsules 1 and 2. The possibility that niobium could act as a getter for iodine needs also to be assessed.

## 2.4 QUALITY ASSURANCE, ASSEMBLY, AND COMMISSIONING

### 2.4.1 Quality Assurance

There are two QA departments at Petten, in the HFR division and in the JRC. The main function of the QA department at JRC Petten is to inspect and approve all experiments that are inserted in the HFR. The HFR QA department provides the final inspections for all in-reactor tests. Details on the JRC and HFR QA departments have been reported.[13-15] In addition, there is a separate department which performs calibration of instruments at the request of the HFR, with particular emphasis on safety.

Once the experiment is accepted and installed in the HFR, the lead engineer of the experiment becomes responsible for calibrations and other QA functions. In the case of the HFR-B1 experiment, the lead engineer was encouraged and helped by the technical review function performed by the experiment cosponsors, KFA and GA. In this particular case, however, there was a unique relationship between the test operator, JRC, and the clients, KFA and GA. KFA and GA essentially functioned as independent reviewers and have required that the tests be conducted in accordance with their QA systems. At this stage, the QA on-site was regarded as being in compliance with the intent of 10 CFR 50, Appendix B, criteria 5, 6, 11, and 12. A document on the QA of experiment HFR-B1[15] is a result of cooperation among the JRC, KFA, and GA.

### 2.4.2 Assembly and Commissioning

The irradiation rig was designed by JRC Petten and manufactured and assembled by subcontractors, i.e., the in-pile part by ECN Petten and the instrumentation rig head by NTG Gelnhausen. The fuel compacts and graphite bodies were assembled by GA according to JRC plans, including dimensions and provisions for TCs and gamma-scan wires. The bodies were shipped to Petten fully assembled except for the KFA SiC rings, which were inserted by JRC into the central hole of the fuel body in capsule 1. The final commissioning of the rig was accomplished by JRC QA. The following items were addressed during the assembly and final checkout of the rig:

1. All dimensions were checked.

2. All parts were cleaned by pickling and rinsing; some parts were cleaned ultrasonically, and tubes and capsules were purged with He at 200° C.

3. Electrical checks of TCs, SPNs, VDU solenoid valves and extension cables were performed.

4. The orientation of detectors and specimens with respect to arrow North was checked.

5. All welds and brazings were leak checked; the maximum leak rate allowed was $3 \times 10^{-7}$ torr L/s.

6. All containments were pressure tested at about 9 MPa and the rig head at about 5 MPa. The maximum allowed leakage was 0.5 MPa in 72 h.

7. Checks of all identification marks on all parts, tubes, cables, connectors, and valves were performed.

8. All tube passages were checked for continuity.

9. All solenoid valves were checked.

10. The polarity of all electrical circuits was checked.

11. All handling parts, such as the transport cover and special top lid adapter, were checked.

12. X-radiography of assembled capsules was performed.[3]

All the above checkout test were accomplished by ECN Petten during and after assembly. The checks are described and registered in the assembly report.[16] The final checkout of the rig was accomplished by JRC QA. They repeated all the above tests before and after installation and connection to the Sweeploop system. A final check on the safety and function of the test was accomplished by the HFR Review Committee.

# 3. IRRADIATION HISTORY

The irradiation of the HFR-B1 experiment was carried out in 20 reactor cycles, starting on April 7, 1987, and ending on July 10, 1989. During the first year of operation, the rig was removed from the core for a total of five cycles. The length of each HFR cycle was between 20 and 26 d, and the duration of the irradiation was 444 EFPD. There were normally 3 to 6 d between each cycle with the exception of the maintenance shutdowns which occurred in March and August for periods of 30 and 45 d, respectively.

The D214.01 rig was irradiated in core position F8 or F2. The rig was turned 180° after each cycle. The vertical displacement units were used only in the first four cycles; thus, the axial positions were constant for the remaining 16 cycles. Capsules 1 and 2 were in the axial center of the core and received similar neutron fluences, while capsule 3 was below centerline. Table 3.0.1 shows HFR start dates, stop dates, EFPD, and average cycle power.

Before the start of each cycle, instructions on the conduct of the experiments in the cycle were given to technicians and reactor operators. The instructions included (1) values of flow rates, pressures, and temperatures; (2) the specific TCs to be monitored; (3) the times and dates for neon and other gas additions or removals; and (4) schedules for all measurements including the measurement of released fission gas using the multi-channel analysis (MCA) equipment and the measurement of the composition of effluent gases using the gas chromatograph (GC). Instructions for special tests, such as the addition of water vapor and hydrogen to capsule 3, were included, along with any requests to accelerate monitoring via the GC and/or the MCA. At least 24 h before the start of each cycle, flows and pressures were re-established in all capsules. The HFR was normally brought to power, 42 to 45 MW, within about 8 h. Scheduled reactor stops were either at 24 or 16 h of the last day of the cycle and were accomplished by rapid insertion of control rods. Consequently, temperatures in all experiments declined rather quickly.

The helium used in all capsules was the normal reactor "service He" and was purified by a "deox" and by molecular sieve beds for the removal of oxygen and water vapor, respectively. A final ultrapurification was accomplished with the use of a bed of activated carbon at liquid nitrogen temperature. The Ne used was purified by only the deox and molecular sieve methods.

MCA measurements were usually started on the second day of the cycle. Nine isotopes of Xe and Kr were measured in the effluent gas from each capsule once daily, except during special tests involving, for example, water vapor addition to capsule 3 or temperature cycling in capsule 2; in such cases, data were taken more frequently. Procedures for and conditions of the specific capsules are given below.

## 3.1 CAPSULE 1

Capsule 1 was intended to operate at steady conditions of temperature, neutron flux, and gas environment. Neon was never added, and temperatures tended to fluctuate from cycle to cycle due to changes in reactor power, declining capsule power, changes in gas gaps and thermal conductivity in the fuel body, and occasional changes in neutron moderation or absorption in adjacent tests in the reactor.

Table 3.0.1. HFR cycle start and stop dates, cycle and cumulative power days, and average cycle power
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| Cycle | Start | End | | | Ave. Power |
|---|---|---|---|---|---|
| y. no | d. mo | d. mo | FPD | ∑FPD | <MW> |
| 87.03 | 07.04 | 04.05 | 21.27 | 21.27 | 44.1 |
| 87.05 | 02.06 | 29.06 | 23.65 | 44.92 | 44.1 |
| 87.09 | 27.10 | 16.11 | 20.03 | 64.95 | 44.1 |
| 87.10 | 18.11 | 14.12 | 24.63 | 89.58 | 44.1 |
| 88.01 | 06.01 | 1.02 | 25.76 | 115.34 | NA |
| 88.02 | 04.02 | 29.02 | 25.44 | 140.78 | 47.7 |
| 88.04 | 28.04 | 23.05 | 25.75 | 166.53 | 47.5 |
| 88.05 | 26.05 | 20.06 | 25.21 | 191.74 | 47.5 |
| 88.06 | 23.06 | 15.07 | 20.79 | 212.53 | 45.1 |
| 88.07 | 08.09 | 28.09 | 21.04 | 233.57 | 45.3 |
| 88.08 | 05.10 | 24.10 | 21.44 | 255.01 | 45.3 |
| 88.09 | 27.10 | 17.11 | 21.26 | 276.27 | 45.1 |
| 88.10 | 21.11 | 12.12 | 20.92 | 297.19 | 45.1 |
| 88.11 | 15.12 | 05.01 | 21.40 | 318.59 | 45.1 |
| 89.01 | 16.01 | 06.02 | 20.96 | 339.55 | 41.7 |
| 89.02 | 10.02 | 04.03 | 18.80 | 358.35 | 45.1 |
| 89.03 | 04.04 | 24.04 | 19.75 | 378.10 | 45.5 |
| 89.04 | 28.04 | 20.05 | 22.75 | 400.85 | 45.3 |
| 89.05 | 25.05 | 14.06 | 21.14 | 421.99 | 44.7 |
| 89.06 | 18.06 | 10.07 | 21.60 | 443.59 | 42.0 |

Y.No = Year; cycle number
d.mo = day.month
FPD = full power days
∑FPD = cumulative number of full power days
Ave. Power = average power per cycle taken from Figs. 6.6.1, 6.6.1, and 6.6.3
NA = not available; data for cycle 88.01 not included in Fig. 6.6.2

The mean temperature of the graphite body was 790 ± 30°C; the estimated fuel temperatures were between 880 and 990° C. The gas environment was pure helium with less than 1 ppm of impurities, such as CO, $CO_2$ , $O_2$ , or $H_2$. During operation at temperature, the outlet gas usually showed trace impurities of about 2 ppmv $H_2$, and about 0.1 ppmv CO and $CO_2$. The gas flow rate was constant at 300 ± 10 $cm^3$/min at standard conditions of 0.1 MPa and 298 K; the inlet pressure was nominally 0.4 ± 0.02 MPa, while the outlet pressure was 0. 36 ± 0.02 MPa.

## 3.2 CAPSULE 2

Capsule 2 was intended to operate over the accessible range of temperatures with the maximum being near the highest temperature expected in the core of an HTGR. The mean temperature of the graphite body was 870 ± 35°C, but the estimated fuel temperatures were between 880 and 1230° C. The latter range in temperature was achieved by adding neon to the sweep gas in half of the reactor cycles to a maximum fractional concentration of 1. For each 1% of neon added, the temperature increased about 3.5%; the maximum increase was 350° C. The effect of temperature on fission gas release at constant nuclear conditions was determined by varying the temperature in some cycles as frequently as two to five times. The flow rates, pressures, and gas impurity concentrations were similar to those of capsule 1. Whenever neon was added, however, impurity measurements could not be made with the gas chromatograph due to the overlap of the huge neon elution peak with that of the trace impurities. During these periods, the outlet impurities were inferred from the capsule 1 data and from the inlet gas measurements.

## 3.3 CAPSULE 3

The purpose of capsule 3 was to measure the effect of water vapor on fission gas release from exposed UCO fuel over a temperature range for which the graphite surrounding the exposed fuel would not react with the water vapor at the lowest temperatures but would react at the higher temperatures. The mean temperature of the graphite body was 742 ± 30°C, but the estimated fuel temperatures were between 820 and 1050° C.

There were 16 water vapor injections which, except for two, had a duration of 4 to 10 d. The partial pressures ranged from 18 to 1060 Pa. The final water vapor injection was started 16 hours before the end of the irradiation for the special purpose of determining whether volatile iodine (such as methyl iodide) would be formed.

Water vapor was added to the capsule 3 inlet gas in the following way: First, the normal He inlet was replaced with a special source which was part of the "water vapor generator" system. This system comprised a bypass flow which bubbled through a water column at ambient temperature, after which it was mixed with dry helium. Knowing the temperature of the water column and therefore the partial pressure of water vapor, the flow rate through the water, the total mixed flow rate, and the absolute pressures above the water column and at the inlet to the capsule, the concentration of water vapor in the mixed gas inlet could be calculated.

In several of the tests, an absolute frostpoint-type moisture monitor (General Eastern Model MI-1) was used to calibrate the water vapor generator system and to check on the accuracy of the methods of calculation. The calibrations corroborated the moisture generation system

performance and calculations; the water vapor concentrations were known in the last 11 tests to be better than ±10%. In the first five injection tests, the flow rate through the bubbler was not known; rather, reliance was placed on readings of Panametrics capacitance-type cells. These cells were found later to yield low values; the true water vapor concentrations in these tests were inferred from an analysis based on the rate of graphite oxidation as determined by the GC measurements.

In two of the cycles, 100 Pa of hydrogen were added to the inlet gas, along with the water vapor, to determine the effect of $H_2$ on the interaction of water vapor with the $UO_2$. This was accomplished by switching the normal He supply to a special tank containing 1000 ppm hydrogen. The valving was arranged so that the $H_2$ could be turned on or off at any time during the test.

GC measurements were normally performed once a day for all capsules except capsule 3 during the water vapor injection tests when measurements were made more frequently. Often, the GC was put on automatic cycle, so that any changes in oxidation rate would be readily detected.

A complete description of the water vapor generator and GC systems, methods of use, and calibrations is given in Appendices A and B, respectively.

# 4. EXPERIMENTAL DATA

## 4.1 GENERAL

The number of experimental data accumulated during the HFR-B1 experiment is so large as to preclude presenting most of them in this final irradiation report. The data of experiment HFR-B1 are briefly described in the categories of (1) data files, (2) laboratory recorded data, (3) graphics and associated data, (4) GC data, and (5) postirradiation iodine decay data. These data have been given by Petten to the ORNL Nuclear Fuel Section of the Metals and Ceramics Division.

### 4.1.1 Data Files

A magnetic tape was generated in the HFR Vax-4300 System at Petten: a copy of this tape is available at ORNL. This tape contains 1457 files and 270,464 blocks of data in 3 directories for the HFR-B1 experiment. The files include those with (1) the steady-state fission gas release values (R/B) for all capsules and cycles for both the total fissile loading and for the loading in the dtf particles only; (2) the plots of these R/B data as a function of time along with a reference temperature profile; (3) the vertical displacement history; (4) the activity history for the three capsules; (5) all TC temperature histories; (6) power and control rod histories; (7) shape factors (related to the axial distribution of neutron fluxes); (8) process data including flow, hygrometer, and pressure data; and (9) Sweeploop data including gas composition, pressure, hygrometer, and reference temperature data. A list of the files in two of the directories is presented in Sect. 6.

### 4.1.2 Laboratory Recorded Data

The principal data relate to the counting of the gaseous isotopes $^{85m}Kr$, $^{87}Kr$, $^{88}Kr$, $^{89}Kr$, $^{90}Kr$, $^{133}Xe$, $^{135}Xe$, $^{135m}Xe$, $^{137}Xe$, and $^{138}Xe$. Associated with each counting are the specific capsule, date, spectrum number, sample collection time, start of counting time, reference temperature, flow rate and pressure, and the net number of counts for each isotope which is used in computing the steady-state fractional fission gas release, R/B. These data obtained during the irradiation, as well as associated data for all 20 cycles, were recorded in 11 ring-binder notebooks.

In addition, there are:

1. Post-cycle calculations of the flux and fluence in seven energy groups, damage to activation ratios for graphite, damage fluence, equivalent DIDO nickel fluence, axial shape factors, and the number of EFPD.

2. HFR-Vax graphics for (per cycle per capsule): (a) temperature profiles; (b) gaseous activity; (c) vertical position; (d) neutron flux from the monitoring of the SPN detectors, SPN1, SPN3, and SPN5; (e) flow histories; (f) downstream moisture profiles; and (g) upstream moisture profiles.

3. DACOS files consisting of: (a) temperature data from the 54 TCs; (b) process data including flow, hygrometer, activity, pressure, and position data; and (c) Sweeploop data including gas composition, pressure, hygrometer, and reference temperature data.

4. Weekly experimental data summaries (these reports are useful for an overall view but were not issued for all weeks).

5. Operating instructions and data logger information.

6. Discussions by fax on the course of the experiments (GA, ORNL, and JRC Petten).

### 4.1.3 Graphics and Associated Data

The graphic displays and associated data obtained include (1) power profiles in fuel compacts and piggyback samples; (2) burnup profiles with separate contributions from $^{235}U$, $^{239}Pu$, $^{241}Pu$, and $^{233}U$ for fuel compacts and piggyback samples; (3) tabular power data and neutron fluxes; (4) tabular ORIGEN calculational data for each cycle for the profiles of (1) and (2) at nominal and maximum fluxes; (5) R/B profiles at 8.9 and 100% fissile power and corresponding reference temperature profiles for each cycle of each capsule; (6) profiles of the activity, pressure, hygrometer readings, and purge flow, and the SPN detector outputs; (7) comparison profiles of the reference temperatures in capsules 1, 2, and 3 for each cycle; and (8) temperature profiles for each cycle associated with three fuel compacts and with each fueled graphite wedge in each capsule.

### 4.1.4 Gas Chromatographic Data

The GC data consist of the time history of the products of hydrolysis of the carbonaceous components of the fuel elements in the three capsules, mainly CO, $CO_2$, $H_2$, and $CH_4$. In addition, the chart records of the multichannel recorder for pressures, selected temperatures, flow rates, and other process and Sweeploop quantities accompany the GC records.

### 4.1.5 Postirradiation Iodine Decay Data

The postirradiation measurements of the xenon isotopes resulting from the radioactive decay of iodine released from exposed kernels during irradiation and the corresponding spectral analyses leading to the net area counts for the xenon isotopes $^{133}Xe$, $^{135}Xe$, and $^{135m}Xe$ were obtained in the form of computer printouts. These data covered the measurements of the xenon isotopes after the termination of irradiation in cycles 88.10, 89.02, 89.04, 89.05, and 89.06.

## 4.2 TEMPERATURES

For measuring the temperature, there were 18 TCs in each capsule located at three depths in the graphite bodies. The arrangements are shown in Figs. 4.2.1, 4.2.2, and 4.2.3 taken from the design and safety report.[3] The TCs in capsules 1 and 3 were type "K" with a sustained temperature limit of 1000° C. In capsule 2, where temperatures were sometimes higher, 12 type "N" TCs (1150° C sustained limit) were used along with 6 type K. The type K TCs were sheathed in stainless steel, and the type N had Inconel sheaths. All TCs were surrounded by niobium protection tubes.

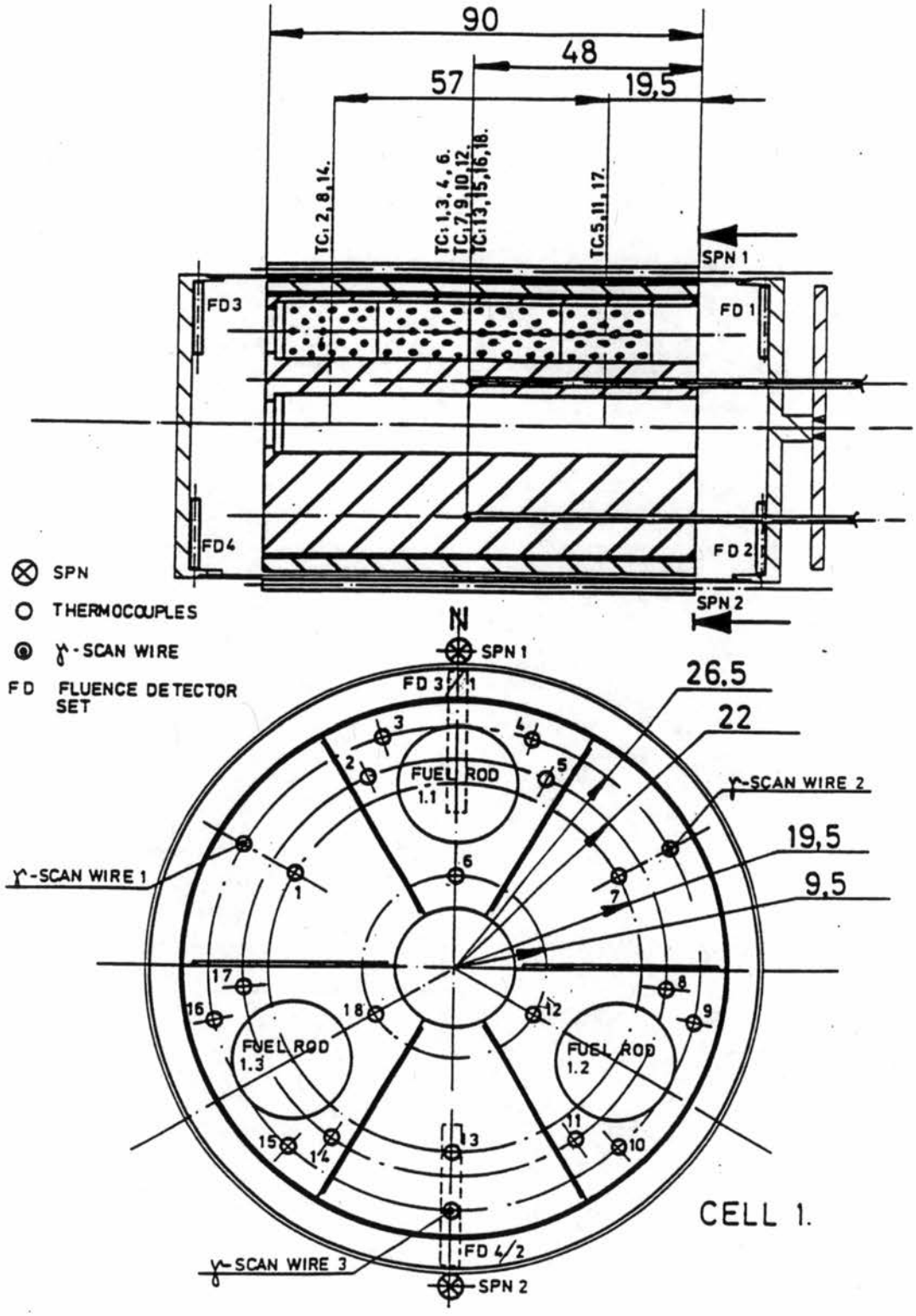



Fig. 4.2.1. Instrumentation of capsule 1 (also designated as capsule A).
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

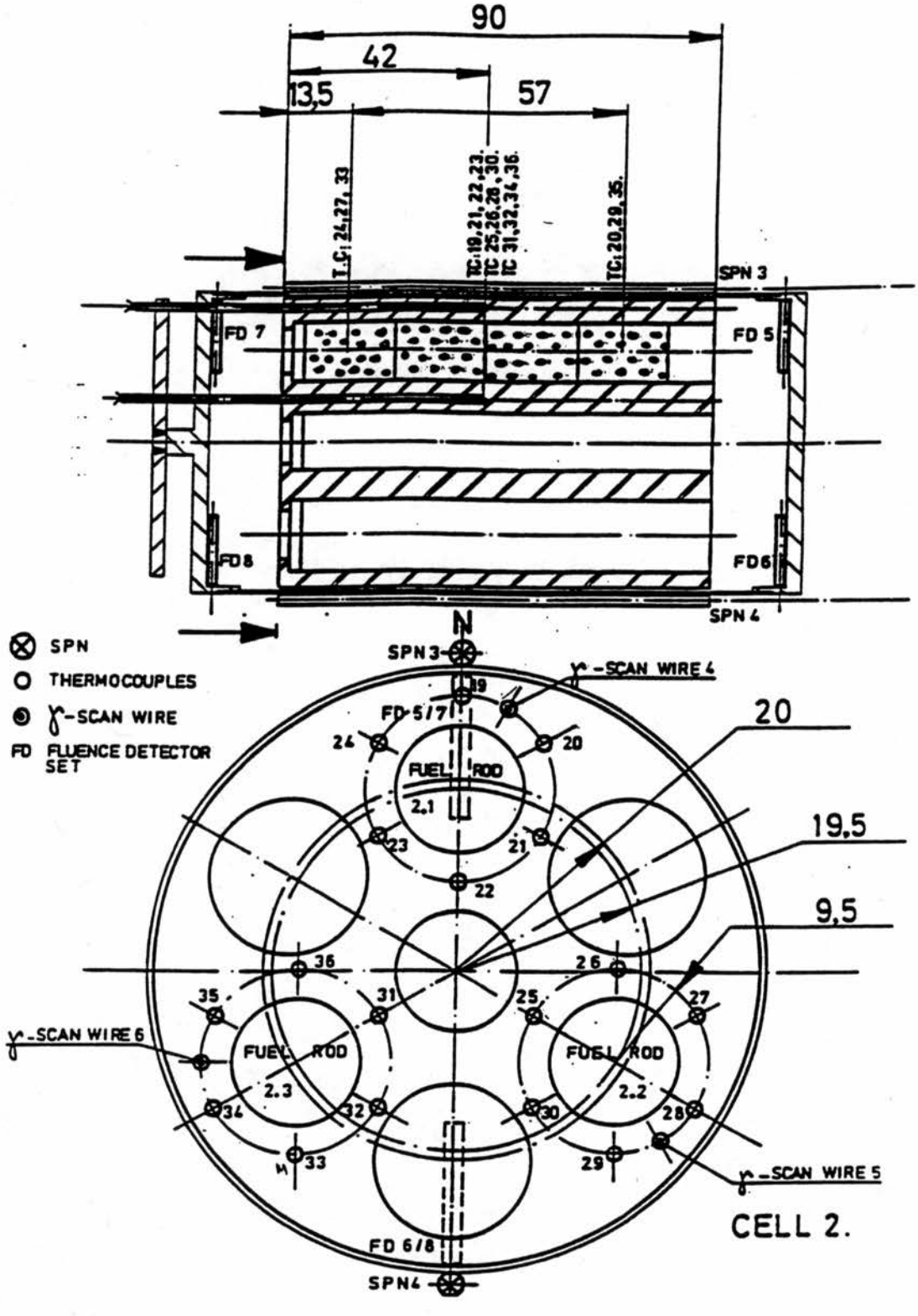



Fig. 4.2.2. Instrumentation of capsule 2 (also designated as capsule B).
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

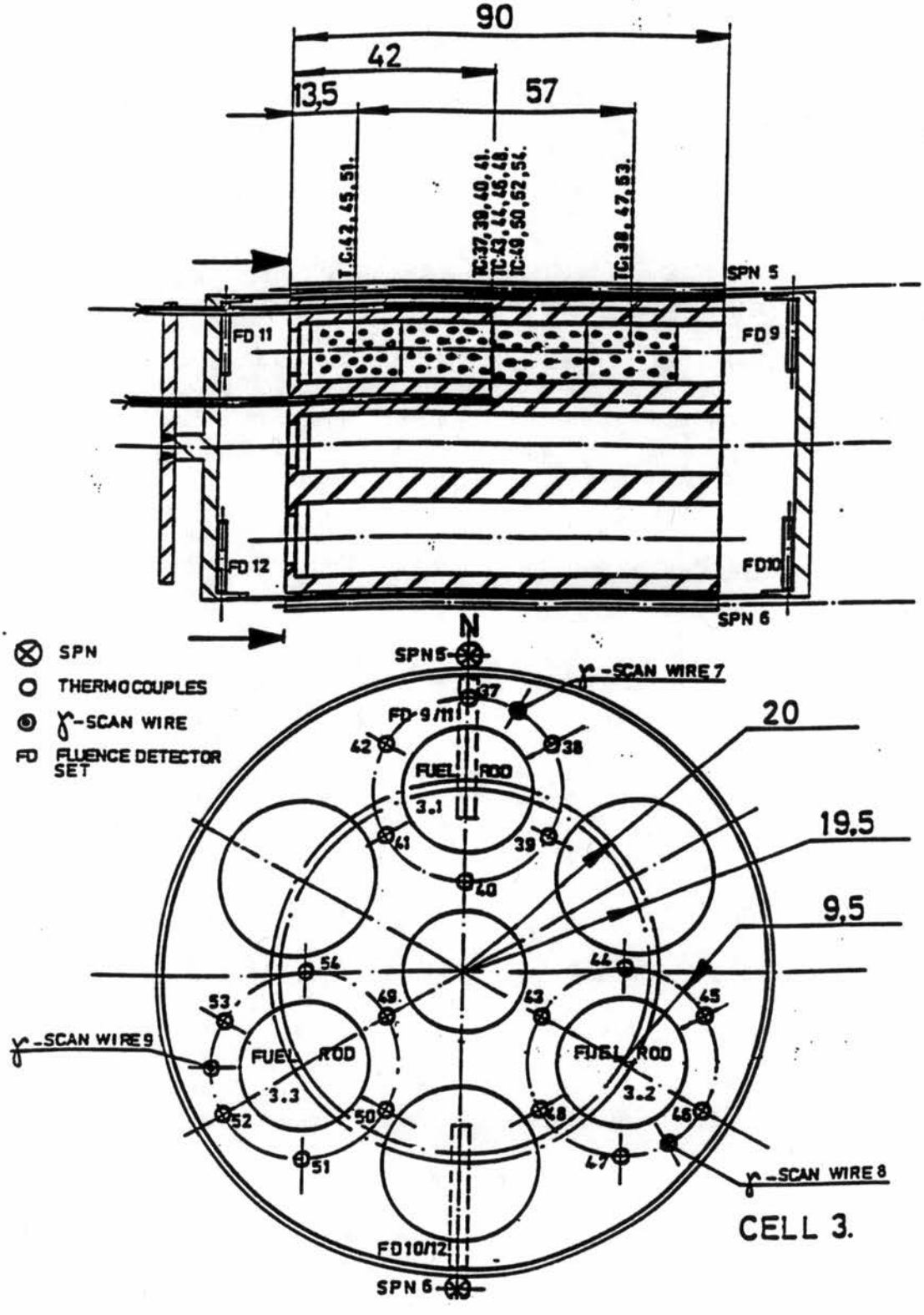



Fig. 4.2.3. Instrumentation of capsule 3 (also designated as capsule C).
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

In capsule 1, each stack of fuel compacts in alternate graphite wedges was surrounded by five TCs located at three radial distances, and in the sink graphite wedges, there was one TC; see Fig. 4.2.1. In capsules 2 and 3, each of the stacks of fuel compacts per capsule was surrounded by six uniformly spaced TCs at a common radial distance from the centerline of the fuel compact stack; see Figs. 4.2.2 and 4.2.3. The TC temperature histories were recorded and stored on the magnetic tape by the HFR Vax-4300 System as stated in Sect. 4.1 above. Two examples of the temperature histories are presented in Figs. 4.2.4 and 4.2.5 for cycles 88.05 and 89.05, respectively. In both cases, TCs profiles in capsules A, B, and C (also more generally referred to as capsules 1, 2, and 3, respectively) for thermocouples numbered 12, 30, and 43, respectively, are shown. Very often, the temperature in a capsule during a single cycle was approximately constant as shown in Figs. 4.2.4 and 4.2.5; however, in capsule B (capsule 2), the temperature was changed occasionally to probe the effect of temperature on the release of fission gases from fuel at temperatures above 1100°C. Note that in Figs. 4.2.4 and 4.2.5, the temperature values are those of the graphite bodies; the fuel temperatures will be higher by approximately 100 to 150°C. For convenience of use, a table of temperatures was constructed in which average values were deduced for the time segments during which the temperature was constant or only slowly varying. An example from this large table is presented in Table 4.2.1. (Note: The complete set of temperature values is presented in Sect. 6, Tables 6.2.1, 6.2.2, and 6.2.3 for capsules 1, 2, and 3 in which TCs numbered 1 through 18, 19 through 36, and 37 through 54, respectively, were monitored.) The tables also provide information on the cycle number, date, time, EFPD, the capsule orientation (see Sect. 4.3), the location of the VDU, the neon content of the purge gas, the power, and the control rod position with respect to the central reactor top lid (Crtl). A comparison of the data in Figs. 4.2.4 and 4.2.5 with the appropriate data in Tables 6.2.1, 6.2.2, or 6.2.3 will reveal the relationship of the average temperature to the temperature values of the profile and the small errors introduced in using the averages. In making the comparison, one must note that calendar days are the units of the abscissae whereas Tables 6.2.1, 6.2.2, and 6.2.3 list the number of EFPD for a given date. In the special cases of Figs. 4.2.4 and 4.2.5, the conversion from calendar days to EFPD is made by adding 168.3 and 402.6 to the appropriate number of calendar days for cycles 88.05 and 89.05, respectively, to obtain the EFPD corresponding to the time of interest in the chosen cycle.

## 4.3 NUCLEAR QUANTITIES

The nuclear quantities and the fission power per capsule and fuel compact stack for each cycle and fuel element position are calculated, post-cycle, using the HIP-TEDDI computer code.[3] This calculation yields volume average data over a vertical distance (length) of 60 cm; the neutron flux and fluence values for a specific vertical location are obtained by using the curve of relative vertical neutron flux distribution for the fuel element positions used, F2 and F8,[3] and the shape factor which is the ratio of a specific flux to the average neutron flux. An example of the post-cycle, HIP-TEDDI volume average data for cycle 88.05 is shown in Table 4.3.1. The post- cycle data for all cycles are presented in Sect. 6.3. Of note in Table 4.3.1 is the orientation of the graphite body in the capsule. The orientation alternates between a reference north and south from cycle to cycle to compensate for an unsymmetrical radial neutron fluence. The latter is a consequence of the peripheral core positions (F2 and F8) which have reflector elements on one side and fuel and other experimental positions on the other sides. By rotating the fuel bodies, the neutron flux and fluence exposures of the three fuel compact stacks are made more uniform. As shown in Table 4.3.1, the initial and cycle average flux and the neutron fluence are given for each

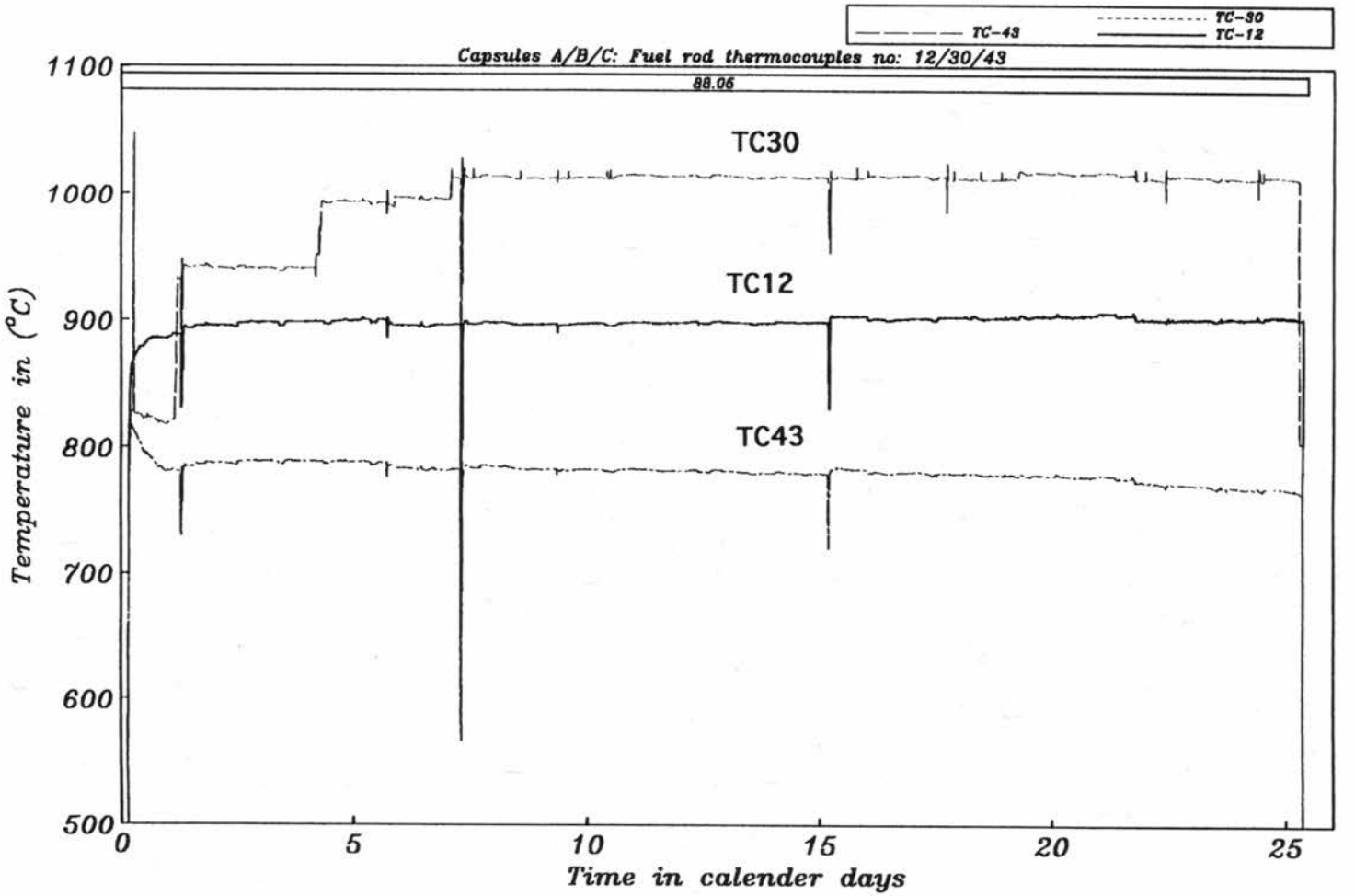



Fig. 4.2.4. Temperature history D-214 Cycle 88.05.
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

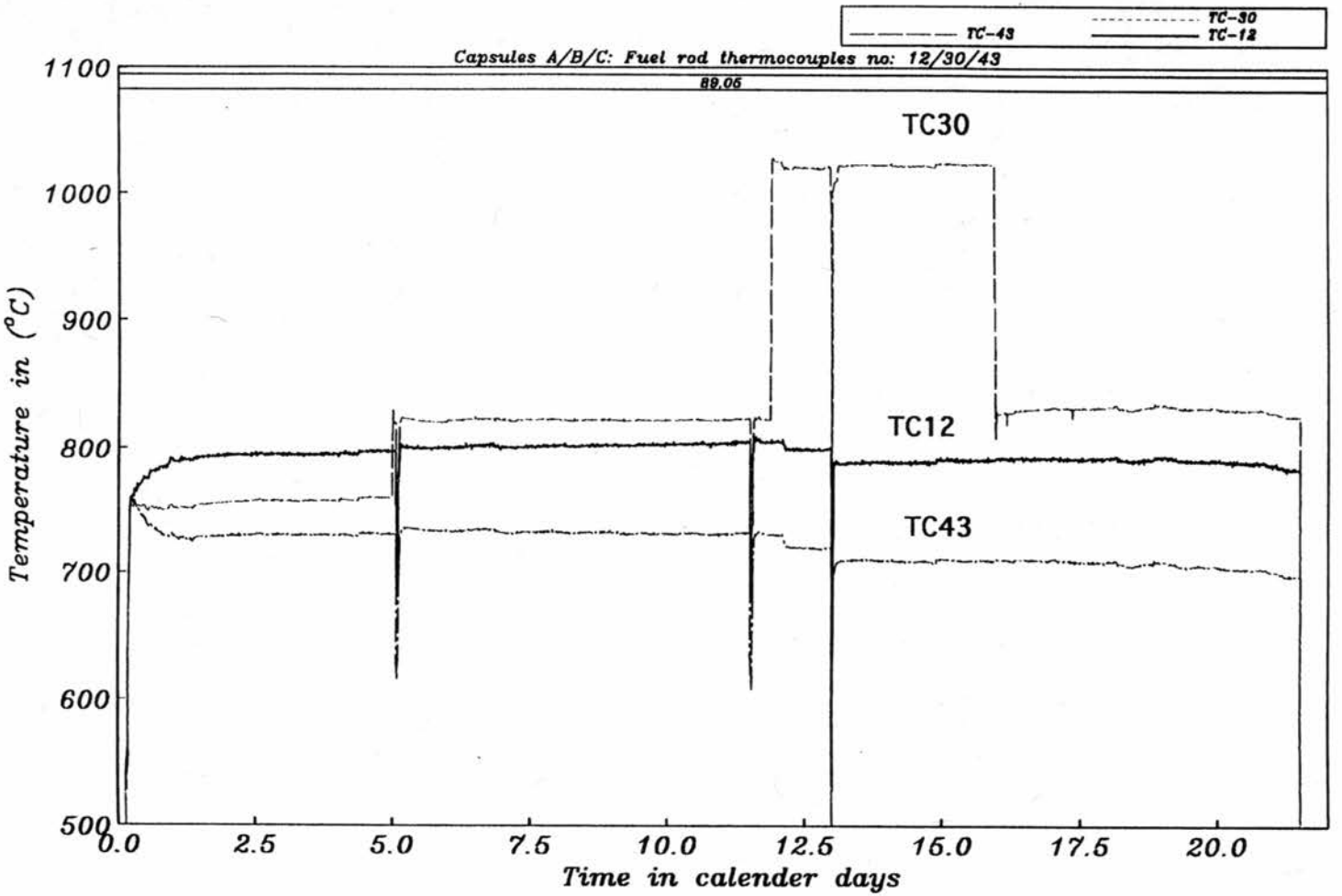



Fig. 4.2.5. Temperature history D-214 Cycle 89.05.
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

Table 4.2.1. Capsule 1: Representative temperatures at selected times, capsule and control rod position, gas composition and reactor power
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| Cycle | 87.03 | | | 87.05 | | | 87.09 | | 87.10 | | 88.01 | | 88.02 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | 13.04 | 22.04 | 4.05 | 8.06 | 9.06 | 29.06 | 28.10 | 16.11 | 20.11 | 14.12 | 11.01 | 1.02 | 4.02 | 29.02 |
| Time | 8.36 | 11.24 | 14.48 | 12.34 | 15.10 | 11.18 | 8.06 | 14.00 | 8.40 | 10.16 | 10.00 | 14.46 | 12.54 | 11.30 |
| FPD | 4 | 10 | 23 | 26 | 27 | 46 | 47 | 66 | 67 | 91 | 96 | 117 | 118 | 142 |
| Orient. | F 8 N | | | F 8 S | | | F 8 N | | F 8 S | | F 2 S | | F 2 N | |
| VDU | +93 | +118 | +118 | +255 | +255 | +255 | +110 | +110 | +110 | +110 | +65 | +65 | +65 | +65 |
| %Ne | 0 | 0 | 0 | 0 | 86 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mw | 45 | | | 45 | | | 45 | | | 45 | 47.5 | 47.5 | 47.5 | |
| Crtl | 65 | 66 | 72 | 64 | 64 | 69 | 57 | 59 | 55 | 57 | 55 | 57 | 57 | 60 |
| TC No. | Temperature (°C) | | | | | | | | | | | | | |
| 1 | 774 | 753 | 769 | 479 | 733 | 507 | 758 | 771 | 698 | 720 | 709 | 733 | 712 | 749 |
| 2 | 744 | 721 | 739 | 454 | 703 | 482 | 780 | 791 | 731 | 747 | 725 | 747 | 750 | 791 |
| 3 | 823 | 800 | 820 | 504 | 761 | 534 | 833 | 844 | 767 | 783 | 782 | 805 | 767 | 800 |
| 4 | 795 | 767 | 786 | 509 | 767 | 542 | 835 | 849 | 766 | 781 | 784 | 808 | 756 | 788 |
| 5 | 783 | 761 | 782 | 473 | 722 | 502 | 795 | 811 | 728 | 749 | 753 | 780 | 727 | 763 |
| 6 | 0 | 0 | 0 | 0 | 0 | 0 | 862 | 876 | 798 | 821 | 816 | 843 | 794 | 831 |
| 7 | 748 | 723 | 742 | 456 | 705 | 483 | 756 | 771 | 709 | 729 | 733 | 760 | 700 | 736 |
| 8 | 750 | 729 | 746 | 485 | 739 | 514 | 768 | 779 | 747 | 759 | 739 | 761 | 728 | 757 |
| 9 | 797 | 764 | 782 | 503 | 761 | 535 | 799 | 810 | 775 | 792 | 770 | 794 | 756 | 790 |
| 10 | 823 | 795 | 815 | 500 | 756 | 530 | 804 | 814 | 784 | 802 | 773 | 797 | 767 | 802 |
| 11 | 755 | 726 | 745 | 473 | 724 | 505 | 756 | 768 | 733 | 757 | 730 | 755 | 725 | 764 |
| 12 | 822 | 802 | 822 | 520 | 777 | 553 | 843 | 856 | 817 | 841 | 813 | 840 | 801 | 840 |
| 13 | 756 | 728 | 743 | 485 | 736 | 512 | 736 | 748 | 720 | 743 | 704 | 727 | 721 | 760 |
| 14 | 724 | 702 | 720 | 464 | 715 | 492 | 773 | 782 | 732 | 748 | 713 | 733 | 738 | 772 |
| 15 | 806 | 778 | 796 | 501 | 759 | 533 | 821 | 829 | 762 | 782 | 759 | 781 | 778 | 816 |
| 16 | 799 | 768 | 786 | 508 | 767 | 541 | 823 | 832 | 767 | 788 | 752 | 772 | 776 | 813 |
| 17 | 765 | 739 | 759 | 478 | 729 | 509 | 789 | 802 | 727 | 741 | 736 | 757 | 722 | 749 |
| 18 | 687 | 680 | 669 | 537 | 581 | 550 | 847 | 857 | 795 | 822 | 790 | 813 | 807 | 848 |

Table 4.3.1. Post-cycle HIP-TEDDIE volume average data
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

Cycle : 87.05
Position : F 8
Orientation : South

| | Start-up fluence rate m^-2 s^-1*10^18 | Neutron fluence m^-2*10^25 | Cycle average fluence rate m^-2 s^-1*10^18 |
|---|---|---|---|
| Neutron flux 1 E> 1.353 MeV | .508 | .105 | .514 |
| Neutron flux 2 1.353MeV>E>.0674MeV | .914 | .190 | .930 |
| Neutron flux 3 .0674MeV>E>.683 eV | 1.211 | .252 | 1.233 |
| Neutron flux 4 E<.683 eV | .748 | .159 | .778 |
| Fission flux | .678 | .139 | .680 |
| 2200 m/s flux | .687 | .145 | .710 |
| Neutron flux E>1 MeV | .640 | .133 | .651 |
| Neutron flux E>.1 MeV | 1.331 | .276 | 1.351 |
| DAR Graphite (1) | 2.23 | - | - |
| Damage flux Graphite | 1.582 | .328 | 1.605 |
| EDN flux (2) | .869 | .180 | .881 |
| Nuclear heating W/g | 2.932 | 3.083 | - |
| DPA Graphite (3) | - | .238 | - |
| Axial shape factors (4) | | | |
| - fast fluence | - | 1.260 | - |
| - thermal fluence | - | 1.230 | - |
| Full power days | - | 23.650 | - |

(1): Damage to activation ratio for graphite
(2): Equivalent DIDO Nickel Fluence
(3): Displacement per Atom
(4): max/average

of four energy groups, for specific fluxes [fission, 2200 m/s, graphite damage, and equivalent DIDO nickel fluence (EDN)] and for two cutoff energies (0.1 and 1.0 MeV). In addition, the damage-to-activation ratio (DAR) for graphite, the displacement per atom (DPA) for graphite, the nuclear heating, the axial shape factors, and the number of EFPD are given.

The nuclear quantities appropriate to each capsule, the fast fluence, and power and burnup are derived from the calculations.

### 4.3.1 Fast Neutron Fluence

The fast neutron fluences at E > 0.1 MeV in the HFR at the end of each cycle are presented in Table 4.3.2. The complete set of fluence data including end of cycle values, mean cycle values adjusted to the end of irradiation values, both for E > 0.1 MeV and the equivalent HTGR fluence values for E > 0.18 MeV, are presented in Sect. 6.3.

### 4.3.2 Power and Burnup

The power and burnup were calculated for the fuel compacts and for the piggyback samples of GA and KFA in the HFR-B1 experiment. The applied method had been verified by comparing measurements for experiment D138.05 with the calculations.[17] In D138.05, HTR fuel spheres of German manufacture were irradiated for 34 HFR cycles, a time period of 3 years. In this method, the following steps were taken:

1. The (1) thermal capture and fission cross sections of $^{232}$Th, $^{233}$Th, $^{233}$Pa, $^{233}$U, $^{234}$U, $^{235}$U, $^{238}$U, $^{239}$U, $^{239}$Np, $^{239}$Pu, $^{240}$Pu, and $^{241}$Pu, (2) energy released per fission for $^{233}$U, $^{235}$U, $^{239}$Pu, and $^{241}$Pu, and (3) value of the neutron temperature, $T_n$, used in the calculation of the ORIGEN[18] spectrum parameter THERM were calculated using the one-dimensional, rotationally symmetrical transport code MICROFLUX.[19]

2. The epithermal, fast capture, and fission cross sections of $^{232}$Th, $^{233}$Th, $^{233}$Pa, $^{233}$U, $^{234}$U, $^{235}$U, $^{238}$U, $^{239}$U, $^{239}$Np, $^{239}$Pu, $^{240}$Pu, and $^{241}$Pu were calculated with a two-neutron group code, GAM.[20] No resonance self-shielding calculations were performed for $^{238}$U. The first energy group corresponds to $\phi_{>1MeV}$ in the HFR-TEDDIE code; the second one corresponds to the sum of $\phi_2$ and $\phi_3$ in the HFR-TEDDIE code.[21] HFR-TEDDI is the two-dimensional, four-group, diffusion code that is used to calculate neutron fluence rates (fluxes) in the HFR core.

3. The standard light-water reactor (LWR) library of ORIGEN_S was overwritten with cross sections for items 1 and 2 above.

4. The following steps were taken after each reactor cycle:

   4.1 The ORIGEN spectrum parameters RES and FAST were calculated from $\phi_{>1MeV}$, $\phi_2$, and $\phi_3$, the width of the lethargy interval of $\phi_2$ and $\phi_3$ being 14.5.

   4.2 Input to the ORIGEN_S code includes the cycle identification; the parameters THERM, RES, FAST, and $\phi_4$; the number of HFR EFPD; and the number of

Table 4.3.2. Fast neutron fluence for E > 0.1 MeV at the end of each cycle in the HFR
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| Index | Cycle | Fast Neutron Fluence, $f$,[a] E > 0.1 MeV | | |
|---|---|---|---|---|
| | | Capsule 1 | Capsule 2 | Capsule 3 |
| 1 | 87.03 | 0.26 | 0.34 | 0.30 |
| 2 | 87.05 | 0.39 | 0.60 | 0.62 |
| 3 | 87.09 | 0.67 | 0.95 | 0.92 |
| 4 | 87.10 | 1.0 | 1.4 | 1.3 |
| 5 | 88.01 | 1.32 | 1.8 | 1.6 |
| 6 | 88.02 | 1.67 | 2.2 | 1.87 |
| 7 | 88.04 | 2.04 | 2.5 | 2.17 |
| 8 | 88.05 | 2.4 | 2.9 | 2.46 |
| 9 | 88.06 | 2.7 | 3.2 | 2.7 |
| 10 | 88.07 | 3.0 | 3.5 | 2.9 |
| 11 | 88.08 | 3.3 | 3.8 | 3.1 |
| 12 | 88.09 | 3.6 | 4.1 | 3.3 |
| 13 | 88.10 | 3.9 | 4.4 | 3.4 |
| 14 | 88.11 | 4.2 | 4.7 | 3.6 |
| 15 | 89.01 | 4.5 | 5.0 | 3.8 |
| 16 | 89.02 | 4.8 | 5.3 | 4.1 |
| 17 | 89.03 | 5.1 | 5.6 | 4.3 |
| 18 | 89.04 | 5.4 | 6.0 | 4.6 |
| 19 | 89.05 | 5.7 | 6.3 | 4.9 |
| 20 | 89.06 | 6.0 | 6.6 | 5.1 |
| Final Data (after gamma scan) | | 6.3 | 6.8 | 5.0 |

[a] $f$ = the fast neutron fluence in units of $10^{25} n/m^2$

zero-power days (between cycles). Both the irradiation and cooling period are divided into ten intervals.

4.3 A FORTRAN-77 program, burnup_D214.01, is executed and performs the following calculations for every interval: The fission power at the start and end of the cycle is calculated for each of the nuclides $^{233}U$, $^{235}U$, $^{239}Pu$, and $^{241}Pu$ according to the relationship:

$$P_j = N_j \sigma_f \phi_{4,j} E_f, \tag{4.1}$$

where

$j$ = the interval in the irradiation period,
$P_j$ = power in interval j (W),
$N_j$ = number of atoms of the nuclide in the interval (atom),
$\sigma_f$ = the fission cross section as constructed by ORIGEN_S ($m^2$/atom),
$\phi_{fj}$ = the thermal group neutron fluence rate in the interval ($n/m^2 \cdot s$),
$E_f$ = energy released per fission with
$E_f(^{233}U)$ = 3.040E-11 J/fission,
$E_f(^{235}U)$ = 3.205E-11 J/fission,
$E_f(^{239}Pu)$ = 3.300E-11 J/fission,
$E_f(^{241}Pu)$ = 3.300E-11 J/fission.

4.4 The burnup ($B_u$) is calculated for each of the nuclides $^{233}U$, $^{235}U$, $^{239}Pu$ and $^{241}Pu$ according to the relationship;

$$B_u = 100\{\Sigma_{i=1,10} N_i \sigma_f \phi_{4,i} \Delta t\}/N_o, \tag{4.2}$$

where

$B_u$ = burnup (%FIMA),
%FIMA = 100 fissions per initial metal atom],
$i$ = interval number in irradiation period,
$N_i$ = number of atoms at start of interval (atom),
$\sigma_f$ = the fission cross section as constructed by ORIGEN_S ($m^2$/atom),
$\phi_{4,i}$ = the thermal group neutron fluence rate in the interval ($n/m^2.s$),
$\Delta t$ = time period in the interval (s),
$N_o$ = number of initial metal atoms (atom).

Spectrum and initial fuel loading data used in the calculations of power and burnup are presented in Table 4.3.3. A summary of the neutron fluence rates by cycle and the full-and zero-power days used in the ORIGEN_S calculation are presented in Table 4.3.4. The calculation of the power and burnup for each cycle and each fissionable nuclide, for both the uranium and thorium chains, and for the fuel compacts and the piggyback samples are presented in Sect. 6, entitled "Final Irradiation Data," along with graphs of the power and burnup profiles. An example of these data is presented in Figs. 4.3.1 and 4.3.2 and Table 4.3.5; in the table, the volume averaged values of the power and burnup in the fuel compacts for the case of the uranium chain are listed for each cycle or segment thereof and each fissionable nuclide. The total power and burnup per cycle

Table 4.3.3. Selected data used in the ORIGEN_S calculation
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

Spectrum Parameters:

| | | | |
|---|---|---|---|
| THERM | = | 0.55 |
| RES | = | 0.18 (average over all cycles) |
| FAST | = | 1.12 (average over all cycles) |

| | INITIAL FUEL LOADING/CAPSULE | | |
|---|---|---|---|
| | $^{232}$Th (g) | $^{235}$U (g) | $^{238}$U (g) |
| GA Fuel Compacts | 2.60 | 0.4464 | 1.8336 |
| Piggyback Specimens of GA | 0.084 | 0.0207 | 0.0847 |
| Piggyback Specimens of KFA | 0.0000 | 4.29E-5 | 6.09E-3 |

Table 4.3.4. HFR-TEDDI volume fluence rates $\phi(10^{18}n/m^2s)$ and irradiation times
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| | HFR-TEDDIE broad group number | | | | | | Time Intervals | |
|---|---|---|---|---|---|---|---|---|
| Y·C | 1 | 2 | 3 | 4 | > 1 MeV | 2200 m/s | FPD | ZPD |
| 87.031 | 0.562 | 1.003 | 1.320 | 0.856 | 0.706 | 0.437 | 7.52 | 1.90 |
| 87.032 | 0.559 | 1.008 | 1.332 | 0.867 | 0.709 | 0.442 | 14.69 | 30.58 |
| 87.051 | 0.514 | 0.930 | 1.233 | 0.778 | 0.651 | 0.400 | 0.64 | 1.94 |
| 87.052 | 0.514 | 0.930 | 1.233 | 0.778 | 0.651 | 0.400 | 23.01 | 120.02 |
| 87.092 | 0.653 | 1.196 | 1.606 | 1.115 | 0.826 | 0.564 | 20.03 | 2.47 |
| 87.101 | 0.631 | 1.153 | 1.552 | 1.081 | 0.798 | 0.547 | 15.96 | 0.88 |
| 87.102 | 0.641 | 1.171 | 1.562 | 1.108 | 0.814 | 0.560 | 8.67 | 23.28 |
| 88.01 | 0.512 | 0.957 | 1.263 | 0.791 | 0.652 | 0.405 | 25.76 | 2.77 |
| 88.02 | 0.569 | 1.060 | 1.401 | 0.915 | 0.723 | 0.467 | 25.44 | 58.40 |
| 88.04 | 0.589 | 1.061 | 1.420 | 0.957 | 0.742 | 0.486 | 25.75 | 2.80 |
| 88.05 | 0.606 | 1.097 | 1.460 | 0.955 | 0.767 | 0.487 | 25.21 | 3.00 |
| 88.061 | 0.540 | 0.984 | 1.304 | 0.869 | 0.683 | 0.442 | 10.36 | 1.55 |
| 88.062 | 0.544 | 0.991 | 1.314 | 0.890 | 0.690 | 0.452 | 10.43 | 54.06 |
| 88.07 | 0.539 | 0.985 | 1.303 | 0.875 | 0.682 | 0.445 | 21.04 | 4.61 |
| 88.08 | 0.545 | 0.993 | 1.323 | 0.891 | 0.691 | 0.453 | 21.44 | 2.78 |
| 88.09 | 0.550 | 0.996 | 1.323 | 0.920 | 0.691 | 0.466 | 21.26 | 4.09 |
| 88.10 | 0.598 | 1.073 | 1.427 | 1.029 | 0.752 | 0.519 | 20.92 | 2.67 |
| 88.11 | 0.557 | 1.060 | 1.352 | 0.957 | 0.703 | 0.485 | 21.40 | 10.57 |
| 89.01 | 0.569 | 1.011 | 1.358 | 0.972 | 0.712 | 0.491 | 20.96 | 3.34 |
| 89.021 | 0.622 | 1.120 | 1.508 | 1.096 | 0.788 | 0.552 | 2.27 | 2.00 |
| 89.022 | 0.622 | 1.120 | 1.508 | 1.096 | 0.788 | 0.552 | 14.42 | 1.89 |
| 89.023 | 0.622 | 1.120 | 1.508 | 1.096 | 0.788 | 0.552 | 2.11 | 29.73 |
| 89.03 | 0.580 | 1.030 | 1.365 | 0.979 | 0.733 | 0.494 | 19.75 | 3.34 |
| 89.04 | 0.580 | 1.040 | 1.380 | 0.982 | 0.734 | 0.496 | 22.75 | 3.69 |
| 89.05 | 0.580 | 1.046 | 1.396 | 0.854 | 0.734 | 0.438 | 21.14 | 2.95 |
| 89.06 | 0.579 | 1.040 | 1.388 | 0.857 | 0.729 | 0.440 | 21.60 | 1000. |

Y·C = year · cycle; EFPD = full-power days; ZPD = zero-power days

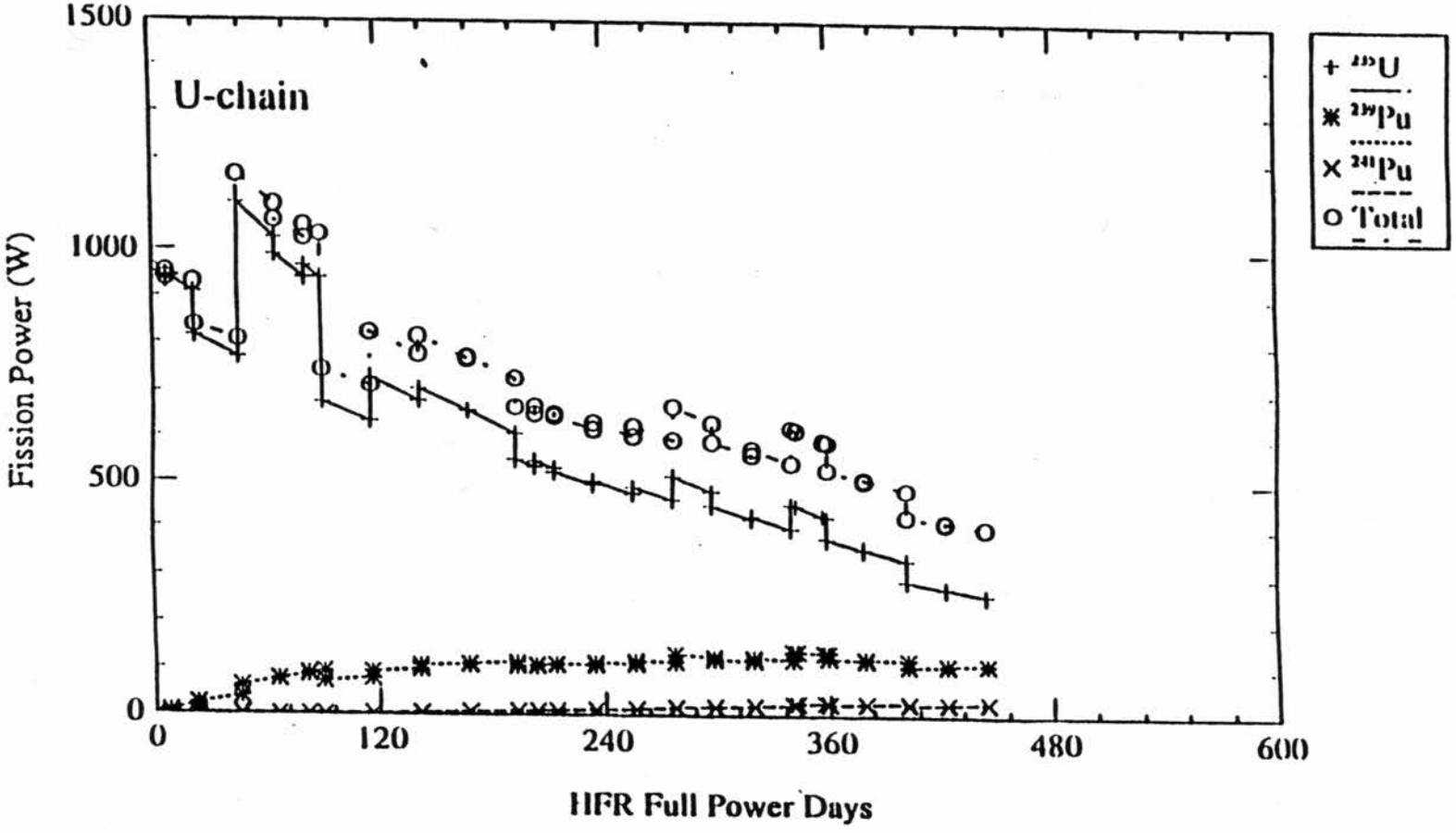



Fig. 4.3.1. Power production in the U-chain nuclides in GA compacts.
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

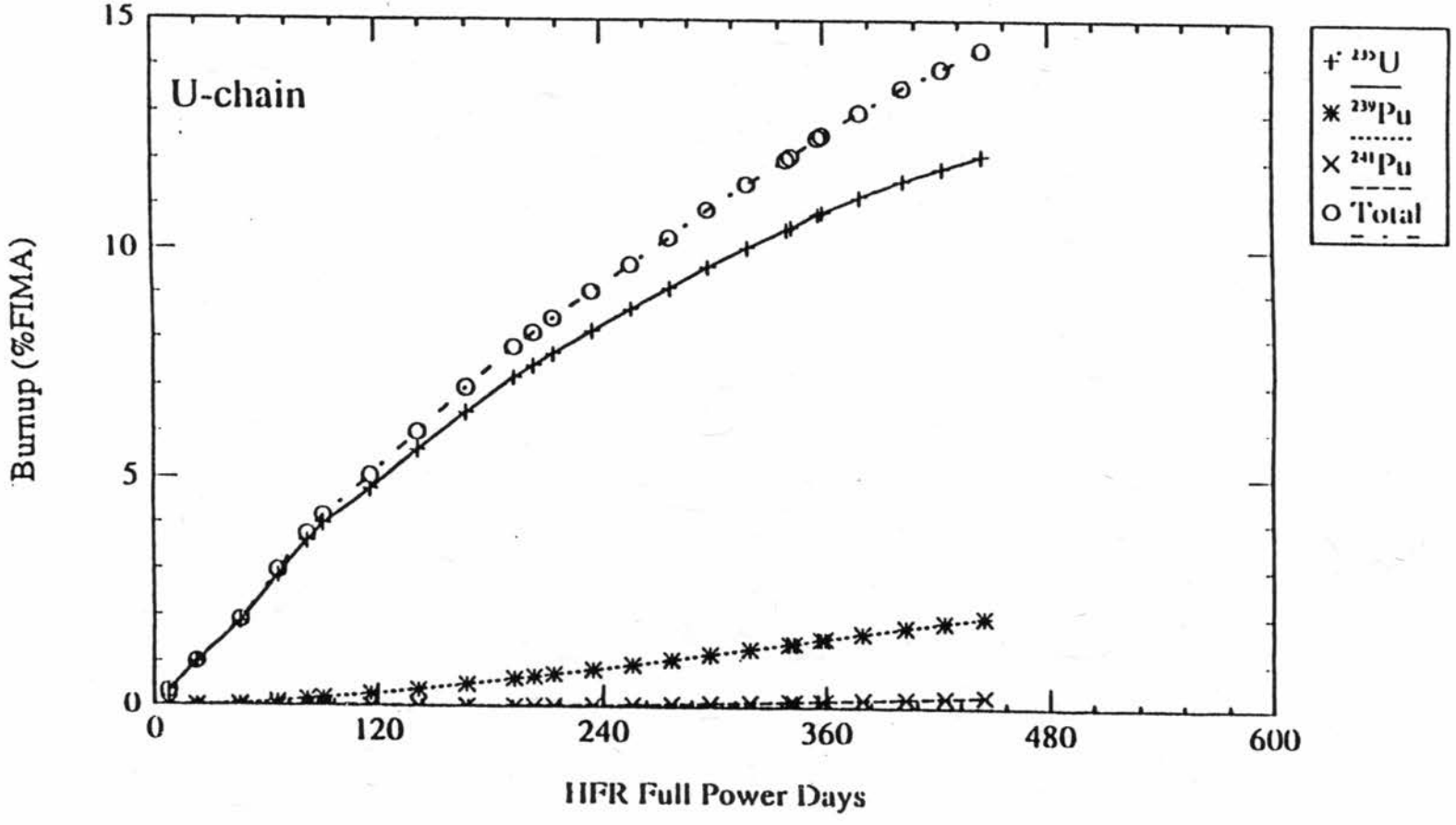



Fig. 4.3.2. Burnup of the U-chain nuclides in GA compacts.
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

Table 4.3.5. Power and burnup volume averaged data for GA compacts in D214.01
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

Date: November 29, 1991
Reactor Chain: Uranium Chain

| FPD | Power (W) | | | | Burnup (% FIMA) | | | |
|---|---|---|---|---|---|---|---|---|
| | $^{235}U$ | $^{239}Pu$ | $^{241}Pu$ | Total | $^{235}U$ | $^{239}Pu$ | $^{241}Pu$ | Total |
| 7.5800 | 945.7285 | 1.8776 | 0.0001 | 947.6062 | 0.3343 | 0.0006 | 0.0000 | 0.3350 |
| 14.6900 | 929.9030 | 13.4004 | 0.0070 | 943.3104 | 0.6371 | 0.0089 | 0.0000 | 0.6460 |
| 0.6400 | 817.0997 | 23.3668 | 0.0211 | 840.4876 | 0.0244 | 0.0007 | 0.0000 | 0.0251 |
| 23.0100 | 796.5581 | 29.2575 | 0.0718 | 825.8875 | 0.8549 | 0.0305 | 0.0001 | 0.8854 |
| 20.0300 | 1072.2058 | 64.8689 | 0.4590 | 1137.5337 | 1.0017 | 0.0589 | 0.0004 | 1.0609 |
| 15.9600 | 970.7537 | 79.2378 | 1.0974 | 1051.0890 | 0.7226 | 0.0573 | 0.0008 | 0.7807 |
| 8.6700 | 955.5254 | 90.8710 | 1.7946 | 1048.1909 | 0.3864 | 0.0357 | 0.0007 | 0.4228 |
| 25.7600 | 652.9997 | 72.9220 | 1.9559 | 727.8776 | 0.7845 | 0.0851 | 0.0023 | 0.8719 |
| 25.4400 | 705.9749 | 93.9309 | 3.7143 | 803.6200 | 0.8377 | 0.1082 | 0.0043 | 0.9502 |
| 25.7500 | 682.7838 | 106.3003 | 5.8091 | 794.8932 | 0.8200 | 0.1240 | 0.0068 | 0.9508 |
| 25.2100 | 633.1757 | 111.5026 | 8.1097 | 752.7880 | 0.7445 | 0.1273 | 0.0093 | 0.8811 |
| 10.3600 | 544.2778 | 105.4156 | 8.9915 | 658.6849 | 0.2630 | 0.0495 | 0.0042 | 0.3167 |
| 10.4300 | 541.2960 | 108.7232 | 10.0953 | 660.1144 | 0.2633 | 0.0514 | 0.0048 | 0.3195 |
| 21.0400 | 510.5790 | 108.5256 | 11.1696 | 630.2742 | 0.5010 | 0.1034 | 0.0106 | 0.6151 |
| 21.4400 | 490.4754 | 111.8066 | 13.2829 | 615.5649 | 0.4905 | 0.1086 | 0.0129 | 0.6119 |
| 21.2600 | 476.7943 | 116.2224 | 15.7123 | 608.7289 | 0.4728 | 0.1119 | 0.0151 | 0.5998 |
| 20.9200 | 499.1407 | 129.8780 | 19.8180 | 648.8367 | 0.4870 | 0.1231 | 0.0188 | 0.6289 |
| 21.4000 | 435.6944 | 120.5871 | 20.6080 | 576.8895 | 0.4349 | 0.1169 | 0.0200 | 0.5717 |
| 20.9600 | 413.8684 | 122.9137 | 22.9319 | 559.7141 | 0.4046 | 0.1167 | 0.0218 | 0.5431 |
| 2.2700 | 450.6094 | 139.8935 | 27.2539 | 617.7567 | 0.0477 | 0.0144 | 0.0028 | 0.0649 |
| 14.4200 | 438.9402 | 137.5051 | 28.1342 | 604.5795 | 0.2952 | 0.0898 | 0.0184 | 0.4034 |
| 2.1100 | 425.7322 | 138.0775 | 29.1246 | 592.9343 | 0.0419 | 0.0132 | 0.0028 | 0.0579 |
| 19.7500 | 368.6486 | 122.6205 | 26.7689 | 518.0380 | 0.3396 | 0.1097 | 0.0239 | 0.4732 |
| 22.7500 | 346.6348 | 122.3259 | 28.7197 | 497.6804 | 0.3678 | 0.1261 | 0.0296 | 0.5235 |
| 21.1400 | 283.7571 | 108.0619 | 26.8283 | 418.6473 | 0.2798 | 0.1035 | 0.0257 | 0.4089 |
| 21.6000 | 268.8645 | 110.9103 | 28.6187 | 408.3934 | 0.2709 | 0.1085 | 0.0280 | 0.4074 |

or segment thereof are also given. The power and the cumulative burnup profiles for each fissionable nuclide and for their sum are plotted in Figs. 4.3.1 and 4.3.2.

## 4.4 FISSION GAS RELEASE

The concentration of released noble gases was monitored using a Canberra MCA along with a Canberra high-efficiency Ge(Li) gamma detector. The system was calibrated once or twice a year, during reactor stop periods, as described in ref. 15. Four isotopes of krypton and five isotopes of xenon were routinely measured during irradiation. At the end of several cycles, measurements of Xe isotopes continued, for the purpose of determining the fraction of plated-out iodine. The method of measurement was to flow the capsule effluent gas through a flat cylindrical or disk-shaped sample chamber of 30 $cm^3$ which was positioned 20 cm above the shielded detector. Radioactive gas measurement was accomplished by the following steps. After an hour or more purge of clean He, the capsule gas to be measured was purged through the chamber for 30 min to ensure constant concentration. While the gas was flowing, the MCA counted the gas directly for 80 s. In this way the short-lived species were assayed with no decay corrections, except for delay time from the capsule. Then the chamber was sealed, and counts were obtained after 15, 60, and 120 min of decay time. In this way, with four separate spectra, analysis of short-, medium-, and long-lived species was ensured. A classification of the isotopes and their characteristic parameters is given in Table 4.4.1.

The Canberra MCA assays the entire gamma spectrum, and with the use of the Spectran F (version 2.07) program, integrates the number of counts above background in each photopeak, prints out the net counts associated with each gamma line, and identifies each line with possible isotopes. Later the counts per minute (cpm) data for each isotope are used to calculate R/B, using a computer code called RUBICON, as described below.

### 4.4.1 Calculation of Steady-state Fractional Fission Gas Release (R/B)

The RUBICON computer code uses the equations in the following two subsections for the isotopes listed in Table 4.4.1. The R/B values calculated with the RUBICON code are correct at the beginning of the irradiation; further calculations are necessary as discussed in Sect. 4.4.4.3.

#### 4.4.1.1 On-line method, short-lived isotopes

$$R/B = [C \cdot \exp(\lambda t_1)]/[\epsilon \cdot b \cdot t_c \cdot (1-\exp\{\lambda t_2\} \cdot B], \tag{4.3}$$

where

- $C$ = net counts under spectral peak,
- $\lambda$ = decay constant (1/s),
- $t_1$ = transport time from capsule to sampling station (see Appendix C),
- $\epsilon$ = detector efficiency,
- $b$ = gamma yield,
- $t_c$ = counting time (s),
- $t_2$ = transport time through the counting volume (s),
- $B$ = birth rate (atom/s). B is calculated as follows:

$$B = P \cdot f_J \cdot {}^{235}Y \tag{4.4}$$

Table 4.4.1. Krypton and xenon isotopes

| Isotope | $t_{1/2}$[(a)] | Decay Const (1/s) | Gamma Line (keV) | Gamma Yield (%) | $^{235}U$ Yield (%) | Group[(b)] |
|---|---|---|---|---|---|---|
| $^{89}Kr$ | 3.2 min | 3.61 (-3) | 221 | 0.20 | 4.59 | short |
| $^{137}Xe$ | 3.8 min | 3.03 (-3) | 456 | 0.31 | 6.2 | short |
| $^{138}Xe$ | 14.2 min | 8.15 (-4) | 258 | 0.31 | 6.4 | short |
| $^{135m}Xe$ | 15.6 min | 7.40 (-4) | 527 | 0.81 | 0.7 | short |
| $^{87}Kr$ | 1.27 h | 1.52 (-4) | 403 | 0.50 | 2.54 | medium |
| $^{88}Kr$ | 2.8 h | 6.88 (-5) | 196 | 0.38 | 3.6 | medium |
| $^{85m}Kr$ | 4.4 h | 4.38 (-5) | 151 | 0.74 | 1.31 | medium |
| $^{135}Xe$ | 9.2 h | 2.10 (-5) | 250 | 0.90 | 6.4 | long |
| $^{133}Xe$ | 5.27 d | 1.52 (-6) | 81 | 0.37 | 6.7 | long |
| $^{131m}Xe$ | 11.7 d | 6.8 (-7) | 163 | 0.019 | 0.029 | long |

[(a)]$t^{1/2}$ = half life of the isotope (min, h, d).
[(b)]Group = the isotopes grouped according to half life.

where

$P$ = power (W)
$f_J$ = fissions/J ≡ $3.12 \times 10^{10}$
$^{235}Y$ = the yield from fissioning of $^{235}U$.

#### 4.4.1.2 Stop-flow method for medium- and long-lived isotopes

$$R/B = [C \cdot f \cdot \exp(\lambda t_1)]/[\epsilon \cdot b \cdot V \cdot (1-\exp\{\lambda t_c\}) \cdot B], \quad (4.5)$$

where

$f$ = flow rate ($\mu m^3/s$), nominally 5 $\mu m^3/s$,
$V$ = counting volume ($\mu m^3$), 30 $\mu m^3$.

#### 4.4.1.3 Calculations of the R/B for Xe and Kr

The R/B values are calculated with the RUBICON code but only for the following three restrictive conditions characteristic of the beginning of the irradiation:

1. Fission gas is released from only those fuel particles with exposed kernels. Shortly after the beginning of irradiation, the number of particles with exposed kernels is equal to the number of dtf particles; the dtf particles fail shortly after the beginning of irradiation leaving the kernels exposed. The dtf particles contain UCO, and the fission gas generated is the result of the fissioning of $^{235}U$ only.

2. The power in the UCO particles with exposed kernels is that at the beginning of irradiation in the dtf particles.*

3. The yields of fission products are those corresponding to the fissioning of $^{235}U$ only.

To account for the changes in the number of exposed kernels, power, and yields as irradiation proceeds, the R/B values calculated under these restrictive conditions must be corrected.

At the beginning of irradiation, there were fertile fuel particles containing $^{232}Th$ and fissile fuel particles containing $^{235}U$ and $^{238}U$. The weight ratio of $^{232}Th/^{235}U$ was 5.82 at the beginning. As the irradiation proceeded, the concentration of the fissionable isotopes $^{233}U$ in fertile fuel particles and $^{239}Pu$ and $^{241}Pu$ in fissile particles grew while the concentration of $^{235}U$ declined. Thus, the power has to be calculated as a function of time for the fertile and fissile particles.

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*The fraction of the fissile power in dtf particles is proportional to the fractional $^{235}U$ loading in them at the beginning of the irradiation. However, in the R/B calculations, the fraction of the fissile power in dtf particles was assumed to be equal to the number fraction of dtf particles (0.089). Because the loading in the kernels of the dtf particles is larger than in the kernels of the normally configured fissile particles (see Table 2.3.1), a correction for this difference must be made.

Table 4.4.2. Yields of fission product isotopes from $^{233}U$, $^{235}U$, $^{239}Pu$, and $^{241}Pu$

| Fission Product | FISSION YIELDS (%)[a] | | | | |
|---|---|---|---|---|---|
| | $^{233}U$ | $^{235}U$ | $^{235}U$[b] | $^{239}Pu$ | $^{241}Pu$ |
| $^{85m}Kr$ | 2.14 | 1.29 | 1.31 | 0.564 | 0.404 |
| $^{87}Kr$ | 3.93 | 2.55 | 2.54 | 0.990 | 0.752 |
| $^{88}Kr$ | 5.45 | 3.50 | 3.60 | 1.26 | 0.978 |
| $^{89}Kr$ | 5.22 | 4.50 | 4.59 | 1.44 | 1.16 |
| $^{131m}Xe$ | 0.05 | 0.04 | | 0.05 | 0.04 |
| $^{133}Xe$ | 6.06 | 6.69 | 6.7 | 7.02 | 6.73 |
| $^{135}Xe$ | 6.27 | 6.54 | 6.4 | 7.61 | 7.17 |
| $^{135m}Xe$ | 1.57 | 1.10 | 0.7 | 1.69 | 1.18 |
| $^{137}Xe$ | 6.06 | 6.12 | 6.2 | 6.02 | 6.57 |
| $^{138}Xe$ | 4.89 | 6.27 | 6.4 | 5.18 | 6.26 |
| $^{131}I$ | 3.59 | 2.89 | 3.86 | 3.10 | |
| $^{133}I$ | 6.00 | 6.69 | 6.97 | 6.73 | |
| $^{135}I$ | 5.00 | 6.28 | 6.50 | 6.95 | |

[a]The fission yields are from **ref. 22.**
[b]These values are used in the RUBICON code.

Likewise, as the isotopic composition of the fuel particles changes with time, the yield of any fission product isotope has to be recalculated to account for the various contributions to the overall yield by the fissionable isotopes. The yields of the relevant fission product isotopes for $^{233}U$, $^{235}U$, $^{239}Pu$ and $^{241}Pu$, are presented in Table 4.4.2.

Shortly after the beginning of irradiation, the dtf particles failed in a manner that exposed the UCO kernels. Previously, experience in experiment HBR-17/18 (ref. 12) demonstrated that all dtf particles failed within 50 h of beginning irradiation. The failure of each dtf particle was recorded as a distinct spike in the signal from an on-line ionization chamber. In the HFR-B1 experiment, the R/B profile reached a plateau after 500 h indicating the completion of the failure of the dtf particles. The longer time for complete failure in the HFR-B1, as compared with the HRB-17/18 experiment, is attributable to the difference in fission rate density which was an order of magnitude smaller in the HFR-B1 experiment.[23] Thus, shortly after the beginning of irradiation, there were 87 exposed kernels per compact and 1044 exposed kernels per capsule. During the remainder of the irradiation, the possibility of failure of the normally configured particles has to be addressed. On the basis of an experiment in another reactor, the R2 reactor at Studsvik, Sweden (a reactor with similar neutron spectral characteristics),[24] one would expect the failure of normally configured fertile or fissile particles during irradiation for about the same reactor time (444 EFPD) to be 0.5 ± 0.1% The latter corresponds to about 7 particles per compact which would be expected to fail during the irradiation. This number corresponds to 8% of the dtf particles; the uncertainty in the R/B is estimated to be, prior to analyzing the R/B data for the uncertainty, about ±15 %. If so, then the particle failure during irradiation will not

introduce a significant error. In practice, however, the R/B data have to be examined for unexpected and sudden increases that might reflect the failure of normally configured particles during irradiation.

In addition to failure of particles during irradiation, an account must be taken of the heavy metal contamination existing in the compacts after fabrication. The heavy metal contamination consists of the true contamination in the compact materials including the surfaces of particles, as well as the as-manufactured particles, and particles that fail during the compaction process which have exposed kernels or which are exposed as a result of the stresses in the compaction process. This can be estimated from the R/B of the capsule prior to the start of the failure of the dtf particles and by leaching unirradiated compacts during the pre-irradiation examination.

### 4.4.2 Derived Values of the Steady-state Fractional Fission Gas Release, R/B

An example of the output of the RUBICON code is presented in Table 4.4.3 for capsule 1 (A), in cycle 88.05. The calculations are based on the assumptions that only dtf particles are releasing fission gas and that the power in dtf particles is 8.9% of the power in all fissile particles (see footnote on page 4-21). As discussed above, these R/B values are valid only under conditions existing at the beginning of the irradiation and after being corrected for particle loading differences. Companion calculations have also been made for the case of 100% of the power in the fissile particles. In Table 4.4.3, the R/B values are grouped according to the counting time designated by one of the SV values 10, 20, or 30. The isotopes measured for specific SV values are $^{89}$Kr, $^{90}$Kr, $^{135m}$Xe, $^{137}$Xe, and $^{138}$Xe at SV = 10, $^{133}$Xe and $^{135}$Xe at SV = 20, and $^{85m}$Kr, $^{87}$Kr, and $^{88}$Kr at SV = 30. In addition to the R/B values, the date and time of sampling, and the reactor power, a representative TC temperature and the number of EFPD are given. Time profiles of the R/B values for all the measured isotopes and the representative TC temperature from the RUBICON output based on the calculated power in the dtf particles are presented in Figs. 4.4.1, 4.4.2, and 4.4.3. In Fig. 4.4.1, data for capsule 1 (A) for cycle 88.05 are shown; in this case, the temperature is approximately constant, and the R/B values are declining. This decline will be mitigated or reversed when the corrections, discussed in Sect. 4.4.1.3, are made. In Fig. 4.4.2, data for capsule 2 (B) for cycle 88.10 are shown; as the temperature rises, so do the R/B values. The rise will be enhanced after the corrections are made. Note that the rise reflects the response of the exposed fuel kernels to the temperature of the fuel kernel; the latter is of the order of 120° C higher than the temperatures of the temperature profile in Fig. 4.4.2. Noting this is important as the rise in R/B is significantly larger above 1100° C than below. In Fig. 4.4.3, data for capsule 3 (C) for cycle 88.01 are shown; in this case, the temperature is constant, but at 95.6 d, 90 Pa of water vapor was added to the capsule, and the addition was terminated at 99.7 d. The increase and decrease in R/B during and after water vapor injection is clearly recognized in Fig. 4.4.3.

## 4.5 INFLUENT AND EFFLUENT GAS COMPOSITION

The composition of the influent and effluent gases consisted of helium and selected additions of neon, impurities in source gases and from leakage, and reaction products of fuel and the carbonaceous material in the fuel elements with added water vapor and hydrogen. The catalytic decomposition of water vapor from reaction with metallic components is also a possible source of impurity gas.

Table 4.4.3. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. | | D214-01 | CAPSULE NO. | A | CYCLE NO. | 88.05 | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 27. 5.88 | 45 | | | | | | 885 |
| 0. 0 | 10 | | | | | | 168.29 |
| 27. 5.88 | 45 | | | 4.885E-03 | 3.622E-03 | 5.020E-03 | 894 |
| 16.28 | 30 | | | | | | 169 |
| 27. 5.88 | 45 | | | | | | 894 |
| 16.28 | 20 | 6.037E-03 | 2.678E-03 | | | | 169 |
| 28. 5.88 | 45 | | 5.864E-04 | | | | 895 |
| 16.14 | 10 | | | 2.156E-03 | 3.326E-04 | 7.031E-04 | 170 |
| 28. 5.88 | 45 | | | 4.824E-03 | 3.559E-03 | 4.904E-03 | 895 |
| 16.14 | 30 | | | | | | 170 |
| 28. 5.88 | 45 | | | | | | 895 |
| 16.14 | 20 | 6.266E-03 | 2.857E-03 | | | | 170 |
| 29. 5.88 | 45 | | 7.215E-04 | | | | 898 |
| 16.26 | 10 | | | 2.123E-03 | 3.291E-04 | 6.121E-04 | 171 |
| 29. 5.88 | 45 | | | 4.377E-03 | 3.499E-03 | 4.863E-03 | 898 |
| 16.26 | 30 | | | | | | 171 |
| 29. 5.88 | 45 | | | | | | 898 |
| 16.26 | 20 | 7.072E-03 | 2.806E-03 | | | | 171 |
| 30. 5.88 | 45 | | 5.610E-04 | | | | 896 |
| 18.3 | 10 | | | 1.910E-03 | 3.464E-04 | 6.354E-04 | 172.1 |
| 31. 5.88 | 45 | | | 3.715E-03 | 2.520E-03 | 3.797E-03 | 898 |
| 16.55 | 30 | | | | | | 173 |
| 31. 5.88 | 45 | | | | | | 898 |
| 16.55 | 20 | 6.955E-03 | 2.145E-03 | | | | 173 |
| 1. 6.88 | 45 | | 4.823E-04 | | | | 894 |
| 17. 5 | 10 | | | 1.651E-03 | 2.828E-04 | 6.252E-04 | 174 |
| 1. 6.88 | 45 | | | 3.403E-03 | 2.592E-03 | 3.797E-03 | 894 |
| 17. 5 | 30 | | | | | | 174 |
| 1. 6.88 | 45 | | | | | | 894 |
| 17. 5 | 20 | 6.448E-03 | 2.077E-03 | | | | 174 |
| 3. 6.88 | 45 | | 3.759E-04 | | | | 897 |
| 17.19 | 10 | | | 1.358E-03 | 2.168E-04 | 4.835E-04 | 176 |
| 3. 6.88 | 45 | | | 3.136E-03 | 2.296E-03 | 3.598E-03 | 897 |
| 17.19 | 30 | | | | | | 176 |
| 3. 6.88 | 45 | | | | | | 897 |
| 17.19 | 20 | 6.324E-03 | 1.937E-03 | | | | 176 |
| 4. 6.88 | 45 | | 3.998E-04 | | | | 890 |
| 16.15 | 10 | | | 1.316E-03 | 2.287E-04 | 4.961E-04 | 177 |
| 4. 6.88 | 45 | | | 3.065E-03 | 2.285E-03 | 3.589E-03 | 890 |
| 16.15 | 30 | | | | | | 177 |
| 4. 6.88 | 45 | | | | | | 890 |
| 16.15 | 20 | 6.585E-03 | 1.851E-03 | | | | 177 |
| 5. 6.88 | 45 | | 3.948E-04 | | | | 897 |
| 16.29 | 10 | | | 1.366E-03 | 2.359E-04 | 4.803E-04 | 178 |
| 5. 6.88 | 45 | | | 2.856E-03 | 2.054E-03 | 2.814E-03 | 897 |
| 16.29 | 30 | | | | | | 178 |
| 5. 6.88 | 45 | | | | | | 897 |
| 16.29 | 20 | 5.989E-03 | 1.813E-03 | | | | 178 |
| 6. 6.88 | 45 | | | | | | 898 |
| 17. 1 | 10 | | | 1.674E-03 | 2.530E-04 | 6.008E-04 | 179 |
| 6. 6.88 | 45 | | | 3.443E-03 | 2.558E-03 | 4.036E-03 | 898 |
| 17. 1 | 30 | | | | | | 179 |

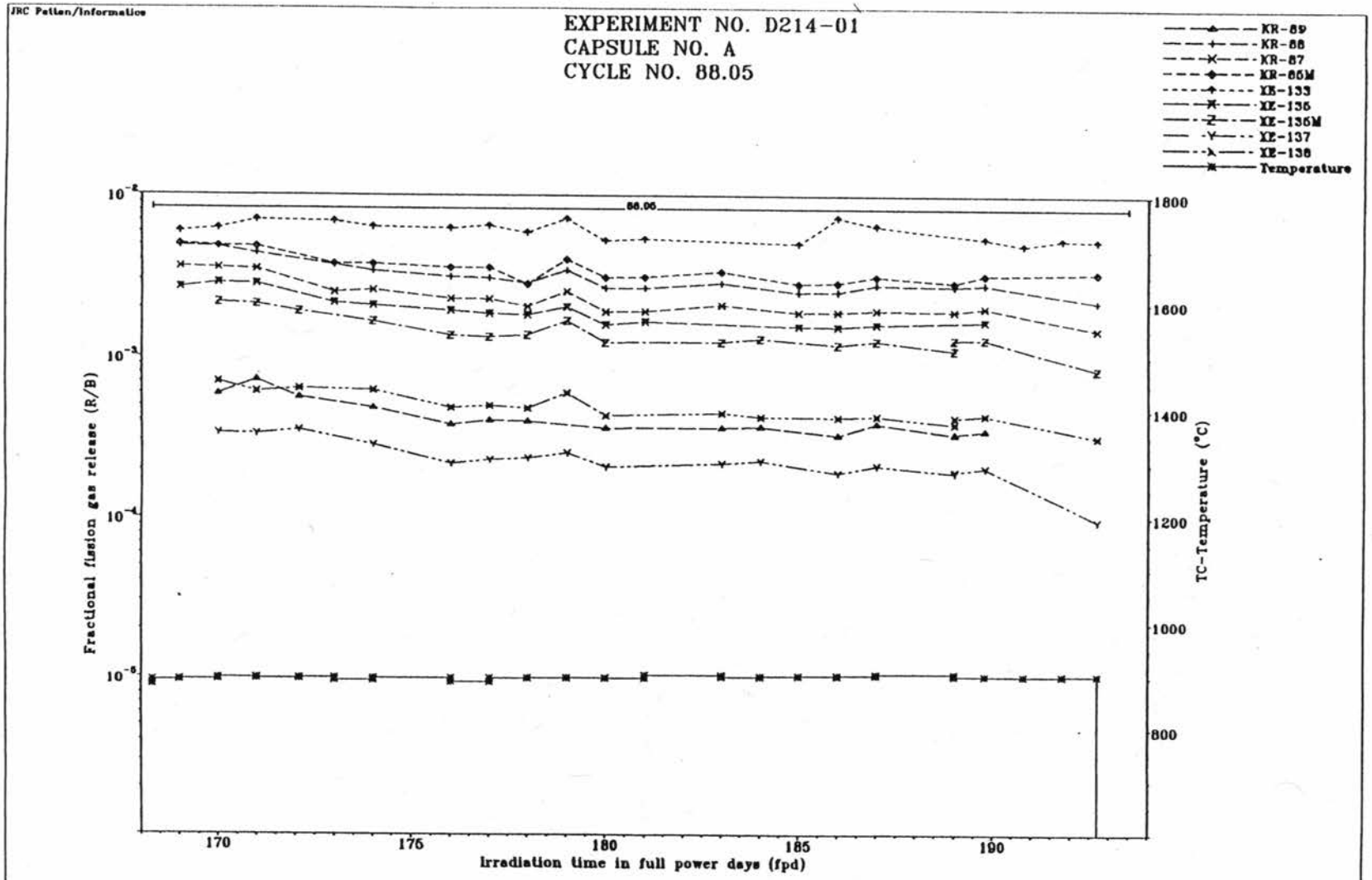



Fig. 4.4.1. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

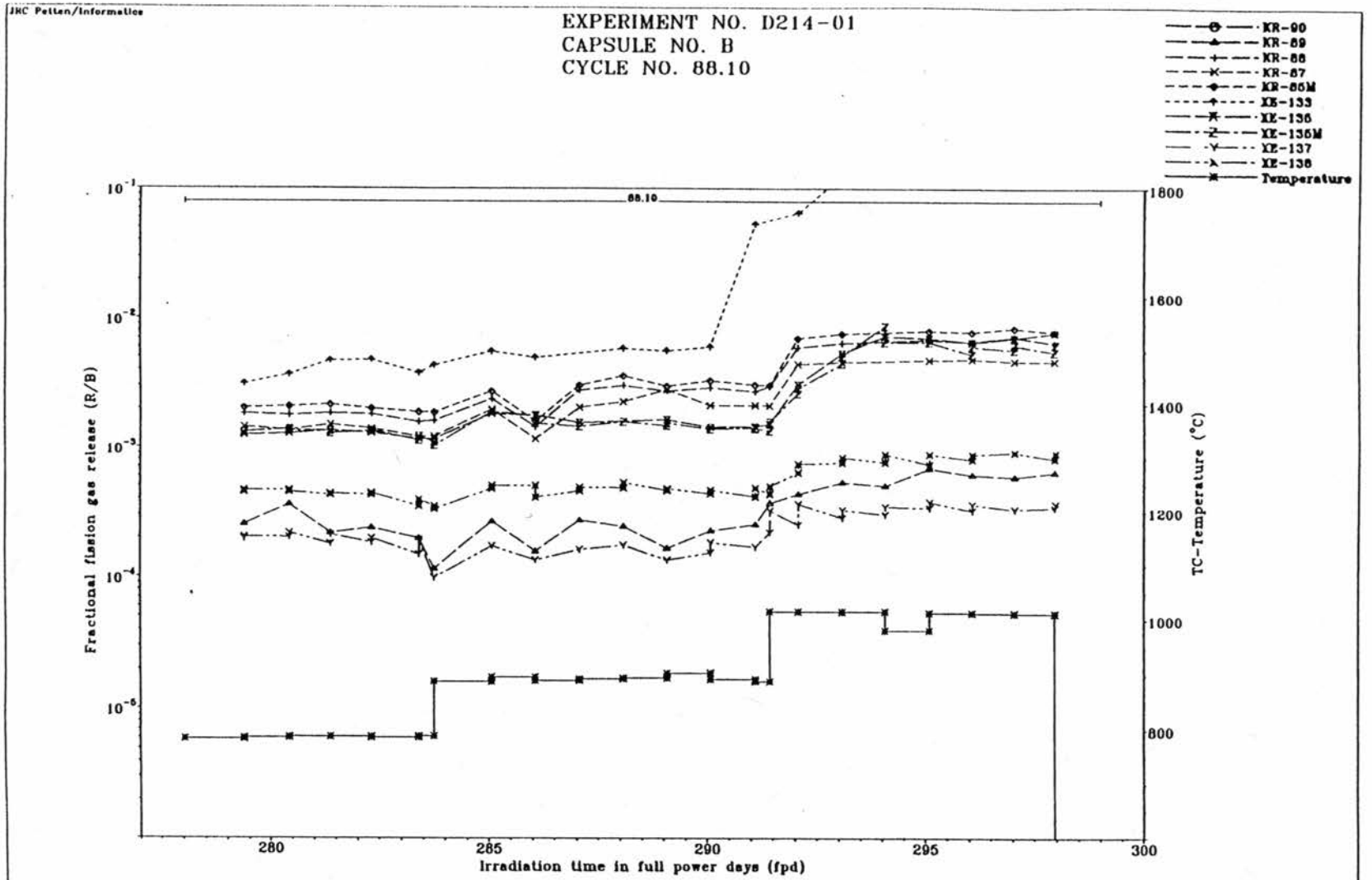



Fig. 4.4.2. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

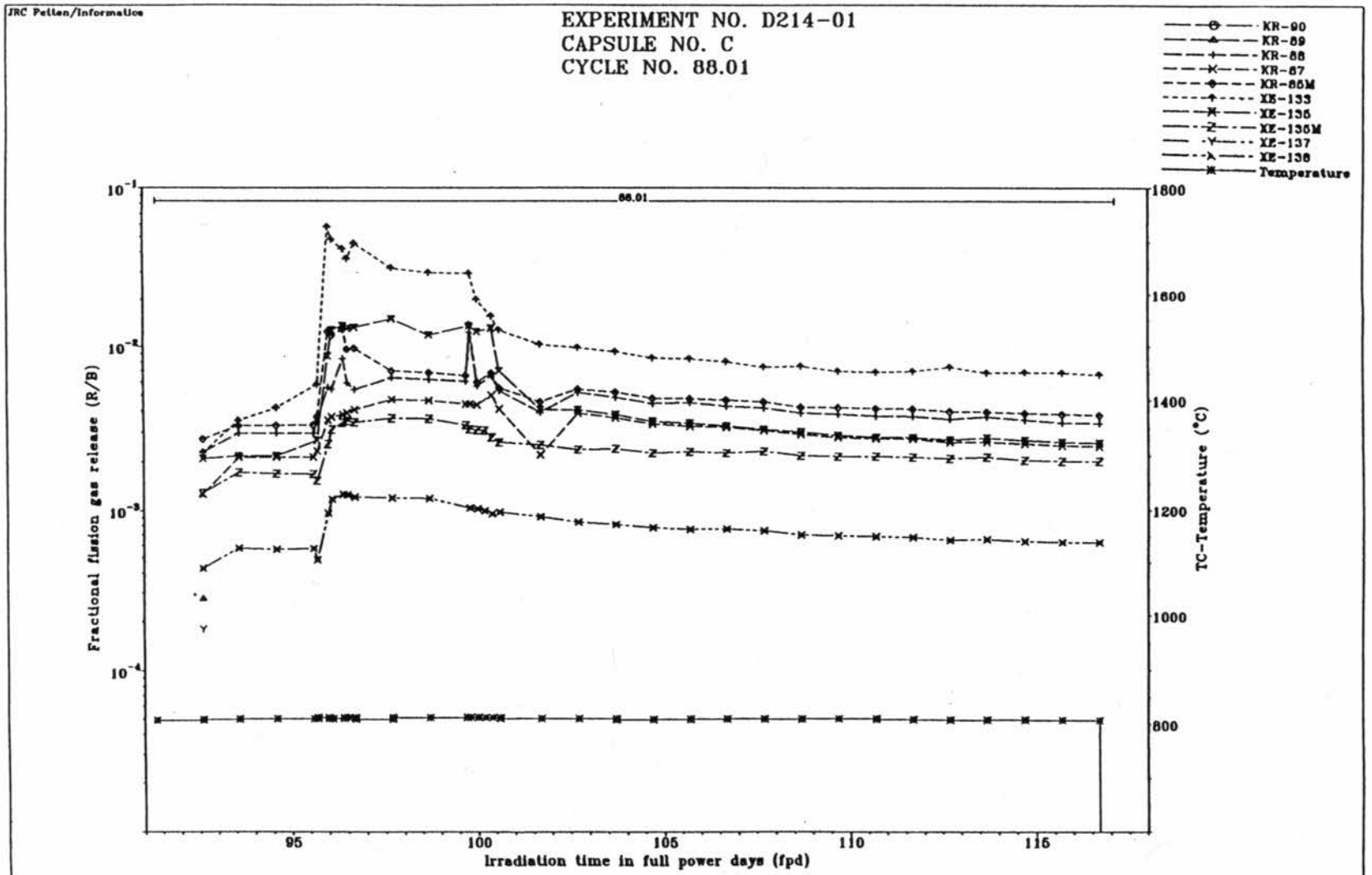



Fig. 4.4.3. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

The impurities of interest in the inlet gas were $O_2$ and $N_2$ which, if present, would indicate contamination by air. Obviously, the oxygen impurity is undesirable because it would react with the hot graphite fuel bodies. The inlet gases to the Sweeploop system contain Oxysorb filters which remove oxygen from the Ne and He streams. Consequently, oxygen was rarely detected in the inlet gas to the capsules. At the end of cycle 88.08, however, about 35 ppmv $N_2$ and 1 to 2 ppm $O_2$ was detected in the service He and in the Sweeploop inlet gas, possibly indicating air contamination during bottle changeover. Consequently, prior to cycle 88.10, liquid-nitrogen-cooled, activated carbon traps were placed in the inlet streams of Ne and He. This effectively reduced the $N_2$ contamination to less than about 0.5 ppmv. In capsule 3, water vapor was injected into the capsule periodically as indicated in Table 4.5.1. The reaction of water vapor with the carbonaceous material in the fuel element led to the appearance of the hydrolysis product gases CO, $CO_2$, $CH_4$, and $H_2$ in the effluent gas. These products were usually in the range 5 to 100 ppmv, and unreacted water vapor was in the range 100 to several thousand ppmv, depending on the particular test.

A GC was used to monitor the compositions of the influent and effluent gases of all capsules for trace impurities and in capsule 3 for the reaction products of the hydrolysis of the exposed fuel and the carbonaceous material in the fuel elements. The GC used at Petten is a model TBT manufactured by L'aire Liquide/Orthodyne in France. This instrument utilizes an He ionization detector. A detailed description of the instrument, the method of use, and calibration is presented in Appendix B.

An example of the measurement of gas composition during water vapor injection in capsule 3 during cycle 89.02 is shown in Fig. 4.5.1. The concentrations of $H_2$, CO, and $CO_2$ rise and decline rapidly after the initiation and termination of water vapor injection, respectively. This behavior reflects the reaction of water vapor with the carbonaceous components of the fuel elements. The data plotted in Fig. 4.5.1 are gathered in Table 4.5.2. The complete set of data is given in Sect. 6.

## 4.6 REACTOR AND PROCESS DATA

The reactor and process data presented in this report include the cycle start and stop dates; graphs of the power and control rod positions; and histories of the activity, pressure, hygrometry, purge flow, and the SPN detectors. Examples of the time profiles of the power and control rod positions, the pressure, and the purge gas flow are given in Figs. 4.6.1, 4.6.2, and 4.6.3, respectively. Note that in Fig. 4.6.1, the control rod position is measured from the central reactor top lid.[25] In Fig. 4.6.2, the pressure is in bars and the ordinate scale to be divided by 100; the mean pressure in Fig. 4.6.2 is of the order of 0.3 MPa. In Fig 4.6.3, the flow rate is to be in $cm^3$/min under standard conditions of 0.1 MPa and 298°C. The complete set of the reactor and process data identified above is presented in Sect. 6.6. These time profile data are presented in graphical form in Sect. 6.6 and can be recovered in digital form from the DACOS files identified in Sect. 4.1.

Table 4.5.1. Water-vapor injection data
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| Cycle | Injection No. | Start d.mo; time | End d.mo; time | Duration (h) | Inlet $P^{\circ}_{H2O}$ (Pa) | Outlet $P_{H2O}$ (Pa) | Delay (h) | Delay (mmol) |
|---|---|---|---|---|---|---|---|---|
| 87.05 | 1 | 16.06; 1030 | 16.06; 1630 | 6 | 45 | 18.3 | 4.5 | 0.37 |
| 87.05 | 2 | 20.06; 1226 | 24.06; 1130 | 95 | 18 | 10.4 | 8.0 | 0.26 |
| 87.09 | 3 | 02.11; 1000 | 10.11; 1000 | 192 | 45 | 3.5 | 4.5 | 0.37 |
| 87.10 | 4 | 23.11; 1115 | 27.11; 1000 | 95 | 90 | 30.3 | 2.3 | 0.38 |
| 88.01 | 5 | 11.01; 1015 | 15.01; 1010 | 96 | 90 | 65.7 | 2.8 | 0.46 |
| 88.05 | 6 | 09.06; 1008 | 09.06; 1018 | 168 | 132 | 110.9 | 3.0 | 0.72 |
| 88.06 | 7 | 28.06; 0900 | 04.07; 0001 | 135 | 136 | 117. | 1.75 | 0.44 |
| 88.07 | 8 | 14.09; 0943 | 19.09; 0943 | 120 | 122 | 109.4 | 3.8 | 0.85 |
| 88.08 | 9 | 10.10; 1100 | 18.10; 1100 | 192 | 118 | 103. | 3.5 | 0.76 |
| 88.09 | 10 | 31.10; 1040 | 10.11; 1145 | 241 | 130.5 | 125.5; 113 | 3.1 | 0.74 |
| 88.10 | 11 | 28.11; 1100 | 05.12; 1350 | 172 | 123. | 53. | 4.5 | 1.0 |
| 89.01 | 12 | 23.01; 1000 | 31.01; 1000 | 192 | 112. | 106.; 98 | 5.0 | 1.0 |
| 89.02 | 13 | 20.02; 0940 | 24.10; 0940 | 96 | 250. | 220 | 2.6 | 1.2 |
| 89.04 | 14 | 08.05; 0853 | 12.05; 0853 | 96 | 550. | 520 | 1.78 | 1.8 |
| 89.06 | 15 | 26.06; 0818 | 03.07; 1018 | 170.5 | 1060. | 1040 | 1.1 | 2.4 |
| 89.06 | 16 | 10.07; 0900 | 10.07; 2400 | 15 | 250. | 220. | 3.1 | 1.5 |

Injection No. = water-vapor injection number
d.mo. time = day.month; clock time
$P^{\circ}_{H2O}$ = inlet pressure of water vapor
$P_{H2O}$ = outlet pressure of water vapor
delay (h) = time of injectin - time of appearance of water-vapor in the outlet gas
delay (mmol) = quality of water-vapor retained by fuel element prior to appearance of water-vapor in the outlet gas

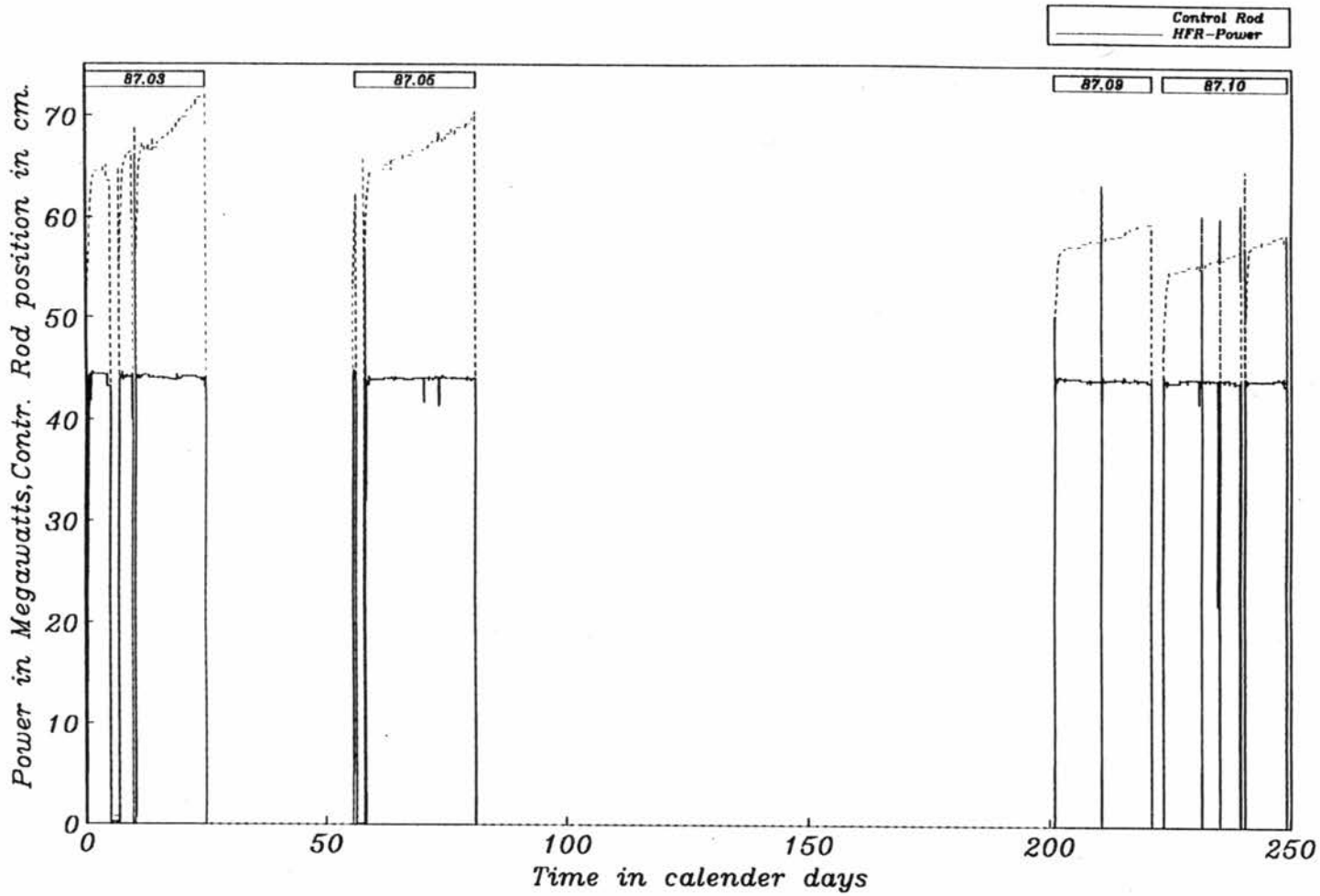



Fig. 4.6.1. HFR power and control-rod history cycles 87.03-87.10.
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

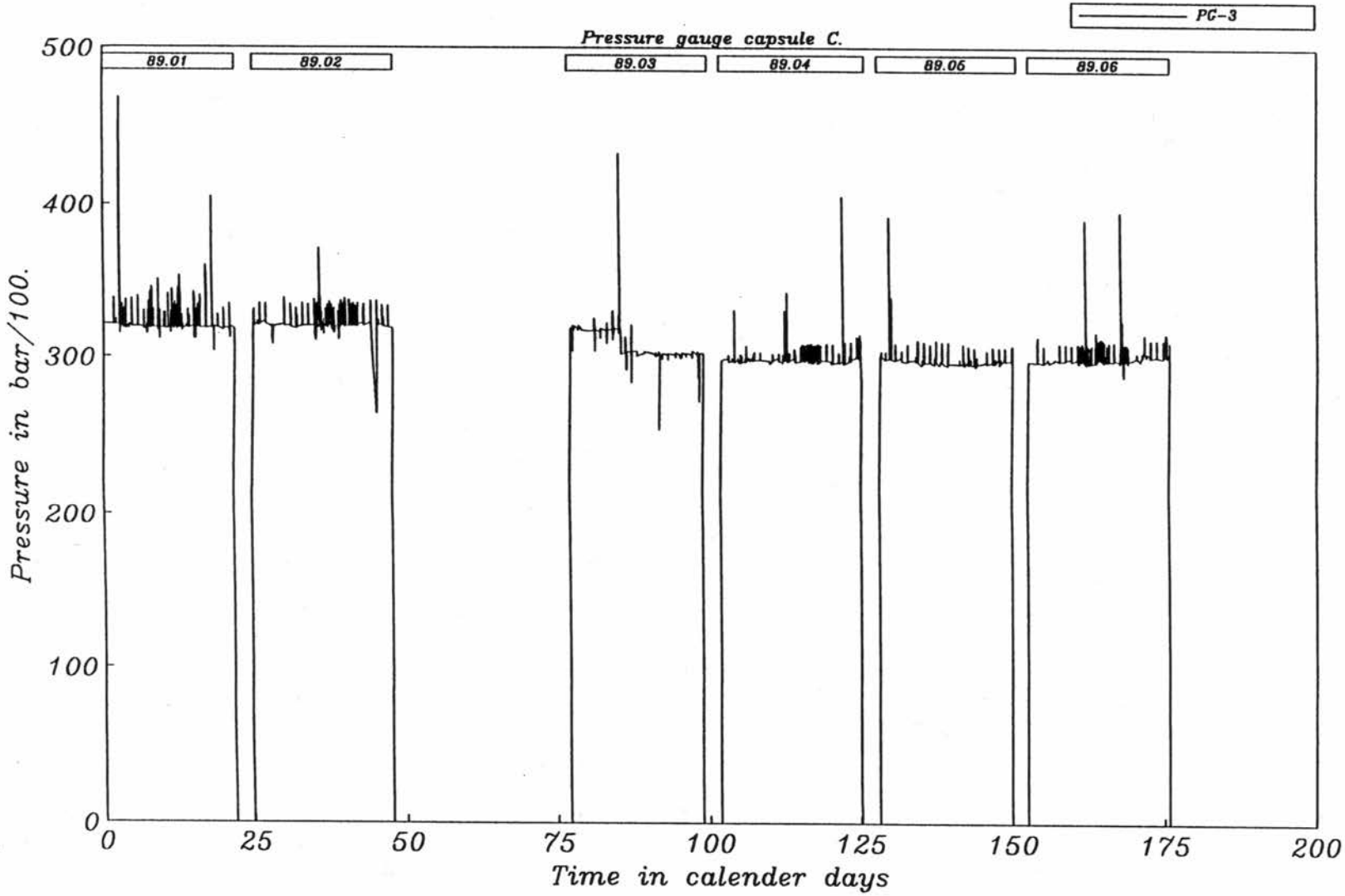



Fig. 4.6.2. Pressure history D-214 Cycles 89.01 – 89.06.
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

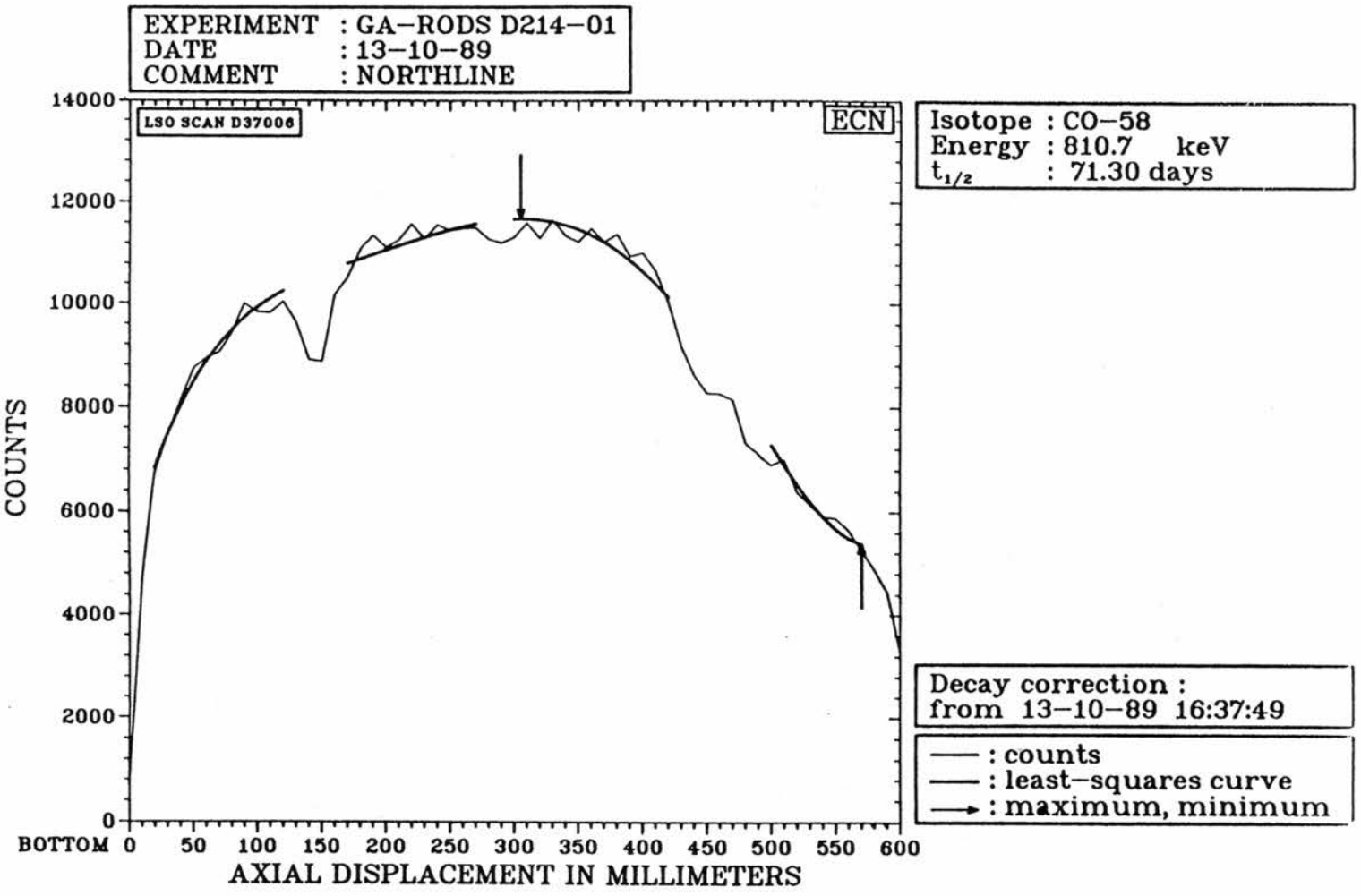



Fig. 5.1.1. Axial gamma scan along northline for $^{58}Co$.
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

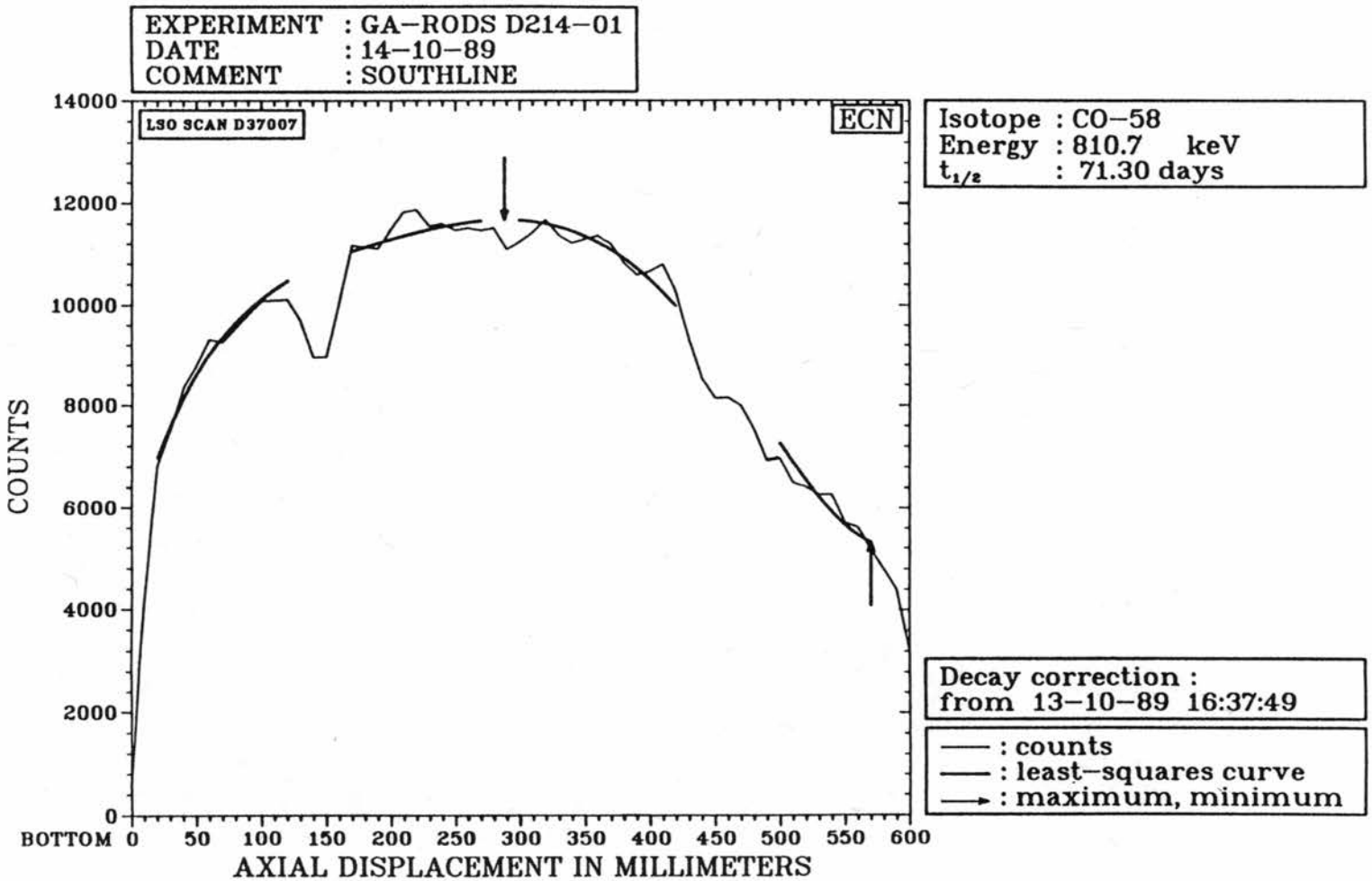



Fig. 5.1.2. Axial gamma scan along southline for $^{58}Co$.
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

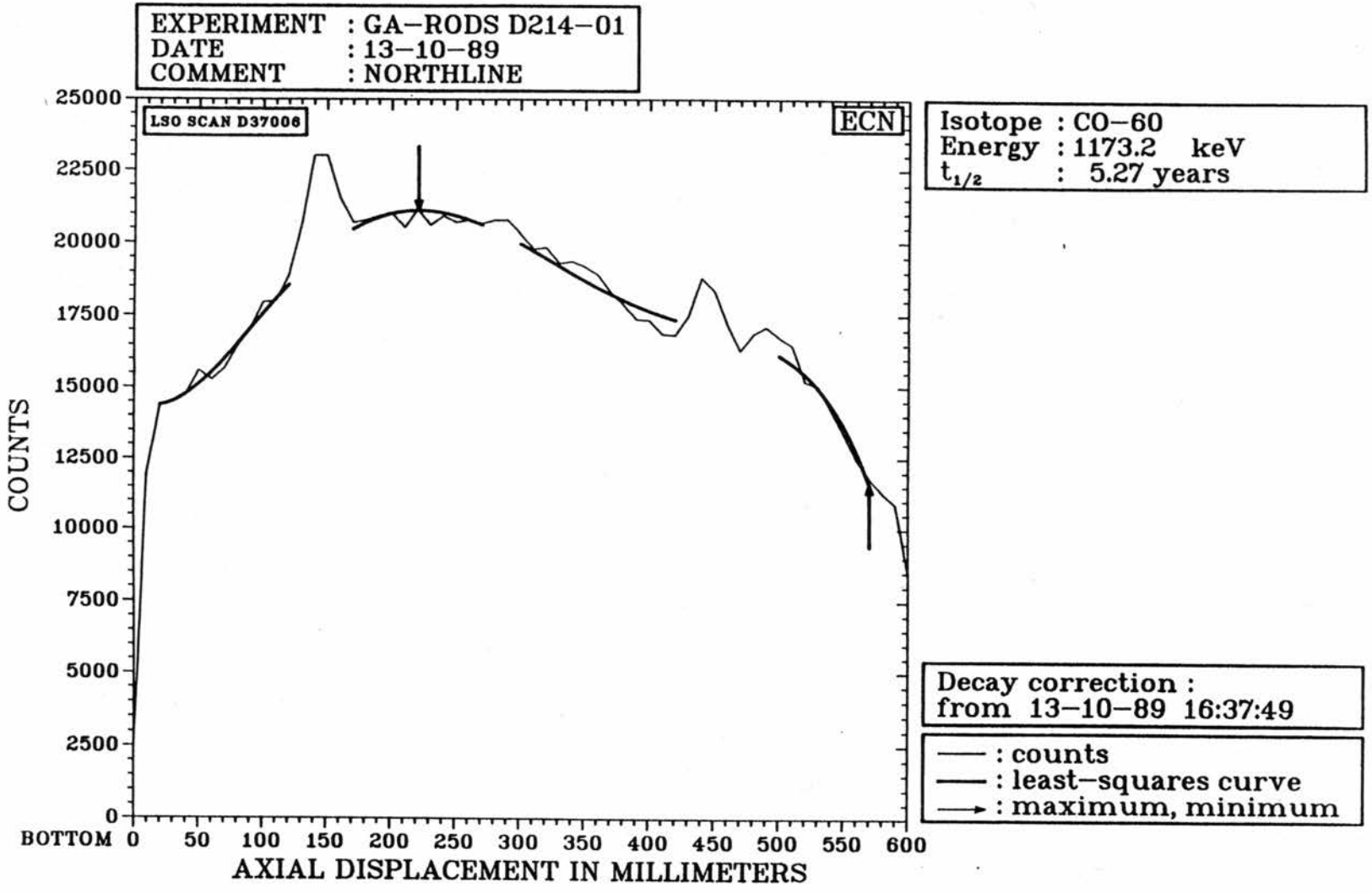



Fig. 5.1.3. Axial gamma scan along northline for $^{60}Co$.
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

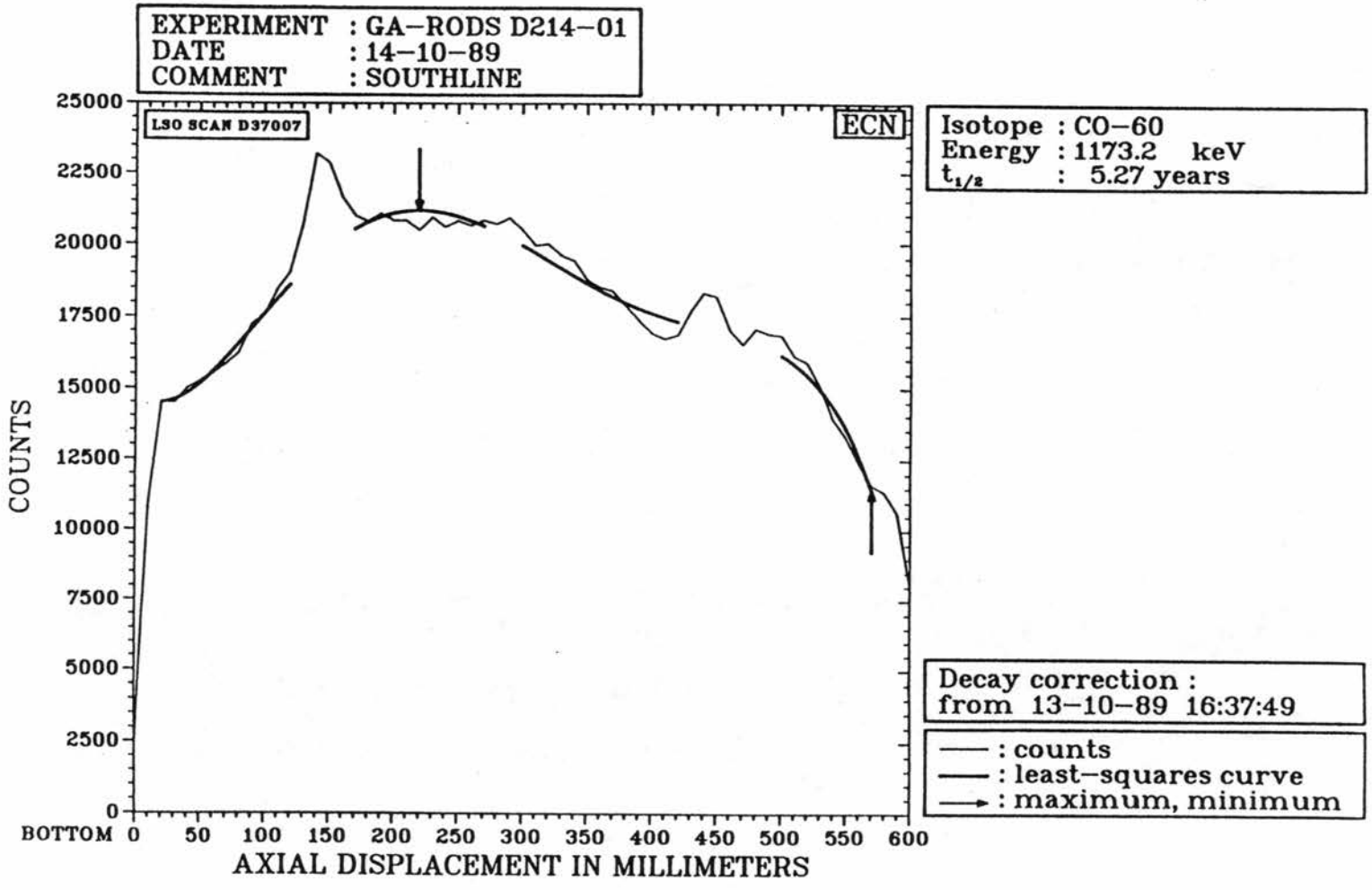



Fig. 5.1.4. Axial gamma scan along southline for $^{60}Co$.
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

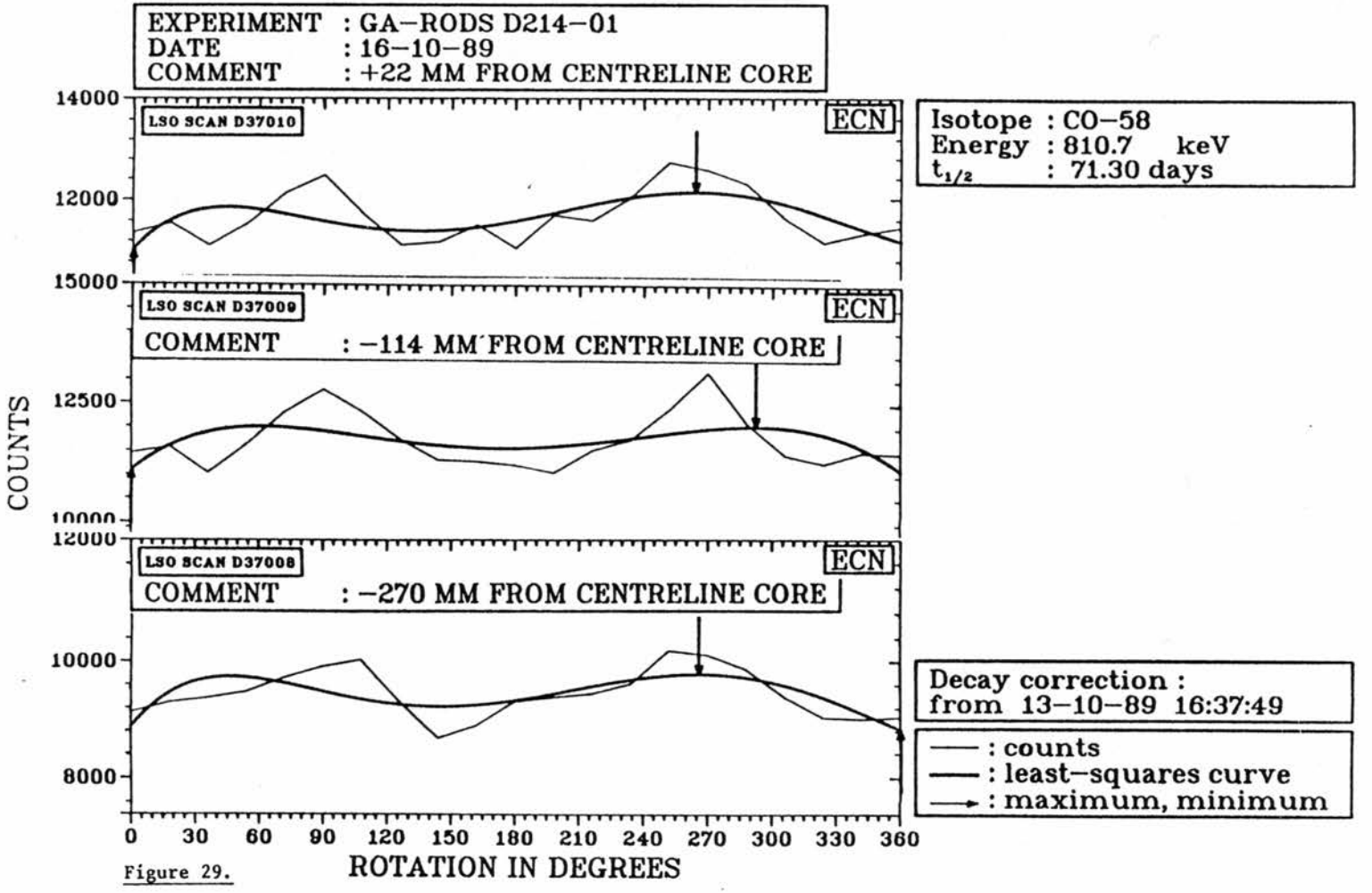



Figure 29.

Fig. 5.1.5. Circumferential gamma scans at three axial locations for $^{58}Co$.
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

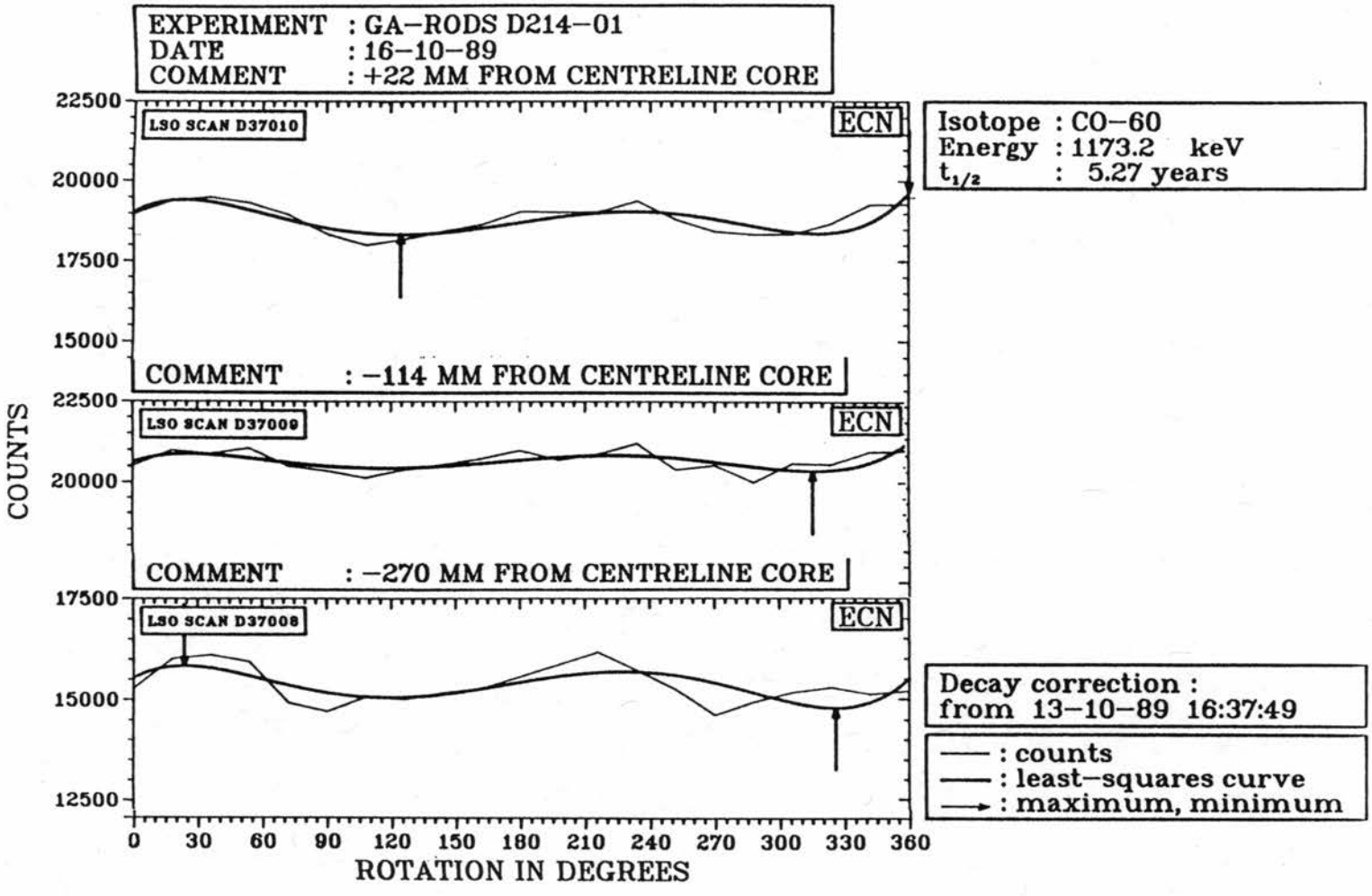



Fig. 5.1.6. Circumferential gamma scans at three axial locations for $^{60}Co$.
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

The circumferential gamma scans, made at three axial locations, are presented in Figs. 5.1.5 and 5.1.6 for $^{58}Co$ and $^{60}Co$, respectively. The axial locations with respect to the core centerline are +22, -114, and -270 mm. The circumferential variational in the number of counts is $<\pm 5\%$ of the average number at all three axial locations. In each circumferential scan, two peaks, separated by about 180°, can be distinguished. For $^{58}Co$, reflecting the fast neutron fluence distribution, one peak is near 90°, and for $^{60}Co$, one peak is near 30°. The ratio of the number of counts, $^{60}Co/^{58}Co$, ranges from 1.5 to 1.8 as a function of distance from the core centerline. For both nuclides, the number of counts, with increasing distance from the core centerline, either rises slightly or remains constant and then declines below -114 mm from the centerline.

## 5.2 NEUTRON METROLOGY

Measurements of the neutron flux and fluence were made using activation monitors,[26,27] gamma-scanning wires,[3,28] and SPN detectors;[3] see Sect. 6.6.

### 5.2.1 Activation Monitor Sets

Each capsule contained four of the activation monitor sets located in the heat shield regions at each end of each capsule.[3] Thermal and fast neutron fluxes and fluences were derived from an analysis[26] of the nuclear reactions undergone by the stainless steel- and quartz-encased specimens of $^{59}Co$, $^{54}Fe$, $^{93}Nb$, and $^{46}Ti$. Location in the heat shields at a temperature of about 300° C was necessitated by the detrimental effects the monitors would have experienced in the fuel elements under the high temperatures (900 to 1250° C) to which the latter were subjected. The results of the analysis are presented in Table 5.2.1; for the north orientation, the neutron flux distributions are shown in Fig. 5.2.1. These results are based on the analysis of the activity monitor sets from capsules 2 and 3; hence, only 8 of the 12 sets were analyzed. Throughout the irradiation, the locations of capsule 3 were in the range, with respect to the core centerline, -0.22 to -0.32 m, and of capsule 2, in the range -0.07 to -0.17 m; the corresponding mean values were -0.27 and -0.12 m, respectively. The change in the thermal and fast fluences with increasing distance from the core centerline is qualitatively consistent with the gamma-scan profiles of the capsule protective tube as shown in Figs. 5.1.1 through 5.1.4. Nevertheless, the flux and fluence values determined with monitors in the heat shield are affected to some degree by the presence of water nearby, and extrapolation of the values into the region of the fuel elements is uncertain.

The data of Table 5.2.1 are compared in Fig. 5.2.2 with the volume-averaged thermal and fast neutron fluences calculated with the HFR-TEDDIE code. Three of the four pairs of data lie very close to the calculated, volume-averaged thermal and fast neutron fluence values. This is unexpected. For example, by assuming that the HFR-TEDDIE volume-averaged fluences are correct and deducing a shape factor of 1.2 at the mean location of capsule 2, -114 mm below the core centerline, the calculated thermal fluence is $4.4 \times 10^{25} n/m^2$, and the calculated fast neutron fluence is $3.5 \times 10^{25} n/m^2$. The measured values are approximately $3.6 \times 10^{25} n/m^2$ and $3.0 \times 10^{25} n/m^2$, respectively. Thus, under the assumption employed, the calculated thermal and fast neutron fluences are larger than the measured fluences by factors of 1.2. The consequences of the alternate assumption, i.e., that the measurements are correct, requires a more elaborate analysis which is beyond the scope of this report.

Table 5.2.1. Results of neutron metrology in experiment D214.01
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

The fluence rate values are valid for HRF core position F8 and a reactor power of 45MW.

| distance to $c_L$ core (in mm) | orien-tation | capsule | monitor set code | thermal fl. rate (in $10^{18}$ $m^{-2} \cdot s^{-1}$) | thermal fluence (in $10^{25} m^{-2}$) | fast fl. rate (in $10^{18}$ $m^{-2} \cdot s^{-1}$ | fast fluence (in $10^{25}$ $m^{-2}$) | fluence E>.1MeV (in $10^{25} M^{-2}$) | fluence [1] E>.18MeV (in $10^{25} m^{-2}$) |
|---|---|---|---|---|---|---|---|---|---|
| — 35 | north | 2 | 05 | 0.857 | 3.57 | 0.728 | 2.80 | 6.26 | 5.68 |
| —35 | south | 2 | 06 | 0.851 | 3.54 | 0.804 | 3.08 | 6.18 | 5.64 |
| —150 | north | 2 | 07 | 0.872 | 3.63 | 0.743 | 2.85 | 6.37 | 5.79 |
| —150 | south | 2 | 08 | 0.894 | 3.73 | 0.834 | 3.20 | 6.41 | 5.86 |
| —192 | north | 3 | 09 | 0.817 | 3.40 | .0688 | 2.64 | 5.91 | 5.36 |
| —192 | south | 3 | 10 | 0.833 | 3.47 | 0.776 | 2.98 | 5.99 | 5.46 |
| —307 | north | 3 | 11 | 0.584 | 2.43 | 0.419 | 1.61 | 3.58 | 3.26 |
| —307 | south | 3 | 12 | 0.594 | 2.48 | 0.455 | 1.75 | 3.51 | 3.20 |

[1] calculated from ABBN groups (CHARDAT package)

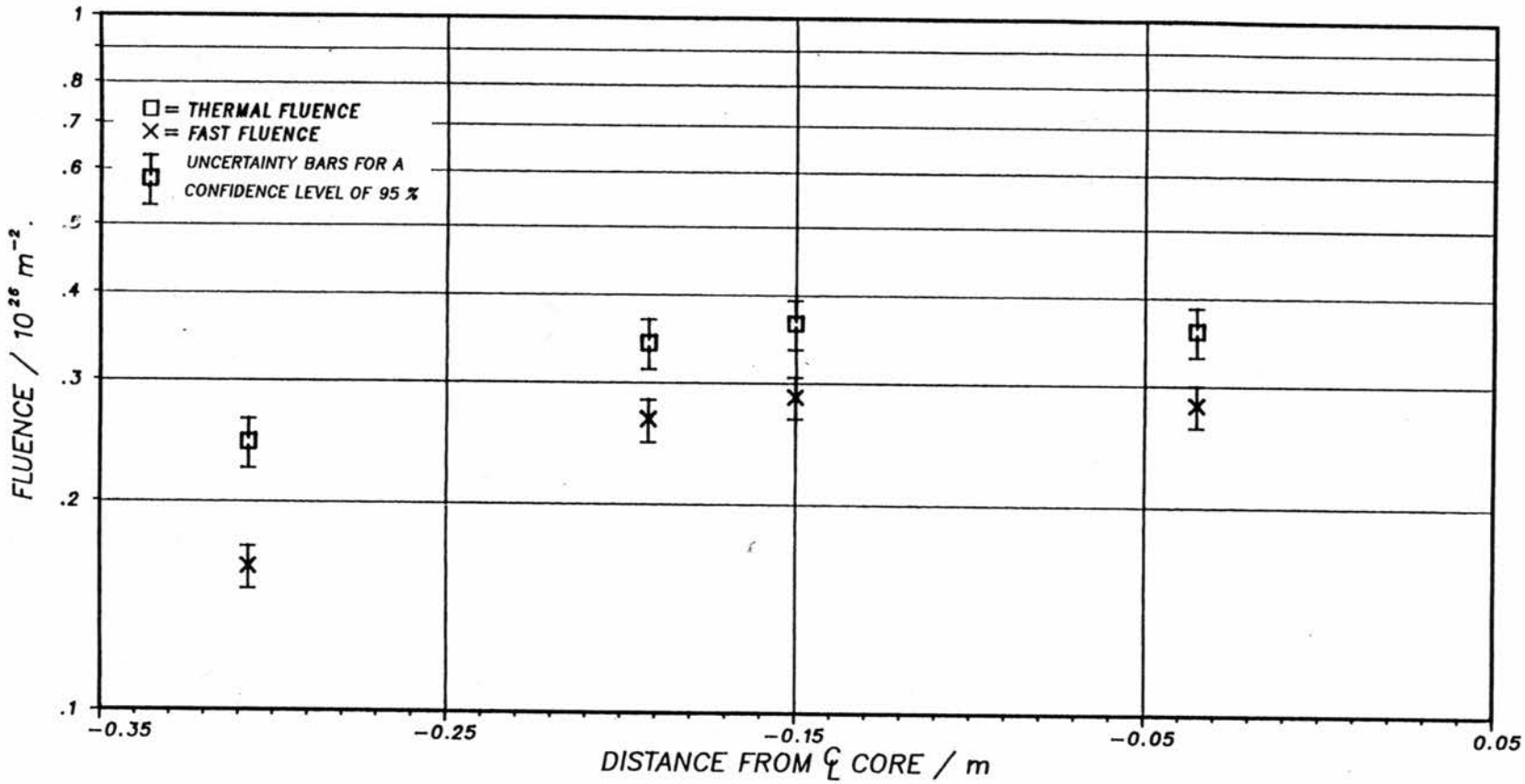



Fig. 5.2.1. Vertical neutron fluence distributions along the north side of capsules 2 and 3.
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

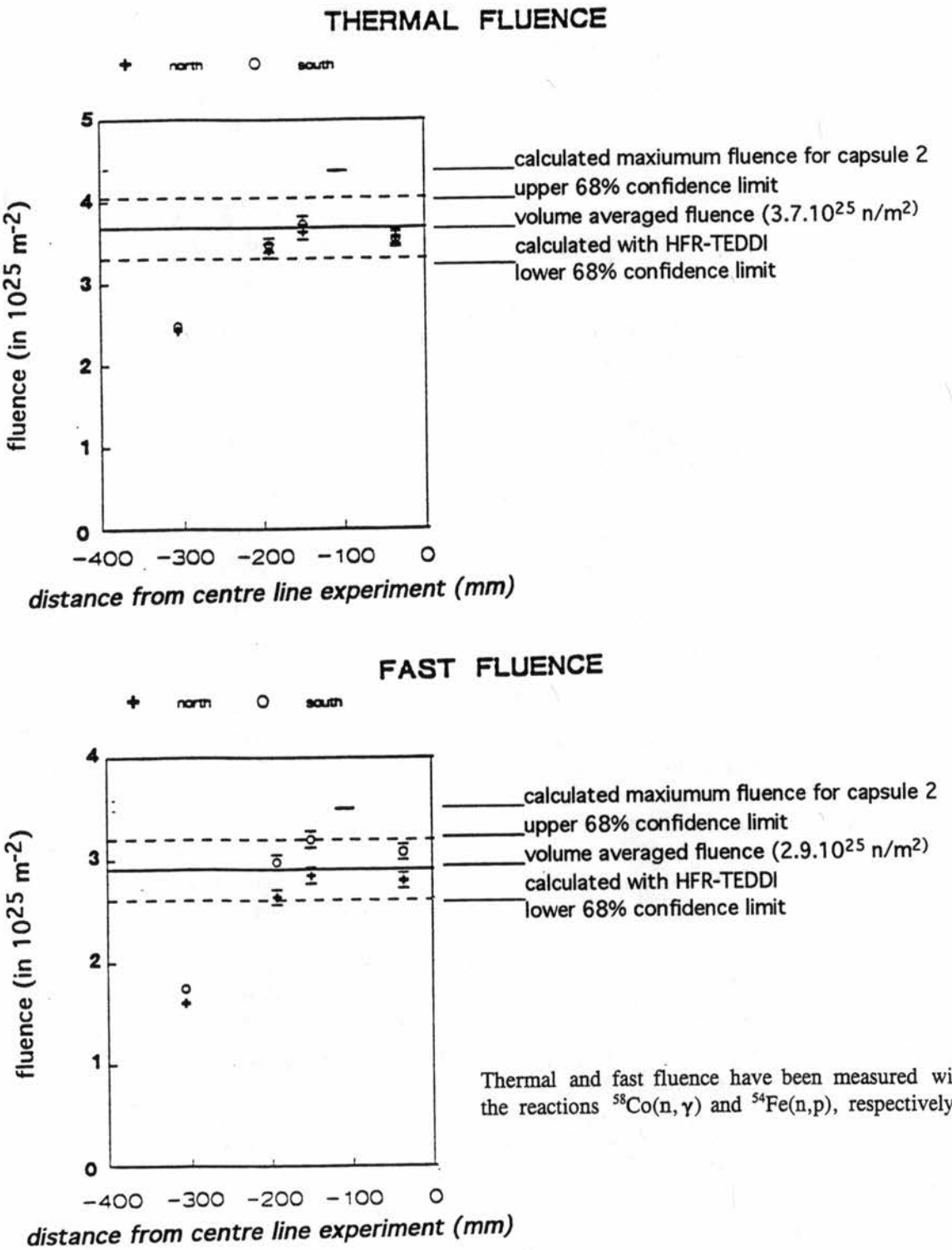



Fig. 5.2.2. Comparison of calculated and measured fluence data.
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

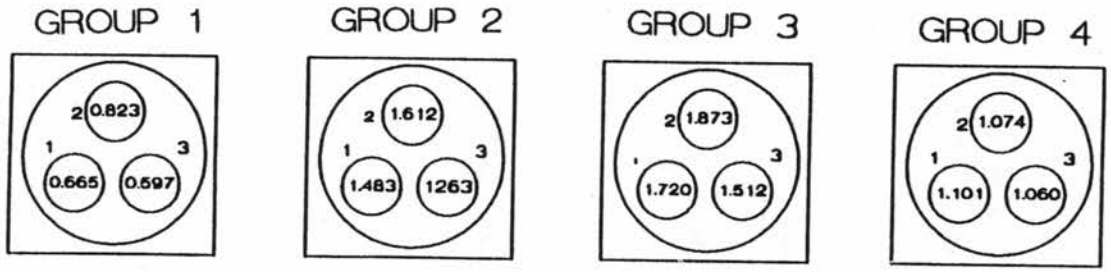
The activation monitor sets were restricted to the heat shield regions of the capsules and consequently yielded no information for the locations of the fueled graphite body, the locations of primary importance. Information on the neutron spectra was obtained at these locations in a simulation of the HFR-B1 experiment in the F8 position of the HFR during a 3-h irradiation at 5 MW (ref. 27). The inner contents of the assembly for the simulation experiment, representing the irradiation rig, consisted of three separated capsules with water in between. Each capsule contained a graphite cylinder between heat shields. The graphite cylinders had, in place of the stacked sets of fuel compacts as in HFR-B1, stacks of fission monitors separated by disks of graphite.[27] In addition, each capsule contained three stainless steel wires. The monitors and wires yielded fluence rate data at specific axial positions and fluence rate axial distributions, respectively.

Neutron fluence rates were measured at the position of the maximum fluence rate, 92 mm below the centerline. These data were then multiplied by the shape factor (=0.805 or 0.80 in two instances) so that comparison with the volume-averaged HFR-TEDDI calculations could be made. The measured fluence rate data were linearly interpolated between the measurement positions so as to match the mesh points in the HFR-TEDDI calculation. The results are shown in Fig. 5.2.3. The fluence rate data differ at the three locations in the chosen plane at 92 mm below the centerline; recall that during the short irradiation of the simulation experiment, the fuel bodies were not rotated as in the HFR-B1 experiment and that environmental conditions did not vary significantly. For comparison, therefore, an average of the three values may be taken as a reasonable approximation in simulating the effect of the rotation. In this approximation, the ratios of the mean calculated to the mean measured fluence rates ($\langle$calculated rate$\rangle$/$\langle$measured rate$\rangle$) are 0.77 for the thermal neutron fluence and 0.83 for the fast neutron fluence.

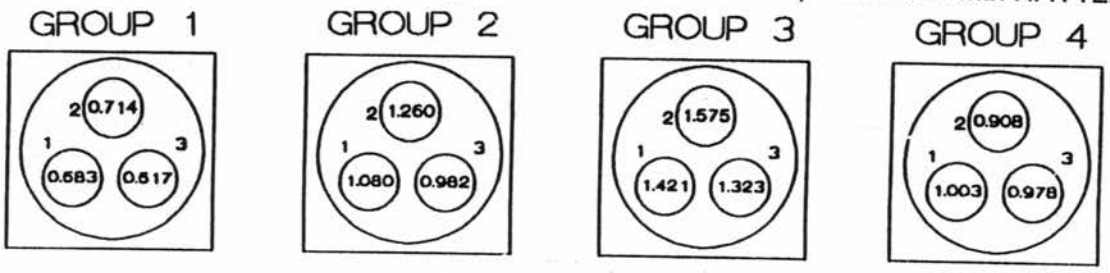
A large discrepancy is now apparent. The calculated-to-measured ratio derived for neutron fluences in relation to the activation monitor sets in the HFR-B1 experiment was deduced to be 1.2 for both the thermal and fast neutron fluences, whereas from the simulation experiment, the calculated-to-measured ratio for neutron fluence rates is deduced to be about 0.8. This discrepancy has not been and remains to be resolved.[27]

From the foil sets and the stainless steel wires in the simulation experiment,[27] the axial distributions of the thermal and fast neutron fluence rates were derived. (Note that the values of these rates are true for the various axial locations and have not been multiplied by shape factors.) The distributions are shown in Figs. 5.2.4 and 5.2.5 for the fast and thermal fluence rates, respectively. Also shown as an insert, are the fluence rate values at -92 mm below the centerline. The location of these values with respect to the distributed fluence rates is indicated in the figures by the short horizontal line segments centered on the -92 mm vertical. In the case of the fast fluence rates of Fig. 5.2.4, the relation between the fluence rate values and the plotted data at -92 mm is not clear from the figure or from the report.[27] The same can be written about the thermal neutron fluence rates in Fig. 5.2.5; here, in addition, there is the complication at -92 mm resulting from the influence of the cadmium foil box on the activity of the stainless steel wires. In any event, however, the use of these distributions, if possible, depends on resolving the discrepancy identified in the previous paragraph.

Average fluence rate spectrum data derived from the irradiation of foil stacks in the mock-up assembly




Volume averaged neutron fluence rate spectrum data for the mock-up calculated with HFR-TEDDI




Ratio of the measured to calculated fluence rate data

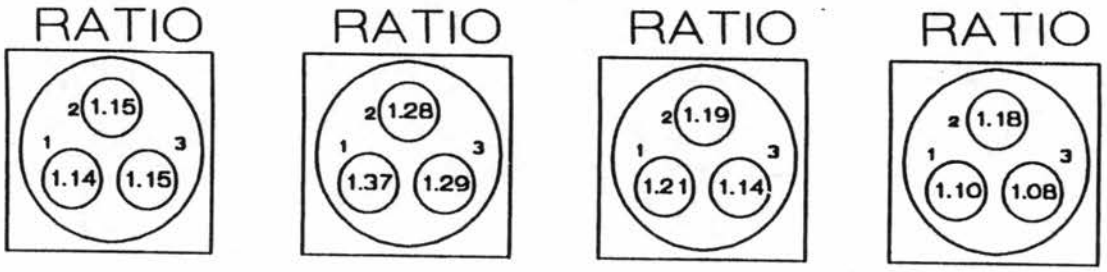



Fig. 5.2.3. Comparison of measured and calculated fluence rates ($10^{18}$ $m^{-2}s^{-1}$) in the three horizontal positions in the simulation experiment in the axial plane 92 mm below the centerline.
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

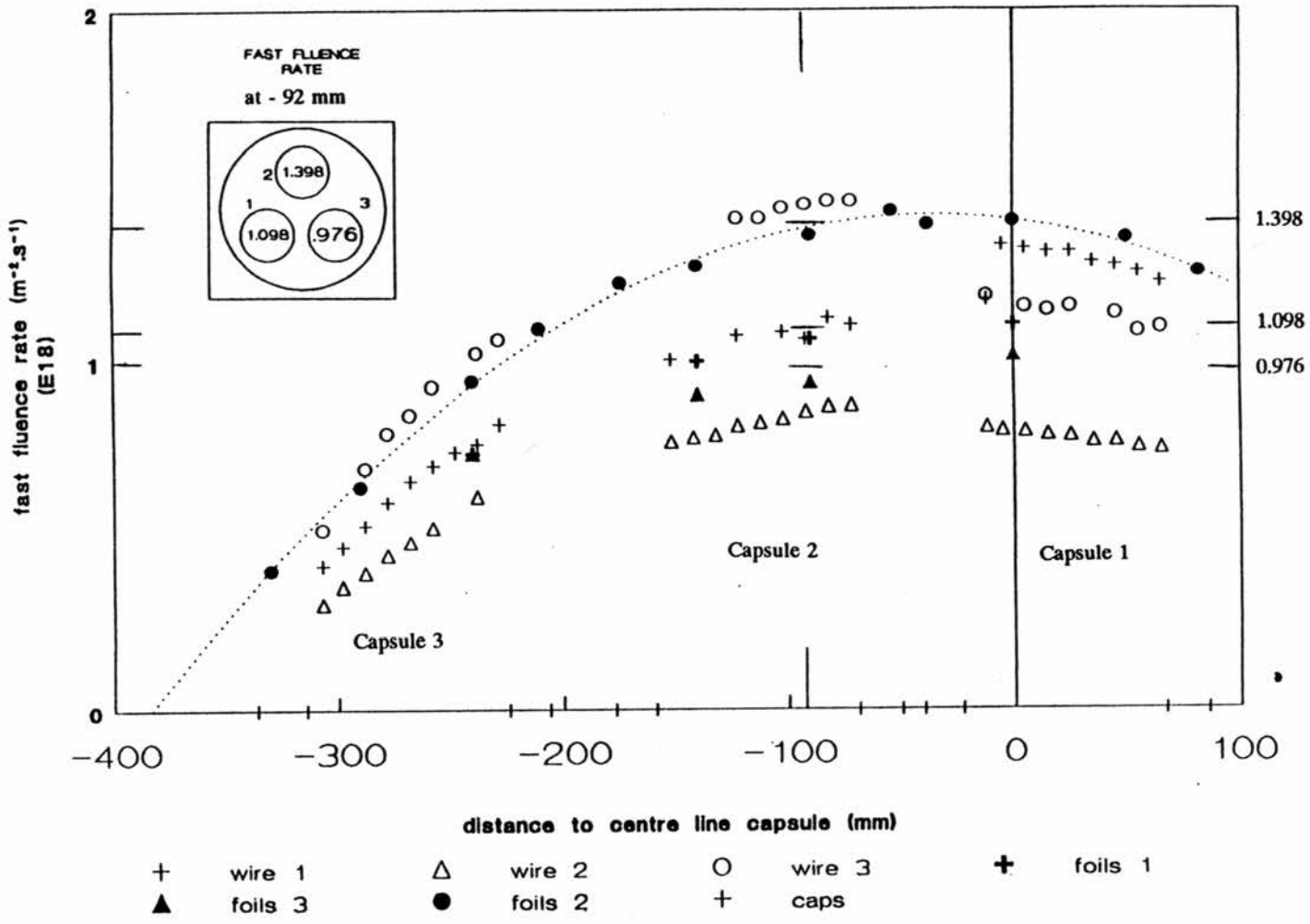



Fig. 5.2.4. Fast fluence rate distributions measured in the simulation of experiment D214.01.
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

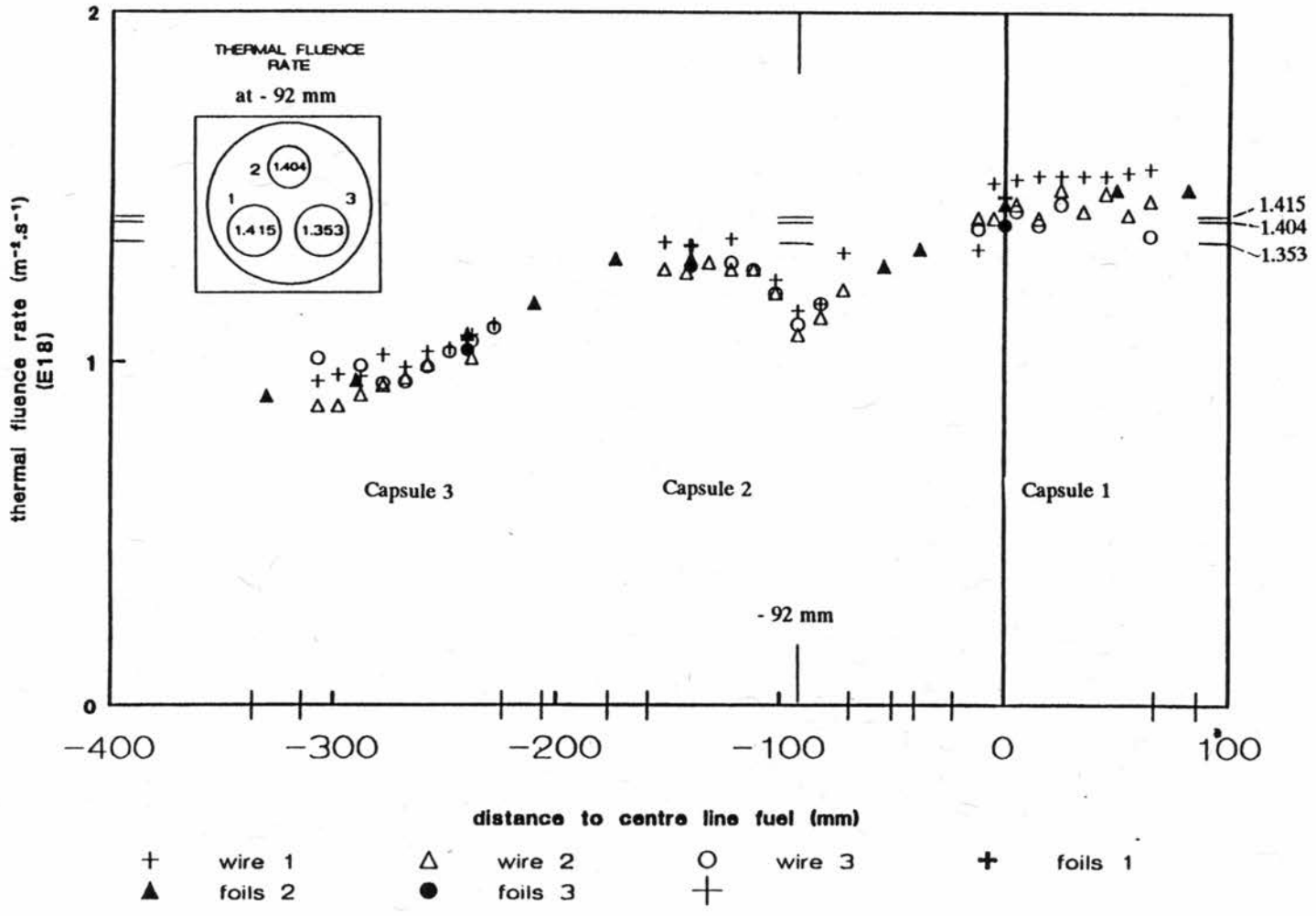



Fig. 5.2.5. Thermal fluence rate distributions measured in the simulation of experiment D214.01.
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

### 5.2.2 Gamma Scan Wires

The gamma-scan wires from capsules 2 and 3 were analyzed at KFA.[28] Each capsule contained three niobium-encased wires located about 3 mm from a stacked set of four fuel compacts and extending more than the length of the stack. Each compact was 19 mm in length resulting in a total length of 76 mm; the scans covered a distance of 109 mm. Scans for the nuclides $^{51}Cr$, $^{58}Co$, $^{54}Mn$, and $^{60}Co$ were made; adequate numbers of counts were obtained only for $^{54}Mn$ and $^{60}Co$. The wires were positioned during the scans as they were during irradiation. Counts were accumulated every millimeter increment for 500 s (except for one gamma-scan wire in capsule 3 for which the measurement time was 300 s). The relative number of counts as a function of scan distance for the gamma-scan wire designated 1 is shown in Fig. 5.2.6 for capsules 2 and 3 and nuclides $^{54}Mn$ and $^{60}Co$. The $^{60}Co$ scans reflect the thermal neutron fluence distribution and the $^{54}Mn$ scans, the fast neutron fluence distribution. Qualitatively, these scans are consistent with the scans of the outer protection tube at the locations of capsules 2 and 3 as shown in Figs. 5.1.3 and 5.1.4 and in Figs. 8 and 19 of ref. 25. Within the uncertainty of the profiles of Fig. 5.2.6, the gamma scans for scan wires designated 2 and 3* are identical to those of gamma scan wire 1 for $^{60}Co$; for $^{54}Mn$, the number of counts is 15 ± 1% larger for gamma-scan wire 2 as compared to 1 and is 9 ± 1% larger for gamma scan wire 3* as compared to 1 for both capsules 2 and 3. Thus, there is some rotational variation in the number of counts measured for $^{54}Mn$ but not for $^{60}Co$.

### 5.2.3 Self-Powered Neutron Detectors

The SPN detectors[3] are used to measure the instantaneous thermal neutron flux. As shown below in Figs. 6.6.39 through 6.6.54, no relatively significant response is recorded until the 14th cycle; this behavior occurs for all capsules and for both the north and south orientations. Thus, there is a consistency in the responses of detectors at a variety of locations, but the response is difficult to understand.

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*Note that the number in Fig. 5.2.6 to the left of the decimal point represents the capsule number, and that to the right identifies the gamma-scan wire.

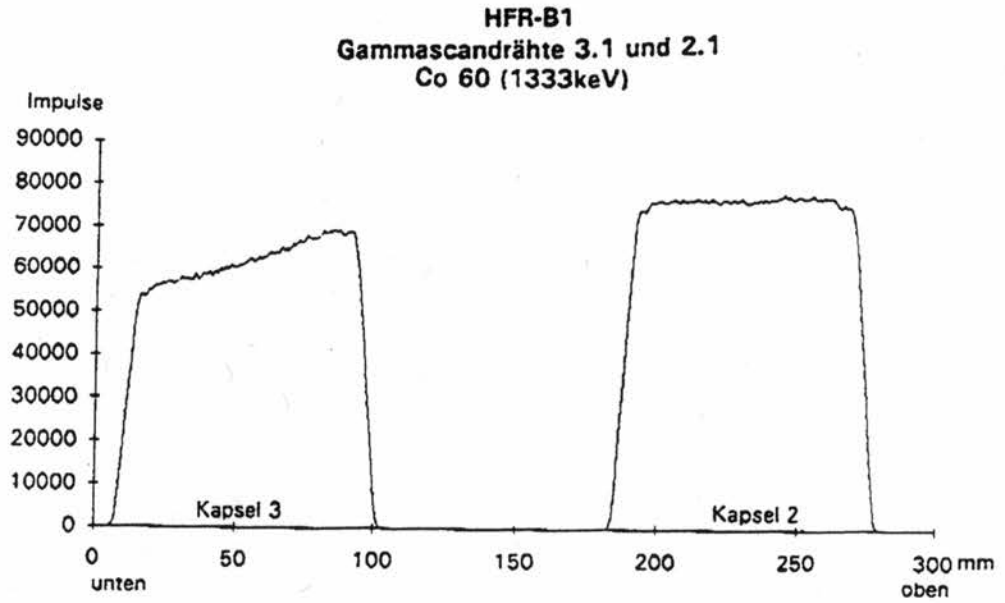



Abb: 1b

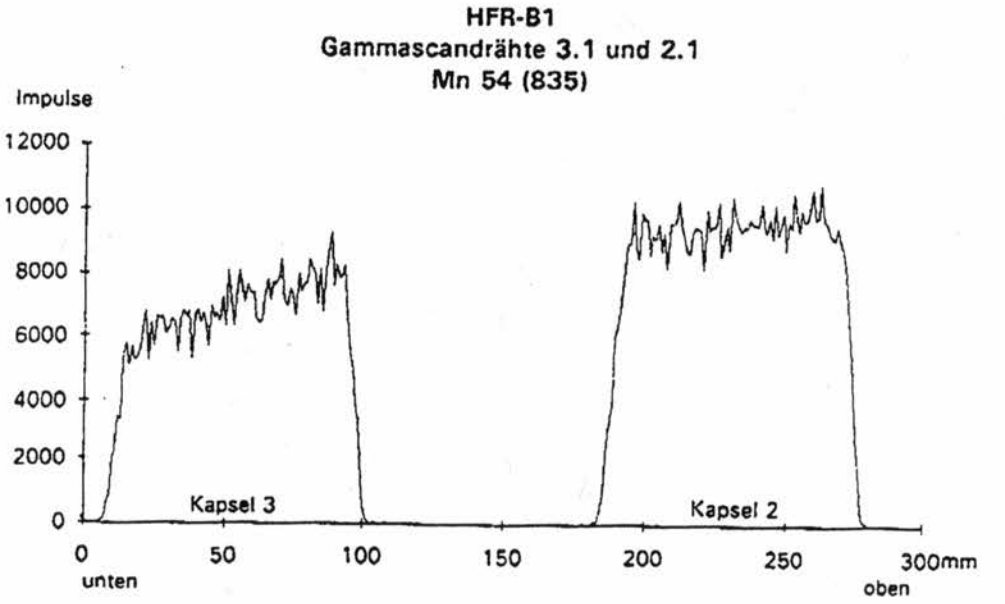



Fig. 5.2.6. Measurement of the gamma-scan wires from capsules 2 and 3.
*Source:* Forschungszentrum, Jülich, Germany

# 6. FINAL IRRADIATION DATA

The data in this section comprise a basic set with which the analysis of the HFR-B1 experiment may be pursued. Certain auxiliary data to which attention may be directed during the analysis can be obtained by consulting the extensive directory files, discussed in Sect. 4, and chart records now in the possession of the ORNL Nuclear Fuel Section of the M&C Division. The data presented here are in numerical and graphical form; the precise values of the graphed data can be obtained from the appropriate directory file. The detailed contents of this section are outlined in Table 6.0.0. The neutron metrology data are not included as they have been presented adequately in Sect. 5 in terms of an extended discussion of the data and associated problems.

Immediately preceding each subsection, a brief explanation of the contents is given.

## 6.1 DIRECTORY LISTINGS

The directory listings for two directories are presented in Tables 6.1.1 and 6.1.2. The third directory listing is not available, but the files may be obtained by access to the tape on which all files are located. Copies of the tape are in the possession of ORNL as well as JRC.

The file names include, generally, the cycle number, a reference to the particular capsule, where appropriate, in the form of the letters A, B, and C (corresponding to capsules 1, 2, and 3, respectively), to the reactor power (REAPWR) and the Sweeploop (SWEEP). A further explanation of file names is as follows.

All files with the extension *.D01 are plots in the metafile form.

All files with the extension *.R0B are R/B data files.

All files with an extra **9****.DAT or ******9.DAT are files where 8.9% of the power is used.

All files with ******N.DAT are data files where the original DACOS temperatures and new powers are used.

All files with *******T.DAT are total data files.

All files with only ******F.DAT are the original final data files.

All data files with IJ****.DAT or INJ****.DAT are files with water-vapor injection data.

All files with D214*******.DAT and SWEEP****.DAT are the original DACOS data files.

Table 6.0.0. The contents of Sect. 6


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| 6.3 | Nuclear data | 6-23 |
| | post-cycle HIP-TEDDIE calculations | 6/24-46 |
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| | activity histories | 6/358-365 |
| | pressure histories | 6/366-374 |
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| | SPN detector histories | 6/393-404 |

Table 6.1.1. HRF VAX-4300 directory listing of experiment D214.01
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

Directory DUA3: [CONRAD.RUBY_214]

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | 8709BS.DAT;18 | 13 | 5-DEC-1988 | 09:01:21.15 |
| | | | | 8709CFN.DO1;1 | 151 | 25-AUG-1992 | 10:14:37.12 |
| 2141AT.DAT;1 | 386 | 5-JUL-1990 | 15:59:26.57 | 8709CFN.DAT;2 | 32 | 21-AUG-1992 | 10:45:02.64 |
| 2141AT.ROB;1 | 482 | 5-JUL-1990 | 16:54:01.58 | 8709CFN.ROB;1 | 40 | 25-AUG-1992 | 10:14:35.34 |
| 2141BT.DAT;1 | 464 | 5-JUL-1990 | 15:59:42.77 | 8709CS.DAT;33 | 31 | 5-DEC-1988 | 09:22:56.94 |
| 2141BT.ROB;4 | 579 | 7-FEB-1991 | 09:33:22.91 | 8710AFN.DO1;1 | 91 | 24-AUG-1992 | 20:01:46.45 |
| 214AT.ROB;5 | 482 | 12-AUG-1992 | 14:57:41.47 | 8710AFN.DAT;2 | 12 | 24-AUG-1992 | 16:29:50.12 |
| 214BT.ROB;26 | 581 | 12-AUG-1992 | 15:05:56.97 | 8710AFN.ROB;1 | 15 | 24-AUG-1992 | 20:01:45.02 |
| 214CT.ROB;6 | 817 | 13-AUG-1992 | 15:19:45.44 | 8710AS.DAT;6 | 12 | 20-JAN-1989 | 10:49:54.82 |
| 214AT.DAT;4 | 386 | 10-AUG-1992 | 15:27:45.15 | 8710BFN.DO1;1 | 87 | 25-AUG-1992 | 09:54:31.10 |
| 214BT.DAT;4 | 465 | 11-AUG-1992 | 10:28:53.58 | 8710BFN.DAT;2 | 12 | 21-AUG-1992 | 16:00:00.92 |
| 214CT.DAT;5 | 653 | 13-AUG-1992 | 11:51:09.79 | 8710BFN.ROB;3 | 15 | 25-AUG-1992 | 09:54:29.36 |
| 214AT.DO1;1 | 1290 | 12-AUG-1992 | 14:57:48.47 | 8710BS.DAT;5 | 12 | 2-DEC-1988 | 14:12:54.11 |
| 214BT.DO1;1 | 1530 | 12-AUG-1992 | 15:06:03.84 | 8710CF.ROB;1 | 29 | 17-JUL-1989 | 15:33:03.82 |
| 214CT.DO1;1 | 1940 | 12-AUG-1992 | 15:11:58.60 | 8710CFN.DO1;1 | 149 | 25-AUG-1992 | 10:15:15.55 |
| 214TST.DAT;3 | 2 | 7-JUN-1990 | 16:37:19.26 | 8710CFN.DAT;2 | 31 | 21-AUG-1992 | 10:45:03.44 |
| 214TST.ROB;3 | 3 | 7-JUN-1990 | 16:41:16.68 | 8710CFN.ROB;1 | 39 | 25-AUG-1992 | 10:15:13.74 |
| 214AT9.ROB;5 | 482 | 12-AUG-1992 | 15:03:54.42 | 8710CS.DAT;5 | 31 | 2-DEC-1988 | 14:38:31.67 |
| 214BT9.ROB;2 | 581 | 12-AUG-1992 | 15:07:48.97 | 8789AT.DAT;7 | 386 | 27-JUL-1989 | 13:29:27.10 |
| 214CT9.ROB;5 | 817 | 13-AUG-1992 | 16:31:06.91 | 8789AT.ROB;1 | 482 | 3-AUG-1992 | 14:25:12.74 |
| 214AT9.DAT;2 | 386 | 10-AUG-1992 | 15:52:35.48 | 8789BT.DAT;5 | 464 | 3-AUG-1992 | 14:44:03.86 |
| 214BT9.DAT;1 | 465 | 11-AUG-1992 | 10:45:47.41 | 8789BT.ROB;1 | 579 | 3-AUG-1992 | 14:41:19.38 |
| 214CT9.DAT;3 | 653 | 13-AUG-1992 | 11:55:14.99 | 8789CT.DAT;3 | 654 | 31-JUL-1992 | 15:03:24.92 |
| 214AT9.DO1;1 | 1290 | 12-AUG-1992 | 15:04:00.24 | 8789CT.ROB;4 | 817 | 31-JUL-1992 | 15:08:23.98 |
| 214BT9.DO1;1 | 1521 | 12-AUG-1992 | 15:07:55.67 | 8801AFN.DO1;2 | 93 | 25-AUG-1992 | 09:32:27.70 |
| 214CT9.DO1;1 | 1927 | 12-AUG-1992 | 15:13:29.17 | 8801AFN.DAT;2 | 13 | 24-AUG-1992 | 16:29:50.51 |
| 8703AFN.DO1;1 | 97 | 24-AUG-1992 | 20:00:05.97 | 8801AFN.ROB;1 | 17 | 25-AUG-1992 | 09:32:26.17 |
| 8703AFN.DAT;2 | 8 | 24-AUG-1992 | 16:29:48.89 | 8801AS.DAT;5 | 13 | 2-DEC-1988 | 13:26:01.77 |
| 8703AFN.ROB;1 | 10 | 24-AUG-1992 | 20:00:03.42 | 8801BFN.DO1;1 | 94 | 25-AUG-1992 | 09:55:06.17 |
| 8703AS.DAT;16 | 8 | 5-DEC-1988 | 13:54:21.14 | 8801BFN.DAT;2 | 14 | 21-AUG-1992 | 16:00:01.27 |
| 8703BFN.DO1;3 | 105 | 26-AUG-1992 | 16:31:43.69 | 8801BFN.ROB;1 | 18 | 25-AUG-1992 | 09:55:04.50 |
| 8703BFN.DAT;2 | 7 | 21-AUG-1992 | 15:59:59.71 | 8801BS.DAT;5 | 14 | 2-DEC-1988 | 13:30:25.64 |
| 8703BFN.ROB;3 | 9 | 26-AUG-1992 | 16:31:42.23 | 8801CFN.DO1;2 | 155 | 25-AUG-1992 | 10:18:09.72 |
| 8703BS.DAT;13 | 7 | 5-DEC-1988 | 14:27:12.70 | 8801CFN.DAT;2 | 36 | 21-AUG-1992 | 10:45:04.16 |
| 8703CFN.DO1;2 | 96 | 25-AUG-1992 | 10:13:26.10 | 8801CFN.ROB;1 | 45 | 25-AUG-1992 | 10:18:07.88 |
| 8703CFN.DAT;7 | 7 | 21-AUG-1992 | 10:02:11.99 | 8801CS.DAT;5 | 36 | 2-DEC-1988 | 13:50:10.69 |
| 8703CFN.ROB;9 | 8 | 25-AUG-1992 | 10:13:24.55 | 8802AFN.DO1;1 | 88 | 25-AUG-1992 | 09:33:00.04 |
| 8703CS.DAT;8 | 7 | 5-DEC-1988 | 13:51:37.57 | 8802AFN.DAT;2 | 12 | 24-AUG-1992 | 16:29:50.86 |
| 8705AFN.DO1;1 | 106 | 24-AUG-1992 | 20:00:38.34 | 8802AFN.ROB;1 | 15 | 25-AUG-1992 | 09:32:58.53 |
| 8705AFN.DAT;2 | 13 | 24-AUG-1992 | 16:29:49.18 | 8802AS.DAT;8 | 12 | 2-DEC-1988 | 10:11:26.00 |
| 8705AFN.ROB;1 | 17 | 24-AUG-1992 | 20:00:36.85 | 8802BFN.DO1;1 | 88 | 25-AUG-1992 | 09:55:41.46 |
| 8705AS.DAT;16 | 13 | 9-DEC-1988 | 15:09:12.09 | 8802BFN.DAT;2 | 12 | 21-AUG-1992 | 16:00:01.59 |
| 8705BFN.DO1;2 | 95 | 25-AUG-1992 | 09:53:20.37 | 8802BFN.ROB;1 | 15 | 25-AUG-1992 | 09:55:39.68 |
| 8705BFN.DAT;2 | 10 | 21-AUG-1992 | 16:00:00.27 | 8802BS.DAT;4 | 12 | 2-DEC-1988 | 10:09:27.20 |
| 8705BFN.ROB;2 | 14 | 25-AUG-1992 | 09:53:18.83 | 8802CFN.DO1;1 | 88 | 25-AUG-1992 | 10:18:47.60 |
| 8705BS.DAT;14 | 10 | 13-SEP-1988 | 08:58:25.40 | 8802CFN.DAT;2 | 12 | 21-AUG-1992 | 10:45:05.12 |
| 8705CFN.DO1;2 | 137 | 25-AUG-1992 | 10:13:59.72 | 8802CFN.ROB;1 | 15 | 25-AUG-1992 | 10:18:45.47 |
| 8705CFN.DAT;2 | 21 | 21-AUG-1992 | 10:45:01.77 | 8802CS.DAT;5 | 11 | 2-DEC-1988 | 10:24:29.10 |
| 8705CFN.ROB;1 | 27 | 25-AUG-1992 | 10:13:58.18 | 8804AFN.DO1;1 | 91 | 25-AUG-1992 | 09:33:36.21 |
| 8705CS.DAT;19 | 21 | 13-SEP-1988 | 10:35:01.60 | 8804AFN.DAT;2 | 10 | 24-AUG-1992 | 16:29:51.27 |
| 8709AFN.DO1;1 | 87 | 24-AUG-1992 | 20:01:14.61 | 8804AFN.ROB;1 | 12 | 25-AUG-1992 | 09:33:34.77 |
| 8709AFN.DAT;2 | 12 | 24-AUG-1992 | 16:29:49.64 | 8804AS.DAT;8 | 10 | 1-DEC-1988 | 16:04:17.34 |
| 8709AFN.ROB;1 | 15 | 24-AUG-1992 | 20:01:13.15 | 8804BFN.DO1;1 | 95 | 25-AUG-1992 | 09:56:19.13 |
| 8703AFN9.DO1;1 | 100 | 25-AUG-1992 | 14:56:44.43 | 8804BFN.DAT;2 | 12 | 21-AUG-1992 | 16:00:01.92 |
| 8709AS.DAT;11 | 12 | 5-DEC-1988 | 12:03:31.65 | 8804BFN.ROB;1 | 15 | 25-AUG-1992 | 09:56:17.61 |
| 8709BFN.DO1;2 | 86 | 25-AUG-1992 | 09:53:54.98 | 8804BS.DAT;5 | 12 | 1-DEC-1988 | 16:07:30.11 |
| 8709BFN.DAT;2 | 12 | 21-AUG-1992 | 16:00:00.60 | 8804CFN.DO1;1 | 96 | 25-AUG-1992 | 10:19:23.92 |
| 8709BFN.ROB;1 | 15 | 25-AUG-1992 | 09:53:53.53 | 8804CFN.DAT;2 | 13 | 21-AUG-1992 | 10:45:05.84 |

Table 6.1.1. (continued)

Directory DUA3: [CONRAD.RUBY_214]

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| 8804CFN.ROB;1 | 17 | 25-AUG-1992 | 10:19:22.38 | 8807AF.DAT;3 | 27 | 20-JUL-1989 | 14:34:19.51 |
| 8804CS.DAT;5 | 13 | 1-DEC-1988 | 16:15:08.24 | 8807AFN.DO1;1 | 141 | 25-AUG-1992 | 09:35:24.43 |
| 8805AFN.DO1;1 | 126 | 25-AUG-1992 | 09:34:09.80 | 8807AFN.DAT;2 | 27 | 24-AUG-1992 | 16:29:52.41 |
| 8805AFN.DAT;2 | 20 | 24-AUG-1992 | 16:29:51.63 | 8807AFN.ROB;1 | 34 | 25-AUG-1992 | 09:35:22.69 |
| 8805AFN.ROB;1 | 26 | 25-AUG-1992 | 09:34:08.30 | 8807AS.DAT;23 | 27 | 25-NOV-1988 | 10:55:26.92 |
| 8805AS.DAT;8 | 21 | 1-FEB-1989 | 17:30:42.90 | 8807BF.DAT;2 | 26 | 20-JUL-1989 | 14:03:57.26 |
| 8703AF.DAT;3 | 8 | 20-JUL-1989 | 13:55:32.50 | 8807BFN.DO1;2 | 141 | 26-AUG-1992 | 16:33:31.96 |
| 8703BF.DAT;2 | 7 | 20-JUL-1989 | 14:01:56.05 | 8807BFN.DAT;2 | 27 | 21-AUG-1992 | 16:00:03.08 |
| 8703CF.DAT;3 | 7 | 20-JUL-1989 | 14:08:43.62 | 8807BFN.ROB;2 | 33 | 26-AUG-1992 | 16:33:30.30 |
| 8705AF.DAT;3 | 13 | 20-JUL-1989 | 13:55:45.47 | 8807BS.DAT;19 | 26 | 8-FEB-1989 | 13:04:00.53 |
| 8705BF.DAT;2 | 10 | 20-JUL-1989 | 14:02:06.54 | 8807CF.DAT;3 | 41 | 20-JUL-1989 | 15:27:15.63 |
| 8705CF.DAT;2 | 21 | 20-JUL-1989 | 14:09:03.87 | 8807CFN.DO1;1 | 198 | 25-AUG-1992 | 10:21:22.06 |
| 8709AF.DAT;2 | 12 | 20-JUL-1989 | 13:55:57.72 | 8807CFN.DAT;2 | 41 | 21-AUG-1992 | 14:46:22.97 |
| 8709BF.DAT;2 | 12 | 20-JUL-1989 | 14:02:17.27 | 8807CFN.ROB;1 | 52 | 25-AUG-1992 | 10:21:20.12 |
| 8709CF.DAT;2 | 31 | 20-JUL-1989 | 14:09:21.72 | 8807CS.DAT;1 | 41 | 25-NOV-1988 | 11:41:39.39 |
| 8710AF.DAT;2 | 12 | 20-JUL-1989 | 13:56:10.45 | 8808AF.DAT;3 | 23 | 20-JUL-1989 | 13:57:45.08 |
| 8710BF.DAT;2 | 12 | 20-JUL-1989 | 14:02:29.36 | 8808AFN.DO1;1 | 130 | 25-AUG-1992 | 09:36:02.88 |
| 8710CF.DAT;3 | 31 | 20-SEP-1990 | 15:59:46.67 | 8808AFN.DAT;2 | 23 | 24-AUG-1992 | 16:29:52.82 |
| 8801AF.DAT;2 | 13 | 20-JUL-1989 | 13:56:24.70 | 8808AFN.ROB;1 | 30 | 25-AUG-1992 | 09:36:01.28 |
| 8801BF.DAT;2 | 14 | 20-JUL-1989 | 14:02:43.45 | 8808AS.DAT;10 | 23 | 25-NOV-1988 | 15:06:51.27 |
| 8801CF.DAT;2 | 36 | 20-JUL-1989 | 14:09:47.90 | 8808BF.DAT;4 | 20 | 20-JUL-1989 | 14:04:09.03 |
| 8802AF.DAT;2 | 12 | 20-JUL-1989 | 13:56:38.15 | 8808BFN.DO1;2 | 118 | 26-AUG-1992 | 16:34:10.09 |
| 8802BF.DAT;2 | 12 | 20-JUL-1989 | 14:02:53.69 | 8808BFN.DAT;2 | 20 | 21-AUG-1992 | 16:00:03.48 |
| 8802CF.DAT;2 | 11 | 20-JUL-1989 | 14:09:58.63 | 8808BFN.ROB;2 | 25 | 26-AUG-1992 | 16:34:08.46 |
| 8804AF.DAT;2 | 10 | 20-JUL-1989 | 13:56:56.08 | 8808BS.DAT;12 | 19 | 25-NOV-1988 | 15:13:08.63 |
| 8804BF.DAT;3 | 12 | 20-JUL-1989 | 14:03:19.79 | 8808CF.DAT;4 | 46 | 20-JUL-1989 | 16:18:30.45 |
| 8804CF.DAT;2 | 13 | 20-JUL-1989 | 14:10:10.16 | 8808CFN.DO1;1 | 180 | 25-AUG-1992 | 10:22:05.10 |
| 8805AF.DAT;3 | 20 | 20-JUL-1989 | 13:57:06.89 | 8808CFN.DAT;2 | 46 | 21-AUG-1992 | 14:46:23.49 |
| 8805BF.DAT;3 | 20 | 20-JUL-1989 | 14:03:32.76 | 8808CFN.ROB;1 | 58 | 25-AUG-1992 | 10:22:03.29 |
| 8805BFN.DO1;3 | 126 | 1-SEP-1992 | 12:04:35.57 | 8808CK.DAT;1 | 48 | 20-JUL-1989 | 14:10:58.11 |
| 8805BFN.DO1;2 | 126 | 26-AUG-1992 | 16:32:19.09 | 8808CS.DAT;2 | 48 | 7-FEB-1989 | 13:30:07.94 |
| 8805BFN.DAT;3 | 21 | 1-SEP-1992 | 12:03:36.91 | 8809AF.DAT;2 | 28 | 20-JUL-1989 | 13:57:55.08 |
| 8805BFN.DAT;2 | 21 | 21-AUG-1992 | 16:00:02.26 | 8809AFN.DO1;1 | 138 | 25-AUG-1992 | 09:36:40.17 |
| 8805BFN.ROB;5 | 27 | 1-SEP-1992 | 12:04:31.56 | 8809AFN.DAT;2 | 28 | 24-AUG-1992 | 16:29:53.25 |
| 8805BFN.ROB;4 | 27 | 1-SEP-1992 | 12:03:40.44 | 8809AFN.ROB;1 | 35 | 25-AUG-1992 | 09:36:37.63 |
| 8805BFN.ROB;3 | 27 | 1-SEP-1992 | 12:03:00.48 | 8809AS.DAT;15 | 28 | 1-FEB-1989 | 17:29:42.30 |
| 8805BFN.ROB;2 | 27 | 26-AUG-1992 | 16:32:17.60 | 8809BF.DAT;2 | 25 | 20-JUL-1989 | 14:04:22.56 |
| 8805BS.DAT;4 | 20 | 1-DEC-1988 | 13:52:45.70 | 8809BFN.DO1;2 | 132 | 26-AUG-1992 | 16:34:45.55 |
| 8805CF.DAT;5 | 34 | 20-JUL-1989 | 14:10:22.49 | 8809BFN.DAT;2 | 25 | 21-AUG-1992 | 16:00:03.84 |
| 8805CFN.DO1;1 | 183 | 25-AUG-1992 | 10:19:58.72 | 8809BFN.ROB;2 | 31 | 26-AUG-1992 | 16:34:43.90 |
| 8805CFN.DAT;2 | 34 | 21-AUG-1992 | 10:45:06.56 | 8809BS.DAT;13 | 25 | 30-NOV-1988 | 15:08:05.24 |
| 8805CFN.ROB;1 | 42 | 25-AUG-1992 | 10:19:56.91 | 8809CF.DAT;1 | 33 | 24-JUL-1989 | 08:49:28.55 |
| 8805CS.DAT;7 | 36 | 2-DEC-1988 | 09:13:28.68 | 8809CFN.DO1;1 | 146 | 25-AUG-1992 | 10:22:48.61 |
| 8806AF.DAT;2 | 17 | 20-JUL-1989 | 13:57:20.10 | 8809CFN.DAT;2 | 33 | 21-AUG-1992 | 14:46:24.13 |
| 8806AFN.DO1;1 | 107 | 25-AUG-1992 | 09:34:47.56 | 8809CFN.ROB;1 | 41 | 25-AUG-1992 | 10:22:46.83 |
| 8806AFN.DAT;2 | 17 | 24-AUG-1992 | 16:29:52.04 | 8809CK.DAT;1 | 33 | 20-JUL-1989 | 14:11:11.08 |
| 8806AFN.ROB;1 | 21 | 25-AUG-1992 | 09:34:45.97 | 8809CS.DAT;11 | 33 | 30-NOV-1988 | 15:59:33.80 |
| 8806AS.DAT;9 | 17 | 1-DEC-1988 | 09:37:03.10 | 8810AF.DAT;7 | 29 | 20-JUL-1989 | 13:58:20.06 |
| 8806BF.DAT;2 | 19 | 20-JUL-1989 | 14:03:44.13 | 8810AFN.DO1;1 | 138 | 25-AUG-1992 | 09:37:17.14 |
| 8806BFN.DO1;2 | 120 | 26-AUG-1992 | 16:32:55.09 | 8810AFN.DAT;2 | 29 | 24-AUG-1992 | 16:29:53.70 |
| 8806BFN.DAT;2 | 19 | 21-AUG-1992 | 16:00:02.71 | 8810AFN.ROB;1 | 38 | 25-AUG-1992 | 09:37:15.40 |
| 8806BFN.ROB;2 | 24 | 26-AUG-1992 | 16:32:53.59 | 8810AS.DAT;24 | 29 | 1-FEB-1989 | 17:31:32.53 |
| 8806BS.DAT;8 | 19 | 1-DEC-1988 | 10:04:48.94 | 8810BF.DAT;6 | 32 | 20-JUL-1989 | 14:04:34.41 |
| 8806CF.DAT;4 | 22 | 21-JUL-1989 | 07:58:23.05 | 8810BFN.DO1;2 | 156 | 26-AUG-1992 | 16:35:23.39 |
| 8806CFN.DO1;1 | 132 | 25-AUG-1992 | 10:20:40.95 | 8810BFN.DAT;2 | 32 | 21-AUG-1992 | 16:00:04.23 |
| 8806CFN.DAT;2 | 22 | 21-AUG-1992 | 10:45:00.79 | 8810BFN.ROB;2 | 40 | 26-AUG-1992 | 16:35:21.64 |
| 8806CFN.ROB;1 | 28 | 25-AUG-1992 | 10:20:39.14 | 8810BS.DAT;12 | 31 | 19-APR-1989 | 16:53:24.34 |
| 8806CS.DAT;6 | 22 | 1-DEC-1988 | 16:50:16.53 | 8810CF.DAT;2 | 334 | 1-AUG-1989 | 14:46:19.27 |

Table 6.1.1. (continued)

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|---|---|---|---|---|---|---|---|
| 8903AF.DAT;6 | 26 | 20-JUL-1989 | 13:59:07.14 | 8906CF.DAT;2 | 69 | 24-JUL-1989 | 08:34:14.48 |
| 8903AFN.DO1;1 | 132 | 25-AUG-1992 | 09:39:43.17 | 8906CFN.DO1;1 | 229 | 25-AUG-1992 | 10:28:21.92 |
| 8903AFN.DAT;2 | 27 | 24-AUG-1992 | 16:29:56.64 | 8906CFN.DAT;3 | 69 | 24-AUG-1992 | 16:55:16.89 |
| 8903AFN.ROB;1 | 33 | 25-AUG-1992 | 09:39:41.53 | 8906CFN.ROB;1 | 87 | 25-AUG-1992 | 10:28:18.78 |
| 8903AS.DAT;18 | 26 | 17-JUL-1989 | 12:08:09.42 | 8906CK.DAT;1 | 70 | 21-JUL-1989 | 12:05:21.60 |
| 8903BF.DAT;5 | 25 | 25-JUL-1989 | 09:07:39.76 | 8906CS.DAT;39 | 70 | 20-JUL-1989 | 14:13:16.85 |
| 8903BFN.DO1;1 | 126 | 25-AUG-1992 | 10:02:50.12 | 8906CS.ROB;11 | 87 | 31-MAY-1990 | 12:35:14.16 |
| 8903BFN.DAT;2 | 25 | 21-AUG-1992 | 16:00:09.55 | 8703AFN9.DAT;2 | 8 | 24-AUG-1992 | 16:45:23.89 |
| 8903BFN.ROB;1 | 31 | 25-AUG-1992 | 10:02:48.54 | 8703AFN9.ROB;5 | 10 | 25-AUG-1992 | 14:56:42.99 |
| 8903BS.DAT;12 | 25 | 2-MAY-1989 | 15:45:30.27 | 8703BFN9.DO1;1 | 105 | 25-AUG-1992 | 15:09:45.76 |
| 8903CF.DAT;5 | 26 | 20-JUL-1989 | 14:12:10.57 | 8703BFN9.DAT;2 | 7 | 26-AUG-1992 | 16:17:42.30 |
| 8903CFN.DO1;1 | 135 | 25-AUG-1992 | 10:26:12.61 | 8703BFN9.ROB;1 | 9 | 25-AUG-1992 | 15:09:44.27 |
| 8903CFN.DAT;2 | 26 | 21-AUG-1992 | 14:46:28.57 | 8703CFN9.DO1;1 | 96 | 25-AUG-1992 | 15:23:16.85 |
| 8903CFN.ROB;1 | 33 | 25-AUG-1992 | 10:26:10.96 | 8703CFN9.DAT;1 | 7 | 24-AUG-1992 | 16:51:08.45 |
| 8903CS.DAT;14 | 26 | 3-MAY-1989 | 13:45:54.06 | 8703CFN9.ROB;1 | 8 | 25-AUG-1992 | 15:23:15.37 |
| 8904AF.DAT;6 | 25 | 21-JUL-1989 | 13:35:16.32 | 8705AFN9.DO1;1 | 106 | 25-AUG-1992 | 14:57:23.51 |
| 8904AFN.DO1;1 | 134 | 25-AUG-1992 | 09:40:20.87 | 8705AFN9.DAT;1 | 13 | 24-AUG-1992 | 16:45:26.70 |
| 8904AFN.DAT;2 | 25 | 24-AUG-1992 | 16:30:02.32 | 8705AFN9.ROB;1 | 17 | 25-AUG-1992 | 14:57:21.88 |
| 8904AFN.ROB;1 | 32 | 25-AUG-1992 | 09:40:19.27 | 8705BFN9.DO1;1 | 95 | 25-AUG-1992 | 15:10:22.71 |
| 8904AS.DAT;8 | 25 | 25-MAY-1989 | 13:08:09.42 | 8705BFN9.DAT;1 | 10 | 24-AUG-1992 | 16:46:41.09 |
| 8904BF.DAT;8 | 31 | 21-JUL-1989 | 11:43:55.95 | 8705BFN9.ROB;1 | 14 | 25-AUG-1992 | 15:10:21.22 |
| 8904BFN.DO1;1 | 148 | 25-AUG-1992 | 10:03:27.76 | 8705CFN9.DO1;1 | 137 | 25-AUG-1992 | 15:23:55.33 |
| 8904BFN.DAT;2 | 31 | 21-AUG-1992 | 16:00:10.59 | 8705CFN9.DAT;1 | 21 | 24-AUG-1992 | 16:51:13.85 |
| 8904BFN.ROB;1 | 40 | 25-AUG-1992 | 10:03:25.99 | 8705CFN9.ROB;1 | 27 | 25-AUG-1992 | 15:23:53.76 |
| 8904BS.DAT;17 | 31 | 25-MAY-1989 | 13:07:09.30 | 8709AFN9.DO1;1 | 87 | 25-AUG-1992 | 14:58:02.48 |
| 8904CF.DAT;16 | 62 | 20-JUL-1989 | 15:57:24.81 | 8709AFN9.DAT;1 | 12 | 24-AUG-1992 | 16:45:29.33 |
| 8904CFN.DO1;1 | 220 | 25-AUG-1992 | 10:26:56.28 | 8709AFN9.ROB;1 | 15 | 25-AUG-1992 | 14:58:00.90 |
| 8904CFN.DAT;2 | 62 | 21-AUG-1992 | 14:46:28.95 | 8709BFN9.DO1;1 | 86 | 25-AUG-1992 | 15:10:59.33 |
| 8904CFN.ROB;1 | 78 | 25-AUG-1992 | 10:26:54.29 | 8709BFN9.DAT;1 | 12 | 24-AUG-1992 | 16:46:43.73 |
| 8904CK.DAT;2 | 65 | 21-JUL-1989 | 11:43:08.96 | 8709BFN9.ROB;1 | 15 | 25-AUG-1992 | 15:10:57.85 |
| 8904CS.DAT;22 | 64 | 25-MAY-1989 | 13:09:55.24 | 8709CFN9.DO1;1 | 147 | 25-AUG-1992 | 15:24:37.25 |
| 8905AF.DAT;9 | 25 | 21-JUL-1989 | 09:38:39.06 | 8709CFN9.DAT;1 | 32 | 24-AUG-1992 | 16:51:18.56 |
| 8905AFN.DO1;1 | 127 | 25-AUG-1992 | 09:40:57.88 | 8709CFN9.ROB;1 | 40 | 25-AUG-1992 | 15:24:35.44 |
| 8905AFN.DAT;2 | 25 | 24-AUG-1992 | 16:29:47.90 | 8710AFN9.DO1;1 | 91 | 25-AUG-1992 | 14:58:39.90 |
| 8905AFN.ROB;1 | 32 | 25-AUG-1992 | 09:40:56.33 | 8710AFN9.DAT;1 | 12 | 24-AUG-1992 | 16:45:31.97 |
| 8905AS.DAT;14 | 25 | 22-JAN-1990 | 16:03:28.93 | 8710AFN9.ROB;1 | 15 | 25-AUG-1992 | 14:58:38.34 |
| 8905BF.DAT;9 | 61 | 25-JUL-1989 | 09:07:06.94 | 8710BFN9.DO1;1 | 87 | 25-AUG-1992 | 15:11:35.66 |
| 8905BFN.DO1;2 | 242 | 26-AUG-1992 | 16:37:17.69 | 8710BFN9.DAT;1 | 12 | 24-AUG-1992 | 16:46:47.56 |
| 8905BFN.DAT;4 | 61 | 26-AUG-1992 | 16:14:49.36 | 8710BFN9.ROB;1 | 15 | 25-AUG-1992 | 15:11:34.17 |
| 8905BFN.ROB;2 | 76 | 26-AUG-1992 | 16:37:15.49 | 8710CFN9.DO1;1 | 146 | 25-AUG-1992 | 15:25:20.12 |
| 8905BS.DAT;39 | 60 | 16-JUN-1989 | 09:20:54.01 | 8710CFN9.DAT;1 | 31 | 24-AUG-1992 | 16:51:23.21 |
| 8905CF.DAT;7 | 25 | 21-JUL-1989 | 14:39:20.60 | 8710CFN9.ROB;1 | 39 | 25-AUG-1992 | 15:25:18.39 |
| 8905CFN.DO1;1 | 132 | 25-AUG-1992 | 10:27:42.76 | 8801AFN9.DO1;1 | 93 | 25-AUG-1992 | 14:59:14.46 |
| 8905CFN.DAT;3 | 25 | 2-SEP-1992 | 15:10:15.02 | 8801AFN9.DAT;1 | 13 | 24-AUG-1992 | 16:45:34.78 |
| 8905CFN.DAT;2 | 25 | 21-AUG-1992 | 14:46:29.58 | 8801AFN9.ROB;1 | 17 | 25-AUG-1992 | 14:59:12.92 |
| 8905CFN.ROB;2 | 32 | 2-SEP-1992 | 15:10:31.95 | 8801BFN9.DO1;1 | 94 | 25-AUG-1992 | 15:12:11.98 |
| 8905CFN.ROB;1 | 32 | 25-AUG-1992 | 10:27:41.22 | 8801BFN9.DAT;1 | 14 | 24-AUG-1992 | 16:46:50.48 |
| 8905CS.DAT;10 | 25 | 15-JUN-1989 | 09:16:07.74 | 8801BFN9.ROB;1 | 18 | 25-AUG-1992 | 15:12:10.33 |
| 8906AF.DAT;1 | 23 | 21-JUL-1989 | 12:05:04.57 | 8801CFN9.DO1;1 | 155 | 25-AUG-1992 | 15:26:02.92 |
| 8906AFN.DO1;1 | 125 | 25-AUG-1992 | 09:41:32.99 | 8801CFN9.DAT;1 | 36 | 24-AUG-1992 | 16:51:28.45 |
| 8906AFN.DAT;2 | 23 | 24-AUG-1992 | 16:30:05.12 | 8801CFN9.ROB;1 | 45 | 25-AUG-1992 | 15:26:01.03 |
| 8906AFN.ROB;1 | 29 | 25-AUG-1992 | 09:41:31.37 | 8802AFN9.DO1;1 | 88 | 25-AUG-1992 | 14:59:52.05 |
| 8906AS.DAT;30 | 23 | 20-JUL-1989 | 13:59:46.08 | 8802AFN9.DAT;1 | 12 | 24-AUG-1992 | 16:45:37.51 |
| 8906BF.DAT;1 | 55 | 21-JUL-1989 | 12:05:12.23 | 8802AFN9.ROB;1 | 15 | 25-AUG-1992 | 14:59:50.52 |
| 8906BFN.DO1;2 | 231 | 26-AUG-1992 | 16:38:03.65 | 8802BFN9.DO1;1 | 88 | 25-AUG-1992 | 15:12:49.09 |
| 8906BFN.DAT;3 | 55 | 26-AUG-1992 | 16:15:17.84 | 8802BFN9.DAT;1 | 12 | 24-AUG-1992 | 16:46:53.25 |
| 8906BFN.ROB;2 | 69 | 26-AUG-1992 | 16:38:01.46 | 8802BFN9.ROB;1 | 15 | 25-AUG-1992 | 15:12:47.60 |
| 8906BS.DAT;29 | 55 | 20-JUL-1989 | 09:46:15.67 | 8802CFN9.DO1;1 | 88 | 25-AUG-1992 | 15:26:44.85 |

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| 8802CFN9.DAT;1 | 12 | 24-AUG-1992 16:51:31.09 | 8810AFN9.ROB;1 | 38 | 25-AUG-1992 15:04:23.42 |
| 8802CFN9.ROB;1 | 15 | 25-AUG-1992 15:26:43.31 | 8810BFN9.DO1;1 | 152 | 25-AUG-1992 15:17:24.77 |
| 8804AFN9.DO1;1 | 92 | 25-AUG-1992 15:00:29.65 | 8810BFN9.DAT;1 | 32 | 24-AUG-1992 16:47:20.17 |
| 8804AFN9.DAT;1 | 10 | 24-AUG-1992 16:45:39.97 | 8810BFN9.ROB;1 | 40 | 25-AUG-1992 15:17:23.01 |
| 8804AFN9.ROB;1 | 12 | 25-AUG-1992 15:00:28.17 | 8810CFN9.DO1;1 | 127 | 25-AUG-1992 15:31:46.08 |
| 8804BFN9.DO1;1 | 95 | 25-AUG-1992 15:13:26.77 | 8810CFN9.DAT;1 | 27 | 24-AUG-1992 16:52:05.61 |
| 8804BFN9.DAT;1 | 12 | 24-AUG-1992 16:46:56.07 | 8810CFN9.ROB;1 | 33 | 25-AUG-1992 15:31:44.53 |
| 8804BFN9.ROB;1 | 15 | 25-AUG-1992 15:13:25.20 | 8811AFN9.DO1;1 | 143 | 25-AUG-1992 15:05:08.03 |
| 8804CFN9.DO1;1 | 96 | 25-AUG-1992 15:27:23.55 | 8811AFN9.DAT;1 | 29 | 24-AUG-1992 16:46:08.16 |
| 8804CFN9.DAT;1 | 13 | 24-AUG-1992 16:51:34.04 | 8811AFN9.ROB;1 | 38 | 25-AUG-1992 15:05:06.30 |
| 8804CFN9.ROB;1 | 17 | 25-AUG-1992 15:27:21.98 | 8811BFN9.DO1;1 | 139 | 25-AUG-1992 15:18:07.61 |
| 8805AFN9.DO1;1 | 126 | 25-AUG-1992 15:01:06.37 | 8811BFN9.DAT;1 | 29 | 24-AUG-1992 16:47:24.79 |
| 8805AFN9.DAT;1 | 20 | 24-AUG-1992 16:45:43.43 | 8811BFN9.ROB;1 | 37 | 25-AUG-1992 15:18:05.89 |
| 8805AFN9.ROB;1 | 26 | 25-AUG-1992 15:01:04.80 | 8811CFN9.DO1;1 | 149 | 25-AUG-1992 15:32:28.92 |
| 8805BFN9.DO1;2 | 130 | 1-SEP-1992 12:05:31.64 | 8811CFN9.DAT;1 | 31 | 24-AUG-1992 16:52:10.32 |
| 8805BFN9.DAT;2 | 21 | 1-SEP-1992 12:04:21.08 | 8811CFN9.ROB;1 | 39 | 25-AUG-1992 15:32:27.25 |
| 8805BFN9.ROB;2 | 27 | 1-SEP-1992 12:05:27.36 | 8901AFN9.DO1;1 | 131 | 25-AUG-1992 15:05:48.98 |
| 8805CFN9.DO1;1 | 179 | 25-AUG-1992 15:28:02.53 | 8901AFN9.DAT;1 | 25 | 24-AUG-1992 16:46:15.04 |
| 8805CFN9.DAT;1 | 34 | 24-AUG-1992 16:51:39.02 | 8901AFN9.ROB;1 | 32 | 25-AUG-1992 15:05:47.33 |
| 8805CFN9.ROB;1 | 42 | 25-AUG-1992 15:28:00.81 | 8901BFN9.DO1;1 | 122 | 25-AUG-1992 15:18:49.69 |
| 8806AFN9.DO1;1 | 107 | 25-AUG-1992 15:01:45.88 | 8901BFN9.DAT;2 | 22 | 26-AUG-1992 16:17:00.30 |
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| 8806BFN9.DO1;1 | 120 | 25-AUG-1992 15:14:43.56 | 8901CFN9.DAT;1 | 48 | 24-AUG-1992 16:52:16.70 |
| 8806BFN9.DAT;1 | 19 | 24-AUG-1992 16:47:03.21 | 8901CFN9.ROB;1 | 61 | 25-AUG-1992 15:33:08.97 |
| 8806BFN9.ROB;1 | 24 | 25-AUG-1992 15:14:41.91 | 8902AFN9.DO1;1 | 112 | 25-AUG-1992 15:06:30.97 |
| 8806CFN9.DO1;1 | 132 | 25-AUG-1992 15:28:48.39 | 8902AFN9.DAT;1 | 18 | 24-AUG-1992 16:46:18.37 |
| 8806CFN9.DAT;1 | 22 | 24-AUG-1992 16:51:43.98 | 8902AFN9.ROB;1 | 23 | 25-AUG-1992 15:06:29.23 |
| 8806CFN9.ROB;1 | 28 | 25-AUG-1992 15:28:46.86 | 8902BFN9.DO1;1 | 145 | 25-AUG-1992 15:19:30.16 |
| 8807AFN9.DO1;1 | 141 | 25-AUG-1992 15:02:23.75 | 8902BFN9.DAT;2 | 31 | 26-AUG-1992 16:17:02.46 |
| 8807AFN9.DAT;1 | 27 | 24-AUG-1992 16:45:50.85 | 8902BFN9.ROB;1 | 40 | 25-AUG-1992 15:19:28.36 |
| 8807AFN9.ROB;1 | 34 | 25-AUG-1992 15:02:21.99 | 8902CFN9.DO1;1 | 180 | 25-AUG-1992 15:33:55.27 |
| 8807BFN9.DO1;1 | 141 | 25-AUG-1992 15:15:23.08 | 8902CFN9.DAT;1 | 50 | 24-AUG-1992 16:52:23.38 |
| 8807BFN9.DAT;1 | 27 | 24-AUG-1992 16:47:07.34 | 8902CFN9.ROB;1 | 63 | 25-AUG-1992 15:33:53.39 |
| 8807BFN9.ROB;1 | 33 | 25-AUG-1992 15:15:21.43 | 8903AFN9.DO1;1 | 135 | 25-AUG-1992 15:07:07.93 |
| 8807CFN9.DO1;1 | 195 | 25-AUG-1992 15:29:29.65 | 8903AFN9.DAT;1 | 27 | 24-AUG-1992 16:46:22.53 |
| 8807CFN9.DAT;1 | 41 | 24-AUG-1992 16:51:50.00 | 8903AFN9.ROB;1 | 33 | 25-AUG-1992 15:07:06.28 |
| 8807CFN9.ROB;1 | 52 | 25-AUG-1992 15:29:27.73 | 8903BFN9.DO1;1 | 126 | 25-AUG-1992 15:20:12.16 |
| 8808AFN9.DO1;1 | 130 | 25-AUG-1992 15:03:05.48 | 8903BFN9.DAT;1 | 25 | 24-AUG-1992 16:47:37.62 |
| 8808AFN9.DAT;1 | 23 | 24-AUG-1992 16:45:54.70 | 8903BFN9.ROB;1 | 31 | 25-AUG-1992 15:20:10.51 |
| 8808AFN9.ROB;1 | 30 | 25-AUG-1992 15:03:03.91 | 8903CFN9.DO1;1 | 135 | 25-AUG-1992 15:34:38.39 |
| 8808BFN9.DO1;1 | 118 | 25-AUG-1992 15:16:03.71 | 8903CFN9.DAT;1 | 26 | 24-AUG-1992 16:52:27.95 |
| 8808BFN9.DAT;1 | 20 | 24-AUG-1992 16:47:11.03 | 8903CFN9.ROB;1 | 33 | 25-AUG-1992 15:34:36.74 |
| 8808BFN9.ROB;1 | 25 | 25-AUG-1992 15:16:02.14 | 8904AFN9.DO1;1 | 134 | 25-AUG-1992 15:07:47.45 |
| 8808CFN9.DO1;1 | 177 | 25-AUG-1992 15:30:18.24 | 8904AFN9.DAT;1 | 25 | 24-AUG-1992 16:46:26.46 |
| 8808CFN9.DAT;1 | 46 | 24-AUG-1992 16:51:56.47 | 8904AFN9.ROB;1 | 32 | 25-AUG-1992 15:07:45.80 |
| 8808CFN9.ROB;1 | 58 | 25-AUG-1992 15:30:16.37 | 8904BFN9.DO1;1 | 148 | 25-AUG-1992 15:20:52.96 |
| 8809AFN9.DO1;1 | 138 | 25-AUG-1992 15:03:45.06 | 8904BFN9.DAT;2 | 31 | 24-AUG-1992 16:50:51.42 |
| 8809AFN9.DAT;1 | 28 | 24-AUG-1992 16:45:59.06 | 8904BFN9.ROB;1 | 40 | 25-AUG-1992 15:20:50.99 |
| 8809AFN9.ROB;1 | 35 | 25-AUG-1992 15:03:43.34 | 8904CFN9.DO1;1 | 214 | 25-AUG-1992 15:35:20.14 |
| 8809BFN9.DO1;1 | 128 | 25-AUG-1992 15:16:44.19 | 8904CFN9.DAT;1 | 62 | 24-AUG-1992 16:52:36.09 |
| 8809BFN9.DAT;1 | 25 | 24-AUG-1992 16:47:15.20 | 8904CFN9.ROB;1 | 78 | 25-AUG-1992 15:35:18.10 |
| 8809BFN9.ROB;1 | 31 | 25-AUG-1992 15:16:42.54 | 8905AFN9.DO1;1 | 127 | 25-AUG-1992 15:08:27.20 |
| 8809CFN9.DO1;1 | 146 | 25-AUG-1992 15:31:02.01 | 8905AFN9.DAT;1 | 25 | 24-AUG-1992 16:46:30.55 |
| 8809CFN9.DAT;1 | 33 | 24-AUG-1992 16:52:01.34 | 8905AFN9.ROB;1 | 32 | 25-AUG-1992 15:08:25.63 |
| 8809CFN9.ROB;1 | 41 | 25-AUG-1992 15:31:00.20 | 8905BFN9.DO1;1 | 239 | 25-AUG-1992 15:21:37.68 |
| 8810AFN9.DO1;1 | 141 | 25-AUG-1992 15:04:25.15 | 8905BFN9.DAT;2 | 61 | 26-AUG-1992 16:17:01.81 |
| 8810AFN9.DAT;1 | 29 | 24-AUG-1992 16:46:03.59 | 8905BFN9.ROB;1 | 76 | 25-AUG-1992 15:21:35.62 |

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| 8906BFN9.DO1;1 | 225 | 25-AUG-1992 | 15:22:27.91 | 8810CK.DAT;1 | 28 | 20-JUL-1989 | 14:11:22.29 |
| 8906BFN9.DAT;2 | 55 | 26-AUG-1992 | 16:17:01.20 | 8810CS.DAT;15 | 28 | 8-FEB-1989 | 15:42:51.19 |
| 8906BFN9.ROB;1 | 69 | 25-AUG-1992 | 15:22:25.78 | 8811AF.DAT;5 | 29 | 20-JUL-1989 | 13:58:34.55 |
| 8906AFN9.DO1;1 | 125 | 25-AUG-1992 | 15:09:05.41 | 8811AFN.DO1;1 | 142 | 25-AUG-1992 | 09:37:54.21 |
| 8906AFN9.DAT;1 | 23 | 24-AUG-1992 | 16:46:35.43 | 8811AFN.DAT;2 | 29 | 24-AUG-1992 | 16:29:54.21 |
| 8906AFN9.ROB;1 | 29 | 25-AUG-1992 | 15:09:03.71 | 8811AFN.ROB;1 | 38 | 25-AUG-1992 | 09:37:52.34 |
| 8906CFN9.DO1;1 | 220 | 25-AUG-1992 | 15:36:47.65 | 8811AS.DAT;19 | 29 | 8-FEB-1989 | 13:26:09.31 |
| 8906CFN9.DAT;1 | 69 | 24-AUG-1992 | 16:58:07.62 | 8811BF.DAT;7 | 29 | 25-JUL-1989 | 09:06:39.24 |
| 8906CFN9.ROB;1 | 87 | 25-AUG-1992 | 15:36:45.61 | 8811BFN.DO1;1 | 139 | 25-AUG-1992 | 10:00:49.97 |
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| DP84.DAT;2 | 21 | 15-SEP-1987 | 10:44:16.00 | 8811BFN.ROB;1 | 37 | 25-AUG-1992 | 10:00:48.23 |
| DP85.DAT;3 | 21 | 15-SEP-1987 | 10:44:51.00 | 8811BS.DAT;26 | 29 | 8-FEB-1989 | 13:09:01.30 |
| INJ8705.DAT;6 | 12 | 23-JUN-1989 | 11:20:49.78 | 8811CF.DAT;5 | 31 | 20-JUL-1989 | 14:11:32.78 |
| INJ8709.DAT;1 | 31 | 19-JUN-1989 | 14:24:15.08 | 8811CFN.DO1;1 | 149 | 25-AUG-1992 | 10:24:06.05 |
| INJ8710.DAT;1 | 31 | 19-JUN-1989 | 14:24:33.26 | 8811CFN.DAT;2 | 31 | 21-AUG-1992 | 14:46:25.04 |
| INJ8801.DAT;1 | 36 | 19-JUN-1989 | 14:24:59.76 | 8811CFN.ROB;1 | 39 | 25-AUG-1992 | 10:24:04.24 |
| INJ8805.DAT;1 | 34 | 19-JUN-1989 | 14:25:24.26 | 8811CS.DAT;13 | 31 | 8-FEB-1989 | 13:32:19.08 |
| INJ8806.DAT;1 | 22 | 19-JUN-1989 | 14:25:40.05 | 8901AF.DAT;7 | 25 | 20-JUL-1989 | 13:58:45.76 |
| INJ8807.DAT;1 | 41 | 19-JUN-1989 | 14:25:54.53 | 8901AFN.DO1;1 | 131 | 25-AUG-1992 | 09:38:31.64 |
| INJ8808.DAT;1 | 48 | 19-JUN-1989 | 14:26:12.76 | 8901AFN.DAT;2 | 25 | 24-AUG-1992 | 16:29:54.62 |
| INJ8809.DAT;1 | 33 | 19-JUN-1989 | 14:26:23.43 | 8901AFN.ROB;1 | 32 | 25-AUG-1992 | 09:38:30.02 |
| INJ8810.DAT;1 | 28 | 19-JUN-1989 | 14:26:42.87 | 8901AS.DAT;33 | 25 | 9-FEB-1989 | 14:20:38.46 |
| INJ8901.DAT;5 | 33 | 23-JUN-1989 | 13:25:16.61 | 8901BF.DAT;6 | 22 | 20-JUL-1989 | 14:04:58.26 |
| INJ8902.DAT;1 | 52 | 19-JUN-1989 | 14:27:19.57 | 8901BFN.DO1;2 | 127 | 26-AUG-1992 | 16:36:02.82 |
| INJ8904.DAT;1 | 64 | 19-JUN-1989 | 14:27:31.65 | 8901BFN.DAT;3 | 22 | 26-AUG-1992 | 16:12:28.10 |
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| IJ98705N.DAT;1 | 12 | 14-AUG-1992 | 10:53:41.01 | 8901BFN.ROB;3 | 29 | 2-SEP-1992 | 15:21:26.59 |
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| IJ98709N.DO1;1 | 147 | 17-AUG-1992 | 20:09:19.03 | 8901BS.DAT;20 | 22 | 9-FEB-1989 | 14:29:52.28 |
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| IJ98709N.ROB;2 | 40 | 17-AUG-1992 | 20:09:17.40 | 8901CFN.DO1;1 | 178 | 25-AUG-1992 | 10:24:46.37 |
| IJ98710N.DO1;1 | 147 | 17-AUG-1992 | 20:09:58.04 | 8901CFN.DAT;2 | 48 | 21-AUG-1992 | 14:46:25.47 |
| IJ98710N.DAT;2 | 31 | 17-AUG-1992 | 10:48:36.02 | 8901CFN.ROB;1 | 61 | 25-AUG-1992 | 10:24:44.48 |
| IJ98710N.ROB;2 | 39 | 17-AUG-1992 | 20:09:56.02 | 8901CK.DAT;2 | 52 | 24-JUL-1989 | 09:15:30.03 |
| IJ98801N.DO1;1 | 156 | 17-AUG-1992 | 20:10:37.41 | 8901CS.DAT;31 | 52 | 9-FEB-1989 | 14:43:42.37 |
| IJ98801N.DAT;1 | 36 | 14-AUG-1992 | 10:55:05.26 | 8901TES.DAT;2 | 27 | 19-JUN-1990 | 14:30:39.87 |
| IJ98801N.ROB;2 | 45 | 17-AUG-1992 | 20:10:35.68 | 8901TES.ROB;9 | 31 | 20-JUN-1990 | 15:29:29.18 |
| IJ98805N.DO1;1 | 181 | 17-AUG-1992 | 20:11:17.12 | 8901TST.DAT;19 | 27 | 13-JUN-1990 | 09:03:12.62 |
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| IJ98806N.DAT;1 | 22 | 14-AUG-1992 | 10:55:50.23 | 8902AFN.DAT;2 | 18 | 24-AUG-1992 | 16:29:56.24 |
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| IJ98807N.ROB;2 | 52 | 17-AUG-1992 | 20:12:38.85 | 8902BFN.DO1;2 | 145 | 26-AUG-1992 | 16:36:39.26 |
| IJ98808N.DO1;1 | 204 | 17-AUG-1992 | 20:13:23.05 | 8902BFN.DAT;3 | 31 | 26-AUG-1992 | 16:13:24.73 |
| IJ98808N.DAT;1 | 48 | 14-AUG-1992 | 10:56:29.02 | 8902BFN.ROB;2 | 40 | 26-AUG-1992 | 16:36:37.56 |
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| IJ98809N.DAT;2 | 33 | 17-AUG-1992 | 10:51:21.60 | 8902CFN.DO1;1 | 183 | 25-AUG-1992 | 10:25:30.06 |
| IJ98809N.ROB;3 | 42 | 17-AUG-1992 | 20:14:05.12 | 8902CFN.DAT;2 | 50 | 21-AUG-1992 | 14:46:26.05 |
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| IJ98810N.DAT;4 | 28 | 17-AUG-1992 | 10:55:32.81 | 8902CK.DAT;1 | 52 | 20-JUL-1989 | 14:11:58.16 |
| IJ98810N.ROB;3 | 35 | 17-AUG-1992 | 20:14:45.14 | 8902CS.DAT;22 | 52 | 11-APR-1989 | 14:13:01.87 |

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INJ8904N.ROB;9           80  17-AUG-1992 20:07:56.91
INJ8789T.DAT;5          458  17-AUG-1992 11:31:05.83
INJ8789T.ROB;7          574  24-AUG-1992 12:09:28.47
INJC07.DAT;16            22  23-SEP-1988 15:12:59.26
INJC08.DAT;19            33  30-NOV-1988 12:20:39.63
INJC08.ROB;1             41  30-JUL-1992 14:21:39.96

Total of 869 files, 92677 blocks.
```

Table 6.1.2. HFR VAX-4300 directory listing of experiment D214.01
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

Directory DUA3: [CONRAD.RUBY_214DACOS]

```
D2148703.DAT;11          569  14-NOV-1991 11:16:39.52
D2148705.DAT;8          3467  14-NOV-1991 10:23:32.36
D2148709.DAT;12         2735  14-NOV-1991 11:34:26.16
D2148709_CORR.DAT;25    3269  29-JUN-1990 14:37:24.14
D2148710.DAT;10         3479  14-NOV-1991 11:35:09.27
D2148710_CORR.DAT;1     4159  29-JUN-1990 14:39:39.31
D2148801.DAT;9          3515  14-NOV-1991 10:00:16.48
D2148801_CORR.DAT;1     4202  29-JUN-1990 14:41:06.91
D2148802.DAT;7          3468  14-NOV-1991 10:19:34.74
D2148804.DAT;5          3486  14-NOV-1991 10:18:25.17
D2148805.DAT;3          3439  13-NOV-1991 10:46:45.73
D2148806.DAT;5          3359  14-NOV-1991 10:16:25.97
D2148807.DAT;5          2876  14-NOV-1991 10:15:19.87
D2148808.DAT;5          2914  14-NOV-1991 10:14:21.38
D2148809.DAT;7          2921  14-NOV-1991 10:12:18.01
D2148810.DAT;3          2872  27-JUL-1989 13:14:47.37
D2148811.DAT;3          2920  14-NOV-1991 10:10:39.64
D2148901.DAT;3          2948  14-NOV-1991 10:09:27.42
D2148902.DAT;3          3098  14-NOV-1991 10:02:11.20
D2148903.DAT;5          2948  14-NOV-1991 10:04:14.97
D2148904.DAT;3          3154  14-NOV-1991 10:05:55.43
D2148905.DAT;3          2948  14-NOV-1991 10:07:21.89
D2148906.DAT;5          3144  14-NOV-1991 10:08:17.16
D214ABC8703.DAT;12       258  15-NOV-1991 16:49:57.96
D214ABC8705.DAT;8        263  18-NOV-1991 17:05:52.15
D214ABC8709.DAT;4       1242  15-NOV-1991 16:41:52.08
D214ABC8710.DAT;5       1580  15-NOV-1991 16:42:36.13
D214ABC8801.DAT;3       1597  25-JUL-1989 13:30:40.53
D214ABC8802.DAT;3       1575  25-JUL-1989 13:31:48.82
D214ABC8804.DAT;7       1576  26-JUL-1989 09:43:37.73
D214ABC8805.DAT;3       1562  25-JUL-1989 14:20:19.41
D214ABC8806.DAT;6       1523  26-JUL-1989 09:18:01.05
D214ABC8807.DAT;4       1305  26-JUL-1989 09:21:05.75
D214ABC8808.DAT;2       1324  25-JUL-1989 14:26:16.47
D214ABC8809.DAT;3       1327  26-JUL-1989 12:24:46.70
D214ABC8810.DAT;4       1304  26-JUL-1989 12:25:30.74
D214ABC8811.DAT;4       1325  25-JUL-1989 14:53:26.00
D214ABC8901.DAT;2       1339  25-JUL-1989 13:16:22.34
D214ABC8902.DAT;3       1405  26-JUL-1989 09:24:14.43
D214ABC8903.DAT;2       1338  25-JUL-1989 13:22:48.69
D214ABC8904.DAT;2       1432  25-JUL-1989 13:26:52.94
D214ABC8905.DAT;2       1339  25-JUL-1989 14:05:01.26
D214ABC8906.DAT;7       1429   2-AUG-1989 09:46:04.14
REAPWR_C8709.DAT;1       251  12-JUN-1990 11:30:35.00
REAPWR_C8710.DAT;1       319  12-JUN-1990 09:20:00.00
REAPWR_C8801.DAT;1       323  11-JUN-1990 16:10:26.00
SWEEP8703.DAT;3          165   4-AUG-1989 08:59:50.78
SWEEP8705.DAT;2          131   4-AUG-1989 08:47:02.68
SWEEP8709.DAT;1          786  19-JUL-1989 00:00:00.00
SWEEP8710.DAT;2         1000   4-AUG-1989 08:39:25.99
SWEEP8801.DAT;3         1011   4-AUG-1989 08:40:03.43
SWEEP8802.DAT;1          997   4-MAR-1988 00:00:00.00
SWEEP8804.DAT;1         1002  26-MAY-1988 00:00:00.00
SWEEP8805.DAT;1          989  24-JUN-1988 00:00:00.00
SWEEP8806.DAT;1          966  18-JUL-1988 00:00:00.00
SWEEP8807.DAT;1          827   5-OCT-1988 00:00:00.00
SWEEP8808.DAT;1          838  31-OCT-1988 00:00:00.00
SWEEP8809.DAT;1          841  22-NOV-1988 00:00:00.00
SWEEP8810.DAT;1          826  13-DEC-1988 00:00:00.00
SWEEP8811.DAT;1          839  10-JAN-1989 00:00:00.00
SWEEP8901.DAT;1          847   8-FEB-1989 00:00:00.00
SWEEP8902.DAT;1          890   7-MAR-1989 00:00:00.00
SWEEP8903.DAT;1          847  26-APR-1989 00:00:00.00
SWEEP8904.DAT;1          907  23-MAY-1989 00:00:00.00
SWEEP8905.DAT;1          847  15-JUN-1989 00:00:00.00
SWEEP8906.DAT;2          905   4-AUG-1989 08:32:14.54

Total of 523 files, 166493 blocks.
```

## 6.2 REPRESENTATIVE TEMPERATURE DATA

Representative temperatures (see Sect. 4.2) have been chosen for selected times. Used in conjunction with the time intervals of constant temperature, these temperatures provide a convenience in analysis. The temperatures have been chosen for all 54 TCs employed in the HFR-B1 experiment. See also Figs. 4.2.1, 4.2.2, and 4.2.3. The data are presented in Tables 6.2.1, 6.2.2, and 6.2.3 for capsules 1, 2, and 3, respectively. On these tables, the data include:

the cycle number,

the date and time,

the number of EFPD,

the orientation (with respect to a reference north and corresponding south),

the relative location of the VDUs,

the neon content (%) of the purge gas,

the power (MW),

the control rod position with respect to the central reactor top lid (Crtl),

the TC number (TC No.), and

the TC responses (°C).

Table 6.2.1. Capsule 1: Representative temperatures at selected times, capsule and control rod position, gas composition and reactor power

*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| Cycle | 87.03 | | | 87.05 | | | 87.09 | | 87.10 | | 88.01 | | 88.02 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | 13.04 | 22.04 | 4.05 | 8.06 | 9.06 | 29.06 | 28.10 | 16.11 | 20.11 | 14.12 | 11.01 | 1.02 | 4.02 | 29.02 |
| Time | 8.36 | 11.24 | 14.48 | 12.34 | 15.10 | 11.18 | 8.06 | 14.00 | 8.40 | 10.16 | 10.00 | 14.46 | 12.54 | 11.30 |
| FPD | 4 | 10 | 23 | 26 | 27 | 46 | 47 | 66 | 67 | 91 | 96 | 117 | 118 | 142 |
| Orient. | F 8 N | | | F 8 S | | | F 8 N | | F 8 S | | F 2 S | | F 2 N | |
| VDU | +93 | +118 | +118 | +255 | +255 | +255 | +110 | +110 | +110 | +110 | +65 | +65 | +65 | +65 |
| %Ne | 0 | 0 | 0 | 0 | 86 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MW | 45 | | | 45 | | | 45 | | | 45 | 47.5 | 47.5 | 47.5 | |
| Crtl | 65 | 66 | 72 | 64 | 64 | 69 | 57 | 59 | 55 | 57 | 55 | 57 | 57 | 60 |
| TC No. | Temperature (°C) | | | | | | | | | | | | | |
| 1 | 774 | 753 | 769 | 479 | 733 | 507 | 758 | 771 | 698 | 720 | 709 | 733 | 712 | 749 |
| 2 | 744 | 721 | 739 | 454 | 703 | 482 | 780 | 791 | 731 | 747 | 725 | 747 | 750 | 791 |
| 3 | 823 | 800 | 820 | 504 | 761 | 534 | 833 | 844 | 767 | 783 | 782 | 805 | 767 | 800 |
| 4 | 795 | 767 | 786 | 509 | 767 | 542 | 835 | 849 | 766 | 781 | 784 | 808 | 756 | 788 |
| 5 | 783 | 761 | 782 | 473 | 722 | 502 | 795 | 811 | 728 | 749 | 753 | 780 | 727 | 763 |
| 6 | 0 | 0 | 0 | 0 | 0 | 0 | 862 | 876 | 798 | 821 | 816 | 843 | 794 | 831 |
| 7 | 748 | 723 | 742 | 456 | 705 | 483 | 756 | 771 | 709 | 729 | 733 | 760 | 700 | 736 |
| 8 | 750 | 729 | 746 | 485 | 739 | 514 | 768 | 779 | 747 | 759 | 739 | 761 | 728 | 757 |
| 9 | 797 | 764 | 782 | 503 | 761 | 535 | 799 | 810 | 775 | 792 | 770 | 794 | 756 | 790 |
| 10 | 823 | 795 | 815 | 500 | 756 | 530 | 804 | 814 | 784 | 802 | 773 | 797 | 767 | 802 |
| 11 | 755 | 726 | 745 | 473 | 724 | 505 | 756 | 768 | 733 | 757 | 730 | 755 | 725 | 764 |
| 12 | 822 | 802 | 822 | 520 | 777 | 553 | 843 | 856 | 817 | 841 | 813 | 840 | 801 | 840 |
| 13 | 756 | 728 | 743 | 485 | 736 | 512 | 736 | 748 | 720 | 743 | 704 | 727 | 721 | 760 |
| 14 | 724 | 702 | 720 | 464 | 715 | 492 | 773 | 782 | 732 | 748 | 713 | 733 | 738 | 772 |
| 15 | 806 | 778 | 796 | 501 | 759 | 533 | 821 | 829 | 762 | 782 | 759 | 781 | 778 | 816 |
| 16 | 799 | 768 | 786 | 508 | 767 | 541 | 823 | 832 | 767 | 788 | 752 | 772 | 776 | 813 |
| 17 | 765 | 739 | 759 | 478 | 729 | 509 | 789 | 802 | 727 | 741 | 736 | 757 | 722 | 749 |
| 18 | 687 | 680 | 669 | 537 | 581 | 550 | 847 | 857 | 795 | 822 | 790 | 813 | 807 | 848 |

Table 6.2.1. (continued)

| Cycle | | 88.04 | | | 88.05 | | | | | 88.06 | | | | 88.07 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | 29.02 | 29.04 | 23.05 | 23.05 | 27.05 | 27.05 | 1.06 | 20.06 | 20.06 | 24.06 | 24.06 | 15.07 | 15.07 | 8.09 | 28.09 |
| Time | 12.16 | 8.54 | 12.00 | 14.18 | 10.16 | 16.32 | 11.52 | 13.42 | 15.34 | 9.06 | 14.48 | 11.12 | 15.28 | 10.54 | 16.23 |
| FPD | 142 | 144 | 168 | 168 | 169 | 169 | 174 | 193 | 193 | 194 | 194 | 216 | 216 | 217 | 217 |
| Orient. | | F 8 N | | | F 8 S | | | | | F 8 N | | | | F 8 S | |
| VDU | +65 | +45 | +45 | +45 | +42 | +42 | +42 | +42 | +42 | +42 | +42 | +42 | +42 | +42 | +42 |
| %Ne | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MW | | 47.5 | | | 47.5 | 47.5 | 47.5 | 47.5 | 47.5 | 45 | 45 | 45 | 45 | 45 | 45 |
| Crtl | 60 | 62 | 68 | 68 | 62 | 62 | 63 | 68 | 68 | 67 | 67 | 63 | 63 | 58 | 61 |
| TC No. | Temperature (°C) | | | | | | | | | | | | | | |
| 1 | 748 | 770 | 777 | 778 | 780 | 786 | 787 | 792 | 792 | 754 | 757 | 773 | 773 | 723 | 749 |
| 2 | 791 | 810 | 815 | 816 | 811 | 817 | 818 | 824 | 823 | 761 | 764 | 780 | 780 | 728 | 749 |
| 3 | 800 | 820 | 824 | 825 | 830 | 835 | 835 | 838 | 838 | 820 | 823 | 838 | 838 | 773 | 798 |
| 4 | 788 | 819 | 823 | 825 | 832 | 836 | 836 | 838 | 838 | 814 | 816 | 836 | 836 | 763 | 786 |
| 5 | 763 | 800 | 807 | 808 | 808 | 813 | 815 | 820 | 820 | 797 | 800 | 817 | 817 | 745 | 773 |
| 6 | 831 | 861 | 866 | 867 | 870 | 877 | 877 | 881 | 881 | 855 | 858 | 873 | 873 | 808 | 833 |
| 7 | 736 | 779 | 784 | 786 | 791 | 796 | 797 | 803 | 803 | 760 | 762 | 779 | 779 | 735 | 762 |
| 8 | 757 | 798 | 797 | 798 | 800 | 805 | 806 | 810 | 809 | 742 | 745 | 757 | 757 | 753 | 774 |
| 9 | 790 | 835 | 836 | 838 | 841 | 846 | 847 | 852 | 852 | 776 | 778 | 788 | 788 | 783 | 805 |
| 10 | 802 | 846 | 847 | 849 | 849 | 854 | 855 | 860 | 860 | 775 | 778 | 789 | 789 | 797 | 819 |
| 11 | 764 | 809 | 816 | 818 | 814 | 820 | 822 | 830 | 830 | 745 | 747 | 763 | 763 | 761 | 787 |
| 12 | 840 | 891 | 895 | 897 | 889 | 895 | 896 | 902 | 902 | 817 | 820 | 838 | 838 | 835 | 860 |
| 13 | 760 | 798 | 802 | 803 | 799 | 805 | 807 | 813 | 813 | 719 | 722 | 737 | 737 | 749 | 775 |
| 14 | 772 | 791 | 791 | 793 | 788 | 794 | 796 | 799 | 798 | 730 | 732 | 747 | 747 | 744 | 764 |
| 15 | 816 | 827 | 831 | 832 | 827 | 833 | 834 | 839 | 838 | 769 | 771 | 789 | 789 | 779 | 802 |
| 16 | 813 | 832 | 835 | 836 | 829 | 835 | 836 | 839 | 839 | 781 | 783 | 789 | 789 | 768 | 789 |
| 17 | 749 | 771 | 774 | 776 | 784 | 790 | 790 | 792 | 792 | 770 | 772 | 794 | 794 | 752 | 780 |
| 18 | 848 | 878 | 882 | 883 | 881 | 887 | 888 | 893 | 893 | 815 | 818 | 836 | 836 | 822 | 847 |

Table 6.2.1. (continued)

| Cycle | | 88.08 | | 88.09 | 88.10 | | | | 88.11 | 89.01 | | 89.02 | | 89.03 | 89.04 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | 28.09 | 5.10 | 18.10 | 17.11 | 22.11 | 28.11 | 5.12 | 12.12 | 16.12 | 17.01 | 24.01 | 16.02 | 27.02 | 6.04 | 1.05 |
| Time | 18.25 | 7.33 | 10.16 | 8.48 | 10.24 | 9.22 | 8.18 | 8.41 | 8.54 | 10.47 | 9.02 | 8.08 | 8.09 | 13.29 | 8.07 |
| FPD | 234 | 237 | 250 | 278 | 278 | 284 | 291 | 298 | 300 | 321 | 328 | 345 | 356 | 362 | 382 |
| Orient. | | F 8 N | | F 8 S | F 8 N | | | | F 8 S | F 8 N | | F 8 S | | F 8 N | F 8 S |
| VDU | +42 | +42 | +42 | +42 | +42 | +42 | +42 | +42 | +42 | +42 | +42 | +42 | +42 | +42 | +42 |
| %Ne | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MW | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 41.5 | 41.5 | 45 | 45 | 45 | 45 |
| Crtl | 61 | 58 | 59 | 62 | 55 | 62 | 65 | 66 | 61 | 55 | 56 | 62 | 65 | 65 | 58 |

| TC No. | Temperature (°C) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 748 | 747 | 736 | 753 | 770 | 786 | 794 | 796 | 746 | 0 | 0 | 798 | 0 | 767 | 0 |
| 2 | 750 | 743 | 734 | 745 | 785 | 799 | 806 | 807 | 741 | 765 | 767 | 788 | 791 | 765 | 738 |
| 3 | 797 | 788 | 778 | 794 | 835 | 851 | 860 | 860 | 782 | 810 | 811 | 831 | 836 | 813 | 778 |
| 4 | 789 | 780 | 772 | 789 | 828 | 843 | 850 | 852 | 771 | 797 | 801 | 821 | 825 | 799 | 766 |
| 5 | 775 | 770 | 761 | 779 | 807 | 826 | 835 | 837 | 757 | 780 | 784 | 813 | 820 | 789 | 758 |
| 6 | 833 | 832 | 819 | 833 | 865 | 884 | 889 | 893 | 815 | 837 | 841 | 871 | 875 | 842 | 814 |
| 7 | 762 | 758 | 744 | 766 | 779 | 799 | 804 | 808 | 747 | 752 | 755 | 803 | 807 | 759 | 749 |
| 8 | 777 | 766 | 757 | 779 | 760 | 775 | 780 | 784 | 757 | 736 | 738 | 813 | 820 | 737 | 759 |
| 9 | 808 | 799 | 789 | 813 | 784 | 801 | 805 | 808 | 787 | 758 | 762 | 846 | 851 | 764 | 787 |
| 10 | 819 | 813 | 801 | 827 | 782 | 797 | 804 | 805 | 796 | 757 | 761 | 856 | 863 | 766 | 801 |
| 11 | 787 | 783 | 767 | 795 | 757 | 774 | 782 | 786 | 771 | 735 | 738 | 832 | 839 | 748 | 779 |
| 12 | 861 | 850 | 838 | 865 | 838 | 856 | 864 | 862 | 839 | 809 | 812 | 900 | 907 | 815 | 842 |
| 13 | 776 | 772 | 758 | 784 | 737 | 754 | 761 | 764 | 767 | 722 | 728 | 825 | 834 | 737 | 775 |
| 14 | 766 | 765 | 753 | 769 | 742 | 757 | 762 | 762 | 761 | 736 | 740 | 814 | 820 | 746 | 767 |
| 15 | 804 | 798 | 785 | 806 | 772 | 788 | 795 | 795 | 792 | 768 | 770 | 847 | 853 | 774 | 791 |
| 16 | 791 | 783 | 773 | 800 | 778 | 794 | 801 | 802 | 784 | 771 | 773 | 839 | 846 | 781 | 789 |
| 17 | 778 | 777 | 762 | 791 | 768 | 785 | 797 | 797 | 775 | 759 | 764 | 830 | 839 | 774 | 773 |
| 18 | 847 | 847 | 834 | 849 | 833 | 851 | 858 | 858 | 835 | 813 | 818 | 892 | 897 | 823 | 836 |

Table 6.2.1. (continued)

| Cycle | | 89.05 | | | | | 89.06 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | 8.05 | 29.05 | 5.06 | 5.06 | 9.06 | 14.06 | 21.06 | 21.06 | 29.06 | 5.07 | 5.07 | 7.07 | 10.07 | 10.07 |
| Time | 9.02 | 8.14 | 8.09 | 13.11 | 8.49 | 14.50 | 8.31 | 13.57 | 9.47 | 9.01 | 13.15 | 8.48 | 8.44 | 23.44 |
| FPD | 390 | 407 | 414 | 414 | 418 | 423 | 426 | 426 | 434 | 440 | 440 | 442 | 442 | 445 |
| Orient. | | F 8 N | | | | | F 8 S | | | | | | F 8 S | |
| VDU | +42 | +42 | +42 | +42 | +42 | +42 | +42 | +42 | +42 | +42 | +42 | +42 | +42 | +42 |
| %Ne | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MW | 45 | 45 | 45 | 45 | 44 | 44 | 42 | 42 | 41.5 | 40.7 | 40.7 | 40.4 | 45 | 45 |
| Crtl | 59 | 58 | 60 | 60 | 63 | 65 | 60 | 60 | 61 | 62 | 62 | 62 | 63 | 63 |
| TC No. | Temperature (°C) | | | | | | | | | | | | | |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | 733 | 762 | 769 | 768 | 758 | 752 | 701 | 702 | 701 | 692 | 693 | 690 | 738 | 740 |
| 3 | 772 | 802 | 809 | 811 | 798 | 792 | 734 | 735 | 733 | 724 | 725 | 722 | 773 | 773 |
| 4 | 761 | 792 | 800 | 799 | 787 | 781 | 725 | 726 | 725 | 717 | 717 | 715 | 765 | 765 |
| 5 | 751 | 776 | 785 | 785 | 773 | 769 | 718 | 717 | 718 | 709 | 709 | 708 | 758 | 760 |
| 6 | 806 | 830 | 839 | 840 | 826 | 819 | 767 | 768 | 768 | 759 | 759 | 757 | 810 | 812 |
| 7 | 744 | 754 | 760 | 761 | 749 | 743 | 714 | 715 | 714 | 706 | 706 | 704 | 753 | 755 |
| 8 | 753 | 728 | 735 | 734 | 719 | 715 | 718 | 719 | 718 | 711 | 711 | 708 | 755 | 757 |
| 9 | 780 | 744 | 751 | 752 | 738 | 733 | 744 | 744 | 743 | 737 | 736 | 733 | 785 | 785 |
| 10 | 793 | 742 | 749 | 748 | 735 | 730 | 749 | 750 | 751 | 743 | 743 | 740 | 793 | 793 |
| 11 | 773 | 730 | 737 | 739 | 726 | 720 | 734 | 733 | 734 | 727 | 727 | 724 | 777 | 779 |
| 12 | 833 | 797 | 804 | 804 | 789 | 784 | 790 | 791 | 791 | 782 | 783 | 781 | 834 | 838 |
| 13 | 767 | 720 | 727 | 728 | 713 | 709 | 721 | 724 | 723 | 716 | 715 | 713 | 764 | 767 |
| 14 | 760 | 725 | 732 | 732 | 719 | 713 | 706 | 707 | 706 | 699 | 698 | 696 | 748 | 749 |
| 15 | 785 | 754 | 762 | 762 | 750 | 743 | 735 | 735 | 736 | 729 | 729 | 727 | 779 | 781 |
| 16 | 783 | 754 | 761 | 761 | 749 | 743 | 724 | 725 | 725 | 717 | 717 | 714 | 768 | 768 |
| 17 | 766 | 751 | 758 | 758 | 746 | 742 | 721 | 722 | 722 | 714 | 715 | 711 | 765 | 766 |
| 18 | 830 | 803 | 811 | 812 | 798 | 792 | 776 | 777 | 778 | 769 | 768 | 766 | 822 | 822 |

Table 6.2.2. Capsule 2: Representative temperatures at selected times, capsule and control rod position, gas composition and reactor power

*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| Cycle | 87.03 | | | 87.05 | | | 87.09 | | 87.10 | | 88.01 | | 88.02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | 13.04 | 22.04 | 4.05 | 8.06 | 9.06 | 29.06 | 28.10 | 16.11 | 20.11 | 14.12 | 11.01 | 1.02 | 4.02 |
| Time | 8.36 | 11.24 | 14.48 | 12.34 | 15.10 | 11.18 | 8.06 | 14.00 | 8.40 | 10.16 | 10.00 | 14.46 | 12.54 |
| FPD | 4 | 10 | 23 | 2 | | | 47 | 66 | 67 | 91 | 96 | 117 | 118 |
| Orient. | F 8 N | | | F 8 S | | | F 8 N | | | F 8 S | F 2 S | | F 8 N |
| VDU | -42 | -17 | -17 | +120 | +120 | +120 | -25 | -25 | -25 | -25 | -70 | -70 | -70 |
| %Ne | 0 | 0 | 0 | 0 | 22 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MW | 45 | | | 45 | | | 45 | | 45 | | 47.5 | 47.5 | 47.5 |
| Crtl | 65 | 66 | 72 | 64 | 64 | 69 | 57 | 59 | 55 | 57 | 55 | 57 | 57 |
| TC No. | Temperature (°C) | | | | | | | | | | | | |
| 19 | 947 | 925 | 947 | 621 | 897 | 656 | 834 | 833 | 784 | 773 | 748 | 748 | 729 |
| 20 | 0 | 0 | 0 | 0 | 0 | 0 | 836 | 835 | 787 | 770 | 751 | 751 | 732 |
| 21 | 806 | 796 | 786 | 636 | 682 | 651 | 888 | 889 | 846 | 833 | 802 | 805 | 789 |
| 22 | 844 | 835 | 826 | 680 | 727 | 697 | 913 | 911 | 870 | 862 | 821 | 823 | 817 |
| 23 | 862 | 854 | 846 | 696 | 744 | 715 | 887 | 886 | 838 | 832 | 792 | 793 | 789 |
| 24 | 724 | 715 | 706 | 568 | 613 | 585 | 839 | 838 | 788 | 782 | 750 | 752 | 742 |
| 25 | 916 | 909 | 901 | 761 | 814 | 777 | 895 | 892 | 874 | 868 | 814 | 816 | 811 |
| 26 | 733 | 842 | 832 | 591 | 747 | 719 | 866 | 864 | 847 | 839 | 792 | 794 | 782 |
| 27 | 709 | 702 | 693 | 574 | 618 | 591 | 796 | 793 | 784 | 773 | 730 | 732 | 722 |
| 28 | 883 | 876 | 867 | 764 | 816 | 779 | 791 | 789 | 783 | 773 | 726 | 725 | 727 |
| 29 | 0 | 0 | 0 | 0 | 0 | 0 | 805 | 801 | 797 | 791 | 735 | 735 | 737 |
| 30 | 792 | 772 | 761 | 644 | 689 | 659 | 862 | 858 | 846 | 843 | 785 | 784 | 788 |
| 31 | 956 | 1097 | 963 | 1010 | 1015 | 1021 | 904 | 918 | 869 | 868 | 844 | 812 | 826 |
| 32 | 853 | 847 | 838 | 700 | 748 | 720 | 867 | 865 | 844 | 838 | 779 | 779 | 799 |
| 33 | 709 | 700 | 691 | 581 | 627 | 600 | 806 | 800 | 783 | 772 | 712 | 713 | 739 |
| 34 | 885 | 872 | 864 | 766 | 820 | 782 | 813 | 806 | 784 | 768 | 714 | 712 | 738 |
| 35 | 946 | 965 | 948 | 796 | 871 | 846 | 830 | 820 | 780 | 774 | 728 | 731 | 747 |
| 36 | 793 | 780 | 768 | 636 | 683 | 651 | 885 | 880 | 840 | 837 | 787 | 787 | 801 |

Table 6.2.2. (continued)

| Cycle | | | 88.04 | | | 88.05 | | | | | 88.06 | | | | 88.07 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | 29.02 | 29.02 | 29.04 | 23.05 | 23.05 | 27.05 | 27.05 | 1.06 | 20.06 | 20.06 | 24.06 | 24.06 | 15.07 | 15.07 | 8.09 |
| Time | 11.30 | 12.16 | 8.54 | 12.00 | 14.18 | 10.16 | 16.32 | 11.52 | 13.42 | 15.34 | 9.06 | 14.48 | 11.12 | 15.28 | 10.54 |
| FPD | 142 | 142 | 144 | 168 | 168 | 169 | 169 | 174 | 193 | 193 | 194 | 194 | 216 | 216 | 216 |
| Orient. | | | F 8 N | | | F 8 S | | | | | F 8 N | | | | F 8 S |
| VDU | -70 | -70 | -90 | -90 | -90 | -93 | -93 | -93 | -93 | -93 | -93 | -93 | -93 | -93 | -93 |
| %Ne | 40 | 0 | 0 | 60 | 0 | 0 | 30 | 35 | 40 | 0 | 0 | 60 | 60 | 0 | 0 |
| MW | | | 47.5 | | | 47.5 | 47.5 | 47.5 | 47.5 | 47.5 | 45 | 45 | 45 | 45 | 45 |
| Crtl | 60 | 60 | 62 | 68 | 68 | 62 | 62 | 63 | 68 | 68 | 67 | 67 | 63 | 63 | 58 |
| TC No. | Temperature (°C) | | | | | | | | | | | | | | |
| 19 | 899 | 724 | 737 | 919 | 725 | 740 | 862 | 918 | 935 | 728 | 715 | 937 | 926 | 730 | 710 |
| 20 | 890 | 725 | 736 | 908 | 726 | 744 | 861 | 912 | 929 | 734 | 711 | 922 | 910 | 726 | 711 |
| 21 | 950 | 772 | 794 | 975 | 778 | 801 | 922 | 976 | 996 | 785 | 754 | 978 | 969 | 772 | 766 |
| 22 | 977 | 796 | 818 | 997 | 798 | 824 | 949 | 1003 | 1018 | 806 | 771 | 1000 | 984 | 788 | 0 |
| 23 | 952 | 772 | 789 | 970 | 771 | 793 | 918 | 973 | 989 | 778 | 753 | 981 | 966 | 768 | 758 |
| 24 | 910 | 732 | 740 | 920 | 724 | 742 | 866 | 923 | 938 | 731 | 710 | 932 | 926 | 729 | 713 |
| 25 | 974 | 794 | 830 | 1011 | 812 | 837 | 961 | 1015 | 1030 | 819 | 762 | 991 | 972 | 776 | 799 |
| 26 | 946 | 768 | 800 | 982 | 786 | 805 | 930 | 984 | 1001 | 791 | 739 | 964 | 949 | 755 | 774 |
| 27 | 891 | 713 | 735 | 923 | 725 | 743 | 868 | 925 | 943 | 733 | 680 | 901 | 895 | 701 | 717 |
| 28 | 897 | 724 | 742 | 926 | 735 | 753 | 874 | 929 | 948 | 744 | 680 | 896 | 890 | 702 | 718 |
| 29 | 897 | 733 | 765 | 937 | 755 | 778 | 893 | 943 | 959 | 767 | 697 | 906 | 895 | 716 | 738 |
| 30 | 952 | 774 | 809 | 990 | 794 | 821 | 943 | 997 | 1012 | 805 | 739 | 964 | 945 | 752 | 781 |
| 31 | 988 | 807 | 831 | 1001 | 814 | 827 | 1006 | 990 | 1027 | 885 | 764 | 993 | 977 | 781 | 795 |
| 32 | 963 | 785 | 808 | 987 | 790 | 813 | 937 | 991 | 1005 | 798 | 737 | 964 | 948 | 754 | 776 |
| 33 | 907 | 728 | 740 | 923 | 725 | 743 | 868 | 925 | 939 | 733 | 676 | 898 | 889 | 695 | 717 |
| 34 | 910 | 733 | 743 | 923 | 729 | 748 | 870 | 925 | 942 | 740 | 692 | 911 | 893 | 704 | 714 |
| 35 | 907 | 740 | 751 | 922 | 737 | 757 | 873 | 924 | 941 | 748 | 697 | 909 | 892 | 712 | 712 |
| 36 | 966 | 786 | 805 | 985 | 785 | 808 | 932 | 984 | 1001 | 793 | 748 | 976 | 960 | 763 | 770 |

Table 6.2.2. (continued)

| Cycle | | | 88.08 | | 88.09 | 88.10 | | | | 88.11 | 89.01 | | 89.02 | | 89.03 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | 28.09 | 28.09 | 5.10 | 18.10 | 17.11 | 22.11 | 28.11 | 5.12 | 12.12 | 16.12 | 17.01 | 24.01 | 16.02 | 27.02 | 6.04 |
| Time | 16.23 | 18.25 | 7.33 | 10.16 | 8.48 | 10.24 | 9.22 | 8.18 | 8.41 | 8.54 | 10.47 | 9.02 | 8.08 | 8.09 | 13.29 |
| FPD | 217 | 234 | 237 | 250 | 278 | 278 | 284 | 291 | 298 | 300 | 321 | 328 | 345 | 356 | 362 |
| Orient. | | | F 8 N | | F 8 S | F 8 N | | | | F 8 S | F 8 N | | F 8 S | | F 8 N |
| VDU | -93 | -93 | -93 | -93 | -93 | -93 | -93 | -9 | -93 | -93 | -93 | -93 | -93 | -93 | -93 |
| %Ne | 40 | 0 | 40 | 0 | 0 | 0 | 0 | 20 | 40 | 0 | 100 | 100 | 0 | 50 | 40 |
| MW | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 41.5 | 41.5 | 45 | 45 | 45 |
| Crtl | 61 | 61 | 58 | 59 | 62 | 55 | 62 | 65 | 66 | 61 | 55 | 56 | 62 | 65 | 65 |
| TC No. | Temperature (°C) | | | | | | | | | | | | | | |
| 19 | 873 | 704 | 711 | 914 | 705 | 759 | 759 | 871 | 1000 | 717 | 1008 | 1010 | 768 | 909 | 907 |
| 20 | 867 | 708 | 715 | 904 | 711 | 756 | 759 | 865 | 984 | 718 | 986 | 988 | 767 | 903 | 895 |
| 21 | 931 | 758 | 768 | 967 | 771 | 810 | 811 | 915 | 1037 | 768 | 1043 | 1044 | 821 | 960 | 941 |
| 22 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1057 | 790 | 0 | 0 | 0 | 0 | 959 |
| 23 | 922 | 750 | 770 | 970 | 769 | 808 | 810 | 916 | 1042 | 767 | 1049 | 1050 | 823 | 964 | 946 |
| 24 | 879 | 711 | 718 | 923 | 715 | 766 | 763 | 872 | 996 | 719 | 1007 | 1008 | 765 | 913 | 905 |
| 25 | 964 | 794 | 805 | 1001 | 805 | 817 | 817 | 922 | 1042 | 801 | 1047 | 1048 | 858 | 999 | 947 |
| 26 | 939 | 770 | 777 | 973 | 780 | 795 | 795 | 899 | 1022 | 776 | 1027 | 1030 | 766 | 972 | 927 |
| 27 | 881 | 710 | 721 | 923 | 718 | 727 | 728 | 834 | 957 | 718 | 966 | 970 | 771 | 912 | 869 |
| 28 | 880 | 714 | 727 | 925 | 715 | 716 | 715 | 823 | 948 | 720 | 954 | 959 | 794 | 917 | 861 |
| 29 | 895 | 739 | 752 | 937 | 736 | 733 | 732 | 829 | 948 | 737 | 951 | 954 | 841 | 925 | 869 |
| 30 | 944 | 776 | 793 | 987 | 787 | 788 | 789 | 888 | 1010 | 783 | 1017 | 1018 | 859 | 982 | 921 |
| 31 | 961 | 790 | 809 | 1005 | 810 | 824 | 824 | 927 | 1047 | 803 | 1056 | 1057 | 841 | 1001 | 954 |
| 32 | 938 | 770 | 788 | 986 | 793 | 792 | 794 | 895 | 1016 | 786 | 1028 | 1026 | 777 | 981 | 925 |
| 33 | 881 | 713 | 726 | 930 | 732 | 727 | 727 | 834 | 956 | 728 | 969 | 971 | 782 | 921 | 872 |
| 34 | 880 | 713 | 726 | 923 | 731 | 732 | 739 | 845 | 968 | 739 | 983 | 984 | 785 | 924 | 880 |
| 35 | 869 | 711 | 725 | 909 | 731 | 747 | 755 | 855 | 973 | 742 | 981 | 984 | 833 | 919 | 885 |
| 36 | 936 | 763 | 781 | 980 | 782 | 802 | 804 | 909 | 1033 | 780 | 1043 | 1044 | | 976 | 939 |

Table 6.2.2. (continued)

| Cycle | 89.04 | | 89.05 | | | | | 89.06 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | 1.05 | 8.05 | 29.05 | 5.06 | 5.06 | 9.06 | 14.06 | 21.06 | 21.06 | 29.06 | 5.07 | 5.07 | 7.07 | 10.07 | 10.07 |
| Time | 8.07 | 9.02 | 8.14 | 8.09 | 13.11 | 8.49 | 14.50 | 8.31 | 13.57 | 9.47 | 9.01 | 13.15 | 8.48 | 8.44 | 23.44 |
| FPD | 382 | 390 | 407 | 414 | 414 | 418 | 423 | 426 | 426 | 434 | 440 | 440 | 442 | 442 | 445 |
| Orient. | F 8 S | | F 8 N | | | | | F 8 S | | | | | | F 8 S | |
| VDU | -93 | -93 | -93 | -93 | -93 | -93 | -93 | -93 | -93 | -93 | -93 | -93 | -93 | -93 | -93 |
| %Ne | 0 | 28 | 0 | 28 | 80 | 80 | 28 | 0 | 85 | 85 | 85 | 100 | 100 | 100 | 0 |
| MW | 45 | 45 | 45 | 45 | 45 | 44 | 44 | 42 | 42 | 41.5 | 40.7 | 40.7 | 40.4 | 45 | 45 |
| Crtl | 58 | 59 | 58 | 60 | 60 | 63 | 65 | 60 | 60 | 61 | 62 | 62 | 62 | 63 | 63 |
| TC No. | Temperature (°C) | | | | | | | | | | | | | | |
| 19 | 815 | 715 | 738 | 803 | 1014 | 1017 | 812 | 688 | 969 | 971 | 962 | 997 | 993 | 1038 | 714 |
| 20 | 809 | 714 | 730 | 792 | 989 | 993 | 801 | 690 | 955 | 959 | 950 | 983 | 979 | 1024 | 716 |
| 21 | 863 | 767 | 766 | 820 | 1022 | 1009 | 797 | 726 | 994 | 994 | 983 | 1035 | 1036 | 1085 | 756 |
| 22 | 888 | 794 | 798 | 861 | 1067 | 0 | 604 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 23 | 866 | 769 | 783 | 847 | 1054 | 1052 | 849 | 739 | 1015 | 1015 | 1005 | 1040 | 1036 | 1087 | 756 |
| 24 | 822 | 719 | 743 | 808 | 1015 | 1015 | 811 | 693 | 969 | 970 | 961 | 995 | 992 | 1037 | 714 |
| 25 | 898 | 805 | 784 | 847 | 1053 | 1050 | 850 | 774 | 1045 | 1046 | 1035 | 1072 | 1067 | 1120 | 789 |
| 26 | 874 | 781 | 762 | 827 | 1033 | 1033 | 833 | 751 | 1024 | 1027 | 1017 | 1053 | 1048 | 1099 | 770 |
| 27 | 823 | 723 | 704 | 772 | 978 | 982 | 779 | 699 | 976 | 980 | 970 | 1006 | 1001 | 1049 | 721 |
| 28 | 819 | 726 | 692 | 758 | 961 | 964 | 768 | 704 | 973 | 979 | 970 | 1005 | 1003 | 1052 | 731 |
| 29 | 832 | 747 | 707 | 770 | 959 | 962 | 780 | 720 | 969 | 975 | 968 | 1001 | 997 | 1045 | 745 |
| 30 | 883 | 791 | 759 | 822 | 1025 | 1022 | 827 | 761 | 1029 | 1031 | 1021 | 1057 | 1053 | 1104 | 778 |
| 31 | 898 | 805 | 792 | 854 | 1060 | 1057 | 857 | 774 | 1045 | 1045 | 1035 | 1070 | 1066 | 1118 | 789 |
| 32 | 881 | 789 | 765 | 828 | 1031 | 1029 | 830 | 758 | 1028 | 1029 | 1019 | 1054 | 1050 | 1102 | 775 |
| 33 | 831 | 736 | 710 | 777 | 982 | 985 | 780 | 704 | 980 | 986 | 973 | 1011 | 1005 | 1054 | 726 |
| 34 | 830 | 735 | 722 | 786 | 987 | 988 | 794 | 709 | 980 | 983 | 973 | 1009 | 1006 | 1053 | 737 |
| 35 | 829 | 740 | 731 | 791 | 979 | 982 | 800 | 712 | 967 | 971 | 963 | 995 | 992 | 1038 | 738 |
| 36 | 874 | 779 | 775 | 838 | 1047 | 1046 | 844 | 751 | 1026 | 1027 | 1016 | 1052 | 1047 | 1097 | 769 |

Table 6.2.3. Capsule 3: Representative temperatures at selected times, capsule and control rod position, gas composition and reactor power

*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cycle | 87.03 | | | 87.05 | | | 87.09 | | 87.10 | | 88.01 | | 88.02 |
| Date | 13.04 | 22.04 | 4.05 | 8.06 | 9.06 | 29.06 | 28.10 | 16.11 | 20.11 | 14.12 | 11.01 | 1.02 | 4.02 |
| Time | 8.36 | 11.24 | 14.48 | 12.34 | 15.10 | 11.18 | 8.06 | 14.00 | 8.40 | 10.16 | 10.00 | 14.46 | 12.54 |
| FPD | 4 | 10 | 23 | 2 | | 46 | 47 | 66 | 67 | 91 | 96 | 117 | 118 |
| Orient. | F 8 N | | | F 8 S | | | F 8 N | | F 8 S | | F 2 S | | F 2 N |
| VDU | -214 | -171 | -171 | -32 | -32 | -32 | -180 | -180 | -180 | -180 | -225 | -225 | -225 |
| %Ne | 0 | 34 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MW | 45 | | | 45 | | | 45 | | 45 | | 47.5 | 47.5 | 47.5 |
| Crtl | 65 | 66 | 72 | 64 | 64 | 69 | 57 | 59 | 55 | 57 | 55 | 57 | 57 |
| TC No. | Temperature (°C) | | | | | | | | | | | | |
| 37 | 715 | 708 | 698 | 569 | 614 | 587 | 857 | 859 | 843 | 819 | 756 | 752 | 746 |
| 38 | 782 | 913 | 785 | 820 | 825 | 825 | 843 | 848 | 835 | 812 | 750 | 747 | 744 |
| 39 | 781 | 904 | 778 | 807 | 810 | 812 | 894 | 906 | 894 | 876 | 802 | 800 | 799 |
| 40 | 671 | 650 | 638 | 542 | 587 | 555 | 916 | 928 | 914 | 893 | 814 | 811 | 816 |
| 41 | 811 | 947 | 819 | 863 | 868 | 873 | 902 | 910 | 890 | 866 | 794 | 790 | 793 |
| 42 | 711 | 699 | 689 | 578 | 623 | 595 | 841 | 849 | 832 | 811 | 747 | 742 | 739 |
| 43 | 769 | 903 | 779 | 814 | 820 | 819 | 912 | 922 | 924 | 905 | 810 | 806 | 824 |
| 44 | 819 | 952 | 824 | 860 | 865 | 868 | 889 | 901 | 908 | 886 | 797 | 794 | 803 |
| 45 | 821 | 955 | 828 | 892 | 897 | 904 | 826 | 838 | 849 | 829 | 744 | 739 | 747 |
| 46 | 808 | 940 | 813 | 877 | 882 | 887 | 724 | 948 | 1078 | 914 | 670 | 712 | 576 |
| 47 | 763 | 887 | 764 | 837 | 842 | 843 | 833 | 836 | 857 | 835 | 741 | 736 | 761 |
| 48 | 0 | 893 | 769 | 763 | 646 | 847 | 886 | 893 | 903 | 884 | 785 | 781 | 806 |
| 49 | 771 | 894 | 769 | 835 | 839 | 841 | 917 | 926 | 918 | 896 | 806 | 802 | 824 |
| 50 | 802 | 931 | 805 | 875 | 880 | 886 | 892 | 900 | 899 | 876 | 780 | 775 | 804 |
| 51 | 824 | 957 | 829 | 886 | 892 | 897 | 833 | 841 | 839 | 816 | 725 | 718 | 748 |
| 52 | 803 | 935 | 807 | 869 | 874 | 879 | 844 | 850 | 836 | 815 | 729 | 723 | 752 |
| 53 | 757 | 889 | 765 | 826 | 832 | 834 | 911 | 848 | 887 | 869 | 725 | 777 | 773 |
| 54 | 770 | 832 | 776 | 831 | 776 | 823 | 901 | 910 | 894 | 874 | 792 | 786 | 807 |

Table 6.2.3. (continued)

| Cycle | | | 88.04 | | | 88.05 | | | | | 88.06 | | | | 88.07 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | 29.02 | 29.02 | 29.04 | 23.05 | 23.05 | 27.05 | 27.05 | 1.06 | 20.06 | 20.06 | 24.06 | 24.06 | 15.07 | 15.07 | 8.09 |
| Time | 11.30 | 12.16 | 8.54 | 12.00 | 14.18 | 10.16 | 16.32 | 11.52 | 13.42 | 15.34 | 9.06 | 14.48 | 11.12 | 15.28 | 10.54 |
| FPD | 142 | 142 | 144 | 168 | 168 | 169 | 169 | 174 | 193 | 193 | 194 | 194 | 216 | 216 | 217 |
| Orient. | | | F 8 N | | | F 8 S | | | | | F 8 N | | | | F 8 S |
| VDU | -225 | -225 | -230 | -230 | -230 | -250 | -250 | -250 | -250 | -250 | -250 | -250 | -250 | -250 | -250 |
| %Ne | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MW | | | 47.5 | | | 47.5 | 47.5 | 47.5 | 47.5 | 47.5 | 45 | 45 | 45 | 45 | 45 |
| Crtl | 60 | | 62 | 68 | 68 | 62 | 62 | 63 | 68 | 68 | 67 | 67 | 63 | 63 | 58 |
| TC No. | Temperature (°C) | | | | | | | | | | | | | | |
| 37 | 721 | 721 | 703 | 686 | 687 | 703 | 706 | 704 | 687 | 686 | 670 | 667 | 694 | 694 | 679 |
| 38 | 721 | 720 | 707 | 692 | 693 | 710 | 713 | 711 | 697 | 696 | 676 | 674 | 692 | 691 | 684 |
| 39 | 773 | 773 | 756 | 739 | 740 | 758 | 761 | 759 | 741 | 740 | 709 | 705 | 734 | 734 | 733 |
| 40 | 789 | 789 | 770 | 752 | 754 | 771 | 774 | 772 | 754 | 752 | 718 | 716 | 747 | 747 | 747 |
| 41 | 768 | 768 | 746 | 728 | 730 | 747 | 749 | 747 | 729 | 728 | 703 | 700 | 730 | 730 | 0 |
| 42 | 716 | 716 | 694 | 675 | 676 | 692 | 694 | 693 | 675 | 674 | 655 | 653 | 678 | 678 | 666 |
| 43 | 797 | 797 | 781 | 763 | 765 | 782 | 785 | 783 | 765 | 764 | 710 | 707 | 738 | 737 | 759 |
| 44 | 777 | 777 | 766 | 0 | 750 | 768 | 771 | 769 | 752 | 751 | 697 | 695 | 725 | 724 | 734 |
| 45 | 722 | 722 | 714 | 0 | 697 | 716 | 718 | 717 | 700 | 698 | 647 | 645 | 673 | 673 | 691 |
| 46 | 729 | 728 | 419 | 0 | 709 | 490 | 467 | 728 | 690 | 644 | 651 | 649 | 676 | 676 | 0 |
| 47 | 736 | 736 | 735 | 0 | 720 | 731 | 734 | 733 | 718 | 717 | 655 | 653 | 681 | 680 | 716 |
| 48 | 779 | 779 | 766 | 0 | 753 | 767 | 769 | 768 | 751 | 749 | 689 | 686 | 716 | 716 | 746 |
| 49 | 797 | 797 | 774 | 0 | 757 | 776 | 779 | 776 | 758 | 757 | 711 | 708 | 740 | 740 | 748 |
| 50 | 778 | 778 | 756 | 0 | 740 | 757 | 760 | 758 | 740 | 739 | 687 | 684 | 716 | 715 | 733 |
| 51 | 727 | 723 | 700 | 0 | 683 | 698 | 701 | 699 | 682 | 681 | 636 | 633 | 659 | 659 | 677 |
| 52 | 727 | 727 | 704 | 0 | 688 | 702 | 705 | 703 | 686 | 685 | 647 | 644 | 672 | 671 | 681 |
| 53 | 728 | 784 | 711 | 0 | 695 | 713 | 716 | 714 | 696 | 695 | 663 | 660 | 689 | 688 | 689 |
| 54 | 781 | 780 | 755 | 0 | 739 | 756 | 759 | 757 | 739 | 737 | 701 | 698 | 729 | 729 | 732 |

Table 6.2.3. (continued)

| Cycle | 28.09 | 28.09 | 88.08 | 18.10 | 88.09 | 88.10 | 28.11 | 5.12 | 12.12 | 88.11 | 89.01 | 24.01 | 89.02 | 27.02 | 89.03 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | 16.23 | 18.25 | 5.10 | 10.16 | 17.11 | 22.11 | 9.22 | 8.18 | 8.41 | 16.12 | 17.01 | 9.02 | 16.02 | 8.09 | 6.04 |
| Time | 217 | 234 | 7.33 | 250 | 8.48 | 10.24 | 284 | 291 | 298 | 8.54 | 10.47 | 328 | 8.08 | 356 | 13.29 |
| FPD | | | 237 | | 278 | 278 | | | | 300 | 321 | | 345 | | 362 |
| Orient. | | | F 8 N | | F 8 S | F 8 N | | | | F 8 S | F 8 N | | F 8 S | | F 8 N |
| VDU | -250 | -250 | -250 | -250 | -250 | -250 | -250 | -250 | -250 | -250 | -250 | -250 | -250 | -250 | -250 |
| %Ne | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 20 | 20 | 0 | 0 | 0 | 0 | 0 | 0 |
| MW | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 41.5 | 41.5 | 45 | 45 | 45 |
| Crtl | 61 | 61 | 58 | 59 | 62 | 55 | 62 | 65 | 66 | 61 | 55 | 56 | 62 | 65 | 65 |
| TC No. | Temperature (°C) | | | | | | | | | | | | | | |
| 37 | 669 | 669 | 672 | 675 | 672 | 824 | 888 | 884 | 877 | 686 | 722 | 717 | 718 | 710 | 678 |
| 38 | 674 | 675 | 680 | 682 | 675 | 826 | 890 | 887 | 880 | 695 | 728 | 724 | 729 | 722 | 685 |
| 39 | 720 | 721 | 728 | 730 | 728 | 871 | 925 | 922 | 914 | 735 | 764 | 761 | 777 | 768 | 717 |
| 40 | 735 | 735 | 741 | 743 | 742 | 884 | 938 | 933 | 925 | 747 | 776 | 773 | 791 | 783 | 727 |
| 41 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 42 | 655 | 655 | 659 | 662 | 659 | 805 | 868 | 864 | 856 | 675 | 706 | 701 | 704 | 697 | 662 |
| 43 | 745 | 745 | 754 | 753 | 753 | 873 | 926 | 922 | 914 | 757 | 766 | 763 | 804 | 796 | 717 |
| 44 | 727 | 739 | 738 | 740 | 732 | 851 | 904 | 901 | 897 | 753 | 761 | 748 | 789 | 780 | 703 |
| 45 | 678 | 679 | 688 | 691 | 687 | 795 | 857 | 854 | 845 | 699 | 698 | 697 | 734 | 727 | 651 |
| 46 | 622 | 618 | 634 | 550 | 700 | 802 | 866 | 864 | 856 | 709 | 703 | 702 | 0 | 614 | 0 |
| 47 | 705 | 705 | 709 | 710 | 708 | 804 | 869 | 868 | 860 | 714 | 705 | 705 | 761 | 752 | 658 |
| 48 | 732 | 731 | 738 | 739 | 740 | 846 | 905 | 903 | 894 | 744 | 744 | 742 | 789 | 782 | 694 |
| 49 | 734 | 735 | 746 | 750 | 747 | 876 | 930 | 926 | 915 | 750 | 767 | 765 | 795 | 778 | 717 |
| 50 | 719 | 719 | 728 | 730 | 730 | 847 | 905 | 901 | 893 | 733 | 741 | 739 | 778 | 770 | 690 |
| 51 | 664 | 664 | 669 | 671 | 670 | 783 | 848 | 846 | 838 | 681 | 684 | 681 | 714 | 706 | 635 |
| 52 | 671 | 671 | 676 | 679 | 680 | 801 | 867 | 863 | 853 | 686 | 696 | 693 | 723 | 716 | 648 |
| 53 | 679 | 680 | 687 | 690 | 693 | 819 | 885 | 882 | 874 | 697 | 716 | 712 | 736 | 729 | 670 |
| 54 | 720 | 720 | 725 | 730 | 728 | 864 | 920 | 915 | 906 | 732 | 757 | 753 | 775 | 767 | 706 |

Table 6.2.3. (continued)

| Cycle | 89.04 | | 89.05 | | | | | | | | | | | 89.06 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | 1.05 | 8.05 | 29.05 | 5.06 | 5.06 | 9.06 | 14.06 | 21.06 | 21.06 | 29.06 | 5.07 | 5.07 | 7.07 | 10.07 | 10.07 |
| Time | 8.07 | 9.02 | 8.14 | 8.09 | 13.11 | 8.49 | 14.50 | 8.31 | 13.57 | 9.47 | 9.01 | 13.15 | 8.48 | 8.44 | 23.44 |
| FPD | 382 | 390 | 407 | 414 | 414 | 418 | 423 | 426 | 426 | 434 | 440 | 440 | 442 | 442 | 445 |
| Orient. | F 8 S | | F 8 N | | | | | F 8 S | | | | | | F 8 S | |
| VDU | -250 | -250 | -250 | -250 | -250 | -250 | -250 | -250 | -250 | -250 | -250 | -250 | -250 | -250 | -250 |
| %Ne | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 20 | 20 | 20 | 20 | 0 |
| MW | 45 | 45 | 45 | 45 | 45 | 44 | 44 | 42 | 42 | 41.5 | 40.7 | 40.7 | 40.4 | 45 | 45 |
| Crtl | 58 | 59 | 58 | 60 | 60 | 63 | 65 | 60 | 60 | 61 | 62 | 62 | 62 | 63 | 63 |
| TC No. | Temperature (°C) | | | | | | | | | | | | | | |
| 37 | 680 | 681 | 687 | 687 | 688 | 667 | 657 | 634 | 635 | 687 | 667 | 670 | 666 | 707 | 651 |
| 38 | 688 | 691 | 695 | 696 | 695 | 675 | 665 | 648 | 648 | 700 | 680 | 683 | 679 | 723 | 666 |
| 39 | 731 | 734 | 729 | 728 | 729 | 708 | 697 | 685 | 685 | 737 | 714 | 716 | 713 | 758 | 700 |
| 40 | 745 | 748 | 740 | 740 | 740 | 719 | 708 | 696 | 697 | 750 | 725 | 728 | 723 | 770 | 712 |
| 41 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 42 | 665 | 666 | 670 | 669 | 669 | 650 | 641 | 621 | 621 | 672 | 651 | 655 | 650 | 691 | 636 |
| 43 | 753 | 758 | 729 | 730 | 729 | 709 | 698 | 710 | 709 | 762 | 735 | 739 | 735 | 782 | 723 |
| 44 | 740 | 741 | 715 | 714 | 715 | 693 | 685 | 696 | 696 | 747 | 724 | 727 | 722 | 769 | 711 |
| 45 | 689 | 690 | 658 | 658 | 658 | 639 | 629 | 646 | 647 | 697 | 676 | 679 | 675 | 719 | 663 |
| 46 | 0 | 702 | 0 | 663 | 663 | 0 | 0 | 0 | 0 | 712 | 0 | 0 | 0 | 0 | 0 |
| 47 | 711 | 713 | 669 | 669 | 670 | 651 | 642 | 671 | 671 | 723 | 701 | 705 | 701 | 748 | 690 |
| 48 | 742 | 744 | 708 | 707 | 708 | 687 | 677 | 698 | 699 | 750 | 725 | 729 | 724 | 771 | 713 |
| 49 | 748 | 0 | 729 | 0 | 731 | 663 | 699 | 702 | 701 | 753 | 728 | 731 | 726 | 774 | 718 |
| 50 | 728 | 731 | 709 | 709 | 709 | 690 | 679 | 689 | 689 | 741 | 717 | 719 | 716 | 761 | 703 |
| 51 | 668 | 670 | 655 | 654 | 655 | 637 | 627 | 635 | 636 | 685 | 665 | 668 | 663 | 705 | 649 |
| 52 | 674 | 677 | 665 | 664 | 664 | 647 | 637 | 636 | 636 | 688 | 666 | 670 | 665 | 709 | 651 |
| 53 | 689 | 691 | 684 | 683 | 683 | 665 | 655 | 645 | 647 | 697 | 675 | 679 | 675 | 717 | 660 |
| 54 | 728 | 730 | 717 | 716 | 716 | 697 | 686 | 677 | 678 | 730 | 706 | 709 | 705 | 749 | 692 |

## 6.3 NUCLEAR DATA

The nuclear data consist of (1) post-cycle HIP-TEDDIE volume-averaged data, (2) power and burnup data and graphs, and (3) fast neutron fluence values per cycle, averaged and for two cut-off energies.

The post-cycle HIP-TEDDIE volume-averaged data are presented in Tables 6.3.1 through 6.3.23. In each table, the startup fluence rate (flux), the cycle average fluence rate, and the fluence are given where appropriate for, or corresponding to, the following quantities: (1) the four energy groups used in the HIP-TEDDIE code; (2) the fission, 2200 m/s and the EDN flux; (3) the flux for cutoff energies of 0.1 and 1.0 MeV; and (4) the damage flux graphite. Also given are the nuclear heating, the axial shape factors, and the number of EFPD. For cycle 87.03.1, the change in the value of the EFPD is given by the handwritten entry.

The volume-averaged fluence rates per cycle and the irradiation times are given in Table 6.3.24. The volume-averaged power and burnup, the power and burnup at maximum flux, and the power and burnup for GA and KFA piggyback samples for the uranium and thorium chains (except for KFA piggyback samples with only uranium chains contributing) are presented as a function of the number of EFPD in Figs. 6.3.1 through 6.3.14 and in Tables 6.3.25 through 6.3.31. The power and burnups are given for each fissioning nuclide and for the sum of the contributions in the uranium and thorium chains. The figures follow the table with the corresponding data.

In Tables 6.3.32 through 6.3.34, the fast neutron fluences at the end of each cycle for $E > 0.1$ MeV, the cycle mean fast neutron fluences for $E > 0.1$ MeV but adjusted to the final fluence values, and the cycle mean fast neutron fluences for $E > 0.18$ MeV adjusted to the final fluence values are presented. The latter table applies to the HTGR. The method and data used to convert fluence values from the HFR to the HTGR are described in ref. 29.

Table 6.3.1. Post-cycle HIP-TEDDIE volume-average data
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

Cycle : 87.03.1
Position : F 8
Orientation : North

| | Start-up fluence rate m^-2 s^-1*10^18 | Neutron fluence m^-2*10^25 | Cycle average fluence rate m^-2 s^-1*10^18 |
|---|---|---|---|
| Neutron flux 1 E> 1.353 MeV | .561 | .0405 | .562 |
| Neutron flux 2 1.353MeV>E>.0674MeV | 1.003 | .0723 | 1.003 |
| Neutron flux 3 .0674MeV>E>.683 eV | 1.326 | .0957 | 1.328 |
| Neutron flux 4 E<.683 eV | .846 | .0616 | .855 |
| Fission flux | .742 | .0535 | .743 |
| 2200 m/s flux | .772 | .056 | .777 |
| Neutron flux E>1 MeV | .707 | .0509 | .706 |
| Neutron flux E>.1 MeV | 1.465 | .1056 | 1.465 |
| DAR Graphite (1) | 2.219 | - | - |
| Damage flux Graphite | 1.741 | .1255 | 1.742 |
| EDN flux (2) | .957 | .0689 | .956 |
| Nuclear heating W/g | 3.199 | 3.236 | - |
| DPA Graphite (3) | - | .0911 | - |
| Axial shape factors (4) | | | |
| - fast fluence | - | 1.260 | - |
| - thermal fluence | - | 1.230 | - |
| Full power days | - | 8.340 7.52 | - |

(1): Damage to activation ratio for graphite
(2): Equivalent DIDO Nickel Fluence
(3): Displacement per Atom

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Table 6.3.2. Post-cycle HIP-TEDDIE volume-average data
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

Cycle : 87.03.2
Position : F 8
Orientation : North

| | Start-up fluence rate m^-2 s^-1*10^18 | Neutron fluence m^-2*10^25 | Cycle average fluence rate m^-2 s^-1*10^18 |
|---|---|---|---|
| Neutron flux 1 E> 1.353 MeV | .563 | .071 | .559 |
| Neutron flux 2 1.353MeV>E>.0674MeV | 1.006 | .128 | 1.008 |
| Neutron flux 3 .0674MeV>E>.683 eV | 1.329 | .169 | 1.332 |
| Neutron flux 4 E<.683 eV | .852 | .110 | .867 |
| Fission flux | .744 | .094 | .741 |
| 2200 m/s flux | .776 | .100 | .788 |
| Neutron flux E>1 MeV | .709 | .090 | .709 |
| Neutron flux E>.1 MeV | 1.469 | .186 | 1.465 |
| DAR Graphite (1) | 2.219 | - | - |
| Damage flux Graphite | 1.745 | .221 | 1.741 |
| EDN flux (2) | .959 | .122 | .961 |
| Nuclear heating W/g | 3.204 | 3.279 | - |
| DPA Graphite (3) | - | .161 | - |
| Axial shape factors (4) | | | |
| - fast fluence | - | 1.260 | - |
| - thermal fluence | - | 1.230 | - |
| Full power days | - | 14.690<br>13.75 | - |

(1): Damage to activation ratio for graphite
(2): Equivalent DIDO Nickel Fluence
(3): Displacement per Atom
(4): max/average

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Table 6.3.3. Post-cycle HIP-TEDDIE volume-average data
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

Cycle : 87.05
Position : F 8
Orientation : South

| | Start-up fluence rate m^-2 s^-1*10^18 | Neutron fluence m^-2*10^25 | Cycle average fluence rate m^-2 s^-1*10^18 |
|---|---|---|---|
| Neutron flux 1 E> 1.353 MeV | .508 | .105 | .514 |
| Neutron flux 2 1.353MeV>E>.0674MeV | .914 | .190 | .930 |
| Neutron flux 3 .0674MeV>E>.683 eV | 1.211 | .252 | 1.233 |
| Neutron flux 4 E<.683 eV | .748 | .159 | .778 |
| Fission flux | .678 | .139 | .680 |
| 2200 m/s flux | .687 | .145 | .710 |
| Neutron flux E>1 MeV | .640 | .133 | .651 |
| Neutron flux E>.1 MeV | 1.331 | .276 | 1.351 |
| DAR Graphite (1) | 2.23 | - | - |
| Damage flux Graphite | 1.582 | .328 | 1.605 |
| EDN flux (2) | .869 | .180 | .881 |
| Nuclear heating W/g | 2.932 | 3.083 | - |
| DPA Graphite (3) | - | .238 | - |
| Axial shape factors (4) | | | |
| - fast fluence | - | 1.260 | - |
| - thermal fluence | - | 1.230 | - |
| Full power days | - | 23.650 | - |

(1): Damage to activation ratio for graphite
(2): Equivalent DIDO Nickel Fluence
(3): Displacement per Atom
(4): max/average

Table 6.3.4. Post-cycle HIP-TEDDIE volume-average data
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

Cycle : 87.09
Position : F 8
Orientation : North

| | Start-up fluence rate m^-2 s^-1*10^18 | Neutron fluence m^-2*10^25 | Cycle averaged fluence rate m^-2 s^-1*10^18 |
|---|---|---|---|
| Neutron flux 1 E>. 1.353 MeV | .650 | .113 | .653 |
| Neutron flux 2 1.353MeV>E>.0674MeV | 1.190 | .207 | 1.196 |
| Neutron flux 3 .0674MeV>E>.683 eV | 1.591 | .278 | 1.606 |
| Neutron flux 4 E<.683 eV | 1.072 | .193 | 1.115 |
| Fission flux | .859 | .149 | .861 |
| 2200 m/s flux | .966 | .173 | 1.000 |
| Neutron flux E>1 MeV | .822 | .143 | .826 |
| Neutron flux E>.1 MeV | 1.722 | .299 | 1.728 |
| DAR Graphite (1) | 2.255 | - | - |
| Damage flux Graphite | 2.048 | .356 | 2.057 |
| EDN flux (2) | 1.125 | .196 | 1.133 |
| Nuclear heating W/g | 3.83 | 3.97 | - |
| DPA Graphite (3) | - | .259 | - |
| Axial shape factors (4) | | | |
| - fast fluence | - | 1.260 | - |
| - thermal fluence | - | 1.230 | - |
| Full power days | - | 20.03 | - |

(1): Damage to activation ratio for graphite
(2): Equivalent DIDO Nickel Fluence
(3): Displacement per Atom
(4): max/average

Table 6.3.5. Post-cycle HIP-TEDDIE volume-average data
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

Cycle : 87.10.1
Position : F 8
Orientation : South

| | Start-up fluence rate m^-2 s^-1*10^18 | Neutron fluence m^-2*10^25 | Cycle averaged fluence rate m^-2 s^-1*10^18 |
|---|---|---|---|
| Neutron flux 1 E> 1.353 MeV | .633 | .087 | .631 |
| Neutron flux 2 1.353MeV>E>.0674MeV | 1.158 | .159 | 1.153 |
| Neutron flux 3 .0674MeV>E>.683 eV | 1.548 | .214 | 1.552 |
| Neutron flux 4 E<.683 eV | 1.058 | .149 | 1.081 |
| Fission flux | .837 | .115 | .834 |
| 2200 m/s flux | .950 | .134 | .972 |
| Neutron flux E>1 MeV | .801 | .110 | .798 |
| Neutron flux E>.1 MeV | 1.677 | .231 | 1.675 |
| DAR Graphite (1) | 2.254 | - | - |
| Damage flux Graphite | 1.995 | .275 | 1.994 |
| EDN flux (2) | 1.096 | .151 | 1.095 |
| Nuclear heating W/g | 3.77 | 3.84 | - |
| DPA Graphite (3) | - | .199 | - |
| Axial shape factors (4) | | | |
| - fast fluence | - | 1.260 | - |
| - thermal fluence | - | 1.230 | - |
| Full power days | - | 15.96 | - |

(1): Damage to activation ratio for graphite
(2): Equivalent DIDO Nickel Fluence
(3): Displacement per Atom
(4): max/average

Table 6.3.6. Post-cycle HIP-TEDDIE volume-average data
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

Cycle : 87.10.2
Position : F 8
Orientation : South

| | Start-up fluence rate m^-2 s^-1*10^18 | Neutron fluence m^-2*10^25 | Cycle averaged fluence rate m^-2 s^-1*10^18 |
|---|---|---|---|
| Neutron flux 1 E> 1.353 MeV | .646 | .048 | .641 |
| Neutron flux 2 1.353MeV>E>.0674MeV | 1.181 | .088 | 1.175 |
| Neutron flux 3 .0674MeV>E>.683 eV | 1.578 | .117 | 1.562 |
| Neutron flux 4 E<.683 eV | 1.098 | .083 | 1.108 |
| Fission flux | .854 | .063 | .841 |
| 2200 m/s flux | .983 | .074 | .988 |
| Neutron flux E>1 MeV | .817 | .061 | .814 |
| Neutron flux E>.1 MeV | 1.710 | .127 | 1.695 |
| DAR Graphite (1) | 2.252 | - | - |
| Damage flux Graphite | 2.034 | .151 | 2.016 |
| EDN flux (2) | 1.118 | .083 | 1.108 |
| Nuclear heating W/g | 3.83 | 3.82 | - |
| DPA Graphite (3) | - | .1097 | - |
| Axial shape factors (4) | | | |
| - fast fluence | - | 1.260 | - |
| - thermal fluence | - | 1.230 | - |
| Full power days | - | 8.67 | - |

(1): Damage to activation ratio for graphite
(2): Equivalent DIDO Nickel Fluence
(3): Displacement per Atom
(4): max/average

Table 6.3.7. Post-cycle HIP-TEDDIE volume-average data
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

Cycle : 88.01
Position : F 2
Orientation : South

| | Start-up fluence rate m^-2 s^-1*10^18 | Neutron fluence m^-2*10^25 | Cycle averaged fluence rate m^-2 s^-1*10^18 |
|---|---|---|---|
| Neutron flux 1 E> 1.353 MeV | 0.511 | 0.114 | 0.512 |
| Neutron flux 2 1.353MeV>E>.0674MeV | 0.952 | 0.213 | 0.957 |
| Neutron flux 3 .0674MeV>E>.683 eV | 1.254 | 0.281 | 1.263 |
| Neutron flux 4 E<.683 eV | 0.768 | 0.176 | 0.791 |
| Fission flux | 0.676 | 0.151 | 0.678 |
| 2200 m/s flux | 0.707 | 0.161 | 0.723 |
| Neutron flux E>1 MeV | 0.649 | 0.145 | 0.652 |
| Neutron flux E>.1 MeV | 1.369 | 0.306 | 1.375 |
| DAR Graphite (1) | 2.279 | - | - |
| Damage flux Graphite | 1.628 | 0.364 | 1.635 |
| EDN flux (2) | 0.895 | 0.200 | 0.899 |
| Nuclear heating W/g | 2.91 | 3.06 | - |
| DPA Graphite (3) | - | 0.264 | - |
| Axial shape factors (4) | | | |
| - fast fluence | - | 1.260 | - |
| - thermal fluence | - | 1.230 | - |
| Full power days | - | 25.76 | - |

(1): Damage to activation ratio for graphite
(2): Equivalent DIDO Nickel Fluence
(3): Displacement per Atom
(4): max/average

Table 6.3.8. Post-cycle HIP-TEDDIE volume-average data
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

Cycle : 88.02
Position : F 2
Orientation : North

| | Start-up fluence rate m^-2 s^-1*10^18 | Neutron fluence m^-2*10^25 | Cycle averaged fluence rate m^-2 s^-1*10^18 |
|---|---|---|---|
| Neutron flux 1 E> 1.353 MeV | 0.574 | 0.125 | 0.569 |
| Neutron flux 2 1.353MeV>E>.0674MeV | 1.071 | 0.233 | 1.060 |
| Neutron flux 3 .0674MeV>E>.683 eV | 1.408 | 0.308 | 1.401 |
| Neutron flux 4 E<.683 eV | 0.898 | 0.201 | 0.915 |
| Fission flux | 0.759 | 0.165 | 0.751 |
| 2200 m/s flux | 0.819 | 0.183 | 0.833 |
| Neutron flux E>1 MeV | 0.729 | 0.159 | 0.723 |
| Neutron flux E>.1 MeV | 1.540 | 0.335 | 1.524 |
| DAR Graphite (1) | 2.282 | - | - |
| Damage flux Graphite | 1.832 | 0.399 | 1.815 |
| EDN flux (2) | 1.006 | 0.219 | 1.000 |
| Nuclear heating W/g | 3.24 | 3.31 | - |
| DPA Graphite (3) | - | 0.290 | - |
| Axial shape factors (4) | | | |
| - fast fluence | - | 1.260 | - |
| - thermal fluence | - | 1.230 | - |
| Full power days | - | 25.44 | - |

(1): Damage to activation ratio for graphite
(2): Equivalent DIDO Nickel Fluence
(3): Displacement per Atom
(4): max/average

Table 6.3.9. Post-cycle HIP-TEDDIE volume-average data
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

Cycle : 88.04
Position : F 8
Orientation : North

| | Start-up fluence rate m^-2 s^-1*10^18 | Neutron fluence m^-2*10^25 | Cycle averaged fluence rate m^-2 s^-1*10^18 |
|---|---|---|---|
| Neutron flux 1 E> 1.353 MeV | 0.596 | 0.131 | 0.589 |
| Neutron flux 2 1.353MeV>E>.0674MeV | 1.078 | 0.236 | 1.061 |
| Neutron flux 3 .0674MeV>E>.683 eV | 1.433 | 0.316 | 1.420 |
| Neutron flux 4 E<.683 eV | 0.937 | 0.213 | 0.957 |
| Fission flux | 0.788 | 0.173 | 0.778 |
| 2200 m/s flux | 0.850 | 0.192 | 0.883 |
| Neutron flux E>1 MeV | 0.752 | 0.165 | 0.742 |
| Neutron flux E>.1 MeV | 1.567 | 0.344 | 1.546 |
| DAR Graphite (1) | 2.238 | - | - |
| Damage flux Graphite | 1.863 | 0.408 | 1.834 |
| EDN flux (2) | 1.023 | 0.224 | 1.007 |
| Nuclear heating W/g | 3.48 | 3.55 | - |
| DPA Graphite (3) | - | 0.297 | - |
| Axial shape factors (4) | | | |
| - fast fluence | - | 1.260 | - |
| - thermal fluence | - | 1.230 | - |
| Full power days | - | 25.75 | - |

(1): Damage to activation ratio for graphite
(2): Equivalent DIDO Nickel Fluence
(3): Displacement per Atom
(4): max/average

Table 6.3.10. Post-cycle HIP-TEDDIE volume-average data
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

Cycle : 88.05
Position : F 8
Orientation : South

| | Start-up fluence rate m^-2 s^-1*10^18 | Neutron fluence m^-2*10^25 | Cycle averaged fluence rate m^-2 s^-1*10^18 |
|---|---|---|---|
| Neutron flux 1 E> 1.353 MeV | 0.610 | 0.132 | 0.606 |
| Neutron flux 2 1.353MeV>E>.0674MeV | 1.103 | 0.239 | 1.097 |
| Neutron flux 3 .0674MeV>E>.683 eV | 1.461 | 0.318 | 1.460 |
| Neutron flux 4 E<.683 eV | 0.928 | 0.208 | 0.955 |
| Fission flux | 0.806 | 0.175 | 0.803 |
| 2200 m/s flux | 0.847 | 0.189 | 0.868 |
| Neutron flux E>1 MeV | 0.770 | 0.167 | 0.767 |
| Neutron flux E>.1 MeV | 1.601 | 0.348 | 1.598 |
| DAR Graphite (1) | 2.238 | - | - |
| Damage flux Graphite | 1.906 | 0.414 | 1.901 |
| EDN flux (2) | 0.883 | 0.227 | 1.042 |
| Nuclear heating W/g | 3.56 | 3.66 | - |
| DPA Graphite (3) | - | 0.300 | - |
| Axial shape factors (4) | | | |
| - fast fluence | - | 1.260 | - |
| - thermal fluence | - | 1.230 | - |
| Full power days | - | 25.21 | - |

(1): Damage to activation ratio for graphite
(2): Equivalent DIDO Nickel Fluence
(3): Displacement per Atom
(4): max/average

Table 6.3.11. Post-cycle HIP-TEDDIE volume-average data
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

Cycle : 88.06.1
Position : F 8
Orientation : North

| | Start-up fluence rate m^-2 s^-1*10^18 | Neutron fluence m^-2*10^25 | Cycle averaged fluence rate m^-2 s^-1*10^18 |
|---|---|---|---|
| Neutron flux 1 E> 1.353 MeV | 0.541 | 0.048 | 0.540 |
| Neutron flux 2 1.353MeV>E>.0674MeV | 0.987 | 0.088 | 0.984 |
| Neutron flux 3 .0674MeV>E>.683 eV | 1.305 | 0.117 | 1.304 |
| Neutron flux 4 E<.683 eV | 0.872 | 0.079 | 0.869 |
| Fission flux | 0.716 | 0.064 | 0.714 |
| 2200 m/s flux | 0.787 | 0.071 | 0.793 |
| Neutron flux E>1 MeV | 0.684 | 0.062 | 0.683 |
| Neutron flux E>.1 MeV | 1.430 | 0.128 | 1.428 |
| DAR Graphite (1) | 2.248 | - | - |
| Damage flux Graphite | 1.701 | 0.152 | 1.697 |
| EDN flux (2) | 0.934 | 0.084 | 0.933 |
| Nuclear heating W/g | 3.03 | 3.06 | - |
| DPA Graphite (3) | - | 0.1103 | - |
| Axial shape factors (4) | | | |
| - fast fluence | - | 1.260 | - |
| - thermal fluence | - | 1.230 | - |
| Full power days | - | 10.36 | - |

(1): Damage to activation ratio for graphite
(2): Equivalent DIDO Nickel Fluence
(3): Displacement per Atom
(4): max/average

Table 6.3.12. Post-cycle HIP-TEDDIE volume-average data
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

Cycle : 88.06.2
Position : F 8
Orientation : North

| | Start-up fluence rate m^-2 s^-1*10^18 | Neutron fluence m^-2*10^25 | Cycle averaged fluence rate m^-2 s^-1*10^18 |
|---|---|---|---|
| Neutron flux 1 E> 1.353 MeV | 0.546 | 0.049 | 0.544 |
| Neutron flux 2 1.353MeV>E>.0674MeV | 0.994 | 0.0893 | 0.991 |
| Neutron flux 3 .0674MeV>E>.683 eV | 1.316 | 0.1184 | 1.314 |
| Neutron flux 4 E<.683 eV | 0.882 | 0.0802 | 0.890 |
| Fission flux | 0.722 | 0.0648 | 0.719 |
| 2200 m/s flux | 0.796 | 0.0722 | 0.801 |
| Neutron flux E>1 MeV | 0.690 | 0.062 | 0.690 |
| Neutron flux E>.1 MeV | 1.442 | 0.1295 | 1.437 |
| DAR Graphite (1) | 2.247 | - | - |
| Damage flux Graphite | 1.714 | 0.1549 | 1.719 |
| EDN flux (2) | 0.942 | 0.0846 | 0.939 |
| Nuclear heating W/g | 3.04 | 3.08 | - |
| DPA Graphite (3) | - | 0.1118 | - |
| Axial shape factors (4) | | | |
| - fast fluence | - | 1.260 | - |
| - thermal fluence | - | 1.230 | - |
| Full power days | - | 10.43 | - |

(1): Damage to activation ratio for graphite
(2): Equivalent DIDO Nickel Fluence
(3): Displacement per Atom
(4): max/average

Table 6.3.13. Post-cycle HIP-TEDDIE volume-average data
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

Cycle : 88.07
Position : F 8
Orientation : South

| | Start-up fluence rate m^-2 s^-1*10^18 | Neutron fluence m^-2*10^25 | Cycle averaged fluence rate m^-2 s^-1*10^18 |
|---|---|---|---|
| Neutron flux 1 E> 1.353 MeV | 0.541 | 0.098 | 0.539 |
| Neutron flux 2 1.353MeV>E>.0674MeV | 0.988 | 0.179 | 0.985 |
| Neutron flux 3 .0674MeV>E>.683 eV | 1.307 | 0.237 | 1.303 |
| Neutron flux 4 E<.683 eV | 0.857 | 0.159 | 0.875 |
| Fission flux | 0.717 | 0.130 | 0.715 |
| 2200 m/s flux | 0.776 | 0.144 | 0.792 |
| Neutron flux E>1 MeV | 0.685 | 0.124 | 0.682 |
| Neutron flux E>.1 MeV | 1.432 | 0.259 | 1.425 |
| DAR Graphite (1) | 2.247 | - | - |
| Damage flux Graphite | 1.702 | 0.308 | 1.694 |
| EDN flux (2) | 0.935 | 0.169 | 0.930 |
| Nuclear heating W/g | 3.03 | 3.10 | - |
| DPA Graphite (3) | - | 0.224 | - |
| Axial shape factors (4) | | | |
| - fast fluence | - | 1.260 | - |
| - thermal fluence | - | 1.230 | - |
| Full power days | - | 21.04 | - |

(1): Damage to activation ratio for graphite
(2): Equivalent DIDO Nickel Fluence
(3): Displacement per Atom
(4): max/average

Table 6.3.14. Post-cycle HIP-TEDDIE volume-average data
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

Cycle : 88.08
Position : F 8
Orientation : North

| | Start-up fluence rate m^-2 s^-1*10^18 | Neutron fluence m^-2*10^25 | Cycle averaged fluence rate m^-2 s^-1*10^18 |
|---|---|---|---|
| Neutron flux 1 E> 1.353 MeV | 0.549 | 0.101 | 0.545 |
| Neutron flux 2 1.353MeV>E>.0674MeV | 1.000 | 0.184 | 0.993 |
| Neutron flux 3 .0674MeV>E>.683 eV | 1.322 | 0.245 | 1.323 |
| Neutron flux 4 E<.683 eV | 0.871 | 0.165 | 0.891 |
| Fission flux | 0.726 | 0.134 | 0.723 |
| 2200 m/s flux | 0.788 | 0.149 | 0.804 |
| Neutron flux E>1 MeV | 0.694 | 0.128 | 0.691 |
| Neutron flux E>.1 MeV | 1.449 | 0.267 | 1.441 |
| DAR Graphite (1) | 2.247 | - | - |
| Damage flux Graphite | 1.723 | 0.318 | 1.717 |
| EDN flux (2) | 0.947 | 0.175 | 0.945 |
| Nuclear heating W/g | 3.06 | 3.14 | - |
| DPA Graphite (3) | - | 0.231 | - |
| Axial shape factors (4) | | | |
| - fast fluence | - | 1.260 | - |
| - thermal fluence | - | 1.230 | - |
| Full power days | - | 21.44 | - |

(1): Damage to activation ratio for graphite
(2): Equivalent DIDO Nickel Fluence
(3): Displacement per Atom
(4): max/average

Table 6.3.15. Post-cycle HIP-TEDDIE volume-average data
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

Cycle : 88.09
Position : F 8
Orientation : South

| | Start-up fluence rate m^-2 s^-1*10^18 | Neutron fluence m^-2*10^25 | Cycle averaged fluence rate m^-2 s^-1*10^18 |
|---|---|---|---|
| Neutron flux 1 E> 1.353 MeV | 0.551 | 0.101 | 0.550 |
| Neutron flux 2 1.353MeV>E>.0674MeV | 1.000 | 0.183 | 0.996 |
| Neutron flux 3 .0674MeV>E>.683 eV | 1.325 | 0.243 | 1.323 |
| Neutron flux 4 E<.683 eV | 0.899 | 0.169 | 0.920 |
| Fission flux | 0.729 | 0.133 | 0.724 |
| 2200 m/s flux | 0.809 | 0.151 | 0.822 |
| Neutron flux E>1 MeV | 0.696 | 0.127 | 0.691 |
| Neutron flux E>.1 MeV | 1.452 | 0.265 | 1.442 |
| DAR Graphite (1) | 2.247 | - | - |
| Damage flux Graphite | 1.727 | 0.315 | 1.715 |
| EDN flux (2) | 0.949 | 0.173 | 0.942 |
| Nuclear heating W/g | 3.09 | 3.15 | - |
| DPA Graphite (3) | - | 0.229 | - |
| Axial shape factors (4) | | | |
| - fast fluence | - | 1.260 | - |
| - thermal fluence | - | 1.230 | - |
| Full power days | - | 21.26 | - |

(1): Damage to activation ratio for graphite
(2): Equivalent DIDO Nickel Fluence
(3): Displacement per Atom
(4): max/average

Table 6.3.16. Post-cycle HIP-TEDDIE volume-average data
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

Cycle : 88.10
Position : F 8
Orientation : North

| | Start-up fluence rate m^-2 s^-1*10^18 | Neutron fluence m^-2*10^25 | Cycle averaged fluence rate m^-2 s^-1*10^18 |
|---|---|---|---|
| Neutron flux 1 E> 1.353 MeV | 0.600 | 0.108 | 0.598 |
| Neutron flux 2 1.353MeV>E>.0674MeV | 1.077 | 0.194 | 1.073 |
| Neutron flux 3 .0674MeV>E>.683 eV | 1.429 | 0.258 | 1.427 |
| Neutron flux 4 E<.683 eV | 1.004 | 0.186 | 1.029 |
| Fission flux | 0.794 | 0.143 | 0.791 |
| 2200 m/s flux | 0.897 | 0.165 | 0.913 |
| Neutron flux E>1 MeV | 0.756 | 0.136 | 0.752 |
| Neutron flux E>.1 MeV | 1.570 | 0.283 | 1.566 |
| DAR Graphite (1) | 2.286 | - | - |
| Damage flux Graphite | 1.866 | 0.336 | 1.859 |
| EDN flux (2) | 1.025 | 0.185 | 1.023 |
| Nuclear heating W/g | 3.46 | 3.54 | - |
| DPA Graphite (3) | - | 0.244 | - |
| Axial shape factors (4) | | | |
| - fast fluence | - | 1.260 | - |
| - thermal fluence | - | 1.230 | - |
| Full power days | - | 20.92 | - |

(1): Damage to activation ratio for graphite
(2): Equivalent DIDO Nickel Fluence
(3): Displacement per Atom
(4): max/average

Table 6.3.17. Post-cycle HIP-TEDDIE volume-average data
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

Cycle : 88.11
Position : F 8
Orientation : South

| | Start-up fluence rate m^-2 s^-1*10^18 | Neutron fluence m^-2*10^25 | Cycle averaged fluence rate m^-2 s^-1*10^18 |
|---|---|---|---|
| Neutron flux 1 E> 1.353 MeV | 0.558 | 0.103 | 0.557 |
| Neutron flux 2 1.353MeV>E>.0674MeV | 1.011 | 0.186 | 1.006 |
| Neutron flux 3 .0674MeV>E>.683 eV | 1.352 | 0.250 | 1.352 |
| Neutron flux 4 E<.683 eV | 0.935 | 0.177 | 0.957 |
| Fission flux | 0.738 | 0.136 | 0.736 |
| 2200 m/s flux | 0.838 | 0.157 | 0.849 |
| Neutron flux E>1 MeV | 0.703 | 0.130 | 0.703 |
| Neutron flux E>.1 MeV | 1.469 | 0.270 | 1.466 |
| DAR Graphite (1) | 2.239 | - | - |
| Damage flux Graphite | 1.747 | 0.321 | 1.736 |
| EDN flux (2) | 0.960 | 0.177 | 0.957 |
| Nuclear heating W/g | 3.24 | 3.30 | - |
| DPA Graphite (3) | - | 0.233 | - |
| Axial shape factors (4) | | | |
| - fast fluence | - | 1.260 | - |
| - thermal fluence | - | 1.230 | - |
| Full power days | - | 21.40 | - |

(1): Damage to activation ratio for graphite
(2): Equivalent DIDO Nickel Fluence
(3): Displacement per Atom
(4): max/average

Table 6.3.18. Post-cycle HIP-TEDDIE volume-average data
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

Cycle : 89.01
Position : F 8
Orientation : North

| | Start-up fluence rate m^-2 s^-1*10^18 | Neutron fluence m^-2*10^25 | Cycle averaged fluence rate m^-2 s^-1*10^18 |
|---|---|---|---|
| Neutron flux 1 E> 1.353 MeV | 0.572 | 0.103 | 0.569 |
| Neutron flux 2 1.353MeV>E>.0674MeV | 1.019 | 0.183 | 1.011 |
| Neutron flux 3 .0674MeV>E>.683 eV | 1.363 | 0.246 | 1.358 |
| Neutron flux 4 E<.683 eV | 0.950 | 0.177 | 0.972 |
| Fission flux | 0.757 | 0.136 | 0.751 |
| 2200 m/s flux | 0.850 | 0.157 | 0.861 |
| Neutron flux E>1 MeV | 0.720 | 0.129 | 0.712 |
| Neutron flux E>.1 MeV | 1.491 | 0.268 | 1.481 |
| DAR Graphite (1) | 2.216 | - | - |
| Damage flux Graphite | 1.771 | 0.318 | 1.756 |
| EDN flux (2) | 0.960 | 0.175 | 0.966 |
| Nuclear heating W/g | 3.3 | 3.36 | - |
| DPA Graphite (3) | - | 0.231 | - |
| Axial shape factors (4) | | | |
| - fast fluence | - | 1.260 | - |
| - thermal fluence | - | 1.230 | - |
| Full power days | - | 20.96 | - |

(1): Damage to activation ratio for graphite
(2): Equivalent DIDO Nickel Fluence
(3): Displacement per Atom
(4): max/average

Table 6.3.19. Post-cycle HIP-TEDDIE volume-average data
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

Cycle : 89.02
Position : F 8
Orientation : South

| | Start-up fluence rate m^-2 s^-1*E 18 | Neutron fluence m^-2*E 25 | Cycle averaged fluence rate m^-2 s^-1*E 18 |
|---|---|---|---|
| Neutron flux 1 E> 1.353 MeV | 0.572 | 0.101 | 0.622 |
| Neutron flux 2 1.353MeV>E>.0674MeV | 1.127 | 0.182 | 1.120 |
| Neutron flux 3 .0674MeV>E>.683 eV | 1.513 | 0.245 | 1.508 |
| Neutron flux 4 E<.683 eV | 1.073 | 0.178 | 1.096 |
| Fission flux | 0.831 | 0.134 | 0.825 |
| 2200 m/s flux | 0.957 | 0.158 | 0.973 |
| Neutron flux E>1 MeV | 0.792 | 0.128 | 0.788 |
| Neutron flux E>.1 MeV | 1.644 | 0.265 | 1.631 |
| DAR Graphite (1) | 2.225 | - | - |
| Damage flux Graphite | 1.955 | 0.315 | 1.940 |
| EDN flux (2) | 1.074 | 0.173 | 1.065 |
| Nuclear heating W/g | 3.65 | 3.70 | - |
| DPA Graphite (3) | - | 0.229 | - |
| Axial shape factors (4) | | | |
| - fast fluence | - | 1.260 | - |
| - thermal fluence | - | 1.230 | - |
| Full power days | - | 18.80 | - |

(1): Damage to activation ratio for graphite
(2): Equivalent DIDO Nickel Fluence
(3): Displacement per Atom
(4): max/average

Table 6.3.20. Post-cycle HIP-TEDDIE volume-average data
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

Cycle : 89.03
Position : F 8
Orientation : North

| | Start-up fluence rate m^-2 s^-1*E 18 | Neutron fluence m^-2*E 25 | Cycle averaged fluence rate m^-2 s^-1*E 18 |
|---|---|---|---|
| Neutron flux 1 E> 1.353 MeV | 0.586 | 0.099 | 0.58 |
| Neutron flux 2 1.353MeV>E>.0674MeV | 1.038 | 0.176 | 1.030 |
| Neutron flux 3 .06[illegible]MeV>E>.683 eV | 1.374 | 0.233 | 1.365 |
| Neutron flux 4 E<.683 eV | 0.958 | 0.167 | 0.979 |
| Fission flux | 0.775 | 0.131 | 0.768 |
| 2200 m/s flux | 0.857 | 0.148 | 0.867 |
| Neutron flux E>1 MeV | 0.736 | 0.125 | 0.733 |
| Neutron flux E>.1 MeV | 1.521 | 0.258 | 1.510 |
| DAR Graphite (1) | 2.206 | - | - |
| Damage flux Graphite | 1.806 | 0.306 | 1.800 |
| EDN flux (2) | 0.992 | 0.168 | 0.985 |
| Nuclear heating W/g | 3.37 | 3.43 | - |
| DPA Graphite (3) | - | 0.222 | - |
| Axial shape factors (4) | | | |
| - fast fluence | - | 1.260 | - |
| - thermal fluence | - | 1.230 | - |
| Full power days | - | 19.75 | - |

(1): Damage to activation ratio for graphite
(2): Equivalent DIDO Nickel Fluence
(3): Displacement per Atom
(4): max/average

Table 6.3.21. Post-cycle HIP-TEDDIE volume-average data
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

Cycle : 89.04
Position : F 8
Orientation : South

| | Start-up fluence rate m^-2 s^-1*E 18 | Neutron fluence m^-2*E 25 | Cycle averaged fluence rate m^-2 s^-1*E 18 |
|---|---|---|---|
| Neutron flux 1 E> 1.353 MeV | 0.588 | 0.114 | 0.58 |
| Neutron flux 2 1.353MeV>E>.0674MeV | 1.050 | 0.204 | 1.040 |
| Neutron flux 3 .0[illegible]MeV>E>.683 eV | 1.390 | 0.272 | 1.380 |
| Neutron flux 4 E<.683 eV | 0.963 | 0.193 | 0.982 |
| Fission flux | 0.778 | 0.151 | 0.768 |
| 2200 m/s flux | 0.862 | 0.172 | 0.875 |
| Neutron flux E>1 MeV | 0.741 | 0.144 | 0.734 |
| Neutron flux E>.1 MeV | 1.535 | 0.299 | 1.521 |
| DAR Graphite (1) | 2.218 | - | - |
| Damage flux Graphite | 1.823 | 0.355 | 1.806 |
| EDI[illegible]lux (2) | 1.002 | 0.195 | 0.992 |
| Nuclear heating W/g | 3.34 | 3.38 | - |
| DPA Graphite (3) | - | 0.258 | - |
| Axial shape factors (4) | | | |
| - fast fluence | - | 1.260 | - |
| - thermal fluence | - | 1.230 | - |
| Full power days | - | 22.75 | - |

(1): Damage to activation ratio for graphite
(2): Equivalent DIDO Nickel Fluence
(3): Displacement per Atom
(4): max/average

Table 6.3.22. Post-cycle HIP-TEDDIE volume-average data
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

Cycle : 89.05
Position : F 8
Orientation : North

| | Start-up fluence rate m^-2 s^-1*E 18 | Neutron fluence m^-2*E 25 | Cycle averaged fluence rate m^-2 s^-1*E 18 |
|---|---|---|---|
| Neutron flux 1 E> 1.353 MeV | 0.584 | 0.106 | 0.58 |
| Neutron flux 2 1.353MeV>E>.0674MeV | 1.050 | 0.191 | 1.046 |
| Neutron flux 3 .0€ MeV>E>.683 eV | 1.399 | 0.255 | 1.396 |
| Neutron flux 4 E<.683 eV | 0.842 | 0.156 | 0.854 |
| Fission flux | 0.773 | 0.140 | 0.766 |
| 2200 m/s flux | 0.778 | 0.144 | 0.788 |
| Neutron flux E>1 MeV | 0.737 | 0.134 | 0.734 |
| Neutron flux E>.1 MeV | 1.530 | 0.278 | 1.522 |
| DAR Graphite (1) | 2.218 | - | - |
| Damage flux Graphite | 1.819 | 0.330 | 1.807 |
| EDF lux (2) | 0.999 | 0.181 | 0.992 |
| Nuclear heating W/g | 3.35 | 3.342 | - |
| DPA Graphite (3) | - | 0.240 | - |
| Axial shape factors (4) | | | |
| - fast fluence | - | 1.260 | - |
| - thermal fluence | - | 1.230 | - |
| Full power days | - | 21.14 | - |

(1): Damage to activation ratio for graphite
(2): Equivalent DIDO Nickel Fluence
(3): Displacement per Atom
(4): max/average

Table 6.3.23. Post-cycle HIP-TEDDIE volume-average data
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

Cycle : 89.06
Position : F 8
Orientation : South

| | Start-up fluence rate m^-2 s^-1*E 18 | Neutron fluence m^-2*E 25 | Cycle averaged fluence rate m^-2 s^-1*E 18 |
|---|---|---|---|
| Neutron flux 1 E> 1.353 MeV | 0.581 | 0.108 | 0.579 |
| Neutron flux 2 1.353MeV>E>.0674MeV | 1.044 | 0.194 | 1.04 |
| Neutron flux 3 .06[illegible]MeV>E>.683 eV | 1.388 | 0.259 | 1.388 |
| Neutron flux 4 E<.683 eV | 0.838 | 0.160 | 0.857 |
| Fission flux | 0.768 | 0.143 | 0.766 |
| 2200 m/s flux | 0.774 | 0.147 | 0.788 |
| Neutron flux E>1 MeV | 0.732 | 0.136 | 0.729 |
| Neutron flux E>.1 MeV | 1.521 | 0.283 | 1.516 |
| DAR Graphite (1) | 2.227 | - | - |
| Damage flux Graphite | 1.808 | 0.336 | 1.800 |
| EDN flux (2) | 0.994 | 0.185 | 0.991 |
| Nuclear heating W/g | 3.35 | 3.44 | - |
| DPA Graphite (3) | - | 0.244 | - |
| Axial shape factors (4) | | | |
| - fast fluence | - | 1.260 | - |
| - thermal fluence | - | 1.230 | - |
| Full power days | - | 21.60 | - |

(1): Damage to activation ratio for graphite
(2): Equivalent DIDO Nickel Fluence
(3): Displacement per Atom
(4): max/average

Table 6.3.24. HFR-TEDDIE volume-average fluence rates $\phi(10^{18}n/m^2s)$ and irradiation times
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| | HFR-TEDDIE broad group number | | | | | | Time Intervals | |
|---|---|---|---|---|---|---|---|---|
| Y·C | 1 | 2 | 3 | 4 | > 1 MeV | 2200 m/s | FPD | ZPD |
| 87.031 | 0.562 | 1.003 | 1.320 | 0.856 | 0.706 | 0.437 | 7.52 | 1.90 |
| 87.032 | 0.559 | 1.008 | 1.332 | 0.867 | 0.709 | 0.442 | 14.69 | 30.58 |
| 87.051 | 0.514 | 0.930 | 1.233 | 0.778 | 0.651 | 0.400 | 0.64 | 1.94 |
| 87.052 | 0.514 | 0.930 | 1.233 | 0.778 | 0.651 | 0.400 | 23.01 | 120.02 |
| 87.092 | 0.653 | 1.196 | 1.606 | 1.115 | 0.826 | 0.564 | 20.03 | 2.47 |
| 87.101 | 0.631 | 1.153 | 1.552 | 1.081 | 0.798 | 0.547 | 15.96 | 0.88 |
| 87.102 | 0.641 | 1.171 | 1.562 | 1.108 | 0.814 | 0.560 | 8.67 | 23.28 |
| 88.01 | 0.512 | 0.957 | 1.263 | 0.791 | 0.652 | 0.405 | 25.76 | 2.77 |
| 88.02 | 0.569 | 1.060 | 1.401 | 0.915 | 0.723 | 0.467 | 25.44 | 58.40 |
| 88.04 | 0.589 | 1.061 | 1.420 | 0.957 | 0.742 | 0.486 | 25.75 | 2.80 |
| 88.05 | 0.606 | 1.097 | 1.460 | 0.955 | 0.767 | 0.487 | 25.21 | 3.00 |
| 88.061 | 0.540 | 0.984 | 1.304 | 0.869 | 0.683 | 0.442 | 10.36 | 1.55 |
| 88.062 | 0.544 | 0.991 | 1.314 | 0.890 | 0.690 | 0.452 | 10.43 | 54.06 |
| 88.07 | 0.539 | 0.985 | 1.303 | 0.875 | 0.682 | 0.445 | 21.04 | 4.61 |
| 88.08 | 0.545 | 0.993 | 1.323 | 0.891 | 0.691 | 0.453 | 21.44 | 2.78 |
| 88.09 | 0.550 | 0.996 | 1.323 | 0.920 | 0.691 | 0.466 | 21.26 | 4.09 |
| 88.10 | 0.598 | 1.073 | 1.427 | 1.029 | 0.752 | 0.519 | 20.92 | 2.67 |
| 88.11 | 0.557 | 1.060 | 1.352 | 0.957 | 0.703 | 0.485 | 21.40 | 10.57 |
| 89.01 | 0.569 | 1.011 | 1.358 | 0.972 | 0.712 | 0.491 | 20.96 | 3.34 |
| 89.021 | 0.622 | 1.120 | 1.508 | 1.096 | 0.788 | 0.552 | 2.27 | 2.00 |
| 89.022 | 0.622 | 1.120 | 1.508 | 1.096 | 0.788 | 0.552 | 14.42 | 1.89 |
| 89.023 | 0.622 | 1.120 | 1.508 | 1.096 | 0.788 | 0.552 | 2.11 | 29.73 |
| 89.03 | 0.580 | 1.030 | 1.365 | 0.979 | 0.733 | 0.494 | 19.75 | 3.34 |
| 89.04 | 0.580 | 1.040 | 1.380 | 0.982 | 0.734 | 0.496 | 22.75 | 3.69 |
| 89.05 | 0.580 | 1.046 | 1.396 | 0.854 | 0.734 | 0.438 | 21.14 | 2.95 |
| 89.06 | 0.579 | 1.040 | 1.388 | 0.857 | 0.729 | 0.440 | 21.60 | 1000. |

Y·C = year. cycle number or cycle interval number
FPD = full power days
ZPP = zero power days

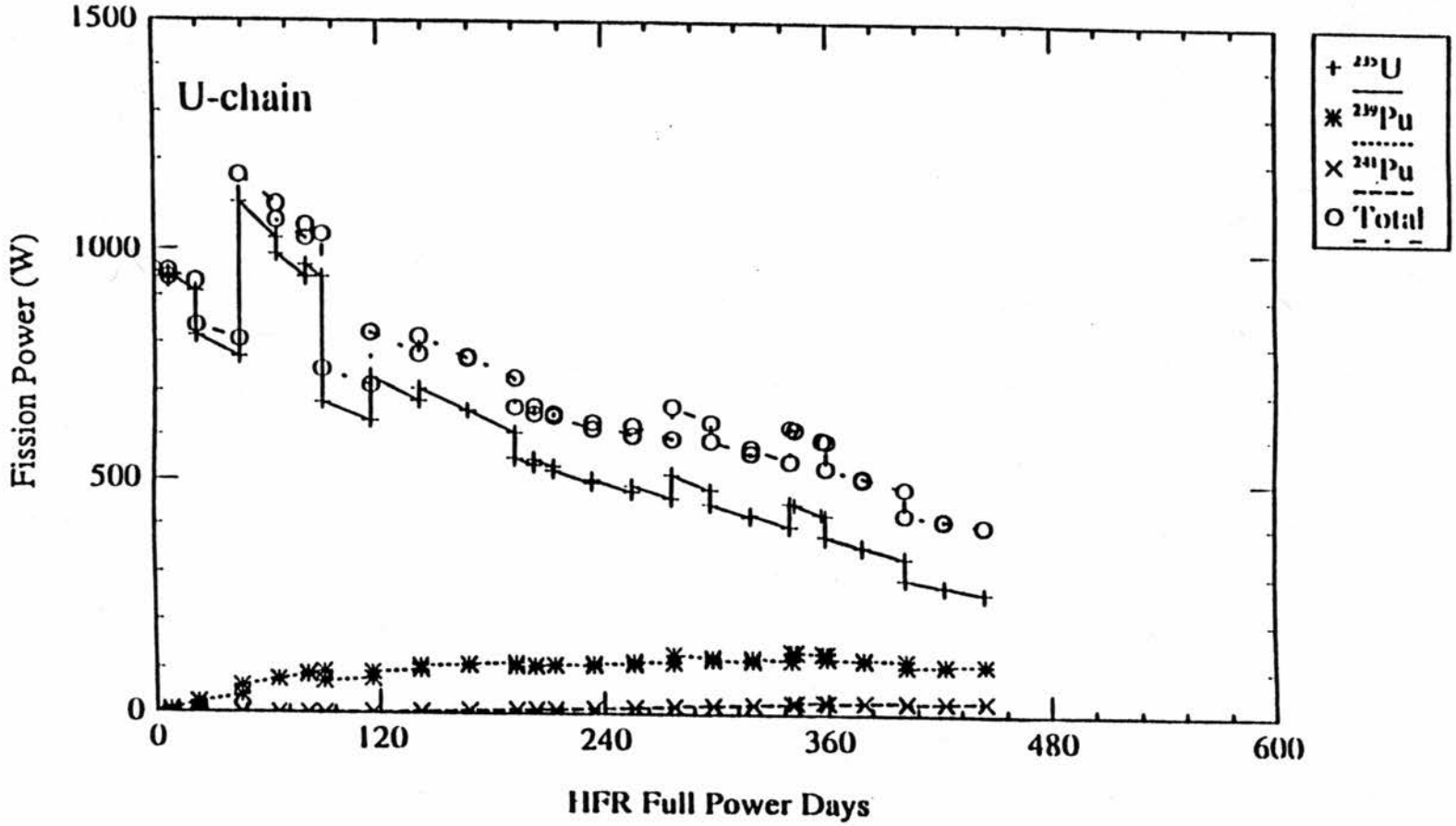



Fig. 6.3.1. Power production in the U-chain nuclides in GA compacts.
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

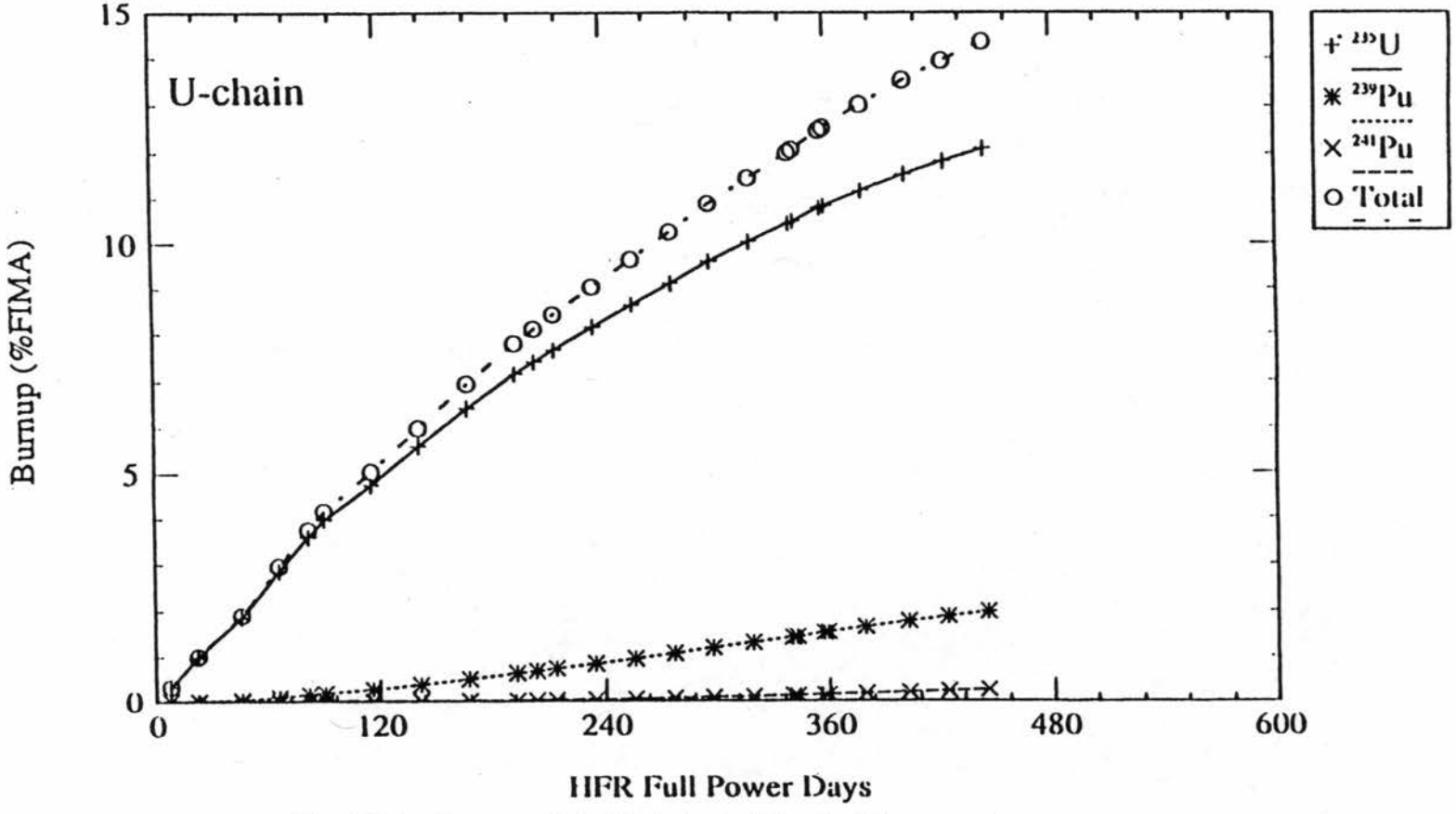



Fig. 6.3.2. Burnup of the U-chain nuclides in GA compacts.
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

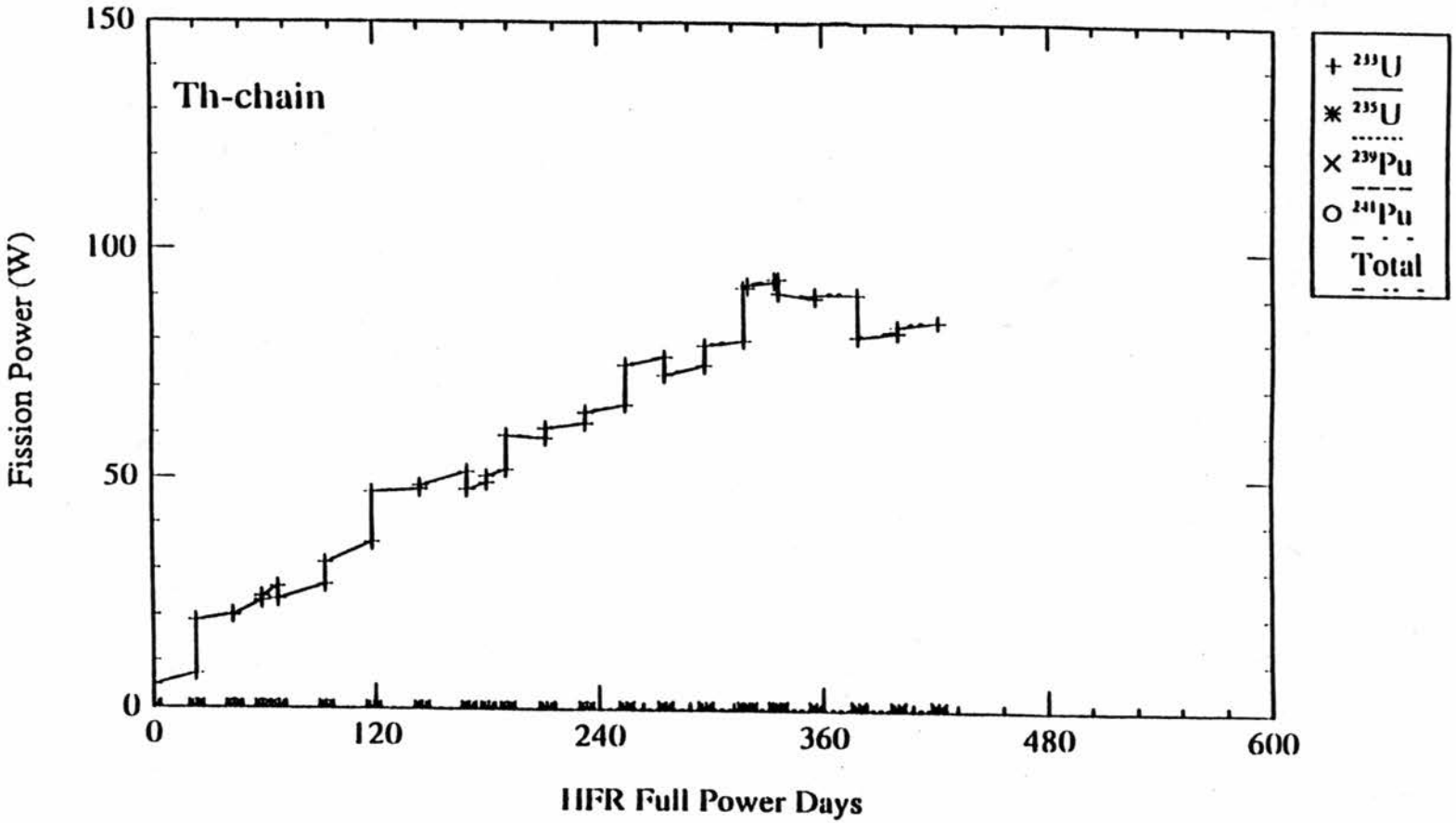



Fig. 6.3.3. Power production in the Th-chain nuclides in GA compacts.
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

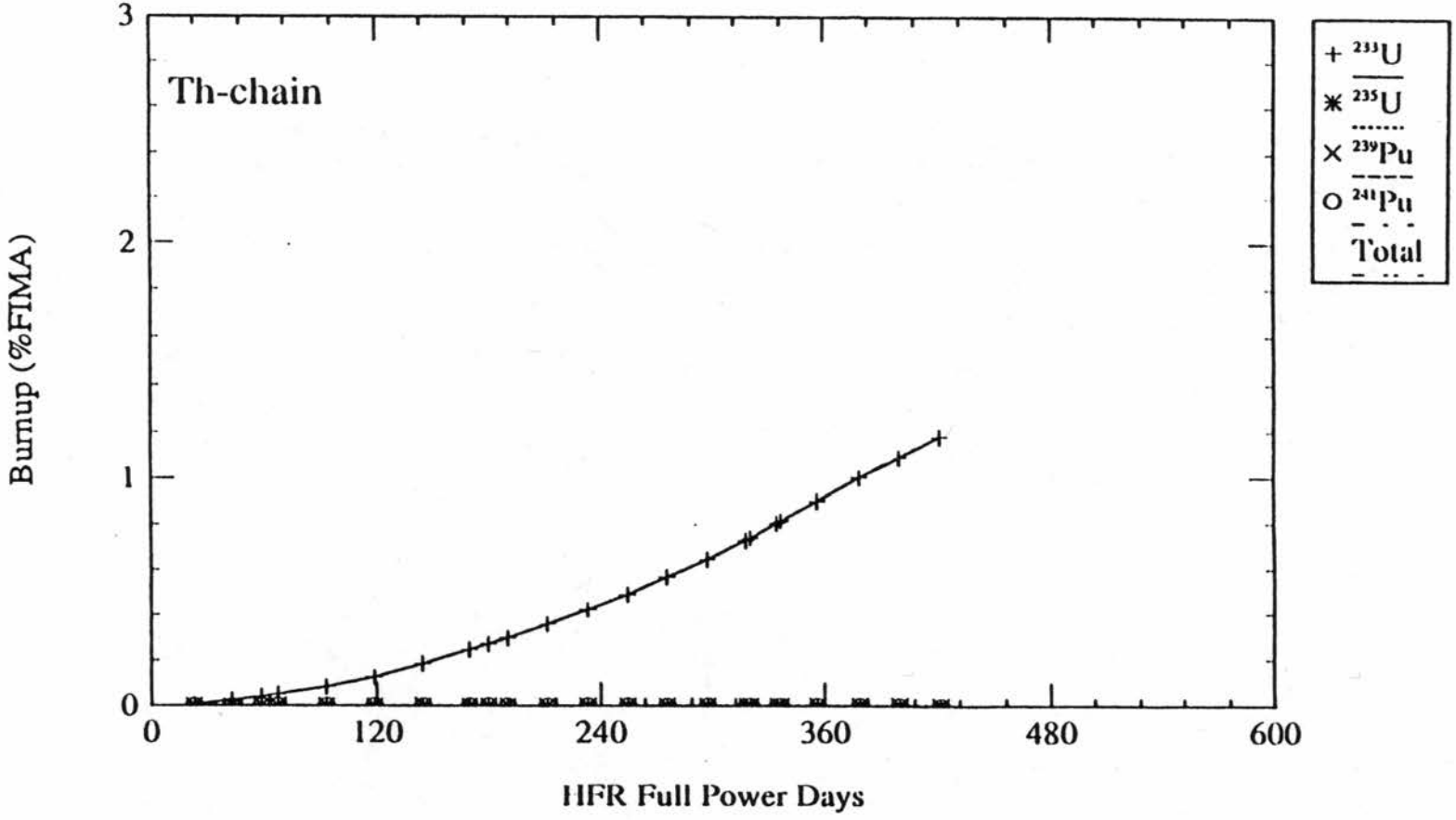



Fig. 6.3.4. Burnup of the Th-chain nuclides in GA compacts.
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

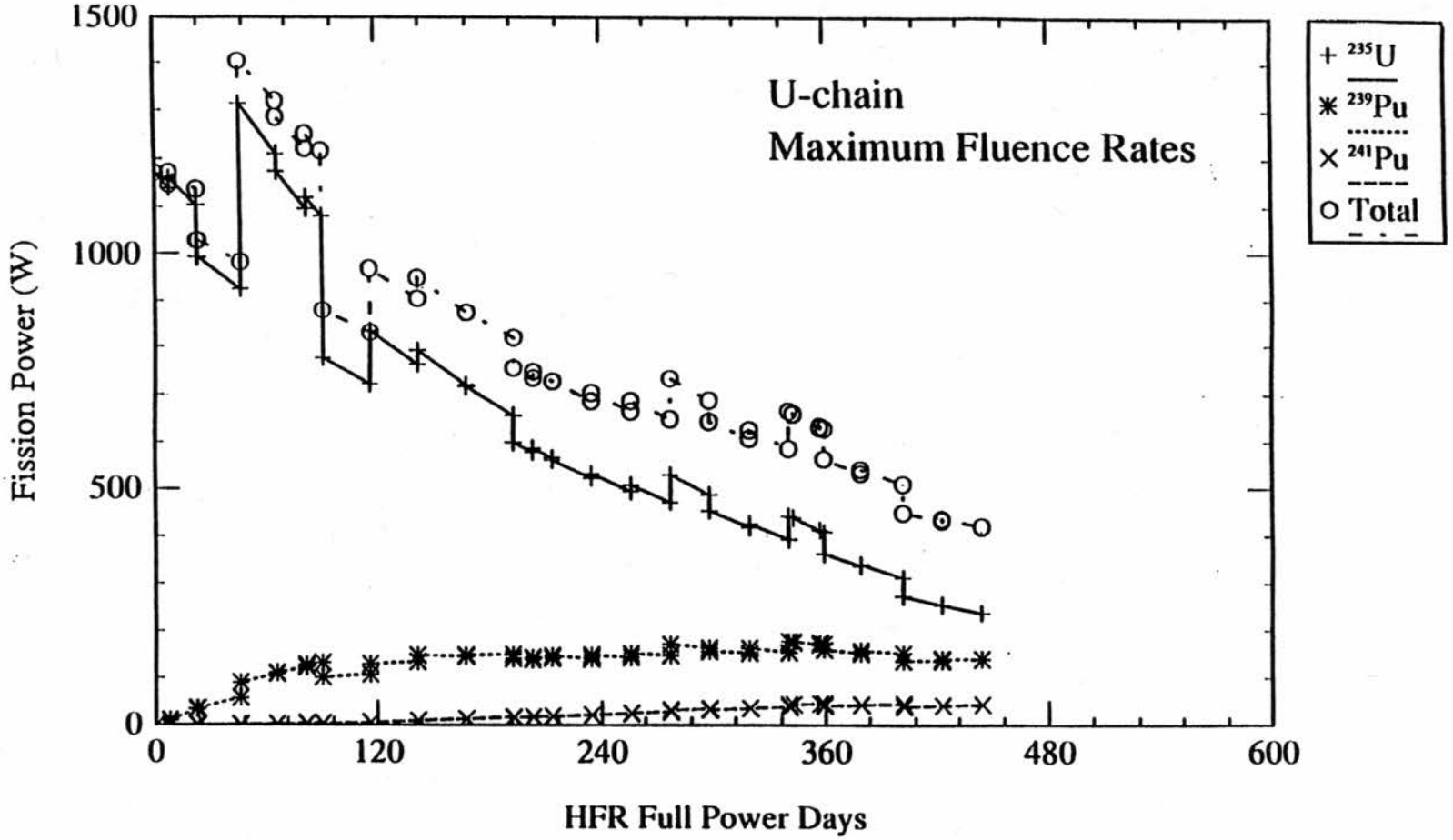



Fig. 6.3.5 Power production in the U-chain nuclides in GA compacts at maximum flux.
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

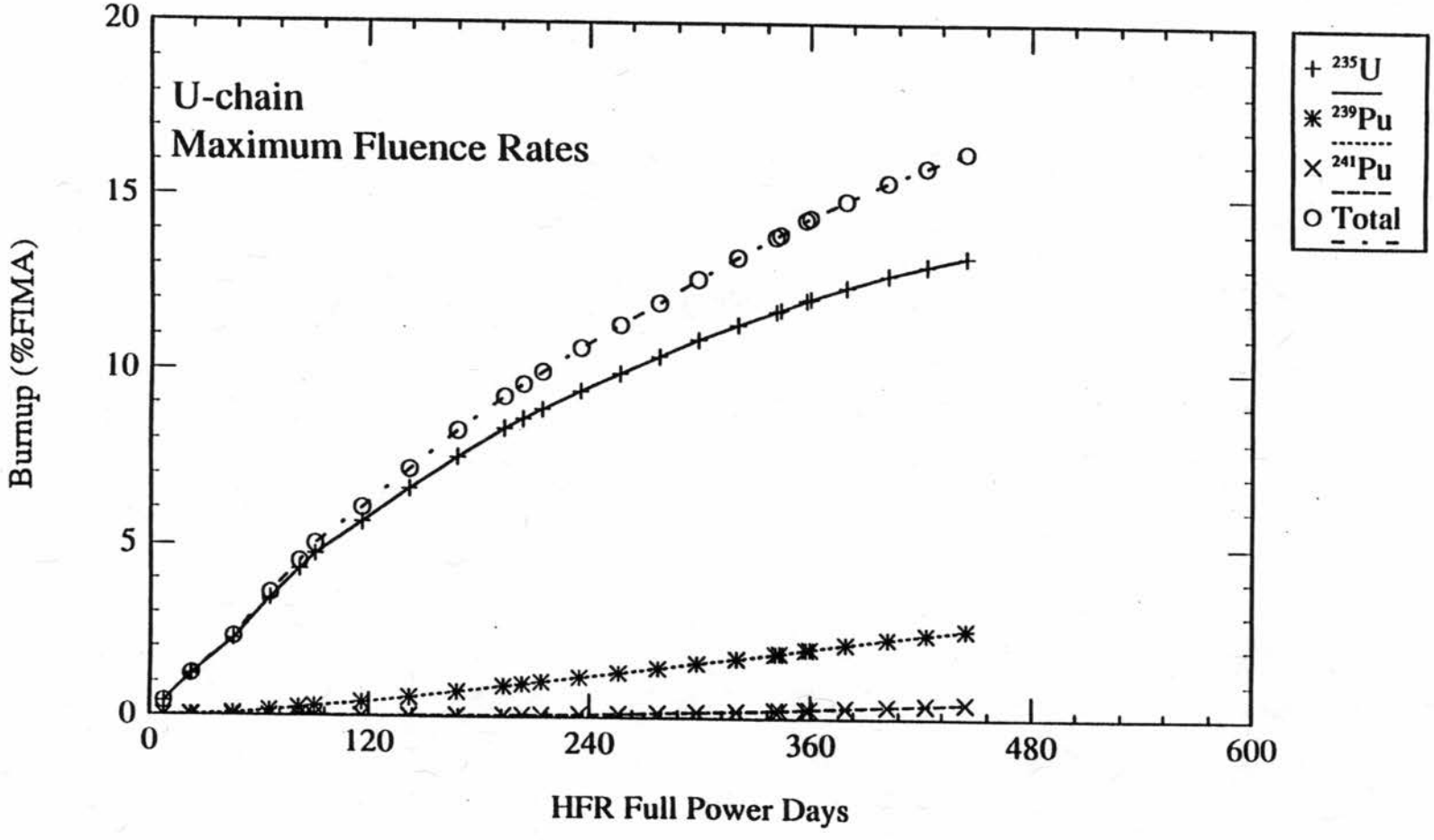



Fig. 6.3.6. Burnup of the U-chain nuclides in GA compacts at maximum flux.
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

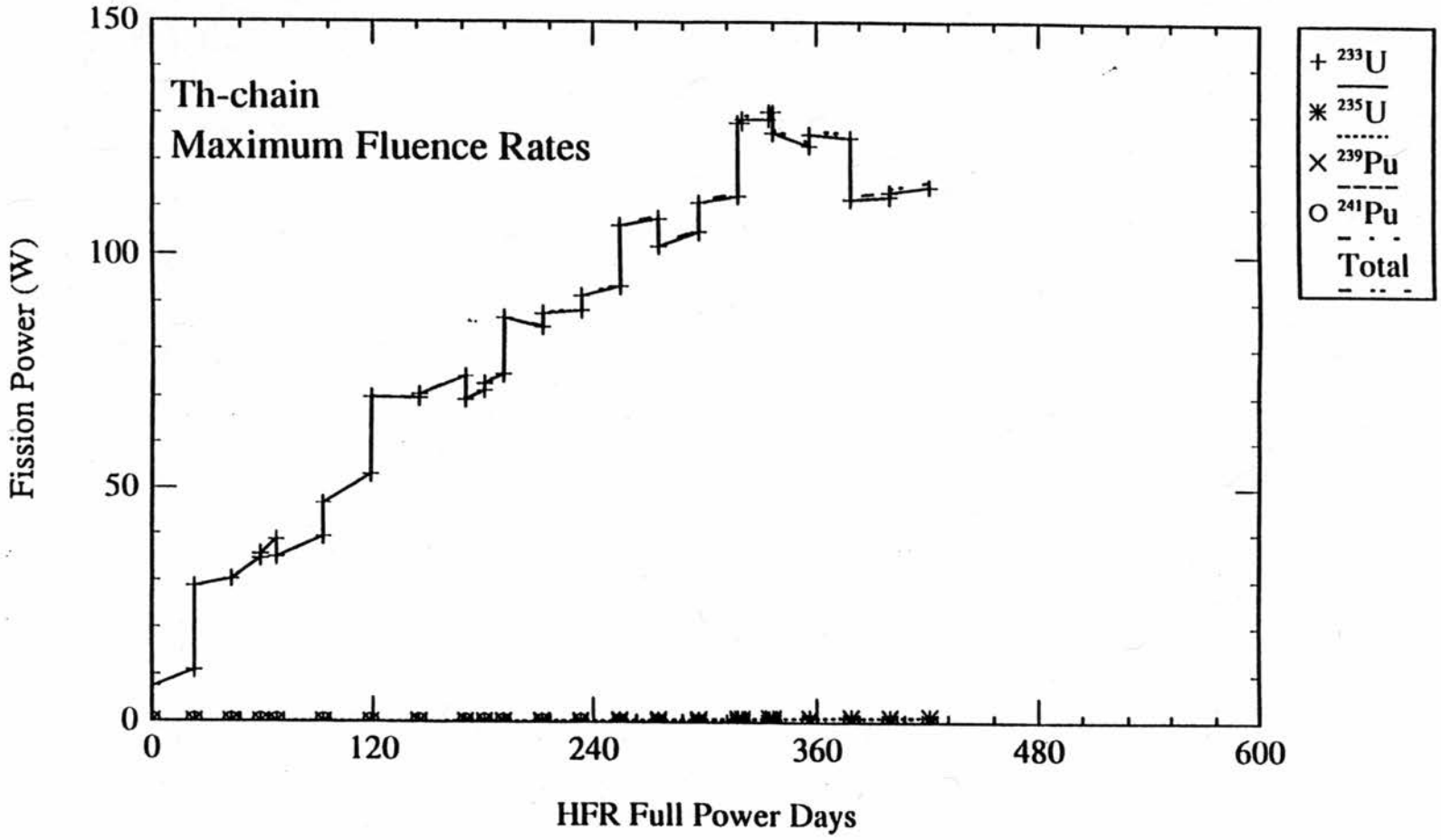



Fig. 6.3.7. Power production in the Th-chain nuclides in GA compacts at maximum flux.
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

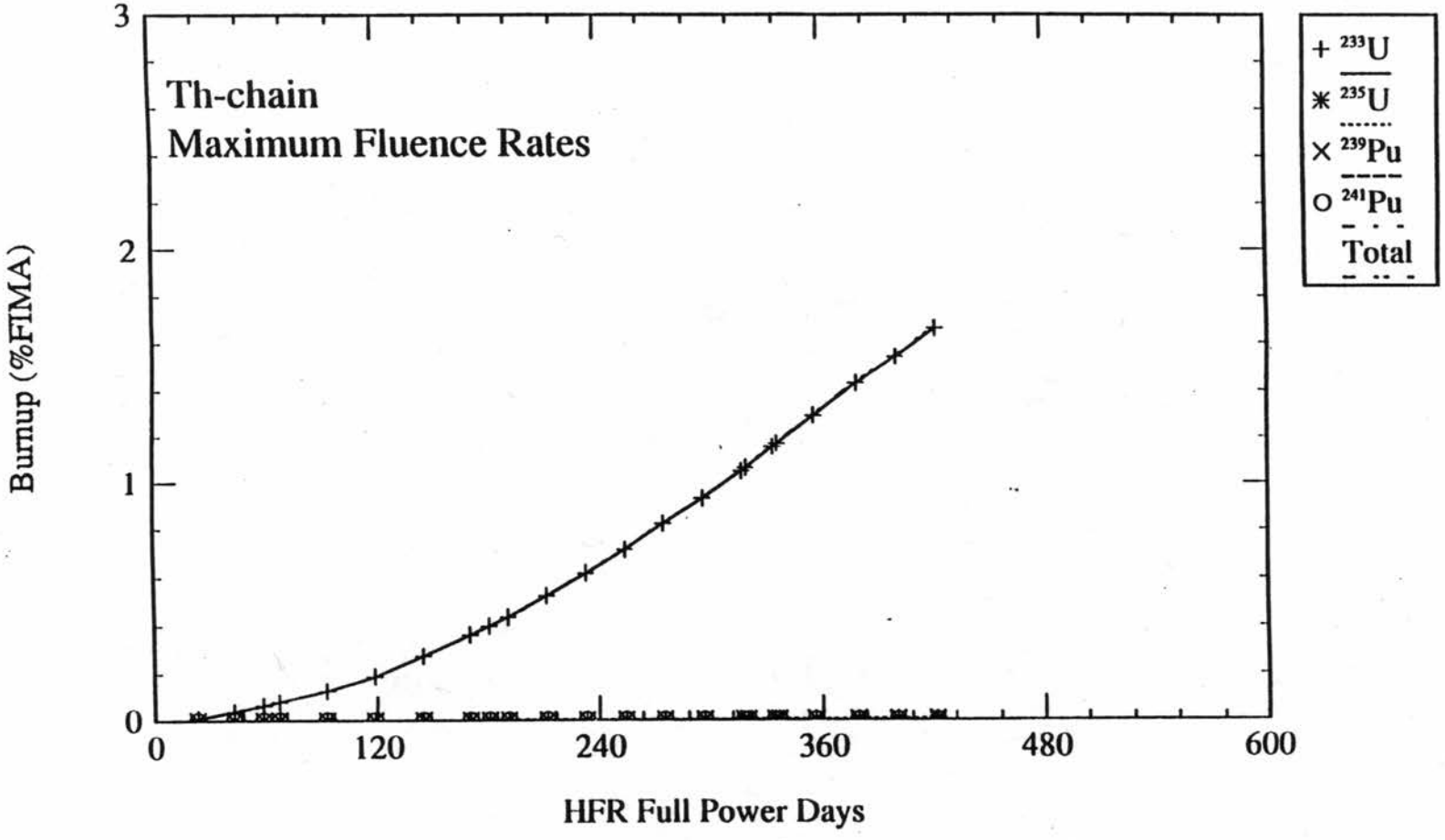



Fig. 6.3.8. Burnup of the Th-chain nuclides in GA compacts at maximum flux.
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

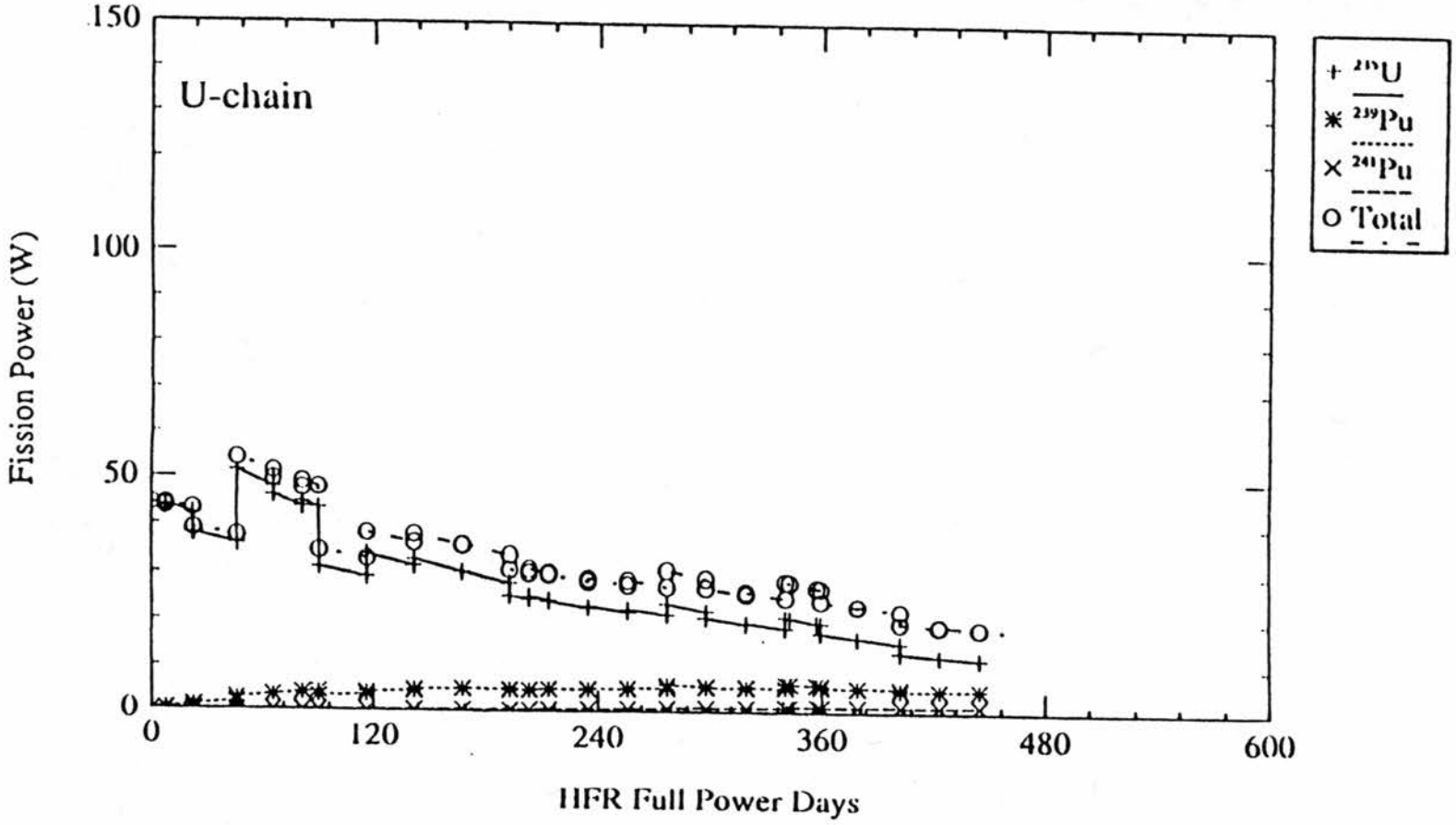



Fig. 6.3.9. Power production in the U-chain nuclides in piggyback samples of GA.
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

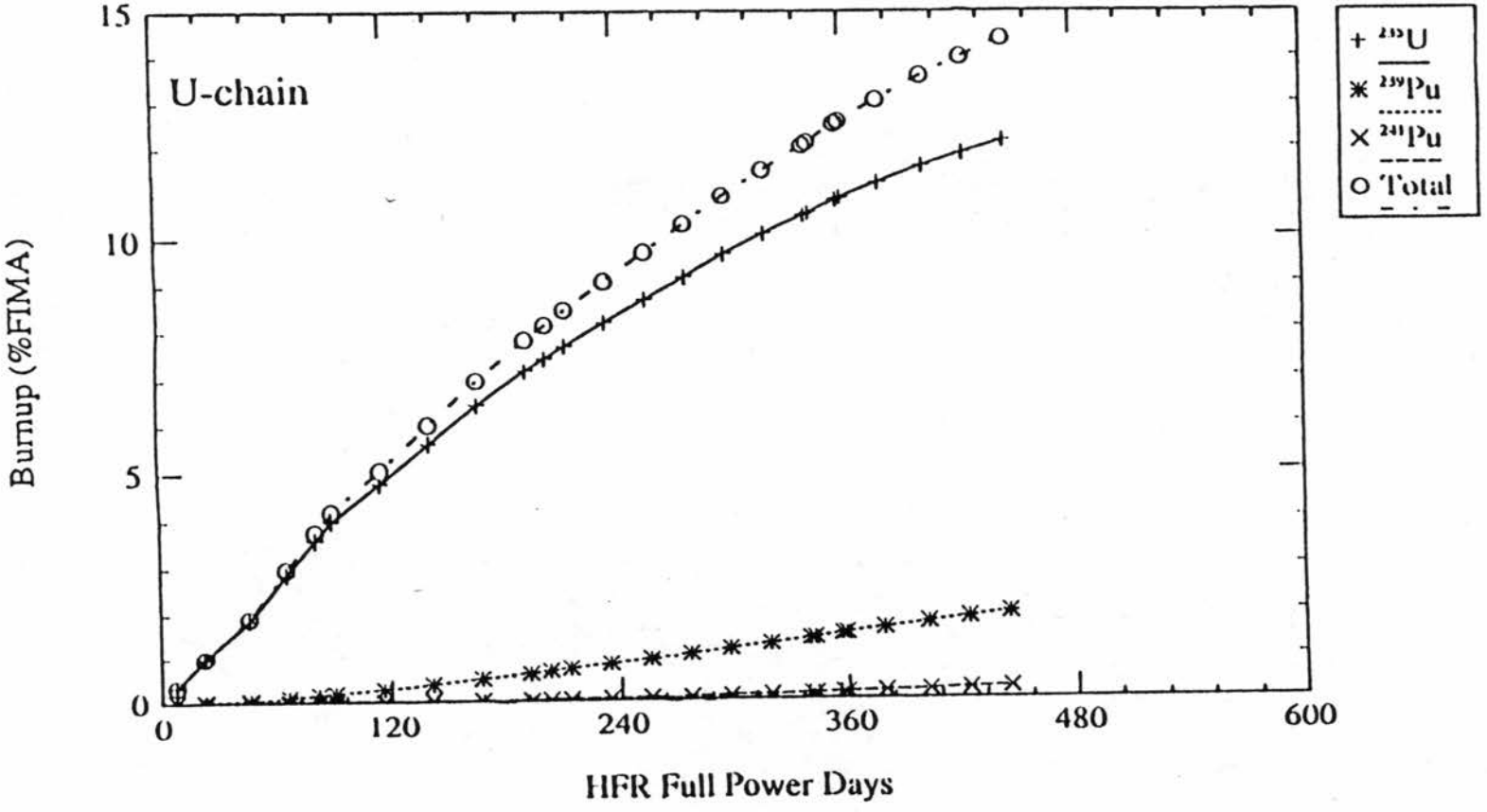



Fig. 6.3.10. Burnup of the U-chain nuclides in piggyback samples of GA.
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

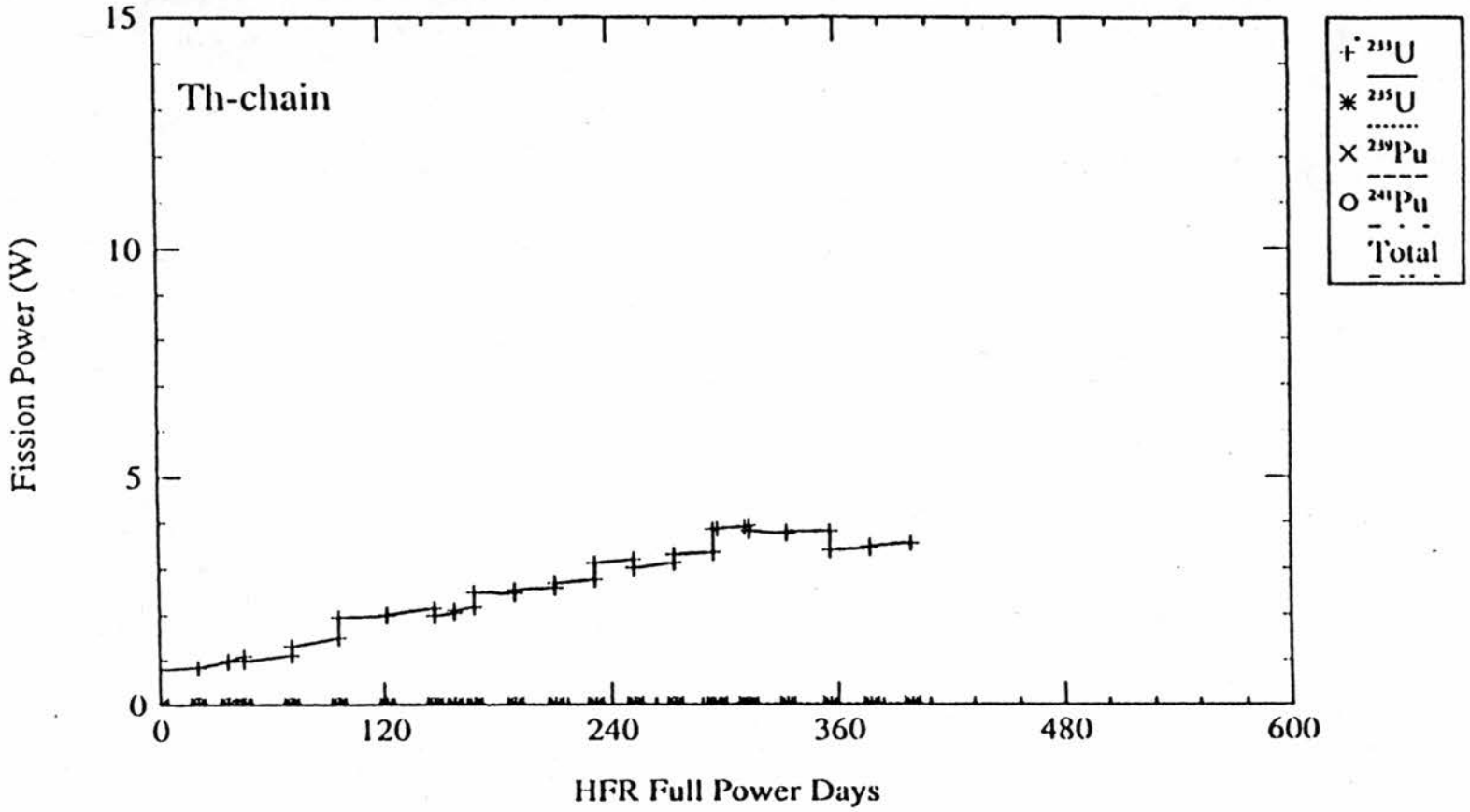



Fig. 6.3.11. Power production in the Th-chain nuclides in piggyback samples of GA.
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

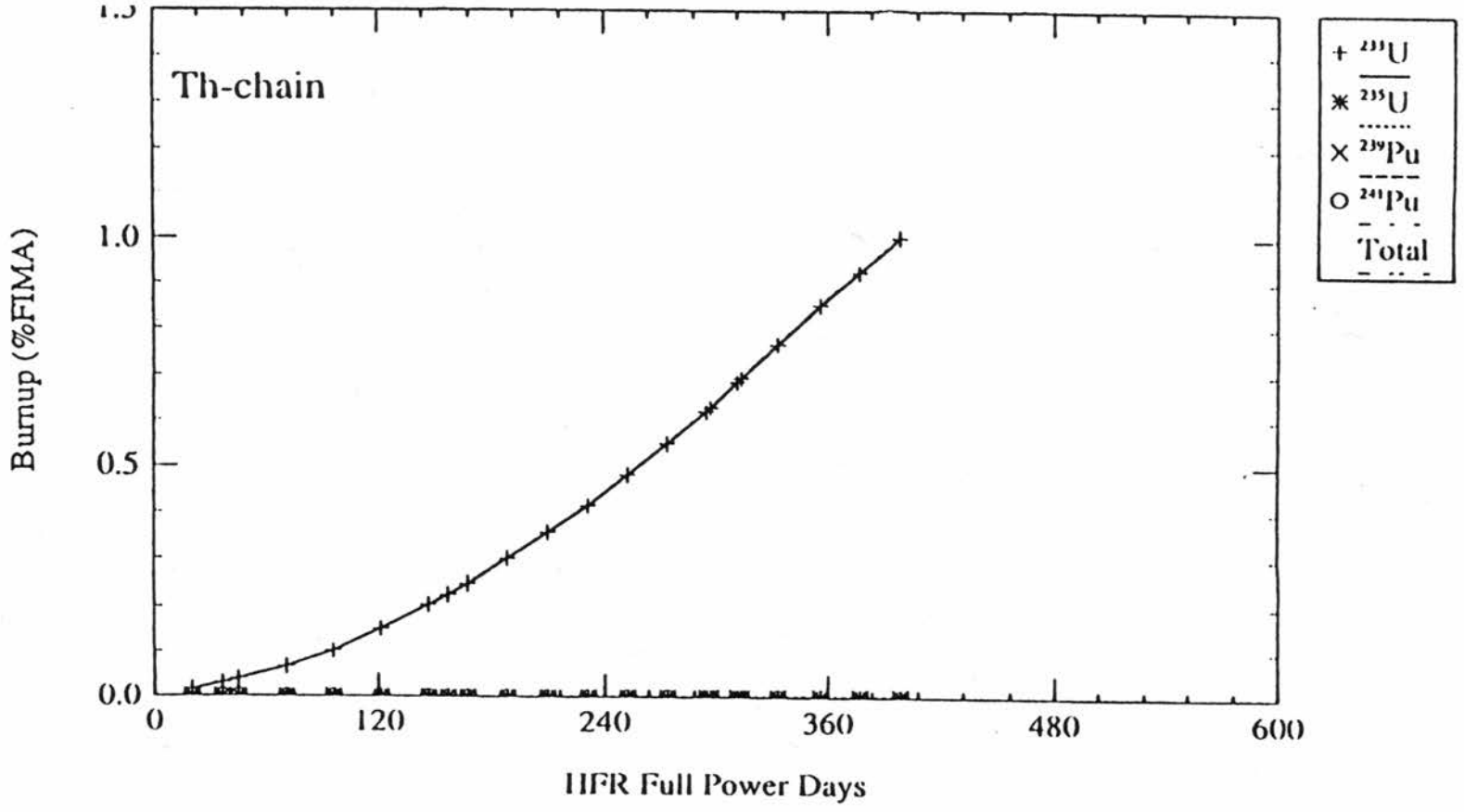



Fig. 6.3.12. Burnup of the Th-chain nuclides in piggyback samples of GA.
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

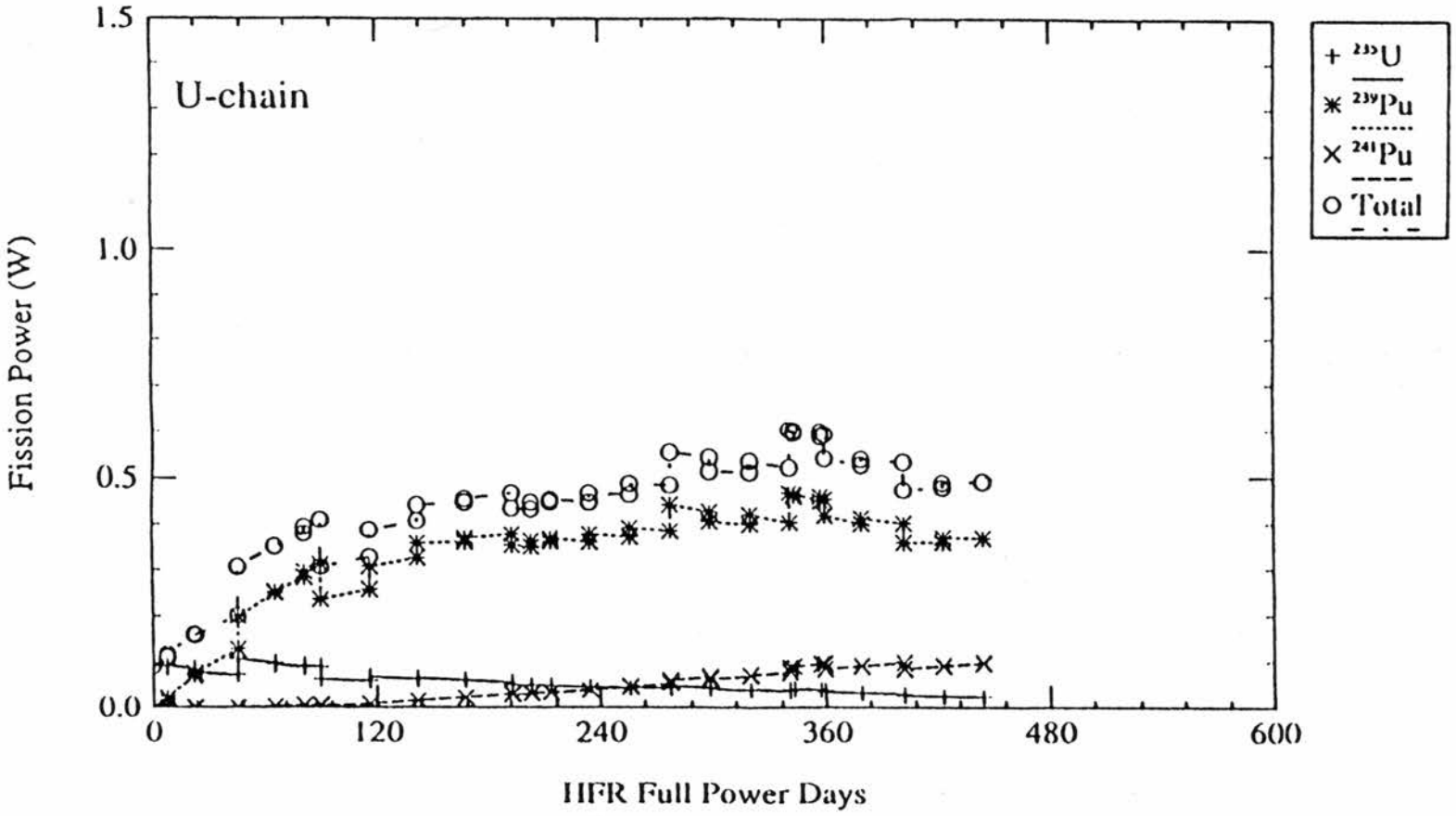



Fig. 6.3.13. Power production in the U-chain nuclides in piggyback samples of KFA.
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

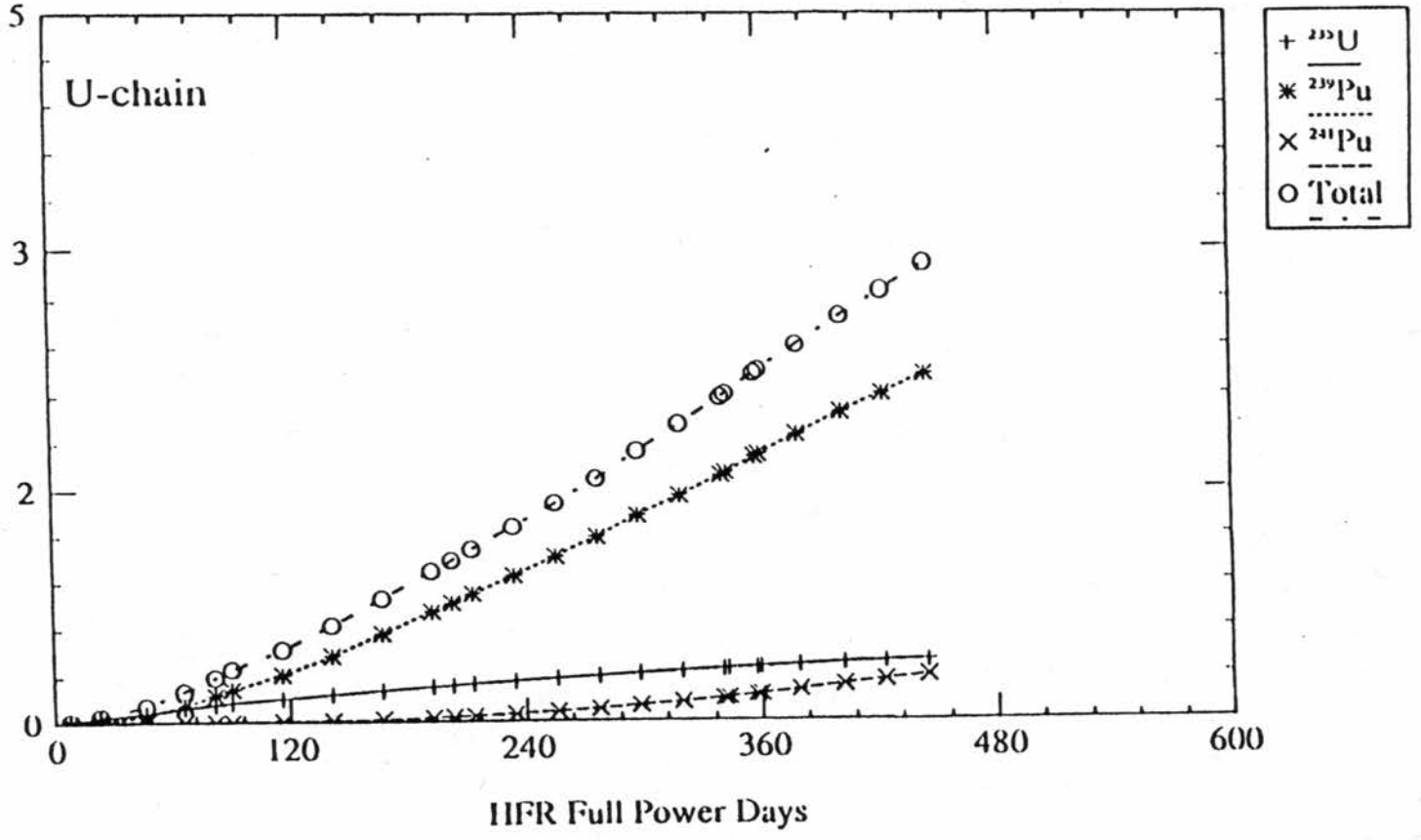



Fig. 6.3.14. Burnup of the U-chain nuclides in piggyback samples of KFA.
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

Table 6.3.25. Power and burnup volume-averaged data for GA compacts in D214.01
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

Date: November 29, 1991
Reactor Chain: Uranium Chain

| | Power (W) | | | | Burnup (% FIMA) | | | |
|---|---|---|---|---|---|---|---|---|
| FPD | $^{235}U$ | $^{239}Pu$ | $^{241}Pu$ | Total | $^{235}U$ | $^{239}Pu$ | $^{241}Pu$ | Total |
| 7.5800 | 945.7285 | 1.8776 | 0.0001 | 947.6062 | 0.3343 | 0.0006 | 0.0000 | 0.3350 |
| 14.6900 | 929.9030 | 13.4004 | 0.0070 | 943.3104 | 0.6371 | 0.0089 | 0.0000 | 0.6460 |
| 0.6400 | 817.0997 | 23.3668 | 0.0211 | 840.4876 | 0.0244 | 0.0007 | 0.0000 | 0.0251 |
| 23.0100 | 796.5581 | 29.2575 | 0.0718 | 825.8875 | 0.8549 | 0.0305 | 0.0001 | 0.8854 |
| 20.0300 | 1072.2058 | 64.8689 | 0.4590 | 1137.5337 | 1.0017 | 0.0589 | 0.0004 | 1.0609 |
| 15.9600 | 970.7537 | 79.2378 | 1.0974 | 1051.0890 | 0.7226 | 0.0573 | 0.0008 | 0.7807 |
| 8.6700 | 955.5254 | 90.8710 | 1.7946 | 1048.1909 | 0.3864 | 0.0357 | 0.0007 | 0.4228 |
| 25.7600 | 652.9997 | 72.9220 | 1.9559 | 727.8776 | 0.7845 | 0.0851 | 0.0023 | 0.8719 |
| 25.4400 | 705.9749 | 93.9309 | 3.7143 | 803.6200 | 0.8377 | 0.1082 | 0.0043 | 0.9502 |
| 25.7500 | 682.7838 | 106.3003 | 5.8091 | 794.8932 | 0.8200 | 0.1240 | 0.0068 | 0.9508 |
| 25.2100 | 633.1757 | 111.5026 | 8.1097 | 752.7880 | 0.7445 | 0.1273 | 0.0093 | 0.8811 |
| 10.3600 | 544.2778 | 105.4156 | 8.9915 | 658.6849 | 0.2630 | 0.0495 | 0.0042 | 0.3167 |
| 10.4300 | 541.2960 | 108.7232 | 10.0953 | 660.1144 | 0.2633 | 0.0514 | 0.0048 | 0.3195 |
| 21.0400 | 510.5790 | 108.5256 | 11.1696 | 630.2742 | 0.5010 | 0.1034 | 0.0106 | 0.6151 |
| 21.4400 | 490.4754 | 111.8066 | 13.2829 | 615.5649 | 0.4905 | 0.1086 | 0.0129 | 0.6119 |
| 21.2600 | 476.7943 | 116.2224 | 15.7123 | 608.7289 | 0.4728 | 0.1119 | 0.0151 | 0.5998 |
| 20.9200 | 499.1407 | 129.8780 | 19.8180 | 648.8367 | 0.4870 | 0.1231 | 0.0188 | 0.6289 |
| 21.4000 | 435.6944 | 120.5871 | 20.6080 | 576.8895 | 0.4349 | 0.1169 | 0.0200 | 0.5717 |
| 20.9600 | 413.8684 | 122.9137 | 22.9319 | 559.7141 | 0.4046 | 0.1167 | 0.0218 | 0.5431 |
| 2.2700 | 450.6094 | 139.8935 | 27.2539 | 617.7567 | 0.0477 | 0.0144 | 0.0028 | 0.0649 |
| 14.4200 | 438.9402 | 137.5051 | 28.1342 | 604.5795 | 0.2952 | 0.0898 | 0.0184 | 0.4034 |
| 2.1100 | 425.7322 | 138.0775 | 29.1246 | 592.9343 | 0.0419 | 0.0132 | 0.0028 | 0.0579 |
| 19.7500 | 368.6486 | 122.6205 | 26.7689 | 518.0380 | 0.3396 | 0.1097 | 0.0239 | 0.4732 |
| 22.7500 | 346.6348 | 122.3259 | 28.7197 | 497.6804 | 0.3678 | 0.1261 | 0.0296 | 0.5235 |
| 21.1400 | 283.7571 | 108.0619 | 26.8283 | 418.6473 | 0.2798 | 0.1035 | 0.0257 | 0.4089 |
| 21.6000 | 268.8645 | 110.9103 | 28.6187 | 408.3934 | 0.2709 | 0.1085 | 0.0280 | 0.4074 |

Table 6.3.26. Power and burnup volume-averaged data for GA compacts in D214.01
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

Date: November 29, 1991
Reactor Chain: Thorium Chain

| | Power (W) | | | | | Burnup (% FIMA) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| FPD | $^{233}U$ | $^{235}U$ | $^{239}Pu$ | $^{241}Pu$ | Total | $^{233}U$ | $^{235}U$ | $^{239}Pu$ | $^{241}Pu$ | Total |
| 23.0100 | 5.6448 | 0.0004 | 0.0000 | 0.0000 | 5.6452 | 0.0064 | 0.0000 | 0.0000 | 0.0000 | 0.0064 |
| 20.0300 | 18.9965 | 0.0025 | 0.0000 | 0.0000 | 18.9991 | 0.0187 | 0.0000 | 0.0000 | 0.0000 | 0.0187 |
| 15.9600 | 21.1219 | 0.0061 | 0.0000 | 0.0000 | 21.1279 | 0.0166 | 0.0000 | 0.0000 | 0.0000 | 0.0166 |
| 8.6700 | 24.8022 | 0.0102 | 0.0000 | 0.0000 | 24.8125 | 0.0106 | 0.0000 | 0.0000 | 0.0000 | 0.0106 |
| 25.7600 | 24.5909 | 0.0116 | 0.0000 | 0.0000 | 24.6026 | 0.0311 | 0.0000 | 0.0000 | 0.0000 | 0.0312 |
| 25.4400 | 33.0991 | 0.0238 | 0.0000 | 0.0000 | 33.1229 | 0.0414 | 0.0000 | 0.0000 | 0.0000 | 0.0414 |
| 25.7500 | 46.6794 | 0.0408 | 0.0000 | 0.0000 | 46.7202 | 0.0591 | 0.0000 | 0.0000 | 0.0000 | 0.0592 |
| 25.2100 | 49.4263 | 0.0621 | 0.0000 | 0.0000 | 49.4884 | 0.0613 | 0.0001 | 0.0000 | 0.0000 | 0.0613 |
| 10.3600 | 48.0478 | 0.0729 | 0.0000 | 0.0000 | 48.1207 | 0.0245 | 0.0000 | 0.0000 | 0.0000 | 0.0245 |
| 10.4300 | 50.9982 | 0.0848 | 0.0000 | 0.0000 | 51.0830 | 0.0262 | 0.0000 | 0.0000 | 0.0000 | 0.0262 |
| 21.0400 | 59.0558 | 0.0993 | 0.0000 | 0.0000 | 59.1551 | 0.0611 | 0.0001 | 0.0000 | 0.0000 | 0.0612 |
| 21.4400 | 61.2057 | 0.1262 | 0.0000 | 0.0000 | 61.3319 | 0.0645 | 0.0001 | 0.0000 | 0.0000 | 0.0647 |
| 21.2600 | 65.0980 | 0.1604 | 0.0000 | 0.0000 | 65.2584 | 0.0681 | 0.0002 | 0.0000 | 0.0000 | 0.0682 |
| 20.9200 | 75.5611 | 0.2179 | 0.0000 | 0.0000 | 75.7789 | 0.0777 | 0.0002 | 0.0000 | 0.0000 | 0.0779 |
| 21.4000 | 73.4488 | 0.2447 | 0.0000 | 0.0000 | 73.6936 | 0.0773 | 0.0002 | 0.0000 | 0.0000 | 0.0775 |
| 20.9600 | 79.5760 | 0.2927 | 0.0000 | 0.0000 | 79.8688 | 0.0820 | 0.0003 | 0.0000 | 0.0000 | 0.0823 |
| 2.2700 | 92.2804 | 0.3639 | 0.0000 | 0.0000 | 92.6443 | 0.0103 | 0.0000 | 0.0000 | 0.0000 | 0.0103 |
| 14.4200 | 93.0003 | 0.3872 | 0.0000 | 0.0000 | 93.3875 | 0.0659 | 0.0003 | 0.0000 | 0.0000 | 0.0662 |
| 2.1100 | 94.2438 | 0.4146 | 0.0000 | 0.0000 | 94.6584 | 0.0098 | 0.0000 | 0.0000 | 0.0000 | 0.0098 |
| 19.7500 | 90.3868 | 0.3968 | 0.0000 | 0.0000 | 90.7835 | 0.0878 | 0.0004 | 0.0000 | 0.0000 | 0.0881 |
| 22.7500 | 90.8396 | 0.4559 | 0.0000 | 0.0000 | 91.2955 | 0.1016 | 0.0005 | 0.0000 | 0.0000 | 0.1021 |
| 21.1400 | 81.8148 | 0.4526 | 0.0000 | 0.0000 | 82.2674 | 0.0850 | 0.0004 | 0.0000 | 0.0000 | 0.0855 |
| 21.6000 | 84.1275 | 0.5089 | 0.0000 | 0.0000 | 84.6364 | 0.0894 | 0.0005 | 0.0000 | 0.0000 | 0.0899 |

Table 6.3.27. Power and burnup at maximum flux for GA compacts in D214.01
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

Date: December 11, 1991
Reactor Chain: Uranium Chain

| | Power (W) | | | | Burnup (%FIMA) | | | |
|---|---|---|---|---|---|---|---|---|
| FPD | $^{235}U$ | $^{239}Pu$ | $^{241}Pu$ | Total | $^{235}U$ | $^{239}Pu$ | $^{241}Pu$ | Total |
| 7.5800 | 1157.5999 | 2.8401 | 0.0002 | 1160.4402 | 0.4092 | 0.0010 | 0.0000 | 0.4102 |
| 14.6900 | 1137.5863 | 20.2366 | 0.0162 | 1157.8390 | 0.7794 | 0.0135 | 0.0000 | 0.7929 |
| 0.6400 | 994.6095 | 35.3293 | 0.0486 | 1029.9874 | 0.0297 | 0.0010 | 0.0000 | 0.0307 |
| 23.0100 | 964.6581 | 43.9024 | 0.1653 | 1008.7257 | 1.0353 | 0.0458 | 0.0002 | 1.0812 |
| 20.0300 | 1265.8700 | 94.7801 | 1.0214 | 1361.6715 | 1.1826 | 0.0860 | 0.0009 | 1.2695 |
| 15.9600 | 1139.4644 | 114.2574 | 2.3942 | 1256.1160 | 0.8482 | 0.0826 | 0.0017 | 0.9325 |
| 8.6700 | 1102.3350 | 128.5132 | 3.8072 | 1234.6554 | 0.4457 | 0.0505 | 0.0015 | 0.4977 |
| 25.7600 | 750.8724 | 101.8526 | 4.0657 | 856.7906 | 0.9021 | 0.1188 | 0.0047 | 1.0257 |
| 25.4400 | 800.2545 | 129.6183 | 7.5627 | 937.4355 | 0.9495 | 0.1494 | 0.0087 | 1.1076 |
| 25.7500 | 759.7676 | 143.5139 | 11.4107 | 914.6921 | 0.9125 | 0.1674 | 0.0133 | 1.0932 |
| 25.2100 | 688.1968 | 146.9160 | 15.3511 | 850.4639 | 0.8092 | 0.1678 | 0.0175 | 0.9945 |
| 10.3600 | 588.4435 | 138.8236 | 16.8085 | 744.0756 | 0.2843 | 0.0651 | 0.0079 | 0.3574 |
| 10.4300 | 576.7539 | 141.8104 | 18.5267 | 737.0911 | 0.2806 | 0.0670 | 0.0088 | 0.3563 |
| 21.0400 | 542.7885 | 141.5583 | 20.2700 | 704.6168 | 0.5326 | 0.1349 | 0.0193 | 0.6869 |
| 21.4400 | 514.3073 | 143.9217 | 23.5685 | 681.7974 | 0.5143 | 0.1398 | 0.0229 | 0.6769 |
| 21.2600 | 490.5343 | 147.7047 | 27.2140 | 665.4531 | 0.4864 | 0.1422 | 0.0262 | 0.6548 |
| 20.9200 | 509.6428 | 165.0233 | 33.8141 | 708.4803 | 0.4973 | 0.1564 | 0.0320 | 0.6857 |
| 21.4000 | 436.6076 | 152.4384 | 34.4134 | 623.4595 | 0.4358 | 0.1478 | 0.0334 | 0.6169 |
| 20.9600 | 410.3931 | 155.4102 | 37.6994 | 603.5027 | 0.4012 | 0.1476 | 0.0358 | 0.5845 |
| 2.2700 | 440.2182 | 175.6853 | 44.0344 | 659.9379 | 0.0466 | 0.0181 | 0.0045 | 0.0692 |
| 14.4200 | 426.1653 | 171.9746 | 45.1161 | 643.2562 | 0.2866 | 0.1123 | 0.0295 | 0.4284 |
| 2.1100 | 410.5334 | 172.8477 | 46.3330 | 629.7142 | 0.0404 | 0.0165 | 0.0044 | 0.0613 |
| 19.7500 | 351.3044 | 152.7585 | 42.1464 | 546.2094 | 0.3236 | 0.1367 | 0.0377 | 0.4980 |
| 22.7500 | 327.2010 | 152.3577 | 44.5377 | 524.0965 | 0.3472 | 0.1570 | 0.0459 | 0.5501 |
| 21.1400 | 264.2372 | 134.1863 | 40.8930 | 439.3165 | 0.2605 | 0.1285 | 0.0392 | 0.4282 |
| 21.6000 | 246.1888 | 137.7782 | 42.9887 | 426.9557 | 0.2480 | 0.1348 | 0.0421 | 0.4249 |

Table 6.3.28. Power and burnup at maximum flux for GA compacts in D214.01
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

Date: December 1, 1991
Reactor Chain: Thorium Chain

| | Power (W) | | | | | Burnup (% FIMA) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| FPD | $^{233}U$ | $^{235}U$ | $^{239}Pu$ | $^{241}Pu$ | Total | $^{233}U$ | $^{235}U$ | $^{239}Pu$ | $^{241}Pu$ | Total |
| 23.0100 | 8.6153 | 0.0010 | 0.0000 | 0.0000 | 8.6163 | 0.0097 | 0.0000 | 0.0000 | 0.0000 | 0.0097 |
| 20.0300 | 28.8499 | 0.0059 | 0.0000 | 0.0000 | 28.8559 | 0.0284 | 0.0000 | 0.0000 | 0.0000 | 0.0284 |
| 15.9600 | 31.9528 | 0.0142 | 0.0000 | 0.0000 | 31.9670 | 0.0251 | 0.0000 | 0.0000 | 0.0000 | 0.0251 |
| 8.6700 | 36.9059 | 0.0237 | 0.0000 | 0.0000 | 36.9296 | 0.0157 | 0.0000 | 0.0000 | 0.0000 | 0.0157 |
| 25.7600 | 36.6421 | 0.0269 | 0.0000 | 0.0000 | 36.6690 | 0.0464 | 0.0000 | 0.0000 | 0.0000 | 0.0464 |
| 25.4400 | 49.2200 | 0.0546 | 0.0000 | 0.0000 | 49.2746 | 0.0616 | 0.0001 | 0.0000 | 0.0000 | 0.0616 |
| 25.7500 | 69.0694 | 0.0927 | 0.0000 | 0.0000 | 69.1621 | 0.0875 | 0.0001 | 0.0000 | 0.0000 | 0.0876 |
| 25.2100 | 71.7643 | 0.1387 | 0.0000 | 0.0000 | 71.9031 | 0.0890 | 0.0002 | 0.0000 | 0.0000 | 0.0891 |
| 10.3600 | 69.8129 | 0.1633 | 0.0000 | 0.0000 | 69.9762 | 0.0356 | 0.0001 | 0.0000 | 0.0000 | 0.0356 |
| 10.4300 | 73.3048 | 0.1875 | 0.0000 | 0.0000 | 73.4923 | 0.0376 | 0.0001 | 0.0000 | 0.0000 | 0.0377 |
| 21.0400 | 85.6024 | 0.2197 | 0.0000 | 0.0000 | 85.8221 | 0.0886 | 0.0002 | 0.0000 | 0.0000 | 0.0888 |
| 21.4400 | 87.8481 | 0.2772 | 0.0000 | 0.0000 | 88.1253 | 0.0926 | 0.0003 | 0.0000 | 0.0000 | 0.0929 |
| 21.2600 | 92.2796 | 0.3477 | 0.0000 | 0.0000 | 92.6273 | 0.0965 | 0.0003 | 0.0000 | 0.0000 | 0.0968 |
| 20.9200 | 106.8698 | 0.4727 | 0.0000 | 0.0000 | 107.3424 | 0.1099 | 0.0005 | 0.0000 | 0.0000 | 0.1104 |
| 21.4000 | 103.4482 | 0.5256 | 0.0000 | 0.0000 | 103.9739 | 0.1089 | 0.0005 | 0.0000 | 0.0000 | 0.1094 |
| 20.9600 | 111.4353 | 0.6276 | 0.0000 | 0.0000 | 112.0629 | 0.1148 | 0.0006 | 0.0000 | 0.0000 | 0.1155 |
| 2.2700 | 128.1040 | 0.7719 | 0.0000 | 0.0000 | 128.8759 | 0.0143 | 0.0001 | 0.0000 | 0.0000 | 0.0144 |
| 14.4200 | 128.9097 | 0.8191 | 0.0000 | 0.0000 | 129.7289 | 0.0914 | 0.0006 | 0.0000 | 0.0000 | 0.0920 |
| 2.1100 | 130.5211 | 0.8748 | 0.0000 | 0.0000 | 131.3959 | 0.0135 | 0.0001 | 0.0000 | 0.0000 | 0.0136 |
| 19.7500 | 124.7560 | 0.8295 | 0.0001 | 0.0000 | 125.5855 | 0.1212 | 0.0008 | 0.0000 | 0.0000 | 0.1219 |
| 22.7500 | 125.0735 | 0.9503 | 0.0001 | 0.0000 | 126.0239 | 0.1399 | 0.0010 | 0.0000 | 0.0000 | 0.1409 |
| 21.1400 | 111.9364 | 0.9370 | 0.0001 | 0.0000 | 112.8735 | 0.1164 | 0.0009 | 0.0000 | 0.0000 | 0.1173 |
| 21.6000 | 113.8261 | 1.0434 | 0.0001 | 0.0000 | 114.8696 | 0.1209 | 0.0011 | 0.0000 | 0.0000 | 0.1219 |

Table 6.3.29. Power and burnup data for GA piggyback samples in D214.01
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

Date: December 02, 1991
Reactor Chain: Uranium Chain

| | Power (W) | | | | Burnup (%FIMA) | | | |
|---|---|---|---|---|---|---|---|---|
| FPD | $^{235}U$ | $^{239}Pu$ | $^{241}Pu$ | Total | $^{235}U$ | $^{239}Pu$ | $^{241}Pu$ | Total |
| 7.5800 | 43.8360 | 0.0867 | 0.0000 | 43.9227 | 0.3355 | 0.0006 | 0.0000 | 0.3361 |
| 14.6900 | 43.1276 | 0.6179 | 0.0003 | 43.7458 | 0.6397 | 0.0089 | 0.0000 | 0.6486 |
| 0.6400 | 37.8285 | 1.0780 | 0.0010 | 38.9074 | 0.0244 | 0.0007 | 0.0000 | 0.0251 |
| 23.0100 | 36.8608 | 1.3504 | 0.0033 | 38.2145 | 0.8564 | 0.0305 | 0.0001 | 0.8869 |
| 20.0300 | 49.7001 | 2.9980 | 0.0212 | 52.7192 | 1.0051 | 0.0589 | 0.0004 | 1.0644 |
| 15.9600 | 45.0134 | 3.6612 | 0.0507 | 48.7253 | 0.7254 | 0.0573 | 0.0008 | 0.7834 |
| 8.6700 | 44.3229 | 4.1976 | 0.0828 | 48.6033 | 0.3880 | 0.0357 | 0.0007 | 0.4244 |
| 25.7600 | 30.2784 | 3.3715 | 0.0903 | 33.7403 | 0.7875 | 0.0852 | 0.0023 | 0.8750 |
| 25.4400 | 32.7325 | 4.3394 | 0.1715 | 37.2435 | 0.8408 | 0.1083 | 0.0043 | 0.9533 |
| 25.7500 | 31.6655 | 4.9084 | 0.2682 | 36.8421 | 0.8233 | 0.1239 | 0.0068 | 0.9540 |
| 25.2100 | 29.3670 | 5.1509 | 0.3749 | 34.8928 | 0.7475 | 0.1273 | 0.0093 | 0.8841 |
| 10.3600 | 25.2319 | 4.8699 | 0.4152 | 30.5171 | 0.2639 | 0.0495 | 0.0042 | 0.3176 |
| 10.4300 | 25.1130 | 5.0236 | 0.4663 | 30.6030 | 0.2645 | 0.0514 | 0.0048 | 0.3206 |
| 21.0400 | 23.6766 | 5.0113 | 0.5161 | 29.2039 | 0.5030 | 0.1034 | 0.0106 | 0.6170 |
| 21.4400 | 22.7391 | 5.1605 | 0.6135 | 28.5132 | 0.4922 | 0.1085 | 0.0129 | 0.6136 |
| 21.2600 | 22.1127 | 5.3715 | 0.7249 | 28.2090 | 0.4747 | 0.1120 | 0.0151 | 0.6017 |
| 20.9200 | 23.1500 | 6.0008 | 0.9157 | 30.0664 | 0.4890 | 0.1231 | 0.0188 | 0.6309 |
| 21.4000 | 20.2037 | 5.5703 | 0.9510 | 26.7250 | 0.4365 | 0.1169 | 0.0200 | 0.5734 |
| 20.9600 | 19.1836 | 5.6803 | 1.0592 | 25.9231 | 0.4060 | 0.1167 | 0.0218 | 0.5445 |
| 2.2700 | 20.9019 | 6.4627 | 1.2600 | 28.6246 | 0.0479 | 0.0144 | 0.0028 | 0.0651 |
| 14.4200 | 20.3569 | 6.3522 | 1.3000 | 28.0091 | 0.2964 | 0.0898 | 0.0184 | 0.4046 |
| 2.1100 | 19.7414 | 6.3798 | 1.3456 | 27.4668 | 0.0421 | 0.0132 | 0.0028 | 0.0580 |
| 19.7500 | 17.0956 | 5.6614 | 1.2363 | 23.9933 | 0.3409 | 0.1096 | 0.0239 | 0.4745 |
| 22.7500 | 16.0798 | 5.6541 | 1.3266 | 23.0605 | 0.3693 | 0.1261 | 0.0296 | 0.5251 |
| 21.1400 | 13.1531 | 4.9910 | 1.2394 | 19.3836 | 0.2807 | 0.1035 | 0.0257 | 0.4099 |
| 21.6000 | 12.4702 | 5.1243 | 1.3221 | 18.9166 | 0.2720 | 0.1085 | 0.0280 | 0.4085 |

Table 6.3.30. Power and burnup data for GA piggyback samples in D214.01
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

Date: December 02, 1991
Reactor Chain: Thorium Chain

| FPD | Power (W) | | | | | Burnup (% FIMA) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | $^{233}U$ | $^{235}U$ | $^{239}Pu$ | $^{241}Pu$ | Total | $^{233}U$ | $^{235}U$ | $^{239}Pu$ | $^{241}Pu$ | Total |
| 20.0300 | 0.7921 | 0.0001 | 0.0000 | 0.0000 | 0.7922 | 0.0160 | 0.0000 | 0.0000 | 0.0000 | 0.0160 |
| 15.9600 | 0.8805 | 0.0003 | 0.0000 | 0.0000 | 0.8807 | 0.0142 | 0.0000 | 0.0000 | 0.0000 | 0.0142 |
| 8.6700 | 1.0341 | 0.0004 | 0.0000 | 0.0000 | 1.0345 | 0.0091 | 0.0000 | 0.0000 | 0.0000 | 0.0091 |
| 25.7600 | 1.0245 | 0.0005 | 0.0000 | 0.0000 | 1.0250 | 0.0267 | 0.0000 | 0.0000 | 0.0000 | 0.0267 |
| 25.4400 | 1.3800 | 0.0010 | 0.0000 | 0.0000 | 1.3809 | 0.0355 | 0.0000 | 0.0000 | 0.0000 | 0.0355 |
| 25.7500 | 1.9461 | 0.0017 | 0.0000 | 0.0000 | 1.9478 | 0.0507 | 0.0000 | 0.0000 | 0.0000 | 0.0507 |
| 25.2100 | 2.0609 | 0.0026 | 0.0000 | 0.0000 | 2.0635 | 0.0525 | 0.0001 | 0.0000 | 0.0000 | 0.0526 |
| 10.3600 | 2.0032 | 0.0030 | 0.0000 | 0.0000 | 2.0062 | 0.0210 | 0.0000 | 0.0000 | 0.0000 | 0.0210 |
| 10.4300 | 2.1258 | 0.0035 | 0.0000 | 0.0000 | 2.1293 | 0.0224 | 0.0000 | 0.0000 | 0.0000 | 0.0225 |
| 21.0400 | 2.4673 | 0.0041 | 0.0000 | 0.0000 | 2.4715 | 0.0525 | 0.0001 | 0.0000 | 0.0000 | 0.0526 |
| 21.4400 | 2.5531 | 0.0053 | 0.0000 | 0.0000 | 2.5584 | 0.0554 | 0.0001 | 0.0000 | 0.0000 | 0.0555 |
| 21.2600 | 2.7124 | 0.0067 | 0.0000 | 0.0000 | 2.7191 | 0.0583 | 0.0001 | 0.0000 | 0.0000 | 0.0585 |
| 20.9200 | 3.1505 | 0.0091 | 0.0000 | 0.0000 | 3.1596 | 0.0667 | 0.0002 | 0.0000 | 0.0000 | 0.0668 |
| 21.4000 | 3.0602 | 0.0102 | 0.0000 | 0.0000 | 3.0704 | 0.0662 | 0.0002 | 0.0000 | 0.0000 | 0.0664 |
| 20.9600 | 3.3143 | 0.0122 | 0.0000 | 0.0000 | 3.3265 | 0.0703 | 0.0002 | 0.0000 | 0.0000 | 0.0705 |
| 2.2700 | 3.8391. | 0.0152 | 0.0000 | 0.0000 | 3.8543 | 0.0088 | 0.0000 | 0.0000 | 0.0000 | 0.0088 |
| 14.4200 | 3.8784 | 0.0161 | 0.0000 | 0.0000 | 3.8945 | 0.0566 | 0.0002 | 0.0000 | 0.0000 | 0.0568 |
| 2.1100 | 3.9268 | 0.0173 | 0.0000 | 0.0000 | 3.9441 | 0.0084 | 0.0000 | 0.0000 | 0.0000 | 0.0084 |
| 19.7500 | 3.7686 | 0.0165 | 0.0000 | 0.0000 | 3.7851 | 0.0753 | 0.0003 | 0.0000 | 0.0000 | 0.0756 |
| 22.7500 | 3.7883 | 0.0190 | 0.0000 | 0.0000 | 3.8073 | 0.0872 | 0.0004 | 0.0000 | 0.0000 | 0.0876 |
| 21.1400 | 3.4102 | 0.0189 | 0.0000 | 0.0000 | 3.4291 | 0.0729 | 0.0004 | 0.0000 | 0.0000 | 0.0733 |
| 21.6000 | 3.5079 | 0.0212 | 0.0000 | 0.0000 | 3.5291 | 0.0766 | 0.0004 | 0.0000 | 0.0000 | 0.0771 |

Table 6.3.31. Power and burnup data for KFA piggyback samples in D214.01
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

Date: November 29, 1991
Reactor Chain: Uranium Chain

| FPD | Power (W) | | | | Burnup (% FIMA) | | | |
|---|---|---|---|---|---|---|---|---|
| | $^{235}U$ | $^{239}Pu$ | $^{241}Pu$ | Total | $^{235}U$ | $^{239}Pu$ | $^{241}Pu$ | Total |
| 7.5800 | 0.0909 | 0.0062 | 0.0000 | 0.0971 | 0.0121 | 0.0008 | 0.0000 | 0.0129 |
| 14.6900 | 0.0894 | 0.0444 | 0.0000 | 0.1338 | 0.0230 | 0.0111 | 0.0000 | 0.0341 |
| 0.6400 | 0.0785 | 0.0775 | 0.0001 | 0.1561 | 0.0009 | 0.0008 | 0.0000 | 0.0017 |
| 23.0100 | 0.0765 | 0.0971 | 0.0002 | 0.1738 | 0.0308 | 0.0380 | 0.0001 | 0.0689 |
| 20.0300 | 0.1030 | 0.2154 | 0.0015 | 0.3200 | 0.0361 | 0.0734 | 0.0005 | 0.1100 |
| 15.9600 | 0.0933 | 0.2633 | 0.0036 | 0.3603 | 0.0261 | 0.0714 | 0.0010 | 0.0985 |
| 8.6700 | 0.0919 | 0.3017 | 0.0060 | 0.3995 | 0.0139 | 0.0445 | 0.0009 | 0.0593 |
| 25.7600 | 0.0627 | 0.2421 | 0.0065 | 0.3114 | 0.0283 | 0.1060 | 0.0028 | 0.1372 |
| 25.4400 | 0.0679 | 0.3118 | 0.0123 | 0.3921 | 0.0302 | 0.1349 | 0.0053 | 0.1705 |
| 25.7500 | 0.0656 | 0.3531 | 0.0193 | 0.4381 | 0.0296 | 0.1546 | 0.0085 | 0.1926 |
| 25.2100 | 0.0609 | 0.3700 | 0.0269 | 0.4578 | 0.0269 | 0.1586 | 0.0115 | 0.1970 |
| 10.3600 | 0.0523 | 0.3499 | 0.0299 | 0.4321 | 0.0095 | 0.0616 | 0.0053 | 0.0764 |
| 10.4300 | 0.0520 | 0.3607 | 0.0335 | 0.4462 | 0.0095 | 0.0640 | 0.0059 | 0.0794 |
| 21.0400 | 0.0491 | 0.3604 | 0.0371 | 0.4466 | 0.0181 | 0.1289 | 0.0133 | 0.1603 |
| 21.4400 | 0.0471 | 0.3712 | 0.0441 | 0.4625 | 0.0177 | 0.1353 | 0.0161 | 0.1691 |
| 21.2600 | 0.0458 | 0.3853 | 0.0521 | 0.4832 | 0.0171 | 0.1393 | 0.0188 | 0.1751 |
| 20.9200 | 0.0480 | 0.4306 | 0.0658 | 0.5444 | 0.0176 | 0.1531 | 0.0234 | 0.1941 |
| 21.4000 | 0.0419 | 0.4001 | 0.0684 | 0.5103 | 0.0157 | 0.1456 | 0.0249 | 0.1861 |
| 20.9600 | 0.0398 | 0.4072 | 0.0762 | 0.5231 | 0.0146 | 0.1451 | 0.0271 | 0.1868 |
| 2.2700 | 0.0433 | 0.4633 | 0.0905 | 0.5971 | 0.0017 | 0.0179 | 0.0035 | 0.0231 |
| 14.4200 | 0.0422 | 0.4554 | 0.0934 | 0.5910 | 0.0106 | 0.1116 | 0.0229 | 0.1452 |
| 2.1100 | 0.0409 | 0.4572 | 0.0967 | 0.5948 | 0.0015 | 0.0164 | 0.0035 | 0.0214 |
| 19.7500 | 0.0354 | 0.4057 | 0.0889 | 0.5300 | 0.0122 | 0.1362 | 0.0298 | 0.1783 |
| 22.7500 | 0.0333 | 0.4045 | 0.0952 | 0.5331 | 0.0133 | 0.1565 | 0.0368 | 0.2066 |
| 21.1400 | 0.0273 | 0.3572 | 0.0890 | 0.4735 | 0.0101 | 0.1284 | 0.0320 | 0.1705 |
| 21.6000 | 0.0258 | 0.3662 | 0.0949 | 0.4869 | 0.0098 | 0.1345 | 0.0349 | 0.1791 |

Table 6.3.32. Fast neutron fluence for E > 0.1 MeV at the end of each cycle in the HFR
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| | | Fast Neutron Fluence, $f$,[(a)] E > 0.1 MeV | | |
|---|---|---|---|---|
| Index | Cycle | Capsule 1 | Capsule 2 | Capsule 3 |
| 1 | 87.03 | 0.26 | 0.34 | 0.30 |
| 2 | 87.05 | 0.39 | 0.60 | 0.62 |
| 3 | 87.09 | 0.67 | 0.95 | 0.92 |
| 4 | 87.10 | 1.0 | 1.4 | 1.3 |
| 5 | 88.01 | 1.32 | 1.8 | 1.6 |
| 6 | 88.02 | 1.67 | 2.2 | 1.87 |
| 7 | 88.04 | 2.04 | 2.5 | 2.17 |
| 8 | 88.05 | 2.4 | 2.9 | 2.46 |
| 9 | 88.06 | 2.7 | 3.2 | 2.7 |
| 10 | 88.07 | 3.0 | 3.5 | 2.9 |
| 11 | 88.08 | 3.3 | 3.8 | 3.1 |
| 12 | 88.09 | 3.6 | 4.1 | 3.3 |
| 13 | 88.10 | 3.9 | 4.4 | 3.4 |
| 14 | 88.11 | 4.2 | 4.7 | 3.6 |
| 15 | 89.01 | 4.5 | 5.0 | 3.8 |
| 16 | 89.02 | 4.8 | 5.3 | 4.1 |
| 17 | 89.03 | 5.1 | 5.6 | 4.3 |
| 18 | 89.04 | 5.4 | 6.0 | 4.6 |
| 19 | 89.05 | 5.7 | 6.3 | 4.9 |
| 20 | 89.06 | 6.0 | 6.6 | 5.1 |
| Final Data (after gamma scan) | | 6.3 | 6.8 | 5.0 |

[(a)] $f$ = the fast neutron fluence in units of $10^{25} n/m^2$.

Table 6.3.33. The cycle mean fast neutron fluences in the HFR for E > 0.10 MeV adjusted to final fluence values

| Index | Cycle | Mean Fast Neutron Fluence,[a] $f$ ($10^{25}$n/m$^2$), E > 0.10 MeV | | |
|---|---|---|---|---|
| | | Capsule 1 | Capsule 2 | Capsule 3 |
| 1 | 87.03 | 0.14 | 0.18 | 0.15 |
| 2 | 87.05 | 0.34 | 0.48 | 0.45 |
| 3 | 87.09 | 0.56 | 0.80 | 0.75 |
| 4 | 87.10 | 0.88 | 1.21 | 1.09 |
| 5 | 88.01 | 1.22 | 1.65 | 1.42 |
| 6 | 88.02 | 1.57 | 2.06 | 1.70 |
| 7 | 88.04 | 1.95 | 2.42 | 1.98 |
| 8 | 88.05 | 2.33 | 2.78 | 2.27 |
| 9 | 88.06 | 2.68 | 3.14 | 2.53 |
| 10 | 88.07 | 2.99 | 3.45 | 2.74 |
| 11 | 88.08 | 3.31 | 3.76 | 2.94 |
| 12 | 88.09 | 3.62 | 4.07 | 3.14 |
| 13 | 88.10 | 3.94 | 4.38 | 3.28 |
| 14 | 88.11 | 4.25 | 4.68 | 3.43 |
| 15 | 89.01 | 4.57 | 5.00 | 3.63 |
| 16 | 89.02 | 4.88 | 5.30 | 3.87 |
| 17 | 89.03 | 5.20 | 5.61 | 4.12 |
| 18 | 89.04 | 5.51 | 5.97 | 4.36 |
| 19 | 89.05 | 5.83 | 6.33 | 4.66 |
| 20 | 89.06 | 6.14 | 6.64 | 4.90 |

[a] $f \equiv \langle F/(10^{25}\text{n/m}^2)\rangle = \{(f_i + f_{i+1})/2\}C$

where $f_j$ is the normalized fast fluence for index numbers j = i and j = i+1 given in Table 6.3.32. The index number i ranges from 0 to 20.

C = final data/last index values
= 1.05 for Capsule 1
= 1.03 for Capsule 2
= 0.98 for Capsule 3

Table 6.3.34. The cycle mean fast neutron fluences in the HTGR for E > 0.18 MeV adjusted to final fluence values

| Index | Cycle | Mean Fast Neutron Fluence[a] $f$ ($10^{25}$n/m$^2$), E > 0.18 MeV | | |
|---|---|---|---|---|
| | | Capsule 1 | Capsule 2 | Capsule 3 |
| 1 | 87.03 | 0.11 | 0.14 | 0.12 |
| 2 | 87.05 | 0.27 | 0.39 | 0.36 |
| 3 | 87.09 | 0.45 | 0.64 | 0.60 |
| 4 | 87.10 | 0.71 | 0.97 | 0.88 |
| 5 | 88.01 | 0.98 | 1.32 | 1.14 |
| 6 | 88.02 | 1.26 | 1.65 | 1.37 |
| 7 | 88.04 | 1.57 | 1.94 | 1.59 |
| 8 | 88.05 | 1.87 | 2.23 | 1.82 |
| 9 | 88.06 | 2.15 | 2.52 | 2.03 |
| 10 | 88.07 | 2.40 | 2.77 | 2.20 |
| 11 | 88.08 | 2.66 | 3.02 | 2.36 |
| 12 | 88.09 | 2.91 | 3.27 | 2.52 |
| 13 | 88.10 | 3.16 | 3.52 | 2.63 |
| 14 | 88.11 | 3.41 | 3.76 | 2.75 |
| 15 | 89.01 | 3.67 | 4.02 | 2.91 |
| 16 | 89.02 | 3.92 | 4.26 | 3.11 |
| 17 | 89.03 | 4.18 | 4.50 | 3.31 |
| 18 | 89.04 | 4.42 | 4.79 | 3.50 |
| 19 | 89.05 | 4.68 | 5.08 | 3.74 |
| 20 | 89.06 | 4.93 | 5.33 | 3.93 |

[a]These values were calculated by applying the following equation from ref. 29 to the data of Table 6.3.33:

$$f\ (\text{HTGR, E} > 0.18\ \text{MeV}) = 0.803\ f\ (\text{HFR, E} > 0.1\ \text{MeV})$$

where $f$ = fast neutron fluence in units of $10^{25}$n/m$^2$.

## 6.4 FISSION GAS RELEASE DATA

The steady-state, fractional fission gas release, R/B, values are presented for the case that:

1. fission gas is released only from dtf particles whose kernels are exposed shortly after the beginning of irradiation (see Sect. 4.4.1.3),

2. the fission gas is generated from the fissioning of $^{235}U$ only,

3. the yield of fission products are those corresponding to the fissioning of $^{235}U$, and

4. the power in the particles with exposed kernels is constant at the initial irradiation value.

Further discussion on these restrictions and their removal is presented in Sect. 4.4.1.3. The R/B values in the following tables and figures are based on 8.9% of the power in the fissile particles; the number of dtf particles is 8.9% of the total number of fissile particles (see footnote on page 4-21).

The R/B values for capsule A (No. 1) are given in Tables 6.4.1 through 6.4.20 and Figs. 6.4.1 through 6.4.20; for capsule B (No. 2) in Tables 6.4.21 through 6.4.40 and Figs. 6.4.21 through 6.4.40; and for capsule C (No. 3), in Tables 6.4.41 through 6.4.60 and Figs. 6.4.41 through 6.4.60. The figures follow the corresponding tables in presentation. In addition to the R/B values, the tables contain the date, time, general relative activity level (GM), the groups of isotopes measured simultaneously (SV) as shown in the table below; the temperature; and the EFPD. The figures show the time profiles of the isotopes $^{85m}Kr$, $^{87}Kr$, $^{88}Kr$, $^{89}Kr$, $^{90}Kr$, $^{133}Xe$, $^{135}Xe$, $^{135m}Xe$, $^{137}Xe$, and $^{138}Xe$ as well as a representative temperature profile of a TC response specific to each capsule. The SV values and the corresponding isotopes measured simultaneously are as follows:

| Isotope | SV | | | | |
|---|---|---|---|---|---|
| $^{85m}Kr$ | 00 | | | 30 | 40 |
| $^{87}Kr$ | 00 | | | 30 | 40 |
| $^{88}Kr$ | 00 | | | 30 | 40 |
| $^{89}Kr$ | 00 | 10 | | | |
| $^{90}Kr$ | 00 | 10 | | | |
| $^{133}Xe$ | | | 20 | | 40 |
| $^{135}Xe$ | 00 | | 20 | | 40 |
| $^{135m}Xe$ | 00 | 10 | | | |
| $^{137}Xe$ | 00 | 10 | | | |
| $^{138}Xe$ | 00 | 10 | | | |

Water-vapor injection data are provided in Table 6.4.61. In the table, cycle number, injection number, the start and ending times, the duration, inlet and outlet water-vapor pressures, the delay in the appearance of water-vapor in the outlet, and the corresponding amount of water-vapor are given.

Table 6.4.1. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. A | | CYCLE NO. 87.03 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 10. 4.87 | 12 | | | | | | 884 |
| 0. 0 | 10 | | | | | | 0 |
| 10. 4.87 | 12 | | 1.144E-05 | | | | 796 |
| 10.1 | 10 | | | 1.774E-05 | 6.554E-06 | 1.256E-05 | 1.4 |
| 11. 4.87 | 12 | | 1.240E-05 | 5.099E-05 | 4.172E-05 | 5.446E-05 | 816 |
| 13.4 | 0 | | 2.020E-05 | 2.333E-05 | 6.782E-06 | 1.200E-05 | 3.4 |
| 11. 4.87 | 14 | 4.034E-05 | 4.422E-05 | 3.926E-05 | 4.313E-05 | 3.880E-05 | 816 |
| 15.24 | 0 | | 1.574E-05 | 3.335E-05 | 2.302E-05 | 1.498E-05 | 3.5 |
| 11. 4.87 | 14 | | | 5.267E-05 | 3.978E-05 | 5.909E-05 | 816 |
| 15.24 | 0 | | 2.383E-05 | | | 1.283E-05 | 3.5 |
| 11. 4.87 | 14 | | | | | | 816 |
| 15.24 | 0 | | | | | | 3.5 |
| 13. 4.87 | 21 | 1.758E-06 | 1.289E-05 | | | | 822 |
| 9. 3 | 0 | | | 2.172E-05 | 6.032E-06 | 1.126E-05 | 6.1 |
| 13. 4.87 | 14 | | | 5.053E-05 | 3.804E-05 | 7.587E-05 | 822 |
| 9. 3 | 0 | | 2.492E-05 | | | | 6.1 |
| 14. 4.87 | 14 | | 3.646E-05 | | | | 826 |
| 9.3 | 10 | | | 5.588E-05 | 1.787E-05 | 2.641E-05 | 7.9 |
| 14. 4.87 | 14 | | | 1.413E-04 | 1.043E-04 | 1.570E-04 | 826 |
| 9.3 | 40 | 3.133E-04 | 6.770E-05 | | | | 7.9 |
| 14. 4.87 | 24 | 2.360E-06 | 2.445E-05 | | | | 826 |
| 11.39 | 10 | | | 4.833E-05 | 1.106E-05 | 2.432E-05 | 8 |
| 14. 4.87 | 24 | | | 1.387E-04 | 1.002E-04 | 1.526E-04 | 826 |
| 11.39 | 40 | 3.203E-04 | 7.063E-05 | | | | 8 |
| 21. 4.87 | 24 | | | | | | 804 |
| 11.14 | 10 | | | 4.572E-04 | 4.541E-05 | 2.237E-04 | 12.4 |
| 21. 4.87 | 24 | | | 1.412E-03 | 9.913E-04 | 1.476E-03 | 804 |
| 11.14 | 30 | | | | | | 12.4 |
| 21. 4.87 | 24 | | | 1.690E-03 | 1.195E-03 | 1.728E-03 | 804 |
| 11.14 | 40 | 2.452E-03 | 9.489E-04 | | | | 12.4 |
| 23. 4.87 | 25 | | | 3.001E-03 | 2.227E-03 | 3.212E-03 | 803 |
| 9.21 | 40 | 5.262E-03 | 1.797E-03 | | | | 14.1 |
| 26. 4.87 | 25 | | | 3.523E-03 | 2.613E-03 | 3.739E-03 | 808 |
| 12.5 | 40 | 6.572E-03 | 2.186E-03 | | | | 16.7 |
| 2. 5.87 | 25 | | | 5.751E-03 | 4.334E-03 | 6.168E-03 | 819 |
| 9.25 | 40 | 1.029E-02 | 3.687E-03 | | | | 21.4 |
| 3. 5.87 | 25 | | | 5.616E-03 | 4.076E-03 | 6.016E-03 | 820 |
| 10.1 | 40 | 9.824E-03 | 3.618E-03 | | | | 22.2 |
| 4. 5.87 | 15 | | | 2.251E-03 | | 2.560E-03 | 822 |
| 13.3 | 40 | 3.864E-03 | 2.440E-03 | | | | 22.9 |
| 4. 5.87 | 15 | | | | | | 241 |
| 16.4 | 40 | | | | | | 23.03 |

Table 6.4.2. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. A | | CYCLE NO. 87.05 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 4. 6.87 | 35 | | | | | | 476 |
| 13.4 | 10 | | | | | | 23.03 |
| 4. 6.87 | 35 | | 4.297E-04 | | | | 476 |
| 13.56 | 10 | | | 1.399E-03 | 3.164E-04 | 6.438E-04 | 23.3 |
| 4. 6.87 | 35 | | | | | | 476 |
| 13.56 | 10 | | | 1.543E-03 | 2.655E-04 | 7.212E-04 | 23.3 |
| 4. 6.87 | 35 | | | 2.322E-03 | 1.862E-03 | 2.492E-03 | 476 |
| 13.56 | 30 | | | | | | 23.3 |
| 4. 6.87 | 35 | | | 2.427E-03 | 1.702E-03 | 2.483E-03 | 476 |
| 13.56 | 40 | 1.029E-03 | 1.958E-03 | | | | 23.3 |
| 6. 6.87 | 32 | | 3.510E-04 | | | | 456 |
| 17.19 | 10 | | | 3.578E-04 | 2.374E-04 | 4.455E-04 | 23.8 |
| 6. 6.87 | 35 | | 4.171E-04 | | | | 456 |
| 17.19 | 10 | | | 4.518E-04 | 2.956E-04 | 5.534E-04 | 23.8 |
| 6. 6.87 | 35 | | 5.195E-04 | | | | 456 |
| 17.23 | 10 | | | 5.172E-04 | 3.521E-04 | 6.606E-04 | 23.8 |
| 7. 6.87 | 35 | | 3.057E-04 | | | | 518 |
| 19.13 | 10 | | | 1.444E-03 | 2.369E-04 | 6.819E-04 | 24.8 |
| 7. 6.87 | 35 | | 4.257E-04 | | | | 518 |
| 19.13 | 10 | | | 1.628E-03 | 2.919E-04 | 7.749E-04 | 24.8 |
| 7. 6.87 | 35 | | | 2.875E-03 | 2.036E-03 | 3.131E-03 | 518 |
| 19.13 | 40 | 1.911E-03 | 2.067E-03 | | | | 24.8 |
| 7. 6.87 | 35 | | | 3.287E-03 | 2.458E-03 | 3.301E-03 | 518 |
| 19.13 | 40 | 2.433E-03 | 2.327E-03 | | | | 24.8 |
| 8. 6.87 | 35 | | | | | | 776 |
| 19.45 | 10 | | | | | | 25.8 |
| 8. 6.87 | 35 | | | | | | 776 |
| 19.45 | 10 | | | 2.167E-03 | | 9.987E-04 | 25.8 |
| 8. 6.87 | 35 | | | 5.444E-03 | 4.071E-03 | 5.749E-03 | 776 |
| 19.45 | 40 | 6.614E-03 | 3.577E-03 | | | | 25.8 |
| 8. 6.87 | 35 | | | 5.818E-03 | 4.410E-03 | 6.209E-03 | 776 |
| 19.45 | 40 | 7.080E-03 | 3.840E-03 | | | | 25.8 |
| 8. 6.87 | 35 | | | | | | 776 |
| 19.45 | 20 | 6.675E-03 | 4.237E-03 | | | | 25.8 |
| 9. 6.87 | 35 | | 5.647E-04 | | | | 777 |
| 13.41 | 10 | | | 2.153E-03 | 4.494E-04 | 8.978E-04 | 26.65 |
| 9. 6.87 | 35 | | | 4.027E-03 | 3.325E-03 | 4.385E-03 | 777 |
| 13.41 | 30 | | | | | | 26.65 |
| 9. 6.87 | 35 | | | 5.067E-03 | 3.935E-03 | 5.025E-03 | 777 |
| 13.41 | 40 | 5.101E-03 | 3.477E-03 | | | | 26.65 |
| 10. 6.87 | 35 | | | | | | 780 |
| 11. 7 | 30 | | | | | | 27.65 |
| 10. 6.87 | 35 | | | 6.214E-03 | 4.833E-03 | 6.611E-03 | 780 |
| 11. 7 | 40 | 7.773E-03 | 4.328E-03 | | | | 27.65 |
| 18. 6.87 | 35 | | 3.109E-04 | | | | 780 |
| 0.49 | 10 | | | 1.645E-03 | 2.123E-04 | | 35.3 |
| 18. 6.87 | 35 | | | | | | 780 |
| 0.49 | 10 | | | 2.281E-03 | 1.765E-04 | 9.136E-04 | 35.3 |
| 18. 6.87 | 35 | | | 6.557E-03 | 4.647E-03 | 7.089E-03 | 780 |
| 0.49 | 40 | 1.015E-02 | 4.529E-03 | | | | 35.3 |
| 18. 6.87 | 35 | | 4.125E-04 | | | | 781 |
| 19.39 | 10 | | | 1.698E-03 | 2.610E-04 | 6.842E-04 | 35.85 |

Table 6.4.2. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. A | | CYCLE NO. 87.05 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 18. 6.87 | 35 | | | 4.924E-03 | 3.574E-03 | 5.368E-03 | 781 |
| 19.39 | 40 | 7.718E-03 | 3.408E-03 | | | | 35.85 |
| 19. 6.87 | 35 | | | 8.014E-03 | 1.142E-02 | 7.201E-03 | 777 |
| 17.18 | 40 | 6.165E-03 | 3.751E-03 | | | | 36.8 |
| 22. 6.87 | 35 | | | 5.414E-03 | 3.078E-03 | 6.374E-03 | 780 |
| 17.28 | 40 | 9.322E-03 | 1.716E-03 | | | | 39.7 |
| 26. 6.87 | 35 | | | 3.954E-03 | 2.360E-03 | 4.525E-03 | 780 |
| 16. 5 | 40 | 7.033E-03 | 1.425E-03 | | | | 43.65 |
| 27. 6.87 | 35 | | | 4.785E-03 | 3.656E-03 | 5.113E-03 | 785 |
| 20. 3 | 40 | 7.786E-03 | 3.023E-03 | | | | 44.8 |
| 28. 6.87 | 35 | | | 4.819E-03 | 3.646E-03 | 5.159E-03 | 785 |
| 16.16 | 40 | 7.692E-03 | 3.037E-03 | | | | 45.65 |
| 29. 6.87 | 35 | | 4.014E-04 | | | | 554 |
| 12.54 | 10 | | | 1.724E-03 | 3.095E-04 | 6.252E-04 | 46.5 |
| 29. 6.87 | 35 | | 6.232E-04 | | | | 554 |
| 12.54 | 10 | | | 2.008E-03 | 3.670E-04 | 7.221E-04 | 46.5 |
| 29. 6.87 | 35 | | 1.159E-03 | | | | 556 |
| 15.12 | 10 | | | 1.794E-03 | | 6.966E-04 | 46.6 |
| 29. 6.87 | 35 | | | | | | 47 |
| 17. 0 | 10 | | | | | | 46.68 |

Table 6.4.3. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. | | D214-01 | CAPSULE NO. | A | CYCLE NO. | 87.09 | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 28.10.87 | 35 | | | | | | 828 |
| 15. 5 | 10 | | | 1.367E-03 | 2.547E-04 | 5.363E-04 | 47.8 |
| 28.10.87 | 35 | | | 3.957E-03 | 2.988E-03 | 4.212E-03 | 828 |
| 15. 5 | 30 | | | | | | 47.8 |
| 28.10.87 | 35 | | | | | | 828 |
| 15. 5 | 20 | 1.578E-03 | 2.483E-03 | | | | 47.8 |
| 29.10.87 | 35 | | | | | | 832 |
| 8.3 | 10 | | | 1.906E-03 | | 7.342E-04 | 48.5 |
| 29.10.87 | 35 | | | 3.286E-03 | 2.025E-03 | 3.896E-03 | 832 |
| 8.3 | 30 | | | | | | 48.5 |
| 29.10.87 | 35 | | | | | | 832 |
| 8.3 | 20 | 3.747E-03 | 2.910E-03 | | | | 48.5 |
| 30.10.87 | 35 | | | | | | 835 |
| 8.27 | 10 | | | 1.254E-03 | 2.124E-04 | 4.958E-04 | 49.5 |
| 30.10.87 | 35 | | | 3.525E-03 | 2.743E-03 | 3.792E-03 | 835 |
| 8.27 | 30 | | | | | | 49.5 |
| 30.10.87 | 35 | | | | | | 835 |
| 8.27 | 20 | 4.275E-03 | 2.531E-03 | | | | 49.5 |
| 3.11.87 | 35 | | | | | | 841 |
| 20.12 | 10 | | | 1.289E-03 | 3.042E-04 | 4.760E-04 | 53.8 |
| 3.11.87 | 35 | | | 3.210E-03 | 2.505E-03 | 3.482E-03 | 841 |
| 20.12 | 30 | | | | | | 53.8 |
| 3.11.87 | 35 | | | | | | 841 |
| 20.12 | 20 | 5.150E-03 | 2.361E-03 | | | | 53.8 |
| 6.11.87 | 35 | | | | | | 842 |
| 17.57 | 10 | | | 1.166E-03 | 2.176E-04 | 4.330E-04 | 56.8 |
| 6.11.87 | 35 | | | 3.227E-03 | 2.426E-03 | 3.463E-03 | 842 |
| 17.57 | 30 | | | | | | 56.8 |
| 6.11.87 | 35 | | | | | | 842 |
| 17.57 | 20 | 5.945E-03 | 2.227E-03 | | | | 56.8 |
| 7.11.87 | 35 | | | | | | 843 |
| 16.49 | 10 | | | 1.189E-03 | | 4.694E-04 | 57.8 |
| 7.11.87 | 35 | | | 3.197E-03 | 2.407E-03 | 3.427E-03 | 843 |
| 16.49 | 30 | | | | | | 57.8 |
| 7.11.87 | 35 | | | | | | 843 |
| 16.49 | 20 | 5.331E-03 | 2.209E-03 | | | | 57.8 |
| 8.11.87 | 35 | | | | | | 844 |
| 16.43 | 10 | | | 1.191E-03 | 1.980E-04 | 4.547E-04 | 58.8 |
| 8.11.87 | 35 | | | 3.287E-03 | 2.500E-03 | 3.583E-03 | 844 |
| 16.43 | 30 | | | | | | 58.8 |
| 8.11.87 | 35 | | | | | | 844 |
| 16.43 | 20 | 6.166E-03 | 2.277E-03 | | | | 58.8 |
| 13.11.87 | 35 | | | | | | 853 |
| 16.26 | 10 | | | 1.209E-03 | 2.261E-04 | 4.398E-04 | 63.8 |
| 13.11.87 | 35 | | | 3.280E-03 | 2.495E-03 | 3.527E-03 | 853 |
| 16.26 | 30 | | | | | | 63.8 |
| 13.11.87 | 35 | | | | | | 853 |
| 16.26 | 20 | 6.091E-03 | 2.162E-03 | | | | 63.8 |
| 14.11.87 | 35 | | | | | | 853 |
| 16.5 | 10 | | | 1.134E-03 | 1.333E-04 | 4.364E-04 | 64.8 |
| 14.11.87 | 35 | | | 3.228E-03 | 2.404E-03 | 3.502E-03 | 853 |
| 16.5 | 30 | | | | | | 64.8 |

Table 6.4.3. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. A | | CYCLE NO. 87.09 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 14.11.87 | 35 | | | | | | 853 |
| 16.5 | 20 | 5.697E-03 | 2.075E-03 | | | | 64.8 |
| 15.11.87 | 35 | | | | | | 853 |
| 16.28 | 10 | | | 1.194E-03 | 2.265E-04 | 4.306E-04 | 65.8 |
| 15.11.87 | 35 | | | 3.106E-03 | 2.367E-03 | 3.388E-03 | 853 |
| 16.28 | 30 | | | | | | 65.8 |
| 15.11.87 | 35 | | | | | | 853 |
| 16.28 | 20 | 5.815E-03 | 1.988E-03 | | | | 65.8 |
| 16.11.87 | 35 | | | | | | 66 |
| 17. 0 | 20 | | | | | | 66.71 |
| --- | --- | | | | | | |

Table 6.4.4. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. A | | CYCLE NO. 87.10 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 25.11.87 | 35 | | | | | | 827 |
| 0. 0 | 10 | | | | | | 66.71 |
| 25.11.87 | 35 | | | | | | 828 |
| 16.25 | 10 | | | 1.227E-03 | 2.464E-04 | 4.631E-04 | 72.6 |
| 25.11.87 | 35 | | | 2.686E-03 | 2.053E-03 | 2.742E-03 | 828 |
| 16.25 | 30 | | | | | | 72.6 |
| 25.11.87 | 35 | | | | | | 828 |
| 16.25 | 20 | 4.602E-03 | 1.817E-03 | | | | 72.6 |
| 26.11.87 | 35 | | | | | | 829 |
| 16. 6 | 10 | | | 1.200E-03 | 1.933E-04 | | 73.6 |
| 26.11.87 | 35 | | | 2.653E-03 | 1.997E-03 | 2.730E-03 | 829 |
| 16. 6 | 30 | | | | | | 73.6 |
| 26.11.87 | 35 | | | | | | 829 |
| 16. 6 | 20 | 4.637E-03 | 1.796E-03 | | | | 73.6 |
| 30.11.87 | 35 | | | | | | 839 |
| 16. 9 | 10 | | | 1.177E-03 | 1.872E-04 | | 78.6 |
| 30.11.87 | 35 | | | 2.638E-03 | 1.980E-03 | 2.718E-03 | 839 |
| 16. 9 | 30 | | | | | | 78.6 |
| 30.11.87 | 35 | | | | | | 839 |
| 16. 9 | 20 | 5.022E-03 | 1.720E-03 | | | | 78.6 |
| 2.12.87 | 35 | | | | | | 841 |
| 16. 3 | 10 | | | 1.159E-03 | 1.942E-04 | 4.411E-04 | 80.6 |
| 2.12.87 | 35 | | | 2.648E-03 | 2.006E-03 | 2.704E-03 | 841 |
| 16. 3 | 30 | | | | | | 80.6 |
| 2.12.87 | 35 | | | | | | 841 |
| 16. 3 | 20 | 4.742E-03 | 1.718E-03 | | | | 80.6 |
| 3.12.87 | 35 | | | | | | 839 |
| 16. 5 | 10 | | | 1.122E-03 | 1.929E-04 | 4.194E-04 | 81.6 |
| 3.12.87 | 35 | | | 2.573E-03 | 1.947E-03 | 2.625E-03 | 839 |
| 16. 5 | 30 | | | | | | 81.6 |
| 3.12.87 | 35 | | | | | | 839 |
| 16. 5 | 20 | 4.757E-03 | 1.674E-03 | | | | 81.6 |
| 4.12.87 | 35 | | | | | | 840 |
| 15.59 | 10 | | | 1.187E-03 | 1.543E-04 | 4.350E-04 | 82.6 |
| 4.12.87 | 35 | | | 2.849E-03 | 2.112E-03 | 2.927E-03 | 840 |
| 15.59 | 30 | | | | | | 82.6 |
| 4.12.87 | 35 | | | | | | 840 |
| 15.59 | 20 | 5.415E-03 | 1.827E-03 | | | | 82.6 |
| 10.12.87 | 35 | | | | | | 836 |
| 16.38 | 10 | | | 1.096E-03 | 1.844E-04 | 3.984E-04 | 87.6 |
| 10.12.87 | 35 | | | 2.375E-03 | 1.774E-03 | 2.469E-03 | 836 |
| 16.38 | 30 | | | | | | 87.6 |
| 10.12.87 | 35 | | | | | | 836 |
| 16.38 | 20 | 4.226E-03 | 1.515E-03 | | | | 87.6 |
| 11.12.87 | 35 | | | | | | 837 |
| 16.21 | 10 | | | 1.065E-03 | 1.935E-04 | 3.949E-04 | 88.6 |
| 11.12.87 | 35 | | | 2.363E-03 | 1.749E-03 | 2.455E-03 | 837 |
| 16.21 | 30 | | | | | | 88.6 |
| 11.12.87 | 35 | | | | | | 837 |
| 16.21 | 20 | 4.350E-03 | 1.490E-03 | | | | 88.6 |
| 12.12.87 | 35 | | | | | | 840 |
| 16.4 | 10 | | | 1.092E-03 | 1.782E-04 | 3.911E-04 | 89.6 |

Table 6.4.4. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. A | | CYCLE NO. 87.10 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 12.12.87 | 35 | | | 2.367E-03 | 1.773E-03 | 2.582E-03 | 840 |
| 16.4 | 30 | | | | | | 89.6 |
| 12.12.87 | 35 | | | | | | 840 |
| 16.4 | 20 | 4.314E-03 | 1.503E-03 | | | | 89.6 |
| 13.12.87 | 35 | | | | | | 840 |
| 16.26 | 10 | | | 1.078E-03 | 1.756E-04 | 3.989E-04 | 90.6 |
| 13.12.87 | 35 | | | 2.400E-03 | 1.783E-03 | 2.498E-03 | 840 |
| 16.26 | 30 | | | | | | 90.6 |
| 13.12.87 | 35 | | | | | | 840 |
| 16.26 | 20 | 4.421E-03 | 1.500E-03 | | | | 90.6 |
| 14.12.87 | 35 | | | | | | 60 |
| 17. 0 | 20 | | | | | | 91.34 |

Table 6.4.5. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. A | | CYCLE NO. 88.01 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 8. 1.88 | 35 | | | | | | 805 |
| 0. 0 | 10 | | | | | | 91.34 |
| 8. 1.88 | 35 | | 5.442E-04 | | | | 807 |
| 15.56 | 10 | | | 1.687E-03 | | 6.152E-04 | 93.1 |
| 8. 1.88 | 35 | | | 3.324E-03 | 2.526E-03 | 3.411E-03 | 807 |
| 15.56 | 30 | | | | | | 93.1 |
| 8. 1.88 | 35 | | | | | | 807 |
| 15.56 | 20 | 2.580E-03 | 2.394E-03 | | | | 93.1 |
| 9. 1.88 | 35 | | | | | | 811 |
| 16. 7 | 10 | | | 1.668E-03 | | 5.981E-04 | 94.1 |
| 9. 1.88 | 35 | | | 3.288E-03 | 2.495E-03 | 3.351E-03 | 811 |
| 16. 7 | 30 | | | | | | 94.1 |
| 9. 1.88 | 35 | | | | | | 811 |
| 16. 7 | 20 | 3.520E-03 | 2.410E-03 | | | | 94.1 |
| 10. 1.88 | 35 | | | | | | 813 |
| 16.1 | 10 | | | 1.679E-03 | | 6.075E-04 | 95.1 |
| 10. 1.88 | 35 | | | 3.259E-03 | 2.497E-03 | 3.531E-03 | 813 |
| 16.1 | 30 | | | | | | 95.1 |
| 10. 1.88 | 35 | | | | | | 813 |
| 16.1 | 20 | 4.605E-03 | 2.378E-03 | | | | 95.1 |
| 12. 1.88 | 35 | | | | | | 816 |
| 15.53 | 10 | | | 1.643E-03 | | 5.738E-04 | 97.1 |
| 12. 1.88 | 35 | | | 3.364E-03 | 2.478E-03 | 3.382E-03 | 816 |
| 15.53 | 30 | | | | | | 97.1 |
| 12. 1.88 | 35 | | | | | | 816 |
| 15.53 | 20 | 4.865E-03 | 2.304E-03 | | | | 97.1 |
| 20. 1.88 | 35 | | | | | | 823 |
| 18.34 | 10 | | | 1.642E-03 | | 5.698E-04 | 105.2 |
| 20. 1.88 | 35 | | | 3.360E-03 | 2.501E-03 | 3.462E-03 | 823 |
| 18.34 | 30 | | | | | | 105.2 |
| 20. 1.88 | 35 | | | | | | 823 |
| 18.34 | 20 | 6.802E-03 | 2.376E-03 | | | | 105.2 |
| 21. 1.88 | 35 | | | | | | 826 |
| 15.55 | 10 | | | 1.608E-03 | | 5.625E-04 | 106.1 |
| 21. 1.88 | 35 | | | 3.316E-03 | 2.468E-03 | 3.447E-03 | 826 |
| 15.55 | 30 | | | | | | 106.1 |
| 21. 1.88 | 35 | | | | | | 826 |
| 15.55 | 20 | 5.964E-03 | 2.359E-03 | | | | 106.1 |
| 22. 1.88 | 35 | | | | | | 830 |
| 16. 0 | 10 | | | 1.524E-03 | | 5.612E-04 | 107.1 |
| 22. 1.88 | 35 | | | 3.606E-03 | 2.542E-03 | 3.670E-03 | 830 |
| 16. 0 | 30 | | | | | | 107.1 |
| 22. 1.88 | 35 | | | | | | 830 |
| 16. 0 | 20 | 6.167E-03 | 2.307E-03 | | | | 107.1 |
| 23. 1.88 | 35 | | | | | | 828 |
| 16.32 | 10 | | | 1.596E-03 | | 5.641E-04 | 108.1 |
| 23. 1.88 | 35 | | | 3.369E-03 | 2.441E-03 | 3.569E-03 | 828 |
| 16.32 | 30 | | | | | | 108.1 |
| 23. 1.88 | 35 | | | | | | 828 |
| 16.32 | 20 | 5.520E-03 | 2.302E-03 | | | | 108.1 |
| 29. 1.88 | 35 | | | | | | 834 |
| 17.14 | 10 | | | 1.577E-03 | | 5.545E-04 | 114.1 |

Table 6.4.5. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. A | | CYCLE NO. 88.01 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 29. 1.88 | 35 | | | 3.221E-03 | 2.397E-03 | 3.304E-03 | 834 |
| 17.14 | 30 | | | | | | 114.1 |
| 29. 1.88 | 35 | | | | | | 834 |
| 17.14 | 20 | 6.346E-03 | 2.214E-03 | | | | 114.1 |
| 30. 1.88 | 35 | | | | | | 836 |
| 16.52 | 10 | | | 1.583E-03 | | 5.662E-04 | 115.1 |
| 30. 1.88 | 35 | | | 3.230E-03 | 2.408E-03 | 3.351E-03 | 836 |
| 16.52 | 30 | | | | | | 115.1 |
| 30. 1.88 | 35 | | | | | | 836 |
| 16.52 | 20 | 5.783E-03 | 2.248E-03 | | | | 115.1 |
| 31. 1.88 | 35 | | | | | | 838 |
| 16.25 | 10 | | | 1.551E-03 | | 5.506E-04 | 116.1 |
| 31. 1.88 | 35 | | | 3.234E-03 | 2.446E-03 | 3.386E-03 | 838 |
| 16.25 | 30 | | | | | | 116.1 |
| 31. 1.88 | 35 | | | | | | 838 |
| 16.25 | 20 | 6.385E-03 | 2.226E-03 | | | | 116.1 |
| 1. 2.88 | 35 | | | | | | 32 |
| 20. 0 | 20 | | | | | | 117.1 |

Table 6.4.6. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. A | | CYCLE NO. 88.02 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 9. 2.88 | 35 | | | | | | 832 |
| 0. 0 | 10 | | | | | | 117.1 |
| 9. 2.88 | 35 | | | | | | 832 |
| 13. 4 | 10 | | | 1.385E-03 | | 4.763E-04 | 122.7 |
| 9. 2.88 | 35 | | | 2.604E-03 | 1.944E-03 | 2.744E-03 | 832 |
| 13. 4 | 30 | | | | | | 122.7 |
| 9. 2.88 | 35 | | | | | | 832 |
| 13. 4 | 20 | 4.649E-03 | 1.324E-03 | | | | 122.7 |
| 10. 2.88 | 35 | | | | | | 832 |
| 9.3 | 10 | | | 1.366E-03 | | 4.736E-04 | 123.5 |
| 10. 2.88 | 35 | | | 2.604E-03 | 1.966E-03 | 2.718E-03 | 832 |
| 9.3 | 30 | | | | | | 123.5 |
| 10. 2.88 | 35 | | | | | | 832 |
| 9.3 | 20 | 4.548E-03 | 1.831E-03 | | | | 123.5 |
| 11. 2.88 | 35 | | | | | | 837 |
| 8.32 | 10 | | | 1.395E-03 | | 4.946E-04 | 124.4 |
| 11. 2.88 | 35 | | | 2.583E-03 | 1.935E-03 | 2.688E-03 | 837 |
| 8.32 | 30 | | | | | | 124.4 |
| 11. 2.88 | 35 | | | | | | 837 |
| 8.32 | 20 | 4.486E-03 | 1.795E-03 | | | | 124.4 |
| 12. 2.88 | 35 | | | | | | 835 |
| 8.29 | 10 | | | 1.339E-03 | | 4.657E-04 | 125.4 |
| 12. 2.88 | 35 | | | 2.610E-03 | 1.903E-03 | 2.669E-03 | 835 |
| 8.29 | 30 | | | | | | 125.4 |
| 12. 2.88 | 35 | | | | | | 835 |
| 8.29 | 20 | 5.585E-03 | 1.772E-03 | | | | 125.4 |
| 17. 2.88 | 35 | | | | | | 844 |
| 17. 9 | 10 | | | 1.234E-03 | | 4.377E-04 | 130.9 |
| 17. 2.88 | 35 | | | 2.412E-03 | 1.789E-03 | 2.532E-03 | 844 |
| 17. 9 | 30 | | | | | | 130.9 |
| 17. 2.88 | 35 | | | | | | 844 |
| 17. 9 | 20 | 4.742E-03 | 1.545E-03 | | | | 130.9 |
| 18. 2.88 | 35 | | | | | | 842 |
| 17. 1 | 10 | | | 1.239E-03 | | 4.383E-04 | 132 |
| 18. 2.88 | 35 | | | 2.363E-03 | 1.767E-03 | 2.591E-03 | 842 |
| 17. 1 | 30 | | | | | | 132 |
| 18. 2.88 | 35 | | | | | | 842 |
| 17. 1 | 20 | 4.206E-03 | 1.557E-03 | | | | 132 |
| 19. 2.88 | 35 | | | | | | 844 |
| 16.31 | 10 | | | 1.214E-03 | | 4.349E-04 | 133 |
| 19. 2.88 | 35 | | | 2.391E-03 | 1.726E-03 | 2.575E-03 | 844 |
| 16.31 | 30 | | | | | | 133 |
| 19. 2.88 | 35 | | | | | | 844 |
| 16.31 | 20 | 4.927E-03 | 1.504E-03 | | | | 133 |
| 26. 2.88 | 35 | | | | | | 838 |
| 16.36 | 10 | | | 1.314E-03 | | 4.604E-04 | 140 |
| 26. 2.88 | 35 | | | 2.550E-03 | 1.869E-03 | 2.677E-03 | 838 |
| 16.36 | 30 | | | | | | 140 |
| 26. 2.88 | 35 | | | | | | 838 |
| 16.36 | 20 | 6.120E-03 | 1.733E-03 | | | | 140 |
| 27. 2.88 | 35 | | | | | | 838 |
| 16.37 | 10 | | | 1.240E-03 | | 4.359E-04 | 141 |

Table 6.4.6. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. A | | CYCLE NO. 88.02 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 27. 2.88 | 35 | | | 2.520E-03 | 1.831E-03 | 2.596E-03 | 838 |
| 16.37 | 30 | | | | | | 141 |
| 27. 2.88 | 35 | | | | | | 838 |
| 16.37 | 20 | 5.641E-03 | 1.699E-03 | | | | 141 |
| 28. 2.88 | 35 | | | | | | 838 |
| 16.38 | 10 | | | 1.362E-03 | | 4.709E-04 | 142 |
| 28. 2.88 | 35 | | | 2.590E-03 | 1.920E-03 | 2.821E-03 | 838 |
| 16.38 | 30 | | | | | | 142 |
| 28. 2.88 | 35 | | | | | | 838 |
| 16.38 | 20 | 5.826E-03 | 1.784E-03 | | | | 142 |
| 29. 2.88 | 35 | | | | | | 62 |
| 18. 0 | 20 | | | | | | 142.54 |
| --- | --- | | | | | | |

Table 6.4.7. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. A | | CYCLE NO. 88.04 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 29. 4.88 | 45 | | | | | | 886 |
| 0. 0 | 10 | | | | | | 142.54 |
| 29. 4.88 | 45 | | 4.274E-04 | | | | 896 |
| 16.55 | 10 | | | 1.489E-03 | | 5.254E-04 | 143.7 |
| 29. 4.88 | 45 | | | | | | 896 |
| 16.55 | 20 | 1.945E-03 | | | | | 143.7 |
| 30. 4.88 | 45 | | | | | | 896 |
| 16.38 | 10 | | | 1.552E-03 | 2.670E-04 | 5.297E-04 | 144.8 |
| 30. 4.88 | 45 | | | 4.349E-03 | 3.245E-03 | 5.039E-03 | 896 |
| 16.38 | 30 | | | | | | 144.8 |
| 30. 4.88 | 45 | | | | | | 896 |
| 16.38 | 20 | 2.822E-03 | 1.653E-03 | | | | 144.8 |
| 1. 5.88 | 45 | | 4.270E-04 | | | | 897 |
| 16.48 | 10 | | | 1.488E-03 | 2.417E-04 | 5.131E-04 | 145.8 |
| 1. 5.88 | 45 | | | 2.620E-03 | 1.998E-03 | 3.097E-03 | 897 |
| 16.48 | 30 | | | | | | 145.8 |
| 1. 5.88 | 45 | | | | | | 897 |
| 16.48 | 20 | 2.939E-03 | 1.594E-03 | | | | 145.8 |
| 3. 5.88 | 45 | | 2.923E-04 | | | | 899 |
| 16.25 | 10 | | | 1.166E-03 | 1.722E-04 | 4.060E-04 | 147.8 |
| 3. 5.88 | 45 | | | 2.093E-03 | 1.447E-03 | 2.392E-03 | 899 |
| 16.25 | 30 | | | | | | 147.8 |
| 3. 5.88 | 45 | | | | | | 899 |
| 16.25 | 20 | 3.114E-03 | 1.256E-03 | | | | 147.8 |
| 10. 5.88 | 45 | | | 5.426E-03 | 3.248E-03 | 6.198E-03 | 899 |
| 8.32 | 30 | | | | | | 155 |
| 10. 5.88 | 45 | | | | | | 899 |
| 8.32 | 20 | 1.474E-02 | 2.944E-03 | | | | 155 |
| 11. 5.88 | 45 | | | 5.018E-03 | 2.981E-03 | 5.756E-03 | 902 |
| 8.54 | 30 | | | | | | 156 |
| 11. 5.88 | 45 | | | | | | 902 |
| 8.54 | 20 | 1.066E-02 | 2.458E-03 | | | | 156 |
| 13. 5.88 | 45 | | | 4.512E-03 | 2.766E-03 | 5.233E-03 | 897 |
| 9. 5 | 30 | | | | | | 158 |
| 13. 5.88 | 45 | | | | | | 897 |
| 9. 5 | 20 | 8.791E-03 | 2.169E-03 | | | | 158 |
| 16. 5.88 | 45 | | | 4.518E-03 | 2.719E-03 | 5.234E-03 | 899 |
| 8.41 | 30 | | | | | | 161 |
| 17. 5.88 | 45 | | | 4.392E-03 | 2.698E-03 | 5.213E-03 | 897 |
| 8.36 | 30 | | | | | | 162 |
| 17. 5.88 | 45 | | | | | | 897 |
| 8.36 | 20 | 8.476E-03 | 1.915E-03 | | | | 162 |
| 18. 5.88 | 45 | | | 4.510E-03 | 2.678E-03 | 5.204E-03 | 900 |
| 8.36 | 30 | | | | | | 163 |
| 18. 5.88 | 45 | | | | | | 900 |
| 8.36 | 20 | 6.657E-03 | 1.670E-03 | | | | 163 |
| 19. 5.88 | 45 | | | 4.391E-03 | 2.690E-03 | 5.232E-03 | 901 |
| 8.42 | 30 | | | | | | 164 |
| 19. 5.88 | 45 | | | | | | 901 |
| 8.42 | 20 | 8.255E-03 | 1.815E-03 | | | | 164 |
| 23. 5.88 | 45 | | | | | | 84 |
| 17. 0 | 20 | | | | | | 168.29 |

Table 6.4.8. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. A | | CYCLE NO. 88.05 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 27. 5.88 | 45 | | | | | | 885 |
| 0. 0 | 10 | | | | | | 168.29 |
| 27. 5.88 | 45 | | | 4.885E-03 | 3.622E-03 | 5.020E-03 | 894 |
| 16.28 | 30 | | | | | | 169 |
| 27. 5.88 | 45 | | | | | | 894 |
| 16.28 | 20 | 6.037E-03 | 2.678E-03 | | | | 169 |
| 28. 5.88 | 45 | | 5.864E-04 | | | | 895 |
| 16.14 | 10 | | | 2.156E-03 | 3.326E-04 | 7.031E-04 | 170 |
| 28. 5.88 | 45 | | | 4.824E-03 | 3.559E-03 | 4.904E-03 | 895 |
| 16.14 | 30 | | | | | | 170 |
| 28. 5.88 | 45 | | | | | | 895 |
| 16.14 | 20 | 6.266E-03 | 2.857E-03 | | | | 170 |
| 29. 5.88 | 45 | | 7.215E-04 | | | | 898 |
| 16.26 | 10 | | | 2.123E-03 | 3.291E-04 | 6.121E-04 | 171 |
| 29. 5.88 | 45 | | | 4.377E-03 | 3.499E-03 | 4.863E-03 | 898 |
| 16.26 | 30 | | | | | | 171 |
| 29. 5.88 | 45 | | | | | | 898 |
| 16.26 | 20 | 7.072E-03 | 2.806E-03 | | | | 171 |
| 30. 5.88 | 45 | | 5.610E-04 | | | | 896 |
| 18.3 | 10 | | | 1.910E-03 | 3.464E-04 | 6.354E-04 | 172.1 |
| 31. 5.88 | 45 | | | 3.715E-03 | 2.520E-03 | 3.797E-03 | 898 |
| 16.55 | 30 | | | | | | 173 |
| 31. 5.88 | 45 | | | | | | 898 |
| 16.55 | 20 | 6.955E-03 | 2.145E-03 | | | | 173 |
| 1. 6.88 | 45 | | 4.823E-04 | | | | 894 |
| 17. 5 | 10 | | | 1.651E-03 | 2.828E-04 | 6.252E-04 | 174 |
| 1. 6.88 | 45 | | | 3.403E-03 | 2.592E-03 | 3.797E-03 | 894 |
| 17. 5 | 30 | | | | | | 174 |
| 1. 6.88 | 45 | | | | | | 894 |
| 17. 5 | 20 | 6.448E-03 | 2.077E-03 | | | | 174 |
| 3. 6.88 | 45 | | 3.759E-04 | | | | 897 |
| 17.19 | 10 | | | 1.358E-03 | 2.168E-04 | 4.835E-04 | 176 |
| 3. 6.88 | 45 | | | 3.136E-03 | 2.296E-03 | 3.598E-03 | 897 |
| 17.19 | 30 | | | | | | 176 |
| 3. 6.88 | 45 | | | | | | 897 |
| 17.19 | 20 | 6.324E-03 | 1.937E-03 | | | | 176 |
| 4. 6.88 | 45 | | 3.998E-04 | | | | 890 |
| 16.15 | 10 | | | 1.316E-03 | 2.287E-04 | 4.961E-04 | 177 |
| 4. 6.88 | 45 | | | 3.065E-03 | 2.285E-03 | 3.589E-03 | 890 |
| 16.15 | 30 | | | | | | 177 |
| 4. 6.88 | 45 | | | | | | 890 |
| 16.15 | 20 | 6.585E-03 | 1.851E-03 | | | | 177 |
| 5. 6.88 | 45 | | 3.948E-04 | | | | 897 |
| 16.29 | 10 | | | 1.366E-03 | 2.359E-04 | 4.803E-04 | 178 |
| 5. 6.88 | 45 | | | 2.856E-03 | 2.054E-03 | 2.814E-03 | 897 |
| 16.29 | 30 | | | | | | 178 |
| 5. 6.88 | 45 | | | | | | 897 |
| 16.29 | 20 | 5.989E-03 | 1.813E-03 | | | | 178 |
| 6. 6.88 | 45 | | | | | | 898 |
| 17. 1 | 10 | | | 1.674E-03 | 2.530E-04 | 6.008E-04 | 179 |
| 6. 6.88 | 45 | | | 3.443E-03 | 2.558E-03 | 4.036E-03 | 898 |
| 17. 1 | 30 | | | | | | 179 |

Table 6.4.8. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. A | | CYCLE NO. 88.05 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 6. 6.88 | 45 | | | | | | 898 |
| 17. 1 | 20 | 7.246E-03 | 2.036E-03 | | | | 179 |
| 7. 6.88 | 45 | | 3.583E-04 | | | | 899 |
| 16.29 | 10 | | | 1.230E-03 | 2.073E-04 | 4.308E-04 | 180 |
| 7. 6.88 | 45 | | | 2.677E-03 | 1.903E-03 | 3.101E-03 | 899 |
| 16.29 | 30 | | | | | | 180 |
| 7. 6.88 | 45 | | | | | | 899 |
| 16.29 | 20 | 5.339E-03 | 1.587E-03 | | | | 180 |
| 8. 6.88 | 45 | | | 2.667E-03 | 1.922E-03 | 3.130E-03 | 898 |
| 16.19 | 30 | | | | | | 181 |
| 8. 6.88 | 45 | | | | | | 898 |
| 16.19 | 20 | 5.490E-03 | 1.654E-03 | | | | 181 |
| 10. 6.88 | 45 | | 3.612E-04 | | | | 904 |
| 16.33 | 10 | | | 1.238E-03 | 2.187E-04 | 4.465E-04 | 183 |
| 10. 6.88 | 45 | | | 2.869E-03 | 2.106E-03 | 3.375E-03 | 904 |
| 17.33 | 30 | | | | | | 183 |
| 11. 6.88 | 45 | | 3.667E-04 | | | | 901 |
| 16.49 | 10 | | | 1.298E-03 | 2.266E-04 | 4.227E-04 | 184 |
| 12. 6.88 | 45 | | | 2.536E-03 | 1.900E-03 | 2.846E-03 | 902 |
| 16.45 | 30 | | | | | | 185 |
| 12. 6.88 | 45 | | | | | | 902 |
| 16.45 | 20 | 5.121E-03 | 1.544E-03 | | | | 185 |
| 13. 6.88 | 45 | | 3.241E-04 | | | | 903 |
| 16.36 | 10 | | | 1.189E-03 | 1.919E-04 | 4.195E-04 | 186 |
| 13. 6.88 | 45 | | | 2.556E-03 | 1.910E-03 | 2.884E-03 | 902 |
| 17.4 | 30 | | | | | | 186 |
| 13. 6.88 | 45 | | | | | | 902 |
| 18.36 | 20 | 7.383E-03 | 1.540E-03 | | | | 186 |
| 14. 6.88 | 45 | | 3.841E-04 | | | | 904 |
| 16.19 | 10 | | | 1.257E-03 | 2.128E-04 | 4.275E-04 | 187 |
| 14. 6.88 | 45 | | | 2.794E-03 | 1.959E-03 | 3.171E-03 | 904 |
| 16.19 | 30 | | | | | | 187 |
| 14. 6.88 | 45 | | | | | | 904 |
| 16.19 | 20 | 6.564E-03 | 1.596E-03 | | | | 187 |
| 16. 6.88 | 45 | | 3.293E-04 | | | | 906 |
| 8.27 | 10 | | | 1.102E-03 | 1.921E-04 | 3.799E-04 | 189 |
| 16. 6.88 | 45 | | | 2.763E-03 | 1.936E-03 | 2.907E-03 | 906 |
| 8.27 | 30 | | | | | | 189 |
| 16. 6.88 | 45 | | 3.330E-04 | | | | 906 |
| 14.21 | 10 | | | 1.274E-03 | 1.972E-04 | 4.209E-04 | 189 |
| 17. 6.88 | 45 | | 3.466E-04 | | | | 902 |
| 8.59 | 10 | | | 1.286E-03 | 2.063E-04 | 4.327E-04 | 189.8 |
| 17. 6.88 | 45 | | | 2.819E-03 | 2.031E-03 | 3.239E-03 | 902 |
| 8.59 | 30 | | | | | | 189.8 |
| 17. 6.88 | 45 | | | | | | 902 |
| 8.59 | 20 | 5.515E-03 | 1.661E-03 | | | | 189.8 |
| 18. 6.88 | 45 | | | | | | 902 |
| 9. 1 | 20 | 4.989E-03 | | | | | 190.8 |
| 19. 6.88 | 45 | | | | | | 902 |
| 9. 2 | 20 | 5.392E-03 | | | | | 191.8 |
| 20. 6.88 | 45 | | | | | | 903 |
| 8.36 | 10 | | | 8.394E-04 | 9.476E-05 | 3.174E-04 | 192.7 |

Table 6.4.8. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. A | | CYCLE NO. 88.05 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 20. 6.88 | 45 | | | 2.201E-03 | 1.486E-03 | 3.327E-03 | 903 |
| 8.36 | 30 | | | | | | 192.7 |
| 20. 6.88 | 45 | | | | | | 903 |
| 8.36 | 20 | 5.316E-03 | | | | | 192.7 |
| 20. 6.88 | 45 | | | | | | 0 |
| 18. 0 | 20 | | | | | | 193.5 |
| --- | --- | | | | | | |

Table 6.4.9. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. A | | CYCLE NO. 88.06 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 24. 6.88 | 42 | | | | | | 809 |
| 0. 0 | 10 | | | | | | 193.5 |
| 24. 6.88 | 42 | | 2.887E-04 | | | | 817 |
| 9.22 | 10 | | | 1.276E-03 | 1.977E-04 | 5.358E-04 | 194.5 |
| 24. 6.88 | 45 | | | 3.392E-03 | 2.497E-03 | 3.597E-03 | 817 |
| 9.22 | 30 | | | | | | 194.5 |
| 24. 6.88 | 45 | | | | | | 817 |
| 9.22 | 20 | 5.005E-03 | 1.880E-03 | | | | 194.5 |
| 25. 6.88 | 45 | | 4.004E-04 | | | | 824 |
| 8.25 | 10 | | | 1.658E-03 | 2.468E-04 | 5.468E-04 | 195.4 |
| 25. 6.88 | 45 | | | | 2.420E-03 | 3.999E-03 | 824 |
| 8.25 | 30 | | | | | | 195.4 |
| 25. 6.88 | 45 | | | | | | 824 |
| 8.25 | 20 | 6.283E-03 | 2.491E-03 | | | | 195.4 |
| 26. 6.88 | 42 | | 2.487E-04 | | | | 827 |
| 9. 0 | 10 | | | 1.380E-03 | 1.598E-04 | 4.448E-04 | 196.5 |
| 26. 6.88 | 45 | | | 3.436E-03 | 2.549E-03 | 4.060E-03 | 827 |
| 9. 0 | 30 | | | | | | 196.5 |
| 26. 6.88 | 45 | | | | | | 827 |
| 9. 0 | 20 | 6.810E-03 | 2.561E-03 | | | | 196.5 |
| 30. 6.88 | 45 | | | 2.814E-03 | 1.643E-03 | 3.427E-03 | 832 |
| 18.16 | 30 | | | | | | 200.8 |
| 30. 6.88 | 45 | | | | | | 831 |
| 20.16 | 20 | 6.241E-03 | 1.215E-03 | | | | 200.8 |
| 1. 7.88 | 45 | | | 2.845E-03 | 1.680E-03 | 3.472E-03 | 834 |
| 16.38 | 30 | | | | | | 201.7 |
| 1. 7.88 | 45 | | | | | | 834 |
| 16.38 | 20 | 6.276E-03 | 1.154E-03 | | | | 201.7 |
| 2. 7.88 | 45 | | | 2.821E-03 | 1.660E-03 | 3.488E-03 | 836 |
| 16.21 | 30 | | | | | | 202.7 |
| 2. 7.88 | 45 | | | | | | 836 |
| 16.21 | 20 | 6.098E-03 | 1.115E-03 | | | | 202.7 |
| 3. 7.88 | 45 | | | 2.703E-03 | 1.607E-03 | 3.392E-03 | 836 |
| 16.12 | 30 | | | | | | 203.7 |
| 3. 7.88 | 45 | | | | | | 836 |
| 16.12 | 20 | 6.132E-03 | 1.067E-03 | | | | 203.7 |
| 7. 7.88 | 45 | | 3.205E-04 | | | | 839 |
| 10.13 | 10 | | | 1.560E-03 | 2.091E-04 | 4.874E-04 | 205.9 |
| 7. 7.88 | 45 | | | 2.985E-03 | 2.045E-03 | 3.228E-03 | 839 |
| 10.13 | 30 | | | | | | 205.9 |
| 7. 7.88 | 45 | | | | | | 839 |
| 10.13 | 20 | 6.473E-03 | 2.084E-03 | | | | 205.9 |
| 8. 7.88 | 45 | | 3.868E-04 | | | | 839 |
| 9. 5 | 10 | | | 1.525E-03 | 2.550E-04 | 4.816E-04 | 206.9 |
| 8. 7.88 | 45 | | | 3.031E-03 | 2.113E-03 | 3.582E-03 | 839 |
| 9. 5 | 30 | | | | | | 206.9 |
| 8. 7.88 | 45 | | | | | | 839 |
| 9. 5 | 20 | 5.352E-03 | 1.998E-03 | | | | 206.9 |
| 9. 7.88 | 45 | | 4.054E-04 | | | | 840 |
| 8.14 | 10 | | | 1.541E-03 | 2.383E-04 | 4.912E-04 | 207.8 |
| 9. 7.88 | 45 | | | 2.907E-03 | 2.202E-03 | 3.396E-03 | 840 |
| 8.14 | 30 | | | | | | 207.8 |

Table 6.4.9. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. A | | CYCLE NO. 88.06 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 9. 7.88 | 45 | | | | | | 840 |
| 8.14 | 20 | 5.559E-03 | 1.902E-03 | | | | 207.8 |
| 10. 7.88 | 45 | | 4.086E-04 | | | | 841 |
| 8.37 | 10 | | | 1.504E-03 | 2.585E-04 | 4.938E-04 | 208.8 |
| 10. 7.88 | 45 | | | 2.944E-03 | 2.133E-03 | 3.315E-03 | 841 |
| 8.37 | 30 | | | | | | 208.8 |
| 10. 7.88 | 45 | | | | | | 841 |
| 8.37 | 20 | 6.035E-03 | 1.955E-03 | | | | 208.8 |
| 11. 7.88 | 45 | | 3.154E-04 | | | | 837 |
| 9. 5 | 10 | | | 1.192E-03 | 1.973E-04 | 3.926E-04 | 209.9 |
| 11. 7.88 | 45 | | | 2.931E-03 | 1.983E-03 | 3.281E-03 | 837 |
| 9. 5 | 30 | | | | | | 209.9 |
| 11. 7.88 | 45 | | | | | | 837 |
| 9. 5 | 20 | 5.474E-03 | 1.800E-03 | | | | 209.9 |
| 12. 7.88 | 45 | | 3.883E-04 | | | | 838 |
| 8.16 | 10 | | | 1.372E-03 | 2.331E-04 | 4.740E-04 | 210.8 |
| 12. 7.88 | 45 | | | 2.325E-03 | 1.339E-03 | 2.918E-03 | 838 |
| 8.16 | 30 | | | | | | 210.8 |
| 12. 7.88 | 45 | | | | | | 838 |
| 8.16 | 20 | 7.962E-03 | 1.832E-03 | | | | 210.8 |
| 13. 7.88 | 45 | | 3.896E-04 | | | | 838 |
| 8.18 | 10 | | | 1.388E-03 | 2.324E-04 | 4.630E-04 | 211.8 |
| 13. 7.88 | 45 | | | 2.702E-03 | 1.930E-03 | 3.055E-03 | 838 |
| 8.18 | 30 | | | | | | 211.8 |
| 13. 7.88 | 45 | | | | | | 838 |
| 8.18 | 20 | 5.803E-03 | 1.700E-03 | | | | 211.8 |
| 14. 7.88 | 45 | | 3.512E-04 | | | | 838 |
| 9.21 | 10 | | | 1.346E-03 | 2.155E-04 | 4.208E-04 | 212.8 |
| 14. 7.88 | 45 | | | 2.639E-03 | 1.950E-03 | 2.995E-03 | 838 |
| 9.21 | 30 | | | | | | 212.8 |
| 14. 7.88 | 45 | | | | | | 838 |
| 9.21 | 20 | 5.649E-03 | 1.671E-03 | | | | 212.8 |
| 15. 7.88 | 45 | | 3.889E-04 | | | | 838 |
| 8.17 | 10 | | | 1.360E-03 | 2.307E-04 | 4.749E-04 | 213.8 |
| 15. 7.88 | 45 | | | 2.666E-03 | 1.906E-03 | 2.849E-03 | 838 |
| 8.17 | 30 | | | | | | 213.8 |
| 15. 7.88 | 45 | | | | | | 838 |
| 8.17 | 20 | 5.814E-03 | 1.670E-03 | | | | 213.8 |
| 18. 7.88 | 45 | | | | | | 27 |
| 5. 0 | 20 | | | | | | 214.29 |

Table 6.4.10. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. A | | CYCLE NO. 88.07 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 8. 9.88 | 42 | | | | | | 364 |
| 0. 0 | 10 | | | | | | 214.3 |
| 8. 9.88 | 42 | | 4.259E-04 | | | | 835 |
| 11. 5 | 10 | | | 9.525E-04 | | 4.514E-04 | 214.7 |
| 8. 9.88 | 45 | | 5.535E-04 | | | | 835 |
| 11.13 | 10 | | | 1.099E-03 | 3.058E-04 | 5.831E-04 | 214.7 |
| 8. 9.88 | 45 | | | 3.218E-03 | 2.379E-03 | 3.681E-03 | 835 |
| 11.13 | 40 | | 1.486E-03 | | | | 214.7 |
| 9. 9.88 | 42 | | 4.153E-04 | | | | 849 |
| 8.42 | 10 | | | 1.302E-03 | 2.620E-04 | 4.181E-04 | 215.6 |
| 9. 9.88 | 45 | | 4.851E-04 | | | | 849 |
| 8.52 | 10 | | | 1.398E-03 | 2.541E-04 | 4.874E-04 | 215.6 |
| 9. 9.88 | 45 | | | 2.624E-03 | 2.001E-03 | 3.151E-03 | 849 |
| 8.52 | 30 | | | | | | 215.6 |
| 9. 9.88 | 45 | | | | | | 849 |
| 8.52 | 20 | 1.742E-03 | 1.956E-03 | | | | 215.6 |
| 10. 9.88 | 42 | | 3.725E-04 | | | | 853 |
| 11.2 | 10 | | | 1.327E-03 | 2.130E-04 | 4.375E-04 | 216.7 |
| 10. 9.88 | 45 | | 3.364E-04 | | | | 853 |
| 11.31 | 10 | | | 1.352E-03 | 1.997E-04 | 5.135E-04 | 216.7 |
| 10. 9.88 | 45 | | | 2.523E-03 | 1.767E-03 | 2.745E-03 | 853 |
| 11.31 | 30 | | | | | | 216.7 |
| 10. 9.88 | 45 | | | | | | 853 |
| 11.31 | 20 | 3.057E-03 | 1.872E-03 | | | | 216.7 |
| 11. 9.88 | 42 | | 3.691E-04 | | | | 853 |
| 9. 1 | 10 | | | 1.310E-03 | 2.228E-04 | 4.010E-04 | 217.6 |
| 11. 9.88 | 45 | | 4.372E-04 | | | | 853 |
| 9.12 | 10 | | | 1.437E-03 | 2.828E-04 | 4.514E-04 | 217.6 |
| 11. 9.88 | 45 | | | 2.772E-03 | 2.061E-03 | 3.201E-03 | 853 |
| 9.12 | 30 | | | | | | 217.6 |
| 11. 9.88 | 45 | | | | | | 853 |
| 9.12 | 20 | 3.822E-03 | 2.064E-03 | | | | 217.6 |
| 12. 9.88 | 42 | | 3.275E-04 | | | | 856 |
| 8.45 | 10 | | | 1.131E-03 | 2.112E-04 | 3.962E-04 | 218.6 |
| 12. 9.88 | 45 | | 4.646E-04 | | | | 856 |
| 8.53 | 10 | | | 1.554E-03 | | 4.999E-04 | 218.6 |
| 12. 9.88 | 45 | | | 2.901E-03 | 2.038E-03 | 3.444E-03 | 856 |
| 8.53 | 30 | | | | | | 218.6 |
| 12. 9.88 | 45 | | | | | | 856 |
| 8.53 | 20 | 4.683E-03 | 2.173E-03 | | | | 218.6 |
| 13. 9.88 | 42 | | 3.773E-04 | | | | 856 |
| 8.45 | 10 | | | 1.378E-03 | 2.391E-04 | 4.626E-04 | 219.7 |
| 13. 9.88 | 45 | | 3.905E-04 | | | | 856 |
| 8.57 | 10 | | | 1.469E-03 | 1.984E-04 | 4.716E-04 | 219.7 |
| 13. 9.88 | 45 | | | 2.753E-03 | 2.074E-03 | 3.327E-03 | 856 |
| 8.57 | 30 | | | | | | 219.7 |
| 13. 9.88 | 45 | | | | | | 856 |
| 8.57 | 20 | 4.894E-03 | 2.142E-03 | | | | 219.7 |
| 16. 9.88 | 42 | | 1.412E-04 | | | | 857 |
| 16.32 | 10 | | | | | | 222.9 |
| 16. 9.88 | 45 | | | | | | 857 |
| 16.38 | 10 | | | 1.251E-03 | | 4.410E-04 | 222.9 |

Table 6.4.10. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. A | | CYCLE NO. | 88.07 | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 16. 9.88 | 45 | | | 2.556E-03 | 1.760E-03 | 3.023E-03 | 857 |
| 16.38 | 30 | | | | | | 222.9 |
| 16. 9.88 | 45 | | | | | | 857 |
| 16.38 | 20 | 6.292E-03 | 2.210E-03 | | | | 222.9 |
| 16. 9.88 | 42 | | 2.914E-04 | | | | 857 |
| 19.2 | 10 | | | 1.293E-03 | 1.875E-04 | 3.922E-04 | 223 |
| 16. 9.88 | 45 | | | | | | 857 |
| 19.25 | 10 | | | 1.717E-03 | 2.917E-04 | 5.564E-04 | 223 |
| 16. 9.88 | 45 | | | 2.924E-03 | 2.028E-03 | 3.495E-03 | 857 |
| 19.25 | 30 | | | | | | 223 |
| 16. 9.88 | 45 | | | | | | 857 |
| 19.25 | 20 | 6.223E-03 | 2.256E-03 | | | | 223 |
| 17. 9.88 | 42 | | 3.115E-04 | | | | 860 |
| 16.33 | 10 | | | 1.482E-03 | 1.957E-04 | 4.628E-04 | 223.9 |
| 17. 9.88 | 45 | | | | | | 860 |
| 16.38 | 10 | | | 1.884E-03 | 2.778E-04 | 6.481E-04 | 223.9 |
| 17. 9.88 | 45 | | | | | | 860 |
| 16.38 | 20 | 7.480E-03 | 2.531E-03 | | | | 223.9 |
| 17. 9.88 | 42 | | 3.431E-04 | | | | 858 |
| 19.3 | 10 | | | 1.407E-03 | 2.093E-04 | 4.740E-04 | 224 |
| 17. 9.88 | 45 | | | | | | 858 |
| 19.35 | 10 | | | 1.900E-03 | 2.253E-04 | 6.062E-04 | 224 |
| 17. 9.88 | 45 | | | 3.259E-03 | 2.300E-03 | 3.709E-03 | 858 |
| 19.35 | 30 | | | | | | 224 |
| 17. 9.88 | 45 | | | | | | 858 |
| 19.35 | 20 | 7.246E-03 | 2.482E-03 | | | | 224 |
| 18. 9.88 | 42 | | 2.296E-04 | | | | 857 |
| 16.35 | 10 | | | 1.512E-03 | 2.276E-04 | 4.752E-04 | 224.9 |
| 18. 9.88 | 45 | | | | | | 857 |
| 16.4 | 10 | | | 2.004E-03 | | 6.964E-04 | 224.9 |
| 18. 9.88 | 45 | | | 3.358E-03 | 2.211E-03 | 3.845E-03 | 857 |
| 16.4 | 30 | | | | | | 224.9 |
| 18. 9.88 | 45 | | | | | | 857 |
| 16.4 | 20 | 7.597E-03 | 2.649E-03 | | | | 224.9 |
| 18. 9.88 | 42 | | 2.116E-04 | | | | 858 |
| 20.43 | 10 | | | 1.222E-03 | 1.878E-04 | 3.596E-04 | 225.05 |
| 18. 9.88 | 45 | | | | | | 858 |
| 20.49 | 10 | | | 1.980E-03 | | 6.333E-04 | 225.05 |
| 18. 9.88 | 45 | | | 3.139E-03 | 2.382E-03 | 3.588E-03 | 858 |
| 20.49 | 30 | | | | | | 225.05 |
| 18. 9.88 | 45 | | | | | | 858 |
| 20.49 | 20 | 7.473E-03 | 2.533E-03 | | | | 225.05 |
| 19. 9.88 | 45 | | 3.349E-04 | | | | 856 |
| 16.51 | 10 | | | 1.833E-03 | 2.787E-04 | 6.040E-04 | 225.91 |
| 19. 9.88 | 45 | | | 3.391E-03 | 2.517E-03 | 3.951E-03 | 856 |
| 16.51 | 30 | | | | | | 225.91 |
| 19. 9.88 | 45 | | | | | | 856 |
| 16.51 | 20 | 7.798E-03 | 2.560E-03 | | | | 225.91 |
| 20. 9.88 | 45 | | 4.166E-04 | | | | 858 |
| 16.39 | 10 | | | 2.160E-03 | 3.101E-04 | 6.918E-04 | 226.9 |
| 20. 9.88 | 45 | | | 3.530E-03 | 2.577E-03 | 4.058E-03 | 858 |
| 16.39 | 30 | | | | | | 226.9 |

Table 6.4.10. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. A | | CYCLE NO. 88.07 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 20. 9.88 | 45 | | | | | | 858 |
| 16.39 | 20 | 1.153E-02 | 2.676E-03 | | | | 226.9 |
| 22. 9.88 | 45 | | 3.954E-04 | | | | 861 |
| 0.35 | 10 | | | 1.994E-03 | 3.022E-04 | 6.437E-04 | 228.25 |
| 22. 9.88 | 45 | | | 3.406E-03 | 2.399E-03 | 3.805E-03 | 861 |
| 0.35 | 30 | | | | | | 228.25 |
| 22. 9.88 | 45 | | | | | | 861 |
| 0.35 | 20 | 7.429E-03 | 2.483E-03 | | | | 228.25 |
| 23. 9.88 | 45 | | 4.070E-04 | | | | 859 |
| 0.4 | 10 | | | 1.843E-03 | 3.071E-04 | 5.769E-04 | 229.25 |
| 23. 9.88 | 45 | | | 3.121E-03 | 2.361E-03 | 3.765E-03 | 859 |
| 0.4 | 30 | | | | | | 229.25 |
| 23. 9.88 | 45 | | | | | | 859 |
| 0.4 | 20 | 8.518E-03 | 2.319E-03 | | | | 229.25 |
| 24. 9.88 | 45 | | 6.569E-04 | | | | 861 |
| 1. 0 | 10 | | | 1.958E-03 | 4.552E-04 | 6.647E-04 | 230.28 |
| 24. 9.88 | 45 | | | 3.087E-03 | 2.301E-03 | 3.501E-03 | 861 |
| 1. 0 | 30 | | | | | | 230.28 |
| 24. 9.88 | 45 | | | | | | 861 |
| 1. 0 | 20 | 7.400E-03 | 2.258E-03 | | | | 230.28 |
| 25. 9.88 | 45 | | 3.892E-04 | | | | 861 |
| 0.43 | 10 | | | 1.744E-03 | 3.211E-04 | 6.091E-04 | 231.25 |
| 25. 9.88 | 45 | | | 2.875E-03 | 2.155E-03 | 3.495E-03 | 861 |
| 0.43 | 30 | | | | | | 231.25 |
| 25. 9.88 | 45 | | | | | | 861 |
| 0.43 | 20 | 6.495E-03 | 2.154E-03 | | | | 231.25 |
| 26. 9.88 | 45 | | 3.917E-04 | | | | 860 |
| 1.55 | 10 | | | 1.749E-03 | 2.700E-04 | 5.663E-04 | 232.32 |
| 26. 9.88 | 45 | | | 2.950E-03 | 2.165E-03 | 3.445E-03 | 860 |
| 1.55 | 30 | | | | | | 232.32 |
| 26. 9.88 | 45 | | | | | | 860 |
| 1.55 | 20 | 9.623E-03 | 2.211E-03 | | | | 232.32 |
| 27. 9.88 | 45 | | 2.803E-04 | | | | 859 |
| 1.15 | 10 | | | 1.405E-03 | 1.864E-04 | 4.546E-04 | 233.29 |
| 27. 9.88 | 45 | | | 2.893E-03 | 2.078E-03 | 3.429E-03 | 859 |
| 1.15 | 30 | | | | | | 233.29 |
| 27. 9.88 | 45 | | | | | | 859 |
| 1.15 | 20 | 8.196E-03 | 2.147E-03 | | | | 233.29 |
| 28. 9.88 | 45 | | 2.608E-04 | | | | 861 |
| 1.5 | 10 | | | 1.621E-03 | 1.998E-04 | 5.377E-04 | 234.32 |
| 28. 9.88 | 45 | | | 2.921E-03 | 2.108E-03 | 3.482E-03 | 861 |
| 1.5 | 30 | | | | | | 234.32 |
| 28. 9.88 | 45 | | | | | | 861 |
| 1.5 | 20 | 6.825E-03 | 2.173E-03 | | | | 234.32 |
| 29. 9.88 | 45 | | | | | | 62 |
| 3. 0 | 20 | | | | | | 235.33 |

Table 6.4.11. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. A | | CYCLE NO. 88.08 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 4.10.88 | 45 | | | | | | 831 |
| 0. 0 | 10 | | | | | | 235.33 |
| 4.10.88 | 45 | | | | | | 839 |
| 17.15 | 10 | | | 1.866E-03 | 1.445E-04 | 6.289E-04 | 236.4 |
| 4.10.88 | 45 | | | 3.864E-03 | 2.910E-03 | 4.660E-03 | 839 |
| 17.15 | 40 | 8.580E-03 | 2.645E-03 | | | | 236.4 |
| 4.10.88 | 45 | | | 4.208E-03 | 2.588E-03 | 4.757E-03 | 839 |
| 17.15 | 40 | 7.206E-03 | 2.863E-03 | | | | 236.4 |
| 5.10.88 | 42 | | 2.593E-04 | | | | 843 |
| 18.25 | 10 | | | 1.892E-03 | 2.131E-04 | 5.696E-04 | 237.6 |
| 5.10.88 | 45 | | 2.154E-04 | | | | 843 |
| 18.25 | 10 | | | 2.039E-03 | 1.850E-04 | 6.290E-04 | 237.6 |
| 5.10.88 | 45 | | | 3.706E-03 | 2.754E-03 | 4.484E-03 | 843 |
| 18.25 | 40 | 6.290E-03 | 2.720E-03 | | | | 237.6 |
| 5.10.88 | 45 | | | 4.263E-03 | 2.906E-03 | 4.748E-03 | 843 |
| 18.25 | 40 | 6.748E-03 | 3.066E-03 | | | | 237.6 |
| 6.10.88 | 42 | | 3.421E-04 | | | | 843 |
| 16.56 | 10 | | | 1.588E-03 | 2.391E-04 | 5.259E-04 | 238.6 |
| 6.10.88 | 45 | | | | | | 843 |
| 17. 0 | 10 | | | 2.146E-03 | 4.057E-04 | 6.808E-04 | 238.6 |
| 6.10.88 | 45 | | | 3.034E-03 | 2.303E-03 | 3.640E-03 | 843 |
| 17. 0 | 30 | | | | | | 238.6 |
| 6.10.88 | 45 | | | | | | 843 |
| 17. 0 | 20 | 5.861E-03 | 2.442E-03 | | | | 238.6 |
| 7.10.88 | 42 | | 2.636E-04 | | | | 845 |
| 16.5 | 10 | | | 1.460E-03 | 1.745E-04 | 4.844E-04 | 239.6 |
| 7.10.88 | 45 | | 2.979E-04 | | | | 845 |
| 16.55 | 10 | | | 1.729E-03 | 2.135E-04 | 5.434E-04 | 239.6 |
| 7.10.88 | 45 | | | 2.766E-03 | 2.095E-03 | 3.491E-03 | 845 |
| 16.55 | 30 | | | | | | 239.6 |
| 7.10.88 | 45 | | | | | | 845 |
| 16.55 | 20 | 6.286E-03 | 2.313E-03 | | | | 239.6 |
| 8.10.88 | 42 | | 2.589E-04 | | | | 846 |
| 16.34 | 10 | | | 1.509E-03 | 2.021E-04 | 5.016E-04 | 240.6 |
| 8.10.88 | 45 | | 3.004E-04 | | | | 846 |
| 16.4 | 10 | | | 1.692E-03 | 2.026E-04 | 5.570E-04 | 240.6 |
| 8.10.88 | 45 | | | 2.927E-03 | 2.096E-03 | 3.589E-03 | 846 |
| 16.4 | 30 | | | | | | 240.6 |
| 8.10.88 | 45 | | | | | | 846 |
| 16.4 | 20 | 6.709E-03 | 2.361E-03 | | | | 240.6 |
| 9.10.88 | 42 | | 3.349E-04 | | | | 849 |
| 16.4 | 10 | | | 1.454E-03 | 2.141E-04 | 4.865E-04 | 241.6 |
| 9.10.88 | 45 | | 3.200E-04 | | | | 849 |
| 16.45 | 10 | | | 1.828E-03 | 2.415E-04 | 5.685E-04 | 241.6 |
| 9.10.88 | 45 | | | 2.939E-03 | 2.103E-03 | 3.561E-03 | 849 |
| 16.45 | 30 | | | | | | 241.6 |
| 9.10.88 | 45 | | | | | | 849 |
| 16.45 | 20 | 7.470E-03 | 2.355E-03 | | | | 241.6 |
| 12.10.88 | 42 | | 2.619E-04 | | | | 849 |
| 20. 3 | 10 | | | 1.470E-03 | 1.769E-04 | 4.224E-04 | 244.8 |
| 12.10.88 | 45 | | | | | | 849 |
| 20. 4 | 10 | | | 1.806E-03 | 2.381E-04 | 5.510E-04 | 244.8 |

Table 6.4.11. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. A | | CYCLE NO. 88.08 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 12.10.88 | 45 | | | 2.851E-03 | 1.996E-03 | 3.385E-03 | 849 |
| 20. 4 | 30 | | | | | | 244.8 |
| 12.10.88 | 45 | | | | | | 849 |
| 20. 4 | 20 | 6.598E-03 | 2.255E-03 | | | | 244.8 |
| 13.10.88 | 42 | | 3.124E-04 | | | | 850 |
| 18.16 | 10 | | | 1.481E-03 | 2.198E-04 | 4.607E-04 | 245.7 |
| 13.10.88 | 45 | | | | | | 850 |
| 18.18 | 10 | | | 1.814E-03 | 2.153E-04 | 5.941E-04 | 245.7 |
| 13.10.88 | 45 | | | 2.866E-03 | 2.162E-03 | 3.477E-03 | 850 |
| 18.18 | 30 | | | | | | 245.7 |
| 13.10.88 | 45 | | | | | | 850 |
| 18.18 | 20 | 7.111E-03 | 2.370E-03 | | | | 245.7 |
| 14.10.88 | 42 | | 2.541E-04 | | | | 850 |
| 16.4 | 10 | | | 1.471E-03 | 1.754E-04 | 4.400E-04 | 246.7 |
| 14.10.88 | 45 | | | | | | 850 |
| 16.41 | 10 | | | 2.063E-03 | 2.765E-04 | 6.115E-04 | 246.7 |
| 14.10.88 | 45 | | | 3.053E-03 | 2.246E-03 | 3.691E-03 | 850 |
| 16.41 | 30 | | | | | | 246.7 |
| 14.10.88 | 45 | | | | | | 850 |
| 16.41 | 20 | 8.591E-03 | 2.488E-03 | | | | 246.7 |
| 15.10.88 | 42 | | 2.681E-04 | | | | 849 |
| 16.43 | 10 | | | 1.410E-03 | 1.521E-04 | 4.681E-04 | 247.7 |
| 15.10.88 | 45 | | | | | | 849 |
| 16.45 | 10 | | | 1.842E-03 | 2.199E-04 | 5.760E-04 | 247.7 |
| 15.10.88 | 45 | | | 2.763E-03 | 2.121E-03 | 3.405E-03 | 849 |
| 16.45 | 30 | | | | | | 247.7 |
| 15.10.88 | 45 | | | | | | 849 |
| 16.45 | 20 | 6.727E-03 | 2.311E-03 | | | | 247.7 |
| 16.10.88 | 42 | | 2.512E-04 | | | | 849 |
| 16.43 | 10 | | | 1.363E-03 | 1.859E-04 | 4.433E-04 | 248.7 |
| 16.10.88 | 45 | | | | | | 849 |
| 16.46 | 10 | | | 1.819E-03 | 2.466E-04 | 5.536E-04 | 248.7 |
| 16.10.88 | 45 | | | 2.644E-03 | 2.035E-03 | 3.187E-03 | 849 |
| 16.46 | 30 | | | | | | 248.7 |
| 16.10.88 | 45 | | | | | | 849 |
| 16.46 | 20 | 7.630E-03 | 2.149E-03 | | | | 248.7 |
| 17.10.88 | 42 | | 2.400E-04 | | | | 851 |
| 17.27 | 10 | | | 1.498E-03 | 1.551E-04 | 4.177E-04 | 249.7 |
| 17.10.88 | 45 | | | | | | 851 |
| 17.3 | 10 | | | 1.691E-03 | 2.377E-04 | 5.514E-04 | 249.7 |
| 17.10.88 | 45 | | | 2.838E-03 | 2.177E-03 | 3.564E-03 | 851 |
| 17.3 | 30 | | | | | | 249.7 |
| 17.10.88 | 45 | | | | | | 851 |
| 17.3 | 20 | 7.210E-03 | 2.395E-03 | | | | 249.7 |
| 19.10.88 | 42 | | 2.882E-04 | | | | 850 |
| 1. 0 | 10 | | | 1.313E-03 | 1.788E-04 | 4.125E-04 | 250.9 |
| 19.10.88 | 45 | | | | | | 850 |
| 1. 3 | 10 | | | 1.739E-03 | 2.539E-04 | 5.264E-04 | 250.9 |
| 19.10.88 | 45 | | | 2.643E-03 | 1.935E-03 | 3.015E-03 | 850 |
| 1. 3 | 30 | | | | | | 250.9 |
| 19.10.88 | 45 | | | | | | 850 |
| 1. 3 | 20 | 1.340E-02 | 2.066E-03 | | | | 250.9 |

Table 6.4.11. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. A | | CYCLE NO. 88.08 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 21.10.88 | 42 | | 2.135E-04 | | | | 852 |
| 18.42 | 10 | | | 1.500E-03 | 1.673E-04 | 4.486E-04 | 253.7 |
| 21.10.88 | 45 | | | | | | 852 |
| 18.46 | 10 | | | 1.727E-03 | 1.647E-04 | 5.154E-04 | 253.7 |
| 21.10.88 | 45 | | | 2.890E-03 | 2.036E-03 | 3.063E-03 | 852 |
| 18.46 | 30 | | | | | | 253.7 |
| 21.10.88 | 45 | | | | | | 852 |
| 18.46 | 20 | 7.065E-03 | 2.398E-03 | | | | 253.7 |
| 22.10.88 | 42 | | 1.824E-04 | | | | 851 |
| 17. 0 | 10 | | | 1.506E-03 | 1.285E-04 | 4.632E-04 | 254.6 |
| 22.10.88 | 45 | | | | | | 851 |
| 17. 2 | 10 | | | 1.740E-03 | 1.248E-04 | 5.339E-04 | 254.6 |
| 22.10.88 | 45 | | | 2.834E-03 | 2.117E-03 | 3.597E-03 | 851 |
| 17. 2 | 30 | | | | | | 254.6 |
| 22.10.88 | 45 | | | | | | 851 |
| 17. 2 | 20 | 6.393E-03 | 2.267E-03 | | | | 254.6 |
| 23.10.88 | 42 | | 2.502E-04 | | | | 853 |
| 16.25 | 10 | | | 1.247E-03 | 1.753E-04 | 3.921E-04 | 255.6 |
| 23.10.88 | 45 | | | | | | 853 |
| 16.3 | 10 | | | 1.481E-03 | | 4.448E-04 | 255.6 |
| 23.10.88 | 45 | | | 2.471E-03 | 1.794E-03 | 2.958E-03 | 853 |
| 16.3 | 30 | | | | | | 255.6 |
| 23.10.88 | 45 | | | | | | 853 |
| 16.3 | 20 | 5.560E-03 | 1.872E-03 | | | | 255.6 |
| 25.10.88 | 45 | | | | | | 78 |
| 1.3 | 20 | | | | | | 256.77 |
| --- | --- | | | | | | |

Table 6.4.12. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. A | | CYCLE NO. 88.09 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 28.10.88 | 45 | | | | | | 836 |
| 0. 0 | 10 | | | | | | 256.77 |
| 28.10.88 | 52 | | 5.900E-04 | | | | 851 |
| 16.52 | 10 | | | 2.412E-03 | 4.008E-04 | 8.656E-04 | 257.8 |
| 28.10.88 | 55 | | | | | | 851 |
| 16.58 | 10 | | | 2.507E-03 | 4.499E-04 | 8.952E-04 | 257.8 |
| 28.10.88 | 55 | | | 3.745E-03 | 2.908E-03 | 4.120E-03 | 851 |
| 16.58 | 30 | | | | | | 257.8 |
| 28.10.88 | 55 | | | | | | 851 |
| 16.58 | 20 | 6.839E-03 | 2.424E-03 | | | | 257.8 |
| 29.10.88 | 52 | | 4.016E-04 | | | | 854 |
| 18. 0 | 10 | | | 2.435E-03 | 3.009E-04 | 7.756E-04 | 258.9 |
| 29.10.88 | 55 | | | | | | 854 |
| 18. 2 | 10 | | | 2.576E-03 | 3.538E-04 | 8.121E-04 | 258.9 |
| 29.10.88 | 55 | | | 3.847E-03 | 2.794E-03 | 4.154E-03 | 854 |
| 18. 2 | 30 | | | | | | 258.9 |
| 29.10.88 | 55 | | | | | | 854 |
| 18. 2 | 20 | 6.985E-03 | 2.652E-03 | | | | 258.9 |
| 30.10.88 | 52 | | 4.540E-04 | | | | 854 |
| 17.1 | 10 | | | 2.350E-03 | 3.172E-04 | 7.331E-04 | 259.8 |
| 30.10.88 | 55 | | | | | | 854 |
| 17.12 | 10 | | | 2.442E-03 | 3.442E-04 | 7.803E-04 | 259.8 |
| 30.10.88 | 55 | | | 3.431E-03 | 2.653E-03 | 3.856E-03 | 854 |
| 17.12 | 30 | | | | | | 259.8 |
| 30.10.88 | 55 | | | | | | 854 |
| 17.12 | 20 | 6.658E-03 | 2.405E-03 | | | | 259.8 |
| 31.10.88 | 52 | | 5.918E-04 | | | | 851 |
| 17. 2 | 10 | | | 2.219E-03 | 3.799E-04 | 7.273E-04 | 260.8 |
| 31.10.88 | 55 | | | | | | 851 |
| 17. 5 | 10 | | | 2.380E-03 | 3.904E-04 | 7.571E-04 | 260.8 |
| 31.10.88 | 55 | | | 3.203E-03 | 2.523E-03 | 3.644E-03 | 851 |
| 17. 5 | 30 | | | | | | 260.8 |
| 31.10.88 | 55 | | | | | | 851 |
| 17. 5 | 20 | 6.517E-03 | 2.259E-03 | | | | 260.8 |
| 1.11.88 | 52 | | 5.258E-04 | | | | 854 |
| 16.24 | 10 | | | 2.083E-03 | 3.402E-04 | 7.368E-04 | 261.8 |
| 1.11.88 | 55 | | | | | | 854 |
| 16.26 | 10 | | | 2.382E-03 | 5.824E-04 | 7.239E-04 | 261.8 |
| 1.11.88 | 55 | | | 3.217E-03 | 2.518E-03 | 3.589E-03 | 854 |
| 16.26 | 30 | | | | | | 261.8 |
| 1.11.88 | 55 | | | | | | 854 |
| 16.26 | 20 | 6.656E-03 | 2.228E-03 | | | | 261.8 |
| 2.11.88 | 52 | | 5.668E-04 | | | | 854 |
| 16.43 | 10 | | | 1.995E-03 | 3.535E-04 | 6.494E-04 | 262.8 |
| 2.11.88 | 55 | | | | | | 854 |
| 16.46 | 10 | | | 2.115E-03 | 5.020E-04 | 7.359E-04 | 262.8 |
| 2.11.88 | 55 | | | 3.090E-03 | 2.400E-03 | 3.396E-03 | 854 |
| 16.46 | 30 | | | | | | 262.8 |
| 2.11.88 | 55 | | | | | | 854 |
| 16.46 | 20 | 9.540E-03 | 2.098E-03 | | | | 262.8 |
| 3.11.88 | 52 | | 5.658E-04 | | | | 858 |
| 17.47 | 10 | | | 2.092E-03 | 3.598E-04 | 7.001E-04 | 263.8 |

Table 6.4.12. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. A | | CYCLE NO. 88.09 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 3.11.88 | 55 | | | | | | 858 |
| 17.49 | 10 | | | 2.397E-03 | 5.464E-04 | 8.130E-04 | 263.8 |
| 3.11.88 | 55 | | | 3.377E-03 | 2.456E-03 | 3.745E-03 | 858 |
| 17.49 | 30 | | | | | | 263.8 |
| 3.11.88 | 55 | | | | | | 858 |
| 17.49 | 20 | 7.109E-03 | 2.272E-03 | | | | 263.8 |
| 4.11.88 | 52 | | 5.236E-04 | | | | 858 |
| 16.35 | 10 | | | 1.997E-03 | 3.247E-04 | 6.333E-04 | 264.8 |
| 4.11.88 | 55 | | | | | | 858 |
| 16.38 | 10 | | | 2.165E-03 | 6.294E-04 | 7.217E-04 | 264.8 |
| 4.11.88 | 55 | | | 3.095E-03 | 2.333E-03 | 3.471E-03 | 858 |
| 16.38 | 30 | | | | | | 264.8 |
| 4.11.88 | 55 | | | | | | 858 |
| 16.38 | 20 | 9.795E-03 | 1.925E-03 | | | | 264.8 |
| 5.11.88 | 52 | | 5.056E-04 | | | | 857 |
| 16.4 | 10 | | | 1.812E-03 | 3.406E-04 | 6.101E-04 | 265.8 |
| 5.11.88 | 55 | | | | | | 857 |
| 16.45 | 10 | | | 2.065E-03 | 5.450E-04 | 6.307E-04 | 265.8 |
| 5.11.88 | 55 | | | 2.869E-03 | 2.222E-03 | 3.219E-03 | 857 |
| 16.45 | 30 | | | | | | 265.8 |
| 5.11.88 | 55 | | | | | | 857 |
| 16.45 | 20 | 6.408E-03 | 1.845E-03 | | | | 265.8 |
| 6.11.88 | 52 | | 6.577E-04 | | | | 859 |
| 16.42 | 10 | | | 1.881E-03 | 3.950E-04 | 6.440E-04 | 266.8 |
| 6.11.88 | 55 | | | | | | 859 |
| 16.45 | 10 | | | 2.077E-03 | 5.379E-04 | 7.124E-04 | 266.8 |
| 6.11.88 | 55 | | | 2.855E-03 | 2.219E-03 | 3.254E-03 | 859 |
| 16.45 | 30 | | | | | | 266.8 |
| 6.11.88 | 55 | | | | | | 859 |
| 16.45 | 20 | 5.797E-03 | 1.865E-03 | | | | 266.8 |
| 7.11.88 | 52 | | 5.361E-04 | | | | 859 |
| 16.35 | 10 | | | 1.753E-03 | 3.489E-04 | 6.148E-04 | 267.8 |
| 7.11.88 | 55 | | | | | | 859 |
| 16.38 | 10 | | | 2.093E-03 | 5.303E-04 | 6.938E-04 | 267.8 |
| 7.11.88 | 55 | | | 2.835E-03 | 2.193E-03 | 3.229E-03 | 859 |
| 16.38 | 30 | | | | | | 267.8 |
| 7.11.88 | 55 | | | | | | 859 |
| 16.38 | 20 | 6.257E-03 | 1.800E-03 | | | | 267.8 |
| 8.11.88 | 52 | | 3.526E-04 | | | | 857 |
| 16.33 | 10 | | | 1.712E-03 | 2.486E-04 | 5.924E-04 | 268.8 |
| 8.11.88 | 55 | | | | | | 857 |
| 16.36 | 10 | | | 1.863E-03 | 4.982E-04 | 6.307E-04 | 268.8 |
| 8.11.88 | 55 | | | 2.871E-03 | 2.225E-03 | 3.308E-03 | 857 |
| 16.36 | 30 | | | | | | 268.8 |
| 8.11.88 | 55 | | | | | | 857 |
| 16.36 | 20 | 6.414E-03 | 1.835E-03 | | | | 268.8 |
| 10.11.88 | 52 | | 4.642E-04 | | | | 858 |
| 16.58 | 10 | | | 1.754E-03 | 3.074E-04 | 5.765E-04 | 270.8 |
| 10.11.88 | 55 | | | | | | 859 |
| 17. 0 | 10 | | | 2.022E-03 | 2.909E-04 | 7.318E-04 | 270.8 |
| 10.11.88 | 55 | | | 3.303E-03 | 2.468E-03 | 3.592E-03 | 859 |
| 17. 0 | 30 | | | | | | 270.8 |

Table 6.4.12. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. A | | CYCLE NO. 88.09 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 10.11.88 | 55 | | | | | | 859 |
| 17. 0 | 20 | 7.434E-03 | 1.981E-03 | | | | 270.8 |
| 11.11.88 | 52 | | 3.139E-04 | | | | 859 |
| 19. 7 | 10 | | | 1.688E-03 | 2.432E-04 | 6.063E-04 | 271.9 |
| 11.11.88 | 55 | | | | | | 859 |
| 19.1 | 10 | | | 1.699E-03 | 3.242E-04 | 6.304E-04 | 271.9 |
| 11.11.88 | 55 | | | 2.983E-03 | 2.258E-03 | 3.443E-03 | 859 |
| 19.1 | 30 | | | | | | 271.9 |
| 11.11.88 | 55 | | | | | | 859 |
| 19.1 | 20 | 6.683E-03 | 1.867E-03 | | | | 271.9 |
| 12.11.88 | 52 | | 4.290E-04 | | | | 859 |
| 17.25 | 10 | | | 1.764E-03 | 2.820E-04 | 6.407E-04 | 272.8 |
| 12.11.88 | 55 | | | | | | 859 |
| 17.31 | 10 | | | 1.671E-03 | 2.403E-04 | 6.009E-04 | 272.8 |
| 12.11.88 | 55 | | | 2.826E-03 | 2.244E-03 | 3.344E-03 | 859 |
| 17.31 | 30 | | | | | | 272.8 |
| 12.11.88 | 55 | | | | | | 859 |
| 17.31 | 20 | 7.032E-03 | 1.768E-03 | | | | 272.8 |
| 14.11.88 | 52 | | 4.279E-04 | | | | 859 |
| 17. 1 | 10 | | | 1.736E-03 | 2.716E-04 | 5.948E-04 | 274.8 |
| 14.11.88 | 55 | | | | | | 859 |
| 17. 3 | 10 | | | 1.808E-03 | 2.193E-04 | 6.162E-04 | 274.8 |
| 14.11.88 | 55 | | | 2.733E-03 | 2.153E-03 | 3.107E-03 | 859 |
| 17. 3 | 30 | | | | | | 274.8 |
| 14.11.88 | 55 | | | | | | 859 |
| 17. 3 | 20 | 7.272E-03 | 1.739E-03 | | | | 274.8 |
| 15.11.88 | 52 | | 4.257E-04 | | | | 860 |
| 16.48 | 10 | | | 1.748E-03 | 2.856E-04 | 6.045E-04 | 275.8 |
| 15.11.88 | 55 | | | | | | 860 |
| 16.5 | 10 | | | 1.857E-03 | 2.414E-04 | 6.316E-04 | 275.8 |
| 15.11.88 | 55 | | | 2.873E-03 | 2.216E-03 | 3.307E-03 | 860 |
| 16.5 | 30 | | | | | | 275.8 |
| 15.11.88 | 55 | | | | | | 860 |
| 16.5 | 20 | 7.566E-03 | 1.843E-03 | | | | 275.8 |
| 16.11.88 | 52 | | 4.003E-04 | | | | 859 |
| 16.29 | 10 | | | 1.724E-03 | 2.712E-04 | 5.480E-04 | 276.8 |
| 16.11.88 | 55 | | | | | | 859 |
| 16.32 | 10 | | | 1.807E-03 | 2.953E-04 | 5.961E-04 | 276.8 |
| 16.11.88 | 55 | | | 2.819E-03 | 2.138E-03 | 3.222E-03 | 859 |
| 16.32 | 30 | | | | | | 276.8 |
| 16.11.88 | 55 | | | | | | 859 |
| 16.32 | 20 | 8.326E-03 | 1.749E-03 | | | | 276.8 |
| 17.11.88 | 52 | | 4.083E-04 | | | | 859 |
| 16.38 | 10 | | | 1.673E-03 | 1.304E-04 | 5.760E-04 | 277.8 |
| 17.11.88 | 55 | | | | | | 859 |
| 16.4 | 10 | | | 1.767E-03 | 2.779E-04 | 5.917E-04 | 277.8 |
| 17.11.88 | 55 | | | 2.927E-03 | 2.231E-03 | 3.366E-03 | 859 |
| 16.4 | 30 | | | | | | 277.8 |
| 17.11.88 | 55 | | | | | | 859 |
| 16.4 | 20 | 7.715E-03 | 1.862E-03 | | | | 277.8 |
| 18.11.88 | 55 | | | | | | 25 |
| 7. 0 | 20 | | | | | | 278.03 |

Table 6.4.13. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. A | | CYCLE NO. 88.10 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 23.11.88 | 52 | | | | | | 848 |
| 1.28 | 10 | | | | | | 278.03 |
| 23.11.88 | 52 | | 4.268E-04 | | | | 848 |
| 1.28 | 10 | | | 1.952E-03 | 3.061E-04 | 6.687E-04 | 279.09 |
| 23.11.88 | 55 | | | | | | 848 |
| 1.33 | 10 | | | | | | 279.09 |
| 23.11.88 | 55 | | | | | | 848 |
| 1.33 | 10 | | | | | | 279.09 |
| 23.11.88 | 55 | | | | | | 848 |
| 1.33 | 20 | 6.773E-03 | 1.926E-03 | | | | 279.09 |
| 24.11.88 | 52 | | 2.910E-04 | | | | 850 |
| 2.36 | 10 | | | 1.920E-03 | 2.245E-04 | 5.642E-04 | 281.14 |
| 24.11.88 | 55 | | | | | | 850 |
| 2.41 | 10 | | | 1.932E-03 | | 5.991E-04 | 281.14 |
| 24.11.88 | 55 | | | 2.999E-03 | 2.267E-03 | 3.455E-03 | 850 |
| 2.41 | 30 | | | | | | 281.14 |
| 24.11.88 | 55 | | | | | | 850 |
| 2.41 | 20 | 6.893E-03 | 2.099E-03 | | | | 281.14 |
| 25.11.88 | 52 | | 3.148E-04 | | | | 850 |
| 0.51 | 10 | | | 2.043E-03 | 2.643E-04 | 6.341E-04 | 282.07 |
| 25.11.88 | 55 | | | | | | 850 |
| 0.54 | 10 | | | 2.119E-03 | 2.991E-04 | 6.590E-04 | 282.07 |
| 25.11.88 | 55 | | | 3.130E-03 | 2.424E-03 | 3.751E-03 | 850 |
| 0.54 | 30 | | | | | | 282.07 |
| 25.11.88 | 55 | | | | | | 850 |
| 0.54 | 20 | 6.569E-03 | 2.140E-03 | | | | 282.07 |
| 26.11.88 | 52 | | 3.274E-04 | | | | 854 |
| 0. 0 | 10 | | | 1.790E-03 | 2.222E-04 | 5.547E-04 | 282.47 |
| 26.11.88 | 55 | | | | | | 854 |
| 0. 5 | 10 | | | 1.779E-03 | | 5.750E-04 | 282.47 |
| 26.11.88 | 55 | | | | | | 854 |
| 0. 5 | 30 | | | | | | 282.47 |
| 26.11.88 | 55 | | | | | | 854 |
| 0. 5 | 20 | 5.968E-03 | 1.760E-03 | | | | 282.47 |
| 26.11.88 | 52 | | 4.630E-04 | | | | 853 |
| 1. 0 | 10 | | | 2.088E-03 | 3.154E-04 | 6.832E-04 | 283.07 |
| 26.11.88 | 55 | | | | | | 853 |
| 1. 1 | 10 | | | 2.255E-03 | 3.707E-04 | 7.079E-04 | 283.07 |
| 26.11.88 | 55 | | | 3.217E-03 | 2.406E-03 | 3.626E-03 | 853 |
| 1. 1 | 30 | | | | | | 283.07 |
| 26.11.88 | 55 | | | | | | 853 |
| 1. 1 | 20 | 7.398E-03 | 2.130E-03 | | | | 283.07 |
| 28.11.88 | 52 | | 3.725E-04 | | | | 855 |
| 17.15 | 10 | | | 2.124E-03 | 2.688E-04 | 6.444E-04 | 284.75 |
| 28.11.88 | 55 | | | | | | 855 |
| 17.18 | 10 | | | 2.181E-03 | 2.613E-04 | 6.845E-04 | 284.75 |
| 28.11.88 | 55 | | | 3.198E-03 | 2.419E-03 | 3.690E-03 | 855 |
| 17.18 | 30 | | | | | | 284.75 |
| 28.11.88 | 55 | | | | | | 855 |
| 17.18 | 20 | 8.328E-03 | 2.227E-03 | | | | 284.75 |
| 29.11.88 | 52 | | 3.811E-04 | | | | 858 |
| 16.15 | 10 | | | 2.103E-03 | 2.929E-04 | 6.701E-04 | 285.7 |

Table 6.4.13. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. A | | CYCLE NO. 88.10 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 29.11.88 | 55 | | | | | | 858 |
| 16.18 | 10 | | | 2.137E-03 | 3.308E-04 | 6.967E-04 | 285.7 |
| 29.11.88 | 55 | | | 3.239E-03 | 2.447E-03 | 3.696E-03 | 858 |
| 16.18 | 30 | | | | | | 285.7 |
| 29.11.88 | 55 | | | | | | 858 |
| 16.18 | 20 | 8.849E-03 | 2.262E-03 | | | | 285.7 |
| 30.11.88 | 52 | | 3.733E-04 | | | | 857 |
| 16.22 | 10 | | | 2.142E-03 | 2.902E-04 | 6.993E-04 | 286.71 |
| 30.11.88 | 55 | | | | | | 857 |
| 16.27 | 10 | | | 2.224E-03 | 2.446E-04 | 6.919E-04 | 286.71 |
| 30.11.88 | 55 | | | 3.248E-03 | 2.378E-03 | 3.738E-03 | 857 |
| 16.27 | 30 | | | | | | 286.71 |
| 30.11.88 | 55 | | | | | | 857 |
| 16.27 | 20 | 8.083E-03 | 2.238E-03 | | | | 286.71 |
| 1.12.88 | 52 | | 3.777E-04 | | | | 862 |
| 17.46 | 10 | | | 2.029E-03 | 2.693E-04 | 5.971E-04 | 287.76 |
| 1.12.88 | 55 | | | | | | 862 |
| 17.49 | 10 | | | 2.163E-03 | 3.287E-04 | 6.992E-04 | 287.76 |
| 1.12.88 | 55 | | | 3.304E-03 | 2.534E-03 | 3.748E-03 | 862 |
| 17.49 | 30 | | | | | | 287.76 |
| 1.12.88 | 55 | | | | | | 862 |
| 17.49 | 20 | 8.800E-03 | 2.382E-03 | | | | 287.76 |
| 2.12.88 | 52 | | | | | | 858 |
| 17.13 | 10 | | | 2.216E-03 | 3.061E-04 | 7.010E-04 | 288.74 |
| 2.12.88 | 55 | | | | | | 858 |
| 17.18 | 10 | | | 2.336E-03 | 2.734E-04 | 7.154E-04 | 288.74 |
| 2.12.88 | 55 | | | 3.502E-03 | 2.673E-03 | 4.020E-03 | 858 |
| 17.18 | 30 | | | | | | 288.74 |
| 2.12.88 | 55 | | | | | | 858 |
| 17.18 | 20 | 8.690E-03 | 2.346E-03 | | | | 288.74 |
| 3.12.88 | 52 | | 4.225E-04 | | | | 861 |
| 16.17 | 10 | | | 2.227E-03 | 3.066E-04 | 6.693E-04 | 289.7 |
| 3.12.88 | 55 | | | | | | 861 |
| 16.24 | 10 | | | 1.962E-03 | 2.638E-04 | 6.356E-04 | 289.7 |
| 3.12.88 | 55 | | | | | | 861 |
| 16.24 | 10 | | | | | | 289.7 |
| 3.12.88 | 55 | | | | | | 861 |
| 16.24 | 20 | 8.381E-03 | 2.274E-03 | | | | 289.7 |
| 4.12.88 | 52 | | 4.029E-04 | | | | 862 |
| 17. 0 | 10 | | | 2.180E-03 | 2.731E-04 | 6.810E-04 | 290.7 |
| 4.12.88 | 55 | | | | | | 862 |
| 17. 2 | 10 | | | 2.270E-03 | 3.098E-04 | 7.202E-04 | 290.7 |
| 4.12.88 | 55 | | | 3.374E-03 | 2.581E-03 | 3.998E-03 | 862 |
| 17. 2 | 30 | | | | | | 290.7 |
| 4.12.88 | 55 | | | | | | 862 |
| 17. 2 | 20 | 9.142E-03 | 2.383E-03 | | | | 290.7 |
| 5.12.88 | 52 | | 3.905E-04 | | | | 860 |
| 17.46 | 10 | | | 2.134E-03 | 2.949E-04 | 6.756E-04 | 291.76 |
| 5.12.88 | 55 | | | | | | 860 |
| 17.52 | 10 | | | 2.278E-03 | | 7.378E-04 | 291.76 |
| 5.12.88 | 55 | | | 3.497E-03 | 2.607E-03 | 3.639E-03 | 860 |
| 17.52 | 30 | | | | | | 291.76 |

Table 6.4.13. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. A | | CYCLE NO. 88.10 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 5.12.88 | 55 | | | | | | 860 |
| 17.52 | 20 | 8.870E-03 | 2.304E-03 | | | | 291.76 |
| 6.12.88 | 52 | | | | | | 862 |
| 16.27 | 10 | | | 2.136E-03 | 2.777E-04 | 6.712E-04 | 292.71 |
| 6.12.88 | 55 | | | | | | 862 |
| 16.3 | 10 | | | | | 7.042E-04 | 292.71 |
| 6.12.88 | 55 | | | 3.355E-03 | 2.489E-03 | 3.782E-03 | 862 |
| 16.2 | 30 | | | | | | 292.71 |
| 6.12.88 | 55 | | | | | | 863 |
| 17.3 | 20 | 8.261E-03 | 2.306E-03 | | | | 292.71 |
| 7.12.88 | 52 | | 4.441E-04 | | | | 862 |
| 16.42 | 10 | | | 2.133E-03 | 2.952E-04 | 6.230E-04 | 293.7 |
| 7.12.88 | 55 | | | | | | 862 |
| 16.45 | 10 | | | 2.241E-03 | 2.333E-04 | 6.623E-04 | 293.7 |
| 7.12.88 | 55 | | | | | | 862 |
| 16.45 | 30 | | | | | | 293.7 |
| 7.12.88 | 55 | | | | | | 862 |
| 16.45 | 20 | | | | | | 293.7 |
| 8.12.88 | 52 | | 5.726E-04 | | | | 863 |
| 17. 0 | 10 | | | 2.038E-03 | 3.853E-04 | 6.081E-04 | 294.73 |
| 8.12.88 | 55 | | | | | | 863 |
| 17. 3 | 10 | | | 2.392E-03 | | 7.679E-04 | 294.73 |
| 8.12.88 | 55 | | | 3.240E-03 | 2.394E-03 | 3.737E-03 | 863 |
| 17. 3 | 30 | | | | | | 294.73 |
| 8.12.88 | 55 | | | | | | 863 |
| 17. 3 | 20 | 9.130E-03 | 1.672E-03 | | | | 294.73 |
| 9.12.88 | 52 | | 5.081E-04 | | | | 863 |
| 16.54 | 10 | | | 2.180E-03 | 3.390E-04 | 6.865E-04 | 295.9 |
| 9.12.88 | 55 | | | | | | 863 |
| 16.58 | 10 | | | 2.387E-03 | | 7.436E-04 | 295.9 |
| 9.12.88 | 55 | | | 3.250E-03 | 2.541E-03 | 3.812E-03 | 863 |
| 16.58 | 30 | | | | | | 295.9 |
| 9.12.88 | 55 | | | | | | 863 |
| 16.58 | 20 | 9.078E-03 | 2.270E-03 | | | | 295.9 |
| 10.12.88 | 52 | | 4.978E-04 | | | | 865 |
| 17. 4 | 10 | | | 2.192E-03 | 3.380E-04 | 6.754E-04 | 296.73 |
| 10.12.88 | 55 | | | | | | 865 |
| 17. 5 | 10 | | | | | | 296.73 |
| 10.12.88 | 55 | | | | | | 865 |
| 17. 5 | 30 | | | | | | 296.73 |
| 10.12.88 | 55 | | | | | | 865 |
| 17. 5 | 20 | 1.042E-02 | 3.094E-03 | | | | 296.73 |
| 11.12.88 | 52 | | 5.169E-04 | | | | 864 |
| 17. 8 | 10 | | | 2.090E-03 | 3.210E-04 | 6.710E-04 | 297.73 |
| 11.12.88 | 55 | | | | | | 864 |
| 17.1 | 10 | | | 2.232E-03 | 3.133E-04 | 7.122E-04 | 297.3 |
| 11.12.88 | 55 | | | 3.050E-03 | 2.432E-03 | 3.499E-03 | 864 |
| 17.1 | 30 | | | | | | 297.73 |
| 11.12.88 | 55 | | | | | | 864 |
| 17.1 | 20 | 1.036E-02 | 2.141E-03 | | | | 297.73 |
| 12.12.88 | 52 | | 6.199E-04 | | | | 865 |
| 16.34 | 10 | | | 2.250E-03 | 4.031E-04 | 6.715E-04 | 298.75 |

Table 6.4.13. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. A | | CYCLE NO. 88.10 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 12.12.88 | 55 | | | | | | 865 |
| 16.34 | 10 | | | 2.586E-03 | 4.726E-04 | 7.671E-04 | 298.75 |
| 12.12.88 | 55 | | | 3.100E-03 | 2.471E-03 | 3.524E-03 | 865 |
| 16.34 | 30 | | | | | | 298.75 |
| 12.12.88 | 55 | | | | | | 865 |
| 16.34 | 20 | 8.354E-03 | 2.218E-03 | | | | 298.75 |
| 13.12.88 | 55 | | | | | | 21 |
| 5. 0 | 20 | | | | | | 298.95 |
| --- | --- | | | | | | |

Table 6.4.14. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. A | | CYCLE NO. 88.11 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 16.12.88 | 52 | | | | | | 831 |
| 0. 0 | 10 | | | | | | 298.95 |
| 16.12.88 | 52 | | 2.530E-04 | | | | 832 |
| 1.3 | 10 | | | 1.326E-03 | 2.118E-04 | 6.862E-04 | 299.45 |
| 16.12.88 | 55 | | | | | | 832 |
| 1.35 | 10 | | | 1.386E-03 | 2.540E-04 | 6.586E-04 | 299.45 |
| 16.12.88 | 55 | | | | | | 832 |
| 1.35 | 30 | | | | | | 299.45 |
| 16.12.88 | 55 | | | | | | 832 |
| 1.35 | 20 | 7.095E-03 | 1.487E-03 | | | | 299.45 |
| 17.12.88 | 52 | | 3.588E-04 | | | | 853 |
| 0.32 | 10 | | | 1.932E-03 | 2.822E-04 | 6.634E-04 | 300.46 |
| 17.12.88 | 55 | | | | | | 853 |
| 0.32 | 10 | | | 2.068E-03 | 3.478E-04 | 6.994E-04 | 300.46 |
| 17.12.88 | 55 | | | 2.765E-03 | 2.168E-03 | 3.114E-03 | 853 |
| 0.32 | 30 | | | | | | 300.46 |
| 17.12.88 | 55 | | | | | | 853 |
| 0.32 | 20 | 7.477E-03 | 2.098E-03 | | | | 300.46 |
| 18.12.88 | 52 | | 2.782E-04 | | | | 853 |
| 0.38 | 10 | | | 2.780E-03 | 2.261E-04 | 6.873E-04 | 301.47 |
| 18.12.88 | 55 | | | | | | 853 |
| 0.38 | 10 | | | 2.373E-03 | 2.252E-04 | 7.289E-04 | 301.47 |
| 18.12.88 | 55 | | | 3.191E-03 | 2.428E-03 | 3.673E-03 | 853 |
| 0.38 | 30 | | | | | | 301.47 |
| 18.12.88 | 55 | | | | | | 853 |
| 0.38 | 20 | 7.650E-03 | 2.518E-03 | | | | 301.47 |
| 19.12.88 | 52 | | 3.252E-04 | | | | 855 |
| 0.33 | 10 | | | 2.210E-03 | 2.598E-04 | 7.070E-04 | 302.48 |
| 19.12.88 | 55 | | | | | | 855 |
| 0.33 | 10 | | | 2.340E-03 | 2.828E-04 | 7.546E-04 | 302.48 |
| 19.12.88 | 55 | | | 3.323E-03 | 2.427E-03 | 3.600E-03 | 855 |
| 0.33 | 30 | | | | | | 302.48 |
| 19.12.88 | 55 | | | | | | 855 |
| 0.33 | 20 | 7.672E-03 | 2.485E-03 | | | | 302.48 |
| 20.12.88 | 52 | | 3.523E-04 | | | | 857 |
| 1.35 | 10 | | | 2.072E-03 | 2.598E-04 | 6.492E-04 | 303.48 |
| 20.12.88 | 55 | | | | | | 857 |
| 1.39 | 10 | | | 2.149E-03 | 2.502E-04 | 6.785E-04 | 303.48 |
| 20.12.88 | 55 | | | 2.821E-03 | 2.236E-03 | 3.220E-03 | 857 |
| 1.39 | 30 | | | | | | 303.48 |
| 20.12.88 | 55 | | | | | | 857 |
| 1.39 | 20 | 7.386E-03 | 2.226E-03 | | | | 303.48 |
| 21.12.88 | 52 | | 3.654E-04 | | | | 856 |
| 0.57 | 10 | | | 2.186E-03 | 2.969E-04 | 7.249E-04 | 304.5 |
| 21.12.88 | 55 | | | | | | 856 |
| 1. 0 | 10 | | | 2.306E-03 | 2.598E-04 | 7.211E-04 | 304.5 |
| 21.12.88 | 55 | | | 2.959E-03 | 2.344E-03 | 3.355E-03 | 856 |
| 1. 0 | 30 | | | | | | 304.5 |
| 21.12.88 | 55 | | | | | | 856 |
| 1. 0 | 20 | 7.612E-03 | 2.329E-03 | | | | 304.5 |
| 22.12.88 | 52 | | 4.117E-04 | | | | 855 |
| 1. 0 | 10 | | | 2.128E-03 | 3.204E-04 | 6.571E-04 | 305.51 |

Table 6.4.14. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. A | | CYCLE NO. 88.11 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 22.12.88 | 55 | | | | | | 855 |
| 1. 5 | 10 | | | 2.207E-03 | 3.470E-04 | 6.947E-04 | 305.51 |
| 22.12.88 | 55 | | | 2.756E-03 | 2.113E-03 | 3.187E-03 | 855 |
| 1. 5 | 30 | | | | | | 305.51 |
| 22.12.88 | 55 | | | | | | 855 |
| 1. 5 | 20 | 7.129E-03 | 2.168E-03 | | | | 305.51 |
| 23.12.88 | 52 | | 3.151E-04 | | | | 855 |
| 1.3 | 10 | | | 2.070E-03 | 2.680E-04 | 6.375E-04 | 306.52 |
| 23.12.88 | 55 | | | | | | 855 |
| 1.34 | 10 | | | 2.161E-03 | 2.302E-04 | 6.864E-04 | 306.52 |
| 23.12.88 | 55 | | | 2.865E-03 | 2.114E-03 | 3.296E-03 | 855 |
| 1.34 | 30 | | | | | | 306.52 |
| 23.12.88 | 55 | | | | | | 855 |
| 1.34 | 20 | | 2.260E-03 | | | | 306.52 |
| 24.12.88 | 52 | | 4.259E-04 | | | | 854 |
| 0.25 | 10 | | | 2.139E-03 | 3.279E-04 | 6.739E-04 | 307.53 |
| 24.12.88 | 55 | | | | | | 854 |
| 0.29 | 10 | | | 2.248E-03 | 2.840E-04 | 7.401E-04 | 307.53 |
| 24.12.88 | 55 | | | 2.873E-03 | 2.142E-03 | 3.098E-03 | 854 |
| 0.29 | 30 | | | | | | 307.53 |
| 24.12.88 | 55 | | | | | | 854 |
| 0.29 | 20 | 7.790E-03 | 2.202E-03 | | | | 307.53 |
| 25.12.88 | 52 | | 3.788E-04 | | | | 856 |
| 1.59 | 10 | | | 2.120E-03 | 2.993E-04 | 6.815E-04 | 308.6 |
| 25.12.88 | 55 | | | | | | 856 |
| 2. 1 | 10 | | | 2.167E-03 | 3.157E-04 | 7.177E-04 | 308.6 |
| 25.12.88 | 55 | | | 2.729E-03 | 2.262E-03 | 3.170E-03 | 856 |
| 2. 1 | 30 | | | | | | 308.6 |
| 25.12.88 | 55 | | | | | | 856 |
| 2. 1 | 20 | 7.808E-03 | 2.261E-03 | | | | 308.6 |
| 26.12.88 | 52 | | 3.736E-04 | | | | 855 |
| 1.15 | 10 | | | 2.238E-03 | 2.927E-04 | 6.800E-04 | 309.61 |
| 26.12.88 | 55 | | | | | | 855 |
| 1.18 | 10 | | | 2.290E-03 | 3.382E-04 | 7.196E-04 | 309.61 |
| 26.12.88 | 55 | | | 2.832E-03 | 2.259E-03 | 3.229E-03 | 855 |
| 1.18 | 30 | | | | | | 309.61 |
| 26.12.88 | 55 | | | | | | 855 |
| 1.18 | 20 | 7.462E-03 | 2.270E-03 | | | | 309.61 |
| 27.12.88 | 52 | | 3.637E-04 | | | | 856 |
| 1.12 | 10 | | | 2.230E-03 | 2.819E-04 | 6.912E-04 | 310.62 |
| 27.12.88 | 55 | | | | | | 856 |
| 1.12 | 10 | | | 2.168E-03 | 2.762E-04 | 7.196E-04 | 310.62 |
| 27.12.88 | 55 | | | 2.808E-03 | 2.235E-03 | 3.170E-03 | 856 |
| 1.12 | 30 | | | | | | 310.61 |
| 27.12.88 | 55 | | | | | | 856 |
| 1.12 | 20 | 7.734E-03 | 2.303E-03 | | | | 310.61 |
| 29.12.88 | 52 | | 3.381E-04 | | | | 857 |
| 0.1 | 10 | | | 2.176E-03 | 2.618E-04 | 6.419E-04 | 312.64 |
| 29.12.88 | 55 | | | | | | 857 |
| 0.13 | 10 | | | 2.193E-03 | 3.314E-04 | 6.976E-04 | 312.64 |
| 29.12.88 | 55 | | | 2.779E-03 | 2.174E-03 | 3.074E-03 | 857 |
| 0.13 | 30 | | | | | | 312.64 |

Table 6.4.14. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. A | | CYCLE NO. 88.11 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 29.12.88 | 55 | | | | | | 857 |
| 0.13 | 20 | 7.409E-03 | 2.210E-03 | | | | 312.64 |
| 30.12.88 | 52 | | 2.637E-04 | | | | 858 |
| 0.25 | 10 | | | 2.331E-03 | 2.459E-04 | 7.478E-04 | 313.65 |
| 30.12.88 | 55 | | | | | | 858 |
| 0.27 | 10 | | | 2.342E-03 | 2.769E-04 | 7.320E-04 | 313.65 |
| 30.12.88 | 55 | | | 3.301E-03 | 2.547E-03 | 3.607E-03 | 858 |
| 0.27 | 30 | | | | | | 313.65 |
| 30.12.88 | 55 | | | | | | 858 |
| 0.27 | 20 | 9.155E-03 | 2.544E-03 | | | | 313.65 |
| 31.12.88 | 52 | | 4.033E-04 | | | | 858 |
| 0. 7 | 10 | | | 2.110E-03 | 2.507E-04 | 6.699E-04 | 314.66 |
| 31.12.88 | 55 | | | | | | 858 |
| 0.1 | 10 | | | 2.177E-03 | 2.514E-04 | 6.753E-04 | 314.66 |
| 31.12.88 | 55 | | | 2.807E-03 | 2.177E-03 | 3.225E-03 | 858 |
| 0.1 | 30 | | | | | | 314.66 |
| 31.12.88 | 55 | | | | | | 858 |
| 0.1 | 20 | 7.894E-03 | 2.301E-03 | | | | 314.66 |
| 1. 1.89 | 52 | | 3.697E-04 | | | | 858 |
| 0.39 | 10 | | | 2.324E-03 | 3.268E-04 | 7.660E-04 | 315.67 |
| 1. 1.89 | 55 | | | | | | 858 |
| 0.42 | 10 | | | 2.623E-03 | 2.986E-04 | 8.285E-04 | 315.67 |
| 1. 1.89 | 55 | | | 3.414E-03 | 2.401E-03 | 3.507E-03 | 858 |
| 0.42 | 30 | | | | | | 315.67 |
| 1. 1.89 | 55 | | | | | | 858 |
| 0.42 | 20 | 8.636E-03 | 2.638E-03 | | | | 315.67 |
| 2. 1.89 | 52 | | 3.691E-04 | | | | 858 |
| 0.41 | 10 | | | 2.441E-03 | 3.015E-04 | 7.503E-04 | 316.7 |
| 2. 1.89 | 55 | | | | | | 858 |
| 0.43 | 10 | | | 2.536E-03 | 3.847E-04 | 8.189E-04 | 316.7 |
| 2. 1.89 | 55 | | | 3.139E-03 | 2.540E-03 | 3.613E-03 | 858 |
| 0.43 | 30 | | | | | | 316.7 |
| 2. 1.89 | 55 | | | | | | 858 |
| 0.43 | 20 | 9.389E-03 | 2.613E-03 | | | | 316.7 |
| 3. 1.89 | 52 | | 2.991E-04 | | | | 859 |
| 0.49 | 10 | | | 1.680E-03 | 2.416E-04 | 5.329E-04 | 317.8 |
| 3. 1.89 | 55 | | | | | | 859 |
| 0.51 | 10 | | | 1.838E-03 | 2.564E-04 | 5.690E-04 | 317.8 |
| 3. 1.89 | 55 | | | 2.139E-03 | 1.686E-03 | 2.408E-03 | 859 |
| 0.51 | 30 | | | | | | 317.8 |
| 3. 1.89 | 55 | | | | | | 859 |
| 0.51 | 20 | 5.910E-03 | 1.753E-03 | | | | 317.8 |
| 4. 1.89 | 52 | | 2.907E-04 | | | | 860 |
| 0.35 | 10 | | | 1.795E-03 | 2.440E-04 | 5.403E-04 | 318.99 |
| 4. 1.89 | 55 | | | | | | 860 |
| 0.37 | 10 | | | 1.830E-03 | 2.892E-04 | 5.639E-04 | 318.99 |
| 4. 1.89 | 55 | | | 2.194E-03 | 1.665E-03 | 2.428E-03 | 860 |
| 0.37 | 30 | | | | | | 318.99 |
| 4. 1.89 | 55 | | | | | | 860 |
| 0.37 | 20 | 5.696E-03 | 1.781E-03 | | | | 318.99 |
| 5. 1.89 | 52 | | 3.033E-04 | | | | 858 |
| 0.29 | 10 | | | 1.660E-03 | 2.328E-04 | 5.393E-04 | 319.99 |

Table 6.4.14. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. A | | CYCLE NO. 88.11 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 5. 1.89 | 55 | | | | | | 858 |
| 0.31 | 10 | | | 1.784E-03 | 2.665E-04 | 5.710E-04 | 319.99 |
| 5. 1.89 | 55 | | | 2.147E-03 | 1.709E-03 | 2.394E-03 | 858 |
| 0.31 | 30 | | | | | | 319.99 |
| 5. 1.89 | 55 | | | | | | 858 |
| 0.31 | 20 | 5.451E-03 | 1.754E-03 | | | | 319.99 |
| 6. 1.89 | 55 | | | | | | 37 |
| 4. 0 | 20 | | | | | | 320.35 |
| --- | --- | | | | | | |

Table 6.4.15. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. A | | CYCLE NO. 89.01 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 17. 1.89 | 52 | | | | | | 807 |
| 0. 0 | 10 | | | | | | 321.25 |
| 17. 1.89 | 52 | | 5.795E-04 | | | | 809 |
| 10.51 | 10 | | | 2.604E-03 | 4.734E-04 | 8.730E-04 | 321.25 |
| 17. 1.89 | 55 | | | | | | 809 |
| 10.55 | 10 | | | 2.851E-03 | 5.961E-04 | 9.687E-04 | 321.25 |
| 17. 1.89 | 55 | | | 3.206E-03 | 2.477E-03 | 3.412E-03 | 809 |
| 10.55 | 30 | | | | | | 321.25 |
| 17. 1.89 | 55 | | | | | | 809 |
| 10.55 | 20 | 4.162E-03 | 2.621E-03 | | | | 321.25 |
| 18. 1.89 | 52 | | 5.143E-04 | | | | 809 |
| 9.56 | 10 | | | 2.629E-03 | 4.170E-04 | 8.177E-04 | 322.2 |
| 18. 1.89 | 55 | | | | | | 809 |
| 9.59 | 10 | | | 2.746E-03 | 4.552E-04 | 5.210E-04 | 322.2 |
| 18. 1.89 | 55 | | | 2.650E-03 | 2.183E-03 | 3.139E-03 | 809 |
| 9.59 | 30 | | | | | | 322.2 |
| 18. 1.89 | 55 | | | | | | 809 |
| 9.59 | 20 | 4.369E-03 | 2.552E-03 | | | | 322.2 |
| 20. 1.89 | 52 | | 4.029E-04 | | | | 808 |
| 8.52 | 10 | | | 2.743E-03 | 3.401E-04 | 8.263E-04 | 324.16 |
| 20. 1.89 | 55 | | | | | | 808 |
| 8.52 | 10 | | | 2.873E-03 | 4.768E-04 | 9.184E-04 | 324.16 |
| 20. 1.89 | 55 | | | 3.062E-03 | 2.475E-03 | 3.556E-03 | 808 |
| 8.52 | 30 | | | | | | 324.16 |
| 20. 1.89 | 55 | | | | | | 808 |
| 8.52 | 20 | 6.574E-03 | 2.854E-03 | | | | 324.16 |
| 21. 1.89 | 52 | | 3.906E-04 | | | | 809 |
| 9.19 | 10 | | | 2.709E-03 | 3.206E-04 | 8.228E-04 | 325.16 |
| 21. 1.89 | 55 | | | | | | 809 |
| 9.19 | 10 | | | 2.701E-03 | 3.760E-04 | 8.439E-04 | 325.16 |
| 21. 1.89 | 55 | | | 3.040E-03 | 2.360E-03 | 3.430E-03 | 809 |
| 9.19 | 30 | | | | | | 325.16 |
| 21. 1.89 | 55 | | | | | | 809 |
| 9.19 | 20 | 7.723E-03 | 2.835E-03 | | | | 325.16 |
| 22. 1.89 | 52 | | 3.791E-04 | | | | 810 |
| 9.29 | 10 | | | 2.707E-03 | 3.343E-04 | 8.107E-04 | 326.16 |
| 22. 1.89 | 55 | | | | | | 810 |
| 9.35 | 10 | | | 2.802E-03 | 2.582E-04 | 8.366E-04 | 326.16 |
| 22. 1.89 | 55 | | | 2.988E-03 | 2.450E-03 | 3.441E-03 | 810 |
| 9.35 | 30 | | | | | | 326.16 |
| 22. 1.89 | 55 | | | | | | 810 |
| 9.35 | 20 | 8.002E-03 | 2.500E-03 | | | | 326.16 |
| 24. 1.89 | 52 | | 5.063E-04 | | | | 815 |
| 16.35 | 10 | | | 2.961E-03 | 3.903E-04 | 8.596E-04 | 328.48 |
| 24. 1.89 | 55 | | | | | | 815 |
| 16.38 | 10 | | | 3.016E-03 | 4.702E-04 | 9.116E-04 | 328.48 |
| 24. 1.89 | 55 | | | 3.167E-03 | 2.561E-03 | 3.676E-03 | 815 |
| 16.38 | 30 | | | | | | 328.48 |
| 24. 1.89 | 55 | | | | | | 815 |
| 16.38 | 20 | 7.981E-03 | 3.035E-03 | | | | 328.48 |
| 25. 1.89 | 52 | | 4.312E-04 | | | | 812 |
| 20. 3 | 10 | | | 2.754E-03 | 3.683E-04 | 7.882E-04 | 329.48 |

Table 6.4.15. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. A | | CYCLE NO. 89.01 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 25. 1.89 | 55 | | | | | | 812 |
| 20. 3 | 10 | | | 2.643E-03 | 4.141E-04 | 8.252E-04 | 329.48 |
| 25. 1.89 | 55 | | | 2.899E-03 | 2.302E-03 | 3.393E-03 | 812 |
| 20. 3 | 30 | | | | | | 329.48 |
| 25. 1.89 | 55 | | | | | | 812 |
| 20. 3 | 20 | 7.894E-03 | 2.702E-03 | | | | 329.48 |
| 26. 1.89 | 52 | | 4.154E-04 | | | | 815 |
| 16.1 | 10 | | | 2.790E-03 | 3.455E-04 | 8.205E-04 | 330.32 |
| 26. 1.89 | 55 | | | | | | 815 |
| 16.12 | 10 | | | 2.874E-03 | 3.598E-04 | 9.028E-04 | 330.32 |
| 26. 1.89 | 55 | | | 3.213E-03 | 2.570E-03 | 3.604E-03 | 815 |
| 16.12 | 30 | | | | | | 330.32 |
| 26. 1.89 | 55 | | | | | | 815 |
| 16.12 | 20 | 1.023E-02 | 3.151E-03 | | | | 330.32 |
| 28. 1.89 | 52 | | 3.494E-04 | | | | 815 |
| 16. 0 | 10 | | | 2.688E-03 | 3.221E-04 | 8.069E-04 | 332.32 |
| 28. 1.89 | 55 | | | | | | 815 |
| 16. 2 | 10 | | | 2.966E-03 | 5.469E-04 | 8.952E-04 | 332.32 |
| 28. 1.89 | 55 | | | 3.114E-03 | 2.522E-03 | 3.488E-03 | 815 |
| 16. 2 | 30 | | | | | | 332.32 |
| 28. 1.89 | 55 | | | | | | 815 |
| 16. 2 | 20 | 1.157E-02 | 3.019E-03 | | | | 332.32 |
| 29. 1.89 | 52 | | 4.089E-04 | | | | 816 |
| 16.4 | 10 | | | 2.746E-03 | 3.484E-04 | 8.296E-04 | 333.32 |
| 29. 1.89 | 55 | | | | | | 816 |
| 16.42 | 10 | | | 2.871E-03 | 6.182E-04 | 9.172E-04 | 333.32 |
| 29. 1.89 | 55 | | | 3.140E-03 | 2.560E-03 | 3.429E-03 | 816 |
| 16.42 | 30 | | | | | | 333.32 |
| 29. 1.89 | 55 | | | | | | 816 |
| 16.42 | 20 | 9.693E-03 | 2.919E-03 | | | | 333.32 |
| 30. 1.89 | 52 | | 4.175E-04 | | | | 816 |
| 16.15 | 10 | | | 2.749E-03 | 3.479E-04 | 8.156E-04 | 334.82 |
| 30. 1.89 | 55 | | | | | | 816 |
| 16.17 | 10 | | | 2.966E-03 | 3.648E-04 | 8.627E-04 | 334.82 |
| 30. 1.89 | 55 | | | 3.216E-03 | 2.442E-03 | 3.684E-03 | 816 |
| 16.17 | 30 | | | | | | 334.82 |
| 30. 1.89 | 55 | | | | | | 816 |
| 16.17 | 20 | 1.641E-02 | 2.902E-03 | | | | 334.82 |
| 1. 2.89 | 52 | | 4.060E-04 | | | | 813 |
| 16.42 | 10 | | | 2.898E-03 | 3.553E-04 | 8.359E-04 | 336.8 |
| 1. 2.89 | 55 | | | | | | 813 |
| 16.44 | 10 | | | 2.985E-03 | 4.087E-04 | 9.316E-04 | 336.8 |
| 1. 2.89 | 55 | | | 3.195E-03 | 2.489E-03 | 3.654E-03 | 813 |
| 16.44 | 30 | | | | | | 336.8 |
| 1. 2.89 | 55 | | | | | | 813 |
| 16.44 | 20 | 9.751E-03 | 3.009E-03 | | | | 336.8 |
| 2. 2.89 | 52 | | 2.791E-04 | | | | 813 |
| 16.15 | 10 | | | 2.525E-03 | 2.793E-04 | 7.626E-04 | 336.8 |
| 2. 2.89 | 55 | | | | | | 813 |
| 16.2 | 10 | | | 2.943E-03 | 4.278E-04 | 8.777E-04 | 336.8 |
| 2. 2.89 | 55 | | | 2.940E-03 | 2.312E-03 | 3.413E-03 | 813 |
| 16.2 | 30 | | | | | | 336.8 |

Table 6.4.15. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. A | | CYCLE NO. 89.01 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 2. 2.89 | 55 | | | | | | 813 |
| 16.2 | 20 | 9.528E-03 | 2.860E-03 | | | | 336.8 |
| 3. 2.89 | 52 | | | | | | 815 |
| 16.31 | 10 | | | 2.001E-03 | | 5.855E-04 | 338.41 |
| 3. 2.89 | 55 | | | | | | 815 |
| 16.35 | 10 | | | 2.406E-03 | | 7.256E-04 | 338.41 |
| 3. 2.89 | 55 | | | 2.879E-03 | 2.270E-03 | 3.328E-03 | 815 |
| 16.35 | 30 | | | | | | 338.41 |
| 3. 2.89 | 55 | | | | | | 815 |
| 16.35 | 20 | 9.411E-03 | 2.806E-03 | | | | 338.41 |
| 4. 2.89 | 52 | | 3.689E-04 | | | | 813 |
| 16.35 | 10 | | | 2.143E-03 | 2.937E-04 | 6.466E-04 | 339.42 |
| 4. 2.89 | 55 | | | | | | 813 |
| 16.38 | 10 | | | 2.230E-03 | 3.036E-04 | 6.713E-04 | 339.42 |
| 4. 2.89 | 55 | | | 2.377E-03 | 1.955E-03 | 2.582E-03 | 813 |
| 16.38 | 30 | | | | | | 339.42 |
| 4. 2.89 | 55 | | | | | | 813 |
| 16.38 | 20 | 6.862E-03 | 2.086E-03 | | | | 339.42 |
| 5. 2.89 | 52 | | 4.282E-04 | | | | 815 |
| 16.4 | 10 | | | 2.866E-03 | 3.659E-04 | 8.341E-04 | 340.42 |
| 5. 2.89 | 55 | | | | | | 815 |
| 16.43 | 10 | | | 2.958E-03 | 3.994E-04 | 9.153E-04 | 340.42 |
| 5. 2.89 | 55 | | | 3.183E-03 | 2.524E-03 | 3.552E-03 | 815 |
| 16.43 | 30 | | | | | | 340.42 |
| 5. 2.89 | 55 | | | | | | 815 |
| 16.43 | 20 | 9.431E-03 | 3.030E-03 | | | | 340.42 |
| 6. 2.89 | 52 | | 4.588E-04 | | | | 815 |
| 16.4 | 10 | | | 2.843E-03 | 3.755E-04 | 8.696E-04 | 341 |
| 6. 2.89 | 55 | | | | | | 815 |
| 16.42 | 10 | | | 3.096E-03 | 3.279E-04 | 6.369E-04 | 341 |
| 6. 2.89 | 55 | | | 3.441E-03 | 2.603E-03 | 3.875E-03 | 815 |
| 16.42 | 30 | | | | | | 341 |
| 6. 2.89 | 55 | | | | | | 815 |
| 16.42 | 20 | 1.043E-02 | 3.149E-03 | | | | 341 |
| 7. 2.89 | 55 | | | | | | 34 |
| 3. 0 | 20 | | | | | | 341.31 |

Table 6.4.16. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. A | | CYCLE NO. 89.02 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 10. 2.89 | 52 | | | | | | 865 |
| 10. 0 | 10 | | | | | | 341.84 |
| 10. 2.89 | 52 | | 4.822E-04 | | | | 882 |
| 18.56 | 10 | | | 2.140E-03 | 4.066E-04 | 9.098E-04 | 341.84 |
| 10. 2.89 | 55 | | | | | | 886 |
| 19. 6 | 10 | | | 2.311E-03 | 3.484E-04 | 9.978E-04 | 341.84 |
| 10. 2.89 | 55 | | | 3.817E-03 | 2.977E-03 | 4.175E-03 | 886 |
| 19. 6 | 30 | | | | | | 341.84 |
| 10. 2.89 | 55 | | | | | | 886 |
| 19. 6 | 20 | 8.605E-03 | 2.254E-03 | | | | 341.84 |
| 11. 2.89 | 52 | | 4.005E-04 | | | | 890 |
| 16.26 | 10 | | | 2.915E-03 | 3.620E-04 | 8.352E-04 | 342.96 |
| 11. 2.89 | 55 | | | | | | 890 |
| 16.3 | 10 | | | 3.148E-03 | 2.929E-04 | 9.005E-04 | 342.96 |
| 11. 2.89 | 55 | | | 3.624E-03 | 2.856E-03 | 4.235E-03 | 890 |
| 16.3 | 30 | | | | | | 342.96 |
| 11. 2.89 | 55 | | | | | | 890 |
| 16.3 | 20 | 9.293E-03 | 3.228E-03 | | | | 342.96 |
| 15. 2.89 | 52 | | 3.902E-04 | | | | 897 |
| 16.36 | 10 | | | 2.649E-03 | 3.303E-04 | 7.999E-04 | 343.96 |
| 15. 2.89 | 55 | | | | | | 897 |
| 16.38 | 10 | | | 2.853E-03 | 3.713E-04 | 8.866E-04 | 343.96 |
| 15. 2.89 | 55 | | | 3.438E-03 | 2.717E-03 | 3.914E-03 | 897 |
| 16.38 | 30 | | | | | | 343.96 |
| 15. 2.89 | 55 | | | | | | 897 |
| 16.38 | 20 | 7.292E-03 | 2.845E-03 | | | | 343.96 |
| 16. 2.89 | 52 | | 4.907E-04 | | | | 902 |
| 16.41 | 10 | | | 3.152E-03 | 3.801E-04 | 8.528E-04 | 345.96 |
| 16. 2.89 | 55 | | | | | | 902 |
| 16.43 | 10 | | | 3.451E-03 | 3.887E-04 | 9.496E-04 | 345.96 |
| 16. 2.89 | 55 | | | 3.904E-03 | 3.060E-03 | 4.593E-03 | 902 |
| 16.43 | 30 | | | | | | 345.96 |
| 16. 2.89 | 55 | | | | | | 902 |
| 16.43 | 20 | 8.723E-03 | 3.535E-03 | | | | 345.96 |
| 17. 2.89 | 52 | | 4.411E-04 | | | | 901 |
| 16.44 | 10 | | | 3.022E-03 | 3.617E-04 | 8.302E-04 | 346.96 |
| 17. 2.89 | 55 | | | | | | 901 |
| 16.47 | 10 | | | 3.409E-03 | 3.924E-04 | 9.234E-04 | 346.96 |
| 17. 2.89 | 55 | | | 3.868E-03 | 3.082E-03 | 4.758E-03 | 901 |
| 16.47 | 30 | | | | | | 346.96 |
| 17. 2.89 | 55 | | | | | | 901 |
| 16.47 | 20 | 9.081E-03 | 3.431E-03 | | | | 346.96 |
| 18. 2.89 | 52 | | 4.302E-04 | | | | 902 |
| 17.24 | 10 | | | 2.998E-03 | 3.445E-04 | 8.026E-04 | 347.98 |
| 18. 2.89 | 55 | | | | | | 902 |
| 17.26 | 10 | | | 3.296E-03 | 3.180E-04 | 9.082E-04 | 347.98 |
| 18. 2.89 | 55 | | | 4.019E-03 | 2.951E-03 | 4.045E-03 | 902 |
| 17.26 | 30 | | | | | | 347.98 |
| 18. 2.89 | 55 | | | | | | 902 |
| 17.26 | 20 | | 3.361E-03 | | | | 347.98 |
| 19. 2.89 | 52 | | 4.229E-04 | | | | 902 |
| 17.1 | 10 | | | 3.089E-03 | 3.617E-04 | 8.123E-04 | 348.97 |

Table 6.4.16. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. A | | CYCLE NO. | 89.02 | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 19. 2.89 | 55 | | | | | | 902 |
| 17.13 | 10 | | | 3.302E-03 | 3.501E-04 | 9.111E-04 | 348.97 |
| 19. 2.89 | 55 | | | 3.793E-03 | 2.963E-03 | 4.365E-03 | 902 |
| 17.13 | 30 | | | | | | 348.97 |
| 19. 2.89 | 55 | | | | | | 902 |
| 17.13 | 20 | 1.021E-02 | 3.379E-03 | | | | 348.07 |
| 25. 2.89 | 52 | | | | | | 905 |
| 16.43 | 10 | | | 2.874E-03 | 3.424E-04 | 7.789E-04 | 354.79 |
| 25. 2.89 | 55 | | | | | | 905 |
| 16.47 | 10 | | | 3.005E-03 | 4.652E-04 | 8.314E-04 | 354.79 |
| 25. 2.89 | 55 | | | 3.591E-03 | 2.628E-03 | 4.236E-03 | 905 |
| 16.47 | 30 | | | | | | 354.79 |
| 25. 2.89 | 55 | | | | | | 905 |
| 16.47 | 20 | 1.255E-02 | 3.063E-03 | | | | 354.79 |
| 27. 2.89 | 52 | | 4.375E-04 | | | | 908 |
| 16.29 | 10 | | | 3.001E-03 | 3.488E-04 | 7.453E-04 | 356.8 |
| 27. 2.89 | 55 | | | | | | 908 |
| 16.31 | 10 | | | 3.068E-03 | 4.025E-04 | 8.304E-04 | 356.8 |
| 27. 2.89 | 55 | | | 3.537E-03 | 2.690E-03 | 4.025E-03 | 908 |
| 16.31 | 30 | | | | | | 356.8 |
| 27. 2.89 | 55 | | | | | | 908 |
| 16.31 | 20 | 1.070E-02 | 3.018E-03 | | | | 356.8 |
| 28. 2.89 | 52 | | 3.718E-04 | | | | 909 |
| 6.2 | 10 | | | 2.961E-03 | 3.394E-04 | 7.622E-04 | 357.78 |
| 28. 2.89 | 55 | | | | | | 908 |
| 16.2 | 10 | | | 3.039E-03 | 3.524E-04 | 8.250E-04 | 357.78 |
| 28. 2.89 | 55 | | | 3.464E-03 | 2.629E-03 | 4.025E-03 | 908 |
| 16.2 | 30 | | | | | | 357.78 |
| 28. 2.89 | 55 | | | | | | 908 |
| 16.2 | 20 | 9.763E-03 | 2.965E-03 | | | | 357.78 |
| 3. 3.89 | 52 | | 4.203E-04 | | | | 901 |
| 18. 0 | 10 | | | 2.513E-03 | 3.362E-04 | 7.738E-04 | 358.86 |
| 3. 3.89 | 55 | | | | | | 901 |
| 18. 0 | 10 | | | 2.595E-03 | 3.980E-04 | 8.403E-04 | 358.86 |
| 3. 3.89 | 55 | | | 3.392E-03 | 2.671E-03 | 3.972E-03 | 901 |
| 18. 0 | 30 | | | | | | 358.86 |
| 3. 3.89 | 55 | | | | | | 901 |
| 18. 0 | 20 | 8.552E-03 | 2.538E-03 | | | | 358.86 |
| 4. 3.89 | 52 | | 3.472E-04 | | | | 904 |
| 16. 0 | 10 | | | 2.649E-03 | 3.071E-04 | 7.423E-04 | 359.78 |
| 4. 3.89 | 55 | | | | | | 904 |
| 16. 0 | 10 | | | 2.852E-03 | 2.958E-04 | 7.694E-04 | 359.78 |
| 4. 3.89 | 55 | | | 3.489E-03 | 2.651E-03 | 3.997E-03 | 904 |
| 16. 0 | 30 | | | | | | 359.78 |
| 4. 3.89 | 55 | | | | | | 904 |
| 16. 0 | 20 | 8.765E-03 | 2.943E-03 | | | | 359.78 |
| 5. 3.89 | 55 | | | | | | 73 |
| 2. 0 | 20 | | | | | | 359.78 |
| --- | --- | | | | | | |

Table 6.4.17. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. A | | CYCLE NO. 89.03 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 6. 4.89 | 52 | | | | | | 805 |
| 0. 0 | 10 | | | | | | 361.28 |
| 6. 4.89 | 52 | | 5.064E-04 | | | | 815 |
| 16.4 | 10 | | | 2.958E-03 | 4.218E-04 | 8.599E-04 | 361.28 |
| 6. 4.89 | 55 | | | | | | 815 |
| 16.4 | 10 | | | 3.094E-03 | 4.976E-04 | 9.114E-04 | 361.28 |
| 6. 4.89 | 55 | | | 2.906E-03 | 2.345E-03 | 3.349E-03 | 815 |
| 16.4 | 30 | | | | | | 361.28 |
| 6. 4.89 | 55 | | | | | | 815 |
| 16.4 | 20 | 3.710E-03 | 1.500E-03 | | | | 361.28 |
| 7. 4.89 | 52 | | 6.328E-04 | | | | 820 |
| 18.15 | 10 | | | 3.157E-03 | 5.110E-04 | 9.025E-04 | 362.54 |
| 7. 4.89 | 55 | | | | | | 820 |
| 18.15 | 10 | | | 3.331E-03 | 5.522E-04 | 9.652E-04 | 362.54 |
| 7. 4.89 | 55 | | | 2.972E-03 | 2.402E-03 | 3.509E-03 | 820 |
| 18.15 | 30 | | | | | | 362.54 |
| 7. 4.89 | 55 | | | | | | 820 |
| 18.15 | 20 | 4.851E-03 | 3.110E-03 | | | | 362.54 |
| 8. 4.89 | 52 | | 4.843E-04 | | | | 820 |
| 16. 0 | 10 | | | 3.065E-03 | 4.149E-04 | 8.672E-04 | 363.46 |
| 8. 4.89 | 55 | | | | | | 820 |
| 16. 0 | 10 | | | 3.214E-03 | 3.662E-04 | 9.274E-04 | 363.46 |
| 8. 4.89 | 55 | | | 2.961E-03 | 2.399E-03 | 3.471E-03 | 820 |
| 16. 0 | 30 | | | | | | 363.46 |
| 8. 4.89 | 55 | | | | | | 820 |
| 16. 0 | 20 | 5.831E-03 | 3.033E-03 | | | | 363.46 |
| 9. 4.89 | 52 | | 4.471E-04 | | | | 822 |
| 16.4 | 10 | | | 3.032E-03 | 4.293E-04 | 8.877E-04 | 364.5 |
| 9. 4.89 | 55 | | | | | | 822 |
| 16.4 | 10 | | | 3.233E-03 | 5.063E-04 | 9.380E-04 | 364.5 |
| 9. 4.89 | 55 | | | 3.080E-03 | 2.442E-03 | 3.445E-03 | 822 |
| 16.4 | 30 | | | | | | 364.5 |
| 9. 4.89 | 55 | | | | | | 822 |
| 16.4 | 20 | 7.341E-03 | 3.115E-03 | | | | 364.5 |
| 10. 4.89 | 52 | | 2.802E-04 | | | | 824 |
| 17.4 | 10 | | | 2.889E-03 | 2.719E-04 | 8.407E-04 | 365.46 |
| 10. 4.89 | 55 | | | | | | 824 |
| 17.4 | 10 | | | 2.978E-03 | | 8.656E-04 | 365.46 |
| 10. 4.89 | 55 | | | 3.273E-03 | 2.519E-03 | 3.654E-03 | 824 |
| 17.4 | 30 | | | | | | 365.46 |
| 10. 4.89 | 55 | | | | | | 824 |
| 17.4 | 20 | 8.172E-03 | 3.274E-03 | | | | 365.46 |
| 11. 4.89 | 52 | | 3.938E-04 | | | | 826 |
| 16.2 | 10 | | | 3.210E-03 | 4.203E-04 | 7.438E-04 | 366.44 |
| 11. 4.89 | 55 | | | | | | 826 |
| 16.2 | 10 | | | 3.561E-03 | 4.047E-04 | 1.014E-03 | 366.44 |
| 11. 4.89 | 55 | | | 3.305E-03 | 2.674E-03 | 3.769E-03 | 826 |
| 16.2 | 30 | | | | | | 366.44 |
| 11. 4.89 | 55 | | | | | | 826 |
| 16.2 | 20 | 8.328E-03 | 3.433E-03 | | | | 366.44 |
| 12. 4.89 | 52 | | 6.234E-04 | | | | 833 |
| 17. 0 | 10 | | | 3.223E-03 | 5.077E-04 | 9.211E-04 | 367.49 |

Table 6.4.17. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. A | | CYCLE NO. | 89.03 | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 12. 4.89 | 55 | | | | | | 833 |
| 17. 0 | 10 | | | 3.401E-03 | 6.740E-04 | 9.783E-04 | 367.49 |
| 12. 4.89 | 55 | | | 3.213E-03 | 2.494E-03 | 3.753E-03 | 833 |
| 17. 0 | 30 | | | | | | 367.49 |
| 12. 4.89 | 55 | | | | | | 833 |
| 17. 0 | 20 | 8.705E-03 | 3.178E-03 | | | | 367.49 |
| 13. 4.89 | 52 | | 6.842E-04 | | | | 813 |
| 16.5 | 10 | | | 3.254E-03 | 5.206E-04 | 8.614E-04 | 368.49 |
| 13. 4.89 | 55 | | | | | | 813 |
| 16.5 | 10 | | | 3.409E-03 | 6.091E-04 | 9.580E-04 | 368.49 |
| 13. 4.89 | 55 | | | 3.017E-03 | 2.524E-03 | 3.545E-03 | 813 |
| 16.5 | 30 | | | | | | 368.49 |
| 13. 4.89 | 55 | | | | | | 813 |
| 16.5 | 20 | 8.421E-03 | 1.568E-03 | | | | 368.49 |
| 14. 4.89 | 52 | | 6.806E-04 | | | | 829 |
| 16.45 | 10 | | | 3.218E-03 | 5.377E-04 | 9.136E-04 | 369.49 |
| 14. 4.89 | 55 | | | | | | 829 |
| 16.45 | 10 | | | 3.694E-03 | 6.895E-04 | 1.067E-03 | 369.49 |
| 14. 4.89 | 55 | | | 3.119E-03 | 2.443E-03 | 3.654E-03 | 829 |
| 16.45 | 30 | | | | | | 369.49 |
| 14. 4.89 | 55 | | | | | | 829 |
| 16.45 | 20 | 8.849E-03 | 3.188E-03 | | | | 369.49 |
| 15. 4.89 | 52 | | 6.813E-04 | | | | 830 |
| 16.45 | 10 | | | 3.261E-03 | 5.355E-04 | 8.821E-04 | 370.49 |
| 15. 4.89 | 55 | | | | | | 830 |
| 16.45 | 10 | | | 3.439E-03 | 5.838E-04 | 1.014E-03 | 370.49 |
| 15. 4.89 | 55 | | | 3.151E-03 | 2.417E-03 | 3.542E-03 | 830 |
| 16.45 | 30 | | | | | | 370.49 |
| 15. 4.89 | 55 | | | | | | 830 |
| 16.45 | 20 | 1.079E-02 | 3.107E-03 | | | | 370.49 |
| 16. 4.89 | 52 | | 6.947E-04 | | | | 832 |
| 16.3 | 10 | | | 3.235E-03 | 5.447E-04 | 8.875E-04 | 371.49 |
| 16. 4.89 | 55 | | | | | | 832 |
| 16.3 | 10 | | | 3.369E-03 | 6.005E-04 | 9.798E-04 | 371.49 |
| 16. 4.89 | 55 | | | 3.085E-03 | 2.472E-03 | 3.573E-03 | 832 |
| 16.3 | 30 | | | | | | 371.49 |
| 16. 4.89 | 55 | | | | | | 832 |
| 16.3 | 20 | 9.491E-03 | 3.182E-03 | | | | 371.49 |
| 17. 4.89 | 52 | | 6.734E-04 | | | | 831 |
| 16.2 | 10 | | | 3.205E-03 | 5.517E-04 | 8.970E-04 | 372.49 |
| 17. 4.89 | 55 | | | | | | 831 |
| 16.2 | 10 | | | 3.404E-03 | 6.490E-04 | 9.322E-04 | 372.49 |
| 17. 4.89 | 55 | | | 3.184E-03 | 2.464E-03 | 3.677E-03 | 831 |
| 16.2 | 30 | | | | | | 372.49 |
| 17. 4.89 | 55 | | | | | | 831 |
| 16.2 | 20 | 9.337E-03 | 3.190E-03 | | | | 372.49 |
| 19. 4.89 | 52 | | 6.847E-04 | | | | 832 |
| 16.41 | 10 | | | 3.071E-03 | 5.199E-04 | 8.383E-04 | 374.56 |
| 19. 4.89 | 55 | | | | | | 832 |
| 16.41 | 10 | | | 3.384E-03 | 4.489E-04 | 9.546E-04 | 374.56 |
| 19. 4.89 | 55 | | | 3.006E-03 | 2.382E-03 | 3.516E-03 | 832 |
| 16.41 | 30 | | | | | | 374.56 |

Table 6.4.17. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. A | | CYCLE NO. 89.03 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 19. 4.89 | 55 | | | | | | 832 |
| 16.41 | 20 | 9.309E-03 | 3.031E-03 | | | | 374.56 |
| 20. 4.89 | 52 | | 6.671E-04 | | | | 831 |
| 16.32 | 10 | | | 3.100E-03 | 5.528E-04 | 9.433E-04 | 375.5 |
| 20. 4.89 | 55 | | | | | | 831 |
| 16.32 | 10 | | | 3.332E-03 | 6.598E-04 | 9.689E-04 | 375.5 |
| 20. 4.89 | 55 | | | 3.106E-03 | 2.409E-03 | 3.648E-03 | 831 |
| 16.32 | 30 | | | | | | 375.5 |
| 20. 4.89 | 55 | | | | | | 831 |
| 16.32 | 20 | 1.107E-02 | 3.077E-03 | | | | 375.5 |
| 21. 4.89 | 52 | | 6.741E-04 | | | | 831 |
| 16.25 | 10 | | | 3.138E-03 | 5.261E-04 | 8.873E-04 | 376.5 |
| 21. 4.89 | 55 | | | | | | 831 |
| 16.25 | 10 | | | 3.368E-03 | 5.962E-04 | 9.559E-04 | 376.5 |
| 21. 4.89 | 55 | | | | | | 831 |
| 16.25 | 30 | | | | | | 376.5 |
| 21. 4.89 | 55 | | | | | | 831 |
| 16.25 | 20 | 9.453E-03 | 3.015E-03 | | | | 376.5 |
| 22. 4.89 | 52 | | 6.352E-04 | | | | 831 |
| 17.1 | 10 | | | 3.087E-03 | 5.299E-04 | 8.617E-04 | 377.54 |
| 22. 4.89 | 55 | | | | | | 831 |
| 17.1 | 10 | | | 3.418E-03 | 5.893E-04 | 9.292E-04 | 377.54 |
| 22. 4.89 | 55 | | | 2.991E-03 | 2.393E-03 | 3.381E-03 | 831 |
| 17.1 | 30 | | | | | | 377.54 |
| 22. 4.89 | 55 | | | | | | 831 |
| 17.1 | 20 | 9.075E-03 | 3.040E-03 | | | | 377.54 |
| 23. 4.89 | 52 | | 6.771E-04 | | | | 829 |
| 16.38 | 10 | | | 3.115E-03 | 5.309E-04 | 9.117E-04 | 378.52 |
| 23. 4.89 | 55 | | | | | | 829 |
| 16.38 | 10 | | | 3.274E-03 | 5.841E-04 | 9.625E-04 | 378.52 |
| 23. 4.89 | 55 | | | 3.042E-03 | 2.380E-03 | 3.444E-03 | 829 |
| 16.38 | 30 | | | | | | 378.52 |
| 23. 4.89 | 55 | | | | | | 829 |
| 16.38 | 20 | 1.111E-02 | 2.990E-03 | | | | 378.52 |
| 24. 4.89 | 52 | | 6.914E-04 | | | | 832 |
| 16.35 | 10 | | | 3.130E-03 | 5.152E-04 | 8.952E-04 | 379.52 |
| 24. 4.89 | 55 | | | | | | 832 |
| 16.35 | 10 | | | 3.325E-03 | 5.850E-04 | 9.617E-04 | 379.52 |
| 24. 4.89 | 55 | | | 3.217E-03 | 2.453E-03 | 3.525E-03 | 832 |
| 16.35 | 30 | | | | | | 379.52 |
| 24. 4.89 | 55 | | | | | | 832 |
| 16.35 | 20 | 9.060E-03 | 3.133E-03 | | | | 379.52 |
| 25. 4.89 | 55 | | | | | | 30 |
| 5. 0 | 20 | | | | | | 379.86 |

Table 6.4.18. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. A | | CYCLE NO. 89.04 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| ---------- | ------- | ---------- | ---------- | ---------- | ---------- | ---------- | ----- |
| 28. 4.89 | 52 | | | | | | 816 |
| 18.25 | 10 | | | | | | 379.86 |
| 28. 4.89 | 52 | | 7.388E-04 | | | | 816 |
| 18.25 | 10 | | | 1.934E-03 | 5.825E-04 | 7.978E-04 | 380.36 |
| 28. 4.89 | 55 | | | | | | 816 |
| 18.25 | 10 | | | 2.055E-03 | 6.605E-04 | 8.894E-04 | 380.36 |
| 28. 4.89 | 55 | | | 2.382E-03 | 1.984E-03 | 2.726E-03 | 816 |
| 18.25 | 30 | | | | | | 380.36 |
| 28. 4.89 | 55 | | | | | | 816 |
| 18.25 | 20 | 6.452E-03 | 1.706E-03 | | | | 380.36 |
| 29. 4.89 | 52 | | 6.844E-04 | | | | 830 |
| 16.32 | 10 | | | 3.008E-03 | 5.776E-04 | 8.776E-04 | 381.3 |
| 29. 4.89 | 55 | | | | | | 830 |
| 16.32 | 10 | | | 3.266E-03 | 5.509E-04 | 9.695E-04 | 381.3 |
| 29. 4.89 | 55 | | | 2.639E-03 | 2.095E-03 | 3.096E-03 | 830 |
| 16.32 | 30 | | | | | | 381.3 |
| 29. 4.89 | 55 | | | | | | 830 |
| 16.32 | 20 | 6.230E-03 | 2.721E-03 | | | | 381.3 |
| 30. 4.89 | 52 | | 7.318E-04 | | | | 834 |
| 16.28 | 10 | | | 3.080E-03 | 5.914E-04 | 8.238E-04 | 382.3 |
| 30. 4.89 | 55 | | | | | | 834 |
| 16.28 | 10 | | | 3.294E-03 | 5.320E-04 | 9.827E-04 | 382.3 |
| 30. 4.89 | 55 | | | 2.699E-03 | 2.203E-03 | 3.205E-03 | 834 |
| 16.28 | 30 | | | | | | 382.3 |
| 30. 4.89 | 55 | | | | | | 834 |
| 16.28 | 20 | 7.443E-03 | 2.862E-03 | | | | 382.3 |
| 1. 5.89 | 52 | | 6.694E-04 | | | | 834 |
| 16.48 | 10 | | | 3.176E-03 | 5.550E-04 | 9.685E-04 | 383.3 |
| 1. 5.89 | 55 | | | | | | 834 |
| 16.48 | 10 | | | 3.511E-03 | 6.022E-04 | 1.013E-03 | 383.3 |
| 1. 5.89 | 55 | | | 2.902E-03 | 2.356E-03 | 3.038E-03 | 834 |
| 16.48 | 30 | | | | | | 383.3 |
| 1. 5.89 | 55 | | | | | | 834 |
| 16.48 | 20 | 9.142E-03 | 3.207E-03 | | | | 383.3 |
| 4. 5.89 | 52 | | 6.804E-04 | | | | 837 |
| 0.38 | 10 | | | 3.245E-03 | 5.255E-04 | 8.782E-04 | 385.64 |
| 4. 5.89 | 55 | | | | | | 837 |
| 0.38 | 10 | | | 3.410E-03 | 6.293E-04 | 9.759E-04 | 385.64 |
| 4. 5.89 | 55 | | | 3.061E-03 | 2.320E-03 | 3.325E-03 | 837 |
| 0.38 | 30 | | | | | | 385.64 |
| 4. 5.89 | 55 | | | | | | 837 |
| 0.38 | 20 | 9.290E-03 | 3.030E-03 | | | | 385.64 |
| 5. 5.89 | 52 | | 6.576E-04 | | | | 838 |
| 0.38 | 10 | | | 3.224E-03 | 5.651E-04 | 8.720E-04 | 386.64 |
| 5. 5.89 | 55 | | | | | | 838 |
| 0.38 | 10 | | | 3.239E-03 | 4.464E-04 | 9.223E-04 | 386.64 |
| 5. 5.89 | 55 | | | 2.784E-03 | 2.248E-03 | 3.319E-03 | 838 |
| 0.38 | 30 | | | | | | 386.64 |
| 5. 5.89 | 55 | | | | | | 838 |
| 0.38 | 20 | 8.761E-03 | 2.916E-03 | | | | 386.64 |
| 6. 5.89 | 52 | | 6.782E-04 | | | | 837 |
| 0.38 | 10 | | | 3.116E-03 | 5.486E-04 | 8.878E-04 | 387.64 |

Table 6.4.18. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. A | | CYCLE NO. 89.04 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 6. 5.89 | 55 | | | | | | 837 |
| 0.38 | 10 | | | 3.290E-03 | 5.816E-04 | 9.511E-04 | 387.64 |
| 6. 5.89 | 55 | | | 2.865E-03 | 2.239E-03 | 3.295E-03 | 837 |
| 0.38 | 30 | | | | | | 387.64 |
| 6. 5.89 | 55 | | | | | | 837 |
| 0.38 | 20 | 8.991E-03 | 2.945E-03 | | | | 387.64 |
| 7. 5.89 | 52 | | 6.491E-04 | | | | 839 |
| 0.43 | 10 | | | 3.234E-03 | 5.483E-04 | 9.111E-04 | 388.64 |
| 7. 5.89 | 55 | | | | | | 839 |
| 0.43 | 10 | | | 3.352E-03 | 6.355E-04 | 9.604E-04 | 388.64 |
| 7. 5.89 | 55 | | | 2.868E-03 | 2.295E-03 | 3.242E-03 | 839 |
| 0.43 | 30 | | | | | | 388.64 |
| 7. 5.89 | 55 | | | | | | 839 |
| 0.43 | 20 | 8.979E-03 | 2.973E-03 | | | | 388.64 |
| 8. 5.89 | 52 | | 6.909E-04 | | | | 843 |
| 1. 0 | 10 | | | 3.297E-03 | 5.681E-04 | 9.226E-04 | 389.64 |
| 8. 5.89 | 55 | | | | | | 843 |
| 1. 0 | 10 | | | 3.391E-03 | 5.973E-04 | 1.024E-03 | 389.64 |
| 8. 5.89 | 55 | | | 3.131E-03 | 2.412E-03 | 3.469E-03 | 843 |
| 1. 0 | 30 | | | | | | 389.64 |
| 8. 5.89 | 55 | | | | | | 843 |
| 1. 0 | 20 | 9.305E-03 | 3.045E-03 | | | | 389.64 |
| 9. 5.89 | 52 | | 6.349E-04 | | | | 842 |
| 16.52 | 10 | | | 3.190E-03 | 5.471E-04 | 9.002E-04 | 391.3 |
| 9. 5.89 | 55 | | | | | | 842 |
| 16.52 | 10 | | | 3.444E-03 | 6.130E-04 | 9.781E-04 | 391.3 |
| 9. 5.89 | 55 | | | 3.020E-03 | 2.395E-03 | 3.440E-03 | 842 |
| 16.52 | 30 | | | | | | 391.3 |
| 9. 5.89 | 55 | | | | | | 842 |
| 16.52 | 20 | 1.214E-02 | 3.195E-03 | | | | 391.3 |
| 10. 5.89 | 52 | | 6.544E-04 | | | | 841 |
| 16.13 | 10 | | | 3.243E-03 | 5.608E-04 | 8.830E-04 | 392.26 |
| 10. 5.89 | 55 | | | | | | 841 |
| 16.13 | 10 | | | 3.364E-03 | 6.180E-04 | 9.867E-04 | 392.26 |
| 10. 5.89 | 55 | | | 2.977E-03 | 2.339E-03 | 3.363E-03 | 841 |
| 16.13 | 30 | | | | | | 392.26 |
| 10. 5.89 | 55 | | | | | | 841 |
| 16.13 | 20 | 1.081E-02 | 3.068E-03 | | | | 392.26 |
| 15. 5.89 | 52 | | 6.302E-04 | | | | 845 |
| 1.26 | 10 | | | 3.122E-03 | 5.082E-04 | 9.146E-04 | 396.64 |
| 15. 5.89 | 55 | | | | | | 845 |
| 1.26 | 10 | | | | | | 396.64 |
| 15. 5.89 | 55 | | | 3.130E-03 | 2.341E-03 | 3.468E-03 | 845 |
| 1.26 | 30 | | | | | | 396.64 |
| 15. 5.89 | 55 | | | | | | 845 |
| 1.26 | 20 | 9.621E-03 | 3.115E-03 | | | | 396.64 |
| 16. 5.89 | 52 | | 6.332E-04 | | | | 843 |
| 0.55 | 10 | | | 3.266E-03 | 5.306E-04 | 9.062E-04 | 397.64 |
| 16. 5.89 | 55 | | | | | | 843 |
| 0.55 | 10 | | | 3.303E-03 | 5.187E-04 | 9.714E-04 | 397.64 |
| 16. 5.89 | 55 | | | 2.875E-03 | 2.267E-03 | 3.327E-03 | 843 |
| 0.55 | 30 | | | | | | 397.64 |

Table 6.4.18. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. A | | CYCLE NO. 89.04 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 16. 5.89 | 55 | | | | | | 843 |
| 0.55 | 20 | 9.758E-03 | 3.042E-03 | | | | 397.64 |
| 17. 5.89 | 52 | | 6.385E-04 | | | | 844 |
| 1. 0 | 10 | | | 3.235E-03 | 5.427E-04 | 9.252E-04 | 398.64 |
| 17. 5.89 | 55 | | | | | | 844 |
| 1. 0 | 10 | | | 3.242E-03 | 4.498E-04 | 9.317E-04 | 398.64 |
| 17. 5.89 | 55 | | | 2.929E-03 | 2.308E-03 | 3.396E-03 | 844 |
| 1. 0 | 30 | | | | | | 398.64 |
| 17. 5.89 | 55 | | | | | | 844 |
| 1. 0 | 20 | 1.186E-02 | 3.033E-03 | | | | 398.64 |
| 18. 5.89 | 52 | | 6.566E-04 | | | | 845 |
| 1.38 | 10 | | | 3.191E-03 | 5.417E-04 | 9.218E-04 | 399.66 |
| 18. 5.89 | 55 | | | | | | 845 |
| 1.38 | 10 | | | 3.364E-03 | 6.106E-04 | 9.654E-04 | 399.66 |
| 18. 5.89 | 55 | | | 2.829E-03 | 2.267E-03 | 3.286E-03 | 845 |
| 1.38 | 30 | | | | | | 399.66 |
| 18. 5.89 | 55 | | | | | | 845 |
| 1.38 | 20 | 9.700E-03 | 2.979E-03 | | | | 399.66 |
| 19. 5.89 | 52 | | 6.601E-04 | | | | 845 |
| 0.5 | 10 | | | 3.171E-03 | 5.446E-04 | 9.313E-04 | 400.64 |
| 19. 5.89 | 55 | | | | | | 845 |
| 0.5 | 10 | | | 3.550E-03 | 4.891E-04 | 1.012E-03 | 400.64 |
| 19. 5.89 | 55 | | | 2.994E-03 | 2.413E-03 | 3.441E-03 | 845 |
| 0.5 | 30 | | | | | | 400.64 |
| 19. 5.89 | 55 | | | | | | 845 |
| 0.5 | 20 | 1.098E-02 | 3.131E-03 | | | | 400.64 |
| 20. 5.89 | 52 | | 6.679E-04 | | | | 847 |
| 0.4 | 10 | | | 3.383E-03 | 5.561E-04 | 9.264E-04 | 401.64 |
| 20. 5.89 | 55 | | | | | | 847 |
| 0.4 | 10 | | | 3.473E-03 | 5.199E-04 | 1.003E-03 | 401.64 |
| 20. 5.89 | 55 | | | | 2.324E-03 | 3.472E-03 | 847 |
| 0.4 | 30 | | | | | | 401.64 |
| 20. 5.89 | 55 | | | | | | 847 |
| 0.4 | 20 | 1.016E-02 | 3.125E-03 | | | | 401.64 |
| 21. 5.89 | 55 | | | | | | 17 |
| 12. 0 | 20 | | | | | | 402.59 |

Table 6.4.19. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. A | | CYCLE NO. 89.05 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 25. 5.89 | 52 | | | | | | 788 |
| 13.2 | 10 | | | | | | 402.61 |
| 25. 5.89 | 52 | | 7.240E-04 | | | | 788 |
| 13.2 | 10 | | | 3.184E-03 | 6.431E-04 | 1.054E-03 | 404.45 |
| 25. 5.89 | 55 | | | | | | 788 |
| 13.2 | 10 | | | 3.354E-03 | 6.754E-04 | 1.134E-03 | 404.45 |
| 25. 5.89 | 55 | | | 2.857E-03 | 2.341E-03 | 3.371E-03 | 788 |
| 13.2 | 30 | | | | | | 404.45 |
| 25. 5.89 | 55 | | | | | | 788 |
| 13.2 | 20 | 7.445E-03 | 2.991E-03 | | | | 404.45 |
| 26. 5.89 | 52 | | 7.342E-04 | | | | 793 |
| 8.2 | 10 | | | 3.570E-03 | 6.277E-04 | 1.054E-03 | 405.25 |
| 26. 5.89 | 55 | | | | | | 793 |
| 8.2 | 10 | | | 3.739E-03 | 7.267E-04 | 1.112E-03 | 405.25 |
| 26. 5.89 | 55 | | | 2.873E-03 | 2.379E-03 | 3.356E-03 | 793 |
| 8.2 | 30 | | | | | | 405.25 |
| 26. 5.89 | 55 | | | | | | 793 |
| 8.2 | 20 | 8.631E-03 | 3.439E-03 | | | | 405.25 |
| 27. 5.89 | 52 | | 7.280E-04 | | | | 794 |
| 9.3 | 10 | | | | | | 406.22 |
| 27. 5.89 | 55 | | | | | | 794 |
| 9.3 | 10 | | | | | | 406.22 |
| 27. 5.89 | 55 | | | 2.901E-03 | 2.282E-03 | 3.198E-03 | 794 |
| 9.3 | 30 | | | | | | 406.22 |
| 27. 5.89 | 55 | | | | | | 794 |
| 9.3 | 20 | 9.101E-03 | 3.442E-03 | | | | 406.22 |
| 28. 5.89 | 52 | | 7.101E-04 | | | | 794 |
| 8.55 | 10 | | | 3.475E-03 | 6.100E-04 | 1.012E-03 | 407.17 |
| 28. 5.89 | 55 | | | | | | 794 |
| 8.55 | 10 | | | 3.700E-03 | 6.504E-04 | 9.940E-04 | 407.17 |
| 28. 5.89 | 55 | | | 2.931E-03 | 2.325E-03 | 3.360E-03 | 794 |
| 8.55 | 30 | | | | | | 407.17 |
| 28. 5.89 | 55 | | | | | | 794 |
| 8.55 | 20 | 9.139E-03 | 3.410E-03 | | | | 407.17 |
| 29. 5.89 | 52 | | 7.213E-04 | | | | 797 |
| 8.25 | 10 | | | 3.616E-03 | 6.392E-04 | 1.015E-03 | 408.12 |
| 29. 5.89 | 55 | | | | | | 797 |
| 8.25 | 10 | | | 3.665E-03 | 6.100E-04 | 1.049E-03 | 408.12 |
| 29. 5.89 | 55 | | | 2.840E-03 | 2.349E-03 | 3.207E-03 | 797 |
| 8.25 | 30 | | | | | | 408.12 |
| 29. 5.89 | 55 | | | | | | 797 |
| 8.25 | 20 | 8.703E-03 | 3.350E-03 | | | | 408.12 |
| 31. 5.89 | 52 | | 6.876E-04 | | | | 801 |
| 8.32 | 10 | | | 3.662E-03 | 6.228E-04 | 1.024E-03 | 409.75 |
| 31. 5.89 | 55 | | | | | | 801 |
| 8.32 | 10 | | | 3.799E-03 | 6.761E-04 | 1.117E-03 | 409.75 |
| 31. 5.89 | 55 | | | 2.958E-03 | 2.432E-03 | 3.520E-03 | 801 |
| 8.32 | 30 | | | | | | 409.75 |
| 31. 5.89 | 55 | | | | | | 801 |
| 8.32 | 20 | 9.139E-03 | 3.476E-03 | | | | 409.75 |
| 1. 6.89 | 52 | | 6.794E-04 | | | | 801 |
| 8.45 | 10 | | | | | | 411 |

Table 6.4.19. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. A | | CYCLE NO. 89.05 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 1. 6.89 | 55 | | | | | | 801 |
| 8.45 | 10 | | | 3.807E-03 | 7.038E-04 | 1.104E-03 | 411 |
| 1. 6.89 | 55 | | | 2.964E-03 | 2.373E-03 | 3.426E-03 | 801 |
| 8.45 | 30 | | | | | | 411 |
| 1. 6.89 | 55 | | | | | | 801 |
| 8.45 | 20 | 1.007E-02 | 3.471E-03 | | | | 411 |
| 2. 6.89 | 52 | | 7.114E-04 | | | | 801 |
| 0.5 | 10 | | | 3.580E-03 | 6.183E-04 | 1.004E-03 | 411.7 |
| 2. 6.89 | 55 | | | | | | 801 |
| 0.5 | 10 | | | 3.941E-03 | 6.626E-04 | 1.106E-03 | 411.7 |
| 2. 6.89 | 55 | | | 3.007E-03 | 2.348E-03 | 3.523E-03 | 801 |
| 0.5 | 30 | | | | | | 411.7 |
| 2. 6.89 | 55 | | | | | | 801 |
| 0.5 | 20 | 1.101E-02 | 3.615E-03 | | | | 411.7 |
| 3. 6.89 | 52 | | 6.757E-04 | | | | 802 |
| 0.4 | 10 | | | 3.605E-03 | 6.080E-04 | 1.020E-03 | 412.65 |
| 3. 6.89 | 55 | | | | | | 802 |
| 0.4 | 10 | | | 3.841E-03 | 5.484E-04 | 1.102E-03 | 412.65 |
| 3. 6.89 | 55 | | | 3.071E-03 | 2.438E-03 | 3.681E-03 | 802 |
| 0.4 | 30 | | | | | | 412.65 |
| 3. 6.89 | 55 | | | | | | 802 |
| 0.4 | 20 | 1.064E-02 | 3.786E-03 | | | | 412.65 |
| 4. 6.89 | 52 | | 6.695E-04 | | | | 804 |
| 0.32 | 10 | | | 3.674E-03 | 6.249E-04 | 1.013E-03 | 413.6 |
| 4. 6.89 | 55 | | | | | | 804 |
| 0.32 | 10 | | | 3.874E-03 | 6.418E-04 | 1.143E-03 | 413.6 |
| 4. 6.89 | 55 | | | 2.975E-03 | 2.371E-03 | 3.537E-03 | 804 |
| 0.32 | 30 | | | | | | 413.6 |
| 4. 6.89 | 55 | | | | | | 804 |
| 0.32 | 20 | | 3.798E-03 | | | | 413.6 |
| 5. 6.89 | 52 | | | | | | 805 |
| 0.51 | 10 | | | | | | 414.5 |
| 5. 6.89 | 55 | | | | | | 805 |
| 0.51 | 10 | | | | | | 414.5 |
| 5. 6.89 | 55 | | | | | | 805 |
| 0.51 | 30 | | | | | | 414.5 |
| 5. 6.89 | 55 | | | | | | 805 |
| 0.51 | 20 | | 3.247E-03 | | | | 414.5 |
| 7. 6.89 | 52 | | 6.822E-04 | | | | 788 |
| 8.46 | 10 | | | 3.431E-03 | 5.856E-04 | 9.885E-04 | 416.75 |
| 7. 6.89 | 55 | | | | | | 788 |
| 8.46 | 10 | | | 3.492E-03 | 6.986E-04 | 9.357E-04 | 416.75 |
| 7. 6.89 | 55 | | | 2.669E-03 | 2.192E-03 | 3.227E-03 | 788 |
| 8.46 | 30 | | | | | | 416.75 |
| 7. 6.89 | 55 | | | | | | 788 |
| 8.46 | 20 | 8.712E-03 | 3.185E-03 | | | | 416.75 |
| 8. 6.89 | 52 | | 6.351E-04 | | | | 788 |
| 8.39 | 10 | | | 3.400E-03 | 5.814E-04 | 1.041E-03 | 417.7 |
| 8. 6.89 | 55 | | | | | | 788 |
| 8.39 | 10 | | | 3.565E-03 | 5.985E-04 | 1.005E-03 | 417.7 |
| 8. 6.89 | 55 | | | 2.619E-03 | 2.262E-03 | 2.836E-03 | 788 |
| 8.39 | 30 | | | | | | 417.7 |

Table 6.4.19. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. A | | CYCLE NO. 89.05 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 8. 6.89 | 55 | | | | | | 788 |
| 8.39 | 20 | 9.193E-03 | 3.216E-03 | | | | 417.7 |
| 11. 6.89 | 52 | | 7.245E-04 | | | | 792 |
| 8.42 | 10 | | | | | | 420.55 |
| 11. 6.89 | 55 | | | | | | 792 |
| 8.42 | 10 | | | 3.692E-03 | 6.774E-04 | 1.044E-03 | 420.55 |
| 11. 6.89 | 55 | | | 2.899E-03 | 2.214E-03 | 3.252E-03 | 792 |
| 8.42 | 30 | | | | | | 420.55 |
| 11. 6.89 | 55 | | | | | | 792 |
| 8.42 | 20 | 1.088E-02 | 3.291E-03 | | | | 420.55 |
| 12. 6.89 | 52 | | 6.560E-04 | | | | 791 |
| 8.2 | 10 | | | 3.438E-03 | 6.150E-04 | 1.004E-03 | 421.5 |
| 12. 6.89 | 55 | | | | | | 791 |
| 8.2 | 10 | | | 3.594E-03 | 6.288E-04 | 1.073E-03 | 421.5 |
| 12. 6.89 | 55 | | | 2.941E-03 | 2.264E-03 | 3.414E-03 | 791 |
| 8.2 | 30 | | | | | | 421.5 |
| 12. 6.89 | 55 | | | | | | 791 |
| 8.2 | 20 | 1.091E-02 | 3.352E-03 | | | | 421.5 |
| 13. 6.89 | 52 | | 6.715E-04 | | | | 790 |
| 8.3 | 10 | | | 3.524E-03 | 6.070E-04 | 9.820E-04 | 422.45 |
| 13. 6.89 | 55 | | | | | | 790 |
| 8.3 | 10 | | | 3.661E-03 | 7.838E-04 | 1.056E-03 | 422.45 |
| 13. 6.89 | 55 | | | 2.760E-03 | 2.215E-03 | 3.046E-03 | 790 |
| 8.3 | 30 | | | | | | 422.45 |
| 13. 6.89 | 55 | | | | | | 790 |
| 8.3 | 20 | 1.202E-02 | 3.234E-03 | | | | 422.45 |
| 14. 6.89 | 52 | | 6.714E-04 | | | | 789 |
| 8.4 | 10 | | | 3.547E-03 | 6.123E-04 | 9.587E-04 | 423.45 |
| 14. 6.89 | 55 | | | | | | 789 |
| 8.4 | 10 | | | 3.828E-03 | 6.055E-04 | 1.123E-03 | 423.45 |
| 14. 6.89 | 55 | | | 2.698E-03 | 2.237E-03 | 3.191E-03 | 789 |
| 8.4 | 30 | | | | | | 423.45 |
| 14. 6.89 | 55 | | | | | | 789 |
| 8.4 | 20 | 1.063E-02 | 3.333E-03 | | | | 423.45 |
| 15. 6.89 | 55 | | | | | | 24 |
| 7. 0 | 20 | | | | | | 423.75 |

Table 6.4.20. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. A | | CYCLE NO. 89.06 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 18. 6.89 | 52 | | | | | | 814 |
| 17.17 | 10 | | | | | | 423.75 |
| 18. 6.89 | 52 | | 7.342E-04 | | | | 814 |
| 17.17 | 10 | | | 3.089E-03 | 6.636E-04 | 1.115E-03 | 424.51 |
| 18. 6.89 | 55 | | | | | | 814 |
| 17.17 | 10 | | | 3.380E-03 | 8.350E-04 | 1.180E-03 | 424.51 |
| 18. 6.89 | 55 | | | 3.074E-03 | 2.333E-03 | 3.410E-03 | 814 |
| 17.17 | 30 | | | | | | 424.51 |
| 18. 6.89 | 55 | | | | | | 814 |
| 17.17 | 20 | 7.421E-03 | 2.909E-03 | | | | 424.51 |
| 19. 6.89 | 52 | | 7.652E-04 | | | | 820 |
| 16.54 | 10 | | | 3.812E-03 | 6.790E-04 | 1.106E-03 | 425.51 |
| 19. 6.89 | 55 | | | | | | 820 |
| 16.54 | 10 | | | 4.001E-03 | 7.293E-04 | 1.178E-03 | 425.51 |
| 19. 6.89 | 55 | | | 2.955E-03 | 2.433E-03 | 3.175E-03 | 820 |
| 16.54 | 30 | | | | | | 425.51 |
| 19. 6.89 | 55 | | | | | | 820 |
| 16.54 | 20 | 7.821E-03 | 3.543E-03 | | | | 425.51 |
| 20. 6.89 | 52 | | 7.784E-04 | | | | 822 |
| 16.13 | 10 | | | 3.975E-03 | 6.488E-04 | 1.139E-03 | 426.75 |
| 20. 6.89 | 55 | | | | | | 822 |
| 16.13 | 10 | | | 4.077E-03 | 7.196E-04 | 1.213E-03 | 426.75 |
| 20. 6.89 | 55 | | | 3.100E-03 | 2.384E-03 | 3.456E-03 | 822 |
| 16.13 | 30 | | | | | | 426.75 |
| 20. 6.89 | 55 | | | | | | 822 |
| 16.13 | 20 | 7.955E-03 | 3.651E-03 | | | | 426.75 |
| 22. 6.89 | 52 | | 6.471E-04 | | | | 789 |
| 8.5 | 10 | | | 3.515E-03 | 6.553E-04 | 1.042E-03 | 428.05 |
| 22. 6.89 | 55 | | | | | | 789 |
| 8.5 | 10 | | | 3.590E-03 | 8.138E-04 | 1.070E-03 | 428.05 |
| 22. 6.89 | 55 | | | 2.713E-03 | 2.096E-03 | 2.918E-03 | 789 |
| 8.5 | 30 | | | | | | 428.05 |
| 22. 6.89 | 55 | | | | | | 789 |
| 8.5 | 20 | 9.160E-03 | 3.261E-03 | | | | 428.05 |
| 23. 6.89 | 52 | | 7.298E-04 | | | | 788 |
| 8.52 | 10 | | | 3.648E-03 | 6.518E-04 | 1.081E-03 | 428.93 |
| 23. 6.89 | 55 | | | | | | 788 |
| 8.52 | 10 | | | 3.841E-03 | 7.362E-04 | 1.160E-03 | 428.93 |
| 23. 6.89 | 55 | | | 2.663E-03 | 2.228E-03 | 3.021E-03 | 788 |
| 8.52 | 30 | | | | | | 428.93 |
| 23. 6.89 | 55 | | | | | | 788 |
| 8.52 | 20 | 8.960E-03 | 3.384E-03 | | | | 428.93 |
| 24. 6.89 | 52 | | 6.960E-04 | | | | 789 |
| 8.32 | 10 | | | 3.754E-03 | 6.560E-04 | 1.090E-03 | 429.86 |
| 24. 6.89 | 55 | | | | | | 789 |
| 8.32 | 10 | | | 3.938E-03 | 8.047E-04 | 1.164E-03 | 429.86 |
| 24. 6.89 | 55 | | | 2.768E-03 | 2.190E-03 | 2.858E-03 | 789 |
| 8.32 | 30 | | | | | | 429.86 |
| 24. 6.89 | 55 | | | | | | 789 |
| 8.32 | 20 | 9.466E-03 | 3.468E-03 | | | | 429.86 |
| 25. 6.89 | 52 | | 7.332E-04 | | | | 789 |
| 8.28 | 10 | | | 3.673E-03 | 6.857E-04 | 1.097E-03 | 430.79 |

Table 6.4.20. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. A | | CYCLE NO. 89.06 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 25. 6.89 | 55 | | | | | | 789 |
| 8.28 | 10 | | | 3.932E-03 | 8.332E-04 | 1.180E-03 | 430.79 |
| 25. 6.89 | 55 | | | 2.600E-03 | 2.211E-03 | 3.158E-03 | 789 |
| 8.28 | 30 | | | | | | 430.79 |
| 25. 6.89 | 55 | | | | | | 789 |
| 8.28 | 20 | 9.051E-03 | 3.486E-03 | | | | 430.79 |
| 1. 7.89 | 52 | | 7.154E-04 | | | | 792 |
| 9. 0 | 10 | | | 3.710E-03 | 6.958E-04 | 1.104E-03 | 436.38 |
| 1. 7.89 | 55 | | | | | | 792 |
| 9. 0 | 10 | | | 3.994E-03 | 6.490E-04 | 1.166E-03 | 436.38 |
| 1. 7.89 | 55 | | | 2.690E-03 | 2.166E-03 | 2.885E-03 | 792 |
| 9. 0 | 30 | | | | | | 436.38 |
| 1. 7.89 | 55 | | | | | | 792 |
| 9. 0 | 20 | 1.004E-02 | 3.481E-03 | | | | 436.38 |
| 2. 7.89 | 52 | | 7.023E-04 | | | | 792 |
| 8.15 | 10 | | | 3.664E-03 | 6.481E-04 | 1.038E-03 | 437.27 |
| 2. 7.89 | 55 | | | | | | 792 |
| 8.15 | 10 | | | 3.802E-03 | 7.949E-04 | 1.167E-03 | 437.27 |
| 2. 7.89 | 55 | | | 2.617E-03 | 2.299E-03 | 2.812E-03 | 792 |
| 8.15 | 30 | | | | | | 437.27 |
| 2. 7.89 | 55 | | | | | | 792 |
| 8.15 | 20 | 8.750E-03 | 3.239E-03 | | | | 437.27 |
| 4. 7.89 | 52 | | 7.124E-04 | | | | 786 |
| 16.28 | 10 | | | 3.644E-03 | 6.786E-04 | 1.129E-03 | 439.53 |
| 4. 7.89 | 55 | | | | | | 786 |
| 16.28 | 10 | | | 4.085E-03 | 7.660E-04 | 1.166E-03 | 439.53 |
| 4. 7.89 | 55 | | | 2.581E-03 | 2.185E-03 | 2.899E-03 | 786 |
| 16.28 | 30 | | | | | | 439.53 |
| 4. 7.89 | 55 | | | | | | 786 |
| 16.28 | 20 | 8.960E-03 | 3.454E-03 | | | | 439.53 |
| 6. 7.89 | 52 | | 7.385E-04 | | | | 781 |
| 9.35 | 10 | | | 3.709E-03 | 6.912E-04 | 1.106E-03 | 441.15 |
| 6. 7.89 | 55 | | | | | | 781 |
| 9.35 | 10 | | | 3.837E-03 | 8.149E-04 | 1.179E-03 | 441.15 |
| 6. 7.89 | 55 | | | 2.582E-03 | 2.120E-03 | 2.931E-03 | 781 |
| 9.35 | 30 | | | | | | 441.15 |
| 6. 7.89 | 55 | | | | | | 781 |
| 9.35 | 20 | 1.127E-02 | 3.522E-03 | | | | 441.15 |
| 7. 7.89 | 52 | | 6.992E-04 | | | | 781 |
| 9.37 | 10 | | | 3.721E-03 | 6.938E-04 | 1.114E-03 | 442.08 |
| 7. 7.89 | 55 | | | | | | 781 |
| 9.37 | 10 | | | 3.861E-03 | 7.561E-04 | 1.177E-03 | 442.08 |
| 7. 7.89 | 55 | | | 2.712E-03 | 2.128E-03 | 2.630E-03 | 781 |
| 9.37 | 30 | | | | | | 442.08 |
| 7. 7.89 | 52 | | | | | | 781 |
| 9.37 | 10 | | | | | | 442.08 |
| 7. 7.89 | 52 | | | | | | 781 |
| 9.37 | 10 | | | | | | 442.08 |
| 8. 7.89 | 52 | | 8.664E-04 | | | | 833 |
| 8.59 | 10 | | | 4.534E-03 | 8.095E-04 | 1.323E-03 | 442.98 |
| 8. 7.89 | 55 | | | | | | 833 |
| 8.59 | 10 | | | 4.777E-03 | 8.699E-04 | 1.434E-03 | 442.98 |

Table 6.4.20. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. A | | CYCLE NO. 89.06 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 8. 7.89 | 55 | | | 3.330E-03 | 2.794E-03 | 3.893E-03 | 833 |
| 8.59 | 30 | | | | | | 442.98 |
| 8. 7.89 | 55 | | | | | | 833 |
| 8.59 | 20 | 1.248E-02 | 4.140E-03 | | | | 442.98 |
| 9. 7.89 | 52 | | 9.259E-04 | | | | 836 |
| 8.45 | 10 | | | 4.511E-03 | 8.231E-04 | 1.306E-03 | 443.91 |
| 9. 7.89 | 55 | | | | | | 836 |
| 8.45 | 10 | | | | 8.646E-04 | 1.381E-03 | 443.91 |
| 9. 7.89 | 55 | | | 3.342E-03 | 2.706E-03 | 3.901E-03 | 836 |
| 8.45 | 30 | | | | | | 443.91 |
| 9. 7.89 | 55 | | | | | | 836 |
| 8.45 | 20 | 1.220E-02 | 4.228E-03 | | | | 443.91 |
| 10. 7.89 | 52 | | 8.611E-04 | | | | 834 |
| 19.37 | 10 | | | 4.514E-03 | 8.035E-04 | 1.330E-03 | 445.11 |
| 10. 7.89 | 55 | | | | | | 834 |
| 19.37 | 10 | | | 9.340E-04 | | 2.857E-04 | 445.11 |
| 10. 7.89 | 55 | | | 3.489E-03 | 2.812E-03 | 4.050E-03 | 834 |
| 19.37 | 30 | | | | | | 445.11 |
| 10. 7.89 | 55 | | | | | | 834 |
| 19.37 | 20 | 1.197E-02 | 4.421E-03 | | | | 445.11 |
| 11. 7.89 | 55 | | | | | | 60 |
| 3. 0 | 20 | | | | | | 445.35 |

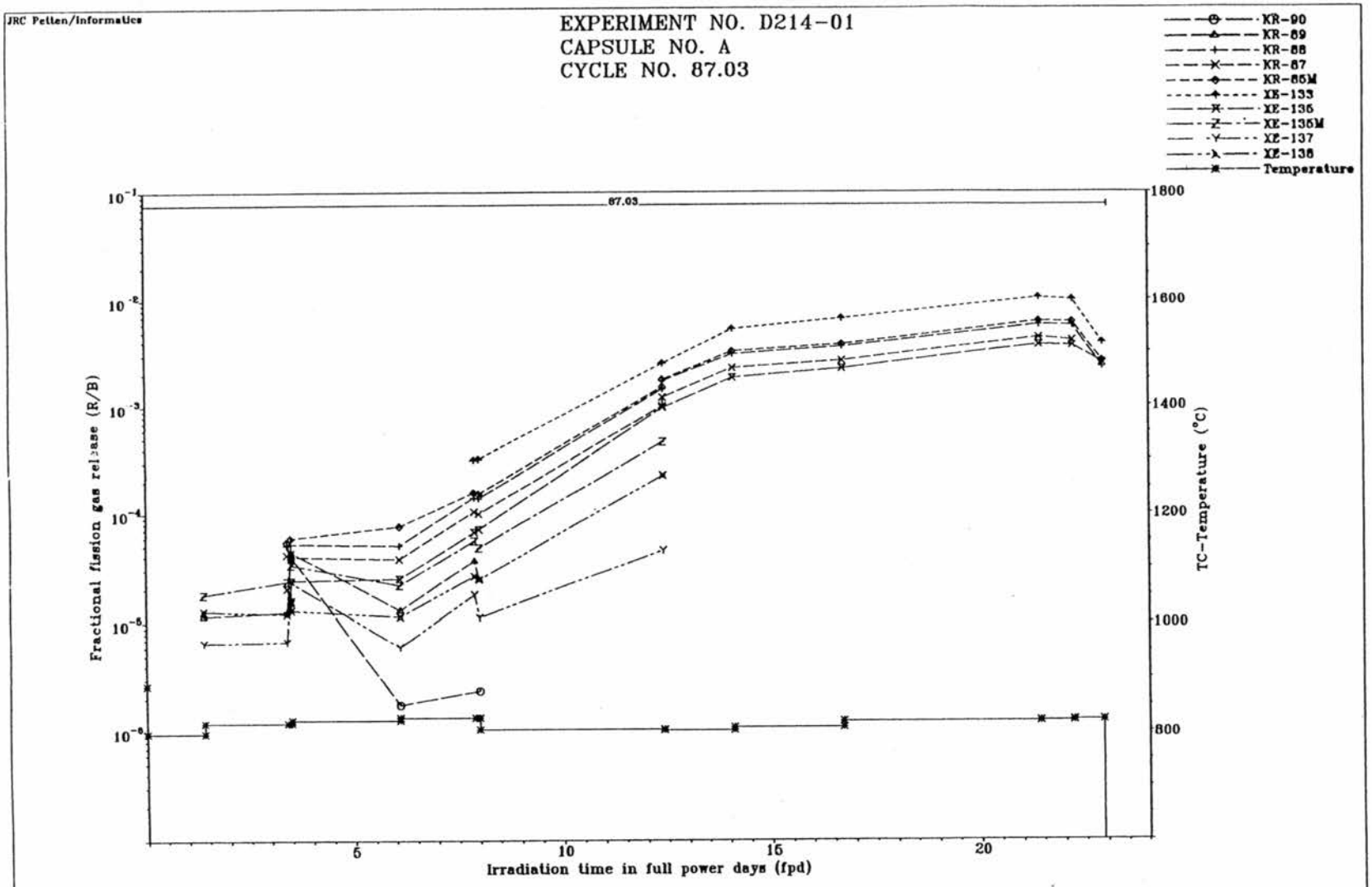



Fig. 6.4.1. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

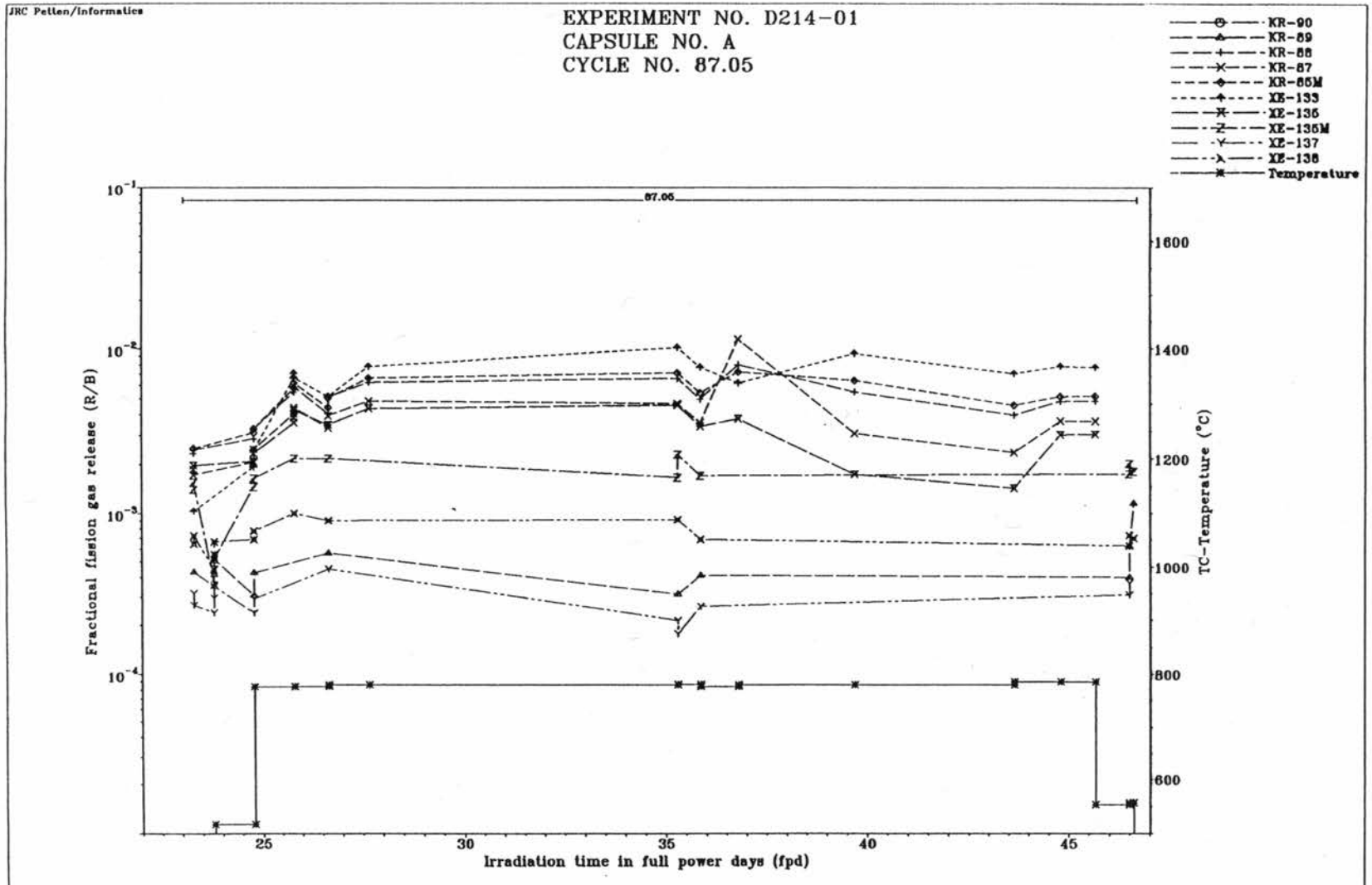



Fig. 6.4.2. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

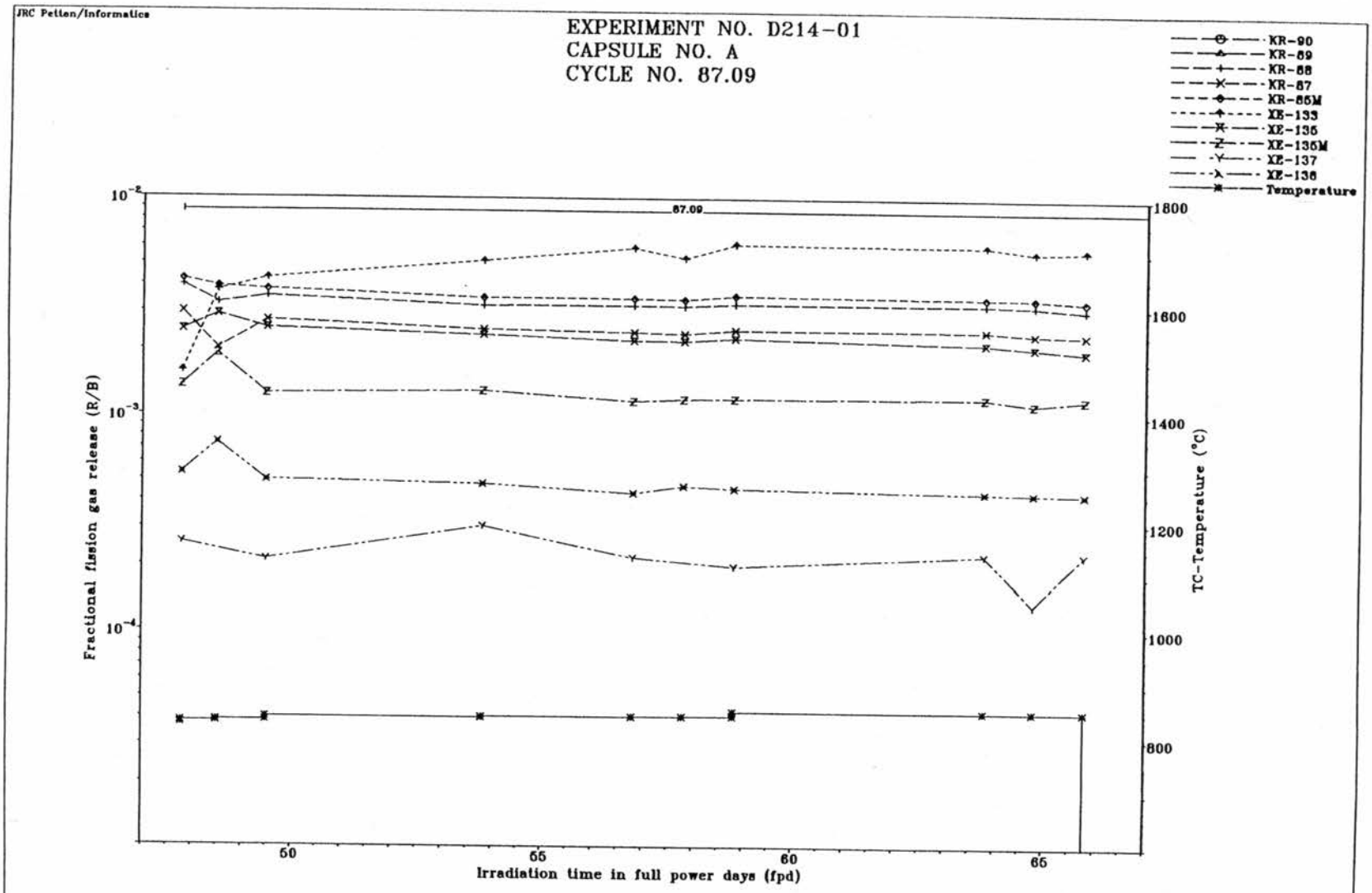



Fig. 6.4.3. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

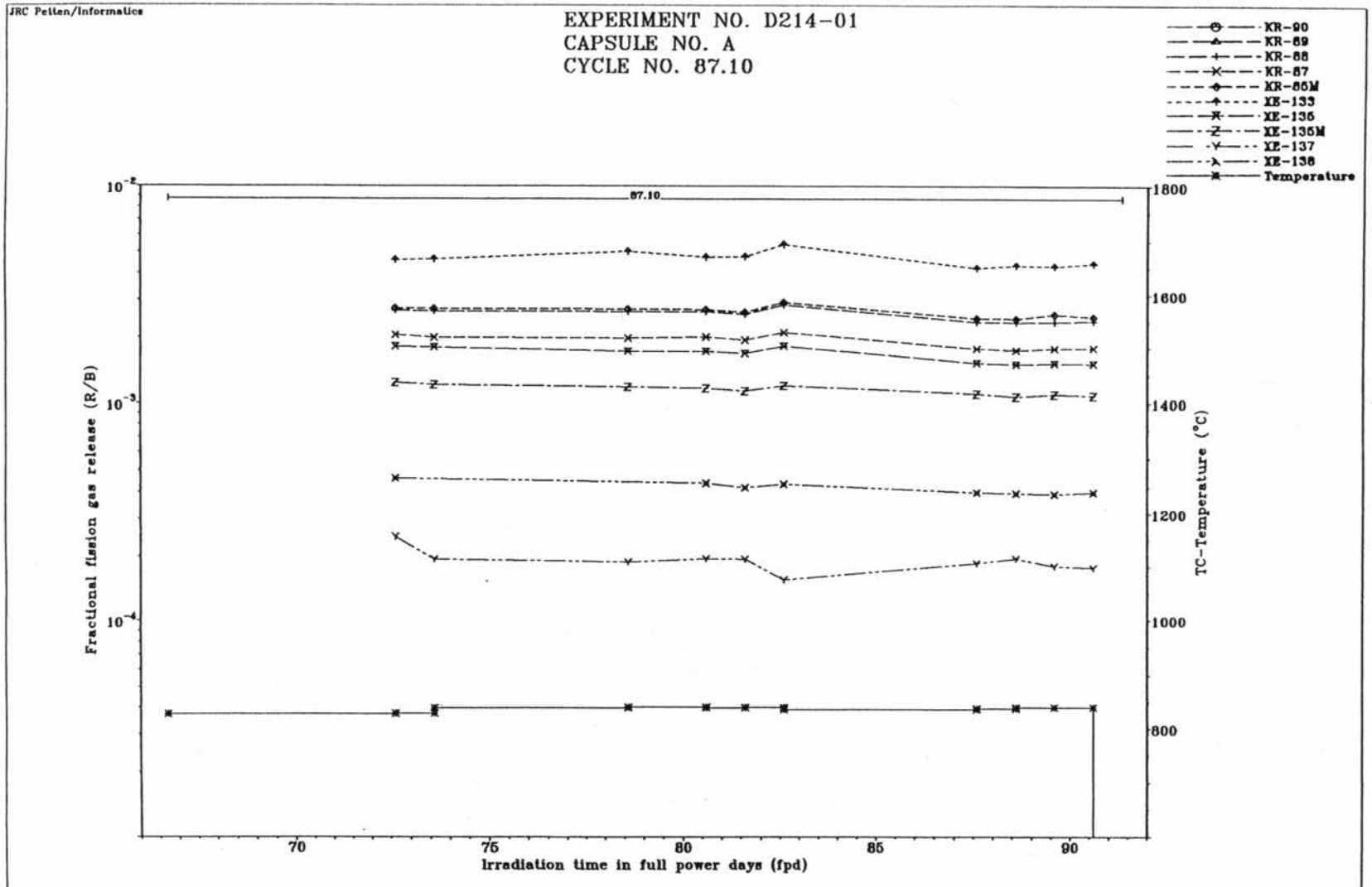



Fig. 6.4.4. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

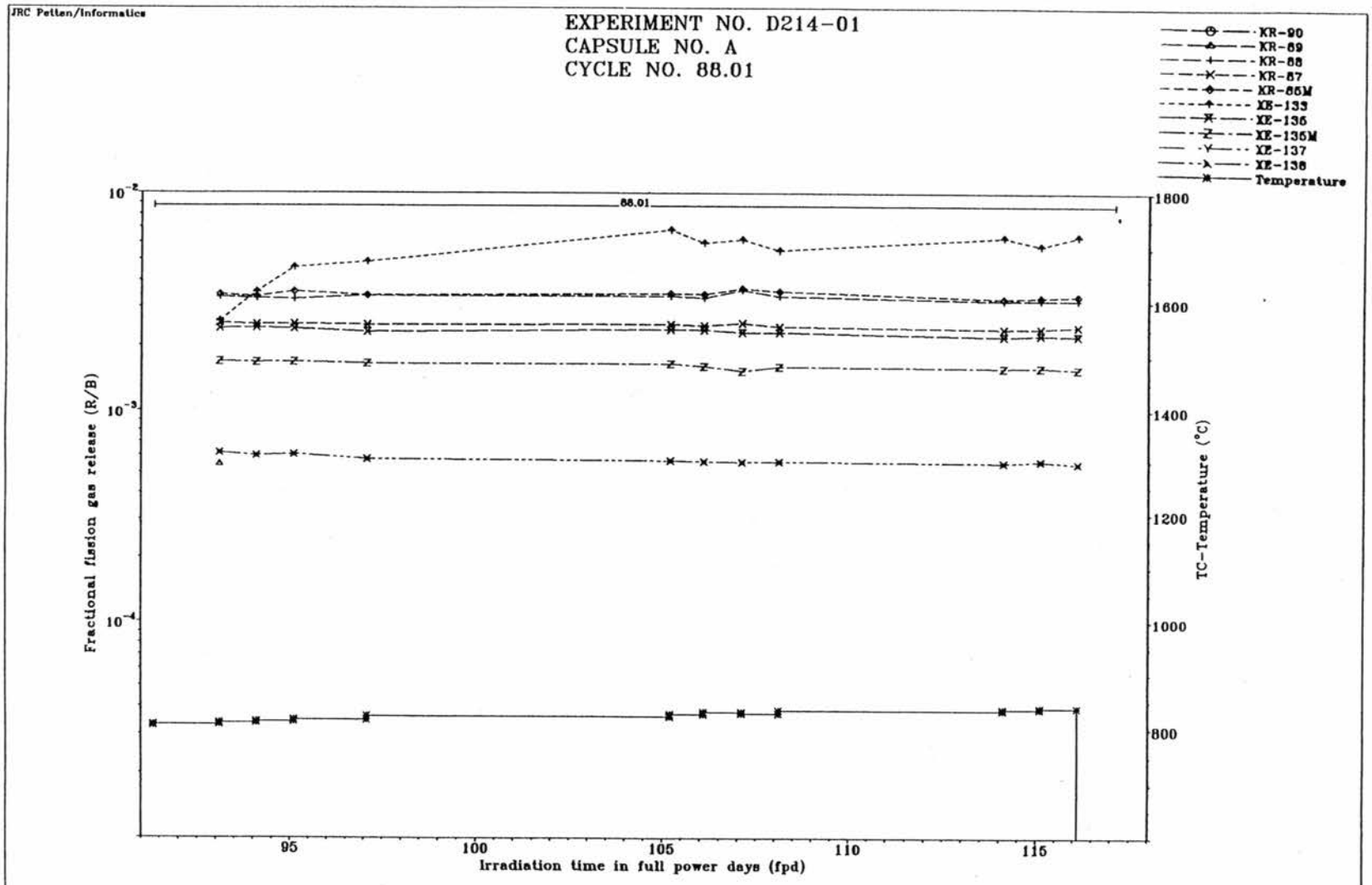



Fig. 6.4.5. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

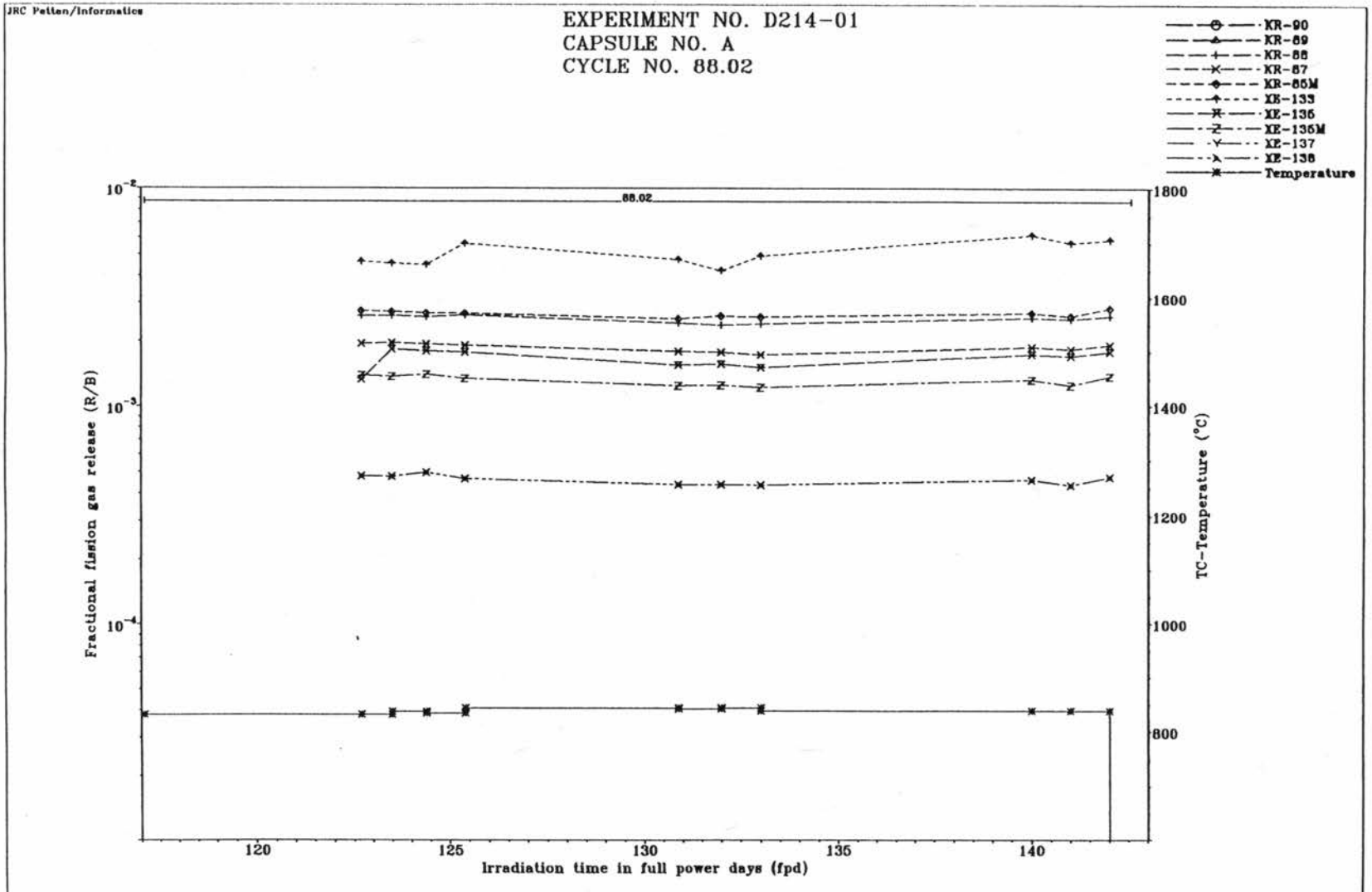



Fig. 6.4.6. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

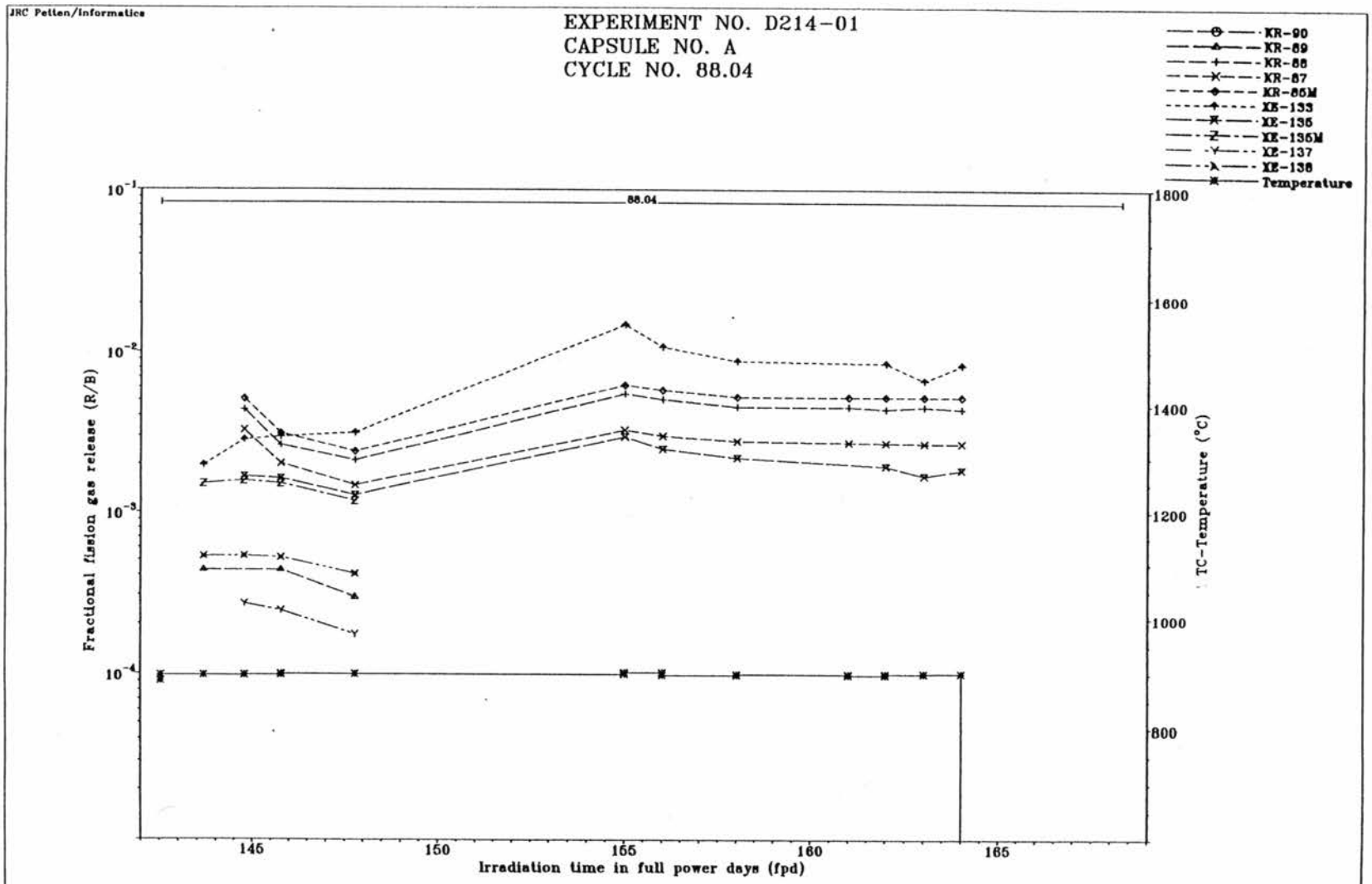



Fig. 6.4.7. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

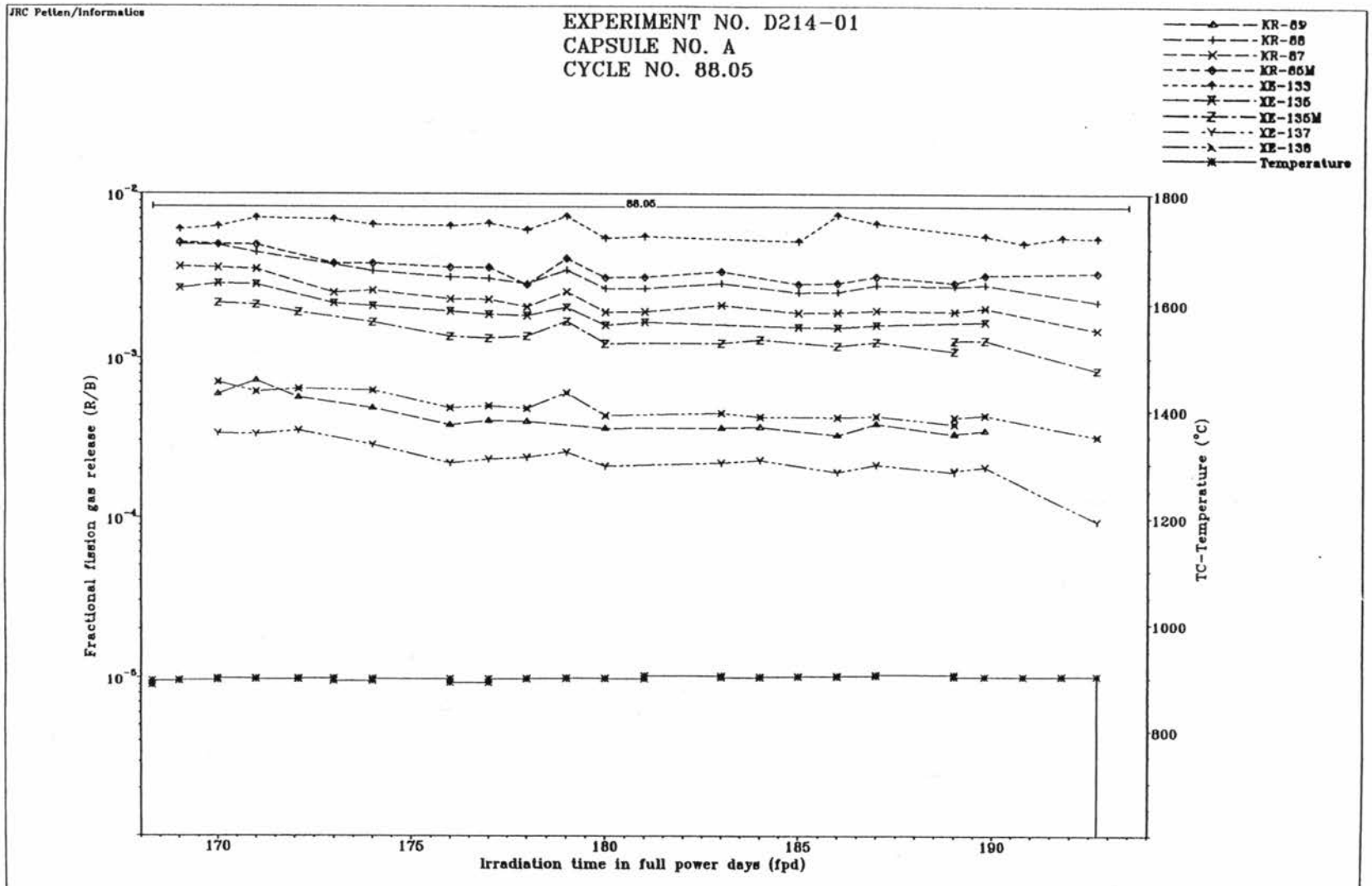



Fig. 6.4.8. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

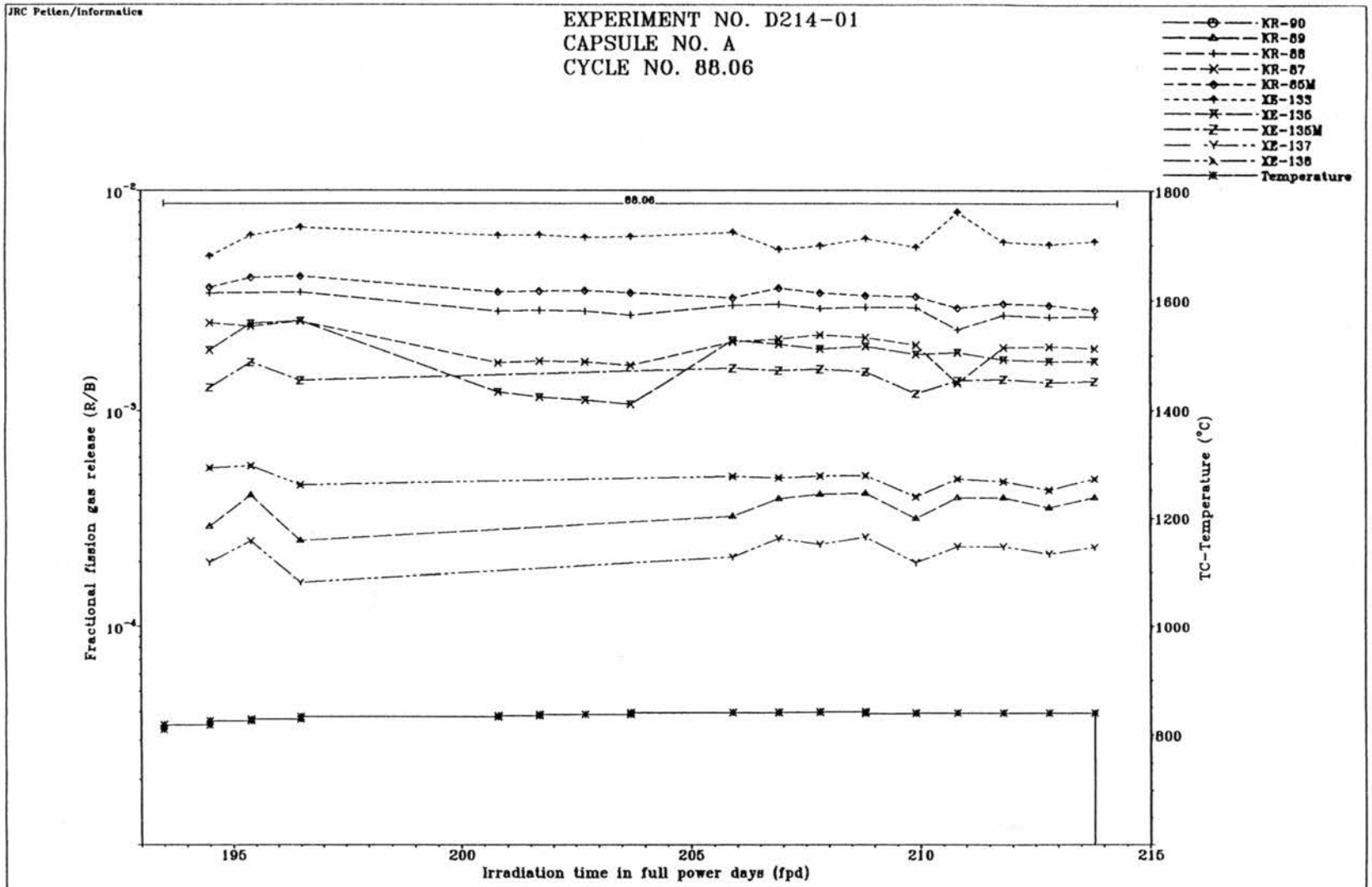



Fig. 6.4.9. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

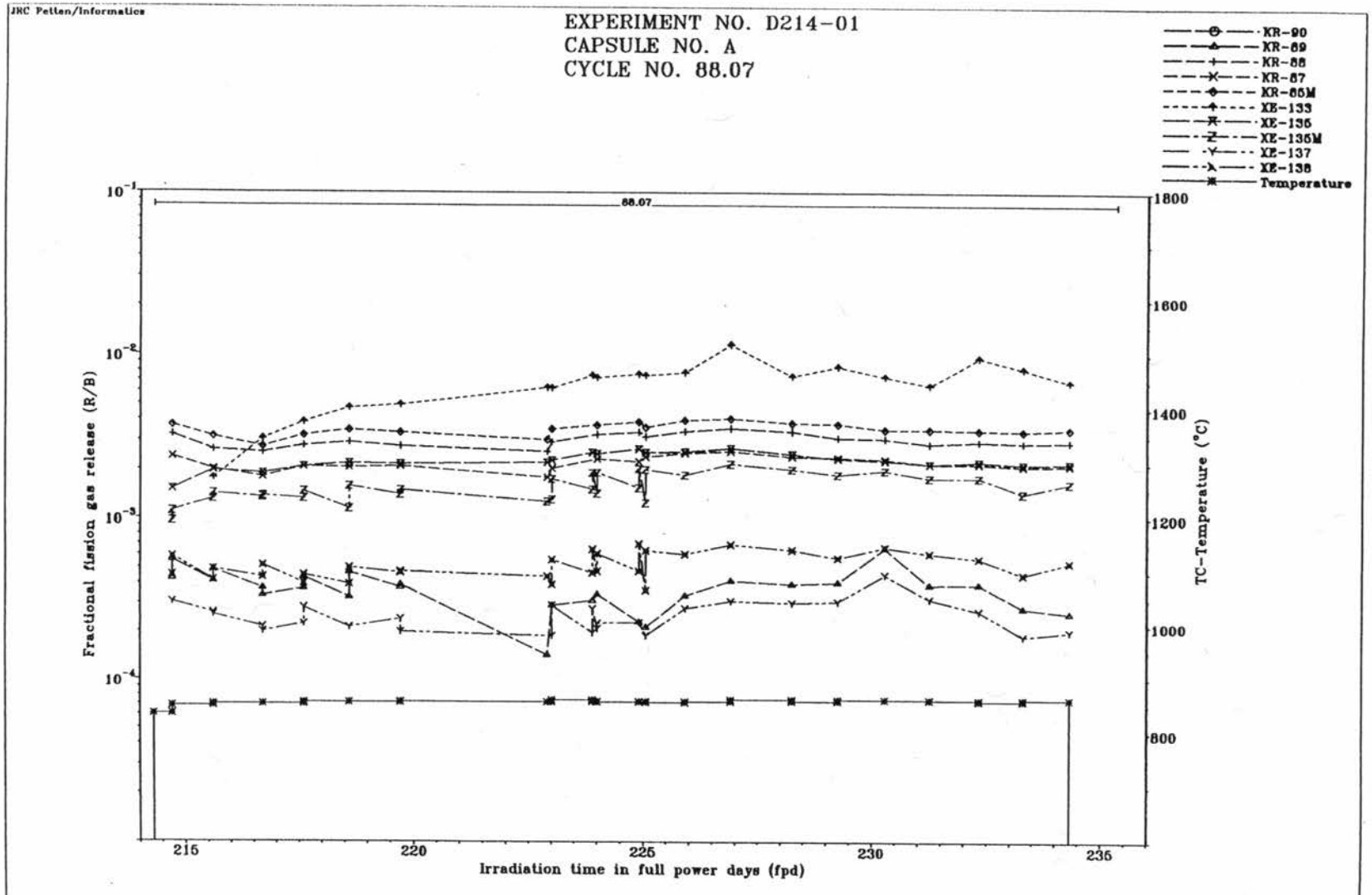



Fig. 6.4.10. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

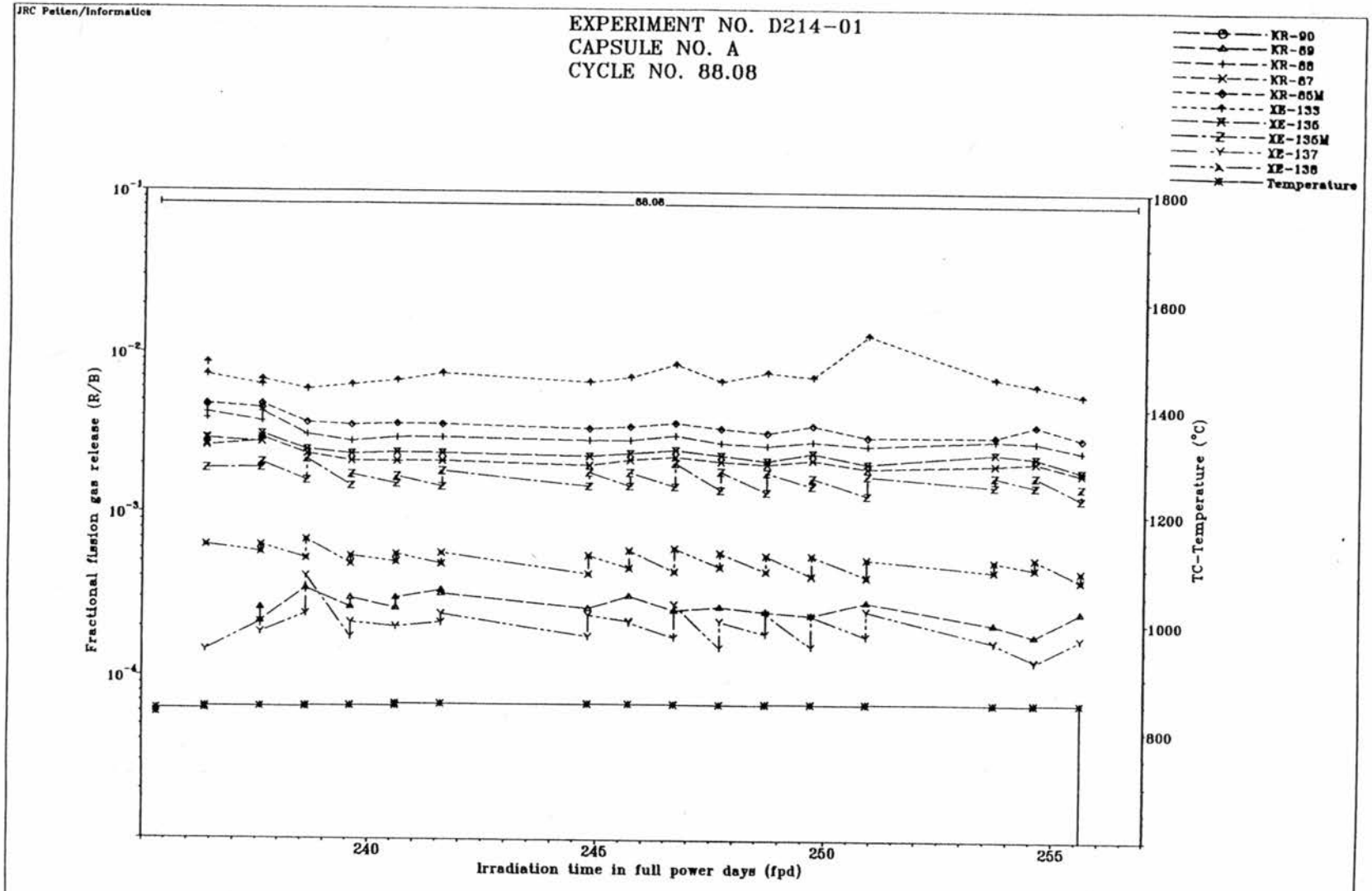



Fig. 6.4.11. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

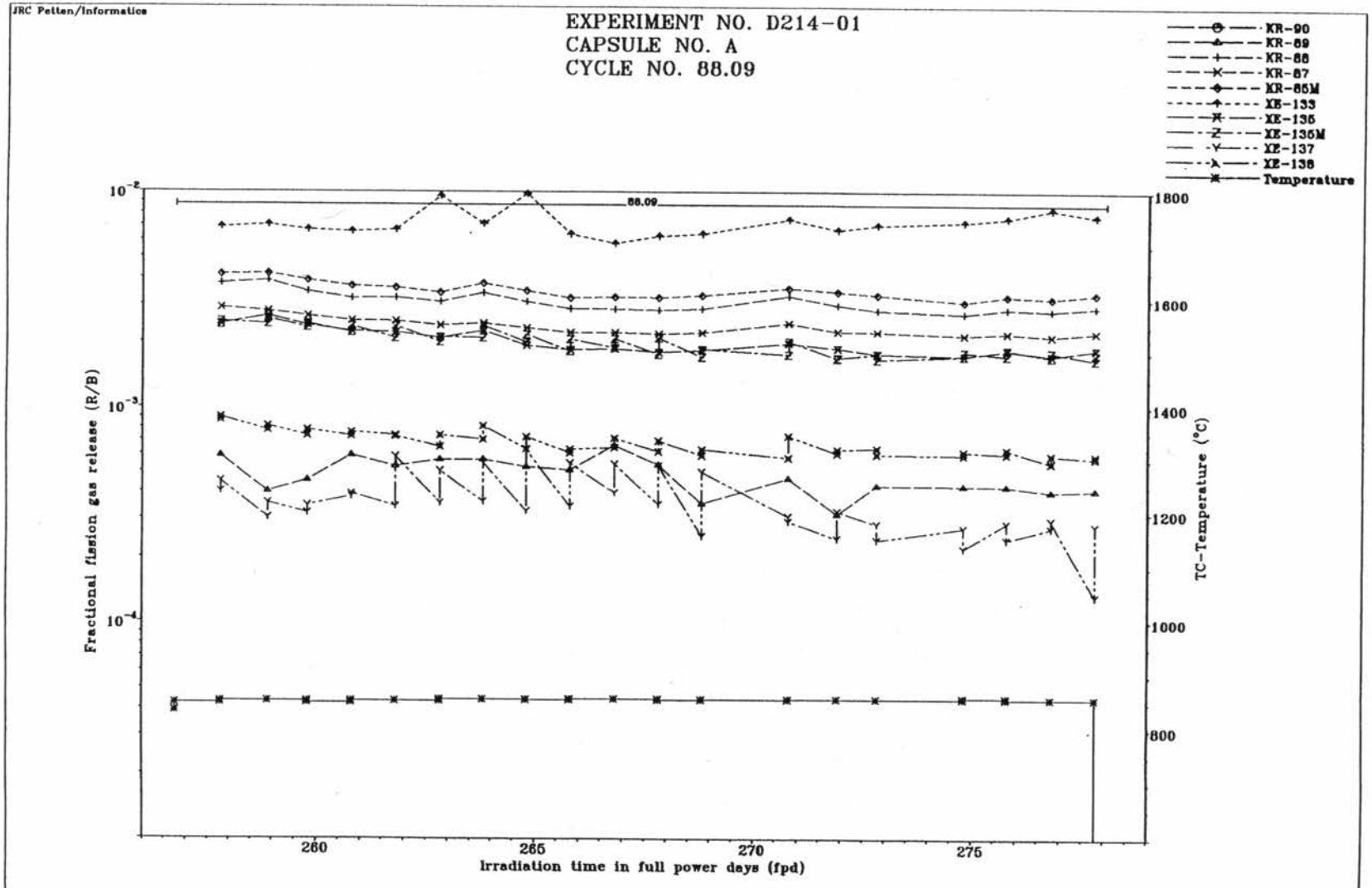



Fig. 6.4.12. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

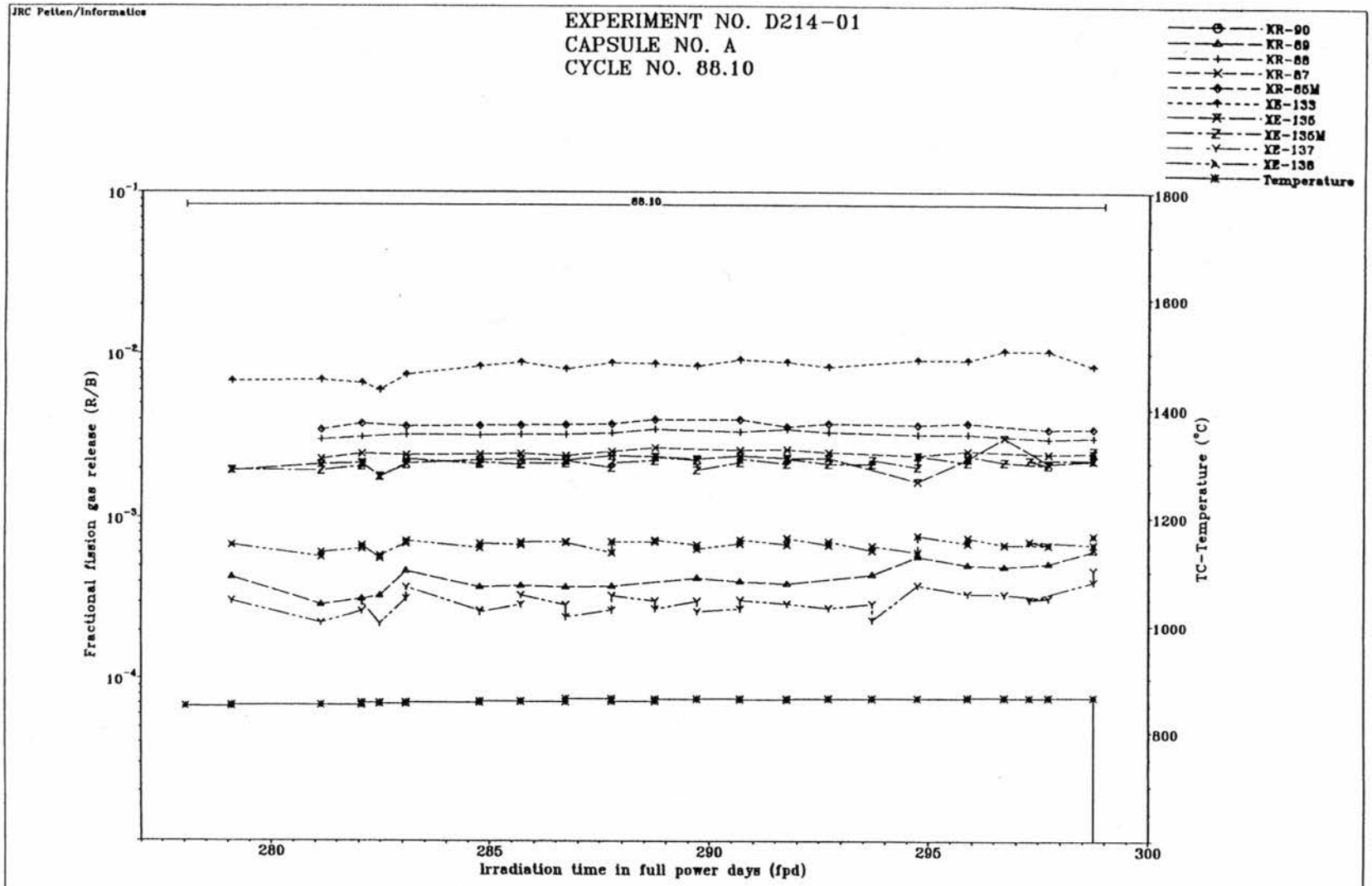



Fig. 6.4.13. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

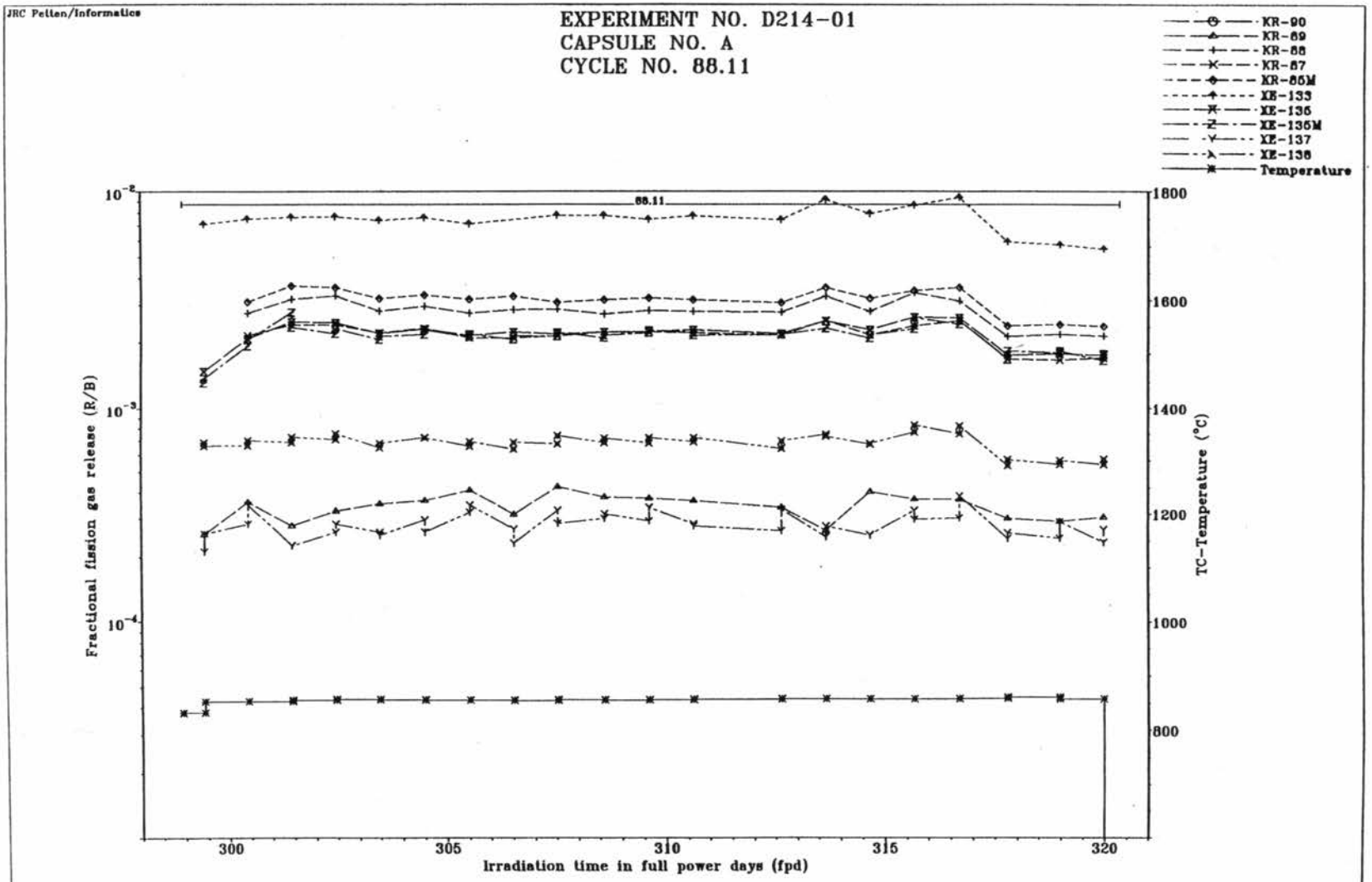



Fig. 6.4.14. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

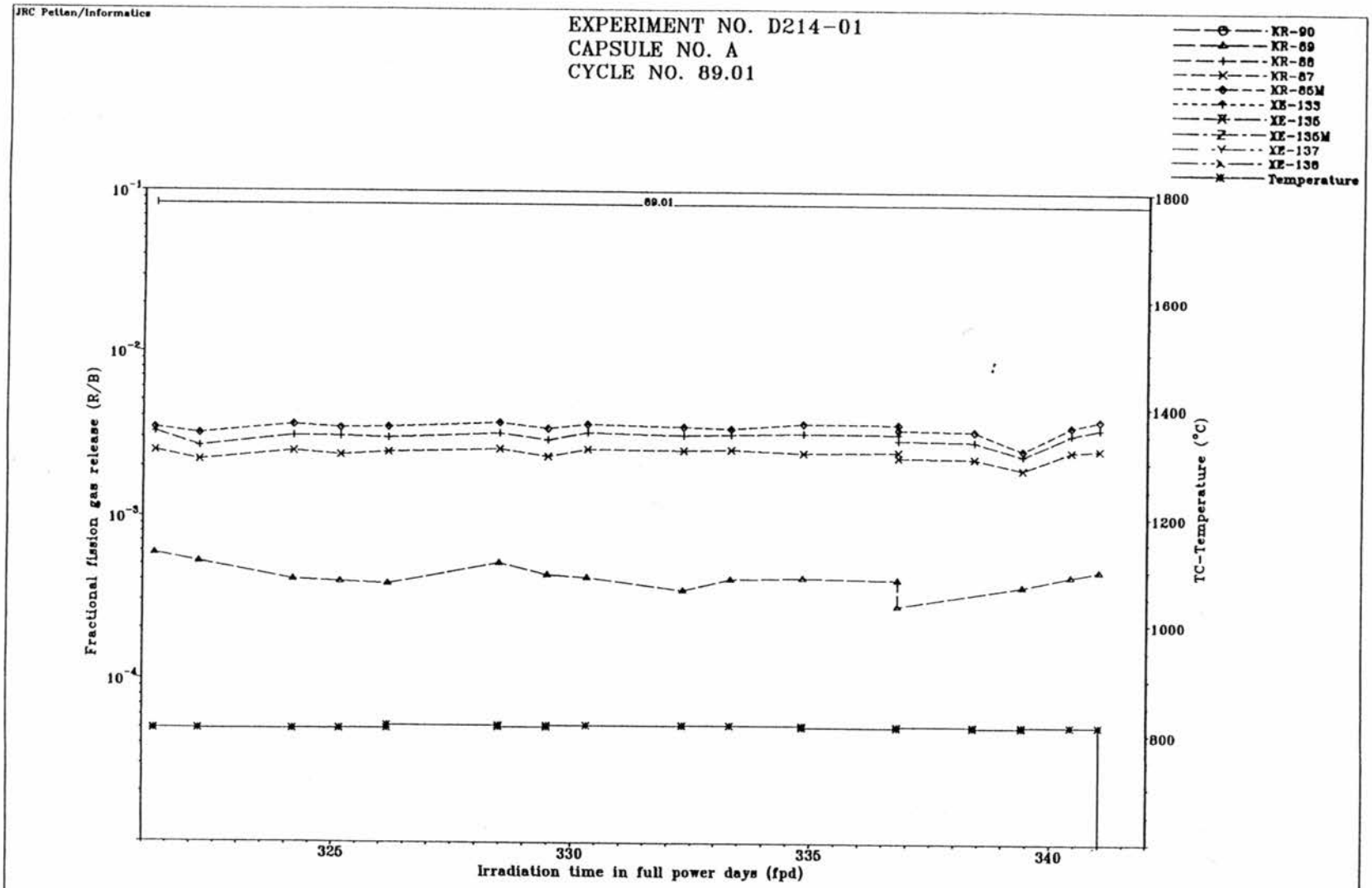



Fig. 6.4.15. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

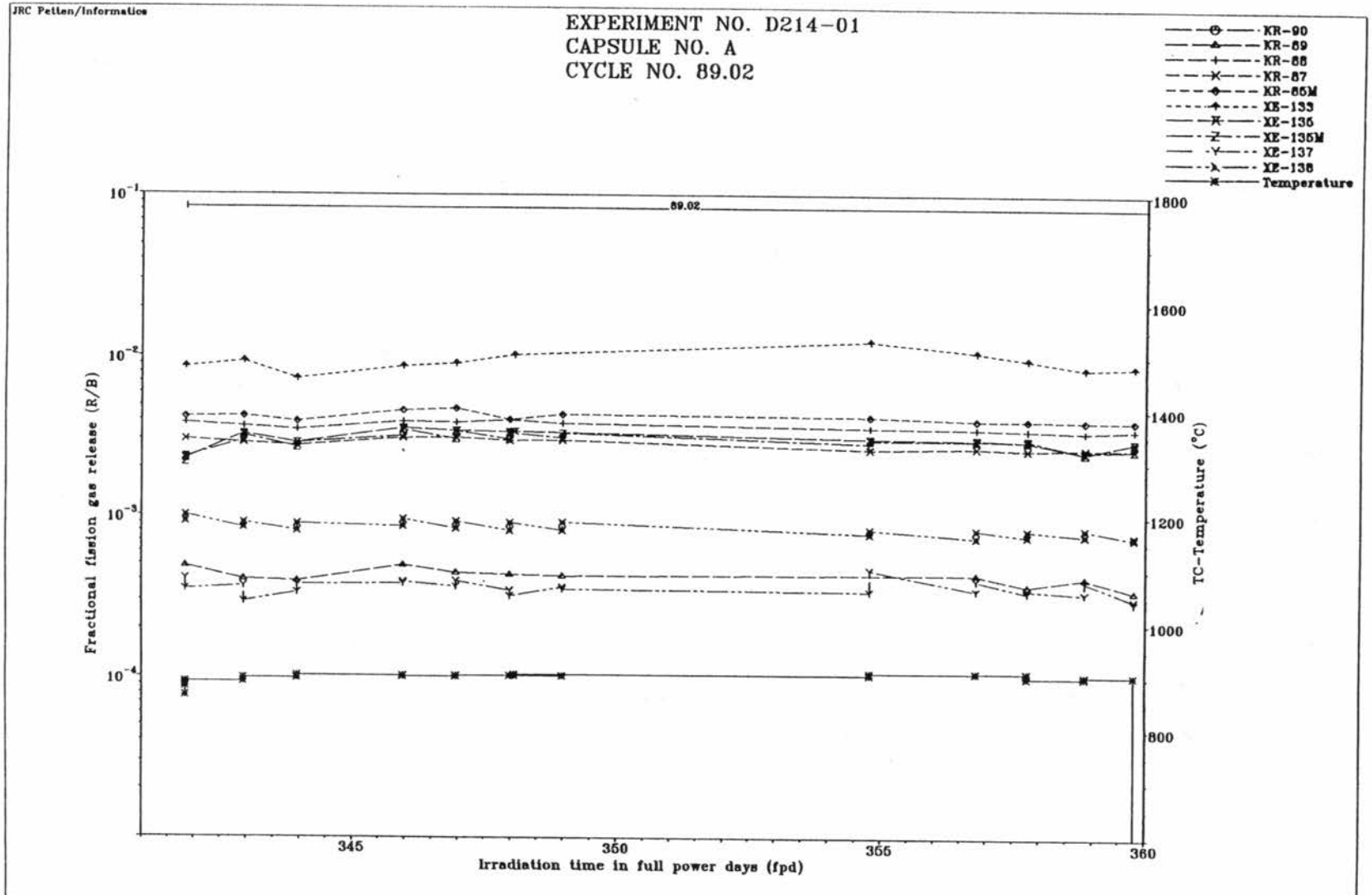



Fig. 6.4.16. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

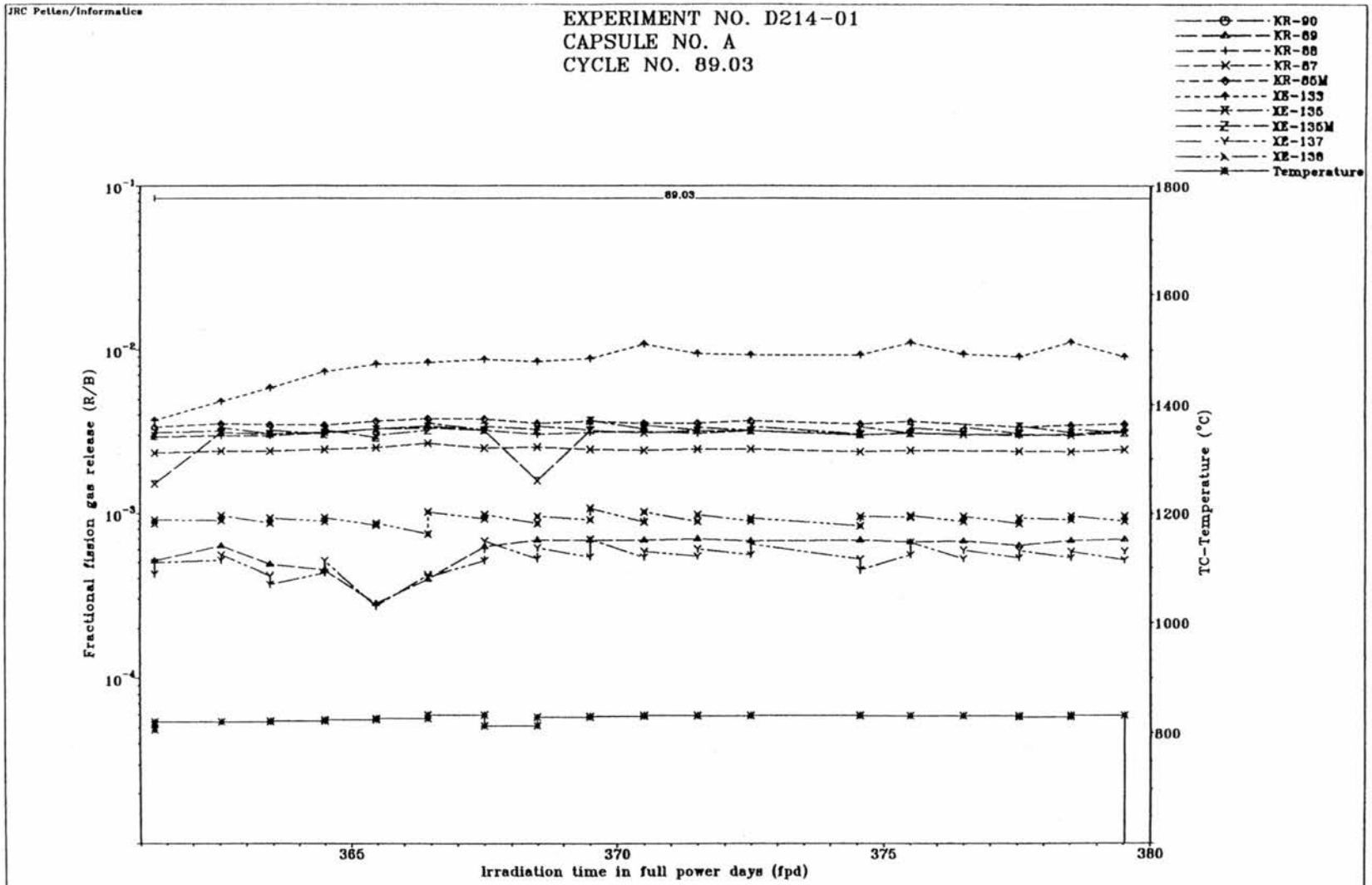



Fig. 6.4.17. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

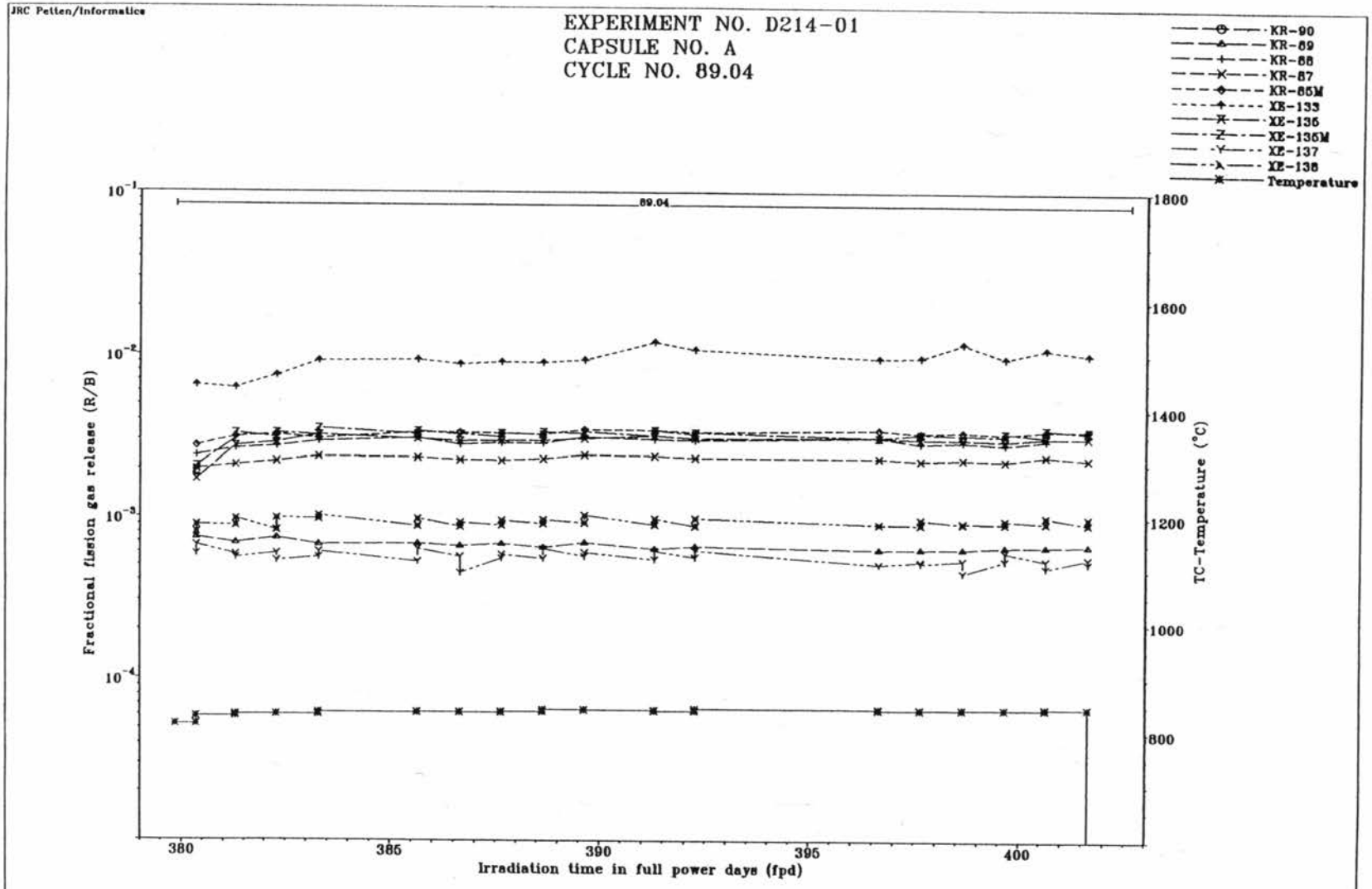



Fig. 6.4.18. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

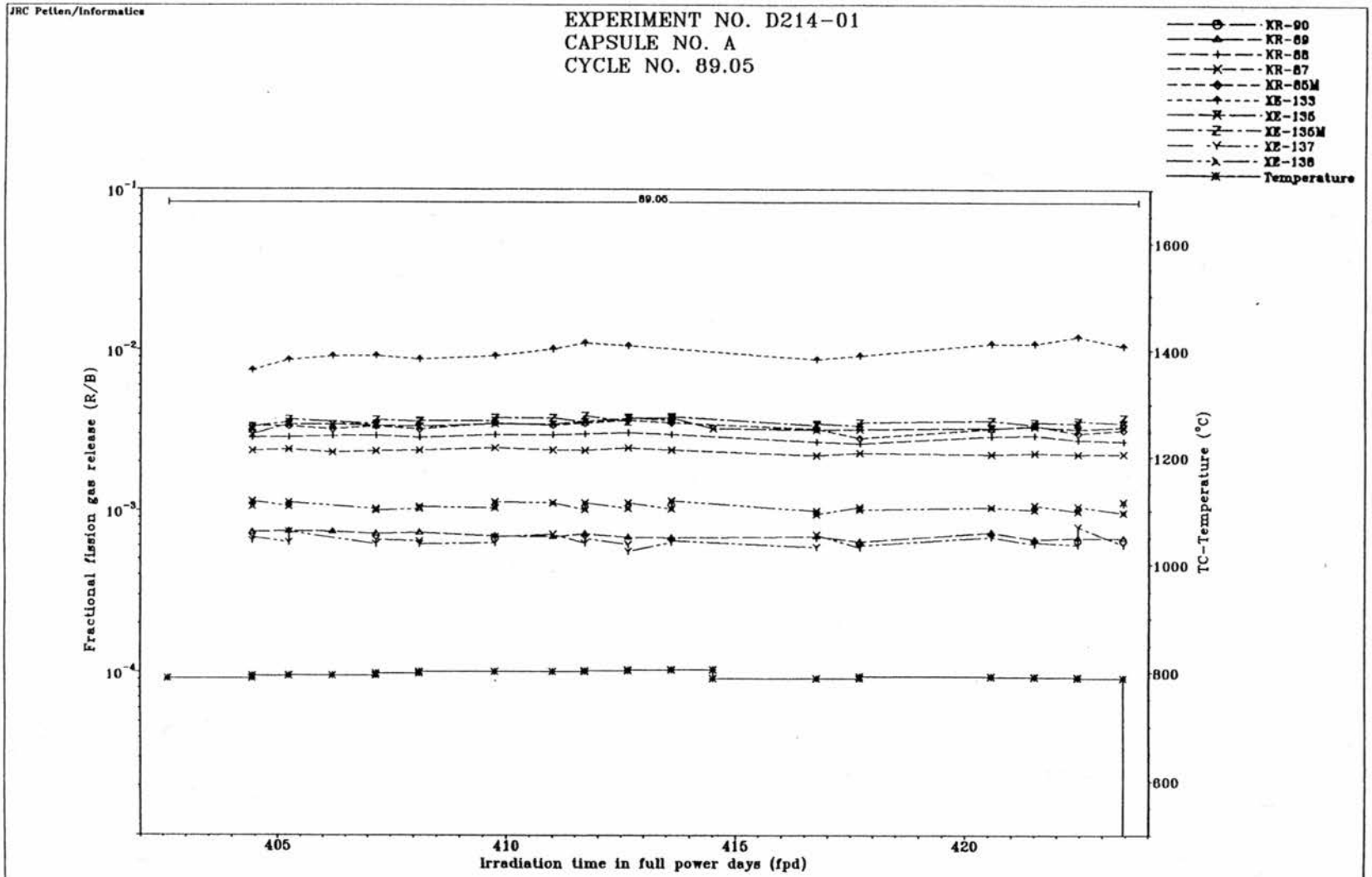



Fig. 6.4.19. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

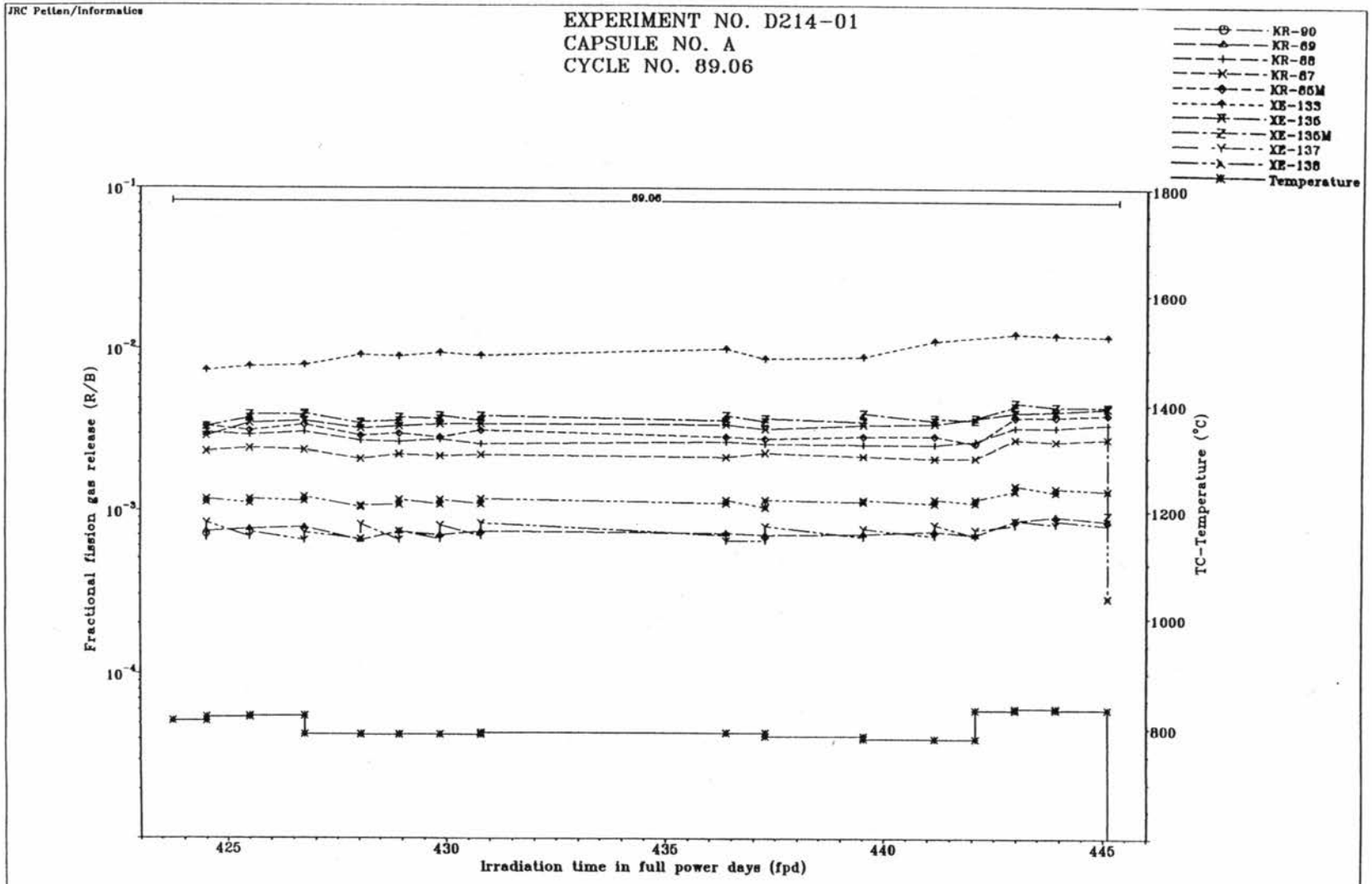



Fig. 6.4.20. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

Table 6.4.21. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 87.03 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 10. 4.87 | 12 | | | | | | 794 |
| 14. 0 | 0 | | | | | | 0 |
| 10. 4.87 | 12 | | 9.343E-06 | 5.134E-05 | 4.106E-05 | 5.734E-05 | 794 |
| 14. 0 | 0 | | 1.122E-05 | 1.412E-05 | 4.593E-06 | 9.686E-06 | 1.7 |
| 11. 4.87 | 11 | 5.251E-07 | 8.497E-06 | 4.602E-05 | 3.428E-05 | 4.634E-05 | 792 |
| 16.46 | 0 | | 1.127E-05 | 1.353E-05 | 2.132E-07 | 7.838E-06 | 3.5 |
| 13. 4.87 | 11 | 4.310E-07 | 1.267E-05 | 1.250E-04 | 6.733E-05 | 1.643E-04 | 791 |
| 12.45 | 0 | 5.920E-04 | 2.816E-05 | 2.799E-05 | 4.471E-06 | 1.315E-05 | 6.7 |
| 13. 4.87 | 14 | | | 1.463E-04 | 9.278E-05 | 1.753E-04 | 791 |
| 13.31 | 0 | 3.303E-04 | 5.589E-05 | | | | 6.75 |
| 16. 4.87 | 25 | | 1.201E-04 | 5.624E-04 | 4.339E-04 | 6.102E-04 | 774 |
| 23.14 | 0 | 8.209E-04 | 1.789E-04 | 1.756E-04 | 6.106E-05 | 1.368E-04 | 8.8 |
| 16. 4.87 | 25 | | | 7.062E-04 | 5.145E-04 | 7.411E-04 | 774 |
| 23.14 | 40 | 1.323E-03 | 2.363E-04 | | | | 8.8 |
| 17. 4.87 | 25 | | 1.405E-04 | | | | 785 |
| 14.32 | 10 | | | 2.664E-04 | 6.670E-04 | 1.578E-04 | 9.2 |
| 17. 4.87 | 25 | | | 1.089E-03 | 8.258E-04 | 1.067E-03 | 785 |
| 14.32 | 40 | 1.916E-03 | 4.712E-04 | | | | 9.2 |
| 22. 4.87 | 25 | | | 4.115E-03 | 3.160E-03 | 4.302E-03 | 773 |
| 10.45 | 40 | 5.952E-03 | 2.475E-03 | | | | 13.2 |
| 24. 4.87 | 15 | | | | | | 770 |
| 16.58 | 40 | 5.838E-03 | | | | | 15.2 |
| 27. 4.87 | 25 | | | 4.681E-03 | 3.811E-03 | 4.875E-03 | 768 |
| 11.45 | 40 | 7.644E-03 | 2.673E-03 | | | | 17.5 |
| 29. 4.87 | 25 | | | 5.177E-03 | 3.666E-03 | 5.829E-03 | 769 |
| 10.45 | 40 | | 2.691E-03 | | | | 19 |
| 1. 5.87 | 25 | | | 5.549E-03 | 4.222E-03 | 5.883E-03 | 766 |
| 9.19 | 40 | 9.033E-03 | 3.192E-03 | | | | 20.6 |
| 2. 5.87 | 25 | | | 7.113E-03 | 5.255E-03 | 7.715E-03 | 763 |
| 20.11 | 40 | 1.137E-02 | 4.095E-03 | | | | 21.7 |
| 3. 5.87 | 25 | | | 5.413E-03 | 4.072E-03 | 5.759E-03 | 762 |
| 18.3 | 40 | 8.721E-03 | 3.094E-03 | | | | 22.4 |
| 4. 5.87 | 15 | | | 4.143E-03 | | 4.956E-03 | 762 |
| 12.3 | 40 | 6.755E-03 | 2.409E-03 | | | | 22.95 |
| 4. 5.87 | 12 | | | | | | 253 |
| 16. 0 | 0 | | | | | | 23.03 |

Table 6.4.22. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 87.05 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| ---------- | ------- | ---------- | ---------- | ---------- | ---------- | ---------- | ----- |
| 6. 6.87 | 35 | | | | | | 43 |
| 0. 0 | 10 | | | | | | 23.03 |
| 6. 6.87 | 35 | | 3.359E-04 | | | | 607 |
| 18.1 | 10 | | | 3.716E-04 | 2.138E-04 | 3.939E-04 | 23.8 |
| 6. 6.87 | 35 | | | 2.077E-03 | 1.756E-03 | 2.215E-03 | 607 |
| 18.1 | 30 | | | | | | 23.8 |
| 7. 6.87 | 35 | | | | | | 644 |
| 20.52 | 10 | | | 1.496E-03 | 2.168E-04 | 7.238E-04 | 24.85 |
| 7. 6.87 | 35 | | | | | | 644 |
| 20.52 | 10 | | | 1.726E-03 | | 8.087E-04 | 24.85 |
| 7. 6.87 | 35 | | | 4.103E-03 | 2.854E-03 | 4.313E-03 | 644 |
| 20.52 | 40 | 3.436E-03 | 2.391E-03 | | | | 24.85 |
| 9. 6.87 | 35 | | | | | | 688 |
| 1.57 | 10 | | | 2.134E-03 | | 9.342E-04 | 26 |
| 9. 6.87 | 35 | | | 5.068E-03 | 3.981E-03 | 5.339E-03 | 688 |
| 1.57 | 30 | | | | | | 26 |
| 9. 6.87 | 35 | | | | | | 688 |
| 1.57 | 20 | 6.210E-03 | 3.544E-03 | | | | 26 |
| 9. 6.87 | 35 | | | 4.786E-03 | 3.638E-03 | 5.061E-03 | 690 |
| 16.38 | 40 | 5.568E-03 | 2.842E-03 | | | | 26.7 |
| 11. 6.87 | 35 | | 3.475E-04 | | | | 694 |
| 2.52 | 10 | | | 1.440E-03 | 2.525E-04 | 5.949E-04 | 28.2 |
| 11. 6.87 | 35 | | | 3.314E-03 | 2.608E-03 | 2.670E-03 | 694 |
| 2.52 | 30 | | | | | | 28.2 |
| 11. 6.87 | 35 | | | 4.597E-03 | 3.576E-03 | 4.921E-03 | 694 |
| 2.52 | 30 | | | | | | 28.2 |
| 11. 6.87 | 35 | | | | | | 694 |
| 2.52 | 20 | 6.344E-03 | 3.292E-03 | | | | 28.2 |
| 17. 6.87 | 35 | | 4.325E-04 | | | | 690 |
| 9.25 | 10 | | | 1.596E-03 | 2.613E-04 | 6.814E-04 | 34.5 |
| 17. 6.87 | 35 | | | 4.699E-03 | 3.529E-03 | 5.035E-03 | 690 |
| 9.25 | 30 | | | | | | 34.5 |
| 17. 6.87 | 35 | | | | | | 690 |
| 9.25 | 20 | 8.141E-03 | 3.139E-03 | | | | 34.5 |
| 19. 6.87 | 35 | | 3.991E-04 | | | | 694 |
| 3. 4 | 10 | | | 2.035E-03 | 2.561E-04 | 6.591E-04 | 36.4 |
| 19. 6.87 | 35 | | | 4.780E-03 | 3.672E-03 | 5.179E-03 | 694 |
| 3. 4 | 30 | | | | | | 36.4 |
| 19. 6.87 | 35 | | | | | | 694 |
| 3. 4 | 20 | 8.505E-03 | 3.218E-03 | | | | 36.4 |
| 20. 6.87 | 35 | | | 4.384E-03 | 3.347E-03 | 4.679E-03 | 696 |
| 0.48 | 40 | 5.785E-03 | 2.461E-03 | | | | 37.35 |
| 23. 6.87 | 35 | | | 4.243E-03 | 3.247E-03 | 4.573E-03 | 696 |
| 1. 1 | 40 | 6.756E-03 | 2.373E-03 | | | | 40.1 |
| 27. 6.87 | 35 | | | 3.986E-03 | 3.070E-03 | 4.304E-03 | 697 |
| 0.29 | 40 | 6.303E-03 | 2.218E-03 | | | | 44.1 |
| 28. 6.87 | 35 | | | 4.015E-03 | 3.048E-03 | 4.327E-03 | 700 |
| 2.11 | 40 | 6.535E-03 | 2.202E-03 | | | | 45.1 |
| 29. 6.87 | 35 | | | 3.914E-03 | 2.964E-03 | 4.264E-03 | 699 |
| 0.18 | 40 | 6.756E-03 | 2.172E-03 | | | | 46.1 |
| 29. 6.87 | 35 | | 3.980E-04 | | | | 659 |
| 13.41 | 10 | | | 1.218E-03 | 2.567E-04 | 4.955E-04 | 46.5 |

Table 6.4.22. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 87.05 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 29. 6.87 | 35 | | | 2.810E-03 | 2.163E-03 | 2.608E-03 | 659 |
| 13.41 | 30 | | | | | | 46.5 |
| 29. 6.87 | 35 | | | | | | 81 |
| 17. 0 | 20 | | | | | | 46.68 |
| --- | --- | | | | | | |

Table 6.4.23. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 87.09 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 28.10.87 | 35 | | | | | | 862 |
| 0. 0 | 10 | | | | | | 46.68 |
| 28.10.87 | 35 | | | | | | 858 |
| 18.26 | 10 | | | 1.288E-03 | | 5.149E-04 | 47.9 |
| 28.10.87 | 35 | | | 5.252E-03 | 5.431E-03 | 5.222E-03 | 858 |
| 18.26 | 30 | | | | | | 47.9 |
| 28.10.87 | 35 | | | | | | 858 |
| 18.26 | 20 | 1.497E-03 | 2.098E-03 | | | | 47.9 |
| 29.10.87 | 35 | | | | | | 860 |
| 16.42 | 10 | | | 1.309E-03 | | 5.147E-04 | 48.9 |
| 29.10.87 | 35 | | | 4.476E-03 | 3.342E-03 | 4.782E-03 | 860 |
| 16.42 | 30 | | | | | | 48.9 |
| 29.10.87 | 35 | | | | | | 860 |
| 16.42 | 20 | 4.418E-03 | 2.589E-03 | | | | 48.9 |
| 30.10.87 | 35 | | | | | | 860 |
| 16.23 | 10 | | | 1.093E-03 | | 4.478E-04 | 49.9 |
| 30.10.87 | 35 | | | 4.017E-03 | 2.925E-03 | 4.245E-03 | 860 |
| 16.23 | 30 | | | | | | 49.9 |
| 30.10.87 | 35 | | | | | | 860 |
| 16.23 | 20 | 5.092E-03 | 2.372E-03 | | | | 49.9 |
| 31.10.87 | 35 | | | | | | 857 |
| 16.14 | 13 | | | 1.121E-03 | | 4.503E-04 | 50.9 |
| 31.10.87 | 35 | | | 3.928E-03 | 2.962E-03 | 4.208E-03 | 857 |
| 16.14 | 30 | | | | | | 50.9 |
| 31.10.87 | 35 | | | | | | 857 |
| 16.14 | 20 | 5.385E-03 | 1.974E-03 | | | | 50.9 |
| 5.11.87 | 35 | | | 3.029E-03 | 2.330E-03 | 3.482E-03 | 859 |
| 16.58 | 30 | | | | | | 55.8 |
| 5.11.87 | 35 | | | | | | 859 |
| 16.58 | 20 | 5.921E-03 | 1.893E-03 | | | | 55.8 |
| 7.11.87 | 35 | | | | | | 858 |
| 0.5 | 10 | | | 1.124E-03 | | 4.093E-04 | 57 |
| 7.11.87 | 35 | | | 3.224E-03 | 2.423E-03 | 3.540E-03 | 858 |
| 0.5 | 30 | | | | | | 57 |
| 7.11.87 | 35 | | | | | | 858 |
| 0.5 | 20 | 5.911E-03 | 1.871E-03 | | | | 57 |
| 9.11.87 | 35 | | | | | | 857 |
| 0.47 | 10 | | | 1.093E-03 | | 3.948E-04 | 58.9 |
| 9.11.87 | 35 | | | 3.233E-03 | 2.381E-03 | 3.465E-03 | 857 |
| 0.47 | 30 | | | | | | 58.9 |
| 9.11.87 | 35 | | | | | | 857 |
| 0.47 | 20 | 6.285E-03 | 1.834E-03 | | | | 58.9 |
| 13.11.87 | 35 | | | | | | 858 |
| 0.37 | 10 | | | 1.039E-03 | | 3.855E-04 | 62.9 |
| 13.11.87 | 35 | | | 3.194E-03 | 2.430E-03 | 3.436E-03 | 858 |
| 0.37 | 30 | | | | | | 62.9 |
| 13.11.87 | 35 | | | | | | 858 |
| 0.37 | 30 | | | | | | 62.9 |
| 14.11.87 | 35 | | | 3.094E-03 | 2.343E-03 | 3.391E-03 | 858 |
| 0.37 | 30 | | | | | | 63.9 |
| 14.11.87 | 35 | | | | | | 858 |
| 0.23 | 20 | 5.873E-03 | 1.741E-03 | | | | 63.9 |

Table 6.4.23. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 87.09 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 15.11.87 | 35 | | | 3.084E-03 | 2.300E-03 | 3.435E-03 | 857 |
| 0.21 | 30 | | | | | | 64.9 |
| 15.11.87 | 35 | | | | | | 857 |
| 0.21 | 20 | 5.804E-03 | 1.725E-03 | | | | 64.9 |
| 16.11.87 | 35 | | | | | | 856 |
| 0.3 | 10 | | | 1.049E-03 | | 3.751E-04 | 65.9 |
| 16.11.87 | 35 | | | 3.051E-03 | 2.237E-03 | 3.358E-03 | 856 |
| 0.3 | 30 | | | | | | 65.9 |
| 16.11.87 | 35 | | | | | | 856 |
| 0.3 | 20 | 6.000E-03 | 1.700E-03 | | | | 65.9 |
| 16.11.87 | 35 | | | | | | 87 |
| 17. 0 | 20 | | | | | | 66.71 |
| --- | --- | | | | | | |

Table 6.4.24. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 87.10 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 26.11.87 | 35 | | | | | | 851 |
| 0. 0 | 10 | | | | | | 66.71 |
| 26.11.87 | 35 | | | | | | 851 |
| 1.5 | 10 | | | 1.011E-03 | | 3.827E-04 | 75.8 |
| 26.11.87 | 35 | | | 2.768E-03 | 2.052E-03 | 2.817E-03 | 851 |
| 1.5 | 30 | | | | | | 75.8 |
| 26.11.87 | 35 | | | | | | 851 |
| 1.5 | 20 | 5.305E-03 | 1.515E-03 | | | | 75.8 |
| 27.11.87 | 35 | | | | | | 858 |
| 3. 2 | 10 | | | 9.790E-04 | | 3.870E-04 | 76.9 |
| 27.11.87 | 35 | | | 2.801E-03 | 2.075E-03 | 2.943E-03 | 858 |
| 3. 2 | 30 | | | | | | 76.9 |
| 27.11.87 | 35 | | | | | | 858 |
| 3. 2 | 20 | 5.476E-03 | 1.450E-03 | | | | 76.9 |
| 1.12.87 | 35 | | | | | | 858 |
| 1.12 | 10 | | | 9.876E-04 | | 3.960E-04 | 78.9 |
| 1.12.87 | 35 | | | 2.858E-03 | 2.058E-03 | 3.089E-03 | 858 |
| 1.12 | 30 | | | | | | 78.9 |
| 1.12.87 | 35 | | | | | | 858 |
| 1.12 | 20 | 5.399E-03 | 1.404E-03 | | | | 78.9 |
| 2.12.87 | 35 | | | | | | 857 |
| 1.35 | 10 | | | 9.913E-04 | | 3.804E-04 | 79.9 |
| 2.12.87 | 35 | | | 2.756E-03 | 1.999E-03 | 3.012E-03 | 857 |
| 1.35 | 30 | | | | | | 79.9 |
| 2.12.87 | 35 | | | | | | 857 |
| 1.35 | 20 | 4.630E-03 | 1.409E-03 | | | | 79.9 |
| 7.12.87 | 35 | | | | | | 843 |
| 0.39 | 10 | | | 8.801E-04 | | 3.747E-04 | 83.9 |
| 7.12.87 | 35 | | | 2.611E-03 | 1.824E-03 | 2.580E-03 | 843 |
| 0.39 | 30 | | | | | | 83.9 |
| 7.12.87 | 35 | | | | | | 843 |
| 0.39 | 20 | 4.106E-03 | 1.178E-03 | | | | 83.9 |
| 8.12.87 | 35 | | | | | | 843 |
| 0.46 | 10 | | | 9.427E-04 | | 3.715E-04 | 84.9 |
| 8.12.87 | 35 | | | 2.617E-03 | 1.850E-03 | 2.775E-03 | 843 |
| 0.46 | 30 | | | | | | 84.9 |
| 8.12.87 | 35 | | | | | | 843 |
| 0.46 | 20 | 4.403E-03 | 1.288E-03 | | | | 84.9 |
| 9.12.87 | 35 | | | | | | 843 |
| 0.17 | 10 | | | 9.492E-04 | | 3.730E-04 | 85.9 |
| 9.12.87 | 35 | | | 2.543E-03 | 1.885E-03 | 2.632E-03 | 843 |
| 0.17 | 30 | | | | | | 85.9 |
| 9.12.87 | 35 | | | | | | 843 |
| 0.17 | 20 | 4.223E-03 | 1.280E-03 | | | | 85.9 |
| 12.12.87 | 35 | | | | | | 844 |
| 0.44 | 10 | | | 9.062E-04 | | 3.552E-04 | 88.9 |
| 12.12.87 | 35 | | | 2.443E-03 | 1.775E-03 | 2.539E-03 | 844 |
| 0.44 | 30 | | | | | | 88.9 |
| 12.12.87 | 35 | | | | | | 844 |
| 0.44 | 20 | 4.341E-03 | 1.223E-03 | | | | 88.9 |
| 13.12.87 | 35 | | | | | | 844 |
| 0.36 | 10 | | | 9.663E-04 | | 3.739E-04 | 89.9 |

Table 6.4.24. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 87.10 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 13.12.87 | 35 | | | 2.468E-03 | 1.788E-03 | 2.546E-03 | 844 |
| 0.36 | 30 | | | | | | 89.9 |
| 13.12.87 | 35 | | | | | | 844 |
| 0.36 | 20 | 4.336E-03 | 1.216E-03 | | | | 89.9 |
| 14.12.87 | 35 | | | | | | 843 |
| 0.35 | 10 | | | 9.203E-04 | | 3.514E-04 | 90.9 |
| 14.12.87 | 35 | | | 2.517E-03 | 2.238E-03 | 2.571E-03 | 843 |
| 0.35 | 30 | | | | | | 90.9 |
| 14.12.87 | 35 | | | | | | 843 |
| 0.35 | 20 | 4.785E-03 | 1.219E-03 | | | | 90.9 |
| 14.12.87 | 35 | | | | | | 78 |
| 17. 0 | 20 | | | | | | 91.34 |
| --- | --- | | | | | | |

Table 6.4.25. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 88.01 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 8. 1.88 | 35 | | | | | | 782 |
| 0. 0 | 10 | | | | | | 91.34 |
| 8. 1.88 | 35 | | | | | | 782 |
| 0.34 | 10 | | | 1.283E-03 | | 5.536E-04 | 92.4 |
| 8. 1.88 | 35 | | | 3.073E-03 | 2.203E-03 | 3.273E-03 | 782 |
| 0.34 | 30 | | | | | | 92.4 |
| 8. 1.88 | 35 | | | | | | 782 |
| 0.34 | 20 | 1.507E-03 | 1.637E-03 | | | | 92.4 |
| 9. 1.88 | 35 | | | | | | 784 |
| 1.27 | 10 | | | 1.369E-03 | | 5.444E-04 | 93.5 |
| 9. 1.88 | 35 | | | 2.969E-03 | 2.205E-03 | 3.084E-03 | 784 |
| 1.27 | 30 | | | | | | 93.5 |
| 9. 1.88 | 35 | | | | | | 784 |
| 1.27 | 20 | 3.028E-03 | 1.747E-03 | | | | 93.5 |
| 10. 1.88 | 35 | | | | | | 785 |
| 1.26 | 10 | | | 1.341E-03 | | 5.419E-04 | 94.5 |
| 10. 1.88 | 35 | | | 2.908E-03 | 2.175E-03 | 3.210E-03 | 785 |
| 1.26 | 30 | | | | | | 93.5 |
| 10. 1.88 | 35 | | | | | | 785 |
| 1.26 | 20 | 3.474E-03 | 1.729E-03 | | | | 94.5 |
| 11. 1.88 | 35 | | | | | | 786 |
| 1.21 | 10 | | | 1.373E-03 | | 5.366E-04 | 95.5 |
| 11. 1.88 | 35 | | | 2.858E-03 | 2.167E-03 | 3.200E-03 | 786 |
| 1.21 | 30 | | | | | | 95.5 |
| 11. 1.88 | 35 | | | | | | 786 |
| 1.21 | 20 | 4.122E-03 | 1.671E-03 | | | | 95.5 |
| 18. 1.88 | 35 | | | | | | 784 |
| 0.38 | 10 | | | 1.321E-03 | | 5.083E-04 | 102.5 |
| 18. 1.88 | 35 | | | 2.997E-03 | 2.156E-03 | 3.063E-03 | 784 |
| 0.38 | 30 | | | | | | 102.5 |
| 18. 1.88 | 35 | | | | | | 784 |
| 0.38 | 20 | 5.214E-03 | 1.646E-03 | | | | 102.5 |
| 19. 1.88 | 35 | | | | | | 786 |
| 0.17 | 10 | | | 1.309E-03 | | 5.225E-04 | 103.5 |
| 19. 1.88 | 35 | | | 3.104E-03 | 2.252E-03 | 3.147E-03 | 786 |
| 0.17 | 30 | | | | | | 103.5 |
| 19. 1.88 | 35 | | | | | | 786 |
| 0.17 | 20 | 5.528E-03 | 1.728E-03 | | | | 103.5 |
| 20. 1.88 | 35 | | | | | | 783 |
| 0.24 | 10 | | | 1.287E-03 | | 5.136E-04 | 104.5 |
| 20. 1.88 | 35 | | | 2.584E-03 | 1.612E-03 | 2.914E-03 | 783 |
| 0.24 | 30 | | | | | | 104.5 |
| 20. 1.88 | 35 | | | | | | 783 |
| 0.24 | 20 | 4.707E-03 | 1.651E-03 | | | | 104.5 |
| 21. 1.88 | 35 | | | | | | 784 |
| 0.15 | 10 | | | 1.343E-03 | | 5.233E-04 | 105.5 |
| 21. 1.88 | 35 | | | 2.798E-03 | 2.119E-03 | 3.199E-03 | 784 |
| 0.15 | 30 | | | | | | 105.5 |
| 21. 1.88 | 35 | | | | | | 784 |
| 0.15 | 20 | 4.721E-03 | 1.637E-03 | | | | 105.5 |
| 28. 1.88 | 35 | | | | | | 784 |
| 0.37 | 10 | | | 1.246E-03 | | 4.875E-04 | 112.5 |

Table 6.4.25. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 88.01 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 28. 1.88 | 35 | | | 2.771E-03 | 2.090E-03 | 2.972E-03 | 784 |
| 0.37 | 30 | | | | | | 112.5 |
| 28. 1.88 | 35 | | | | | | 784 |
| 0.37 | 20 | 5.526E-03 | 1.594E-03 | | | | 112.5 |
| 29. 1.88 | 35 | | | | | | 784 |
| 0.16 | 10 | | | 1.094E-03 | | 4.157E-04 | 113.5 |
| 29. 1.88 | 35 | | | 2.869E-03 | 2.049E-03 | 3.029E-03 | 784 |
| 0.16 | 30 | | | | | | 113.5 |
| 29. 1.88 | 35 | | | | | | 784 |
| 0.16 | 20 | 5.289E-03 | 1.607E-03 | | | | 113.5 |
| 30. 1.88 | 35 | | | | | | 783 |
| 0.58 | 10 | | | 1.265E-03 | | 4.863E-04 | 114.5 |
| 30. 1.88 | 35 | | | 2.852E-03 | 2.070E-03 | 3.120E-03 | 783 |
| 0.58 | 30 | | | | | | 114.5 |
| 30. 1.88 | 35 | | | | | | 783 |
| 0.58 | 20 | 4.799E-03 | 1.595E-03 | | | | 114.5 |
| 31. 1.88 | 35 | | | | | | 783 |
| 0.42 | 10 | | | 1.282E-03 | | 4.972E-04 | 115.5 |
| 31. 1.88 | 35 | | | 2.789E-03 | 2.040E-03 | 3.095E-03 | 783 |
| 0.42 | 30 | | | | | | 115.5 |
| 31. 1.88 | 35 | | | | | | 783 |
| 0.42 | 20 | 5.177E-03 | 1.590E-03 | | | | 115.5 |
| 1. 2.88 | 35 | | | | | | 46 |
| 20. 0 | 20 | | | | | | 117.1 |

Table 6.4.26. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. | 88.02 | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 12. 2.88 | 35 | | | | | | 940 |
| 0. 0 | 10 | | | | | | 117.1 |
| 12. 2.88 | 35 | | | | | | 940 |
| 0.3 | 10 | | | 1.051E-03 | | 4.016E-04 | 125.2 |
| 12. 2.88 | 35 | | | 3.225E-03 | 2.392E-03 | 3.557E-03 | 940 |
| 0.3 | 30 | | | | | | 125.2 |
| 12. 2.88 | 35 | | | | | | 940 |
| 0.3 | 20 | 4.666E-03 | 1.346E-03 | | | | 125.2 |
| 13. 2.88 | 35 | | | | | | 948 |
| 1.15 | 10 | | | 1.033E-03 | | 3.846E-04 | 126.3 |
| 13. 2.88 | 35 | | | 3.270E-03 | 2.379E-03 | 3.474E-03 | 948 |
| 1.15 | 30 | | | | | | 126.3 |
| 13. 2.88 | 35 | | | | | | 948 |
| 1.15 | 20 | 4.875E-03 | 1.351E-03 | | | | 126.3 |
| 14. 2.88 | 35 | | | | | | 950 |
| 0.28 | 10 | | | 1.030E-03 | | 3.853E-04 | 127.2 |
| 14. 2.88 | 35 | | | 3.290E-03 | 2.343E-03 | 3.569E-03 | 950 |
| 0.28 | 30 | | | | | | 127.2 |
| 14. 2.88 | 35 | | | | | | 950 |
| 0.28 | 20 | 4.774E-03 | 1.336E-03 | | | | 127.2 |
| 15. 2.88 | 35 | | | | | | 950 |
| 3. 7 | 10 | | | 9.209E-04 | | 3.659E-04 | 128.3 |
| 15. 2.88 | 35 | | | 3.139E-03 | 2.334E-03 | 3.435E-03 | 950 |
| 3. 7 | 30 | | | | | | 128.3 |
| 15. 2.88 | 35 | | | | | | 950 |
| 3. 7 | 20 | 4.000E-03 | 1.209E-03 | | | | 128.3 |
| 19. 2.88 | 35 | | | | | | 969 |
| 0.46 | 10 | | | 9.992E-04 | | 3.816E-04 | 131.2 |
| 19. 2.88 | 35 | | | 3.294E-03 | 2.399E-03 | 3.577E-03 | 969 |
| 0.46 | 30 | | | | | | 131.2 |
| 19. 2.88 | 35 | | | | | | 969 |
| 0.46 | 20 | 4.756E-03 | 1.225E-03 | | | | 131.2 |
| 20. 2.88 | 35 | | | | | | 968 |
| 0.33 | 10 | | | 9.878E-04 | | 3.699E-04 | 132.2 |
| 20. 2.88 | 35 | | | 3.295E-03 | 2.373E-03 | 3.579E-03 | 968 |
| 0.33 | 30 | | | | | | 132.2 |
| 20. 2.88 | 35 | | | | | | 968 |
| 0.33 | 20 | 4.799E-03 | 1.214E-03 | | | | 132.2 |
| 21. 2.88 | 35 | | | | | | 969 |
| 0.22 | 10 | | | 9.697E-04 | | 3.688E-04 | 133.2 |
| 21. 2.88 | 35 | | | 3.360E-03 | 2.400E-03 | 3.657E-03 | 969 |
| 0.22 | 30 | | | | | | 133.2 |
| 21. 2.88 | 35 | | | | | | 969 |
| 0.22 | 20 | 4.857E-03 | 1.232E-03 | | | | 133.2 |
| 24. 2.88 | 35 | | | | | | 964 |
| 0.2 | 10 | | | 6.263E-04 | | 2.266E-04 | 136.2 |
| 24. 2.88 | 35 | | | 3.179E-03 | 2.350E-03 | 3.399E-03 | 964 |
| 0.2 | 30 | | | | | | 136.2 |
| 24. 2.88 | 35 | | | | | | 964 |
| 0.2 | 20 | 4.805E-03 | 1.198E-03 | | | | 136.2 |
| 28. 2.88 | 35 | | | | | | 952 |
| 0.23 | 10 | | | 1.104E-03 | | 4.072E-04 | 138.2 |

Table 6.4.26. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 88.02 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 28. 2.88 | 35 | | | 4.616E-03 | 3.265E-03 | 4.756E-03 | 952 |
| 0.23 | 30 | | | | | | 138.2 |
| 28. 2.88 | 35 | | | | | | 952 |
| 0.23 | 20 | 4.823E-03 | 1.305E-03 | | | | 138.2 |
| 29. 2.88 | 35 | | | | | | 952 |
| 0.3 | 10 | | | 1.006E-03 | | 3.919E-04 | 139.2 |
| 29. 2.88 | 35 | | | 3.046E-03 | 2.295E-03 | 3.348E-03 | 952 |
| 0.3 | 30 | | | | | | 139.2 |
| 29. 2.88 | 35 | | | | | | 952 |
| 0.3 | 20 | 4.780E-03 | 1.219E-03 | | | | 139.2 |
| 29. 2.88 | 35 | | | | | | 79 |
| 18. 0 | 20 | | | | | | 142.54 |
| --- | --- | | | | | | |

Table 6.4.27. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 88.04 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| ---------- | ------- | ---------- | ---------- | ---------- | ---------- | ---------- | ---- |
| 29. 4.88 | 45 | | 3.031E-04 | | | | 806 |
| 8.36 | 10 | | | 7.711E-04 | 1.756E-04 | 3.324E-04 | 143.7 |
| 29. 4.88 | 45 | | | 1.644E-03 | 1.106E-03 | 1.826E-03 | 806 |
| 8.36 | 30 | | | | | | 143.7 |
| 29. 4.88 | 45 | | | | | | 806 |
| 8.36 | 20 | 9.012E-04 | 8.074E-04 | | | | 143.7 |
| 29. 4.88 | 45 | | | | | | 806 |
| 8.36 | 20 | 7.719E-04 | 8.223E-04 | | | | 143.7 |
| 29. 4.88 | 45 | | | | | | 806 |
| 8.36 | 20 | 9.127E-04 | 8.298E-04 | | | | 143.8 |
| 30. 4.88 | 45 | | | | | | 989 |
| 0.51 | 10 | | | | | | 144.7 |
| 30. 4.88 | 45 | | 4.034E-04 | | | | 989 |
| 0.51 | 10 | | | 1.101E-03 | 1.676E-04 | 3.946E-04 | 144.7 |
| 30. 4.88 | 45 | | | 3.653E-03 | 2.681E-03 | 4.055E-03 | 989 |
| 0.51 | 30 | | | | | | 144.7 |
| 30. 4.88 | 45 | | | | | | 989 |
| 0.51 | 20 | 1.834E-03 | 1.249E-03 | | | | 144.7 |
| 1. 5.88 | 45 | | 4.060E-04 | | | | 987 |
| 0.48 | 10 | | | 1.148E-03 | 1.705E-04 | 4.247E-04 | 145.7 |
| 2. 5.88 | 45 | | 4.196E-04 | | | | 990 |
| 1. 0 | 10 | | | 1.227E-03 | 1.792E-04 | 4.393E-04 | 146.7 |
| 2. 5.88 | 45 | | | 4.138E-03 | 2.921E-03 | 4.414E-03 | 990 |
| 1. 0 | 30 | | | | | | 146.7 |
| 9. 5.88 | 45 | | 3.838E-04 | | | | 993 |
| 16.39 | 10 | | | 1.003E-03 | 1.574E-04 | 3.675E-04 | 154.5 |
| 9. 5.88 | 45 | | | 3.225E-03 | 2.145E-03 | 3.689E-03 | 993 |
| 16.39 | 30 | | | | | | 154.5 |
| 9. 5.88 | 45 | | | | | | 993 |
| 16.39 | 20 | 4.054E-03 | 1.122E-03 | | | | 154.5 |
| 10. 5.88 | 45 | | 4.009E-04 | | | | 995 |
| 16.22 | 10 | | | 1.029E-03 | 1.642E-04 | 3.725E-04 | 155.5 |
| 10. 5.88 | 45 | | | | | | 995 |
| 16.22 | 20 | 4.239E-03 | 1.150E-03 | | | | 155.5 |
| 11. 5.88 | 45 | | 3.812E-04 | | | | 992 |
| 16.52 | 10 | | | 1.018E-03 | 1.590E-04 | 3.555E-04 | 156.5 |
| 11. 5.88 | 45 | | | 3.158E-03 | 2.107E-03 | 3.515E-03 | 992 |
| 16.52 | 30 | | | | | | 156.5 |
| 11. 5.88 | 45 | | | | | | 992 |
| 16.52 | 20 | 3.985E-03 | 1.111E-03 | | | | 156.5 |
| 13. 5.88 | 45 | | 3.285E-04 | | | | 992 |
| 16.27 | 10 | | | 1.076E-03 | 1.400E-04 | 3.743E-04 | 158.5 |
| 13. 5.88 | 45 | | | | | | 992 |
| 16.27 | 20 | 4.535E-03 | 1.187E-03 | | | | 158.5 |
| 18. 5.88 | 45 | | | 3.230E-03 | 1.826E-03 | 3.973E-03 | 995 |
| 16.28 | 30 | | | | | | 163.5 |
| 18. 5.88 | 45 | | | | | | 995 |
| 16.28 | 20 | 3.903E-03 | 6.460E-04 | | | | 163.5 |
| 19. 5.88 | 45 | | | 3.208E-03 | 1.793E-03 | 4.008E-03 | 993 |
| 16. 8 | 30 | | | | | | 164.5 |
| 19. 5.88 | 45 | | | | | | 993 |
| 16. 8 | 20 | 4.831E-03 | 6.041E-04 | | | | 164.5 |

Table 6.4.27. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 88.04 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 20. 5.88 | 45 | | | 3.288E-03 | 1.823E-03 | 4.125E-03 | 992 |
| 16.26 | 30 | | | | | | 165.5 |
| 20. 5.88 | 45 | | | | | | 992 |
| 16.26 | 20 | 7.266E-03 | 7.300E-04 | | | | 165.5 |
| 21. 5.88 | 45 | | | 3.237E-03 | 1.791E-03 | 4.025E-03 | 993 |
| 16.35 | 30 | | | | | | 166.5 |
| 21. 5.88 | 45 | | | | | | 993 |
| 16.35 | 20 | 7.342E-03 | 7.400E-04 | | | | 166.5 |
| 21. 5.88 | 45 | | | | | | 992 |
| 17. 0 | 20 | | | | | | 168.29 |
| 23. 5.88 | 45 | | | | | | 100 |
| 17. 0 | 20 | | | | | | 168.29 |

Table 6.4.28. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 88.05 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 28. 5.88 | 45 | | | | | | 942 |
| 0. 0 | 10 | | | | | | 168.29 |
| 28. 5.88 | 45 | | 3.304E-04 | | | | 942 |
| 2. 2 | 10 | | | 1.015E-03 | 1.586E-04 | 3.770E-04 | 169.6 |
| 28. 5.88 | 45 | | | 2.748E-03 | 2.007E-03 | 3.329E-03 | 942 |
| 2. 2 | 30 | | | | | | 169.6 |
| 28. 5.88 | 45 | | | | | | 942 |
| 2. 2 | 20 | 3.193E-03 | 1.161E-03 | | | | 169.6 |
| 29. 5.88 | 45 | | | | | | 941 |
| 0. 0 | 20 | | | | | | 169.99 |
| 29. 5.88 | 45 | | 3.145E-04 | | | | 941 |
| 1.47 | 10 | | | 1.015E-03 | 1.390E-04 | 3.708E-04 | 170.5 |
| 29. 5.88 | 45 | | | 2.723E-03 | 1.981E-03 | 3.108E-03 | 941 |
| 1.47 | 30 | | | | | | 170.5 |
| 29. 5.88 | 45 | | | | | | 941 |
| 1.47 | 20 | 3.546E-03 | 1.166E-03 | | | | 170.5 |
| 30. 5.88 | 45 | | 3.309E-04 | | | | 941 |
| 2.11 | 10 | | | 1.034E-03 | 1.575E-04 | 3.747E-04 | 171.5 |
| 30. 5.88 | 45 | | | 2.885E-03 | 1.859E-03 | 3.133E-03 | 941 |
| 2.11 | 30 | | | | | | 171.5 |
| 30. 5.88 | 45 | | | | | | 941 |
| 2.11 | 20 | 3.883E-03 | 1.184E-03 | | | | 171.5 |
| 31. 5.88 | 45 | | | | | | 994 |
| 0.32 | 10 | | | | | | 172.5 |
| 31. 5.88 | 45 | | 4.019E-04 | | | | 994 |
| 0.32 | 10 | | | 1.058E-03 | 1.782E-04 | 3.821E-04 | 172.5 |
| 31. 5.88 | 45 | | | | | | 994 |
| 0.32 | 20 | 4.567E-03 | 1.231E-03 | | | | 172.5 |
| 1. 6.88 | 45 | | 3.511E-04 | | | | 993 |
| 0.25 | 10 | | | 9.227E-04 | 1.494E-04 | 3.237E-04 | 173.5 |
| 1. 6.88 | 45 | | | 2.369E-03 | 2.295E-03 | | 993 |
| 0.25 | 30 | | | | | | 173.5 |
| 1. 6.88 | 45 | | | | | | 993 |
| 0.25 | 20 | 3.579E-03 | 9.882E-04 | | | | 173.5 |
| 2. 6.88 | 45 | | 3.377E-04 | | | | 996 |
| 0.3 | 10 | | | 9.117E-04 | 1.446E-04 | 3.157E-04 | 174.5 |
| 2. 6.88 | 45 | | | | | | 996 |
| 0.3 | 20 | 3.337E-03 | 9.360E-04 | | | | 174.5 |
| 4. 6.88 | 45 | | 3.270E-04 | | | | 1012 |
| 0.42 | 10 | | | 9.314E-04 | 1.322E-04 | 3.071E-04 | 176.5 |
| 4. 6.88 | 45 | | | 2.836E-03 | 2.055E-03 | 3.252E-03 | 1012 |
| 0.42 | 30 | | | | | | 176.5 |
| 4. 6.88 | 45 | | | | | | 1012 |
| 0.42 | 20 | 4.385E-03 | 1.089E-03 | | | | 176.5 |
| 5. 6.88 | 45 | | 3.156E-04 | | | | 1013 |
| 0.46 | 10 | | | 9.931E-04 | 1.331E-04 | 3.085E-04 | 177.5 |
| 5. 6.88 | 45 | | | 3.032E-03 | 2.068E-03 | 3.299E-03 | 1013 |
| 0.46 | 30 | | | | | | 177.5 |
| 5. 6.88 | 45 | | | | | | 1013 |
| 0.46 | 20 | 7.701E-03 | 1.160E-03 | | | | 177.5 |
| 6. 6.88 | 45 | | 2.887E-04 | | | | 1015 |
| 0.54 | 10 | | | 9.130E-04 | 1.245E-04 | 2.965E-04 | 178.5 |

Table 6.4.28. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 88.05 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 6. 6.88 | 45 | | | 2.888E-03 | 1.972E-03 | 3.140E-03 | 1015 |
| 0.54 | 30 | | | | | | 178.5 |
| 6. 6.88 | 45 | | | | | | 1015 |
| 0.54 | 20 | 6.071E-03 | 1.141E-03 | | | | 178.5 |
| 7. 6.88 | 45 | | 2.563E-04 | | | | 1014 |
| 0.54 | 10 | | | 9.412E-04 | 1.087E-04 | 2.781E-04 | 179.5 |
| 7. 6.88 | 45 | | | 2.762E-03 | 1.897E-03 | 3.064E-03 | 1014 |
| 0.54 | 30 | | | | | | 179.5 |
| 7. 6.88 | 45 | | | | | | 1014 |
| 0.54 | 20 | 5.959E-03 | 1.177E-03 | | | | 179.5 |
| 8. 6.88 | 45 | | 2.721E-04 | | | | 1015 |
| 0.57 | 10 | | | 9.380E-04 | 1.144E-04 | 2.842E-04 | 180.5 |
| 8. 6.88 | 45 | | | 2.603E-03 | 1.766E-03 | 2.864E-03 | 1015 |
| 0.57 | 30 | | | | | | 180.5 |
| 8. 6.88 | 45 | | | | | | 1015 |
| 0.57 | 20 | 1.124E-02 | 1.040E-03 | | | | 180.5 |
| 9. 6.88 | 45 | | 2.872E-04 | | | | 1014 |
| 0.28 | 10 | | | 9.421E-04 | 1.204E-04 | 2.801E-04 | 181.5 |
| 9. 6.88 | 45 | | | 2.515E-03 | 1.706E-03 | 2.905E-03 | 1014 |
| 0.28 | 30 | | | | | | 181.5 |
| 9. 6.88 | 45 | | | | | | 1014 |
| 0.28 | 20 | 4.725E-03 | 1.089E-03 | | | | 181.5 |
| 11. 6.88 | 45 | | 3.943E-04 | | | | 1013 |
| 1. 5 | 10 | | | 1.089E-03 | 1.736E-04 | 2.872E-04 | 183.5 |
| 11. 6.88 | 45 | | | 2.826E-03 | 1.902E-03 | 3.167E-03 | 1012 |
| 2. 5 | 30 | | | | | | 183.5 |
| 12. 6.88 | 45 | | 2.088E-04 | | | | 1015 |
| 1.1 | 10 | | | 9.314E-04 | 1.017E-04 | 2.469E-04 | 184.5 |
| 13. 6.88 | 45 | | 4.576E-05 | | | | 1015 |
| 0.3 | 10 | | | 8.222E-04 | 2.797E-05 | 2.169E-04 | 185.5 |
| 13. 6.88 | 45 | | | 2.557E-03 | 1.715E-03 | 3.078E-03 | 1015 |
| 0.3 | 30 | | | | | | 185.5 |
| 14. 6.88 | 45 | | 9.513E-05 | | | | 1013 |
| 0.44 | 10 | | | 8.821E-04 | 5.258E-05 | 2.331E-04 | 186.5 |
| 14. 6.88 | 45 | | | 2.397E-03 | 1.726E-03 | 2.775E-03 | 1013 |
| 0.44 | 30 | | | | | | 186.5 |
| 14. 6.88 | 45 | | | | | | 1013 |
| 0.44 | 20 | 7.814E-03 | 1.186E-03 | | | | 186.5 |
| 15. 6.88 | 45 | | 1.926E-04 | | | | 1019 |
| 0.43 | 10 | | | 1.058E-03 | 9.625E-05 | 2.898E-04 | 187.5 |
| 15. 6.88 | 45 | | | 2.600E-03 | 1.871E-03 | 3.025E-03 | 1019 |
| 0.43 | 30 | | | | | | 187.5 |
| 15. 6.88 | 45 | | | | | | 1019 |
| 0.43 | 20 | 1.041E-02 | 1.305E-03 | | | | 187.5 |
| 15. 6.88 | 45 | | 3.774E-04 | | | | 1018 |
| 16.5 | 10 | | | 1.132E-03 | 1.582E-04 | 2.893E-04 | 187.5 |
| 15. 6.88 | 45 | | | 2.961E-03 | 1.980E-03 | 3.336E-03 | 1018 |
| 16.5 | 30 | | | | | | 187.5 |
| 17. 6.88 | 45 | | 6.814E-05 | | | | 1012 |
| 16.5 | 10 | | | 8.419E-04 | 4.180E-05 | 2.268E-04 | 190.1 |
| 17. 6.88 | 45 | | | 2.238E-03 | 1.483E-03 | 2.665E-03 | 1012 |
| 16.5 | 30 | | | | | | 190.1 |

Table 6.4.28. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 88.05 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 17. 6.88 | 45 | | | | | | 1012 |
| 16.5 | 20 | 9.733E-03 | 1.179E-03 | | | | 190.1 |
| 19. 6.88 | 45 | | 8.033E-05 | | | | 1015 |
| 16.32 | 10 | | | 9.538E-04 | 4.619E-05 | 2.566E-04 | 192 |
| 19. 6.88 | 45 | | | 2.658E-03 | 1.846E-03 | 3.109E-03 | 1015 |
| 16.32 | 30 | | | | | | 192 |
| 19. 6.88 | 45 | | | | | | 1015 |
| 16.32 | 20 | 9.335E-03 | 1.310E-03 | | | | 192 |
| 19. 6.88 | 45 | | | | | | 1012 |
| 18. 0 | 20 | | | | | | 193.5 |
| 20. 6.88 | 45 | | | | | | 0 |
| 18. 0 | 10 | | | | | | 193.5 |
| --- | --- | | | | | | |

Table 6.4.29. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 88.06 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 24. 6.88 | 45 | | | | | | 930 |
| 12. 0 | 20 | | | | | | 193.99 |
| 24. 6.88 | 45 | | 1.867E-04 | | | | 949 |
| 17.3 | 10 | | | 1.070E-03 | 1.155E-04 | 4.002E-04 | 194.7 |
| 24. 6.88 | 45 | | | 3.093E-03 | 2.090E-03 | 3.674E-03 | 949 |
| 17.3 | 30 | | | | | | 194.7 |
| 24. 6.88 | 45 | | | | | | 949 |
| 17.3 | 20 | 4.760E-03 | 1.423E-03 | | | | 194.7 |
| 25. 6.88 | 45 | | | | | | 952 |
| 12. 0 | 20 | | | | | | 194.99 |
| 25. 6.88 | 45 | | 1.825E-04 | | | | 950 |
| 18.16 | 10 | | | 1.205E-03 | 1.063E-04 | 4.017E-04 | 195.8 |
| 25. 6.88 | 45 | | | 3.058E-03 | 2.183E-03 | 3.568E-03 | 950 |
| 18.16 | 30 | | | | | | 195.8 |
| 25. 6.88 | 45 | | | | | | 950 |
| 18.16 | 20 | 5.210E-03 | 1.523E-03 | | | | 195.8 |
| 26. 6.88 | 45 | | 2.304E-04 | | | | 953 |
| 16.2 | 10 | | | 1.178E-03 | 1.365E-04 | 3.911E-04 | 196.7 |
| 26. 6.88 | 45 | | | 3.134E-03 | 2.234E-03 | 3.558E-03 | 953 |
| 16.2 | 30 | | | | | | 196.7 |
| 26. 6.88 | 45 | | | | | | 953 |
| 16.2 | 20 | 4.234E-03 | 1.402E-03 | | | | 196.7 |
| 27. 6.88 | 45 | | 2.868E-04 | | | | 951 |
| 16.2 | 10 | | | 1.223E-03 | 1.490E-04 | 4.173E-04 | 197.7 |
| 27. 6.88 | 45 | | | 3.724E-03 | 2.507E-03 | 4.012E-03 | 951 |
| 16.2 | 30 | | | | | | 197.7 |
| 27. 6.88 | 45 | | | | | | 951 |
| 16.2 | 20 | 4.822E-03 | 1.495E-03 | | | | 197.7 |
| 1. 7.88 | 45 | | 2.248E-04 | | | | 950 |
| 1. 9 | 10 | | | 9.214E-04 | 1.192E-04 | 3.099E-04 | 201.3 |
| 1. 7.88 | 45 | | | 2.637E-03 | 1.894E-03 | 3.076E-03 | 950 |
| 1. 9 | 30 | | | | | | 201.3 |
| 1. 7.88 | 45 | | | | | | 950 |
| 1. 9 | 20 | 4.195E-03 | 1.084E-03 | | | | 201.3 |
| 2. 7.88 | 45 | | 2.364E-04 | | | | 948 |
| 2.53 | 10 | | | 8.704E-04 | 1.194E-04 | 3.336E-04 | 202.3 |
| 2. 7.88 | 45 | | | 2.591E-03 | 1.849E-03 | 3.040E-03 | 948 |
| 2.53 | 30 | | | | | | 202.3 |
| 2. 7.88 | 45 | | | | | | 948 |
| 2.53 | 20 | 3.844E-03 | 1.081E-03 | | | | 202.3 |
| 3. 7.88 | 45 | | 2.393E-04 | | | | 948 |
| 2. 6 | 10 | | | 9.468E-04 | 1.242E-04 | 3.051E-04 | 203.3 |
| 3. 7.88 | 45 | | | | | | 948 |
| 2. 6 | 20 | 3.785E-03 | 1.068E-03 | | | | 203.3 |
| 7. 7.88 | 45 | | 2.853E-04 | | | | 940 |
| 16.43 | 10 | | | 1.028E-03 | 1.554E-04 | 3.673E-04 | 206.2 |
| 7. 7.88 | 45 | | | | | | 940 |
| 16.43 | 20 | 3.736E-03 | 1.145E-03 | | | | 206.2 |
| 8. 7.88 | 45 | | 3.038E-04 | | | | 940 |
| 16.28 | 10 | | | 9.403E-04 | 1.386E-04 | 3.392E-04 | 207.2 |
| 8. 7.88 | 45 | | | 2.561E-03 | 1.820E-03 | 2.971E-03 | 940 |
| 16.28 | 30 | | | | | | 207.2 |

Table 6.4.29. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 88.06 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 8. 7.88 | 45 | | | | | | 940 |
| 16.28 | 20 | 3.406E-03 | 1.062E-03 | | | | 207.2 |
| 9. 7.88 | 45 | | 2.686E-04 | | | | 942 |
| 16.32 | 10 | | | 9.672E-04 | 1.463E-04 | 3.368E-04 | 208.2 |
| 9. 7.88 | 45 | | | 2.522E-03 | 1.782E-03 | 2.929E-03 | 942 |
| 16.32 | 30 | | | | | | 208.2 |
| 9. 7.88 | 45 | | | | | | 942 |
| 16.32 | 20 | 3.568E-03 | 1.059E-03 | | | | 208.2 |
| 10. 7.88 | 45 | | 2.514E-04 | | | | 943 |
| 16.41 | 10 | | | 9.551E-04 | 1.403E-04 | 3.359E-04 | 209.2 |
| 10. 7.88 | 45 | | | 2.503E-03 | 1.773E-03 | 2.979E-03 | 943 |
| 16.41 | 30 | | | | | | 209.2 |
| 10. 7.88 | 45 | | | | | | 943 |
| 16.41 | 20 | 4.152E-03 | 1.053E-03 | | | | 209.2 |
| 11. 7.88 | 45 | | 2.200E-04 | | | | 936 |
| 16. 5 | 10 | | | 8.350E-04 | 1.179E-04 | 2.961E-04 | 210.2 |
| 11. 7.88 | 45 | | | 2.295E-03 | 1.698E-03 | 2.690E-03 | 936 |
| 16. 5 | 30 | | | | | | 210.2 |
| 11. 7.88 | 45 | | | | | | 936 |
| 16. 5 | 20 | 3.586E-03 | 9.842E-04 | | | | 210.2 |
| 12. 7.88 | 45 | | 2.646E-04 | | | | 936 |
| 16.39 | 10 | | | 8.833E-04 | 1.372E-04 | 3.194E-04 | 211.2 |
| 12. 7.88 | 45 | | | 2.293E-03 | 1.606E-03 | 2.740E-03 | 936 |
| 16.39 | 30 | | | | | | 211.2 |
| 12. 7.88 | 45 | | | | | | 936 |
| 16.39 | 20 | 4.180E-03 | 9.792E-04 | | | | 211.2 |
| 13. 7.88 | 42 | | 1.415E-04 | | | | 946 |
| 16. 6 | 10 | | | 7.999E-04 | 7.757E-05 | 2.674E-04 | 212.2 |
| 13. 7.88 | 45 | | | 2.474E-03 | 1.785E-03 | 2.829E-03 | 946 |
| 16. 6 | 30 | | | | | | 212.2 |
| 13. 7.88 | 45 | | | | | | 946 |
| 16. 6 | 20 | 3.618E-03 | 9.965E-04 | | | | 212.2 |
| 14. 7.88 | 45 | | | 2.411E-03 | 1.791E-03 | 2.758E-03 | 944 |
| 16.23 | 30 | | | | | | 213.2 |
| 14. 7.88 | 45 | | | | | | 944 |
| 16.23 | 20 | 3.548E-03 | 9.814E-04 | | | | 213.2 |
| 15. 7.88 | 45 | | 2.840E-04 | | | | 945 |
| 11.41 | 10 | | | 9.232E-04 | 1.455E-04 | 3.182E-04 | 214.1 |
| 15. 7.88 | 45 | | | 2.338E-03 | 1.655E-03 | 2.777E-03 | 945 |
| 11.41 | 30 | | | | | | 214.1 |
| 15. 7.88 | 45 | | 1.485E-04 | | | | 753 |
| 17. 1 | 10 | | | 8.160E-04 | 1.035E-04 | 2.287E-04 | 214.2 |
| 15. 7.88 | 45 | | | 7.983E-04 | 6.096E-04 | 8.974E-04 | 753 |
| 17. 1 | 30 | | | | | | 214.2 |
| 15. 7.88 | 45 | | 1.570E-04 | | | | 753 |
| 17.14 | 10 | | | 8.035E-04 | 1.117E-04 | 2.473E-04 | 214.2 |
| 15. 7.88 | 45 | | | 9.665E-04 | 7.085E-04 | 1.129E-03 | 753 |
| 17.14 | 30 | | | | | | 214.2 |
| 15. 7.88 | 45 | | 1.585E-04 | | | | 753 |
| 18.2 | 10 | | | 7.358E-04 | 1.147E-04 | 2.518E-04 | 214.2 |
| 15. 7.88 | 45 | | | 1.015E-03 | 7.387E-04 | 1.198E-03 | 753 |
| 18.2 | 30 | | | | | | 214.2 |

Table 6.4.30. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 88.07 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 8. 9.88 | 42 | | | | | | 364 |
| 0. 0 | 10 | | | | | | 214.3 |
| 8. 9.88 | 42 | | 1.230E-04 | | | | 776 |
| 18.15 | 10 | | | 1.338E-03 | 1.000E-04 | 3.298E-04 | 215 |
| 8. 9.88 | 45 | | 2.071E-04 | | | | 776 |
| 18.23 | 10 | | | 1.494E-03 | 1.630E-04 | 4.518E-04 | 215 |
| 8. 9.88 | 45 | | | 1.511E-03 | 1.208E-03 | 1.800E-03 | 776 |
| 18.23 | 30 | | | | | | 215 |
| 8. 9.88 | 45 | | | | | | 776 |
| 18.23 | 20 | 8.923E-04 | 1.794E-03 | | | | 215 |
| 9. 9.88 | 42 | | 3.285E-04 | | | | 961 |
| 16.2 | 10 | | | 1.526E-03 | 1.727E-04 | 4.020E-04 | 215.9 |
| 9. 9.88 | 45 | | 3.179E-04 | | | | 961 |
| 16.3 | 10 | | | 1.524E-03 | 1.634E-04 | 4.135E-04 | 215.9 |
| 9. 9.88 | 45 | | | 2.942E-03 | 2.128E-03 | 3.451E-03 | 961 |
| 16.3 | 30 | | | | | | 215.9 |
| 10. 9.88 | 42 | | 2.538E-04 | | | | 944 |
| 16.2 | 10 | | | 1.234E-03 | 1.337E-04 | 3.581E-04 | 216.9 |
| 10. 9.88 | 45 | | 2.744E-04 | | | | 944 |
| 16.3 | 10 | | | 1.211E-03 | 1.539E-04 | 3.579E-04 | 216.9 |
| 10. 9.88 | 45 | | | 2.862E-03 | 1.950E-03 | 3.155E-03 | 944 |
| 16.3 | 30 | | | | | | 216.9 |
| 10. 9.88 | 45 | | | | | | 944 |
| 16.3 | 20 | 2.842E-03 | 1.515E-03 | | | | 216.9 |
| 11. 9.88 | 45 | | | | | | 964 |
| 12. 0 | 20 | | | | | | 216.99 |
| 11. 9.88 | 42 | | 2.891E-04 | | | | 964 |
| 16.3 | 10 | | | 1.217E-03 | 1.451E-04 | 3.663E-04 | 217.9 |
| 11. 9.88 | 45 | | 2.855E-04 | | | | 964 |
| 16.4 | 10 | | | 1.226E-03 | 1.496E-04 | 3.733E-04 | 217.9 |
| 11. 9.88 | 45 | | | 3.127E-03 | 2.145E-03 | 3.435E-03 | 964 |
| 16.4 | 30 | | | | | | 217.9 |
| 11. 9.88 | 45 | | | | | | 964 |
| 16.4 | 20 | 3.463E-03 | 1.557E-03 | | | | 217.9 |
| 11. 9.88 | 45 | | | | | | 963 |
| 20. 0 | 20 | | | | | | 217.99 |
| 12. 9.88 | 42 | | 2.480E-04 | | | | 963 |
| 16.4 | 10 | | | 9.624E-04 | 1.224E-04 | 3.224E-04 | 218.9 |
| 12. 9.88 | 45 | | 2.540E-04 | | | | 963 |
| 16.49 | 10 | | | 1.051E-03 | 1.413E-04 | 3.171E-04 | 218.9 |
| 12. 9.88 | 45 | | | 2.946E-03 | 2.218E-03 | 3.451E-03 | 963 |
| 16.49 | 30 | | | | | | 218.9 |
| 12. 9.88 | 45 | | | | | | 963 |
| 16.49 | 20 | 3.658E-03 | 1.439E-03 | | | | 218.9 |
| 13. 9.88 | 42 | | 2.828E-04 | | | | 950 |
| 16.2 | 10 | | | 1.037E-03 | 1.494E-04 | 3.228E-04 | 219.9 |
| 13. 9.88 | 45 | | 2.976E-04 | | | | 950 |
| 16.3 | 10 | | | 1.053E-03 | 1.570E-04 | 3.240E-04 | 219.9 |
| 13. 9.88 | 45 | | | 2.637E-03 | 1.872E-03 | 2.871E-03 | 950 |
| 16.3 | 30 | | | | | | 219.9 |
| 13. 9.88 | 45 | | | | | | 950 |
| 16.3 | 20 | 3.484E-03 | 1.314E-03 | | | | 219.9 |

Table 6.4.30. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 88.07 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 17. 9.88 | 42 | | 2.700E-04 | | | | 942 |
| 0.45 | 10 | | | 9.562E-04 | 1.485E-04 | 3.323E-04 | 223.25 |
| 17. 9.88 | 45 | | 2.827E-04 | | | | 942 |
| 0.54 | 10 | | | 1.024E-03 | 1.478E-04 | 3.530E-04 | 223.25 |
| 17. 9.88 | 45 | | | 2.653E-03 | 1.901E-03 | 3.183E-03 | 942 |
| 0.54 | 30 | | | | | | 223.25 |
| 17. 9.88 | 45 | | | | | | 942 |
| 0.54 | 20 | 4.060E-03 | 1.371E-03 | | | | 223.25 |
| 17. 9.88 | 42 | | 2.743E-04 | | | | 937 |
| 3.45 | 10 | | | 9.757E-04 | 1.512E-04 | 3.393E-04 | 223.4 |
| 17. 9.88 | 45 | | 2.963E-04 | | | | 937 |
| 3.53 | 10 | | | 9.462E-04 | 1.620E-04 | 3.470E-04 | 223.4 |
| 17. 9.88 | 45 | | | 2.595E-03 | 1.836E-03 | 3.022E-03 | 937 |
| 3.53 | 30 | | | | | | 223.4 |
| 17. 9.88 | 45 | | | | | | 937 |
| 3.53 | 20 | 3.966E-03 | 1.304E-03 | | | | 223.4 |
| 18. 9.88 | 42 | | 3.364E-04 | | | | 971 |
| 0.45 | 10 | | | 1.019E-03 | 1.610E-04 | 3.531E-04 | 224.25 |
| 18. 9.88 | 45 | | 3.350E-04 | | | | 971 |
| 0.55 | 10 | | | 1.094E-03 | 1.606E-04 | 3.718E-04 | 224.25 |
| 18. 9.88 | 45 | | | 3.259E-03 | 2.321E-03 | 3.776E-03 | 971 |
| 0.55 | 30 | | | | | | 224.25 |
| 18. 9.88 | 45 | | | | | | 971 |
| 0.55 | 20 | 4.895E-03 | 1.565E-03 | | | | 224.25 |
| 18. 9.88 | 42 | | 2.482E-04 | | | | 937 |
| 3.46 | 10 | | | 9.263E-04 | 1.297E-04 | 3.523E-04 | 224.4 |
| 18. 9.88 | 45 | | 2.538E-04 | | | | 937 |
| 3.57 | 10 | | | 1.074E-03 | 1.443E-04 | 3.567E-04 | 224.4 |
| 18. 9.88 | 45 | | | 2.784E-03 | 2.016E-03 | 3.191E-03 | 937 |
| 3.57 | 30 | | | | | | 224.4 |
| 18. 9.88 | 45 | | | | | | 937 |
| 3.57 | 20 | 4.407E-03 | 1.488E-03 | | | | 224.4 |
| 19. 9.88 | 42 | | 2.224E-04 | | | | 949 |
| 0.33 | 10 | | | 8.429E-04 | 1.193E-04 | 3.192E-04 | 225.25 |
| 19. 9.88 | 45 | | 2.477E-04 | | | | 949 |
| 0.41 | 10 | | | 1.022E-03 | 1.329E-04 | 3.360E-04 | 225.25 |
| 19. 9.88 | 45 | | | 2.879E-03 | 2.044E-03 | 3.384E-03 | 949 |
| 0.41 | 30 | | | | | | 225.25 |
| 19. 9.88 | 45 | | | | | | 949 |
| 0.41 | 20 | 4.885E-03 | 1.457E-03 | | | | 225.25 |
| 19. 9.88 | 42 | | 1.734E-04 | | | | 949 |
| 3.38 | 10 | | | 1.039E-03 | 1.074E-04 | 3.846E-04 | 225.4 |
| 19. 9.88 | 45 | | 1.776E-04 | | | | 949 |
| 3.47 | 10 | | | 1.059E-03 | 9.929E-05 | 3.582E-04 | 225.4 |
| 19. 9.88 | 45 | | | 3.322E-03 | 2.297E-03 | 3.916E-03 | 949 |
| 3.47 | 30 | | | | | | 225.4 |
| 19. 9.88 | 45 | | | | | | 949 |
| 3.47 | 20 | 5.214E-03 | 1.548E-03 | | | | 225.4 |
| 20. 9.88 | 45 | | 4.216E-04 | | | | 962 |
| 1.1 | 10 | | | 1.406E-03 | 2.465E-04 | 4.674E-04 | 226.3 |
| 21. 9.88 | 45 | | 2.523E-04 | | | | 960 |
| 0.42 | 10 | | | 1.401E-03 | 1.720E-04 | 4.745E-04 | 227.28 |

Table 6.4.30. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 88.07 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 21. 9.88 | 45 | | 2.732E-04 | | | | 959 |
| 16. 3 | 10 | | | 1.236E-03 | 1.538E-04 | 4.354E-04 | 227.88 |
| 21. 9.88 | 45 | | | 3.471E-03 | 2.319E-03 | 3.892E-03 | 959 |
| 16. 3 | 30 | | | | | | 227.88 |
| 21. 9.88 | 45 | | | | | | 959 |
| 16. 3 | 20 | 5.775E-03 | 1.646E-03 | | | | 227.88 |
| 22. 9.88 | 45 | | 2.579E-04 | | | | 959 |
| 16. 2 | 10 | | | 1.174E-03 | 1.330E-04 | 4.174E-04 | 228.88 |
| 22. 9.88 | 45 | | | 3.304E-03 | 2.220E-03 | 3.790E-03 | 959 |
| 16. 2 | 30 | | | | | | 228.88 |
| 22. 9.88 | 45 | | | | | | 959 |
| 16. 2 | 20 | 5.271E-03 | 1.543E-03 | | | | 228.88 |
| 23. 9.88 | 45 | | 2.545E-04 | | | | 959 |
| 16. 3 | 10 | | | 1.112E-03 | 1.402E-04 | 3.730E-04 | 229.88 |
| 23. 9.88 | 45 | | | 3.141E-03 | 2.095E-03 | 3.502E-03 | 959 |
| 16. 3 | 30 | | | | | | 229.88 |
| 23. 9.88 | 45 | | | | | | 959 |
| 16. 3 | 20 | 5.277E-03 | 1.419E-03 | | | | 229.88 |
| 24. 9.88 | 45 | | 1.848E-04 | | | | 892 |
| 9.2 | 10 | | | 9.926E-04 | 1.164E-04 | 3.312E-04 | 230.65 |
| 24. 9.88 | 45 | | | 2.385E-03 | 1.931E-03 | 2.826E-03 | 892 |
| 9.2 | 30 | | | | | | 230.65 |
| 24. 9.88 | 45 | | | | | | 892 |
| 9.2 | 20 | 2.249E-03 | 7.342E-04 | | | | 230.65 |
| 25. 9.88 | 45 | | 3.016E-04 | | | | 958 |
| 9.45 | 10 | | | 1.140E-03 | 1.905E-04 | 3.938E-04 | 231.67 |
| 25. 9.88 | 45 | | | 2.868E-03 | 2.056E-03 | 3.166E-03 | 958 |
| 9.45 | 30 | | | | | | 231.67 |
| 25. 9.88 | 45 | | | | | | 958 |
| 9.45 | 20 | 4.803E-03 | 1.307E-03 | | | | 231.67 |
| 27. 9.88 | 45 | | 4.127E-04 | | | | 925 |
| 9.45 | 10 | | | 1.219E-03 | 1.674E-04 | 4.224E-04 | 233.67 |
| 27. 9.88 | 45 | | | 2.729E-03 | 1.844E-03 | 3.047E-03 | 925 |
| 9.45 | 30 | | | | | | 233.67 |
| 27. 9.88 | 45 | | | | | | 925 |
| 9.45 | 20 | 4.820E-03 | 1.360E-03 | | | | 233.67 |
| 28. 9.88 | 45 | | 2.947E-04 | | | | 944 |
| 9.53 | 10 | | | 1.079E-03 | 1.599E-04 | 3.969E-04 | 234.67 |
| 28. 9.88 | 45 | | | 2.790E-03 | 1.957E-03 | 3.072E-03 | 944 |
| 9.53 | 30 | | | | | | 234.67 |
| 28. 9.88 | 45 | | | | | | 944 |
| 9.53 | 20 | 4.711E-03 | 1.289E-03 | | | | 234.67 |
| 29. 9.88 | 45 | | | | | | 76 |
| 3. 0 | 20 | | | | | | 235.33 |
| --- | --- | | | | | | |

Table 6.4.31. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 88.08 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 7.10.88 | 42 | | | | | | 1001 |
| 0. 0 | 10 | | | | | | 235.33 |
| 7.10.88 | 42 | | | | | | 1001 |
| 0.25 | 10 | | | | | | 238.9 |
| 7.10.88 | 42 | | 2.791E-04 | | | | 1001 |
| 0.25 | 10 | | | 1.103E-03 | 1.441E-04 | 3.673E-04 | 238.9 |
| 7.10.88 | 45 | | 3.061E-04 | | | | 1001 |
| 0.3 | 10 | | | 1.304E-03 | 1.562E-04 | 4.167E-04 | 238.9 |
| 7.10.88 | 45 | | | 3.658E-03 | 2.400E-03 | 4.237E-03 | 1001 |
| 0.3 | 30 | | | | | | 238.9 |
| 7.10.88 | 45 | | | | | | 1001 |
| 0.3 | 20 | 5.269E-03 | 1.583E-03 | | | | 238.9 |
| 8.10.88 | 42 | | 2.826E-04 | | | | 996 |
| 0.23 | 10 | | | 1.129E-03 | 1.398E-04 | 3.687E-04 | 239.9 |
| 8.10.88 | 45 | | 3.007E-04 | | | | 996 |
| 0.28 | 10 | | | 1.328E-03 | 1.621E-04 | 4.147E-04 | 239.9 |
| 8.10.88 | 45 | | | 3.581E-03 | 2.583E-03 | 4.213E-03 | 996 |
| 0.28 | 30 | | | | | | 239.9 |
| 8.10.88 | 45 | | | | | | 996 |
| 0.28 | 20 | 5.974E-03 | 1.601E-03 | | | | 239.9 |
| 9.10.88 | 42 | | 2.197E-04 | | | | 994 |
| 0.19 | 10 | | | 1.224E-03 | 1.240E-04 | 3.583E-04 | 240.9 |
| 9.10.88 | 45 | | 1.508E-04 | | | | 994 |
| 0.24 | 10 | | | 1.222E-03 | 1.047E-04 | 3.975E-04 | 240.9 |
| 9.10.88 | 45 | | | 3.612E-03 | 2.548E-03 | 4.286E-03 | 994 |
| 0.24 | 30 | | | | | | 240.9 |
| 9.10.88 | 45 | | | | | | 994 |
| 0.24 | 20 | 9.490E-03 | 1.685E-03 | | | | 240.9 |
| 10.10.88 | 42 | | 2.806E-04 | | | | 996 |
| 0. 9 | 10 | | | 1.215E-03 | 1.472E-04 | 3.710E-04 | 241.9 |
| 10.10.88 | 45 | | 3.158E-04 | | | | 996 |
| 0.14 | 10 | | | 1.439E-03 | 1.270E-04 | 4.167E-04 | 241.9 |
| 10.10.88 | 45 | | | 3.622E-03 | 2.600E-03 | 4.211E-03 | 996 |
| 0.14 | 30 | | | | | | 241.9 |
| 10.10.88 | 45 | | | | | | 996 |
| 0.14 | 20 | 7.058E-03 | 1.729E-03 | | | | 241.9 |
| 14.10.88 | 42 | | 1.746E-04 | | | | 786 |
| 1.13 | 10 | | | 9.644E-04 | 1.255E-04 | 3.054E-04 | 246 |
| 14.10.88 | 45 | | | | | | 786 |
| 1.15 | 10 | | | 1.044E-03 | 1.165E-04 | 3.281E-04 | 246 |
| 14.10.88 | 45 | | | 1.412E-03 | 8.326E-04 | 1.685E-03 | 786 |
| 1.15 | 40 | 3.650E-03 | 1.094E-03 | | | | 246 |
| 15.10.88 | 42 | | 1.766E-04 | | | | 790 |
| 0.5 | 10 | | | 8.617E-04 | 1.427E-04 | 3.217E-04 | 247 |
| 15.10.88 | 45 | | | | | | 790 |
| 0.55 | 10 | | | 9.968E-04 | 2.111E-04 | 3.823E-04 | 247 |
| 15.10.88 | 45 | | | 1.437E-03 | 1.027E-03 | 1.740E-03 | 790 |
| 0.55 | 30 | | | | | | 247 |
| 15.10.88 | 45 | | | | | | 790 |
| 0.55 | 20 | 3.751E-03 | 1.084E-03 | | | | 247 |
| 16.10.88 | 42 | | 1.627E-04 | | | | 791 |
| 3.32 | 10 | | | 7.847E-04 | 1.226E-04 | 3.064E-04 | 248.1 |

Table 6.4.31. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 88.08 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 16.10.88 | 45 | | | | | | 791 |
| 3.34 | 10 | | | 9.244E-04 | 1.354E-04 | 3.352E-04 | 248.1 |
| 16.10.88 | 45 | | | 1.465E-03 | 1.077E-03 | 1.636E-03 | 791 |
| 3.34 | 30 | | | | | | 248.1 |
| 16.10.88 | 45 | | | | | | 791 |
| 3.34 | 20 | 3.297E-03 | 1.060E-03 | | | | 248.1 |
| 17.10.88 | 42 | | 1.893E-04 | | | | 792 |
| 0.5 | 10 | | | 8.756E-04 | 1.378E-04 | 3.248E-04 | 249 |
| 17.10.88 | 45 | | | | | | 792 |
| 0.51 | 10 | | | 8.829E-04 | 1.550E-04 | 3.524E-04 | 249 |
| 17.10.88 | 45 | | | 1.352E-03 | 1.026E-03 | 1.656E-03 | 792 |
| 0.51 | 30 | | | | | | 249 |
| 17.10.88 | 45 | | | | | | 792 |
| 0.51 | 20 | 2.913E-03 | 1.002E-03 | | | | 249 |
| 18.10.88 | 42 | | 1.174E-04 | | | | 793 |
| 0.5 | 10 | | | 7.608E-04 | 9.635E-05 | 3.063E-04 | 250 |
| 18.10.88 | 45 | | | | | | 793 |
| 0.51 | 10 | | | 8.744E-04 | 1.604E-04 | 3.360E-04 | 250 |
| 18.10.88 | 45 | | | 1.347E-03 | 1.011E-03 | 1.667E-03 | 793 |
| 0.51 | 30 | | | | | | 250 |
| 18.10.88 | 45 | | | | | | 793 |
| 0.51 | 20 | 2.822E-03 | 9.972E-04 | | | | 250 |
| 22.10.88 | 42 | | 1.888E-04 | | | | 790 |
| 0.37 | 10 | | | 8.609E-04 | 1.414E-04 | 2.920E-04 | 254 |
| 22.10.88 | 45 | | | | | | 790 |
| 0.4 | 10 | | | 9.516E-04 | 1.636E-04 | 3.605E-04 | 254 |
| 22.10.88 | 45 | | | 1.343E-03 | 1.015E-03 | 1.628E-03 | 790 |
| 0.4 | 30 | | | | | | 254 |
| 22.10.88 | 45 | | | | | | 790 |
| 0.4 | 20 | 3.287E-03 | 1.060E-03 | | | | 254 |
| 23.10.88 | 42 | | 9.486E-05 | | | | 788 |
| 3.56 | 10 | | | 7.550E-04 | 7.645E-05 | 2.690E-04 | 255.1 |
| 23.10.88 | 45 | | | | | | 788 |
| 3.57 | 10 | | | 8.182E-04 | 1.100E-04 | 2.832E-04 | 255.1 |
| 23.10.88 | 45 | | | 1.321E-03 | 9.399E-04 | 1.481E-03 | 788 |
| 3.57 | 30 | | | | | | 255.1 |
| 23.10.88 | 45 | | | | | | 788 |
| 3.57 | 20 | 2.852E-03 | 1.012E-03 | | | | 255.1 |
| 24.10.88 | 42 | | 1.583E-04 | | | | 790 |
| 0.54 | 10 | | | 8.316E-04 | 1.202E-04 | 2.965E-04 | 256 |
| 24.10.88 | 45 | | | | | | 790 |
| 0.55 | 10 | | | 1.084E-03 | 2.527E-04 | 3.875E-04 | 256 |
| 24.10.88 | 45 | | | 1.303E-03 | 9.464E-04 | 1.524E-03 | 790 |
| 0.55 | 30 | | | | | | 256 |
| 24.10.88 | 45 | | | | | | 790 |
| 0.55 | 20 | 2.949E-03 | 9.495E-04 | | | | 256 |
| 24.10.88 | 42 | | 1.699E-04 | | | | 789 |
| 16.25 | 10 | | | 8.945E-04 | 1.247E-04 | 3.060E-04 | 256.5 |
| 24.10.88 | 45 | | | | | | 789 |
| 16.27 | 10 | | | 9.497E-04 | 8.988E-05 | 3.612E-04 | 256.5 |
| 24.10.88 | 45 | | | 1.453E-03 | 1.072E-03 | 1.751E-03 | 789 |
| 16.27 | 30 | | | | | | 256.5 |

Table 6.4.31. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 88.08 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 24.10.88 | 45 | | | | | | 789 |
| 16.27 | 20 | 3.433E-03 | 1.100E-03 | | | | 256.5 |
| 25.10.88 | 45 | | | | | | 90 |
| 1. 0 | 20 | | | | | | 256.77 |
| --- | --- | | | | | | |

Table 6.4.32. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 88.09 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| ---------- | ------- | ---------- | ---------- | ---------- | ---------- | ---------- | ---- |
| 29.10.88 | 55 | | | | | | 793 |
| 0. 0 | 10 | | | | | | 256.77 |
| 29.10.88 | 55 | | | | | | 793 |
| 0.41 | 10 | | | 1.337E-03 | 2.293E-04 | 4.934E-04 | 258.1 |
| 29.10.88 | 55 | | | 1.839E-03 | 1.474E-03 | 2.177E-03 | 793 |
| 0.41 | 30 | | | | | | 258.1 |
| 29.10.88 | 55 | | | | | | 793 |
| 0.41 | 20 | 3.340E-03 | 1.241E-03 | | | | 258.1 |
| 30.10.88 | 52 | | 3.084E-04 | | | | 794 |
| 0.55 | 10 | | | 1.349E-03 | 2.234E-04 | 4.514E-04 | 259.1 |
| 30.10.88 | 55 | | | | | | 794 |
| 1. 0 | 10 | | | 1.448E-03 | 2.094E-04 | 4.940E-04 | 259.1 |
| 30.10.88 | 55 | | | 1.955E-03 | 1.533E-03 | 2.249E-03 | 794 |
| 1. 0 | 30 | | | | | | 259.1 |
| 30.10.88 | 55 | | | | | | 794 |
| 1. 0 | 20 | 3.238E-03 | 1.347E-03 | | | | 259.1 |
| 31.10.88 | 52 | | 2.509E-04 | | | | 794 |
| 0.42 | 10 | | | 1.231E-03 | 1.920E-04 | 4.129E-04 | 260.1 |
| 31.10.88 | 55 | | | | | | 794 |
| 0.45 | 10 | | | 1.249E-03 | 1.899E-04 | 4.356E-04 | 260.1 |
| 31.10.88 | 55 | | | 1.811E-03 | 1.373E-03 | 2.057E-03 | 794 |
| 0.45 | 30 | | | | | | 260.1 |
| 31.10.88 | 55 | | | | | | 794 |
| 0.45 | 20 | 3.839E-03 | 1.183E-03 | | | | 260.1 |
| 1.11.88 | 52 | | 3.016E-04 | | | | 791 |
| 1. 0 | 10 | | | 1.243E-03 | 2.031E-04 | 4.408E-04 | 261.1 |
| 1.11.88 | 55 | | | | | | 791 |
| 1. 2 | 10 | | | 1.210E-03 | 2.310E-04 | 4.396E-04 | 261.1 |
| 1.11.88 | 55 | | | 1.838E-03 | 1.434E-03 | 2.073E-03 | 791 |
| 1. 2 | 30 | | | | | | 261.1 |
| 1.11.88 | 55 | | | | | | 791 |
| 1. 2 | 20 | 3.969E-03 | 1.211E-03 | | | | 261.1 |
| 2.11.88 | 52 | | 3.224E-04 | | | | 790 |
| 1. 8 | 10 | | | 1.286E-03 | 2.235E-04 | 4.526E-04 | 262.1 |
| 2.11.88 | 52 | | 3.182E-04 | | | | 790 |
| 1.15 | 10 | | | 1.292E-03 | 2.069E-04 | 4.582E-04 | 262.1 |
| 2.11.88 | 55 | | | | | | 790 |
| 1.21 | 10 | | | 1.314E-03 | 2.615E-04 | 4.457E-04 | 262.1 |
| 2.11.88 | 55 | | | 1.840E-03 | 1.454E-03 | 2.144E-03 | 790 |
| 1.21 | 30 | | | | | | 262.1 |
| 2.11.88 | 55 | | | | | | 790 |
| 1.21 | 20 | 3.457E-03 | 1.273E-03 | | | | 262.1 |
| 3.11.88 | 52 | | 3.283E-04 | | | | 793 |
| 1.1 | 10 | | | 1.253E-03 | 2.243E-04 | 4.314E-04 | 263.1 |
| 3.11.88 | 55 | | | 1.846E-03 | 1.422E-03 | 2.135E-03 | 793 |
| 1.13 | 30 | | | | | | 263.1 |
| 3.11.88 | 55 | | | | | | 793 |
| 1.13 | 20 | 3.767E-03 | 1.189E-03 | | | | 263.1 |
| 4.11.88 | 52 | | 2.954E-04 | | | | 792 |
| 0.43 | 10 | | | 1.189E-03 | 2.122E-04 | 4.078E-04 | 264.1 |
| 4.11.88 | 55 | | | | | | 792 |
| 0.45 | 10 | | | | | | 264.1 |

Table 6.4.32. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 88.09 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 4.11.88 | 55 | | | | | | 792 |
| 0.45 | 20 | 3.912E-03 | 1.143E-03 | | | | 264.1 |
| 5.11.88 | 52 | | 3.373E-04 | | | | 791 |
| 1. 0 | 10 | | | 1.137E-03 | 2.273E-04 | 4.262E-04 | 265.1 |
| 5.11.88 | 55 | | | | | | 791 |
| 1. 3 | 10 | | | 1.174E-03 | 3.220E-04 | 4.023E-04 | 265.1 |
| 5.11.88 | 55 | | | 1.717E-03 | 1.326E-03 | 1.879E-03 | 791 |
| 1. 3 | 30 | | | | | | 265.1 |
| 5.11.88 | 55 | | | | | | 791 |
| 1. 3 | 20 | 3.884E-03 | 1.112E-03 | | | | 265.1 |
| 6.11.88 | 52 | | 3.088E-04 | | | | 792 |
| 2. 0 | 10 | | | 1.400E-03 | 2.185E-04 | 4.537E-04 | 266.2 |
| 6.11.88 | 55 | | | | | | 792 |
| 2. 4 | 10 | | | 1.194E-03 | 2.901E-04 | 4.354E-04 | 266.2 |
| 6.11.88 | 55 | | | 1.892E-03 | 1.398E-03 | 2.154E-03 | 792 |
| 2. 4 | 30 | | | | | | 266.2 |
| 6.11.88 | 55 | | | | | | 792 |
| 2. 4 | 20 | 5.416E-03 | 1.383E-03 | | | | 266.2 |
| 7.11.88 | 52 | | 3.157E-04 | | | | 791 |
| 0.44 | 10 | | | 1.165E-03 | 2.185E-04 | 4.329E-04 | 267.1 |
| 7.11.88 | 55 | | | | | | 791 |
| 0.46 | 10 | | | 1.291E-03 | 3.611E-04 | 4.508E-04 | 267.1 |
| 7.11.88 | 55 | | | 1.724E-03 | 1.399E-03 | 2.011E-03 | 791 |
| 0.46 | 30 | | | | | | 267.1 |
| 7.11.88 | 55 | | | | | | 791 |
| 0.46 | 20 | 4.014E-03 | 1.115E-03 | | | | 267.1 |
| 8.11.88 | 52 | | 1.331E-04 | | | | 789 |
| 0.55 | 10 | | | 8.389E-04 | 1.012E-04 | 3.047E-04 | 268.1 |
| 8.11.88 | 55 | | | | | | 789 |
| 0.59 | 10 | | | 7.567E-04 | | 2.612E-04 | 268.1 |
| 8.11.88 | 55 | | | 1.152E-03 | 8.451E-04 | 1.287E-03 | 789 |
| 0.59 | 30 | | | | | | 268.1 |
| 8.11.88 | 55 | | | | | | 789 |
| 0.59 | 20 | 2.345E-03 | 7.174E-04 | | | | 268.1 |
| 11.11.88 | 52 | | 2.053E-04 | | | | 789 |
| 0.51 | 10 | | | 9.145E-04 | 1.529E-04 | 3.403E-04 | 271.1 |
| 11.11.88 | 55 | | | | | | 789 |
| 0.55 | 10 | | | 8.997E-04 | | 3.340E-04 | 271.1 |
| 11.11.88 | 55 | | | 1.449E-03 | 1.081E-03 | 1.693E-03 | 789 |
| 0.55 | 30 | | | | | | 271.1 |
| 11.11.88 | 55 | | | | | | 789 |
| 0.55 | 20 | 3.149E-03 | 9.246E-04 | | | | 271.1 |
| 12.11.88 | 52 | | 1.575E-04 | | | | 790 |
| 0.42 | 10 | | | 1.049E-03 | 1.266E-04 | 3.607E-04 | 272.1 |
| 12.11.88 | 55 | | | | | | 790 |
| 0.45 | 10 | | | 1.049E-03 | | 3.686E-04 | 272.1 |
| 12.11.88 | 55 | | | 1.718E-03 | 1.259E-03 | 1.808E-03 | 790 |
| 0.45 | 30 | | | | | | 272.1 |
| 12.11.88 | 55 | | | | | | 790 |
| 0.45 | 20 | 3.934E-03 | 1.034E-03 | | | | 272.1 |
| 13.11.88 | 52 | | 1.717E-04 | | | | 789 |
| 0.35 | 10 | | | 1.066E-03 | 1.325E-04 | 3.884E-04 | 273.1 |

Table 6.4.32. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 88.09 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 13.11.88 | 55 | | | | | | 789 |
| 0.4 | 10 | | | 1.038E-03 | 2.632E-04 | 3.671E-04 | 273.1 |
| 13.11.88 | 55 | | | 1.684E-03 | 1.243E-03 | 1.927E-03 | 789 |
| 0.4 | 30 | | | | | | 273.1 |
| 13.11.88 | 55 | | | | | | 789 |
| 0.4 | 20 | 4.213E-03 | 1.092E-03 | | | | 273.1 |
| 15.11.88 | 52 | | 1.629E-04 | | | | 788 |
| 0.55 | 10 | | | 9.938E-04 | 1.438E-04 | 3.644E-04 | 275.1 |
| 15.11.88 | 55 | | | | | | 787 |
| 1. 0 | 10 | | | 9.914E-04 | 1.632E-04 | 3.652E-04 | 275.1 |
| 15.11.88 | 55 | | | 1.602E-03 | 1.201E-03 | 1.714E-03 | 787 |
| 1. 0 | 30 | | | | | | 275.1 |
| 15.11.88 | 55 | | | | | | 787 |
| 1. 0 | 20 | 5.470E-03 | 1.026E-03 | | | | 275.1 |
| 16.11.88 | 52 | | 1.426E-04 | | | | 788 |
| 1.21 | 10 | | | 9.858E-04 | 1.115E-04 | 3.383E-04 | 276.1 |
| 16.11.88 | 55 | | | | | | 788 |
| 1.25 | 10 | | | 9.588E-04 | 2.132E-04 | 3.600E-04 | 276.1 |
| 16.11.88 | 55 | | | 1.505E-03 | 1.212E-03 | 1.771E-03 | 788 |
| 1.25 | 30 | | | | | | 276.1 |
| 16.11.88 | 55 | | | | | | 788 |
| 1.25 | 20 | 3.798E-03 | 1.029E-03 | | | | 276.1 |
| 17.11.88 | 52 | | 1.682E-04 | | | | 786 |
| 1. 0 | 10 | | | 1.026E-03 | 1.344E-04 | 3.487E-04 | 277.1 |
| 17.11.88 | 55 | | | | | | 786 |
| 1. 5 | 10 | | | 1.018E-03 | 2.255E-04 | 3.724E-04 | 277.1 |
| 17.11.88 | 55 | | | 1.496E-03 | 1.170E-03 | 1.657E-03 | 786 |
| 1. 5 | 30 | | | | | | 277.1 |
| 17.11.88 | 55 | | | | | | 786 |
| 1. 5 | 20 | 3.651E-03 | 1.014E-03 | | | | 277.1 |
| 18.11.88 | 55 | | | | | | 39 |
| 7. 0 | 20 | | | | | | 278.03 |

Table 6.4.33. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. | 88.10 | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 23.11.88 | 52 | | | | | | 784 |
| 8.5 | 10 | | | | | | 278.03 |
| 23.11.88 | 52 | | 2.536E-04 | | | | 784 |
| 8.5 | 10 | | | 1.299E-03 | 1.928E-04 | 4.509E-04 | 279.39 |
| 23.11.88 | 55 | | | | | | 784 |
| 8.52 | 10 | | | 1.317E-03 | 2.015E-04 | 4.641E-04 | 279.39 |
| 23.11.88 | 55 | | | 1.829E-03 | 1.432E-03 | 2.016E-03 | 784 |
| 8.52 | 30 | | | | | | 279.39 |
| 23.11.88 | 55 | | | | | | 784 |
| 8.52 | 20 | 3.097E-03 | 1.234E-03 | | | | 279.39 |
| 24.11.88 | 55 | | 3.602E-04 | | | | 787 |
| 9.47 | 10 | | | 1.376E-03 | 1.988E-04 | 4.649E-04 | 280.43 |
| 24.11.88 | 55 | | | | | | 787 |
| 9.49 | 10 | | | 1.330E-03 | 2.142E-04 | 4.487E-04 | 280.43 |
| 24.11.88 | 55 | | | 1.771E-03 | 1.346E-03 | 2.052E-03 | 787 |
| 9.49 | 30 | | | | | | 280.43 |
| 24.11.88 | 55 | | | | | | 787 |
| 9.49 | 20 | 3.618E-03 | 1.271E-03 | | | | 280.43 |
| 25.11.88 | 52 | | 2.153E-04 | | | | 788 |
| 9.43 | 10 | | | 1.334E-03 | 1.762E-04 | 4.279E-04 | 281.38 |
| 25.11.88 | 55 | | | | | | 788 |
| 9.47 | 10 | | | 1.282E-03 | 2.070E-04 | 4.397E-04 | 281.38 |
| 25.11.88 | 55 | | | 1.820E-03 | 1.482E-03 | 2.109E-03 | 788 |
| 9.47 | 30 | | | | | | 281.38 |
| 25.11.88 | 55 | | | | | | 788 |
| 9.47 | 20 | 4.672E-03 | 1.330E-03 | | | | 281.38 |
| 26.11.88 | 52 | | 2.344E-04 | | | | 788 |
| 8.41 | 10 | | | 1.327E-03 | 1.801E-04 | 4.300E-04 | 282.32 |
| 26.11.88 | 55 | | | | | | 788 |
| 8.43 | 10 | | | 1.344E-03 | 1.948E-04 | 4.433E-04 | 282.32 |
| 26.11.88 | 55 | | | 1.798E-03 | 1.386E-03 | 1.982E-03 | 788 |
| 8.43 | 30 | | | | | | 282.32 |
| 26.11.88 | 55 | | | | | | 788 |
| 8.43 | 20 | 4.747E-03 | 1.295E-03 | | | | 282.32 |
| 27.11.88 | 52 | | 1.949E-04 | | | | 787 |
| 8.4 | 10 | | | 1.124E-03 | 1.468E-04 | 3.530E-04 | 283.39 |
| 27.11.88 | 55 | | | | | | 787 |
| 8.42 | 10 | | | 1.212E-03 | 1.882E-04 | 3.949E-04 | 283.39 |
| 27.11.88 | 55 | | | 1.563E-03 | 1.201E-03 | 1.854E-03 | 787 |
| 8.42 | 30 | | | | | | 283.39 |
| 27.11.88 | 55 | | | | | | 787 |
| 8.42 | 20 | 3.743E-03 | 1.163E-03 | | | | 283.39 |
| 27.11.88 | 52 | | 1.143E-04 | | | | 789 |
| 17.2 | 10 | | | 1.090E-03 | 9.662E-05 | 3.506E-04 | 283.75 |
| 27.11.88 | 55 | | | | | | 789 |
| 17.25 | 10 | | | 1.026E-03 | | 3.333E-04 | 283.75 |
| 27.11.88 | 55 | | | 1.593E-03 | 1.210E-03 | 1.841E-03 | 789 |
| 17.25 | 30 | | | | | | 283.75 |
| 27.11.88 | 55 | | | | | | 789 |
| 17.25 | 20 | 4.295E-03 | 1.158E-03 | | | | 283.75 |
| 27.11.88 | 55 | | | | | | 789 |
| 17.25 | 20 | | | | | | 283.75 |

Table 6.4.33. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 88.10 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 29.11.88 | 52 | | 2.647E-04 | | | | 889 |
| 0.48 | 10 | | | 1.864E-03 | 1.688E-04 | 4.763E-04 | 285.06 |
| 29.11.88 | 55 | | | | | | 889 |
| 0.51 | 10 | | | 1.873E-03 | | 5.012E-04 | 285.06 |
| 29.11.88 | 55 | | | 2.343E-03 | 1.949E-03 | 2.680E-03 | 889 |
| 0.51 | 30 | | | | | | 285.06 |
| 29.11.88 | 55 | | | | | | 889 |
| 0.51 | 20 | 5.517E-03 | 1.805E-03 | | | | 285.06 |
| 30.11.88 | 52 | | 1.545E-04 | | | | 896 |
| 0.46 | 10 | | | 1.733E-03 | 1.331E-04 | 5.031E-04 | 286.06 |
| 30.11.88 | 55 | | | | | | 896 |
| 0.51 | 10 | | | 1.524E-03 | | 4.087E-04 | 286.06 |
| 30.11.88 | 55 | | | 1.433E-03 | 1.159E-03 | 1.586E-03 | 896 |
| 0.51 | 30 | | | | | | 286.06 |
| 30.11.88 | 55 | | | | | | 896 |
| 0.51 | 20 | 4.956E-03 | 1.766E-03 | | | | 286.06 |
| 1.12.88 | 52 | | 2.698E-04 | | | | 890 |
| 0.55 | 10 | | | | 1.595E-04 | 4.588E-04 | 287.07 |
| 1.12.88 | 55 | | | | | | 890 |
| 0.57 | 10 | | | 1.452E-03 | | 4.887E-04 | 287.07 |
| 1.12.88 | 55 | | | 2.748E-03 | 2.030E-03 | 3.021E-03 | 890 |
| 0.57 | 30 | | | | | | 287.07 |
| 1.12.88 | 55 | | | | | | 890 |
| 0.57 | 20 | | 1.542E-03 | | | | 287.07 |
| 2.12.88 | 52 | | 2.408E-04 | | | | 894 |
| 0.55 | 10 | | | 1.570E-03 | 1.719E-04 | 4.836E-04 | 288.07 |
| 2.12.88 | 55 | | | | | | 894 |
| 0.57 | 10 | | | 1.576E-03 | | 5.321E-04 | 288.07 |
| 2.12.88 | 55 | | | 2.989E-03 | 2.249E-03 | 3.567E-03 | 894 |
| 0.57 | 30 | | | | | | 288.07 |
| 2.12.88 | 55 | | | | | | 894 |
| 0.57 | 20 | 5.822E-03 | | | | | 288.07 |
| 3.12.88 | 52 | | 1.641E-04 | | | | 895 |
| 1.16 | 10 | | | 1.478E-03 | 1.329E-04 | 4.604E-04 | 289.08 |
| 3.12.88 | 55 | | | | | | 895 |
| 1.18 | 10 | | | 1.535E-03 | | 4.769E-04 | 289.08 |
| 3.12.88 | 55 | | | 2.716E-03 | 2.781E-03 | 2.977E-03 | 895 |
| 1.18 | 30 | | | | | | 289.08 |
| 3.12.88 | 55 | | | | | | 895 |
| 1.18 | 20 | 5.573E-03 | 1.638E-03 | | | | 289.08 |
| 4.12.88 | 52 | | 2.241E-04 | | | | 904 |
| 0.58 | 10 | | | 1.385E-03 | 1.504E-04 | 4.408E-04 | 290.07 |
| 4.12.88 | 55 | | | | | | 905 |
| 1. 0 | 10 | | | 1.376E-03 | 1.804E-04 | 4.652E-04 | 290.07 |
| 4.12.88 | 55 | | | 2.866E-03 | 2.092E-03 | 3.278E-03 | 905 |
| 1. 0 | 0 | | | | | | 290.07 |
| 4.12.88 | 55 | | | | | | 905 |
| 1. 0 | 20 | 6.028E-03 | 1.441E-03 | | | | 290.07 |
| 5.12.88 | 52 | | 2.508E-04 | | | | 893 |
| 1.46 | 10 | | | 1.411E-03 | 1.664E-04 | 4.165E-04 | 291.1 |
| 5.12.88 | 55 | | | | | | 893 |
| 1.48 | 10 | | | 1.391E-03 | | 4.842E-04 | 291.1 |

Table 6.4.33. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 88.10 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 5.12.88 | 55 | | | 2.685E-03 | 2.094E-03 | 3.030E-03 | 893 |
| 1.48 | 30 | | | | | | 291.1 |
| 5.12.88 | 55 | | | | | | 893 |
| 1.48 | 20 | 5.340E-02 | 1.447E-03 | | | | 291.1 |
| 5.12.88 | 55 | | | | | | 893 |
| 1.48 | 20 | | | | | | 291.1 |
| 5.12.88 | 52 | | 3.684E-04 | | | | 889 |
| 9.41 | 10 | | | 1.332E-03 | 2.162E-04 | 4.370E-04 | 291.43 |
| 5.12.88 | 55 | | | | | | 889 |
| 9.44 | 10 | | | 1.580E-03 | 3.216E-04 | 4.985E-04 | 291.43 |
| 5.12.88 | 55 | | | 2.948E-03 | 2.076E-03 | 3.022E-03 | 889 |
| 9.44 | 30 | | | | | | 291.43 |
| 5.12.88 | 55 | | | | | | 889 |
| 9.44 | 20 | | 1.513E-03 | | | | 291.43 |
| 6.12.88 | 52 | | 4.374E-04 | | | | 1016 |
| 1.13 | 10 | | | 2.585E-03 | 2.493E-04 | 6.336E-04 | 292.08 |
| 6.12.88 | 55 | | | | | | 1016 |
| 1.15 | 10 | | | 2.837E-03 | 3.634E-04 | 7.381E-04 | 292.08 |
| 6.12.88 | 55 | | | 5.953E-03 | 4.409E-03 | 6.957E-03 | 1016 |
| 1.15 | 30 | | | | | | 292.08 |
| 6.12.88 | 55 | | | | | | 1016 |
| 1.15 | 20 | 6.502E-02 | 3.052E-03 | | | | 292.08 |
| 7.12.88 | 52 | | 5.360E-04 | | | | 1016 |
| 0.57 | 10 | | | 4.427E-03 | 2.839E-04 | 7.540E-04 | 293.07 |
| 7.12.88 | 55 | | | | | | 1015 |
| 1. 0 | 10 | | | 5.117E-03 | 3.278E-04 | 8.315E-04 | 293.07 |
| 7.12.88 | 55 | | | 6.424E-03 | 4.605E-03 | 7.604E-03 | 1015 |
| 1. 0 | 30 | | | | | | 293.07 |
| 7.12.88 | 55 | | | | | | 1015 |
| 1. 0 | 20 | 1.293E-01 | 5.419E-03 | | | | 293.07 |
| 8.12.88 | 52 | | 4.995E-04 | | | | 1016 |
| 0.59 | 10 | | | 8.710E-03 | 3.011E-04 | 7.644E-04 | 294.07 |
| 8.12.88 | 55 | | | | | | 1016 |
| 1. 2 | 10 | | | 6.579E-03 | 3.495E-04 | 8.765E-04 | 294.07 |
| 8.12.88 | 55 | | | | | | 1016 |
| 1. 2 | 20 | | | | | | 294.07 |
| 8.12.88 | 55 | | | | | | 1016 |
| 1. 2 | 20 | 3.218E-01 | 7.281E-03 | | | | 294.07 |
| 9.12.88 | 52 | | 6.850E-04 | | | | 981 |
| 1.28 | 10 | | | | 3.417E-04 | 7.302E-04 | 295.09 |
| 9.12.88 | 55 | | | | | | 981 |
| 1.28 | 10 | | | 6.583E-03 | 3.782E-04 | 8.796E-04 | 295.09 |
| 9.12.88 | 55 | | | 6.826E-03 | 4.781E-03 | 8.051E-03 | 981 |
| 1.28 | 30 | | | | | | 295.09 |
| 9.12.88 | 55 | | | | | | 981 |
| 1.28 | 20 | 1.816E-01 | 7.039E-03 | | | | 295.09 |
| 10.12.88 | 52 | | 6.096E-04 | | | | 1013 |
| 0.58 | 10 | | | 5.319E-03 | 3.206E-04 | 7.979E-04 | 296.07 |
| 10.12.88 | 55 | | | | | | 1013 |
| 0.58 | 10 | | | 6.069E-03 | 3.606E-04 | 8.698E-04 | 296.07 |
| 10.12.88 | 55 | | | 6.570E-03 | 4.864E-03 | 7.855E-03 | 1013 |
| 0.58 | 30 | | | | | | 296.07 |

Table 6.4.33. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 88.10 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 10.12.88 | 55 | | | | | | 1013 |
| 0.58 | 20 | 1.659E-01 | 6.556E-03 | | | | 296.07 |
| 11.12.88 | 52 | | 5.865E-04 | | | | 1012 |
| 0.59 | 10 | | | 5.718E-03 | 3.308E-04 | | 297.05 |
| 11.12.88 | 55 | | | | | | 1012 |
| 1. 2 | 10 | | | 6.180E-03 | 3.325E-04 | 9.041E-04 | 297.05 |
| 11.12.88 | 55 | | | 7.127E-03 | 4.673E-03 | 8.439E-03 | 1012 |
| 1. 2 | 30 | | | | | | 297.05 |
| 11.12.88 | 55 | | | | | | 1012 |
| 1. 2 | 20 | 2.013E-01 | 7.016E-03 | | | | 297.05 |
| 12.12.88 | 52 | | 6.355E-04 | | | | 1011 |
| 0.54 | 10 | | | 5.518E-03 | 3.393E-04 | 8.051E-04 | 297.95 |
| 12.12.88 | 55 | | | | | | 1011 |
| 0.56 | 10 | | | 6.267E-03 | 3.629E-04 | 9.003E-04 | 297.97 |
| 12.12.88 | 55 | | | 6.405E-03 | 4.668E-03 | 7.827E-03 | 1011 |
| 0.56 | 30 | | | | | | 297.95 |
| 12.12.88 | 55 | | | | | | 1011 |
| 0.56 | 20 | 1.512E-01 | 7.721E-03 | | | | 297.95 |
| 13.12.88 | 55 | | | | | | 36 |
| 5. 0 | 20 | | | | | | 298.95 |
| --- | --- | | | | | | |

Table 6.4.34. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 88.11 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 16.12.88 | 52 | | 4.647E-04 | | | | 784 |
| 8.45 | 10 | | | 3.099E-03 | 3.991E-04 | 1.045E-03 | 299.7 |
| 16.12.88 | 55 | | | | | | 784 |
| 8.47 | 10 | | | 3.438E-03 | 4.586E-04 | 1.179E-03 | 299.7 |
| 16.12.88 | 55 | | | 3.815E-03 | 3.183E-03 | 4.387E-03 | 784 |
| 8.47 | 30 | | | | | | 299.7 |
| 16.12.88 | 55 | | | | | | 784 |
| 8.47 | 20 | 9.359E-03 | 3.641E-03 | | | | 299.7 |
| 17.12.88 | 52 | | 3.244E-04 | | | | 794 |
| 8.5 | 10 | | | 2.836E-03 | 2.821E-04 | 8.615E-04 | 300.71 |
| 17.12.88 | 55 | | | | | | 794 |
| 8.51 | 10 | | | 3.043E-03 | | 9.058E-04 | 300.71 |
| 17.12.88 | 55 | | | 3.377E-03 | 2.611E-03 | 3.852E-03 | 794 |
| 8.51 | 30 | | | | | | 300.71 |
| 17.12.88 | 55 | | | | | | 794 |
| 8.51 | 20 | 7.617E-03 | 3.288E-03 | | | | 300.71 |
| 18.12.88 | 52 | | 2.601E-04 | | | | 799 |
| 9. 5 | 10 | | | 2.379E-03 | 2.276E-04 | 9.975E-04 | 301.75 |
| 18.12.88 | 55 | | | | | | 799 |
| 9. 8 | 10 | | | 2.453E-03 | 2.898E-04 | 7.597E-04 | 301.75 |
| 18.12.88 | 55 | | | 3.022E-03 | 2.332E-03 | 3.476E-03 | 799 |
| 9. 8 | 30 | | | | | | 301.75 |
| 18.12.88 | 55 | | | | | | 799 |
| 9. 8 | 20 | 6.914E-03 | 2.747E-03 | | | | 301.75 |
| 19.12.88 | 52 | | | | | | 801 |
| 8.52 | 10 | | | 1.600E-03 | | 4.976E-04 | 302.76 |
| 19.12.88 | 55 | | | | | | 801 |
| 8.55 | 10 | | | 1.614E-03 | | 4.961E-04 | 302.76 |
| 19.12.88 | 55 | | | 2.586E-03 | 1.925E-03 | 3.042E-03 | 801 |
| 8.55 | 30 | | | | | | 302.76 |
| 19.12.88 | 55 | | | | | | 801 |
| 8.55 | 20 | 6.095E-03 | 2.256E-03 | | | | 302.76 |
| 20.12.88 | 52 | | 2.247E-04 | | | | 802 |
| 9.46 | 10 | | | 1.801E-03 | 1.982E-04 | 5.765E-04 | 303.77 |
| 20.12.88 | 55 | | | | | | 802 |
| 9.48 | 10 | | | 1.797E-03 | | 6.029E-04 | 303.77 |
| 20.12.88 | 55 | | | 2.353E-03 | 1.757E-03 | 2.718E-03 | 802 |
| 9.48 | 30 | | | | | | 303.77 |
| 20.12.88 | 55 | | | | | | 802 |
| 9.48 | 20 | 5.648E-03 | 1.934E-03 | | | | 303.77 |
| 21.12.88 | 52 | | 2.760E-04 | | | | 799 |
| 8.42 | 10 | | | 1.786E-03 | 2.169E-04 | 5.845E-04 | 304.78 |
| 21.12.88 | 55 | | | | | | 799 |
| 8.44 | 10 | | | 1.861E-03 | 2.556E-04 | 5.977E-04 | 304.78 |
| 21.12.88 | 55 | | | 2.162E-03 | 1.702E-03 | 2.606E-03 | 799 |
| 8.44 | 30 | | | | | | 304.78 |
| 21.12.88 | 55 | | | | | | 799 |
| 8.44 | 20 | 5.897E-03 | 1.818E-03 | | | | 304.78 |
| 22.12.88 | 52 | | 2.722E-04 | | | | 799 |
| 8.4 | 10 | | | 1.622E-03 | 2.214E-04 | 5.656E-04 | 305.79 |
| 22.12.88 | 55 | | | | | | 799 |
| 8.44 | 10 | | | 1.716E-03 | | 5.723E-04 | 305.79 |

Table 6.4.34. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 88.11 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 22.12.88 | 55 | | | 2.111E-03 | 1.643E-03 | 2.422E-03 | 799 |
| 8.44 | 30 | | | | | | 305.79 |
| 22.12.88 | 55 | | | | | | 799 |
| 8.44 | 20 | 5.071E-03 | 1.658E-03 | | | | 305.79 |
| 23.12.88 | 52 | | 3.042E-04 | | | | 798 |
| 8.37 | 10 | | | 1.454E-03 | 2.404E-04 | 4.899E-04 | 306.81 |
| 23.12.88 | 55 | | | | | | 798 |
| 8.39 | 10 | | | 1.543E-03 | 2.743E-04 | 5.334E-04 | 306.81 |
| 23.12.88 | 55 | | | 1.803E-03 | 1.420E-03 | 1.935E-03 | 798 |
| 8.39 | 30 | | | | | | 306.81 |
| 23.12.88 | 55 | | | | | | 798 |
| 8.39 | 20 | 4.247E-03 | 1.442E-03 | | | | 306.81 |
| 24.12.88 | 52 | | 3.030E-04 | | | | 797 |
| 9. 7 | 10 | | | 1.354E-03 | | 4.413E-04 | 307.82 |
| 24.12.88 | 55 | | | | | | 797 |
| 9. 7 | 10 | | | 1.325E-03 | | | 307.82 |
| 24.12.88 | 55 | | | 1.949E-03 | 1.503E-03 | 2.333E-03 | 797 |
| 9. 7 | 30 | | | | | | 307.82 |
| 24.12.88 | 55 | | | | | | 797 |
| 9. 7 | 20 | 5.066E-03 | 1.549E-03 | | | | 307.82 |
| 25.12.88 | 52 | | 2.759E-04 | | | | 800 |
| 9.22 | 10 | | | 1.487E-03 | 2.240E-04 | 5.084E-04 | 308.83 |
| 25.12.88 | 55 | | | | | | 800 |
| 9.24 | 10 | | | 1.489E-03 | 2.303E-04 | 5.212E-04 | 308.83 |
| 25.12.88 | 55 | | | 1.841E-03 | 1.457E-03 | 2.113E-03 | 800 |
| 9.24 | 30 | | | | | | 308.83 |
| 25.12.88 | 55 | | | | | | 800 |
| 9.24 | 20 | 6.820E-03 | 1.422E-03 | | | | 308.83 |
| 26.12.88 | 52 | | 2.917E-04 | | | | 798 |
| 9.15 | 10 | | | 1.434E-03 | 2.205E-04 | 5.164E-04 | 309.84 |
| 26.12.88 | 55 | | | | | | 798 |
| 9.15 | 10 | | | 1.481E-03 | | 5.182E-04 | 309.84 |
| 26.12.88 | 55 | | | 1.897E-03 | 1.460E-03 | 2.076E-03 | 798 |
| 9.15 | 30 | | | | | | 309.84 |
| 26.12.88 | 55 | | | | | | 798 |
| 9.15 | 20 | 4.672E-03 | 1.471E-03 | | | | 309.84 |
| 27.12.88 | 52 | | 2.644E-04 | | | | 797 |
| 9.11 | 10 | | | 1.512E-03 | 2.140E-04 | 5.164E-04 | 310.85 |
| 27.12.88 | 55 | | | | | | 797 |
| 9.13 | 10 | | | 1.555E-03 | 2.088E-04 | 5.234E-04 | 310.85 |
| 27.12.88 | 55 | | | 1.906E-03 | 1.510E-03 | 2.178E-03 | 797 |
| 9.13 | 30 | | | | | | 310.85 |
| 27.12.88 | 55 | | | | | | 797 |
| 9.13 | 20 | 4.393E-03 | 1.502E-03 | | | | 310.84 |
| 29.12.88 | 52 | | 2.529E-04 | | | | 798 |
| 8.45 | 10 | | | 1.403E-03 | 2.014E-04 | 4.847E-04 | 312.87 |
| 29.12.88 | 55 | | | | | | 798 |
| 8.5 | 10 | | | 1.394E-03 | 1.821E-04 | 4.919E-04 | 312.87 |
| 29.12.88 | 55 | | | 1.854E-03 | 1.453E-03 | 2.100E-03 | 798 |
| 8.5 | 30 | | | | | | 312.87 |
| 29.12.88 | 55 | | | | | | 798 |
| 8.5 | 20 | 4.524E-03 | 1.424E-03 | | | | 312.87 |

Table 6.4.34. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 88.11 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 30.12.88 | 52 | | 2.502E-04 | | | | 798 |
| 8.37 | 10 | | | 1.445E-03 | 2.069E-04 | 4.889E-04 | 313.88 |
| 30.12.88 | 55 | | | | | | 798 |
| 8.39 | 10 | | | 1.409E-03 | | 4.895E-04 | 313.88 |
| 30.12.88 | 55 | | | 1.803E-03 | 1.390E-03 | 1.961E-03 | 798 |
| 8.39 | 30 | | | | | | 313.88 |
| 30.12.88 | 55 | | | | | | 798 |
| 8.39 | 20 | 4.383E-03 | 1.412E-03 | | | | 313.88 |
| 31.12.88 | 52 | | 2.445E-04 | | | | 798 |
| 8.15 | 10 | | | 1.489E-03 | 2.003E-04 | 4.990E-04 | 314.89 |
| 31.12.88 | 55 | | | | | | 798 |
| 8.15 | 10 | | | 1.451E-03 | 2.174E-04 | 5.179E-04 | 314.89 |
| 31.12.88 | 55 | | | 1.915E-03 | 1.436E-03 | 2.080E-03 | 798 |
| 8.15 | 30 | | | | | | 314.89 |
| 31.12.88 | 55 | | | | | | 798 |
| 8.15 | 20 | 5.094E-03 | 1.474E-03 | | | | 314.89 |
| 1. 1.89 | 52 | | 2.396E-04 | | | | 797 |
| 8.32 | 10 | | | 1.553E-03 | 2.060E-04 | 5.573E-04 | 315.9 |
| 1. 1.89 | 55 | | | | | | 797 |
| 8.34 | 10 | | | 1.659E-03 | 2.900E-04 | 5.535E-04 | 315.9 |
| 1. 1.89 | 55 | | | 2.064E-03 | 1.567E-03 | 2.370E-03 | 797 |
| 8.34 | 30 | | | | | | 315.9 |
| 1. 1.89 | 55 | | | | | | 797 |
| 8.34 | 20 | 5.103E-03 | 1.580E-03 | | | | 315.9 |
| 2. 1.89 | 52 | | 2.489E-04 | | | | 797 |
| 8.46 | 10 | | | 1.548E-03 | 2.067E-04 | 5.408E-04 | 316.01 |
| 2. 1.89 | 55 | | | | | | 797 |
| 8.49 | 10 | | | 1.579E-03 | 2.298E-04 | 5.333E-04 | 316.01 |
| 2. 1.89 | 55 | | | 2.009E-03 | 1.599E-03 | 2.300E-03 | 797 |
| 8.49 | 30 | | | | | | 316.01 |
| 2. 1.89 | 55 | | | | | | 797 |
| 8.49 | 20 | 5.554E-03 | 1.585E-03 | | | | 316.01 |
| 3. 1.89 | 52 | | 2.529E-04 | | | | 797 |
| 8.39 | 10 | | | 1.553E-03 | 2.210E-04 | 5.572E-04 | 317.93 |
| 3. 1.89 | 55 | | | | | | 797 |
| 8.41 | 10 | | | 1.631E-03 | 2.027E-04 | 5.668E-04 | 317.98 |
| 3. 1.89 | 55 | | | 2.112E-03 | 1.667E-03 | 2.397E-03 | 797 |
| 8.41 | 30 | | | | | | 317.93 |
| 3. 1.89 | 55 | | | | | | 797 |
| 8.41 | 20 | 5.138E-03 | | | | | 317.93 |
| 4. 1.89 | 52 | | 2.053E-04 | | | | 796 |
| 8.37 | 10 | | | 1.670E-03 | 1.874E-04 | 5.921E-04 | 318.94 |
| 4. 1.89 | 55 | | | | | | 796 |
| 8.39 | 10 | | | 1.603E-03 | 1.973E-04 | 5.667E-04 | 318.94 |
| 4. 1.89 | 55 | | | 2.238E-03 | 1.789E-03 | 2.534E-03 | 796 |
| 8.39 | 30 | | | | | | 318.94 |
| 4. 1.89 | 55 | | | | | | 796 |
| 8.39 | 20 | 7.789E-03 | 1.774E-03 | | | | 318.94 |
| 5. 1.89 | 52 | | 2.148E-04 | | | | 796 |
| 8.4 | 10 | | | 1.706E-03 | 1.844E-04 | 5.736E-04 | 319.95 |
| 5. 1.89 | 55 | | | | | | 796 |
| 8.44 | 10 | | | 1.719E-03 | 1.915E-04 | 5.580E-04 | 319.95 |

Table 6.4.34. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 88.11 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 5. 1.89 | 55 | | | 2.169E-03 | 1.733E-03 | 2.532E-03 | 796 |
| 8.44 | 30 | | | | | | 319.95 |
| 5. 1.89 | 55 | | | | | | 796 |
| 8.44 | 20 | 5.903E-03 | 1.770E-03 | | | | 319.95 |
| 6. 1.89 | 55 | | | | | | 54 |
| 4. 0 | 20 | | | | | | 319.99 |

Table 6.4.35. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 89.01 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 17. 1.89 | 55 | | | | | | 782 |
| 0. 0 | 20 | | | | | | 320.35 |
| 17. 1.89 | 52 | | 6.037E-04 | | | | 1002 |
| 17.41 | 10 | | | 1.947E-03 | 3.018E-04 | 5.933E-04 | 321.6 |
| 17. 1.89 | 55 | | | | | | 1002 |
| 17.43 | 10 | | | 1.831E-03 | 3.035E-04 | 5.808E-04 | 321.6 |
| 17. 1.89 | 55 | | | 3.580E-03 | 2.750E-03 | 3.917E-03 | 1002 |
| 17.43 | 30 | | | | | | 321.6 |
| 17. 1.89 | 55 | | | | | | 1002 |
| 17.43 | 20 | 3.836E-03 | 1.657E-03 | | | | 321.6 |
| 18. 1.89 | 52 | | 5.770E-04 | | | | 1018 |
| 17. 0 | 10 | | | 2.521E-03 | 3.076E-04 | 7.298E-04 | 322.5 |
| 18. 1.89 | 55 | | | | | | 1018 |
| 17. 3 | 10 | | | 2.666E-03 | 2.670E-04 | 7.882E-04 | 322.5 |
| 18. 1.89 | 55 | | | 3.790E-03 | 3.705E-03 | 3.954E-03 | 1018 |
| 17. 3 | 30 | | | | | | 322.5 |
| 18. 1.89 | 55 | | | | | | 1018 |
| 17. 3 | 20 | 8.784E-03 | 2.752E-03 | | | | 322.5 |
| 20. 1.89 | 52 | | 5.040E-04 | | | | 1016 |
| 16.45 | 10 | | | 3.533E-03 | 1.556E-04 | 8.358E-04 | 324.5 |
| 20. 1.89 | 55 | | | | | | 1016 |
| 16.48 | 10 | | | 3.695E-03 | 2.221E-04 | 8.332E-04 | 324.5 |
| 20. 1.89 | 55 | | | 6.310E-03 | 4.524E-03 | 7.276E-03 | 1016 |
| 16.48 | 30 | | | | | | 324.5 |
| 20. 1.89 | 55 | | | | | | 1016 |
| 16.48 | 20 | 2.252E-02 | 4.012E-03 | | | | 324.5 |
| 21. 1.89 | 52 | | 6.750E-04 | | | | 1016 |
| 16.55 | 10 | | | 4.604E-03 | 3.738E-04 | 8.942E-04 | 325.5 |
| 21. 1.89 | 55 | | | | | | 1016 |
| 17. 0 | 10 | | | 5.017E-03 | 3.833E-04 | 1.039E-03 | 325.5 |
| 21. 1.89 | 55 | | | 8.356E-03 | 5.655E-03 | 1.149E-02 | 1016 |
| 17. 0 | 30 | | | | | | 325.5 |
| 21. 1.89 | 55 | | | | | | 1016 |
| 17. 0 | 20 | 2.360E-02 | 6.113E-03 | | | | 325.5 |
| 22. 1.89 | 52 | | 3.785E-04 | | | | 1017 |
| 16.45 | 10 | | | 4.888E-03 | 2.342E-04 | 7.688E-04 | 326.5 |
| 22. 1.89 | 55 | | | | | | 1017 |
| 16.5 | 10 | | | 5.003E-03 | | 8.706E-04 | 326.5 |
| 22. 1.89 | 55 | | | 6.984E-03 | 5.092E-03 | 8.156E-03 | 1017 |
| 16.5 | 30 | | | | | | 326.5 |
| 22. 1.89 | 55 | | | | | | 1017 |
| 16.5 | 20 | 7.115E-02 | 5.943E-03 | | | | 326.5 |
| 25. 1.89 | 52 | | 4.841E-04 | | | | 1017 |
| 0.35 | 10 | | | 6.387E-03 | 3.082E-04 | 9.392E-04 | 329.14 |
| 25. 1.89 | 55 | | | | | | 1017 |
| 0.38 | 10 | | | 6.833E-03 | | 1.010E-03 | 329.14 |
| 25. 1.89 | 55 | | | 7.279E-03 | 5.348E-03 | 8.721E-03 | 1017 |
| 0.38 | 30 | | | | | | 329.14 |
| 25. 1.89 | 55 | | | | | | 1017 |
| 0.38 | 20 | 1.007E-01 | 7.619E-03 | | | | 329.14 |
| 26. 1.89 | 52 | | 4.551E-04 | | | | 1016 |
| 1.18 | 10 | | | 6.134E-03 | 2.864E-04 | 9.165E-04 | 330.14 |

Table 6.4.35. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 89.01 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 26. 1.89 | 55 | | | | | | 1016 |
| 1.2 | 10 | | | 6.301E-03 | 3.254E-04 | 9.543E-04 | 330.14 |
| 26. 1.89 | 55 | | | 6.911E-03 | 5.098E-03 | 8.145E-03 | 1016 |
| 1.2 | 30 | | | | | | 330.14 |
| 26. 1.89 | 55 | | | | | | 1016 |
| 1.2 | 20 | 1.040E-01 | 7.143E-03 | | | | 330.14 |
| 29. 1.89 | 52 | | 3.608E-04 | | | | 1014 |
| 0.45 | 10 | | | 6.540E-03 | 2.594E-04 | 9.623E-04 | 333.14 |
| 29. 1.89 | 55 | | | | | | 1014 |
| 0.5 | 10 | | | 6.697E-03 | | 9.749E-04 | 333.14 |
| 29. 1.89 | 55 | | | 7.419E-03 | 5.887E-03 | 8.894E-03 | 1014 |
| 0.5 | 30 | | | | | | 333.14 |
| 29. 1.89 | 55 | | | | | | 1014 |
| 0.5 | 20 | 1.194E-01 | 8.480E-03 | | | | 333.14 |
| 30. 1.89 | 52 | | 2.179E-04 | | | | 1014 |
| 1.1 | 10 | | | 7.009E-03 | 2.033E-04 | 7.931E-04 | 334.14 |
| 30. 1.89 | 55 | | | | | | 1014 |
| 1.15 | 10 | | | 7.052E-03 | | 8.516E-04 | 334.14 |
| 30. 1.89 | 55 | | | 4.887E-03 | 3.431E-03 | 6.382E-03 | 1014 |
| 1.15 | 30 | | | | | | 334.14 |
| 30. 1.89 | 55 | | | | | | 1014 |
| 1.15 | 20 | 1.601E-01 | 8.608E-03 | | | | 334.14 |
| 31. 1.89 | 52 | | 4.574E-04 | | | | 1019 |
| 1. 2 | 10 | | | 6.831E-03 | 3.022E-04 | 1.090E-03 | 335.14 |
| 31. 1.89 | 55 | | | | | | 1019 |
| 1. 5 | 10 | | | 7.713E-03 | | 1.191E-03 | 335.14 |
| 31. 1.89 | 55 | | | 8.278E-03 | 6.177E-03 | 1.009E-02 | 1019 |
| 1. 5 | 30 | | | | | | 335.14 |
| 31. 1.89 | 55 | | | | | | 1019 |
| 1. 5 | 20 | 1.613E-01 | 8.864E-03 | | | | 335.14 |
| 2. 2.89 | 52 | | 4.783E-04 | | | | 1016 |
| 0.41 | 10 | | | 7.030E-03 | 3.462E-04 | 1.036E-03 | 337.04 |
| 2. 2.89 | 55 | | | | | | 1016 |
| 0.43 | 10 | | | 7.575E-03 | 3.029E-04 | 1.132E-03 | 337.04 |
| 2. 2.89 | 55 | | | 8.467E-03 | 6.071E-03 | 1.029E-02 | 1016 |
| 0.43 | 30 | | | | | | 337.04 |
| 2. 2.89 | 55 | | | | | | 1016 |
| 0.43 | 20 | 1.550E-01 | 8.966E-03 | | | | 337.04 |
| 3. 2.89 | 52 | | 4.310E-04 | | | | 1015 |
| 0.37 | 10 | | | 6.940E-03 | 3.233E-04 | 1.094E-03 | 338.03 |
| 3. 2.89 | 55 | | | | | | 1015 |
| 0.43 | 10 | | | 7.623E-03 | 3.250E-04 | 1.171E-03 | 338.03 |
| 3. 2.89 | 55 | | | 7.871E-03 | 5.579E-03 | 9.768E-03 | 1015 |
| 0.43 | 30 | | | | | | 338.03 |
| 3. 2.89 | 55 | | | | | | 1015 |
| 0.43 | 20 | 1.312E-01 | 9.089E-03 | | | | 338.03 |
| 4. 2.89 | 52 | | 5.690E-04 | | | | 1013 |
| 1.15 | 10 | | | 6.832E-03 | 4.002E-04 | 1.079E-03 | 339.01 |
| 4. 2.89 | 55 | | | | | | 1013 |
| 1.18 | 10 | | | 7.379E-03 | 5.072E-04 | 1.187E-03 | 339.01 |
| 4. 2.89 | 55 | | | 7.275E-03 | 5.441E-03 | 9.004E-03 | 1013 |
| 1.18 | 30 | | | | | | 339.01 |

Table 6.4.35. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 89.01 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 4. 2.89 | 55 | | | | | | 1013 |
| 1.18 | 20 | 1.496E-01 | 8.169E-03 | | | | 339.01 |
| 5. 2.89 | 52 | | 5.963E-04 | | | | 1019 |
| 1.41 | 10 | | | 6.705E-03 | 3.994E-04 | 1.057E-03 | 340 |
| 5. 2.89 | 55 | | | | | | 1019 |
| 1.47 | 10 | | | 7.411E-03 | 3.898E-04 | 1.193E-03 | 340 |
| 5. 2.89 | 55 | | | 7.276E-03 | 5.520E-03 | | 1019 |
| 1.47 | 30 | | | | | | 340 |
| 5. 2.89 | 55 | | | | | | 1019 |
| 1.47 | 20 | 1.110E-01 | 8.129E-03 | | | | 340 |
| 6. 2.89 | 52 | | 6.069E-04 | | | | 1018 |
| 0.48 | 10 | | | 7.438E-03 | 4.124E-04 | 1.249E-03 | 341 |
| 6. 2.89 | 55 | | | | | | 1018 |
| 0.5 | 10 | | | 8.045E-03 | 3.603E-04 | 1.282E-03 | 341 |
| 6. 2.89 | 55 | | | 7.363E-03 | 5.603E-03 | 8.787E-03 | 1018 |
| 0.5 | 30 | | | | | | 341 |
| 6. 2.89 | 55 | | | | | | 1018 |
| 0.5 | 20 | 7.828E-02 | 8.415E-03 | | | | 341 |
| 7. 2.89 | 55 | | | | | | 49 |
| 3. 0 | 20 | | | | | | 341.31 |

Table 6.4.36. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 89.02 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 11. 2.89 | 52 | | | | | | 821 |
| 1.14 | 10 | | | | | | 341.31 |
| 11. 2.89 | 52 | | 6.338E-04 | | | | 821 |
| 1.14 | 10 | | | 5.057E-03 | 6.046E-04 | 1.454E-03 | 342.11 |
| 11. 2.89 | 55 | | | | | | 821 |
| 1.17 | 10 | | | 5.397E-03 | 5.961E-04 | 1.710E-03 | 342.11 |
| 11. 2.89 | 55 | | | 5.038E-03 | 3.516E-03 | 5.485E-03 | 821 |
| 1.17 | 30 | | | | | | 342.11 |
| 11. 2.89 | 55 | | | | | | 821 |
| 1.17 | 20 | 1.035E-02 | 5.825E-03 | | | | 342.11 |
| 12. 2.89 | 52 | | 4.022E-04 | | | | 828 |
| 1.35 | 10 | | | 4.233E-03 | 4.708E-04 | 1.182E-03 | 343.11 |
| 12. 2.89 | 55 | | | | | | 828 |
| 1.37 | 10 | | | 4.771E-03 | 5.290E-04 | 1.317E-03 | 343.11 |
| 12. 2.89 | 55 | | | 4.175E-03 | 3.192E-03 | 4.498E-03 | 828 |
| 1.37 | 30 | | | | | | 343.11 |
| 12. 2.89 | 55 | | | | | | 828 |
| 1.37 | 20 | 9.465E-03 | 5.047E-03 | | | | 343.11 |
| 16. 2.89 | 52 | | 4.107E-04 | | | | 842 |
| 1. 0 | 10 | | | 3.526E-03 | 3.911E-04 | 9.770E-04 | 345.19 |
| 16. 2.89 | 55 | | | | | | 842 |
| 1. 0 | 10 | | | 3.630E-03 | 4.082E-04 | 1.072E-03 | 345.19 |
| 16. 2.89 | 55 | | | 3.694E-03 | 4.274E-03 | 3.995E-03 | 842 |
| 1. 0 | 30 | | | | | | 345.19 |
| 16. 2.89 | 55 | | | | | | 842 |
| 1. 0 | 20 | 7.679E-03 | 3.881E-03 | | | | 345.19 |
| 17. 2.89 | 52 | | 3.848E-04 | | | | 842 |
| 0.51 | 10 | | | 3.429E-03 | 3.628E-04 | 9.513E-04 | 346.19 |
| 17. 2.89 | 55 | | | | | | 842 |
| 0.55 | 10 | | | 3.806E-03 | 4.166E-04 | 1.064E-03 | 346.19 |
| 17. 2.89 | 55 | | | 3.501E-03 | 2.730E-03 | 4.009E-03 | 842 |
| 0.55 | 30 | | | | | | 346.19 |
| 17. 2.89 | 55 | | | | | | 842 |
| 0.55 | 20 | 8.579E-03 | 3.844E-03 | | | | 346.19 |
| 18. 2.89 | 52 | | 3.748E-04 | | | | 842 |
| 0.45 | 10 | | | 3.018E-03 | 3.501E-04 | 8.505E-04 | 347.19 |
| 18. 2.89 | 55 | | | | | | 842 |
| 0.48 | 10 | | | 3.106E-03 | 3.518E-04 | 9.261E-04 | 347.19 |
| 18. 2.89 | 55 | | | 3.123E-03 | 2.517E-03 | 3.663E-03 | 842 |
| 0.48 | 30 | | | | | | 347.19 |
| 18. 2.89 | 55 | | | | | | 842 |
| 0.48 | 20 | 8.144E-03 | 3.295E-03 | | | | 347.19 |
| 19. 2.89 | 52 | | 3.218E-04 | | | | 841 |
| 0.55 | 10 | | | 2.891E-03 | 3.070E-04 | 8.348E-04 | 348.19 |
| 19. 2.89 | 55 | | | | | | 841 |
| 0.57 | 10 | | | 2.920E-03 | 2.875E-04 | 8.451E-04 | 348.19 |
| 19. 2.89 | 55 | | | 3.074E-03 | 2.416E-03 | 3.498E-03 | 841 |
| 0.57 | 30 | | | | | | 348.19 |
| 19. 2.89 | 55 | | | | | | 841 |
| 0.57 | 20 | 9.003E-03 | 3.156E-03 | | | | 348.19 |
| 20. 2.89 | 52 | | 2.895E-04 | | | | 799 |
| 1.56 | 10 | | | 2.619E-03 | 2.572E-04 | 7.706E-04 | 349.19 |

Table 6.4.36. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 89.02 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 20. 2.89 | 55 | | | | | | 836 |
| 2. 0 | 10 | | | 2.631E-03 | 1.618E-04 | 8.085E-04 | 349.19 |
| 20. 2.89 | 55 | | | 3.318E-03 | 2.524E-03 | 3.754E-03 | 836 |
| 2. 0 | 30 | | | | | | 349.19 |
| 20. 2.89 | 55 | | | | | | 836 |
| 2. 0 | 20 | 9.390E-03 | 3.067E-03 | | | | 349.19 |
| 20. 2.89 | 55 | | | | | | 836 |
| 2. 0 | 20 | | | | | | 349.19 |
| 20. 2.89 | 52 | | 4.584E-04 | | | | 975 |
| 11.25 | 10 | | | 2.774E-03 | 3.415E-04 | 8.462E-04 | 349.59 |
| 20. 2.89 | 55 | | | | | | 975 |
| 11.29 | 10 | | | 2.797E-03 | 4.000E-04 | 9.378E-04 | 349.59 |
| 20. 2.89 | 55 | | | 4.875E-03 | 3.531E-03 | 6.197E-03 | 975 |
| 11.29 | 30 | | | | | | 349.59 |
| 20. 2.89 | 55 | | | | | | 975 |
| 11.29 | 20 | 1.561E-02 | 3.027E-03 | | | | 349.59 |
| 20. 2.89 | 52 | | 4.900E-04 | | | | 986 |
| 14.33 | 10 | | | 3.654E-03 | 3.783E-04 | 9.540E-04 | 349.71 |
| 20. 2.89 | 55 | | | | | | 986 |
| 14.4 | 10 | | | 4.026E-03 | 4.077E-04 | 1.051E-03 | 349.71 |
| 20. 2.89 | 55 | | | 5.091E-03 | 4.071E-03 | 6.158E-03 | 986 |
| 14.4 | 30 | | | | | | 349.71 |
| 20. 2.89 | 55 | | | | | | 986 |
| 14.4 | 20 | 1.691E-02 | 4.206E-03 | | | | 349.71 |
| 21. 2.89 | 52 | | 5.219E-04 | | | | 984 |
| 0.35 | 10 | | | 4.407E-03 | 3.786E-04 | 9.907E-04 | 350.1 |
| 21. 2.89 | 55 | | | | | | 984 |
| 0.37 | 10 | | | 4.999E-03 | 4.263E-04 | 1.092E-03 | 350.1 |
| 21. 2.89 | 55 | | | 5.583E-03 | 4.325E-03 | 6.494E-03 | 984 |
| 0.37 | 30 | | | | | | 350.1 |
| 21. 2.89 | 55 | | | | | | 984 |
| 0.37 | 20 | 1.757E-02 | 5.131E-03 | | | | 350.1 |
| 21. 2.89 | 52 | | 4.030E-04 | | | | 984 |
| 9. 0 | 10 | | | 4.257E-03 | 2.996E-04 | 8.475E-04 | 350.42 |
| 21. 2.89 | 55 | | | | | | 984 |
| 9. 0 | 10 | | | 4.303E-03 | 3.062E-04 | 9.350E-04 | 350.42 |
| 21. 2.89 | 55 | | | 4.929E-03 | 3.859E-03 | 5.785E-03 | 984 |
| 9. 0 | 30 | | | | | | 350.42 |
| 21. 2.89 | 55 | | | | | | 984 |
| 9. 0 | 20 | 1.467E-02 | 4.621E-03 | | | | 350.42 |
| 21. 2.89 | 52 | | 4.983E-04 | | | | 983 |
| 16.48 | 10 | | | 3.510E-03 | 3.165E-04 | 7.616E-04 | 350.74 |
| 21. 2.89 | 55 | | | | | | 983 |
| 16.5 | 10 | | | 3.685E-03 | 4.163E-04 | 8.671E-04 | 350.74 |
| 21. 2.89 | 55 | | | 4.260E-03 | 3.289E-03 | 4.979E-03 | 983 |
| 16.5 | 30 | | | | | | 350.74 |
| 21. 2.89 | 55 | | | | | | 983 |
| 16.5 | 20 | 1.267E-02 | 3.844E-03 | | | | 350.74 |
| 22. 2.89 | 52 | | 4.079E-04 | | | | 983 |
| 0.3 | 10 | | | 3.846E-03 | 2.956E-04 | 8.103E-04 | 351.04 |
| 22. 2.89 | 55 | | | | | | 983 |
| 0.3 | 10 | | | 4.142E-03 | 3.478E-04 | 8.965E-04 | 351.04 |

Table 6.4.36. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 89.02 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 22. 2.89 | 55 | | | 4.884E-03 | 3.495E-03 | 5.633E-03 | 983 |
| 0.3 | 30 | | | | | | 351.04 |
| 22. 2.89 | 55 | | | | | | 983 |
| 0.3 | 20 | 1.391E-02 | 4.340E-03 | | | | 351.04 |
| 22. 2.89 | 52 | | 3.631E-04 | | | | 984 |
| 8.2 | 10 | | | 3.739E-03 | 2.653E-04 | 7.976E-04 | 351.49 |
| 22. 2.89 | 55 | | | | | | 984 |
| 8.2 | 10 | | | 3.910E-03 | 3.642E-04 | 8.670E-04 | 351.49 |
| 22. 2.89 | 55 | | | 4.747E-03 | 3.601E-03 | 5.519E-03 | 984 |
| 8.2 | 30 | | | | | | 351.49 |
| 22. 2.89 | 55 | | | | | | 984 |
| 8.2 | 20 | 1.426E-02 | 4.185E-03 | | | | 351.49 |
| 22. 2.89 | 52 | | 4.142E-04 | | | | 984 |
| 16.33 | 10 | | | 3.657E-03 | 2.869E-04 | 8.465E-04 | 351.81 |
| 22. 2.89 | 55 | | | | | | 984 |
| 16.33 | 10 | | | 3.949E-03 | 2.953E-04 | 8.736E-04 | 351.81 |
| 22. 2.89 | 55 | | | 4.895E-03 | 3.602E-03 | 5.577E-03 | 984 |
| 16.33 | 30 | | | | | | 351.81 |
| 22. 2.89 | 55 | | | | | | 984 |
| 16.33 | 20 | 1.495E-02 | 4.146E-03 | | | | 351.81 |
| 23. 2.89 | 52 | | 3.976E-04 | | | | 984 |
| 0. 5 | 10 | | | 3.440E-03 | 2.389E-04 | 7.816E-04 | 352.15 |
| 23. 2.89 | 55 | | | | | | 984 |
| 0. 7 | 10 | | | 3.695E-03 | 2.115E-04 | 8.667E-04 | 352.15 |
| 23. 2.89 | 55 | | | 4.546E-03 | 3.587E-03 | 5.475E-03 | 984 |
| 0. 7 | 30 | | | | | | 352.15 |
| 23. 2.89 | 55 | | | | | | 984 |
| 0. 7 | 20 | 1.356E-02 | 3.903E-03 | | | | 352.15 |
| 24. 2.89 | 52 | | 3.873E-04 | | | | 982 |
| 8.15 | 10 | | | 3.238E-03 | 2.871E-04 | 7.235E-04 | 353.46 |
| 24. 2.89 | 55 | | | | | | 982 |
| 8.15 | 10 | | | 3.520E-03 | 3.477E-04 | 7.843E-04 | 353.46 |
| 24. 2.89 | 55 | | | 4.253E-03 | 3.062E-03 | 5.113E-03 | 982 |
| 8.15 | 30 | | | | | | 353.46 |
| 24. 2.89 | 55 | | | | | | 982 |
| 8.15 | 20 | 1.274E-02 | 3.523E-03 | | | | 353.46 |
| 25. 2.89 | 52 | | 3.949E-04 | | | | 982 |
| 20.1 | 10 | | | 3.162E-03 | 2.854E-04 | 7.319E-04 | 354.98 |
| 25. 2.89 | 55 | | | | | | 982 |
| 20.1 | 10 | | | 3.312E-03 | 3.129E-04 | 7.784E-04 | 354.98 |
| 25. 2.89 | 55 | | | 4.218E-03 | 3.106E-03 | 4.731E-03 | 982 |
| 20.1 | 30 | | | | | | 354.98 |
| 25. 2.89 | 55 | | | | | | 982 |
| 20.1 | 20 | 1.134E-02 | 3.270E-03 | | | | 354.98 |
| 28. 2.89 | 52 | | 3.718E-04 | | | | 983 |
| 1. 0 | 10 | | | 2.905E-03 | 2.735E-04 | 7.140E-04 | 357.16 |
| 28. 2.89 | 55 | | | | | | 983 |
| 1. 5 | 10 | | | 2.996E-03 | 3.344E-04 | 7.133E-04 | 357.16 |
| 28. 2.89 | 55 | | | 4.097E-03 | 3.096E-03 | 4.677E-03 | 983 |
| 1. 5 | 30 | | | | | | 357.16 |
| 28. 2.89 | 55 | | | | | | 983 |
| 1. 5 | 20 | 1.267E-02 | 2.979E-03 | | | | 357.16 |

Table 6.4.36. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 89.02 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 3. 3.89 | 52 | | | | | | 979 |
| 2.25 | 10 | | | | | | 358.12 |
| 3. 3.89 | 55 | | | | | | 979 |
| 2.25 | 10 | | | | | | 358.12 |
| 3. 3.89 | 55 | | | | | | 979 |
| 2.25 | 30 | | | | | | 358.12 |
| 3. 3.89 | 55 | | | | | | 979 |
| 2.25 | 20 | | | | | | 358.12 |
| 4. 3.89 | 52 | | 4.433E-04 | | | | 983 |
| 0.45 | 10 | | | 2.806E-03 | 3.150E-04 | 7.252E-04 | 359.42 |
| 4. 3.89 | 55 | | | | | | 983 |
| 0.45 | 10 | | | 2.943E-03 | 3.183E-04 | 7.919E-04 | 359.42 |
| 4. 3.89 | 55 | | | 4.057E-03 | 3.010E-03 | 4.401E-03 | 983 |
| 0.45 | 30 | | | | | | 359.42 |
| 4. 3.89 | 55 | | | | | | 983 |
| 0.45 | 20 | 8.567E-03 | 2.861E-03 | | | | 359.42 |
| 5. 3.89 | 55 | | | | | | 87 |
| 2. 0 | 20 | | | | | | 359.78 |

Table 6.4.37. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 89.03 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 7. 4.89 | 52 | | 4.156E-04 | | | | 923 |
| 1.15 | 10 | | | 3.001E-03 | 3.076E-04 | 7.391E-04 | 361.78 |
| 7. 4.89 | 55 | | | | | | 923 |
| 1.15 | 10 | | | 2.968E-03 | 2.190E-04 | 7.615E-04 | 361.78 |
| 7. 4.89 | 55 | | | 3.535E-03 | 2.643E-03 | 4.212E-03 | 923 |
| 1.15 | 30 | | | | | | 361.78 |
| 7. 4.89 | 55 | | | | | | 923 |
| 1.15 | 20 | 3.894E-03 | 2.952E-03 | | | | 361.78 |
| 8. 4.89 | 52 | | 4.168E-04 | | | | 924 |
| 0.4 | 10 | | | 2.727E-03 | 2.903E-04 | 6.753E-04 | 362.8 |
| 8. 4.89 | 55 | | | | | | 924 |
| 0.4 | 10 | | | 2.651E-03 | 3.210E-04 | 6.876E-04 | 362.8 |
| 8. 4.89 | 55 | | | 3.282E-03 | 2.396E-03 | 3.614E-03 | 924 |
| 0.4 | 30 | | | | | | 362.8 |
| 8. 4.89 | 55 | | | | | | 924 |
| 0.4 | 20 | 5.377E-03 | 2.528E-03 | | | | 362.8 |
| 9. 4.89 | 52 | | 4.379E-04 | | | | 925 |
| 3.35 | 10 | | | 2.372E-03 | 3.009E-04 | 6.473E-04 | 363.99 |
| 9. 4.89 | 55 | | | | | | 925 |
| 3.35 | 10 | | | 2.538E-03 | 3.232E-04 | 6.756E-04 | 363.99 |
| 9. 4.89 | 55 | | | 3.176E-03 | 2.383E-03 | 3.689E-03 | 925 |
| 3.35 | 30 | | | | | | 363.99 |
| 9. 4.89 | 55 | | | | | | 925 |
| 3.35 | 20 | 5.648E-03 | 2.403E-03 | | | | 363.99 |
| 10. 4.89 | 52 | | 3.511E-04 | | | | 923 |
| 1.15 | 10 | | | 2.323E-03 | 2.700E-04 | 6.313E-04 | 364.82 |
| 10. 4.89 | 55 | | | | | | 923 |
| 1.15 | 10 | | | 2.403E-03 | 2.902E-04 | 6.257E-04 | 364.82 |
| 10. 4.89 | 55 | | | 3.049E-03 | 2.296E-03 | 3.480E-03 | 923 |
| 1.15 | 30 | | | | | | 364.82 |
| 10. 4.89 | 55 | | | | | | 923 |
| 1.15 | 20 | 6.313E-03 | 2.299E-03 | | | | 364.82 |
| 11. 4.89 | 52 | | 3.161E-04 | | | | 925 |
| 1.2 | 10 | | | 2.308E-03 | 2.403E-04 | 6.234E-04 | 365.83 |
| 11. 4.89 | 55 | | | | | | 925 |
| 1.2 | 10 | | | 2.257E-03 | 2.818E-04 | 6.357E-04 | 365.83 |
| 11. 4.89 | 55 | | | 3.167E-03 | 2.343E-03 | 3.671E-03 | 925 |
| 1.2 | 30 | | | | | | 365.83 |
| 11. 4.89 | 55 | | | | | | 925 |
| 1.2 | 20 | 5.912E-03 | 2.318E-03 | | | | 365.83 |
| 12. 4.89 | 52 | | 3.846E-04 | | | | 924 |
| 3.1 | 10 | | | 2.265E-03 | 2.743E-04 | 6.083E-04 | 366.92 |
| 12. 4.89 | 55 | | | | | | 924 |
| 3.1 | 10 | | | 2.281E-03 | 2.987E-04 | 6.352E-04 | 366.92 |
| 12. 4.89 | 55 | | | 2.873E-03 | 2.276E-03 | 3.419E-03 | 924 |
| 3.1 | 30 | | | | | | 366.92 |
| 12. 4.89 | 55 | | | | | | 924 |
| 3.1 | 20 | 6.282E-03 | 2.162E-03 | | | | 366.92 |
| 13. 4.89 | 52 | | 3.863E-04 | | | | 928 |
| 0.59 | 10 | | | 2.141E-03 | 2.528E-04 | 6.180E-04 | 367.78 |
| 13. 4.89 | 55 | | | | | | 928 |
| 0.59 | 10 | | | 2.208E-03 | 2.701E-04 | 6.183E-04 | 367.78 |

Table 6.4.37. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 89.03 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 13. 4.89 | 55 | | | 2.950E-03 | 2.188E-03 | 3.388E-03 | 928 |
| 0.59 | 30 | | | | | | 367.78 |
| 13. 4.89 | 55 | | | | | | 928 |
| 0.59 | 20 | 5.912E-03 | 2.064E-03 | | | | 367.78 |
| 14. 4.89 | 52 | | 4.101E-04 | | | | 922 |
| 1. 0 | 10 | | | 2.133E-03 | 2.878E-04 | 6.045E-04 | 368.78 |
| 14. 4.89 | 55 | | | | | | 922 |
| 1. 0 | 10 | | | 2.106E-03 | 2.654E-04 | 6.049E-04 | 368.78 |
| 14. 4.89 | 55 | | | 2.872E-03 | 2.208E-03 | 3.232E-03 | 922 |
| 1. 0 | 30 | | | | | | 368.78 |
| 14. 4.89 | 55 | | | | | | 922 |
| 1. 0 | 20 | 5.837E-03 | 1.923E-03 | | | | 368.78 |
| 15. 4.89 | 52 | | 3.922E-04 | | | | 922 |
| 0.3 | 10 | | | 2.137E-03 | 2.876E-04 | 5.897E-04 | 369.78 |
| 15. 4.89 | 55 | | | | | | 922 |
| 0.3 | 10 | | | 2.061E-03 | 3.217E-04 | 5.950E-04 | 369.78 |
| 15. 4.89 | 55 | | | 2.846E-03 | 2.144E-03 | 3.281E-03 | 922 |
| 0.3 | 30 | | | | | | 369.78 |
| 15. 4.89 | 55 | | | | | | 922 |
| 0.3 | 20 | 6.137E-03 | 1.919E-03 | | | | 369.78 |
| 16. 4.89 | 52 | | 4.278E-04 | | | | 923 |
| 0.45 | 10 | | | 2.053E-03 | 2.911E-04 | 5.895E-04 | 370.78 |
| 16. 4.89 | 55 | | | | | | 923 |
| 0.45 | 10 | | | 2.104E-03 | 3.217E-04 | 5.891E-04 | 370.78 |
| 16. 4.89 | 55 | | | 2.764E-03 | 2.144E-03 | 3.345E-03 | 923 |
| 0.45 | 30 | | | | | | 370.78 |
| 16. 4.89 | 55 | | | | | | 923 |
| 0.45 | 20 | 6.143E-03 | 1.941E-03 | | | | 370.78 |
| 17. 4.89 | 52 | | | | | | 918 |
| 2.35 | 10 | | | | | | 371.85 |
| 17. 4.89 | 55 | | | | | | 918 |
| 2.35 | 10 | | | | | | 371.85 |
| 17. 4.89 | 55 | | | 2.750E-03 | 1.914E-03 | 3.250E-03 | 918 |
| 2.35 | 30 | | | | | | 371.85 |
| 17. 4.89 | 55 | | | | | | 918 |
| 2.35 | 20 | 6.463E-03 | 1.829E-03 | | | | 371.85 |
| 18. 4.89 | 52 | | 4.905E-04 | | | | 919 |
| 1. 0 | 10 | | | 1.575E-03 | 3.029E-04 | 4.637E-04 | 372.79 |
| 18. 4.89 | 55 | | | | | | 919 |
| 1. 0 | 10 | | | 1.677E-03 | 3.098E-04 | 5.067E-04 | 372.79 |
| 18. 4.89 | 55 | | | 2.051E-03 | 1.625E-03 | 2.427E-03 | 919 |
| 1. 0 | 30 | | | | | | 372.79 |
| 18. 4.89 | 55 | | | | | | 919 |
| 1. 0 | 20 | 4.733E-03 | 1.420E-03 | | | | 372.79 |
| 20. 4.89 | 52 | | 4.921E-04 | | | | 917 |
| 0.38 | 10 | | | 1.597E-03 | 3.051E-04 | 4.545E-04 | 374.79 |
| 20. 4.89 | 55 | | | | | | 917 |
| 0.38 | 10 | | | 1.622E-03 | 3.589E-04 | 4.854E-04 | 374.79 |
| 20. 4.89 | 55 | | | 1.999E-03 | 1.557E-03 | 2.232E-03 | 917 |
| 0.38 | 30 | | | | | | 374.79 |
| 20. 4.89 | 55 | | | | | | 917 |
| 0.38 | 20 | 4.782E-03 | 1.380E-03 | | | | 374.79 |

Table 6.4.37. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 89.03 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 21. 4.89 | 52 | | 5.030E-04 | | | | 918 |
| 0.36 | 10 | | | 1.660E-03 | 3.203E-04 | 4.678E-04 | 375.79 |
| 21. 4.89 | 55 | | | | | | 918 |
| 0.36 | 10 | | | 1.566E-03 | 3.476E-04 | 4.871E-04 | 375.79 |
| 21. 4.89 | 55 | | | 2.017E-03 | 1.601E-03 | 2.318E-03 | 918 |
| 0.36 | 30 | | | | | | 375.79 |
| 21. 4.89 | 55 | | | | | | 918 |
| 0.36 | 20 | 4.743E-03 | 1.374E-03 | | | | 375.79 |
| 22. 4.89 | 52 | | 4.200E-04 | | | | 918 |
| 0.42 | 10 | | | 1.795E-03 | 2.822E-04 | 5.615E-04 | 376.79 |
| 22. 4.89 | 55 | | | | | | 918 |
| 0.42 | 10 | | | 1.966E-03 | 3.161E-04 | 5.828E-04 | 376.79 |
| 22. 4.89 | 55 | | | 2.686E-03 | 2.027E-03 | 3.021E-03 | 918 |
| 0.42 | 30 | | | | | | 376.79 |
| 22. 4.89 | 55 | | | | | | 918 |
| 0.42 | 20 | 6.104E-03 | 1.782E-03 | | | | 376.79 |
| 23. 4.89 | 52 | | 5.061E-04 | | | | 916 |
| 0.28 | 10 | | | 1.339E-03 | 3.012E-04 | 4.629E-04 | 377.79 |
| 23. 4.89 | 55 | | | | | | 916 |
| 0.28 | 10 | | | 1.653E-03 | 3.703E-04 | 4.820E-04 | 377.79 |
| 23. 4.89 | 55 | | | 2.046E-03 | 1.537E-03 | 2.354E-03 | 916 |
| 0.28 | 30 | | | | | | 377.79 |
| 23. 4.89 | 55 | | | | | | 916 |
| 0.28 | 20 | 4.555E-03 | 1.324E-03 | | | | 377.79 |
| 24. 4.89 | 52 | | 4.741E-04 | | | | 916 |
| 0.42 | 10 | | | 1.547E-03 | 2.985E-04 | 4.458E-04 | 378.79 |
| 24. 4.89 | 55 | | | | | | 916 |
| 0.42 | 10 | | | 1.537E-03 | 3.088E-04 | 4.911E-04 | 378.79 |
| 24. 4.89 | 55 | | | 1.999E-03 | 1.600E-03 | 2.225E-03 | 916 |
| 0.42 | 30 | | | | | | 378.79 |
| 24. 4.89 | 55 | | | | | | 916 |
| 0.42 | 20 | 4.748E-03 | 1.319E-03 | | | | 378.79 |
| 25. 4.89 | 52 | | | | | | 44 |
| 5. 0 | 10 | | | | | | 379.86 |

Table 6.4.38. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 89.04 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 29. 4.89 | 52 | | 3.034E-04 | | | | 780 |
| 1.1 | 10 | | | 1.259E-03 | 2.767E-04 | 5.224E-04 | 380.66 |
| 29. 4.89 | 55 | | | | | | 780 |
| 1.1 | 10 | | | 1.265E-03 | | 5.342E-04 | 380.66 |
| 29. 4.89 | 55 | | | 1.565E-03 | 1.287E-03 | 1.806E-03 | 780 |
| 1.1 | 30 | | | | | | 380.66 |
| 29. 4.89 | 55 | | | | | | 780 |
| 1.1 | 20 | 2.887E-03 | 1.164E-03 | | | | 380.66 |
| 30. 4.89 | 52 | | 3.011E-04 | | | | 786 |
| 0.58 | 10 | | | 1.426E-03 | 2.858E-04 | 5.319E-04 | 381.76 |
| 30. 4.89 | 55 | | | | | | 786 |
| 0.58 | 10 | | | 1.418E-03 | 3.173E-04 | 5.530E-04 | 381.76 |
| 30. 4.89 | 55 | | | 1.550E-03 | 1.178E-03 | 1.700E-03 | 786 |
| 0.58 | 30 | | | | | | 381.76 |
| 30. 4.89 | 55 | | | | | | 786 |
| 0.58 | 20 | 3.385E-03 | 1.364E-03 | | | | 381.76 |
| 1. 5.89 | 52 | | 3.041E-04 | | | | 792 |
| 1.15 | 10 | | | 1.477E-03 | 2.831E-04 | 5.490E-04 | 382.66 |
| 1. 5.89 | 55 | | | | | | 792 |
| 1.15 | 10 | | | 1.515E-03 | 2.803E-04 | 4.703E-04 | 382.66 |
| 1. 5.89 | 55 | | | 1.572E-03 | 1.246E-03 | 1.817E-03 | 792 |
| 1.15 | 30 | | | | | | 382.66 |
| 1. 5.89 | 55 | | | | | | 792 |
| 1.15 | 20 | 3.508E-03 | 1.407E-03 | | | | 382.66 |
| 2. 5.89 | 52 | | 3.267E-04 | | | | 791 |
| 0.58 | 10 | | | 1.434E-03 | 2.540E-04 | 5.373E-04 | 383.68 |
| 2. 5.89 | 55 | | | | | | 791 |
| 0.58 | 10 | | | 1.548E-03 | 2.977E-04 | 5.434E-04 | 383.68 |
| 2. 5.89 | 55 | | | 1.488E-03 | 1.236E-03 | 1.784E-03 | 791 |
| 0.58 | 30 | | | | | | 383.68 |
| 2. 5.89 | 55 | | | | | | 791 |
| 0.58 | 20 | 3.863E-03 | 1.349E-03 | | | | 383.68 |
| 2. 5.89 | 55 | | | | | | 791 |
| 0.58 | 20 | | | | | | 384.1 |
| 2. 5.89 | 52 | | 4.101E-04 | | | | 887 |
| 12.1 | 10 | | | 1.753E-03 | 3.313E-04 | 6.292E-04 | 384.1 |
| 2. 5.89 | 55 | | | | | | 887 |
| 12.1 | 10 | | | 1.895E-03 | 3.968E-04 | 6.646E-04 | 384.1 |
| 2. 5.89 | 55 | | | 2.449E-03 | 1.808E-03 | 2.905E-03 | 887 |
| 12.1 | 30 | | | | | | 384.1 |
| 2. 5.89 | 55 | | | | | | 887 |
| 12.1 | 20 | 6.172E-03 | 1.745E-03 | | | | 384.1 |
| 2. 5.89 | 52 | | 3.976E-04 | | | | 883 |
| 16.34 | 10 | | | 1.943E-03 | 3.358E-04 | 6.261E-04 | 384.27 |
| 2. 5.89 | 55 | | | | | | 883 |
| 16.34 | 10 | | | 1.928E-03 | 3.636E-04 | 6.473E-04 | 384.27 |
| 2. 5.89 | 55 | | | 2.325E-03 | 1.786E-03 | 2.650E-03 | 883 |
| 16.34 | 30 | | | | | | 384.27 |
| 2. 5.89 | 55 | | | | | | 883 |
| 16.34 | 20 | 5.220E-03 | 1.780E-03 | | | | 384.27 |
| 2. 5.89 | 52 | | 3.800E-04 | | | | 883 |
| 20.22 | 10 | | | 1.917E-03 | 3.149E-04 | 6.253E-04 | 384.43 |

Table 6.4.38. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 89.04 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 2. 5.89 | 55 | | | | | | 883 |
| 20.22 | 10 | | | 2.022E-03 | 4.021E-04 | 6.716E-04 | 384.43 |
| 2. 5.89 | 55 | | | 2.243E-03 | 1.758E-03 | 2.459E-03 | 883 |
| 20.22 | 30 | | | | | | 384.43 |
| 2. 5.89 | 55 | | | | | | 883 |
| 20.22 | 20 | 5.442E-03 | 1.790E-03 | | | | 384.43 |
| 3. 5.89 | 52 | | 4.057E-04 | | | | 885 |
| 0.33 | 10 | | | 1.878E-03 | 3.074E-04 | 5.897E-04 | 384.61 |
| 3. 5.89 | 55 | | | | | | 885 |
| 0.33 | 10 | | | 1.955E-03 | 3.087E-04 | 6.169E-04 | 384.61 |
| 3. 5.89 | 55 | | | 2.859E-03 | 2.891E-03 | 2.866E-03 | 885 |
| 0.33 | 30 | | | | | | 384.61 |
| 3. 5.89 | 55 | | | | | | 885 |
| 0.33 | 20 | 5.323E-03 | 1.729E-03 | | | | 384.61 |
| 3. 5.89 | 52 | | 3.825E-04 | | | | 883 |
| 8.1 | 10 | | | 1.859E-03 | 2.913E-04 | 5.861E-04 | 384.96 |
| 3. 5.89 | 55 | | | | | | 883 |
| 8.1 | 10 | | | 1.978E-03 | 3.385E-04 | 6.233E-04 | 384.96 |
| 3. 5.89 | 55 | | | 2.161E-03 | 1.682E-03 | 2.494E-03 | 883 |
| 8.1 | 30 | | | | | | 384.96 |
| 3. 5.89 | 55 | | | | | | 883 |
| 8.1 | 20 | 4.872E-03 | 1.729E-03 | | | | 384.96 |
| 3. 5.89 | 52 | | 3.726E-04 | | | | 883 |
| 11.54 | 10 | | | 1.868E-03 | 2.196E-04 | 5.852E-04 | 385.1 |
| 3. 5.89 | 55 | | | | | | 883 |
| 11.54 | 10 | | | 1.796E-03 | 3.471E-04 | 5.924E-04 | 385.1 |
| 3. 5.89 | 55 | | | 2.255E-03 | 1.715E-03 | 2.506E-03 | 883 |
| 11.54 | 30 | | | | | | 385.1 |
| 3. 5.89 | 55 | | | | | | 883 |
| 11.54 | 20 | 4.641E-03 | 1.660E-03 | | | | 385.1 |
| 4. 5.89 | 52 | | 3.678E-04 | | | | 884 |
| 8.3 | 10 | | | 1.725E-03 | 2.906E-04 | 5.673E-04 | 385.96 |
| 4. 5.89 | 55 | | | | | | 884 |
| 8.3 | 10 | | | 1.805E-03 | 3.176E-04 | 5.788E-04 | 385.96 |
| 4. 5.89 | 55 | | | 2.094E-03 | 1.626E-03 | 2.383E-03 | 884 |
| 8.3 | 30 | | | | | | 385.96 |
| 4. 5.89 | 55 | | | | | | 884 |
| 8.3 | 20 | 5.193E-03 | 1.577E-03 | | | | 385.96 |
| 5. 5.89 | 52 | | 3.633E-04 | | | | 883 |
| 8.4 | 10 | | | 1.672E-03 | 2.960E-04 | 5.578E-04 | 386.98 |
| 5. 5.89 | 55 | | | | | | 883 |
| 8.4 | 10 | | | 1.799E-03 | 4.154E-04 | 5.885E-04 | 386.98 |
| 5. 5.89 | 55 | | | 2.127E-03 | 1.653E-03 | 2.366E-03 | 883 |
| 8.4 | 30 | | | | | | 386.98 |
| 5. 5.89 | 55 | | | | | | 883 |
| 8.4 | 20 | 4.571E-03 | 1.568E-03 | | | | 386.98 |
| 6. 5.89 | 52 | | 3.887E-04 | | | | 883 |
| 8.47 | 10 | | | 1.705E-03 | 2.961E-04 | 5.660E-04 | 387.98 |
| 6. 5.89 | 55 | | | | | | 883 |
| 8.47 | 10 | | | 1.746E-03 | 3.557E-04 | 5.894E-04 | 387.98 |
| 6. 5.89 | 55 | | | 2.153E-03 | 1.540E-03 | 2.241E-03 | 883 |
| 8.47 | 30 | | | | | | 387.98 |

Table 6.4.38. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 89.04 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 6. 5.89 | 55 | | | | | | 883 |
| 8.47 | 20 | 4.730E-03 | 1.578E-03 | | | | 387.98 |
| 7. 5.89 | 52 | | 3.842E-04 | | | | 884 |
| 8.27 | 10 | | | 1.613E-03 | 2.976E-04 | 5.636E-04 | 388.96 |
| 7. 5.89 | 55 | | | | | | 884 |
| 8.27 | 10 | | | 1.760E-03 | 4.025E-04 | 5.847E-04 | 388.96 |
| 7. 5.89 | 55 | | | 2.085E-03 | 1.661E-03 | 2.505E-03 | 884 |
| 8.27 | 30 | | | | | | 388.96 |
| 7. 5.89 | 55 | | | | | | 884 |
| 8.27 | 20 | 4.789E-03 | 1.551E-03 | | | | 388.96 |
| 10. 5.89 | 52 | | 3.845E-04 | | | | 883 |
| 1. 2 | 10 | | | 1.714E-03 | 2.906E-04 | 5.552E-04 | 391.65 |
| 10. 5.89 | 55 | | | | | | 883 |
| 1. 2 | 10 | | | 1.707E-03 | 2.827E-04 | 5.784E-04 | 391.65 |
| 10. 5.89 | 55 | | | 2.076E-03 | 1.588E-03 | 2.305E-03 | 883 |
| 1. 2 | 30 | | | | | | 391.65 |
| 10. 5.89 | 55 | | | | | | 883 |
| 1. 2 | 20 | 5.320E-03 | 1.571E-03 | | | | 391.65 |
| 11. 5.89 | 52 | | 3.671E-04 | | | | 885 |
| 0. 9 | 10 | | | 1.781E-03 | 2.959E-04 | 5.674E-04 | 392.73 |
| 11. 5.89 | 55 | | | | | | 885 |
| 0. 9 | 10 | | | 1.787E-03 | 2.956E-04 | 5.777E-04 | 392.73 |
| 11. 5.89 | 55 | | | 2.107E-03 | 1.678E-03 | 2.318E-03 | 885 |
| 0. 9 | 30 | | | | | | 392.73 |
| 11. 5.89 | 55 | | | | | | 885 |
| 0. 9 | 20 | 5.387E-03 | 1.627E-03 | | | | 392.73 |
| 16. 5.89 | 52 | | 3.592E-04 | | | | 883 |
| 8.49 | 10 | | | 1.692E-03 | 3.016E-04 | 5.625E-04 | 397.98 |
| 16. 5.89 | 55 | | | | | | 883 |
| 8.49 | 10 | | | 1.829E-03 | 4.530E-04 | 6.073E-04 | 397.98 |
| 16. 5.89 | 55 | | | 2.106E-03 | 1.666E-03 | 2.466E-03 | 883 |
| 8.49 | 30 | | | | | | 397.98 |
| 16. 5.89 | 55 | | | | | | 883 |
| 8.49 | 20 | 5.526E-03 | 1.595E-03 | | | | 397.98 |
| 17. 5.89 | 52 | | 3.863E-04 | | | | 882 |
| 11.27 | 10 | | | 1.719E-03 | 3.071E-04 | 5.790E-04 | 399.06 |
| 17. 5.89 | 55 | | | | | | 882 |
| 11.27 | 10 | | | 1.643E-03 | 2.552E-04 | 5.685E-04 | 399.06 |
| 17. 5.89 | 55 | | | 2.056E-03 | 1.603E-03 | 2.271E-03 | 882 |
| 11.27 | 30 | | | | | | 399.06 |
| 17. 5.89 | 55 | | | | | | 882 |
| 11.27 | 30 | | | | | | 399.06 |
| 18. 5.89 | 52 | | 3.783E-04 | | | | 882 |
| 8.51 | 10 | | | 1.715E-03 | 2.989E-04 | 5.764E-04 | 399.98 |
| 18. 5.89 | 55 | | | | | | 882 |
| 8.51 | 10 | | | 1.718E-03 | 3.084E-04 | 5.813E-04 | 399.98 |
| 18. 5.89 | 55 | | | 2.117E-03 | 1.640E-03 | 2.304E-03 | 882 |
| 8.51 | 30 | | | | | | 399.98 |
| 18. 5.89 | 55 | | | | | | 882 |
| 8.51 | 20 | 4.972E-03 | 1.559E-03 | | | | 399.98 |
| 19. 5.89 | 52 | | 3.747E-04 | | | | 881 |
| 8.58 | 10 | | | 1.791E-03 | 2.992E-04 | 5.785E-04 | 400.98 |

Table 6.4.38. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 89.04 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 19. 5.89 | 55 | | | | | | 881 |
| 8.58 | 10 | | | 1.789E-03 | 3.057E-04 | 5.991E-04 | 400.98 |
| 19. 5.89 | 55 | | | 2.183E-03 | 1.649E-03 | 2.577E-03 | 881 |
| 8.58 | 30 | | | | | | 400.98 |
| 19. 5.89 | 55 | | | | | | 881 |
| 8.58 | 20 | 5.264E-03 | 1.610E-03 | | | | 400.98 |
| 20. 5.89 | 52 | | 3.861E-04 | | | | 882 |
| 8.47 | 10 | | | 1.774E-03 | 2.944E-04 | 5.829E-04 | 401.98 |
| 20. 5.89 | 55 | | | | | | 882 |
| 8.47 | 10 | | | 1.755E-03 | 2.974E-04 | 5.854E-04 | 401.98 |
| 20. 5.89 | 55 | | | 2.011E-03 | 1.577E-03 | 2.275E-03 | 882 |
| 8.47 | 30 | | | | | | 401.98 |
| 20. 5.89 | 55 | | | | | | 882 |
| 8.47 | 20 | 5.030E-03 | 1.554E-03 | | | | 401.98 |
| 20. 5.89 | 55 | | | | | | 882 |
| 22. 0 | 20 | | | | | | 402.59 |
| 21. 5.89 | 52 | | | | | | 31 |
| 12. 0 | 10 | | | | | | 403.1 |

Table 6.4.39 RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 89.05 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 25. 5.89 | 52 | | 3.305E-04 | | | | 751 |
| 17.37 | 10 | | | 1.580E-03 | 3.081E-04 | 6.003E-04 | 404.64 |
| 25. 5.89 | 55 | | | | | | 751 |
| 17.37 | 10 | | | 1.622E-03 | 3.067E-04 | 5.744E-04 | 404.64 |
| 25. 5.89 | 55 | | | 1.462E-03 | 1.202E-03 | 1.647E-03 | 751 |
| 17.37 | 30 | | | | | | 404.64 |
| 25. 5.89 | 55 | | | | | | 751 |
| 17.37 | 20 | 2.651E-03 | 1.352E-03 | | | | 404.64 |
| 26. 5.89 | 52 | | | | | | 756 |
| 17.58 | 10 | | | 1.644E-03 | 3.164E-04 | 5.891E-04 | 405.6 |
| 26. 5.89 | 55 | | | | | | 756 |
| 17.58 | 10 | | | 1.687E-03 | 3.600E-04 | 5.849E-04 | 405.6 |
| 26. 5.89 | 55 | | | 1.583E-03 | 1.235E-03 | 1.770E-03 | 756 |
| 17.58 | 30 | | | | | | 405.6 |
| 26. 5.89 | 55 | | | | | | 756 |
| 17.58 | 20 | 3.751E-03 | 1.553E-03 | | | | 405.6 |
| 27. 5.89 | 52 | | 3.314E-04 | | | | 757 |
| 17.1 | 10 | | | 1.766E-03 | 3.133E-04 | 5.950E-04 | 406.55 |
| 27. 5.89 | 55 | | | | | | 757 |
| 17.1 | 10 | | | 1.791E-03 | 4.465E-04 | 5.930E-04 | 406.55 |
| 27. 5.89 | 55 | | | 1.503E-03 | 1.260E-03 | 1.809E-03 | 757 |
| 17.1 | 30 | | | | | | 406.55 |
| 27. 5.89 | 55 | | | | | | 757 |
| 17.1 | 20 | 3.976E-03 | 1.579E-03 | | | | 406.55 |
| 28. 5.89 | 52 | | 3.251E-04 | | | | 757 |
| 17. 7 | 10 | | | 1.702E-03 | 3.150E-04 | 5.954E-04 | 407.5 |
| 28. 5.89 | 55 | | | | | | 757 |
| 17. 7 | 10 | | | 1.768E-03 | 4.179E-04 | 5.997E-04 | 407.5 |
| 28. 5.89 | 55 | | | 1.596E-03 | 1.286E-03 | 1.807E-03 | 757 |
| 17. 7 | 30 | | | | | | 407.5 |
| 28. 5.89 | 55 | | | | | | 757 |
| 17. 7 | 20 | 3.904E-03 | 1.565E-03 | | | | 407.5 |
| 29. 5.89 | 52 | | | | | | 823 |
| 16. 0 | 10 | | | | | | 408.4 |
| 29. 5.89 | 52 | | 3.933E-04 | | | | 823 |
| 16. 0 | 10 | | | 1.925E-03 | 3.501E-04 | 6.524E-04 | 408.4 |
| 29. 5.89 | 55 | | | | | | 823 |
| 16. 0 | 10 | | | 1.866E-03 | 3.433E-04 | 6.828E-04 | 408.4 |
| 29. 5.89 | 55 | | | 2.234E-03 | 1.665E-03 | 2.400E-03 | 823 |
| 16. 0 | 30 | | | | | | 408.4 |
| 29. 5.89 | 55 | | | | | | 823 |
| 16. 0 | 20 | 5.841E-03 | 1.735E-03 | | | | 408.94 |
| 29. 5.89 | 52 | | 4.002E-04 | | | | 822 |
| 21. 2 | 10 | | | 1.953E-03 | 3.716E-04 | 6.638E-04 | 408.6 |
| 29. 5.89 | 55 | | | | | | 822 |
| 21. 2 | 10 | | | 1.941E-03 | 3.594E-04 | 6.650E-04 | 408.6 |
| 29. 5.89 | 55 | | | 1.985E-03 | 1.599E-03 | 2.286E-03 | 822 |
| 21. 2 | 30 | | | | | | 408.6 |
| 29. 5.89 | 55 | | | | | | 822 |
| 21. 2 | 20 | 5.063E-03 | 1.760E-03 | | | | 408.6 |
| 30. 5.89 | 52 | | 3.933E-04 | | | | 821 |
| 0.4 | 10 | | | 1.973E-03 | 3.299E-04 | 6.322E-04 | 408.75 |

Table 6.4.39. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 89.05 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 30. 5.89 | 55 | | | | | | 821 |
| 0.4 | 10 | | | 1.894E-03 | 3.821E-04 | 6.670E-04 | 408.75 |
| 30. 5.89 | 55 | | | 2.033E-03 | 1.647E-03 | 2.181E-03 | 821 |
| 0.4 | 30 | | | | | | 408.75 |
| 30. 5.89 | 55 | | | | | | 821 |
| 0.4 | 20 | 5.394E-03 | 1.743E-03 | | | | 408.75 |
| 30. 5.89 | 52 | | 3.872E-04 | | | | 820 |
| 4. 5 | 10 | | | 1.961E-03 | 3.443E-04 | 6.692E-04 | 408.9 |
| 30. 5.89 | 55 | | | | | | 820 |
| 4. 5 | 10 | | | 1.977E-03 | 3.076E-04 | 6.797E-04 | 408.9 |
| 30. 5.89 | 55 | | | 2.063E-03 | 1.673E-03 | 2.246E-03 | 820 |
| 4. 5 | 30 | | | | | | 408.9 |
| 30. 5.89 | 55 | | | | | | 820 |
| 4. 5 | 20 | 4.878E-03 | 1.829E-03 | | | | 408.9 |
| 30. 5.89 | 52 | | 3.723E-04 | | | | 820 |
| 8.45 | 10 | | | 2.006E-03 | 3.386E-04 | 6.692E-04 | 409.1 |
| 30. 5.89 | 55 | | | | | | 820 |
| 8.45 | 10 | | | 1.963E-03 | 3.905E-04 | 6.755E-04 | 409.1 |
| 30. 5.89 | 55 | | | 2.083E-03 | 1.697E-03 | 2.253E-03 | 820 |
| 8.45 | 30 | | | | | | 409.1 |
| 30. 5.89 | 55 | | | | | | 820 |
| 8.45 | 20 | 4.477E-03 | 1.809E-03 | | | | 409.1 |
| 30. 5.89 | 52 | | 3.805E-04 | | | | 820 |
| 11.5 | 10 | | | 2.000E-03 | 3.417E-04 | 6.537E-04 | 409.25 |
| 30. 5.89 | 55 | | | | | | 820 |
| 11.5 | 10 | | | 2.019E-03 | 2.804E-04 | 6.687E-04 | 409.25 |
| 30. 5.89 | 55 | | | 1.953E-03 | 1.630E-03 | 2.341E-03 | 820 |
| 11.5 | 30 | | | | | | 409.25 |
| 30. 5.89 | 55 | | | | | | 820 |
| 11.5 | 20 | 4.943E-03 | 1.789E-03 | | | | 409.25 |
| 31. 5.89 | 52 | | 4.197E-04 | | | | 823 |
| 8.45 | 10 | | | 1.952E-03 | 3.446E-04 | 6.518E-04 | 410.05 |
| 31. 5.89 | 55 | | | | | | 823 |
| 8.45 | 10 | | | 1.912E-03 | 4.008E-04 | 6.476E-04 | 410.05 |
| 31. 5.89 | 55 | | | 2.003E-03 | 1.635E-03 | 2.223E-03 | 823 |
| 8.45 | 30 | | | | | | 410.05 |
| 31. 5.89 | 55 | | | | | | 823 |
| 8.45 | 20 | 4.943E-03 | 1.795E-03 | | | | 410.05 |
| 1. 6.89 | 52 | | 3.864E-04 | | | | 823 |
| 8.45 | 10 | | | 1.876E-03 | 3.450E-04 | 6.728E-04 | 411 |
| 1. 6.89 | 55 | | | | | | 823 |
| 8.45 | 10 | | | 1.942E-03 | 4.028E-04 | 6.616E-04 | 411 |
| 1. 6.89 | 55 | | | 1.941E-03 | 1.641E-03 | 2.227E-03 | 823 |
| 8.45 | 30 | | | | | | 411 |
| 1. 6.89 | 55 | | | | | | 823 |
| 8.45 | 20 | 4.560E-03 | 1.729E-03 | | | | 411 |
| 2. 6.89 | 52 | | 3.814E-04 | | | | 822 |
| 8.4 | 10 | | | 1.951E-03 | 3.278E-04 | 6.450E-04 | 411.95 |
| 2. 6.89 | 55 | | | | | | 822 |
| 8.4 | 10 | | | 1.863E-03 | 3.633E-04 | 6.813E-04 | 411.95 |
| 2. 6.89 | 55 | | | 1.984E-03 | 1.564E-03 | 2.250E-03 | 822 |
| 8.4 | 30 | | | | | | 411.95 |

Table 6.4.39. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 89.05 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 2. 6.89 | 55 | | | | | | 822 |
| 8.4 | 20 | 4.578E-03 | 1.764E-03 | | | | 411.95 |
| 3. 6.89 | 52 | | 3.885E-04 | | | | 822 |
| 9. 8 | 10 | | | 1.987E-03 | 3.282E-04 | 6.416E-04 | 412.89 |
| 3. 6.89 | 55 | | | | | | 822 |
| 9. 8 | 10 | | | 1.922E-03 | 3.512E-04 | 6.359E-04 | 412.89 |
| 3. 6.89 | 55 | | | 1.910E-03 | 1.583E-03 | 2.278E-03 | 822 |
| 9. 8 | 30 | | | | | | 412.89 |
| 3. 6.89 | 55 | | | | | | 822 |
| 9. 8 | 20 | 5.144E-03 | 1.714E-03 | | | | 412.89 |
| 4. 6.89 | 52 | | 3.920E-04 | | | | 822 |
| 8.5 | 10 | | | 1.938E-03 | 3.364E-04 | 6.192E-04 | 413.85 |
| 4. 6.89 | 55 | | | | | | 822 |
| 8.5 | 10 | | | 1.882E-03 | 3.310E-04 | 6.570E-04 | 413.85 |
| 4. 6.89 | 55 | | | 1.947E-03 | 1.497E-03 | 2.202E-03 | 822 |
| 8.5 | 30 | | | | | | 413.85 |
| 4. 6.89 | 55 | | | | | | 822 |
| 8.5 | 20 | 5.015E-03 | 1.586E-03 | | | | 413.85 |
| 5. 6.89 | 52 | | 3.808E-04 | | | | 822 |
| 8.24 | 10 | | | 1.921E-03 | 3.368E-04 | 6.267E-04 | 414.8 |
| 5. 6.89 | 55 | | | | | | 822 |
| 8.24 | 10 | | | 1.904E-03 | 3.421E-04 | 6.372E-04 | 414.8 |
| 5. 6.89 | 52 | | 3.716E-04 | | | | 823 |
| 9.25 | 10 | | | 2.005E-03 | 3.767E-04 | 7.385E-04 | 414.8 |
| 5. 6.89 | 52 | | 6.014E-04 | | | | 823 |
| 9.4 | 10 | | | 2.132E-03 | 4.142E-04 | 7.581E-04 | 414.8 |
| 5. 6.89 | 52 | | 6.976E-04 | | | | 823 |
| 9.54 | 10 | | | 2.244E-03 | 4.602E-04 | 9.373E-04 | 414.8 |
| 5. 6.89 | 52 | | 8.522E-04 | | | | 1026 |
| 10.33 | 10 | | | 2.843E-03 | 5.133E-04 | 1.004E-03 | 414.91 |
| 5. 6.89 | 52 | | 8.189E-04 | | | | 1026 |
| 10.45 | 10 | | | 2.949E-03 | 4.900E-04 | 1.009E-03 | 414.92 |
| 5. 6.89 | 55 | | | | | | 1026 |
| 10.45 | 10 | | | 2.932E-03 | 4.843E-04 | 1.106E-03 | 414.92 |
| 5. 6.89 | 55 | | | 6.994E-03 | 4.767E-03 | 9.196E-03 | 1026 |
| 10.45 | 30 | | | | | | 414.92 |
| 5. 6.89 | 55 | | | | | | 1026 |
| 10.45 | 20 | 3.411E-02 | 3.121E-03 | | | | 414.93 |
| 5. 6.89 | 52 | | 7.872E-04 | | | | 1021 |
| 15.51 | 10 | | | 3.478E-03 | 4.826E-04 | 8.875E-04 | 414.93 |
| 5. 6.89 | 55 | | | | | | 1021 |
| 15.51 | 10 | | | 3.611E-03 | 6.071E-04 | 1.072E-03 | 415.1 |
| 5. 6.89 | 55 | | | 5.739E-03 | 4.338E-03 | 6.658E-03 | 1021 |
| 15.51 | 30 | | | | | | 415.1 |
| 5. 6.89 | 55 | | | | | | 1021 |
| 15.51 | 20 | 3.960E-02 | 3.468E-03 | | | | 415.1 |
| 5. 6.89 | 52 | | 7.545E-04 | | | | 1020 |
| 19.5 | 10 | | | 3.459E-03 | 4.802E-04 | 9.912E-04 | 415.3 |
| 5. 6.89 | 55 | | | | | | 1020 |
| 19.5 | 10 | | | 3.670E-03 | 5.634E-04 | 1.108E-03 | 415.3 |
| 5. 6.89 | 55 | | | 5.688E-03 | 4.337E-03 | 6.673E-03 | 1020 |
| 19.5 | 30 | | | | | | 415.3 |

Table 6.4.39. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 89.05 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 5. 6.89 | 55 | | | | | | 1020 |
| 19.5 | 20 | 2.138E-02 | 3.457E-03 | | | | 415.3 |
| 6. 6.89 | 52 | | 8.003E-04 | | | | 1021 |
| 0.25 | 10 | | | 3.508E-03 | 4.695E-04 | 9.322E-04 | 415.45 |
| 6. 6.89 | 55 | | | | | | 1021 |
| 0.25 | 10 | | | 3.794E-03 | 5.279E-04 | 1.066E-03 | 415.45 |
| 6. 6.89 | 55 | | | 5.675E-03 | 4.433E-03 | 6.537E-03 | 1021 |
| 0.25 | 30 | | | | | | 415.45 |
| 6. 6.89 | 55 | | | | | | 1021 |
| 0.25 | 20 | 2.287E-02 | 3.588E-03 | | | | 415.45 |
| 6. 6.89 | 52 | | 7.849E-04 | | | | 1020 |
| 4.18 | 10 | | | 3.572E-03 | 5.000E-04 | 1.006E-03 | 415.6 |
| 6. 6.89 | 55 | | | | | | 1020 |
| 4.18 | 10 | | | 3.740E-03 | 3.536E-04 | 1.049E-03 | 415.6 |
| 6. 6.89 | 55 | | | 5.717E-03 | 4.293E-03 | 6.556E-03 | 1020 |
| 4.18 | 30 | | | | | | 415.6 |
| 6. 6.89 | 55 | | | | | | 1020 |
| 4.18 | 20 | 2.187E-02 | 3.559E-03 | | | | 415.6 |
| 6. 6.89 | 52 | | 7.880E-04 | | | | 1019 |
| 8.31 | 10 | | | 3.570E-03 | 4.630E-04 | 9.652E-04 | 415.75 |
| 6. 6.89 | 55 | | | | | | 1019 |
| 8.31 | 10 | | | 3.660E-03 | 3.822E-04 | 1.022E-03 | 415.75 |
| 6. 6.89 | 55 | | | 5.733E-03 | 4.323E-03 | 6.651E-03 | 1019 |
| 8.31 | 30 | | | | | | 415.75 |
| 6. 6.89 | 55 | | | | | | 1019 |
| 8.31 | 20 | 2.218E-02 | 3.523E-03 | | | | 415.75 |
| 6. 6.89 | 52 | | 7.625E-04 | | | | 1023 |
| 16. 0 | 10 | | | 3.707E-03 | 4.587E-04 | 1.027E-03 | 416.15 |
| 6. 6.89 | 55 | | | | | | 1023 |
| 16. 0 | 10 | | | 3.924E-03 | 4.836E-04 | 1.106E-03 | 416.15 |
| 6. 6.89 | 55 | | | 6.008E-03 | 4.493E-03 | 7.039E-03 | 1023 |
| 16. 0 | 30 | | | | | | 416.15 |
| 6. 6.89 | 55 | | | | | | 1023 |
| 16. 0 | 20 | 2.829E-02 | 3.854E-03 | | | | 416.15 |
| 6. 6.89 | 52 | | 7.481E-04 | | | | 1023 |
| 19.5 | 10 | | | 3.705E-03 | 4.586E-04 | 9.849E-04 | 416.3 |
| 6. 6.89 | 55 | | | | | | 1023 |
| 19.5 | 10 | | | 3.988E-03 | 5.449E-04 | 1.082E-03 | 416.3 |
| 6. 6.89 | 55 | | | 5.846E-03 | 4.570E-03 | 6.819E-03 | 1023 |
| 19.5 | 30 | | | | | | 416.3 |
| 6. 6.89 | 55 | | | | | | 1023 |
| 19.5 | 20 | 2.435E-02 | 3.836E-03 | | | | 416.3 |
| 7. 6.89 | 52 | | 7.756E-04 | | | | 1023 |
| 0.33 | 10 | | | 3.691E-03 | 4.520E-04 | 1.013E-03 | 416.35 |
| 7. 6.89 | 55 | | | | | | 1023 |
| 0.33 | 10 | | | 3.974E-03 | 4.581E-04 | 1.040E-03 | 416.35 |
| 7. 6.89 | 55 | | | 5.783E-03 | 4.498E-03 | 6.777E-03 | 1023 |
| 0.33 | 30 | | | | | | 416.35 |
| 7. 6.89 | 55 | | | | | | 1023 |
| 0.33 | 20 | 2.396E-02 | 3.856E-03 | | | | 416.35 |
| 7. 6.89 | 52 | | 7.440E-04 | | | | 1022 |
| 16. 8 | 10 | | | 3.762E-03 | 4.396E-04 | 9.836E-04 | 417.05 |

Table 6.4.39. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 89.05 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 7. 6.89 | 55 | | | | | | 1022 |
| 16. 8 | 10 | | | 4.068E-03 | 4.970E-04 | 1.060E-03 | 417.05 |
| 7. 6.89 | 55 | | | 5.881E-03 | 4.418E-03 | 6.897E-03 | 1022 |
| 16. 8 | 30 | | | | | | 417.05 |
| 7. 6.89 | 55 | | | | | | 1022 |
| 16. 8 | 20 | 2.372E-02 | 3.898E-03 | | | | 417.05 |
| 8. 6.89 | 52 | | 7.569E-04 | | | | 1024 |
| 16.2 | 10 | | | 4.169E-03 | 4.507E-04 | 9.150E-04 | 418 |
| 8. 6.89 | 55 | | | | | | 1024 |
| 16.2 | 10 | | | 4.315E-03 | 6.124E-04 | 1.044E-03 | 418 |
| 8. 6.89 | 55 | | | 5.867E-03 | 4.463E-03 | 6.790E-03 | 1024 |
| 16.2 | 30 | | | | | | 418 |
| 8. 6.89 | 55 | | | | | | 1024 |
| 16.2 | 20 | 3.029E-02 | 4.203E-03 | | | | 418 |
| 9. 6.89 | 52 | | 7.381E-04 | | | | 1024 |
| 7.48 | 10 | | | 4.691E-03 | 4.679E-04 | 9.955E-04 | 418.65 |
| 9. 6.89 | 55 | | | | | | 1024 |
| 7.48 | 10 | | | 4.859E-03 | 5.099E-04 | 1.044E-03 | 418.65 |
| 9. 6.89 | 55 | | | 5.962E-03 | 4.664E-03 | 6.909E-03 | 1024 |
| 7.48 | 30 | | | | | | 418.65 |
| 9. 6.89 | 55 | | | | | | 1024 |
| 7.48 | 20 | 5.303E-02 | 4.882E-03 | | | | 418.65 |
| 9. 6.89 | 52 | | 7.660E-04 | | | | 1023 |
| 10.4 | 10 | | | 4.597E-03 | 4.341E-04 | 9.388E-04 | 418.75 |
| 9. 6.89 | 52 | | 2.657E-04 | | | | 1023 |
| 10.55 | 10 | | | 5.333E-03 | 2.714E-04 | 5.530E-04 | 418.76 |
| 9. 6.89 | 52 | | 2.981E-04 | | | | 837 |
| 11.1 | 10 | | | 6.772E-03 | 2.847E-04 | 5.767E-04 | 418.77 |
| 9. 6.89 | 52 | | 2.815E-04 | | | | 837 |
| 11.3 | 10 | | | 7.259E-03 | 2.887E-04 | 6.002E-04 | 418.8 |
| 9. 6.89 | 55 | | | | | | 837 |
| 11.3 | 10 | | | 7.239E-03 | 3.112E-04 | 6.030E-04 | 418.8 |
| 9. 6.89 | 55 | | | 2.221E-03 | 1.594E-03 | 3.382E-03 | 837 |
| 11.3 | 30 | | | | | | 418.8 |
| 9. 6.89 | 55 | | | | | | 837 |
| 11.3 | 20 | 2.213E-01 | 7.408E-03 | | | | 418.8 |
| 9. 6.89 | 52 | | 3.472E-04 | | | | 818 |
| 16.43 | 10 | | | 5.233E-03 | 3.103E-04 | 5.895E-04 | 419 |
| 9. 6.89 | 55 | | | | | | 818 |
| 16.43 | 10 | | | 4.914E-03 | 2.934E-04 | 5.472E-04 | 419 |
| 9. 6.89 | 55 | | | 1.895E-03 | 1.558E-03 | 2.174E-03 | 818 |
| 16.43 | 30 | | | | | | 419 |
| 9. 6.89 | 55 | | | | | | 818 |
| 16.43 | 20 | 2.058E-02 | 4.847E-03 | | | | 419 |
| 9. 6.89 | 52 | | 3.439E-04 | | | | 828 |
| 19.55 | 10 | | | 4.116E-03 | 3.075E-04 | 6.011E-04 | 419.15 |
| 9. 6.89 | 55 | | | | | | 828 |
| 19.55 | 10 | | | 4.235E-03 | 3.933E-04 | 6.018E-04 | 419.15 |
| 9. 6.89 | 55 | | | 1.856E-03 | 1.501E-03 | 2.035E-03 | 828 |
| 19.55 | 30 | | | | | | 419.15 |
| 9. 6.89 | 55 | | | | | | 828 |
| 19.55 | 20 | 1.698E-02 | 3.911E-03 | | | | 419.15 |

Table 6.4.39. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 89.05 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 10. 6.89 | 52 | | 3.342E-04 | | | | 831 |
| 0. 0 | 10 | | | 3.219E-03 | 3.027E-04 | 5.583E-04 | 419.25 |
| 10. 6.89 | 55 | | | | | | 831 |
| 0. 0 | 10 | | | 3.340E-03 | 4.356E-04 | 5.740E-04 | 419.25 |
| 10. 6.89 | 55 | | | 1.849E-03 | 1.451E-03 | 2.154E-03 | 831 |
| 0. 0 | 30 | | | | | | 419.25 |
| 10. 6.89 | 55 | | | | | | 831 |
| 0. 0 | 20 | 1.453E-02 | 3.043E-03 | | | | 419.25 |
| 10. 6.89 | 52 | | 3.287E-04 | | | | 831 |
| 3.56 | 10 | | | 2.730E-03 | 2.921E-04 | 5.929E-04 | 419.4 |
| 10. 6.89 | 55 | | | | | | 831 |
| 3.56 | 10 | | | 2.795E-03 | 3.162E-04 | 5.916E-04 | 419.4 |
| 10. 6.89 | 55 | | | 1.967E-03 | 1.481E-03 | 2.323E-03 | 831 |
| 3.56 | 30 | | | | | | 419.4 |
| 10. 6.89 | 55 | | | | | | 831 |
| 3.56 | 20 | 1.193E-02 | 2.675E-03 | | | | 419.4 |
| 10. 6.89 | 52 | | 3.266E-04 | | | | 832 |
| 8.3 | 10 | | | 2.421E-03 | 3.119E-04 | 5.773E-04 | 419.65 |
| 10. 6.89 | 55 | | | | | | 832 |
| 8.3 | 10 | | | 3.004E-03 | 5.778E-04 | 7.296E-04 | 419.65 |
| 10. 6.89 | 55 | | | 1.942E-03 | 1.472E-03 | 2.150E-03 | 832 |
| 8.3 | 30 | | | | | | 419.65 |
| 10. 6.89 | 55 | | | | | | 832 |
| 8.3 | 20 | 1.168E-02 | 2.292E-03 | | | | 419.65 |
| 10. 6.89 | 52 | | 3.452E-04 | | | | 832 |
| 11.52 | 10 | | | 2.282E-03 | 3.058E-04 | 5.974E-04 | 419.75 |
| 10. 6.89 | 55 | | | | | | 832 |
| 11.52 | 10 | | | 2.280E-03 | 3.811E-04 | 6.180E-04 | 419.75 |
| 10. 6.89 | 55 | | | 1.999E-03 | 1.502E-03 | 2.177E-03 | 832 |
| 11.52 | 30 | | | | | | 419.75 |
| 10. 6.89 | 55 | | | | | | 832 |
| 11.52 | 20 | 1.122E-02 | 2.110E-03 | | | | 419.75 |
| 10. 6.89 | 52 | | 3.348E-04 | | | | 832 |
| 17. 9 | 10 | | | 2.016E-03 | 3.066E-04 | 5.977E-04 | 420 |
| 10. 6.89 | 55 | | | | | | 832 |
| 17. 9 | 10 | | | 2.071E-03 | 2.803E-04 | 5.914E-04 | 420 |
| 10. 6.89 | 55 | | | 1.940E-03 | 1.479E-03 | 2.131E-03 | 832 |
| 17. 9 | 30 | | | | | | 420 |
| 10. 6.89 | 55 | | | | | | 832 |
| 17. 9 | 20 | 1.035E-02 | 1.867E-03 | | | | 420 |
| 10. 6.89 | 52 | | 3.493E-04 | | | | 831 |
| 20.22 | 10 | | | 1.881E-03 | 2.802E-04 | 5.948E-04 | 420.1 |
| 10. 6.89 | 55 | | | | | | 831 |
| 20.22 | 10 | | | 1.833E-03 | 2.686E-04 | 5.820E-04 | 420.1 |
| 10. 6.89 | 55 | | | 1.822E-03 | 1.421E-03 | 2.055E-03 | 831 |
| 20.22 | 30 | | | | | | 420.1 |
| 10. 6.89 | 55 | | | | | | 831 |
| 20.22 | 20 | 8.508E-03 | 1.816E-03 | | | | 420.1 |
| 11. 6.89 | 52 | | 3.232E-04 | | | | 834 |
| 16.17 | 10 | | | 1.778E-03 | 3.056E-04 | 5.880E-04 | 420.85 |
| 11. 6.89 | 55 | | | | | | 834 |
| 16.17 | 10 | | | 1.780E-03 | 3.692E-04 | 6.029E-04 | 420.85 |

Table 6.4.39. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 89.05 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 11. 6.89 | 55 | | | 1.882E-03 | 1.486E-03 | 2.125E-03 | 834 |
| 16.17 | 30 | | | | | | 420.85 |
| 11. 6.89 | 55 | | | | | | 834 |
| 16.17 | 20 | 6.106E-03 | 1.712E-03 | | | | 420.85 |
| 12. 6.89 | 52 | | 3.144E-04 | | | | 833 |
| 16.12 | 10 | | | 1.771E-03 | 3.151E-04 | 5.698E-04 | 421.8 |
| 12. 6.89 | 55 | | | | | | 833 |
| 16.12 | 10 | | | 1.825E-03 | 3.006E-04 | 6.116E-04 | 421.8 |
| 12. 6.89 | 55 | | | 1.750E-03 | 1.440E-03 | 2.102E-03 | 833 |
| 16.12 | 30 | | | | | | 421.8 |
| 12. 6.89 | 55 | | | | | | 833 |
| 16.12 | 20 | 5.274E-03 | 1.608E-03 | | | | 421.8 |
| 13. 6.89 | 52 | | 3.319E-04 | | | | 831 |
| 16.12 | 10 | | | 1.695E-03 | 3.076E-04 | 5.738E-04 | 422.75 |
| 13. 6.89 | 55 | | | | | | 831 |
| 16.12 | 10 | | | 1.740E-03 | 3.673E-04 | 5.843E-04 | 422.75 |
| 13. 6.89 | 55 | | | 1.771E-03 | 1.395E-03 | 1.869E-03 | 831 |
| 16.12 | 30 | | | | | | 422.75 |
| 13. 6.89 | 55 | | | | | | 831 |
| 16.12 | 20 | 4.635E-03 | 1.594E-03 | | | | 422.75 |
| 14. 6.89 | 52 | | 3.333E-04 | | | | 827 |
| 16.17 | 10 | | | 1.721E-03 | 3.018E-04 | 5.861E-04 | 423.7 |
| 14. 6.89 | 55 | | | | | | 827 |
| 16.17 | 10 | | | 1.755E-03 | 3.488E-04 | 5.699E-04 | 423.7 |
| 14. 6.89 | 55 | | | 1.641E-03 | 1.312E-03 | 1.738E-03 | 827 |
| 16.17 | 30 | | | | | | 423.7 |
| 14. 6.89 | 55 | | | | | | 827 |
| 16.17 | 20 | 3.815E-03 | 1.520E-03 | | | | 423.7 |
| 15. 6.89 | 55 | | | | | | 39 |
| 7. 0 | 20 | | | | | | 423.75 |
| --- | --- | | | | | | |

Table 6.4.40. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 89.06 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 18. 6.89 | 52 | | | | | | 779 |
| 8.59 | 10 | | | | | | 423.75 |
| 18. 6.89 | 52 | | 3.275E-04 | | | | 779 |
| 8.59 | 10 | | | 1.186E-03 | 3.161E-04 | 6.206E-04 | 424.13 |
| 18. 6.89 | 55 | | | | | | 779 |
| 8.59 | 10 | | | 1.214E-03 | 3.373E-04 | 6.255E-04 | 424.13 |
| 18. 6.89 | 55 | | | 1.552E-03 | 1.227E-03 | 1.726E-03 | 779 |
| 8.59 | 30 | | | | | | 424.13 |
| 18. 6.89 | 55 | | | | | | 779 |
| 8.59 | 20 | 2.566E-03 | 1.114E-03 | | | | 424.13 |
| 19. 6.89 | 52 | | 3.241E-04 | | | | 784 |
| 0.45 | 10 | | | 1.620E-03 | 3.075E-04 | 6.003E-04 | 424.82 |
| 19. 6.89 | 55 | | | | | | 784 |
| 0.45 | 10 | | | 1.721E-03 | 4.106E-04 | 6.022E-04 | 424.82 |
| 19. 6.89 | 55 | | | 1.529E-03 | 1.245E-03 | 1.718E-03 | 784 |
| 0.45 | 30 | | | | | | 424.82 |
| 19. 6.89 | 55 | | | | | | 784 |
| 0.45 | 20 | 3.016E-03 | 1.434E-03 | | | | 424.82 |
| 20. 6.89 | 52 | | 3.315E-04 | | | | 787 |
| 0.5 | 10 | | | 1.707E-03 | 3.395E-04 | 6.384E-04 | 425.82 |
| 20. 6.89 | 55 | | | | | | 787 |
| 0.5 | 10 | | | 1.730E-03 | 3.081E-04 | 5.876E-04 | 425.82 |
| 20. 6.89 | 55 | | | 1.549E-03 | 1.218E-03 | 1.779E-03 | 787 |
| 0.5 | 30 | | | | | | 425.82 |
| 20. 6.89 | 55 | | | | | | 787 |
| 0.5 | 20 | 2.985E-03 | 1.528E-03 | | | | 425.82 |
| 21. 6.89 | 52 | | 3.243E-04 | | | | 760 |
| 0.5 | 10 | | | 1.620E-03 | 2.152E-04 | 5.484E-04 | 426.82 |
| 21. 6.89 | 55 | | | | | | 760 |
| 0.5 | 10 | | | 1.516E-03 | 2.921E-04 | 5.288E-04 | 426.82 |
| 21. 6.89 | 55 | | | 1.243E-03 | 1.032E-03 | 1.387E-03 | 760 |
| 0.5 | 30 | | | | | | 426.82 |
| 21. 6.89 | 55 | | | | | | 760 |
| 0.5 | 20 | 2.854E-03 | 1.399E-03 | | | | 426.82 |
| 21. 6.89 | 52 | | 3.077E-04 | | | | 761 |
| 8.42 | 10 | | | 1.582E-03 | 3.197E-04 | 5.682E-04 | 427.03 |
| 21. 6.89 | 52 | | 3.473E-04 | | | | 866 |
| 9. 0 | 10 | | | 1.518E-03 | 3.092E-04 | 6.606E-04 | 427.04 |
| 21. 6.89 | 52 | | 7.415E-04 | | | | 866 |
| 9.12 | 10 | | | 2.587E-03 | 4.990E-04 | 1.191E-03 | 427.05 |
| 21. 6.89 | 52 | | 7.460E-04 | | | | 866 |
| 9.3 | 10 | | | 2.439E-03 | 4.945E-04 | 9.953E-04 | 427.06 |
| 21. 6.89 | 52 | | 7.267E-04 | | | | 866 |
| 9.45 | 10 | | | 2.468E-03 | 4.770E-04 | 9.671E-04 | 427.07 |
| 21. 6.89 | 52 | | 6.997E-04 | | | | 1032 |
| 10. 0 | 10 | | | 2.582E-03 | 4.835E-04 | 9.569E-04 | 427.09 |
| 21. 6.89 | 52 | | 7.034E-04 | | | | 1032 |
| 10.53 | 10 | | | 2.511E-03 | 4.585E-04 | 9.101E-04 | 427.12 |
| 21. 6.89 | 55 | | | | | | 1032 |
| 10.53 | 10 | | | 2.860E-03 | 5.403E-04 | 1.002E-03 | 427.12 |
| 21. 6.89 | 55 | | | 5.534E-03 | 3.892E-03 | 7.135E-03 | 1032 |
| 10.53 | 30 | | | | | | 427.12 |

Table 6.4.40. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 89.06 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 21. 6.89 | 55 | | | | | | 1032 |
| 10.53 | 20 | 1.995E-02 | 2.813E-03 | | | | 427.12 |
| 21. 6.89 | 52 | | 7.278E-04 | | | | 1029 |
| 16.15 | 10 | | | 2.998E-03 | 4.466E-04 | 8.902E-04 | 427.32 |
| 21. 6.89 | 55 | | | | | | 1029 |
| 16.15 | 10 | | | 2.977E-03 | | 9.400E-04 | 427.32 |
| 21. 6.89 | 55 | | | 4.696E-03 | 3.399E-03 | 5.190E-03 | 1029 |
| 16.15 | 30 | | | | | | 427.32 |
| 21. 6.89 | 55 | | | | | | 1029 |
| 16.15 | 20 | 1.235E-02 | 2.850E-03 | | | | 427.32 |
| 21. 6.89 | 52 | | 6.982E-04 | | | | 1028 |
| 19.3 | 10 | | | 3.043E-03 | 4.224E-04 | 9.228E-04 | 427.44 |
| 21. 6.89 | 55 | | | | | | 1028 |
| 19.3 | 10 | | | 3.130E-03 | 5.024E-04 | 9.333E-04 | 427.44 |
| 21. 6.89 | 55 | | | 4.503E-03 | 3.531E-03 | 5.302E-03 | 1028 |
| 19.3 | 30 | | | | | | 427.44 |
| 21. 6.89 | 55 | | | | | | 1028 |
| 19.3 | 20 | 1.068E-02 | 2.824E-03 | | | | 427.44 |
| 21. 6.89 | 52 | | 6.933E-04 | | | | 1028 |
| 23.54 | 10 | | | 2.975E-03 | 4.405E-04 | 8.039E-04 | 427.65 |
| 21. 6.89 | 55 | | | | | | 1028 |
| 23.54 | 10 | | | 2.942E-03 | 3.349E-04 | 8.635E-04 | 427.65 |
| 21. 6.89 | 55 | | | 4.299E-03 | 3.329E-03 | 4.973E-03 | 1028 |
| 23.54 | 30 | | | | | | 427.65 |
| 21. 6.89 | 55 | | | | | | 1028 |
| 23.54 | 20 | 1.010E-02 | 2.793E-03 | | | | 427.65 |
| 22. 6.89 | 52 | | 6.728E-04 | | | | 1028 |
| 2.55 | 10 | | | 2.831E-03 | 4.238E-04 | 8.397E-04 | 427.8 |
| 22. 6.89 | 55 | | | | | | 1028 |
| 2.55 | 10 | | | 2.974E-03 | 5.083E-04 | 8.861E-04 | 427.8 |
| 22. 6.89 | 55 | | | 4.344E-03 | 3.500E-03 | 5.007E-03 | 1028 |
| 2.55 | 30 | | | | | | 427.8 |
| 22. 6.89 | 55 | | | | | | 1028 |
| 2.55 | 20 | 1.053E-02 | 2.783E-03 | | | | 427.8 |
| 22. 6.89 | 52 | | 6.643E-04 | | | | 1029 |
| 16.35 | 10 | | | 2.818E-03 | 4.263E-04 | 8.244E-04 | 428.35 |
| 22. 6.89 | 55 | | | | | | 1029 |
| 16.35 | 10 | | | 2.994E-03 | 4.518E-04 | 8.684E-04 | 428.35 |
| 22. 6.89 | 55 | | | 4.243E-03 | 3.339E-03 | 4.780E-03 | 1029 |
| 16.35 | 30 | | | | | | 428.35 |
| 22. 6.89 | 55 | | | | | | 1029 |
| 16.35 | 20 | 1.041E-02 | 2.829E-03 | | | | 428.35 |
| 23. 6.89 | 52 | | 6.866E-04 | | | | 1027 |
| 17.3 | 10 | | | 2.960E-03 | 4.294E-04 | 8.283E-04 | 429.37 |
| 23. 6.89 | 55 | | | | | | 1027 |
| 17.3 | 10 | | | 3.150E-03 | 5.248E-04 | 8.618E-04 | 429.37 |
| 23. 6.89 | 55 | | | 4.290E-03 | 3.256E-03 | 4.931E-03 | 1027 |
| 17.3 | 30 | | | | | | 429.37 |
| 23. 6.89 | 55 | | | | | | 1027 |
| 17.3 | 20 | 1.392E-02 | 2.869E-03 | | | | 429.37 |
| 24. 6.89 | 52 | | 6.721E-04 | | | | 1027 |
| 16.1 | 10 | | | 3.259E-03 | 3.907E-04 | 8.070E-04 | 430.33 |

Table 6.4.40. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 89.06 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 24. 6.89 | 55 | | | | | | 1027 |
| 16.1 | 10 | | | 3.279E-03 | 3.906E-04 | 8.559E-04 | 430.33 |
| 24. 6.89 | 55 | | | 4.352E-03 | 3.363E-03 | 5.103E-03 | 1027 |
| 16.1 | 30 | | | | | | 430.33 |
| 24. 6.89 | 55 | | | | | | 1027 |
| 16.1 | 20 | 1.778E-02 | 3.053E-03 | | | | 430.33 |
| 25. 6.89 | 52 | | 6.482E-04 | | | | 1031 |
| 16.35 | 10 | | | 3.478E-03 | 4.320E-04 | 8.307E-04 | 431.34 |
| 25. 6.89 | 55 | | | | | | 1031 |
| 16.35 | 10 | | | 3.617E-03 | 4.853E-04 | 8.718E-04 | 431.34 |
| 25. 6.89 | 55 | | | 4.611E-03 | 3.471E-03 | 5.340E-03 | 1031 |
| 16.35 | 30 | | | | | | 431.34 |
| 25. 6.89 | 55 | | | | | | 1031 |
| 16.35 | 20 | 2.174E-02 | 3.396E-03 | | | | 431.34 |
| 28. 6.89 | 52 | | 6.420E-04 | | | | 1032 |
| 11.48 | 10 | | | 4.530E-03 | 4.218E-04 | 8.673E-04 | 433.71 |
| 28. 6.89 | 55 | | | | | | 1032 |
| 11.48 | 10 | | | 4.691E-03 | 4.075E-04 | 9.312E-04 | 433.71 |
| 28. 6.89 | 55 | | | 5.221E-03 | 3.706E-03 | 6.435E-03 | 1032 |
| 11.48 | 30 | | | | | | 433.71 |
| 28. 6.89 | 55 | | | | | | 1032 |
| 11.48 | 20 | 1.573E-01 | 4.994E-03 | | | | 433.71 |
| 28. 6.89 | 52 | | 6.153E-04 | | | | 1031 |
| 16. 3 | 10 | | | 4.793E-03 | 4.272E-04 | 8.841E-04 | 433.87 |
| 28. 6.89 | 55 | | | | | | 1031 |
| 16. 3 | 10 | | | 4.714E-03 | 4.413E-04 | 9.056E-04 | 433.87 |
| 28. 6.89 | 55 | | | 4.712E-03 | 3.606E-03 | 5.474E-03 | 1031 |
| 16. 3 | 30 | | | | | | 433.87 |
| 28. 6.89 | 55 | | | | | | 1031 |
| 16. 3 | 20 | 6.000E-02 | 4.603E-03 | | | | 433.87 |
| 30. 6.89 | 52 | | 5.817E-04 | | | | 1032 |
| 8.28 | 10 | | | 4.868E-03 | 4.116E-04 | 8.927E-04 | 435.43 |
| 30. 6.89 | 55 | | | | | | 1032 |
| 8.28 | 10 | | | 5.408E-03 | 7.526E-04 | 9.912E-04 | 435.43 |
| 30. 6.89 | 55 | | | 5.189E-03 | 3.772E-03 | 6.687E-03 | 1032 |
| 8.28 | 30 | | | | | | 435.43 |
| 30. 6.89 | 55 | | | | | | 1032 |
| 8.28 | 20 | 1.143E-01 | 5.527E-03 | | | | 435.43 |
| 30. 6.89 | 52 | | 6.261E-04 | | | | 1030 |
| 16.14 | 10 | | | 5.302E-03 | 4.378E-04 | 9.345E-04 | 435.74 |
| 30. 6.89 | 55 | | | | | | 1030 |
| 16.14 | 10 | | | 5.462E-03 | 3.971E-04 | 9.487E-04 | 435.74 |
| 30. 6.89 | 55 | | | 4.937E-03 | 3.808E-03 | 6.061E-03 | 1030 |
| 16.14 | 30 | | | | | | 435.74 |
| 30. 6.89 | 55 | | | | | | 1030 |
| 16.14 | 20 | 1.010E-01 | 5.462E-03 | | | | 435.74 |
| 1. 7.89 | 52 | | 6.105E-04 | | | | 1029 |
| 0.4 | 10 | | | 5.181E-03 | 4.255E-04 | 9.119E-04 | 436.07 |
| 1. 7.89 | 55 | | | | | | 1029 |
| 0.4 | 10 | | | 5.647E-03 | 4.507E-04 | 9.558E-04 | 436.07 |
| 1. 7.89 | 55 | | | 4.918E-03 | 3.741E-03 | 5.910E-03 | 1029 |
| 0.4 | 30 | | | | | | 436.07 |

Table 6.4.40. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 89.06 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 1. 7.89 | 55 | | | | | | 1029 |
| 0.4 | 20 | 6.906E-02 | 5.095E-03 | | | | 436.07 |
| 1. 7.89 | 52 | | 6.263E-04 | | | | 1031 |
| 15.57 | 10 | | | 5.260E-03 | 4.409E-04 | 8.906E-04 | 436.64 |
| 1. 7.89 | 55 | | | | | | 1031 |
| 15.57 | 10 | | | 5.271E-03 | 4.310E-04 | 9.482E-04 | 436.64 |
| 1. 7.89 | 55 | | | 4.727E-03 | 3.563E-03 | 5.553E-03 | 1031 |
| 15.57 | 30 | | | | | | 436.64 |
| 1. 7.89 | 55 | | | | | | 1031 |
| 15.57 | 20 | 5.927E-02 | 5.095E-03 | | | | 436.64 |
| 2. 7.89 | 52 | | 6.612E-04 | | | | 1031 |
| 16. 8 | 10 | | | 5.593E-03 | 4.471E-04 | 9.423E-04 | 437.57 |
| 2. 7.89 | 55 | | | | | | 1031 |
| 16. 8 | 10 | | | 5.616E-03 | 5.551E-04 | 9.856E-04 | 437.57 |
| 2. 7.89 | 55 | | | 4.991E-03 | 3.740E-03 | 5.949E-03 | 1031 |
| 16. 8 | 30 | | | | | | 437.57 |
| 2. 7.89 | 55 | | | | | | 1031 |
| 16. 8 | 20 | 1.155E-01 | 5.507E-03 | | | | 437.57 |
| 4. 7.89 | 52 | | 6.098E-04 | | | | 1022 |
| 20.31 | 10 | | | 4.904E-03 | 4.269E-04 | 8.566E-04 | 439.69 |
| 4. 7.89 | 55 | | | | | | 1022 |
| 20.31 | 10 | | | 5.112E-03 | 4.830E-04 | 9.357E-04 | 439.69 |
| 4. 7.89 | 55 | | | 4.405E-03 | 3.406E-03 | 5.349E-03 | 1022 |
| 20.31 | 30 | | | | | | 439.69 |
| 4. 7.89 | 55 | | | | | | 1022 |
| 20.31 | 20 | 5.823E-02 | 4.959E-03 | | | | 439.69 |
| 5. 7.89 | 52 | | 5.703E-04 | | | | 1022 |
| 0.5 | 10 | | | 4.757E-03 | 4.036E-04 | 8.907E-04 | 439.87 |
| 5. 7.89 | 55 | | | 4.611E-03 | 3.387E-03 | 5.543E-03 | 1022 |
| 0.5 | 30 | | | | | | 439.87 |
| 5. 7.89 | 55 | | | | | | 1022 |
| 0.5 | 20 | 6.928E-02 | 5.074E-03 | | | | 439.87 |
| 5. 7.89 | 52 | | 6.155E-04 | | | | 1022 |
| 3.58 | 0 | | | 4.916E-03 | 4.319E-04 | 8.917E-04 | 440.02 |
| 5. 7.89 | 55 | | | | | | 1022 |
| 3.58 | 10 | | | 5.142E-03 | 4.541E-04 | 9.603E-04 | 440.02 |
| 5. 7.89 | 55 | | | 4.559E-03 | 3.437E-03 | 5.385E-03 | 1022 |
| 3.58 | 30 | | | | | | 440.02 |
| 5. 7.89 | 55 | | | | | | 1022 |
| 3.58 | 20 | 4.910E-02 | 4.911E-03 | | | | 440.02 |
| 5. 7.89 | 52 | | 6.196E-04 | | | | 1022 |
| 8.1 | 10 | | | 4.690E-03 | 4.319E-04 | 8.926E-04 | 440.14 |
| 5. 7.89 | 52 | | 6.231E-04 | | | | 1022 |
| 8.17 | 10 | | | 4.744E-03 | 4.259E-04 | 8.885E-04 | 440.15 |
| 5. 7.89 | 52 | | 6.157E-04 | | | | 1022 |
| 8.23 | 10 | | | 4.636E-03 | 4.196E-04 | 8.831E-04 | 440.16 |
| 5. 7.89 | 52 | | 5.694E-04 | | | | 1022 |
| 8.29 | 10 | | | 4.628E-03 | 4.197E-04 | 8.788E-04 | 440.17 |
| 5. 7.89 | 52 | | 5.852E-04 | | | | 1022 |
| 8.49 | 10 | | | 4.658E-03 | 4.371E-04 | 8.675E-04 | 440.18 |
| 5. 7.89 | 52 | | 5.999E-04 | | | | 1021 |
| 9. 2 | 10 | | | 4.504E-03 | 4.179E-04 | 8.876E-04 | 440.19 |

Table 6.4.40. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 89.06 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 5. 7.89 | 52 | | 6.797E-04 | | | | 1021 |
| 9. 6 | 10 | | | 4.831E-03 | 4.644E-04 | 1.019E-03 | 440.19 |
| 5. 7.89 | 52 | | 7.500E-04 | | | | 1021 |
| 9.15 | 10 | | | 4.806E-03 | 4.950E-04 | 1.040E-03 | 440.2 |
| 5. 7.89 | 52 | | 6.975E-04 | | | | 1021 |
| 9.22 | 10 | | | 4.842E-03 | 4.845E-04 | 1.027E-03 | 440.2 |
| 5. 7.89 | 52 | | 7.459E-04 | | | | 1021 |
| 9.34 | 10 | | | 4.774E-03 | 4.597E-04 | 1.007E-03 | 440.21 |
| 5. 7.89 | 52 | | 7.370E-04 | | | | 1021 |
| 9.44 | 10 | | | 4.676E-03 | 4.549E-04 | 9.707E-04 | 440.2 |
| 5. 7.89 | 55 | | | | | | 1021 |
| 9.44 | 10 | | | 5.031E-03 | 5.136E-04 | 1.047E-03 | 440.2 |
| 5. 7.89 | 55 | | | 6.151E-03 | 4.502E-03 | 7.767E-03 | 1021 |
| 9.44 | 30 | | | | | | 440.2 |
| 5. 7.89 | 55 | | | | | | 1021 |
| 9.44 | 20 | 9.158E-02 | 5.125E-03 | | | | 440.2 |
| 5. 7.89 | 52 | | 7.332E-04 | | | | 1057 |
| 13. 0 | 10 | | | 5.172E-03 | 4.962E-04 | 1.019E-03 | 440.31 |
| 5. 7.89 | 55 | | | | | | 1057 |
| 13. 0 | 10 | | | 5.398E-03 | 5.034E-04 | 1.090E-03 | 440.2 |
| 5. 7.89 | 55 | | | 5.852E-03 | 4.360E-03 | 7.168E-03 | 1057 |
| 13. 0 | 30 | | | | | | 440.2 |
| 5. 7.89 | 55 | | | | | | 1057 |
| 13. 0 | 20 | 1.103E-01 | 5.545E-03 | | | | 440.2 |
| 5. 7.89 | 52 | | 7.365E-04 | | | | 1056 |
| 17.4 | 10 | | | 6.018E-03 | 4.815E-04 | 1.104E-03 | 440.5 |
| 5. 7.89 | 55 | | | | | | 1056 |
| 17.4 | 10 | | | 6.245E-03 | 5.063E-04 | 1.152E-03 | 440.5 |
| 5. 7.89 | 55 | | | 6.020E-03 | 4.561E-03 | 7.234E-03 | 1056 |
| 17.4 | 30 | | | | | | 440.5 |
| 5. 7.89 | 55 | | | | | | 1056 |
| 17.4 | 20 | 1.361E-01 | 3.508E-03 | | | | 440.5 |
| 5. 7.89 | 52 | | 7.182E-04 | | | | 1055 |
| 21.57 | 10 | | | 6.061E-03 | 4.863E-04 | 1.007E-03 | 440.69 |
| 5. 7.89 | 55 | | | | | | 1055 |
| 21.57 | 10 | | | 6.317E-03 | 4.306E-04 | 1.099E-03 | 440.69 |
| 5. 7.89 | 55 | | | 6.161E-03 | 4.605E-03 | 7.364E-03 | 1055 |
| 21.57 | 30 | | | | | | 440.69 |
| 5. 7.89 | 55 | | | | | | 1055 |
| 21.57 | 20 | 1.426E-01 | 6.508E-03 | | | | 440.69 |
| 6. 7.89 | 52 | | 7.162E-04 | | | | 1055 |
| 1. 5 | 10 | | | 6.117E-03 | 4.960E-04 | 1.044E-03 | 440.8 |
| 6. 7.89 | 55 | | | | | | 1055 |
| 1. 5 | 10 | | | 6.480E-03 | 5.509E-04 | 1.120E-03 | 440.8 |
| 6. 7.89 | 55 | | | 5.766E-03 | 4.267E-03 | 6.969E-03 | 1055 |
| 1. 5 | 30 | | | | | | 440.8 |
| 6. 7.89 | 55 | | | | | | 1055 |
| 1. 5 | 20 | 9.018E-02 | 6.386E-03 | | | | 440.8 |
| 6. 7.89 | 52 | | 7.318E-04 | | | | 1054 |
| 6.23 | 10 | | | 6.517E-03 | 5.010E-04 | 1.031E-03 | 441.01 |
| 6. 7.89 | 55 | | | | | | 1054 |
| 6.23 | 10 | | | 6.697E-03 | 5.392E-04 | 1.104E-03 | 441.01 |

Table 6.4.40. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. B | | CYCLE NO. 89.06 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 6. 7.89 | 55 | | | 5.778E-03 | 4.239E-03 | 7.130E-03 | 1054 |
| 6.23 | 30 | | | | | | 441.01 |
| 6. 7.89 | 55 | | | | | | 1054 |
| 6.23 | 20 | 1.304E-01 | 6.887E-03 | | | | 441.01 |
| 6. 7.89 | 52 | | 7.121E-04 | | | | 1053 |
| 17.13 | 10 | | | 7.425E-03 | 4.782E-04 | 1.092E-03 | 441.43 |
| 6. 7.89 | 55 | | | | | | 1053 |
| 17.13 | 10 | | | 7.575E-03 | 4.621E-04 | 1.134E-03 | 441.43 |
| 6. 7.89 | 55 | | | 6.632E-03 | 4.593E-03 | 7.485E-03 | 1053 |
| 17.13 | 30 | | | | | | 441.43 |
| 6. 7.89 | 55 | | | | | | 1053 |
| 17.13 | 20 | 1.496E-01 | 7.736E-03 | | | | 441.43 |
| 7. 7.89 | 52 | | 6.860E-04 | | | | 1052 |
| 16.34 | 10 | | | 8.062E-03 | 5.128E-04 | 1.175E-03 | 442.34 |
| 7. 7.89 | 55 | | | | | | 1052 |
| 16.34 | 10 | | | 8.248E-03 | 6.018E-04 | 1.203E-03 | 442.34 |
| 7. 7.89 | 55 | | | 6.355E-03 | 4.799E-03 | 7.637E-03 | 1052 |
| 16.34 | 30 | | | | | | 442.34 |
| 7. 7.89 | 55 | | | | | | 1052 |
| 16.34 | 20 | 1.585E-01 | 8.550E-03 | | | | 442.34 |
| 7. 7.89 | 55 | | | | | | 1090 |
| 20. 0 | 20 | | | | | | 442.85 |
| 7. 7.89 | 55 | | | | | | 1090 |
| 20. 0 | 20 | | | | | | 442.85 |
| 8. 7.89 | 52 | | 1.332E-03 | | | | 1106 |
| 16.47 | 10 | | | 2.675E-02 | 9.375E-04 | 2.240E-03 | 443.25 |
| 8. 7.89 | 55 | | | | | | 1106 |
| 16.47 | 10 | | | 2.922E-02 | 1.025E-03 | 4.264E-03 | 443.25 |
| 8. 7.89 | 55 | | | 1.484E-02 | 1.056E-02 | 2.031E-02 | 1106 |
| 16.47 | 30 | | | | | | 443.25 |
| 8. 7.89 | 55 | | | | | | 1106 |
| 16.47 | 20 | 9.501E-01 | 6.208E-02 | | | | 443.25 |
| 9. 7.89 | 52 | | 1.243E-03 | | | | 1106 |
| 16.5 | 10 | | | 2.396E-02 | 9.754E-04 | 2.331E-03 | 444.18 |
| 9. 7.89 | 55 | | | | | | 1106 |
| 16.5 | 0 | | | 2.846E-02 | 1.132E-03 | 2.870E-03 | 444.18 |
| 9. 7.89 | 55 | | | 1.497E-02 | 1.047E-02 | 2.000E-02 | 1106 |
| 16.5 | 30 | | | | | | 444.18 |
| 9. 7.89 | 55 | | | | | | 1106 |
| 16.5 | 20 | 5.855E-01 | 6.329E-02 | | | | 444.18 |
| 10. 7.89 | 52 | | 1.196E-03 | | | | 1105 |
| 22.48 | 10 | | | 2.247E-02 | 9.712E-04 | 2.183E-03 | 445.27 |
| 10. 7.89 | 55 | | | | | | 1105 |
| 22.48 | 10 | | | 2.725E-02 | 1.262E-03 | 3.130E-03 | 445.27 |
| 10. 7.89 | 55 | | | 1.632E-02 | 1.234E-02 | 2.091E-02 | 1105 |
| 22.48 | 30 | | | | | | 445.27 |
| 10. 7.89 | 55 | | | | | | 1105 |
| 22.48 | 20 | 6.281E-01 | 6.506E-02 | | | | 445.27 |
| 11. 7.89 | 55 | | | | | | 72 |
| 3. 0 | 20 | | | | | | 445.35 |

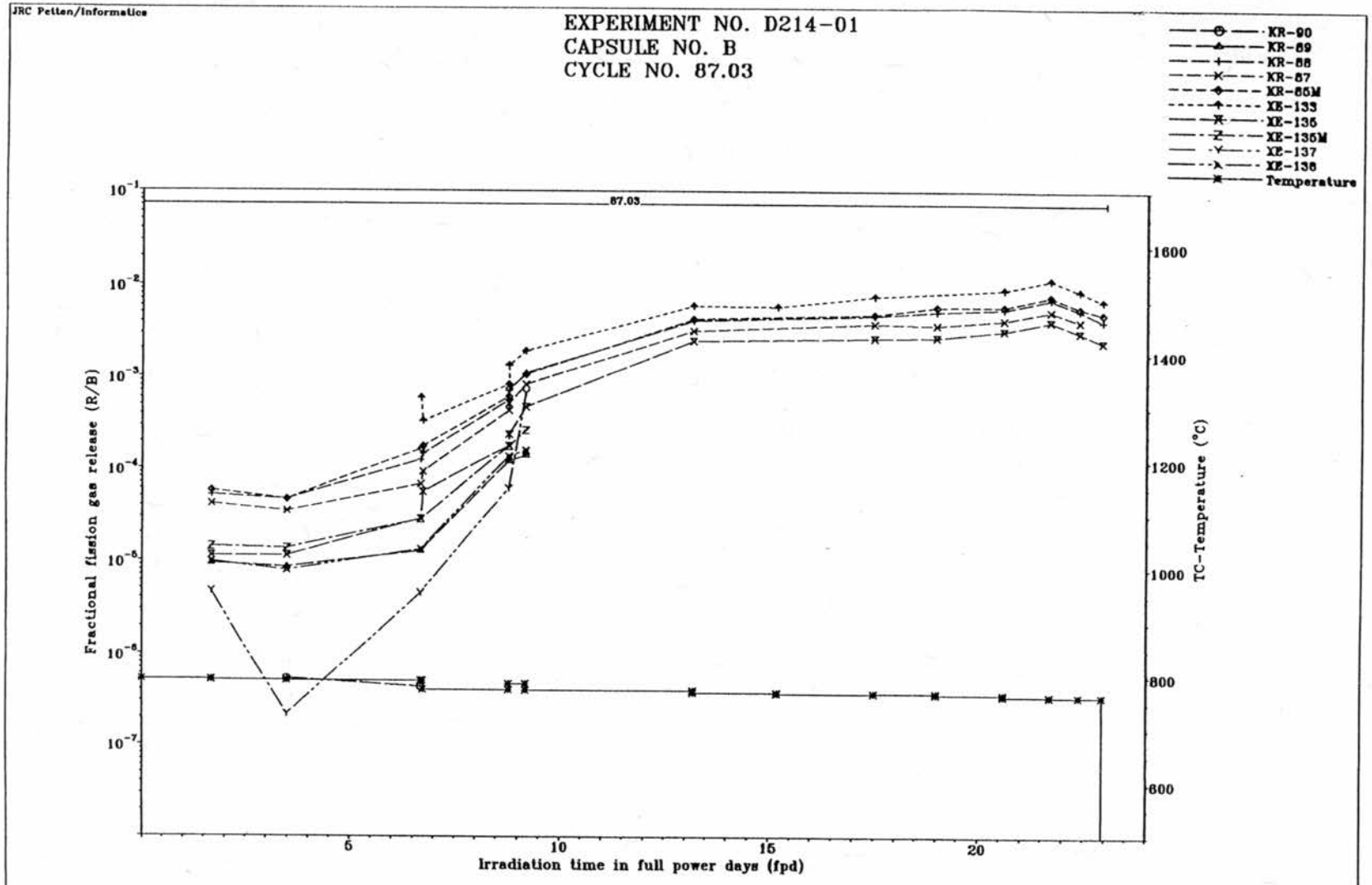



Fig. 6.4.21. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

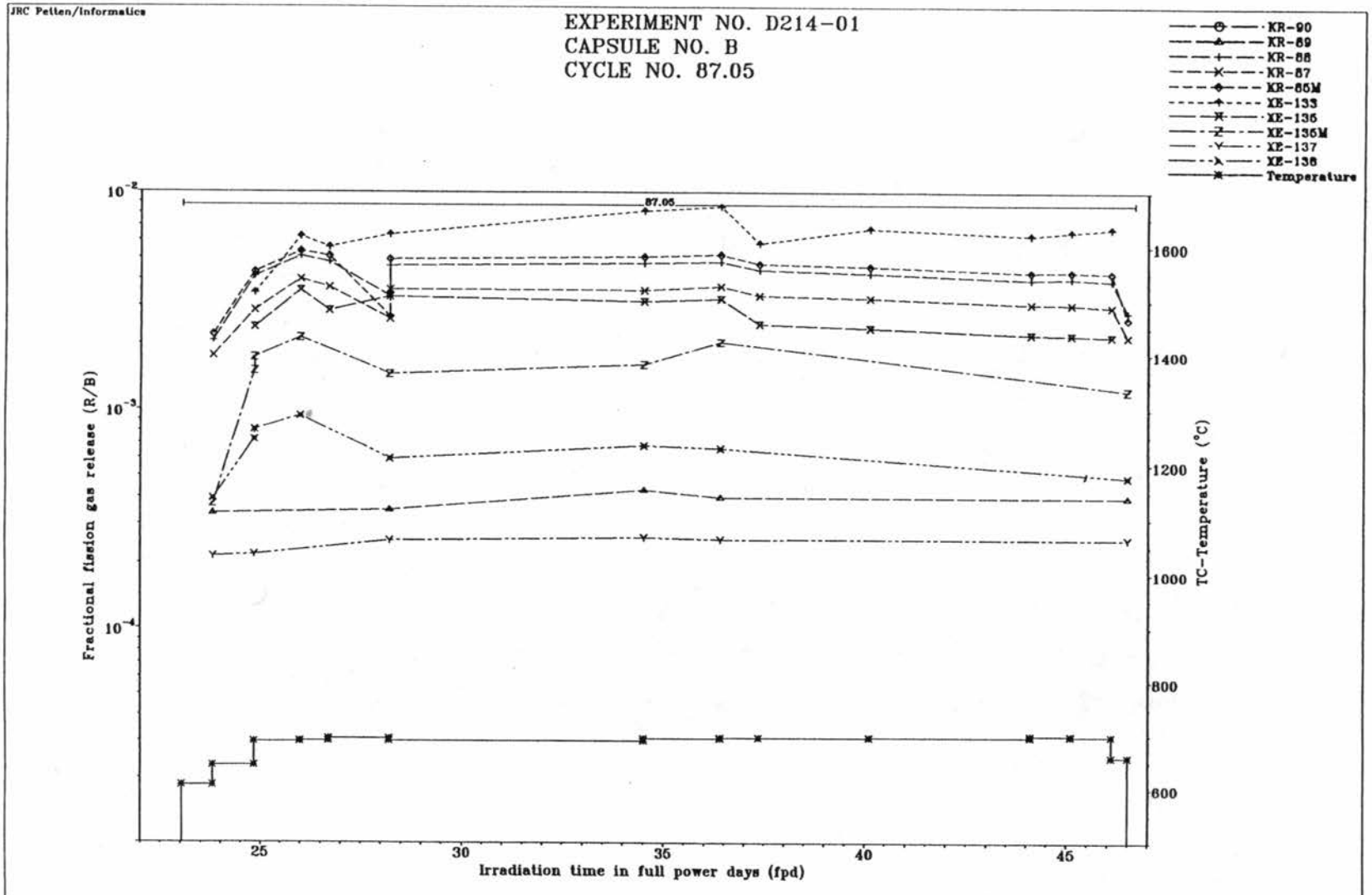



Fig. 6.4.22. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

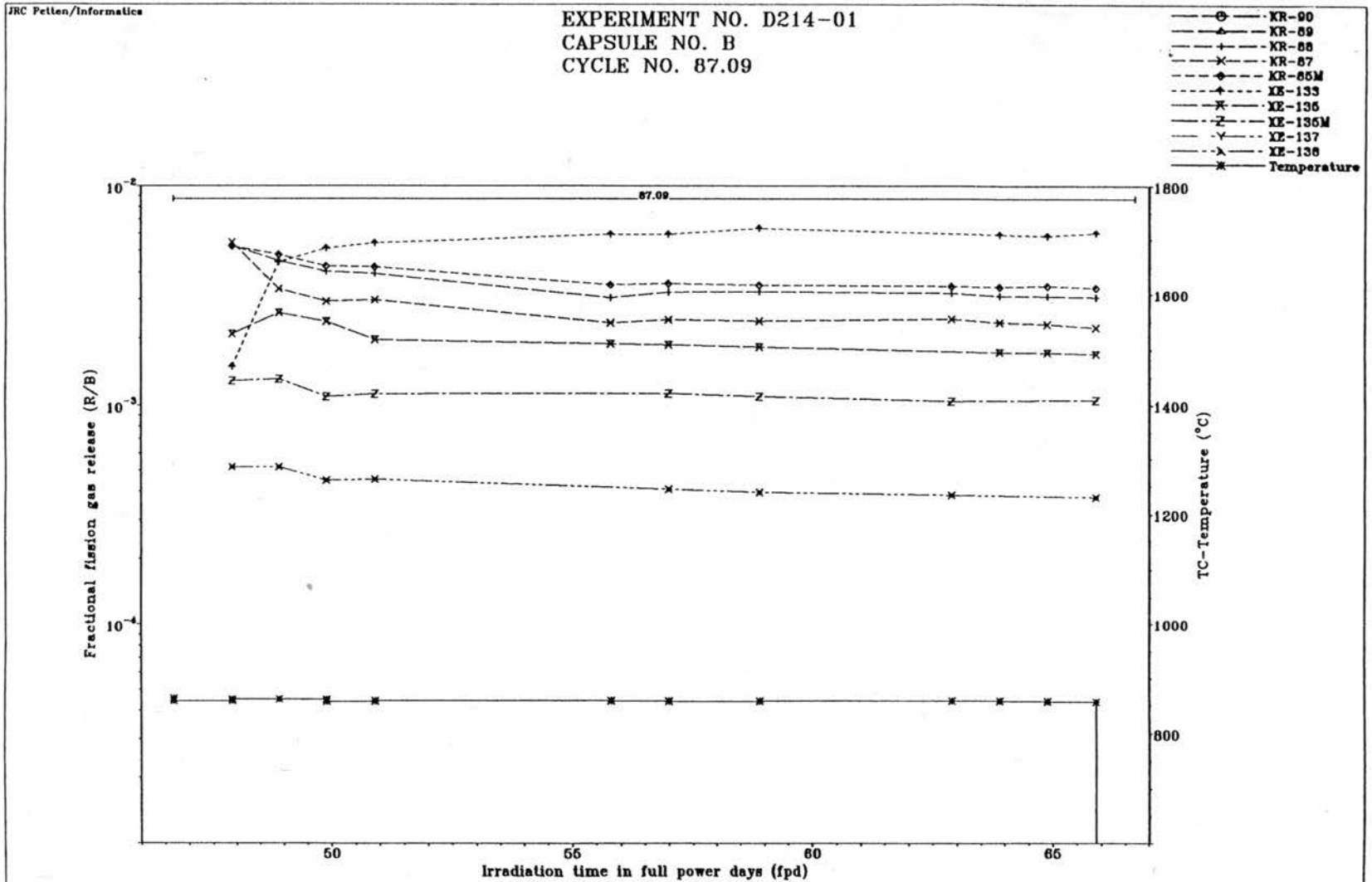



Fig. 6.4.23. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

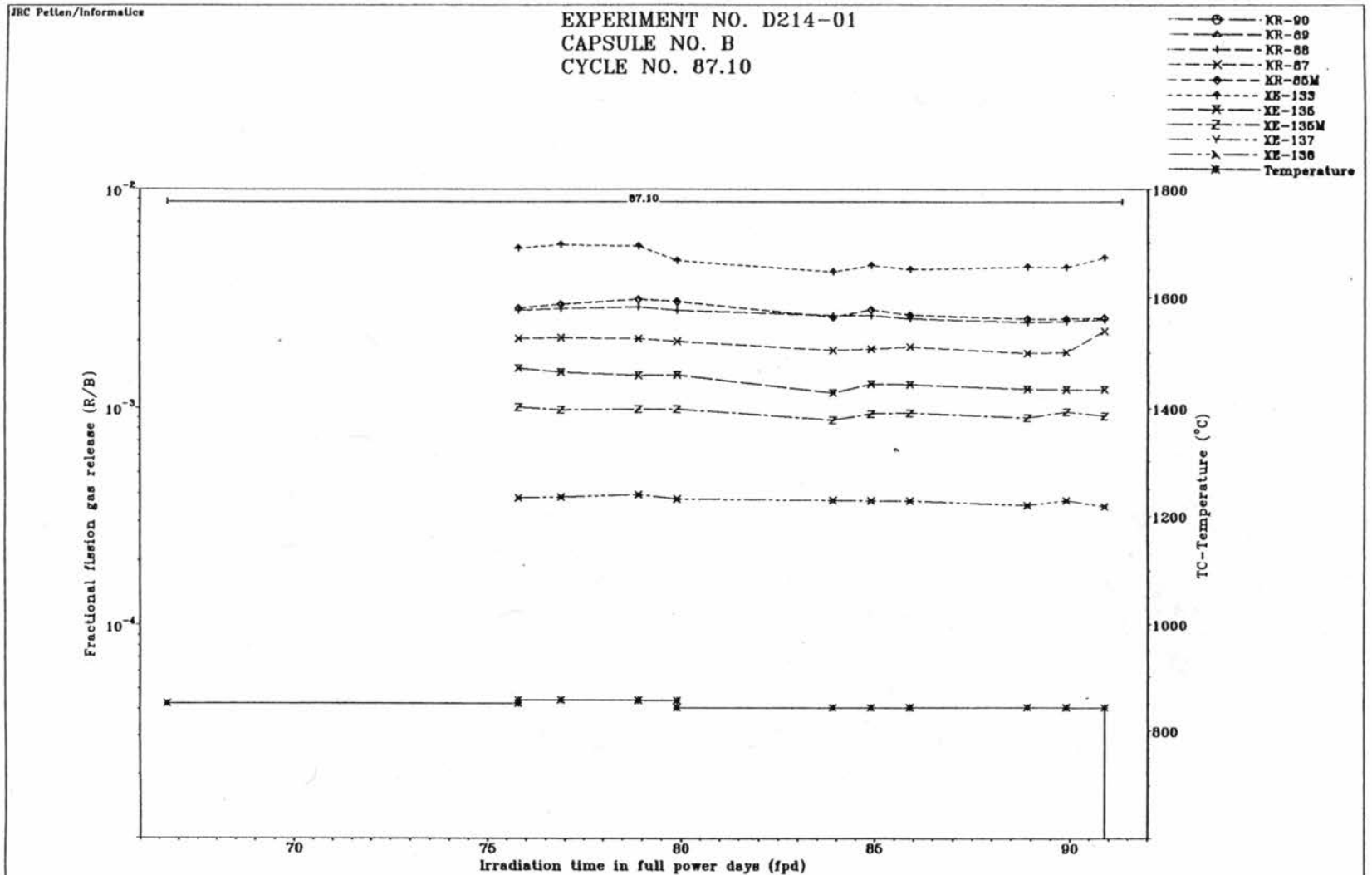



Fig. 6.4.24. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

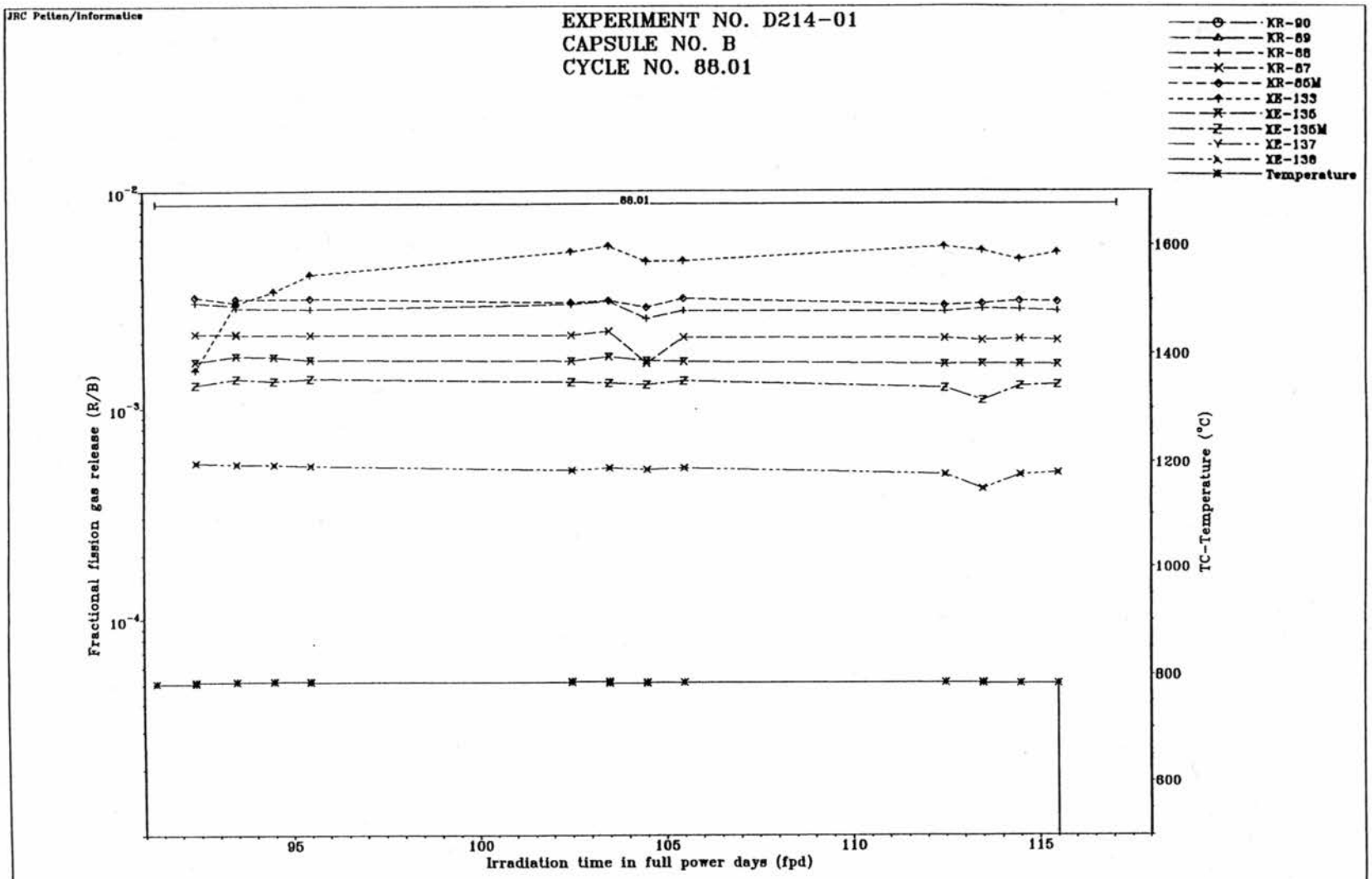



Fig. 6.4.25. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

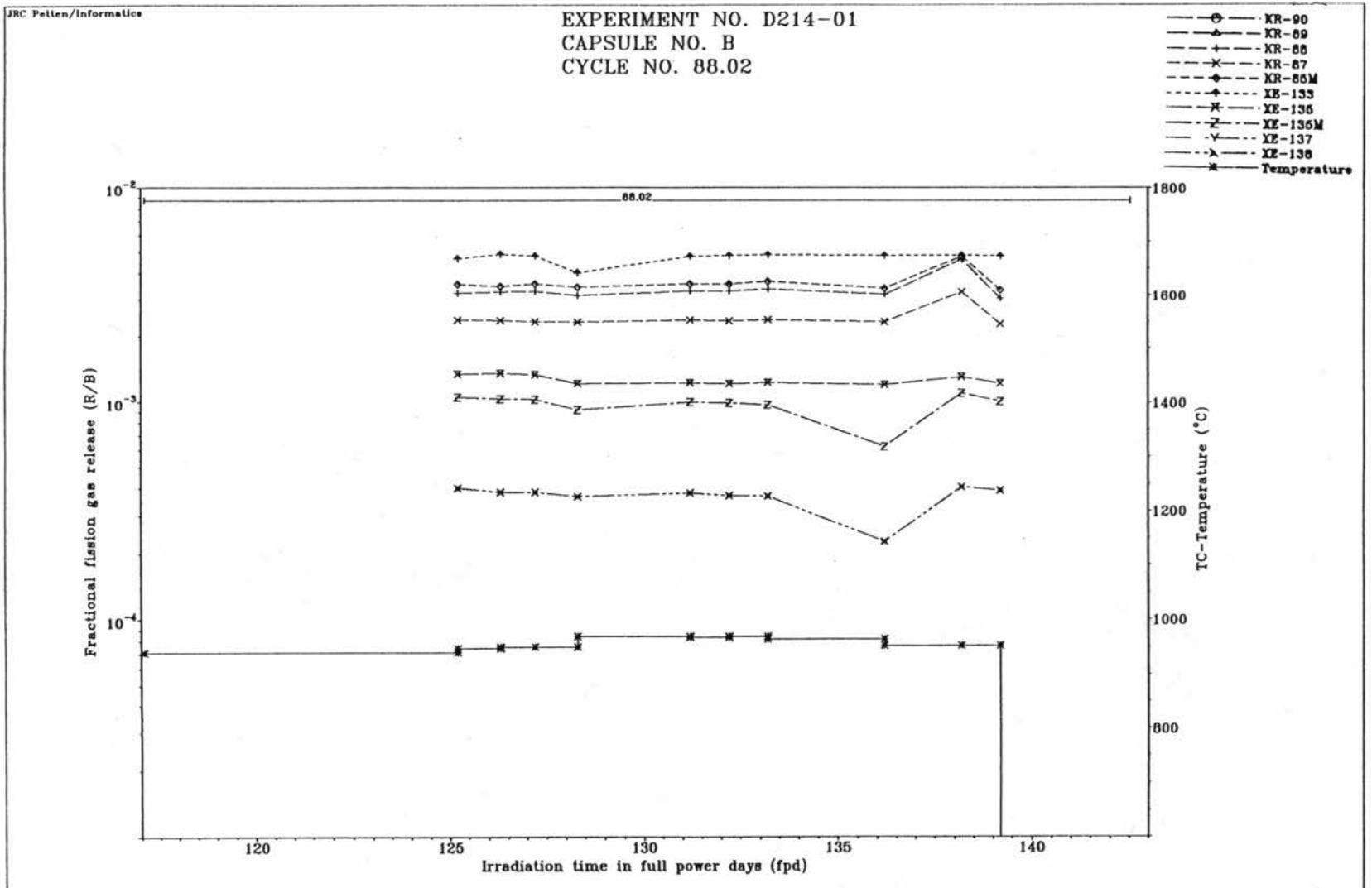



Fig. 6.4.26. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

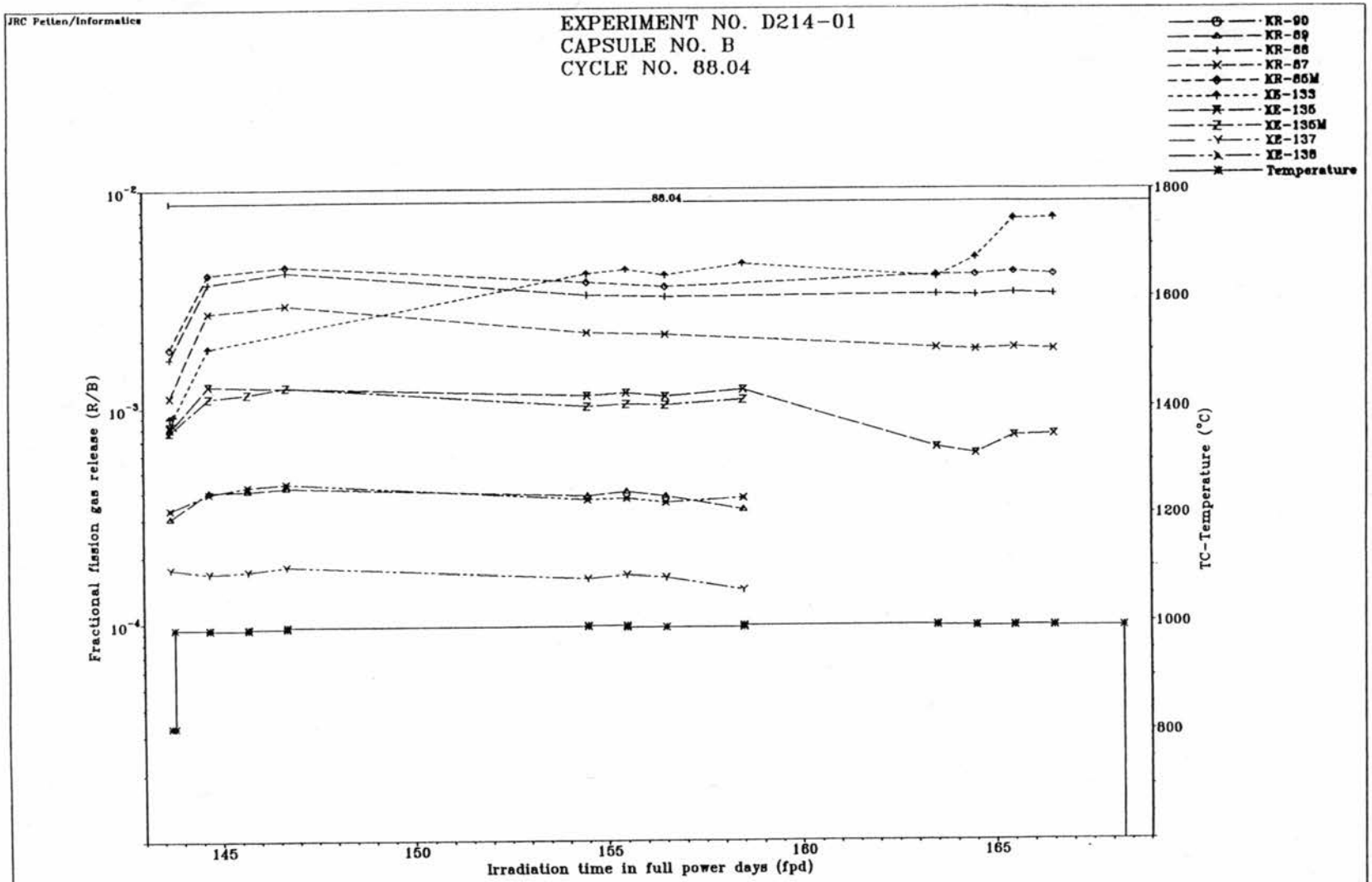



Fig. 6.4.27. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

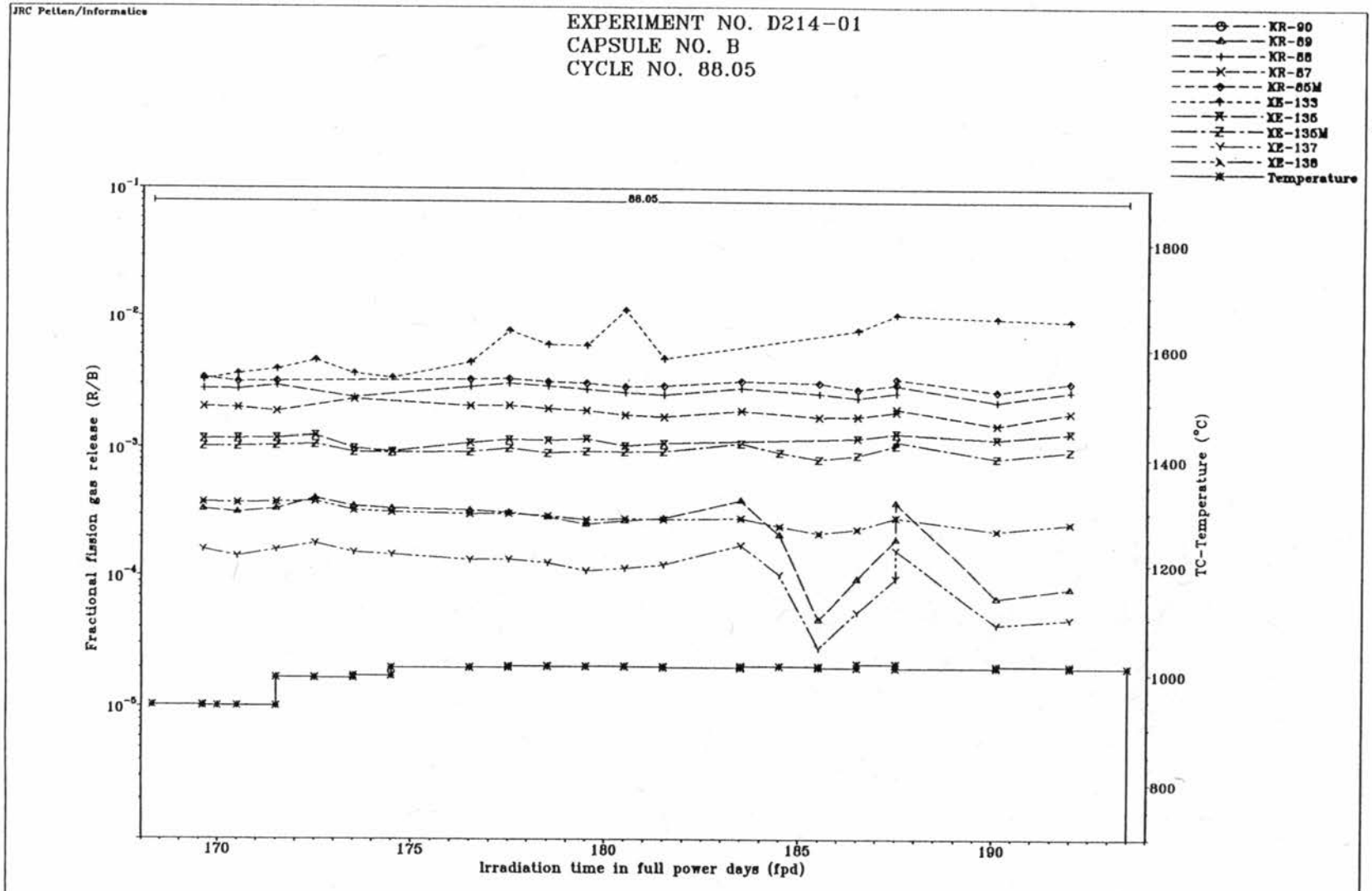



Fig. 6.4.28. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

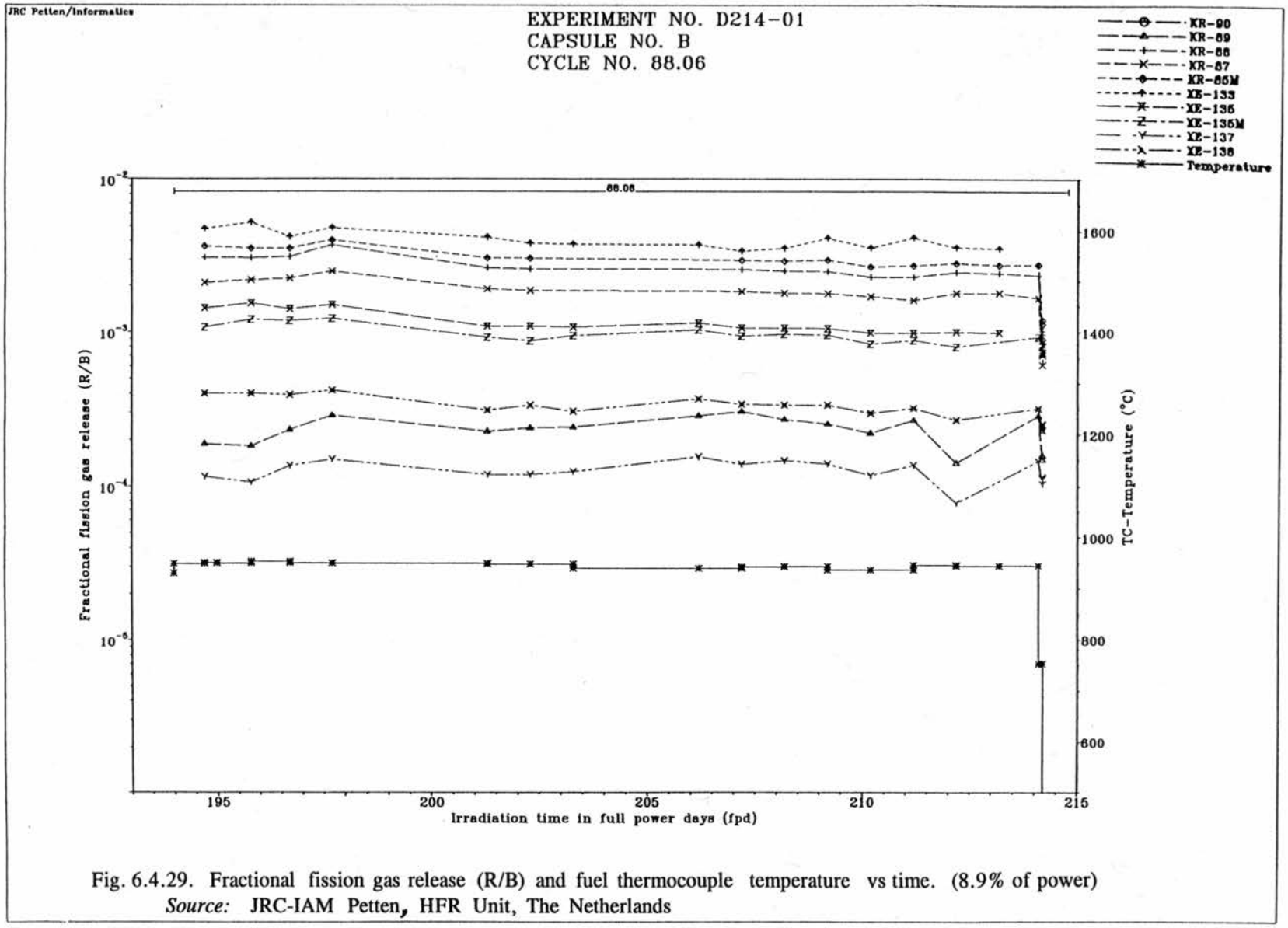



Fig. 6.4.29. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

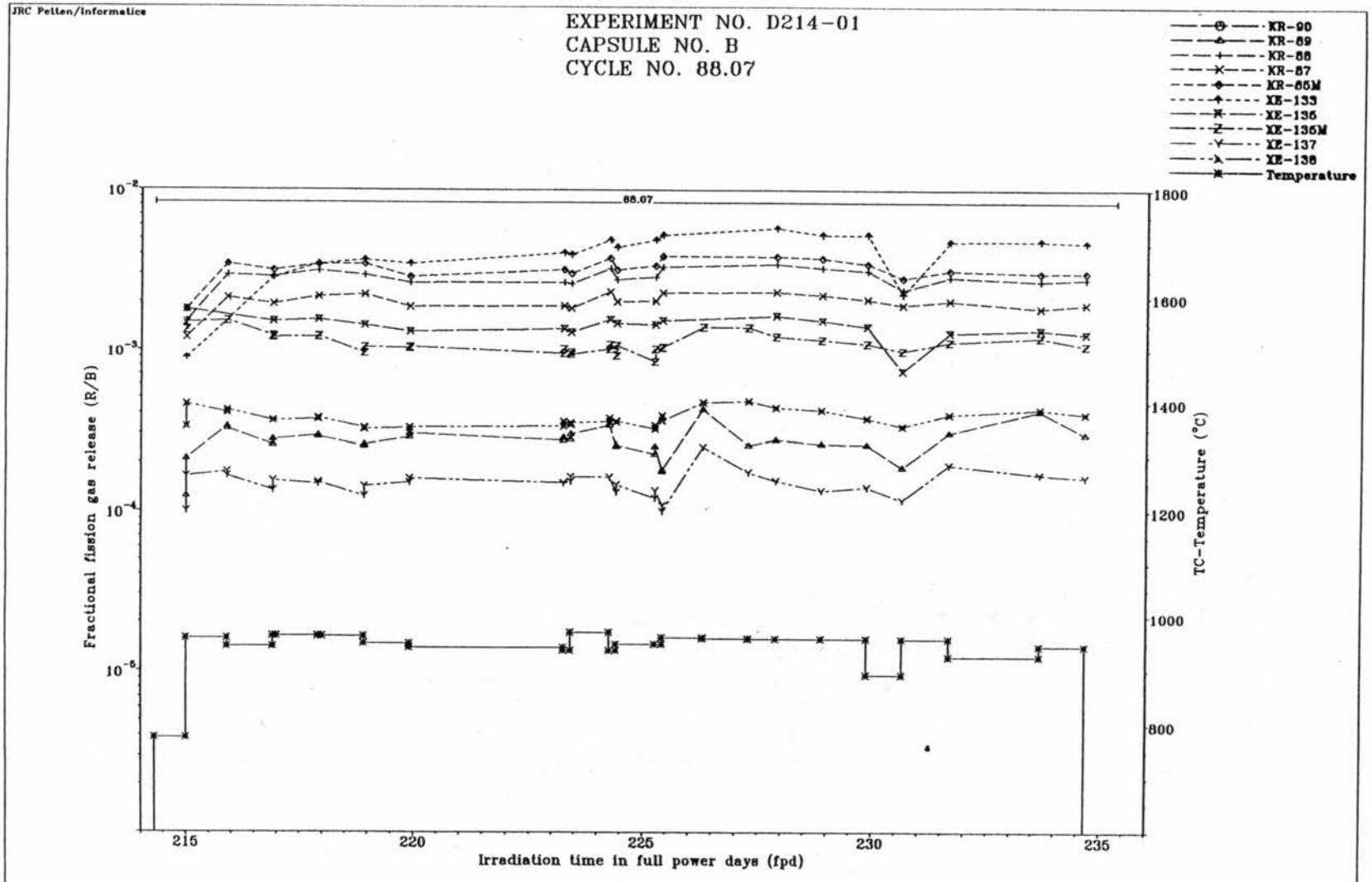



Fig. 6.4.30. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

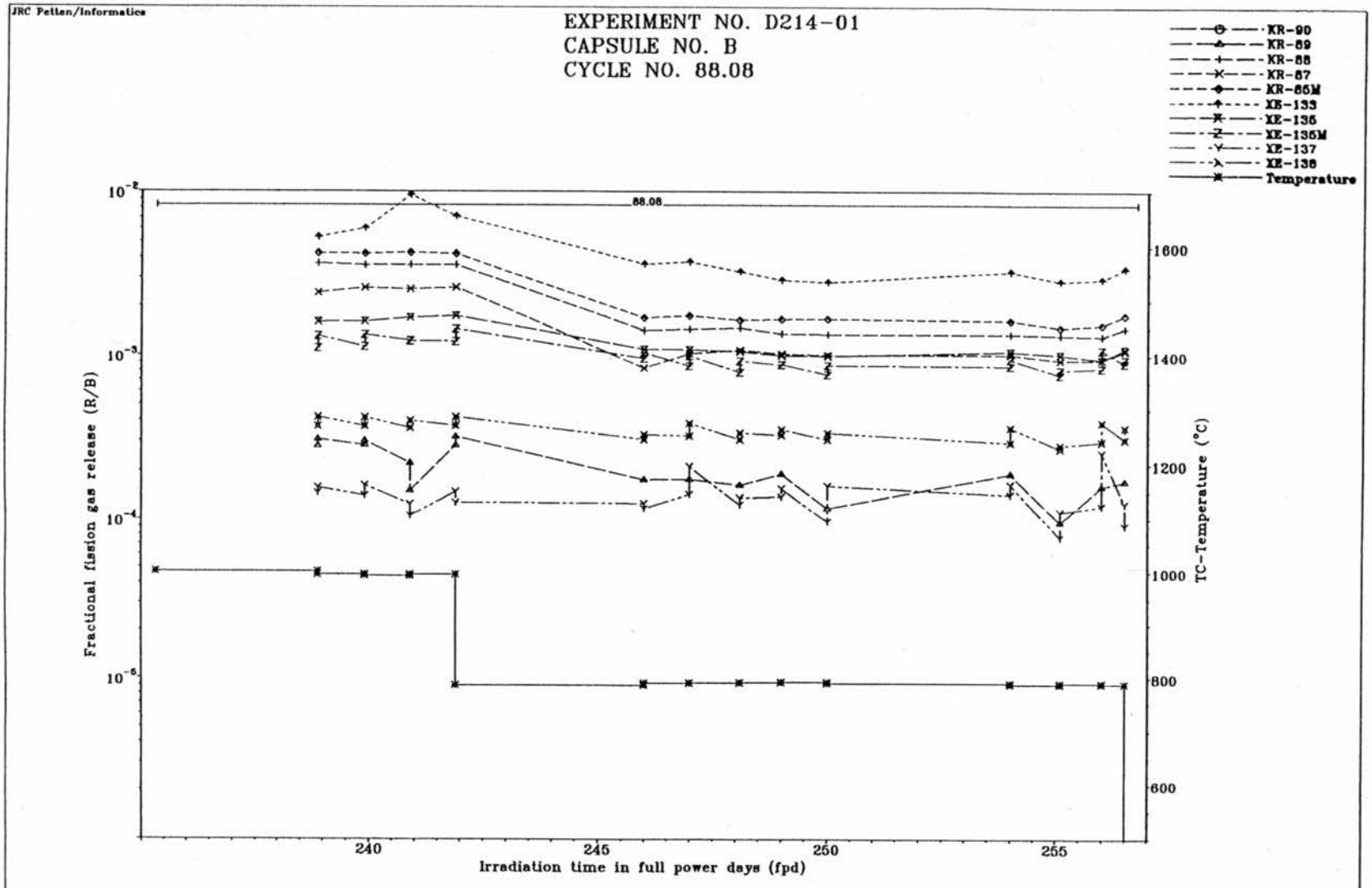



Fig. 6.4.31. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

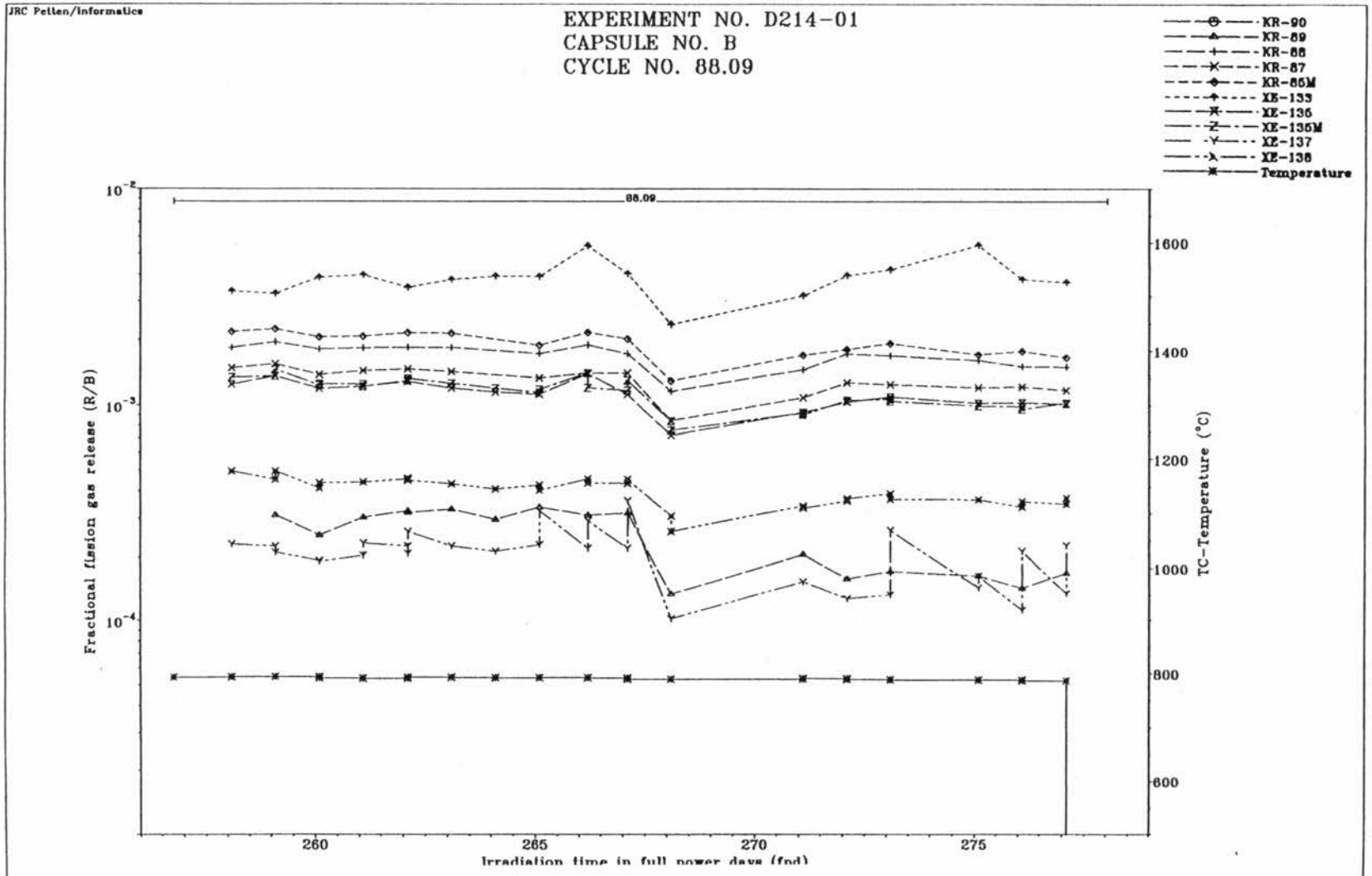



Fig. 6.4.32. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

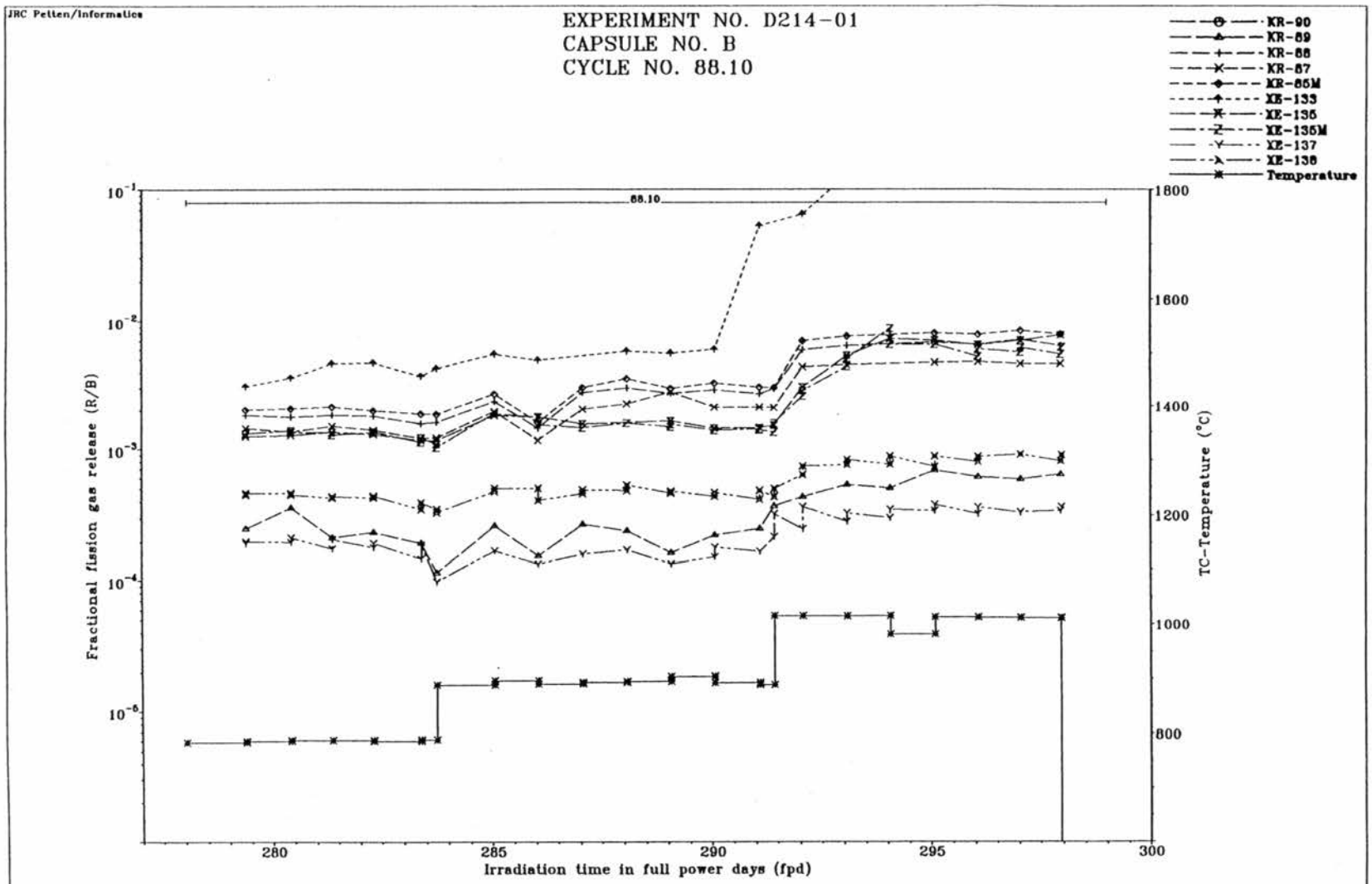



Fig. 6.4.33. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

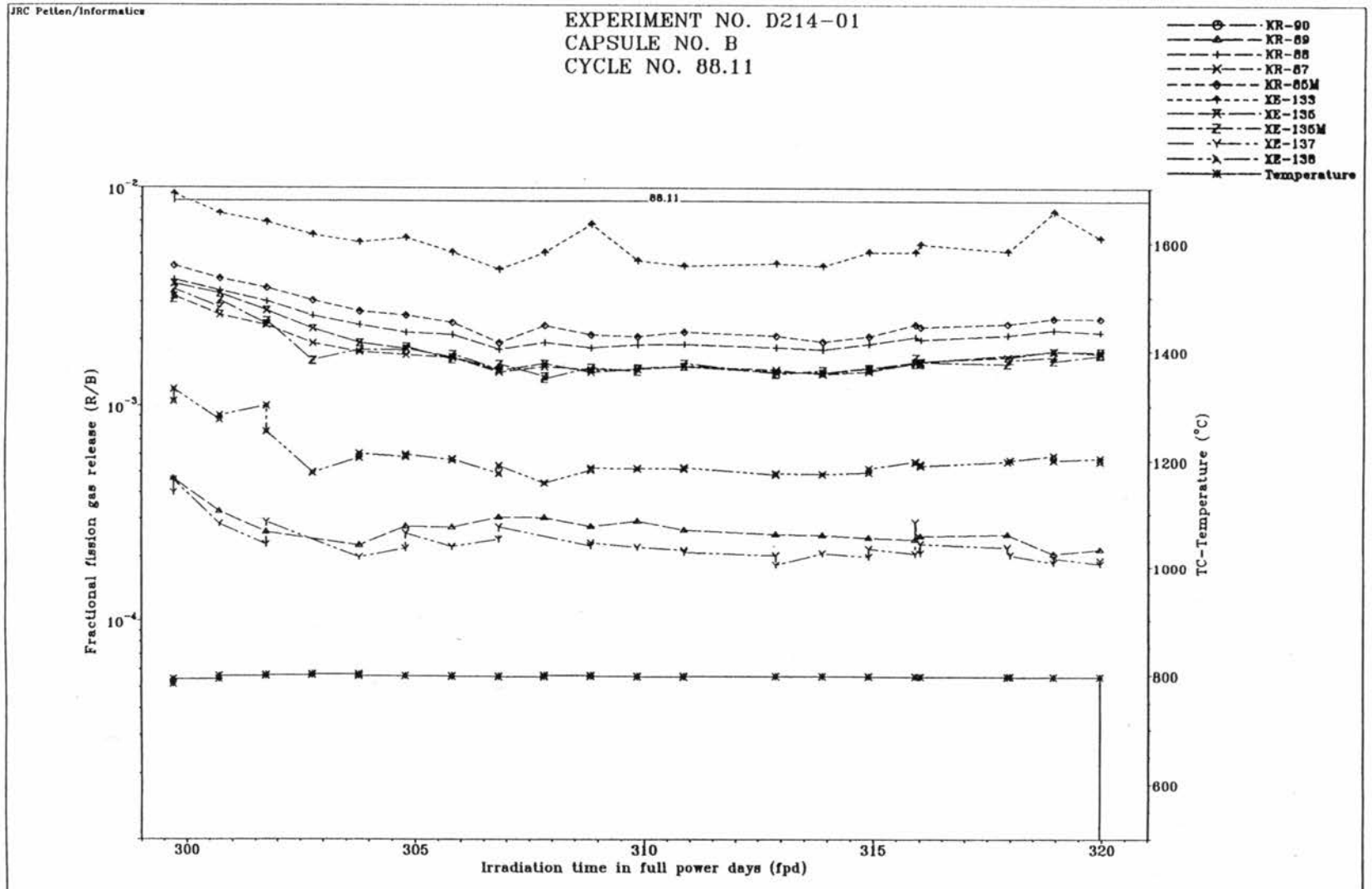



Fig. 6.4.34. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

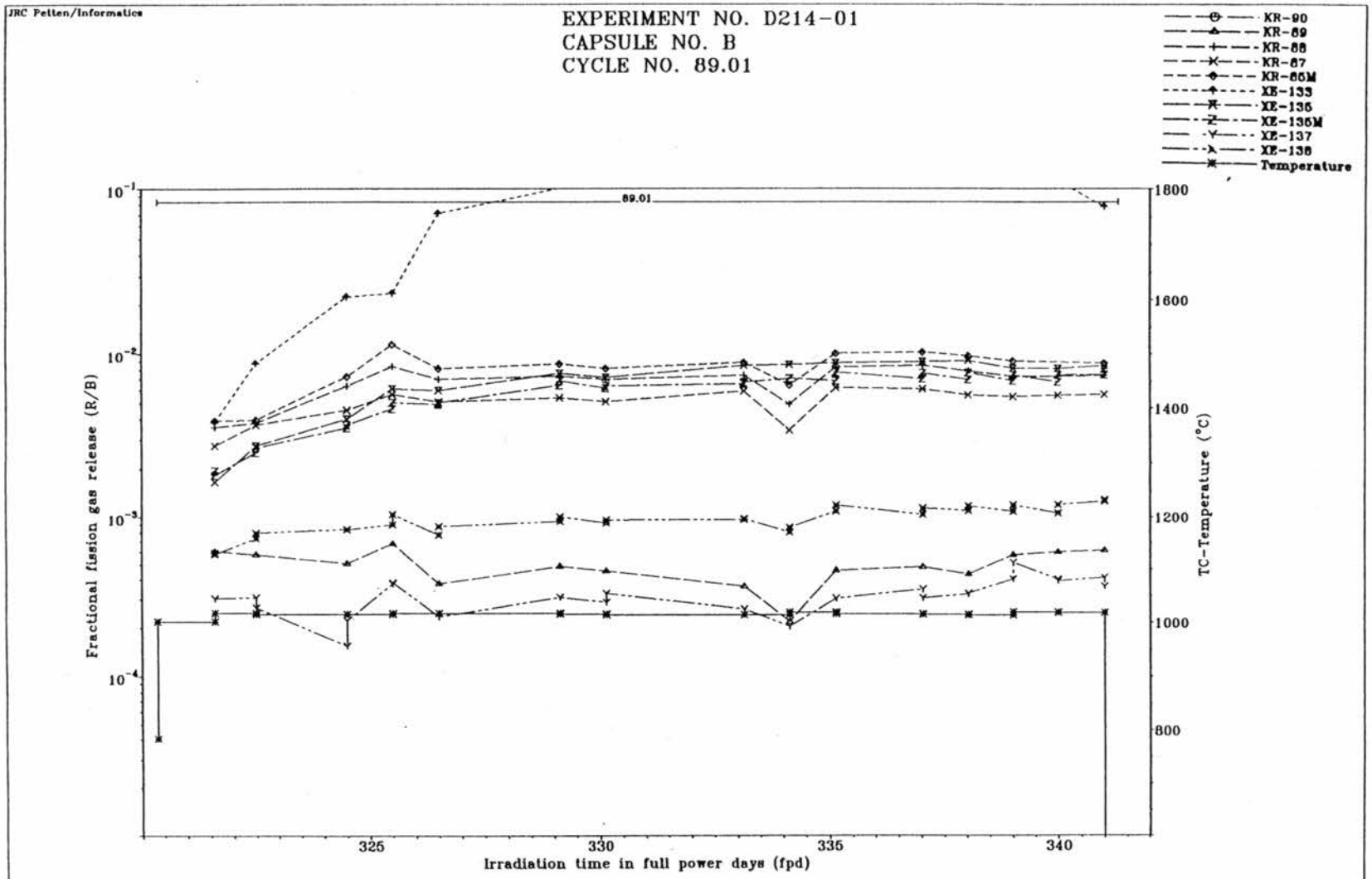



Fig. 6.4.35. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

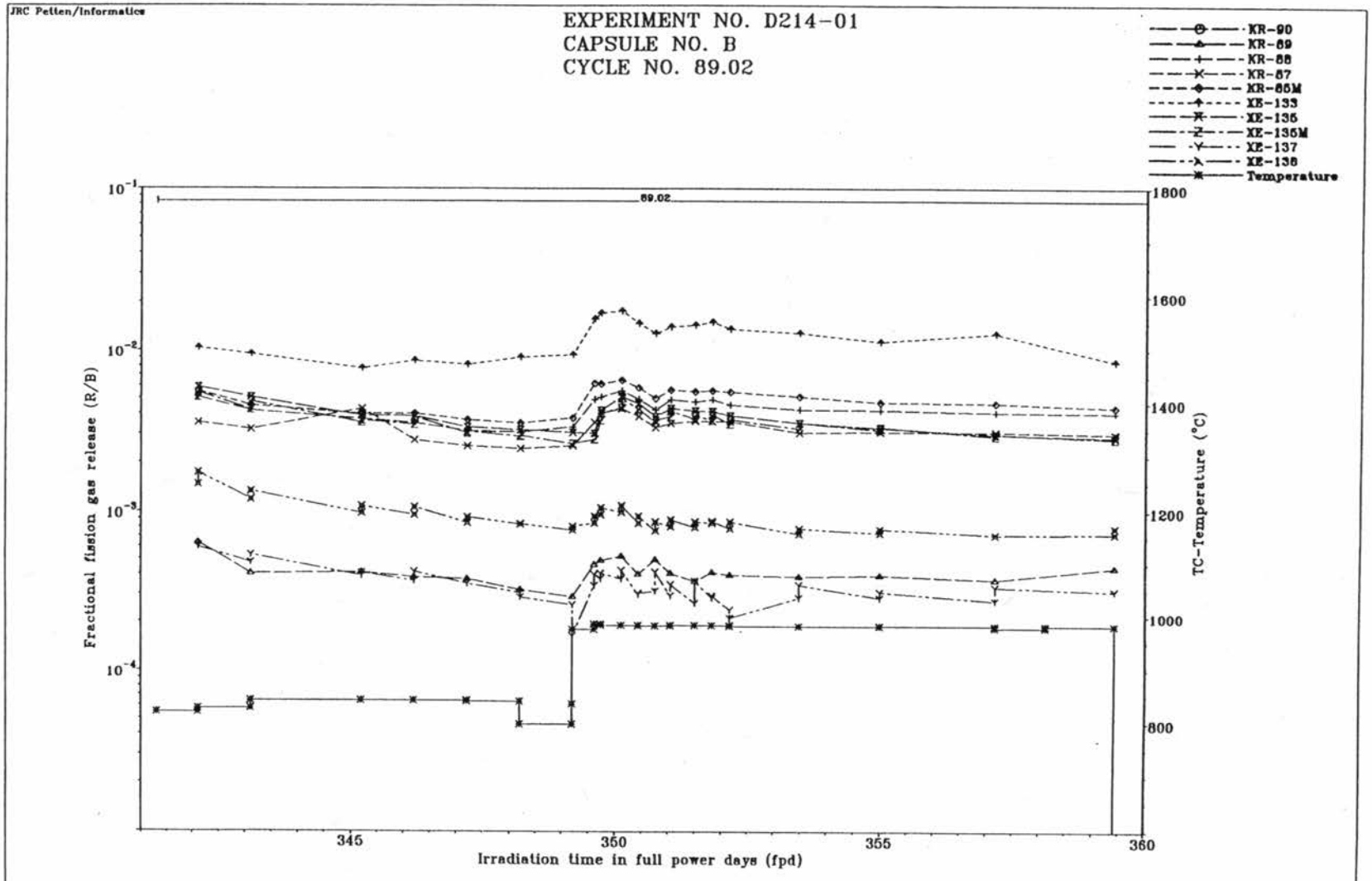



Fig. 6.4.36. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

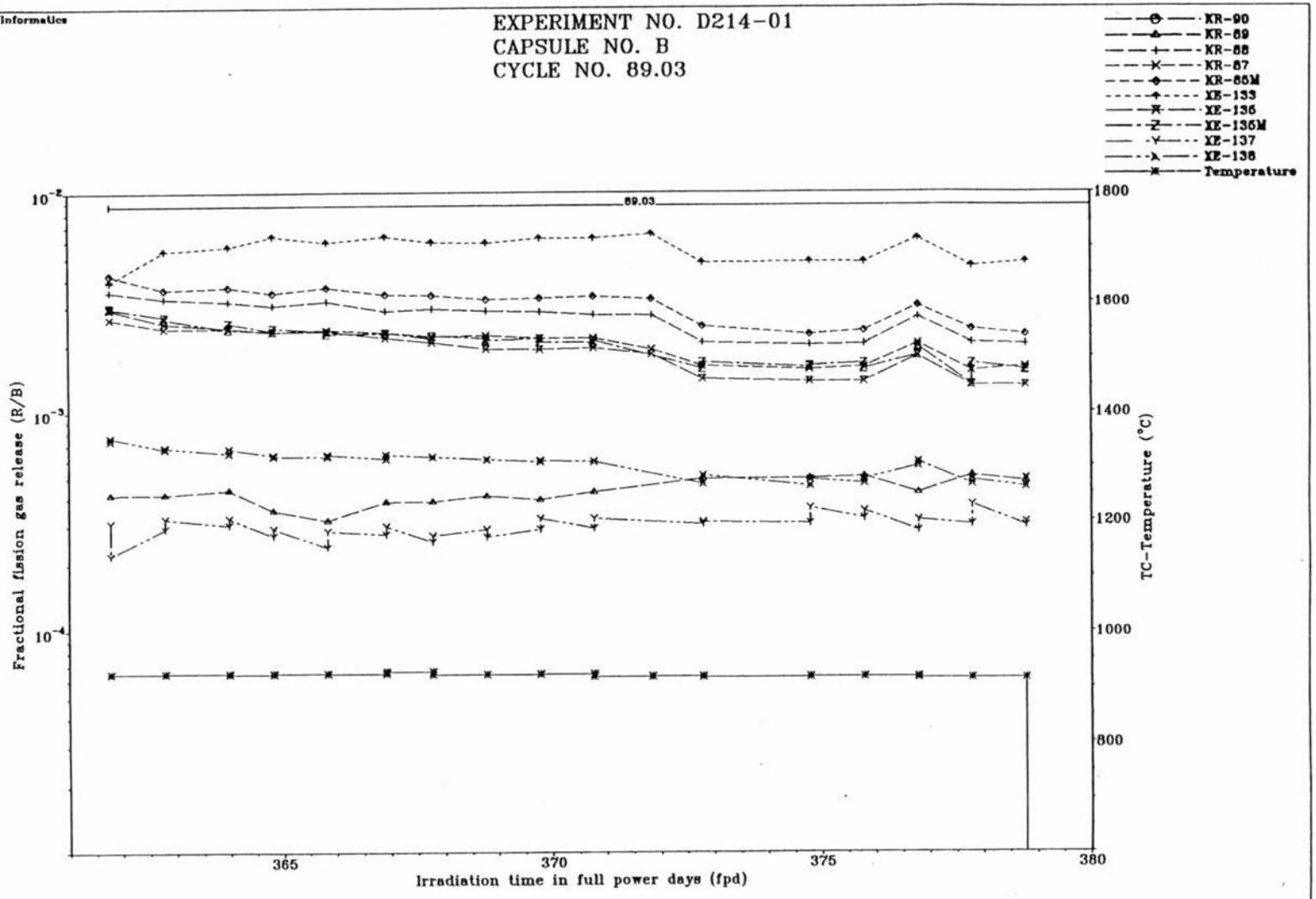



Fig. 6.4.37. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

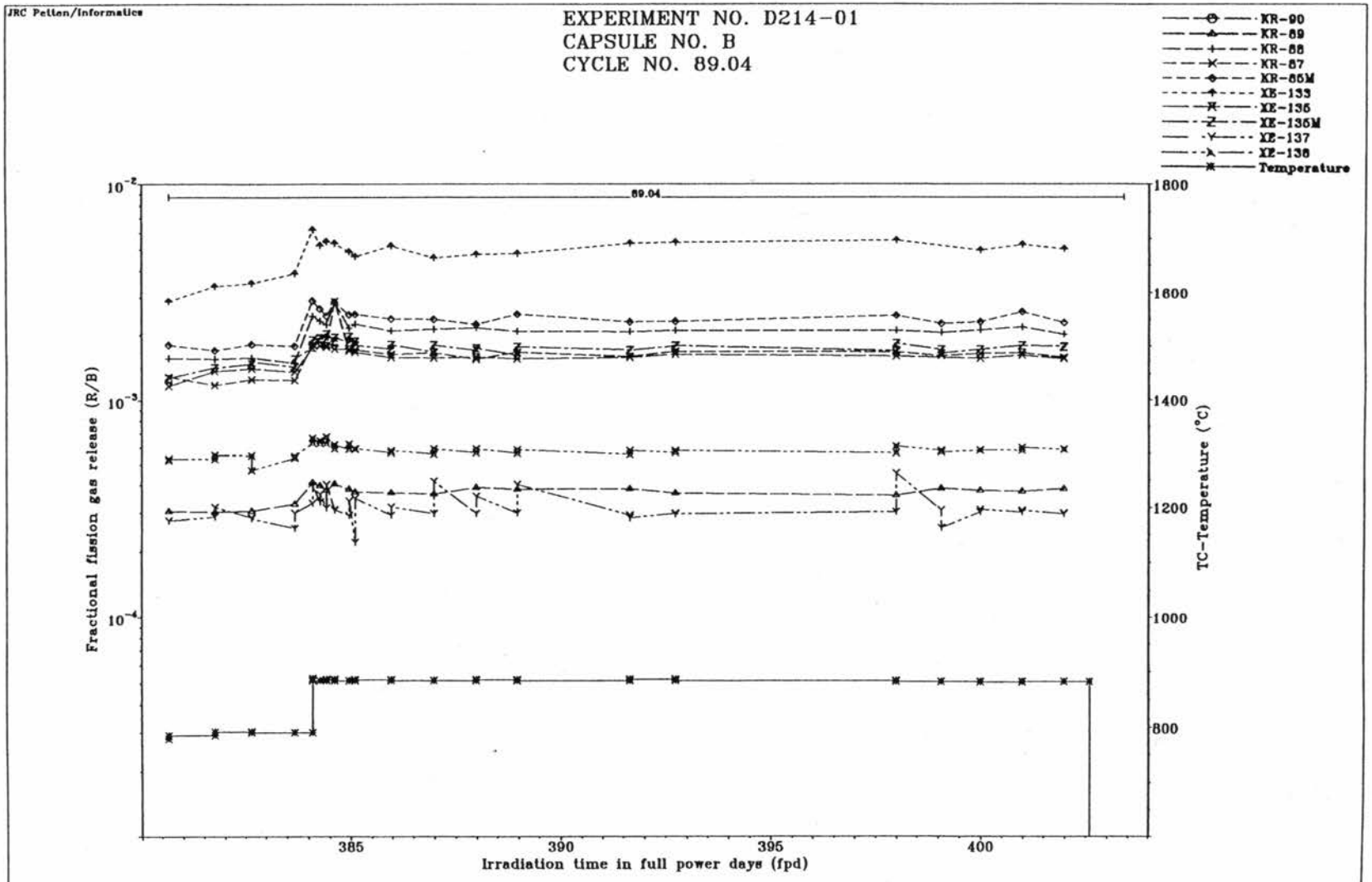



Fig. 6.4.38. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

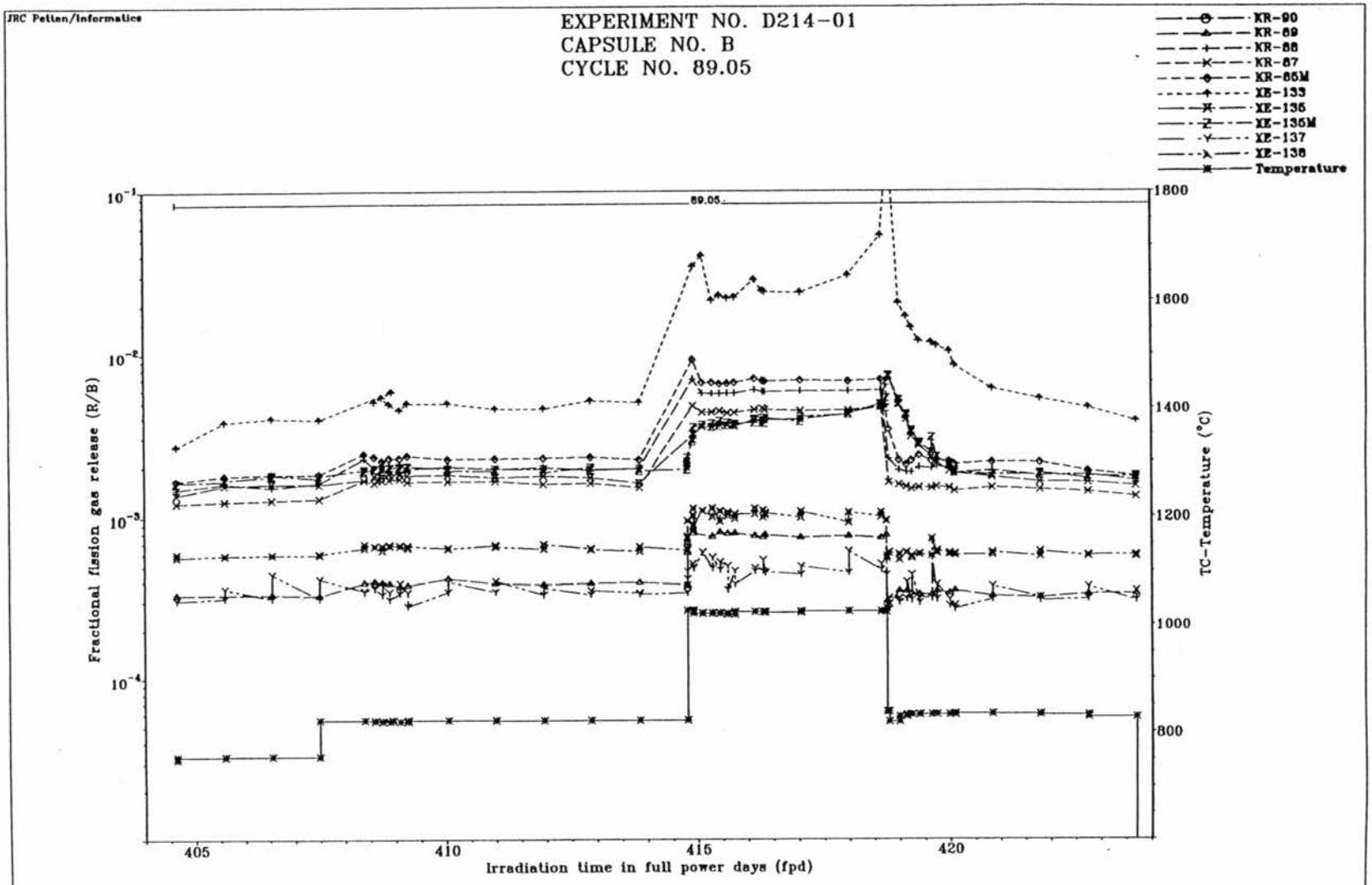



Fig. 6.4.39. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

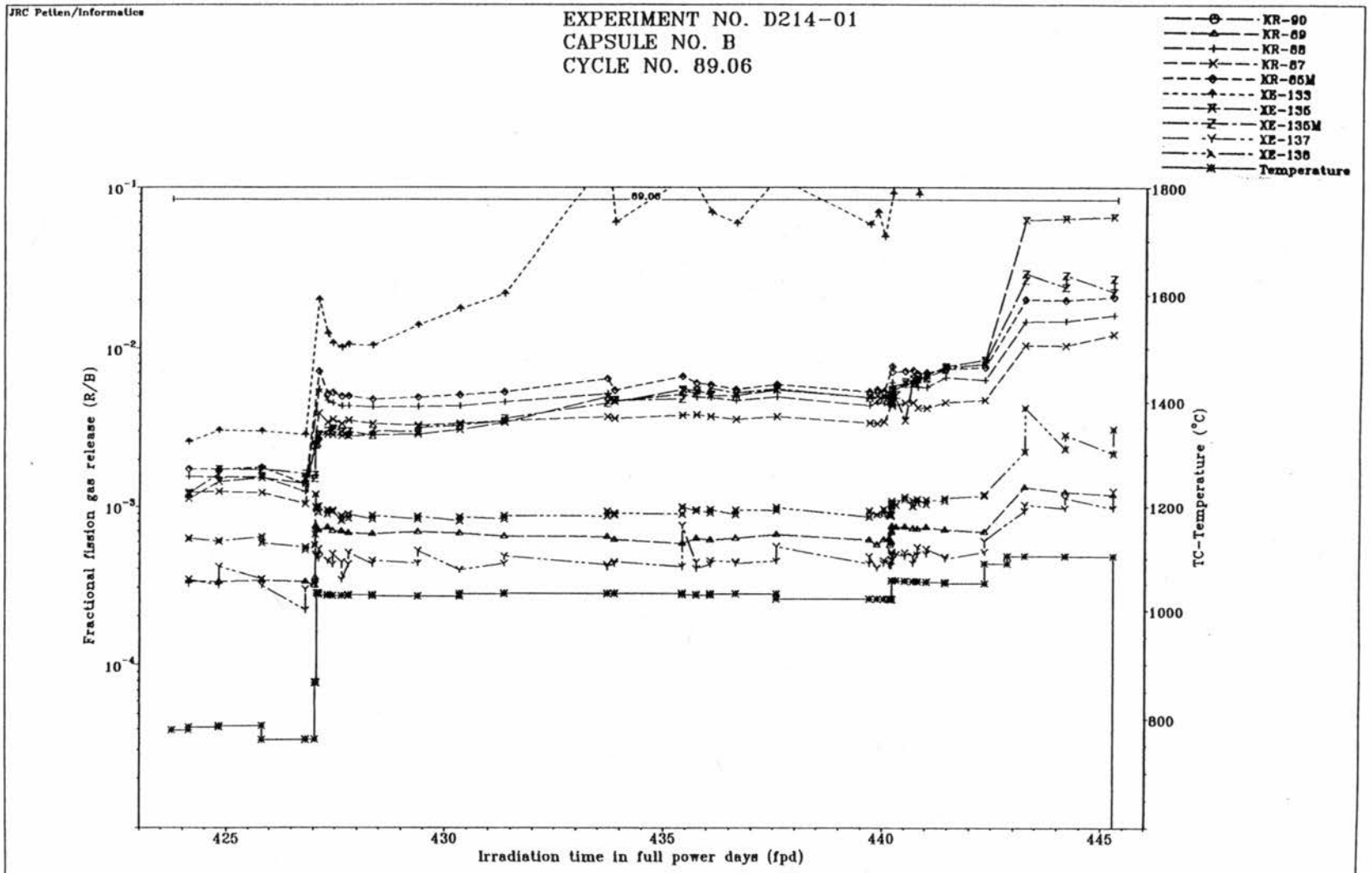



Fig. 6.4.40. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

Table 6.4.41. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. 214.01 | | | CAPSULE NO. C | | CYCLE NO. 87.03 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 10. 4.87 | 12 | | | | | | 786 |
| 0. 0 | 0 | | | | | | 0.5 |
| 10. 4.87 | 12 | | | 4.366E-05 | 3.464E-05 | 4.596E-05 | 776 |
| 16. 3 | 0 | | 1.274E-05 | 1.357E-05 | 3.877E-06 | 9.130E-06 | 1.8 |
| 10. 4.87 | 14 | | | 4.179E-05 | 3.035E-05 | 3.961E-05 | 776 |
| 16. 3 | 0 | | 1.314E-05 | | | | 1.8 |
| 11. 4.87 | 11 | 3.645E-07 | 7.545E-06 | | | | 769 |
| 17.32 | 10 | | | 1.293E-05 | 3.893E-06 | 7.555E-06 | 3.6 |
| 11. 4.87 | 14 | | | 3.666E-05 | 2.877E-05 | 3.598E-05 | 769 |
| 18. 3 | 0 | | 1.355E-05 | | | | 3.6 |
| 13. 4.87 | 21 | 7.909E-07 | 1.080E-05 | | | | 769 |
| 16.45 | 10 | | | 2.347E-05 | 5.090E-06 | 1.107E-05 | 6.9 |
| 13. 4.87 | 24 | | | 5.260E-05 | 3.850E-05 | 6.168E-05 | 769 |
| 17. 5 | 40 | 6.442E-05 | 2.978E-05 | | | | 6.92 |
| 16. 4.87 | 14 | | 1.151E-05 | | | | 816 |
| 22. 7 | 10 | | | 4.384E-05 | 6.006E-06 | 3.257E-05 | 8.75 |
| 16. 4.87 | 14 | | | 3.625E-04 | 2.518E-04 | 4.063E-04 | 816 |
| 22. 7 | 40 | 5.447E-04 | 1.079E-04 | | | | 8.75 |
| 21. 4.87 | 15 | | | 3.595E-03 | | 4.137E-03 | 904 |
| 16.14 | 40 | 4.752E-03 | 1.792E-03 | | | | 12.6 |
| 24. 4.87 | 25 | | | 3.559E-03 | 2.750E-03 | 3.700E-03 | 893 |
| 12.57 | 40 | 4.450E-03 | 1.803E-03 | | | | 15.1 |
| 28. 4.87 | 25 | | | 4.258E-03 | 3.285E-03 | 4.435E-03 | 887 |
| 19.59 | 40 | 6.265E-03 | 2.244E-03 | | | | 18.5 |
| 30. 4.87 | 25 | | | 4.674E-03 | 3.540E-03 | 4.932E-03 | 881 |
| 12.17 | 40 | 6.836E-03 | 2.509E-03 | | | | 19.8 |
| 1. 5.87 | 25 | | | 4.108E-03 | 2.502E-03 | 4.602E-03 | 879 |
| 22.44 | 40 | 7.203E-03 | 2.450E-03 | | | | 21 |
| 3. 5.87 | 25 | | | 4.025E-03 | 3.278E-03 | 4.219E-03 | 874 |
| 2.49 | 40 | 7.100E-03 | 2.895E-03 | | | | 21.9 |
| 4. 5.87 | 25 | | | 6.002E-03 | 4.686E-03 | 6.377E-03 | 881 |
| 2.49 | 40 | 9.751E-03 | 3.107E-03 | | | | 22.8 |
| 4. 5.87 | 25 | | | | | | 266 |
| 16. 0 | 40 | | | | | | 23.03 |

Table 6.4.42. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 87.05 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 6. 6.87 | 35 | | | | | | 30 |
| 0. 0 | 10 | | | | | | 23.03 |
| 6. 6.87 | 35 | | | | | | 829 |
| 18.54 | 10 | | | 9.086E-04 | | 9.143E-04 | 23.8 |
| 6. 6.87 | 35 | | | 6.353E-03 | 5.112E-03 | 6.247E-03 | 829 |
| 18.54 | 30 | | | | | | 23.8 |
| 6. 6.87 | 35 | | | | | | 829 |
| 18.54 | 20 | 3.199E-03 | 1.840E-03 | | | | 23.8 |
| 8. 6.87 | 35 | | | | | | 815 |
| 12.32 | 10 | | | 5.568E-04 | | 1.989E-04 | 25.65 |
| 8. 6.87 | 35 | | | 6.286E-03 | 4.490E-03 | 6.344E-03 | 815 |
| 12.32 | 30 | | | | | | 25.65 |
| 8. 6.87 | 35 | | | | | | 815 |
| 12.32 | 20 | 7.657E-03 | 4.471E-03 | | | | 25.65 |
| 9. 6.87 | 35 | | | 6.030E-03 | 5.026E-03 | 6.228E-03 | 819 |
| 6.25 | 30 | | | | | | 26.4 |
| 9. 6.87 | 35 | | | | | | 819 |
| 6.25 | 20 | 7.035E-03 | 3.834E-03 | | | | 26.4 |
| 10. 6.87 | 35 | | | | | | 819 |
| 0.17 | 10 | | | 1.136E-03 | | | 27.1 |
| 10. 6.87 | 35 | | | 3.766E-03 | 2.958E-03 | 4.009E-03 | 819 |
| 0.17 | 30 | | | | | | 27.1 |
| 10. 6.87 | 35 | | | 7.800E-03 | 5.989E-03 | 8.051E-03 | 819 |
| 0.17 | 40 | 8.270E-03 | 4.115E-03 | | | | 27.1 |
| 12. 6.87 | 35 | | | | | | 820 |
| 0.49 | 10 | | | 1.110E-03 | 1.248E-04 | 5.764E-04 | 29.1 |
| 12. 6.87 | 35 | | | 6.551E-03 | 5.055E-03 | 6.710E-03 | 820 |
| 0.49 | 30 | | | | | | 29.1 |
| 12. 6.87 | 35 | | | | | | 820 |
| 0.49 | 20 | 1.005E-02 | 4.308E-03 | | | | 29.1 |
| 13. 6.87 | 35 | | | | | | 821 |
| 1. 2 | 10 | | | 1.084E-03 | 1.534E-04 | | 30.1 |
| 13. 6.87 | 35 | | | 6.480E-03 | 4.934E-03 | 6.712E-03 | 821 |
| 1. 2 | 30 | | | | | | 30.1 |
| 15. 6.87 | 35 | | | | | | 818 |
| 11. 5 | 10 | | | 1.089E-03 | | 4.674E-04 | 32.6 |
| 15. 6.87 | 35 | | | 6.143E-03 | 4.638E-03 | 6.343E-03 | 818 |
| 11. 5 | 30 | | | | | | 32.6 |
| 15. 6.87 | 35 | | | | | | 818 |
| 11. 5 | 20 | 1.031E-02 | 3.982E-03 | | | | 32.6 |
| 16. 6.87 | 35 | | | | | | 819 |
| 8.42 | 10 | | | 8.834E-04 | | 3.522E-04 | 33.4 |
| 16. 6.87 | 35 | | | 6.229E-03 | 4.802E-03 | 6.478E-03 | 819 |
| 8.42 | 30 | | | | | | 33.4 |
| 16. 6.87 | 35 | | | | | | 819 |
| 8.42 | 20 | 1.062E-02 | 4.018E-03 | | | | 33.4 |
| 16. 6.87 | 35 | | | | | | 819 |
| 14.18 | 10 | | | 1.037E-03 | | 2.979E-04 | 33.65 |
| 16. 6.87 | 35 | | | 5.848E-03 | 4.502E-03 | 6.174E-03 | 819 |
| 14.18 | 30 | | | | | | 33.65 |
| 16. 6.87 | 35 | | | | | | 819 |
| 14.18 | 20 | 1.071E-02 | 4.318E-03 | | | | 33.65 |

Table 6.4.42. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 87.05 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 16. 6.87 | 35 | | | | | | 819 |
| 21. 0 | 10 | | | 2.049E-04 | | 7.753E-05 | 33.85 |
| 16. 6.87 | 35 | | | 8.510E-03 | 6.609E-03 | 8.914E-03 | 819 |
| 21. 0 | 40 | 1.578E-02 | 4.252E-03 | | | | 33.85 |
| 17. 6.87 | 35 | | | | | | 818 |
| 17.1 | 10 | | | 9.464E-04 | 1.338E-04 | | 34.75 |
| 17. 6.87 | 35 | | | 6.476E-03 | 4.932E-03 | 6.724E-03 | 818 |
| 17.1 | 30 | | | | | | 34.75 |
| 17. 6.87 | 35 | | | | | | 818 |
| 17.1 | 20 | 1.128E-02 | 4.574E-03 | | | | 34.75 |
| 18. 6.87 | 35 | | | 9.207E-03 | 7.253E-03 | 9.900E-03 | 819 |
| 13. 0 | 40 | 1.170E-02 | 4.903E-03 | | | | 35.65 |
| 19. 6.87 | 35 | | | | | | 820 |
| 11. 0 | 10 | | | 1.201E-03 | 1.297E-04 | 2.015E-04 | 36.6 |
| 19. 6.87 | 35 | | | 6.516E-03 | 4.916E-03 | 6.898E-03 | 820 |
| 11. 0 | 40 | 8.485E-03 | 3.353E-03 | | | | 36.6 |
| 20. 6.87 | 35 | | 2.370E-04 | | | | 820 |
| 9.36 | 10 | | | 1.019E-03 | 1.718E-04 | 5.190E-05 | 37.5 |
| 20. 6.87 | 35 | | | 5.818E-03 | 4.356E-03 | 6.198E-03 | 820 |
| 9.36 | 30 | | | | | | 37.5 |
| 20. 6.87 | 35 | | | 4.332E-03 | 3.509E-03 | 4.726E-03 | 820 |
| 9.36 | 30 | | | | | | 37.5 |
| 20. 6.87 | 35 | | | 5.947E-03 | 4.479E-03 | 6.230E-03 | 819 |
| 16.56 | 40 | 7.725E-03 | 2.844E-03 | | | | 37.7 |
| 21. 6.87 | 35 | | | 6.701E-03 | 4.945E-03 | 7.098E-03 | 818 |
| 0.52 | 40 | 2.344E-02 | 3.131E-03 | | | | 38 |
| 21. 6.87 | 35 | | | 6.697E-03 | 7.241E-03 | 7.075E-03 | 819 |
| 3.42 | 40 | 2.414E-02 | 3.249E-03 | | | | 38.2 |
| 21. 6.87 | 35 | | | 7.740E-03 | 5.754E-03 | 8.485E-03 | 819 |
| 8.37 | 40 | 4.313E-02 | 4.003E-03 | | | | 38.5 |
| 21. 6.87 | 35 | | | 8.883E-03 | 6.377E-03 | 9.890E-03 | 820 |
| 17.53 | 40 | 5.016E-02 | 5.239E-03 | | | | 38.7 |
| 22. 6.87 | 35 | | | 7.363E-03 | 7.720E-03 | 7.865E-03 | 819 |
| 0.4 | 30 | | | | | | 39 |
| 22. 6.87 | 35 | | | 6.987E-03 | 5.274E-03 | 7.409E-03 | 819 |
| 3.42 | 40 | 3.575E-02 | 4.117E-03 | | | | 39.2 |
| 22. 6.87 | 35 | | | 7.560E-03 | 5.857E-03 | 7.720E-03 | 819 |
| 8.29 | 40 | 3.347E-02 | 4.450E-03 | | | | 39.45 |
| 22. 6.87 | 35 | | | 8.258E-03 | 6.732E-03 | 8.685E-03 | 821 |
| 11.57 | 40 | 3.356E-02 | 4.925E-03 | | | | 39.6 |
| 23. 6.87 | 35 | | | 7.115E-03 | 8.094E-03 | 7.697E-03 | 819 |
| 8.22 | 40 | 2.434E-02 | 4.631E-03 | | | | 40.45 |
| 23. 6.87 | 35 | | | 7.969E-03 | 6.359E-03 | 8.740E-03 | 820 |
| 13.28 | 40 | 2.632E-02 | 5.232E-03 | | | | 40.65 |
| 24. 6.87 | 35 | | | 6.699E-03 | 5.211E-03 | 7.069E-03 | 820 |
| 8.22 | 30 | | | | | | 41.45 |
| 24. 6.87 | 35 | | | | | | 820 |
| 8.22 | 20 | 3.919E-02 | 7.008E-03 | | | | 41.45 |
| 25. 6.87 | 35 | | | 5.723E-03 | 4.508E-03 | 5.953E-03 | 819 |
| 8.17 | 30 | | | | | | 42.45 |
| 25. 6.87 | 35 | | | | | | 819 |
| 8.17 | 20 | 1.437E-02 | 5.686E-03 | | | | 42.45 |

Table 6.4.42. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 87.05 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 26. 6.87 | 35 | | | 6.073E-03 | 4.755E-03 | 6.475E-03 | 819 |
| 8.24 | 30 | | | | | | 43.45 |
| 26. 6.87 | 35 | | | | | | 819 |
| 8.24 | 20 | 1.220E-02 | 4.782E-03 | | | | 43.45 |
| 27. 6.87 | 35 | | | 5.933E-03 | 4.556E-03 | 6.231E-03 | 820 |
| 11.32 | 40 | 7.451E-03 | 3.055E-03 | | | | 44.6 |
| 28. 6.87 | 35 | | | 6.064E-03 | 4.618E-03 | 6.452E-03 | 820 |
| 9. 6 | 30 | | | | | | 45.5 |
| 28. 6.87 | 35 | | | | | | 820 |
| 9. 6 | 20 | 1.136E-02 | 4.221E-03 | | | | 45.5 |
| 29. 6.87 | 35 | | | 6.018E-03 | 4.521E-03 | 6.342E-03 | 818 |
| 8.45 | 40 | 7.464E-03 | 3.012E-03 | | | | 46.5 |
| 29. 6.87 | 35 | | | | | | 80 |
| 17. 0 | 30 | | | | | | 46.68 |
| --- | --- | | | | | | |

Table 6.4.43. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 87.09 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 29.10.87 | 35 | | | | | | 925 |
| 1. 0 | 10 | | | | | | 46.68 |
| 29.10.87 | 35 | | | | | | 925 |
| 1.17 | 10 | | | 1.357E-03 | | 4.886E-04 | 48.2 |
| 29.10.87 | 35 | | | 5.084E-03 | 4.007E-03 | 5.655E-03 | 925 |
| 1.17 | 30 | | | | | | 48.2 |
| 29.10.87 | 35 | | | | | | 925 |
| 1.17 | 20 | 2.586E-02 | 2.878E-03 | | | | 48.2 |
| 30.10.87 | 35 | | | | | | 926 |
| 0.54 | 10 | | | 1.599E-03 | | 5.808E-04 | 49.2 |
| 30.10.87 | 35 | | | 5.609E-03 | 4.154E-03 | 5.947E-03 | 926 |
| 0.54 | 30 | | | | | | 49.2 |
| 30.10.87 | 35 | | | | | | 926 |
| 0.54 | 20 | 5.557E-03 | 3.275E-03 | | | | 49.2 |
| 31.10.87 | 35 | | | | | | 922 |
| 1.34 | 10 | | | 2.083E-03 | | 8.430E-04 | 50.2 |
| 31.10.87 | 35 | | | 5.510E-03 | 4.035E-03 | 5.910E-03 | 922 |
| 1.34 | 30 | | | | | | 50.2 |
| 31.10.87 | 35 | | | | | | 922 |
| 1.34 | 20 | 6.932E-03 | 3.291E-03 | | | | 50.2 |
| 1.11.87 | 35 | | | | | | 922 |
| 1.45 | 10 | | | 1.576E-03 | | 5.985E-04 | 51.2 |
| 1.11.87 | 35 | | | 5.311E-03 | 4.050E-03 | 5.784E-03 | 922 |
| 1.45 | 30 | | | | | | 51.2 |
| 1.11.87 | 35 | | | | | | 922 |
| 1.45 | 20 | 7.549E-03 | 3.065E-03 | | | | 51.2 |
| 2.11.87 | 35 | | | | | | 921 |
| 0.38 | 10 | | | 1.449E-03 | | 5.202E-04 | 52.2 |
| 2.11.87 | 35 | | | 5.384E-03 | 4.013E-03 | 5.793E-03 | 921 |
| 0.38 | 30 | | | | | | 52.2 |
| 2.11.87 | 35 | | | | | | 921 |
| 0.38 | 20 | 7.834E-03 | 2.990E-03 | | | | 52.2 |
| 2.11.87 | 35 | | | 5.114E-03 | 3.845E-03 | 5.544E-03 | 920 |
| 7.18 | 30 | | | | | | 52.5 |
| 2.11.87 | 35 | | | | | | 920 |
| 7.18 | 20 | 6.766E-03 | 2.556E-03 | | | | 52.5 |
| 2.11.87 | 35 | | | | | | 921 |
| 12.17 | 10 | | | 9.405E-04 | | 3.544E-04 | 52.7 |
| 2.11.87 | 35 | | | 5.518E-03 | 3.954E-03 | 6.137E-03 | 921 |
| 12.17 | 30 | | | | | | 52.7 |
| 2.11.87 | 35 | | | | | | 921 |
| 12.17 | 20 | 8.311E-03 | 2.941E-03 | | | | 52.7 |
| 2.11.87 | 35 | | | | | | 922 |
| 17.53 | 10 | | | 2.489E-03 | | 7.440E-04 | 52.8 |
| 2.11.87 | 35 | | | 6.922E-03 | 4.491E-03 | 8.857E-03 | 922 |
| 17.53 | 30 | | | | | | 52.8 |
| 2.11.87 | 35 | | | | | | 922 |
| 17.53 | 20 | 1.138E-01 | 4.916E-03 | | | | 52.8 |
| 2.11.87 | 35 | | | 7.898E-03 | 5.365E-03 | 9.742E-03 | 923 |
| 22.41 | 30 | | | | | | 52.9 |
| 2.11.87 | 35 | | | 8.998E-03 | 5.873E-03 | 1.143E-02 | 923 |
| 22.41 | 30 | | | | | | 52.9 |

Table 6.4.43. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 87.09 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 2.11.87 | 35 | | | | | | 923 |
| 22.41 | 20 | 1.070E-01 | 6.659E-03 | | | | 52.9 |
| 3.11.87 | 35 | | | | | | 922 |
| 3.51 | 10 | | | 3.391E-03 | | 1.017E-03 | 53.1 |
| 3.11.87 | 35 | | | 6.312E-03 | 4.932E-03 | 7.906E-03 | 922 |
| 3.51 | 30 | | | | | | 53.1 |
| 3.11.87 | 35 | | | | | | 922 |
| 9. 2 | 10 | | | 2.105E-03 | | 5.352E-04 | 53.5 |
| 3.11.87 | 35 | | | 6.973E-03 | 4.878E-03 | 7.868E-03 | 922 |
| 9. 2 | 30 | | | | | | 53.5 |
| 3.11.87 | 35 | | | | | | 922 |
| 9. 2 | 20 | 6.264E-02 | 8.031E-03 | | | | 53.5 |
| 3.11.87 | 35 | | | | | | 924 |
| 15. 5 | 10 | | | 3.657E-03 | | 1.124E-03 | 53.6 |
| 3.11.87 | 35 | | | 6.534E-03 | 4.988E-03 | 7.349E-03 | 924 |
| 15. 5 | 30 | | | | | | 53.6 |
| 3.11.87 | 35 | | | | | | 924 |
| 15. 5 | 20 | 5.103E-02 | 7.133E-03 | | | | 53.6 |
| 4.11.87 | 35 | | | | | | 923 |
| 4.13 | 10 | | | 3.519E-03 | | 8.508E-04 | 54.2 |
| 4.11.87 | 35 | | | 6.811E-03 | 5.108E-03 | 7.684E-03 | 923 |
| 4.13 | 30 | | | | | | 54.2 |
| 4.11.87 | 35 | | | | | | 923 |
| 4.13 | 20 | 6.154E-02 | 7.342E-03 | | | | 54.2 |
| 5.11.87 | 35 | | | | | | 924 |
| 0.24 | 10 | | | 3.374E-03 | | 9.157E-04 | 55 |
| 5.11.87 | 35 | | | 6.513E-03 | 4.785E-03 | 7.263E-03 | 924 |
| 0.24 | 30 | | | | | | 55 |
| 5.11.87 | 35 | | | | | | 924 |
| 0.24 | 20 | 5.410E-02 | 8.094E-03 | | | | 55 |
| 6.11.87 | 35 | | | | | | 931 |
| 13. 0 | 10 | | | 1.494E-03 | | 4.651E-04 | 56.5 |
| 6.11.87 | 35 | | | 6.453E-03 | 4.962E-03 | 7.121E-03 | 931 |
| 13. 0 | 30 | | | | | | 56.5 |
| 6.11.87 | 35 | | | | | | 931 |
| 13. 0 | 20 | 3.935E-01 | 5.838E-02 | | | | 56.5 |
| 7.11.87 | 35 | | | | | | 923 |
| 8.29 | 10 | | | 2.856E-03 | | 7.996E-04 | 57 |
| 7.11.87 | 35 | | | 6.355E-03 | 4.745E-03 | 6.812E-03 | 923 |
| 8.29 | 30 | | | | | | 57 |
| 7.11.87 | 35 | | | | | | 923 |
| 8.29 | 20 | 3.736E-02 | 4.978E-03 | | | | 57 |
| 8.11.87 | 35 | | | | | | 923 |
| 8.26 | 10 | | | 1.779E-03 | | 4.285E-04 | 58 |
| 8.11.87 | 35 | | | 8.163E-03 | 4.549E-03 | 8.873E-03 | 923 |
| 8.26 | 30 | | | | | | 58 |
| 8.11.87 | 35 | | | | | | 923 |
| 8.26 | 20 | 9.044E-02 | 5.976E-03 | | | | 58 |
| 9.11.87 | 35 | | | | | | 923 |
| 8.17 | 10 | | | 2.532E-03 | | 6.929E-04 | 59.2 |
| 9.11.87 | 35 | | | 6.048E-03 | 4.572E-03 | 8.630E-03 | 923 |
| 8.17 | 30 | | | | | | 59.2 |

Table 6.4.43. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 87.09 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 9.11.87 | 35 | | | | | | 923 |
| 8.17 | 20 | 3.389E-02 | 4.637E-03 | | | | 59.2 |
| 10.11.87 | 35 | | | | | | 925 |
| 8.23 | 10 | | | 2.663E-03 | | 7.209E-04 | 60.2 |
| 10.11.87 | 35 | | | 5.459E-03 | 4.096E-03 | 2.130E-03 | 925 |
| 8.23 | 30 | | | | | | 60.2 |
| 10.11.87 | 35 | | | 4.384E-03 | 3.332E-03 | 3.782E-03 | 925 |
| 11. 5 | 30 | | | | | | 60.3 |
| 10.11.87 | 35 | | | | | | 925 |
| 11. 5 | 20 | 2.163E-02 | 5.731E-03 | | | | 60.3 |
| 10.11.87 | 35 | | | 3.852E-03 | 2.958E-03 | 3.305E-03 | 926 |
| 13.56 | 30 | | | | | | 60.4 |
| 10.11.87 | 35 | | | | | | 926 |
| 13.56 | 20 | 1.717E-02 | 4.524E-03 | | | | 60.4 |
| 10.11.87 | 35 | | | 3.946E-03 | 3.005E-03 | 4.244E-03 | 925 |
| 17.12 | 30 | | | | | | 60.5 |
| 10.11.87 | 35 | | | | | | 925 |
| 17.12 | 20 | 1.353E-02 | 5.788E-03 | | | | 60.5 |
| 10.11.87 | 35 | | | 3.892E-03 | 2.891E-03 | 4.132E-03 | 924 |
| 19.56 | 30 | | | | | | 60.6 |
| 10.11.87 | 35 | | | | | | 924 |
| 19.56 | 20 | 1.238E-02 | 4.003E-03 | | | | 60.6 |
| 10.11.87 | 35 | | | 4.213E-03 | 3.202E-03 | 1.387E-03 | 924 |
| 22.49 | 30 | | | | | | 60.7 |
| 10.11.87 | 35 | | | | | | 924 |
| 22.49 | 20 | 1.190E-02 | 4.792E-03 | | | | 60.7 |
| 11.11.87 | 35 | | | | | | 928 |
| 1.35 | 10 | | | 2.585E-03 | | 7.258E-04 | 60.9 |
| 11.11.87 | 35 | | | 5.418E-03 | 4.169E-03 | 5.895E-03 | 928 |
| 1.35 | 40 | 1.019E-02 | 4.670E-03 | | | | 60.9 |
| 11.11.87 | 35 | | | | | | 926 |
| 4.26 | 10 | | | 2.605E-03 | | 7.756E-04 | 61.2 |
| 11.11.87 | 35 | | | 5.461E-03 | 4.044E-03 | 5.816E-03 | 926 |
| 4.26 | 40 | 9.743E-03 | 4.460E-03 | | | | 61.2 |
| 11.11.87 | 35 | | | | | | 924 |
| 7.1 | 10 | | | 2.390E-03 | | 7.054E-04 | 61.4 |
| 11.11.87 | 35 | | | 5.170E-03 | 4.036E-03 | 9.794E-03 | 924 |
| 7.1 | 40 | 9.630E-03 | 4.394E-03 | | | | 61.4 |
| 11.11.87 | 35 | | | | | | 924 |
| 10.46 | 10 | | | 1.679E-03 | | 4.801E-04 | 61.5 |
| 11.11.87 | 35 | | | 5.355E-03 | 4.031E-03 | 2.333E-03 | 924 |
| 10.46 | 40 | 1.062E-02 | 4.341E-03 | | | | 61.5 |
| 12.11.87 | 35 | | | | | | 925 |
| 8.26 | 10 | | | 1.658E-03 | | 4.748E-04 | 62.4 |
| 12.11.87 | 35 | | | 4.953E-03 | 3.720E-03 | 1.007E-02 | 925 |
| 8.26 | 30 | | | | | | 62.4 |
| 12.11.87 | 35 | | | | | | 925 |
| 8.26 | 20 | 1.107E-02 | 5.650E-03 | | | | 62.4 |
| 13.11.87 | 35 | | | | | | 924 |
| 8.26 | 10 | | | 1.591E-03 | | 4.156E-04 | 63.4 |
| 13.11.87 | 35 | | | 4.729E-03 | 3.492E-03 | 8.257E-03 | 924 |
| 8.26 | 30 | | | | | | 63.4 |

Table 6.4.43. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 87.09 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 13.11.87 | 35 | | | | | | 924 |
| 8.26 | 20 | 9.867E-03 | 3.543E-03 | | | | 63.4 |
| 14.11.87 | 35 | | | | | | 924 |
| 9. 6 | 10 | | | 8.295E-04 | | 2.153E-04 | 64.4 |
| 14.11.87 | 35 | | | 6.600E-03 | 3.487E-03 | 5.565E-03 | 924 |
| 9. 6 | 30 | | | | | | 64.4 |
| 14.11.87 | 35 | | | | | | 924 |
| 9. 6 | 20 | 9.147E-03 | 5.170E-03 | | | | 64.4 |
| 15.11.87 | 35 | | | | | | 922 |
| 8.41 | 10 | | | 1.571E-03 | | 4.622E-04 | 65.4 |
| 15.11.87 | 35 | | | 6.700E-03 | 3.338E-03 | 4.926E-03 | 922 |
| 8.41 | 30 | | | | | | 65.4 |
| 15.11.87 | 35 | | | | | | 922 |
| 8.41 | 20 | 8.119E-03 | 4.196E-03 | | | | 65.4 |
| 16.11.87 | 35 | | | | | | 921 |
| 8.51 | 10 | | | 1.870E-03 | | 5.911E-04 | 66.4 |
| 16.11.87 | 35 | | | 5.191E-03 | 3.225E-03 | 5.499E-03 | 921 |
| 8.51 | 30 | | | | | | 66.4 |
| 16.11.87 | 35 | | | | | | 80 |
| 17. 0 | 30 | | | | | | 66.71 |

Table 6.4.44. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 87.10 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 23.11.87 | 35 | | | | | | 925 |
| 0. 0 | 30 | | | | | | 66.71 |
| 23.11.87 | 35 | | | 3.338E-03 | 2.588E-03 | 4.242E-03 | 925 |
| 13.25 | 30 | | | | | | 70.6 |
| 23.11.87 | 35 | | | | | | 925 |
| 13.25 | 20 | 7.203E-03 | 7.584E-04 | | | | 70.6 |
| 24.11.87 | 35 | | | 2.019E-03 | 4.653E-03 | | 926 |
| 11.55 | 30 | | | | | | 72.5 |
| 25.11.87 | 35 | | | 1.165E-02 | 4.412E-03 | 7.362E-03 | 927 |
| 0.27 | 30 | | | | | | 72.9 |
| 25.11.87 | 35 | | | | | | 927 |
| 0.27 | 20 | 2.081E-01 | | | | | 72.9 |
| 25.11.87 | 35 | | | 2.360E-03 | 4.161E-03 | 1.480E-02 | 927 |
| 8.35 | 30 | | | | | | 73.4 |
| 25.11.87 | 35 | | | | | | 927 |
| 8.35 | 30 | | | | | | 73.4 |
| 26.11.87 | 35 | | | | | | 927 |
| 8.51 | 10 | | | 2.964E-03 | | 7.491E-04 | 74.4 |
| 26.11.87 | 35 | | | 9.977E-03 | 4.078E-03 | 9.356E-03 | 927 |
| 8.51 | 30 | | | | | | 74.4 |
| 26.11.87 | 35 | | | | | | 927 |
| 8.51 | 20 | 3.530E-02 | | | | | 74.4 |
| 27.11.87 | 35 | | | | | | 934 |
| 8.56 | 10 | | | 2.555E-03 | | 5.762E-04 | 75.4 |
| 27.11.87 | 35 | | | 9.162E-03 | 3.795E-03 | 9.406E-03 | 934 |
| 8.56 | 30 | | | | | | 75.4 |
| 27.11.87 | 35 | | | | | | 932 |
| 11.4 | 10 | | | 2.139E-03 | | 5.657E-04 | 75.45 |
| 27.11.87 | 35 | | | 6.951E-03 | 3.580E-03 | 8.772E-03 | 932 |
| 11.4 | 30 | | | | | | 75.45 |
| 27.11.87 | 35 | | | | | | 931 |
| 14.26 | 10 | | | 2.041E-03 | | 5.624E-04 | 75.5 |
| 27.11.87 | 35 | | | 6.684E-03 | 3.627E-03 | 8.555E-03 | 931 |
| 14.26 | 30 | | | | | | 75.5 |
| 27.11.87 | 35 | | | | | | 929 |
| 17.13 | 10 | | | 1.955E-03 | | 5.584E-04 | 75.55 |
| 27.11.87 | 35 | | | 4.454E-03 | 3.215E-03 | 9.516E-03 | 929 |
| 17.13 | 30 | | | | | | 75.55 |
| 27.11.87 | 35 | | | | | | 930 |
| 21. 0 | 10 | | | 1.734E-03 | | 4.274E-04 | 75.6 |
| 27.11.87 | 35 | | | 4.435E-03 | 3.398E-03 | 5.558E-03 | 930 |
| 21. 0 | 30 | | | | | | 75.6 |
| 28.11.87 | 35 | | | | | | 931 |
| 0.34 | 10 | | | 1.879E-03 | | 5.388E-04 | 75.8 |
| 28.11.87 | 35 | | | 4.505E-03 | 3.470E-03 | 9.858E-03 | 931 |
| 0.34 | 30 | | | | | | 75.8 |
| 28.11.87 | 35 | | | | | | 932 |
| 3.46 | 10 | | | 1.862E-03 | | 4.827E-04 | 76 |
| 28.11.87 | 35 | | | 4.464E-03 | 3.370E-03 | 4.783E-03 | 932 |
| 3.46 | 30 | | | | | | 76 |
| 28.11.87 | 35 | | | | | | 931 |
| 8.56 | 10 | | | 1.828E-03 | | 4.913E-04 | 76.4 |

Table 6.4.44. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 87.10 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 28.11.87 | 35 | | | 4.413E-03 | 3.329E-03 | 6.800E-03 | 931 |
| 8.56 | 30 | | | | | | 76.4 |
| 28.11.87 | 35 | | | | | | 931 |
| 11.43 | 10 | | | 1.822E-03 | | 5.239E-04 | 76.5 |
| 28.11.87 | 35 | | | 4.395E-03 | 3.319E-03 | 5.572E-03 | 931 |
| 11.43 | 30 | | | | | | 76.5 |
| 28.11.87 | 35 | | | | | | 931 |
| 16.5 | 10 | | | 1.653E-03 | | 4.526E-04 | 76.6 |
| 28.11.87 | 35 | | | 4.280E-03 | 3.226E-03 | 8.598E-03 | 931 |
| 16.5 | 30 | | | | | | 76.6 |
| 28.11.87 | 35 | | | | | | 930 |
| 19.55 | 10 | | | 1.471E-03 | | 4.012E-04 | 76.7 |
| 28.11.87 | 35 | | | 4.195E-03 | 3.139E-03 | 6.546E-03 | 930 |
| 19.55 | 30 | | | | | | 76.7 |
| 29.11.87 | 35 | | | | | | 930 |
| 0.49 | 10 | | | 1.707E-03 | | 5.179E-04 | 76.9 |
| 29.11.87 | 35 | | | 4.290E-03 | 3.179E-03 | 6.732E-03 | 930 |
| 0.49 | 30 | | | | | | 76.9 |
| 29.11.87 | 35 | | | | | | 930 |
| 3.53 | 10 | | | 1.642E-03 | | 4.521E-04 | 77.2 |
| 29.11.87 | 35 | | | 4.203E-03 | 3.147E-03 | 7.074E-03 | 930 |
| 3.53 | 30 | | | | | | 77.2 |
| 29.11.87 | 35 | | | | | | 931 |
| 8.31 | 10 | | | 1.614E-03 | | 4.715E-04 | 77.4 |
| 29.11.87 | 35 | | | 4.214E-03 | 3.145E-03 | 4.540E-03 | 931 |
| 8.31 | 30 | | | | | | 77.4 |
| 29.11.87 | 35 | | | | | | 931 |
| 11.14 | 10 | | | 1.613E-03 | | 4.526E-04 | 77.5 |
| 29.11.87 | 35 | | | 4.165E-03 | 3.132E-03 | 7.125E-03 | 931 |
| 11.14 | 30 | | | | | | 77.5 |
| 29.11.87 | 35 | | | | | | 931 |
| 16.54 | 10 | | | 1.106E-03 | 2.162E-04 | | 77.6 |
| 29.11.87 | 35 | | | 2.461E-03 | 1.864E-03 | 2.543E-03 | 931 |
| 16.54 | 30 | | | | | | 77.6 |
| 29.11.87 | 35 | | | | | | 931 |
| 16.54 | 20 | 4.644E-03 | 1.631E-03 | | | | 77.6 |
| 30.11.87 | 35 | | | | | | 930 |
| 0.17 | 10 | | | 1.459E-03 | | 4.052E-04 | 78 |
| 30.11.87 | 35 | | | 4.001E-03 | 2.971E-03 | 4.252E-03 | 930 |
| 0.17 | 30 | | | | | | 78 |
| 30.11.87 | 35 | | | | | | 929 |
| 3. 0 | 10 | | | 1.569E-03 | | 4.400E-04 | 78.2 |
| 30.11.87 | 35 | | | 3.961E-03 | 2.880E-03 | 4.369E-03 | 929 |
| 3. 0 | 30 | | | | | | 78.2 |
| 30.11.87 | 35 | | | | | | 928 |
| 8.33 | 10 | | | 1.594E-03 | | 4.508E-04 | 78.3 |
| 30.11.87 | 35 | | | 3.997E-03 | 2.937E-03 | 4.338E-03 | 928 |
| 8.33 | 30 | | | | | | 78.3 |
| 30.11.87 | 35 | | | | | | 928 |
| 8.33 | 20 | 7.804E-03 | 2.557E-03 | | | | 78.3 |
| 1.12.87 | 35 | | | | | | 932 |
| 8.3 | 10 | | | 1.521E-03 | | 4.292E-04 | 79.3 |

Table 6.4.44. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 87.10 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 1.12.87 | 35 | | | 3.797E-03 | 2.815E-03 | 4.189E-03 | 932 |
| 8.3 | 30 | | | | | | 79.3 |
| 1.12.87 | 35 | | | | | | 932 |
| 8.3 | 20 | 7.092E-03 | 2.331E-03 | | | | 79.3 |
| 2.12.87 | 35 | | | | | | 929 |
| 8.22 | 10 | | | 1.547E-03 | | 4.299E-04 | 80.3 |
| 2.12.87 | 35 | | | 2.867E-03 | 1.525E-03 | 3.426E-03 | 929 |
| 8.22 | 30 | | | | | | 80.3 |
| 2.12.87 | 35 | | | | | | 929 |
| 8.22 | 20 | 6.886E-03 | 2.322E-03 | | | | 80.3 |
| 3.12.87 | 35 | | | | | | 927 |
| 8.28 | 10 | | | 1.512E-03 | | 4.226E-04 | 81.3 |
| 3.12.87 | 35 | | | 3.707E-03 | 2.636E-03 | 4.088E-03 | 927 |
| 8.28 | 30 | | | | | | 81.3 |
| 3.12.87 | 35 | | | | | | 927 |
| 8.28 | 20 | 6.693E-03 | 2.211E-03 | | | | 81.3 |
| 4.12.87 | 35 | | | | | | 925 |
| 8.35 | 10 | | | 1.456E-03 | | 4.086E-04 | 82.3 |
| 4.12.87 | 35 | | | 3.451E-03 | 2.456E-03 | 3.784E-03 | 925 |
| 8.35 | 30 | | | | | | 82.3 |
| 4.12.87 | 35 | | | | | | 925 |
| 8.35 | 20 | 6.468E-03 | 2.145E-03 | | | | 82.3 |
| 7.12.87 | 35 | | | | | | 911 |
| 8.45 | 10 | | | 1.443E-03 | | 4.199E-04 | 84.3 |
| 7.12.87 | 35 | | | 2.589E-03 | 1.361E-03 | 3.191E-03 | 911 |
| 8.45 | 30 | | | | | | 84.3 |
| 7.12.87 | 35 | | | | | | 911 |
| 8.45 | 20 | 5.621E-03 | 2.013E-03 | | | | 84.3 |
| 8.12.87 | 35 | | | | | | 909 |
| 8.4 | 10 | | | 1.409E-03 | | 4.095E-04 | 85.3 |
| 8.12.87 | 35 | | | 2.998E-03 | 2.160E-03 | 3.352E-03 | 909 |
| 8.4 | 30 | | | | | | 85.3 |
| 8.12.87 | 35 | | | | | | 909 |
| 8.4 | 20 | 5.628E-03 | 1.876E-03 | | | | 85.3 |
| 9.12.87 | 35 | | | | | | 908 |
| 8.37 | 10 | | | 1.419E-03 | | 4.120E-04 | 86.3 |
| 9.12.87 | 35 | | | 2.949E-03 | 2.107E-03 | 3.315E-03 | 908 |
| 8.37 | 30 | | | | | | 86.3 |
| 9.12.87 | 35 | | | | | | 908 |
| 8.37 | 20 | 5.998E-03 | 1.897E-03 | | | | 86.3 |
| 10.12.87 | 35 | | | | | | 908 |
| 8.43 | 10 | | | 1.348E-03 | | 4.092E-04 | 87.3 |
| 10.12.87 | 35 | | | 2.916E-03 | 2.087E-03 | 3.232E-03 | 908 |
| 8.43 | 30 | | | | | | 87.3 |
| 10.12.87 | 35 | | | | | | 908 |
| 8.43 | 20 | 5.787E-03 | 1.836E-03 | | | | 87.3 |
| 11.12.87 | 35 | | | | | | 907 |
| 8.38 | 10 | | | 1.368E-03 | | 3.971E-04 | 88.3 |
| 11.12.87 | 35 | | | 2.898E-03 | 2.061E-03 | 3.241E-03 | 907 |
| 8.38 | 30 | | | | | | 88.3 |
| 11.12.87 | 35 | | | | | | 907 |
| 8.38 | 20 | 6.188E-03 | 1.821E-03 | | | | 88.3 |

Table 6.4.44. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 87.10 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 12.12.87 | 35 | | | | | | 907 |
| 8.15 | 10 | | | 1.284E-03 | | 3.974E-04 | 89.3 |
| 12.12.87 | 35 | | | 2.903E-03 | 2.053E-03 | 3.242E-03 | 907 |
| 8.15 | 30 | | | | | | 89.3 |
| 12.12.87 | 35 | | | | | | 907 |
| 8.15 | 20 | 5.999E-03 | 1.809E-03 | | | | 89.3 |
| 13.12.87 | 35 | | | | | | 906 |
| 8.14 | 10 | | | 1.299E-03 | | 3.928E-04 | 90.3 |
| 13.12.87 | 35 | | | 2.903E-03 | 2.030E-03 | 3.172E-03 | 906 |
| 8.14 | 30 | | | | | | 90.3 |
| 13.12.87 | 35 | | | | | | 906 |
| 8.14 | 20 | 6.104E-03 | 1.769E-03 | | | | 90.3 |
| 14.12.87 | 35 | | | | | | 72 |
| 17. 0 | 20 | | | | | | 91.34 |

Table 6.4.45. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 88.01 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 8. 1.88 | 35 | | | | | | 807 |
| 0. 0 | 10 | | | | | | 91.34 |
| 8. 1.88 | 35 | | 2.746E-04 | | | | 807 |
| 8.45 | 10 | | | 1.286E-03 | 1.795E-04 | 4.288E-04 | 92.6 |
| 8. 1.88 | 35 | | | 2.273E-03 | 1.258E-03 | 2.717E-03 | 807 |
| 8.45 | 30 | | | | | | 92.6 |
| 8. 1.88 | 35 | | | | | | 807 |
| 8.45 | 20 | 2.261E-03 | 2.072E-03 | | | | 92.6 |
| 9. 1.88 | 35 | | | | | | 809 |
| 8.43 | 10 | | | 1.701E-03 | | 5.706E-04 | 93.6 |
| 9. 1.88 | 35 | | | 2.951E-03 | 2.102E-03 | 3.269E-03 | 809 |
| 8.43 | 30 | | | | | | 93.6 |
| 9. 1.88 | 35 | | | | | | 809 |
| 8.43 | 20 | 3.498E-03 | 2.166E-03 | | | | 93.6 |
| 10. 1.88 | 35 | | | | | | 810 |
| 8.35 | 10 | | | 1.681E-03 | | 5.596E-04 | 94.6 |
| 10. 1.88 | 35 | | | 2.936E-03 | 2.118E-03 | 3.277E-03 | 810 |
| 8.35 | 30 | | | | | | 94.6 |
| 10. 1.88 | 35 | | | | | | 810 |
| 8.35 | 20 | 4.144E-03 | 2.162E-03 | | | | 94.6 |
| 11. 1.88 | 35 | | | | | | 810 |
| 8.4 | 10 | | | 1.668E-03 | | 5.685E-04 | 95.6 |
| 11. 1.88 | 35 | | | 2.938E-03 | 2.117E-03 | 3.285E-03 | 810 |
| 8.4 | 30 | | | | | | 95.6 |
| 11. 1.88 | 35 | | | | | | 810 |
| 11.25 | 10 | | | 1.522E-03 | | 4.808E-04 | 95.7 |
| 11. 1.88 | 35 | | | 3.428E-03 | 2.301E-03 | 3.681E-03 | 810 |
| 11.25 | 30 | | | | | | 95.7 |
| 11. 1.88 | 35 | | | | | | 810 |
| 11.25 | 20 | 5.776E-03 | 2.675E-03 | | | | 95.7 |
| 11. 1.88 | 35 | | | | | | 812 |
| 16. 9 | 10 | | | 2.550E-03 | | 9.575E-04 | 96 |
| 11. 1.88 | 35 | | | 5.533E-03 | 3.506E-03 | 1.247E-02 | 812 |
| 16. 9 | 30 | | | | | | 96 |
| 11. 1.88 | 35 | | | | | | 812 |
| 16. 9 | 20 | 5.732E-02 | 8.727E-03 | | | | 96 |
| 11. 1.88 | 35 | | | | | | 810 |
| 19.54 | 10 | | | 3.099E-03 | | 1.171E-03 | 96.1 |
| 11. 1.88 | 35 | | | 5.392E-03 | 3.681E-03 | 1.163E-02 | 810 |
| 19.54 | 30 | | | | | | 96.1 |
| 11. 1.88 | 35 | | | | | | 810 |
| 19.54 | 20 | 4.764E-02 | 1.267E-02 | | | | 96.1 |
| 12. 1.88 | 35 | | | | | | 811 |
| 0.44 | 10 | | | 3.394E-03 | | 1.248E-03 | 96.4 |
| 12. 1.88 | 35 | | | 8.389E-03 | 3.777E-03 | 1.281E-02 | 811 |
| 0.44 | 30 | | | | | | 96.4 |
| 12. 1.88 | 35 | | | | | | 811 |
| 0.44 | 20 | 4.165E-02 | 1.351E-02 | | | | 96.4 |
| 12. 1.88 | 35 | | | | | | 812 |
| 4.24 | 10 | | | 3.476E-03 | | 1.239E-03 | 96.5 |
| 12. 1.88 | 35 | | | 5.896E-03 | 3.879E-03 | 9.611E-03 | 812 |
| 4.24 | 30 | | | | | | 96.5 |

Table 6.4.45. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 88.01 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 12. 1.88 | 35 | | | | | | 812 |
| 4.24 | 20 | 3.613E-02 | 1.293E-02 | | | | 96.5 |
| 12. 1.88 | 35 | | | | | | 812 |
| 8.4 | 10 | | | 3.423E-03 | | 1.206E-03 | 96.7 |
| 12. 1.88 | 35 | | | 5.359E-03 | 4.053E-03 | 9.734E-03 | 812 |
| 8.4 | 30 | | | | | | 96.7 |
| 12. 1.88 | 35 | | | | | | 812 |
| 8.4 | 20 | 4.516E-02 | 1.317E-02 | | | | 96.7 |
| 13. 1.88 | 35 | | | | | | 809 |
| 8.38 | 10 | | | 3.603E-03 | | 1.194E-03 | 97.7 |
| 13. 1.88 | 35 | | | 6.329E-03 | 4.669E-03 | 6.995E-03 | 809 |
| 8.38 | 30 | | | | | | 97.7 |
| 13. 1.88 | 35 | | | | | | 809 |
| 8.38 | 20 | 3.171E-02 | 1.493E-02 | | | | 97.7 |
| 14. 1.88 | 35 | | | | | | 812 |
| 8.43 | 10 | | | 3.598E-03 | | 1.190E-03 | 98.7 |
| 14. 1.88 | 35 | | | 6.189E-03 | 4.615E-03 | 6.835E-03 | 812 |
| 8.43 | 30 | | | | | | 98.7 |
| 14. 1.88 | 35 | | | | | | 812 |
| 8.43 | 20 | 2.963E-02 | 1.180E-02 | | | | 98.7 |
| 15. 1.88 | 35 | | | | | | 812 |
| 8.41 | 10 | | | 3.283E-03 | | | 99.7 |
| 15. 1.88 | 35 | | | 6.017E-03 | 4.399E-03 | 6.544E-03 | 812 |
| 8.41 | 30 | | | | | | 99.7 |
| 15. 1.88 | 35 | | | | | | 813 |
| 11.22 | 10 | | | 3.126E-03 | | 1.035E-03 | 99.8 |
| 15. 1.88 | 35 | | | 1.240E-02 | 4.394E-03 | 1.384E-02 | 813 |
| 11.22 | 30 | | | | | | 99.8 |
| 15. 1.88 | 35 | | | | | | 813 |
| 11.22 | 20 | 2.923E-02 | 1.354E-02 | | | | 99.8 |
| 15. 1.88 | 35 | | | | | | 813 |
| 16.48 | 10 | | | 3.074E-03 | | 1.023E-03 | 100 |
| 15. 1.88 | 35 | | | 5.642E-03 | 4.347E-03 | 5.961E-03 | 813 |
| 16.48 | 30 | | | | | | 100 |
| 15. 1.88 | 35 | | | | | | 813 |
| 16.48 | 20 | 1.985E-02 | 1.248E-02 | | | | 100 |
| 15. 1.88 | 35 | | | | | | 812 |
| 21.33 | 10 | | | 3.067E-03 | | 9.954E-04 | 100.2 |
| 16. 1.88 | 35 | | | | | | 812 |
| 0.2 | 10 | | | 2.794E-03 | | 9.466E-04 | 100.4 |
| 16. 1.88 | 35 | | | 6.500E-03 | 4.943E-03 | 6.808E-03 | 812 |
| 0.2 | 30 | | | | | | 100.4 |
| 16. 1.88 | 35 | | | | | | 812 |
| 0.2 | 20 | 1.561E-02 | 1.304E-02 | | | | 100.4 |
| 16. 1.88 | 35 | | | | | | 812 |
| 8.15 | 10 | | | 2.613E-03 | | 9.764E-04 | 100.6 |
| 16. 1.88 | 35 | | | 5.285E-03 | 4.078E-03 | 5.492E-03 | 812 |
| 8.15 | 30 | | | | | | 100.6 |
| 16. 1.88 | 35 | | | | | | 812 |
| 8.15 | 20 | 1.269E-02 | 6.965E-03 | | | | 100.6 |
| 17. 1.88 | 35 | | | | | | 811 |
| 8.2 | 10 | | | 2.521E-03 | | 9.145E-04 | 101.7 |

Table 6.4.45. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 88.01 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 17. 1.88 | 35 | | | 3.910E-03 | 2.192E-03 | 4.510E-03 | 811 |
| 8.2 | 30 | | | | | | 101.7 |
| 17. 1.88 | 35 | | | | | | 811 |
| 8.2 | 20 | 1.031E-02 | 4.063E-03 | | | | 101.7 |
| 18. 1.88 | 35 | | | | | | 811 |
| 8.15 | 10 | | | 2.361E-03 | | 8.427E-04 | 102.7 |
| 18. 1.88 | 35 | | | 5.141E-03 | 3.845E-03 | 5.400E-03 | 811 |
| 8.15 | 30 | | | | | | 102.7 |
| 18. 1.88 | 35 | | | | | | 811 |
| 8.15 | 20 | 9.809E-03 | 4.053E-03 | | | | 102.7 |
| 19. 1.88 | 35 | | | | | | 811 |
| 8.25 | 10 | | | 2.383E-03 | | 8.089E-04 | 103.7 |
| 19. 1.88 | 35 | | | 4.823E-03 | 3.632E-03 | 5.198E-03 | 811 |
| 8.25 | 30 | | | | | | 103.7 |
| 19. 1.88 | 35 | | | | | | 811 |
| 8.25 | 20 | 9.238E-03 | 3.780E-03 | | | | 103.7 |
| 20. 1.88 | 35 | | | | | | 808 |
| 8. 5 | 10 | | | 2.234E-03 | | 7.720E-04 | 104.7 |
| 20. 1.88 | 35 | | | 4.439E-03 | 3.336E-03 | 4.768E-03 | 808 |
| 8. 5 | 30 | | | | | | 104.7 |
| 20. 1.88 | 35 | | | | | | 808 |
| 8. 5 | 20 | 8.458E-03 | 3.446E-03 | | | | 104.7 |
| 21. 1.88 | 35 | | | | | | 809 |
| 8. 3 | 10 | | | 2.271E-03 | | 7.548E-04 | 105.7 |
| 21. 1.88 | 35 | | | 4.442E-03 | 3.233E-03 | 4.713E-03 | 809 |
| 8. 3 | 30 | | | | | | 105.7 |
| 21. 1.88 | 35 | | | | | | 809 |
| 8. 3 | 20 | 8.330E-03 | 3.381E-03 | | | | 105.7 |
| 22. 1.88 | 35 | | | | | | 810 |
| 8. 3 | 10 | | | 2.225E-03 | | 7.572E-04 | 106.7 |
| 22. 1.88 | 35 | | | 4.246E-03 | 3.182E-03 | 4.648E-03 | 810 |
| 8. 3 | 30 | | | | | | 106.7 |
| 22. 1.88 | 35 | | | | | | 810 |
| 8. 3 | 20 | 8.031E-03 | 3.247E-03 | | | | 106.7 |
| 23. 1.88 | 35 | | | | | | 811 |
| 9.12 | 10 | | | 2.293E-03 | | 7.401E-04 | 107.7 |
| 23. 1.88 | 35 | | | 4.138E-03 | 3.059E-03 | 4.511E-03 | 811 |
| 9.12 | 30 | | | | | | 107.7 |
| 23. 1.88 | 35 | | | | | | 811 |
| 9.12 | 20 | 7.384E-03 | 3.111E-03 | | | | 107.7 |
| 24. 1.88 | 35 | | | | | | 810 |
| 9. 7 | 10 | | | 2.160E-03 | | 6.948E-04 | 108.7 |
| 24. 1.88 | 35 | | | 3.870E-03 | 2.877E-03 | 4.202E-03 | 810 |
| 9. 7 | 30 | | | | | | 108.7 |
| 24. 1.88 | 35 | | | | | | 810 |
| 9. 7 | 20 | 7.479E-03 | 3.009E-03 | | | | 108.7 |
| 25. 1.88 | 35 | | | | | | 811 |
| 8.41 | 10 | | | 2.127E-03 | | 6.855E-04 | 109.7 |
| 25. 1.88 | 35 | | | 3.815E-03 | 2.771E-03 | 4.163E-03 | 811 |
| 8.41 | 30 | | | | | | 109.7 |
| 25. 1.88 | 35 | | | | | | 811 |
| 8.41 | 20 | 6.928E-03 | 2.861E-03 | | | | 109.7 |

Table 6.4.45. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | CAPSULE NO. C | | CYCLE NO. 88.01 | | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 26. 1.88 | 35 | | | | | | 811 |
| 8.44 | 10 | | | 2.138E-03 | | 6.790E-04 | 110.7 |
| 26. 1.88 | 35 | | | 3.742E-03 | 2.736E-03 | 4.113E-03 | 811 |
| 8.44 | 30 | | | | | | 110.7 |
| 26. 1.88 | 35 | | | | | | 811 |
| 8.44 | 20 | 6.866E-03 | 2.788E-03 | | | | 110.7 |
| 27. 1.88 | 35 | | | | | | 809 |
| 8.42 | 10 | | | 2.108E-03 | | 6.692E-04 | 111.7 |
| 27. 1.88 | 35 | | | 3.704E-03 | 2.720E-03 | 4.093E-03 | 809 |
| 8.42 | 30 | | | | | | 111.7 |
| 27. 1.88 | 35 | | | | | | 809 |
| 8.42 | 20 | 6.946E-03 | 2.775E-03 | | | | 111.7 |
| 28. 1.88 | 35 | | | | | | 808 |
| 8.41 | 10 | | | 2.057E-03 | | 6.452E-04 | 112.7 |
| 28. 1.88 | 35 | | | 3.557E-03 | 2.603E-03 | 3.952E-03 | 808 |
| 8.41 | 30 | | | | | | 112.7 |
| 28. 1.88 | 35 | | | | | | 808 |
| 8.41 | 20 | 7.401E-03 | 2.677E-03 | | | | 112.7 |
| 29. 1.88 | 35 | | | | | | 807 |
| 8.39 | 10 | | | 2.098E-03 | | 6.516E-04 | 113.7 |
| 29. 1.88 | 35 | | | 3.688E-03 | 2.613E-03 | 3.939E-03 | 807 |
| 8.39 | 30 | | | | | | 113.7 |
| 29. 1.88 | 35 | | | | | | 807 |
| 8.39 | 20 | 6.779E-03 | 2.749E-03 | | | | 113.7 |
| 30. 1.88 | 35 | | | | | | 808 |
| 9.21 | 10 | | | 2.022E-03 | | 6.310E-04 | 114.7 |
| 30. 1.88 | 35 | | | 3.514E-03 | 2.543E-03 | 3.866E-03 | 808 |
| 9.21 | 30 | | | | | | 114.7 |
| 30. 1.88 | 35 | | | | | | 808 |
| 9.21 | 20 | 6.847E-03 | 2.663E-03 | | | | 114.7 |
| 31. 1.88 | 35 | | | | | | 807 |
| 8.4 | 10 | | | 1.996E-03 | | 6.230E-04 | 115.7 |
| 31. 1.88 | 35 | | | 3.409E-03 | 2.481E-03 | 3.816E-03 | 807 |
| 8.4 | 30 | | | | | | 115.7 |
| 31. 1.88 | 35 | | | | | | 807 |
| 8.4 | 20 | 6.778E-03 | 2.619E-03 | | | | 115.7 |
| 1. 2.88 | 35 | | | | | | 807 |
| 8.38 | 10 | | | 1.999E-03 | | 6.236E-04 | 116.7 |
| 1. 2.88 | 35 | | | 3.383E-03 | 2.448E-03 | 3.765E-03 | 807 |
| 8.38 | 30 | | | | | | 116.7 |
| 1. 2.88 | 35 | | | | | | 807 |
| 8.38 | 20 | 6.613E-03 | 2.576E-03 | | | | 116.7 |
| 1. 2.88 | 35 | | | | | | 30 |
| 20. 0 | 20 | | | | | | 117.1 |

Table 6.4.46. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 88.02 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 10. 2.88 | 35 | | | | | | 807 |
| 0. 0 | 10 | | | | | | 117.1 |
| 10. 2.88 | 35 | | | | | | 806 |
| 16.24 | 10 | | | 1.573E-03 | | 4.849E-04 | 123.8 |
| 10. 2.88 | 35 | | | 2.361E-03 | 1.728E-03 | 2.619E-03 | 806 |
| 16.24 | 30 | | | | | | 123.8 |
| 10. 2.88 | 35 | | | | | | 806 |
| 16.24 | 20 | 4.724E-03 | 1.895E-03 | | | | 123.8 |
| 11. 2.88 | 35 | | | | | | 810 |
| 16. 6 | 10 | | | 1.598E-03 | | 4.888E-04 | 124.8 |
| 11. 2.88 | 35 | | | 2.420E-03 | 1.759E-03 | 2.671E-03 | 810 |
| 16. 6 | 30 | | | | | | 124.8 |
| 11. 2.88 | 35 | | | | | | 810 |
| 16. 6 | 20 | 4.729E-03 | 1.889E-03 | | | | 124.8 |
| 12. 2.88 | 35 | | | | | | 806 |
| 16. 9 | 10 | | | 1.548E-03 | | 4.684E-04 | 125.8 |
| 12. 2.88 | 35 | | | 2.346E-03 | 1.708E-03 | 2.610E-03 | 806 |
| 16. 9 | 30 | | | | | | 125.8 |
| 12. 2.88 | 35 | | | | | | 806 |
| 16. 9 | 20 | 4.964E-03 | 1.873E-03 | | | | 125.8 |
| 13. 2.88 | 35 | | | | | | 805 |
| 16.23 | 10 | | | 1.577E-03 | | 4.923E-04 | 126.8 |
| 13. 2.88 | 35 | | | 2.306E-03 | 1.705E-03 | 2.566E-03 | 805 |
| 16.23 | 30 | | | | | | 126.8 |
| 13. 2.88 | 35 | | | | | | 805 |
| 16.23 | 20 | 4.982E-03 | 1.856E-03 | | | | 126.8 |
| 18. 2.88 | 35 | | | | | | 812 |
| 8.4 | 10 | | | 1.424E-03 | | 4.407E-04 | 131.6 |
| 18. 2.88 | 35 | | | 2.251E-03 | 1.640E-03 | 2.511E-03 | 812 |
| 8.4 | 30 | | | | | | 131.6 |
| 18. 2.88 | 35 | | | | | | 812 |
| 8.4 | 20 | 5.051E-03 | 1.771E-03 | | | | 131.6 |
| 20. 2.88 | 35 | | | | | | 812 |
| 8.28 | 10 | | | 1.463E-03 | | 4.670E-04 | 133.5 |
| 20. 2.88 | 35 | | | 2.275E-03 | 1.655E-03 | 2.490E-03 | 812 |
| 8.28 | 30 | | | | | | 133.5 |
| 20. 2.88 | 35 | | | | | | 812 |
| 8.28 | 20 | 5.284E-03 | 1.756E-03 | | | | 133.5 |
| 21. 2.88 | 35 | | | | | | 811 |
| 8.24 | 10 | | | 1.560E-03 | | 4.927E-04 | 134.5 |
| 21. 2.88 | 35 | | | 2.267E-03 | 1.654E-03 | 2.509E-03 | 811 |
| 8.24 | 30 | | | | | | 134.5 |
| 21. 2.88 | 35 | | | | | | 811 |
| 8.24 | 20 | 5.369E-03 | 1.835E-03 | | | | 134.5 |
| 27. 2.88 | 35 | | | | | | 799 |
| 9.2 | 10 | | | 1.542E-03 | | 4.952E-04 | 140.5 |
| 27. 2.88 | 35 | | | 2.319E-03 | 1.709E-03 | 2.587E-03 | 799 |
| 9.2 | 30 | | | | | | 140.5 |
| 27. 2.88 | 35 | | | | | | 799 |
| 9.2 | 20 | 5.901E-03 | 1.893E-03 | | | | 140.5 |
| 28. 2.88 | 35 | | | | | | 798 |
| 8.34 | 10 | | | 1.570E-03 | | 4.962E-04 | 141.5 |

Table 6.4.46. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 88.02 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 28. 2.88 | 35 | | | 2.259E-03 | 1.664E-03 | 2.527E-03 | 798 |
| 8.34 | 30 | | | | | | 141.5 |
| 28. 2.88 | 35 | | | | | | 798 |
| 8.34 | 20 | 5.119E-03 | 1.857E-03 | | | | 141.5 |
| 29. 2.88 | 35 | | | | | | 797 |
| 8.28 | 10 | | | 1.584E-03 | | 5.041E-04 | 142.5 |
| 29. 2.88 | 35 | | | 2.284E-03 | 1.689E-03 | 2.552E-03 | 797 |
| 8.28 | 30 | | | | | | 142.5 |
| 29. 2.88 | 45 | | | | | | 63 |
| 18. 0 | 10 | | | | | | 142.54 |

Table 6.4.47. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 88.04 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 30. 4.88 | 45 | | 2.759E-04 | | | | 788 |
| 8.27 | 10 | | | 1.486E-03 | 1.955E-04 | 4.817E-04 | 144.9 |
| 30. 4.88 | 45 | | | 1.977E-03 | 1.441E-03 | 2.227E-03 | 788 |
| 8.27 | 30 | | | | | | 144.9 |
| 30. 4.88 | 45 | | | | | | 788 |
| 8.27 | 20 | 2.321E-03 | 1.651E-03 | | | | 144.9 |
| 1. 5.88 | 45 | | 2.633E-04 | | | | 789 |
| 9.52 | 10 | | | 1.444E-03 | 1.770E-04 | 4.688E-04 | 146 |
| 1. 5.88 | 45 | | | 1.977E-03 | 1.461E-03 | 2.236E-03 | 789 |
| 9.52 | 30 | | | | | | 146 |
| 1. 5.88 | 45 | | | | | | 789 |
| 9.52 | 20 | 2.672E-03 | 1.665E-03 | | | | 146 |
| 3. 5.88 | 45 | | 2.397E-04 | | | | 789 |
| 9. 4 | 10 | | | 1.175E-03 | 1.616E-04 | 3.862E-04 | 147.9 |
| 3. 5.88 | 45 | | | 1.505E-03 | 1.127E-03 | 1.696E-03 | 789 |
| 9. 4 | 30 | | | | | | 147.9 |
| 3. 5.88 | 45 | | | | | | 789 |
| 9. 4 | 20 | 2.655E-03 | 1.250E-03 | | | | 147.9 |
| 4. 5.88 | 45 | | | 1.578E-03 | 1.115E-03 | 1.726E-03 | 788 |
| 8.2 | 30 | | | | | | 149 |
| 4. 5.88 | 45 | | | | | | 788 |
| 8.2 | 20 | 2.826E-03 | 1.274E-03 | | | | 149 |
| 9. 5.88 | 45 | | 3.587E-04 | | | | 783 |
| 0.24 | 10 | | | 2.013E-03 | 2.709E-04 | 7.166E-04 | 154 |
| 9. 5.88 | 45 | | | | | | 783 |
| 0.24 | 20 | 6.204E-03 | 2.416E-03 | | | | 154 |
| 10. 5.88 | 45 | | 2.405E-04 | | | | 781 |
| 0.57 | 10 | | | 1.916E-03 | 1.986E-04 | 6.755E-04 | 155 |
| 10. 5.88 | 45 | | | 2.687E-03 | 1.894E-03 | 2.765E-03 | 781 |
| 0.57 | 30 | | | | | | 155 |
| 10. 5.88 | 45 | | | | | | 781 |
| 0.57 | 20 | 5.586E-03 | 2.319E-03 | | | | 155 |
| 14. 5.88 | 45 | | 4.338E-04 | | | | 779 |
| 0.28 | 10 | | | 1.895E-03 | 3.055E-04 | 6.708E-04 | 159 |
| 14. 5.88 | 45 | | | 2.453E-03 | 1.639E-03 | 2.595E-03 | 779 |
| 0.28 | 30 | | | | | | 159 |
| 14. 5.88 | 45 | | | | | | 779 |
| 0.28 | 20 | 4.779E-03 | 2.057E-03 | | | | 159 |
| 15. 5.88 | 45 | | 4.225E-04 | | | | 779 |
| 0.27 | 10 | | | 2.107E-03 | 3.021E-04 | 6.921E-04 | 160 |
| 15. 5.88 | 45 | | | 2.604E-03 | 1.806E-03 | | 779 |
| 0.27 | 30 | | | | | | 160 |
| 15. 5.88 | 45 | | | | | | 779 |
| 0.27 | 20 | 5.532E-03 | 2.234E-03 | | | | 160 |
| 19. 5.88 | 45 | | 2.940E-04 | | | | 778 |
| 0.12 | 10 | | | 1.757E-03 | 2.153E-04 | 5.898E-04 | 164 |
| 19. 5.88 | 45 | | | 2.547E-03 | 1.806E-03 | 2.688E-03 | 778 |
| 0.12 | 30 | | | | | | 164 |
| 19. 5.88 | 45 | | | | | | 778 |
| 0.12 | 20 | 5.472E-03 | 2.076E-03 | | | | 164 |
| 20. 5.88 | 45 | | 3.859E-04 | | | | 778 |
| 0.22 | 10 | | | 1.813E-03 | 2.728E-04 | 6.144E-04 | 165 |

Table 6.4.47. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 88.04 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 20. 5.88 | 45 | | | 2.401E-03 | 1.831E-03 | 2.704E-03 | 778 |
| 0.22 | 30 | | | | | | 165 |
| 20. 5.88 | 45 | | | | | | 778 |
| 0.22 | 20 | 5.445E-03 | 2.075E-03 | | | | 165 |
| 22. 5.88 | 45 | | 3.298E-04 | | | | 774 |
| 0.16 | 10 | | | 1.726E-03 | 2.162E-04 | 5.555E-04 | 167 |
| 22. 5.88 | 45 | | | 2.445E-03 | 1.747E-03 | 2.730E-03 | 774 |
| 0.16 | 30 | | | | | | 167 |
| 22. 5.88 | 45 | | | | | | 774 |
| 0.16 | 20 | 5.492E-03 | 2.086E-03 | | | | 167 |
| 23. 5.88 | 45 | | 3.021E-04 | | | | 772 |
| 0. 6 | 10 | | | 1.710E-03 | 2.219E-04 | 5.526E-04 | 168 |
| 23. 5.88 | 45 | | | 2.386E-03 | 1.710E-03 | 2.698E-03 | 772 |
| 0. 6 | 30 | | | | | | 168 |
| 23. 5.88 | 45 | | | | | | 772 |
| 0. 6 | 20 | 5.556E-03 | 2.029E-03 | | | | 168 |
| 23. 5.88 | 45 | | | | | | 75 |
| 17. 0 | 10 | | | | | | 168.29 |

Table 6.4.48. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. | | D214-01 | CAPSULE NO. | C | CYCLE NO. | 88.05 | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| | | | | | | | |
| 28. 5.88 | 45 | | 3.351E-04 | | | | 787 |
| 9. 5 | 10 | | | 1.824E-03 | 2.399E-04 | 6.024E-04 | 169.8 |
| 28. 5.88 | 45 | | | 2.468E-03 | 1.763E-03 | 2.805E-03 | 787 |
| 9. 5 | 30 | | | | | | 169.8 |
| 28. 5.88 | 45 | | | | | | 787 |
| 9. 5 | 20 | 4.424E-03 | 2.058E-03 | | | | 169.8 |
| 29. 5.88 | 45 | | | 2.609E-03 | 1.781E-03 | 2.788E-03 | 788 |
| 8.55 | 30 | | | | | | 170.8 |
| 29. 5.88 | 45 | | | | | | 788 |
| 8.55 | 20 | 4.942E-03 | 2.089E-03 | | | | 170.8 |
| 30. 5.88 | 45 | | 9.002E-05 | | | | 789 |
| 8.54 | 10 | | | 1.469E-03 | 9.653E-05 | 4.652E-04 | 171.8 |
| 30. 5.88 | 45 | | | | | | 789 |
| 8.54 | 20 | 4.958E-03 | 2.070E-03 | | | | 171.8 |
| 31. 5.88 | 45 | | | 2.549E-03 | 1.690E-03 | 2.709E-03 | 788 |
| 9.45 | 30 | | | | | | 172.8 |
| 31. 5.88 | 45 | | | | | | 788 |
| 9.45 | 20 | 5.073E-03 | 2.023E-03 | | | | 172.8 |
| 1. 6.88 | 45 | | 2.547E-04 | | | | 783 |
| 8.45 | 10 | | | 1.457E-03 | 1.724E-04 | 4.672E-04 | 173.8 |
| 1. 6.88 | 45 | | | 1.902E-03 | 1.363E-03 | 2.088E-03 | 783 |
| 8.45 | 30 | | | | | | 173.8 |
| 1. 6.88 | 45 | | | | | | 783 |
| 8.45 | 20 | 4.097E-03 | 1.547E-03 | | | | 173.8 |
| 2. 6.88 | 45 | | | 1.827E-03 | 1.355E-03 | 2.065E-03 | 781 |
| 8.45 | 30 | | | | | | 174.8 |
| 2. 6.88 | 42 | | 3.413E-04 | | | | 782 |
| 9.52 | 10 | | | 1.344E-03 | 1.974E-04 | 4.258E-04 | 174.8 |
| 2. 6.88 | 42 | | 3.490E-04 | | | | 782 |
| 10. 0 | 10 | | | 1.345E-03 | 1.994E-04 | 4.143E-04 | 174.8 |
| 2. 6.88 | 42 | | 3.267E-04 | | | | 782 |
| 10.39 | 10 | | | 1.232E-03 | 2.071E-04 | | 174.9 |
| 2. 6.88 | 42 | | 3.354E-04 | | | | 782 |
| 11.22 | 10 | | | 1.284E-03 | 1.989E-04 | 4.001E-04 | 174.9 |
| 2. 6.88 | 42 | | 3.614E-04 | | | | 782 |
| 13. 2 | 10 | | | 1.405E-03 | 2.242E-04 | 4.712E-04 | 175 |
| 2. 6.88 | 42 | | 3.789E-04 | | | | 782 |
| 13.53 | 10 | | | 1.387E-03 | 2.062E-04 | 4.835E-04 | 175 |
| 2. 6.88 | 42 | | 3.951E-04 | | | | 761 |
| 15. 3 | 10 | | | 1.477E-03 | 2.160E-04 | 5.925E-04 | 175 |
| 2. 6.88 | 42 | | 3.907E-04 | | | | 781 |
| 16. 0 | 10 | | | 1.438E-03 | 2.808E-04 | 5.519E-04 | 175 |
| 2. 6.88 | 42 | | 3.910E-04 | | | | 785 |
| 17.3 | 10 | | | 8.715E-04 | 2.785E-04 | 5.764E-04 | 175.1 |
| 2. 6.88 | 42 | | 4.041E-04 | | | | 783 |
| 21.44 | 10 | | | 2.004E-03 | 4.254E-04 | 6.731E-04 | 175.2 |
| 3. 6.88 | 42 | | 1.412E-04 | | | | 786 |
| 3.12 | 10 | | | 1.025E-03 | 1.841E-04 | 3.355E-04 | 175.6 |
| 3. 6.88 | 42 | | 2.399E-04 | | | | 784 |
| 14.1 | 10 | | | 4.714E-04 | 1.503E-04 | 4.394E-04 | 176 |
| 3. 6.88 | 45 | | | | | | 784 |
| 14.18 | 10 | | | 3.992E-03 | 4.927E-04 | 1.255E-03 | 176 |

Table 6.4.48. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 88.05 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 3. 6.88 | 45 | | | 4.194E-03 | 2.990E-03 | 4.697E-03 | 784 |
| 14.18 | 30 | | | | | | 176 |
| 4. 6.88 | 45 | | 4.226E-04 | | | | 782 |
| 8.3 | 10 | | | 2.853E-03 | 3.802E-04 | 7.939E-04 | 176.8 |
| 4. 6.88 | 45 | | | 4.282E-03 | 3.161E-03 | 5.334E-03 | 782 |
| 8.3 | 30 | | | | | | 176.8 |
| 4. 6.88 | 45 | | | | | | 782 |
| 8.3 | 20 | 1.112E-01 | 6.031E-03 | | | | 176.8 |
| 5. 6.88 | 45 | | 4.173E-04 | | | | 782 |
| 8.2 | 10 | | | 2.845E-03 | 3.564E-04 | 7.837E-04 | 177.8 |
| 5. 6.88 | 45 | | | 4.646E-03 | 3.243E-03 | 5.666E-03 | 782 |
| 8.2 | 30 | | | | | | 177.8 |
| 5. 6.88 | 45 | | | | | | 782 |
| 8.2 | 20 | 1.824E-01 | 6.568E-03 | | | | 177.8 |
| 6. 6.88 | 45 | | 4.327E-04 | | | | 783 |
| 8.31 | 10 | | | 2.742E-03 | 3.953E-04 | 8.000E-04 | 178.8 |
| 6. 6.88 | 45 | | | 3.541E-03 | 2.834E-03 | 4.042E-03 | 783 |
| 8.31 | 30 | | | | | | 178.8 |
| 6. 6.88 | 45 | | | | | | 783 |
| 8.31 | 20 | 3.536E-02 | 5.381E-03 | | | | 178.8 |
| 7. 6.88 | 45 | | 4.627E-04 | | | | 781 |
| 8.38 | 10 | | | 2.575E-03 | 3.850E-04 | 7.945E-04 | 178.8 |
| 7. 6.88 | 45 | | | 3.297E-03 | 2.509E-03 | 3.864E-03 | 781 |
| 8.38 | 30 | | | | | | 178.8 |
| 8. 6.88 | 45 | | 4.602E-04 | | | | 781 |
| 8.15 | 10 | | | 2.521E-03 | 3.909E-04 | 7.192E-04 | 180.8 |
| 8. 6.88 | 45 | | | 3.307E-03 | 2.638E-03 | 3.970E-03 | 781 |
| 8.15 | 30 | | | | | | 180.8 |
| 8. 6.88 | 45 | | | | | | 781 |
| 8.15 | 20 | 2.558E-02 | 4.314E-03 | | | | 180.8 |
| 9. 6.88 | 45 | | 4.413E-04 | | | | 779 |
| 8.14 | 10 | | | 2.609E-03 | 3.957E-04 | 7.173E-04 | 181.8 |
| 9. 6.88 | 45 | | | 3.286E-03 | 2.709E-03 | 4.016E-03 | 779 |
| 8.14 | 30 | | | | | | 181.8 |
| 9. 6.88 | 42 | | 3.681E-04 | | | | 781 |
| 10.22 | 10 | | | 2.010E-03 | 3.254E-04 | 6.020E-04 | 181.8 |
| 9. 6.88 | 42 | | 3.076E-04 | | | | 781 |
| 10.36 | 10 | | | 1.364E-03 | 2.223E-04 | 3.797E-04 | 181.8 |
| 9. 6.88 | 42 | | 3.061E-04 | | | | 780 |
| 12. 0 | 10 | | | 1.415E-03 | 2.118E-04 | 3.918E-04 | 181.9 |
| 9. 6.88 | 42 | | 2.124E-04 | | | | 780 |
| 13. 0 | 10 | | | 8.529E-04 | 1.593E-04 | 2.491E-04 | 181.9 |
| 9. 6.88 | 42 | | 1.751E-04 | | | | 780 |
| 13.2 | 10 | | | 8.740E-04 | 1.412E-04 | 2.410E-04 | 181.9 |
| 9. 6.88 | 42 | | 1.620E-04 | | | | 780 |
| 14.4 | 10 | | | 8.435E-04 | 2.128E-04 | 2.868E-04 | 182 |
| 9. 6.88 | 45 | | | 3.174E-03 | 2.382E-03 | 3.071E-03 | 779 |
| 16. 2 | 30 | | | | | | 182 |
| 9. 6.88 | 42 | | 2.684E-04 | | | | 779 |
| 16.24 | 10 | | | 1.726E-03 | 1.911E-04 | 4.598E-04 | 182 |
| 9. 6.88 | 45 | | | 2.998E-03 | 2.303E-03 | 3.318E-03 | 780 |
| 17.3 | 30 | | | | | | 182 |

Table 6.4.48. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 88.05 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 9. 6.88 | 42 | | 2.150E-04 | | | | 780 |
| 17.5 | 10 | | | 1.578E-03 | 2.155E-04 | 4.660E-04 | 182.1 |
| 9. 6.88 | 42 | | 3.062E-04 | | | | 780 |
| 19.16 | 10 | | | 1.448E-03 | 2.013E-04 | 3.758E-04 | 182.2 |
| 9. 6.88 | 45 | | | 2.582E-03 | 1.446E-03 | 2.655E-03 | 779 |
| 20.22 | 30 | | | | | | 182.2 |
| 9. 6.88 | 42 | | 4.765E-04 | | | | 779 |
| 20.41 | 10 | | | 1.853E-03 | 3.180E-04 | 4.909E-04 | 182.2 |
| 9. 6.88 | 45 | | | 3.225E-03 | 2.342E-03 | 3.366E-03 | 779 |
| 21.5 | 30 | | | | | | 182.2 |
| 10. 6.88 | 45 | | | 3.212E-03 | 2.404E-03 | 2.683E-03 | 779 |
| 4.34 | 30 | | | | | | 182.6 |
| 10. 6.88 | 42 | | 3.464E-04 | | | | 779 |
| 4.53 | 10 | | | 1.181E-03 | 2.328E-04 | 3.956E-04 | 182.6 |
| 10. 6.88 | 45 | | | 3.136E-03 | 2.380E-03 | 3.352E-03 | 779 |
| 6. 0 | 30 | | | | | | 182.7 |
| 10. 6.88 | 42 | | 2.882E-04 | | | | 779 |
| 8.3 | 10 | | | 1.140E-03 | 2.074E-04 | 3.218E-04 | 182.8 |
| 10. 6.88 | 45 | | | 3.352E-03 | 2.331E-03 | 3.427E-03 | 779 |
| 9.5 | 30 | | | | | | 182.8 |
| 10. 6.88 | 42 | | 4.099E-04 | | | | 779 |
| 10.1 | 10 | | | 1.569E-03 | 2.834E-04 | 5.148E-04 | 182.8 |
| 10. 6.88 | 45 | | | 3.048E-03 | 2.347E-03 | 3.250E-03 | 779 |
| 10.2 | 30 | | | | | | 182.9 |
| 10. 6.88 | 42 | | 3.470E-04 | | | | 779 |
| 10.4 | 10 | | | 1.019E-03 | 2.490E-04 | 4.126E-04 | 182.9 |
| 10. 6.88 | 45 | | | 2.096E-03 | 1.737E-03 | 2.459E-03 | 782 |
| 13. 0 | 30 | | | | | | 182.9 |
| 10. 6.88 | 42 | | 3.539E-04 | | | | 783 |
| 14.55 | 10 | | | 1.315E-03 | 2.439E-04 | 4.457E-04 | 183 |
| 10. 6.88 | 45 | | | 2.783E-03 | 2.292E-03 | 3.155E-03 | 783 |
| 15.2 | 30 | | | | | | 183 |
| 11. 6.88 | 45 | | 4.604E-04 | | | | 780 |
| 10.43 | 10 | | | 1.922E-03 | 3.041E-04 | 6.812E-04 | 183.9 |
| 11. 6.88 | 45 | | | | | | 781 |
| 12.51 | 20 | 7.541E-03 | 2.752E-03 | | | | 183.9 |
| 12. 6.88 | 45 | | 3.956E-04 | | | | 780 |
| 8.47 | 10 | | | 1.812E-03 | 2.896E-04 | 5.984E-04 | 184.7 |
| 12. 6.88 | 45 | | | 2.326E-03 | 1.725E-03 | 2.713E-03 | 781 |
| 9.38 | 30 | | | | | | 184.7 |
| 12. 6.88 | 45 | | | | | | 781 |
| 10.38 | 20 | 6.012E-03 | 2.362E-03 | | | | 184.7 |
| 13. 6.88 | 45 | | 3.589E-04 | | | | 779 |
| 8.48 | 10 | | | 1.667E-03 | 2.549E-04 | 5.729E-04 | 185.7 |
| 13. 6.88 | 45 | | | 2.571E-03 | 1.911E-03 | 2.767E-03 | 779 |
| 9.48 | 30 | | | | | | 185.7 |
| 13. 6.88 | 45 | | | | | | 780 |
| 10.48 | 20 | 5.344E-03 | 2.231E-03 | | | | 185.8 |
| 14. 6.88 | 45 | | 3.397E-04 | | | | 778 |
| 8.41 | 10 | | | 1.630E-03 | 2.426E-04 | 5.525E-04 | 186.7 |
| 14. 6.88 | 45 | | | 2.473E-03 | 1.845E-03 | 2.769E-03 | 778 |
| 8.41 | 30 | | | | | | 186.7 |

Table 6.4.48. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 88.05 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 14. 6.88 | 45 | | | | | | 778 |
| 8.41 | 20 | 5.541E-03 | 2.208E-03 | | | | 186.8 |
| 15. 6.88 | 45 | | 3.452E-04 | | | | 778 |
| 8.28 | 10 | | | 1.674E-03 | 2.463E-04 | 5.503E-04 | 187.7 |
| 15. 6.88 | 45 | | | 2.560E-03 | 1.876E-03 | 2.815E-03 | 778 |
| 8.28 | 30 | | | | | | 187.7 |
| 15. 6.88 | 45 | | | | | | 778 |
| 8.28 | 20 | 5.534E-03 | 2.190E-03 | | | | 187.7 |
| 16. 6.88 | 45 | | 2.016E-04 | | | | 777 |
| 0.43 | 10 | | | 1.559E-03 | 1.553E-04 | 5.253E-04 | 188.5 |
| 16. 6.88 | 45 | | | 2.313E-03 | 1.779E-03 | 2.704E-03 | 777 |
| 0.43 | 30 | | | | | | 188.5 |
| 16. 6.88 | 45 | | | | | | 777 |
| 0.43 | 20 | 5.472E-03 | 2.129E-03 | | | | 188.5 |
| 17. 6.88 | 45 | | 2.395E-04 | | | | 776 |
| 0.45 | 10 | | | 1.544E-03 | 1.774E-04 | 5.335E-04 | 189.5 |
| 17. 6.88 | 45 | | | 2.333E-03 | 1.783E-03 | 2.786E-03 | 776 |
| 0.45 | 30 | | | | | | 189.5 |
| 17. 6.88 | 45 | | | | | | 776 |
| 0.45 | 20 | 5.596E-03 | 2.137E-03 | | | | 189.5 |
| 18. 6.88 | 45 | | | | | | 771 |
| 0.42 | 20 | 5.009E-03 | | | | | 190.5 |
| 19. 6.88 | 45 | | | 1.594E-03 | 8.373E-04 | 1.980E-03 | 769 |
| 1.36 | 30 | | | | | | 191.5 |
| 19. 6.88 | 45 | | | | | | 769 |
| 1.36 | 20 | 5.106E-03 | 1.691E-03 | | | | 191.5 |
| 20. 6.88 | 45 | | | | | | 768 |
| 0.57 | 10 | | | 4.824E-04 | | 1.522E-04 | 192.5 |
| 20. 6.88 | 45 | | | 1.800E-03 | 1.141E-03 | 2.088E-03 | 768 |
| 0.57 | 30 | | | | | | 192.5 |
| 20. 6.88 | 45 | | | | | | 0 |
| 18. 0 | 30 | | | | | | 193.5 |

Table 6.4.49. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 88.06 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 25. 6.88 | 45 | | | | | | 705 |
| 0. 0 | 10 | | | | | | 193.5 |
| 25. 6.88 | 45 | | 4.045E-04 | | | | 705 |
| 0.28 | 10 | | | 1.910E-03 | 2.947E-04 | 6.455E-04 | 195.2 |
| 25. 6.88 | 45 | | | 2.395E-03 | 1.900E-03 | 2.843E-03 | 705 |
| 0.28 | 30 | | | | | | 195.2 |
| 25. 6.88 | 45 | | | | | | 705 |
| 0.28 | 20 | 4.677E-03 | 2.409E-03 | | | | 195.2 |
| 26. 6.88 | 45 | | 3.797E-04 | | | | 711 |
| 0.19 | 10 | | | 1.986E-03 | 2.817E-04 | 6.410E-04 | 196.2 |
| 26. 6.88 | 45 | | | 2.533E-03 | 1.948E-03 | 3.002E-03 | 711 |
| 0.19 | 30 | | | | | | 196.2 |
| 26. 6.88 | 45 | | | | | | 711 |
| 0.19 | 20 | 5.493E-03 | 2.576E-03 | | | | 196.2 |
| 27. 6.88 | 45 | | 3.846E-04 | | | | 712 |
| 0. 8 | 10 | | | 2.031E-03 | 2.811E-04 | 6.661E-04 | 197.2 |
| 27. 6.88 | 45 | | | 2.563E-03 | 1.842E-03 | 2.827E-03 | 712 |
| 0. 8 | 30 | | | | | | 197.2 |
| 27. 6.88 | 45 | | | | | | 712 |
| 0. 8 | 20 | 5.756E-03 | 2.456E-03 | | | | 197.2 |
| 28. 6.88 | 45 | | | 2.712E-03 | 1.989E-03 | 3.078E-03 | 713 |
| 0.41 | 30 | | | | | | 198.2 |
| 28. 6.88 | 42 | | 3.722E-04 | | | | 714 |
| 10. 1 | 10 | | | 1.509E-03 | 2.405E-04 | 5.043E-04 | 198.5 |
| 28. 6.88 | 45 | | 3.399E-04 | | | | 714 |
| 10. 7 | 10 | | | 1.572E-03 | 2.848E-04 | 5.201E-04 | 198.5 |
| 28. 6.88 | 45 | | | 1.914E-03 | 1.611E-03 | 2.378E-03 | 714 |
| 10. 7 | 30 | | | | | | 198.5 |
| 28. 6.88 | 45 | | | | | | 714 |
| 10. 7 | 20 | 5.351E-03 | 2.068E-03 | | | | 198.5 |
| 28. 6.88 | 42 | | 3.548E-04 | | | | 714 |
| 11.3 | 10 | | | 1.540E-03 | 2.475E-04 | 5.188E-04 | 198.52 |
| 28. 6.88 | 45 | | 3.911E-04 | | | | 714 |
| 11.34 | 10 | | | 1.818E-03 | 3.015E-04 | 6.011E-04 | 198.52 |
| 28. 6.88 | 45 | | | 1.324E-03 | 1.486E-03 | 1.558E-03 | 714 |
| 11.34 | 30 | | | | | | 198.52 |
| 28. 6.88 | 45 | | | 3.293E-03 | 2.428E-03 | 4.124E-03 | 714 |
| 13.15 | 30 | | | | | | 198.6 |
| 28. 6.88 | 42 | | 2.522E-04 | | | | 713 |
| 15.44 | 10 | | | 1.402E-03 | 2.196E-04 | 4.345E-04 | 198.62 |
| 28. 6.88 | 45 | | 5.371E-04 | | | | 713 |
| 15.5 | 10 | | | 2.415E-03 | 4.303E-04 | 7.141E-04 | 198.62 |
| 28. 6.88 | 42 | | 3.235E-04 | | | | 713 |
| 17.15 | 10 | | | 1.946E-03 | | 5.150E-04 | 198.65 |
| 28. 6.88 | 45 | | | | | | 713 |
| 17.22 | 10 | | | 2.186E-03 | 2.314E-04 | 6.725E-04 | 198.65 |
| 28. 6.88 | 45 | | | 3.627E-03 | 2.244E-03 | 5.160E-03 | 713 |
| 17.22 | 30 | | | | | | 198.65 |
| 28. 6.88 | 45 | | | | | | 713 |
| 21. 4 | 10 | | | 2.394E-03 | | 6.047E-04 | 198.9 |
| 28. 6.88 | 42 | | 1.927E-04 | | | | 713 |
| 22.25 | 10 | | | 2.408E-03 | 2.154E-04 | 5.295E-04 | 198.95 |

Table 6.4.49. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 88.06 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 28. 6.88 | 45 | | | | | | 713 |
| 22.35 | 10 | | | 3.273E-03 | 2.414E-04 | 7.263E-04 | 198.95 |
| 29. 6.88 | 45 | | 4.529E-04 | | | | 711 |
| 0.35 | 10 | | | 2.785E-03 | 1.809E-04 | 8.031E-04 | 199.2 |
| 29. 6.88 | 45 | | | 6.968E-03 | 3.852E-03 | 1.052E-02 | 711 |
| 0.35 | 30 | | | | | | 199.2 |
| 29. 6.88 | 45 | | 2.932E-04 | | | | 710 |
| 4. 0 | 10 | | | 3.791E-03 | 2.061E-04 | 8.175E-04 | 199.2 |
| 29. 6.88 | 42 | | 2.283E-04 | | | | 712 |
| 16.12 | 10 | | | 3.346E-03 | 3.334E-04 | 6.563E-04 | 199.6 |
| 29. 6.88 | 45 | | | | | | 712 |
| 16.12 | 10 | | | 4.423E-03 | 4.607E-04 | 9.114E-04 | 199.6 |
| 29. 6.88 | 45 | | 2.687E-04 | | | | 712 |
| 18. 0 | 10 | | | | 2.263E-04 | 2.753E-04 | 199.64 |
| 29. 6.88 | 45 | | 4.349E-04 | | | | 711 |
| 19.46 | 10 | | | 3.708E-03 | 4.948E-04 | 6.489E-04 | 199.7 |
| 29. 6.88 | 45 | | 1.171E-04 | | | | 711 |
| 19.46 | 10 | | | 2.801E-03 | 2.006E-04 | 5.253E-04 | 199.7 |
| 29. 6.88 | 45 | | | | | | 713 |
| 21.14 | 10 | | | | 3.053E-04 | | 199.9 |
| 29. 6.88 | 45 | | 1.490E-04 | | | | 713 |
| 21.35 | 10 | | | | | | 199.9 |
| 29. 6.88 | 45 | | | 5.891E-03 | 3.807E-03 | 6.809E-03 | 713 |
| 21.35 | 30 | | | | | | 199.9 |
| 30. 6.88 | 45 | | | 5.347E-03 | 3.846E-03 | 6.820E-03 | 711 |
| 13.17 | 30 | | | | | | 200.7 |
| 1. 7.88 | 45 | | 2.911E-04 | | | | 710 |
| 8.36 | 10 | | | 4.552E-03 | 3.459E-04 | 9.994E-04 | 201.5 |
| 1. 7.88 | 45 | | | 6.855E-03 | 4.179E-03 | | 710 |
| 8.36 | 30 | | | | | | 201.5 |
| 1. 7.88 | 45 | | | | | | 710 |
| 8.36 | 30 | | | | | | 201.5 |
| 2. 7.88 | 45 | | 1.305E-04 | | | | 710 |
| 9.47 | 10 | | | 4.700E-03 | 3.122E-04 | 1.020E-03 | 202.5 |
| 3. 7.88 | 45 | | 2.436E-04 | | | | 709 |
| 11. 0 | 10 | | | 3.730E-03 | 2.801E-04 | 8.564E-04 | 203.7 |
| 9. 7.88 | 45 | | | | | | 741 |
| 0.55 | 10 | | | 3.417E-03 | 3.363E-04 | 9.326E-04 | 207.7 |
| 9. 7.88 | 45 | | | 5.943E-03 | 4.266E-03 | 6.911E-03 | 741 |
| 0.55 | 30 | | | | | | 207.7 |
| 10. 7.88 | 45 | | 4.604E-04 | | | | 741 |
| 0.32 | 10 | | | 3.291E-03 | 4.021E-04 | 9.130E-04 | 208.7 |
| 10. 7.88 | 45 | | | 6.106E-03 | 4.412E-03 | 6.305E-03 | 741 |
| 0.32 | 30 | | | | | | 208.7 |
| 10. 7.88 | 45 | | | | | | 741 |
| 0.32 | 20 | 2.048E-02 | 1.545E-02 | | | | 208.7 |
| 11. 7.88 | 45 | | 4.317E-04 | | | | 741 |
| 0.51 | 10 | | | 3.502E-03 | 3.835E-04 | 9.342E-04 | 209.7 |
| 12. 7.88 | 45 | | 2.795E-04 | | | | 735 |
| 1.37 | 10 | | | 2.769E-03 | 2.317E-04 | 7.339E-04 | 210.7 |
| 12. 7.88 | 45 | | | 5.492E-03 | 4.064E-03 | 6.339E-03 | 735 |
| 1.37 | 40 | 1.829E-02 | 5.891E-03 | | | | 210.7 |

Table 6.4.49. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 88.06 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 13. 7.88 | 45 | | 4.947E-04 | | | | 736 |
| 0.57 | 10 | | | 3.231E-03 | 1.589E-04 | 8.506E-04 | 211.7 |
| 13. 7.88 | 45 | | | 4.881E-03 | 3.480E-03 | 5.552E-03 | 736 |
| 0.57 | 30 | | | | | | 211.7 |
| 13. 7.88 | 45 | | | | | | 736 |
| 0.57 | 20 | 1.889E-02 | 9.007E-03 | | | | 211.7 |
| 14. 7.88 | 45 | | 2.641E-04 | | | | 739 |
| 0.27 | 10 | | | 4.180E-03 | 4.532E-04 | 1.129E-03 | 212.7 |
| 14. 7.88 | 45 | | | 5.386E-03 | 3.735E-03 | 5.719E-03 | 739 |
| 0.27 | 30 | | | | | | 212.7 |
| 15. 7.88 | 45 | | 4.140E-04 | | | | 737 |
| 0.23 | 10 | | | 3.069E-03 | 3.584E-04 | 8.022E-04 | 213.7 |
| 15. 7.88 | 45 | | | 4.818E-03 | 3.418E-03 | 5.474E-03 | 737 |
| 0.23 | 30 | | | | | | 213.7 |
| 15. 7.88 | 45 | | | | | | 737 |
| 0.23 | 20 | 1.945E-02 | 6.074E-03 | | | | 213.7 |
| 18. 7.88 | 45 | | | | | | 26 |
| 5. 0 | 20 | | | | | | 214.3 |

Table 6.4.50. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 88.07 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 9. 9.88 | 42 | | | | | | 751 |
| 0. 0 | 10 | | | | | | 214.3 |
| 9. 9.88 | 42 | | 3.475E-04 | | | | 755 |
| 2.55 | 10 | | | 1.314E-03 | 2.751E-04 | 5.808E-04 | 215.3 |
| 9. 9.88 | 45 | | 4.165E-04 | | | | 755 |
| 3. 5 | 10 | | | 2.852E-03 | 3.410E-04 | 7.751E-04 | 215.3 |
| 9. 9.88 | 45 | | | 4.893E-03 | 3.740E-03 | 5.291E-03 | 755 |
| 3. 5 | 30 | | | | | | 215.3 |
| 9. 9.88 | 45 | | | | | | 755 |
| 3. 5 | 20 | 4.626E-03 | 5.747E-03 | | | | 215.3 |
| 10. 9.88 | 42 | | 3.937E-04 | | | | 756 |
| 1.19 | 10 | | | 2.516E-03 | 2.817E-04 | 5.711E-04 | 216.3 |
| 10. 9.88 | 45 | | 3.567E-04 | | | | 756 |
| 1.31 | 10 | | | 2.700E-03 | 3.578E-04 | 6.159E-04 | 216.3 |
| 10. 9.88 | 45 | | | 4.744E-03 | 3.341E-03 | 5.131E-03 | 756 |
| 1.31 | 30 | | | | | | 216.3 |
| 10. 9.88 | 45 | | | | | | 756 |
| 1.31 | 20 | 7.550E-03 | 5.583E-03 | | | | 216.3 |
| 11. 9.88 | 42 | | 7.527E-04 | | | | 757 |
| 3. 0 | 10 | | | 1.969E-03 | 4.916E-04 | 6.872E-04 | 217.3 |
| 11. 9.88 | 45 | | | 5.237E-03 | 3.489E-03 | 5.475E-03 | 757 |
| 3.15 | 30 | | | | | | 217.3 |
| 11. 9.88 | 45 | | | | | | 757 |
| 3.15 | 20 | 1.094E-02 | 6.004E-03 | | | | 217.3 |
| 12. 9.88 | 42 | | 3.995E-04 | | | | 756 |
| 1.2 | 10 | | | 2.531E-03 | 2.851E-04 | 6.147E-04 | 218.3 |
| 12. 9.88 | 45 | | 3.537E-04 | | | | 756 |
| 1.32 | 10 | | | 2.689E-03 | 2.701E-04 | 6.648E-04 | 218.3 |
| 12. 9.88 | 45 | | | 5.154E-03 | 3.762E-03 | 5.975E-03 | 756 |
| 1.32 | 30 | | | | | | 218.3 |
| 12. 9.88 | 45 | | | | | | 756 |
| 1.32 | 20 | 1.260E-02 | 6.207E-03 | | | | 218.3 |
| 13. 9.88 | 42 | | 3.380E-04 | | | | 757 |
| 0.37 | 10 | | | 2.429E-03 | 2.495E-04 | 6.019E-04 | 219.3 |
| 13. 9.88 | 45 | | 2.830E-04 | | | | 757 |
| 0.5 | 10 | | | 2.773E-03 | 2.331E-04 | 6.798E-04 | 219.3 |
| 13. 9.88 | 45 | | | 5.097E-03 | 3.619E-03 | 5.510E-03 | 757 |
| 0.5 | 30 | | | | | | 219.3 |
| 13. 9.88 | 45 | | | | | | 757 |
| 0.5 | 20 | 1.452E-02 | 6.184E-03 | | | | 219.3 |
| 14. 9.88 | 42 | | 3.078E-04 | | | | 755 |
| 1.17 | 10 | | | 2.122E-03 | 2.221E-04 | 4.858E-04 | 220.3 |
| 14. 9.88 | 45 | | 2.627E-04 | | | | 755 |
| 1.32 | 10 | | | 2.408E-03 | 1.819E-04 | 5.747E-04 | 220.3 |
| 14. 9.88 | 45 | | | 4.586E-03 | 3.178E-03 | 4.945E-03 | 755 |
| 1.32 | 30 | | | | | | 220.3 |
| 14. 9.88 | 45 | | | | | | 755 |
| 1.32 | 20 | 1.431E-02 | 5.683E-03 | | | | 220.3 |
| 14. 9.88 | 42 | | 3.403E-04 | | | | 756 |
| 9. 1 | 10 | | | 2.484E-03 | 2.731E-04 | 5.823E-04 | 220.7 |
| 14. 9.88 | 42 | | 2.877E-04 | | | | 756 |
| 9.15 | 10 | | | 1.927E-03 | 2.333E-04 | 4.715E-04 | 220.7 |

Table 6.4.50. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 88.07 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 14. 9.88 | 42 | | 2.506E-04 | | | | 756 |
| 9.29 | 10 | | | 1.807E-03 | 2.138E-04 | 3.780E-04 | 220.7 |
| 14. 9.88 | 42 | | 3.905E-04 | | | | 754 |
| 11.25 | 10 | | | 2.674E-03 | 3.205E-04 | 6.584E-04 | 220.79 |
| 14. 9.88 | 42 | | 2.804E-04 | | | | 754 |
| 11.5 | 10 | | | 1.975E-03 | 2.693E-04 | 4.412E-04 | 220.8 |
| 14. 9.88 | 42 | | 1.783E-04 | | | | 755 |
| 12.46 | 10 | | | 1.595E-03 | 2.135E-04 | 4.006E-04 | 220.83 |
| 14. 9.88 | 42 | | 2.972E-04 | | | | 755 |
| 13.34 | 10 | | | 1.915E-03 | 2.650E-04 | 4.906E-04 | 220.85 |
| 14. 9.88 | 42 | | 2.220E-04 | | | | 755 |
| 13.58 | 10 | | | 1.532E-03 | 1.998E-04 | 3.949E-04 | 220.86 |
| 14. 9.88 | 42 | | 2.720E-04 | | | | 755 |
| 14.46 | 10 | | | 1.688E-03 | 1.865E-04 | 3.672E-04 | 220.9 |
| 14. 9.88 | 42 | | 1.609E-04 | | | | 755 |
| 15.55 | 10 | | | 1.353E-03 | 1.491E-04 | 3.102E-04 | 220.93 |
| 14. 9.88 | 45 | | 7.460E-04 | | | | 753 |
| 19. 5 | 10 | | | 4.316E-03 | 4.823E-04 | 1.166E-03 | 221.03 |
| 14. 9.88 | 45 | | 4.231E-04 | | | | 754 |
| 22.5 | 10 | | | 4.361E-03 | 5.464E-04 | 1.081E-03 | 221.2 |
| 15. 9.88 | 45 | | | | | | 754 |
| 0. 5 | 10 | | | 2.340E-03 | | 6.035E-04 | 221.27 |
| 15. 9.88 | 45 | | | | | | 754 |
| 0.56 | 10 | | | 1.163E-03 | | 5.877E-04 | 221.31 |
| 15. 9.88 | 45 | | | | | | 754 |
| 1.56 | 10 | | | 2.247E-03 | | 5.337E-04 | 221.34 |
| 15. 9.88 | 45 | | | | | | 754 |
| 2.55 | 10 | | | 2.106E-03 | | 5.470E-04 | 221.37 |
| 15. 9.88 | 45 | | | | | | 755 |
| 3.52 | 10 | | | 2.104E-03 | | 5.234E-04 | 221.4 |
| 15. 9.88 | 45 | | | | | | 755 |
| 4.53 | 10 | | | 1.735E-03 | 5.618E-04 | 4.809E-04 | 221.43 |
| 15. 9.88 | 45 | | | | | | 754 |
| 5.53 | 10 | | | 1.322E-03 | | 5.285E-04 | 221.46 |
| 15. 9.88 | 45 | | | | | | 755 |
| 6.5 | 10 | | | 2.131E-03 | | 4.262E-04 | 221.5 |
| 15. 9.88 | 45 | | | | | | 754 |
| 8.2 | 10 | | | 1.940E-03 | | 5.151E-04 | 221.57 |
| 15. 9.88 | 45 | | | 2.691E-03 | 2.993E-03 | 3.706E-03 | 754 |
| 8.2 | 30 | | | | | | 221.57 |
| 15. 9.88 | 45 | | 3.356E-04 | | | | 754 |
| 9.38 | 10 | | | 1.663E-03 | | 7.019E-04 | 221.64 |
| 15. 9.88 | 45 | | | 7.098E-03 | 4.230E-03 | 8.861E-03 | 752 |
| 12.29 | 30 | | | | | | 221.75 |
| 15. 9.88 | 45 | | | 7.001E-03 | 4.173E-03 | 8.689E-03 | 753 |
| 13.39 | 30 | | | | | | 221.8 |
| 15. 9.88 | 45 | | | 4.811E-03 | 3.875E-03 | 5.660E-03 | 752 |
| 15.36 | 30 | | | | | | 221.88 |
| 15. 9.88 | 45 | | | | | | 753 |
| 17.58 | 10 | | | 2.064E-03 | | 5.205E-04 | 221.95 |
| 15. 9.88 | 45 | | | 3.014E-03 | 3.016E-03 | 3.827E-03 | 753 |
| 17.58 | 30 | | | | | | 221.95 |

Table 6.4.50. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 88.07 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 15. 9.88 | 45 | | | | | | 752 |
| 19.58 | 10 | | | 2.018E-03 | | 4.824E-04 | 222.03 |
| 15. 9.88 | 45 | | | 3.651E-03 | 3.050E-03 | 4.347E-03 | 752 |
| 19.58 | 30 | | | | | | 222.03 |
| 15. 9.88 | 45 | | | | | | 753 |
| 21.27 | 10 | | | 2.314E-03 | | 4.687E-04 | 222.11 |
| 15. 9.88 | 45 | | | 3.912E-03 | 3.295E-03 | 4.590E-03 | 753 |
| 21.27 | 30 | | | | | | 222.11 |
| 16. 9.88 | 45 | | | | | | 753 |
| 0.27 | 10 | | | 1.585E-03 | | 5.153E-04 | 222.25 |
| 16. 9.88 | 45 | | | 2.506E-03 | 2.919E-03 | 3.703E-03 | 753 |
| 0.27 | 30 | | | | | | 222.25 |
| 16. 9.88 | 45 | | | | | | 753 |
| 2.24 | 10 | | | 1.707E-03 | | 5.366E-04 | 222.32 |
| 16. 9.88 | 45 | | | 3.592E-03 | 2.973E-03 | 3.871E-03 | 753 |
| 2.24 | 30 | | | | | | 222.32 |
| 16. 9.88 | 45 | | | | | | 754 |
| 6. 3 | 10 | | | 2.037E-03 | | 4.526E-04 | 222.47 |
| 16. 9.88 | 45 | | | 3.251E-03 | 2.778E-03 | 4.183E-03 | 754 |
| 6. 3 | 30 | | | | | | 222.47 |
| 16. 9.88 | 45 | | | | | | 753 |
| 8.26 | 10 | | | 1.531E-03 | | 5.057E-04 | 222.55 |
| 16. 9.88 | 45 | | | 3.614E-03 | 3.023E-03 | 3.613E-03 | 753 |
| 8.26 | 30 | | | | | | 222.55 |
| 16. 9.88 | 45 | | | | | | 753 |
| 9.36 | 10 | | | 2.956E-03 | | 7.370E-04 | 222.59 |
| 16. 9.88 | 45 | | | 5.353E-03 | 3.676E-03 | 3.443E-03 | 753 |
| 9.36 | 30 | | | | | | 222.59 |
| 16. 9.88 | 45 | | | | | | 754 |
| 12.3 | 10 | | | 3.660E-03 | 3.457E-04 | 9.859E-04 | 222.7 |
| 16. 9.88 | 45 | | 2.608E-04 | | | | 751 |
| 14. 0 | 10 | | | 3.492E-03 | 2.408E-04 | 8.533E-04 | 222.75 |
| 16. 9.88 | 45 | | | 4.711E-03 | 3.814E-03 | 5.863E-03 | 751 |
| 14. 0 | 30 | | | | | | 222.75 |
| 17. 9.88 | 42 | | 2.100E-04 | | | | 753 |
| 8.15 | 10 | | | 1.564E-03 | 1.816E-04 | 2.966E-04 | 223.54 |
| 17. 9.88 | 45 | | 2.833E-04 | | | | 753 |
| 8.35 | 10 | | | 1.318E-03 | | 3.434E-04 | 223.55 |
| 17. 9.88 | 45 | | | 5.729E-03 | 4.680E-03 | 6.118E-03 | 753 |
| 8.35 | 30 | | | | | | 223.55 |
| 17. 9.88 | 45 | | | | | | 753 |
| 8.35 | 20 | 3.326E-02 | 8.990E-03 | | | | 223.55 |
| 17. 9.88 | 42 | | 1.389E-04 | | | | 751 |
| 11.15 | 10 | | | 9.419E-04 | 1.368E-04 | 2.057E-04 | 223.65 |
| 17. 9.88 | 45 | | 1.844E-04 | | | | 751 |
| 11.37 | 10 | | | 1.207E-03 | 1.802E-04 | 3.247E-04 | 223.66 |
| 17. 9.88 | 45 | | | 5.763E-03 | 4.692E-03 | 6.734E-03 | 751 |
| 11.37 | 30 | | | | | | 223.66 |
| 17. 9.88 | 45 | | | | | | 751 |
| 11.37 | 20 | 4.423E-02 | 1.006E-02 | | | | 223.66 |
| 18. 9.88 | 42 | | 1.535E-04 | | | | 752 |
| 8. 0 | 10 | | | 6.805E-04 | | | 224.53 |

Table 6.4.50. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 88.07 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| | | | | | | | |
| 18. 9.88 | 45 | | 1.394E-04 | | | | 752 |
| 8.22 | 10 | | | 8.460E-04 | | 2.325E-04 | 224.54 |
| 18. 9.88 | 45 | | | 5.496E-03 | 4.430E-03 | 6.182E-03 | 752 |
| 8.22 | 30 | | | | | | 224.54 |
| 18. 9.88 | 45 | | | | | | 752 |
| 8.22 | 20 | 4.722E-02 | 9.894E-03 | | | | 224.54 |
| 18. 9.88 | 42 | | 1.951E-04 | | | | 753 |
| 11.3 | 10 | | | 7.514E-04 | 1.112E-04 | 2.414E-04 | 224.67 |
| 18. 9.88 | 45 | | | 5.843E-03 | 4.655E-03 | 6.600E-03 | 753 |
| 12. 6 | 30 | | | | | | 224.68 |
| 18. 9.88 | 45 | | | | | | 753 |
| 12. 6 | 20 | 4.852E-02 | 1.032E-02 | | | | 224.68 |
| 19. 9.88 | 42 | | | | | | 751 |
| 8. 9 | 10 | | | 6.385E-04 | | | 225.53 |
| 19. 9.88 | 45 | | | | | | 751 |
| 8.32 | 10 | | | 6.653E-04 | | 4.774E-04 | 225.54 |
| 19. 9.88 | 45 | | | | | | 751 |
| 8.32 | 20 | 3.725E-02 | 9.533E-03 | | | | 225.54 |
| 20. 9.88 | 45 | | 4.824E-04 | | | | 751 |
| 8.32 | 10 | | | 3.828E-03 | 3.895E-04 | 1.007E-03 | 226.54 |
| 20. 9.88 | 45 | | | 6.373E-03 | 4.796E-03 | 7.243E-03 | 751 |
| 8.32 | 30 | | | | | | 226.54 |
| 20. 9.88 | 45 | | | | | | 751 |
| 8.32 | 20 | 3.129E-02 | 9.204E-03 | | | | 226.54 |
| 21. 9.88 | 45 | | | | | | 749 |
| 9.25 | 10 | | | 2.630E-03 | | 7.225E-04 | 227.57 |
| 21. 9.88 | 45 | | | 6.122E-03 | 4.653E-03 | 6.884E-03 | 749 |
| 9.25 | 30 | | | | | | 227.57 |
| 21. 9.88 | 45 | | | | | | 749 |
| 9.25 | 20 | 2.335E-02 | 8.424E-03 | | | | 227.57 |
| 22. 9.88 | 45 | | 6.293E-04 | | | | 751 |
| 8.25 | 10 | | | 3.649E-03 | 4.867E-04 | 1.001E-03 | 228.53 |
| 22. 9.88 | 45 | | | 5.701E-03 | 4.452E-03 | 6.282E-03 | 751 |
| 8.25 | 30 | | | | | | 228.53 |
| 22. 9.88 | 45 | | | | | | 751 |
| 8.25 | 20 | 1.964E-02 | 7.554E-03 | | | | 228.53 |
| 23. 9.88 | 45 | | 5.653E-04 | | | | 750 |
| 8.15 | 10 | | | 3.238E-03 | 6.083E-04 | 1.001E-03 | 229.53 |
| 23. 9.88 | 45 | | | 5.716E-03 | 4.371E-03 | 5.863E-03 | 750 |
| 8.15 | 30 | | | | | | 229.53 |
| 23. 9.88 | 45 | | | | | | 750 |
| 8.15 | 20 | 1.891E-02 | 6.595E-03 | | | | 229.53 |
| 24. 9.88 | 45 | | 5.504E-04 | | | | 749 |
| 16.53 | 10 | | | 3.843E-03 | 4.815E-04 | 1.077E-03 | 230.88 |
| 24. 9.88 | 45 | | | 5.664E-03 | 4.316E-03 | 5.950E-03 | 749 |
| 16.53 | 30 | | | | | | 230.88 |
| 24. 9.88 | 45 | | | | | | 749 |
| 16.53 | 20 | 1.906E-02 | 6.396E-03 | | | | 230.88 |
| 25. 9.88 | 45 | | 5.898E-04 | | | | 747 |
| 17.52 | 10 | | | 3.637E-03 | 4.509E-04 | 1.033E-03 | 231.92 |
| 25. 9.88 | 45 | | | 5.158E-03 | 3.918E-03 | 6.094E-03 | 747 |
| 17.52 | 30 | | | | | | 231.92 |

Table 6.4.50. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 88.07 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 25. 9.88 | 45 | | | | | | 747 |
| 17.52 | 20 | 1.726E-02 | 5.949E-03 | | | | 231.92 |
| 26. 9.88 | 45 | | 6.155E-04 | | | | 746 |
| 17.18 | 10 | | | 3.674E-03 | 4.689E-04 | 1.070E-03 | 232.9 |
| 26. 9.88 | 45 | | | 5.470E-03 | 3.855E-03 | 5.838E-03 | 746 |
| 17.18 | 30 | | | | | | 232.9 |
| 26. 9.88 | 45 | | | | | | 746 |
| 17.18 | 20 | 1.752E-02 | 6.059E-03 | | | | 232.9 |
| 27. 9.88 | 45 | | 5.708E-04 | | | | 744 |
| 17.19 | 10 | | | 3.775E-03 | 4.947E-04 | 9.792E-04 | 233.9 |
| 27. 9.88 | 45 | | | 5.001E-03 | 3.743E-03 | 5.706E-03 | 744 |
| 17.19 | 30 | | | | | | 233.9 |
| 27. 9.88 | 45 | | | | | | 744 |
| 17.19 | 20 | 2.091E-02 | 5.848E-03 | | | | 233.9 |
| 28. 9.88 | 45 | | 6.168E-04 | | | | 745 |
| 16.32 | 10 | | | 3.091E-03 | 4.957E-04 | 9.463E-04 | 234.88 |
| 28. 9.88 | 45 | | | 4.689E-03 | 3.300E-03 | 4.832E-03 | 745 |
| 16.32 | 30 | | | | | | 234.88 |
| 28. 9.88 | 45 | | | | | | 745 |
| 16.32 | 20 | 1.563E-02 | 5.275E-03 | | | | 234.88 |
| 29. 9.88 | 45 | | | | | | 55 |
| 3. 0 | 20 | | | | | | 235.33 |
| --- | --- | | | | | | |

Table 6.4.51. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 88.08 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 5.10.88 | 45 | | | | | | 754 |
| 0. 0 | 10 | | | | | | 235.33 |
| 5.10.88 | 45 | | 3.281E-04 | | | | 754 |
| 9.18 | 10 | | | 4.643E-03 | 3.345E-04 | 1.223E-03 | 237.2 |
| 5.10.88 | 45 | | | 6.883E-03 | 4.824E-03 | 7.413E-03 | 754 |
| 9.18 | 40 | 1.610E-02 | 7.106E-03 | | | | 237.2 |
| 5.10.88 | 45 | | | 7.748E-03 | 5.514E-03 | 9.060E-03 | 754 |
| 9.18 | 40 | 1.627E-02 | 7.745E-03 | | | | 237.2 |
| 6.10.88 | 42 | | 2.014E-04 | | | | 756 |
| 8.48 | 10 | | | | | | 238.2 |
| 6.10.88 | 45 | | 1.770E-04 | | | | 756 |
| 8.54 | 10 | | | 3.757E-03 | 2.560E-04 | 9.627E-04 | 238.2 |
| 6.10.88 | 45 | | | 6.108E-03 | 4.608E-03 | 7.039E-03 | 756 |
| 8.54 | 40 | 1.689E-02 | 6.089E-03 | | | | 238.2 |
| 6.10.88 | 45 | | | 7.600E-03 | 5.529E-03 | 9.015E-03 | 756 |
| 8.54 | 40 | 2.049E-02 | 8.120E-03 | | | | 238.2 |
| 7.10.88 | 42 | | 3.696E-04 | | | | 758 |
| 8.46 | 10 | | | | | | 239.2 |
| 7.10.88 | 45 | | 3.664E-04 | | | | 758 |
| 8.51 | 10 | | | 1.267E-03 | 2.804E-04 | 3.594E-04 | 239.2 |
| 7.10.88 | 45 | | | 5.345E-03 | 3.764E-03 | 5.695E-03 | 758 |
| 8.51 | 30 | | | | | | 239.2 |
| 7.10.88 | 45 | | | | | | 758 |
| 8.51 | 20 | 1.599E-02 | 6.112E-03 | | | | 239.2 |
| 8.10.88 | 42 | | 2.938E-04 | | | | 756 |
| 9. 1 | 10 | | | | | | 240.2 |
| 8.10.88 | 45 | | 3.834E-04 | | | | 756 |
| 9. 8 | 10 | | | 3.135E-03 | 3.316E-04 | 8.955E-04 | 240.2 |
| 8.10.88 | 45 | | | 4.940E-03 | 3.689E-03 | 5.819E-03 | 756 |
| 9. 8 | 30 | | | | | | 240.2 |
| 8.10.88 | 45 | | | | | | 756 |
| 9. 8 | 20 | 1.661E-02 | 5.924E-03 | | | | 240.2 |
| 9.10.88 | 42 | | 3.178E-04 | | | | 757 |
| 8.38 | 10 | | | | | | 241.2 |
| 9.10.88 | 45 | | 4.483E-04 | | | | 757 |
| 8.44 | 10 | | | 3.418E-03 | 3.784E-04 | 9.268E-04 | 241.2 |
| 9.10.88 | 45 | | | 4.870E-03 | 3.668E-03 | 5.633E-03 | 757 |
| 8.44 | 30 | | | | | | 241.2 |
| 9.10.88 | 45 | | | | | | 757 |
| 8.44 | 20 | 1.734E-02 | 5.927E-03 | | | | 241.2 |
| 10.10.88 | 42 | | 3.195E-04 | | | | 756 |
| 8.45 | 10 | | | | | | 242.2 |
| 10.10.88 | 45 | | | 4.908E-03 | 3.646E-03 | 5.802E-03 | 756 |
| 8.52 | 30 | | | | | | 242.2 |
| 10.10.88 | 45 | | | | | | 756 |
| 8.52 | 20 | 1.706E-02 | 5.711E-03 | | | | 242.2 |
| 10.10.88 | 42 | | 2.146E-04 | | | | 755 |
| 15.22 | 10 | | | | | | 242.4 |
| 10.10.88 | 45 | | | | | | 755 |
| 15.3 | 10 | | | 3.831E-03 | 5.965E-04 | 9.970E-04 | 242.4 |
| 10.10.88 | 45 | | | 6.176E-03 | 4.195E-03 | 6.847E-03 | 755 |
| 15.3 | 30 | | | | | | 242.4 |

Table 6.4.51. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 88.08 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 10.10.88 | 45 | | | | | | 755 |
| 15.3 | 20 | 3.134E-02 | 6.487E-03 | | | | 242.4 |
| 10.10.88 | 42 | | 1.409E-04 | | | | 754 |
| 18.5 | 10 | | | | | | 242.56 |
| 10.10.88 | 45 | | | | | | 754 |
| 18.58 | 10 | | | 3.434E-03 | 2.042E-04 | 9.966E-04 | 242.56 |
| 10.10.88 | 45 | | | 6.083E-03 | 4.101E-03 | 6.563E-03 | 754 |
| 18.58 | 30 | | | | | | 242.56 |
| 10.10.88 | 45 | | | | | | 754 |
| 18.58 | 20 | 5.031E-02 | 7.670E-03 | | | | 242.56 |
| 11.10.88 | 45 | | | | | | 756 |
| 2.13 | 10 | | | 1.398E-03 | 1.234E-04 | 8.285E-04 | 242.86 |
| 11.10.88 | 45 | | | 5.444E-03 | 4.319E-03 | 6.523E-03 | 756 |
| 2.13 | 30 | | | | | | 242.86 |
| 11.10.88 | 45 | | | | | | 756 |
| 2.13 | 20 | 6.760E-02 | 8.777E-03 | | | | 242.86 |
| 11.10.88 | 45 | | | | | | 755 |
| 10.42 | 10 | | | 3.003E-03 | | 7.356E-04 | 243.2 |
| 11.10.88 | 45 | | | 5.448E-03 | 4.406E-03 | 6.160E-03 | 755 |
| 10.42 | 30 | | | | | | 243.2 |
| 11.10.88 | 45 | | | | | | 755 |
| 10.42 | 20 | 5.054E-02 | 9.201E-03 | | | | 243.2 |
| 11.10.88 | 45 | | | | | | 757 |
| 17.2 | 10 | | | 3.056E-03 | 1.362E-04 | 7.960E-04 | 243.5 |
| 11.10.88 | 45 | | | 5.319E-03 | 4.371E-03 | 5.967E-03 | 757 |
| 17.2 | 30 | | | | | | 243.5 |
| 11.10.88 | 45 | | | | | | 757 |
| 17.2 | 20 | 5.266E-02 | 1.043E-02 | | | | 243.5 |
| 12.10.88 | 42 | | 1.232E-04 | | | | 757 |
| 2.15 | 10 | | | | | | 243.9 |
| 12.10.88 | 45 | | | | | | 757 |
| 2.25 | 10 | | | 1.763E-03 | | 7.821E-04 | 243.9 |
| 12.10.88 | 45 | | | 7.494E-03 | 5.832E-03 | 8.647E-03 | 757 |
| 2.25 | 30 | | | | | | 243.9 |
| 12.10.88 | 45 | | | | | | 757 |
| 2.25 | 20 | 5.602E-02 | 9.660E-03 | | | | 243.9 |
| 12.10.88 | 45 | | | | | | 757 |
| 9.32 | 10 | | | 2.472E-03 | | 7.074E-04 | 244.2 |
| 12.10.88 | 45 | | | 5.265E-03 | 4.720E-03 | 6.046E-03 | 757 |
| 9.32 | 30 | | | | | | 244.2 |
| 12.10.88 | 45 | | | | | | 757 |
| 9.32 | 20 | 5.093E-02 | 9.775E-03 | | | | 244.2 |
| 12.10.88 | 42 | | 2.078E-04 | | | | 756 |
| 14.56 | 10 | | | | | | 244.4 |
| 12.10.88 | 42 | | 1.889E-04 | | | | 756 |
| 15. 0 | 10 | | | | | | 244.4 |
| 12.10.88 | 42 | | 1.709E-04 | | | | 756 |
| 15. 2 | 10 | | | | | | 244.4 |
| 12.10.88 | 42 | | 2.379E-04 | | | | 756 |
| 15. 4 | 10 | | | | | | 244.4 |
| 12.10.88 | 42 | | 1.980E-04 | | | | 756 |
| 15. 6 | 10 | | | | | | 244.4 |

Table 6.4.51. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 88.08 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 12.10.88 | 42 | | 2.399E-04 | | | | 756 |
| 15.11 | 10 | | | | | | 244.4 |
| 12.10.88 | 45 | | | | | | 756 |
| 15.27 | 10 | | | 1.296E-03 | 1.113E-04 | 3.003E-04 | 244.4 |
| 12.10.88 | 45 | | | | | | 756 |
| 15.22 | 10 | | | 2.296E-03 | 5.386E-04 | 7.731E-04 | 244.4 |
| 12.10.88 | 45 | | | | | | 756 |
| 15.22 | 10 | | | 2.085E-03 | | 1.533E-03 | 244.4 |
| 12.10.88 | 45 | | | 5.109E-03 | 4.255E-03 | 6.327E-03 | 756 |
| 15.22 | 30 | | | | | | 244.4 |
| 12.10.88 | 45 | | | | | | 756 |
| 15.22 | 20 | 5.111E-02 | 9.778E-03 | | | | 244.4 |
| 13.10.88 | 45 | | | | | | 754 |
| 3.12 | 10 | | | 1.489E-03 | | 7.798E-04 | 244.9 |
| 13.10.88 | 45 | | | 6.328E-03 | 5.176E-03 | 7.352E-03 | 754 |
| 3.12 | 30 | | | | | | 244.9 |
| 13.10.88 | 45 | | | | | | 754 |
| 3.12 | 20 | 5.267E-02 | 9.457E-03 | | | | 244.9 |
| 13.10.88 | 42 | | 1.655E-04 | | | | 755 |
| 11. 4 | 10 | | | | | | 245.2 |
| 13.10.88 | 45 | | | | | | 755 |
| 11. 6 | 10 | | | 2.546E-03 | 6.097E-04 | 5.691E-04 | 245.2 |
| 13.10.88 | 45 | | | 4.641E-03 | 3.769E-03 | 4.389E-03 | 755 |
| 11. 6 | 30 | | | | | | 245.2 |
| 13.10.88 | 45 | | | | | | 755 |
| 11. 6 | 20 | 2.572E-02 | 5.628E-03 | | | | 245.2 |
| 14.10.88 | 42 | | 1.616E-04 | | | | 754 |
| 11. 3 | 10 | | | | | | 246.3 |
| 14.10.88 | 45 | | | | | | 754 |
| 11. 7 | 10 | | | 1.624E-03 | | 6.063E-04 | 246.3 |
| 14.10.88 | 45 | | | 4.983E-03 | 4.260E-03 | 6.072E-03 | 754 |
| 11. 7 | 30 | | | | | | 246.3 |
| 14.10.88 | 45 | | | | | | 754 |
| 11. 7 | 20 | 4.600E-02 | 9.540E-03 | | | | 246.3 |
| 15.10.88 | 42 | | 1.531E-04 | | | | 753 |
| 9.4 | 10 | | | | | | 247.2 |
| 15.10.88 | 45 | | | | | | 753 |
| 9.42 | 10 | | | 1.860E-03 | | 6.889E-04 | 247.2 |
| 15.10.88 | 45 | | | 5.011E-03 | 4.204E-03 | 6.347E-03 | 753 |
| 9.42 | 30 | | | | | | 247.2 |
| 15.10.88 | 45 | | | | | | 753 |
| 9.42 | 20 | 5.319E-02 | 9.076E-03 | | | | 247.2 |
| 16.10.88 | 42 | | 1.164E-04 | | | | 752 |
| 8.5 | 10 | | | | | | 248.2 |
| 16.10.88 | 45 | | | | | | 752 |
| 8.54 | 10 | | | 2.940E-03 | 5.362E-04 | 7.451E-04 | 248.2 |
| 16.10.88 | 45 | | | 5.047E-03 | 4.301E-03 | 5.113E-03 | 752 |
| 8.54 | 30 | | | | | | 248.2 |
| 16.10.88 | 45 | | | | | | 752 |
| 8.54 | 20 | 4.082E-02 | 8.951E-03 | | | | 248.2 |
| 17.10.88 | 42 | | 1.113E-04 | | | | 752 |
| 9. 0 | 10 | | | | | | 249.2 |

Table 6.4.51. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 88.08 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 17.10.88 | 45 | | | | | | 752 |
| 9. 3 | 10 | | | 1.003E-03 | | 6.850E-04 | 249.2 |
| 17.10.88 | 45 | | | 5.423E-03 | 3.987E-03 | 5.895E-03 | 752 |
| 9. 3 | 30 | | | | | | 249.2 |
| 17.10.88 | 45 | | | | | | 752 |
| 9. 3 | 20 | 4.825E-02 | 8.947E-03 | | | | 249.2 |
| 18.10.88 | 42 | | 2.004E-04 | | | | 752 |
| 9.45 | 10 | | | | | | 250.2 |
| 18.10.88 | 45 | | | | | | 752 |
| 9.47 | 10 | | | 3.033E-03 | 3.533E-04 | 1.075E-03 | 250.2 |
| 18.10.88 | 45 | | | 5.290E-03 | 4.480E-03 | 6.262E-03 | 752 |
| 9.47 | 30 | | | | | | 250.2 |
| 18.10.88 | 45 | | | 7.987E-03 | 5.805E-03 | 8.443E-03 | 752 |
| 9.47 | 40 | 3.929E-02 | 8.705E-03 | | | | 250.2 |
| 18.10.88 | 42 | | 3.185E-04 | | | | 752 |
| 15.49 | 10 | | | | | | 250.5 |
| 18.10.88 | 45 | | | | | | 752 |
| 15.51 | 10 | | | 4.024E-03 | 4.380E-04 | 1.096E-03 | 250.5 |
| 18.10.88 | 45 | | | 5.540E-03 | 4.179E-03 | 6.169E-03 | 752 |
| 15.51 | 30 | | | | | | 250.5 |
| 18.10.88 | 45 | | | | | | 752 |
| 15.51 | 20 | 3.306E-02 | 8.717E-03 | | | | 250.5 |
| 19.10.88 | 42 | | 1.718E-04 | | | | 751 |
| 8.5 | 10 | | | | | | 251.2 |
| 19.10.88 | 45 | | | | | | 751 |
| 8.52 | 10 | | | 1.669E-03 | 3.833E-04 | 7.083E-04 | 251.2 |
| 19.10.88 | 45 | | | 5.295E-03 | 3.742E-03 | 5.830E-03 | 751 |
| 8.52 | 30 | | | | | | 251.2 |
| 19.10.88 | 45 | | | | | | 751 |
| 8.52 | 20 | 2.435E-02 | 7.600E-03 | | | | 251.2 |
| 19.10.88 | 42 | | 2.255E-04 | | | | 750 |
| 16.4 | 10 | | | | | | 251.5 |
| 19.10.88 | 45 | | | | | | 750 |
| 16.41 | 10 | | | 1.953E-03 | 3.559E-04 | 7.307E-04 | 251.5 |
| 19.10.88 | 45 | | | 4.892E-03 | 3.951E-03 | 5.677E-03 | 750 |
| 16.41 | 30 | | | | | | 251.5 |
| 19.10.88 | 45 | | | | | | 750 |
| 16.41 | 20 | 2.129E-02 | 7.016E-03 | | | | 251.5 |
| 20.10.88 | 42 | | 2.375E-04 | | | | 750 |
| 0.22 | 10 | | | | | | 251.9 |
| 20.10.88 | 45 | | | | | | 750 |
| 0.25 | 10 | | | 3.421E-03 | 6.081E-04 | 1.160E-03 | 251.9 |
| 20.10.88 | 45 | | | 4.795E-03 | 3.873E-03 | 5.895E-03 | 750 |
| 0.25 | 30 | | | | | | 251.9 |
| 20.10.88 | 45 | | | | | | 750 |
| 0.25 | 20 | 1.923E-02 | 6.694E-03 | | | | 251.9 |
| 20.10.88 | 42 | | 1.945E-04 | | | | 750 |
| 9.12 | 10 | | | | | | 252.2 |
| 20.10.88 | 45 | | | | | | 750 |
| 9.15 | 10 | | | 1.472E-03 | | 6.143E-04 | 252.2 |
| 20.10.88 | 45 | | | 5.539E-03 | 3.859E-03 | 4.249E-03 | 750 |
| 9.15 | 30 | | | | | | 252.2 |

Table 6.4.51. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 88.08 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 20.10.88 | 45 | | | | | | 750 |
| 9.15 | 20 | 1.888E-02 | 6.504E-03 | | | | 252.2 |
| 20.10.88 | 42 | | 2.494E-04 | | | | 750 |
| 16.25 | 10 | | | | | | 252.5 |
| 20.10.88 | 45 | | | | | | 750 |
| 16.26 | 10 | | | 2.281E-03 | 1.051E-04 | 9.919E-04 | 252.5 |
| 20.10.88 | 45 | | | 5.120E-03 | 4.071E-03 | 5.730E-03 | 750 |
| 16.26 | 30 | | | | | | 252.5 |
| 20.10.88 | 45 | | | | | | 750 |
| 16.26 | 20 | 1.739E-02 | 6.641E-03 | | | | 252.5 |
| 21.10.88 | 42 | | 1.635E-04 | | | | 749 |
| 2. 4 | 10 | | | | | | 253 |
| 21.10.88 | 45 | | | | | | 749 |
| 2. 6 | 10 | | | 3.059E-03 | 2.641E-04 | 8.928E-04 | 253 |
| 21.10.88 | 45 | | | 4.885E-03 | 3.524E-03 | 5.427E-03 | 749 |
| 2. 6 | 30 | | | | | | 253 |
| 21.10.88 | 45 | | | | | | 749 |
| 2. 6 | 20 | 1.543E-02 | 6.216E-03 | | | | 253 |
| 21.10.88 | 42 | | 1.338E-04 | | | | 749 |
| 9.32 | 10 | | | | | | 253.3 |
| 21.10.88 | 45 | | | | | | 749 |
| 9.37 | 10 | | | 3.185E-03 | 3.252E-04 | 9.549E-04 | 253.3 |
| 21.10.88 | 45 | | | 4.492E-03 | 3.604E-03 | 4.876E-03 | 749 |
| 9.37 | 30 | | | | | | 253.3 |
| 21.10.88 | 45 | | | | | | 749 |
| 9.37 | 20 | 1.619E-02 | 6.076E-03 | | | | 253.3 |
| 22.10.88 | 42 | | 1.178E-04 | | | | 747 |
| 9.49 | 10 | | | | | | 254.3 |
| 22.10.88 | 45 | | | | | | 747 |
| 9.52 | 10 | | | 3.347E-03 | 3.039E-04 | 1.000E-03 | 254.3 |
| 22.10.88 | 45 | | | 5.020E-03 | 3.993E-03 | 3.696E-03 | 747 |
| 9.52 | 30 | | | | | | 254.3 |
| 22.10.88 | 45 | | | | | | 747 |
| 9.52 | 20 | 1.686E-02 | 6.528E-03 | | | | 254.3 |
| 23.10.88 | 42 | | 1.946E-04 | | | | 746 |
| 8.32 | 10 | | | | | | 255.3 |
| 23.10.88 | 45 | | | | | | 746 |
| 8.34 | 10 | | | 3.443E-03 | 3.181E-04 | 9.693E-04 | 255.3 |
| 23.10.88 | 45 | | | 5.241E-03 | 4.114E-03 | 6.311E-03 | 746 |
| 8.34 | 30 | | | | | | 255.3 |
| 23.10.88 | 45 | | | | | | 746 |
| 8.34 | 20 | 1.702E-02 | 6.442E-03 | | | | 255.3 |
| 24.10.88 | 42 | | 1.585E-04 | | | | 747 |
| 8.3 | 10 | | | | | | 256.3 |
| 24.10.88 | 45 | | | | | | 747 |
| 8.36 | 10 | | | 3.218E-03 | 1.505E-04 | 9.111E-04 | 256.3 |
| 24.10.88 | 45 | | | 4.624E-03 | 3.443E-03 | 5.912E-03 | 747 |
| 8.36 | 30 | | | | | | 256.3 |
| 24.10.88 | 45 | | | | | | 747 |
| 8.36 | 20 | 1.543E-02 | 6.003E-03 | | | | 256.3 |
| 25.10.88 | 45 | | | | | | 70 |
| 1. 0 | 20 | | | | | | 256.77 |

Table 6.4.52. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 88.09 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 29.10.88 | 52 | | | | | | 764 |
| 0. 0 | 10 | | | | | | 256.77 |
| 29.10.88 | 52 | | 1.730E-03 | | | | 764 |
| 9.52 | 10 | | | | | | 258.5 |
| 29.10.88 | 55 | | | | | | 764 |
| 9.55 | 10 | | | 8.927E-03 | 1.014E-03 | 3.002E-03 | 258.5 |
| 29.10.88 | 55 | | | 1.155E-02 | 8.181E-03 | 1.149E-02 | 764 |
| 9.55 | 40 | 2.155E-02 | 9.901E-03 | | | | 258.5 |
| 30.10.88 | 52 | | 8.170E-04 | | | | 765 |
| 9.1 | 10 | | | | | | 259.5 |
| 30.10.88 | 55 | | | | | | 765 |
| 9.14 | 10 | | | 8.854E-03 | 1.146E-03 | 2.794E-03 | 259.5 |
| 30.10.88 | 55 | | | 1.160E-02 | 8.544E-03 | 1.165E-02 | 765 |
| 9.14 | 30 | | | | | | 259.5 |
| 30.10.88 | 55 | | | | | | 765 |
| 9.14 | 20 | 2.867E-02 | 1.121E-02 | | | | 259.5 |
| 31.10.88 | 52 | | 1.254E-03 | | | | 767 |
| 8.58 | 10 | | | | | | 260.5 |
| 31.10.88 | 55 | | | | | | 766 |
| 9. 0 | 10 | | | 8.810E-03 | 1.089E-03 | 2.743E-03 | 260.5 |
| 31.10.88 | 55 | | | 1.086E-02 | 7.855E-03 | 1.095E-02 | 766 |
| 9. 0 | 30 | | | | | | 260.5 |
| 31.10.88 | 55 | | | | | | 766 |
| 9. 0 | 20 | 2.749E-02 | 1.038E-02 | | | | 260.5 |
| 1.11.88 | 52 | | 1.209E-03 | | | | 762 |
| 9.4 | 10 | | | | | | 261.5 |
| 1.11.88 | 55 | | | | | | 762 |
| 9.43 | 10 | | | 8.487E-03 | 1.511E-03 | 2.778E-03 | 261.5 |
| 1.11.88 | 55 | | | 1.147E-02 | 8.280E-03 | 1.124E-02 | 762 |
| 9.43 | 30 | | | | | | 261.5 |
| 1.11.88 | 55 | | | | | | 762 |
| 9.43 | 20 | 3.886E-02 | 1.110E-02 | | | | 261.5 |
| 2.11.88 | 52 | | 7.997E-04 | | | | 761 |
| 9. 2 | 10 | | | | | | 262.5 |
| 2.11.88 | 55 | | | | | | 761 |
| 9.1 | 10 | | | 9.101E-03 | 4.982E-04 | 2.959E-03 | 262.5 |
| 2.11.88 | 55 | | | 1.178E-02 | 9.945E-03 | 1.221E-02 | 761 |
| 9.1 | 30 | | | | | | 262.5 |
| 2.11.88 | 55 | | | | | | 761 |
| 9.1 | 20 | 4.205E-02 | 1.218E-02 | | | | 262.5 |
| 3.11.88 | 52 | | 1.060E-03 | | | | 764 |
| 9.15 | 10 | | | | | | 263.5 |
| 3.11.88 | 55 | | | | | | 764 |
| 9.18 | 10 | | | 9.482E-03 | 8.932E-04 | 2.973E-03 | 263.5 |
| 3.11.88 | 55 | | | 1.310E-02 | 1.019E-02 | 1.210E-02 | 764 |
| 9.18 | 30 | | | | | | 263.5 |
| 3.11.88 | 55 | | | | | | 764 |
| 9.18 | 20 | 3.923E-02 | 1.276E-02 | | | | 263.5 |
| 4.11.88 | 52 | | 1.125E-03 | | | | 763 |
| 8.56 | 10 | | | | | | 264.5 |
| 4.11.88 | 55 | | | | | | 764 |
| 9. 0 | 10 | | | 9.785E-03 | 1.138E-03 | 3.236E-03 | 264.5 |

Table 6.4.52. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 88.09 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 4.11.88 | 55 | | | 1.226E-02 | 1.006E-02 | 1.349E-02 | 764 |
| 9. 0 | 40 | 4.610E-02 | 1.199E-02 | | | | 264.5 |
| 5.11.88 | 52 | | 9.848E-04 | | | | 759 |
| 10.12 | 10 | | | | | | 265.5 |
| 5.11.88 | 55 | | | | | | 759 |
| 10.15 | 10 | | | 8.995E-03 | 1.080E-03 | 1.565E-03 | 265.5 |
| 5.11.88 | 55 | | | 1.200E-02 | 8.787E-03 | 1.197E-02 | 759 |
| 10.15 | 30 | | | | | | 265.5 |
| 5.11.88 | 55 | | | | | | 759 |
| 10.15 | 20 | 4.879E-02 | 1.273E-02 | | | | 265.5 |
| 6.11.88 | 52 | | 1.038E-03 | | | | 762 |
| 9. 0 | 10 | | | | | | 266.5 |
| 6.11.88 | 55 | | | | | | 762 |
| 9. 4 | 10 | | | 9.528E-03 | 1.409E-03 | 3.106E-03 | 266.5 |
| 6.11.88 | 55 | | | 1.231E-02 | 1.000E-02 | 1.204E-02 | 762 |
| 9. 4 | 30 | | | | | | 266.5 |
| 6.11.88 | 55 | | | | | | 762 |
| 9. 4 | 20 | 4.847E-02 | 1.273E-02 | | | | 266.5 |
| 7.11.88 | 55 | | | | | | 761 |
| 9.52 | 10 | | | 8.246E-03 | 5.606E-04 | 2.745E-03 | 267.5 |
| 7.11.88 | 55 | | | 1.218E-02 | 8.840E-03 | 1.213E-02 | 761 |
| 9.42 | 30 | | | | | | 267.5 |
| 7.11.88 | 55 | | | | | | 761 |
| 9.52 | 20 | 4.873E-02 | 1.253E-02 | | | | 267.5 |
| 8.11.88 | 52 | | 1.126E-03 | | | | 759 |
| 9. 1 | 10 | | | | | | 268.5 |
| 8.11.88 | 55 | | | | | | 759 |
| 9. 5 | 10 | | | 8.089E-03 | 1.074E-03 | 2.835E-03 | 268.5 |
| 8.11.88 | 55 | | | 1.101E-02 | 7.883E-03 | 1.067E-02 | 759 |
| 9. 5 | 30 | | | | | | 268.5 |
| 8.11.88 | 55 | | | | | | 759 |
| 9. 5 | 20 | 3.301E-02 | 1.050E-02 | | | | 268.5 |
| 9.11.88 | 52 | | 1.089E-03 | | | | 760 |
| 15.59 | 10 | | | | | | 269.75 |
| 9.11.88 | 55 | | | | | | 759 |
| 16. 3 | 10 | | | 8.124E-03 | 7.248E-04 | 2.663E-03 | 269.75 |
| 9.11.88 | 55 | | | 1.148E-02 | 8.124E-03 | 1.149E-02 | 759 |
| 16. 3 | 30 | | | | | | 269.75 |
| 9.11.88 | 55 | | | | | | 759 |
| 16. 3 | 20 | 3.563E-02 | 1.152E-02 | | | | 269.75 |
| 10.11.88 | 52 | | 1.223E-03 | | | | 761 |
| 0.52 | 10 | | | | | | 270.1 |
| 10.11.88 | 55 | | | | | | 761 |
| 0.55 | 10 | | | 8.413E-03 | 1.250E-03 | 2.785E-03 | 270.1 |
| 10.11.88 | 55 | | | 1.104E-02 | 8.687E-03 | 1.080E-02 | 761 |
| 0.55 | 30 | | | | | | 270.1 |
| 10.11.88 | 55 | | | | | | 761 |
| 0.55 | 20 | 3.289E-02 | 1.035E-02 | | | | 270.1 |
| 10.11.88 | 52 | | 1.086E-03 | | | | 758 |
| 9.57 | 10 | | | | | | 270.5 |
| 10.11.88 | 55 | | | | | | 758 |
| 10. 0 | 10 | | | 8.758E-03 | 1.117E-03 | 2.821E-03 | 270.5 |

Table 6.4.52. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 88.09 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 10.11.88 | 55 | | | 1.118E-02 | 7.855E-03 | 1.086E-02 | 758 |
| 10. 0 | 30 | | | | | | 270.5 |
| 10.11.88 | 55 | | | | | | 758 |
| 10. 0 | 20 | 3.160E-02 | 1.028E-02 | | | | 270.5 |
| 11.11.88 | 52 | | 1.268E-03 | | | | 757 |
| 9. 2 | 10 | | | | | | 271.5 |
| 11.11.88 | 55 | | | | | | 757 |
| 9. 5 | 10 | | | 8.438E-03 | 1.224E-03 | 2.788E-03 | 271.5 |
| 11.11.88 | 55 | | | 1.066E-02 | 7.435E-03 | 1.051E-02 | 757 |
| 9. 5 | 30 | | | | | | 271.5 |
| 11.11.88 | 55 | | | | | | 757 |
| 9. 5 | 20 | 3.030E-02 | 1.014E-02 | | | | 271.5 |
| 12.11.88 | 52 | | 1.058E-03 | | | | 756 |
| 8.56 | 10 | | | | | | 272.5 |
| 12.11.88 | 55 | | | | | | 756 |
| 8.58 | 10 | | | 8.390E-03 | 1.147E-03 | 2.610E-03 | 272.5 |
| 12.11.88 | 55 | | | 1.042E-02 | 7.461E-03 | 9.978E-03 | 756 |
| 8.58 | 30 | | | | | | 272.5 |
| 12.11.88 | 55 | | | | | | 756 |
| 8.58 | 20 | 2.717E-02 | 9.711E-03 | | | | 272.5 |
| 13.11.88 | 52 | | 9.975E-04 | | | | 755 |
| 8.47 | 10 | | | | | | 273.5 |
| 13.11.88 | 55 | | | | | | 755 |
| 8.5 | 10 | | | 7.883E-03 | 9.031E-04 | 2.701E-03 | 273.5 |
| 13.11.88 | 55 | | | 1.018E-02 | 7.342E-03 | 1.005E-02 | 755 |
| 8.5 | 30 | | | | | | 273.5 |
| 13.11.88 | 55 | | | | | | 755 |
| 8.5 | 20 | 2.567E-02 | 9.591E-03 | | | | 273.5 |
| 13.11.88 | 52 | | 1.154E-03 | | | | 755 |
| 16.58 | 10 | | | | | | 273.8 |
| 13.11.88 | 55 | | | | | | 754 |
| 17. 0 | 10 | | | 8.614E-03 | 1.085E-03 | 2.696E-03 | 273.8 |
| 13.11.88 | 55 | | | 1.029E-02 | 7.485E-03 | 1.029E-02 | 754 |
| 17. 0 | 30 | | | | | | 273.8 |
| 13.11.88 | 55 | | | | | | 754 |
| 17. 0 | 20 | 2.631E-02 | 1.001E-02 | | | | 273.8 |
| 14.11.88 | 52 | | 1.058E-03 | | | | 756 |
| 0.3 | 10 | | | | | | 274.1 |
| 14.11.88 | 55 | | | | | | 756 |
| 0.35 | 10 | | | 7.954E-03 | 1.099E-03 | 2.459E-03 | 274.1 |
| 14.11.88 | 55 | | | 9.601E-03 | 7.677E-03 | 9.871E-03 | 756 |
| 0.35 | 30 | | | | | | 274.1 |
| 14.11.88 | 55 | | | | | | 756 |
| 0.35 | 20 | 2.570E-02 | 7.039E-03 | | | | 274.1 |
| 14.11.88 | 52 | | 1.044E-03 | | | | 755 |
| 8.43 | 10 | | | | | | 274.5 |
| 14.11.88 | 55 | | | | | | 755 |
| 8.45 | 10 | | | 7.968E-03 | 1.021E-03 | 2.620E-03 | 274.5 |
| 14.11.88 | 55 | | | 9.094E-03 | 7.084E-03 | 8.996E-03 | 755 |
| 8.45 | 30 | | | | | | 274.5 |
| 14.11.88 | 55 | | | | | | 755 |
| 8.45 | 20 | 2.502E-02 | 8.733E-03 | | | | 274.5 |

Table 6.4.52. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 88.09 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 15.11.88 | 52 | | 1.102E-03 | | | | 754 |
| 9. 3 | 10 | | | | | | 275.5 |
| 15.11.88 | 55 | | | | | | 754 |
| 9. 4 | 10 | | | 8.645E-03 | 1.282E-03 | 2.501E-03 | 275.5 |
| 15.11.88 | 55 | | | 8.248E-03 | 7.247E-03 | 9.393E-03 | 754 |
| 9. 4 | 30 | | | | | | 275.5 |
| 15.11.88 | 55 | | | | | | 754 |
| 9. 4 | 20 | 2.424E-02 | 8.796E-03 | | | | 275.5 |
| 16.11.88 | 52 | | 1.010E-03 | | | | 754 |
| 8.45 | 10 | | | | | | 276.5 |
| 16.11.88 | 55 | | | | | | 754 |
| 8.48 | 10 | | | 7.455E-03 | 1.097E-03 | 2.358E-03 | 276.5 |
| 16.11.88 | 55 | | | 7.765E-03 | 6.119E-03 | 8.749E-03 | 754 |
| 8.48 | 30 | | | | | | 276.5 |
| 16.11.88 | 55 | | | | | | 754 |
| 8.48 | 20 | 2.351E-02 | 8.417E-03 | | | | 276.5 |
| 17.11.88 | 52 | | 9.868E-04 | | | | 753 |
| 8.48 | 10 | | | | | | 277.5 |
| 17.11.88 | 55 | | | | | | 753 |
| 8.51 | 10 | | | 6.960E-03 | 8.845E-04 | 2.223E-03 | 277.5 |
| 17.11.88 | 55 | | | 7.973E-03 | 5.685E-03 | 8.052E-03 | 753 |
| 8.51 | 30 | | | | | | 277.5 |
| 17.11.88 | 55 | | | | | | 753 |
| 8.51 | 20 | 2.227E-02 | 7.700E-03 | | | | 277.5 |
| 18.11.88 | 55 | | | | | | 22 |
| 7. 0 | 20 | | | | | | 278.03 |

Table 6.4.53. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 88.10 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 22.11.88 | 52 | | | | | | 909 |
| 16.23 | 10 | | | | | | 278.03 |
| 22.11.88 | 52 | | 8.569E-04 | | | | 909 |
| 16.23 | 10 | | | | | | 278.7 |
| 22.11.88 | 55 | | | | | | 909 |
| 16.25 | 10 | | | 6.266E-03 | 7.979E-04 | 2.458E-03 | 278.7 |
| 22.11.88 | 55 | | | 1.737E-02 | 1.396E-02 | 1.658E-02 | 909 |
| 16.25 | 30 | | | | | | 278.7 |
| 22.11.88 | 55 | | | | | | 909 |
| 16.25 | 20 | 3.267E-02 | 8.859E-03 | | | | 278.7 |
| 23.11.88 | 52 | | 9.204E-04 | | | | 901 |
| 16.43 | 10 | | | | | | 279.72 |
| 23.11.88 | 55 | | | | | | 901 |
| 16.46 | 10 | | | 7.277E-03 | 6.104E-04 | 2.150E-03 | 279.72 |
| 23.11.88 | 55 | | | 1.651E-02 | 1.251E-02 | 1.641E-02 | 901 |
| 16.46 | 30 | | | | | | 279.72 |
| 23.11.88 | 55 | | | | | | 901 |
| 16.43 | 20 | 2.629E-02 | 9.751E-03 | | | | 279.72 |
| 24.11.88 | 52 | | 9.986E-04 | | | | 925 |
| 16.25 | 10 | | | | | | 280.7 |
| 24.11.88 | 55 | | | | | | 925 |
| 16.28 | 10 | | | 7.922E-03 | 6.239E-04 | 2.167E-03 | 280.7 |
| 24.11.88 | 55 | | | 1.556E-02 | 1.202E-02 | 1.504E-02 | 925 |
| 16.28 | 30 | | | | | | 280.7 |
| 24.11.88 | 55 | | | | | | 925 |
| 16.28 | 20 | 3.002E-02 | 1.062E-02 | | | | 280.7 |
| 25.11.88 | 55 | | | | | | 926 |
| 18.37 | 10 | | | 7.944E-03 | 7.963E-04 | 2.025E-03 | 281.81 |
| 25.11.88 | 55 | | | 1.423E-02 | 1.213E-02 | 1.494E-02 | 926 |
| 18.37 | 30 | | | | | | 281.81 |
| 25.11.88 | 55 | | | | | | 926 |
| 18.37 | 20 | 3.066E-02 | 1.040E-02 | | | | 281.81 |
| 26.11.88 | 52 | | 1.070E-03 | | | | 925 |
| 17.1 | 10 | | | | | | 282.74 |
| 26.11.88 | 55 | | | | | | 925 |
| 17.17 | 10 | | | 9.204E-03 | 1.796E-03 | 2.492E-03 | 282.74 |
| 26.11.88 | 55 | | | 1.343E-02 | 1.031E-02 | 1.347E-02 | 925 |
| 17.17 | 30 | | | | | | 282.74 |
| 26.11.88 | 55 | | | | | | 925 |
| 17.17 | 20 | 3.158E-02 | 9.181E-03 | | | | 282.74 |
| 28.11.88 | 52 | | 7.621E-04 | | | | 927 |
| 10. 9 | 10 | | | | | | 284.44 |
| 28.11.88 | 55 | | | | | | 927 |
| 10. 9 | 10 | | | 5.916E-03 | 3.404E-04 | 1.441E-03 | 284.44 |
| 28.11.88 | 55 | | | 1.044E-02 | 8.438E-03 | 1.167E-02 | 927 |
| 10. 9 | 30 | | | | | | 284.44 |
| 28.11.88 | 55 | | | | | | 927 |
| 10. 9 | 20 | 2.694E-02 | 7.354E-03 | | | | 284.44 |
| 29.11.88 | 52 | | 1.175E-03 | | | | 927 |
| 8.41 | 10 | | | | | | 285.39 |
| 29.11.88 | 55 | | | | | | 927 |
| 8.46 | 10 | | | 7.393E-03 | 7.127E-04 | 1.943E-03 | 285.39 |

Table 6.4.53. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 88.10 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 29.11.88 | 55 | | | 1.485E-02 | 1.140E-02 | 1.415E-02 | 927 |
| 8.46 | 30 | | | | | | 285.39 |
| 29.11.88 | 55 | | | | | | 927 |
| 8.46 | 20 | 3.680E-02 | 9.625E-03 | | | | 285.39 |
| 30.11.88 | 55 | | | | | | 926 |
| 8.53 | 10 | | | 7.862E-03 | 8.927E-04 | 1.913E-03 | 286.39 |
| 30.11.88 | 55 | | | 1.713E-02 | 1.333E-02 | 1.592E-02 | 926 |
| 8.53 | 30 | | | | | | 286.39 |
| 30.11.88 | 55 | | | | | | 926 |
| 8.53 | 20 | 3.555E-02 | 1.055E-02 | | | | 286.39 |
| 1.12.88 | 52 | | 9.691E-04 | | | | 927 |
| 8.47 | 10 | | | | | | 287.39 |
| 1.12.88 | 55 | | | | | | 927 |
| 8.53 | 10 | | | 7.618E-03 | 7.308E-04 | 2.281E-03 | 287.39 |
| 1.12.88 | 55 | | | 1.503E-02 | 1.213E-02 | 1.496E-02 | 927 |
| 8.53 | 30 | | | | | | 287.39 |
| 1.12.88 | 55 | | | | | | 927 |
| 8.53 | 20 | 3.698E-02 | 1.065E-02 | | | | 287.33 |
| 2.12.88 | 52 | | 8.770E-04 | | | | 926 |
| 9. 9 | 10 | | | | | | 288.41 |
| 2.12.88 | 55 | | | | | | 926 |
| 9.13 | 10 | | | 7.757E-03 | | 2.074E-03 | 288.41 |
| 2.12.88 | 55 | | | 1.598E-02 | 1.294E-02 | 1.559E-02 | 926 |
| 9.13 | 30 | | | | | | 288.41 |
| 2.12.88 | 55 | | | | | | 926 |
| 9.13 | 20 | 4.565E-02 | 1.194E-02 | | | | 288.41 |
| 4.12.88 | 52 | | 9.007E-04 | | | | 922 |
| 9.49 | 10 | | | | | | 290.43 |
| 4.12.88 | 55 | | | | | | 922 |
| 9.49 | 10 | | | | | 3.056E-03 | 290.43 |
| 4.12.88 | 55 | | | 1.462E-02 | 1.214E-02 | 1.385E-02 | 922 |
| 9.49 | 30 | | | | | | 290.43 |
| 4.12.88 | 55 | | | | | | 922 |
| 9.49 | 20 | 3.563E-02 | 1.061E-02 | | | | 290.43 |
| 5.12.88 | 52 | | 8.779E-04 | | | | 921 |
| 13.46 | 10 | | | | | | 291.6 |
| 5.12.88 | 55 | | | | | | 921 |
| 13.5 | 10 | | | 8.318E-03 | 6.087E-04 | 2.252E-03 | 291.6 |
| 5.12.88 | 55 | | | 1.674E-02 | 1.311E-02 | 1.715E-02 | 921 |
| 13.5 | 30 | | | | | | 291.6 |
| 5.12.88 | 55 | | | | | | 921 |
| 13.5 | 20 | 4.649E-02 | 1.225E-02 | | | | 291.6 |
| 6.12.88 | 52 | | 6.853E-04 | | | | 921 |
| 8.55 | 10 | | | | | | 292.4 |
| 6.12.88 | 55 | | | | | | 921 |
| 8.58 | 10 | | | 8.747E-03 | 6.685E-04 | 2.289E-03 | 292.4 |
| 6.12.88 | 55 | | | 1.596E-02 | 1.228E-02 | 1.524E-02 | 921 |
| 8.58 | 30 | | | | | | 292.4 |
| 6.12.88 | 55 | | | | | | 921 |
| 8.58 | 20 | 3.593E-02 | 1.142E-02 | | | | 292.4 |
| 7.12.88 | 52 | | 1.026E-03 | | | | 920 |
| 9.33 | 10 | | | | | | 293.42 |

Table 6.4.53. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 88.10 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 7.12.88 | 55 | | | | | | 920 |
| 9.35 | 10 | | | 7.988E-03 | 9.187E-04 | 2.023E-03 | 293.42 |
| 7.12.88 | 55 | | | 1.574E-02 | 1.248E-02 | 1.523E-02 | 920 |
| 9.35 | 30 | | | | | | 293.42 |
| 7.12.88 | 55 | | | | | | 920 |
| 9.35 | 20 | 3.711E-02 | 1.100E-02 | | | | 293.42 |
| 8.12.88 | 52 | | 8.910E-04 | | | | 919 |
| 8.53 | 10 | | | | | | 294.4 |
| 8.12.88 | 55 | | | | | | 919 |
| 8.55 | 10 | | | 7.953E-03 | 7.679E-04 | 2.012E-03 | 294.4 |
| 8.12.88 | 55 | | | 1.344E-02 | 1.158E-02 | 1.401E-02 | 919 |
| 8.55 | 30 | | | | | | 294.4 |
| 8.12.88 | 55 | | | | | | 919 |
| 8.55 | 20 | 3.335E-02 | 1.027E-02 | | | | 294.4 |
| 9.12.88 | 52 | | 1.138E-03 | | | | 918 |
| 9. 4 | 10 | | | | | | 295.4 |
| 9.12.88 | 55 | | | | | | 918 |
| 9. 6 | 10 | | | 8.032E-03 | 7.292E-04 | 1.979E-03 | 295.4 |
| 9.12.88 | 55 | | | 1.214E-02 | 1.022E-02 | 1.296E-02 | 918 |
| 9. 6 | 30 | | | | | | 295.4 |
| 9.12.88 | 55 | | | | | | 918 |
| 9. 6 | 20 | 3.605E-02 | 1.014E-02 | | | | 295.4 |
| 10.12.88 | 55 | | | | | | 803 |
| 9. 2 | 10 | | | 6.996E-03 | | 1.340E-03 | 296.39 |
| 10.12.88 | 55 | | | | | | 803 |
| 9. 2 | 20 | | 7.581E-03 | | | | 296.39 |
| 11.12.88 | 52 | | 1.057E-03 | | | | 913 |
| 8.38 | 10 | | | | | | 297.38 |
| 11.12.88 | 55 | | | | | | 913 |
| 8.46 | 10 | | | 7.014E-03 | 6.773E-04 | 1.696E-03 | 297.38 |
| 11.12.88 | 55 | | | 1.160E-02 | 9.011E-03 | 1.175E-02 | 913 |
| 8.46 | 30 | | | | | | 297.38 |
| 11.12.88 | 55 | | | | | | 913 |
| 8.46 | 20 | 3.017E-02 | 8.379E-03 | | | | 297.38 |
| 12.12.88 | 52 | | 1.103E-03 | | | | 913 |
| 8.17 | 10 | | | | | | 298.37 |
| 12.12.88 | 55 | | | | | | 913 |
| 8.2 | 10 | | | 7.218E-03 | 7.104E-04 | 1.804E-03 | 298.37 |
| 12.12.88 | 55 | | | 1.030E-02 | 8.778E-03 | 1.143E-02 | 913 |
| 8.2 | 30 | | | | | | 298.37 |
| 12.12.88 | 55 | | | | | | 913 |
| 8.2 | 20 | 3.530E-02 | 8.444E-03 | | | | 298.37 |
| 13.12.88 | 55 | | | | | | 19 |
| 5. 0 | 20 | | | | | | 298.95 |

Table 6.4.54. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 88.11 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 16.12.88 | 52 | | | | | | 764 |
| 16.54 | 10 | | | | | | 298.95 |
| 16.12.88 | 52 | | 7.505E-04 | | | | 764 |
| 16.54 | 10 | | | 5.106E-03 | 6.533E-04 | 1.640E-03 | 300.3 |
| 16.12.88 | 55 | | | | | | 764 |
| 16.54 | 10 | | | 5.412E-03 | 6.794E-04 | 1.701E-03 | 300.3 |
| 16.12.88 | 53 | | | | | | 764 |
| 16.54 | 10 | | | | | | 300.3 |
| 16.12.88 | 52 | | | | | | 764 |
| 16.54 | 10 | | | | | | 300.3 |
| 17.12.88 | 52 | | 6.712E-04 | | | | 766 |
| 19.47 | 10 | | | 5.040E-03 | 5.764E-04 | 1.322E-03 | 301.15 |
| 17.12.88 | 55 | | | | | | 766 |
| 19.47 | 10 | | | 5.717E-03 | 5.463E-04 | 1.814E-03 | 301.15 |
| 17.12.88 | 53 | | | | | | 766 |
| 19.47 | 10 | | | | | | 301.15 |
| 17.12.88 | 55 | | | | | | 766 |
| 19.47 | 20 | 1.516E-02 | 6.881E-03 | | | | 301.15 |
| 18.12.88 | 52 | | 7.518E-04 | | | | 770 |
| 17.2 | 10 | | | 5.627E-03 | 7.050E-04 | 1.605E-03 | 302.03 |
| 18.12.88 | 55 | | | | | | 770 |
| 17.2 | 10 | | | 5.909E-03 | 5.835E-04 | 1.747E-03 | 302.03 |
| 18.12.88 | 55 | | | 6.869E-03 | 5.003E-03 | 7.822E-03 | 770 |
| 17.2 | 30 | | | | | | 302.03 |
| 18.12.88 | 55 | | | | | | 770 |
| 17.2 | 20 | 1.772E-02 | 7.018E-03 | | | | 302.03 |
| 19.12.88 | 52 | | 8.459E-04 | | | | 771 |
| 16.18 | 10 | | | 5.593E-03 | 6.864E-04 | 1.540E-03 | 303.01 |
| 19.12.88 | 55 | | | | | | 771 |
| 16.24 | 10 | | | 5.922E-03 | 7.265E-04 | 1.774E-03 | 303.01 |
| 19.12.88 | 55 | | | 6.989E-03 | 5.176E-03 | 7.425E-03 | 771 |
| 16.24 | 30 | | | | | | 303.01 |
| 19.12.88 | 55 | | | | | | 771 |
| 16.24 | 20 | 1.860E-02 | 6.690E-03 | | | | 303.01 |
| 20.12.88 | 52 | | 8.080E-04 | | | | 770 |
| 16.58 | 10 | | | 5.201E-03 | 6.848E-04 | 1.440E-03 | 304.02 |
| 20.12.88 | 55 | | | | | | 770 |
| 16.58 | 10 | | | 5.919E-03 | 7.320E-04 | 1.713E-03 | 304.02 |
| 20.12.88 | 55 | | | 6.356E-03 | 4.659E-03 | 7.218E-03 | 770 |
| 16.58 | 30 | | | | | | 304.02 |
| 20.12.88 | 55 | | | | | | 770 |
| 16.58 | 20 | 1.805E-02 | 6.421E-03 | | | | 304.02 |
| 21.12.88 | 52 | | 8.632E-04 | | | | 767 |
| 16.55 | 10 | | | 4.802E-03 | 6.929E-04 | 1.374E-03 | 305.02 |
| 21.12.88 | 55 | | | | | | 767 |
| 16.55 | 10 | | | 5.803E-03 | 7.678E-04 | 1.680E-03 | 305.02 |
| 21.12.88 | 55 | | | 5.936E-03 | 4.516E-03 | 6.675E-03 | 767 |
| 16.55 | 30 | | | | | | 305.02 |
| 21.12.88 | 55 | | | | | | 767 |
| 16.55 | 20 | 1.795E-02 | 6.141E-03 | | | | 305.02 |
| 22.12.88 | 52 | | 7.930E-04 | | | | 768 |
| 16.5 | 10 | | | 4.649E-03 | 6.547E-04 | 1.243E-03 | 306.04 |

Table 6.4.54. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 88.11 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 22.12.88 | 55 | | | | | | 768 |
| 16.5 | 10 | | | 4.507E-03 | | 1.194E-03 | 306.04 |
| 22.12.88 | 55 | | | 5.510E-03 | 4.538E-03 | 6.603E-03 | 768 |
| 16.5 | 30 | | | | | | 306.04 |
| 22.12.88 | 55 | | | | | | 768 |
| 16.5 | 20 | 1.878E-02 | 5.955E-03 | | | | 306.04 |
| 23.12.88 | 52 | | 8.223E-04 | | | | 767 |
| 16.5 | 10 | | | 4.544E-03 | 6.643E-04 | 1.320E-03 | 307.04 |
| 23.12.88 | 55 | | | | | | 767 |
| 16.55 | 10 | | | 5.282E-03 | 7.946E-04 | 1.539E-03 | 307.04 |
| 23.12.88 | 55 | | | 5.421E-03 | 4.005E-03 | 6.055E-03 | 767 |
| 16.55 | 30 | | | | | | 307.04 |
| 23.12.88 | 55 | | | | | | 767 |
| 16.55 | 20 | 1.773E-02 | 5.676E-03 | | | | 307.04 |
| 24.12.88 | 52 | | 5.561E-04 | | | | 766 |
| 16.39 | 10 | | | 4.413E-03 | 4.760E-04 | 1.312E-03 | 308.05 |
| 24.12.88 | 55 | | | | | | 766 |
| 16.43 | 10 | | | 4.748E-03 | 4.817E-04 | 1.419E-03 | 308.04 |
| 24.12.88 | 55 | | | 5.251E-03 | 3.901E-03 | 5.906E-03 | 766 |
| 16.43 | 30 | | | | | | 308.04 |
| 24.12.88 | 55 | | | | | | 766 |
| 16.43 | 20 | 1.729E-02 | 5.407E-03 | | | | 308.04 |
| 25.12.88 | 52 | | 8.444E-04 | | | | 767 |
| 16.3 | 10 | | | 4.674E-03 | 5.533E-04 | 1.303E-03 | 309.05 |
| 25.12.88 | 55 | | | | | | 767 |
| 16.35 | 10 | | | 4.468E-03 | | 1.313E-03 | 309.05 |
| 25.12.88 | 55 | | | 5.024E-03 | 4.317E-03 | 6.236E-03 | 767 |
| 16.35 | 30 | | | | | | 309.05 |
| 25.12.88 | 55 | | | | | | 767 |
| 16.35 | 20 | 1.782E-02 | 5.546E-03 | | | | 309.05 |
| 26.12.88 | 52 | | 8.315E-04 | | | | 765 |
| 16.36 | 10 | | | 5.166E-03 | 6.683E-04 | 1.357E-03 | 310.05 |
| 26.12.88 | 55 | | | | | | 765 |
| 16.38 | 10 | | | 5.243E-03 | 6.829E-04 | 1.552E-03 | 310.05 |
| 26.12.88 | 55 | | | 5.448E-03 | 4.157E-03 | 5.671E-03 | 765 |
| 16.38 | 30 | | | | | | 310.05 |
| 26.12.88 | 55 | | | | | | 765 |
| 16.38 | 20 | 1.816E-02 | 5.547E-03 | | | | 310.05 |
| 27.12.88 | 52 | | 7.730E-04 | | | | 765 |
| 16.38 | 10 | | | 4.917E-03 | 6.354E-04 | 1.334E-03 | 311.05 |
| 27.12.88 | 55 | | | | | | 765 |
| 16.4 | 10 | | | 5.187E-03 | 6.674E-04 | 1.509E-03 | 311.05 |
| 27.12.88 | 55 | | | 5.329E-03 | 4.040E-03 | 5.983E-03 | 765 |
| 16.4 | 30 | | | | | | 311.05 |
| 27.12.88 | 55 | | | | | | 765 |
| 16.4 | 20 | 1.752E-02 | 4.719E-03 | | | | 311.05 |
| 28.12.88 | 52 | | 8.107E-04 | | | | 766 |
| 16.39 | 10 | | | 4.901E-03 | 6.447E-04 | 1.282E-03 | 312.05 |
| 28.12.88 | 55 | | | | | | 766 |
| 16.44 | 10 | | | 5.229E-03 | 7.142E-04 | 1.497E-03 | 312.05 |
| 28.12.88 | 55 | | | 5.685E-03 | 4.288E-03 | 6.015E-03 | 766 |
| 16.44 | 30 | | | | | | 312.05 |

Table 6.4.54. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 88.11 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 28.12.88 | 55 | | | | | | 766 |
| 16.44 | 20 | 1.817E-02 | 5.498E-03 | | | | 312.05 |
| 29.12.88 | 52 | | 8.297E-04 | | | | 766 |
| 17.15 | 10 | | | 5.133E-03 | 6.545E-04 | 1.366E-03 | 313.06 |
| 29.12.88 | 55 | | | | | | 766 |
| 17.2 | 10 | | | 5.331E-03 | 6.901E-04 | 1.554E-03 | 313.06 |
| 29.12.88 | 55 | | | 5.442E-03 | 3.784E-03 | 6.050E-03 | 766 |
| 17.2 | 30 | | | | | | 313.06 |
| 29.12.88 | 55 | | | | | | 766 |
| 17.2 | 20 | 1.827E-02 | 5.594E-03 | | | | 313.06 |
| 30.12.88 | 52 | | 7.651E-04 | | | | 763 |
| 16.54 | 10 | | | 4.615E-03 | 6.363E-04 | 1.298E-03 | 314.06 |
| 30.12.88 | 55 | | | | | | 763 |
| 16.57 | 10 | | | 5.211E-03 | 6.823E-04 | 1.489E-03 | 314.06 |
| 30.12.88 | 55 | | | 5.591E-03 | 3.976E-03 | 5.965E-03 | 763 |
| 16.57 | 30 | | | | | | 314.06 |
| 30.12.88 | 55 | | | | | | 763 |
| 16.57 | 20 | 1.895E-02 | 5.522E-03 | | | | 314.06 |
| 31.12.88 | 52 | | 7.043E-04 | | | | 762 |
| 16.2 | 10 | | | 4.849E-03 | 5.889E-04 | 1.452E-03 | 315.07 |
| 31.12.88 | 55 | | | | | | 762 |
| 16.22 | 10 | | | 5.703E-03 | 6.728E-04 | 1.581E-03 | 315.07 |
| 31.12.88 | 55 | | | 5.770E-03 | 4.305E-03 | 6.498E-03 | 762 |
| 16.22 | 30 | | | | | | 315.07 |
| 31.12.88 | 55 | | | | | | 762 |
| 16.22 | 20 | 2.049E-02 | 6.019E-03 | | | | 315.07 |
| 1. 1.89 | 52 | | 6.514E-04 | | | | 762 |
| 16.55 | 10 | | | 4.909E-03 | 5.595E-04 | 1.372E-03 | 316.08 |
| 1. 1.89 | 55 | | | | | | 762 |
| 16.59 | 10 | | | 5.476E-03 | 6.542E-04 | 1.488E-03 | 316.08 |
| 1. 1.89 | 55 | | | 5.665E-03 | 4.667E-03 | 6.575E-03 | 762 |
| 16.59 | 30 | | | | | | 316.08 |
| 1. 1.89 | 55 | | | | | | 762 |
| 16.59 | 20 | 2.029E-02 | 6.072E-03 | | | | 316.08 |
| 2. 1.89 | 52 | | 6.526E-04 | | | | 760 |
| 17.23 | 10 | | | 5.014E-03 | 5.732E-04 | 1.422E-03 | 317.09 |
| 2. 1.89 | 55 | | | | | | 760 |
| 17.25 | 10 | | | 5.485E-03 | 5.675E-04 | 1.584E-03 | 317.09 |
| 2. 1.89 | 55 | | | 5.641E-03 | 4.468E-03 | 6.384E-03 | 760 |
| 17.25 | 30 | | | | | | 317.09 |
| 2. 1.89 | 55 | | | | | | 760 |
| 17.25 | 20 | 2.010E-02 | 6.008E-03 | | | | 317.09 |
| 3. 1.89 | 52 | | 5.536E-04 | | | | 760 |
| 16.55 | 10 | | | 4.867E-03 | 5.046E-04 | 1.327E-03 | 318.1 |
| 3. 1.89 | 55 | | | | | | 760 |
| 16.57 | 10 | | | 5.324E-03 | 4.858E-04 | 1.504E-03 | 318.1 |
| 3. 1.89 | 55 | | | 6.145E-03 | 4.135E-03 | 6.323E-03 | 760 |
| 16.57 | 30 | | | | | | 318.1 |
| 3. 1.89 | 55 | | | | | | 760 |
| 16.57 | 20 | 2.079E-02 | 6.247E-03 | | | | 318.1 |
| 4. 1.89 | 52 | | 4.790E-04 | | | | 757 |
| 16.33 | 10 | | | 5.432E-03 | 4.846E-04 | 1.506E-03 | 319.11 |

Table 6.4.54. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 88.11 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 4. 1.89 | 55 | | | | | | 757 |
| 16.33 | 10 | | | 5.845E-03 | 3.953E-04 | 1.624E-03 | 319.11 |
| 4. 1.89 | 55 | | | 6.216E-03 | 4.551E-03 | 7.059E-03 | 757 |
| 16.33 | 30 | | | | | | 319.11 |
| 4. 1.89 | 55 | | | | | | 757 |
| 16.33 | 20 | 2.331E-02 | 6.848E-03 | | | | 319.11 |
| 5. 1.89 | 52 | | 5.049E-04 | | | | 757 |
| 15.59 | 10 | | | 5.164E-03 | 4.548E-04 | 1.511E-03 | 320.12 |
| 5. 1.89 | 55 | | | | | | 757 |
| 16. 1 | 10 | | | 5.836E-03 | 6.196E-04 | 1.656E-03 | 320.12 |
| 5. 1.89 | 55 | | | 6.441E-03 | 4.625E-03 | 7.116E-03 | 757 |
| 16. 1 | 30 | | | | | | 320.12 |
| 5. 1.89 | 55 | | | | | | 757 |
| 16. 1 | 20 | 2.347E-02 | 6.996E-03 | | | | 320.12 |
| 6. 1.89 | 55 | | | | | | 35 |
| 4. 0 | 20 | | | | | | 320.5 |
| --- | --- | | | | | | |

Table 6.4.55. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 89.01 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 18. 1.89 | 52 | | | | | | 765 |
| 0.45 | 10 | | | | | | 320.35 |
| 18. 1.89 | 52 | | 7.690E-04 | | | | 765 |
| 0.45 | 10 | | | | | | 321.85 |
| 18. 1.89 | 55 | | | | | | 765 |
| 0.48 | 10 | | | 5.540E-03 | 6.405E-04 | 1.519E-03 | 321.85 |
| 18. 1.89 | 55 | | | 5.301E-03 | 4.019E-03 | 5.928E-03 | 765 |
| 0.48 | 30 | | | | | | 321.85 |
| 18. 1.89 | 55 | | | | | | 765 |
| 0.48 | 20 | 9.633E-03 | 5.751E-03 | | | | 321.85 |
| 19. 1.89 | 52 | | 8.650E-04 | | | | 766 |
| 0.38 | 10 | | | | | | 322.83 |
| 19. 1.89 | 55 | | | | | | 766 |
| 0.4 | 10 | | | 5.534E-03 | 8.042E-04 | 1.522E-03 | 322.83 |
| 19. 1.89 | 55 | | | 5.222E-03 | 4.164E-03 | 6.034E-03 | 766 |
| 0.4 | 30 | | | | | | 322.83 |
| 19. 1.89 | 55 | | | | | | 766 |
| 0.4 | 20 | 1.182E-02 | 5.763E-03 | | | | 322.83 |
| 19. 1.89 | 52 | | 7.400E-04 | | | | 766 |
| 8.3 | 10 | | | | | | 323.15 |
| 19. 1.89 | 55 | | | | | | 766 |
| 8.36 | 10 | | | 5.874E-03 | 7.595E-04 | 1.560E-03 | 323.15 |
| 19. 1.89 | 55 | | | 5.556E-03 | 4.150E-03 | 6.321E-03 | 766 |
| 8.36 | 30 | | | | | | 323.15 |
| 19. 1.89 | 55 | | | | | | 766 |
| 8.36 | 20 | 1.388E-02 | 6.136E-03 | | | | 323.15 |
| 19. 1.89 | 52 | | 8.902E-04 | | | | 766 |
| 16.4 | 10 | | | | | | 323.47 |
| 19. 1.89 | 55 | | | | | | 766 |
| 16.4 | 10 | | | 6.048E-03 | 8.389E-04 | 1.681E-03 | 323.47 |
| 19. 1.89 | 55 | | | 6.293E-03 | 4.673E-03 | 7.172E-03 | 766 |
| 16.4 | 30 | | | | | | 323.47 |
| 19. 1.89 | 55 | | | | | | 766 |
| 16.4 | 20 | 1.617E-02 | 6.381E-03 | | | | 323.47 |
| 20. 1.89 | 52 | | 9.105E-04 | | | | 764 |
| 0.4 | 10 | | | | | | 323.83 |
| 20. 1.89 | 55 | | | | | | 764 |
| 0.43 | 10 | | | 6.592E-03 | 8.410E-04 | 1.813E-03 | 323.83 |
| 20. 1.89 | 55 | | | 7.447E-03 | 5.084E-03 | 7.945E-03 | 764 |
| 0.43 | 30 | | | | | | 323.83 |
| 20. 1.89 | 55 | | | | | | 764 |
| 0.43 | 20 | 1.739E-02 | 7.169E-03 | | | | 323.83 |
| 21. 1.89 | 52 | | 9.572E-04 | | | | 765 |
| 0.35 | 10 | | | | | | 324.83 |
| 21. 1.89 | 55 | | | | | | 765 |
| 0.38 | 10 | | | 6.883E-03 | 7.500E-04 | 1.918E-03 | 324.83 |
| 21. 1.89 | 55 | | | | 6.077E-03 | 7.456E-03 | 765 |
| 0.38 | 30 | | | | | | 324.83 |
| 21. 1.89 | 55 | | | | | | 765 |
| 0.38 | 20 | 1.903E-02 | 7.576E-03 | | | | 324.83 |
| 22. 1.89 | 52 | | 9.875E-04 | | | | 763 |
| 0.3 | 10 | | | | | | 325.83 |

Table 6.4.55. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 89.01 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 22. 1.89 | 55 | | | | | | 763 |
| 0.33 | 10 | | | 6.862E-03 | 7.131E-04 | 1.752E-03 | 325.83 |
| 22. 1.89 | 55 | | | 7.228E-03 | 5.357E-03 | 8.221E-03 | 763 |
| 0.33 | 30 | | | | | | 325.83 |
| 22. 1.89 | 55 | | | | | | 763 |
| 0.33 | 20 | 2.063E-02 | 7.625E-03 | | | | 325.83 |
| 23. 1.89 | 52 | | 9.503E-04 | | | | 764 |
| 0.35 | 10 | | | | | | 326.83 |
| 23. 1.89 | 55 | | | | | | 764 |
| 0.38 | 10 | | | 6.955E-03 | 8.164E-04 | 2.037E-03 | 326.83 |
| 23. 1.89 | 55 | | | 8.268E-03 | 6.108E-03 | 8.454E-03 | 764 |
| 0.38 | 30 | | | | | | 326.83 |
| 23. 1.89 | 55 | | | | | | 764 |
| 0.38 | 20 | 2.177E-02 | 7.705E-03 | | | | 326.83 |
| 23. 1.89 | 52 | | 9.975E-04 | | | | 765 |
| 16.3 | 10 | | | | | | 327.5 |
| 23. 1.89 | 55 | | | | | | 765 |
| 16.33 | 10 | | | 7.659E-03 | 9.520E-04 | 2.195E-03 | 327.5 |
| 23. 1.89 | 55 | | | 9.660E-03 | 6.471E-03 | 9.834E-03 | 765 |
| 16.33 | 30 | | | | | | 327.5 |
| 23. 1.89 | 55 | | | | | | 765 |
| 16.33 | 20 | 3.457E-02 | 8.513E-03 | | | | 327.5 |
| 23. 1.89 | 52 | | 1.089E-03 | | | | 765 |
| 20. 5 | 10 | | | | | | 327.8 |
| 23. 1.89 | 55 | | | | | | 765 |
| 20. 8 | 10 | | | 7.837E-03 | 7.893E-04 | 2.214E-03 | 327.8 |
| 23. 1.89 | 55 | | | 9.885E-03 | 6.663E-03 | 1.027E-02 | 765 |
| 20. 8 | 30 | | | | | | 327.8 |
| 23. 1.89 | 55 | | | | | | 765 |
| 20. 8 | 20 | 4.490E-02 | 9.385E-03 | | | | 327.8 |
| 24. 1.89 | 52 | | 9.244E-04 | | | | 765 |
| 1. 0 | 10 | | | | | | 328 |
| 24. 1.89 | 55 | | | 1.069E-02 | 7.243E-03 | 1.118E-02 | 765 |
| 1. 7 | 30 | | | | | | 328 |
| 24. 1.89 | 55 | | | | | | 765 |
| 1. 7 | 20 | 4.953E-02 | 1.009E-02 | | | | 328 |
| 24. 1.89 | 52 | | 1.074E-03 | | | | 765 |
| 4.1 | 10 | | | | | | 328.2 |
| 24. 1.89 | 55 | | | | | | 765 |
| 4.2 | 10 | | | 6.906E-03 | 8.981E-04 | 2.201E-03 | 328.2 |
| 24. 1.89 | 55 | | | 8.229E-03 | 6.136E-03 | 8.376E-03 | 765 |
| 4.2 | 30 | | | | | | 328.2 |
| 24. 1.89 | 55 | | | | | | 765 |
| 4.2 | 20 | 3.668E-02 | 7.808E-03 | | | | 328.2 |
| 24. 1.89 | 52 | | 1.061E-03 | | | | 765 |
| 8. 9 | 10 | | | | | | 328.36 |
| 24. 1.89 | 55 | | | | | | 765 |
| 8.12 | 10 | | | 9.598E-03 | 1.318E-03 | 3.132E-03 | 328.36 |
| 24. 1.89 | 55 | | | 1.266E-02 | 8.495E-03 | 1.314E-02 | 765 |
| 8.12 | 30 | | | | | | 328.36 |
| 24. 1.89 | 55 | | | | | | 765 |
| 8.12 | 20 | 5.679E-02 | 1.207E-02 | | | | 328.36 |

Table 6.4.55. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 89.01 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 25. 1.89 | 52 | | 1.166E-03 | | | | 764 |
| 9.2 | 10 | | | | | | 329.36 |
| 25. 1.89 | 55 | | | | | | 764 |
| 9.22 | 10 | | | 9.293E-03 | 9.049E-04 | 2.936E-03 | 329.36 |
| 25. 1.89 | 55 | | | 1.105E-02 | 9.298E-03 | 1.161E-02 | 764 |
| 9.22 | 30 | | | | | | 329.36 |
| 25. 1.89 | 55 | | | | | | 764 |
| 9.22 | 20 | 4.828E-02 | 1.167E-02 | | | | 329.36 |
| 26. 1.89 | 52 | | 1.275E-03 | | | | 763 |
| 8.44 | 10 | | | | | | 330.36 |
| 26. 1.89 | 55 | | | | | | 763 |
| 8.47 | 10 | | | 9.949E-03 | 1.079E-03 | 3.208E-03 | 330.36 |
| 26. 1.89 | 55 | | | 1.167E-02 | 9.216E-03 | 1.170E-02 | 763 |
| 8.47 | 30 | | | | | | 330.36 |
| 26. 1.89 | 55 | | | | | | 763 |
| 8.47 | 20 | 4.493E-02 | 1.181E-02 | | | | 330.36 |
| 27. 1.89 | 55 | | | | | | 763 |
| 1.15 | 10 | | | 9.449E-03 | 1.089E-03 | 3.116E-03 | 330.99 |
| 27. 1.89 | 55 | | | 1.249E-02 | 8.926E-03 | 1.255E-02 | 763 |
| 1.15 | 30 | | | | | | 330.99 |
| 27. 1.89 | 55 | | | | | | 763 |
| 1.15 | 20 | 4.839E-02 | 1.295E-02 | | | | 330.99 |
| 27. 1.89 | 52 | | 8.065E-04 | | | | 764 |
| 9.3 | 10 | | | | | | 331.31 |
| 27. 1.89 | 55 | | | | | | 764 |
| 9.33 | 10 | | | 9.288E-03 | 1.385E-03 | 3.044E-03 | 331.31 |
| 27. 1.89 | 55 | | | 1.264E-02 | 9.323E-03 | 1.261E-02 | 764 |
| 9.33 | 30 | | | | | | 331.31 |
| 27. 1.89 | 55 | | | | | | 764 |
| 9.33 | 20 | 4.713E-02 | 1.262E-02 | | | | 331.31 |
| 27. 1.89 | 52 | | 1.051E-03 | | | | 763 |
| 16.3 | 10 | | | | | | 331.63 |
| 27. 1.89 | 55 | | | | | | 763 |
| 16.32 | 10 | | | 5.205E-03 | 7.138E-04 | 1.772E-03 | 331.63 |
| 27. 1.89 | 55 | | | 1.226E-02 | 9.159E-03 | 1.171E-02 | 763 |
| 16.32 | 30 | | | | | | 331.63 |
| 27. 1.89 | 55 | | | | | | 763 |
| 16.32 | 20 | 5.020E-02 | 1.249E-02 | | | | 331.63 |
| 27. 1.89 | 52 | | 1.081E-03 | | | | 762 |
| 20.23 | 10 | | | | | | 331.81 |
| 27. 1.89 | 55 | | | | | | 762 |
| 20.25 | 10 | | | 9.820E-03 | 1.111E-03 | 3.172E-03 | 331.81 |
| 27. 1.89 | 55 | | | 1.276E-02 | 1.006E-02 | 1.225E-02 | 762 |
| 20.25 | 30 | | | | | | 331.81 |
| 27. 1.89 | 55 | | | | | | 762 |
| 20.25 | 20 | 5.094E-02 | 1.329E-02 | | | | 331.81 |
| 28. 1.89 | 52 | | 1.109E-03 | | | | 762 |
| 0.4 | 10 | | | | | | 331.98 |
| 28. 1.89 | 55 | | | | | | 762 |
| 0.4 | 10 | | | 9.439E-03 | 8.017E-04 | 3.146E-03 | 331.98 |
| 28. 1.89 | 55 | | | 1.211E-02 | 9.268E-03 | 1.151E-02 | 762 |
| 0.4 | 30 | | | | | | 331.98 |

Table 6.4.55. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 89.01 | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 28. 1.89 | 55 | | | | | | 762 |
| 0.4 | 20 | 5.506E-02 | 1.350E-02 | | | | 331.98 |
| 28. 1.89 | 55 | | | | | | 762 |
| 3.35 | 10 | | | 9.907E-03 | 9.142E-04 | 3.192E-03 | 332.11 |
| 28. 1.89 | 55 | | | | | | 762 |
| 3.35 | 20 | 5.747E-02 | 1.371E-02 | | | | 332.11 |
| 28. 1.89 | 52 | | 8.991E-04 | | | | 762 |
| 8.45 | 10 | | | | | | 332.27 |
| 28. 1.89 | 55 | | | | | | 762 |
| 8.48 | 10 | | | 8.847E-03 | 1.019E-03 | 3.159E-03 | 332.27 |
| 28. 1.89 | 55 | | | 1.253E-02 | 1.018E-02 | 1.247E-02 | 762 |
| 8.48 | 30 | | | | | | 332.27 |
| 28. 1.89 | 55 | | | | | | 762 |
| 8.48 | 20 | 5.267E-02 | 1.307E-02 | | | | 332.27 |
| 28. 1.89 | 52 | | 1.143E-03 | | | | 762 |
| 12.38 | 10 | | | | | | 332.42 |
| 28. 1.89 | 55 | | | 1.258E-02 | 8.914E-03 | 1.224E-02 | 762 |
| 12.42 | 30 | | | | | | 332.42 |
| 28. 1.89 | 55 | | | | | | 762 |
| 12.42 | 20 | 5.312E-02 | 1.293E-02 | | | | 332.42 |
| 30. 1.89 | 52 | | 7.492E-04 | | | | 762 |
| 9.3 | 10 | | | | | | 334.3 |
| 30. 1.89 | 55 | | | 1.193E-02 | 8.563E-03 | 1.154E-02 | 762 |
| 9.35 | 30 | | | | | | 334.3 |
| 30. 1.89 | 55 | | | | | | 762 |
| 9.35 | 20 | 5.305E-02 | | | | | 334.3 |
| 31. 1.89 | 52 | | 9.002E-04 | | | | 758 |
| 8.45 | 10 | | | | | | 335.26 |
| 31. 1.89 | 55 | | | | | | 758 |
| 8.48 | 10 | | | 9.539E-03 | 8.580E-04 | 3.160E-03 | 335.26 |
| 31. 1.89 | 55 | | | 1.235E-02 | 1.013E-02 | 1.216E-02 | 758 |
| 8.48 | 30 | | | | | | 335.26 |
| 31. 1.89 | 55 | | | | | | 758 |
| 8.48 | 20 | 5.561E-02 | 1.338E-02 | | | | 335.26 |
| 31. 1.89 | 52 | | 1.175E-03 | | | | 759 |
| 16. 0 | 10 | | | | | | 335.54 |
| 31. 1.89 | 55 | | | | | | 759 |
| 16. 2 | 10 | | | 1.060E-02 | 1.237E-03 | 3.429E-03 | 335.54 |
| 31. 1.89 | 55 | | | 1.156E-02 | 9.175E-03 | 1.143E-02 | 759 |
| 16. 2 | 30 | | | | | | 335.54 |
| 31. 1.89 | 55 | | | | | | 759 |
| 16. 2 | 20 | 3.997E-02 | 1.211E-02 | | | | 335.54 |
| 31. 1.89 | 52 | | 1.163E-03 | | | | 760 |
| 19.5 | 10 | | | | | | 335.6 |
| 31. 1.89 | 55 | | | | | | 760 |
| 19.52 | 10 | | | 9.617E-03 | 1.011E-03 | 3.061E-03 | 335.6 |
| 31. 1.89 | 55 | | | 1.100E-02 | 8.707E-03 | 1.081E-02 | 760 |
| 19.52 | 30 | | | | | | 335.6 |
| 31. 1.89 | 55 | | | | | | 760 |
| 19.52 | 20 | 3.579E-02 | 1.170E-02 | | | | 335.6 |
| 1. 2.89 | 52 | | 1.085E-03 | | | | 758 |
| 0.15 | 10 | | | | | | 335.76 |

Table 6.4.55. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 89.01 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 1. 2.89 | 55 | | | | | | 758 |
| 0.2 | 10 | | | 8.813E-03 | 9.627E-04 | 2.714E-03 | 335.76 |
| 1. 2.89 | 55 | | | 1.053E-02 | 7.585E-03 | 1.007E-02 | 758 |
| 0.2 | 30 | | | | | | 335.76 |
| 1. 2.89 | 55 | | | | | | 758 |
| 0.2 | 20 | 3.074E-02 | 1.111E-02 | | | | 335.76 |
| 1. 2.89 | 52 | | 1.177E-03 | | | | 757 |
| 4.1 | 10 | | | | | | 335.94 |
| 1. 2.89 | 55 | | | | | | 757 |
| 4.15 | 10 | | | 9.043E-03 | 9.340E-04 | 2.822E-03 | 335.94 |
| 1. 2.89 | 55 | | | 1.042E-02 | 8.310E-03 | 1.029E-02 | 757 |
| 4.15 | 30 | | | | | | 335.94 |
| 1. 2.89 | 55 | | | | | | 757 |
| 4.15 | 20 | 2.957E-02 | 1.062E-02 | | | | 335.94 |
| 1. 2.89 | 55 | | | | | | 758 |
| 8.55 | 10 | | | 9.000E-03 | 1.006E-03 | 2.958E-03 | 336.14 |
| 1. 2.89 | 55 | | | 1.094E-02 | 8.635E-03 | 1.067E-02 | 758 |
| 8.55 | 30 | | | | | | 336.14 |
| 1. 2.89 | 55 | | | | | | 758 |
| 8.55 | 20 | 2.955E-02 | 1.107E-02 | | | | 336.14 |
| 2. 2.89 | 52 | | 8.639E-04 | | | | 758 |
| 8.45 | 10 | | | | | | 337.14 |
| 2. 2.89 | 55 | | | | | | 758 |
| 8.5 | 10 | | | 8.537E-03 | 1.257E-03 | 2.680E-03 | 337.14 |
| 2. 2.89 | 55 | | | 1.075E-02 | 8.413E-03 | 1.064E-02 | 758 |
| 8.5 | 30 | | | | | | 337.14 |
| 2. 2.89 | 55 | | | | | | 758 |
| 8.5 | 20 | 2.996E-02 | 1.059E-02 | | | | 337.14 |
| 3. 2.89 | 52 | | 9.501E-04 | | | | 757 |
| 9.1 | 10 | | | | | | 338.11 |
| 3. 2.89 | 55 | | | | | | 757 |
| 9.13 | 10 | | | 7.320E-03 | 9.550E-04 | 2.173E-03 | 338.11 |
| 3. 2.89 | 55 | | | 8.428E-03 | 6.065E-03 | 8.483E-03 | 757 |
| 9.13 | 30 | | | | | | 338.11 |
| 3. 2.89 | 55 | | | | | | 757 |
| 9.13 | 20 | 2.133E-02 | 8.115E-03 | | | | 338.11 |
| 4. 2.89 | 52 | | 1.121E-03 | | | | 756 |
| 8.5 | 10 | | | | | | 339.11 |
| 4. 2.89 | 55 | | | | | | 756 |
| 8.52 | 10 | | | 7.292E-03 | 1.159E-03 | 2.173E-03 | 339.11 |
| 4. 2.89 | 55 | | | 7.580E-03 | 6.059E-03 | 8.257E-03 | 756 |
| 8.52 | 30 | | | | | | 339.11 |
| 4. 2.89 | 55 | | | | | | 756 |
| 8.52 | 20 | 2.110E-02 | 7.903E-03 | | | | 339.11 |
| 5. 2.89 | 52 | | 1.000E-03 | | | | 757 |
| 8.3 | 10 | | | | | | 340.11 |
| 5. 2.89 | 55 | | | | | | 757 |
| 8.32 | 10 | | | 7.008E-03 | 7.380E-04 | 2.132E-03 | 340.11 |
| 5. 2.89 | 55 | | | 7.419E-03 | 5.691E-03 | 8.351E-03 | 757 |
| 8.32 | 30 | | | | | | 340.11 |
| 5. 2.89 | 55 | | | | | | 757 |
| 8.32 | 20 | 2.154E-02 | 7.858E-03 | | | | 340.11 |

Table 6.4.55. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 89.01 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 6. 2.89 | 52 | | 9.460E-04 | | | | 756 |
| 8.35 | 10 | | | | | | 341.1 |
| 6. 2.89 | 55 | | | | | | 756 |
| 8.37 | 10 | | | 6.774E-03 | 8.329E-04 | 2.147E-03 | 341.1 |
| 6. 2.89 | 55 | | | 7.344E-03 | 6.116E-03 | 8.219E-03 | 756 |
| 8.37 | 30 | | | | | | 341.1 |
| 6. 2.89 | 55 | | | | | | 756 |
| 8.37 | 20 | 2.249E-02 | 7.806E-03 | | | | 341.1 |
| 7. 2.89 | 55 | | | | | | 32 |
| 3. 0 | 20 | | | | | | 341.31 |
| --- | --- | | | | | | |

Table 6.4.56. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 89.02 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 11. 2.89 | 52 | | 9.275E-04 | | | | 788 |
| 9.26 | 10 | | | | | | 341.43 |
| 11. 2.89 | 55 | | | | | | 788 |
| 9.29 | 10 | | | 5.615E-03 | 7.991E-04 | 1.788E-03 | 341.43 |
| 11. 2.89 | 55 | | | 6.966E-03 | 5.432E-03 | 7.346E-03 | 788 |
| 9.29 | 30 | | | | | | 341.43 |
| 11. 2.89 | 55 | | | | | | 788 |
| 9.29 | 20 | 1.100E-02 | 6.174E-03 | | | | 341.43 |
| 12. 2.89 | 52 | | 9.336E-04 | | | | 794 |
| 8.42 | 10 | | | | | | 342.43 |
| 12. 2.89 | 55 | | | | | | 794 |
| 8.45 | 10 | | | 5.684E-03 | 9.564E-04 | 1.708E-03 | 342.43 |
| 12. 2.89 | 55 | | | 6.669E-03 | 4.713E-03 | 7.126E-03 | 794 |
| 8.45 | 30 | | | | | | 342.43 |
| 12. 2.89 | 55 | | | | | | 794 |
| 8.45 | 20 | 1.325E-02 | 6.172E-03 | | | | 342.43 |
| 15. 2.89 | 52 | | 8.507E-04 | | | | 808 |
| 9.5 | 10 | | | | | | 344.54 |
| 15. 2.89 | 55 | | | | | | 808 |
| 9.5 | 10 | | | 4.867E-03 | 7.062E-04 | 1.553E-03 | 344.54 |
| 15. 2.89 | 55 | | | 6.249E-03 | 4.812E-03 | 6.934E-03 | 808 |
| 9.55 | 30 | | | | | | 344.54 |
| 15. 2.89 | 55 | | | | | | 808 |
| 9.55 | 20 | 9.940E-03 | 4.923E-03 | | | | 344.54 |
| 16. 2.89 | 52 | | 8.739E-04 | | | | 804 |
| 10.35 | 10 | | | | | | 345.54 |
| 16. 2.89 | 55 | | | | | | 804 |
| 10.39 | 10 | | | 6.291E-03 | 6.973E-04 | 1.735E-03 | 345.54 |
| 16. 2.89 | 55 | | | 7.113E-03 | 5.294E-03 | 7.881E-03 | 804 |
| 10.39 | 30 | | | | | | 345.54 |
| 16. 2.89 | 55 | | | | | | 804 |
| 10.39 | 20 | 1.433E-02 | 6.846E-03 | | | | 345.54 |
| 17. 2.89 | 52 | | 8.975E-04 | | | | 804 |
| 8.55 | 10 | | | | | | 346.5 |
| 17. 2.89 | 55 | | | | | | 804 |
| 9. 0 | 10 | | | 5.984E-03 | 8.116E-04 | 1.719E-03 | 346.5 |
| 17. 2.89 | 55 | | | 6.488E-03 | 5.379E-03 | 7.469E-03 | 804 |
| 9. 0 | 30 | | | | | | 346.5 |
| 17. 2.89 | 55 | | | | | | 804 |
| 9. 0 | 20 | 1.542E-02 | 6.411E-03 | | | | 346.5 |
| 18. 2.89 | 52 | | 7.896E-04 | | | | 803 |
| 9. 0 | 10 | | | | | | 347.5 |
| 18. 2.89 | 55 | | | | | | 803 |
| 9. 0 | 10 | | | 6.018E-03 | 7.501E-04 | 1.621E-03 | 347.5 |
| 18. 2.89 | 55 | | | 6.491E-03 | 4.836E-03 | 7.430E-03 | 803 |
| 9. 0 | 30 | | | | | | 347.5 |
| 18. 2.89 | 55 | | | | | | 803 |
| 9. 0 | 20 | 1.649E-02 | 6.455E-03 | | | | 347.5 |
| 19. 2.89 | 52 | | 8.226E-04 | | | | 802 |
| 8.46 | 10 | | | | | | 348.5 |
| 19. 2.89 | 55 | | | | | | 802 |
| 8.49 | 10 | | | 5.888E-03 | 6.655E-04 | 1.599E-03 | 348.5 |

Table 6.4.56. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 89.02 | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 19. 2.89 | 55 | | | 6.257E-03 | 5.092E-03 | 7.269E-03 | 802 |
| 8.49 | 30 | | | | | | 348.5 |
| 19. 2.89 | 55 | | | | | | 802 |
| 8.49 | 20 | 1.731E-02 | 6.261E-03 | | | | 348.5 |
| 20. 2.89 | 52 | | 7.992E-04 | | | | 801 |
| 8. 0 | 10 | | | | | | 349.46 |
| 20. 2.89 | 55 | | | | | | 801 |
| 8. 0 | 10 | | | 5.530E-03 | 6.373E-04 | 1.535E-03 | 349.46 |
| 20. 2.89 | 55 | | | 6.208E-03 | 4.642E-03 | 7.086E-03 | 801 |
| 8. 0 | 30 | | | | | | 349.46 |
| 20. 2.89 | 55 | | | | | | 801 |
| 8. 0 | 20 | 1.768E-02 | 6.031E-03 | | | | 349.46 |
| 20. 2.89 | 55 | | | | | | 801 |
| 18.36 | 10 | | | 8.192E-03 | 8.487E-04 | 2.583E-03 | 349.9 |
| 20. 2.89 | 55 | | | 1.173E-02 | 9.304E-03 | 1.290E-02 | 801 |
| 18.36 | 30 | | | | | | 349.9 |
| 20. 2.89 | 55 | | | | | | 801 |
| 18.36 | 20 | 1.182E-01 | 1.167E-02 | | | | 349.9 |
| 21. 2.89 | 52 | | 5.990E-04 | | | | 800 |
| 12.24 | 10 | | | | | | 350.62 |
| 21. 2.89 | 55 | | | | | | 800 |
| 12.28 | 10 | | | 9.409E-03 | 1.797E-03 | 3.064E-03 | 350.62 |
| 21. 2.89 | 55 | | | 1.213E-02 | 8.887E-03 | 1.234E-02 | 800 |
| 12.28 | 30 | | | | | | 350.62 |
| 21. 2.89 | 55 | | | | | | 800 |
| 12.28 | 20 | | 1.386E-02 | | | | 350.62 |
| 21. 2.89 | 52 | | 1.156E-03 | | | | 798 |
| 20.5 | 10 | | | | | | 350.94 |
| 21. 2.89 | 55 | | | | | | 798 |
| 20.5 | 10 | | | 9.181E-03 | | 2.874E-03 | 350.94 |
| 21. 2.89 | 55 | | | 1.109E-02 | 7.923E-03 | 1.101E-02 | 798 |
| 20.5 | 30 | | | | | | 350.94 |
| 21. 2.89 | 55 | | | | | | 798 |
| 20.5 | 20 | 8.853E-02 | 1.249E-02 | | | | 350.94 |
| 22. 2.89 | 52 | | 9.295E-04 | | | | 800 |
| 4.3 | 10 | | | | | | 351.34 |
| 22. 2.89 | 55 | | | | | | 800 |
| 4.3 | 10 | | | 8.733E-03 | 1.129E-03 | 3.006E-03 | 351.34 |
| 22. 2.89 | 55 | | | 1.208E-02 | 9.901E-03 | 1.208E-02 | 800 |
| 4.3 | 30 | | | | | | 351.34 |
| 22. 2.89 | 55 | | | | | | 800 |
| 4.3 | 20 | 7.384E-02 | 1.374E-02 | | | | 351.34 |
| 22. 2.89 | 52 | | 9.494E-04 | | | | 801 |
| 11.52 | 10 | | | | | | 351.64 |
| 22. 2.89 | 55 | | | | | | 801 |
| 11.55 | 10 | | | 9.367E-03 | 1.145E-03 | 3.030E-03 | 351.64 |
| 22. 2.89 | 55 | | | 1.239E-02 | 1.004E-02 | 1.195E-02 | 801 |
| 11.55 | 30 | | | | | | 351.64 |
| 22. 2.89 | 55 | | | | | | 801 |
| 11.55 | 20 | 8.375E-02 | 1.314E-02 | | | | 351.64 |
| 22. 2.89 | 52 | | 7.496E-04 | | | | 800 |
| 20. 0 | 10 | | | | | | 351.96 |

Table 6.4.56. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 89.02 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 22. 2.89 | 55 | | | | | | 800 |
| 20. 0 | 10 | | | 9.399E-03 | 8.685E-04 | 3.195E-03 | 351.96 |
| 22. 2.89 | 55 | | | 1.270E-02 | 9.713E-03 | 1.179E-02 | 800 |
| 20. 0 | 30 | | | | | | 351.96 |
| 22. 2.89 | 55 | | | | | | 800 |
| 20. 0 | 20 | 7.830E-02 | 1.404E-02 | | | | 351.96 |
| 23. 2.89 | 52 | | 7.564E-04 | | | | 799 |
| 4. 0 | 10 | | | | | | 352.32 |
| 23. 2.89 | 55 | | | | | | 799 |
| 4. 0 | 10 | | | 9.360E-03 | 1.181E-03 | 3.100E-03 | 352.32 |
| 23. 2.89 | 55 | | | 1.237E-02 | 1.023E-02 | 1.236E-02 | 799 |
| 4. 0 | 30 | | | | | | 352.32 |
| 23. 2.89 | 55 | | | | | | 799 |
| 4. 0 | 20 | 7.461E-02 | 1.360E-02 | | | | 352.32 |
| 23. 2.89 | 52 | | 9.940E-04 | | | | 799 |
| 17. 0 | 10 | | | | | | 352.72 |
| 23. 2.89 | 55 | | | | | | 799 |
| 17. 0 | 10 | | | 8.008E-03 | 5.541E-04 | 2.744E-03 | 352.72 |
| 23. 2.89 | 55 | | | 1.200E-02 | 9.896E-03 | 1.102E-02 | 799 |
| 17. 0 | 30 | | | | | | 352.72 |
| 23. 2.89 | 55 | | | | | | 799 |
| 17. 0 | 20 | 7.341E-02 | 1.795E-02 | | | | 352.72 |
| 24. 2.89 | 52 | | 1.002E-03 | | | | 799 |
| 4.25 | 10 | | | | | | 353.3 |
| 24. 2.89 | 55 | | | | | | 799 |
| 4.28 | 10 | | | 8.731E-03 | | 3.096E-03 | 353.3 |
| 24. 2.89 | 55 | | | 1.201E-02 | 8.924E-03 | 1.155E-02 | 799 |
| 4.28 | 30 | | | | | | 353.3 |
| 24. 2.89 | 55 | | | | | | 799 |
| 4.28 | 20 | 6.838E-02 | 1.262E-02 | | | | 353.3 |
| 24. 2.89 | 52 | | 6.768E-04 | | | | 799 |
| 13.33 | 10 | | | | | | 353.67 |
| 24. 2.89 | 55 | | | | | | 799 |
| 13.35 | 10 | | | 9.532E-03 | | | 353.67 |
| 24. 2.89 | 55 | | | 9.009E-03 | 5.297E-03 | 9.465E-03 | 799 |
| 13.35 | 30 | | | | | | 353.67 |
| 24. 2.89 | 55 | | | | | | 799 |
| 13.35 | 20 | 4.839E-02 | 1.158E-02 | | | | 353.67 |
| 24. 2.89 | 52 | | 1.242E-03 | | | | 799 |
| 16.28 | 10 | | | | | | 353.79 |
| 24. 2.89 | 55 | | | | | | 799 |
| 16.31 | 10 | | | | 1.135E-03 | 3.075E-03 | 353.79 |
| 24. 2.89 | 55 | | | 1.123E-02 | 8.708E-03 | 1.081E-02 | 799 |
| 16.31 | 30 | | | | | | 353.79 |
| 24. 2.89 | 55 | | | | | | 799 |
| 16.31 | 20 | 4.394E-02 | 1.139E-02 | | | | 353.79 |
| 24. 2.89 | 52 | | 1.134E-03 | | | | 797 |
| 19.58 | 10 | | | | | | 353.92 |
| 24. 2.89 | 55 | | | | | | 797 |
| 20. 0 | 10 | | | 9.186E-03 | 1.616E-03 | 2.933E-03 | 353.92 |
| 24. 2.89 | 55 | | | 1.133E-02 | 9.218E-03 | 1.115E-02 | 797 |
| 20. 0 | 30 | | | | | | 353.92 |

Table 6.4.56. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 89.02 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 24. 2.89 | 55 | | | | | | 797 |
| 20. 0 | 20 | | 1.127E-02 | | | | 353.92 |
| 25. 2.89 | 55 | | | | | | 797 |
| 0.42 | 10 | | | 8.443E-03 | 1.085E-03 | | 354.11 |
| 25. 2.89 | 55 | | | 1.109E-02 | 8.198E-03 | 9.865E-03 | 797 |
| 0.42 | 30 | | | | | | 354.11 |
| 25. 2.89 | 55 | | | | | | 797 |
| 0.42 | 20 | 3.213E-02 | 1.067E-02 | | | | 354.11 |
| 25. 2.89 | 55 | | | | | | 797 |
| 4. 1 | 10 | | | 7.932E-03 | 1.026E-03 | 2.806E-03 | 354.27 |
| 25. 2.89 | 55 | | | 1.062E-02 | 7.870E-03 | 1.034E-02 | 797 |
| 4. 1 | 30 | | | | | | 354.27 |
| 25. 2.89 | 55 | | | | | | 797 |
| 4. 1 | 20 | 2.941E-02 | 1.071E-02 | | | | 354.27 |
| 25. 2.89 | 52 | | 1.106E-03 | | | | 797 |
| 9. 8 | 10 | | | | | | 354.47 |
| 25. 2.89 | 55 | | | | | | 797 |
| 9.1 | 10 | | | 7.936E-03 | 1.590E-03 | 2.681E-03 | 354.47 |
| 25. 2.89 | 55 | | | 1.013E-02 | 8.203E-03 | 1.005E-02 | 797 |
| 9.1 | 30 | | | | | | 354.47 |
| 25. 2.89 | 55 | | | | | | 797 |
| 9.1 | 20 | 2.808E-02 | 9.729E-03 | | | | 354.47 |
| 25. 2.89 | 55 | | | | | | 797 |
| 12.54 | 10 | | | 7.369E-03 | 6.443E-04 | 2.643E-03 | 354.66 |
| 25. 2.89 | 55 | | | 1.063E-02 | 7.709E-03 | 9.693E-03 | 797 |
| 12.54 | 30 | | | | | | 354.66 |
| 25. 2.89 | 55 | | | | | | 797 |
| 12.54 | 20 | 2.713E-02 | 9.613E-03 | | | | 354.66 |
| 26. 2.89 | 52 | | 1.196E-03 | | | | 797 |
| 0.28 | 10 | | | | | | 355.12 |
| 26. 2.89 | 55 | | | | | | 797 |
| 0.3 | 10 | | | 7.668E-03 | 9.586E-04 | 2.583E-03 | 355.12 |
| 26. 2.89 | 55 | | | 9.068E-03 | 7.349E-03 | 9.834E-03 | 797 |
| 0.3 | 30 | | | | | | 355.12 |
| 26. 2.89 | 55 | | | | | | 797 |
| 0.3 | 20 | 2.347E-02 | 9.118E-03 | | | | 355.12 |
| 26. 2.89 | 52 | | 1.070E-03 | | | | 797 |
| 3.53 | 10 | | | | | | 355.29 |
| 26. 2.89 | 55 | | | | | | 797 |
| 3.56 | 10 | | | 8.072E-03 | 1.005E-03 | 2.710E-03 | 355.29 |
| 26. 2.89 | 55 | | | 1.018E-02 | 7.097E-03 | 9.907E-03 | 797 |
| 3.56 | 30 | | | | | | 355.29 |
| 26. 2.89 | 55 | | | | | | 797 |
| 3.56 | 20 | 2.418E-02 | 9.099E-03 | | | | 355.29 |
| 26. 2.89 | 52 | | 1.118E-03 | | | | 795 |
| 8.54 | 10 | | | | | | 355.46 |
| 26. 2.89 | 55 | | | | | | 796 |
| 9. 2 | 10 | | | 7.278E-03 | 1.071E-03 | 2.452E-03 | 355.46 |
| 26. 2.89 | 55 | | | 9.012E-03 | 6.633E-03 | 8.899E-03 | 796 |
| 9. 2 | 30 | | | | | | 355.46 |
| 26. 2.89 | 55 | | | | | | 796 |
| 9. 2 | 20 | 2.171E-02 | 8.053E-03 | | | | 355.46 |

Table 6.4.56. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 89.02 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 26. 2.89 | 52 | | 1.095E-03 | | | | 798 |
| 12.19 | 10 | | | | | | 355.64 |
| 26. 2.89 | 55 | | | | | | 798 |
| 12.21 | 10 | | | 7.400E-03 | 1.191E-03 | 2.604E-03 | 355.64 |
| 26. 2.89 | 55 | | | 9.460E-03 | 6.604E-03 | 9.332E-03 | 798 |
| 12.21 | 30 | | | | | | 355.64 |
| 26. 2.89 | 55 | | | | | | 798 |
| 12.21 | 20 | 2.329E-02 | 8.321E-03 | | | | 355.64 |
| 26. 2.89 | 52 | | 1.129E-03 | | | | 798 |
| 16.55 | 10 | | | | | | 355.82 |
| 26. 2.89 | 55 | | | | | | 798 |
| 16.58 | 10 | | | 7.522E-03 | 7.272E-04 | 2.449E-03 | 355.82 |
| 26. 2.89 | 55 | | | 9.684E-03 | 7.025E-03 | 9.559E-03 | 798 |
| 16.58 | 30 | | | | | | 355.82 |
| 26. 2.89 | 55 | | | | | | 798 |
| 16.58 | 20 | 2.233E-02 | 8.746E-03 | | | | 355.82 |
| 26. 2.89 | 52 | | 1.162E-03 | | | | 798 |
| 20.3 | 10 | | | | | | 355.94 |
| 26. 2.89 | 55 | | | | | | 798 |
| 20.34 | 10 | | | 7.507E-03 | 9.710E-04 | 2.361E-03 | 355.92 |
| 26. 2.89 | 55 | | | 9.943E-03 | 7.008E-03 | 9.701E-03 | 798 |
| 20.34 | 30 | | | | | | 355.92 |
| 26. 2.89 | 55 | | | | | | 798 |
| 20.34 | 20 | 2.341E-02 | 8.656E-03 | | | | 355.92 |
| 27. 2.89 | 52 | | 1.142E-03 | | | | 798 |
| 0.3 | 10 | | | | | | 356.18 |
| 27. 2.89 | 55 | | | | | | 798 |
| 0.32 | 10 | | | 7.745E-03 | 1.065E-03 | 2.426E-03 | 356.18 |
| 27. 2.89 | 55 | | | 9.584E-03 | 6.892E-03 | 9.246E-03 | 798 |
| 0.32 | 30 | | | | | | 356.18 |
| 27. 2.89 | 55 | | | | | | 798 |
| 0.32 | 20 | 2.183E-02 | 8.527E-03 | | | | 356.18 |
| 27. 2.89 | 52 | | 1.057E-03 | | | | 796 |
| 3.5 | 10 | | | | | | 356.32 |
| 27. 2.89 | 55 | | | | | | 796 |
| 3.52 | 10 | | | 6.993E-03 | 1.113E-03 | 2.386E-03 | 356.32 |
| 27. 2.89 | 55 | | | 8.122E-03 | 6.637E-03 | 9.412E-03 | 796 |
| 3.52 | 30 | | | | | | 356.32 |
| 27. 2.89 | 55 | | | | | | 796 |
| 3.52 | 20 | 2.109E-02 | 8.270E-03 | | | | 356.32 |
| 27. 2.89 | 52 | | 1.143E-03 | | | | 795 |
| 8.45 | 10 | | | | | | 356.46 |
| 27. 2.89 | 55 | | | | | | 795 |
| 8.47 | 10 | | | 7.970E-03 | 1.114E-03 | 2.488E-03 | 356.46 |
| 27. 2.89 | 55 | | | 9.178E-03 | 6.757E-03 | 9.213E-03 | 795 |
| 8.47 | 30 | | | | | | 356.46 |
| 27. 2.89 | 55 | | | | | | 795 |
| 8.47 | 20 | 2.181E-02 | 8.360E-03 | | | | 356.46 |
| 28. 2.89 | 52 | | 1.075E-03 | | | | 797 |
| 8.45 | 10 | | | | | | 357.46 |
| 28. 2.89 | 55 | | | | | | 797 |
| 8. 4 | 10 | | | 7.246E-03 | 1.131E-03 | 2.254E-03 | 357.46 |

Table 6.4.56. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 89.02 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 28. 2.89 | 55 | | | 8.601E-03 | 6.183E-03 | 8.762E-03 | 797 |
| 8.45 | 30 | | | | | | 357.46 |
| 28. 2.89 | 55 | | | | | | 797 |
| 8.45 | 20 | 2.046E-02 | 7.635E-03 | | | | 357.46 |
| 3. 3.89 | 52 | | 7.062E-04 | | | | 802 |
| 10.27 | 10 | | | | | | 358.45 |
| 3. 3.89 | 55 | | | | | | 802 |
| 10.27 | 10 | | | 5.109E-03 | 4.673E-04 | 1.938E-03 | 358.45 |
| 3. 3.89 | 55 | | | 8.750E-03 | 6.169E-03 | 8.384E-03 | 802 |
| 10.27 | 30 | | | | | | 358.45 |
| 3. 3.89 | 55 | | | | | | 802 |
| 10.27 | 30 | | | | | | 358.45 |
| 4. 3.89 | 52 | | 9.490E-04 | | | | 788 |
| 9. 0 | 10 | | | | | | 359.46 |
| 4. 3.89 | 55 | | | | | | 788 |
| 9. 0 | 10 | | | 6.446E-03 | 9.264E-04 | 2.041E-03 | 359.46 |
| 4. 3.89 | 55 | | | 7.817E-03 | 6.045E-03 | 8.138E-03 | 788 |
| 9. 0 | 30 | | | | | | 359.46 |
| 4. 3.89 | 55 | | | | | | 788 |
| 9. 0 | 20 | 1.467E-02 | 6.965E-03 | | | | 359.46 |
| 5. 3.89 | 55 | | | | | | 65 |
| 2. 0 | 20 | | | | | | 359.78 |
| --- | --- | | | | | | |

Table 6.4.57. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 89.03 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 7. 4.89 | 52 | | | | | | 718 |
| 8.4 | 10 | | | | | | 360.11 |
| 7. 4.89 | 52 | | 8.489E-04 | | | | 718 |
| 8.4 | 10 | | | 4.575E-03 | 7.168E-04 | 1.428E-03 | 362.15 |
| 7. 4.89 | 55 | | | | | | 718 |
| 8.4 | 10 | | | 5.080E-03 | 9.206E-04 | 1.601E-03 | 362.15 |
| 7. 4.89 | 55 | | | 4.352E-03 | 3.663E-03 | 4.879E-03 | 718 |
| 8.4 | 30 | | | | | | 362.15 |
| 7. 4.89 | 55 | | | | | | 718 |
| 8.4 | 20 | 6.465E-03 | 4.914E-03 | | | | 362.15 |
| 8. 4.89 | 52 | | 1.013E-03 | | | | 720 |
| 8.45 | 10 | | | 5.595E-03 | 8.641E-04 | 1.769E-03 | 363.16 |
| 8. 4.89 | 55 | | | | | | 720 |
| 8.45 | 10 | | | 6.198E-03 | 8.811E-04 | 1.950E-03 | 363.16 |
| 8. 4.89 | 55 | | | 5.697E-03 | 4.712E-03 | 6.312E-03 | 720 |
| 8.45 | 30 | | | | | | 363.16 |
| 8. 4.89 | 55 | | | | | | 720 |
| 8.45 | 20 | 1.077E-02 | 6.388E-03 | | | | 363.16 |
| 9. 4.89 | 52 | | 9.429E-04 | | | | 720 |
| 9.21 | 10 | | | 5.316E-03 | 8.145E-04 | 1.583E-03 | 364.18 |
| 9. 4.89 | 55 | | | | | | 720 |
| 9.21 | 10 | | | 5.692E-03 | 8.029E-04 | 1.817E-03 | 364.18 |
| 9. 4.89 | 55 | | | 5.790E-03 | 4.419E-03 | 5.945E-03 | 720 |
| 9.21 | 30 | | | | | | 364.18 |
| 9. 4.89 | 55 | | | | | | 720 |
| 9.21 | 20 | 1.170E-02 | 6.035E-03 | | | | 364.18 |
| 10. 4.89 | 52 | | 9.001E-04 | | | | 718 |
| 8.35 | 10 | | | 5.049E-03 | 7.683E-04 | 1.520E-03 | 364.14 |
| 10. 4.89 | 55 | | | | | | 718 |
| 8.35 | 10 | | | 5.637E-03 | 7.830E-04 | 1.753E-03 | 364.14 |
| 10. 4.89 | 55 | | | 5.094E-03 | 4.051E-03 | 5.730E-03 | 718 |
| 8.35 | 30 | | | | | | 364.14 |
| 10. 4.89 | 55 | | | | | | 718 |
| 8.35 | 20 | 1.261E-02 | 5.788E-03 | | | | 364.14 |
| 11. 4.89 | 52 | | 9.279E-04 | | | | 722 |
| 9. 0 | 10 | | | 5.133E-03 | 7.203E-04 | 1.588E-03 | 365.16 |
| 11. 4.89 | 55 | | | | | | 722 |
| 9. 0 | 10 | | | 5.579E-03 | 6.628E-04 | 1.738E-03 | 365.16 |
| 11. 4.89 | 55 | | | 5.680E-03 | 4.688E-03 | 5.972E-03 | 722 |
| 9. 0 | 30 | | | | | | 365.16 |
| 11. 4.89 | 55 | | | | | | 722 |
| 9. 0 | 20 | 1.475E-02 | 6.286E-03 | | | | 365.16 |
| 12. 4.89 | 52 | | 9.270E-04 | | | | 722 |
| 9. 0 | 10 | | | 5.272E-03 | 7.935E-04 | 1.585E-03 | 367.16 |
| 12. 4.89 | 55 | | | | | | 722 |
| 9. 0 | 10 | | | 5.521E-03 | 8.616E-04 | 1.705E-03 | 367.16 |
| 12. 4.89 | 55 | | | 5.578E-03 | 4.300E-03 | 5.966E-03 | 722 |
| 9. 0 | 30 | | | | | | 367.16 |
| 12. 4.89 | 55 | | | | | | 722 |
| 9. 0 | 20 | 1.399E-02 | 5.930E-03 | | | | 367.16 |
| 13. 4.89 | 52 | | 9.599E-04 | | | | 726 |
| 9. 5 | 10 | | | 5.180E-03 | 8.068E-04 | 1.523E-03 | 368.16 |

Table 6.4.57. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 89.03 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 13. 4.89 | 55 | | | | | | 726 |
| 9. 5 | 10 | | | 5.500E-03 | 8.457E-04 | 1.727E-03 | 368.16 |
| 13. 4.89 | 55 | | | 5.575E-03 | 4.338E-03 | 5.978E-03 | 726 |
| 9. 5 | 30 | | | | | | 368.16 |
| 13. 4.89 | 55 | | | | | | 726 |
| 9. 5 | 20 | 1.452E-02 | 5.784E-03 | | | | 368.16 |
| 14. 4.89 | 52 | | 9.269E-04 | | | | 723 |
| 9. 0 | 10 | | | 4.911E-03 | 7.585E-04 | 1.492E-03 | 369.16 |
| 14. 4.89 | 55 | | | | | | 723 |
| 9. 0 | 10 | | | 5.467E-03 | 7.026E-04 | 1.663E-03 | 369.16 |
| 14. 4.89 | 55 | | | 5.105E-03 | 4.067E-03 | 5.592E-03 | 723 |
| 9. 0 | 30 | | | | | | 369.16 |
| 14. 4.89 | 55 | | | | | | 723 |
| 9. 0 | 20 | 1.451E-02 | 5.752E-03 | | | | 369.16 |
| 15. 4.89 | 52 | | 9.362E-04 | | | | 723 |
| 11.34 | 10 | | | 4.884E-03 | 8.108E-04 | 1.474E-03 | 370.24 |
| 15. 4.89 | 55 | | | | | | 723 |
| 11.34 | 10 | | | 5.350E-03 | 8.416E-04 | 1.659E-03 | 370.24 |
| 15. 4.89 | 55 | | | 5.242E-03 | 3.945E-03 | 5.689E-03 | 723 |
| 11.34 | 30 | | | | | | 370.24 |
| 15. 4.89 | 55 | | | | | | 723 |
| 11.34 | 20 | 1.422E-02 | 5.451E-03 | | | | 370.24 |
| 16. 4.89 | 52 | | 9.091E-04 | | | | 724 |
| 11.23 | 10 | | | 4.924E-03 | 7.400E-04 | 1.463E-03 | 371.24 |
| 16. 4.89 | 55 | | | | | | 724 |
| 11.23 | 10 | | | 5.202E-03 | 7.093E-04 | 1.603E-03 | 371.24 |
| 16. 4.89 | 55 | | | 5.295E-03 | 3.957E-03 | 5.235E-03 | 724 |
| 11.23 | 30 | | | | | | 371.24 |
| 16. 4.89 | 55 | | | | | | 724 |
| 11.23 | 20 | 1.411E-02 | 5.414E-03 | | | | 371.24 |
| 17. 4.89 | 52 | | 9.522E-04 | | | | 723 |
| 8.4 | 10 | | | 4.699E-03 | 7.574E-04 | 1.437E-03 | 372.16 |
| 17. 4.89 | 55 | | | | | | 723 |
| 8.4 | 10 | | | 5.176E-03 | 7.332E-04 | 1.627E-03 | 372.16 |
| 17. 4.89 | 55 | | | 4.845E-03 | 3.901E-03 | 5.591E-03 | 723 |
| 8.4 | 30 | | | | | | 372.16 |
| 17. 4.89 | 55 | | | | | | 723 |
| 8.4 | 20 | 1.416E-02 | 5.333E-03 | | | | 372.16 |
| 18. 4.89 | 52 | | 8.838E-04 | | | | 722 |
| 8.44 | 10 | | | 4.796E-03 | 7.010E-04 | 1.409E-03 | 373.16 |
| 18. 4.89 | 55 | | | | | | 722 |
| 8.44 | 10 | | | 5.270E-03 | 6.600E-04 | 1.594E-03 | 373.16 |
| 18. 4.89 | 55 | | | 4.862E-03 | 3.797E-03 | 5.107E-03 | 722 |
| 8.44 | 30 | | | | | | 373.16 |
| 18. 4.89 | 55 | | | | | | 722 |
| 8.44 | 20 | 1.429E-02 | 5.267E-03 | | | | 373.16 |
| 19. 4.89 | 52 | | 8.703E-04 | | | | 721 |
| 9.33 | 10 | | | 4.681E-03 | 7.030E-04 | 1.409E-03 | 374.18 |
| 19. 4.89 | 55 | | | | | | 721 |
| 9.33 | 10 | | | 4.977E-03 | 7.274E-04 | 1.545E-03 | 374.18 |
| 19. 4.89 | 55 | | | 4.331E-03 | 3.639E-03 | 4.981E-03 | 721 |
| 9.33 | 30 | | | | | | 374.18 |

Table 6.4.57. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 89.03 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 19. 4.89 | 55 | | | | | | 721 |
| 9.33 | 20 | 1.432E-02 | 5.059E-03 | | | | 374.18 |
| 20. 4.89 | 52 | | 7.992E-04 | | | | 719 |
| 9.45 | 10 | | | 4.558E-03 | 6.919E-04 | 1.360E-03 | 375.18 |
| 20. 4.89 | 55 | | | | | | 719 |
| 9.45 | 10 | | | 4.962E-03 | 7.576E-04 | 1.502E-03 | 375.18 |
| 20. 4.89 | 55 | | | 4.473E-03 | 3.786E-03 | 5.042E-03 | 719 |
| 9.45 | 30 | | | | | | 375.18 |
| 20. 4.89 | 55 | | | | | | 719 |
| 9.45 | 20 | 1.488E-02 | 5.051E-03 | | | | 375.18 |
| 21. 4.89 | 52 | | 8.180E-04 | | | | 719 |
| 9.1 | 10 | | | 4.543E-03 | 6.815E-04 | 1.352E-03 | 376.16 |
| 21. 4.89 | 55 | | | | | | 719 |
| 9.1 | 10 | | | 4.800E-03 | 7.851E-04 | 1.427E-03 | 376.16 |
| 21. 4.89 | 55 | | | 4.872E-03 | 3.673E-03 | 5.198E-03 | 719 |
| 9.1 | 30 | | | | | | 376.16 |
| 21. 4.89 | 55 | | | | | | 719 |
| 9.1 | 20 | 1.429E-02 | 5.089E-03 | | | | 376.16 |
| 22. 4.89 | 52 | | 8.024E-04 | | | | 717 |
| 9.1 | 10 | | | 4.726E-03 | 6.726E-04 | 1.330E-03 | 377.16 |
| 22. 4.89 | 55 | | | | | | 717 |
| 9.1 | 10 | | | 4.996E-03 | 6.455E-04 | 1.523E-03 | 377.16 |
| 22. 4.89 | 55 | | | 4.453E-03 | 3.552E-03 | 4.830E-03 | 717 |
| 9.1 | 30 | | | | | | 377.16 |
| 22. 4.89 | 55 | | | | | | 717 |
| 9.1 | 20 | 1.478E-02 | 5.072E-03 | | | | 377.16 |
| 23. 4.89 | 52 | | 7.946E-04 | | | | 716 |
| 8.5 | 10 | | | 4.611E-03 | 6.977E-04 | 1.342E-03 | 378.16 |
| 23. 4.89 | 55 | | | 4.921E-03 | 4.254E-03 | 5.036E-03 | 716 |
| 8.5 | 30 | | | | | | 378.16 |
| 23. 4.89 | 55 | | | | | | 716 |
| 8.5 | 20 | 1.536E-02 | 4.927E-03 | | | | 378.16 |
| 24. 4.89 | 52 | | 8.154E-04 | | | | 717 |
| 8.5 | 10 | | | 4.143E-03 | 6.626E-04 | 1.220E-03 | 379.16 |
| 24. 4.89 | 55 | | | | | | 717 |
| 8.5 | 10 | | | 4.731E-03 | 8.723E-04 | 1.412E-03 | 379.16 |
| 24. 4.89 | 55 | | | 4.351E-03 | 3.276E-03 | 4.660E-03 | 717 |
| 8.5 | 30 | | | | | | 379.16 |
| 24. 4.89 | 55 | | | | | | 717 |
| 8.5 | 20 | 1.377E-02 | 4.738E-03 | | | | 379.16 |
| 25. 4.89 | 55 | | | | | | 28 |
| 5. 0 | 20 | | | | | | 379.79 |
| --- | --- | | | | | | |

Table 6.4.58. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 89.04 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 29. 4.89 | 52 | | | | | | 748 |
| 8.57 | 10 | | | | | | 379.86 |
| 29. 4.89 | 52 | | 8.994E-04 | | | | 748 |
| 8.57 | 10 | | | 4.562E-03 | 7.389E-04 | 1.422E-03 | 380.98 |
| 29. 4.89 | 52 | | 8.994E-04 | | | | 748 |
| 8.57 | 10 | | | 4.562E-03 | 7.389E-04 | 1.422E-03 | 380.98 |
| 29. 4.89 | 55 | | | | | | 748 |
| 8.57 | 10 | | | 5.186E-03 | 7.806E-04 | 1.645E-03 | 380.98 |
| 29. 4.89 | 55 | | | 5.180E-03 | 4.150E-03 | 5.926E-03 | 748 |
| 8.57 | 30 | | | | | | 380.98 |
| 29. 4.89 | 55 | | | | | | 748 |
| 8.57 | 20 | 1.177E-02 | 5.319E-03 | | | | 380.98 |
| 30. 4.89 | 52 | | 8.682E-04 | | | | 754 |
| 9. 5 | 10 | | | 5.146E-03 | 7.175E-04 | 1.509E-03 | 381.98 |
| 30. 4.89 | 55 | | | | | | 754 |
| 9. 5 | 10 | | | 5.664E-03 | 8.321E-04 | 1.622E-03 | 381.98 |
| 30. 4.89 | 55 | | | 5.097E-03 | 4.212E-03 | 5.595E-03 | 754 |
| 9. 5 | 30 | | | | | | 381.98 |
| 30. 4.89 | 55 | | | | | | 754 |
| 9. 5 | 20 | 1.330E-02 | 5.692E-03 | | | | 381.98 |
| 1. 5.89 | 52 | | 8.763E-04 | | | | 757 |
| 8. 2 | 10 | | | 5.014E-03 | 7.489E-04 | 1.440E-03 | 382.94 |
| 1. 5.89 | 55 | | | | | | 757 |
| 8. 2 | 10 | | | 5.734E-03 | 8.399E-04 | 1.670E-03 | 382.94 |
| 1. 5.89 | 55 | | | 5.503E-03 | 4.064E-03 | 5.809E-03 | 757 |
| 8. 2 | 30 | | | | | | 382.94 |
| 1. 5.89 | 55 | | | | | | 757 |
| 8. 2 | 20 | 1.394E-02 | 5.827E-03 | | | | 382.94 |
| 2. 5.89 | 52 | | 8.684E-04 | | | | 758 |
| 8.15 | 10 | | | 4.889E-03 | 7.303E-04 | 1.416E-03 | 383.96 |
| 2. 5.89 | 55 | | | | | | 758 |
| 8.15 | 10 | | | 5.540E-03 | 7.306E-04 | 1.625E-03 | 383.96 |
| 2. 5.89 | 55 | | | 5.511E-03 | 4.132E-03 | 5.865E-03 | 758 |
| 8.15 | 30 | | | | | | 383.96 |
| 2. 5.89 | 55 | | | | | | 758 |
| 8.15 | 20 | 1.531E-02 | 5.638E-03 | | | | 383.96 |
| 3. 5.89 | 52 | | 8.811E-04 | | | | 758 |
| 16.15 | 10 | | | 5.122E-03 | 7.205E-04 | 1.453E-03 | 385.28 |
| 3. 5.89 | 55 | | | | | | 758 |
| 16.15 | 10 | | | 5.489E-03 | 7.168E-04 | 1.586E-03 | 385.28 |
| 3. 5.89 | 55 | | | 5.016E-03 | 4.068E-03 | 5.728E-03 | 758 |
| 16.15 | 30 | | | | | | 385.28 |
| 3. 5.89 | 55 | | | | | | 758 |
| 16.15 | 20 | 1.478E-02 | 5.561E-03 | | | | 385.28 |
| 4. 5.89 | 52 | | 8.795E-04 | | | | 756 |
| 16.28 | 10 | | | 4.867E-03 | 7.066E-04 | | 386.29 |
| 4. 5.89 | 55 | | | | | | 756 |
| 16.28 | 10 | | | 5.452E-03 | 7.798E-04 | 1.574E-03 | 386.29 |
| 4. 5.89 | 55 | | | 5.018E-03 | 3.624E-03 | 5.732E-03 | 756 |
| 16.28 | 30 | | | | | | 386.29 |
| 4. 5.89 | 55 | | | | | | 756 |
| 16.28 | 20 | 1.584E-02 | 5.452E-03 | | | | 386.29 |

Table 6.4.58. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 89.04 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 5. 5.89 | 52 | | 9.025E-04 | | | | 755 |
| 17. 5 | 10 | | | 4.711E-03 | 7.119E-04 | 1.346E-03 | 387.31 |
| 5. 5.89 | 55 | | | | | | 755 |
| 17. 5 | 10 | | | 5.650E-03 | 6.991E-04 | 1.540E-03 | 387.31 |
| 5. 5.89 | 55 | | | 4.700E-03 | 3.848E-03 | 5.410E-03 | 755 |
| 17. 5 | 30 | | | | | | 387.31 |
| 5. 5.89 | 55 | | | | | | 755 |
| 17. 2 | 20 | 1.482E-02 | 5.300E-03 | | | | 387.31 |
| 6. 5.89 | 52 | | 8.360E-04 | | | | 755 |
| 17.1 | 10 | | | 4.702E-03 | 6.868E-04 | 1.373E-03 | 388.22 |
| 6. 5.89 | 55 | | | | | | 755 |
| 17.1 | 10 | | | 5.201E-03 | 8.626E-04 | 1.536E-03 | 388.22 |
| 6. 5.89 | 55 | | | 4.794E-03 | 3.753E-03 | 5.491E-03 | 755 |
| 17.1 | 30 | | | | | | 388.22 |
| 6. 5.89 | 55 | | | | | | 755 |
| 17.1 | 20 | 1.575E-02 | 5.305E-03 | | | | 388.22 |
| 7. 5.89 | 52 | | 8.694E-04 | | | | 755 |
| 16.48 | 10 | | | 4.749E-03 | 7.239E-04 | 1.365E-03 | 389.27 |
| 7. 5.89 | 55 | | | | | | 755 |
| 16.48 | 10 | | | 5.349E-03 | 7.853E-04 | 1.513E-03 | 389.27 |
| 7. 5.89 | 55 | | | 4.832E-03 | 3.843E-03 | 5.472E-03 | 755 |
| 16.48 | 30 | | | | | | 389.27 |
| 7. 5.89 | 55 | | | | | | 755 |
| 16.48 | 20 | 1.724E-02 | 5.316E-03 | | | | 389.27 |
| 8. 5.89 | 52 | | 8.412E-04 | | | | 755 |
| 8.44 | 10 | | | | | | 389.98 |
| 8. 5.89 | 55 | | | | | | 755 |
| 8.44 | 10 | | | 5.230E-03 | 8.494E-04 | 1.602E-03 | 389.98 |
| 8. 5.89 | 55 | | | 5.017E-03 | 3.800E-03 | 5.494E-03 | 755 |
| 8.44 | 30 | | | | | | 389.98 |
| 8. 5.89 | 55 | | | | | | 755 |
| 8.44 | 20 | 1.345E-02 | 4.360E-03 | | | | 389.98 |
| 8. 5.89 | 52 | | 9.789E-04 | | | | 756 |
| 11.58 | 10 | | | | | | 390.1 |
| 8. 5.89 | 55 | | | | | | 756 |
| 11.58 | 10 | | | 7.917E-03 | 9.887E-04 | 2.597E-03 | 390.1 |
| 8. 5.89 | 55 | | | 1.653E-02 | 8.365E-03 | 2.368E-02 | 756 |
| 11.58 | 30 | | | | | | 390.1 |
| 8. 5.89 | 55 | | | | | | 756 |
| 11.58 | 20 | 1.676E+00 | 1.289E-02 | | | | 390.1 |
| 8. 5.89 | 55 | | | | | | 755 |
| 16.3 | 10 | | | 1.224E-02 | | 2.097E-03 | 390.27 |
| 8. 5.89 | 55 | | | 1.994E-02 | 1.047E-02 | 2.932E-02 | 755 |
| 16.3 | 30 | | | | | | 390.27 |
| 8. 5.89 | 55 | | | | | | 755 |
| 16.3 | 20 | 1.662E+00 | 5.310E-02 | | | | 390.27 |
| 8. 5.89 | 52 | | 8.923E-04 | | | | 754 |
| 20.28 | 10 | | | | | | 390.44 |
| 8. 5.89 | 55 | | | | | | 754 |
| 20.28 | 10 | | | 2.010E-02 | 9.090E-04 | 3.592E-03 | 390.44 |
| 8. 5.89 | 55 | | | 2.017E-02 | 1.196E-02 | 2.264E-02 | 754 |
| 20.28 | 30 | | | | | | 390.44 |

Table 6.4.58. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 89.04 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 8. 5.89 | 55 | | | | | | 754 |
| 20.28 | 20 | 1.644E+00 | 5.927E-02 | | | | 390.44 |
| 9. 5.89 | 52 | | 3.037E-04 | | | | 755 |
| 1.4 | 10 | | | | | | 390.62 |
| 9. 5.89 | 55 | | | | | | 755 |
| 1.4 | 10 | | | 1.647E-02 | 4.585E-04 | 3.429E-03 | 390.62 |
| 9. 5.89 | 55 | | | 1.876E-02 | 1.213E-02 | 2.259E-02 | 755 |
| 1.4 | 30 | | | | | | 390.62 |
| 9. 5.89 | 55 | | | | | | 755 |
| 1.4 | 20 | 1.598E+00 | 5.872E-02 | | | | 390.62 |
| 9. 5.89 | 52 | | 4.096E-04 | | | | 755 |
| 5. 7 | 10 | | | | | | 390.82 |
| 9. 5.89 | 55 | | | | | | 755 |
| 5. 7 | 10 | | | 1.611E-02 | | 3.370E-03 | 390.82 |
| 9. 5.89 | 55 | | | 1.747E-02 | 1.340E-02 | 2.035E-02 | 755 |
| 5. 7 | 30 | | | | | | 390.82 |
| 9. 5.89 | 55 | | | | | | 755 |
| 5. 7 | 20 | 9.080E-01 | 5.856E-02 | | | | 390.82 |
| 9. 5.89 | 52 | | 6.602E-04 | | | | 756 |
| 8.34 | 10 | | | | | | 390.96 |
| 9. 5.89 | 55 | | | | | | 756 |
| 8.34 | 10 | | | 1.974E-02 | 1.190E-03 | 4.057E-03 | 390.96 |
| 9. 5.89 | 55 | | | 1.749E-02 | 1.296E-02 | 1.836E-02 | 756 |
| 8.34 | 30 | | | | | | 390.96 |
| 9. 5.89 | 55 | | | | | | 756 |
| 8.34 | 20 | 9.431E-01 | 5.905E-02 | | | | 390.96 |
| 9. 5.89 | 52 | | 6.841E-04 | | | | 755 |
| 12.28 | 10 | | | | | | 391.12 |
| 9. 5.89 | 55 | | | | | | 755 |
| 12.28 | 10 | | | 1.844E-02 | 1.208E-03 | 4.289E-03 | 391.12 |
| 9. 5.89 | 55 | | | 1.887E-02 | 1.537E-02 | | 755 |
| 12.28 | 30 | | | | | | 391.12 |
| 9. 5.89 | 55 | | | | | | 755 |
| 12.28 | 20 | 9.103E-01 | 5.878E-02 | | | | 391.12 |
| 10. 5.89 | 52 | | 3.450E-04 | | | | 755 |
| 8.32 | 10 | | | | | | 391.98 |
| 10. 5.89 | 55 | | | | | | 755 |
| 8.32 | 10 | | | 8.993E-03 | | 4.273E-03 | 391.98 |
| 10. 5.89 | 55 | | | 1.775E-02 | 1.440E-02 | 1.888E-02 | 755 |
| 8.32 | 30 | | | | | | 391.98 |
| 10. 5.89 | 55 | | | | | | 755 |
| 8.32 | 20 | 2.464E-01 | | | | | 391.98 |
| 11. 5.89 | 52 | | 6.434E-04 | | | | 754 |
| 8.34 | 10 | | | | | | 392.96 |
| 11. 5.89 | 55 | | | | | | 754 |
| 8.34 | 10 | | | 1.291E-02 | | 4.399E-03 | 392.96 |
| 11. 5.89 | 55 | | | 1.912E-02 | 1.487E-02 | 1.932E-02 | 754 |
| 8.34 | 30 | | | | | | 392.96 |
| 11. 5.89 | 55 | | | | | | 754 |
| 8.34 | 20 | 1.824E-01 | 5.685E-02 | | | | 392.96 |
| 11. 5.89 | 52 | | 4.870E-04 | | | | 754 |
| 12. 1 | 10 | | | | | | 393.1 |

Table 6.4.58. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 89.04 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 11. 5.89 | 55 | | | | | | 754 |
| 12. 1 | 10 | | | 1.229E-02 | 5.004E-04 | | 393.1 |
| 11. 5.89 | 55 | | | 1.936E-02 | 1.478E-02 | 2.114E-02 | 754 |
| 12. 1 | 30 | | | | | | 393.1 |
| 11. 5.89 | 55 | | | | | | 754 |
| 12. 1 | 20 | 1.902E-01 | 5.125E-02 | | | | 393.1 |
| 11. 5.89 | 52 | | 7.020E-04 | | | | 753 |
| 16. 0 | 10 | | | | | | 393.27 |
| 11. 5.89 | 55 | | | | | | 753 |
| 16. 0 | 10 | | | 1.250E-02 | 8.077E-04 | 4.625E-03 | 393.27 |
| 11. 5.89 | 55 | | | 1.861E-02 | 1.708E-02 | 2.035E-02 | 753 |
| 16. 0 | 30 | | | | | | 393.27 |
| 11. 5.89 | 55 | | | | | | 753 |
| 16. 0 | 20 | 1.693E-01 | 5.770E-02 | | | | 393.27 |
| 11. 5.89 | 55 | | | | | | 754 |
| 19.2 | 10 | | | 1.360E-02 | | 4.208E-03 | 393.4 |
| 11. 5.89 | 55 | | | 2.047E-02 | 1.783E-02 | 2.013E-02 | 754 |
| 19.2 | 30 | | | | | | 393.4 |
| 11. 5.89 | 55 | | | | | | 754 |
| 19.2 | 20 | 1.613E-01 | 5.793E-02 | | | | 393.4 |
| 12. 5.89 | 52 | | 2.405E-04 | | | | 754 |
| 0.43 | 10 | | | | | | 393.65 |
| 12. 5.89 | 55 | | | | | | 754 |
| 0.43 | 10 | | | 7.356E-03 | | 3.089E-03 | 393.65 |
| 12. 5.89 | 55 | | | 2.201E-02 | 1.898E-02 | 2.206E-02 | 754 |
| 0.43 | 30 | | | | | | 393.65 |
| 12. 5.89 | 55 | | | | | | 754 |
| 0.43 | 20 | 1.677E-01 | | | | | 393.65 |
| 12. 5.89 | 52 | | 2.343E-04 | | | | 753 |
| 4. 5 | 10 | | | | | | 393.77 |
| 12. 5.89 | 55 | | | | | | 753 |
| 4. 5 | 10 | | | 9.821E-03 | | | 393.77 |
| 12. 5.89 | 55 | | | 1.805E-02 | 1.494E-02 | 1.834E-02 | 753 |
| 4. 5 | 30 | | | | | | 393.77 |
| 12. 5.89 | 55 | | | | | | 753 |
| 4. 5 | 20 | 1.561E-01 | 4.910E-02 | | | | 393.77 |
| 12. 5.89 | 55 | | | | | | 754 |
| 8.34 | 10 | | | 3.019E-03 | | 4.199E-03 | 393.98 |
| 12. 5.89 | 55 | | | 1.873E-02 | 1.692E-02 | 1.886E-02 | 754 |
| 8.34 | 30 | | | | | | 393.98 |
| 12. 5.89 | 55 | | | | | | 754 |
| 8.34 | 20 | 1.561E-01 | | | | | 393.98 |
| 12. 5.89 | 52 | | 1.112E-03 | | | | 753 |
| 12.19 | 10 | | | | | | 394.1 |
| 12. 5.89 | 55 | | | | | | 753 |
| 12.19 | 10 | | | 1.390E-02 | | 4.092E-03 | 394.1 |
| 12. 5.89 | 55 | | | 1.810E-02 | 1.554E-02 | 1.794E-02 | 753 |
| 12.19 | 30 | | | | | | 394.1 |
| 12. 5.89 | 55 | | | | | | 753 |
| 12.19 | 20 | 1.085E-01 | 4.629E-02 | | | | 394.1 |
| 12. 5.89 | 52 | | 8.852E-04 | | | | 754 |
| 16.2 | 10 | | | | | | 394.27 |

Table 6.4.58. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 89.04 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 12. 5.89 | 55 | | | | | | 754 |
| 16.2 | 10 | | | 1.457E-02 | 7.916E-04 | 4.049E-03 | 394.27 |
| 12. 5.89 | 55 | | | 1.637E-02 | 1.453E-02 | 1.641E-02 | 754 |
| 16.2 | 30 | | | | | | 394.27 |
| 12. 5.89 | 55 | | | | | | 754 |
| 16.2 | 20 | 7.959E-02 | 3.809E-02 | | | | 394.27 |
| 12. 5.89 | 52 | | 8.014E-04 | | | | 754 |
| 20.15 | 10 | | | | | | 394.44 |
| 12. 5.89 | 55 | | | | | | 754 |
| 20.15 | 10 | | | 1.419E-02 | 1.698E-03 | 4.150E-03 | 394.44 |
| 12. 5.89 | 55 | | | 1.619E-02 | 1.387E-02 | 1.513E-02 | 754 |
| 20.15 | 30 | | | | | | 394.44 |
| 12. 5.89 | 55 | | | | | | 754 |
| 20.15 | 20 | 7.257E-02 | 3.068E-02 | | | | 394.44 |
| 13. 5.89 | 52 | | 3.999E-04 | | | | 754 |
| 0.58 | 10 | | | | | | 394.65 |
| 13. 5.89 | 55 | | | | | | 754 |
| 0.58 | 10 | | | 1.296E-02 | | 3.296E-03 | 394.65 |
| 13. 5.89 | 55 | | | 1.617E-02 | 1.237E-02 | 1.613E-02 | 754 |
| 0.58 | 30 | | | | | | 394.65 |
| 13. 5.89 | 55 | | | | | | 754 |
| 0.58 | 20 | 6.819E-02 | 2.275E-02 | | | | 394.65 |
| 13. 5.89 | 52 | | 7.422E-04 | | | | 753 |
| 4.2 | 10 | | | | | | 394.77 |
| 13. 5.89 | 55 | | | | | | 753 |
| 4.2 | 10 | | | 1.383E-02 | 1.157E-03 | 4.231E-03 | 394.77 |
| 13. 5.89 | 55 | | | 1.662E-02 | 1.317E-02 | 1.680E-02 | 753 |
| 4.2 | 30 | | | | | | 394.77 |
| 13. 5.89 | 55 | | | | | | 753 |
| 4.2 | 20 | 6.389E-02 | 2.249E-02 | | | | 394.77 |
| 13. 5.89 | 52 | | 9.279E-04 | | | | 754 |
| 9. 8 | 10 | | | | | | 394.98 |
| 13. 5.89 | 55 | | | | | | 754 |
| 9. 8 | 10 | | | 1.269E-02 | 6.054E-04 | 3.675E-03 | 394.98 |
| 13. 5.89 | 55 | | | 2.634E-02 | 1.745E-02 | 3.267E-02 | 754 |
| 9. 8 | 30 | | | | | | 394.98 |
| 13. 5.89 | 55 | | | | | | 754 |
| 9. 8 | 20 | 6.248E-02 | 2.097E-02 | | | | 394.98 |
| 13. 5.89 | 52 | | 1.287E-03 | | | | 753 |
| 12.12 | 10 | | | | | | 395.1 |
| 13. 5.89 | 55 | | | | | | 753 |
| 12.12 | 10 | | | 1.356E-02 | 2.224E-03 | 4.132E-03 | 395.1 |
| 13. 5.89 | 55 | | | 1.676E-02 | 1.422E-02 | 1.616E-02 | 753 |
| 12.12 | 30 | | | | | | 395.1 |
| 13. 5.89 | 55 | | | | | | 753 |
| 12.12 | 20 | 5.847E-02 | 2.138E-02 | | | | 395.1 |
| 13. 5.89 | 52 | | 8.132E-04 | | | | 753 |
| 15.58 | 10 | | | | | | 395.27 |
| 13. 5.89 | 55 | | | | | | 753 |
| 15.58 | 10 | | | 1.043E-02 | 1.224E-03 | 3.908E-03 | 395.27 |
| 13. 5.89 | 55 | | | 1.505E-02 | 1.283E-02 | 1.580E-02 | 753 |
| 15.58 | 30 | | | | | | 395.27 |

Table 6.4.58. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 89.04 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 13. 5.89 | 55 | | | | | | 753 |
| 15.58 | 20 | 5.180E-02 | 2.008E-02 | | | | 395.27 |
| 13. 5.89 | 52 | | 8.253E-04 | | | | 753 |
| 19.4 | 10 | | | | | | 395.4 |
| 13. 5.89 | 55 | | | | | | 753 |
| 19.4 | 10 | | | 1.256E-02 | 7.285E-04 | 3.799E-03 | 395.4 |
| 13. 5.89 | 55 | | | 1.514E-02 | 1.292E-02 | 1.463E-02 | 753 |
| 19.4 | 30 | | | | | | 395.4 |
| 13. 5.89 | 55 | | | | | | 753 |
| 19.4 | 20 | 5.538E-02 | 1.991E-02 | | | | 395.4 |
| 14. 5.89 | 52 | | 4.658E-04 | | | | 753 |
| 1.46 | 10 | | | | | | 395.69 |
| 14. 5.89 | 55 | | | | | | 753 |
| 1.46 | 10 | | | 1.103E-02 | | 3.301E-03 | 395.69 |
| 14. 5.89 | 55 | | | | | | 753 |
| 1.46 | 20 | | | | | | 395.69 |
| 14. 5.89 | 55 | | | | | | 753 |
| 1.46 | 20 | 5.402E-02 | 1.957E-02 | | | | 395.69 |
| 14. 5.89 | 52 | | 4.779E-04 | | | | 753 |
| 4.59 | 10 | | | | | | 395.82 |
| 14. 5.89 | 55 | | | | | | 753 |
| 4.59 | 10 | | | 9.088E-03 | | 3.678E-03 | 395.82 |
| 14. 5.89 | 55 | | | 1.607E-02 | 1.134E-02 | 1.590E-02 | 753 |
| 4.59 | 30 | | | | | | 395.82 |
| 14. 5.89 | 55 | | | | | | 753 |
| 4.59 | 20 | 5.420E-02 | 2.037E-02 | | | | 395.82 |
| 14. 5.89 | 55 | | | | | | 754 |
| 8.48 | 10 | | | 1.301E-02 | 2.247E-03 | 3.822E-03 | 395.98 |
| 14. 5.89 | 55 | | | 1.599E-02 | 1.095E-02 | 1.537E-02 | 754 |
| 8.49 | 30 | | | | | | 395.98 |
| 14. 5.89 | 55 | | | | | | 754 |
| 8.48 | 20 | 4.753E-02 | 1.890E-02 | | | | 395.98 |
| 14. 5.89 | 52 | | 8.435E-04 | | | | 752 |
| 15.5 | 10 | | | | | | 396.27 |
| 14. 5.89 | 55 | | | | | | 752 |
| 15.5 | 10 | | | 1.231E-02 | 1.044E-03 | 3.608E-03 | 396.27 |
| 14. 5.89 | 55 | | | 1.548E-02 | 1.223E-02 | 1.505E-02 | 752 |
| 15.5 | 30 | | | | | | 396.27 |
| 14. 5.89 | 55 | | | | | | 752 |
| 15.5 | 20 | 4.866E-02 | 1.935E-02 | | | | 396.27 |
| 15. 5.89 | 52 | | 9.542E-04 | | | | 747 |
| 16.33 | 10 | | | | | | 397.27 |
| 15. 5.89 | 55 | | | | | | 747 |
| 16.33 | 10 | | | 1.363E-02 | 1.373E-03 | 3.755E-03 | 397.27 |
| 15. 5.89 | 55 | | | 1.405E-02 | 1.145E-02 | 1.461E-02 | 747 |
| 16.33 | 30 | | | | | | 397.27 |
| 15. 5.89 | 55 | | | | | | 747 |
| 16.33 | 20 | 4.267E-02 | 1.760E-02 | | | | 397.27 |
| 16. 5.89 | 52 | | 1.349E-03 | | | | 748 |
| 16.23 | 10 | | | | | | 398.27 |
| 16. 5.89 | 55 | | | | | | 748 |
| 16.23 | 10 | | | 1.248E-02 | 1.320E-03 | 3.616E-03 | 398.27 |

Table 6.4.58. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 89.04 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 16. 5.89 | 55 | | | 1.340E-02 | 1.001E-02 | 1.325E-02 | 748 |
| 16.23 | 30 | | | | | | 398.27 |
| 16. 5.89 | 55 | | | | | | 748 |
| 16.23 | 20 | 4.290E-02 | 1.703E-02 | | | | 398.27 |
| 17. 5.89 | 52 | | 1.181E-03 | | | | 747 |
| 16.33 | 10 | | | | | | 399.27 |
| 17. 5.89 | 55 | | | | | | 747 |
| 16.33 | 10 | | | 1.220E-02 | 1.374E-03 | 3.349E-03 | 399.27 |
| 17. 5.89 | 55 | | | 1.317E-02 | 9.191E-03 | 1.320E-02 | 747 |
| 16.33 | 30 | | | | | | 399.27 |
| 17. 5.89 | 55 | | | | | | 747 |
| 16.33 | 20 | 4.147E-02 | 1.583E-02 | | | | 399.27 |
| 18. 5.89 | 52 | | 1.053E-03 | | | | 745 |
| 16.25 | 10 | | | | | | 400.27 |
| 18. 5.89 | 55 | | | | | | 745 |
| 16.25 | 10 | | | 1.213E-02 | 1.139E-03 | 3.371E-03 | 400.27 |
| 18. 5.89 | 55 | | | 1.233E-02 | 9.402E-03 | 1.308E-02 | 745 |
| 16.25 | 30 | | | | | | 400.27 |
| 18. 5.89 | 55 | | | | | | 745 |
| 16.25 | 20 | 4.241E-02 | 1.620E-02 | | | | 400.27 |
| 19. 5.89 | 52 | | 1.095E-03 | | | | 747 |
| 16.42 | 10 | | | | | | 401.27 |
| 19. 5.89 | 55 | | | | | | 747 |
| 16.42 | 10 | | | 1.153E-02 | 1.008E-03 | 3.185E-03 | 401.27 |
| 19. 5.89 | 55 | | | 1.267E-02 | 9.043E-03 | 1.320E-02 | 747 |
| 16.42 | 30 | | | | | | 401.27 |
| 19. 5.89 | 55 | | | | | | 747 |
| 16.42 | 20 | 4.196E-02 | 1.551E-02 | | | | 401.27 |
| 20. 5.89 | 52 | | 1.331E-03 | | | | 746 |
| 16.14 | 10 | | | | | | 402.27 |
| 20. 5.89 | 55 | | | | | | 746 |
| 16.14 | 10 | | | 1.237E-02 | 1.372E-03 | 3.475E-03 | 402.27 |
| 20. 5.89 | 55 | | | 1.264E-02 | 8.897E-03 | 1.295E-02 | 746 |
| 16.14 | 30 | | | | | | 402.27 |
| 20. 5.89 | 55 | | | | | | 746 |
| 16.14 | 20 | 4.376E-02 | 1.523E-02 | | | | 402.27 |
| 21. 5.89 | 55 | | | | | | 17 |
| 12. 0 | 20 | | | | | | 402.59 |
| --- | --- | | | | | | |

Table 6.4.59. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 89.05 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 26. 5.89 | 52 | | | | | | 727 |
| 1.48 | 10 | | | | | | 402.61 |
| 26. 5.89 | 52 | | 1.412E-03 | | | | 727 |
| 1.48 | 10 | | | 9.330E-03 | 1.362E-03 | 2.609E-03 | 404.95 |
| 26. 5.89 | 55 | | | | | | 727 |
| 1.48 | 10 | | | 1.305E-02 | 1.384E-03 | 3.720E-03 | 404.95 |
| 26. 5.89 | 55 | | | 1.325E-02 | 9.776E-03 | 1.350E-02 | 727 |
| 1.48 | 30 | | | | | | 404.95 |
| 26. 5.89 | 55 | | | | | | 727 |
| 1.48 | 20 | 2.798E-02 | 1.593E-02 | | | | 404.95 |
| 27. 5.89 | 52 | | 1.440E-03 | | | | 729 |
| 0.46 | 10 | | | 1.011E-02 | 1.417E-03 | 2.757E-03 | 405.95 |
| 27. 5.89 | 55 | | | | | | 729 |
| 0.46 | 10 | | | 1.425E-02 | 1.278E-03 | 4.029E-03 | 405.95 |
| 27. 5.89 | 55 | | | 1.286E-02 | 1.004E-02 | 1.367E-02 | 729 |
| 0.46 | 30 | | | | | | 405.95 |
| 27. 5.89 | 55 | | | | | | 729 |
| 0.46 | 20 | 3.394E-02 | 1.616E-02 | | | | 405.95 |
| 28. 5.89 | 52 | | 1.421E-03 | | | | 729 |
| 0.59 | 10 | | | 1.019E-02 | 1.450E-03 | 2.640E-03 | 406.9 |
| 28. 5.89 | 55 | | | | | | 729 |
| 0.59 | 10 | | | 1.309E-02 | 1.343E-03 | 3.585E-03 | 406.9 |
| 28. 5.89 | 55 | | | 1.235E-02 | 9.496E-03 | 1.299E-02 | 729 |
| 0.59 | 30 | | | | | | 406.9 |
| 28. 5.89 | 55 | | | | | | 729 |
| 0.59 | 20 | 3.564E-02 | 1.568E-02 | | | | 406.9 |
| 29. 5.89 | 52 | | 1.526E-03 | | | | 731 |
| 0.35 | 10 | | | 9.902E-03 | 1.276E-03 | 2.309E-03 | 407.9 |
| 29. 5.89 | 55 | | | | | | 731 |
| 0.35 | 10 | | | 1.347E-02 | 1.675E-03 | 3.488E-03 | 407.9 |
| 29. 5.89 | 55 | | | 1.281E-02 | 9.408E-03 | 1.328E-02 | 731 |
| 0.35 | 30 | | | | | | 407.9 |
| 29. 5.89 | 55 | | | | | | 731 |
| 0.35 | 20 | 4.040E-02 | 1.588E-02 | | | | 407.9 |
| 30. 5.89 | 52 | | 1.297E-03 | | | | 732 |
| 16.33 | 10 | | | 9.797E-03 | 1.295E-03 | 2.758E-03 | 409.43 |
| 30. 5.89 | 55 | | | | | | 732 |
| 16.33 | 10 | | | 1.333E-02 | 1.561E-03 | 3.490E-03 | 409.43 |
| 30. 5.89 | 55 | | | 1.258E-02 | 8.521E-03 | 1.304E-02 | 732 |
| 16.33 | 30 | | | | | | 409.43 |
| 30. 5.89 | 55 | | | | | | 732 |
| 16.33 | 20 | 4.158E-02 | 1.535E-02 | | | | 409.43 |
| 31. 5.89 | 52 | | 1.285E-03 | | | | 730 |
| 17.52 | 10 | | | 9.796E-03 | 1.232E-03 | 2.451E-03 | 410.44 |
| 31. 5.89 | 55 | | | | | | 730 |
| 17.52 | 10 | | | 1.242E-02 | | 3.191E-03 | 410.44 |
| 31. 5.89 | 55 | | | 1.240E-02 | 8.348E-03 | 1.270E-02 | 730 |
| 17.52 | 30 | | | | | | 410.44 |
| 31. 5.89 | 55 | | | | | | 730 |
| 17.52 | 20 | 4.128E-02 | 1.551E-02 | | | | 410.44 |
| 1. 6.89 | 52 | | 1.474E-03 | | | | 731 |
| 16.55 | 10 | | | 1.106E-02 | 1.366E-03 | 2.740E-03 | 411.35 |

Table 6.4.59. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 89.05 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 1. 6.89 | 55 | | | | | | 731 |
| 16.55 | 10 | | | 1.275E-02 | 1.176E-03 | 3.709E-03 | 411.35 |
| 1. 6.89 | 55 | | | 1.216E-02 | 8.338E-03 | 1.268E-02 | 731 |
| 16.55 | 30 | | | | | | 411.35 |
| 1. 6.89 | 55 | | | | | | 731 |
| 16.55 | 20 | 4.194E-02 | 1.508E-02 | | | | 411.35 |
| 2. 6.89 | 52 | | 1.307E-03 | | | | 730 |
| 17.25 | 10 | | | 1.029E-02 | 1.224E-03 | 2.577E-03 | 412.32 |
| 2. 6.89 | 55 | | | | | | 730 |
| 17.25 | 10 | | | 1.207E-02 | 8.246E-04 | 3.495E-03 | 412.32 |
| 2. 6.89 | 55 | | | 1.135E-02 | 8.409E-03 | 1.270E-02 | 730 |
| 17.25 | 30 | | | | | | 412.32 |
| 2. 6.89 | 55 | | | | | | 730 |
| 17.25 | 20 | 4.403E-02 | 1.530E-02 | | | | 412.32 |
| 3. 6.89 | 52 | | 1.333E-03 | | | | 730 |
| 16.35 | 10 | | | 9.507E-03 | 1.303E-03 | 2.483E-03 | 413.24 |
| 3. 6.89 | 55 | | | | | | 730 |
| 16.35 | 10 | | | 1.187E-02 | 1.172E-03 | 3.133E-03 | 413.24 |
| 3. 6.89 | 55 | | | 1.148E-02 | 8.028E-03 | 1.232E-02 | 730 |
| 16.35 | 30 | | | | | | 413.24 |
| 3. 6.89 | 55 | | | | | | 730 |
| 16.35 | 20 | 4.288E-02 | 1.432E-02 | | | | 413.24 |
| 4. 6.89 | 52 | | | | | | 730 |
| 16.4 | 10 | | | 1.013E-02 | | 2.475E-03 | 414.19 |
| 4. 6.89 | 55 | | | | | | 730 |
| 16.4 | 10 | | | 1.218E-02 | 1.157E-03 | 3.460E-03 | 414.19 |
| 4. 6.89 | 55 | | | 1.142E-02 | 7.828E-03 | 1.199E-02 | 730 |
| 16.4 | 30 | | | | | | 414.19 |
| 4. 6.89 | 55 | | | | | | 730 |
| 16.4 | 20 | 4.095E-02 | 1.396E-02 | | | | 414.19 |
| 7. 6.89 | 52 | | 1.161E-03 | | | | 710 |
| 3.58 | 10 | | | 8.423E-03 | | 2.256E-03 | 416.5 |
| 7. 6.89 | 55 | | | | | | 710 |
| 3.58 | 10 | | | 1.090E-02 | 1.503E-03 | 2.950E-03 | 416.5 |
| 7. 6.89 | 55 | | | 9.828E-03 | 7.029E-03 | 1.044E-02 | 710 |
| 3.48 | 30 | | | | | | 416.5 |
| 7. 6.89 | 55 | | | | | | 710 |
| 3.58 | 20 | 3.732E-02 | 1.245E-02 | | | | 416.5 |
| 8. 6.89 | 52 | | 1.236E-03 | | | | 708 |
| 0.3 | 10 | | | 9.552E-03 | 1.170E-03 | 2.533E-03 | 417.3 |
| 8. 6.89 | 55 | | | | | | 708 |
| 0.3 | 10 | | | 1.085E-02 | 1.235E-03 | 2.906E-03 | 417.3 |
| 8. 6.89 | 55 | | | 9.698E-03 | 6.973E-03 | 1.032E-02 | 708 |
| 0.3 | 30 | | | | | | 417.3 |
| 8. 6.89 | 55 | | | | | | 708 |
| 0.3 | 20 | 3.694E-02 | 1.242E-02 | | | | 417.3 |
| 9. 6.89 | 52 | | 1.221E-03 | | | | 709 |
| 0.38 | 10 | | | 9.452E-03 | 1.181E-03 | 2.260E-03 | 418.25 |
| 9. 6.89 | 55 | | | | | | 709 |
| 0.38 | 10 | | | 1.089E-02 | 1.261E-03 | 2.929E-03 | 418.25 |
| 9. 6.89 | 55 | | | 8.780E-03 | 6.640E-03 | 1.007E-02 | 709 |
| 0.38 | 30 | | | | | | 418.25 |

Table 6.4.59. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 89.05 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 9. 6.89 | 55 | | | | | | 709 |
| 0.38 | 20 | 3.668E-02 | 1.227E-02 | | | | 418.25 |
| 11. 6.89 | 52 | | 1.245E-03 | | | | 708 |
| 0.38 | 10 | | | 9.034E-03 | 1.239E-03 | 2.427E-03 | 420.15 |
| 11. 6.89 | 55 | | | | | | 708 |
| 0.38 | 10 | | | 1.099E-02 | 1.202E-03 | 2.918E-03 | 420.15 |
| 11. 6.89 | 55 | | | 9.350E-03 | 6.799E-03 | 9.973E-03 | 708 |
| 0.38 | 30 | | | | | | 420.15 |
| 11. 6.89 | 55 | | | | | | 708 |
| 0.38 | 20 | 3.743E-02 | 1.219E-02 | | | | 420.15 |
| 12. 6.89 | 52 | | 1.241E-03 | | | | 705 |
| 0.3 | 10 | | | 8.889E-03 | 1.203E-03 | 2.370E-03 | 421.1 |
| 12. 6.89 | 55 | | | | | | 705 |
| 0.3 | 10 | | | 1.048E-02 | 1.324E-03 | 2.836E-03 | 421.1 |
| 12. 6.89 | 55 | | | 9.183E-03 | 6.577E-03 | 9.596E-03 | 705 |
| 0.3 | 30 | | | | | | 421.1 |
| 12. 6.89 | 55 | | | | | | 705 |
| 0.3 | 20 | 3.876E-02 | 1.175E-02 | | | | 421.1 |
| 13. 6.89 | 52 | | 1.242E-03 | | | | 704 |
| 0.45 | 10 | | | 8.935E-03 | 1.188E-03 | 2.342E-03 | 422.05 |
| 13. 6.89 | 55 | | | | | | 704 |
| 0.45 | 10 | | | 1.032E-02 | 1.418E-03 | 2.807E-03 | 422.05 |
| 13. 6.89 | 55 | | | 8.163E-03 | 6.058E-03 | 9.215E-03 | 704 |
| 0.45 | 30 | | | | | | 422.05 |
| 13. 6.89 | 55 | | | | | | 704 |
| 0.45 | 20 | 3.535E-02 | 1.123E-02 | | | | 422.05 |
| 14. 6.89 | 52 | | 1.208E-03 | | | | 702 |
| 0.45 | 10 | | | 8.648E-03 | 1.173E-03 | 2.341E-03 | 423 |
| 14. 6.89 | 55 | | | | | | 702 |
| 0.45 | 10 | | | 1.036E-02 | 1.200E-03 | 2.799E-03 | 423 |
| 14. 6.89 | 55 | | | 8.596E-03 | 5.987E-03 | 9.279E-03 | 702 |
| 0.45 | 30 | | | | | | 423 |
| 14. 6.89 | 55 | | | | | | 702 |
| 0.45 | 20 | 3.418E-02 | 1.126E-02 | | | | 423 |
| 15. 6.89 | 55 | | | | | | 24 |
| 7. 0 | 20 | | | | | | 423.75 |
| | | | | | | | |

Table 6.4.60. RUBICON - R/B values
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 89.06 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| | | | | | | | |
| 19. 6.89 | 52 | | | | | | 735 |
| 8.52 | 10 | | | | | | 423.75 |
| 19. 6.89 | 52 | | 1.306E-03 | | | | 735 |
| 8.52 | 10 | | | 9.987E-03 | 1.265E-03 | 2.510E-03 | 425.13 |
| 19. 6.89 | 55 | | | | | | 735 |
| 8.52 | 10 | | | 1.164E-02 | 1.716E-03 | 3.141E-03 | 425.13 |
| 19. 6.89 | 55 | | | 9.209E-03 | 7.549E-03 | 1.050E-02 | 735 |
| 8.52 | 30 | | | | | | 425.13 |
| 19. 6.89 | 55 | | | | | | 735 |
| 8.52 | 20 | 2.876E-02 | 1.228E-02 | | | | 425.13 |
| 20. 6.89 | 52 | | 1.299E-03 | | | | 737 |
| 8.53 | 10 | | | 9.753E-03 | 1.280E-03 | 2.512E-03 | 426.13 |
| 20. 6.89 | 55 | | | | | | 737 |
| 8.53 | 10 | | | 1.145E-02 | 1.383E-03 | 3.098E-03 | 426.13 |
| 20. 6.89 | 55 | | | 1.005E-02 | 6.973E-03 | 1.074E-02 | 737 |
| 8.53 | 30 | | | | | | 426.13 |
| 20. 6.89 | 55 | | | | | | 737 |
| 8.53 | 20 | 3.133E-02 | 1.257E-02 | | | | 426.13 |
| 23. 6.89 | 52 | | 1.127E-03 | | | | 704 |
| 0.17 | 10 | | | 8.817E-03 | 1.185E-03 | 2.752E-03 | 428.66 |
| 23. 6.89 | 55 | | | | | | 704 |
| 0.17 | 10 | | | 9.686E-03 | 1.177E-03 | 2.574E-03 | 428.66 |
| 23. 6.89 | 55 | | | 7.705E-03 | 6.092E-03 | 8.503E-03 | 704 |
| 0.17 | 30 | | | | | | 428.66 |
| 23. 6.89 | 55 | | | | | | 704 |
| 0.17 | 20 | 3.123E-02 | 1.078E-02 | | | | 428.66 |
| 24. 6.89 | 52 | | 1.252E-03 | | | | 704 |
| 0.15 | 10 | | | 8.641E-03 | 1.125E-03 | 2.249E-03 | 429.59 |
| 24. 6.89 | 55 | | | | | | 704 |
| 0.11 | 10 | | | 9.713E-03 | 1.273E-03 | 2.651E-03 | 429.59 |
| 24. 6.89 | 55 | | | 7.778E-03 | 5.967E-03 | 8.489E-03 | 704 |
| 0.11 | 30 | | | | | | 429.59 |
| 24. 6.89 | 55 | | | | | | 704 |
| 0.11 | 20 | 2.987E-02 | 1.057E-02 | | | | 429.59 |
| 25. 6.89 | 52 | | 1.161E-03 | | | | 703 |
| 0.11 | 10 | | | 8.916E-03 | 1.105E-03 | 2.242E-03 | 430.52 |
| 25. 6.89 | 55 | | | | | | 703 |
| 0.11 | 10 | | | 9.253E-03 | 1.070E-03 | 2.662E-03 | 430.52 |
| 25. 6.89 | 55 | | | 8.126E-03 | 5.922E-03 | 8.368E-03 | 703 |
| 0.11 | 30 | | | | | | 430.52 |
| 25. 6.89 | 55 | | | | | | 703 |
| 0.11 | 20 | 3.014E-02 | 1.048E-02 | | | | 430.52 |
| 26. 6.89 | 52 | | 1.224E-03 | | | | 703 |
| 0. 0 | 10 | | | 9.170E-03 | 1.115E-03 | 2.303E-03 | 431.43 |
| 26. 6.89 | 55 | | | | | | 703 |
| 0. 0 | 10 | | | 9.614E-03 | 1.141E-03 | 2.639E-03 | 431.43 |
| 26. 6.89 | 55 | | | 7.852E-03 | 5.885E-03 | 8.503E-03 | 703 |
| 0. 0 | 30 | | | | | | 431.43 |
| 26. 6.89 | 55 | | | | | | 703 |
| 0. 0 | 20 | 3.042E-02 | 1.039E-02 | | | | 431.43 |
| 26. 6.89 | 52 | | 1.129E-03 | | | | 703 |
| 7.58 | 10 | | | | | | 431.73 |

Table 6.4.60. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 89.06 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 26. 6.89 | 52 | | 8.385E-04 | | | | 703 |
| 8.2 | 10 | | | | | | 431.73 |
| 26. 6.89 | 52 | | 1.090E-03 | | | | 703 |
| 8.41 | 10 | | | | | | 431.73 |
| 26. 6.89 | 52 | | 1.086E-03 | | | | 703 |
| 8.52 | 10 | | | | | | 431.73 |
| 26. 6.89 | 52 | | 1.084E-03 | | | | 703 |
| 9. 5 | 10 | | | | | | 431.76 |
| 26. 6.89 | 52 | | 1.046E-03 | | | | 703 |
| 9.18 | 10 | | | | | | 431.76 |
| 26. 6.89 | 52 | | 1.096E-03 | | | | 703 |
| 9.31 | 10 | | | | | | 431.77 |
| 26. 6.89 | 52 | | 1.078E-03 | | | | 703 |
| 9.37 | 10 | | | | | | 431.77 |
| 26. 6.89 | 52 | | 1.147E-03 | | | | 703 |
| 9.45 | 10 | | | | | | 431.78 |
| 26. 6.89 | 55 | | | | | | 705 |
| 10. 2 | 10 | | | 9.223E-03 | 1.139E-03 | 2.966E-03 | 431.79 |
| 26. 6.89 | 55 | | | 1.575E-02 | 8.630E-03 | 1.821E-02 | 705 |
| 10. 2 | 30 | | | | | | 431.79 |
| 26. 6.89 | 55 | | | | | | 705 |
| 10. 2 | 20 | 1.891E-01 | 1.484E-02 | | | | 431.79 |
| 26. 6.89 | 52 | | 1.267E-03 | | | | 704 |
| 12.32 | 10 | | | | | | 431.86 |
| 26. 6.89 | 55 | | | | | | 704 |
| 12.32 | 10 | | | 1.565E-02 | 1.078E-03 | 4.511E-03 | 431.86 |
| 26. 6.89 | 55 | | | 2.639E-02 | 1.425E-02 | 3.187E-02 | 704 |
| 12.32 | 30 | | | | | | 431.86 |
| 26. 6.89 | 55 | | | | | | 704 |
| 12.32 | 20 | 5.218E-01 | 4.920E-02 | | | | 431.86 |
| 26. 6.89 | 52 | | 1.151E-03 | | | | 704 |
| 16.1 | 10 | | | | | | 432.01 |
| 26. 6.89 | 55 | | | | | | 704 |
| 16.1 | 10 | | | 1.965E-02 | 7.974E-04 | 4.885E-03 | 432.01 |
| 26. 6.89 | 55 | | | 2.218E-02 | 1.500E-02 | 2.322E-02 | 704 |
| 16.1 | 30 | | | | | | 432.01 |
| 26. 6.89 | 55 | | | | | | 704 |
| 16.1 | 20 | ######## | 6.248E-02 | | | | 432.01 |
| 26. 6.89 | 52 | | 1.246E-03 | | | | 703 |
| 19.3 | 10 | | | | | | 432.12 |
| 26. 6.89 | 55 | | | | | | 703 |
| 19.3 | 10 | | | 1.962E-02 | 9.211E-04 | 5.071E-03 | 432.12 |
| 26. 6.89 | 55 | | | 2.047E-02 | 1.302E-02 | 2.206E-02 | 703 |
| 19.3 | 30 | | | | | | 432.12 |
| 26. 6.89 | 55 | | | | | | 703 |
| 19.3 | 20 | 4.731E-01 | 5.726E-02 | | | | 432.12 |
| 27. 6.89 | 52 | | 1.206E-03 | | | | 702 |
| 0.31 | 10 | | | | | | 432.32 |
| 27. 6.89 | 55 | | | | | | 702 |
| 0.31 | 10 | | | 1.896E-02 | 1.545E-03 | 5.558E-03 | 432.32 |
| 27. 6.89 | 55 | | | 2.015E-02 | 1.495E-02 | 2.153E-02 | 702 |
| 0.31 | 30 | | | | | | 432.32 |

Table 6.4.60. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 89.06 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 27. 6.89 | 55 | | | | | | 702 |
| 0.31 | 20 | 3.727E-01 | 5.034E-02 | | | | 432.32 |
| 27. 6.89 | 52 | | 1.044E-03 | | | | 703 |
| 4.19 | 10 | | | | | | 432.47 |
| 27. 6.89 | 55 | | | | | | 703 |
| 4.19 | 10 | | | 1.907E-02 | 1.023E-03 | 5.465E-03 | 432.47 |
| 27. 6.89 | 55 | | | 2.005E-02 | 1.504E-02 | 2.112E-02 | 703 |
| 4.19 | 30 | | | | | | 432.47 |
| 27. 6.89 | 55 | | | | | | 703 |
| 4.19 | 20 | 3.944E-01 | 4.943E-02 | | | | 432.47 |
| 27. 6.89 | 52 | | 1.100E-03 | | | | 704 |
| 8.4 | 10 | | | | | | 432.62 |
| 27. 6.89 | 55 | | | | | | 704 |
| 8.4 | 10 | | | 1.873E-02 | 1.579E-03 | 5.509E-03 | 432.62 |
| 27. 6.89 | 55 | | | 1.962E-02 | 1.516E-02 | 1.915E-02 | 704 |
| 8.4 | 30 | | | | | | 432.62 |
| 27. 6.89 | 55 | | | | | | 704 |
| 8.4 | 20 | 2.177E-01 | 5.002E-02 | | | | 432.62 |
| 27. 6.89 | 52 | | 8.904E-04 | | | | 704 |
| 11.46 | 10 | | | | | | 432.73 |
| 27. 6.89 | 55 | | | | | | 704 |
| 11.46 | 10 | | | 1.861E-02 | | 5.268E-03 | 432.73 |
| 27. 6.89 | 55 | | | 1.930E-02 | 1.338E-02 | 1.986E-02 | 704 |
| 11.46 | 30 | | | | | | 432.73 |
| 27. 6.89 | 55 | | | | | | 704 |
| 11.46 | 20 | 1.914E-01 | 4.834E-02 | | | | 432.73 |
| 27. 6.89 | 52 | | 1.331E-03 | | | | 704 |
| 16.25 | 10 | | | | | | 432.92 |
| 27. 6.89 | 55 | | | | | | 704 |
| 16.25 | 10 | | | 1.790E-02 | | 5.642E-03 | 432.92 |
| 27. 6.89 | 55 | | | 1.811E-02 | 1.438E-02 | 1.955E-02 | 704 |
| 16.25 | 30 | | | | | | 432.92 |
| 27. 6.89 | 55 | | | | | | 704 |
| 16.25 | 20 | 1.854E-01 | 4.831E-02 | | | | 432.92 |
| 27. 6.89 | 52 | | 4.832E-04 | | | | 704 |
| 19.4 | 10 | | | | | | 433.03 |
| 27. 6.89 | 55 | | | | | | 704 |
| 19.4 | 10 | | | 1.690E-02 | 1.154E-03 | 5.397E-03 | 433.03 |
| 27. 6.89 | 55 | | | 1.768E-02 | 1.514E-02 | 1.979E-02 | 704 |
| 19.4 | 30 | | | | | | 433.03 |
| 27. 6.89 | 55 | | | | | | 704 |
| 19.4 | 20 | 1.739E-01 | 4.763E-02 | | | | 433.03 |
| 28. 6.89 | 52 | | 1.068E-03 | | | | 704 |
| 0.3 | 10 | | | | | | 433.23 |
| 28. 6.89 | 55 | | | | | | 704 |
| 0.3 | 10 | | | 1.915E-02 | 1.302E-03 | 5.781E-03 | 433.23 |
| 28. 6.89 | 55 | | | 1.966E-02 | 1.418E-02 | 1.945E-02 | 704 |
| 0.3 | 30 | | | | | | 433.23 |
| 28. 6.89 | 55 | | | | | | 704 |
| 0.3 | 20 | 1.554E-01 | 4.741E-02 | | | | 433.23 |
| 28. 6.89 | 55 | | | | | | 704 |
| 4.19 | 10 | | | 1.867E-02 | 1.016E-03 | 5.644E-03 | 433.39 |

Table 6.4.60. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 89.06 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 28. 6.89 | 55 | | | 1.970E-02 | 1.433E-02 | 1.961E-02 | 704 |
| 4.19 | 30 | | | | | | 433.39 |
| 28. 6.89 | 55 | | | | | | 704 |
| 4.19 | 20 | 1.846E-01 | 4.764E-02 | | | | 433.39 |
| 28. 6.89 | 52 | | 1.419E-03 | | | | 705 |
| 8.28 | 10 | | | | | | 433.54 |
| 28. 6.89 | 55 | | | | | | 705 |
| 8.28 | 10 | | | 1.938E-02 | 1.712E-03 | 6.029E-03 | 433.54 |
| 28. 6.89 | 55 | | | 2.056E-02 | 1.614E-02 | 2.008E-02 | 705 |
| 8.28 | 30 | | | | | | 433.54 |
| 28. 6.89 | 55 | | | | | | 705 |
| 8.28 | 20 | 1.663E-01 | 4.815E-02 | | | | 433.54 |
| 28. 6.89 | 52 | | 7.372E-04 | | | | 703 |
| 20. 0 | 10 | | | | | | 434.01 |
| 28. 6.89 | 55 | | | | | | 703 |
| 20. 0 | 10 | | | 1.725E-02 | 8.240E-04 | 5.358E-03 | 434.01 |
| 28. 6.89 | 55 | | | | | | 703 |
| 20. 0 | 30 | | | | | | 434.01 |
| 28. 6.89 | 55 | | | | | | 703 |
| 20. 0 | 20 | 1.364E-01 | 4.656E-02 | | | | 434.01 |
| 29. 6.89 | 52 | | | | | | 703 |
| 0.21 | 10 | | | | | | 434.18 |
| 29. 6.89 | 52 | | 1.302E-03 | | | | 703 |
| 0.21 | 10 | | | | | | 434.18 |
| 29. 6.89 | 55 | | | | | | 703 |
| 0.21 | 10 | | | 1.855E-02 | 1.601E-03 | 5.817E-03 | 434.18 |
| 29. 6.89 | 55 | | | 1.867E-02 | 1.500E-02 | 1.956E-02 | 703 |
| 0.21 | 30 | | | | | | 434.18 |
| 29. 6.89 | 55 | | | | | | 703 |
| 0.21 | 20 | 1.437E-01 | 4.750E-02 | | | | 434.18 |
| 29. 6.89 | 52 | | 5.851E-04 | | | | 704 |
| 4. 1 | 10 | | | | | | 434.33 |
| 29. 6.89 | 55 | | | | | | 704 |
| 4. 1 | 10 | | | 1.601E-02 | | 5.337E-03 | 434.33 |
| 29. 6.89 | 55 | | | 1.894E-02 | 1.494E-02 | 2.015E-02 | 704 |
| 4. 1 | 30 | | | | | | 434.33 |
| 29. 6.89 | 55 | | | | | | 704 |
| 4. 1 | 20 | 1.474E-01 | 4.624E-02 | | | | 434.33 |
| 29. 6.89 | 55 | | | | | | 704 |
| 8.42 | 10 | | | 1.116E-02 | | 3.597E-03 | 434.48 |
| 29. 6.89 | 55 | | | 1.894E-02 | 1.488E-02 | 2.076E-02 | 704 |
| 8.42 | 30 | | | | | | 434.48 |
| 29. 6.89 | 55 | | | | | | 704 |
| 8.42 | 20 | 1.879E-01 | 3.747E-02 | | | | 434.48 |
| 29. 6.89 | 52 | | 4.706E-04 | | | | 761 |
| 11. 8 | 10 | | | | | | 434.61 |
| 29. 6.89 | 55 | | | | | | 761 |
| 11. 8 | 10 | | | 2.091E-02 | | 6.657E-03 | 434.61 |
| 29. 6.89 | 55 | | | 2.250E-02 | 1.708E-02 | 2.313E-02 | 761 |
| 11. 8 | 30 | | | | | | 434.61 |
| 29. 6.89 | 55 | | | | | | 761 |
| 11. 8 | 20 | 1.752E-01 | 5.599E-02 | | | | 434.61 |

Table 6.4.60. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. | 89.06 | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 29. 6.89 | 52 | | 4.252E-04 | | | | 761 |
| 13.31 | 10 | | | | | | 434.69 |
| 29. 6.89 | 55 | | | | | | 761 |
| 13.31 | 10 | | | 2.149E-02 | | 6.786E-03 | 434.69 |
| 29. 6.89 | 55 | | | 2.094E-02 | 1.879E-02 | 2.127E-02 | 761 |
| 13.31 | 30 | | | | | | 434.69 |
| 29. 6.89 | 55 | | | | | | 761 |
| 13.31 | 20 | | 5.596E-02 | | | | 434.69 |
| 29. 6.89 | 52 | | 3.743E-04 | | | | 761 |
| 16.13 | 10 | | | | | | 434.8 |
| 29. 6.89 | 55 | | | | | | 761 |
| 16.13 | 10 | | | 2.184E-02 | | 6.927E-03 | 434.8 |
| 29. 6.89 | 55 | | | 2.125E-02 | 1.922E-02 | 2.323E-02 | 761 |
| 16.13 | 30 | | | | | | 434.8 |
| 29. 6.89 | 55 | | | | | | 761 |
| 16.13 | 20 | | 5.251E-02 | | | | 434.8 |
| 29. 6.89 | 52 | | 3.056E-04 | | | | 760 |
| 19.46 | 10 | | | | | | 434.92 |
| 29. 6.89 | 55 | | | | | | 760 |
| 19.46 | 10 | | | 2.028E-02 | | 6.720E-03 | 434.92 |
| 29. 6.89 | 55 | | | 2.159E-02 | 1.863E-02 | 2.183E-02 | 760 |
| 19.46 | 30 | | | | | | 434.92 |
| 29. 6.89 | 55 | | | | | | 760 |
| 19.46 | 20 | 1.577E-01 | 5.110E-02 | | | | 434.92 |
| 30. 6.89 | 52 | | 1.061E-03 | | | | 759 |
| 0.4 | 10 | | | | | | 435.11 |
| 30. 6.89 | 55 | | | | | | 759 |
| 0.4 | 10 | | | 2.258E-02 | | 7.345E-03 | 435.11 |
| 30. 6.89 | 55 | | | 2.270E-02 | 1.979E-02 | 2.258E-02 | 759 |
| 0.4 | 30 | | | | | | 435.11 |
| 30. 6.89 | 55 | | | | | | 759 |
| 0.4 | 20 | 1.558E-01 | 5.696E-02 | | | | 435.11 |
| 30. 6.89 | 52 | | 7.083E-04 | | | | 760 |
| 3.44 | 10 | | | | | | 435.22 |
| 30. 6.89 | 55 | | | | | | 760 |
| 3.44 | 10 | | | 2.191E-02 | | 1.534E-02 | 435.22 |
| 30. 6.89 | 55 | | | 2.302E-02 | 1.997E-02 | 2.455E-02 | 760 |
| 3.44 | 30 | | | | | | 435.22 |
| 30. 6.89 | 55 | | | | | | 760 |
| 3.44 | 20 | 1.448E-01 | 5.307E-02 | | | | 435.22 |
| 30. 6.89 | 52 | | 7.371E-04 | | | | 759 |
| 11.58 | 10 | | | | | | 435.52 |
| 30. 6.89 | 55 | | | | | | 759 |
| 11.58 | 10 | | | 2.317E-02 | | 7.201E-03 | 435.52 |
| 30. 6.89 | 55 | | | 2.242E-02 | 2.003E-02 | 2.214E-02 | 759 |
| 11.58 | 30 | | | | | | 435.52 |
| 30. 6.89 | 55 | | | | | | 759 |
| 11.58 | 20 | 1.636E-01 | 5.192E-02 | | | | 435.52 |
| 30. 6.89 | 52 | | 6.201E-04 | | | | 755 |
| 19.5 | 10 | | | | | | 435.89 |
| 30. 6.89 | 55 | | | | | | 755 |
| 19.5 | 10 | | | 2.273E-02 | | 7.127E-03 | 435.89 |

Table 6.4.60. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 89.06 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 30. 6.89 | 55 | | | 2.068E-02 | 1.935E-02 | 2.049E-02 | 755 |
| 19.5 | 30 | | | | | | 435.89 |
| 30. 6.89 | 55 | | | | | | 755 |
| 19.5 | 20 | 1.433E-01 | 4.992E-02 | | | | 435.89 |
| 1. 7.89 | 52 | | 5.965E-04 | | | | 756 |
| 4.5 | 10 | | | | | | 436.23 |
| 1. 7.89 | 55 | | | | | | 756 |
| 4.5 | 10 | | | 2.016E-02 | | 6.781E-03 | 436.23 |
| 1. 7.89 | 55 | | | 2.362E-02 | 1.749E-02 | 2.245E-02 | 756 |
| 4.5 | 30 | | | | | | 436.23 |
| 1. 7.89 | 55 | | | | | | 756 |
| 4.5 | 20 | 1.396E-01 | 6.020E-02 | | | | 436.23 |
| 2. 7.89 | 52 | | 9.327E-04 | | | | 756 |
| 0.37 | 10 | | | | | | 437.01 |
| 2. 7.89 | 55 | | | | | | 756 |
| 0.37 | 10 | | | 2.081E-02 | | 6.803E-03 | 437.01 |
| 2. 7.89 | 55 | | | 2.206E-02 | 1.695E-02 | 2.189E-02 | 756 |
| 0.37 | 30 | | | | | | 437.01 |
| 2. 7.89 | 55 | | | | | | 756 |
| 0.37 | 20 | 1.314E-01 | 5.960E-02 | | | | 437.01 |
| 3. 7.89 | 52 | | 1.012E-03 | | | | 756 |
| 0.3 | 10 | | | | | | 437.97 |
| 3. 7.89 | 55 | | | | | | 756 |
| 0.3 | 10 | | | 2.364E-02 | | 7.338E-03 | 437.97 |
| 3. 7.89 | 55 | | | 1.687E-02 | 1.359E-02 | 1.660E-02 | 756 |
| 0.3 | 30 | | | | | | 437.97 |
| 3. 7.89 | 55 | | | | | | 756 |
| 0.3 | 20 | 1.315E-01 | 5.035E-02 | | | | 437.97 |
| 3. 7.89 | 52 | | 2.921E-04 | | | | 742 |
| 9.58 | 10 | | | | | | 438.28 |
| 3. 7.89 | 55 | | | | | | 742 |
| 9.58 | 10 | | | 2.466E-02 | | 8.588E-03 | 438.28 |
| 3. 7.89 | 55 | | | 2.159E-02 | 1.736E-02 | 2.078E-02 | 742 |
| 9.58 | 30 | | | | | | 438.28 |
| 3. 7.89 | 55 | | | | | | 742 |
| 9.58 | 20 | 9.741E-02 | 6.240E-02 | | | | 438.28 |
| 3. 7.89 | 52 | | 2.258E-04 | | | | 749 |
| 12.3 | 10 | | | | | | 438.36 |
| 3. 7.89 | 55 | | | | | | 749 |
| 12.3 | 10 | | | 1.532E-02 | 8.391E-04 | 5.512E-03 | 438.36 |
| 3. 7.89 | 55 | | | 2.114E-02 | 1.707E-02 | 2.038E-02 | 749 |
| 12.3 | 30 | | | | | | 438.36 |
| 3. 7.89 | 55 | | | | | | 749 |
| 12.3 | 20 | 8.535E-02 | 4.664E-02 | | | | 438.36 |
| 3. 7.89 | 52 | | 2.406E-04 | | | | 747 |
| 16.1 | 10 | | | | | | 438.51 |
| 3. 7.89 | 55 | | | | | | 747 |
| 16.1 | 10 | | | 1.602E-02 | 1.763E-03 | 5.590E-03 | 438.51 |
| 3. 7.89 | 55 | | | 1.930E-02 | 1.648E-02 | 2.049E-02 | 747 |
| 16.1 | 30 | | | | | | 438.51 |
| 3. 7.89 | 55 | | | | | | 747 |
| 16.1 | 20 | 7.224E-02 | 4.537E-02 | | | | 438.51 |

Table 6.4.60. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 89.06 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 3. 7.89 | 52 | | 1.211E-03 | | | | 744 |
| 20. 0 | 10 | | | | | | 438.66 |
| 3. 7.89 | 55 | | | | | | 744 |
| 20. 0 | 10 | | | 1.653E-02 | 1.177E-03 | 5.295E-03 | 438.66 |
| 3. 7.89 | 55 | | | 1.917E-02 | 1.537E-02 | 1.929E-02 | 744 |
| 20. 0 | 30 | | | | | | 438.66 |
| 3. 7.89 | 55 | | | | | | 744 |
| 20. 0 | 20 | 6.552E-02 | 2.582E-02 | | | | 438.66 |
| 4. 7.89 | 52 | | 1.002E-03 | | | | 746 |
| 1. 0 | 10 | | | | | | 438.94 |
| 4. 7.89 | 55 | | | | | | 746 |
| 1. 0 | 10 | | | 1.592E-02 | 1.206E-03 | 5.067E-03 | 438.94 |
| 4. 7.89 | 55 | | | 1.902E-02 | 1.533E-02 | 1.991E-02 | 746 |
| 1. 0 | 30 | | | | | | 438.94 |
| 4. 7.89 | 55 | | | | | | 746 |
| 1. 0 | 20 | 6.512E-02 | 2.592E-02 | | | | 438.94 |
| 4. 7.89 | 52 | | 6.073E-04 | | | | 745 |
| 4.21 | 10 | | | | | | 439.05 |
| 4. 7.89 | 55 | | | | | | 745 |
| 4.21 | 10 | | | 9.481E-03 | 1.107E-03 | 5.374E-03 | 439.05 |
| 4. 7.89 | 55 | | | 1.955E-02 | 1.529E-02 | 1.939E-02 | 745 |
| 4.21 | 30 | | | | | | 439.05 |
| 4. 7.89 | 55 | | | | | | 745 |
| 4.21 | 20 | 6.612E-02 | 2.559E-02 | | | | 439.05 |
| 4. 7.89 | 52 | | 1.071E-03 | | | | 745 |
| 8.45 | 10 | | | | | | 439.2 |
| 4. 7.89 | 55 | | | | | | 745 |
| 8.45 | 10 | | | 1.585E-02 | | 5.263E-03 | 439.2 |
| 4. 7.89 | 55 | | | 1.989E-02 | 1.601E-02 | 1.779E-02 | 745 |
| 8.45 | 30 | | | | | | 439.2 |
| 4. 7.89 | 55 | | | | | | 745 |
| 8.45 | 20 | 6.076E-02 | 2.460E-02 | | | | 439.2 |
| 7. 7.89 | 52 | | 5.547E-04 | | | | 735 |
| 0.27 | 10 | | | | | | 441.73 |
| 7. 7.89 | 55 | | | | | | 735 |
| 0.27 | 10 | | | 1.519E-02 | | 5.189E-03 | 441.73 |
| 7. 7.89 | 55 | | | 1.680E-02 | 1.184E-02 | 1.665E-02 | 735 |
| 0.27 | 30 | | | | | | 441.73 |
| 7. 7.89 | 55 | | | | | | 735 |
| 0.27 | 20 | 4.795E-02 | 2.152E-02 | | | | 441.73 |
| 7. 7.89 | 55 | | | | | | 735 |
| 0.27 | 20 | | | | | | 441.73 |
| 8. 7.89 | 52 | | 4.873E-04 | | | | 791 |
| 0.48 | 10 | | | | | | 442.81 |
| 8. 7.89 | 55 | | | 2.018E-02 | 1.761E-02 | 2.170E-02 | 791 |
| 0.48 | 30 | | | | | | 442.81 |
| 8. 7.89 | 55 | | | | | | 791 |
| 0.48 | 20 | 6.666E-02 | 2.284E-02 | | | | 442.81 |
| 8. 7.89 | 52 | | | | | | 786 |
| 12. 0 | 10 | | | | | | 442.99 |
| 9. 7.89 | 52 | | 7.869E-04 | | | | 784 |
| 0.57 | 10 | | | | | | 443.74 |

Table 6.4.60. (continued)

| RUBICON -- R/B RATES | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXPERIMENT NO. D214-01 | | | CAPSULE NO. C | | CYCLE NO. 89.06 | | |
| | | | | | | | |
| DATE | GM | KR-90 | KR-89 | KR-88 | KR-87 | KR-85M | TEMP |
| TIME | SV | XE-133 | XE-135 | XE-135M | XE-137 | XE-138 | FPD |
| 9. 7.89 | 55 | | | | | | 784 |
| 0.57 | 10 | | | 1.660E-02 | 1.929E-03 | 5.208E-03 | 443.74 |
| 9. 7.89 | 55 | | | 2.131E-02 | 1.670E-02 | 2.094E-02 | 784 |
| 0.57 | 30 | | | | | | 443.74 |
| 9. 7.89 | 55 | | | | | | 784 |
| 0.57 | 20 | 1.791E-01 | 6.611E-02 | | | | 443.74 |
| 10. 7.89 | 52 | | 1.641E-03 | | | | 784 |
| 1.15 | 10 | | | | | | 444.68 |
| 10. 7.89 | 55 | | | | | | 784 |
| 1.15 | 10 | | | 1.659E-02 | 1.041E-03 | 4.990E-03 | 444.68 |
| 10. 7.89 | 55 | | | 2.075E-02 | 1.472E-02 | 2.108E-02 | 784 |
| 1.15 | 30 | | | | | | 444.68 |
| 10. 7.89 | 55 | | | | | | 784 |
| 1.15 | 20 | 6.117E-02 | 2.277E-02 | | | | 444.68 |
| 10. 7.89 | 52 | | 1.122E-03 | | | | 780 |
| 16.41 | 10 | | | | | | 445.01 |
| 10. 7.89 | 55 | | | | | | 780 |
| 16.41 | 10 | | | 1.702E-02 | 1.685E-03 | 5.453E-03 | 445.01 |
| 10. 7.89 | 55 | | | 2.266E-02 | 1.772E-02 | 2.330E-02 | 780 |
| 16.41 | 30 | | | | | | 445.01 |
| 10. 7.89 | 55 | | | | | | 780 |
| 16.41 | 20 | 9.377E-02 | 2.502E-02 | | | | 445.01 |
| 11. 7.89 | 55 | | | | | | 59 |
| 3. 0 | 20 | | | | | | 445.35 |

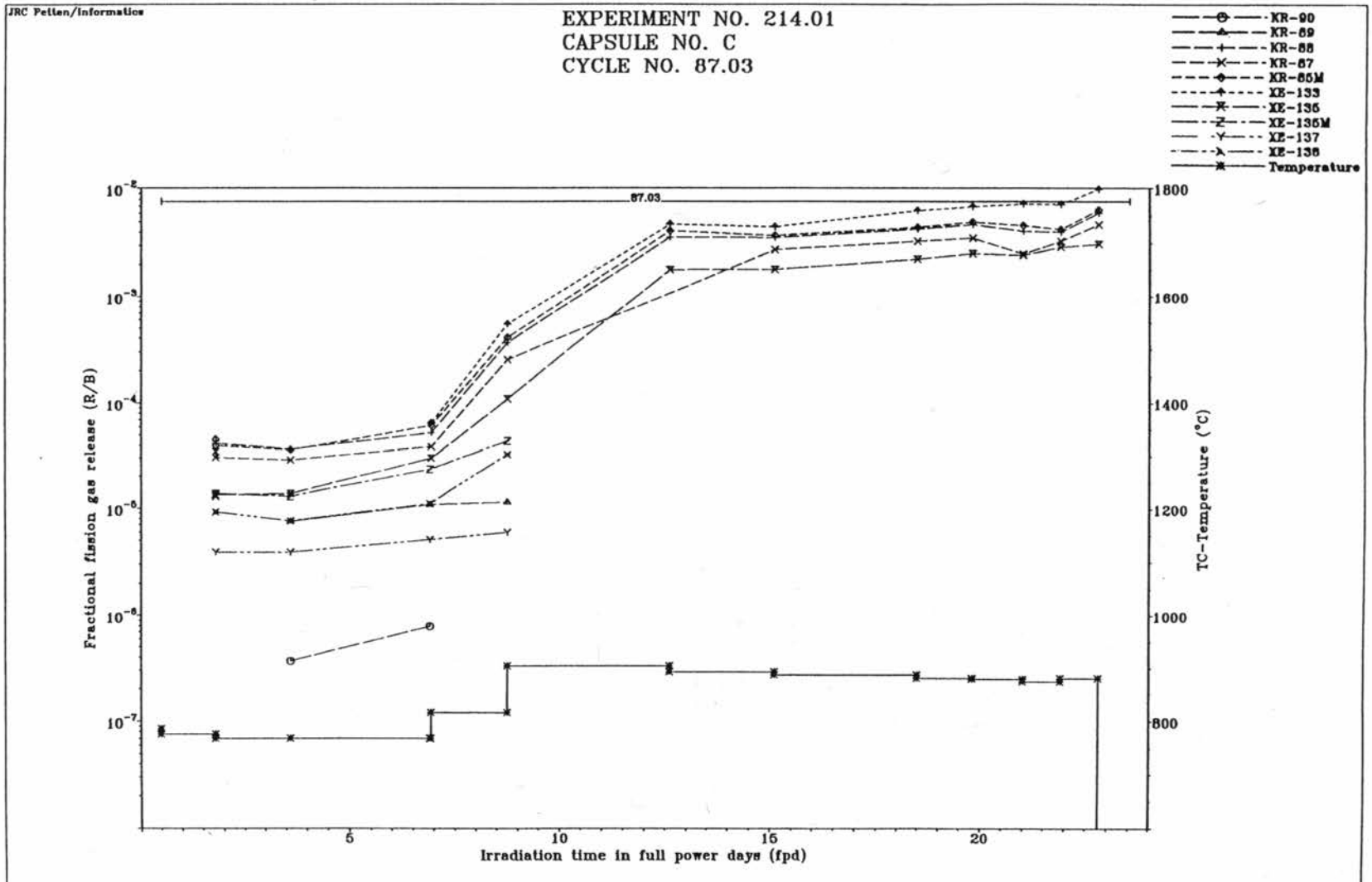



Fig. 6.4.41. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

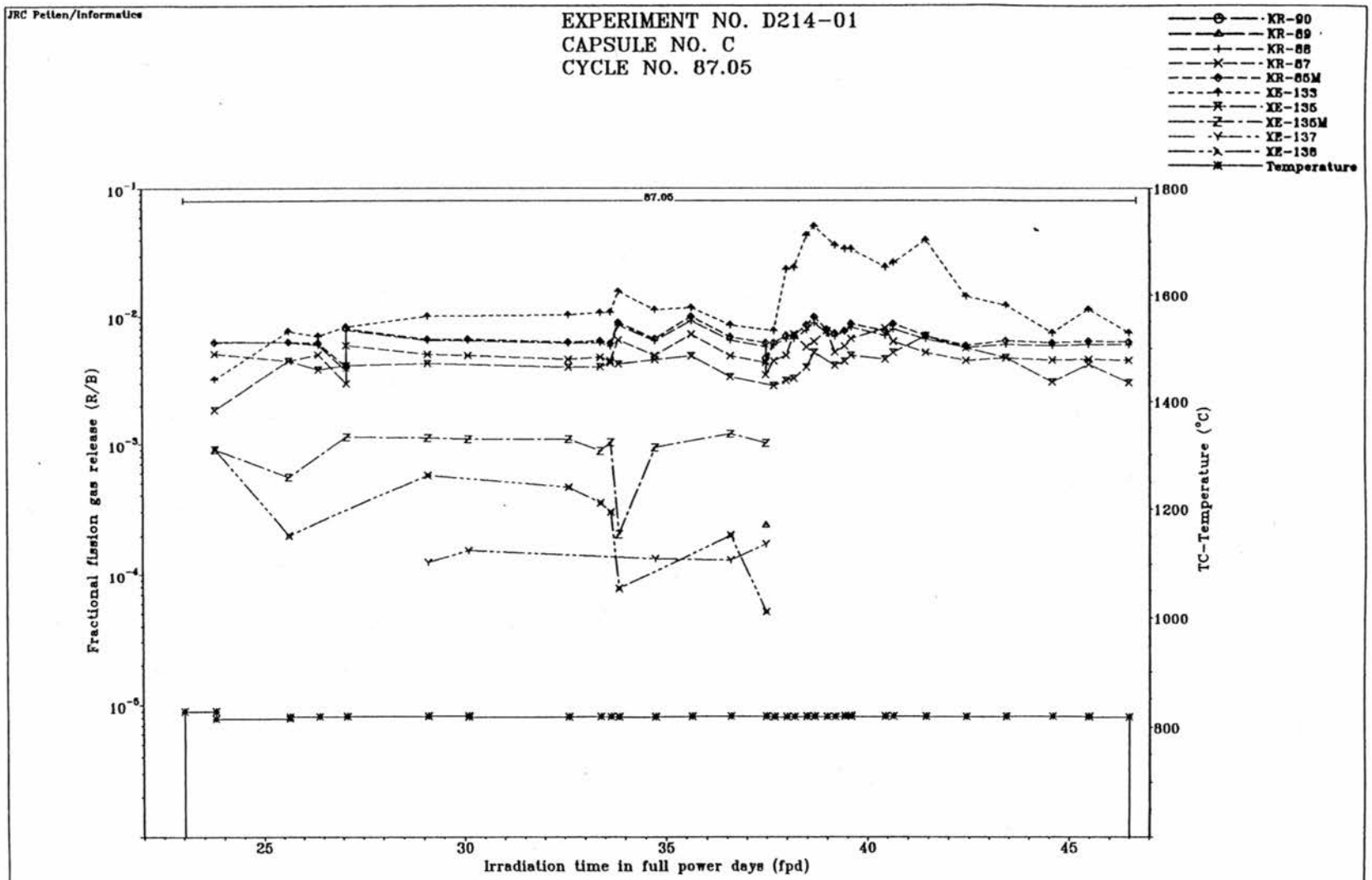



Fig. 6.4.42. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

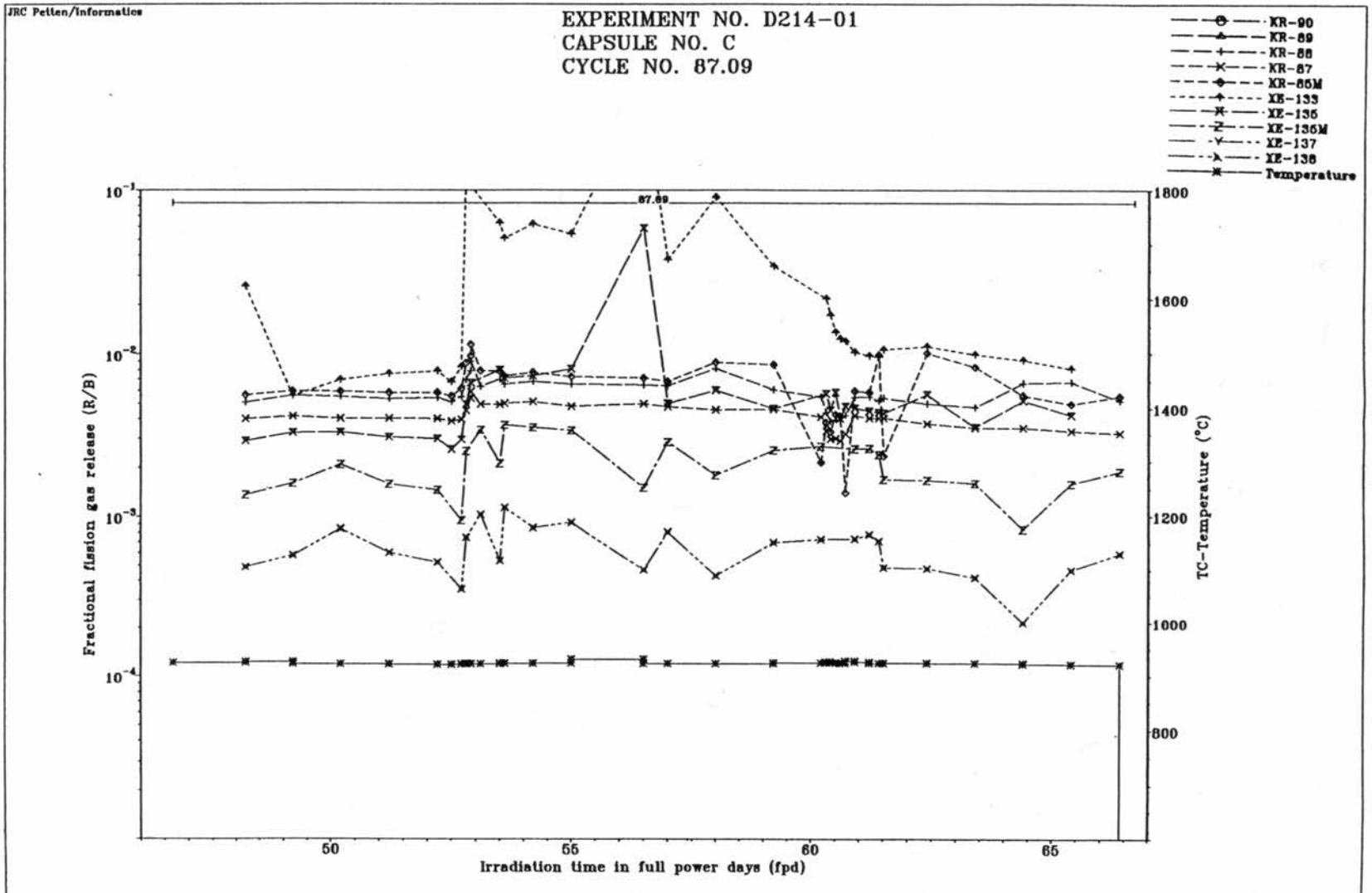



Fig. 6.4.43. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

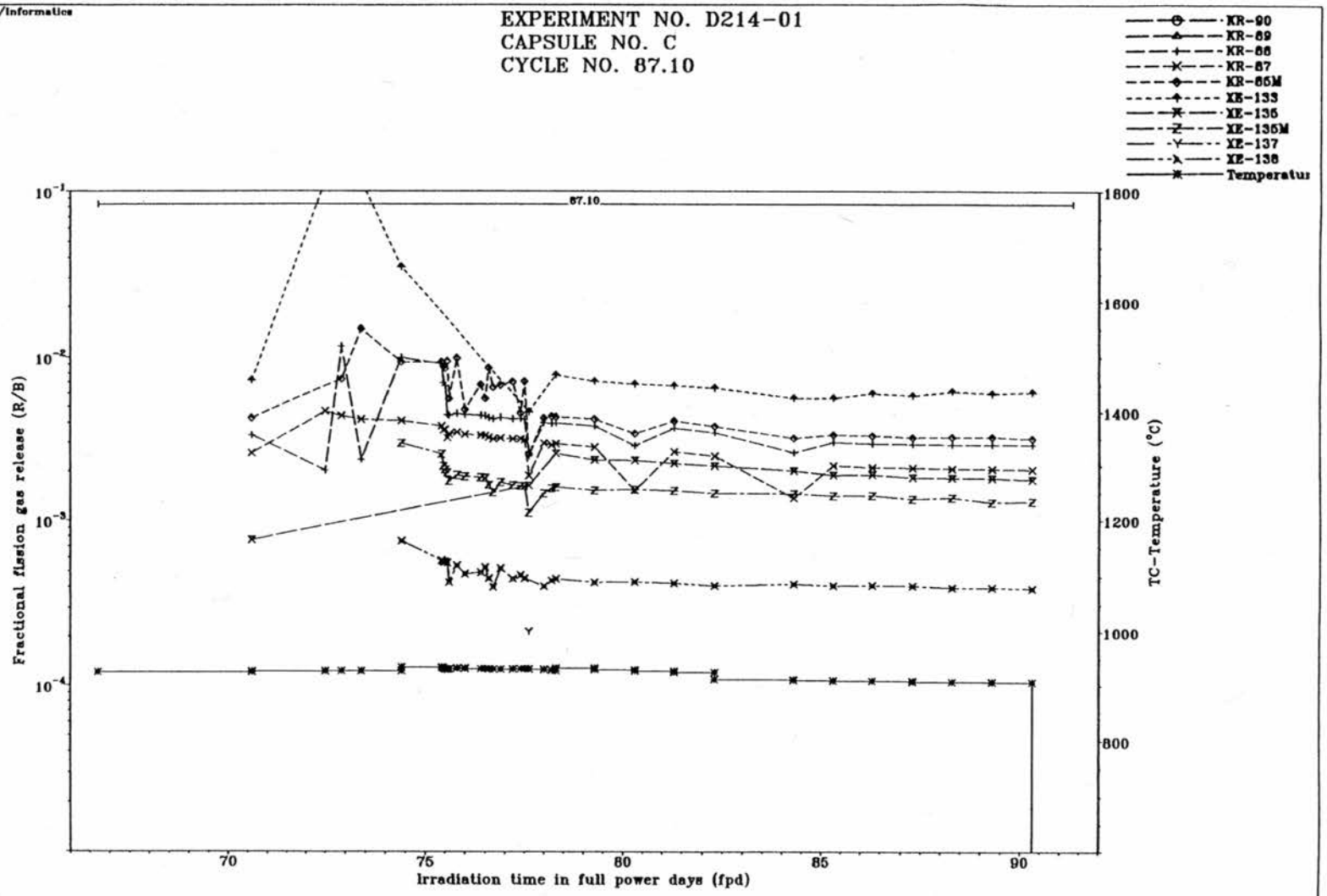



Fig. 6.4.44. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

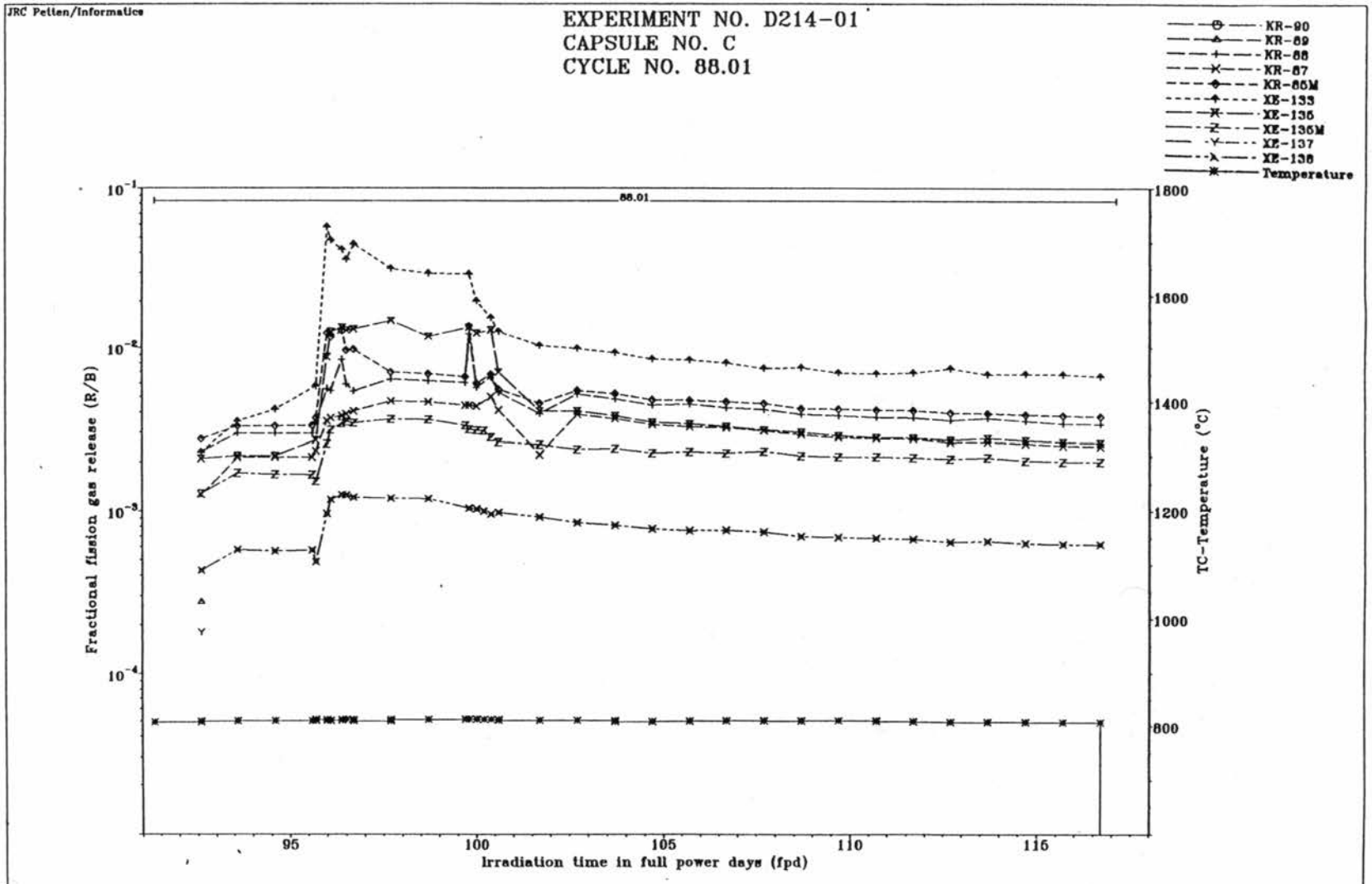



Fig. 6.4.45. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

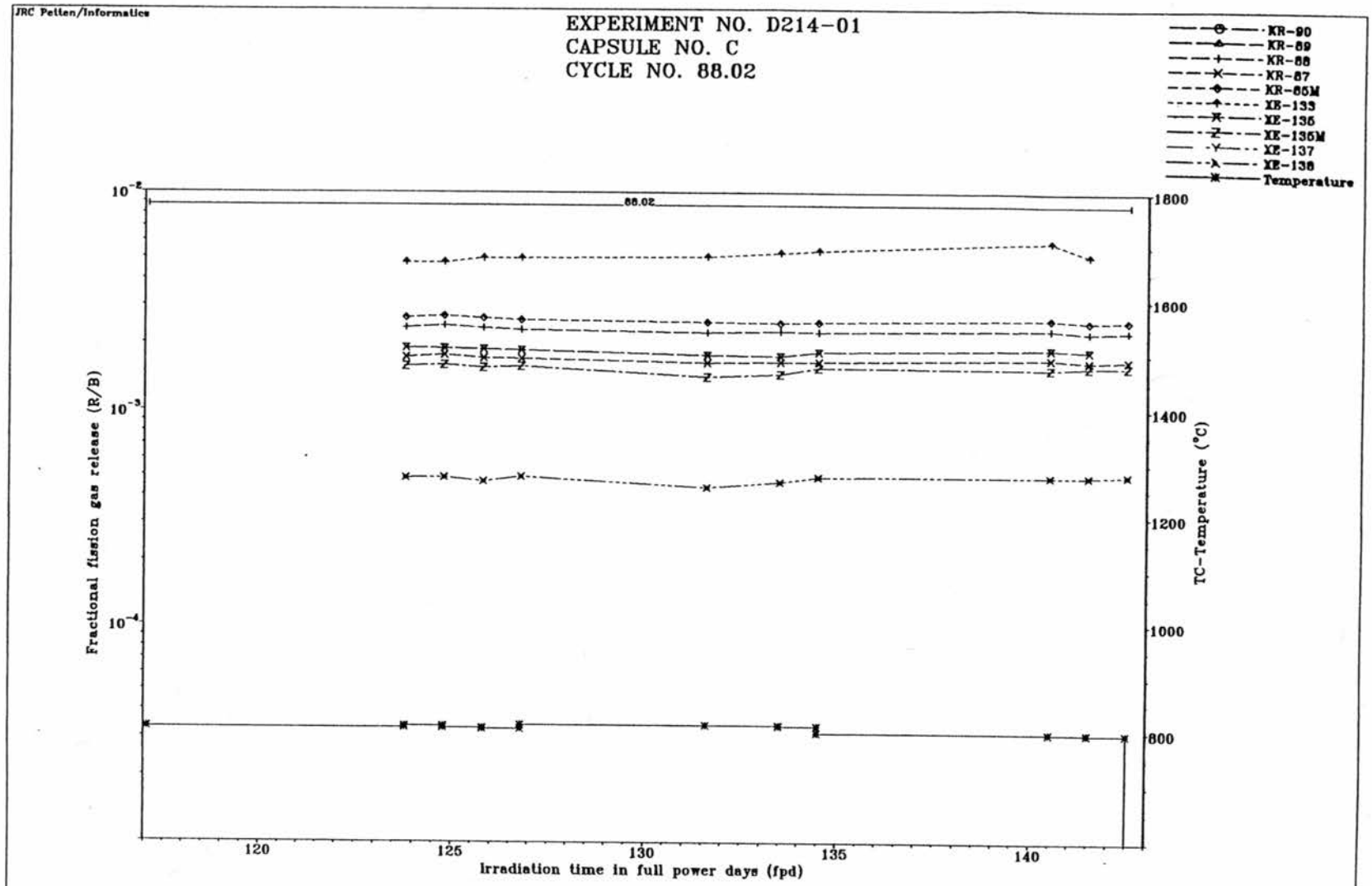



Fig. 6.4.46. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

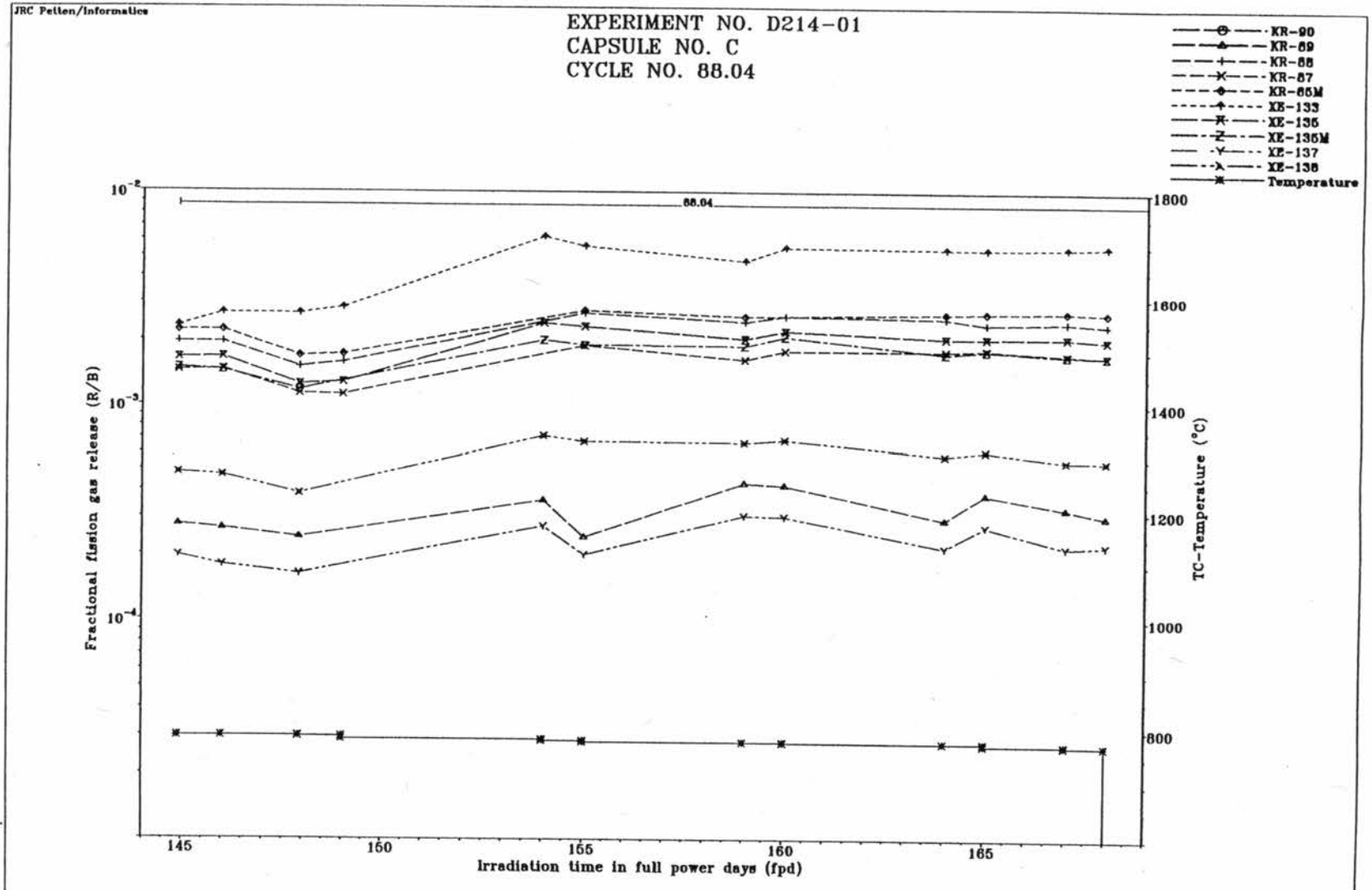



Fig. 6.4.47. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

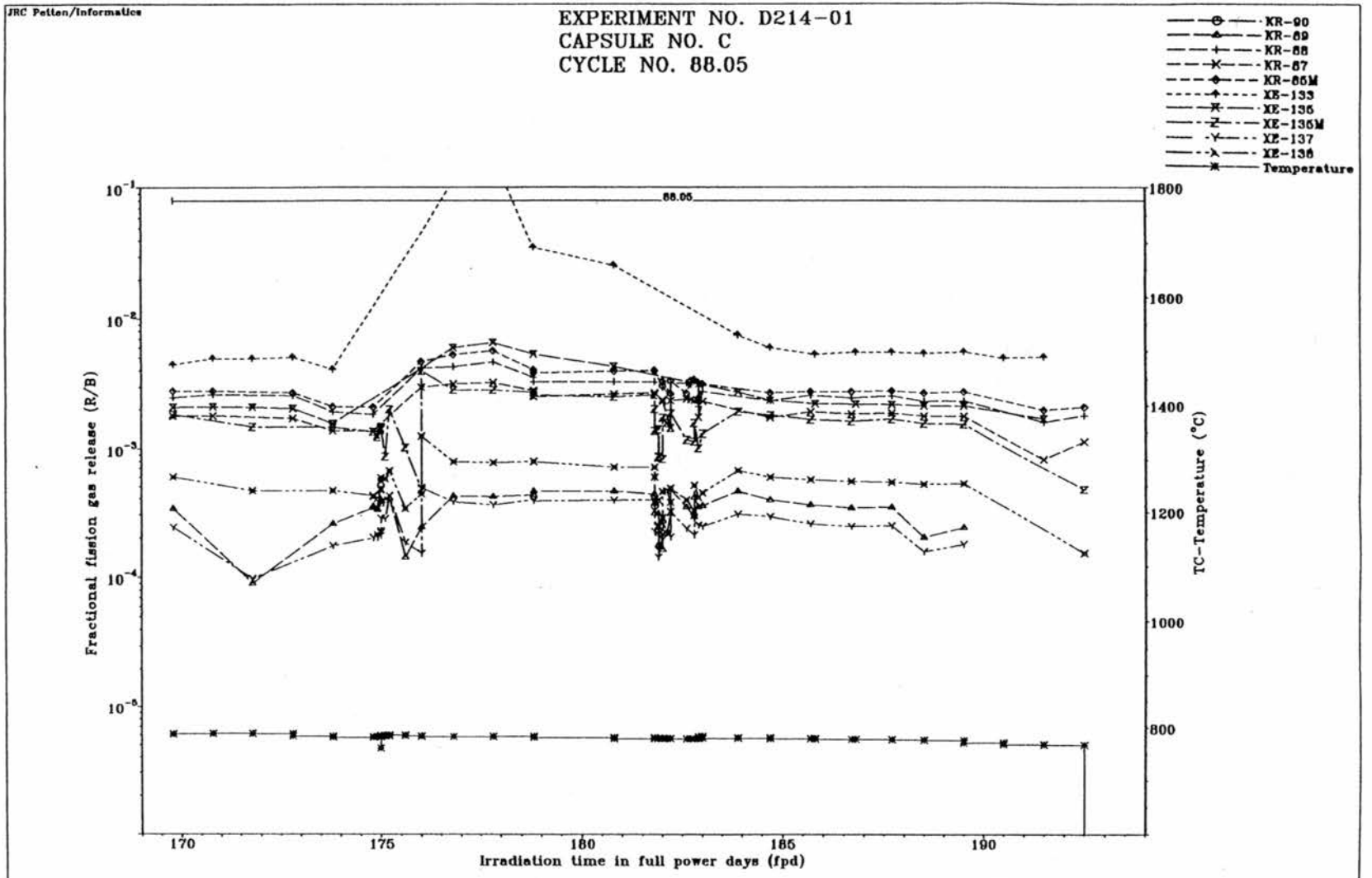



Fig. 6.4.48. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

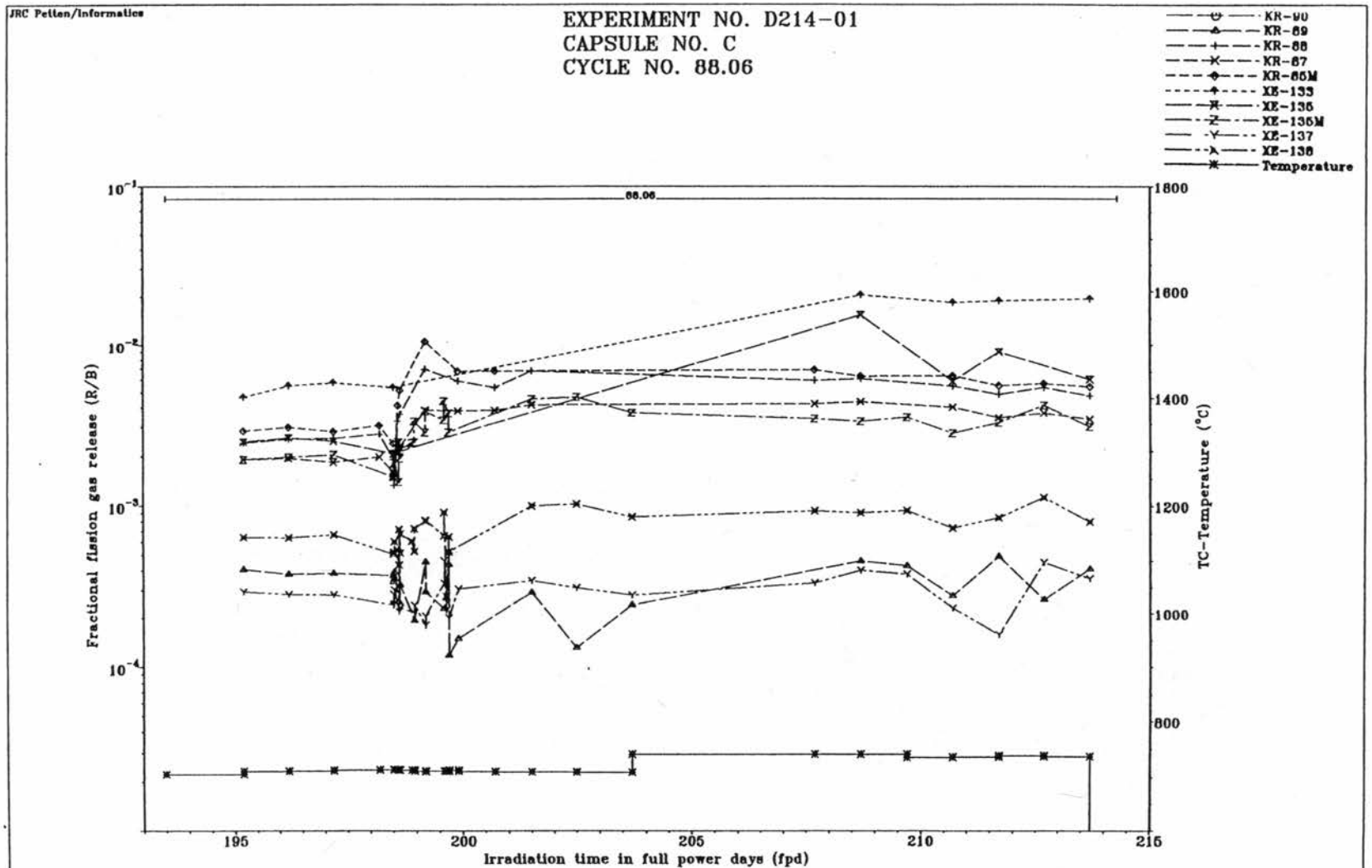



Fig. 6.4.49. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

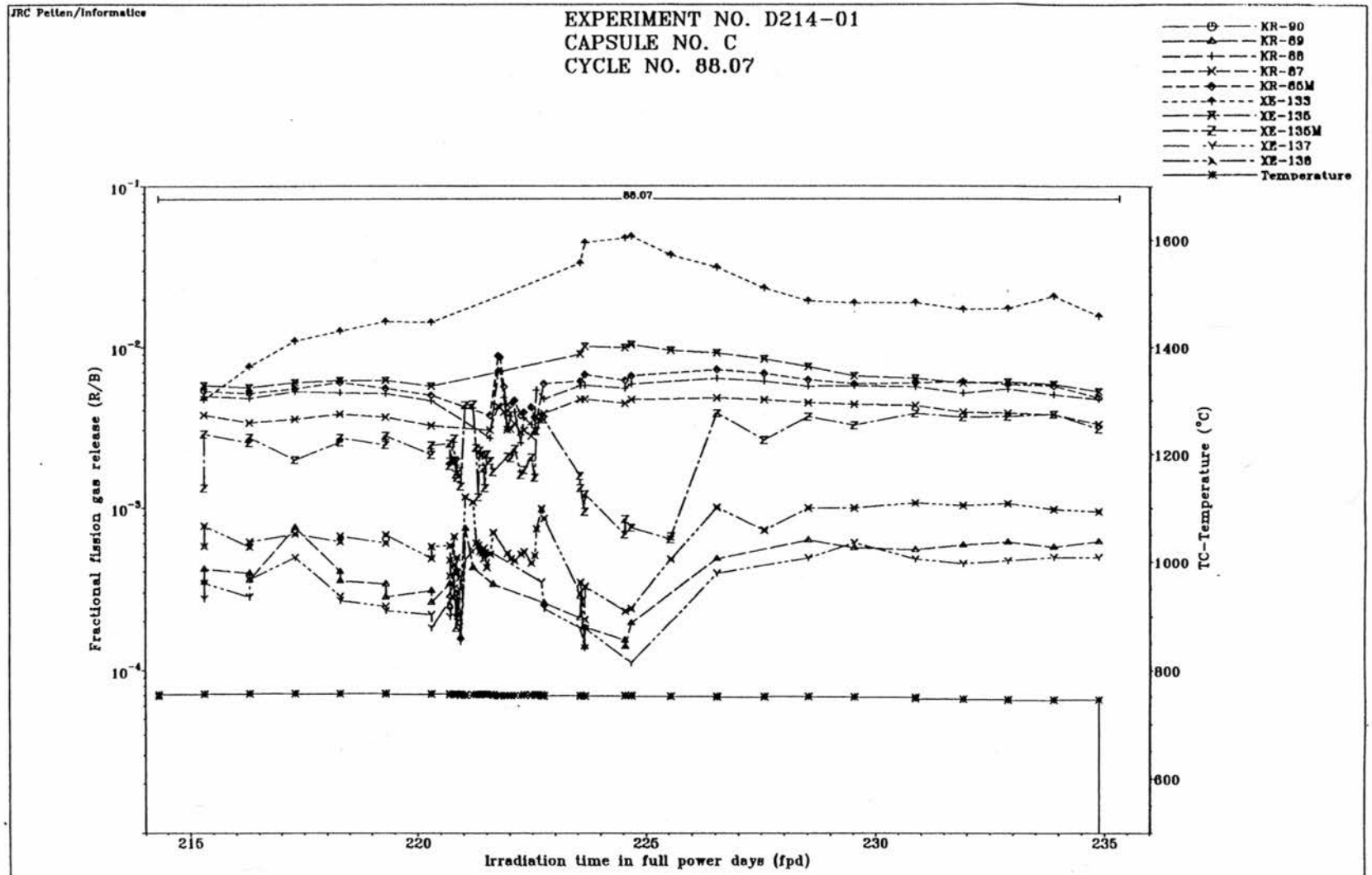



Fig. 6.4.50. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

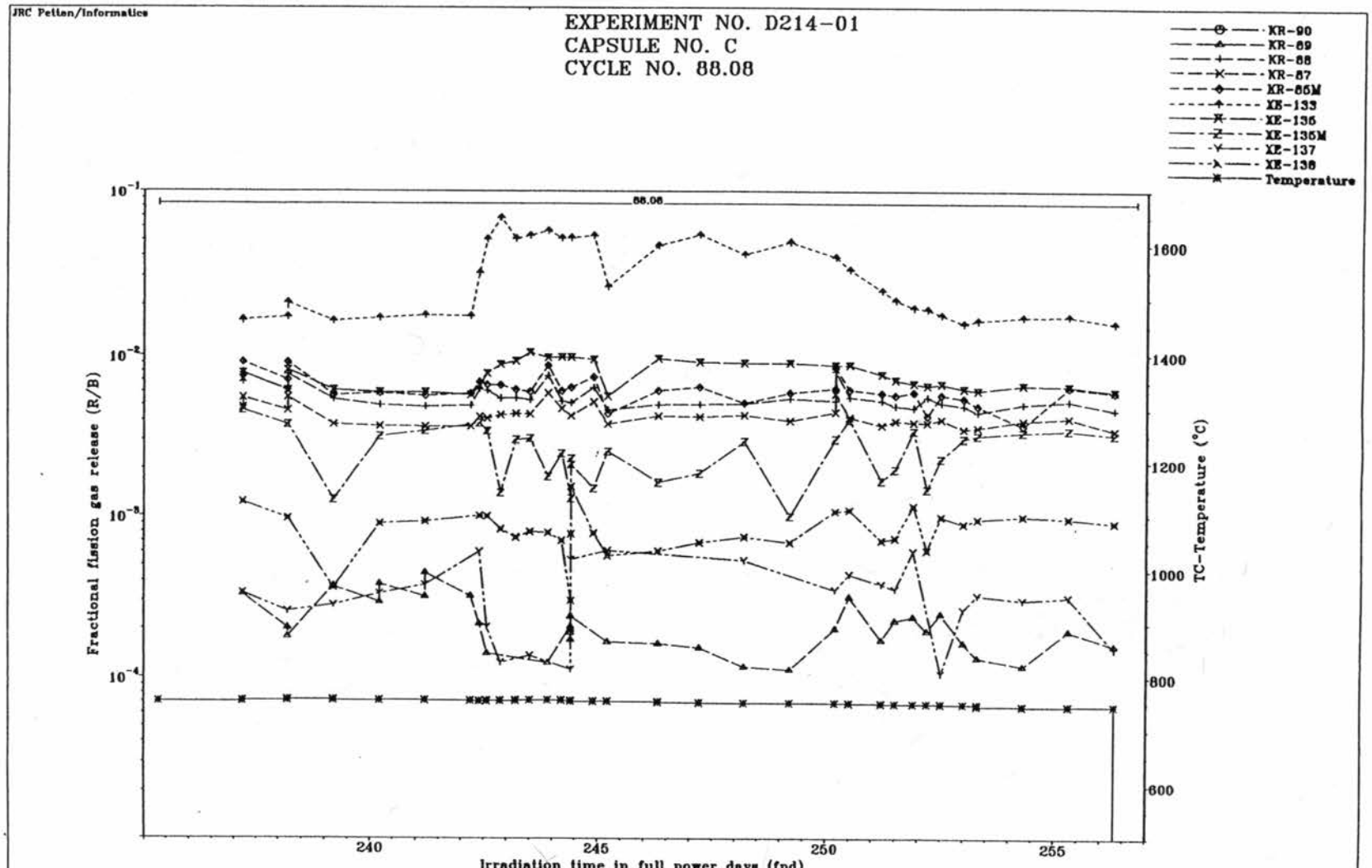



Fig. 6.4.51. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

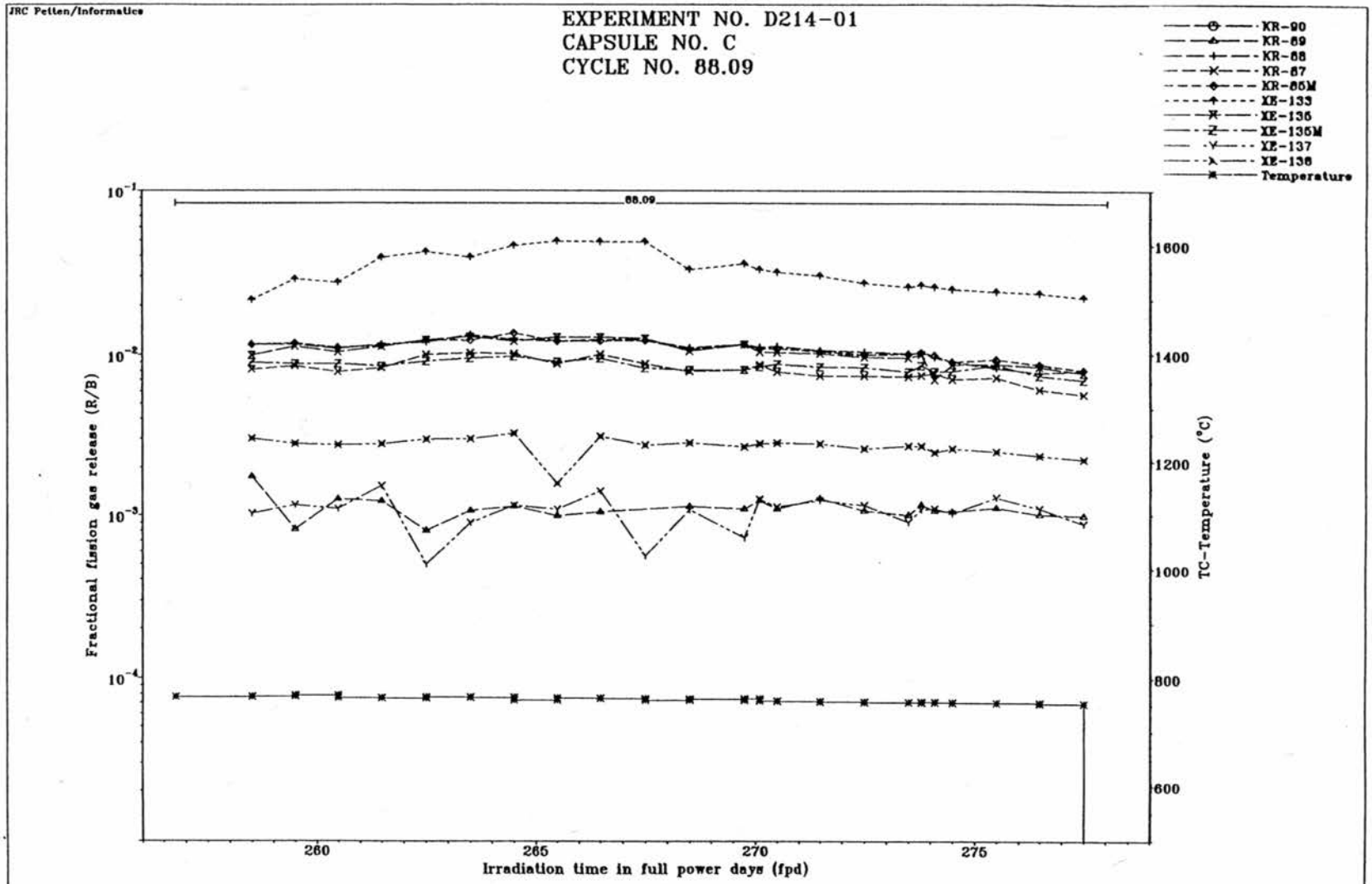



Fig. 6.4.52. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

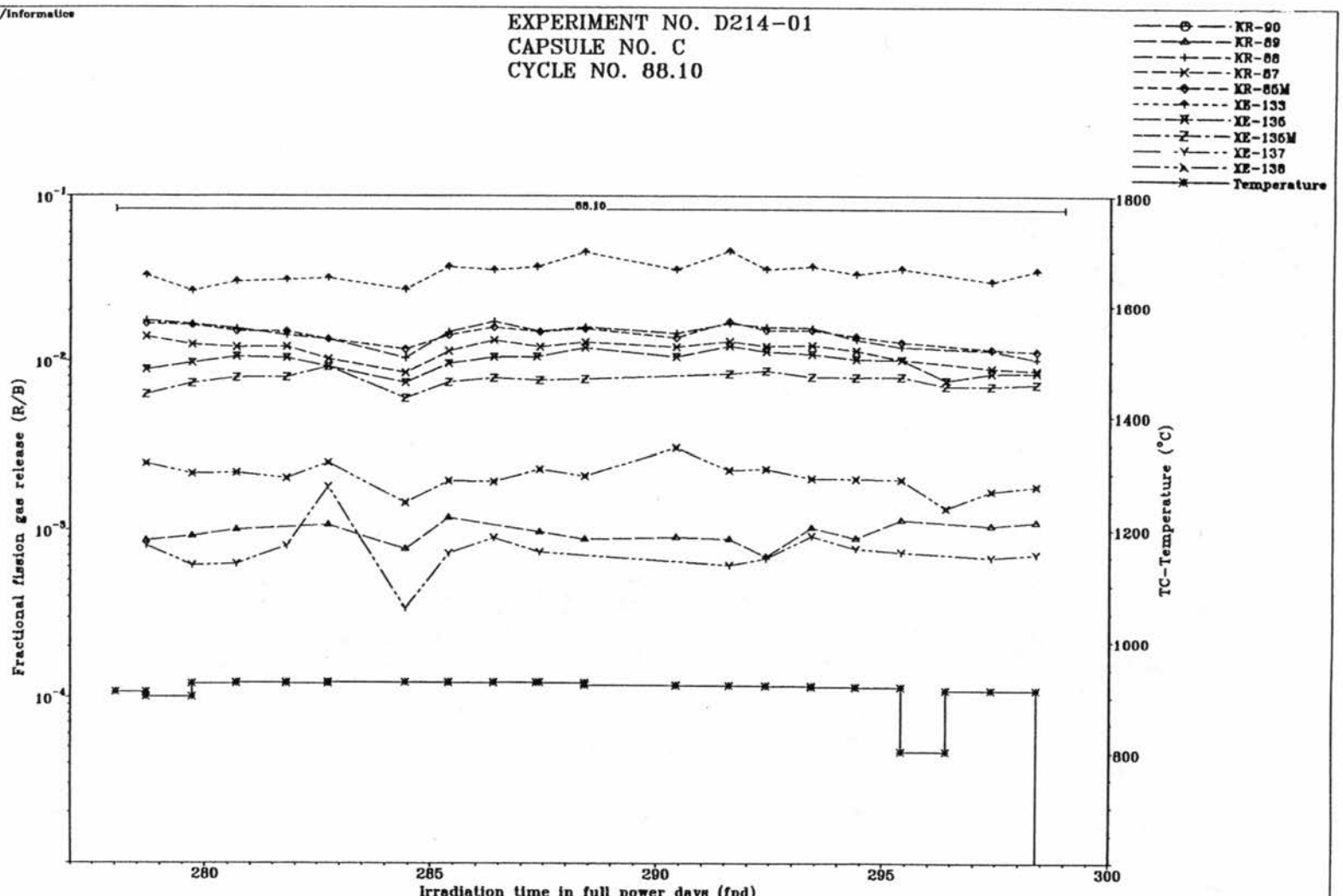



Fig. 6.4.53. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

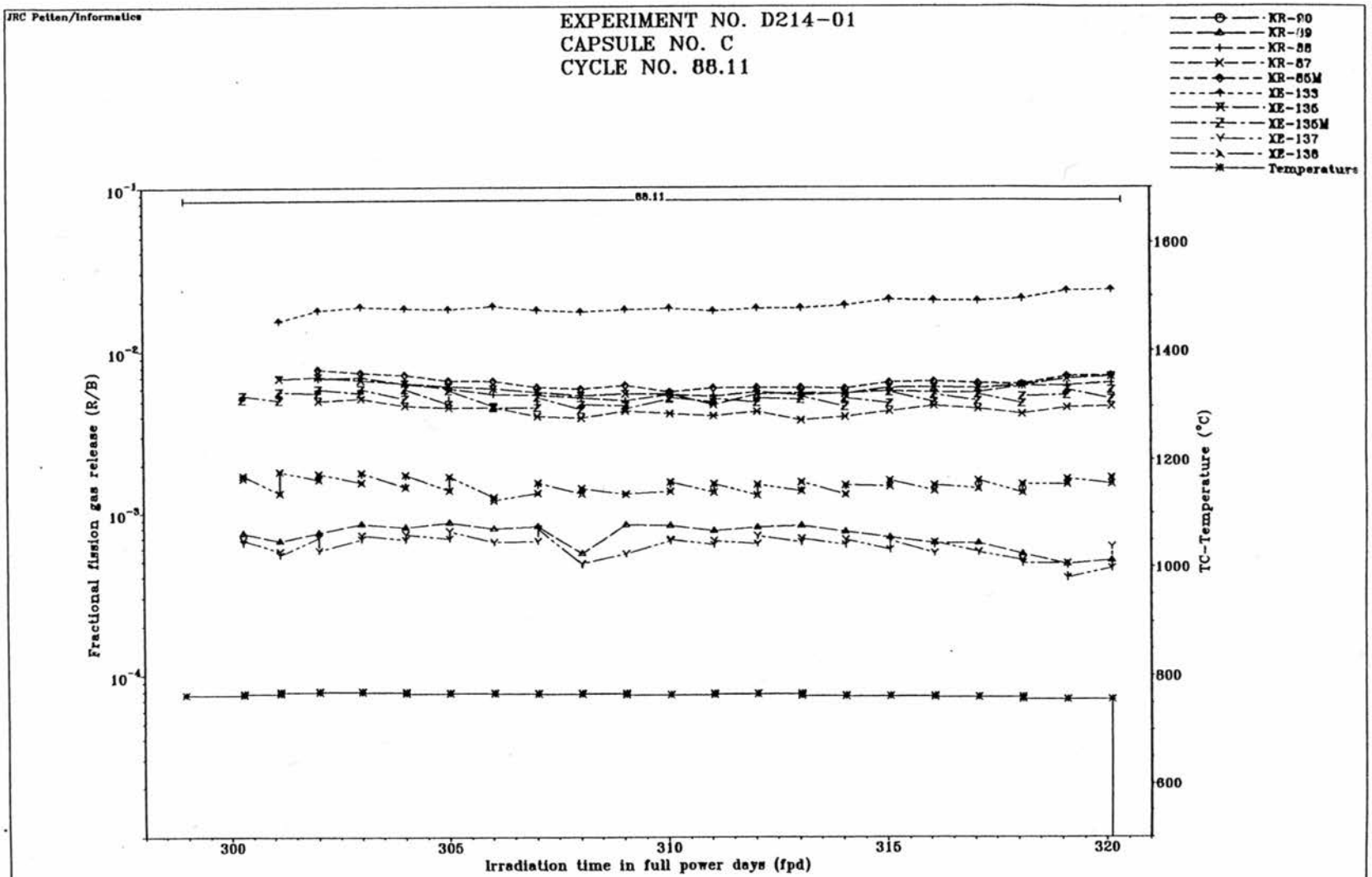



Fig. 6.4.54. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

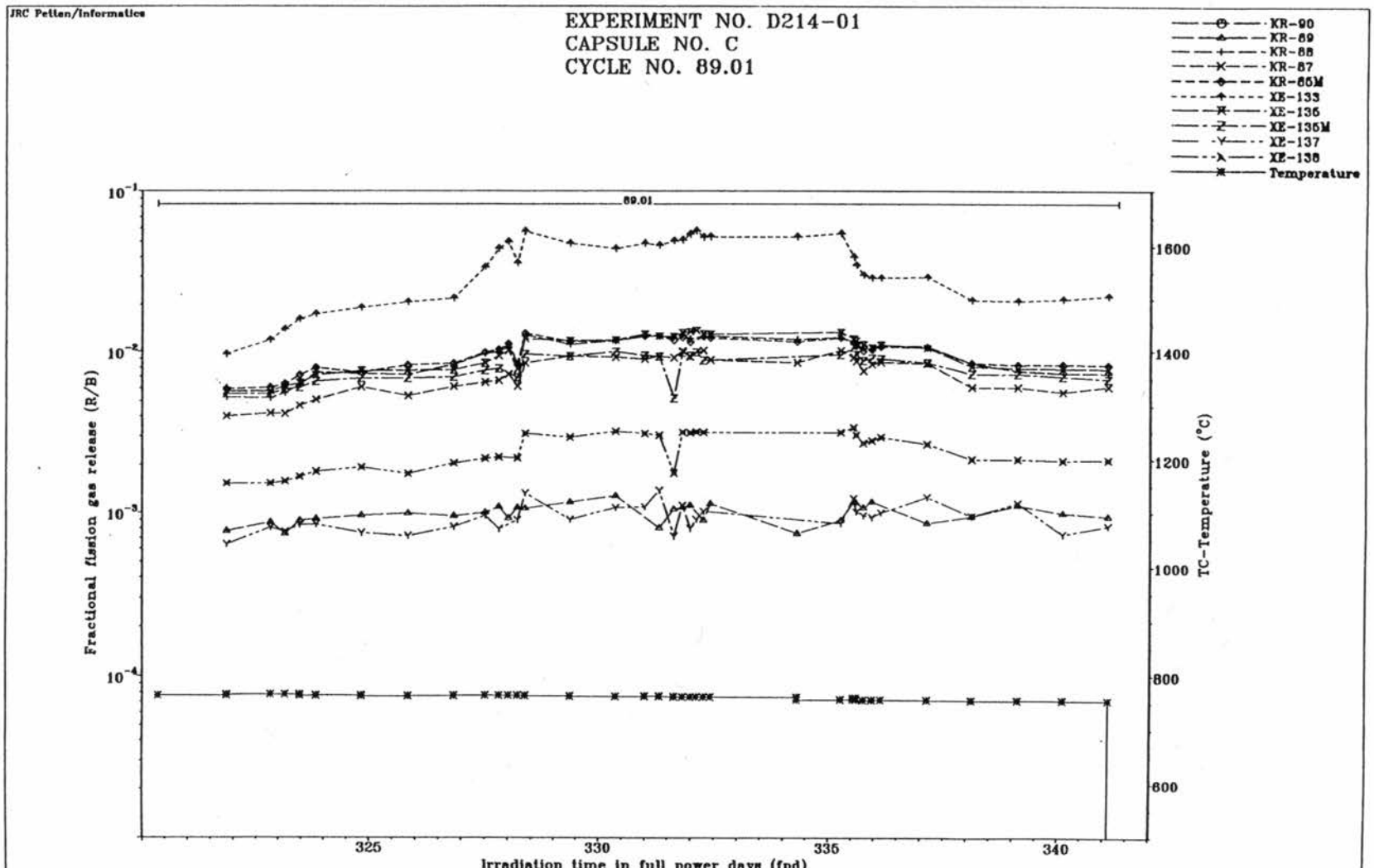



Fig. 6.4.55. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

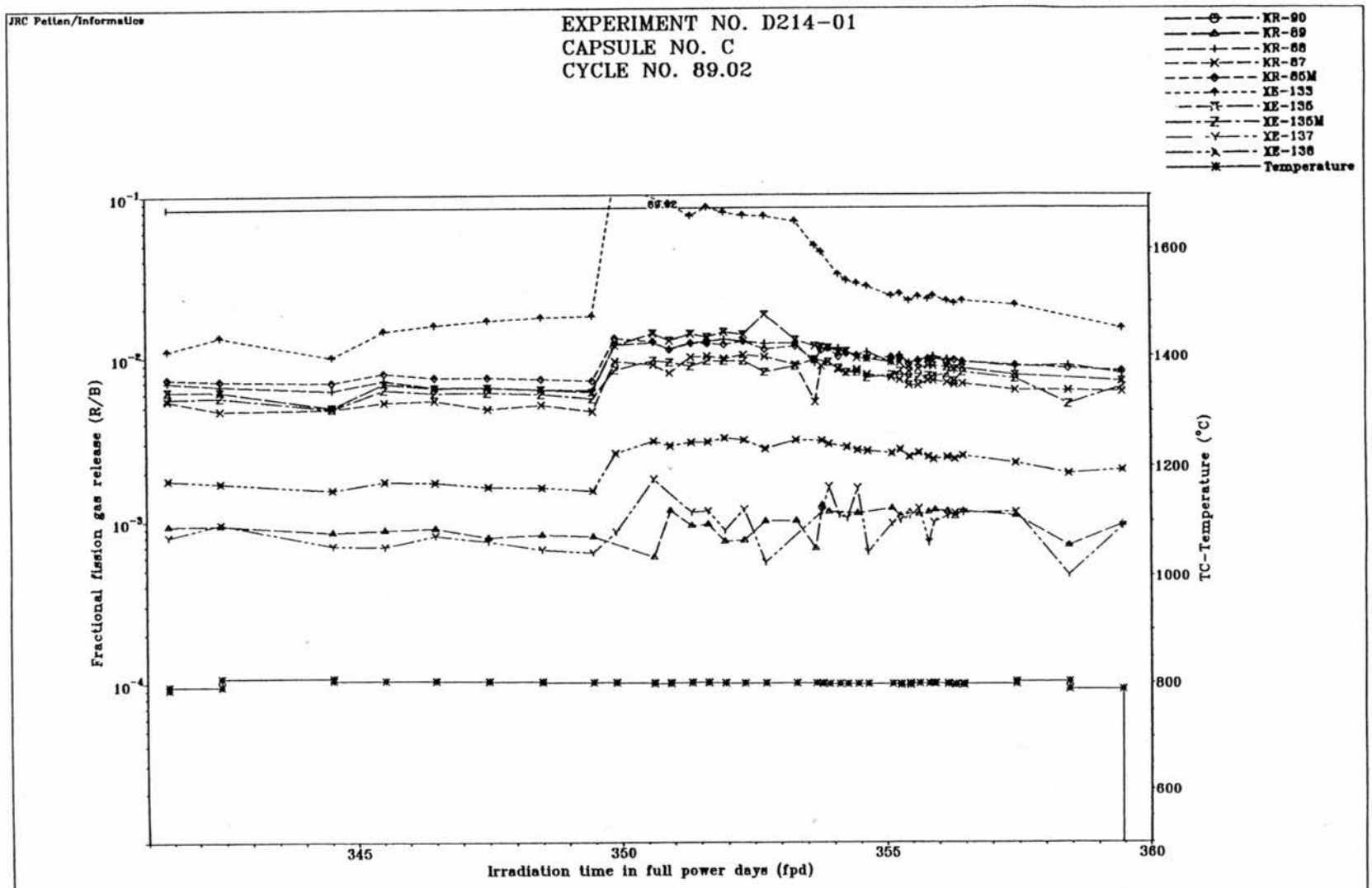



Fig. 6.4.56. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

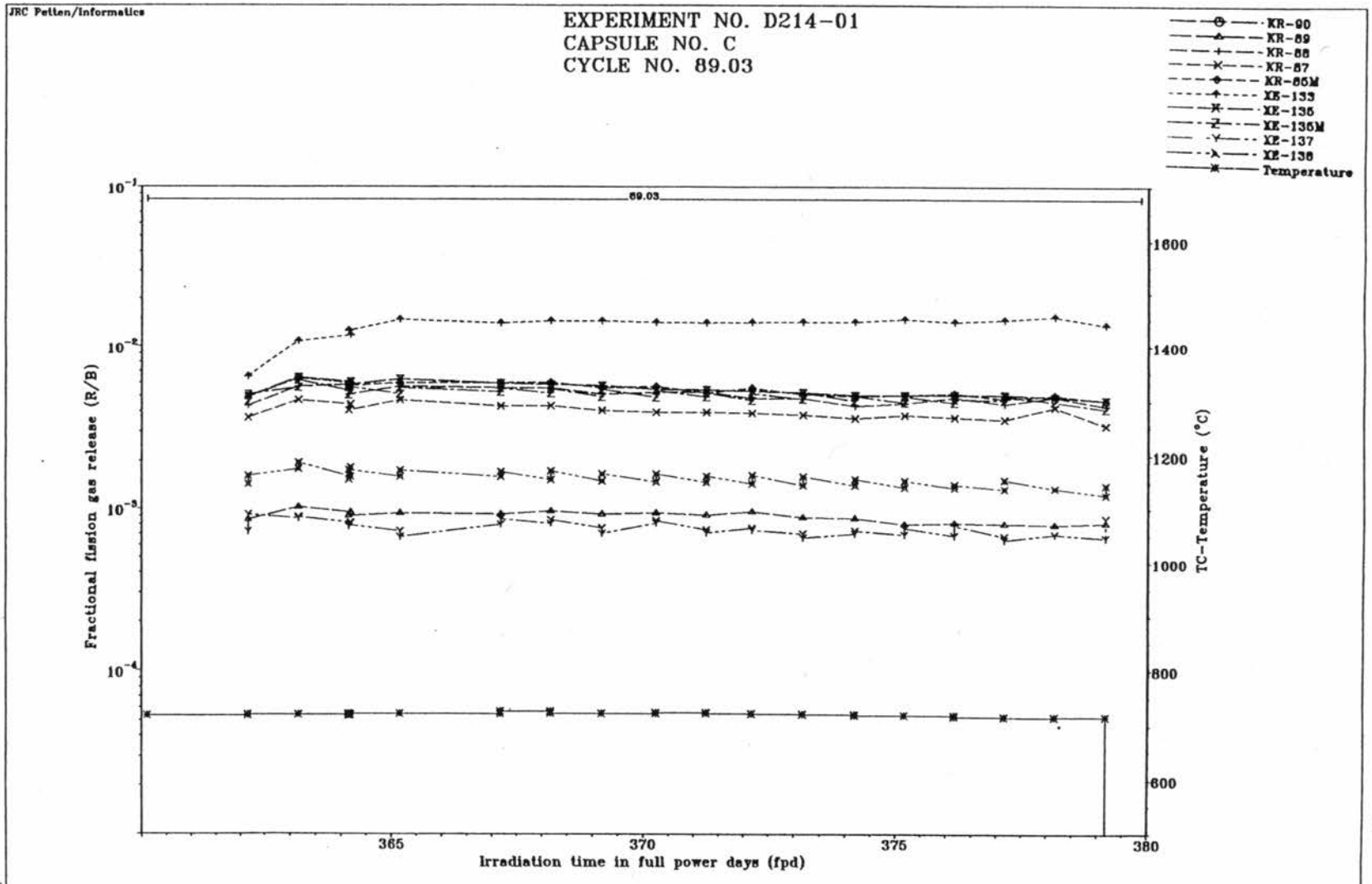



Fig. 6.4.57. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

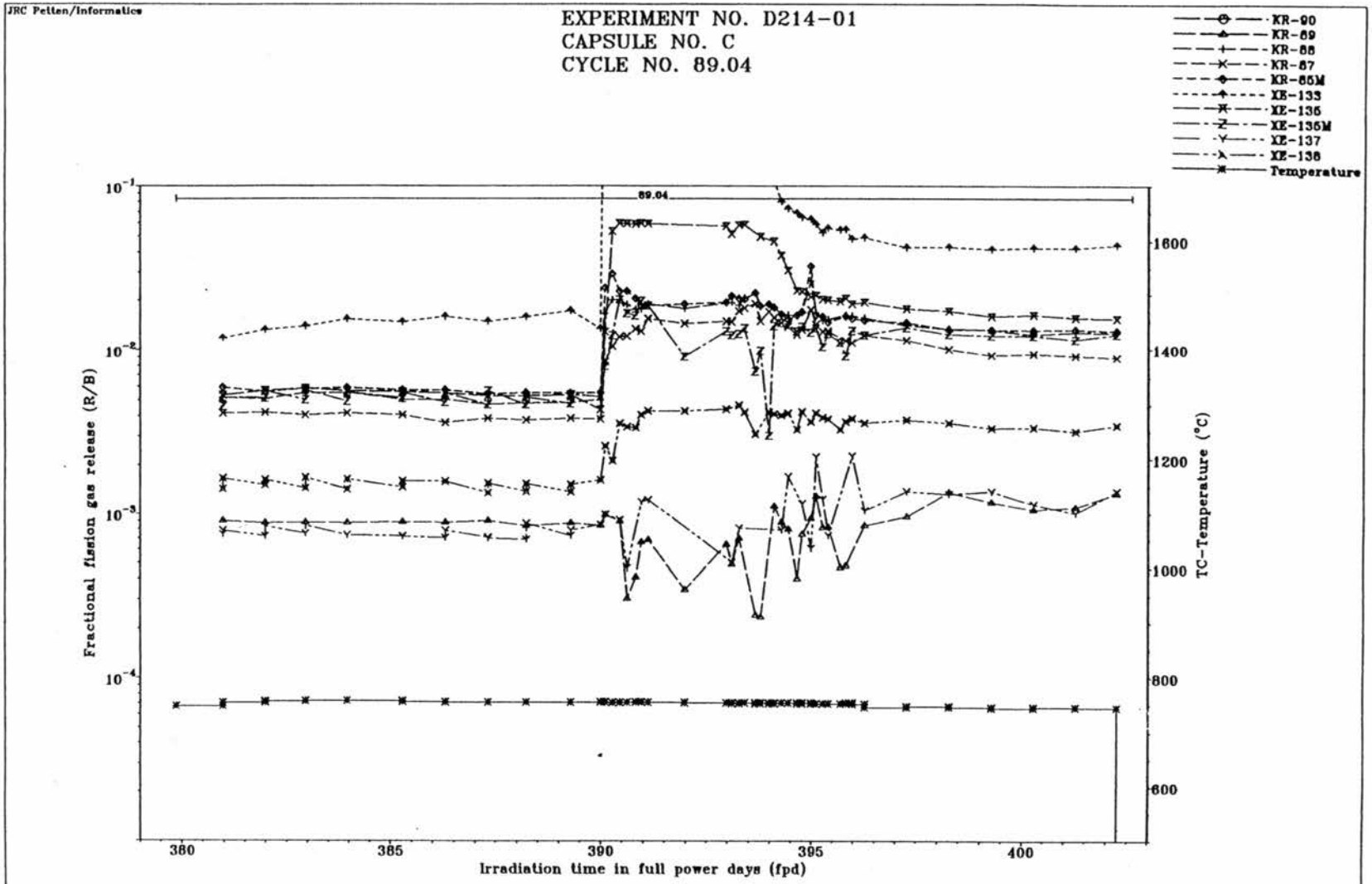



Fig. 6.4.58. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

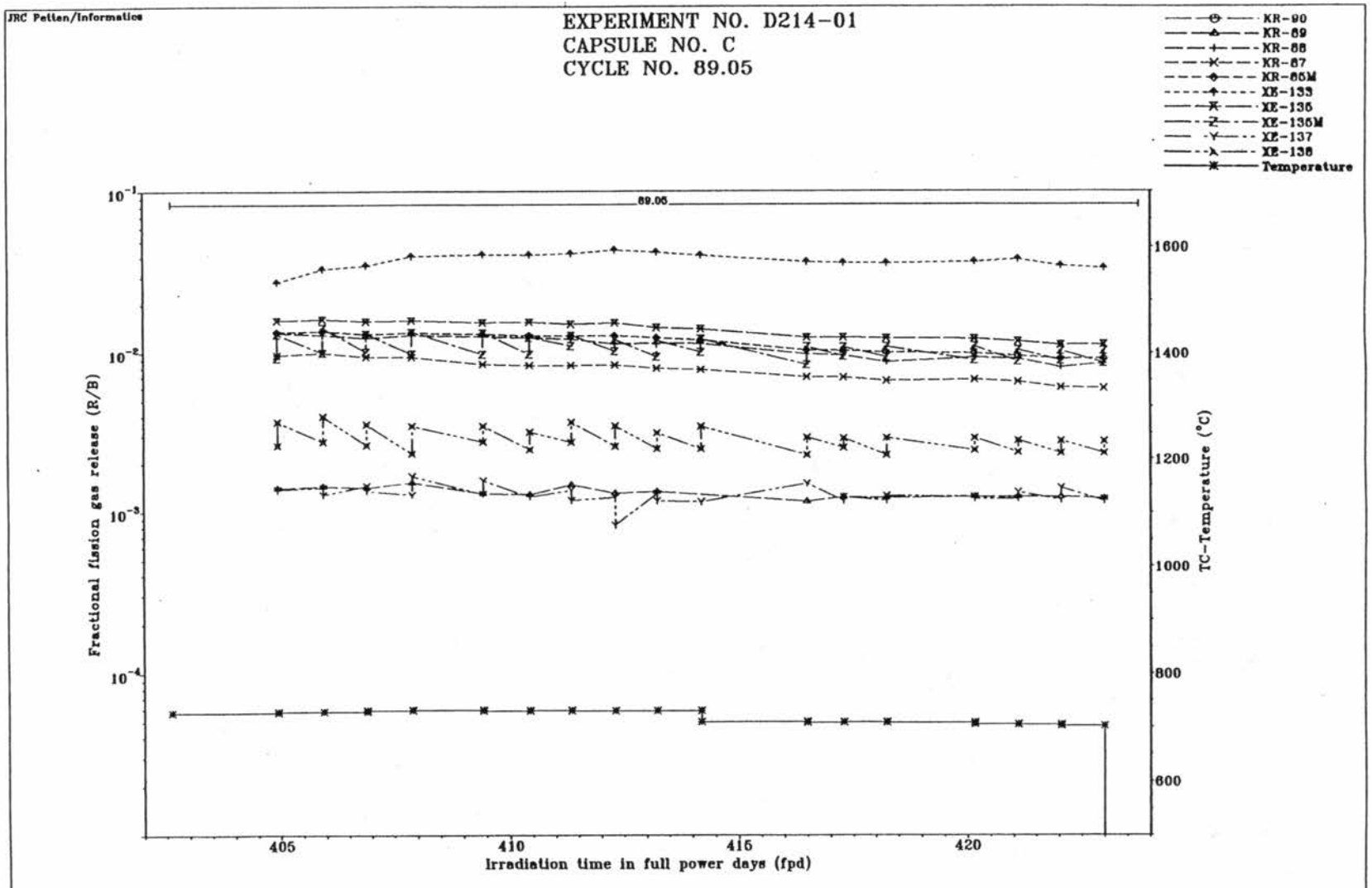



Fig. 6.4.59. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

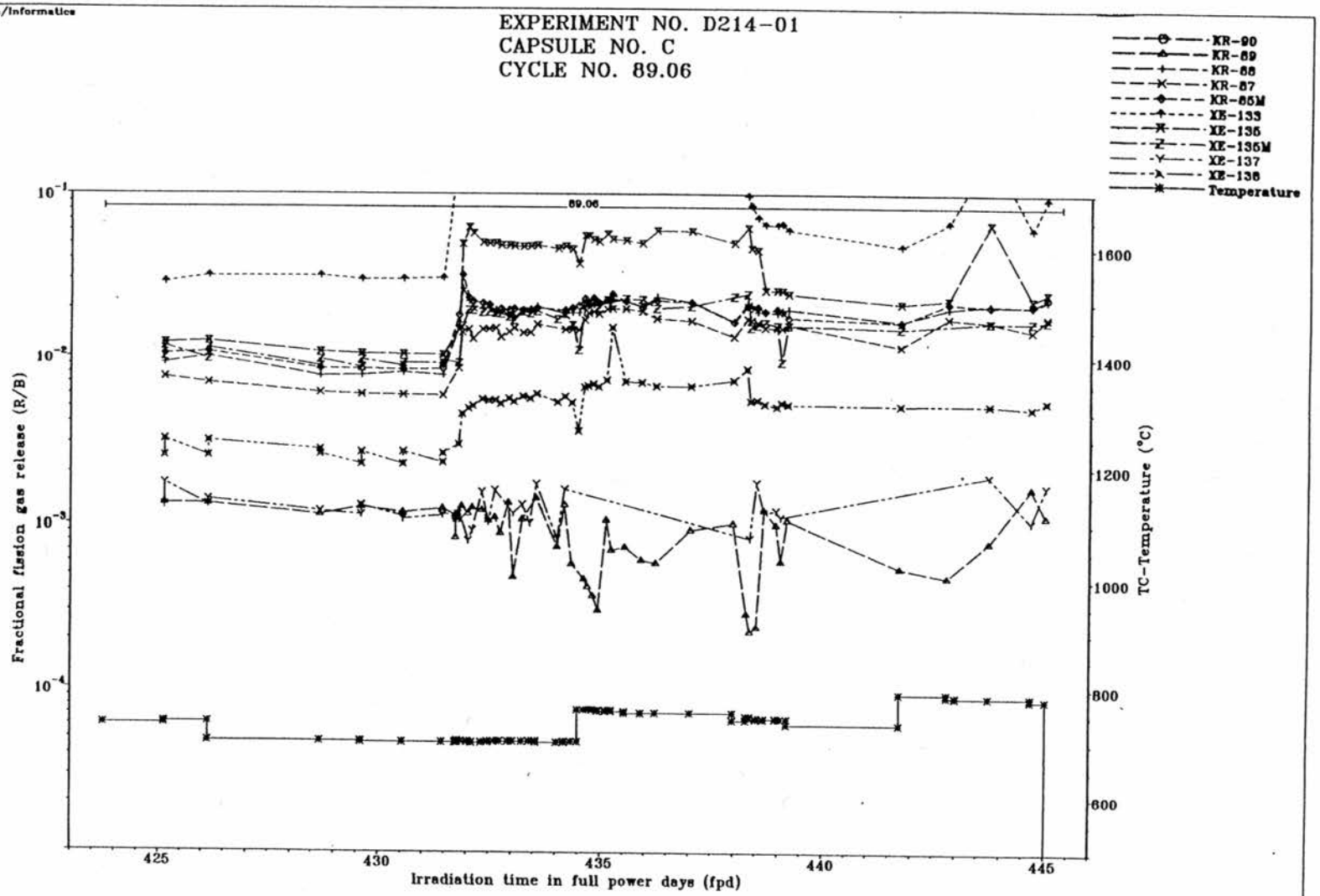



Fig. 6.4.60. Fractional fission gas release (R/B) and fuel thermocouple temperature vs time. (8.9% of power)
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

Table 6.4.61. Water-vapor injection data
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| Cycle | Injection No. | Start d.mo; time | End d.mo; time | Duration (h) | Inlet $P^{\circ}_{H2O}$ (Pa) | Outlet $P_{H2O}$ (Pa) | Delay (h) | Delay (mmol) |
|---|---|---|---|---|---|---|---|---|
| 87.05 | 1 | 16.06; 1030 | 16.06; 1630 | 6 | 45 | 18.3 | 4.5 | 0.37 |
| 87.05 | 2 | 20.06; 1226 | 24.06; 1130 | 95 | 18 | 10.4 | 8.0 | 0.26 |
| 87.09 | 3 | 02.11; 1000 | 10.11; 1000 | 192 | 45 | 3.5 | 4.5 | 0.37 |
| 87.10 | 4 | 23.11; 1115 | 27.11; 1000 | 95 | 90 | 30.3 | 2.3 | 0.38 |
| 88.01 | 5 | 11.01; 1015 | 15.01; 1010 | 96 | 90 | 65.7 | 2.8 | 0.46 |
| 88.05 | 6 | 09.06; 1008 | 09.06; 1018 | 168 | 132 | 110.9 | 3.0 | 0.72 |
| 88.06 | 7 | 28.06; 0900 | 04.07; 0001 | 135 | 136 | 117. | 1.75 | 0.44 |
| 88.07 | 8 | 14.09; 0943 | 19.09; 0943 | 120 | 122 | 109.4 | 3.8 | 0.85 |
| 88.08 | 9 | 10.10; 1100 | 18.10; 1100 | 192 | 118 | 103. | 3.5 | 0.76 |
| 88.09 | 10 | 31.10; 1040 | 10.11; 1145 | 241 | 130.5 | 125.5; 113 | 3.1 | 0.74 |
| 88.10 | 11 | 28.11; 1100 | 05.12; 1350 | 172 | 123. | 53. | 4.5 | 1.0 |
| 89.01 | 12 | 23.01; 1000 | 31.01; 1000 | 192 | 112. | 106.; 98 | 5.0 | 1.0 |
| 89.02 | 13 | 20.02; 0940 | 24.10; 0940 | 96 | 250. | 220 | 2.6 | 1.2 |
| 89.04 | 14 | 08.05; 0853 | 12.05; 0853 | 96 | 550. | 520 | 1.78 | 1.8 |
| 89.06 | 15 | 26.06; 0818 | 03.07; 1018 | 170.5 | 1060. | 1040 | 1.1 | 2.4 |
| 89.06 | 16 | 10.07; 0900 | 10.07; 2400 | 15 | 250. | 220. | 3.1 | 1.5 |

Injection No. = water-vapor injection number
d.mo. time = day.month; clock time
$P^{\circ}_{H2O}$ = inlet pressure of water vapor
$P_{H2O}$ = outlet pressure of water vapor
delay (h) = time of injectin - time of appearance of water-vapor in the outlet gas
delay (mmol) = quality of water-vapor retained by fuel element prior to appearance of water-vapor in the outlet gas

## 6.5 GAS COMPOSITION

The gas composition of the effluent gas is reported in the following tables. The species CO, $CO_2$, $H_2$, $N_2$, and $CH_4$ were measured by GC. In the tables, the concentration of these species was determined in terms of the ppmv. For each measurement, the cycle, day, and time are given. For capsules 1 and 2, in which no water-vapor was added, the gas composition measurements reflect the level of impurities; these results are presented in Tables 6.5.1 through 6.5.4. For capsule 3, in which there was extensive addition of water vapor, the gas composition measurements reflect the reactions of water vapor with the carbonaceous material in the fuel element and the interaction of water vapor with the $UO_2$ and $UC_2$ in the kernel. The gas composition data for capsule 3 are presented in Tables 6.5.5 through 6.5.19. The notes to all preceding tables are summarized in Table 6.5.20.

The neon content of the helium purge gas is important for the possible effects the addition may have on particle failure and change in the fission gas release of particles with exposed kernels. The neon content was monitored at one location past which the effluent gas from all three capsules flowed. It is therefore necessary to analyze the temperature profiles and the measurements of the fractional neon content of the effluent gas to obtain the neon content of the purge gas passing through specific capsules. This will be reported in the documentation of the analysis.

Table 6.5.1. Gas composition data
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

CAPSULE 1, CYCLES 87.03, 87.05,87.09,AND 87.10

| cycle | date | time | Concentration of Effluent Gases (ppmv) CO | $CO_2$ | $H_2$ | $N_2$ | $CH_4$ |
|---|---|---|---|---|---|---|---|
| 87.03 | 7.04 | Bef St | 0 | 0 | 0 | 0 | 0 |
| | 09.04 | 5MW | 3.7 | 3.5 | Ne | 5 | 2.3 |
| | 10.04 | 45MW | 25 | 4 | Ne | 3 | 22 |
| | 14.04 | 1518 | 0 | | Ne | 4 | 0 |
| | 16.04 | 1535 | 1 | | 5 | 3 | 0 |
| | 23.04 | 0932 | 1 | | Ne | 2 | |
| | 28.04 | 1012 | 1 | 0 | 5 | 2 | 0 |
| | 30.04 | 1927 | 1 | 0 | Ne | 3 | 0 |
| | 04.05 | 0908 | 1 | 0 | Ne | 1 | 0.5 |
| 87.05 | 03.06 | 0658 | 0 | 0 | Ne | 8 | 0 |
| | 0806 | 0839 | 0 | 0 | Ne | 20 | 0 |
| 87.09 | 22.10 | 1052 | | | | 2.5 | |
| | 28.10 | | 0 | 0.4 | Ne | 40 | 0 |
| | 29.10 | | 0 | 0 | 2.4 | 2 | 0 |
| | 04.11 | 1235 | 0 | 0 | 2.2 | 1.3 | 0 |
| | 05.11 | 1014 | 0 | 0 | 2.2 | 2 | 0 |
| | 08.11 | | 0 | 0 | 0 | 2 | 0 |
| | 12.11 | 0930 | 0 | 0 | 2 | 3.6 | 0 |
| 87.10 | 20.11 | 0931 | 0 | 0 | 1.4 | 0.5 | 0 |
| | 23.11 | 1056 | 0 | 0 | 1.5 | 1 | 0 |
| | 25.11 | 1452 | 0 | 0 | 3.2 | 1 | 0 |
| | 27.11 | 0455 | 0 | 0 | 0.9 | 0 | 0 |

Table 6.5.2. Gas composition data
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

CAPSULE 1, CYCLES 88.09 to 89.06

| cycle | date | time | Concentration of Effluent Gases (ppmv) CO | $CO_2$ | $H_2$ | $N_2$ |
|---|---|---|---|---|---|---|
| 88.09 | 31.10 | 0900 | 1.7 | 0 | 6 | 18 |
| | 01.11 | 1013 | 1.4 | 0 | 4 | 20 |
| | 04.11 | 0930 | 1.5 | 0.4 | 3 | 19.8 |
| | 11.11 | 0938 | 2.1 | 1.7 | 6.9 | 32 |
| | 13.11 | 1131 | 3.1 | 2.9 | 4 | 31.4 |
| | 15.11 | 1022 | 4.5 | 5.1 | 3.1 | 30.7 |
| | 16.11 | 1000 | 5.5 | 5.9 | 3.3 | 31.6 |
| | 17.11 | 0921 | 5.7 | 5.3 | 3.6 | 35.5 |
| 88.10 | 22.11 | 1509 | 3.3 | 1.6 | 12 | 2.2 |
| | 25.11 | 0855 | 2 | 0.5 | Ne | 1.0 |
| | 01.12 | 1000 | 2 | | | |
| | 02.12 | 0947 | 0.8 | | Ne | 0.5 |
| | 04.12 | 1754 | tr | | Ne | 0.5 |
| | 07.12 | 0827 | tr | | Ne | 0.5 |
| | 09.12 | 0942 | tr | | Ne | 0.5 |
| 88.11 | 16.12 | 0952 | 0.5 | 0 | Ne | 1 |
| | 19.12 | 1416 | 0.5 | 0 | Ne | 1 |
| | 23.12 | 1410 | 1.2 | tr | 1.7 | 0.5 |
| | 27.12 | 1026 | 1.3 | 0 | 2.3 | 0.5 |
| | 30.12 | 1120 | tr | 0 | 1.6 | 0.2 |
| | 03.01 | 1016 | tr | 0 | 2 | 0.2 |
| 89.01 | 17.01 | 0938 | 1.3 | tr | 2.5 | 0.8 |
| | 23.01 | 1106 | tr | tr | 11 | 3.6 |
| | 25.01 | 1452 | tr | tr | 4 | 1.4 |
| | 30.01 | 1010 | tr | tr | 3.3 | 2 |
| | 06.02 | 0940 | 0.3 | tr | 1.6 | |

Table 6.5.2. (continued)

CAPSULE 1, CYCLES 88.09 TO 89.06

| | | | Concentration of Effluent Gases (ppmv) | | | |
|---|---|---|---|---|---|---|
| cycle | date | time | CO | $CO_2$ | $H_2$ | $N_2$ |
| 89.02 | 10.02 | 1010 | 3.0 | 2.3 | 4.5 | 1.8 |
| | 16.02 | 0834 | 1.8 | tr | 2.0 | 1.0 |
| | 20.02 | 0846 | 1.0 | 0.5 | 2.1 | 3.0 |
| | 23.02 | 0841 | 0 | | 2.3 | 2.0 |
| | 28.02 | 1106 | 0.5 | 0 | 2.3 | 0.5 |
| | 30.02 | 1542 | tr | tr | 2.5 | 1 |
| 89.04 | 28.04 | 1418 | | | 3.5 | 26 |
| | 02.05 | 0843 | tr | | 3.4 | 28 |
| | 05.05 | 0912 | tr | | 2.8 | 29 |
| 89.05 | 24.05 | 1330 | 0 | 0 | 1.0 | 30 |
| | 29.05 | 0940 | tr | 0 | 1.9 | 47 |
| | 01.06 | 0918 | tr | 0 | 1.8 | 23 |
| | 05.06 | 0902 | tr | 0 | 2.1 | 25 |
| | 08.06 | 0935 | tr | 0 | 1.7 | 28 |
| | 13.06 | 0835 | tr | 0 | 1.8 | 17 |
| 89.06 | 19.06 | 0936 | tr | 0 | 1.9 | 30.2 |
| | 23.06 | 0912 | 0 | 0 | 2.2 | 20 |
| | 27.06 | 0930 | | 0 | 0 | 3 |

Table 6.5.3. Gas composition data
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

CAPSULE 2, CYCLES 87.03, 87.05, 87.09 and 87.10

| | | | Concentration of Effluent Gases (ppmv) | | | | | |
|---|---|---|---|---|---|---|---|---|
| cycle | date | time | CO | $CO_2$ | $H_2$ | $N_2$ | $CH_4$ | |
| 87.03 | 07.04 | Bef St | 0 | 0 | 0 | 2 | 0 | |
| | 09.04 | 5MW | 5 | 2 | Ne | 3 | 5 | |
| | | 15MW | 12 | | Ne | Ne | Ne | 12 |
| | | 45MW | 7 | | Ne | Ne | 0 | |
| | 14.14 | 1609 | | | | 3 | | |
| | 28.04 | 1123 | 1 | 0 | 6 | 1 | 1 | |
| | 30.04 | | 1 | 0 | Ne | 12 | 1 | |
| | 02.05 | 1851 | 1 | 0 | Ne | 2 | 1 | |
| | 04.05 | | 1 | 0 | Ne | 1 | 1 | |
| 87.05 | 03.06 | | 0 | 0 | 0 | 8 | 0 | |
| | 08.06 | 0907 | 0 | 0 | 3 | 20 | 0 | |
| 87.09 | 22.10 | 1151 | 0 | 0 | 0 | 1.8 | 0 | |
| | 28.10 | 1113 | 0 | 0 | 0 | 4 | 0 | |
| | 29.10 | 1107 | 0 | 0 | 0 | 4 | 0 | |
| | 30.10 | 1021 | 0 | 0 | 1 | 0.5 | 0 | |
| | 04.11 | 2158 | 0 | 0 | 5.4 | | 0 | |
| | 05.11 | 1258 | 0 | 0 | 0.9 | 1 | 0 | |
| | 11.11 | 1220 | 0 | 0 | 1.7 | 49 | 0 | |
| | 12.11 | 1051 | 0 | 0 | 0.8 | 1 | 0 | |
| 87.10 | 23.11 | 1041 | 0 | 0 | 1.1 | 0.5 | 0 | |
| | 24.11 | 1545 | 0 | 0 | 3.2 | 2.4 | 0 | |
| | 25.11 | 1418 | 0 | 0 | 3.1 | 4.6 | 0 | |

Table 6.5.4. Gas composition data
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

CAPSULE 2, CYCLES 88.09 TO 89.05

| | | | Concentration of Effluent Gases (ppmv) | | | |
|---|---|---|---|---|---|---|
| cycle | date | time | CO | $CO_2$ | $H_2$ | $N_2$ |
| 88.90 | 31.10 | 0920 | 2.0 | 0 | 5.7 | 18.1 |
| | 01.11 | 1003 | 2.9 | 0 | 8 | 19.6 |
| | 04.11 | 0946 | 2.6 | 0 | 3.3 | 19.9 |
| | 11.11 | 1010 | 2.9 | 0.5 | 4.8 | 32. |
| | 13.11 | 1152 | 2.4 | 1.1 | 4.6 | 31.7 |
| | 15.11 | 1012 | 4.1 | 2.3 | 4.4 | 31.5 |
| | 16.11 | 0950 | 4.2 | 2.4 | 3.2 | 31.4 |
| | 17.11 | 0909 | 4.3 | 3.5 | 4.2 | 35.9 |
| 88.10 | 22.11 | 1458 | 4.7 | 1.6 | 2 | 2.5 |
| | 25.11 | 0906 | | 0.5 | Ne | 1.3 |
| | 01.12 | 1010 | 4.7 | | | |
| | 02.12 | 0936 | 4 | | Ne | 0.5 |
| | 04.12 | 1827 | 2.7 | | Ne | 0.5 |
| | 07.12 | 0827 | TR | | Ne | 0.5 |
| | 09.12 | 0953 | 3 | | Ne | 0.5 |
| 88.11 | 16.12 | 1003 | 2 | 0 | Ne | 2 |
| | 19.12 | 1426 | 2 | 0 | Ne | 1 |
| | 23.12 | 1451 | 2.4 | tr | 1.9 | 0.9 |
| | 27.12 | 1036 | 2.3 | 0 | 2 | 1.2 |
| | 30.12 | 1152 | 1.9 | 0 | 2 | 10. |
| | 03.01 | 1026 | 1.9 | 0 | 2 | 0.8 |
| 89.02 | 20.02 | 0856 | 1.3 | tr | 1.7 | 20 |
| 89.04 | 02.05 | 0902 | tr | | 2.8 | 26 |
| 89.05 | 26.05 | 0846 | 0.5 | 0 | 4 | 19 |
| | 29.05 | 0905 | 1.7 | 0 | 1.7 | 30 |
| | 01.06 | 0918 | | | | |

Table 6.5.5. Gas composition data
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

CAPSULE 3, CYCLE 87.03

| | | | $H_2O$-vapor Injection Press. | | | Concentration of Effluent Gases (ppmv) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| cycle | date | time | (Pa) | start | stop | CO | $CO_2$ | $H_2$ | $N_2$ | $CH_4$ |
| 87.03 | 24.04 | | | | | 1.0 | 6.0 | Ne | | 0.5 |
| | 27.04 | | | | | 2.0 | | Ne | | 0.5 |
| | 28.04 | | | | | 1.0 | | | | 0.5 |
| | 01.05 | | | | | 1.0 | | | | |
| | 01.05 | 11.14 | | | | 2.0 | | | | |
| | 04.05 | 19.58 | | | | | | Ne | 2.0 | |

Table 6.5.6. Gas compositon data
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

CAPSULE 3, CYCLE 87.05

Water-vapor injection No. 1; Duration 6 h

| | $H_2O$-vapor Injection Press. | | | | | Concentration of Effluent Gases (ppmv) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| cycle | date | time | (Pa) | start | stop | CO | $CO_2$ | $H_2$ | $N_2$ | $CH_4$ |
| 87.05 | 14.06 | 1904 | | | | | | Ne (25) | | |
| | 16.06 | 1016 | | | | 2.4 | 0.4 | Ne | | |
| | | 1030 | 45 | xxxx | | | | | | |
| | | 1034 | | | | 2.4 | 0.4 | | | |
| | | 1045 | | | | 2.4 | 10.1 | | | |
| | | 1139 | | | | 3.6 | 6.7 | | | |
| | | 1150 | | | | 3.6 | 8.4 | | | |
| | | 1159 | | | | 3.6 | 5.8 | | | |
| | | 1212 | | | | 3.6 | 11.7 | | | |
| | | 1246 | | | | 2.4 | 42.1 | | | |
| | | 1306 | | | | 3.6 | 29.5 | | | |
| | | 1603 | | | | 8.6 | 27.8 | | | |
| | | 1630 | | | xxxx | 9.6 | 24.8 | | | |

Water-vapor injection No. 2; Duration 95 h

| | | | $H_2O$-vapor Injection Press. | | | Concentration of Effluent Gases (ppmv) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| cycle | date | time | (Pa) | start | stop | CO | $CO_2$ | $H_2$ | $N_2$ | $CH_4$ |
| 87.05 | 20.06 | 0907 | | | | 0 | 0 | 0 | 0 | 0 |
| | 20.06 | 1226 | 18 | xxxx | | | | | | |
| | 22.06 | 1426 | | | | | 3.4 | 16.3 | | |
| | | 1443 | | | | | 3.4 | 16.3 | | |
| | | 1605 | | | | | 1.7 | | | |
| | 23.06 | 1131 | | | | | 10.3 | Ne (18.8) | | |
| | | 1155 | | | | | 6.9 | Ne (75) | | |
| | 24.06 | 1048 | | | | | 4.8 | Ne (50) | | |
| | | 1112 | | | | | 7.2 | Ne (69) | | |
| | | 1130 | | | xxxx | | | | | |
| | 25.06 | 1505 | | | | | 2.4 | NE (88) | | |

Table 6.5.7. Gas composition data
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

CAPSULE 3, CYCLE 87.09

Water-vapor injection No.3 ; Duration 192 h

| | | | $H_2O$-vapor Injection Press. | | | Concentration of Effluent Gases (ppmv) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| cycle | date | time | (Pa) | start | stop | CO | $CO_2$ | $H_2$ | $N_2$ | $CH_4$ |
| 87.09 | 28.10 | 1129 | | | | 1.5 | 1.0 | Ne (47) | | |
| | | 14.15 | | | | 2.9 | 0.5 | Ne | 6.5 | |
| | 3010 | 1148 | | | | 0 | 0 | 1.5 | 2 | |
| | 02.11 | 0931 | | | | 0 | 0 | 1 | 2.1 | |
| | 02.11 | 1000 | 45 | xxxx | | | | | | |
| | | 1115 | | | | 0 | 0 | 1 | 1.6 | 0 |
| | | 1323 | | | | 6.7 | 26 | 45 | 4 | 0 |
| | | 1425 | | | | 8.9 | 27 | 54 | 4 | 0 |
| | | 1714 | | | | 11.0 | 30 | 68 | 4 | 0 |
| | | 2153 | | | | 13 | 30 | 80 | 3 | - |
| | 03.11 | 1013 | | | | 19 | 33 | 102 | 3 | 0.5 |
| | | 1152 | | | | 17 | 32 | 103 | 3 | 0.5 |
| | | 1433 | | | | 22 | 33 | 104 | 6 | 0.5 |
| | | 1515 | | | | 22 | 33 | 104 | 2 | 1.0 |
| | | 2246 | | | | 24 | 34 | 105 | 2 | 0.5 |
| | 05.11 | 2220 | | | | 26.8 | 43 | 110 | 4 | 1.0 |
| | | 2247 | | | | 26.8 | 44 | 110 | 2 | 1.0 |
| | 06.11 | 1509 | | | | 25 | 36.5 | 110 | 3 | 1.5 |
| | 08.11 | 1250 | | | | 28.9 | 36 | 120 | 2 | 1.0 |
| | 09.11 | 1754 | | | | 33 | 41 | 125 | 3 | 1.5 |
| | 10.11 | 1000 | | | xxxx | | | | | |
| | | 1027 | | | | 28 | 38 | 20 | 18 | 0.8 |
| | | 1055 | | | | 29 | 36 | 100 | 9 | |
| | | 1210 | | | | 16.7 | 19 | 20 | | 0.9 |
| | | 1321 | | | | 11 | 17 | 80 | | 0.8 |
| | | 1446 | | | | 10 | 8 | 55 | | 0.6 |
| | | 1557 | | | | 8.7 | 6 | 38 | | 0.7 |
| | | 2126 | | | | 5.8 | 3 | 25 | | 0.6 |
| | 11.11 | 1022 | | | | 3.6 | 1 | 14 | | 0.5 |
| | | 1619 | | | | 0 | 0 | 1.8 | 0 | 0.0 |

Note: A manual peak height analysis showed the automatic "Shimadzu" integrations were accurate, except for hydrogen, which was analyzed by a multi-point calibration method.

Table 6.5.8. Gas composition data
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

CAPSULE 3, CYCLE 87.10

Water-vapor injection No. 4; Duration 95 h

| cycle | date | time | $H_2O$-vapor Injection Press. (Pa) | start | stop | Concentration of Effluent Gases (ppmv) CO | $CO_2$ | $H_2$ | $N_2$ | $CH_4$ |
|---|---|---|---|---|---|---|---|---|---|---|
| 87.10 | 19.11 | 1542 | | | | 0 | 0 | 2.7 | 2.4 | 0 |
| | 23.11 | 0918 | | | | 0 | 0 | 1.1 | 6 | 0 |
| | | 1115 | 90 | xxxx | | | | | | |
| | | 1257 | | | | 4.5 | 0 | 1.5 | 4 | 0 |
| | | 1338 | | | | 15 | 45 | 92 | 18 | 0.4 |
| | | 1538 | | | | 26.8 | 54 | 00 | 11 | 0.4 |
| | 24.11 | 0159 | | | | 32 | 54 | 20 | 12 | 0.5 |
| | | 0759 | | | | 30 | 52 | 20 | 0.6 | 0.6 |
| | 26.11 | 0311 | | | | 39 | 55 | 99 | 6.3 | 0.7 |
| | | 0930 | | | | 45 | 56 | 110 | 2.5 | 0.7 |
| | | 2216 | | | | 47 | 53 | 110 | 3.2 | 0.7 |
| | 27.11 | 0948 | | | | 42 | 47 | 117 | | |
| | | 1000 | | | xxxx | | | | | |
| | | 1018 | | | | 45.3 | 51 | 120 | | 0.6 |
| | | 1118 | | | | 24 | 27 | 102 | | 0.6 |
| | | 1355 | | | | 11 | 10 | 104 | | 0.6 |
| | 30.11 | 1844 | | | | 0 | 1.4 | 1.4 | | 1.2 |

Note: The hydrogen values are between 120 and 140 ppm. All others were "Shimadzu" integration values which were found to be accurate by peak height analysis.

Table 6.5.9. Gas composition data
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

CAPSULE 3, CYCLE 88.01

Water-vapor injection No. 5; Duration 96 h

| | | | $H_2O$-vapor Injection Press. | | | Concentration of Effluent Gases (ppmv) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| cycle | date | time | (Pa) | start | stop | CO | $CO_2$ | $H_2$ | $N_2$ | $CH_4$ |
| 88.01 | 11.01 | 1001 | | | | 0 | 0 | 3 | 2.8 | 0 |
| | | 1015 | 90 | xxxx | | | | | | |
| | | 1130 | | | | 0 | 0 | 1.6 | 2.1 | 0 |
| | | 1230 | | | | 1.5 | 17.8 | 0.6 | 8.3 | 0 |
| | | 1320 | | | | 1.6 | 19.6 | 40 | 2.6 | 0 |
| | | 1410 | | | | 4.5 | 24.8 | 45 | 2.7 | 0 |
| | | 1455 | | | | 3 | 27.8 | 50 | 2.6 | 0 |
| | | 1540 | | | | 3.3 | 28.2 | 50 | 2.3 | 0 |
| | | 1620 | | | | 3.5 | 23.7 | 50 | 12 | 0 |
| | | 1705 | | | | 4.5 | 28.5 | 55 | 2.8 | 0 |
| | | 1925 | | | | 4.0 | 27.6 | 55 | 2.3 | 0 |
| | | 2100 | | | | 3.7 | 26.8 | 60 | 3.3 | 0 |
| | | 2320 | | | | 3.5 | 26.8 | 65 | 2.7 | 0 |
| | 12.01 | 0000 | | | | 4.2 | 26.9 | 65 | 2.7 | |
| | | 0145 | | | | 4.6 | 27.6 | 60 | 5.8 | 0 |
| | | 0320 | | | | 4 | 26.5 | 60 | 2.9 | 0 |
| | | 0540 | | | | 3.4 | 26.8 | 65 | 2 | 0 |
| | | 0800 | | | | 4 | 25.7 | 65 | 2.4 | 0 |
| | | 1320 | | | | 4.6 | 26.6 | 70 | 2.2 | 0 |
| | | 1550 | | | | 2 | 29 | 70 | 20 | 0 |
| | | 2350 | | | | 2.4 | 25.7 | 75 | 2.5 | 0 |
| | 13.01 | 0125 | | | | 3.9 | 28.7 | 70 | 2.1 | 0 |
| | | 0245 | | | | 4.7 | 28.9 | 70 | 2.4 | 0 |
| | | 0700 | | | | 4.5 | 30.1 | 75 | 2.8 | 0 |
| | 15.01 | 1000 | | | | 2 | 10.8 | 50 | 3.7 | 0 |
| | | 1012 | | | xxxx | | | | | |
| | | 1015 | | | | 4.3 | 24.9 | 70 | 16.7 | 0 |
| | | 1055 | | | | 5.5 | 23.3 | 65 | 15.4 | 0 |
| | | 1220 | | | | 3.9 | 11.8 | 45 | 2.7 | 0 |
| | | 1340 | | | | 4.2 | 8.0 | 40 | 1.6 | 0 |
| | | 2015 | | | | 0 | 1.7 | 19 | 1.6 | 0 |
| | 16.01 | 0500 | | | | 1.4 | 1.6 | 15 | 1.6 | 0 |
| | | 1320 | | | | 1.3 | 1.1 | 13 | 6.7 | 0 |

Note: The "Shimadzu" automatic integration was found to be accurate for all GC peaks with the exception of hydrogen, which was found to be 50 to 100 ppm, during the injection.

Table 6.5.10. Gas composition data
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

CAPSULE 3, CYCLE 88.05

Water-vapor injection No. 6; Duration 168h

| | | | $H_2O$-vapor Injection Press. | | | Concentration of Effluent Gases (ppmv) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| cycle | date | time | (Pa) | start | stop | CO | $CO_2$ | $H_2$ | $N_2$ | $CH_4$ |
| 88.05 | 02.06 | 1008 | 132 | xxxx | | | | | | |
| | 02.06 | 1612 | | | | | -- | 49 | | |
| | | 1635 | | | | | -- | 49 | | |
| | 03.06 | 1809 | | | | | 15 | | 2.4 | |
| | | 1325 | | | | | 14 | | | |
| | | 1345 | | | | | 14 | | | |
| | | 1440 | | | | 2 | 19 | | | |
| | | 0359 | | | | 1 | 19 | | | |
| | | 0855 | | | | 1 | 20 | | | |
| | 06.06 | 1715 | | | | 2.9 | 19 | | | |
| | | 1100 | | | | | | 65 | | |
| | 07.06 | 1006 | | | | 1.7 | 19 | | | |
| | 08.06 | 0118 | | | | 2.3 | 20 | | | |
| | | 1849 | | | | 2.3 | 18 | | | |
| | 09.06 | 0056 | | | | 2.9 | 19 | | 2.2 | |
| | | 0907 | | | | 2.9 | 18 | | | |
| | | 1018 | | | xxxx | | | | | |
| | | 1030 | | | | | | 50 | | |
| | | 1045 | | | | | | 45 | | |
| | | 1100 | | | | | | 37 | | |
| | | 1435 | | | | | | 32 | | |
| | | 1047 | | | | 1.7 | 17 | | | |
| | | 1118 | | | | 1.2 | 16.6 | | | |
| | | 1134 | | | | 2.3 | 13.9 | | | |

Note: The CO and $CO_2$ peaks were analyzed by a manual peak height method, as the "Shimadzu" integrator gave apparent erroneous results. Hydrogen could not be analyzed by ordinary means due to Ne contamination. The hydrogen data were obtained by separation of the Ne and $H_2$ peaks by use of a mol seive column at -140° C and read out on a separate recorder.

Table 6.5.11. Gas composition data
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

CAPSULE 3, CYCLE 88.06

Water-vapor injection No. ; Duration 135 h.

| | | | $H_2O$-vapor Injection Press. | | | Concentration of Effluent Gases (ppmv) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| cycle | date | time | (Pa) | start | stop | CO | $CO_2$ | $H_2$ | $N_2$ | $CH_4$ |
| 88.06 | 21.06 | 1757 | | | | 1.6 | 0.3 | | | |
| | 27.06 | 0913 | | | | 1.1 | | | | |
| | | 1001 | | | | 1.5 | | | | |
| | 28.06 | 0900 | 136 | xxxx | | | | | | |
| | | 1016 | | | | 0.6 | | | | |
| | | 1325 | | | | | 1.2 | | | |
| | | 1738 | | | | | 1.5 | | | |
| | 29.06 | 0845 | | | | | | 25 | | |
| | 29.06 | 1544 | | | | | 14 | | | |
| | | 1632 | | | | | 21 | | | |
| | | 1642 | | | | | 22 | | | |
| | | 2008 | | | | | 21 | | | |
| | | 2037 | | | | | 26 | | | |
| | 30.06 | 1054 | | | | | 14 | | | |
| | | 1124 | | | | | 21 | | | |
| | | 1327 | | | | | 12 | | | |
| | 01.07 | 0859 | | | | | 15 | 25 | | |
| | | 0930 | | | | | 17 | | | |
| | 02.07 | 1951 | | | | | 24 | | | |
| | 04.07 | 0001 | | | xxxx | | | | | |

Note: The $CO_2$ data are "Shimadzu" integrations. The original strip charts could not be located; therefore, the data cannot be checked. The $H_2$ data were obtained by use of the special low-temperature molesieve column. The test ended by inadvertent reactor scram.

Table 6.5.12. Gas composition data
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

CAPSULE 3, CYCLE 88.07

Water-vapor injection No. 8; Duration 120 h

| | | | $H_2O$-vapor Injection | | | | Concentration of Effluent Gases (ppmv) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| cycle | | date | Press. time | (Pa) | start | stop | CO | $CO_2$ | $H_2$ | $N_2$ | $CH_4$ |
| 88.07 | 14.09 | 0936 | | | | | 2 | 0 | Ne | | |
| | | 0943 | 122 | xxxx | | | | | | | |
| | | 1107 | | | | | 3 | | | | |
| | | 1253 | | | | | 4 | 2 | | | |
| | | 1328 | | | | | 1 | 7 | | | |
| | | 1429 | | | | | 1 | 8.3 | | | |
| | | 1512 | | | | | 1 | 10 | | | |
| | | 1814 | | | | | 1 | 14.8 | | | |
| | | 2010 | | | | | 1 | 13.4 | | | |
| | 14.10 | 0054 | | | | | | 15 | | | |
| | | 0647 | | | | | 2 | 13 | | | |
| | | 0903 | | | | | 1 | 14 | | | |
| | 1509 | 4553 | | | | | 1 | 14.4 | 40 | | |
| | | 2015 | | | | | 1 | 14.2 | | | |
| | 16.09 | 0611 | | | | | 1 | 16.5 | | | |
| | | 0956 | | | | | - | 13.8 | | | |
| | | 1420 | | | | | | 13.9 | | | |
| | 17.09 | 0940 | | | | | | | 32 | | |
| | | 1149 | | | | | 1 | 13.9 | | | |
| | 18.09 | 1237 | | | | | 1 | 13.9 | | | |
| | 19.09 | 0943 | | | xxxx | | | | | | |
| | | 1026 | | | | | 1 | 12.6 | | | |
| | | 1156 | | | | | | 8.3 | | | |
| | | 1426 | | | | | 2 | 5.7 | | | |
| | | 1515 | | | | | 1 | | 26 | | |

Note: The manual peak height analysis agreed well with the "Shimadzu" intergrator; therefore, the "Shimadzu" data are used. The $H_2$ data were corrected using a multi-point calibration method, as the GC response for $H_2$ was found to be non-linear. The CO data are very approximate.

Table 6.5.13. Gas composition data
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

CAPSULE 3, CYCLE 88.08

Water-vapor injection No. 9; Duration 192 h

| | | $H_2O$-vapor Injection | | | | Concentration of Effluent Gases (ppmv) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Press. | | | | | | | | |
| cycle | date | time | | start | stop | CO | $CO_2$ | $H_2$ | $N_2$ | $CH_4$ |
| 88.08 | 10.10 | 1100 | 118 | xxxx | | | | Ne | | |
| | | 1447 | | | | 0.8 | 12.5 | | 1 | |
| | | 1459 | | | | 0.8 | 10 | | | |
| | | 1601 | | | | 0.8 | 13.6 | | | |
| | | 2225 | | | | 1.5 | 18.2 | 22 | 1 | |
| | 11.10 | 0903 | | | | 2 | 19 | 23 | 1 | |
| | | 1055 | | | | 1.1 | 19.5 | 35 | 1 | 0.3 |
| | | 1220 | | | | 2 | 18.2 | 35 | 1 | 0.3 |
| | | 1928 | | | | 1.2 | 16.5 | 33 | | 0.3 |
| | 12.10 | 0943 | | | | 1.4 | 18 | 35 | | 0.2 |
| | | 0956 | | | | 1.4 | 18.7 | 35 | 1 | 0.2 |
| | 13.10 | 0331 | | | | 1.4 | 18.3 | 40 | 1 | 0.2 |
| | 14.10 | 1130 | | | | 1.4 | 18 | 44 | 1 | 0.2 |
| | | 1811 | | | | 1.2 | 17.8 | 38 | 2.2 | 0.2 |
| | 15.10 | 0150 | | | | 1.4 | 18.7 | 40 | 1.9 | 0.23 |
| | 16.10 | 0554 | | | | 1.4 | 18 | 40 | | 0.2 |
| | 17.10 | 0246 | | | | 1.4 | 16.6 | 40 | | 0.2 |
| | | 0947 | 350 | | | | | | | |
| | | 0949 | | | | | 18.5 | 40 | 2 | 0.25 |
| | | 1002 | | | | 1.5 | 16.8 | 40 | 1.8 | 0.25 |
| | | 1014 | | | | 1.5 | 17.2 | 42 | | |
| | | 1026 | | | | | 17.9 | 40 | | |
| | | 1038 | | | | 1.2 | 21.6 | 48 | | 1.2 |
| | | 1047 | 118 | | | | | | | |
| | | 1050 | | | | 1.3 | 24.5 | 46 | | 1.3 |
| | | 1102 | | | | 1.3 | 26.4 | 50 | 2.2 | 0.23 |
| | | 1115 | | | | 1.6 | 27.3 | 54 | | 0.27 |
| | | 1127 | | | | 1.7 | 27.6 | 54.8 | | 0.26 |
| | | 1139 | | | | 1.6 | 24.9 | 51 | | 0.28 |
| | | 1215 | | | | 1.5 | 19.1 | 42.5 | | |
| | | 1240 | | | | 1.5 | 19.2 | 42 | | |
| | | 1304 | | | | 1.3 | 19.8 | 40 | | |
| | | 1328 | | | | 1.3 | 18.7 | 40 | | |
| | | 1405 | | | | 1.5 | 18.8 | 40 | | |
| | | 1906 | | | | 1.4 | 17.7 | 40 | | 0.17 |

Table 6.5.13. (continued)

CAPSULE 3, CYCLE 88.08

Water-vapor injection No. 9; Duration 192 h

| cycle | date | $H_2O$-vapor Injection Press. time | start | stop | Concentration of Effluent Gases (ppmv) CO | $CO_2$ | $H_2$ | $N_2$ | $CH_4$ |
|---|---|---|---|---|---|---|---|---|---|
| | 18.10 | 1100 | | xxxx | | | | | |
| | | 1100 | | | 1.3 | 18 | 40 | 2.3 | 0.2 |
| | | 1300 | | | 1.3 | 12 | 33 | | |
| | | 1530 | | | 3.6 | 8.1 | 25 | | |
| | | 2100 | | | 3.7 | 5.0 | 20 | | |

Note: The "Shimadzu" integrations were found to be correct, after a detailed peak height analysis. The hydrogen peaks were analyzed by the muti-point manual method. The increase in water vapor concentration indicated a 45-min delay in the formation and transport of product gases. The CO and $CH_4$ data are uncertain to about a factor of 0.5.

Table 6.5.14. Gas composition data
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

CAPSULE 3, CYCLE 88.09

Water-vapor injection No. 10; Duration 241 h

| | | | $H_2O$-vapor Injection Press | | | Concentration of Effluent Gases (ppmv) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| cycle | date | time | (Pa) | start | stop | CO | $CO_2$ | $H_2$ | $N_2$ | $CH_4$ |
| 88.09 | 31.10 | 1000 | 130.5 | | | 2.1 | 0 | 1000 | 3.4 | 1.8 |
| | | 1040 | | xxxx | | | | | | |
| | 31.10 | 1217 | | | | 2.0 | 0 | 1000 | | 1.7 |
| | | 1437 | | | | 5.7 | 2.2 | 1000 | | 1.7 |
| | | 1739 | | | | 5.3 | 5.7 | 1000 | 3.4 | 2 |
| | 01.11 | 0739 | | | | 5.4 | 5.4 | 1000 | 2.8 | 1.8 |
| | | 0953 | | | | 5.5 | 2.7 | 1000 | 2.8 | 1.6 |
| | 02.11 | 0927 | | | | 4.2 | 2.4 | 1000 | | 1.4 |
| | 03.11 | 1045 | | | | 5.6 | 4.6 | 1000 | 1.9 | 1.7 |
| | | 1145 | | | | | | | | |
| | | 1219 | | | | 2.8 | 4.3 | | 16.8 | 0.7 |
| | | 1239 | | | | 2.8 | 4.8 | | 16.4 | 0.7 |
| | | 1820 | | | | 2.7 | 6.7 | | 16.7 | 0.6 |
| | | 1840 | | | | 2.4 | 7.4 | | 17.6 | 0.5 |
| | 04.11 | 0107 | | | | 2.7 | 7.8 | | 17.4 | 0.4 |
| | | 1511 | | | | 2.4 | 18.6 | | 21.1 | 0.4 |
| | | 1658 | | | | 2.5 | 17.6 | | 21 | 0.37 |
| | 05.11 | 0145 | | | | 2.7 | 18.0 | | 22.3 | 0.32 |
| | | 1111 | | | | 2.2 | 18.5 | | 21.3 | 0.3 |
| | | 1725 | | | | 2.3 | 18.4 | | 21.5 | 0.3 |
| | 06.11 | 1000 | | | | 2.6 | 18.3 | | 22.5 | 0.3 |
| | | 1955 | | | | 2.6 | 19.7 | | 22.1 | 2.24 |
| | 07.11 | 0145 | | | | 2.4 | 19.2 | | 23.1 | 0.23 |
| | | 1135 | 100 | | | | | | | |
| | | 1138 | | | | 2.2 | 20 | 1000 | 18.5 | 0.31 |
| | | 1158 | | | | 9.3 | 10 | 1000 | 14.1 | 1.2 |
| | | 1229 | | | | 7.5 | 6.6 | 1000 | 6.9 | 1.2 |
| | | 1713 | | | | 6.0 | 3.7 | 1000 | 2.2 | 1.6 |
| | 08.11 | 0911 | | | | 5.0 | 2.8 | 1000 | 2.8 | 1.6 |
| | | 1656 | | | | 5.2 | 3.9 | 1000 | 1.5 | 1.5 |
| | 09.11 | 0200 | | | | 4.9 | 3.2 | 1000 | 1.6 | 1.6 |
| | | 0913 | | | | 4.0 | 3.6 | 1000 | 5.7 | 1.4 |
| | | 0954 | | | | 4.6 | 2.3 | 1000 | 1.4 | 1.5 |
| | | 1000 | | | | | | | | |
| | | 1054 | | | | 4.9 | 2.8 | 1000 | 4.2 | 1.3 |
| | | 1154 | | | | 4.6 | 0.7 | 1000 | 3.7 | 1.5 |
| | | 1254 | | | | | | | | |
| | | 1254 | | | | 3.8 | 0.4 | 1000 | 6.2 | 1.5 |
| | | 1324 | | | | 4.5 | 2.4 | 1000 | 6.3 | 1.5 |

Table 6.5.14 (continued)

CAPSULE 3, CYCLE 88.09

Water-vapor injection No. 10; Duration 241 h

| cycle | date | time | $H_2O$-vapor Injection Press (Pa) | start | stop | Concentration of Effluent Gases (ppmv) CO | $CO_2$ | $H_2$ | $N_2$ | $CH_4$ |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 1454 | | | | 5.2 | 2.3 | 1000 | 6.3 | 1.4 |
| | | 1625 | | | | 4.5 | 2.0 | 1000 | 1.3 | 1.3 |
| | 10.11 | 0110 | | | | 5.0 | 3.6 | 1000 | 1.5 | 1.6 |
| | | 0926 | | | | 5.2 | 2.5 | 1000 | 1.6 | 1.4 |
| | | | | | xxxx | | | | | |
| | | 1150 | | | | 4.4 | 4.1 | 1000 | 8.3 | 2.0 |
| | | 1301 | | | | 4.9 | 4.1 | 1000 | 1.4 | 1.8 |
| | | 1401 | | | | 3.9 | 0.6 | 1000 | 1.7 | 1.8 |
| | | 2114 | | | | 3.2 | 0 | 1000 | 1.7 | 2.3 |
| | 11.11 | 0251 | | | | 2.6 | 0 | 1000 | 1.7 | 2.2 |
| | 13.11 | 0113 | | | | 1.2 | 0 | 1000 | 1.3 | 1.5 |
| | | 1145 | | | | | | | | |
| | | 1408 | | | | 1.4 | 0.7 | | 29.7 | 0.5 |
| | | 1849 | | | | 1.5 | 1.5 | | 29.7 | 0.3 |
| | 14.11 | 0913 | | | | 1.7 | 1.9 | | 30.7 | 0.2 |

Note: All GC data peaks checked by manual peak height method. The "Shimadzu" integrations were accurate, except for hydrogen, which literally swamped the GC. Later, multi-point calibrations showed that the special tank labeled 0.1% $H_2$ was indeed 1000 ppm. The $N_2$ data indicate the service He was contaminated with nitrogen, or air. Checking the inlet service He showed < 2ppm oxygen. Also, the CO peaks for capsules 1 and 2 average 4 ppm; therefore, the maximum $O_2$ in the inlet gas was 2 ppm.

Table 6.5.15. Gas composition data
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

CAPSULE 3 CYCLE 88.10

Water-vapor injection No. 11; Duration 172 h.

| | | | $H_2O$-vapor Injection Press. | | | Concentration of Effluent Gases (ppmv) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| cycle | date | time | (Pa) | start | stop | CO | $CO_2$ | $H_2$ | $N_2$ | $CH_4$ |
| 88.10 | 22.11 | 0927 | | | | 3.0 | 1.9 | 21.9 | 1.6 | 0.5 |
| | | 0938 | | | | 3.3 | 2.1 | 21.7 | 1.6 | 0.6 |
| | | 0941 | | | | | | | | |
| | | 0949 | | | | 3.5 | 2.5 | Ne | 2.9 | 0.55 |
| | | 1000 | | | | 3.5 | 3.9 | Ne+ | 20 | 0.45 |
| | | 1011 | | | | 37.5 | 15 | Ne+ | 150 | 7.0 |
| | | 1021 | | | | 69 | 10 | Ne | 20 | 20.5 |
| | | 1036 | | | | 90 | Ne | Ne | 25 | 33 |
| | | 1135 | | | | 105 | Ne | Ne | Ne | 50 |
| | | 1235 | | | | 106 | Ne | Ne | 20 | 58 |
| | | 1435 | | | | 95 | Ne | Ne | Ne | 54 |
| | 23.11 | 0934 | | | | 10 | Ne | Ne | Ne | 5 |
| | 25.11 | 0917 | | | | 5 | Ne | Ne | Ne | Ne |
| | 28.11 | 0930 | | | | 5 | Ne | Ne | Ne | Ne |
| | 29.11 | 1100 | 123 | xxxx | | | | | | |
| | 30.11 | 0940 | | | | 100 | Ne | Ne | Ne | Ne |
| | 01.12 | 1457 | | | | 76 | 58 | Ne | Ne | 12 |
| | 02.12 | 1100 | | | | 68 | 55 | Ne | Ne | 12 |
| | 03.12 | 0924 | | | | 64 | 52 | Ne | Ne | 11 |
| | 04.12 | 1146 | | | | 63 | 47 | Ne | 0.5 | 7.9 |
| | | 1150 | | | | 61 | 57 | Ne | 0.5 | 10.4 |
| | 05.12 | 2101 | | | | 60 | 60 | Ne | 0.5 | 9.8 |
| | | 1021 | | | | 61.5 | 62.4 | Ne | 0.5 | 8.5 |
| | | 1340 | | | xxxx | | | | | |
| | | 1400 | | | | 66 | 57 | Ne | | 7 |
| | 06.12 | 0907 | | | | 8 | | Ne | 0.5 | 3 |
| | 07.12 | 1427 | | | | 4 | | Ne | | 3 |
| | 08.12 | 0940 | | | | 3 | | Ne | 0.5 | 2.5 |
| | 09.12 | 1004 | | | | 2 | | Ne | 0.5 | 2 |
| | 12.12 | 0914 | | | | 2 | | Ne | 0.5 | 2 |

Note: Neon was added to capsule 3, starting at 22.11, 0941, to increase the fuel temperature to 1040° C. During the Ne addition, the Ne peak swamped the GC columns. Some usable quantitative data were possible by decreasing the gain and increasing the zero setting, so that the CO, $N_2$, and $CH_4$ peaks could be seen on top of the large Ne tail. The $CO_2$ peak eluted before the Ne and, thus, could be easily seen. The peaks were all analyzed by a manual peak height method.

Table 6.5.16. Gas composition data
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

CAPSULE 3, CYCLE 89.01

Water-vapor injection No. 12: Duration 192 h
Hydrogen injection No. 1: Duration 192 h

| | | | $H_2O$-vapor Injection Press. | | | Concentration of Effluent Gases (ppmv) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| cycle | date | time | (Pa) | start | stop | CO | $CO_2$ | $H_2$ | $N_2$ | $CH_4$ |
| 89.01 | 17.01 | 0928 | | | | 0.5 | | 2.5 | 1.4 | |
| | 18.01 | 0916 | | | | 0.5 | | Ne | 1.0 | |
| | 19.01 | 0905 | | | | 0.5 | tr | Ne | 1.6 | |
| | | 0915 | | $H_2$ | | 0.5 | | 2.4 | 1 | |
| | 0931 | 100 | | xxxx | | | | | | |
| | 20.01 | 0925 | | $H_2O$ | | | | 1000 | 2.5 | 2.5 |
| | 23.01 | 1000 | 112 | xxxx | | | | | | |
| | | 1056 | | | | tr | | 1000 | 11.7 | 1.8 |
| | | 1426 | | | | tr | | | | 1.7 |
| | | 1436 | | | | 1.4 | | 1000 | 7.8 | 1.9 |
| | | 1446 | | | | 2.6 | tr | 1000 | 6.7 | 2.2 |
| | | 1456 | | | | 2.5 | tr | 1000 | 6.9 | 2.0 |
| | | 1506 | | | | 2.6 | tr | 1000 | 6.3 | 2.0 |
| | 24.01 | 0844 | | | | 8.4 | 2.6 | 1000 | 13.7 | 2.6 |
| | | 0854 | | | | 8.2 | 2.5 | 1000 | 8.0 | 2.6 |
| | | 1428 | | | | 8.4 | 3.0 | 1000 | 3.2 | 2.8 |
| | 25.01 | 0832 | | | | 7.5 | 2.4 | 1000 | 6.0 | 2.3 |
| | 26.01 | 0924 | | | | 7.5 | 2.7 | 1000 | 2.7 | 2.0 |
| | | 1521 | | | | 8.8 | 2.7 | 1000 | 5.0 | 2.6 |
| | 27.01 | 0845 | | | $H_2$ | 9.3 | 2.7 | 1000 | | 2.9 |
| | | 0935 | | | xxxx | | | | | |
| | | 0950 | | | | 8.6 | 2.8 | 75 | | 2.5 |
| | | 1000 | | | | 7.1 | 7.0 | 55 | 23 | 1.3 |
| | | 1010 | | | | 4.5 | 8.5 | 54 | 13 | 1.1 |
| | | 1257 | | | | 4.6 | 17 | 48 | | 1 |
| | | 1307 | | | | 4.6 | 17 | 47 | 6.3 | 0.7 |
| | | 1350 | | | | 4.0 | 17 | 51 | 6.2 | 0.9 |
| | | 1640 | | | | 3.0 | 25 | 45 | 18 | 0.5 |
| | | 1709 | | | | 2.9 | 23 | 41 | 7.8 | 0.5 |
| | | 0138 | | | | 2.8 | 23 | Ne | 43 | 0.5 |
| | 28.01 | 1657 | | | | 3.4 | 24 | 38 | 6.8 | 0.5 |
| | | 1734 | | | | 3.7 | 24 | 35 | 2.7 | 0.5 |
| | | 1000 | | | | 2.8 | 23.6 | 36 | 3.3 | 0.4 |
| | 30.01 | 1414 | | | | 3.5 | 26.4 | 37 | 2.3 | 0.5 |
| | 31.01 | 0952 | | | $H_2O$ | 2.9 | 27 | 38 | 7.6 | 0.5 |
| | | 1000 | | | xxxx | | | | | |
| | | 1052 | | | | 2.8 | 21 | Ne | 4.8 | tr |
| | | 1152 | | | | 3.2 | 16 | Ne | | 0.5 |

Table 6.5.16 (continued)

CAPSULE 3, CYCLE 89.01

Water-vapor injection No. 12: Duration 192 h
Hydrogen injection No. 1: Duration 192 h

| cycle | date | time | $H_2O$-vapor Injection Press. (Pa) start | stop | Concentration of Effluent Gases (ppmv) CO | $CO_2$ | $H_2$ | $N_2$ | $CH_4$ |
|---|---|---|---|---|---|---|---|---|---|
| | 1452 | | | | 3.7 | 9 | Ne | | 0.6 |
| | 1541 | | | | 3.7 | 8 | Ne | | 0.5 |
| | 01.02 | 0919 | | | 2.0 | 1.8 | 21 | 6 | tr |
| | 02.02 | 1512 | | | 0.3 | 0.5 | 14 | 1 | tr |
| | 03.02 | 0940 | | | 0.3 | 0.5 | 16 | 1.5 | 0.17 |

Note: The GC peaks were checked by manual peak height method; the "Shimadzu" integrations were correct, except for hydrogen, which was integrated manually.

Table 6.5.17. Gas composition data
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

CAPSULE 3, CYCLE 89.02

Water-vapor injection No. 13; Duration 96 h

| | | | $H_2O$-vapor Injection Press. | | | Concentration of Effluent Gases (ppmv) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| cycle | date | time | (Pa) | start | stop | CO | $CO_2$ | $H_2$ | $N_2$ | $CH_4$ |
| 89.02 | 10.02 | 1020 | | | | 2.6 | 1.7 | 15.9 | 1.6 | 0.2 |
| | 14.02 | 1300 | | | | | | | | |
| | 15.02 | 0844 | | | | 2.6 | tr | 9.5 | 2.0 | 0.4 |
| | 16.02 | 0854 | | | | 1.5 | tr | 8.0 | 1.0 | 0.3 |
| | 20.02 | 0905 | | | | 0.55 | tr | 6.1 | 1.5 | 0.1 |
| | | 0940 | 250 | xxxx | | | | | | |
| | | 1034 | | | | tr | tr | 6.1 | 6.0 | tr |
| | | 1202 | | | | 2.4 | 5.4 | 17.2 | 6 | 0.2 |
| | | 1212 | | | | 2.4 | 19 | 70 | 5.1 | 0.35 |
| | | 1222 | | | | 2.9 | 20.8 | 70 | 4.9 | 0.3 |
| | | 1312 | | | | 3.7 | 26.6 | 70 | 4.3 | 0.3 |
| | | 1547 | | | | 6.1 | 36 | 70 | 3.0 | 0.3 |
| | 21.02 | 1135 | | | | 6.4 | 33 | 70 | 1.7 | 0.37 |
| | | 1459 | | | | 6.1 | 33 | 70 | 1.9 | 0.5 |
| | 22.02 | 0912 | | | | 6.2 | 34.5 | 70 | 2.1 | 0.5 |
| | | 1414 | | | | 6.5 | 34.8 | 70 | 1.6 | 0.4 |
| | 23.02 | 0851 | | | | 5.5 | 31.2 | 70 | 1.5 | 0.37 |
| | | 0901 | | | | 5.8 | 31.4 | 70 | 1.4 | 0.39 |
| | 24.02 | 0900 | | | xxxx | 6.1 | 31.8 | 70 | 1.9 | 0.4 |
| | | 0910 | | | | 6.3 | 31.7 | 70 | 1.6 | 0.4 |
| | | 0940 | | | | | | | | |
| | | 1018 | | | | 5.6 | 29.9 | 70 | 2.2 | 0.4 |
| | | 1048 | | | | 4.3 | 21.4 | | 1.9 | 0.3 |
| | | 1118 | | | | 4.6 | 17.3 | 40 | 1.4 | 0.4 |
| | | 1218 | | | | 8.1 | 16.1 | | 1.2 | 0.6 |
| | | 1356 | | | | 10.3 | 12.5 | | 1.9 | 0.9 |
| | | 1546 | | | | 8.8 | 8.5 | | 1.1 | 1.0 |
| | 20.02 | 0925 | | | | 1.3 | tr | 12 | 3.0 | 0.17 |
| | 30.06 | 153 | | | | 1.3 | tr | 6 | 1 | tr |

Note: The "Shimadzu" integrations were found to be correct, except for hydrogen, which was estimated to be 70 ppm by the multi-point peak height method. Between 10.02, 1020, and 14.02, 1300, the reactor was down for two days.

Table 6.5.18. Gas composition data
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

CAPSULE 3, CYCLE 89.04

Water-vapor injection No. 14; Duration 96 h

| | | | $H_2O$-vapor Injection Press. | | | Concentration of Effluent Gases (ppmv) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| cycle | date | time | (Pa) | start | stop | CO | $CO_2$ | $H_2$ | $N_2$ | $CH_4$ |
| 89.04 | 01.05 | 1349 | | | | tr | 0 | 4.6 | 26.5 | 0 |
| | | 02.05 | 0925 | | | | tr | 0 | 4.8 | 25.7 |
| | | 0305 | 1337 | | | | tr | 0 | 4.3 | 28 |
| | | 05.05 | 0930 | | | | | 0 | 3.8 | 26 |
| | | 08.05 | 0853 | 550 | xxxx | | | | | |
| | | 0957 | | | | 1.1 | tr | 4.2 | 31 | |
| | | 1027 | | | | tr | 4.5 | 6 | 17 | tr |
| | | 1057 | | | | 2.2 | 15.6 | 64 | 15 | 0.7 |
| | | 1137 | | | | 2.2 | 24 | 63 | 15 | 0.7 |
| | | 1342 | | | | 2.2 | 29 | 63 | 13 | 0.7 |
| | | 1633 | | | | 2.2 | 30 | 63 | 14 | 0.5 |
| | 09.05 | 0234 | | | | 2.8 | 31 | 64 | 17 | 0.5 |
| | | 0855 | | | | 2.8 | 32 | 64 | 15 | 0.5 |
| | | 1339 | | | | 2.8 | 32.5 | 64 | 13 | 0.5 |
| | 10.05 | 0908 | | | | 2.2 | 32 | 64 | 16 | |
| | 11.05 | 0946 | | | | 2.8 | 32 | 64 | 17 | 0.5 |
| | | 1410 | | | | 2.8 | 32 | 64 | | 0.3 |
| | 12.05 | 0853 | | | xxxx | | | | | |
| | | 0959 | | | | 2.8 | 26 | 55 | 15 | 0.3 |
| | | 1145 | | | | 3.0 | 16 | 43 | | 0.3 |
| | | 1433 | | | | 5.4 | 12 | 30 | 14 | 0.7 |
| | 17.05 | 0911 | | | | | | 7 | | |

Note: The "Shimadzu" integrations were found to be in error. The above data were obtained by a manual peak height analysis. The nitrogen peaks appear high; however, no oxygen was seen in the inlet gas, and the CO peaks in capsule 1, which is swept with the same service He, were less than 1 ppm.

Table 6.5.19. Gas composition data
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

CAPSULE 3, CYCLE 89.06

Water-vapor injection No. 15; Duration 15 h
Water-vapor injection No. 16; Duration 15 h

| | | | $H_2O$-vapor Injection Press. | | | Concentration of Effluent Gases (ppmv) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| cycle | date | time | (Pa) | start | stop | CO | $CO_2$ | $H_2$ | $N_2$ | $CH_4$ |
| 89.06 | 22.06 | 0923 | | | | 0 | 0 | 2 | 16 | 0 |
| | 26.06 | 0818 | 1050 | xxxx | | | | | | |
| | | 0925 | | | | 0 | 7.5 | 54 | | tr |
| | | 0938 | | | | tr | 17.3 | 100 | 20 | 2 |
| | | 0958 | | | | | 25 | 80 | 18 | 1.5 |
| | | 1027 | | | | | 25 | 75 | 15 | 1 |
| | | 1319 | | | | | 25 | 60 | 13 | tr |
| | 27.06 | 0900 | | | | | 25 | 60 | 26 | |
| | | 1513 | | | | | 25 | 60 | | |
| | 28.06 | 0842 | | | | | 25 | 64 | | |
| | | 0852 | | | | | 25 | 64 | | |
| | 29.06 | 0830 | | | | | 25 | Ne | | |
| | | 0925 | | | | 4.4 | | Ne | | 0.6 |
| | | 1125 | | | | 4.4 | 54 | Ne | | 0.6 |
| | | 1408 | | | | 4.4 | 51 | Ne | | 0.6 |
| | 30.06 | 0837 | | | | 4.4 | 46 | Ne | | 1.0 |
| | | 0903 | | | | 4.4 | 47 | Ne | | 1.0 |
| | | 1502 | | | | 4.4 | 50 | Ne | | 1.0 |
| | 02.07 | 0259 | | | | 4.4 | 47 | Ne | | 0.6 |
| | 03.07 | 1048 | | | xxxx | | | | | |
| | | 1228 | | | | | 19 | Ne | | |
| | 04.07 | 0109 | | | | | 7 | | | |
| | | 0931 | | | | | 3 | | | |
| 89.06 | 10.07 | 0828 | 250 | xxxx | | | | | | |
| | | 10.05 | | | | 0 | 0 | Ne | 0 | 0 |
| | | 1130 | | | | | 14 | | | |
| | | 1140 | | | | tr | 22.4 | Ne | tr | tr |
| | 8.11 | 1618 | | | | tr | 43.4 | | tr | tr |
| | | 2350 | | | xxxx | | | | | |
| | | 2354 | | | | tr | 24 | | tr | tr |
| | | 2400 | | | xxxx | | | | | |

Note: The integrations were checked by manual peak height method. The manual method was judged to be more accurate.

Table 6.5.20. Summary of notes to Tables 6.5.1 through 6.5.19
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| Table 6.5.X | Note | Schimadza | manual | manual method | lot temp. GC condition |
|---|---|---|---|---|---|
| 1 | N | | | | |
| 2 | N | | | | |
| 3 | Y | AEFH | CK | MPH | |
| 4 | Y | AEFH | CK | ? | |
| 5 | Y | AEFH | CK | ? | |
| 6 | Y | E | CK | MPH | Y.H |
| 7 | Y | ($CO_2$) | | | Y.H |
| 8 | Y | A | CK | MPC* | |
| 9 | Y | AEFH | CK | MPM | |
| 10 | Y | AEFH | CK | MPH | |
| 11 | Y | | | MPH | |
| 12 | Y | AEFH | CK | MPH | |
| 13 | Y | AEFH | CK | MPC | |
| 14 | Y | E | | MPH | |
| 15 | N | | | MPH | |
| 16 | N | | | | |
| 17 | N | | | | |
| 18 | no | | | | |
| 19 | no | | | | |

A = accurate
AEFH = accurate except for hydrogen
CK = a manual method was used to check the Shimadza
E = erroneous results for all species
MPC = multi-point calibration
MPH = manual peak height method
MPM = multi-point manual method
N = no note
V = used only the manual method
Y = note present
Y.H = yes for hydrogen in presence, Nc
* = used to correct non-linear response of GC to #2

## 6.6 REACTOR AND PROCESS DATA

The reactor start and stop dates, the cycle and cumulative power days and average cycle power are presented in Table 6.6.1. Following this, there are graphs of some of the reactor and process data according to the following order and table numbers.

| Reactor and Process Data History | Figures |
|---|---|
| HFR power and control rod | 6.6.1 through 6.6.3 |
| Activity, capsule A (1) | 6.6.4 through 6.6.6 |
| Activity, capsule B (2) | 6.6.7 through 6.6.8 |
| Activity, capsule C (3) | 6.6.9 through 6.6.11 |
| Pressure, capsule A (1) | 6.6.12 through 6.6.14 |
| Pressure, capsule B (2) | 6.6.15 through 6.6.17 |
| Pressure, capsule C (3) | 6.6.18 through 6.6.20 |
| Hygrometer, capsule A (1) | 6.6.21 through 6.6.23 |
| Hygrometer, capsule B (2) | 6.6.24 through 6.6.26 |
| Hygrometer, capsule C (3) | 6.6.27 through 6.6.29 |
| Purge flow, capsule A (1) | 6.6.30 through 6.6.32 |
| Purge flow, capsule B (2) | 6.6.33 through 6.6.35 |
| Purge flow, capsule C (3) | 6.6.36 through 6.6.38 |
| SPN-1 detector, capsule A (1) | 6.6.39 through 6.6.41 |
| SPN-1 detector, capsule B (2) | 6.6.42 through 6.6.44 |
| SPN-1 detector, capsule C (3) | 6.6.45 |
| SPN-2 detector, capsule A (1) | 6.6.46 through 6.6.48 |
| SPN-2 detector, capsule B (2) | 6.6.49 through 6.6.51 |
| SPN-2 detector, capsule C (3) | 6.6.52 through 6.6.54 |

The activity of the purge gas is in counts per sec (cps).
The ordinate scale values on the pressure history are to be divided by 100.
Note that Fig. 6.6.23 has an incorrect ordinate title; it should be Humidity in ppm.
The purge flow (Sccm) is in $cm^3$/min under standard conditions, i.e., at 0.1 MPa and 298 K.

Table 6.6.1. HFR cycle start and stop dates, cycle and cumulative power days, and average cycle power
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

| Cycle | Start | End | | | Ave. Power |
|---|---|---|---|---|---|
| y. no | d. mo | d. mo | FPD | ∑FPD | <MW> |
| 87.03 | 07.04 | 04.05 | 21.27 | 21.27 | 44.1 |
| 87.05 | 02.06 | 29.06 | 23.65 | 44.92 | 44.1 |
| 87.09 | 27.10 | 16.11 | 20.03 | 64.95 | 44.1 |
| 87.10 | 18.11 | 14.12 | 24.63 | 89.58 | 44.1 |
| 88.01 | 06.01 | 1.02 | 25.76 | 115.34 | NA |
| 88.02 | 04.02 | 29.02 | 25.44 | 140.78 | 47.7 |
| 88.04 | 28.04 | 23.05 | 25.75 | 166.53 | 47.5 |
| 88.05 | 26.05 | 20.06 | 25.21 | 191.74 | 47.5 |
| 88.06 | 23.06 | 15.07 | 20.79 | 212.53 | 45.1 |
| 88.07 | 08.09 | 28.09 | 21.04 | 233.57 | 45.3 |
| 88.08 | 05.10 | 24.10 | 21.44 | 255.01 | 45.3 |
| 88.09 | 27.10 | 17.11 | 21.26 | 276.27 | 45.1 |
| 88.10 | 21.11 | 12.12 | 20.92 | 297.19 | 45.1 |
| 88.11 | 15.12 | 05.01 | 21.40 | 318.59 | 45.1 |
| 89.01 | 16.01 | 06.02 | 20.96 | 339.55 | 41.7 |
| 89.02 | 10.02 | 04.03 | 18.80 | 358.35 | 45.1 |
| 89.03 | 04.04 | 24.04 | 19.75 | 378.10 | 45.5 |
| 89.04 | 28.04 | 20.05 | 22.75 | 400.85 | 45.3 |
| 89.05 | 25.05 | 14.06 | 21.14 | 421.99 | 44.7 |
| 89.06 | 18.06 | 10.07 | 21.60 | 443.59 | 42.0 |

y. no = year; cycle number
d. mo = day. month
FPD = full power days
∑FPD = cumulative number of full power days
Ave. Power = average power per cycle taken from Figs. 6.6-1, 6.6-2, and 6.6.-3
NA = not available; data for cycle 88.01 not included in Fig. 6.6-2

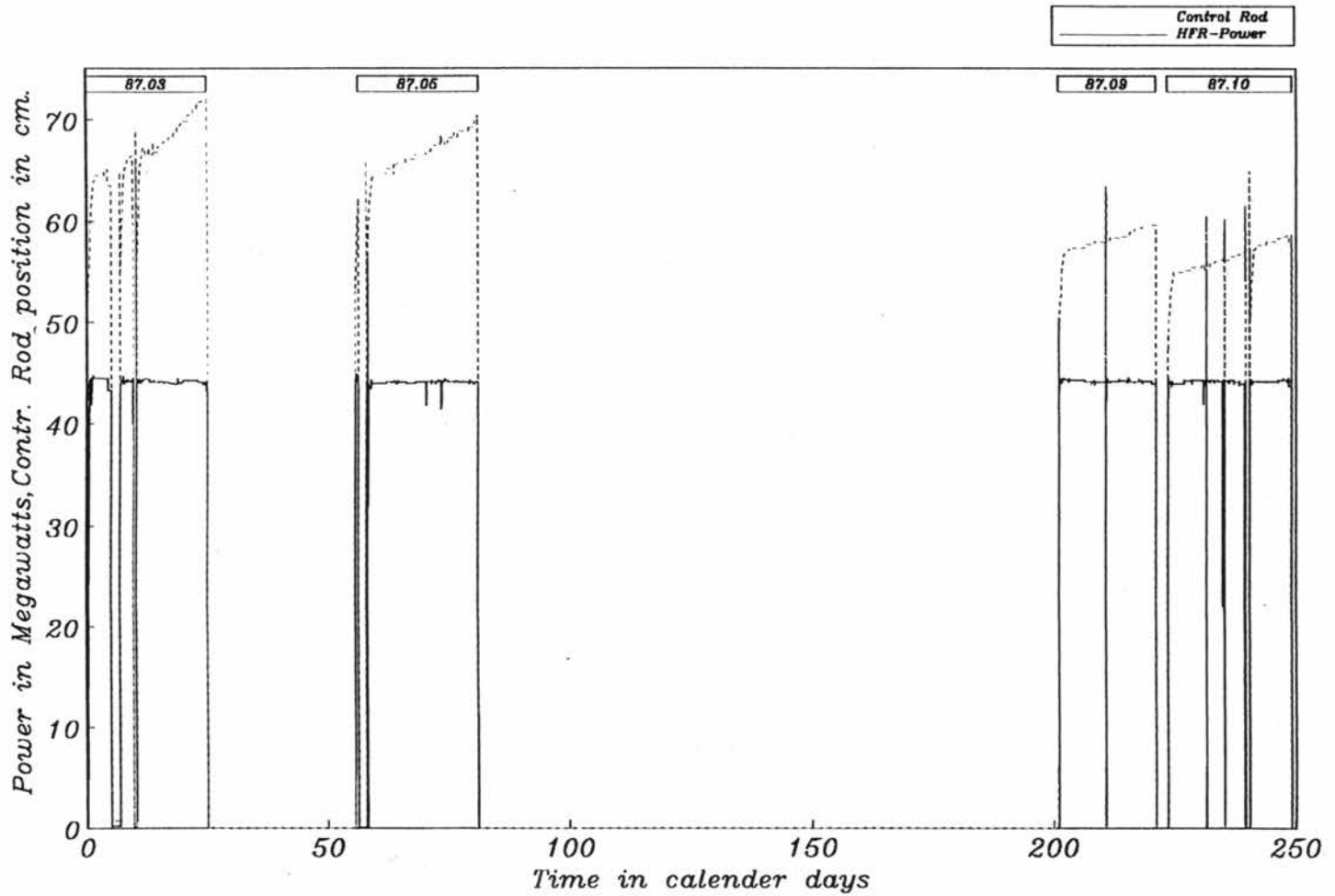



Fig. 6.6.1. HFR power and control-rod history cycles 87.03 – 87.10
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

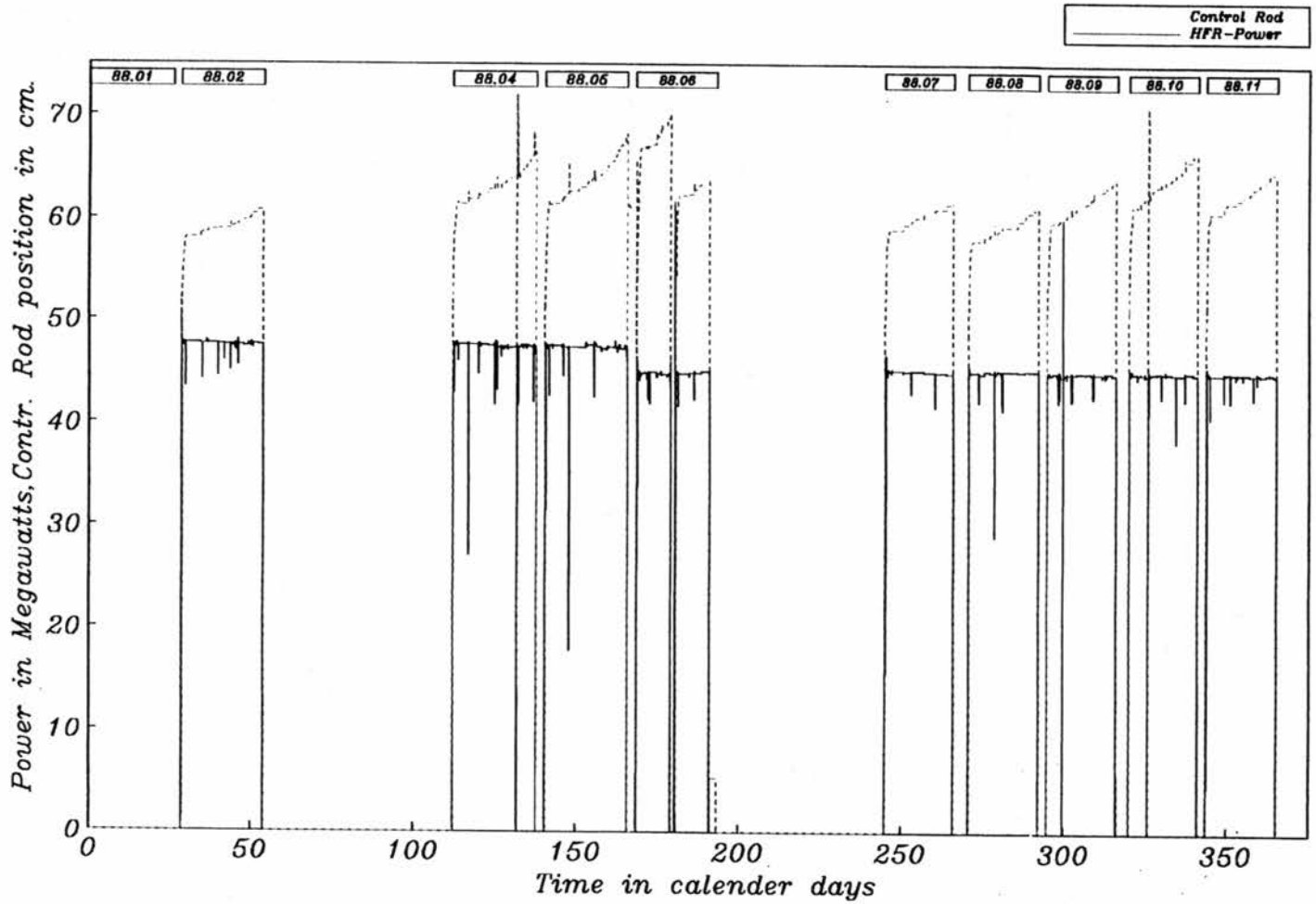



Fig. 6.6.2. HFR power and control-rod history cycles 88.10-88.11
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

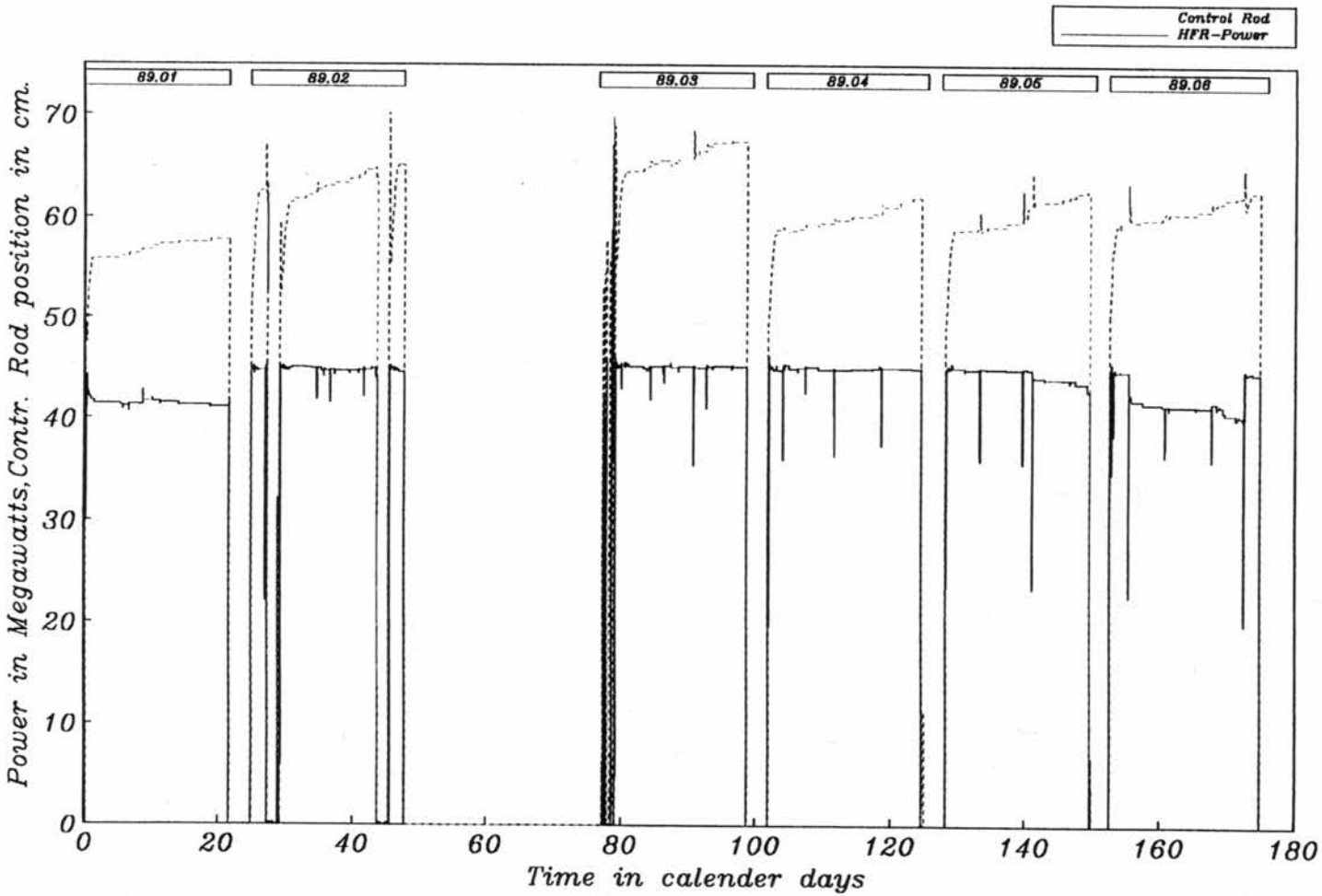



Fig. 6.6.3. HFR power and control-rod history cycles 89.01 – 89.06
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

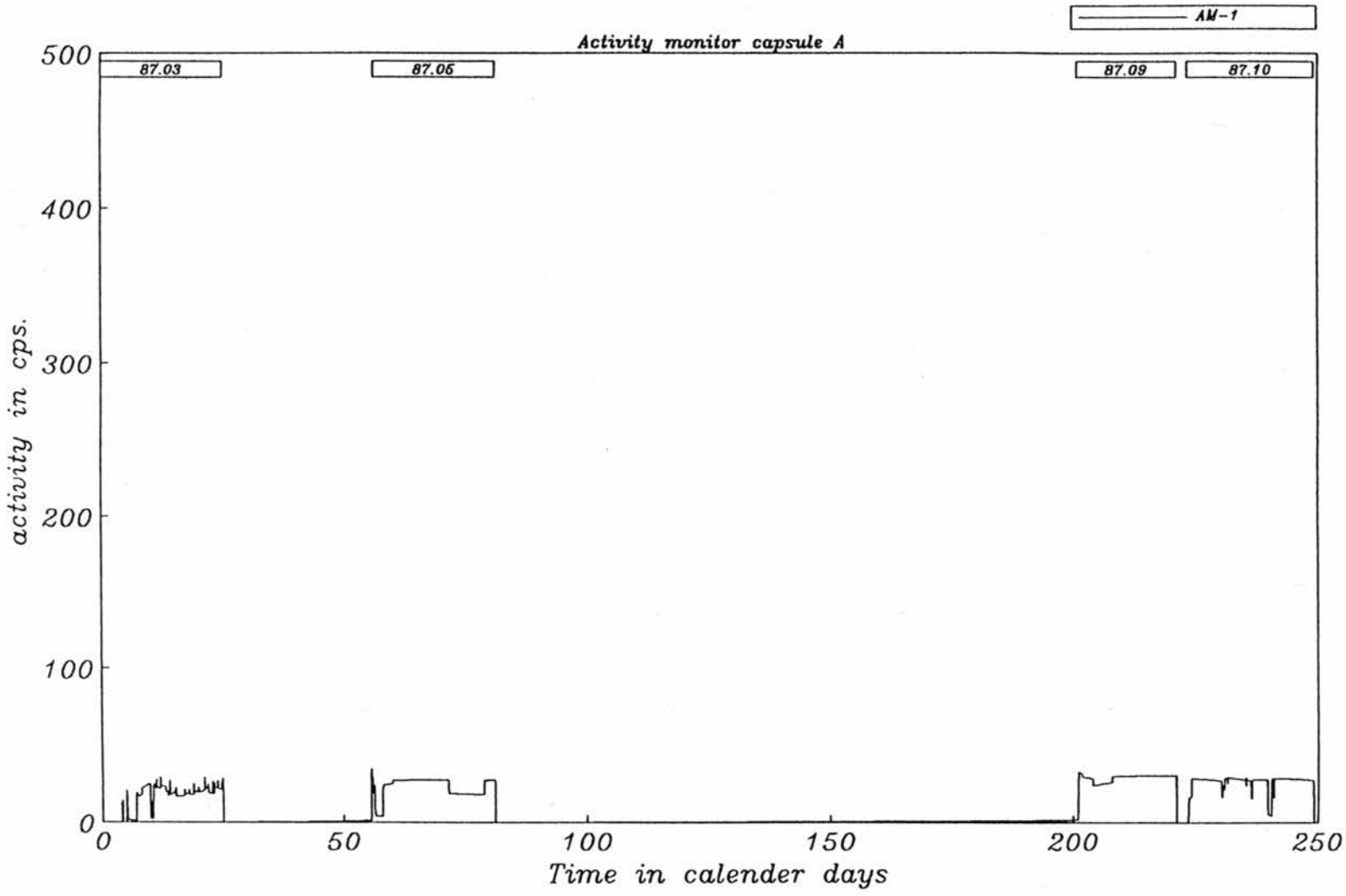



Fig. 6.6.4. Activity history D-214 Cycles 87.03 – 87.10
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

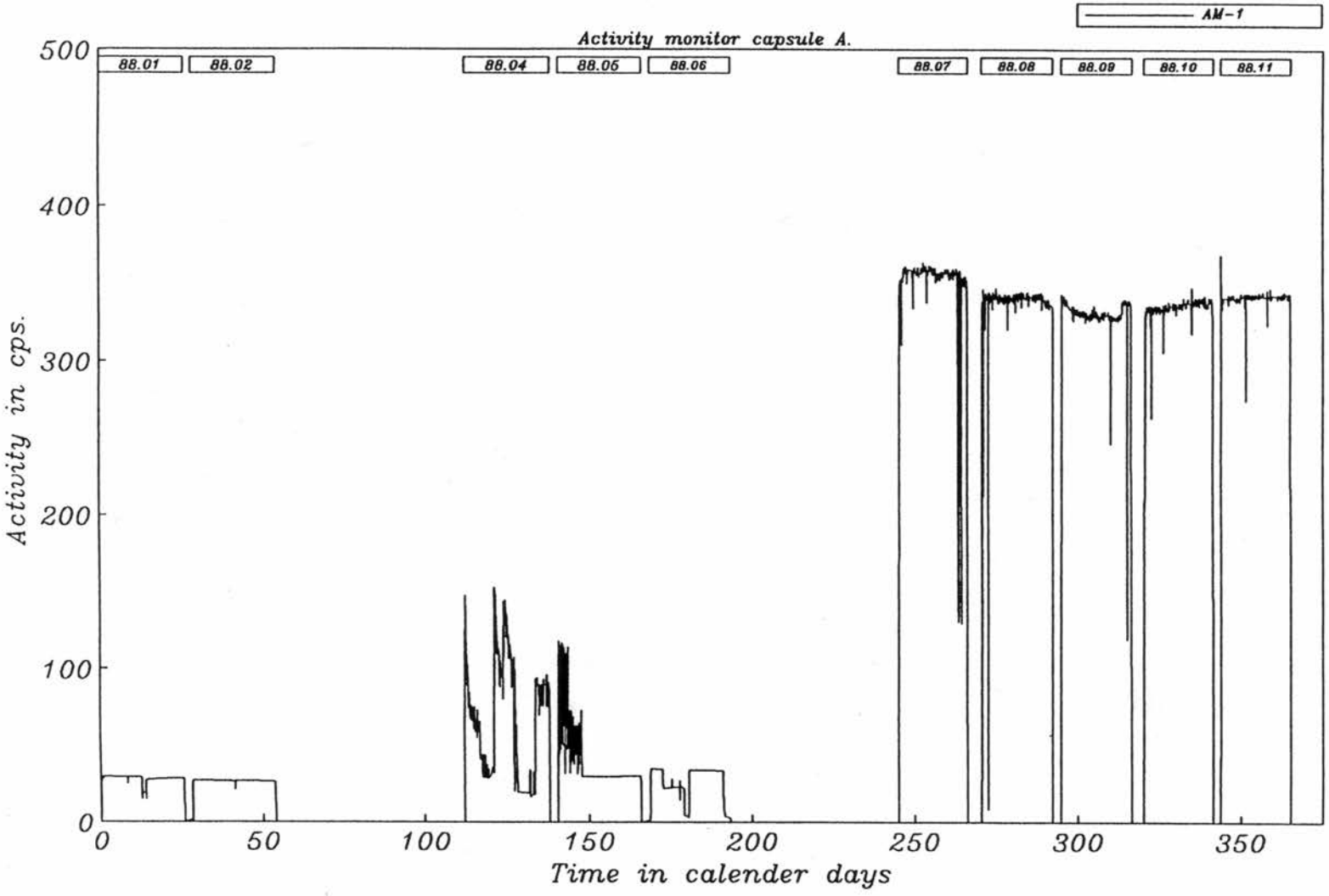



Fig. 6.6.5. Activity history D-214 Cycles 88.01 – 88.11
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

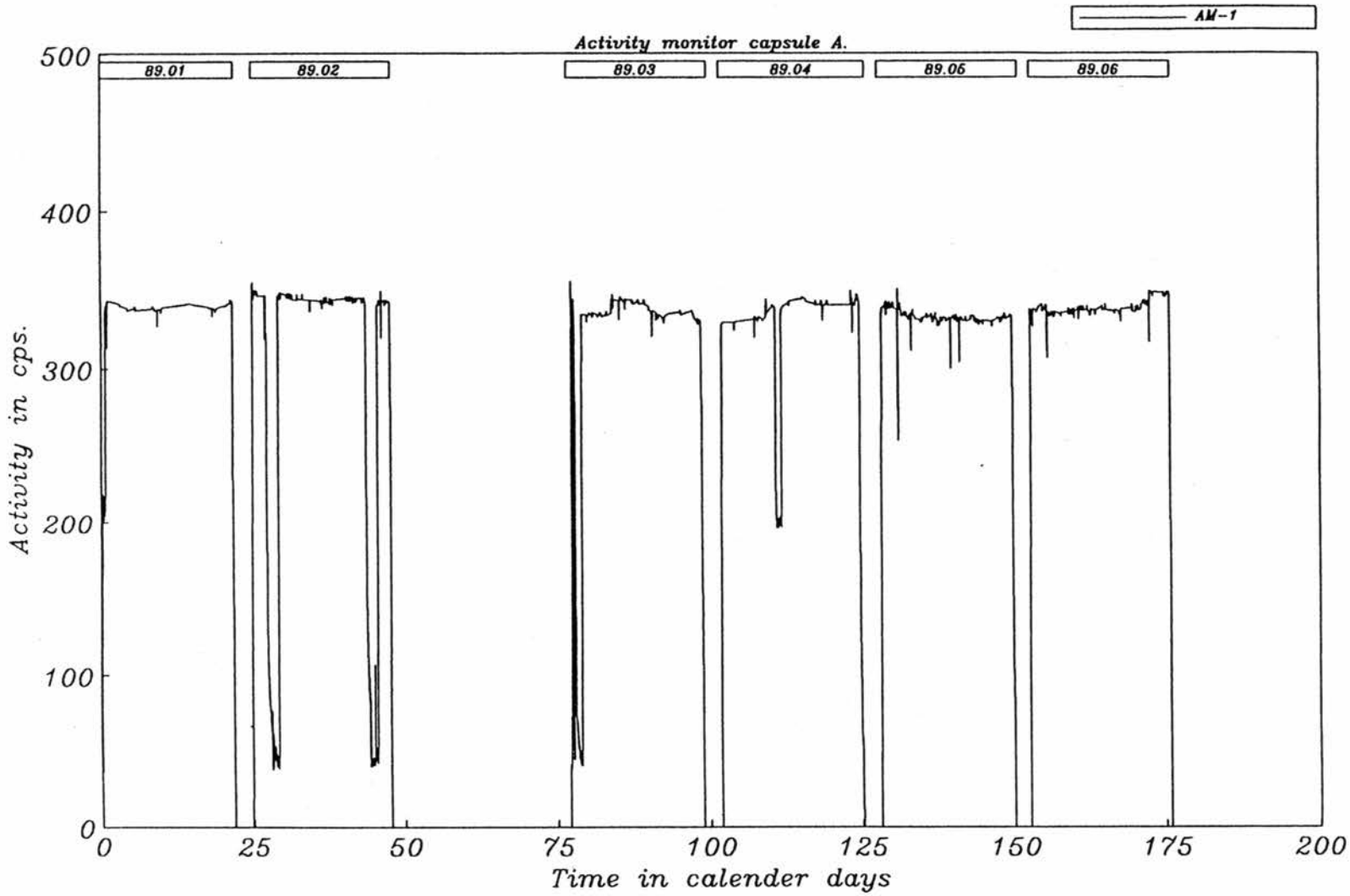



Fig. 6.6.6. Activity history D-214 Cycles 89.01 — 89.06
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

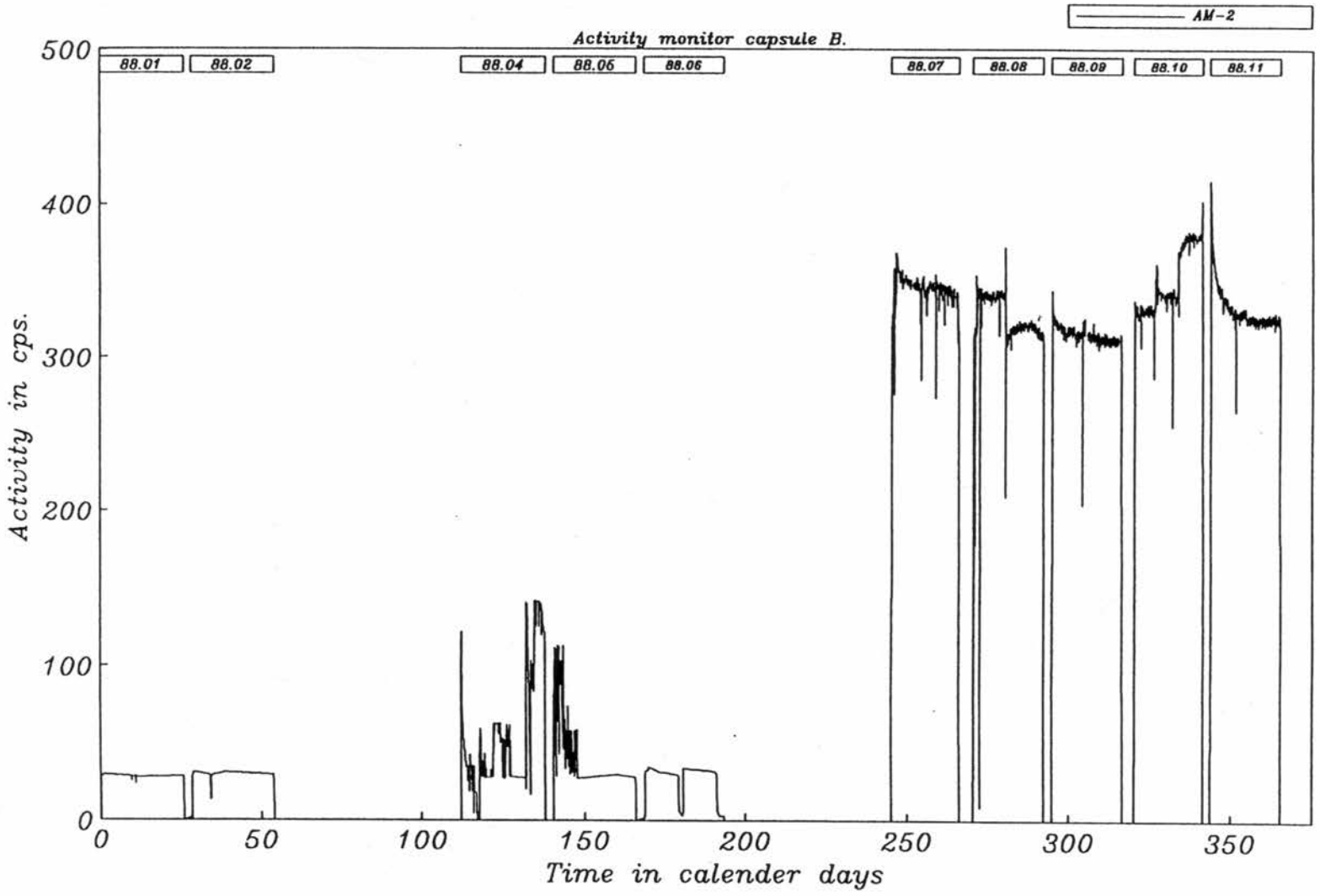



Fig. 6.6.7. Activity history D-214 Cycles 88.01 – 88.11
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

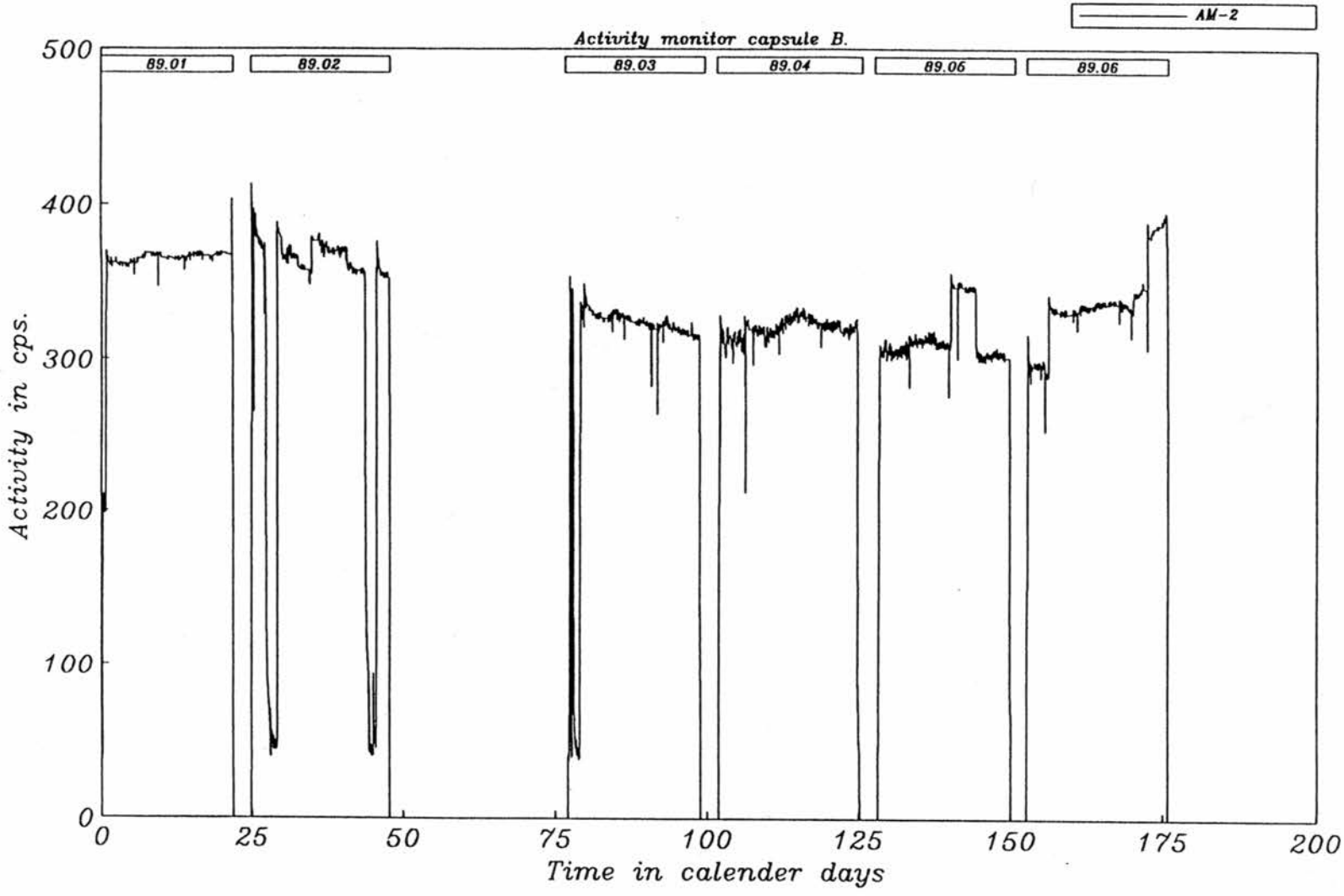



Fig. 6.6.8. Activity history D-214 Cycles 89.01 – 89.06
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

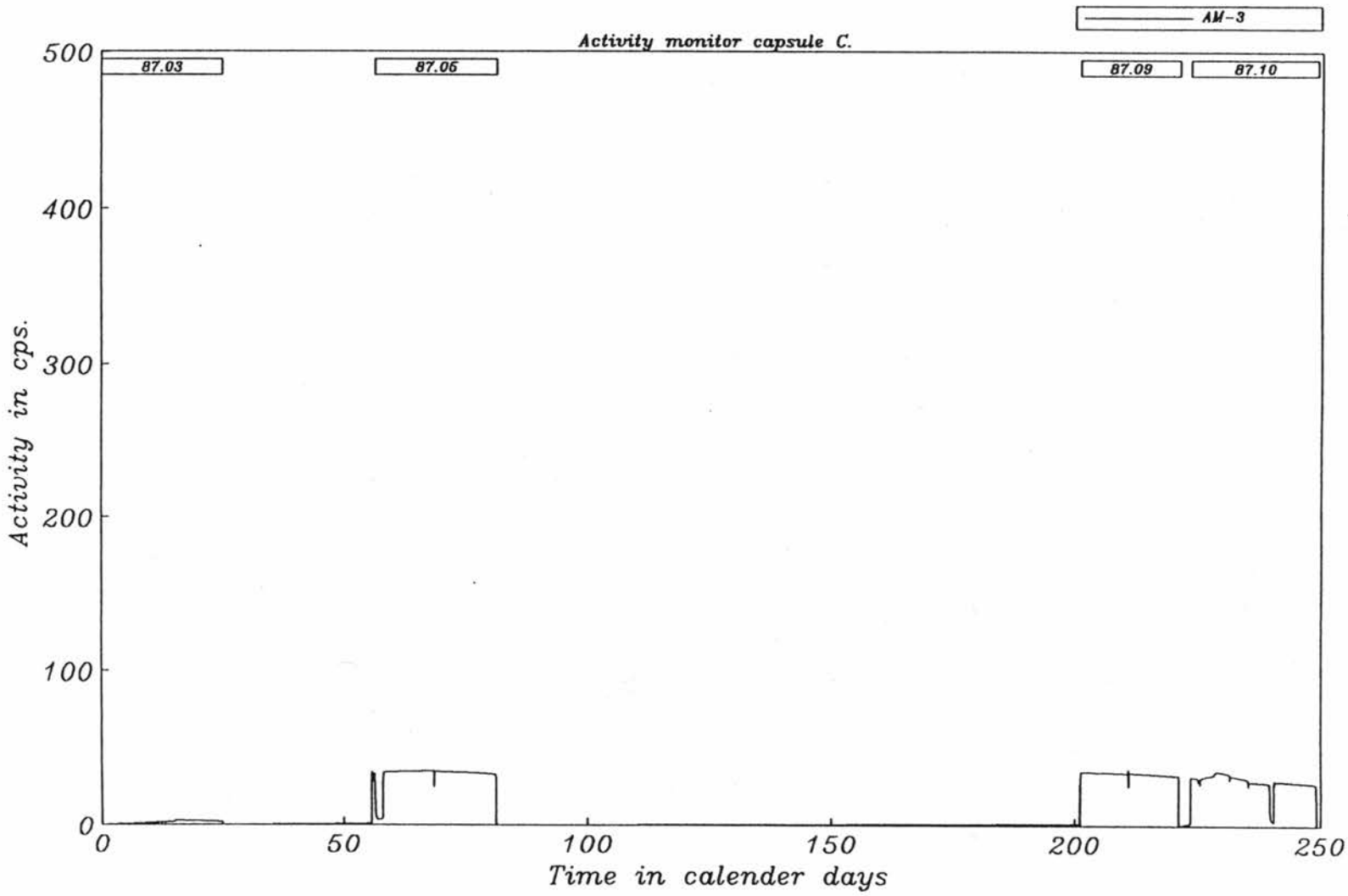



Fig. 6.6.9. Activity history D-214 Cycles 87.03 – 87.10
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

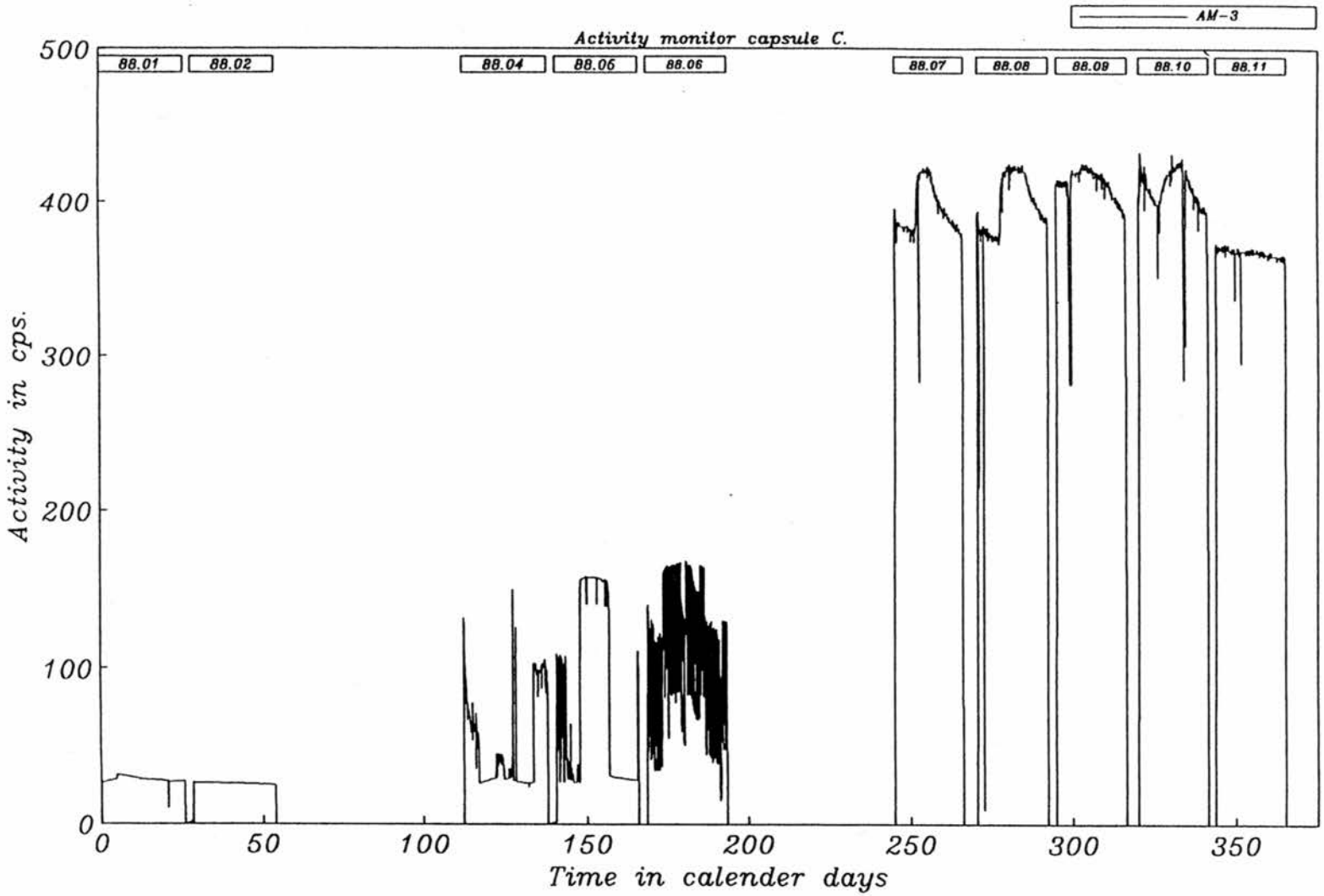



Fig. 6.6.10. Activity history D-214 Cycles 88.01 – 88.11
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

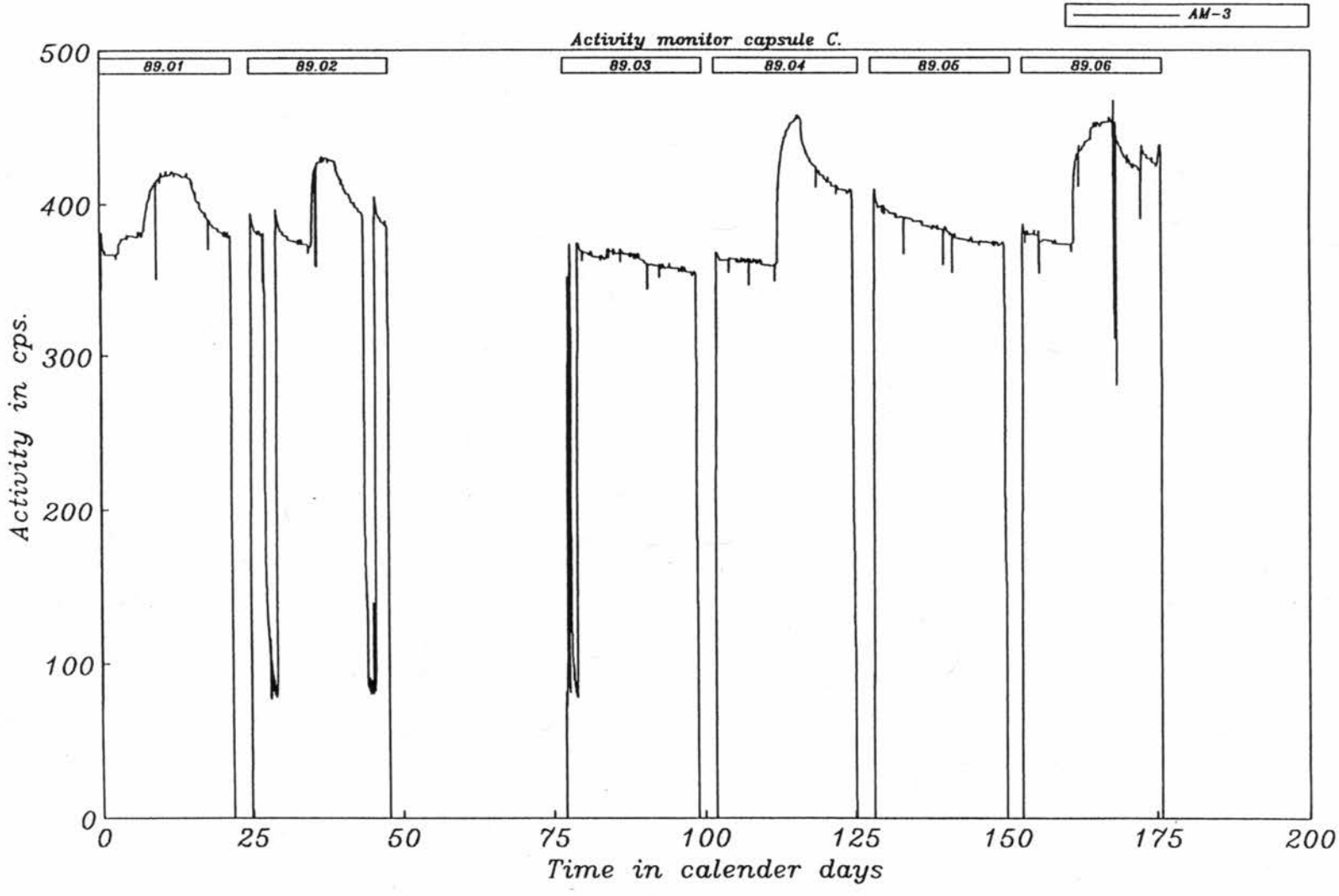



Fig. 6.6.11. Activity history D-214 Cycles 89.01 — 89.06
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

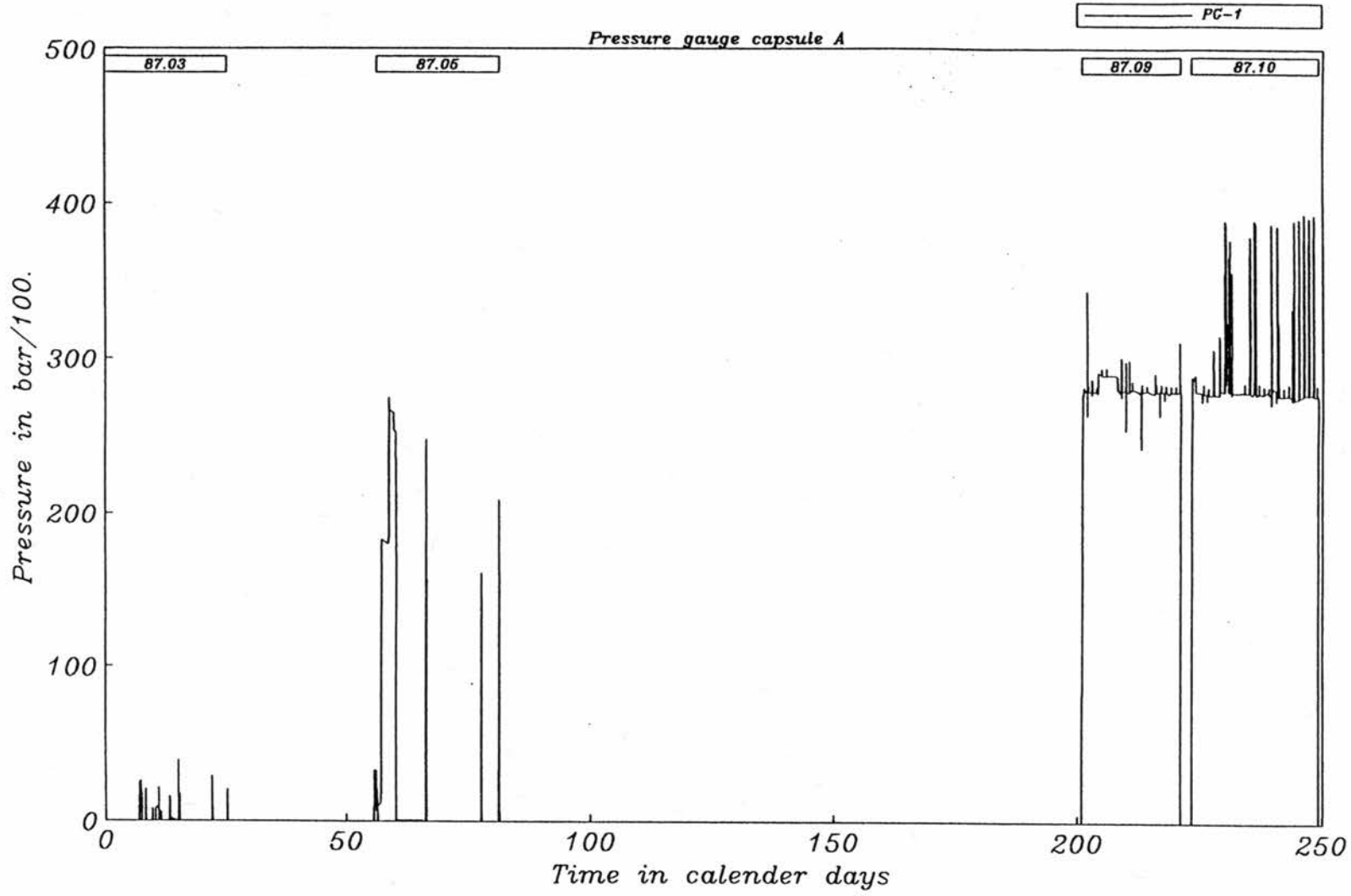



Fig. 6.6.12. Pressure history D-214 Cycles 87.03 – 87.10
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

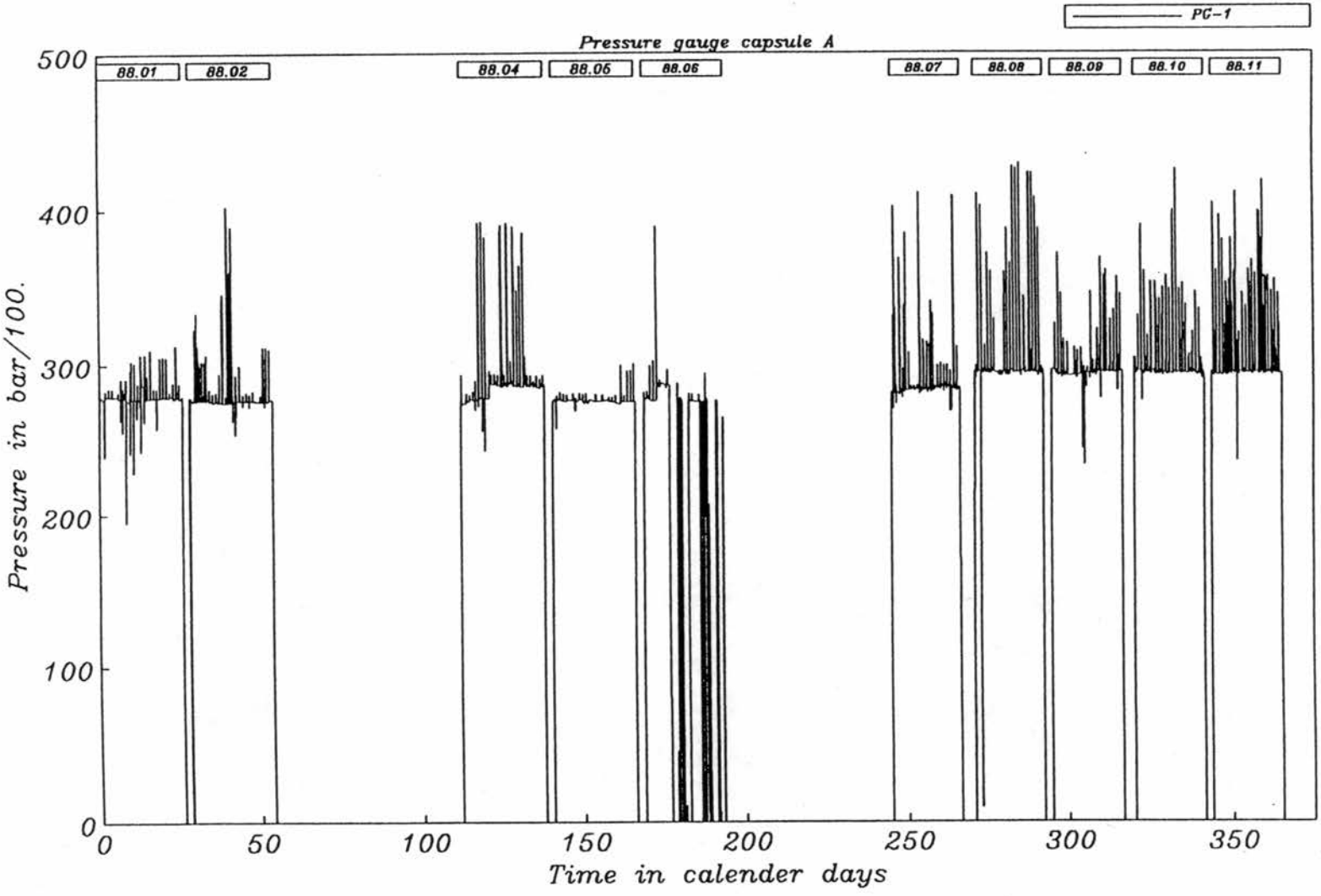



Fig. 6.6.13. Pressure history D-214 Cycles 88.01 – 88.11
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

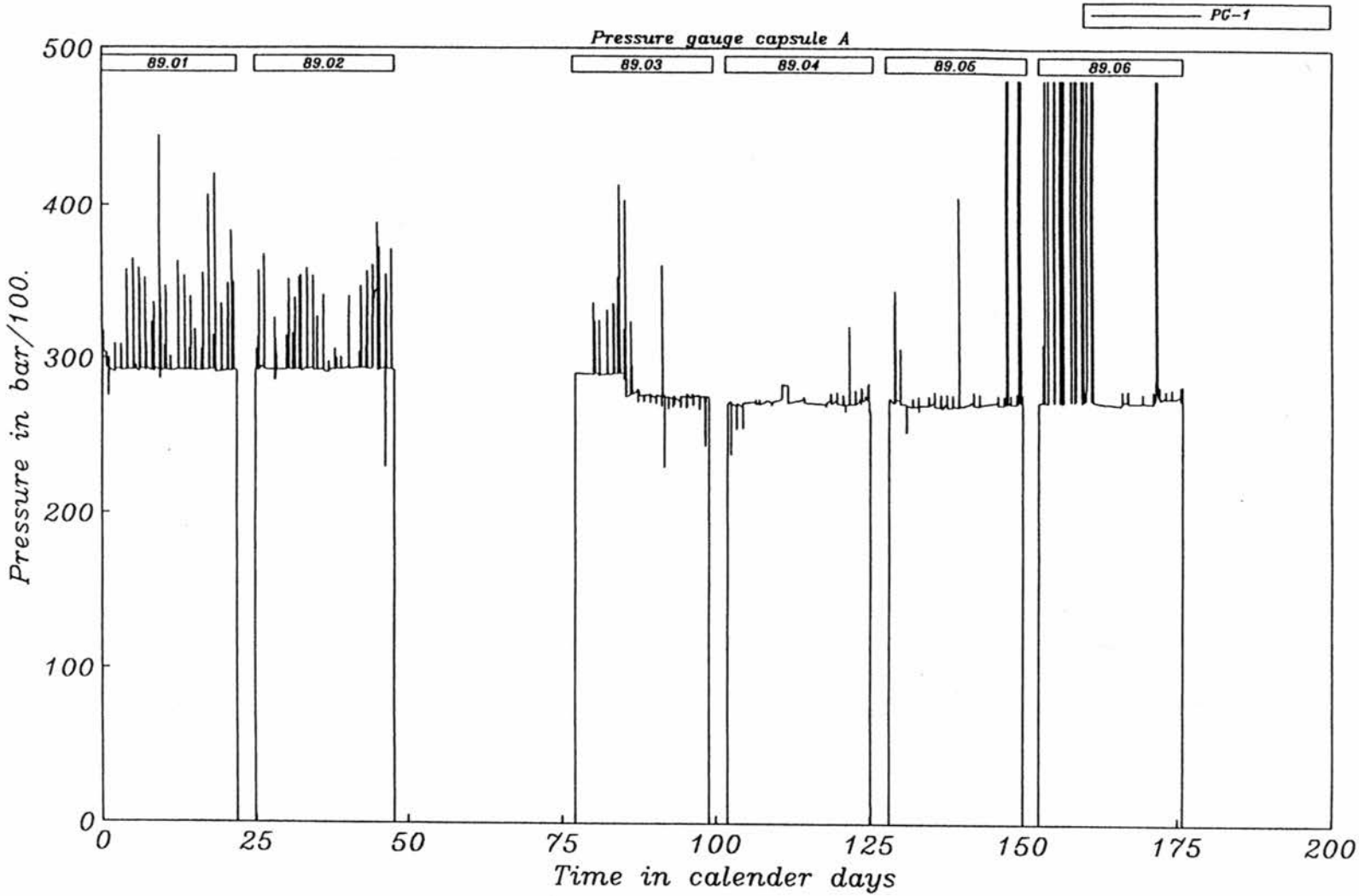



Fig. 6.6.14. Pressure history D-214 Cycles 89.01 – 88.06
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

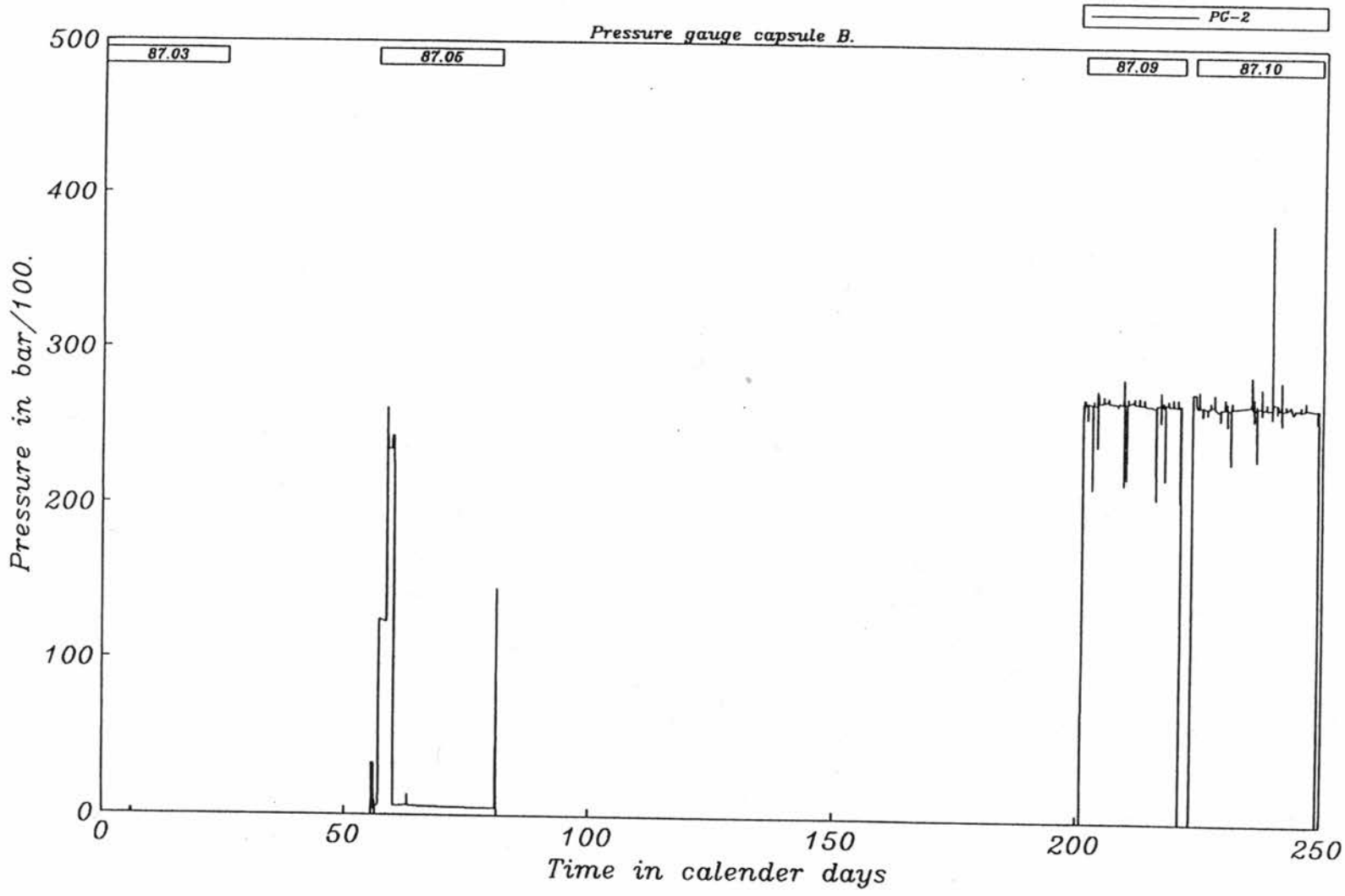



Fig. 6.6.15. Pressure history D-214 Cycles 87.03 – 87.10
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

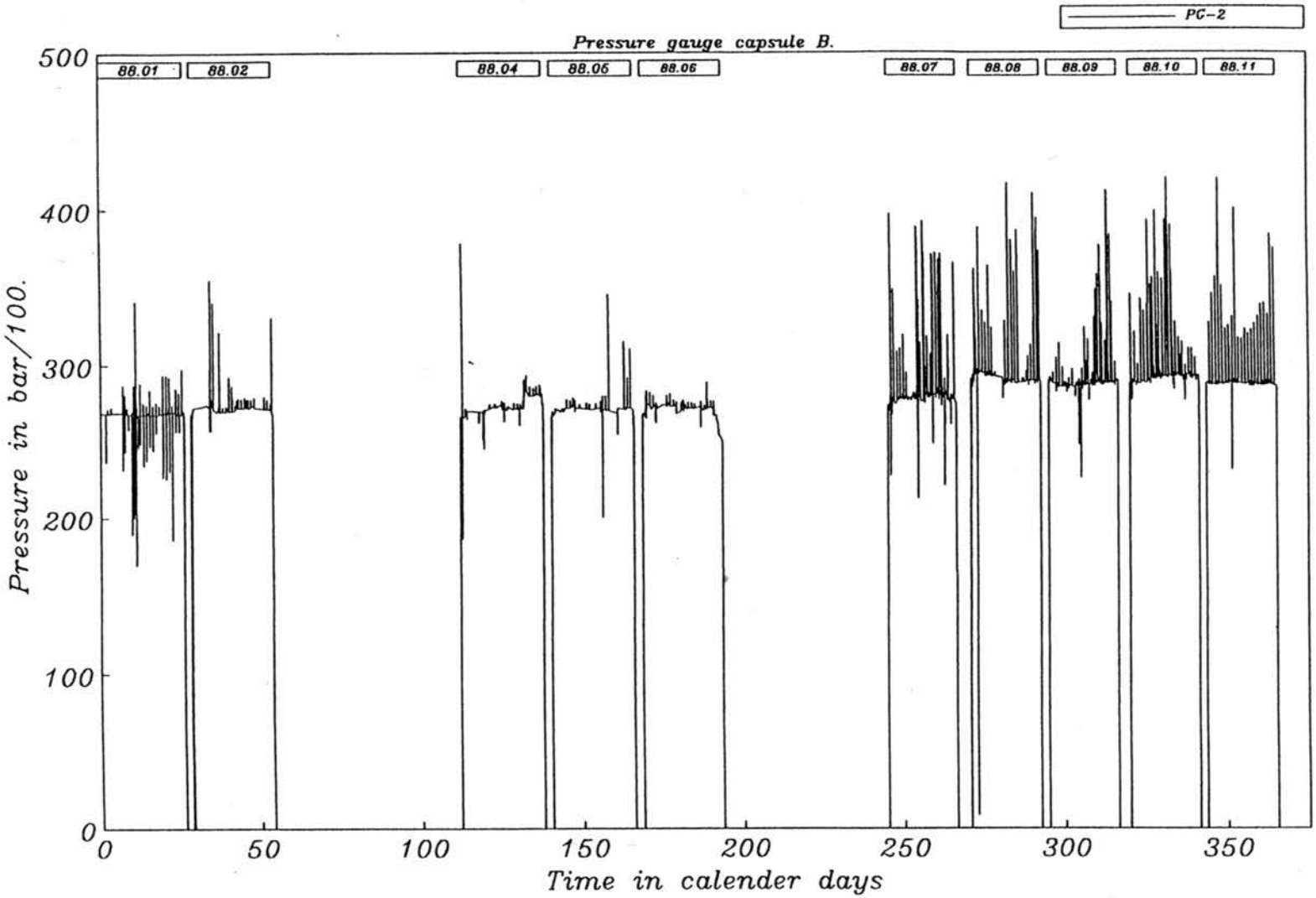



Fig. 6.6.16. Pressure history D-214 Cycles 88.01 – 88.11
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

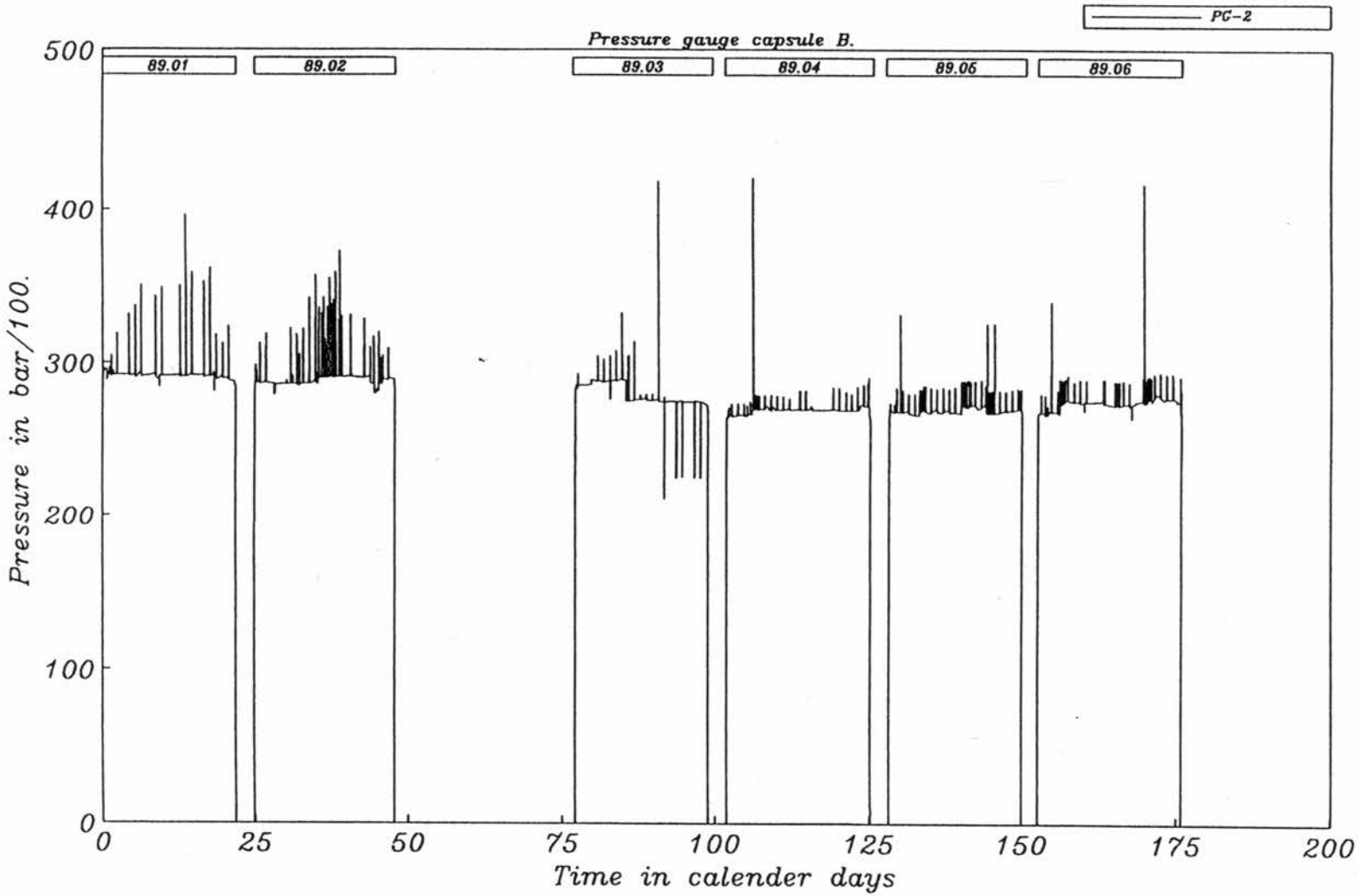



Fig. 6.6.17. Pressure history D-214 Cycles 89.01 – 89.06.
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

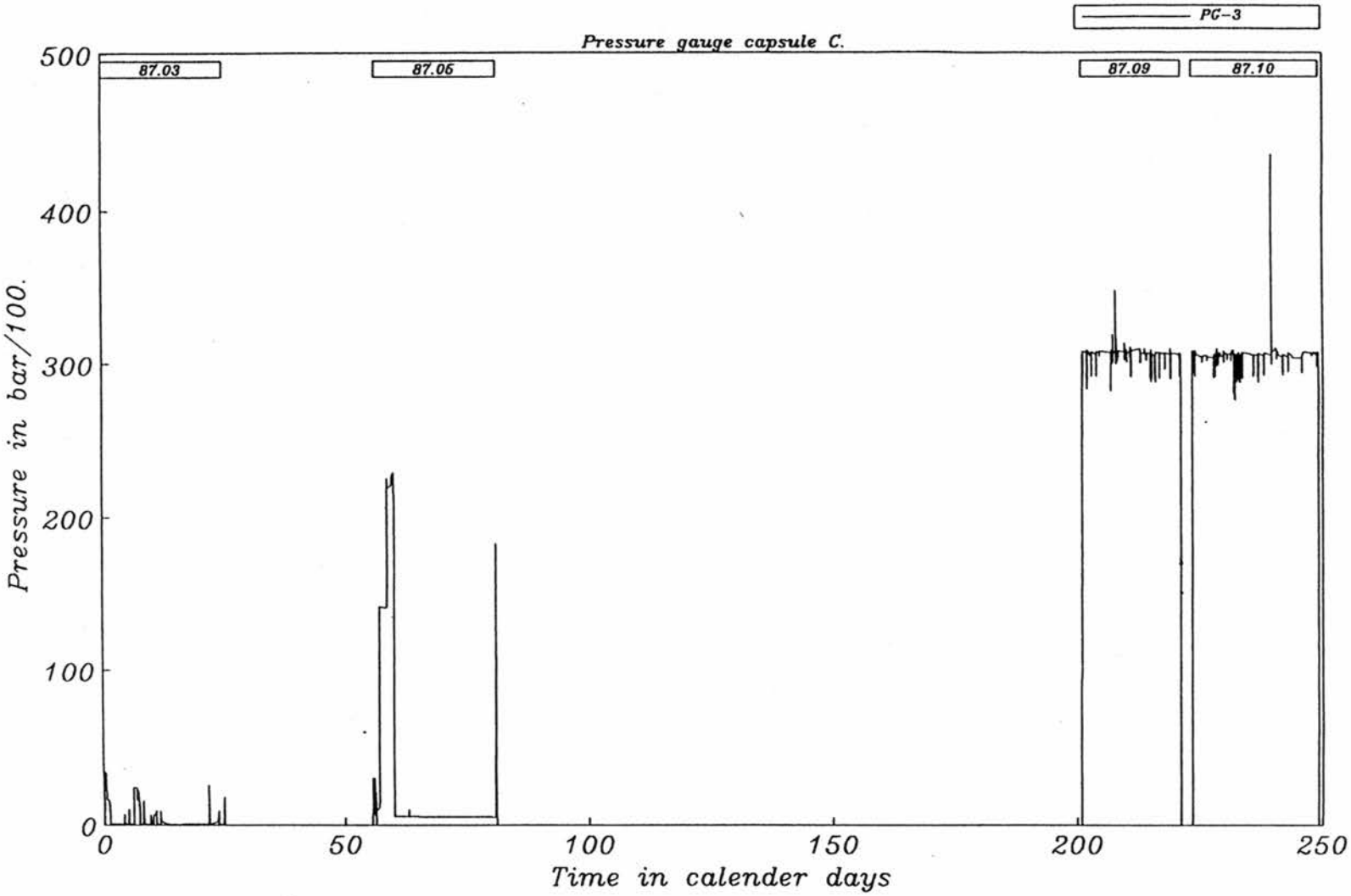



Fig. 6.6.18. Pressure history D-214 Cycles 87.03 – 87.10
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

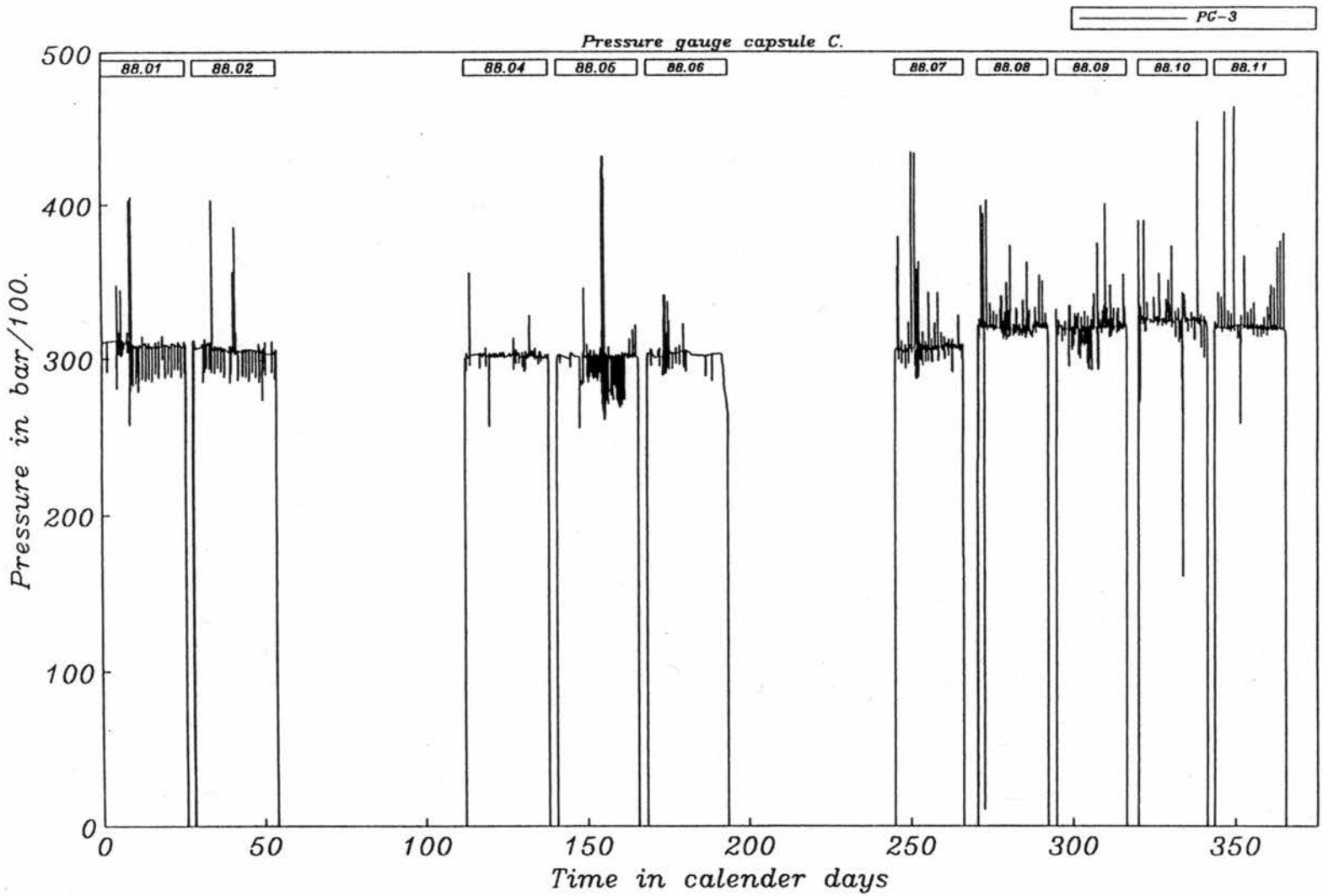



Fig. 6.6.19. Pressure history D-214 Cycles 88.01 – 88.11
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

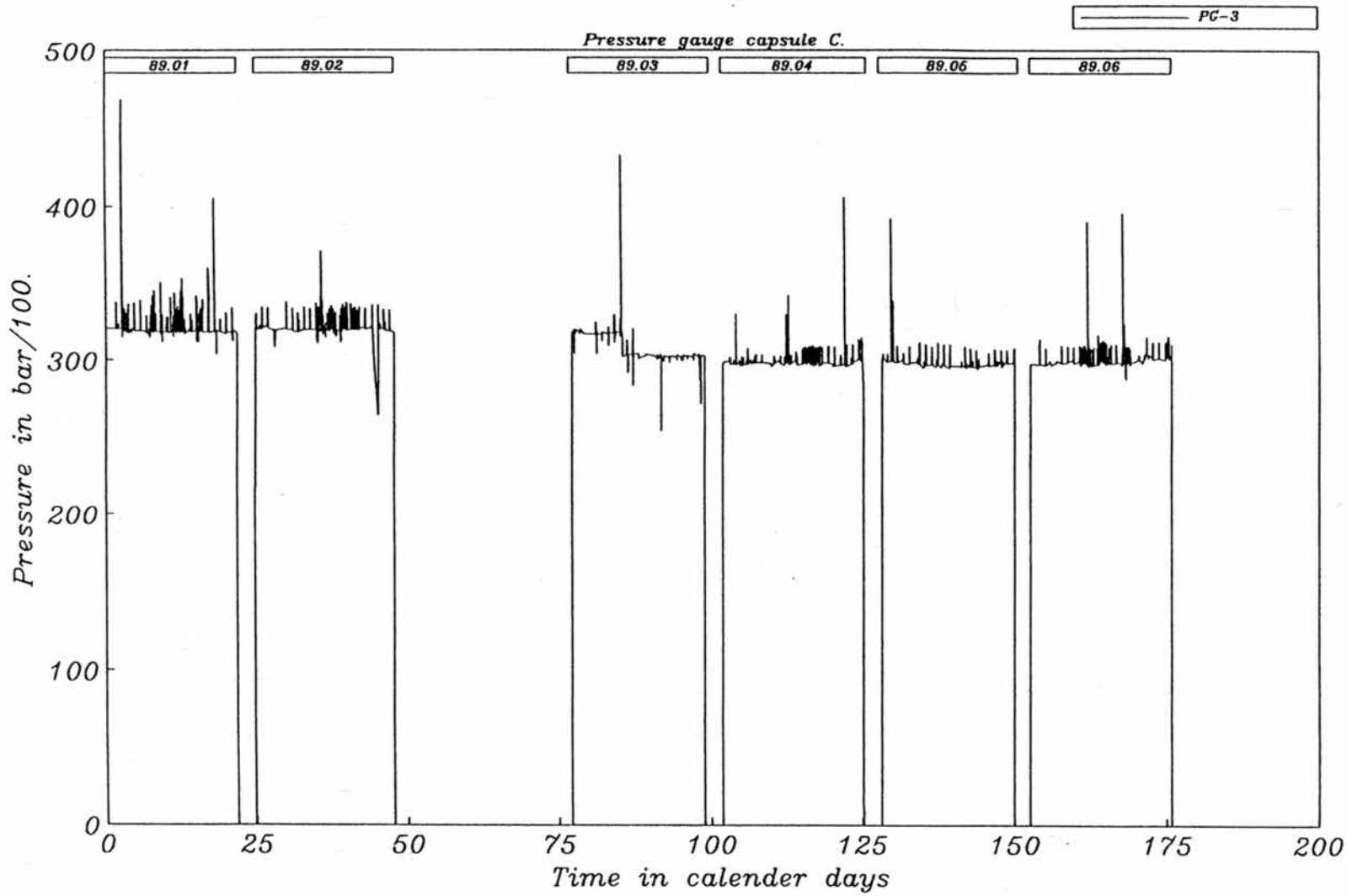



Fig. 6.6.20. Pressure history D-214 Cycles 89.01 – 89.06
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

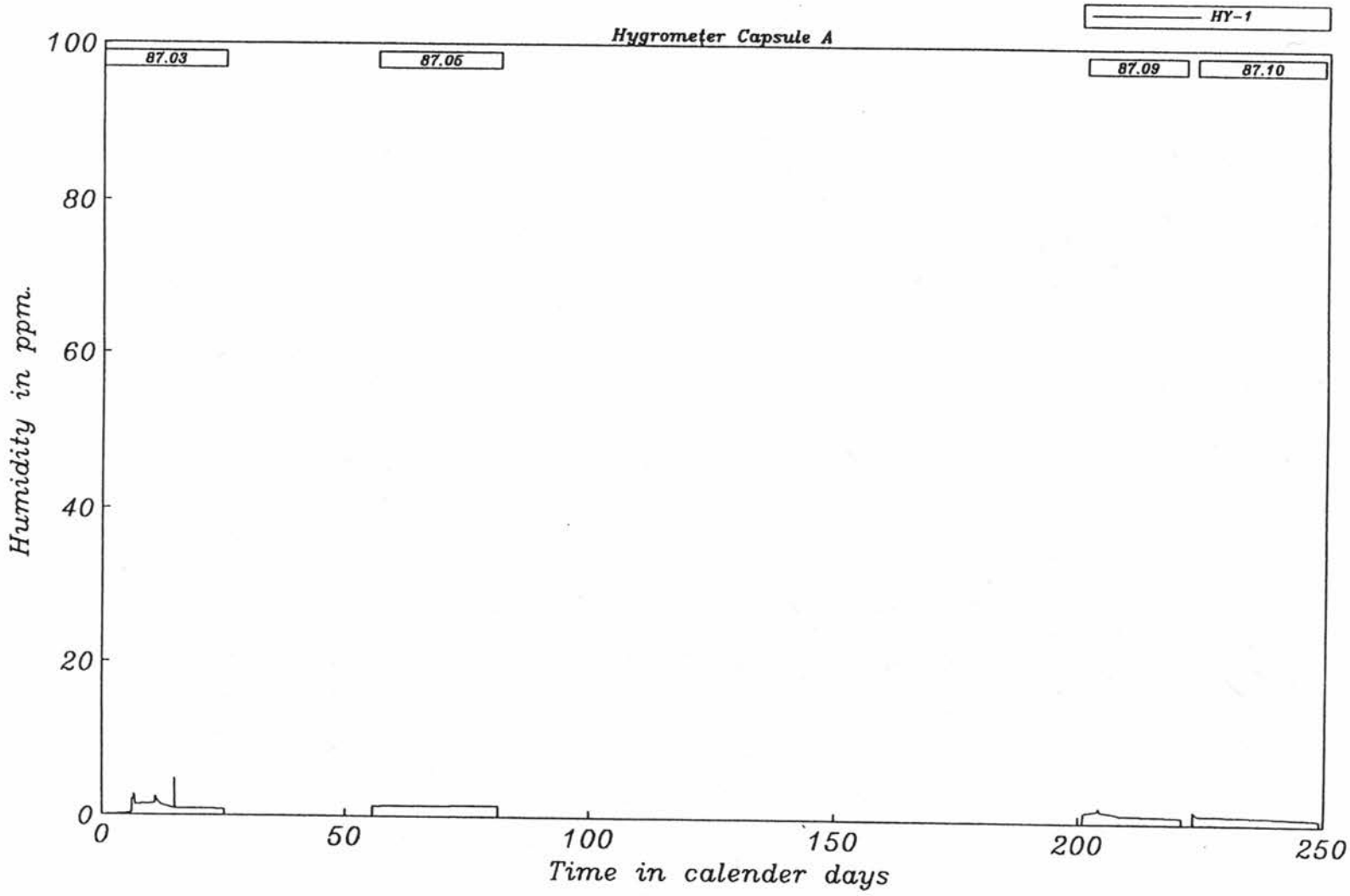



Fig. 6.6.21. Hygrometer history D-214 Cycles 87.03 – 87.10
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

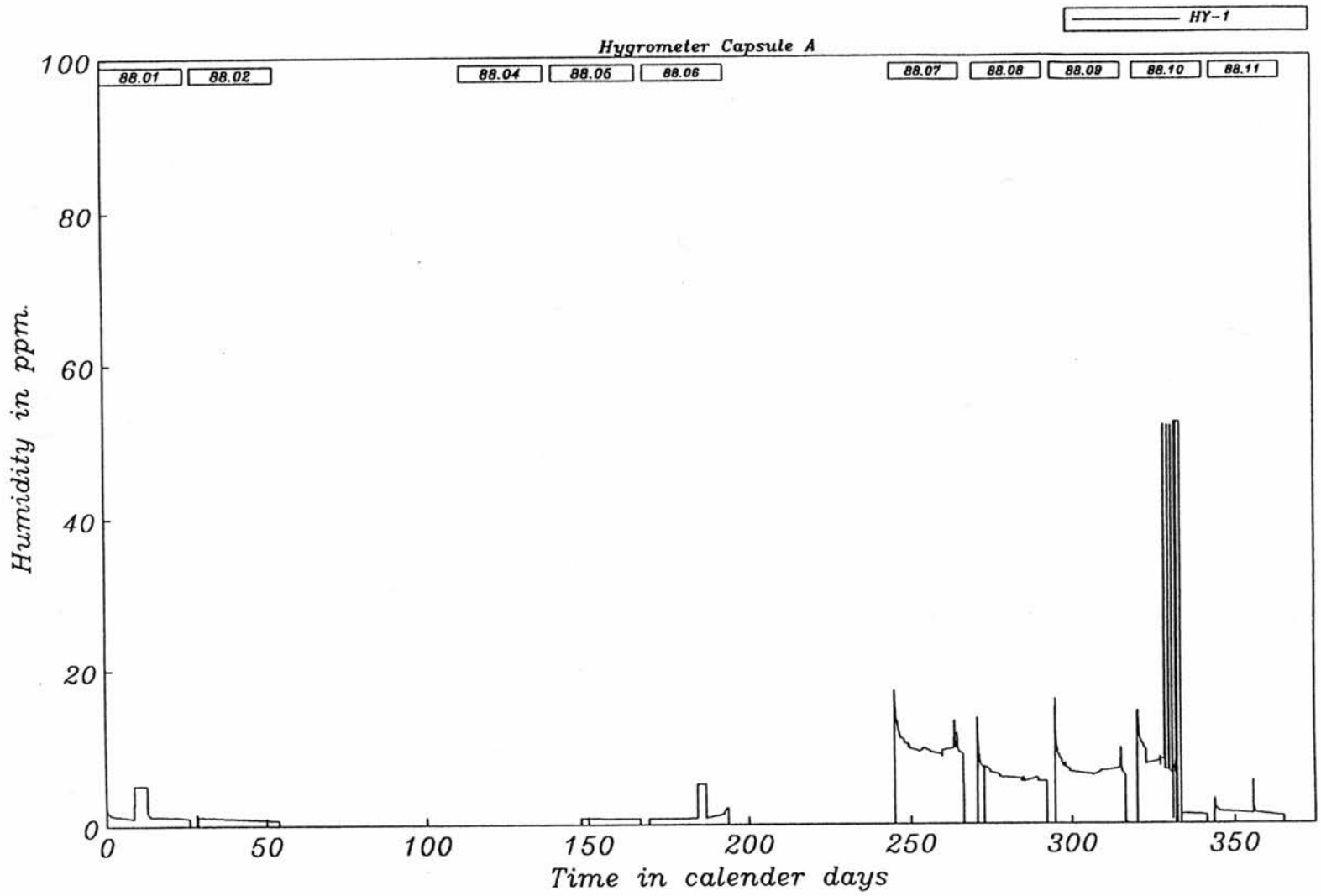



Fig. 6.6.22. Hygrometer history D-214 Cycles 88.01 – 88.11
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

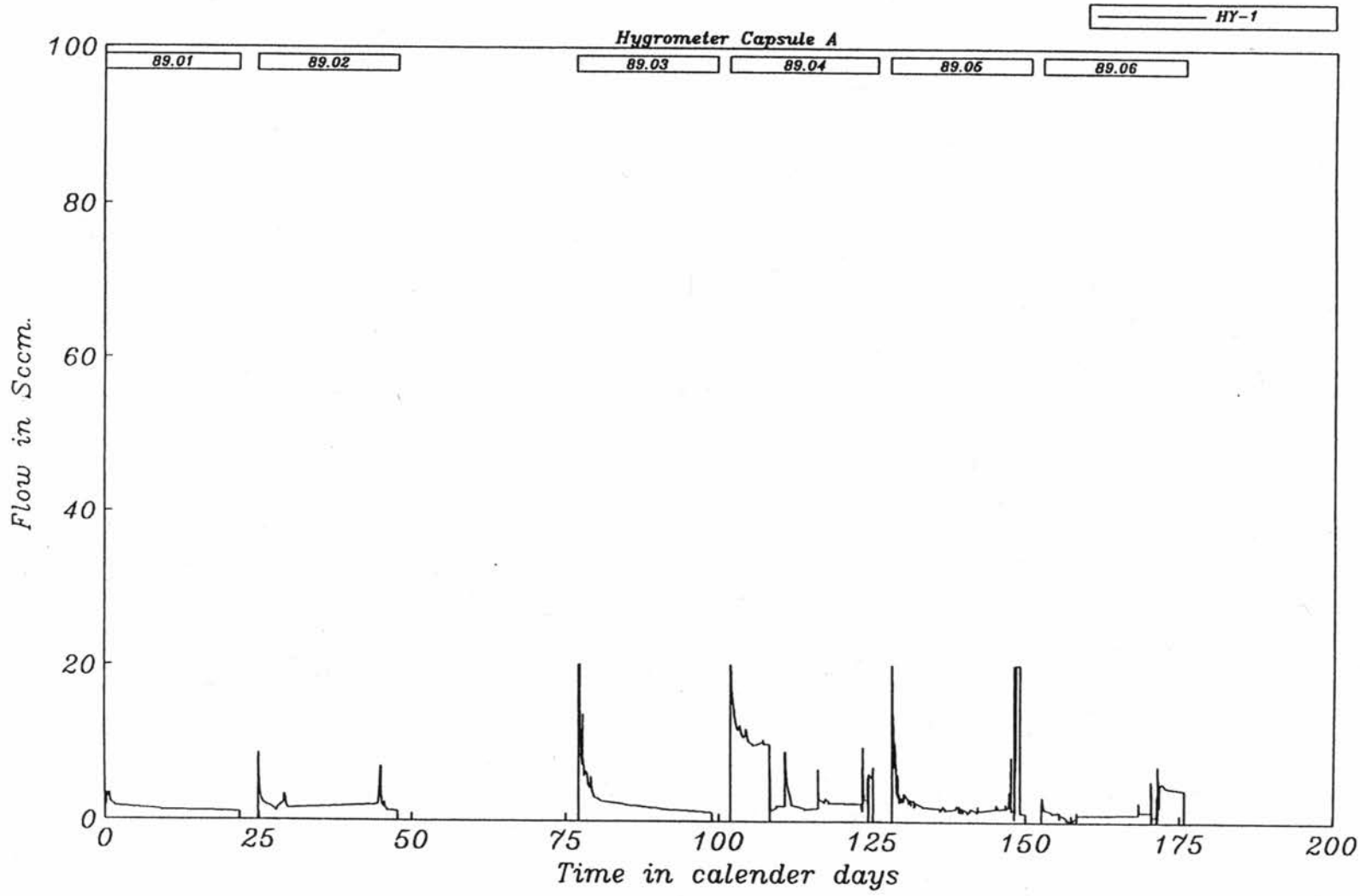



Fig. 6.6.23 Hygrometer history D-214 Cycles 89.01 – 89.06
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

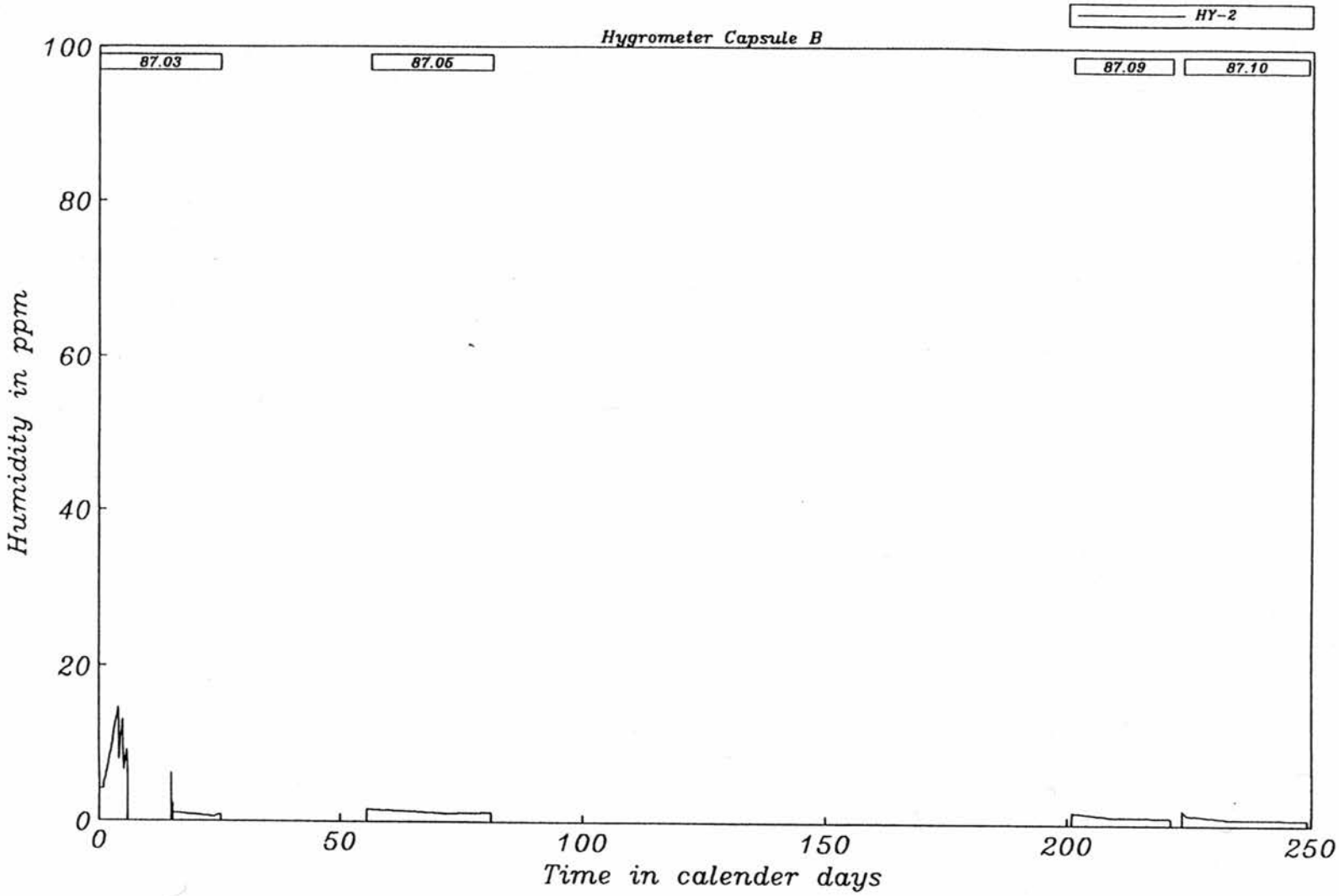



Fig. 6.6.24. Hygrometer history D-214 Cycles 87.03 – 87.10
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

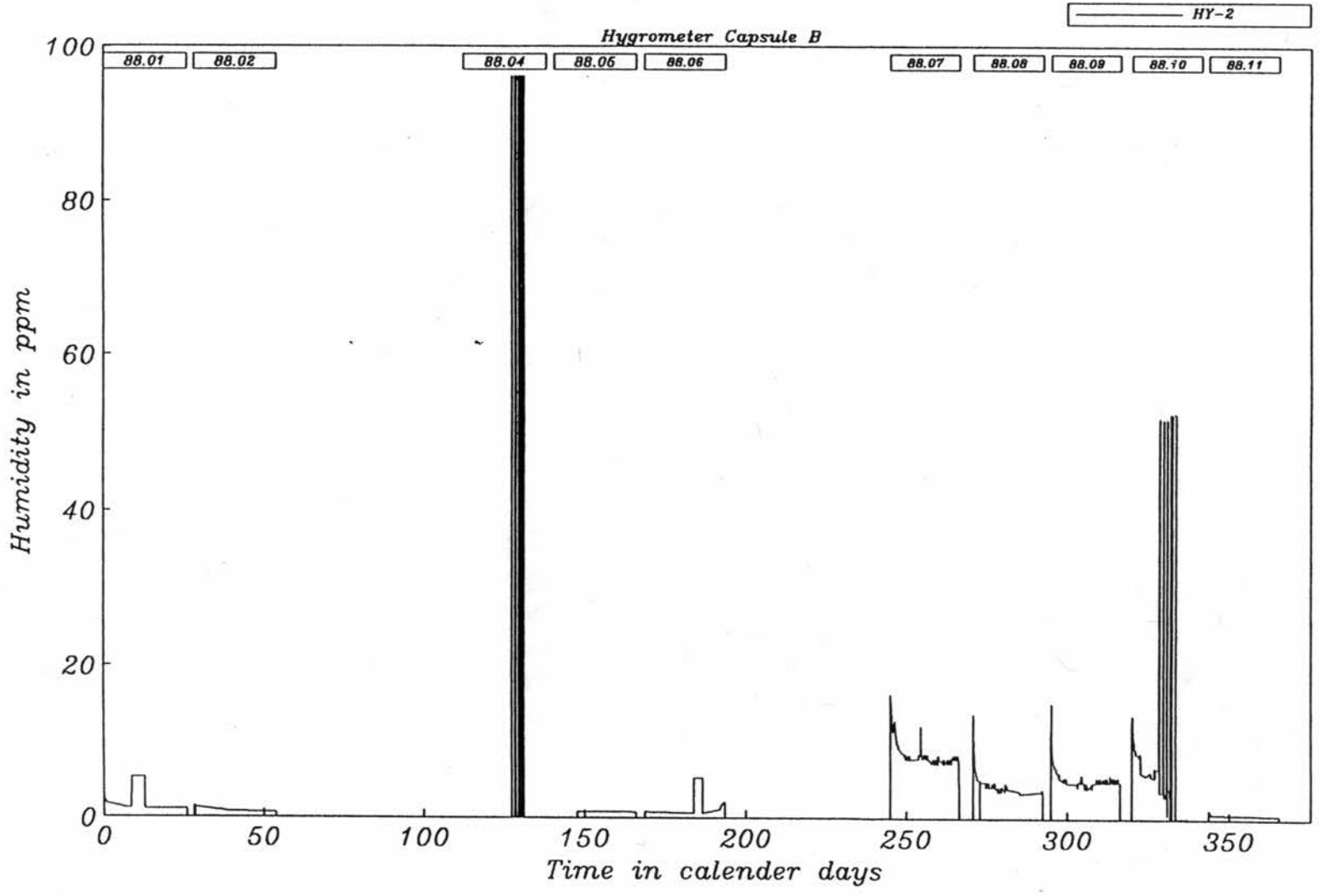



Fig. 6.6.25. Hygrometer history D-214 Cycles 88.01 – 88.11
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

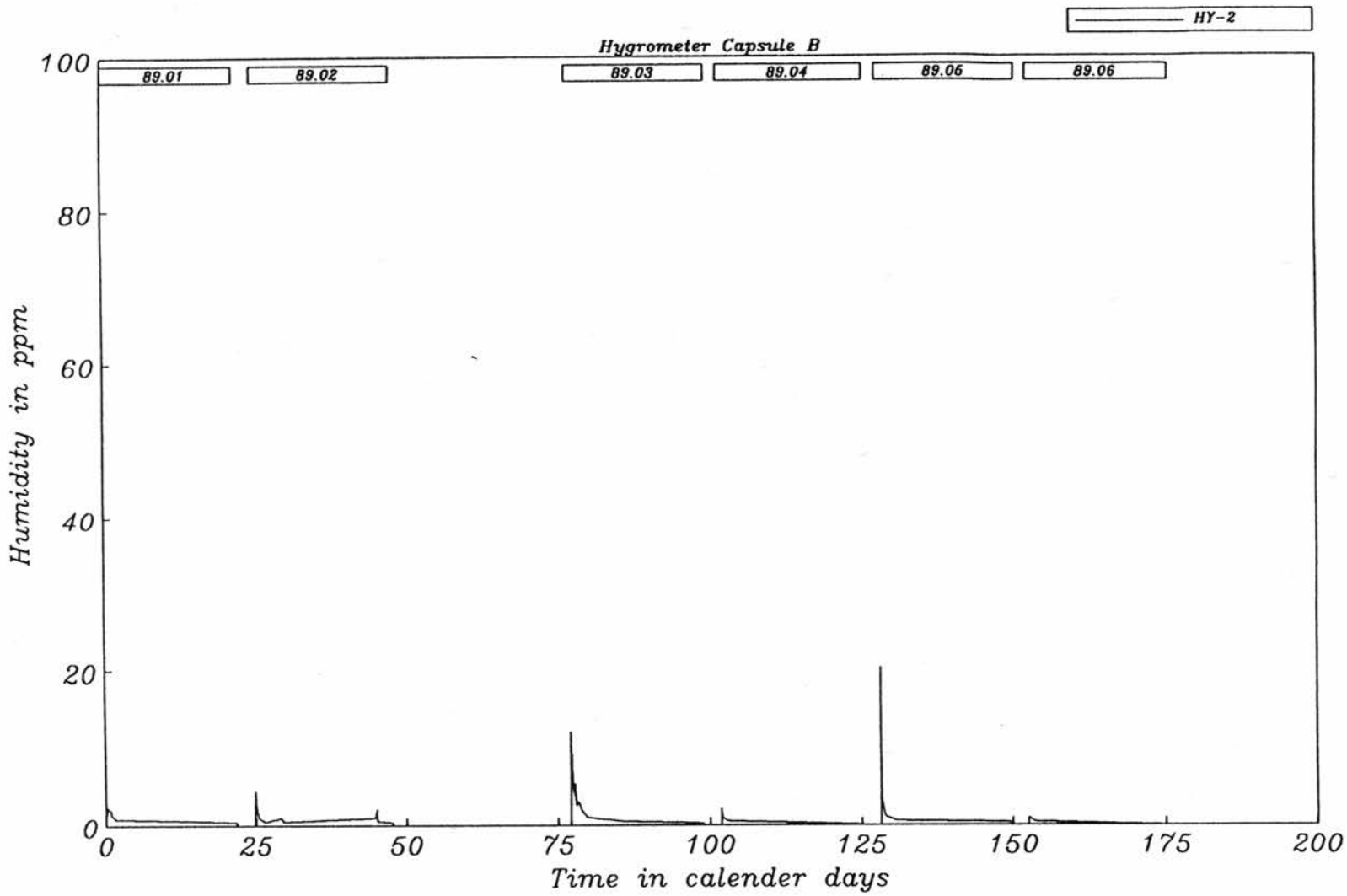



Fig. 6.6.26. Hygrometer history D-214 Cycles 89.01 – 89.06
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

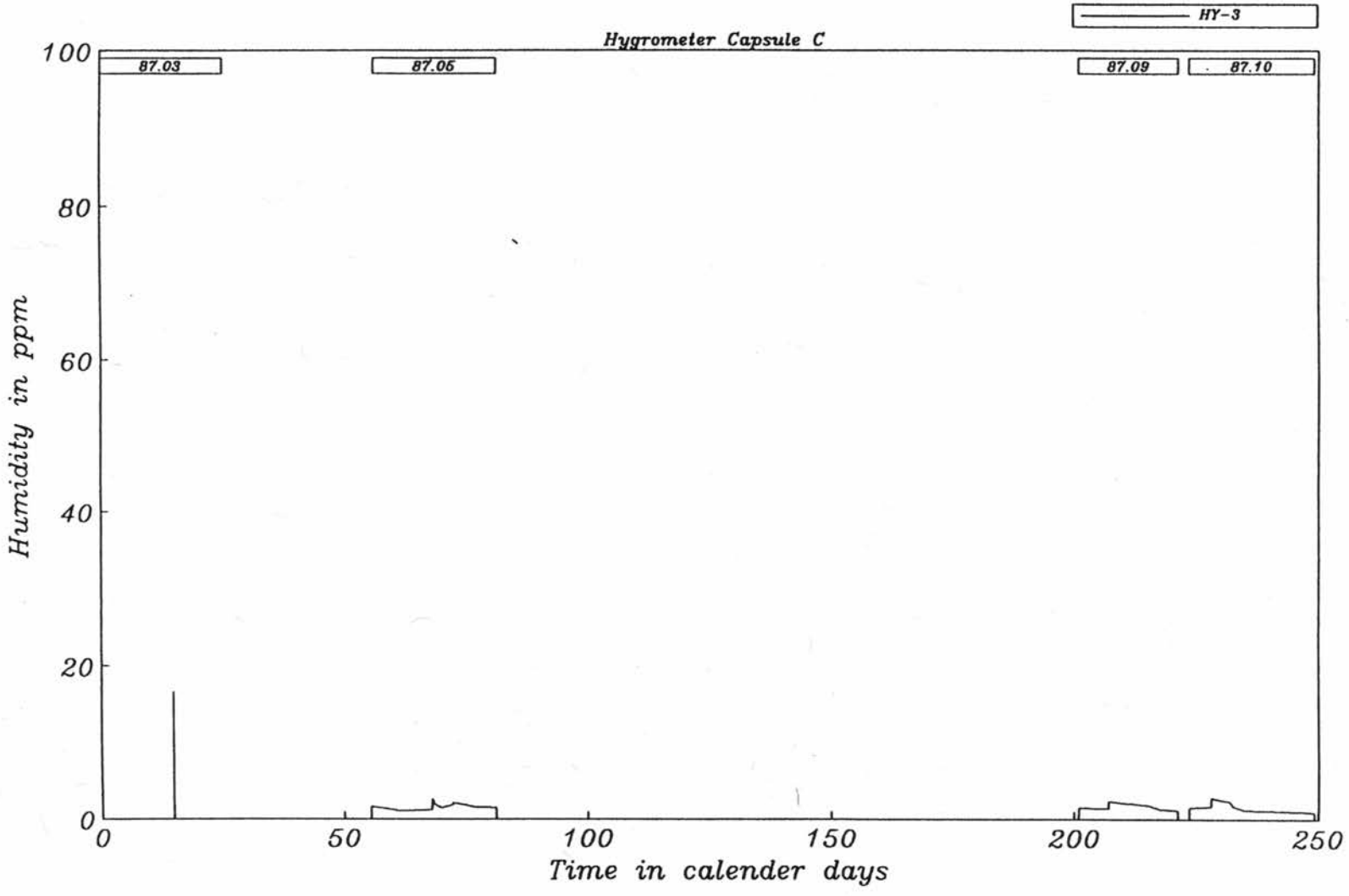



Fig. 6.6.27. Hygrometer history D-214 Cycles 87.03 – 87.10
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

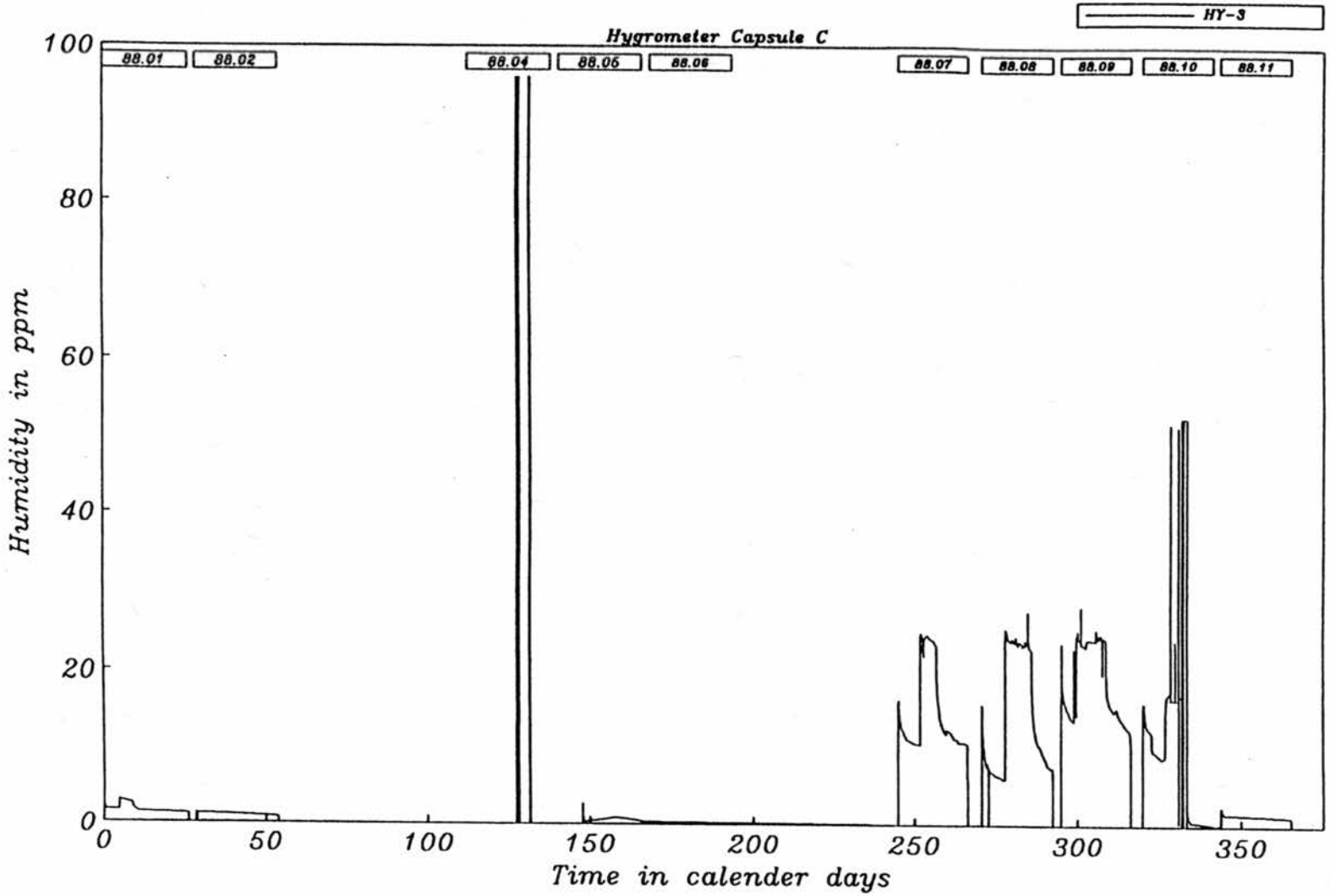



Fig. 6.6.28. Hygrometer history D-214 Cycles 88.01 – 88.11
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

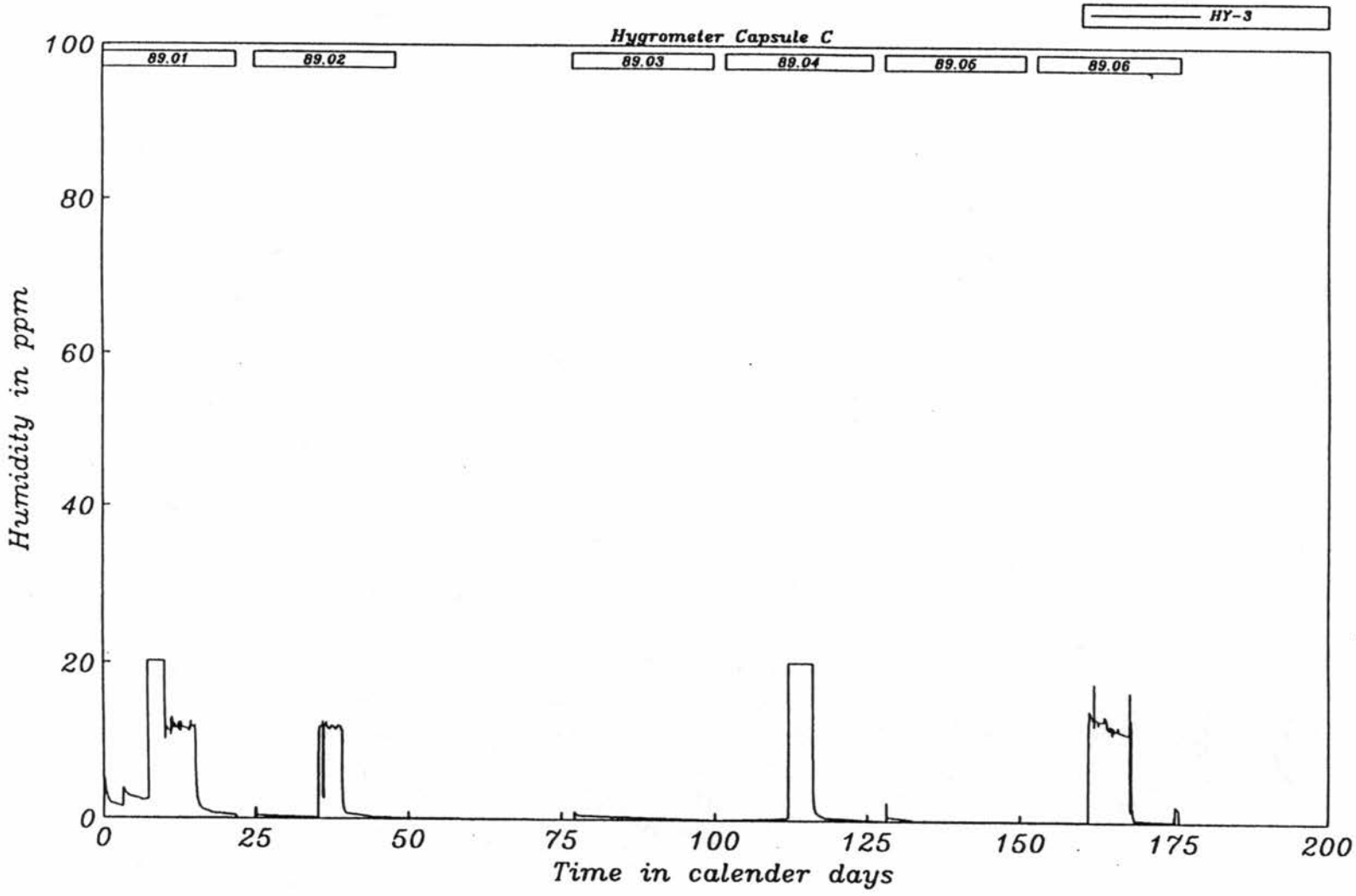



Fig. 6.6.29. Hygrometer history D-214 Cycles 89.01 – 89.06
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

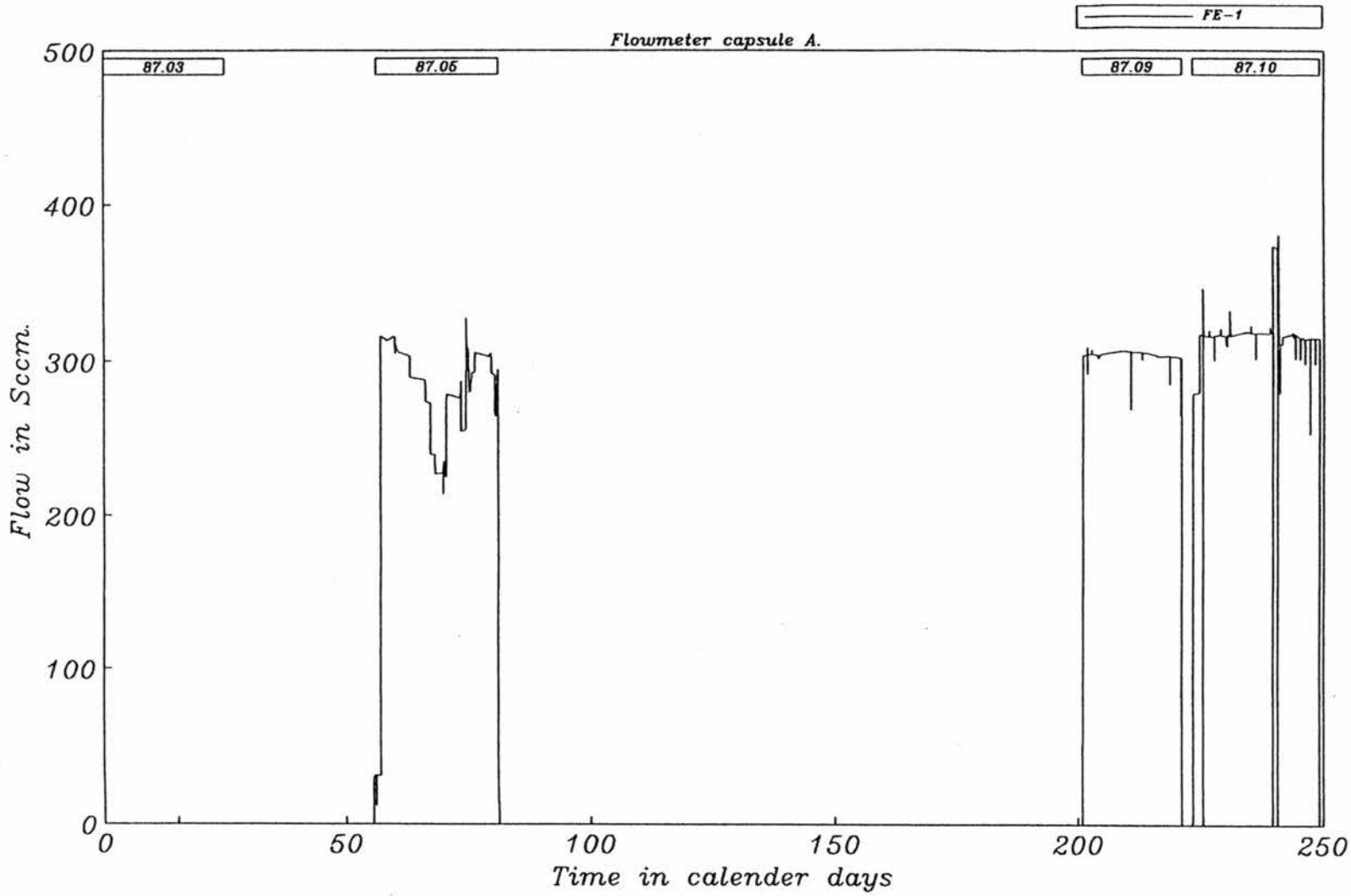



Fig. 6.6.30. Purge flow history D-214 Cycles 87.03 – 87.10
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

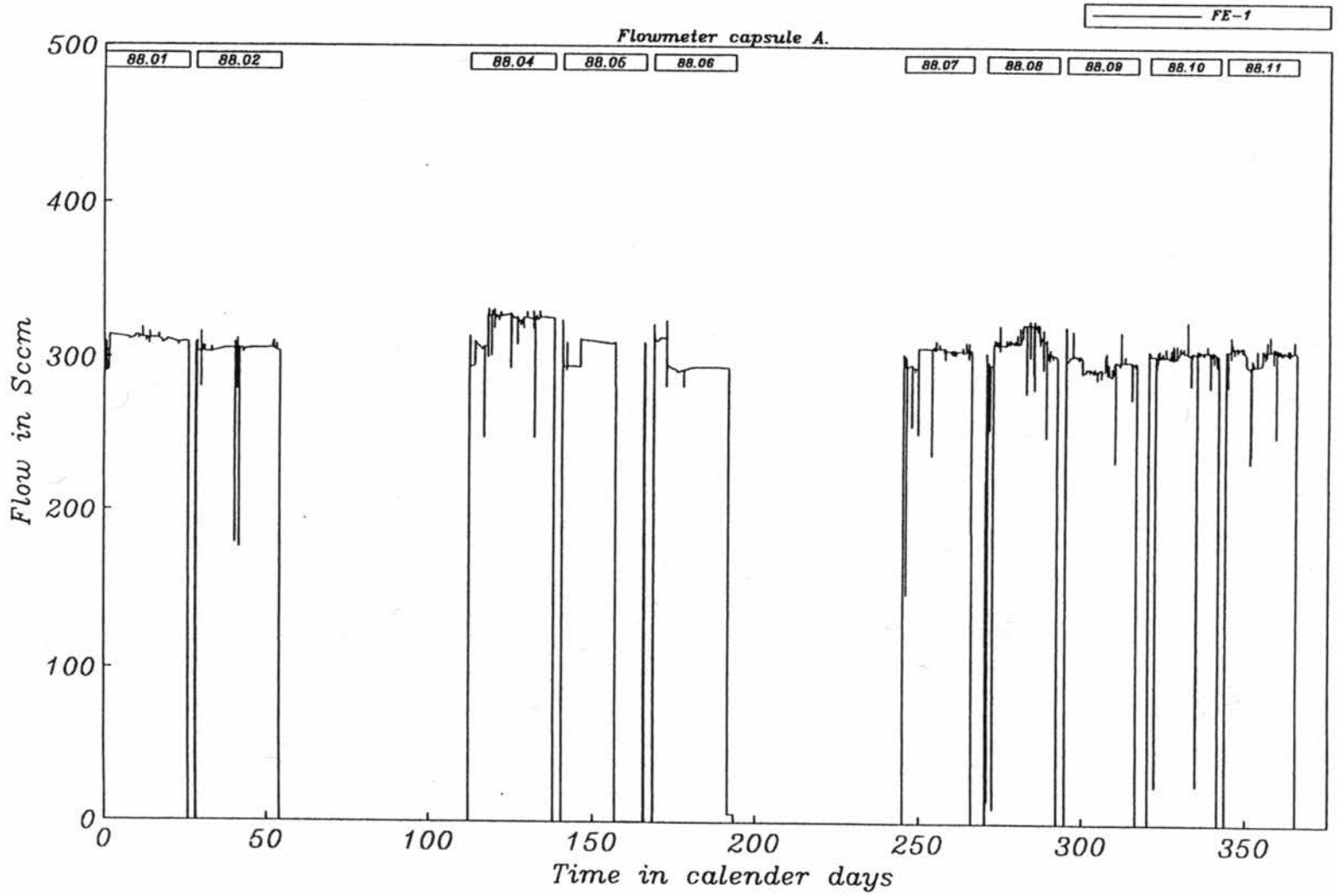



Fig. 6.6.31. Purge flow history D-214 Cycles 88.01 – 88.11
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

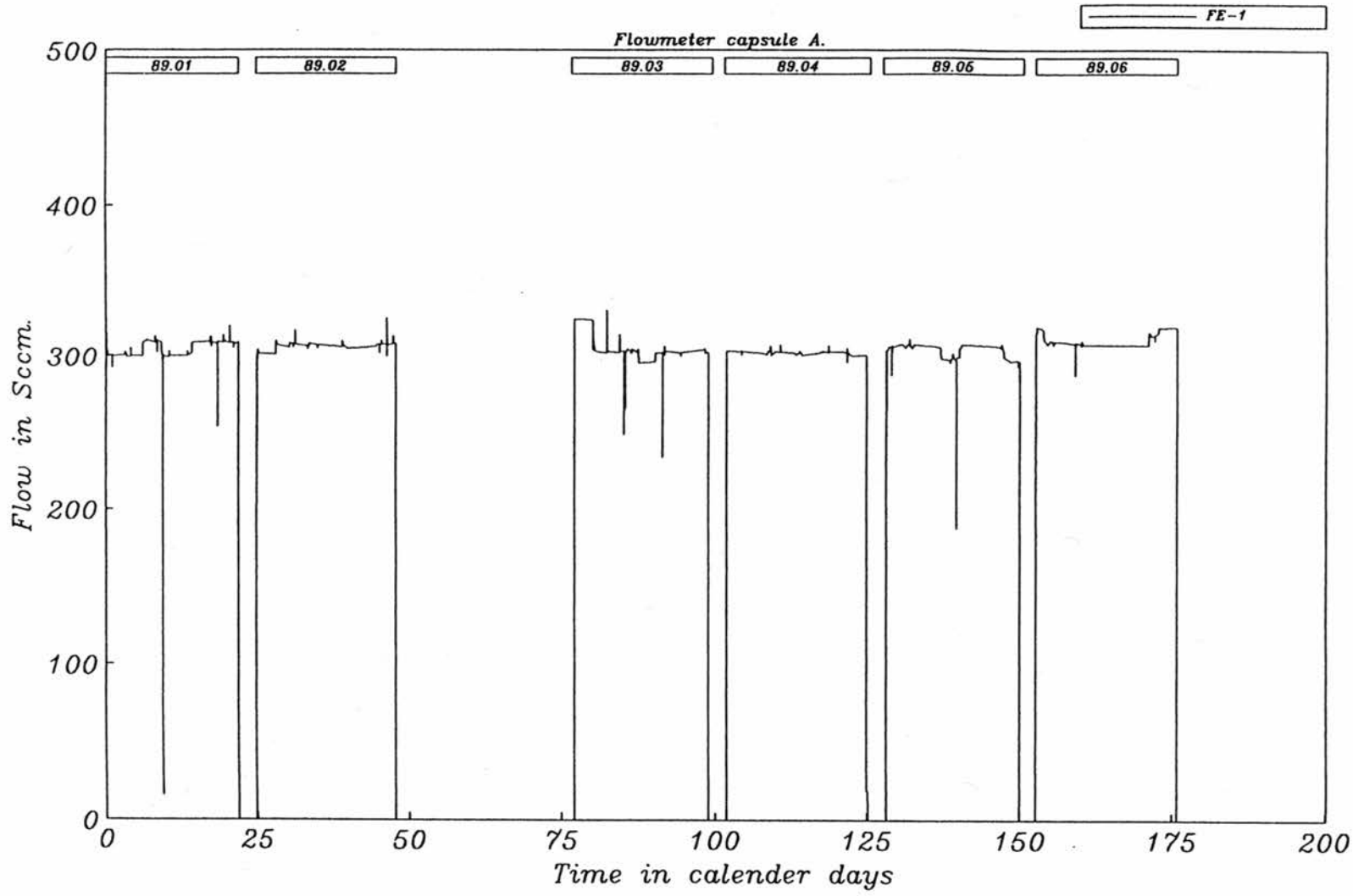



Fig. 6.6.32. Purge flow history D-214 Cycles 89.01 – 89.06
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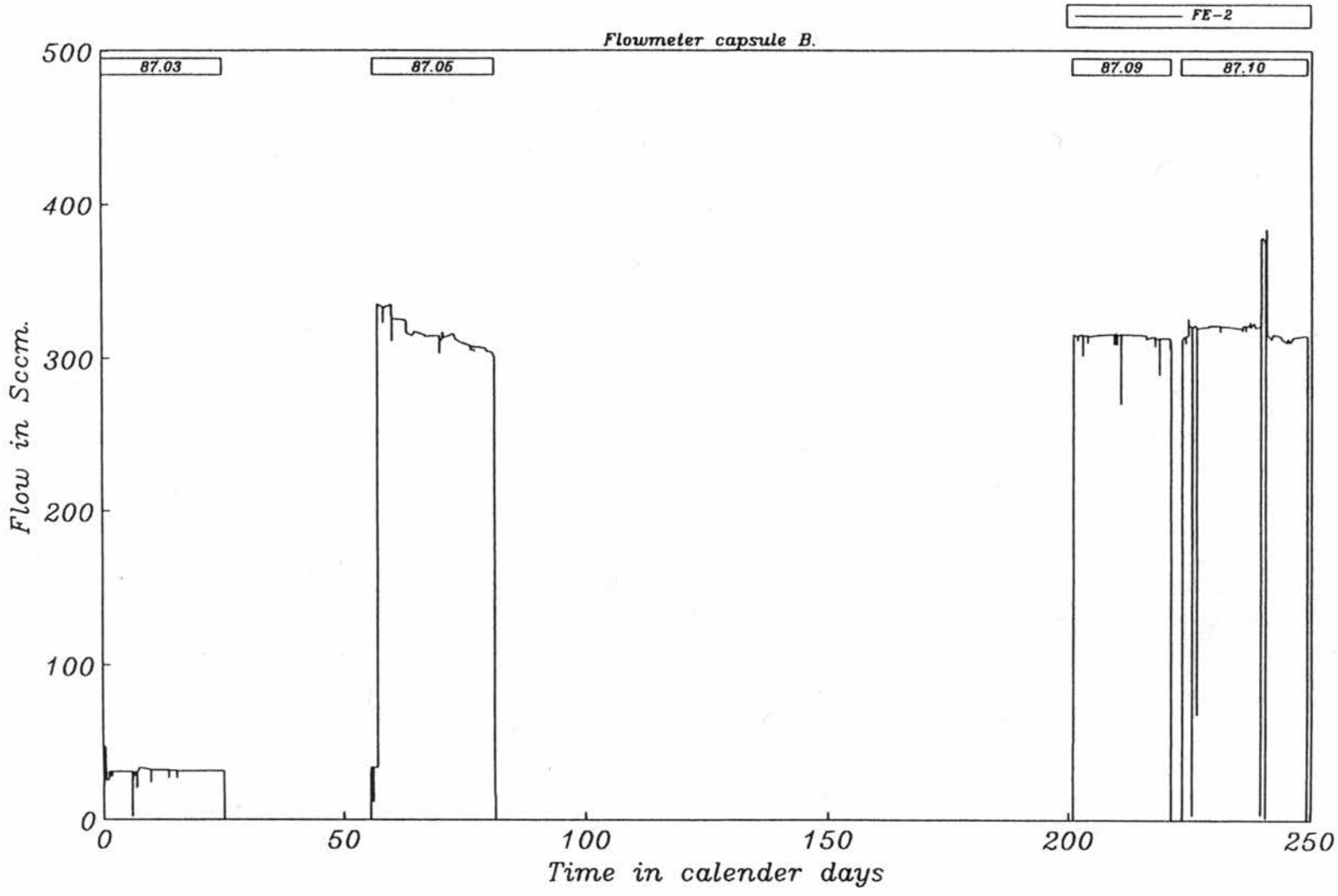



Fig. 6.6.33. Purge flow history D-214 Cycles 87.03 – 87.10
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

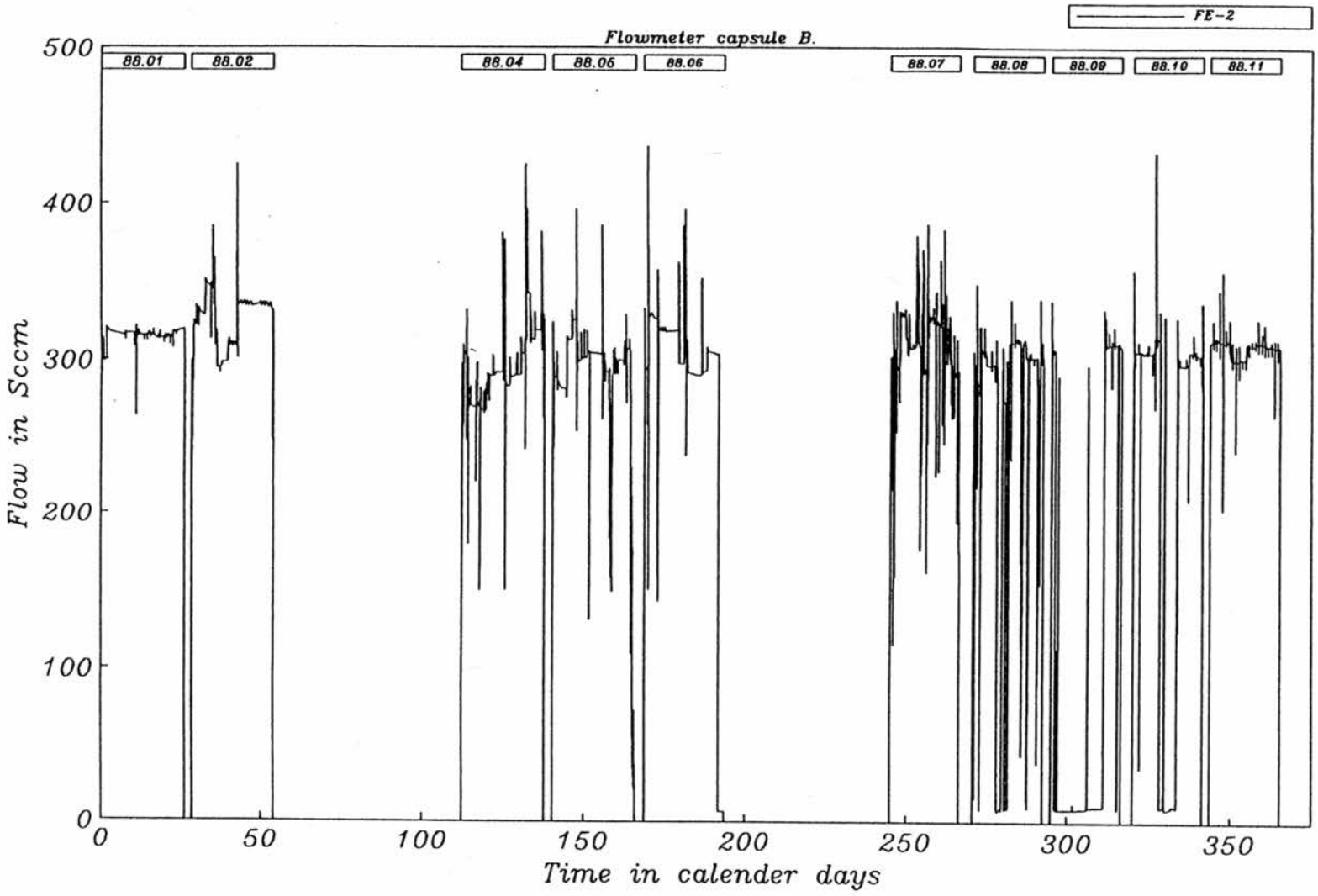



Fig. 6.6.34. Purge flow history D-214 Cycles 88.01 – 88.11
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

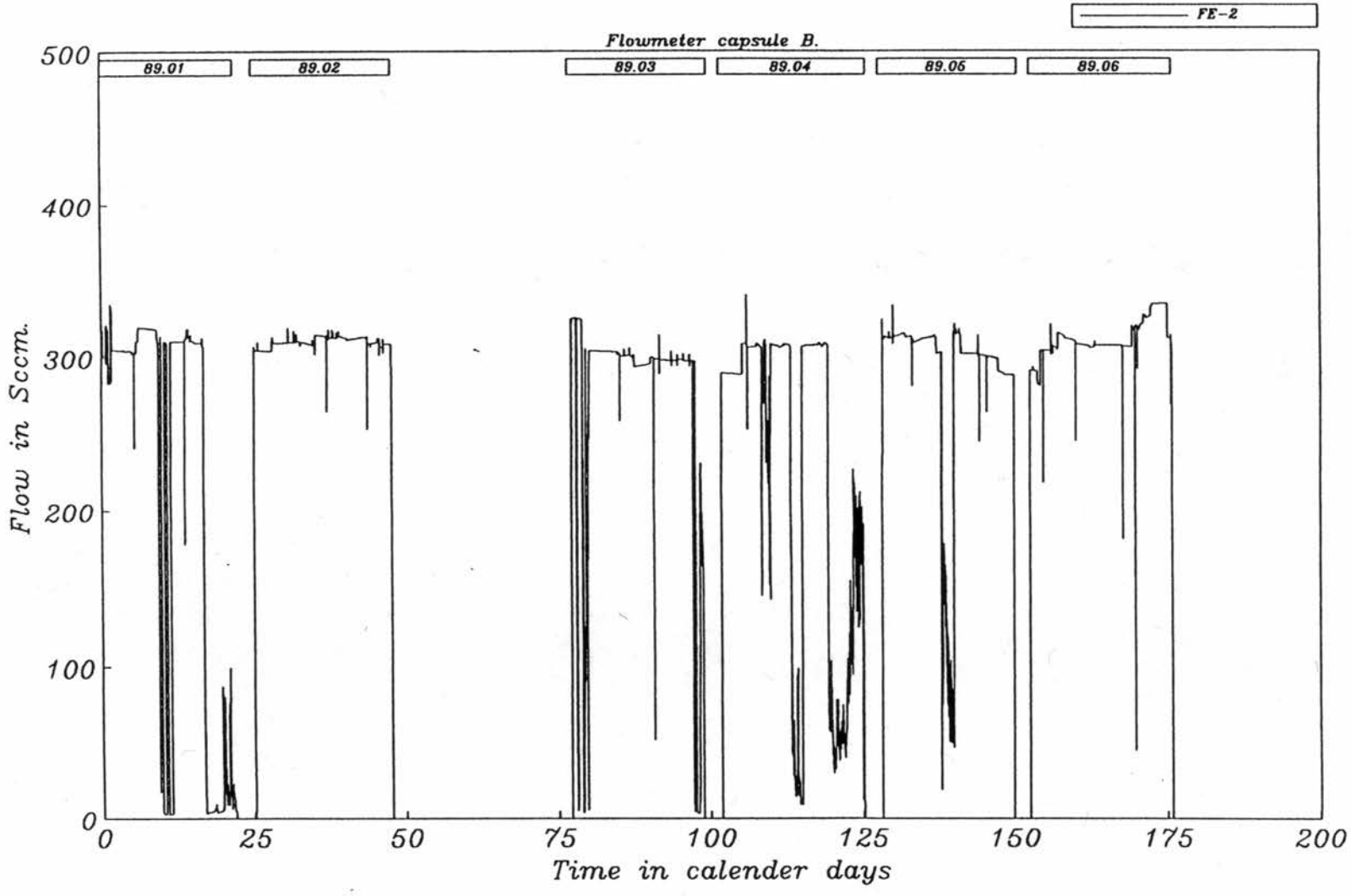



Fig. 6.6.35. Purge flow history D-214 Cycles 89.01 – 89.06
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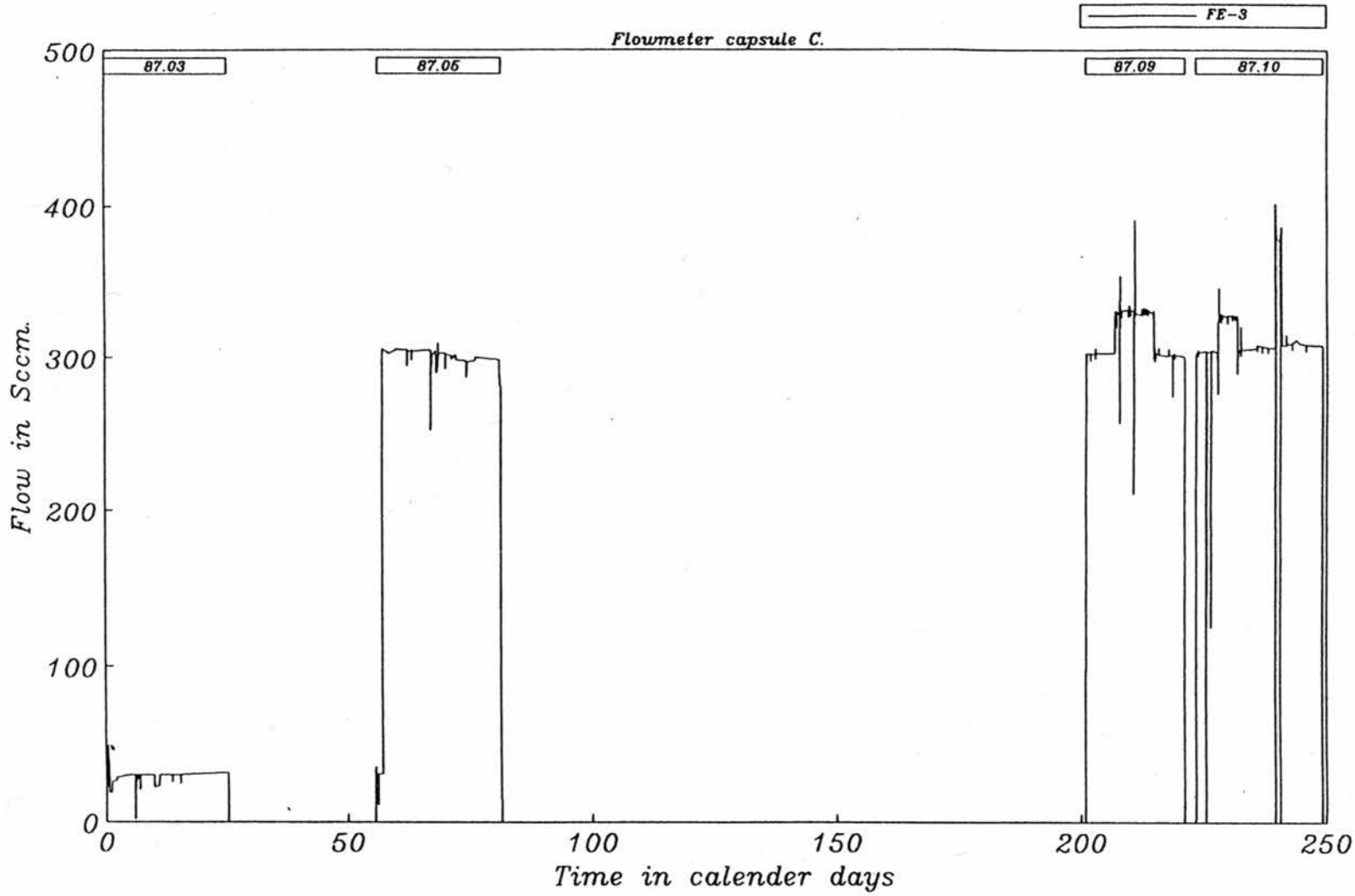



Fig. 6.6.36. Purge flow history D-214 Cycles 87.03 – 87.10
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

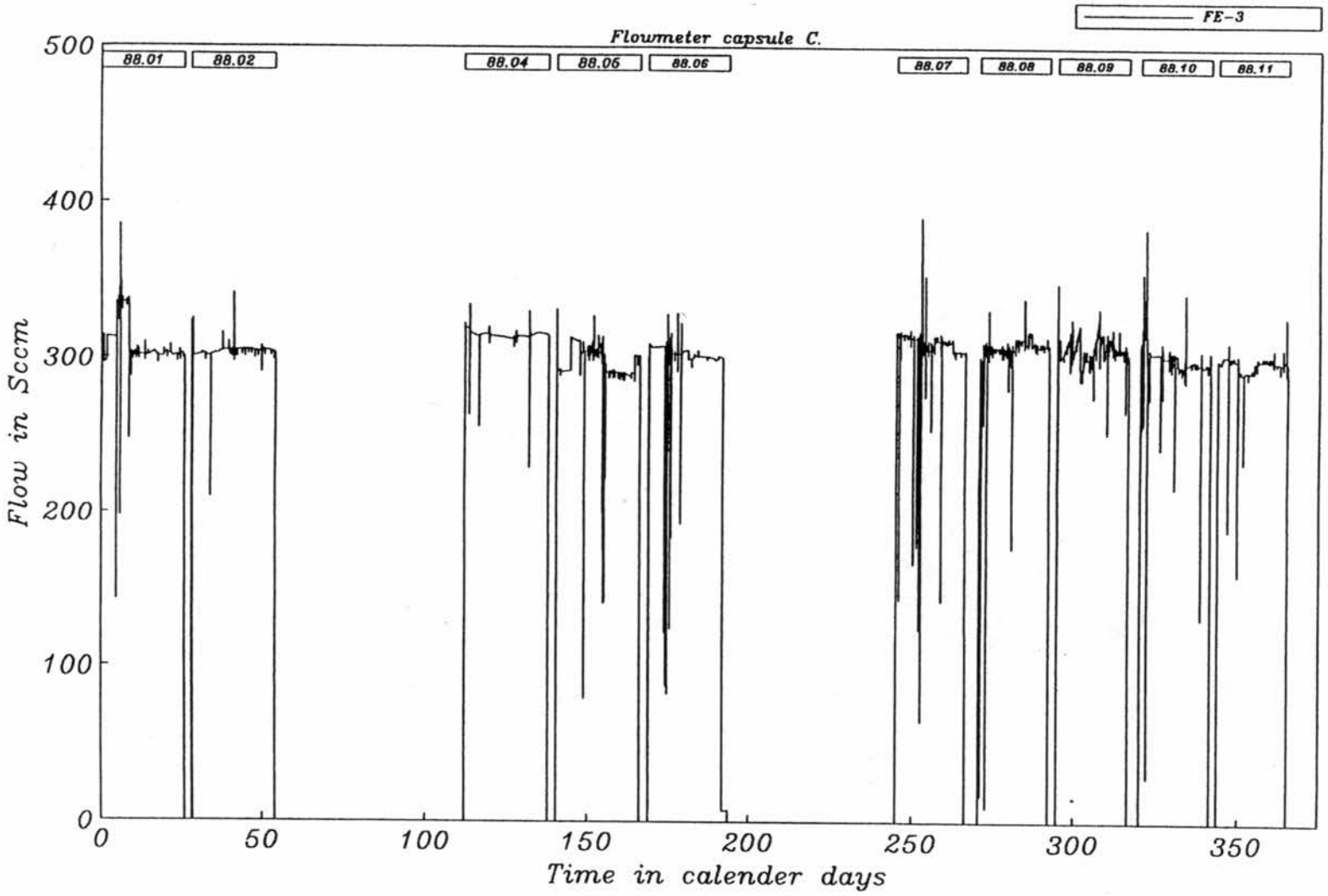



Fig. 6.6.37. Purge flow history D-214 Cycles 88.01 – 88.11
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

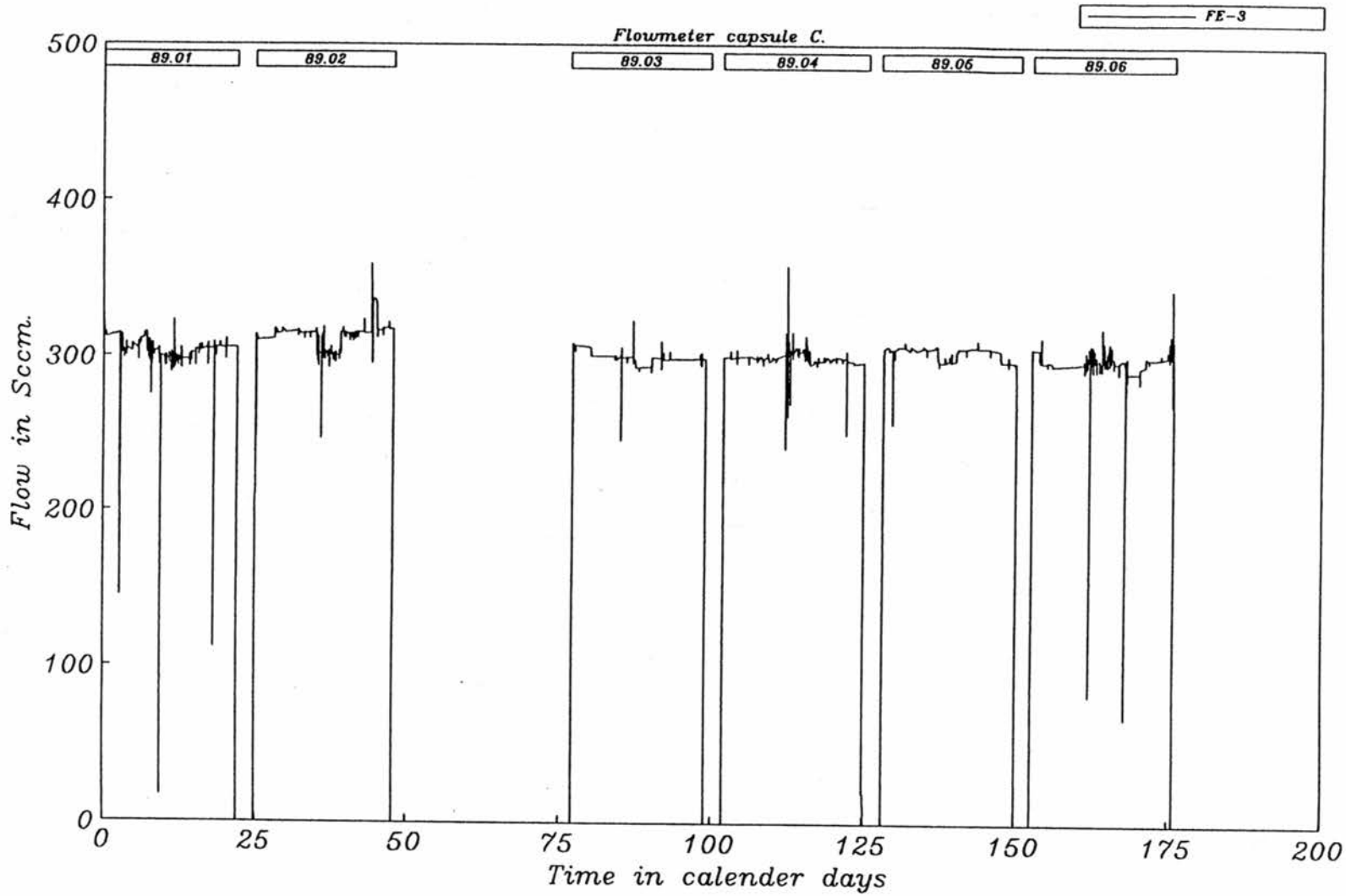



Fig. 6.6.38. Purge flow history D-214 Cycles 89.01 – 89.06
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

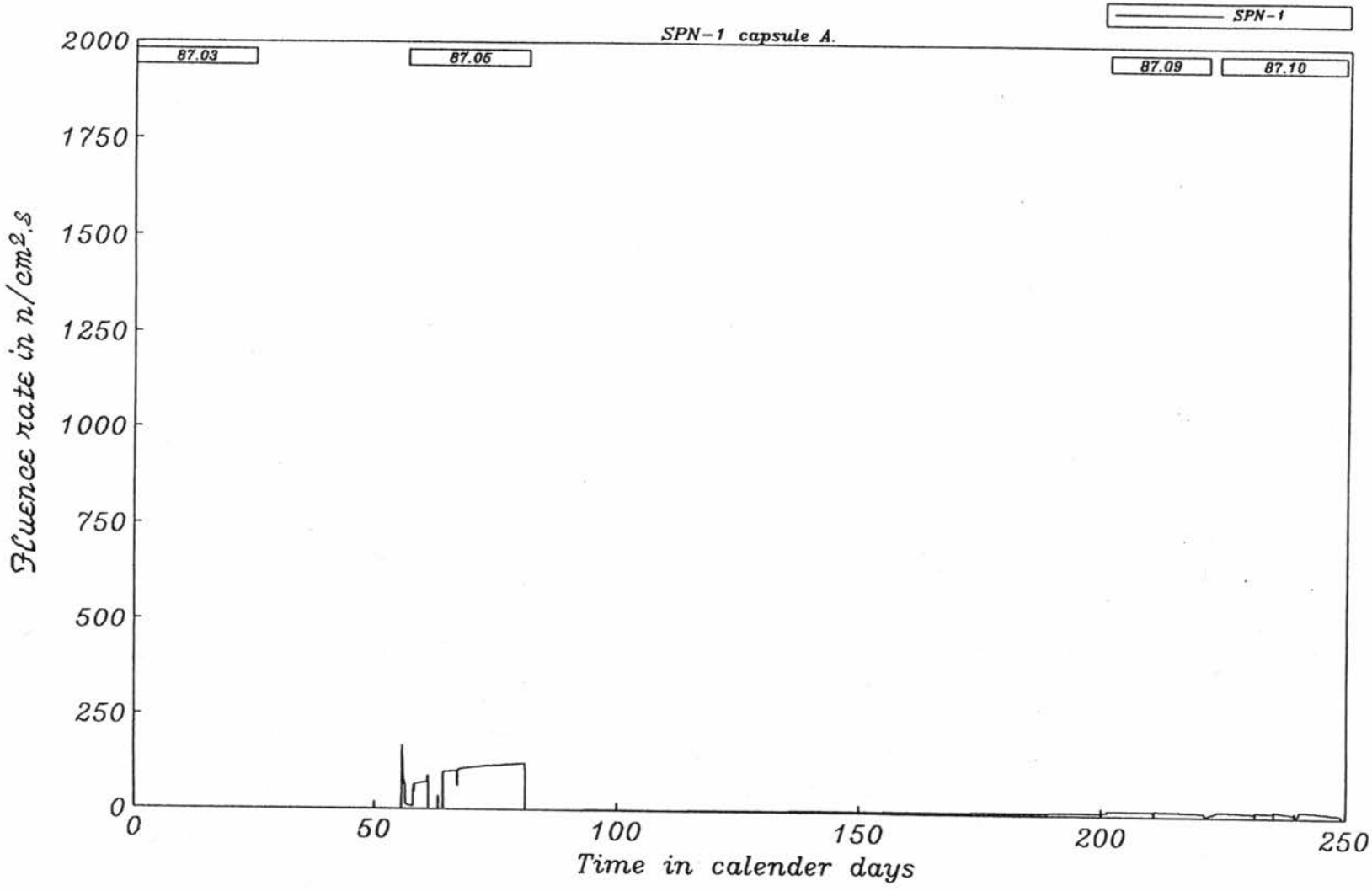



Fig. 6.6.39. SPN detector history D-214 Cycles 87.03 – 87.10
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

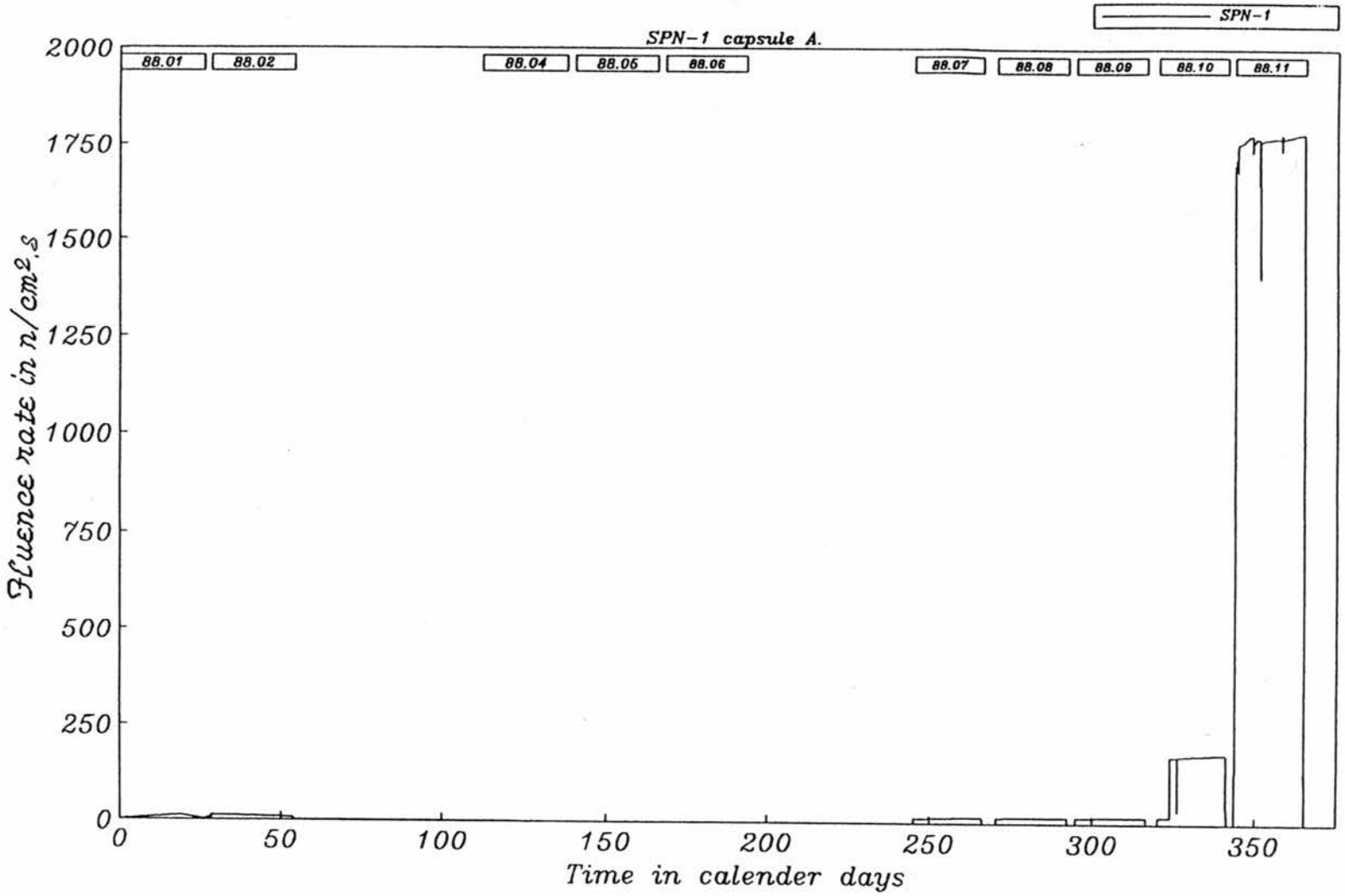



Fig. 6.6.40. SPN detector history D-214 Cycles 88.01 – 88.11
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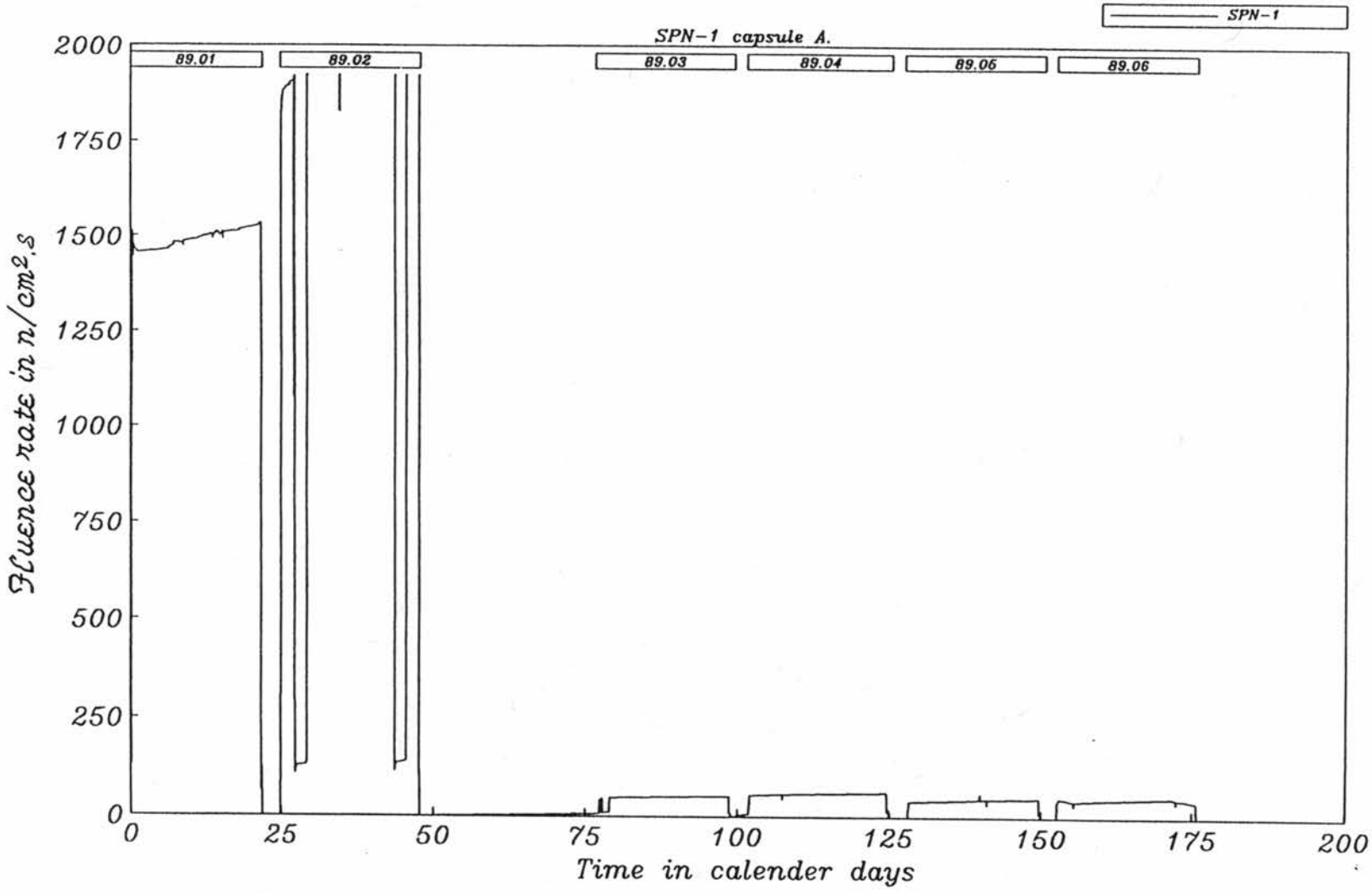



Fig. 6.6.41. SPN detector history D-214 Cycles 89.01 – 89.06
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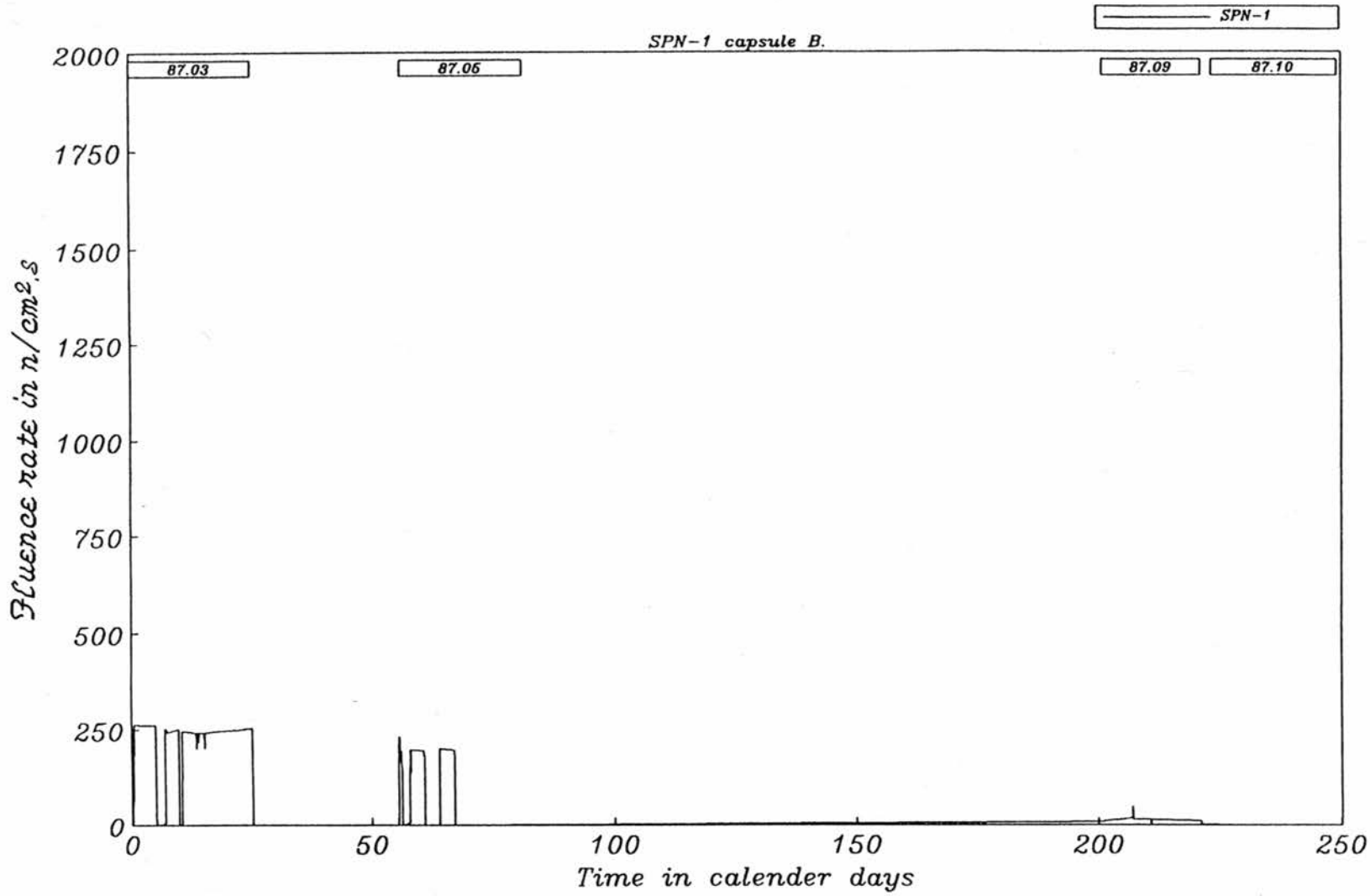



Fig. 6.6.42. SPN detector history D-214 Cycles 87.03 – 87.10
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

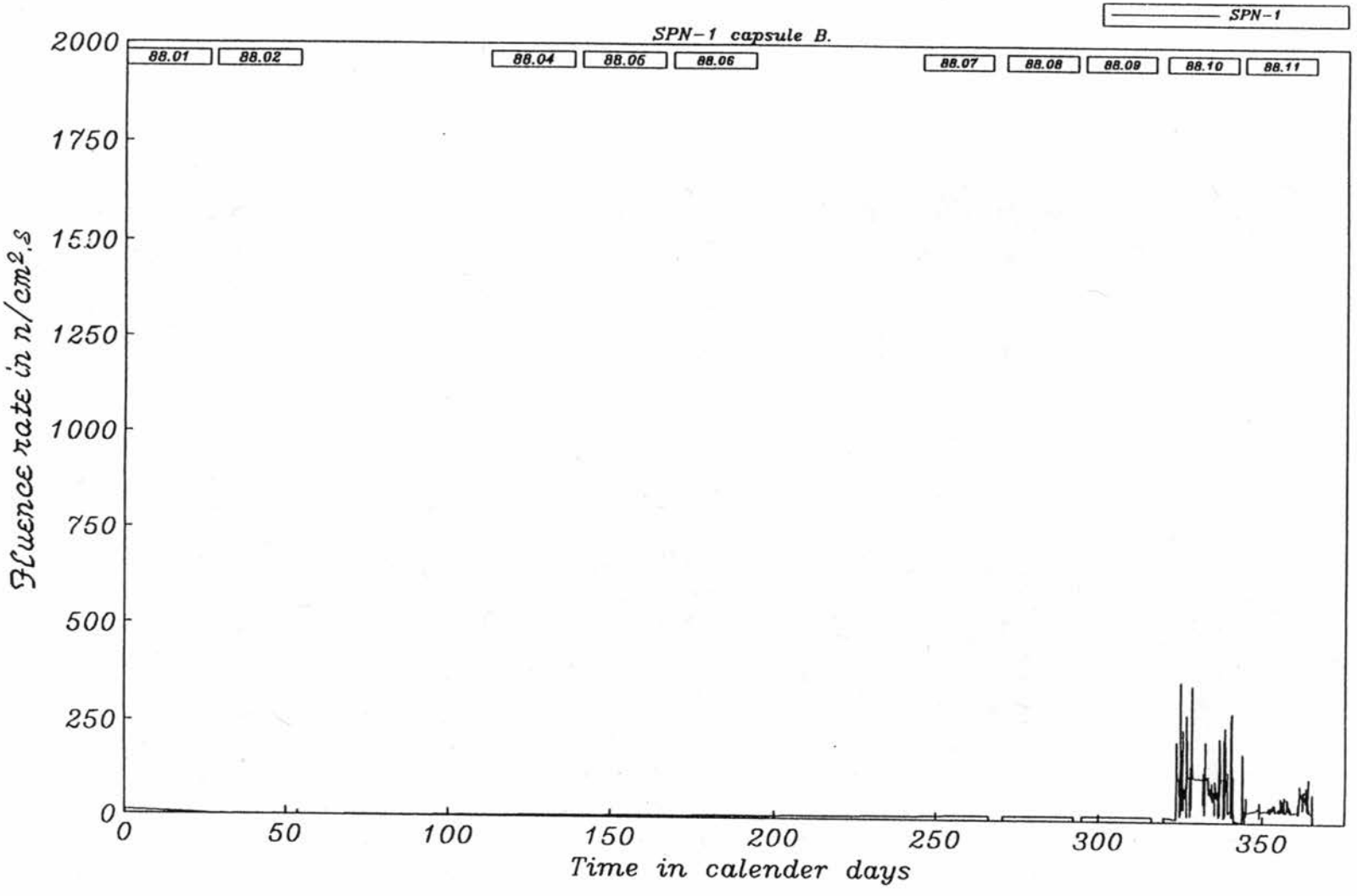



Fig. 6.6.43. SPN detector history D-214 Cycles 88.01 – 88.11
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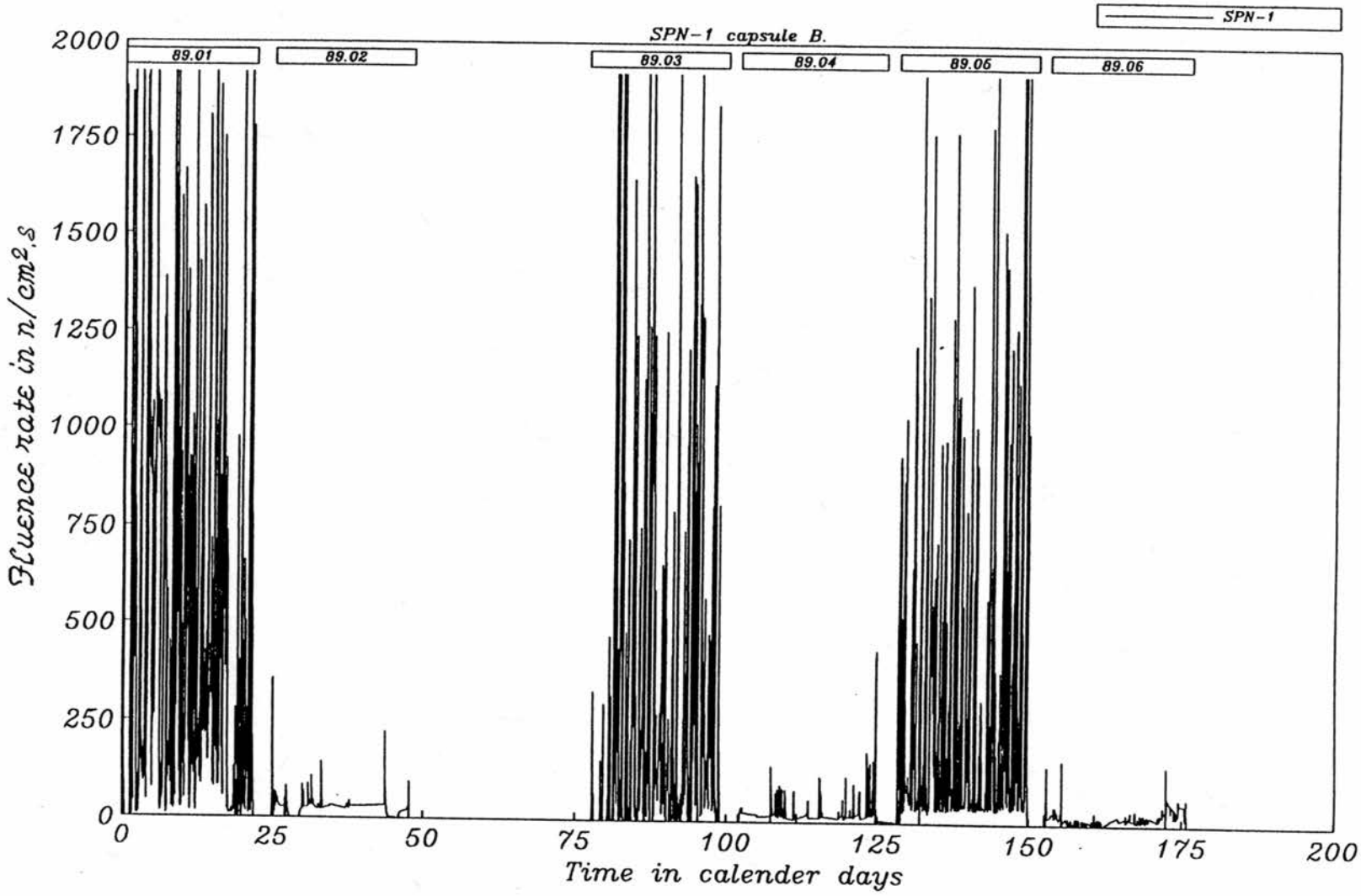



Fig. 6.6.44. SPN detector history D-214 Cycles 89.01 – 89.06
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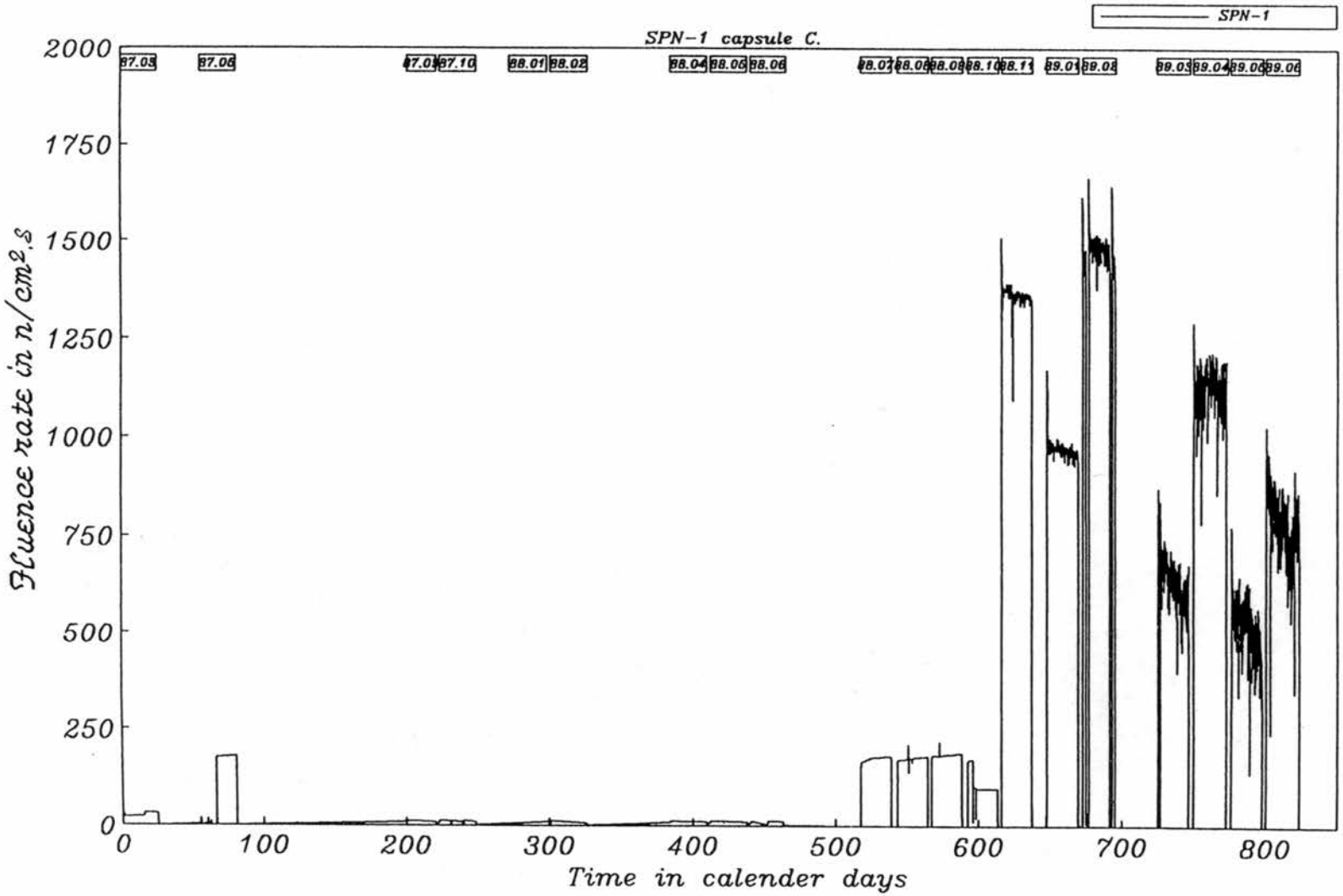



Fig. 6.6.45. SPN detector history D-214 Cycles 87.03 — 89.06
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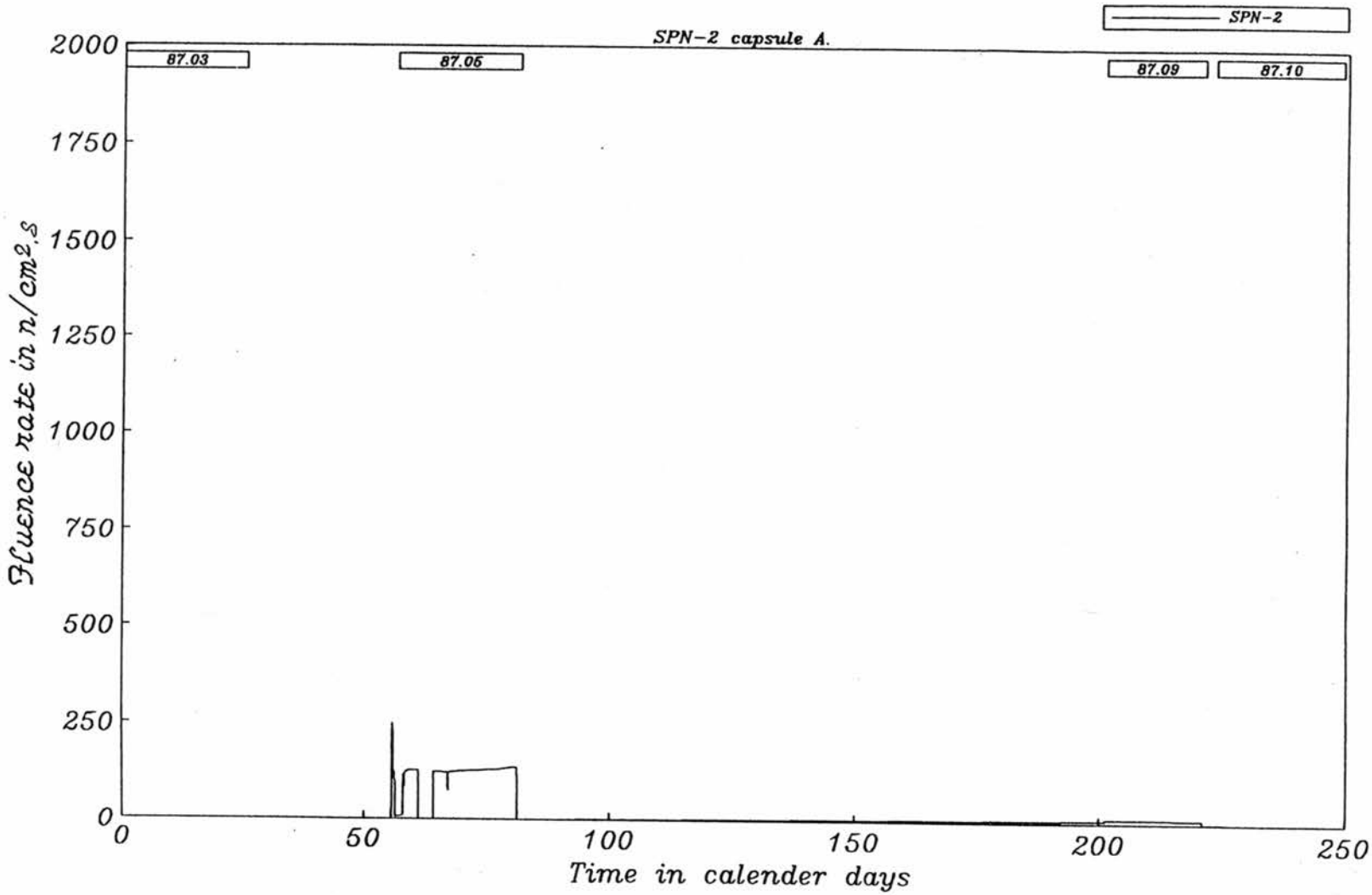



Fig. 6.6.46. SPN detector history D-214 Cycles 87.03 – 87.10
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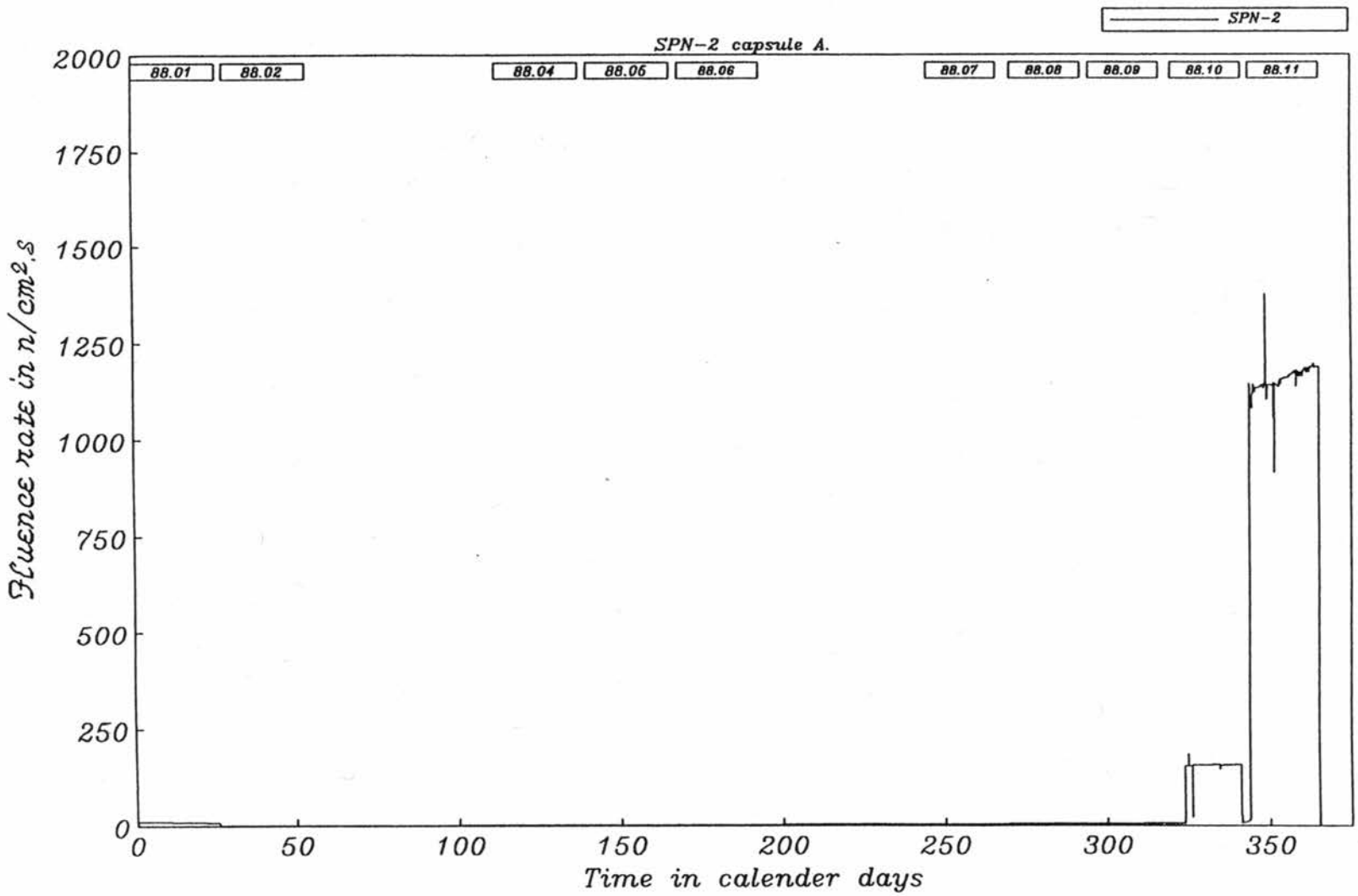



Fig. 6.6.47. SPN detector history D-214 Cycles 88.01 – 88.11
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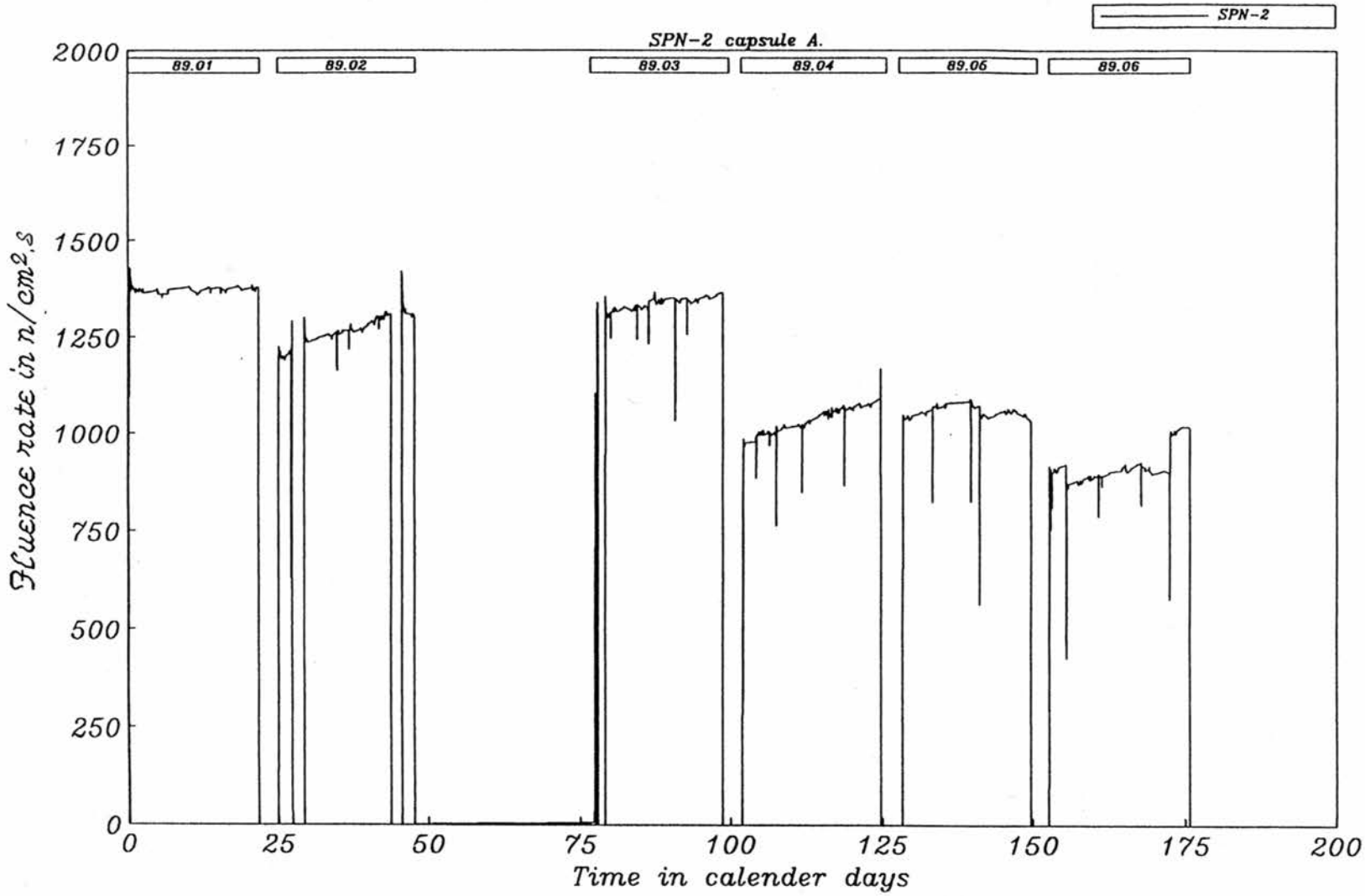



Fig. 6.6.48. SPN detector history D-214 Cycles 89.01 — 89.06
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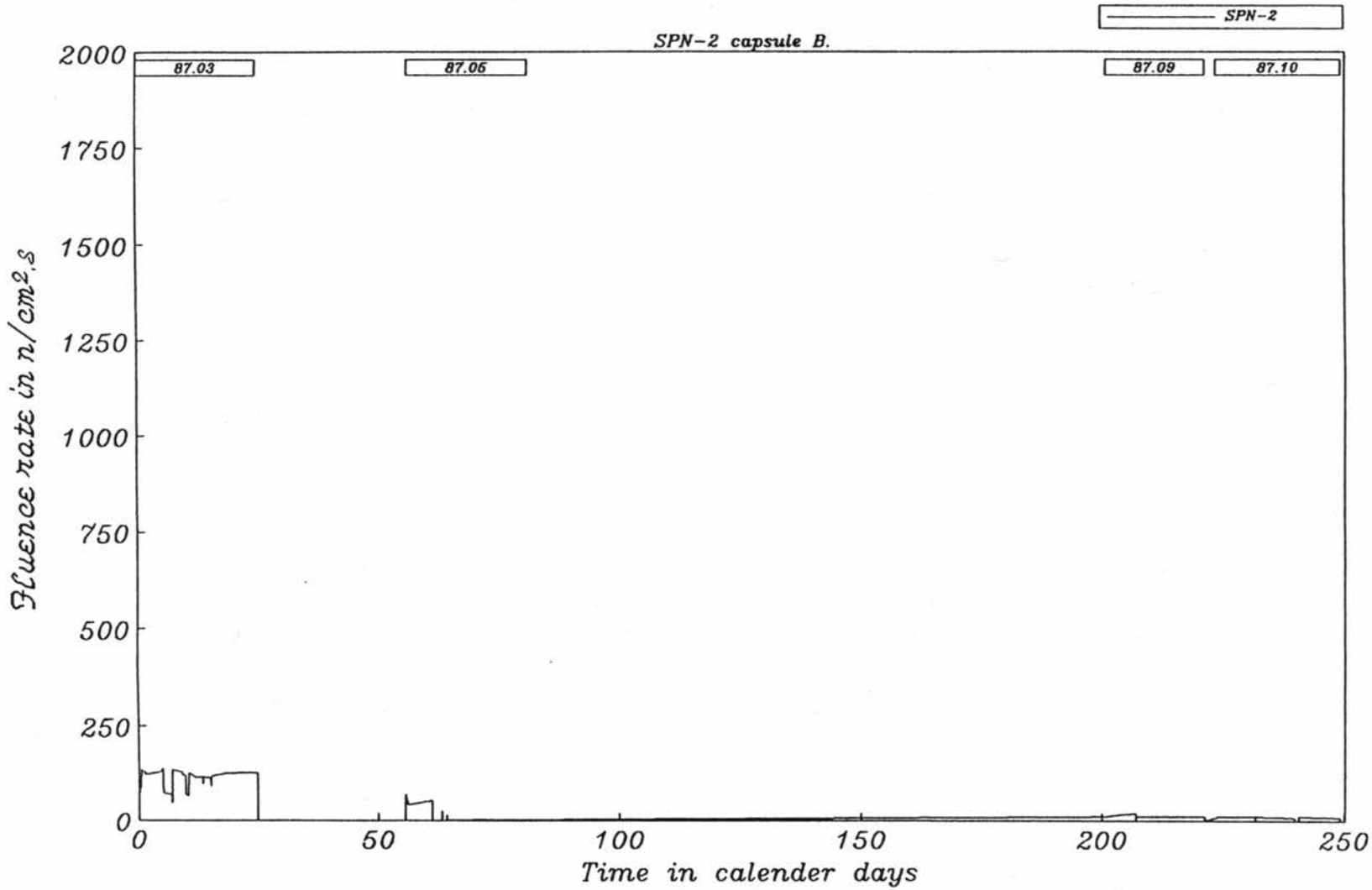



Fig. 6.6.49. SPN detector history D-214 Cycles 87.03 – 87.10
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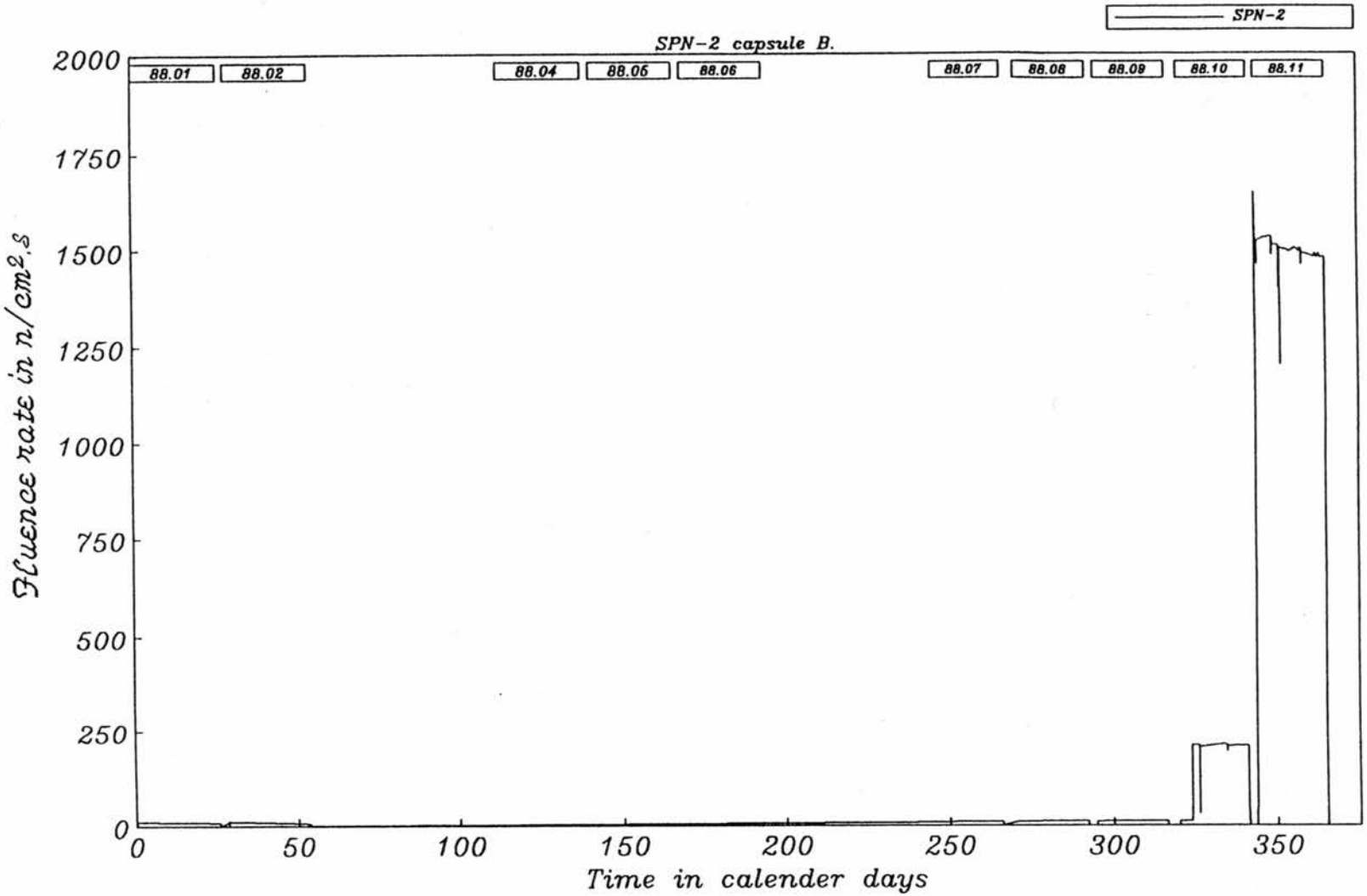



Fig. 6.6.50. SPN detector history D-214 Cycles 88.01 – 88.11
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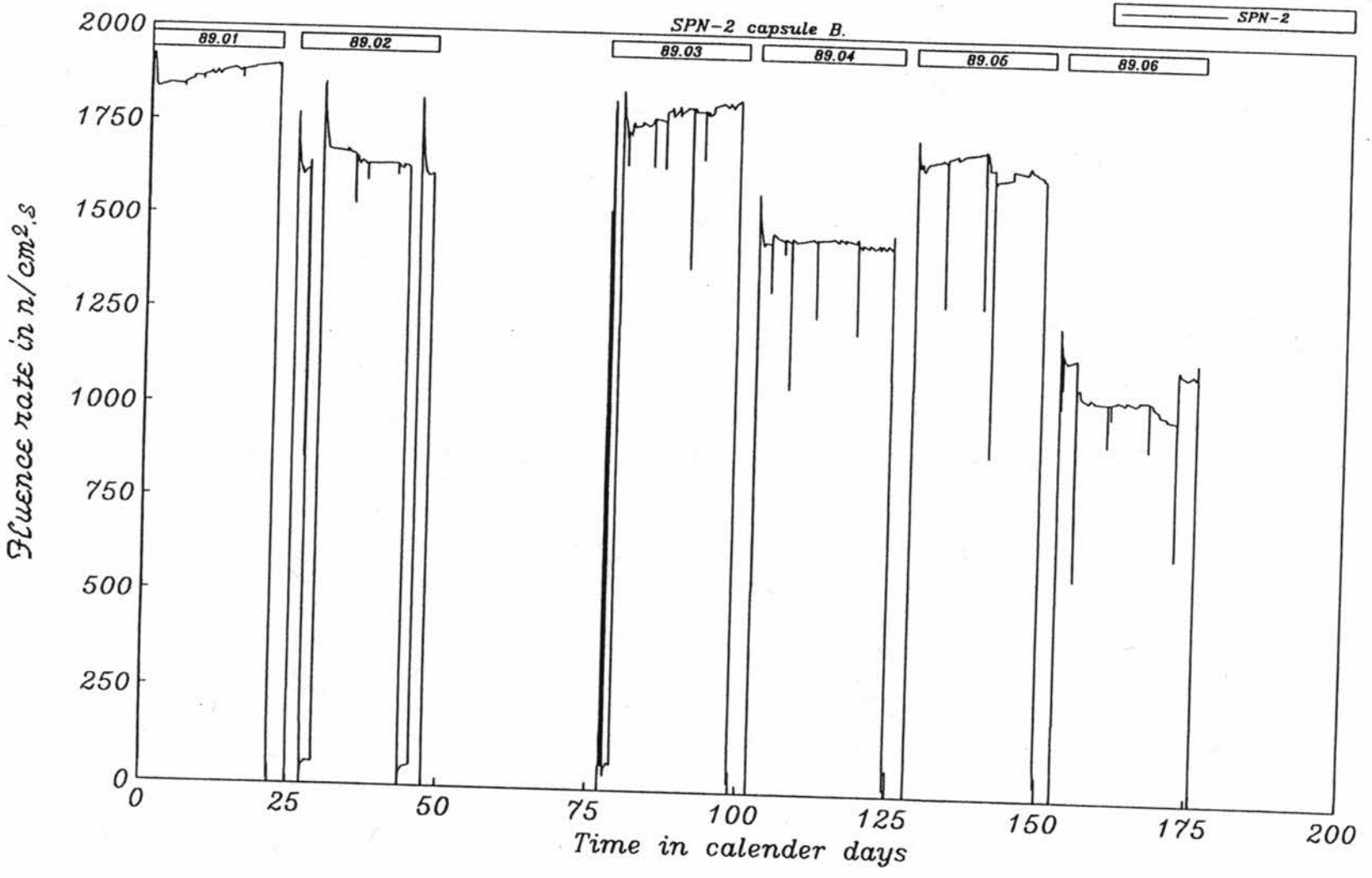



Fig. 6.6.51. SPN detector history D-214 Cycles 89.01 – 89.06
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

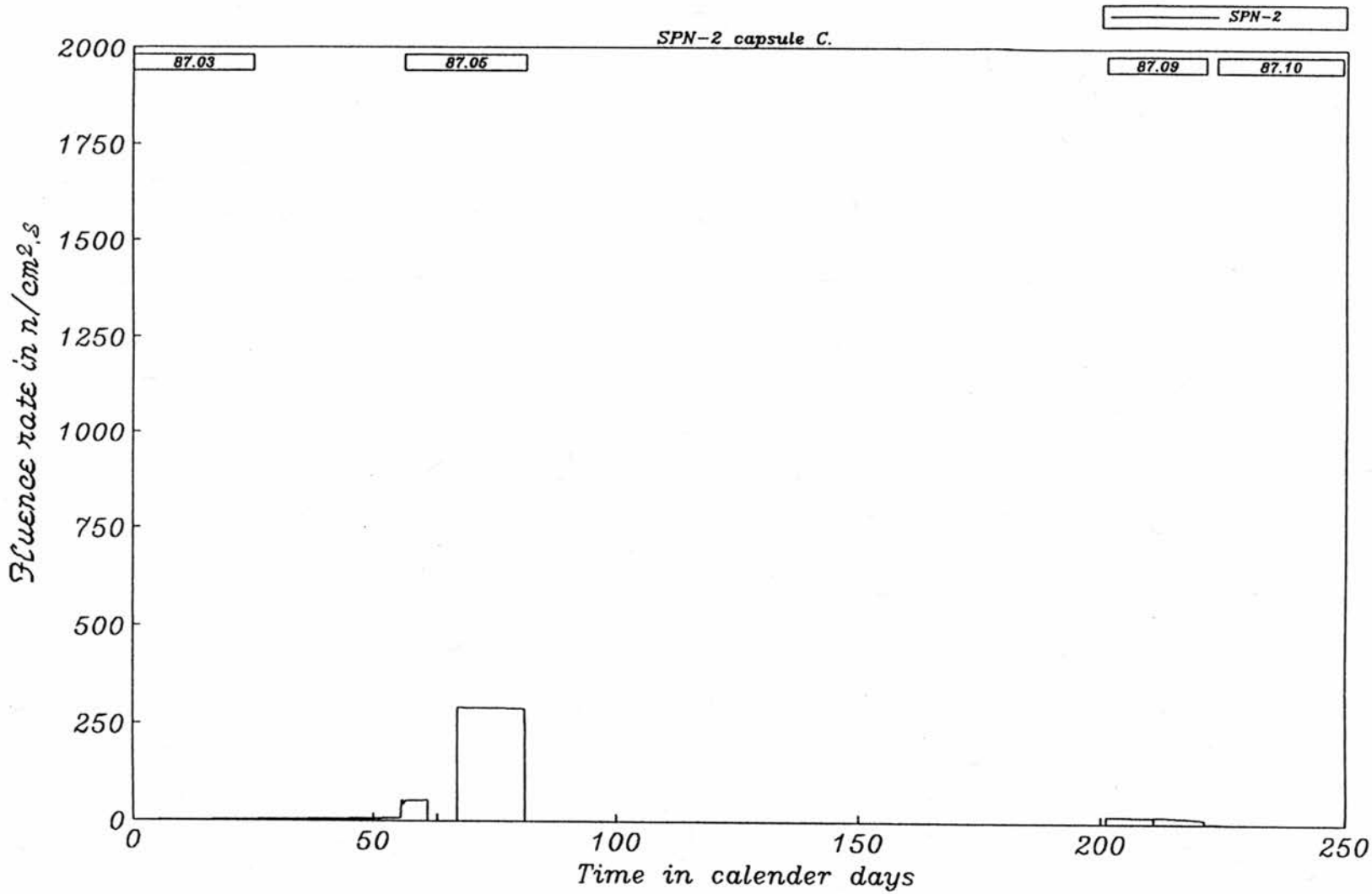



Fig. 6.6.52. SPN detector history D-214 Cycles 87.03 – 87.10
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

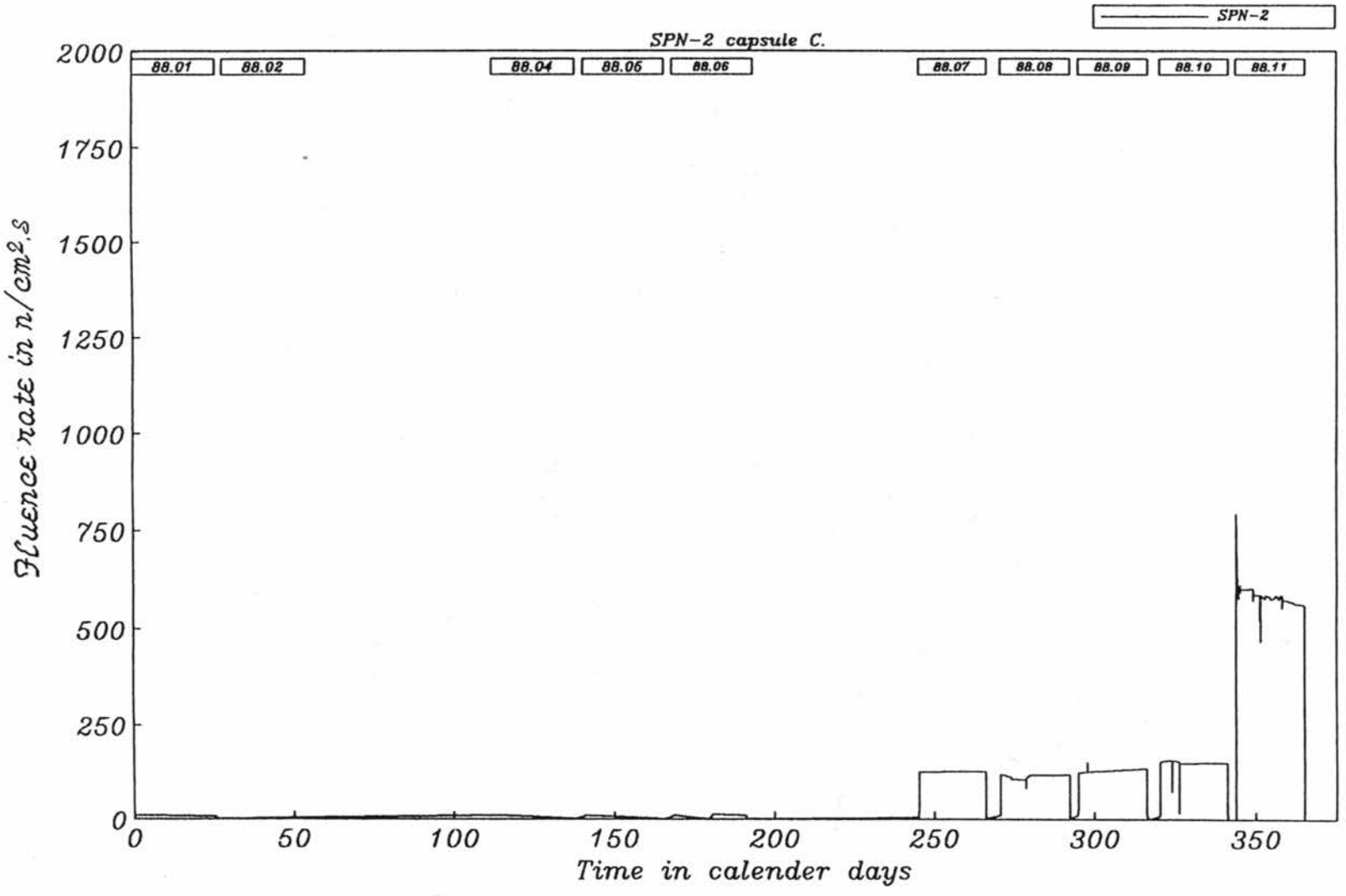



Fig. 6.6.53. SPN detector history D-214 Cycles 88.01 – 88.11
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

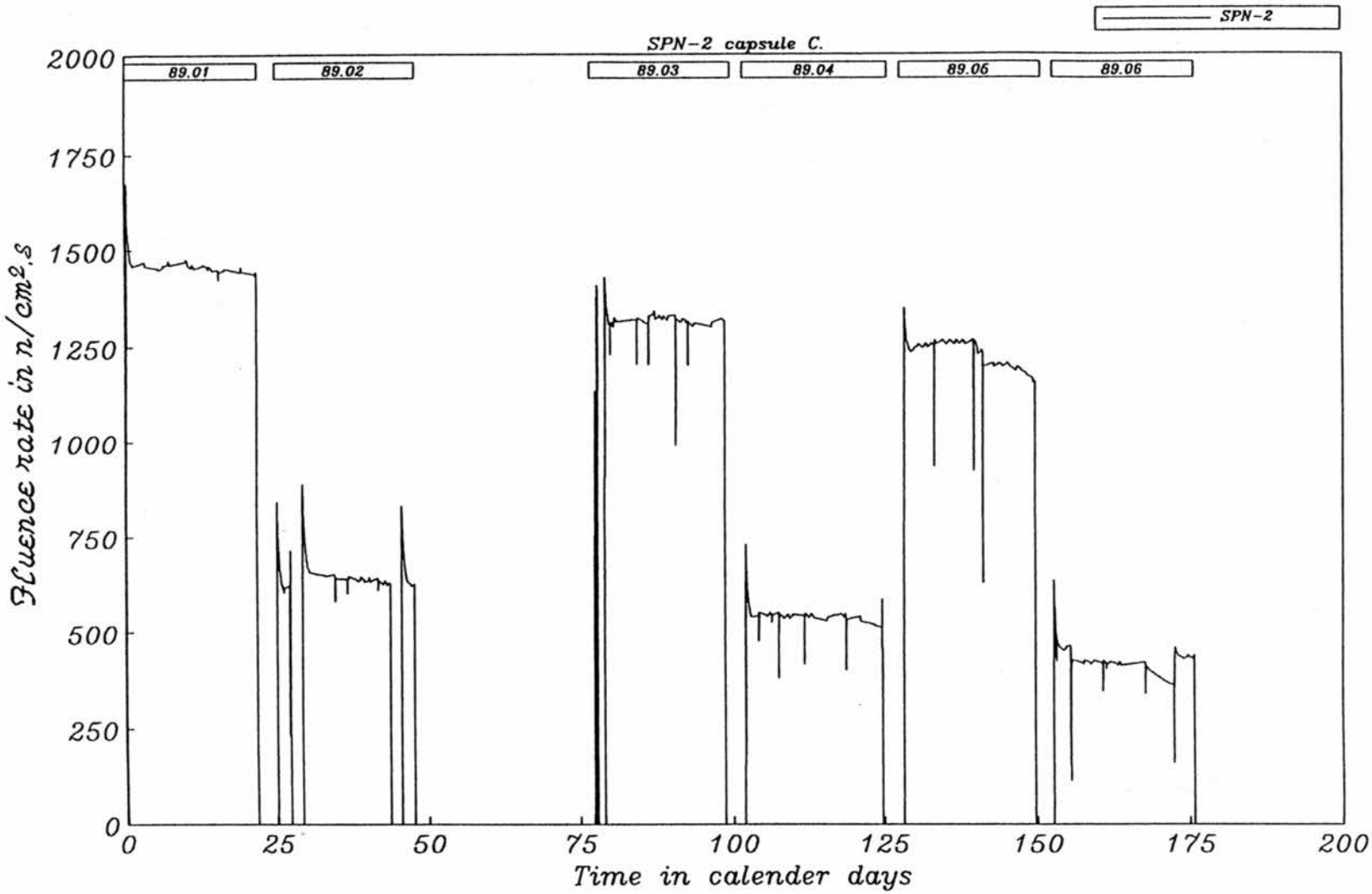



Fig. 6.6.54. SPN detector history D-214 Cycles 89.01 – 89.06
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

## 7. ACKNOWLEDGMENTS

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# APPENDIX A

# WATER VAPOR GENERATOR SYSTEM AND HYGROMETRY

# Appendix A

## WATER VAPOR GENERATOR SYSTEM AND HYGROMETRY

### A.1 Water Vapor Generator

A description of the water vapor generator system and the procedure for the injection of water vapor into capsule 3 is provided here; the system underwent some changes after the start of the tests. A schematic diagram of the present water vapor generator is shown ref. 30. In brief, the inlet helium is humidified by passing a known amount of the gas through a water bubbler at room temperature and mixing that with dry gas. By knowing the flow rate entering the bubbler, the total flow rate (comprising "wet" and "dry" flows), the absolute pressures in the bubbler and at the capsule inlet, and the temperature of the bubbler, the water vapor concentration at the capsule inlet was calculated, as follows:

$$P(H_2O) = (f_3/f_1)(P_4/P_2)P_b, \qquad (A.1)$$

where $P(H_2O)$ = partial pressure of water vapor (Pa),
$f_3$ = flow rate into the bubbler (standard $cm^3$/min),
$f_1$ = total flow rate (standard $cm^3$/min),
$P_4$ = absolute pressure at the capsule inlet (Pa),
$P_2$ = absolute pressure in the bubbler (Pa),
$P_b$ = vapor pressure of water (Pa) at the bubbler temperature, obtained from the standard hygrometric tables.

The flows rated $f_1$ and $f_3$ were measured with calibrated mass flow meters. The pressures $P_2$ and $P_4$ were measured with calibrated gauges. The water temperature was measured with a laboratory thermometer strapped to the side of the bubbler. The thermometer was calibrated by immersion in an ice bath.

### A.2 Hygrometry

The Sweeploop system utilized Panametrics Company aluminum oxide sensors. These sensors consist of an aluminum strip which is anodized to produce a porous oxide layer. A thin, porous metal coating is then evaporated onto the oxide layer, forming an aluminum oxide capacitor. Water vapor diffuses rapidly through the outer layer and adsorbs on the porous oxide, changing its electrical impedance. The magnitude of the impedance is proportional to the amount of water adsorbed, which is, in turn, a function of the water vapor concentration in the gas phase. Such cells have very fast response times and provide measurements over a wide range, from a dewpoint of -110 to +20° C. However, the sensors may decalibrate with time and therefore, for quantitative measurements must be recalibrated frequently. This can be done by sending the cells to the Panametrics Company, or, preferably by an in situ method, as described in Sect. A.3; see ref. 15 for further information.

In the Sweeploop system, there were a total of 8 hygrometer sensors (designated 5, 5-1 through 5-5, 1-1, and 1-4) and 2 Panametrics control units (systems 1 and 5). In system 5, sensor 5-1 monitored the inlet He, and sensor 5-2 monitored the inlet Ne to all capsules. Hygrometers 5-3 through 5-5 monitored the outlet streams of capsules 1, 2, and 3, respectively. In system 1, sensor 1-1 monitored the gas flowing to the sampling station. Sensor 1-4 was located in the water vapor generator along with sensor 5, whose millivolt signal was fed into the trend recorders and to the DACOS data acquisition system. These latter two hygrometers monitored the inlet water vapor of capsule 3 during the water vapor injection experiments and have received special attention, as will be explained. Both sensors 1-4 and 5 were calibrated in September 1988 by the Panametrics Company in The Netherlands. These sensors were found to have drifted considerably since their original purchase. Sensor 1-4, for example, was reading low by a factor of three. This meant that the water vapor concentrations in the first five water vapor injection tests were higher than originally thought. A correction factor of three has been applied to those data, after being justified by an analysis. After reinstallation in the water vapor generator, the sensors continued to drift. However, sensor 5 has been a bit more stable since the calibration in September 1988. Both hygrometers have since been frequently calibrated in situ by methods described in the next section.

The outlet hygrometer in capsule 3 is sensor 5-5. It is also known to read substantially low. Because it was in the radioactive portion of the system, it could not be removed for recalibration. Rather, the outlet water vapor concentration was calculated by subtracting from the inlet water vapor concentration the amount of water vapor consumed by reaction with the graphite body, (as measured by the quantity $2CO_2 + CO$). Sensor 5-5, therefore, was used as a relative monitor much like the inlet relative monitor, sensor 5-1.

## A.3 Calibration of Hygrometers

The Panametrics hygrometers have been calibrated using three methods. First, by the Panametrics method as mentioned above. Second, by an in situ method developed at Petten, and third, by use of an auxiliary dewpoint hygrometer, the General Eastern Instruments, GEI, Model M1. This latter calibration was performed a number of times using two different MI-1 instruments.

The in situ method uses the water vapor generator system. If flow rates, pressures, and bubbler temperature are known, then the water vapor concentration can be calculated with confidence. In this method, the moisture generator itself is the primary means of knowing the water vapor concentration. Therefore, the Panametric sensors were calibrated virtually daily during every injection test. Alternatively, between reactor cycles, the small water bubbler, one of the two in the water-vapor generator system, was used for additional calibrations. The small bubbler was first immersed in an ice bath Dewar and allowed to equilibrate overnight. Then by passing the entire flow through the bubbler at 0° C, a single-point calibration was effected at 602.8 Pa without having to rely on knowledge of the flow rates but assuming the pressures in the bubbler and the hygrometer were identical. Next, the pressure at the hygrometer, $P_4$, was adjusted to a value lower than that at the bubbler, $P_2$, and additional data points were obtained down to about 300 Pa. Finally, by mixing the wet and dry flows, $f_3$ and $f_1$, calibration points down to about 10 Pa could be obtained.

The third method, involving the GEI Model M1 dewpoint hygrometer, was used after the fifth moisture injection test in HFR cycle 88.05 to check on the calibration of the Panametrics sensors. At the same time, a mass flow meter was installed in the bubbler line which allowed the water vapor concentration to be calculated. The conclusion of the work with the M1 was that the flow calculation method is accurate, and the Panametrics cells were initially low by a factor of three. The Panametrics cells were then sent to the factory representative in Holland for recalibration. They were found to be low by about 10° C, which is a factor of three in the 100 Pa range. The recalibrated cells were placed back into service prior to cycle 88.07. The company representing Panametrics uses a flow mixing device similar to that used for the capsule 3 injections; by flow mixing, they claimed to know the true water vapor concentration to within 5%. The reference water vapor concentration is measured by a GEI Model M1. Finally, a new model M1 was permanently installed in the Sweeploop, after cycle 89.03. During the last three cycles of operation, this instrument was used extensively to check on the water bubbler method as well as to recalibrate the Panametrics cells. These final calibrations corroborated the early calibrations. In Fig. A.1, a comparison is shown of the GEI M1 response with the calculated water vapor content based on the flow mixing/calculation method. These data show that the latter method is accurate. It may be stated that the water vapor concentrations in all the injection experiments after cycle 88.05 were known to be within 10%. The uncertainty of the water vapor concentration in the first five injection tests is estimated to be 20 to 30%.

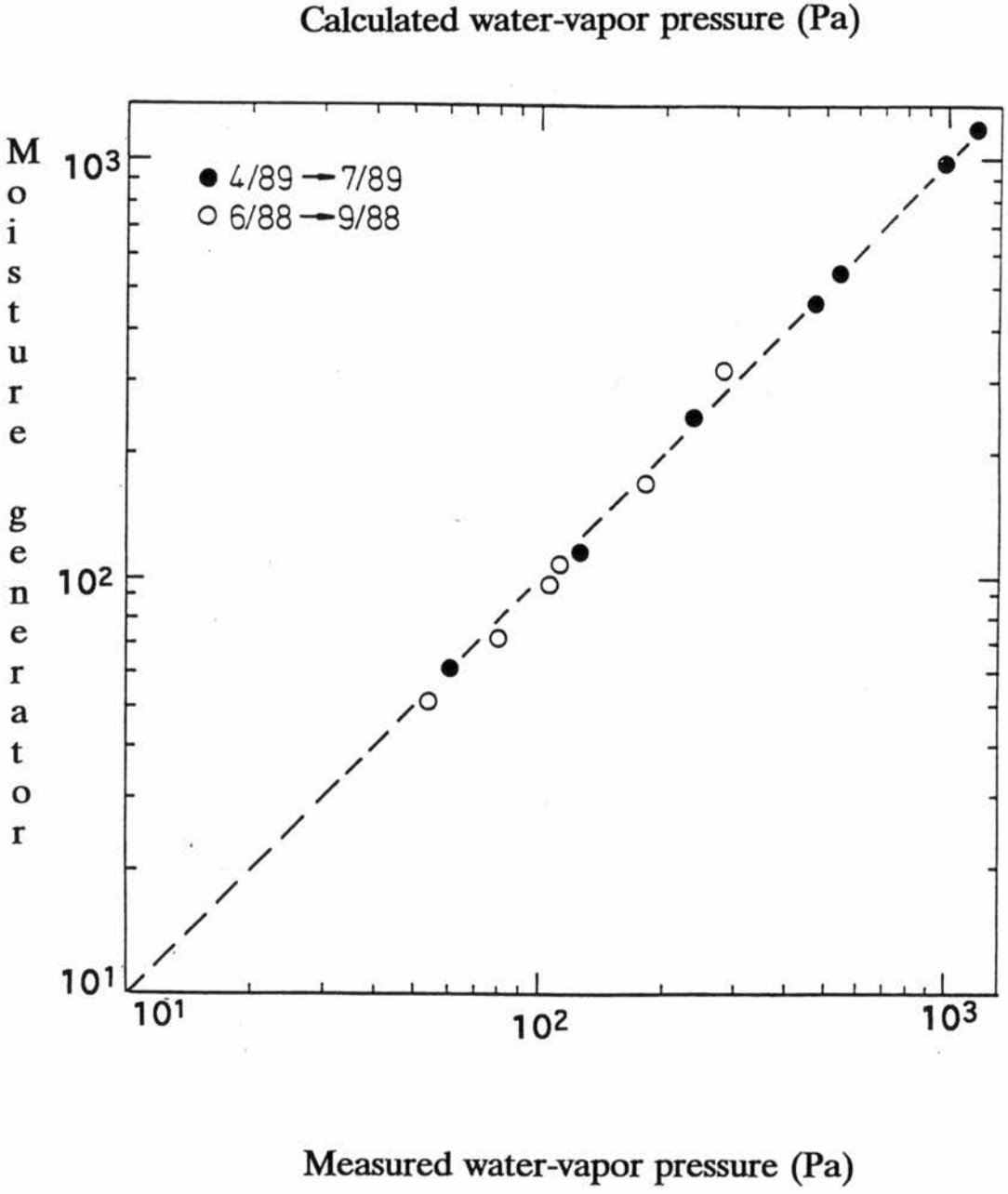



Fig. A.1. Comparison of the calculated and measured (M1-1) water vapor pressures.
*Source:* JRC-IAM Petten, HFR Unit, The Netherlands

# APPENDIX B

# GAS CHROMATOGRAPHY

# Appendix B

## GAS CHROMATOGRAPHY

### B.1 Instrumentation and Use

The gas chromatograph (GC) was used to monitor the compositions of the inlet and outlet gases of all capsules for trace impurities and, in capsule 3, for the reaction products of the hydrolysis of the carbonaceous material in the fuel elements. The GC used at Petten is a model TBT, manufactured by L'aire Liquide/Orthodyne in France. It utilizes an He ionization detector and delay columns of porapak Q at 50° C, and molecular sieves at a temperature of 75° C. In addition, there is a molecular sieve column which is cooled with liquid nitrogen. This column is used at -140° C for the measurement of $H_2$ whenever there is Ne contamination. Also, whenever Ne is added to a capsule for temperature adjustment, the GC measurements are affected. This is because at the considerable concentrations of Ne used, 20 to 100%, the huge Ne peak virtually wipes out the other peaks. This problem has been alleviated by operation of the TBT at reduced gain and at increased zero set point, such that the Ne peak, which is negative, was nearly on scale. This way, the other peaks, with the exception of $H_2$, could be seen as small peaks on the "tail" of the Ne peak and were adequately quantified. The columns were protected from excessive moisture during the injection tests by a bed of magnesium perchlorate in the sample line. Coupled with the TBT is a Shimadzu integrator/recorder. The Shimadzu records the date and time of each sample, plots the chromatogram, integrates the peaks, and calculates the concentration in terms of parts per million by volume, ppmv, associated with each peak by comparison with stored calibration data. The sensitivity for all the above gases was about 1 ppmv. GC peaks smaller than 1 ppmv were resolved but with reduced accuracy. In the concentration range of 1 to 100 ppmv, the accuracy and repeatability were within about 10%.

For normal capsule operation, with no special tests, GC samples were obtained once per shift per capsule. During water vapor injections in capsule 3, sampling was more frequent; sometimes the instrument was placed on automatic, in which sampling was as often as every 10 min. Normally, during moisture injections, the GC was placed on automatic sampling during the initial or ending phases of the tests, or at other times when conditions are being adjusted. In between these special periods, sampling of capsule 3 was performed between 1 and 4 times per shift. GC sampling usually involved two consecutive samples; the second sample was sufficiently purged. As a consequence, each GC cycle is 10 or more minutes, and about 5 min of purging is enough to ensure a representative mixture in the sample loop. Raw GC data in ppmv are listed in Tables 6.5.1 through 6.5.20.

### B.2 GC Calibration

The GC was calibrated at the beginning of each reactor cycle. At this time, the Shimadzu integrator was programmed to integrate the peaks and convert their areas to ppmv. The calibration was then checked daily or sometimes more often. If the calculated ppmv of any of the standard gas peaks disagreed with the true value by more than 10%, the Shimadzu was reprogrammed to reflect the true values. Normally, a calibration was good for 3 to 6 d. Occasionally, because of changing conditions, such as flow rate, pressure, temperature, vibrations, etc., the individual GC peaks were not properly integrated by the Shimadzu. This was detected

by visual inspection of each peak and comparison of the integrated value with a hand-calculated value based on comparison of peak heights. Consequently, all Shimadzu integrations and calculations were checked daily to ensure their accuracy.

In a few cases, the Shimadzu did not integrate properly. This was discovered in cycles 89.04 and 89.06. The discrepancy was discovered by the observation that standard GC peaks of obviously the same area were recorded by the Shimadzu as having different areas. Consequently, all integrations from the first to the last cycle have been checked by the manual method of peak height analysis. When discrepancies were found, the manual peak height method was substituted for the Shimadzu integrations.

Calibrations were accomplished by injection of standard gas mixtures into the TBT sample loop at the same flow and pressure as the capsule gas sample flow. In this way, a direct comparison of the capsule gas with the standard gas is made. This type of calibration is "end to end," that is, it does not require the calibration of individual components of the GC, such as current, flows, pressures, oven temperatures, and the like. The measurements are known to be consistent from day to day by daily injection of the standard gas into the GC. More detailed information on GC calibrations is given in ref. 30.

# APPENDIX C

# TRANSIT TIMES

## Appendix C

## TRANSIT TIMES

The train through which fission gas released from the fuel must pass in order to reach the sampling station is of importance in determining the steady-state fractional release, R/B. This passage necessarily entails a delay that, in the case of radioactive gases, must be taken into account in determining the actual activity of the gas leaving the fuel.

The configuration of the gas train is important. If the gas train is tubular without significant, segmental variations in the diameter of the train, then the transit time can be represented by

$$t = V/f_r, \tag{C.1}$$

where

$t$ = transit time (min),
$V$ = volume of the gas train ($cm^3$),
$f_r$ = flow rate ($cm^3$/min).

Viscous effects and diffusion are neglected, and the flow is laminar. If, however, there is in the gas train a large-diameter segment, a holdup volume for example, and the gas is well mixed in this volume, i.e., the concentration of a given species is homogeneous therein, a gas element in transit through the well-mixed volume will experience an increased delay different from that in a tubular segment of the same volume, and the concentration profile of sequential gas elements may be distorted. The effects of a well-mixed volume in the gas train of the HFR-B1 experiment remain to be established.

The flow rate is determined in the Sweeploop of the high-flux reactor (HFR) by an instrument that measures the mass flow rate; the detector senses the mass flow in a given time period through measurement of the thermal conductivity. However, the mass flow rate is converted by the instrument software to a volumetric flow rate assuming standard conditions for the pressure ($P_o$) and temperature ($T_o$), i.e., 0.1 MPa and 298 K. The true volumetric flow rate has to be calculated based on measurements of the pressure and temperature of the purge gas. By assuming the ideal gas law applies and by applying the operator $\partial/\partial t$ to the equation for the ideal gas, i.e.,

$$Pv = mRT/M, \tag{C.2}$$

where

| | | |
|---|---|---|
| P | = | pressure (MPa), |
| v | = | volume ($m^3$), |
| m | = | mass of the gas (kg), |
| R | = | the gas constant (=8.314J/(mol·K)), |
| T | = | temperature (K), |
| M | = | molecular weight of gas (kg/mol). |

The volumetric flow rate, $f_r$, is given by

$$f_r = (\partial m/\partial t)_{P,T} (RT/MP) \tag{C.3}$$

where $f_r = (\partial v/\partial t)_{P,T}$.

To convert to the true flow rate, $f_r$, corresponding to the measured conditions of pressure and temperature, P and T, from the flow rate, $f_{ro}$, corresponding to the assumed standard conditions, $P_o$ and $T_o$, the ratio of Eq. (C.3) for two sets of conditions is formed and leads to the expression

$$f_r = f_{ro} (P_o T/PT_o). \tag{C.4}$$

Assuming that Eq. (C.1) applies, the transit time is given by the relation

$$t = (V/f_{ro})(P/T)(T_o/P_o). \tag{C.5}$$

If the gas train consists of segments with variations in diameter, the Eq. (C.5) becomes

$$t = (T_o/(P_o f_{ro})) \sum_i (VP/T)_i, \tag{C.6}$$

where i = subscript identifying segment i.

In the equations of Sect. 4.4.1, the quantity $t_1$ = t of Eqs. (C.5) and (C.6).

Three values of the transit time between the capsule and the sampling station have been used or reported. In determining the R/B according to the equations of Sect. 4.4.1, a value of 5 min has been used.[30] A value of 5.4 min has been calculated according to Eq. (C.6).[30] In an experiment in which neon was added to the gas train, a value of 7.8 min was calculated[31] based on the time of arrival of the neon in the capsule, as reflected by the temperature rise, indicated by a thermocouple, and the time of arrival, as detected by the gas chromatograph, downstream. Corrections to the operating conditions during the experiment were included.
These discrepancies in the transit time remain to be resolved. The calculations were made essentially with Eq. (C.6) and included the holdup volume (i.e., the delay tank). Also, the question remains as to when the delay tank was in the gas train during irradiation and collection of fission gas samples.

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