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SUPPLEMENT TO

THE EFFECT OF THE NUMBER AND SPACING OF
ELEMENTS ON THE EFFICIENCY OF LASA BEAMS

21 November 1968

Prepared For
AIR FORCE TECHNICAL APPLICATIONS CENTER
Washington, D. C.

By
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TELEDYNE, INC.

Under
Project VELA UNIFORM

Sponsored By
ADVANCED RESEARCH PROJECTS AGENCY
Nuclear Test Detection Office
ARPA Order No. 624

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SUPPLEMENT 1

SUPPLEMENT TO
THE EFFECT OF THE NUMBER AND SPACING OF
ELEMENTS ON THE EFFICIENCY OF LASA BEAMS
SEISMIC DATA LABORATORY REPORT NO. 203

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|---------------------------|---|
| AFTAC Project No.: | VELA T/6702 |
| Project Title: | Seismic Data Laboratory |
| ARPA Order No.: | 624 |
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| Contract Expiration Date: | 1 March 1969 |
| Project Manager: | Royal A. Hartenberger (703) 836-7647 |

P. O. Box 334, Alexandria, Virginia

AVAILABILITY

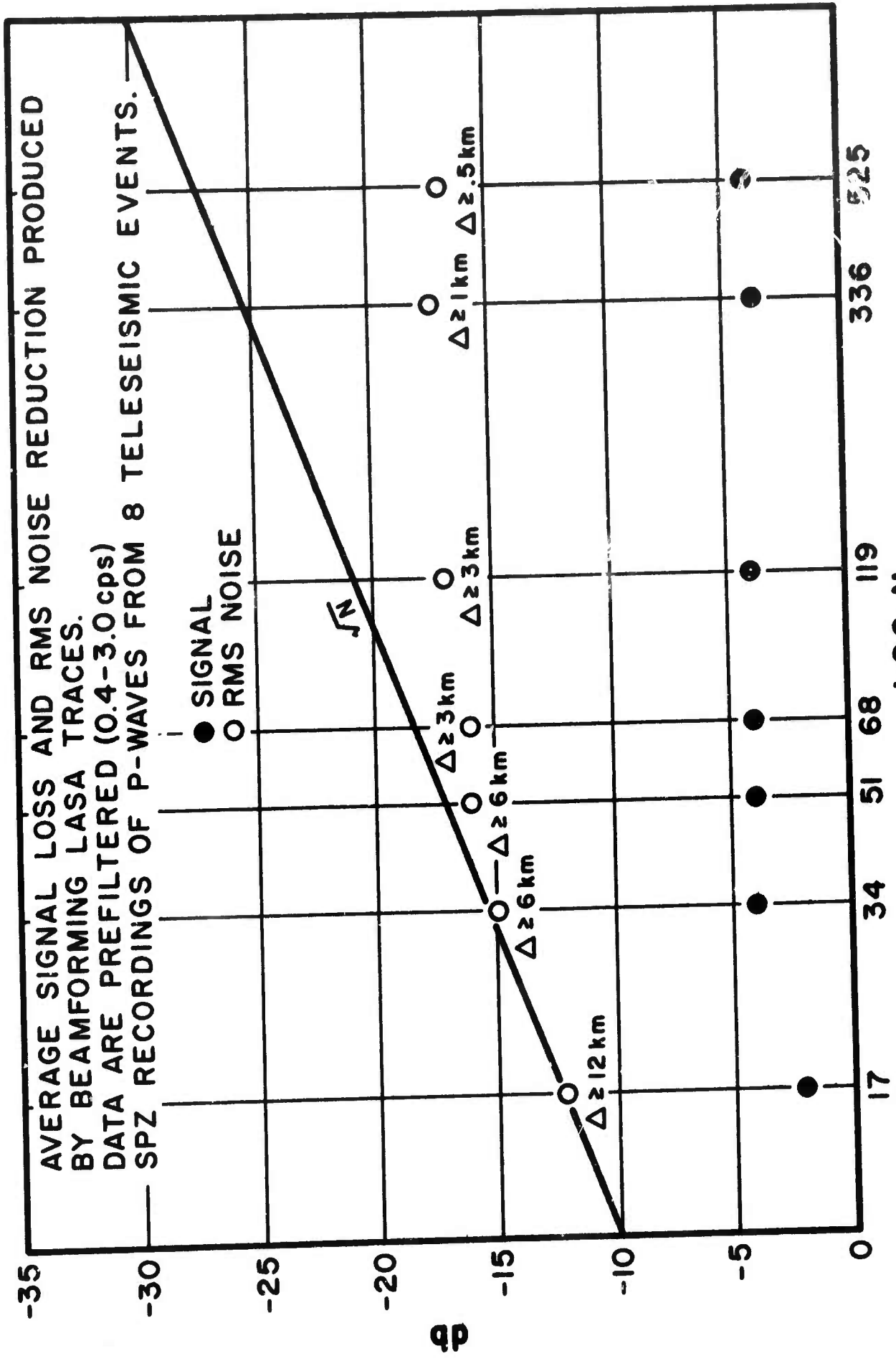
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SUMMARY

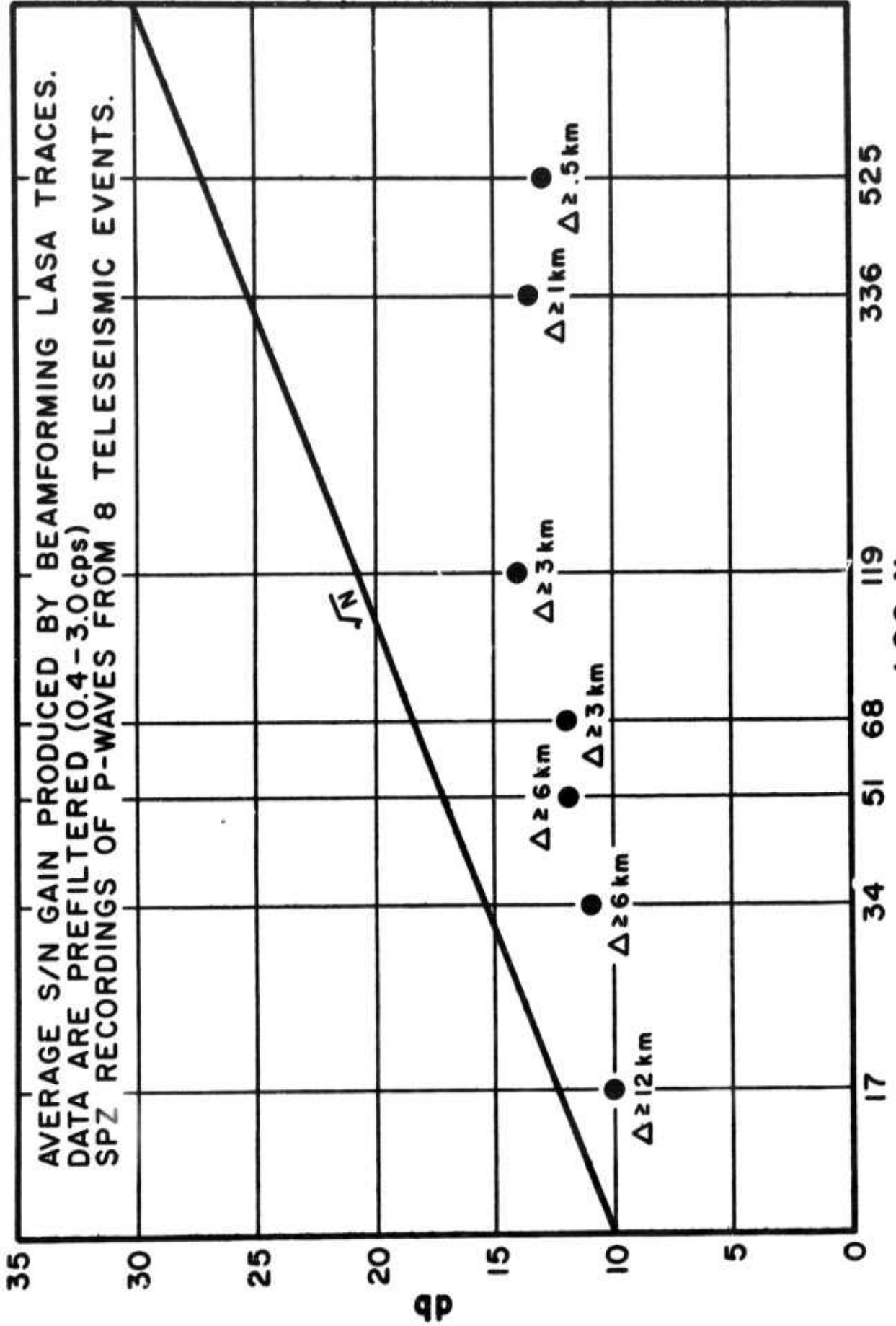
A report entitled "The Effect of the Number and Spacing of Elements on the Efficiency of LASA Beams", was distributed on 21 December 1967. ^{in a previous report} The study described the average signal loss, rms noise reduction, and S/N gain produced by beamforming eight teleseismic events two different ways. First, each event was beamsteered using 51 LASA SPZ inputs (inter-sensor spacing, Δ , \geq 6 km), and the results were averaged to obtain the values plotted in the original figures. Second, each event was beamformed using outputs from 525 elements ($\Delta \geq$ 0.5 km) to obtain average values. We concluded from this study that beams composed of 51 traces reduce rms noise and improve S/N within 1 db of that produced by 525-element beams.. ^{greater than or equal to}

After publication of the report described above, we ^{was extended} extended the analysis to include beams containing 17 channels ($\Delta \geq$ 12 km), 34 ($\Delta \geq$ 6 km), 68 ($\Delta \geq$ 3.5 km), and 119 channels ($\Delta \geq$ 3.0 km). The number of channels contributed to these beams by each of 17 subarrays was 1, 2, 4, and 7, respectively. ^{delta} Outputs from subarrays B1 through B4 were not used.

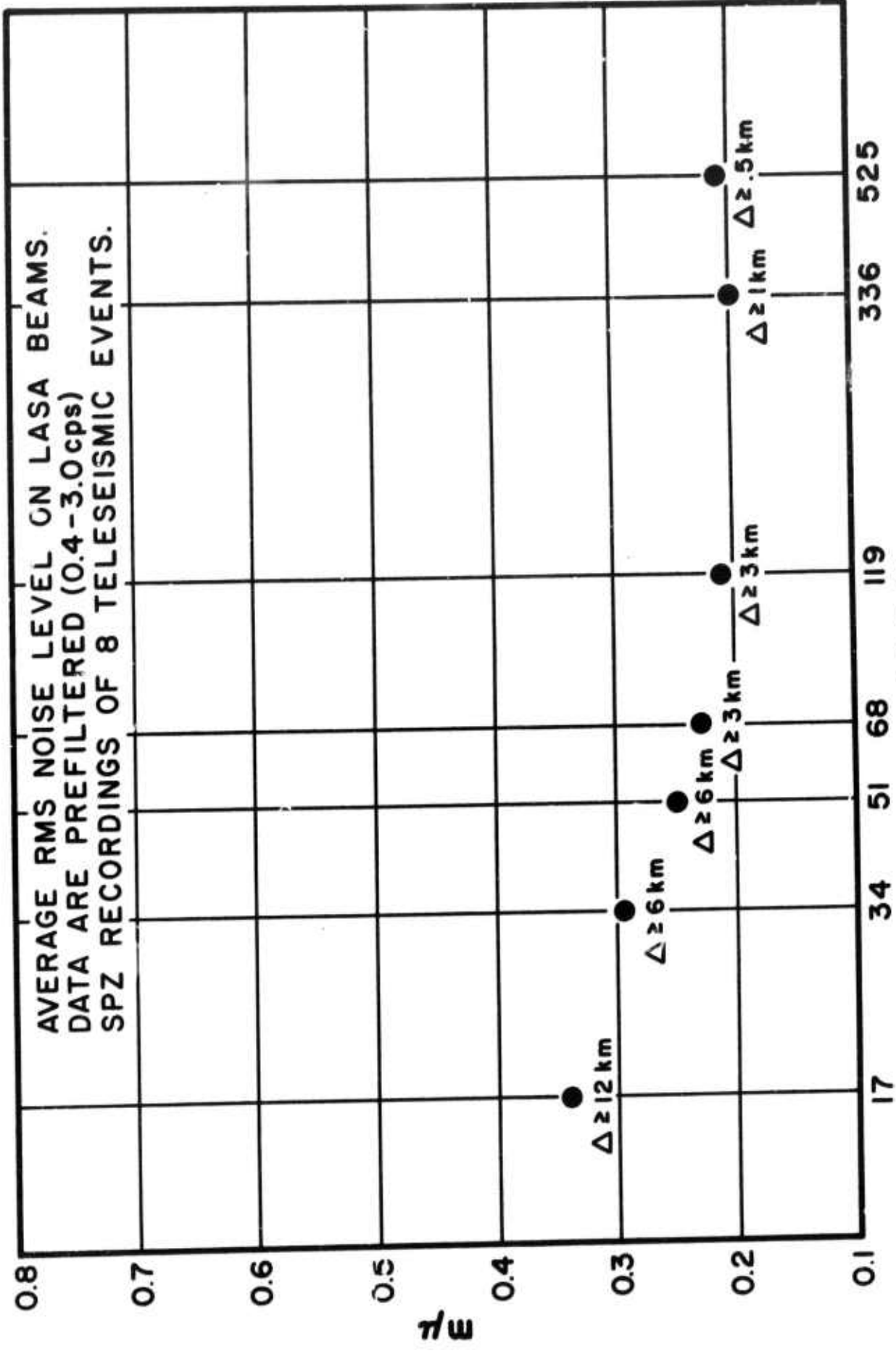
Recently we extended the study, ^{extended} still further, by forming LASA beams containing 336 traces ($\Delta \geq$ 1 km) derived from the 21 subarrays. In these beams, outputs from sensors in the "B" and "C" rings of each subarray (a total of 9 per subarray) were not used. ^{delta} We have beamformed the original eight events in this manner and the results are shown in Figures 1, 2, and 3 along with the results of the original and extended SDL studies. ^{greater than or equal to}



LOG N
Figure 1



LOG N
Figure 2



LOG N

Figure 3

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| Signal rms noise Signal-to-noise ratio | | | |

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