

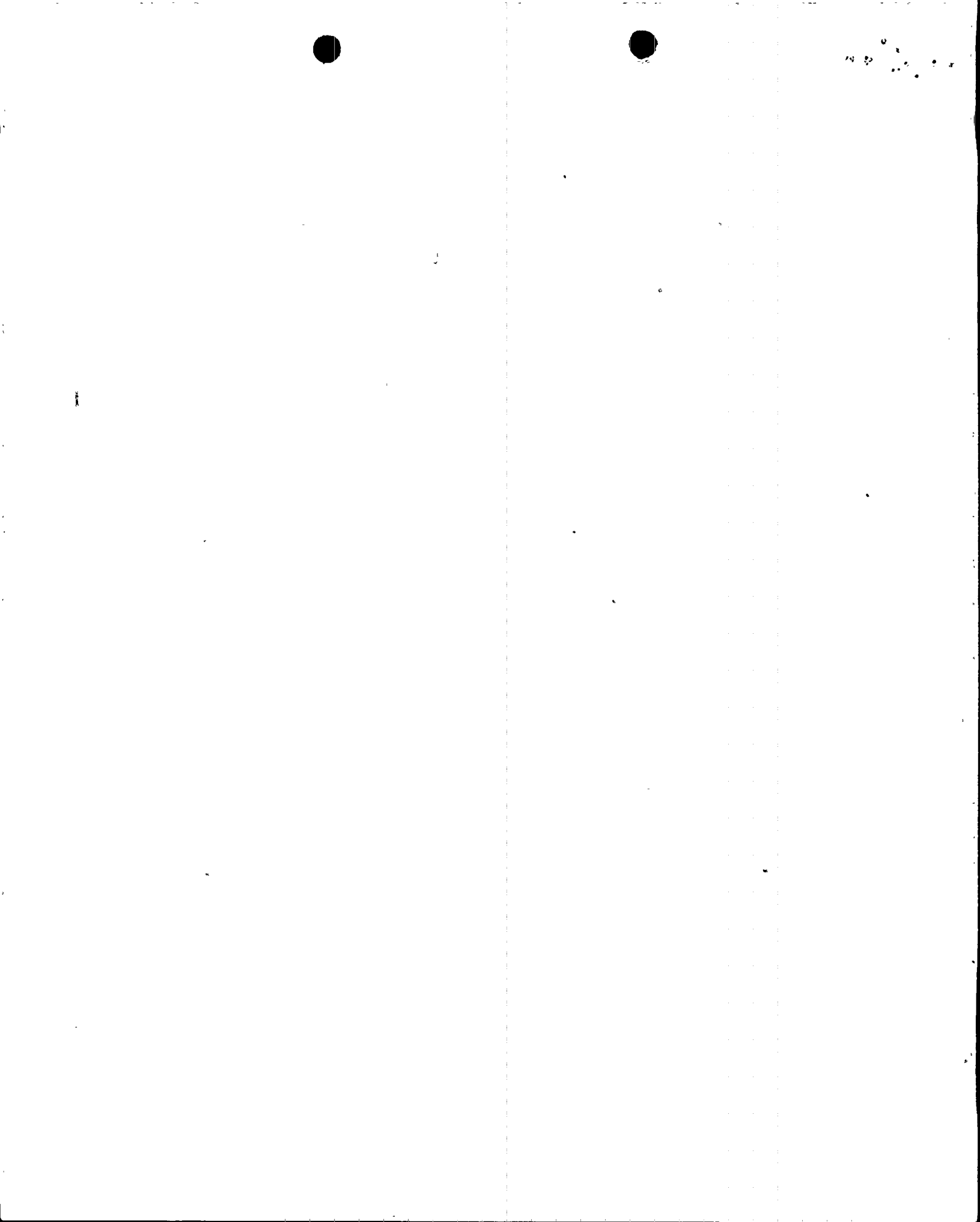
This report provides an evaluation of the design and performance of Palo Verde Nuclear Generating Station Unit 1 (PVNGS-1) during its third cycle of operation at 100% rated core power of 3800 MWt and NSSS power of 3822 MWt. Operating conditions for Cycle 3 have been assumed to be consistent with those of the previous cycle and are summarized as full power operation under base load conditions. The core will consist of irradiated Batch B, C and D assemblies, along with fresh Batch E assemblies. The Cycle 2 termination burnup has been assumed to be between 284 and 350 EFPD (Effective Full Power Days).

The second cycle of operation will hereafter be referred to in this report as the "Reference Cycle."

The safety criteria (margins of safety, dose limits, etc.) applicable for the plant were established in Reference 1-1. A review of all postulated accidents and anticipated operational occurrences has shown that the Cycle 3 core design meets these safety criteria.

The Cycle 3 reload core characteristics have been evaluated with respect to the Reference Cycle. Specific differences in core fuel loadings have been accounted for in the present analysis. The status of the postulated accidents and anticipated operational occurrences for Cycle 3 can be summarized as follows:

1. Transient data are less severe than those of the Reference Cycle analysis; therefore, no reanalysis is necessary, or
2. Transient data are not bounded by those of the Reference Cycle analysis, therefore, reanalysis is required.

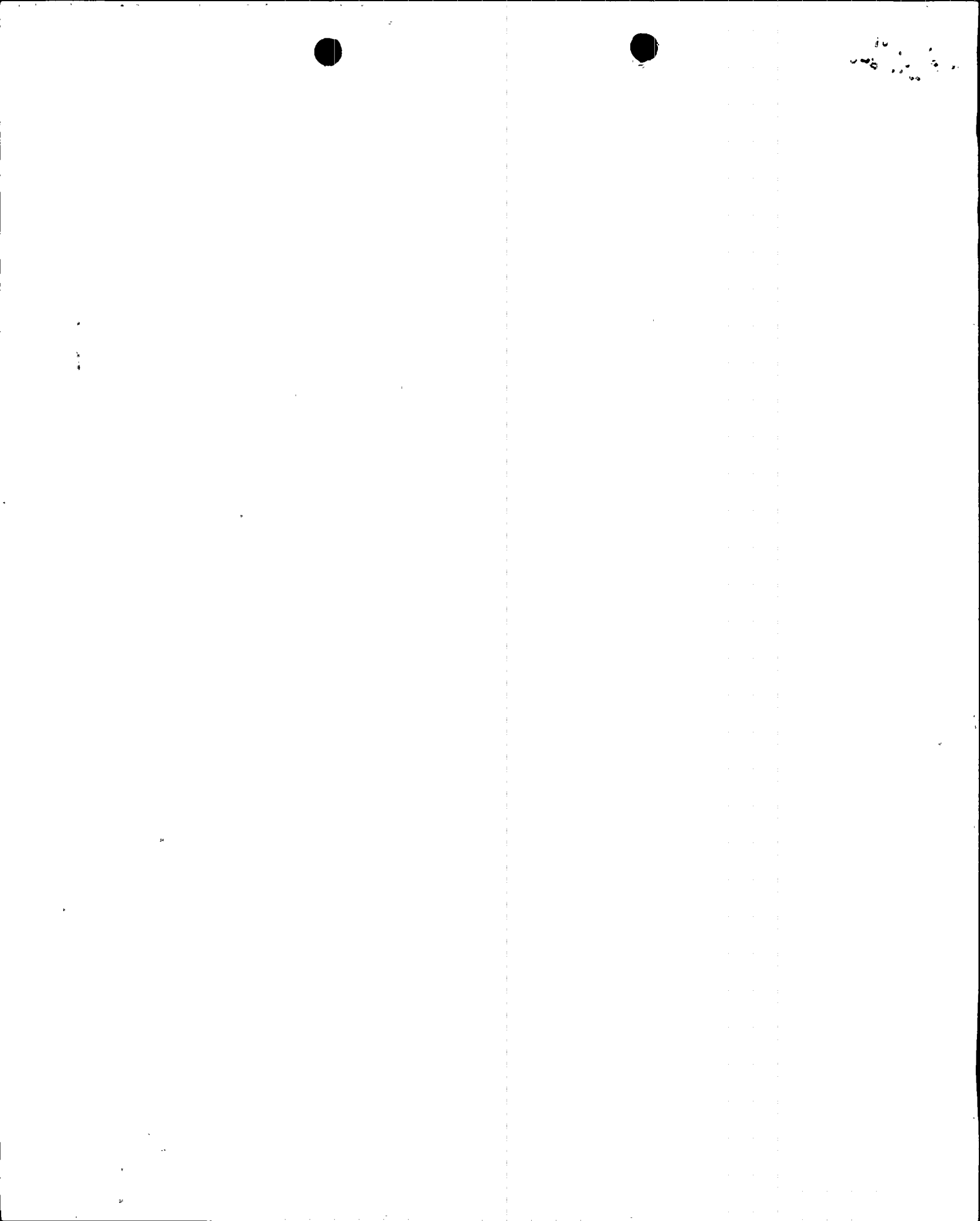


2.0

OPERATING HISTORY OF THE REFERENCE CYCLE

The Reference Cycle began with initial criticality on March 5, 1988. Power Ascension began on March 9, 1988, and on March 19, 1988, the unit reached full power.

It is presently estimated that Cycle 2 will terminate on or about April 8, 1989. The Cycle 2 termination point can vary between 284 and 350 EFPD to accommodate the plant schedule and still be within the assumptions of the Cycle 3 analyses.



#### 4.3

##### THERMAL DESIGN

The thermal performance of composite fuel pins that envelope the pins of fuel batches B, C, D and E present in Cycle 3 have been evaluated using the FATES3A version of the C-E fuel evaluation model (References 4-3 and 4-4) as approved by the NRC (Reference 4-5). FATES3A is the version of FATES3 that incorporates the grain size restriction given in Reference 4-5. The analysis was performed using a power history that enveloped the power and burnup levels representative of the peak pin at each burnup interval, from beginning of cycle to end of cycle burnups. The burnup range analyzed is in excess of that expected at the end of Cycle 3.

#### 4.4

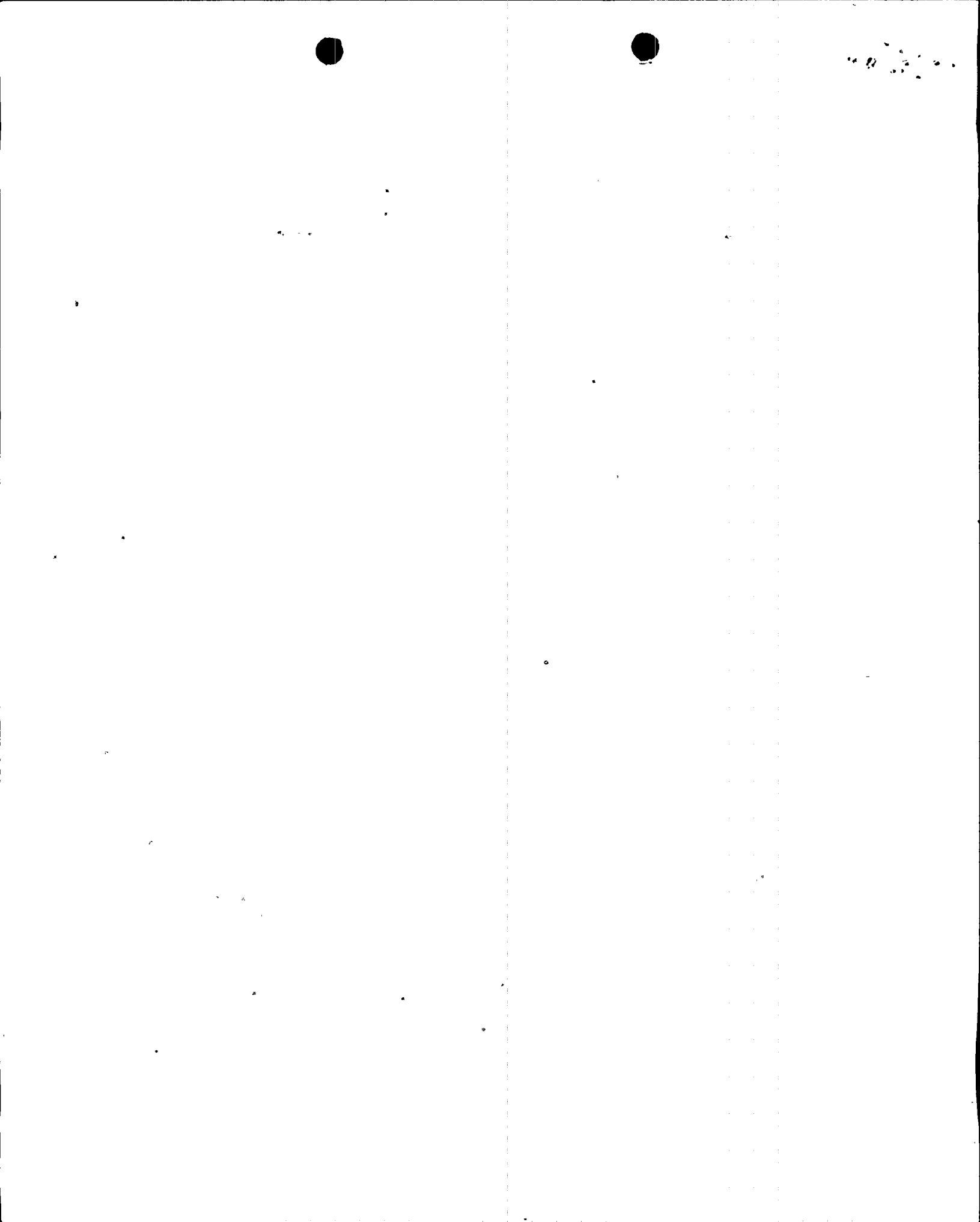
##### CHEMICAL DESIGN

The metallurgical requirements of the fuel cladding and the fuel assembly structural members for the Batch E fuel are identical to those of the fuel batches included in Cycle 2. Thus, the chemical or metallurgical performance of the Batch E fuel will remain unchanged from the performance of the Cycle 2 fuel.

#### 4.5

##### SHOULDER GAP ADEQUACY

Measured shoulder gap data (references 4-1 and 4-2) acquired from post Cycle 1 inspection of fuel assemblies at PVNGS Units 1 and 2 indicated that the fuel had adequate shoulder gap for Cycle 2 operation. Although the present shoulder gap is projected to be adequate for Cycle 3 operation, additional shoulder gap inspections will be performed at EOC2.



## 5.0 NUCLEAR DESIGN

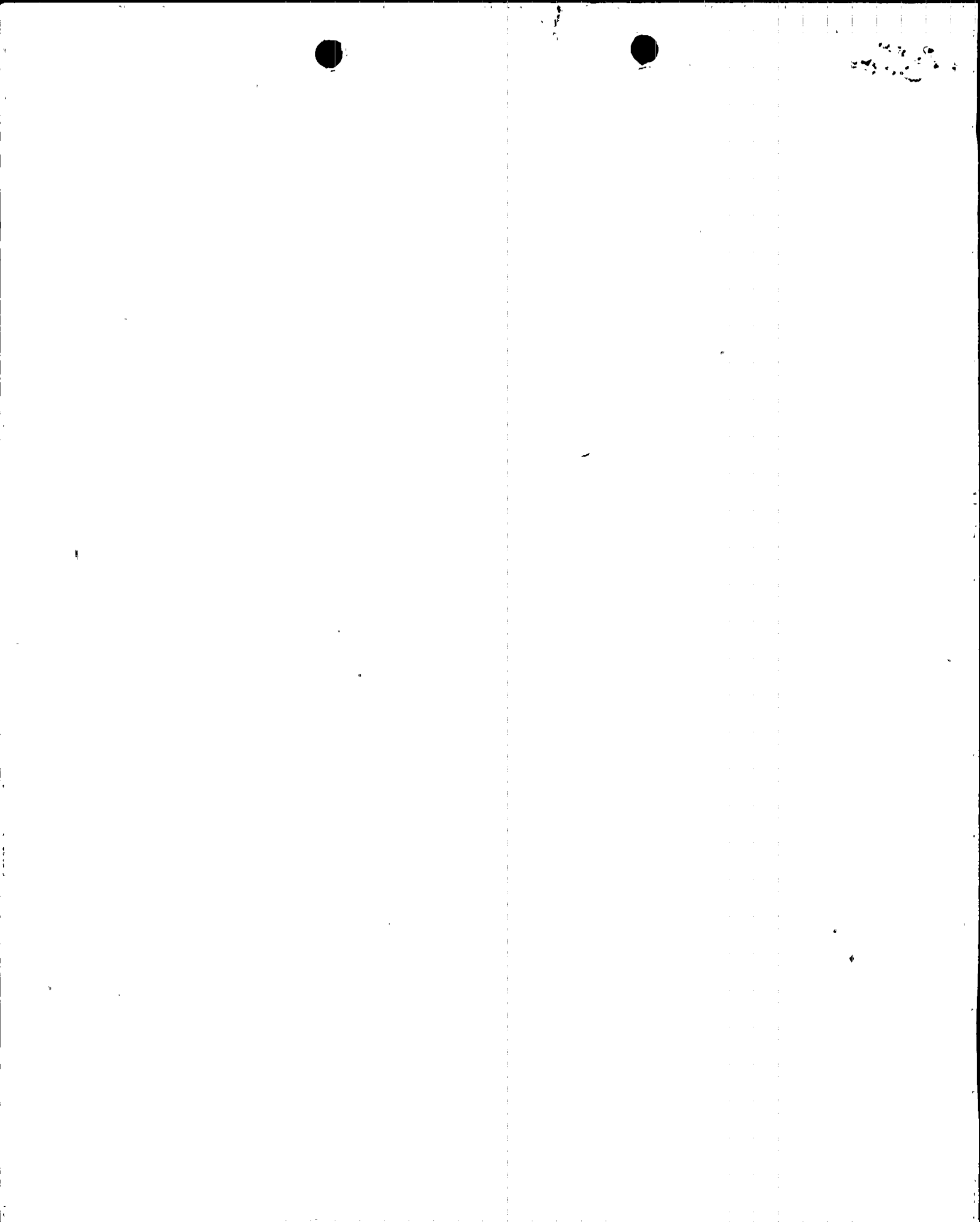
### 5.1 PHYSICS CHARACTERISTICS

#### 5.1.1 Fuel Management

The Cycle 3 core makes use of a low-leakage fuel management scheme, in which previously burned Batch C assemblies are placed on the core periphery. Most of the fresh Batch E assemblies are located throughout the interior of the core where they are mixed with the previously burned fuel in a pattern that minimizes power peaking. With this loading and a Cycle 2 endpoint at 330 EFPD, the Cycle 3 reactivity lifetime for full power operation is expected to be 475 EFPD. Explicit evaluations have been performed to assure applicability of all analyses to a Cycle 2 termination burnup of between 284 and 350 EFPD and for a Cycle 3 length up to 500 EFPD. |

Characteristic physics parameters for Cycle 3 are compared to those of the Reference Cycle in Table 5-1. The values in this table are intended to represent nominal core parameters. Those values used in the safety analysis (see Sections 7 and 8) contain appropriate uncertainties, or incorporate values to bound future operating cycles, and in all cases are conservative with respect to the values reported in Table 5-1.

Table 5-2 presents a summary of CEA reactivity worths and allowances for the end of Cycle 3 full power steam line break transient with a comparison to the Reference Cycle data. The full power steam line break was chosen to illustrate differences in CEA reactivity worths for the two cycles.





July 5, 1989

DOCKET NO(S). STN 50-528,  
STN 50-529 and STN 50-530

Mr. William F. Conway  
Executive Vice President  
Arizona Nuclear Power Project  
P. O. Box 52034  
Phoenix, Arizona 85072-2034

SUBJECT: ARIZONA PUBLIC SERVICE COMPANY - PALO VERDE NUCLEAR GENERATING STATION

The following documents concerning our review of the subject facility are transmitted for your information.

- ☐ Notice of Receipt of Application, dated \_\_\_\_\_.
- ☐ Draft/Final Environmental Statement, dated \_\_\_\_\_.
- ☐ Notice of Availability of Draft/Final Environmental Statement, dated \_\_\_\_\_.
- ☐ Safety Evaluation Report, or Supplement No. \_\_\_\_\_ dated \_\_\_\_\_.
- ☐ Environmental Assessment and Finding of No Significant Impact, dated \_\_\_\_\_.
- ☐ Notice of Consideration of Issuance of Facility Operating License or Amendment to Facility Operating License, dated \_\_\_\_\_.
- ☒ Bi-Weekly Notice; Applications and Amendments to Operating Licenses Involving No Significant Hazards Considerations, dated 6/28/89 [see page(s)] 27245.
- ☐ Exemption, dated \_\_\_\_\_.
- ☐ Construction Permit No. CPPR-\_\_\_\_\_, Amendment No. \_\_\_\_\_ dated \_\_\_\_\_.
- ☐ Facility Operating License No. \_\_\_\_\_, Amendment No. \_\_\_\_\_ dated \_\_\_\_\_.
- ☐ Order Extending Construction Completion Date, dated \_\_\_\_\_.
- ☐ Monthly Operating Report for \_\_\_\_\_ transmitted by letter dated \_\_\_\_\_.
- ☐ Annual/Semi-Annual Report- \_\_\_\_\_  
\_\_\_\_\_ transmitted by letter dated \_\_\_\_\_.

Office of Nuclear Reactor Regulation

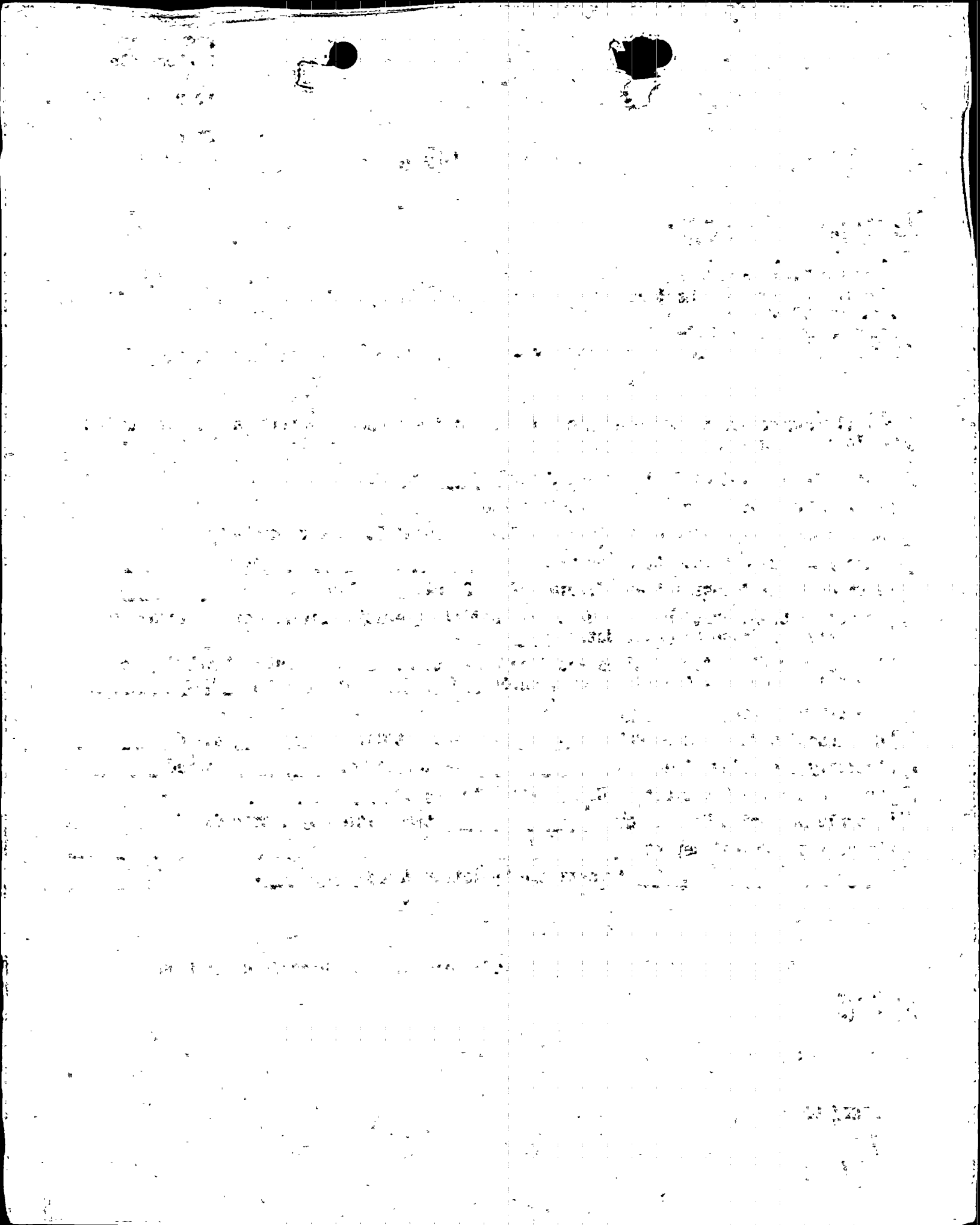
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DATE	7/5/89						

