DEPARTMENT OF THE NAVY
SOUTHWEST DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
ENVIRONMENTAL DIVISION
1220 PACIFIC HIGHWAY, RM 18
SAN DIEGO, CALIFORNIA 92132-5181

5090
Ser 1832.CA/445
May 8, 1996

Ms. Alice Gimeno
California Environmental Protection Agency
Department of Toxic Substances Control
Region 4
245 West Broadway, Suite 425
Long Beach, CA 92802-4444

Dear Ms. Gimeno:

The purpose of this letter is to address the comments in the letter dated April 3, 1996, which summarized the Department of Toxic Substances Control's (DTSC) review, specifically Mr. Brain Davis's review, of the *Final Extended Site Inspection (ESI) Report for Inactive Landfill, Naval Training Center (NTC), San Diego, California, February 1996*. As indicated in the letter, the issue of proper background methodology for the Inactive Landfill at NTC San Diego is an area of disagreement between the Navy and regulatory agencies. First, allow me to reiterate the Navy's full commitment to cooperative efforts regarding this issue. The Navy's position is not based on a 'policy issue' as previously implied by DTSC, but rather on the fact that the method does not provide a reasonable screening level for risk. Furthermore, Navy statistician, Mr. Dennis Askvig, believes that the lower 80 percent confidence limit is extremely conservative and will nearly always result in providing background (natural and anthropogenic) values below preliminary remediation goal (PRG) levels. He also believes there are numerous statistical methods available for use in risk assessment applications.

The Navy still believes that the ESI provides an adequate approach for addressing the background at NTC San Diego. Unfortunately, the Navy and DTSC have not reached resolution on this issue. As a result of the Navy and DTSC's inability to reach resolution on this issue, additional costs and time delays threaten completion of the project itself.

In order to facilitate completion of the project, the Navy proposes an alternative evaluation to clarify our position. Enclosure (1), *Addendum to the Final ESI, Inactive Landfill, NTC San Diego*, provides a comment/response sheet and the additional evaluation of background for the metals.

A very conservative statistical approach, the 95th percentile estimate graphically obtained from the cumulative frequency distribution, is used (see enclosure (1)) at NTC

San Diego instead of the 80 percent lower confidence limit (LCL) or the 95th percentile upper tolerance limit (UTL) approaches. With this 95th percentile estimate, the probability of committing a Type I error, which is stating that an analyte is a chemical of concern (COC) when in fact it is really clean natural background, during risk screening for each analyte is well over 50 percent. This also means that the probability is 99 percent that multiple analytes at a site will be categorized as COCs even when the entire site is actually background. This is obviously very conservative, but in this case at NTC San Diego the remediation action will be the same whether one or all of the COCs tested at NTC San Diego are categorized as COCs.

Furthermore, it was also noted in the letter that some changes in the document were not handled in a satisfactory matter. It does appear that a few comment/responses were either overlooked or need further elaboration. The Navy apologizes for this error and has supplied all relevant information in the enclosed addendum. Please be assured that all future changes will be clearly indicated in the comment response sheets.

I hope that this addendum will be successful in addressing all DTSC's concerns and we can proceed with current efforts on the Engineering Evaluation/Cost Analysis (EE/CA) at the Inactive Landfill. We look forward to a continued strong working relationship. If you have any questions or concerns please do not hesitate to contact the undersigned at (619) 532-3341.

Sincerely,

CONTENT P. ARNOLD
Remedial Project Manger
By direction of the Commander

Encl:
(1) Addendum to the Final Extended Site Inspection, Inactive Landfill, Naval Training Center, San Diego

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Copy to:
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San Diego, CA 92133-1449

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Addendum to the Final Extended Site Inspection, Inactive Landfill, Naval Training Center

COMMENTS

Written on: 01 April 1996
From: Brian Davis via Alice Gimeno
To: Keith Forman
Received on: 02 April 1996

GENERAL COMMENTS

COMMENT 1: Background Metals Evaluation: In our memorandum of 10/27/95, we stated our objections to the Navy's methods of evaluating background metal concentrations. We noted the inappropriateness of the statistics being applied to a very limited sample size (16 background samples) and we offered alternative methods in Appendix A of our memorandum.

In the 11/30/95 meeting it was agreed that the Navy would consider our proposed methods and discuss a resolution (e.g., Responses 5 and 9 on pages 27 and 28 of the Navy Responses [dated 12/21/95] to our comments). No discussions to achieve resolution occurred. Instead, in the telephone conference call of 01/29/96 the Navy suggested that the background sample size be increased by adding samples from Naval Air Station North Island. Participants in the conference call expressed reservations about the appropriateness of doing so. The Navy also stated that the statistical methods were not negotiable. This was based on Navy policy rather than scientific and mathematic arguments.

Appendix M of the Final Extended Site Inspection uses the same statistical methods as did the draft document. We do not accept these methods for the inactive landfill or for other Naval Training Center sites. Therefore, we do not accept that an adequate basis has been established for the elimination of barium, chromium, cobalt, mercury, manganese, nickel, or vanadium as chemicals of concern.

Since the evaluation of background metals has not been resolved, we suggest

RESPONSE 1: Additional evaluation of background for the metals has been performed. This evaluation consisted of screening all metals as potential contaminants and included a feasibility study evaluating the appropriateness of augmenting the NTC data sets with the NASNI data set.

With regard to the inclusion of the NASNI data set, the fill material at NTC is considered to be comparable to fill material at portions of NASNI. The source of the materials for both locations consists of dredgings from San Diego Bay. In addition, the dredging and filling operations for both locations occurred during generally the same time period. However, it was determined to be infeasible to use the NASNI data and, therefore, the NASNI data was not included in the additional evaluations. The infeasibility of using the data resulted from idiosyncrasies involved in the very low concentrations for much of the NASNI data, such that comparisons of the two data sets for common variance were confounded. Due to differing laboratory measurement methods, numerous small values were detected in the NASNI data. The time and effort required to perform extensive statistical analyses on the data is unwarranted and was, therefore, not performed.

The approach for the additional evaluation consisted of 1) an initial comparison of the maximum concentrations for each of the trace metals detected in the cover soil samples (SS-01 to SS-17) to their respective residential PRGs (February 1995 update); and 2) a statistical evaluation of background levels for those metals with maximum concentrations that were below their respective

Comments from Brian Davis via Alice Gimeno	Navy Responses
that two alternative evaluations be done. One evaluation would be that presented in this document. The other would include all detected metals as potential contaminants. This does not imply that remediation would be recommended for all detected metals, but it will provide adequate information for the risk managers.	PRGs. Metals that exceeded their residential PRG and/or that had at least one concentration exceeding their background level were considered COPCs and were included in the risk screening. Since statistical analyses were not performed for the metals that had greater than 50 percent nondetects in the background data set, these metals were automatically included in the risk screening. The initial screening based on residential PRGs resulted in only two metals, arsenic and beryllium, which had maximum concentrations that exceeded their PRGs. These metals were included in the risk screening. Attachment I, Table 1 presents the maximum concentrations detected in the 17 cover soil samples and the PRGs for these two metals. The remaining metals, aluminum, barium, chromium, cobalt, copper, lead, manganese, nickel, vanadium, and zinc, were subjected to the statistical background evaluation. The background data set consisted of the 19 samples from the perimeter of the Inactive Landfill; these samples consist of sample sets 2 and 3, as described in the final ESI, Section 6.2.4. Due to the small sample size, the 95th percentile was used, which is a more conservative approach than the $UTL_{95,95}$. The method presented in Appendix A of the DTSC memorandum (dated 10/27/95), which used the lower 80-percent confidence limit, was not used because it does not provide a reasonable screening level for risk. Even at the 95th-percentile risk-screening level, there is a greater than 50-percent chance of committing a Type I error (i.e., concluding that a clean site is not a clean site for each analyte). Therefore, the Navy believes that the 95th-percentile screening level is a more than conservative approach. In addition, as explained in the meeting minutes for the 29 January 1996 meeting, the Navy's position is that "...the lower 80-percent confidence limit is very conservative and will likely result in low values similar or below preliminary remediation goals (PRGs). Therefore, no useful background levels would be obtained, leaving only the PRG levels to use for risk screening." Attachment I, which includes Figures 1 through 11, presents the cumulative probability plots and associated statistical parameters and the 95th percentiles for aluminum, barium, chromium, cobalt, copper, lead, manganese, nickel, vanadium, and zinc. Arsenic was also included since it has been and is a significant portion of the risk presented in the final ESI. The 95th percentiles were graphically estimated using the cumulative frequency distribution. The

	maximum concentrations in the 17 cover soil samples for aluminum, barium, chromium, cobalt, manganese, and vanadium (refer to Table 6-1 in the final ESI for these concentrations) did not exceed their respective background (95th percentile) levels. The maximum concentrations in the 17 cover soil samples for arsenic, copper, lead, nickel, and zinc exceeded their background levels and, therefore, were included in the risk screening. Cumulative probability plots and statistical parameters were not produced for beryllium, cadmium, mercury, and selenium, which had nondetects in excess of 50 percent in the background data set. Therefore, all of these metals were automatically included in the risk screening. Attachment I, Table 1 presents the risk screening data for the nine metals noted above, and all detected organics. There was little difference in the re-calculated risks as compared to those in the ESI. The total cancer risk was estimated to be 2.5×10^{-5}, which is nearly identical to the total cancer risk presented in the ESI of 2.4×10^{-5} (Table 8-4, page 8-14 of the ESI). The noncancer risk was estimated to be 0.7, compared to a noncancer risk of 0.45 presented in the ESI (Table 8-4).
COMMENT 2: Other Statistical Evaluations: Comment 5 in our memorandum of 10/27/95 noted the need to address homogeneity of samples. For example, the plots of metal concentrations against aluminum concentration (Figure 6-3) show heterogeneity of the sample sets. This was not addressed in the responses or the revised document. Another statistical issue is the evaluation of linearity. How were the Appendix M (page M-7) determinations made? What is the basis for the qualitative descriptions of "distinct linear correlations", "relatively weak linear trends", and "two linear trends"? If statistical analysis was done, this should be described. If no statistical analysis was done, this should be justified.	**RESPONSE 2:** Referring to Comment 5 of the memorandum of 10/27/95, the intention of the metals versus aluminum plots was an initial qualitative screening to evaluate whether any metals from the three data sets, which would include the cover soil samples, could be considered background. As described in the final ESI, this is Step 1 of the background evaluation (page M-7). Also on page M-7, the rationale and theory for using this method is described, and it is stated that "Artificially elevated metals concentrations would be expected to fall outside of the general linear trends." As shown on Figure 6-3 in the final ESI, the metals arsenic, copper, lead, manganese, and zinc exhibited nonlinear plots, which may indicate that these metals had concentrations above background. Therefore, these metals that did not exhibit linearity on the plots were subjected to statistical evaluation (Steps 2 and 3 in Appendix M). The metals exhibiting linear plots were considered to represent background and were not addressed further. The issue of homogeneity (i.e., intended background data sets can be pooled) or heterogeneity (i.e., intended background data sets cannot be pooled) of data sets pertains to the background data sets used in the statistical calculations. Referring to Comment 5 of the previous memorandum, the data shown in Table

	6-1, which are the cover soils data, were not included in the statistical calculations shown in Table M-1 (formerly Table 6-4) because the metal versus aluminum plots indicated that those metals may be above background. Therefore, a background data set was chosen (Table M-1), from which background values can be determined, and then compared against the cover soil data. Determination of data pooling is generally based on an examination of the cumulative frequency plots, as described in Step 2 of Appendix M of the final ESI. Refer also to the response to Comment 1, which further addresses pooling of data sets used for background. The basis for the linearity determinations described on page M-7 for the log-log plots were visual observations of the graphs to determine whether or not the data approximated a line. The descriptions were strictly qualitative based on the visual observations, and they did not include statistical analysis to evaluate linearity. Visual observations are generally considered to be adequate to make the assessment of linearity; therefore, only those that clearly showed a linear relationship were interpreted to represent background. Refer to the response to Comment 1 (above), which details the additional background evaluation that was performed. This analysis also included those metals which exhibited linearity on the metals versus aluminum plots.
COMMENT 3: Chromium: The Extended Site Inspection doesn't discuss the issue of chromium speciation. Table 6-4 (page 6-17) lists chromium VI and doesn't mention chromium III or total chromium. The text (e.g., page 6-13) refers only to "chromium," without addressing the important issue of speciation into chromium III and chromium VI. The document should clearly state what was done. If speciation was not done, this must be justified.	**RESPONSE 3:** The chromium was not speciated into chromium III and VI but was analyzed as total chromium as part of the TAL metals analysis outlined in the work plan. The designation as chromium VI in Table 6-4 is incorrect, and it should have be listed as total chromium.
COMMENT 4: Sample Data Presentation: Tables 8-1 and 8-2 summarize the soil and groundwater sample data. Although the titles of the two tables are "Ranges, Means, 95-Percent Upper Confidence Limits,...", these statistics have been omitted. Tables 8-1 and 8-2 in the draft document did include these values and were therefore more informative.	**RESPONSE 4:** The titles of Tables 8-1 and 8-2 are incorrect. The ranges, means, and 95-percent UCLs were presented in a draft version of the ESI but were excluded from the tables in the final ESI since they were not used in the evaluation of risk. The highest reported concentration for each constituent was used to evaluate risk rather than the UCL (as was done in the draft ESI). This is a more conservative approach since the UCLs are lower than the highest concentrations.
An explanation is needed for the changes in the detection frequency and 95%	The changes in the Aroclor data were due to receipt of revised analytical results

UCL for Aroclor 1254 (Table 8-1) between this version of the document and the draft version.

COMMENT 5: Groundwater Contaminants: A. Some groundwater contaminants (aluminum, cobalt, vanadium, and cis-1,2-DCE) were not evaluated because there were no associated criteria in the California Bays and Estuaries Plan or the Federal Ambient Water Quality Criteria (Table 8-5). In our 10/27/95 memorandum (Comment 17), we requested that if regulatory criteria could not be found, the scientific literature should be consulted. Since this was not done, we compared the maximum values listed in Table 8-5 to the U.S. EPA Region IX tap water PRG values. These values are based only on human health considerations and exclude ecological receptors.

All four of the excluded contaminants (aluminum, cobalt, vanadium, and cis-1,2-DCE) had maximum values lower than the corresponding tap water PRG values. We note that although the maximum value for trichloroethene (38 µg/L) was less than the listed water quality value (81 µg/L), it does exceed the tap water PRG (1.6 µg/L).

B. The document argues that the level of risk associated with arsenic contamination is acceptable (page 8-15). The fourth bullet states that the maximum value of arsenic is less than the $UTL_{(99,95)}$. This may or may not be true, since the document presents $UTL_{(95,95)}$ values and not $UTL_{(99,95)}$ values. The maximum value of arsenic exceeds the $UTL_{(95,95)}$. It is no doubt true that if a high enough UTL value is used, it will exceed the maximum value for arsenic or any other metal. The kindest thing to be said about this argument is that it is irrelevant.

sent to BNI from the laboratory. Attachment II provides an explanation of the revised results and documentation of the resolution by the laboratory.

RESPONSE 5: A. Researching the scientific literature to establish criteria for those constituents for which there are no current appropriate regulatory criteria is beyond the scope of a screening risk assessment. However, where possible, surrogate values were used in the risk assessment.

Regarding the comparison of the constituents with tap-water criteria for this site, the groundwater within the hydrologic subarea that includes the site is considered by RWQCB to be of nonbeneficial use (including for municipal water supply), as discussed in the ESI, page 3-4. This designation is primarily due to the relatively high salinity of the groundwater. Therefore, the tap-water criteria are not applicable to this site.

B. The only COPC with an incremental risk above 10^{-6} is arsenic with an estimated risk of 4.3×10^{-6}. That risk estimate is based on the highest measured concentration of arsenic, which was the only concentration detected above the estimated upper limit of the background concentration of arsenic, and an exposure regimen representative of residential land use. That level of risk is within the generally acceptable range of 10^{-6} to 10^{-4} defined by the NCP. The average upper-bound risk would certainly be lower.

The fourth bullet states that "If the $UTL_{(99,95)}$ were used as the background cutoff, the highest measured concentration of arsenic would have been within the background range." The intention of this statement was to offer a comparison of the arsenic values to the methodology used for the nearby NASNI site, to support the conclusion that the risk was probably acceptable (i.e., minimal). At NASNI, the 99th percentile was used for the threshold values. Based on comparison of the NTC samples to the background values at NASNI, if the $UTL_{(99,95)}$ were to be calculated for the NTC background, then the same arsenic samples that exceeded the $UTL_{(95,95)}$ would not exceed the $UTL_{(99,95)}$. As discussed in the response to Comment 1, additional statistical analysis and risk screening were performed.

COMMENT 6: Ecological Risk Assessment: The ecological risk assessment has been greatly improved from the draft document by a) extrapolation from the belted kingfisher rather than rodents to estimate toxicity criteria for the least tern, and b) evaluation of the desert cottontail and the red-tailed hawk. However, deficiencies which were identified in the draft still remain (see Comment 7 below).

We agree with the assessment that the least terns are of greatest concern among ecological receptors. Although the reproduction of the least terns is encouraging, the document overstates the observations. For example, it discusses "the increase in the number of nests over the past 3 years" (page 8-39). The actual numbers (page 8-36) are one nest in 1993, 10 successful nests in 1994, and 5 successful nests in 1995. This is encouraging but suggests a fragile breeding colony with a decrease from 1994 to 1995.

RESPONSE 6: Comment noted. In addition, refer to the responses to Comment 7.

The data do indicate that the breeding colony appears to be fragile. However, variation in the number of breeding pairs occurs from year to year at breeding sites throughout southern California. This is based on review of an unpublished California least tern breeding survey from the California Department of Fish and Game, which shows nesting and breeding data for 37 locations in southern California in 1993 and 1994, including NTC.

As stated in the ESI on page 8-36 (Section 8.6.3.4), "In the opinion of the least tern researchers, least tern survival and health at the nesting area are as good or better than at most other nesting areas" (refer to the response to Comment 7, Part D, for a list of the least tern researchers). As mentioned in the ESI (Section 8.6.3.4), two chicks were thought to be lost to predators in 1995.

COMMENT 7: Failure to Make Changes: In several instances, the Responses to Comments agreed to changes which were not made in preparing this document.

RESPONSE 7:

A. Comment 10 in our 10/27/95 memorandum pointed out that a screening risk assessment does not always overestimate risk. The response agreed to change paragraph 3 of page 8-6, but no changes were made.

A. Section 8.4 should have been replaced by the following: "A two-phased health-risk assessment approach was described in the work plan. This approach consisted of performing a screening risk assessment, followed by a refined risk assessment if the results of the screening assessment indicated that the latter was warranted. The screening risk assessment showed that the potential risk, based on the exposure pathways and routes evaluated, is within the range classified by the NCP as being generally acceptable. The results of the screening risk assessment indicated that a refined risk assessment, performed in accordance with procedures described in the risk assessment work plan, would not produce significantly different estimates of risk. The refined risk assessment was, therefore, not performed."

B. Comment 13 in our 10/27/95 memorandum pointed out that risks and hazards must be summed over all pathways. The response agreed, but pathways are not summed for the ecological assessment. For least terns, air

B. Comment 13 in the 10/27/95 memo referred to the top of page 8-14 in the Draft ESI, which discussed human-health risk. Section 8.5.4, Total Risk, was added to the final ESI to specifically address this comment. This section discusses the summation of the risks and hazards over all pathways for the

Comments from Brian Davis via Alice Gimeno	Navy Responses
exposure and soil exposure were evaluated separately and the hazards were not summed. Nor was there any recognition that the hazard are underestimated because not all pathways were evaluated.	human-health risk assessment, as agreed. The only summation that can be performed in the ecological risk assessment is that of the air and soil pathways for the least tern. Referring to Tables 8-10 and 8-11, the summation of hazard quotients for air and soil are as follows: non-least-tern soil = 2.52×10^{-3} (air) + 2.14 (soil) = 2.14 (this value is the same as the soil alone because the air value is relatively small); and least-tern soil = 2.52×10^{-3} (air) + 0.08 (soil) = 0.14. Therefore, a hazard may exist to the least terns by exposure to soils outside the least tern area, however, no hazard is presented to the least tern by exposure to the least tern soils. On the bottom of page 8-27 of the final ESI, the ecological receptors are described. These receptors and their associated pathways are considered realistic given the ecosystem and the feeding habits of the organisms at the site. Although dermal exposure was not addressed, the ESI states that conservative soil exposures were used that would indicate any risks from soil COPCs. Therefore, the hazard indices are probably overestimated. Specifically, as noted in Sections 8.6.2, 8.6.3.5, and 8.6.4, the following risk assessment assumptions were conservative (and perhaps extreme): an air inhalation rate of 100-percent absorption; the least terns spend 100 percent of their time on the landfill; exceptionally high soil ingestion rate of the least tern; 100 percent of the rabbit's diet consisted of soil from the landfill site; and 100 percent of the red-tailed hawk's diet consisted of rabbits eating solely landfill soil. Although the hazard indices probably represent a worst-case scenario for those pathways evaluated, there is some uncertainty in the risk screening, because not all intake pathways may have been considered in the analysis.
C. Comment 15 in our 10/27/95 memorandum pointed out the need for more detail on the biological surveys. The response agreed, but the information is still lacking.	C. Site visits were made by Dr. Roy Woodward in June 1995 and January 1996, and by the BNI aquatic biologist, Noriko Kawamoto, in July 1995. During each of these visits, observations of wildlife and vegetation were recorded, which allowed an assessment of the type, extent, and condition of habitat available. During these visits, BNI personnel observed that the wetland no longer exists and that the soil covering of the least tern breeding area is different than the cover soil in the remainder of the landfill area. As stated in the ESI on page 8-27 (Section 8.6.1.2), "A relatively simple ecosystem exists at the NTC Inactive Landfill Site." Also, Section 8.6.1.1 describes the limited wildlife use, the sparse plant cover, and the periodic

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	plowing and grading of the Inactive Landfill. Therefore, for this ecological risk screening, the Navy believes that the biological survey was sufficiently descriptive.
D. Comment 19 in our 10/27/95 memorandum requested that "the least tern researchers" who are cited (page 8-36) be identified. The response agreed, but the information is still lacking.	D. The following biologists knowledgeable about the least terns in San Diego Bay were consulted during preparation of the ecological risk screening: Timothy Burr, Southwest Division (SWDIV) Fish and Wildlife Biologist; Lyann Comrack, California Department of Fish and Game (CDFG) Nongame Bird and Mammal Program; and Brian Foster, Ph.D., private consultant to SWDIV specializing in southern California least tern colonies. Dr. Foster conducts the annual least tern monitoring for San Diego Bay.
CONCLUSIONS:	**RESPONSE:**
Since this site is a location of a former landfill, the major concern is the contaminants in the landfill itself and their potential movement into air and groundwater. This was expressed in comments on the draft document (e.g., Comment 1 of the 11/2/95 memorandum from Alice Gimeno; General Comments 1 and 2 and Specific Comments 4 and 6 of the 10/27/95 memorandum from Michael J. Wade and Brian K. Davis). In this regard, we consider the evaluations of other agencies about the possibility of air contamination and of groundwater contamination to be of great importance. We also recognize that the issues of background concentrations of metals and the evaluation of soil contaminants relate to chemicals found in the landfill cover and not the landfill material itself. It is important to establish acceptable methods of evaluation not only for this site, but also for other sites at the Naval Training Center. The site provides poor habitat for most animals and plants because of the constant physical disturbance. Unless this changes, the major ecological concern appears to be to maintain the nesting area for the least terns. Reviewed by Mike J. Wade, Senior Toxicologist	This addendum is intended to address the comments from DTSC, and to present additional data evaluation, as appropriate, to support the responses to the comments. It is the Navy's belief that all the comments and areas of concern have been sufficiently addressed in this addendum, with the realization that differences of opinion exist regarding the use of certain methodologies for data evaluation.

ATTACHMENT I

Attachment I

Table 1
Estimated Risk Based on Comparison of Measured Concentrations in Chemicals in Soil with PRGs[a]

Analyte	Detect Frequency	Highest Concentration (mg/kg)[b]	PRG Cancer Risk (mg/kg)	PRG Noncancer Risk (mg/kg)	Cancer Risk	Hazard Index
Arsenic	14/17	6.7	0.32	22	2.1E-05	0.3
Aroclor 1254	10/17	0.19	NC[c]	1.4	NA[d]	0.14
Aroclor 1260	8/17	0.039	0.066	1.4[e]	5.9E-07	0.028
Beryllium	3/17	0.36	0.14	NC	2.6E-06	NA
Cadmium	2/17	0.38	9	38	4.2E-08	0.01
4,4′-DDT[f]	3/17	0.3	1.3	NC	2.3E-07	NA
4,4′-DDE[g]	2/17	0.13	1.3	NC	1.0E-07	NA
Chlordane, alpha	1/17	0.016	0.34	NC	4.7E-08	NA
Chlordane, gamma	2/17	0.016	0.34	NC	4.7E-08	NA
4,4′-DDD[h]	1/17	0.032	1.9	NC	1.7E-08	NA
Copper	17/17	42.3	NC	2,800	NA	0.015
Lead	17/17	72.8	130	400	5.6E-07	0.18
Mercury	5/17	0.24	NC	23	NA	0.01
Nickel	17/17	12.3	150	1,500	8.2E-08	0.0082
Selenium	11/17	1.3	NC	380	NA	0.0034
Zinc	17/17	119	NC	23,000	NA	0.0052
Diethylphthalate	1/17	1.1	NC	52,000	NA	0.000021
TOTAL					2.5E-05	0.7

Notes:
- [a] PRG – (United States Environmental Protection Agency Region IX) preliminary remediation goal, residential scenario, February 1995 update
- [b] mg/kg – milligrams per kilogram
- [c] NC – no criteria
- [d] NA – not applicable
- [e] no reference dose; assigned reference dose of Aroclor 1254
- [f] DDT – dichlorodiphenyltrichloroethane
- [g] DDE – dichlorodiphenyldichloroethene
- [h] DDD – dichlorodiphenyldichloroethane

Figure 1

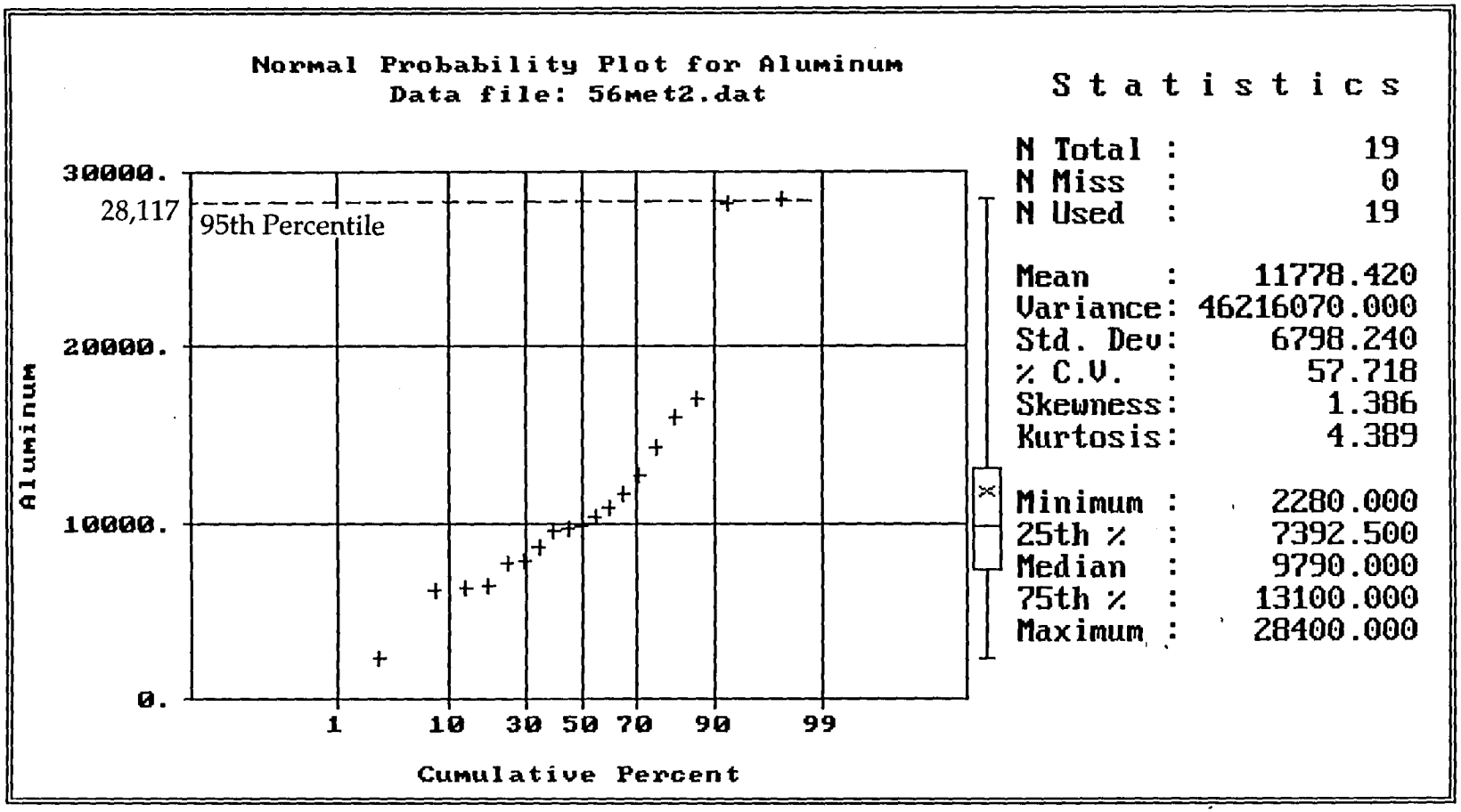

Normal Probability Plot for Aluminum
Data file: 56met2.dat
30000.
28,117
95th Percentile
20000.
10000.
0.
Aluminum
1
10
30
50
70
90
99
Cumulative Percent
Statistics
N Total : 19
N Miss : 0
N Used : 19
Mean : 11778.420
Variance: 46216070.000
Std. Dev: 6798.240
% C.V. : 57.718
Skewness: 1.386
Kurtosis: 4.389
Minimum : 2280.000
25th % : 7392.500
Median : 9790.000
75th % : 13100.000
Maximum : 28400.000

Figure 2

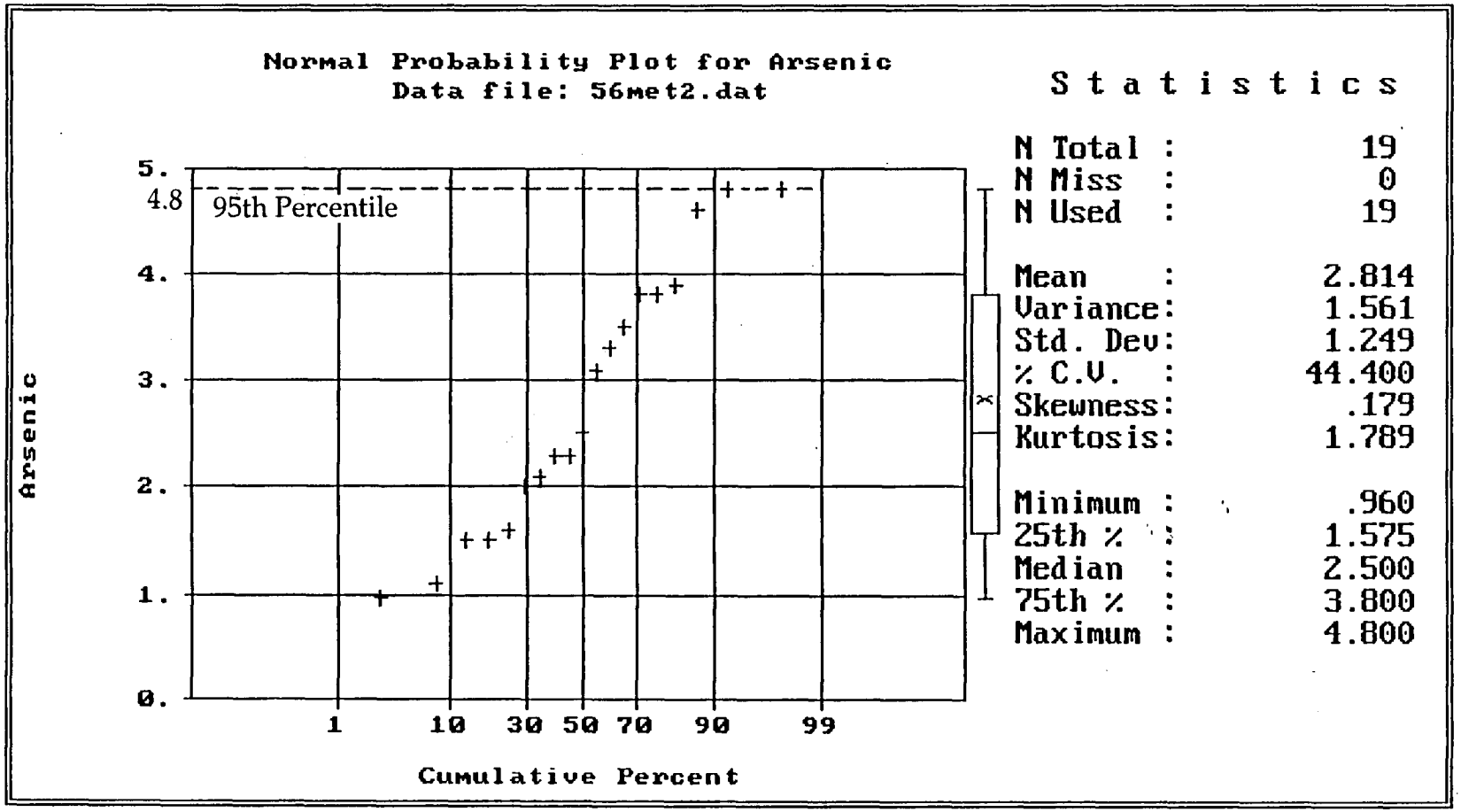

Normal Probability Plot for Arsenic
Data file: 56met2.dat
4.8
95th Percentile
5.
4.
3.
2.
1.
0.
Arsenic
1
10
30
50
70
90
99
Cumulative Percent
Statistics
N Total : 19
N Miss : 0
N Used : 19
Mean : 2.814
Variance: 1.561
Std. Dev: 1.249
% C.V. : 44.400
Skewness: .179
Kurtosis: 1.789
Minimum : .960
25th % : 1.575
Median : 2.500
75th % : 3.800
Maximum : 4.800

Figure 3

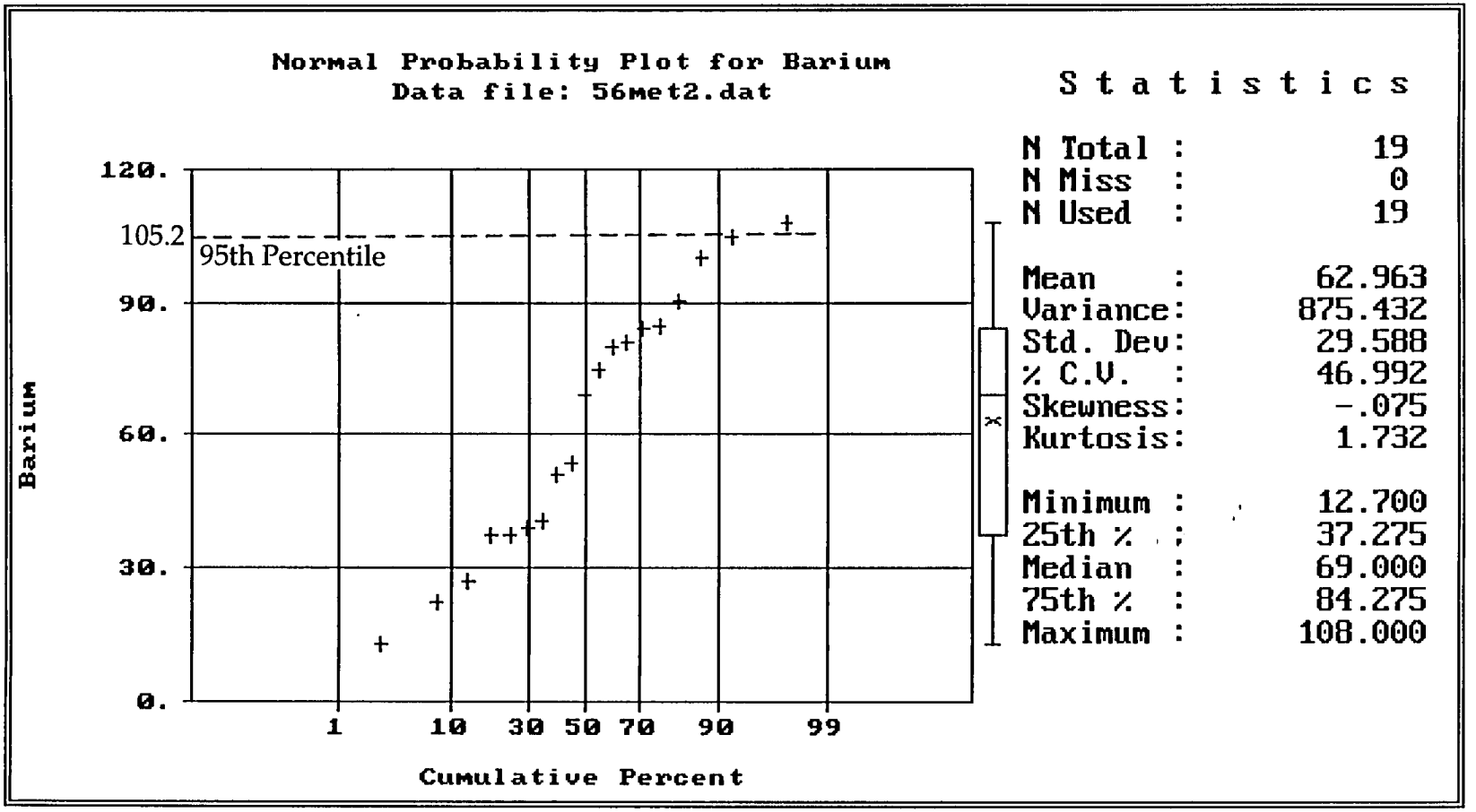

Normal Probability Plot for Barium
Data file: 56met2.dat
120.
105.2
95th Percentile
90.
60.
30.
0.
Barium
1
10
30
50
70
90
99
Cumulative Percent
Statistics
N Total : 19
N Miss : 0
N Used : 19
Mean : 62.963
Variance: 875.432
Std. Dev: 29.588
% C.V. : 46.992
Skewness: -.075
Kurtosis: 1.732
Minimum : 12.700
25th % : 37.275
Median : 69.000
75th % : 84.275
Maximum : 108.000

Figure 4

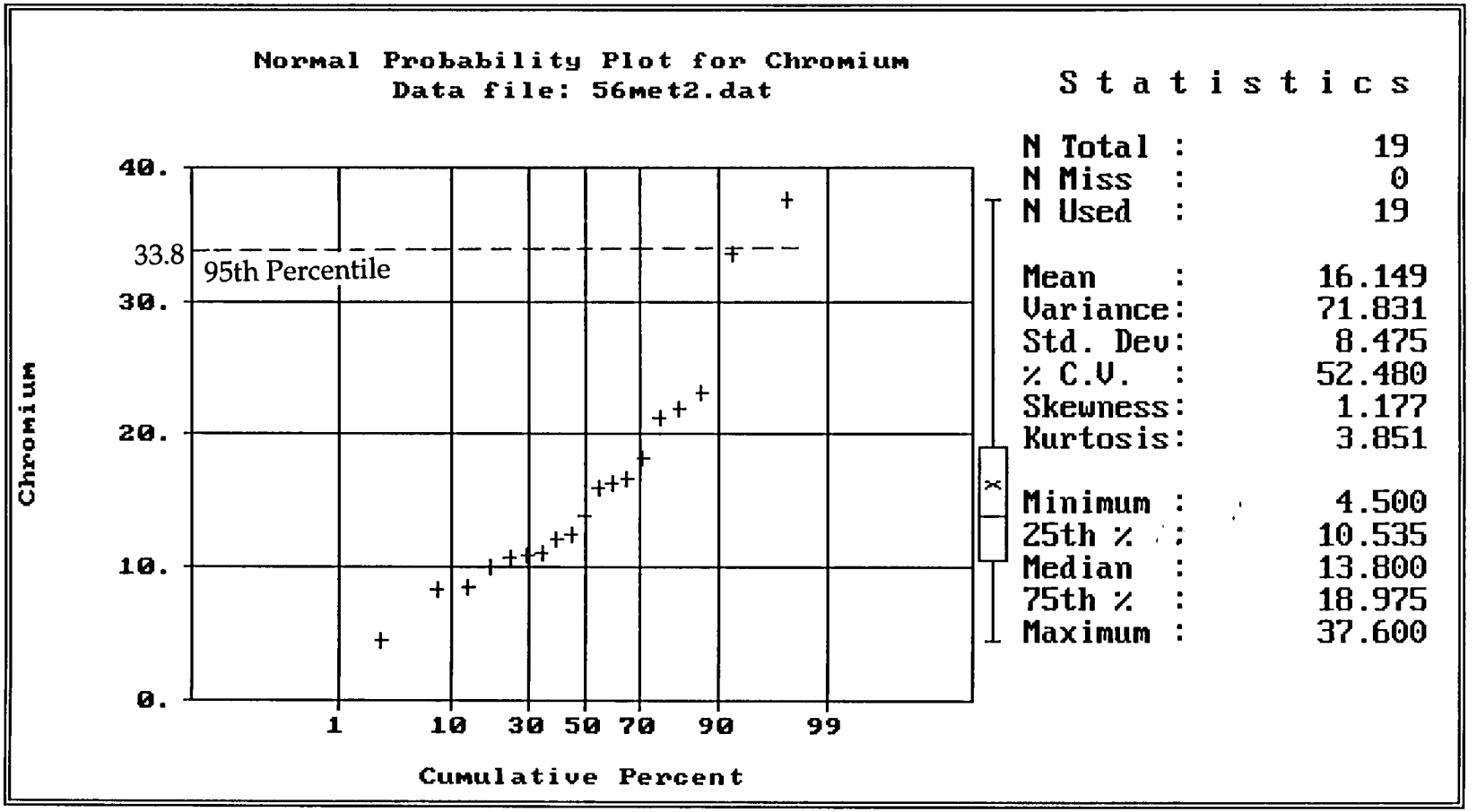

Normal Probability Plot for Chromium
Data file: 56met2.dat
Chromium
40.
33.8
95th Percentile
30.
20.
10.
0.
1
10
30
50
70
90
99
Cumulative Percent
Statistics
N Total : 19
N Miss : 0
N Used : 19
Mean : 16.149
Variance: 71.831
Std. Dev: 8.475
% C.V. : 52.480
Skewness: 1.177
Kurtosis: 3.851
Minimum : 4.500
25th % : 10.535
Median : 13.800
75th % : 18.975
Maximum : 37.600

Figure 5

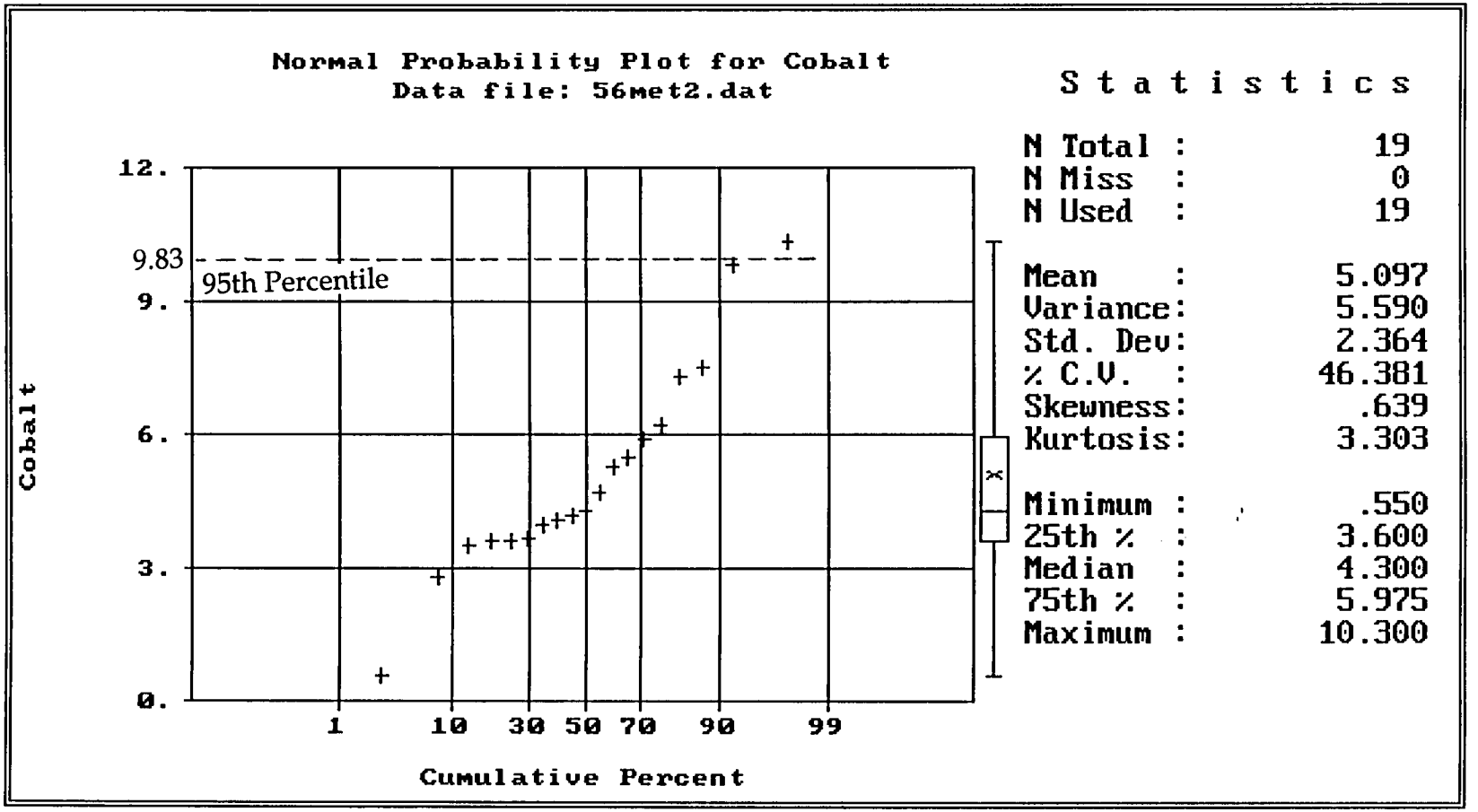

Normal Probability Plot for Cobalt
Data file: 56met2.dat
12.
9.83
95th Percentile
9.
6.
3.
0.
Cobalt
1
10
30
50
70
90
99
Cumulative Percent
Statistics
N Total : 19
N Miss : 0
N Used : 19
Mean : 5.097
Variance: 5.590
Std. Dev: 2.364
% C.V. : 46.381
Skewness: .639
Kurtosis: 3.303
Minimum : .550
25th % : 3.600
Median : 4.300
75th % : 5.975
Maximum : 10.300

Figure 6

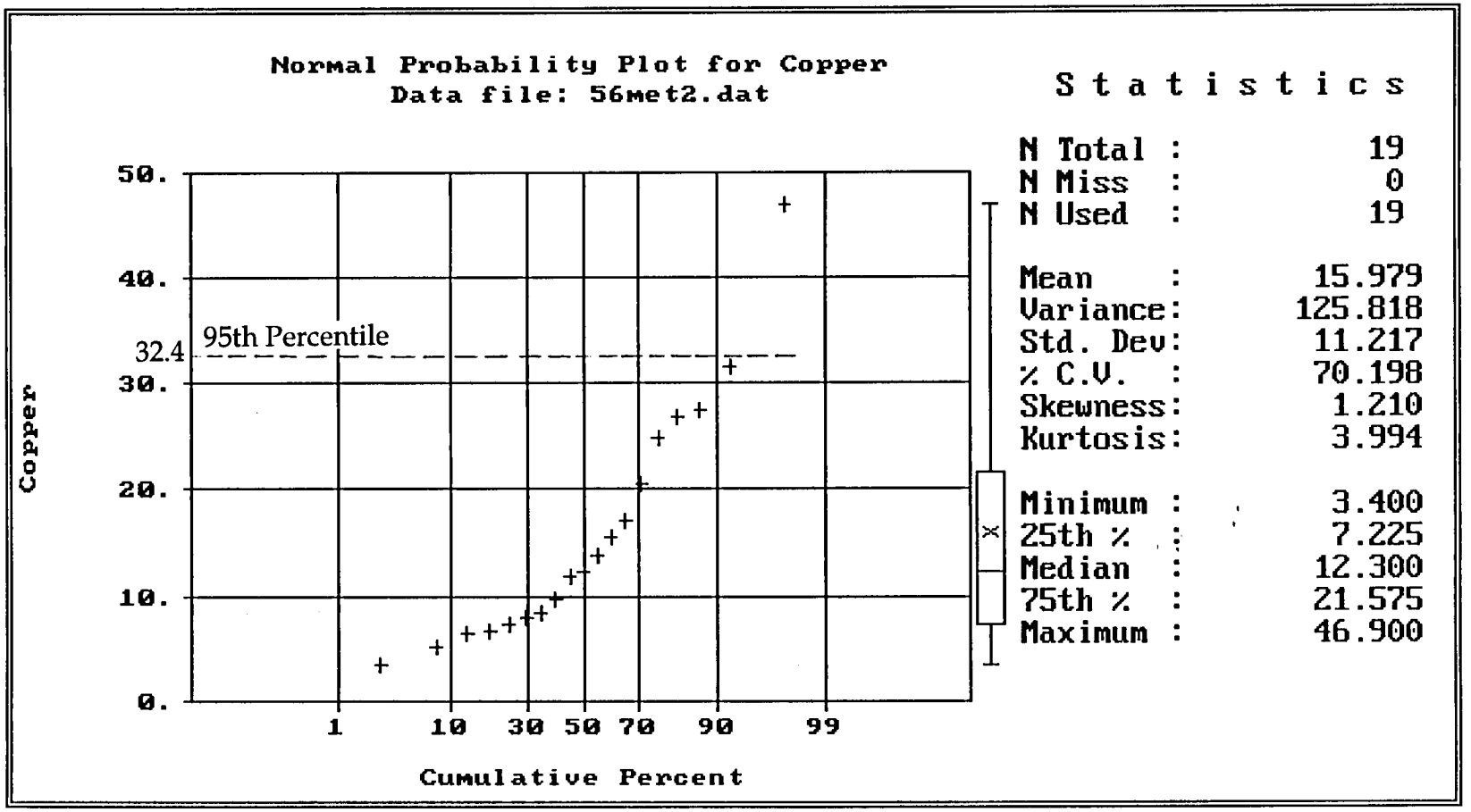

Normal Probability Plot for Copper
Data file: 56met2.dat
Copper
50.
40.
32.4
95th Percentile
30.
20.
10.
0.
1
10
30
50
70
90
99
Cumulative Percent
Statistics
N Total : 19
N Miss : 0
N Used : 19
Mean : 15.979
Variance: 125.818
Std. Dev: 11.217
% C.V. : 70.198
Skewness: 1.210
Kurtosis: 3.994
Minimum : 3.400
25th % : 7.225
Median : 12.300
75th % : 21.575
Maximum : 46.900

Figure 7

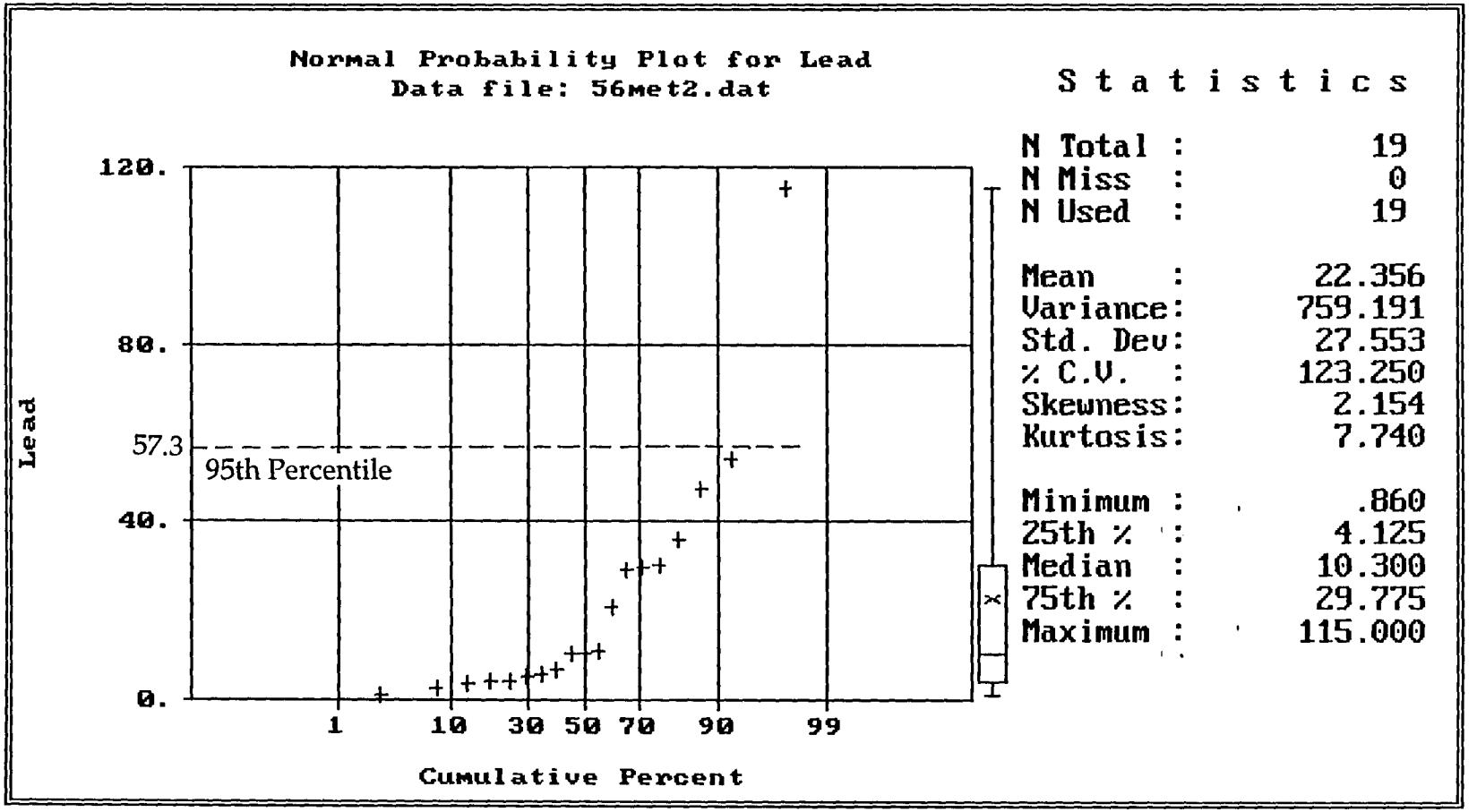

Normal Probability Plot for Lead
Data file: 56met2.dat
Lead
120.
80.
57.3
95th Percentile
40.
0.
1
10
30
50
70
90
99
Cumulative Percent
Statistics
N Total : 19
N Miss : 0
N Used : 19
Mean : 22.356
Variance: 759.191
Std. Dev: 27.553
% C.V. : 123.250
Skewness: 2.154
Kurtosis: 7.740
Minimum : .860
25th % : 4.125
Median : 10.300
75th % : 29.775
Maximum : 115.000

Figure 8

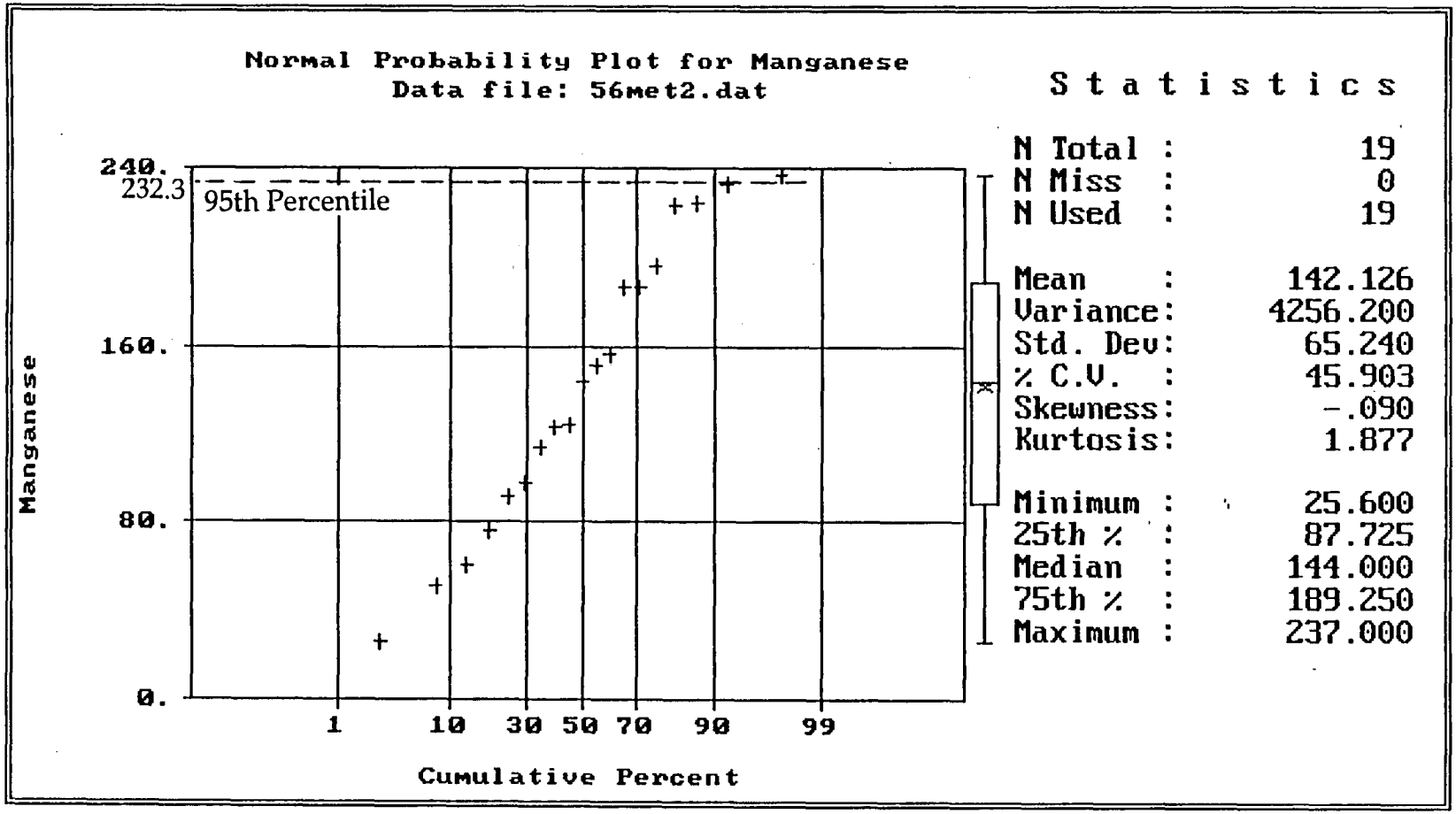

Normal Probability Plot for Manganese
Data file: 56met2.dat
240.
232.3
95th Percentile
160.
80.
0.
Manganese
1
10
30
50
70
90
99
Cumulative Percent
Statistics
N Total : 19
N Miss : 0
N Used : 19
Mean : 142.126
Variance: 4256.200
Std. Dev: 65.240
% C.V. : 45.903
Skewness: -.090
Kurtosis: 1.877
Minimum : 25.600
25th % : 87.725
Median : 144.000
75th % : 189.250
Maximum : 237.000

Figure 9

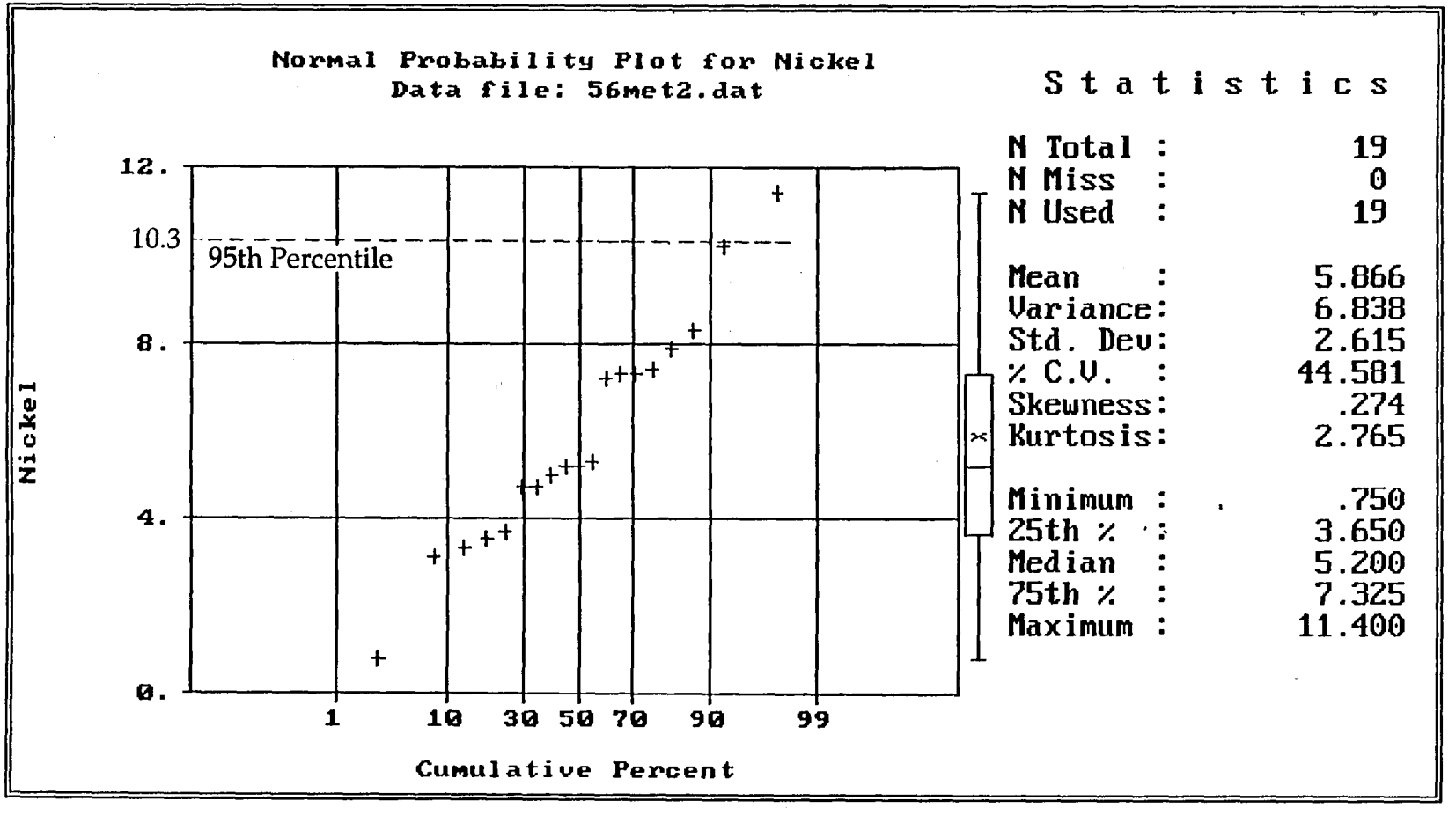

Normal Probability Plot for Nickel
Data file: 56met2.dat
12.
10.3
95th Percentile
8.
4.
0.
Nickel
1
10
30
50
70
90
99
Cumulative Percent
Statistics
N Total : 19
N Miss : 0
N Used : 19
Mean : 5.866
Variance: 6.838
Std. Dev: 2.615
% C.V. : 44.581
Skewness: .274
Kurtosis: 2.765
Minimum : .750
25th % : 3.650
Median : 5.200
75th % : 7.325
Maximum : 11.400

Figure 10

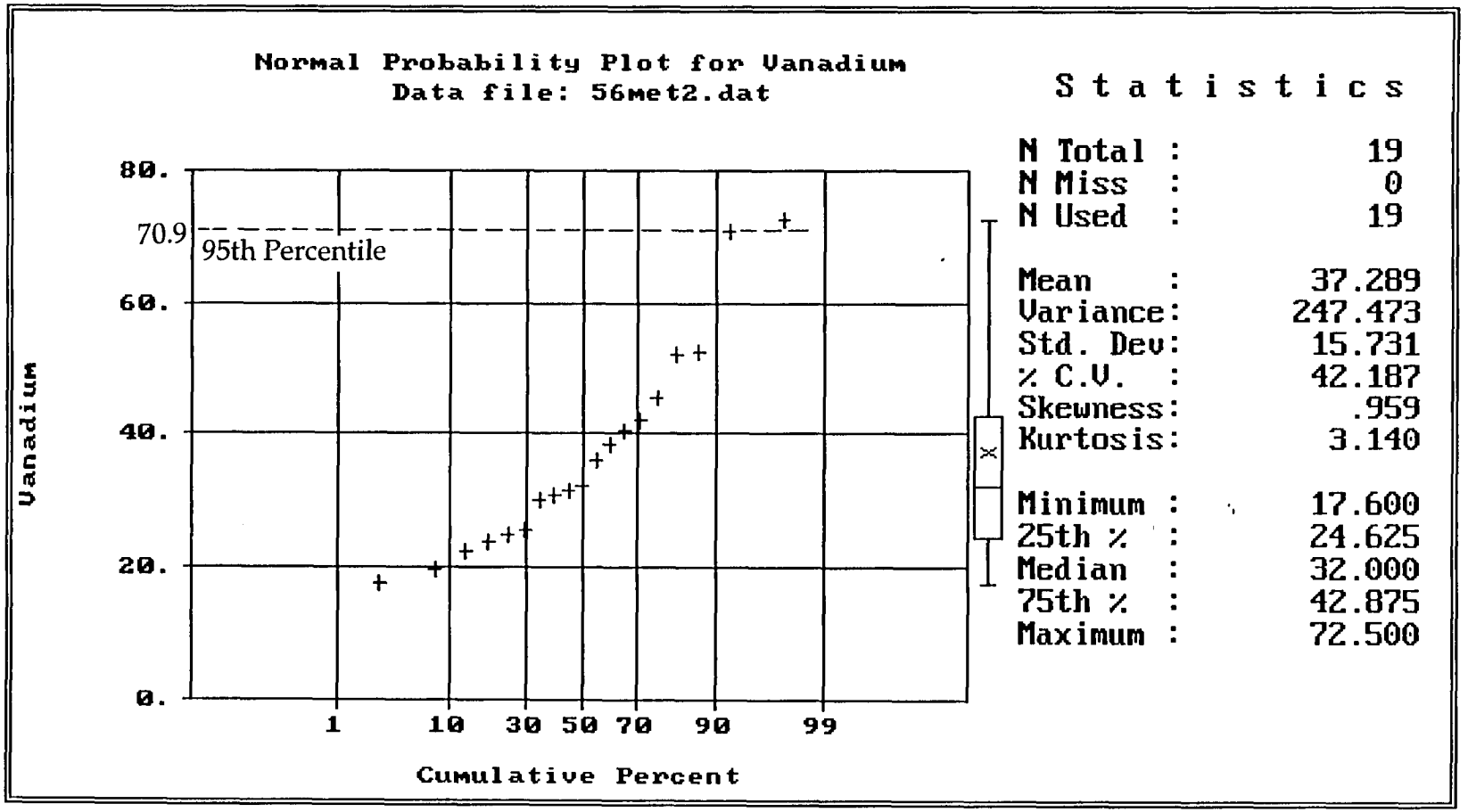
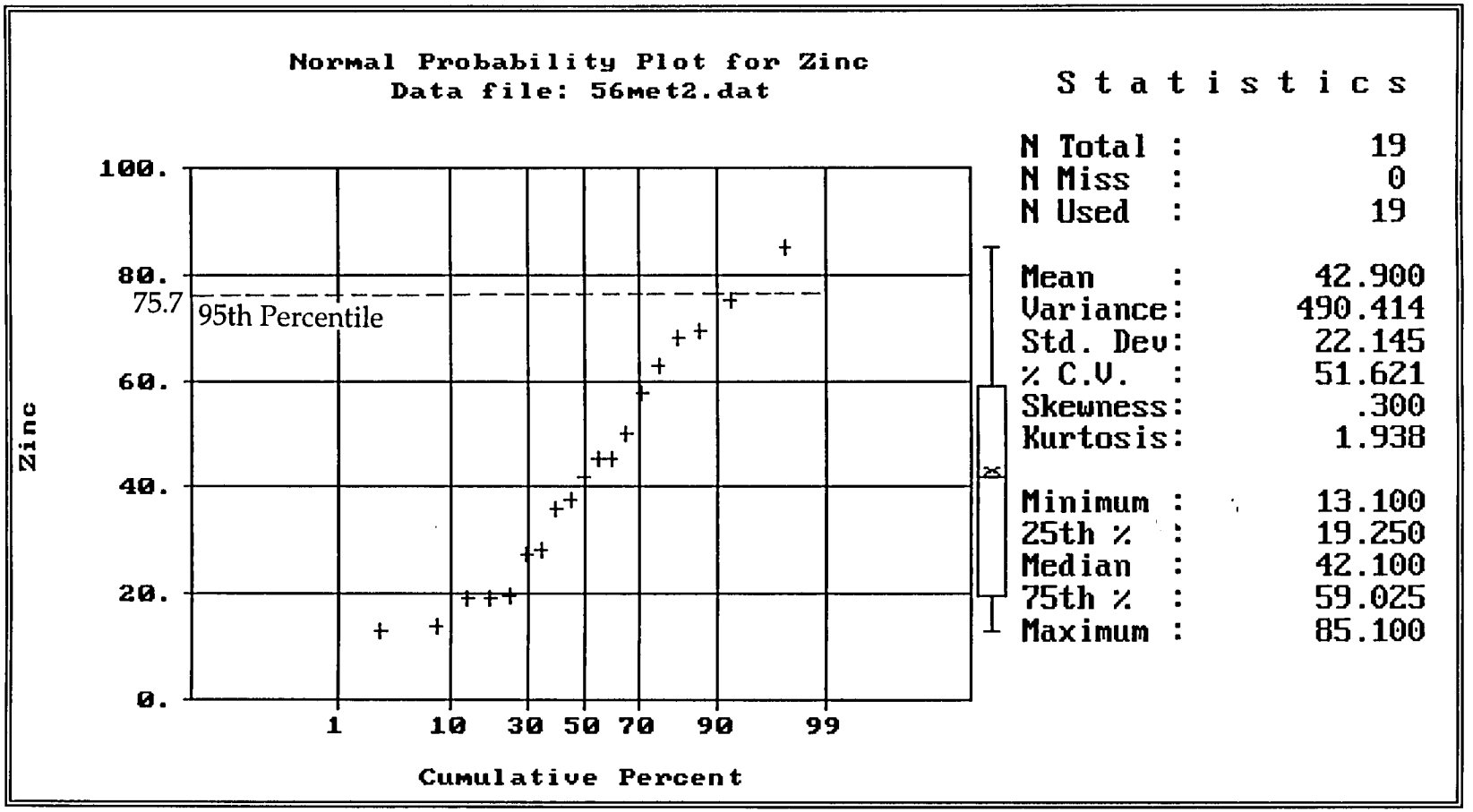

Normal Probability Plot for Vanadium
Data file: 56met2.dat
Vanadium
80.
70.9
95th Percentile
60.
40.
20.
0.
1
10
30
50
70
90
99
Cumulative Percent
Statistics
N Total : 19
N Miss : 0
N Used : 19
Mean : 37.289
Variance: 247.473
Std. Dev: 15.731
% C.V. : 42.187
Skewness: .959
Kurtosis: 3.140
Minimum : 17.600
25th % : 24.625
Median : 32.000
75th % : 42.875
Maximum : 72.500

Figure 11


Normal Probability Plot for Zinc
Data file: 56met2.dat
Zinc
100.
80.
60.
40.
20.
0.
75.7
95th Percentile
1
10
30
50
70
90
99
Cumulative Percent
Statistics
N Total : 19
N Miss : 0
N Used : 19
Mean : 42.900
Variance: 490.414
Std. Dev: 22.145
% C.V. : 51.621
Skewness: .300
Kurtosis: 1.938
Minimum : 13.100
25th % : 19.250
Median : 42.100
75th % : 59.025
Maximum : 85.100

ATTACHMENT II

Lockheed Environmental Systems & Technologies Co.
Lockheed Analytical Services
975 Kelly Johnson Drive Las Vegas, Nevada 89119-3705
Telephone 702-361-0220 800-582-7605 Facsimile 702-361-8146

LOCKHEED MARTIN

February 2, 1996

Mr. James Jordan
Bechtel National
401 West "A" Street
Suite 1000
San Diego, CA 92101-7905

Re: Aroclor 1254 results for SDG's L4182 & L4197, CTO-056

Dear Mr. Jordan:

Please be advised that results reported for Aroclor 1254 were incorrectly reported at twice the actual value in SDG's L4182 and L4197. This was solely due to a calculation error made by Lockheed during the preparation of a five-point calibration curve for this PCB mixture. The results of all positive "hits" (those values reported above the MDL if "j" values were reported, and all values above the RDL) were biased high by a factor of two. Non-detect results were not affected.

The error occurred as follows: Due to the complexity of identification and quantification of PCB mixtures (Aroclors), a single point calibration is routinely run with each initial and continuing calibration. If a particular Aroclor is detected in a sample (Aroclor 1254 in this case), Lockheed performs a five point calibration for that Aroclor prior to quantification, and the sample is re-analyzed. The error was made during the determination of the nominal concentration of the standards used for the five point calibration. This was attributed to the misuse os a calculation spreadsheet utilized for documentation of the standards preparation. The nominal concentration assigned was twice the actual concentration.

Our corrective action for this problem has been comprehensive. The analyst who misused the spreadsheet is no longer with Lockheed. The spreadsheet has been modified to "lockout" the calculation, preventing a reoccurrence of the miscalculation. Analysts have been instructed on the proper use of the spreadsheet. A formal Nonconformance and Corrective Action Record (NCAR) has been generated and is enclosed. The results for all affected samples have been corrected in our database. The Form 1's for all your samples have been regenerated to reflect the corrected PCB 1254 concentrations and are enclosed.

Please do not hesitate to contact me at (702)361-3955, extension 325 if I may be of further assistance to you with regard to this or any other matter. In the event that I cannot be reached, please call Mary Ford, Client Service Manager at (702) 361-3955, extension 326.

Yours Sincerely

Michael Lenkauskas
Client Service Representative

cc: M. Ford (w/o attachment)

Lockheed Analytical Services

FOLLOW-UP EVALUATION OF NONCONFORMANCE & CORRECTIVE ACTION

CLOSED

NCAR-160F

Detailed Description The followup for the PCB standard preparation problem consisted of correcting the spreadsheet format, notifying the clients that were impacted and resubmitting the affected data, and a review by QAD that the standards are being prepared correctly. All action items have been done, and all PCB standards are being made correctly and the spreadsheet is accurate. NCAR is Closed.

X☐ NCAR Is Officially Closed	NCAR Requires Further Review
QA Staff's Signature	Date 11/01/95

DISTRIBUTION: Originator Manager/Supervisor Project Manager QA Dept Doc Control NCAR-FUP-06/94

Lockheed Analytical Services

FOLLOW-UP EVALUATION OF NONCONFORMANCE & CORRECTIVE ACTION

NCAR-160F

Detailed Description

Interim Status:

The following logins have been reissued and a copy of the reissue has been provided with the original deliverable in document control:

- L4310 - Woodward Clyde
- L4631 - Woodward Clyde
- L4476 - Parsons Engineering Science
- L4546 - MK Ferguson

The following logins have been reissued, however; a copy of the reissue has not been provided with the original deliverable in document control.

- L4598 - SEG

The following logins have not been reissued:

- L4182 - Bechtel Navy Clean II
- L4197 - Bechtel Navy Clean II

The appropriate client services representatives have been notified of the situation.

☐ NCAR Is Officially Closed	NCAR Requires Further Review
QA Staff's Signature Carrie Pancurn	Date 8/25/95

DISTRIBUTION: Originator Manager/Supervisor Project Manager QA Dept Doc Control

NCAR-FUP-06/94

Lockheed Analytical Services

NONCONFORMANCE & CORRECTIVE ACTION RECORD

CLOSED

NCAR - 160

Nonconformance

- ☐ Analytical Method
- ☐ Analytical System
- ☐ Sample Preparation
- ☒ Standard Prep & Traceability
- ☐ Sample Handling & Management
- ☐ Data Review & Validation
- ☐ Data Reporting
- ☐ Communication
- ☐ External PE Studies
- ☐ Other *(describe below)*

Detailed Description of Nonconformance On 6-14-95, we discovered an error with the calculation of the nominal concentrations of PCB 1254 5-point calibration standards 0727-6-1,2,3,4,5. The actual concentrations of these standards, prepared on April 10, 1995, was one-half what they were calculated to be. The problem was a misuse of an Excel spreadsheet used to calculate nominal concentrations of standards. As a result, all of the

Project Name/Job Name	Prep Batch ID	Analysis Batch ID
8080 PCB 1254	VARIOUS	VARIOUS
Originator's Signature	Supervisor's Signature	Date
		6-16-95

Corrective Action

Detailed Description of Corrective Actions Implemented or Planned
The problem was discovered by Scott Carelle. Scott should be commended for recognizing it. The individual who prepared the standards and misused the spreadsheet is no longer with LAS. To prevent this problem from reoccurring, the GC Technical Lead Jeff Lawes will modify the spreadsheet so the calculations are "locked out". Additionally, he will instruct personnel on the proper use of the spreadsheet and discuss with them what has happened. On 6-16-95, Chad Funk generated

Responsible Person's Signature		Date 6-19-95
Supervisor's Signature		Date 6-19-95
Client Notification Required? ☒ Yes ☐ No ☐ N/A	Means? Phone, Fax, reissued dels.	Date Contacted 6-16-95

Corrective Action Verification

Detailed Description Error was an oversight due to misuse of spreadsheet. Protection of the spreadsheet calculations and contacting the clients and re-issuing reports will address this issue. There is not a systematic problem with incorrectly prepared standards. QA will perform a follow up with the Technical Lead and Client Services to ensure that the program has been corrected and protected, and that

Corrective Action Satisfactory? ☒ Yes ☐ No	Follow Up Required? ☒ Yes ☐ No
QA Staff's Signature	Date 6/19/95

DISTRIBUTION: *Originator* *Manager/Supervisor* *Project Manager* *QA Dept* *Doc Control*

Lockheed Analytical Services
NONCONFORMANCE & CORRECTIVE ACTION RECORD
NCAR- 160
Page 2 of 2

Nonconformance

Detailed Description of Nonconformance *(Continued)*

Values determined for PCB 1254 using these calibration standards were double what they should have been. Therefore, all of the results reported as non-detects were not affected. However, all of the "hits" reported were overestimated by a factor of two. The real determined values are one half of what we reported. The affected LALIDs, clients, projects, matrices, and results are listed on the attached ACS printout. The logins are also attached. KMA 6-16-95

Corrective Action

Detailed Description of Corrective Action Implemented and Planned *(Continued)*

Corrected Form Is for all affected samples. All clients involved ~~have been~~ will be notified. Reissued deliverables in the form of a FAX, reissued Form Is, or a complete report reissue will be done depending on client preference. Electronic deliverables will be corrected and reissued as required. All reissues will be documented through amended report files in Document Control. Hard copy raw data will be annotated if required by specific clients. KMA 6-19-95 KMA 6-19-95

Corrective Action Verification

Detailed Description *(Continued)* All affected client samples have be reissued. Furthermore, as part of the internal audits scheduled for this year, QA will assess the analysts understanding of the concentrations and calculations. Audit will be closed when all actions have been completed, including follow-up by QAD. Tup of re-issues will be conducted the first week in July 1995.

Jamie F. Armour
6/19/95

Lockheed Analytical Services

NONCONFORMANCE & CORRECTIVE ACTION RECORD

NCAR - 160

Nonconformance

- ☐ Analytical Method
- ☐ Analytical System
- ☐ Sample Preparation
- ☒ Standard Prep & Traceability
- ☐ Sample Handling & Management
- ☐ Data Review & Validation
- ☐ Data Reporting
- ☐ Communication
- ☐ External PE Studies
- ☐ Other *(describe below)*

Detailed Description of Nonconformance ON 6-14-95, we discovered an error with the calculation of the nominal concentrations of PCB 1254 5-point calibration standards 0727-6-1,2,3,4,5. The actual concentrations of these standard prepared on April 10, 1995, was one-half what they were calculated to be. The problem was a misuse of an Excel spreadsheet used to calculate nominal concentrations of standards. As a result, all of th

Project Name/Job Name	Prep Batch ID	Analysis Batch ID
8080 PCB 1254	various	various
Originator's Signature	Supervisor's Signature	Date
		6-16-95

Corrective Action

Detailed Description of Corrective Actions Implemented or Planned

The problem was discovered by Scott Corelle. Scott should be commended for recognizing it. The individual who prepared the standards and misused the spreadsheet is no longer with LAS. To prevent this problem from reoccurring, the GC technical lead Jeff Lancos will modify the spreadsheet so the calculations are "locked out". Additionally, he will instruct personnel on the proper use of the spreadsheet and discuss with them what has happened. On 6-16-95, Chad Funk generated

Responsible Person's Signature	Date 6-18-95
Supervisor's Signature	Date 6-19-95

Client Notification Required? ☒ Yes ☐ No ☐ N/A	Means? Phone, Fax, reissued dels.	Date Contacted 6-16-9

Corrective Action Verification

Detailed Description

Corrective Action Satisfactory? ☐ Yes ☐ No	Follow Up Required? ☐ Yes ☐ No
QA Staff's Signature	Date

DISTRIBUTION: *Originator* *Manager/Supervisor* *Project Manager* *QA Dept* *Doc Control*

Lockheed Analytical Services
NONCONFORMANCE & CORRECTIVE ACTION RECORD
NCAR- 160

Nonconformance

Detailed Description of Nonconformance *(Continued)*

values determined for PCB 1254 using these calibration standards were double what they should have been. Therefore, all of the results reported as non-detects were not affected. However, all of the "hits" reported were overestimated by a factor of two. The real determined values are one half of what we reported. The affected LALIDs, clients, projects, matrices, and results are listed on the attached ACS printout. The logins are also attached. KWH 6-6-95

Corrective Action

Detailed Description of Corrective Action Implemented and Planned *(Continued)*

corrected Form Is for all affected samples. All clients involved ~~have~~ will be ~~been~~ notified. Reissued deliverables in the form of a FAX, reissued Form Is, or a complete report reissue will be done depending on client preference. Electronic deliverables will be corrected and reissued as required. All reissues will be documented through amended report files in Document Control. Hard copy raw data will be annotated if required by specific clients.

KWH 6-19-95

KWH 6-19-95

Corrective Action Verification

Detailed Description *(Continued)*

AR_N00247_000325
NTC SAN DIEGO
SSIC NO. 5090.3.A

FINAL
EXTENDED SITE INSPECTION
INACTIVE LANDFILL

DATED 12 FEBRUARY 1996

THIS RECORD IS ENTERED IN THE DATABASE AND FILED AS

RECORD NO. AR_N00247_000278