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March 1965

TECHNICAL PUBLICATION

PHOTOGRAPHIC EVALUATION REPORT MISSION 1009-1 6-9 AUGUST 1964 AND MISSION 1009-2 9-13 AUGUST 1964

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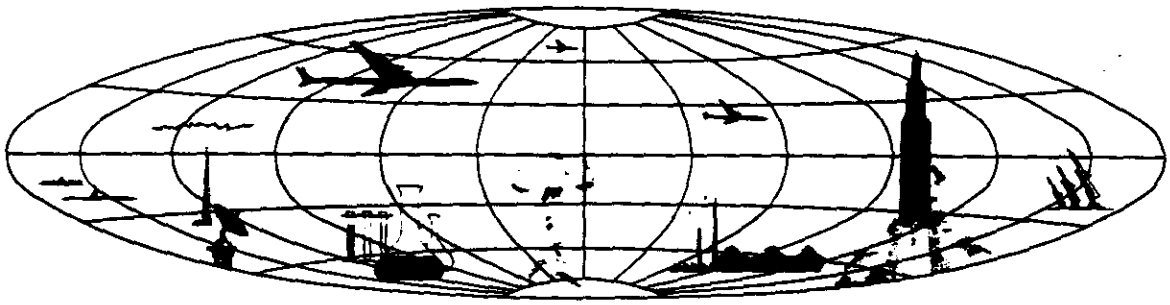

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[redacted]

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NATIONAL PHOTOGRAPHIC INTERPRETATION CENTER

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TABLE OF CONTENTS

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LIST OF ILLUSTRATIONS

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SYNOPSIS

Mission 1009 (System J-12) was a two-part satellite photographic reconnaissance mission. A normal orbit was achieved and photographic coverage was accomplished between 6 and 13 August 1964. Clouds covered approximately 48 percent of the mission. The cameras and associated photographic equipment functioned properly and more than 11 million square nautical miles (nm) of plottable photographic coverage was acquired.

The recovery capsule from Mission 1009-1 was retrieved by an air catch during revolution 49. The cameras were reactivated during the same revolution and continued to function properly throughout Mission 1009-2. The second recovery capsule was retrieved by an air catch during revolution 128.

There is no significant difference in image quality of the panoramic material between missions 1009-1 and 1009-2.

The mission was assigned an MIP rating of 85.

GENERAL FLIGHT DATA

Date of Launch: 5 August 1964

Actual Orbital Parameters

	Revolution 25	Revolution 112
Period:	90.7 minutes	90.6 minutes
Perigee:	101 nm	102 nm
Perigee Latitude:	44.6°N	63.3°N
Apogee:	243 nm	242 nm
Eccentricity:	0.0198	0.0194
Inclination Angle:	79.99°	80.0°

Recovery:
Mission 1009-1: 8 August 1964
Mission 1009-2: 13 August 1964

PART I. CAMERA OPERATIONS

1. Master (FWD) Panoramic Camera No 154

The Master Panoramic Camera functioned properly on this mission. The major detriment to the photographic record is the slight loss of resolution

[redacted]

[redacted]

at the supply end of the format adjacent to the non-timing track edge. This area varies in size and recurs sporadically. On occasion it extends as far as 2.3 inches into the format along the non-timing track edge, but does not extend more than 0.6 inch along the timing track edge. The area is most prevalent in the first three passes and appears intermittently throughout the first part of the mission (1009-1). It is not detected throughout the second part (1009-2). Other degradations, which are considered minor, include:

a. There are three, and sometimes four, short scratches, approximately 0.4 inch apart within the format adjacent to the camera number and parallel to the major axis of the negatives. These scratches continue throughout both parts of the mission and appear to be associated with the field flattener.

b. Continuous scratches parallel to the edges of the negatives are evident throughout both parts of the mission. These scratches are attributed to the rails which support the film during film transport.

c. Non-image forming light caused fogged areas and shadowgraphs of equipment on the last two frames of all passes and a diagonal fog streak is evident on the second or third frame after a camera on. The density of these fogged areas is commensurate with the duration of the camera-off period.

2. Slave (AFT) Panoramic Camera No 155

The Slave Panoramic Camera functioned properly on this mission. There is no major detriment to the photographic record from this camera. Minor degradations attributed to the camera include:

a. A continuous fine minus density streak 0.8 inch from and parallel to the non-timing track edge.

b. Recurring minus density streaks, approximately 0.05 inch wide, parallel to the major axis and variable in intensity, quantity, and location. These streaks are presumed to be caused by foreign matter close to the slit aperture.

c. Non-image-forming light caused fog areas and shadowgraphs of equipment in the third and in the last or second to last frame of most passes.

[redacted]

[redacted]

3. Master (FWD) Horizon Cameras

a. The port (supply) horizon camera was operational throughout the mission. The exposure is commensurate with the solar elevation. The negatives in pass 1D contain images of material associated with the vehicle. What appears to be a piece of tape can be readily identified in successive frames and unidentifiable objects can also be detected.

b. The starboard (take-up) horizon camera was operational throughout the mission. The exposure is commensurate with the solar elevation. The imagery in the early passes and at extreme northern latitudes in later passes has the appearance of being recorded through a cloud of vapor. This veiling degrades the imagery, but the horizons are definable and useful for the determination of vehicle attitude.

4. Slave (AFT) Horizon Cameras

a. The port (take-up) horizon camera was operational throughout the mission. The exposure is commensurate with the solar elevation. The negatives in pass 1D contain images of material similar to those described for the Master Port Horizon Camera.

b. The starboard (supply) horizon camera shutter failed to open in passes 46D, frames 6 and 12; 47DE, frame 6; 52D, frames 125 through 145; 69D, frame 3; 70D, frames 7 and 15; 85D, frames 13 and 188; 99D, frame 3; 116D, frame 20; and 118D, frame 47. The exposure is commensurate with the solar elevation. The imagery in the early passes and at extreme northern latitudes in the later passes has the same appearance as that described for the Master Starboard Horizon Camera.

5. Stellar Camera No 56 (Mission 1009-1)

This stellar camera functioned properly, recording 338 frames. Stars to the 7th magnitude were identified and as many as 56 stars can be detected in some frames. The first frame contains a double exposure.

Flare affects approximately 20 percent of each frame. A certain amount of flare may be advantageous for hypersensitizing the emulsion. Stellar images can be detected in the flared area.

Multidirectional streaks are present on 10 percent of the frames. These streaks may be caused by particles of fuel used to control the vehicle attitude. The streaks were noted in the following frames: 1, 3, 4, 5, 6, 7, 12, 16, 17, 18, 21, 24, 25, 27, 28, 29, 31, 46, 47, 53, 57, 58, 59, 64, 69, 91, 100, 103, 104, 106, 139, 174, 197, 247, 270, 304, 325 and 326.

[redacted]

[redacted]

Edge static and emulsion cracking along the minor axis is noted throughout the material. The similarity of the two degradations causes difficulty in differentiation between them. In some instances the emulsion cracking extends from edge to edge (example frame 330).

6. Stellar Camera No 34 (Mission 1009-2)

This stellar camera functioned properly, recording 412 frames. Stars to the 7th magnitude were identified and as many as 50 stars can be detected in some frames.

Flare affects approximately 35 percent of each frame. There were six fewer stars detectable in Mission 1009-2 than in 1009-1. This loss may be attributed to the excessive flare.

There are small plus density areas and associated markings that appear as emulsion cracks. These areas are located 0.3 inch and 0.6 inch from the edge opposite the camera number and appear randomly throughout the material. There is evidence of continuous dendritic static discharges or emulsion cracks along the edge opposite the camera number and similar markings intermittently along the camera number edge. These marks extend from edge to edge more frequently as the mission progresses. The last seven feet contain continuous edge-to-edge markings. The format is slightly degraded by non-image-forming light that produces a plus density streak entering the format from the camera number edge and extending 0.5 inch into the format. The following frames are affected: 25, 62, 110, 145, 165, 172, 174, 205, 227, 244, 266, 293, 312, 325, 331, 344, 362, 376, 382, 384, 388 and 402. A plus density streak, approximately 0.1 inch wide and of undetermined origin, is noted between the camera number and the format in the last 17 frames of the mission.

[redacted]

[redacted]

FIGURE 1. DEFINITION OF PHOTOGRAPHIC DATA.

The data pertaining to photographs contained in this publication are defined as follows:

PASS: A pass is the operational portion of an orbital revolution. A suffix D indicates that the photography was acquired during the descending portion, a suffix A indicates that the photography was acquired during the ascending portion, and a suffix M indicates that the photography was acquired during a pass that includes both ascending and descending portions. An additional suffix E indicates that the pass was an engineering operation or that a portion of the pass has been edited.

DATE OF PHOTOGRAPHY: The date of photography indicates the day, month, and year (GMT) that the photography was acquired.

UNIVERSAL GRID COORDINATES: These coordinates are included to locate the illustrated photography within the panoramic format.

ENLARGEMENT FACTOR: The enlargement factor is included to indicate the number of diameters the original material has been enlarged in the photographic illustration.

GEOGRAPHIC COORDINATES: These coordinates are included to indicate the latitude and longitude of the panoramic format.

ALTITUDE: This measurement is the vertical distance from the vehicle to the Hough Ellipsoid at the time of the acquisition of the photography.

PITCH: The pitch is the rotation of the vehicle about the transverse axis. Positive readings indicate nose-up attitude, negative readings indicate nose-down attitude.

ROLL: The roll is the rotation of the vehicle about the longitudinal axis. Positive readings indicate left wing-up attitude. Negative readings indicate right wing-up attitude.

YAW: The yaw is the rotation of the vehicle about the vertical axis. Positive readings indicate counterclockwise rotation when viewing the ground nadir from the vehicle.

LOCAL SUN TIME: This time is included to present to the viewer a realistic time of the acquisition of the photography illustrated.

[redacted]

SOLAR ELEVATION: The solar elevation is the angular elevation of the sun above a plane tangent to the surface of the earth at the center of the panoramic format. A negative solar elevation indicates that the sun is below the plane.

SOLAR AZIMUTH: The solar azimuth is the angular measurement of the rays of the sun measured from True North in a clockwise direction.

EXPOSURE: The exposure is the duration of the photographic exposure expressed in a fraction of a second and is computed from the scan rate and slit width.

[redacted]

FIGURE 2. STELLAR FRAME NO 1 (MISSION 1009-1).

NPIC J-8554 (3/65)

This is the first frame recorded by the stellar camera (No 56) on this mission. It depicts the typical streaks that are usually observed in stellar photography during the early portion of a mission. The vertical lines of the reseau are double imaged in this frame; however, no other double exposures were detected in the stellar material of this mission.

[redacted]

[redacted]

Stellar Frame Number	1 (1009-1)
Correlates with FWD Camera:	
Pass	1D
Frame	4
Date of Photography	6 August 1964
Enlargement Factor	5X
Vehicle:	
Pitch	-01° 03.5'
Roll	00° 32.6'
Yaw	00° 13.5'
Exposure Time	2 seconds

[redacted]

[redacted]

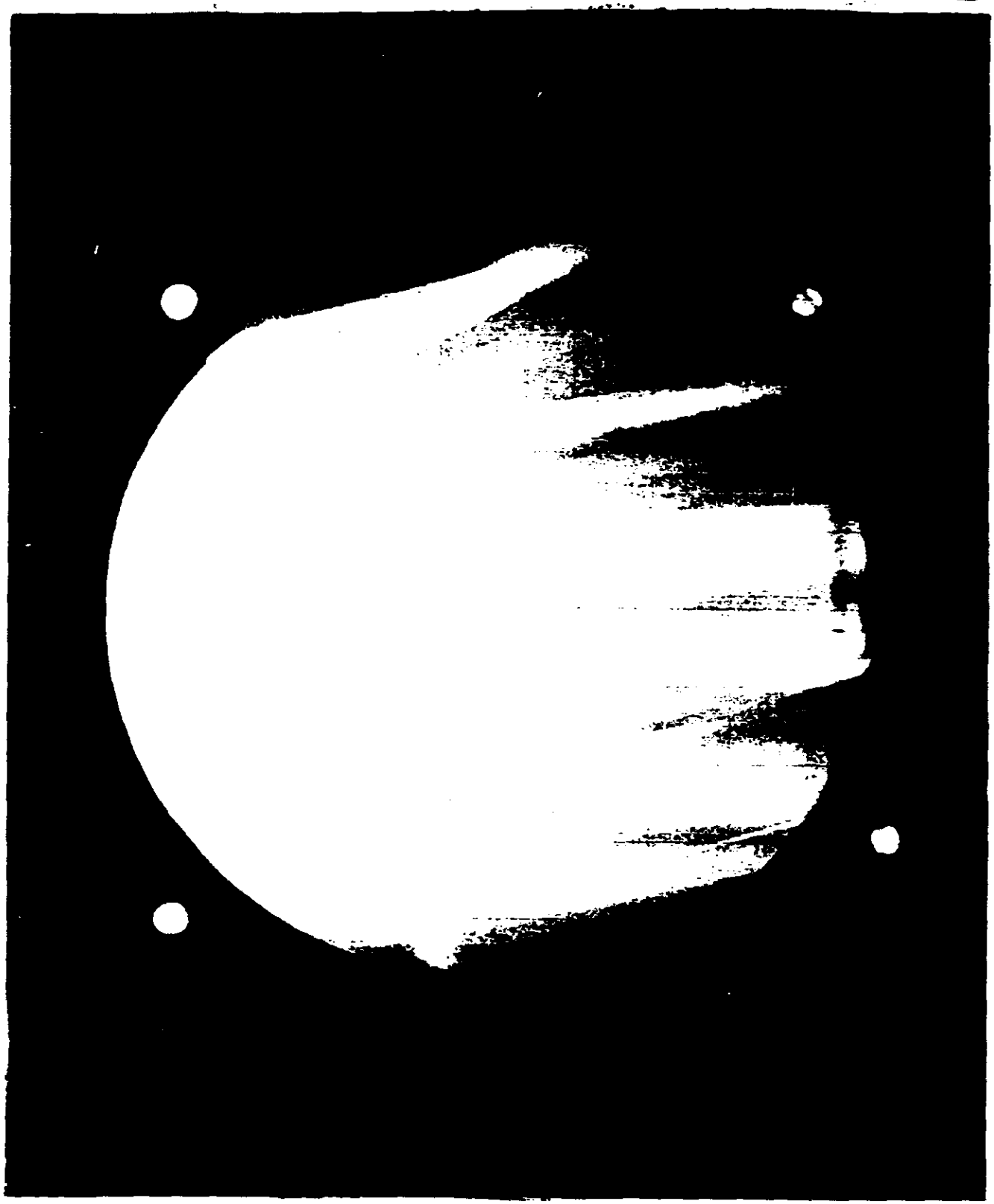

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FIGURE 3. STELLAR FRAME NO 3 (MISSION 1009-1).

NPIC J-8585 (3/68)

This frame was recorded 7 hours and 30 minutes after stellar frame 1. Similar streaks can still be observed, but the quantity has diminished considerably. The streaks shown in this photograph have the appearance of flat objects rotating as they pass through the angle of view of the stellar camera.

[redacted]

[redacted]

Stellar Frame Number	3 (1009-1)
Correlates with FWD Camera:	
Pass	6D
Frame	10
Date of Photography	6 August 1964
Enlargement Factor	5X
Vehicle:	
Pitch	-01°03.5'
Roll	00°32.0'
Yaw	00°18.6'
Exposure Time	2 seconds

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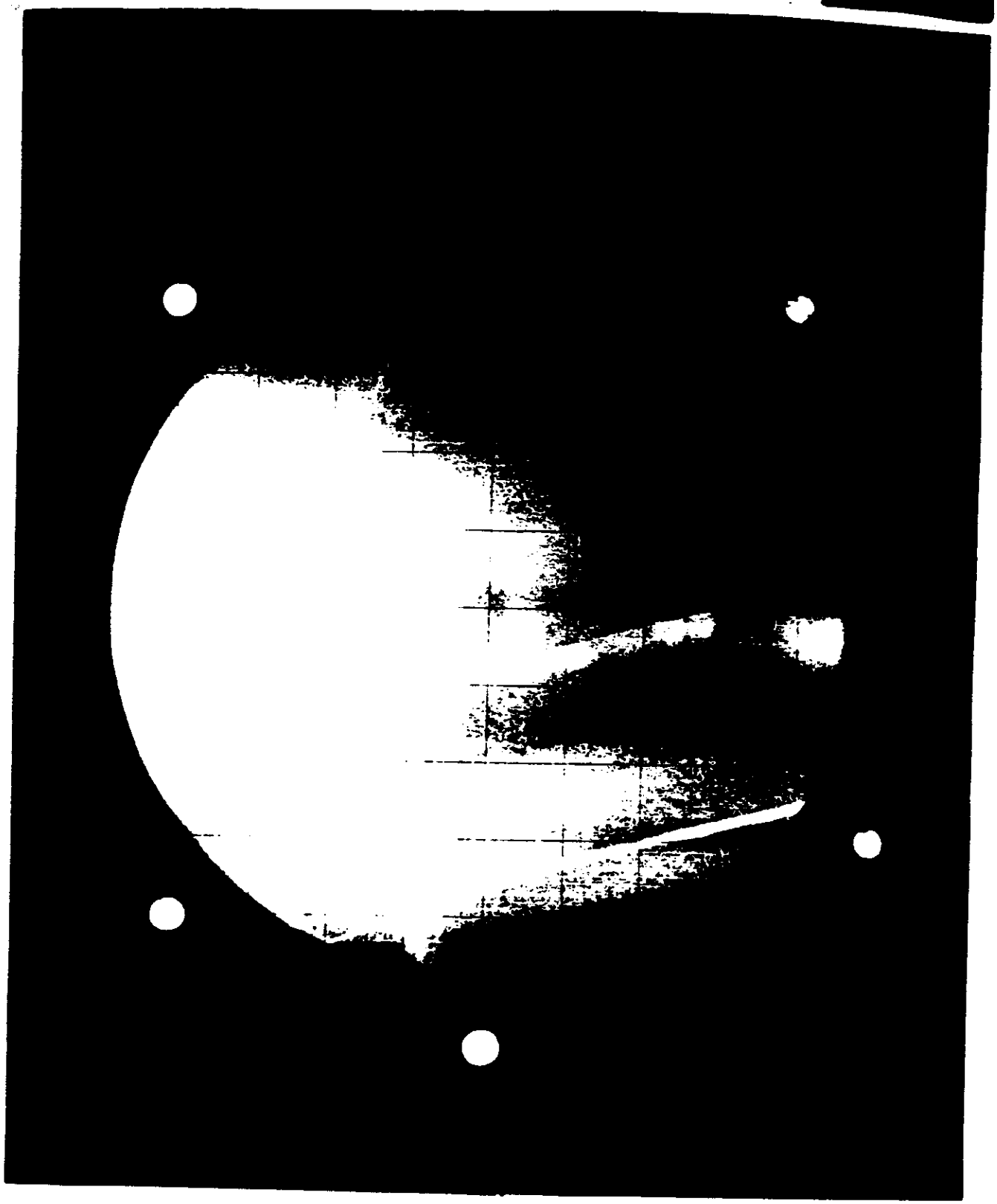

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FIGURE 4. STELLAR FRAME NO 4 (MISSION 1009-1).

NPIC J-8556 (3/68)

This photograph is included to show the pattern of one of the larger streaks observed in the stellar photography in Mission 1009-1.

[redacted]

[redacted]

Stellar Frame Number	4 (1009-1)
Correlates with FWD Camera:	
Pass	6D
Frame	17
Date of Photography	6 August 1964
Enlargement Factor	5X
Vehicle:	
Pitch	-01°05.5'
Roll	00°32.2'
Yaw	00°25.3'
Exposure Time	2 seconds

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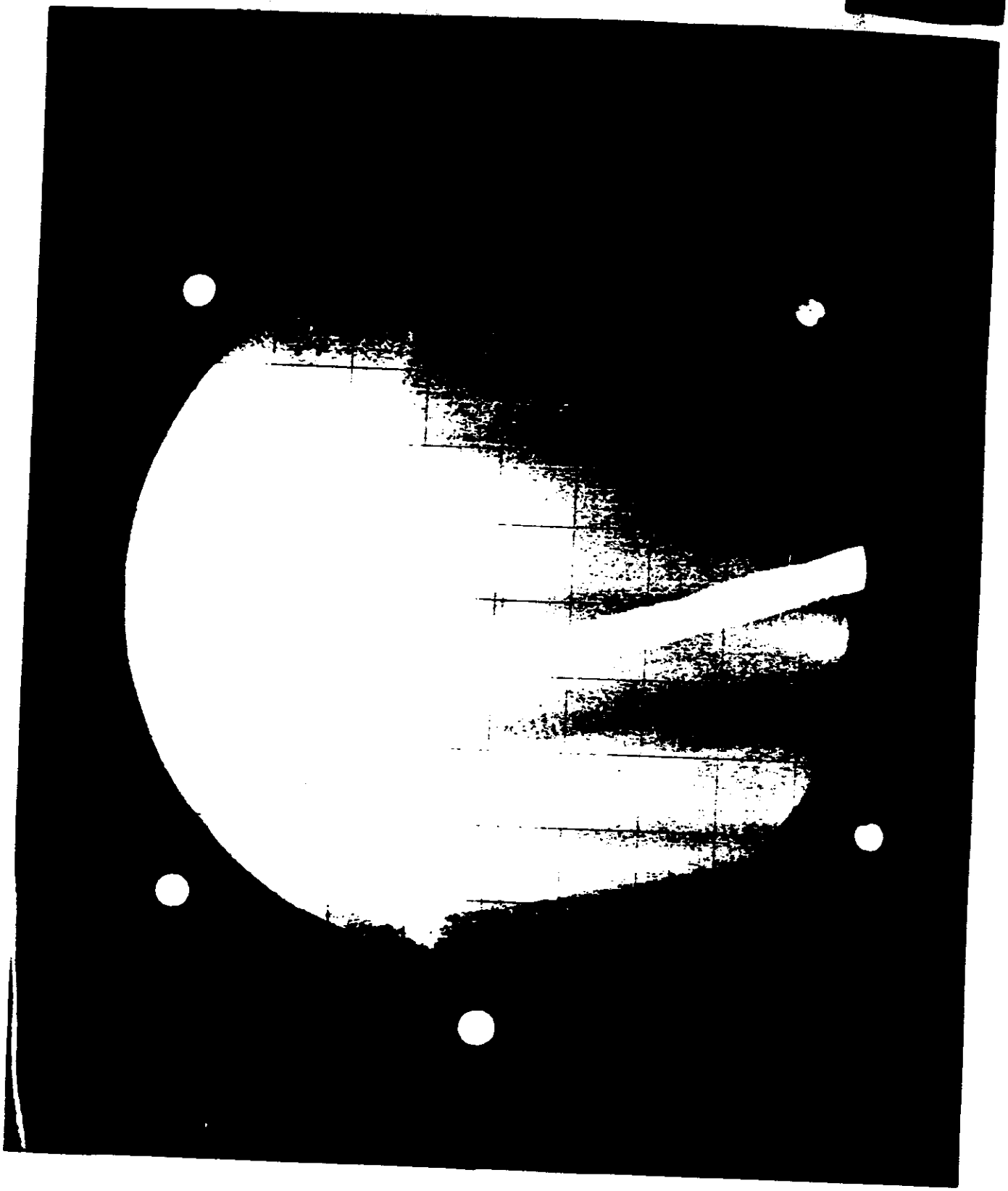

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FIGURE 5. STELLAR FRAME NO 24 (MISSION 1009-1).

NPIC J-8867 (3/68)

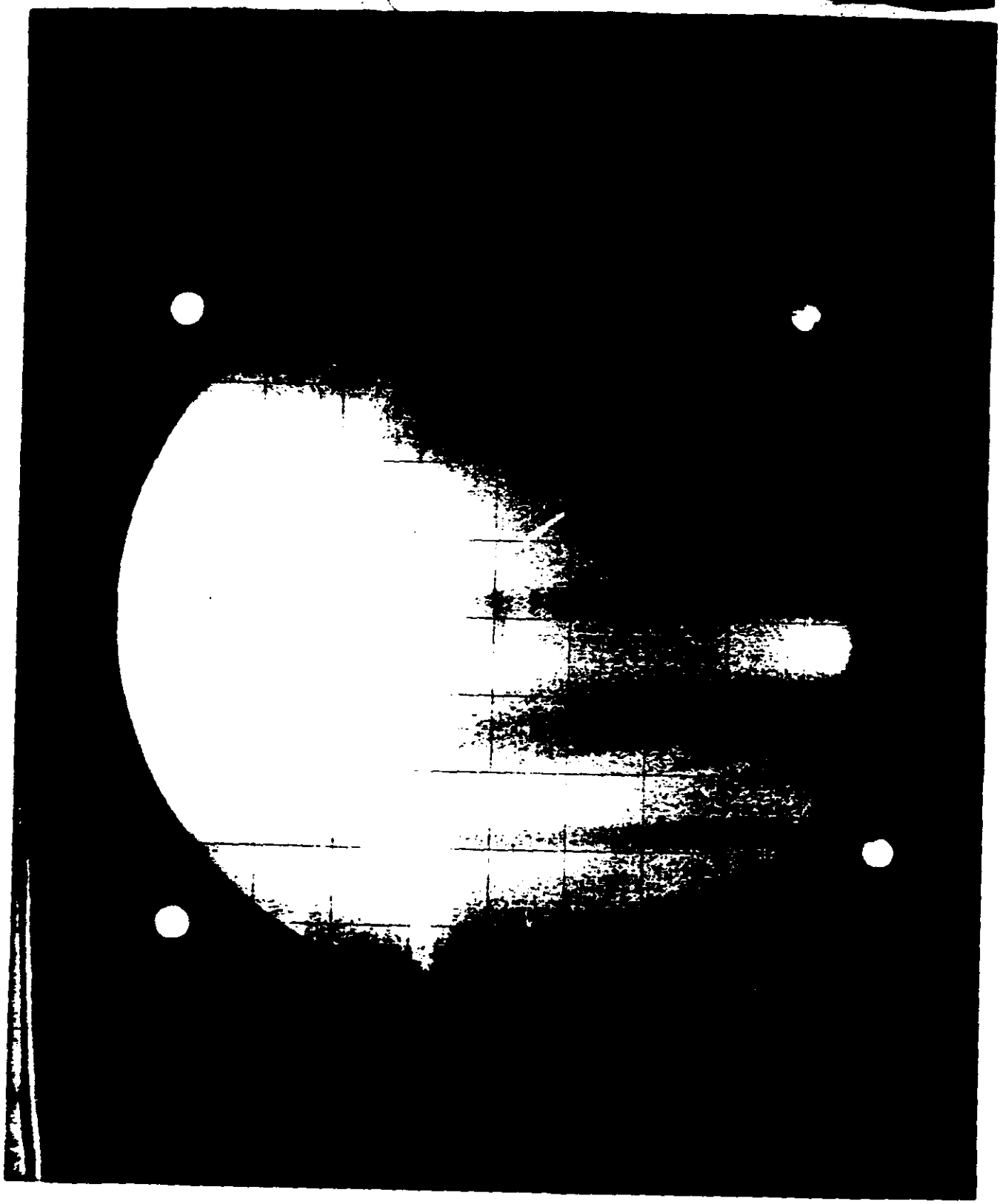
This photograph shows an average stellar frame from Mission 1009-1.

[redacted]

[redacted]

Stellar Frame Number	24 (1009-1)
Correlates with FWD Camera:	
Pass	6D
Frame	157
Date of Photography	6 August 1964
Enlargement Factor	5X
Vehicle:	
Pitch	-00° 44.1'
Roll	00° 27.5'
Yaw	-00° 05.8'
Exposure Time	2 seconds

[redacted]



[redacted]

FIGURE 6. STELLAR FRAME NO 139 (MISSION 1009-1).

NPIC J-8588 (3/65)

This photograph is included to show the pattern of a streak that was recorded during the middle portion of Mission 1009-1.

[redacted]

[redacted]

Stellar Frame Number	139 (1009-1)
Correlates with FWD Camera:	
Pass	21D
Frame	137
Date of Photography	7 August 1964
Enlargement Factor	5X
Vehicle:	
Pitch	00° 10.3'
Roll	00° 01.9'
Yaw	00° 40.8'
Exposure Time	2 seconds

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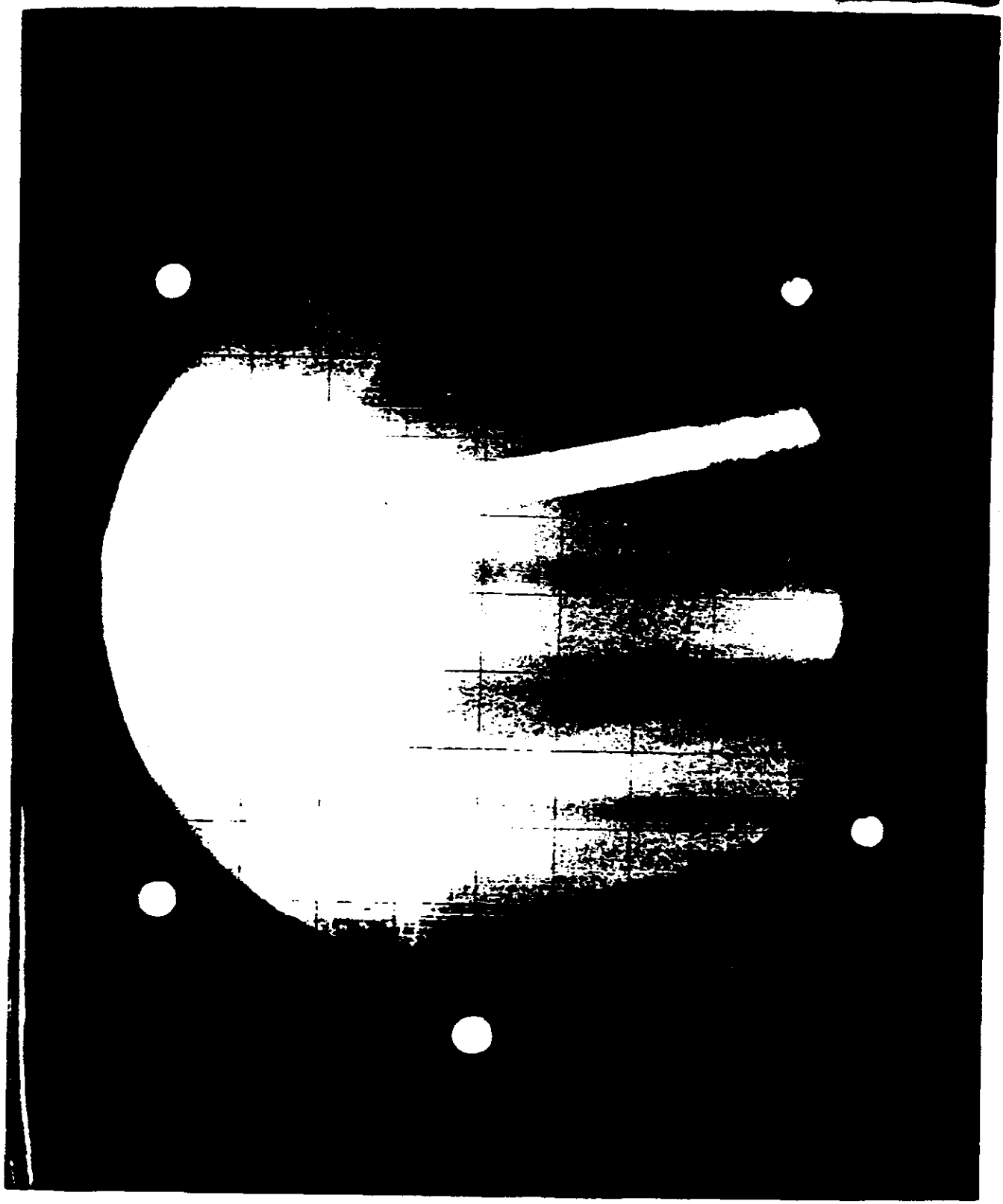

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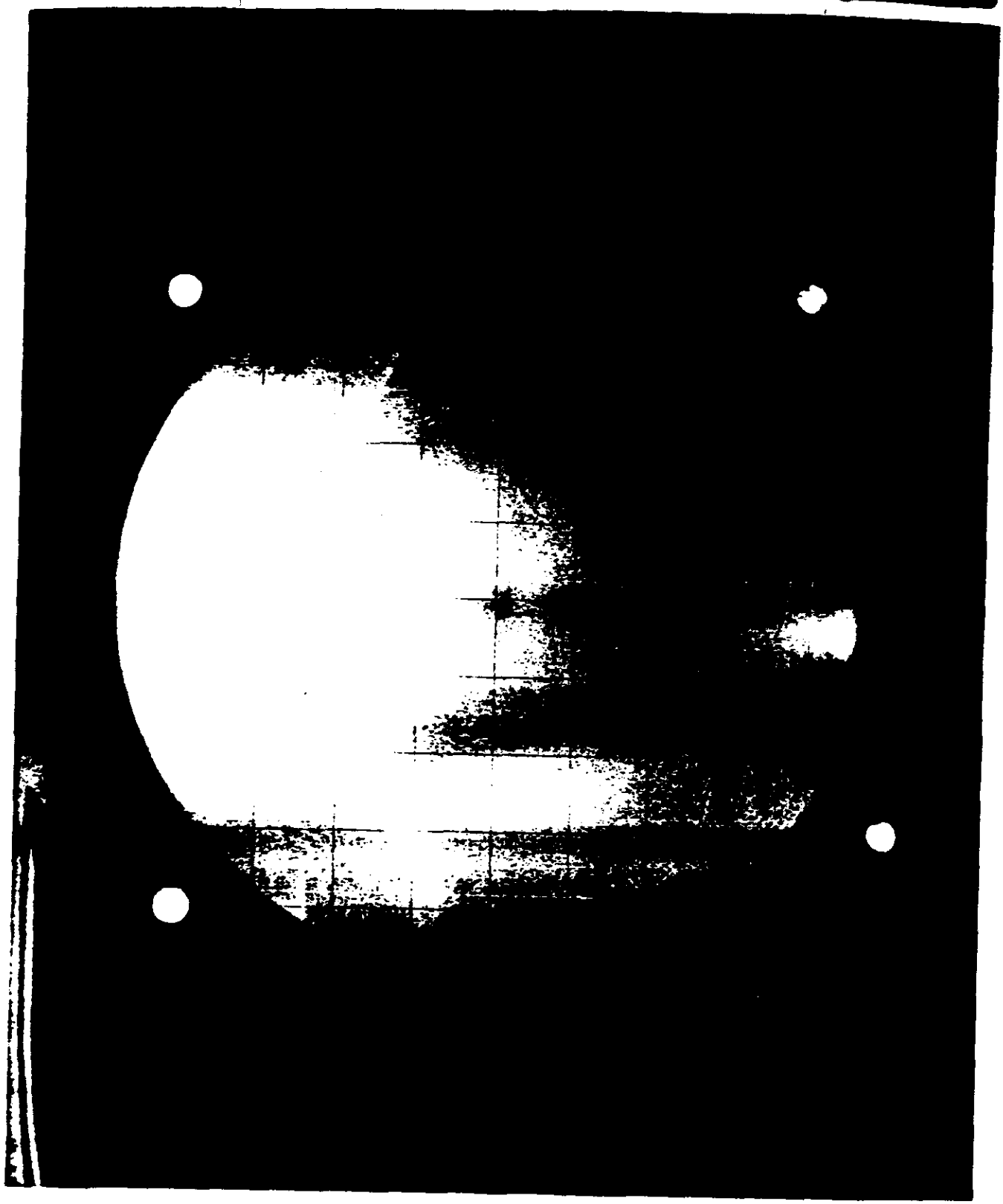
FIGURE 7. STELLAR FRAME NO 303 (MISSION 1009-1).

NPIC J-8858 (3/69)

This photograph shows stellar images that are detectable in the flared area of the format in Mission 1009-1.

[redacted]

Stellar Frame Number	303 (1009-1)
Correlates with FWD Camera:	
Pass	40D
Frame	88
Date of Photography	8 August 1964
Enlargement Factor	5X
Vehicle:	
Pitch	01°47.7'
Roll	00°34.9'
Yaw	-00°04.2'
Exposure Time	2 seconds



[redacted]

FIGURE 8. STELLAR FRAME NO 28 (MISSION 1009-2).

NPIC J-8560 (3/68)

This photograph shows the difference in contrast between the stellar photography from Camera No 56 (Mission 1009-1) and Camera No 34 (Mission 1009-2). Emulsion cracking or the results of electric discharges can be detected two places within the format.

[redacted]

[redacted]

Stellar Frame Number	28 (1009-2)
Correlates with FWD Camera:	
Pass	52D
Frame	176
Date of Photography	9 August 1964
Enlargement Factor	5X
Vehicle:	
Pitch	00°03.3'
Roll	00°48.1'
Yaw	00°02.9'
Exposure Time	2 seconds

[redacted]

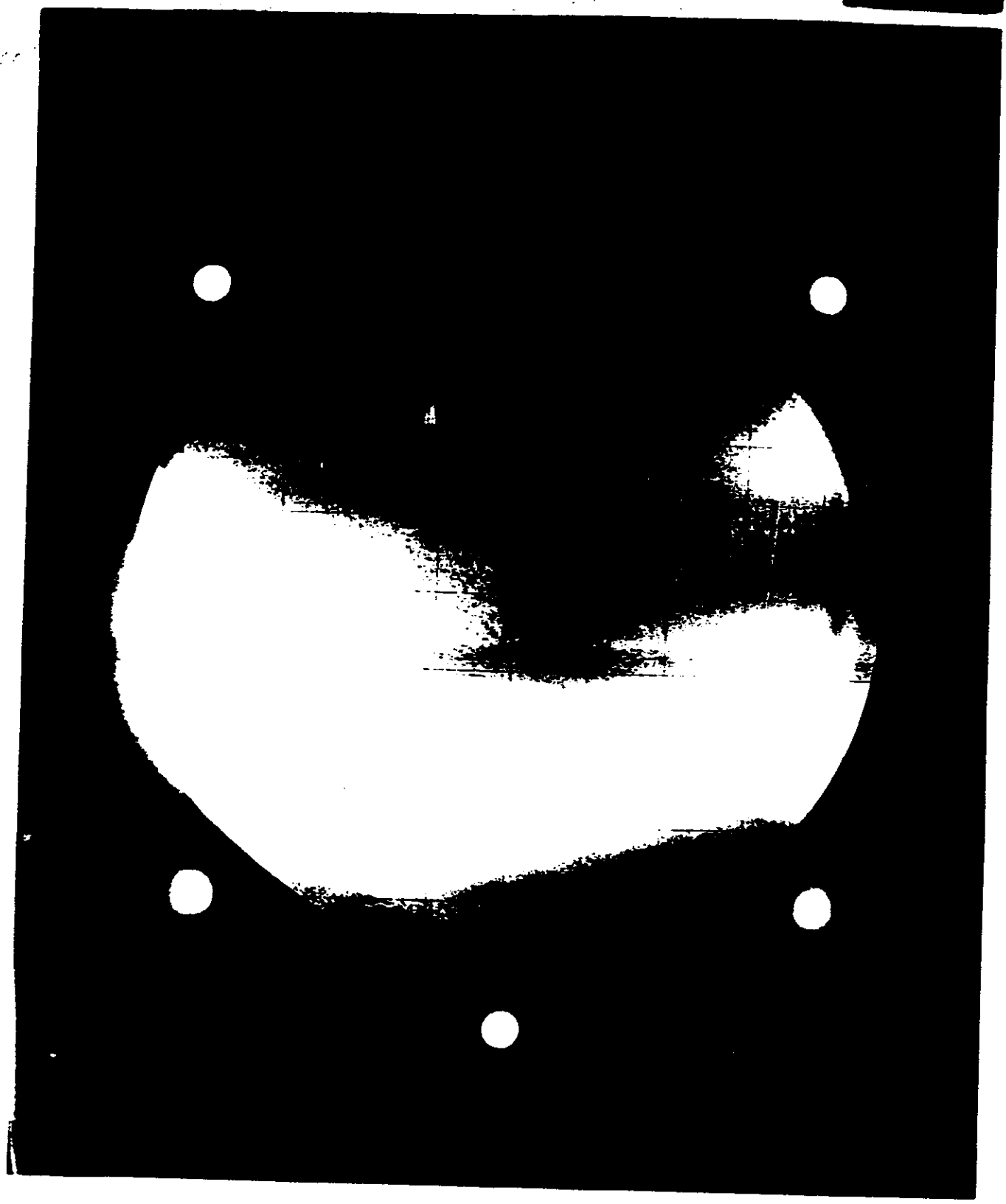


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FIGURE 9. STELLAR FRAME NO 95 (MISSION 1009-2).

NPIC J-9961 (3/68)

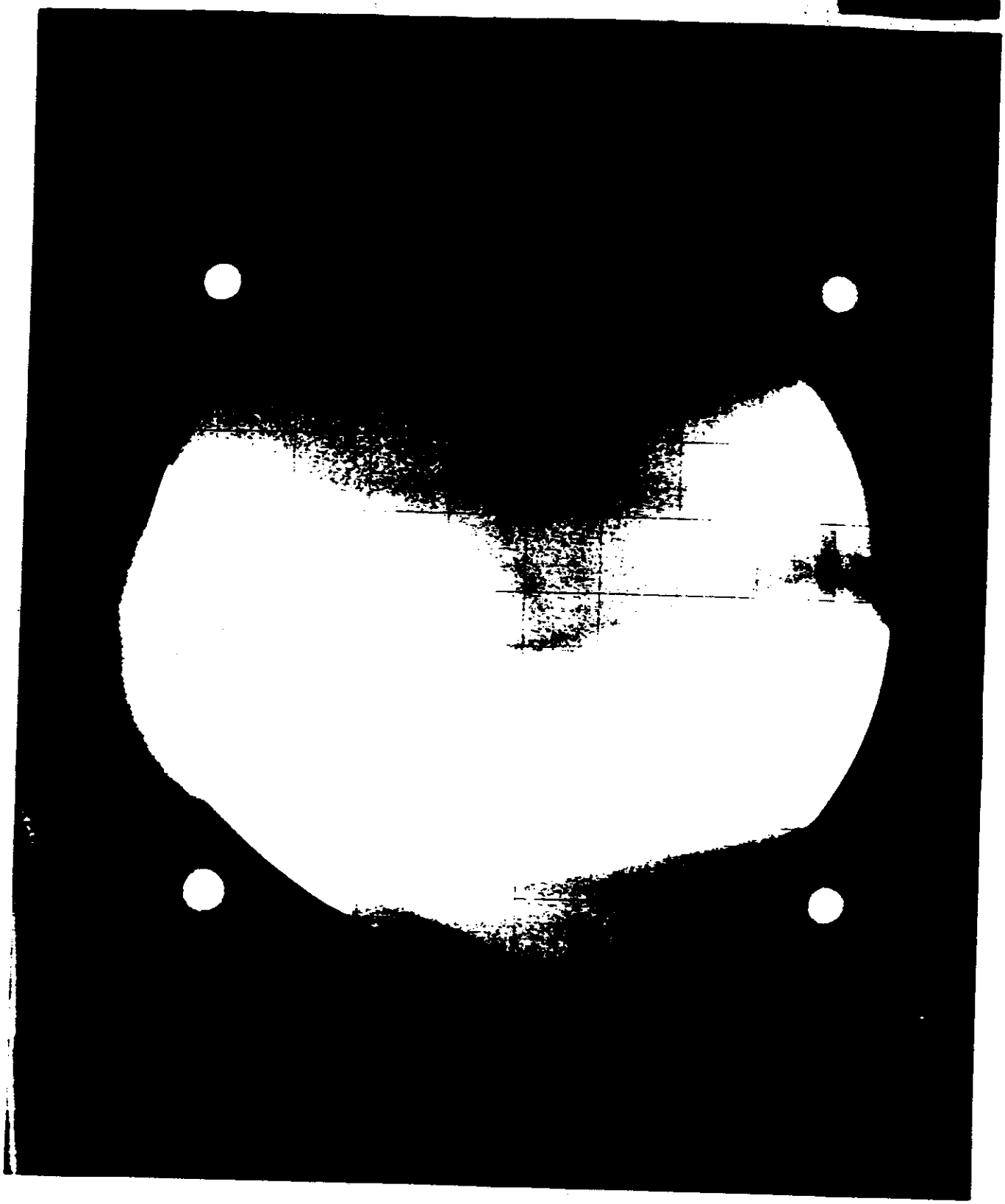
This photograph is included to show the pattern of the flared area in the stellar format of Camera No 34 of Mission 1009-2.

[redacted]

[redacted]

Stellar Frame Number	95 (1009-2)
Correlates with FWD Camera:	
Pass	54D
Frame	185
Date of Photography	9 August 1964
Enlargement Factor	5X
Vehicle:	
Pitch	00°04.9'
Roll	00°03.8'
Yaw	00°56.1'
Exposure Time	2 seconds

[redacted]



[redacted]

FIGURE 10. STELLAR FRAME NO 392 (MISSION 1009-2).

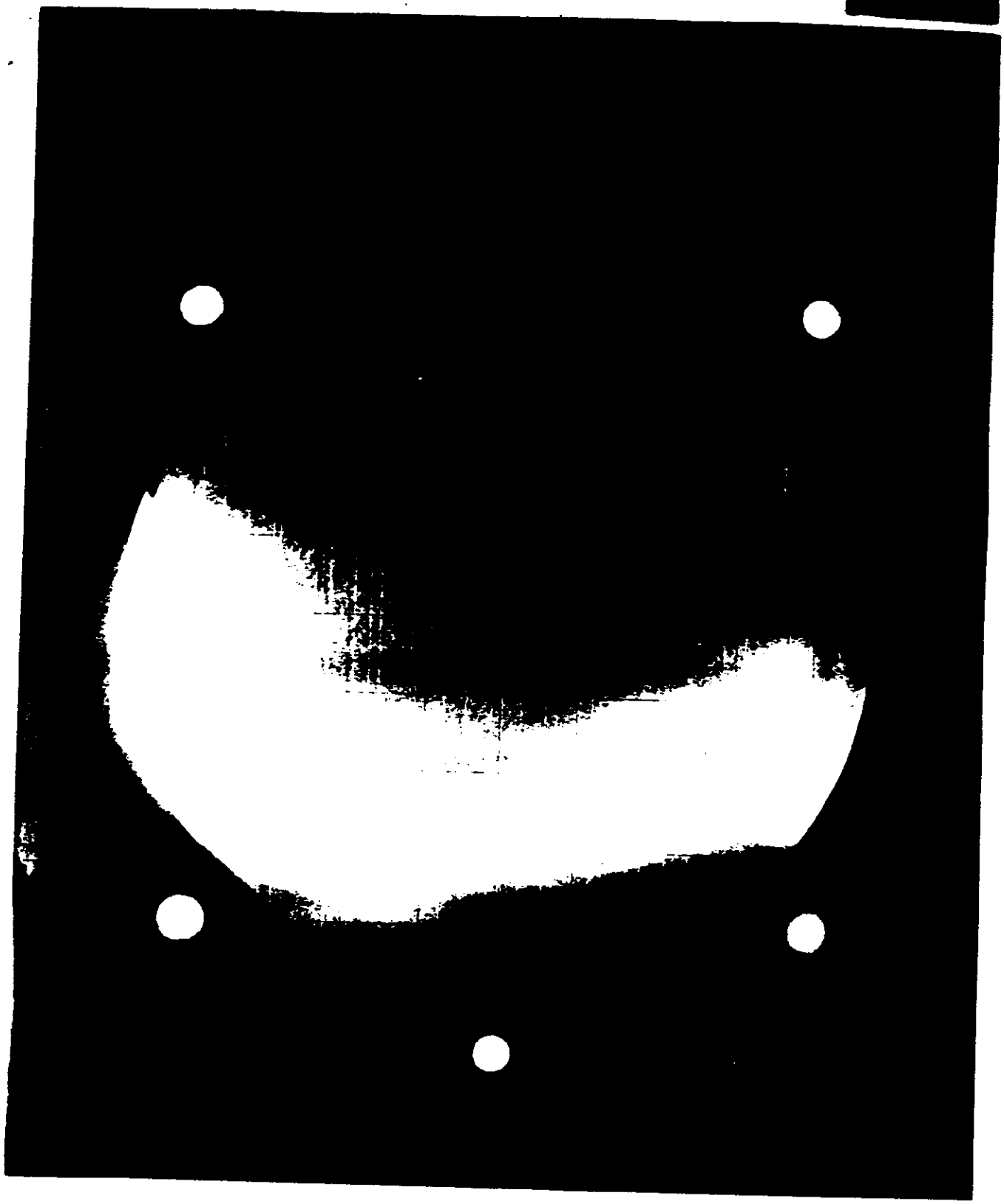
NPIC J-8862 (3/68)

This photograph shows the most severe emulsion cracking observed in the stellar photography from Camera No 3⁴ of Mission 1009-2.

[redacted]

Stellar Frame Number	392 (1009-2)
Correlates with FWD Camera:	
Pass	112D
Frame	6
Date of Photography	13 August 1964
Enlargement Factor	5X
Vehicle:	
Pitch	-00°09.7'
Roll	00°13.7'
Yaw	00°43.4'
Exposure Time	2 seconds

[redacted]



[redacted]

7. Index Camera No 54 (Mission 1009-1)

The first frame is double exposed. The results of a light leak are noted in the format adjacent to the camera number in frame 96. No other degradations are noted in the index material of this mission.

8. Index Camera No 38 (Mission 1009-2)

A light leak of undetermined origin degrades each frame to a minor degree. The light leak causes a plus density streak to project 0.3 inch into the format 0.35 inch on the supply side of the camera number block. The density of the streak is commensurate with the duration between operations and is most severe in the following frames: 5, 28, 65, 113, 148, 150, 175, 177, 198, 208, 230, 232, 247, 269, 282, 288, 296, 315, 317, 328, 334, 347, 365, 372, 379, 385, 387, 391, 405, 426 and 434. This light leak is not associated with the camera, but rather occurs in the transport path because the plus density occurs even on frames that were exposed on the dark side of the orbit.

9. Associated Equipment

This equipment records technical information required for the correlation and mensuration of the primary cameras.

With the exception of the binary word the equipment associated with the master and slave panoramic cameras functioned properly throughout the missions. The horizon camera fiducials are clearly defined. The 200 cycles per second timing pips are legible and recorded properly outside the format. The camera number, index marks and binary word are of optimum density. The binary word that is recorded on the negatives and the serial output recorded in the clock interrogations exhibit an error after pass 8D frame 157. Bit 15 of the binary word remained lighted for extended intervals, producing erroneous time data throughout the balance of Mission 1009-1 and throughout all of Mission 1009-2. These errors are accumulative and occur in passes 8D, 40D, 99D and 100D. Two additional errors occur in the clock correlation figures; however, no photographic record is available during these occurences. The binary word errors are being hand corrected for ephemeris data. There are two camera-off markers at most camera-off positions in the material from both the master and slave panoramic cameras.

[redacted]

[redacted]

FIGURE 11. INDEX FRAME NO 279 (MISSION 1009-1).

NPIC J-6883 (3/68)

This photograph is included to show the density fall-off in the corners of the format of the index photography from Mission 1009-1.

[redacted]

[redacted]

Index Frame Number	279 (1009-1)
Correlates with FWD Camera:	
Pass	39D
Frame	63
Date of Photography	8 August 1964
Enlargement Factor	3X
Vehicle:	
Pitch	00° 12.7'
Roll	00° 28.9'
Yaw	00° 29.7'
Exposure	1/500 second

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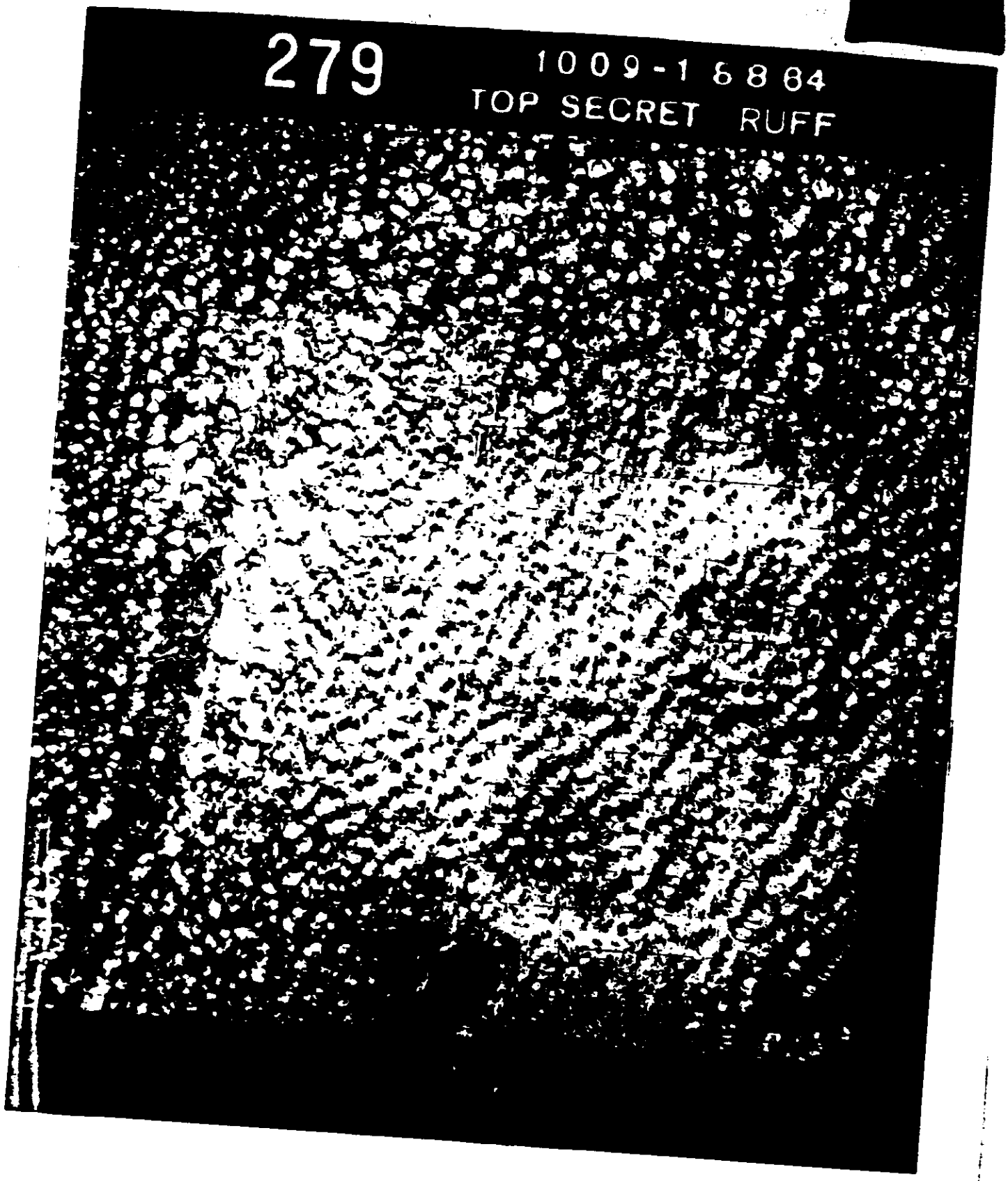

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FIGURE 12. INDEX FRAME NO 319 (MISSION 1009-1).

NPIC J-6864 (3/68)

The following photograph shows a cloud-free frame of photography from Mission 1009-1.

[redacted]

Index Frame Number	319 (1009-1)
Correlates with FWD Camera:	
Pass	46D
Frame	17
Date of Photography	8 August 1964
Enlargement Factor	3X
Vehicle:	
Pitch	01°57.3'
Roll	00°18.4'
Yaw	00°31.9'
Exposure	1/500 second

[redacted]

[redacted]

[redacted]

FIGURE 13. INDEX FRAME NO 247 (MISSION 1009-2).

NPIC J-8868 (3/68)

The following photograph is an example of the fogged area caused by a non-image forming light leak in the index camera used in Mission 1009-2.

[redacted]

[redacted]

Index Frame Number	247 (1009-2)
Correlates with FWD Camera:	
Pass	72D
Frame	78
Date of Photography	10 August 1964
Enlargement Factor	3X
Vehicle:	
Pitch	00° 15.7'
Roll	00° 19.6'
Yaw	00° 12.1'
Exposure	1/500 second

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[redacted]

[redacted]

PART II. FILM

1. Film Footage

The film footage and the frames processed from each of the cameras employed in Missions 1009-1 and 1009-2 are as follows:

CAMERA	FOOTAGE	FRAMES
Master Panoramic Camera No 154, Mission 1009-1	6,628	2,377
Mission 1009-2	8,293	3,125
Slave Panoramic Camera No 155, Mission 1009-1	6,558	2,360
Mission 1009-2	8,248	3,120
Stellar Camera No 56 Mission 1009-1	47	338
Stellar Camera No 34 Mission 1009-2	42	412
Index Camera No 54 Mission 1009-1	90	338
Index Camera No 38 Mission 1009-2	90	436

2. Film Processing

This section provides an evaluation of exposure, processing, and densities of the original negatives from the 10 cameras used in Missions 1009-1 and 1009-2.

a. The exposure was good throughout the mission.

b. Infra-red detection densitometry was employed to determine the optimum levels of development for the various portions of the missions. Sixty-six changes in the level of development were required for optimum development of the material from the Master Camera and 77 changes were required for the slave material. The percentages processed at the various levels are as follows:

[redacted]

Level of Development	Mission 1009-1 Master	Mission 1009-1 Slave	Mission 1009-2 Master	Mission 1009-2 Slave
Primary	1%	0%	3%	4%
Intermediate	26%	40%	21%	47%
Full	73%	60%	76%	49%

c. The density of the negatives is considered good and compares favorably with negatives from previous missions. The photography on this mission was taken in the mid-afternoon between 1415 and 1530 sun time. The combination of elevation and azimuth caused a variance in the negative densities and contrast across the format of most frames. The principal ray of the forward camera was facing the sun on the starboard side and facing across the rays of the sun of the port side. The principal ray of the aft camera was facing across the rays of the sun on the starboard side and facing with the sun on the port side. This variance in density and contrast necessitated "special" printing on 33 parts of the mission in the reproduction of the duplicate positives.

3. Physical Film Degradations

There are no major film degradations on the material from the panoramic cameras used in missions 1009-1 and 1009-2. Static electrical discharges of undetermined origin caused minor dendritic-type fogging along the non-timing-track edge of the negatives from the master camera throughout Mission 1009-1. The fog is contained within the borders and does not affect the format. Starting with pass 52D, evidence of static electrical discharges is also present along the timing-track edge and becomes progressively more intense throughout Mission 1009-2. The negatives from the slave camera contain the results of static electrical discharges along the timing-track edge in passes 25AE, 25D, 30D, 46D, 99D and 112D. The negatives from the master camera contain manufacturing splices in passes 37D, frame 71; 54D, frame 197; and 85D, frame 197; and 85D, frame 185. The slave material contains manufacturing splices in passes 21D, frame 21; 46D, frame 29; and 69D, frame 39. Emulsion digs, scratches, pinholes and handling marks are considered normal.

4. Film Processing Curves

The following processing curves are a product of the processing contractor:

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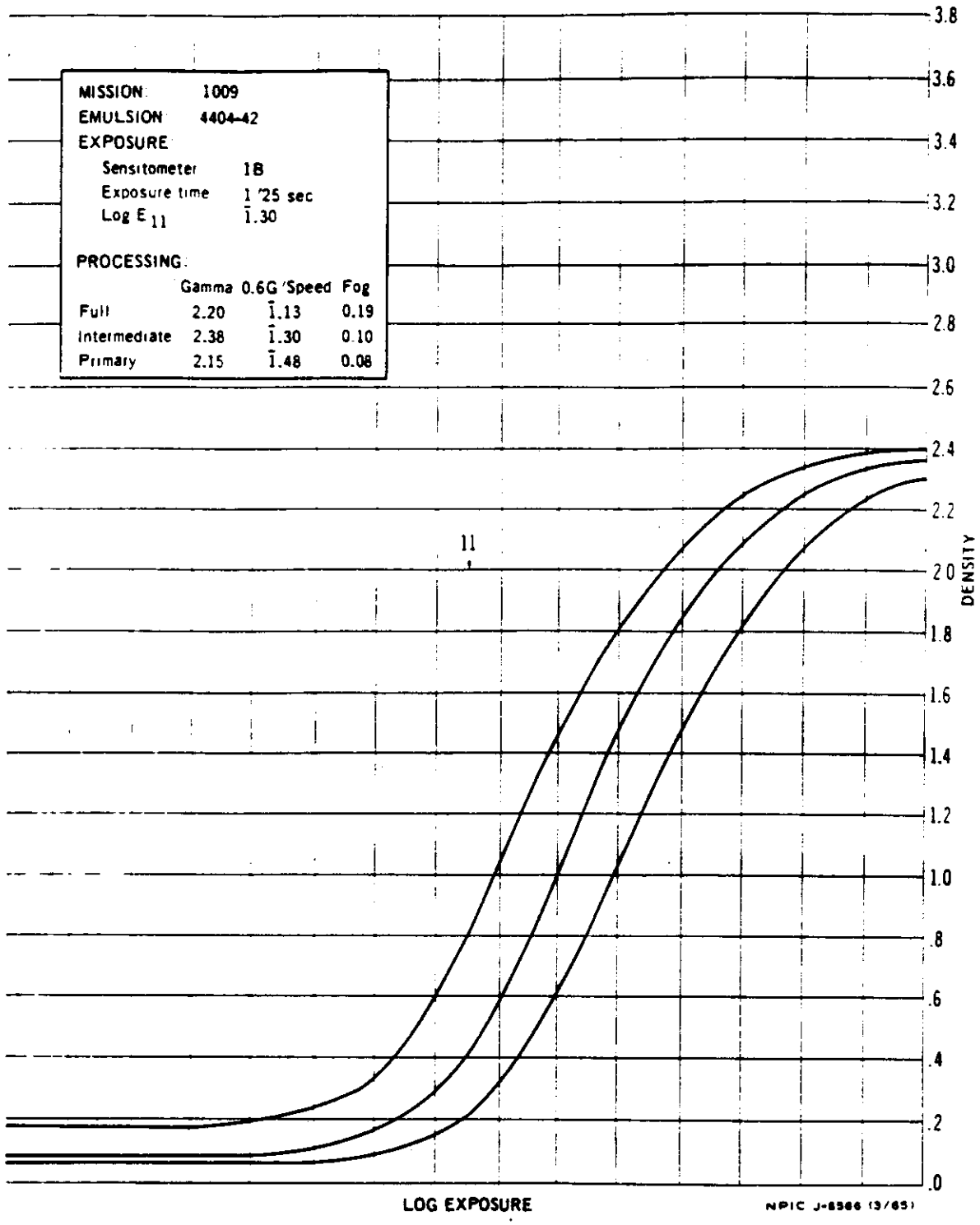
[redacted]

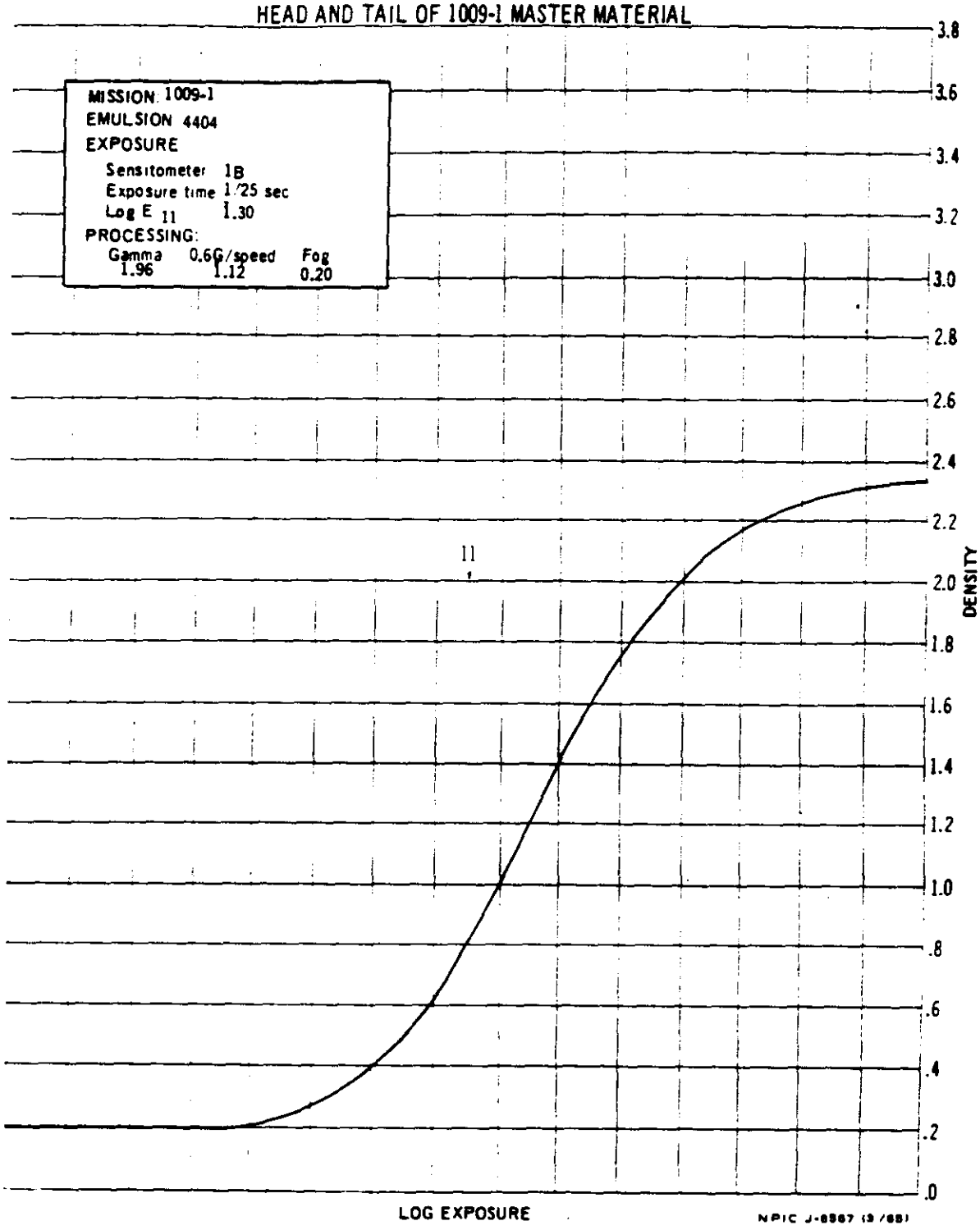
STANDARD SENSITOMETRIC CONTROL CURVES



[redacted]

[redacted]

SENSITOMETRIC CURVE FROM HEAD AND TAIL OF 1009-1 MASTER MATERIAL



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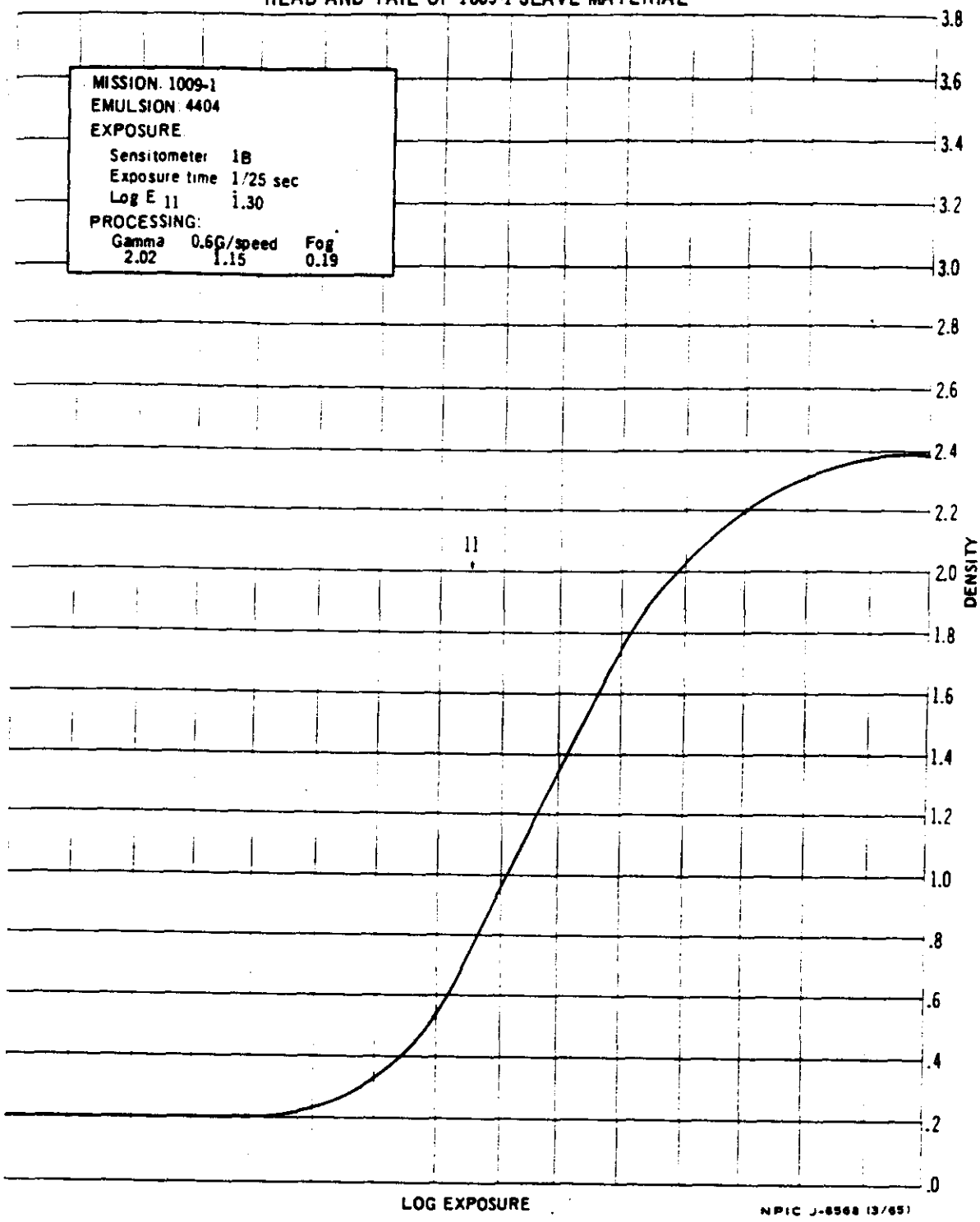
SENSITOMETRIC CURVE FROM HEAD AND TAIL OF 1009-1 SLAVE MATERIAL



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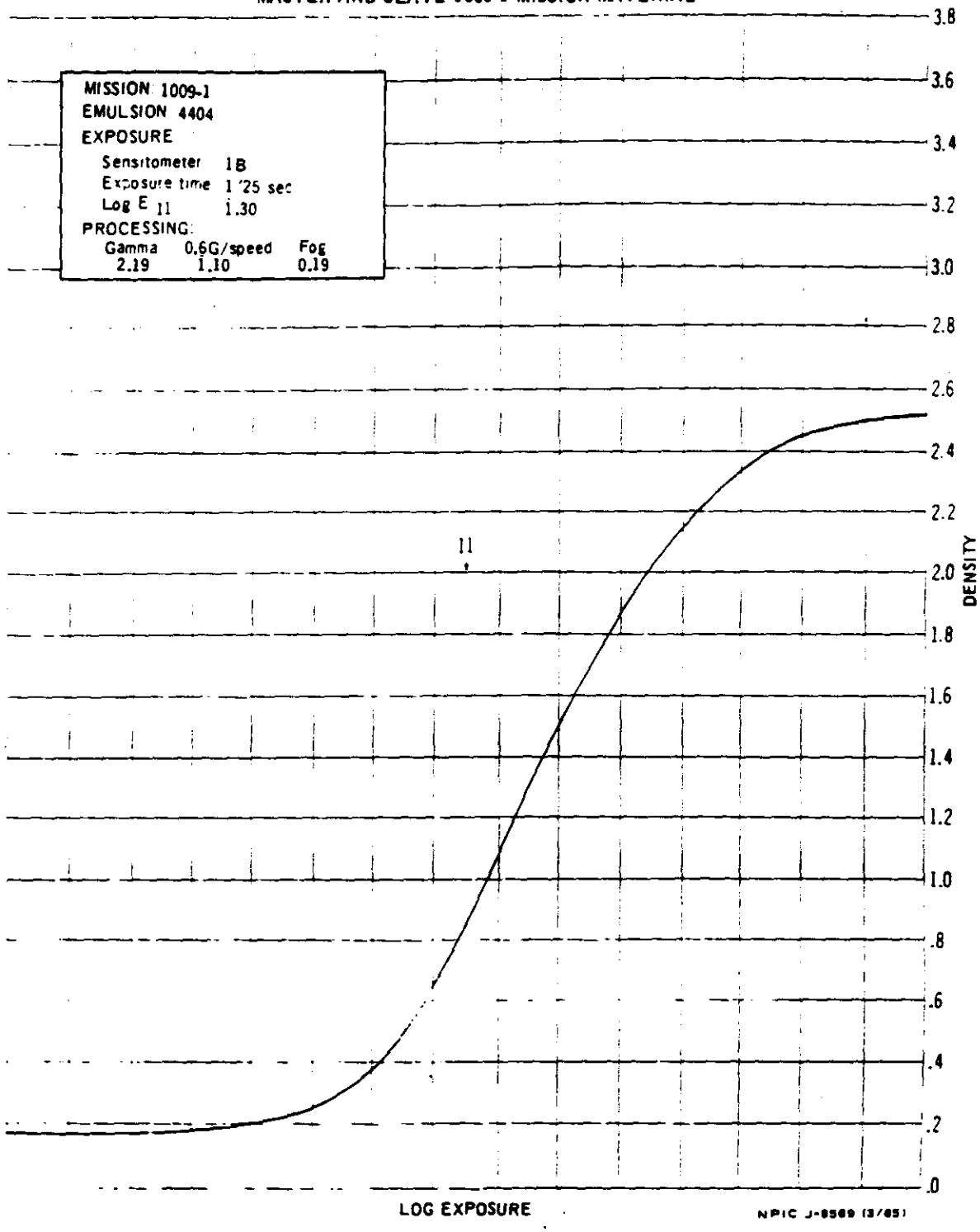
SENSITOMETRIC CURVE FROM MASTER AND SLAVE 1009-1 MISSION MATERIAL



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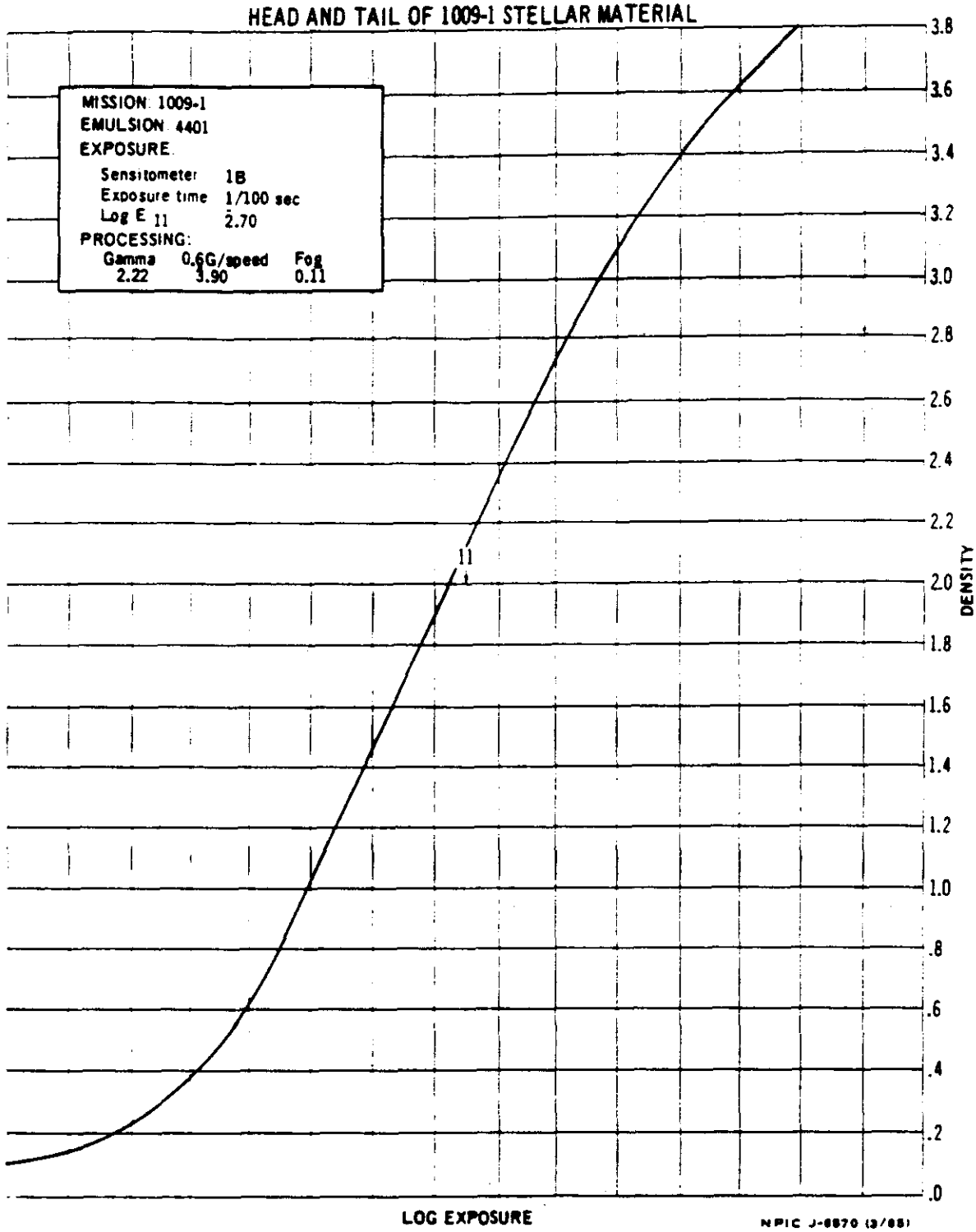
SENSITOMETRIC CURVE FROM HEAD AND TAIL OF 1009-1 STELLAR MATERIAL



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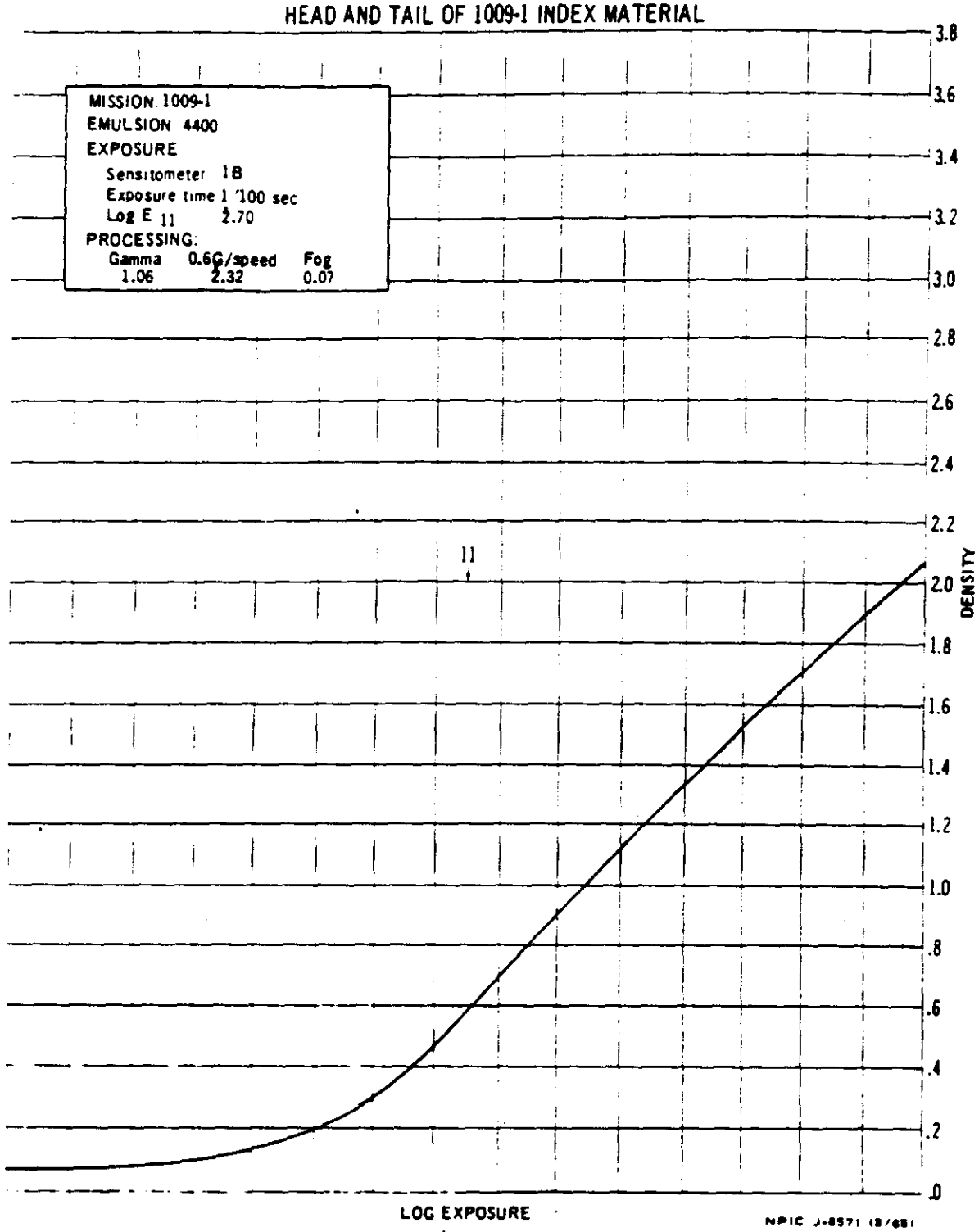
SENSITOMETRIC CURVE FROM HEAD AND TAIL OF 1009-1 INDEX MATERIAL



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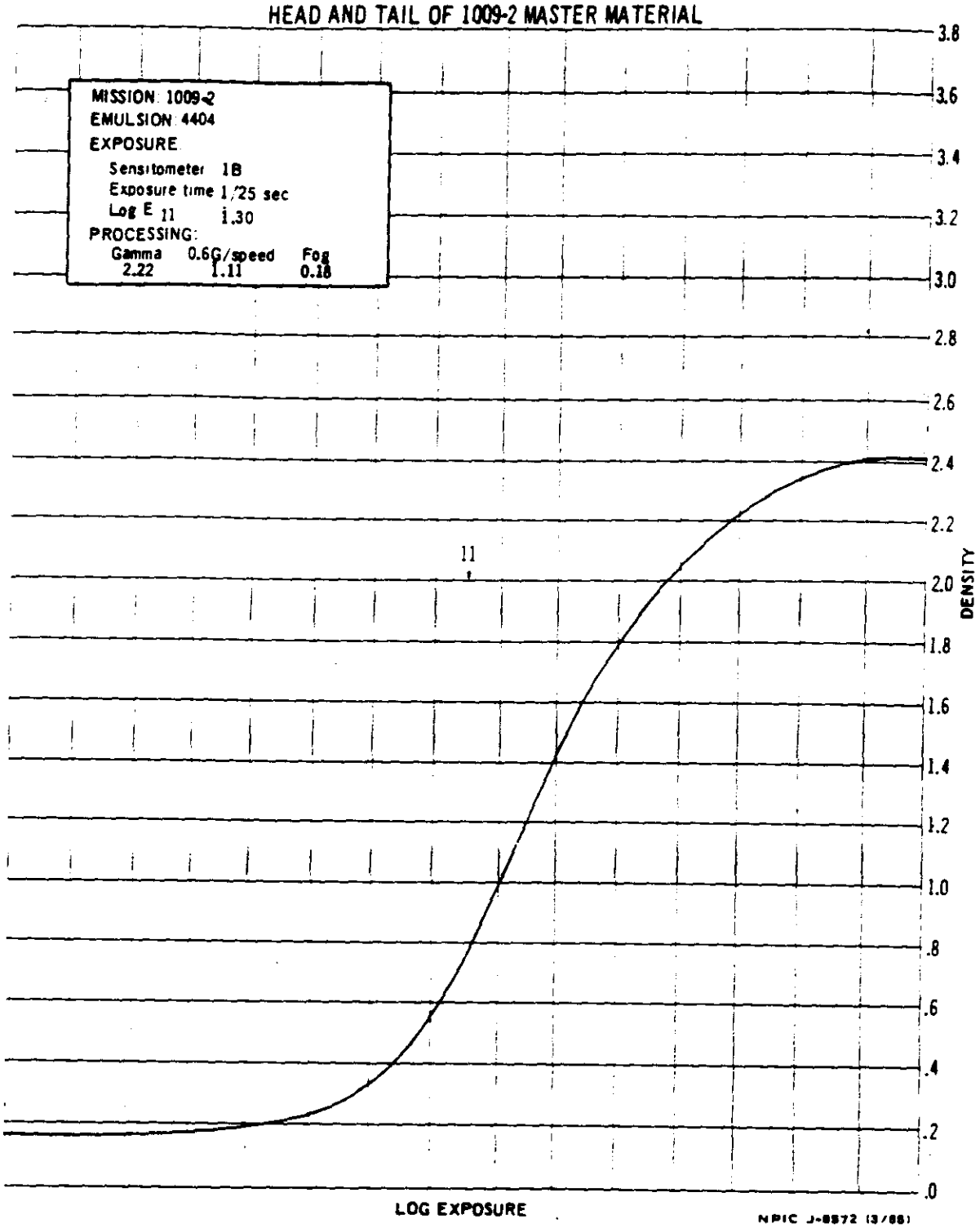
[redacted]

SENSITOMETRIC CURVE FROM HEAD AND TAIL OF 1009-2 MASTER MATERIAL



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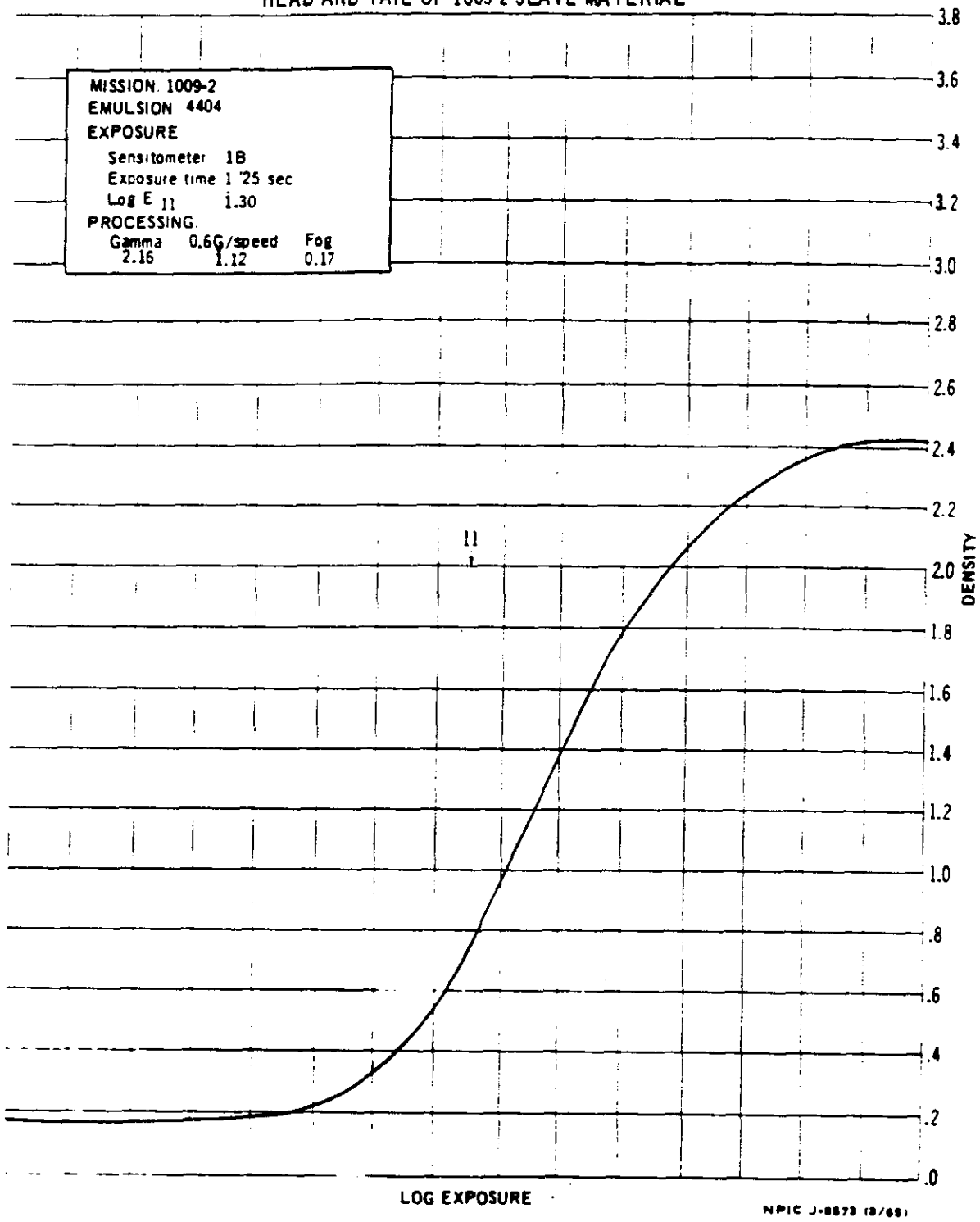
SENSITOMETRIC CURVE FROM
HEAD AND TAIL OF 1009-2 SLAVE MATERIAL



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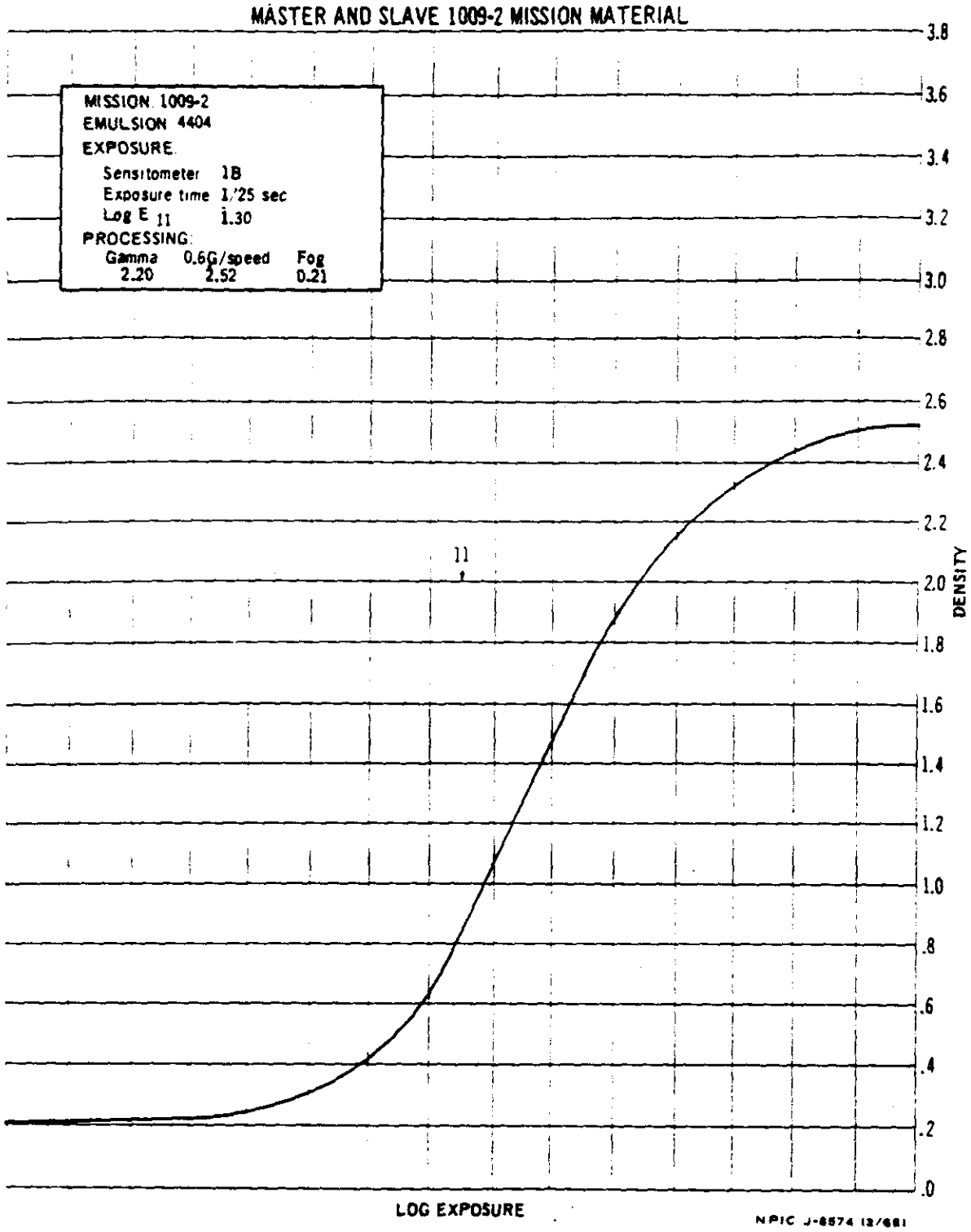
SENSITOMETRIC CURVE FROM MASTER AND SLAVE 1009-2 MISSION MATERIAL



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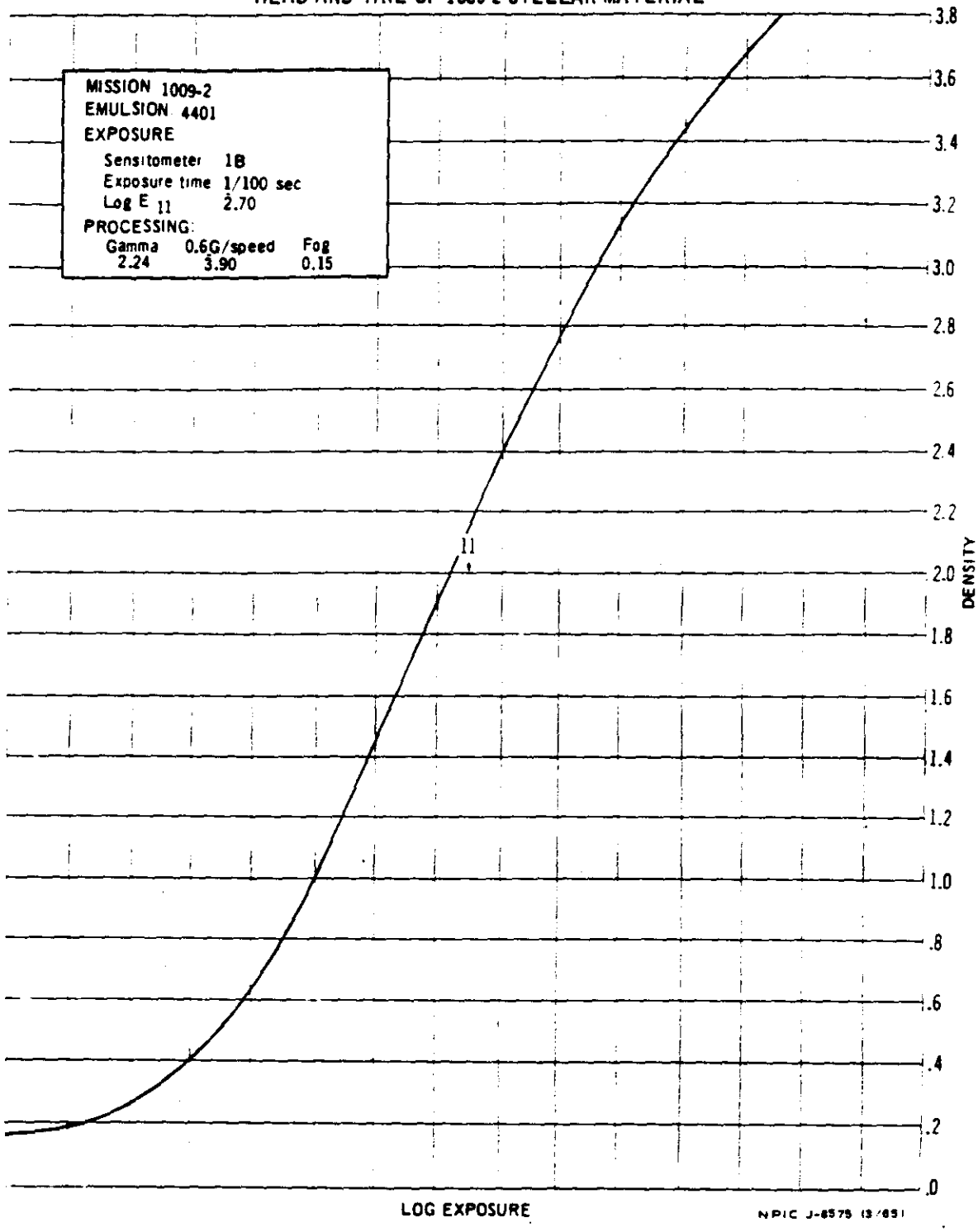
SENSITOMETRIC CURVE FROM HEAD AND TAIL OF 1009-2 STELLAR MATERIAL



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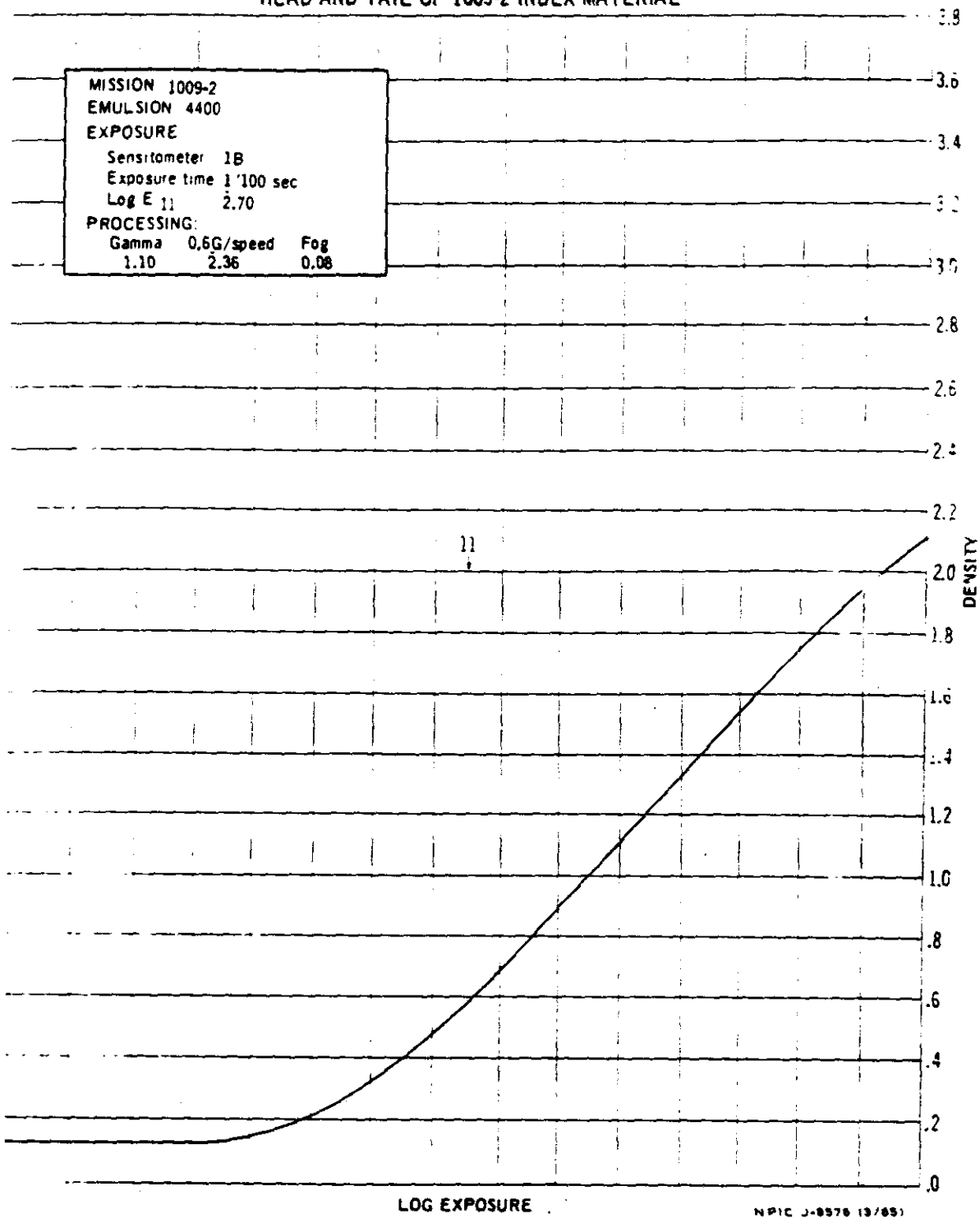
SENSITOMETRIC CURVE FROM HEAD AND TAIL OF 1009-2 INDEX MATERIAL



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PART III. IMAGE QUALITY

1. Photographic Interpretation (PI) Suitability

The PI suitability is an assessment of the information content of photographic reconnaissance material and its interpretability. A number of interrelated factors are involved, such as the quality of the photography, the extent of target coverage, scale, and weather limitations. However, the fundamental criteria for assigning a PI suitability rating may be reduced to (a) the scope of the photographic coverage and (b) the degree to which a photographic interpreter may extract useful and reliable information from the material.

PI suitability ratings are categorized as Excellent, Good, Fair, Poor, and Unusable. These ratings refer to the overall interpretive value of the photography obtained from a particular reconnaissance mission. Individual targets may also be assigned PI suitability ratings. The standards that determine assignment of the various ratings are:

Excellent: The photography is free of degradations by camera malfunctions or processing faults and the weather conditions are favorable throughout. The imagery contains sharp, well defined edges and corners with no unusual distortions. Contrast is optimum and shadow details, as well as details in the highlight areas, are readily detectable. Observation of small objects and a high order of mensuration are made possible by the consistently good quality of the photography.

Good: The photography is relatively free of degradation or limiting atmospheric conditions. Edges and corners are well defined. No unusual distortions are present. Detection and accurate mensuration of small objects are feasible, but to a lesser degree than in material rated as "Excellent."

Fair: Degradation is present and the acuity of the photography is less than optimum. Edges and corners are not crisply defined and there is loss of detail in shadow and/or highlight areas. Detection and identification of small objects are possible, but accuracy of mensuration is reduced by the fall-off in image quality and the less-than-optimum contrast that prevails.

Poor: Camera-induced degradations and/or weather limitations severely reduce the effectiveness of the photography. Definition of edges and corners is not sharp. Only gross terrain features and culture may be detected or identified and distortion of form may exist. Accurate mensuration of even large objects is doubtful.

Unusable: Degradation of photography completely precludes detection, identification, and mensuration of cultural details.

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2. PI Suitability for Missions 1009-1 and 1009-2

The PI suitability is good for both parts of the mission. Photographic interpreters reported on 88 targets in the preliminary readout of Mission 1009-1. No poor-quality ratings were assigned. Three of the 92 targets reported on in the preliminary readout of Mission 1009-2 were assigned a poor-quality rating.

It should be noted that the preliminary report represents the initial scan results only, accomplished in a short time. More detailed study of the photography may develop additional information or may necessitate alteration of portions of the preliminary report.

The time of the launch and the inclination angle of the orbit were selected to produce optimum photographic coverage of targets of interest. Since the majority of the targets of interest are between 40 and 60 North latitude, the combination of launch time and inclination angle located the sun on the Western (starboard) side and slightly forward of the beam of the vehicle at this time of day at these latitudes. Generally this caused a variance in illumination across the format of most frames. The forward-looking camera starts taking the photograph of the terrain on the starboard side with the principal ray facing the light source. When it completes the scan the rays of the sun are at right angles to the principal ray. The aft-looking camera starts taking the picture of the terrain on the port side with the principal ray facing away from and approximately parallel with the rays of the sun. When it completes the scan the rays of the sun are at right angles to the principal ray. This causes targets that are to be viewed in stereo to have radically different lighting, which may be beneficial for viewing some targets and detrimental for others. "Special" printing of 33 parts of the mission minimized the difference in contrast and density in the reproduction of the duplicate positives and no major complaints were voiced by the interpreters.

HIGHLIGHTS OF THE MISSION

(a) Eighty-eight targets were observed in the material from Mission 1009-1 and 92 targets in the material from Mission 1009-2.

(b) A newly identified launch facility was observed.

(c) A launch site was confirmed.

(d) Fifteen submarines were observed and identified. Another was observed but could not be identified.

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