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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

January 13, 1997

MEMORANDUM TO: Commissioner Rogers
FROM: *[Signature]*
Hugh L. Thompson, Jr.
Acting Executive Director for Operations

SUBJECT: TIMES TO INITIATION OF BOILING SUBSEQUENT TO LOSS
OF SPENT FUEL COOLING

During the AEOD presentation of its assessment of spent fuel cooling on November 14, 1996, you raised questions about Viewgraph 13, "Reduced Time to Boil at Nine Mile Point Unit 2." Of particular interest was the apparent lack of smoothness in the plot of hours to boil as a function of outage number. You also indicated that you were interested in seeing the plot of time to boil versus time after reactor shutdown.

The data plotted in Viewgraph 13 (attached) were provided by the Nine Mile Point Unit 2 licensee in a June 14, 1996, memorandum and discussed during a June 21, 1996, telephone conversation with AEOD staff. In response to discussions with AEOD after the November 14, 1996, Commission meeting, Nine Mile Point Unit 2 re-evaluated their spent fuel pool heatup calculations and found that there were some anomalies in the data that had been provided in June 1996. The original calculations supplied in June 1996 were inconsistent. The original calculations for refueling outages 1, 2 and 3 assumed that the refueling pool gates were not installed ("gates out" configuration). The original calculations for refueling outage 4 assumed that the refueling pool gates were installed ("gates in" configuration). Note that when the refueling pool gates are installed they separate the fuel pool from the reactor cavity. When the refueling pool gates are not installed, there is a larger mass of water to be heated, i.e., the water in the spent fuel pool and the water in the reactor cavity. The data provided in June 1996 were further complicated because the calculated time to boil for the first refueling outage included the effects of environmental heat losses while the calculated times to boil for the other three outages did not include these effects.

The attached figures provide consistent results of the Nine Mile Point Unit 2 reanalyses noting the positions of the refueling pool gates and neglecting environmental heat losses.

Figure 1 shows the time until boiling begins versus the number of days after reactor shutdown. We believe this figure addresses the request you made on November 14, 1996, during the AEOD spent fuel cooling presentation. This figure also shows the effect of the refueling pool gates' positions.

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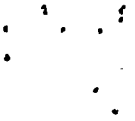
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Figure 2 shows the time from reactor shutdown until completion of the full core offload. Note that this is different than the information provided in Viewgraph 13 which indicated time from reactor shutdown until start of core offload. As Figure 2 indicates, the period from shutdown until completion of the offload decreased from 35 days in the first outage to 13 days in the fourth refueling outage.

Figure 3 shows the time to initiate boiling as a function of outage number with the refueling pool gates in and out. During the first four refueling outages the refueling pool gates were out at Nine Mile Point Unit 2. However, if maintenance work would have been required on the reactor vessel or appurtenances during those times it would have been necessary to have the refueling pool gates installed, thereby leading to shorter times to spent fuel pool boiling.

These figures will be accompanied by explanatory text in the AEOD report when it is finalized for publication as a NUREG report.

Attachments: Viewgraph 13 "Reduced Time to Boil at Nine Mile Point Unit 2"
 Figure 1 "Time to Boil vs. Time After Reactor Shutdown"
 Figure 2 "Full Core Offload Times vs. Outage Number"
 Figure 3 "Time to Boil vs. Outage Number"

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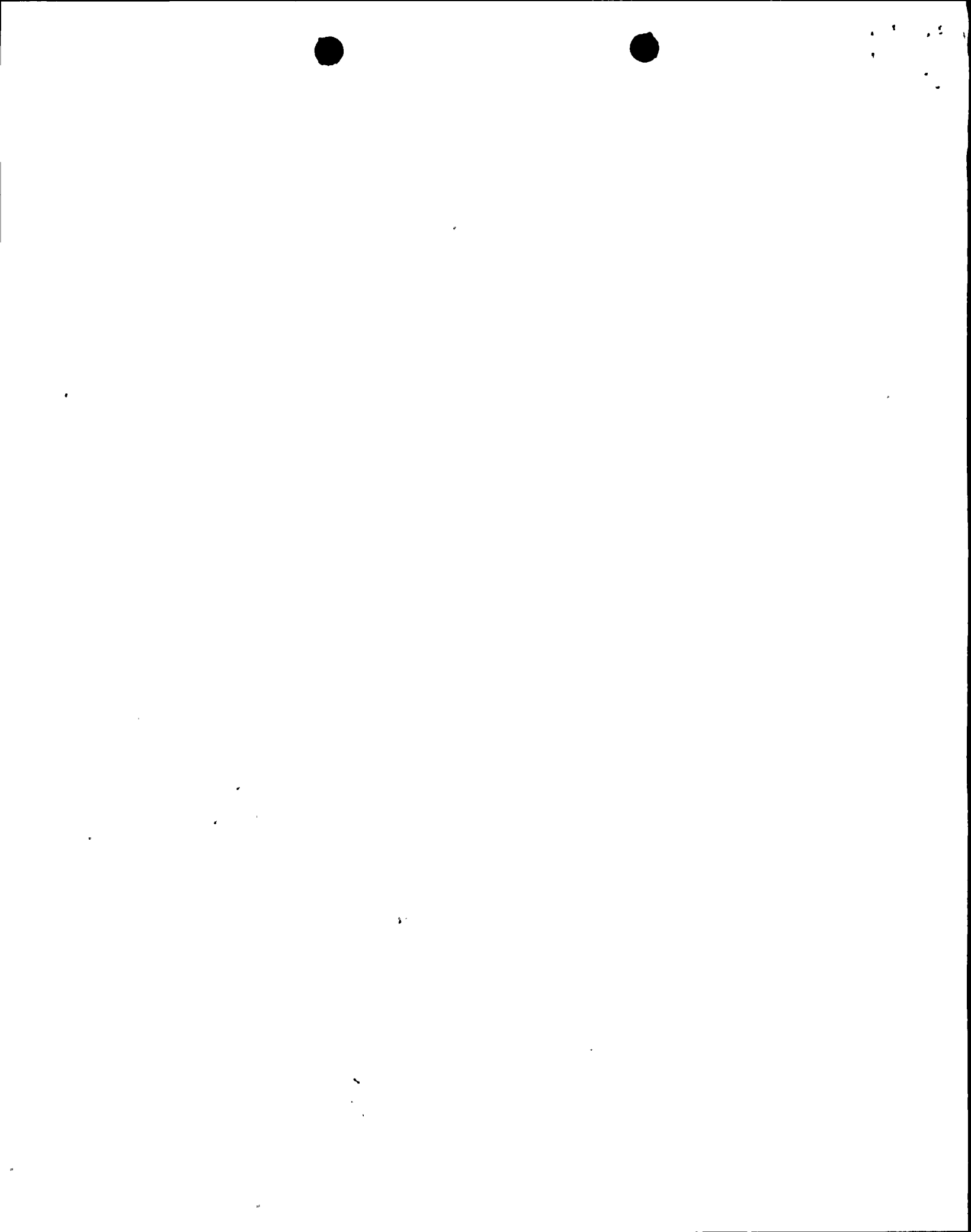
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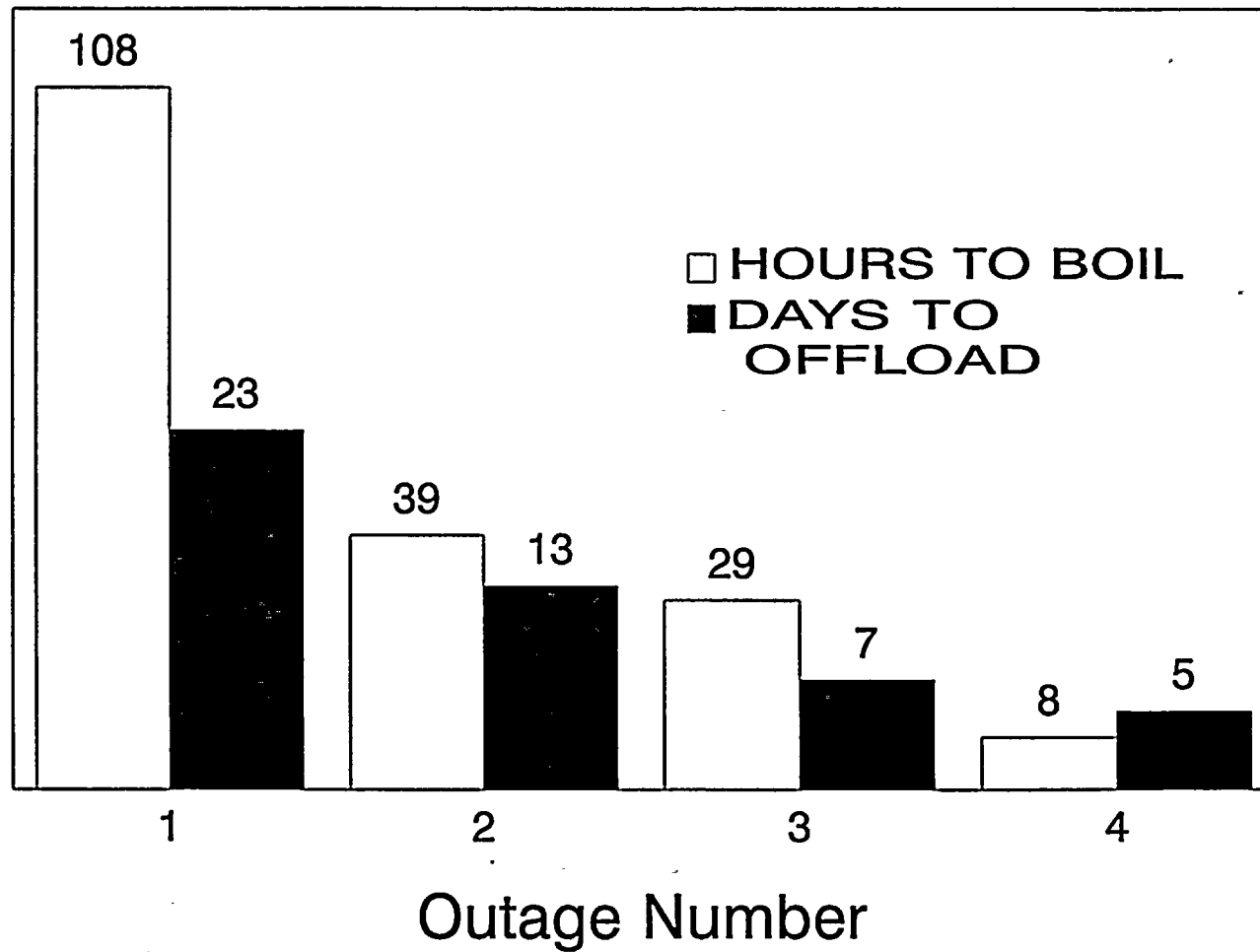
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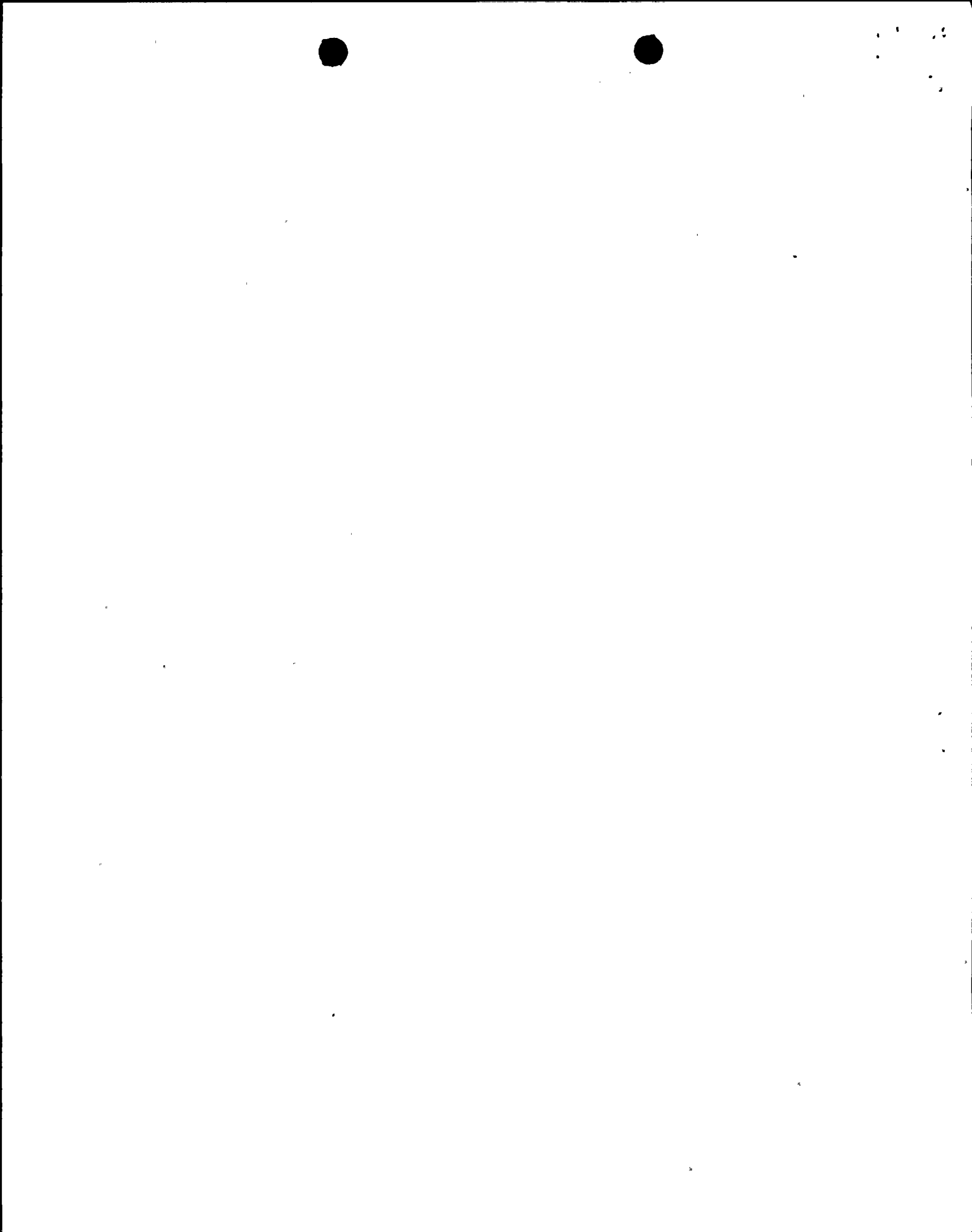
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Reduced Time to Boil at Nine Mile Point Unit 2



(Viewgraph 13)



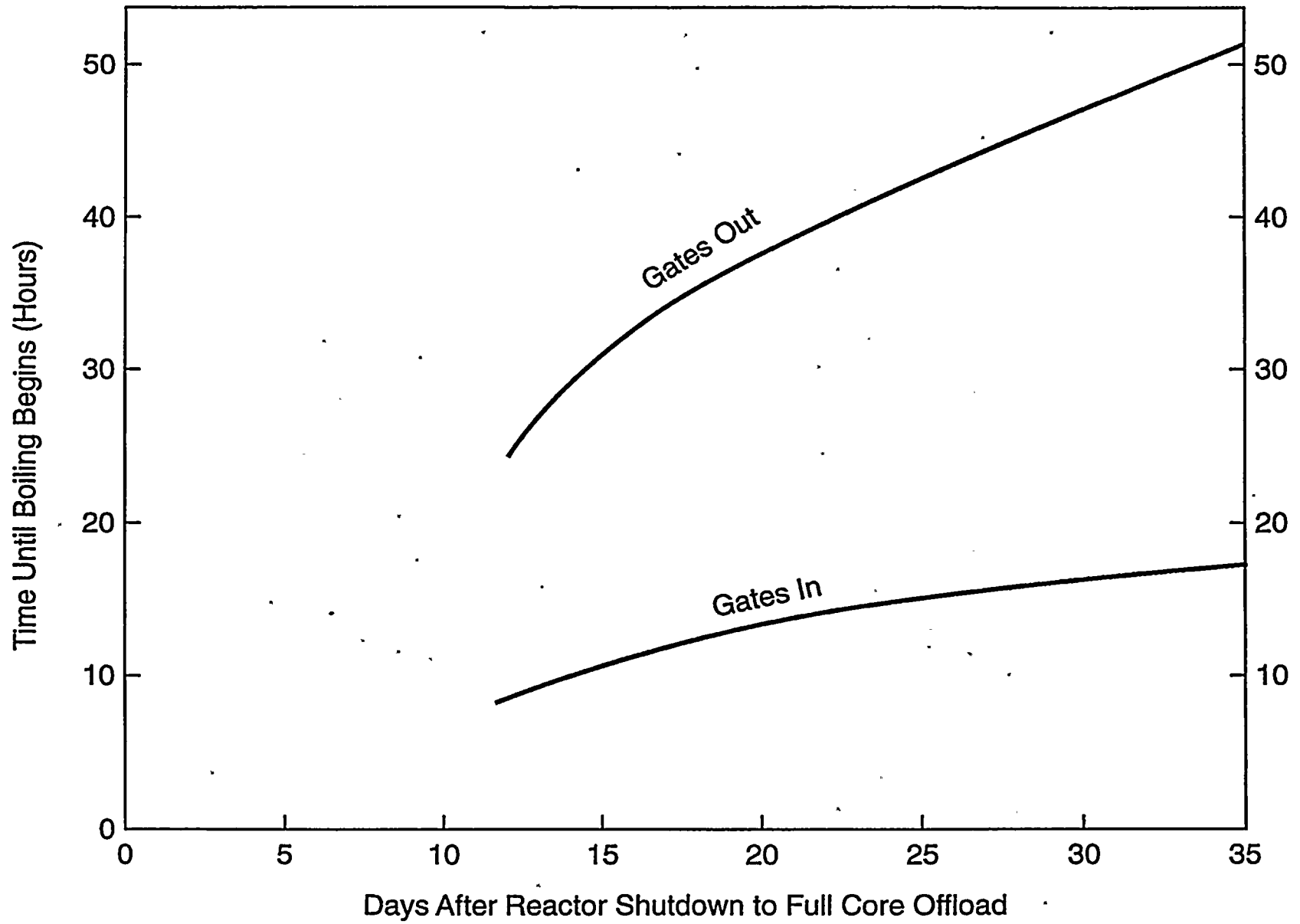


Figure 1 Time to Boil vs. Time After Reactor Shutdown



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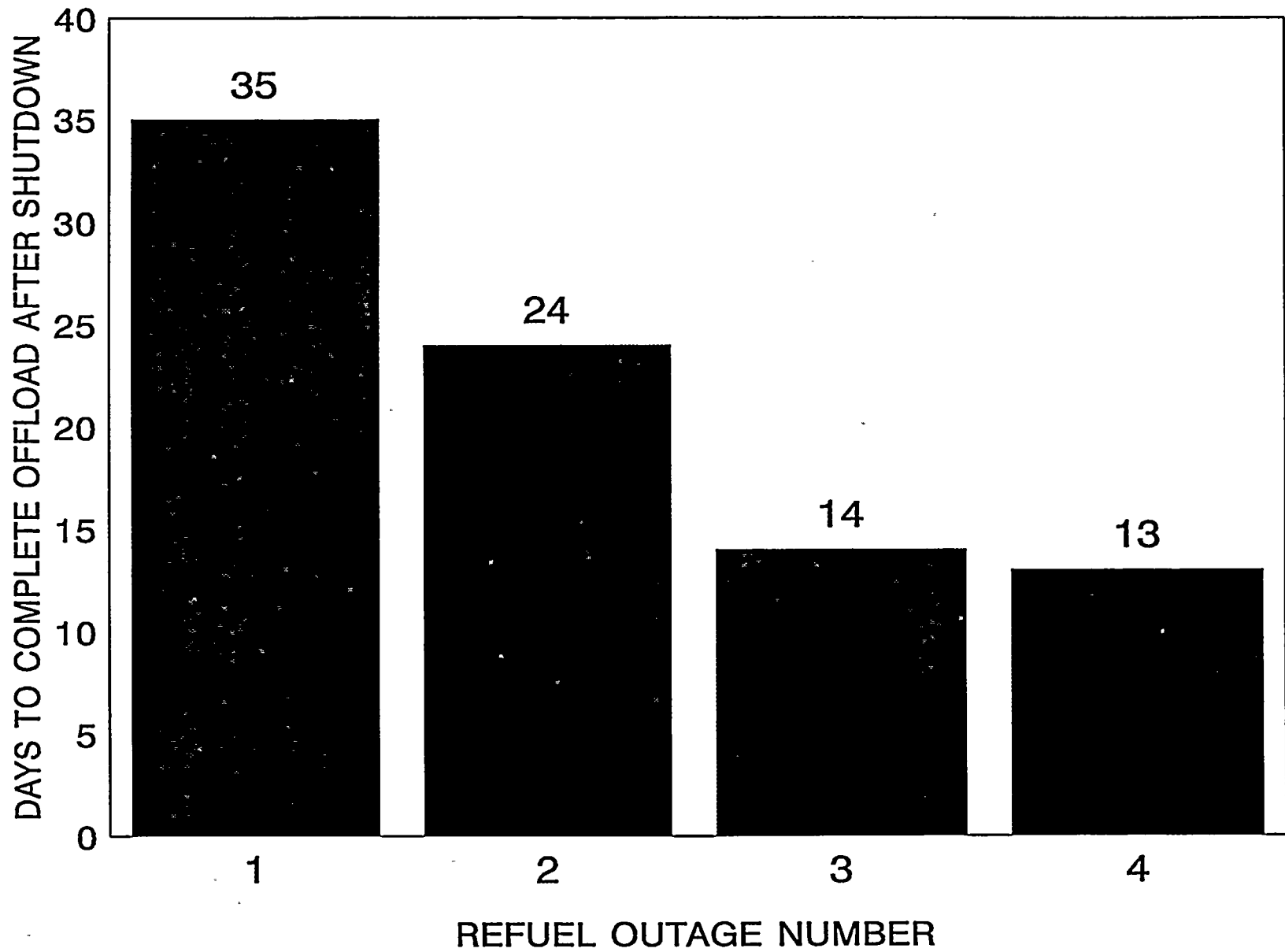


Figure 2 Full Core Offload Times vs. Outage Number



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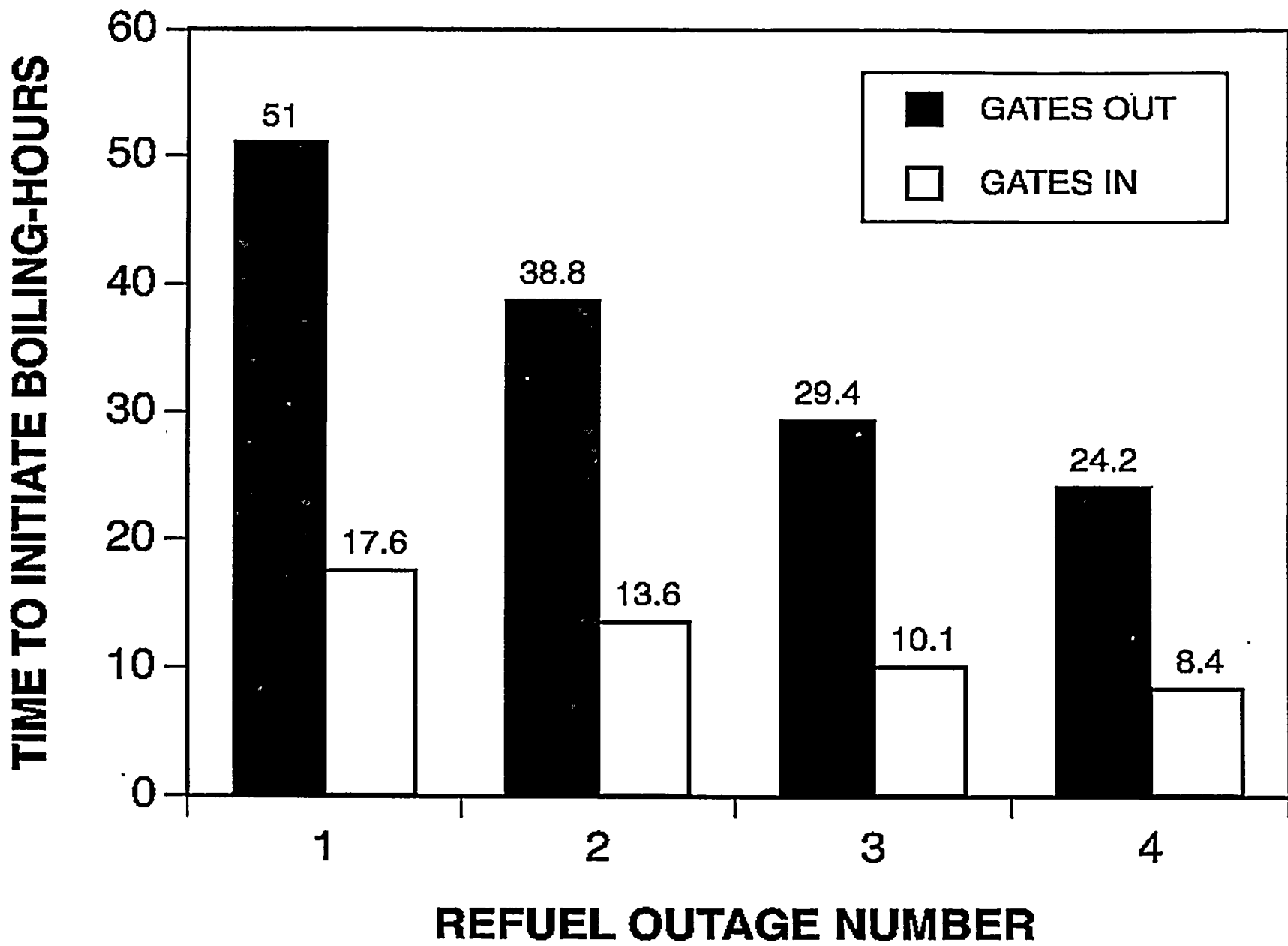


Figure 3 Time to Boil vs. Outage Number

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