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A COMPREHENSIVE REVIEW OF THE IMPROVED LAKEFILL QUALITY CONTROL PROGRAM FOR 1990

contains recycled material

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A/ History of the Improved Lakefill Quality Control Program

In 1982, the Ontario Ministry of the Environment(MOE) initiated the Lakefill Quality Assurance Program(LQAP) in order to control the quality of lakefill generated in specific areas of the City of Toronto. The program designated the area bounded by Queen St. to the north, Roncesvalles Ave. to the west and Leslie St. to the east as the Designated Control Area(DCA). All fill within this area had to be chemically tested in order to determine it's suitability as lakefill. This particular geographic region was singled out because of its close proximity to the Leslie St. Spit; its largely industrial makeup and its high fill content. It was hoped that since a large percentage of the lakefill material taken to the Leslie St. Spit was generated in this area, the general quality of the lakefill material would improve. The formation of additional Designated Control Areas was also proposed for the LQAP however, the program was replaced by the present procedures before these areas could be identified.

Particular concerns with the LQAP were :

i) A significant percentage of material deposited as lakefill was generated in areas outside of the DCA.

ii) Because the program did not employ a "weigh bill" system, it was impossible for the lakefill site operators to identify the origin of trucks carrying fill material to the lake.

In 1987, The MOE commissioned a study of the soil quality on the Leslie St. Spit and determined that the material deposited since the inception of the LQAP largely exceeded various parameters on the MOE's Open Water Disposal Guidelines. For this reason the LQAP was replaced with the Improved Lakefill Quality Control Program(ILQCP) on January 1, 1989.

B/ Achievements 1990

1) Improvements made to the program in 1990 :

The year saw many changes to the working procedures of the ILQCP;

a) The Small Site Group B category of application was eliminated. This category had allowed for applicants with less than 50 cubic metres or approximately 5 truckloads of potential lakefill material to apply to The Authority, and receive their Bills of Lading immediately without a site inspection, providing that the material appeared clean and that the load was originating from an area which was not expected to contain contaminated soils. This change was approved by the full Authority board in time for the commencement of the peak dumping season in April, 1990.

This change was made as it became apparent to the lakefill staff that the Small Site Group B category was not working. The applicants were almost always the contractors or haulers themselves and not the excavation site owners as required by the ILQCP manual. The haulers would often apply for dump tickets at two or more excavation sites and thus receive more than the maximum number of bills allowed without an inspection. Often the haulers would apply for 5 Bills of Lading for one address and attempt to use those Bills to haul in material from other addresses. Consequently, although Small Sites provided just 16 percent of the total lakefill material in 1989, the ILQCP inspectors were spending more than 50 percent of their time policing such sites. Therefore the staff recommended eliminating the Small Site Group B category and requiring a pre-approval site inspection for all Small Sites(under 200 cubic metres or 20 truckloads).

b) Earth fill originating from untested Small Sites was required to be deposited in "confined " areas at the lakefill sites. Previously the material was allowed to be deposited in "protected " areas. This change was also instituted before the commencement of the peak dumping season.

The rationale behind this change was the fact that in 1989, 24% of the Small Site samples subjected to distilled water leachate analysis and compared to the Drinking Water Guidelines were found to exceed those guidelines and hence to be suitable for "confined" disposal and not "protected" disposal. Therefore the Authority recommended disposing of all untested fill material from Small Projects in "confined" areas.

c) The definition of a "confined " disposal area was changed to exclude any disposal in water. As of October, 1990, the definition of confined reads as follows;(see pg. 7 ILQCP Manual)

> "Confined lakefill disposal may be permitted in areas where there is no direct contact with water, if the concentration of chemical constituents in the material exceed the Open Water Guidelines but meet the Restricted Land Use Guidelines, and the results of a Distilled Water Leach Analysis exceed the Drinking Water Guidelines. Confined disposal areas must be above the 100 year flood level(75.7 metres geodetic) and not less than 15 metres from the shoreline ".

2) Statistics :

Table 1 on pages 4 and 5 includes statistics compiled from the Lakefill Quality Information System. The statistics for 1990 are compared to 1989 and explanations are included where there are noticeable and/or important differences between the two years.

TABLE 1 1989 - 1990 COMPARISON

Category volumes in m^3	1989	1990	Explanation
total volume of fill received	1,363,550	1,052,040	A 22.8% decrease in 1990, most of this volume was deposited in the first few months of 1990.
total volume of fill received from large sites	1,145,370	1,032,860	Very comparable numbers over the two years.
total volume of fill received from small sites	218,180	19,180	Large difference due mostly to the stricter small site regulations requiring all small sites to be inspected.
percentage of total which originated from large sites	84.00	98.18	In 1990, the vast majority of fill came from tested large projects..
percentage of total which originated from small sites	16.00	1.82	Again this is reflective of the stricter small site regulations and the economic slowdown.
volume of material rejected	682,490	132,990	Decrease due to significant reduction of "mega projects " applying to the Authori for bills of lading over the two years. Or project in 1989 accounted for 450,000 cubic meters of rejected material.
$\frac{\text{vol. rej.}}{\text{vol. received + vol. rej.}} * 100$	33.3	11.2	This figure represents an approximate percentage of the total volume of fill applied for that was rejected.
volume open water	1,040,790	1,016,760	Comparable numbers.
volume protected	317,640	5 ,730	The large decrease here is due to the change in small site disposal policy from protected to confined in 1990.
volume confined	4,510	29,550	In 1990 confined areas received all of the untested small site material and hence the increase.
total number of large project applicants	189	96	Significantly fewer projects applying for bills in 1990.
total number of bills issued to to large projects	247,622	48,659	The largest number of bills applied for by one project was 8100. There were no other " mega projects " in 1990.
difference between bills received and bills issued (large sites)	-133085	54,627	"-" more bills issued than receive "+" more bills received than issue
number of violations	30	9	Decrease due to the elimination of th 1-5 load category

TABLE 2

1989 - 1990 COMPARISON OF CHEMICAL TEST AUDIT RESULTS

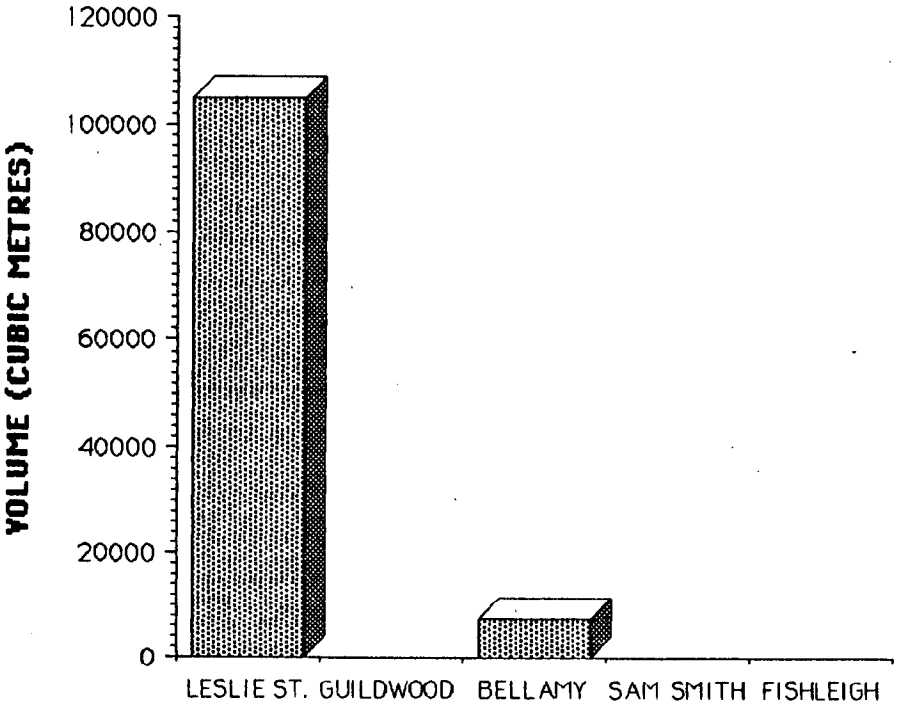
Category (volumes in m^3)	1989	1990	Explanation
total number of samples taken	135	156	[1989-135 samples=88 lge+32sml+15 storage yds] [1990-156=107 lge+49 sml]
total number of samples taken from trucks originating from large sites	32	107	
number of samples failing OWG against the expectations of the original environmental report	8	16	
number of samples failing RLUG against results of the original environmental report	2	0	
percentage of samples exceeding original environmental report results	25 ILQCP 75% efficient by audit for large sites	15 ILQCP 85% efficient by audit for large sites	Improvements in 1990 were due to increasing expectations for environmental reports and the fact that very few large untested projects obtaining bills of lading from the Authority as part of the ILQCP phase in period were still coming to lakefill ,in 1990.
total number of samples taken from trucks originating from small sites	88	49	
number of these small site samples failing the OWG	45	12	Passing the OWG is not a necessary criteria for small site loads but this information can be helpful in identifying the quality of material that we are approving through our site inspections.
number of small site samples failing the RLUG against the expectations of the ILQCP	6	1	In 1990 only 1 sample of 46 tested exceeded the expectations for small sites.
% of samples exceeding expectations	6.8 ILQCP 93.2% efficient by audit for small sites	2.0 ILQCP 98% efficient by audit for small sites	Mandatory inspection on small projects has led to an improvement in this area.

APPENDIX 1

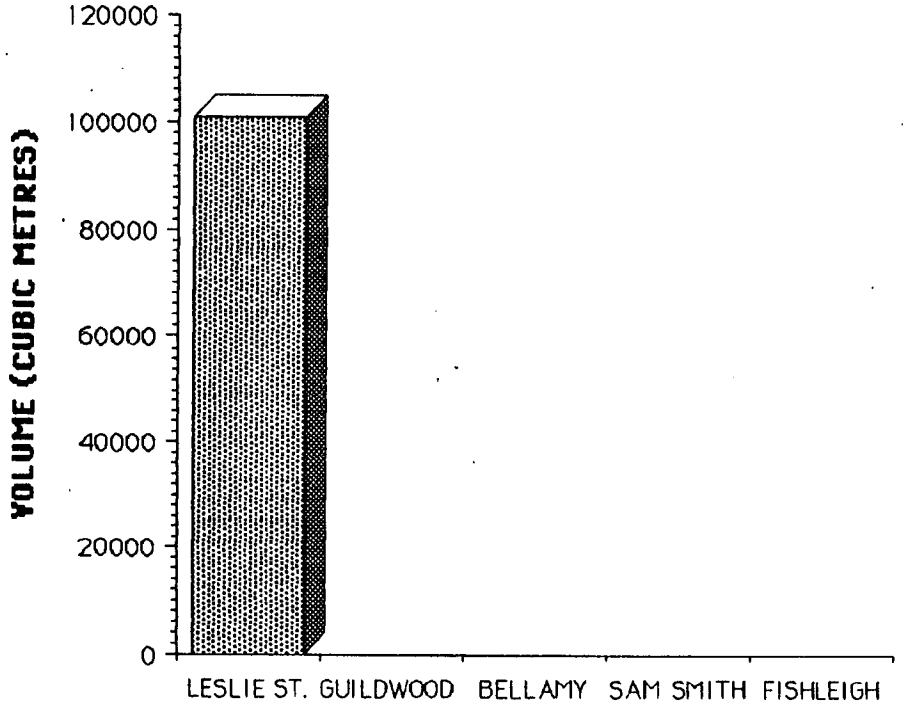
Monthly Breakdown of Total Fill Volumes Received at Each Fill Site

..... graphs 1 - 12

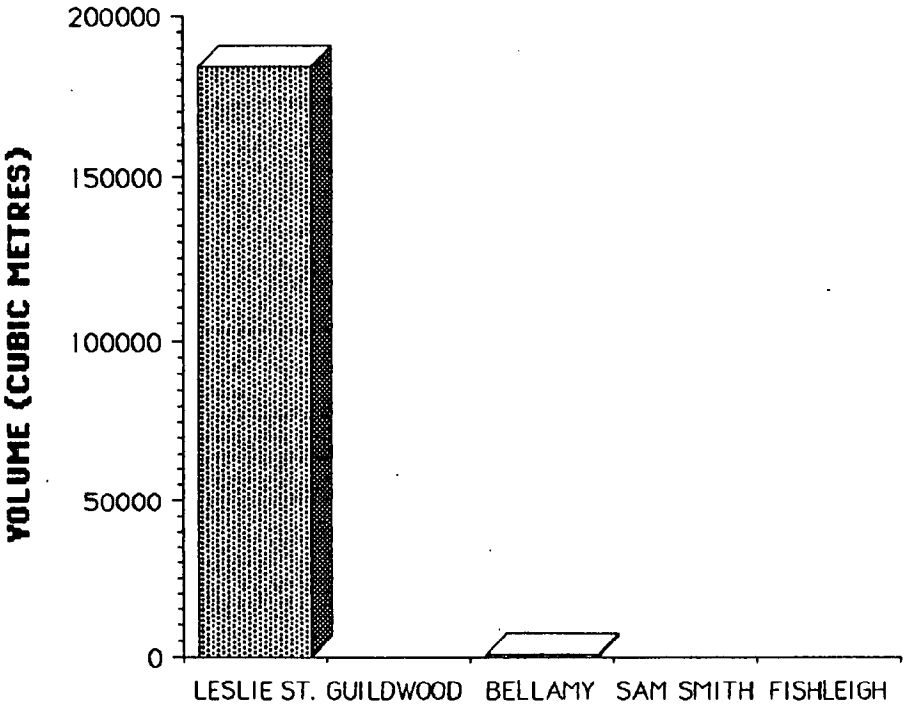
GRAPH 1 : FILL VOLUMES RECEIVED PER LAKEFILL SITE IN JANUARY 1990



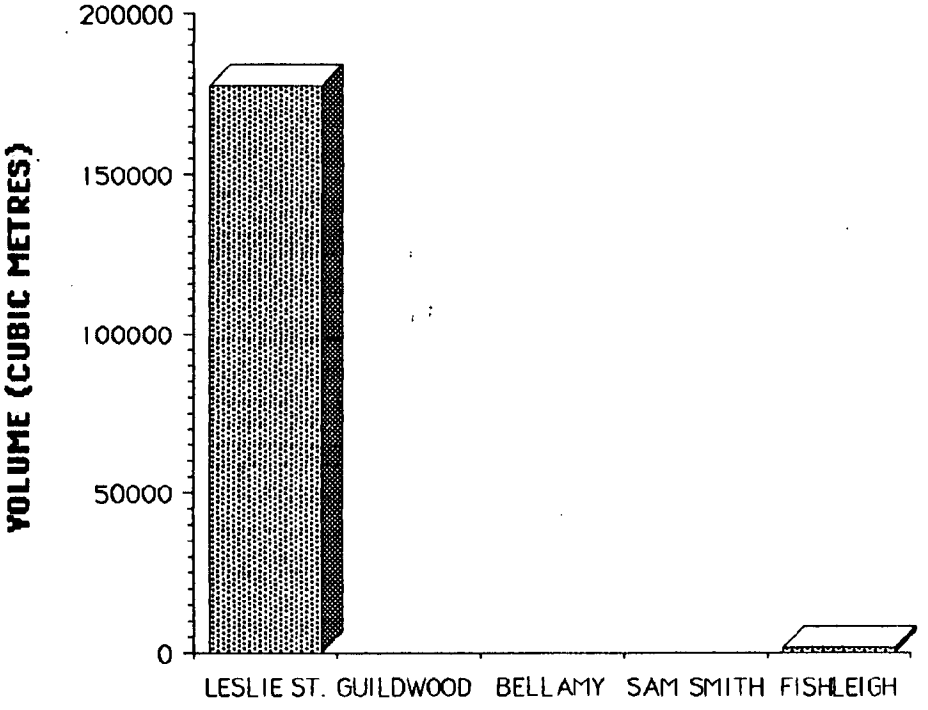
GRAPH 2 : FILL VOLUMES RECEIVED PER LAKEFILL SITE IN FEBRUARY 1990



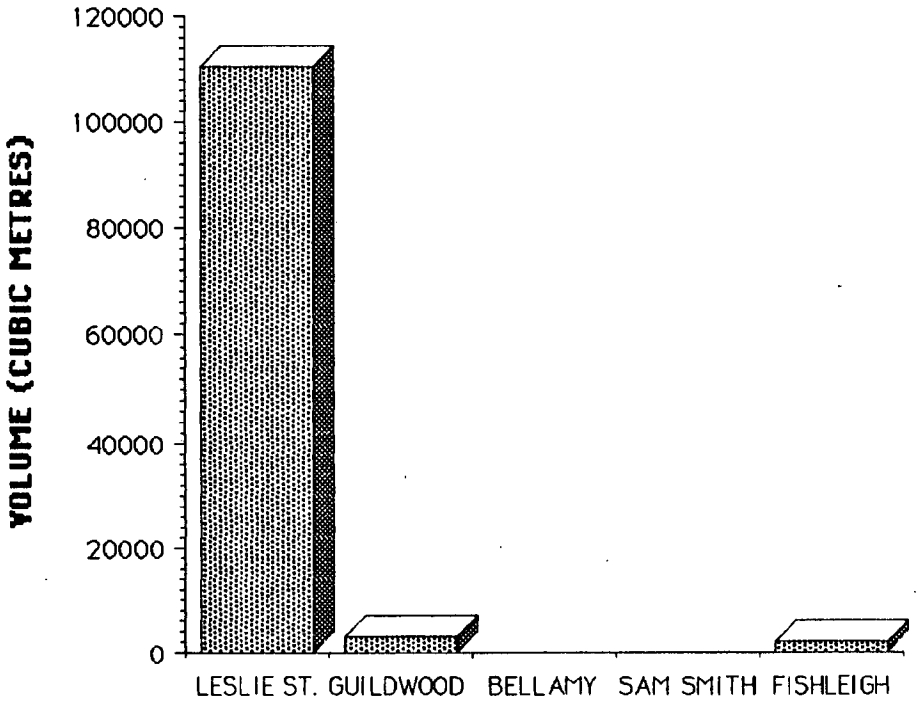
GRAPH 3 : FILL VOLUMES RECEIVED PER LAKEFILL SITE IN MARCH 1990



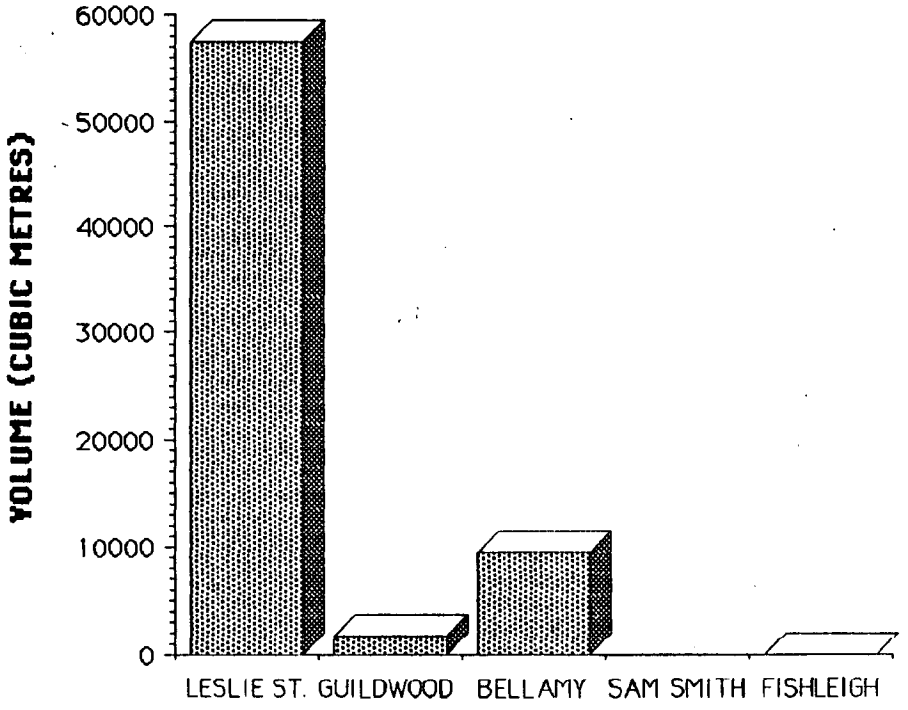
GRAPH 4 : FILL VOLUMES RECEIVED PER LAKEFILL SITE IN APRIL 1990



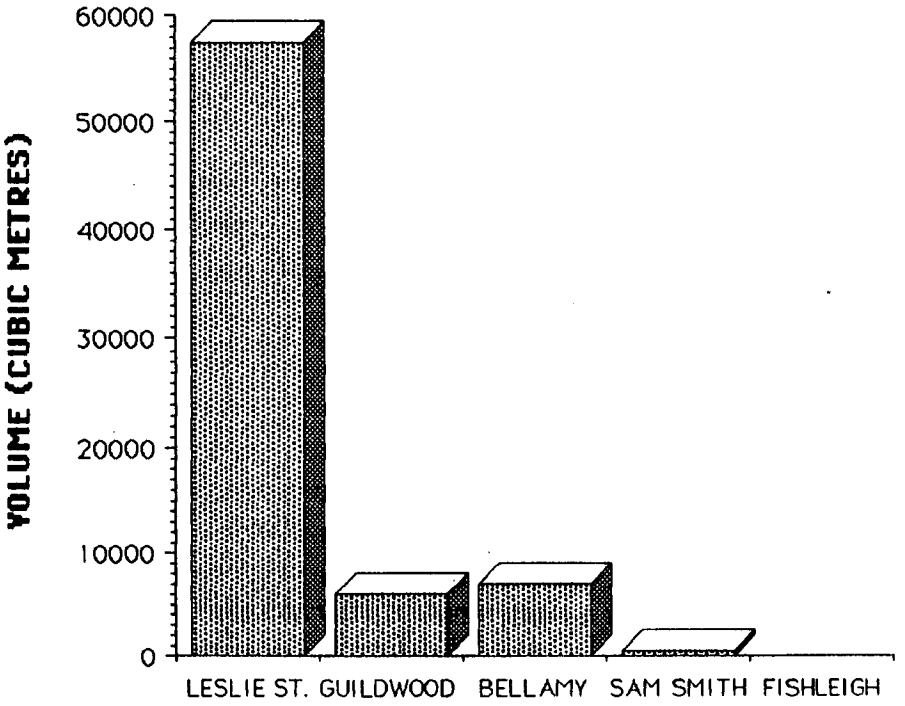
GRAPH 5 : FILL VOLUMES RECEIVED PER LAKEFILL SITE IN MAY 1990



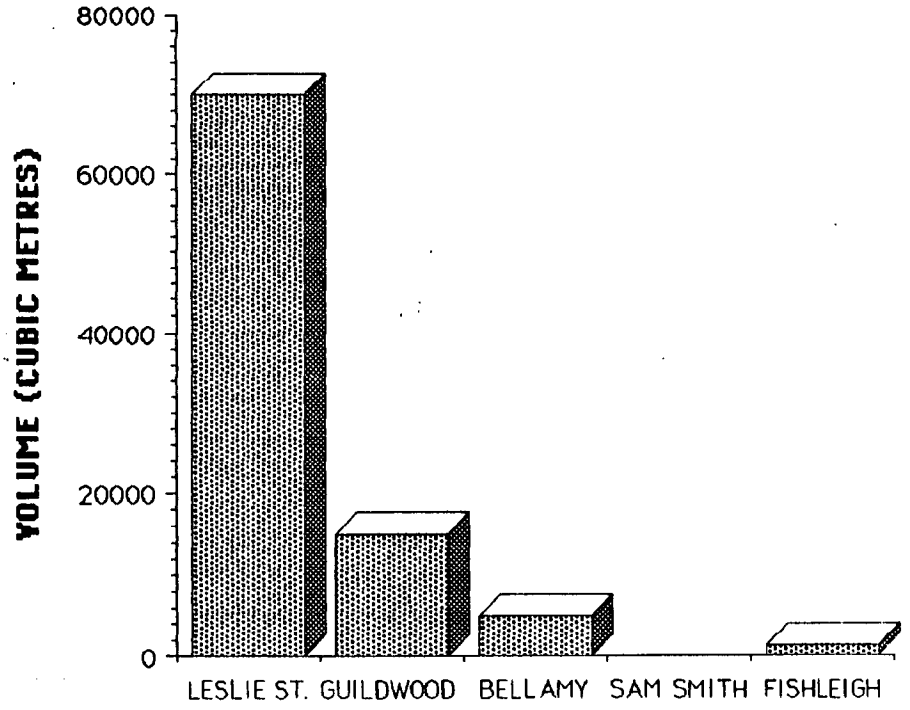
GRAPH 6 : FILL VOLUMES RECEIVED PER LAKEFILL SITE IN JUNE 1990



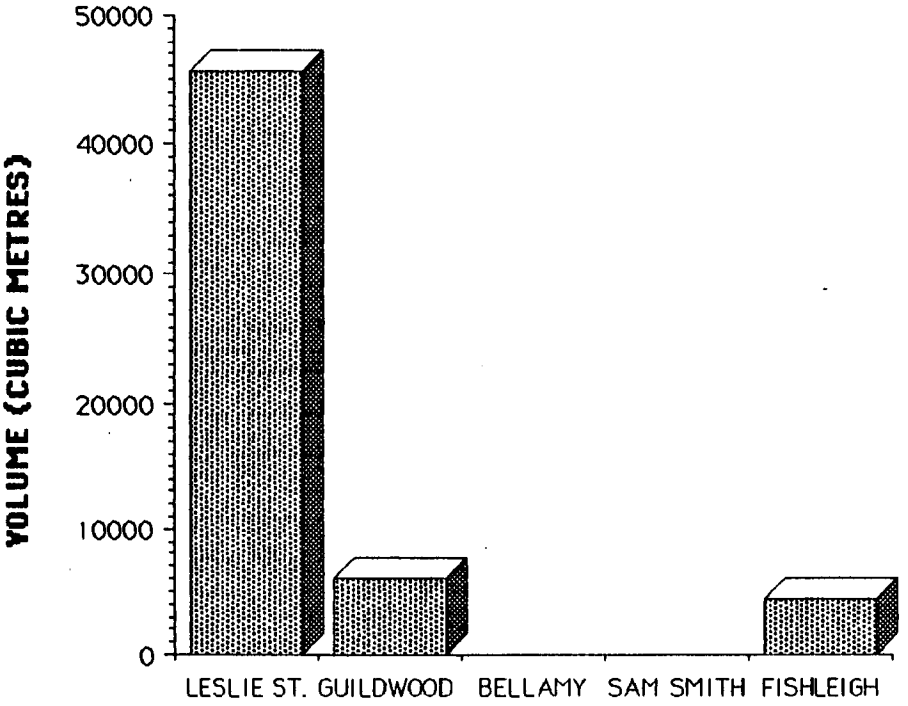
GRAPH 7 : FILL VOLUMES RECEIVED PER LAKEFILL SITES IN JULY 1990



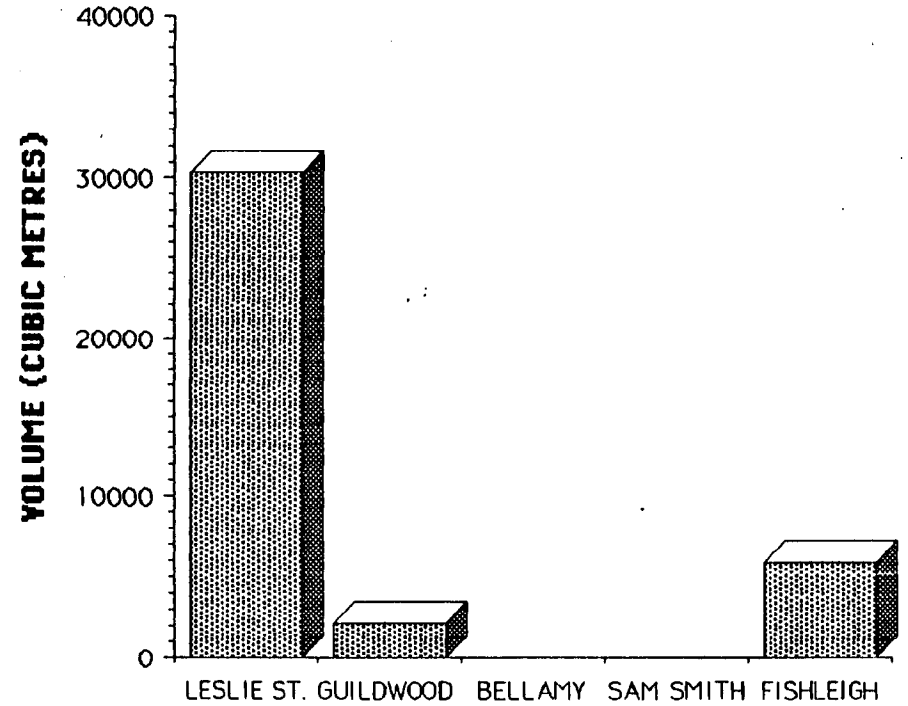
GRAPH 8 : FILL VOLUMES RECEIVED PER LAKEFILL SITE IN AUGUST 1990



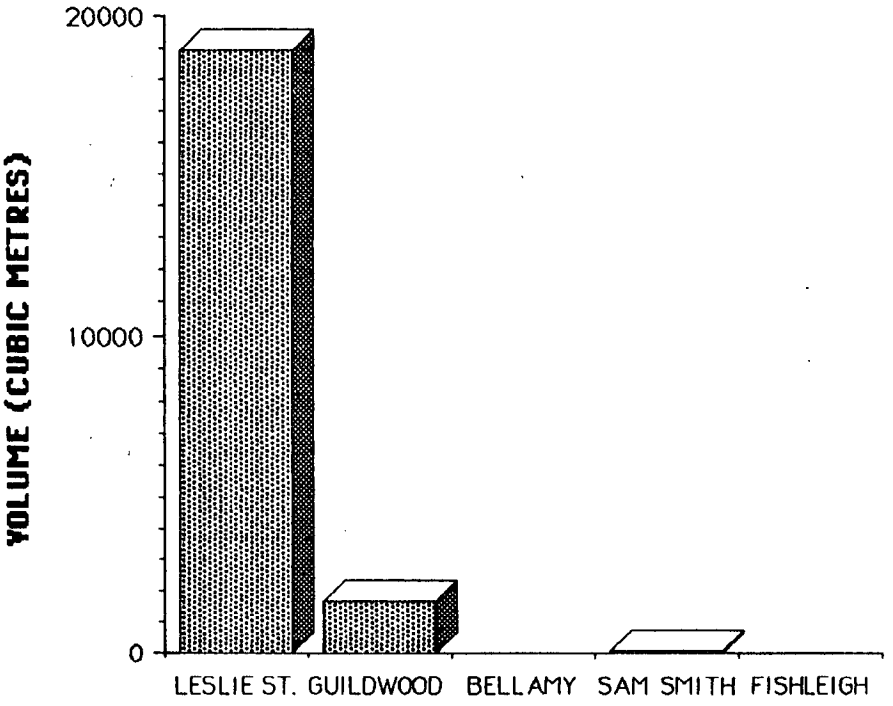
GRAPH 9 : FILL VOLUMES RECEIVED PER LAKEFILL SITE IN SEPTEMBER 1990



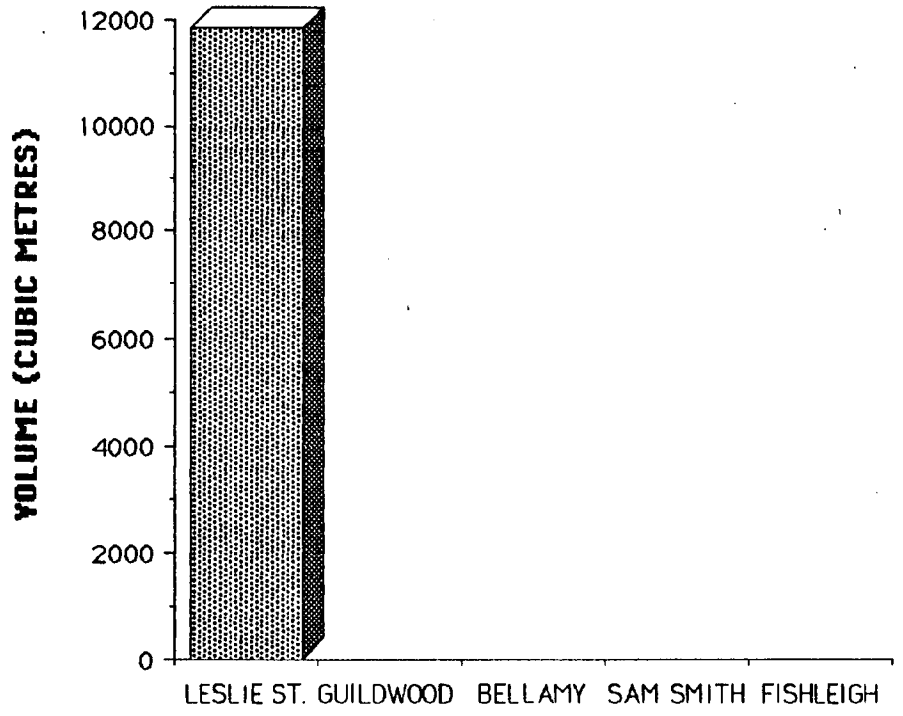
GRAPH 10 : FILL VOLUMES RECEIVED PER LAKEFILL SITE IN OCTOBER 1990



GRAPH 11 : FILL VOLUMES RECEIVED PER LAKEFILL SITE IN NOVEMBER 1990



GRAPH 12 : FILL VOLUMES RECEIVED PER LAKEFILL SITE IN DECEMBER 1990



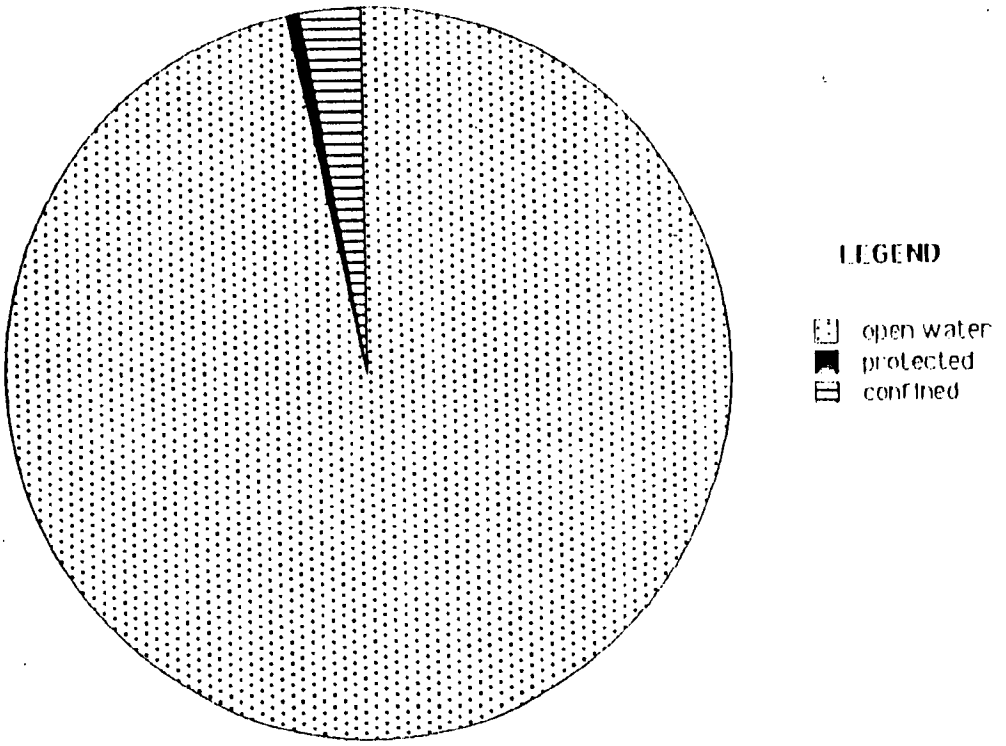
APPENDIX 2

Breakdown of Fill Volumes Received by Disposal Area Classification

..... graph 13 and table 3.

GRAPH 13 :

BREAKDOWN OF TOTAL FILL VOLUMES RECEIVED IN 1990 BY SOIL QUALITY CLASSIFICATION



The graph above illustrates a breakdown of fill volumes received at all lakefill sites from January 1, 1990 to December 31, 1990. The following table shows the exact numerical data used to create this graph.

TABLE 3.

THE TOTAL VOLUME OF FILL RECEIVED AT LAKEFILL SITES BY SOIL QUALITY CLASSIFICATION

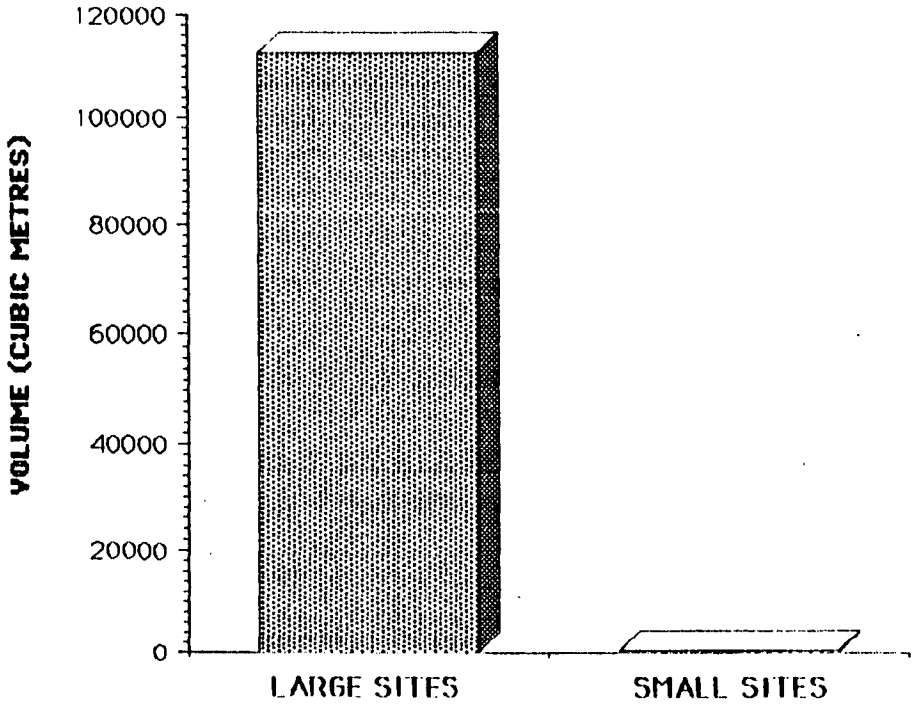
Classification	Volume m3	Percentage
Open Water	1,016,760	96.6
Protected	5,730	0.6
Confined	29,550	2.8

APPENDIX 3

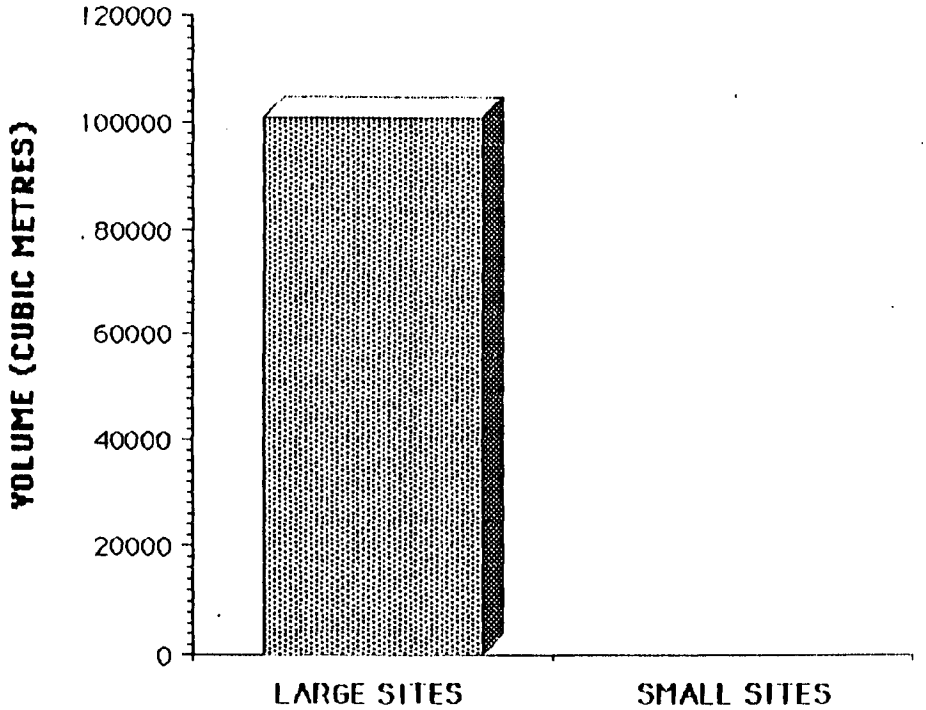
Monthly Breakdown of Fill Volumes Received from "Large Projects" and "Small Projects"

..... graphs 14 - 25

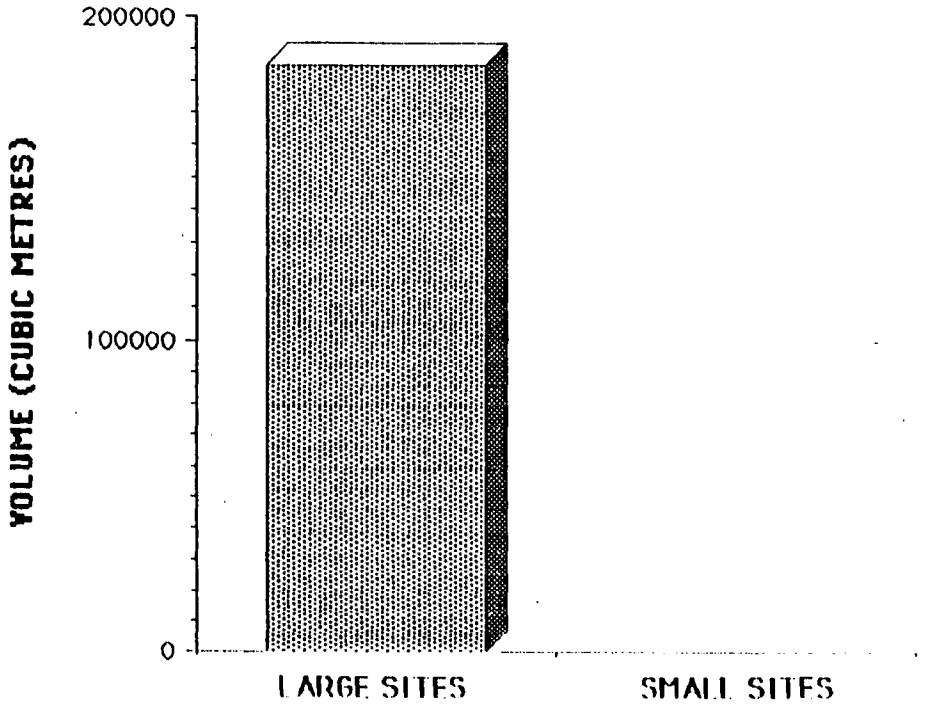
GRAPH 14 : FILL VOLUMES RECEIVED FROM LARGE AND SMALL SITES IN JANUARY 1990



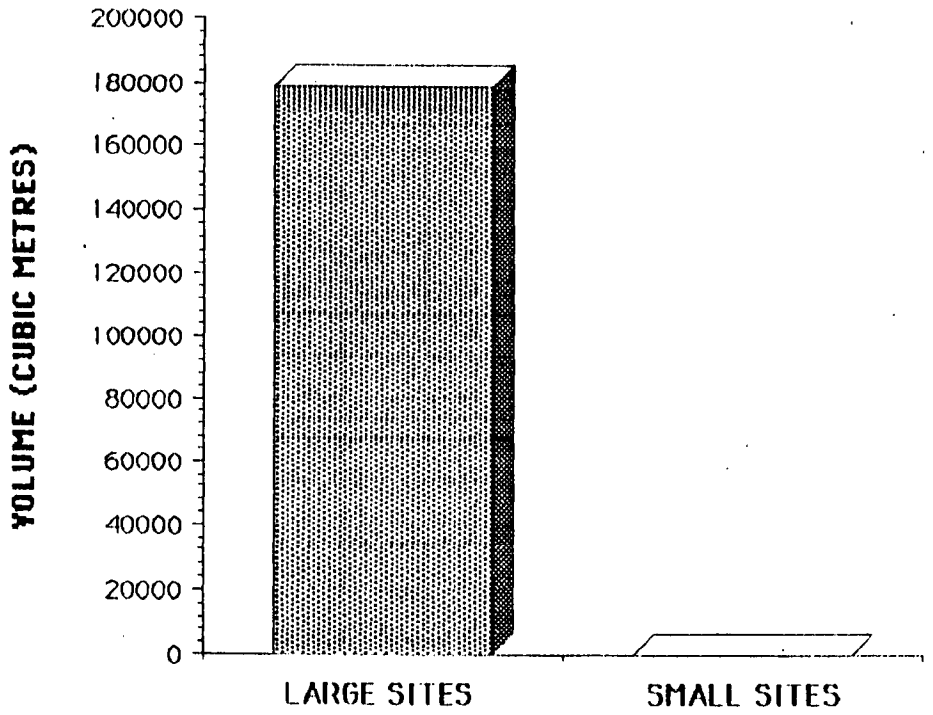
GRAPH 15 : FILL VOLUMES RECEIVED FROM LARGE AND SMALL SITES IN FEBRUARY 1990



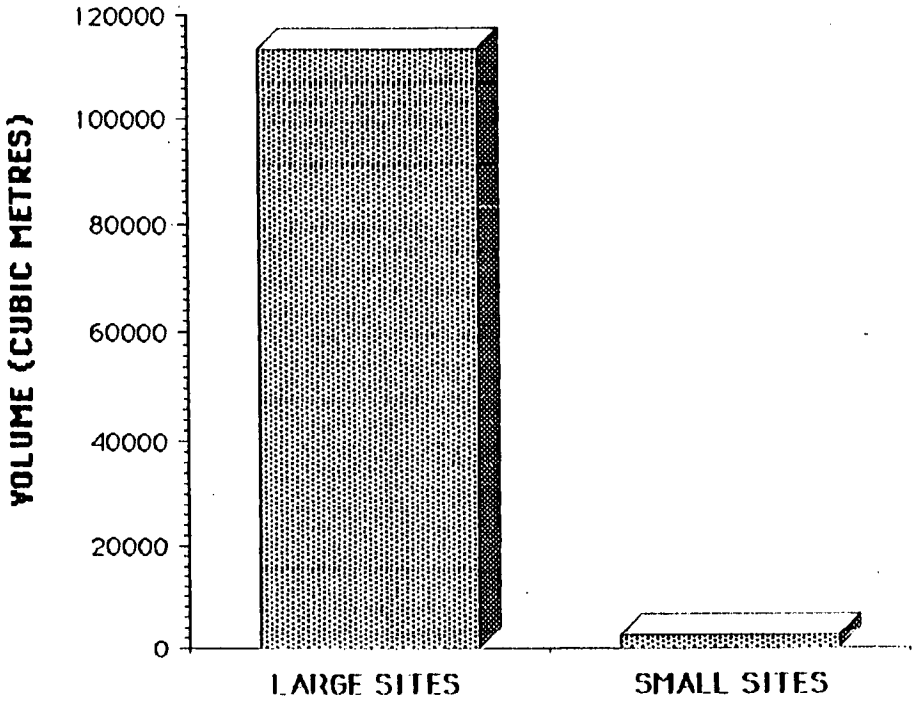
GRAPH 16 : FILL VOLUMES RECEIVED FOR LARGE AND SMALL SITES IN MARCH 1990



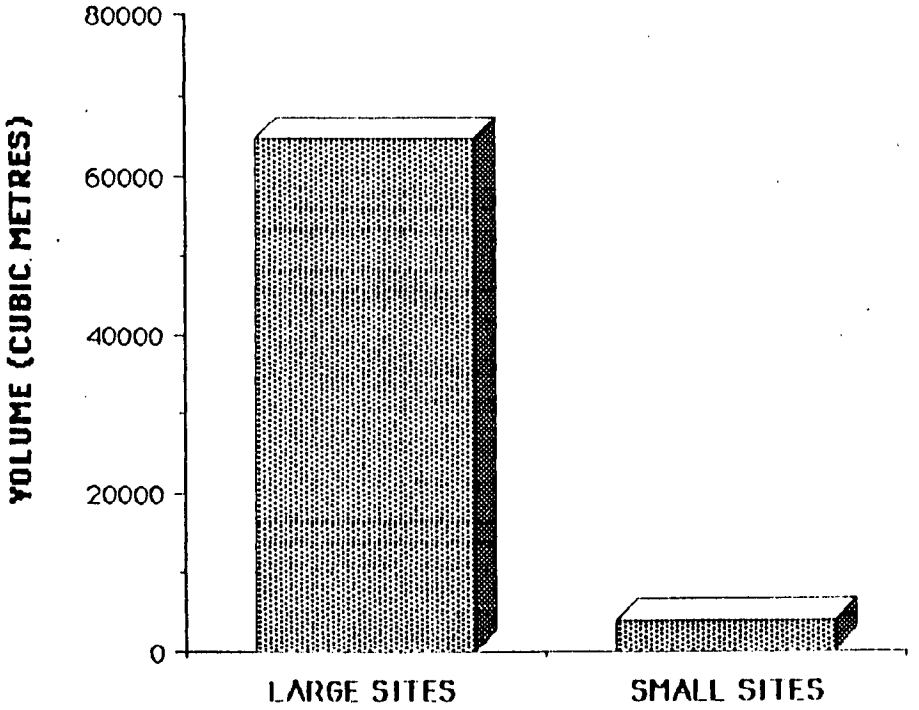
GRAPH 17 : FILL VOLUMES RECEIVED FROM LARGE AND SMALL SITES IN APRIL 1990



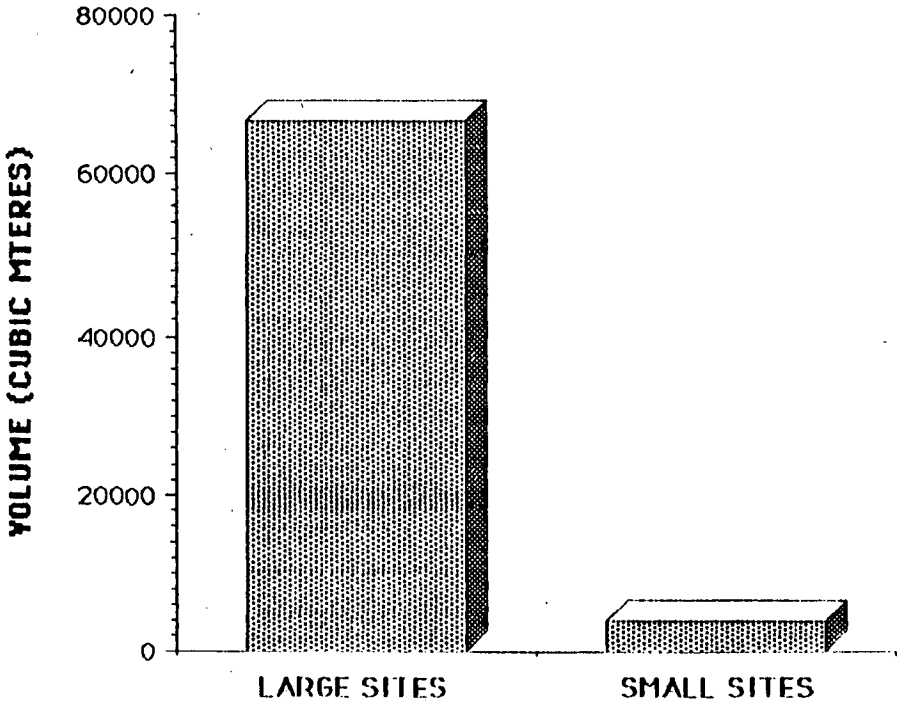
GRAPH 18 : FILL VOLUMES RECEIVED FROM LARGE AND SMALL SITES IN MAY 1990



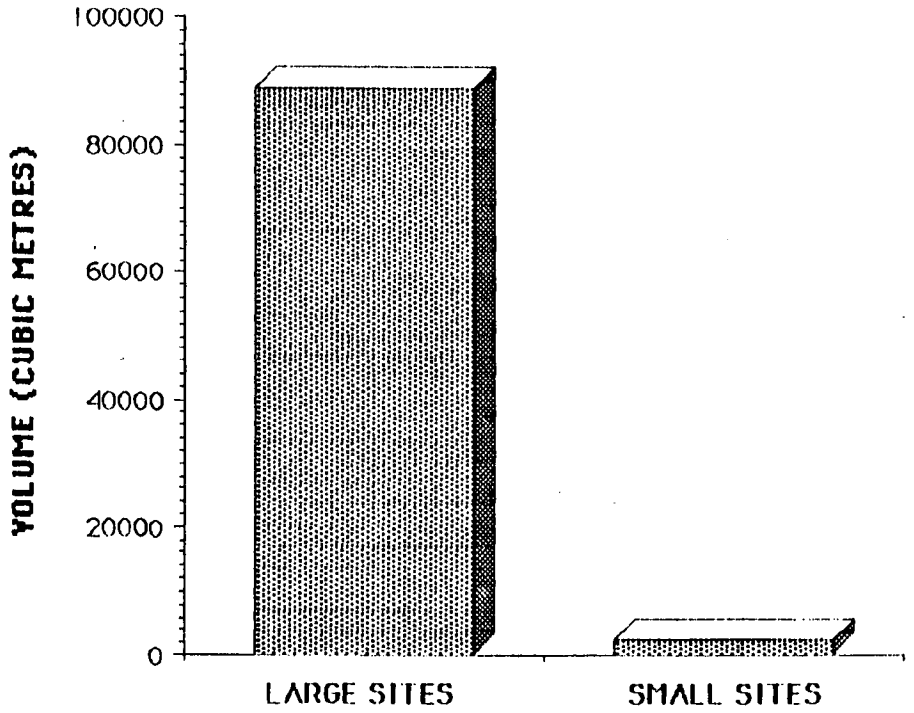
GRAPH 19 : FILL VOLUMES RECEIVED FROM LARGE AND SMALL SITES IN JUNE 1990



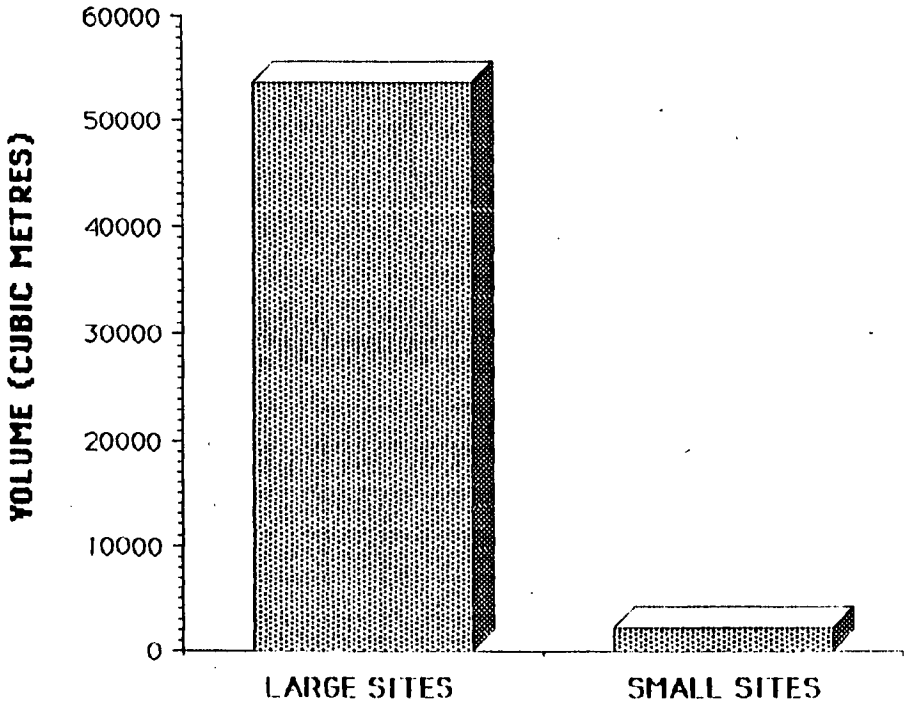
GRAPH 20 : FILL VOLUME RECEIVED FROM LARGE AND SMALL SITES IN JULY 1990



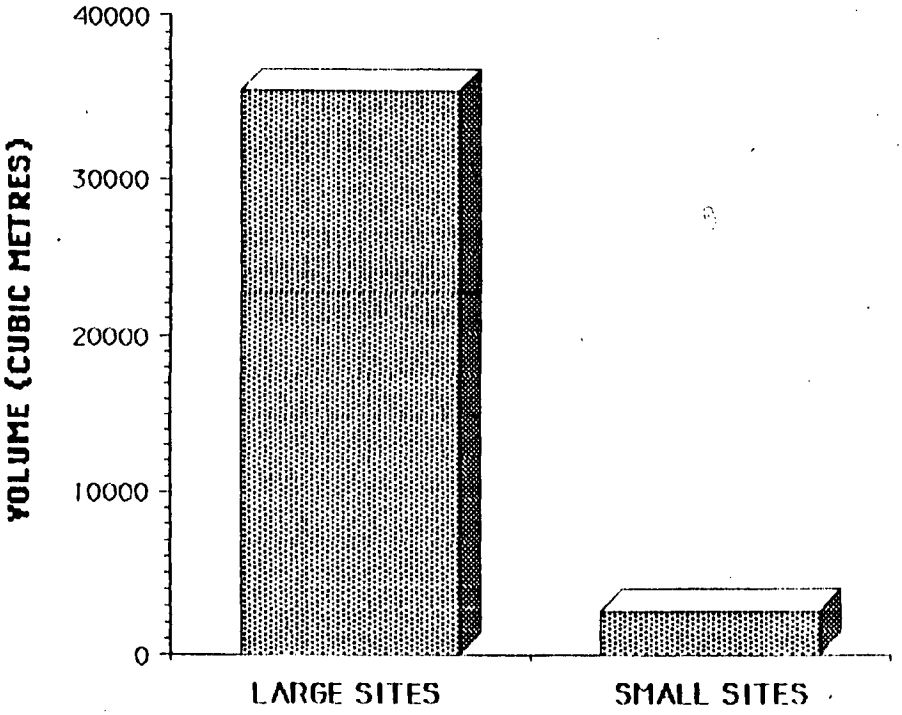
GRAPH 21 : FILL VOLUMES RECEIVED FROM LARGE AND SMALL SITES IN AUGUST 1990



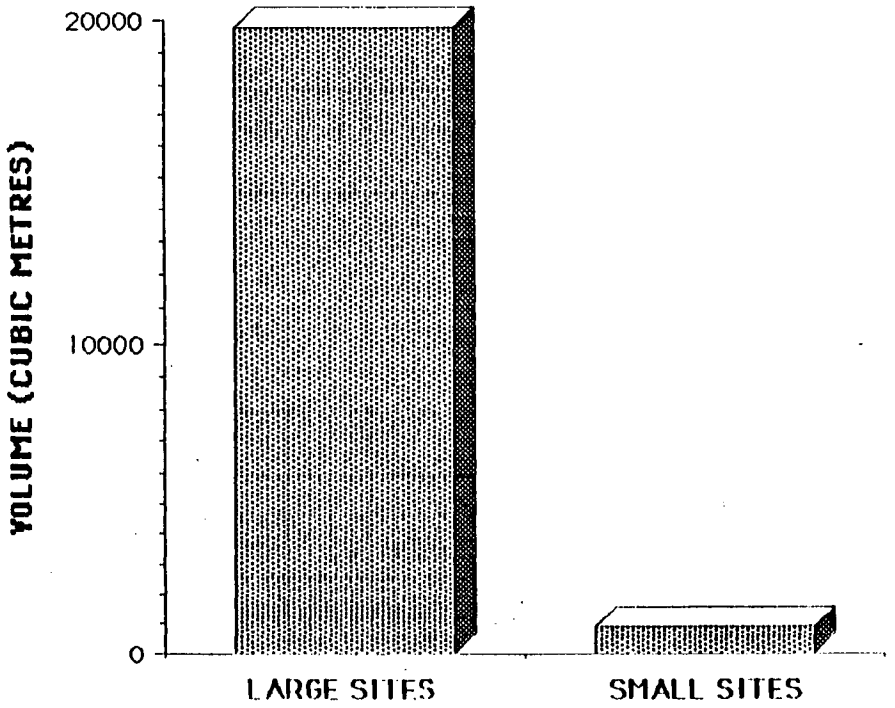
GRAPH 22 : FILL VOLUMES RECEIVED FROM LARGE AND SMALL SITES IN SEPTEMBER 1990



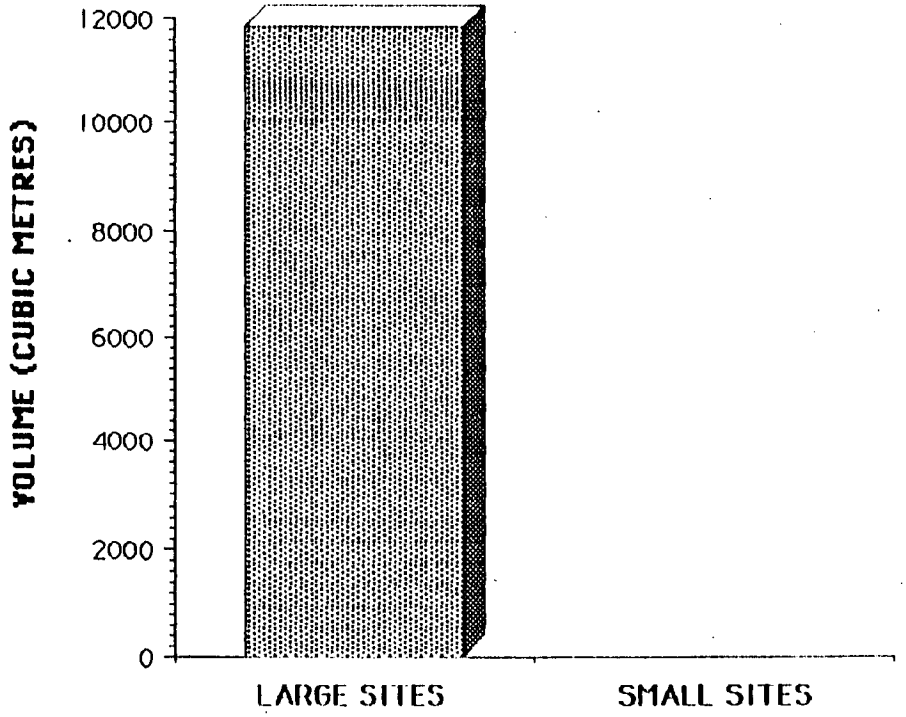
GRAPH 23 : FILL VOLUMES RECEIVED FROM LARGE AND SMALL SITES IN OCTOBER 1990



GRAPH 24 : FILL VOLUMES RECEIVED FROM LARGE AND SMALL SITES IN NOVEMBER 1990



GRAPH 25 : FILL VOLUMES RECEIVED FROM LARGE AND SMALL SITES IN DECEMBER 1990



APPENDIX 4

Results of the ILQCP Internal Chemical Analysis Auditing System

..... pages 4 -1 and graphs TR1 to TR18

REPORT ON CHEMICAL TESTING RESULTS RECEIVED AS PART OF THE ILQCP INTERNAL AUDITING PROGRAM

Table 2, on page 5 of the main text in this report gives a complete statistical breakdown of the test audit results for 1990 as compared to those for 1989. The audit results indicate that the overall quality of material entering the lakefill sites improved in 1990 over 1989.

Only one of 156 samples taken from trucks entering a lakefill site failed the Restricted Land Use Guidelines in 1990 as compared to six of 135 the previous year.

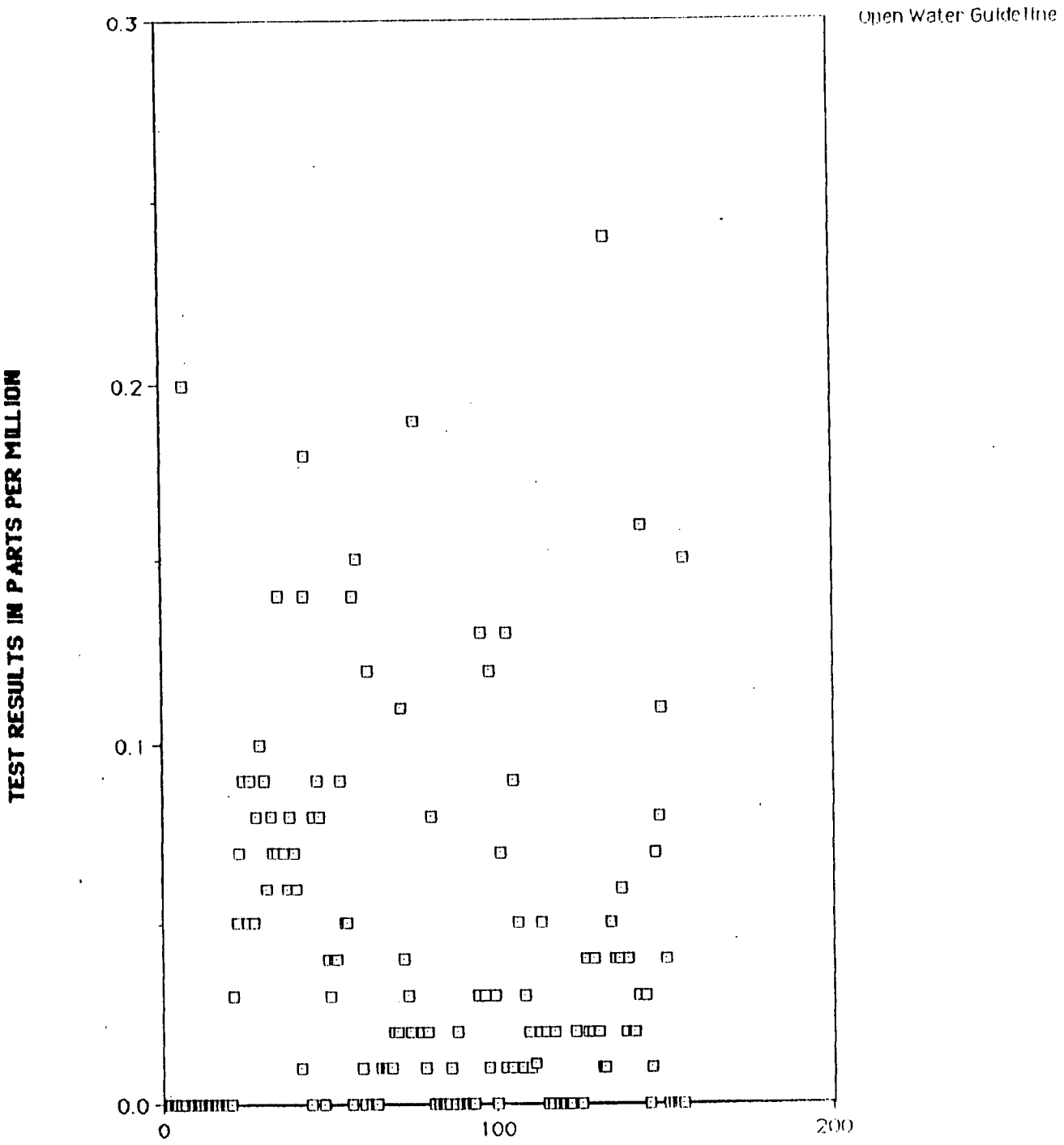
Significant inprovement in the audit results for large sites was observed (see table 2). Two explanations for this improvement are the increased expectations for environmental reports and the lack of untested "phase in" projects who were given bills without having to provide chemical analysis results as the commencement of the program in 1989. Over the first two years of the ILQCP, Authority staff have continuously updated their qualitative and quantitative expectations for environmental soils reports. Once it became clear, for example, that previously filled soils on excavation sites often represent the greatest potential for contamination and the contamination was very difficult to localize, the staff began rejecting large quantities of fill on the basis of just one high test result. If, for example, six samples are taken for a fill layer of soil and one exceeds the guidelines and the consultant cannot provide logical evidence (ie. through the site history of appearance of the soil) to localize that contaminated material, the entire fill layer is often rejected because the test reults are not considered sufficient evidence on their own of the localization of the contaminants. Many other examples of changes with regards to assessing large site environmental soils reports exist.

Significant improvements were also observed in the test results for previously untested small sites. The changes in small site approval policies outlined in Achievements 1990, are the reasons for this improvement. As of May 1990, all small sites had to be inspected by ILQCP staff before approval for lakefilling was given.

The eighteen graphs which are contained in this Appendix show that distribution of test audit results received for each parameter on the Open Water Guidelines for all audit samples taken (ie. large and small projects). These graphs illustrate which parameters are most often likely to exceed the various guidelines.

Graph IR(test results) 1

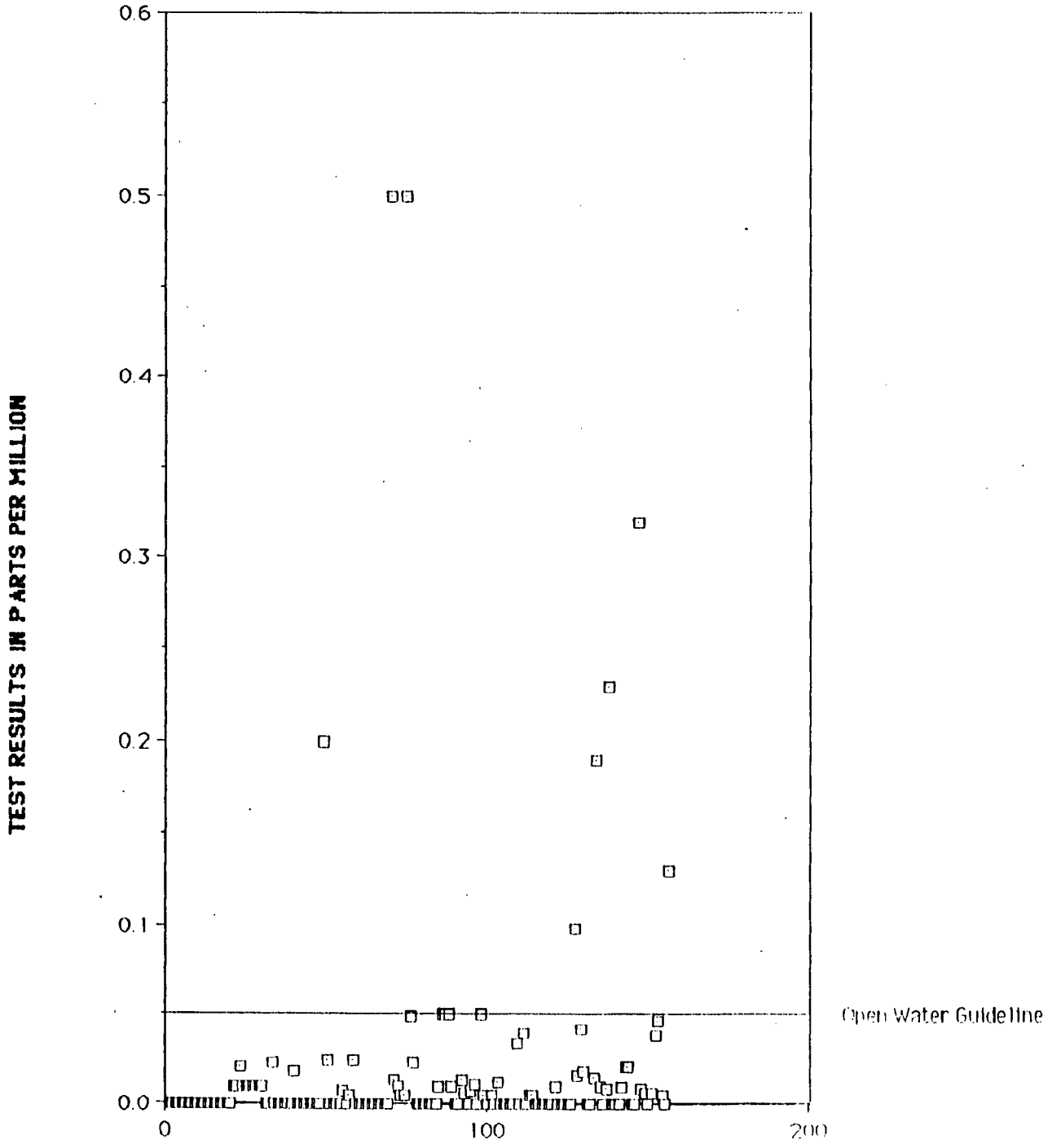
MERCURY



note : Restricted Land Use Guideline is 0.5 ppm.

Graph : TR2

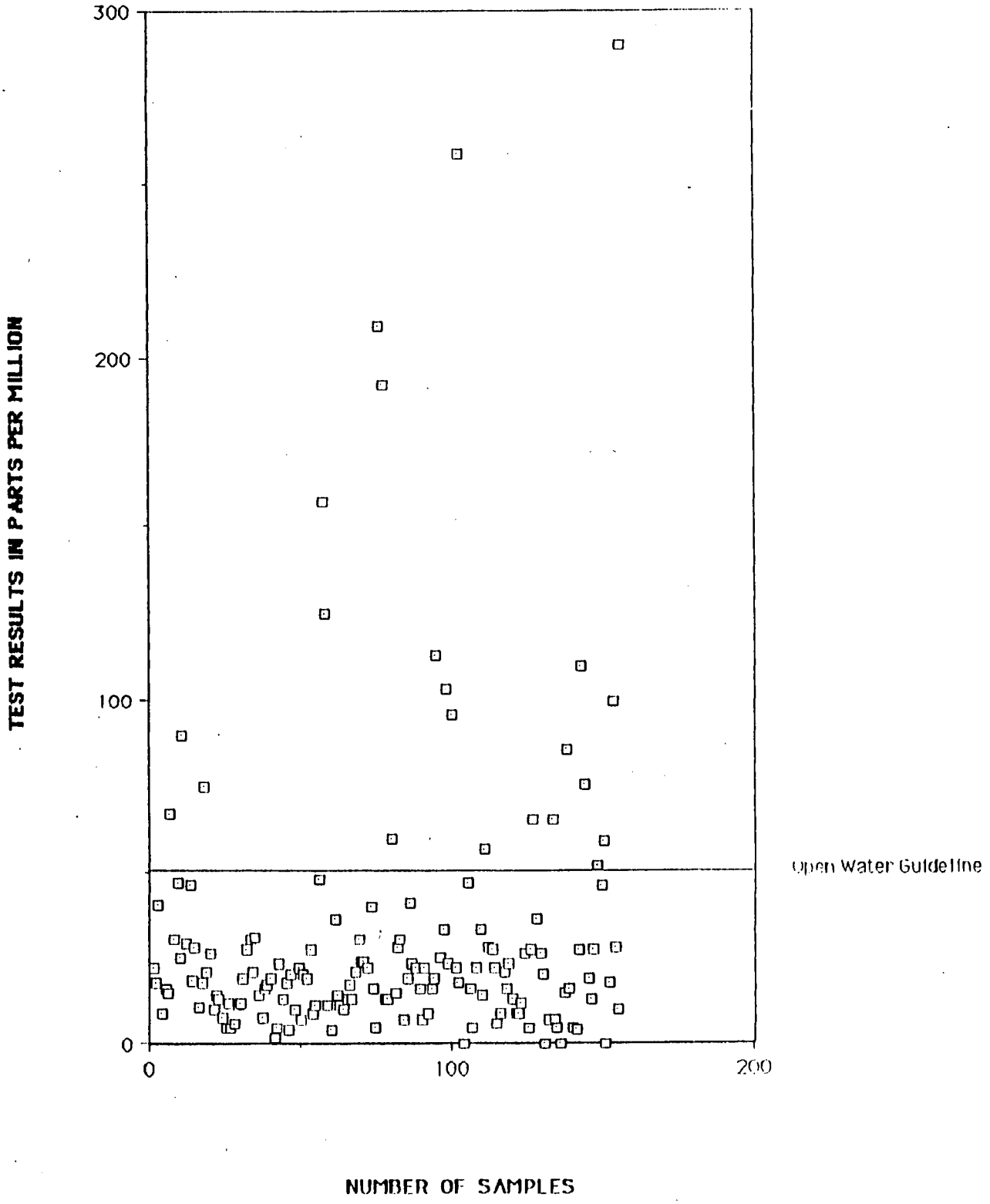
PCB's



note : Restricted Land Use Guideline is 2.0 ppm

Graph : TR3

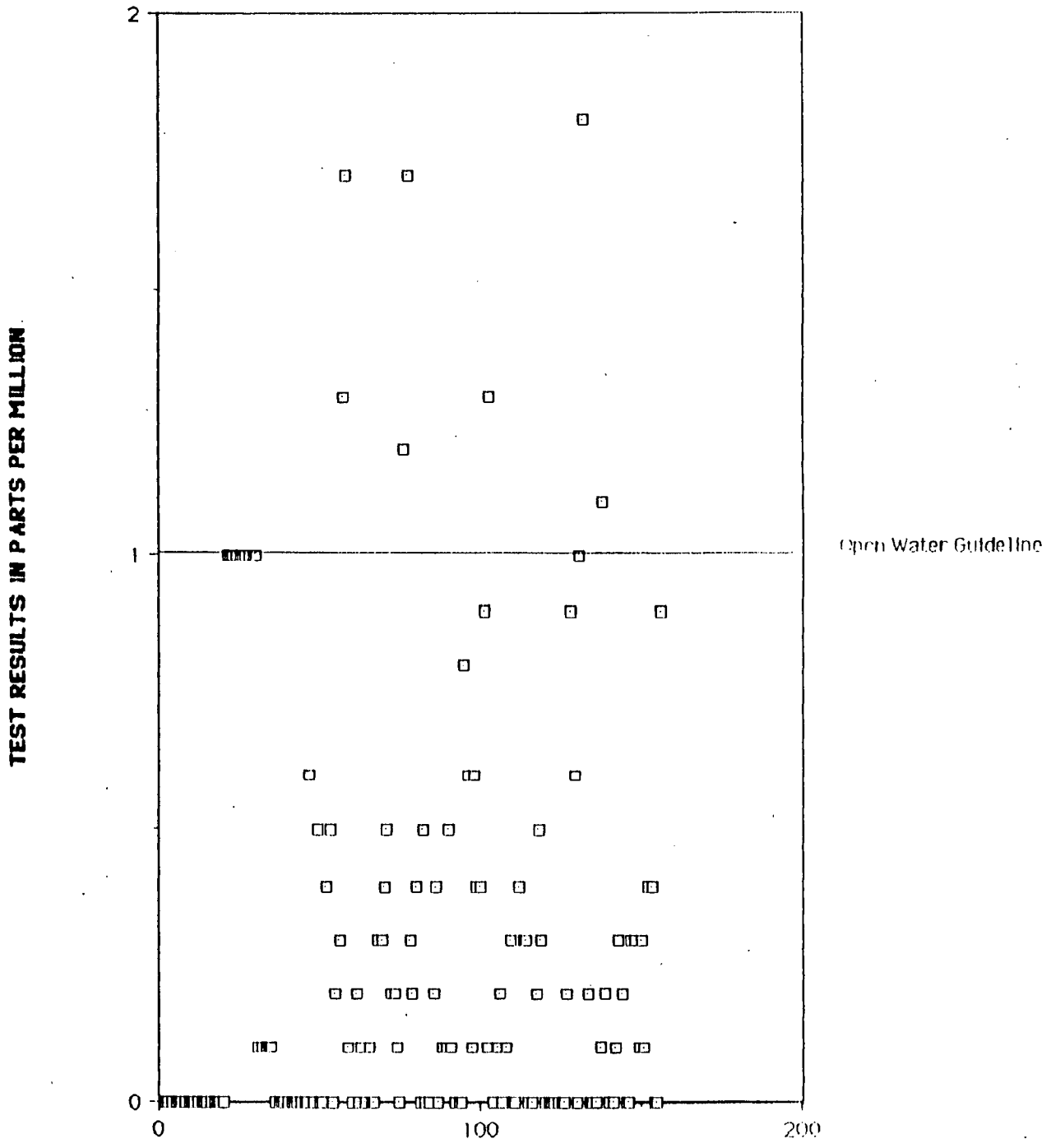
LEAD



note : Restricted Land Use Guideline is 375 ppm

Graph : TR4

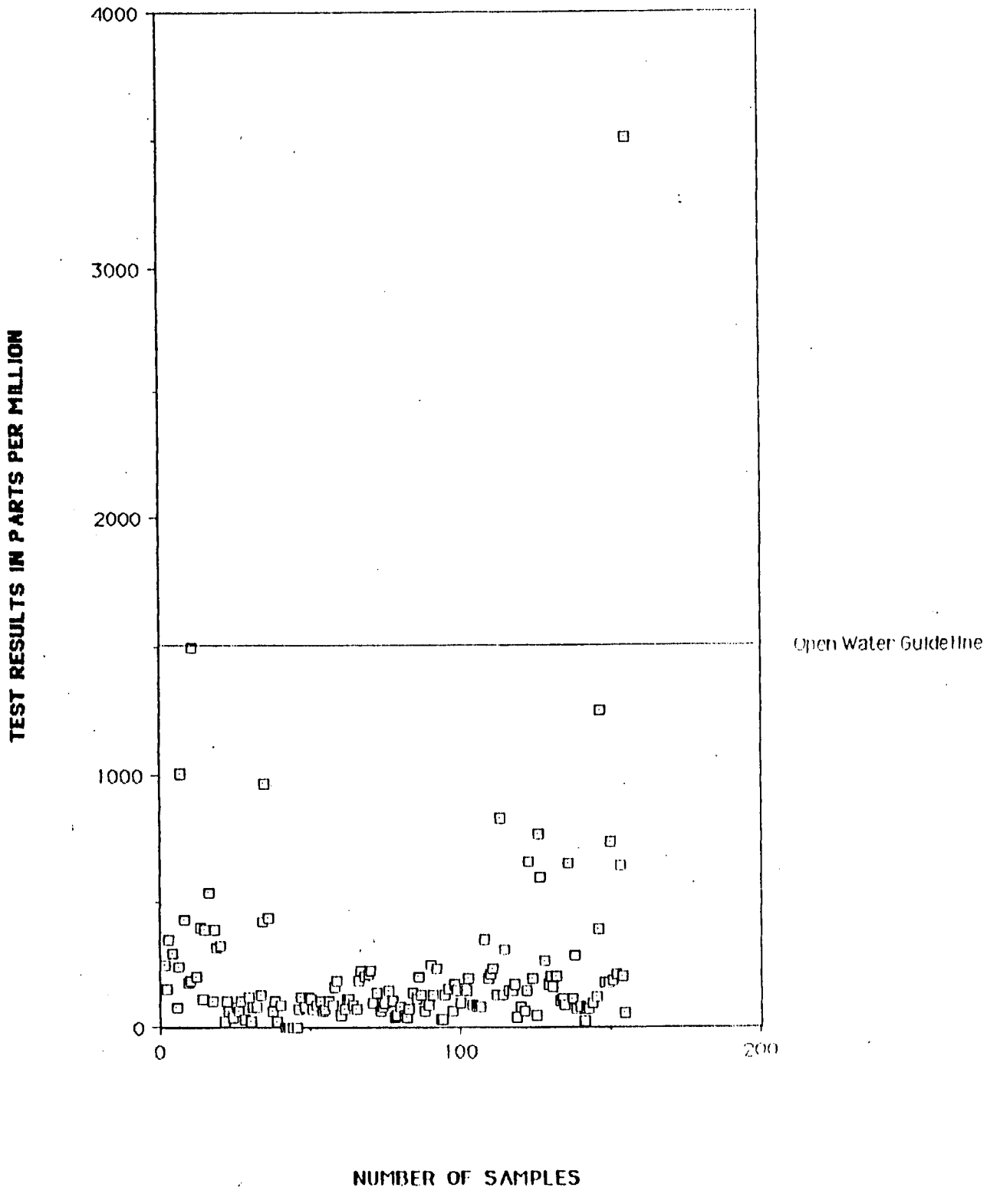
CADMIUM



note : Restricted Land Use Guideline is 3 ppm

Graph : TR5

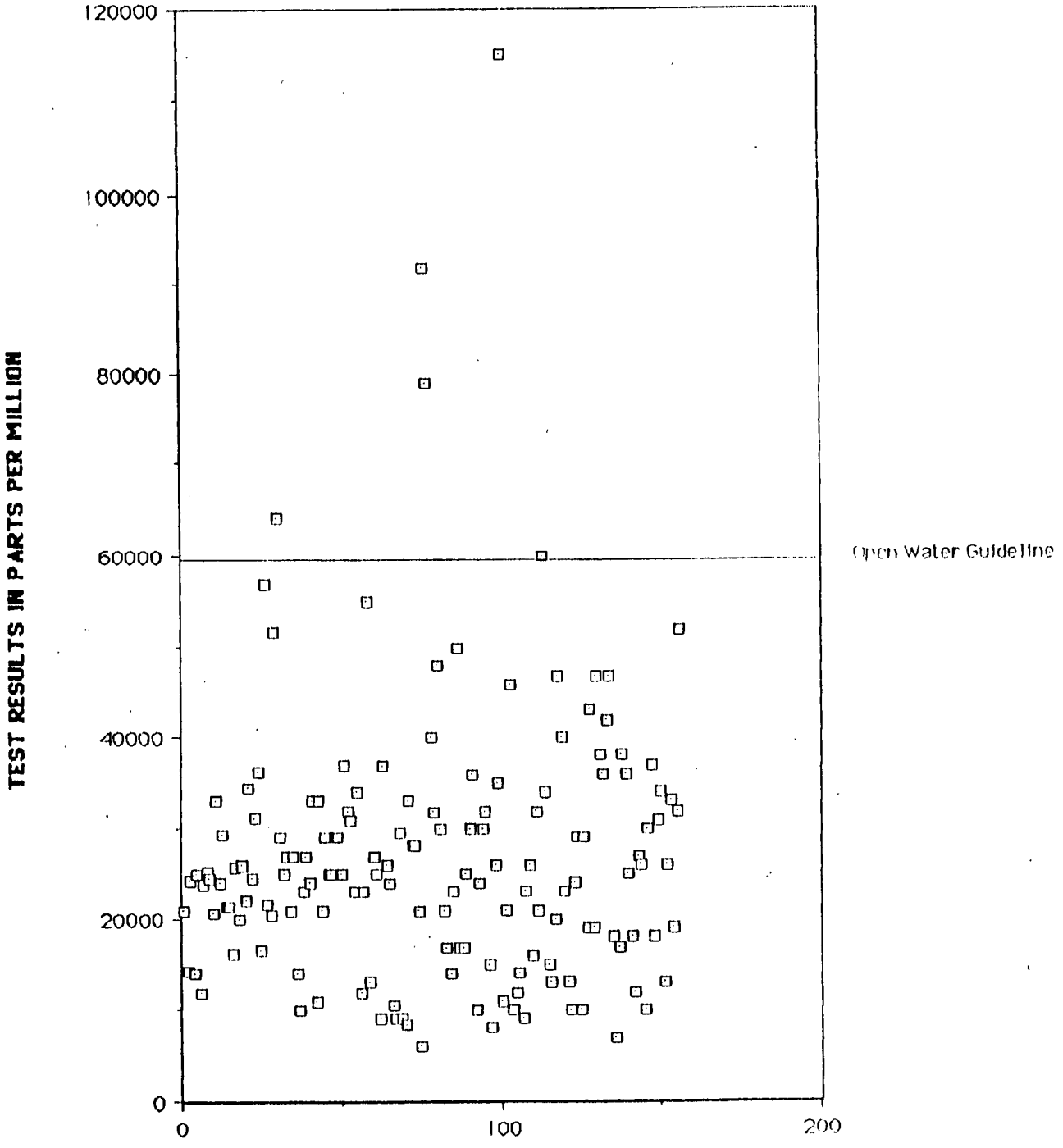
OIL AND GREASE



note : Restricted Land Use Guideline is 5,000 ppm

Graph : TR6

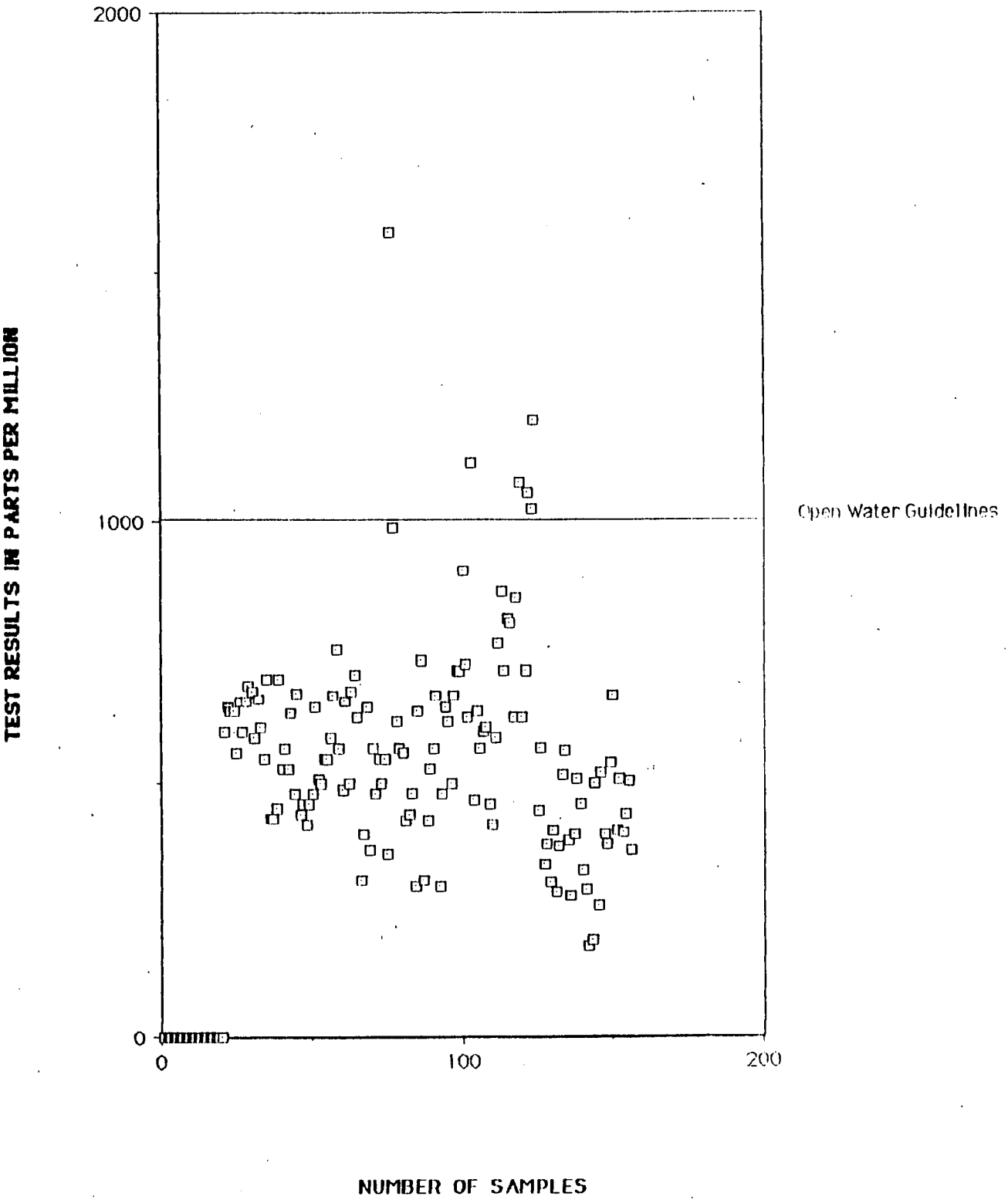
VOLATILE SOLIDS



note : volatile solids is not present on the Restricted Land Use Guideline

Graph : TR7

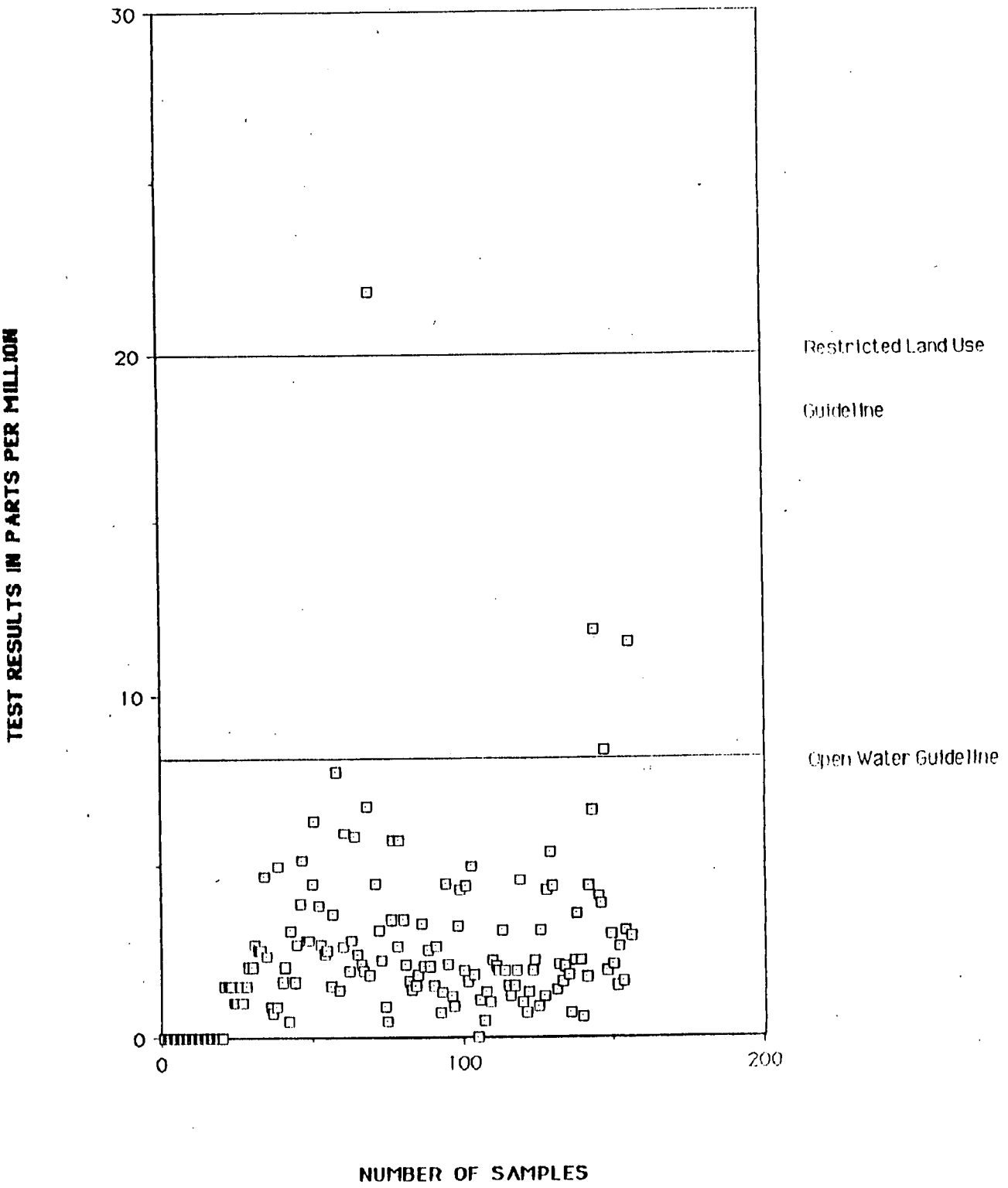
TOTAL PHOSPHORUS



note : total phosphorus is not present on the Restricted Land Use Guidelines

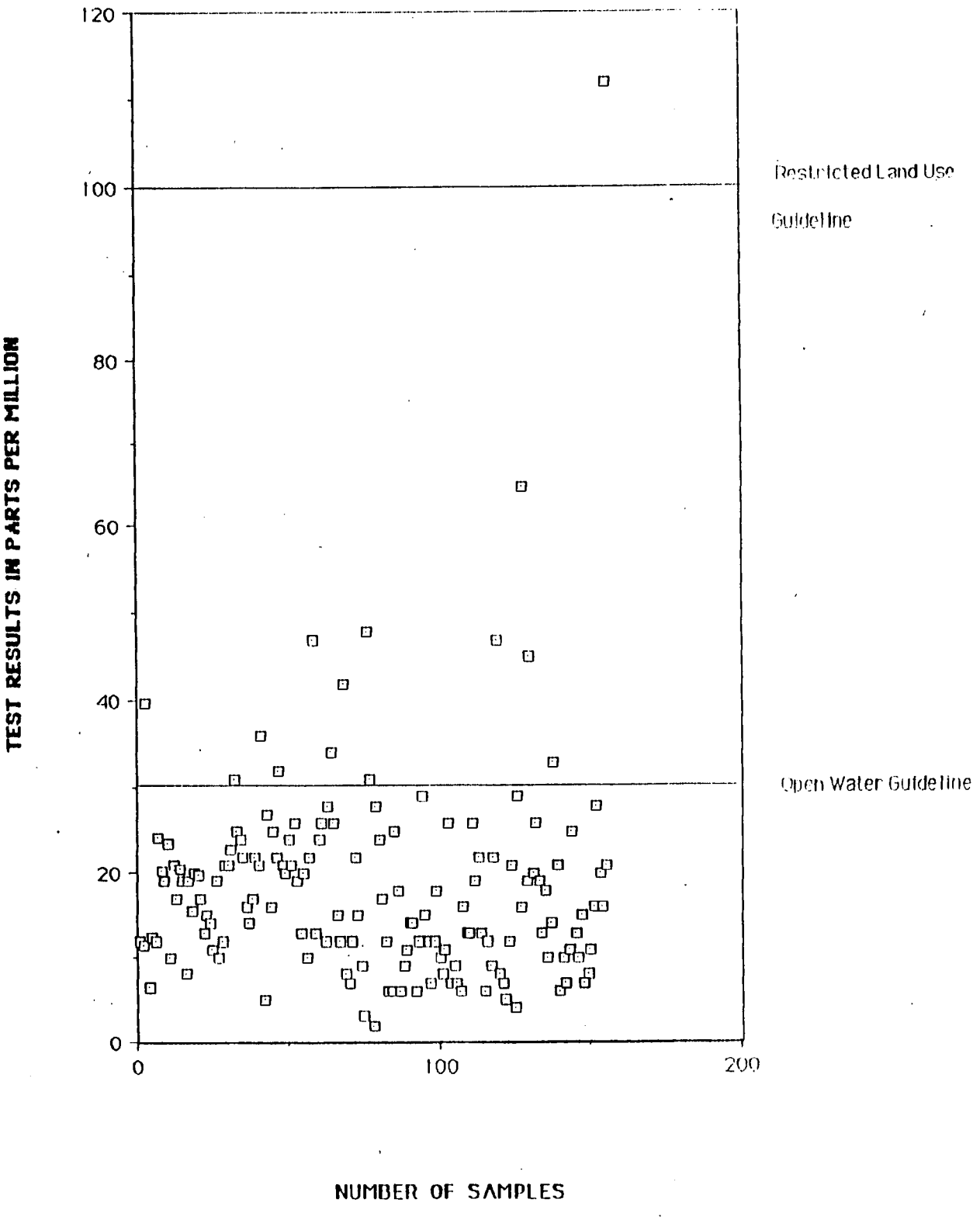
GRAPH : TR8

ARSENIC



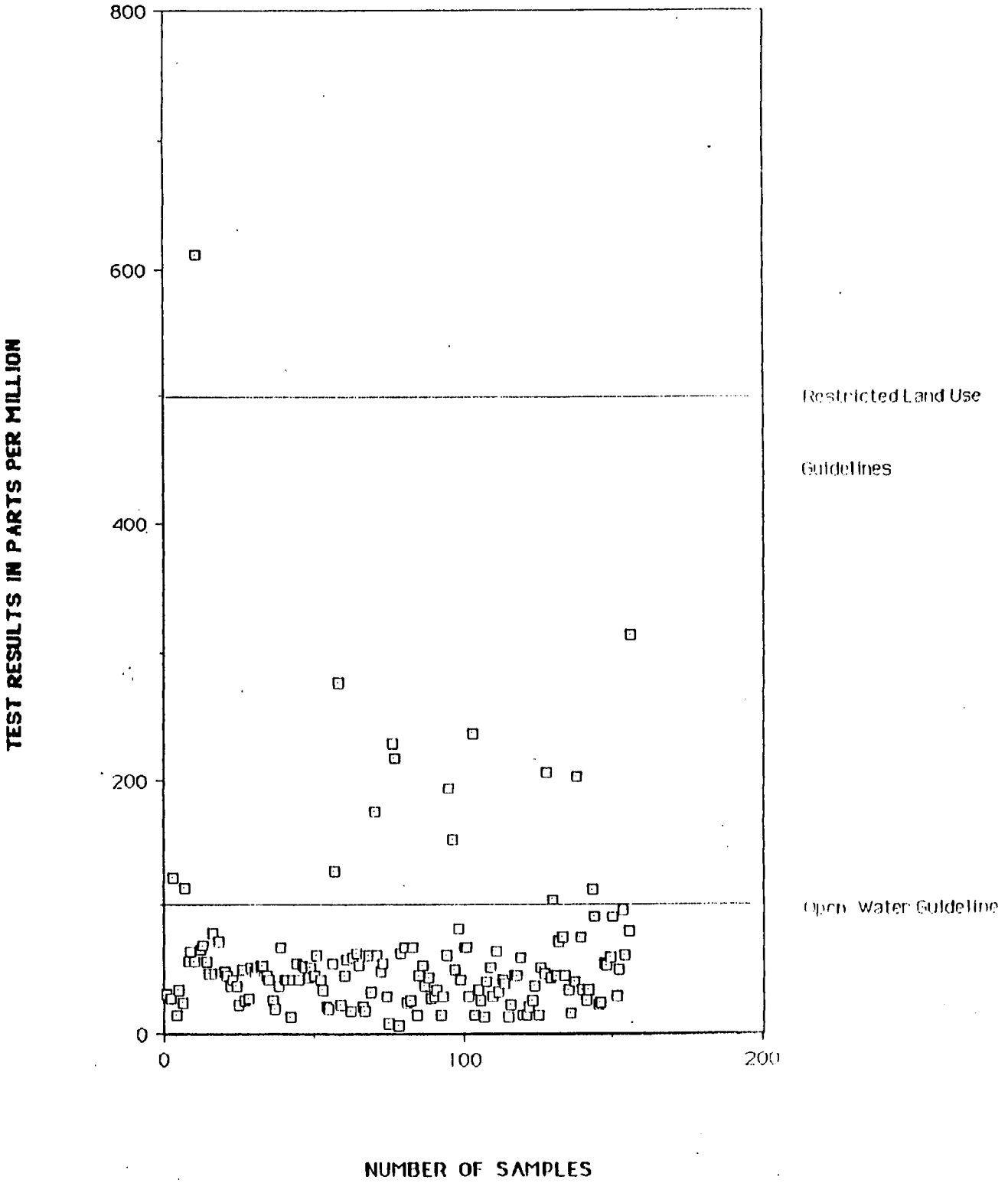
Graph : TR9

COPPER



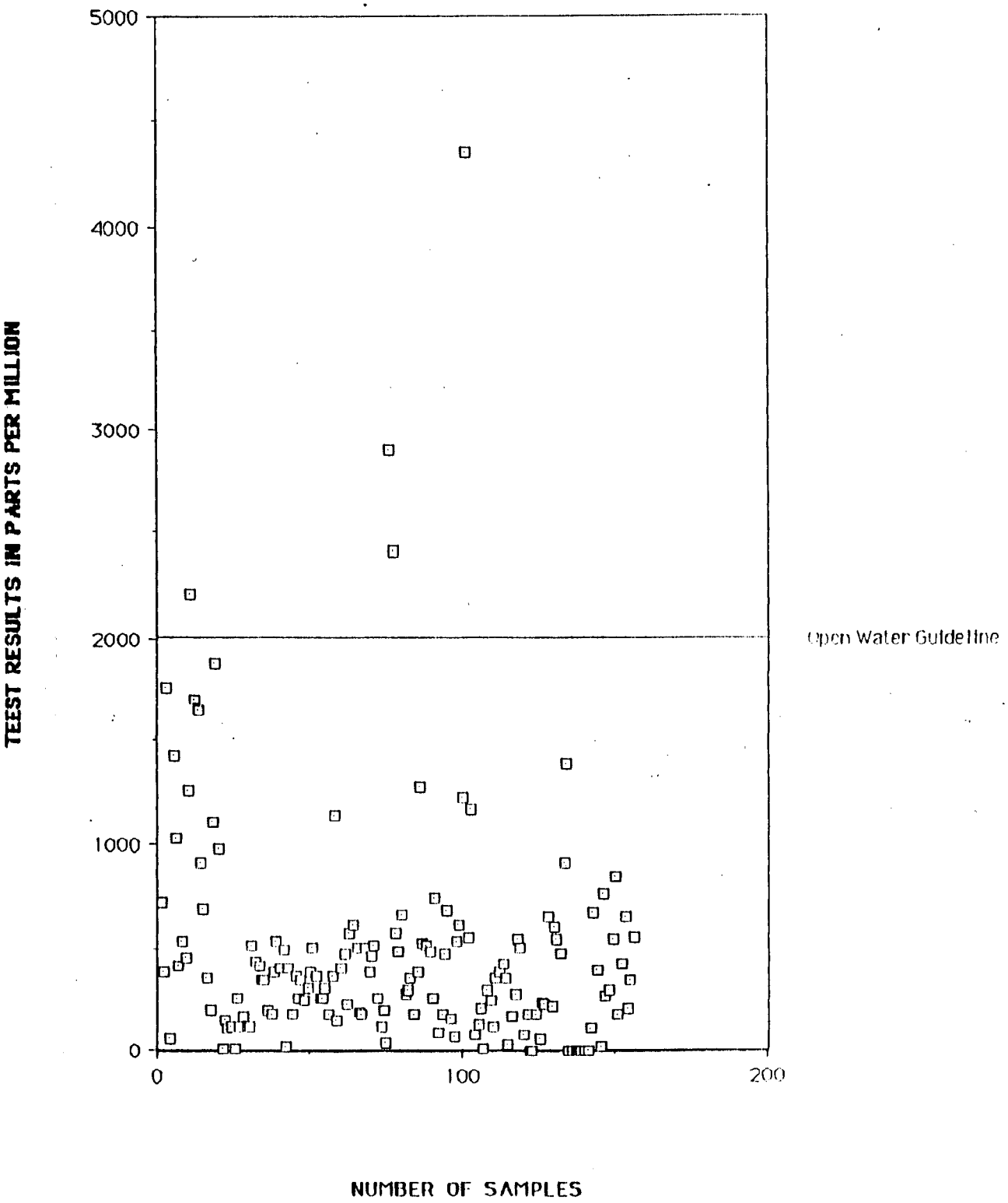
Graph : TR10

ZINC



Graph : TR11

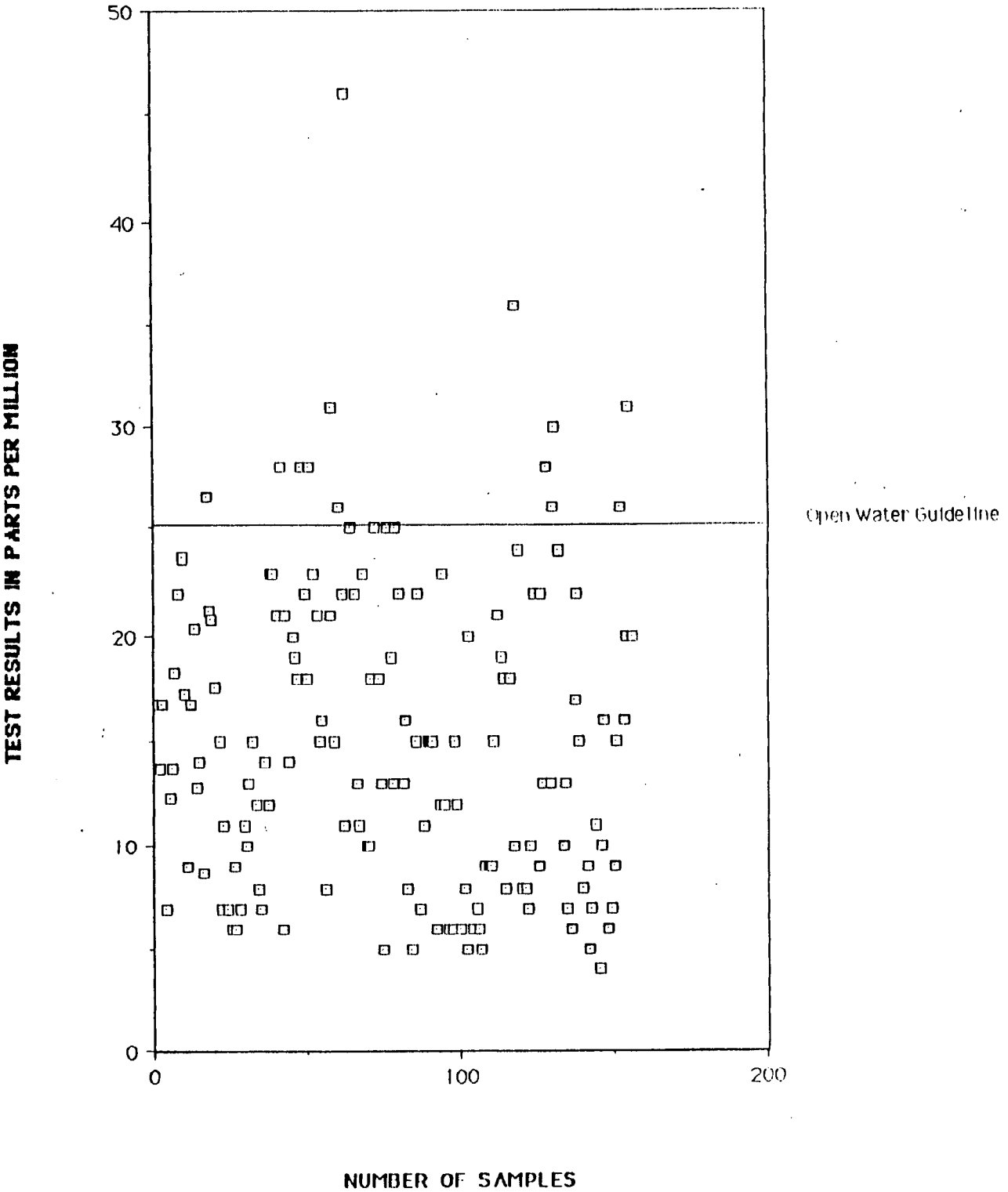
TOTAL KJELDAHL NITROGEN



note : total Kjeldahl nitrogen is not present on the Restricted Land Use Guidelines

Graph : TR12

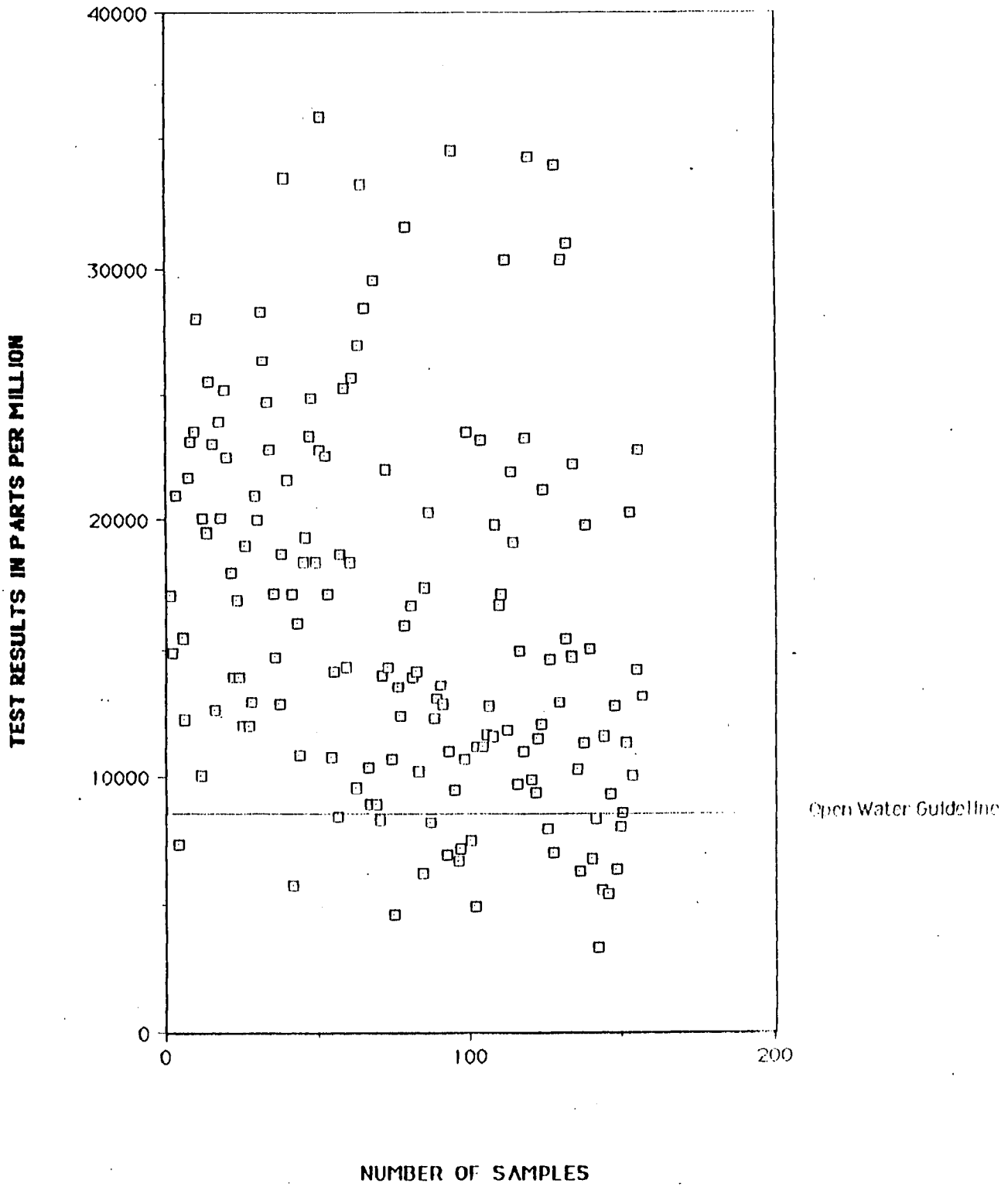
CHROMIUM



note : Restricted Land Use Guideline is 120 ppm.

Graph : TR13

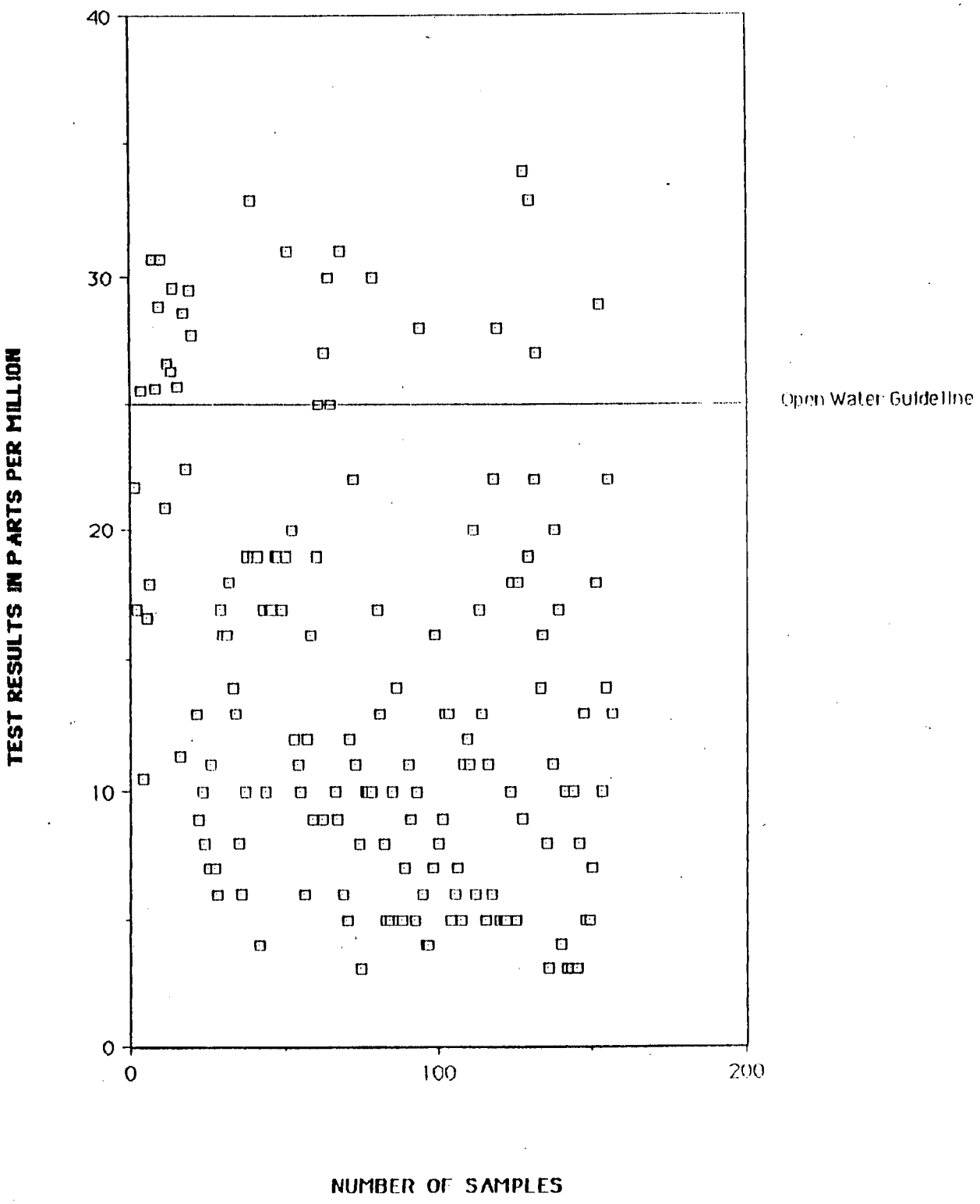
IRON



note : Iron is not present on the Restricted Land Use Guideline.

Graph : TR14

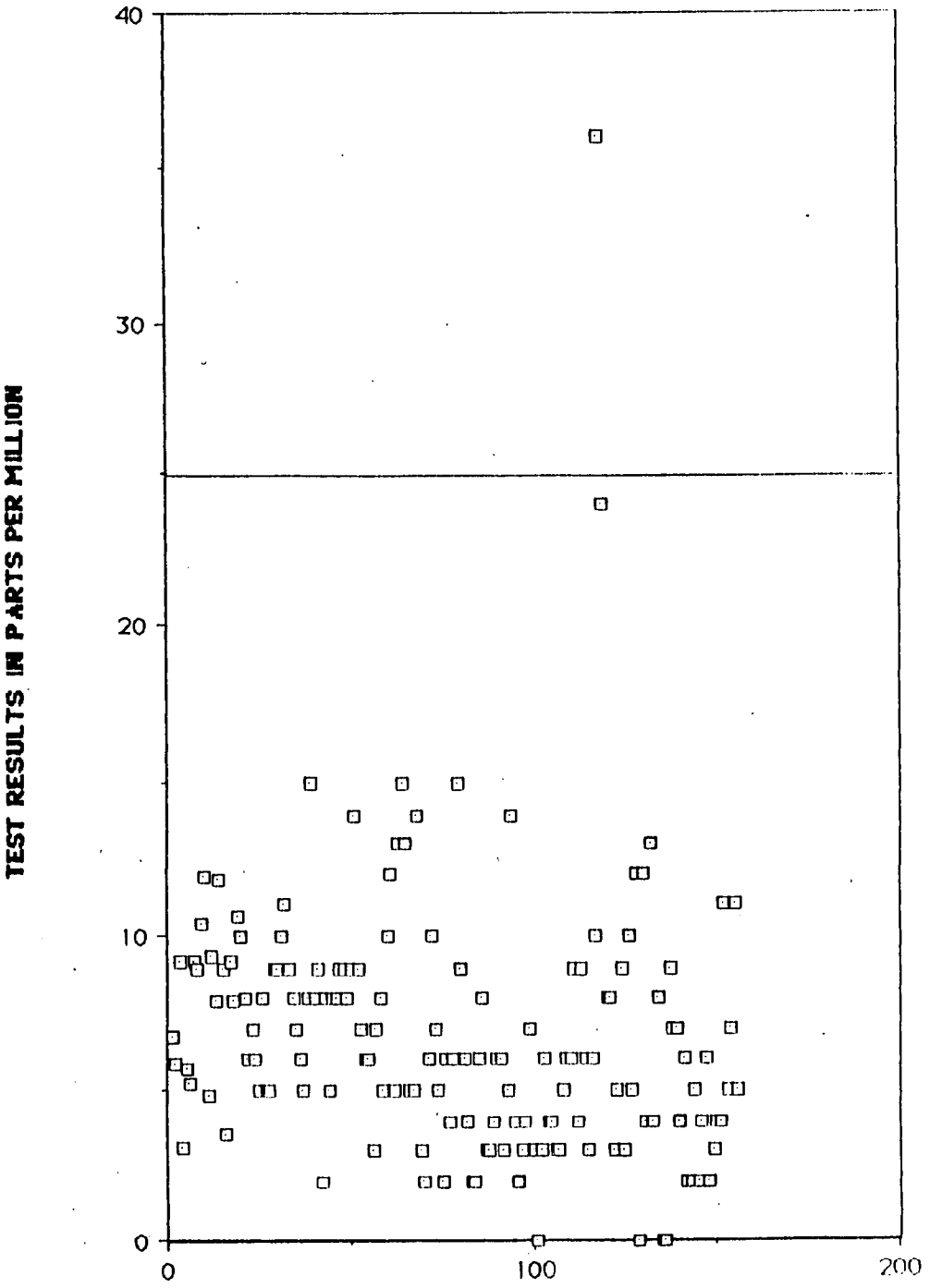
NICKEL



note : Restricted Land Use Guideline is 60 ppm.

Graph TR15

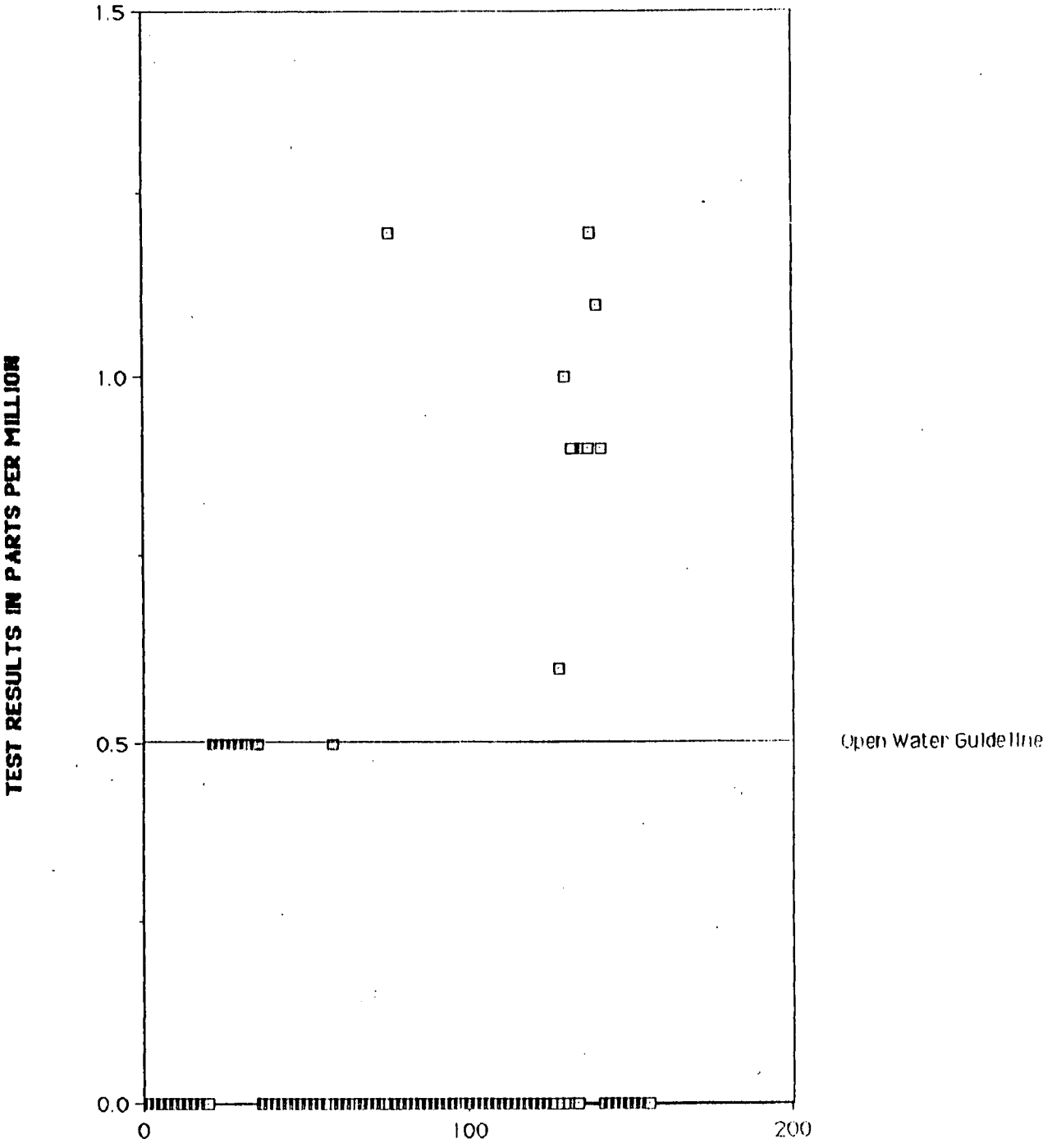
COBALT



note : Open Water Guideline is 50 ppm.

Graph : TR16

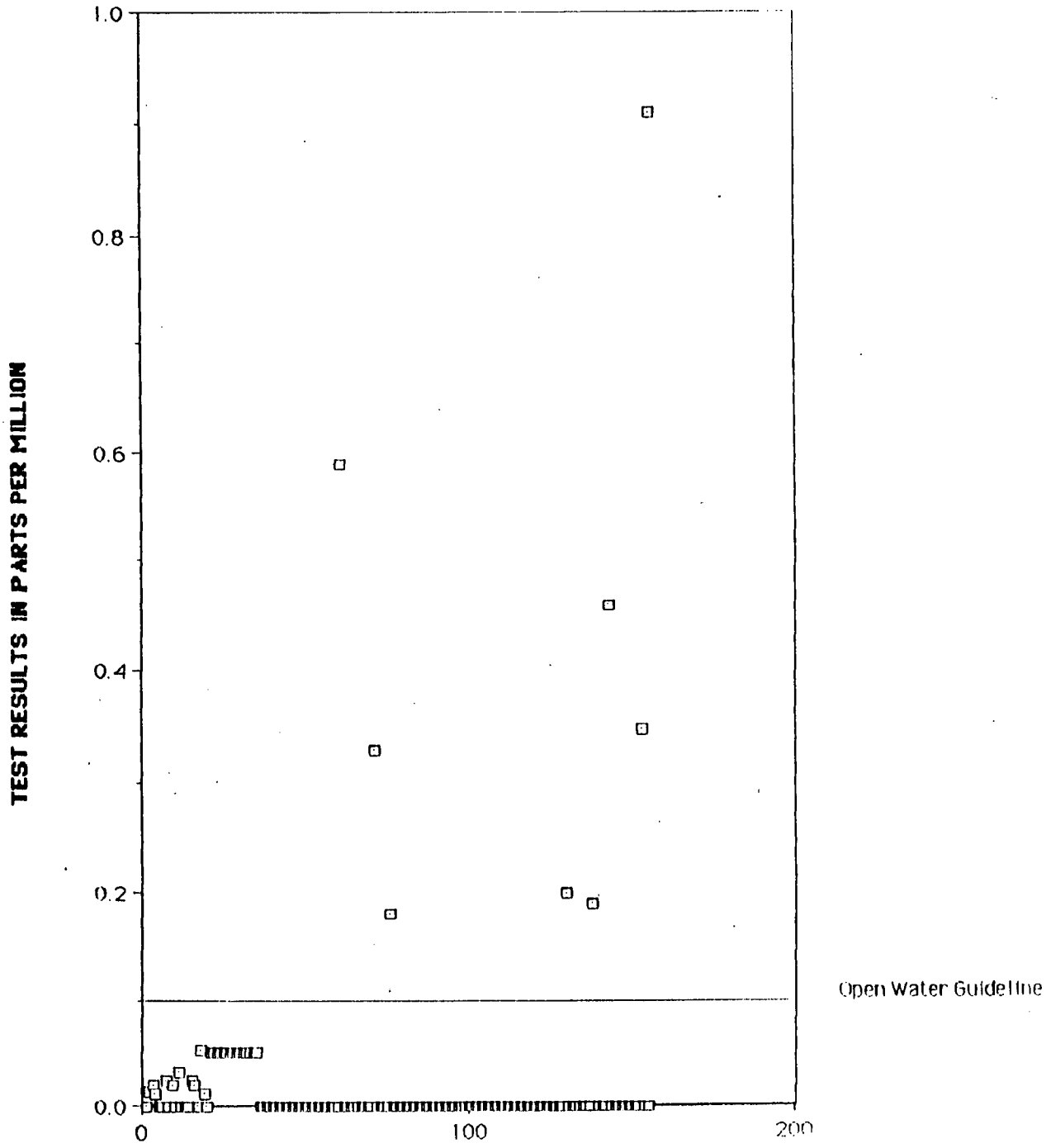
SILVER



note : silver is not present on the Restricted Land Use Guideline.

Graph : TR17

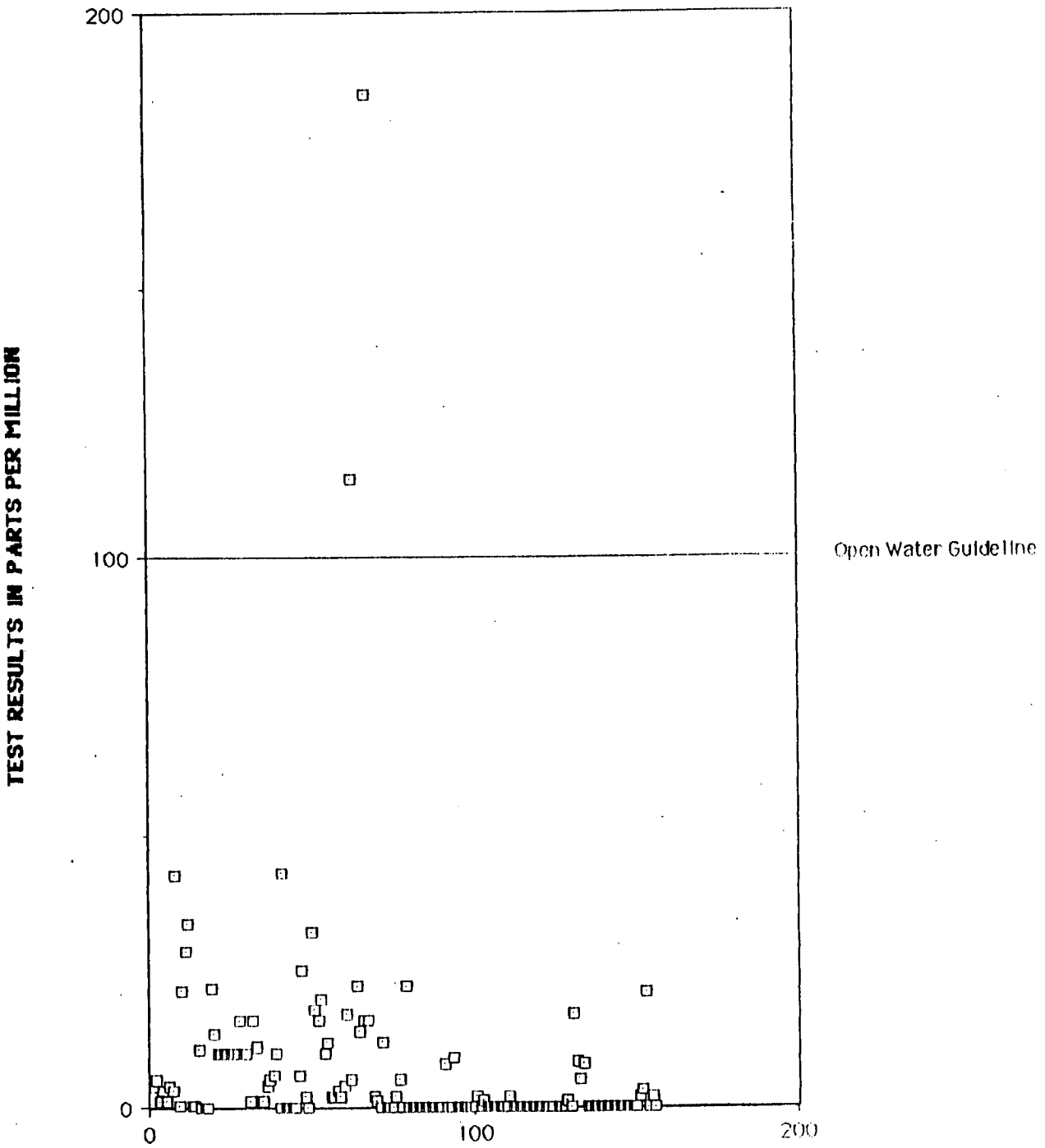
CYANIDE



note : cyanide is not present on the Restricted Land Use Guideline.

Graph : TR18

AMMONIA



note : ammonia is not present on the Restricted Land Use Guidelines.