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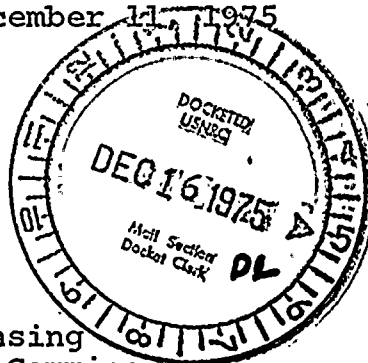
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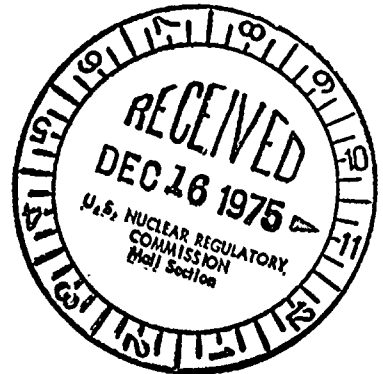
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Re: Docket No. 50-275-01  
Docket No. 50-323-01

Dear Sir:

Enclosed in support of our application for an operating license for Units 1 and 2 at the Diablo Canyon Site are 30 copies of the following:

"Seismic Reflection Data from the Offshore Region Between Point Estero and Point Arguello: Interpretive Data and Discussion."

This material constitutes a non-proprietary version of the following submittal dated November 12, 1975, which we requested be withheld from public disclosure pursuant to 10 CFR 2.790:

"Western Geophysical Company and Shell Oil Company Proprietary Seismic Reflection Data from the Offshore Region between Point Estero and Point Arguello: Basic Data, Interpretive Data, and Discussion."

Kindly acknowledge receipt of the above material on the enclosed copy of this letter and return it to me in the enclosed addressed envelope.

Very truly yours,

*Philip A. Crane, Jr.*

Enclosures  
CC w/enc.: ASLB  
Parties



[The text in this section is extremely faint and illegible, appearing as scattered black dots and light gray smudges across the page.]

Seismic Reflection Data from the Offshore Region  
Between Point Estero and Point Arguello:  
Interpretive Data and Discussion

Revised 12/14/75 Dated 12-11-75

Contents

- I. Note on the structure of the East Boundary zone of the offshore Santa Maria Basin and the Hosgri fault, as observed on Western Geophysical Company line W74-12.

Introduction

Discussion

Illustrations:

- Figure 1 Plot of reflectors and other features on Western Geophysical Company line W74-12 (migrated).
- 2 Geologic section through the Diablo Canyon Power Plant Site and Adjacent Area

- II. Note on Comparison of Fault Locations near the Diablo Canyon Site as Observed on Seismic Reflection Records from Different Surveys

Introduction

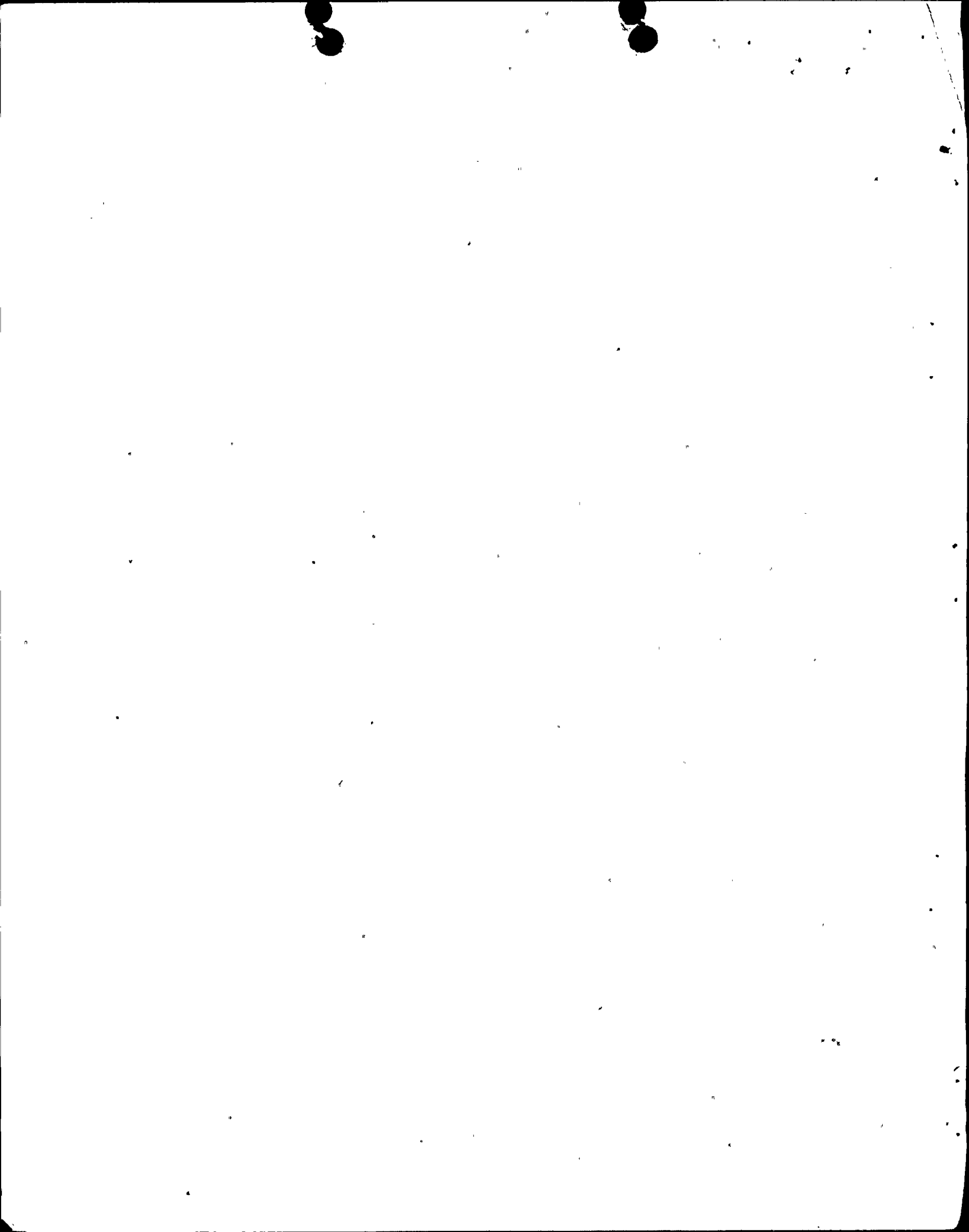
Discussion

Table A. Seismic Reflection Lines Surveyed in the Offshore Area Between Estero Bay and Point San Luis

Illustrations:

Plate II(N) Map showing geology and structural relationships within the coastal and offshore region between Port San Luis and Lopez Point, California, annotated to show location of Western Geophysical Company seismic reflection lines, and location of the Figure 2 cross section from I, above.

Plate II Map showing geology and structural relationships within the coastal and offshore region between Point Conception and Arroyo Grande, California, annotated to show location of Western Geophysical Company seismic reflection lines.



Note on the structure of the East Boundary zone of the offshore Santa Maria Basin and the Hosgri fault, as observed on Western Geophysical Company line W74-12

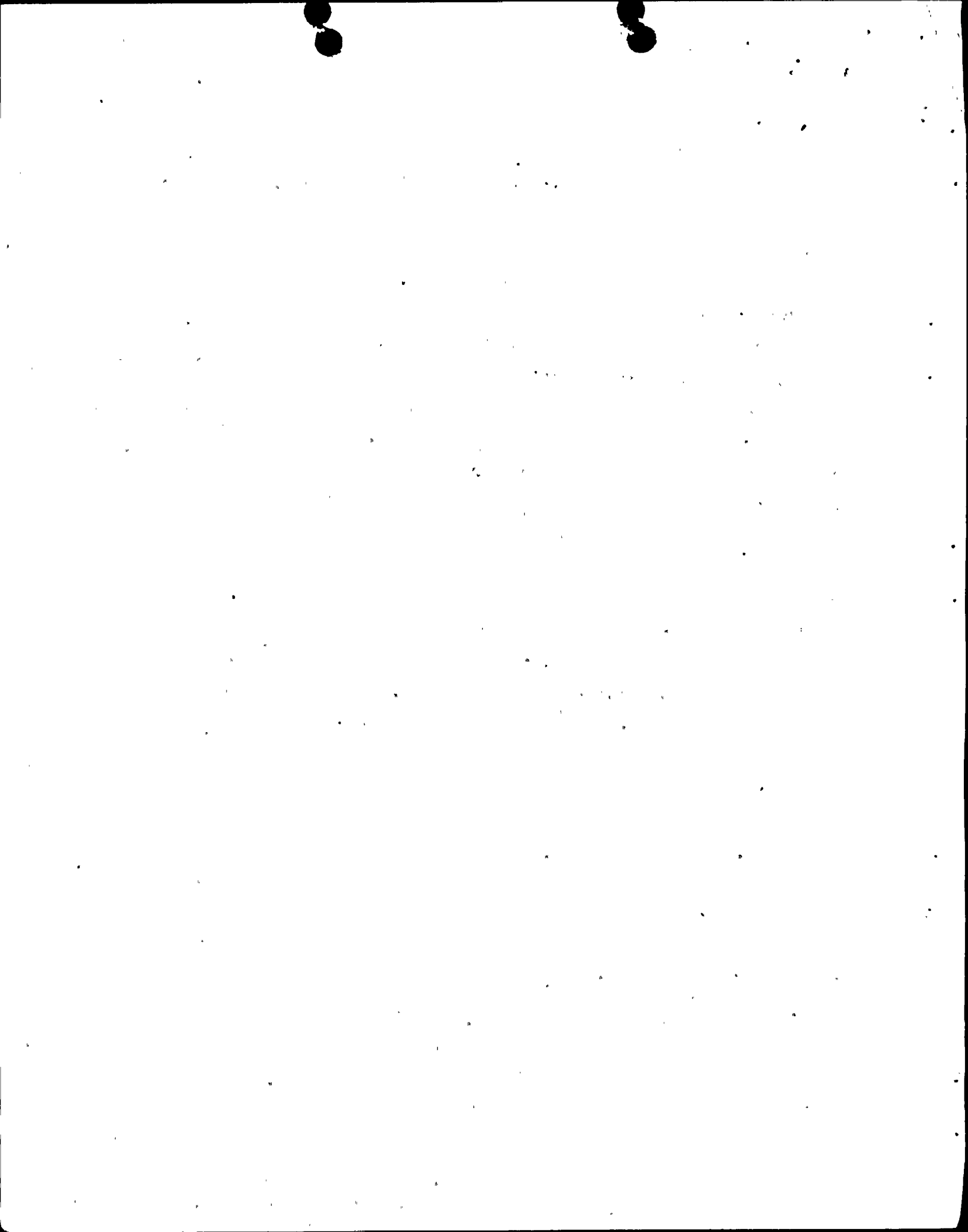
Introduction

The "Santa Lucia" deep seismic reflection survey by Western Geophysical Company includes one line, W74-12, that is located almost directly offshore from the Diablo Canyon Power Plant Site. Although this line is in an area that had been covered by numerous sparker and "boomer" (Acoustipulse and Uniboom) surveys, it was considered possible that a record obtained with the Western deep seismic "Aquapulse" system might provide additional significant information about the structure of the offshore Santa Maria Basin East Boundary zone and the Hosgri fault, at the point opposite from the power plant site. Consequently, the line was purchased from Western, both in standard recorded form and also in migrated form. The interpretation of this line is presented in the following discussion.

Figure 1 is an approximately 1:1 scale plot of prominent reflectors and geologic features on line W74-12 (migrated). Figure 2 is a geologic cross section through the Diablo Canyon site and the adjacent inland and offshore areas. The geologic relationships shown for the offshore area are based on interpretation of line W74-12 and of higher resolution sparker lines from the same area, shown on Plate II(N) of Part II of this report.

Discussion

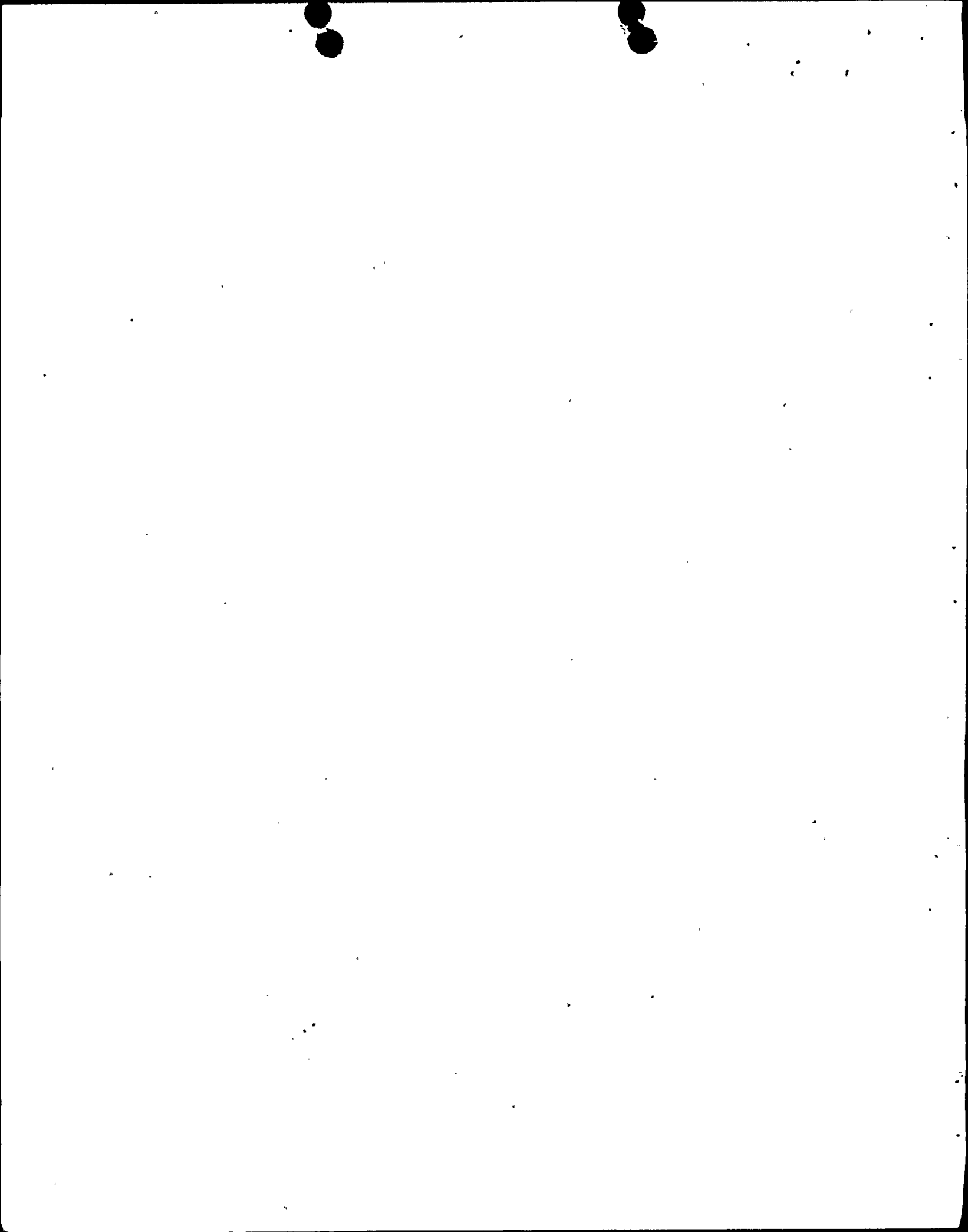
The Western Geophysical Company line W74-12 deep seismic reflection record shows the entire late Miocene and younger section along the easterly margin of the offshore Santa Maria Basin. The record of the basin column consists of an upper section having a seismic signature that correlates with the upper Pliocene Acoustic Unit  $A_1$  of Plate II(N) and a lower section having a seismic signature that correlates with the lower Pliocene - upper Miocene Acoustic Unit  $A_2$  of Plate II(N). The lower part of this seismically well defined offshore section overlies a deeper unit characterized by short, discontinuous reflections or random seismic signals which corresponds to the older Tertiary and Mesozoic rock Acoustic Unit  $A_3$  "basement" of the basin. The "offshore basin" section of the record that exhibits the Acoustic Unit  $A_1$  and  $A_2$  seismic signature



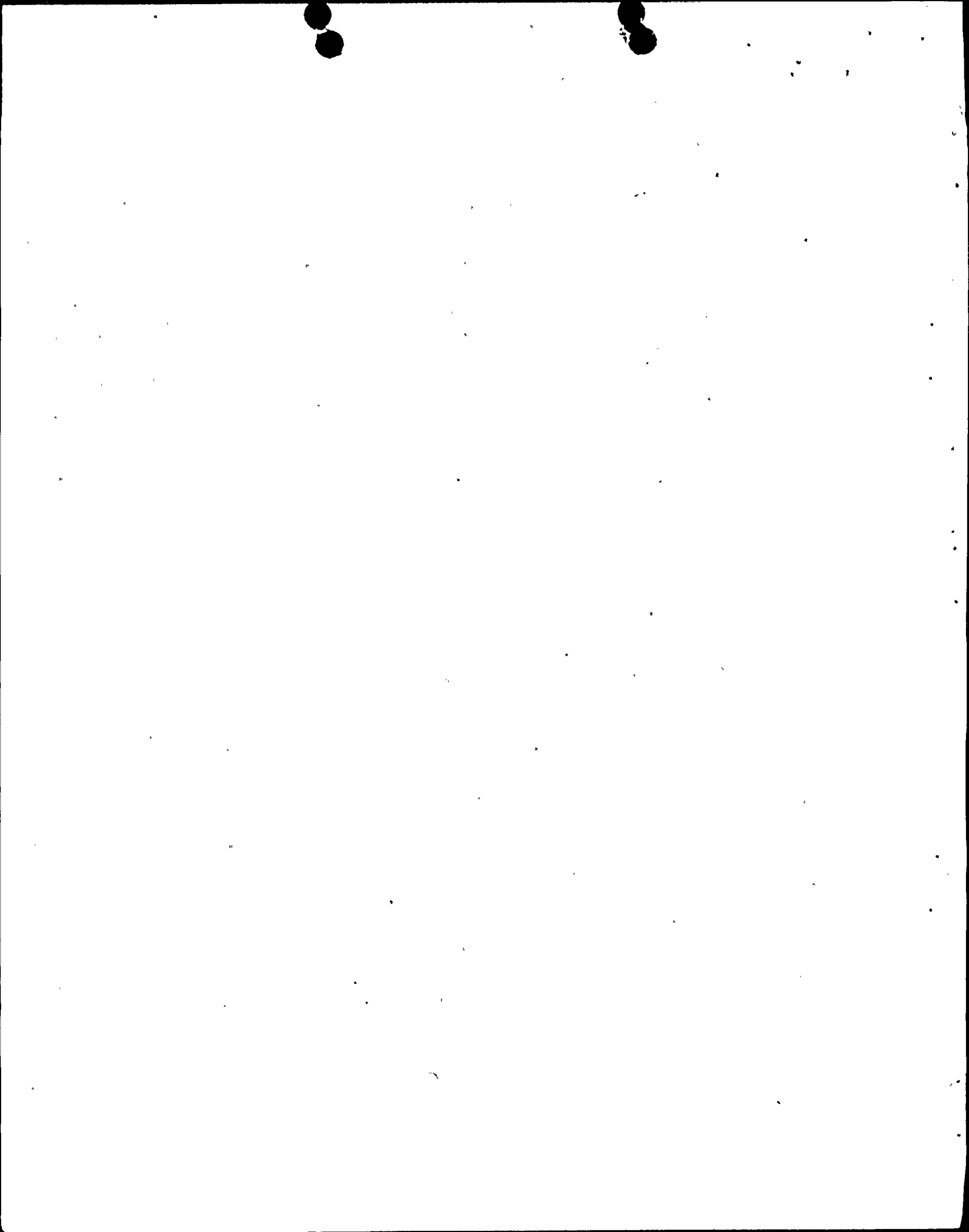


is juxtaposed to the east against Acoustic Unit  $A_3$  type seismic returns, which are interpreted to represent an upraised block of basement Acoustic Unit  $A_3$  and deformed Acoustic Unit  $A_2$ -equivalent rock. The boundary between the basal Acoustic Unit  $A_2$  part of the offshore section and the inferred  $A_2$ - $A_3$  near-shore section is interpreted to represent an east-dipping reverse fault. The inference that this boundary represents a fault contact is based on the apparent abrupt large vertical separation across it, and on the interpretation that the prominent diffractions present on the unmigrated line W74-12 record are associated with a fault surface. The reverse fault contact is overlapped without break by the upper, Acoustic Unit  $A_1$ , part of the offshore basin section.

The part of the offshore Santa Maria Basin East Boundary zone that has been affected by post-Pliocene fault movements is referred to as the Hosgri fault or fault zone. The outer, main break along the post-Pliocene fault zone is indicated on the unmigrated line W74-12 record only by vague diffractions (since it is not well displayed in the acoustic frequency range used to produce the Western seismic lines), but it is clearly identifiable on most sparker seismic reflection lines. Likewise, the details of structural deformation adjacent to this fault are observable on sparker lines (e.g., Figures 9A, 12A, 13A, and 14A of Appendix A to Appendix 2.5D to the Diablo FSAR), but not on the Western Geophysical lines. Features appearing on the two versions of line W74-12 that are considered to be artifacts of the data recording and/or processing operations include two water-bottom multiples (on both unmigrated and migrated versions), diffractions from the Hosgri and the buried fault planes on the unmigrated record, and arcuate patterns of alignments referred to by Western Geophysical as "velocity diffraction patterns" on the migrated record. These latter features are important because they could, if confused with true bedding reflections, be the cause of a misleading interpretation of the geologic structure. The velocity diffraction patterns appear as partly overlapping concentric arcuate lines that are centered about point sources located at intervals of about 16,000 feet, ground distance. They are most prominent near the ends of lines, in areas of data dropout, and in zones where slight velocity errors occur in the migration process. These conditions mostly exist where Acoustic Unit  $A_3$  and deformed Acoustic Unit  $A_2$  parts of the section are represented in the record. In general, the velocity diffraction patterns have a much lower degree of coherency than reflections from bedded strata.



The apparent geologic significance of the information contained in the line W74-12 record is that evidence of a pre-upper-Pliocene episode of compressional deformation is indicated there. This episode of tectonism probably corresponds to the compressional deformation represented by the deep synclinal folding of the San Luis Range. The evidence from other, higher resolution records showing the upper several thousand feet of the present Hosgri fault zone indicates that its post-mid-Pliocene history has been characterized by extensional and probably also by lateral slip movements rather than the reverse movements shown at depth on line W74-12.



## II

### Note on Comparison of Fault Locations near the Diablo Canyon Site as Observed on Seismic Reflection Records from Different Surveys

#### Introduction

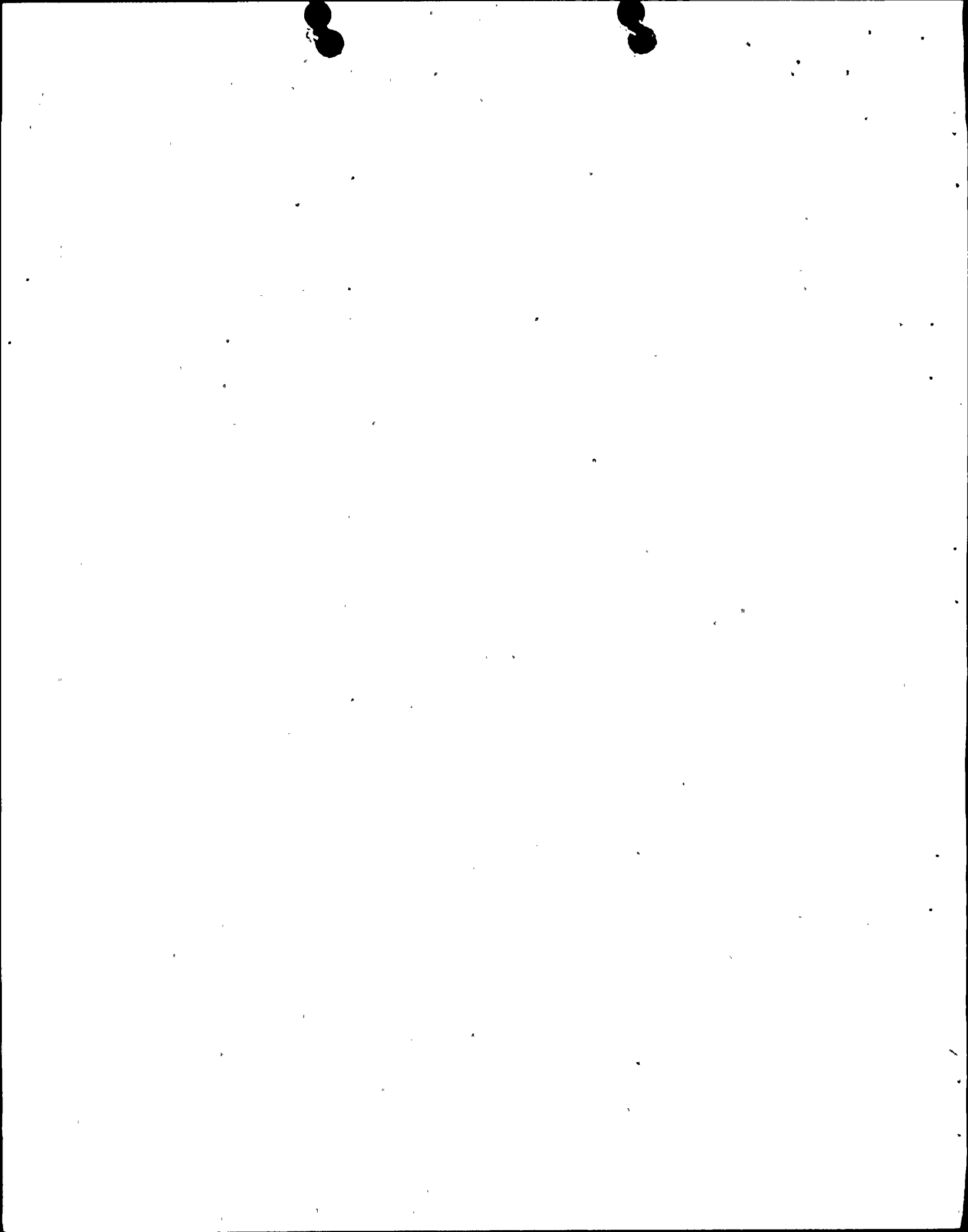
Records and post-plot track charts from four different seismic reflection surveys of the offshore area near the Diablo Canyon site are available. The track charts and records from three of these surveys (USGS Kelez, 1973; BBN, 1973-74; Aquatronics, 1974) have been submitted as part of the documentation of geologic interpretations for the Diablo Canyon FSAR. Records and track charts for a survey conducted by Western Geophysical Co., Inc. in 1974 have also been used for the interpretations presented, but the records themselves, being proprietary, have not been submitted directly.

#### Discussion

The offshore area near Diablo Canyon has been intensively surveyed by seismic reflection techniques. Within the reach extending about 12 miles from Point San Luis north to the southerly part of Estero Bay, some 55 separate lines have been surveyed and are available for interpretation, as shown on the track chart base to Plate II(N) and in Table A.

These lines were all run in 1973 and 1974. The USGS Kelez and Western records were from parts of regional coastal surveys, while the BBN and Aquatronics surveys were concerned specifically with the area offshore from Diablo Canyon. The Western, BBN, and Aquatronics surveys were all navigationally controlled and post-plotted by Navigation Services, Inc., using computer-reduced plots of continuous radio-transponder records of the survey ship's position. This system is said to be accurate to within a few feet when good station control is available, as it was in the Diablo area.

The original FSAR map of the position of faults in the Diablo offshore area was based on interpretation of records from the BBN, Aquatronics, and Kelez surveys. These records were all obtained using sparker type energy sources, which varied in resolution and penetration from the very high resolution .5 second penetration 3 Kj Aquatronics system to the intermediate resolution 1.5 second penetration 90 Kj Kelez system. The latter system achieved nearly 10,000 feet of penetration.



Interpretation of these data resulted in a map showing four main breaks within the Hosgri fault zone. Directly opposite from Diablo Canyon, these breaks ranged from about 2.7 to 4.7 miles distance offshore. The outermost break was seen only in the deeper part of the section, and was mapped as a buried fault.

The records obtained from Western Geophysical were of the computer-processed deep seismic type. These records register to 5.0 seconds penetration, but are of much lower resolution than the sparker records. Because of the nature of the recording and the computer processing, which are designed to maximize the return of information from the deeper part of the section, the Western records show no usable information in the uppermost 500 to 1000 feet of the section. Consequently, faults of small displacement in the near surface part of the section are in many cases difficult or impossible to detect in such records.

In the case of Western line W74-12, run nearly opposite Diablo Canyon, the chief feature that relates to faulting is a deeply buried steep reverse fault that corresponds to the outermost buried fault shown on Plate II(N). This fault truncates the easterly end of the deeper (Lower Pliocene-Miocene Acoustic Unit A<sub>2</sub>) part of the offshore Santa Maria Basin section against Mesozoic basement and upraised Acoustic Unit A<sub>2</sub> rock, but is overlapped by the shallow Upper Pliocene Acoustic Unit A<sub>1</sub> section without break. Smaller breaks that extend to the surface at points closer to shore are only vaguely suggested in the Western records.

Line W74-12 was obtained both in standard format and also with computer migration processing, the latter in order to determine whether significant errors of subsurface geometry and position could be present in the unprocessed record. It was found that the migration caused little change in the apparent position of the buried fault, and that it resulted in appreciable degradation of the nearer surface part of the record.

It is considered significant that the major fault break seen on line W74-12 is a deeply buried feature, and that it corresponds to a similar feature mapped at the same location using the three sets of sparker records available previously. These higher resolution records clearly show an unbroken Pliocene section several hundred feet thick extending across this fault.

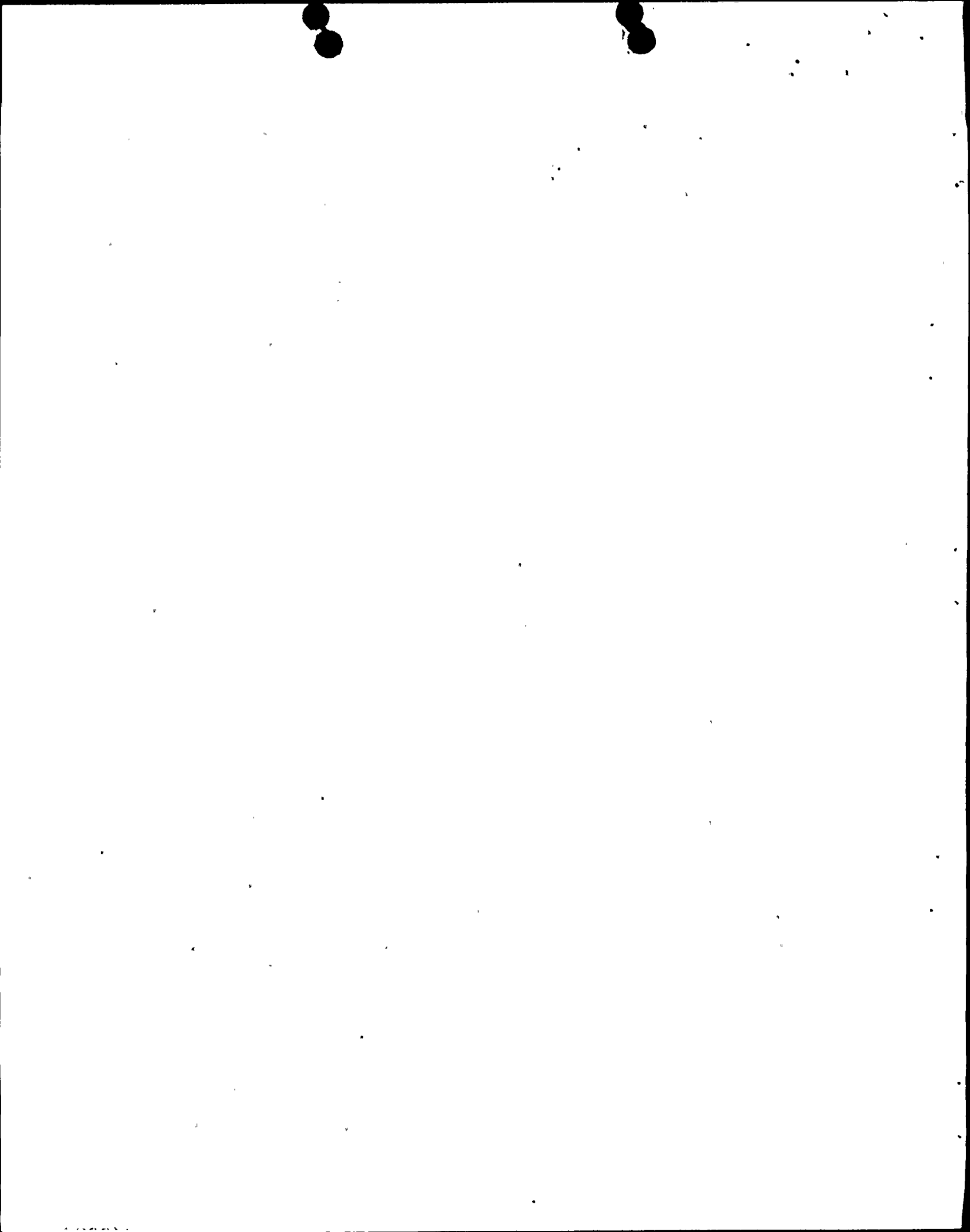
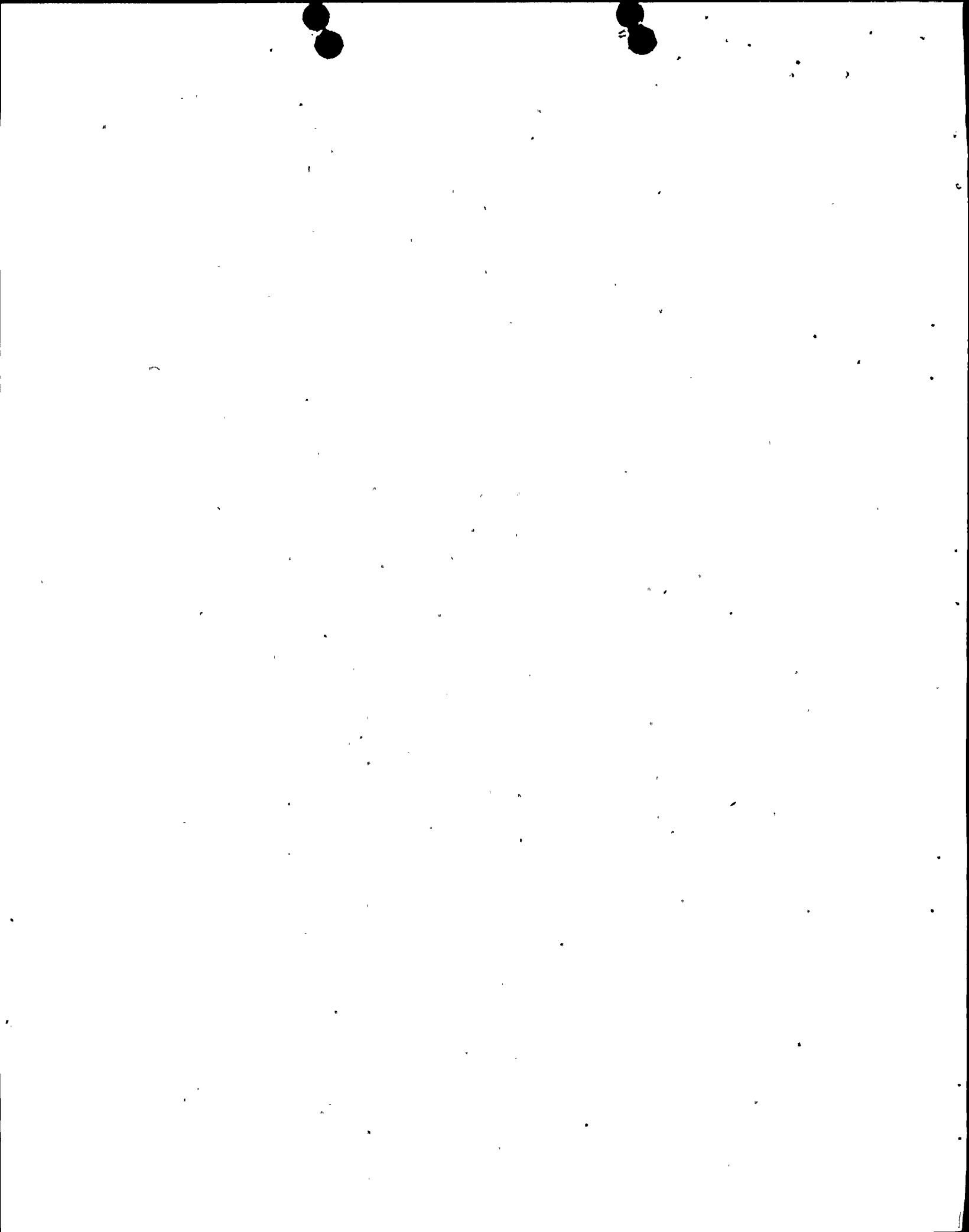




Table A  
 Seismic Reflection Lines Surveyed  
 in the Offshore Area Between Estero Bay and Point San Luis

<u>Kelez</u>	<u>BBN</u>	<u>Aquatronics</u>	<u>Western</u>
123	27	50 SS-1 SS-2 SS-3	W74-14
125	25-26	48  46	
127	23	PB-1	W74-80
129	21		
	19	44	
	17	PB-2	
131	15	42	
	13		
		PB-3	
133	11		W74-12
		38	
		PB-4	
135	9		
	2		
137	4		
	6	36	
	8		
	10		
139	12		
	14		
	16		
	18		
	20	34	
141			W74-82
	22		
		32	
		30	



Kelez

BBN

Aquatronics

Western

143

7

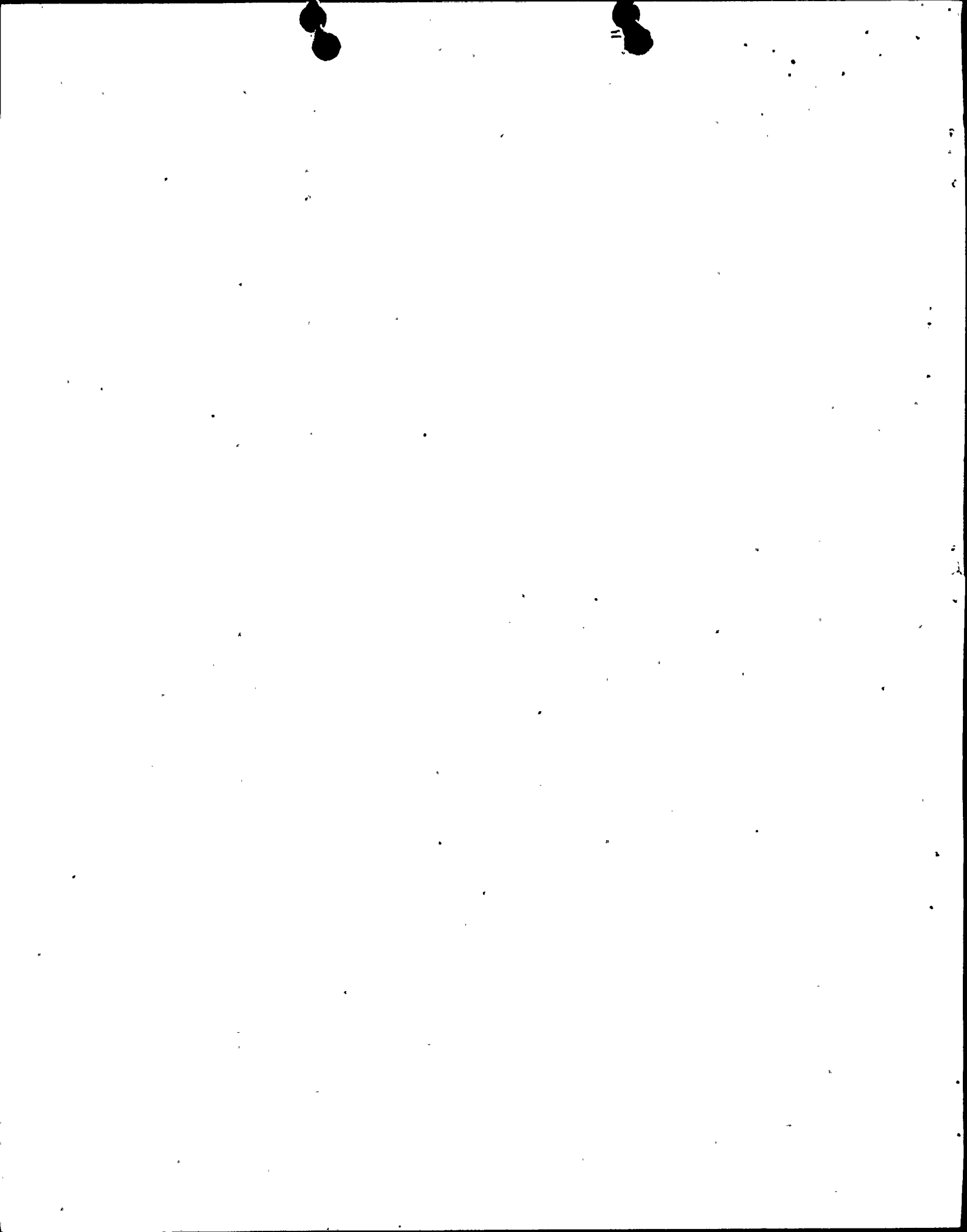
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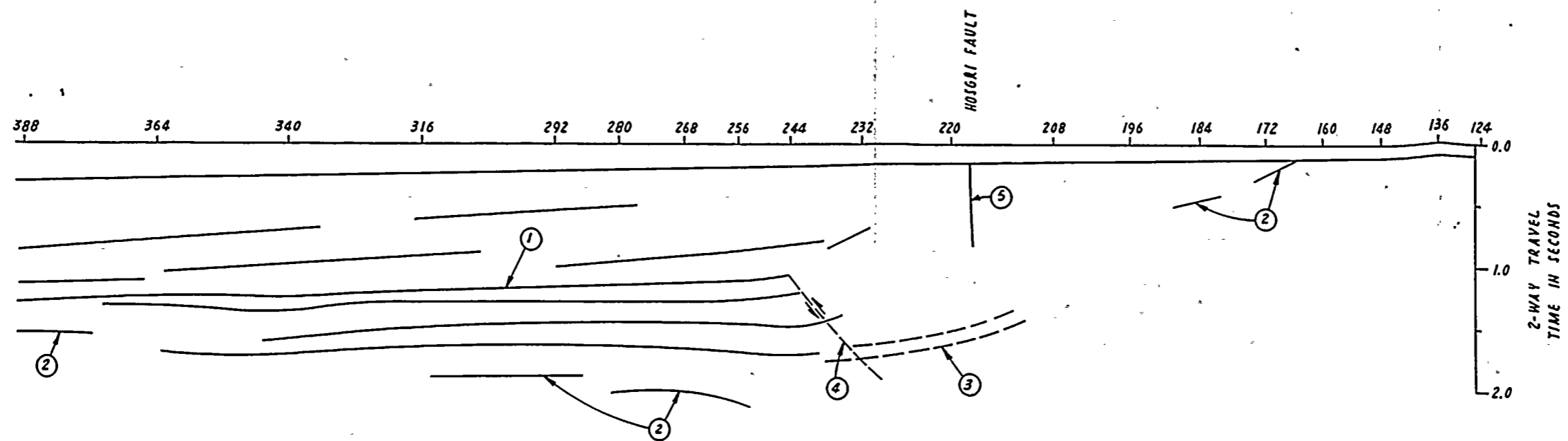
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W74-10

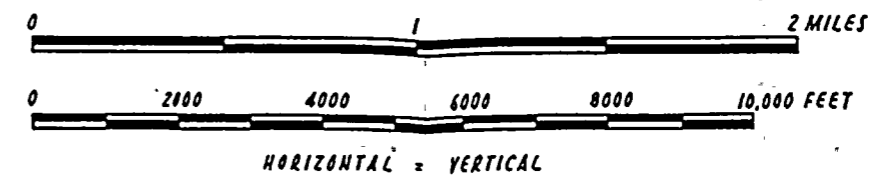




NOTES:

- ① REFLECTOR INTERPRETED TO REPRESENT THE UNCONFORMITY BETWEEN UPPER MIOCENE-LOWER PIOCENE (ACOUSTIC UNIT A<sub>2</sub>), AND UPPER PIOCENE (ACOUSTIC UNIT A<sub>1</sub>) STRATA.
- ② REFLECTORS INTERPRETED TO REPRESENT THE UNCONFORMITY BETWEEN UPPER MIOCENE AND OLDER OR MORE DEFORMED (ACOUSTIC UNIT A<sub>3</sub>) ROCKS.
- ③ ALIGNMENTS INTERPRETED TO BE AMONG THE "VELOCITY DIFFRACTION PATTERNS" ON LINE W74-12.
- ④ INTERPRETED POSITION OF BURIED REVERSE FAULT.
- ⑤ POSITION OF MAIN TRACE OF THE HOSGRI FAULT.

APPROXIMATE SCALE



PLOT OF REFLECTORS AND OTHER FEATURES ON WESTERN GEOPHYSICAL COMPANY LINE W74-12 (MIGRATED)

FIGURE 1

