DAIRYLAND POWER COOPERATIVE

La Crosse, Wisconsin

54601

January 17, 1980

In reply, please
refer to LAC-6739

DOCKET NO. 50-409

Director of Nuclear Reactor Regulation
ATTN: Mr. Dennis L. Ziemann, Chief
Operating Reactors Branch #2
Division of Operating Reactors
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

SUBJECT: DAIRYLAND POWER COOPERATIVE
LA CROSSE BOILING WATER REACTOR (LACBWR)
PROVISIONAL OPERATING LICENSE NO. DPR-45
REQUEST FOR INTERIM RELIEF FROM
TECHNICAL SPECIFICATION LIMIT

Reference: (1) DPC Letter, LAC-6274, Linder to Ziemann, dated May 9, 1979.
(2) DPC Letter, LAC-4771, Madgett to Reid, dated July 7, 1977.

Gentlemen:

Dairyland Power Cooperative (DPC) hereby requests interim relief from LACBWR Technical Specification 4.2.4.2.5 which limits the maximum average exposure of any fuel assembly to not more than 15,000 MWD/MTU. It is presently estimated that the most exposed fuel assembly in the LACBWR will reach this limiting exposure on February 4, 1980. DPC requests that an incremental increase of 350 MWD/MTU be granted initially and that one or more additional incremental increases of approximately 300 MWD/MTU be considered in a timely manner as each interim limit is approached. DPC will furnish in a timely manner such additional reporting of monitored reactor conditions, etc., as deemed necessary for the consideration of each incremental increase in the fuel exposure limit.

Detailed justification for the request for interim relief from LACBWR Technical Specification 4.2.4.2.5 follows.

(1) When the most exposed fuel assembly in the LACBWR, Assembly 2-58 in Core Position F-1 (see Figure 1), reaches an average exposure of 15,000 MWD/MTU, the core average exposure will be only 8,000 MWD/MTU. A total of only five Type II fuel assemblies will have an average exposure greater than 14,600 MWD/MTU and the remaining seven A-C Type II fuel assemblies

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will have average exposures of less than 14,000 MWD/MTU. All of the Type II fuel assemblies in t e present LACBWR core loading are located on the periphery of the core. The lead assembly 2-58 is presently operating at only 0.539 times core average assembly power, and none of the Type II assemblies are greater than 0.6 average assembly power. The reactor has been operated at approximat ly 85% of rated power for the majority of the time during fuel cycle 5. See Figure 2.

(2) All fuel assemblies located in the higher powered inner regions of the LACBWR core are Type III (Exxon) assemblies except for two Type I (A-C) assemblies in core positions B-5 and B-6. When the 15,000 MWD/MTU exposure limit is reached in the lead assembly, 2-58, the maximum exposure in a Type III assembly will be only 9,950 MWD/MTU. These assemblies are designed for a batch average exposure of 16,800 MWD/MTU, which corresponds to a maximum assembly exposure of approximately 21,500 MWD/MTU. It is anticipated that the Type III fuel will operate without defects to exposures considerably greater than 10,000 MWD/MTU. Likewise, the two Type I assemblies which will have experienced only approximately 4,240 MWD/MTU exposure are also expected to be trouble-free for many thousand additional MWD/MTU exposure.

(3) During the 5 previous fuel cycles on the LACBWR, the incidence of significant fuel failures in peripheral fuel assemblies has been relatively low compared to that in assemblies located in the interior of the core. See Reference (1). Most of the defects which did occur in peripheral assemblies were only evident from sipping indications. Visible clad defects have been observed in only six peripheral fuel assemblies, two at the end of cycle 4 and four at the end of cycle 5.

(4) Since all the high exposure fuel in the LACBWR is in low power density peripheral core positions, any minor clad defects that may be present or may develop during continued operation would be expected to develop very slowly, and the consequences of such failures would be minimal. The probability of a fuel rod failure propagating a failure in an adjacent rod is essentially nil at the low power densities present in the peripheral core positions. Continued low α activity in the primary coolant will give adequate assurance that there are no gross fuel rod failures present.

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(5) The α activity in the primary coolant decreased rapidly during the first few weeks of Cycle 6 and has continued to decrease gradually during the ensuing months. The average of six measurements obtained during the period from December 24, 1979, to January 10, 1980, yields a value of 0.040×10^{-6} μCi/g. The α activity in the LACBWR coolant is currently less than 5% of that present at the end of Cycle 5. See Figure 3. The α activity in the primary coolant at the present time is only 0.8% of the current Technical Specification limit. This low α activity in the primary coolant is a good indication that there are no fuel rods in the core with major clad defects exposing UO_2 to the coolant.

(6) At the present time, with the reactor at a steady 85% power, the I^{131} activity in the primary coolant is approximately 0.0020 μCi/g. Near the end of fuel cycle 5, the I^{131} activity in the primary coolant was approximately 0.0095 with the reactor at 49% power. Assuming that the I^{131} activity in the coolant is directly proportional to reactor power, the present I^{131} activity in the coolant is only approximately 12% of that at the EOC-5.

(7) The Dose Equivalent I^{131} activity in the primary coolant is presently approximately 0.017 μCi/g at 85% power compared to an activity of approximately 0.040 μCi/g at 49% power at the EOC-5. Again assuming that Dose Equivalent I^{131} activity is directly proportional to power, the present Dose Equivalent I^{131} activity would be only approximately 25% of that at the EOC-5 and is only approximately 8.5% of the current Technical Specification limit.

(8) The gross β/γ activity in the primary coolant is currently approximately 1.54 μCi/g at 85% power compared to an activity of approximately 3.21 μCi/g at 49% power at the EOC-5. Assuming a directly proportional relationship with power, the present gross β/γ activity is approximately 28% of that at the EOC-5.

(9) The off-gas activity measured at the 150 cu. ft. off-gas hold-up tank effluent monitor is presently approximately 246 Ci/day at 85% power. This off-gas activity is 36% of the current Technical Specification limit at 85% power and, conservatively assuming that off-gas activity is directly proportional to reactor power, it is approximately 50% of that at the EOC-5.

(10) All of the monitored parameters discussed in 5 through 9 above which indicate the condition of the fuel in the LACBWR core exhibited a decreasing trend early in Cycle 6 as the system

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continued to clean up the residues from previous fuel failures. All have been relatively constant for the last several months of operation at approximately 85% of rated power indicating that the fuel condition is very stable. All of the parameters indicate that the shutdowns and startups which have occurred have not produced any significant detrimental effects in the fuel. We believe that no precipitous deterioration of the fuel condition will occur during the limited additional operation that would be allowed under the requested interim relief from LACBWR Technical Specification 4.2.4.2.5. Any deterioration that might possibly occur is expected to develop slowly and would be apparent at an early stage from increases in the monitored parameters discussed above.

If the interim relief from LACBWR Technical Specification 4.2.4.2.5 is granted by an increase in the assembly exposure limit to 15,350 MWD/MTU, fuel cycle-6 can be extended by 31 full power days or 37 days at 85% of rated power. The core average exposure at that time would be approximately 8648 MWD/MTU and five control rods would still be partially inserted into the core. The full power all rods out end of life core average exposure is estimated to be at least 10,600 MWD/MTU.

The information submitted with this request has been reviewed by LACBWR committees as prescribed in Technical Specifications.

DPC respectfully asks that the review of this request be expedited so that a decision may be received before the present Technical Specification limit is reached on the 4th of February.

If you have any questions, please feel free to call us at any time.

Very truly yours,

DAIRYLAND POWER COOPERATIVE

Frank Linder

Frank Linder, General Manager

FL:SJR:af
Attachments

cc: J. Keppler, Reg. Dir., NRC-DRO III

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STATE OF WISCONSIN)
)
COUNTY OF LA CROSSE)

Personally came before me this 25th day of January, 1980, the above named Frank Linder, to me known to be the person who executed the foregoing instrument and acknowledged the same.

Notary Public, La Crosse County
Wisconsin.
My Commission Expires March 2, 1980.

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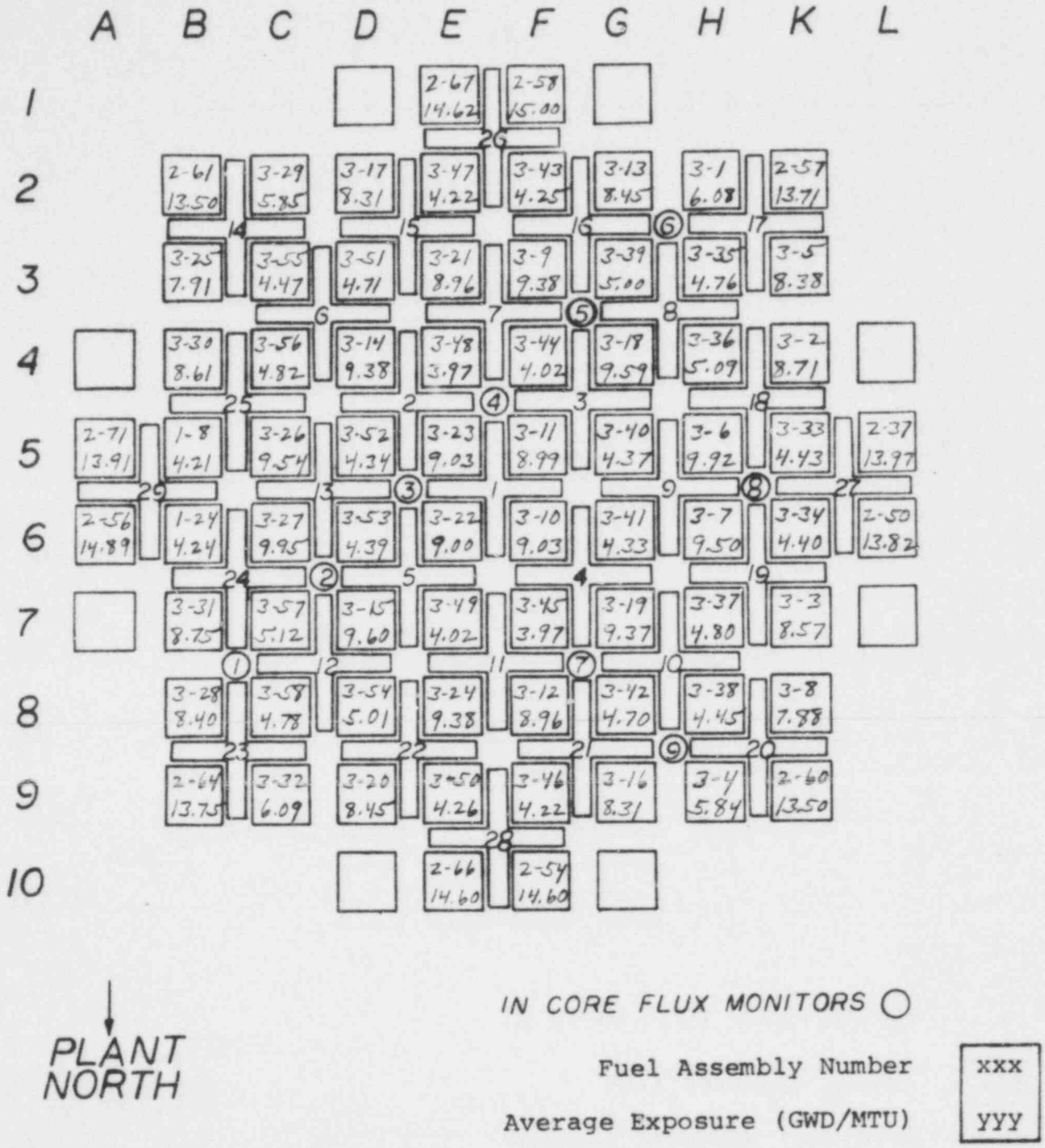

FIGURE 1 - LACBWR Cycle-6 Core Configuration and Estimated Fuel Assembly Exposure when the Lead Assembly Reaches 15,000 MWD/MTU. Estimated Core Average Exposure is 8,000 MWD/MTU.

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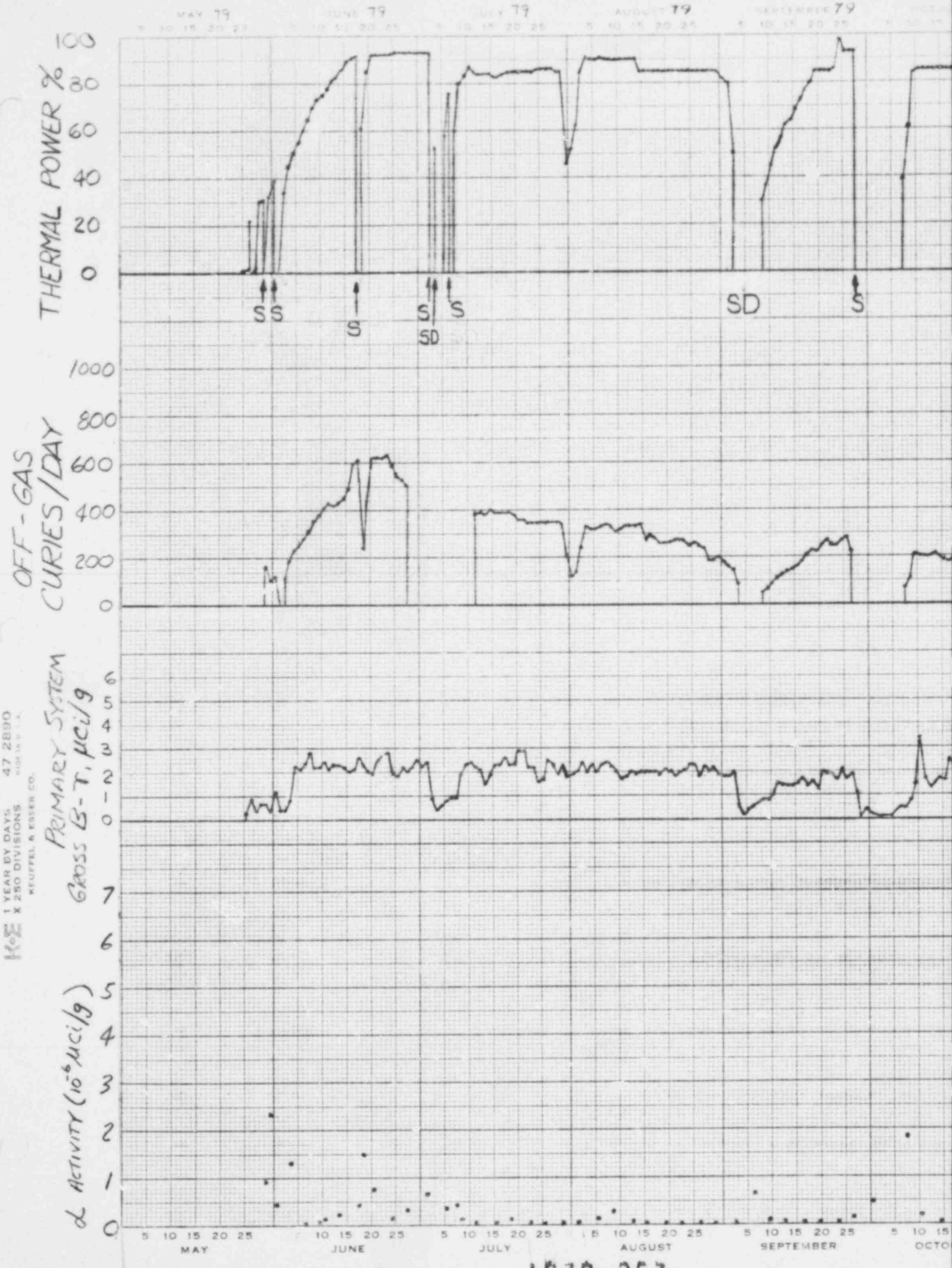
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JUNE 79
JULY 79
AUGUST 79
SEPTEMBER 79
THERMAL POWER %
100
80
60
40
20
0
S S
S
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SD
S
SD
S
OFF-GAS CURIES/DAY
1000
800
600
400
200
0
PRIMARY SYSTEM GROSS B-T, μCi/g
6
5
4
3
2
1
0
α ACTIVITY (10^{-6} μCi/g)
7
6
5
4
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MAY
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KEUFFEL & ESSER CO.

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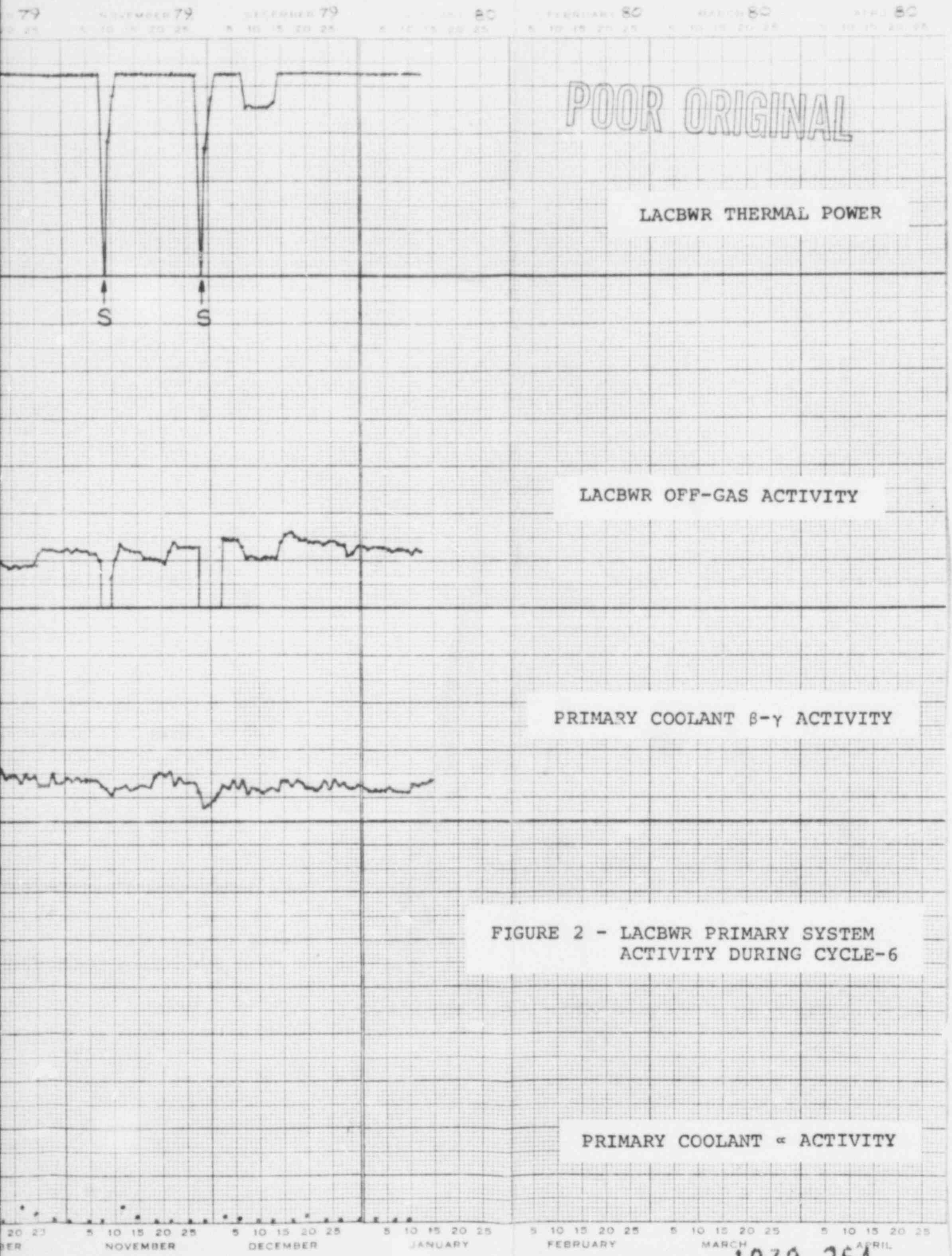
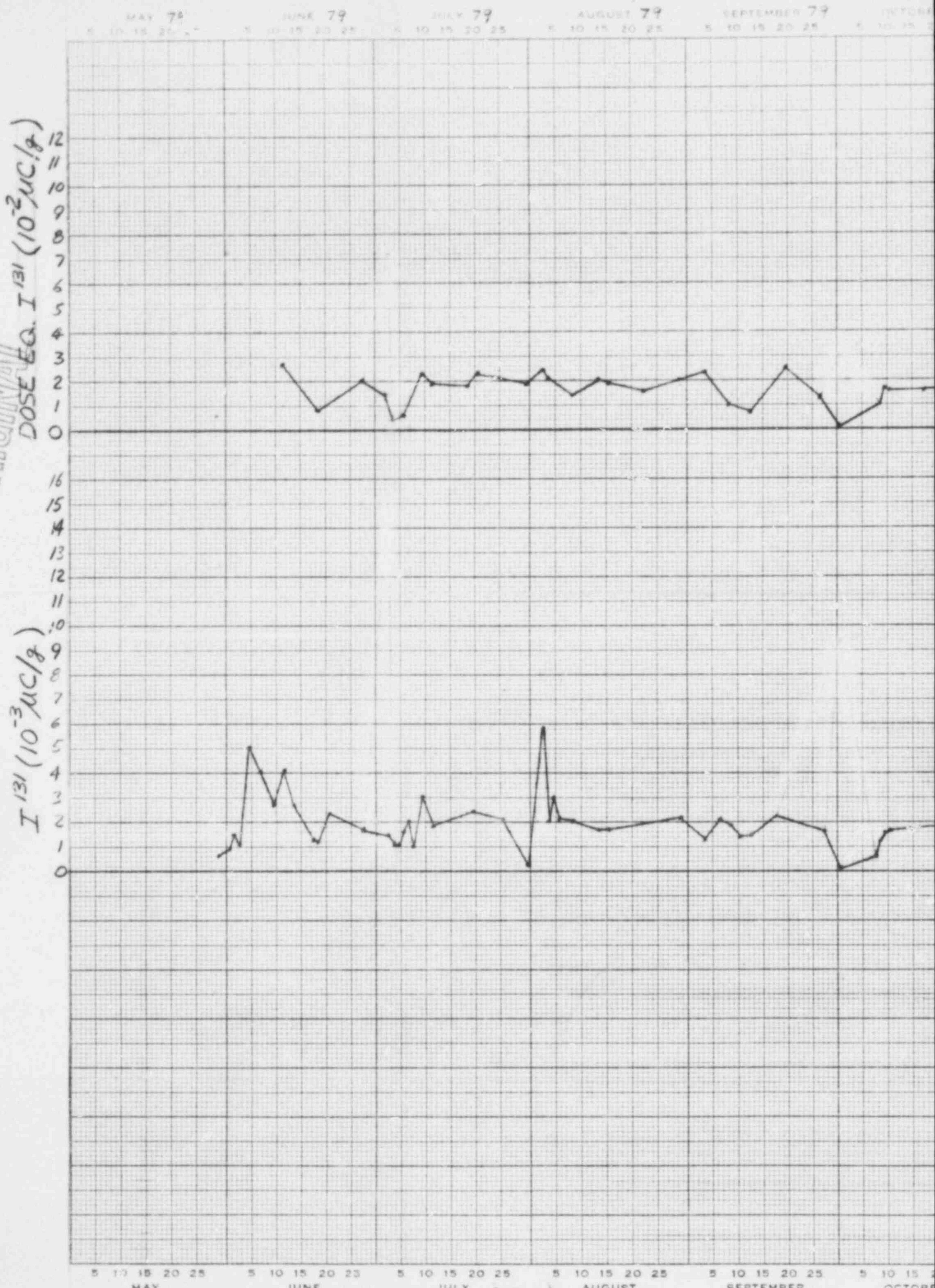


FIGURE 2 - LACBWR PRIMARY SYSTEM ACTIVITY DURING CYCLE-6

POOR ORIGINAL



K&E 1 YEAR BY DAYS X 250 DIVISIONS 47 2890
KEUFFEL & ESSER CO.

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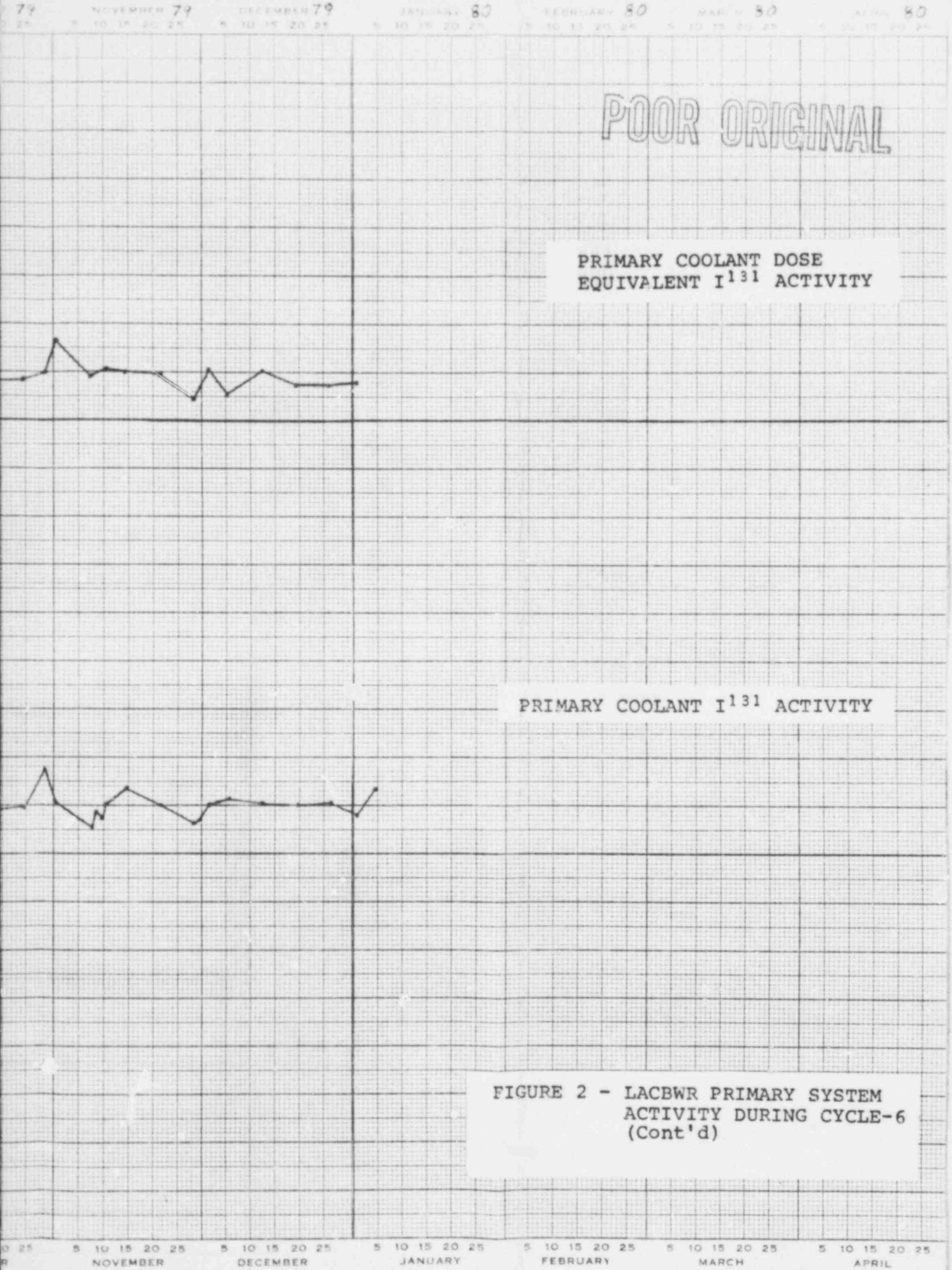
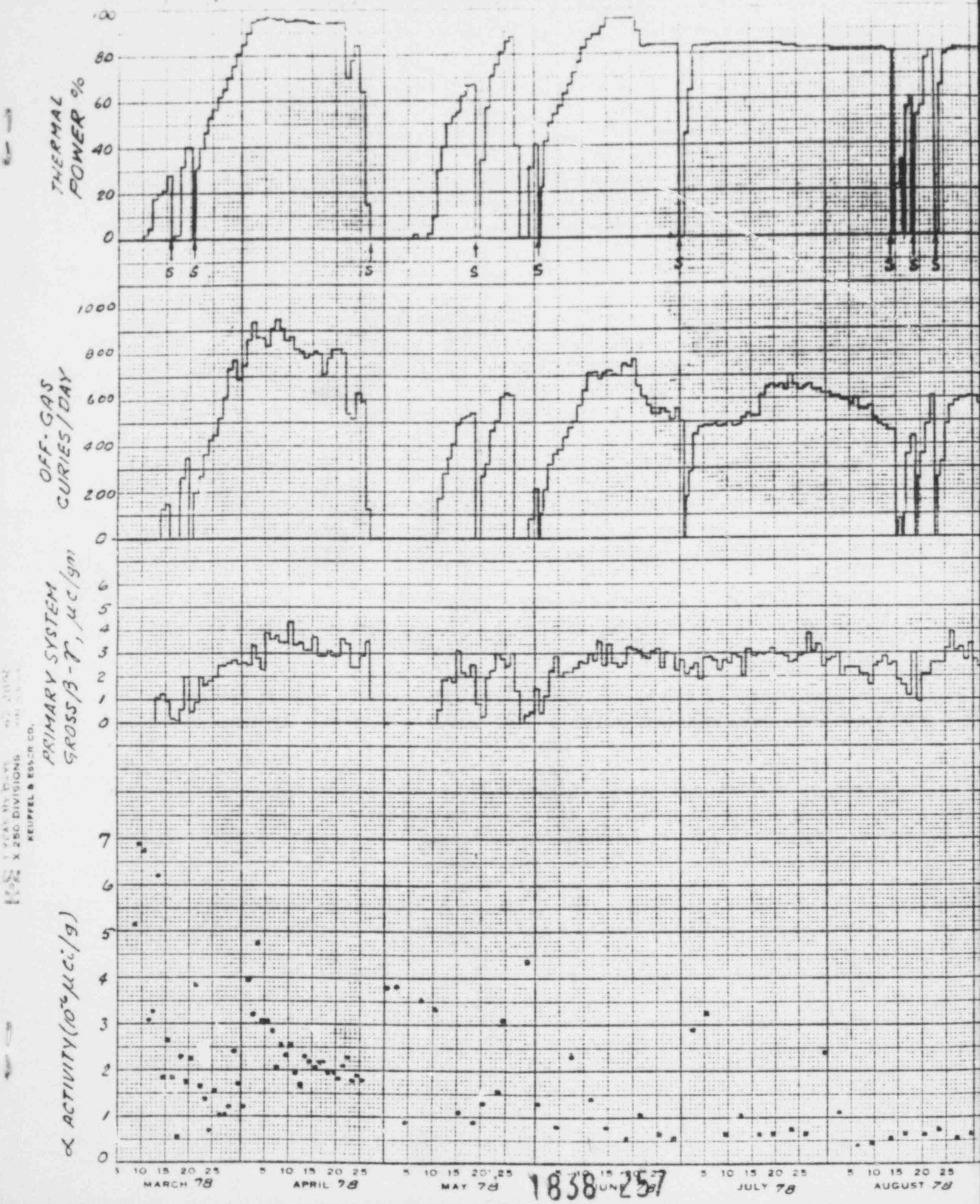


FIGURE 2 - LACBWR PRIMARY SYSTEM ACTIVITY DURING CYCLE-6 (Cont'd)

POOR ORIGINAL



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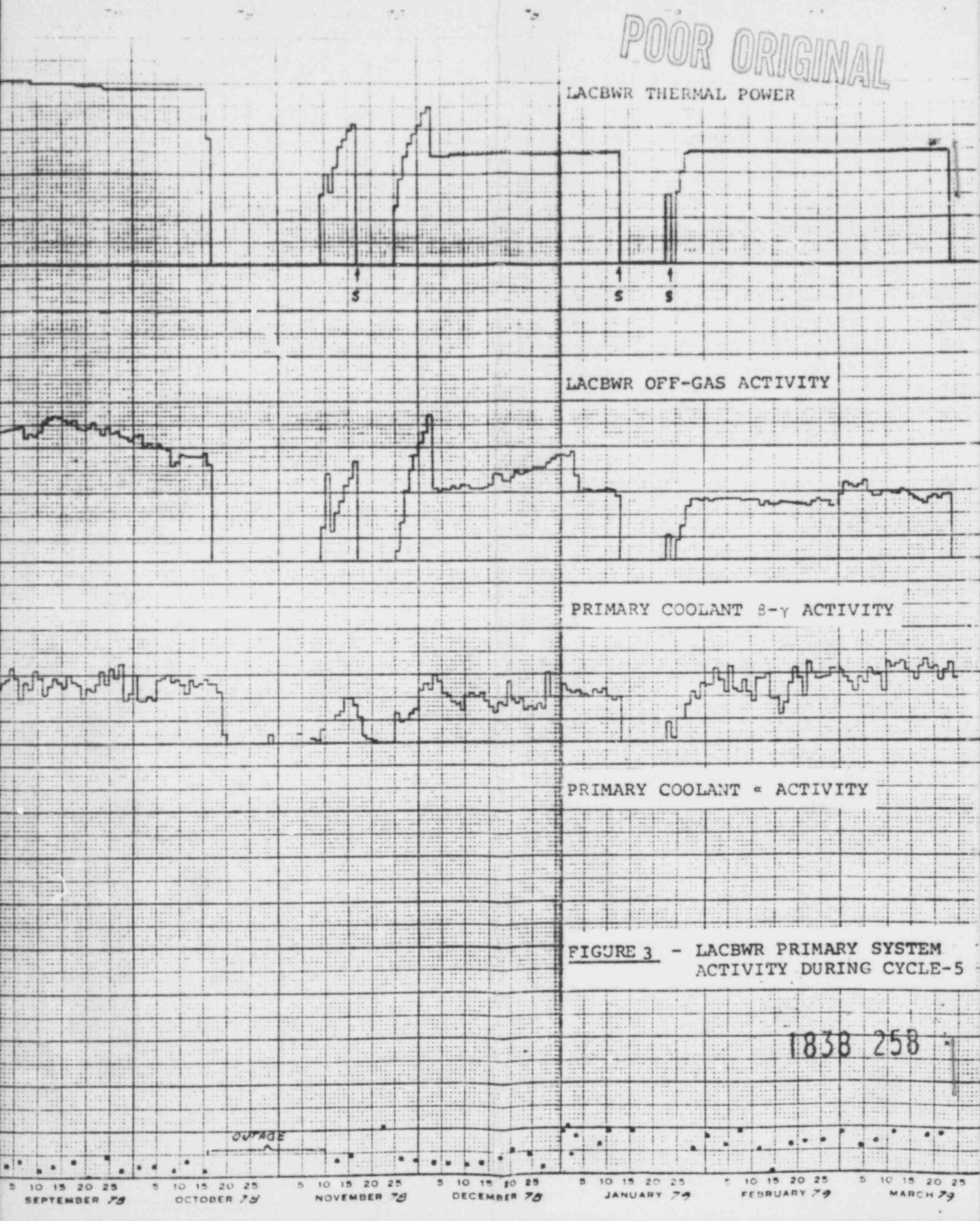

FIGURE 3 - LACBWR PRIMARY SYSTEM ACTIVITY DURING CYCLE-5

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