

A 04/26/78

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)
DISTRIBUTION FOR INCOMING MATERIAL

50-315

REC: KEPPLER J G
NRC

ORG: SHALLER D V
IN & MI PWR

DOCDATE: 04/04/78
DATE RCVD: 04/24/78

DOCTYPE: LETTER NOTARIZED: NO
SUBJECT:

COPIES RECEIVED
LTR 1 ENCL 1

FURNISHING REPT PURSUANT TO APPENDIX A TECH SPECS 3.4.8 & 6.9.1 CONCERNING,
ON 01/07/78 THE DOSE EQUIVALENT IODINE-131 ACTIVITY WAS FOUND OUT OF
SPECIFICATION...W/ATT SUPPORTING INFO.

PLANT NAME: COOK - UNIT 1

REVIEWER INITIAL: XJM
DISTRIBUTOR INITIAL: *me*

***** DISTRIBUTION OF THIS MATERIAL IS AS FOLLOWS *****

GENERAL DISTRIBUTION FOR AFTER ISSUANCE OF OPERATING LICENSE.
(DISTRIBUTION CODE A001)

FOR ACTION: BR CHIEF SCHWENCER**W/7 ENCL

INTERNAL:

REG FILE**W/ENCL

I & E**W/2 ENCL

HANAUER**W/ENCL

EISENHUT**W/ENCL

BAER**W/ENCL

EEB**W/ENCL

J. MCGOUGH**W/ENCL

EXTERNAL:

LPDR'S

ST. JOSEPH, MI**W/ENCL

TIC**W/ENCL

NSIC**W/ENCL

ACRS CAT B**W/16 ENCL

NRC PDR**W/ENCL

DELD**LTR ONLY

CHECK**W/ENCL

SHAO**W/ENCL

BUTLER**W/ENCL

J COLLINS**W/ENCL

SCHROEDER/IPPOLITO ENCL

HOUSTON ENCL

NOVAR ENCL

KNIGHT ENCL

TEDESCO ENCL

VOLLMER 1 BUNCH ENCL

KREGER ENCL

ROSA ENCL

K. SEYFRIT ENCL.

DISTRIBUTION:
SIZE: 2P+10P

⁵⁰
LTR 40

⁵⁰
ENCL 99

CONTROL NBR: 781150032

MA 4
60

THE END

Figure 1. The effect of the concentration of the *Agrobacterium* suspension on the transformation efficiency of *Agrobacterium* strains. The concentration of the *Agrobacterium* suspension was 10⁶ cells/ml (○), 10⁷ cells/ml (□), 10⁸ cells/ml (△), 10⁹ cells/ml (◇), and 10¹⁰ cells/ml (×). The error bars represent the standard deviation of three independent experiments.

$$0 \rightarrow \mathcal{O}_X(-n) \rightarrow \mathcal{O}_X(-n+1) \rightarrow \mathcal{O}_X(-n+2) \rightarrow \cdots \rightarrow \mathcal{O}_X(-1) \rightarrow \mathcal{O}_X \rightarrow 0$$
[illegible][illegible]

Figure 1

[illegible]

2 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016 1017 1018 1019 1020 1021 1022 1023 1024 1025 1026 1027 1028 1029 1030 1031 1032 1033 1034 1035 1036 1037 1038 1039 1040 1041

Age Group	1990	1995	2000	2005
0-14	18	16	14	12
15-24	12	13	14	15
25-34	15	16	17	18
35-44	18	19	20	20
45-54	20	21	22	22
55-64	22	23	24	25
65+	25	26	27	28

21

•

1

Figure 1

D. Lenham



INDIANA & MICHIGAN POWER COMPANY

DONALD C. COOK NUCLEAR PLANT
P.O. Box 458, Bridgman, Michigan 49106
(616) 465-5901

REGULATORY DOCKET FILE COPY

April 4, 1978

Operating License DPR-58,
Docket # 50-315

1978 APR 24 AM 10 05

RECEIVED DISTRIBUTION
SERVICES UNIT

Mr. J. G. Keppler, Regional Director
Office of Inspection and Enforcement
U. S. Nuclear Regulatory Commission
Region III
799 Roosevelt Road
Glen Ellyn, Ill. 60137

Dear Mr. Keppler:

This report is submitted pursuant to the requirement of Appendix A Technical Specifications 3.4.8 and 6.9.1. On January 7, 1978 the dose equivalent iodine-131 activity was found out of specification.

At 1400 on January 7, 1978 reactor power on Unit 1 was reduced slowly to 8% power and the reactor tripped from 8%. Power reduction was done for a scheduled repair/investigation outage.

Routine surveillance at 2100 January 7, 1978 showed that the dose equivalent iodine-131 had spiked with a maximum value noted of 1.1 μ Ci/gram.*

Reactor power had been varied considerably the previous week with no evidence of iodine spiking noted. During power reduction CVCS purification flow through the mixed bed demineralizer was approximately 75 gpm, as it had been for the majority of the week. No degassing operations were associated with this occurrence.

Analysis of the reactor coolant prior to this excursion had shown dose equivalent iodine-131 to range from $9.12 \times 10^{-3} \mu$ Ci/g to $2.80 \times 10^{-2} \mu$ Ci/g during the period of numerous power changes. Analysis at 0500 on 1-8-78 showed the iodine-131 had decreased to 0.539 μ Ci/g with dose equivalent iodine-131 at 0.675 μ Ci/g. This activity continued to decrease even during power ascension on 1-9-78. Once stable at 100% dose equivalent iodine-131 remained constant at approximately $2.3 \times 10^{-2} \mu$ Ci/g.

Iodine release at this time period is consistent with data reported in Westinghouse Electric Corporation WCAP-8637 "Iodine Behavior under transient conditions in the Pressurized Water Reactor". Dose equivalent iodine-131 values were in the "Acceptable Operation" portion of Technical

APR 10 1978

781150032

*A002
111*


April 4, 1978
Mr. J. G. Keppler
Page 2

Specification Figure 3.4.1 at all times during the transient. Fuel burnup by core region is indicated in the attached table.

This report does not meet the 30 day Technical Specification reporting requirement. This is presently under investigation and a Licensee Event Report will be submitted describing the findings and resolutions.

* Coolant samples are brought to ambient conditions before counting; therefore, units of $\mu\text{Ci}/\text{gram}$ and $\mu\text{Ci}/\text{cc}$ are interchangeable.

Very truly yours,


D. V. Shaller
Plant Manager

ms

attachments

cc: R. W. Jurgensen
J. E. Dolan
R. Kilburn
R. F. Kroeger
R. J. Vollen, BPI
K. R. Baker, RO:III
P. W. Steketee, Esq.
R. C. Callan
R. Walsh, Esq.
G. Olson
J. Stietzel
PNSRC File
G. Charnoff, Esq.
J. M. Hennigan
Dir, IE (20 copies)
Dir, MIPC (2 copies)

CORE REGION

BURNUP FOR
PERIOD (MWD/MTU)
10-1-77 to 1-18-78

4 (D)

0.7672×10^4

2 (B)

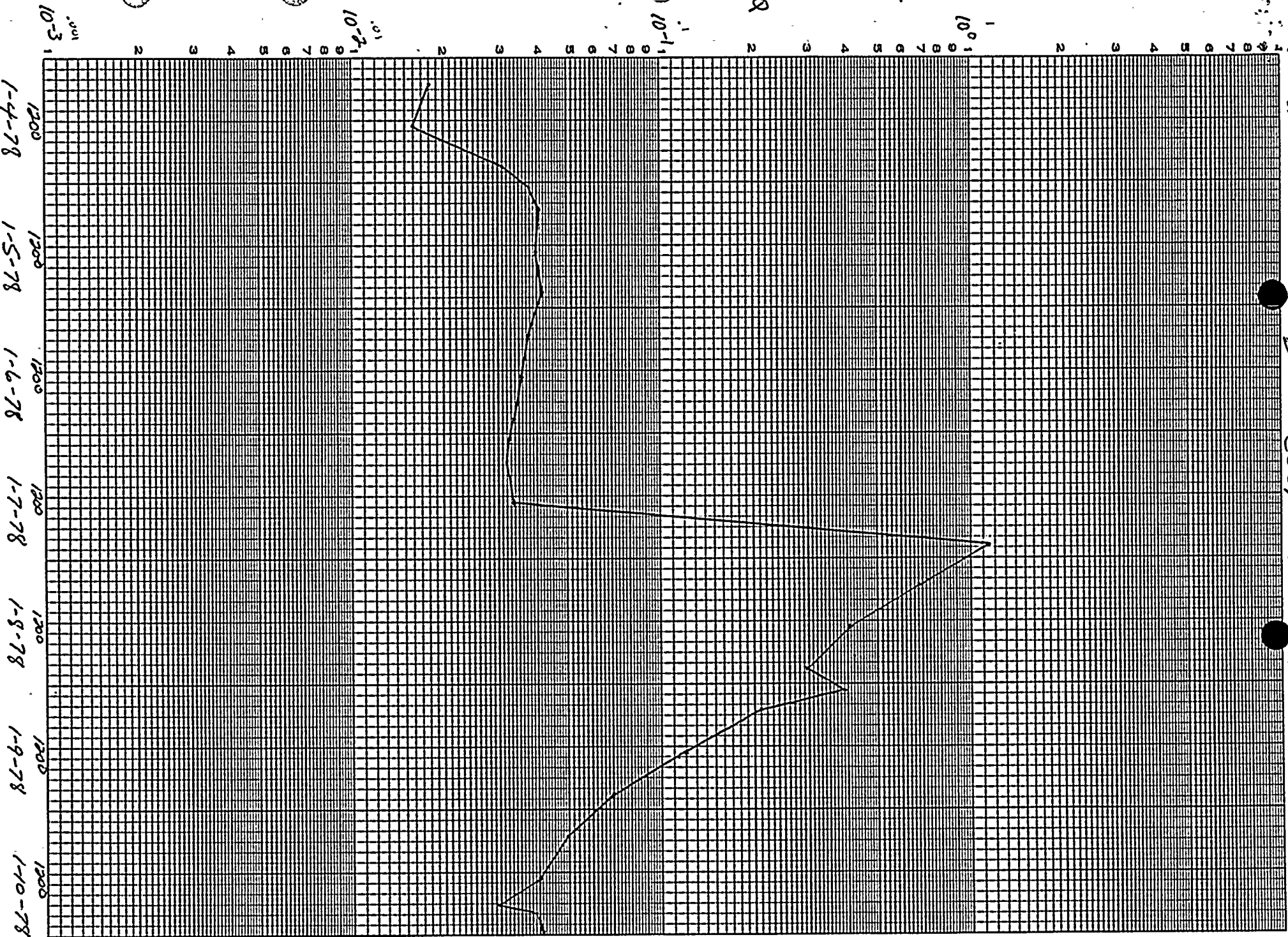
0.2622×10^5

3 (C)

0.2192×10^5

Josef
I 131

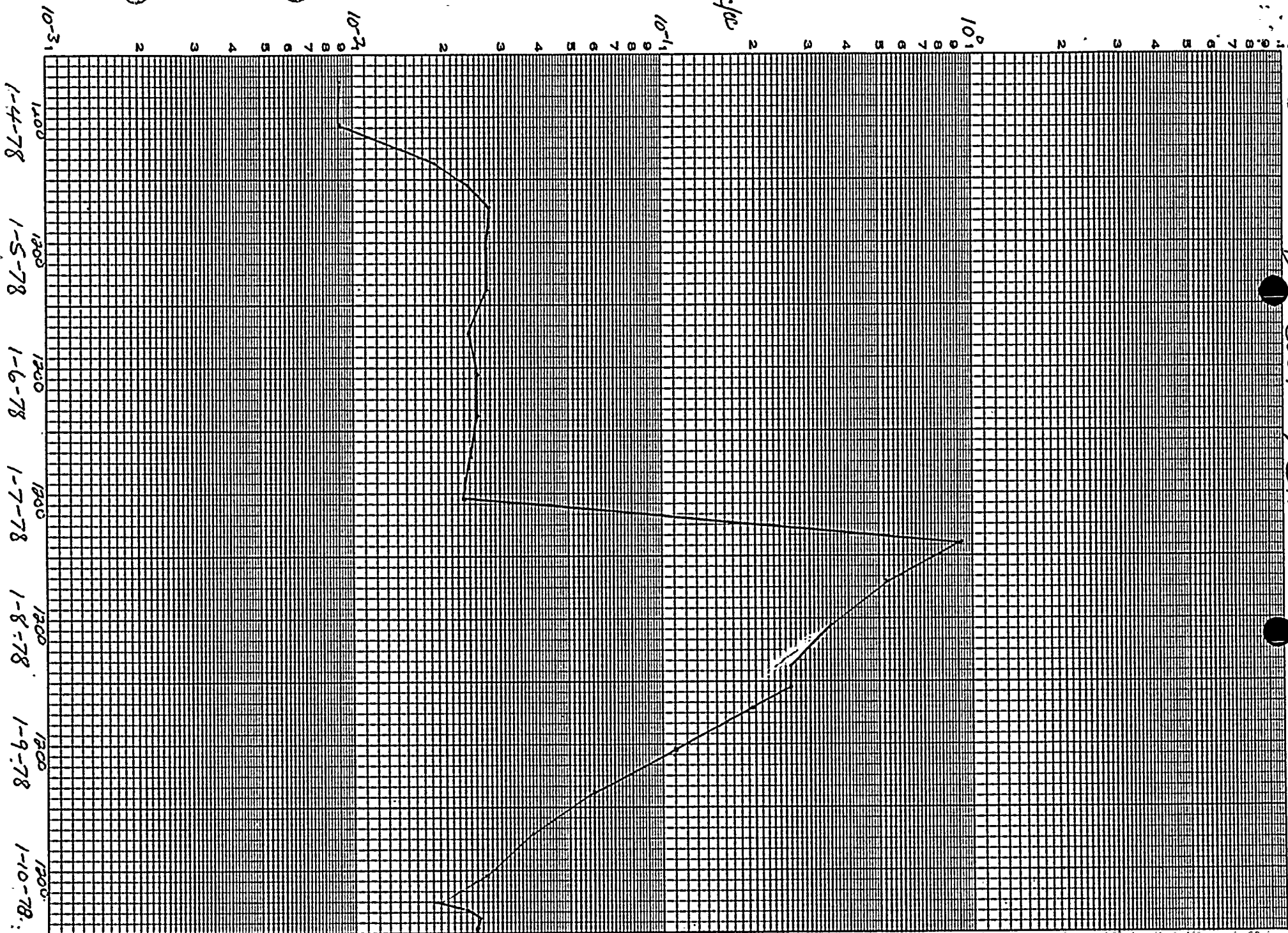
DC Book Plot



EUGENE DIETZGEN CO.
MADE IN U. S. A.

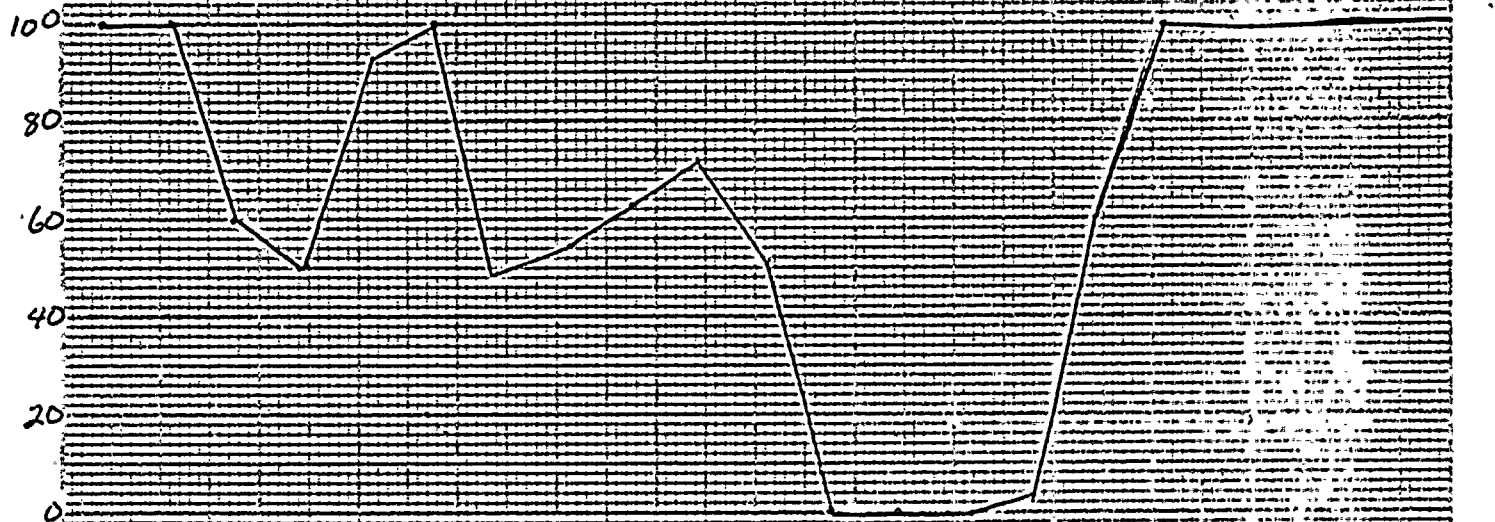
131
Ipswich

De Cook PLANT

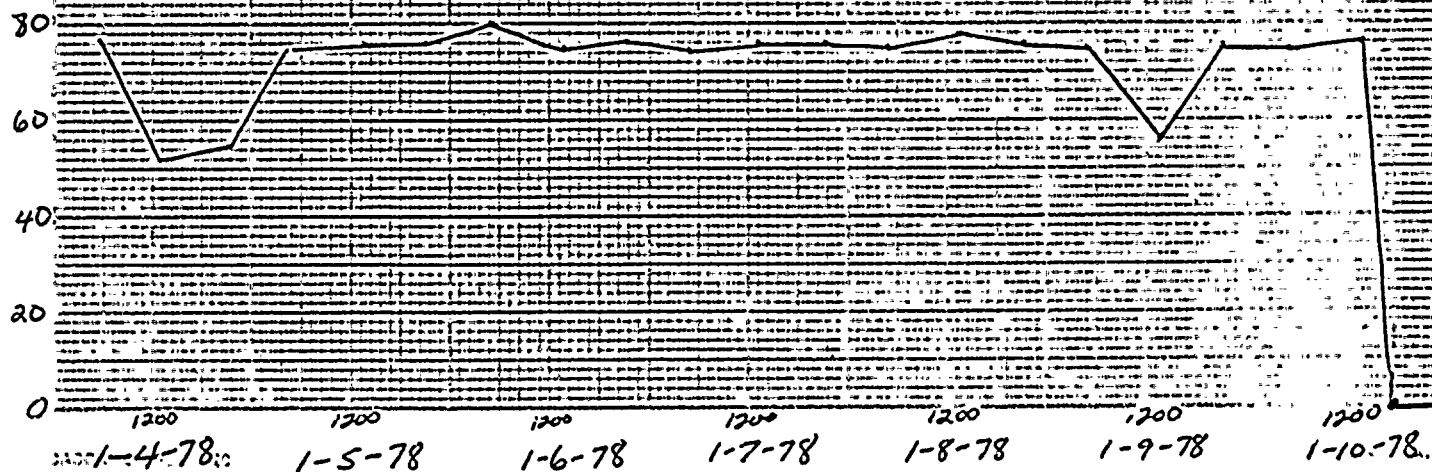


DC COOK PLANT

Rx
Pwr.
(%)



Letdown Flow (gpm)



**DONALD C. COOK
NUCLEAR PLANT
CONDITION REPORT**

(1) R No. 1-1-78-13
(2) Date 1-9-78 Time 1200
(3) Category A B C D E
(4) Classified By [Signature]
(5) AO/AEO No. [Signature]

TO: Plant Manager

LER DUE BY 1/30/78

Special Report

(6) Item Reported On Dose Equivalent
I-131 in the Unit 1 R.C.S. out of
specification

(7) Plant Conditions
Unit #1 Mode 2 Testing () Yes (☒) No
Unit #2 Mode _____ Testing () Yes () No

(8) Description of Condition At 2100 on 1-7-78, the dose equivalent I-131 on the reactor coolant system was found to be 1.14 μ Ci/cc. This was following unit 1 trip from ~8% power at 1426

() Additional Pages

Reported By [Signature]

(9) Corrective Action Taken

By _____

(10) Off-Site Notification Made By X (Complete Telephone Records & Attach)
() AEPSC () I & M () NRC () Michigan (☒) Not Applicable

(11) Investigation Assigned To E. A. SMARRELLA

(12) Investigation Report *Attached report on the dose equivalent I-131 closes out the investigation*

() Additional Pages

Completed By [Signature]

(13) Preventive Action Taken

SEE ATTACHED.

() Additional Pages

Dept. Head Approval E. A. Smarella

(14) PNSRC Review: Date _____
Comments: _____

(15) Distribution:

Plant Mgr., Asst. Plant Mgr., QA Supv., PNSRC Secretary, AEPSC Manager Q.A. Dept. Head of Orig. Dept.
Form No. DMP 7030 RPT 001-1

CONDITION REPORTS

Instructions For Use

1. Condition Report No. — assigned by Q.A. Supervisor; Duty Staff Supervisor, Plant Manager or Assistant Plant Manager.
2. Date and Time — completed by originator.
3. Category — assigned by Plant Manager, Assistant Plant Manager, Operations Supervisor or Duty Staff Supervisor.
4. Classified By — signature of classifier.
5. AO/AEO No. — assigned by Q.A. Supervisor — after review of Condition Report by PNSRC.
6. Item Reported On — completed by originator.
7. Plant Condition — completed by originator.
8. Description of Condition — completed by originator.
9. Corrective Action — completed by whoever takes the action.

NOTE:

1. Corrective Action is the action taken to 1) restore the system, component or structure to a normal condition or 2) to place the plant in a safe and stable condition until permanent corrective action can be identified and accomplished.
 2. If a Job Order was written, provide the number. If a Temporary Change Sheet was initiated, provide the number.
 3. If no Corrective Action was required, enter NA and sign it.
10. Off-Site Notification — completed by classifier. If not applicable, the classifier should enter his initials in that block.
 11. Investigation Assignment — completed by the classifier.
 12. Investigation Report — completed by individual conducting the investigations.
 13. Preventive Action Taken — completed by individual who completes the preventive action.
- NOTE: Preventive action is that action taken in addition to the Corrective Action Taken, to identify the root cause of the condition and the measures taken to prevent recurrence of the condition.
14. PNSRC Review — completed by PNSRC.
 15. Distribution — made by QA Supervisor or Duty Staff Supervisor a) after completion through item 11, b) by QA Supervisor after original is reviewed by PNSRC.

INDIANA AND MICHIGAN POWER COMPANY
DONALD C. COOK NUCLEAR PLANT

Iodine Spike Following Power Transient - January 7, 1978

This report is submitted pursuant to the requirement of Appendix A Technical Specifications 3.4.8 and 6.9.1. On January 7, 1978 the dose equivalent iodine-131 activity was found out of specification.

At 1400 on January 7, 1978 reactor power on Unit 1 was reduced slowly to 8% power and the reactor tripped from 8%. Power reduction was done for a scheduled repair/investigation outage.

Routine surveillance at 2100 on January 7, 1978 showed that the dose equivalent iodine-131 had spiked with a maximum value noted of 1.1 μ Ci/gram.*

Reactor power had been varied considerably the previous week with no evidence of iodine spiking noted. During power reduction CVCS purification flow through the mixed bed demineralizer was approximately 75 gpm, as it had been for the majority of the week. No degassing operations were associated with this occurrence.

Analysis of the reactor coolant prior to this excursion had shown dose equivalent iodine-131 to range from 9.12×10^{-3} μ Ci/g to 2.80×10^{-2} μ Ci/g during the period of numerous power changes. Analysis at 0500 on 1-8-78 showed the iodine-131 had decreased to 0.539 μ Ci/g with dose equivalent iodine-131 at 0.675 μ Ci/g. This activity continued to decrease even during power ascension on 1-9-78. Once stable at 100% dose equivalent iodine-131 remained constant at approximately 2.3×10^{-2} μ Ci/g.

Iodine release at this time period is consistent with data reported in Westinghouse Electric Corporation WCAP-8637 "Iodine Behavior under transient conditions in the Pressurized Water Reactor". Dose equivalent iodine-131 values were in the "Acceptable Operation" portion of Technical Specification Figure 3.4.1 at all times during the transient. Fuel burnup by core region is indicated in the attached table.

* Coolant samples are brought to ambient conditions before counting; therefore, units of μ Ci/gram and μ Ci/cc are interchangeable.

CORE REGION

BURNUP FOR
PERIOD (MWD/MTU)
10-1-77 to 1-18-78

4 (D)

0.7672×10^4

2 (B)

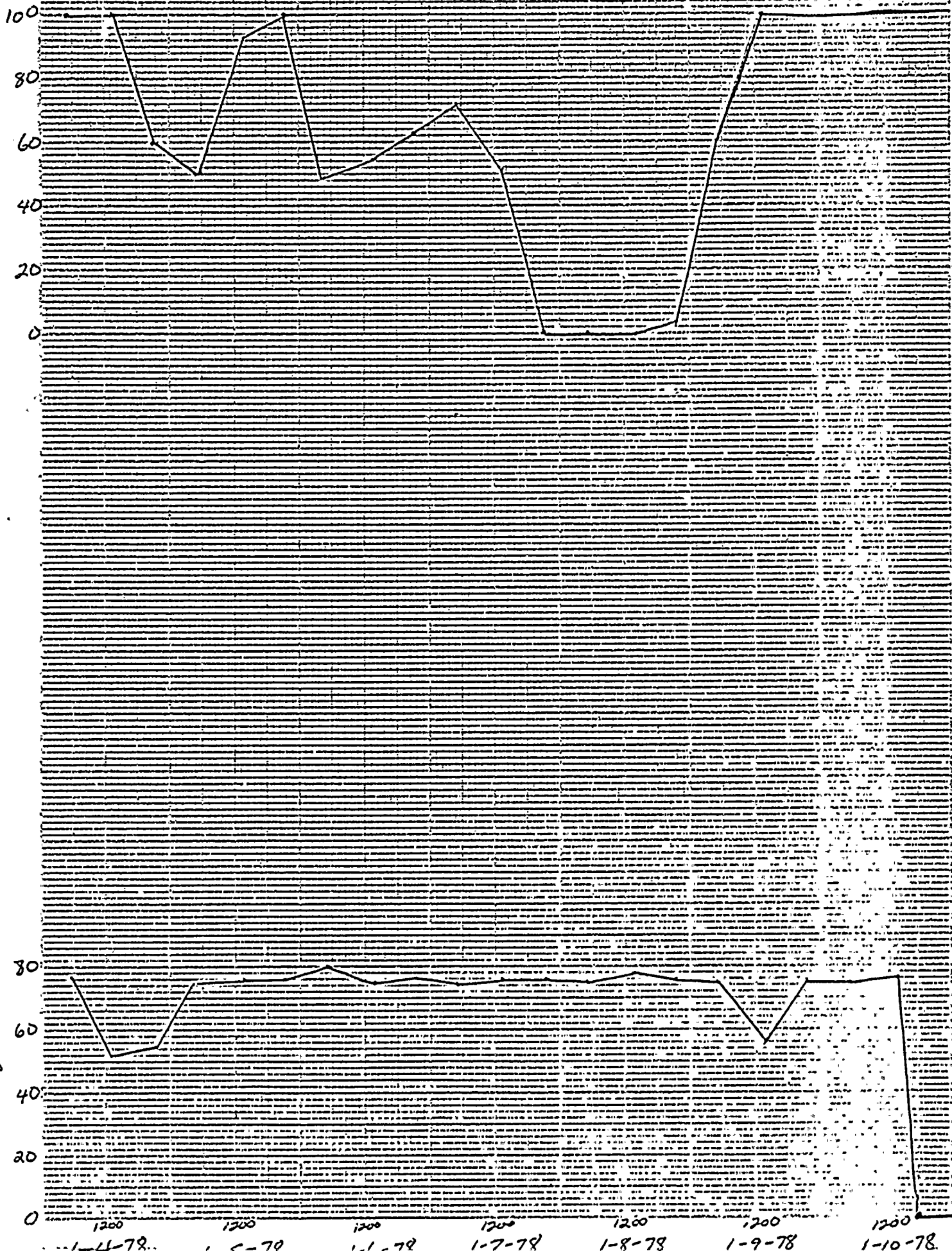
0.2622×10^5

3 (C)

0.2192×10^5

Rx
wr.
(%)

Letdown Flow (gpm)



1-11-78

1-18-78

1-25-78

2-1-78

2-8-78

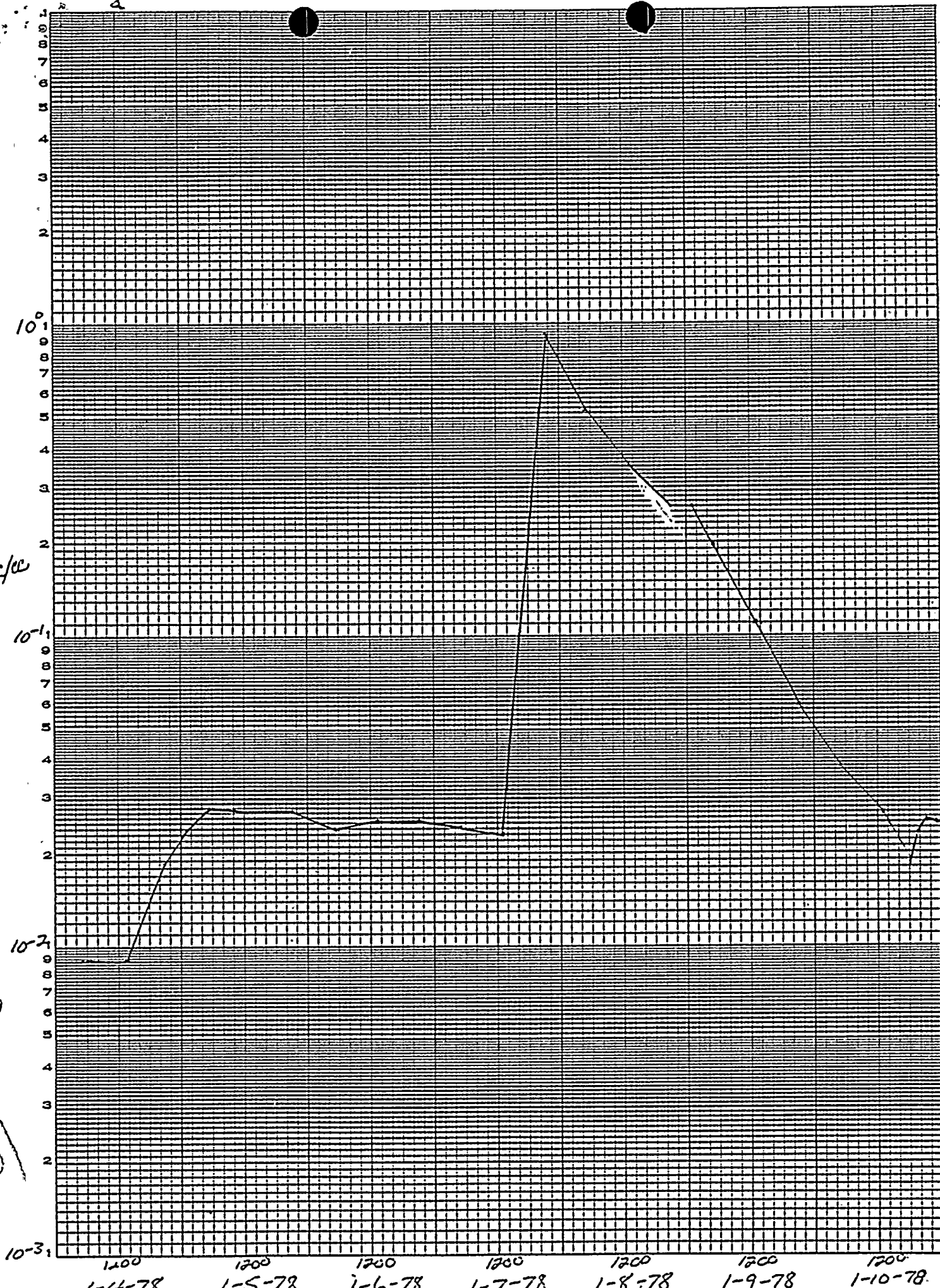
2-15-78

2-22-78

EUGENE DIETZGEN CO.
MADE IN U. S. A.

NO. 340-L412 DIETZGEN GRAPH PAPER
SEMI-LOGARITHMIC
4 CYCLES X 12 DIVISIONS PER INCH

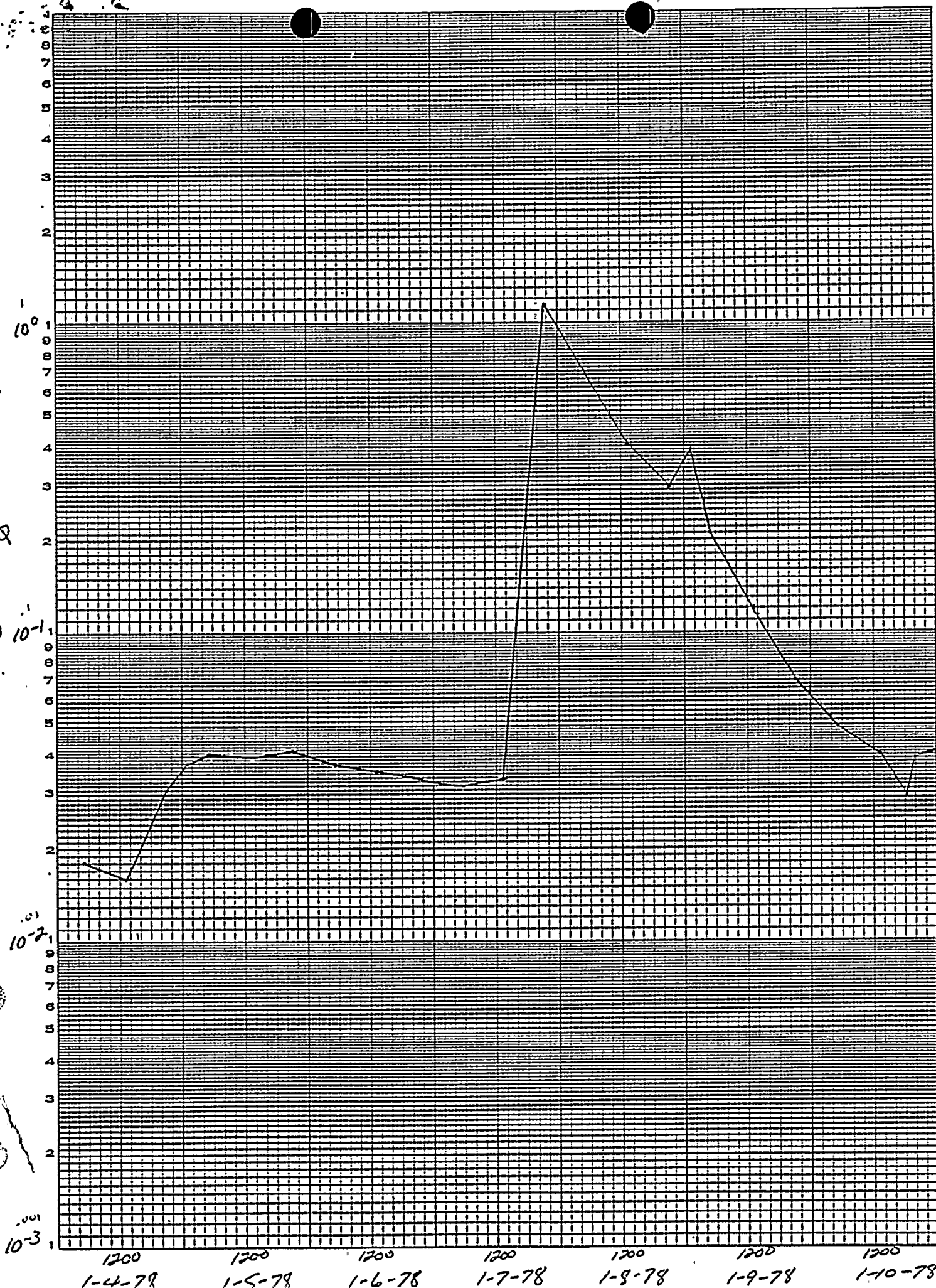
131
I μ C/CC



EUGENE DIETZGEN CO.
MADE IN U. S. A.

Dose
131

NO. 340-L412 DIETZGEN GRAPH PAPER
SEMI-LOGARITHMIC
4 CYCLES X 12 DIVISIONS PER INCH



100-100000