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DOT-TSC-CG-87-2, II

SERVICE VESSEL ANALYSIS

VOL. II: DETAILED DISTRICT PLOTS

AD-A186 263

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Cambridge, MA 02142

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Final Report
September 1987

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16. Abstract <p>This is a supplement to Service Vessel Analysis, Vol. I: Seagoing and Coastal Vessel Requirements for Servicing Aids to Navigation. The material included is not intended to stand alone but is prepared for use in conjunction with the original study.</p> <p>The analysis in Vol. I determines the number, mix, and home ports of vessels required to replace the aging fleet of WLB (seagoing) and WLM (coastal) buoy tenders currently servicing aids to navigation. Case studies were made with differing values of vessel speed, discrepancy response and other mission activity. The Service Force Model (SFM) model is a computer implemented simulation which models the activities of vessel servicing aids to navigation. Given a list of navigation aids which are assigned to available servicing vessels, the model simulates, for each vessel, the annual servicing of those aids and reports the resulting vessel performance.</p> <p>This analysis makes no recommendations but a possible scenario would suggest a replacement fleet of 31 vessels (17 seagoing, 14 coastal vessels), reducing the current fleet by 9 vessels. Determination of such savings might not have been obvious without the use of this modeling analysis technique.</p> <p>This document contains graphic plots of aid to the vessel assignments used in this study.</p>					
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PREFACE

This study of the replacement vessel requirements for servicing aids to navigation was performed by the Transportation Systems Center (TSC) for the United States Coast Guard, Office of Navigation. It is delivered as part of Project Plan Agreement CG-775 to the Short Range Aids Division (G-NSR-2). The Coast Guard project managers have been LCDR H. H. Sharpe and LCDR A. R. Stiles Jr. The significant contributions of LCDR Stiles toward chapter 3 and for description of the acquisition process are appreciated. The intensive activity of obtaining and verifying accurate data describing thousands of aids to navigation throughout the Coast Guard as well as the need for a thoroughly coordinated study approach has provided the opportunity for an unusually close working relationship between TSC and the Coast Guard project managers. The author gratefully acknowledges the guidance, support, and pleasing nature of this relationship.

All of the TSC data entry, computer model runs and hand entry of data for and plotting of aid assignments shown in Volume II of this document were cheerfully and tirelessly performed by Kathleen Murphy.

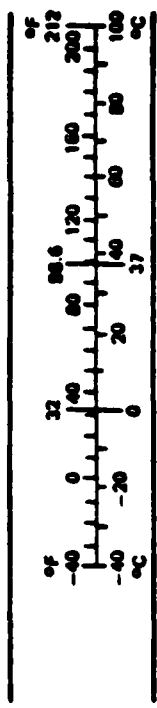


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Justification	
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Availability Codes	
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METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures			Approximate Conversions from Metric Measures					
Symbol	When You Know	Multiply by	To Find	Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH								
in	inches	2.5	centimeters	cm	centimeters	0.04	inches	in
ft	feet	30	centimeters	cm	inches	0.4	inches	in
yd	yards	0.9	meters	m	feet	3.3	feet	ft
mi	miles	1.6	kilometers	km	yards	1.1	yards	yd
					meters	0.9	meters	m
					kilometers	0.6	kilometers	km
AREA								
sq	square inches	6.5	square centimeters	cm ²	square centimeters	0.16	square inches	sq in
sq	square feet	0.09	square meters	m ²	square meters	1.2	square yards	sq yd
sq	square yards	0.8	square meters	m ²	square kilometers	0.4	square miles	sq mi
sq	square miles	2.6	square kilometers	km ²	hectares (10,000 m ²)	2.5	acres	ac
	acres	0.4	hectares	ha				
MASS (weight)								
oz	ounces	28	grams	g	grams	0.035	ounces	oz
lb	pounds	0.45	kilograms	kg	kilograms	2.2	pounds	lb
	short tons (2000 lb)	0.9	tonnes	t	tonnes (1000 kg)	1.1	short tons	st
VOLUME								
tblsp	tablespoons	5	milliliters	ml	milliliters	0.03	fluid ounces	fl oz
ts	teaspoons	15	milliliters	ml	liters	2.1	pints	pt
fl oz	fluid ounces	30	milliliters	ml	liters	1.06	quarts	qt
c	cups	0.24	liters	l	liters	0.26	gallons	gal
pt	pints	0.47	liters	l	cubic meters	35	cubic feet	cu ft
qt	quarts	0.95	liters	l	cubic meters	1.3	cubic yards	cu yd
gal	gallons	3.8	liters	l				
cu ft	cubic feet	0.03	cubic meters	m ³				
cu yd	cubic yards	0.76	cubic meters	m ³				
TEMPERATURE (exact)								
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F

1 in. = 2.54 cm (exactly). For other exact conversions and more detail tables see NBS Misc. Publ. 286, Units of Weights and Measures. Price \$2.25. SD Catalog No. C13 10 286.



INTRODUCTION

This document is a supplement to the Service Vessel Analysis. It contains plots of aid assignments used in conjunction with the analysis. This material was separated from the main text because of its volume and the less direct nature of its content. This document is not intended to stand alone. Rather, it is a companion to the original study to which the reader is referred. The description below is repeated from Appendix E in the original document.

DESCRIPTION OF DETAILED DISTRICT PLOTS

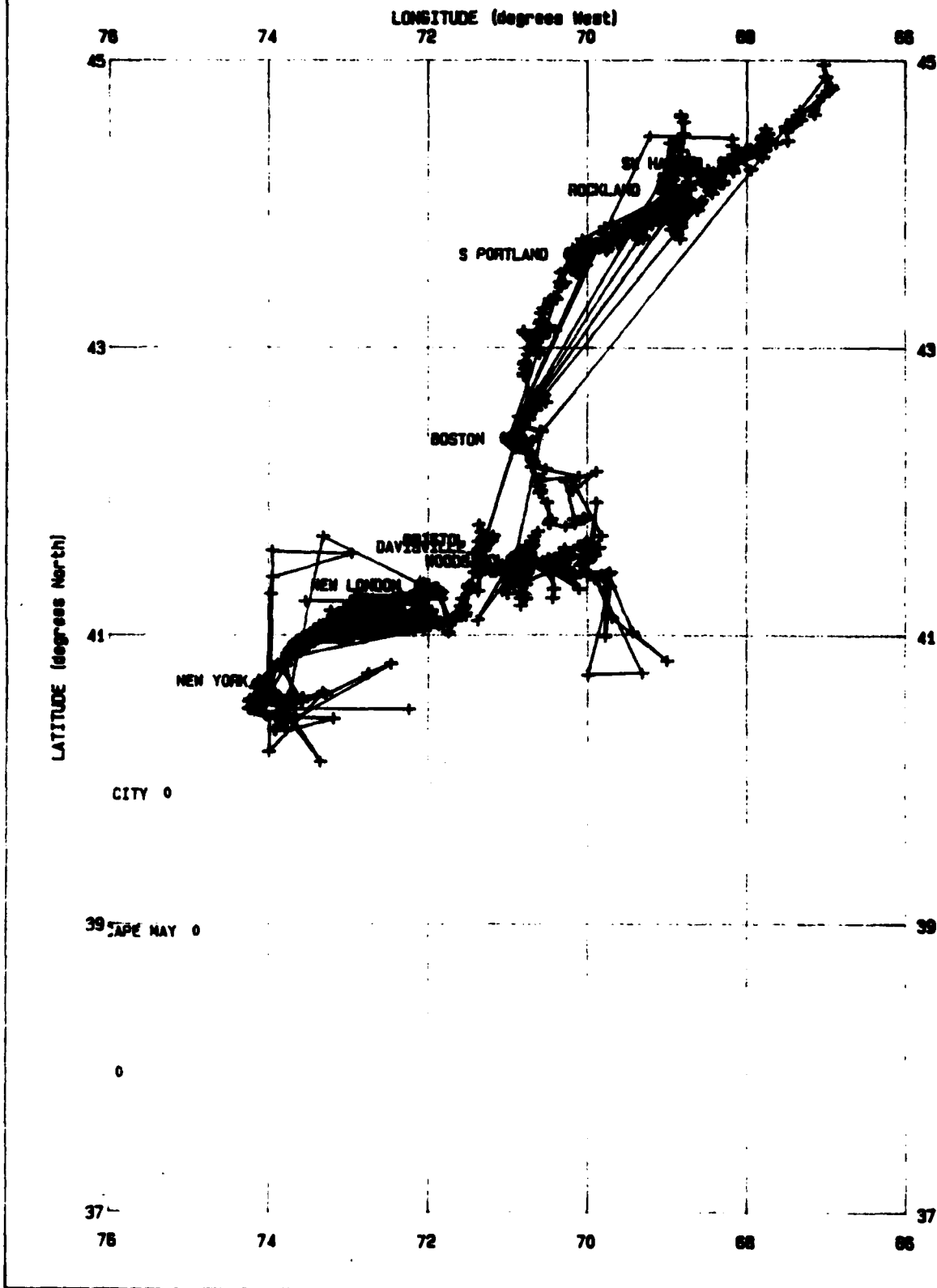
As part of the process of verifying that assignments of aids to servicing vessels was reasonable, plots were developed representing the aids assigned to vessels. This section contains those plots. They are given in District order and within each District, they are shown in order of increasing numbers of District vessels. Each plot has an identifying heading which shows the district, run number and vessel name. The run number may be interpreted as follows. The example of "RUN2a-1" means there were 2 seagoing vessels and 1 coastal vessel assigned to the District. The "a" next to the "2" indicates this is the case where an alternative setup "a" was run of the 2 seagoing vessels. The vessel name of "big-1" indicates that this plot is only for seagoing vessel "1" and "small-2" would indicate that this plot is only for coastal vessel "2".

In addition to the heading, the number of aids plotted and shown are given. In cases where these two numbers are different, the difference is attributable to those aids which, due to their location, were outside the boundaries of the given map.

Each plot shows latitudes, longitudes, and all home ports within the boundaries (even if the ports are not in the same District). Each aid is plotted with a "+". The pen is left down between aids so that vessel track lines are also plotted. For each District, the first plot is "RUN1-1". This shows all the aids in the district for either the seagoing or coastal vessels on a single page. This helps to establish that the ordering on the aid list does not cause excessive zigzag vessel travel.

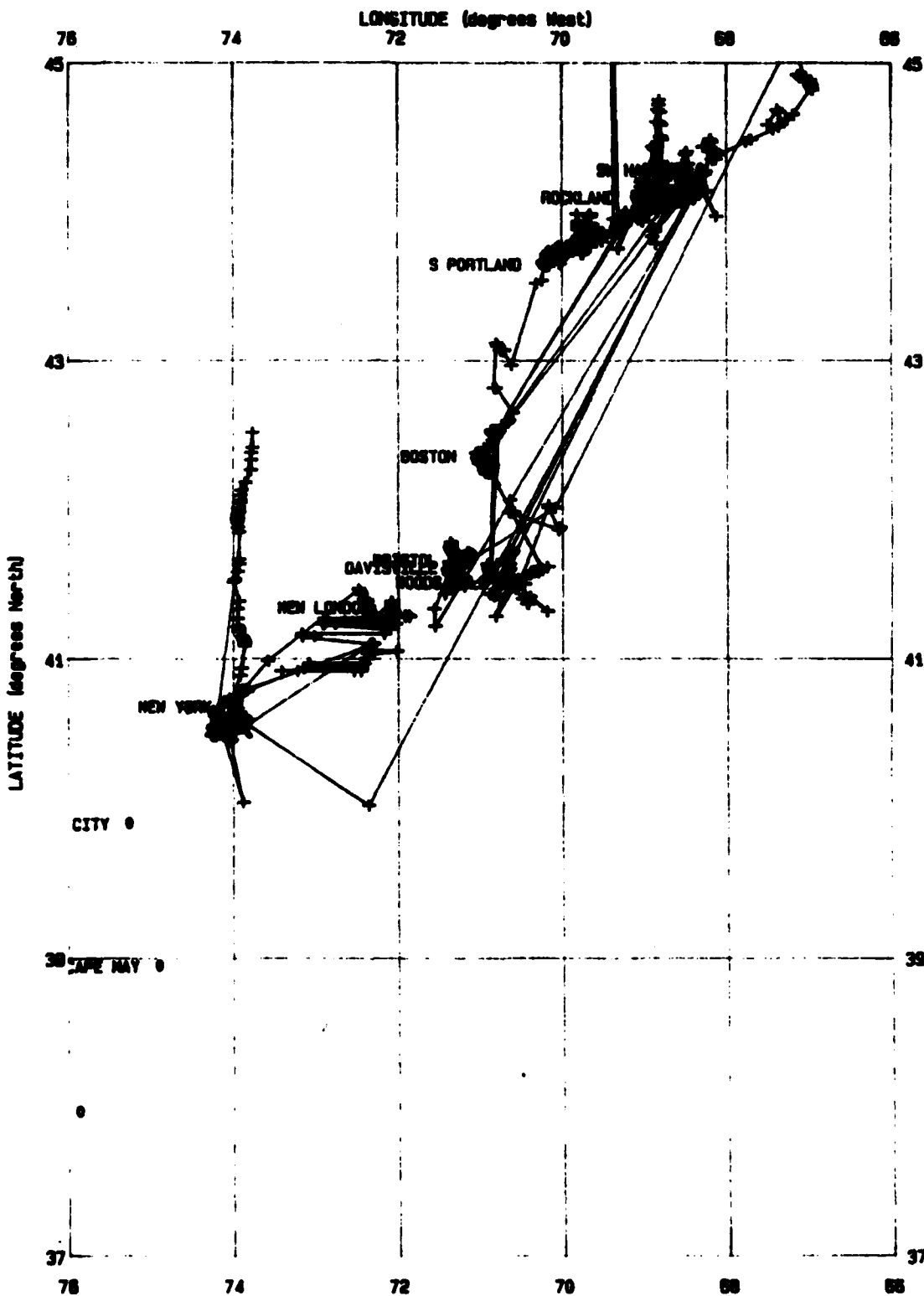
Other plots for the Districts show the cases run for other numbers of vessels. The runs shown are representative of each of the numbers of vessels run for the Districts. Not all of the minor changes which may have been run were plotted.

DISTRICT 1 RUN1-1 BIG-1
1067 OF 1067 AIDS SHOWN



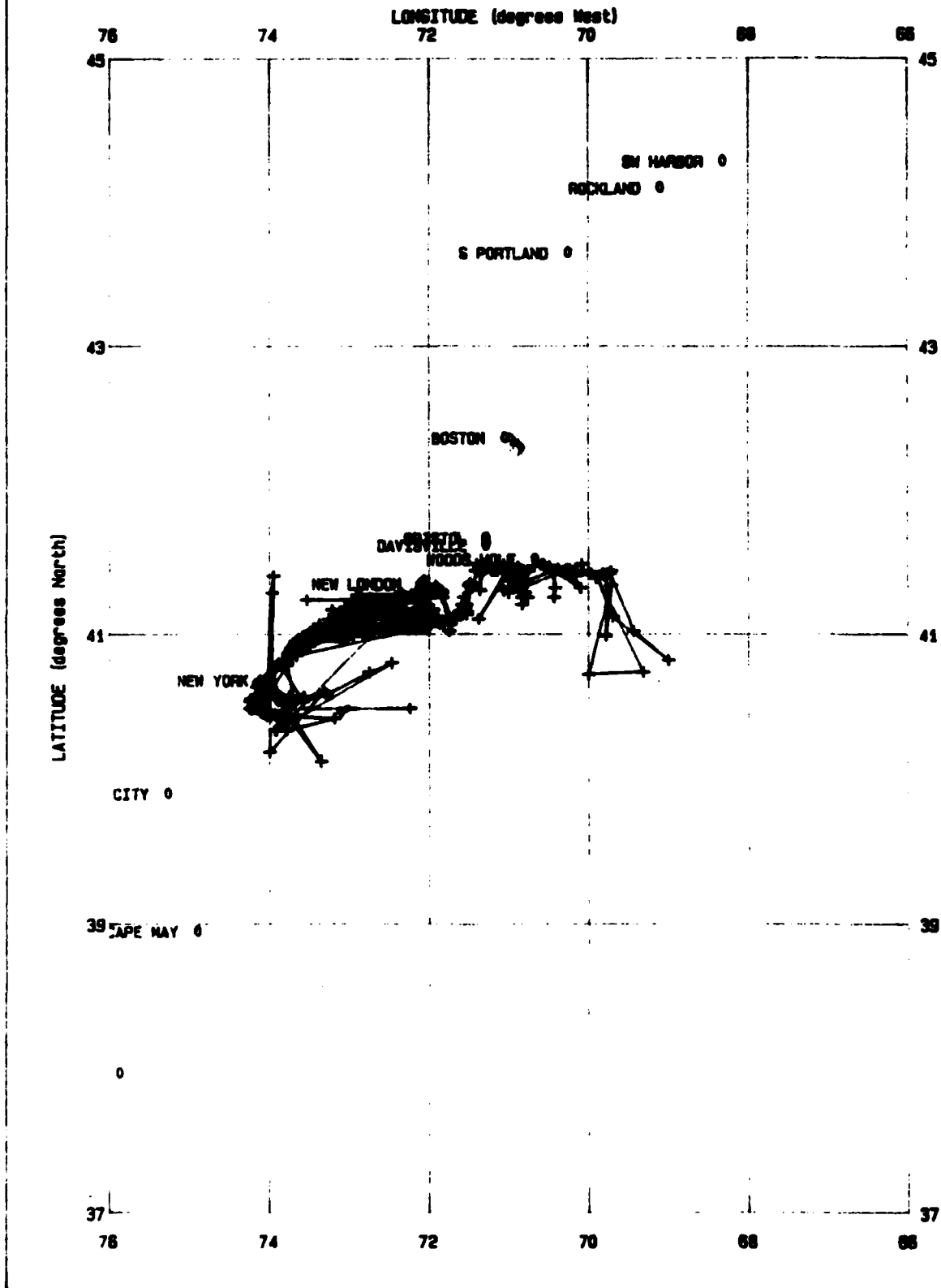
DISTRICT 1 RUN1-1 SMALL-1

886 OF 894 AIDS SHOWN

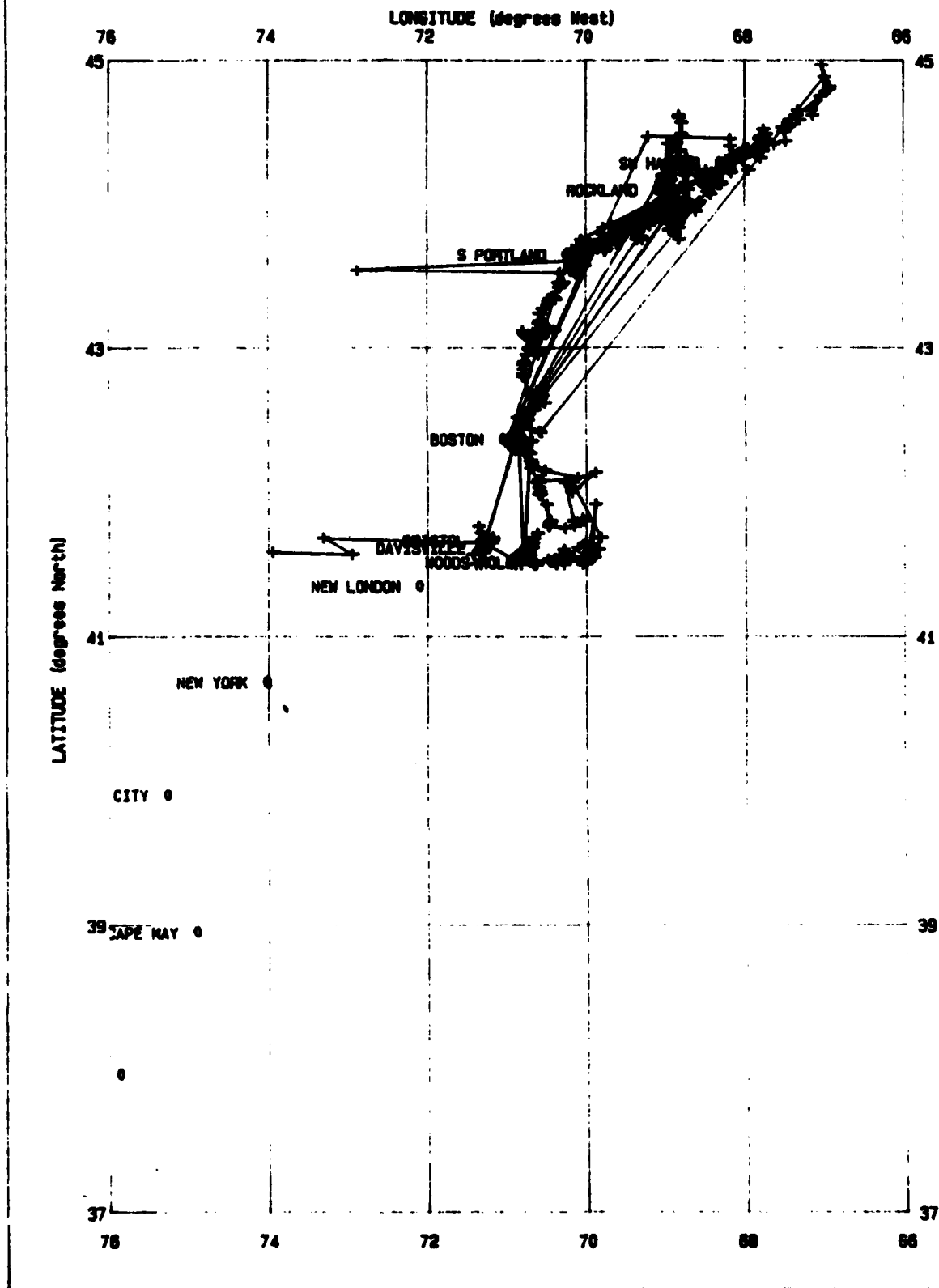


DISTRICT 1 RUN2-2 BIG-1

505 OF 505 AIDS SHOWN

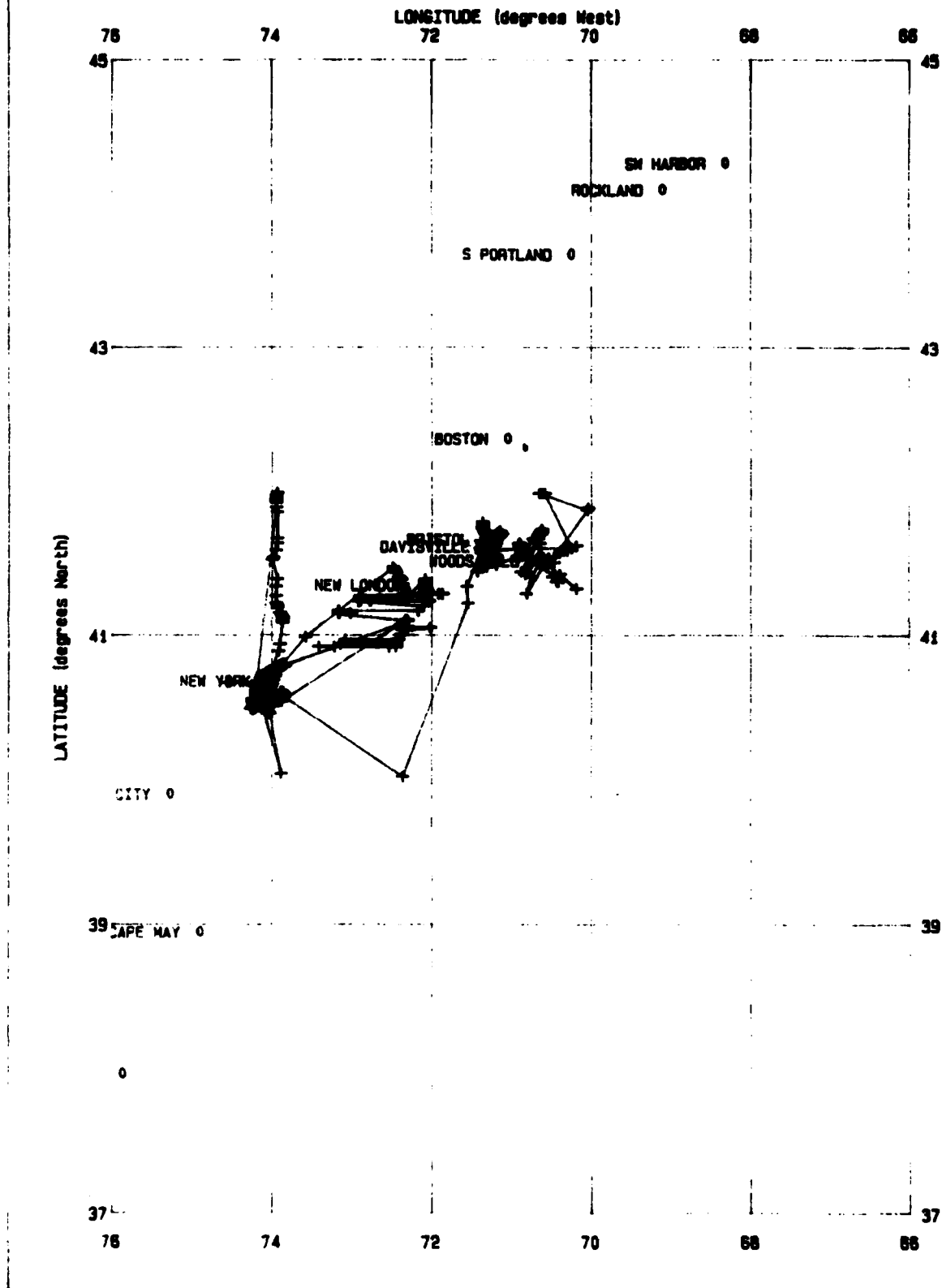


DISTRICT 1 RUN2-2 BIG-2
563 OF 563 AIDS SHOWN



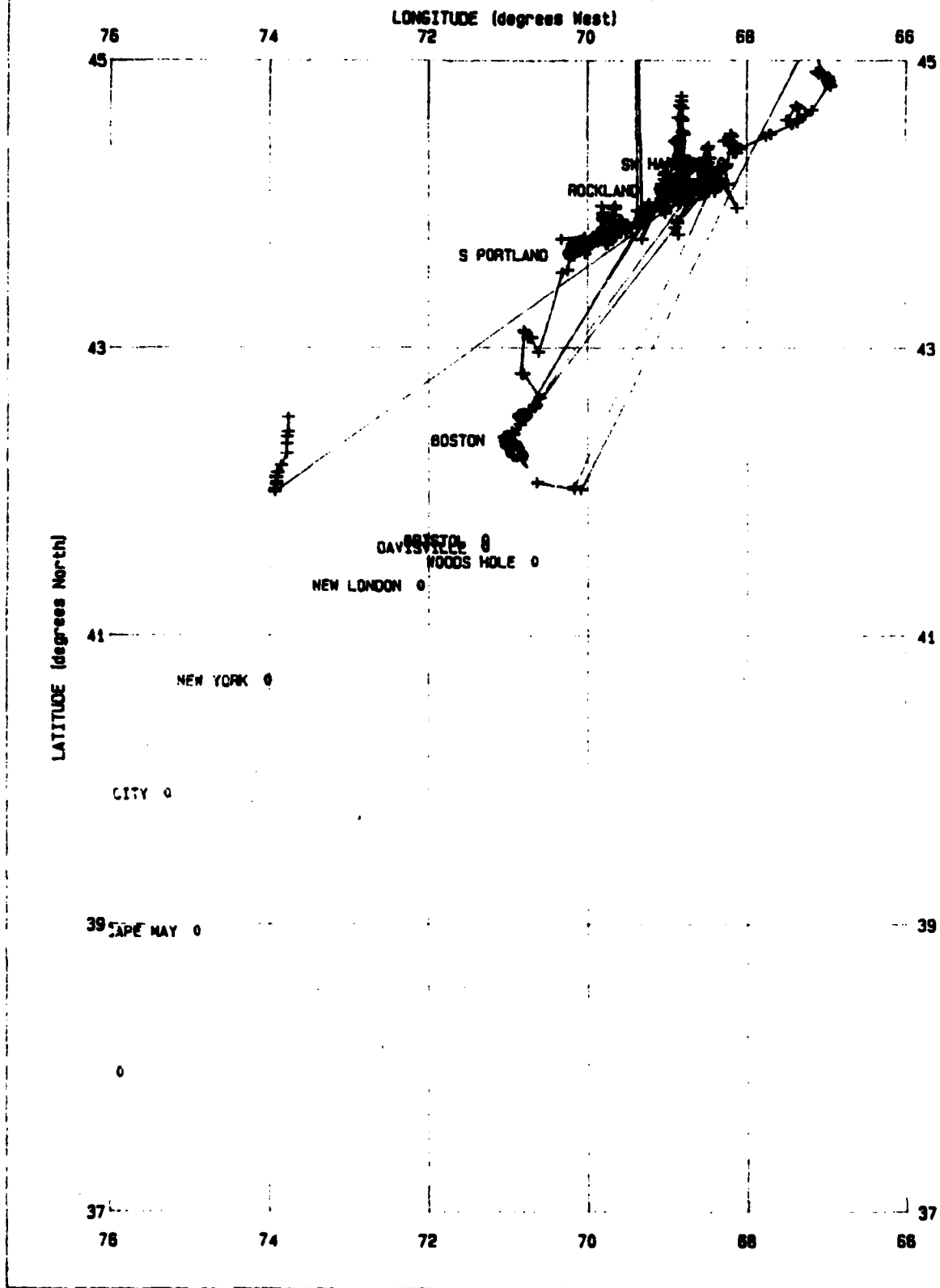
DISTRICT 1 RUN2-2 SMALL-1

455 OF 455 AIDS SHOWN



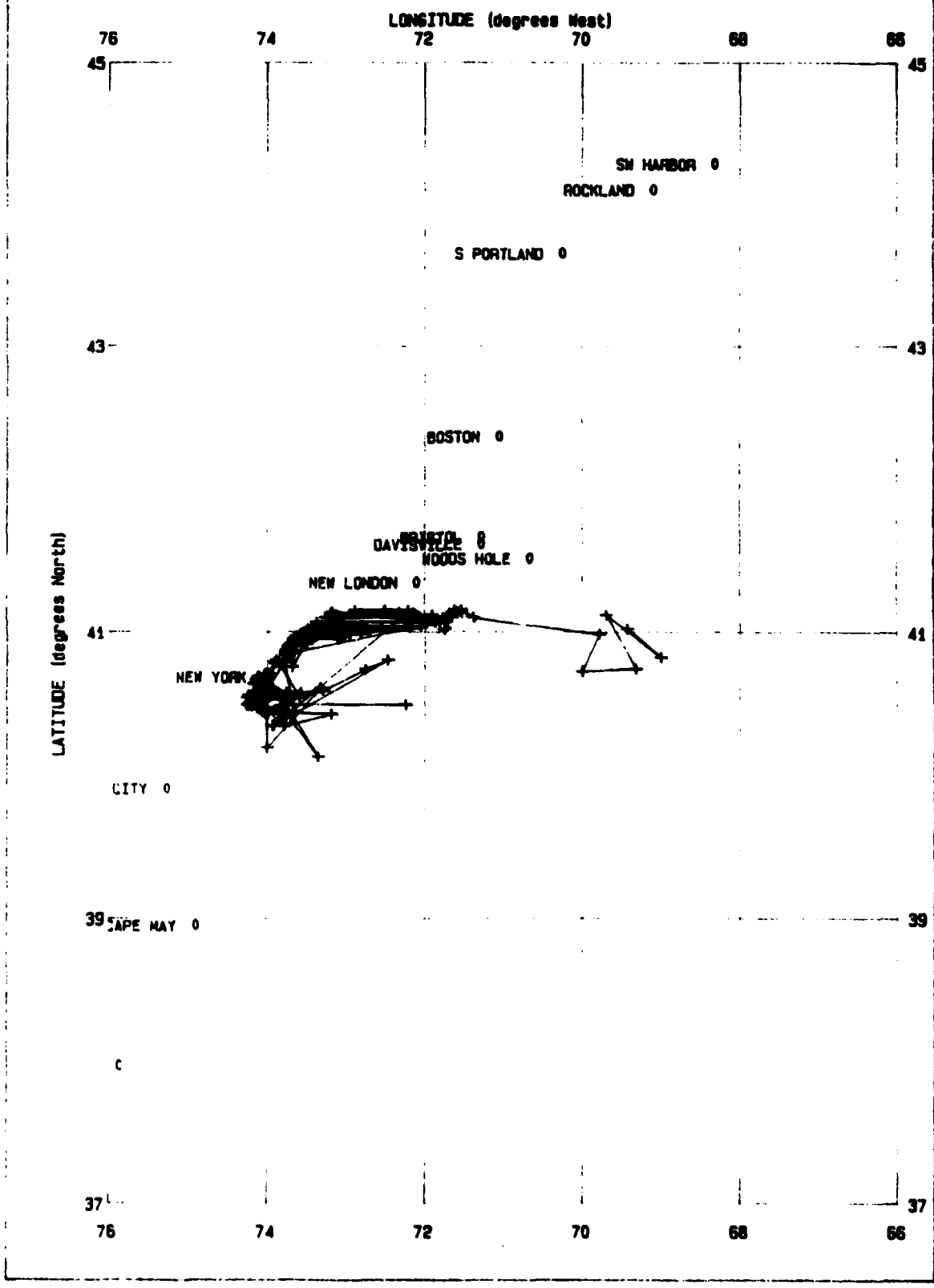
DISTRICT 1 RUN2-2 SMALL-2

431 OF 439 AIDS SHOWN



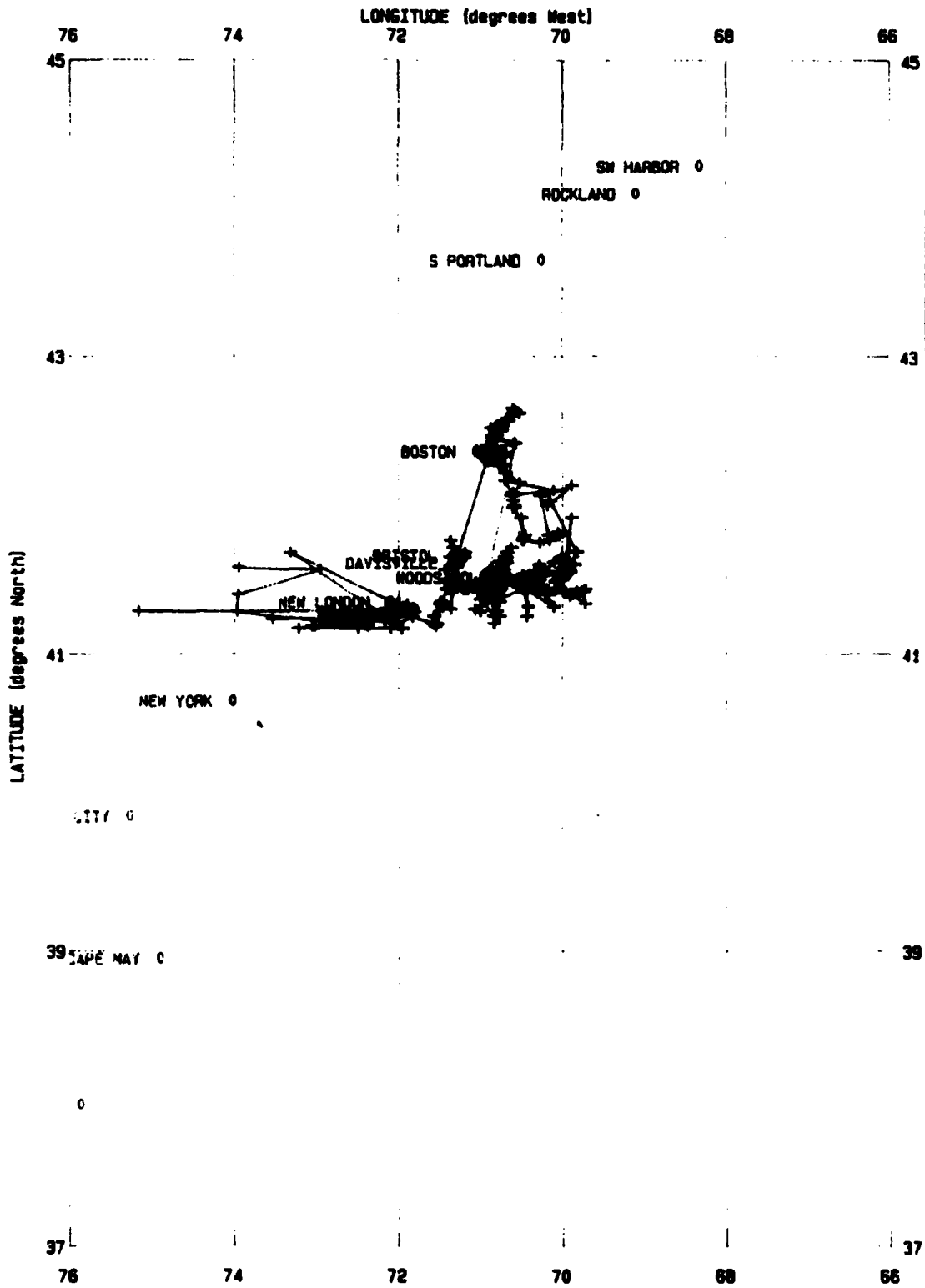
DISTRICT 1 RUN3-3 BIG-1

303 OF 303 AIDS SHOWN



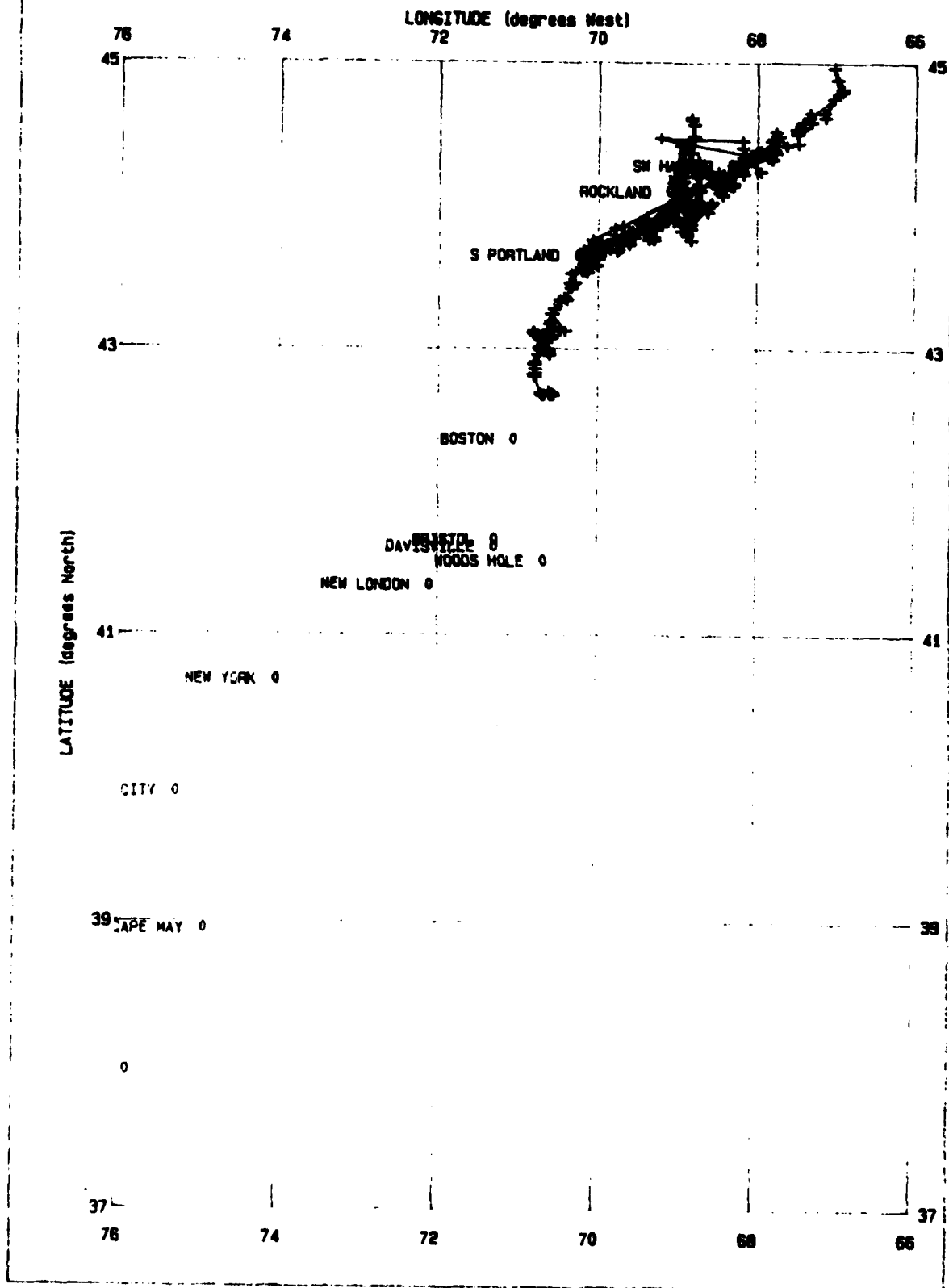
DISTRICT 1 RUN3-3 BIG-2

417 OF 417 AIDS SHOWN



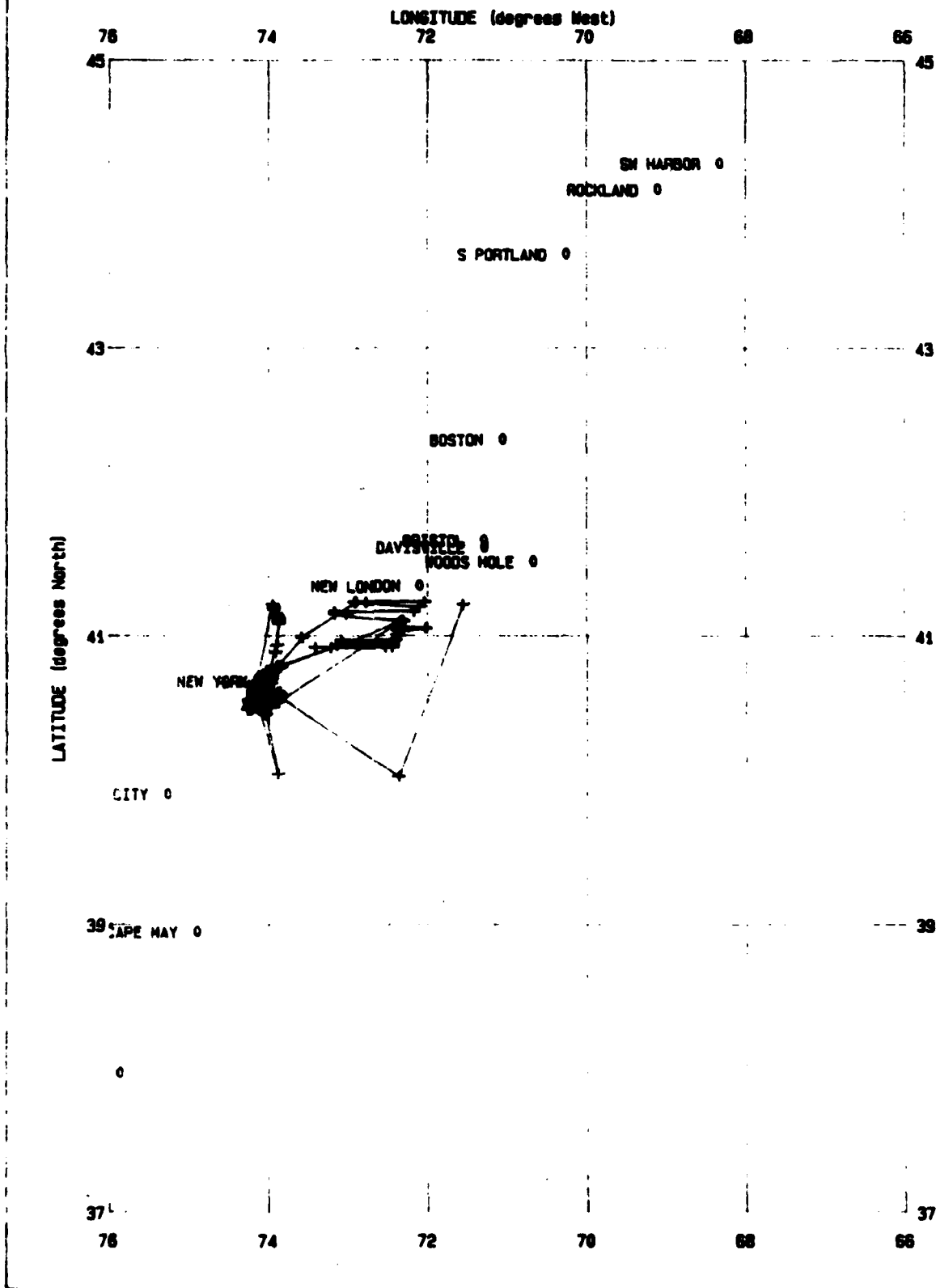
DISTRICT 1 RUN3-3 BIG-3

348 OF 348 AIDS SHOWN



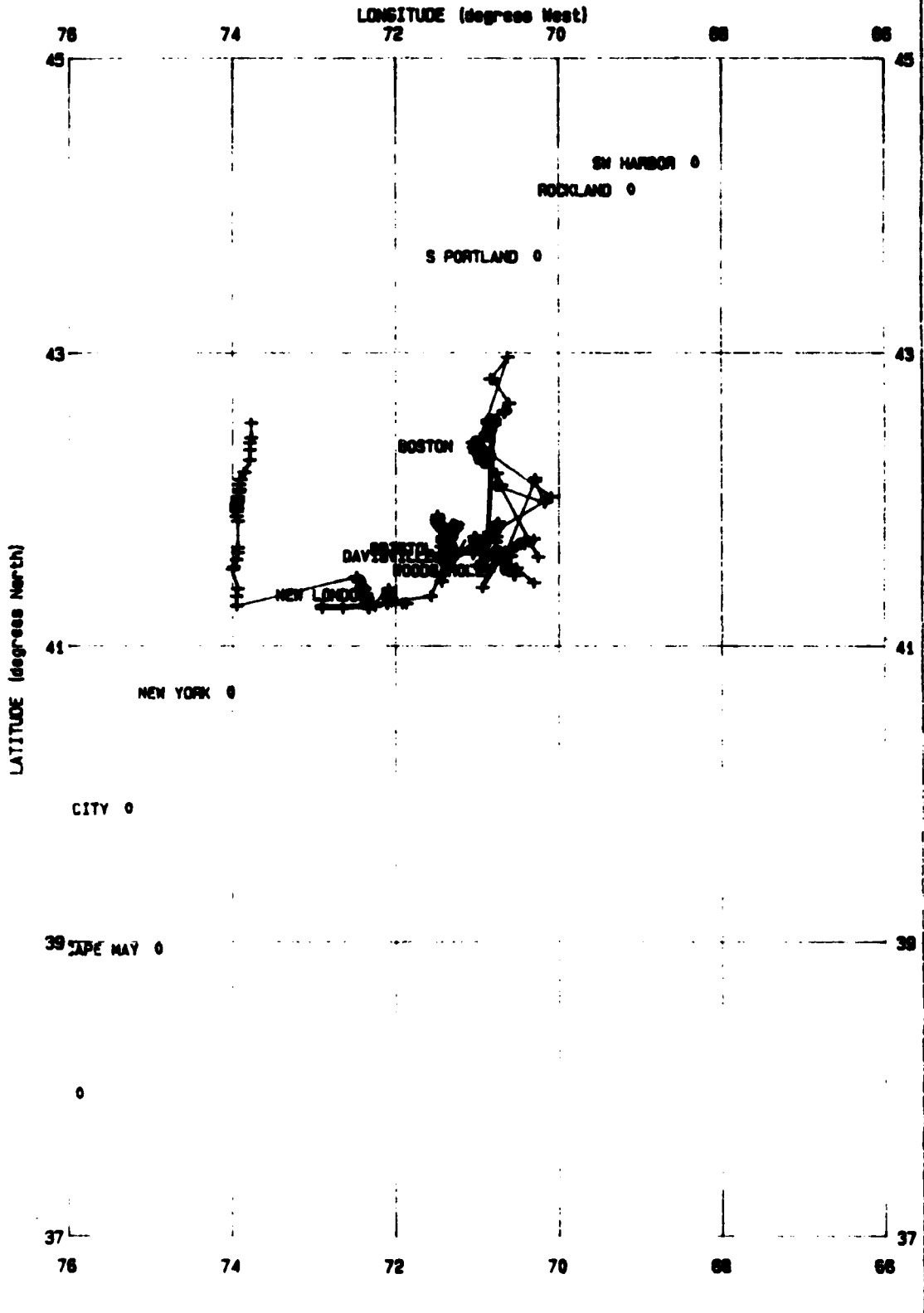
DISTRICT 1 RUN3-3 SMALL-1

204 OF 204 AIDS SHOWN



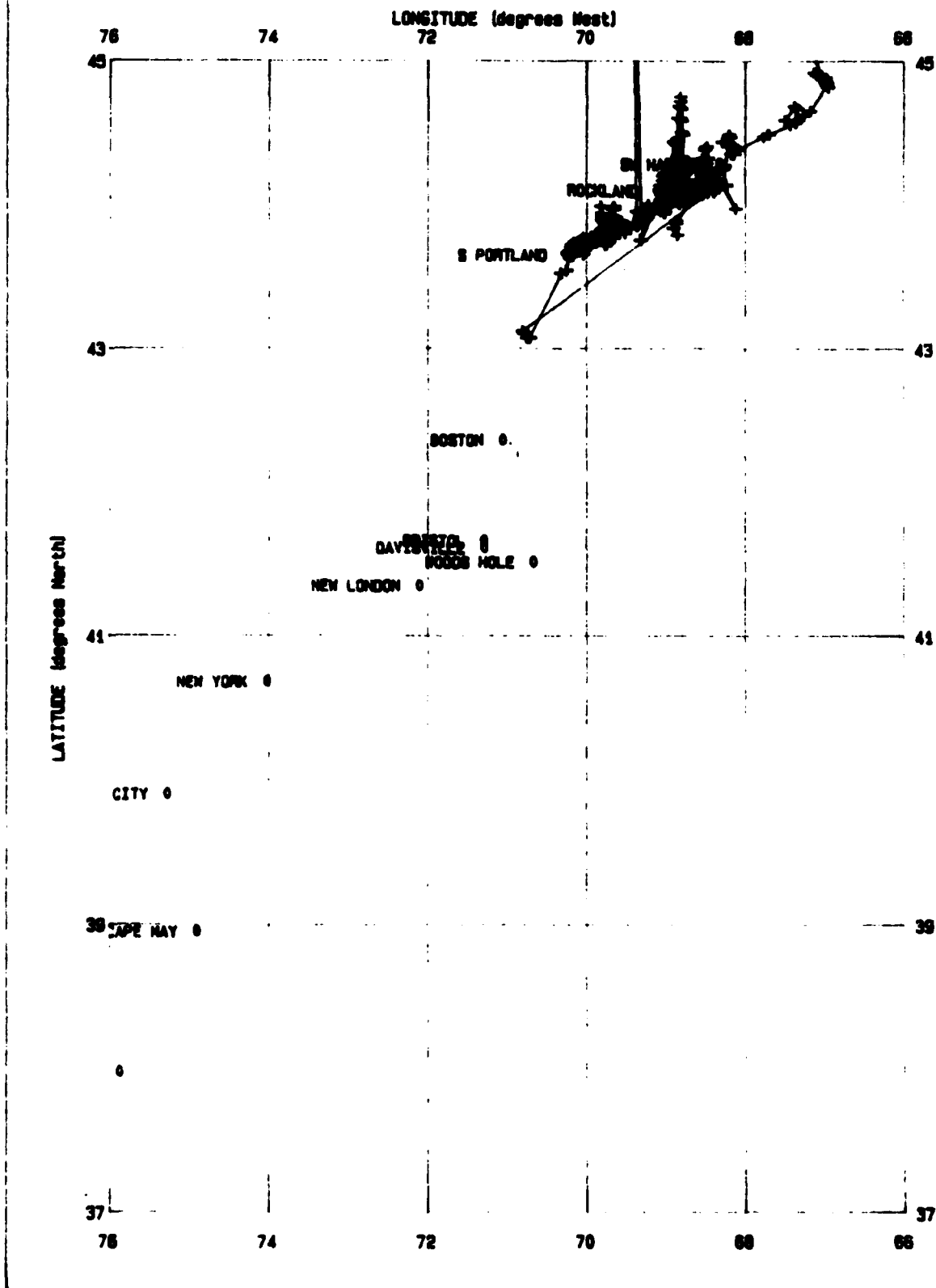
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381 OF 381 AIDS SHOWN



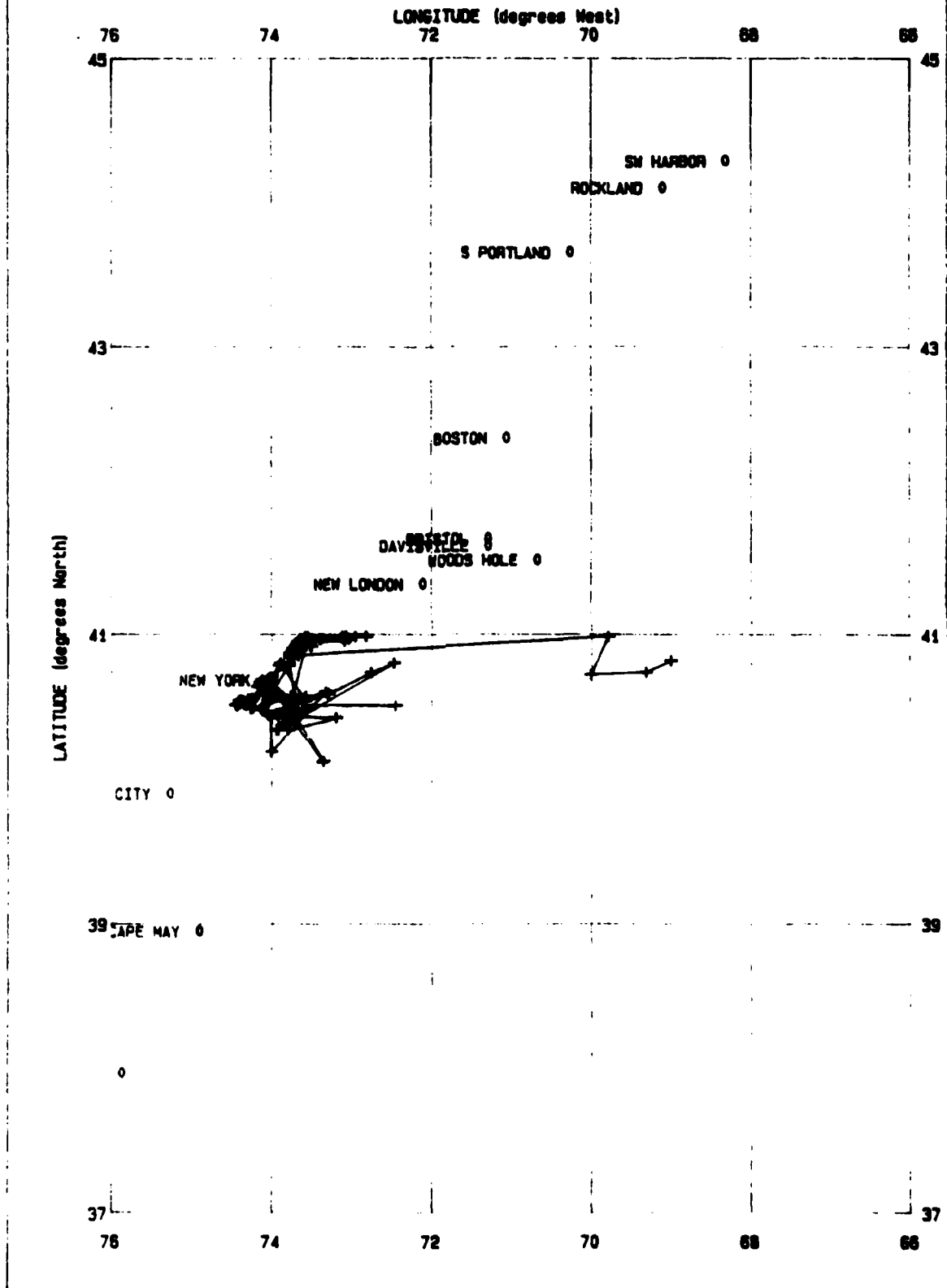
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301 OF 309 AIDS SHOWN



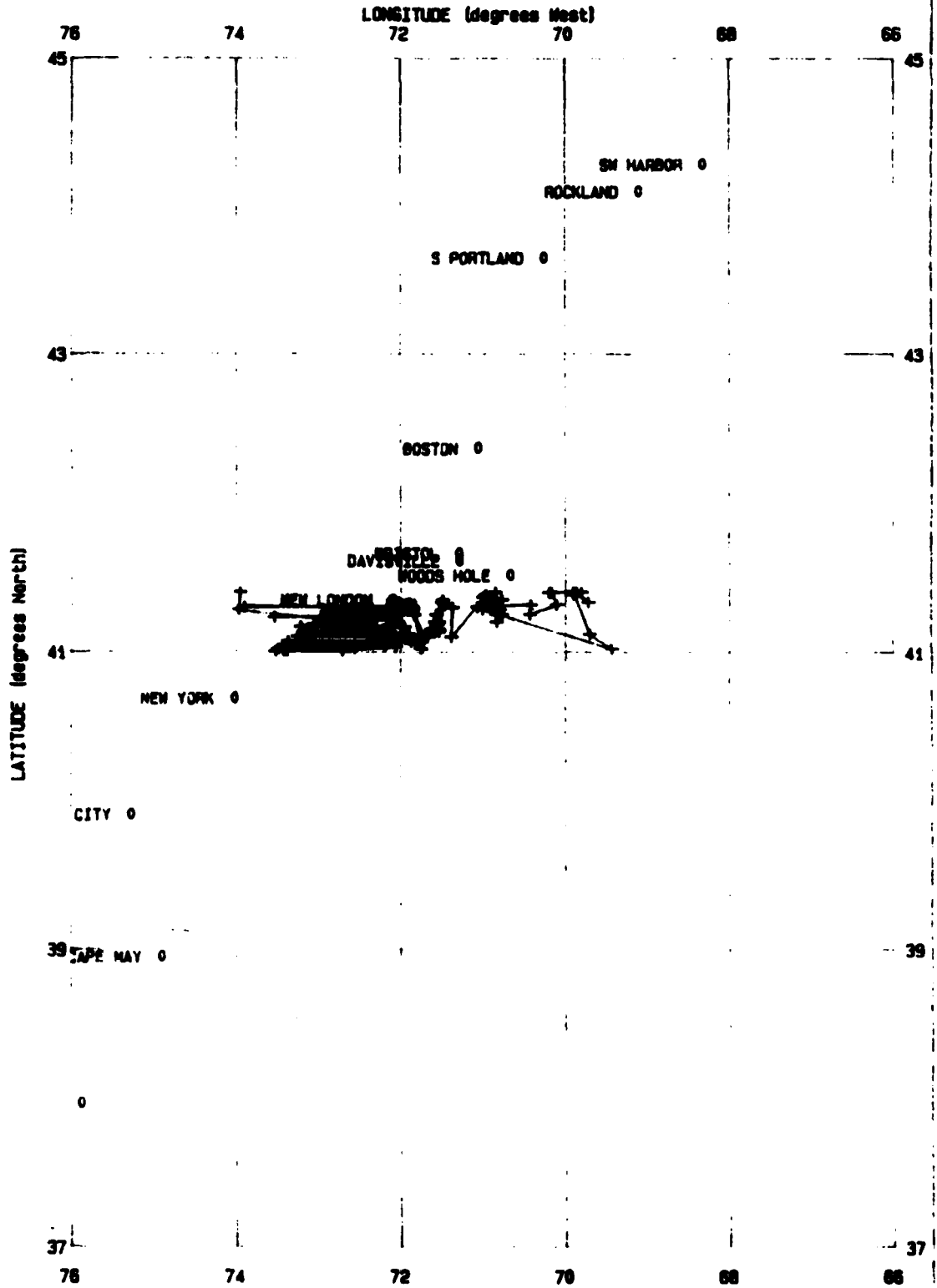
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249 OF 249 AIDS SHOWN



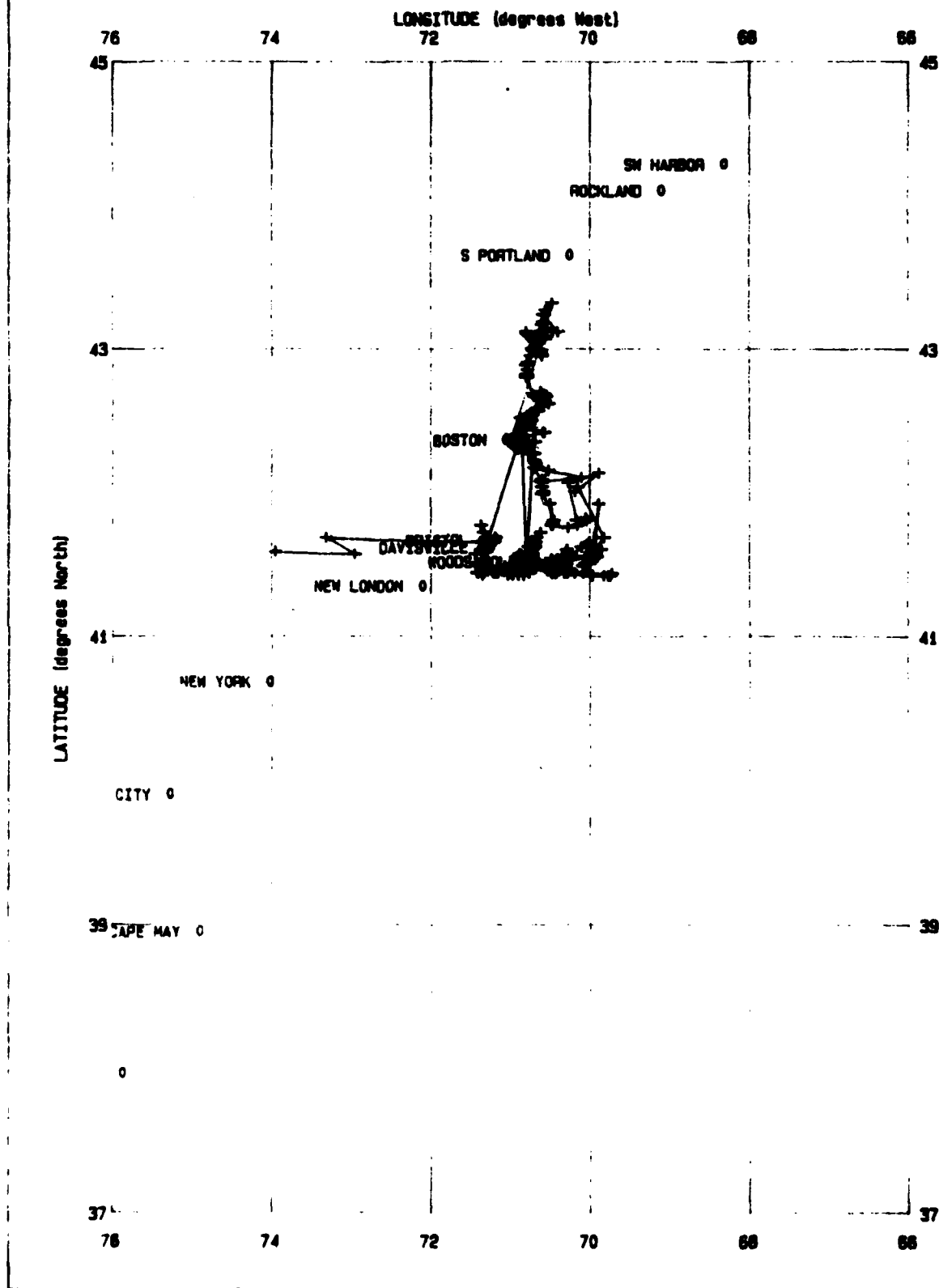
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197 OF 197 AIDS SHOWN

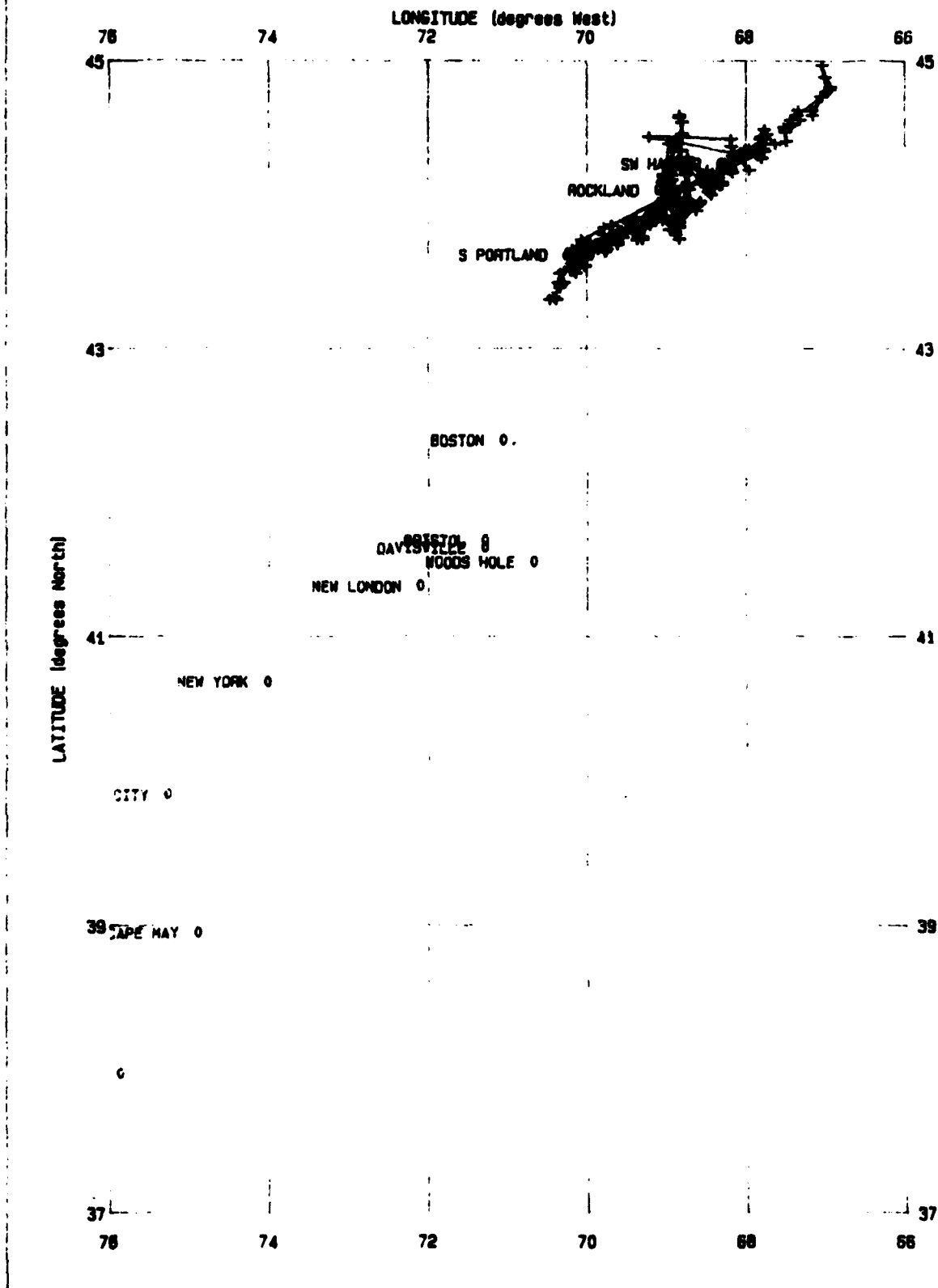


DISTRICT 1 RUN4-3 BIG-3

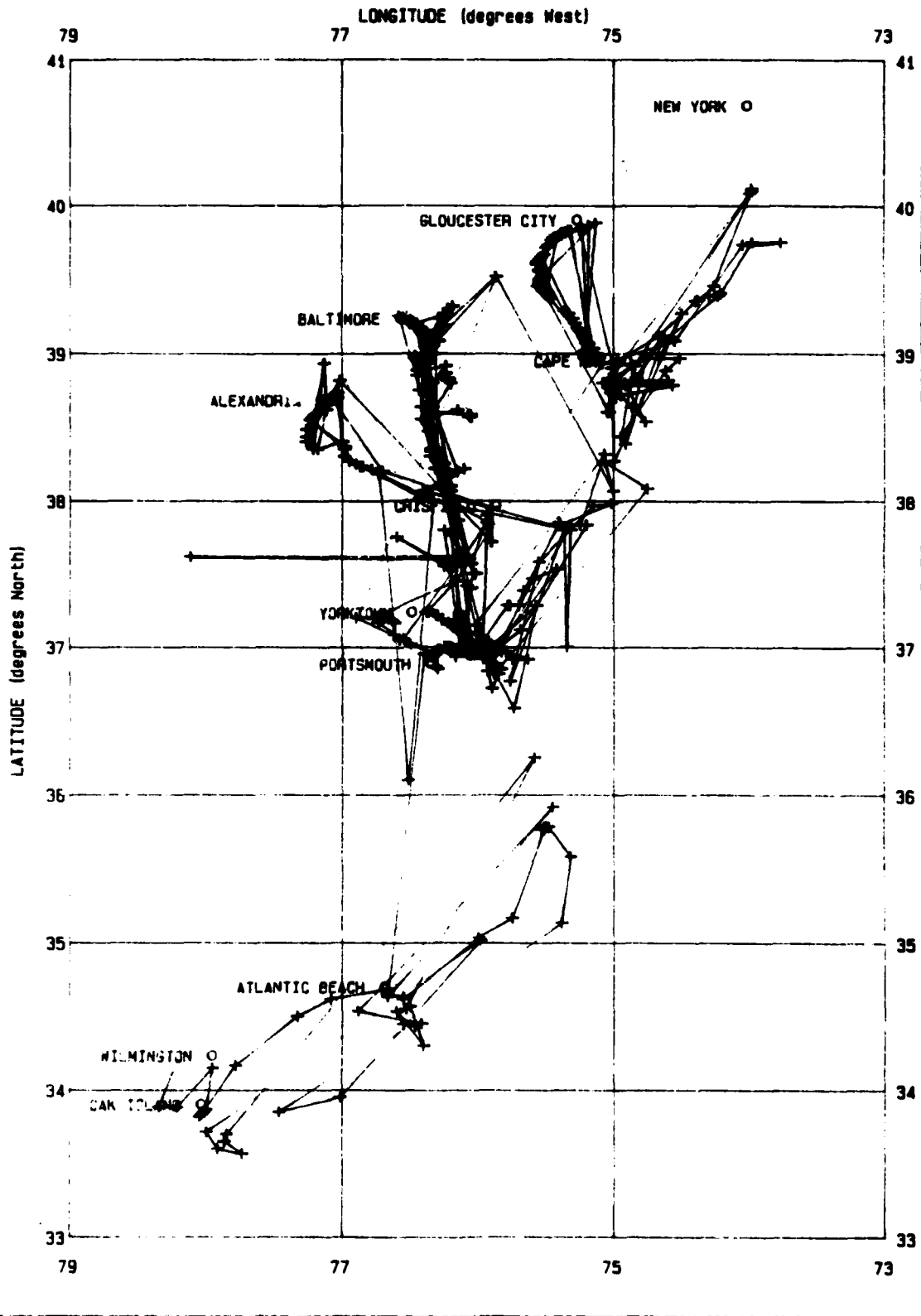
329 OF 329 AIDS SHOWN



DISTRICT 1 RUN4-3 BIG-4
293 OF 293 AIDS SHOWN

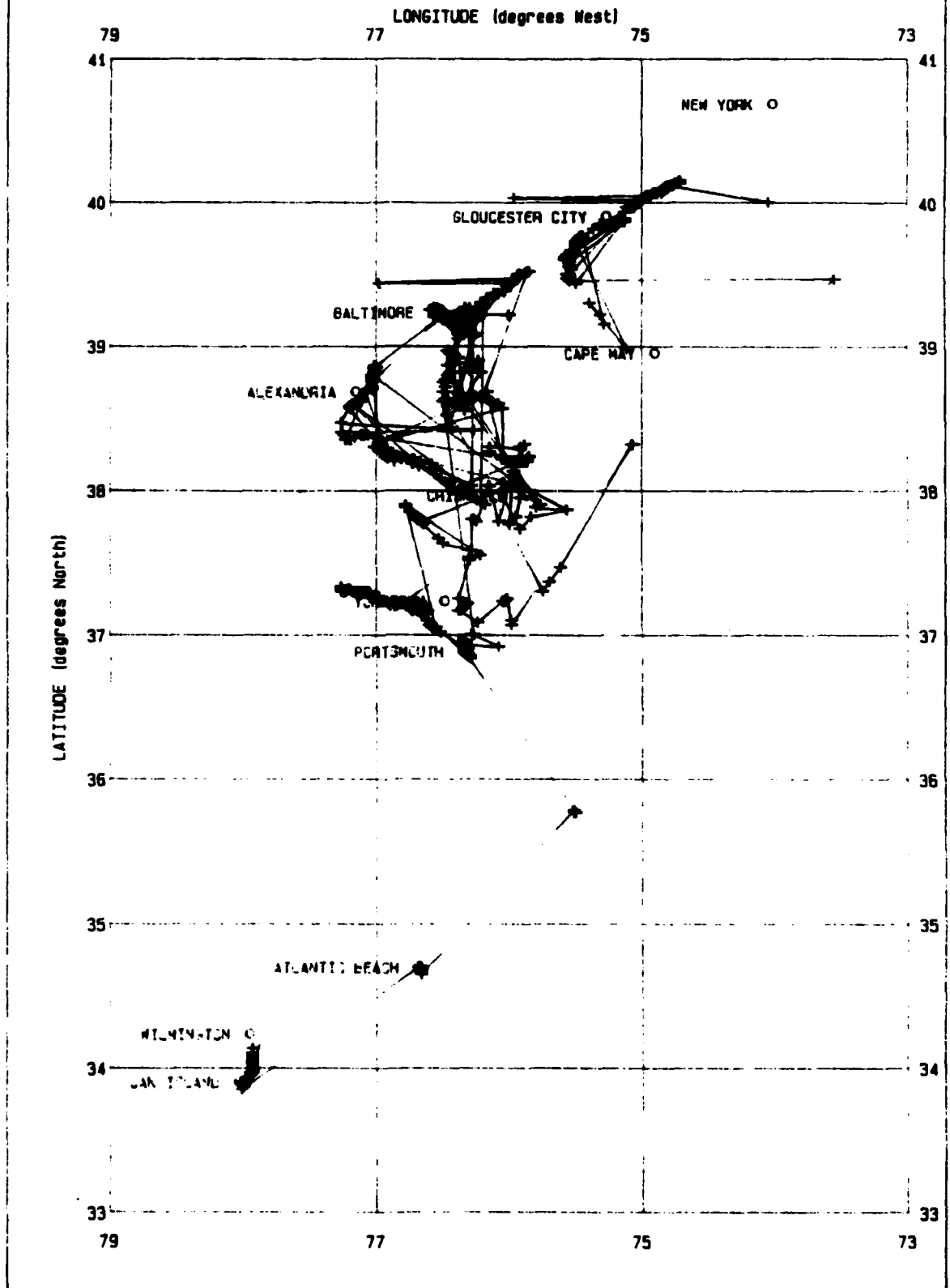


DISTRICT 5 RUN1-1 BIG-1
595 OF 595 AIDS SHOWN



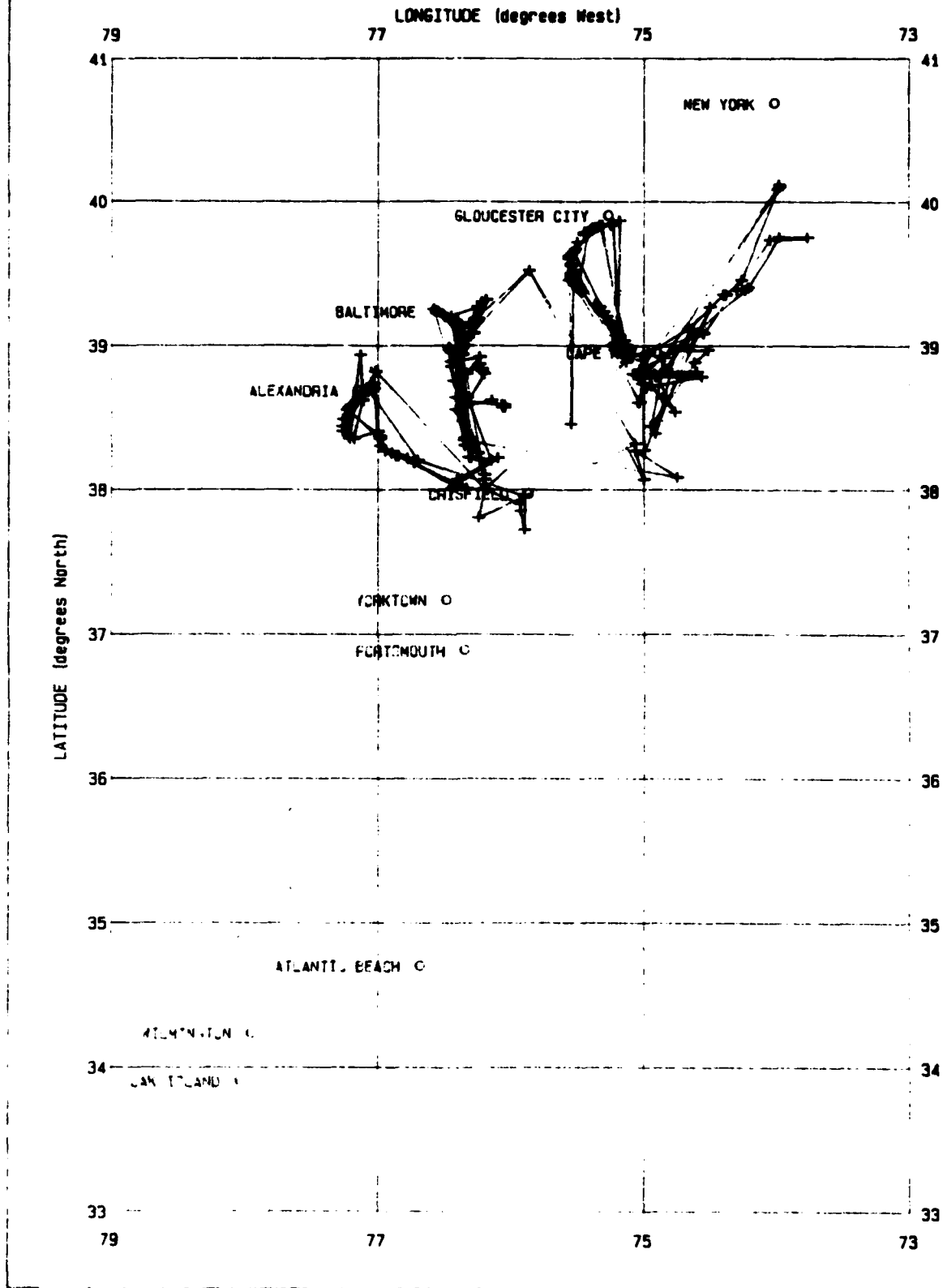
DISTRICT 5 RUN1-1 SMALL-1

842 OF 842 AIDS SHOWN



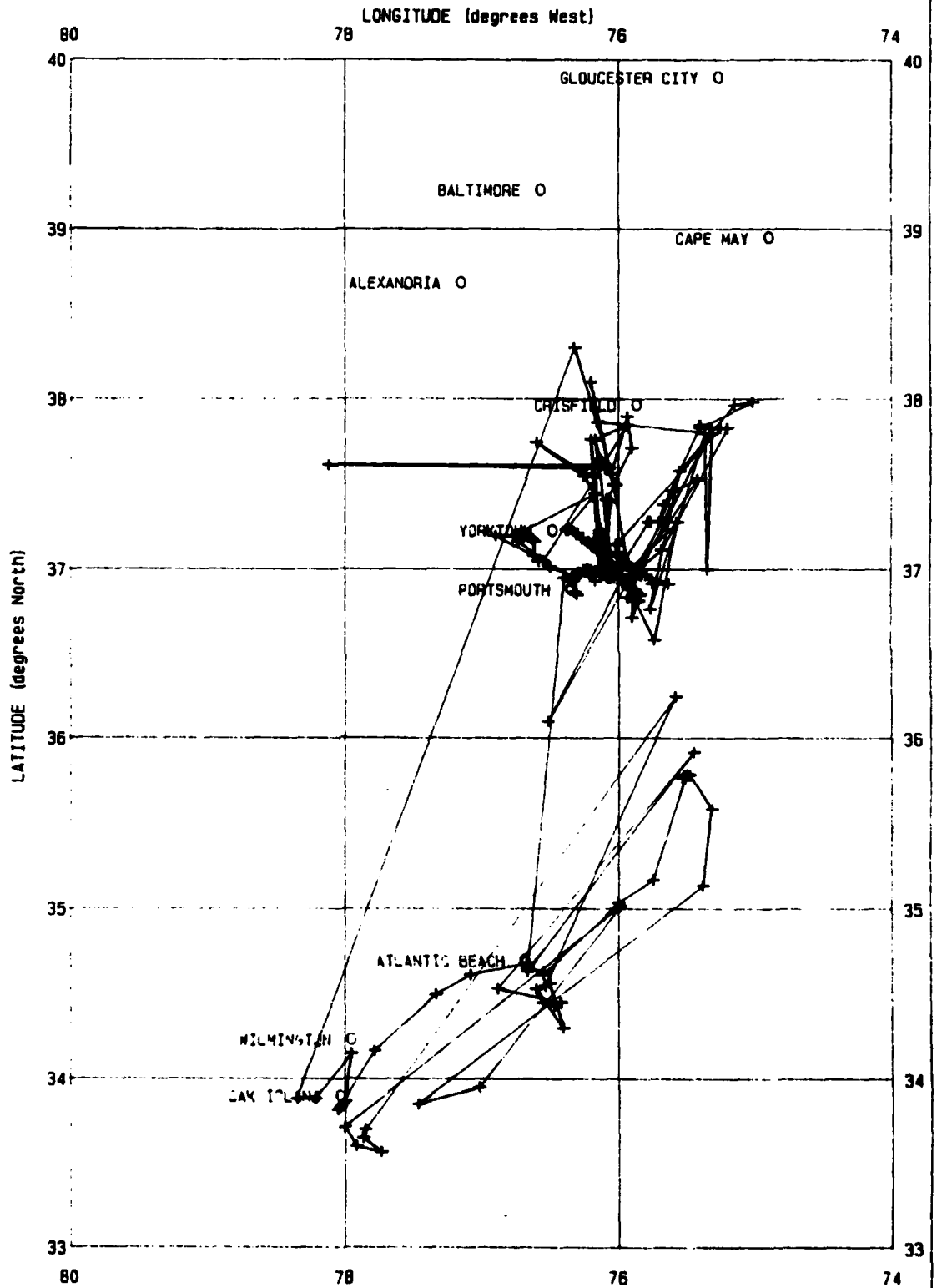
DISTRICT 5 RUN2-2 BIG-2

338 OF 338 AIDS SHOWN



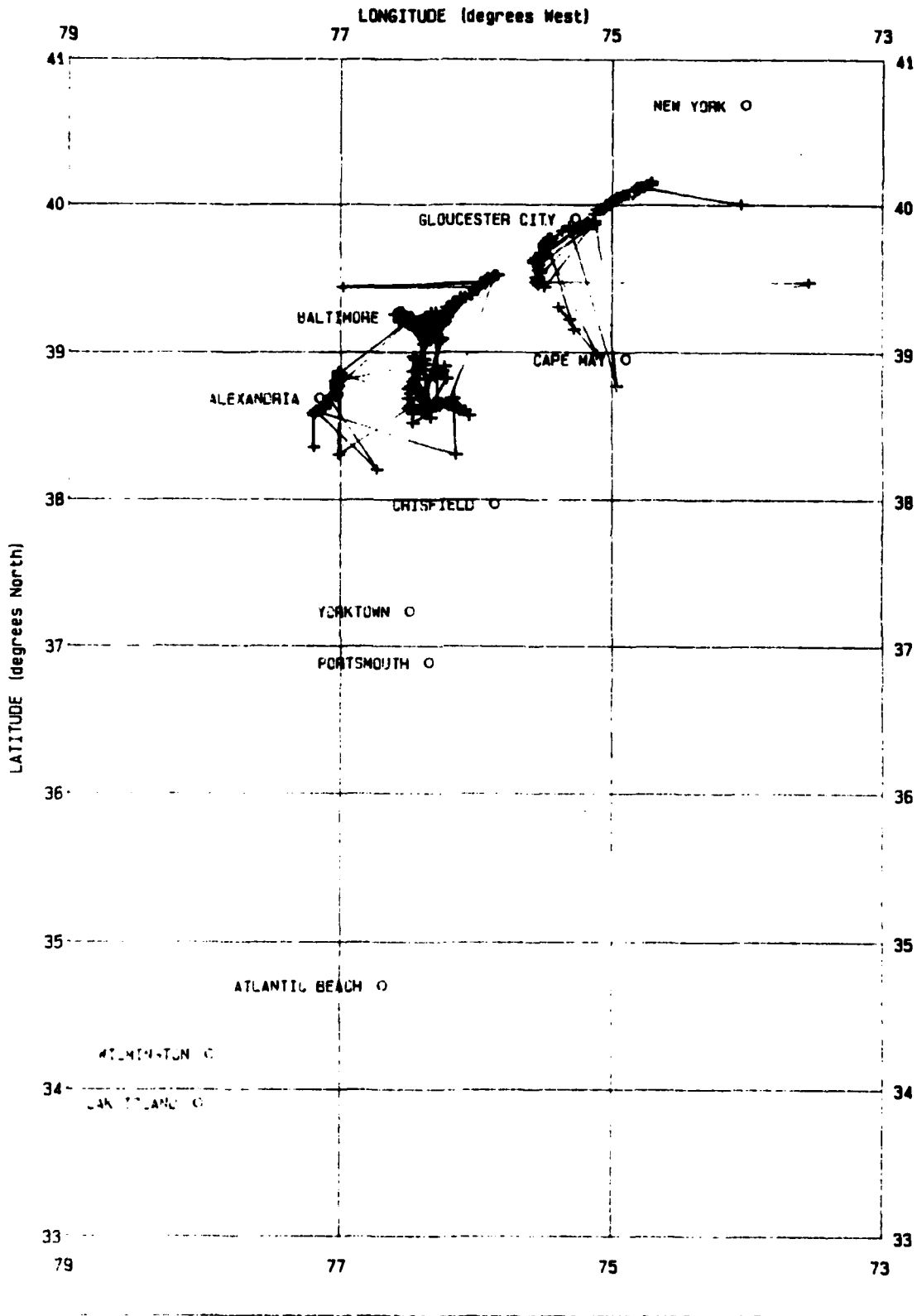
DISTRICT 5 RUN2-2 BIG-3

243 OF 243 AIDS SHOWN

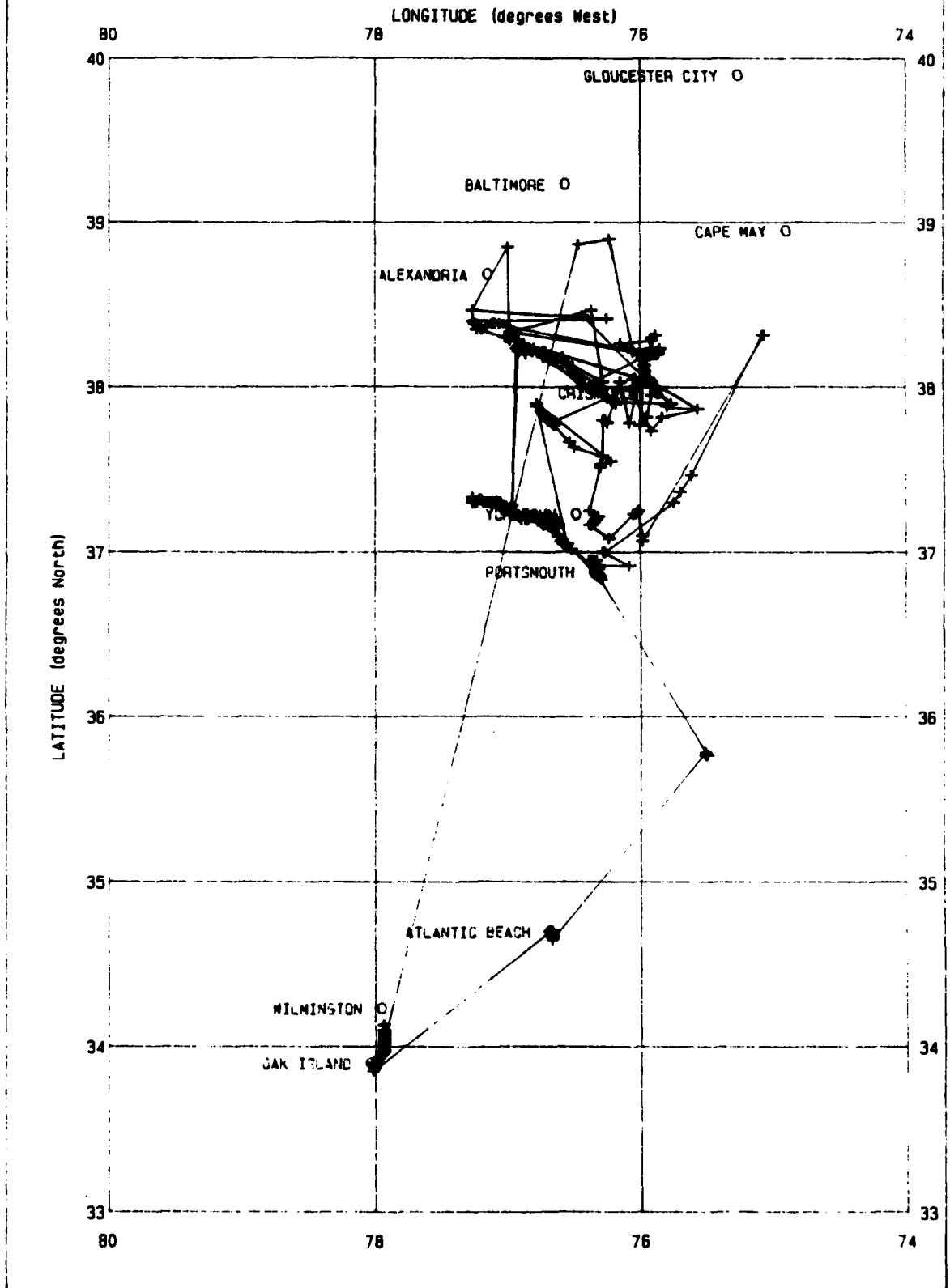


DISTRICT 5 RUN2-2 SMALL-2

511 OF 511 AIDS SHOWN

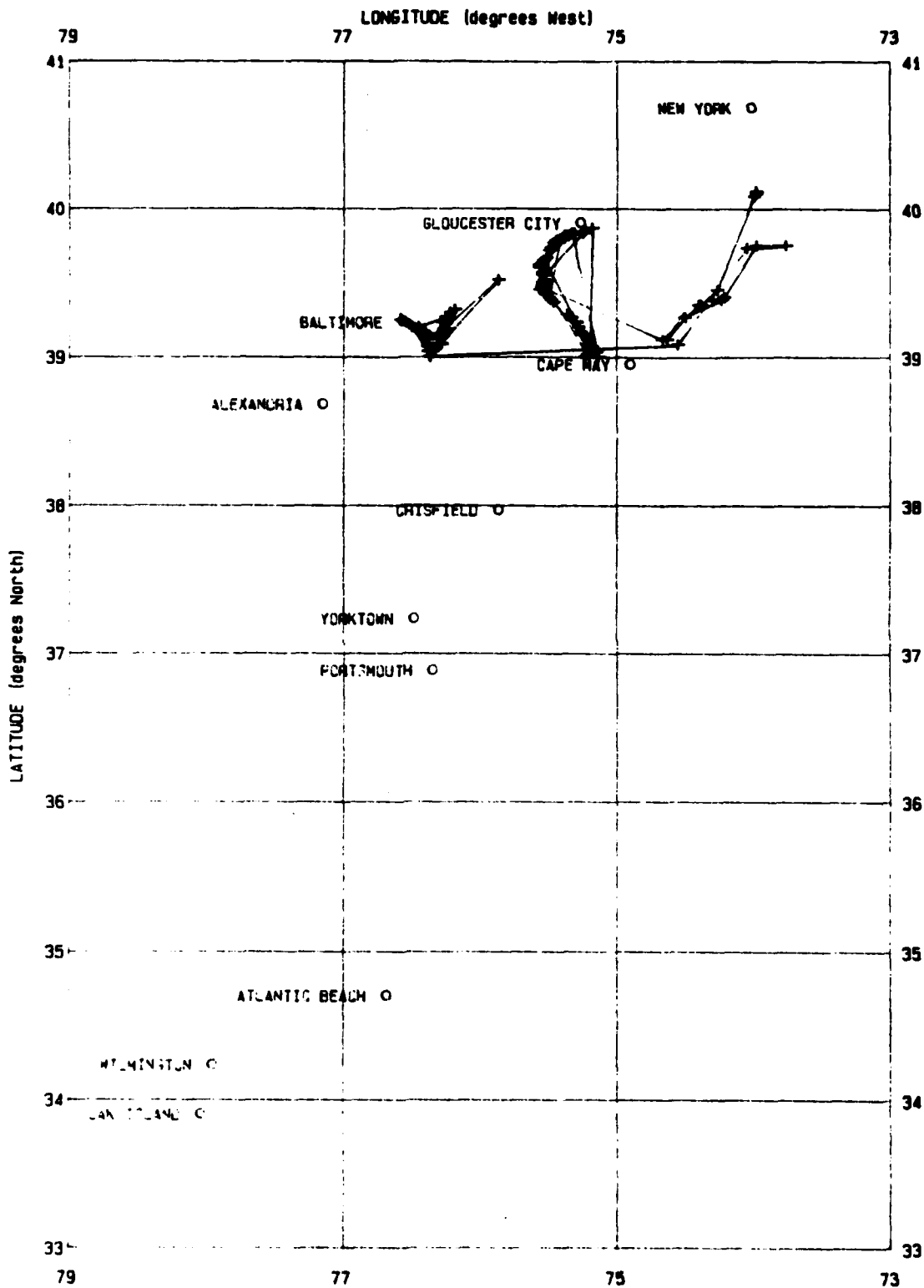


DISTRICT 5 RUN2-2 SMALL-3
345 OF 345 AIDS SHOWN



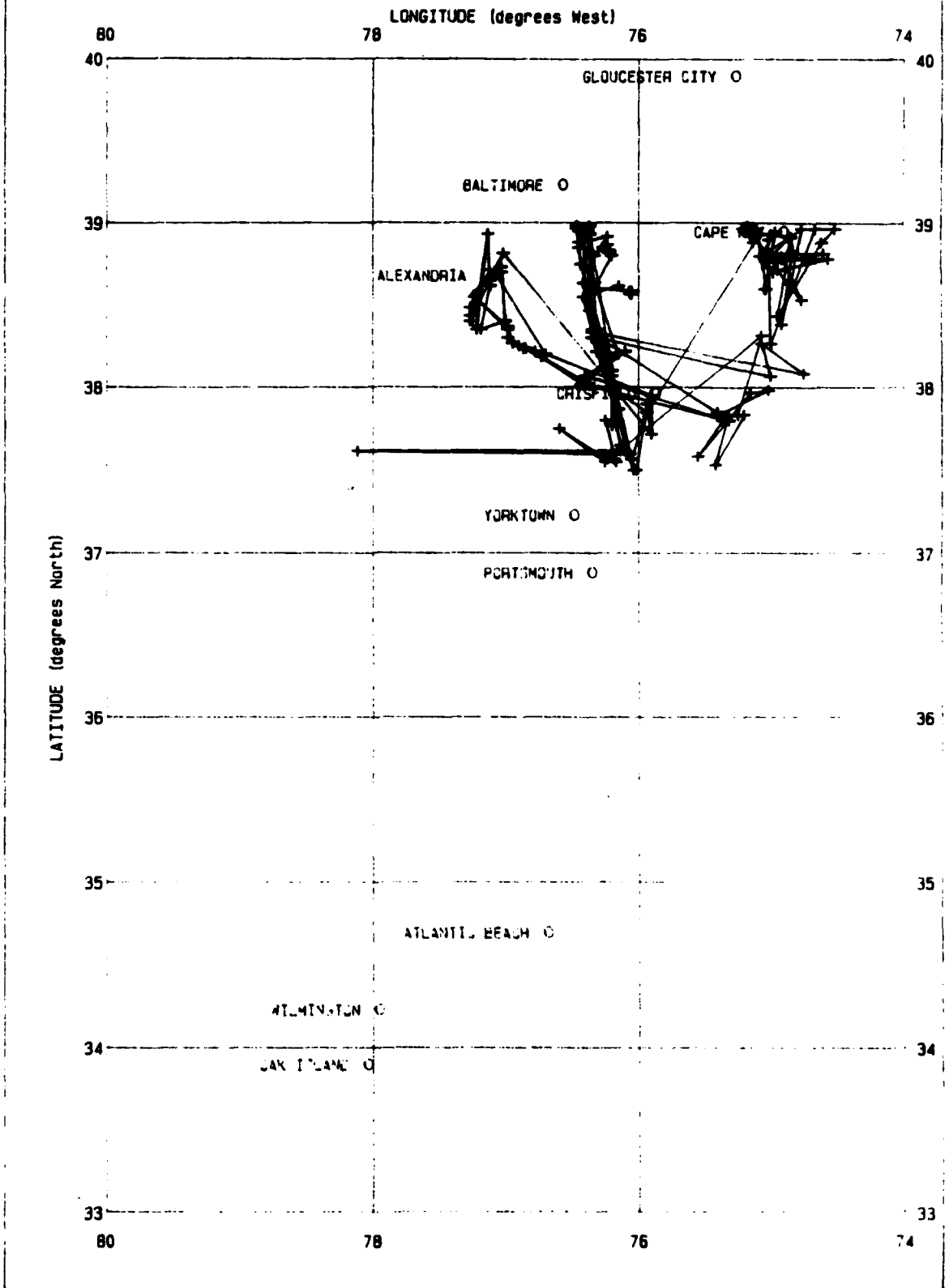
DISTRICT 5 RUN3-3 BIG-1

151 OF 151 AIDS SHOWN



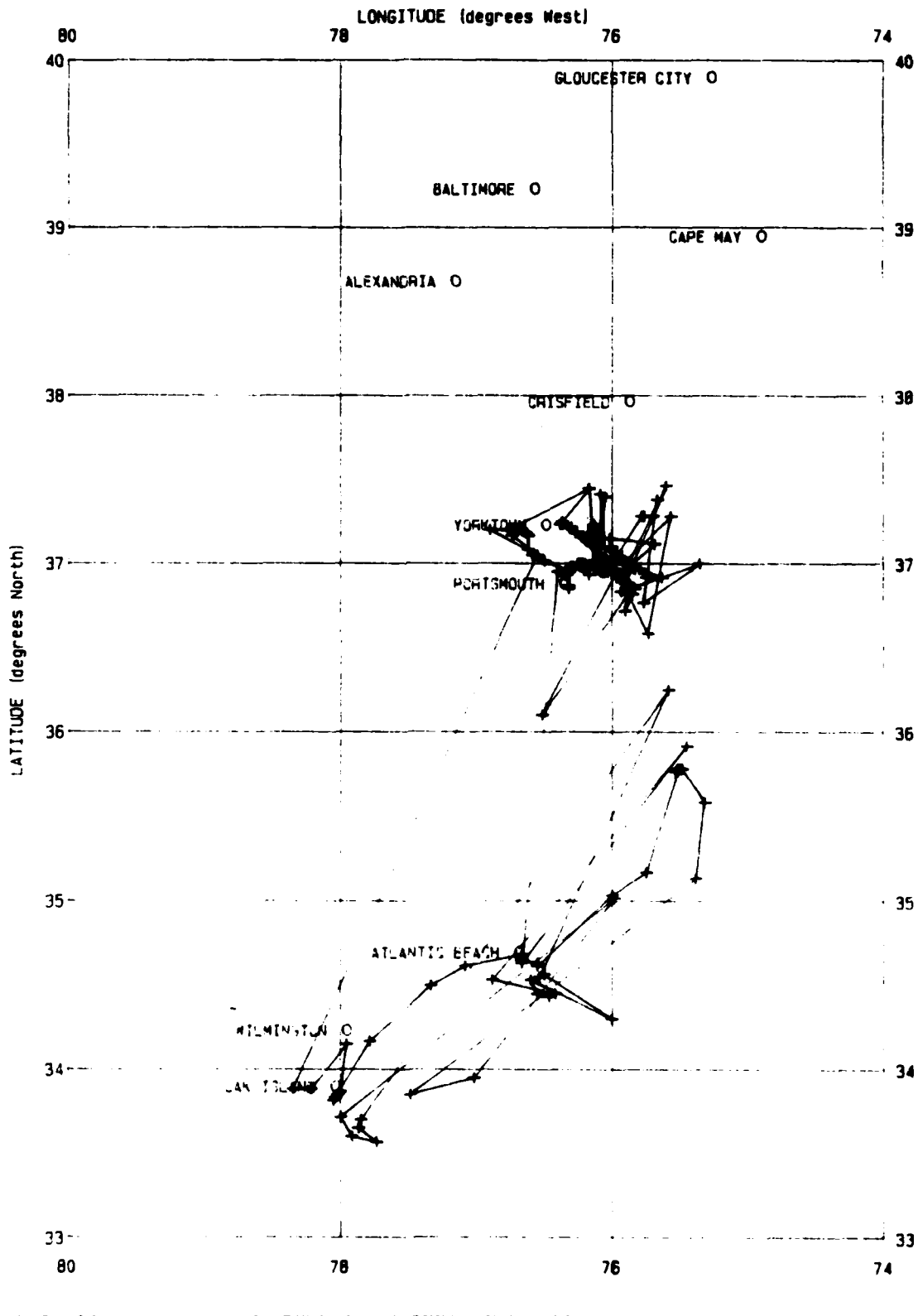
DISTRICT 5 RUN3-3 BIG-2

250 OF 250 AIDS SHOWN



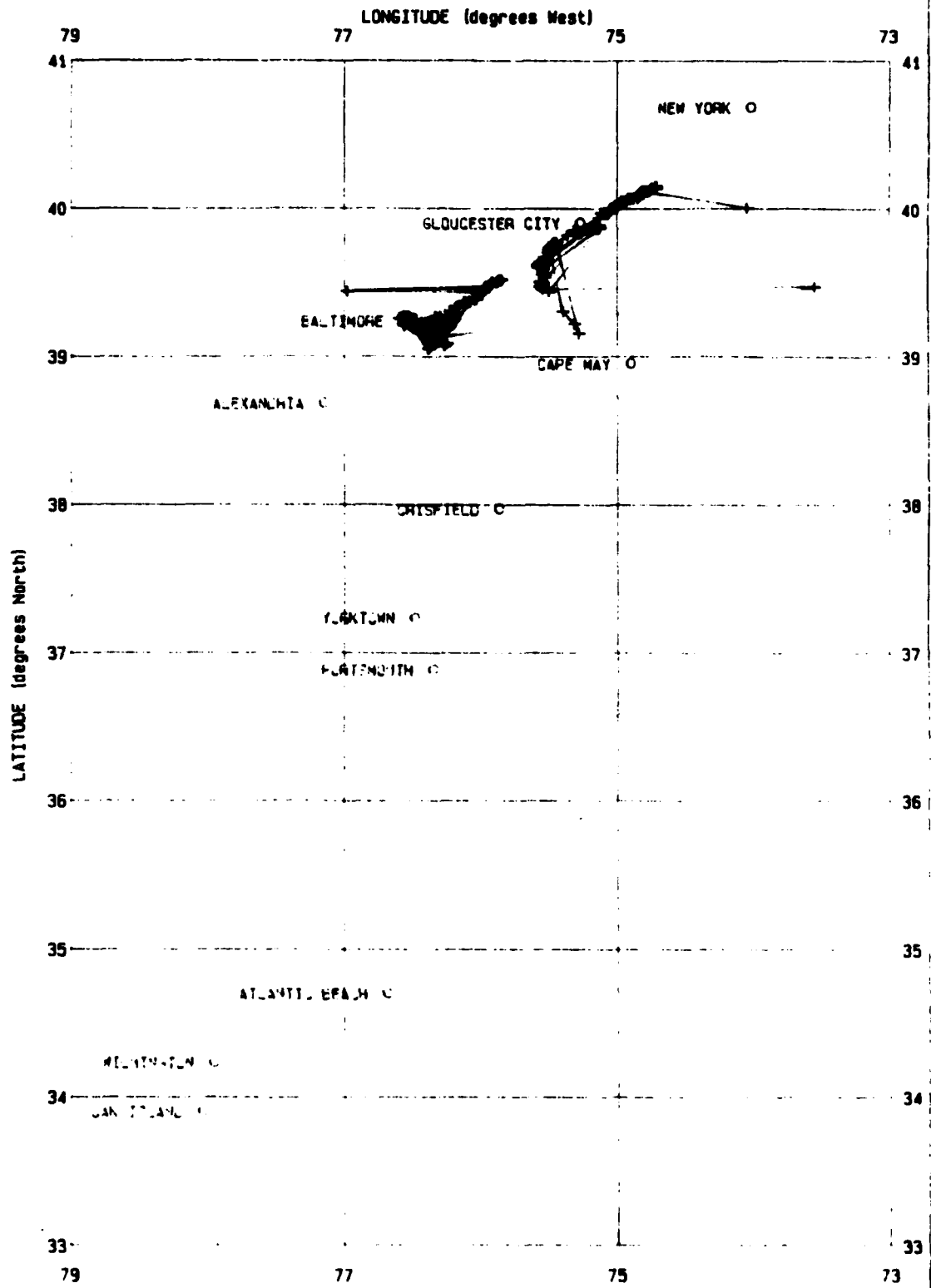
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194 OF 194 AIDS SHOWN



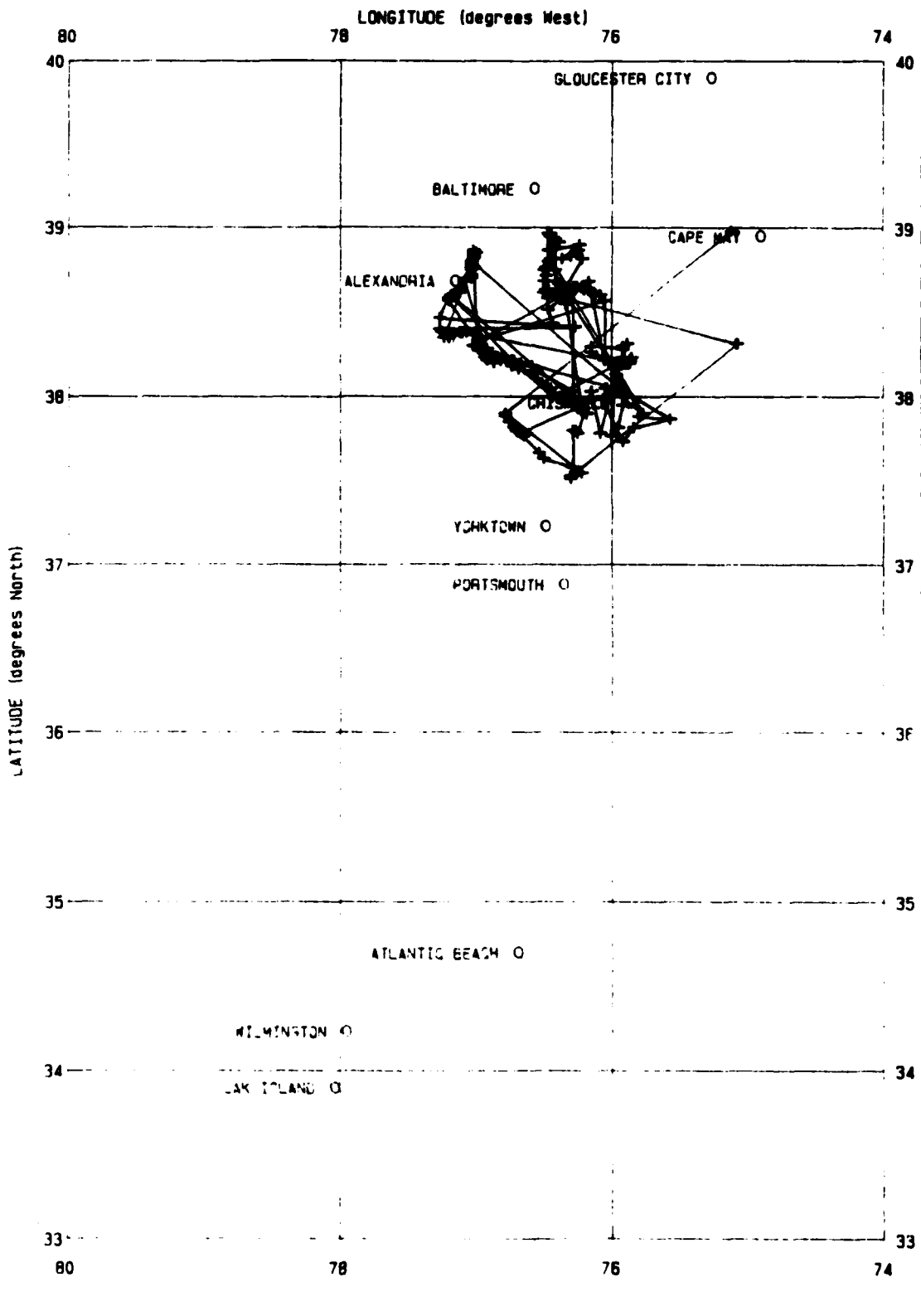
DISTRICT 5 RUN3-3 SMALL-1

383 OF 383 AIDS SHOWN



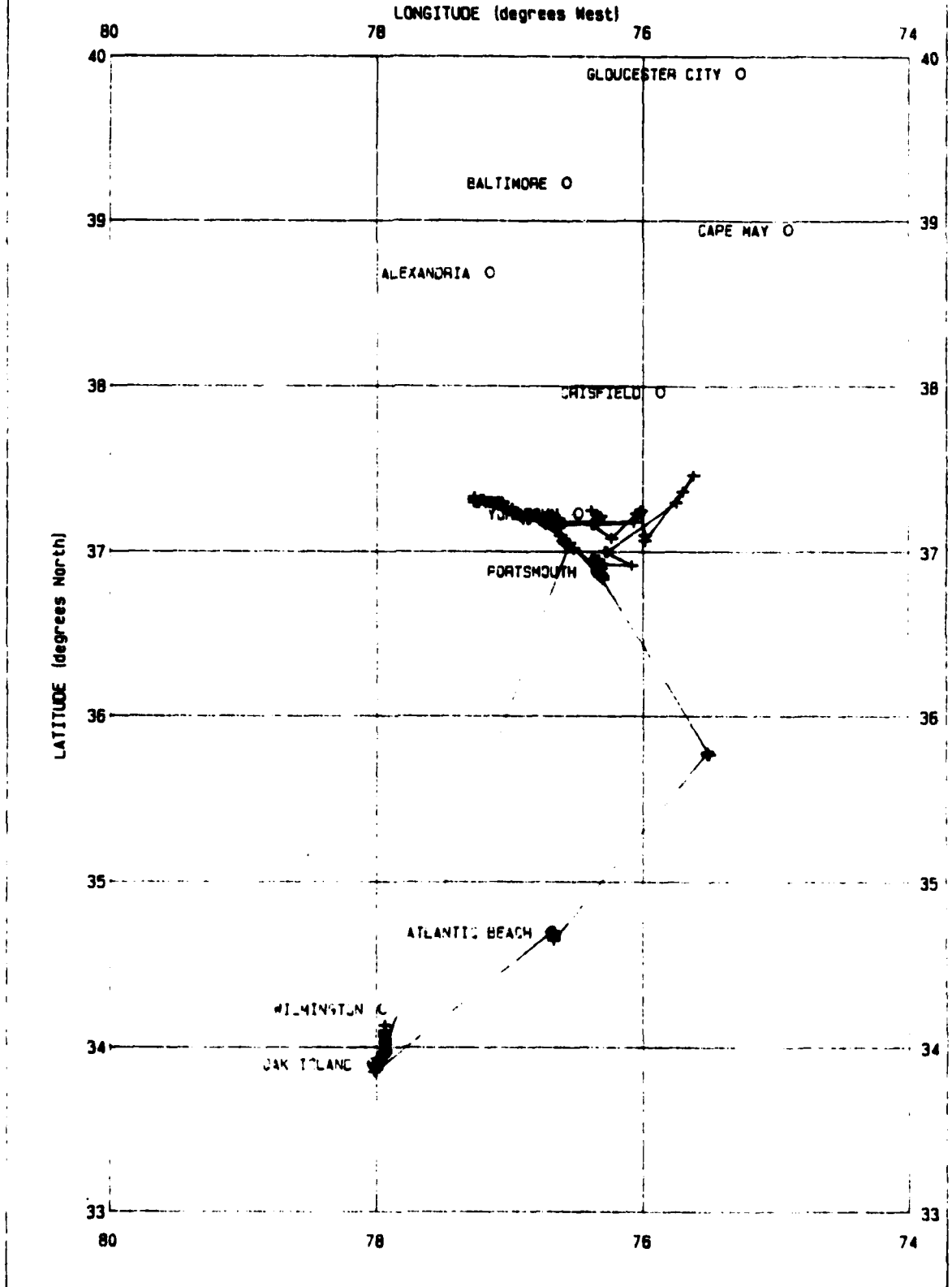
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263 OF 263 AIDS SHOWN

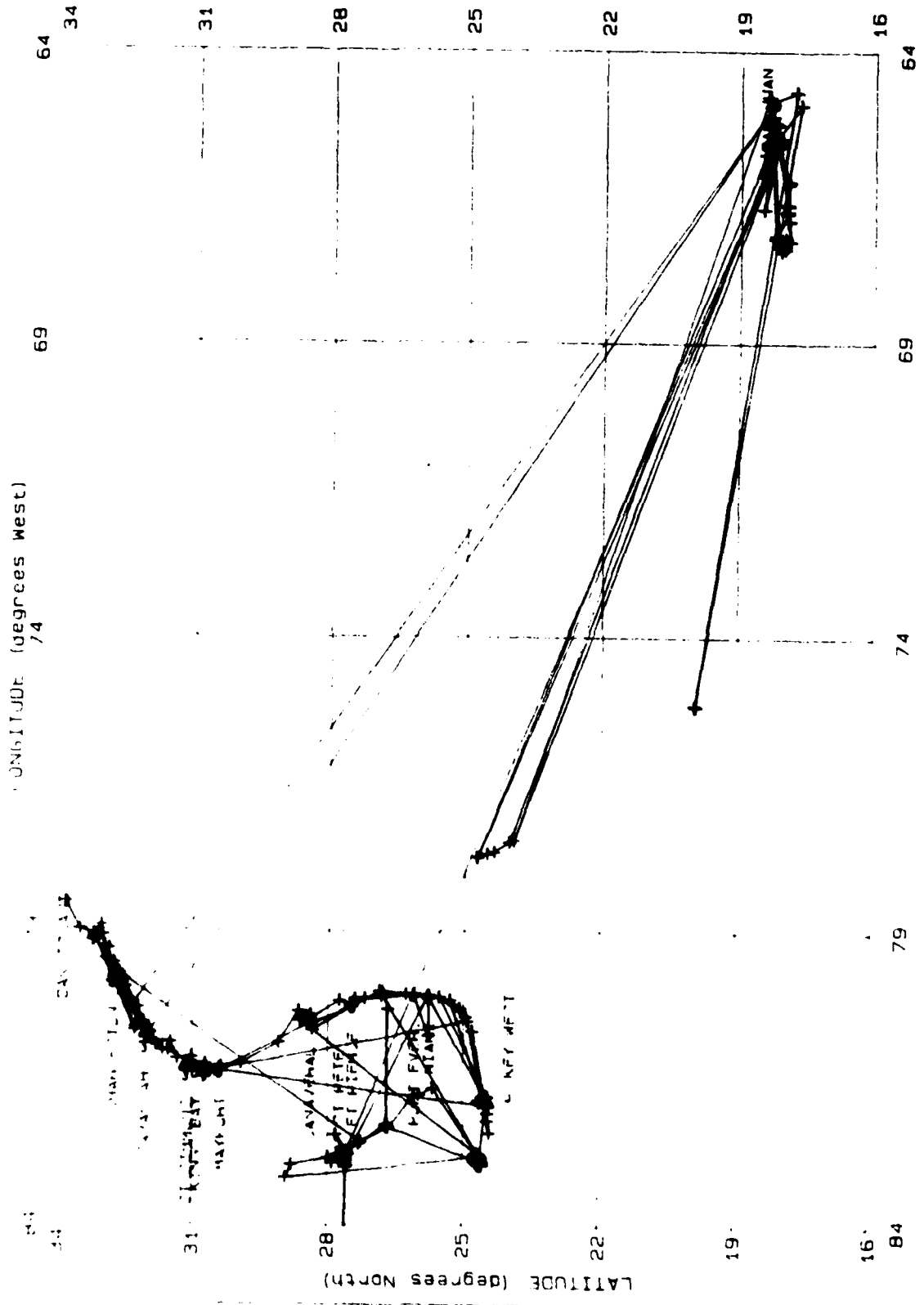


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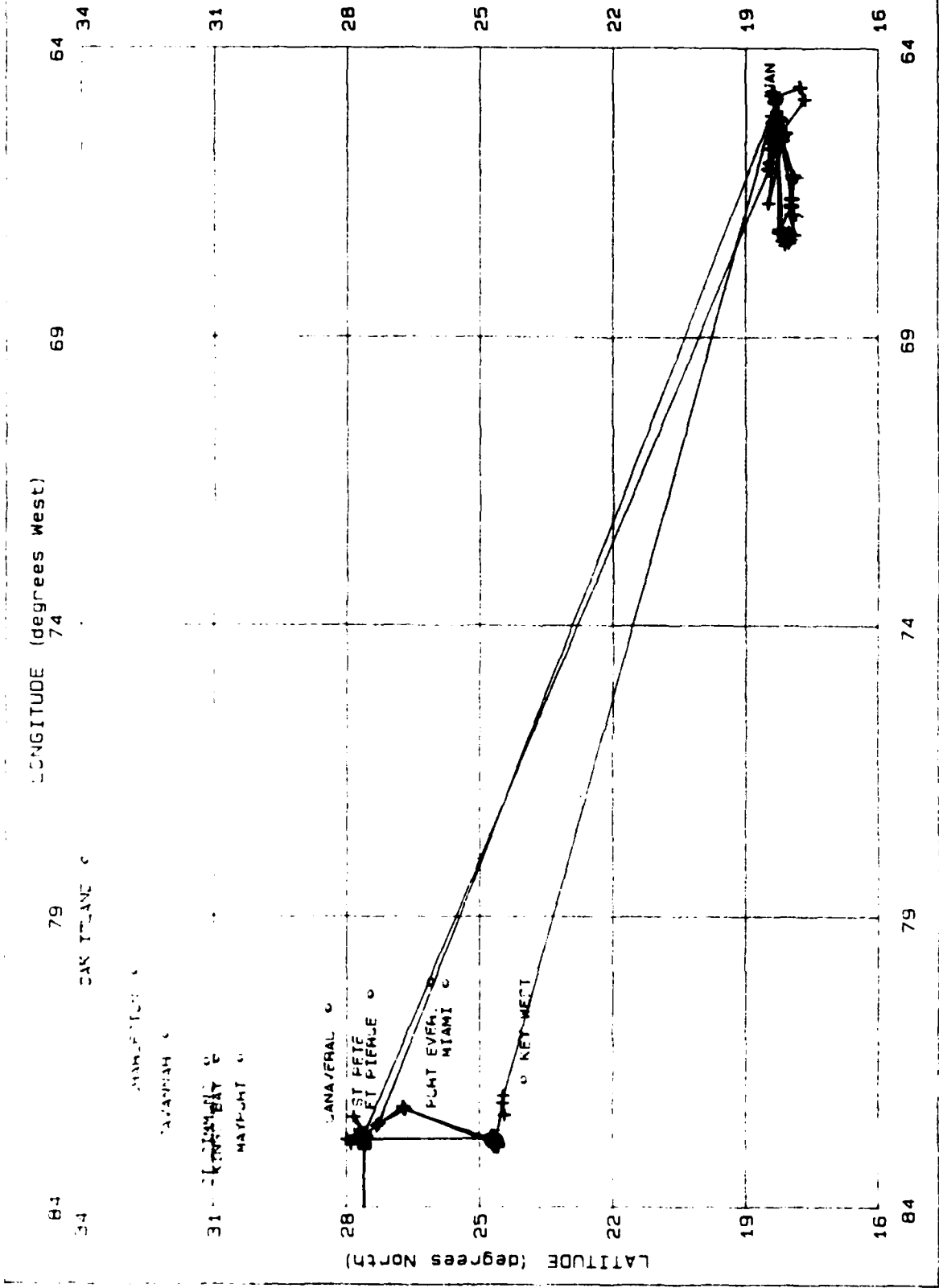
196 OF 196 AIDS SHOWN



DISTRICT 7 RUN1-1 BIG-1
 415 OF 416 AIDS SHOWN

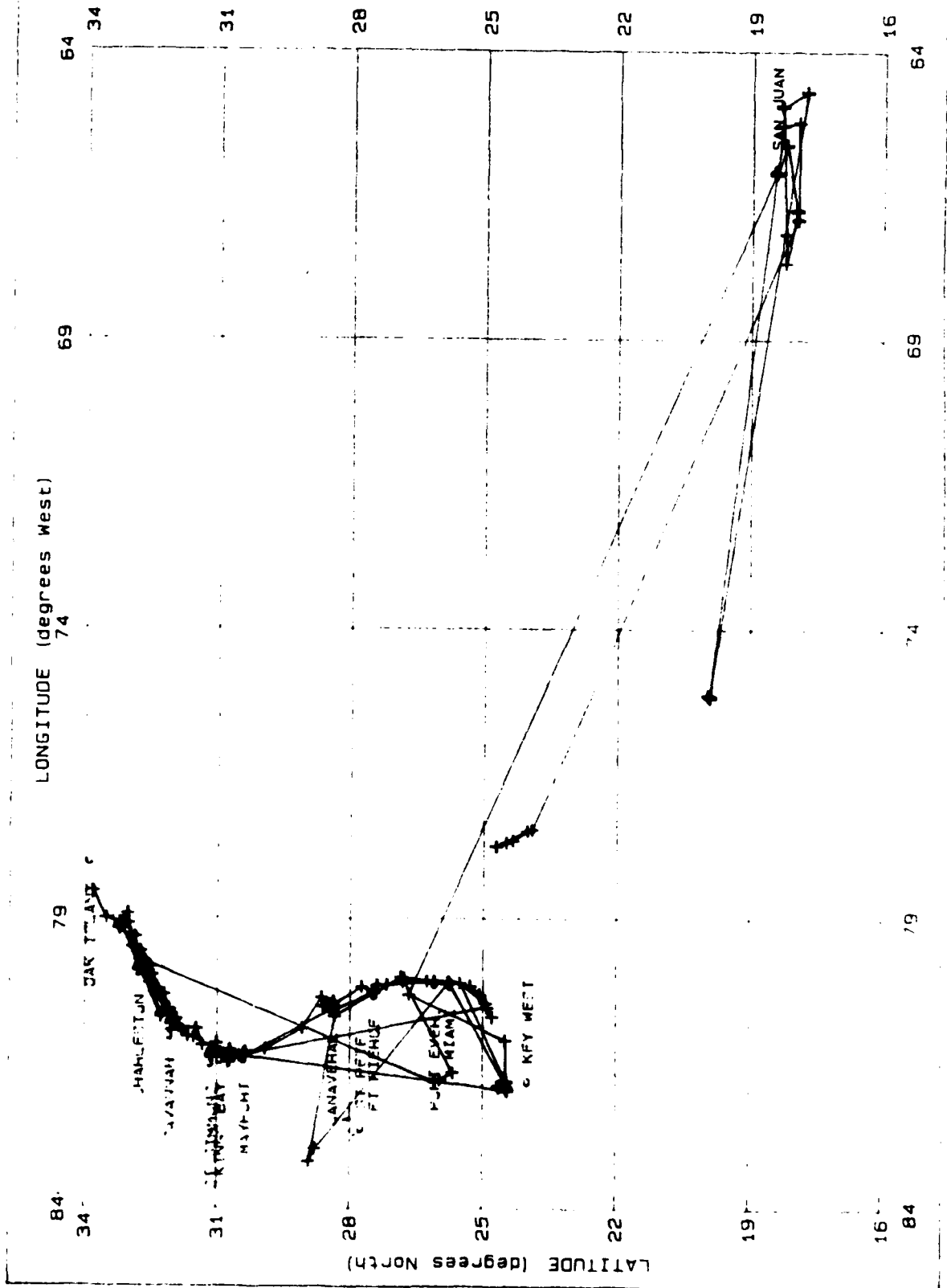


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169 OF 170 AIDS SHOWN

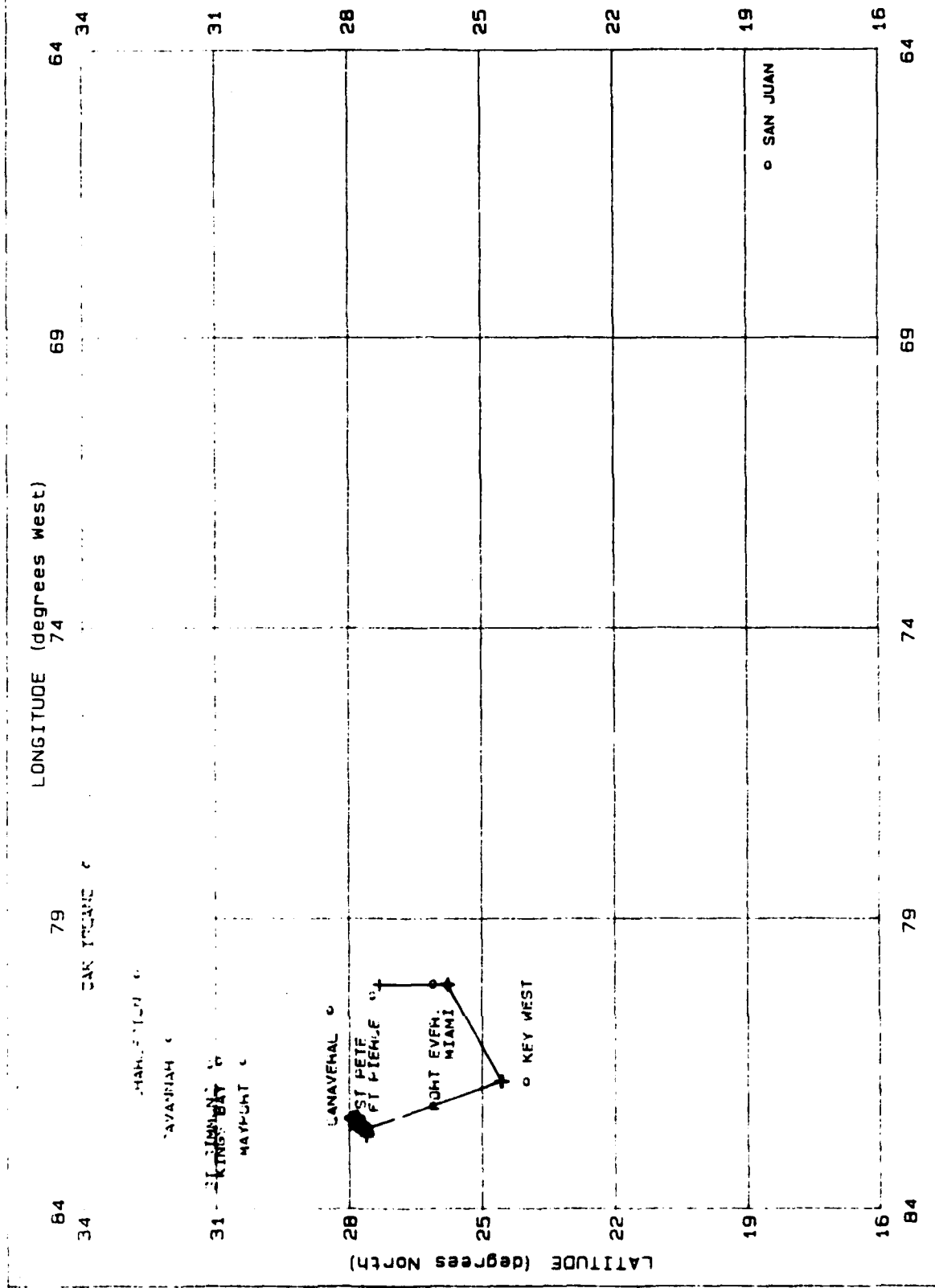


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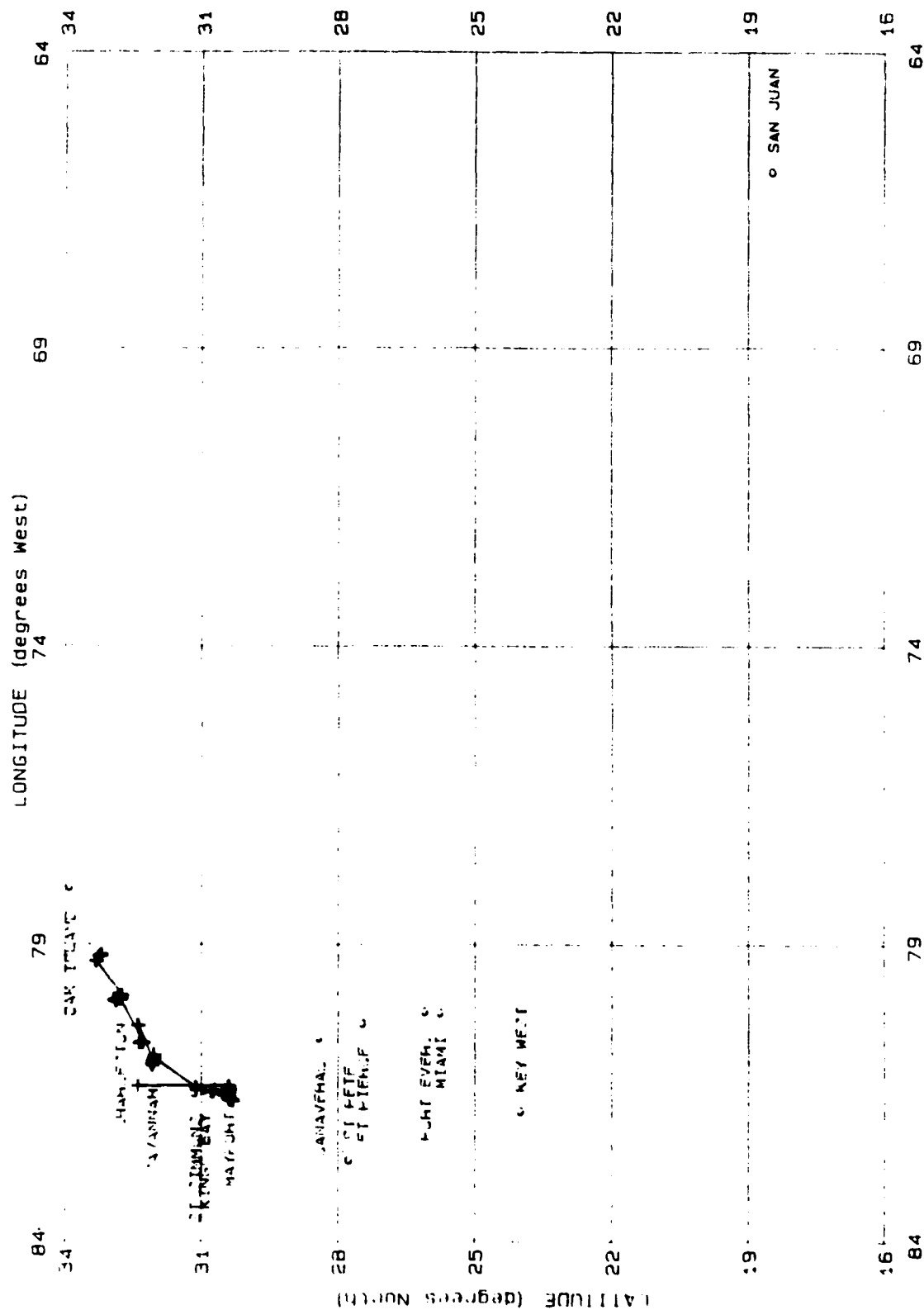
312 OF 312 AIDS SHOWN



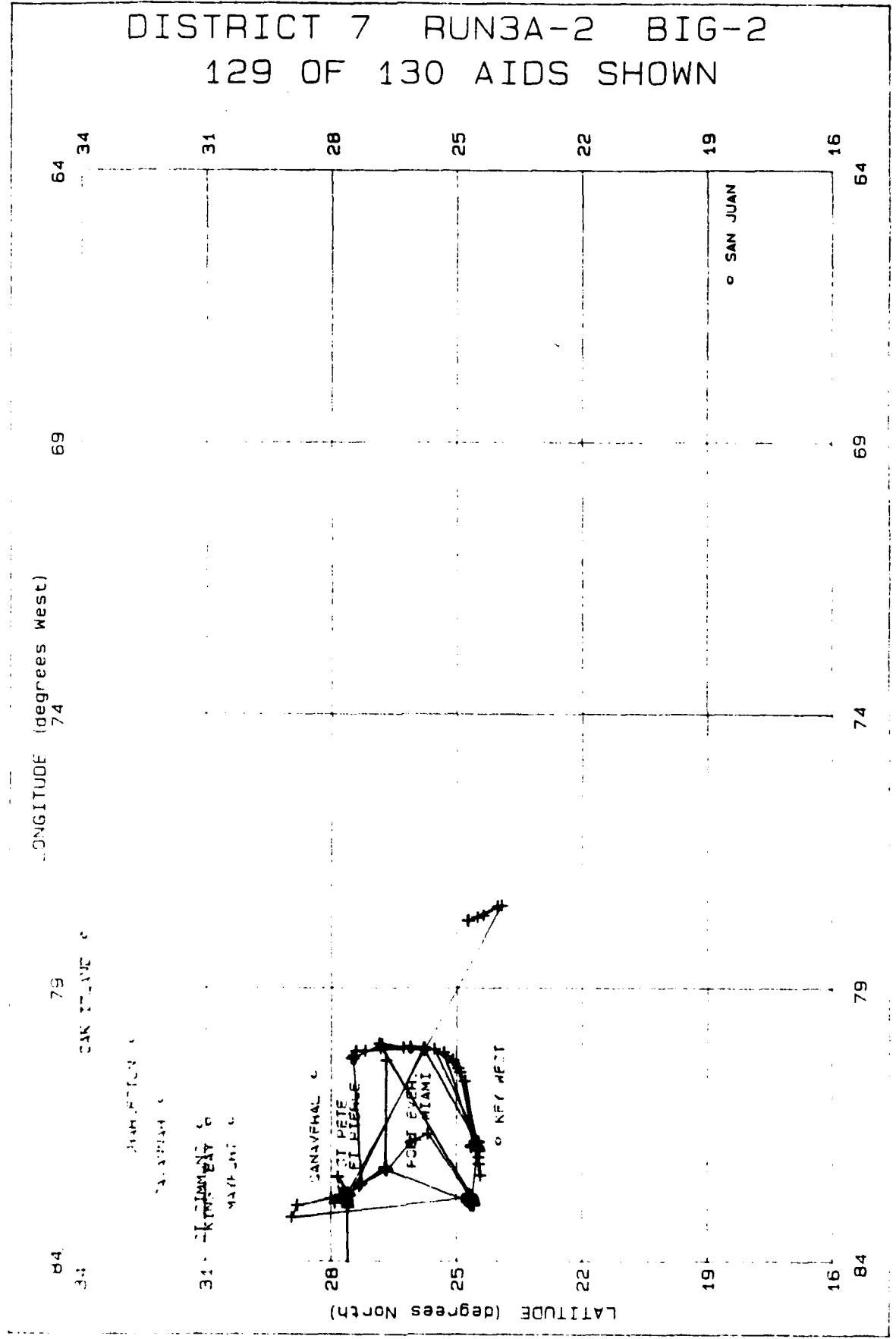
DISTRICT 7 RUN2A-2 SMALL-2
 107 OF 107 AIDS SHOWN



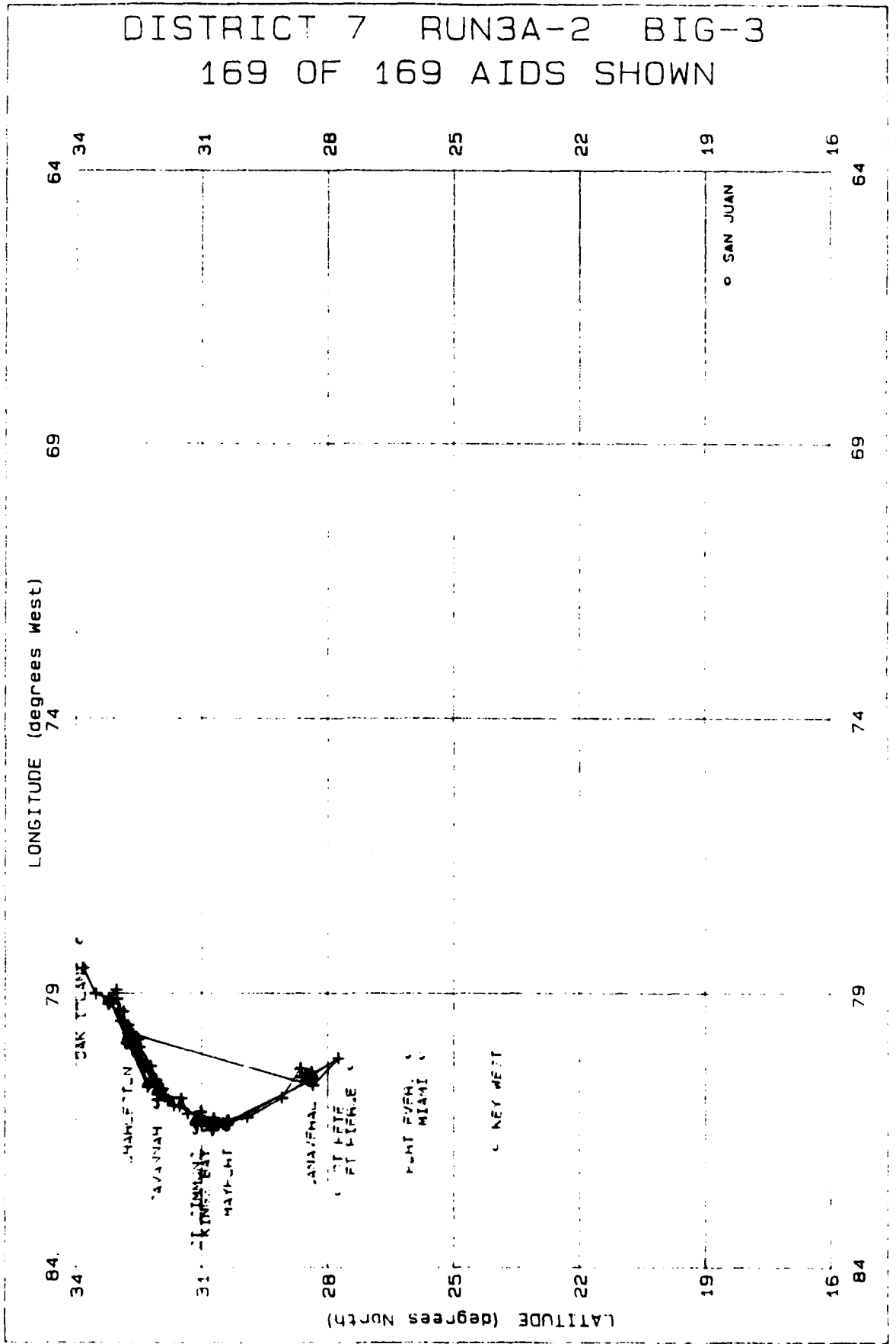
DISTRICT 7 RUN2A-2 SMALL-3
134 OF 134 AIDS SHOWN



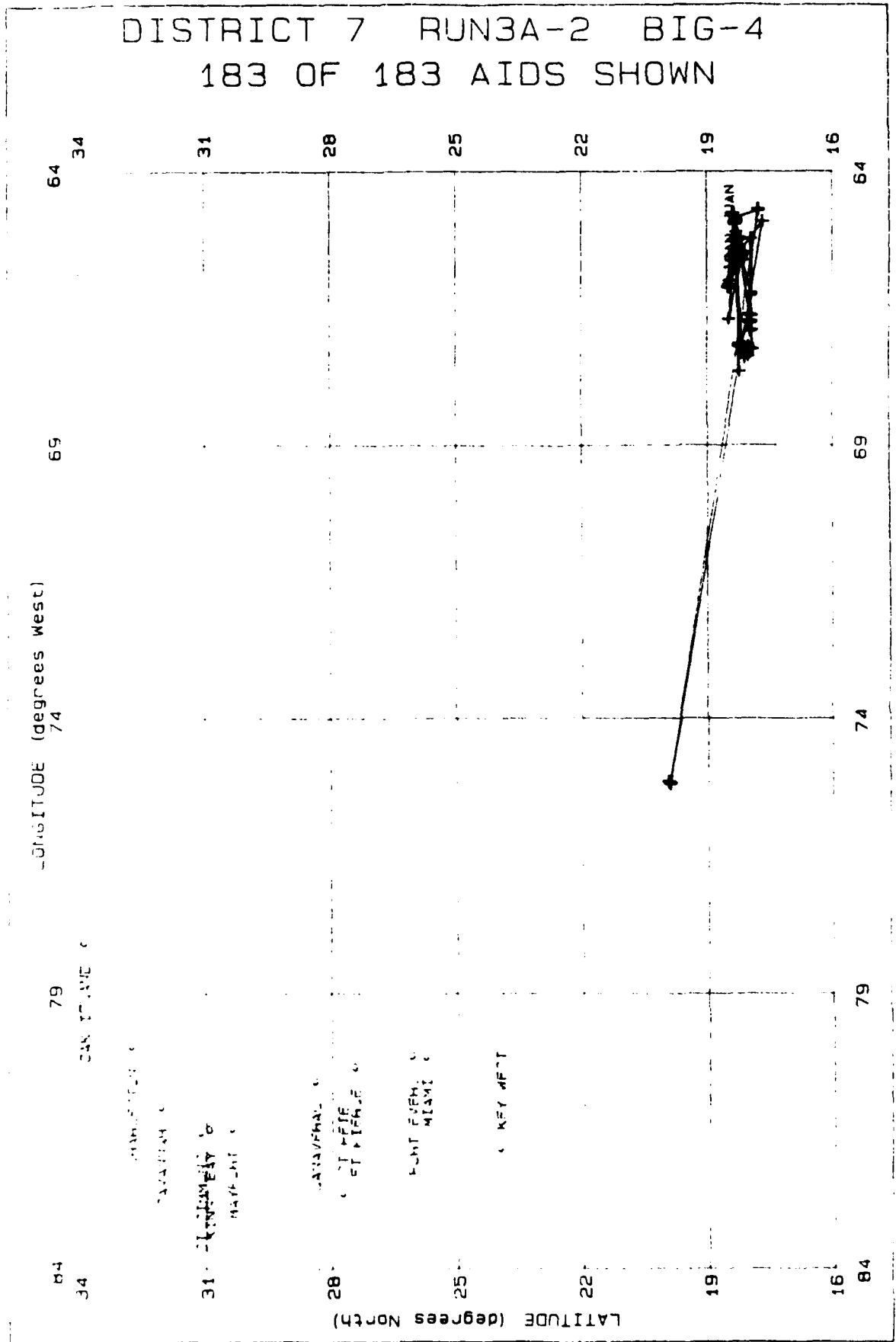
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 129 OF 130 AIDS SHOWN



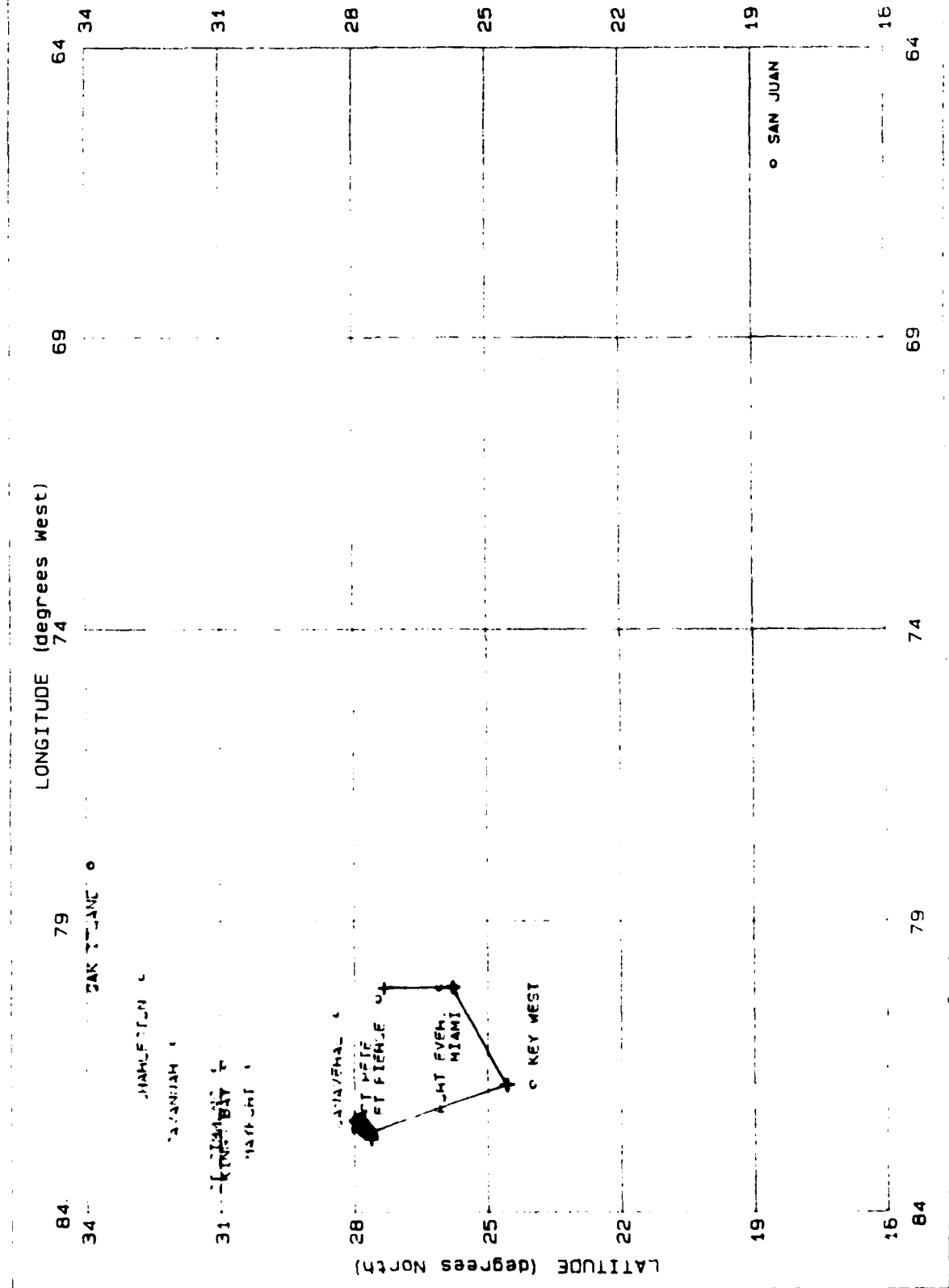
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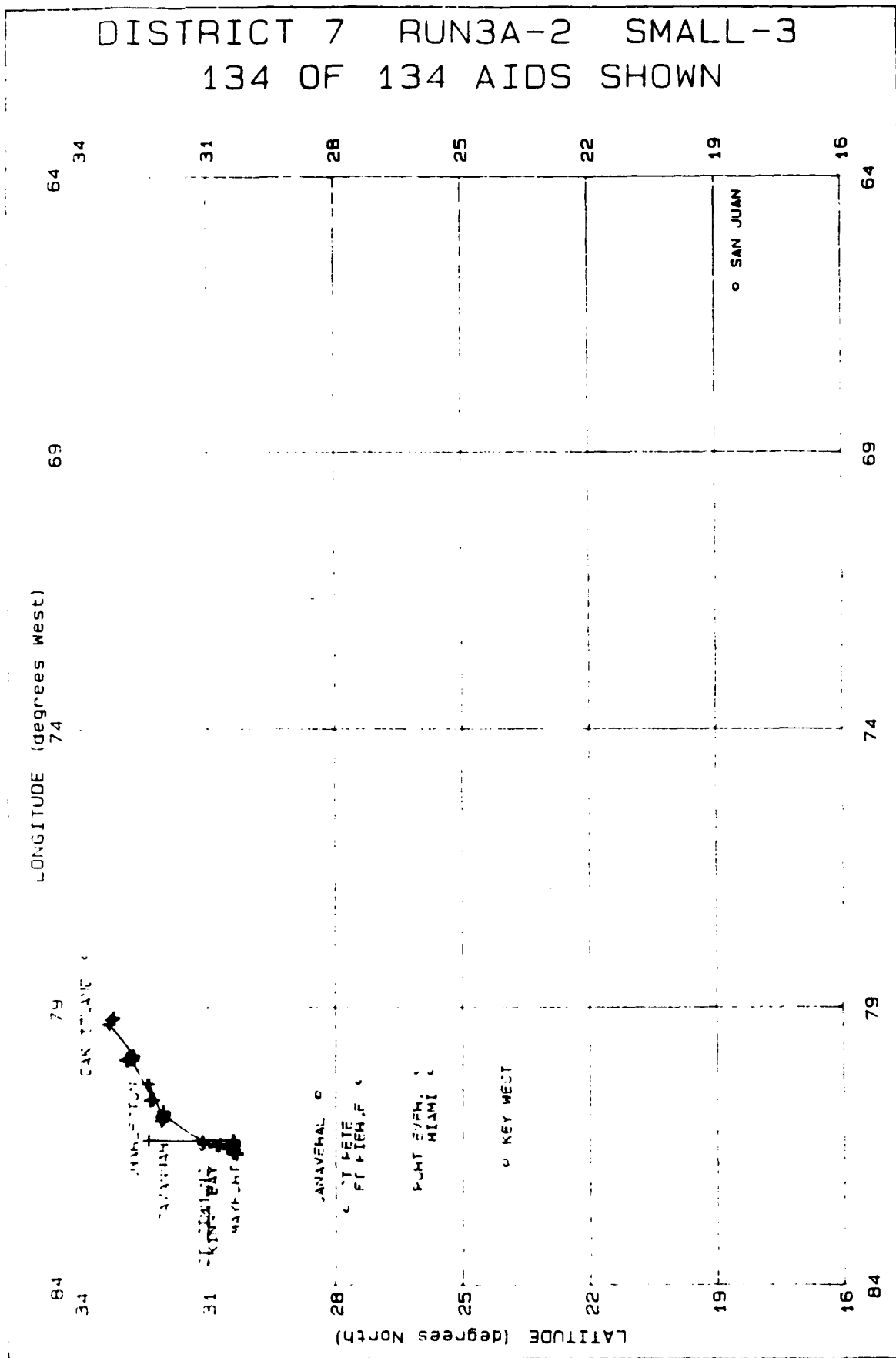
DISTRICT 7 RUN3A-2 BIG-4
 183 OF 183 AIDS SHOWN



DISTRICT 7 RUN3A-2 SMALL-2
 107 OF 107 AIDS SHOWN



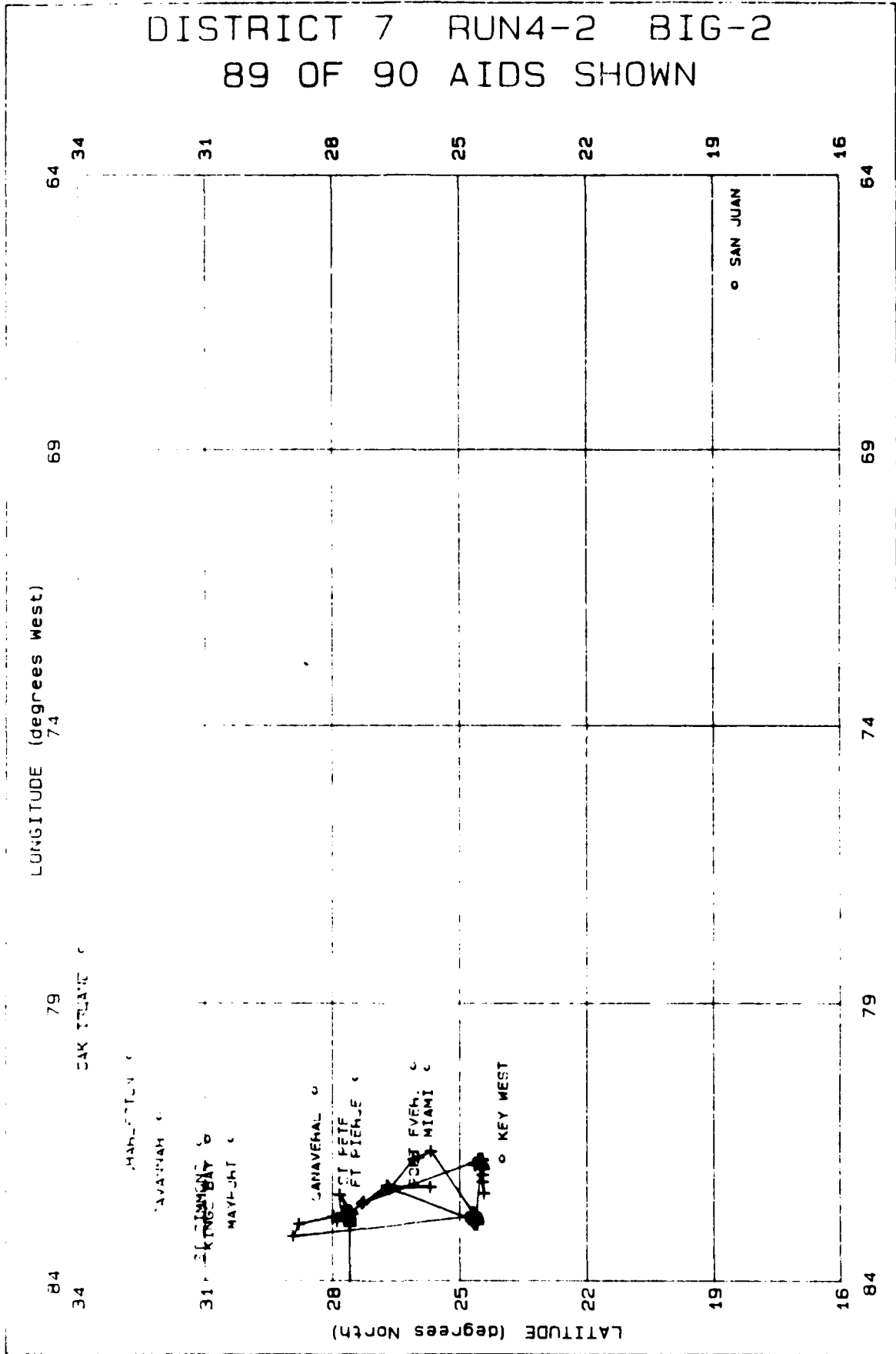
DISTRICT 7 RUN3A-2 SMALL-3
 134 OF 134 AIDS SHOWN



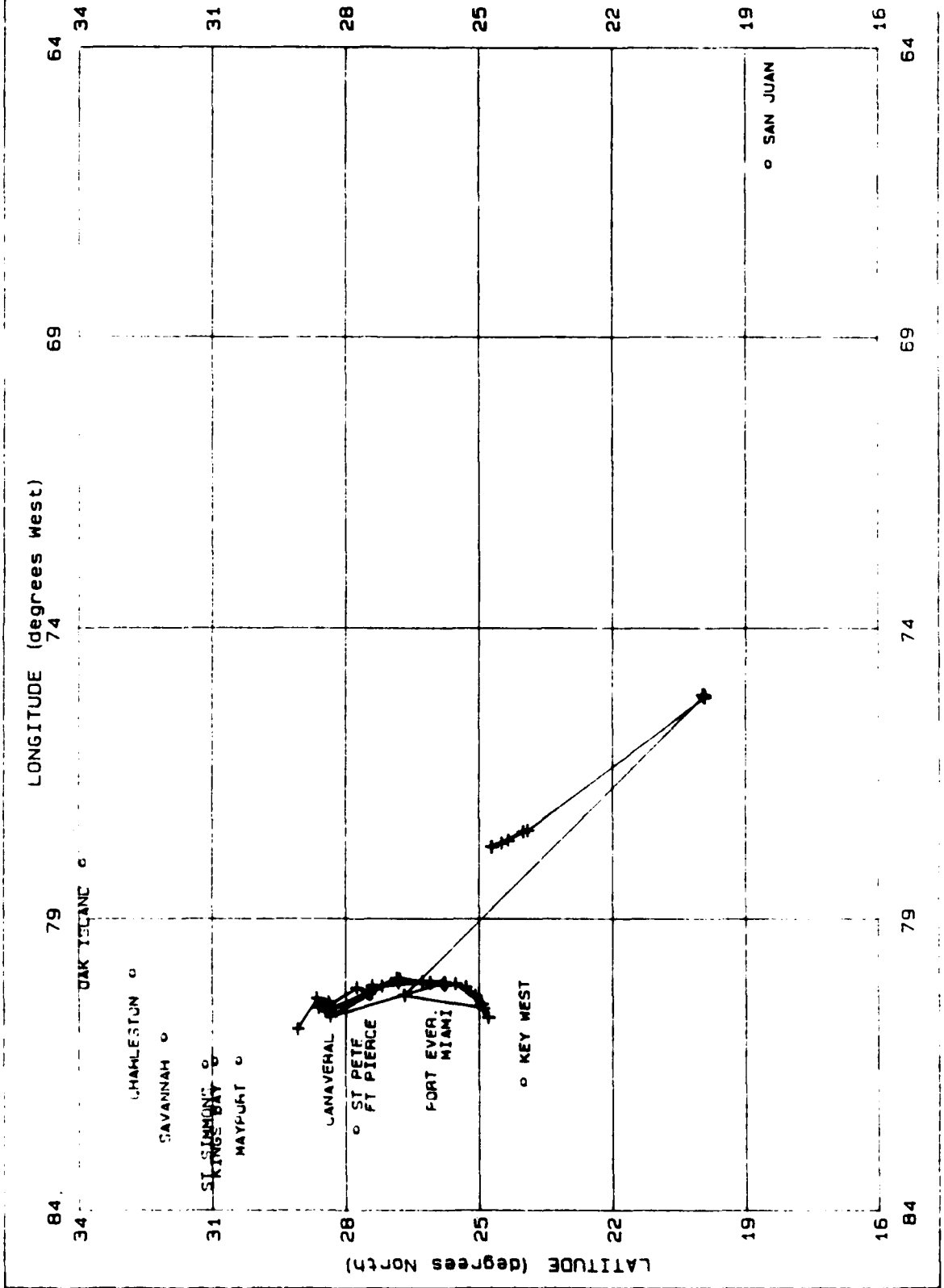
DISTRICT 7 RUN4-2 BIG-1
 150 OF 150 AIDS SHOWN



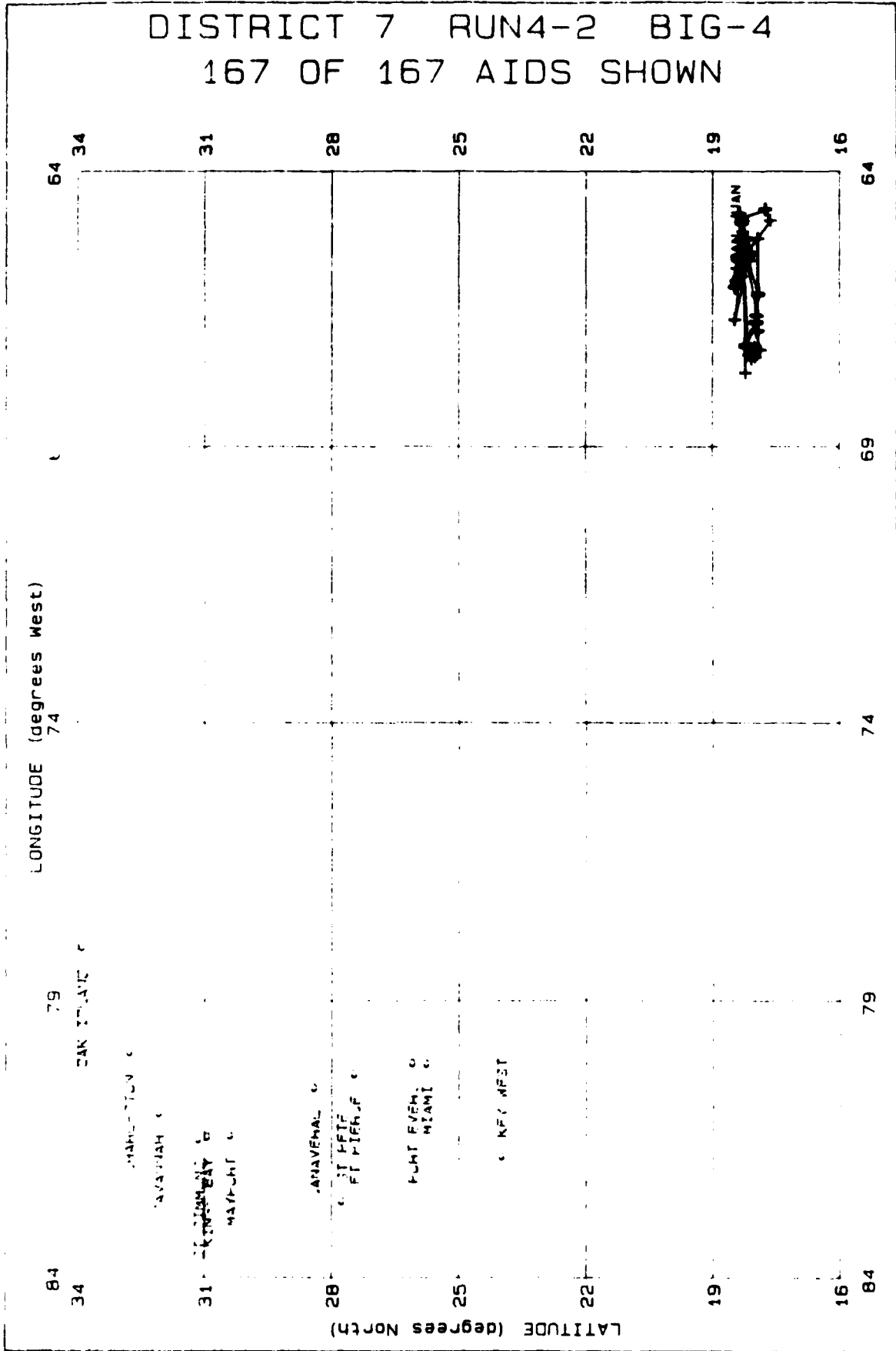
DISTRICT 7 RUN4-2 BIG-2
 89 OF 90 AIDS SHOWN



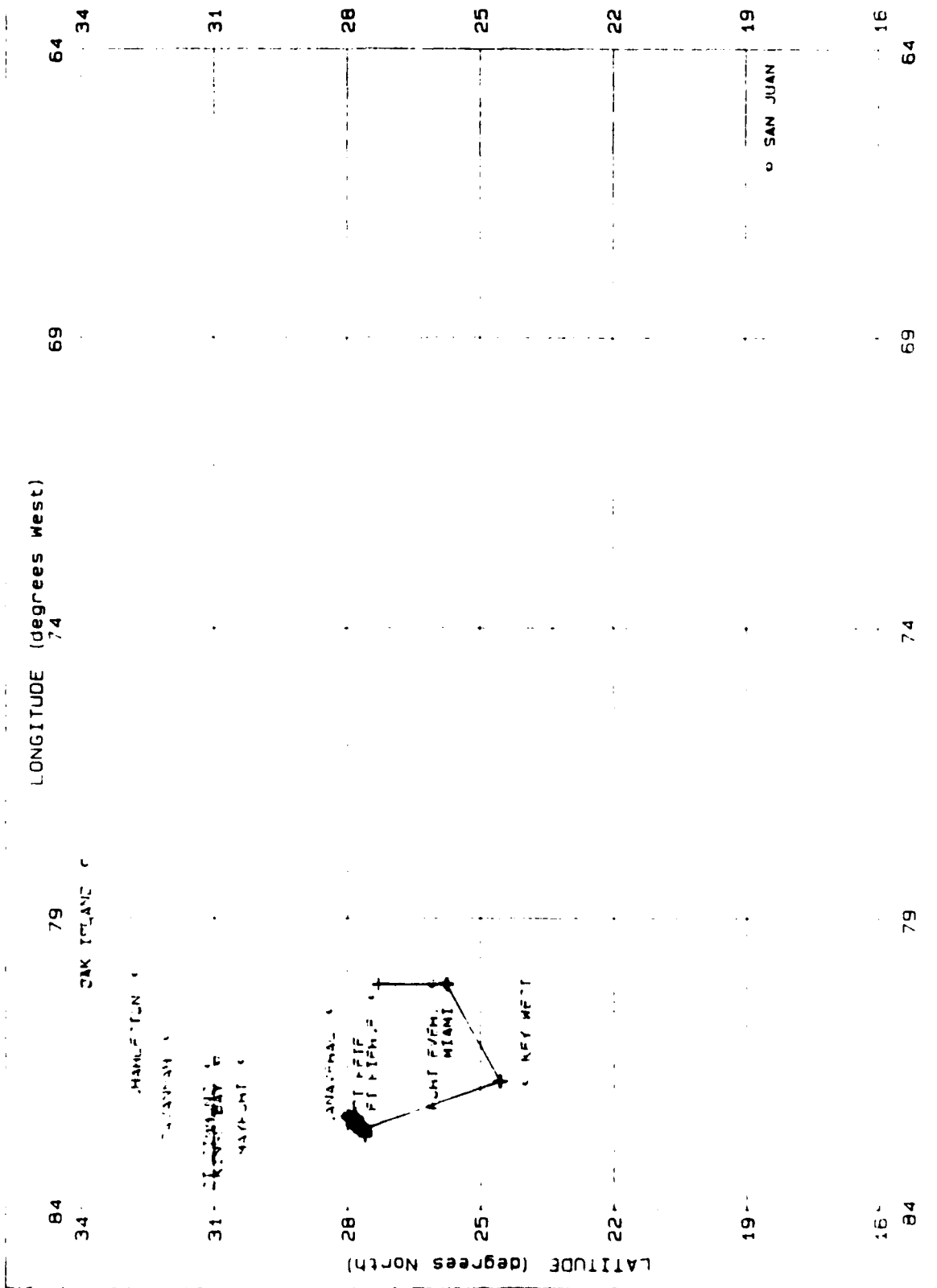
DISTRICT 7 RUN4-2 BIG-3
75 OF 75 AIDS SHOWN



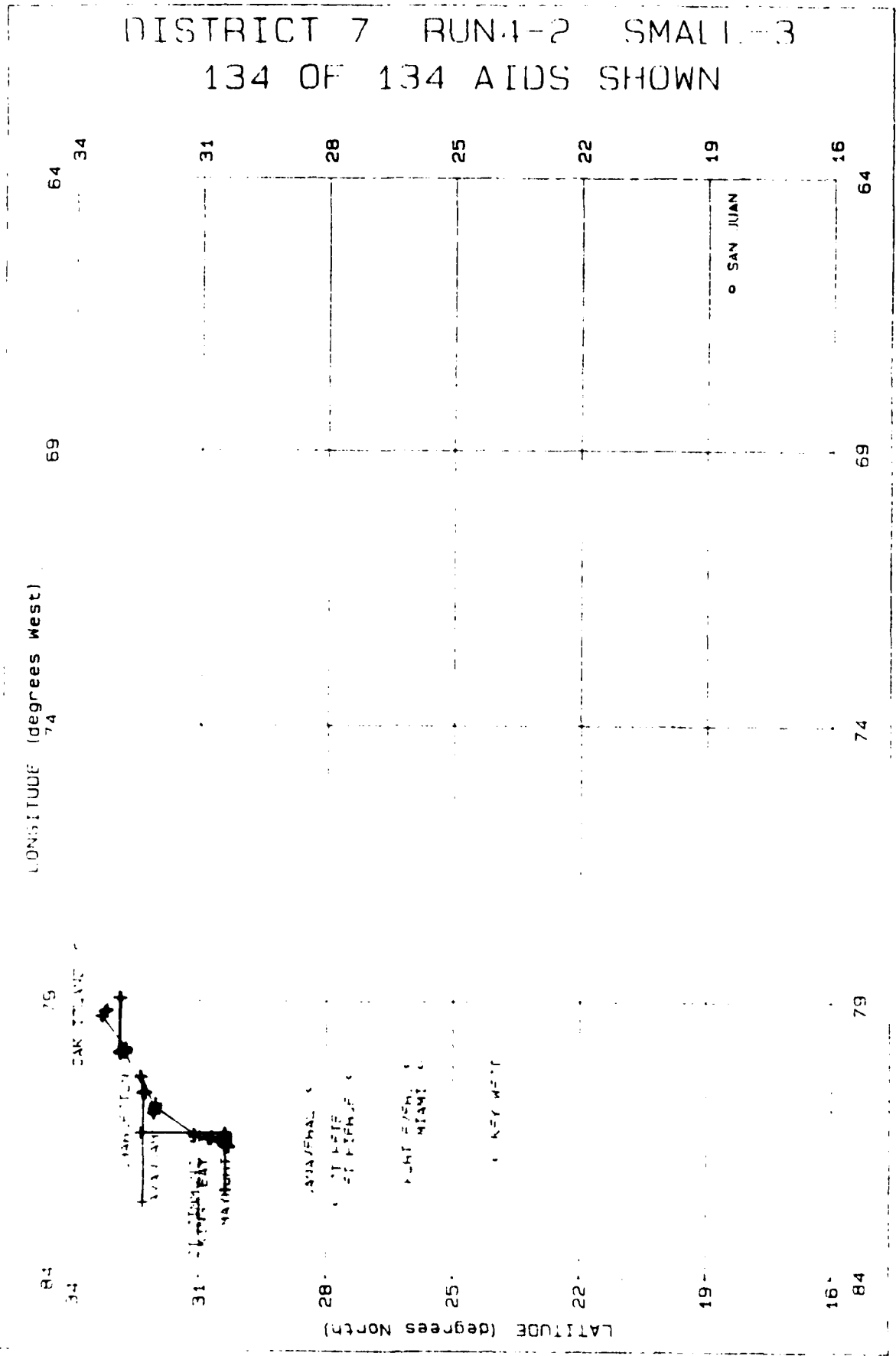
DISTRICT 7 RUN4-2 BIG-4
 167 OF 167 AIDS SHOWN



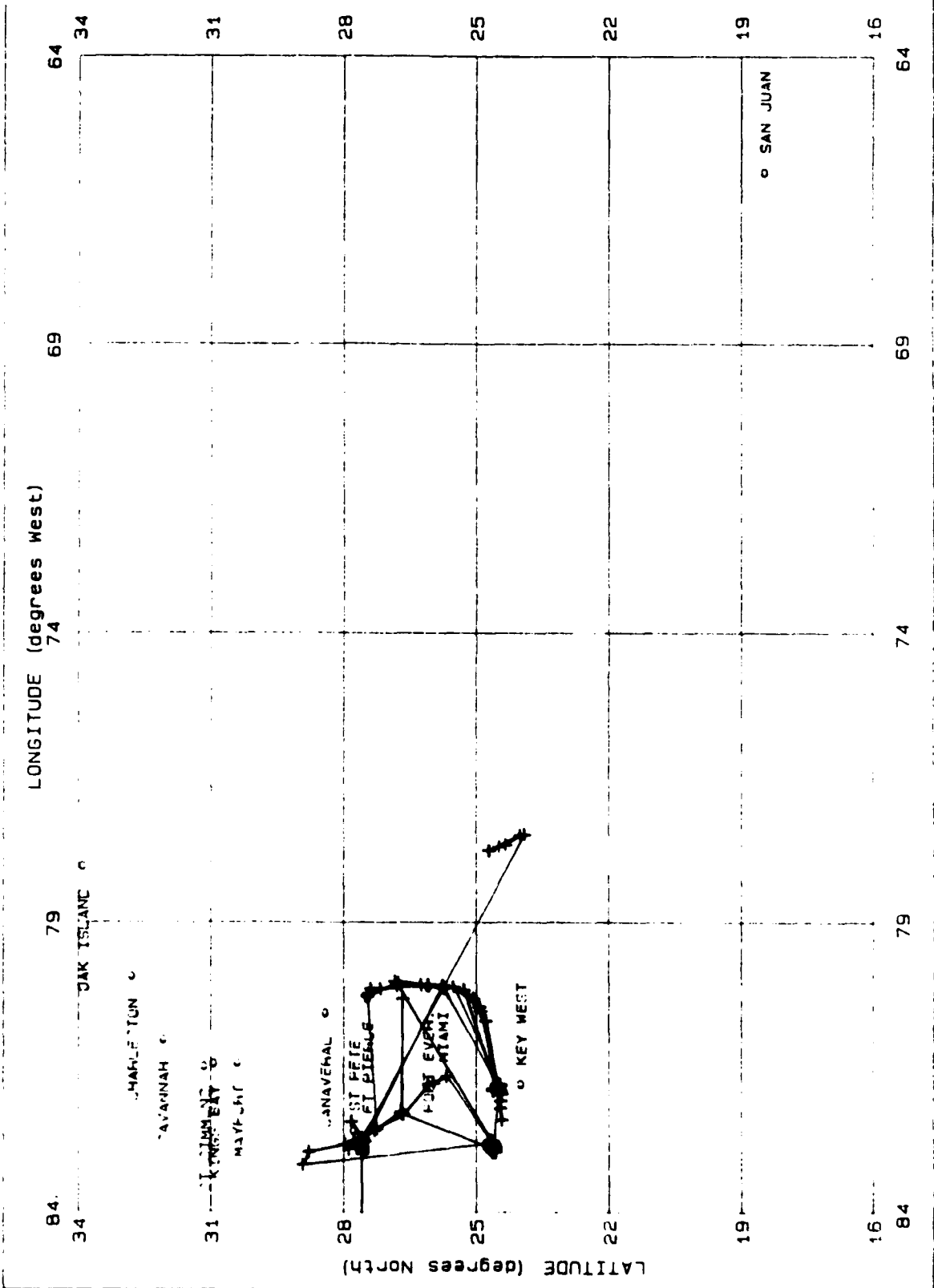
DISTRICT 7 RUN4-2 SMALL-2
107 OF 107 AIDS SHOWN



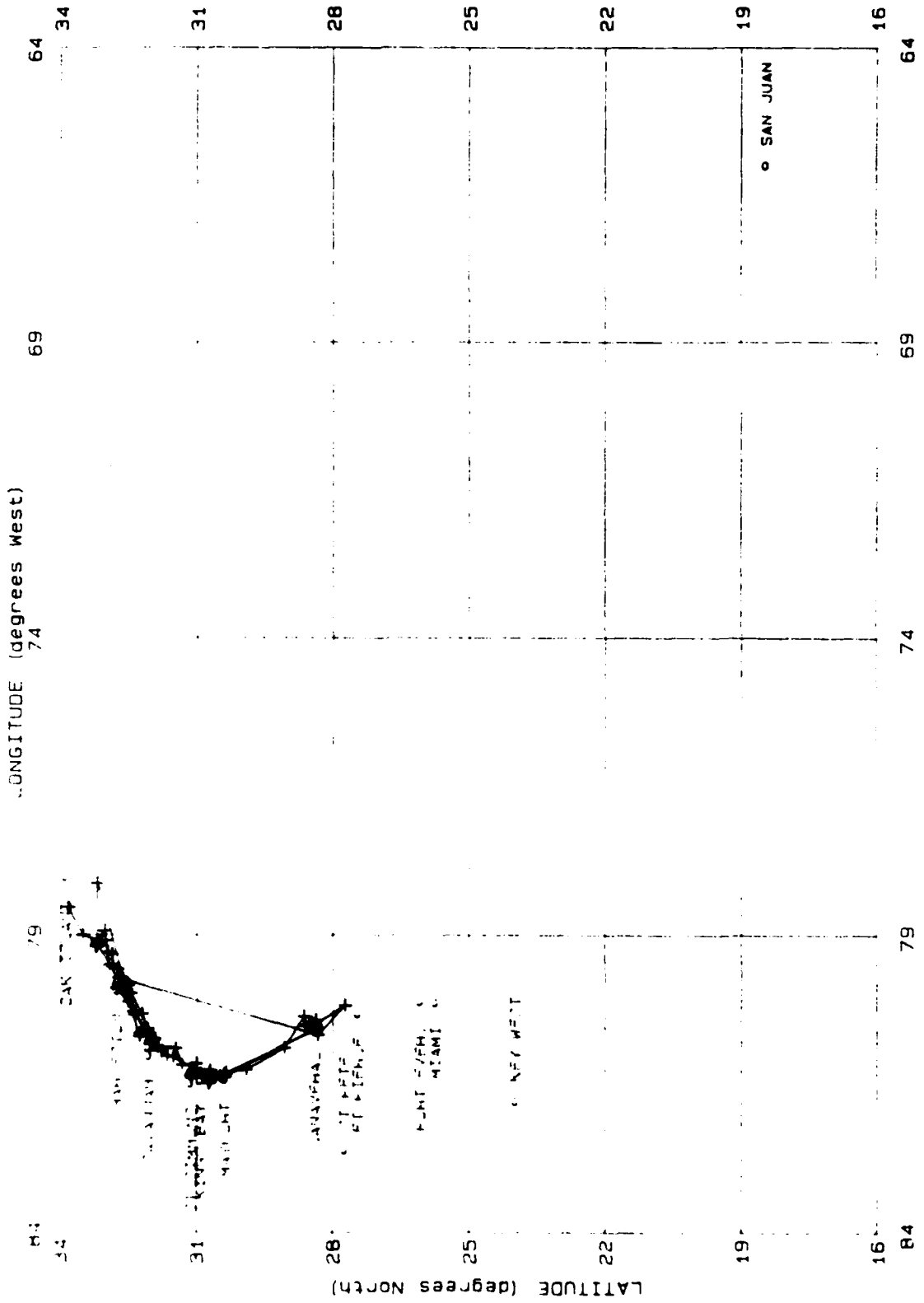
DISTRICT 7 RUN-1-2 SMALL-3
 134 OF 134 AIDS SHOWN



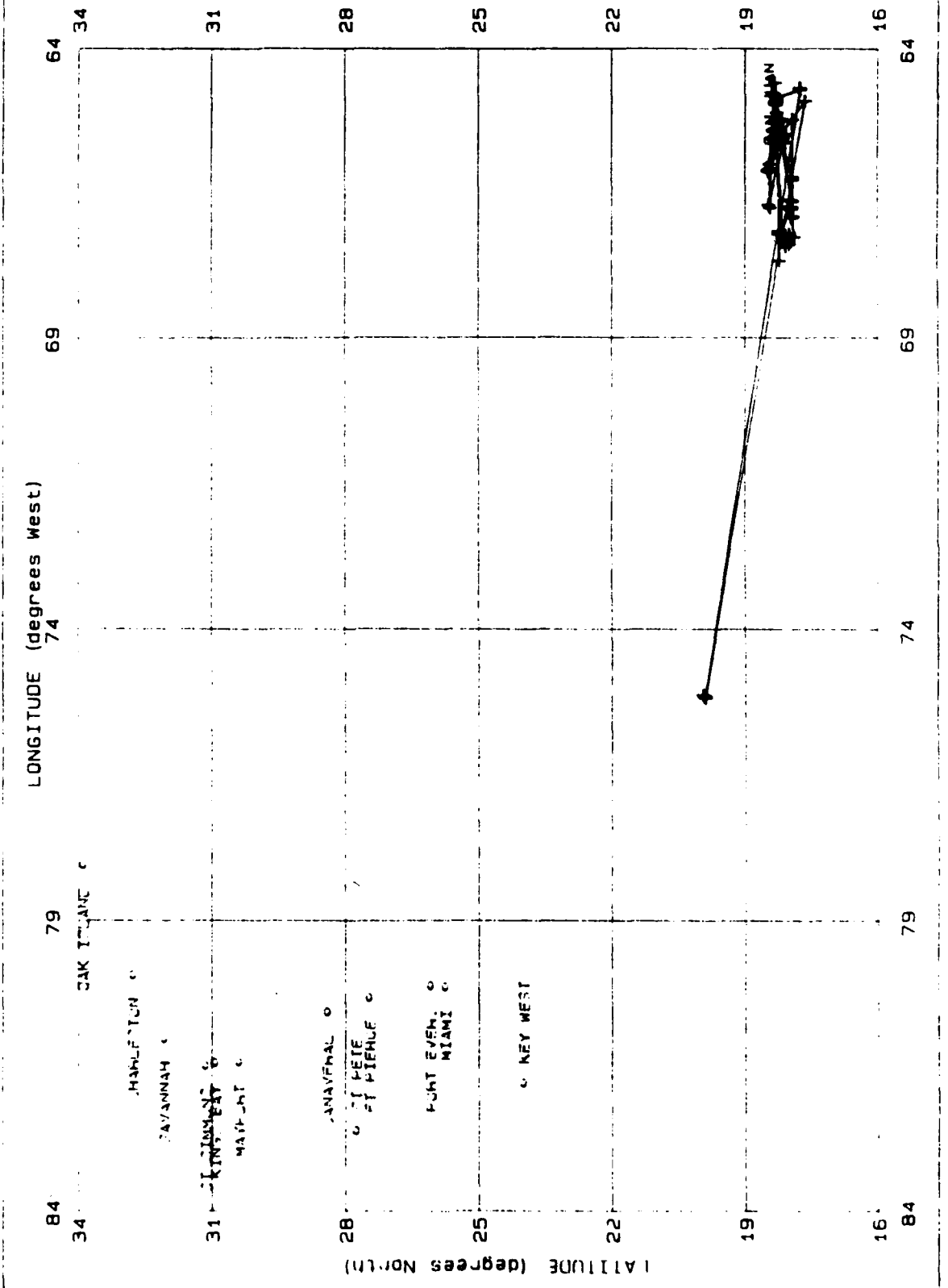
DISTRICT 7 RUN3A-1A BIG-2
129 OF 130 AIDS SHOWN



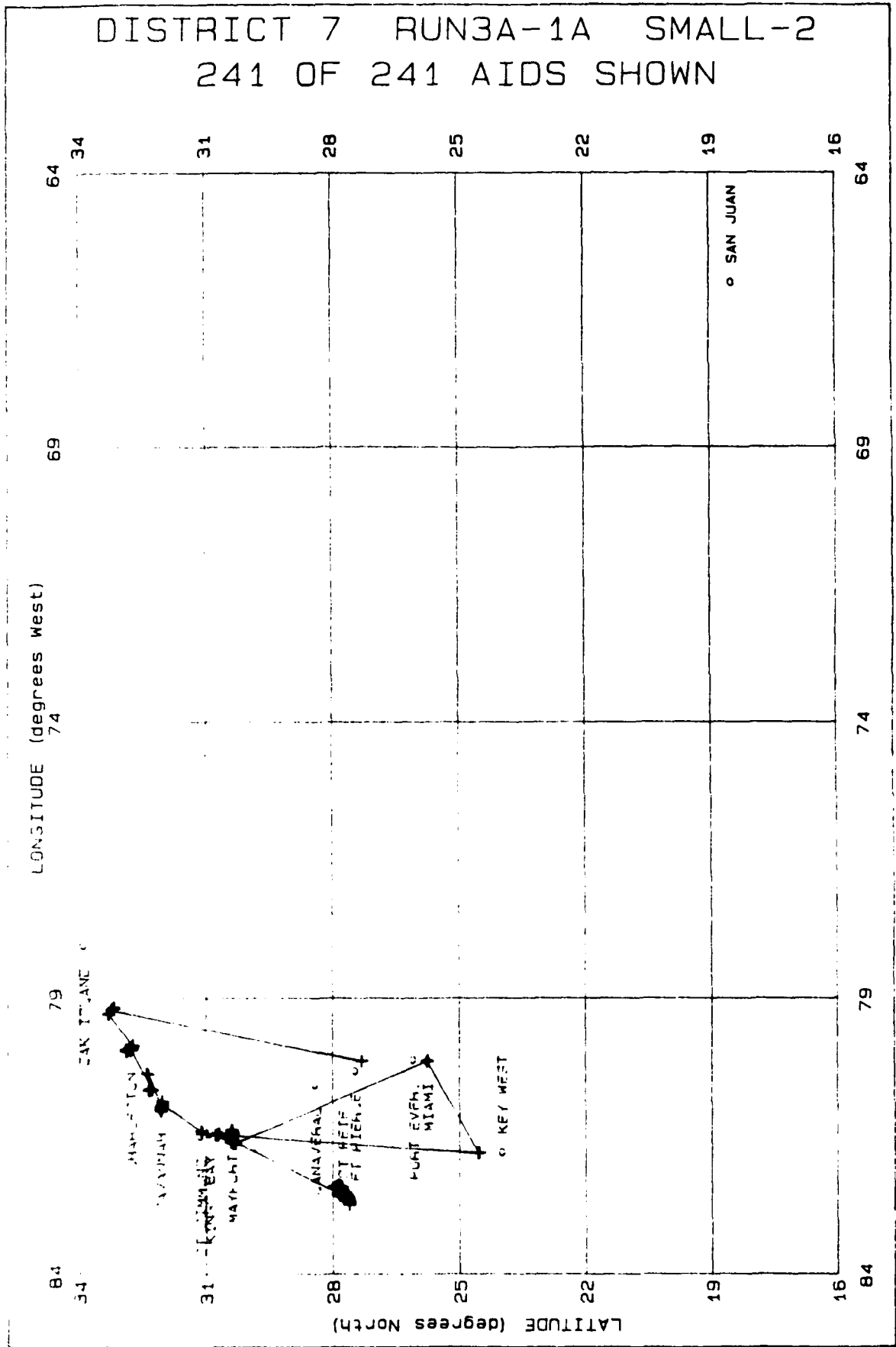
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169 OF 169 AIDS SHOWN



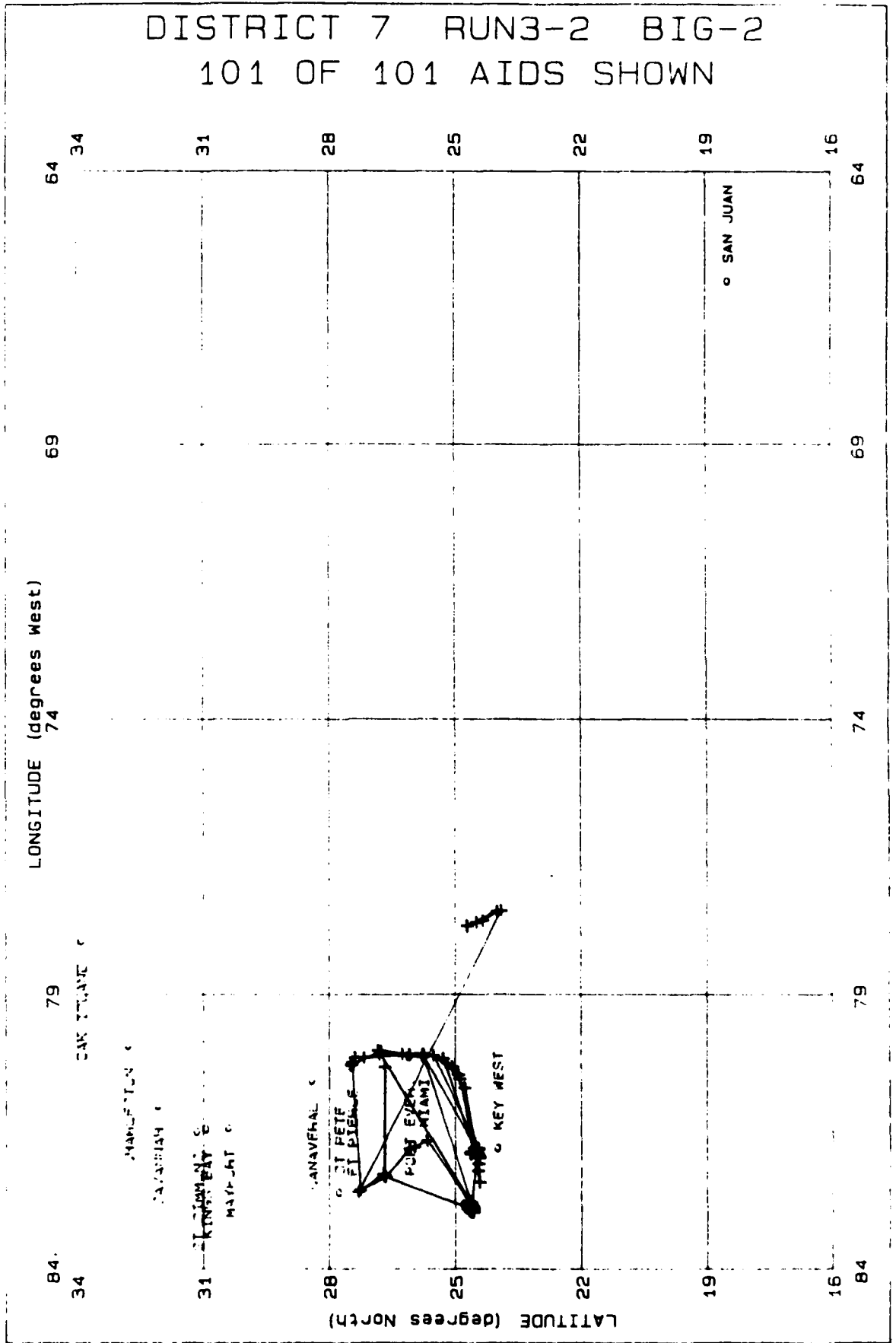
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 183 OF 183 AIDS SHOWN



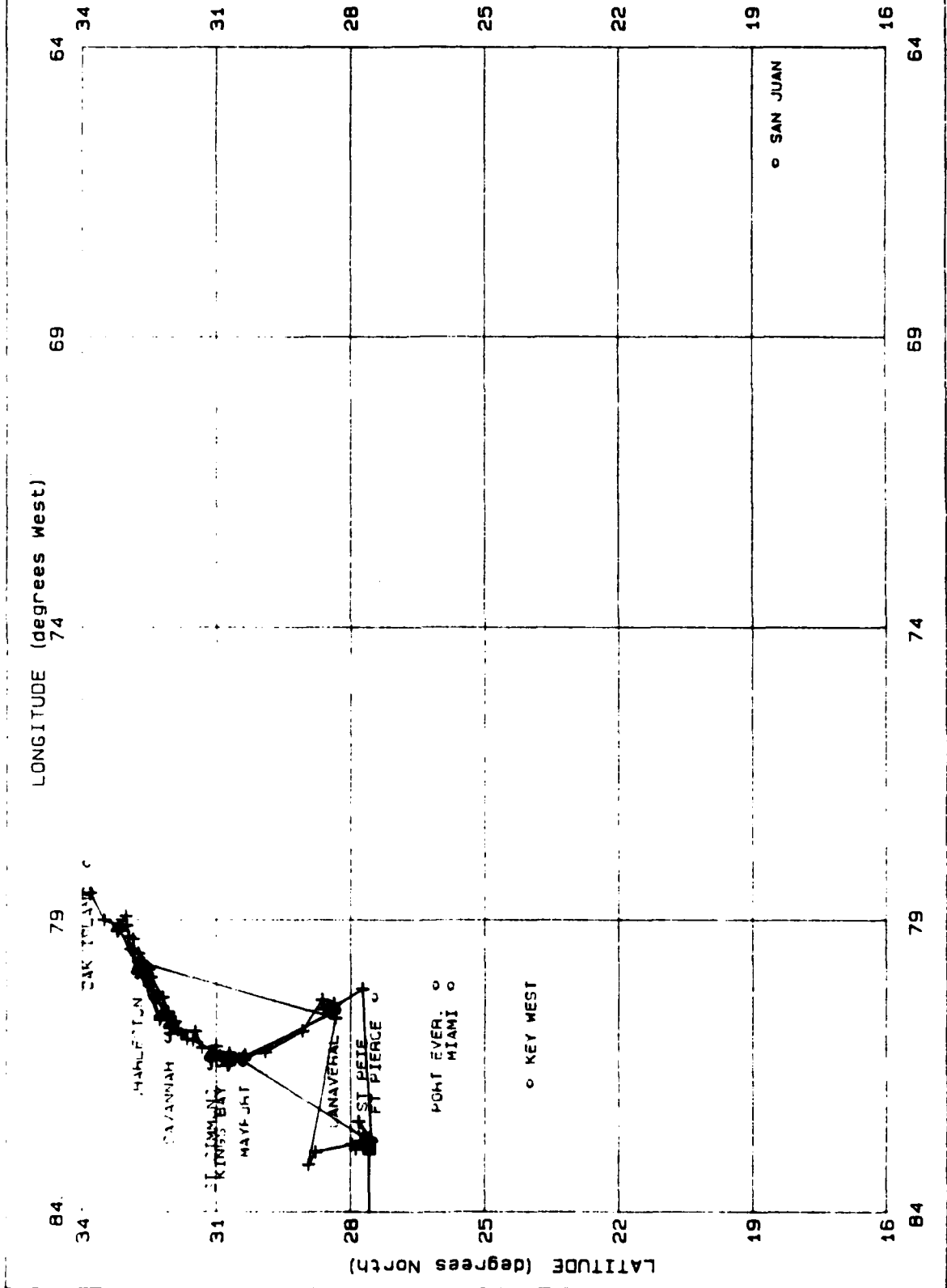
DISTRICT 7 RUN3A-1A SMALL-2
 241 OF 241 AIDS SHOWN



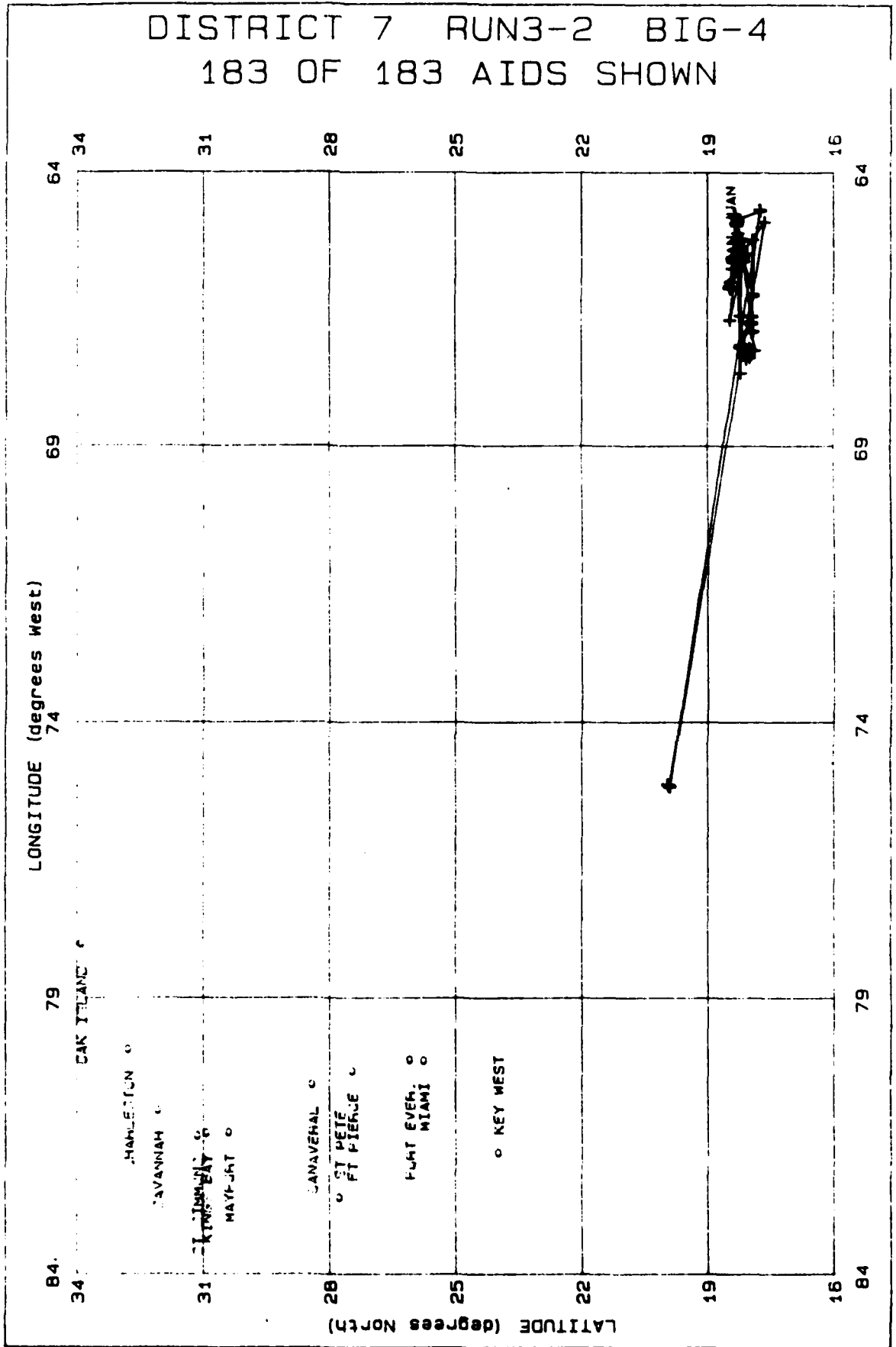
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 101 OF 101 AIDS SHOWN



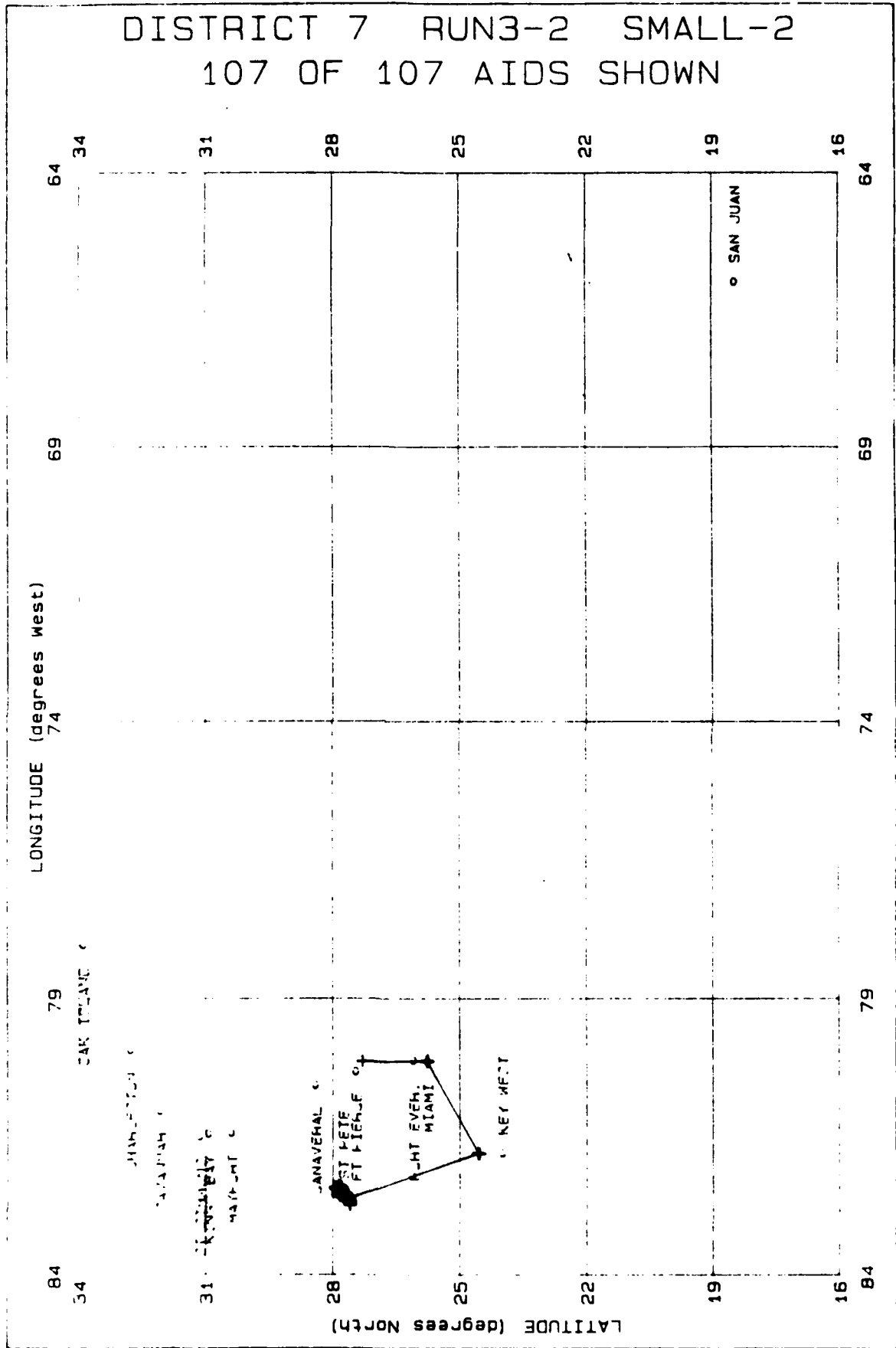
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 197 OF 198 AIDS SHOWN



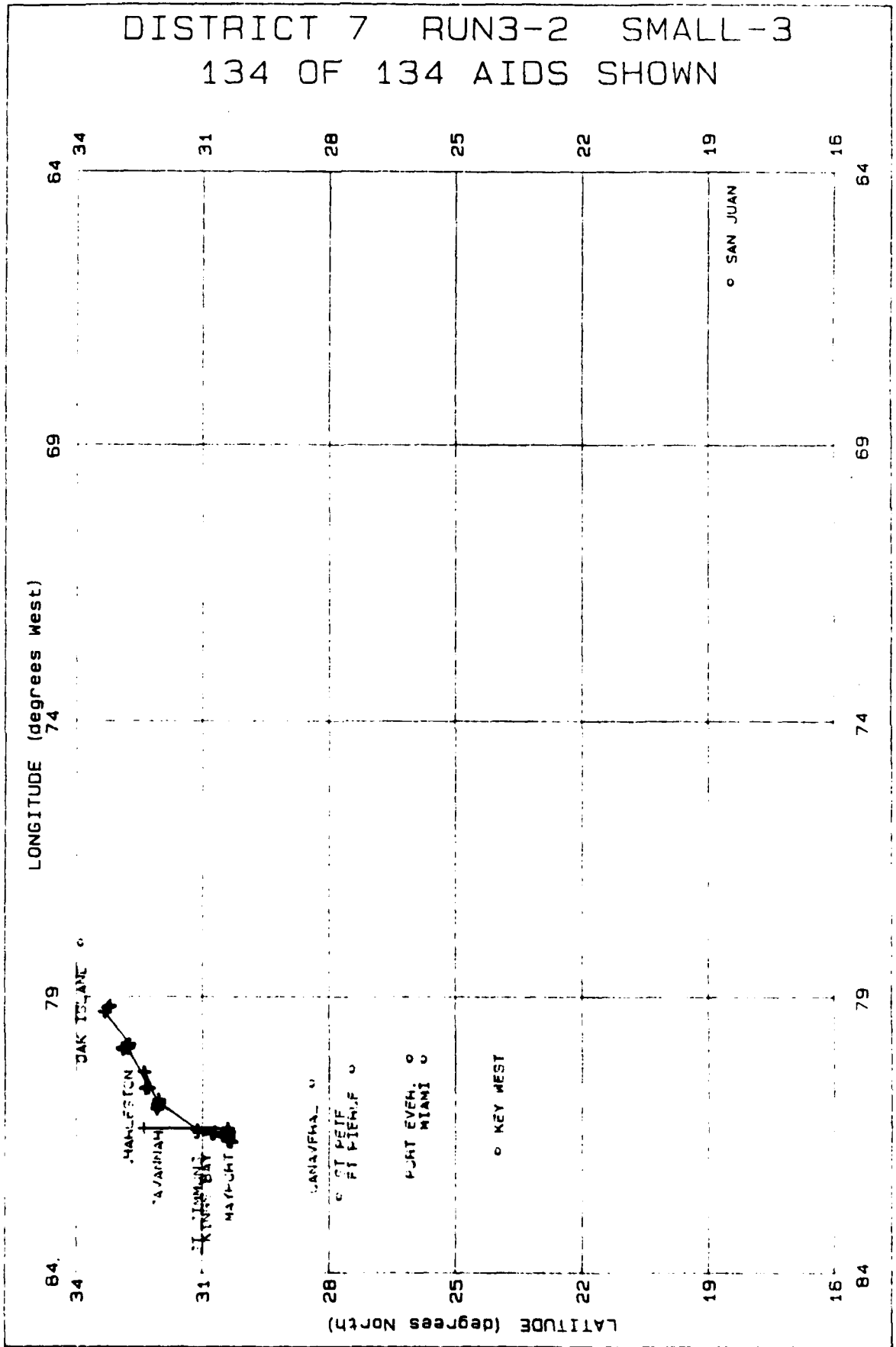
DISTRICT 7 RUN3-2 BIG-4
 183 OF 183 AIDS SHOWN



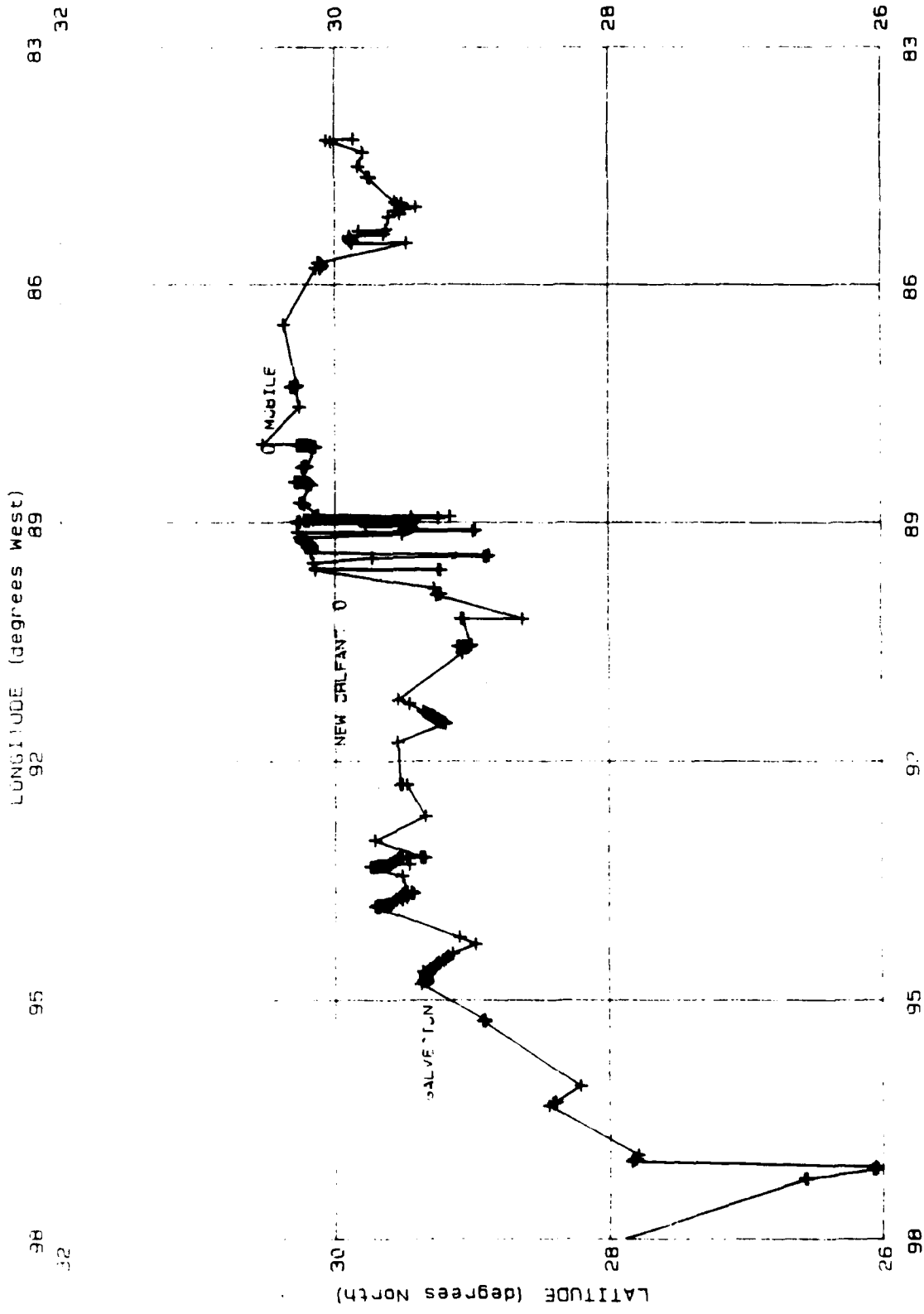
DISTRICT 7 RUN3-2 SMALL-2
 107 OF 107 AIDS SHOWN



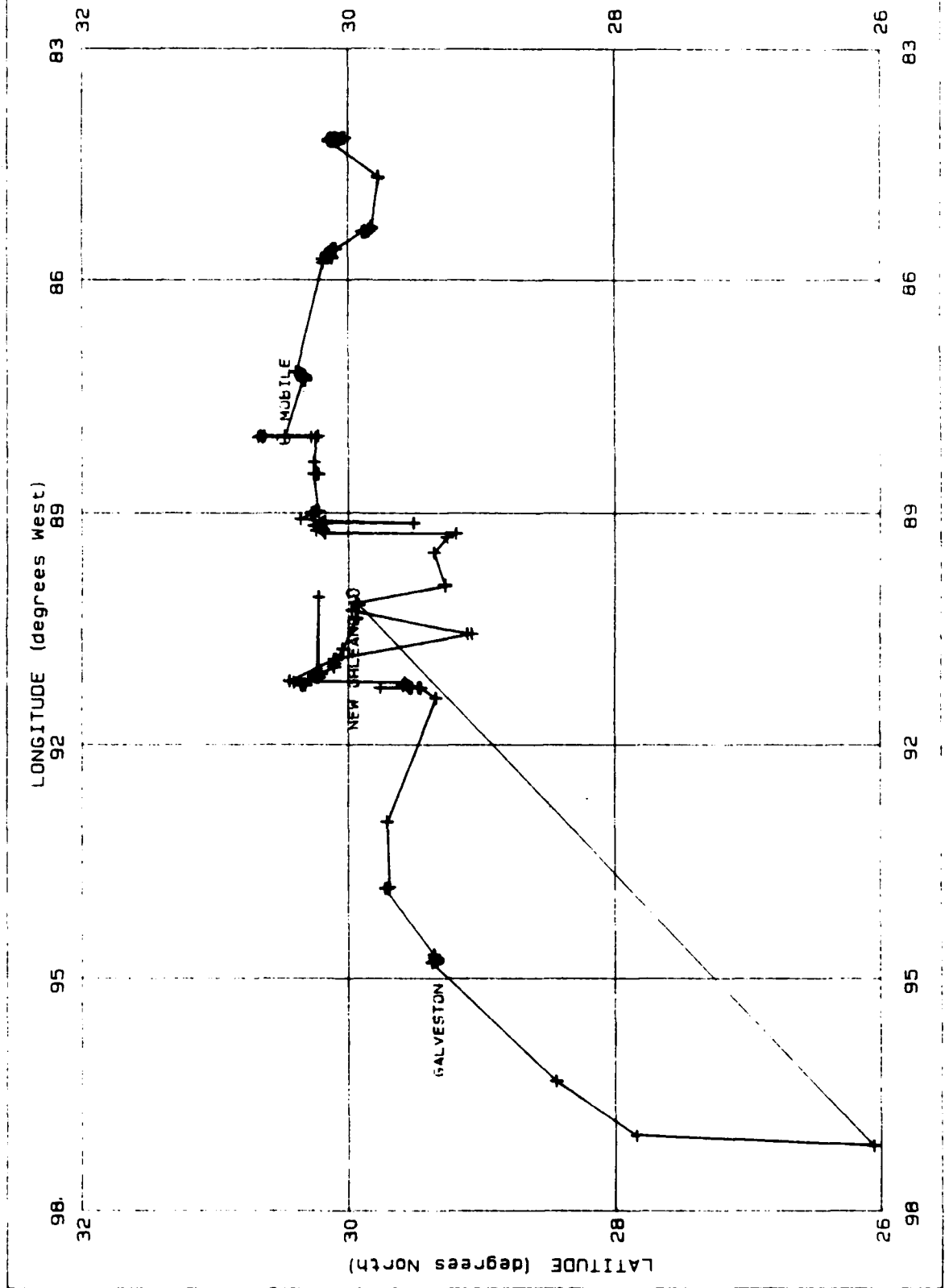
DISTRICT 7 RUN3-2 SMALL-3
 134 OF 134 AIDS SHOWN



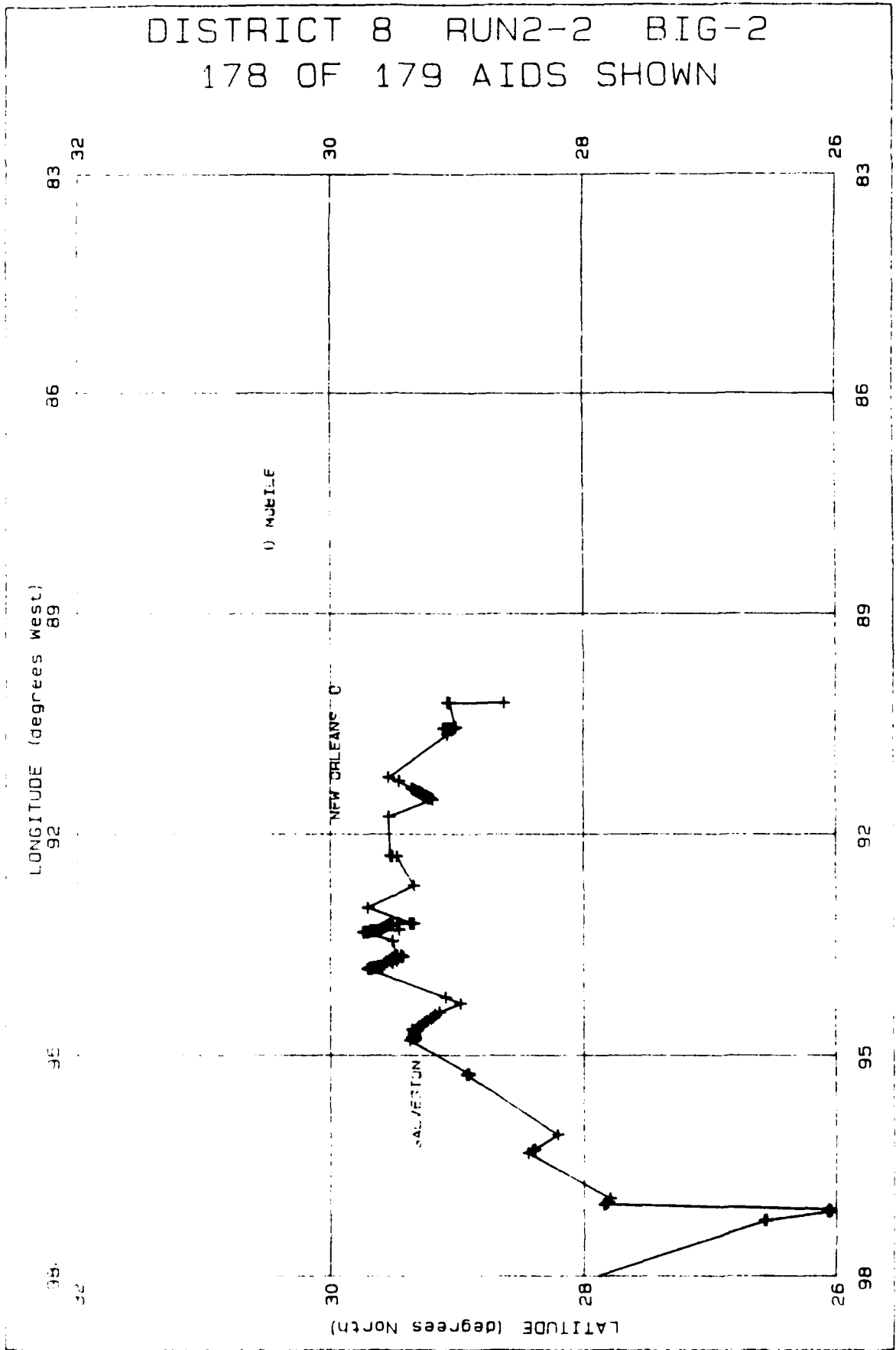
DISTRICT 8 RUN1-1 BIG-1
369 OF 370 AIDS SHOWN



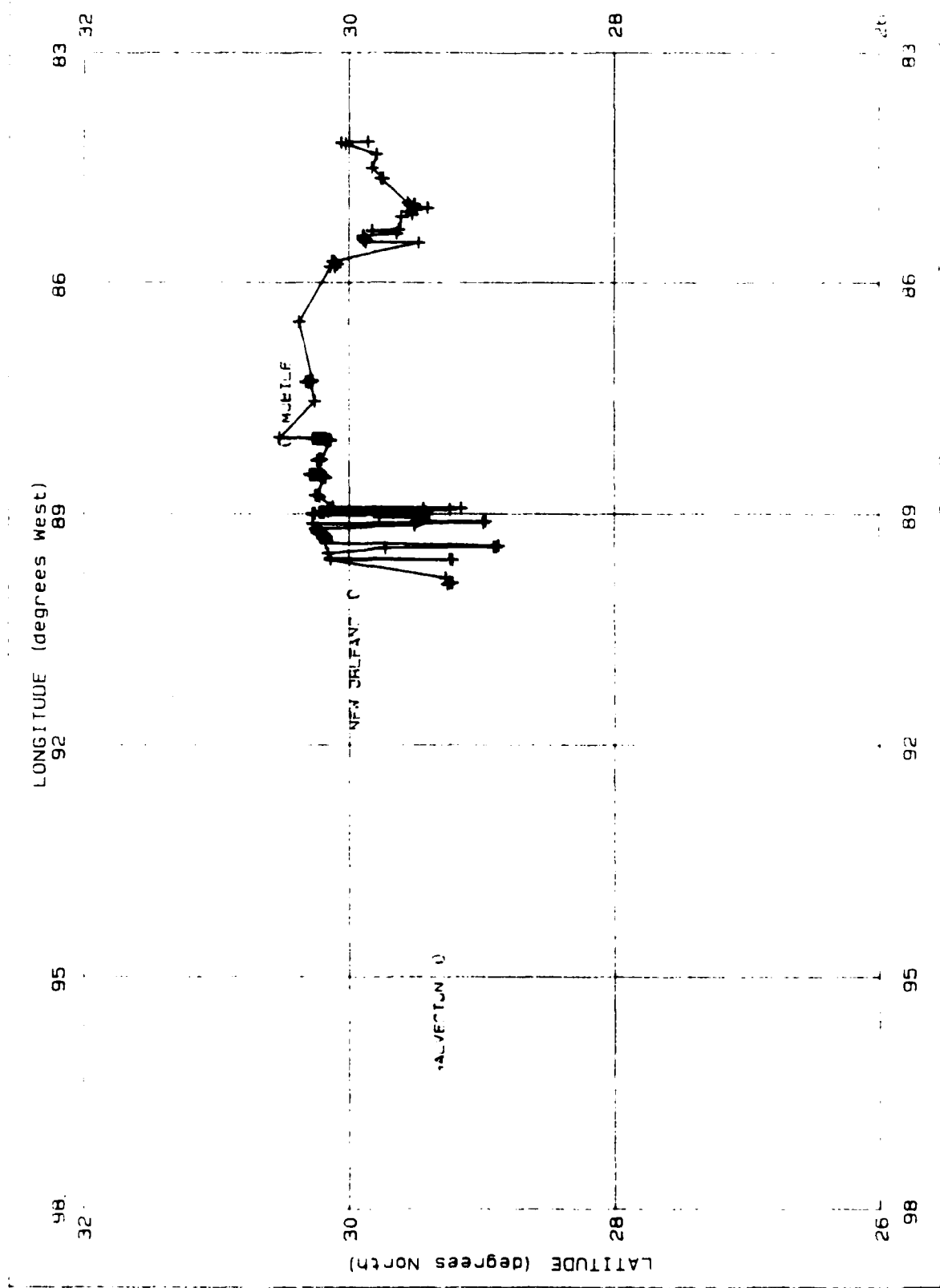
DISTRICT 8 RUN1-1 SMALL-1
278 OF 278 AIDS SHOWN



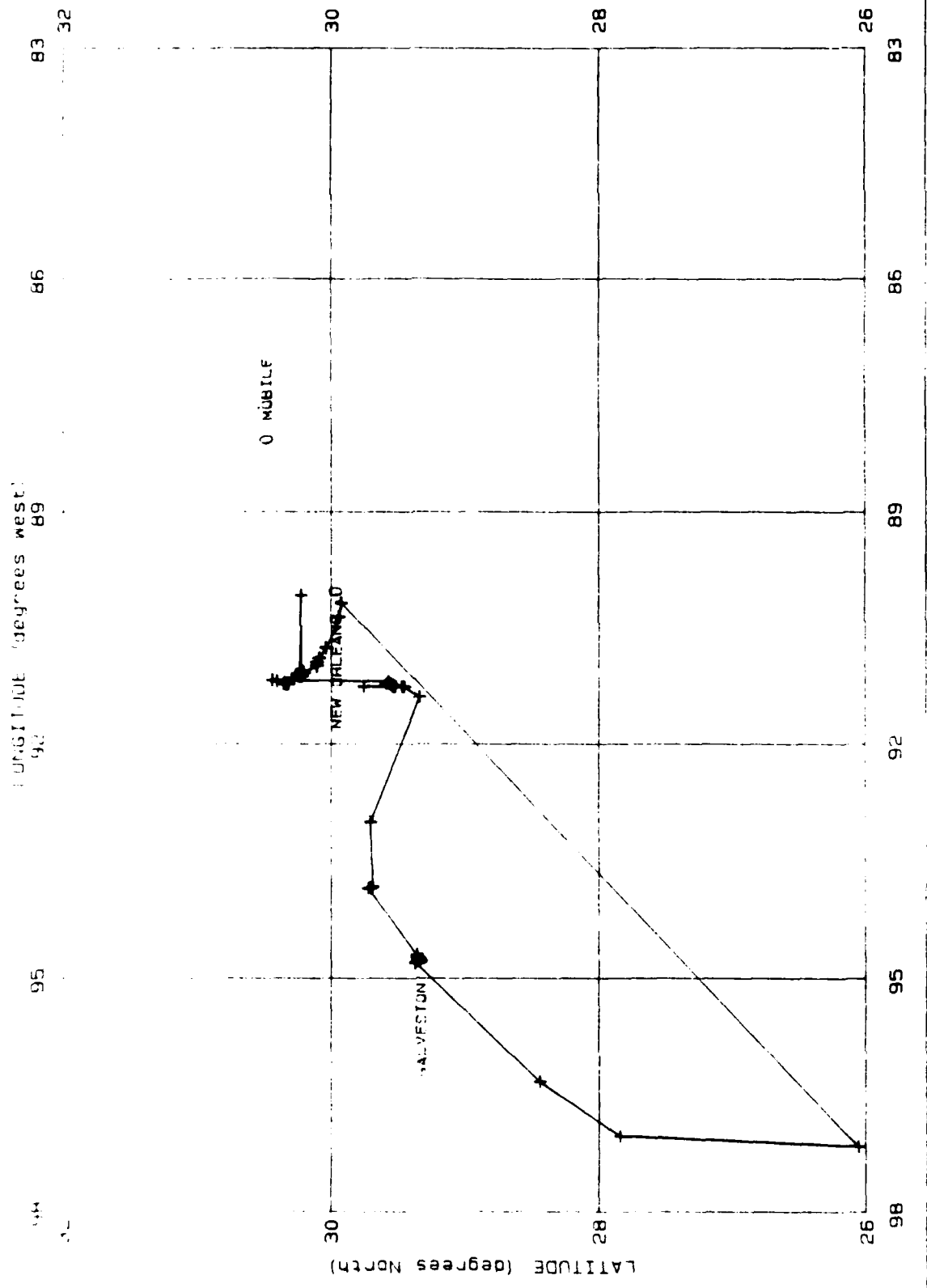
DISTRICT 8 RUN2-2 BIG-2
 178 OF 179 AIDS SHOWN



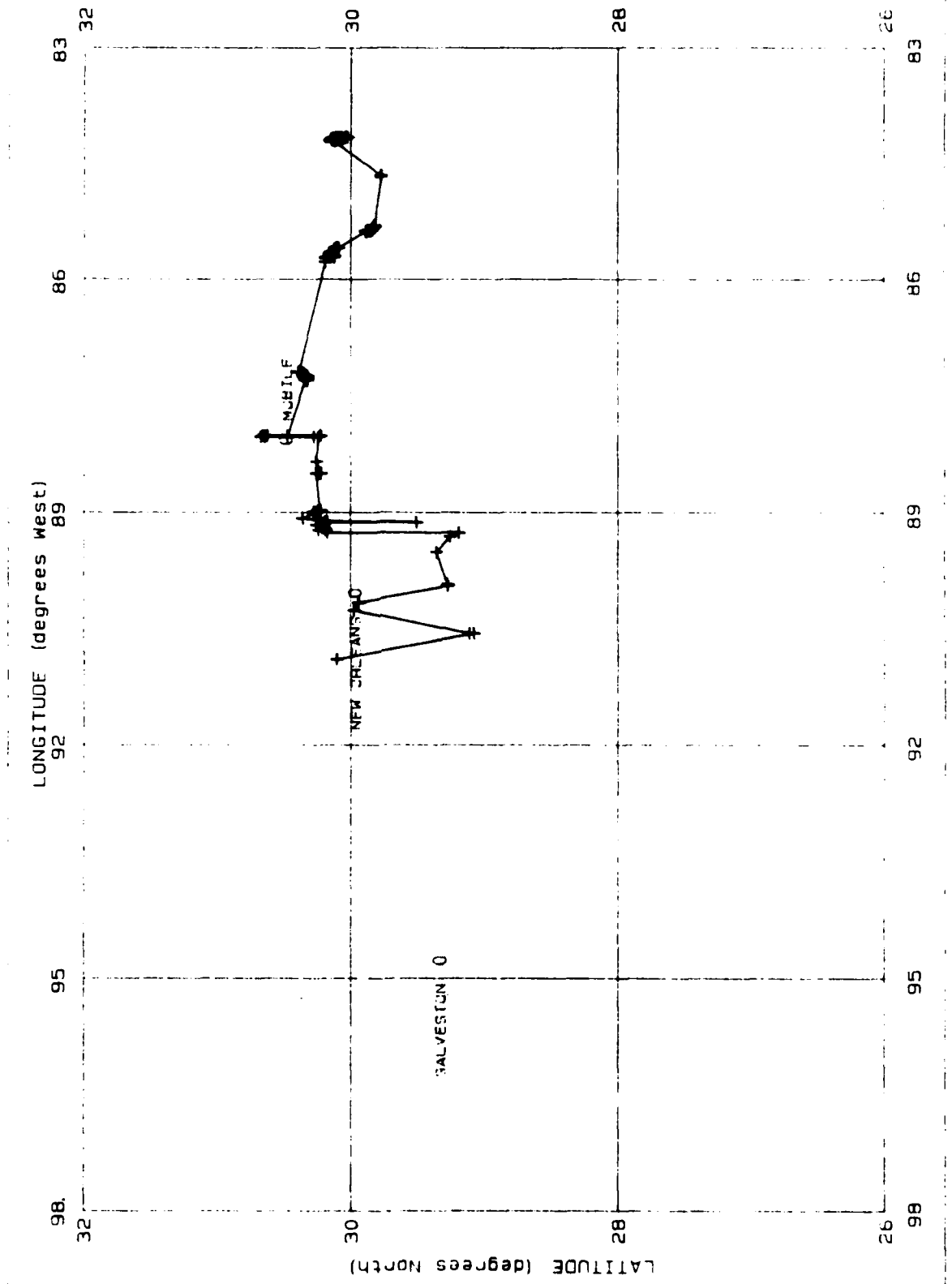
DISTRICT 8 RUN2-2 BIG-3
 191 OF 191 AIDS SHOWN



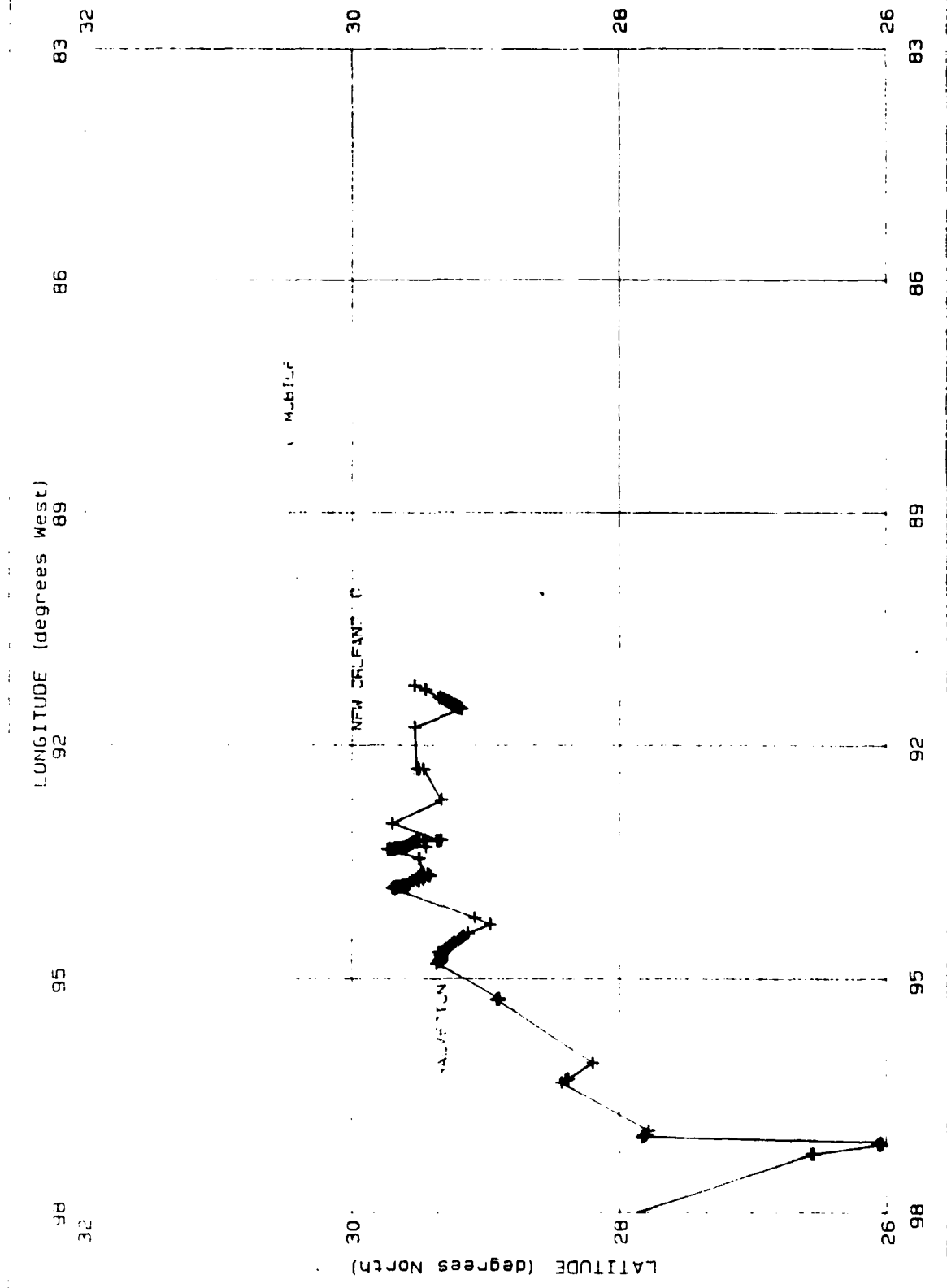
DISTRICT 8 RUN2-2 SMALL-2
 100 OF 100 AIDS SHOWN



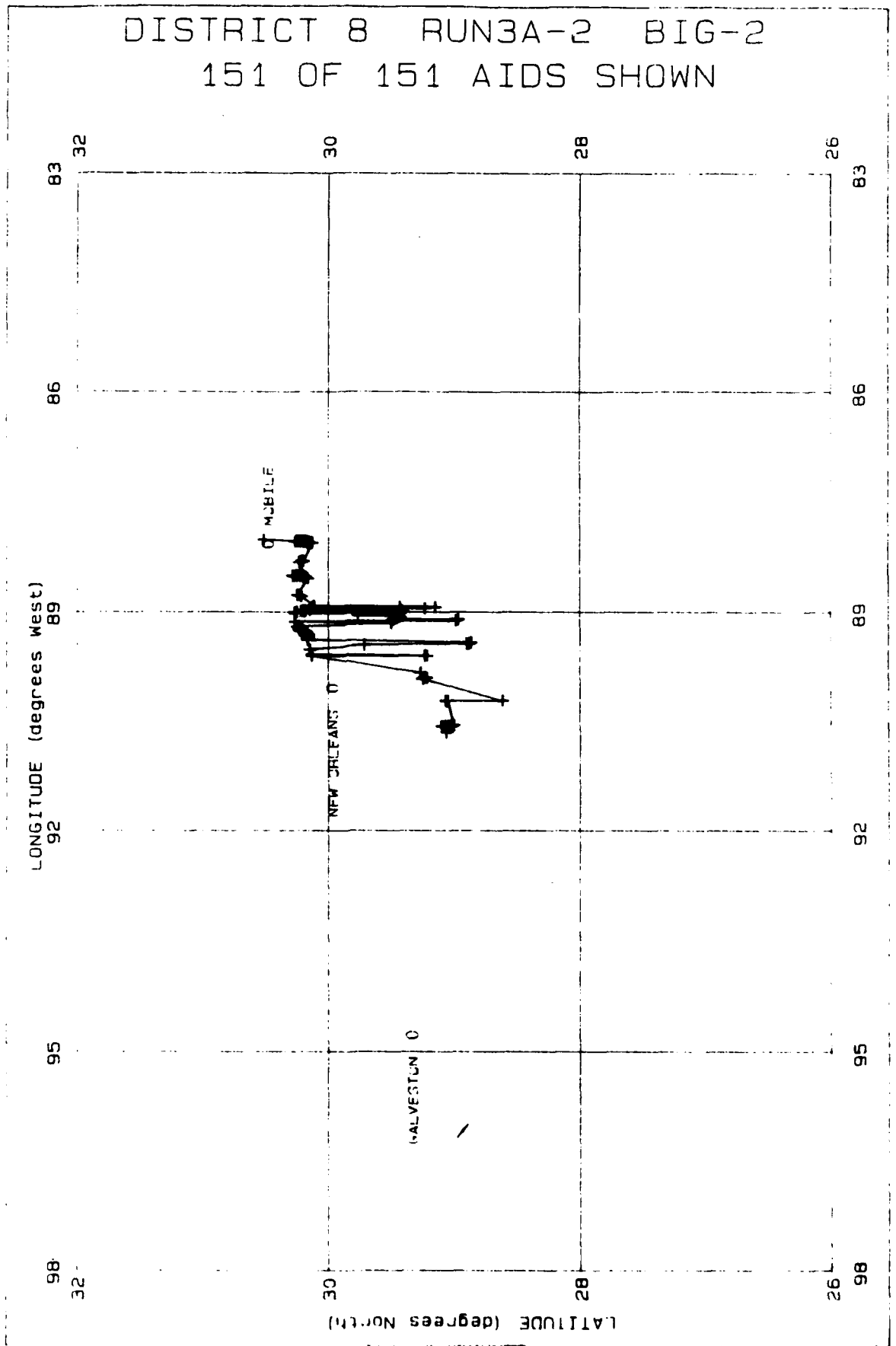
DISTRICT 8 RUN2-2 SMALL-3
178 OF 178 AIDS SHOWN



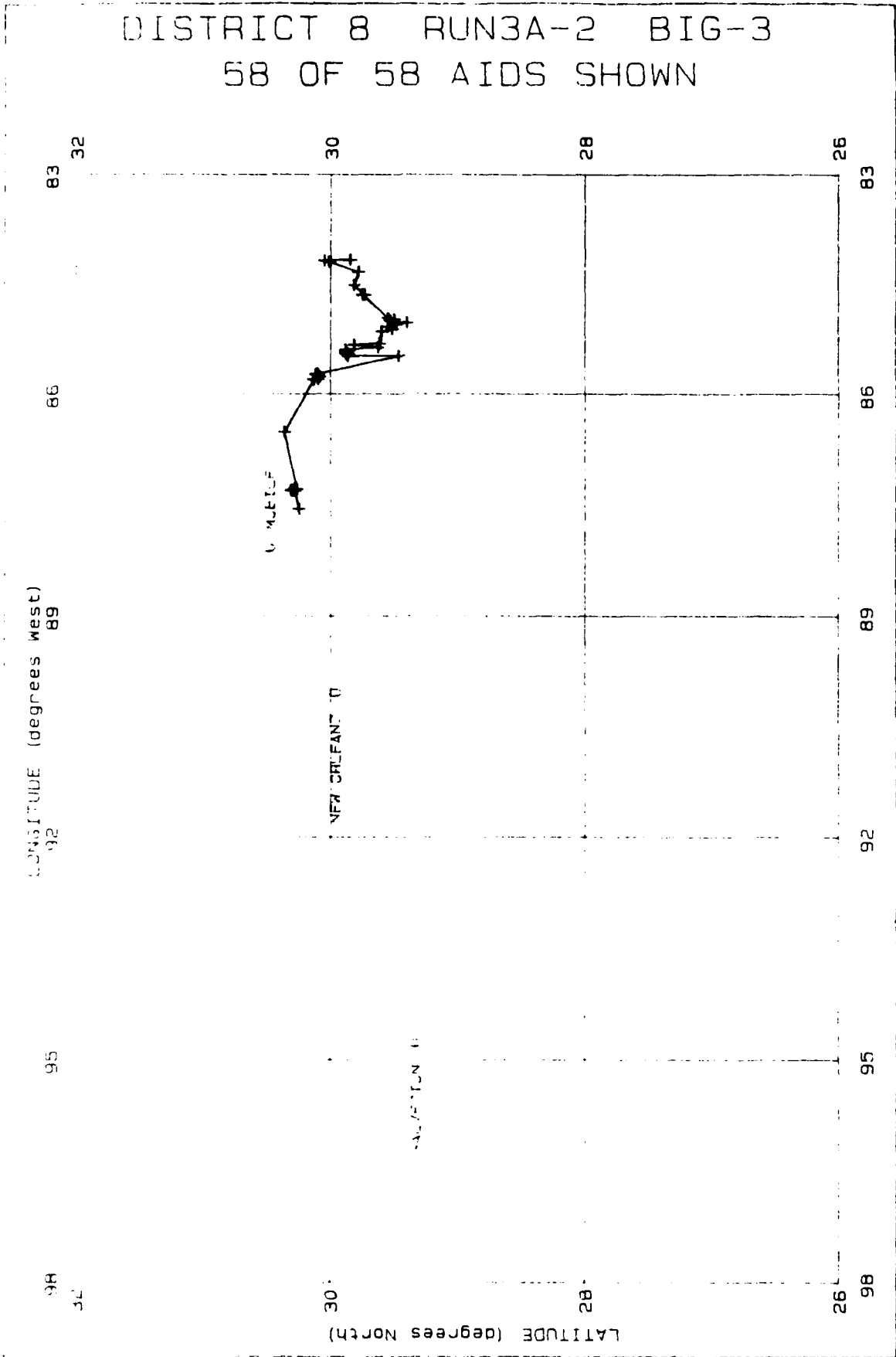
DISTRICT 8 RUN3A-2 BIG-1
 160 OF 161 AIDS SHOWN



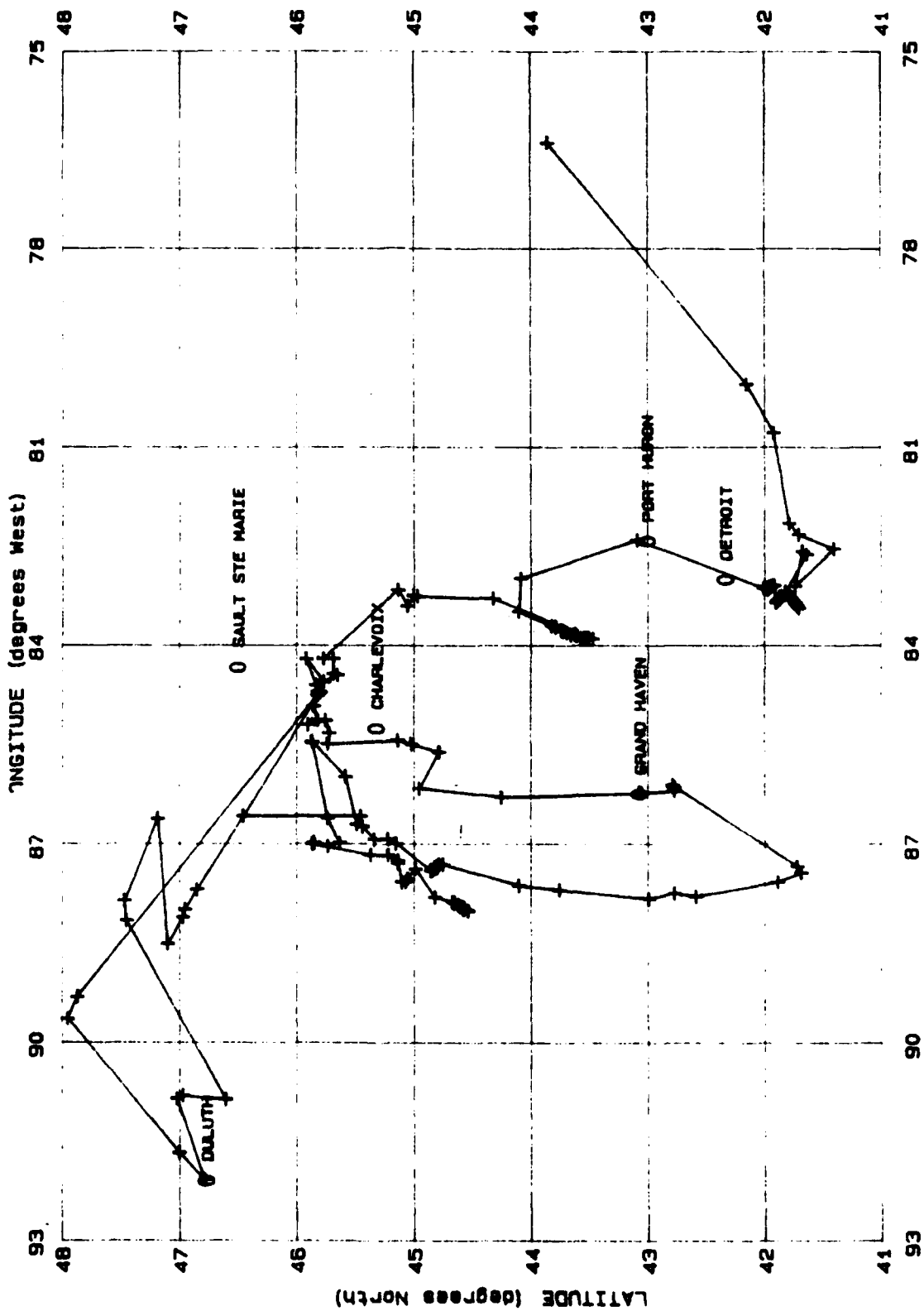
DISTRICT 8 RUN3A-2 BIG-2
151 OF 151 AIDS SHOWN



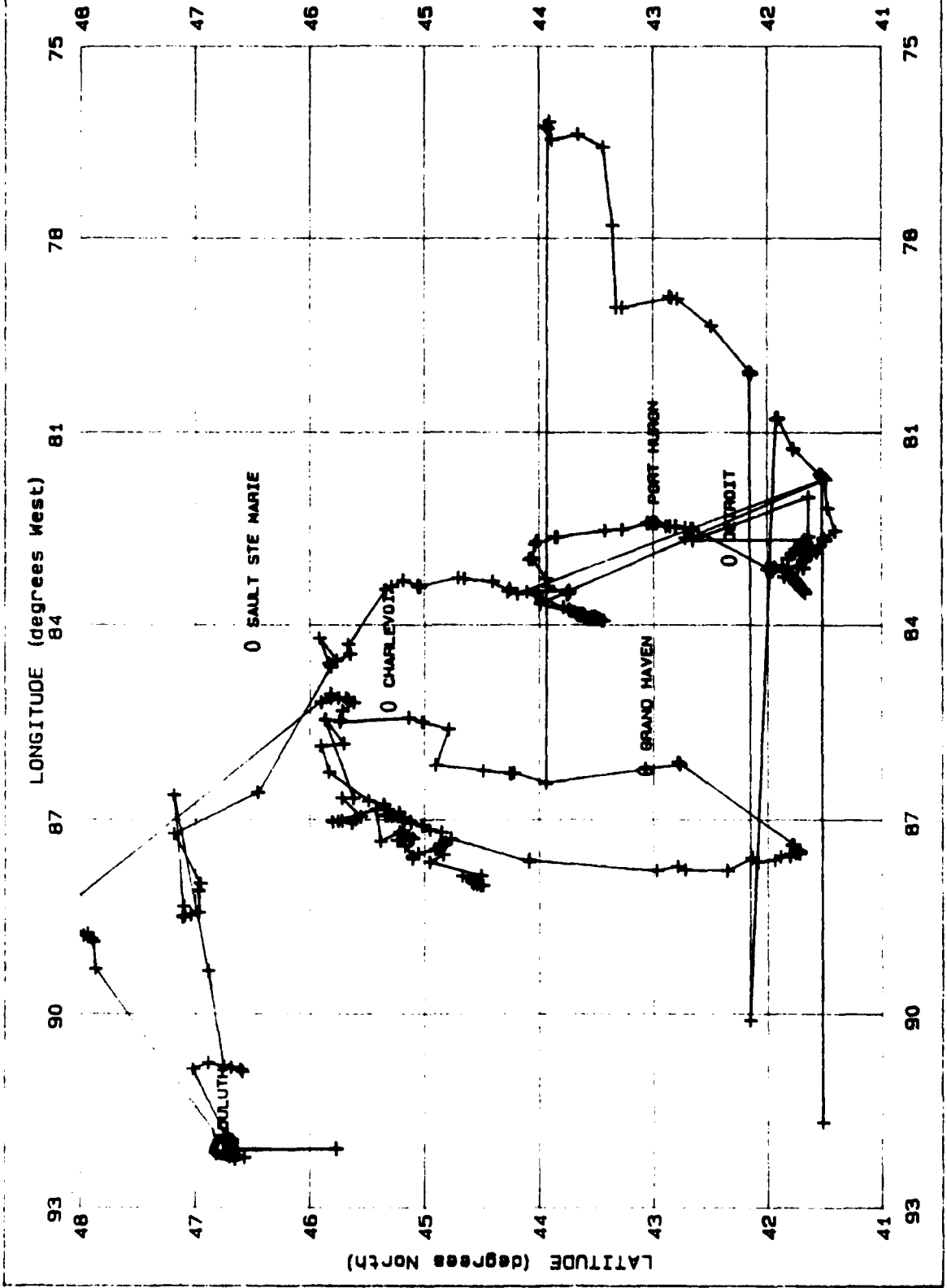
DISTRICT 8 RUN3A-2 BIG-3
 58 OF 58 AIDS SHOWN



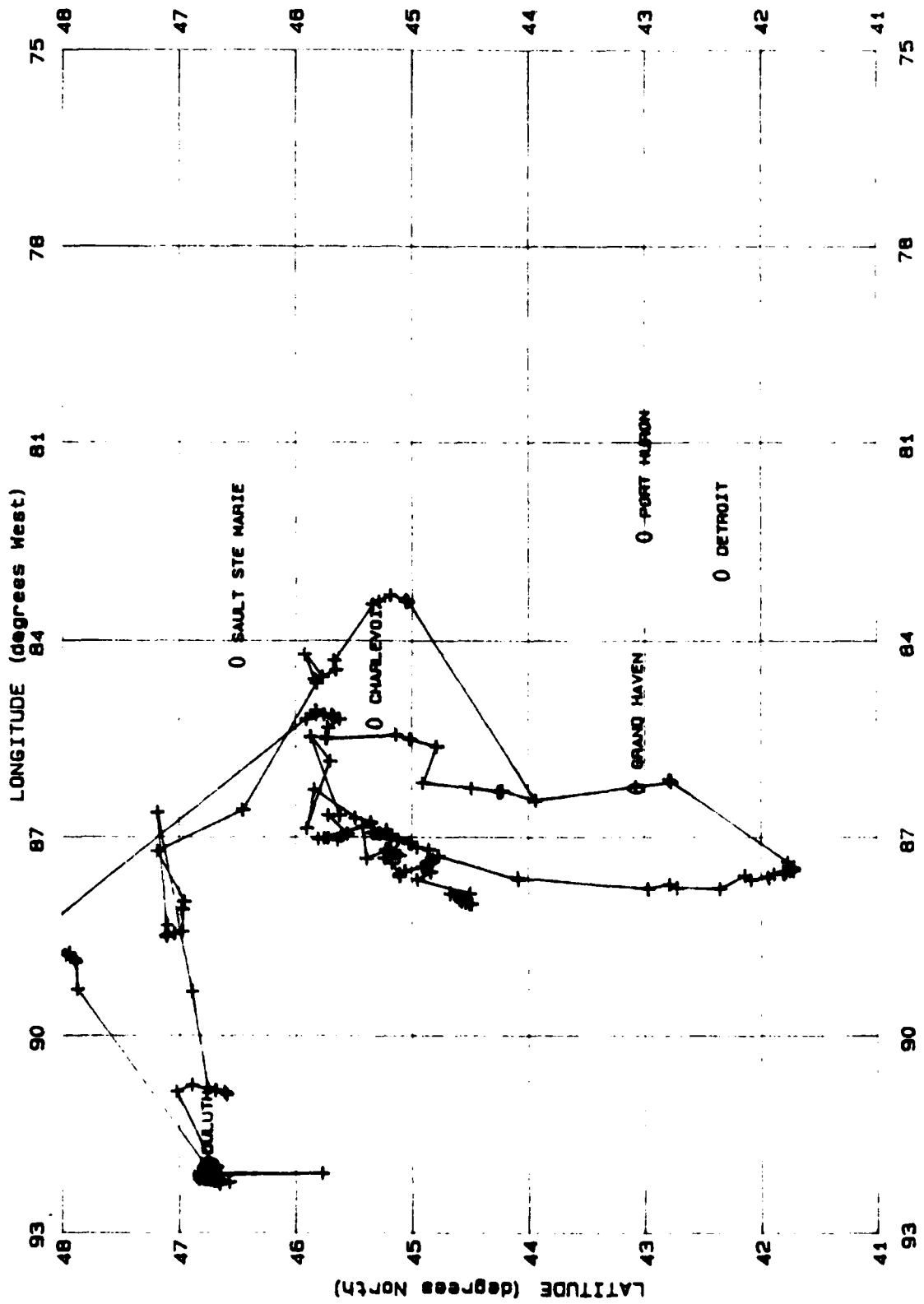
DISTRICT 9 RUN1-1 BIG-1
 258 OF 258 AIDS SHOWN



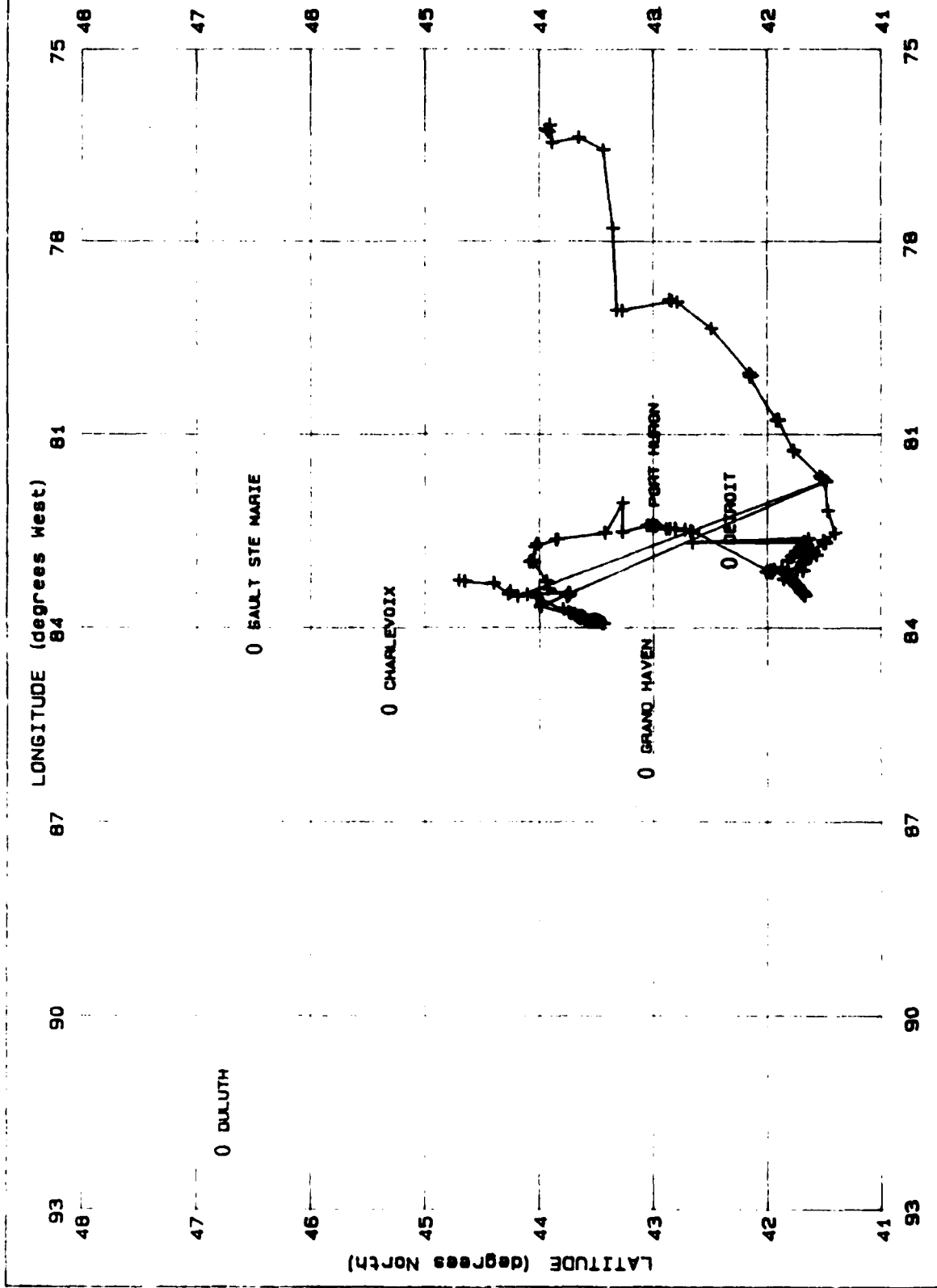
DISTRICT 9 RUN1-1 SMALL-1
 681 OF 687 AIDS SHOWN



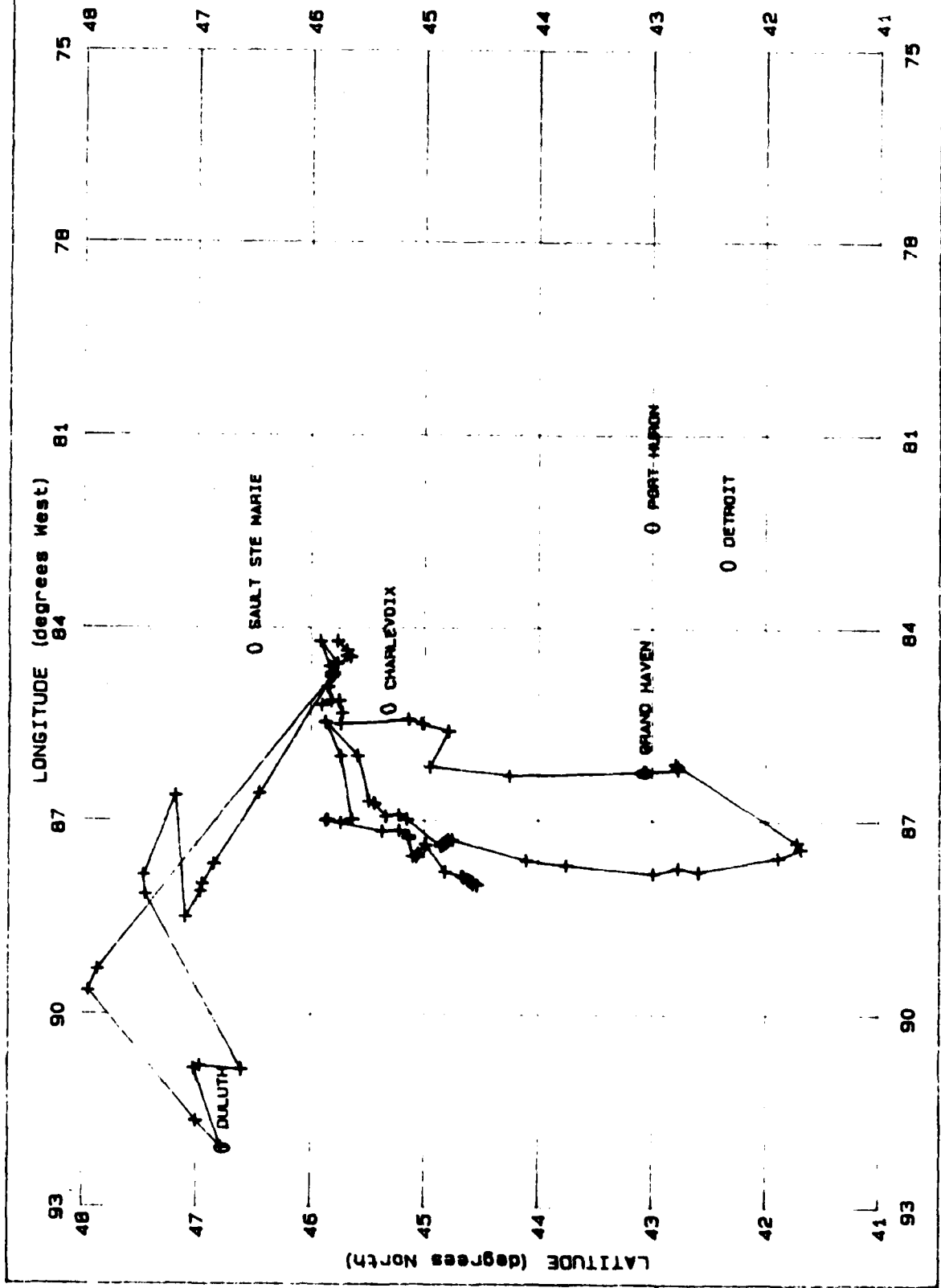
DISTRICT 9 RUN2-2 SMALL-1
 389 OF 395 AIDS SHOWN



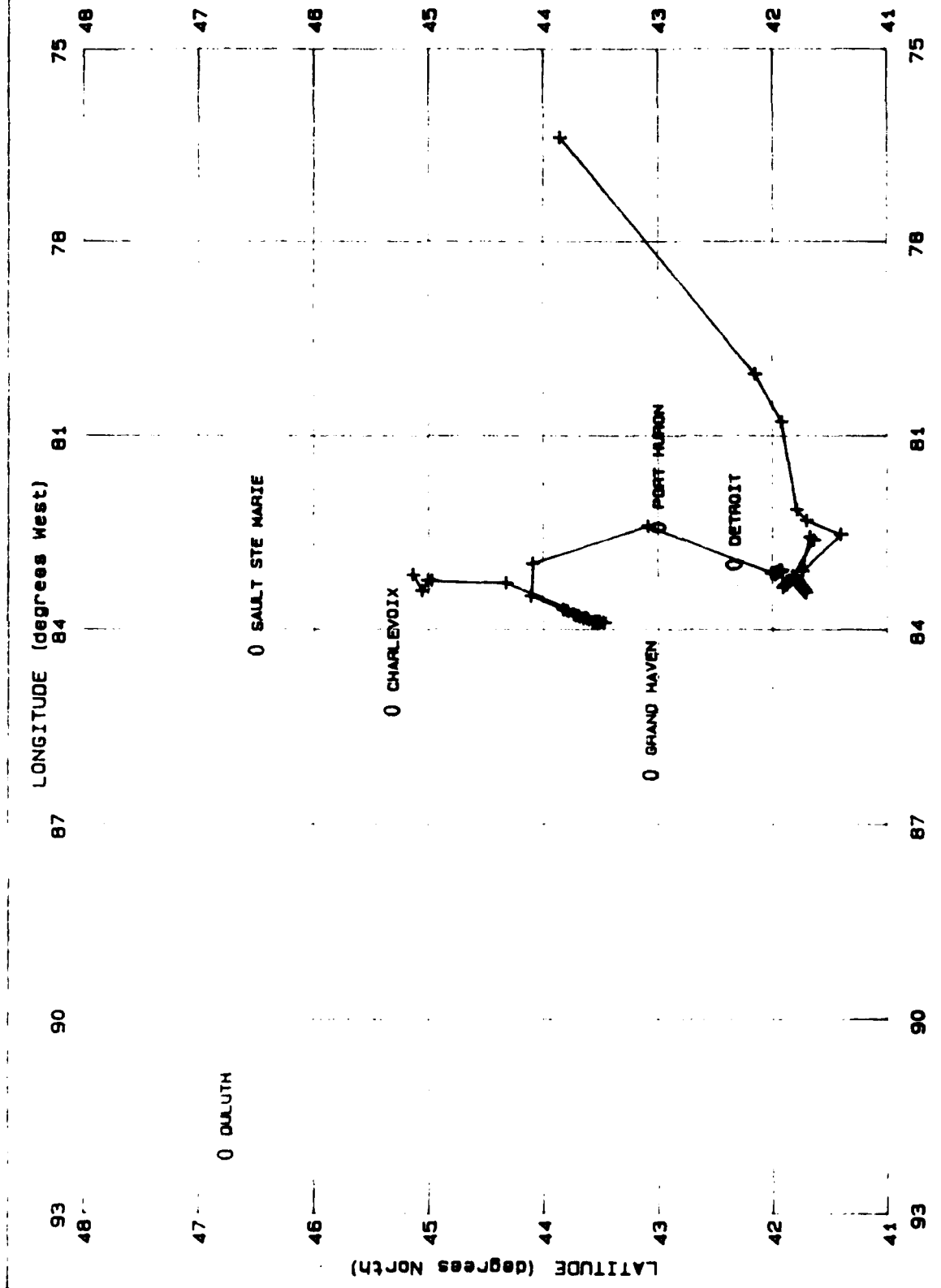
DISTRICT 9 RUN2-2 SMALL-2
 291 OF 291 AIDS SHOWN



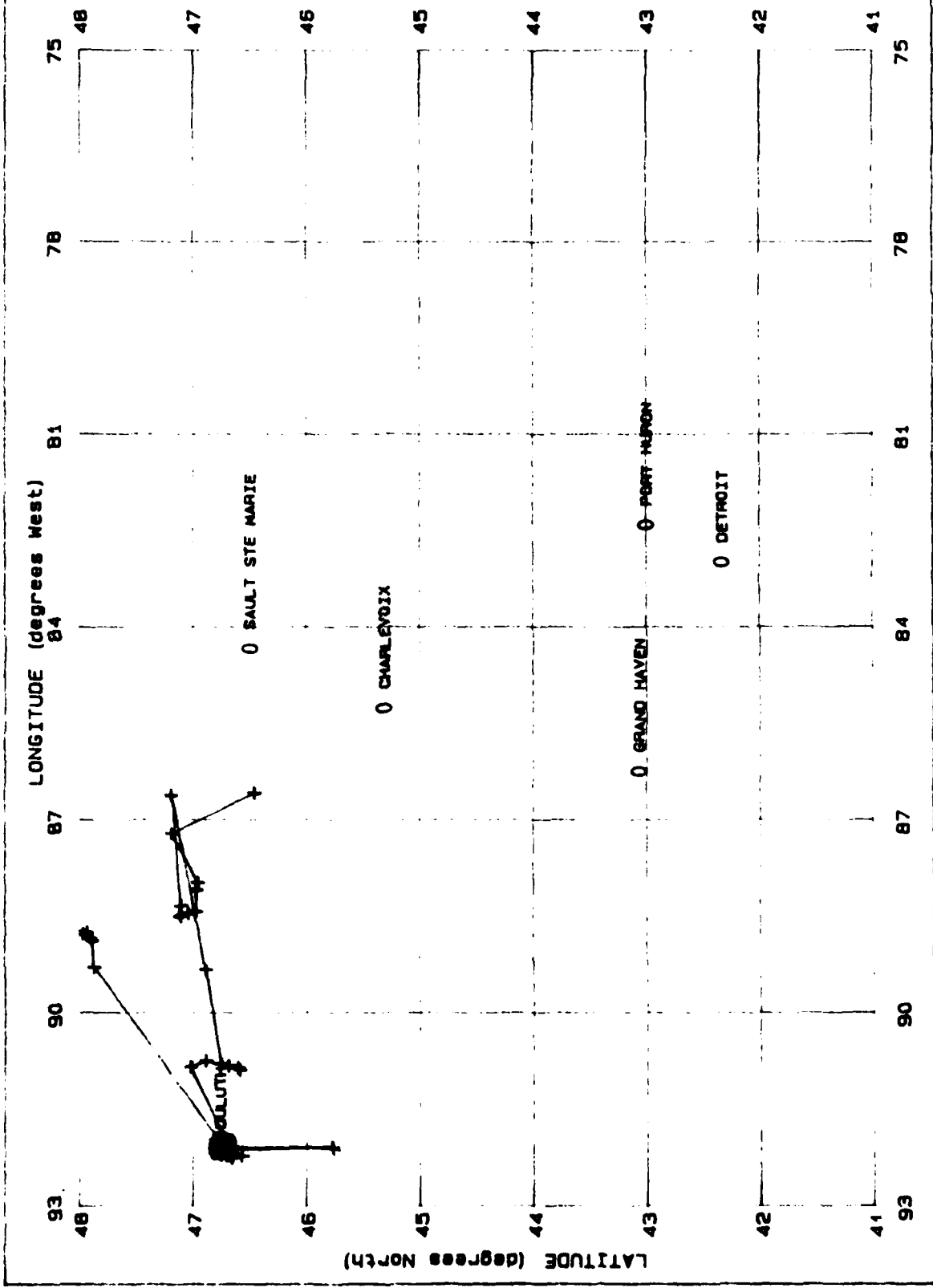
DISTRICT 9 RUN2-3 BIG-1
 156 OF 156 AIDS SHOWN



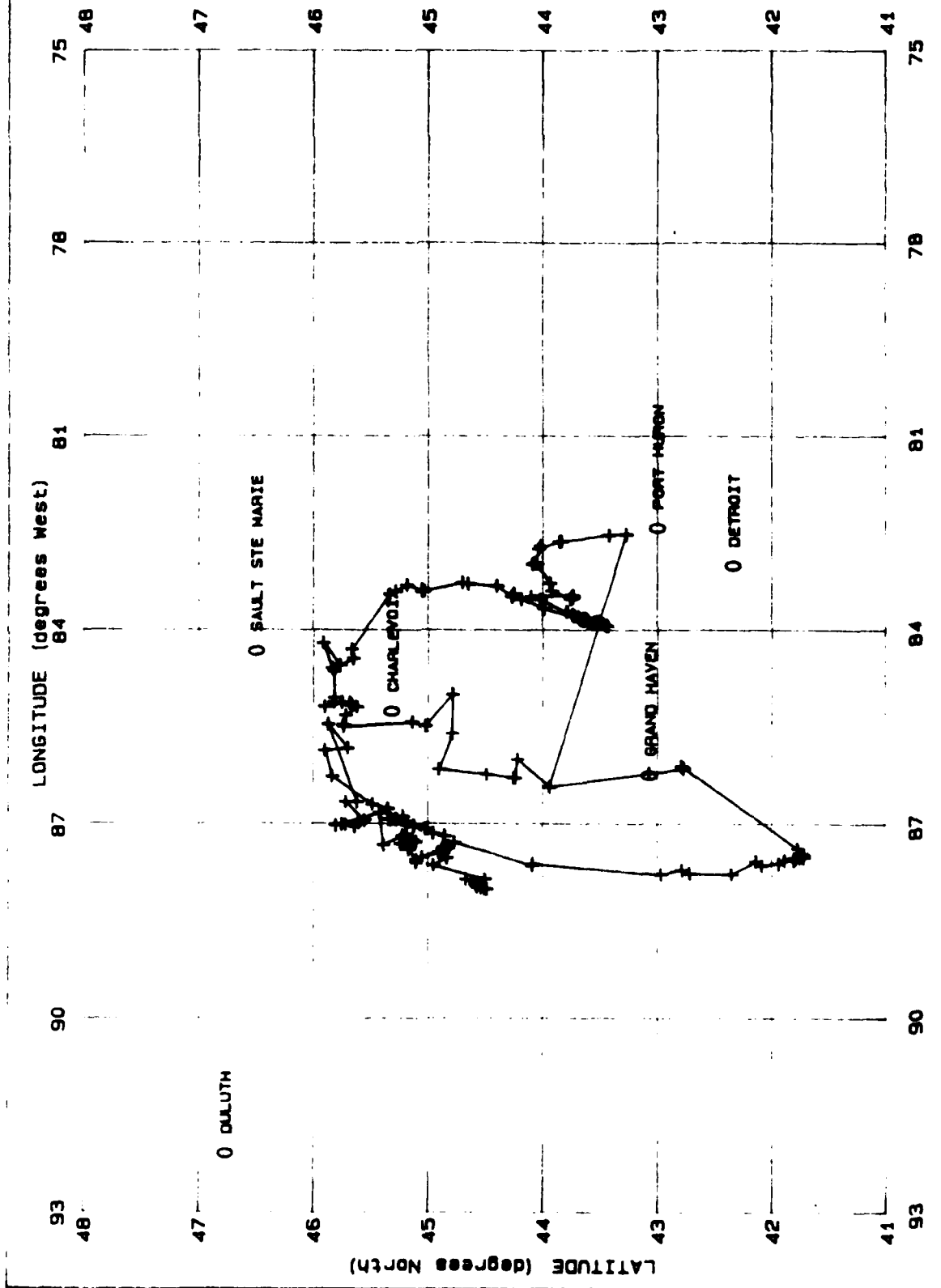
DISTRICT 9 RUN2-3 BIG-2
 103 OF 103 AIDS SHOWN



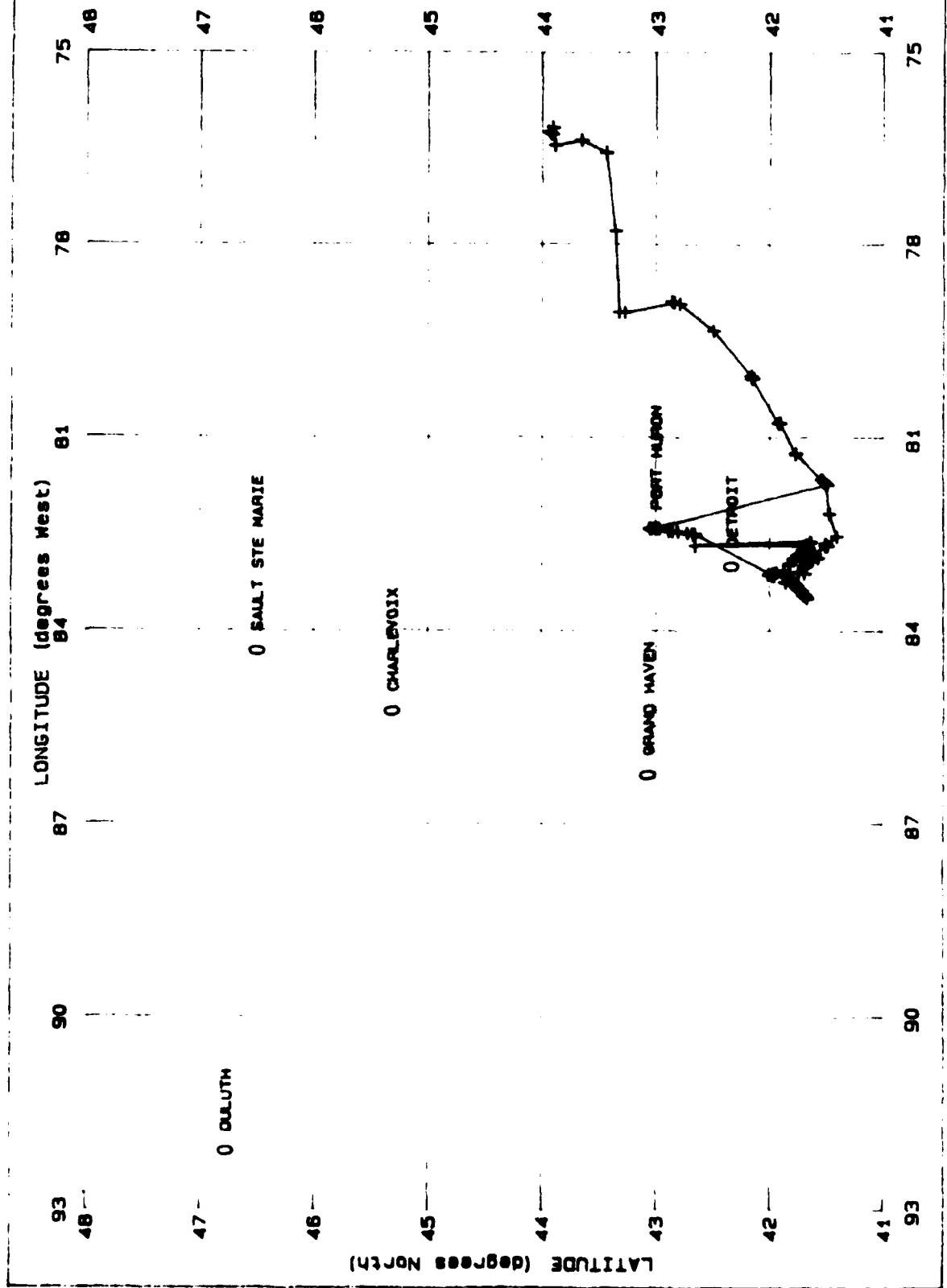
DISTRICT 9 RUN2-3 SMALL-1
 217 OF 223 AIDS SHOWN



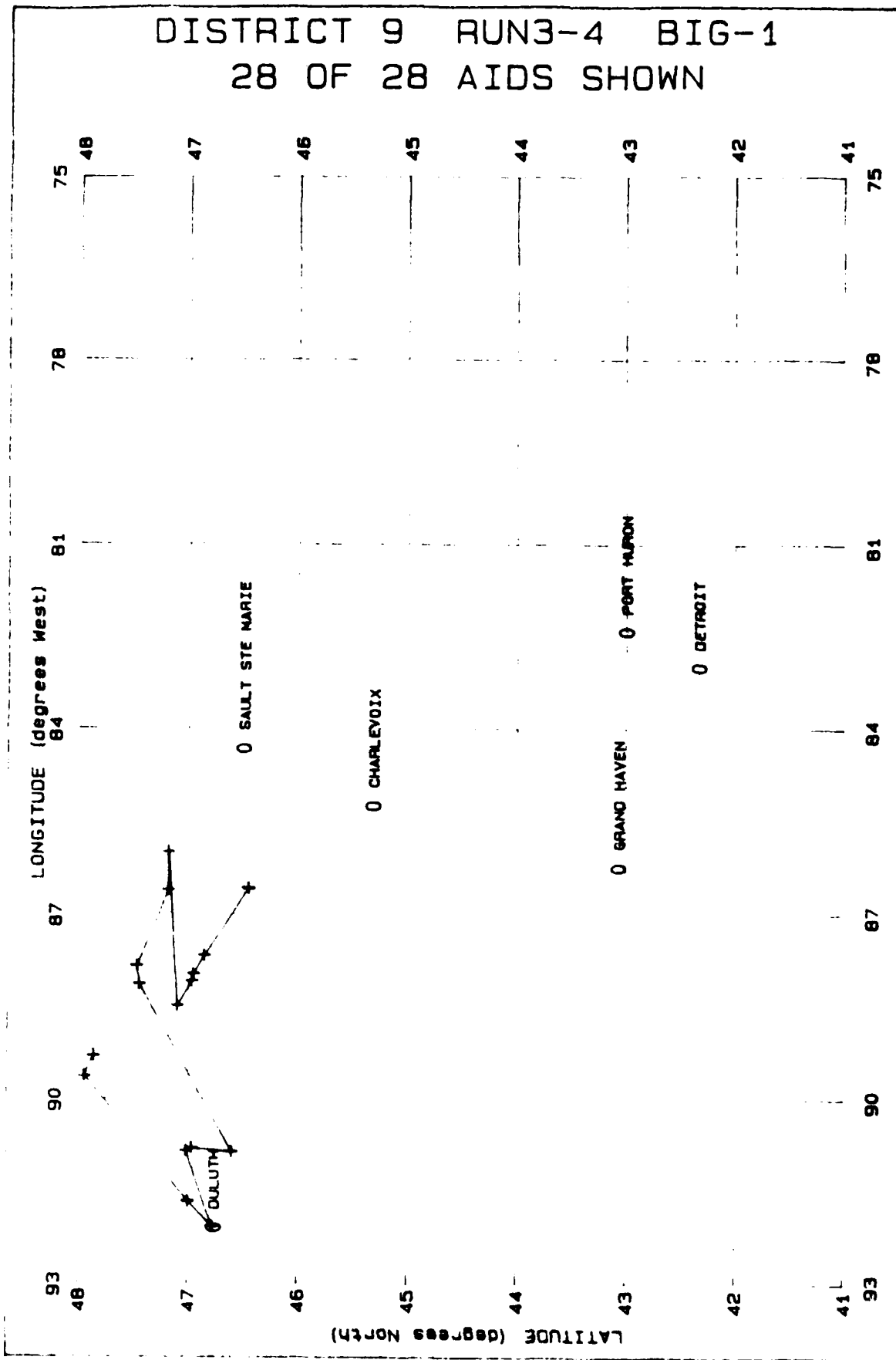
DISTRICT 9 RUN2-3 SMALL-2
307 OF 307 AIDS SHOWN



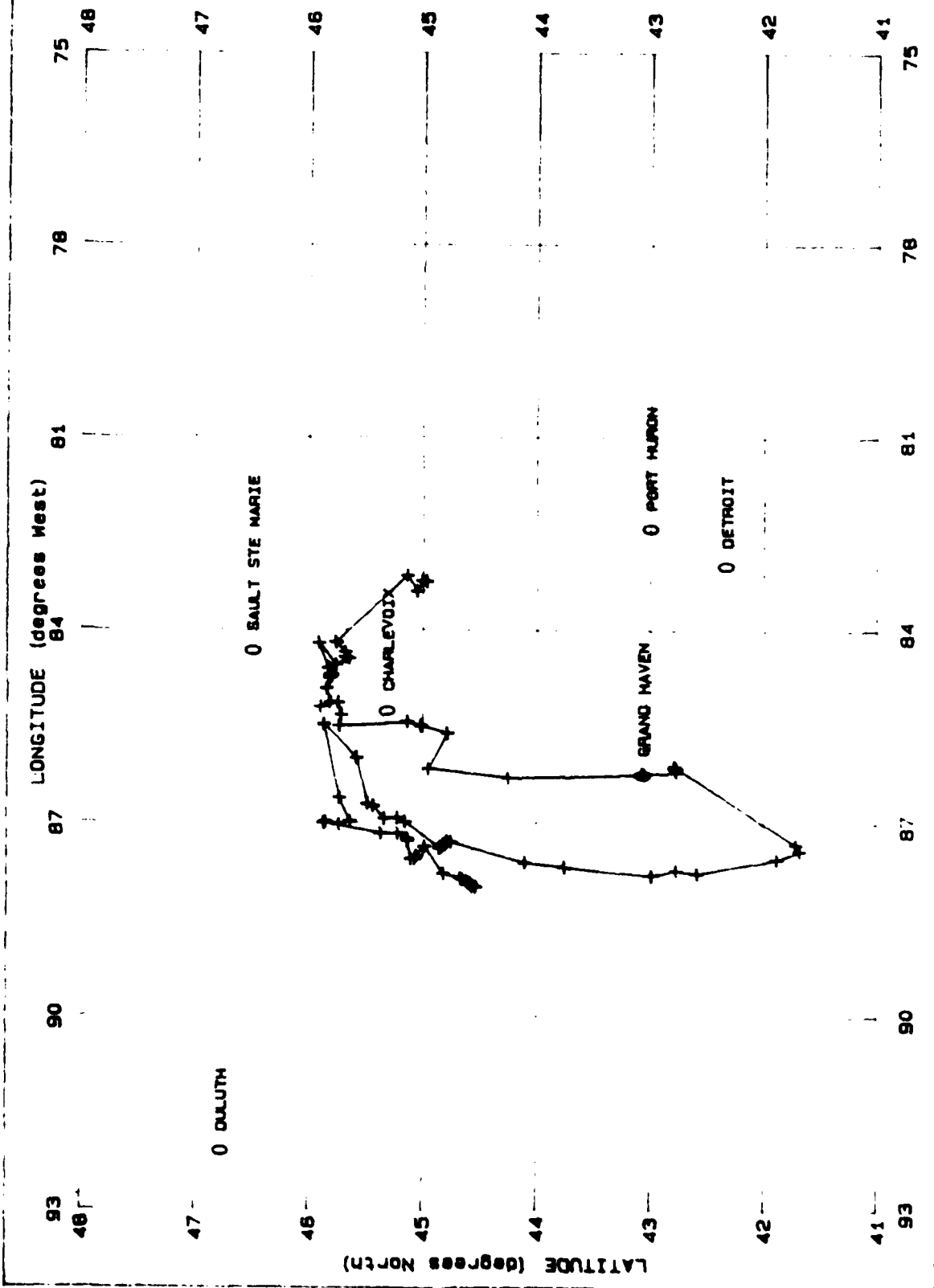
DISTRICT 9 RUN2-3 SMALL-3
 156 OF 156 AIDS SHOWN



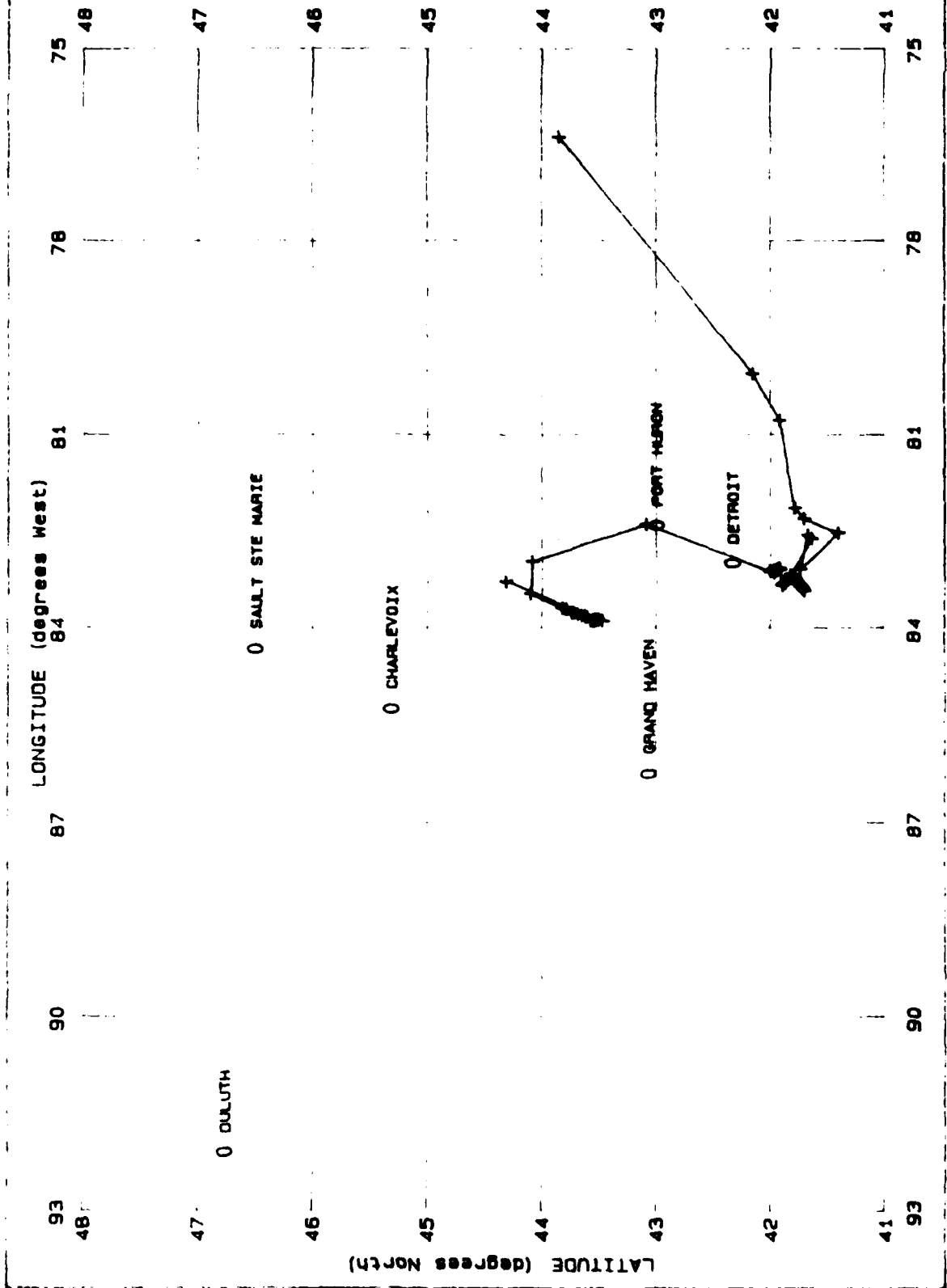
DISTRICT 9 RUN3-4 BIG-1
 28 OF 28 AIDS SHOWN



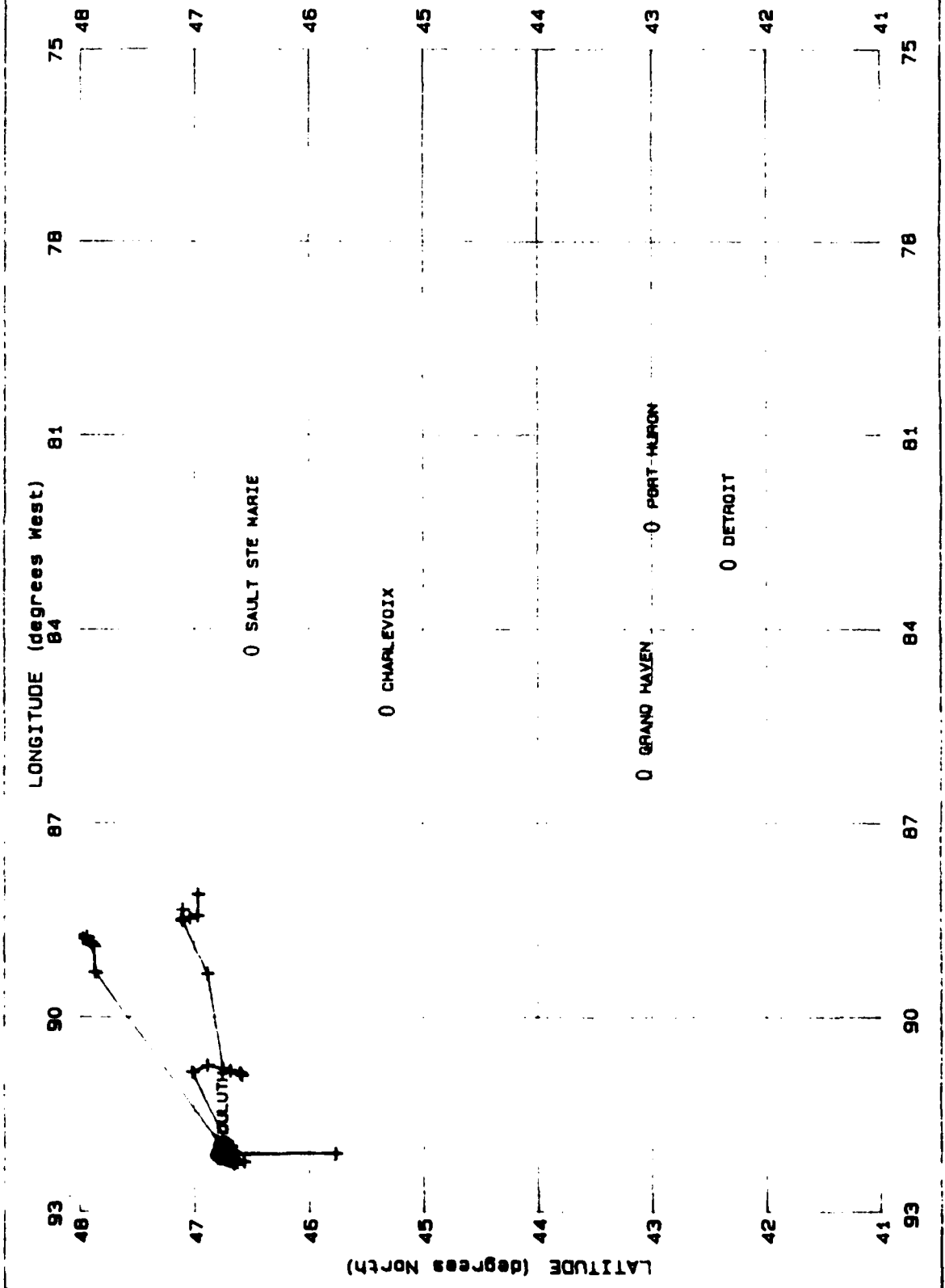
DISTRICT 9 RUN3-4 BIG-2
 133 OF 133 AIDS SHOWN



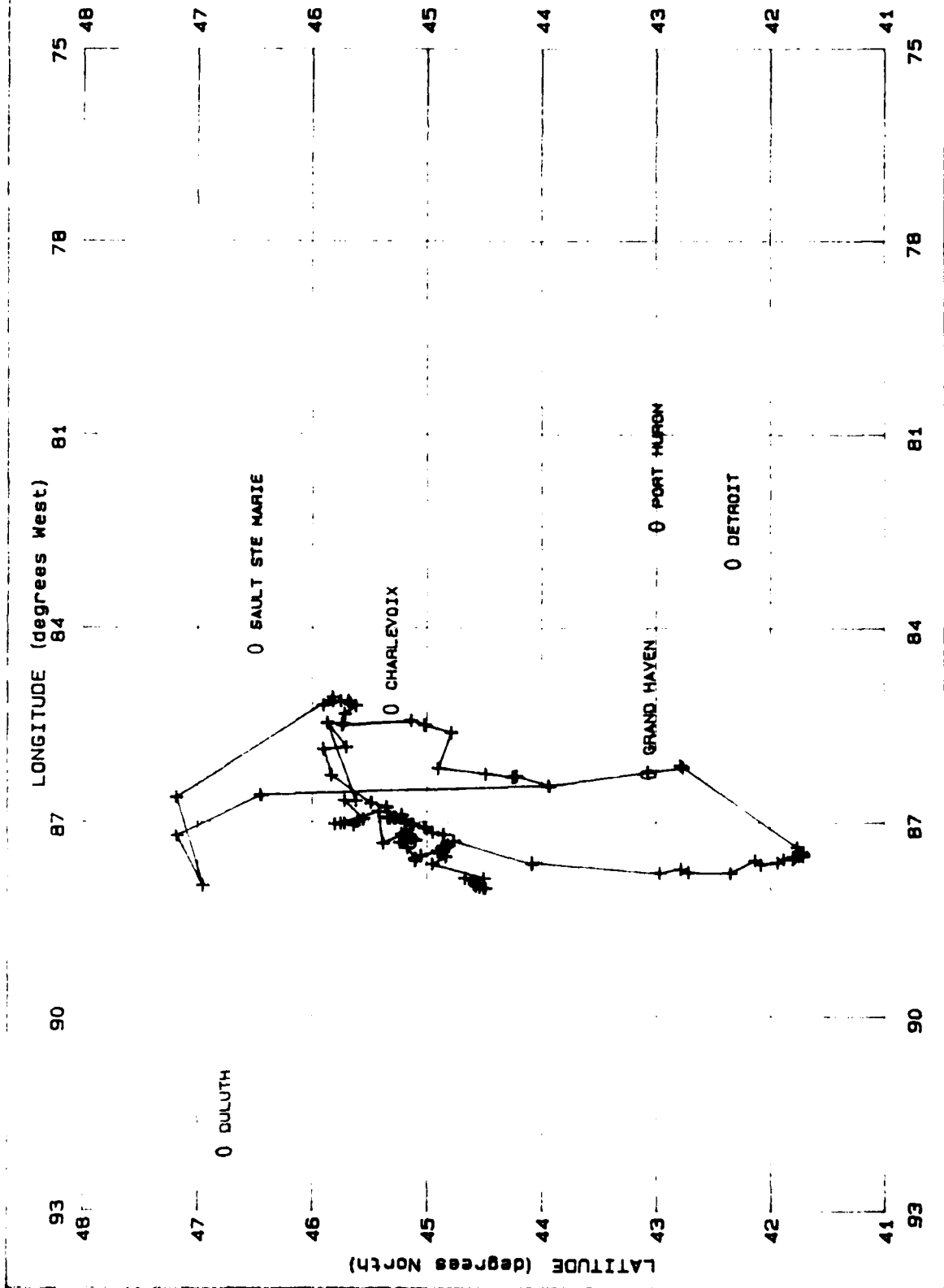
DISTRICT 9 RUN3-4 BIG-3
 98 OF 98 AIDS SHOWN



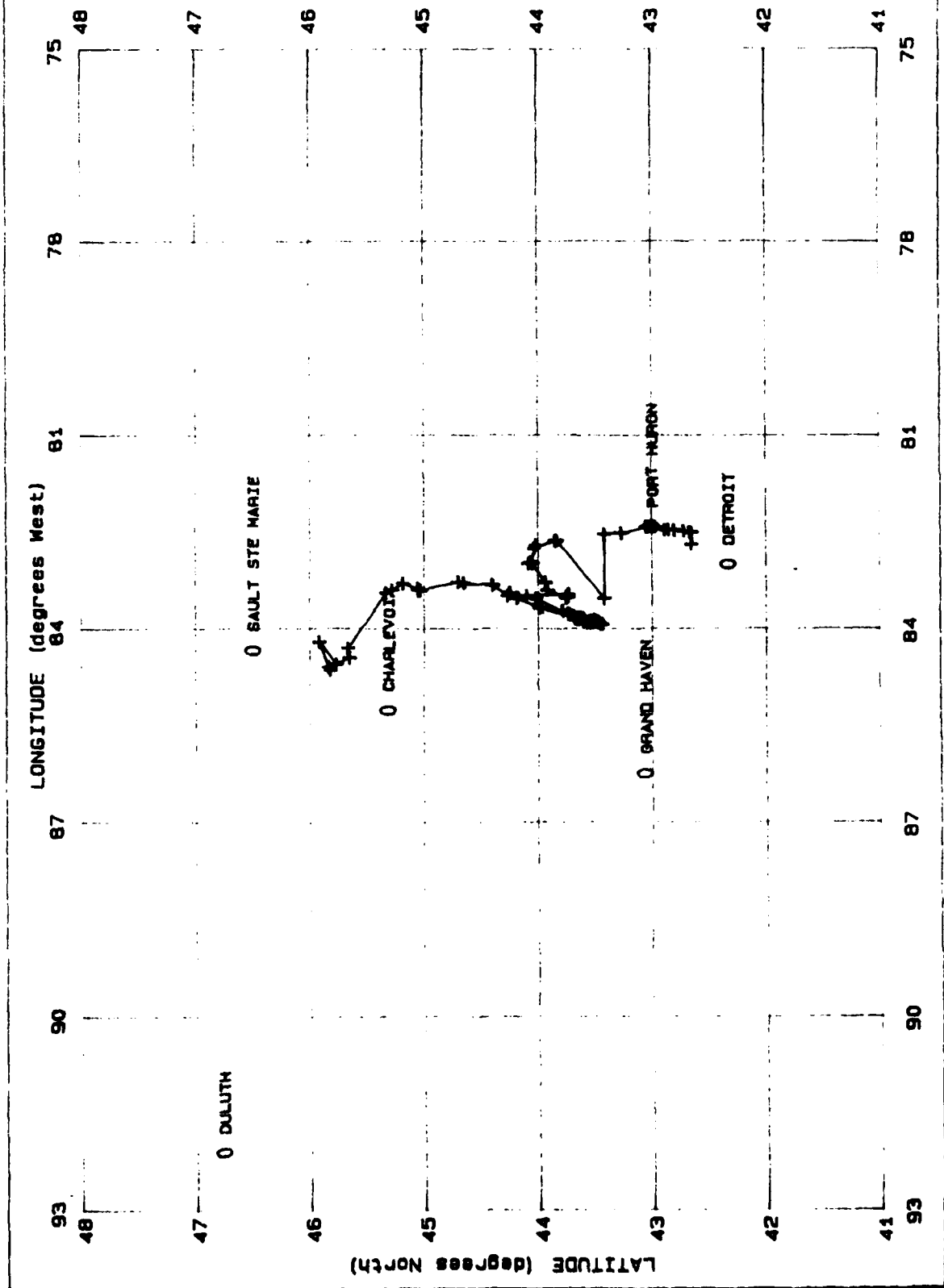
DISTRICT 9 RUN3-4 SMALL-1
 208 OF 214 AIDS SHOWN



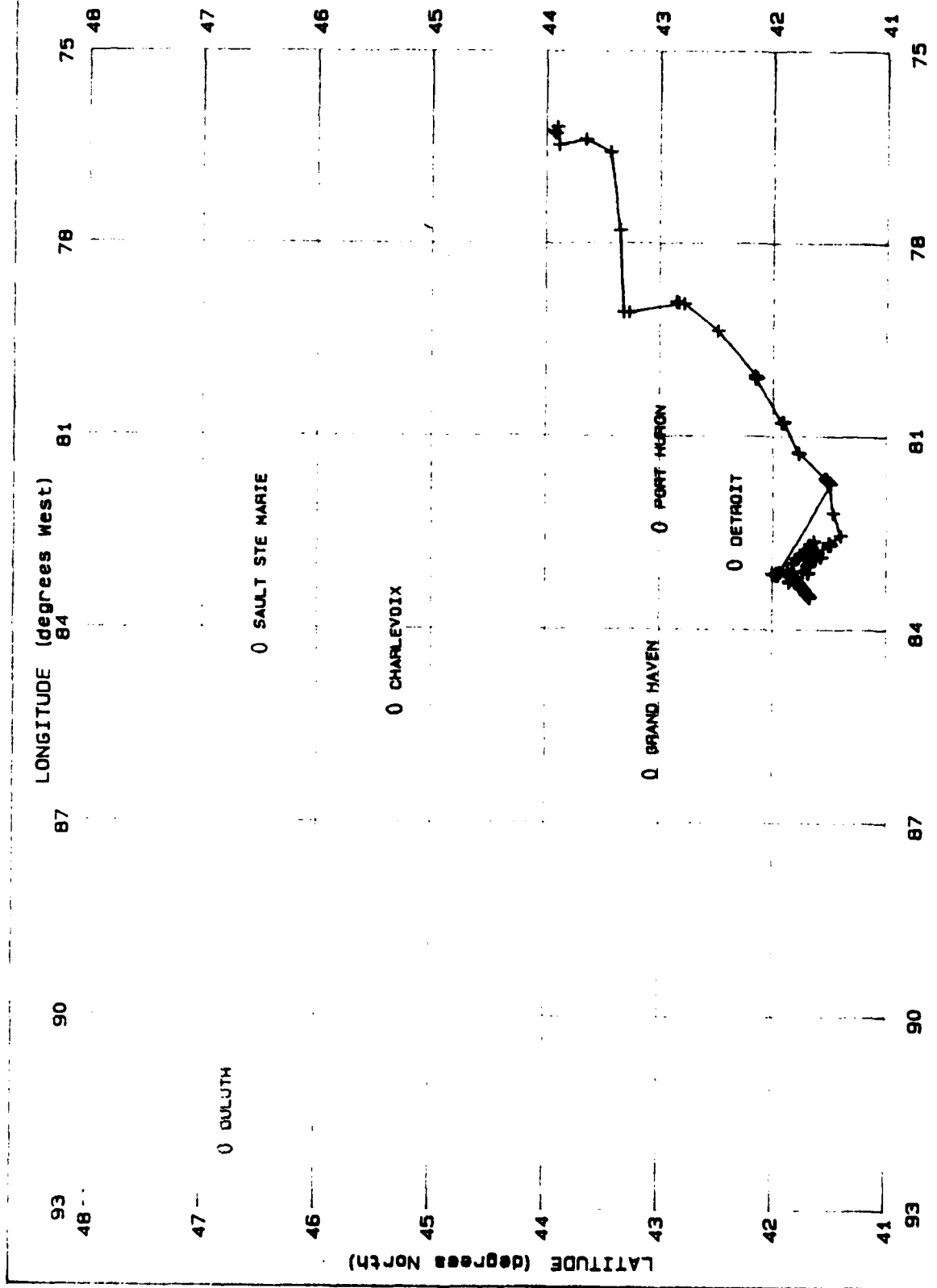
DISTRICT 9 RUN3-4 SMALL-2
 163 OF 163 AIDS SHOWN



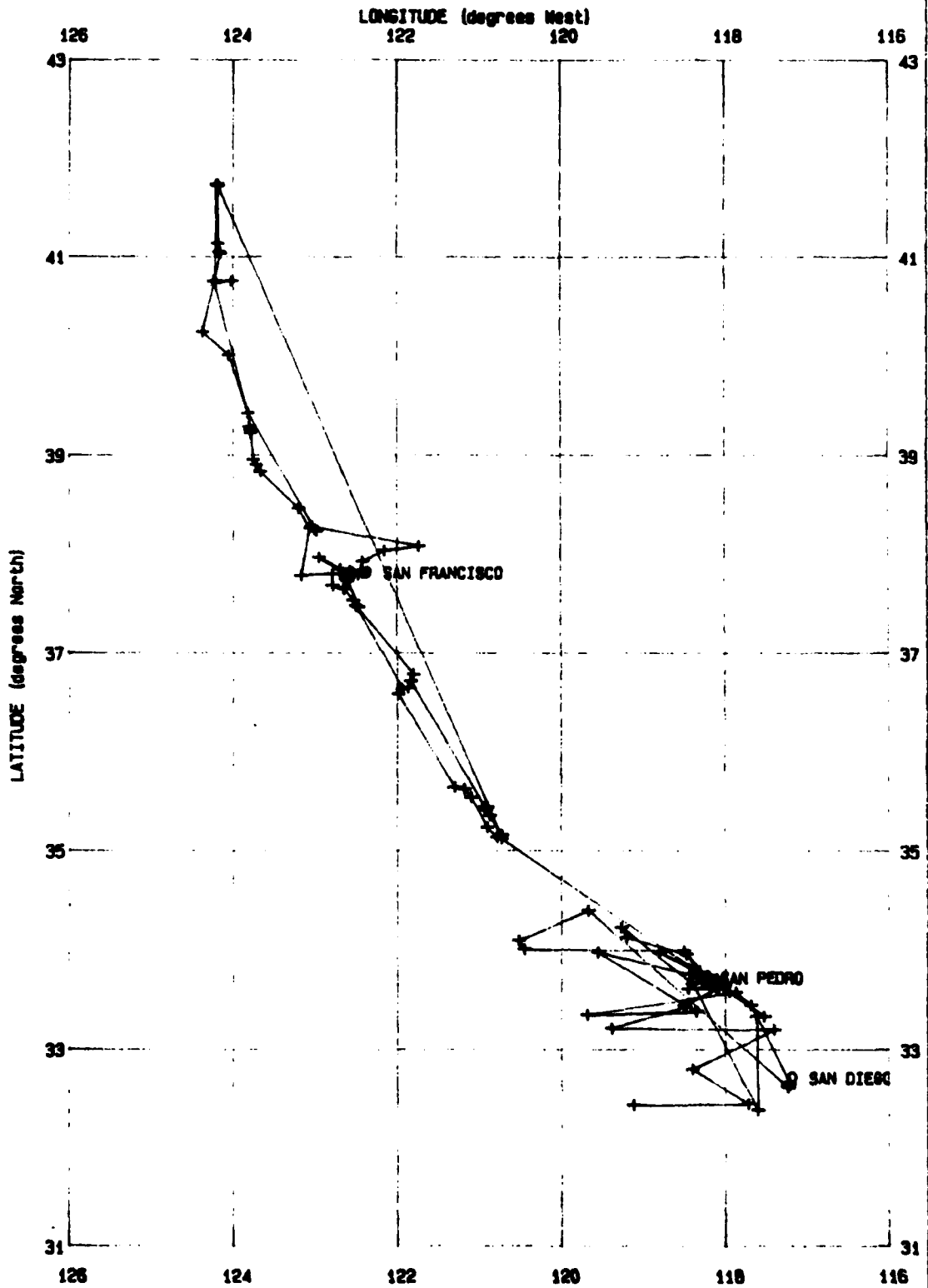
DISTRICT 9 RUN3-4 SMALL-3
 179 OF 179 AIDS SHOWN



DISTRICT 9 RUN3-4 SMALL-4
 130 OF 130 AIDS SHOWN

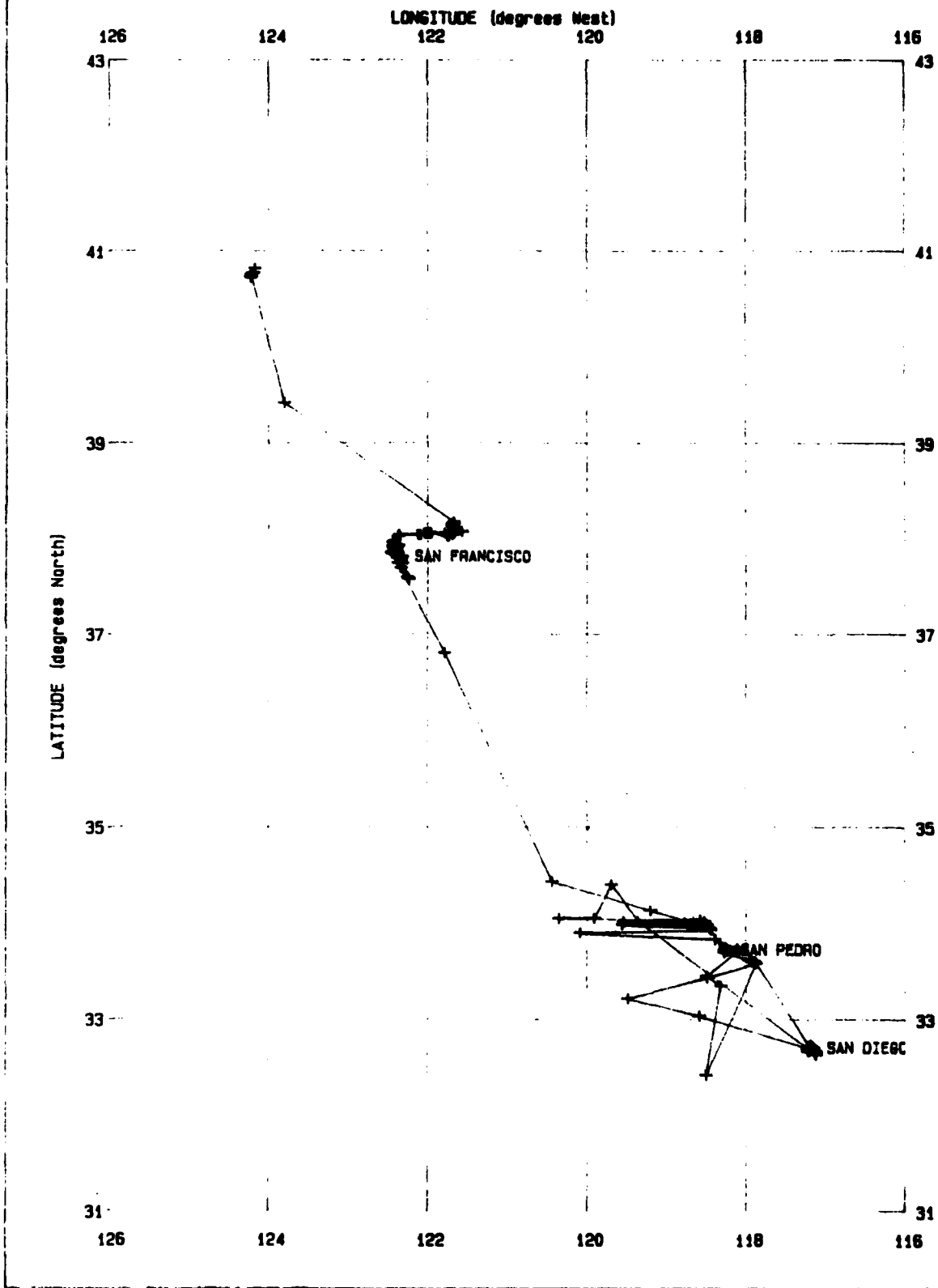


DISTRICT 11 RUN1-1 BIG-1
132 OF 132 AIDS SHOWN



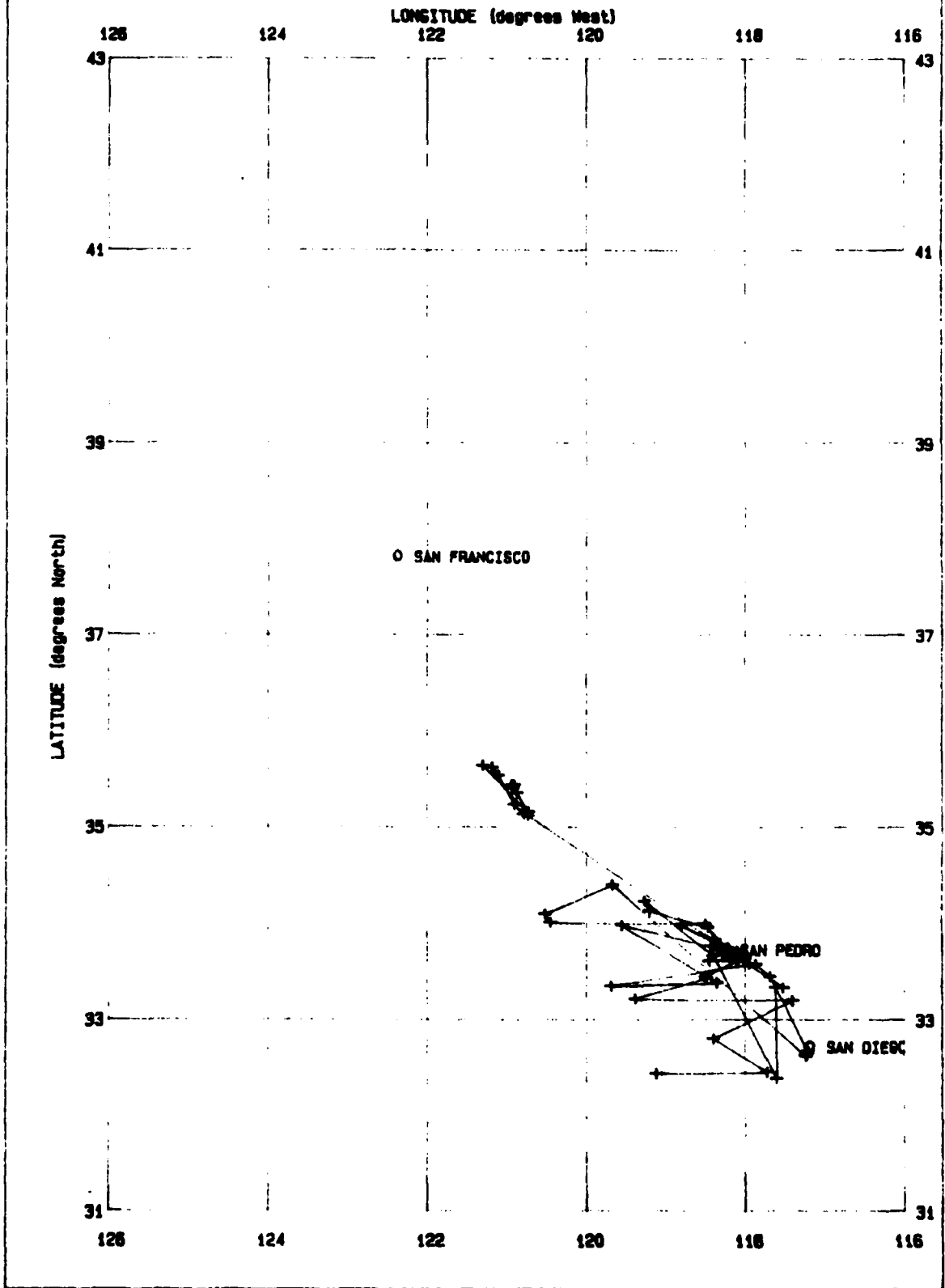
DISTRICT 11 RUN1-1 SMALL-1

140 OF 140 AIDS SHOWN



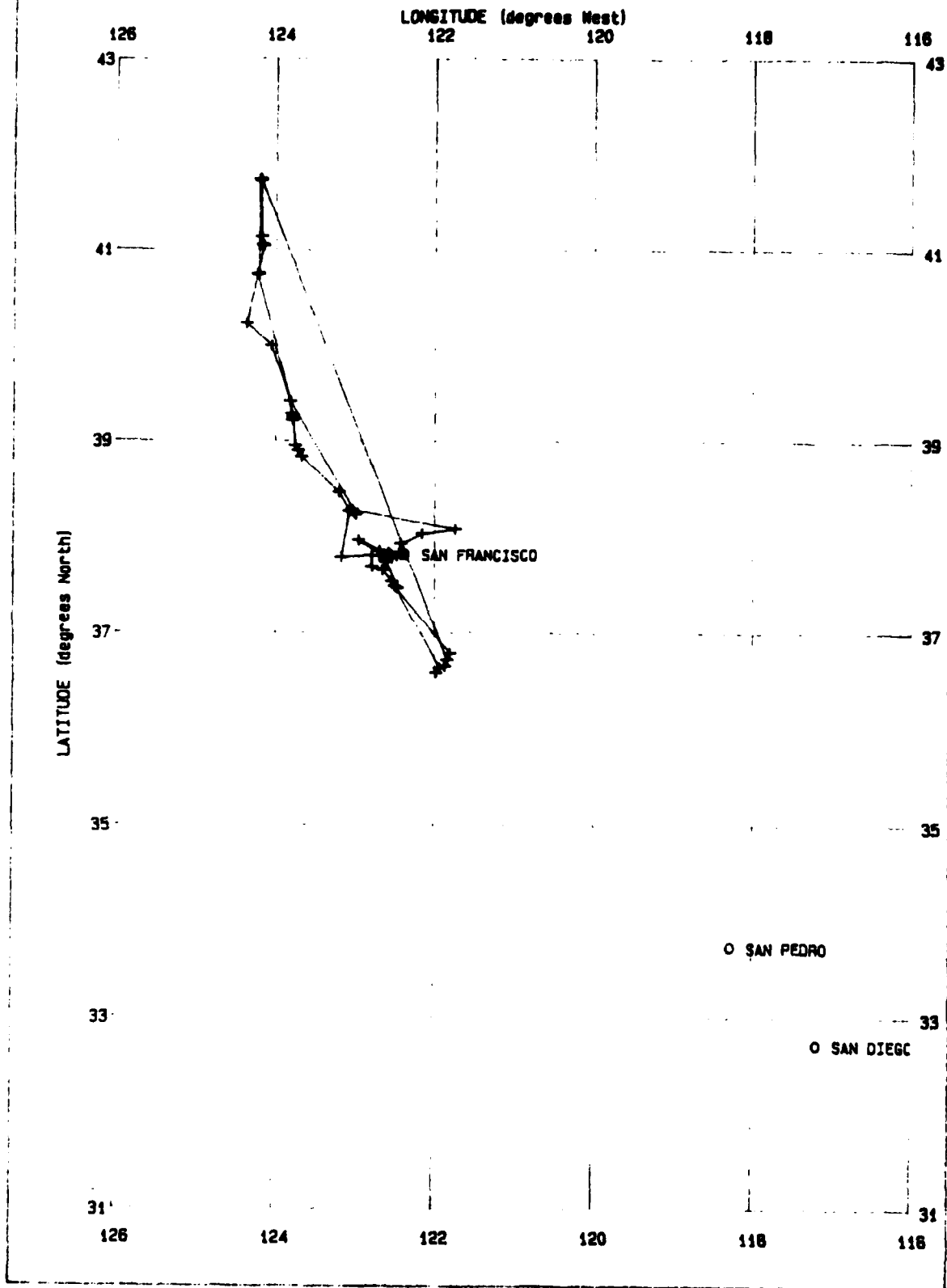
DISTRICT 11 RUN2-2 BIG-1

73 OF 73 AIDS SHOWN



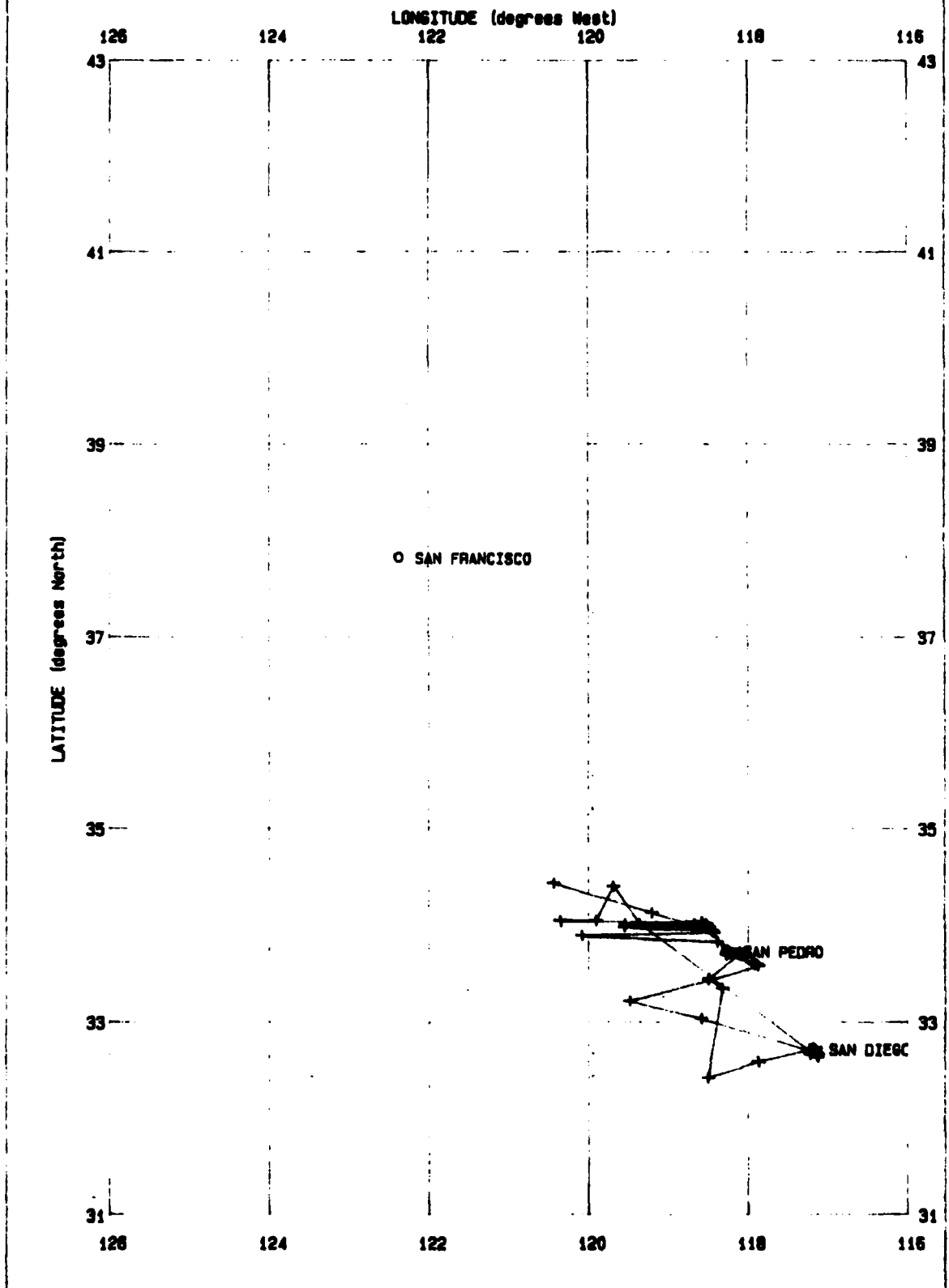
DISTRICT 11 RUN2-2 BIG-2

59 OF 59 AIDS SHOWN



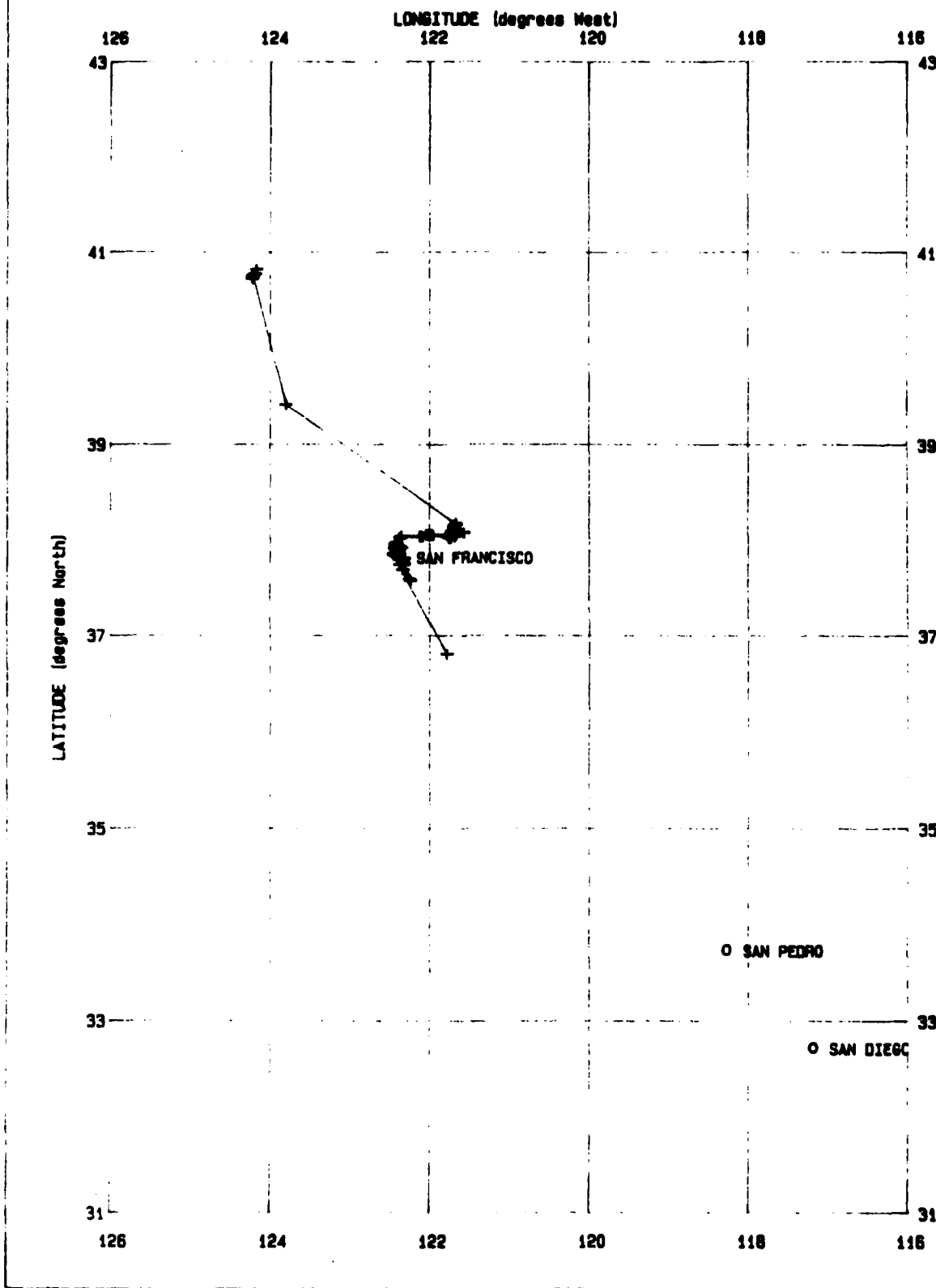
DISTRICT 11 RUN2-2 SMALL-1

69 OF 69 AIDS SHOWN



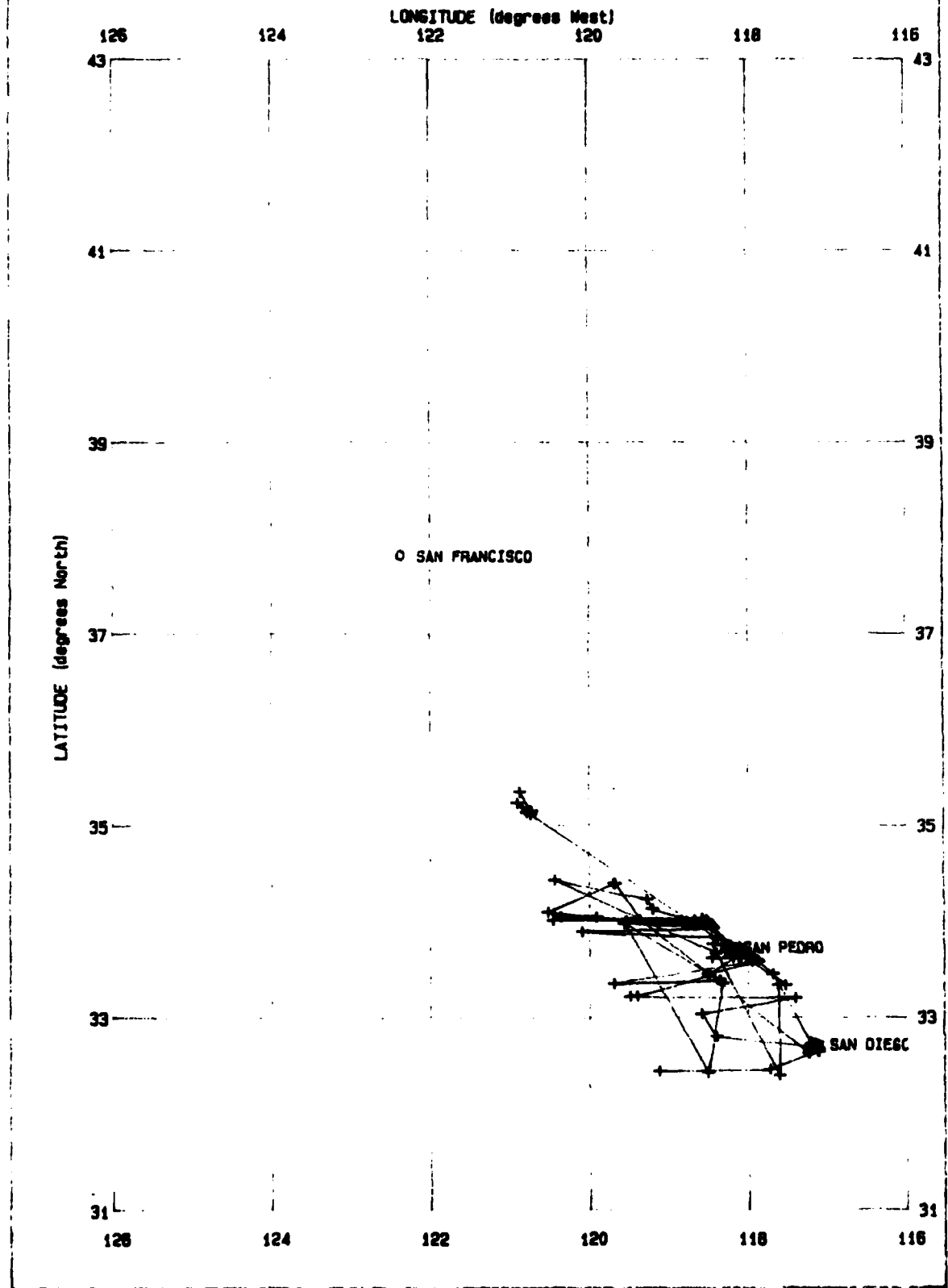
DISTRICT 11 RUN2-2 SMALL-2

71 OF 71 AIDS SHOWN



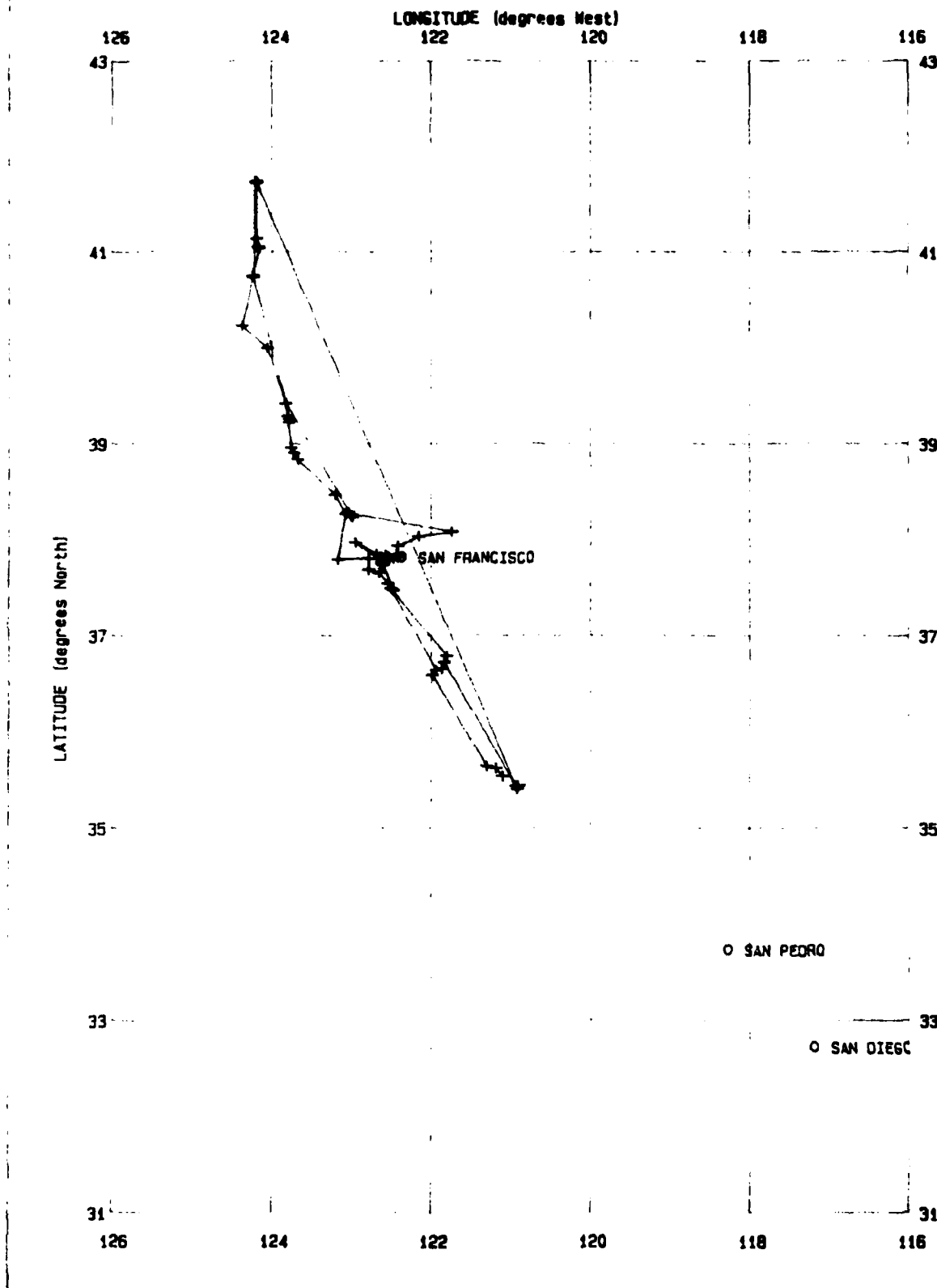
DISTRICT 11 RUN2A-1A BIG-1

136 OF 136 AIDS SHOWN



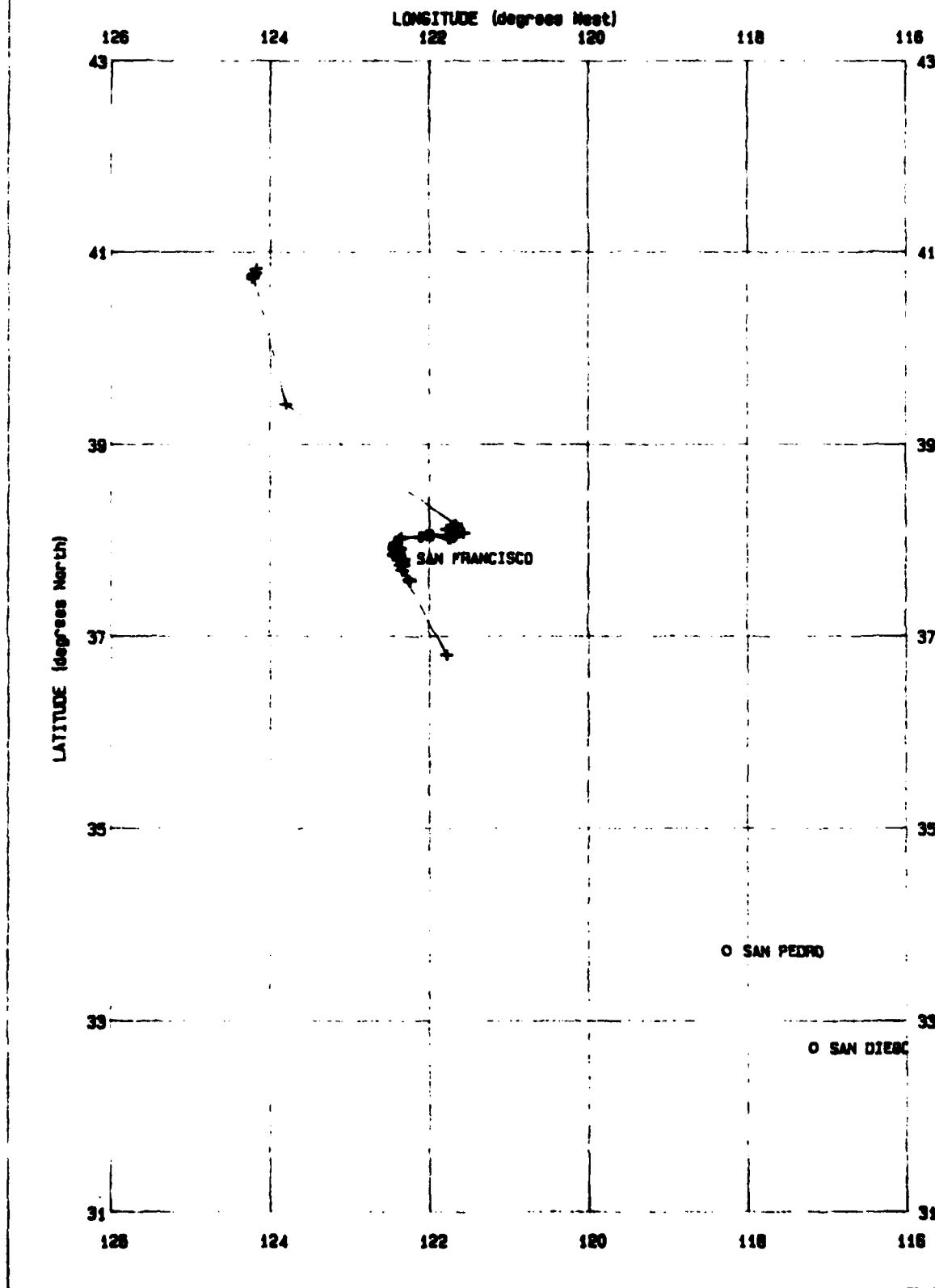
DISTRICT 11 RUN2A-1A BIG-2

65 OF 65 AIDS SHOWN



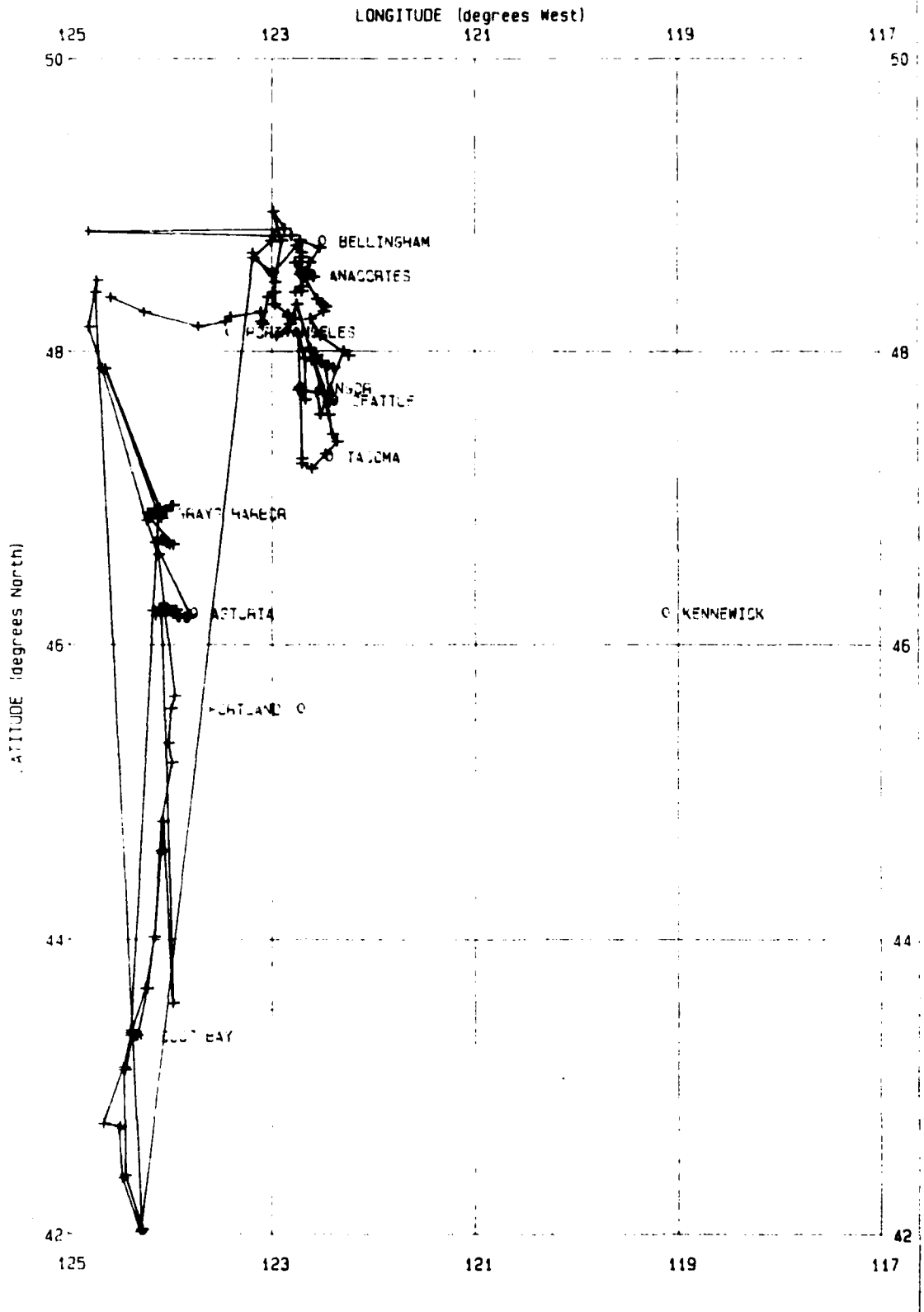
DISTRICT 11 RUN2A-1A SMALL-2

71 OF 71 AIDS SHOWN



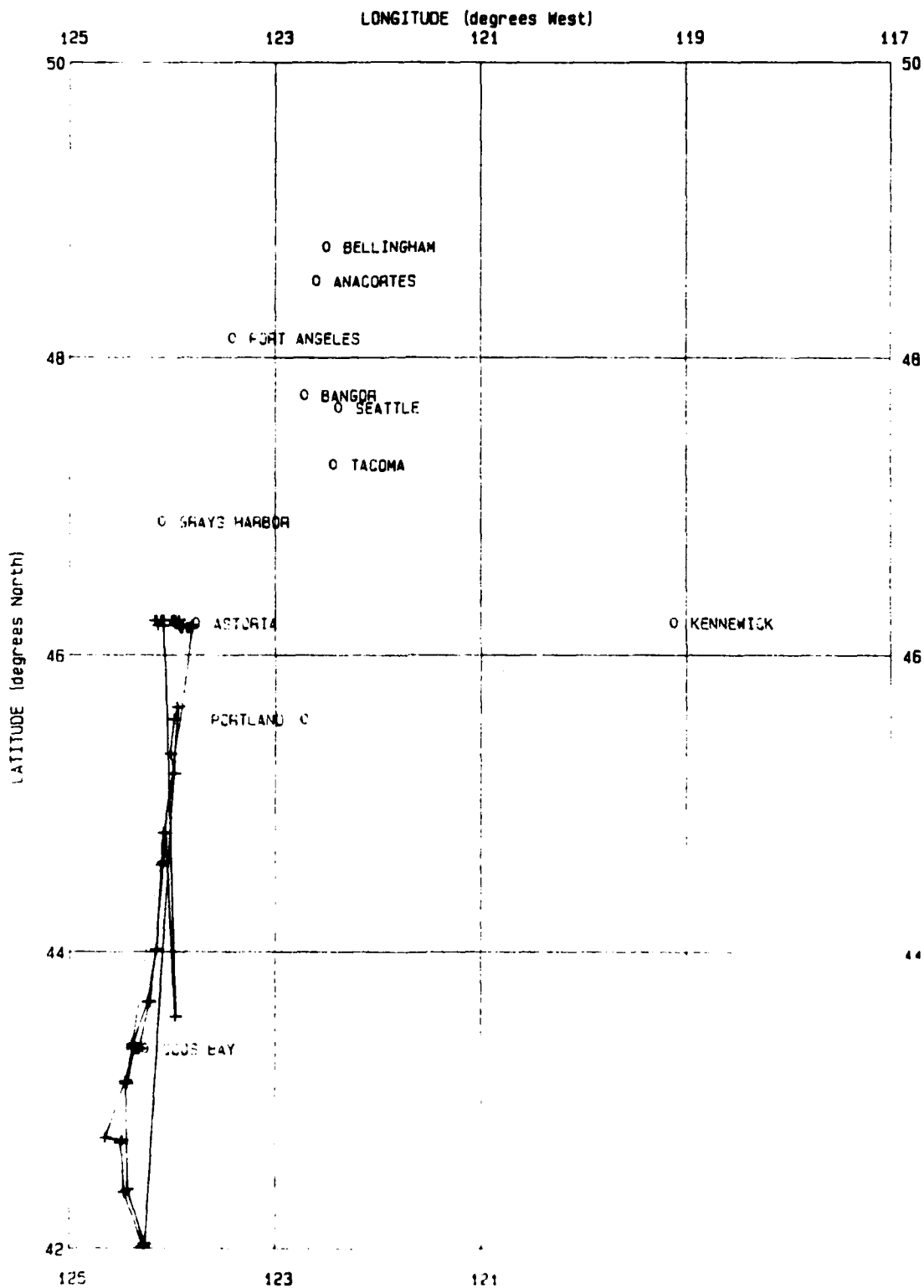
DISTRICT 13 RUN1-1 BIG-1

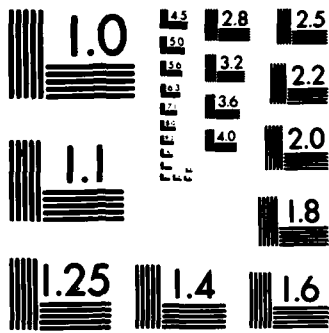
177 OF 177 AIDS SHOWN



DISTRICT 13 RUN2-2 BIG-2

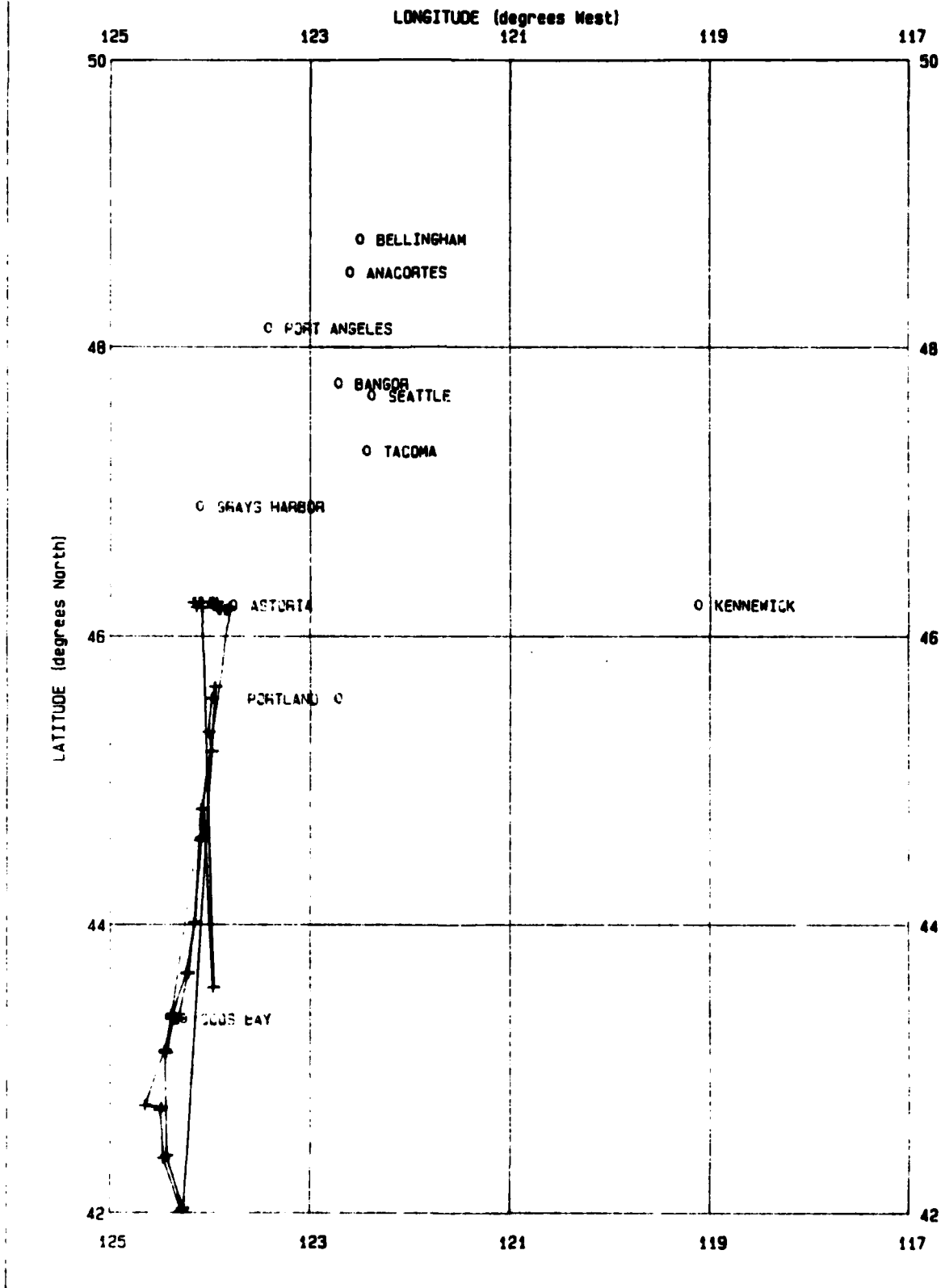
56 OF 56 AIDS SHOWN





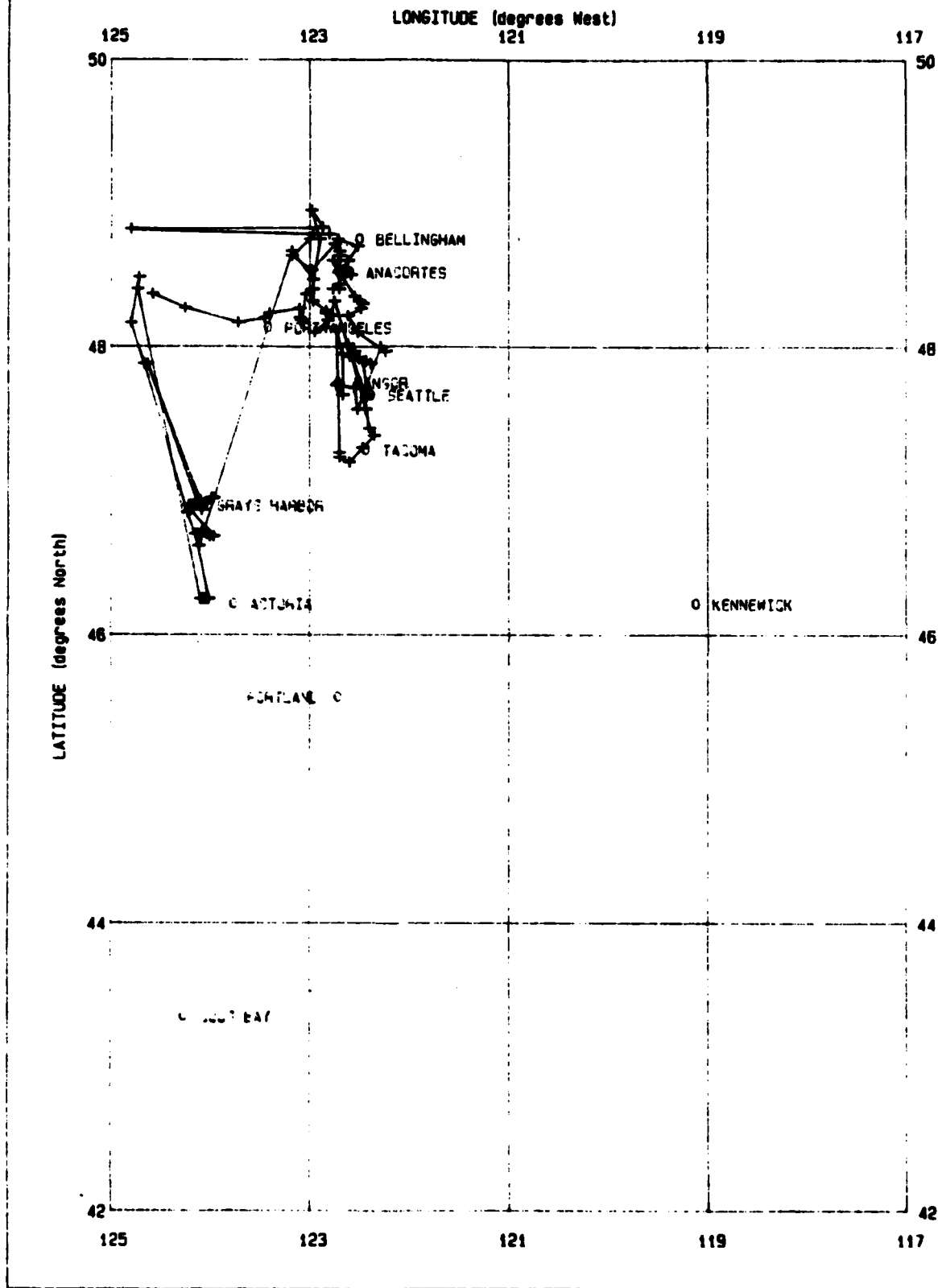
MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

DISTRICT 13 RUN2-2 BIG-2
56 OF 56 AIDS SHOWN



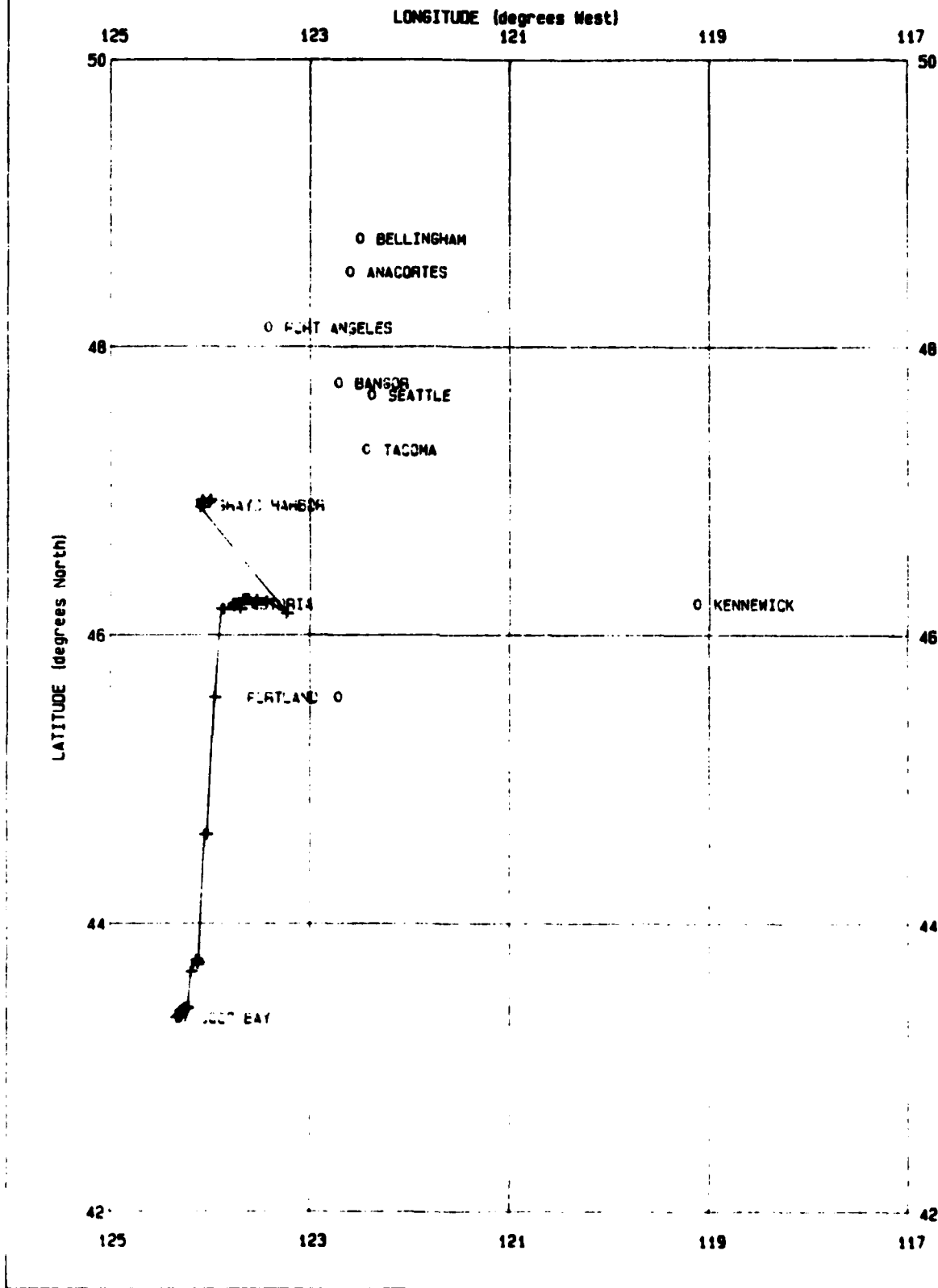
DISTRICT 13 RUN2-2 BIG-3

121 OF 121 AIDS SHOWN



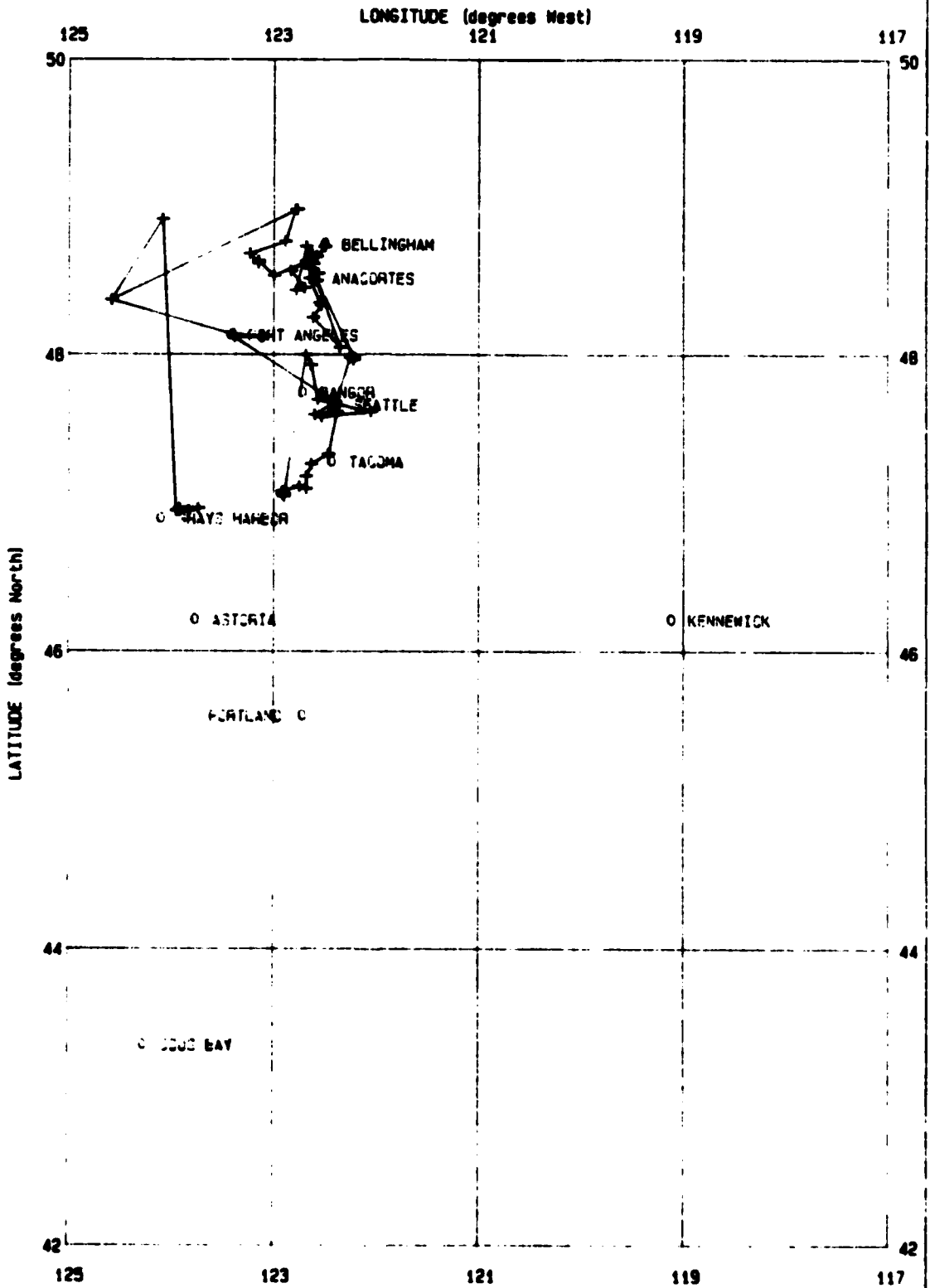
DISTRICT 13 RUN2-2 SMALL-2

47 OF 47 AIDS SHOWN

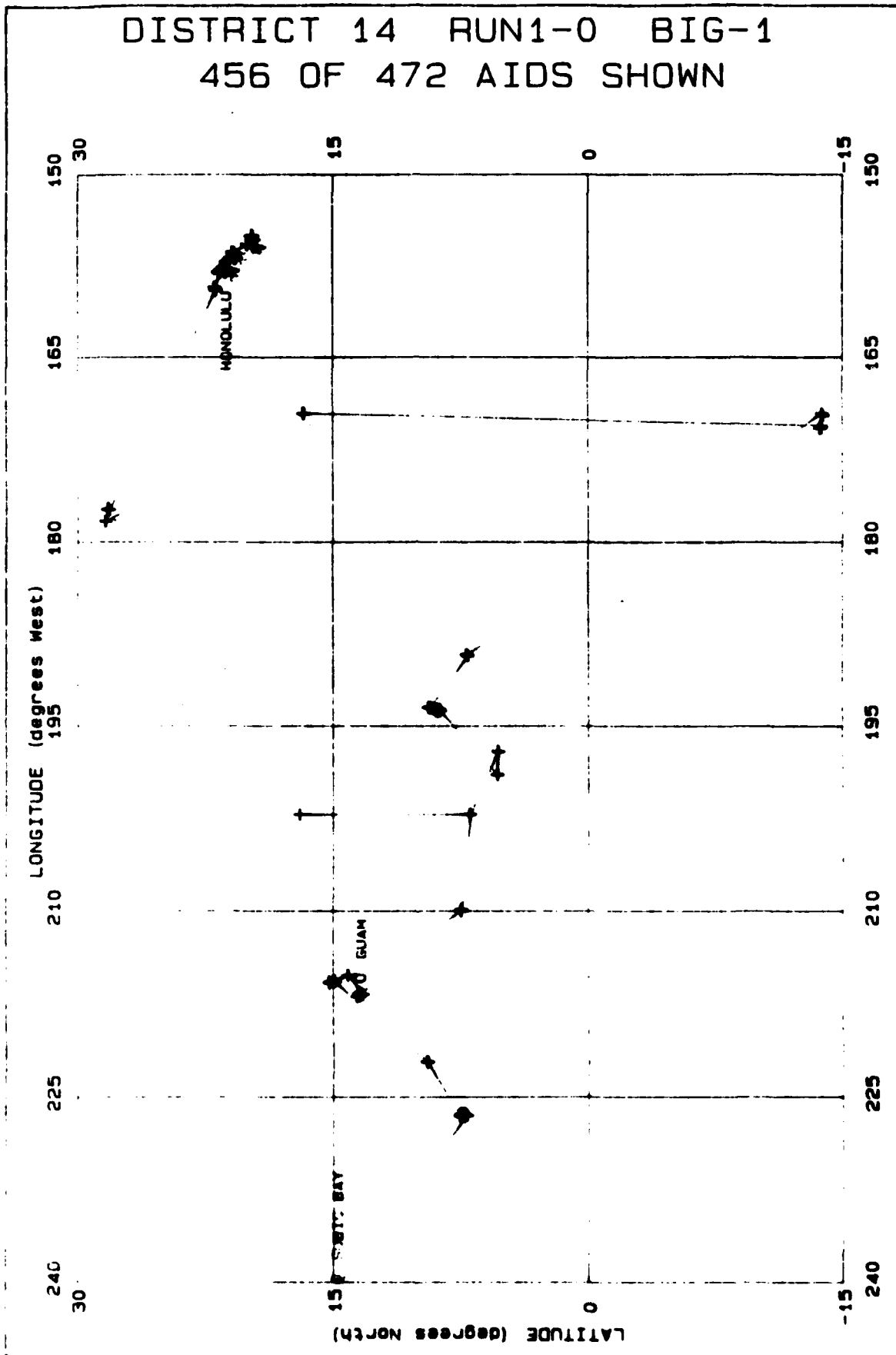


DISTRICT 13 RUN2-2 SMALL-3

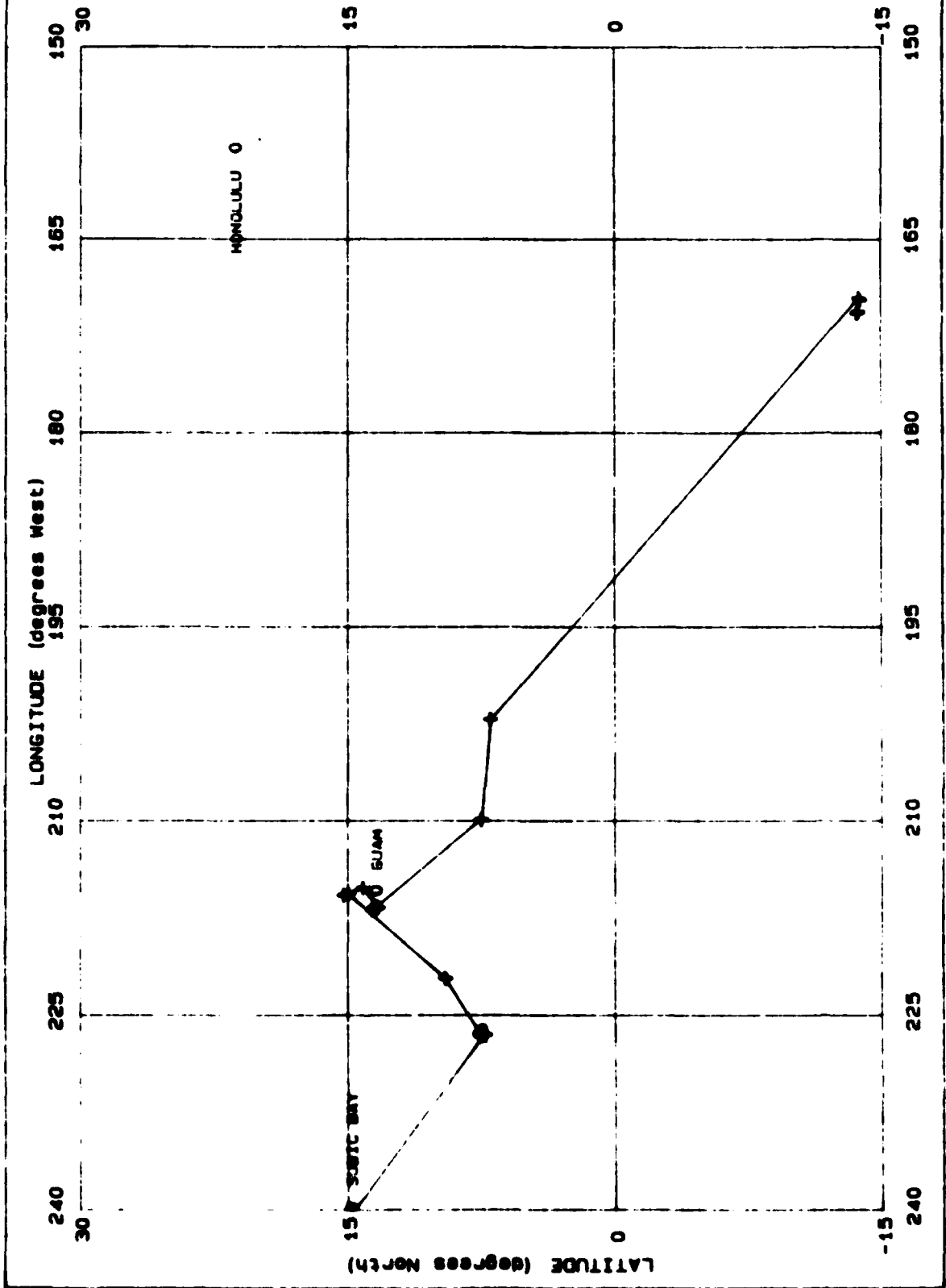
68 OF 68 AIDS SHOWN



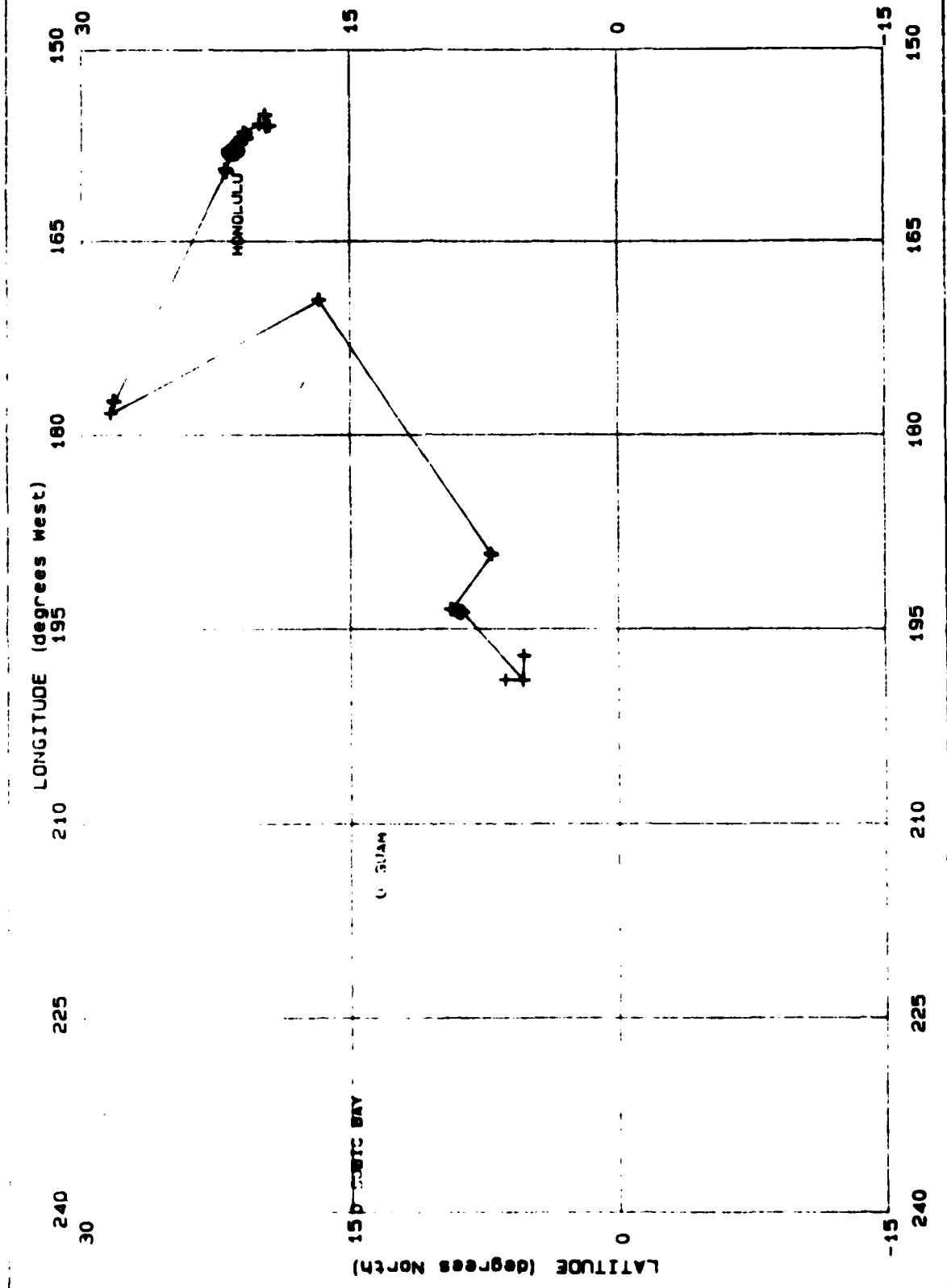
DISTRICT 14 RUN1-0 BIG-1
 456 OF 472 AIDS SHOWN



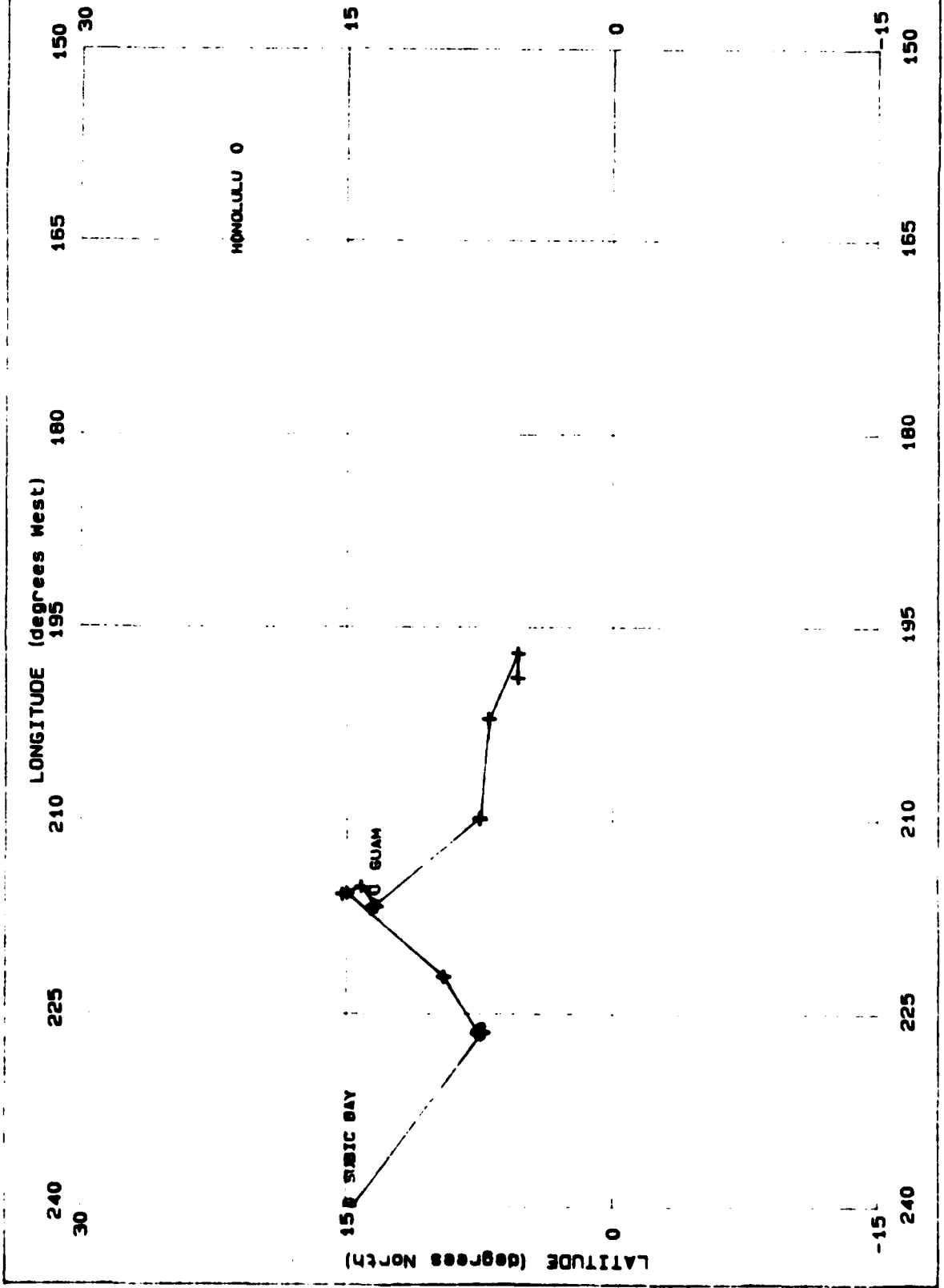
DISTRICT 14 RUN2A-0 BIG-1
 176 OF 192 AIDS SHOWN



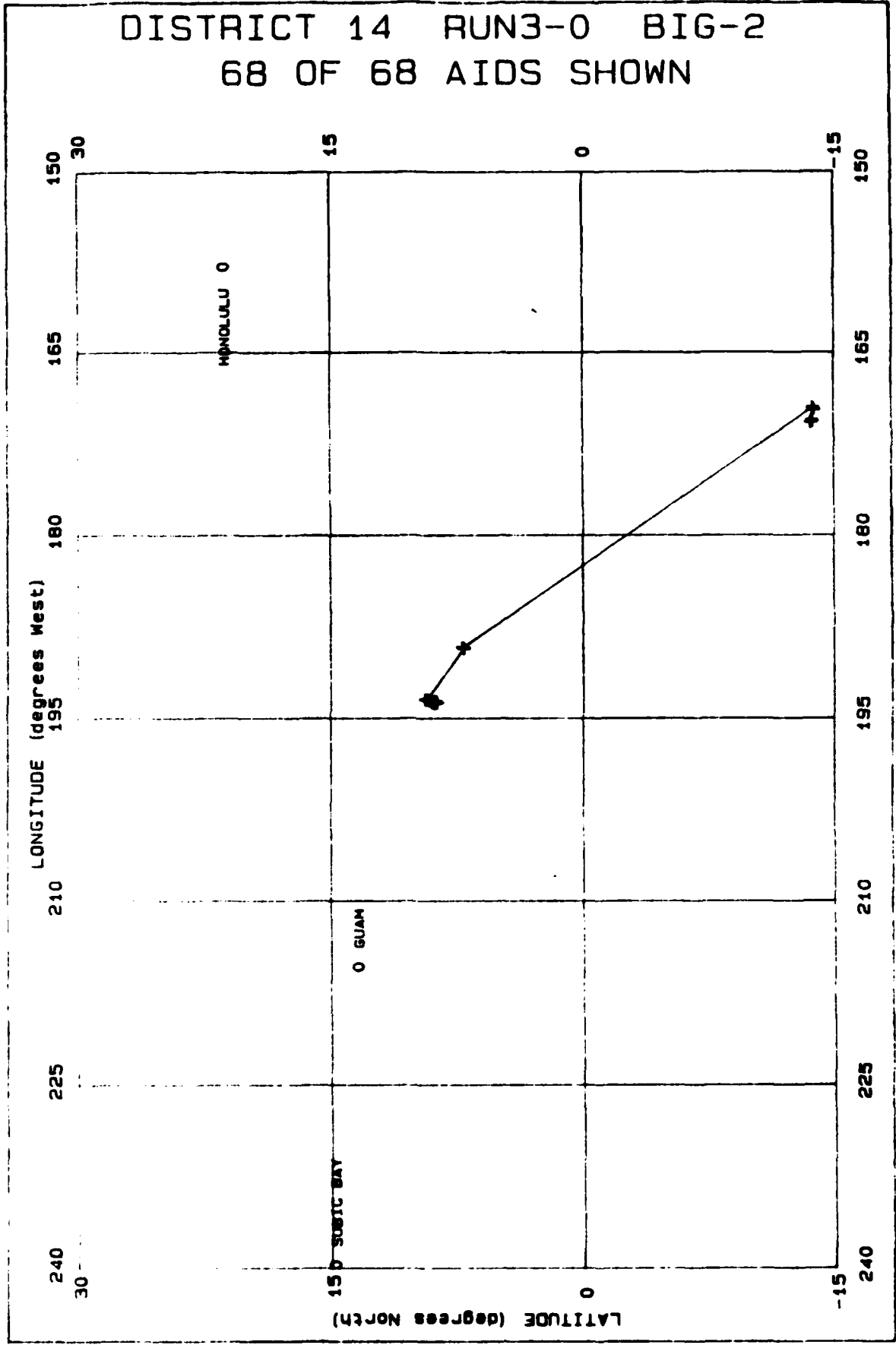
DISTRICT 14 RUN2A-0 BIG-2
 280 OF 280 AIDS SHOWN



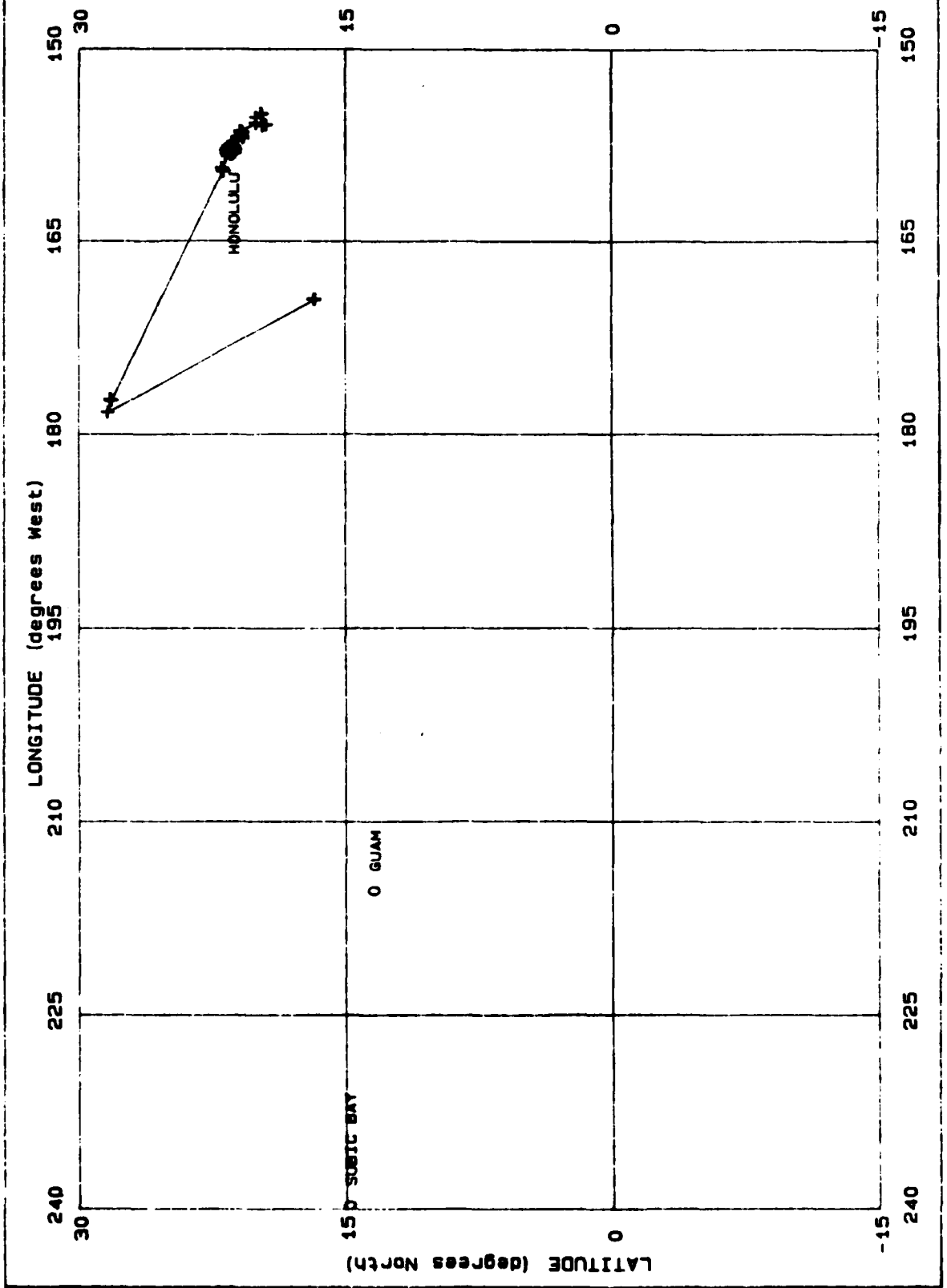
DISTRICT 14 RUN3-0 BIG-1
 170 OF 186 AIDS SHOWN



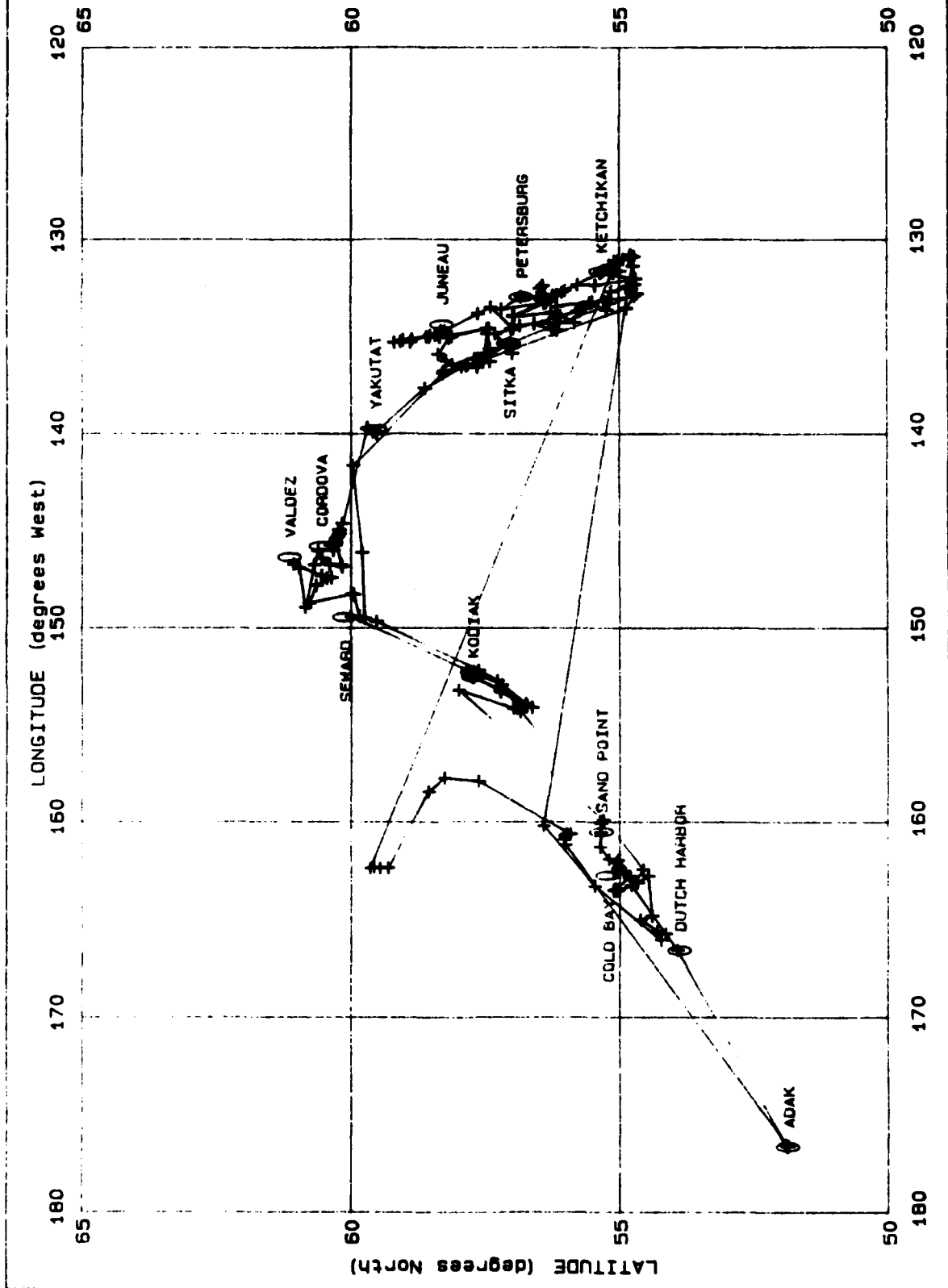
DISTRICT 14 RUN3-0 BIG-2
68 OF 68 AIDS SHOWN



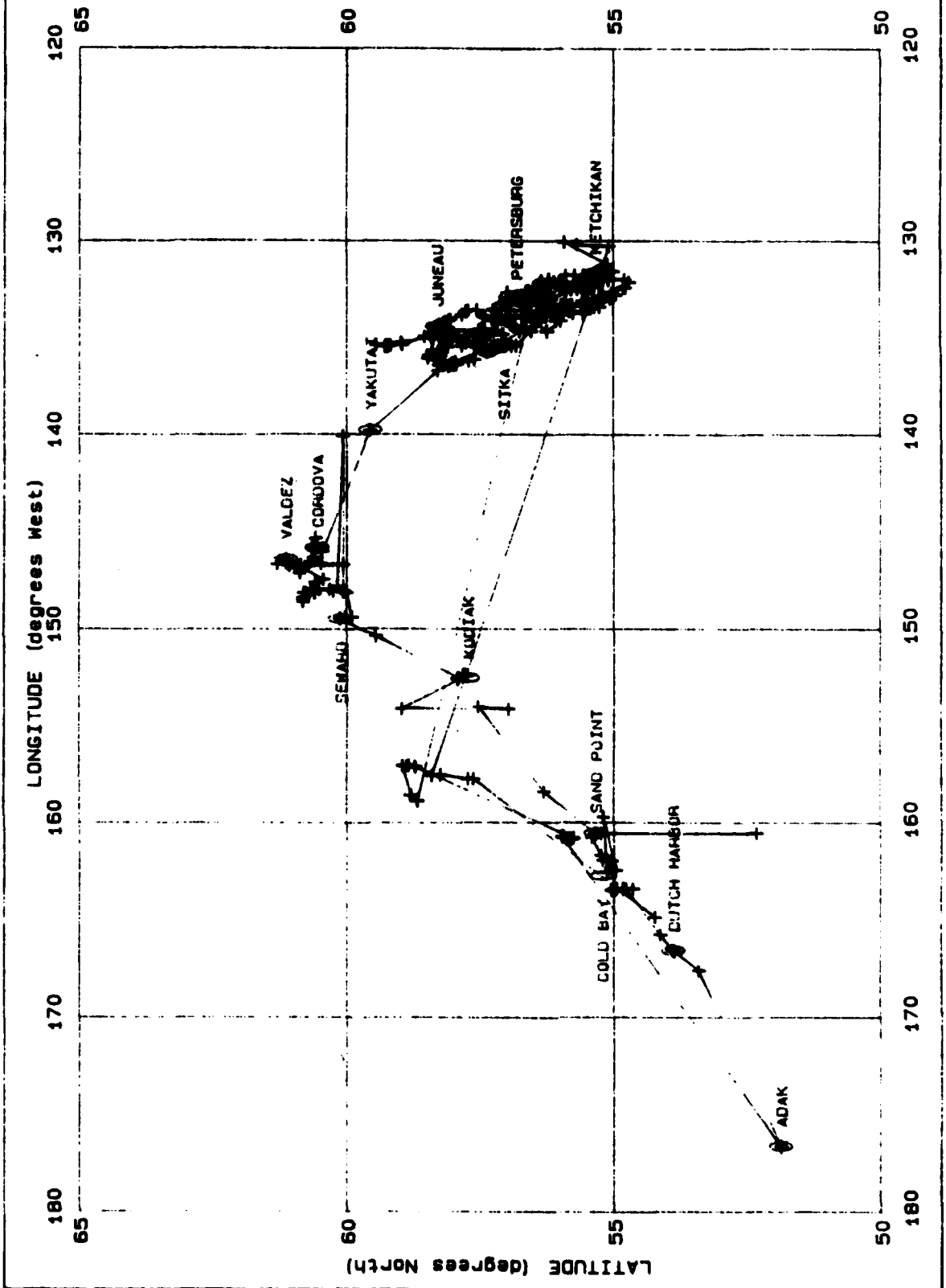
DISTRICT 14 RUN3-0 BIG-3
218 OF 218 AIDS SHOWN



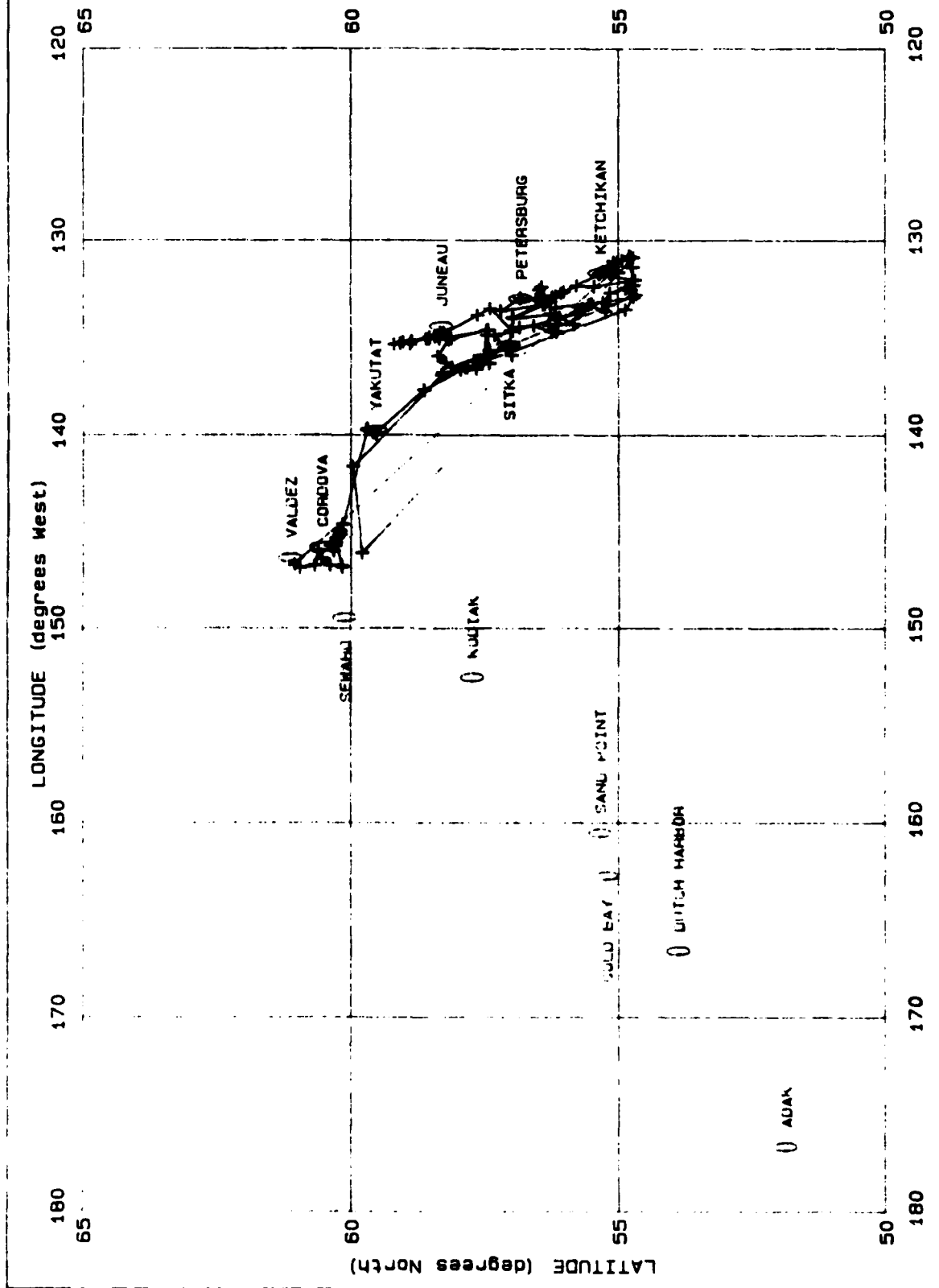
DISTRICT 17 RUN1-1 BIG-1
283 OF 283 AIDS SHOWN



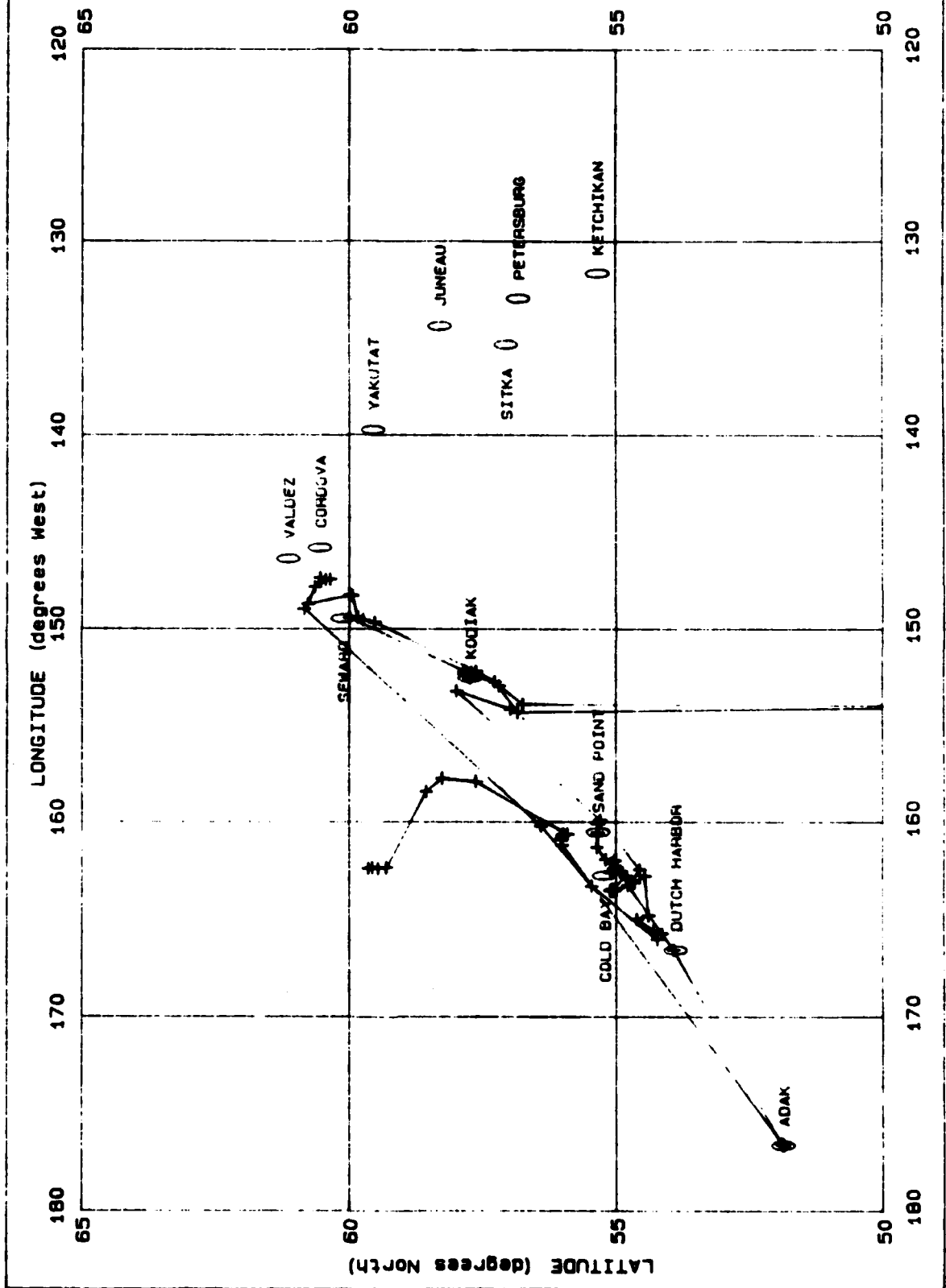
DISTRICT 17 RUN1-1 SMALL-1
710 OF 710 AIDS SHOWN



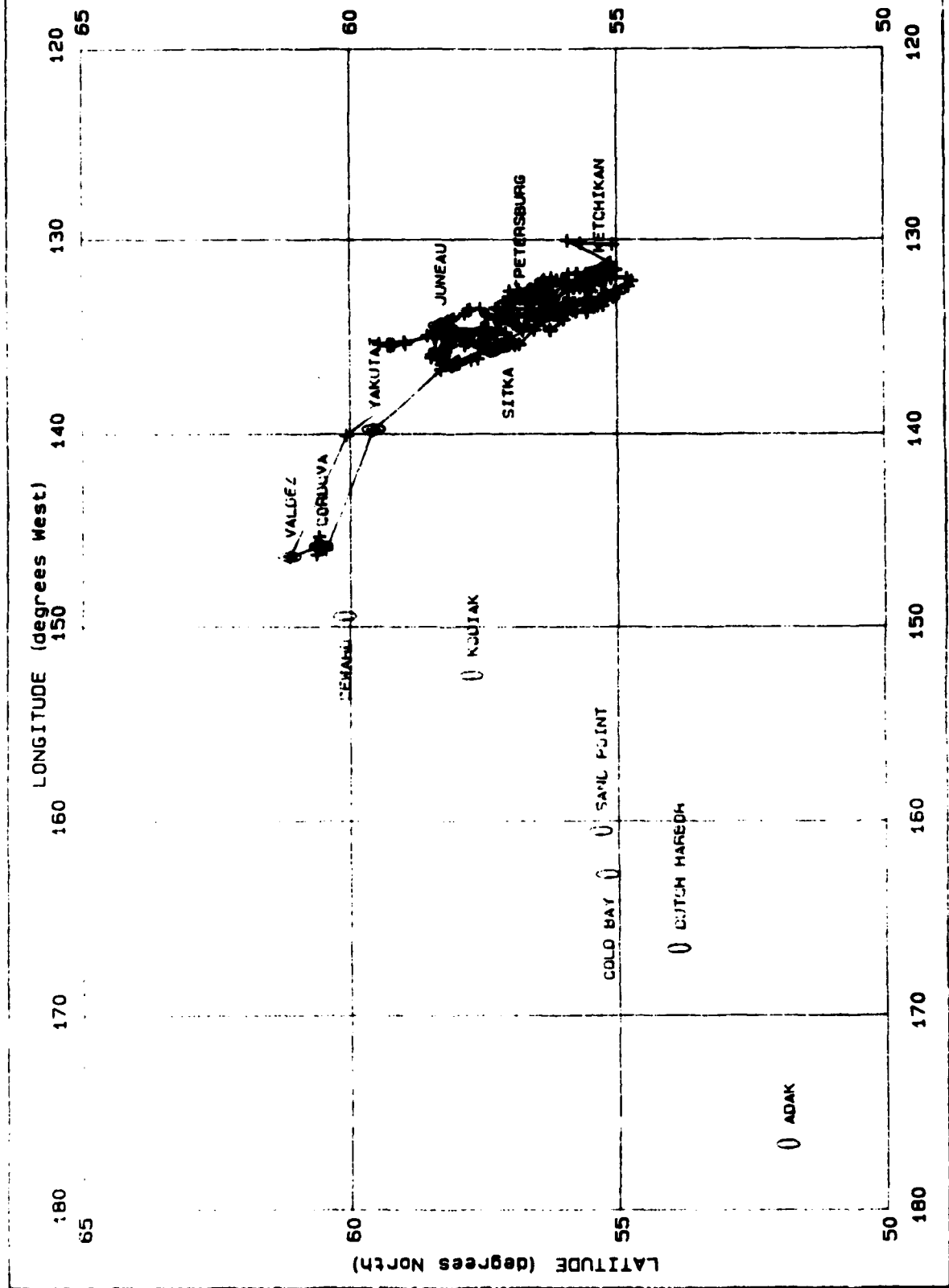
DISTRICT 17 RUN2-2 BIG-2
 154 OF 154 AIDS SHOWN



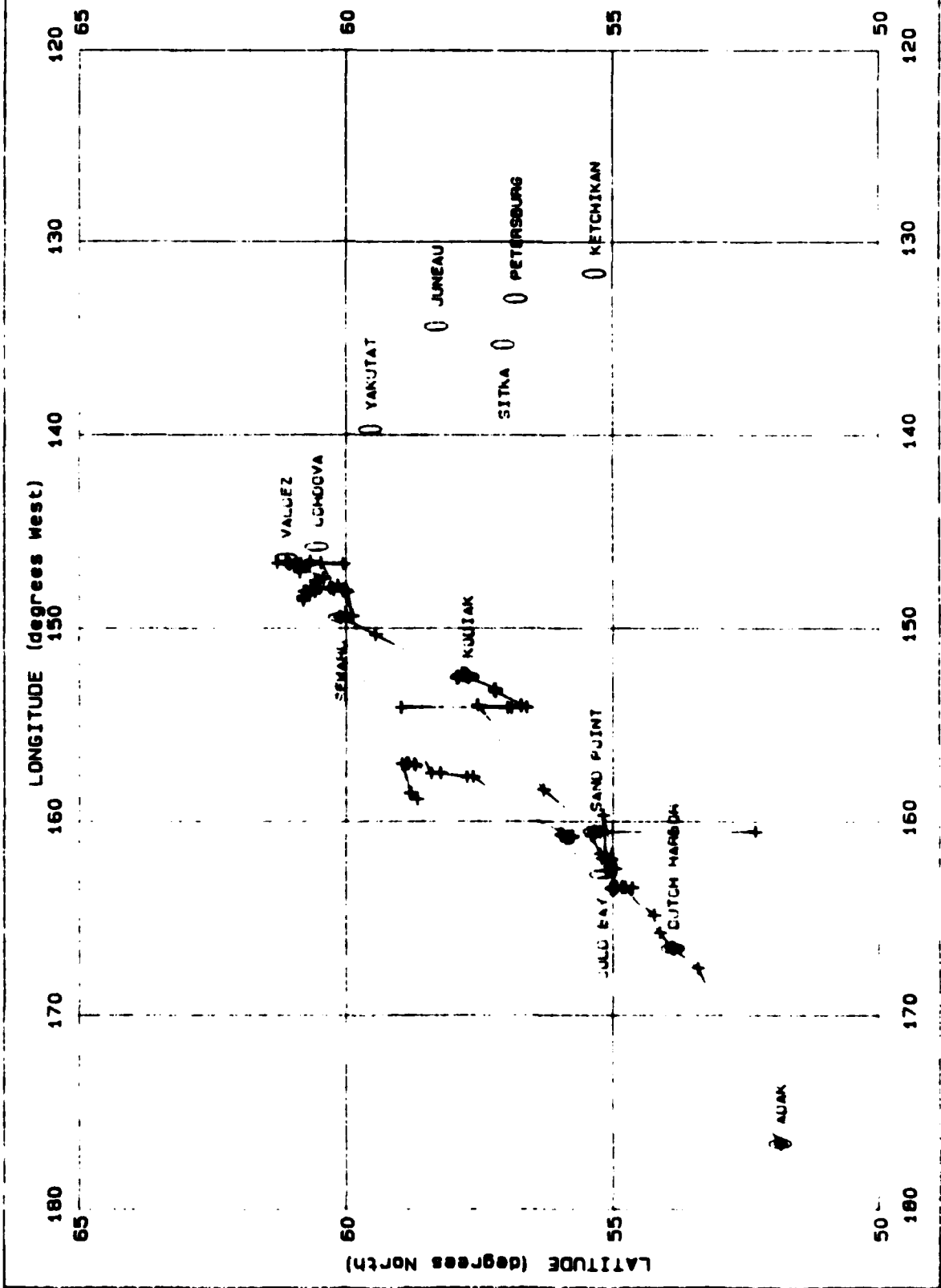
DISTRICT 17 RUN2-2 BIG-3
 100 OF 101 AIDS SHOWN



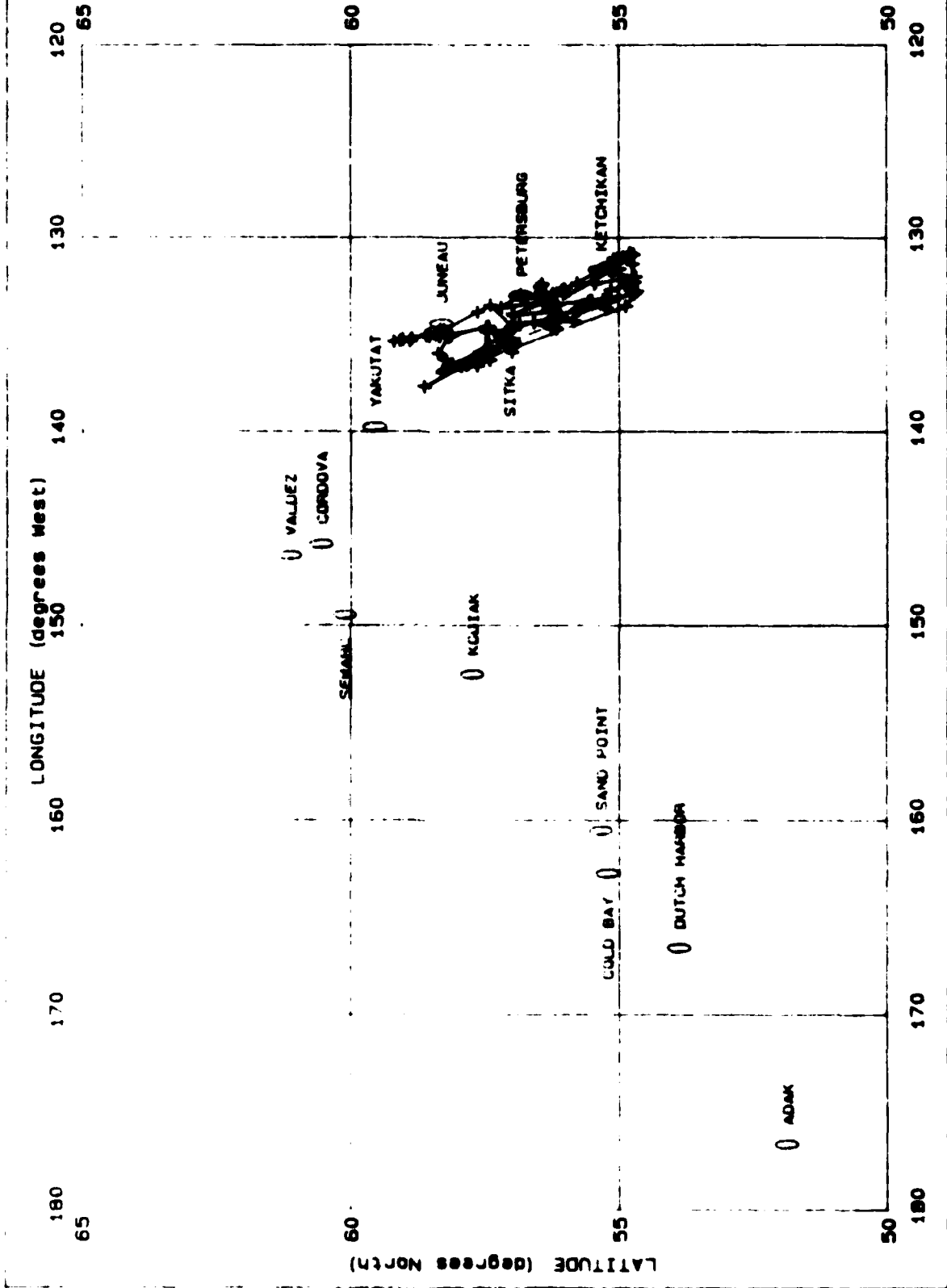
DISTRICT 17 RUN2-2 SMALL-2
559 OF 559 AIDS SHOWN



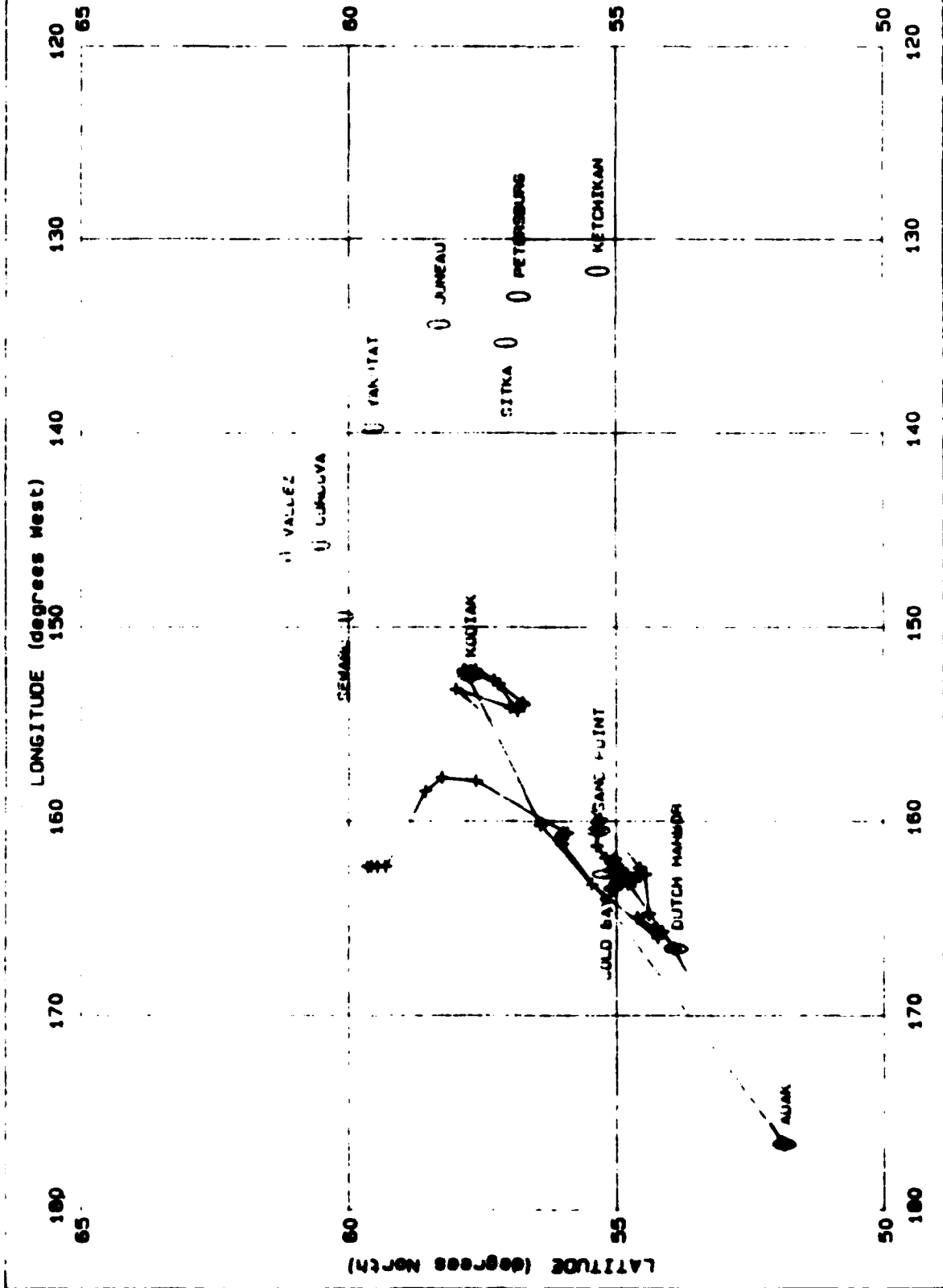
DISTRICT 17 RUN2-2 SMALL-3
 178 OF 178 AIDS SHOWN



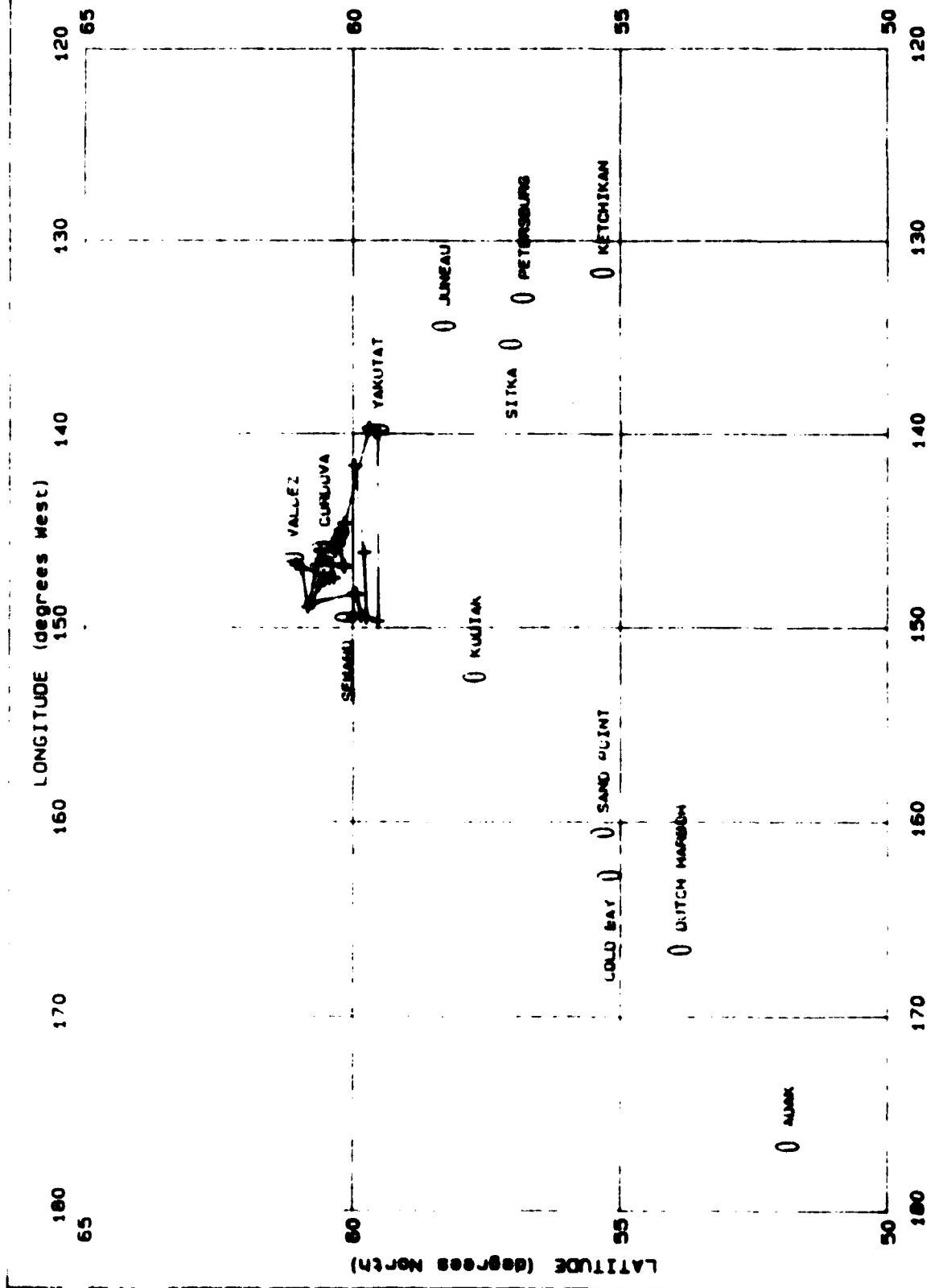
DISTRICT 17 RUN3-3 BIG-2
128 OF 128 AIDS SHOWN



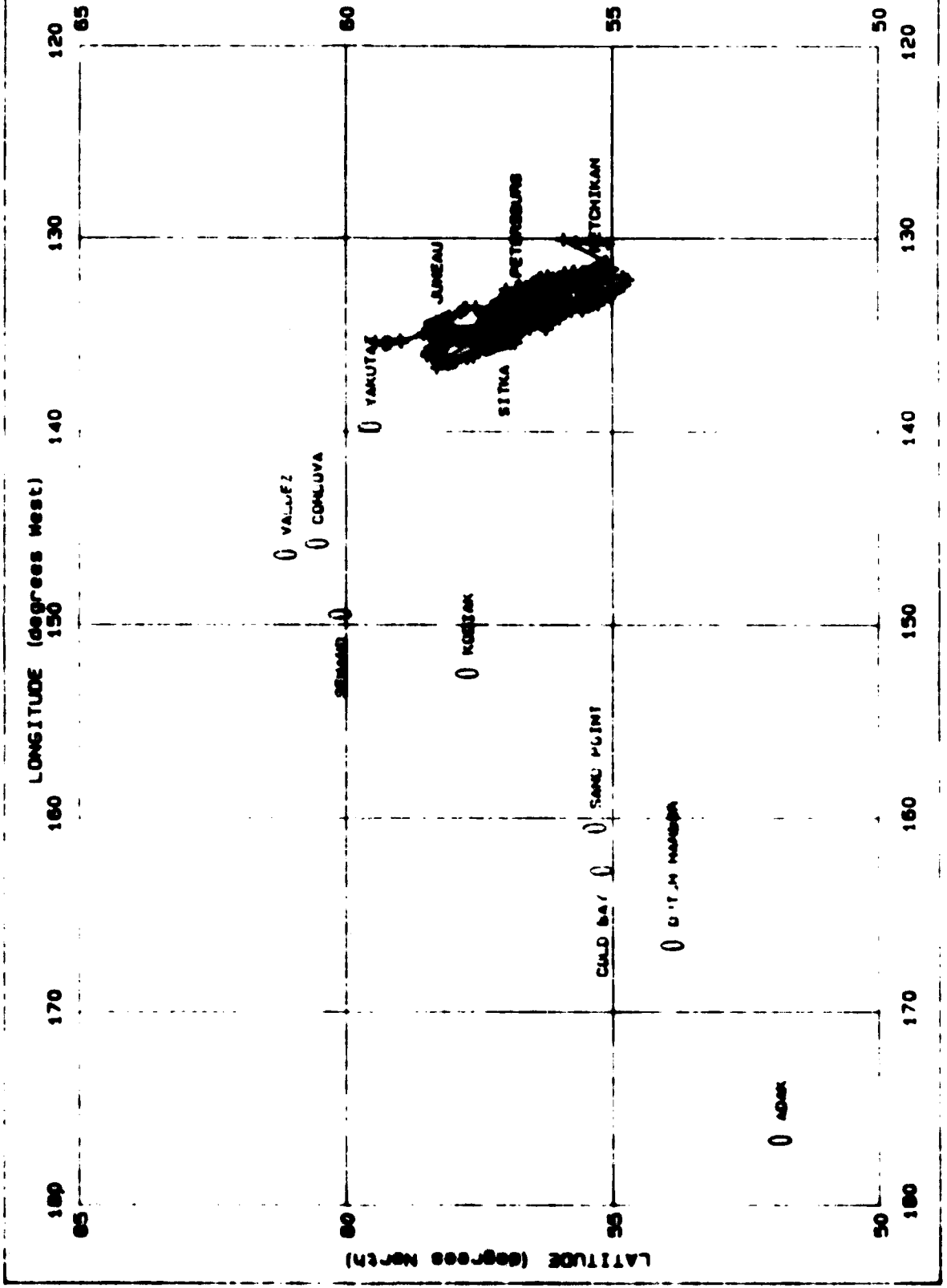
DISTRICT 17 RUN3-3 BIG-3
89 OF 89 AIDS SHOWN



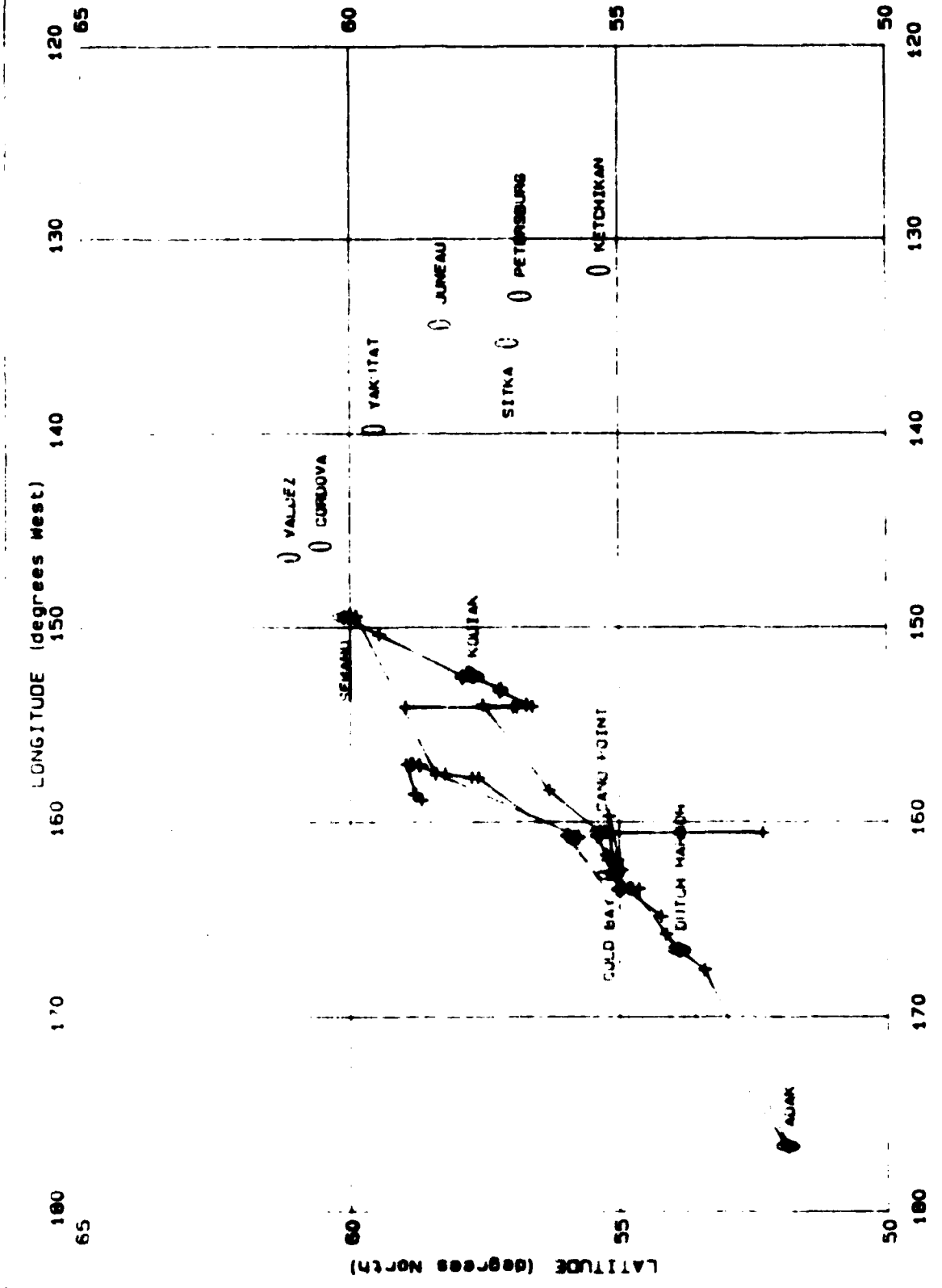
DISTRICT 17 RUN3-3 BIG-4
 38 OF 38 AIDS SHOWN



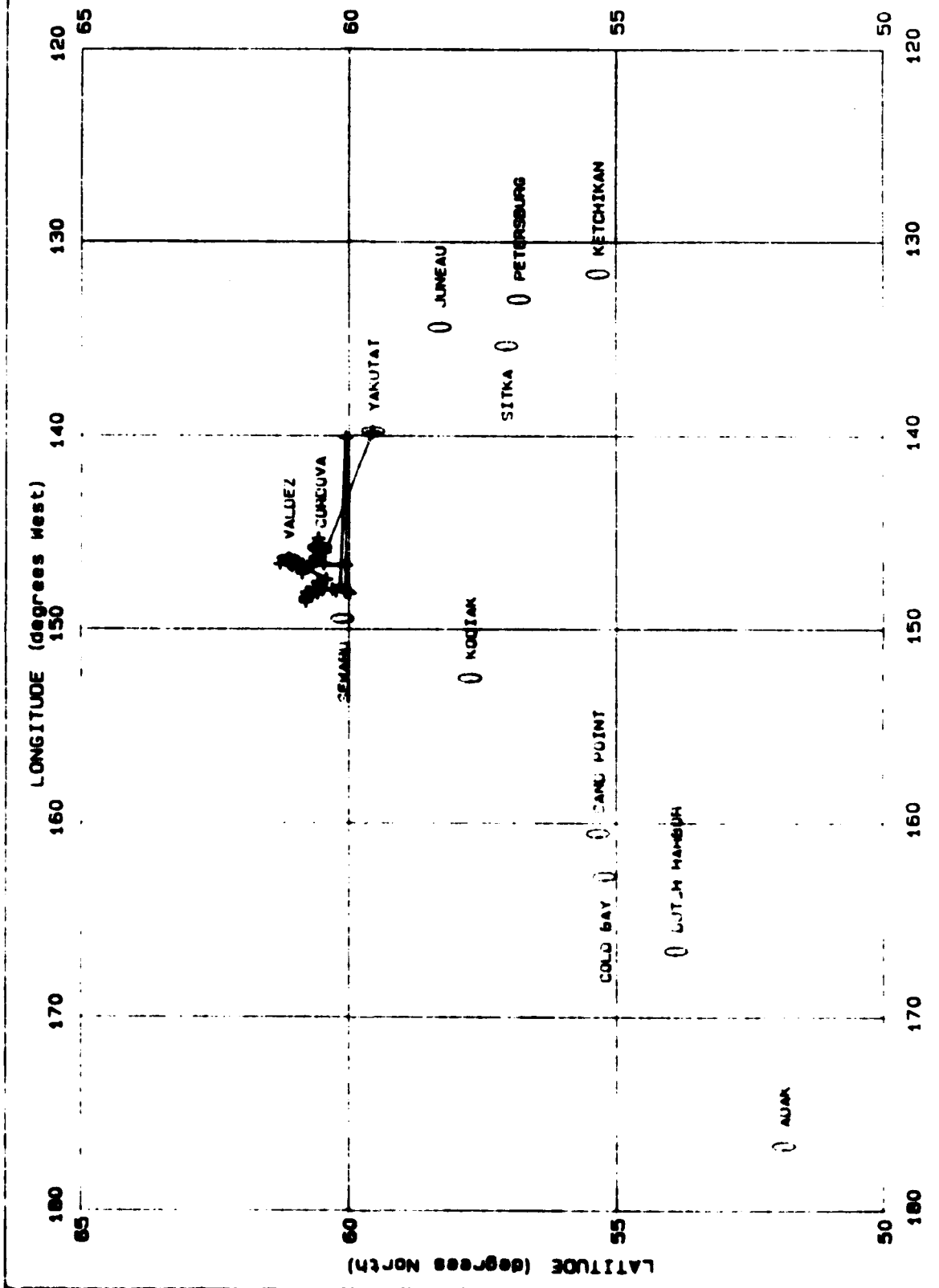
DISTRICT 17 RUN3-3 SMALL-2
537 OF 537 AIDS SHOWN



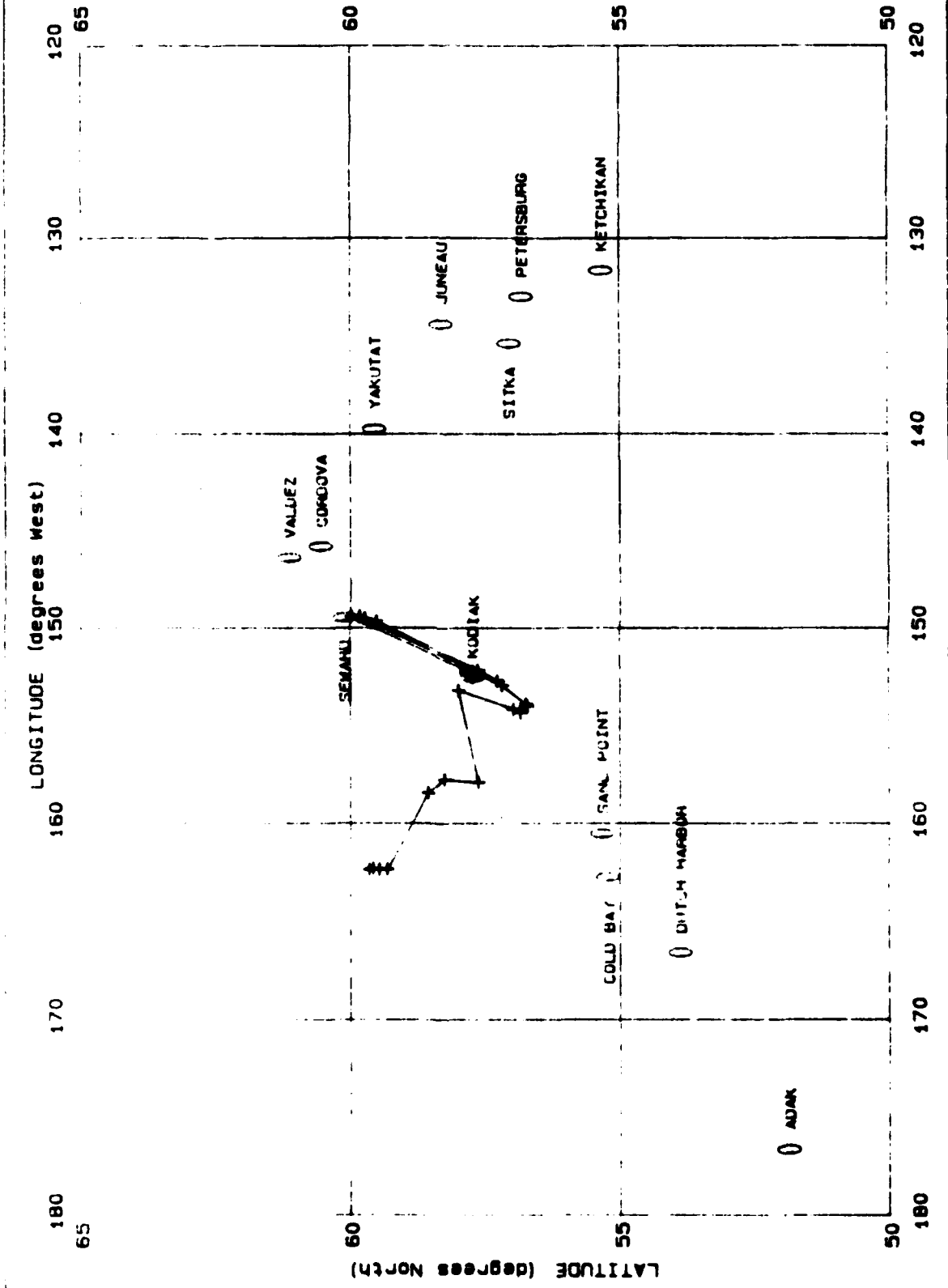
DISTRICT 17 RUN3-3 SMALL-3
 141 OF 141 AIDS SHOWN



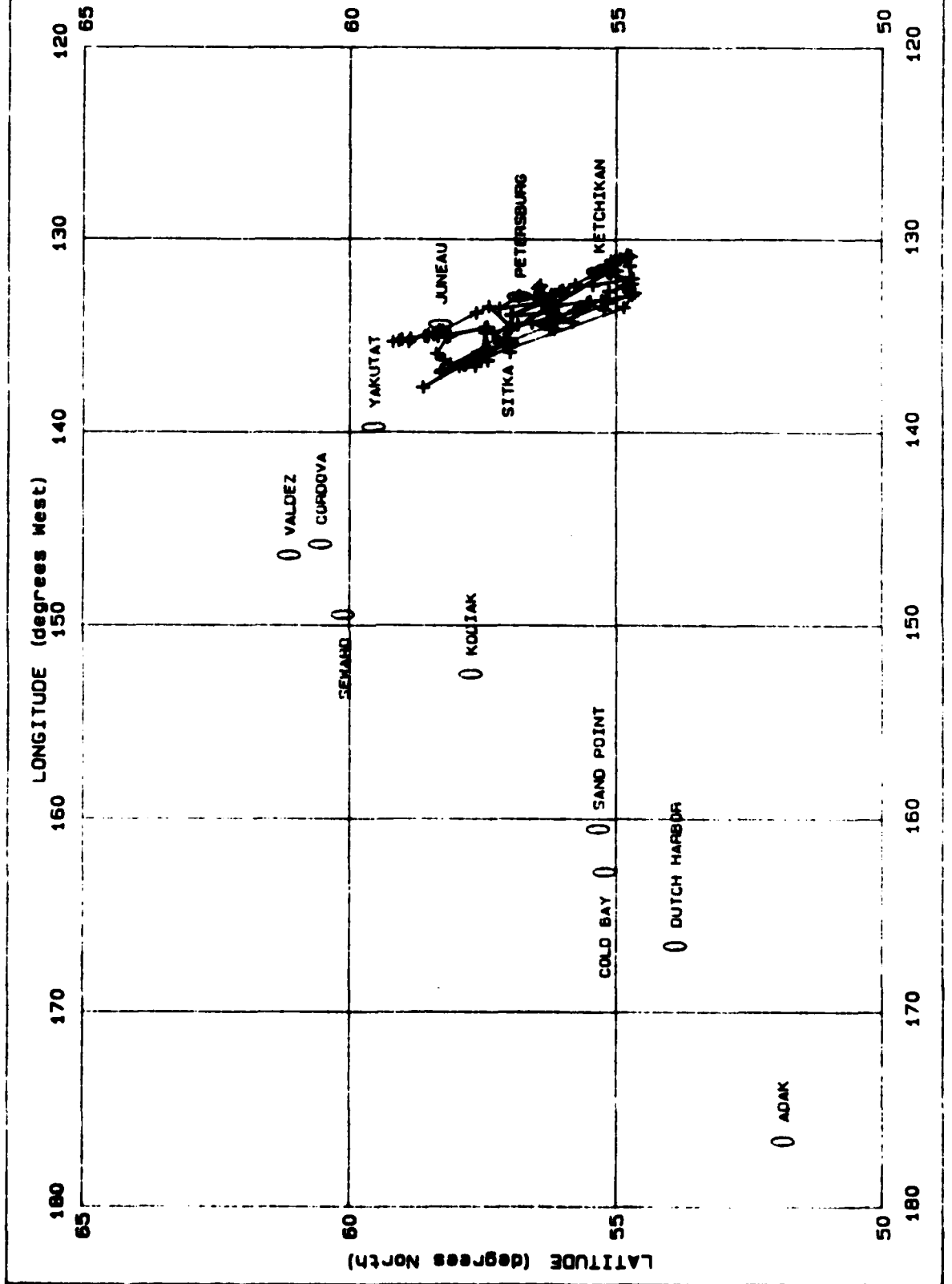
DISTRICT 17 RUN3-3 SMALL-4
59 OF 59 AIDS SHOWN



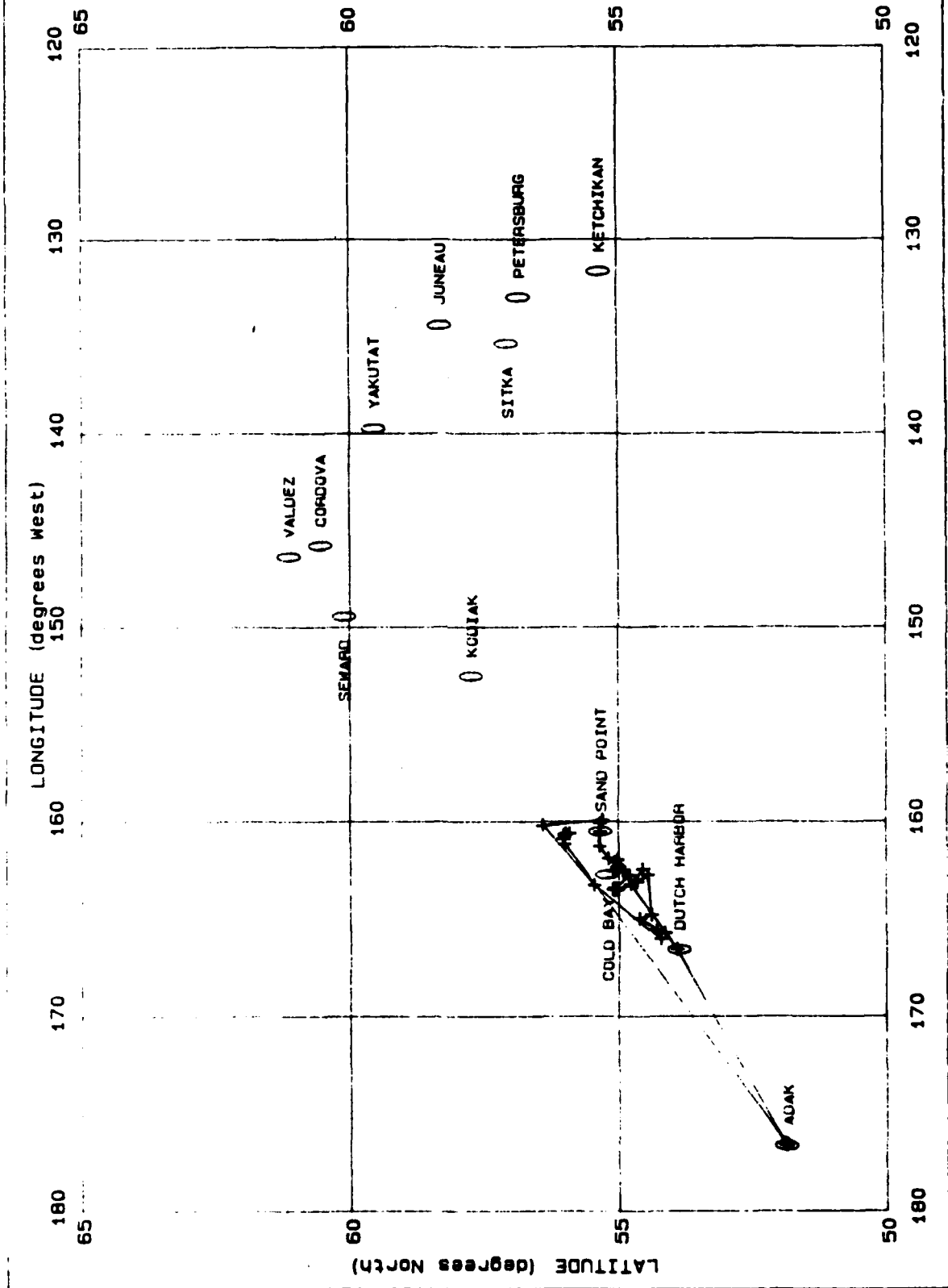
DISTRICT 17 RUN4-4A BIG-1
 43 OF 43 AIDS SHOWN



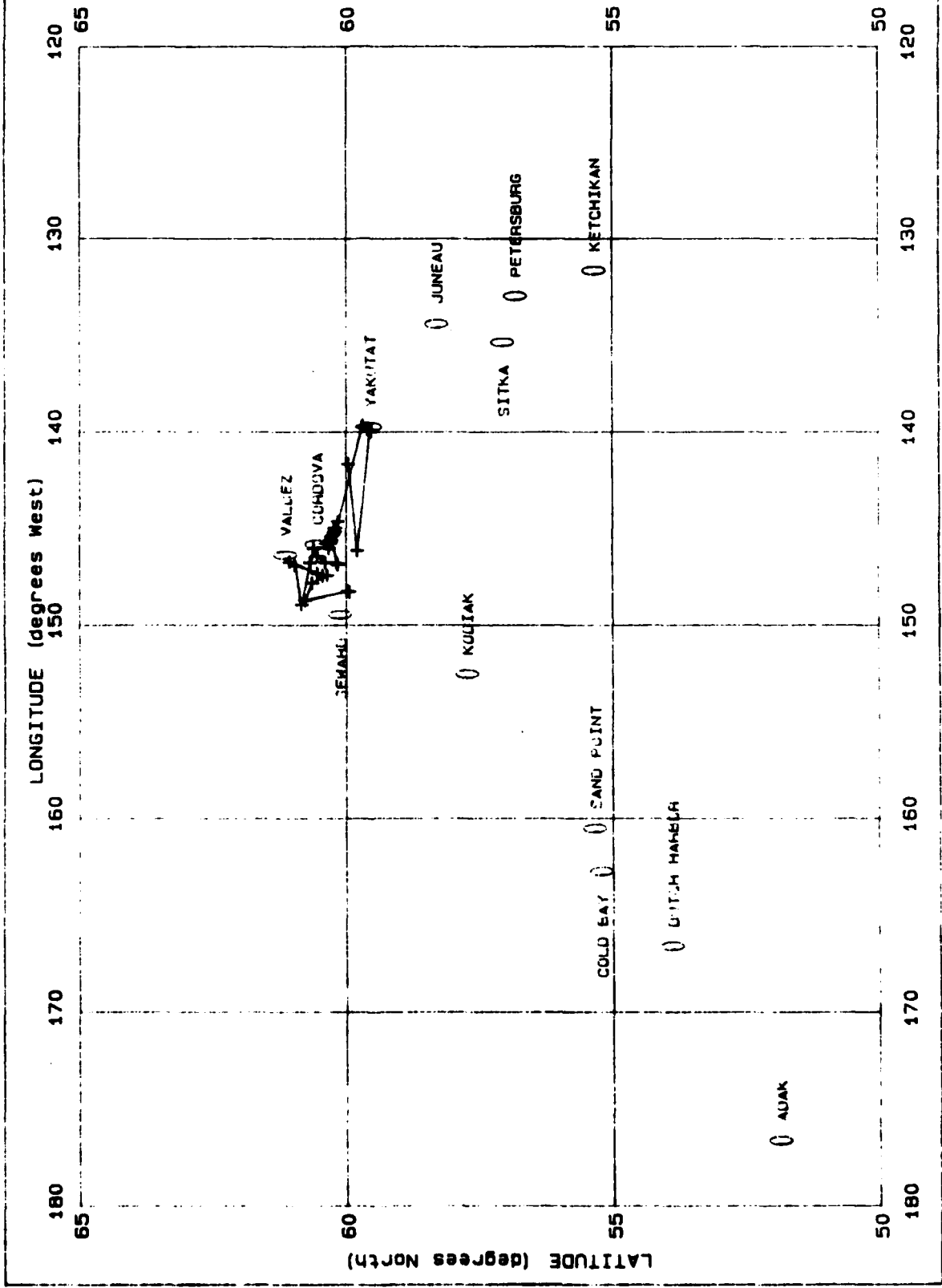
DISTRICT 17 RUN4-4A BIG-2
128 OF 128 AIDS SHOWN



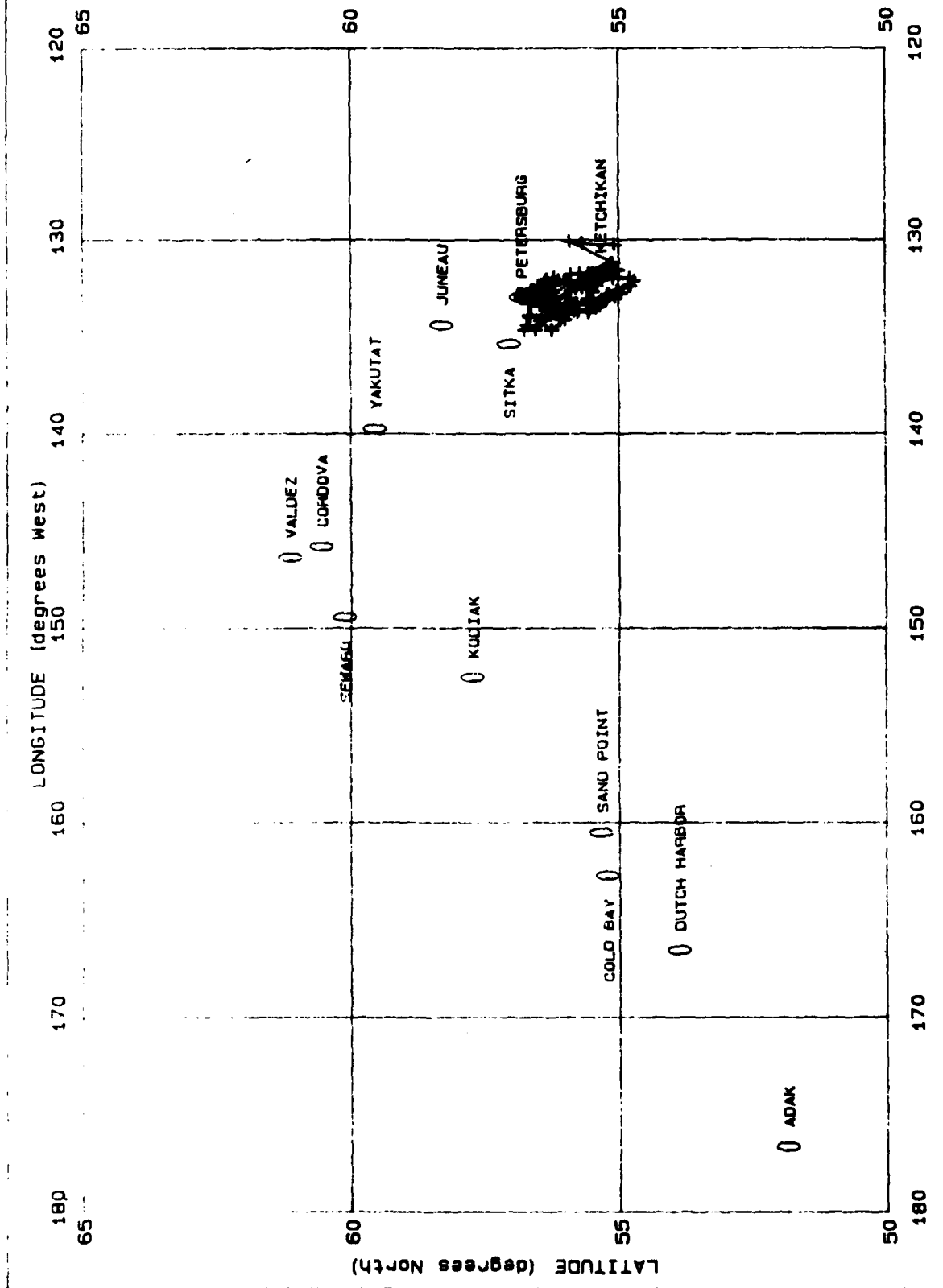
DISTRICT 17 RUN4-4A BIG-3
50 OF 50 AIDS SHOWN



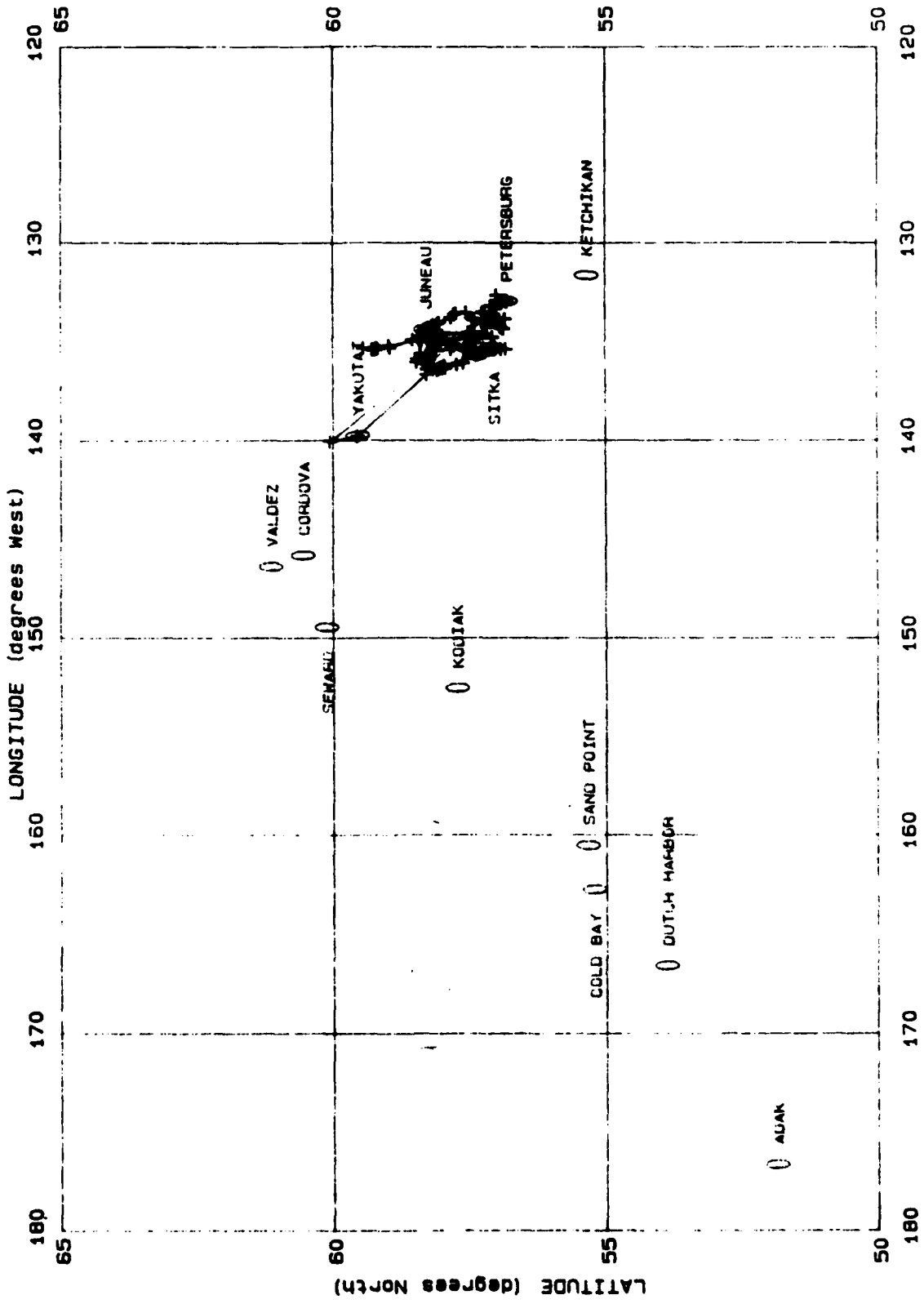
DISTRICT 17 RUN4-4A BIG-4
 34 OF 34 AIDS SHOWN



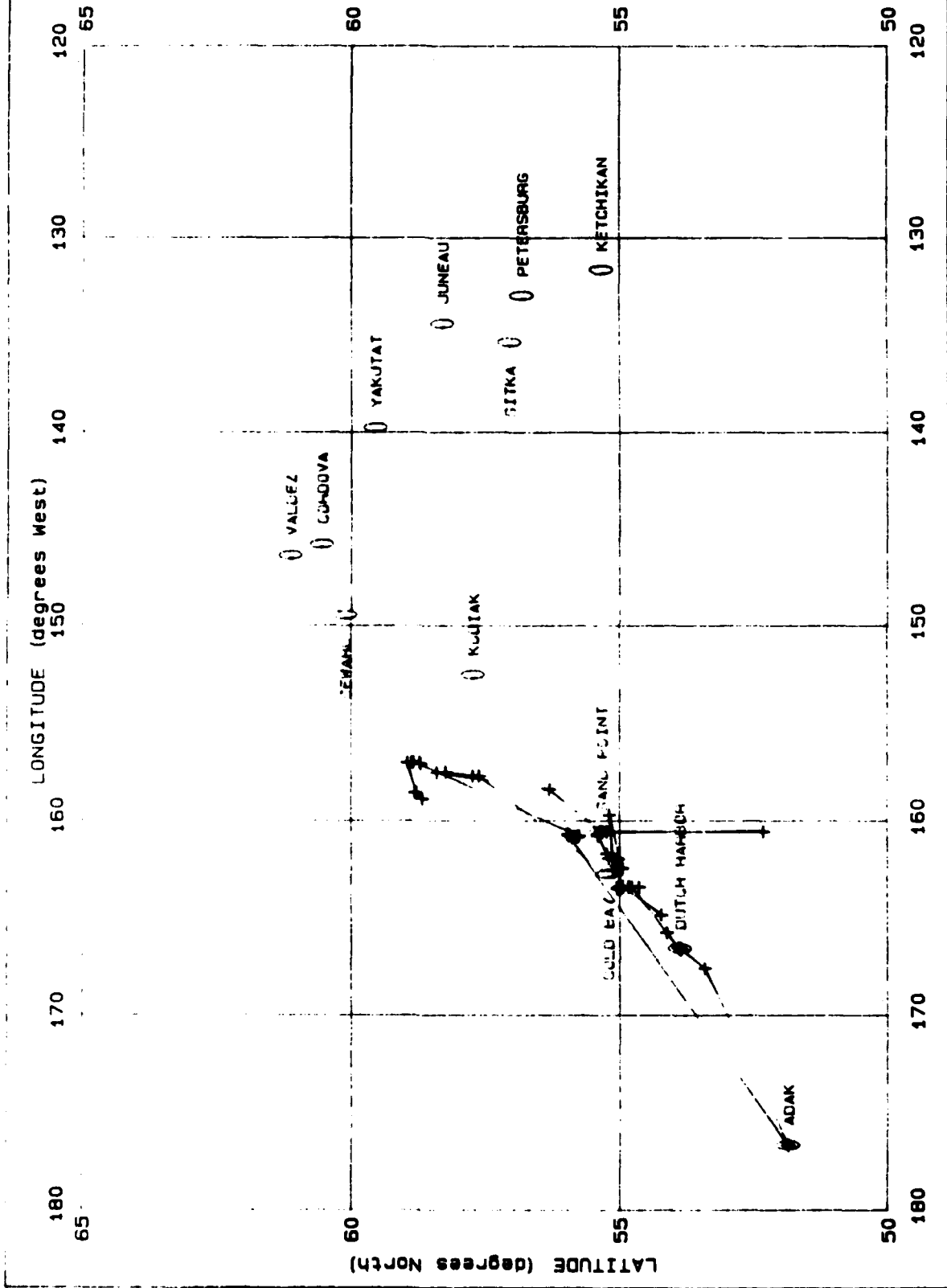
DISTRICT 17 RUN4-4A SMALL-1
312 OF 312 AIDS SHOWN



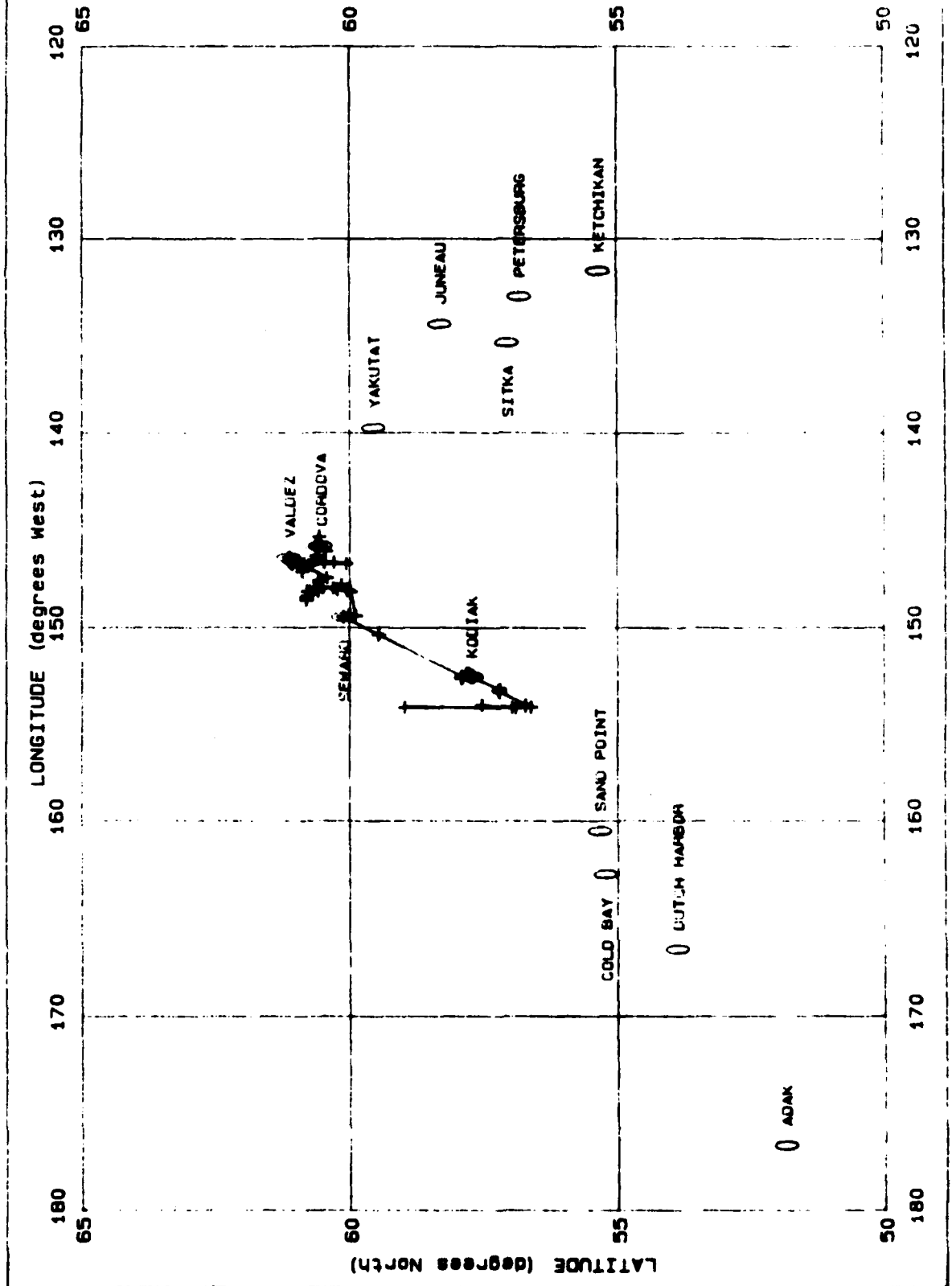
DISTRICT 17 RUN4-4A SMALL-2
228 OF 228 AIDS SHOWN



DISTRICT 17 RUN4-4A SMALL-3
 84 OF 84 AIDS SHOWN



DISTRICT 17 RUN4-4A SMALL-4
113 OF 113 AIDS SHOWN



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