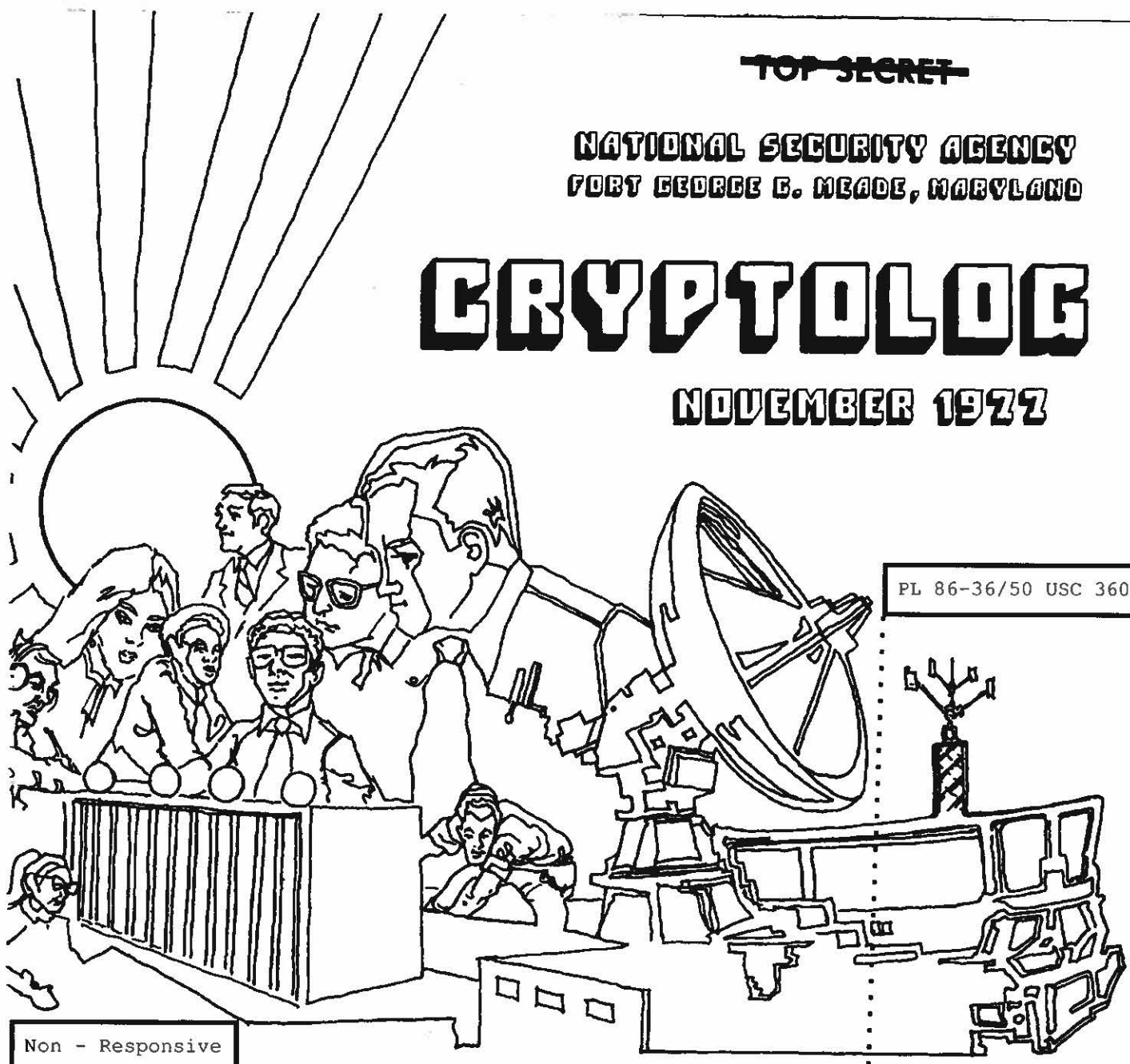


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NATIONAL SECURITY AGENCY
FORT GEORGE G. MEADE, MARYLAND

CRYPTOLOG

NOVEMBER 1977



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ANALYSIS OF SOVIET MISSILES BY EXTERNALS.		7
OBJECTIVE SATISFACTION SCORE: COLLECTION.		2
DIRECTOR'S MEMORANDUM: "MARCOON SHIELD"	Vice Admiral R. P. Inman	7

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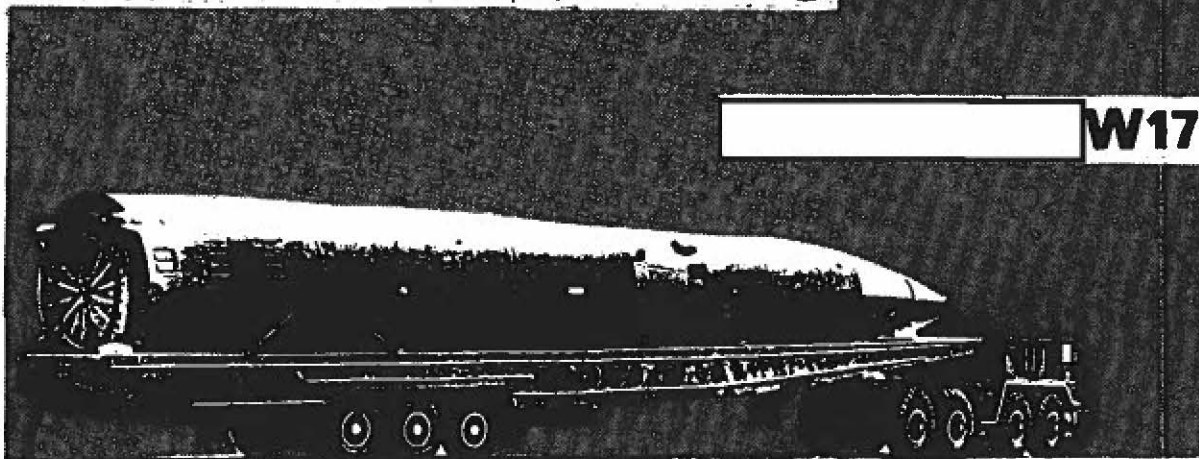
NOVEMBER 1977

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ANALYSIS OF SOVIET MISSILES BY TELEMETRY EXTERNALS



One of the major efforts of the intelligence community has been the monitoring of the development and testing of Soviet missiles. The main sources of data for this purpose are provided by the reception and exploitation of instrumentation test signals that the Soviets transmit to assist their engineers in testing and evaluating these weapon systems. The instrumentation signals, along with beacons and space vehicle command signals, are commonly referred to as telemetry.

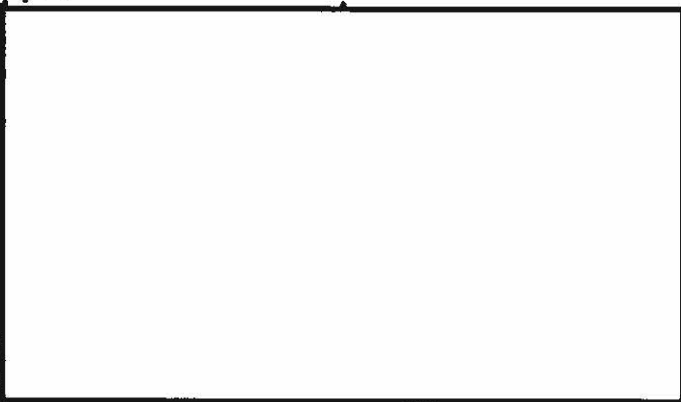
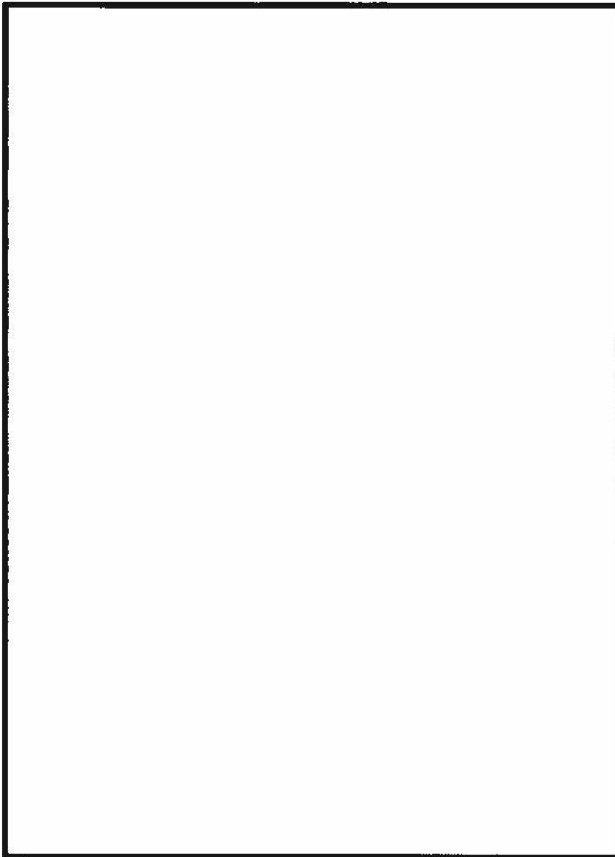
The following paragraphs provide information about a new direction in telemetry -- the making of *external* measurements of missile transmissions -- and give some insight into the application of this development in W1, the Office of Space and Missiles.

Background

As a result of the decreasing availability of exploitable telemetry internals (i.e. the data transmitted to monitor critical missile parameters like fluid flow and acceleration) -- either because of encryption of that data or because of low received-signal strength -- the Scientific and Technical Intelligence Community (e. g. MIA, FTD) has been forced to explore the area of externals data. It is of extreme significance that, from the external characteristics of the signal, the community can now recover data on weapon systems that would otherwise not be available.

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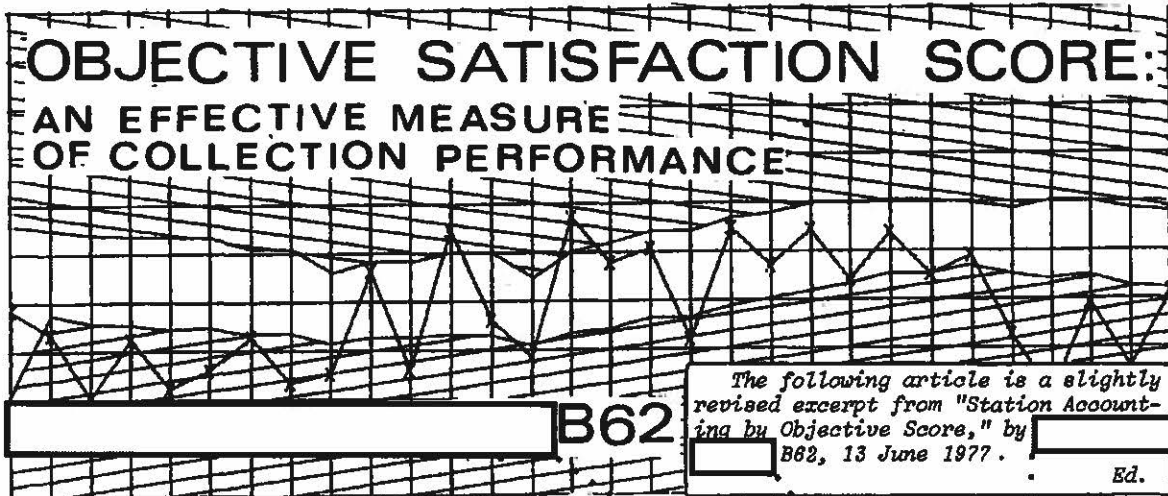
Conclusion

The extraction and uses of externals data require the continued interaction of experienced signal analysts with experienced missile system analysts so that each extracted characteristic can be identified as a parameter of interest or discarded as a byproduct of interference, collection, recording, or processing.

In general, externals telemetry data alone does not permit determination of the missile capabilities. The externals data must be used in conjunction with other data types (e. g., internals, models, simulation programs) to obtain the highest confidence estimates of Soviet missile capabilities.

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The Collection Objectives Priorities and Evaluation System (COPEs) has been in operation since 1973. It was primarily designed to give control of collection objectives to the analyst while allowing intercept stations to retain a large

degree of flexibility in utilizing their collection resources. As stated in USSID 198 (7 February 1975, p. 1), "The most important aspect of the COPEs program is the accurate and valid translation of intelligence requirements into clearly defined and meaningful resources."

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Since the implementation of COPES, management personnel have tried many methods of measuring the stations' ability to satisfy tasked objectives. Many of these provide unedited counts of the number of times a station claims an objective satisfied. Some are difficult to analyze and consume many man-hours in lower-level management to provide higher-level management with an overall view of the stations' performance.

The need for an objective performance index with a flexible display and evaluation mechanism was very evident.

Objective Tasking and Reporting

Objectives tasks by NSA/CSS analysts are assigned via the SIGINT Collection Objectives List (SCOL) within the Case/Target Remarks (CR) record of the Intercept Tasking Data Base (ITDB). They are specific collection goals which define a SIGINT requirement with a two- or three-element designator (number, letter, number).

These objectives are assigned to a specific terminal or case notation and Arbitrary Station Designators (ASDs), periodicity codes, and a priority guidance are assigned to these. The case notation and ASD define a specific terminal or group of terminals as the information source. Periodicity codes indicate how often the intercept station is to satisfy the objective and the priority guidance states the relative importance of the objective.

Satisfied objectives are flagged in the traffic and are retained in the Collection Management Record (CMR), where they are accessible via the IBM 370-168 complex. The problem is in determining whether or not the objectives claimed satisfied were actually tasked.

Objective Satisfaction Evaluation

The station's ability to fulfill objective requirements (which will be called its "score") is measured by evaluating each objective claimed as satisfied by the intercept station (as reported in the CMR) against the tasking assigned to that station (within the ITDB). After determining that the objective was tasked and that collection falls within periodicity-code requirements, the score is developed by multiplying each objective satisfied by a value inversely related to the priority assigned the objective (i.e., priority 1 x 5, priority 2 x 4, etc.) This gives added weight to high-priority targets and thus higher scores to a station which consistently satisfies high-priority tasking requirements.

A unique feature in the score development is the ability of the procedure to reject objective satisfactions which represent oversatisfactions of tasked objectives (i.e., an objec-

tive satisfaction claimed a second time in one day when the tasking required only one satisfaction per day) which occur within the scope of the program (one Sunday-through-Saturday Coverage Accounting Period -- CAP).

All objectives tasked in accordance with nonmeasurable periodicity codes are considered to be valid every time they are satisfied. Whenever periodicity codes are measurable but the frequency of required satisfaction is less than the scope of the program, they are treated as if they were tasked with a once-per-week requirement. If the periodicity codes are measurable, and the frequency of required satisfaction falls within the scope of the program, then the data concerning the last time this objective was satisfied (date and time of intercept) is compared with the data concerning this satisfaction to see that it does not exceed periodicity requirements before crediting it as a valid satisfaction.

Verification of tasking is essential in developing a valid score. To verify a claimed objective satisfaction, the case, ASD, and the objective reported in the CMR must have an equivalent case, ASD, and objective in the regenerated tasking list.

This procedure is executed weekly and the output is added to an on-line statistical data base to provide a station performance history. This file is defined for SPECOL (SPecial Consumer Oriented Language) retrievals. This data, when further evaluated by the AUTOGRAF (automated graphics) display program, can provide an overview of a station's performance at a glance.

Optional Diagnostic Listings

As an option, managers may run this procedure to provide themselves with a weekly list of a station's current performance. The list provides three in-depth diagnostic listings which could be very useful to lower-level managers.

Diagnostic one is displayed in a matrix-type format with the vertical coordinate representing the objectives and the horizontal coordinate representing the priorities. The total number of each type of objective satisfied per priority is entered into the appropriate cell of the matrix. At the end of each row and column, the total number of objectives and the score are entered. Fig. 1. shows diagnostic one for USJ783, block 1501, for CAP 770529 through 770604.

Diagnostic two (Fig. 2) is similar to diagnostic one, except that it combines the entries in diagnostic one with the oversatisfaction counts. By comparing diagnostics one and two, one can isolate significant areas of oversatisfaction.

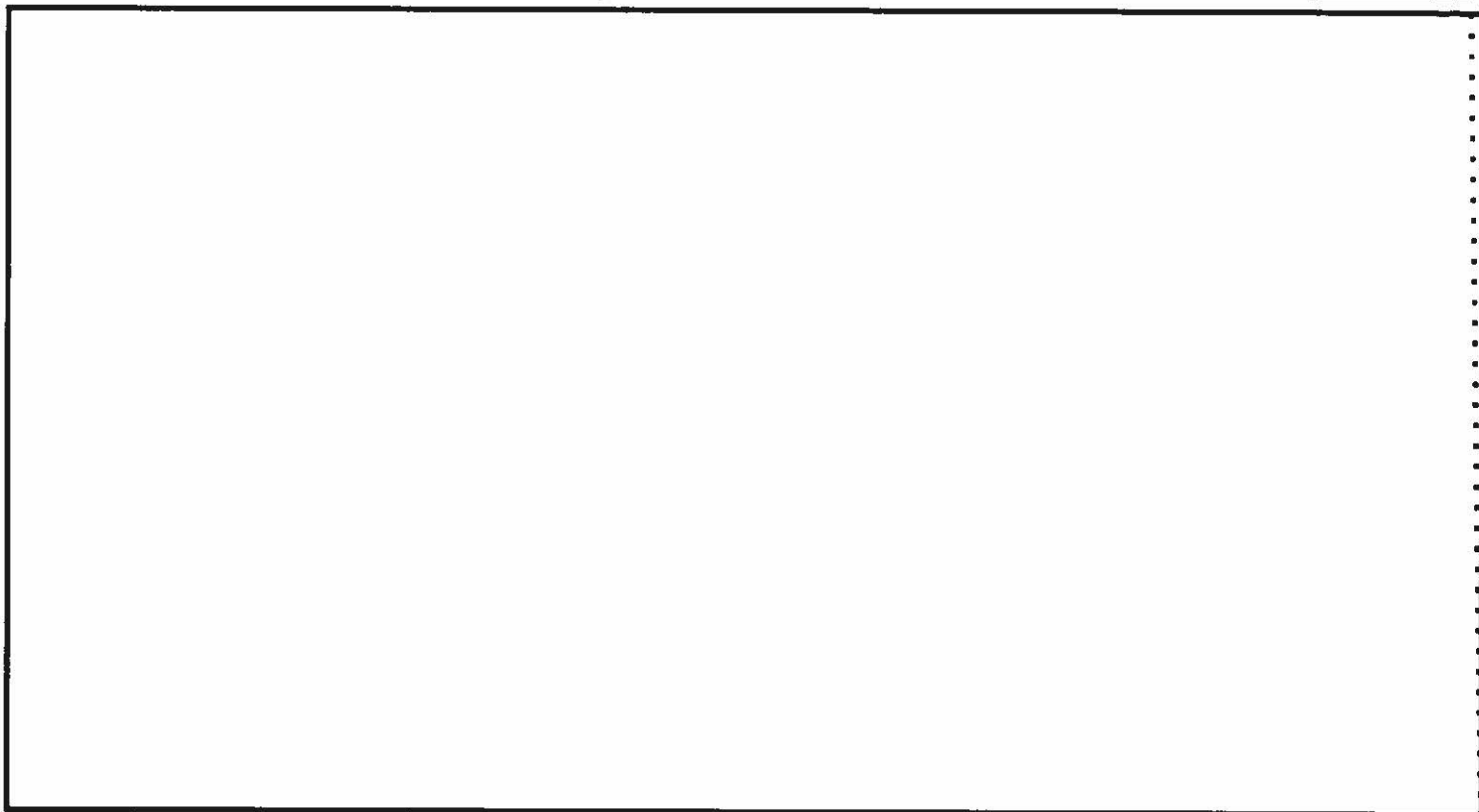


Fig. 1. Sample of Diagnostic one

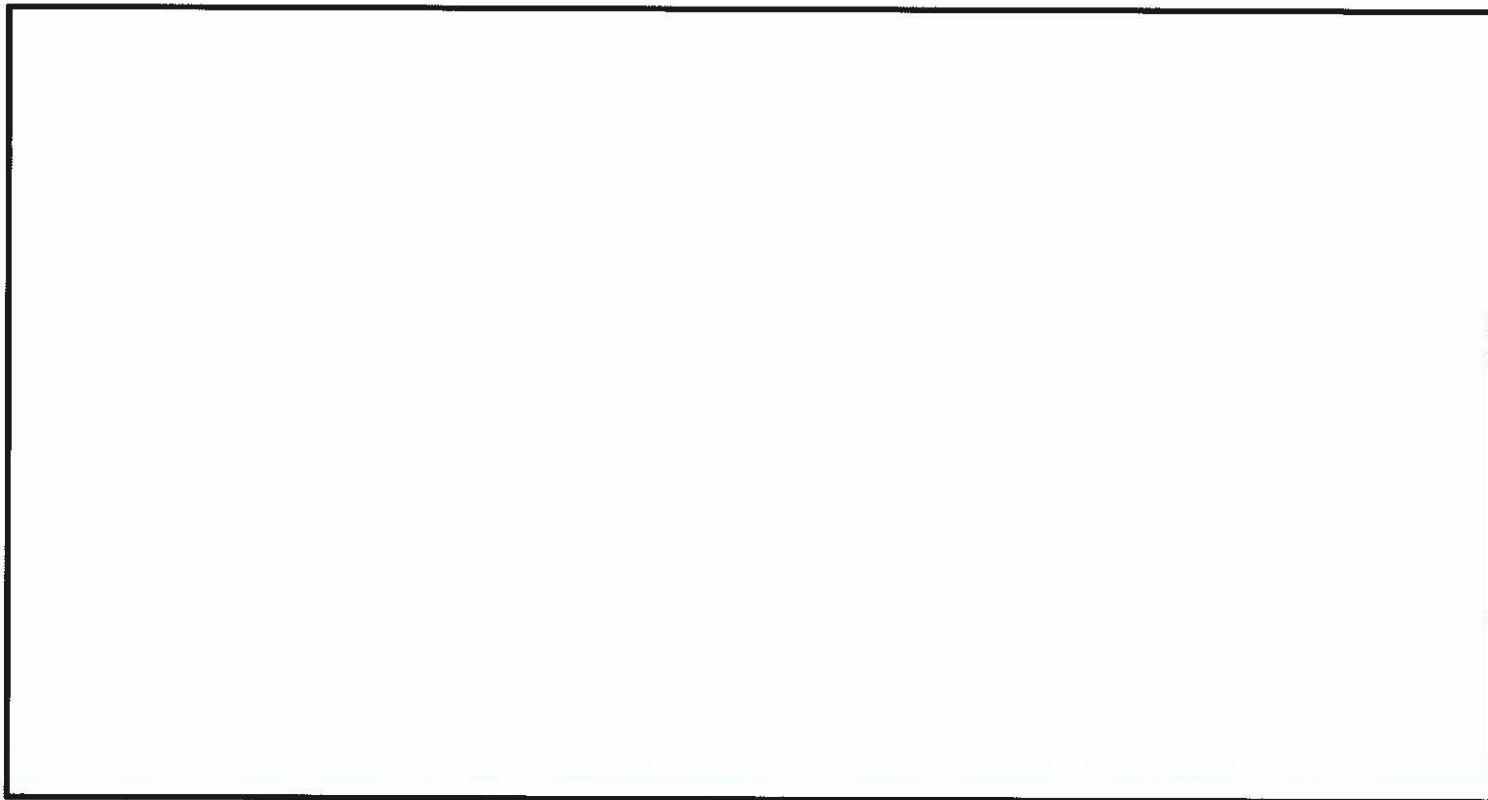
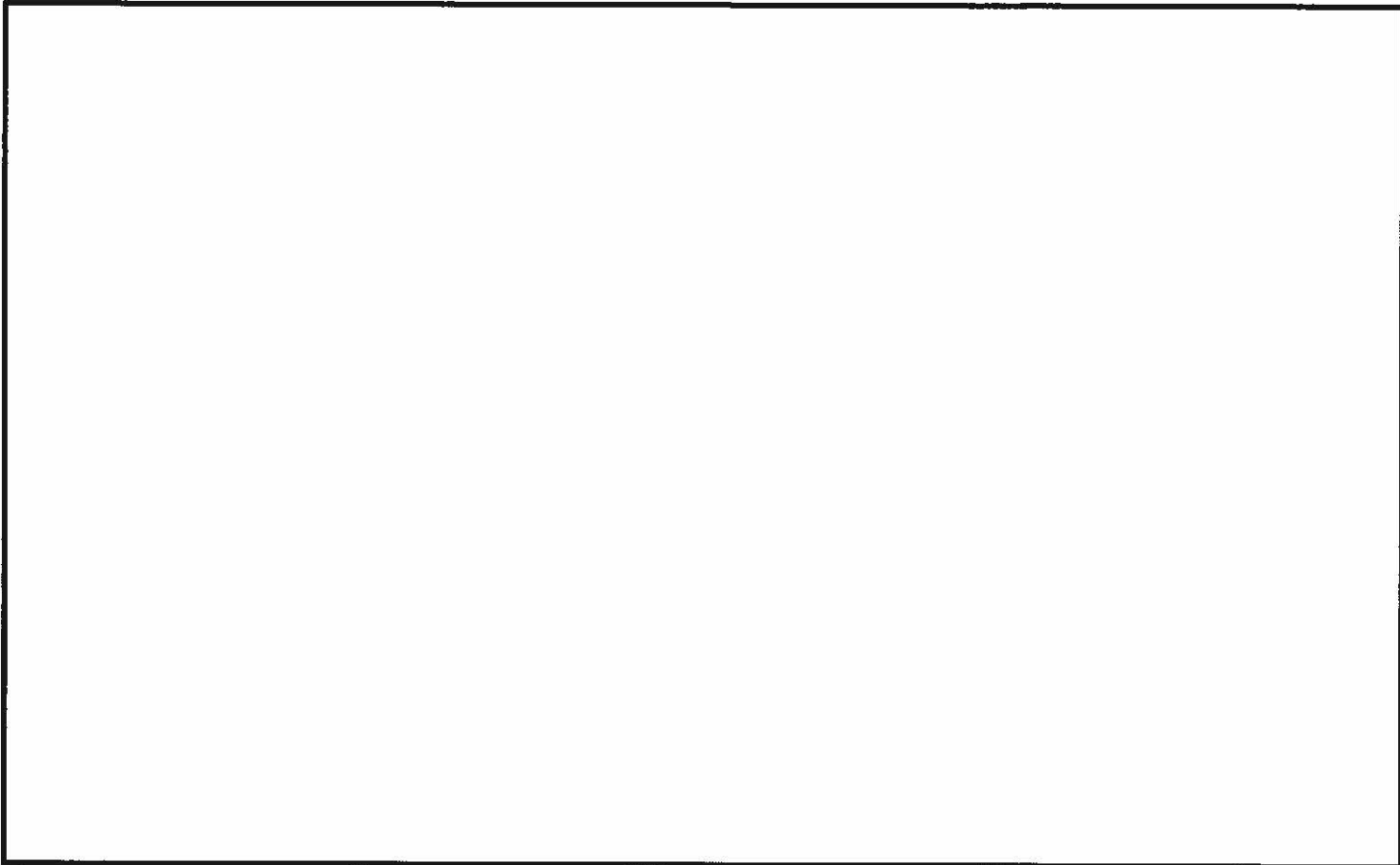


Fig. 2. Sample of Diagnostic two

Diagnostic three is a list containing a diagnostic code, station identifier, case notation, ASD, and objective as reported by the station, giving the reason for this record's being either

rejected from or included in the matrix displays. Fig. 3 is a portion of diagnostic three for USJ783, block 1501, for the given CAP.



Code interpretations for diagnostic three:

- +1 - No station to match in the ITDB or case is greater than the last case tasked under that station.
- +2 - Case not assigned or objective is greater than the last objective assigned to that case.
- +3 - Objective not assigned or ASD is greater than the last ASD assigned to that objective.
- +4 - ASD is not assigned.
- * - The objective was tasked as reported but this record represents an oversatisfaction of that tasking.
- This record is good in all aspects and is included in all matrix displays.

Fig. 3. Sample of Diagnostic three

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DIRECTOR'S MEMORANDUM: "MAROON SHIELD GUIDANCE"

Recently I came across a copy of the Director's 4 August 1977 Memorandum and was greatly impressed by its clarity and succinctness. Since a fairly large percentage of the Agency's population is not as well informed as might be desired concerning the objective of MAROON SHIELD and the constraints and considerations to be applied to that program, I requested the Direc-

tor's permission to reproduce the Memorandum in entirety in CRYPTOLOG. In that way, we could inform our readers of what the program will entail. The Director has graciously granted that permission and we are pleased to reproduce the Memorandum in this issue.

Ralph D. Bulla
Collection Editor

OPTIONAL FORM NO. 10
JULY 1973 EDITION
GSA FPMR (41 CFR) 101-11.6

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UNITED STATES GOVERNMENT

Memorandum

TO : DISTRIBUTION

DATE: 4 Aug 77

FROM : DIRECTOR

SUBJECT: MAROON SHIELD GUIDANCE

1. As a result of the information briefing provided to me on 29 July 1977, the following guidance is issued in order to ensure that continued planning and action on the MAROON SHIELD program is undertaken within established policy.

2. First, we need a clear understanding with regard to what we hope to accomplish under the MAROON SHIELD program and what are the necessary elements of this program, e.g., R&D, operations, facilities/logistics, manpower, training, and career patterns for both military and civilians. In this regard we need to develop a comprehensive MAROON SHIELD Master Plan.

3. Secondly, we can start with some basic assumptions. These are:

a. Our overall goal is to improve the timeliness of information flow to users, and maximize coverage of targets and satisfaction of requirements. In this regard, manpower is not our principal concern. We will not justify programs solely on people savings.

b. We must continually strive for quality in our entire operation, from the collection at the front end, through the people who perform the job, to the product of our effort.

c. We will maintain approximately the present military/civilian mix (not necessarily within the established ceilings). We must also address the means of maintaining and enhancing direct support skills.

d. The major efforts in cryptanalysis will continue to be performed here at the headquarters.

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Exempt from GDS - Cat II
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- e. Bulk processing will be performed where practical and economical.
- f. Operations will be target not geographic or SCA (service) oriented.
- g. We must keep our options open for greater civilian rotation to alternate operating facilities as well as greater military participation here at the headquarters.
- h. We should be looking for career stability and attractiveness for both military and civilians.

4. In our MAROON SHIELD planning I want emphasis placed on the program's impact on military and civilian recruitment, career opportunities, and retention of quality personnel. We should plan for four or five year rotational tours at all of our locations, where desirable, including here at the headquarters. That will allow us to move more effectively, invest in training for military personnel here at headquarters, and lead to placing military careerists in jobs requiring experience and continuity equal to their civilian counterparts. In like manner, we should seek opportunities for wider field experience for our civilian personnel.

5. We need an investment strategy. We need to determine what is a reasonable price tag for modernization in place, both in CONUS and overseas, assuming that we will continue to operate for the next ten years as we are now. Also, we need to determine, under this investment strategy, what is the optimum remoring mix assuming we are not fettered by other constraints such as communications vulnerabilities. The key to this strategy is our ability to deal with targets, not efficiencies.

6. I desire that we conduct an honest and aggressive breakout of the ALTROF concept not from a parochial or geographic viewpoint, but from a practical approach. We must keep in mind that we are not going to get a lot of money for construction. Also keep in mind what has already been said, and look for attractive ALTROF options for the long-term enhancement of military and civilian career opportunities. Find locations that are operationally feasible, where facilities, in the main, already exist, and where our people will actively seek assignment. We must be prepared to pay a little more if the result will give us better recruitment and retention.

7. I look to the SIGINT Architect to coordinate this action and be the driving force behind this stage of MAROON SHIELD planning. The DDF should take initial steps to sort out from the overall planning those activities requiring more immediate and separate action. I am keeping my option open at this time on deciding whether or not we will have a MAROON SHIELD Project Management Office.

8. I do not expect that this planning effort proceed at a crisis pace. On the other hand, we cannot afford to let it continue at its current rate. Rather, I expect a well measured effort which will result in three alternatives: a preferred, a practical, and, a minimally acceptable alternative. Keeping all facets of our mission in mind, I am totally committed to a single national SIGINT system. In all of our activities we must strive to build confidence in that single system.

9. Request that DDF in conjunction with the SIGINT Architect initiate appropriate action to carry out necessary planning using the policy and guidance provided above. I will be available to address separate issues and make decisions when necessary. Please provide me with information on your plan of action by the end of August.


B. R. INMAN

Vice Admiral, U. S. Navy
Director, NSA/Chief, CSS

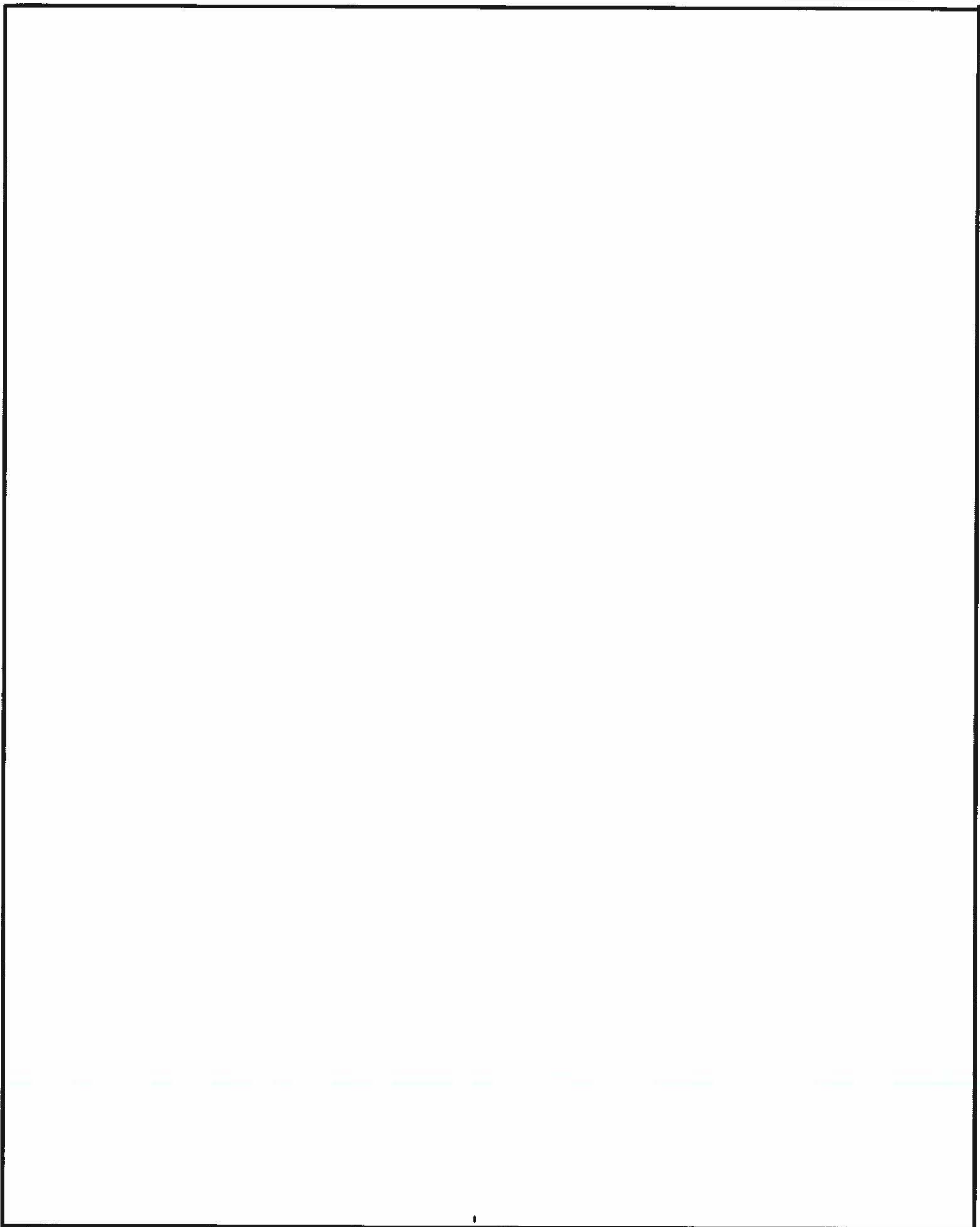
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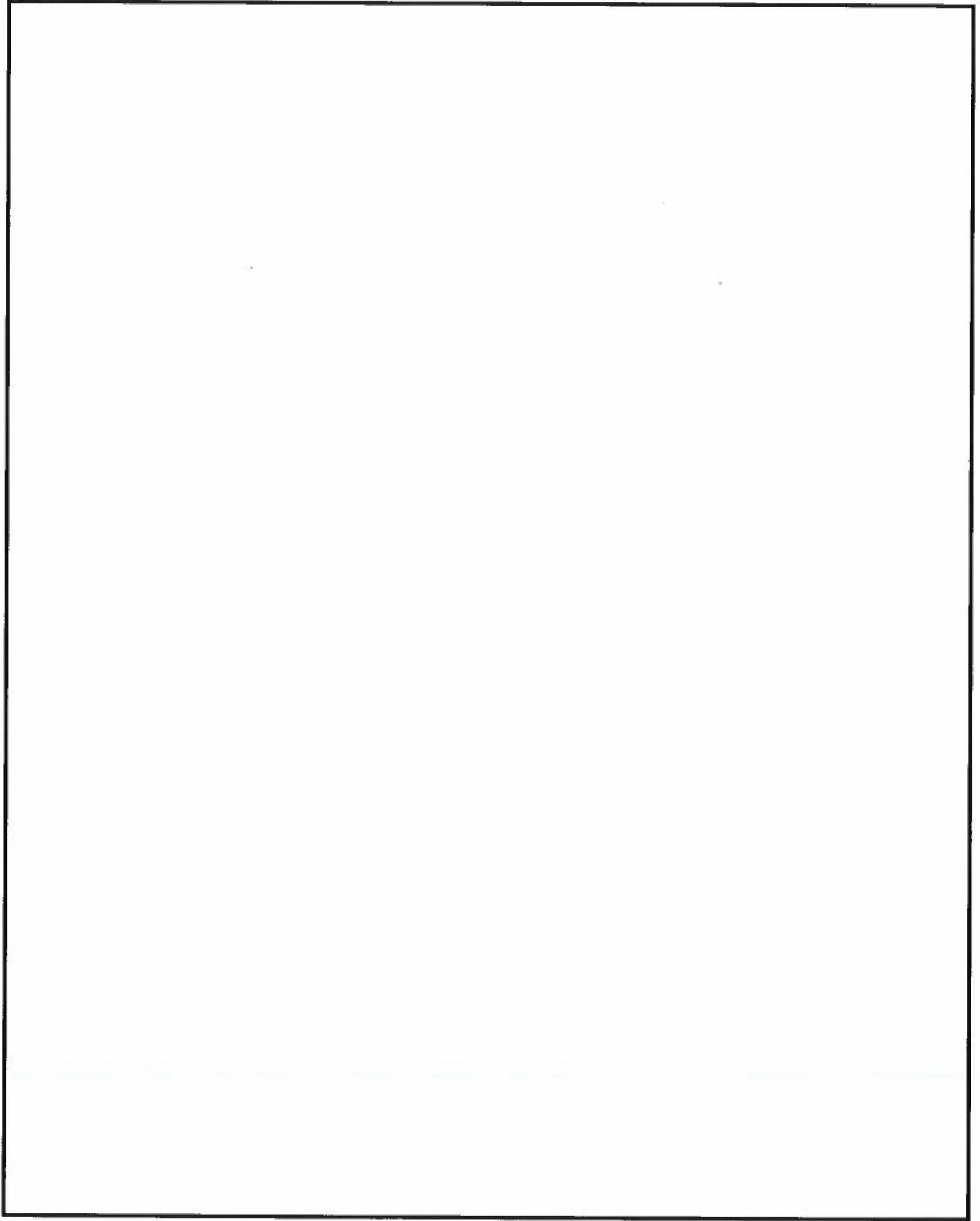
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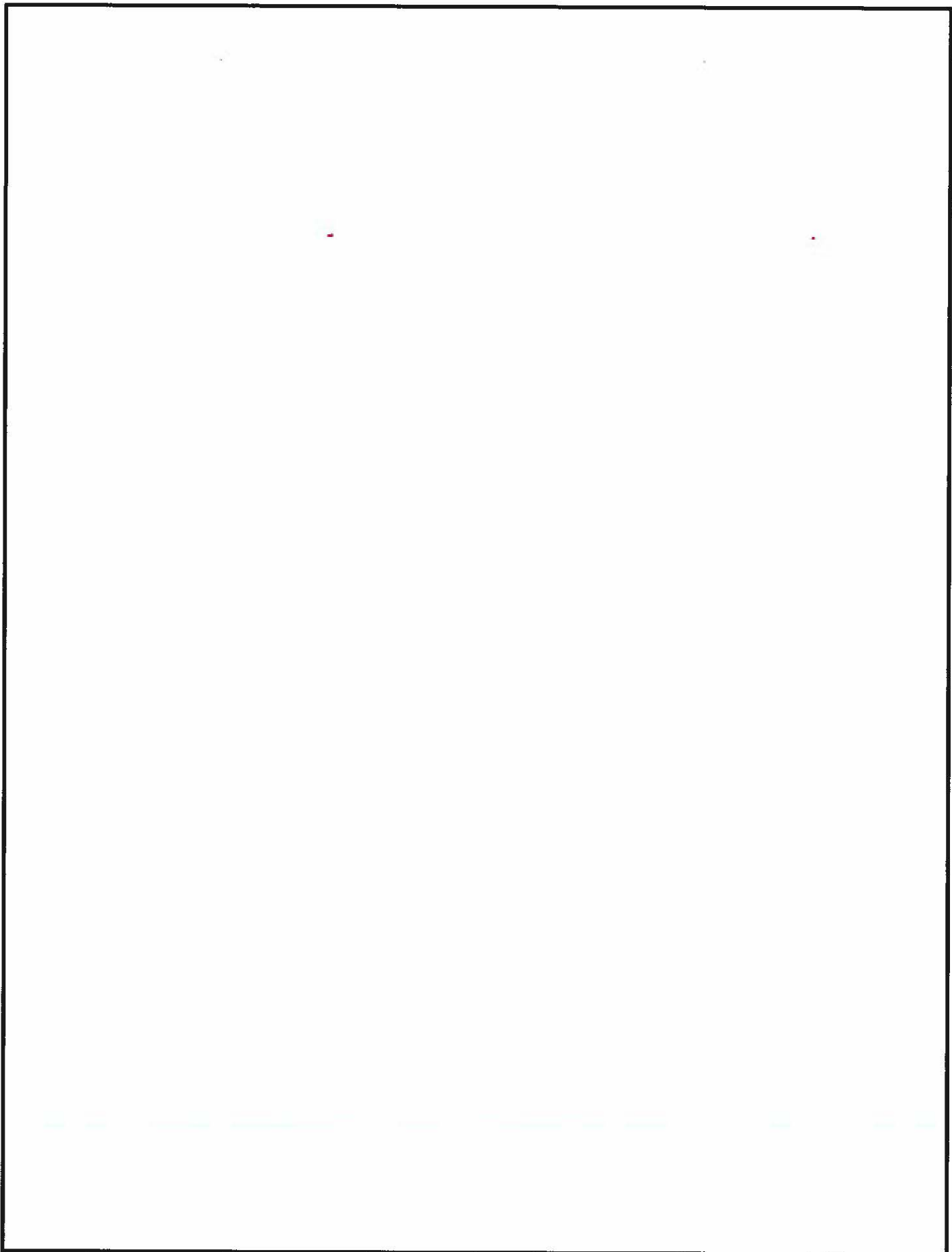
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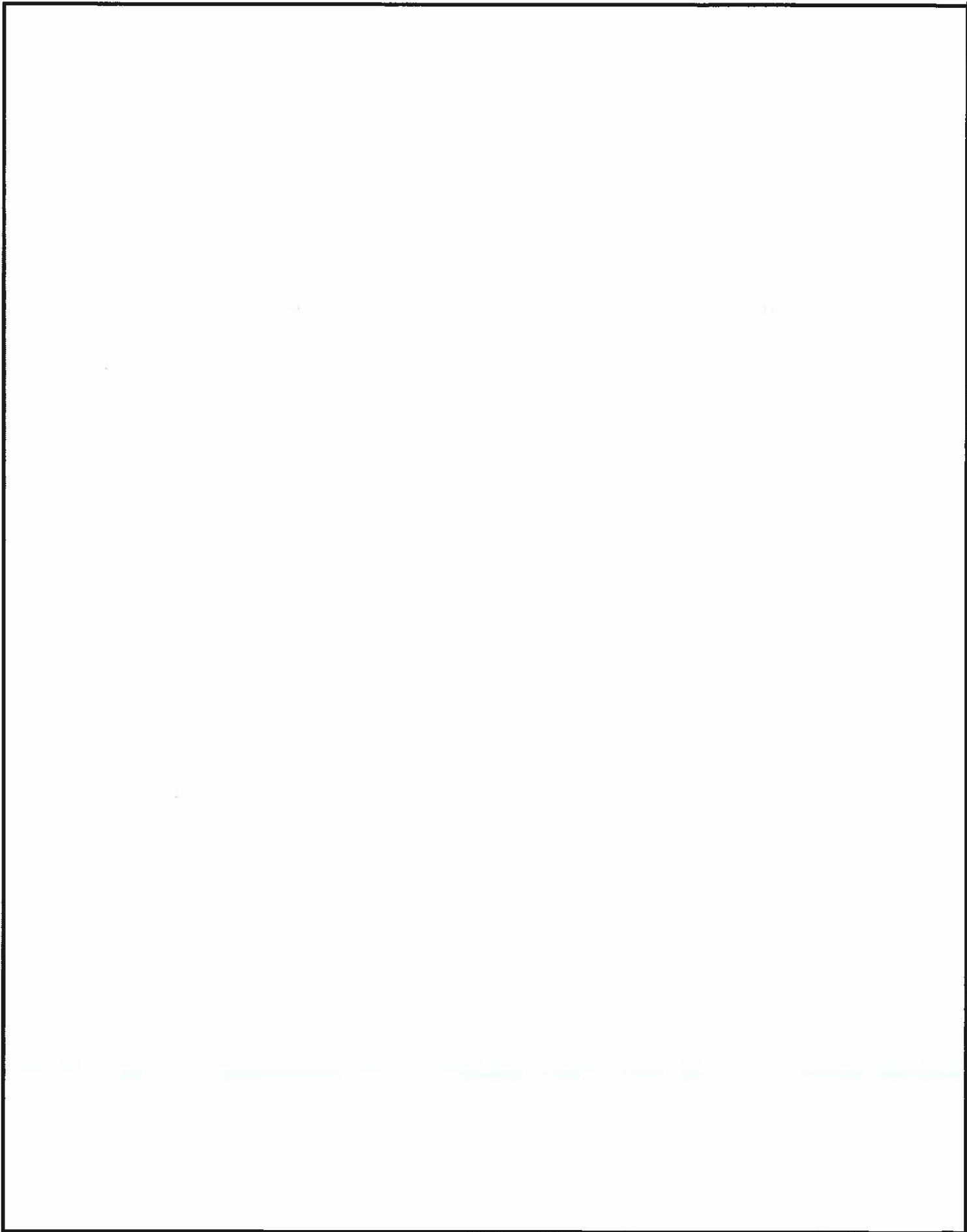


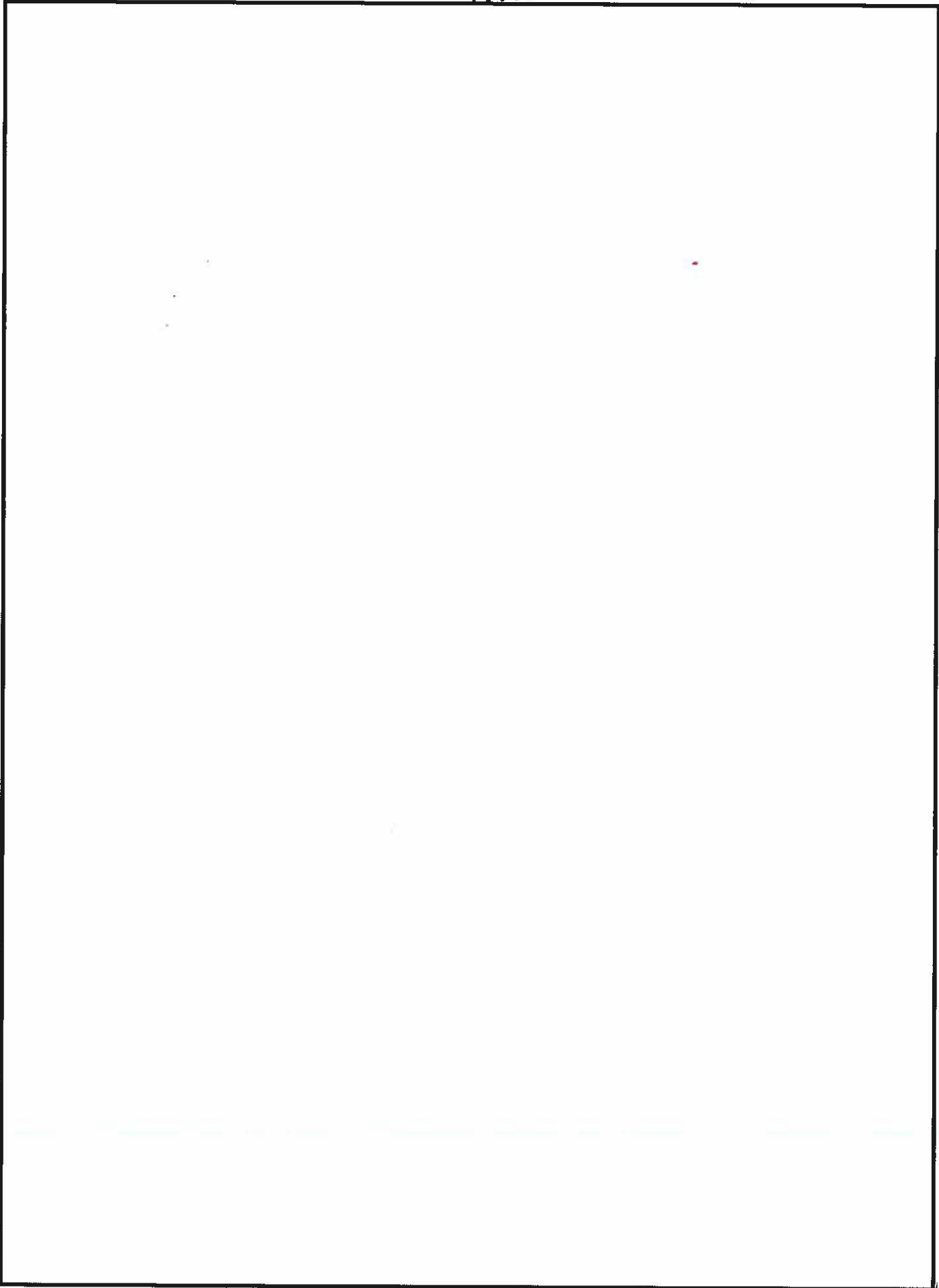
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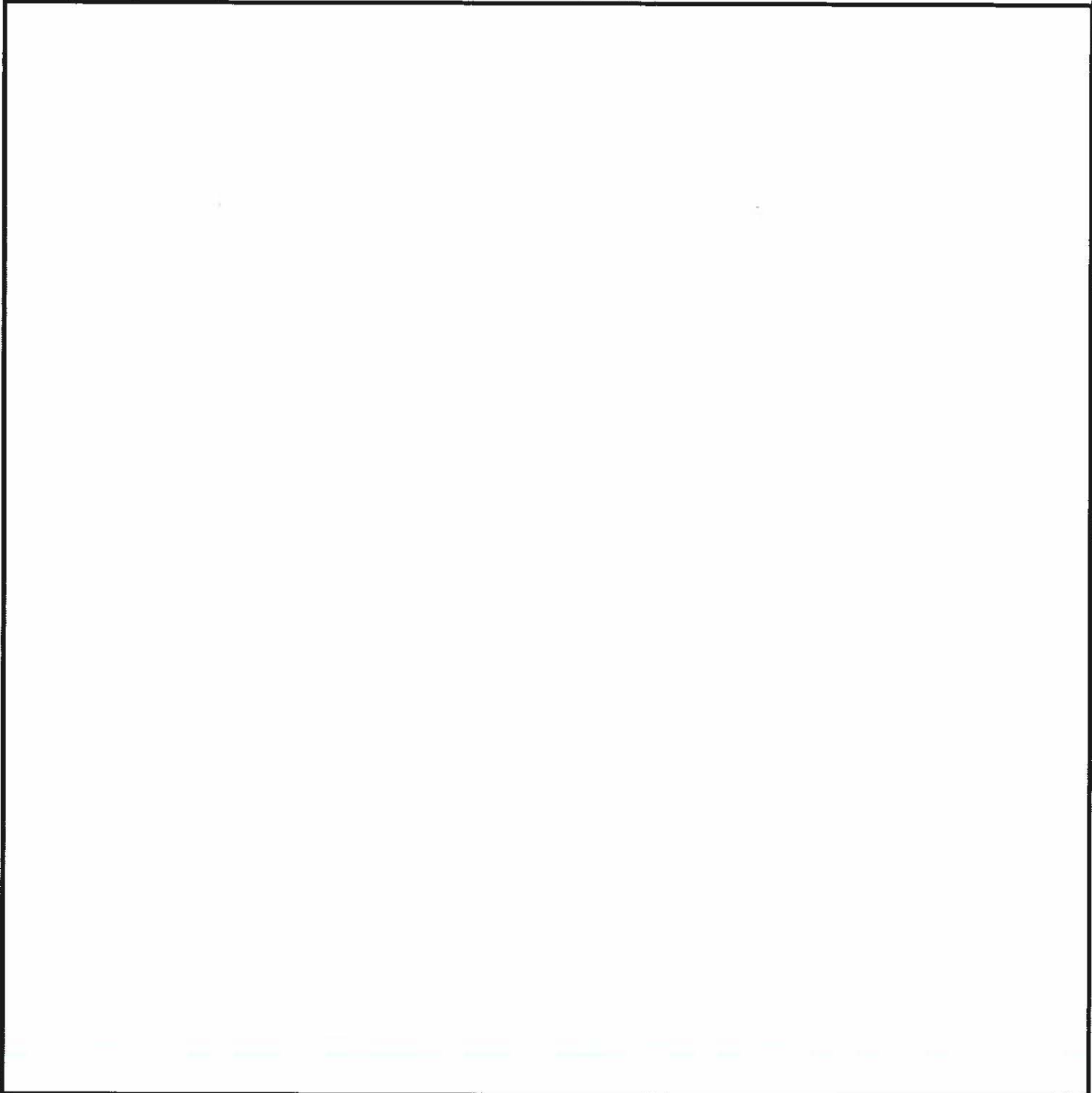
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By A.J.S.

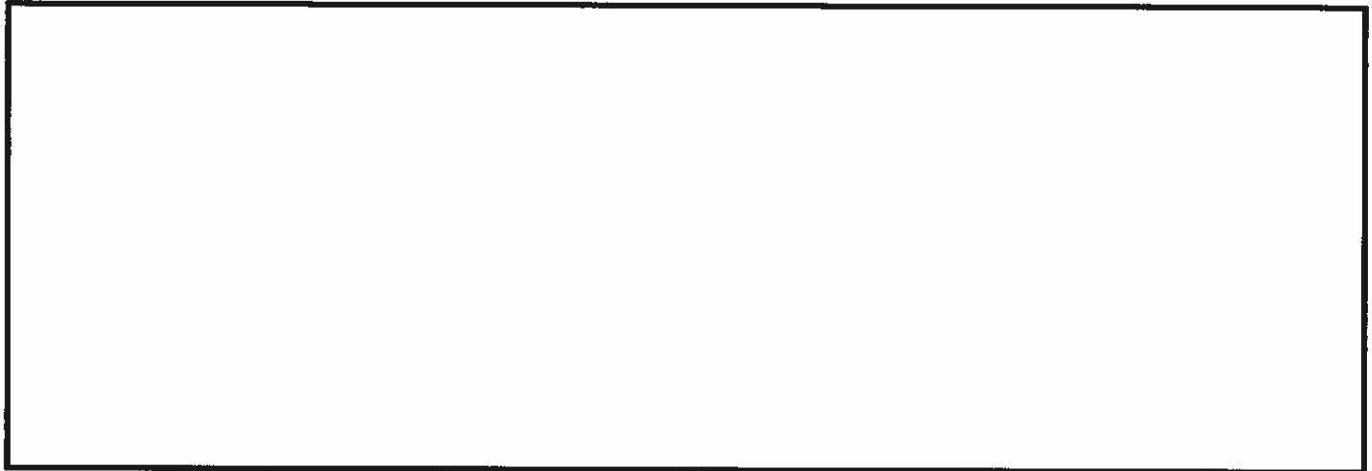
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DEFINITIONS

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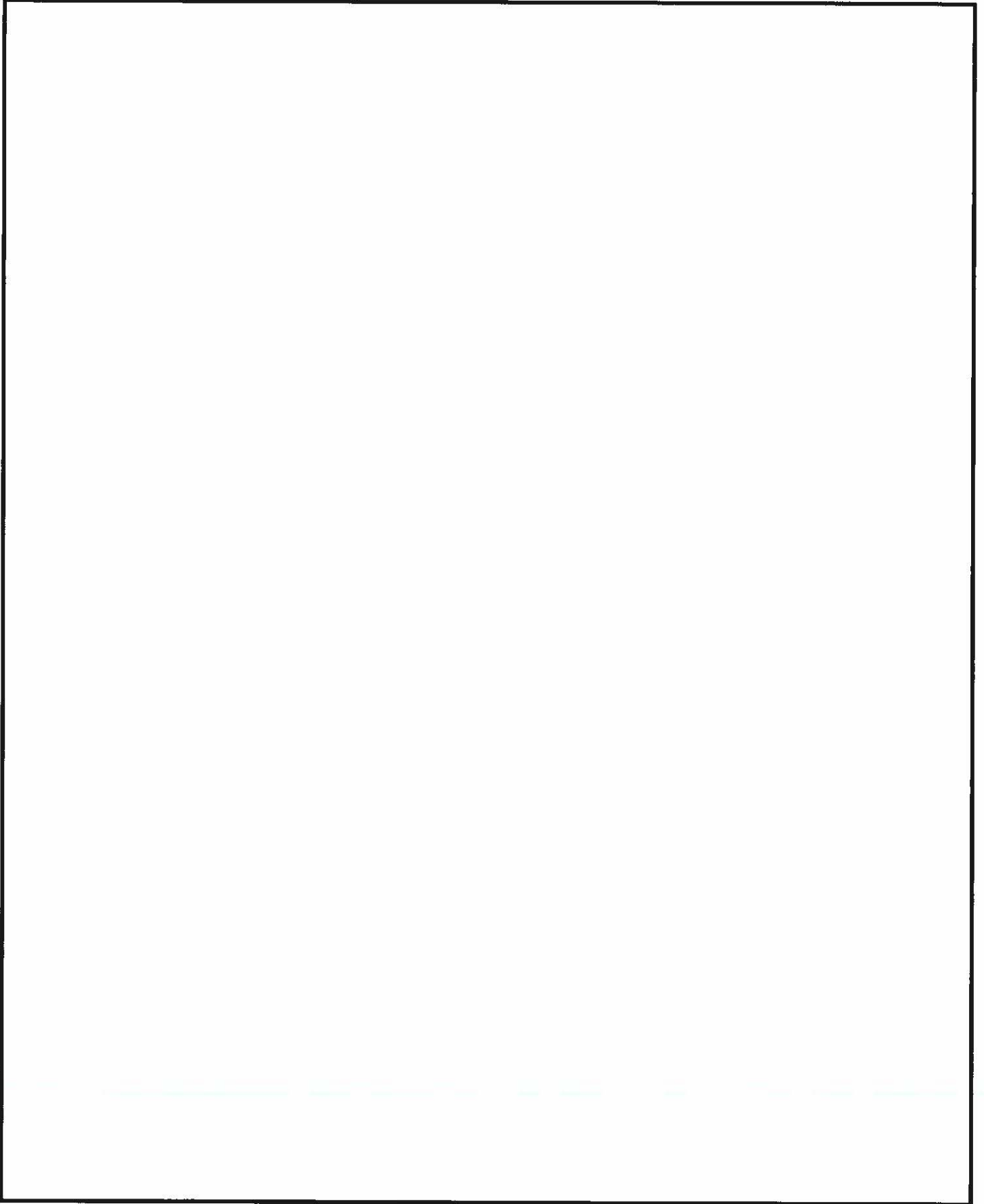


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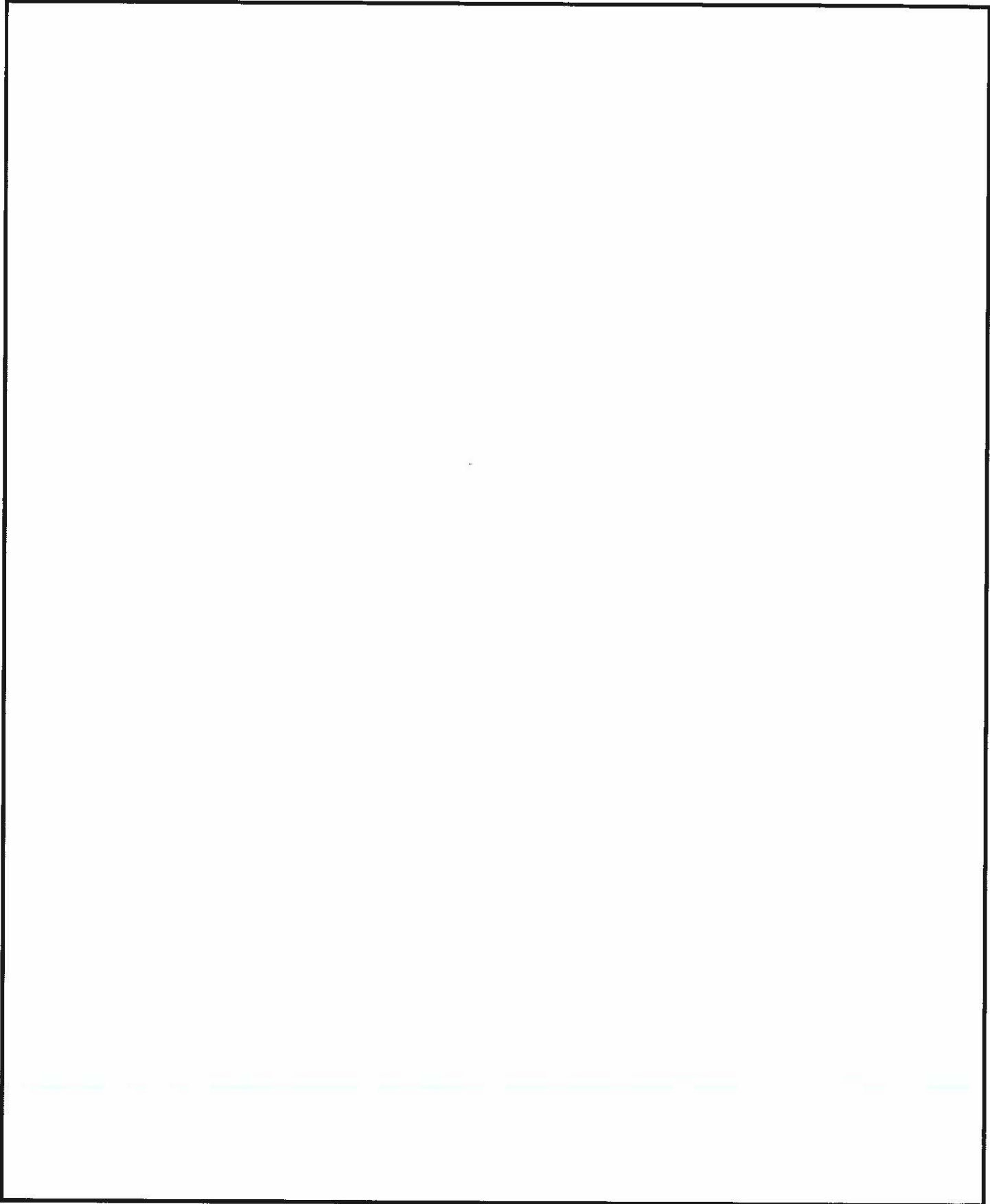
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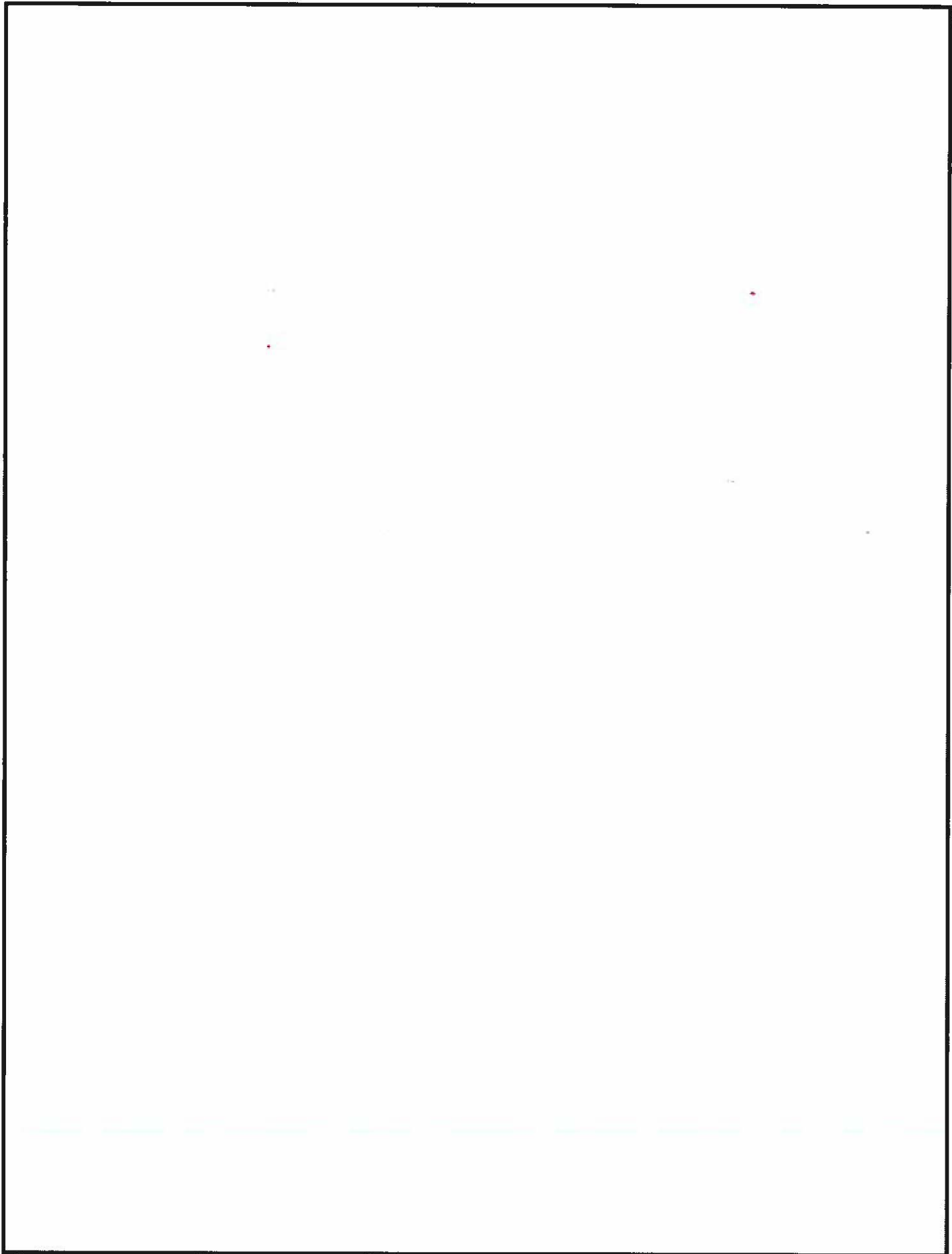
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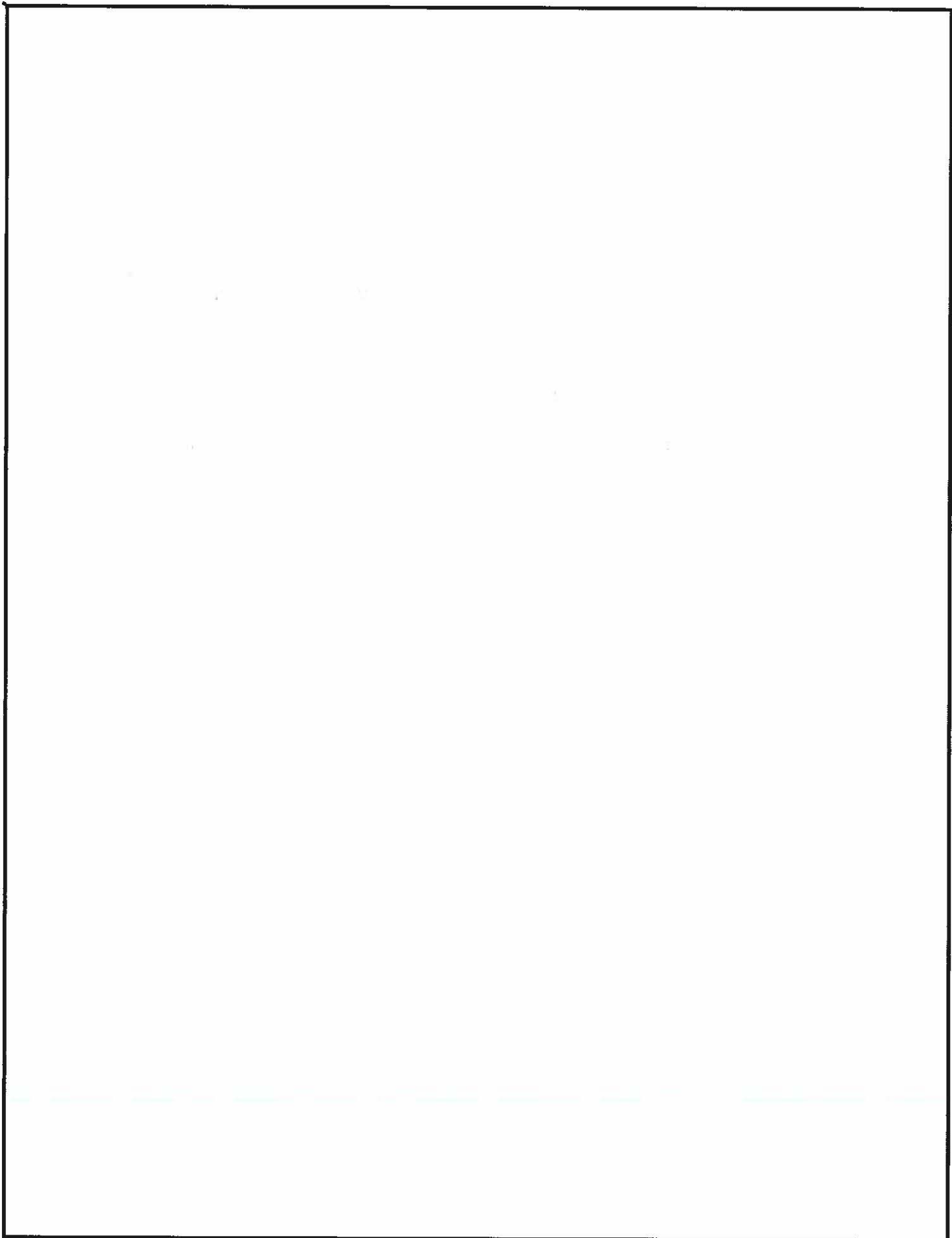
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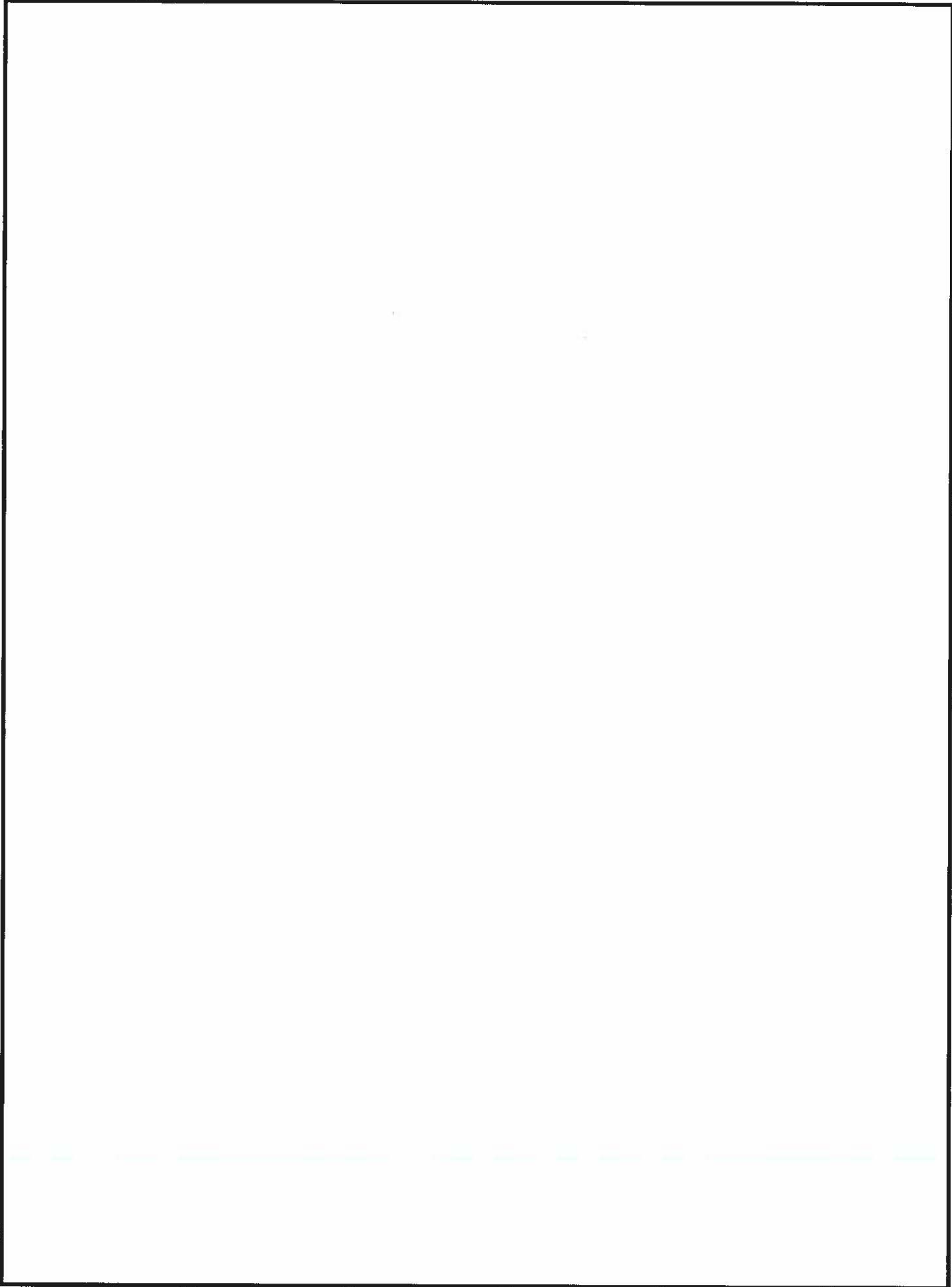


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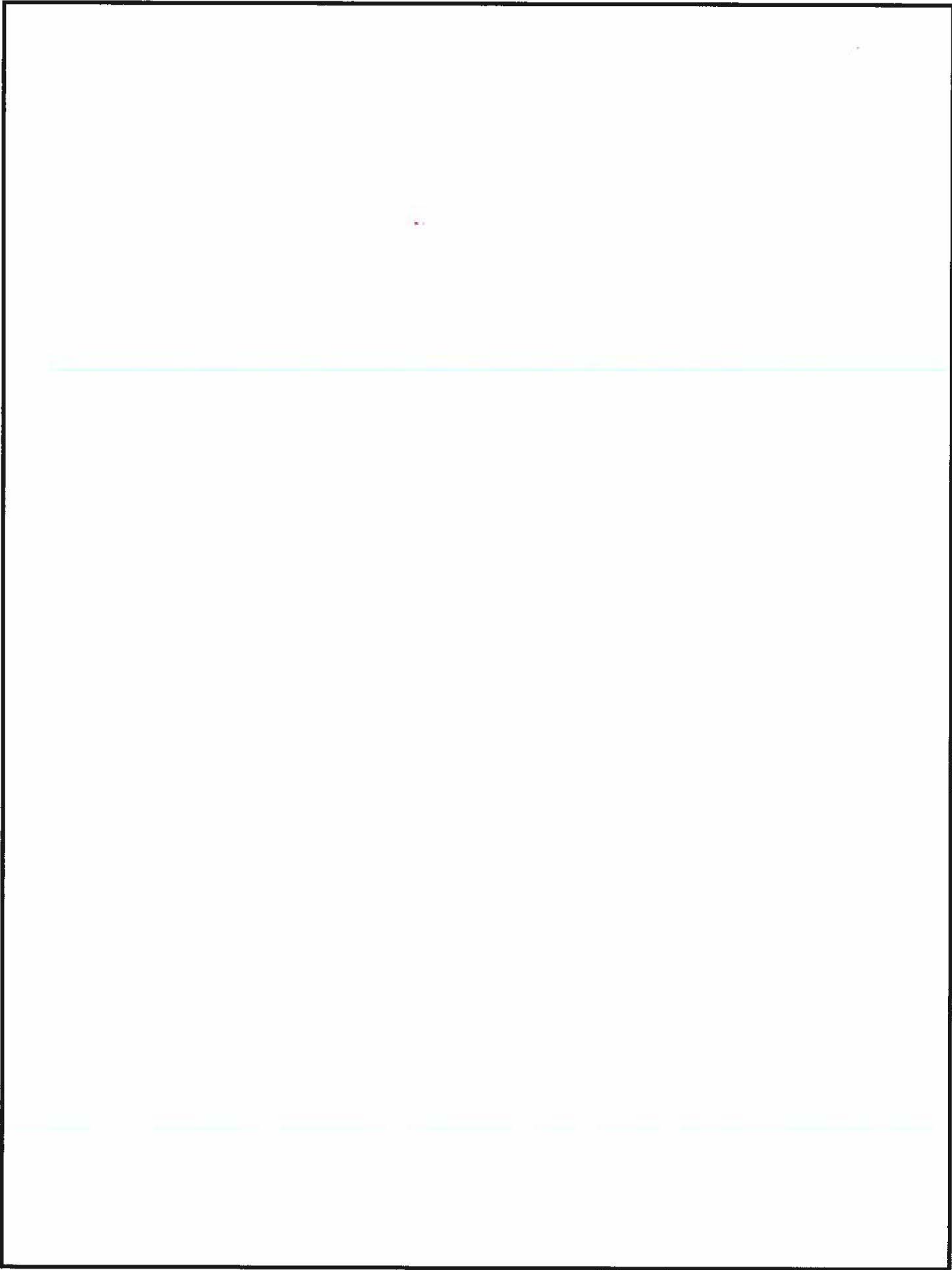


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