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BASIN CHARACTERIZATION SUMMARY

ANALYTICAL RESULTS, DATABASE MANAGEMENT AND QUALITY ASSURANCE FOR ANALYSIS OF SOIL CORES FROM THE F- AND H-AREA SEEPAGE BASINS

December 1985

E. I. du Pont de Nemours & Co.
Savannah River Laboratory
Aiken, SC 29808

PREPARED FOR THE U.S. DEPARTMENT OF ENERGY UNDER CONTRACT DE-AC09-76SR00001

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February 4, 1992

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AUTHOR(S)

P. Corbo, M. V. Kantelo, C. B. Fliermans

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J. C. Corey, Research Manager
Environmental Sciences Division

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CONTENTS

INTRODUCTION AND SUMMARY

SRP Waste Management Technology Department retained Woodward-Clyde Consultants to oversee collection and analysis of soil core samples and to develop closure plans for the F- and H-Area seepage basins. Waste Management Technology requested the SRL Environmental Sciences Division to provide database management and quality assurance of analytical data from the F- and H-Area seepage basin soil cores.

The establishment of a computerized database and data reporting in table and graph forms were incorporated into the database management program. A database of analytical results for radionuclides, cations, and anions was constructed on an IBM 3081 mainframe computer.

Two subcontractors were chosen to perform the laboratory analyses of the soil cores. The major subcontractor (Controls for Environmental Pollution, Santa Fe, New Mexico) analyzed all samples and was audited as part of the quality assurance program. The second subcontractor (EAL Corporation, Richmond, CA) performed limited analyses on selected samples for quality control purposes. After a detailed evaluation, results reported by Controls for Environmental Pollution (CEP) for ^{129}I, ^{241}Am, and the isotopes of uranium and plutonium were found to be suspect. Results from EAL were determined to be a more accurate representation of concentrations of these constituents in the basin soils.

The highest concentrations of most radionuclides and inorganic constituents were found within the top foot of basin soil. Tritium, ^{90}Sr, iron, and in some cases ^{137}Cs, sodium, and nitrate were found to persist at elevated levels to at least 3 feet.

SOIL SAMPLING AND ANALYSIS

The sampling program was implemented by the Waste Management Technology Department, with assistance from Alsay, Inc. and Woodward-Clyde Consultants (Woodward-Clyde Consultants, 1985). Twenty-one cores were taken from the F- and H-Area basins. The locations of these cores are shown in Figures 1 and 2. The three to four foot length of each core was divided into six inch segments. Samples were prepared for shipping and designated as "A". A second (backup) core was taken two to three feet from each of the "A" sampling sites. These cores were segmented similarly to the "A" cores, designated as "B", and archived.

Analyses were performed by CEP for the radionuclides, cations, and anions listed in Table 1.

TABLE 1

Radionuclides, Cations, and Anions Analyzed in F- and H-Area Seepage Basin Soil Cores

Radionuclides		Cations and Anions	
Species	CEP Detection Limit (pCi/g)	Species	CEP Detection Limit (µg/g)
^{241}Am	0.05	Ag	5
^{141}Ce	*	As	2
^{144}Ce	*	B	5
$^{243,244}Cm$	0.05	Ba	5
^{60}Co	*	Be	5
^{134}Cs	*	Bi	5
^{137}Cs	*	Cd	2
^{3}H	0.05	CN	5
^{129}I	0.05	Cr	8
^{95}Nb	*	Cu	5
^{147}Pm	0.05	Fe	10
^{238}Pu	0.05	F	50
$^{239,240}Pu$	0.05	Hg	2
^{103}Ru	*	Li	2
^{106}Ru	*	Mn	5
^{89}Sr	0.05	NO_2	100
^{90}Sr	0.05	NO_3	100
^{99}Tc	0.05	Pb	2
^{232}Th	0.05	Se	2
$^{233,234}U$	0.05	Sn	5
^{235}U	0.05	Ti	5
^{238}U	0.05	W	5
^{95}Zr	*	Zn	5

* Detection limits vary from sample to sample as a function of concentrations of other radionuclide constituents.

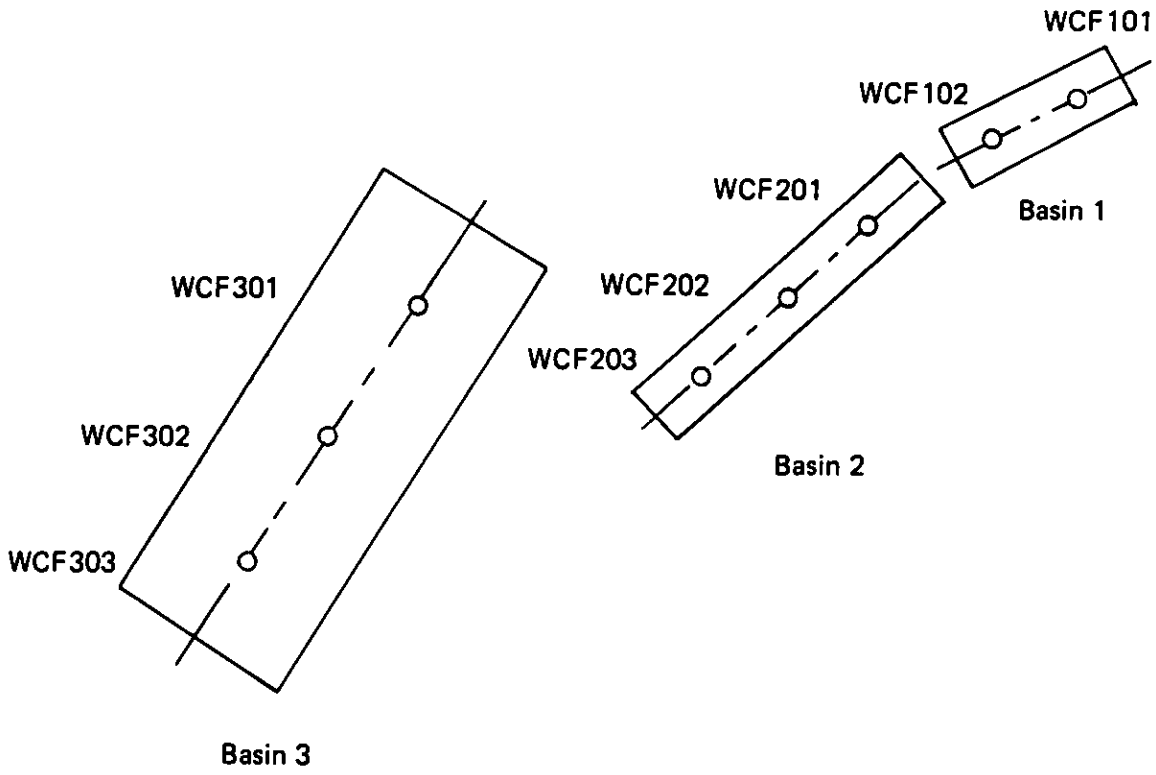

FIGURE 1. Location of F-Area Seepage Basin Soil Cores

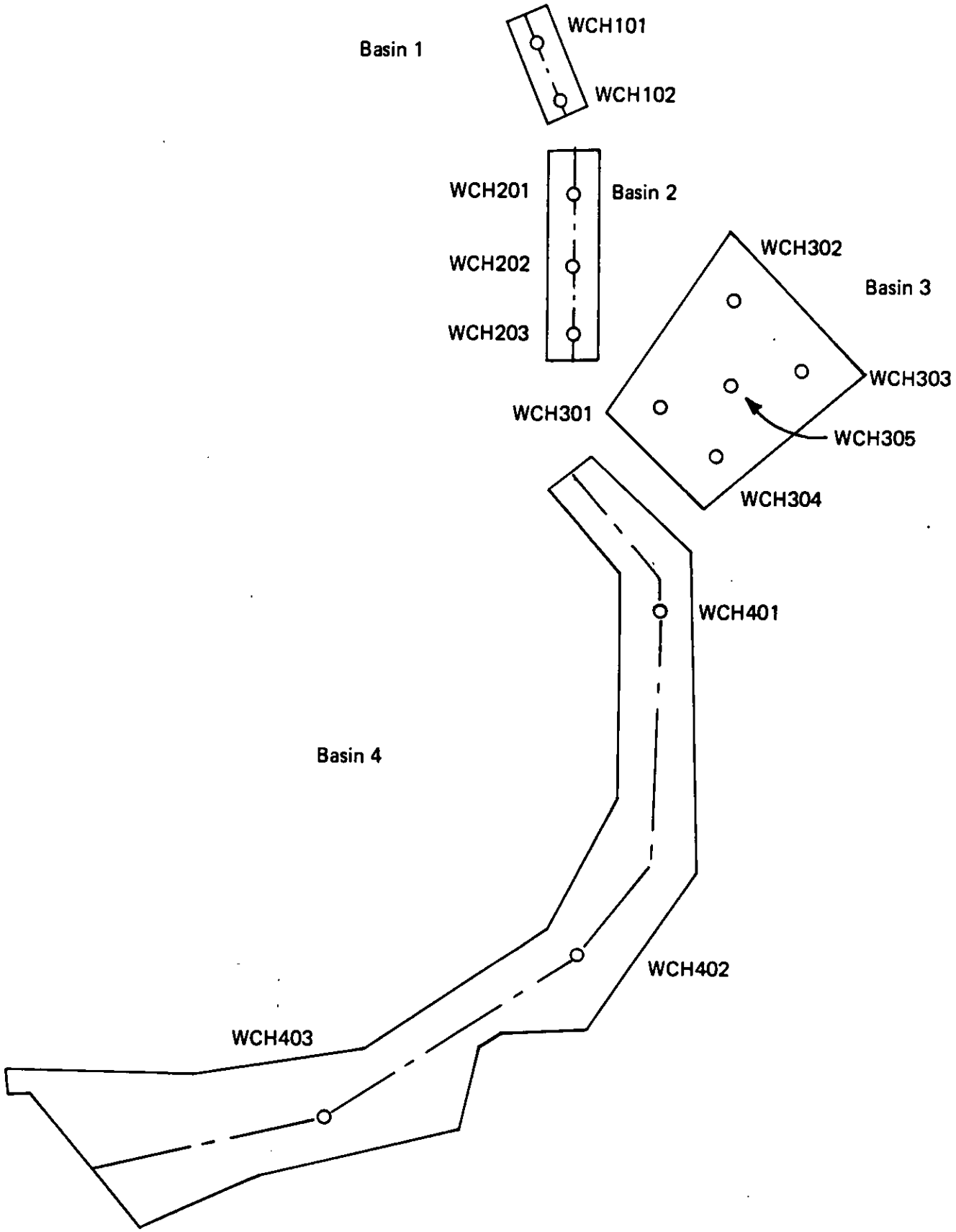

FIGURE 2. Location of H-Area Seepage Basin Soil Cores

DATABASE MANAGEMENT

Coding instructions for identification of sample analyses, and procedures for data transfer and data retrieval were developed for the database management program.

Data Management Program

A data management program was developed in January 1985 (Fliermans, 1985). Parameters included in the database are listed in Table 2. Samples were coded by area, basin, core, depth to top of sample, and sampling interval. For example, the sample coded as WCH102/1.0/0.5 is interpreted as: WC, Woodward-Clyde; H, H-Area; 1, basin 1; 02, core 2; 1.0, depth to the top of sample in feet; and 0.5, sample interval in feet.

Data Transfer and Retrieval

Data were transmitted to SRL on personal computer diskettes, and were subsequently transferred to an IBM 3081. SAS (Statistical Analysis Systems, Inc.) programs were used to produce tables and graphs of the data presented in this report.

QUALITY ASSURANCE

Auditing of the major subcontractor's laboratory, duplicate analyses of quality control samples by a second laboratory, detailed evaluation of the data, and verification of database management were incorporated into the quality assurance program.

Laboratory Audit

The analytical laboratory and analytical procedures of CEP were audited by SRL personnel (Gordon and Kantelo, 1985). Quality control and quality assurance practices were found to be satisfactory. CEP was judged to be capable of producing satisfactory results, although several shortcomings were identified during the audit. Chemical procedures for ^{99}Tc, ^{129}I, and ^{147}Pm were questioned and comments were directed to CEP management. Chemical yield determinations for the ^{99}Tc and ^{147}Pm assays and equilibration of iodine tracer in the ^{129}I analysis were found to not be rigorous. CEP's description of all analytical methods is given in Appendix I.

Discrepancies were found in the CEP library of gamma abundance values of eight radionuclides. Of these eight, only one (^{134}Cs) was analyzed in the basin core samples. However, to quantify ^{134}Cs for this set of samples, CEP actually used another gamma ray having an abundance not in question.

TABLE 2

Parameters Included in the F- and H-Area Soil Core Analytical Database

Parameter
Sample name
Depth to top of sample
Sampling interval
Date of analysis
Time of analysis
Laboratory name
Laboratory ID for sample
Name of analysis
Analytical method
Instrument type
Result
Units
Accuracy
Dilution factor
Concentration of standard
Initials of analyst

Despite the satisfactory audit, critical evaluation of the subsequently reported results revealed significant problems in the analysis for isotopes of iodine, americium, uranium, and plutonium. The inconsistent results for these isotopes are discussed in the following subsection.

Laboratory Analyses and Evaluation of Data

Fourteen of the "B" samples were analyzed by a second laboratory, EAL Corporation. These samples were analyzed for all of the radionuclides and inorganic species listed in Table 1 except for ^{147}Pm, ^{89}Sr, cyanide, nitrate, nitrite, and fluoride.

Since the "A" and "B" cores were taken several feet apart, minor differences in the results from CEP and EAL could be expected. There was general agreement between CEP ("A" samples) and EAL ("B" samples) for most analyses; however, major discrepancies were found in analytical results for ^{129}I, ^{241}Am, $^{233,234}U$, ^{235}U, ^{238}U, ^{238}Pu, and $^{239,240}Pu$. The discrepancies between these radionuclides are greater than what could reasonably be expected. A detailed inspection (Appendix V) of the data revealed that only data from the EAL laboratory should be considered for these radionuclides.

Americium, uranium, and plutonium are analyzed radiochemically which consists of chemical separation, purification, electrodeposition, and alpha spectrometry. The decay of ^{241}Am, ^{235}U, and ^{238}U results in emission of gamma rays which allows direct determination of concentrations of these nuclides by gamma spectrometric measurement of the original soil sample. The comparisons in Appendix V demonstrate that CEP's reported results for uranium isotopes were not consistent with the corresponding results derived from their gamma spectrometric measurement. However, these latter results were consistent with both EAL's reported uranium results and the results derived from EAL's gamma spectrometric measurement. From this evaluation it was concluded that CEP had performed the uranium analyses incorrectly. For ^{241}Am, such comparisons were not possible since CEP's gamma spectrometric measurement did not include ^{241}Am. However, due to the large differences in reported ^{241}Am results from CEP and EAL, and based on the consistent results for the two methods at EAL, the results reported by CEP for ^{241}Am were judged to be suspect. Thus, the EAL results for uranium and ^{241}Am were accepted as valid and CEP's results were rejected.

For plutonium, the EAL results were accepted and CEP results were rejected, based on evidence of a plutonium analysis problem at CEP (Appendix V). For ^{129}I, CEP results were consistently biased lower than EAL results. As shown in Appendix V, CEP results were generally in the range of 1 to 10% of the EAL results. This low bias is attributed primarily to a less than rigorous radiochemical

procedure for ^{129}I as identified in the audit of CEP (Gordon and Kantelo, 1985). Thus, EAL results were accepted and CEP results were rejected for ^{129}I.

Data Management

Data management at CEP was examined during the audit of CEP. Subsequently, all data were transmitted on computer diskettes along with paper copies. All computer data were verified by ESD personnel against the data received from CEP on paper. The data were also inspected for spurious results. CEP was notified by letter of any questionable data and was asked to check these data against original laboratory data. Any changes were documented and made on the computerized database. In cases of duplicate analyses, the larger result was reported and recorded on the computer file.

ANALYTICAL RESULTS

Analytical results for the F- and H-Area seepage basin soil cores are given in Appendices II and III. The results are decay corrected to a reference date of March 1985. Graphs are given in Appendix IV for the mean concentration found in each basin versus depth. In averaging concentrations, reported detection limit values have been treated as real values.

F-Area Seepage Basins

All radionuclides listed in Table 1, except ^{141}Ce, were observed in the soil cores. $^{243,244}Cm$, ^{144}Ce, ^{60}Co, ^{103}Ru, and ^{89}Sr were present infrequently. Silver, beryllium, lead, selenium, tungsten, cyanide, and nitrite were not found in the soil cores. Chromium, iron, fluoride, manganese, sodium, nitrate, and titanium were found above detection limits frequently, while the remaining cations and anions in Table 1 were found infrequently.

The ranges of concentrations for species found in the F-Area seepage basins are listed in Table 3. The majority of the radionuclide inventory was found in the top foot of core, for most of the cores. Tritium and ^{90}Sr were found to persist throughout the cores. For most of the cations and anions, a large portion of the inventory was found in the top foot of cores, also. Iron, sodium, and in some cases nitrate and fluoride, were found to persist at elevated levels throughout the core.

Additional radionuclides which were not included in the required analyses have been identified. As discussed in Appendix VI, these nuclides are present at low concentrations and are not major constituents.

TABLE 3

Range of Concentrations for Radionuclides, Cations and Anions Found in F-Area Seepage Basin Soil Cores*

Radionuclides		Cations and Anions	
Species	Range (pCi/g)†	Species	Range (µg/g)†
^{241}Am**	0.2 - 80.6	Ag	LTDL
^{141}Ce	LTDL	As	2 - 9
^{144}Ce	0.44 - 3.7	B	10 - 10
$^{243,244}Cm$	0.17 - 5	Ba	15 - 15
^{60}Co	0.17 - 13.5	Be	LTDL
^{134}Cs	0.05 - 4.5	Bi	2 - 2
^{137}Cs	0.59 - 4920	Cd	LTDL
^{3}H	2561 - 13211	CN	LTDL
^{129}I**	1.8 - 117	Cr	8 - 48
^{95}Nb	17 - 2620	Cu	11 - 11
^{147}Pm	0.08 - 88	Fe	2466 - 7633
^{238}Pu**	0.70 - 709	F	43 - 125
$^{239,240}Pu$**	2.1 - 2944	Hg	2.3 - 11
^{103}Ru	0.49 - 4.5	Li	2.1 - 5
^{106}Ru	1.04 - 325	Mn	5.3 - 90
^{89}Sr	2.21 - 28.4	Na	18 - 1698
^{90}Sr	0.98 - 2461	Ni	5.7 - 47
^{99}Tc	0.32 - 13.8	NO_2	LTDL
^{232}Th	1.83 - 17	NO_3	110 - 210
$^{233,234}U$**	2.1 - 25.2	Pb	LTDL
^{235}U**	0.3 - 15.6	Se	LTDL
^{238}U**	3.7 - 32.4	Sn	10 - 53
^{95}Zr	0.08 - 38.8	Ti	7.7 - 87
		W	LTDL
		Zn	6.7 - 30

LTDL = Less than detection limits for all samples
* Data from CEP unless otherwise noted
** Range based only on the limited number of cores and depth intervals analyzed by EAL.
† Minimum value represents lowest measured positive value

H-Area Seepage Basins

Except for ^{141}Ce and ^{95}Zr, all radionuclides listed in Table 1 were observed in soil cores. Although ^{95}Zr had been released to the basins, its gamma spectrometric measurement was subject to significant interferences that precluded its accurate identification. The ^{95}Zr concentrations reported by CEP were incorrect (Appendix V).

Except for beryllium, cadmium, and selenium, all cations and anions listed in Table 1 were detected in the soil samples. Silver, arsenic, cyanide, tungsten, and mercury were observed above detection limits in only a few samples.

The ranges of concentrations for species found in the H-Area seepage basins are listed in Table 4. The distribution of radionuclides, cations, and anions throughout the core is similar to the F-Area distribution. Additional radionuclides which were not included in the required analyses have been identified at low concentrations. See Appendix VI.

TABLE 4

Range of Concentrations for Radionuclides, Cations and Anions Found in H-Area Seepage Basin Soil Cores*

Radionuclides		Cations and Anions	
Species	Range (pCi/g)†	Species	Range (μg/g)†
^{241}Am**	0.2 - 982	Ag	6 - 17
^{141}Ce	LTDL	As	2 - 6
^{144}Ce	1.66 - 303	B	5 - 75
$^{243,244}Cm$	0.06 - 704	Ba	7 - 84
^{60}Co	0.13 - 1270	Be	LTDL
^{134}Cs	0.05 - 178	Bi	9 - 25
^{137}Cs	0.14 - 18400	Cd	LTDL
^{3}H	80 - 34722	CN	5 - 9
^{129}I**	1.0 - 190	Cr	4 - 3833
^{95}Nb	0.18 - 43.1	Cu	8 - 79
^{147}Pm	0.23 - 2869	Fe	386 - 115,218
^{238}Pu**	0.3 - 2171	F	30 - 225
$^{239,240}Pu$**	0.3 - 11230	Hg	2 - 120
^{103}Ru	1.28 - 61.8	Li	2 - 14
^{106}Ru	1.48 - 453	Mn	5 - 967
^{89}Sr	1.52 - 1031	Na	14 - 1676
^{90}Sr	0.87 - 4869	Ni	21.7 - 87
^{99}Tc	0.30 - 267	NO_2	LTDL
^{232}Th	0.38 - 9.1	NO_3	130 - 500
$^{233,234}U$**	2.1 - 127	Pb	1.8 - 2780
^{235}U**	0.16 - 15.6	Se	2 - 2
^{238}U**	0.9 - 26.5	Sn	6.7 - 57
^{95}Zr	a	Ti	6 - 140
		W	10 - 101
		Zn	5 - 323

LTDL = Less than detection limits for all samples.
* Data from CEP unless otherwise noted.
** Range based only a limited number of cores and depth interval analyzed by EAL.
a Nuclide misidentified by subcontractor, concentrations could not be interpreted from data.
† Minimum value represents lowest measured positive value

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APPENDIX I — ANALYTICAL METHODOLOGY (CONTROLS FOR ENVIRONMENTAL POLLUTION)

Radiochemistry Methodology References

Parameter	Method References (From which CEP Methods are Derived)	Sample Preparation References
Tritium	(c)	(c)
Cobalt-60	901.1 (b)	(d)
Strontium-89	E-Sr-02-01 (a)	(d)
Strontium-90	E-Sr-02-01 (a)	(d)
Niobium-95	901.1 (b)	(d)
Zirconium-95	901.1 (b)	(d)
Technetium-99	E-Tc-01 (a)	(d)
Ruthenium-103	901.1 (b)	(d)
Ruthenium-106	901.1 (b)	(d)
Iodine-129	902.0 (b)	(d)
Cesium-134	901.1 (b)	(d)
Cesium-137	901.1 (b)	(d)
Cerium-141	901.1 (b)	(d)
Cerium-144	901.1 (b)	(d)
Thorium-232	E-Th-03-01 (a)	(d)
Uranium-233	E-U-04-01 (a)	(d)
Uranium-235	E-U-04-01 (a)	(d)
Uranium-238	E-U-04-01 (a)	(d)
Plutonium-238	E-Pu-04-01 (a)	(d)
Plutonium-239	E-Pu-04-01 (a)	(d)
Americium-241	E-Am-03-01 (a)	(d)
Curium-244	Pg. 55 (e)	(d)
Promethium-147	E-Pm-01 (a)	(d)

(a) Environmental Measurements Laboratory Procedures Manual, 25th Edition, 1982 U.S. Department of Energy (HASL 300).

(b) "Prescribed Procedures for Measurements of Radiochemistry in Drinking Water", EPA, 1980, 600/4-80-32.

(c) "Tritium Measurements Techniques", NCRP Report No. 47, May 28, 1976.

(d) Appendix A.

(e) "Collected Radiochemical Procedures" Los Alamos Scientific Laboratory, LA-1721, 4th Edition.

Parameter	Method References	Sample Preparation References
Arsenic	304 (a)	(d)
Barium	(c)	(d)
Beryllium	(c)	(c)
Bismuth	303A (a)	(c)
Boron	(c)	(c)
Cadmium	310A (a)	(c)
Chromium	312A (a)	(c)
Copper	313A (a)	(c)
Iron	(c)	(c)
Lead	316A (a)	(c)
Lithium	303 (a)	(c)
Mercury	320A (a)	(c)
Manganese	(c)	(c)
Nickel	(c)	(c)
Sodium	325A (a)	(c)
Selenium	304 (a)	(c)
Silver	324A (a)	(c)
Tin	303A (a)	(c)
Titanium	(b)	(c)
Zinc	(b)	(c)
Tungsten	(b)	(c)
Nitrate	418F (a)	(d)
Nitrite	419 (a)	(d)
Cyanide	412E (a)	(c)
Fluoride	413B (a)	(c)

(a) Standard Methods for the Examination of Water and Wastewater, 15th Edition, American Public Health Association, Water Pollution Controls Federation, 1981.

(b) "Inductively Coupled Plasma-Atomic Emmission Spetrometer Method for Trace Element Analysis of Water and Wastes", Method 200.7, Theodore D. Martin and John F. Kopp, USEPA.

(c) Appendix B.

(d) "Procedures for Handling and Chemical Analysis of Sediment and Water Samples", Russell Plumb Jr., EPA Corps. of Engineers Technical Report, EPA/CE-81-1.

APPENDIX A

SAMPLE PREPARATIONS FOR RADIOCHEMICAL ANALYSES

Sample Preparation Method

The following soil sample preparation method is used routinely by CEP:

(a) Sample containers are opened when they arrive at the CEP laboratory and their contents transferred into new clean drying pans.

(b) The drying pans filled with soil, are placed into an oven at 110°C and allowed to dry thoroughly.

(c) After the soil is thoroughly dried, it is pulverized to approximately one-hundred mesh.

(d) After the entire soil sample is ground to one-hundred mesh, the soil is mixed and separated, utilizing a splitter box technique.

(e) The thoroughly mixed soil sample is spread out on new clean plastic, marked off into quarters, and aliquots taken from each quarter until a five-hundred gram sample is collected for analysis.

Cesium-137 and 134, Cobalt-60, Niobium-95, Zirconium-95, Ruthenium-103 and 106, Cesium-134 and 137, Cerium-141 and 144

One-hundred grams of dried and pulverized sample is placed in a Marinelli beaker and counted for eight hours, on a Ge(Li) Detector, which is coupled to a 2048 computer based, multi-channel analyzer (Northern Scientific). The resulting spectrum is fed into a computer and specific nuclides, if present, are identified and quantized in terms of energy and net count rate with the aid of the computer.

Strontium-90

A ten-gram aliquot is spiked with Strontium-85 tracer and dissolved in HNO_3 - HF mixture. After dissolution of the soil, the solution is evaporated to dryness several times with HCl. Oxalic acid is added and the solution adjusted to a pH of 5.5 - 6.0 with NH_4OH. The solution is allowed to stand for several hours and is then stirred and filtered. The filtrate is discarded.

The precipitate and paper are transferred to a dish and dried overnight at 110°C. The oxalate precipitate is ignited in a muffle furnace at 400-500°C for two hours. The temperature is raised slowly to about 700°C and heating continued for two

hours.

The precipitate is cooled and transferred to an appropriate size beaker and dissolved in 1:1 HNO_3. About six drops of H_2O_2 (30%) is added to facilitate dissolution, and then the solution is gently heated to boiling. The solution is cooled to room temperature.

The solution is transferred to a suitable size beaker and evaporated to dryness. The residue is dissolved in 25 ml of 0.08 N HCl and transferred to a 125 ml separatory funnel using two 5 ml rinses of 0.08 N HCl.

After the 14-day ingrowth period is established, the Yttrium-90 is extracted with 5% di-2-ethylhexyl phosphoric acid (D_2EHPA) in toluene, back extracted into an aqueous phase, precipitated as the oxalate and counted in a low background internal gas flow proportional counter (Beckman Low Beta II) to determine the Strontium-90 content of the sample. The Strontium-85 tracer is counted on the Gamma Spectrometer to determine the percent recovery of the method.

Strontium-89

A ten-gram aliquot of sample containing standardized stable Strontium carrier is dried at 110°C for twenty-four hours, ashed in a muffle furnace with the addition of concentrated fuming nitric acid. The Strontium is precipitated with concentrated fuming nitric acid, redissolved is water, made basic with dilute ammonium hydroxide and precipitated as the oxalate. The dried oxalate precipitate is counted in a low-background proportional counter, which has 60% Strontium, Yttrium-90 efficiency. The Strontium-89 activity is determined by subtracting the previously measured Strontium-90 activity and its corresponding Yttrium-90 ingrowth from the measured Gross Strontium activity.

Isotopic Uranium (U-234, U-235, U-238)

CEP uses the following analytical method for analyzing Uranium-234, 235, 238 in soil: A ten-gram aliquot is spiked with Uranium-232 tracer. Total dissolution of

the soil is performed using a hydrofluoric-nitric acid mixture, nitrated and evaporated to dryness. The residue is dissolved in concentrated nitric acid and again taken to dryness and redissolved in dilute acid. The sample is purified with an ion exchange resin column. The Uranium is electroplated and the discs counted on a solid state alpha spectrometer and the chemical recovery is determined from the Uranium-232 tracer peak.

Thorium-232

CEP uses the following analytical method for analyzing Thorium-232 in soil: Two ten-gram aliquots of the sample are taken and Thorium-232 external tracer added to one of the aliquots. Total dissolution of the soil is performed using hydrofluoric-nitric acid mixture. The residue is dissolved in dilute hydrochloric acid. The samples are purified with an ion exchange resin column. The Thorium is electroplated and the stainless steel disc is counted on a solid state alpha spectrometer and the chemical recovery is determined from the Thorium-232 tracer peak in the second aliquot.

Iodine-129

Iodine-129 is removed from soil along with a standard Iodine carrier using concentrated ammonium hydroxide (NH_4OH) and hydrogen peroxide (H_2O_2). The soil is filtered and the filtrate is acidified with nitric acid (HNO_3) and extracted with carbon tetrachloride (CCl_4) using a 0.2% hydrazine solution which supplies more purification and an aqueous media for precipitation. Iodine is precipitated with silver nitrate ($AgNO_3$) and filtered on a tared glass fiber as silver iodide (AgI). The dried precipitate is weighed for recovery and counted for Iodine-129 in a thin window, gas flow, proportional counter.

Plutonium-238 and 239

The soil sample is totally dissolved using a 40% solution of HF and Pu-236 tracer is added before dissolution. The sample is fumed with HF and converted to sulfate

and then brought up with HNO_3. The Plutonium is separated using an ion exchange resin. The Plutonium is eluted off the column and electroplated on a stainless steel disc. The disc is counted on a solid state alpha spectrometer and chemical recovery is determined from the tracer peak.

Americium-241

The soil sample is totally dissolved using a 40% solution of HF and Am-243 tracer is added before dissolution. The sample is fumed with HF and converted to sulfate and then brought up with HNO_3. The Amercium is separated using an ion exchange resin. The Americium is eluted off the column and electroplated on a stainless steel disc. The disc is counted on a solid state alpha spectrometer and chemical recovery is determined from the tracer peak.

Promethium-147

A ten-gram soil sample is totally dissolved using a 40% solution of hydrofluoric acid. After pH adjustment to 3.4, Promethium is then extracted into a solution containing di-2-ethylhexyl phosphoric acid and a liquid scintillator, transferred to a counting vial and counted in a liquid scintillation spectrometer.

Curium-244

Two ten-gram aliquots of prepared soil are taken. To one sample, a tracer of Curium is added and this serves as the "spike" sample. The samples are completely dissolved using nitric and hydrofluoric acids. Samples are then passed through a clean-up ion exchange column to remove impurities. After clean-up, the samples are passed through a chloride-form ion exchange column and the Curuim is adsorbed as a thyocyanate complex (5m ammonion thyocyanate at pH 1.5 is added to sample before ion exchange). The Curium is eluted from the column using a dilute ammoniumm thyocyanate solution. The samples are electroplated on stainless steel discs and counted by alpha spectroscopy.

Technetium-99

A ten-gram aliquot of sample is wet ashed with nitric acid. After wet ashing is completed, the sample is evaporated to the smallest volume possible without "salting out". The sample is cooled and 800 ml of H_2O is added. The sample is stirred and filtered through a 15 cm glass fiber filter. The filtrate is then analyzed for Technetium-99 (see method reference).

APPENDIX B

SAMPLE PREPARATIONS FOR INORGANIC ANALYSES AND SELECTED ANALYTICAL METHODS

Sample Preparation Method for the Analysis of Fluoride in Solids

Fluoride is separated from the other constituents in solids by distillation as fluosilic (or hydrofluoric) acid from an sulfuric acid solution with a boiling point higher than that of water. Quantitative Fluoride recovery is approached by using a one-gram sample. Sulfate carry-over from H_2SO_4 is minimized by distilling over a broad temperature range with a strict control of maximum temperature. The distillate is then analyzed using a selective ion electrode.

ATTACHMENT 1

ACID DIGESTION OF SEDIMENTS, SLUDGES AND SOILS

1. Scope and Application

1.1 This method is an acid digestion procedure used to prepare sediments, sludges, and soil samples for analysis by flame or furnace atomic absorption spectroscopy (AAS) or by inductively coupled argon plasma spectroscopy (ICP). Samples prepared by this method may be analyzed by AAS or ICP for the following metals:

Aluminum	Chromium	Selenium
Antimony	Cobalt	Silver
Arsenic	Copper	Sodium
Barium	Iron	Thallium
Beryllium	Lead	Tin
Cadmium	Magnesium	Vanadium
Calcium	Manganese	Zinc
Lithium	Nickel	Tungsten
Titanium	Potassium	Bismuth
		Boron

2. Summary of Method

NOTE: A separate digestion procedure is required for furnace AA and ICP analysis.

2.1 A representative 1 g (wet weight) sample is digested in nitric acid and hydrogen peroxide. The digestate is then refluxed with either nitric acid or hydrochloric acid. Hydrochloric acid is used as the final reflux acid for the furnace AA analysis of Sb and Sn, the flame AA or ICP analysis of Al, Sb, Ba, Be, Ca, Cd, Cr, Co, Cu, Fe, Pb, Mg, Mn, Ni, K, Ag, Na, Tl, Sn, V and Zn. Nitric acid is employed as the final reflux acid for the furnace AA analysis of As, Be, Cd, Cr, Co, Cu, Fe, Pb, Mn, Ni, Se, Ag, Tl, V, and Zn. A separate sample shall be dried for a total solids determination (Exhibit D, Attachment 9).

3. Apparatus and Materials

3.1 Conical beakers - 250 ml Phillips beaker or other appropriate vessel.

3.2 Watch glasses

3.3 Thermometer that covers range of 0° to 200°C

3.4 Whatman No. 42 filter paper or equivalent

4. Reagents

4.1 ASTM Type II water (ASTM D1193): Water must be monitored.

4.2 Concentrated Nitric Acid (sp. gr. 1.41)

4.3 Concentrated Hydrochloric Acid (sp. gr. 1.19)

4.4 Hydrogen Peroxide (30%): Tin-free grade.

5. Sample Preservation, and Handling

5.1 Non-aqueous samples must be refrigerated upon receipt until analysis.

6. Procedure

6.1 Mix the sample thoroughly to achieve homogeniety. For each digestion procedure, weigh and transfer to a conical beaker a 1.0 g portion (to the nearest 0.01 gms) of sample.

6.2 Add 10 ml of 1:1 nitric acid (HNO_3), mix the slurry, and cover with a watch glass. Heat the sample to 95°C and reflux for 10 minutes without boiling. Allow the sample to cool, add 5 ml of concentrated HNO_3, replace the watch glass, and reflux for 30 minutes. Do not allow the volume to be reduced to less than 5 ml while maintaining a covering of solution over the bottom of the beaker.

6.3 After the second reflux step has been completed and the sample has cooled, add 2 ml of Type II water and 3 ml of 30% hydrogen peroxide (H_2O_2). Return the beaker to the hot plate for warming to start the peroxide reaction. Care must be taken to ensure that losses do not occur due to excessively vigorous effervescence. Heat until effervescence subsides, and cool the beaker.

6.4 Continue to add 30% H_2O_2 in 1 ml aliquots with warming until the effervescence is minimal or until the general sample appearance is unchanged. (NOTE: Do not add more than a total of 10 ml 30% H_2O_2.)

6.5 If the sample is being prepared for the furnace AA analysis of Sn and Sb, the flame AA or ICP analysis of Al, Sb, Ba, Be, Ca, Cd, Cr, Co, Cu, Fe, Pb, Mg, Mn, Ni, K, Ag, Na, Tl, Sn, V, and Zn, add 5 ml of 1:1 HCl and 10 ml of Type II water, return the covered beaker to the hot plate, and heat for an additional 10 minutes. After cooling, filter through Whatman No. 42 filter paper (or equivalent) and dilute to 100 ml with Type II water (or centrifuge the sample - see Note 1). The diluted sample has an approximate acid concentration of 2.5% (v/v) HCl and 5% (v/v) HNO_3. Dilute the digestate 1:5 with the deionized water. The sample is now ready for analysis.

6.6 If the sample is being prepared for the furnace analysis of As, Be, Cd, Cr, Co, Cu, Fe, Pb, Mn, Ni, Se, Ag, Tl, V, and Zn, continue heating the acid-peroxide digestate until the volume has been reduced to approximately 2 ml, add 10 ml of Type II water, and warm the mixture. After cooling, filter through Whatman No. 42 filter paper (or equivalent - see Note 1) and dilute to 100 ml with Type II water (or centrifuge the sample). The diluted digestate solution contains approximately 2% (v/v) HNO_3. Dilute the digestate 1:5 with deionized water. For analysis, withdraw aliquots of appropriate volume, and add any required reagent or matrix modifier. The sample is now ready for analysis.

7. Calculations

7.1 A separate determination of percent solids must be performed (Exhibit D, Attachment 9).

7.2 The concentrations determined in the digest are to be reported on the basis of the dry weight of the sample.

$$\text{Concentration (dry wt.) (mg/kg)} = \frac{C \times V}{W \times S}$$

where C = Concentration (mg/L)
V = 0.1L (Final volume in liters after sample preparation)
W = 0.002 kg (weight in kg of wet sample)
S = % Solids/100

REF: Modification of Method 3050 from SW-846, Test Methods for Evaluating Solid Waste, EPA Office of Solid Waste and Emergency Response, July 1982.

APPENDIX II — RESULTS OF THE F- AND H-AREA BASIN SOIL ANALYSES (CONTROLS FOR ENVIRONMENTAL POLLUTION)

- CEP's results for ^{241}Am, ^{129}I, ^{234}U, ^{235}U, ^{238}U, ^{238}Pu, $^{239,240}Pu$, in both F- and H-Area basins, and ^{95}Zr in the H-Area basins reported in Appendix II were found to be erroneous. (See text for details)
- "-" denotes value less than detection limits
- See Appendix VI for additional radionuclide constituents
- Precision at 95% confidence level (1.96 standard deviation)

TABLE II-1

Results of Radioisotope and Inorganic Analyses by CEP

F-AREA SEEPAGE BASINS RADIOISOTOPE ANALYSES

REPORTED AS PICOCURIES/GRAM
BASIN=1

		TESTNAME							
		AM-241 *		CE-141		CE-144		CM-244	
CORE	DEPTH TO TOP OF SAMPLE	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION
WCF101A	0	22.900	3.700	-1.000	-1.000	-2.000	-2.000	-0.050	-0.050
	0.5	-0.050	-0.050	-2.000	-2.000	-4.000	-4.000	-0.050	-0.050
	1	-0.050	-0.050	-2.000	-2.000	-3.000	-3.000	-0.050	-0.050
	1.5	-0.050	-0.050	-2.000	-2.000	-3.000	-3.000	-0.050	-0.050
	2	0.110	0.060	-2.000	-2.000	-3.000	-3.000	-0.050	-0.050
WCF102A	0	0.090	0.080	-0.050	-0.050	-35.000	-35.000	0.170	0.050
	0.5	-0.050	-0.050	-1.000	-1.000	-2.000	-2.000	-0.050	-0.050
	1	-0.050	-0.050	-1.000	-1.000	-2.000	-2.000	-0.050	-0.050
	1.5	-0.050	-0.050	-1.000	-1.000	-2.000	-2.000	-0.050	-0.050
	2	-0.050	-0.050	-1.000	-1.000	-2.000	-2.000	-0.050	-0.050
	2.5	-0.050	-0.050	-0.050	-0.050	-1.000	-1.000	-0.050	-0.050

*See footnote, p.II-1

F-AREA SEEPAGE BASINS RADIOISOTOPE ANALYSES

REPORTED AS PICOCURIES/GRAM
BASIN=1

		TESTNAME							
		CO-60		CS-134		CS-137		H-3	
CORE	DEPTH TO TOP OF SAMPLE	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION
WCF101A	0	12.800	0.500	4.520	0.590	4810.000	10.000	10198.000	7.000
	0.5	0.320	0.050	0.820	0.080	858.000	13.000	6449.000	4.000
	1	-0.300	-0.300	0.540	0.080	742.000	9.000	8808.000	6.000
	1.5	-0.200	-0.200	0.500	0.070	789.000	13.000	13211.000	8.000
	2	-0.200	-0.200	0.440	0.100	299.000	7.000	4963.000	4.000
WCF102A	0	13.500	0.600	4.210	0.800	4920.000	12.000	10560.000	5.000
	0.5	0.170	0.050	0.160	0.050	367.000	6.000	5100.000	4.000
	1	-0.200	-0.200	-0.050	-0.050	215.000	5.000	4434.000	3.000
	1.5	-0.200	-0.200	-0.030	-0.030	89.600	0.400	5396.000	4.000
	2	-0.200	-0.200	-0.030	-0.030	41.200	0.200	5643.000	4.000
	2.5	-0.200	-0.200	-0.190	-0.190	13.700	0.200	5414.000	3.000

F-AREA SEEPAGE BASINS RADIOISOTOPE ANALYSES

REPORTED AS PICOCURIES/GRAM
BASIN=1

		TESTNAME							
		I-129*		NB-95		PM-147		PU-238*	
		RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION
CORE	DEPTH TO TOP OF SAMPLE								
WCF101A	0	17.100	1.800	930.000	8.000	88.000	2.000	1.030	0.710
	0.5	3.600	0.300	3.480	0.170	6.590	0.520	0.090	0.050
	1	3.500	0.300	2.910	0.140	4.040	0.430	-0.050	-0.050
	1.5	1.200	0.200	6.210	0.190	5.110	0.470	-0.050	-0.050
	2	0.400	0.200	0.330	0.130	3.860	0.420	-0.050	-0.050
WCF102A	0	-0.050	-0.050	2620.000	17.000	0.500	0.200	0.510	0.100
	0.5	0.890	0.160	7.450	0.180	18.000	1.000	-0.050	-0.050
	1	0.210	0.130	0.840	0.100	0.710	0.250	0.350	0.090
	1.5	0.170	0.080	0.650	0.190	0.490	0.240	-0.050	-0.050
	2	-0.050	-0.050	0.770	0.170	0.250	0.220	-0.050	-0.050
	2.5	0.320	0.140	0.860	0.130	-0.050	-0.050	-0.050	-0.050

*See footnote, p. II-1

F-AREA SEEPAGE BASINS RADIOISOTOPE ANALYSES

REPORTED AS PICOCURIES/GRAM
BASIN=1

		TESTNAME							
		PU-239 *		RU-103		RU-106		SR-89	
		RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION
CORE	DEPTH TO TOP OF SAMPLE								
WCF101A	0	-0.050	-0.050	-1.700	-1.700	255.000	12.000	-0.050	-0.050
	0.5	0.060	0.040	-1.400	-1.400	28.100	1.500	-0.050	-0.050
	1	-0.050	-0.050	-1.000	-1.000	22.700	1.300	-0.050	-0.050
	1.5	-0.050	-0.050	-1.200	-1.200	17.000	1.300	-0.050	-0.050
	2	-0.050	-0.050	-0.900	-0.900	5.090	0.950	-0.050	-0.050
WCF102A	0	0.900	0.200	-27.000	-27.000	325.000	21.000	-0.050	-0.050
	0.5	-0.050	-0.050	-0.800	-0.800	9.230	0.940	-0.050	-0.050
	1	0.220	0.070	-0.600	-0.600	2.690	0.670	-0.050	-0.050
	1.5	-0.050	-0.050	-0.700	-0.700	2.460	0.670	-0.050	-0.050
	2	-0.050	-0.050	-0.500	-0.500	1.200	0.570	-0.050	-0.050
	2.5	-0.050	-0.050	-0.400	-0.400	1.040	0.480	-0.050	-0.050

*See footnote, p. II-1

F-AREA SEEPAGE BASINS RADIOISOTOPE ANALYSES

REPORTED AS PICOCURIES/GRAM
BASIN=1

		TESTNAME							
		SR-90		TC-99		TH-232		U-234*	
		RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION
CORE	DEPTH TO TOP OF SAMPLE								
WCF101A	0	271.000	26.000	-0.050	-0.050	10.300	1.000	4277.000	16.000
	0.5	8.020	1.740	1.050	0.300	3.390	0.410	412.000	10.000
	1	12.700	2.200	1.600	0.200	3.730	0.340	123.000	5.000
	1.5	12.700	2.200	-0.050	-0.050	3.120	0.360	52.300	0.300
	2	8.050	1.060	-0.050	-0.050	4.040	0.290	65.800	0.400
WCF102A	0	2461.000	116.000	8.500	0.400	17.000	2.000	1261.000	9.000
	0.5	1.620	0.670	0.670	0.300	3.490	0.280	4.350	0.110
	1	3.000	0.860	0.500	0.200	2.400	0.220	7.100	2.100
	1.5	1.590	1.130	0.900	0.100	4.020	0.230	68.900	0.400
	2	1.520	0.640	0.480	0.200	3.830	0.190	5.040	0.120
	2.5	-0.050	-0.050	0.380	0.200	2.200	0.160	6.960	0.140

* See footnote, p. II-1

F-AREA SEEPAGE BASINS RADIOISOTOPE ANALYSES

REPORTED AS PICOCURIES/GRAM
BASIN=1

		TESTNAME					
		U-235*		U-238*		ZR-95	
CORE	DEPTH TO TOP OF SAMPLE	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION
WCF101A	0	209.000	20.000	770.000	80.000	258.000	3.000
	0.5	30.000	10.000	74.000	27.000	1.330	0.150
	1	9.560	1.000	22.100	1.100	1.210	0.120
	1.5	1.240	0.250	9.410	1.100	2.220	0.140
	2	3.320	1.000	11.800	2.000	-0.500	-0.500
WCF102A	0	88.000	10.000	263.000	30.000	770.000	7.000
	0.5	0.300	0.100	0.900	0.200	2.720	0.140
	1	0.400	0.200	1.400	0.200	0.370	0.090
	1.5	3.510	1.000	12.400	1.000	0.600	0.200
	2	0.350	0.100	0.900	0.100	0.540	0.200
	2.5	0.400	0.100	1.240	0.500	0.500	0.200

*See footnote, p. II-1

F-AREA SEEPAGE BASINS RADIOISOTOPE ANALYSES

REPORTED AS PICOCURIES/GRAM
BASIN=2

		TESTNAME							
		AM-241*		CE-141		CE-144		CM-244	
CORE	DEPTH TO TOP OF SAMPLE	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION
WCF201A	0	0.760	0.130	-1.000	-1.000	3.700	0.500	5.000	1.000
	0.5	-0.050	-0.050	-0.800	-0.800	0.440	0.100	1.300	0.500
	1	0.070	0.050	-2.000	-2.000	-4.000	-4.000	1.100	0.300
	1.5	0.160	0.070	-1.000	-1.000	-3.000	-3.000	0.400	0.300
	2	-0.050	-0.050	-1.000	-1.000	-2.000	-2.000	-0.050	-0.050
	2.5	-0.050	-0.050	-1.000	-1.000	-2.000	-2.000	-0.050	-0.050
	3.25	-0.050	-0.050	-1.000	-1.000	-2.000	-2.000	-0.050	-0.050
WCF202A	0	-0.050	-0.050	-1.000	-1.000	-3.000	-3.000	-0.050	-0.050
	0.5	-0.050	-0.050	-1.000	-1.000	-2.000	-2.000	-0.050	-0.050
	1	-0.050	-0.050	-0.500	-0.500	-1.000	-1.000	-0.050	-0.050
	1.5	-0.050	-0.050	-1.000	-1.000	-2.000	-2.000	-0.050	-0.050
	2	-0.050	-0.050	-1.000	-1.000	-2.000	-2.000	-0.050	-0.050
	2.5	0.050	0.030	-1.000	-1.000	-1.000	-1.000	-0.050	-0.050
	3	0.160	0.060	-1.000	-1.000	-2.000	-2.000	-0.050	-0.050
WCF203A	0	-0.050	-0.050	-1.000	-1.000	-2.000	-2.000	-0.050	-0.050
	0.5	0.070	0.040	-1.000	-1.000	-3.000	-3.000	-0.050	-0.050
	1	-0.050	-0.050	-1.000	-1.000	-2.000	-2.000	-0.050	-0.050
	1.5	0.160	0.060	-1.000	-1.000	-1.000	-1.000	-0.050	-0.050
	2	-0.050	-0.050	-0.500	-0.500	-1.000	-1.000	-0.050	-0.050
	2.5	-0.050	-0.050	-1.000	-1.000	-2.000	-2.000	-0.050	-0.050
	3.77	0.140	0.100	-1.000	-1.000	-2.000	-2.000	-0.050	-0.050

*See footnote, p. II-1

F-AREA SEEPAGE BASINS RADIOISOTOPE ANALYSES

REPORTED AS PICOCURIES/GRAM
BASIN=2

		TESTNAME							
		CO-60		CS-134		CS-137		H-3	
		RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION
CORE	DEPTH TO TOP OF SAMPLE								
WCF201A	0	-0.200	-0.200	0.840	0.080	1210.000	12.000	3609.000	3.000
	0.5	-0.200	-0.200	0.430	0.100	1560.000	16.000	3910.000	3.000
	1	-0.200	-0.200	0.340	0.100	1280.000	11.000	5666.000	5.000
	1.5	-0.200	-0.200	0.230	0.050	900.000	12.000	4516.000	3.000
	2	-0.200	-0.200	0.130	0.050	646.000	11.000	4667.000	4.000
	2.5	-0.200	-0.200	-0.020	-0.020	258.000	6.000	4433.000	4.000
	3.25	-0.200	-0.200	-0.010	-0.010	105.000	4.000	4489.000	3.000
WCF202A	0	-0.200	-0.200	0.050	0.020	791.000	12.000	4903.000	4.000
	0.5	-0.200	-0.200	-0.040	-0.040	136.000	4.000	4098.000	3.000
	1	-0.100	-0.100	-0.030	-0.030	25.600	0.200	6940.000	6.000
	1.5	-0.200	-0.200	-0.050	-0.050	5.330	0.110	9887.000	6.000
	2	-0.200	-0.200	-0.100	-0.100	7.090	0.111	7040.000	4.000
	2.5	-0.200	-0.200	-0.030	-0.030	6.360	0.100	7760.000	5.000
	3	-0.200	-0.200	-0.040	-0.040	5.060	0.110	4461.000	3.000
WCF203A	0	-0.100	-0.100	0.250	0.050	267.000	5.000	5136.000	5.000
	0.5	-0.200	-0.200	0.180	0.050	376.000	9.000	3153.000	3.000
	1	-0.200	-0.200	-0.010	-0.010	376.000	6.000	2908.000	2.000
	1.5	-0.200	-0.200	-0.010	-0.010	72.500	0.300	4835.000	4.000
	2	-0.100	-0.100	-0.050	0.020	51.000	0.200	3967.000	3.000
	2.5	-0.200	-0.200	-0.020	-0.200	44.500	0.300	4978.000	4.000
	3.77	-0.200	-0.200	-0.020	-0.020	26.100	0.200	4828.000	3.000

F-AREA SEEPAGE BASINS RADIOISOTOPE ANALYSES

REPORTED AS PICOCURIES/GRAM
BASIN=2

		TESTNAME							
		I-129 *		NB-95		PM-147		PU-238 *	
CORE	DEPTH TO TOP OF SAMPLE	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION
WCF201A	0	0.830	0.170	2.770	0.230	4.400	0.440	0.110	0.050
	0.5	0.200	0.080	0.800	0.380	4.180	0.430	-0.050	-0.050
	1	0.210	0.070	1.530	0.340	3.730	0.410	-0.050	-0.050
	1.5	-0.050	-0.050	1.090	0.300	2.360	0.350	-0.050	-0.050
	2	0.550	0.130	0.660	0.180	1.810	0.320	0.240	0.070
	2.5	-0.050	-0.050	0.610	0.200	0.880	0.260	-0.050	-0.050
	3.25	0.360	0.120	0.420	0.180	0.410	0.230	0.060	0.030
WCF202A	0	-0.050	-0.050	1.220	0.910	2.290	0.350	0.080	0.040
	0.5	0.920	0.150	0.430	0.100	0.490	0.240	-0.050	-0.050
	1	0.200	0.070	0.430	0.100	-0.050	-0.050	-0.050	-0.050
	1.5	-0.050	-0.050	0.280	0.110	-0.050	-0.050	-0.050	-0.050
	2	-0.050	-0.050	0.290	0.110	-0.050	-0.050	-0.050	-0.050
	2.5	0.150	0.060	0.240	0.090	-0.050	-0.050	-0.050	-0.050
	3	-0.050	-0.050	-0.700	-0.700	-0.050	-0.050	-0.050	0.040
WCF203A	0	0.610	0.200	6.950	0.230	1.200	0.280	0.080	0.050
	0.5	-0.050	-0.050	0.790	0.200	1.320	0.290	-0.050	-0.050
	1	-0.050	-0.050	0.750	0.170	5.000	1.000	-0.050	-0.050
	1.5	0.330	0.150	-0.500	-0.500	-0.050	-0.050	-0.050	-0.050
	2	0.270	0.100	0.170	0.070	1.300	0.300	0.160	0.060
	2.5	-0.050	-0.050	0.410	0.100	-0.050	-0.050	-0.050	-0.050
	3.77	-0.050	-0.050	0.560	0.180	-0.050	-0.050	0.100	0.050

*See footnote, p. II-1

F-AREA SEEPAGE BASINS RADIOISOTOPE ANALYSES

REPORTED AS PICOCURIES/GRAM
BASIN=2

		TESTNAME							
		PU-239 *		RU-103		RU-106		SR-89	
		RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION
CORE	DEPTH TO TOP OF SAMPLE								
WCF201A	0	-0.050	-0.050	-2.000	-2.000	17.200	1.600	-0.050	-0.050
	0.5	-0.050	-0.050	4.520	1.000	8.790	2.650	-0.050	-0.050
	1	-0.050	-0.050	3.320	1.000	7.780	1.500	-0.050	-0.050
	1.5	0.050	0.040	-3.100	-3.100	4.990	1.350	-0.050	-0.050
	2	0.170	0.060	-0.900	-0.900	-4.000	-4.000	-0.050	-0.050
	2.5	-0.050	-0.050	-1.000	-1.000	-3.000	-3.000	-0.050	-0.050
	3.25	-0.050	-0.050	-0.800	-0.800	-2.000	-2.000	2.210	1.480
WCF202A	0	0.130	0.050	-1.300	-1.300	4.100	1.330	-0.050	-0.050
	0.5	-0.050	-0.050	-0.500	-0.500	-2.000	-2.000	-0.050	-0.050
	1	-0.050	-0.050	-0.400	-0.400	-1.000	-1.000	-0.050	-0.050
	1.5	-0.050	-0.050	-0.400	-0.400	-2.000	-2.000	-0.050	-0.050
	2	-0.050	-0.050	-0.400	-0.400	-2.000	-5.000	-0.050	-0.050
	2.5	-0.050	-0.050	-0.300	-0.300	-2.000	-2.000	-0.050	-0.050
	3	-0.050	0.040	-0.600	-0.600	-2.000	-2.000	-0.050	-0.050
WCF203A	0	-0.050	-0.050	-0.900	-0.900	25.000	1.400	-0.050	-0.050
	0.5	-0.050	-0.050	-1.400	-1.400	7.830	1.000	-0.050	-0.050
	1	-0.050	-0.050	-1.000	-1.000	4.140	0.840	-0.050	-0.050
	1.5	-0.050	-0.050	-0.600	-0.600	1.380	0.480	-0.050	-0.050
	2	-0.050	-0.050	-0.300	-0.300	-2.000	-2.000	-0.050	-0.050
	2.5	0.080	0.030	-0.500	-0.500	-2.000	-2.000	-0.050	-0.050
	3.77	-0.050	-0.050	-0.700	-0.700	-2.000	-2.000	-0.050	-0.050

*See footnote, p. II-1

F-AREA SEEPAGE BASINS RADIOISOTOPE ANALYSES

REPORTED AS PICOCURIES/GRAM
BASIN=2

		TESTNAME							
		SR-90		TC-99		TH-232		U-234 *	
		RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION
CORE	DEPTH TO TOP OF SAMPLE								
WCF201A	0	0.980	0.740	1.030	0.300	3.770	0.430	67.200	0.400
	0.5	-0.050	-0.050	1.200	0.300	4.170	0.470	24.400	0.300
	1	-0.050	-0.050	0.970	0.200	4.390	1.500	10.400	0.200
	1.5	-0.050	-0.050	0.870	0.200	2.770	0.350	12.300	0.200
	2	-0.050	-0.050	0.860	0.200	3.480	0.340	6.100	0.130
	2.5	-0.050	-0.050	0.630	0.200	4.080	0.260	3.970	0.110
	3.25	-0.050	-0.050	0.440	0.200	2.420	0.190	9.520	0.160
WCF202A	0	-0.050	-0.050	13.800	0.400	4.070	0.400	21.400	0.500
	0.5	-0.050	-0.050	-0.050	-0.050	3.670	0.200	3.310	0.210
	1	-0.050	-0.050	-0.050	-0.050	2.220	0.120	2.690	0.100
	1.5	-0.050	-0.050	-0.050	-0.050	3.640	0.190	2.880	0.100
	2	-0.050	-0.050	0.460	0.200	4.040	0.180	12.100	0.200
	2.5	-0.050	-0.050	0.400	0.100	2.500	0.150	5.180	0.200
	3	-0.050	-0.050	0.480	0.200	3.570	0.190	2.660	0.100
WCF203A	0	2.570	1.070	0.590	0.200	3.710	0.240	29.500	0.300
	0.5	-0.050	-0.050	0.760	0.200	4.280	0.300	5.060	0.120
	1	-0.050	-0.050	0.610	0.200	3.940	0.250	12.200	0.200
	1.5	-0.050	-0.050	0.370	0.100	2.660	0.150	23.100	0.300
	2	-0.050	-0.050	0.340	0.100	2.590	0.140	3.310	0.100
	2.5	-0.050	-0.050	0.540	0.200	3.520	0.210	6.880	0.140
	3.77	-0.050	-0.050	0.450	0.200	3.720	0.180	3.260	0.100

*See footnote, p. II-1

F-AREA SEEPAGE BASINS RADIOISOTOPE ANALYSES

REPORTED AS PICOCURIES/GRAM
BASIN=2

		TESTNAME					
		U-235*		U-238*		ZR-95	
		RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION
CORE	DEPTH TO TOP OF SAMPLE						
WCF201A	0	3.010	0.270	12.000	2.000	1.020	0.170
	0.5	1.320	0.260	3.700	0.400	0.950	0.300
	1	0.500	0.200	1.560	0.200	0.930	0.300
	1.5	0.550	0.200	2.270	0.500	0.860	0.300
	2	0.410	0.100	1.090	0.300	0.650	0.200
	2.5	0.280	0.100	0.710	0.200	0.710	0.200
	3.25	0.620	0.200	1.710	0.500	0.540	0.200
WCF202A	0	1.600	0.470	3.850	0.500	0.670	0.140
	0.5	0.160	0.050	0.600	0.100	0.530	0.100
	1	0.120	0.060	0.500	0.100	0.410	0.110
	1.5	0.150	0.050	0.510	0.100	-0.050	-0.050
	2	1.090	0.300	2.200	0.300	0.480	0.200
	2.5	0.210	0.080	0.800	0.200	0.400	0.100
	3	0.120	0.050	0.470	0.100	-0.600	-0.600
WCF203A	0	1.860	0.300	5.300	0.700	1.940	0.150
	0.5	0.450	0.200	0.800	0.200	0.680	0.200
	1	0.880	0.200	2.160	0.300	0.580	0.100
	1.5	1.790	0.500	4.200	0.500	-0.500	-0.500
	2	0.140	0.050	0.600	0.200	0.330	0.100
	2.5	0.320	0.100	1.230	0.300	0.510	0.100
	3.77	0.200	0.050	0.590	0.200	0.600	0.200

*See footnote, p. II-1

F-AREA SEEPAGE BASINS RADIOISOTOPE ANALYSES

REPORTED AS PICOCURIES/GRAM
BASIN=3

		TESTNAME							
		AM-241*		CE-141		CE-144		CM-244	
		RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION
CORE	DEPTH TO TOP OF SAMPLE								
WCF301A	0	-0.050	-0.050	-1.000	-1.000	-2.000	-2.000	-0.050	-0.050
	0.5	0.200	0.100	-1.000	-1.000	-2.000	-2.000	-0.050	-0.050
	1	-0.050	-0.050	-0.500	-0.500	0.750	0.340	-0.050	-0.050
	1.5	-0.050	-0.050	-1.000	-1.000	-2.000	-2.000	-0.050	-0.050
	2	0.090	0.070	-1.000	-1.000	-2.000	-2.000	-0.050	-0.050
	2.5	-0.050	-0.050	-1.000	-1.000	-2.000	-2.000	-0.050	-0.050
	3.12	-0.050	-0.050	-1.000	-1.000	-1.000	-1.000	-0.050	-0.050
WCF302A	0	0.260	0.120	-1.000	-1.000	-2.000	-2.000	-0.050	-0.050
	0.5	-0.050	-0.050	-2.000	-2.000	-2.000	-2.000	-0.050	-0.050
	1	-0.050	-0.050	-1.000	-1.000	-2.000	-2.000	-0.050	-0.050
	1.5	0.080	0.060	-1.000	-1.000	-3.000	-3.000	-0.050	-0.050
	2	-0.050	-0.050	-1.000	-1.000	-2.000	-2.000	-0.050	-0.050
	2.5	0.110	0.090	-1.000	-1.000	-2.000	-2.000	-0.050	-0.050
	3.3	-0.050	-0.050	-1.000	-1.000	-3.000	-3.000	-0.050	-0.050
WCF303A	0	0.410	0.150	-1.000	-1.000	-2.000	-2.000	-0.050	-0.050
	0.5	-0.050	-0.050	-1.000	-1.000	-3.000	-3.000	-0.050	-0.050
	1	-0.050	-0.050	-1.000	-1.000	-2.000	-2.000	-0.050	-0.050
	1.5	0.060	0.030	-1.000	-1.000	-2.000	-2.000	-0.050	-0.050
	2	0.270	0.120	-1.000	-1.000	-2.000	-2.000	-0.050	-0.050
	2.5	-0.050	-0.050	-1.000	-1.000	-3.000	-3.000	-0.050	-0.050

*See footnote, P. II-1

F-AREA SEEPAGE BASINS RADIOISOTOPE ANALYSES

REPORTED AS PICOCURIES/GRAM
BASIN=3

		TESTNAME							
		CO-60		CS-134		CS-137		H-3	
		RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION
CORE	DEPTH TO TOP OF SAMPLE								
WCF301A	0	-0.200	-0.200	0.180	0.050	148.000	4.000	5010.000	35.000
	0.5	-0.100	-0.100	0.140	0.050	144.000	4.000	3643.000	3.000
	1	-0.100	-0.100	-0.030	-0.030	76.400	0.300	3832.000	3.000
	1.5	-0.200	-0.200	-0.040	-0.040	158.000	5.000	3693.000	3.000
	2	-0.200	-0.200	-0.050	-0.050	21.500	0.200	5067.000	4.000
	2.5	-0.200	-0.200	0.070	0.030	0.590	0.060	4961.000	3.000
	3.12	-0.200	-0.200	-0.040	-0.040	-0.200	-0.200	6139.000	4.000
WCF302A	0	-0.200	-0.200	0.290	0.060	286.000	7.000	4291.000	3.000
	0.5	-0.200	-0.200	0.300	0.100	447.000	6.000	3745.000	3.000
	1	-0.100	-0.100	0.180	0.050	424.000	8.000	3817.000	3.000
	1.5	-0.200	-0.200	0.130	0.050	356.000	8.000	3683.000	3.000
	2	-0.200	-0.200	0.110	0.050	378.000	6.000	3933.000	3.000
	2.5	-0.200	-0.200	0.060	0.030	350.000	8.000	-0.020	-0.020
	3.3	-0.200	-0.200	-0.010	-0.010	427.000	9.000	3193.000	3.000
WCF303A	0	-0.100	-0.100	0.160	0.050	447.000	6.000	3564.000	3.000
	0.5	-0.100	-0.100	0.070	0.030	616.000	11.000	2561.000	2.000
	1	-0.200	-0.200	0.060	0.030	215.000	6.000	2648.000	2.000
	1.5	-0.200	-0.200	-0.030	-0.030	230.000	6.000	3657.000	3.000
	2	-0.200	-0.200	-0.010	-0.010	171.000	6.000	4818.000	3.000
	2.5	-0.200	-0.200	0.230	0.050	280.000	8.000	4818.000	3.000

F-AREA SEEPAGE BASINS RADIOISOTOPE ANALYSES

REPORTED AS PICOCURIES/GRAM
BASIN=3

		TESTNAME							
		I-129		NB-95		PM-147		PU-238*	
CORE	DEPTH TO TOP OF SAMPLE	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION
WCF301A	0	0.560	0.150	0.460	0.150	0.990	0.280	-0.050	-0.050
	0.5	-0.050	-0.050	0.680	0.100	-0.050	-0.050	0.090	0.040
	1	-0.050	-0.050	0.600	0.150	0.320	0.220	-0.050	-0.050
	1.5	-0.050	-0.050	0.740	0.190	0.080	0.040	-0.050	-0.050
	2	-0.050	-0.050	0.660	0.210	-0.050	-0.050	0.060	0.030
	2.5	-0.050	-0.050	0.690	0.200	-0.050	-0.050	0.060	0.050
	3.12	-0.050	-0.050	2.620	0.140	3.100	0.400	-0.050	-0.050
WCF302A	0	2.130	0.190	2.090	0.190	0.240	0.060	1.290	0.160
	0.5	1.250	0.160	0.580	0.180	0.280	0.060	-0.050	-0.050
	1	0.500	0.130	-0.600	-0.600	0.260	0.060	0.160	0.050
	1.5	0.240	0.120	0.600	0.200	0.240	0.060	0.210	0.110
	2	-0.050	-0.050	0.710	0.170	0.230	0.060	2.420	0.380
	2.5	-0.050	-0.050	0.450	0.160	16.000	1.000	0.080	0.040
	3.3	0.460	0.130	0.700	0.190	0.230	0.160	-0.050	-0.050
WCF303A	0	2.630	0.210	5.630	0.200	0.310	0.060	3.500	0.430
	0.5	0.590	0.140	0.930	0.230	0.310	0.060	-0.050	-0.050
	1	0.270	0.120	0.490	0.220	0.130	0.050	-0.050	-0.050
	1.5	0.540	0.130	0.670	0.260	0.140	0.050	0.100	0.070
	2	-0.050	-0.050	0.560	0.200	-0.050	-0.050	-0.050	-0.050
	2.5	0.700	0.140	1.110	0.240	10.000	1.000	0.220	0.120

*See footnote, P. II-1

F-AREA SEEPAGE BASINS RADIOISOTOPE ANALYSES

REPORTED AS PICOCURIES/GRAM
BASIN=3

		TESTNAME							
		PU-239*		RU-103		RU-106		SR-89	
CORE	DEPTH TO TOP OF SAMPLE	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION
WCF301A	0	-0.050	-0.050	0.540	0.200	78.300	1.400	-0.050	-0.050
	0.5	0.060	0.040	0.490	0.200	10.900	0.600	28.420	5.340
	1	-0.050	-0.050	-0.600	-0.600	5.630	0.500	-0.050	-0.050
	1.5	-0.050	-0.050	-0.900	-0.900	26.000	0.700	-0.050	-0.050
	2	0.180	0.060	-0.700	-0.700	-2.000	-2.000	-0.050	-0.050
	2.5	-0.050	-0.050	-0.600	-0.600	-2.000	-2.000	-0.050	-0.050
	3.12	-0.050	-0.050	-0.400	-0.400	-2.000	-2.000	-0.050	-0.050
WCF302A	0	0.340	0.080	-1.300	-1.300	27.800	1.600	-0.050	-0.050
	0.5	-0.050	-0.050	-1.200	-1.200	18.900	1.000	-0.050	-0.050
	1	-0.050	-0.050	-1.300	-1.300	27.600	1.100	-0.050	-0.050
	1.5	-0.050	-0.050	-1.500	-1.500	24.700	1.700	-0.050	-0.050
	2	-0.050	-0.050	-1.100	-1.100	16.900	0.900	-0.050	-0.050
	2.5	-0.050	-0.050	1.290	0.500	10.100	0.900	-0.050	-0.050
	3.3	-0.050	-0.050	1.580	0.500	15.900	1.000	-0.050	-0.050
WCF303A	0	0.390	0.140	1.180	0.600	43.100	1.400	2.610	1.940
	0.5	-0.050	-0.050	-2.000	-2.000	-4.000	-4.000	-0.050	-0.050
	1	-0.050	-0.050	1.390	0.900	3.270	0.980	-0.050	-0.050
	1.5	0.120	0.080	1.130	0.300	2.850	0.900	-0.050	-0.050
	2	-0.050	-0.050	-0.190	-0.190	2.540	0.900	-0.050	-0.050
	2.5	0.320	0.150	-1.600	-1.600	9.270	1.020	-0.050	-0.050

*See footnote, P. II-1

F-AREA SEEPAGE BASINS RADIOISOTOPE ANALYSES

REPORTED AS PICOCURIES/GRAM
BASIN=3

		TESTNAME							
		SR-90		TC-99		TH-232		U-234*	
CORE	DEPTH TO TOP OF SAMPLE	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION
WCF301A	0	1.340	0.500	0.570	0.200	3.240	0.220	32.200	0.300
	0.5	33.900	2.900	0.440	0.200	2.030	0.180	5.360	0.120
	1	-0.050	-0.050	0.340	0.100	1.830	0.140	7.480	0.140
	1.5	-0.050	-0.050	0.520	0.200	3.760	0.210	7.210	0.140
	2	-0.050	-0.050	0.500	0.100	4.020	0.200	5.940	0.130
	2.5	-0.050	-0.050	0.450	0.100	3.940	0.180	12.200	0.200
	3.12	-0.050	-0.050	0.320	0.100	2.620	0.140	7.400	0.150
WCF302A	0	5.900	1.600	0.670	0.200	2.770	0.250	18.200	0.200
	0.5	-0.050	-0.050	0.660	0.200	3.310	0.330	12.700	0.200
	1	11.500	1.800	0.610	0.200	1.930	0.240	8.200	0.150
	1.5	78.700	3.300	9.600	0.300	2.670	0.270	6.120	0.130
	2	-0.050	-0.050	0.550	0.200	2.680	0.240	11.300	0.200
	2.5	-0.050	-0.050	0.600	0.200	2.020	0.240	14.200	0.200
	3.3	-0.050	-0.050	4.700	0.200	2.980	0.270	12.700	0.200
WCF303A	0	-0.050	-0.050	0.600	0.200	2.810	0.240	108.000	5.000
	0.5	5.930	1.450	0.810	0.200	3.300	0.410	8.780	0.160
	1	-0.050	-0.050	0.660	0.200	3.350	0.270	4.480	0.120
	1.5	1.620	1.400	0.610	0.200	3.820	0.250	5.370	0.130
	2	-0.050	-0.050	1.440	0.200	2.020	0.210	8.350	0.160
	2.5	-0.050	-0.050	3.400	0.200	3.380	0.300	7.660	0.150

*See footnote, P. II-1

F-AREA SEEPAGE BASINS RADIOISOTOPE ANALYSES

REPORTED AS PICOCURIES/GRAM
BASIN=3

		TESTNAME					
		U-235*		U-238*		ZR-95	
		RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION
CORE	DEPTH TO TOP OF SAMPLE						
WCF301A	0	1.660	0.300	5.780	1.000	1.800	0.150
	0.5	0.380	0.100	0.960	0.200	0.400	0.100
	1	0.240	0.080	1.100	0.300	0.420	0.100
	1.5	0.500	0.100	1.300	0.200	0.390	0.100
	2	0.270	0.080	1.070	0.200	0.680	0.200
	2.5	0.950	0.300	1.900	0.300	0.690	0.200
	3.12	0.580	0.200	1.300	0.300	-0.500	-0.500
WCF302A	0	0.450	0.200	3.270	0.400	0.560	0.150
	0.5	0.640	0.200	2.300	0.300	0.590	0.200
	1	0.550	0.130	1.230	0.180	-0.500	-0.500
	1.5	0.720	0.150	1.100	0.200	0.650	0.200
	2	0.730	0.170	2.030	0.300	0.570	0.200
	2.5	0.820	0.240	2.520	0.300	0.530	0.200
	3.3	0.720	0.300	1.900	0.200	0.610	0.200
WCF303A	0	6.220	1.000	19.400	2.000	1.570	0.140
	0.5	0.250	0.100	1.600	0.300	0.630	0.200
	1	0.240	0.100	0.670	0.300	0.710	0.300
	1.5	0.240	0.100	0.810	0.200	0.750	0.300
	2	0.330	0.100	1.300	0.200	0.560	0.200
	2.5	0.550	0.100	1.140	0.200	0.790	0.300

*See footnote, P. II-1

F-AREA SEEPAGE BASINS METAL ANALYSES

REPORTED AS MICROGRAMS/GRAM
BASIN=1

		TESTNAME								
		AG	AS	B	BA	BE	BI	CD	CN	CR
		RESULT	RESULT	RESULT	RESUL.	RESULT	RESULT	RESULT	RESULT	RESULT
CORE	DEPTH TO TOP OF SAMPLE									
WCF101A	0	-5.000	9.300	10.000	15.000	-5.000	2.100	-2.000	-5.000	40.000
	0.5	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	-8.000
	1	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	16.300
	1.5	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	47.600
	2	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	14.000
WCF102A	0	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	11.000
	0.5	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	-8.000
	1	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	-8.000
	1.5	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	-8.000
	2	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	-8.000
	2.5	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	-8.000

F-AREA SEEPAGE BASINS METAL ANALYSES

REPORTED AS MICROGRAMS/GRAM
BASIN=1

		TESTNAME								
		CU	FE	F	HG	LI	MN	NA	NI	NO2
		RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT
CORE	DEPTH TO TOP OF SAMPLE									
WCF101A	0	11.000	7633.000	68.000	-2.000	2.100	90.000	1698.000	9.200	-100.000
	0.5	-5.000	5099.000	103.000	-2.000	-2.000	10.700	120.000	-5.000	-100.000
	1	-5.000	5233.000	73.000	-2.000	-2.000	5.700	200.000	-5.000	-100.000
	1.5	-5.000	5466.000	55.000	2.300	-2.000	10.700	130.000	46.600	-100.000
	2	-5.000	2466.000	-25.000	-2.000	-2.000	-5.000	130.000	9.700	-100.000
WCF102A	0	-5.000	5232.000	85.000	-2.000	-2.000	18.000	1182.000	-5.000	-100.000
	0.5	-5.000	5099.000	108.000	-2.000	-2.000	-5.000	100.000	-5.000	-100.000
	1	-5.000	6299.000	125.000	-2.000	-2.000	13.300	83.000	-5.000	-100.000
	1.5	-5.000	5233.000	98.000	-2.000	-2.000	11.000	67.000	-5.000	-100.000
	2	-5.000	3666.000	115.000	-2.000	-2.000	13.000	80.000	-5.000	-100.000
	2.5	-5.000	3660.000	78.000	-2.000	-2.000	13.000	80.000	-5.000	-100.000

F-AREA SEEPAGE BASINS METAL ANALYSES

REPORTED AS MICROGRAMS/GRAM
BASIN=1

		TESTNAME						
		NO3	PB	SE	SN	TI	W	ZN
		RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT
CORE	DEPTH TO TOP OF SAMPLE							
WCF101A	0	200.000	-5.000	-2.000	53.300	87.000	-5.000	30.000
	0.5	120.000	-5.000	-2.000	-5.000	15.700	-5.000	-5.000
	1	170.000	-5.000	-2.000	-5.000	12.700	-5.000	-5.000
	1.5	200.000	-5.000	-2.000	-5.000	8.300	-5.000	-5.000
	2	140.000	-5.000	-2.000	-5.000	10.000	-5.000	-5.000
WCF102A	0	-100.000	-5.000	-2.000	10.000	45.000	-5.000	6.700
	0.5	210.000	-5.000	-2.000	-5.000	9.300	-5.000	-5.000
	1	-100.000	-5.000	-2.000	-5.000	28.300	-5.000	-5.000
	1.5	110.000	-5.000	-2.000	-5.000	23.000	-5.000	-5.000
	2	140.000	-5.000	-2.000	-5.000	28.000	-5.000	-5.000
	2.5	160.000	-5.000	-2.000	-5.000	14.300	-5.000	-5.000

F-AREA SEEPAGE BASINS METAL ANALYSES

REPORTED AS MICROGRAMS/GRAM
BASIN=2

		TESTNAME								
		AG	AS	B	BA	BE	BI	CD	CN	CR
		RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT
CORE	DEPTH TO TOP OF SAMPLE									
WCF201A	0	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	14.700
	0.5	-5.000	2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	19.000
	1	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	15.700
	1.5	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	12.700
	2	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	9.300
	2.5	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	8.000
	3.25	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	-8.000
WCF202A	0	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	9.300
	0.5	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	16.700
	1	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	-8.000
	1.5	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	10.300
	2	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	13.000
	2.5	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	9.300
	3	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	-8.000
WCF203A	0	-5.000	-2.000	-5.000	-2.000	-5.000	-5.000	-2.000	-5.000	-8.000
	0.5	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	-8.000
	1	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	8.000
	1.5	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	-8.000
	2	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	-8.000
	2.5	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	-8.000
	3.77	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	-8.000

F-AREA SEEPAGE BASINS METAL ANALYSES

REPORTED AS MICROGRAMS/GRAM
BASIN=2

		TESTNAME								
		CU	FE	F	HG	LI	MN	NA	NI	NO2
		RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT
CORE	DEPTH TO TOP OF SAMPLE									
WCF201A	0	-5.000	4000.000	78.000	-2.000	3.600	9.300	33.000	5.700	-100.000
	0.5	-5.000	5098.000	73.000	-2.000	3.500	17.300	33.000	-5.000	-100.000
	1	-5.000	5299.000	78.000	-2.000	-2.000	12.300	33.000	-5.000	-100.000
	1.5	-5.000	5032.000	78.000	-2.000	-2.000	9.000	33.000	-5.000	-100.000
	2	-5.000	6067.000	73.000	-2.000	2.400	10.300	33.000	-5.000	-100.000
	2.5	-5.000	5566.000	80.000	-2.000	-2.000	5.300	110.000	-5.000	-100.000
	3.25	-5.000	3226.000	73.000	-2.000	-2.000	-5.000	33.000	-5.000	-100.000
WCF202A	0	-5.000	5133.000	75.000	-2.000	2.200	-5.000	33.000	-5.000	-100.000
	0.5	-5.000	5066.000	70.000	-2.000	4.900	17.600	28.000	-5.000	-100.000
	1	-5.000	4266.000	88.000	-2.000	-2.000	-5.000	23.000	-5.000	-100.000
	1.5	-5.000	4168.000	60.000	-2.000	-2.000	12.700	28.000	-5.000	-100.000
	2	-5.000	4367.000	65.000	-2.000	-2.000	15.000	37.000	-5.000	-100.000
	2.5	-5.000	4069.000	60.000	-2.000	-2.000	20.600	40.000	-5.000	-100.000
	3	-5.000	4032.000	80.000	-2.000	-2.000	15.700	50.000	-5.000	-100.000
WCF203A	0	-5.000	4200.000	85.000	-2.000	-2.000	6.300	31.000	-5.000	-100.000
	0.5	-5.000	3965.000	120.000	-2.000	-2.000	6.700	30.000	-5.000	-100.000
	1	-5.000	5466.000	68.000	-2.000	-2.000	5.700	26.000	-5.000	-100.000
	1.5	-5.000	5567.000	73.000	-2.000	-2.000	9.000	18.000	-5.000	-100.000
	2	-5.000	5266.000	95.000	-2.000	-2.000	9.300	23.000	-5.000	-100.000
	2.5	-5.000	3273.000	48.000	11.000	-2.000	-5.000	19.000	-5.000	-100.000
	3.77	-5.000	5166.000	70.000	-2.000	-2.000	13.300	25.000	-5.000	-100.000

F-AREA SEEPAGE BASINS METAL ANALYSES

REPORTED AS MICROGRAMS/GRAM
BASIN=2

		TESTNAME						
		NO3	PB	SE	SN	TI	W	ZN
		RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT
CORE	DEPTH TO TOP OF SAMPLE							
WCF201A	0	-100.000	-5.000	-2.000	-5.000	24.600	-5.000	-5.000
	0.5	-100.000	-5.000	-2.000	-5.000	28.000	-5.000	-5.000
	1	-100.000	-5.000	-2.000	-5.000	37.000	-5.000	-5.000
	1.5	-100.000	-5.000	-2.000	-5.000	33.000	-5.000	-5.000
	2	-100.000	-5.000	-2.000	-5.000	23.600	-5.000	-5.000
	2.5	-100.000	-5.000	-2.000	-5.000	12.300	-5.000	-5.000
	3.25	-100.000	-5.000	-2.000	-5.000	7.700	-5.000	-5.000
WCF202A	0	-100.000	-5.000	-2.000	-5.000	10.000	-5.000	-5.000
	0.5	-100.000	-5.000	-2.000	-5.000	41.600	-5.000	-5.000
	1	-100.000	-5.000	-2.000	-5.000	16.700	-5.000	-5.000
	1.5	-100.000	-5.000	-2.000	-5.000	47.300	-5.000	-5.000
	2	-100.000	-5.000	-2.000	-5.000	48.300	-5.000	-5.000
	2.5	-100.000	-5.000	-2.000	-5.000	30.300	-5.000	-5.000
	3	-100.000	-5.000	-2.000	-5.000	39.000	-5.000	-5.000
WCF203A	0	-100.000	-5.000	-2.000	-5.000	26.000	-5.000	-5.000
	0.5	-100.000	-5.000	-2.000	-5.000	21.600	-5.000	-5.000
	1	-100.000	-5.000	-2.000	-5.000	21.300	-5.000	-5.000
	1.5	-100.000	-5.000	-2.000	-5.000	23.000	-5.000	-5.000
	2	-100.000	-5.000	-2.000	-5.000	28.300	-5.000	-5.000
	2.5	-100.000	-5.000	-2.000	-5.000	19.000	-5.000	-5.000
	3.77	-100.000	-5.000	-2.000	-5.000	24.600	-5.000	-5.000

F-AREA SEEPAGE BASINS METAL ANALYSES

REPORTED AS MICROGRAMS/GRAM
BASIN=3

		TESTNAME								
		AG	AS	B	BA	BE	BI	CD	CN	CR
		RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT
CORE	DEPTH TO TOP OF SAMPLE									
WCF301A	0	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	8.300
	0.5	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	-8.000
	1	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	8.000
	1.5	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	11.300
	2	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	-8.000
	2.5	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	11.000
	3.12	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	11.000
WCF302A	0	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	-8.000
	0.5	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	-8.000
	1	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	10.700
	1.5	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	8.300
	2	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	8.300
	2.5	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	8.300
	3.3	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	9.000
WCF303A	0	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	11.300
	0.5	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	-8.000
	1	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	20.000
	1.5	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	-8.000
	2	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	12.000
	2.5	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	-8.000

F-AREA SEEPAGE BASINS METAL ANALYSES

REPORTED AS MICROGRAMS/GRAM
BASIN=3

		TESTNAME								
		CU	FE	F	HG	LI	MN	NA	NI	NO2
		RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT
CORE	DEPTH TO TOP OF SAMPLE									
WCF301A	0	-5.000	4200.000	-25.000	-2.000	-2.000	7.300	43.000	-5.000	-100.000
	0.5	-5.000	4865.000	48.000	10.600	-2.000	-5.000	40.000	-5.000	-100.000
	1	-5.000	5332.000	48.000	-2.000	-2.000	8.300	37.000	-5.000	-100.000
	1.5	-5.000	4634.000	43.000	-2.000	2.400	9.300	37.000	-5.000	-100.000
	2	-5.000	5866.000	53.000	-2.000	-2.000	-5.000	21.000	-5.000	-100.000
	2.5	-5.000	4533.000	70.000	-2.000	-2.000	12.000	43.000	-5.000	-100.000
	3.12	-5.000	4600.000	85.000	-2.000	-2.000	11.300	47.000	-5.000	-100.000
WCF302A	0	-5.000	5566.000	-25.000	-2.000	-2.000	20.000	31.000	-5.000	-100.000
	0.5	-5.000	5135.000	60.000	-2.000	-2.000	7.300	30.000	-5.000	-100.000
	1	-5.000	4434.000	65.000	-2.000	-2.000	9.000	37.000	-5.000	-100.000
	1.5	-5.000	5367.000	55.000	-2.000	-2.000	10.700	37.000	-5.000	-100.000
	2	-5.000	5200.000	68.000	-2.000	-2.000	7.000	33.000	-5.000	-100.000
	2.5	-5.000	5098.000	50.000	-2.000	-2.000	8.300	37.000	-5.000	-100.000
	3.3	-5.000	5232.000	78.000	-2.000	-2.000	9.300	37.000	-5.000	-100.000
WCF303A	0	-5.000	5367.000	58.000	-2.000	-2.000	5.300	33.000	-5.000	-100.000
	0.5	-5.000	5200.000	50.000	2.300	-2.000	7.300	22.000	-5.000	-100.000
	1	-5.000	5298.000	45.000	-2.000	-2.000	8.000	25.000	13.300	-100.000
	1.5	-5.000	5065.000	53.000	-2.000	-2.000	6.700	33.000	-5.000	-100.000
	2	-5.000	5134.000	48.000	4.600	-2.000	6.000	32.000	-5.000	-100.000
	2.5	-5.000	5400.000	48.000	-2.000	-2.000	6.000	37.000	-5.000	-100.000

F-AREA SEEPAGE BASINS METAL ANALYSES

REPORTED AS MICROGRAMS/GRAM
BASIN=3

		TESTNAME						
		NO3	PB	SE	SN	TI	W	ZN
		RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT
CORE	DEPTH TO TOP OF SAMPLE							
WCF301A	0	-100.000	-5.000	-2.000	-5.000	47.300	-5.000	-5.000
	0.5	-100.000	-5.000	-2.000	-5.000	19.600	-5.000	-5.000
	1	-100.000	-5.000	-2.000	-5.000	18.300	-5.000	-5.000
	1.5	-100.000	-5.000	-2.000	-5.000	44.600	-5.000	-5.000
	2	-100.000	-5.000	-2.000	-5.000	29.600	-5.000	-5.000
	2.5	-100.000	-5.000	-2.000	-5.000	72.300	-5.000	-5.000
	3.12	-100.000	-5.000	-2.000	-5.000	64.300	-5.000	-5.000
WCF302A	0	-100.000	-5.000	-2.000	-5.000	29.000	-5.000	-5.000
	0.5	-100.000	-5.000	-2.000	-5.000	19.000	-5.000	-5.000
	1	-100.000	-5.000	-2.000	-5.000	20.300	-5.000	-5.000
	1.5	-100.000	-5.000	-2.000	-5.000	24.000	-5.000	-5.000
	2	-100.000	-5.000	-2.000	-5.000	25.000	-5.000	-5.000
	2.5	-100.000	-5.000	-2.000	-5.000	19.000	-5.000	-5.000
	3.3	-100.000	-5.000	-2.000	-5.000	16.700	-5.000	-5.000
WCF303A	0	-100.000	-5.000	-2.000	-5.000	24.600	-5.000	-5.000
	0.5	-100.000	-5.000	-2.000	-5.000	20.600	-5.000	-5.000
	1	-100.000	-5.000	-2.000	-5.000	17.600	-5.000	-5.000
	1.5	-100.000	-5.000	-2.000	-5.000	17.000	-5.000	-5.000
	2	-100.000	-5.000	-2.000	-5.000	26.000	-5.000	-5.000
	2.5	-100.000	-5.000	-2.000	-5.000	17.300	-5.000	-5.000

H-AREA SEEPAGE BASINS RADIOISOTOPE ANALYSES

REPORTED AS PICOCURIES/GRAM
BASIN=1

		TESTNAME							
		AM-241*		CE-141		CE-144		CM-244	
		RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION
CORE	DEPTH TO TOP OF SAMPLE								
WCH101A	0	3.460	1.000	-3.000	-3.000	303.000	15.000	74.300	7.600
	0.5	20.400	2.000	-3.000	-3.000	37.600	1.100	31.600	5.600
	1	-0.050	-0.050	-3.000	-3.000	86.100	3.000	1.100	0.200
	1.5	0.080	0.040	-3.000	-3.000	13.800	3.200	-0.050	-0.050
	2	0.090	0.040	-3.000	-3.000	8.090	1.890	-0.050	-0.050
	2.5	-0.050	-0.050	-1.000	1.000	3.440	0.640	9.500	1.100
WCH102A	0	136.000	13.000	-3.000	-3.000	206.000	14.000	10.600	1.600
	0.5	0.220	0.070	-3.000	-3.000	7.400	2.400	158.000	4.000
	1	-0.050	-0.050	-1.000	-1.000	-4.000	-4.000	25.900	1.800
	1.5	0.360	0.080	-1.000	-1.000	-1.000	-1.000	5.500	0.900
	2	-0.050	-0.050	-1.000	-1.000	-2.000	-2.000	1.400	0.500
	2.5	0.090	0.020	-1.000	-1.000	-1.000	-1.000	-0.050	-0.050
	4.25	-0.050	-0.050	-1.000	-1.000	6.220	1.040	7.300	0.800

*See footnote, p. II-1

H-AREA SEEPAGE BASINS RADIOISOTOPE ANALYSES

REPORTED AS PICOCURIES/GRAM
BASIN=1

		TESTNAME							
		CO-60		CS-134		CS-137		H-3	
		RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION
CORE	DEPTH TO TOP OF SAMPLE								
WCH101A	0	712.000	5.000	143.000	3.000	12500.000	20.000	34722.000	14.000
	0.5	595.000	3.000	78.600	2.300	11600.000	14.000	30166.000	13.000
	1	401.000	5.000	123.000	6.000	18400.000	37.000	19356.000	8.000
	1.5	122.000	1.000	41.100	0.300	8080.000	3.000	5334.000	4.000
	2	111.000	1.000	22.100	0.300	6480.000	3.000	6158.000	4.000
	2.5	100.000	1.000	0.398	0.104	561.000	1.000	6783.000	4.000
WCH102A	0	1270.000	6.000	178.000	4.000	17700.000	20.000	26163.000	10.000
	0.5	378.000	1.000	23.700	0.400	5300.000	3.000	14682.000	9.000
	1	47.500	0.300	4.390	0.150	835.000	1.000	4267.000	3.000
	1.5	3.730	0.080	0.284	0.056	74.800	0.300	3277.000	3.000
	2	0.380	0.056	-0.050	-0.050	7.740	0.120	372.000	1.000
	2.5	0.305	0.037	-0.010	-0.010	2.740	0.070	3048.000	3.000
	4.25	107.000	11.000	-0.060	-0.060	57.400	0.400	4577.000	3.000

H-AREA SEEPAGE BASINS RADIOISOTOPE ANALYSES

REPORTED AS PICOCURIES/GRAM
BASIN=1

		TESTNAME							
		I-129*		NB-95		PM-147		PU-238*	
		RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION
CORE	DEPTH TO TOP OF SAMPLE								
WCH101A	0	14.600	1.500	18.100	3.000	603.000	15.000	53.400	5.700
	0.5	13.400	1.400	13.000	0.900	584.000	15.000	-0.050	-0.050
	1	9.600	1.200	21.500	2.000	2869.000	33.000	3.960	0.900
	1.5	1.700	0.140	-0.050	-0.050	752.000	5.000	-0.050	-0.050
	2	1.070	0.120	-0.700	-0.700	7.300	0.330	-0.050	-0.050
	2.5	0.330	0.090	-0.500	-0.500	0.370	0.100	-0.050	-0.050
WCH102A	0	48.700	5.800	43.100	5.900	2158.000	41.000	1.270	0.700
	0.5	1.840	0.130	2.420	0.360	5.010	0.270	0.310	0.170
	1	-0.050	-0.050	0.420	0.159	2.620	0.800	0.270	0.100
	1.5	-0.050	-0.050	0.314	0.095	-0.050	-0.050	-0.050	-0.050
	2	-0.050	-0.050	-0.400	-0.400	-0.050	-0.050	-0.050	-0.050
	2.5	-0.050	-0.050	-0.200	-0.200	-0.050	-0.050	-0.050	-0.050
	4.25	-0.050	-0.050	0.707	0.252	364.000	4.000	-0.050	-0.050

*See footnote, p. II-1

H-AREA SEEPAGE BASINS RADIOISOTOPE ANALYSES

REPORTED AS PICOCURIES/GRAM
BASIN=1

		TESTNAME							
		PU-239 *		RU-103		RU-106		SR-89	
		RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION
CORE	DEPTH TO TOP OF SAMPLE								
WCH101A	0	9.700	2.430	40.400	0.900	438.000	30.000	173.000	5.000
	0.5	-0.050	-0.050	26.200	1.000	56.800	2.600	-0.050	-0.050
	1	6.850	1.100	61.800	1.000	127.000	3.000	-0.050	-0.050
	1.5	-0.050	-0.050	31.000	1.000	20.000	3.700	-0.050	-0.050
	2	-0.050	-0.050	-2.200	-2.200	7.470	2.940	-0.050	-0.050
	2.5	-0.050	-0.050	-0.700	-0.700	-4.000	-4.000	-0.050	-0.050
WCH102A	0	2.530	0.900	35.100	2.000	453.000	30.000	1031.000	8.000
	0.5	0.280	0.170	-0.050	-0.050	22.300	3.500	-0.050	-0.050
	1	0.220	0.050	-1.000	-1.000	6.260	1.420	-0.050	-0.050
	1.5	-0.050	-0.050	-0.030	-0.030	-2.000	-2.000	-0.050	-0.050
	2	-0.050	-0.050	-0.300	-0.300	-2.000	-5.000	-0.050	-0.050
	2.5	-0.050	-0.050	-0.200	-0.200	-1.000	-1.000	-0.050	-0.050
	4.25	-0.050	-0.050	-0.700	-0.700	-4.000	-4.000	-0.050	-0.050

*See footnote, p. II-1

H-AREA SEEPAGE BASINS RADIOISOTOPE ANALYSES

REPORTED AS PICOCURIES/GRAM
BASIN=1

		TESTNAME							
		SR-90		TC-99		TH-232		U-234*	
		RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION
CORE	DEPTH TO TOP OF SAMPLE								
WCH101A	0	591.000	38.000	121.000	2.000	2.410	0.300	2328.000	8.000
	0.5	1711.000	144.000	87.400	2.000	1.590	0.400	8698.000	16.000
	1	1488.000	63.000	197.000	2.000	3.680	0.900	14613.000	21.000
	1.5	210.600	3.900	27.100	1.000	5.630	1.100	4348.000	30.000
	2	145.000	3.300	172.000	1.000	5.390	0.900	2097.000	213.000
	2.5	84.800	2.700	0.700	0.200	1.300	0.320	88.400	0.500
WCH102A	0	1562.000	73.000	110.000	2.000	1.320	0.600	5093.000	18.000
	0.5	4869.000	21.000	27.100	1.000	5.460	1.050	1583.000	44.000
	1	101.600	2.800	0.980	0.200	4.850	0.440	264.000	8.000
	1.5	4.700	0.700	0.470	0.200	2.510	0.180	71.400	0.400
	2	11.100	1.000	0.490	0.200	3.210	0.190	9.310	0.160
	2.5	15.400	1.200	0.330	0.100	1.890	0.120	3.070	0.100
	4.25	2141.000	13.000	11.900	1.000	4.750	0.400	99.700	0.500

*See footnote, p. II-1

H-AREA SEEPAGE BASINS RADIOISOTOPE ANALYSES

REPORTED AS PICOCURIES/GRAM
BASIN=1

		TESTNAME					
		U-235*		U-238*		ZR-95 *	
		RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION
CORE	DEPTH TO TOP OF SAMPLE						
HCH101A	0	298.000	30.000	349.000	50.000	16.700	4.000
	0.5	223.000	70.000	1300.000	100.000	12.300	1.000
	1	197.000	20.000	2630.000	50.000	21.700	1.900
	1.5	139.000	40.000	780.000	20.000	3.950	0.330
	2	97.000	5.000	314.000	30.000	5.240	0.270
	2.5	1.170	0.190	13.200	1.000	1.290	0.170
HCH102A	0	140.000	28.000	916.000	30.000	38.800	4.500
	0.5	71.700	2.200	285.000	30.000	9.230	0.440
	1	7.930	0.260	47.500	1.000	0.865	0.181
	1.5	35.000	11.000	12.700	2.000	-0.400	-0.400
	2	0.450	0.200	1.670	0.300	-0.400	-0.400
	2.5	0.200	0.100	0.500	0.100	-0.300	-0.300
	4.25	3.290	0.230	17.900	2.000	2.850	0.300

*See footnote, p. II-1

H-AREA SEEPAGE BASINS RADIOISOTOPE ANALYSES

REPORTED AS PICOCURIES/GRAM
BASIN=2

		TESTNAME							
		AM-241*		CE-141		CE-144		CM-244	
CORE	DEPTH TO TOP OF SAMPLE	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION
WCH201A	0	0.450	0.060	-0.050	-0.050	34.700	2.500	142.000	4.000
	0.5	0.130	0.060	-5.000	-5.000	-4.000	-4.000	30.600	6.500
	1	0.400	0.050	-3.000	-3.000	-2.000	-2.000	16.100	1.100
	1.5	-0.050	-0.050	-3.000	-3.000	-2.000	-2.000	5.800	1.500
	2	0.080	0.060	-1.000	-1.000	-1.000	-1.000	4.800	0.800
	2.5	-0.050	-0.050	-0.500	-0.500	-1.000	-1.000	109.000	11.000
	3.37	0.130	0.020	-1.000	-1.000	-2.000	-2.000	-0.050	-0.050
WCH202A	0	0.070	0.050	-1.000	-1.000	8.060	1.870	704.000	30.000
	0.5	-0.050	-0.050	-1.000	-1.000	-2.000	-2.000	24.500	5.900
	1	0.080	0.020	-3.000	-3.000	-2.000	-2.000	16.300	1.400
	1.5	0.120	0.020	-1.000	-1.000	-1.000	-1.000	6.400	1.600
	2	-0.050	-0.050	-1.000	-1.000	-1.000	-1.000	22.300	1.200
	2.5	0.050	0.020	-1.000	-1.000	-2.000	-2.000	-0.050	-0.050
WCH203A	0	0.100	0.030	-2.000	-2.000	-3.000	-3.000	13.800	1.000
	0.5	0.050	0.030	-1.000	-1.000	-4.000	-4.000	40.500	7.500
	1	0.900	0.120	-1.000	-1.000	-2.000	-2.000	19.600	5.500
	1.5	0.310	0.060	-1.000	-1.000	-2.000	-2.000	4.200	1.000
	2	-0.050	-0.050	-1.000	-1.000	-2.000	-2.000	-0.050	-0.050
	2.5	-0.050	-0.050	-1.000	-1.000	-1.000	-1.000	-0.050	-0.050
	3	0.080	0.020	-1.000	-1.000	-2.000	-2.000	4.800	1.400

*See footnote, p. II-1

H-AREA SEEPAGE BASINS RADIOISOTOPE ANALYSES

REPORTED AS PICOCURIES/GRAM
BASIN=2

		TESTNAME							
		CO-60		CS-134		CS-137		H-3	
		RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION
CORE	DEPTH TO TOP OF SAMPLE								
WCH201A	0	122.000	0.500	26.800	0.300	4560.000	3.000	12087.000	8.000
	0.5	28.800	0.100	0.829	0.123	692.000	2.000	4996.000	4.000
	1	1.430	0.080	-0.060	-0.060	15.600	0.200	2831.000	2.000
	1.5	0.301	0.061	-0.040	-0.040	2.340	0.090	2231.000	2.000
	2	0.332	0.042	-0.050	-0.050	0.275	0.052	343.000	1.000
	2.5	0.271	0.037	-0.020	-0.020	-0.200	-0.200	3202.000	3.000
	3.37	0.571	0.053	-0.100	-0.100	0.505	0.064	3031.000	3.000
WCH202A	0	33.900	0.200	16.500	0.200	3960.000	2.000	5316.000	4.000
	0.5	1.720	0.060	0.242	0.053	284.000	1.000	4375.000	3.000
	1	0.501	0.055	-0.010	-0.010	14.700	0.200	3388.000	3.000
	1.5	0.402	0.044	-0.090	-0.090	1.790	0.690	2664.000	3.000
	2	0.433	0.043	-0.040	-0.040	0.380	0.047	4181.000	4.000
	2.5	0.805	0.065	-0.030	-0.030	-0.200	-0.200	5033.000	4.000
WCH203A	0	-0.050	-0.050	-0.080	-0.080	0.640	0.096	929.000	3.000
	0.5	2.660	0.080	2.440	0.120	1310.000	4.000	3195.000	3.000
	1	0.830	0.060	0.170	0.050	241.000	1.000	4030.000	3.000
	1.5	1.200	0.050	0.180	0.050	423.000	1.000	3486.000	3.000
	2	0.409	0.037	0.160	0.050	226.000	1.000	3856.000	3.000
	2.5	-0.200	-0.200	-0.030	-0.030	77.900	0.400	4645.000	4.000
	3	-0.200	-0.200	0.080	0.020	67.400	0.400	3183.000	3.000

H-AREA SEEPAGE BASINS RADIOISOTOPE ANALYSES

REPORTED AS PICOCURIES/GRAM
BASIN=2

		TESTNAME							
		I-129*		NB-95		PM-147		PU-238*	
CORE	DEPTH TO TOP OF SAMPLE	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION
WCH201A	0	6.240	0.250	0.504	0.175	18.500	1.800	0.190	0.060
	0.5	-0.050	-0.050	0.000	-0.400	1.260	0.630	0.070	0.050
	1	-0.050	-0.050	-0.400	-0.400	53.000	1.000	0.050	0.040
	1.5	-0.050	-0.050	-0.400	-0.400	-0.050	-0.050	-0.050	-0.050
	2	-0.050	-0.050	-0.100	-0.100	-0.050	-0.050	-0.050	-0.050
	2.5	-0.050	-0.050	-0.200	-0.200	-0.050	-0.050	-0.050	-0.050
	3.37	-0.050	-0.050	-0.400	-0.400	-0.050	-0.050	-0.050	-0.050
WCH202A	0	1.600	0.160	-0.500	-0.500	13.500	0.700	-0.050	-0.050
	0.5	0.140	0.090	-0.050	-0.050	0.880	0.250	-0.050	-0.050
	1	-0.050	-0.050	-0.300	-0.300	-0.050	-0.050	0.070	0.050
	1.5	0.340	0.130	-0.300	-0.300	-0.050	-0.050	0.080	0.050
	2	0.550	0.140	-0.300	-0.300	1.000	0.200	-0.050	-0.050
	2.5	0.270	0.140	-0.400	-0.400	0.230	0.100	0.120	0.050
WCH203A	0	-0.050	-0.050	-0.400	-0.400	0.960	0.260	-0.050	-0.050
	0.5	-0.050	-0.050	-0.400	-0.400	-0.050	-0.050	0.360	0.040
	1	-0.050	-0.050	0.203	0.093	1.060	0.270	0.150	0.030
	1.5	0.220	0.060	0.210	0.080	0.300	0.210	-0.050	-0.050
	2	0.850	0.150	0.180	0.060	-0.050	-0.050	0.060	0.020
	2.5	0.780	0.150	0.390	0.080	-0.050	-0.050	-0.050	-0.050
	3	0.130	0.060	0.240	0.090	0.680	0.240	0.800	0.060

*See footnote, p. II-1

H-AREA SEEPAGE BASINS RADIOISOTOPE ANALYSES

REPORTED AS PICOCURIES/GRAM
BASIN=2

		TESTNAME							
		PU-239 *		RU-103		RU-106		SR-89	
		RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION
CORE	DEPTH TO TOP OF SAMPLE								
WCH201A	0	0.320	0.080	-2.700	-2.700	333.000	5.000	-0.050	-0.050
	0.5	0.050	0.060	-1.000	-1.000	-5.000	-5.000	-0.050	-0.050
	1	-0.050	-0.050	-0.300	-0.300	-2.000	-2.000	-0.050	-0.050
	1.5	-0.050	-0.050	-0.300	-0.300	-2.000	-2.000	-0.050	-0.050
	2	-0.050	-0.050	-0.200	-0.200	-1.000	-1.000	-0.050	-0.050
	2.5	0.210	0.100	-0.200	-0.200	-1.000	-1.000	-0.050	-0.050
	3.37	-0.050	-0.050	-0.300	-0.300	-2.000	-2.000	-0.050	-0.050
WCH202A	0	-0.050	-0.050	-2.000	-2.000	51.400	2.800	-0.050	-0.050
	0.5	-0.050	-0.050	-0.300	-0.300	2.220	0.730	-0.050	-0.050
	1	-0.050	-0.050	-0.300	-0.300	-2.000	-2.000	-0.050	-0.050
	1.5	-0.050	-0.050	-0.200	-0.200	-2.000	-2.000	-0.050	-0.050
	2	-0.050	-0.050	-0.200	-0.200	-1.000	-1.000	-0.050	-0.050
	2.5	0.060	0.030	-0.400	-0.400	-2.000	-2.000	-0.050	-0.050
WCH203A	0	-0.050	-0.050	-1.000	-1.000	-3.000	-3.000	6.300	1.000
	0.5	0.230	0.030	-1.000	-1.000	-2.000	-2.000	-0.050	-0.050
	1	0.290	0.040	-0.600	-0.600	-3.000	-3.000	-0.050	-0.050
	1.5	0.060	0.020	-0.600	-0.600	-3.000	-3.000	-0.050	-0.050
	2	-0.050	-0.050	-0.500	-0.500	-2.000	-2.000	-0.050	-0.050
	2.5	-0.050	-0.050	-0.400	-0.400	-2.000	-2.000	-0.050	-0.050
	3	0.300	0.040	-0.400	-0.400	-2.000	-2.000	-0.050	-0.050

*See footnote, p. II-1

H-AREA SEEPAGE BASINS RADIOISOTOPE ANALYSES

REPORTED AS PICOCURIES/GRAM
BASIN=2

		TESTNAME							
		SR-90		TC-99		TH-232		U-234*	
		RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION
CORE	DEPTH TO TOP OF SAMPLE								
WCH201A	0	298.900	4.800	267.000	2.000	3.350	0.280	3007.000	28.000
	0.5	8.700	0.900	2.900	0.200	5.430	0.480	25.500	0.300
	1	3.300	0.600	0.660	0.200	4.650	0.240	7.570	0.140
	1.5	3.100	0.600	0.500	0.200	0.378	0.255	6.690	0.130
	2	6.500	0.800	0.390	0.100	3.270	0.150	5.720	0.800
	2.5	13.400	1.100	0.340	0.100	2.590	0.130	142.000	10.000
	3.37	3.100	0.600	0.490	0.100	4.080	0.180	4.120	0.110
WCH202A	0	179.100	3.500	1.830	0.300	4.980	0.810	11.000	0.200
	0.5	110.800	2.900	0.550	0.200	3.030	2.280	32.100	0.300
	1	35.800	1.700	0.490	0.200	4.080	0.180	10.700	0.200
	1.5	47.700	1.900	0.430	0.100	3.870	0.390	10.600	0.200
	2	7.900	0.900	0.330	0.100	2.760	1.410	7.380	0.140
	2.5	47.100	1.900	15.700	0.400	4.740	0.240	234.000	7.000
WCH203A	0	8.200	1.000	0.830	0.300	3.960	0.270	11.500	0.200
	0.5	11.700	0.900	1.430	0.200	9.060	0.540	94.200	0.500
	1	6.000	0.700	0.670	0.200	3.060	0.250	19.300	0.230
	1.5	1.900	0.500	0.640	0.200	2.870	0.250	4.200	0.110
	2	2.300	0.500	1.400	0.200	1.770	0.190	4.500	0.110
	2.5	-0.050	-0.050	0.420	0.200	2.280	0.160	4.950	0.120
	3	-0.050	-0.050	0.560	0.200	2.960	0.210	6.250	0.130

*See footnote, p. II-1

H-AREA SEEPAGE BASINS RADIOISOTOPE ANALYSES

REPORTED AS PICOCURIES/GRAM
BASIN=2

		TESTNAME					
		U-235*		U-238*		ZR-95*	
		RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION
CORE	DEPTH TO TOP OF SAMPLE						
HCH201A	0	196.000	15.000	5.400	0.700	2.090	0.210
	0.5	1.140	0.300	4.590	0.700	-0.500	-0.500
	1	0.400	0.200	1.130	0.300	-0.500	-0.500
	1.5	0.350	0.100	1.000	0.200	-0.400	-0.400
	2	0.300	0.100	1.020	0.300	-0.400	-0.400
	2.5	6.620	1.000	21.300	2.000	-0.300	-0.300
	3.37	0.350	0.100	0.620	0.200	-0.400	-0.400
HCH202A	0	0.460	0.100	1.700	0.200	1.700	0.200
	0.5	1.700	0.140	4.800	0.700	-0.400	-0.400
	1	0.290	0.100	1.800	0.200	-0.400	-0.400
	1.5	0.050	0.200	1.900	0.200	-0.400	-0.400
	2	0.610	0.200	1.320	0.300	-0.300	-0.300
	2.5	14.000	2.000	35.000	5.000	-0.500	-0.500
HCH203A	0	0.450	0.200	2.070	0.300	-0.700	-0.700
	0.5	1.220	0.150	14.100	3.000	-0.600	-0.600
	1	0.590	0.200	2.310	0.400	0.213	0.090
	1.5	0.290	0.080	0.630	0.090	0.390	0.100
	2	0.320	0.060	0.770	0.200	0.330	0.100
	2.5	0.440	0.100	0.890	0.200	0.360	0.100
	3	0.430	0.100	1.250	0.190	0.260	0.100

*See footnote, p. II-1

H-AREA SEEPAGE BASINS RADIOISOTOPE ANALYSES

REPORTED AS PICOCURIES/GRAM
BASIN=3

		TESTNAME							
		AM-241 *		CE-141		CE-144		CM-244	
		RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION
CORE	DEPTH TO TOP OF SAMPLE								
WCH301A	0	0.060	0.020	-1.000	-1.000	-0.050	-0.050	7.400	0.900
	0.5	-0.050	-0.050	-1.000	-1.000	-2.000	-2.000	-0.050	-0.050
	1	0.230	0.030	-1.000	-1.000	-1.000	-1.000	-0.050	-0.050
	1.5	-0.050	-0.050	-1.000	-1.000	-1.000	-1.000	-0.050	-0.050
	2	-0.050	-0.050	-1.000	-1.000	-1.000	-1.000	0.800	0.300
	2.5	0.100	0.030	-2.000	-2.000	-2.000	-2.000	-0.050	-0.050
WCH302A	0	-0.050	-0.050	-1.000	-1.000	-2.000	-2.000	4.800	1.000
	0.5	0.120	0.040	-1.000	-1.000	-1.000	-1.000	-0.050	-0.050
	1	-0.050	-0.050	-1.000	-1.000	-1.000	-1.000	-0.050	-0.050
	1.5	0.290	0.050	-1.000	-1.000	-2.000	-2.000	-0.050	-0.050
	2	-0.050	-0.050	-1.000	-1.000	-2.000	-2.000	-0.050	-0.050
	2.5	0.080	0.040	-1.000	-1.000	-2.000	-2.000	-0.050	-0.050
	3.62	-0.050	-0.050	-1.000	-1.000	-2.000	-2.000	0.060	0.030
WCH303A	0	0.300	0.040	-1.000	-1.000	-2.000	-2.000	7.100	1.000
	0.5	-0.050	-0.050	-1.000	-1.000	-2.000	-2.000	-0.050	-0.050
	1	-0.050	-0.050	-1.000	-1.000	-1.000	-1.000	-0.050	-0.050
	1.5	0.120	0.080	-1.000	-1.000	-1.000	-1.000	-0.050	-0.050
	2	-0.050	-0.050	-2.000	-2.000	-3.000	-3.000	-0.050	-0.050
	2.5	-0.050	-0.050	-1.000	-1.000	-1.000	-1.000	-0.050	-0.050
	3.12	-0.050	-0.050	-1.000	-1.000	-1.000	-1.000	-0.050	-0.050
WCH304A	0	0.450	0.150	-2.000	-2.000	-5.000	-5.000	2.500	0.400

*See footnote, p. II-1

(CONTINUED)

H-AREA SEEPAGE BASINS RADIOISOTOPE ANALYSES

REPORTED AS PICOCURIES/GRAM
BASIN=3

		TESTNAME							
		AM-241*		CE-141		CE-144		CM-244	
		RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION
CORE	DEPTH TO TOP OF SAMPLE								
WCH304A	0.5	-0.050	-0.050	-1.000	-1.000	-1.000	-1.000	1.600	0.900
	1	0.050	0.030	-1.000	-1.000	-2.000	-2.000	4.100	1.400
	1.5	0.160	0.060	-1.000	-1.000	-2.000	-2.000	-0.050	-0.050
	2	0.120	0.060	-1.000	-1.000	-2.000	-2.000	-0.050	-0.050
	2.5	-0.050	-0.050	-1.000	-1.000	-0.200	-0.200	-0.050	-0.050
WCH305A	0	0.190	0.060	-1.000	-1.000	-3.000	-3.000	9.200	1.800
	0.5	-0.050	-0.050	-1.000	-1.000	-2.000	-2.000	-0.050	-0.050
	1	-0.050	-0.050	-0.200	-0.200	-0.800	-0.800	-0.050	-0.050
	1.5	0.080	0.040	-1.000	-1.000	-1.000	-1.000	-0.050	-0.050
	2	-0.050	-0.050	-1.000	-1.000	-2.000	-2.000	-0.050	-0.050

*See footnote, p. II-1

H-AREA SEEPAGE BASINS RADIOISOTOPE ANALYSES

REPORTED AS PICOCURIES/GRAM
BASIN=3

		TESTNAME							
		CO-60		CS-134		CS-137		H-3	
		RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION
CORE	DEPTH TO TOP OF SAMPLE								
WCH301A	0	1.370	0.070	-0.010	-0.010	299.000	1.000	457.000	10.000
	0.5	-0.200	-0.200	-0.050	-0.050	0.176	0.066	185.000	6.000
	1	-0.200	-0.200	-0.010	-0.010	4.430	0.090	164.000	6.000
	1.5	0.414	0.039	-0.040	-0.040	76.100	0.300	141.000	1.000
	2	-0.200	-0.200	-0.010	-0.010	-0.100	-0.100	149.000	1.000
	2.5	0.167	0.040	-0.010	-0.010	-0.200	-0.200	141.000	1.000
WCH302A	0	0.648	0.053	0.140	0.050	164.000	1.000	796.000	2.000
	0.5	0.125	0.031	-0.040	-0.040	24.600	0.200	248.000	1.000
	1	-0.200	-0.200	-0.050	-0.050	1.160	0.060	166.000	1.000
	1.5	-0.200	-0.200	-0.030	-0.030	0.835	0.071	301.000	1.000
	2	-0.200	-0.200	-0.020	-0.020	0.142	0.060	200.000	1.000
	2.5	-0.200	-0.200	-0.010	-0.010	0.840	0.070	168.000	1.000
	3.62	-0.200	-0.200	-0.030	-0.030	-0.200	-0.200	80.000	1.000
WCH303A	0	1.380	0.070	0.270	0.050	221.000	1.000	795.000	2.000
	0.5	-0.200	-0.200	-0.090	-0.090	-0.200	-0.200	214.000	1.000
	1	-0.200	-0.200	0.050	0.020	4.800	0.100	193.000	1.000
	1.5	-0.200	-0.200	-0.040	-0.040	1.280	0.060	133.000	1.000
	2	-0.300	-0.300	0.120	0.040	0.300	0.050	97.000	1.000
	2.5	-0.100	-0.100	-0.050	-0.050	-0.050	-0.050	148.000	1.000
	3.12	-0.200	-0.200	-0.170	-0.170	-0.100	-0.100	143.000	1.000
WCH304A	0	73.600	0.200	1.570	0.190	612.000	18.000	1007.000	2.000

(CONTINUED)

H-AREA SEEPAGE BASINS RADIOISOTOPE ANALYSES

REPORTED AS PICOCURIES/GRAM
BASIN=3

		TESTNAME							
		CO-60		CS-134		CS-137		H-3	
		RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION
CORE	DEPTH TO TOP OF SAMPLE								
WCH304A	0.5	-0.100	-0.100	-0.050	-0.050	238.000	1.000	6072.000	4.000
	1	0.238	0.050	0.050	0.030	36.600	0.200	355.000	1.000
	1.5	0.240	0.040	0.090	0.040	29.100	0.200	282.000	1.000
	2	-0.200	-0.200	-0.050	-0.050	0.869	0.083	169.000	1.000
	2.5	-0.200	-0.200	-0.210	-0.210	-0.200	-0.200	170.000	1.000
WCH305A	0	27.300	0.900	0.621	0.080	291.000	1.000	1083.000	2.000
	0.5	0.870	0.050	-0.040	-0.040	156.000	1.000	323.000	1.000
	1	-0.100	-0.100	-0.010	-0.010	9.610	0.090	216.000	1.000
	1.5	-0.200	-0.200	-0.190	-0.190	1.640	0.072	164.000	1.000
	2	-0.200	-0.200	-0.020	-0.020	0.430	0.070	150.000	1.000

H-AREA SEEPAGE BASINS RADIOISOTOPE ANALYSES

REPORTED AS PICOCURIES/GRAM
BASIN=3

		TESTNAME							
		I-129*		NB-95		PM-147		PU-238*	
CORE	DEPTH TO TOP OF SAMPLE	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION
WCH301A	0	0.390	0.150	0.480	0.110	-0.050	-0.050	-0.050	-0.050
	0.5	0.190	0.070	0.370	0.100	-0.050	-0.050	0.080	0.030
	1	0.240	0.150	0.280	0.080	-0.050	-0.050	0.050	0.030
	1.5	0.200	0.130	0.210	0.070	-0.050	-0.050	0.090	0.040
	2	0.220	0.090	-0.300	-0.300	0.300	0.200	-0.050	-0.050
	2.5	0.340	0.140	0.370	0.110	-0.050	-0.050	0.190	0.040
WCH302A	0	0.130	0.060	0.230	0.090	0.590	0.230	-0.050	-0.050
	0.5	0.160	0.130	0.180	0.070	-0.050	-0.050	-0.050	-0.050
	1	0.670	0.150	0.200	0.090	-0.050	-0.050	0.050	0.030
	1.5	0.200	0.130	0.300	0.070	-0.050	-0.050	-0.050	-0.050
	2	-0.050	-0.050	0.310	0.100	-0.050	-0.050	-0.050	-0.050
	2.5	-0.050	-0.050	0.300	0.140	0.530	0.230	0.420	0.090
	3.62	-0.050	-0.050	0.340	0.090	13.000	1.000	0.060	0.030
WCH303A	0	-0.050	-0.050	0.500	0.120	-0.050	-0.050	0.080	0.050
	0.5	-0.050	-0.050	0.570	0.200	-0.050	-0.050	0.440	0.100
	1	-0.050	-0.050	-0.400	-0.400	-0.050	-0.050	-0.050	-0.050
	1.5	-0.050	-0.050	-0.300	-0.300	-0.050	-0.050	0.140	0.050
	2	-0.050	-0.050	0.940	0.330	-0.050	-0.050	0.370	0.090
	2.5	-0.050	-0.050	0.380	0.066	-0.050	-0.050	0.130	0.070
	3.12	-0.050	-0.050	-0.200	-0.200	-0.050	-0.050	0.210	0.050
WCH304A	0	-0.050	-0.050	1.500	0.610	-0.050	-0.050	0.160	0.070

*See footnote, p. II-1
(CONTINUED)

H-AREA SEEPAGE BASINS RADIOISOTOPE ANALYSES

REPORTED AS PICOCURIES/GRAM
BASIN=3

		TESTNAME							
		I-129 *		NB-95		PM-147		PU-238 *	
		RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION
CORE	DEPTH TO TOP OF SAMPLE								
WCH304A	0.5	-0.050	-0.050	-0.300	-0.300	-0.050	-0.050	1.430	0.170
	1	-0.050	-0.050	-0.400	-0.400	0.490	0.220	-0.050	-0.050
	1.5	-0.050	-0.050	-0.300	-0.300	-0.050	-0.050	0.050	0.020
	2	-0.050	-0.050	-0.300	-0.300	-0.050	-0.050	0.070	0.040
	2.5	-0.050	-0.050	-0.400	-0.400	-0.050	-0.050	0.140	0.040
WCH305A	0	-0.050	-0.050	-0.300	-0.300	0.850	0.260	-0.050	-0.050
	0.5	-0.050	-0.050	0.350	0.100	3.300	0.400	0.430	0.070
	1	-0.050	-0.050	-0.100	-0.100	-0.050	-0.050	-0.050	-0.050
	1.5	2.700	0.300	-0.200	-0.200	-0.050	-0.050	-0.050	-0.050
	2	-0.050	-0.050	0.420	0.110	-0.050	-0.050	0.090	0.050

*See footnote, p. II-1

H-AREA SEEPAGE BASINS RADIOISOTOPE ANALYSES

REPORTED AS PICOCURIES/GRAM
BASIN=3

		TESTNAME							
		PU-239*		RU-103		RU-106		SR-89	
		RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION
CORE	DEPTH TO TOP OF SAMPLE								
WCH301A	0	-0.050	-0.050	-0.800	-0.800	-4.000	-4.000	2.100	0.400
	0.5	0.090	0.030	-0.300	-0.300	-2.000	-2.000	-0.050	-0.050
	1	-0.050	-0.050	-0.300	-0.300	-1.000	-1.000	-0.050	-0.050
	1.5	-0.050	-0.050	-0.300	-0.300	-2.000	-2.000	-0.050	-0.050
	2	-0.050	-0.050	-0.200	-0.200	-1.000	-1.000	-0.050	-0.050
	2.5	0.140	0.040	-0.300	-0.300	-2.000	-2.000	-0.050	-0.050
WCH302A	0	-0.050	-0.050	-0.500	-0.500	-2.000	-2.000	3.740	2.170
	0.5	-0.050	-0.050	-0.200	-0.200	-1.000	-1.000	-0.050	-0.050
	1	0.060	0.030	-0.200	-0.200	-1.000	-1.000	-0.050	-0.050
	1.5	-0.050	-0.050	-0.500	-0.500	-3.000	-3.000	-0.050	-0.050
	2	-0.050	-0.050	-0.300	-0.300	-2.000	-2.000	-0.050	-0.050
	2.5	0.110	0.050	-0.400	-0.400	-2.000	-2.000	-0.050	-0.050
	3.62	-0.050	-0.050	-0.300	-0.300	-2.000	-2.000	-0.050	-0.050
WCH303A	0	0.050	0.040	-0.600	-0.600	-3.000	-3.000	-0.050	-0.050
	0.5	0.210	0.070	-0.600	-0.600	-2.000	-2.000	1.520	1.300
	1	-0.050	-0.050	-0.300	-0.300	-2.000	-2.000	-0.050	-0.050
	1.5	0.070	0.040	-0.200	-0.200	-1.000	-1.000	-0.050	-0.050
	2	0.330	0.080	-0.900	-0.900	-3.000	-3.000	-0.050	-0.050
	2.5	0.090	0.060	-0.200	-0.200	-1.000	-1.000	-0.050	-0.050
	3.12	-0.050	-0.050	-0.200	-0.200	-1.000	-1.000	-0.050	-0.050
WCH304A	0	0.150	0.070	-0.300	-0.300	6.600	2.200	-0.050	-0.050

*See footnote, p. II-1
(CONTINUED)

H-AREA SEEPAGE BASINS RADIOISOTOPE ANALYSES

REPORTED AS PICOCURIES/GRAM
BASIN=3

		TESTNAME							
		PU-239 *		RU-103		RU-106		SR-89	
		RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION
CORE	DEPTH TO TOP OF SAMPLE								
WCH304A	0.5	0.480	0.100	-0.300	-0.300	1.820	0.750	-0.050	-0.050
	1	0.070	0.040	-0.400	-0.400	-2.000	-2.000	-0.050	-0.050
	1.5	0.150	0.040	-0.300	-0.300	-2.000	-2.000	-0.050	-0.050
	2	0.090	0.040	-0.300	-0.300	-2.000	-2.000	-0.050	-0.050
	2.5	-0.050	-0.050	-0.300	-0.300	-2.000	-2.000	-0.050	-0.050
WCH305A	0	-0.050	-0.050	-0.700	-0.700	2.510	0.980	-0.050	-0.050
	0.5	0.200	0.050	-0.500	-0.500	-2.000	-2.000	-0.050	-0.050
	1	-0.050	-0.050	-0.200	-0.200	-1.000	-1.000	-0.050	-0.050
	1.5	-0.050	-0.050	-0.300	-0.300	-2.000	-2.000	-0.050	-0.050
	2	0.120	0.050	-0.300	-0.300	-2.000	-2.000	-0.050	-0.050

*See footnote, p. II-1

H-AREA SEEPAGE BASINS RADIOISOTOPE ANALYSES

REPORTED AS PICOCURIES/GRAM
BASIN=3

		TESTNAME							
		SR-90		TC-99		TH-232		U-234 *	
		RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION
CORE	DEPTH TO TOP OF SAMPLE								
WCH301A	0	-0.050	-0.050	0.800	0.200	4.170	0.310	12.100	0.200
	0.5	9.950	1.060	0.450	0.100	3.380	18.000	4.490	0.130
	1	8.080	1.400	0.420	0.100	3.300	0.160	2.170	0.090
	1.5	-0.050	-0.050	0.390	0.100	1.980	0.160	3.180	0.110
	2	-0.050	-0.050	0.410	0.100	3.470	0.160	-0.050	-0.050
	2.5	-0.050	-0.050	0.300	0.100	3.500	0.180	-0.050	-0.050
WCH302A	0	1.790	0.870	0.570	0.200	3.510	0.230	2.800	0.100
	0.5	5.840	1.620	0.330	0.100	2.330	0.160	8.080	0.170
	1	-0.050	-0.050	0.370	0.200	2.480	0.150	3.360	0.110
	1.5	-0.050	-0.050	-0.050	-0.050	3.600	0.210	3.950	0.120
	2	1.380	0.790	-0.050	-0.050	3.680	0.200	1.370	0.070
	2.5	5.100	1.250	-0.050	-0.050	3.600	0.210	4.200	0.130
	3.62	-0.050	-0.050	-0.050	-0.050	3.610	0.170	0.120	0.060
WCH303A	0	8.400	1.310	0.740	0.200	4.720	0.300	4.810	0.130
	0.5	-0.050	-0.050	0.440	0.200	3.200	0.170	0.330	0.040
	1	1.460	0.590	0.360	0.100	2.550	0.150	1.520	0.080
	1.5	-0.050	-0.050	0.450	0.100	3.900	0.140	0.840	0.060
	2	-0.050	-0.050	0.670	0.200	5.620	0.270	3.040	0.100
	2.5	-0.050	-0.050	0.380	0.100	3.460	0.120	2.910	0.100
	3.12	-0.050	-0.050	0.340	0.100	2.700	0.150	3.900	0.120
WCH304A	0	-0.050	-0.050	1.590	0.300	6.860	0.660	3.000	0.300

*See footnote, p. II-1
(CONTINUED)

H-AREA SEEPAGE BASINS RADIOISOTOPE ANALYSES

REPORTED AS PICOCURIES/GRAM
BASIN=3

		TESTNAME							
		SR-90		TC-99		TH-232		U-234 *	
		RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION
CORE	DEPTH TO TOP OF SAMPLE								
WCH304A	0.5	2.740	0.770	0.700	0.100	2.380	0.230	9.040	0.180
	1	2.830	0.980	0.510	0.200	3.290	0.200	4.250	0.120
	1.5	0.970	0.440	0.460	0.200	3.510	0.180	53.800	0.400
	2	0.960	0.780	0.480	0.200	3.340	0.190	0.830	0.100
	2.5	2.160	0.840	0.430	0.200	3.260	0.170	1.820	0.100
WCH305A	0	12.300	1.400	0.800	0.200	4.350	0.320	4.930	0.130
	0.5	3.000	0.890	0.570	0.200	3.350	0.230	3.520	0.110
	1	13.100	1.500	0.500	0.100	2.260	0.110	2.090	0.090
	1.5	0.870	0.760	0.390	0.100	2.480	0.160	1.490	0.100
	2	-0.050	-0.050	0.510	0.200	3.760	0.200	2.690	0.100

*See footnote, p. II-1

H-AREA SEEPAGE BASINS RADIOISOTOPE ANALYSES

REPORTED AS PICOCURIES/GRAM
BASIN=3

		TESTNAME					
		U-235*		U-238 *		ZR-95*	
CORE	DEPTH TO TOP OF SAMPLE	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION
WCH301A	0	0.720	0.200	1.820	0.300	0.540	0.100
	0.5	-0.050	-0.050	0.530	0.100	0.420	0.100
	1	-0.050	-0.050	0.240	0.100	0.390	0.090
	1.5	-0.050	-0.050	0.380	0.100	0.320	0.090
	2	-0.050	-0.050	-0.050	-0.050	-0.400	-0.400
	2.5	-0.050	-0.050	-0.050	-0.050	0.440	0.100
WCH302A	0	-0.050	-0.050	0.420	0.100	0.440	0.100
	0.5	0.560	0.080	0.960	0.200	0.030	0.100
	1	0.200	0.080	0.400	0.100	0.360	0.120
	1.5	0.130	0.050	0.590	0.100	0.490	0.100
	2	0.110	0.050	0.270	0.100	-0.500	-0.500
	2.5	0.120	0.050	0.630	0.090	0.480	0.200
	3.62	-0.050	-0.050	-0.050	-0.050	0.420	0.100
WCH303A	0	0.340	0.100	0.870	0.130	0.580	0.120
	0.5	-0.050	-0.050	-0.050	-0.050	0.580	0.150
	1	0.080	0.040	0.240	0.070	-0.400	-0.400
	1.5	-0.050	-0.050	-0.050	-0.050	-0.300	-0.300
	2	0.180	0.050	0.460	0.080	1.100	0.400
	2.5	0.100	0.070	0.520	0.080	0.300	0.100
	3.12	0.090	0.040	0.590	0.100	-0.400	-0.400
WCH304A	0	2.470	0.400	5.940	1.000	2.090	0.700

*See footnote, p. II-1
(CONTINUED)

H-AREA SEEPAGE BASINS RADIOISOTOPE ANALYSES

REPORTED AS PICOCURIES/GRAM
BASIN=3

		TESTNAME					
		U-235*		U-238*		ZR-95*	
CORE	DEPTH TO TOP OF SAMPLE	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION
WCH304A	0.5	0.430	0.100	1.620	0.200	-0.400	-0.400
	1	0.100	0.050	0.510	0.200	-0.500	-0.500
	1.5	1.100	0.300	6.450	0.800	-0.400	-0.400
	2	-0.050	-0.050	-0.050	-0.050	-0.400	-0.400
	2.5	0.120	0.070	0.210	0.080	-0.500	-0.500
WCH305A	0	0.520	0.100	0.740	0.200	-0.600	-0.600
	0.5	0.250	0.080	0.500	0.100	0.300	0.100
	1	0.150	0.080	0.380	0.090	-0.300	-0.300
	1.5	0.100	0.050	0.220	0.080	-0.100	-0.400
	2	0.200	0.080	0.300	0.090	0.470	0.100

*See footnote, p. II-1

H-AREA SEEPAGE BASINS RADIOISOTOPE ANALYSES

REPORTED AS PICOCURIES/GRAM
BASIN=4

		TESTNAME							
		AM-241*		CE-141		CE-144		CM-244	
CORE	DEPTH TO TOP OF SAMPLE	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION
WCH401A	0	0.130	0.070	-2.000	-2.000	-5.000	-5.000	0.500	0.300
	0.5	-0.050	-0.050	-1.000	-1.000	3.180	0.100	30.000	3.700
	1	-0.050	-0.050	-1.000	-1.000	-2.000	-2.000	-0.050	-0.050
	1.5	-0.050	-0.050	-2.000	-2.000	12.000	1.000	-0.050	-0.050
	2	-0.050	-0.050	-2.000	-2.000	-3.000	-3.000	-0.050	-0.050
	2.5	-0.050	-0.050	-2.000	-2.000	-3.000	-3.000	-0.050	-0.050
	3.33	0.080	0.040	-1.000	-1.000	-2.000	-2.000	-0.050	-0.050
WCH402A	0	-0.050	-0.050	-1.000	-1.000	4.700	1.560	14.600	2.700
	0.5	0.060	0.040	-2.000	-2.000	-3.000	-3.000	1.900	0.900
	1	-0.050	-0.050	-2.000	-2.000	-3.000	-3.000	2.400	0.800
	1.5	-0.050	-0.050	-1.000	-1.000	-3.000	-3.000	2.300	0.900
	2	-0.050	-0.050	-1.000	-1.000	-2.000	-2.000	-0.050	-0.050
	2.5	-0.050	-0.050	-1.000	-1.000	-2.000	-2.000	-0.050	-0.050
	3	-0.050	-0.050	-1.000	-1.000	-2.000	-2.000	-0.050	-0.050
WCH403A	0	-0.050	-0.050	-1.000	-1.000	4.110	1.080	9.200	1.000
	0.5	-0.050	-0.050	-2.000	-2.000	5.910	0.910	3.600	0.900
	1	-0.050	-0.050	-0.800	-0.800	1.660	0.650	2.100	0.900
	1.5	-0.050	-0.050	-1.000	-1.000	2.100	0.840	-0.050	-0.050
	2	-0.050	-0.050	-1.000	-1.000	-3.000	-3.000	-0.050	-0.050

*See footnote, p. II-1

H-AREA SEEPAGE BASINS RADIOISOTOPE ANALYSES

REPORTED AS PICOCURIES/GRAM
BASIN=4

		TESTNAME							
		CO-60		CS-134		CS-137		H-3	
		RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION
CORE	DEPTH TO TOP OF SAMPLE								
WCH401A	0	3.070	0.090	13.200	0.200	1710.000	19.000	11297.000	8.000
	0.5	2.160	0.070	9.280	0.140	1440.000	1.000	9117.000	6.000
	1	2.860	0.280	7.200	0.470	2100.000	5.000	12937.000	7.000
	1.5	1.960	0.220	2.730	0.310	1180.000	39.000	11676.000	6.000
	2	1.370	0.060	0.730	0.080	632.000	1.000	9428.000	5.000
	2.5	4.220	0.090	0.120	0.050	319.000	1.000	9229.000	5.000
	3.33	2.090	0.070	0.190	0.050	28.900	0.200	6824.000	4.000
WCH402A	0	2.980	0.100	20.700	0.200	2590.000	18.000	10046.000	6.000
	0.5	1.020	0.050	3.110	0.100	660.000	1.000	12526.000	7.000
	1	1.470	0.060	1.310	0.080	493.000	1.000	15245.000	8.000
	1.5	2.850	0.100	0.490	0.090	340.000	1.000	8011.000	7.000
	2	1.820	0.060	-0.030	-0.030	60.000	0.400	10369.000	6.000
	2.5	2.310	0.080	-0.060	-0.060	22.500	0.200	7336.000	4.000
	3	2.210	0.070	-0.020	-0.020	21.600	0.200	7125.000	4.000
WCH403A	0	2.830	0.090	12.900	0.200	1060.000	10.000	8421.000	5.000
	0.5	0.700	0.060	10.400	0.100	766.000	1.000	8909.000	6.000
	1	0.520	0.050	5.070	0.100	487.000	1.000	9071.000	5.000
	1.5	0.470	0.060	5.730	0.130	622.000	1.000	8246.000	5.000
	2	0.710	0.050	6.230	0.110	796.000	1.000	8082.000	5.000

H-AREA SEEPAGE BASINS RADIOISOTOPE ANALYSES

REPORTED AS PICOCURIES/GRAM
BASIN=4

		TESTNAME							
		I-129*		NB-95		PM-147		PU-238*	
		RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION
CORE	DEPTH TO TOP OF SAMPLE								
WCH401A	0	0.230	0.160	-0.500	-0.500	2.000	0.300	0.080	0.050
	0.5	-0.050	-0.050	0.350	0.120	4.040	0.430	0.080	0.050
	1	-0.050	-0.050	32.200	1.000	26.000	4.000	-0.050	-0.050
	1.5	-0.050	-0.050	29.700	1.000	36.000	4.000	-0.050	-0.050
	2	-0.050	-0.050	0.300	0.100	2.250	0.350	-0.050	-0.050
	2.5	-0.050	-0.050	0.950	0.270	0.860	0.260	-0.050	-0.050
	3.33	2.800	0.170	0.370	0.100	5.300	0.500	-0.050	-0.050
WCH402A	0	0.170	0.100	0.340	0.140	9.920	0.630	-0.050	-0.050
	0.5	-0.050	-0.050	0.340	0.110	1.690	0.310	0.090	0.040
	1	-0.050	-0.050	-0.400	-0.400	3.630	0.410	-0.050	-0.050
	1.5	-0.050	-0.050	0.350	0.140	0.830	0.260	-0.050	-0.050
	2	-0.050	-0.050	0.220	0.100	0.280	0.220	-0.050	-0.050
	2.5	-0.050	-0.050	-0.400	-0.400	-0.050	-0.050	-0.050	-0.050
	3	-0.050	-0.050	0.290	0.110	4.500	0.400	-0.050	-0.050
WCH403A	0	-0.050	-0.050	-0.500	-0.500	3.660	0.410	0.160	0.070
	0.5	263.200	2.000	0.290	0.130	2.880	0.380	0.070	0.040
	1	-0.050	-0.050	0.380	0.100	1.590	0.310	0.050	0.040
	1.5	258.800	1.900	0.570	0.130	2.060	0.340	-0.050	-0.050
	2	-0.050	-0.050	0.390	0.100	3.070	0.390	-0.050	-0.050

*See footnote, p. II-1

H-AREA SEEPAGE BASINS RADIOISOTOPE ANALYSES

REPORTED AS PICOCURIES/GRAM
BASIN=4

		TESTNAME							
		PU-239 *		RU-103		RU-106		SR-89	
		RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION
CORE	DEPTH TO TOP OF SAMPLE								
WCH401A	0	-0.050	-0.050	-0.100	-0.100	30.700	3.600	-0.050	-0.050
	0.5	-0.050	-0.050	1.290	0.300	9.010	1.570	-0.050	-0.050
	1	-0.050	-0.050	9.870	0.900	21.400	1.000	-0.050	-0.050
	1.5	-0.050	-0.050	-0.700	-0.700	-2.000	-2.000	-0.050	-0.050
	2	-0.050	-0.050	-0.800	-0.800	-4.000	-4.000	-0.050	-0.050
	2.5	-0.050	-0.050	-0.300	-0.300	-3.000	-3.000	-0.050	-0.050
	3.33	-0.050	-0.050	-0.400	-0.400	-2.000	-2.000	-0.050	-0.050
WCH402A	0	-0.050	-0.050	-1.800	-1.800	19.600	3.900	-0.050	-0.050
	0.5	0.080	0.040	-1.000	-1.000	-4.000	-4.000	-0.050	-0.050
	1	-0.050	-0.050	-0.800	-0.800	2.560	0.970	-0.050	-0.050
	1.5	-0.050	-0.050	-0.900	-0.900	-0.400	-4.000	-0.050	-0.050
	2	-0.050	-0.050	-0.400	-0.400	-2.000	-2.000	-0.050	-0.050
	2.5	-0.050	-0.050	-0.400	-0.400	1.480	0.570	-0.050	-0.050
	3	-0.050	-0.050	-0.400	-0.400	-2.000	-2.000	-0.050	-0.050
WCH403A	0	-0.050	-0.050	-1.400	-1.400	30.400	1.700	-0.050	-0.050
	0.5	0.180	0.060	-0.800	-0.800	10.300	1.300	-0.050	-0.050
	1	0.070	0.050	-0.900	-0.900	7.830	0.980	-0.050	-0.050
	1.5	-0.050	-0.050	-1.200	-1.200	8.010	1.210	-0.050	-0.050
	2	-0.050	-0.050	-0.900	-0.900	5.760	1.170	-0.050	-0.050

*See footnote, p. II-1

H-AREA SEEPAGE BASINS RADIOISOTOPE ANALYSES

REPORTED AS PICOCURIES/GRAM
BASIN=4

		TESTNAME							
		SR-90		TC-99		TH-232		U-234*	
CORE	DEPTH TO TOP OF SAMPLE	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION
WCH401A	0	30.100	2.100	1.520	0.200	4.930	0.590	54.300	0.400
	0.5	32.000	2.500	19.600	0.040	4.230	0.600	26.300	0.300
	1	358.000	31.000	3.560	0.300	5.130	0.900	22.400	1.200
	1.5	262.000	21.000	2.740	1.000	4.480	0.800	8.990	0.850
	2	10.700	2.000	0.790	0.200	4.140	0.320	0.380	0.040
	2.5	10.500	1.200	0.720	0.200	3.580	0.280	0.430	0.100
	3.33	23.900	2.500	2.000	0.200	3.490	0.230	0.850	0.100
WCH402A	0	30.300	2.300	-0.050	-0.050	4.030	0.680	14.500	0.200
	0.5	10.300	1.500	0.950	0.300	4.050	0.360	0.930	0.050
	1	6.720	1.110	0.760	0.200	3.970	0.390	1.020	0.100
	1.5	13.000	2.300	0.880	0.300	4.340	0.350	0.630	0.100
	2	16.600	1.500	0.500	0.200	3.430	0.240	0.820	0.100
	2.5	9.250	1.600	1.600	0.200	3.850	0.210	1.520	0.070
	3	9.780	1.650	0.490	0.200	3.500	0.230	2.300	0.080
WCH403A	0	2240.000	17.000	1.150	0.100	3.410	0.470	3.010	0.100
	0.5	1.470	0.460	0.630	0.200	3.920	0.380	1.100	0.060
	1	7.650	1.330	0.700	0.300	2.750	0.280	3.690	0.100
	1.5	7.000	1.430	0.940	0.200	4.280	0.370	4.170	0.370
	2	3360.000	26.000	0.860	0.200	3.330	0.350	48.600	1.000

*See footnote, p. II-1

H-AREA SEEPAGE BASINS RADIOISOTOPE ANALYSES

REPORTED AS PICOCURIES/GRAM
BASIN=4

		TESTNAME					
		U-235 *		U-238*		ZR-95 *	
CORE	DEPTH TO TOP OF SAMPLE	RESULT	PRECISION	RESULT	PRECISION	RESULT	PRECISION
WCH401A	0	2.660	0.470	9.800	1.200	-0.600	-0.600
	0.5	1.780	0.250	3.940	0.600	0.570	0.200
	1	1.600	0.500	4.030	0.800	29.500	1.000
	1.5	0.490	0.100	1.300	0.300	27.400	1.000
	2	-0.050	-0.050	-0.050	-0.050	0.490	0.100
	2.5	-0.050	-0.050	-0.050	-0.050	0.790	0.300
	3.33	-0.050	-0.050	0.110	0.050	0.460	0.100
WCH402A	0	0.310	0.100	2.610	0.900	0.680	0.120
	0.5	0.070	0.040	0.180	0.040	0.490	0.100
	1	0.070	0.040	0.200	0.100	-0.500	-0.500
	1.5	-0.050	-0.050	-0.050	-0.050	0.400	0.150
	2	-0.050	-0.050	-0.050	-0.050	0.440	0.150
	2.5	0.110	0.050	0.300	0.100	-0.500	-0.500
	3	0.110	0.050	0.410	0.080	0.510	0.150
WCH403A	0	0.170	0.050	0.540	0.100	-0.600	-0.600
	0.5	0.080	0.050	0.180	0.060	0.590	0.150
	1	0.540	0.100	0.660	0.100	0.440	0.150
	1.5	0.610	0.100	0.750	0.200	0.540	0.100
	2	1.310	0.190	8.740	1.310	0.480	0.150

*See footnote, p. II-1

H-AREA SEEPAGE BASINS METAL ANALYSES

REPORTED AS MICROGRAMS/GRAM
BASIN=1

		TESTNAME								
		AG	AS	B	BA	BE	BI	CD	CN	CR
		RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT
CORE	DEPTH TO TOP OF SAMPLE									
WCH101A	0	6.300	2.200	10.000	37.000	-5.000	-5.000	-2.000	-5.000	710.000
	0.5	6.000	2.600	16.000	55.000	-5.000	-5.000	-2.000	7.500	1483.000
	1	-5.000	-2.000	11.000	43.000	-5.000	11.400	-2.000	5.000	1143.000
	1.5	7.700	-2.000	9.000	12.000	-5.000	9.000	-2.000	6.800	192.000
	2	16.000	-2.000	-5.000	30.000	-5.000	25.000	-2.000	9.000	611.000
	2.5	-5.000	-2.000	-5.000	7.000	-5.000	-5.000	-2.000	-5.000	32.000
WCH102A	0	-5.000	3.300	14.000	84.000	-5.000	-5.000	-2.000	6.300	3833.000
	0.5	17.000	-2.000	-5.000	30.000	-5.000	22.000	-2.000	6.500	659.000
	1	-5.000	-2.000	-5.000	8.000	-5.000	-5.000	-2.000	-5.000	82.000
	1.5	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	31.000
	2	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	21.000
	2.5	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	24.000
	4.25	-5.000	-2.000	-5.000	20.000	-5.000	-5.000	-2.000	-5.000	21.000

H-AREA SEEPAGE BASINS METAL ANALYSES

REPORTED AS MICROGRAMS/GRAM
BASIN=1

		TESTNAME								
		CU	FE	F	HG	LI	MN	NA	NI	NO2
		RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT
CORE	DEPTH TO TOP OF SAMPLE									
WCH101A	0	18.000	7066.000	93.000	-2.000	8.700	195.000	225.000	21.700	-100.000
	0.5	57.000	6433.000	73.000	-2.000	9.700	937.000	397.000	76.700	-100.000
	1	55.000	5599.000	70.000	-2.000	11.000	640.000	317.000	-5.000	-100.000
	1.5	41.000	7860.000	38.000	-2.000	3.000	8.000	129.000	-5.000	-100.000
	2	79.000	26100.000	70.000	-2.000	7.000	8.000	270.000	-5.000	-100.000
	2.5	22.000	4890.000	43.000	6.900	-2.000	6.000	174.000	-5.000	-100.000
WCH102A	0	37.000	6333.000	73.000	-2.000	14.300	967.000	700.000	-5.000	-100.000
	0.5	64.000	27100.000	63.000	-2.000	5.000	8.000	983.000	-5.000	-100.000
	1	11.000	7920.000	43.000	5.600	-2.000	9.000	1676.000	-5.000	-100.000
	1.5	-5.000	6590.000	43.000	-2.000	-2.000	6.000	1027.000	-5.000	-100.000
	2	-5.000	3220.000	43.000	-2.000	-2.000	5.000	606.000	-5.000	-100.000
	2.5	-5.000	5490.000	53.000	-2.000	-2.000	9.000	1133.000	-5.000	-100.000
	4.25	8.000	1200.000	50.000	2.900	-2.000	6.000	349.000	-5.000	-100.000

H-AREA SEEPAGE BASINS METAL ANALYSES

REPORTED AS MICROGRAMS/GRAM
BASIN=1

		TESTNAME						
		NO3	PB	SE	SN	TI	W	ZN
		RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT
CORE	DEPTH TO TOP OF SAMPLE							
HCH101A	0	350.000	56.700	-2.000	37.000	88.000	-5.000	170.000
	0.5	500.000	29.300	-2.000	56.600	101.000	101.000	266.000
	1	350.000	-5.000	-2.000	47.000	57.000	-5.000	177.000
	1.5	130.000	270.000	-2.000	-5.000	14.000	-5.000	78.000
	2	150.000	180.000	2.000	-5.000	31.000	-5.000	38.000
	2.5	-100.000	12.000	-2.000	-5.000	15.000	-5.000	37.000
HCH102A	0	450.000	83.300	-2.000	50.000	140.000	10.000	323.000
	0.5	420.000	170.000	2.000	-5.000	42.000	-5.000	177.000
	1	130.000	20.000	-2.000	-5.000	20.000	-5.000	57.000
	1.5	-100.000	5.600	-2.000	-5.000	29.000	-5.000	10.000
	2	-100.000	3.600	-2.000	-5.000	22.000	-5.000	5.000
	2.5	-100.000	4.900	-2.000	-5.000	22.000	-5.000	19.000
	4.25	-100.000	36.000	-2.000	-5.000	-5.000	-5.000	55.000

H-AREA SEEPAGE BASINS METAL ANALYSES

REPORTED AS MICROGRAMS/GRAM
BASIN=2

		TESTNAME								
		AG	AS	B	BA	BE	BI	CD	CN	CR
		RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT
CORE	DEPTH TO TOP OF SAMPLE									
WCH201A	0	7.000	-2.000	-5.000	7.000	-5.000	-5.000	-2.000	-5.000	708.000
	0.5	-5.000	-2.000	9.000	-5.000	-5.000	-5.000	-2.000	-5.000	29.000
	1	-5.000	-2.000	10.000	-5.000	-5.000	-5.000	-2.000	-5.000	28.000
	1.5	-5.000	-2.000	9.000	-5.000	-5.000	-5.000	-2.000	-5.000	22.000
	2	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	20.000
	2.5	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	18.000
	3.37	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	19.000
WCH202A	0	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	151.000
	0.5	-5.000	-2.000	7.000	-5.000	-5.000	-5.000	-2.000	-5.000	20.000
	1	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	19.000
	1.5	-5.000	-2.000	-5.000	8.000	-5.000	-5.000	-2.000	-5.000	18.000
	2	-5.000	-2.000	12.000	-5.000	-5.000	-5.000	-2.000	-5.000	20.000
	2.5	-5.000	-2.000	9.000	-5.000	-5.000	-5.000	-2.000	-5.000	19.000
WCH203A	0	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	43.000
	0.5	-5.000	-2.000	12.000	-5.000	-5.000	-5.000	-2.000	-5.000	35.000
	1	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	25.000
	1.5	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	24.000
	2	10.000	2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	19.000
	2.5	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	19.000
	3	-5.000	3.000	8.000	-5.000	-5.000	-5.000	-2.000	-5.000	18.000

H-AREA SEEPAGE BASINS METAL ANALYSES

REPORTED AS MICROGRAMS/GRAM
BASIN=2

		TESTNAME								
		CU	FE	F	HG	LI	MN	NA	NI	NO2
		RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT
CORE	DEPTH TO TOP OF SAMPLE									
WCH201A	0	26.000	13700.000	45.000	120.000	2.000	6.000	94.000	-5.000	-100.000
	0.5	-5.000	6670.000	50.000	-2.000	-2.000	7.000	43.000	-5.000	-100.000
	1	-5.000	4880.000	58.000	2.000	-2.000	6.000	67.000	-5.000	-100.000
	1.5	15.000	4400.000	50.000	-2.000	-2.000	-5.000	46.000	-5.000	-100.000
	2	16.000	4950.000	65.000	-2.000	-2.000	-5.000	41.000	-5.000	-100.000
	2.5	16.000	3860.000	68.000	-2.000	-2.000	-5.000	42.000	-5.000	-100.000
	3.37	16.000	3430.000	75.000	-2.000	-2.000	-5.000	41.000	-5.000	-100.000
WCH202A	0	17.000	15400.000	65.000	-2.000	2.000	5.000	81.000	-5.000	-100.000
	0.5	16.000	5340.000	75.000	-2.000	-2.000	6.000	65.000	-5.000	-100.000
	1	19.000	5390.000	48.000	-2.000	-2.000	5.000	48.000	-5.000	-100.000
	1.5	16.000	4360.000	75.000	-2.000	-2.000	5.000	45.000	-5.000	-100.000
	2	14.000	5120.000	65.000	-2.000	-2.000	6.000	61.000	-5.000	-100.000
	2.5	14.000	2040.000	48.000	-2.000	-2.000	5.000	42.000	-5.000	-100.000
WCH203A	0	14.000	17600.000	48.000	2.200	-2.000	5.000	55.000	-5.000	-100.000
	0.5	14.000	8390.000	225.000	2.900	-2.000	6.000	61.000	-5.000	-100.000
	1	13.000	2110.000	150.000	-2.000	-2.000	-5.000	35.000	-5.000	-100.000
	1.5	14.000	1850.000	175.000	-2.000	-2.000	-5.000	39.000	-5.000	-100.000
	2	15.000	386.000	173.000	-2.000	-2.000	-5.000	54.000	-5.000	-100.000
	2.5	15.000	1110.000	165.000	-2.000	-2.000	-5.000	61.000	-5.000	-100.000
	3	16.000	1040.000	93.000	-2.000	-2.000	-5.000	50.000	-5.000	-100.000

H-AREA SEEPAGE BASINS METAL ANALYSES

REPORTED AS MICROGRAMS/GRAM
BASIN=2

		TESTNAME						
		NO3	PB	SE	SN	TI	W	ZN
		RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT
CORE	DEPTH TO TOP OF SAMPLE							
WCH201A	0	-100.000	44.000	-2.000	-5.000	29.000	-5.000	20.000
	0.5	-100.000	3.900	-2.000	-5.000	6.000	-5.000	5.000
	1	-100.000	12.000	-2.000	-5.000	-5.000	-5.000	6.000
	1.5	-100.000	7.100	-2.000	-5.000	-5.000	-5.000	5.000
	2	-100.000	6.400	-2.000	-5.000	19.000	-5.000	16.000
	2.5	-100.000	5.200	-2.000	-5.000	16.000	-5.000	-5.000
	3.37	-100.000	3.400	-2.040	-5.000	17.000	-5.000	-5.000
WCH202A	0	-100.000	19.000	-2.000	-5.000	33.000	-5.000	12.000
	0.5	-100.000	8.200	-2.000	-5.000	28.000	-5.000	5.000
	1	-100.000	9.500	-2.000	-5.000	17.000	-5.000	8.000
	1.5	-100.000	8.200	-2.000	-5.000	14.000	-5.000	-5.000
	2	-100.000	5.300	-2.000	-5.000	21.000	-5.000	7.000
	2.5	-100.000	5.100	-2.000	-5.000	-5.000	-5.000	-5.000
WCH203A	0	-100.000	8.700	-2.000	-5.000	45.000	-5.000	10.000
	0.5	-100.000	6.600	-2.000	-5.000	21.000	-5.000	7.000
	1	-100.000	1.800	-2.000	-5.000	11.000	-5.000	-5.000
	1.5	-100.000	2.500	-2.000	-5.000	10.000	-5.000	7.000
	2	-100.000	-5.000	-2.000	-5.000	-5.000	-5.000	11.000
	2.5	-100.000	2.200	-2.000	-5.000	6.000	-5.000	5.000
	3	-100.000	2780.000	-2.000	-5.000	6.000	-5.000	5.000

H-AREA SEEPAGE BASINS METAL ANALYSES

REPORTED AS MICROGRAMS/GRAM
BASIN=3

		TESTNAME								
		AG	AS	B	BA	BE	BI	CD	CN	CR
		RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT
CORE	DEPTH TO TOP OF SAMPLE									
WCH301A	0	-5.000	-2.000	5.000	-5.000	-5.000	-5.000	-2.000	-5.000	31.000
	0.5	-5.000	-2.000	-5.000	-10.000	-5.000	-5.000	-2.000	-5.000	17.000
	1	-5.000	-2.000	39.000	-5.000	-5.000	-5.000	-2.000	-5.000	14.000
	1.5	-5.000	-2.000	8.000	-5.000	-5.000	-5.000	-2.000	-5.000	10.000
	2	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	14.000
	2.5	-5.000	-2.000	22.000	-5.000	-5.000	-5.000	-2.000	-5.000	18.000
WCH302A	0	-5.000	-2.000	11.000	-5.000	-5.000	-5.000	-2.000	-5.000	17.000
	0.5	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	9.000
	1	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	21.000
	1.5	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	9.000
	2	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	9.000
	2.5	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	14.000
	3.62	-5.000	-2.000	24.000	-5.000	-5.000	-5.000	-2.000	-5.000	16.000
WCH303A	0	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	22.000
	0.5	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	15.000
	1	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	14.000
	1.5	-5.000	-2.000	49.000	-5.000	-5.000	-5.000	-2.000	-5.000	15.000
	2	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	4.000
	2.5	-5.000	-2.000	33.000	-5.000	-5.000	-5.000	-2.000	-5.000	11.000
	3.12	-5.000	-2.000	12.000	-5.000	-5.000	-5.000	-2.000	-5.000	5.000
WCH304A	0	-5.000	-2.000	-2.000	-5.000	-5.000	-5.000	-2.000	-5.000	22.000

(CONTINUED)

H-AREA SEEPAGE BASINS METAL ANALYSES

REPORTED AS MICROGRAMS/GRAM
BASIN=3

		TESTNAME								
		AG	AS	B	BA	BE	BI	CD	CN	CR
		RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT
CORE	DEPTH TO TOP OF SAMPLE									
WCH304A	0.5	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	6.000
	1	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	9.000
	1.5	-5.000	-2.000	49.000	-5.000	-5.000	-5.000	-2.000	-5.000	12.000
	2	-5.000	-2.000	65.000	-5.000	-5.000	-5.000	-2.000	-5.000	4.000
	2.5	-5.000	-2.000	59.000	-5.000	-5.000	-5.000	-2.000	-5.000	6.000
WCH305A	0	-5.000	-2.000	47.000	-5.000	-5.000	-5.000	-2.000	-5.000	28.000
	0.5	-5.000	-2.000	75.000	-5.000	-5.000	-5.000	-2.000	-5.000	10.000
	1	-5.000	-2.000	54.000	-5.000	-5.000	-5.000	-2.000	-5.000	10.000
	1.5	-5.000	-2.000	24.000	-5.000	-5.000	-5.000	-2.000	-5.000	18.000
	2	-5.000	-2.000	49.000	-5.000	-5.000	-5.000	-2.000	-5.000	27.000

H-AREA SEEPAGE BASINS METAL ANALYSES

REPORTED AS MICROGRAMS/GRAM
BASIN=3

		TESTNAME								
		CU	FE	F	HG	LI	MN	NA	NI	NO2
		RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT
CORE	DEPTH TO TOP OF SAMPLE									
WCH301A	0	15.000	7030.000	32.000	-2.000	-2.000	10.000	167.000	-5.000	-100.000
	0.5	14.000	6930.000	50.000	-2.000	-2.000	10.000	85.000	-5.000	-100.000
	1	14.000	9210.000	58.000	-2.000	2.000	5.000	95.000	-5.000	-100.000
	1.5	14.000	7160.000	62.000	-2.000	2.000	9.000	59.000	-5.000	-100.000
	2	12.000	7480.000	75.000	-2.000	-2.000	9.000	39.000	-5.000	-100.000
	2.5	13.000	12300.000	82.000	-2.000	2.000	9.000	77.000	-5.000	-100.000
WCH302A	0	14.000	9820.000	48.000	3.000	2.000	8.000	130.000	-5.000	-100.000
	0.5	13.000	4470.000	40.000	-2.000	2.000	5.000	94.000	-5.000	-100.000
	1	14.000	8610.000	68.000	-2.000	4.000	9.000	139.000	-5.000	-100.000
	1.5	14.000	9690.000	95.000	-2.000	4.000	7.000	70.000	-5.000	-100.000
	2	13.000	10500.000	105.000	-2.000	3.000	8.000	47.000	-5.000	-100.000
	2.5	11.000	5240.000	90.000	-2.000	3.000	-5.000	52.000	-5.000	-100.000
	3.62	13.000	6670.000	125.000	-2.000	2.000	-5.000	60.000	-5.000	-100.000
WCH303A	0	14.000	13600.000	88.000	3.190	2.000	-5.000	157.000	-5.000	-100.000
	0.5	12.000	15300.000	63.000	-2.000	-2.000	-5.000	56.000	-5.000	-100.000
	1	13.000	4160.000	73.000	-2.000	-2.000	-5.000	46.000	-5.000	-100.000
	1.5	13.000	10400.000	78.000	-2.000	2.000	-5.000	93.000	-5.000	-100.000
	2	13.000	1260.000	163.000	-2.000	-2.000	-5.000	25.000	-5.000	-100.000
	2.5	12.000	1770.000	73.000	-2.000	-2.000	-5.000	100.000	-5.000	-100.000
	3.12	12.000	1460.000	75.000	-2.000	-2.000	-5.000	61.000	-5.000	-100.000
WCH304A	0	53.000	4080.000	35.000	2.300	-2.000	9.500	114.000	-5.000	-100.000

(CONTINUED)

H-AREA SEEPAGE BASINS METAL ANALYSES

REPORTED AS MICROGRAMS/GRAM
BASIN=3

		TESTNAME								
		CU	FE	F	HG	LI	MN	NA	NI	NO2
		RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT
CORE	DEPTH TO TOP OF SAMPLE									
WCH304A	0.5	13.000	2110.000	68.000	-2.000	-5.000	-5.000	89.000	-5.000	-100.000
	1	11.000	2540.000	83.000	-2.000	-5.000	-5.000	122.000	-5.000	-100.000
	1.5	12.000	4100.000	73.000	-2.000	-2.000	-5.000	136.000	-5.000	-100.000
	2	11.000	1170.000	103.000	-2.000	-2.000	-5.000	766.000	-5.000	-100.000
	2.5	13.000	6930.000	53.000	-2.000	-2.000	6.000	124.000	-5.000	-100.000
WCH305A	0	14.000	5990.000	43.000	4.300	-2.000	12.000	253.000	-5.000	-100.000
	0.5	12.000	3480.000	78.000	-2.000	-2.000	-2.000	139.000	-5.000	-100.000
	1	12.000	5580.000	75.000	-2.000	-2.000	5.000	120.000	-5.000	-100.000
	1.5	11.000	7550.000	83.000	-2.000	-2.000	7.900	464.000	-5.000	-100.000
	2	12.000	17000.000	70.000	-2.000	2.000	16.000	94.000	-5.000	-100.000

H-AREA SEEPAGE BASINS METAL ANALYSES

REPORTED AS MICROGRAMS/GRAM
BASIN=3

		TESTNAME						
		NO3	PB	SE	SN	TI	W	ZN
		RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT
CORE	DEPTH TO TOP OF SAMPLE							
WCH301A	0	-100.000	16.000	-2.000	-5.000	29.000	-5.000	44.000
	0.5	-100.000	5.000	-2.000	-5.000	20.000	-5.000	-5.000
	1	-100.000	6.000	-2.000	-5.000	39.000	-5.000	5.000
	1.5	-100.000	-5.000	-2.000	-5.000	26.000	-5.000	5.000
	2	-100.000	5.000	-2.000	-5.000	28.000	-5.000	5.000
	2.5	-100.000	5.000	-2.000	-5.000	38.000	-5.000	5.000
WCH302A	0	-100.000	-5.000	-2.000	-5.000	14.000	-5.000	5.000
	0.5	-100.000	-5.000	-2.000	-5.000	24.000	-5.000	5.000
	1	-100.000	7.000	-2.000	-5.000	34.000	-5.000	7.000
	1.5	-100.000	7.000	-2.000	-5.000	41.000	-5.000	6.000
	2	-100.000	7.000	-2.000	-5.000	31.000	-5.000	6.000
	2.5	-100.000	5.000	-2.000	-5.000	15.000	-5.000	-5.000
	3.62	-100.000	-5.000	-2.000	-5.000	20.000	-5.000	6.000
WCH303A	0	-100.000	-5.000	-2.000	-5.000	27.000	-5.000	13.000
	0.5	-100.000	-5.000	-2.000	-5.000	-5.000	-5.000	6.000
	1	-100.000	-5.000	-2.000	-5.000	12.000	-5.000	-5.000
	1.5	-100.000	29.000	-2.000	-5.000	10.000	-5.000	6.000
	2	-100.000	-5.000	-2.000	-5.000	7.000	-5.000	-5.000
	2.5	-100.000	-5.000	-2.000	-5.000	10.000	-5.000	-5.000
	3.12	-100.000	-5.000	-2.000	-5.000	9.000	-5.000	-5.000
WCH304A	0	-100.000	25.000	-2.000	-5.000	15.000	-5.000	13.000

(CONTINUED)

H-AREA SEEPAGE BASINS METAL ANALYSES

REPORTED AS MICROGRAMS/GRAM
BASIN=3

		TESTNAME						
		NO3	PB	SE	SN	TI	W	ZN
		RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT
CORE	DEPTH TO TOP OF SAMPLE							
WCH304A	0.5	-100.000	6.000	-2.000	-5.000	-5.000	-5.000	-5.000
	1	-100.000	-5.000	-2.000	-5.000	7.000	-5.000	-5.000
	1.5	-100.000	-5.000	-2.000	-5.000	8.000	-5.000	-5.000
	2	-100.000	-5.000	-2.000	-5.000	7.000	-5.000	-5.000
	2.5	-100.000	30.000	-2.000	-5.000	6.000	-5.000	-5.000
WCH305A	0	-100.000	-5.000	-2.000	-5.000	15.000	-5.000	10.000
	0.5	-100.000	-5.000	-2.000	-5.000	12.000	-5.000	-5.000
	1	-100.000	5.000	-2.000	-5.000	24.000	-5.000	5.000
	1.5	-100.000	7.000	-2.000	-5.000	14.000	-5.000	-5.000
	2	-100.000	28.000	-2.000	-5.000	39.000	-5.000	9.000

H-AREA SEEPAGE BASINS METAL ANALYSES

REPORTED AS MICROGRAMS/GRAM
BASIN=4

		TESTNAME								
		AG	AS	B	BA	BE	BI	CD	CH	CR
		RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT
CORE	DEPTH TO TOP OF SAMPLE									
WCH401A	0	-5.000	-2.000	41.000	-5.000	-5.000	-5.000	-2.000	-5.000	153.000
	0.5	-5.000	-2.000	38.000	-5.000	-5.000	-5.000	-2.000	-5.000	147.000
	1	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	77.000
	1.5	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	15.000
	2	-5.000	-2.000	10.000	-5.000	-5.000	-5.000	-2.000	-5.000	14.000
	2.5	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	17.000
	3.33	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	-8.000
WCH402A	0	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	58.300
	0.5	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	10.300
	1	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	-8.000
	1.5	-5.000	3.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	-8.000
	2	-5.000	2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	55.300
	2.5	-5.000	6.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	12.000
	3	-5.000	3.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	-8.000
WCH403A	0	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	22.600
	0.5	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	64.900
	1	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	63.600
	1.5	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	68.600
	2	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000	-2.000	-5.000	71.600

H-AREA SEEPAGE BASINS METAL ANALYSES

REPORTED AS MICROGRAMS/GRAM
BASIN=4

		TESTNAME								
		CU	FE	F	HG	LI	MN	NA	NI	NO2
		RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT
CORE	DEPTH TO TOP OF SAMPLE									
WCH401A	0	11.000	11800.000	32.000	-2.000	-5.000	16.000	109.000	-5.000	-100.000
	0.5	13.000	8130.000	65.000	-2.000	-2.000	10.000	112.000	-5.000	-100.000
	1	-5.000	5733.000	47.000	4.700	-2.000	9.000	41.000	-5.000	-100.000
	1.5	-5.000	5633.000	55.000	-2.000	-2.000	13.000	44.000	-5.000	-100.000
	2	12.000	3210.000	50.000	-2.000	-2.000	-5.000	93.000	-0.050	-100.000
	2.5	12.000	5440.000	30.000	-2.000	-2.000	8.200	226.000	-5.000	-100.000
	3.33	-5.000	4728.600	33.000	-2.000	-2.000	17.000	-33.000	-5.000	-100.000
WCH402A	0	-5.000	13586.400	32.000	2.000	-2.000	16.000	57.000	-5.000	-100.000
	0.5	-5.000	8325.000	50.000	5.100	-2.000	13.000	43.000	-5.000	-100.000
	1	-5.000	115218.000	53.000	-2.000	-2.000	23.000	33.000	-5.000	-100.000
	1.5	-5.000	9057.600	69.000	-2.000	-2.000	60.000	43.000	-5.000	-100.000
	2	-5.000	7492.500	63.000	-2.000	-2.000	16.000	40.000	87.000	-100.000
	2.5	-5.000	8991.000	50.000	-2.000	-2.000	9.000	37.000	-5.000	-100.000
	3	-5.000	8125.200	68.000	-2.000	-2.000	5.000	33.000	-5.000	-100.000
WCH403A	0	-5.000	8857.800	43.000	-2.000	-2.000	27.000	37.000	-5.000	-100.000
	0.5	-5.000	6393.600	65.000	-2.000	-2.000	17.000	37.000	-5.000	-100.000
	1	-5.000	4528.800	65.000	-2.000	-2.000	7.000	27.000	-5.000	-100.000
	1.5	-5.000	6460.200	60.000	-2.000	-2.000	9.000	27.000	-5.000	-100.000
	2	-5.000	6393.600	60.000	-2.000	-2.000	15.000	27.000	-5.000	-100.000

H-AREA SEEPAGE BASINS METAL ANALYSES

REPORTED AS MICROGRAMS/GRAM
BASIN=4

		TESTNAME						
		NO3	PB	SE	SN	TI	W	ZN
		RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT
CORE	DEPTH TO TOP OF SAMPLE							
WCH401A	0	-100.000	7.000	-2.000	-5.000	24.000	-5.000	6.000
	0.5	-100.000	6.000	-2.000	-5.000	25.000	-5.000	5.000
	1	-100.000	-5.000	-2.000	-5.000	23.000	-5.000	-5.000
	1.5	-100.000	-5.000	-2.000	6.700	21.000	-5.000	-5.000
	2	-100.000	5.000	-2.000	-5.000	10.000	-5.000	-5.000
	2.5	-100.000	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000
	3.33	-100.000	-5.000	-2.000	-5.000	-5.000	-5.000	-5.000
WCH402A	0	-100.000	-5.000	-2.000	-5.000	18.600	-5.000	5.300
	0.5	-100.000	-5.000	-2.000	-5.000	42.300	-5.000	-5.000
	1	-100.000	-5.000	-2.000	-5.000	37.000	-5.000	-5.000
	1.5	-100.000	-5.000	-2.000	-5.000	45.300	-5.000	5.000
	2	-100.000	-5.000	-2.000	-5.000	24.300	-5.000	-5.000
	2.5	-100.000	-5.000	-2.000	-5.000	28.300	-5.000	6.700
	3	-100.000	-5.000	-2.000	-5.000	23.000	-5.000	-5.000
WCH403A	0	-100.000	-5.000	-2.000	-5.000	30.300	-5.000	-5.000
	0.5	-100.000	-5.000	-2.000	-5.000	24.600	-5.000	-5.000
	1	-100.000	-5.000	-2.000	-5.000	18.300	-5.000	-5.000
	1.5	-100.000	-5.000	-2.000	-5.000	13.700	-5.000	-5.000
	2	-100.000	-5.000	-2.000	-5.000	25.000	-5.000	-5.000

TABLE II-2

Percent Moisture in F-Area Seepage Basin Sediment Samples (CEP)

Depth to Top of Sample (ft)	Sample							
	WCF101	WCF102	WCF201	WCF202	WCF203	WCF301	WCF302	WCF303
0	64.3	18.4	19.7	24.6	32.1	20.9	19.7	17.9
0.5	22.9	21.4	19.3	18.6	18.8	17.4	17.5	12.5
1.0	25.5	17.4	32.1	15.4	11.8	15.9	18.2	13.6
1.5	32.5	18.2	19.6	30.6	19.2	13.9	15.7	14.3
2.0	21.9	17.3	22.6	18.0	16.4	18.2	19.0	12.5
2.5		16.4	18.8	20.6	18.5	17.4	22.0	16.9
3.0				11.1				
3.12						18.2		
3.25			16.9					
3.30							16.1	
3.77					17.2			
4.25								

TABLE II-3

Percent Moisture in H-Area Seepage Basin Sediment Samples (CEP)

Depth to Top of Sample (ft)	Sample												
	WCH101	WCH102	WCH201	WCH202	WCH203	WCH301	WCH302	WCH303	WCH304	WCH305	WCH401	WCH402	WCH403
0	37.5	26.3	26.8	19.2	41.4	14.0	29.3	46.2	31.0	34.5	36.0	29.6	18.8
0.5	39.5	33.3	15.9	15.8	13.3	13.5	14.6	11.1	16.7	17.9	22.6	26.8	25.6
1.0	23.7	14.4	14.3	20.3	14.3	13.6	7.1	14.3	16.0	15.6	29.0	31.7	23.5
1.5	~10.0	12.9	12.3	16.7	17.4	13.6	23.5	14.5	14.5	16.7	24.3	22.2	23.9
2.0	22.6	48.3	14.3	20.7	15.9	14.1	22.5	14.5	15.3	15.8	18.8	22.6	22.7
2.5	17.0	11.1	14.5	21.3	20.5	16.2	18.8	15.6	13.7	----	18.6	17.2	----
3.0					15.9							26.5	
3.12								14.5					
3.33											15.9		
3.37			16.5										
3.62							7.5						
4.25	13.3												

APPENDIX III — QUALITY CONTROL RESULTS OF F- AND H-AREA BASIN SOIL ANALYSES (EAL CORPORATION)

- "<" denotes value less than detection limits
- Radionuclide concentrations are reported in units of disintegrations per minute (dpm) per gram. To compare these results to CEP's results, EAL values should be divided by the conversion factor 2.22 dpm/pCi.
- Percent error at 68% confidence level (one standard deviation) except as indicated for ^{129}I and ^{99}Tc results.

EAL Corporation

Thermo Electron Corporation

2030 Wright Avenue
Richmond, California 94804
(415) 235-2633
(TWX) 910-382-8132

5 June 1985

Ref: E.I. DuPont P.O. No. AX 0690373
EAL C.N. No. 3387

Dr. Carl Fleirmans
Environmental Science Division
E.I. DuPont deNemours and Company
Atomic Energy Division
Savannah River Plant
Aiken, SC 29808-0001

Dear Mr. Fleirmans:

Enclosed is the partial report of 14 quality assurance samples sent to us for analysis on the above purchase order. Results of ^{129}I, ^{99}Tc, and the cations will be reported to you as soon as available.

Please give me a call if you have any questions.

Very truly yours,

D. P. Kharkar

Dinkar P. Kharkar, Ph.D.
Manager, Nuclear Projects
Nuclear Science Department

DPK/ss

Enclosures: Table 1 and 2

TABLE 1 CONCENTRATION OF ^{60}Co, ^{95}Zr, ^{95}Nb, ^{103}Ru, ^{106}Ru, ^{134}Cs, ^{137}Cs, ^{141}Ce and ^{144}Ce IN SRP SAMPLES

EAL Corporation

Customer Number	EAL No.	dpm/gram ± % error (a)								
		^{60}Co	^{95}Zr	^{95}Nb	^{103}Ru	^{106}Ru	^{134}Cs	^{137}Cs	^{141}Ce	^{144}Ce
WCF102B/ 0.0/0.5	526-1	16.0 ± 2	1050 ± 0.3	1888 ± 0.1	<3.8	838 ± 1	5.20 ± 7	6080 ± 0.1	<3.4	13 ± 41
WCF102B/ 2.5/0.5	526-2	0.16 ± 45	0.413 ± 16	0.686 ± 7	<1.9	3.1 ± 23	<0.13	48.2 ± 1	<0.18	<0.80
WCF203B/ 0.0/0.5	526-3	0.47 ± 22	4.50 ± 5	8.35 ± 2	<1.4	95.9 ± 3	1.63 ± 9	1788 ± 0.1	<0.98	<4.3
WCF/203B/ 2.5/0.5	526-4	<0.20	<0.29	<0.16	<0.38	<2.3	0.15 ± 37	166 ± 0.4	<0.31	<1.5
WCF301B/ 0.0/0.5	526-5	0.14 ± 59	12.2 ± 3	21.8 ± 1	<0.60	270 ± 1	0.731 ± 14	412 ± 0.2	<0.40	1.7 ± 40
WCF301B/ 2.5/0.5	526-6	0.12 ± 38	<0.27	<0.13	<0.10	1.0 ± 40	0.22 ± 25	3.23 ± 3	0.093 ± 55	<0.56
WCH102B/ 0.5/0.5	526-7	1721 ± 0.6	<23	<9.5	<25	986 ± 7	341 ± 1	55200 ± 0.1	<14	610 ± 5
WCH102B/ 2.5/0.5	526-8	2.18 ± 5	<0.28	<0.13	<0.25	<1.7	0.355 ± 19	54.1 ± 0.7	<0.34	<1.6
WCH201B/ 0.0/0.5	526-9	160 ± 1	<3.4	3.49 ± 17	<5.5	404 ± 4	55.3 ± 1	13000 ± 0.1	<3.8	48.7 ± 13
WCH201B/ 2.5/0.5	526-10	0.956 ± 11	<0.37	<0.16	<0.12	<1.2	0.27 ± 29	0.795 ± 11	<0.16	<0.71
WCH302B/ 0.0/0.5	526-11	2.45 ± 5	<0.37	<0.14	<0.67	<4.2	0.657 ± 9	656 ± 0.2	<0.60	<2.7
WCH302B/ 2.5/0.5	526-12	0.25 ± 27	<0.25	<0.13	<0.11	<0.89	0.094 ± 56	0.426 ± 16	<0.13	<0.59
WCH402B/ 0.0/0.5	526-13	10.2 ± 4	<1.1	<0.56	<3.2	50.1 ± 15	62.7 ± 1	9487 ± 0.1	<2.8	<13
WCH402B/ 2.5/0.5	526-14	6.05 ± 3	<0.35	<0.17	<0.25	2.7 ± 26	0.17 ± 44	72.9 ± 1	<0.24	<1.1

(a) Less than values are with 95% confidence limit.

TABLE 2 CONCENTRATION OF PLUTONIUM, AMERICIUM, CURIUM, URANIUM, STRONTIUM, THORIUM AND TRITIUM ISOTOPES

EAL Corporation

Customer Number	EAL No.	dpm/gram ± % error (a)										
		^{238}Pu	$^{239,240}Pu$	^{241}Am	^{244}Cm	^{234}U	^{235}U	^{238}U	^{89}Sr	^{90}Sr	^{232}Th	^{3}H
WCF102B/ 0.0/0.5	526-1	1,574 ± 4	6,536 ± 4	179 ± 7	159 ± 7	4.8 ± 43	<0.6	8.2 ± 21	<65	750 ± 4	6.3 ± 39	110,313 ± 3
WCF102B/ 2.5/0.5	526-2	4.13 ± 12	9.27 ± 8	30.2 ± 8	10.2 ± 12	16.2 ± 6	2.54 ± 15	46.3 ± 4	<11	<11	15.1 ± 8	7,553 ± 3
WCF203B/ 0.0/0.5	526-3	335 ± 6	2,510 ± 3	7.4 ± 45	2.5 ± 67	4.6 ± 56	<3.7	13 ± 25	<53	<63	7.8 ± 31	10,434 ± 3
WCF203B/ 2.5/0.5	526-4	1.56 ± 12	22.7 ± 3	2.69 ± 12	0.80 ± 21	56.0 ± 3	5.26 ± 7	72.1 ± 3	<2	<5	18.6 ± 8	11,954 ± 2
WCF301B/ 0.0/0.5	526-5	240 ± 4	645 ± 3	0.42 ± 60	1.3 ± 25	7.48 ± 7	0.67 ± 22	21.0 ± 5	2.1 ± 86	16.4 ± 8	6.2 ± 39	10,188 ± 3
WCF301B/ 2.5/0.5	526-6	1.56 ± 18	4.64 ± 11	<0.3	1.66 ± 19	53.3 ± 3	4.54 ± 8	66.8 ± 3	<1	5.77 ± 11	29.3 ± 13	14,472 ± 3
WCH102B/ 0.5/0.5	526-7	4,820 ± 3	24,930 ± 3	2,179 ± 4	84.8 ± 5	283 ± 3	34.6 ± 4	36.8 ± 4	100 ± 53	1,185 ± 2	7.6 ± 53	182,857 ± 2
WCH102B/ 2.5/0.5	526-8	8.20 ± 5	9.45 ± 5	5.20 ± 12	0.41 ± 50	4.40 ± 10	0.47 ± 40	4.09 ± 11	54 ± 40	419 ± 4	1.4 ± 46	16,154 ± 2
WCH201B/ 0.0/0.5	526-9	2,280 ± 5	7,002 ± 4	492 ± 4	52.4 ± 11	185 ± 5	22.3 ± 14	58.9 ± 8	8.5 ± 45	1,540 ± 2	5.5 ± 46	40,000 ± 2
WCH201B/ 2.5/0.5	526-10	7.0 ± 40	16 ± 22	<4	<4	<6	<3	3.9 ± 54	<3	<5	6.5 ± 64	43,864 ± 2
WCH302B/ 0.0/0.5	526-11	2.00 ± 11	46.4 ± 3	<0.2	0.11 ± 67	21.4 ± 4	1.64 ± 12	21.4 ± 4	54 ± 78	682 ± 2	22.2 ± 17	1,590 ± 3
WCH302B/ 2.5/0.5	526-12	1.67 ± 12	3.91 ± 8	<0.1	0.17 ± 43	8.76 ± 5	0.35 ± 37	8.45 ± 5	1.5 ± 52	1.2 ± 70	17.6 ± 15	232 ± 2
WCH402B/ 0.0/0.5	526-13	43.8 ± 4	4.55 ± 9	6.32 ± 11	7.71 ± 10	14.8 ± 6	2.28 ± 15	1.98 ± 19	18 ± 99	205 ± 8	5.9 ± 23	26,494 ± 3
WCH402B/ 2.5/0.5	526-14	0.775 ± 17	0.605 ± 19	0.30 ± 83	4.62 ± 11	11.5 ± 5	0.82 ± 22	11.0 ± 5	30 ± 21	108 ± 2	15.2 ± 10	15,544 ± 2
Blank	526-16	0.05 ± 35	<0.02	0.03 ± 97	<0.06	<0.1	<0.05	<0.06	<0.2	<0.3	<0.2	----

(a) Less than values are with 95% confidence limit.

EAL Corporation

Thermo Electron Corporation

2030 Wright Avenue
Richmond, California 94804
(415) 235-2633
(TWX) 910-382-8132

August 6, 1985

Ref: E. I. DuPont P.O. No. AX 0690373
EAL C.N. No. 3387

Mr. Marti Kantelo
E. I. DuPont DeNemours and Company
Savannah River Laboratory
Bldg. 735A, Room D-106
Aiken, South Carolina 29808

Dear Mr. Kantelo:

Enclosed are the raw data for Samples 526-1, 526-7 and 526-9, which you requested. The raw data consists of the computer printouts of Ge(Li) counts and the alpha spectroscopic data of uranium and plutonium analyses. We have recounted the samples on the Ge(Li). The recount results and the ratio of original to the recount results are given in Table 1. We generally use 1001 keV line for uranium. There are a number of interferences in the region of 92.6 keV line for uranium.

The samples were dried and pulverized. They were counted on a Ge(Li) detector in a Petri dish geometry. They were also screened for gross alpha and gross beta activity. One gram of the sample was completely dissolved and 1 to 10% aliquot of the dissolved sample (depending on gross alpha and gross beta activity screen) was taken for sequential analyses of plutonium, americium, curium, uranium and thorium nuclides.

Please give me a call if you have any questions.

Very truly yours,

D. P. Kharkar

Dr. Dinkar P. Kharkar, Manager
Nuclear Projects

DPK/sc
Enclosure: Table 1
Raw Data

TABLE 1 Ge(Li) RECOUNT RESULTS

dpm/gram

	Number 1			Number 7			Number 9		
	Original	Recount	O/R	Original	Recount	O/R	Original	Recount	O/R
GMT of Count	100.319 $\frac{85}{---}$	204.622 $\frac{85}{---}$		102.863 $\frac{85}{---}$	204.623 $\frac{85}{---}$		102.941 $\frac{85}{---}$	204.623 $\frac{85}{---}$	
Detector	G2	G2		G3	G3		G3	G4	
Length of Count	532.73	323.85		100.32	406.88		214.80	211.58	
^{40}K		3.81 ± 37%		---	<16.2		---	4.8 ± 51%	
^{60}Co	15.96 ± 2%	15.71 ± 3%	1.015	1721 ± 1%	1650 ± 1%	1.043	160.0 ± 1%	154.9 ± 1%	1.033
^{95}Zr	1050 ± 1%	964.2 ± 1%	1.089	<23.4	20.7 ± 42%		<3.4	10.0 ± 31%	
^{95}Nb	1888 ± 1%			<9.5			3.5 ± 17%		
^{103}Ru	<3.8	<30.4		<24.8	<74.2		<5.5	<32.9	
^{106}Ru	837.8 ± 1%	907.0 ± 1%	0.924	986.1 ± 7%	1055 ± 4%	0.935	404.3 ± 4%	403.6 ± 4%	1.002
^{134}Cs	5.20 ± 7%	4.36 ± 25%	1.193	341.3 ± 1%	338.0 ± 1%	1.010	55.3 ± 1%	53.7 ± 1%	1.030
^{137}Cs	6080 ± 1%	9900 ± 1%	0.614	55200 ± 1%	51700 ± 1%	1.068	13000 ± 1%	12130 ± 1%	1.072
^{141}Ce	<3.4	---		<14.2	---		<3.8	---	
^{144}Ce	12.7 ± 41%	20.8		610.1 ± 5%	584.3 ± 3%	1.044	48.6 ± 13%	39.5 ± 21%	1.230
^{238}U		<127			<998			184.5 ± 34%	

EAL Corporation

Thermo Electron

2030 Wright Avenue
Richmond, California 94804
415. 235-2633
TWX: 910-382-8132

19 July 1985

Ref: E.I. DuPont P.O. No. AX0690373
EAL CN 3387

Dr. Carl Fleirmans
Environmental Science Division
E.I. DuPont de Nemours and Company
Atomic Energy Division
Savannah River Plant
Aiken, SC 29808-0001

Dear Mr. Fleirmans:

Enclosed are the results of ^{129}I, ^{99}Tc and the cations on 14 quality assurance samples sent to us for analysis on the above purchase order. The results of other analytes on these samples were reported to you on 5 June 1985. This completed the work in hand on this purchase order.

Samples for ^{99}Tc analysis are treated with a persulfate-sulfuric acid leach in the presence of ^{99m}Tc tracer. The leached Tc is purified by a tributyl phosphate extraction, a mixed hydroxide scavenge and an anion column procedure. The separated Tc is electrodeposited, carrier free, on a metal disc and counted on a gamma spectrometer for yield. It is counted on a low background beta counter for ^{99}Tc content. Beta absorption counting and additional gamma spectrometry is done to check ^{99}Tc beta purity and for any radio impurities, when the activity level is high enough.

Sample for ^{129}I are fused with iodine carrier and the iodine is solubilized. The iodine is purified by the usual oxidation-reduction steps (i.e., I^-, IO_3^-, I_2), and CCl_4 extraction procedures, etc. Iodine carrier yield is determined by a volumetric titration. The ^{129}I is counted on a liquid scintillation spectrometer. The purified sample is counted on a gamma spectrometer to check for radio impurities when sample activity is high enough.

Bismuth and tungsten were determined by atomic absorption, mercury by cold vapor atomic absorption, and the other elements determined by ICP. All detection limits were higher for "High Level Activity Samples." Since they had to be diluted before testing by ICP, or by A.A., or by cold vapor atomic absorption methods. The dilution of the high level activity samples were according to EAL's in-house handling protocol.

Please give me a call if you have any questions.

Very truly yours,

D.P. Kharkar

Dinkar P. Kharkar, Ph.D.
Manager, Nuclear Projects

DPK/ss
Enclosures: Tables 1 and 2

TABLE 1 Analysis of ^{129}I and ^{99}Tc of SRP Samples

Customer I.D.	EAL No.	dpm/gram ± % error (2 σ) ^{129}I	dpm/gram ± % error (2 σ) ^{99}Tc
WCH 102B/0.5/0.5	526-1	260 ± 11	60.0 ± 11
WCH 102B/2.5/0.5	526-2	8.8 ± 17	2.78 ± 16
WCH 201B/0.0/0.5	526-3	77.7 ± 14 (a)	55.9 ± 12
WCH 201B/2.5/0.5	526-4	4.22 ± 19	1.20 ± 14
WCH 302B/0.0/0.5	526-5	26.4 ± 13	6.26 ± 17
WCH 302B/2.5/0.5	526-6	4.0 ± 94	0.40 ± 30 (b)
WCH 402B/0.0/0.5	526-7	420 ± 10	25.3 ± 17
WCH 402B/2.5/0.5	526-8	3.6 ± 50	0.533 ± 14 (b)
WCF 102B/0.0/0.5	526-9	205 ± 10	44.2 ± 10
WCF 102B/2.5/0.5	526-10	2.9 ± 72	0.51 ± 37 (b)
WCF 203B/0.0/0.5	526-11	2.4 ± 92	7.13 ± 11
WCF 203B/2.2/0.5	526-12	2.2 ± 88	0.666 ± 12 (b)
WCF 301B/0.0/0.5	526-13	11.8 ± 20	4.00 ± 14
WCF 301B/2.5/0.5	526-14	1.3 ± 140	0.400 ± 15 (b)

(a) Low chemical yield obtained.
(b) The observed beta activity was too low to check for isotopic purity.

Note: Customer I.D. incorrectly matched with concentration. See p. III-10 for correction.

TABLE 2 ANALYSIS OF CATIONS ON SAVANNAH RIVER PLANT SAMPLES

EAL Corporation

Customer I.D.	EAL No.	ppm																			
		Hg	As	Ba	Be	Bi	B	Cd	Cr	Cu	Fe	Pb	Li	Mn	Ni	Na	Se	Ag	Sn	Ti	Zn	W
WCH 102B/0.5/0.5	3602-1	<10	<83	<25	<3	<20	<4	<6	<8	<2	6,683	<42	<8	<8	<33	9,833	<83	<3	<83	<2	<6	<3000
WCH 102B/2.5/0.5	3602-2	<0.1	<17	<5	<0.7	<60	<0.8	<1	<2	<0.3	4,466	<8	<2	<2	<7	1,485	<17	<0.5	<17	<0.3	<1	<700
WCH 201B/0.0/0.5	3602-3	3.2	<56	<17	<2	<8	<3	<4	<6	<1	10,611	<28	23.3	<6	<22	5,178	<56	<2	<56	<1	<4	<2000
WCH 201B/2.5/0.5	3602-4	<0.03	2.8	0.50	<0.07	<8	<0.08	<0.1	10	2.3	11,362	8.8	<0.2	11.2	<0.7	146	<2	<0.05	2.83	51.5	7.83	<300
WCH 302B/0.0/0.5	3602-5	0.46	<2	0.50	<0.07	<8	<0.08	<0.1	1.2	<0.03	1,733	<0.8	1.0	2.3	<0.7	172	<2	<0.05	<2	25.0	1.83	<300
WCH 302B/2.5/0.5	3602-6	<0.03	5.8	1.8	<0.07	<8	<0.08	<0.1	33	<0.03	18,826	8.8	<0.2	15.3	<0.7	218	<2	<0.05	4.00	109	3.50	<300
WCH 402B/0.0/0.5	3602-7	220	<28	<8	<1	30	<1	<2	580	<0.6	26,944	<14	8.3	278	<11	256	<28	<0.8	<28	100	69.40	<1000
WCH 402B/2.5/0.5	3602-8	1.8	6.0	1.8	<0.07	<8	<0.08	<0.1	8.8	2.3	10,096	4.3	<0.2	167	<0.7	137	<2	<0.05	3.00	42.8	5.16	<300
WCF 102B/0.0/0.5	3602-9	120	<42	<12	<2	<40	<2	<3	750	<0.8	32,999	<21	<4	4.16	<17	3,096	<42	4.16	<42	<0.8	79.2	<2000
WCF 102B/2.5/0.5	3602-10	0.10	2.5	3.7	<0.07	<8	<0.08	<0.1	4.2	1.8	8,713	14.7	<0.2	4.83	<0.7	129	<2	<0.05	1.83	35.5	<0.1	<300
WCF 203B/0.0/0.5	3602-11	1.4	<15	<5	<0.6	<20	39	<1	<2	<0.3	11,287	<8	<2	<2	<6	1,247	<15	<0.5	<15	60.6	<1	<600
WCF 203B/2.2/0.5	3602-12	0.04	10.2	5.5	<0.07	<8	<0.08	<0.1	12.7	2.5	13,961	10.8	2.6	12.8	1.33	143	<2	<0.05	5.66	51.8	5.16	<300
WCF 301B/0.0/0.5	3602-13	7.7	13.5	4.5	<0.07	<8	<0.08	<0.1	132	<0.03	20,658	26.2	1.0	24.0	2.50	182	<2	<0.05	6.50	72.0	8.16	<300
WCF 301B/2.5/0.5	3602-14	0.08	2.5	<0.5	<0.07	<8	<0.08	<0.1	5.8	<0.03	7,397	1.8	<0.2	5.66	<0.7	173	<2	<0.05	2.17	25.5	4.00	<300
Blank	3602-17	<0.03	<0.1	<0.03	<0.007	<8	<0.005	<0.007		<0.01	<0.002	<0.01	<0.05	<0.01	<0.01	<0.04	<0.2	<0.1	<0.003	<0.1	<0.002	<0.007

EAL Corporation

Thermo Electron Corporation

2030 Wright Avenue
Richmond, California 94804
(415) 235-2633
(TWX) 910-382-8132

October 11, 1985

Ref: E. I. DuPont P.O. No. AX0690373
EAL C.N. 3387

Mr. Carl Fleirmans
Environmental Science Division
E. I. DuPont deNemours and Company
Atomic Energy Division
Savannah River Plant
Aiken, South Carolina 29808-0001

Dear Mr. Fleirmans:

The report dated July 19, 1985, on the analysis of ^{129}I and ^{99}Tc on SRP samples is incorrect. While the data reported is correct, the customer I.D. numbers and corresponding EAL numbers are incorrect.

Attached is a corrected copy of the report. We apologize for this error. Please call me if you have any questions or comments.

Very truly yours,

D. P. Kharkar

Dinkar P. Kharkar, Ph.D
Manager, Nuclear Projects

DPK/sc
Enclosure: Table 1

P.S. Table 2 was correct.

TABLE 1 Analysis of ^{129}I and ^{99}Tc of SRP Samples

Customer I.D.	EAL No.	dpm/gram ± % error (2 σ) ^{129}I	dpm/gram ± % error (2 σ) ^{99}Tc
WCF 102B/0.0/0.5	526-1	260 ± 11	60.0 ± 11
WCF 102B/2.5/0.5	2	8.8 ± 17	2.78 ± 16
WCF 203B/0.0/0.5	3	77.7 ± 14 (a)	55.9 ± 12
WCF 203B/2.5/0.5	4	4.22 ± 19	1.20 ± 14
WCF 301B/0.0/0.5	5	26.4 ± 13	6.26 ± 17
WCF 301B/2.5/0.5	6	4.0 ± 94	0.40 ± 30 (b)
WCH 102B/0.5/0.5	7	420 ± 10	25.3 ± 17
WCH 102B/2.5/0.5	8	3.6 ± 50	0.533 ± 14 (b)
WCH 201B/0.0/0.5	9	205 ± 10	44.2 ± 10
WCH 201B/2.5/0.5	10	2.9 ± 72	0.51 ± 37 (b)
WCH 302B/0.0/0.5	11	2.4 ± 92	7.13 ± 11
WCH 302B/2.5/0.5	12	2.2 ± 88	0.666 ± 12 (b)
WCH 402B/0.0/0.5	13	11.8 ± 20	4.00 ± 14
WCH 402B/2.5/0.5	14	1.3 ± 140	0.400 ± 15 (b)

(a) Low chemical yield obtained.
(b) The observed beta activity was too low to check for isotopic purity.

TABLE III-1

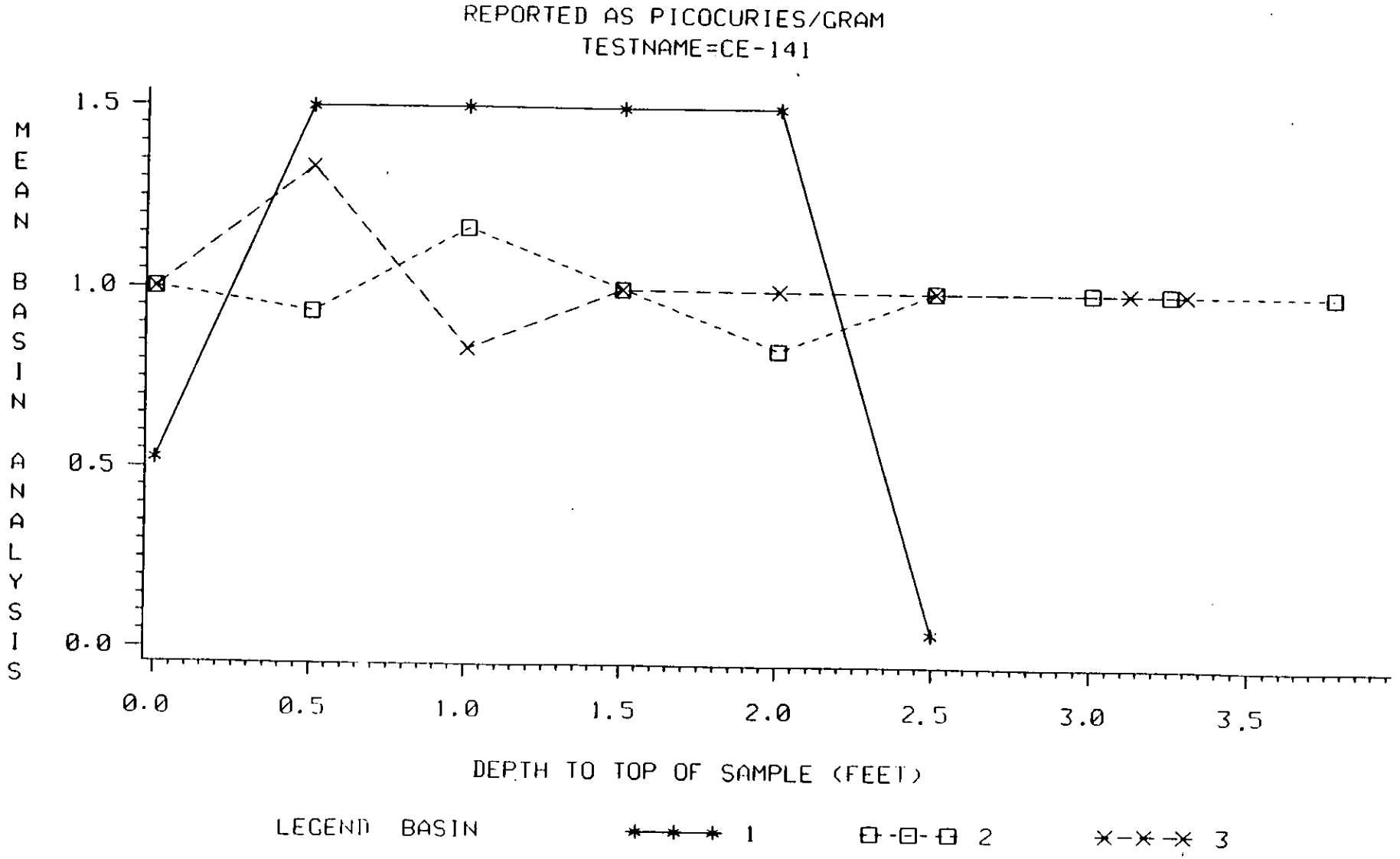
Percent Moisture in F- and H-Area Seepage Basin Quality Control Samples (EAL)

Sample	Depth to Top of Sample (ft)	Percent Moisture
WCF102	0.0	68
WCF102	2.5	6
WCF203	0.0	17
WCF203	2.5	9
WCF301	0.0	15
WCF301	2.5	11
WCH102	0.5	65
WCH102	2.5	8
WCH201	0.0	75
WCH201	2.5	12
WCH302	0.0	19
WCH302	2.5	13
WCH402	0.0	23
WCH402	2.5	10

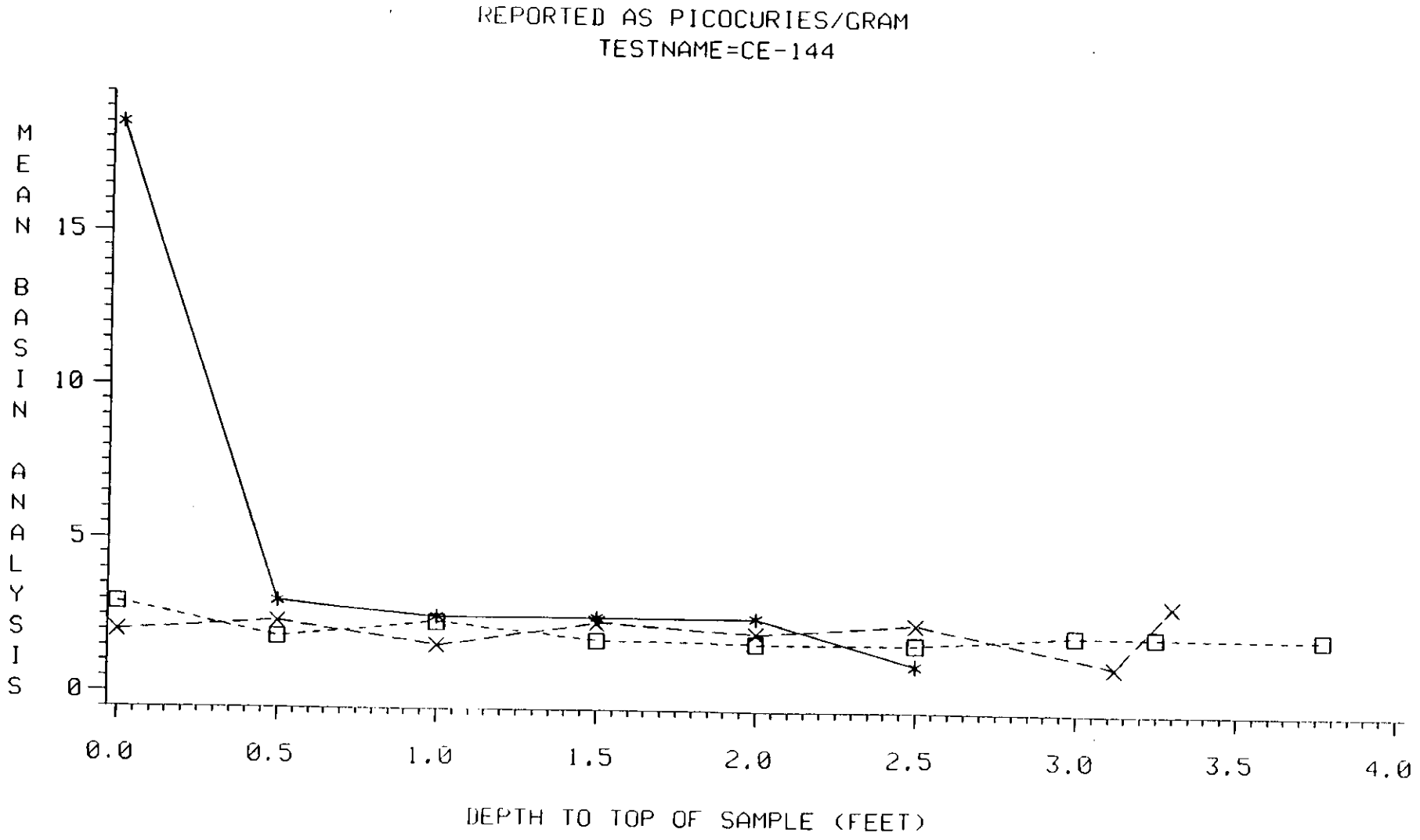
APPENDIX IV — GRAPHS OF F- AND H-AREA BASIN SOIL CORE ANALYSES (CONTROLS FOR ENVIRONMENTAL POLLUTION)

- Graphs for ^{129}I, ^{241}Am, ^{238}Pu, $^{239,240}Pu$, $^{233,234}U$, ^{235}U, and ^{238}U, have been omitted due to erroneous reported data (see text). For H-Area basins only, the graph for ^{95}Zr has been omitted due to erroneous data.

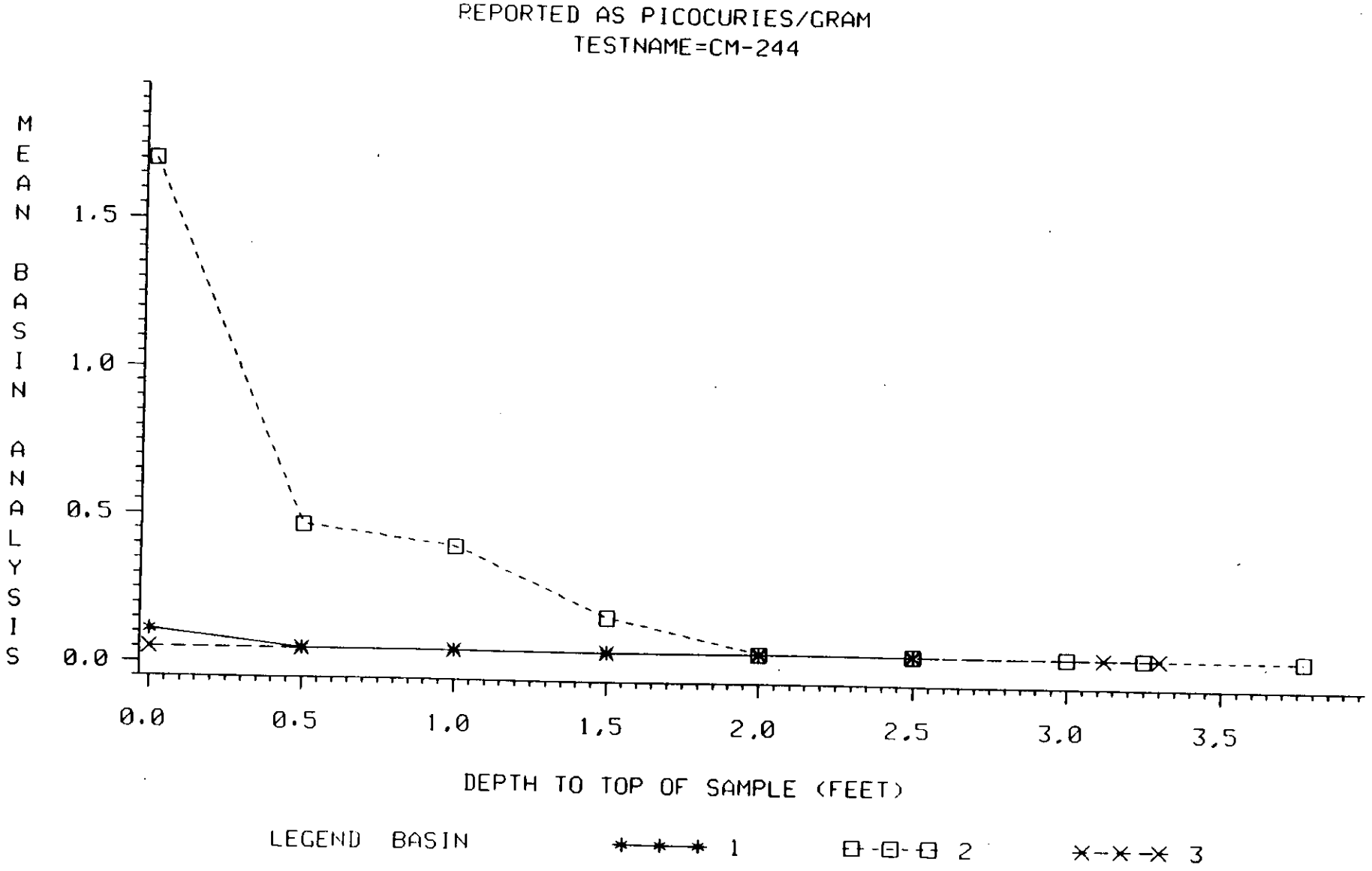
F-AREA SEEPAGE BASINS RADIONUCLIDE ANALYSES



F-AREA SEEPAGE BASINS RADIONUCLIDE ANALYSES



F-AREA SEEPAGE BASINS RADIONUCLIDE ANALYSES



F-AREA SEEPAGE BASINS RADIONUCLIDE ANALYSES

REPORTED AS PICOCURIES/GRAM
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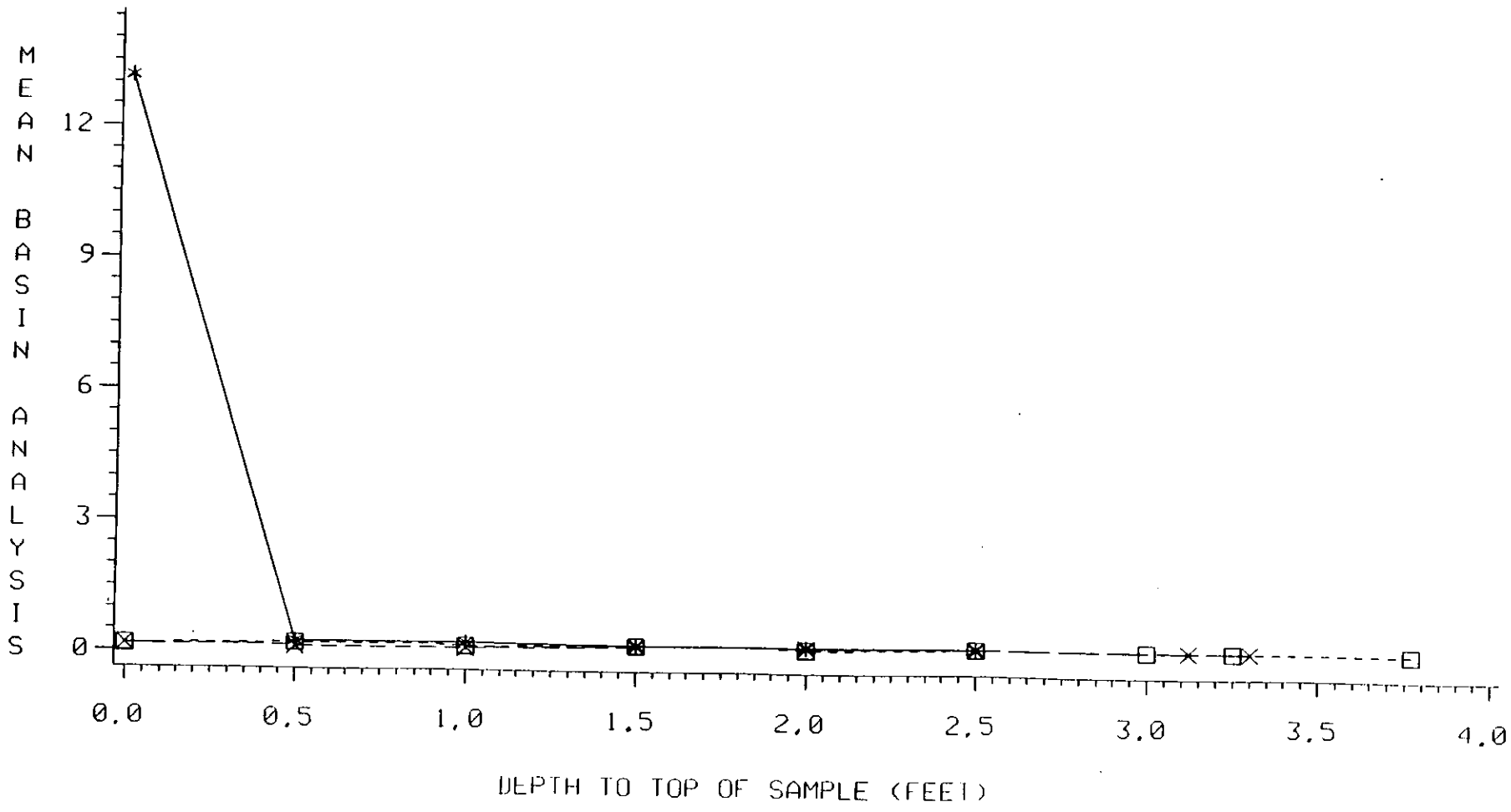

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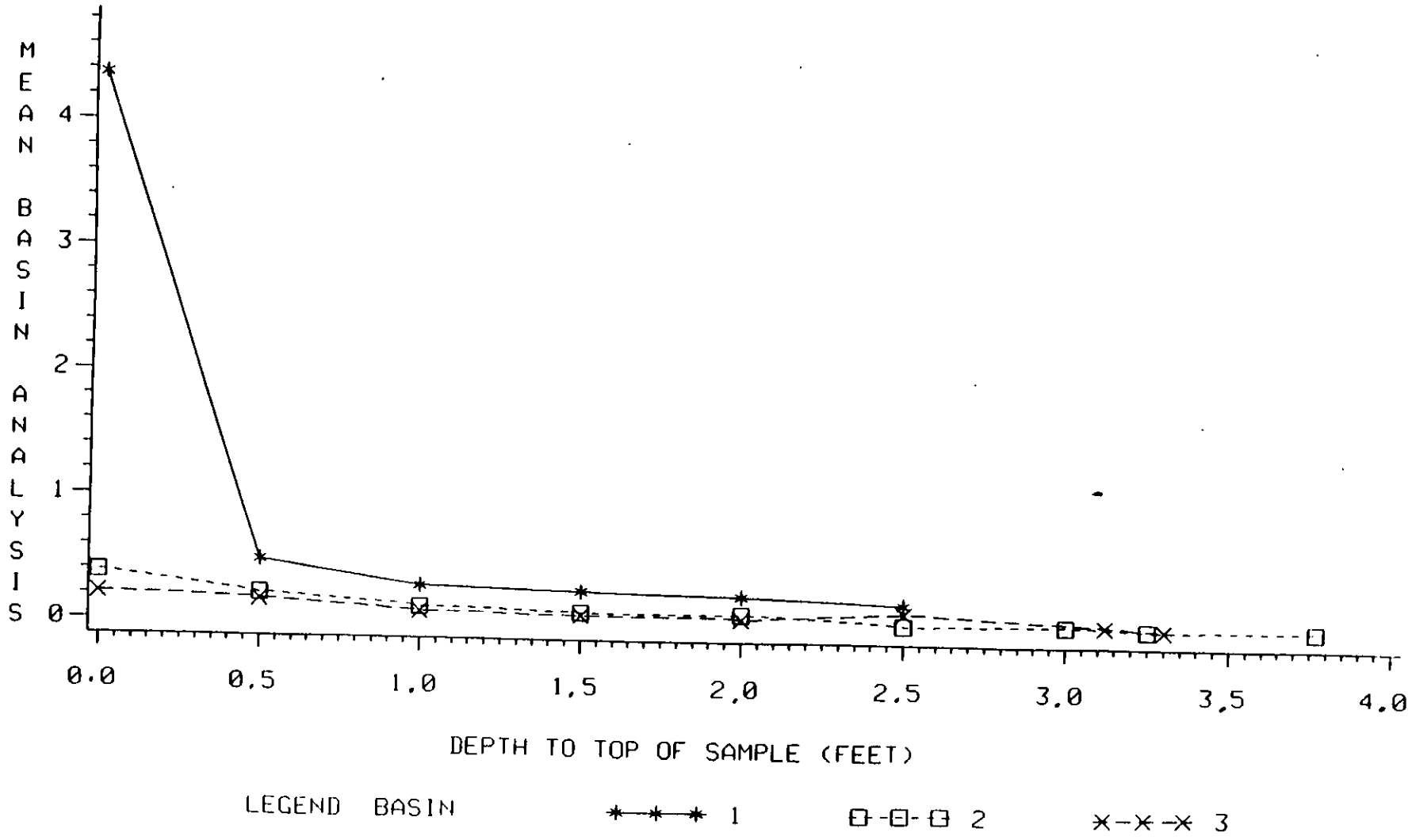

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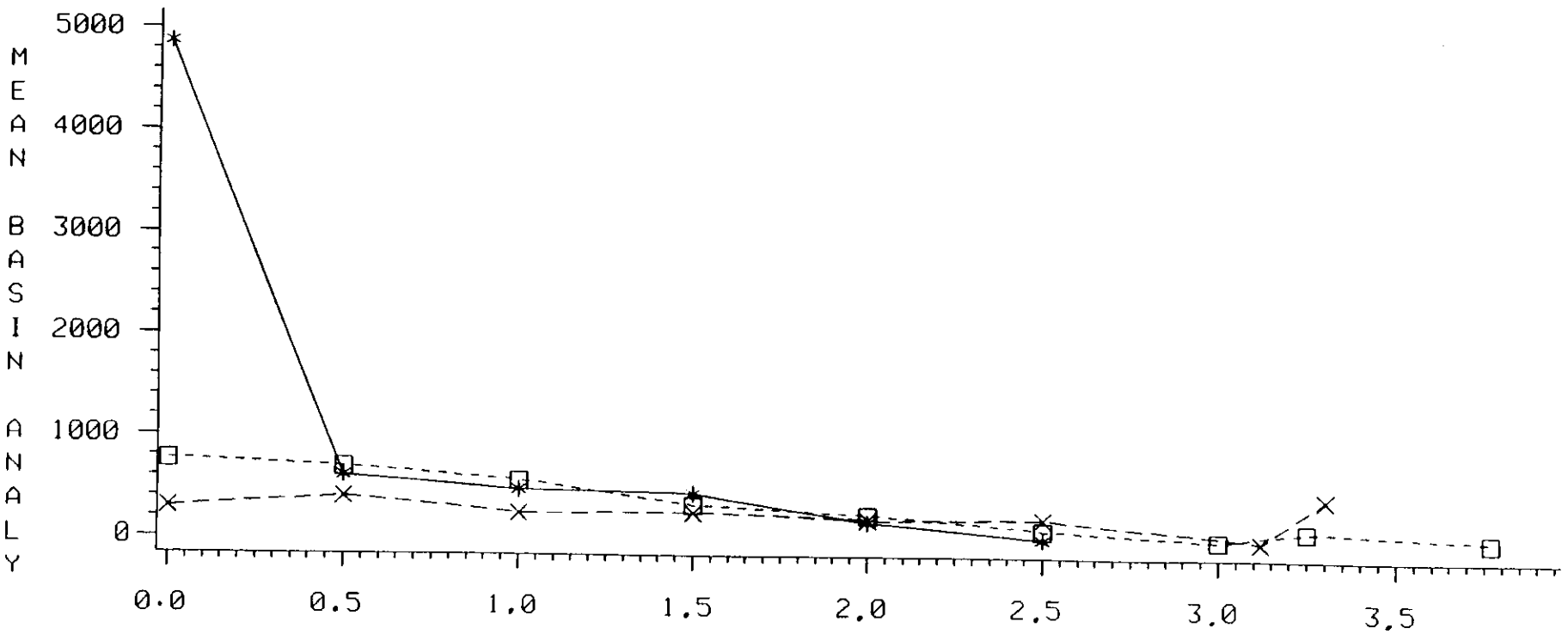
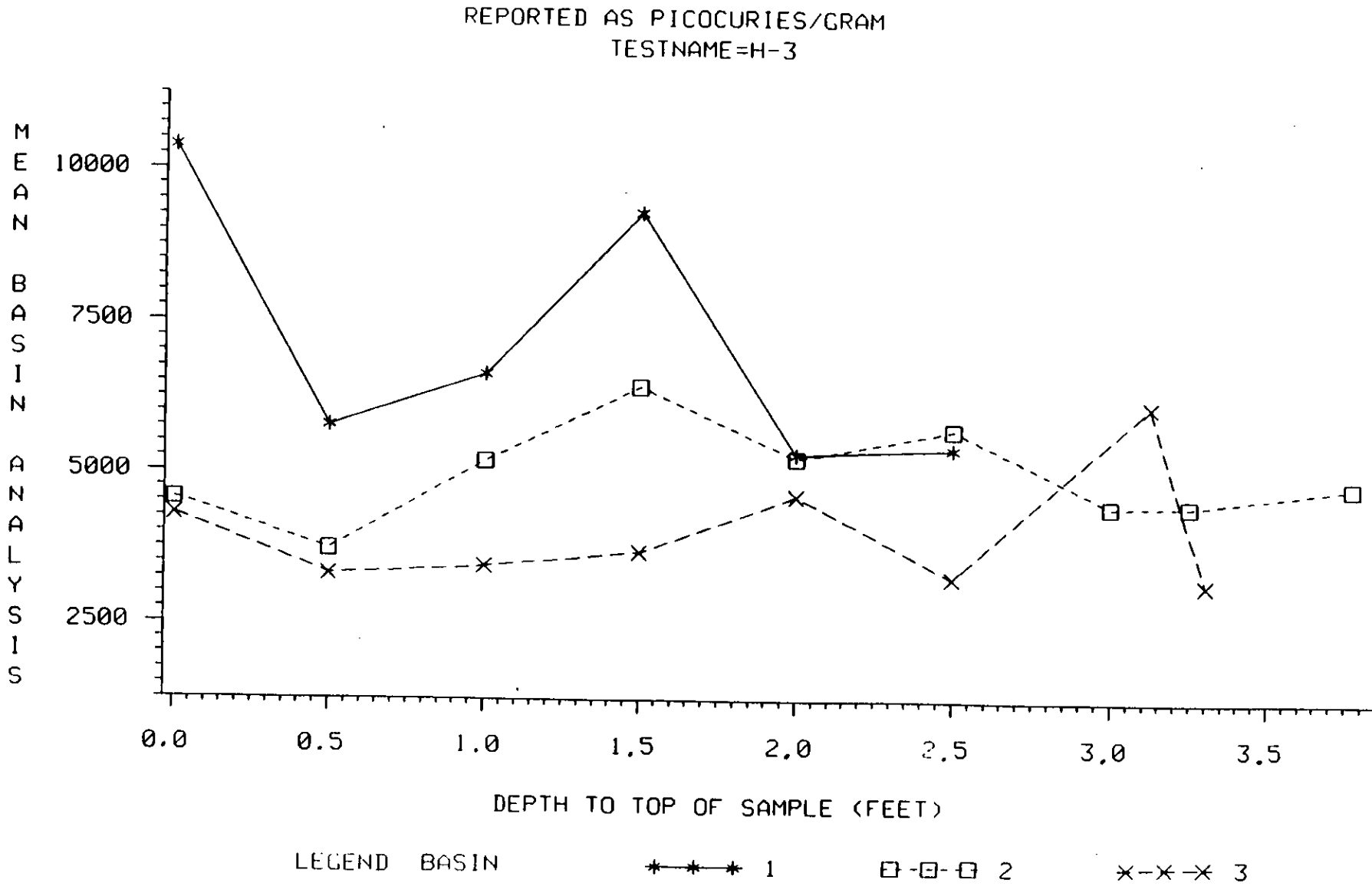


F-AREA SEEPAGE BASINS RADIONUCLIDE ANALYSES



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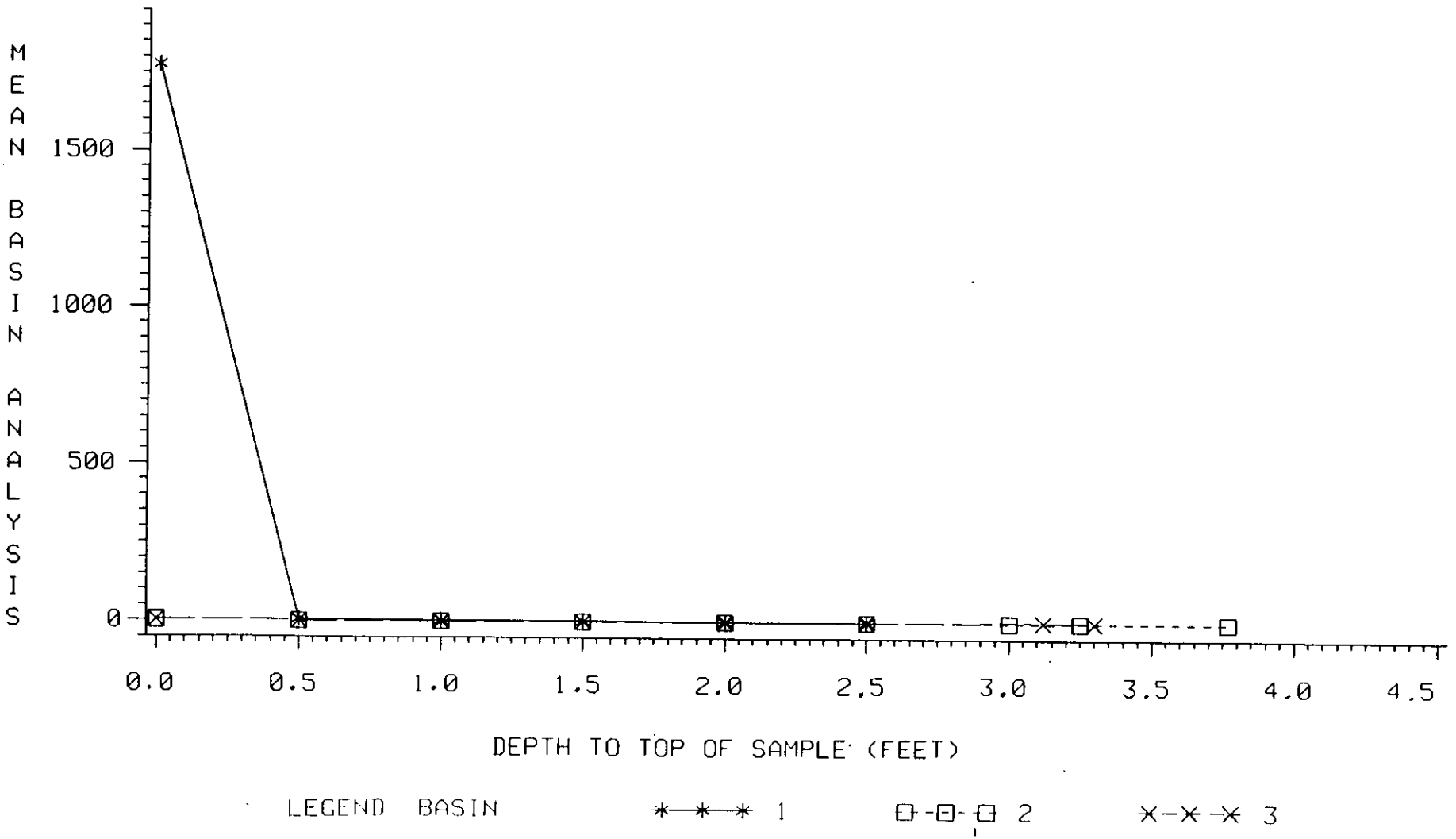

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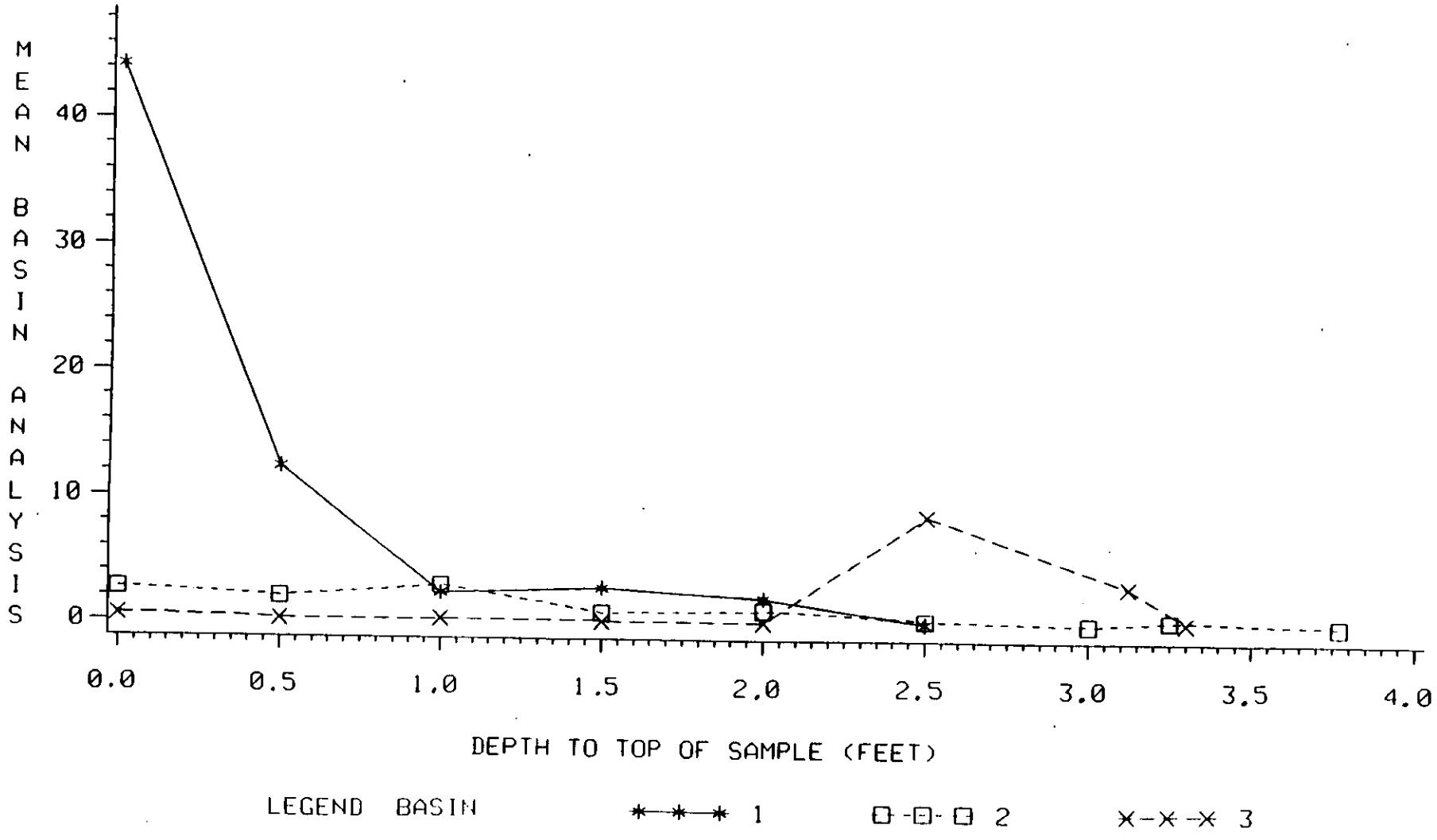

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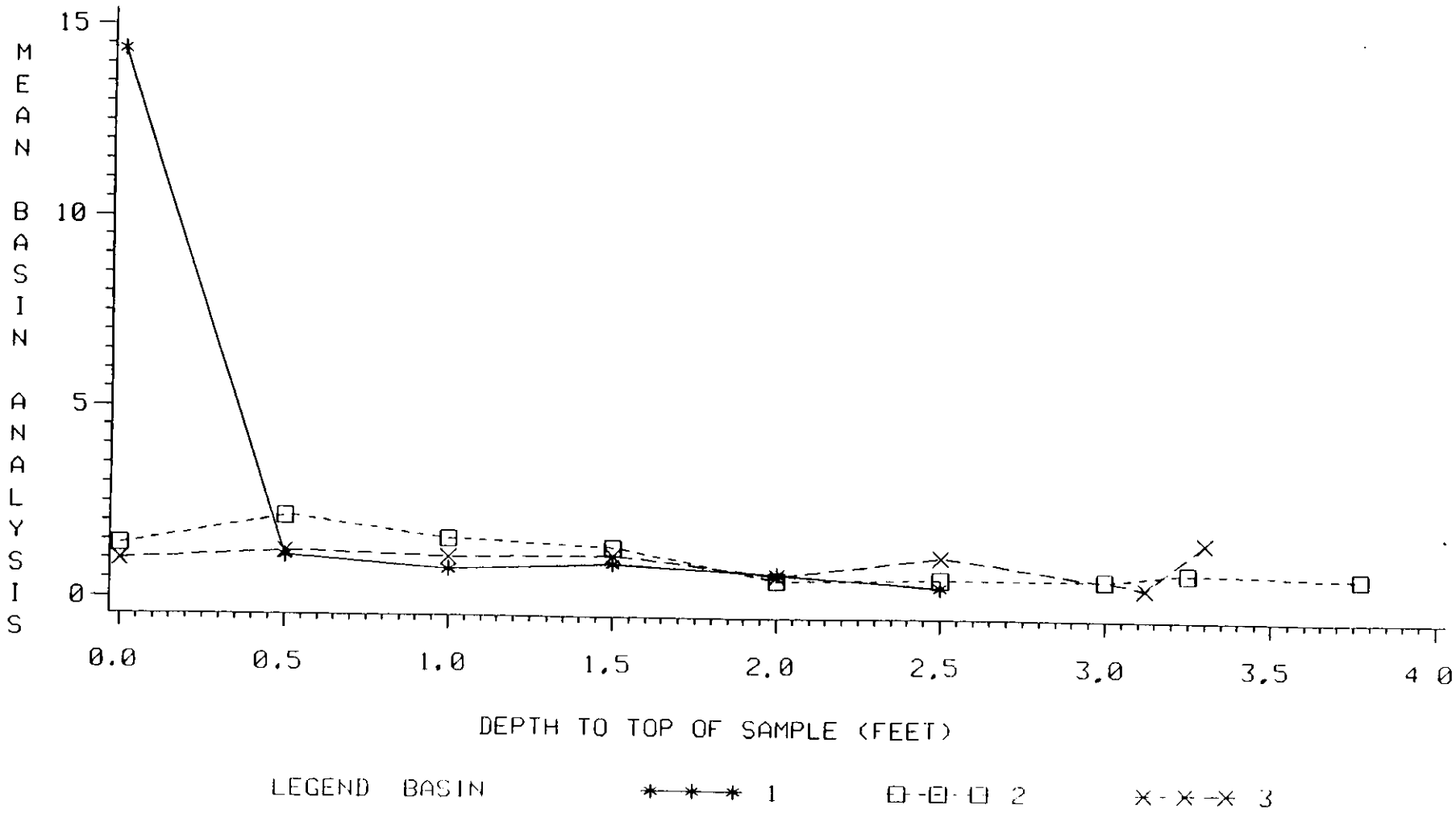
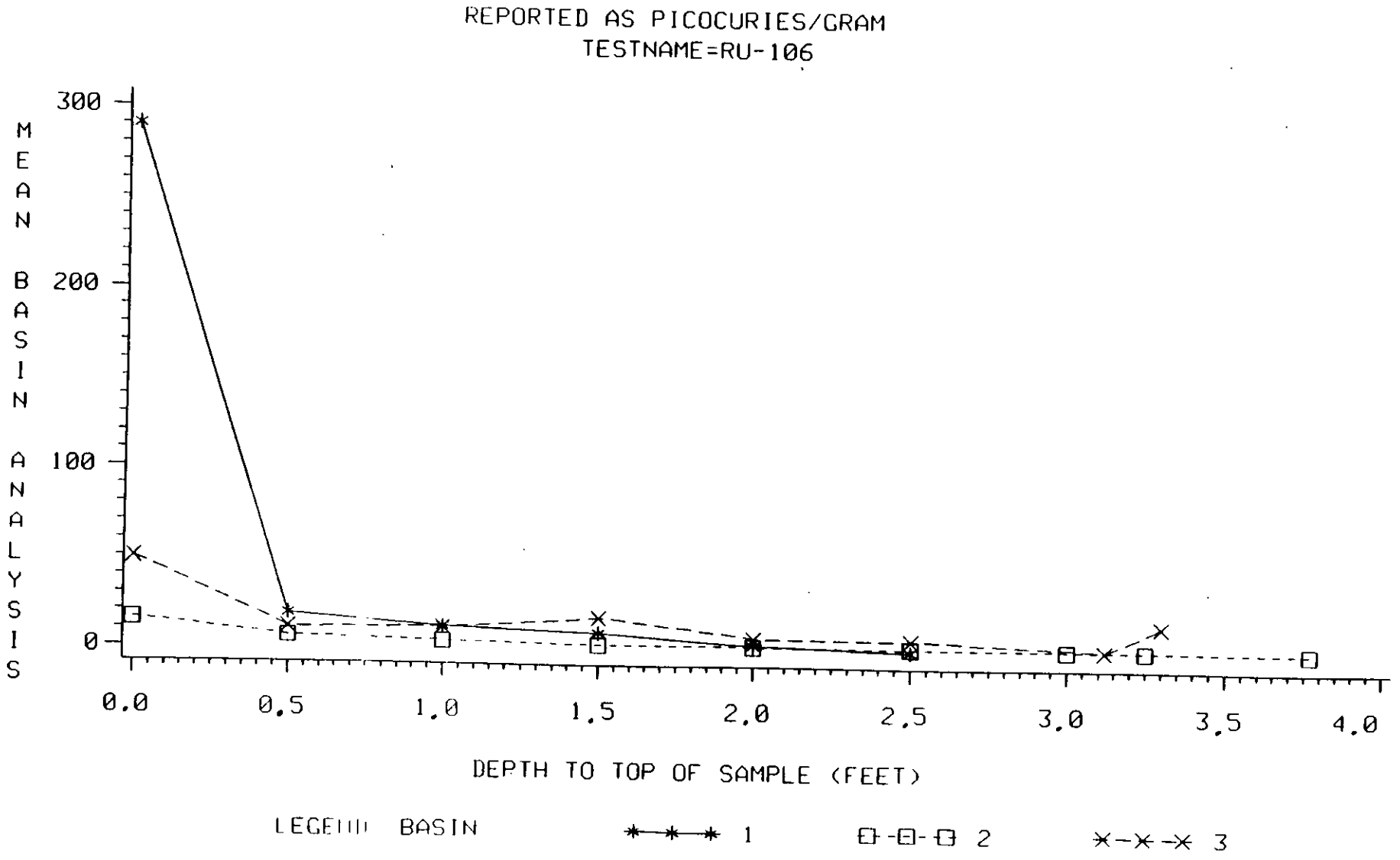
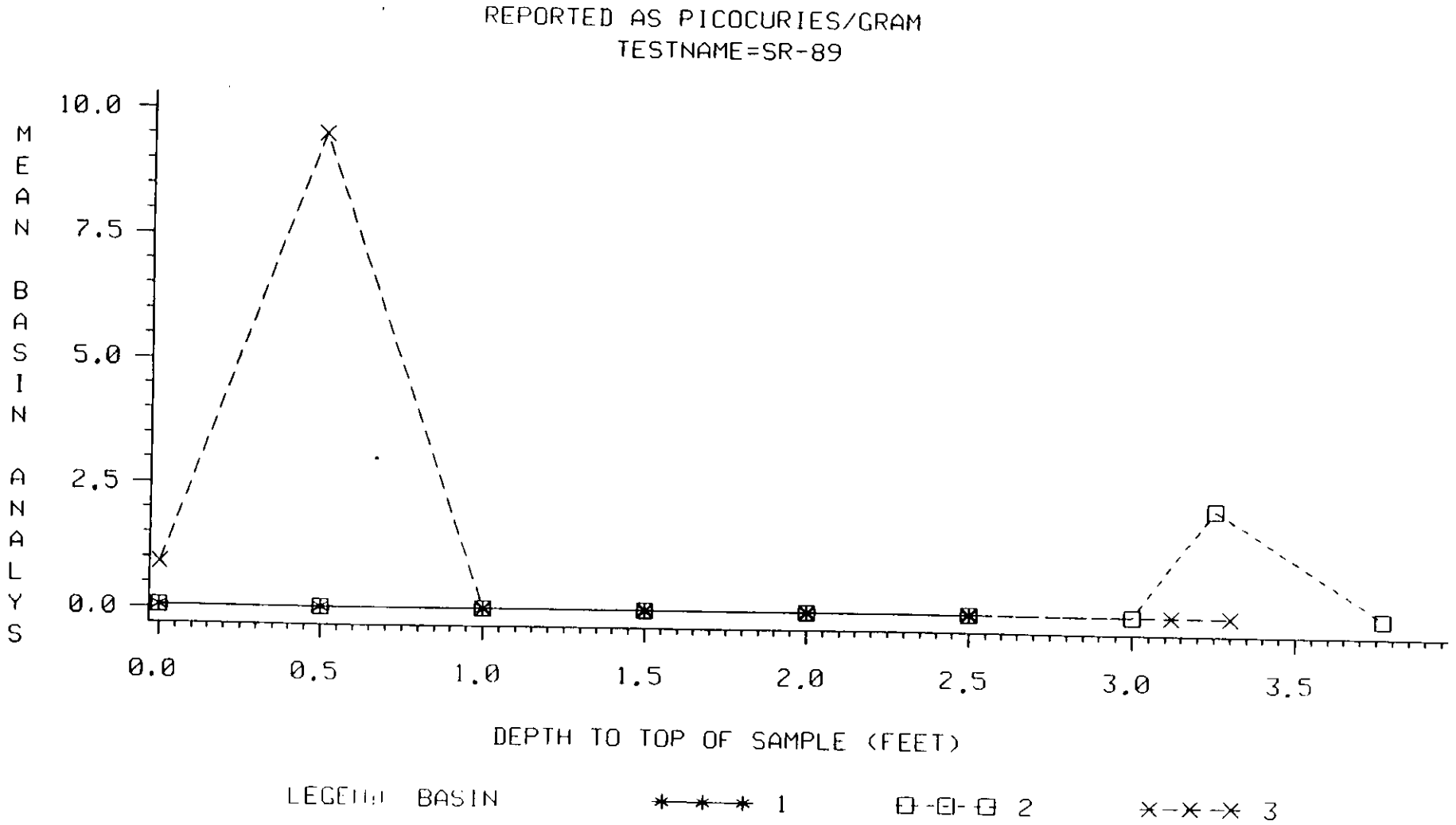


F-AREA SEEPAGE BASINS RADIONUCLIDE ANALYSES



F-AREA SEEPAGE BASINS RADIONUCLIDE ANALYSES



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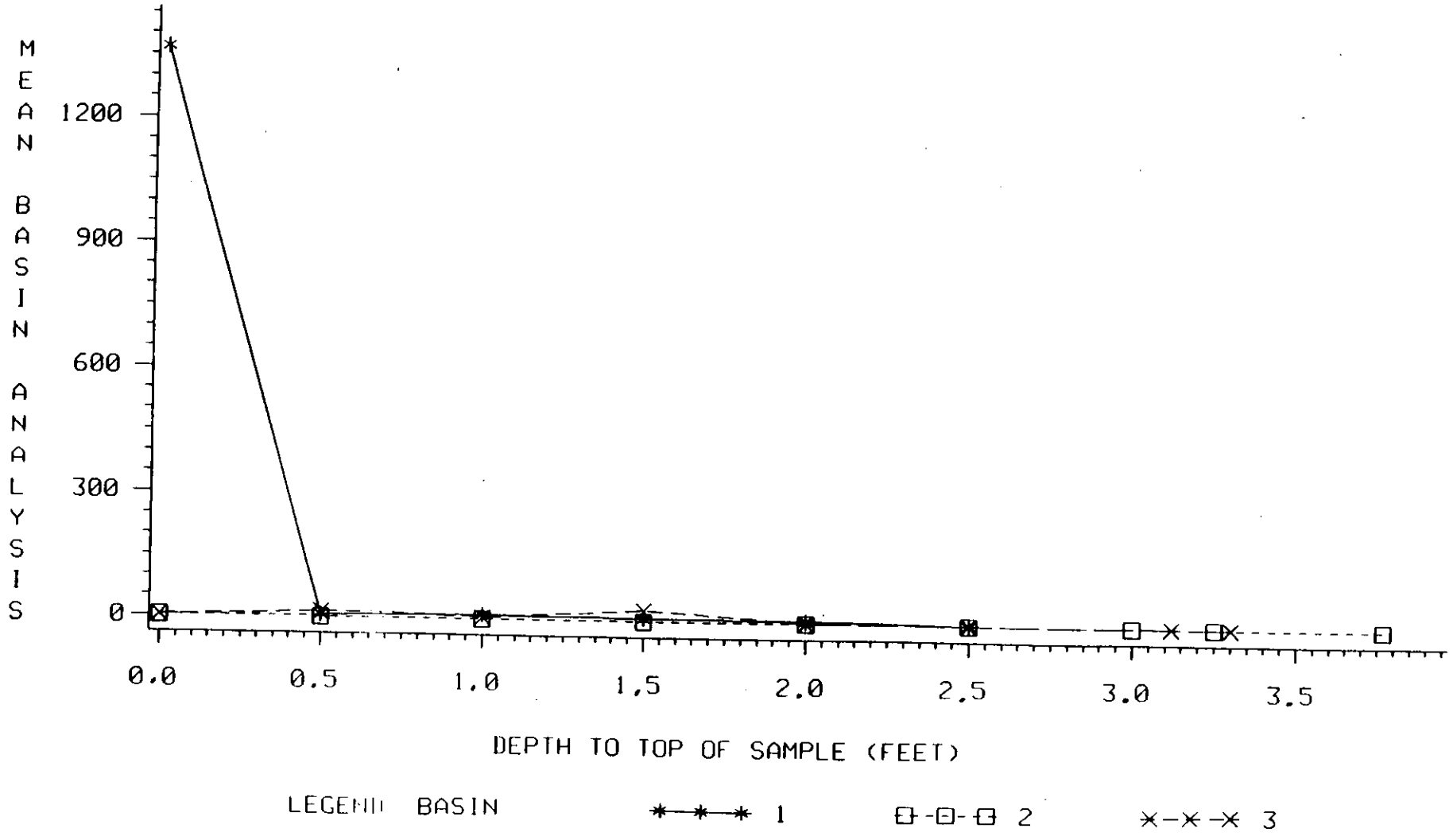
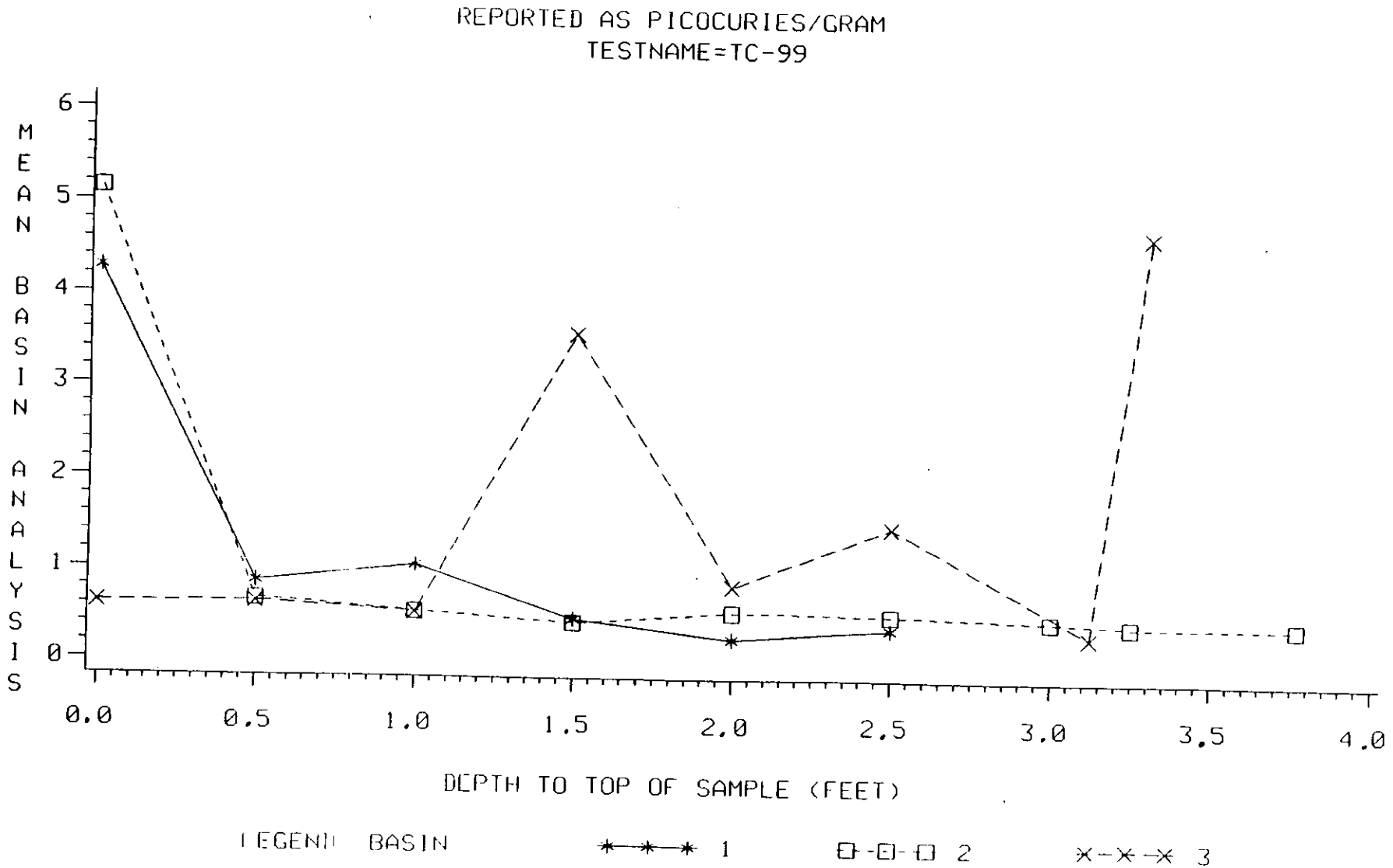


F-AREA SEEPAGE BASINS RADIONUCLIDE ANALYSES



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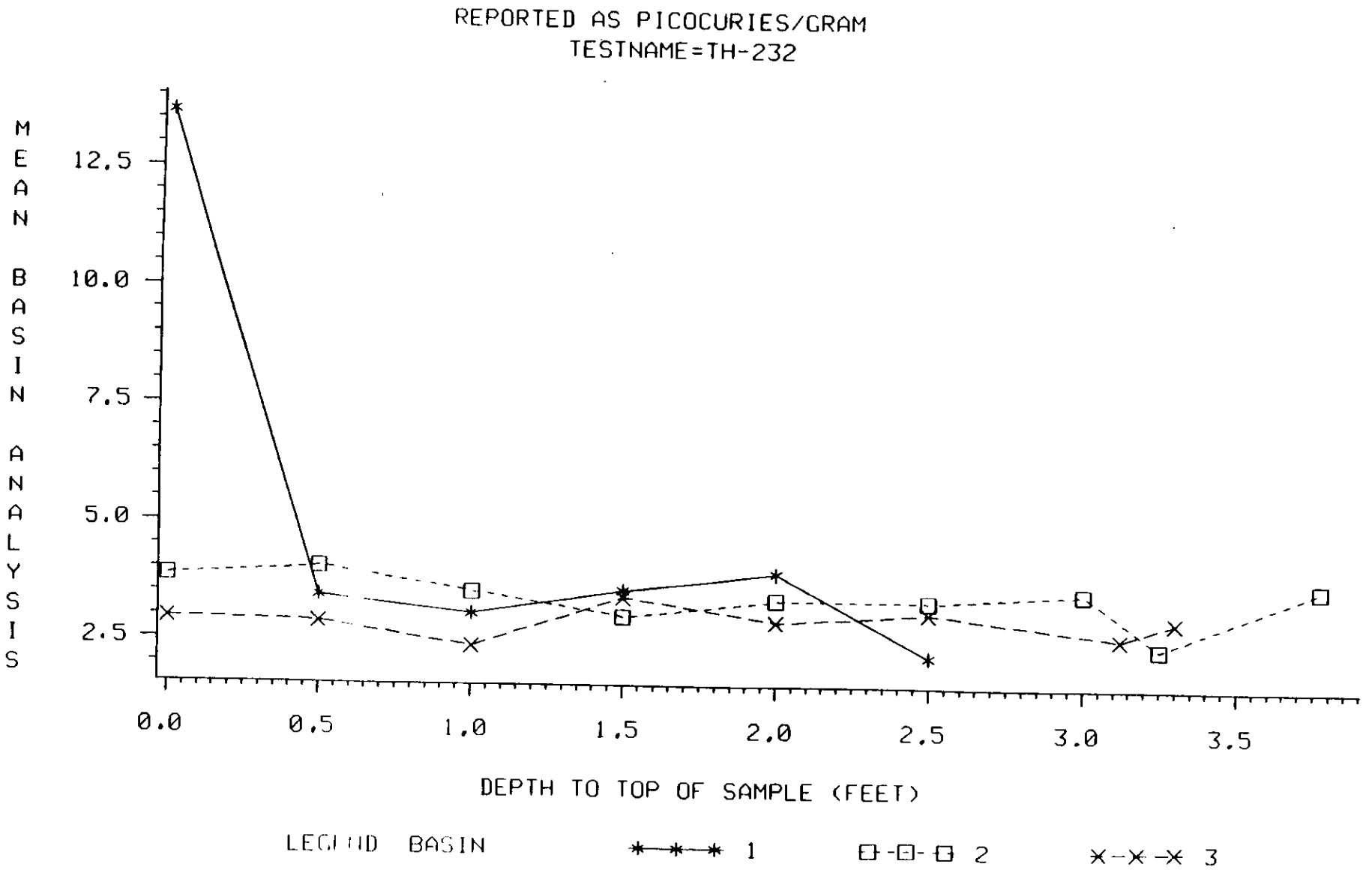

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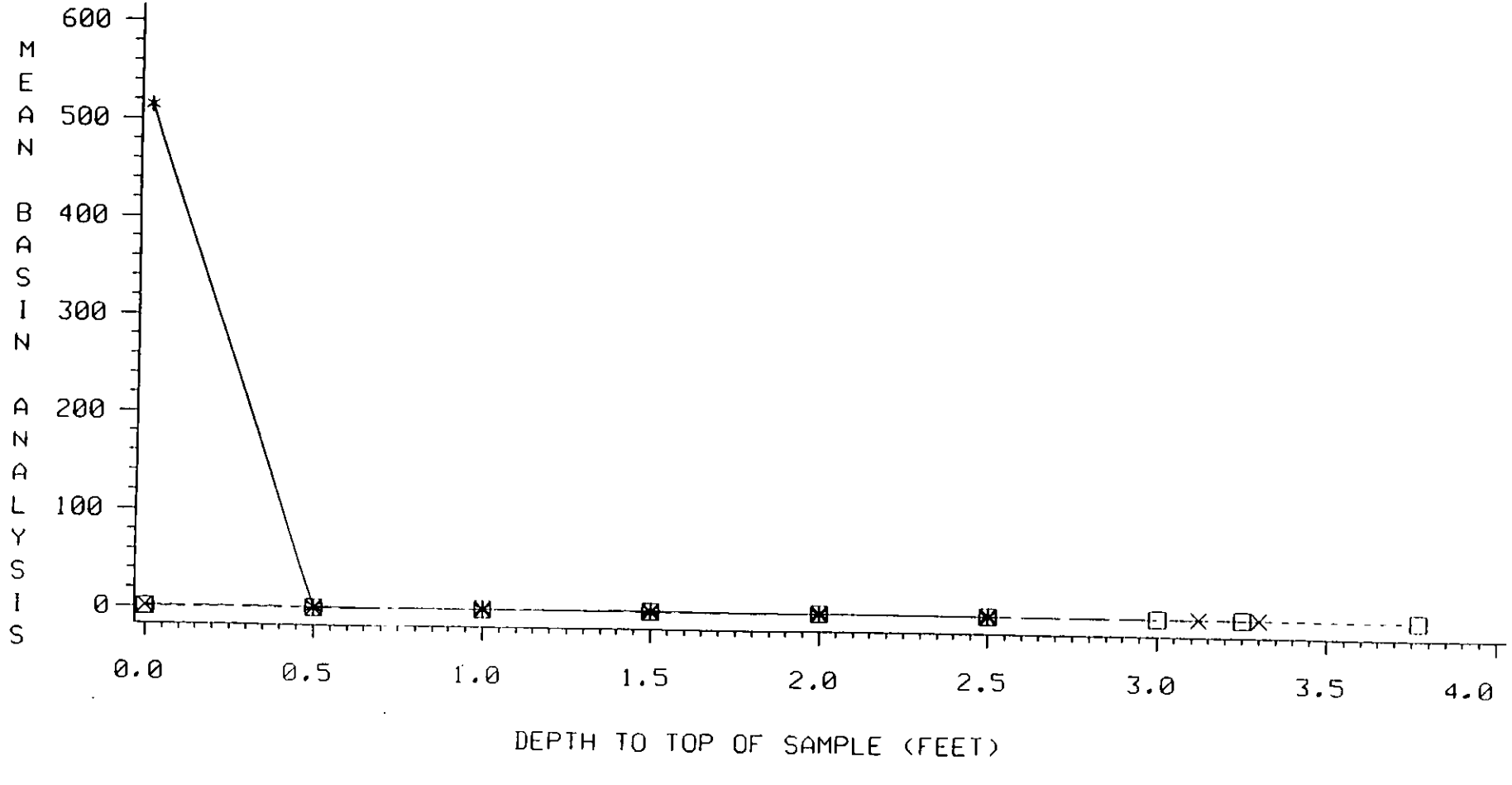
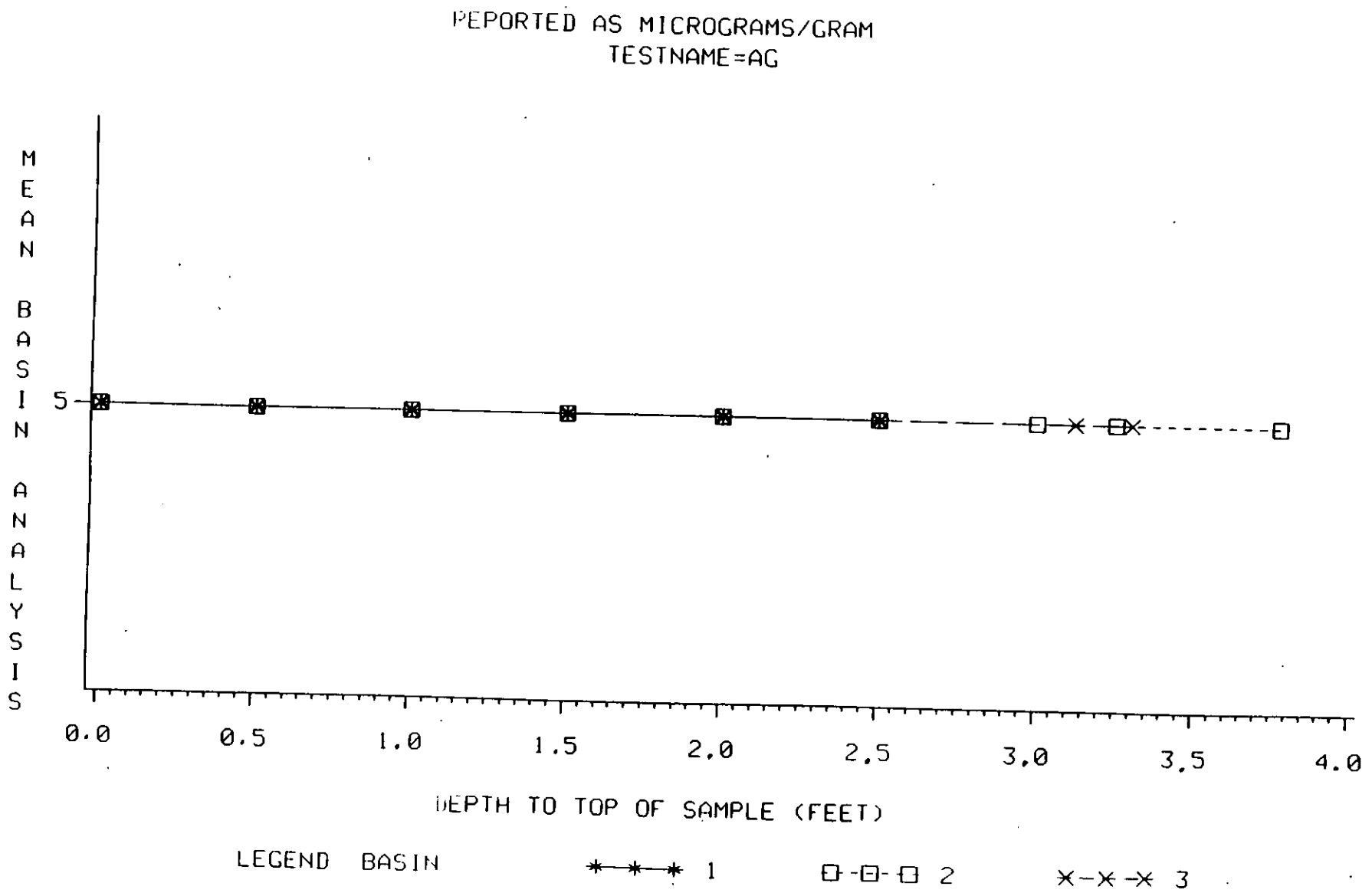


F-AREA SEEPAGE BASINS INORGANIC ANALYSES



F-AREA SEEPAGE BASINS INORGANIC ANALYSES

REPORTED AS MICROGRAMS/GRAM
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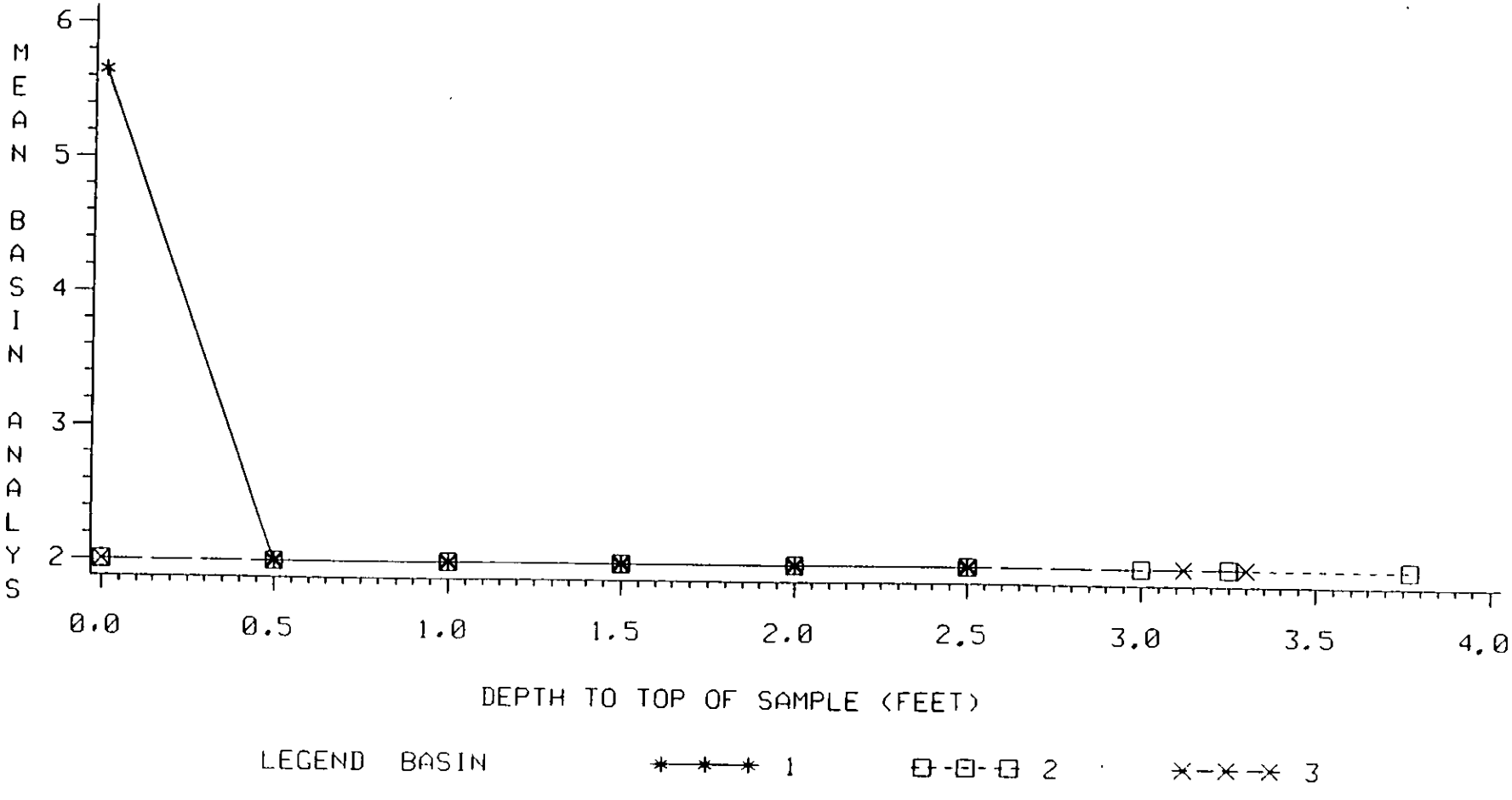

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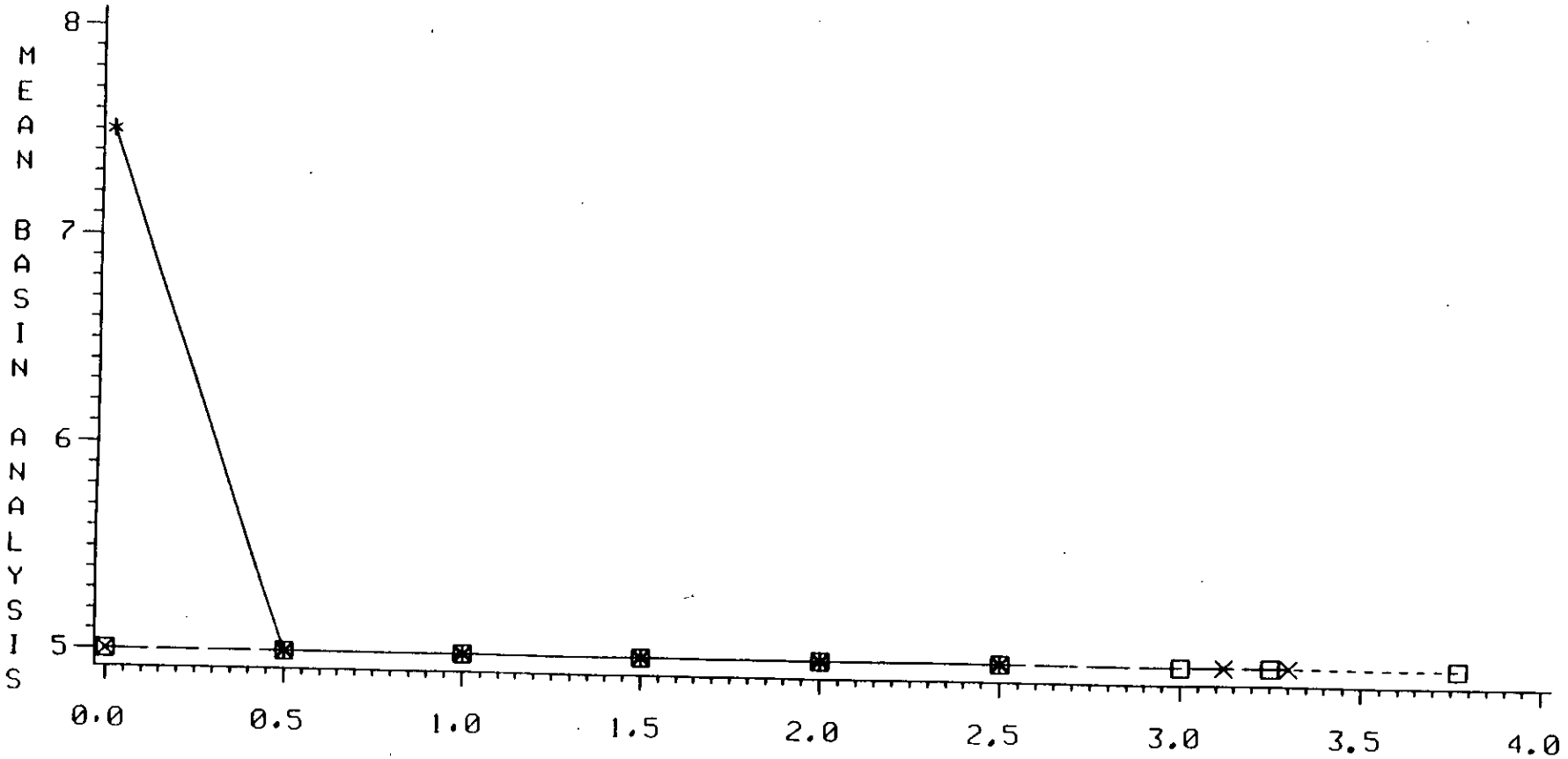

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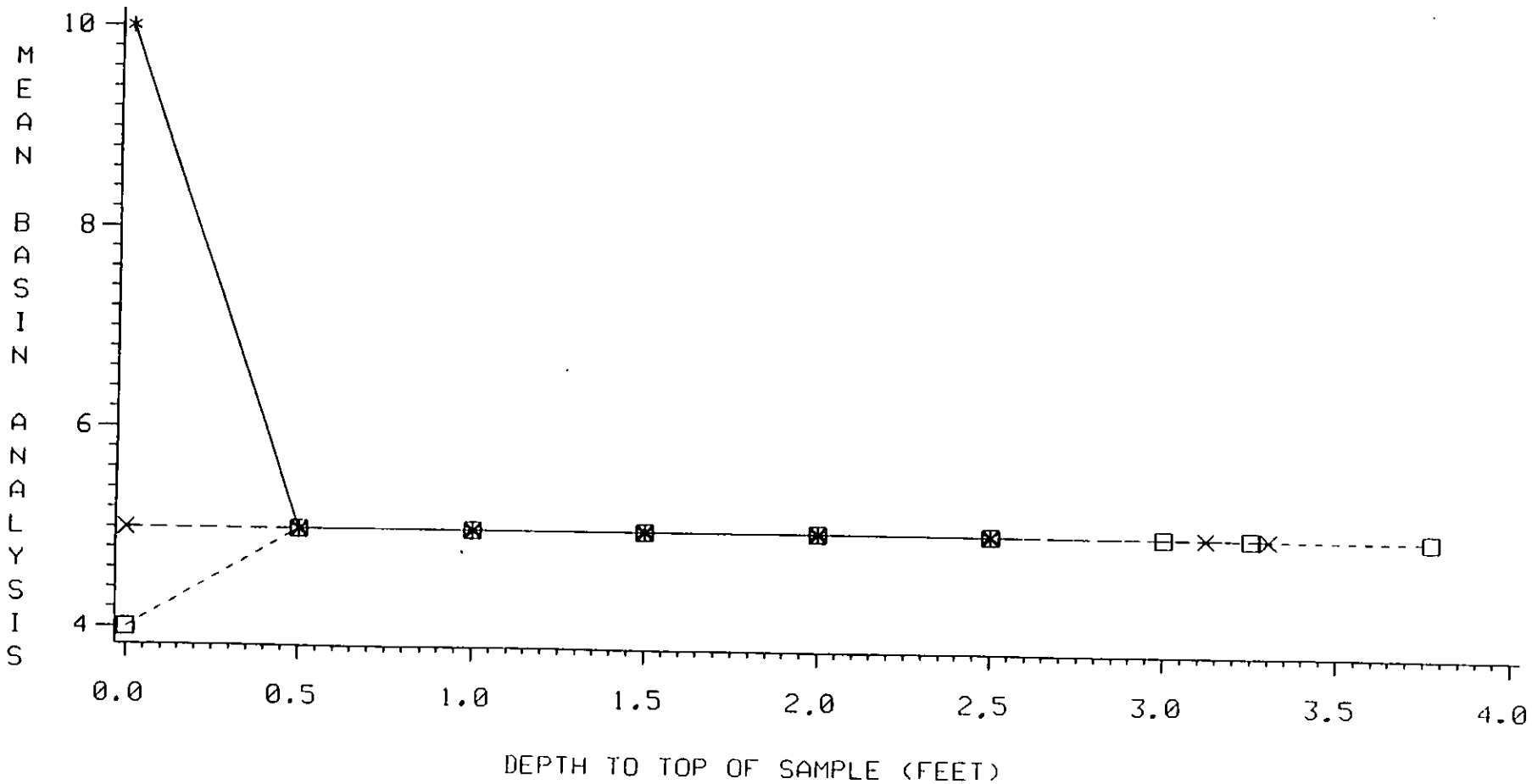

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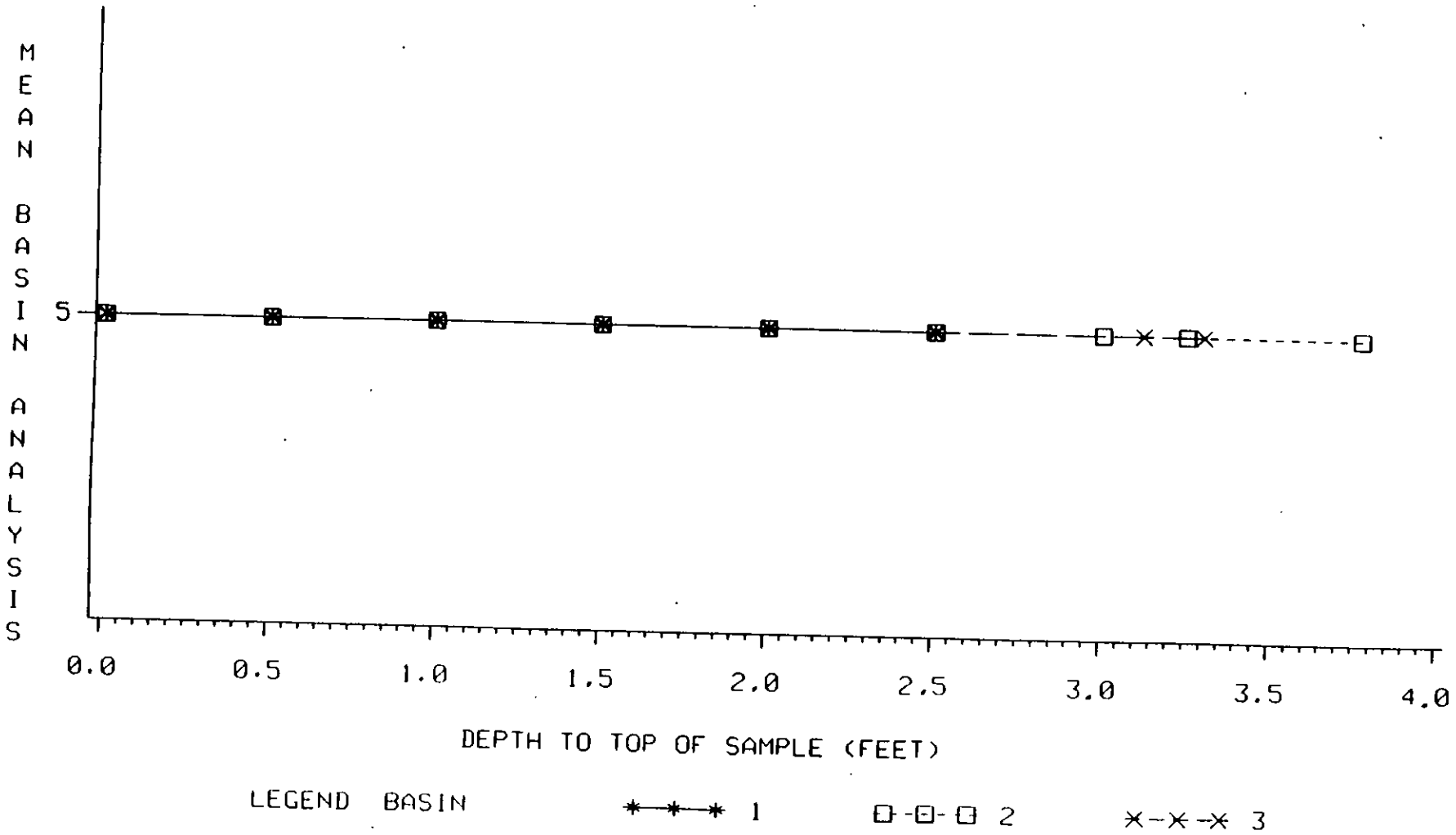

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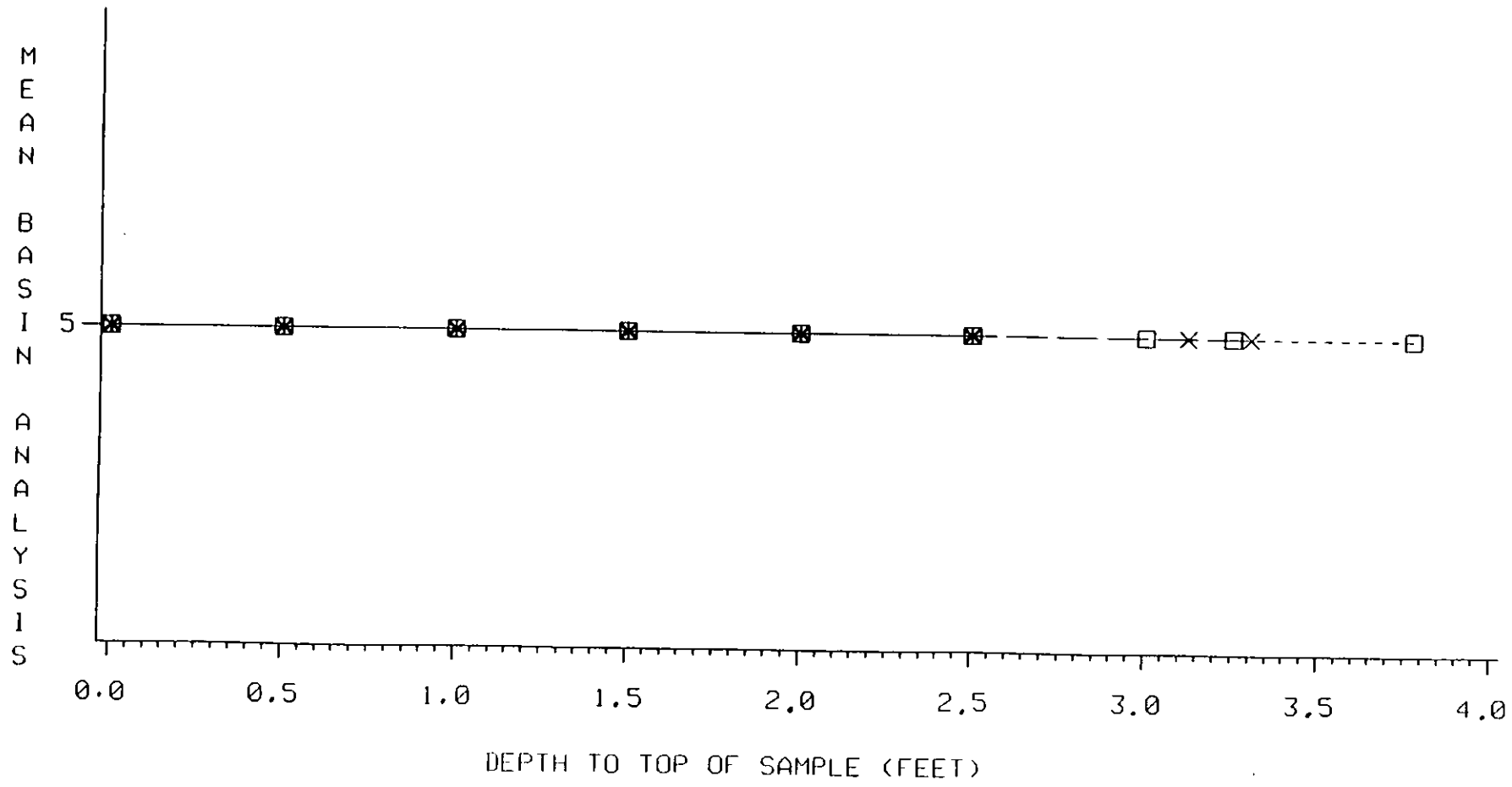

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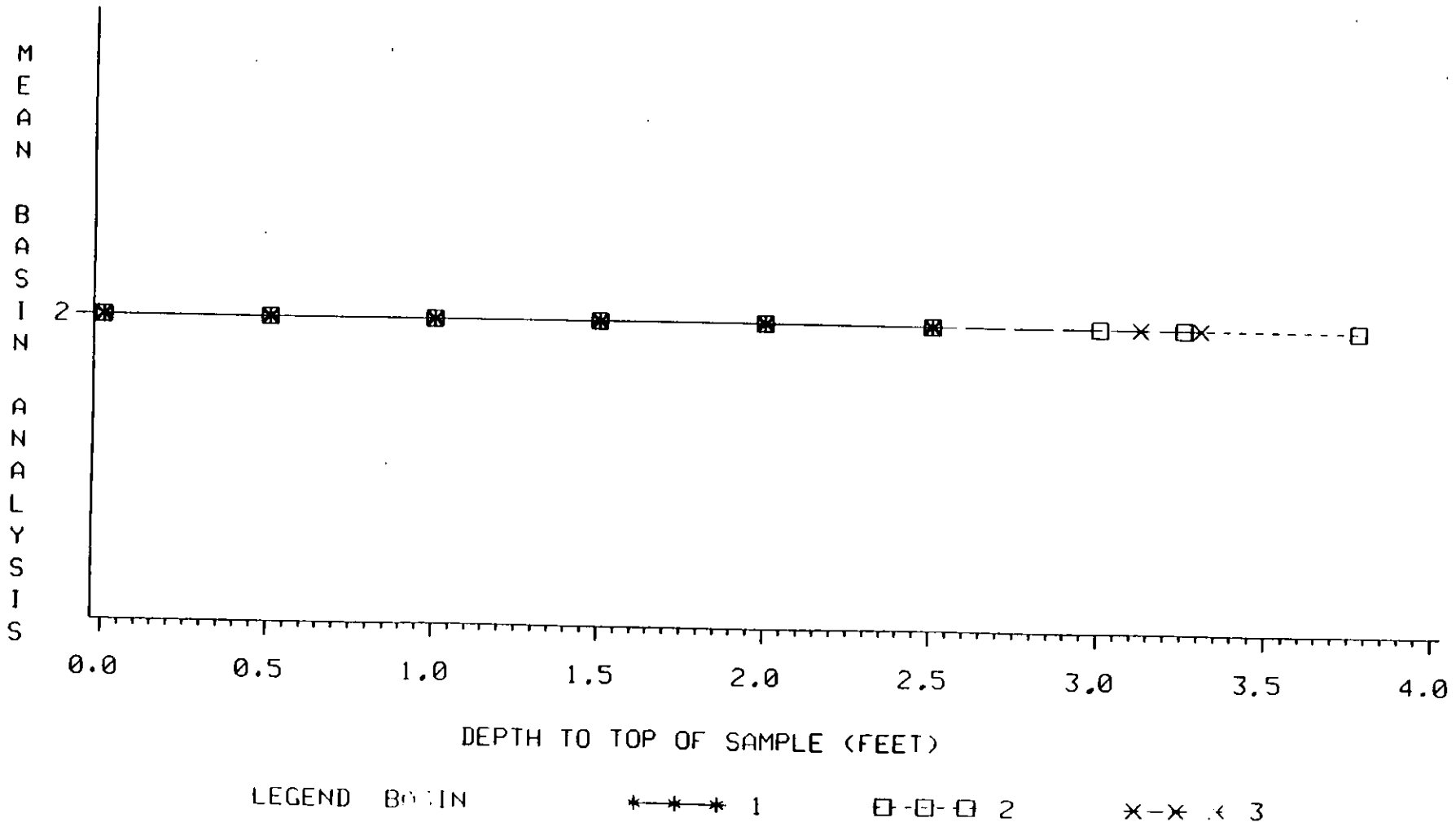

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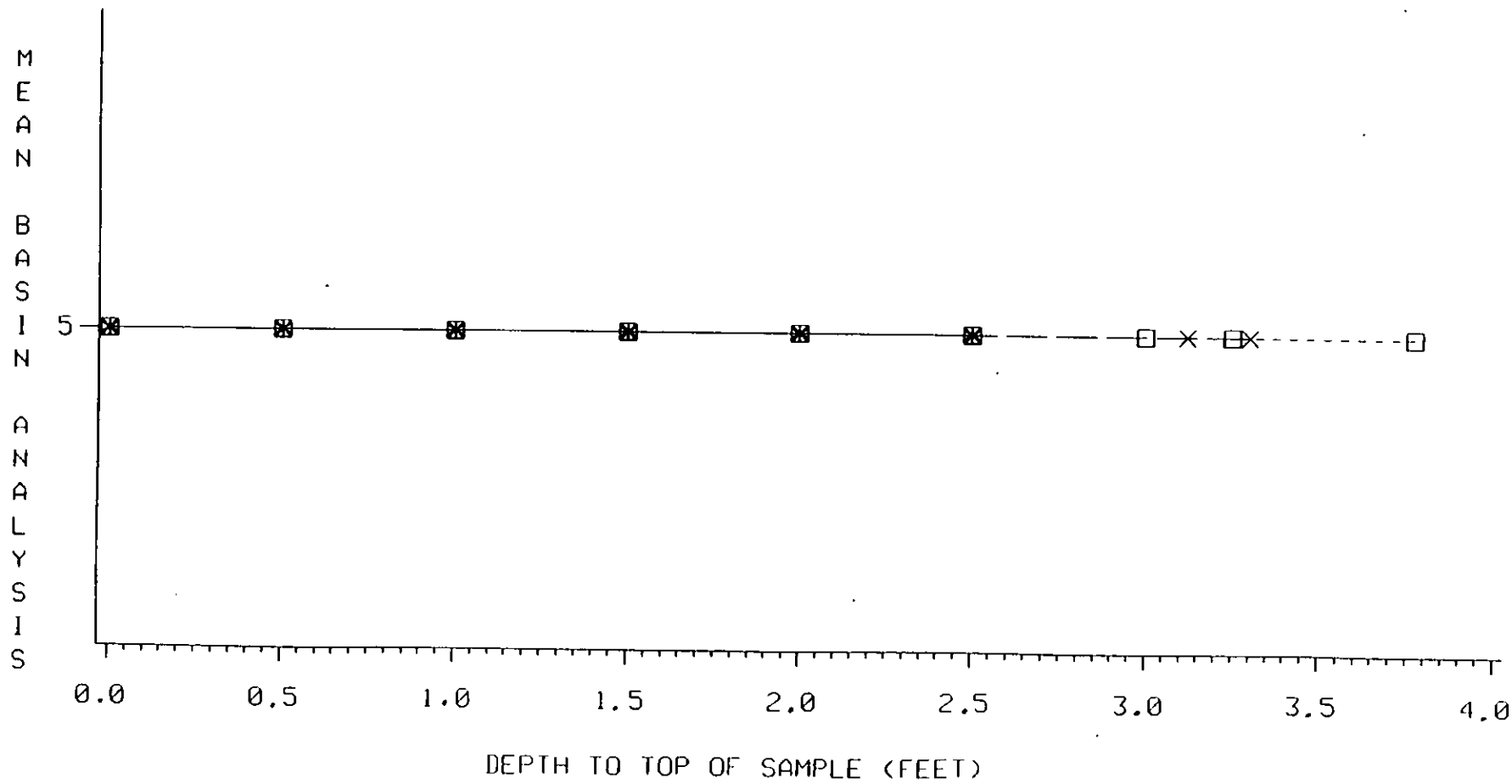

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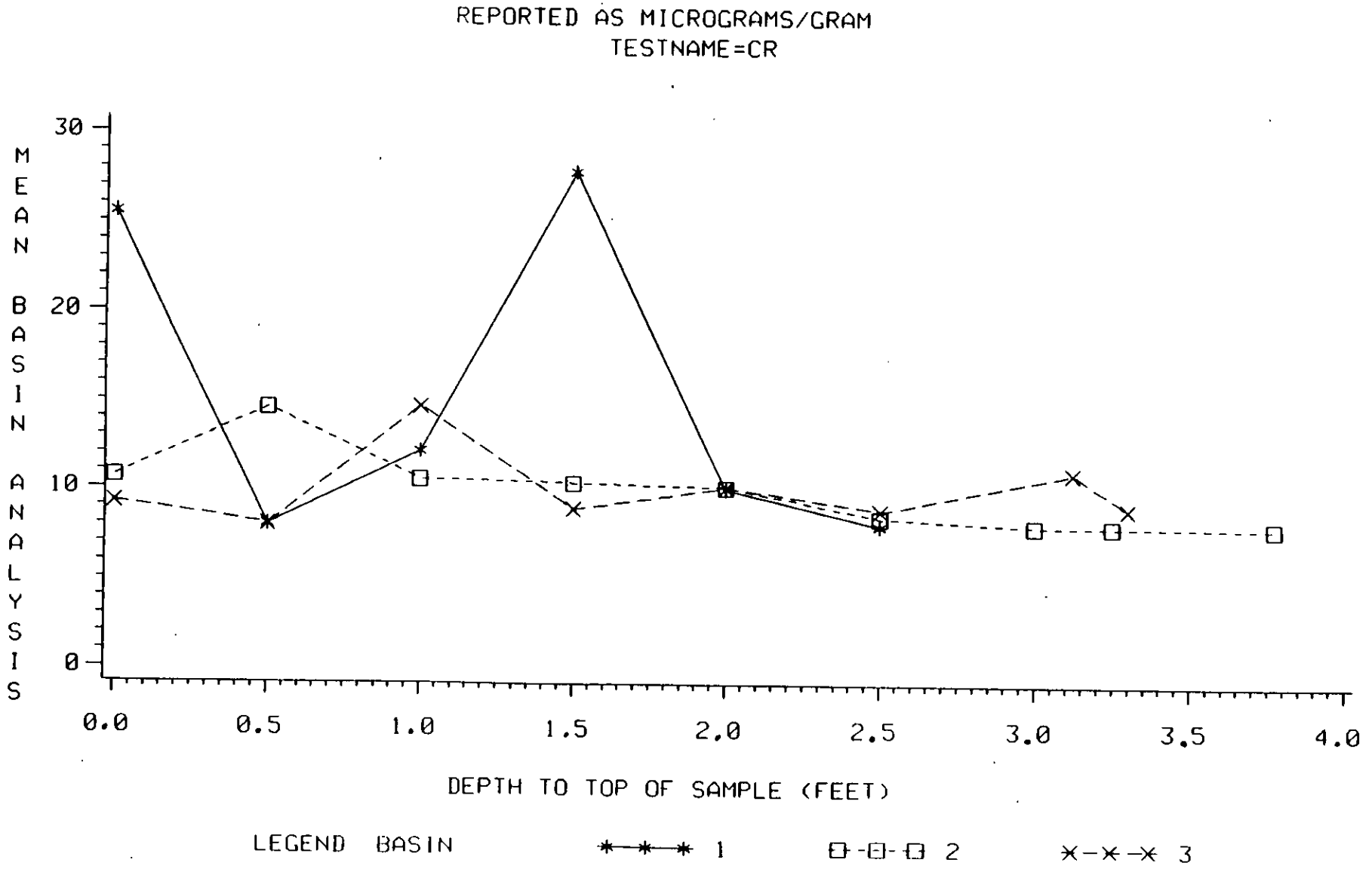

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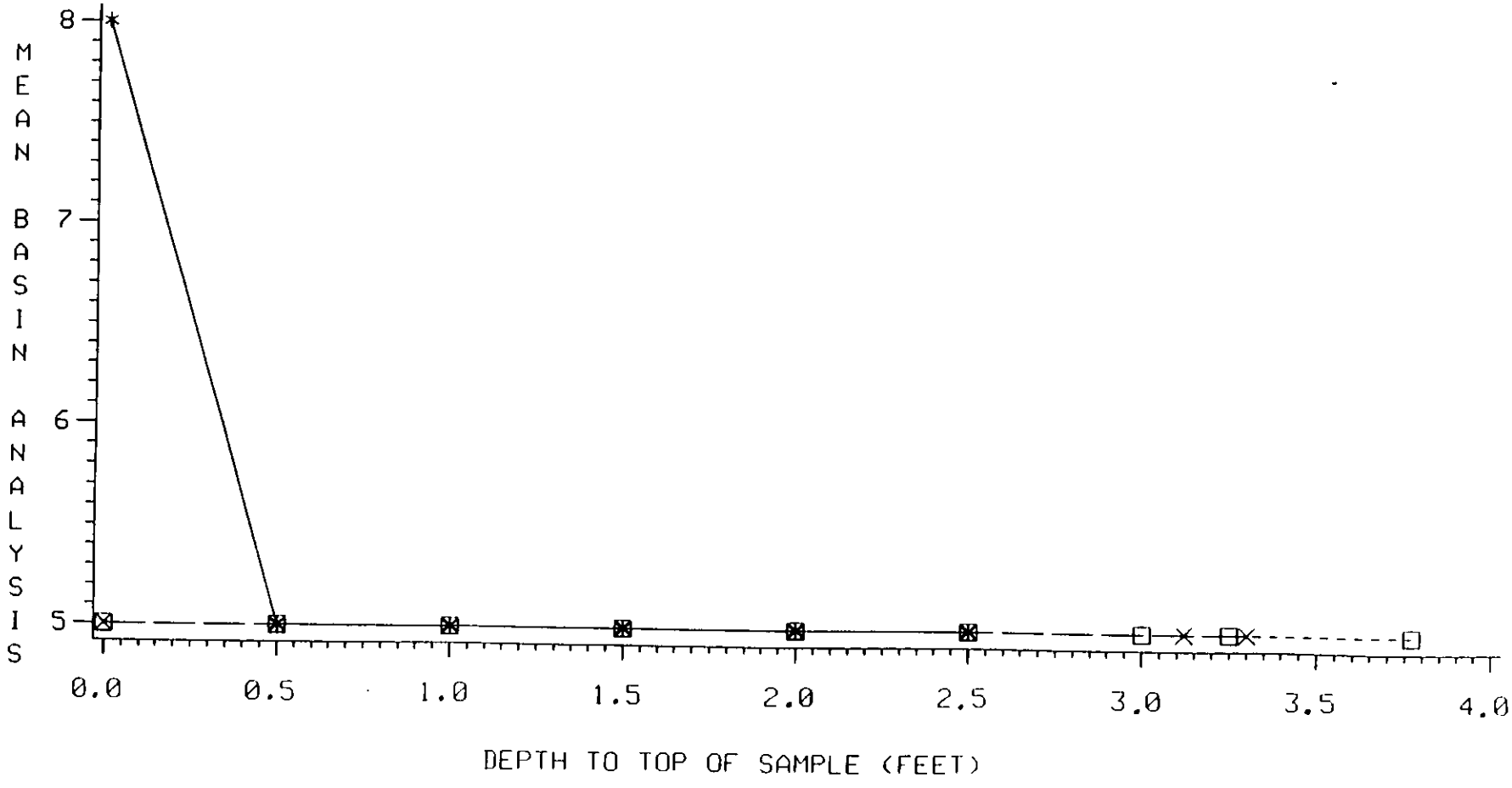

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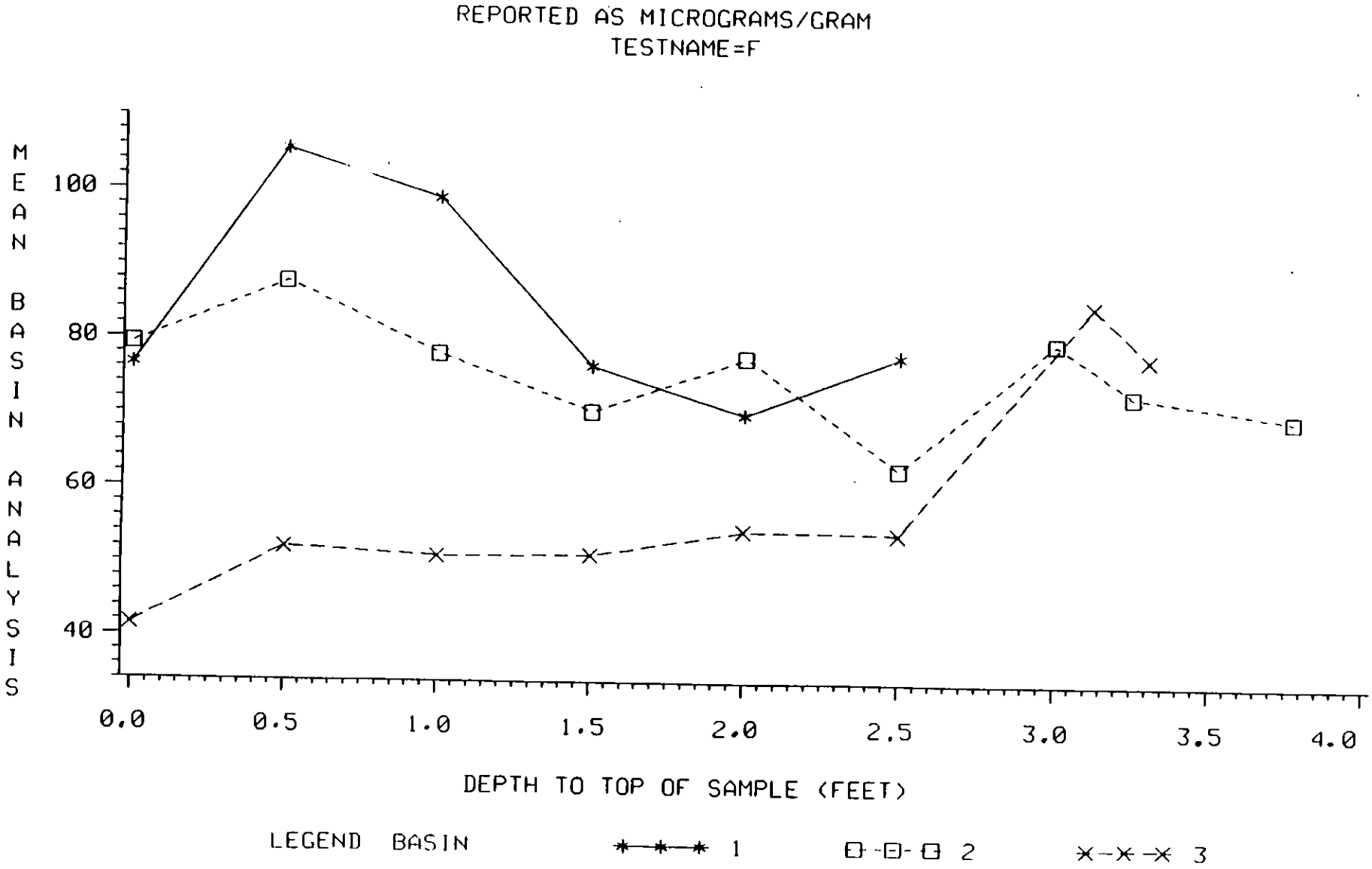

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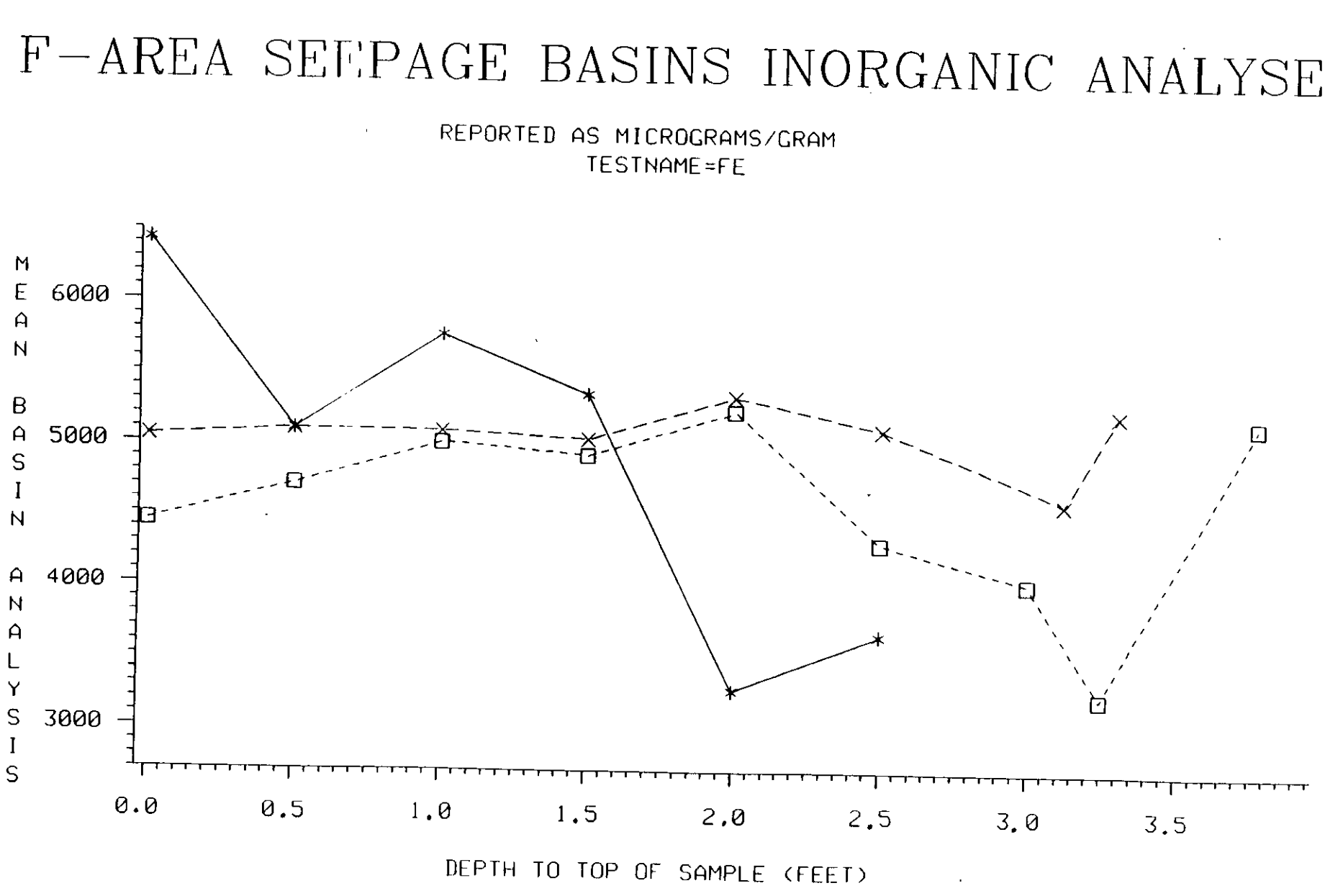

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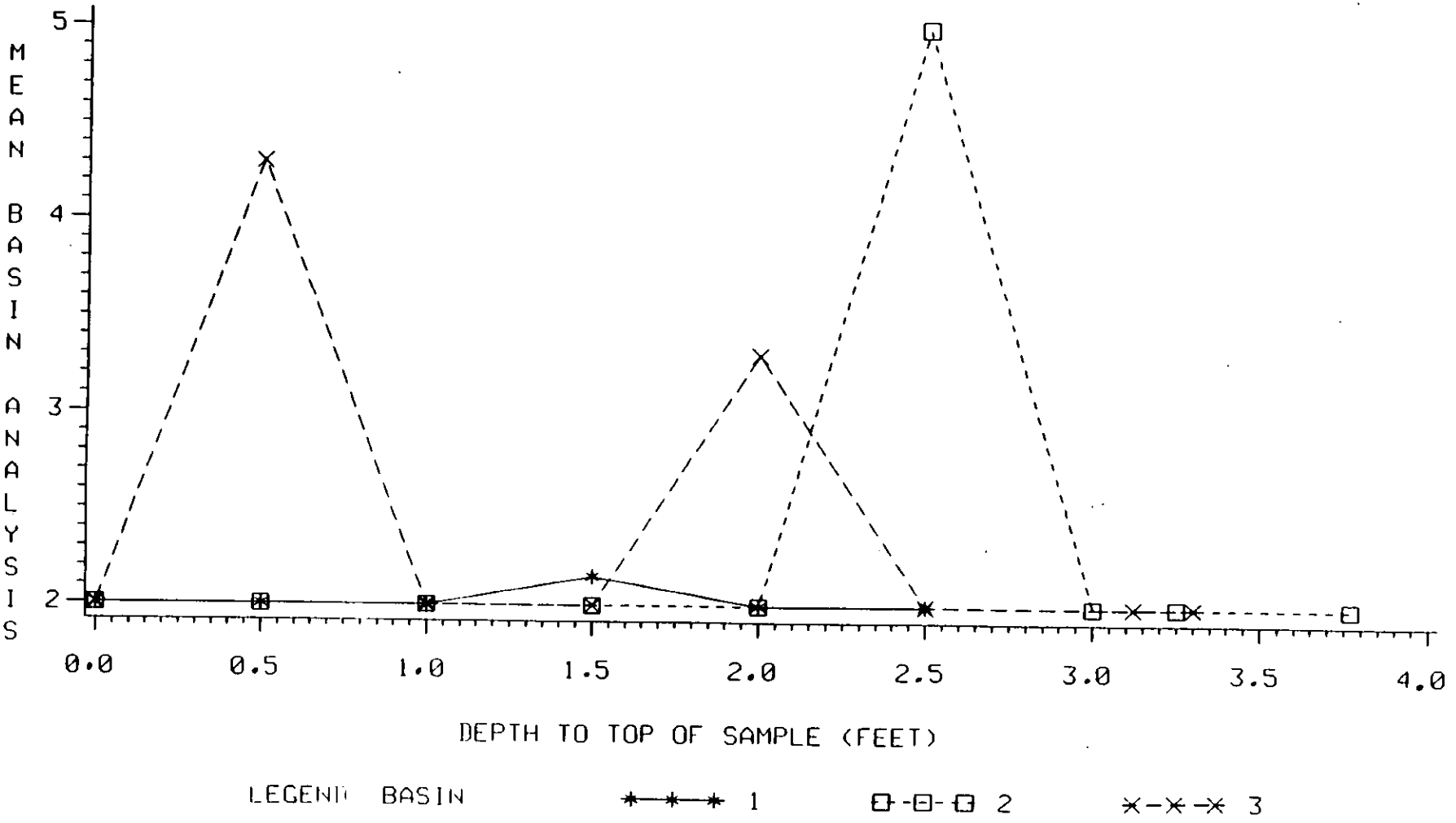

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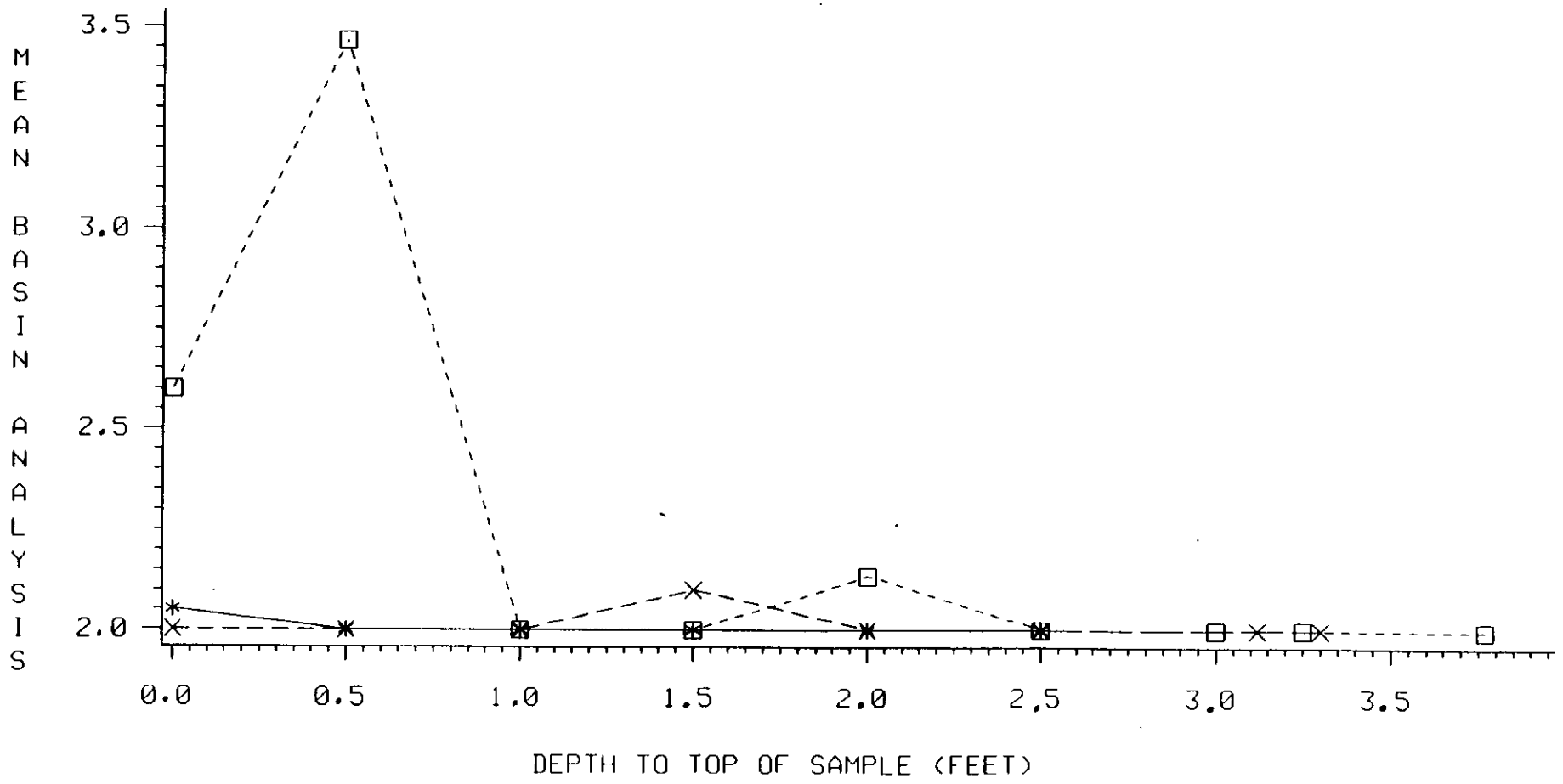

F-AREA SEEPAGE BASINS INORGANIC ANALYSES

REPORTED AS MICROGRAMS/GRAM
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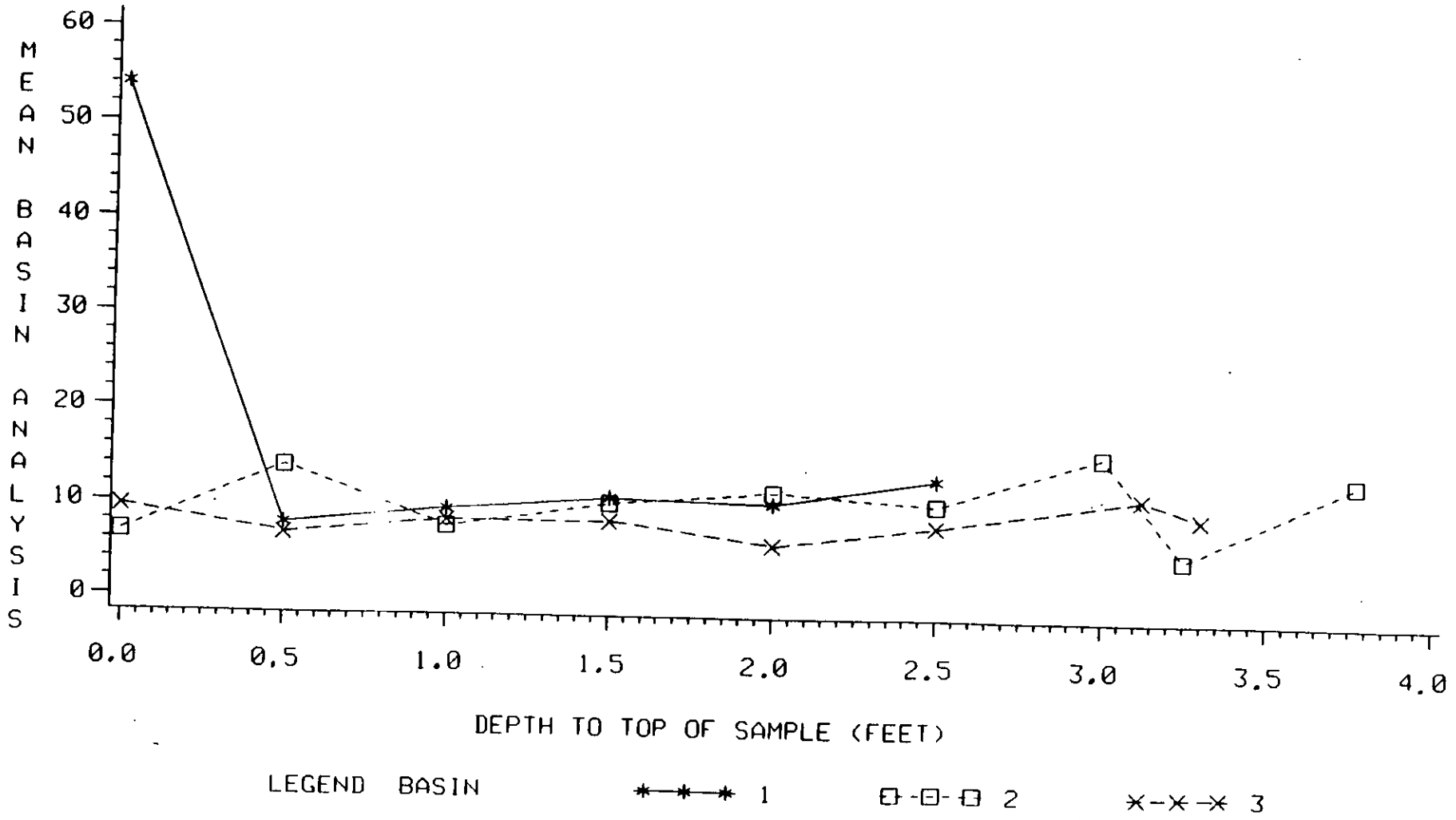

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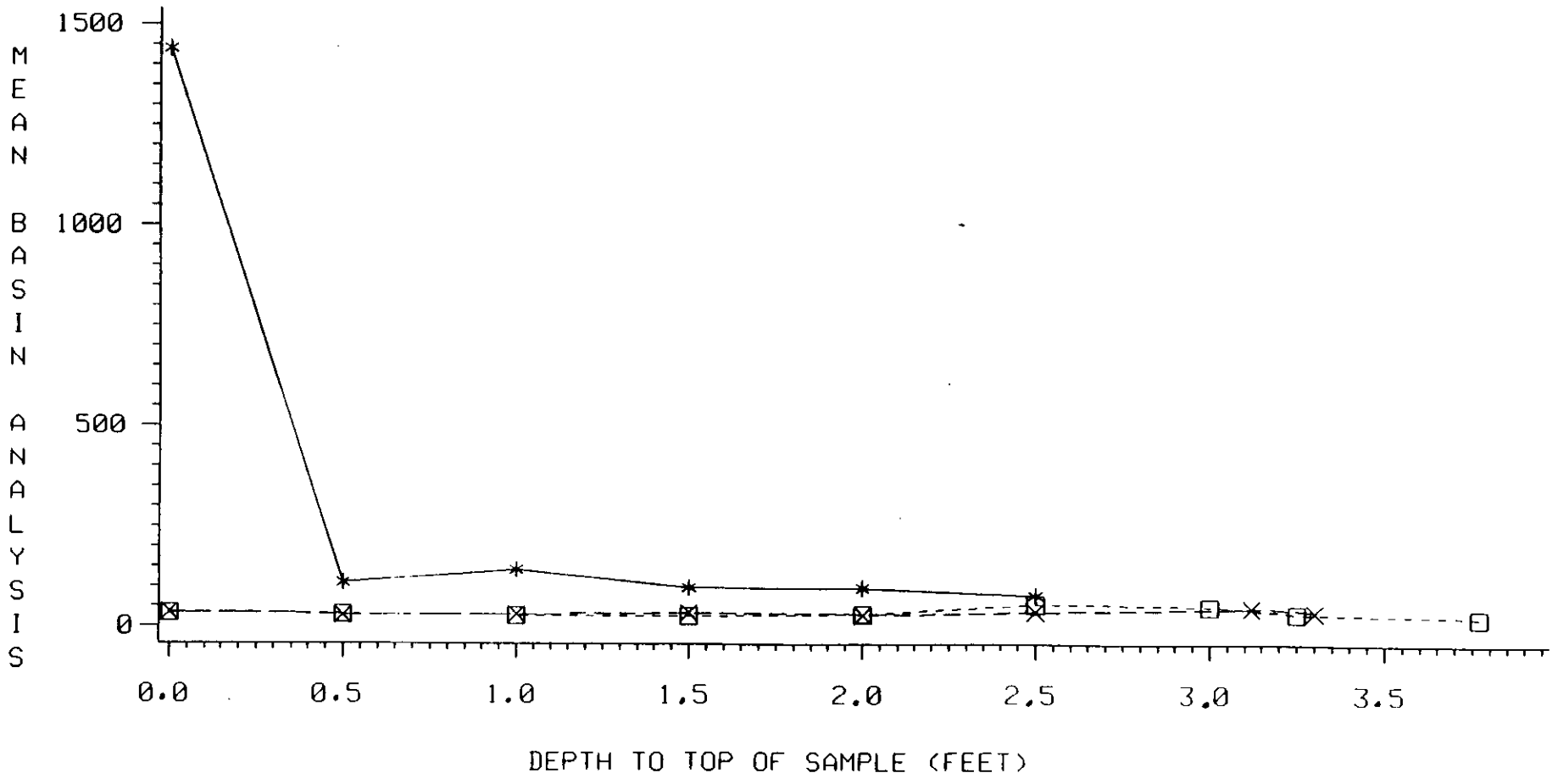

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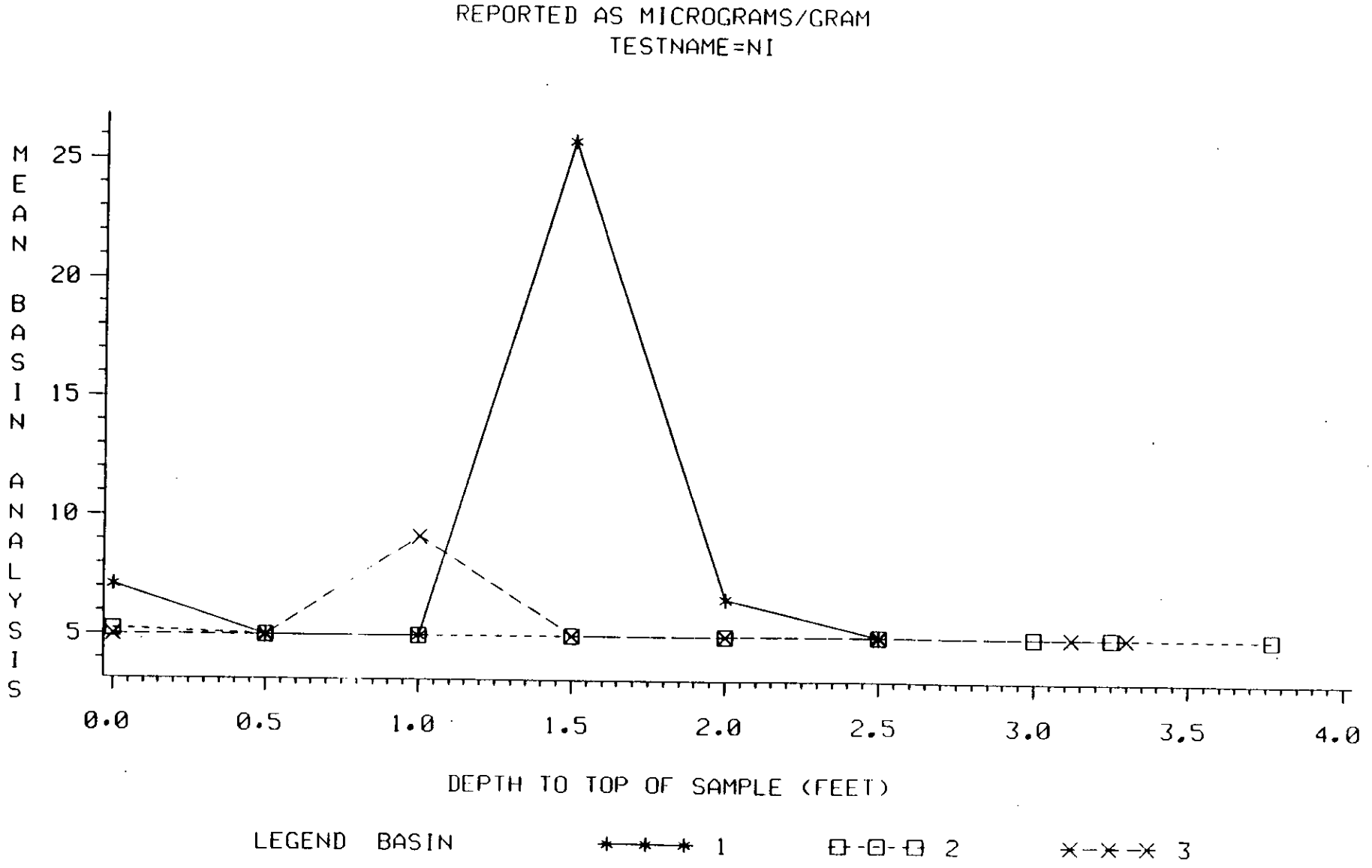

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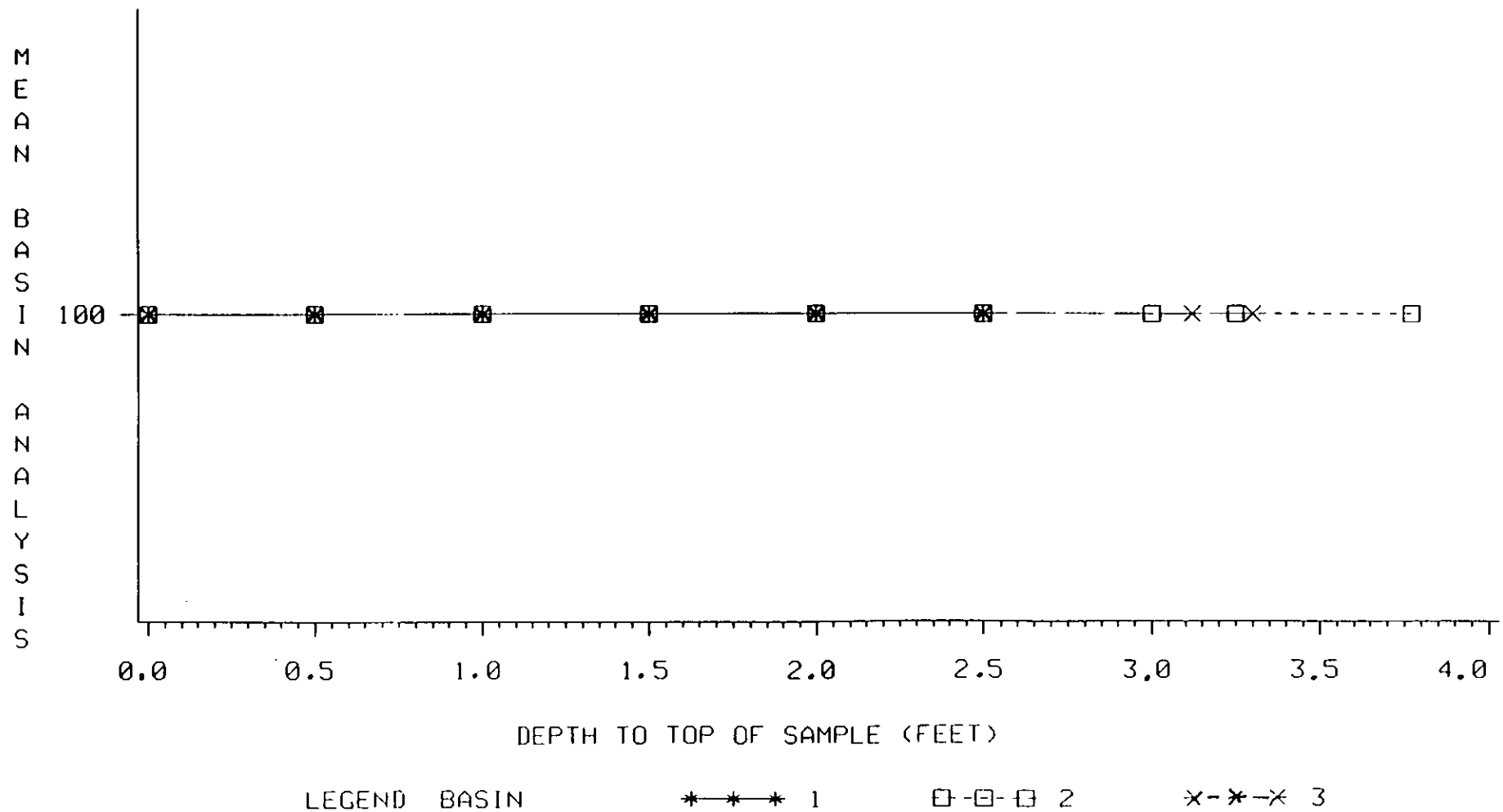

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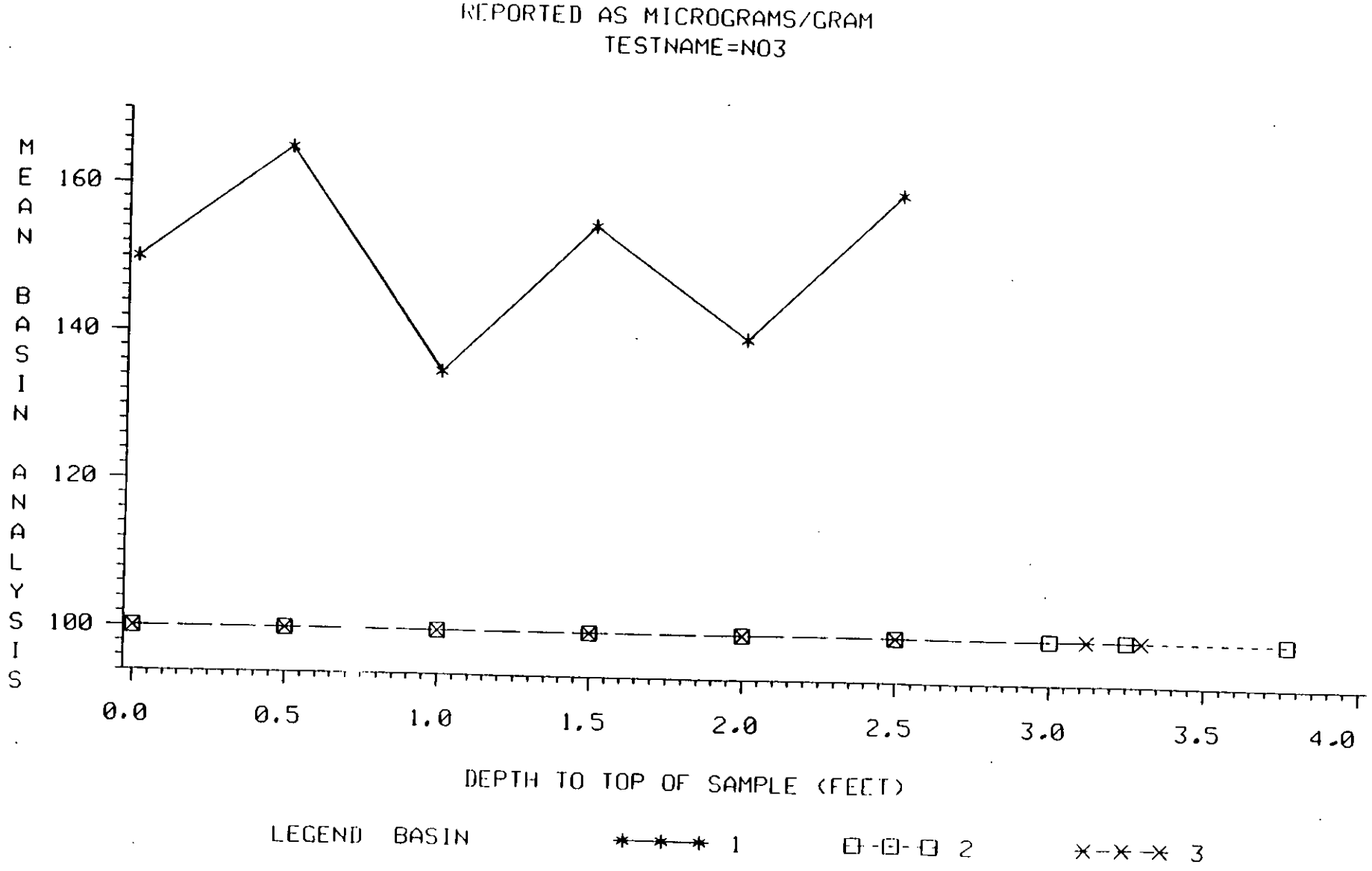

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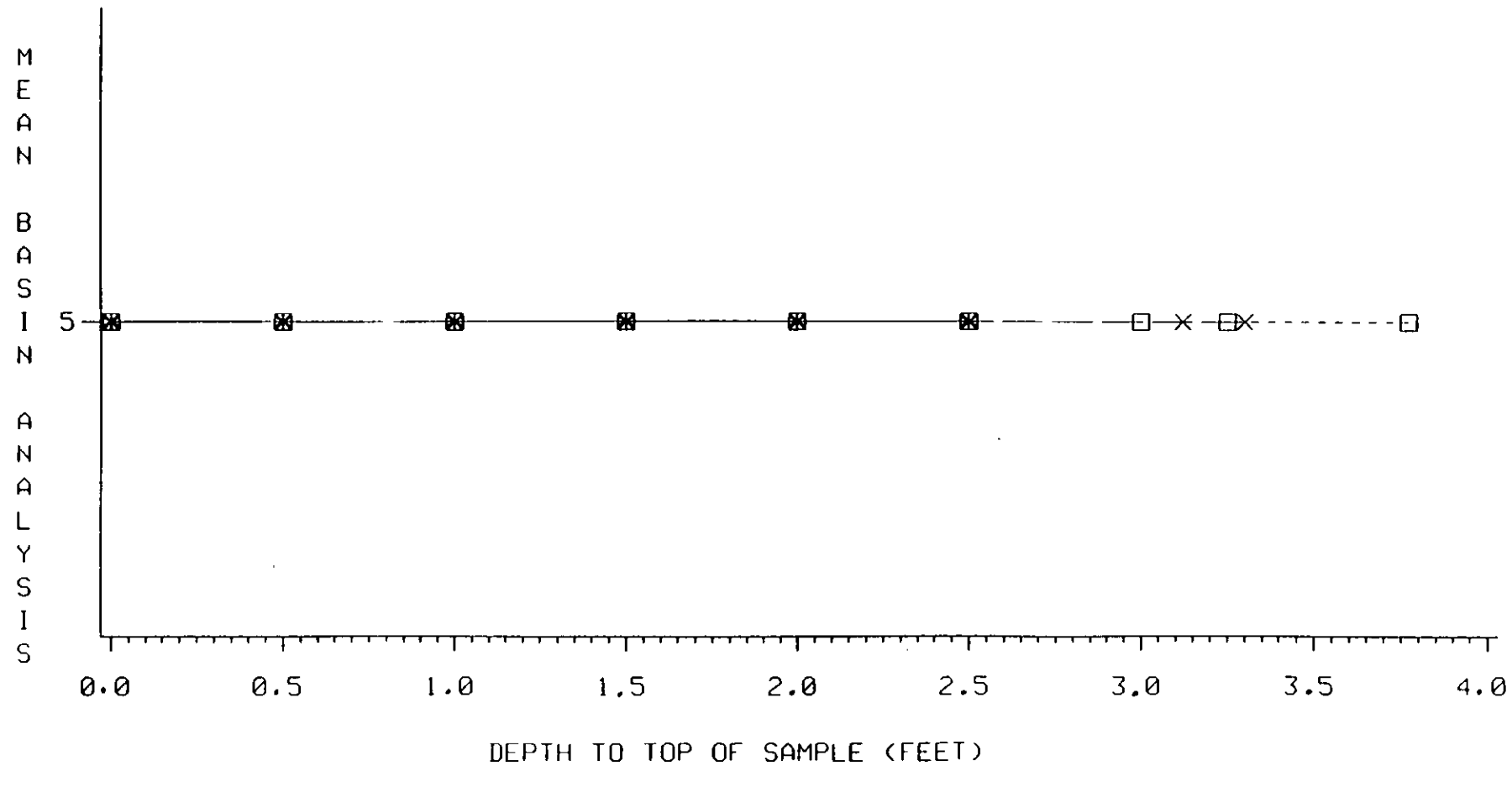

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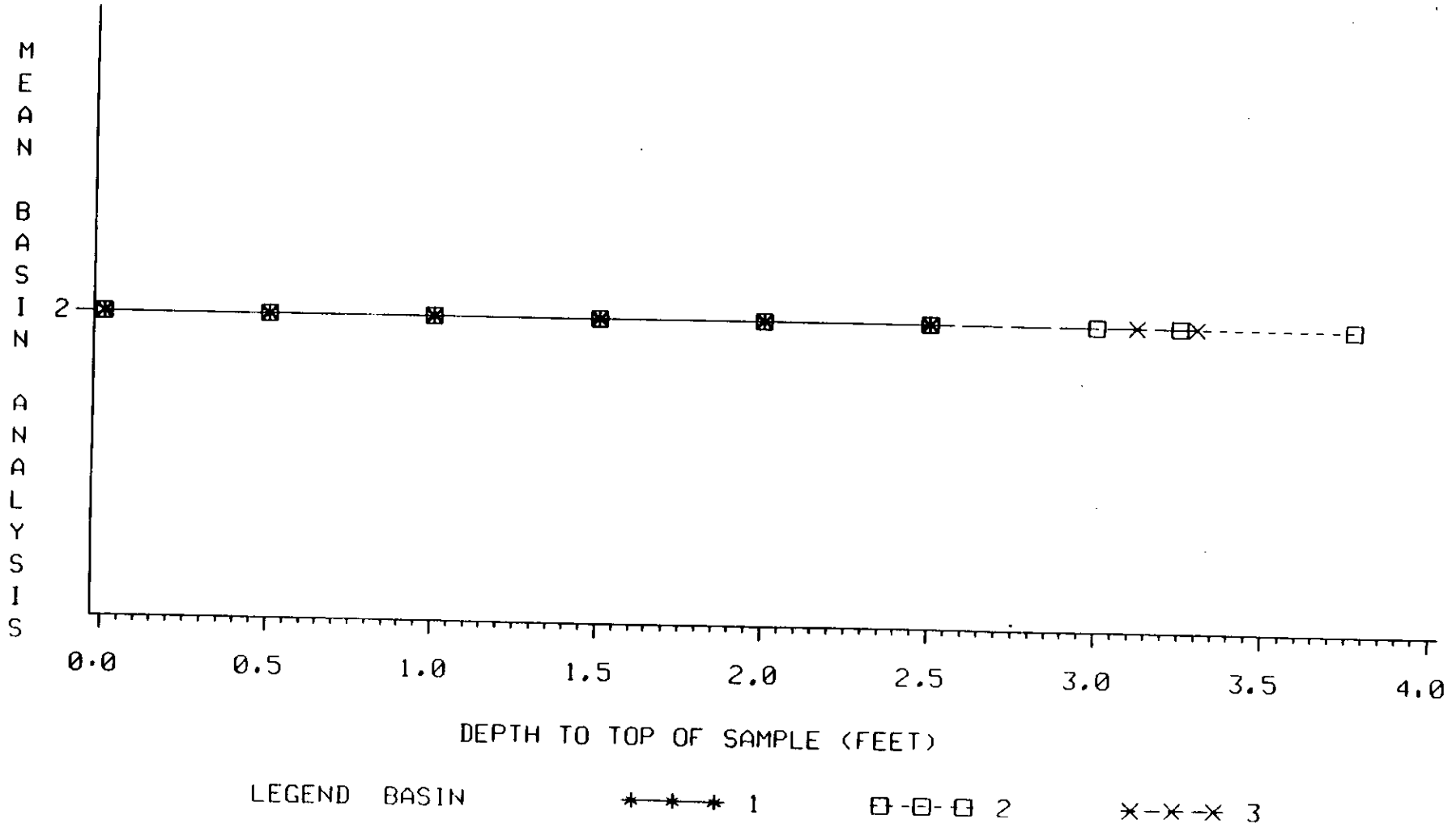

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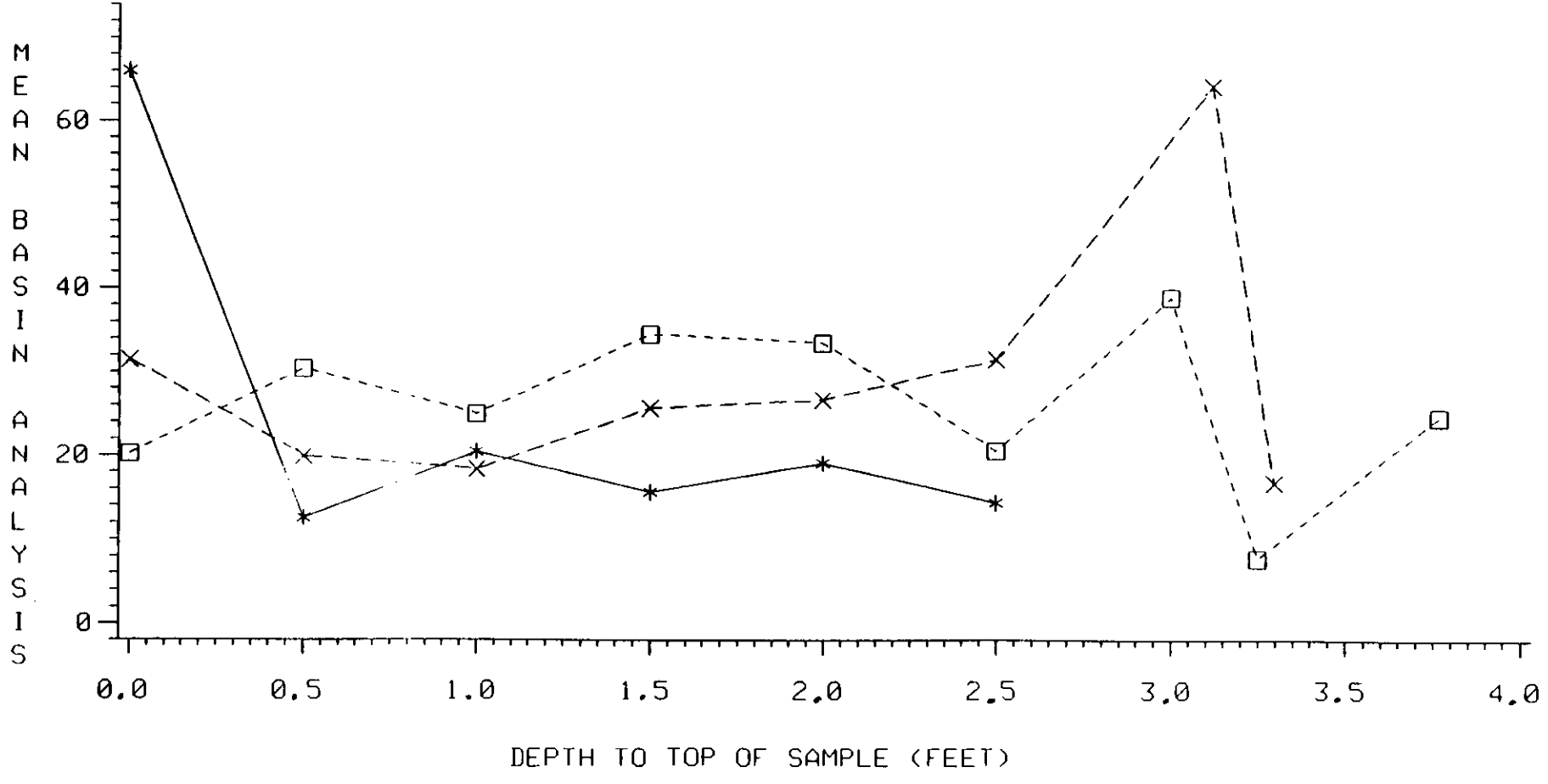

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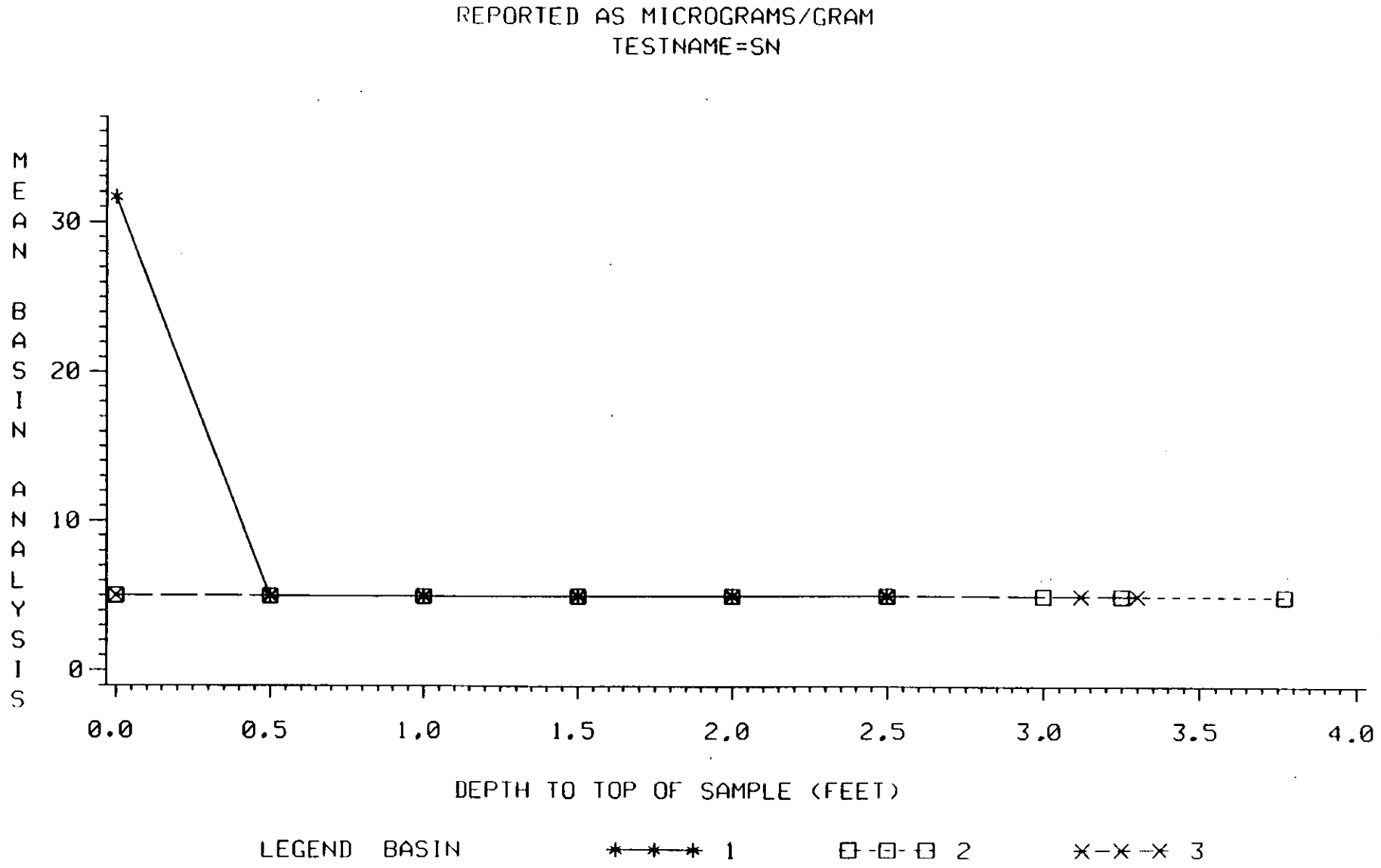

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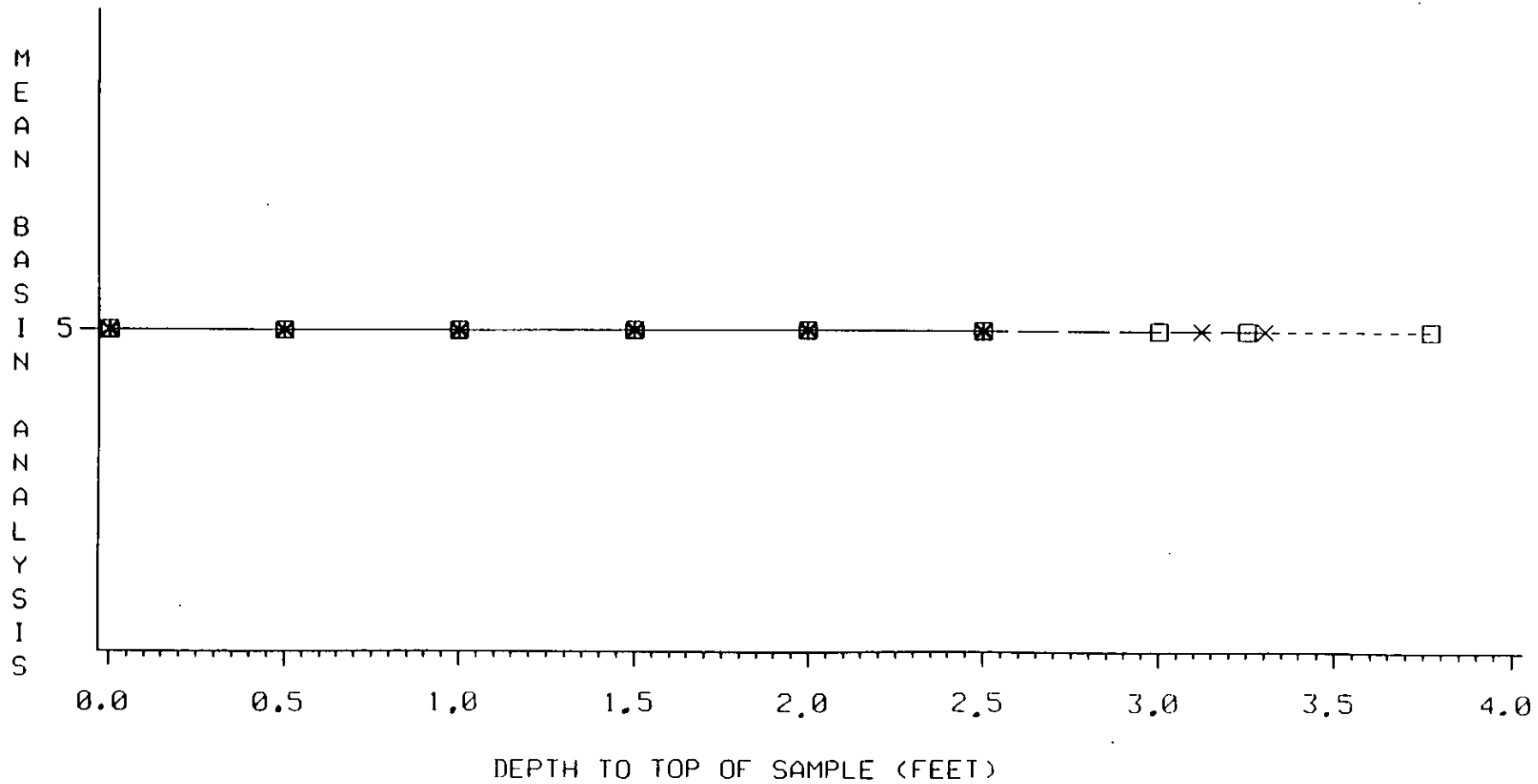

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REPORTED AS MICROGRAMS/GRAM
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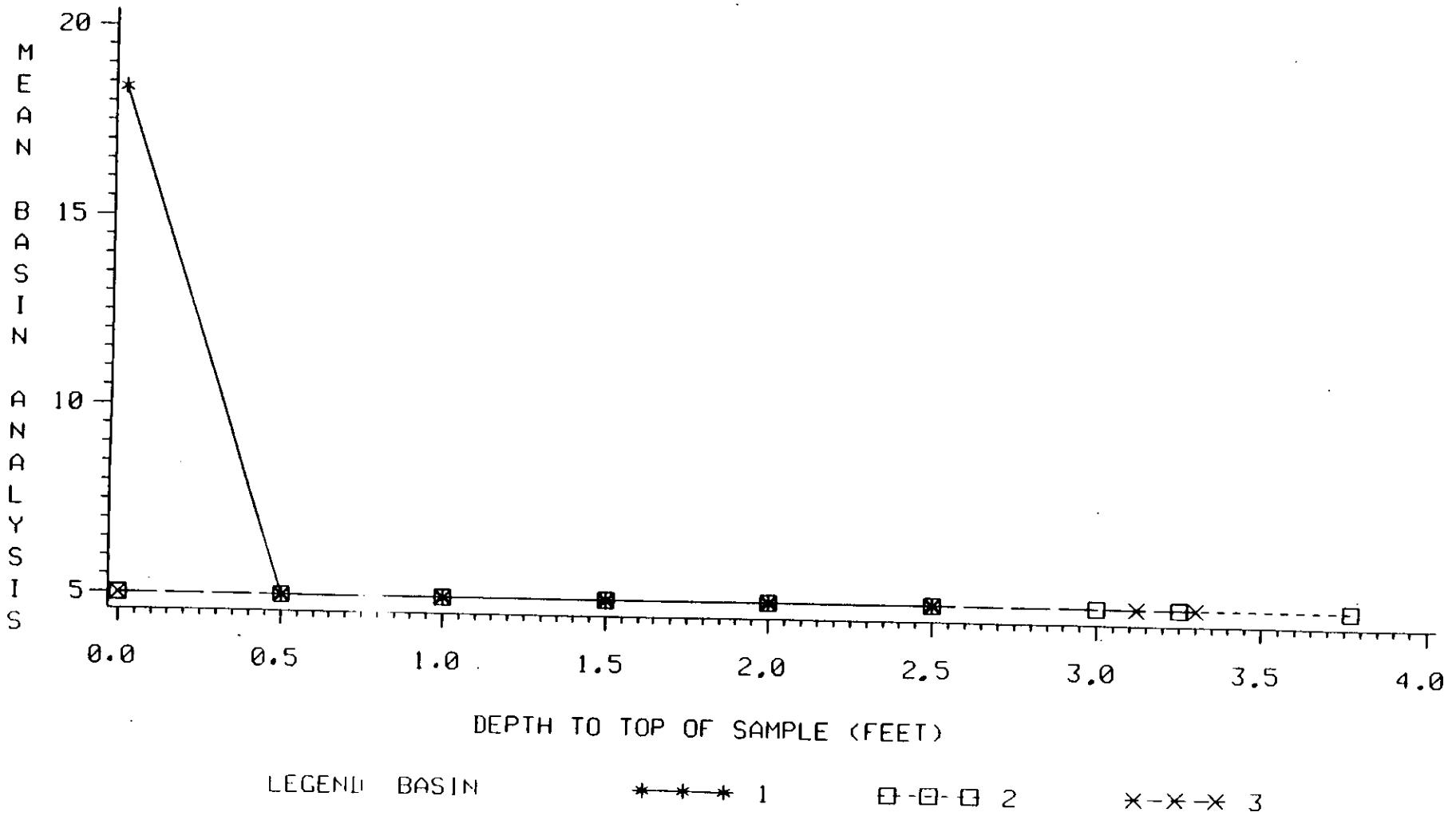
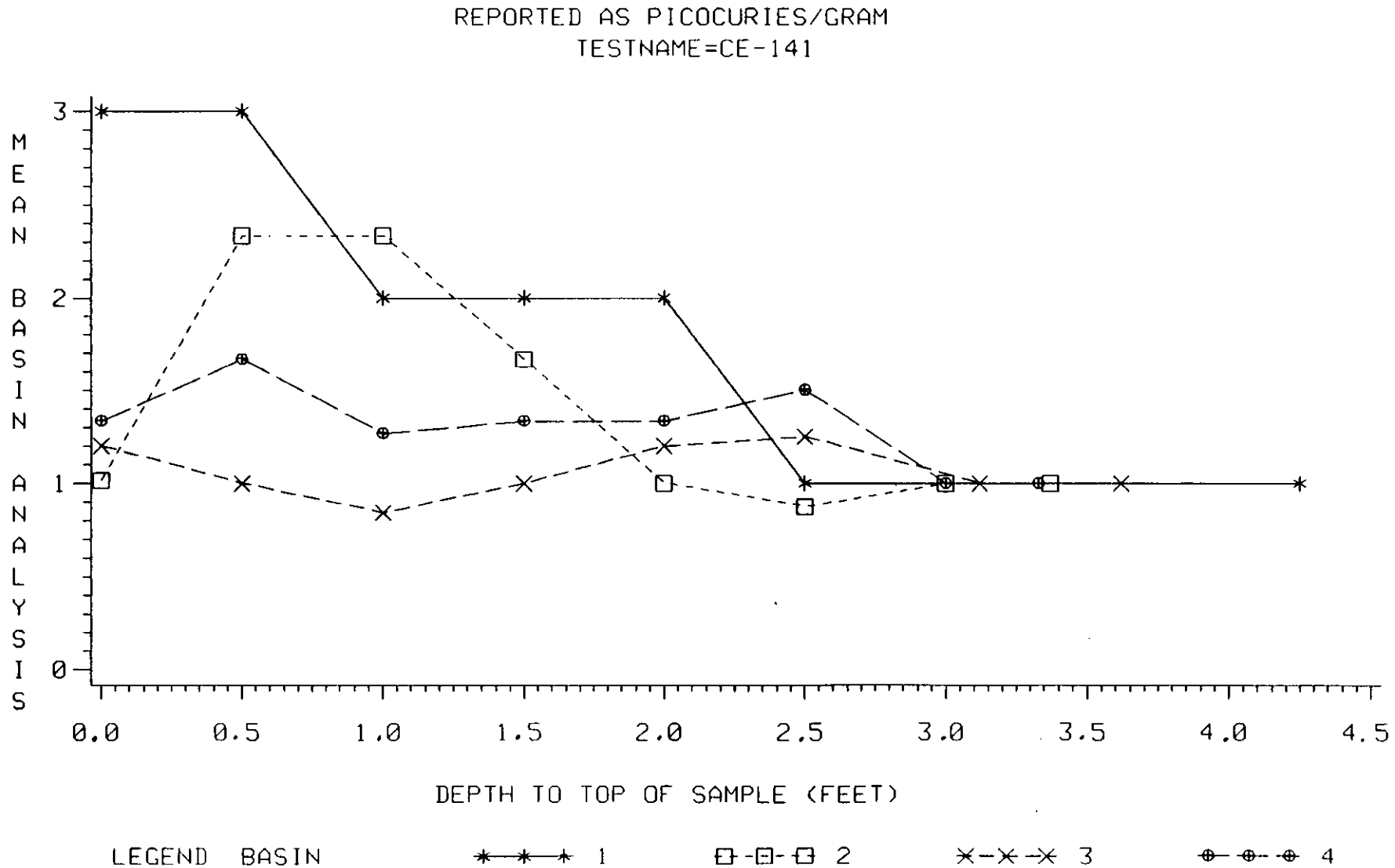


H-AREA SEEPAGE BASINS RADIONUCLIDE ANALYSES



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REPORTED AS PICOCURIES/GRAM
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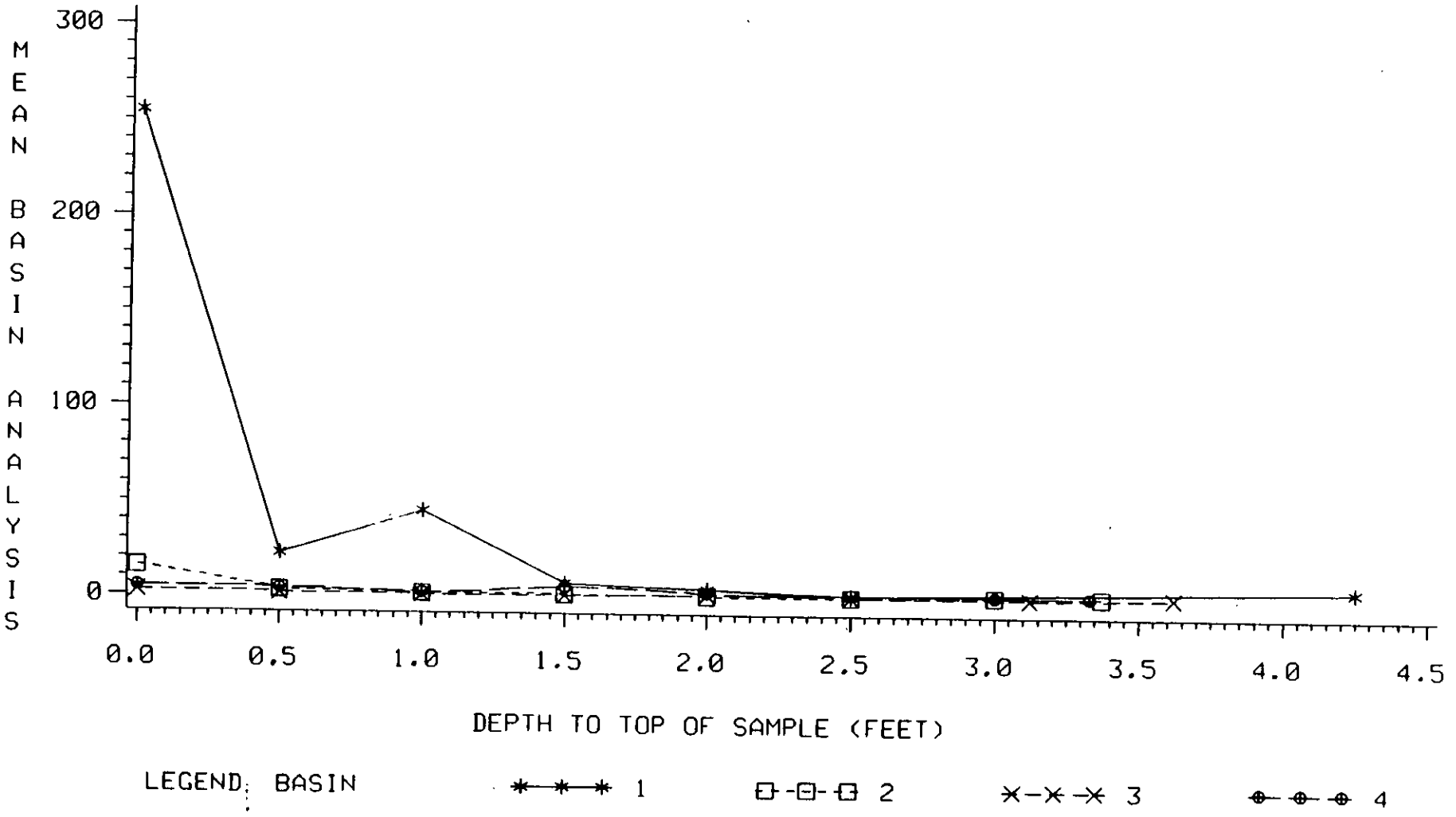

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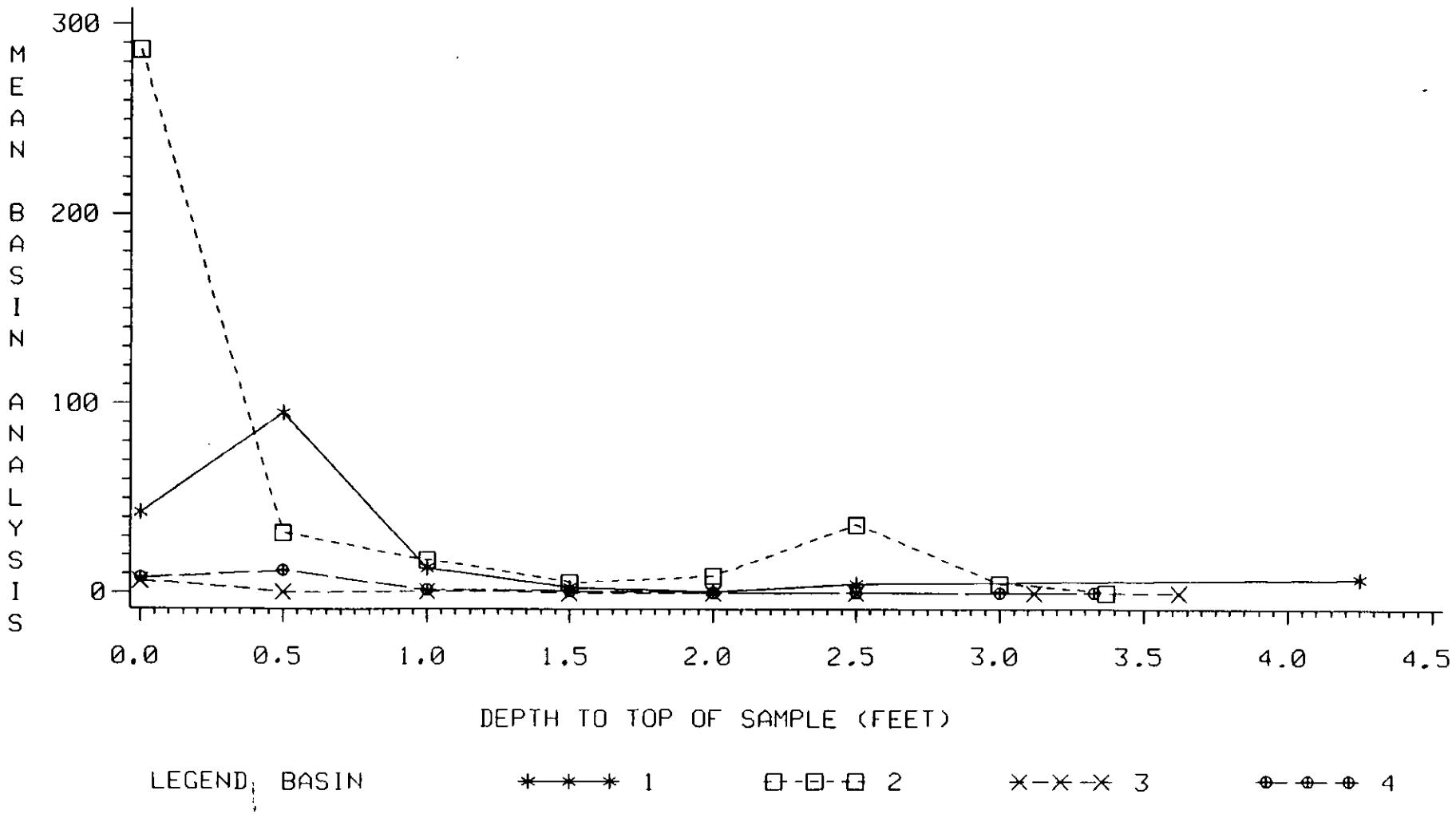
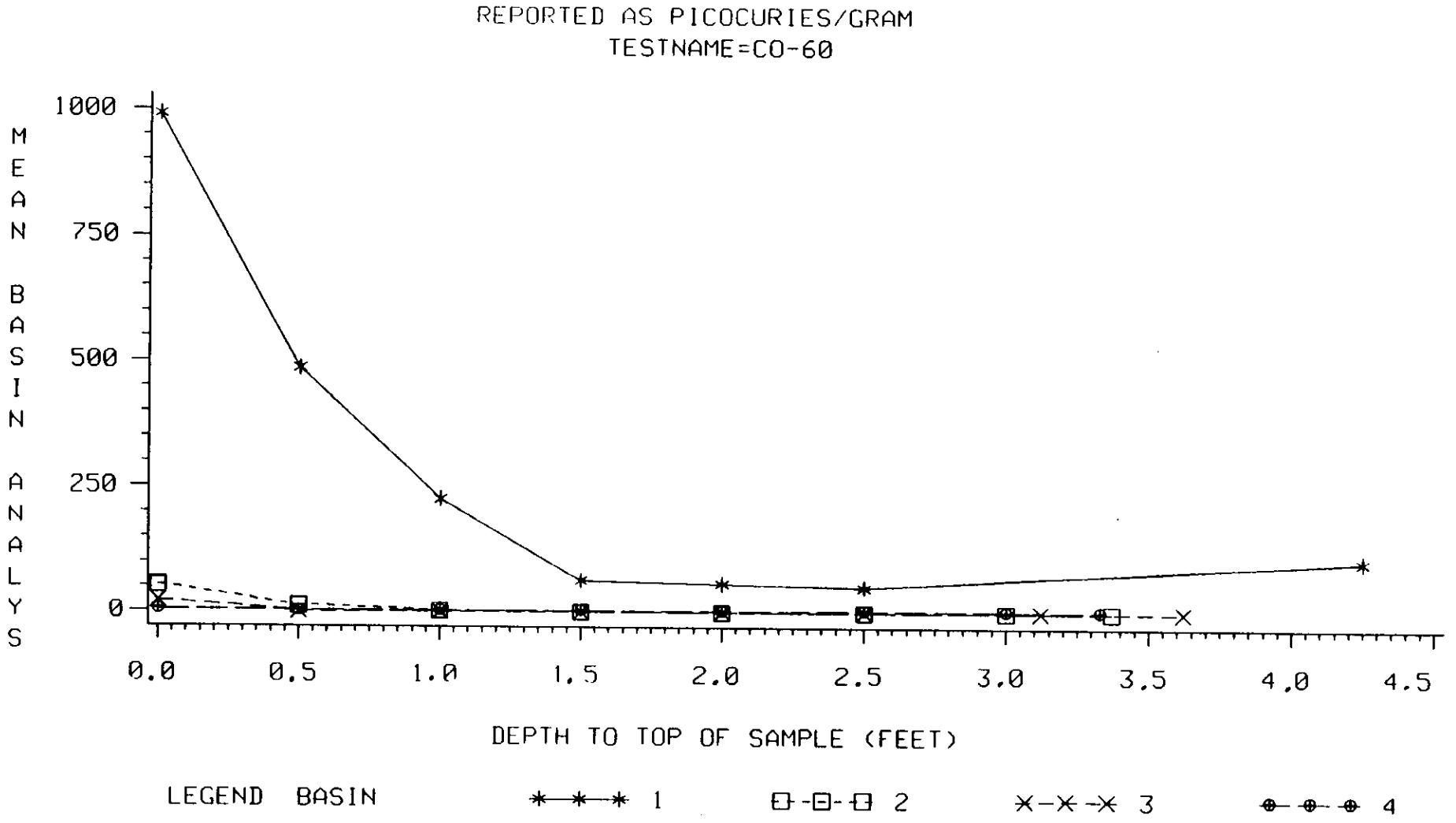


H-AREA SEEPAGE BASINS RADIONUCLIDE ANALYSES



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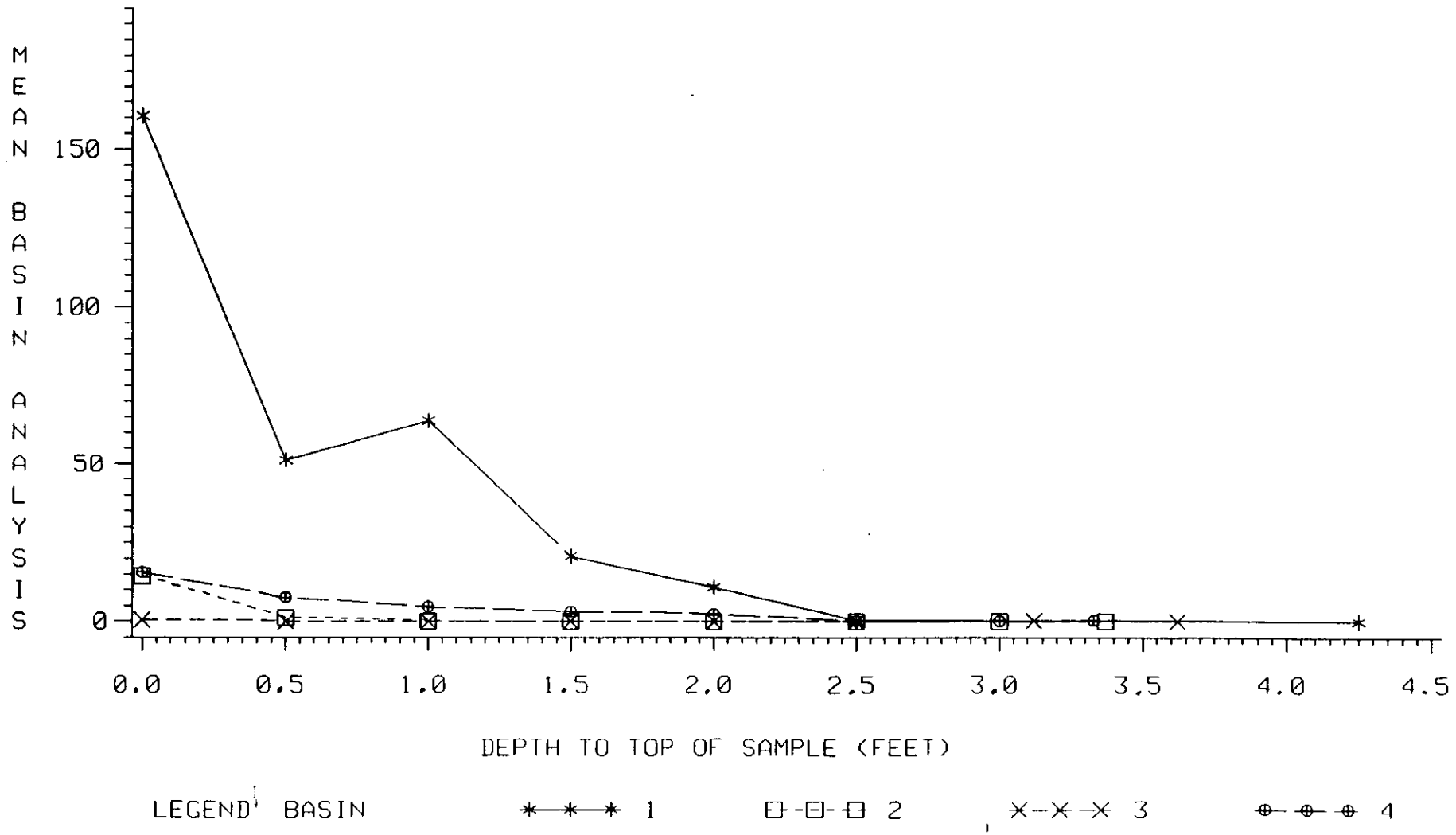

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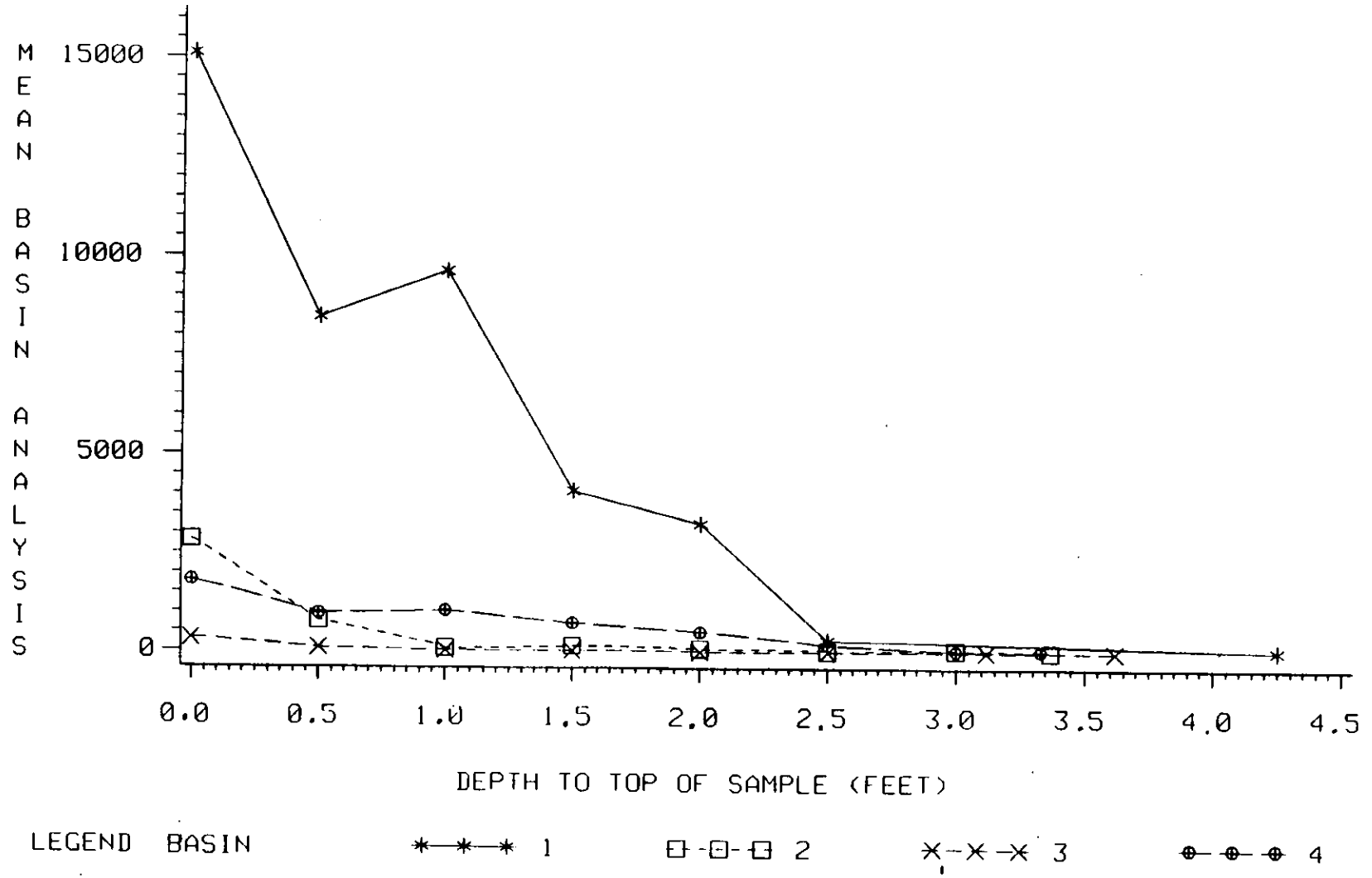

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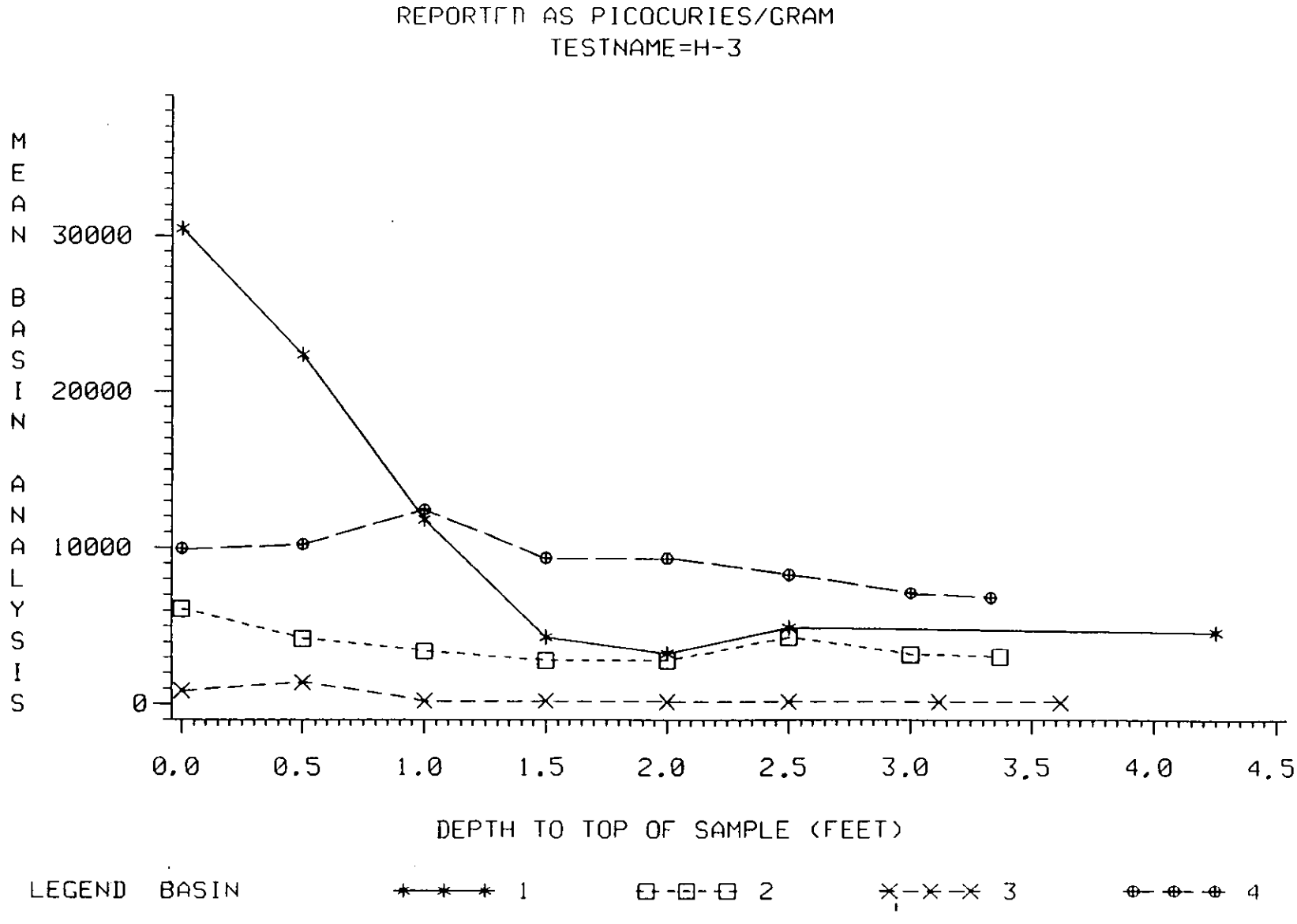

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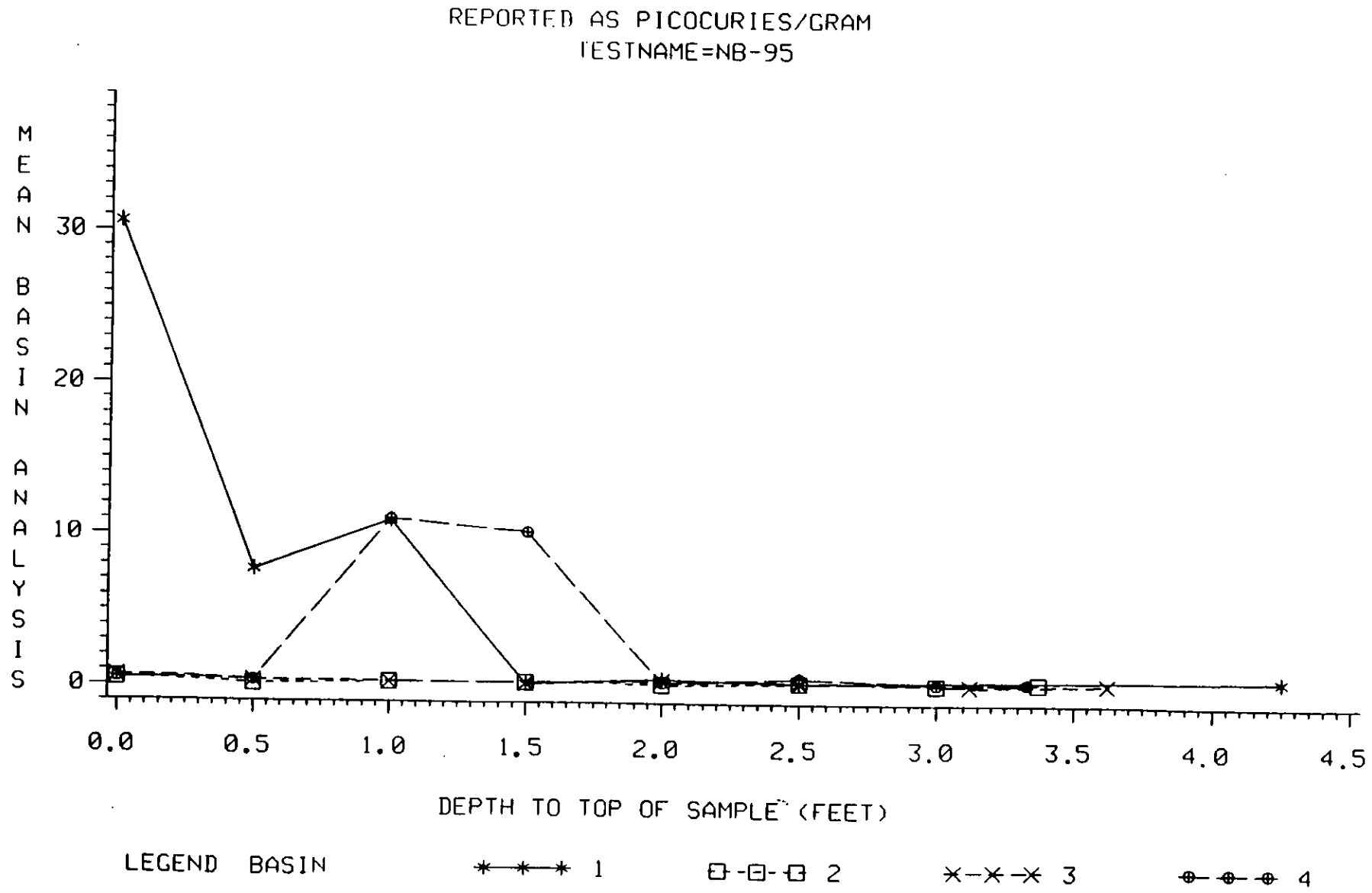

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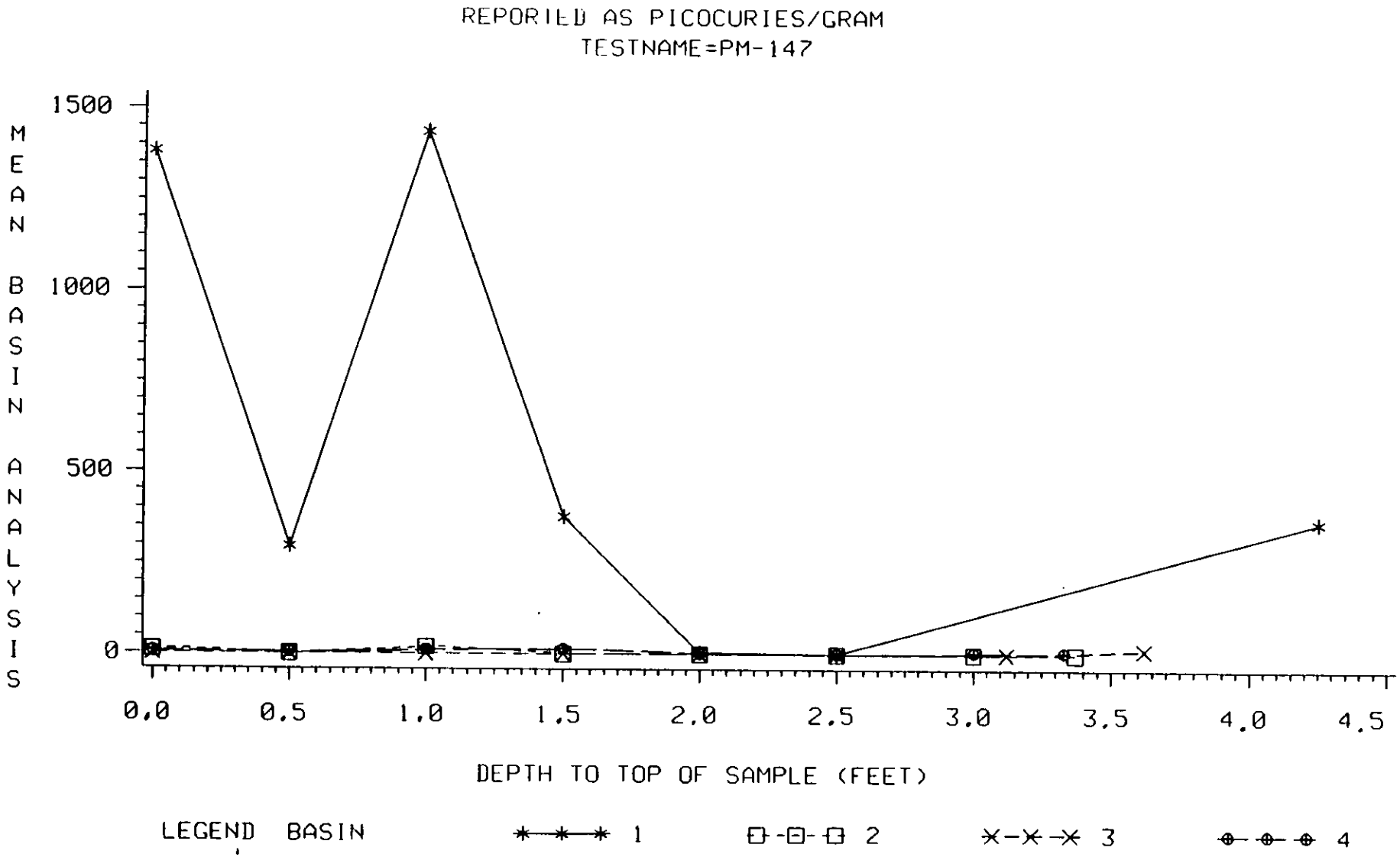
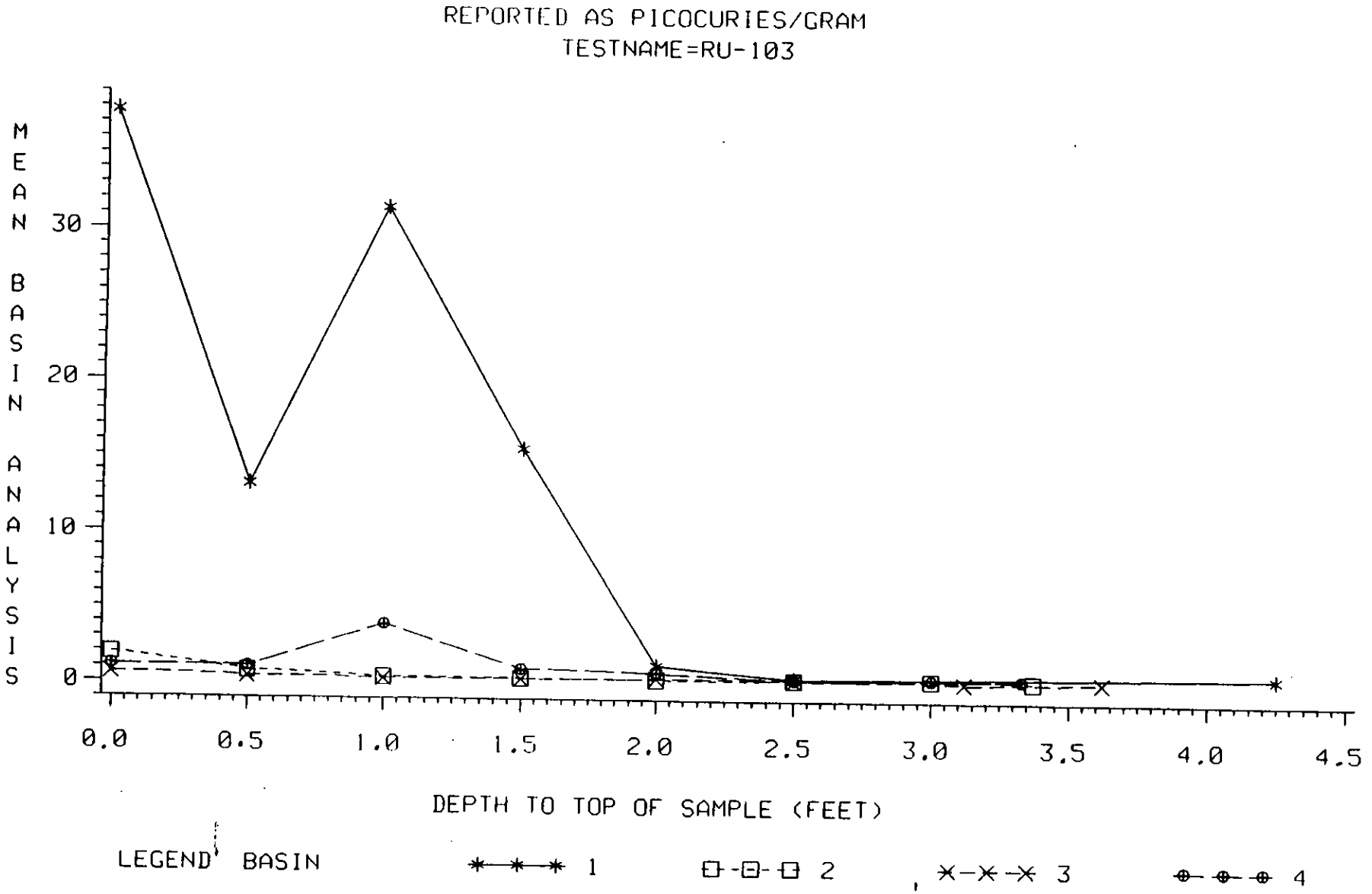


H-AREA SEEPAGE BASINS RADIONUCLIDE ANALYSES



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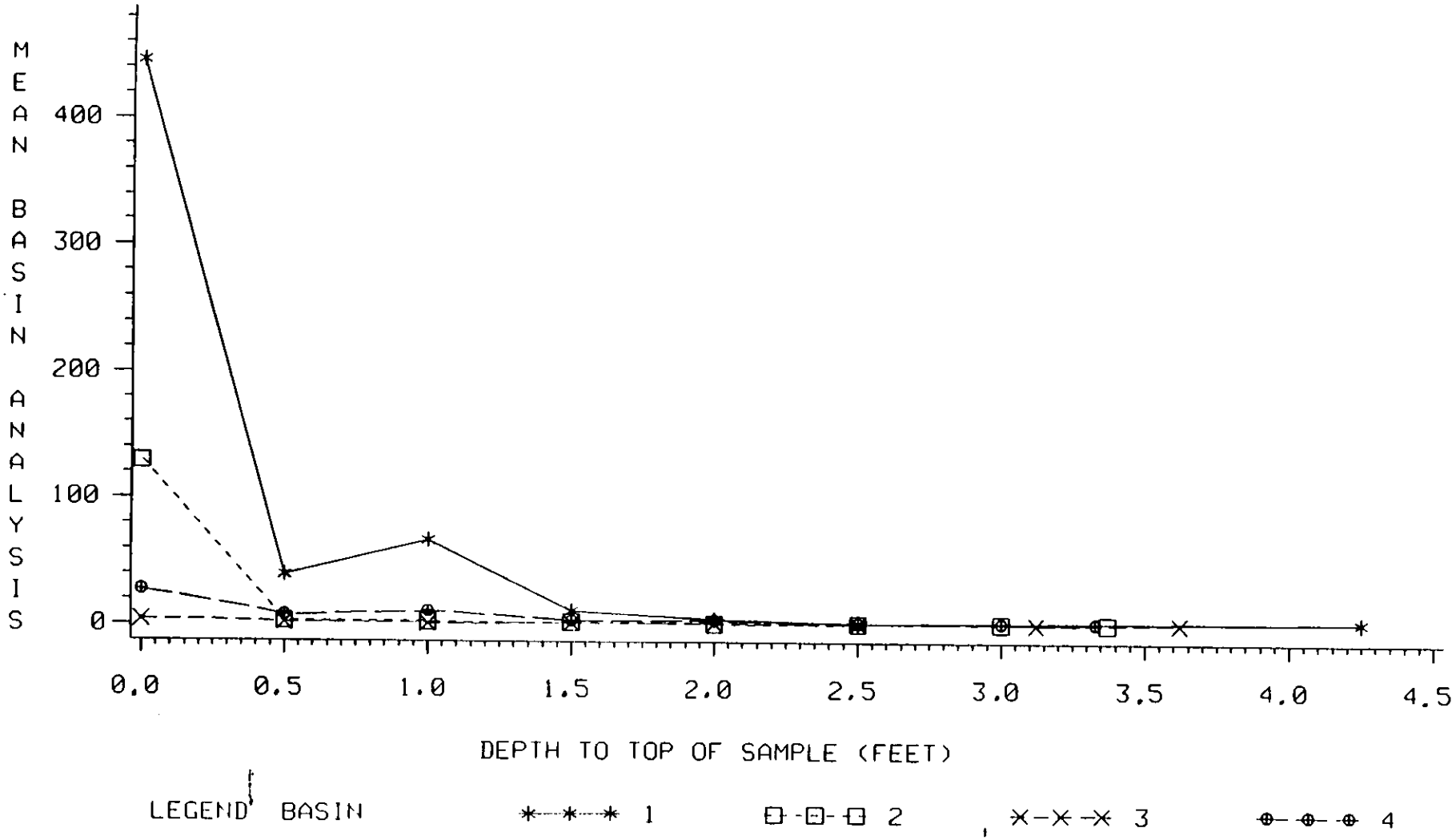

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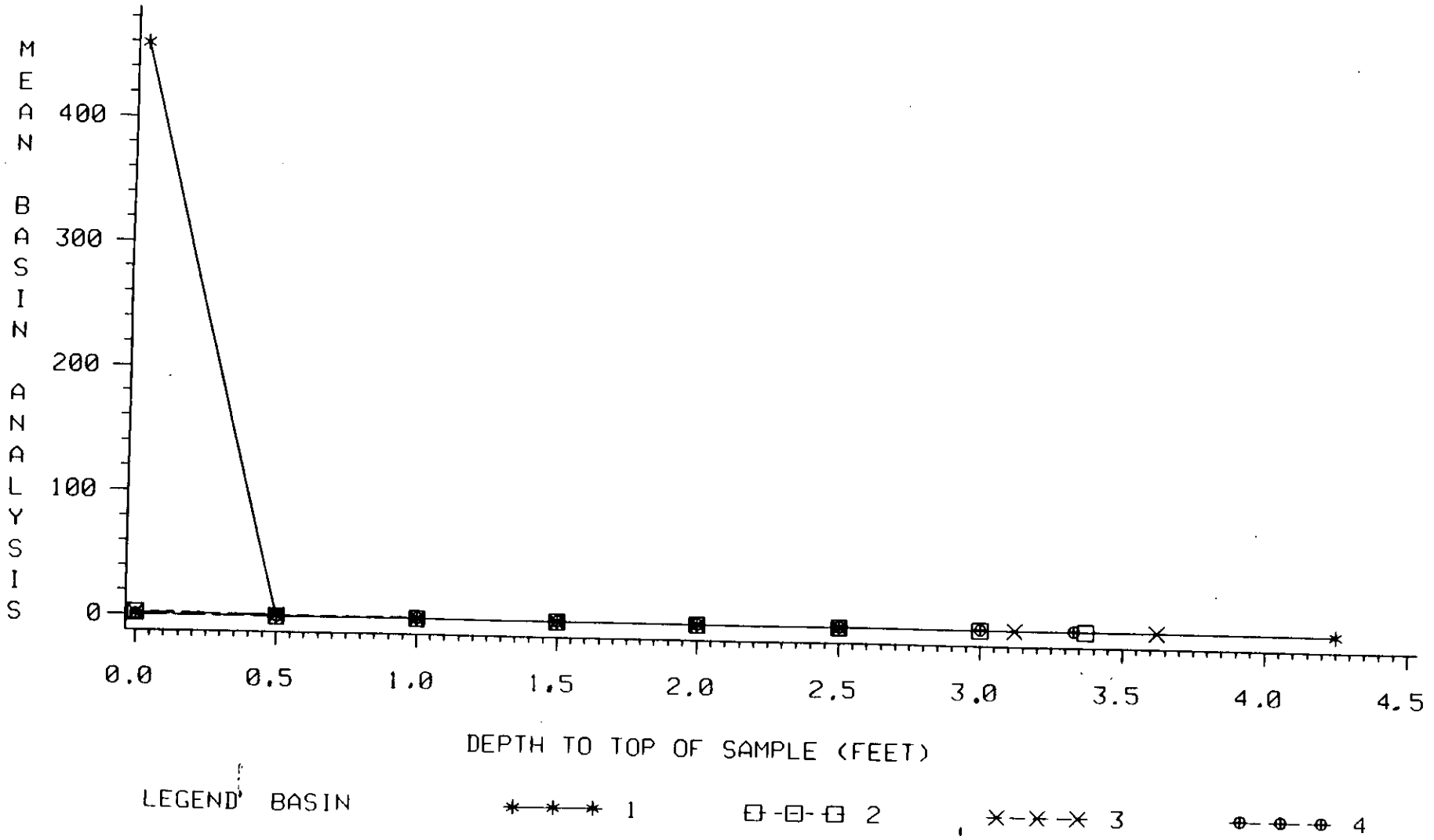

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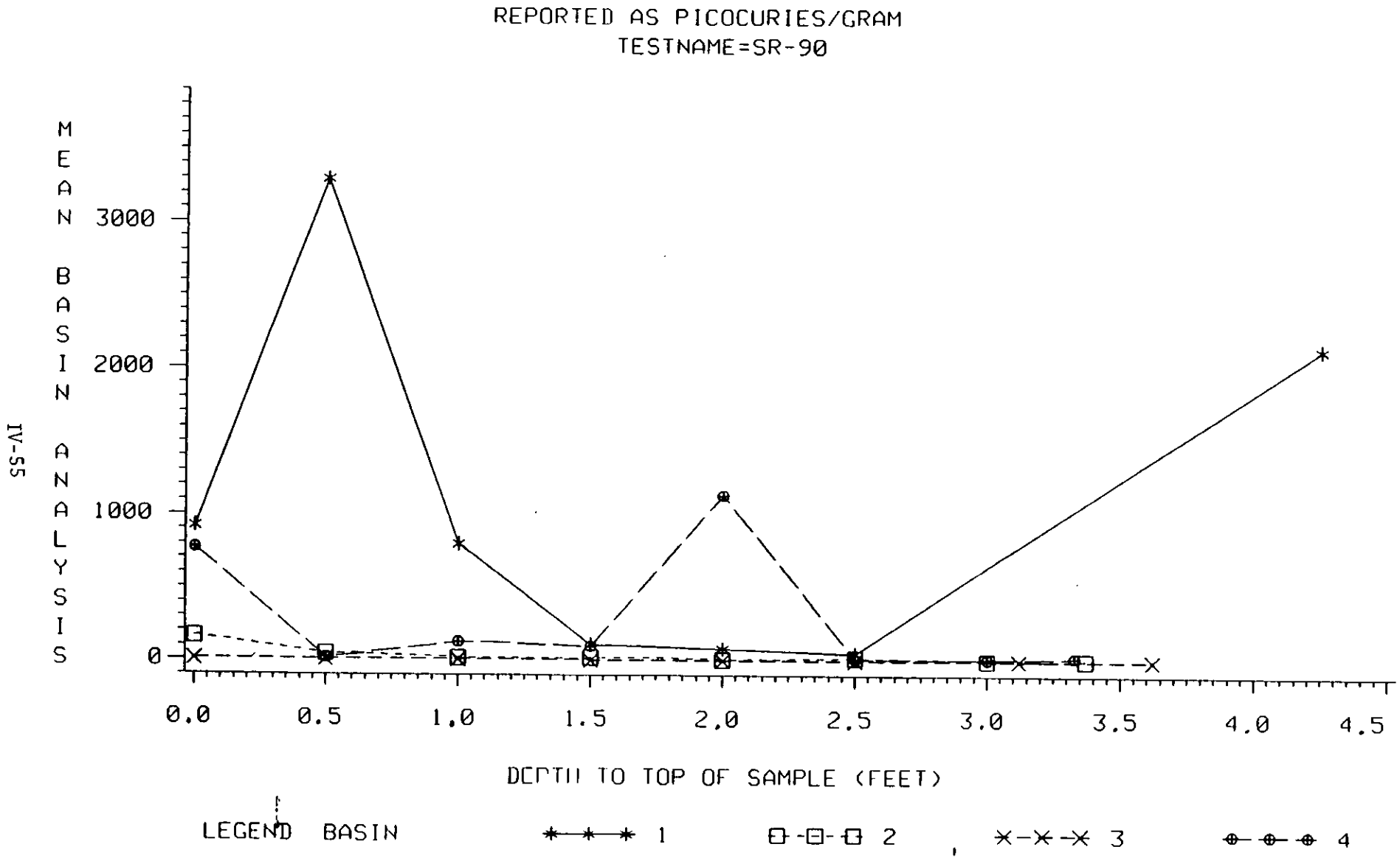

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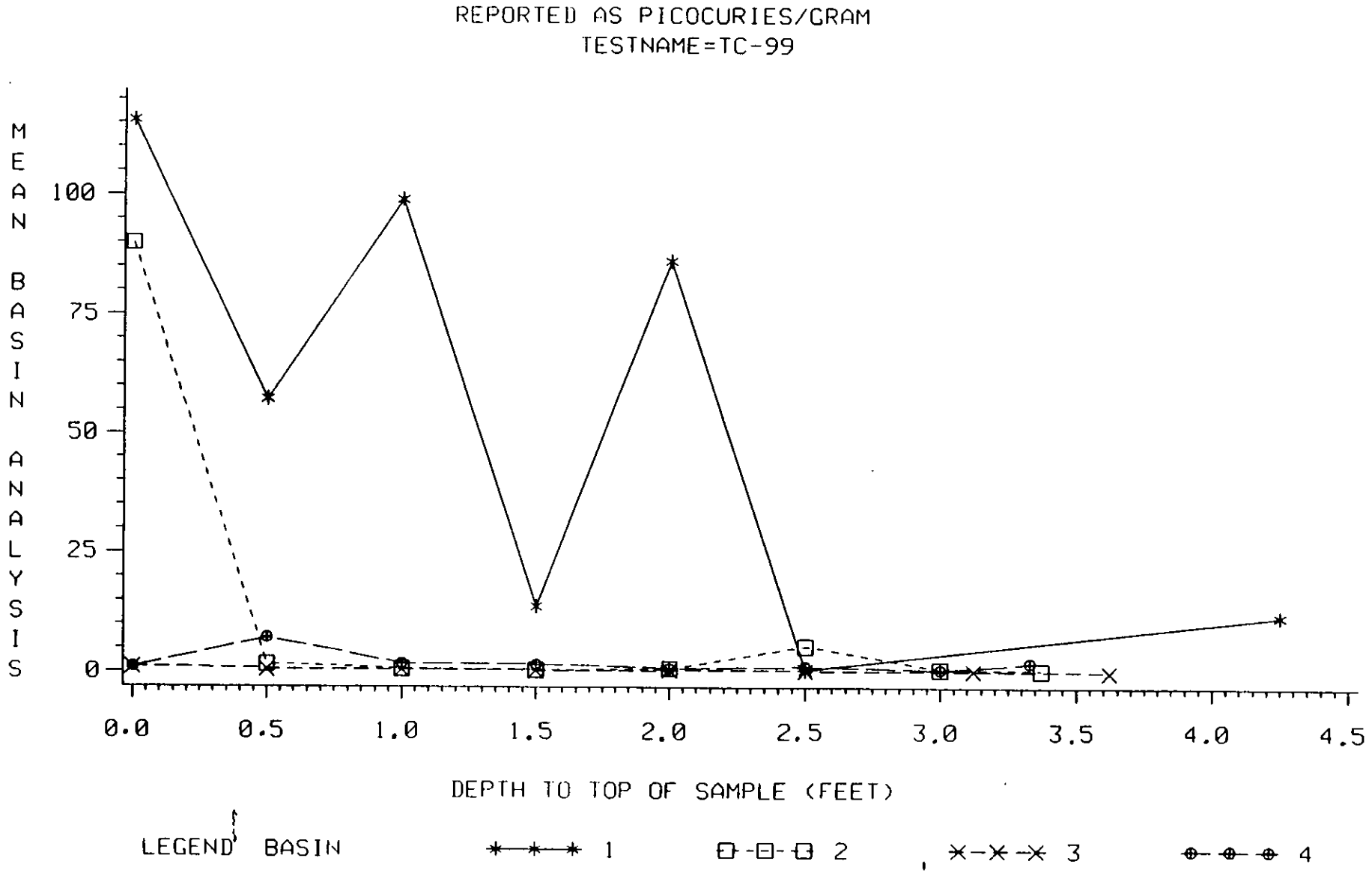

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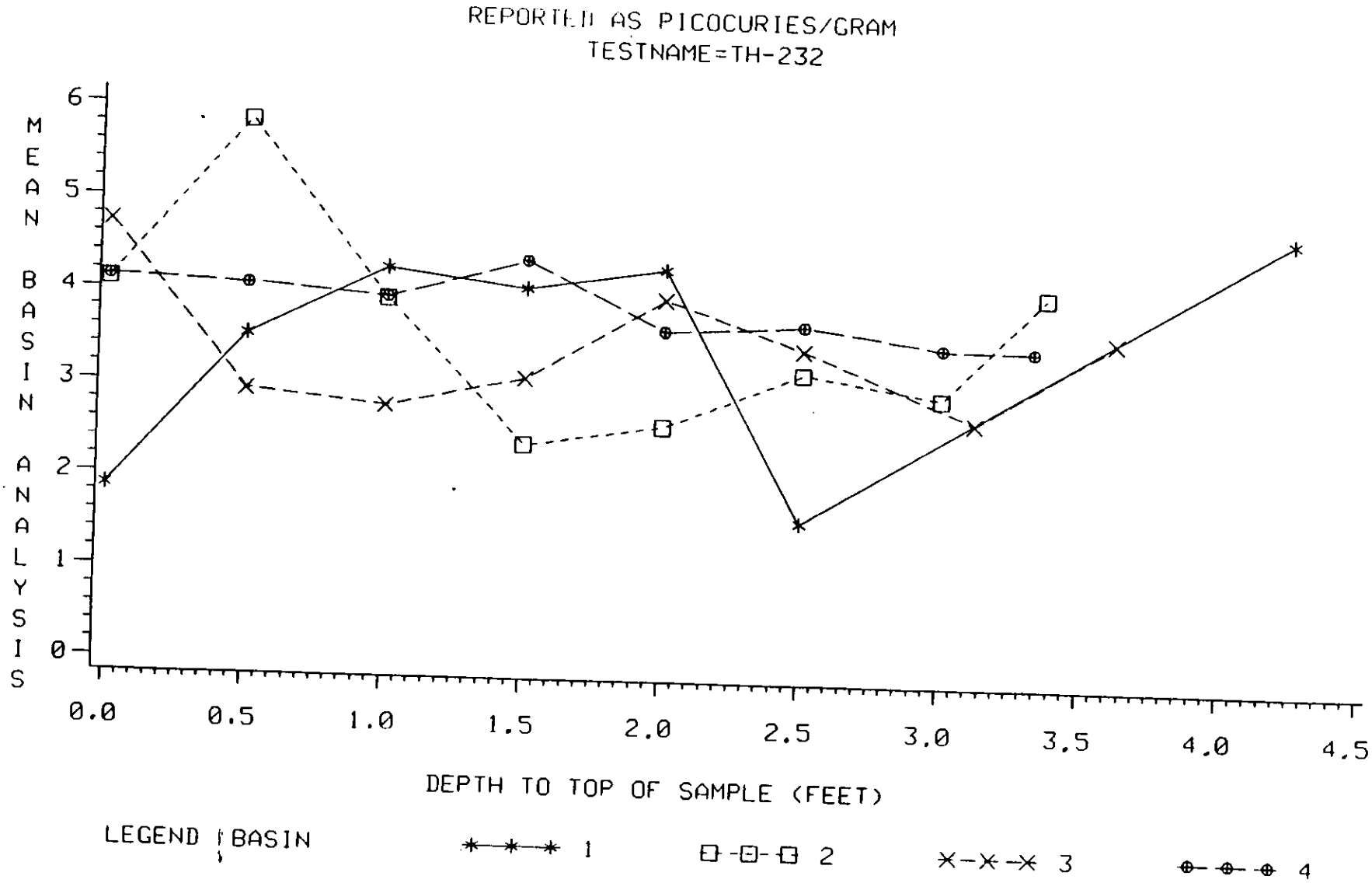

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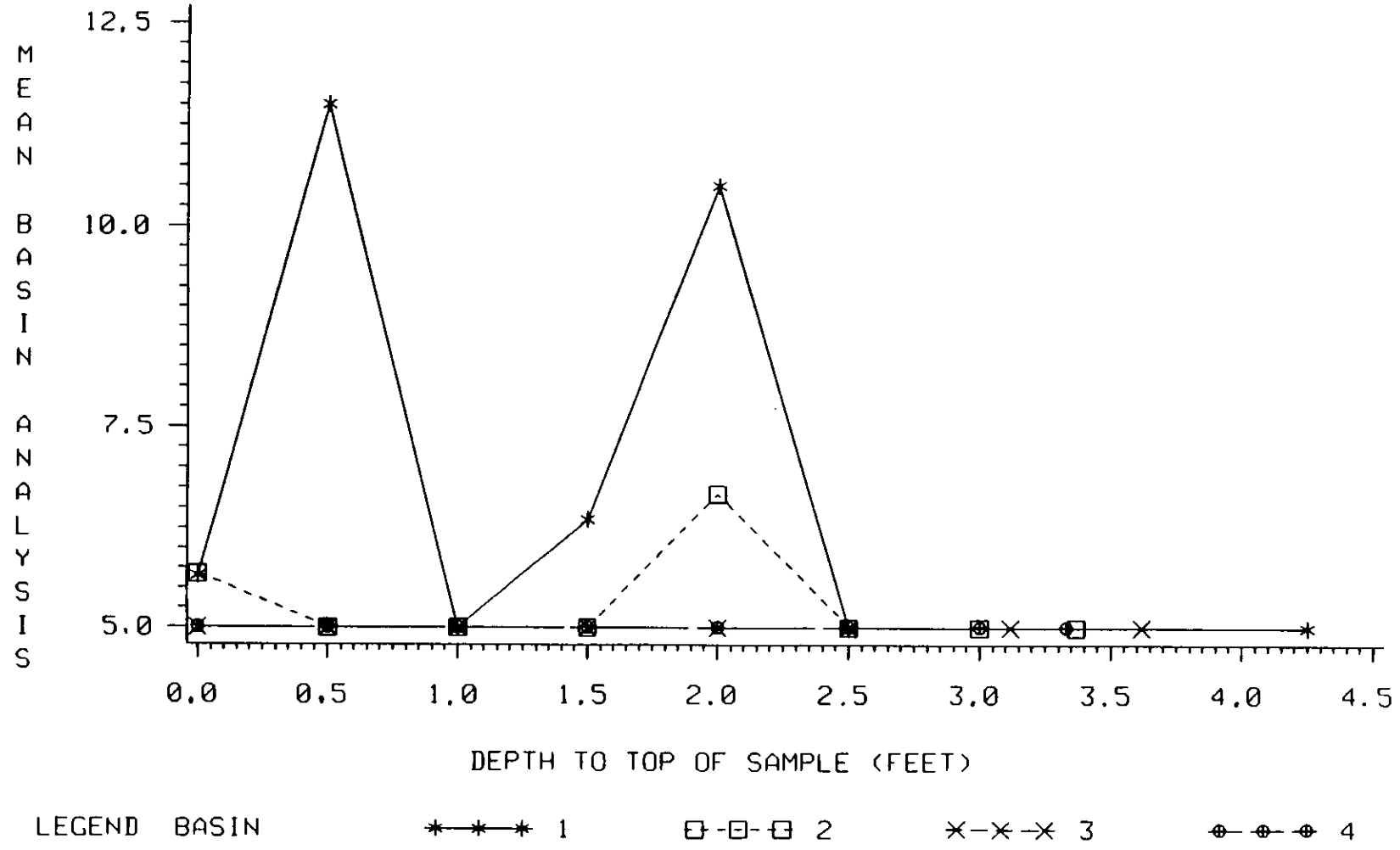

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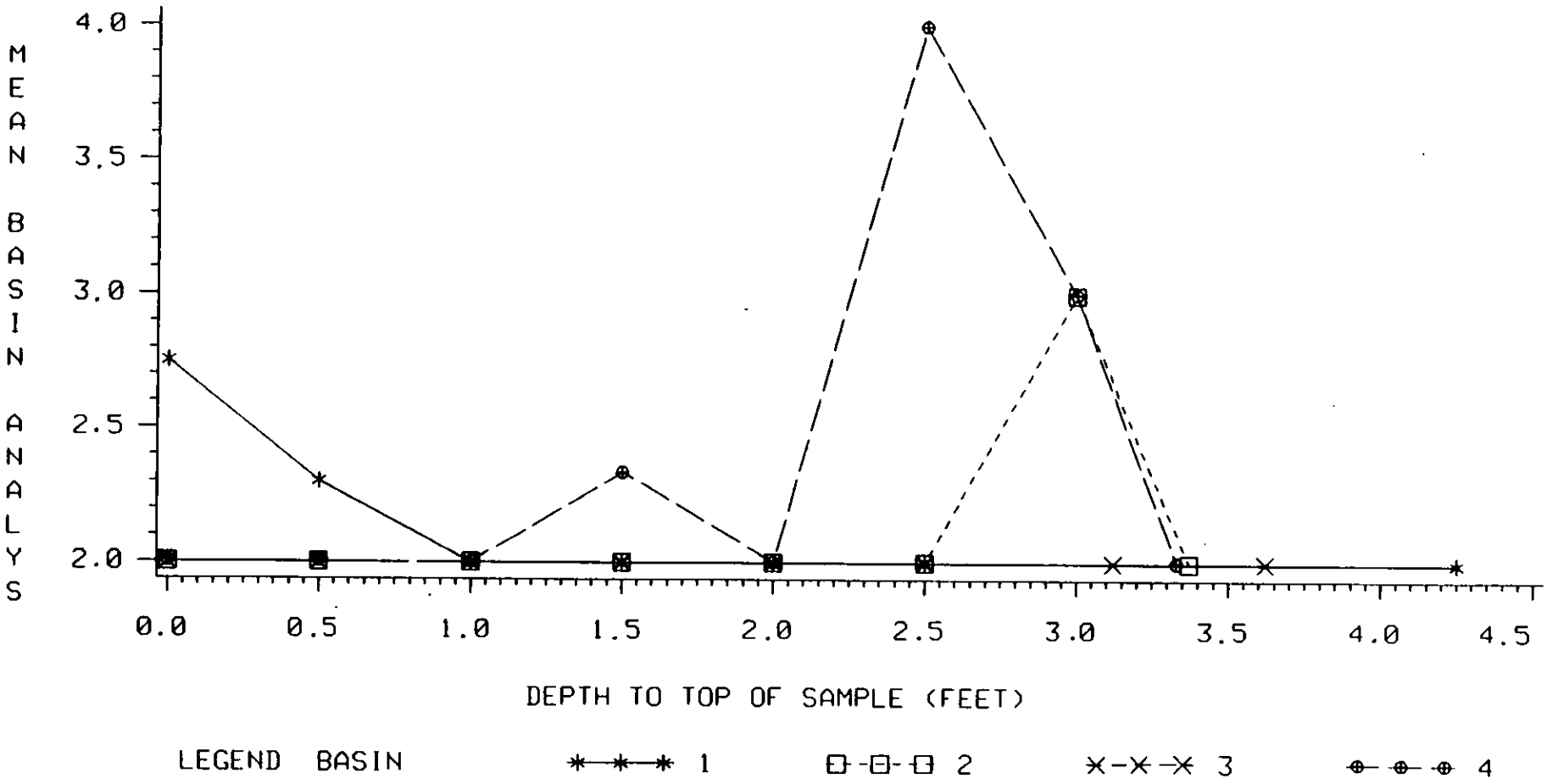

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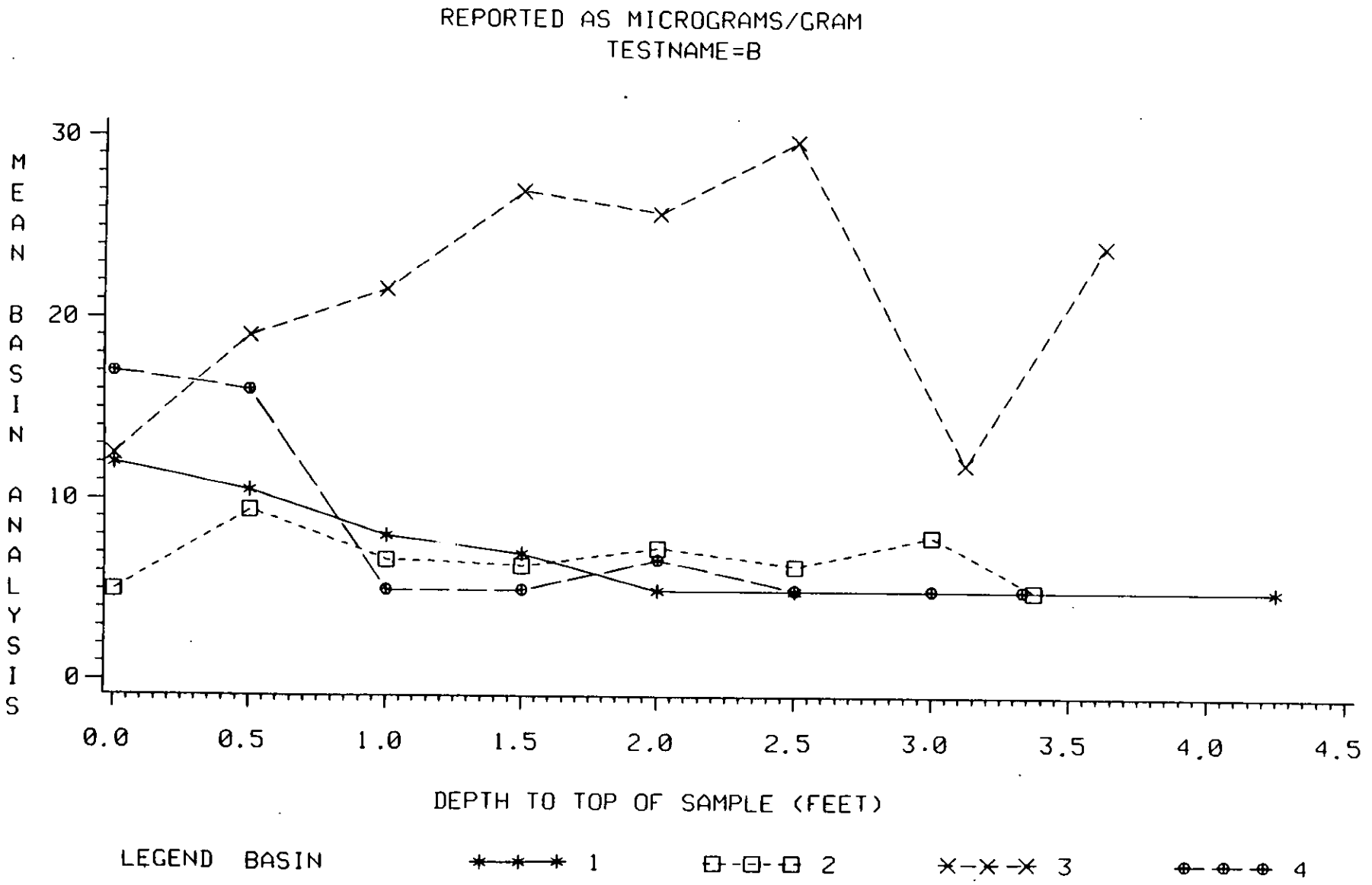

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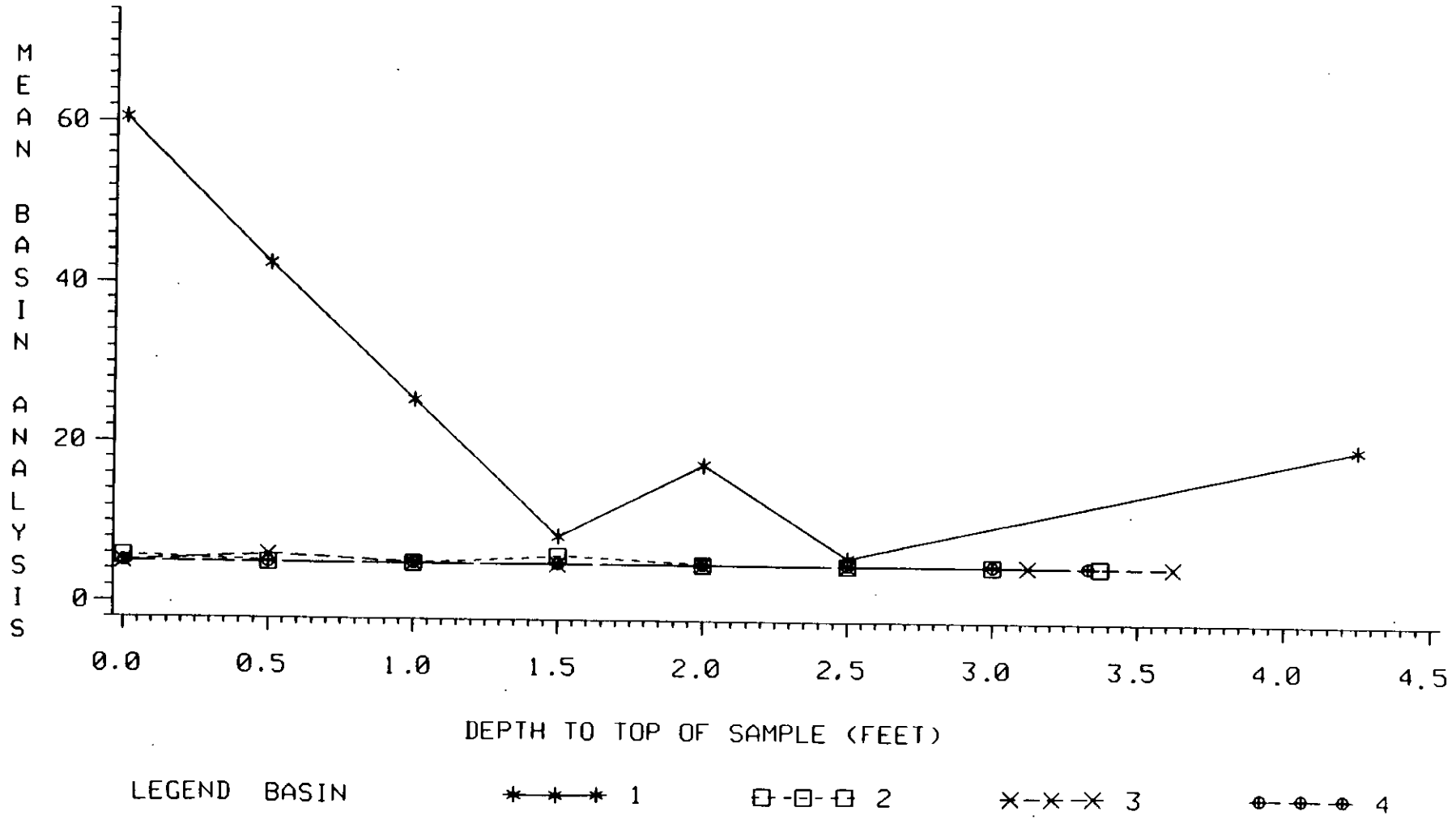

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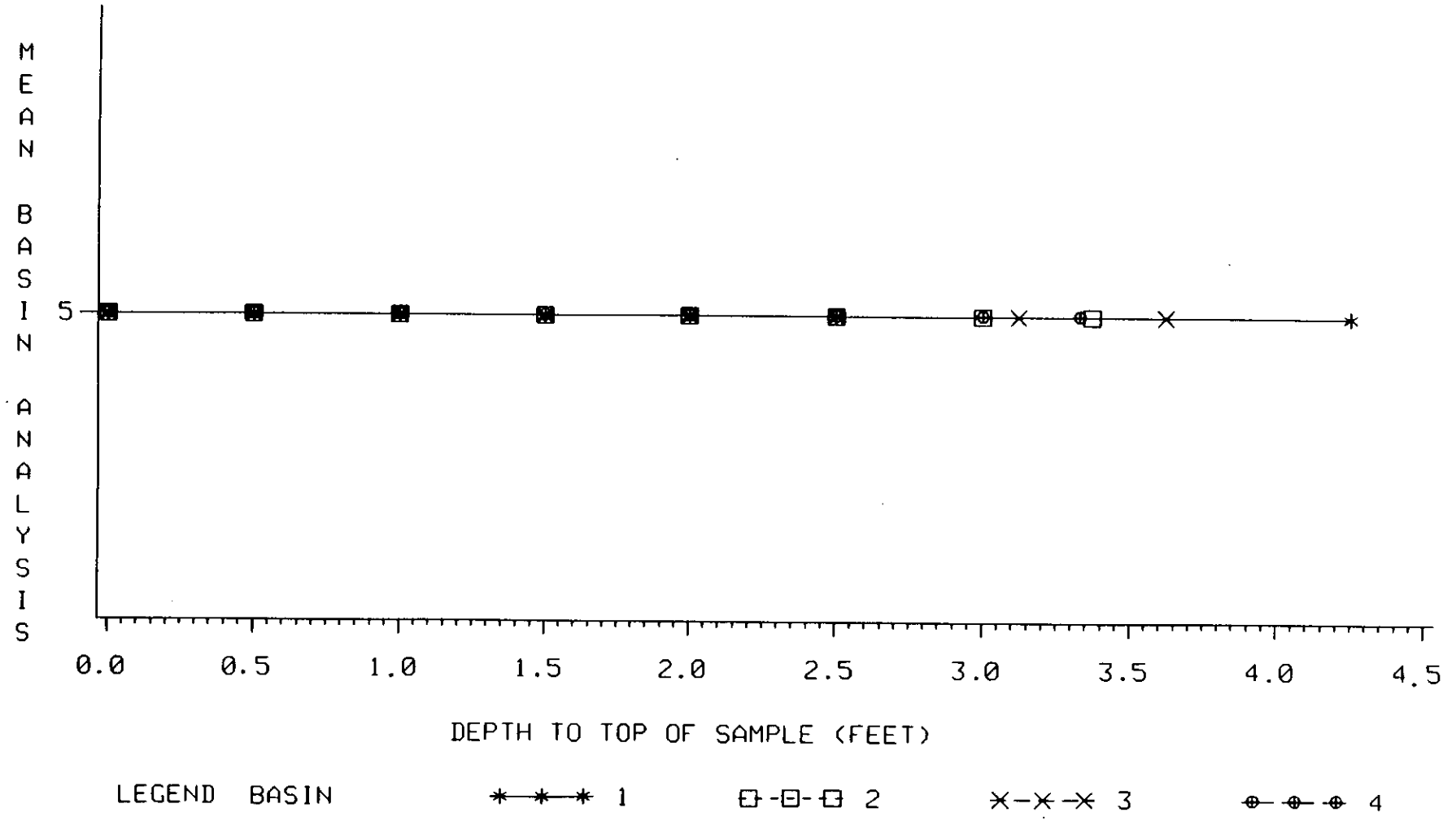

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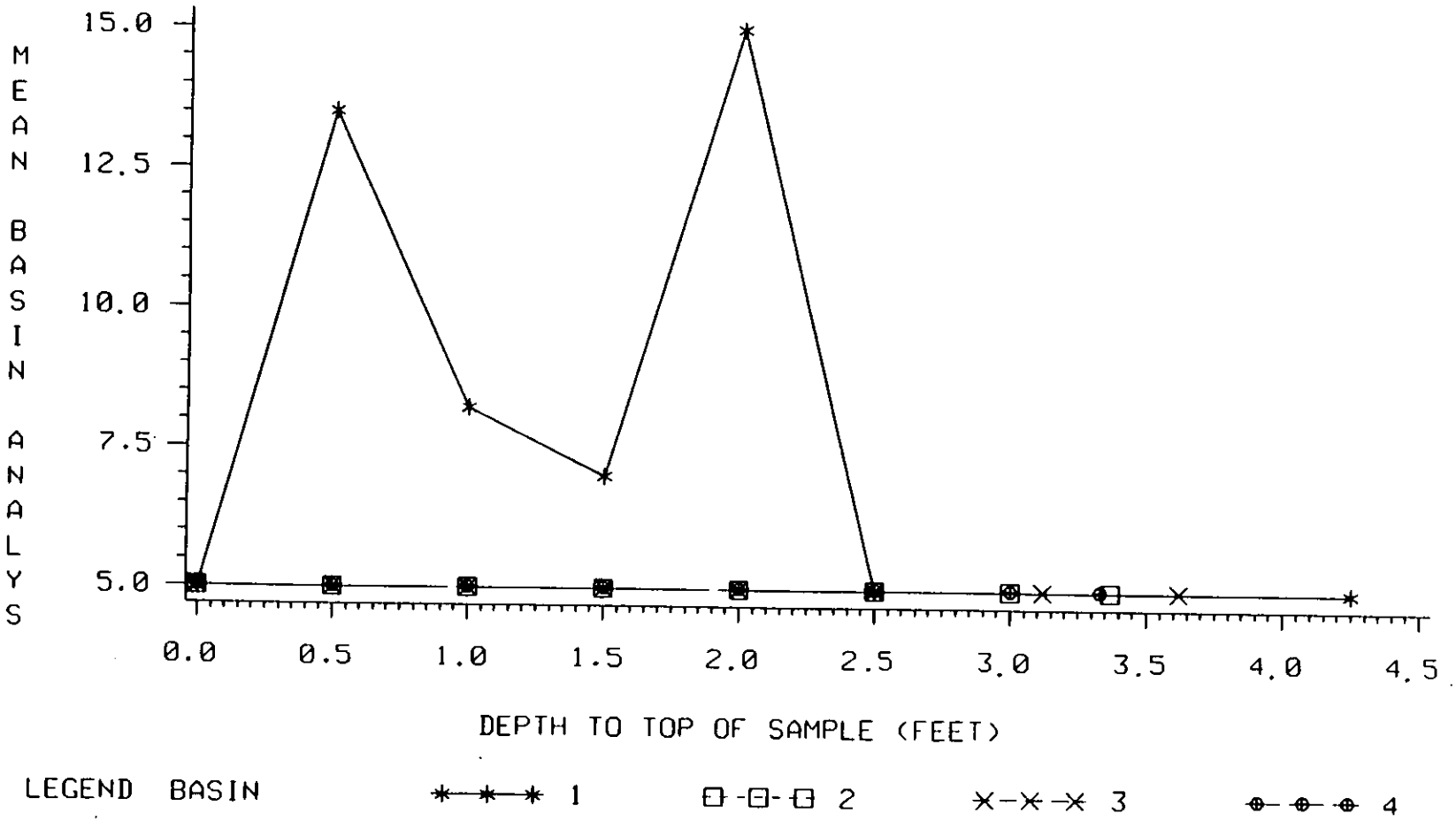

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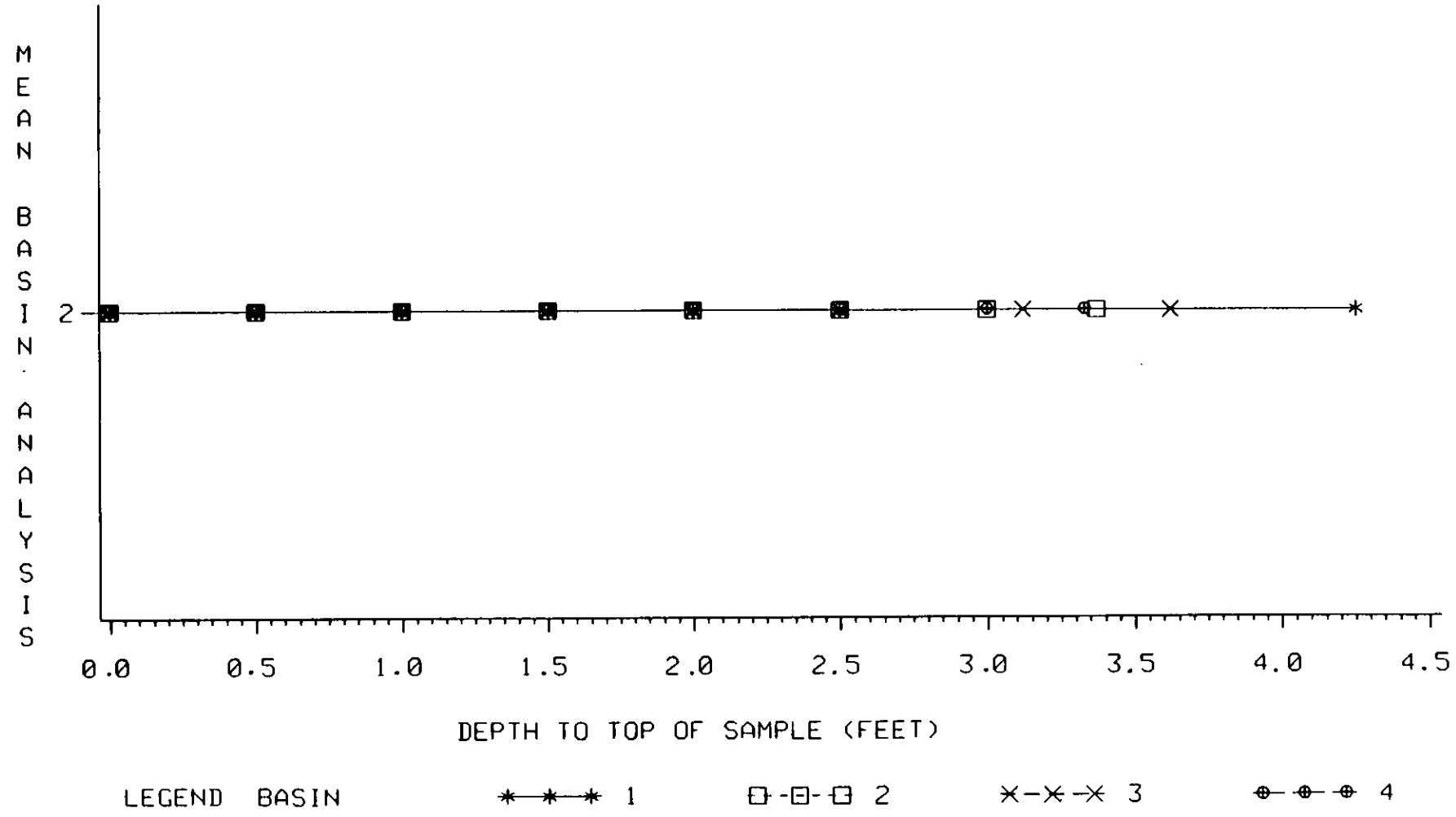

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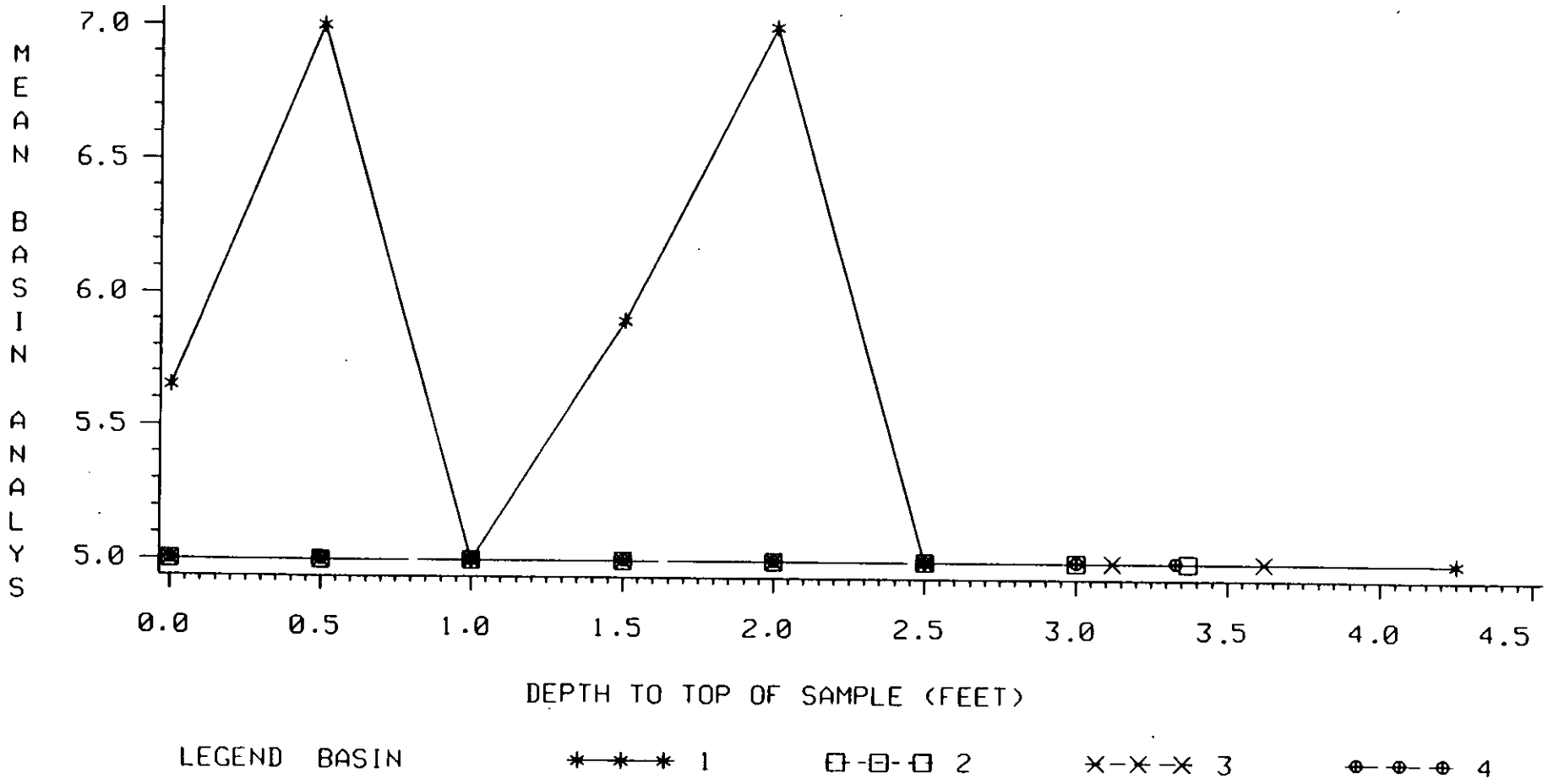

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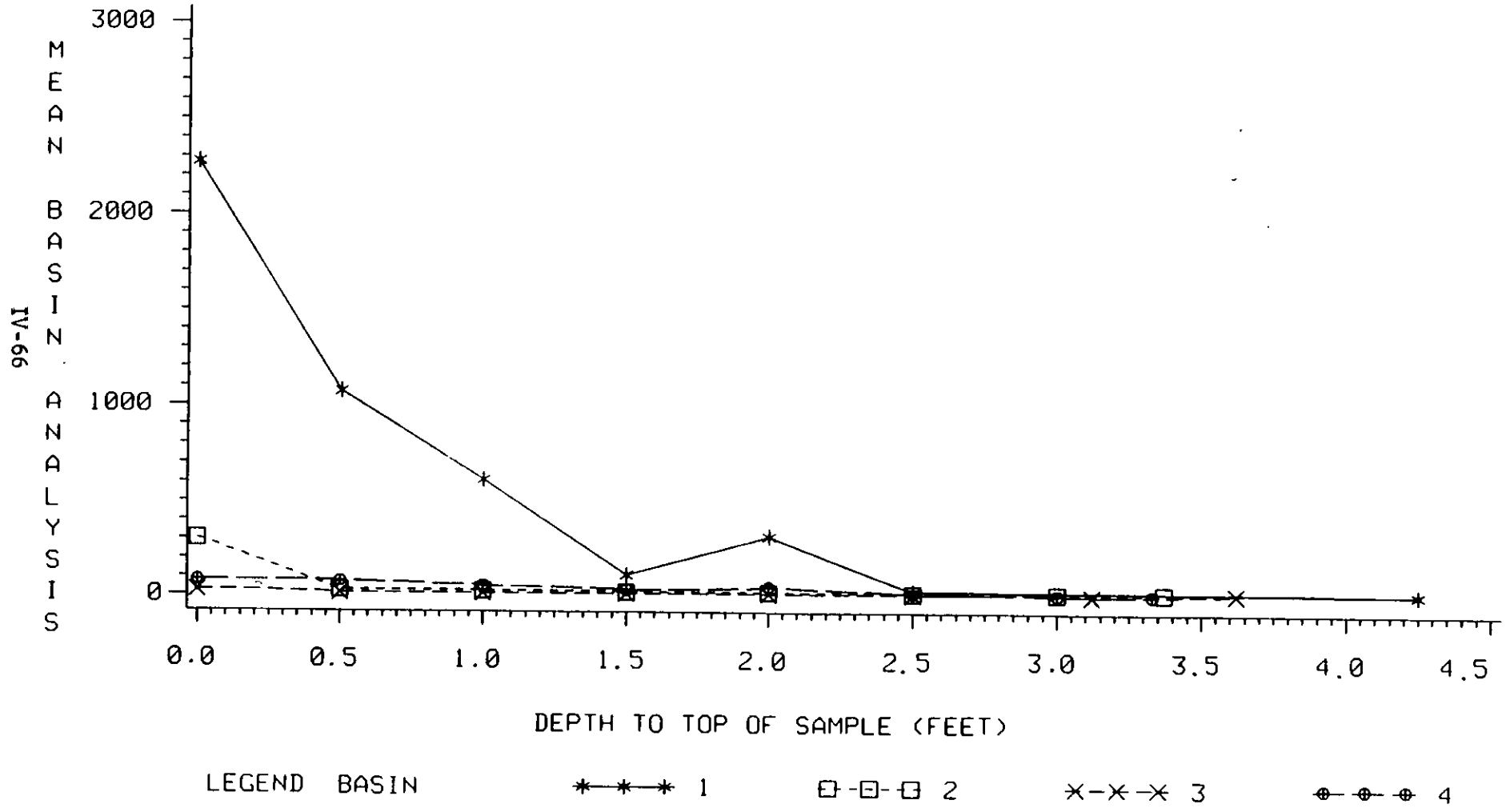

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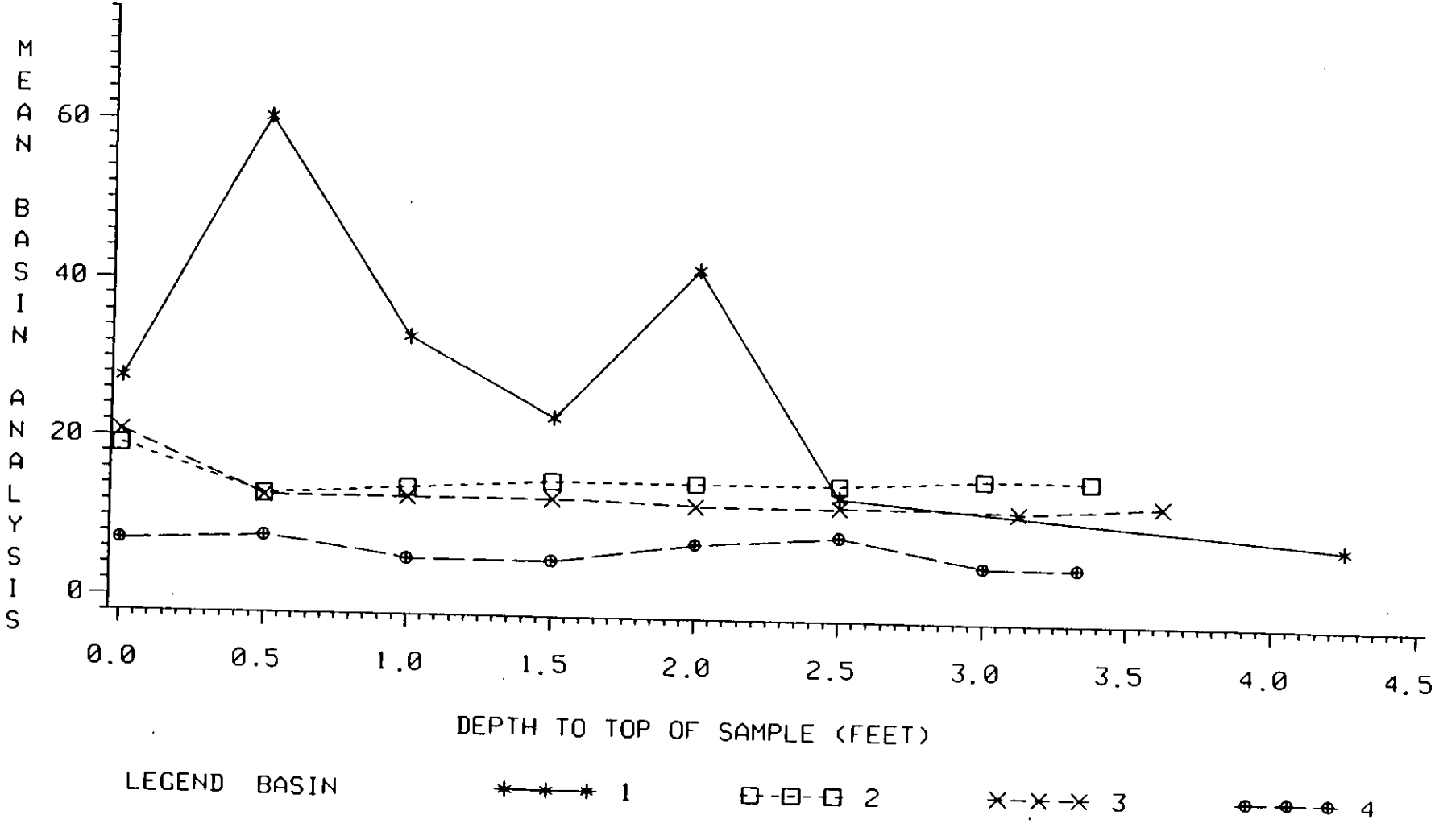

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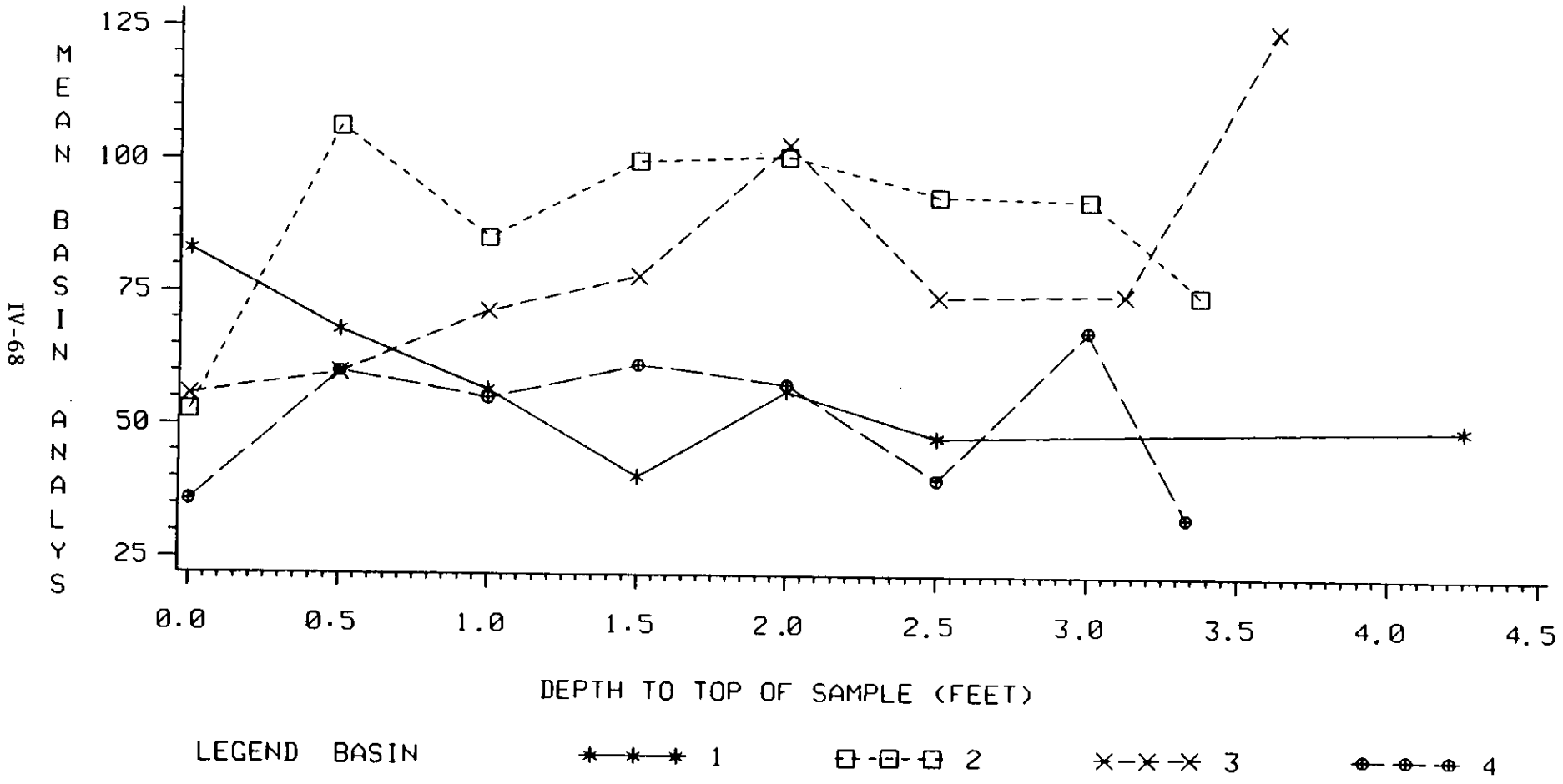

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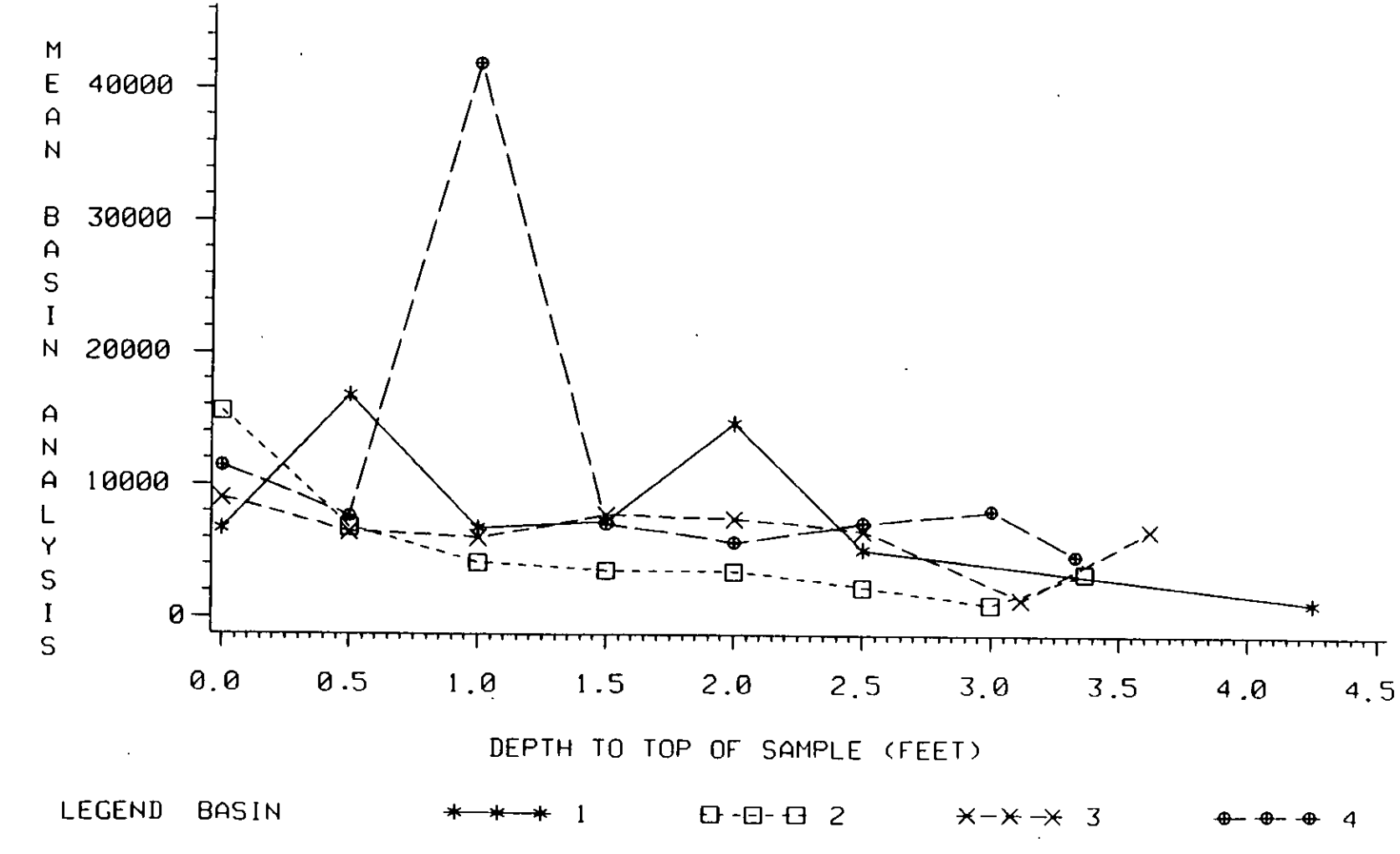

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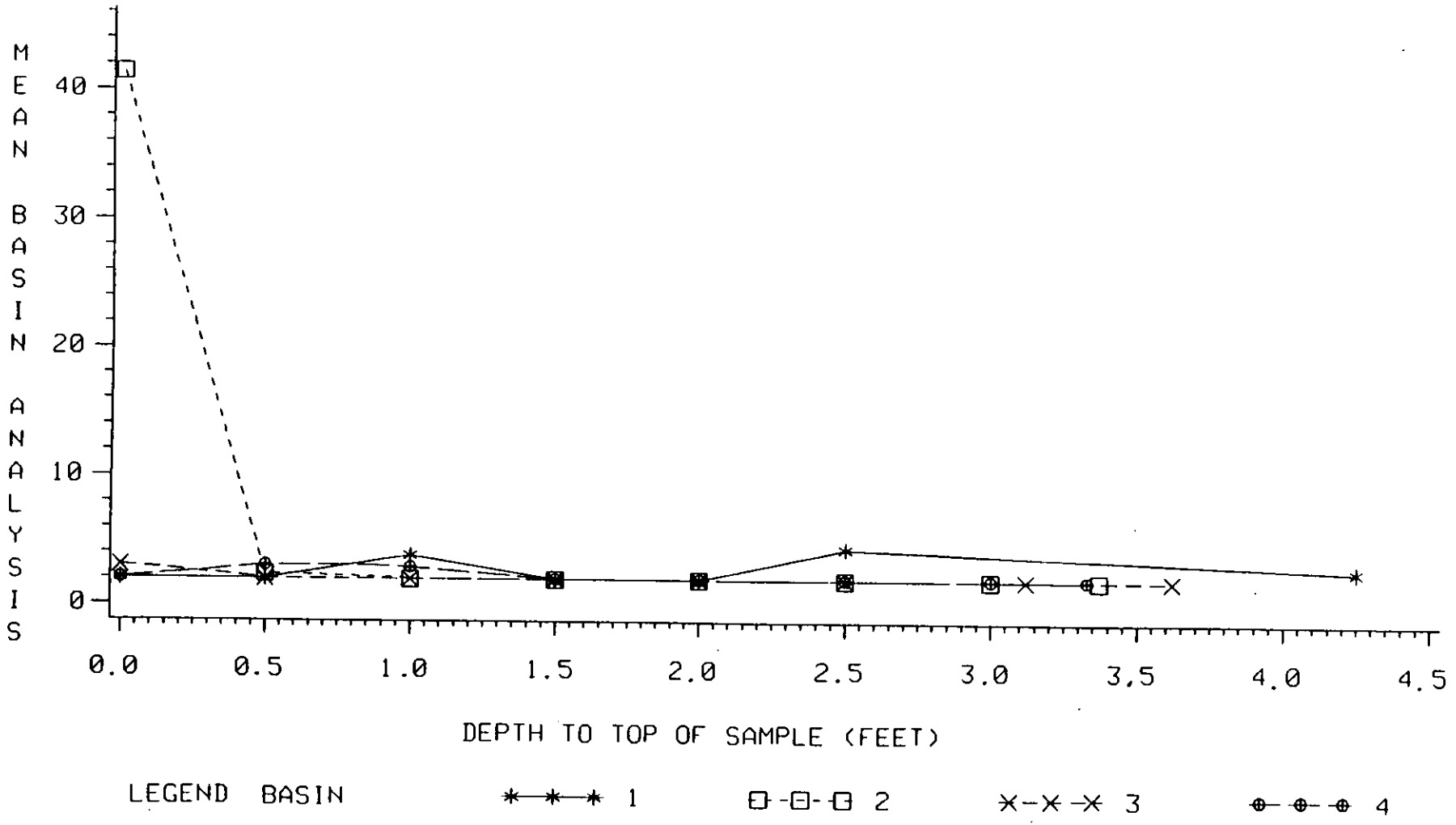

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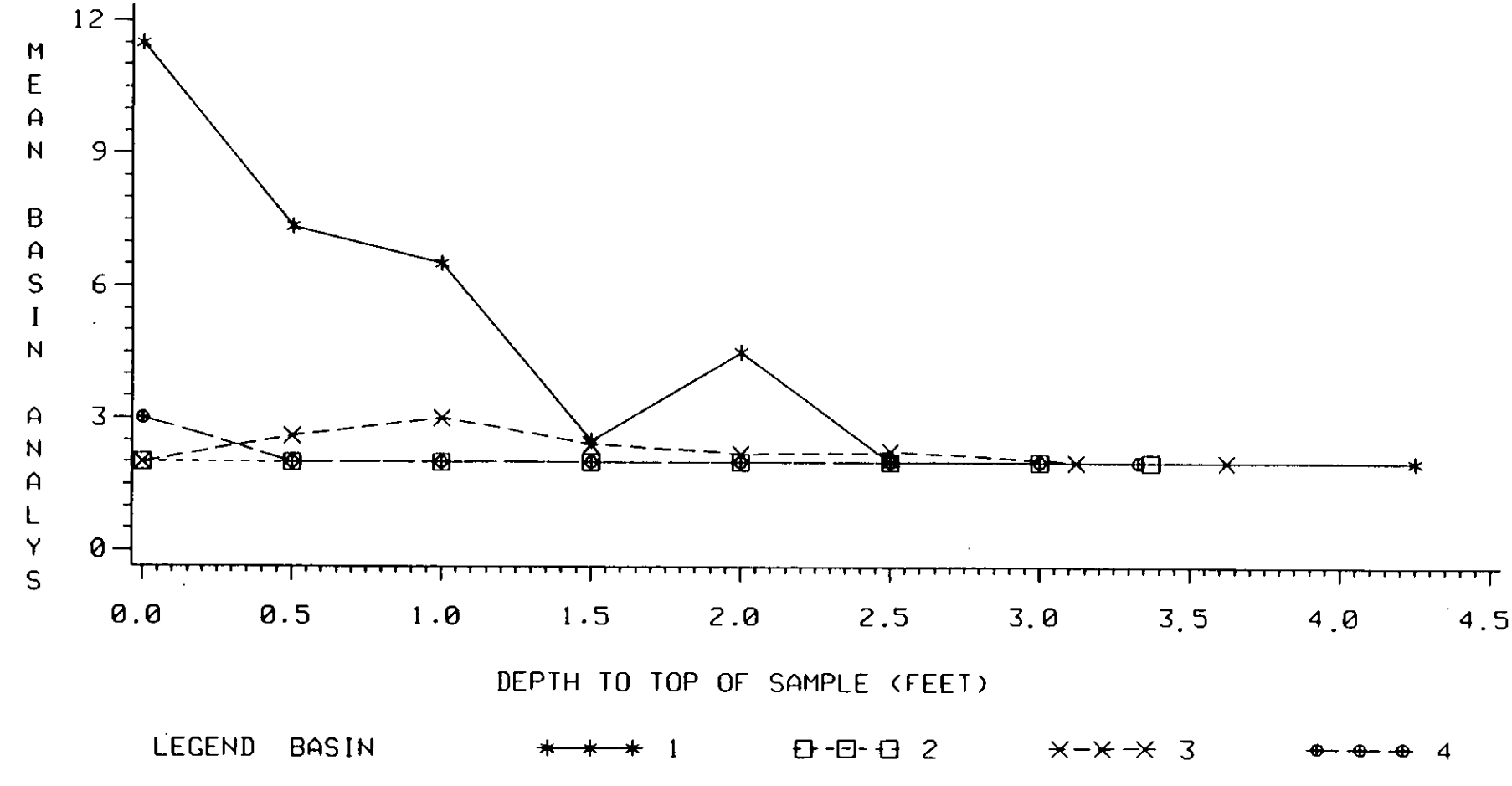

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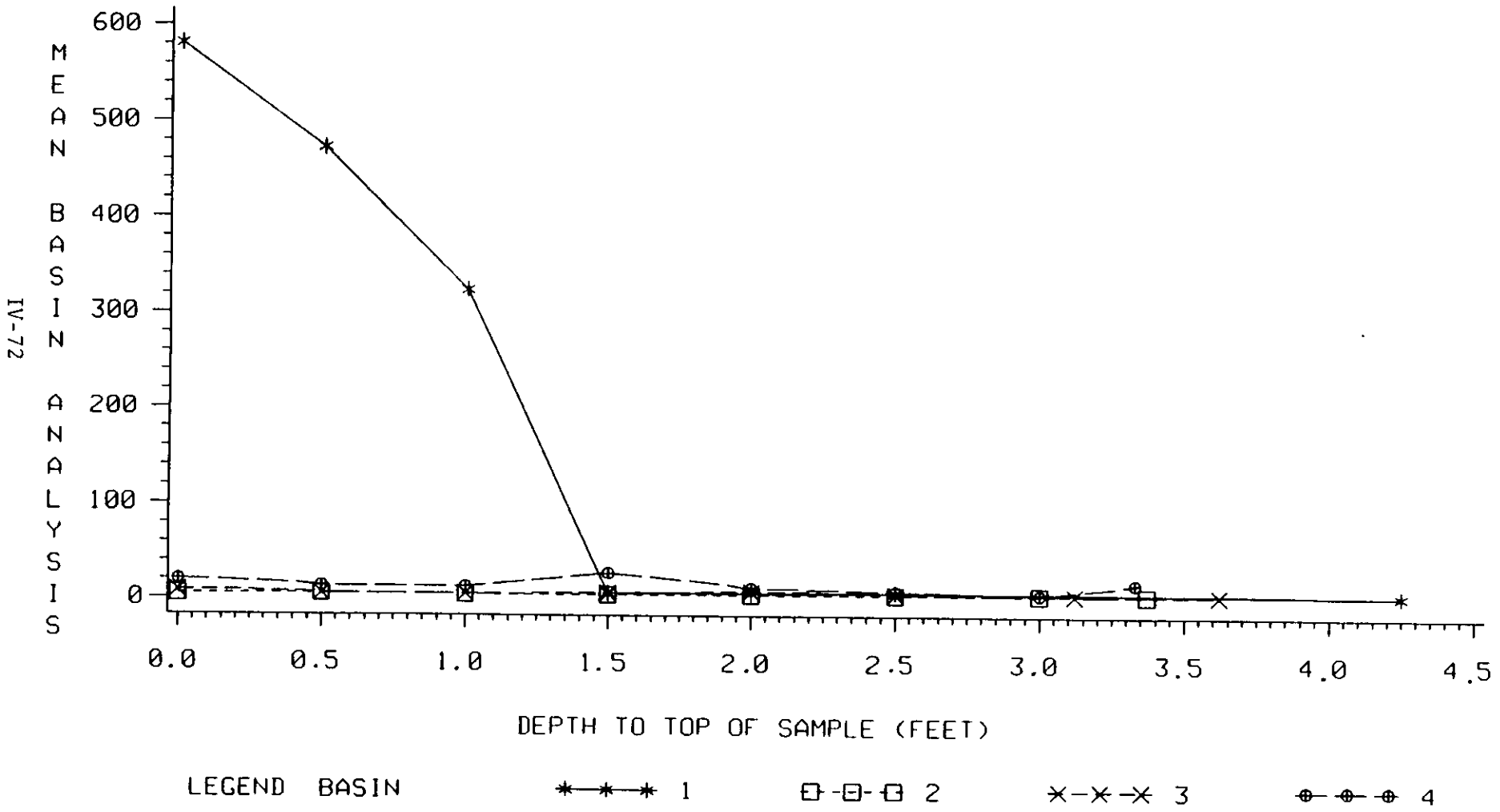

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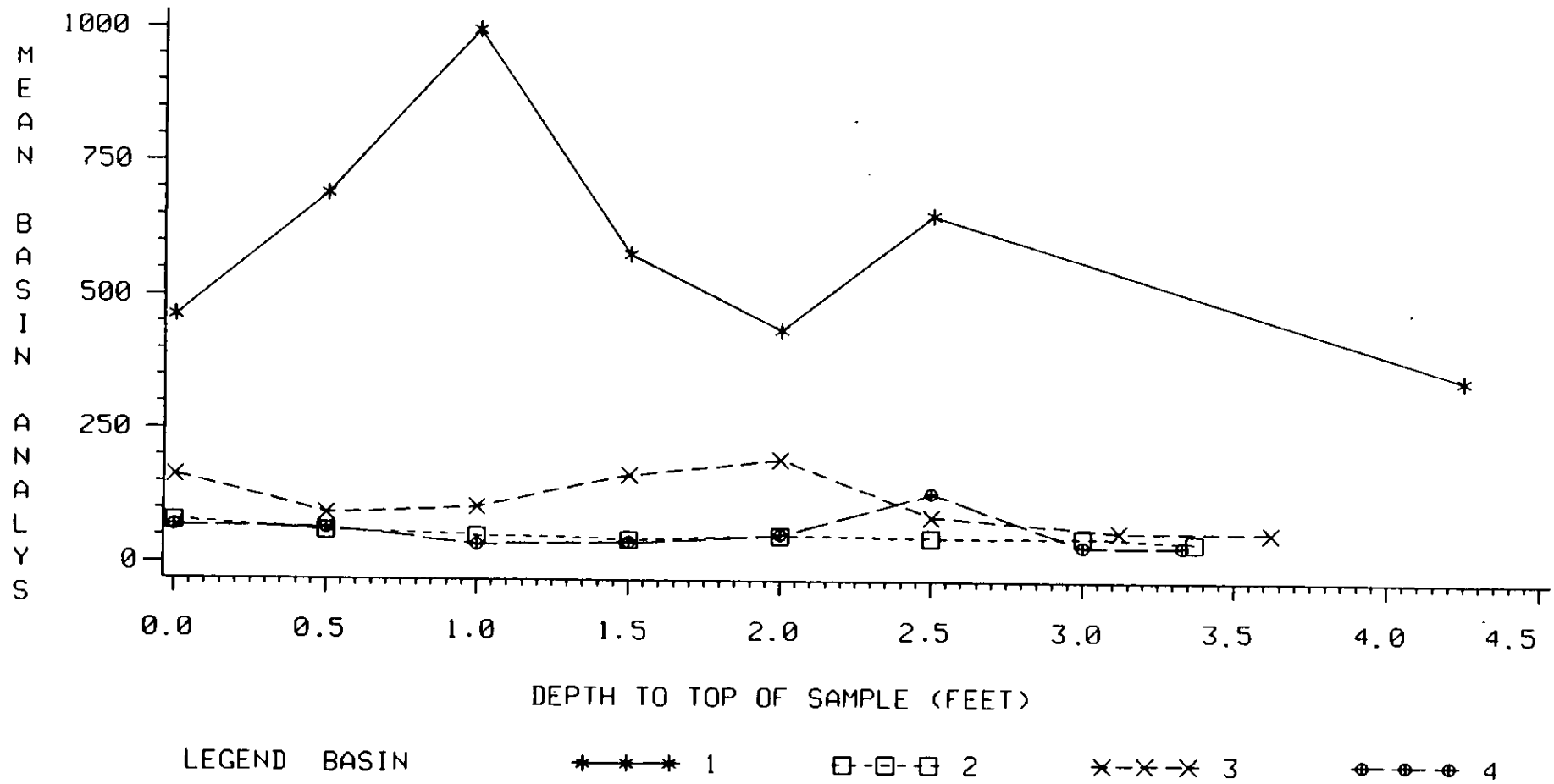

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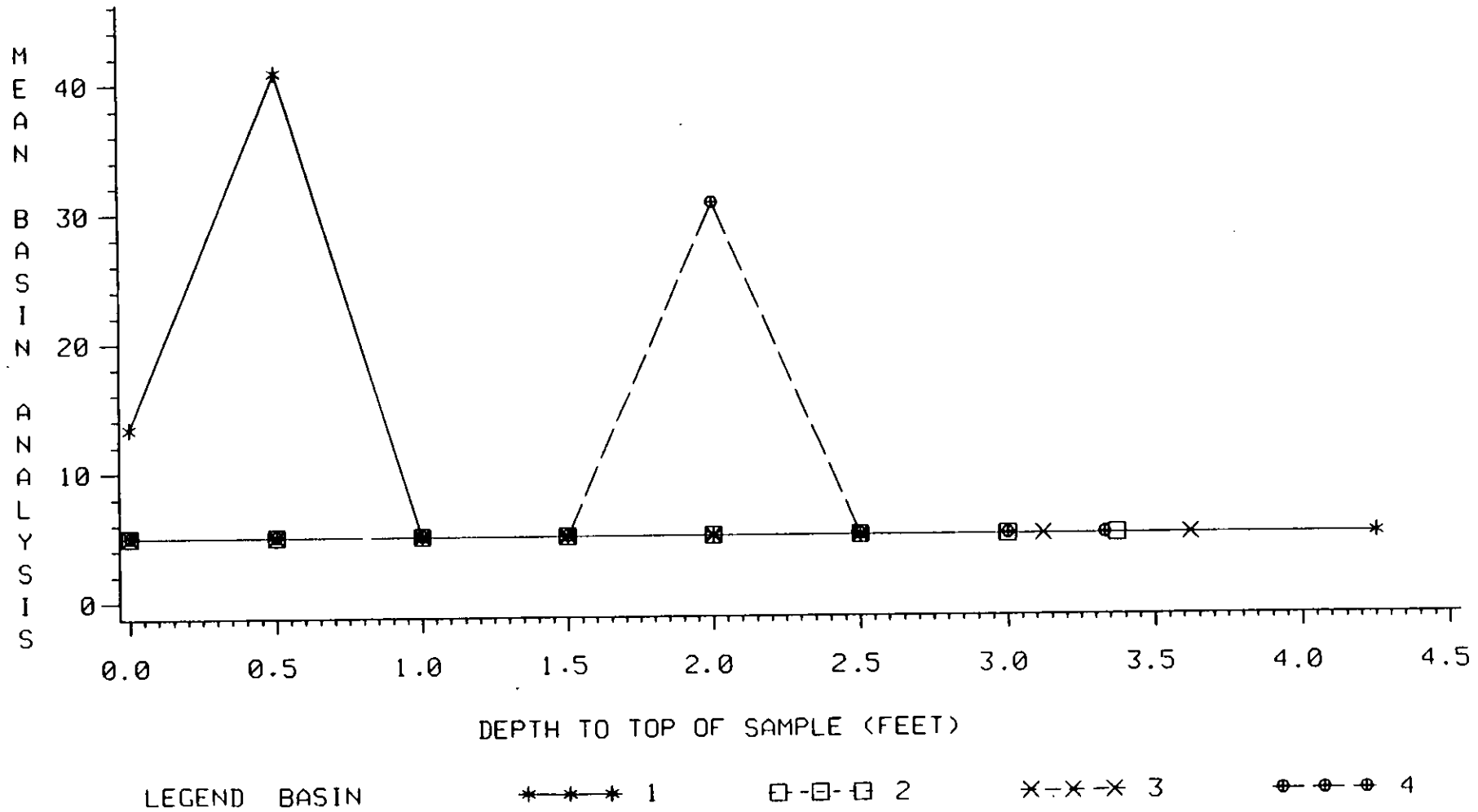

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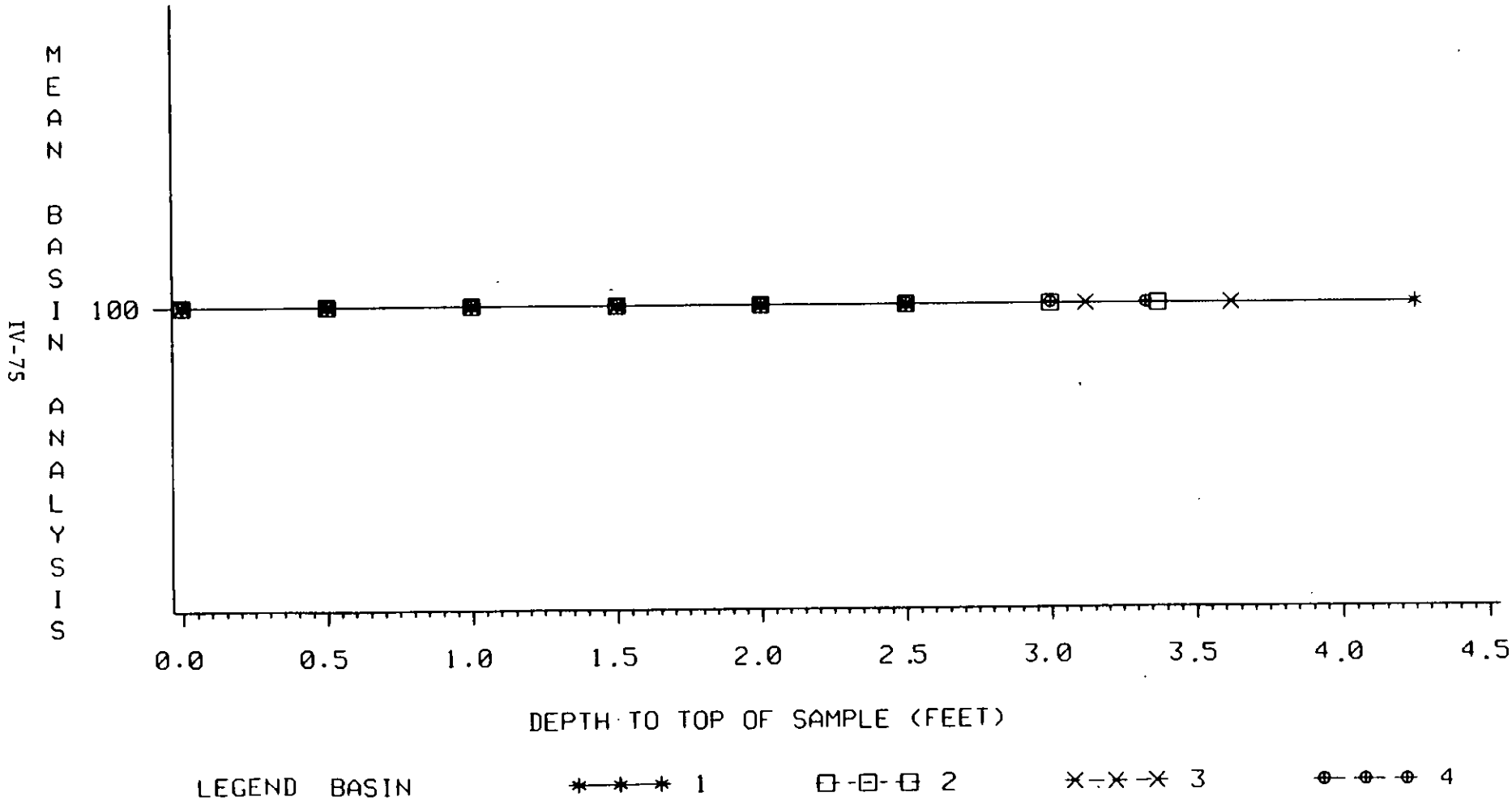

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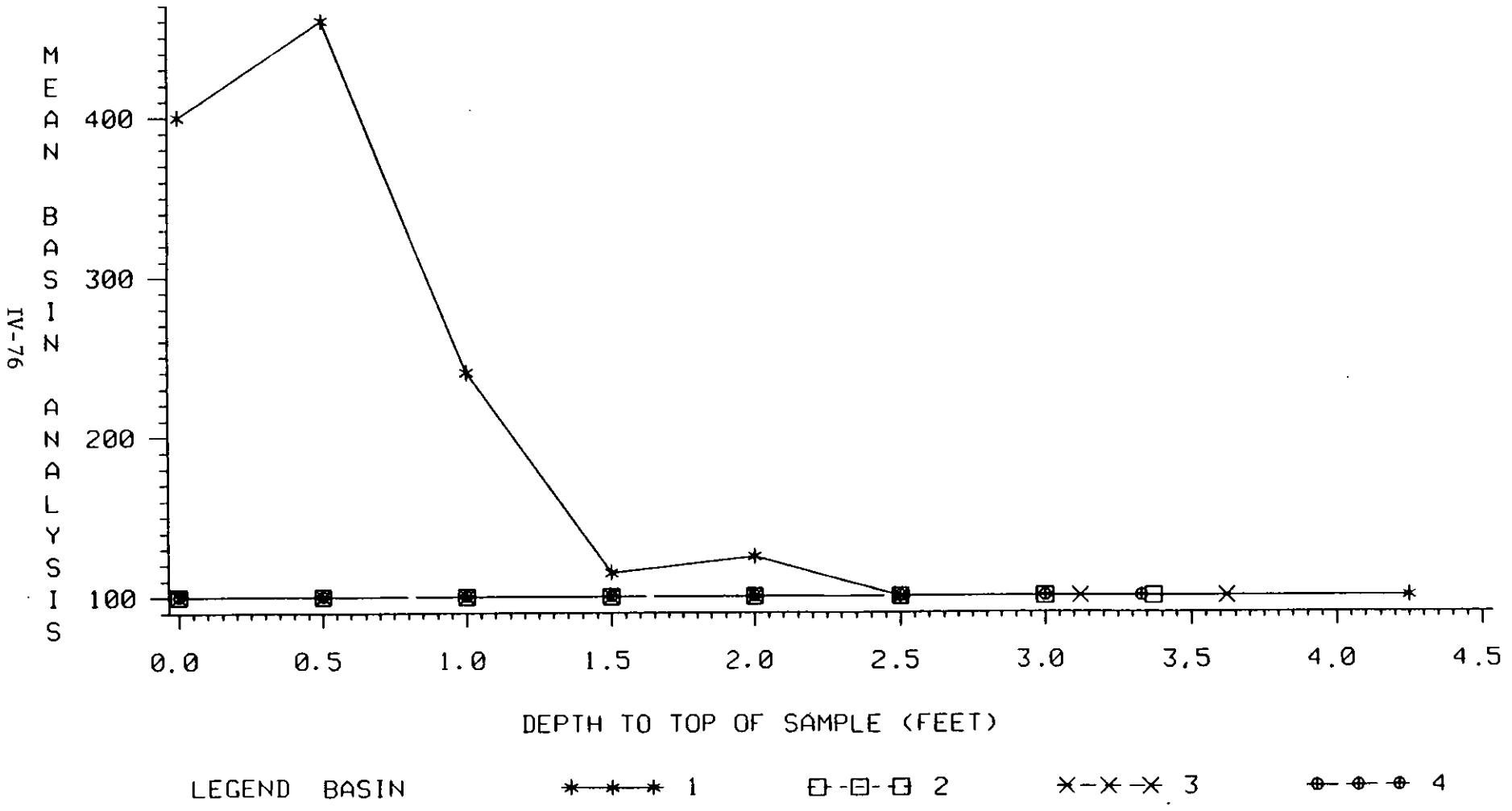

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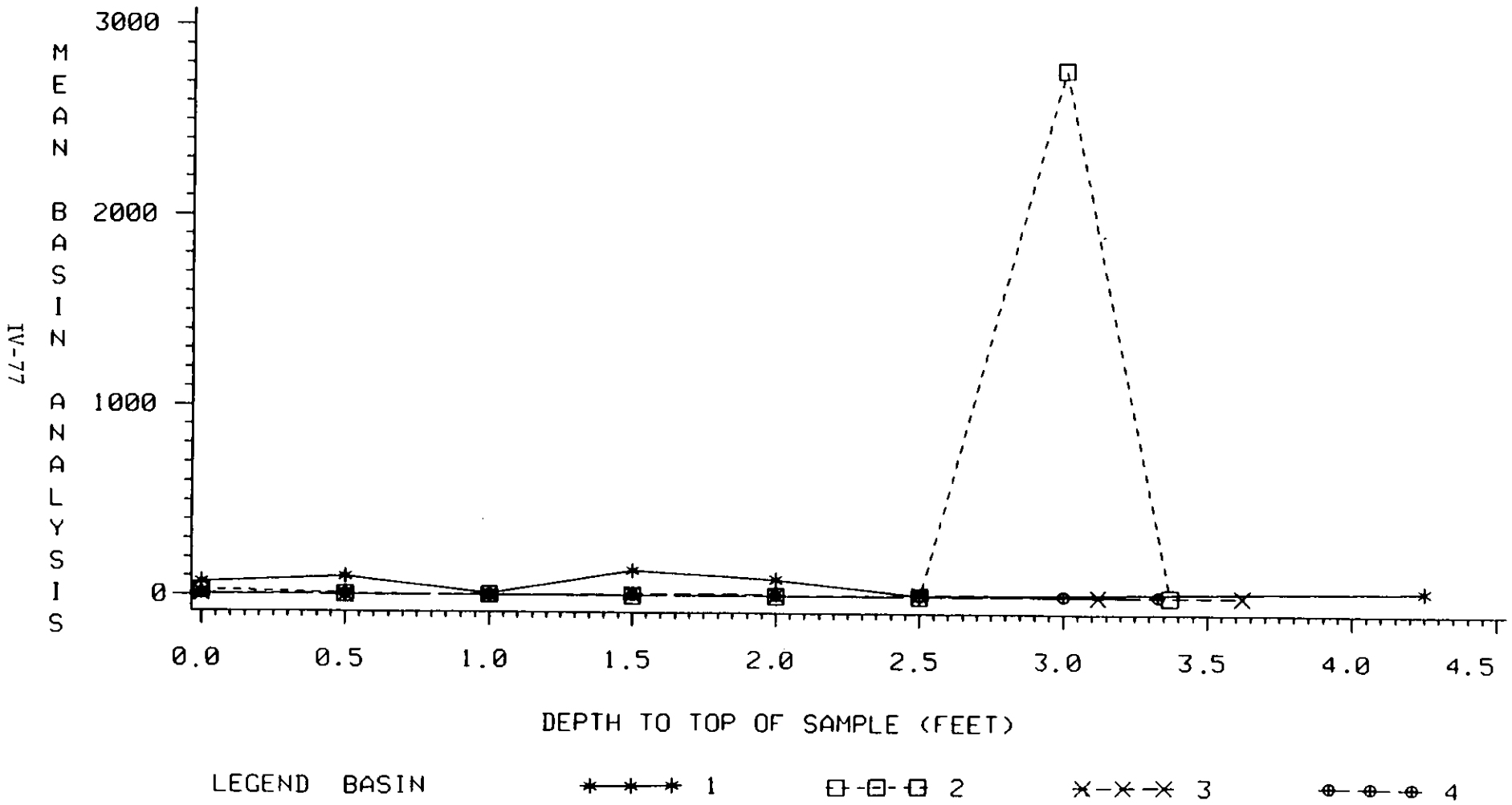

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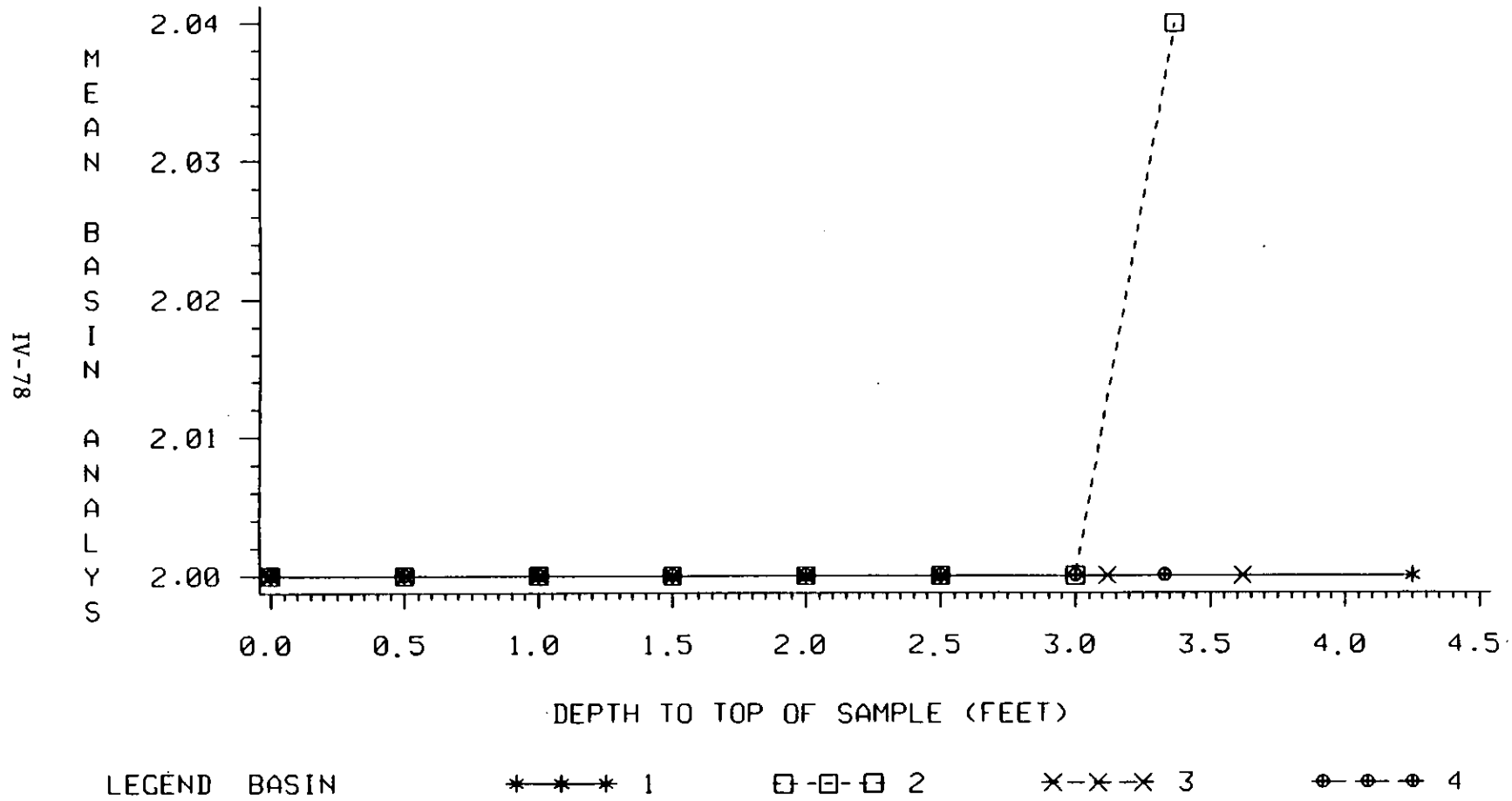

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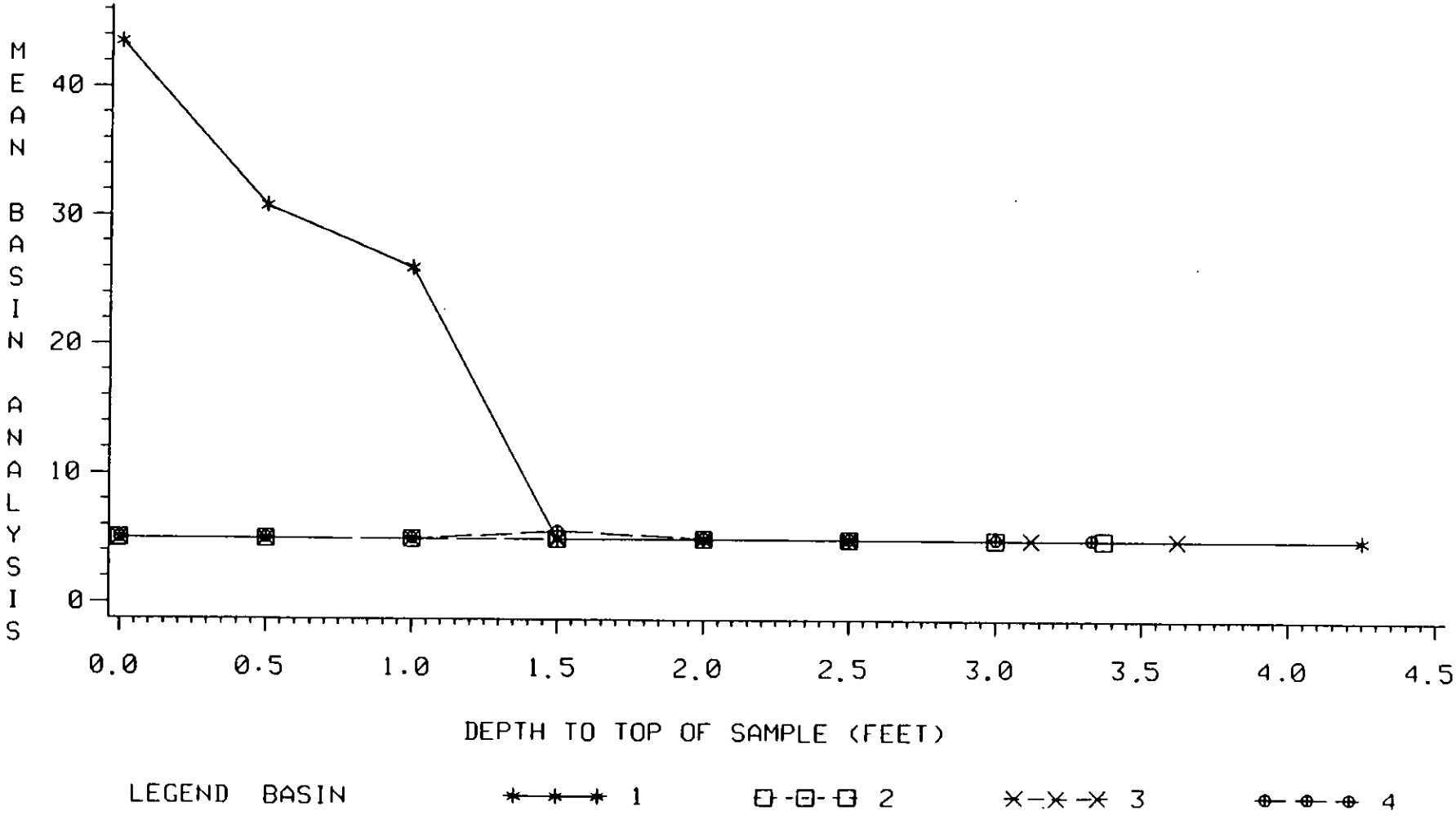

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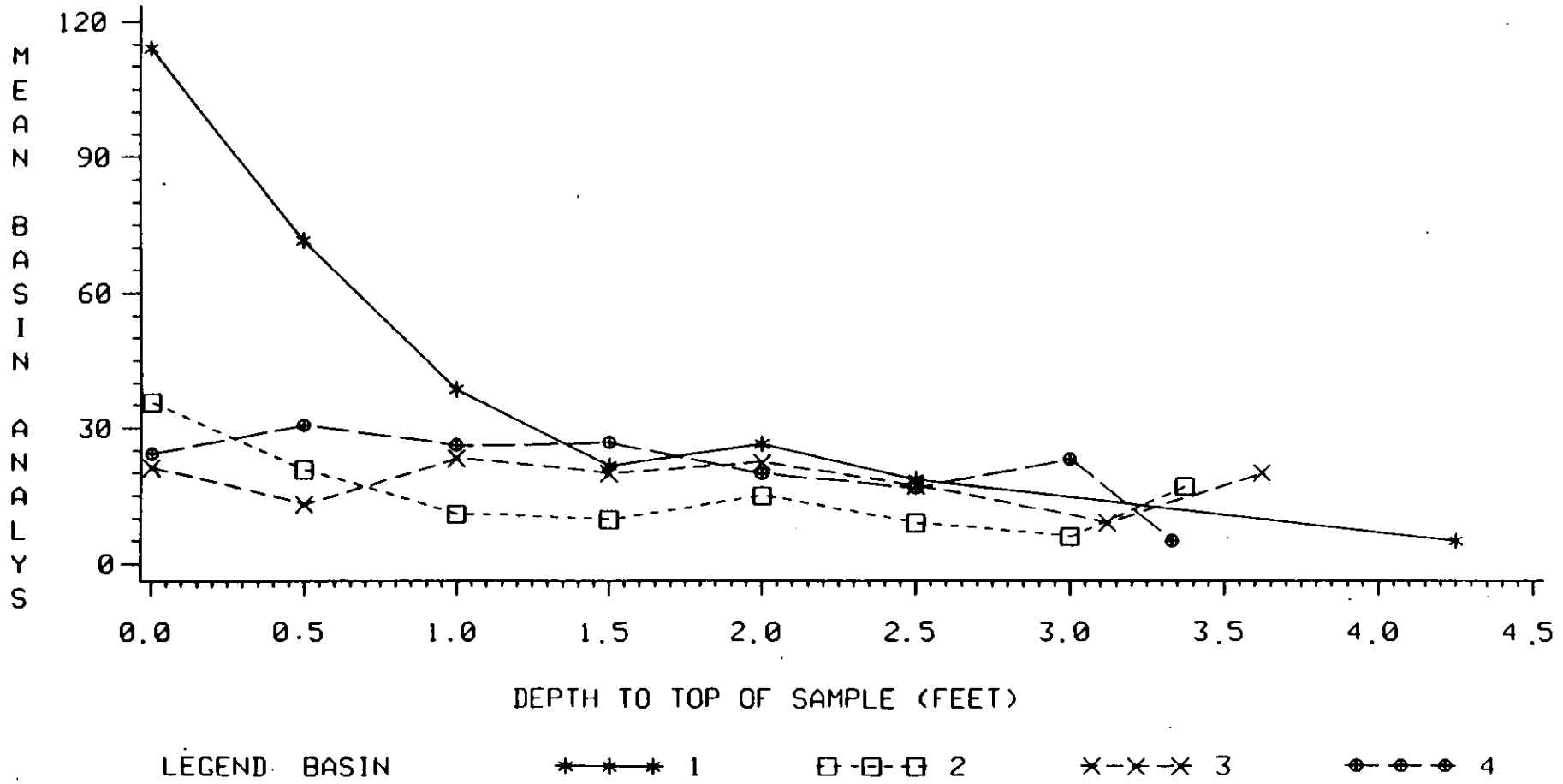

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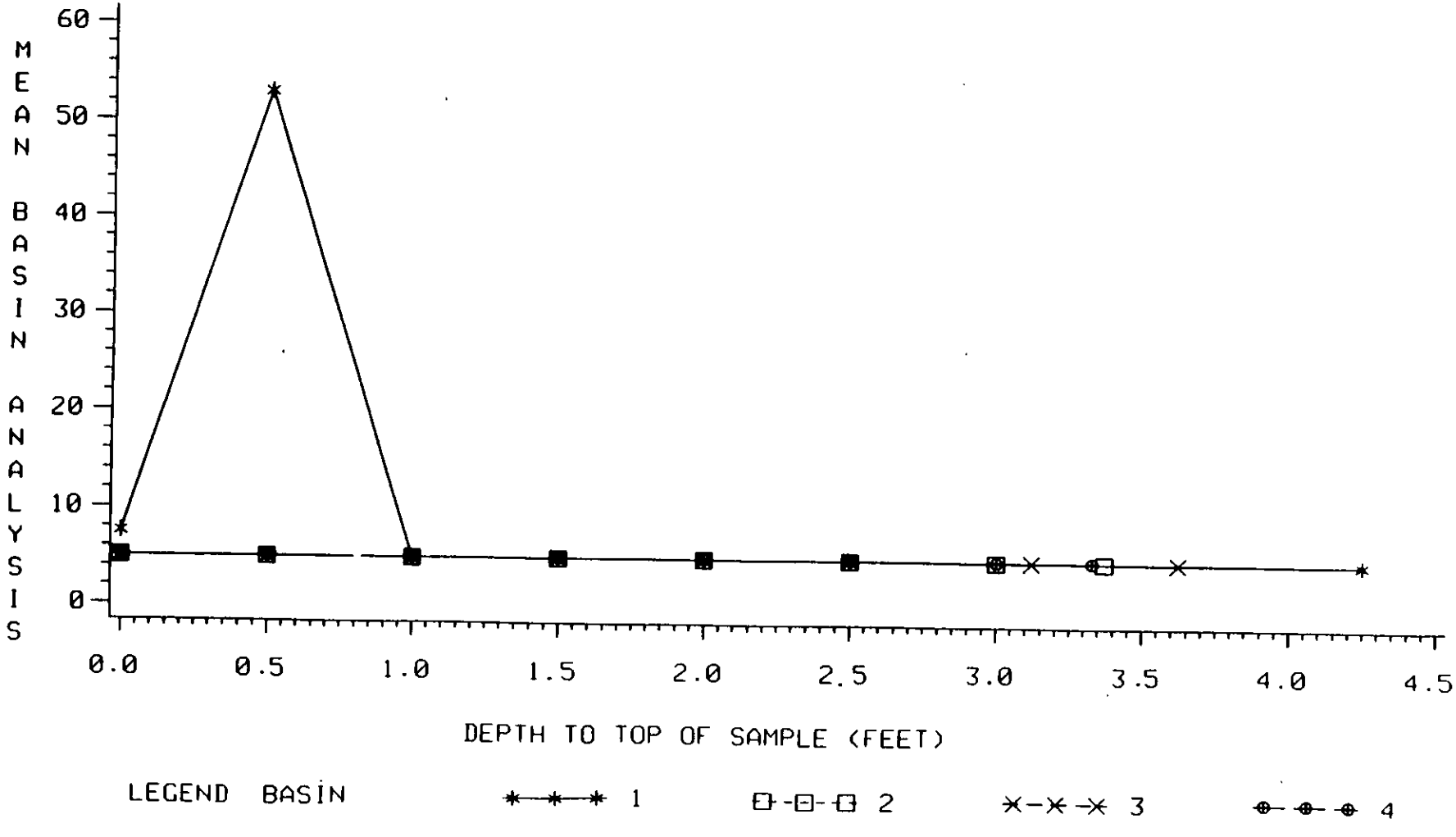

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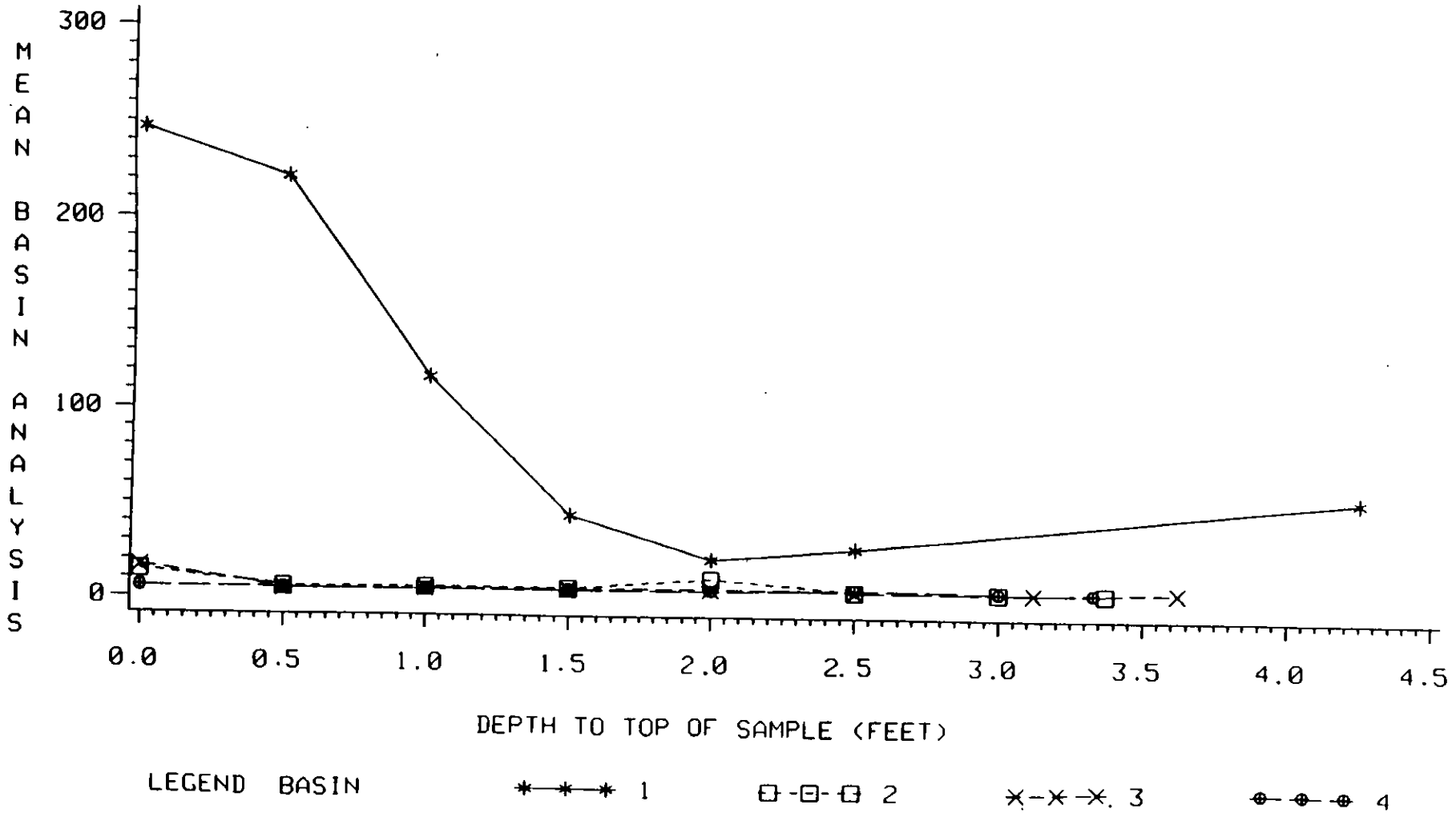

APPENDIX V — EVALUATION OF DISCREPANCIES IN RESULTS FOR QUALITY ASSURANCE SAMPLES

Two major discrepancies were found in the results for the 14 quality assurance samples. First, the radiochemically determined results reported by CEP for plutonium isotopes, uranium isotopes, ^{241}Am and ^{129}I were as much as four orders of magnitude different from results reported by EAL. The CEP and EAL results are compared in Table V-1 as the ratio of CEP reported concentration to EAL reported concentration. Although some disagreement had been expected since the core samples from each pair of primary and secondary cores were not rigorous duplicates, disagreement by orders of magnitude was unacceptable.

The second major discrepancy, which is inconsistent intra-laboratory measurements, can provide information about the validity of the differing results for uranium isotopes and ^{241}Am. Such measurements are independent of the core samples not being rigorous duplicates. ^{241}Am, ^{235}U, and ^{238}U which were analyzed radiochemically by alpha spectrometry can also be determined directly by gamma spectrometry on the original soil sample. Since each laboratory performed gamma spectrometric measurement on the same sample that it analyzed radiochemically, the results for the radiochemical analyses compared to the results derived from the gamma spectrometric measurement should be internally consistent at each laboratory. The laboratories reported only the results of radiochemical analyses for these nuclides. Data reduction outputs containing raw data from the gamma spectrometric measurement of three sets of samples were obtained from each laboratory. This raw data was used by SRL to derive the gamma spectrometric results for ^{241}Am, ^{235}U, and ^{238}U. Such intra-laboratory comparisons are presented in Tables V-2 through V-4.

The radiochemical results reported by EAL for ^{235}U and ^{238}U are internally consistent with the corresponding results derived from EAL's gamma spectrometric measurements. The radiochemical results reported by CEP for ^{235}U and ^{238}U are not internally consistent with the corresponding results derived from CEP's gamma spectrometric measurements. Furthermore, not only are the EAL results for ^{235}U and ^{238}U internally consistent, but they are also consistent with the results derived from CEP's gamma spectrometric measurements. Thus, it is concluded that the results reported by CEP for ^{235}U and ^{238}U are erroneous. By inference, $^{233,234}U$ results reported by CEP are also considered erroneous.

The radiochemical results reported by EAL for ^{241}Am are internally consistent with the corresponding results derived from EAL's gamma spectrometric measurements. The internal consistency of CEP results for ^{241}Am could not be determined since the energy

region in the gamma spectrometric measurement at CEP was not sufficiently broad to include the low-energy gamma ray emitted in the decay of ^{241}Am. Since the EAL results are internally consistent, but significantly different from CEP results, the CEP results were judged to be suspect.

For plutonium, the results reported by CEP were rejected and the results reported by EAL were accepted for the following reasons:

- Analysis of the data indicates circumstantial evidence that CEP has difficulty analyzing plutonium in soil. For example, the highest concentration of $^{239,240}Pu$ reported by either laboratory was 11,200 pCi/g reported by EAL. The corresponding "A" sample concentration reported by CEP was 0.3 pCi/g. All plutonium isotope concentrations reported by CEP were biased lower than EAL's results and were at or near detection limits. Yet the basin soils are known to contain elevated concentrations of plutonium based on the documented history of plutonium releases to the basin. Furthermore, in a 1971 coring of F-Area basin No. 3, the combined ^{238}Pu and $^{239,240}Pu$ concentration was 1748 pCi/g in the 0-4 inch segment and 660 pCi/g in the 4-8 inch segment (Fenimore and Horton, 1972).

- Evaluation of plutonium data reported by CEP for the recent SRL project to characterize the L-Area oil and chemical basin has provided conclusive evidence of a problem at CEP for the analysis of plutonium in a soil matrix (Kantelo, 1985). Plutonium concentrations reported by CEP were up to three orders of magnitude lower than the actual concentrations. The evaluation also described low plutonium concentrations reported by CEP for blind spiked soil samples which were part of another recent SRL project - a lysimeter study of the burial ground.

- EAL has a proven capability for plutonium analysis in a soil matrix (Kantelo, 1985).

For ^{129}I, the CEP concentrations are typically less than 10% of the EAL concentrations (Table V-1). Such a consistent low bias is attributed primarily to CEP's radiochemical procedure which does not account for the equilibration of all possible oxidation states of iodine (Gordon and Kantelo, 1985).

Another discrepancy in the reported data is misidentification by CEP and EAL of ^{95}Zr in at least two H-Area basin samples (the WCH samples in the tables of this appendix). Such misidentification was determined from evaluation of the data reduction outputs for gamma spectrometric measurements. The gamma rays emitted in the decay of ^{95}Zr were strongly interfered with by gamma rays of

similar energy emitted in the decay of ^{154}Eu. The extent of interference precluded accurate determination of the ^{95}Zr concentrations. For example, the data reduction output for CEP sample number 8502256-13 (WCH 102A/4.25/0.5) shows that the peaks observed at 724 and 756 keV were assigned to ^{95}Zr. The ^{95}Zr concentration based on the two gammas was 5.09 and 0.88 pCi/g, respectively. Despite the factor of 6 disagreement, CEP based its reported ^{95}Zr concentration of 2.09 pCi/g on these results (since the mean is 3.0, it is not clear how 2.09 was derived). In fact, both peaks are due to ^{154}Eu. Calculation of the ^{154}Eu concentration based on the two gammas yields consistent values of 8.4 and 8.5 pCi/g.

TABLE V-1

Comparison of CEP and EAL Results for Selected Radionuclides

	Ratio (CEP concentration/EAL concentration*)						
Sample	^{238}Pu	$^{239,240}Pu$	^{241}Am	$^{233,234}U$	^{235}U	^{238}U	^{129}I
WCF102/0.0/0.5	0.00072	0.00031	0.0011	583	>326	71	<0.00042
WCF102/2.5/0.5	<0.027	<0.012	<0.0037	0.95	0.35	0.06	0.081
WCF203/0.0/0.5	0.00053	<0.00004	<0.015	14	>1.12	0.91	0.018
WCF203/2.5/0.5	<0.071	<0.0078	<0.041	0.27	0.14	0.038	<0.026
WCF301/0.0/0.5	<0.00046	<0.00017	<0.26	9.6	5.5	0.61	0.045
WCF301/2.5/0.5	0.085	<0.024	-	0.51	0.46	0.063	<0.028
WCH102/0.5/0.5	0.00014	0.000025	0.00022	12	4.6	17	0.010
WCH102/2.5/0.5	<0.014	<0.012	0.038	1.55	0.94	0.27	<0.031
WCH201/0.0/0.5	0.00019	0.0001	0.002	36	20	0.20	0.068
WCH201/2.5/0.5	<0.016	0.029	-	>52	>4.9	12	<0.038
WCH302/0.0/0.5	<0.056	<0.0024	-	0.29	<0.068	0.044	0.12
WCH302/2.5/0.5	0.56	0.062	>2	1.06	0.76	0.17	<0.050
WCH402/0.0/0.5	<0.0025	<0.024	<0.018	2.2	0.30	2.9	0.032
WCH402/2.5/0.5	<0.143	<0.18	<0.37	0.29	0.30	0.06	<0.080

* EAL results converted to pCi/g.
\- Both concentrations less than detection limits

TABLE V-2

Comparison of ^{235}U Measurements

Sample	Lab	Concentration (pCi/g) Reported	Based on γ
WCF102/0.0/0.5	CEP	90	<8
	EAL	<0.3	<17
WCH102/0.5/0.5	CEP	72	10
	EAL	16	*
WCH201/0.0/0.5	CEP	200	10
	EAL	10	<11

* Not quantifiable due to peak interference.

TABLE V-3

Comparison of ^{238}U Measurements

Sample	Lab	Concentration (pCi/g) Reported	Based on γ
WCF102/0.0/0.5	CEP	260	<26
	EAL	4	<10
WCH102/0.5/0.5	CEP	280	60
	EAL	17	40
WCH201/0.0/0.5	CEP	5	19
	EAL	27	14

TABLE V-4

Comparison of ^{241}Am Measurements

Sample	Lab	Concentration (pCi/g) Reported	Based on γ
WCF102/0.0/0.5	CEP	0.1	*
	EAL	80	85
WCH102/0.5/0.5	CEP	0.2	*
	EAL	980	1600
WCH201/0.0/0.5	CEP	0.4	*
	EAL	220	230

* Not measured

APPENDIX VI — ADDITIONAL RADIONUCLIDE CONSTITUENTS IN F- AND H-AREA BASIN SOILS

CEP and EAL had been contracted to analyze only for designated nuclides. Additional radionuclides were identifiable in the three sets of data reduction outputs obtained from CEP and EAL for their gamma spectrometric measurements. These results are presented in Table VI-1. Since the concentrations are low, these nuclides are considered minor constituents.

TABLE VI-1

Additional Nuclides Identifiable in Gamma Spectra

Nuclide	Lab	Concentration (pCi/g)* WCF102/0.0/0.5	WCH102/0.5/0.5	WCH201/0.0/0.5
^{152}Eu	CEP	-	18±8	17±4
	EAL	-	37±4	11±2
^{154}Eu	CEP	-	34±4	21±2
	EAL	-	66±5	18±4
^{155}Eu	CEP	-	7±1	5±2
	EAL	-	16±3	5±2
^{237}Np	CEP	-	47±1	<10
	EAL	-	41±4	9±2
^{125}Sb	CEP	17±6	30±4	56±4
	EAL	10±1	150±7	30±8

* Precision at 68% confidence level (1 standard deviation).