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Iron and Lead Corrosion in WIPP-Relevant Conditions: 18 Month Results

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TABLE OF CONTENTS

APPROVAL PAGE 2

TABLE OF CONTENTS 3

LIST OF FIGURES 4

LIST OF TABLES 5

DEFINITION OF ABBREVIATIONS, ACRONYMS AND INITIALISMS 6

1 INTRODUCTION 7

2 EXPERIMENTAL APPROACH AND METHODS 8

3 EXPERIMENTAL RESULTS 10

3.1 Determination of Mass-Loss and Corrosion Rates 10

4 CONCLUSIONS 17

5 ACKNOWLEDGEMENTS 18

6 REFERENCES 19

APPENDIX A 20

APPENDIX B 31

APPENDIX C 36

APPENDIX D 109

LIST OF FIGURES

Figure 3-1 Average corrosion rates for steel coupons in the various brines plotted as a function of the atmospheric CO_2 concentration. Bars indicate one standard deviation for the average corrosion rates. 12

Figure 3-2 Average corrosion rates for steel coupons in the various brines plotted as a function of the exposure time. Bars indicate one standard deviation for the average corrosion rates. 13

Figure 3-3 Average corrosion rates for lead coupons in the various brines plotted as a function of the atmospheric CO_2 concentration. Bars indicate one standard deviation for the average corrosion rates. 15

Figure 3-4 Average corrosion rates for lead coupons in the various brines plotted as a function of the exposure time. Bars indicate one standard deviation for the average corrosion rates. 16

LIST OF TABLES

Table 2-1 Experimental Test Matrix 9

Table 3-1 Average Corrosion Rate (μm/yr) for 18 Month Steel Samples 11

Table 3-2 Average Corrosion Rate (μm/yr) for 18 Month Lead Samples 14

Table A-1 Measured Steel Coupon Dimensions and Calculated Surface Areas 21

Table A-2 Measured Lead Coupon Dimensions and Calculated Surface Areas 26

Table B-1 Summary of Steel Coupon Corrosion Rate Data 32

Table B-2 Summary of Lead Coupon Corrosion Rate Data 34

DEFINITION OF ABBREVIATIONS, ACRONYMS AND INITIALISMS

Abbreviation or Acronym	Definition
ASTM	American Society for Testing and Materials
CH	contact handled
CO_2	carbon dioxide
DOE	Department of Energy
EDS	energy dispersive spectroscopy
ERDA-6	Energy Research and Development Administration (WIPP Well) 6. Synthetic Castile Formation brine
GWB	Generic Weep Brine, a synthetic Salado Formation brine.
ISO	International Standards Organization
m	molal (mol/kg)
M	molar (mol/L)
MFGCS	mixed-flow gas control system
N_2	nitrogen gas
NACE	National Association of Corrosion Engineers
RH	remote handled
SEM	scanning electron microscopy
SNL	Sandia National Laboratories
TP	test plan
TRU	Transuranic
WIPP	Waste Isolation Pilot Plant

1 INTRODUCTION

The experimental work reported in this document assesses the corrosion behavior of carbon steel and Pb alloys used to contain CH and RH waste under WIPP-relevant conditions. The objective of this work is to determine to what extent these alloys consume CO_2 through the formation of carbonates, potentially supporting MgO in its role of CO_2 sequestration. This work is being conducted under the test plan "Iron and Lead Corrosion in WIPP-Relevant Conditions, Test Plan TP 06-02" (Wall and Enos, 2006).

The following report documents the 18-month results from this two year experimental work. This report is a follow up to Roselle (2009, 2010) in which the results from the six and twelve month experiments were presented.

2 EXPERIMENTAL APPROACH AND METHODS

The purpose of these experiments is to assess the corrosion behavior of low carbon steel and Pb alloys used to contain CH and RH waste under WIPP-relevant conditions. Specifically, the experiments aim to determine the corrosion rates of these metals and the nature of the corrosion products that will form. The environmental conditions and samples used for this set of experiments are set up to be representative of the conditions that are expected in the WIPP following its closure. During these experiments steel and lead coupons will be immersed in different WIPP-relevant brines or hung in WIPP-relevant atmospheric conditions for a period of two years. A subset of samples will be removed from the experiments for analysis at six month intervals. The range of experimental variables is summarized in Table 2-1. This combination of experimental conditions, material types and time segments results in 288 unique experiments. In addition, three replicate coupons are used for each of the experimental conditions resulting in a total of 864 coupons (432 for lead and 432 for steel). A detailed discussion of the types of metal coupons used and the environmental conditions employed in the experiments is given in Roselle (2009).

Also shown in Table 2-1 are the matrix identifiers used in formulating unique sample numbers. The naming convention used follows this format: Aa-Bb-#### - X – Yz, where Aa is the material type, Bb the brine (or "Atm" for humid samples), #### the atmosphere, X the time segment, Y the replicate number (1 to 3) and z the sample position (left blank for humid position). Thus, sample number Fe-Go-1500-18-1f indicates the first replicate of a steel coupon fully inundated in GWB organic brine in a 1500 ppm CO_2 atmosphere for 18 months.

Previous corrosion experiments (e.g., Telander and Westerman, 1993; 1997) have been conducted in closed systems in which the atmosphere in the experiments changes as a function of corrosion. This method uses measurements of the head gas composition to estimate the amount and type of corrosion occurring in the experiments. However, such experiments result in head space gas compositions that change over time and may not reflect the expected conditions in the WIPP after closure. Therefore, the current Fe/Pb corrosion experiments are being conducted in a continuous flow setup that allows the atmospheric composition to be fixed at constant values. The specific details of the experimental setup and methods can be found in the six month experimental report (Roselle, 2009).

Table 2-1 Experimental Test Matrix

Condition	Variable	Matrix Identifier
Material Type	ASTM A1008 Steel	Fe
	QQ-L-171e Grade C Lead	Pb
Brine	GWB	G
	GWB with organics	Go
	ERDA-6	E
	ERDA-6 with organics	Eo
Sample Positioning	Fully Submerged	f
	Partially Submerged	p
	Humid Atmosphere	Atm
Atmosphere	0 ppm CO_2 (balance N_2)	0000
	350 ppm CO_2 (balance N_2)	0350
	1500 ppm CO_2 (balance N_2)	1500
	3500 ppm CO_2 (balance N_2)	3500
Time Segment	6 months	6
	12 months	12
	18 months	18
	24 months	24
Fixed Properties (constant for all experiments)	Temperature – 26 °C	--
	Relative Humidity – 75% ± 10%	--
	O_2 concentration < 5 ppm	--

Note: [2 Material types × 4 Brines × 2 Positions (wet) × 4 Atmospheres × 4 Time segments] + [2 Material type × 1 Position (humid) × 4 Atmospheres × 4 Time segments] = 288 experiments

3 EXPERIMENTAL RESULTS

After 18 months of exposure in the various brines and atmospheres most of the coupons show clear signs of corrosion. This report will not discuss in detail the post-experimental appearance of the 18 month coupons. However, it can be stated that the general trends observed among the six and twelve month coupons (Roselle, 2009, 2010) are similar for the 18 month experiments.

3.1 Determination of Mass-Loss and Corrosion Rates

After the corrosion tests have been completed, two of the three replicate coupons for each test condition were chemically cleaned in order to remove all of the corrosion products. The mass of the coupons after cleaning is compared to the initial mass and the difference represents the loss of material to corrosion. The mass loss can then be used to calculate a corrosion rate.

There are numerous standard procedures that outline requirements for the cleaning of corrosion samples: ISO 8407:1991, NACE Standard TM0169-2000 and ASTM G 1 – 03. For the most part, each of these standard procedures outlines nearly identical requirements and all coupons were cleaned per the requirements outlined in these standards. Where there are differences between the standards, the source for a particular requirement that was used is noted. The cleaning process included multiple cycles of chemical etching, brushing with a nonmetallic soft bristle brush followed by rinsing with deionized water. Following each cleaning cycle the coupons were dried and weighed with the weight for each cycle being recorded in the scientific notebook. A minimum of five cleaning cycles was performed for each coupon. The details of the chemical cleaning process for each material type are given in detail in Roselle (2009).

Because the above cleaning procedures remove some amount of base metal in addition to the corrosion products a procedure needs to be employed that corrects the weight loss measurements for the base metal loss. This study uses a procedure of graphical analysis based on multiple cleaning cycles in order to extrapolate the actual weight loss due to corrosion from the total measured weight loss. The graphical analysis method is outlined in ISO 8407:1991 and discussed in Roselle (2009). Corrosion rates are calculated from the mass loss data according to the following formula (NACE, 2000):

$$rate = \frac{W \times 87.6}{SA \times t \times \rho} \times 1000 \tag{3}$$

where *rate* is the corrosion rate in μm/yr, W the mass loss (mg), SA the exposed surface area of the coupon (cm^2), t the exposure duration (hours), ρ the metal density (g/cm^3) and 1,000 converts the rate from mm/yr to μm/yr. The details of the surface area determination for each coupon are described in Appendix A. Metal densities of 7.872 g/cm^3 and 11.340 g/cm^3 were used for steel and lead, respectively (MatWeb, 2009). A summary of the weight loss data for each coupon is

given in Appendix B. The raw cleaning cycle data and graphical analysis results for each coupon are given in Appendix C (steel) and Appendix D (lead).

Table 3-1 gives the steel coupon average corrosion rates calculated from the weight-loss and surface area measurements for each brine type and the humid samples for the 18 month experiments. The average corrosion rates for the different brine types are calculated using the results for both the fully immersed and partially submerged coupons for each brine type. This was done because the calculated corrosion rates do not seem to be dependent on the coupon placement. The average steel corrosion rates are plotted as a function of CO_2 concentration in Figure 3-1. From this plot it can be seen that for both brine types the corrosion rate appears to be a function of the CO_2 concentration, regardless of the presence or absence of organic ligands. However, there are differences in the corrosion rates between the different brine types. The ERDA-6 brines appear to be more corrosive than the GWB brines by a factor of nearly 3 at the higher CO_2 concentrations. It also appears that the addition of organic ligands to the ERDA-6 and GWB brines does not result in significantly different corrosion rates. This is in contrast to the six month (Roselle, 2009) and 12 month (Roselle, 2010) experiments in which the addition of organics to the brine resulted in enhanced corrosion rates for ERDA-6 brines. The humid samples show no corrosion regardless of the CO_2 concentration.

Table 3-1 Average Corrosion Rate (μm/yr) for 18 Month Steel Samples

Brine	CO_2 Concentration (ppm)			
	0	350	1500	3500
GWB	0.10 ± 0.01	0.12 ± 0.02	0.18 ± 0.01	0.25 ± 0.01
GWB org	0.11 ± 0.01	0.14 ± 0.03	0.16 ± 0.01	0.26 ± 0.04
ERDA-6	0.19 ± 0.02	0.18 ± 0.05	0.43 ± 0.09	0.73 ± 0.08
ERDA-6 org	0.12 ± 0.02	0.13 ± 0.02	0.34 ± 0.06	0.74 ± 0.05
Humid	0.00 ± 0.00	0.00 ± 0.00	0.01 ± 0.00	0.02 ± 0.01

Source: Averages calculated from data in Appendix B. Note that negative corrosion rates given in Appendix B are considered as 0.0 for calculation of averages.

The trends seen in the 18 month experiments are generally consistent with the results obtained in the six and twelve month experiments. A comparison of the18 month rates with the six and 12 month experiments is shown in Figure 3-2. This plot indicates that the corrosion rates may be slowing down as a function of time at the highest CO_2 concentrations. The reduction in corrosion rates with time could be an indication that the samples are beginning to show signs of passivation. However, the three sets of corrosion rates are within error of each other and the observed trends may be the result of experimental variations in the data as opposed to passivation. Additional data from the 24 month experiments will be needed before making any definitive conclusions regarding passivation.

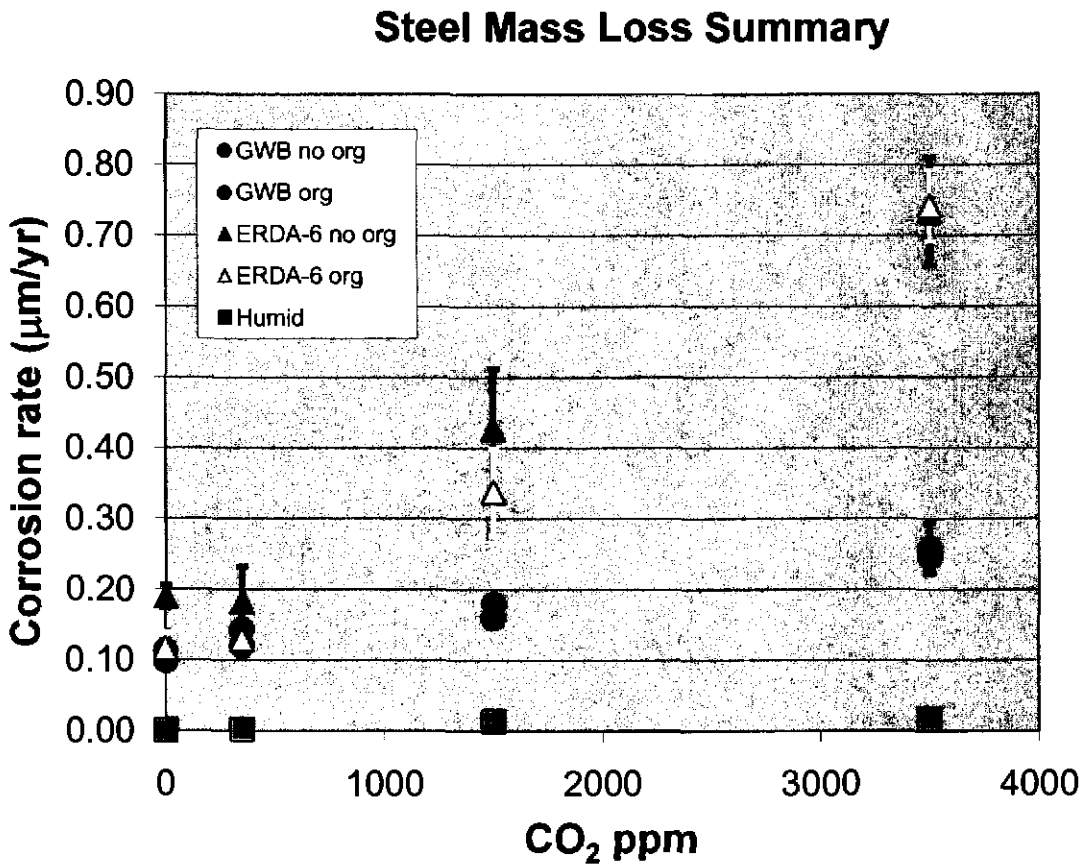

Figure 3-1 Average corrosion rates for steel coupons in the various brines plotted as a function of the atmospheric CO_2 concentration. Bars indicate one standard deviation for the average corrosion rates.

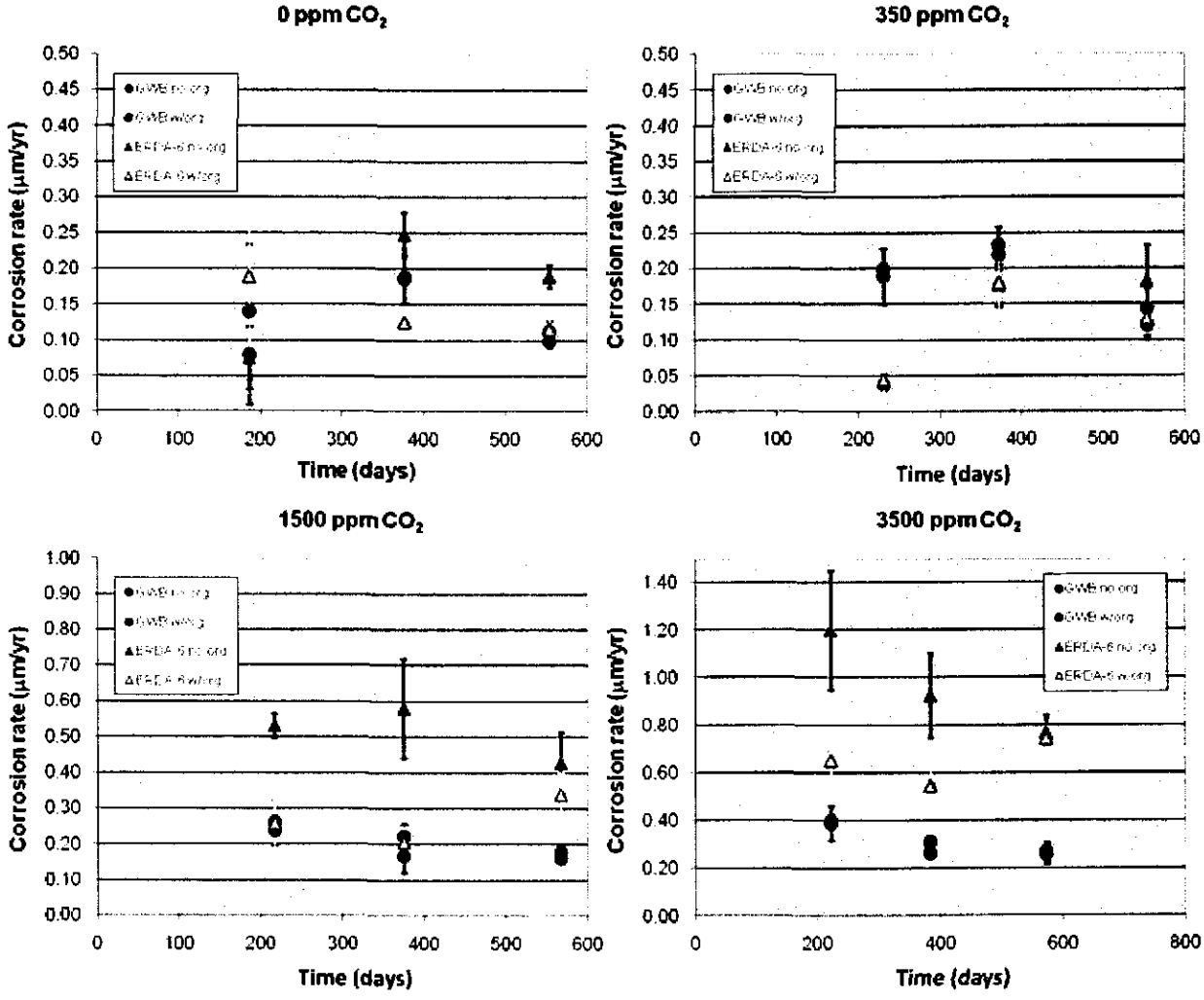

Figure 3-2 Average corrosion rates for steel coupons in the various brines plotted as a function of the exposure time. Bars indicate one standard deviation for the average corrosion rates.

Table 3-2 gives the Pb coupon average corrosion rates calculated from the weight-loss and surface area measurements for each brine type and the humid samples. As with the steel coupons, the average Pb corrosion rates are calculated using the results for both the fully immersed and partially submerged coupons for each brine type. The average lead corrosion rates are plotted as a function of CO_2 concentration in Figure 3-3. From this plot it can be seen that the data for the lead coupons does not present as clear a picture as for the steel coupons. There may be a slight dependence on corrosion rates with the CO_2 concentration. However, given the relatively large standard deviation in the averages it is difficult to determine if there is an actual dependence on CO_2 concentration. As with the six and twelve month Pb experiments, there does not appear to be differences in the corrosion rates between the different brine types. The humid

samples show measureable mass loss regardless of the CO_2 concentration. However, it is not certain if the magnitude of the mass loss is within the measurement uncertainty of the graphical analysis method (Appendix B).

Table 3-2 Average Corrosion Rate (μm/yr) for 18 Month Lead Samples

Brine	CO_2 Concentration (ppm)			
	0	350	1500	3500
GWB	0.11 ± 0.10	0.14 ± 0.05	0.19 ± 0.10	0.21 ± 0.03
GWB org	0.12 ± 0.08	0.15 ± 0.06	0.22 ± 0.07	0.16 ± 0.11
ERDA-6	0.17 ± 0.14	0.13 ± 0.04	0.05 ± 0.04	n.d.
ERDA-6 org	0.12 ± 0.10	0.13 ± 0.07	0.12 ± 0.12	0.04 ± 0.03
Humid	0.01 ± 0.02	0.05 ± 0.00	0.05 ± n.d.	0.07 ± 0.05

Source: Averages calculated from data in Appendix B. Note that negative corrosion rates given in Appendix B are considered as 0.0 for calculation of averages. Abbreviation n.d. means no data available.

A comparison of the 18 month lead corrosion rates with the six and 12 month experiments is shown in Figure 3-4. This plot shows that the corrosion rates are likely slowing down as a function of time, especially at the highest CO_2 concentrations. The reduction in corrosion rates with time could be an indication that the samples are beginning to show signs of passivation. However, the three sets of corrosion rates are close to being within error of each other and the observed trends may be the result of experimental variations in the data as opposed to passivation. Additional data from the 24 month experiments will be needed before making any definitive conclusions regarding passivation.

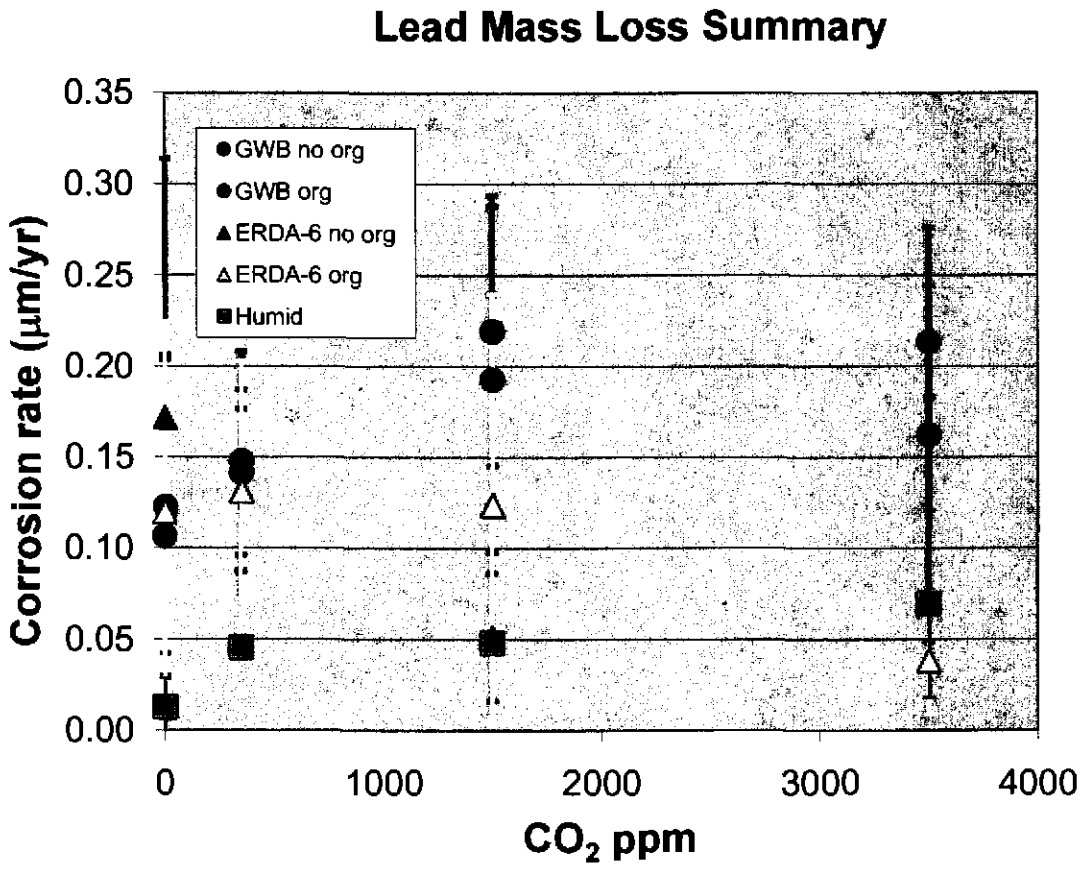

Figure 3-3 Average corrosion rates for lead coupons in the various brines plotted as a function of the atmospheric CO_2 concentration. Bars indicate one standard deviation for the average corrosion rates.

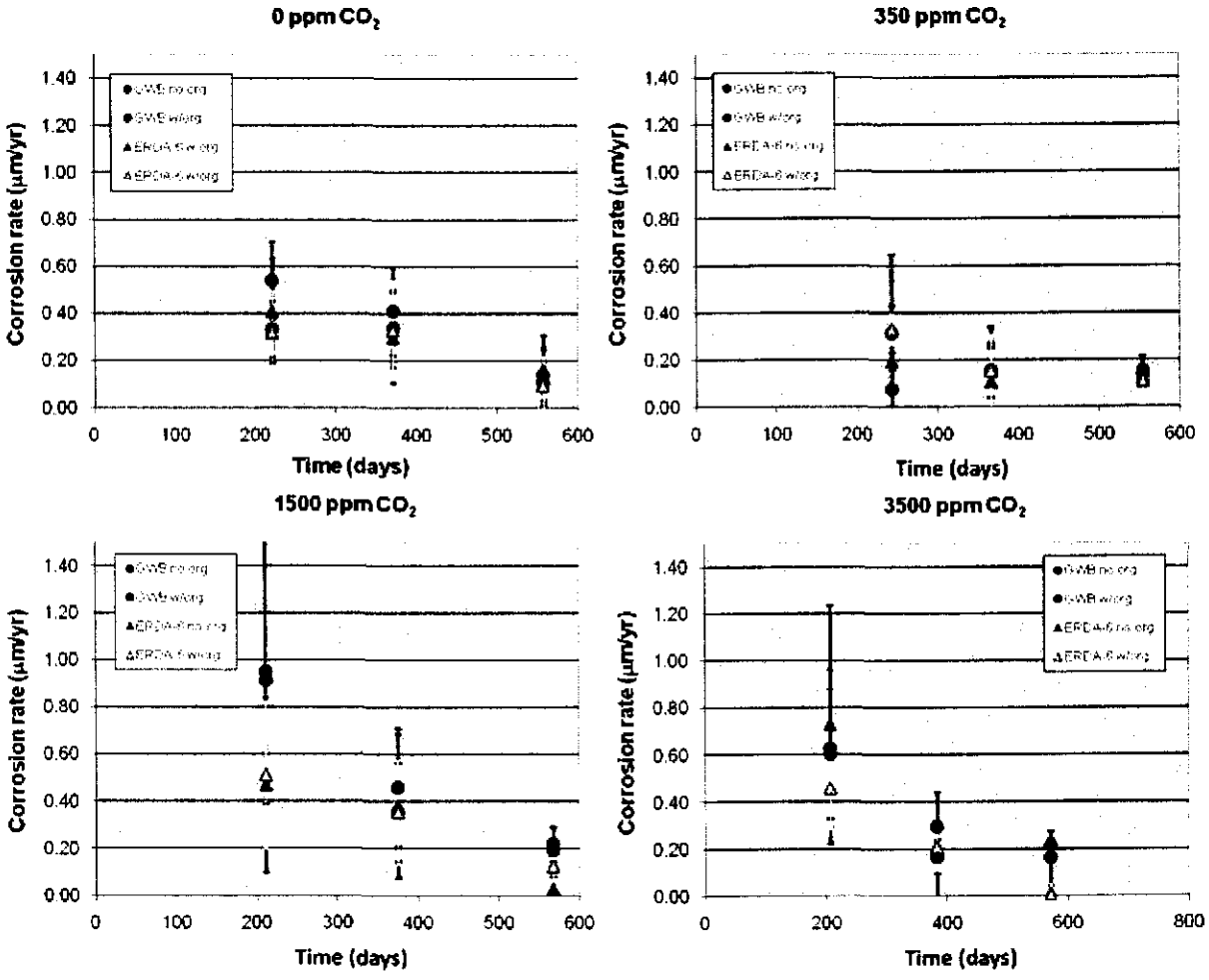

Figure 3-4 Average corrosion rates for lead coupons in the various brines plotted as a function of the exposure time. Bars indicate one standard deviation for the average corrosion rates.

4 CONCLUSIONS

This report describes the 18 month results of a two year study on the corrosion of steel and lead under WIPP-relevant conditions. Analysis of the results from this set of experiments allows the following conclusions to be drawn. It should be noted, however, that the results of future experiments conducted for longer times may require modification to these conclusions.

- The corrosion rate of ASTM A1008 low-carbon steel immersed in brine is a strong function of the CO_2 concentration for all brine types. ERDA-6 brines (with and without organics) are more corrosive than the GWB brines by a factor of nearly 3 at higher CO_2 concentrations. The addition of organic ligands to the ERDA-6 brine results in less corrosion than the organic free ERDA-6. Corrosion rates for GWB appear to be independent of the presence or absence of organic ligands.

- The corrosion rate of chemical Pb may show a slight dependence of corrosion rates on the CO_2 concentration. However, given the relatively large standard deviation in the averages it is difficult to determine if there is an actual dependence on CO_2 concentration. There does not appear to be any difference in the corrosion rates between the different brine types at CO_2 concentrations of 350 ppm or less. At CO_2 concentrations greater than 350 ppm it appears that GWB may be more corrosive.

- Steel samples subjected only to humid conditions show no corrosion regardless of the CO_2 concentration. Whereas, humid Pb samples show measureable mass loss regardless of the CO_2 concentration. However, the magnitude of the mass loss may be within the measurement uncertainty of the graphical analysis method.

- The corrosion rates calculated for both steel and lead coupons from the 18 month experiments appear to be lower than the results from the six and twelve month experiments. This may be due to the passivation of the coupon surfaces but the rates are still within the standard deviation of each other. More data from the longer term experiments will be needed in order to determine if passivation is occurring.

5 ACKNOWLEDGEMENTS

These experiments are the result of the dedicated work from numerous people whose assistance is greatly appreciated. The initial conceptual design for this work was developed by Nathalie Wall and David Enos. Michael Schuhen was responsible for most of the design, building, testing and maintenance of the MFGCS; without his insight the system would never have come to fruition. Raul Rascon and Panit Howard provided additional invaluable assistance in the creation of the MFGCS. A large part of the sample preparation and laboratory analysis work was conducted under the direction of Shelly Johnsen and Leslie Kirkes with the assistance of student interns: Caitlin Allen, Rachael Roselle, Tana Saul, Matt Stroble, Diana Goulding, Cassandra Marrs, and Brittany Hoard.

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APPENDIX A

Table A-1 lists the length, width and thickness measurements for each steel coupon, as well as, the average value of these measurements used to calculate the surface area. The equivalent data for the lead coupons is given in Table A-2. Additionally, for each of the coupons that were partially submerged the length of the portion of the coupon that was submerged is also given. In this case two measurements are made because the coupon may not have been submerged exactly parallel to the water surface.

For coupons that were fully submerged or exposed only to the atmosphere the following formula is used to calculate surface area:

$$SA = 2(L_{avg} \times W_{avg}) + 2(L_{avg} \times T_{avg}) + 2(W_{avg} \times T_{avg}) - 2\pi R^2 + 2\pi R \times T_{avg} \quad (A1)$$

where L_{avg} is the average measured length, W_{avg} the average width, T_{avg} the average thickness and R the radius of the hole, which is assumed constant for each coupon at 0.235 cm for steel coupons and 0.296 cm for lead coupons. The surface area for coupons that were partially submerged is calculated as follows:

$$SA = 2(L_1 \times W_{avg}) + (L_1 \times T_{avg}) + (L_2 \times T_{avg}) + (W_{avg} \times T_{avg}) + (W_{avg} \times (L_2 - L_1)) \quad (A2)$$

where L_1 is the smallest measured partial submersion length, L_2 the largest measured length and all other symbols are the same as for equation A1.

Table A-1 Measured Steel Coupon Dimensions and Calculated Surface Areas

Coupon		1 (mm)	2 (mm)	3 (mm)	Average (mm)	Average (cm)	L_1 (cm)	L_2 (cm)	SA (cm^2)
034	Length	51.13	51.17	51.09	51.13	5.113	N/A	N/A	41.520
	Width	38.45	38.48	38.33	38.42	3.842			
	Thickness	1.34	1.31	1.34	1.33	0.133			
035	Length	51.09	51.24	51.28	51.20	5.120	N/A	N/A	41.645
	Width	38.38	38.57	38.41	38.45	3.845			
	Thickness	1.38	1.35	1.31	1.35	0.135			
037	Length	50.96	51.32	51.30	51.19	5.119	2.850	2.945	23.433
	Width	38.28	38.45	38.35	38.36	3.836			
	Thickness	1.29	1.26	1.20	1.25	0.125			
038	Length	51.19	51.20	50.92	51.10	5.110	2.756	2.780	22.555
	Width	38.57	38.70	38.56	38.61	3.861			
	Thickness	1.30	1.27	1.20	1.26	0.126			
040	Length	51.30	51.28	51.17	51.25	5.125	N/A	N/A	41.499
	Width	38.30	38.44	38.28	38.34	3.834			
	Thickness	1.28	1.33	1.33	1.31	0.131			
041	Length	51.19	51.23	51.19	51.20	5.120	N/A	N/A	41.621
	Width	38.34	38.46	38.36	38.39	3.839			
	Thickness	1.37	1.37	1.37	1.37	0.137			
043	Length	51.06	51.19	51.18	51.14	5.114	2.944	3.164	24.835
	Width	38.37	38.55	38.41	38.44	3.844			
	Thickness	1.36	1.37	1.35	1.36	0.136			
044	Length	51.22	51.31	51.29	51.27	5.127	2.913	3.071	24.445
	Width	38.46	38.61	38.64	38.57	3.857			
	Thickness	1.38	1.40	1.38	1.39	0.139			
046	Length	51.16	51.30	51.18	51.21	5.121	N/A	N/A	41.723
	Width	38.46	38.53	38.57	38.52	3.852			
	Thickness	1.38	1.34	1.32	1.35	0.135			
047	Length	51.08	51.26	51.23	51.19	5.119	N/A	N/A	41.588
	Width	38.36	38.42	38.39	38.39	3.839			
	Thickness	1.36	1.37	1.34	1.36	0.136			
049	Length	51.10	51.20	51.21	51.17	5.117	2.907	3.104	24.484
	Width	38.34	38.56	38.62	38.51	3.851			
	Thickness	1.38	1.34	1.35	1.36	0.136			
050	Length	51.08	51.26	51.19	51.18	5.118	2.895	2.904	23.666
	Width	38.45	38.89	38.33	38.56	3.856			
	Thickness	1.38	1.35	1.33	1.35	0.135			
052	Length	51.11	51.21	51.39	51.24	5.124	N/A	N/A	41.565
	Width	38.32	38.58	38.34	38.41	3.841			
	Thickness	1.34	1.30	1.30	1.31	0.131			
053	Length	51.12	51.26	51.26	51.21	5.121	N/A	N/A	41.755
	Width	38.43	38.63	38.59	38.55	3.855			
	Thickness	1.37	1.36	1.31	1.35	0.135			

Table A-1 continued.

Coupon		1 (mm)	2 (mm)	3 (mm)	Average (mm)	Average (cm)	L_1 (cm)	L_2 (cm)	SA (cm^2)
055	Length	51.16	51.27	51.26	51.23	5.123	3.190	3.301	26.349
	Width	38.43	38.55	38.38	38.45	3.845			
	Thickness	1.35	1.34	1.34	1.34	0.134			
056	Length	51.26	51.25	51.23	51.25	5.125	3.148	3.239	25.838
	Width	38.33	38.52	38.41	38.42	3.842			
	Thickness	1.31	1.29	1.21	1.27	0.127			
058	Length	51.22	51.22	51.11	51.18	5.118	N/A	N/A	41.542
	Width	38.27	38.67	38.54	38.49	3.849			
	Thickness	1.30	1.31	1.23	1.28	0.128			
059	Length	51.14	51.23	51.37	51.25	5.125	N/A	N/A	41.520
	Width	38.29	38.47	38.42	38.39	3.839			
	Thickness	1.32	1.36	1.21	1.30	0.130			
169	Length	51.15	51.25	51.10	51.17	5.117	N/A	N/A	41.643
	Width	38.51	38.54	38.35	38.47	3.847			
	Thickness	1.37	1.34	1.35	1.35	0.135			
170	Length	51.09	51.21	51.12	51.14	5.114	N/A	N/A	41.722
	Width	38.72	38.48	38.32	38.51	3.851			
	Thickness	1.39	1.37	1.39	1.38	0.138			
172	Length	51.13	51.17	51.09	51.13	5.113	2.844	2.901	23.280
	Width	38.23	38.39	38.28	38.30	3.830			
	Thickness	1.35	1.32	1.33	1.33	0.133			
173	Length	51.28	51.25	51.19	51.24	5.124	2.793	2.816	22.784
	Width	38.37	38.45	38.29	38.37	3.837			
	Thickness	1.36	1.33	1.32	1.34	0.134			
175	Length	51.11	51.35	51.04	51.17	5.117	N/A	N/A	41.595
	Width	38.37	38.46	38.47	38.43	3.843			
	Thickness	1.36	1.33	1.35	1.35	0.135			
176	Length	51.01	51.11	50.99	51.04	5.104	N/A	N/A	41.138
	Width	38.23	38.37	38.26	38.29	3.829			
	Thickness	1.29	1.19	1.25	1.24	0.124			
178	Length	50.96	51.19	51.04	51.06	5.106	2.964	3.004	24.054
	Width	38.27	38.36	38.21	38.28	3.828			
	Thickness	1.26	1.24	1.20	1.23	0.123			
179	Length	50.83	51.26	51.16	51.17	5.117	2.533	2.771	21.637
	Width	38.31	38.85	38.67	38.61	3.861			
	Thickness	1.29	1.25	1.25	1.26	0.126			
181	Length	51.08	51.19	51.16	51.14	5.114	N/A	N/A	41.665
	Width	38.37	38.53	38.56	38.49	3.849			
	Thickness	1.34	1.36	1.39	1.36	0.136			
182	Length	51.04	51.48	51.22	51.25	5.125	N/A	N/A	41.606
	Width	38.39	38.51	38.23	38.38	3.838			
	Thickness	1.38	1.33	1.34	1.35	0.135			
184	Length	50.89	51.18	51.09	51.05	5.105	3.021	3.039	24.550
	Width	38.29	38.48	38.25	38.34	3.834			
	Thickness	1.31	1.33	1.35	1.33	0.133			

Table A-1 continued.

Coupon		1 (mm)	2 (mm)	3 (mm)	Average (mm)	Average (cm)	L_1 (cm)	L_2 (cm)	SA (cm^2)
185	Length	51.02	51.26	51.08	51.12	5.112	2.762	2.846	22.896
	Width	38.45	38.74	38.67	38.62	3.862			
	Thickness	1.32	1.30	1.30	1.31	0.131			
187	Length	51.00	51.37	51.09	51.15	5.115	N/A	N/A	41.548
	Width	38.30	38.55	38.40	38.42	3.842			
	Thickness	1.38	1.32	1.31	1.34	0.134			
188	Length	51.10	51.20	51.08	51.13	5.113	N/A	N/A	41.554
	Width	38.31	38.45	38.44	38.40	3.840			
	Thickness	1.36	1.36	1.36	1.36	0.136			
195	Length	50.89	51.14	51.10	51.04	5.104	2.573	2.672	21.356
	Width	38.52	38.59	38.35	38.49	3.849			
	Thickness	1.27	1.28	1.31	1.29	0.129			
196	Length	51.01	51.15	51.04	51.07	5.107	2.721	2.910	22.799
	Width	38.31	38.50	38.33	38.38	3.838			
	Thickness	1.27	1.25	1.24	1.25	0.125			
198	Length	50.99	51.16	51.04	51.06	5.106	N/A	N/A	41.231
	Width	38.21	38.47	38.33	38.34	3.834			
	Thickness	1.25	1.27	1.24	1.25	0.125			
201	Length	51.03	51.02	51.10	51.05	5.105	N/A	N/A	41.496
	Width	38.27	38.67	38.49	38.48	3.848			
	Thickness	1.31	1.32	1.33	1.32	0.132			
253	Length	51.08	51.07	51.14	51.10	5.110	N/A	N/A	41.343
	Width	38.48	38.48	38.35	38.44	3.844			
	Thickness	1.21	1.29	1.23	1.24	0.124			
254	Length	51.09	51.23	51.09	51.14	5.114	N/A	N/A	41.438
	Width	38.38	38.61	38.39	38.46	3.846			
	Thickness	1.28	1.26	1.25	1.26	0.126			
256	Length	51.10	51.19	51.08	51.12	5.112	3.215	3.215	25.973
	Width	38.21	38.42	38.31	38.31	3.831			
	Thickness	1.30	1.32	1.29	1.30	0.130			
257	Length	51.07	51.23	51.22	51.17	5.117	3.113	3.173	25.480
	Width	38.37	38.47	38.32	38.39	3.839			
	Thickness	1.31	1.36	1.33	1.33	0.133			
259	Length	51.07	51.29	51.23	51.20	5.120	N/A	N/A	41.581
	Width	38.43	38.54	38.37	38.45	3.845			
	Thickness	1.35	1.31	1.30	1.32	0.132			
260	Length	51.23	51.19	51.06	51.16	5.116	N/A	N/A	41.454
	Width	38.35	38.35	38.36	38.35	3.835			
	Thickness	1.32	1.32	1.32	1.32	0.132			
262	Length	51.06	51.22	51.14	51.14	5.114	2.958	2.990	24.180
	Width	38.43	38.54	38.37	38.45	3.845			
	Thickness	1.34	1.38	1.30	1.34	0.134			
263	Length	50.98	51.24	51.16	51.13	5.113	3.035	3.120	24.944
	Width	38.35	38.54	38.37	38.42	3.842			
	Thickness	1.29	1.30	1.30	1.30	0.130			

Table A-1 continued.

Coupon		1 (mm)	2 (mm)	3 (mm)	Average (mm)	Average (cm)	L_1 (cm)	L_2 (cm)	SA (cm^2)
265	Length	51.13	51.30	51.25	51.23	5.123	N/A	N/A	41.614
	Width	38.33	38.58	38.38	38.43	3.843			
	Thickness	1.34	1.33	1.33	1.33	0.133			
266	Length	51.03	51.22	51.22	51.16	5.116	N/A	N/A	41.380
	Width	38.27	38.51	38.39	38.39	3.839			
	Thickness	1.25	1.28	1.26	1.26	0.126			
268	Length	51.17	51.24	51.07	51.16	5.116	2.946	3.008	24.120
	Width	38.30	38.50	38.35	38.38	3.838			
	Thickness	1.30	1.29	1.29	1.29	0.129			
269	Length	51.07	51.29	51.20	51.19	5.119	3.028	3.206	25.337
	Width	38.38	38.60	38.67	38.55	3.855			
	Thickness	1.29	1.29	1.30	1.29	0.129			
271	Length	50.97	51.25	51.32	51.18	5.118	N/A	N/A	41.474
	Width	38.39	38.50	38.33	38.41	3.841			
	Thickness	1.30	1.28	1.30	1.29	0.129			
272	Length	51.11	51.17	51.12	51.13	5.113	N/A	N/A	41.347
	Width	38.36	38.35	38.29	38.33	3.833			
	Thickness	1.28	1.32	1.26	1.29	0.129			
274	Length	51.25	51.20	51.08	51.18	5.118	2.852	2.934	23.462
	Width	38.31	38.48	38.37	38.39	3.839			
	Thickness	1.31	1.29	1.30	1.30	0.130			
275	Length	51.00	51.25	51.13	51.13	5.113	2.867	2.867	23.344
	Width	38.42	38.65	38.56	38.54	3.854			
	Thickness	1.30	1.28	1.31	1.30	0.130			
277	Length	50.96	51.27	51.33	51.19	5.119	N/A	N/A	41.525
	Width	38.27	38.46	38.38	38.37	3.837			
	Thickness	1.33	1.34	1.34	1.34	0.134			
278	Length	50.99	51.27	51.25	51.17	5.117	N/A	N/A	41.508
	Width	38.34	38.48	38.39	38.40	3.840			
	Thickness	1.30	1.32	1.33	1.32	0.132			
362	Length	51.08	51.25	51.21	51.18	5.118	N/A	N/A	41.589
	Width	38.35	38.52	38.40	38.42	3.842			
	Thickness	1.35	1.33	1.35	1.34	0.134			
363	Length	51.19	51.24	51.11	51.18	5.118	N/A	N/A	41.571
	Width	38.30	38.52	38.40	38.41	3.841			
	Thickness	1.36	1.32	1.35	1.34	0.134			
365	Length	51.17	51.25	51.15	51.19	5.119	3.045	3.161	25.146
	Width	38.33	38.48	38.18	38.33	3.833			
	Thickness	1.37	1.36	1.33	1.35	0.135			
366	Length	51.22	51.20	51.04	51.15	5.115	3.078	3.120	25.049
	Width	38.21	38.49	38.33	38.34	3.834			
	Thickness	1.28	1.28	1.28	1.28	0.128			
368	Length	51.10	51.14	51.15	51.13	5.113	N/A	N/A	41.451
	Width	38.30	38.47	38.35	38.37	3.837			
	Thickness	1.32	1.32	1.32	1.32	0.132			

Table A-1 continued.

Coupon		1 (mm)	2 (mm)	3 (mm)	Average (mm)	Average (cm)	L_1 (cm)	L_2 (cm)	SA (cm^2)
369	Length	51.10	51.23	51.18	51.17	5.117	N/A	N/A	41.459
	Width	38.23	38.50	38.34	38.36	3.836			
	Thickness	1.33	1.33	1.29	1.32	0.132			
371	Length	50.94	51.27	51.18	51.13	5.113	2.838	3.122	24.035
	Width	38.24	38.41	38.19	38.28	3.828			
	Thickness	1.27	1.25	1.22	1.25	0.125			
372	Length	51.04	51.20	51.14	51.13	5.113	2.796	3.167	24.077
	Width	38.29	38.46	38.19	38.31	3.831			
	Thickness	1.27	1.27	1.23	1.26	0.126			
374	Length	51.02	51.24	51.13	51.13	5.113	N/A	N/A	41.404
	Width	38.28	38.55	38.34	38.39	3.839			
	Thickness	1.30	1.27	1.29	1.29	0.129			
375	Length	51.17	51.28	51.16	51.20	5.120	N/A	N/A	41.510
	Width	38.36	38.57	38.34	38.42	3.842			
	Thickness	1.32	1.29	1.27	1.29	0.129			
377	Length	51.13	51.27	51.18	51.19	5.119	3.000	3.082	24.676
	Width	38.27	38.54	38.30	38.37	3.837			
	Thickness	1.34	1.37	1.34	1.35	0.135			
378	Length	51.12	51.22	51.23	51.19	5.119	3.081	3.081	24.994
	Width	38.51	38.37	38.31	38.40	3.840			
	Thickness	1.36	1.33	1.31	1.33	0.133			
380	Length	51.19	51.24	51.14	51.19	5.119	N/A	N/A	41.637
	Width	38.49	38.57	38.38	38.48	3.848			
	Thickness	1.32	1.33	1.35	1.33	0.133			
381	Length	51.10	51.19	51.20	51.16	5.116	N/A	N/A	41.674
	Width	38.35	38.65	38.33	38.44	3.844			
	Thickness	1.36	1.40	1.39	1.38	0.138			
383	Length	51.05	51.22	51.10	51.12	5.112	2.931	2.931	23.813
	Width	38.25	38.50	38.35	38.37	3.837			
	Thickness	1.36	1.36	1.37	1.36	0.136			
384	Length	51.07	51.25	51.17	51.16	5.116	2.920	3.107	24.503
	Width	38.39	38.53	38.35	38.42	3.842			
	Thickness	1.38	1.37	1.34	1.36	0.136			
386	Length	51.05	51.25	51.19	51.16	5.116	N/A	N/A	41.475
	Width	38.29	38.50	38.23	38.34	3.834			
	Thickness	1.36	1.34	1.31	1.34	0.134			
387	Length	51.08	51.25	51.17	51.17	5.117	N/A	N/A	41.596
	Width	38.36	38.53	38.32	38.40	3.840			
	Thickness	1.36	1.37	1.36	1.36	0.136			

Source: Individual data sheets for each coupon in *WIPP-FePb-3 Supplemental Binder C (ERMS 546084)*

Table A-2 Measured Lead Coupon Dimensions and Calculated Surface Areas

Coupon		1 (mm)	2 (mm)	3 (mm)	Average (mm)	Average (cm)	L_1 (cm)	L_2 (cm)	SA (cm^2)
L029	Length	51.18	51.26	51.16	51.20	5.120	N/A	N/A	41.978
	Width	38.38	38.56	38.48	38.47	3.847			
	Thickness	1.60	1.60	1.55	1.58	0.158			
L030	Length	51.54	51.44	51.69	51.55	5.155	N/A	N/A	42.559
	Width	38.81	38.84	38.61	38.75	3.875			
	Thickness	1.57	1.57	1.60	1.58	0.158			
L032	Length	51.54	51.51	51.74	51.60	5.160	2.751	2.881	23.356
	Width	38.71	38.68	38.79	38.73	3.873			
	Thickness	1.60	1.65	1.63	1.63	0.163			
L033	Length	51.56	51.71	51.56	51.61	5.161	3.048	3.077	25.387
	Width	38.89	38.84	38.74	38.82	3.882			
	Thickness	1.63	1.63	1.57	1.61	0.161			
L035	Length	51.44	51.44	51.66	51.51	5.151	N/A	N/A	42.650
	Width	38.74	38.74	38.71	38.73	3.873			
	Thickness	1.65	1.68	1.65	1.66	0.166			
L036	Length	51.26	51.36	51.26	51.29	5.129	N/A	N/A	42.509
	Width	38.91	38.74	38.68	38.78	3.878			
	Thickness	1.68	1.65	1.63	1.65	0.165			
L038	Length	51.71	51.99	51.71	51.81	5.181	3.050	3.114	25.538
	Width	38.71	38.86	38.74	38.77	3.877			
	Thickness	1.65	1.65	1.60	1.63	0.163			
L039	Length	51.61	51.56	51.36	51.51	5.151	3.172	3.263	26.607
	Width	38.81	38.66	38.48	38.65	3.865			
	Thickness	1.68	1.70	1.68	1.68	0.168			
L041	Length	51.00	50.98	50.85	50.94	5.094	N/A	N/A	41.752
	Width	38.35	38.40	38.40	38.39	3.839			
	Thickness	1.63	1.63	1.60	1.62	0.162			
L042	Length	51.18	51.21	51.10	51.16	5.116	N/A	N/A	41.863
	Width	38.18	38.43	38.28	38.29	3.829			
	Thickness	1.60	1.63	1.68	1.63	0.163			
L044	Length	51.03	51.00	51.00	51.01	5.101	2.226	2.477	19.442
	Width	38.35	38.40	38.23	38.33	3.833			
	Thickness	1.65	1.68	1.65	1.66	0.166			
L045	Length	51.10	51.16	51.08	51.11	5.111	2.974	2.974	24.422
	Width	38.35	38.35	38.40	38.37	3.837			
	Thickness	1.65	1.63	1.63	1.63	0.163			
L047	Length	51.10	51.08	51.05	51.08	5.108	N/A	N/A	41.898
	Width	38.35	38.38	38.25	38.33	3.833			
	Thickness	1.70	1.63	1.68	1.67	0.167			
L048	Length	51.05	51.08	51.05	51.06	5.106	N/A	N/A	41.794
	Width	38.35	38.38	38.33	38.35	3.835			
	Thickness	1.63	1.60	1.60	1.61	0.161			

Table A-2 continued.

Coupon		1 (mm)	2 (mm)	3 (mm)	Average (mm)	Average (cm)	L_1 (cm)	L_2 (cm)	SA (cm^2)
L050	Length	51.49	51.82	51.71	51.67	5.167	3.139	3.139	26.013
	Width	38.40	38.66	38.91	38.66	3.866			
	Thickness	1.80	1.65	1.70	1.72	0.172			
L051	Length	51.84	51.69	51.36	51.63	5.163	3.085	3.280	26.409
	Width	38.61	38.84	39.01	38.82	3.882			
	Thickness	1.73	1.63	1.63	1.66	0.166			
L053	Length	52.15	51.94	51.31	51.80	5.180	N/A	N/A	43.094
	Width	38.76	38.84	39.32	38.97	3.897			
	Thickness	1.65	1.65	1.60	1.63	0.163			
L054	Length	52.04	51.77	51.64	51.82	5.182	N/A	N/A	43.246
	Width	38.86	38.89	39.34	39.03	3.903			
	Thickness	1.68	1.66	1.68	1.67	0.167			
L164	Length	51.41	51.45	51.41	51.42	5.142	N/A	N/A	42.420
	Width	38.69	38.63	38.65	38.66	3.866			
	Thickness	1.64	1.59	1.62	1.62	0.162			
L165	Length	51.67	51.56	51.69	51.64	5.164	N/A	N/A	42.944
	Width	38.94	39.13	38.79	38.95	3.895			
	Thickness	1.61	1.64	1.65	1.63	0.163			
L167	Length	51.51	51.54	51.46	51.50	5.150	2.615	2.833	22.601
	Width	38.76	38.56	38.67	38.66	3.866			
	Thickness	1.65	1.62	1.68	1.65	0.165			
L168	Length	51.39	51.55	51.64	51.53	5.153	2.688	2.787	22.761
	Width	38.76	38.77	38.72	38.75	3.875			
	Thickness	1.66	1.63	1.67	1.65	0.165			
L170	Length	51.70	51.62	51.34	51.55	5.155	N/A	N/A	42.914
	Width	38.63	38.88	38.94	38.82	3.882			
	Thickness	1.78	1.69	1.71	1.73	0.173			
L171	Length	51.41	51.33	51.28	51.34	5.134	N/A	N/A	42.585
	Width	38.68	38.69	38.64	38.67	3.867			
	Thickness	1.76	1.71	1.71	1.73	0.173			
L173	Length	51.27	51.26	51.40	51.31	5.131	2.869	2.949	24.127
	Width	38.56	38.56	38.77	38.63	3.863			
	Thickness	1.70	1.70	1.72	1.71	0.171			
L174	Length	51.32	51.39	51.44	51.38	5.138	2.946	2.991	24.606
	Width	38.52	38.61	38.66	38.60	3.860			
	Thickness	1.82	1.69	1.67	1.73	0.173			
L176	Length	51.27	51.28	51.21	51.25	5.125	N/A	N/A	42.359
	Width	38.49	38.51	38.51	38.50	3.850			
	Thickness	1.76	1.72	1.73	1.74	0.174			
L177	Length	51.27	51.18	51.30	51.25	5.125	N/A	N/A	42.341
	Width	38.48	38.58	38.52	38.53	3.853			
	Thickness	1.71	1.74	1.70	1.72	0.172			
L179	Length	51.26	51.28	51.30	51.28	5.128	2.985	2.985	24.729
	Width	38.37	38.65	38.67	38.56	3.856			
	Thickness	1.75	1.74	1.72	1.74	0.174			

Table A-2 continued.

Coupon		1 (mm)	2 (mm)	3 (mm)	Average (mm)	Average (cm)	L_1 (cm)	L_2 (cm)	SA (cm^2)
L180	Length	51.44	51.42	51.39	51.42	5.142	2.670	2.675	22.169
	Width	38.60	38.46	38.54	38.53	3.853			
	Thickness	1.71	1.73	1.69	1.71	0.171			
L182	Length	51.38	51.42	51.40	51.40	5.140	N/A	N/A	42.292
	Width	38.41	38.49	38.50	38.47	3.847			
	Thickness	1.66	1.62	1.71	1.66	0.166			
L183	Length	51.40	51.43	51.39	51.41	5.141	N/A	N/A	42.319
	Width	38.39	38.61	38.61	38.54	3.854			
	Thickness	1.60	1.62	1.69	1.64	0.164			
L185	Length	51.39	51.32	51.29	51.33	5.133	2.86	3.117	24.561
	Width	38.39	38.37	38.42	38.39	3.839			
	Thickness	1.68	1.57	1.68	1.64	0.164			
L186	Length	51.12	51.08	51.02	51.07	5.107	2.772	2.92	23.551
	Width	38.55	38.51	38.55	38.54	3.854			
	Thickness	1.72	1.66	1.70	1.69	0.169			
L188	Length	51.05	51.18	51.35	51.19	5.119	N/A	N/A	42.037
	Width	38.38	38.38	38.48	38.41	3.841			
	Thickness	1.65	1.64	1.65	1.65	0.165			
L189	Length	51.34	51.41	51.14	51.30	5.130	N/A	N/A	42.073
	Width	38.31	38.37	38.41	38.36	3.836			
	Thickness	1.63	1.68	1.64	1.65	0.165			
L245	Length	51.75	51.93	51.79	51.82	5.182	N/A	N/A	42.998
	Width	38.93	38.74	38.98	38.88	3.888			
	Thickness	1.60	1.56	1.71	1.62	0.162			
L246	Length	51.62	51.54	51.65	51.60	5.160	N/A	N/A	42.786
	Width	38.82	38.70	38.81	38.78	3.878			
	Thickness	1.67	1.67	1.65	1.66	0.166			
L248	Length	51.78	51.69	51.69	51.72	5.172	3.057	3.185	25.951
	Width	38.90	38.74	38.97	38.87	3.887			
	Thickness	1.67	1.65	1.68	1.67	0.167			
L249	Length	51.46	51.62	51.68	51.59	5.159	2.937	2.937	24.407
	Width	38.81	38.77	38.77	38.78	3.878			
	Thickness	1.61	1.71	1.68	1.67	0.167			
L251	Length	51.68	51.85	51.60	51.71	5.171	N/A	N/A	42.991
	Width	38.79	38.87	38.93	38.86	3.886			
	Thickness	1.69	1.66	1.68	1.68	0.168			
L252	Length	51.23	51.30	51.29	51.27	5.127	N/A	N/A	42.336
	Width	38.71	38.55	38.59	38.62	3.862			
	Thickness	1.68	1.69	1.60	1.66	0.166			
L254	Length	51.23	51.25	51.43	51.30	5.130	3.206	3.283	26.783
	Width	38.60	38.63	38.68	38.64	3.864			
	Thickness	1.66	1.63	1.67	1.65	0.165			
L255	Length	51.34	51.04	51.10	51.16	5.116	3.018	3.070	25.132
	Width	38.68	38.59	38.44	38.57	3.857			
	Thickness	1.71	1.66	1.61	1.66	0.166			

Table A-2 continued.

Coupon		1 (mm)	2 (mm)	3 (mm)	Average (mm)	Average (cm)	L_1 (cm)	L_2 (cm)	SA (cm^2)
L257	Length	51.33	51.30	51.38	51.34	5.134	N/A	N/A	42.154
	Width	38.45	38.56	38.63	38.55	3.855			
	Thickness	1.62	1.47	1.64	1.58	0.158			
L258	Length	51.41	51.54	51.69	51.55	5.155	N/A	N/A	42.555
	Width	38.70	38.65	38.31	38.55	3.855			
	Thickness	1.64	1.69	1.74	1.69	0.169			
L260	Length	51.43	51.46	51.52	51.47	5.147	2.689	2.945	23.301
	Width	38.62	38.54	38.72	38.63	3.863			
	Thickness	1.62	1.61	1.63	1.62	0.162			
L261	Length	51.84	51.89	51.57	51.77	5.177	2.805	2.805	23.252
	Width	38.82	38.75	38.54	38.70	3.870			
	Thickness	1.55	1.66	1.66	1.62	0.162			
L263	Length	51.53	51.33	51.62	51.49	5.149	N/A	N/A	42.523
	Width	38.70	38.64	38.63	38.66	3.866			
	Thickness	1.63	1.66	1.63	1.64	0.164			
L264	Length	51.68	51.83	51.72	51.74	5.174	N/A	N/A	42.867
	Width	38.86	38.85	38.70	38.80	3.880			
	Thickness	1.63	1.64	1.63	1.63	0.163			
L266	Length	51.45	51.51	51.60	51.52	5.152	2.933	2.933	24.336
	Width	38.71	38.76	38.72	38.73	3.873			
	Thickness	1.64	1.68	1.66	1.66	0.166			
L267	Length	51.96	51.58	51.32	51.62	5.162	2.953	3.082	25.180
	Width	38.91	38.84	38.98	38.91	3.891			
	Thickness	1.62	1.79	1.72	1.71	0.171			
L269	Length	51.09	51.20	51.38	51.22	5.122	N/A	N/A	42.211
	Width	38.52	38.51	38.43	38.49	3.849			
	Thickness	1.72	1.68	1.65	1.68	0.168			
L270	Length	51.33	51.35	51.37	51.35	5.135	N/A	N/A	42.366
	Width	38.51	38.56	38.69	38.59	3.859			
	Thickness	1.64	1.66	1.67	1.66	0.166			
L359	Length	51.64	51.62	51.57	51.61	5.161	N/A	N/A	42.995
	Width	38.95	38.96	38.90	38.94	3.894			
	Thickness	1.67	1.67	1.70	1.68	0.168			
L360	Length	51.59	51.63	51.81	51.68	5.168	N/A	N/A	42.973
	Width	38.74	38.88	38.92	38.85	3.885			
	Thickness	1.69	1.69	1.69	1.69	0.169			
L362	Length	51.23	51.57	51.43	51.41	5.141	2.927	3.003	24.618
	Width	38.61	38.74	38.65	38.67	3.867			
	Thickness	1.74	1.72	1.71	1.72	0.172			
L363	Length	51.15	51.08	51.08	51.10	5.110	3.143	3.194	26.172
	Width	38.53	38.51	38.58	38.54	3.854			
	Thickness	1.70	1.76	1.69	1.72	0.172			
L365	Length	51.59	51.63	51.40	51.54	5.154	N/A	N/A	42.601
	Width	38.78	38.66	38.55	38.66	3.866			
	Thickness	1.68	1.66	1.63	1.66	0.166			

Table A-2 continued.

Coupon		1 (mm)	2 (mm)	3 (mm)	Average (mm)	Average (cm)	L_1 (cm)	L_2 (cm)	SA (cm^2)
L366	Length	51.31	51.29	51.12	51.24	5.124	N/A	N/A	42.320
	Width	38.52	38.59	38.47	38.53	3.853			
	Thickness	1.75	1.69	1.69	1.71	0.171			
L368	Length	51.25	51.27	51.48	51.33	5.133	3.080	3.080	25.563
	Width	38.67	38.84	38.76	38.76	3.876			
	Thickness	1.68	1.71	1.66	1.68	0.168			
L369	Length	51.43	51.61	51.39	51.48	5.148	3.109	3.186	26.007
	Width	38.57	38.72	38.55	38.61	3.861			
	Thickness	1.69	1.67	1.66	1.67	0.167			
L371	Length	51.39	51.44	51.42	51.42	5.142	N/A	N/A	42.433
	Width	38.56	38.68	38.52	38.59	3.859			
	Thickness	1.67	1.66	1.66	1.66	0.166			
L372	Length	51.53	51.49	51.44	51.49	5.149	N/A	N/A	42.632
	Width	38.58	38.84	38.95	38.79	3.879			
	Thickness	1.63	1.63	1.62	1.63	0.163			
L374	Length	51.35	51.37	51.44	51.39	5.139	2.798	2.798	23.131
	Width	38.46	38.61	38.64	38.57	3.857			
	Thickness	1.64	1.63	1.64	1.64	0.164			
L376	Length	51.15	51.35	51.39	51.30	5.130	2.895	2.997	24.367
	Width	38.57	38.64	38.73	38.65	3.865			
	Thickness	1.66	1.64	1.61	1.64	0.164			
L378	Length	51.32	51.34	51.32	51.33	5.133	N/A	N/A	42.450
	Width	38.59	38.67	38.64	38.63	3.863			
	Thickness	1.69	1.68	1.68	1.68	0.168			
L379	Length	51.29	51.29	51.22	51.27	5.127	N/A	N/A	42.417
	Width	38.52	38.58	38.64	38.58	3.858			
	Thickness	1.73	1.70	1.73	1.72	0.172			
L381	Length	51.35	51.33	51.34	51.34	5.134	2.952	2.952	24.378
	Width	38.49	38.60	38.63	38.57	3.857			
	Thickness	1.65	1.65	1.63	1.64	0.164			
L382	Length	51.14	51.23	51.11	51.16	5.116	2.891	2.891	23.866
	Width	38.26	38.49	38.54	38.43	3.843			
	Thickness	1.72	1.69	1.72	1.71	0.171			
L384	Length	51.35	51.46	51.46	51.42	5.142	N/A	N/A	42.617
	Width	38.62	38.78	38.79	38.73	3.873			
	Thickness	1.67	1.70	1.66	1.68	0.168			
L385	Length	51.83	51.47	51.37	51.56	5.156	N/A	N/A	42.508
	Width	38.43	38.43	38.59	38.48	3.848			
	Thickness	1.72	1.69	1.69	1.70	0.170			

Source: Individual data sheets for each coupon in *WIPP-FePb-3 Supplemental Binder C (ERMS 546084)*

APPENDIX B

Table B-1 lists the exposure duration, initial weight, final weight, weight loss, surface area and calculated corrosion rate for each steel coupon. The equivalent data for the lead coupons is given in Table B-2. The reported surface areas are taken from Tables A-1 and A-2 for steel and lead, respectively. The final weight is determined from the cleaning cycle data and graphical analysis, which is presented in Appendix C for the steel coupons and Appendix D for the lead coupons (see Section 4.4 in Roselle (2009) for details).

Corrosion rates are calculated according to Equation (3) given in Section 3.1.

Table B-1 Summary of Steel Coupon Corrosion Rate Data

Test ID	Coupon	Duration (days)	Initial Wt (g)	Final Wt (g) (Calculated)	Weight Loss (mg)	Surface Area (cm^2)	Corrosion Rate (μm/yr)
Fe-G-0000-18-2f	034	554	19.5493	19.5440	5.3	41.520	0.107
Fe-G-0000-18-3f	035	554	19.6833	19.6788	4.5	41.645	0.090
Fe-G-0000-18-2p	037	554	18.3932	18.3903	2.9	23.433	0.104
Fe-G-0000-18-3p	038	554	18.4550	18.4525	2.5	22.555	0.093
Fe-Go-0000-18-2f	040	554	18.9886	18.9827	5.9	41.499	0.119
Fe-Go-0000-18-3f	041	554	20.4180	20.4122	5.8	41.621	0.117
Fe-Go-0000-18-2p	043	554	20.3030	20.3003	2.7	24.835	0.091
Fe-Go-0000-18-3p	044	554	20.4383	20.4347	3.6	24.445	0.123
Fe-E-0000-18-2f	046	554	20.1818	20.1725	9.3	41.723	0.187
Fe-E-0000-18-3f	047	554	20.2995	20.2895	10.0	41.588	0.201
Fe-E-0000-18-2p	049	554	20.2017	20.1968	4.9	24.484	0.167
Fe-E-0000-18-3p	050	554	20.0687	20.0630	5.7	23.666	0.202
Fe-Eo-0000-18-2f	052	554	19.6660	19.6597	6.3	41.565	0.127
Fe-Eo-0000-18-3f	053	554	19.7653	19.7600	5.3	41.755	0.106
Fe-Eo-0000-18-2p	055	554	20.0585	20.0557	2.8	26.349	0.089
Fe-Eo-0000-18-3p	056	554	18.4668	18.4624	4.4	25.838	0.143
Fe-Atm-0000-18-2	058	554	18.7299	18.7298	0.1	41.542	0.002
Fe-Atm-0000-18-3	059	554	18.8844	18.8844	0.0	41.520	0.000
Fe-G-0350-18-2f	169	553	20.0624	20.0559	6.5	41.643	0.131
Fe-G-0350-18-3f	170	553	20.1873	20.1811	6.2	41.722	0.125
Fe-G-0350-18-2p	172	553	19.6613	19.6586	2.7	23.280	0.097
Fe-G-0350-18-3p	173	553	19.7186	19.7151	3.5	22.784	0.129
Fe-Go-0350-18-2f	175	553	19.7910	19.7857	5.3	41.595	0.107
Fe-Go-0350-18-3f	176	553	18.6358	18.6286	7.2	41.138	0.147
Fe-Go-0350-18-2p	178	553	18.7196	18.7155	4.1	24.054	0.143
Fe-Go-0350-18-3p	179	553	18.8799	18.8753	4.6	21.637	0.178
Fe-E-0350-18-2f	181	553	20.5586	20.5469	11.7	41.665	0.235
Fe-E-0350-18-3f	182	553	20.3932	20.3826	10.6	41.606	0.214
Fe-E-0350-18-2p	184	553	20.0962	20.0920	4.2	24.550	0.143
Fe-E-0350-18-3p	185	553	19.9873	19.9836	3.7	22.896	0.135
Fe-Eo-0350-18-2f	187	553	20.1792	20.1718	7.4	41.548	0.149
Fe-Eo-0350-18-3f	188	553	20.2219	20.2150	6.9	41.554	0.139
Fe-Eo-0350-18-2p	195	553	19.6885	19.6853	3.2	21.356	0.126
Fe-Eo-0350-18-3p	196	553	18.7094	18.7066	2.8	22.799	0.103
Fe-Atm-0350-18-2	198	553	18.7610	18.7611	-0.1	41.231	-0.002
Fe-Atm-0350-18-3	201	553	20.1683	20.1682	0.1	41.496	0.002
Fe-G-1500-18-2f	253	567	18.8198	18.8100	9.8	41.343	0.194
Fe-G-1500-18-3f	254	567	19.0262	19.0176	8.6	41.438	0.170

Table B-1 continued.

Test ID	Coupon	Duration (days)	Initial Wt (g)	Final Wt (g) (Calculated)	Weight Loss (mg)	Surface Area (cm^2)	Corrosion Rate (μm/yr)
Fe-G-1500-18-2p	256	567	19.3590	19.3532	5.8	25.973	0.183
Fe-G-1500-18-3p	257	567	19.5622	19.5568	5.4	25.480	0.173
Fe-Go-1500-18-2f	259	567	19.6236	19.6152	8.4	41.581	0.165
Fe-Go-1500-18-3f	260	567	19.8384	19.8305	7.9	41.454	0.156
Fe-Go-1500-18-2p	262	567	19.7987	19.7936	5.1	24.180	0.172
Fe-Go-1500-18-3p	263	567	19.6969	19.6924	4.5	24.944	0.148
Fe-E-1500-18-2f	265	567	19.9768	19.9574	19.4	41.614	0.381
Fe-E-1500-18-3f	266	567	19.4376	19.4200	17.6	41.380	0.348
Fe-E-1500-18-2p	268	567	19.5566	19.5406	16.0	24.120	0.542
Fe-E-1500-18-3p	269	567	19.6998	19.6863	13.5	25.337	0.436
Fe-Eo-1500-18-2f	271	567	19.0806	19.0613	19.3	41.474	0.381
Fe-Eo-1500-18-3f	272	567	19.1743	19.1541	20.2	41.347	0.400
Fe-Eo-1500-18-2p	274	567	19.2944	19.2858	8.6	23.462	0.300
Fe-Eo-1500-18-3p	275	567	19.5771	19.5693	7.8	23.344	0.273
Fe-Atm-1500-18-2	277	567	20.2048	20.2038	1.0	41.525	0.020
Fe-Atm-1500-18-3	278	567	20.0311	20.0307	0.4	41.508	0.008
Fe-G-3500-18-2f	362	573	20.3139	20.3016	12.3	41.589	0.239
Fe-G-3500-18-3f	363	573	20.3431	20.3308	12.3	41.571	0.239
Fe-G-3500-18-2p	365	573	20.6158	20.6076	8.2	25.146	0.264
Fe-G-3500-18-3p	366	573	19.5118	19.5043	7.5	25.049	0.242
Fe-Go-3500-18-2f	368	573	19.9349	19.9233	11.6	41.451	0.226
Fe-Go-3500-18-3f	369	573	20.1843	20.1725	11.8	41.459	0.230
Fe-Go-3500-18-2p	371	573	18.7512	18.7430	8.2	24.035	0.276
Fe-Go-3500-18-3p	372	573	19.0172	19.0083	8.9	24.077	0.299
Fe-E-3500-18-2f	374	573	19.6811	19.6434	37.7	41.404	0.737
Fe-E-3500-18-3f	375	573	19.9213	19.8820	39.3	41.510	0.766
Fe-E-3500-18-2p	377	573	20.1881	20.1636	24.5	24.676	0.803
Fe-E-3500-18-3p	378	573	20.0073	19.9879	19.4	24.994	0.628
Fe-Eo-3500-18-2f	380	573	19.8498	19.8118	38.0	41.637	0.739
Fe-Eo-3500-18-3f	381	573	20.5335	20.4978	35.7	41.674	0.693
Fe-Eo-3500-18-2p	383	573	20.4598	20.4359	23.9	23.813	0.812
Fe-Eo-3500-18-3p	384	573	20.5520	20.5301	21.9	24.503	0.723
Fe-Atm-3500-18-2	386	573	20.0792	20.0788	0.4	41.475	0.008
Fe-Atm-3500-18-3	387	573	20.2290	20.2276	1.4	41.596	0.027

Source: WIPP-FePb-3 Supplemental Binder C (ERMS 546084)

Table B-2 Summary of Lead Coupon Corrosion Rate Data

Test ID	Coupon	Duration (days)	Initial Wt (g)	Final Wt (g) (Calculated)	Weight Loss (mg)	Surface Area (cm^2)	Corrosion Rate (μm/yr)
Pb-G-0000-18-2f	L029	557	34.3063	34.3048	1.5	41.978	0.021
Pb-G-0000-18-3f	L030	557	34.3276	34.3262	1.4	42.559	0.019
Pb-G-0000-18-2p	L032	557	34.4391	34.4314	7.7	23.356	0.191
Pb-G-0000-18-3p	L033	557	34.5575	34.5489	8.6	25.387	0.196
Pb-Go-0000-18-2f	L035	557	35.1404	35.1329	7.5	42.650	0.102
Pb-Go-0000-18-3f	L036	557	34.3672	34.3608	6.4	42.509	0.087
Pb-Go-0000-18-2p	L038	557	33.9740	33.9713	2.7	25.538	0.061
Pb-Go-0000-18-3p	L039	557	35.6926	35.6815	11.1	26.607	0.241
Pb-E-0000-18-2f	L041	557	34.0598	34.0580	1.8	41.752	0.025
Pb-E-0000-18-3f	L042	557	34.3987	34.3919	6.8	41.863	0.094
Pb-E-0000-18-2p	L044	557	34.7290	34.7215	7.5	19.442	0.223
Pb-E-0000-18-3p	L045	557	34.6101	34.5955	14.6	24.422	0.345
Pb-Eo-0000-18-2f	L047	557	34.5793	34.5784	0.9	41.898	0.012
Pb-Eo-0000-18-3f	L048	557	33.9877	33.9883	-0.6	41.794	-0.008
Pb-Eo-0000-18-2p	L050	557	35.5817	35.5717	10.0	26.013	0.222
Pb-Eo-0000-18-3p	L051	557	35.1003	35.0946	5.7	26.409	0.125
Pb-Atm-0000-18-2	L053	557	34.9513	34.9512	0.1	43.094	0.001
Pb-Atm-0000-18-3	L054	557	35.1549	35.1531	1.8	43.246	0.024
Pb-G-0350-18-2f	L164	553	34.0606	34.0544	6.2	42.420	0.085
Pb-G-0350-18-3f	L165	553	35.3544	35.3452	9.2	42.944	0.125
Pb-G-0350-18-2p	L167	553	34.4808	34.4740	6.8	22.601	0.175
Pb-G-0350-18-3p	L168	553	35.0329	35.0258	7.1	22.761	0.182
Pb-Go-0350-18-2f	L170	553	35.2164	35.2071	9.3	42.914	0.126
Pb-Go-0350-18-3f	L171	553	35.8826	35.8751	7.5	42.585	0.103
Pb-Go-0350-18-2p	L173	553	35.9921	35.9869	5.2	24.127	0.125
Pb-Go-0350-18-3p	L174	553	34.5597	34.5497	10.0	24.606	0.237
Pb-E-0350-18-2f	L176	553	35.8624	35.8550	7.4	42.359	0.102
Pb-E-0350-18-3f	L177	553	35.9128	35.9059	6.9	42.341	0.095
Pb-E-0350-18-2p	L179	553	36.0121	36.0039	8.2	24.729	0.193
Pb-E-0350-18-3p	L180	553	35.9762	35.9710	5.2	22.169	0.137
Pb-Eo-0350-18-2f	L182	553	35.7734	35.7657	7.7	42.292	0.106
Pb-Eo-0350-18-3f	L183	553	34.5553	34.5514	3.9	42.319	0.054
Pb-Eo-0350-18-2p	L185	553	36.1124	36.1065	5.9	24.561	0.140
Pb-Eo-0350-18-3p	L186	553	36.0568	36.0477	9.1	23.551	0.225
Pb-Atm-0350-18-2	L188	553	34.7444	34.7409	3.5	42.037	0.048
Pb-Atm-0350-18-3	L189	553	34.8288	34.8257	3.1	42.073	0.043
Pb-G-1500-18-2f	L245	567	34.8306	34.8215	9.1	42.998	0.120
Pb-G-1500-18-3f	L246	567	35.3314	35.3214	10.0	42.786	0.133

Table B-2 continued.

Test ID	Coupon	Duration (days)	Initial Wt (g)	Final Wt (g) (Calculated)	Weight Loss (mg)	Surface Area (cm^2)	Corrosion Rate (μm/yr)
Pb-G-1500-18-2p	L248	567	35.4782	35.4695	8.7	25.951	0.190
Pb-G-1500-18-3p	L249	567	34.7978	34.7837	14.1	24.407	0.328
Pb-Go-1500-18-2f	L251	567	34.9622	34.9421	20.1	42.991	0.265
Pb-Go-1500-18-3f	L252	567	35.5246	35.5164	8.2	42.336	0.110
Pb-Go-1500-18-2p	L254	567	35.1169	35.1044	12.5	26.783	0.265
Pb-Go-1500-18-3p	L255	567	35.1302	35.1197	10.5	25.132	0.237
Pb-E-1500-18-2f	L257	567	34.7452	34.7384	6.8	42.154	0.092
Pb-E-1500-18-3f	L258	567	35.4430	35.4409	2.1	42.555	0.028
Pb-E-1500-18-2p	L260	567	34.1285	34.1271	1.4	23.301	0.034
Pb-E-1500-18-3p	L261	567	34.6729	34.6743	-1.4	23.252	-0.034
Pb-Eo-1500-18-2f	L263	567	34.8119	34.8093	2.6	42.523	0.035
Pb-Eo-1500-18-3f	L264	567	34.6367	34.6357	1.0	42.867	0.013
Pb-Eo-1500-18-2p	L266	567	34.8324	34.8235	8.9	24.336	0.208
Pb-Eo-1500-18-3p	L267	567	34.7187	34.7081	10.6	25.180	0.239
Pb-Atm-1500-18-2	L269	567	35.1766	35.1775	-0.9	42.211	-0.012
Pb-Atm-1500-18-3	L270	567	34.5613	34.5577	3.6	42.366	0.048
Pb-G-3500-18-2f	L359	571	34.4345	34.4156	18.9	42.995	0.248
Pb-G-3500-18-3f	L360	571	35.1906	35.1736	17.0	42.973	0.223
Pb-G-3500-18-2p	L362	571	35.7358	35.7282	7.6	24.618	0.174
Pb-G-3500-18-3p	L363	571	35.4985	35.4888	9.7	26.172	0.209
Pb-Go-3500-18-2f	L365	571	35.1688	35.1560	12.8	42.601	0.169
Pb-Go-3500-18-3f	L366	571	35.9119	35.8990	12.9	42.320	0.172
Pb-Go-3500-18-2p	L368	571	35.3528	35.3521	0.7	25.563	0.015
Pb-Go-3500-18-3p	L369	571	35.3189	35.3054	13.5	26.007	0.293
Pb-E-3500-18-2f	L371	571	35.1792	35.1814	-2.2	42.433	-0.029
Pb-E-3500-18-3f	L372	571	35.0504	35.0562	-5.8	42.632	-0.077
Pb-E-3500-18-2p	L374	571	35.3381	35.3465	-8.4	23.131	-0.205
Pb-E-3500-18-3p	L376	571	34.6894	34.6962	-6.8	24.367	-0.157
Pb-Eo-3500-18-2f	L378	571	35.2542	35.2497	4.5	42.450	0.060
Pb-Eo-3500-18-3f	L379	571	36.0201	36.0188	1.3	42.417	0.017
Pb-Eo-3500-18-2p	L381	571	34.6266	34.6288	-2.2	24.378	-0.051
Pb-Eo-3500-18-3p	L382	571	36.0202	36.0203	-0.1	23.866	-0.002
Pb-Atm-3500-18-2	L384	571	35.3341	35.3261	8.0	42.617	0.106
Pb-Atm-3500-18-3	L385	571	36.0778	36.0753	2.5	42.508	0.033

Source: WIPP-FePb-3 Supplemental Binder C (ERMS 546084)

APPENDIX C

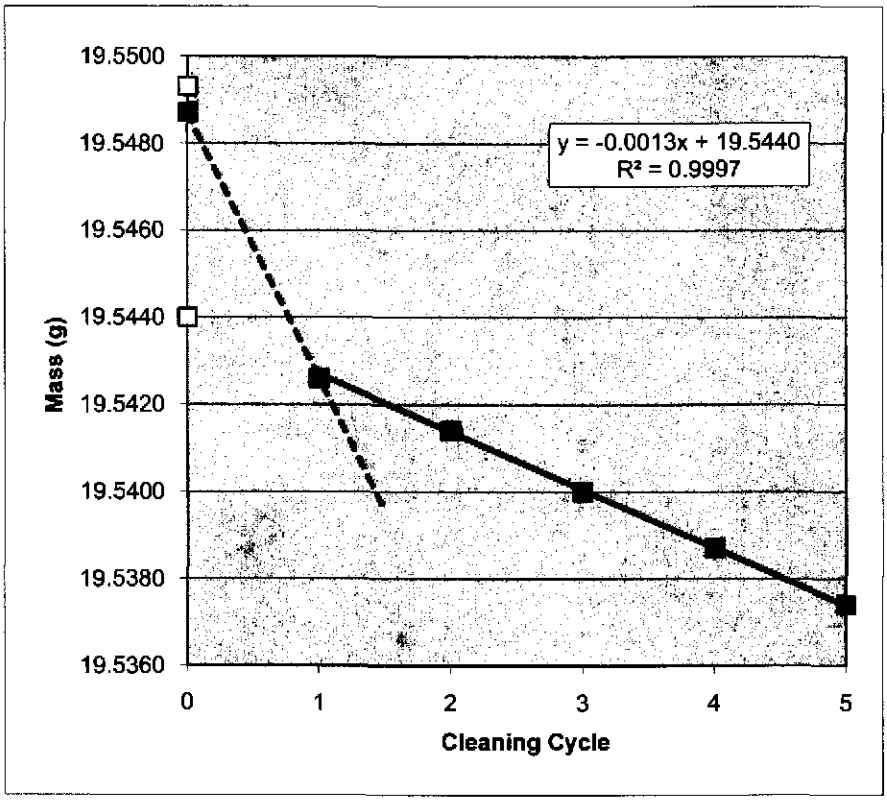
This appendix contains all of the weight loss cleaning cycle data, as well as the results of the graphical analysis of that data for each of the steel coupons (see individual data sheets for each coupon in WIPP-FePb-3 Supplemental Binder C). Each of the following pages lists the initial coupon weight, removal weight, cleaning cycle weights, calculated final weight and the resulting weight loss. The environmental conditions for each coupon can be read from the test matrix label that is given for each coupon. The meaning of the test matrix labels is discussed in Section 2.

For each coupon the graphical analysis is shown (see Section 3.1 for details of the process). The blue symbols indicate those parts of the cleaning cycle data used to determine the calculated final weight, which is the y-intercept of the line fit to the blue symbols. The red symbols show the cleaning cycle data not used in the linear regression. Yellow symbols indicate the initial coupon weight (prior to the experiment) and the final calculated weight.

Coupon:	034
Test Matrix:	Fe-G-0000-18-2f
Initial wt (g)	19.5493
Removal wt (g)	19.5487

Calculated final wt (g)	19.5440
Total wt loss (g)	0.0053
Total wt loss (mg)	5.3

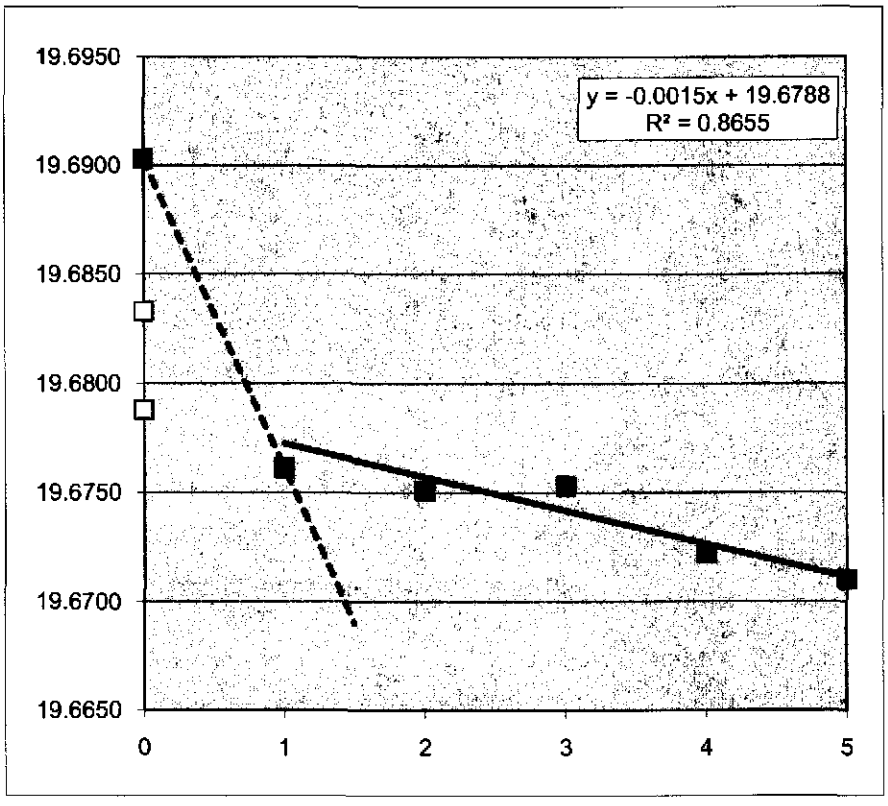
Cleaning Cycle	Wt (g)
0	19.5487
1	19.5426
2	19.5414
3	19.5400
4	19.5387
5	19.5374



Coupon:	035
Test Matrix:	Fe-G-0000-18-3f
Initial wt (g)	19.6833
Removal wt (g)	19.6903

Calculated final wt (g)	19.6788
Total wt loss (g)	0.0045
Total wt loss (mg)	4.5

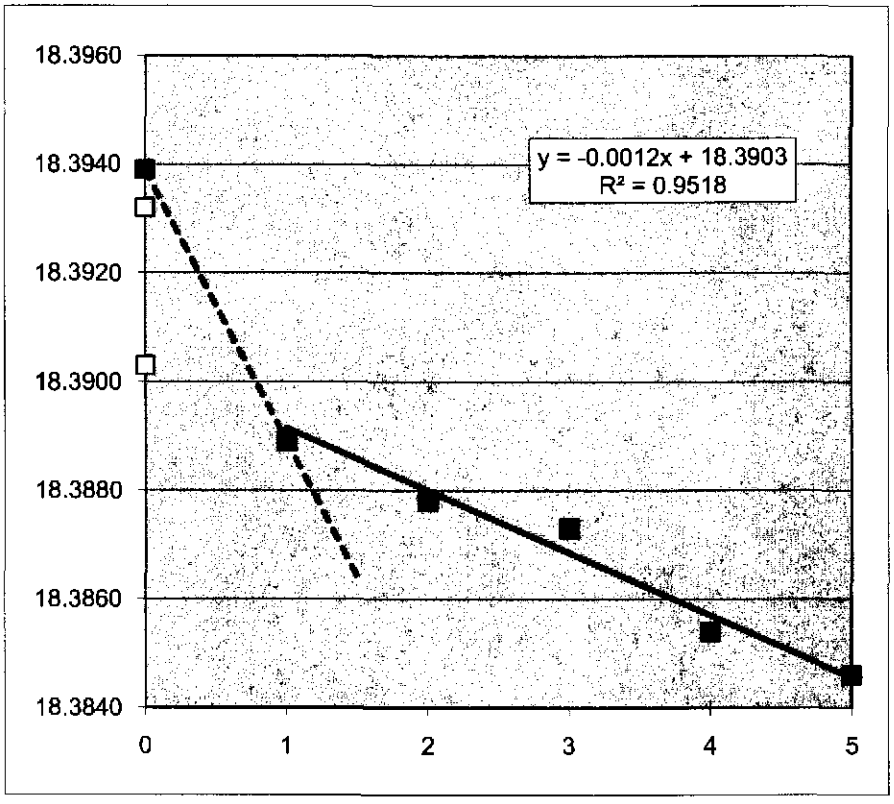
Cleaning Cycle	Wt (g)
0	19.6903
1	19.6761
2	19.6751
3	19.6753
4	19.6722
5	19.6710



Coupon:	037
Test Matrix:	Fe-G-0000-18-2p
Initial wt (g)	18.3932
Removal wt (g)	18.3939

Calculated final wt (g)	18.3903
Total wt loss (g)	0.0029
Total wt loss (mg)	2.9

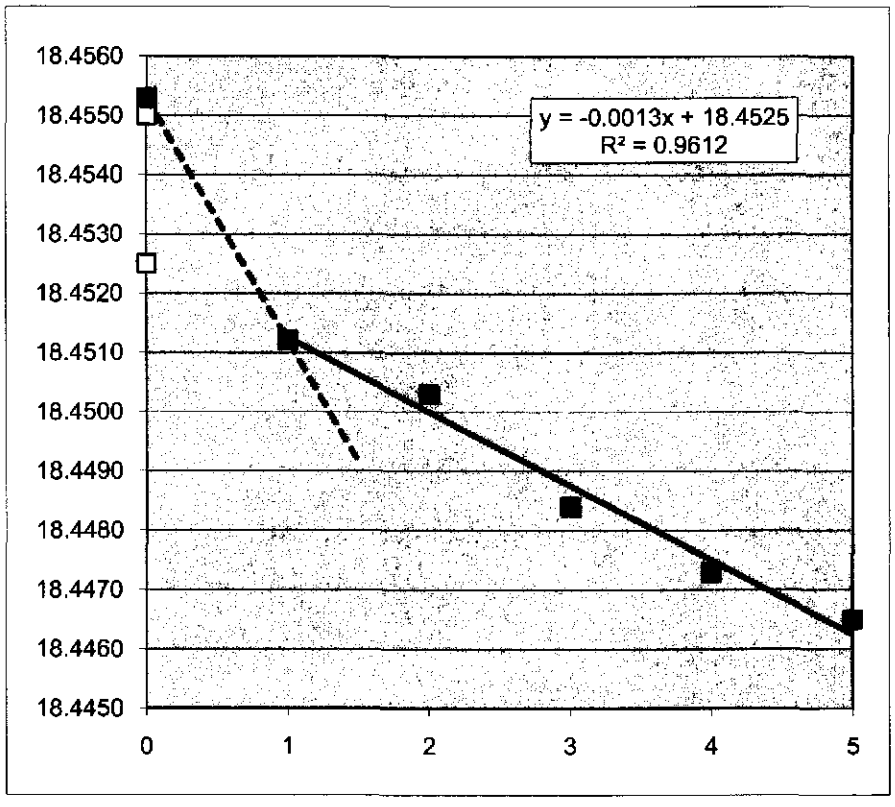
Cleaning Cycle	Wt (g)
0	18.3939
1	18.3889
2	18.3878
3	18.3873
4	18.3854
5	18.3846



Coupon:	038
Test Matrix:	Fe-G-0000-18-3p
Initial wt (g)	18.4550
Removal wt (g)	18.4553

Calculated final wt (g)	18.4525
Total wt loss (g)	0.0025
Total wt loss (mg)	2.5

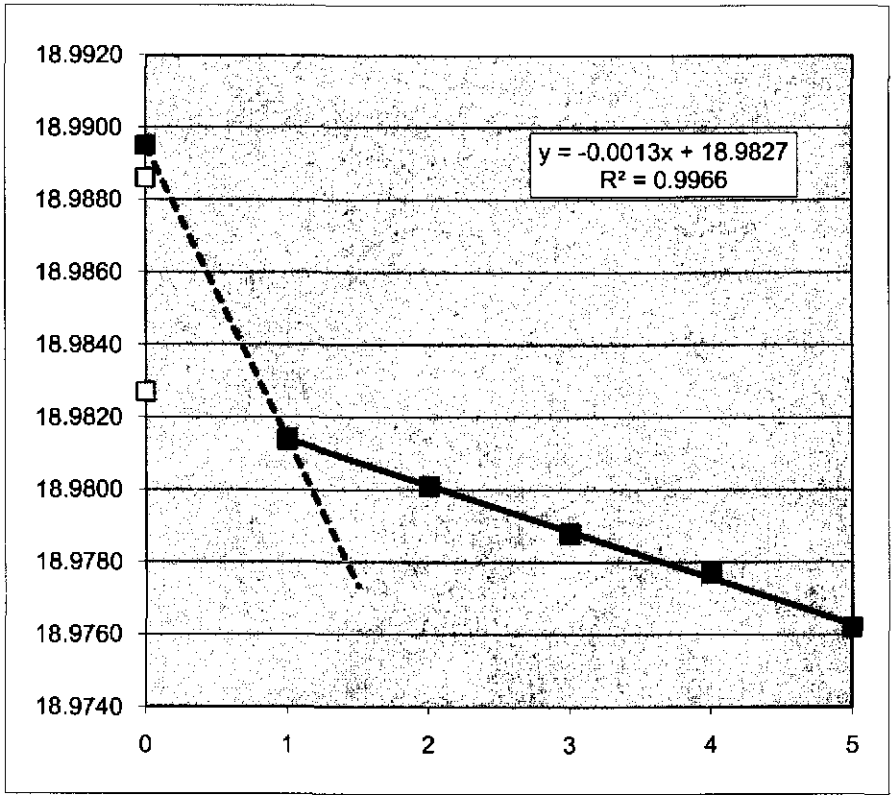
Cleaning Cycle	Wt (g)
0	18.4553
1	18.4512
2	18.4503
3	18.4484
4	18.4473
5	18.4465



Coupon:	040
Test Matrix:	Fe-Go-0000-18-2f
Initial wt (g)	18.9886
Removal wt (g)	18.9895

Calculated final wt (g)	18.9827
Total wt loss (g)	0.0059
Total wt loss (mg)	5.9

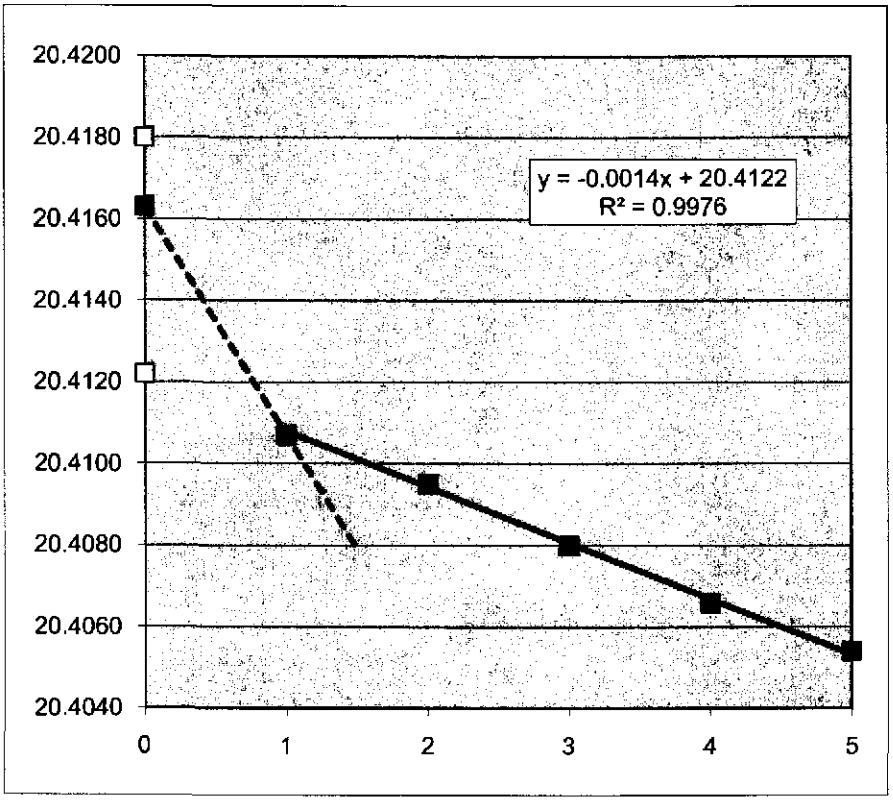
Cleaning Cycle	Wt (g)
0	18.9895
1	18.9814
2	18.9801
3	18.9788
4	18.9777
5	18.9762



Coupon:	041
Test Matrix:	Fe-Go-0000-18-3f
Initial wt (g)	20.4180
Removal wt (g)	20.4163

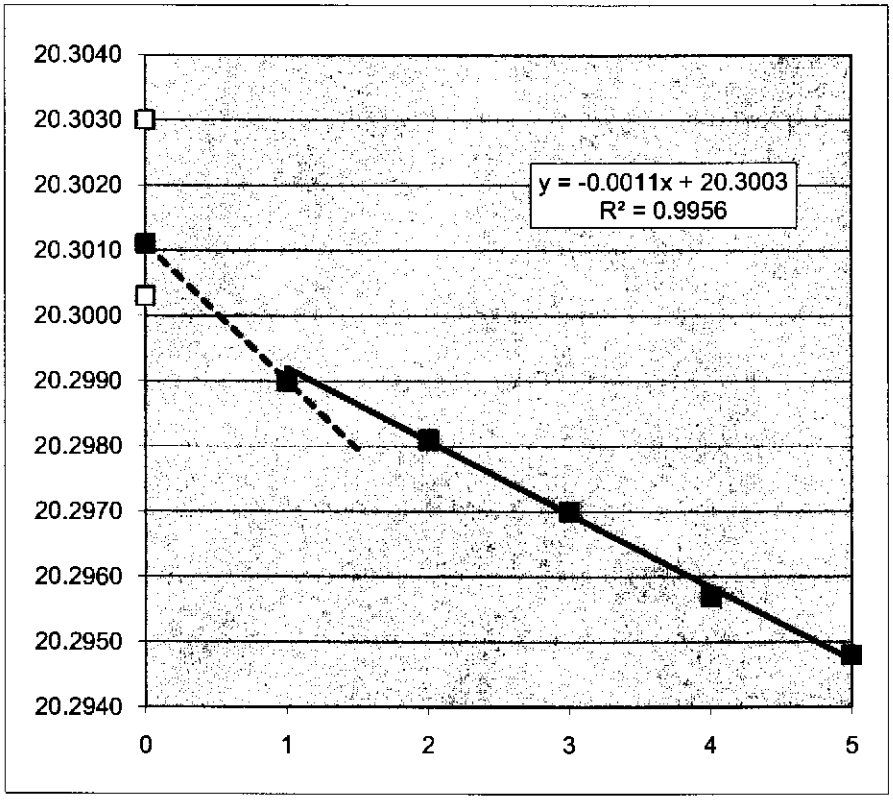
Calculated final wt (g)	20.4122
Total wt loss (g)	0.0058
Total wt loss (mg)	5.8

Cleaning Cycle	Wt (g)
0	20.4163
1	20.4107
2	20.4095
3	20.4080
4	20.4066
5	20.4054



Coupon:	043		
Test Matrix:	Fe-Go-0000-18-2p		
Initial wt (g)	20.3030	**Calculated final wt (g)**	20.3003
Removal wt (g)	20.3011	**Total wt loss (g)**	0.0027
		Total wt loss (mg)	2.7

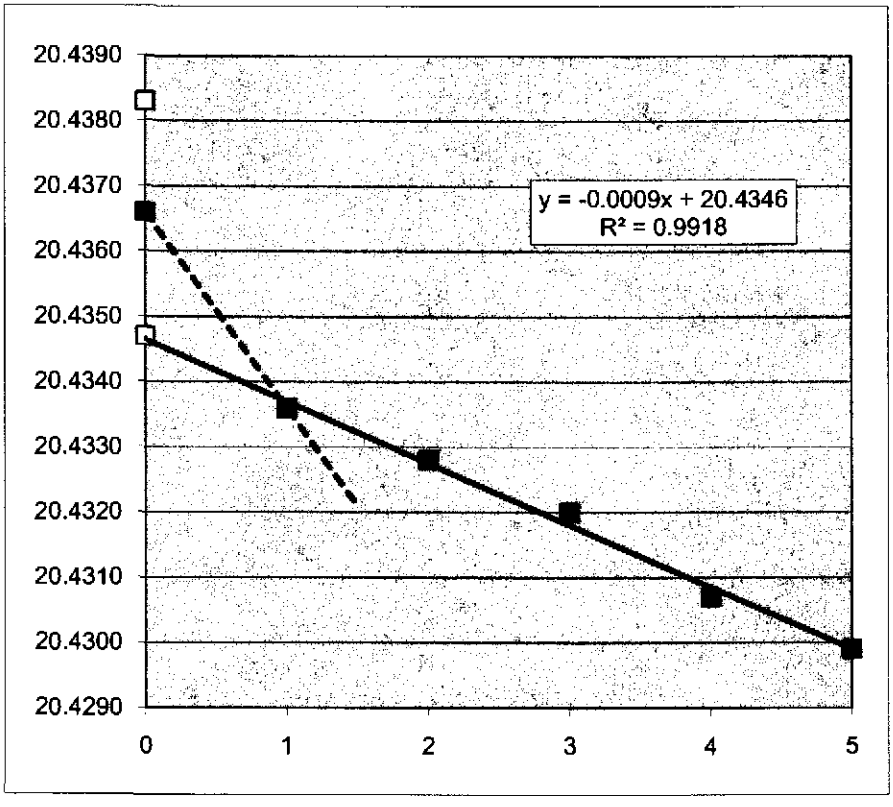
Cleaning Cycle	Wt (g)
0	20.3011
1	20.2990
2	20.2981
3	20.2970
4	20.2957
5	20.2948



Coupon:	044
Test Matrix:	Fe-Go-0000-18-3p
Initial wt (g)	20.4383
Removal wt (g)	20.4366

Calculated final wt (g)	20.4347
Total wt loss (g)	0.0036
Total wt loss (mg)	3.6

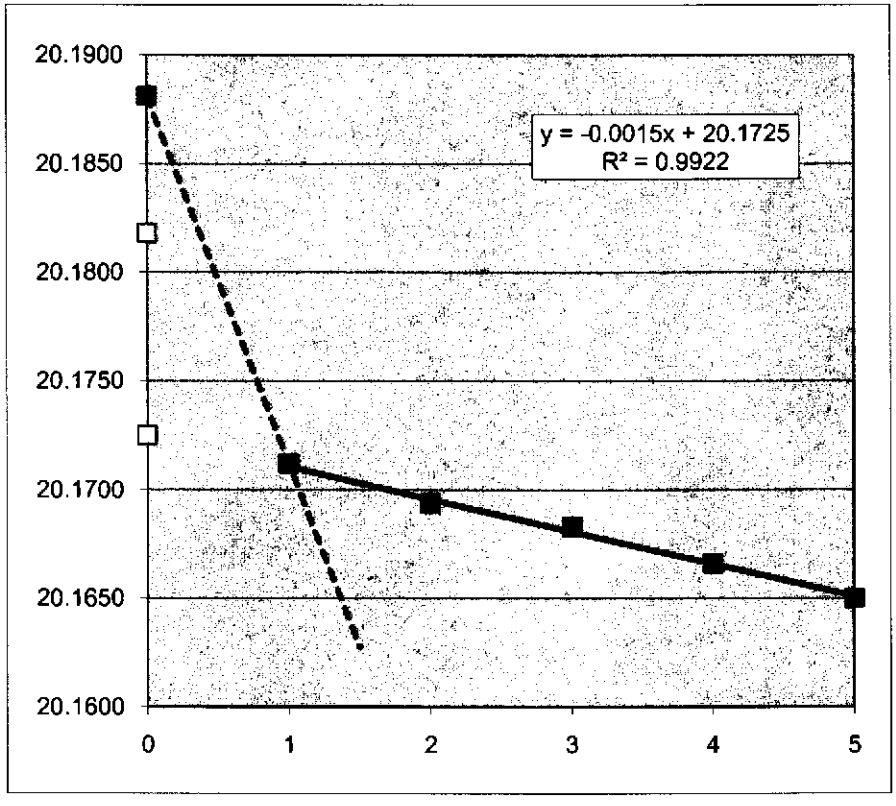
Cleaning Cycle	Wt (g)
0	20.4366
1	20.4336
2	20.4328
3	20.4320
4	20.4307
5	20.4299



Coupon:	046
Test Matrix:	Fe-E-0000-18-2f
Initial wt (g)	20.1818
Removal wt (g)	20.1881

Calculated final wt (g)	20.1725
Total wt loss (g)	0.0093
Total wt loss (mg)	9.3

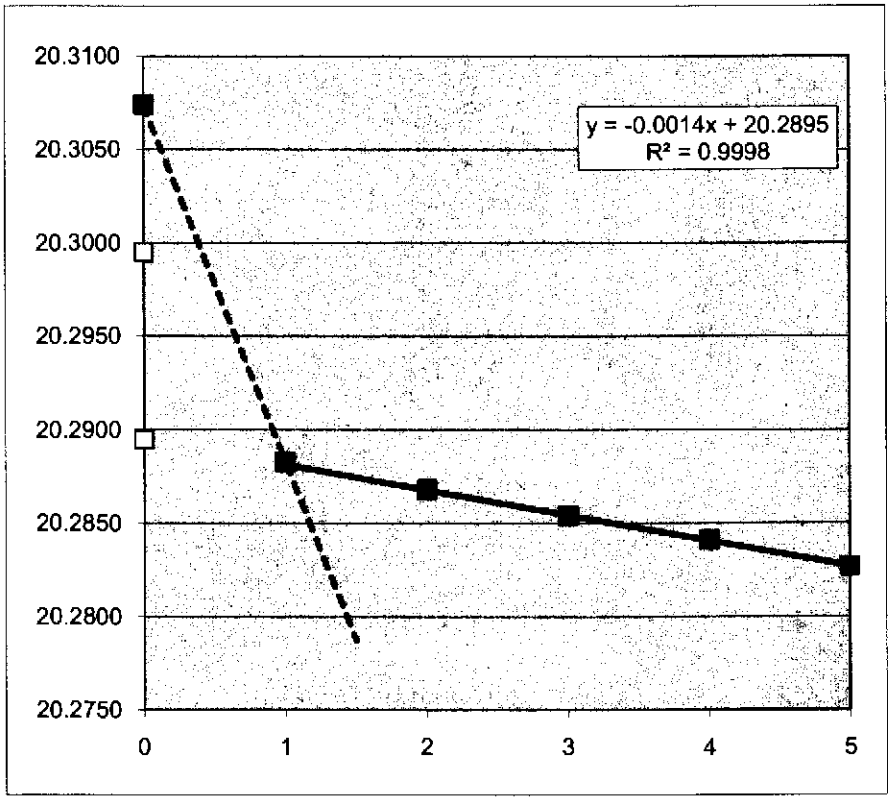
Cleaning Cycle	Wt (g)
0	20.1881
1	20.1712
2	20.1694
3	20.1683
4	20.1666
5	20.1650



Coupon:	047
Test Matrix:	Fe-E-0000-18-3f
Initial wt (g)	20.2995
Removal wt (g)	20.3074

Calculated final wt (g)	20.2895
Total wt loss (g)	0.0100
Total wt loss (mg)	10.0

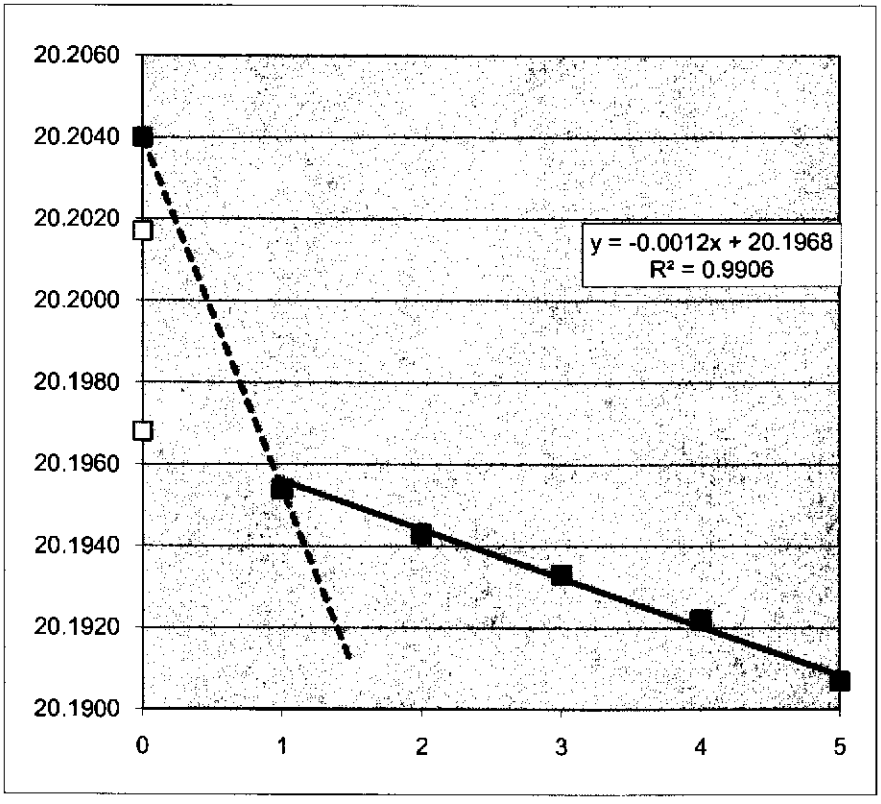
Cleaning Cycle	Wt (g)
0	20.3074
1	20.2883
2	20.2868
3	20.2854
4	20.2841
5	20.2827



Coupon:	049
Test Matrix:	Fe-E-0000-18-2p
Initial wt (g)	20.2017
Removal wt (g)	20.2040

Calculated final wt (g)	20.1968
Total wt loss (g)	0.0049
Total wt loss (mg)	4.9

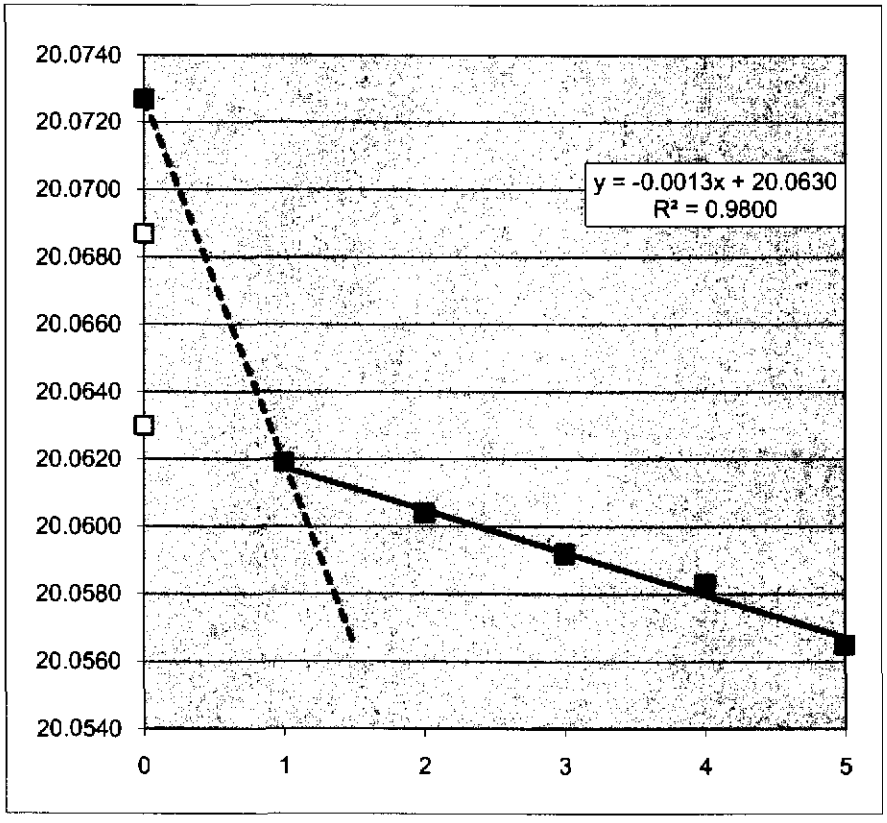
Cleaning Cycle	Wt (g)
0	20.2040
1	20.1954
2	20.1943
3	20.1933
4	20.1922
5	20.1907



Coupon:	050
Test Matrix:	Fe-E-0000-18-3p
Initial wt (g)	20.0687
Removal wt (g)	20.0727

Calculated final wt (g)	20.0630
Total wt loss (g)	0.0057
Total wt loss (mg)	5.7

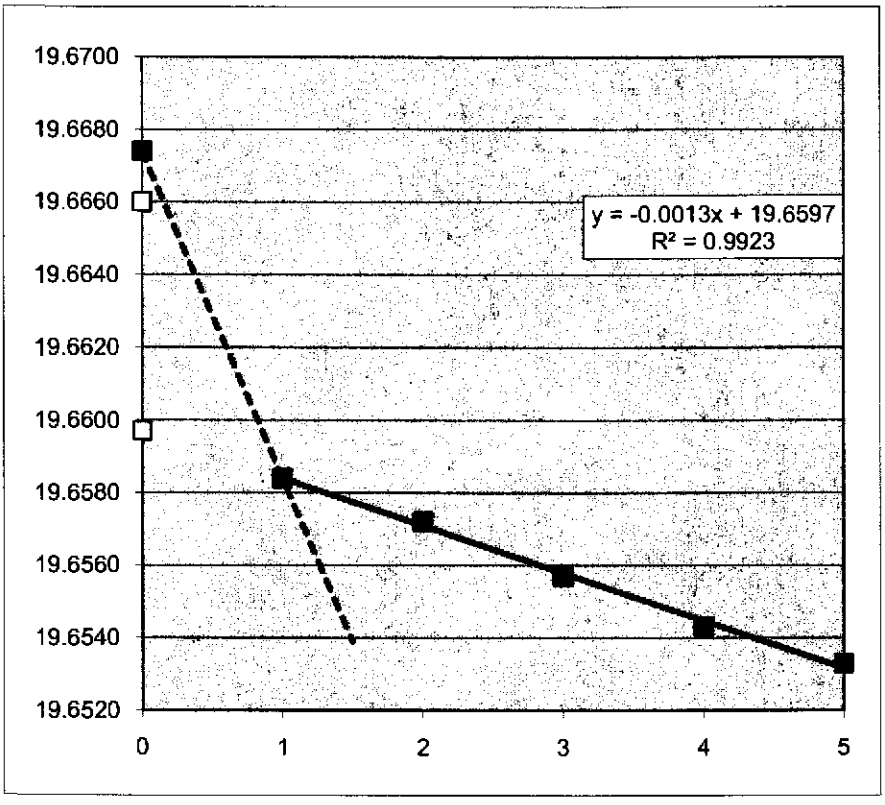
Cleaning Cycle	Wt (g)
0	20.0727
1	20.0619
2	20.0604
3	20.0592
4	20.0583
5	20.0565



Coupon:	052
Test Matrix:	Fe-Eo-0000-18-2f
Initial wt (g)	19.6660
Removal wt (g)	19.6674

Calculated final wt (g)	19.6597
Total wt loss (g)	0.0063
Total wt loss (mg)	6.3

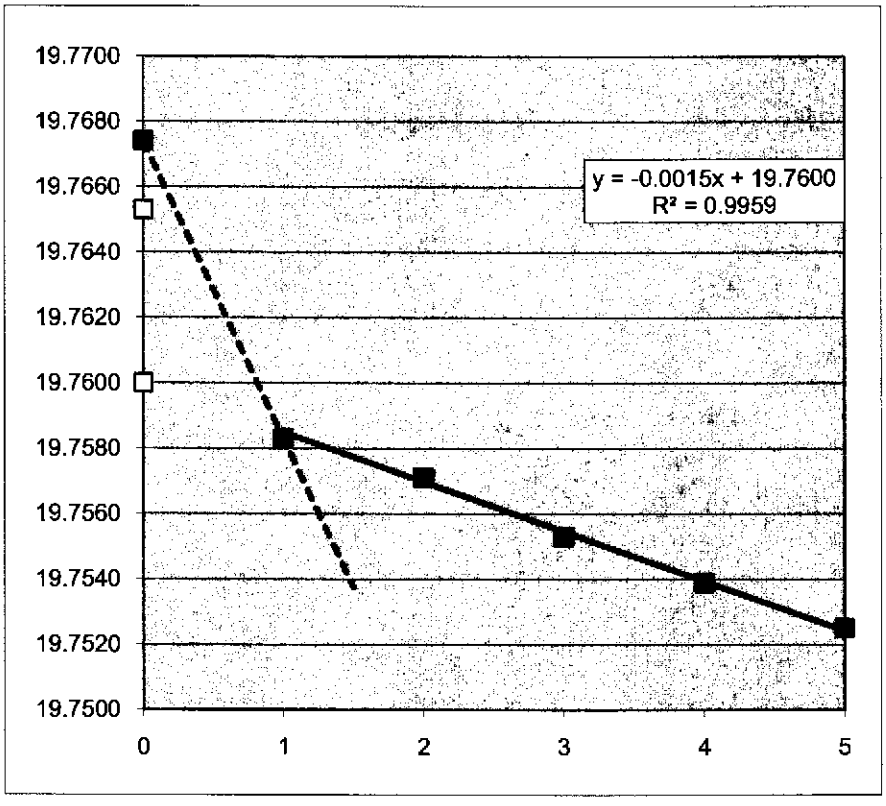
Cleaning Cycle	Wt (g)
0	19.6674
1	19.6584
2	19.6572
3	19.6557
4	19.6543
5	19.6533



Coupon:	053
Test Matrix:	Fe-Eo-0000-18-3f
Initial wt (g)	19.7653
Removal wt (g)	19.7674

Calculated final wt (g)	19.7600
Total wt loss (g)	0.0053
Total wt loss (mg)	5.3

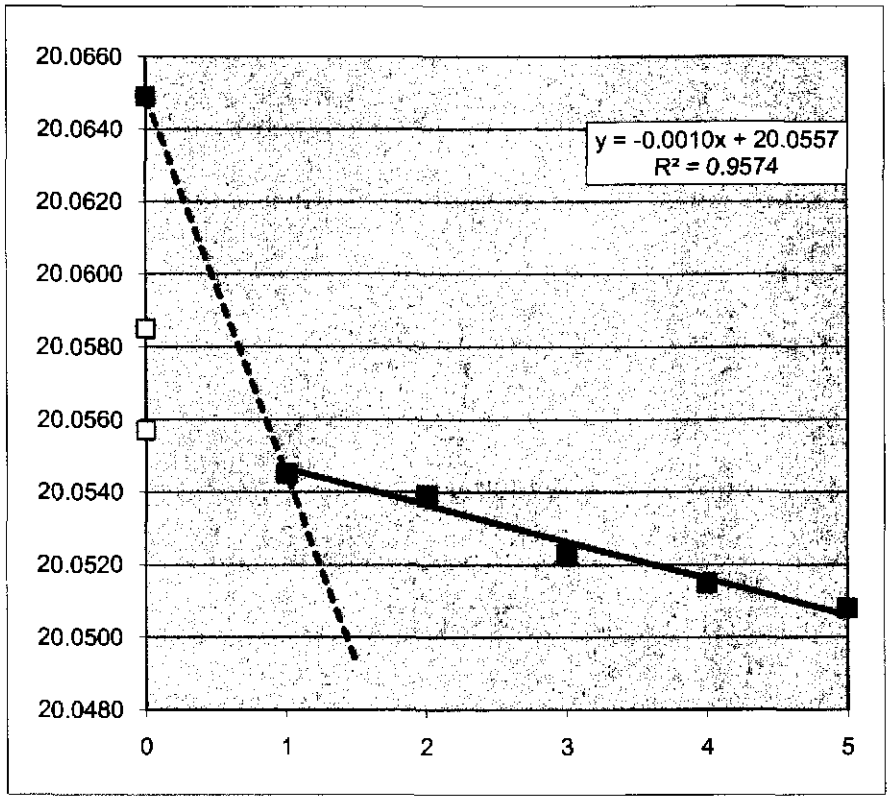
Cleaning Cycle	Wt (g)
0	19.7674
1	19.7583
2	19.7571
3	19.7553
4	19.7539
5	19.7525



Coupon:	055
Test Matrix:	Fe-Eo-0000-18-2p
Initial wt (g)	20.0585
Removal wt (g)	20.0649

Calculated final wt (g)	20.0557
Total wt loss (g)	0.0028
Total wt loss (mg)	2.8

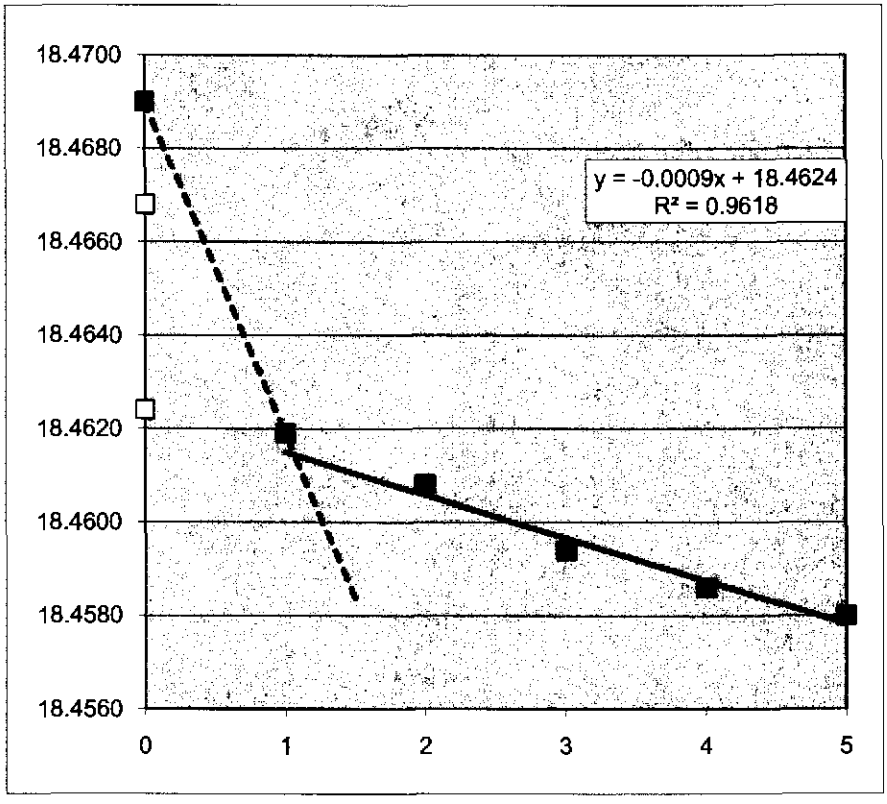
Cleaning Cycle	Wt (g)
0	20.0649
1	20.0545
2	20.0539
3	20.0523
4	20.0515
5	20.0508



Coupon:	056
Test Matrix:	Fe-Eo-0000-18-3p
Initial wt (g)	18.4668
Removal wt (g)	18.4690

Calculated final wt (g)	18.4624
Total wt loss (g)	0.0044
Total wt loss (mg)	4.4

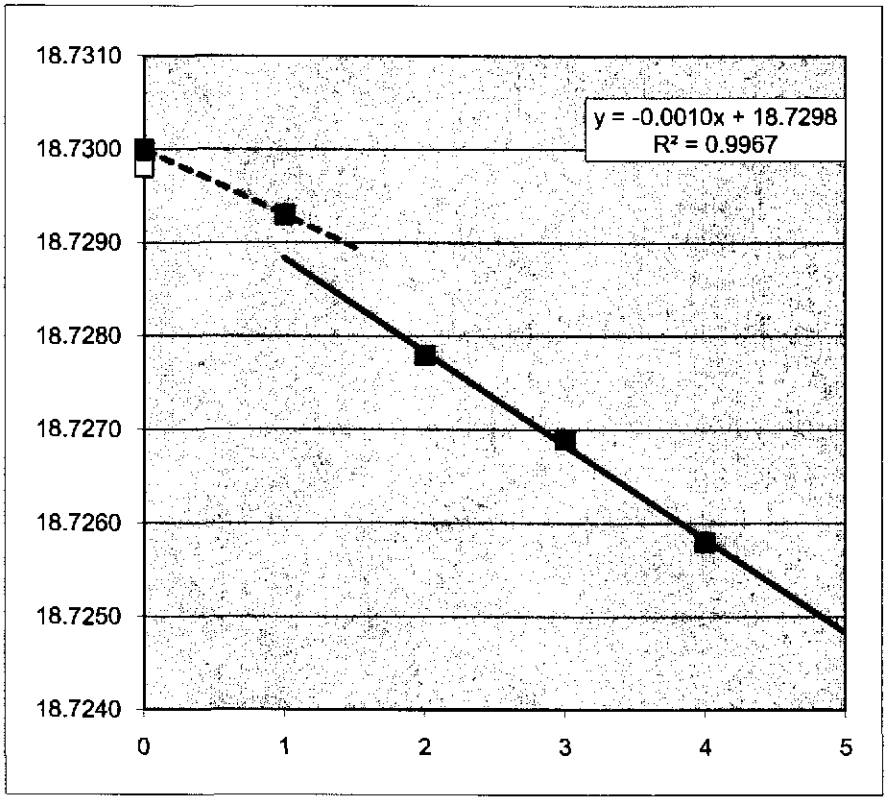
Cleaning Cycle	Wt (g)
0	18.4690
1	18.4619
2	18.4608
3	18.4594
4	18.4586
5	18.4580



Coupon:	058		
Test Matrix:	Fe-Atm-0000-18-2		
Initial wt (g)	18.7299	**Calculated final wt (g)**	18.7298
Removal wt (g)	18.7300	**Total wt loss (g)**	0.0001
		Total wt loss (mg)	0.1

Cleaning Cycle	Wt (g)
0	18.7300
1	18.7293
2	18.7278
3	18.7269
4	18.7258
5	18.7261

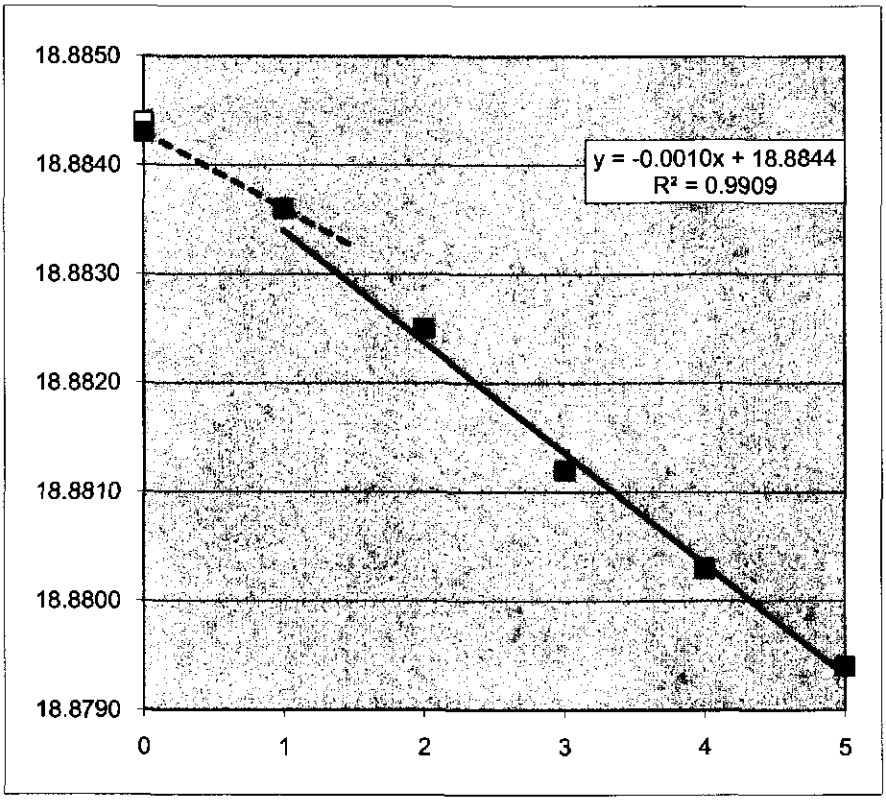
Note: 5th cleaning cycle weight not used in data regression.



Coupon:	059
Test Matrix:	Fe-Atm-0000-18-3
Initial wt (g)	18.8844
Removal wt (g)	18.8843

Calculated final wt (g)	18.8844
Total wt loss (g)	0.0000
Total wt loss (mg)	0.0

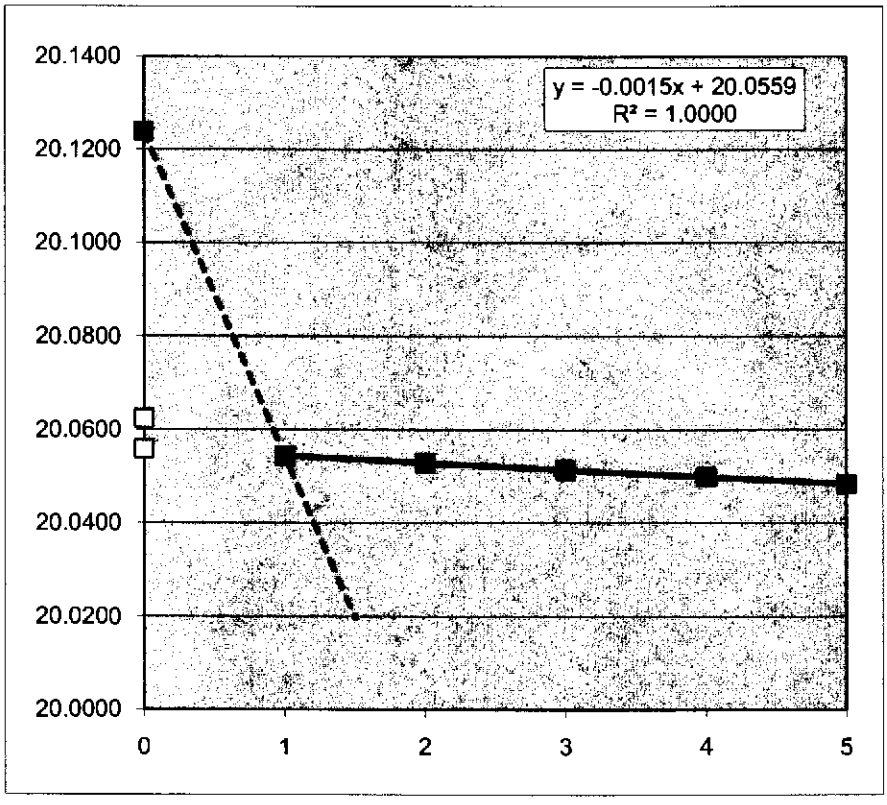
Cleaning Cycle	Wt (g)
0	18.8843
1	18.8836
2	18.8825
3	18.8812
4	18.8803
5	18.8794



Coupon:	169
Test Matrix:	Fe-G-0350-18-2f
Initial wt (g)	20.0624
Removal wt (g)	20.1239

Calculated final wt (g)	20.0559
Total wt loss (g)	0.0065
Total wt loss (mg)	6.5

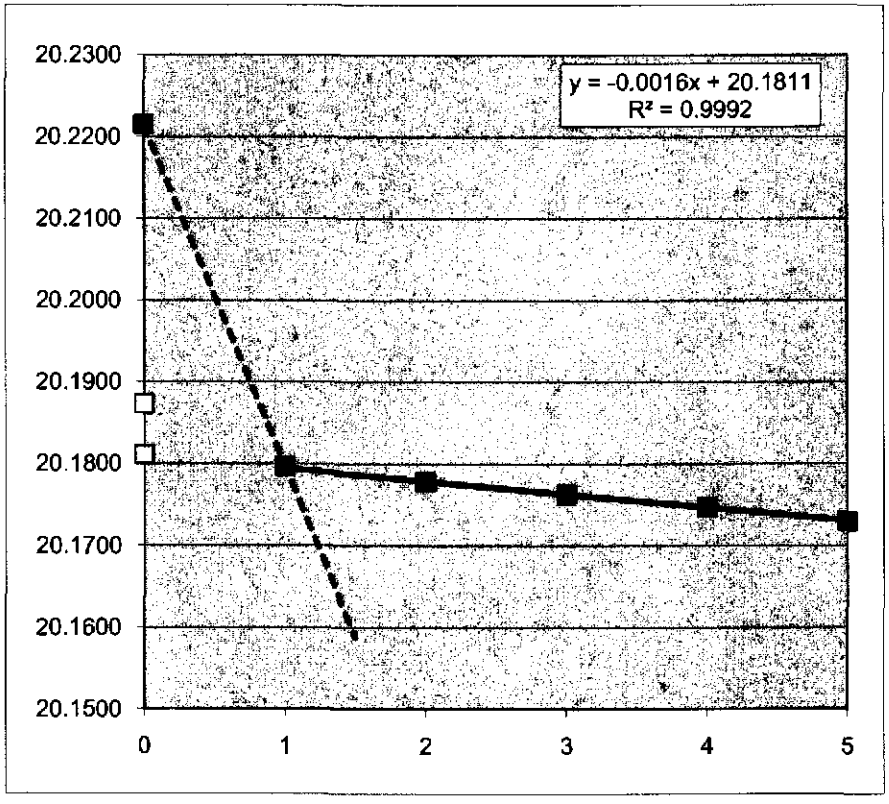
Cleaning Cycle	Wt (g)
0	20.1239
1	20.0544
2	20.0529
3	20.0514
4	20.0499
5	20.0484



Coupon:	170
Test Matrix:	Fe-G-0350-18-3f
Initial wt (g)	20.1873
Removal wt (g)	20.2215

Calculated final wt (g)	20.1811
Total wt loss (g)	0.0062
Total wt loss (mg)	6.2

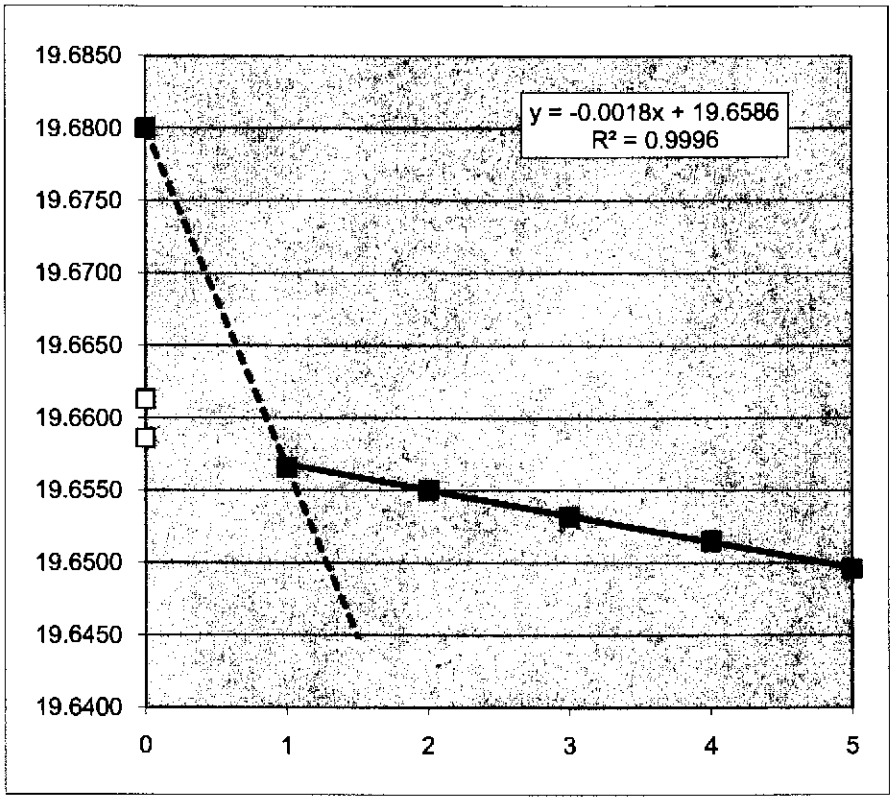
Cleaning Cycle	Wt (g)
0	20.2215
1	20.1797
2	20.1778
3	20.1763
4	20.1747
5	20.1730



Coupon:	172
Test Matrix:	Fe-G-0350-18-2p
Initial wt (g)	19.6613
Removal wt (g)	19.6800

Calculated final wt (g)	19.6586
Total wt loss (g)	0.0027
Total wt loss (mg)	2.7

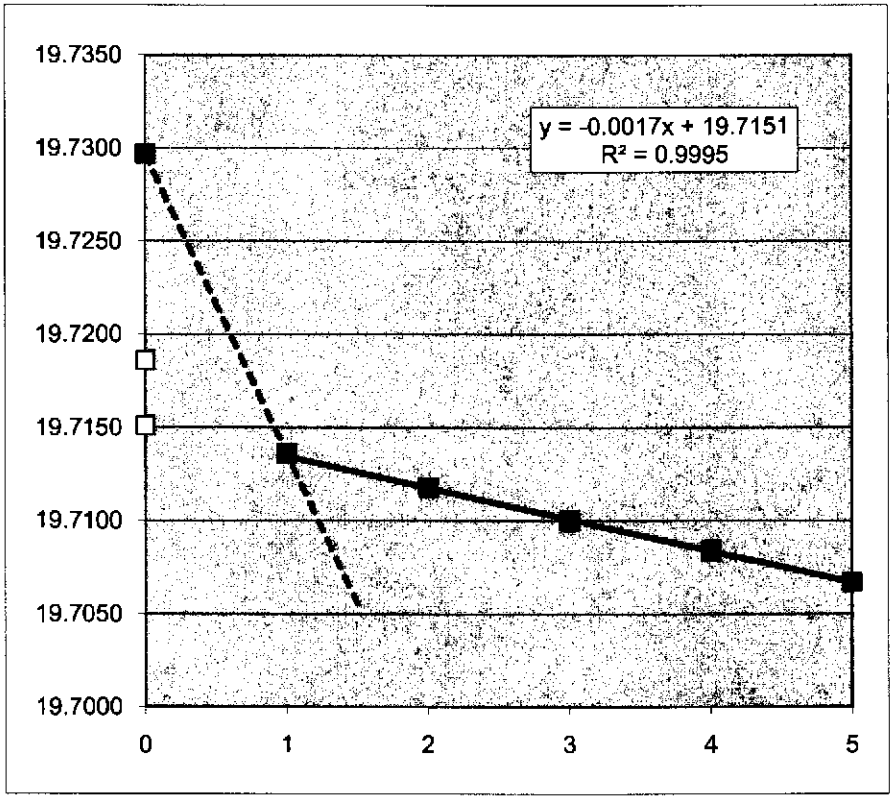
Cleaning Cycle	Wt (g)
0	19.6800
1	19.6566
2	19.6550
3	19.6532
4	19.6515
5	19.6496



Coupon:	173
Test Matrix:	Fe-G-0350-18-3p
Initial wt (g)	19.7186
Removal wt (g)	19.7297

Calculated final wt (g)	19.7151
Total wt loss (g)	0.0035
Total wt loss (mg)	3.5

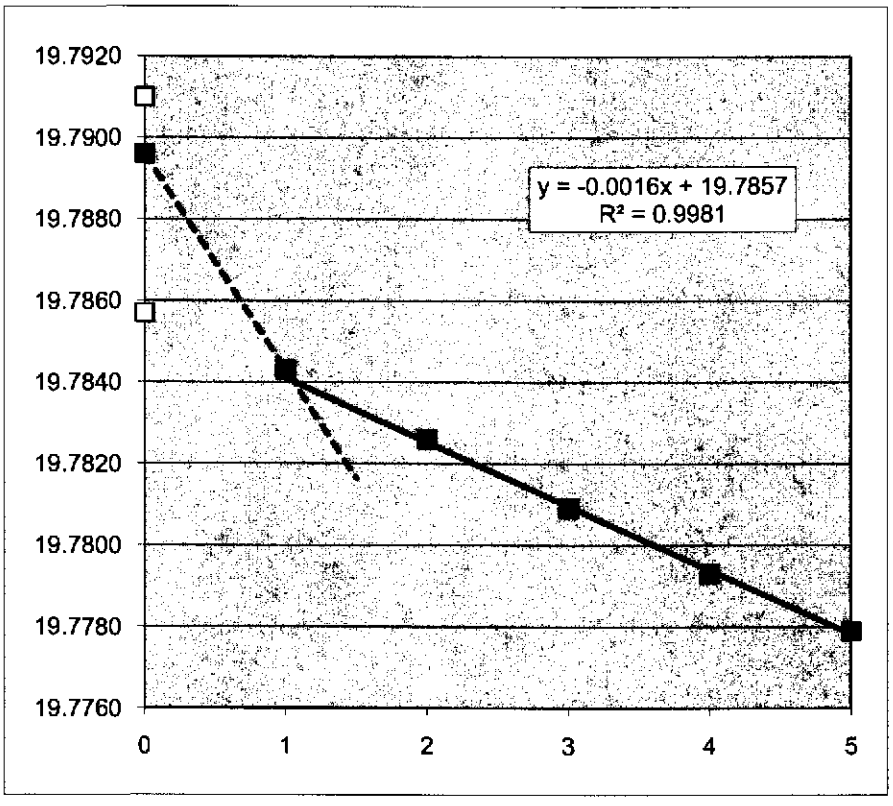
Cleaning Cycle	Wt (g)
0	19.7297
1	19.7136
2	19.7118
3	19.7100
4	19.7084
5	19.7067



Coupon:	175
Test Matrix:	Fe-Go-0350-18-2f
Initial wt (g)	19.7910
Removal wt (g)	19.7896

Calculated final wt (g)	19.7857
Total wt loss (g)	0.0053
Total wt loss (mg)	5.3

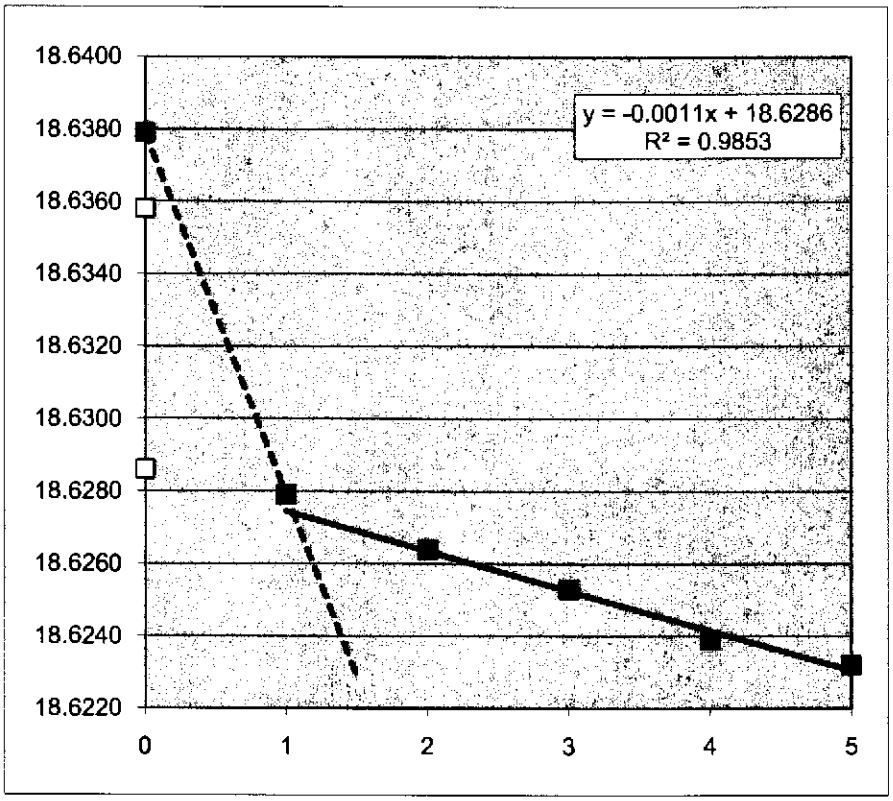
Cleaning Cycle	Wt (g)
0	19.7896
1	19.7843
2	19.7826
3	19.7809
4	19.7793
5	19.7779



Coupon:	176
Test Matrix:	Fe-Go-0350-18-3f
Initial wt (g)	18.6358
Removal wt (g)	18.6379

Calculated final wt (g)	18.6286
Total wt loss (g)	0.0072
Total wt loss (mg)	7.2

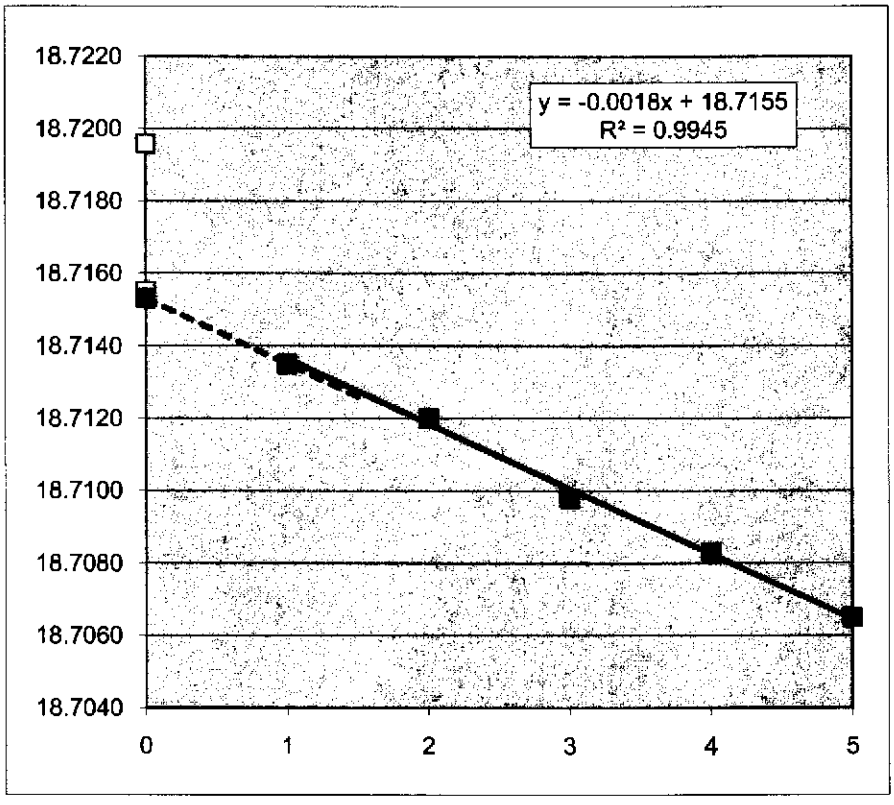
Cleaning Cycle	Wt (g)
0	18.6379
1	18.6279
2	18.6264
3	18.6253
4	18.6239
5	18.6232



Coupon:	178
Test Matrix:	Fe-Go-0350-18-2p
Initial wt (g)	18.7196
Removal wt (g)	18.7153

Calculated final wt (g)	18.7155
Total wt loss (g)	0.0041
Total wt loss (mg)	4.1

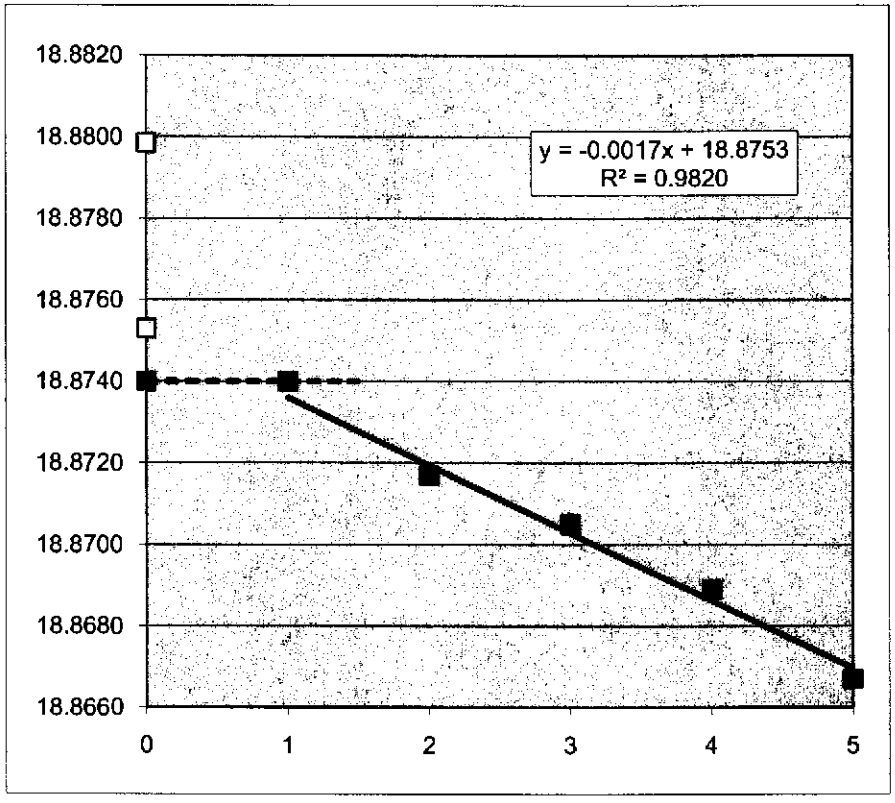
Cleaning Cycle	Wt (g)
0	18.7153
1	18.7135
2	18.7120
3	18.7098
4	18.7083
5	18.7065



Coupon:	179
Test Matrix:	Fe-Go-0350-18-3p
Initial wt (g)	18.8799
Removal wt (g)	18.8740

Calculated final wt (g)	18.8753
Total wt loss (g)	0.0046
Total wt loss (mg)	4.6

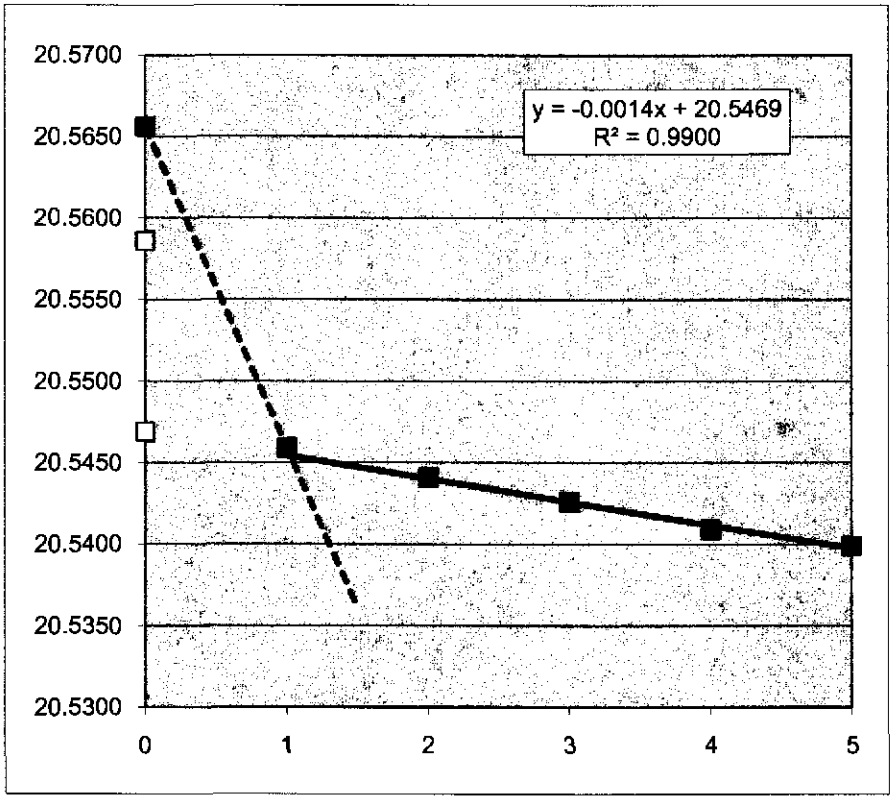
Cleaning Cycle	Wt (g)
0	18.8740
1	18.8740
2	18.8717
3	18.8705
4	18.8689
5	18.8667



Coupon:	181
Test Matrix:	Fe-E-0350-18-2f
Initial wt (g)	20.5586
Removal wt (g)	20.5656

Calculated final wt (g)	20.5469
Total wt loss (g)	0.0117
Total wt loss (mg)	11.7

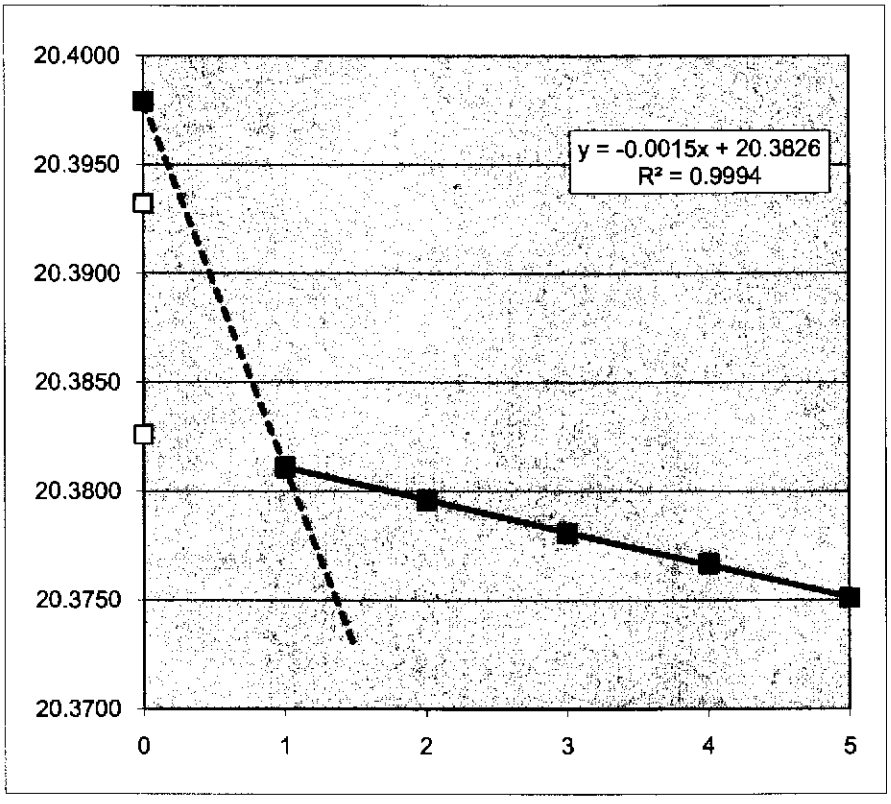
Cleaning Cycle	Wt (g)
0	20.5656
1	20.5459
2	20.5441
3	20.5426
4	20.5409
5	20.5399



Coupon:	182
Test Matrix:	Fe-E-0350-18-3f
Initial wt (g)	20.3932
Removal wt (g)	20.3979

Calculated final wt (g)	20.3826
Total wt loss (g)	0.0106
Total wt loss (mg)	10.6

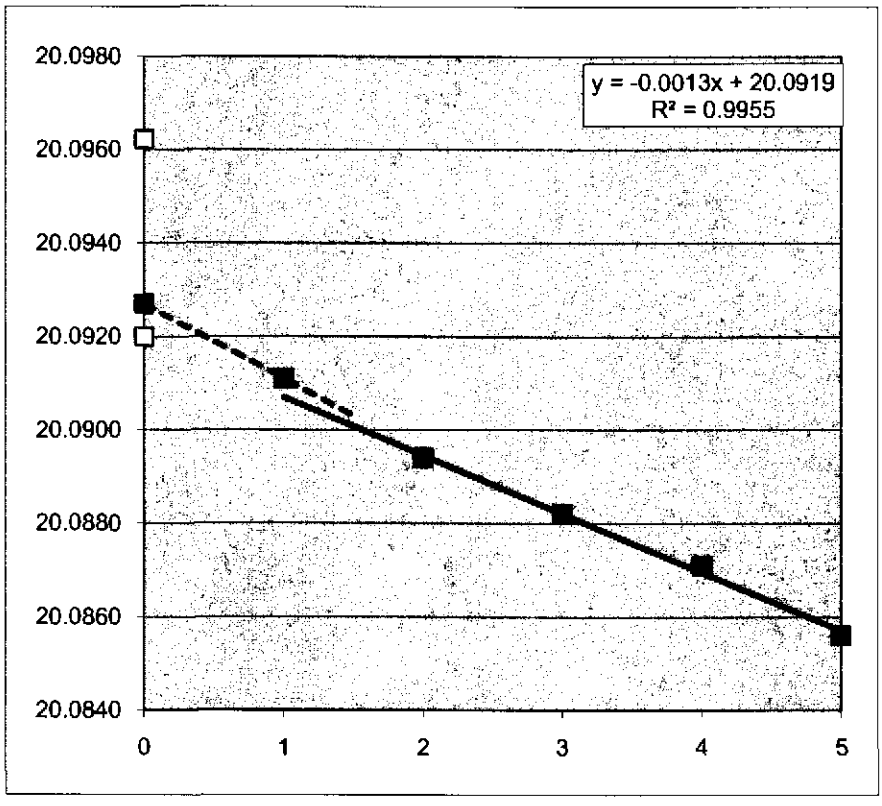
Cleaning Cycle	Wt (g)
0	20.3979
1	20.3811
2	20.3796
3	20.3781
4	20.3767
5	20.3751



Coupon:	184
Test Matrix:	Fe-E-0350-18-2p
Initial wt (g)	20.0962
Removal wt (g)	20.0927

Calculated final wt (g)	20.092
Total wt loss (g)	0.0042
Total wt loss (mg)	4.2

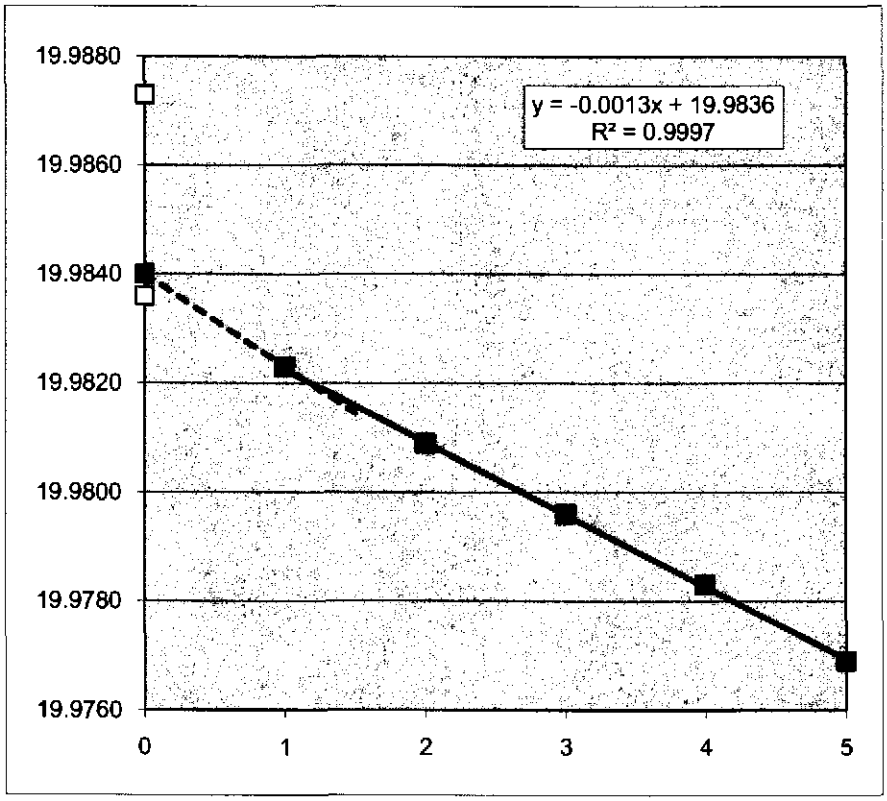
Cleaning Cycle	Wt (g)
0	20.0927
1	20.0911
2	20.0894
3	20.0882
4	20.0871
5	20.0856



Coupon:	185
Test Matrix:	Fe-E-0350-18-3p
Initial wt (g)	19.9873
Removal wt (g)	19.9840

Calculated final wt (g)	19.9836
Total wt loss (g)	0.0037
Total wt loss (mg)	3.7

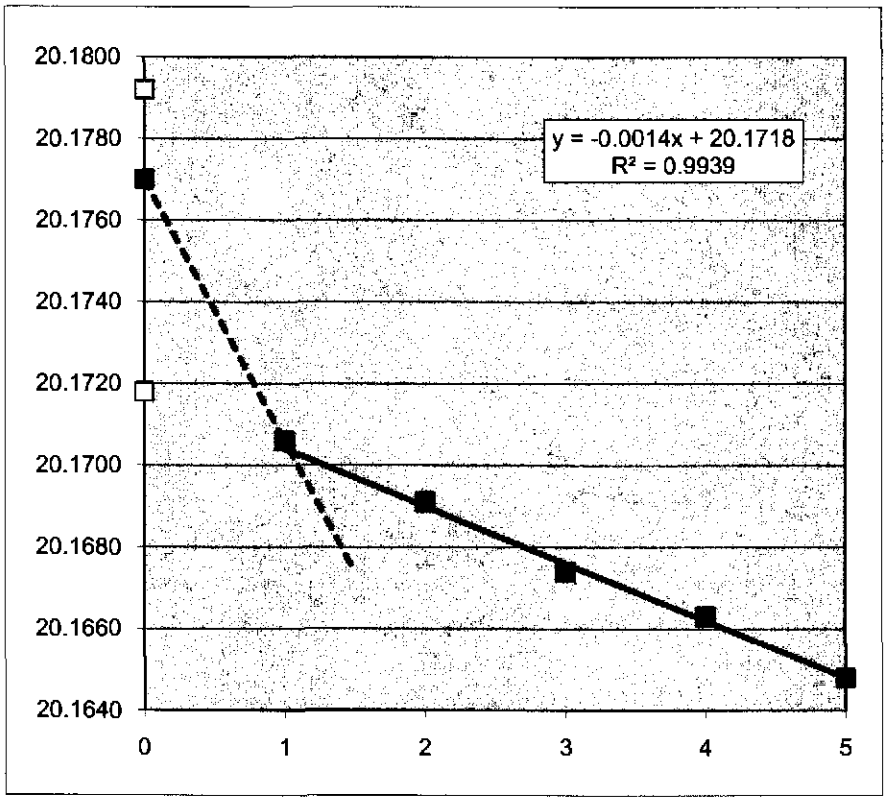
Cleaning Cycle	Wt (g)
0	19.9840
1	19.9823
2	19.9809
3	19.9796
4	19.9783
5	19.9769



Coupon:	187
Test Matrix:	Fe-Eo-0350-18-2f
Initial wt (g)	20.1792
Removal wt (g)	20.1770

Calculated final wt (g)	20.1718
Total wt loss (g)	0.0074
Total wt loss (mg)	7.4

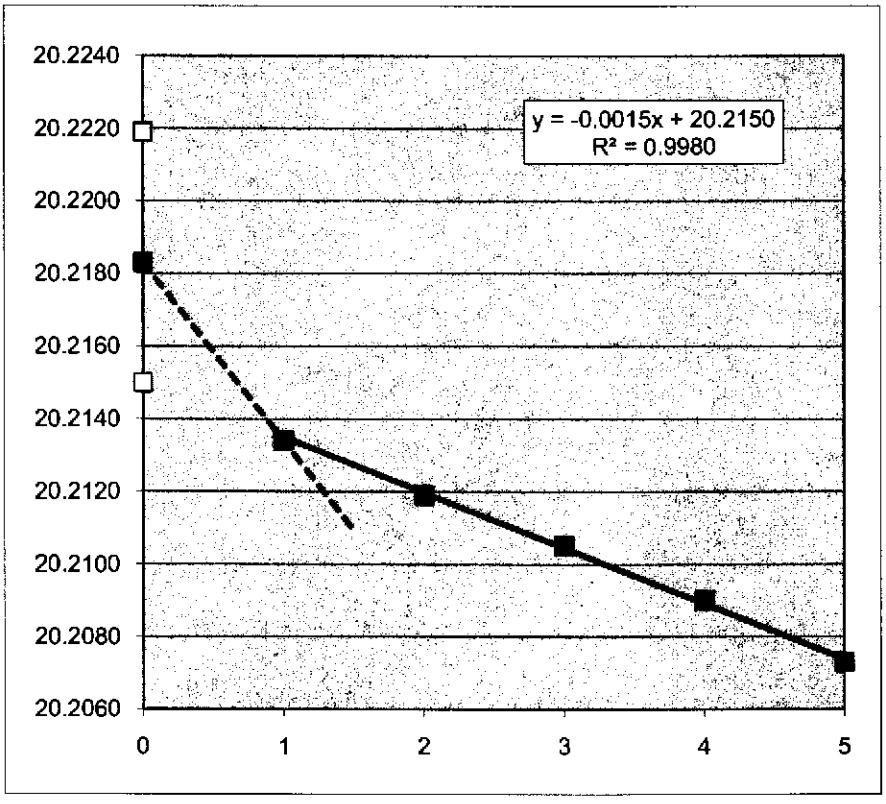
Cleaning Cycle	Wt (g)
0	20.1770
1	20.1706
2	20.1691
3	20.1674
4	20.1663
5	20.1648



Coupon:	188
Test Matrix:	Fe-Eo-0350-18-3f
Initial wt (g)	20.2219
Removal wt (g)	20.2183

Calculated final wt (g)	20.2150
Total wt loss (g)	0.0069
Total wt loss (mg)	6.9

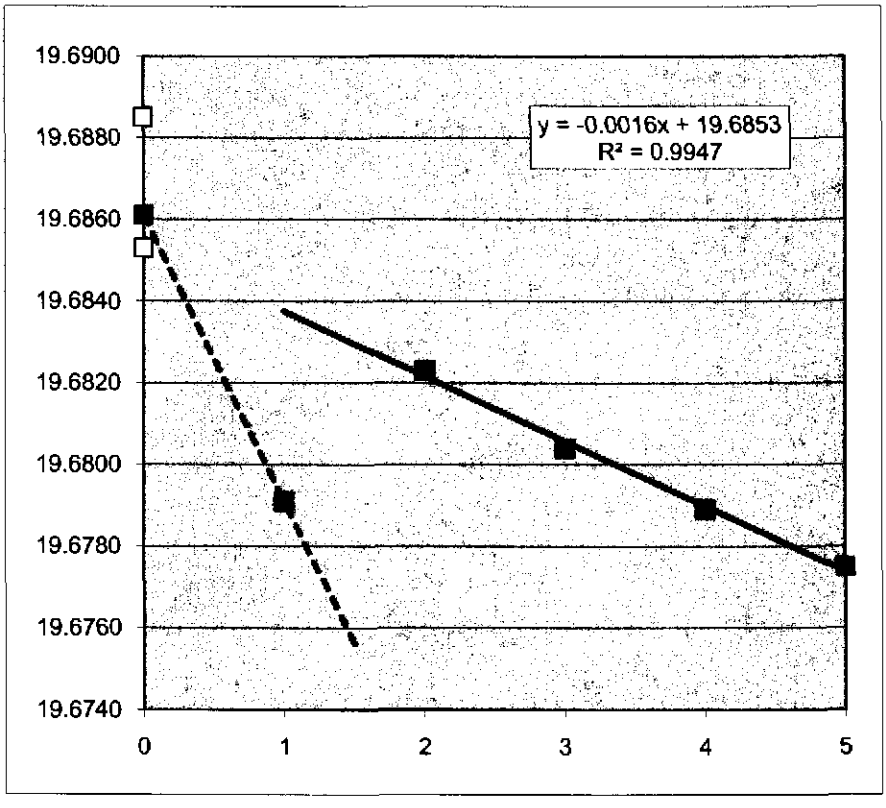
Cleaning Cycle	Wt (g)
0	20.2183
1	20.2134
2	20.2119
3	20.2105
4	20.2090
5	20.2073



Coupon:	195
Test Matrix:	Fe-Eo-0350-18-2p
Initial wt (g)	19.6885
Removal wt (g)	19.6861

Calculated final wt (g)	19.6853
Total wt loss (g)	0.0032
Total wt loss (mg)	3.2

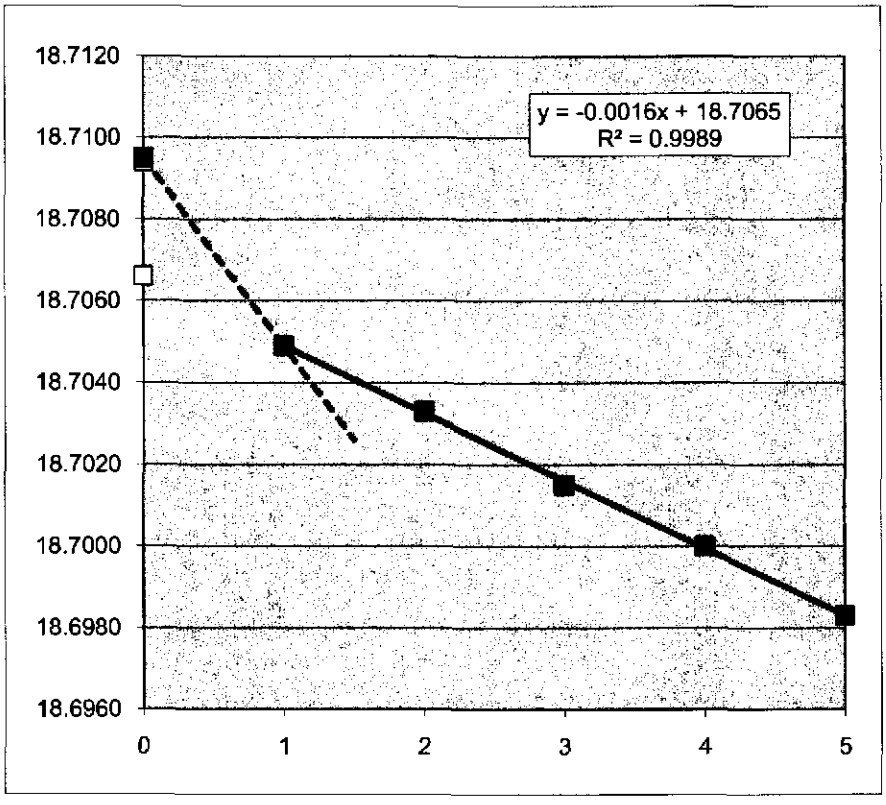
Cleaning Cycle	Wt (g)
0	19.6861
1	19.6791
2	19.6823
3	19.6804
4	19.6789
5	19.6775



Coupon:	196
Test Matrix:	Fe-Eo-0350-18-3p
Initial wt (g)	18.7094
Removal wt (g)	18.7095

Calculated final wt (g)	18.7066
Total wt loss (g)	0.0028
Total wt loss (mg)	2.8

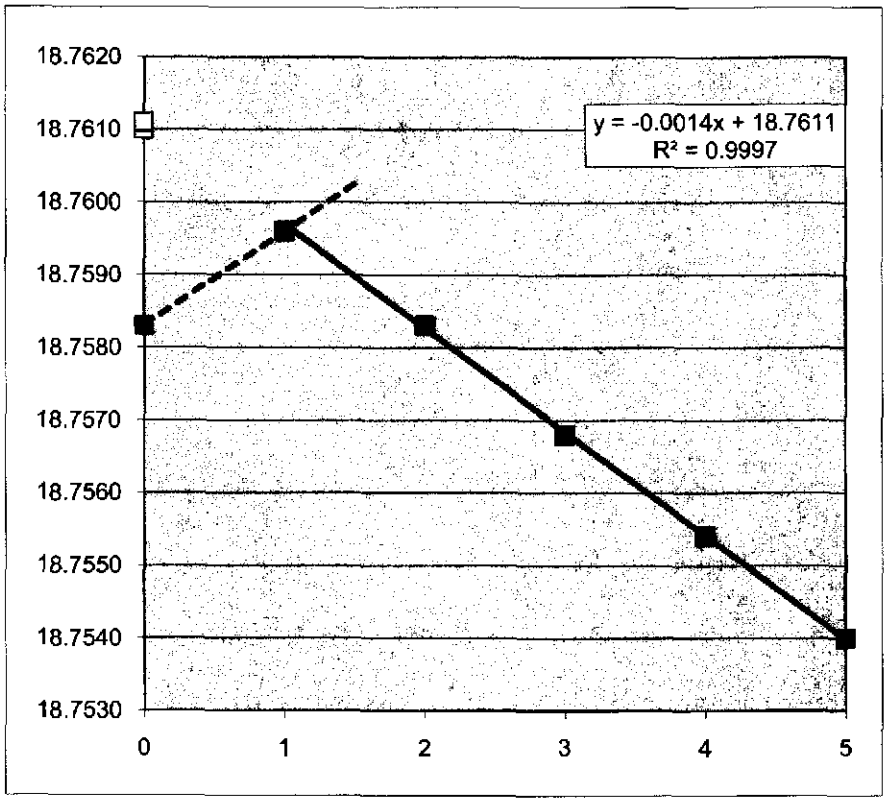
Cleaning Cycle	Wt (g)
0	18.7095
1	18.7049
2	18.7033
3	18.7015
4	18.7000
5	18.6983



Coupon:	198
Test Matrix:	Fe-Atm-0350-18-2
Initial wt (g)	18.7610
Removal wt (g)	18.7583

Calculated final wt (g)	18.7611
Total wt loss (g)	-0.0001
Total wt loss (mg)	-0.1

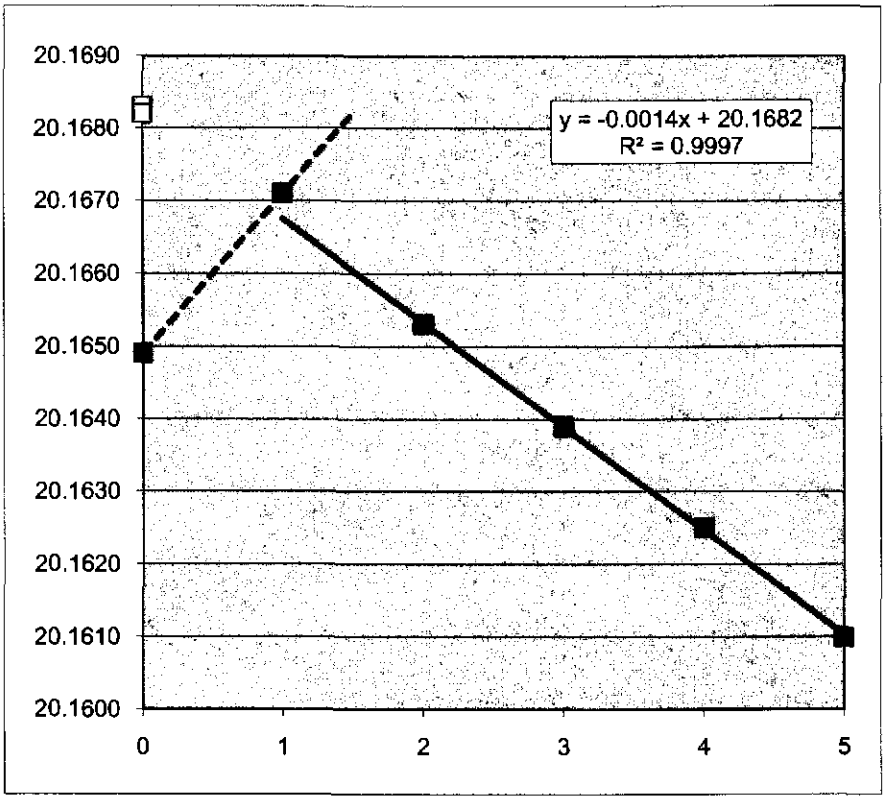
Cleaning Cycle	Wt (g)
0	18.7583
1	18.7596
2	18.7583
3	18.7568
4	18.7554
5	18.7540



Coupon:	201
Test Matrix:	Fe-Atm-0350-18-3
Initial wt (g)	20.1683
Removal wt (g)	20.1649

Calculated final wt (g)	20.1682
Total wt loss (g)	0.0001
Total wt loss (mg)	0.1

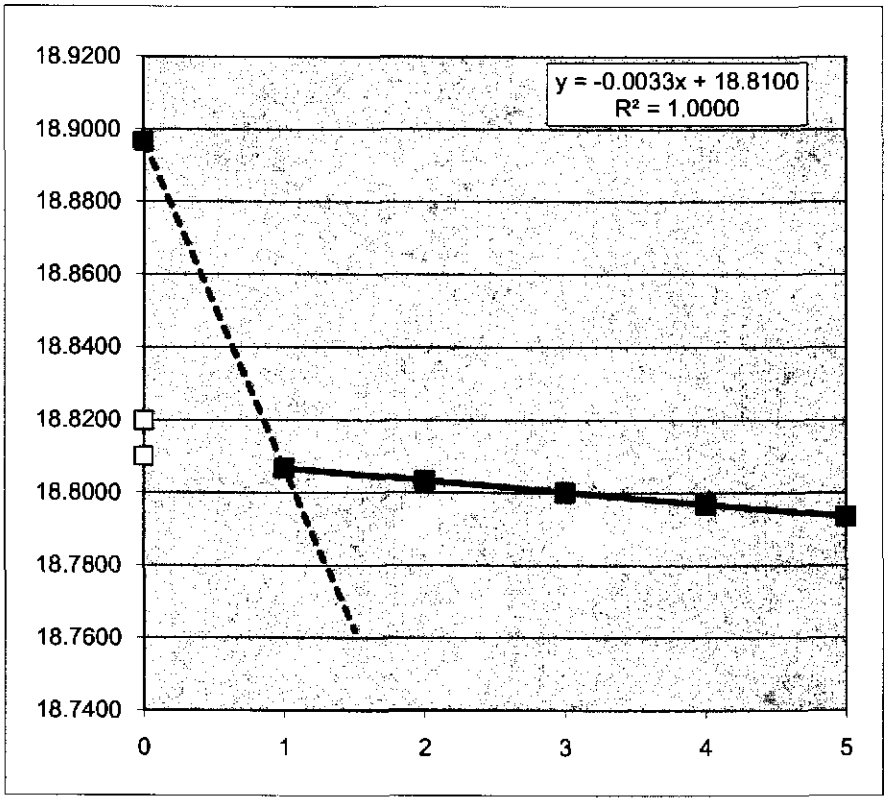
Cleaning Cycle	Wt (g)
0	20.1649
1	20.1671
2	20.1653
3	20.1639
4	20.1625
5	20.1610



Coupon:	253
Test Matrix:	Fe-G-1500-18-2f
Initial wt (g)	18.8198
Removal wt (g)	18.8967

Calculated final wt (g)	18.8100
Total wt loss (g)	0.0098
Total wt loss (mg)	9.8

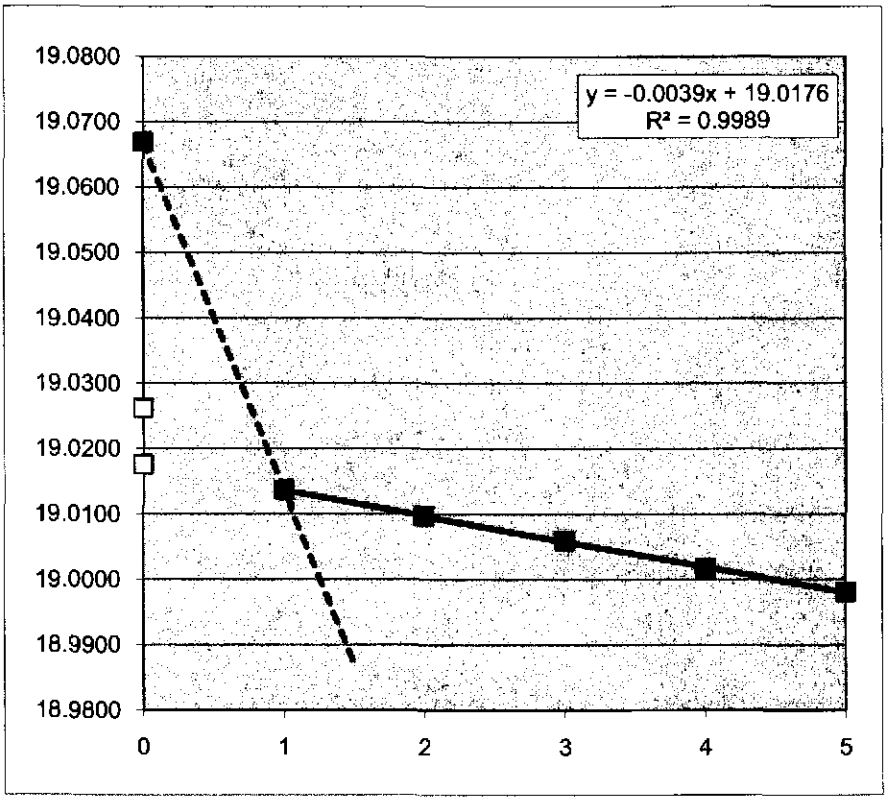
Cleaning Cycle	Wt (g)
0	18.8967
1	18.8068
2	18.8034
3	18.8001
4	18.7968
5	18.7935



Coupon:	254
Test Matrix:	Fe-G-1500-18-3f
Initial wt (g)	19.0262
Removal wt (g)	19.0669

Calculated final wt (g)	19.0176
Total wt loss (g)	0.0086
Total wt loss (mg)	8.6

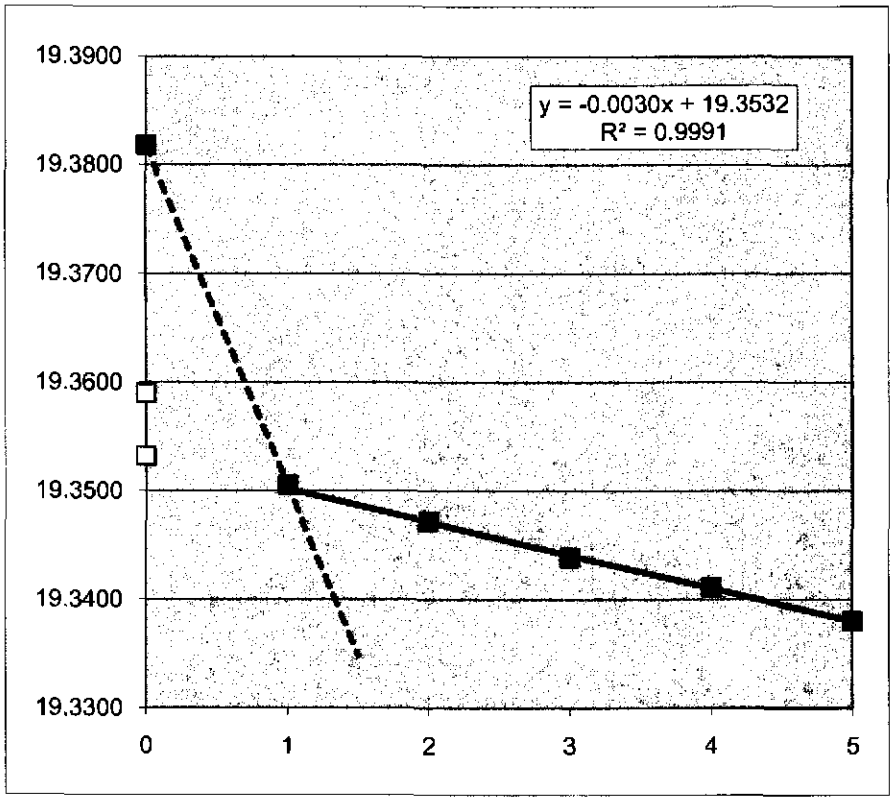
Cleaning Cycle	Wt (g)
0	19.0669
1	19.0137
2	19.0097
3	19.0060
4	19.0017
5	18.9981



Coupon:	256
Test Matrix:	Fe-G-1500-18-2p
Initial wt (g)	19.3590
Removal wt (g)	19.3818

Calculated final wt (g)	19.3532
Total wt loss (g)	0.0058
Total wt loss (mg)	5.8

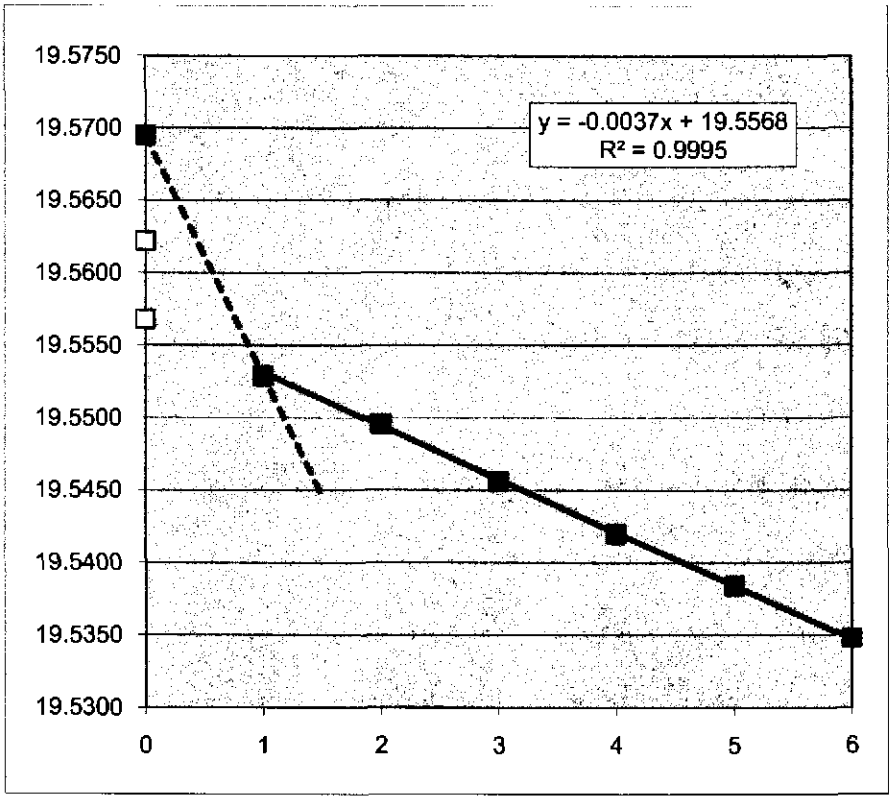
Cleaning Cycle	Wt (g)
0	19.3818
1	19.3505
2	19.3472
3	19.3439
4	19.3411
5	19.3380



Coupon:	257
Test Matrix:	Fe-G-1500-18-3p
Initial wt (g)	19.5622
Removal wt (g)	19.5695

Calculated final wt (g)	19.5568
Total wt loss (g)	0.0054
Total wt loss (mg)	5.4

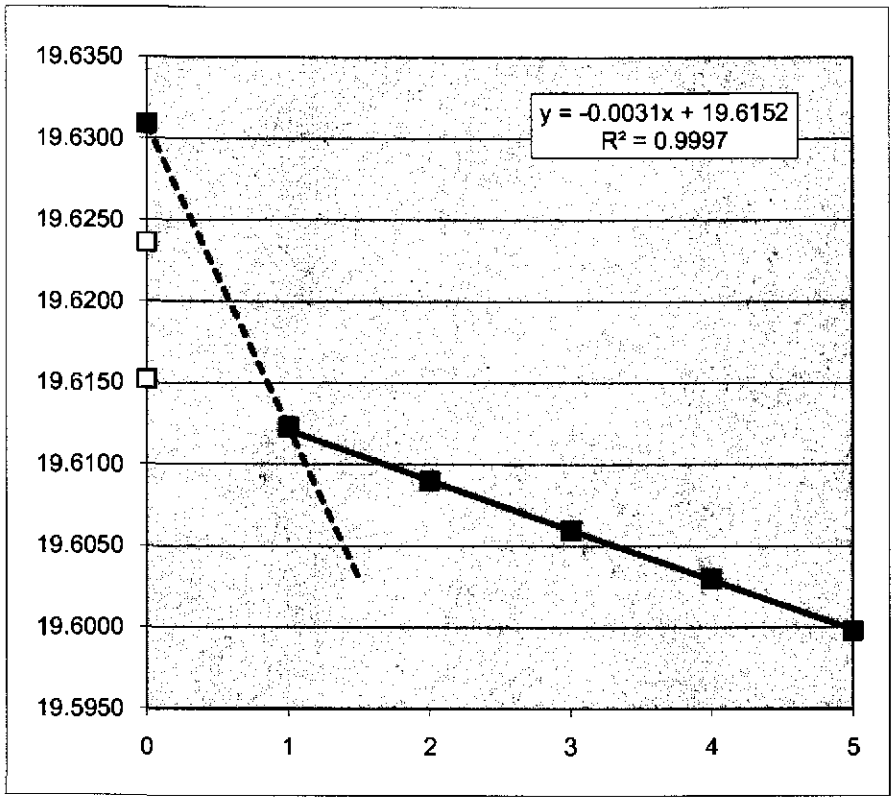
Cleaning Cycle	Wt (g)
0	19.5695
1	19.5529
2	19.5496
3	19.5456
4	19.5420
5	19.5384
6	19.5348



Coupon:	259
Test Matrix:	Fe-Go-1500-18-2f
Initial wt (g)	19.6236
Removal wt (g)	19.6309

Calculated final wt (g)	19.6152
Total wt loss (g)	0.0084
Total wt loss (mg)	8.4

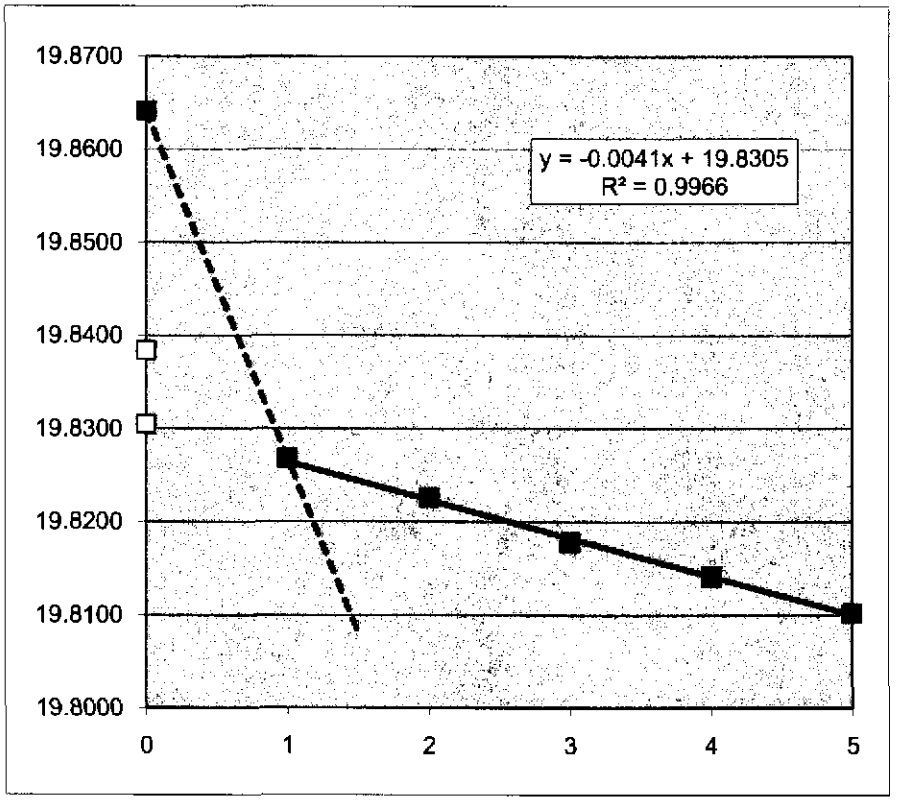
Cleaning Cycle	Wt (g)
0	19.6309
1	19.6123
2	19.6090
3	19.6060
4	19.6030
5	19.5998



Coupon:	260
Test Matrix:	Fe-Go-1500-18-3f
Initial wt (g)	19.8384
Removal wt (g)	20.4585

Calculated final wt (g)	19.8305
Total wt loss (g)	0.0079
Total wt loss (mg)	7.9

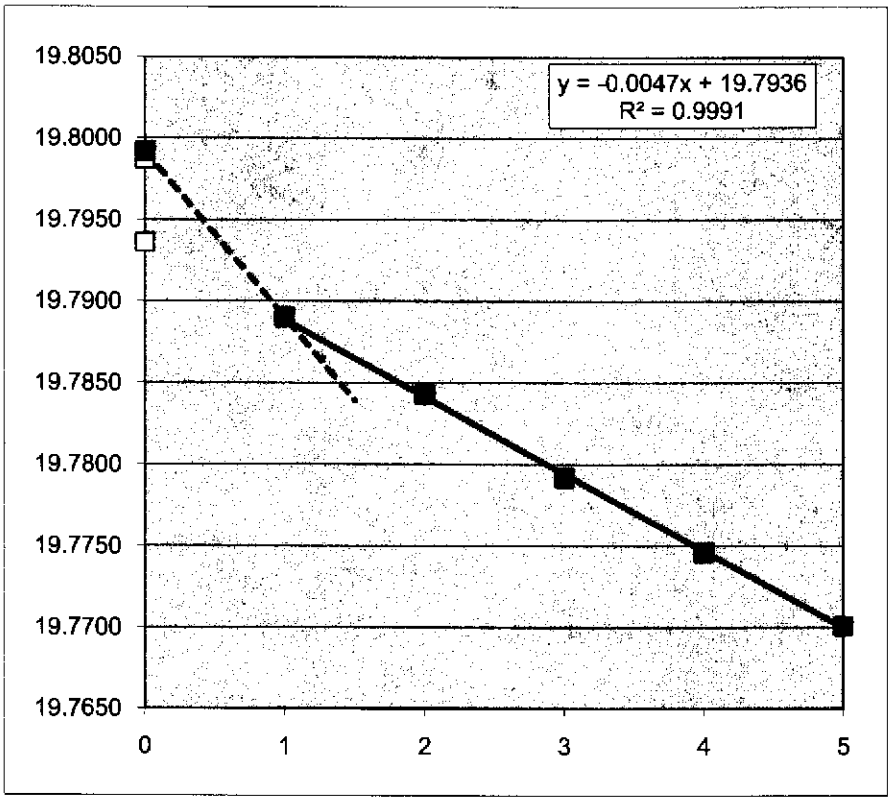
Cleaning Cycle	Wt (g)
0	19.8641
1	19.8268
2	19.8226
3	19.8178
4	19.8141
5	19.8102



Coupon:	262
Test Matrix:	Fe-Go-1500-18-2p
Initial wt (g)	19.7987
Removal wt (g)	19.7992

Calculated final wt (g)	19.7936
Total wt loss (g)	0.0051
Total wt loss (mg)	5.1

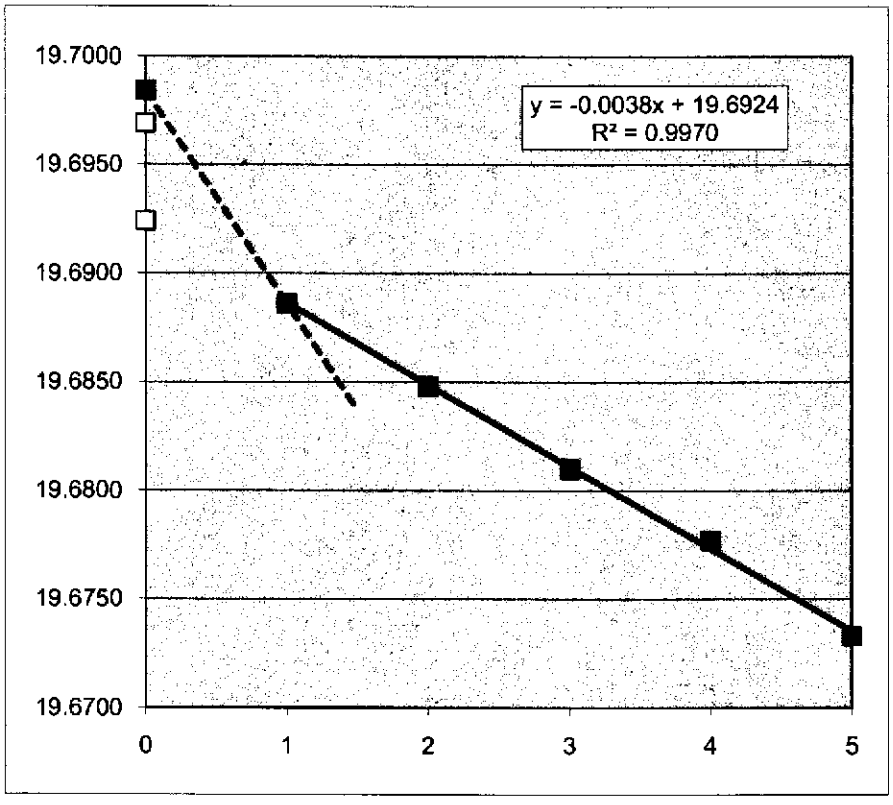
Cleaning Cycle	Wt (g)
0	19.7992
1	19.7890
2	19.7843
3	19.7792
4	19.7746
5	19.7701



Coupon:	263
Test Matrix:	Fe-Go-1500-18-3p
Initial wt (g)	19.6969
Removal wt (g)	19.6984

Calculated final wt (g)	19.6924
Total wt loss (g)	0.0045
Total wt loss (mg)	4.5

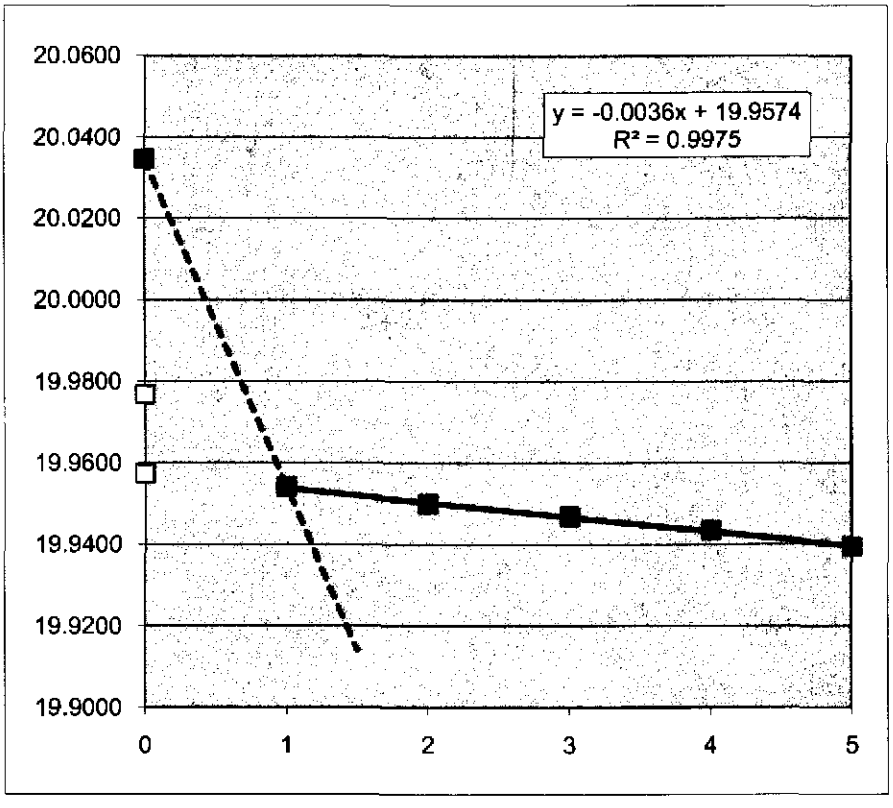
Cleaning Cycle	Wt (g)
0	19.6984
1	19.6886
2	19.6848
3	19.6810
4	19.6777
5	19.6733



Coupon:	265
Test Matrix:	Fe-E-1500-18-2f
Initial wt (g)	19.9768
Removal wt (g)	20.0346

Calculated final wt (g)	19.9574
Total wt loss (g)	0.0194
Total wt loss (mg)	19.4

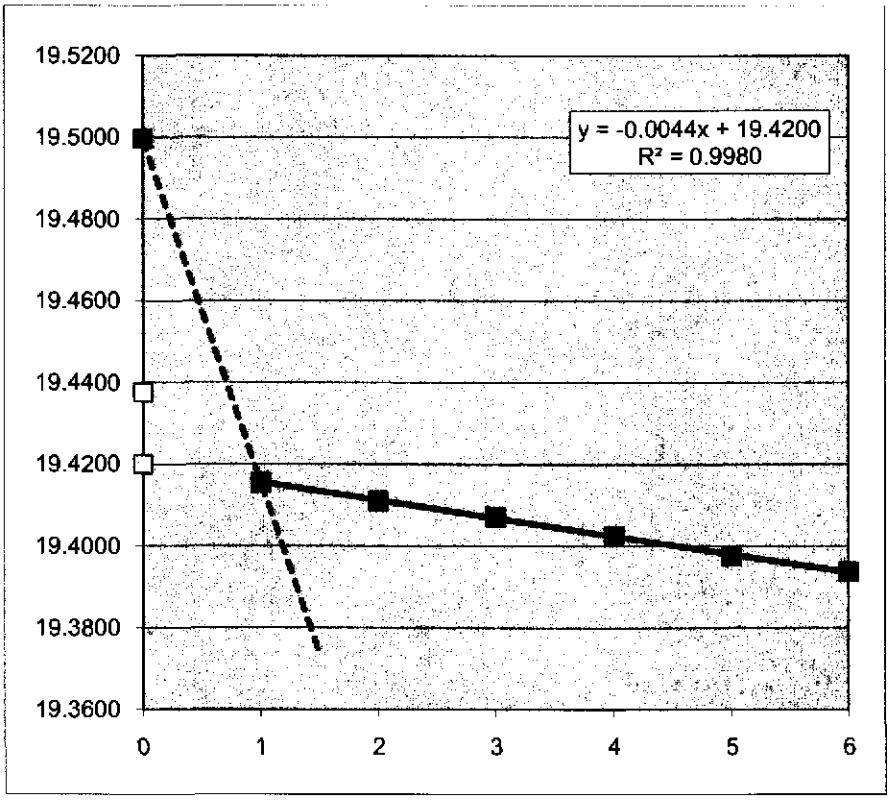
Cleaning Cycle	Wt (g)
0	20.0346
1	19.9542
2	19.9501
3	19.9469
4	19.9434
5	19.9394



Coupon:	266
Test Matrix:	Fe-E-1500-18-3f
Initial wt (g)	19.4376
Removal wt (g)	19.4996

Calculated final wt (g)	19.4200
Total wt loss (g)	0.0176
Total wt loss (mg)	17.6

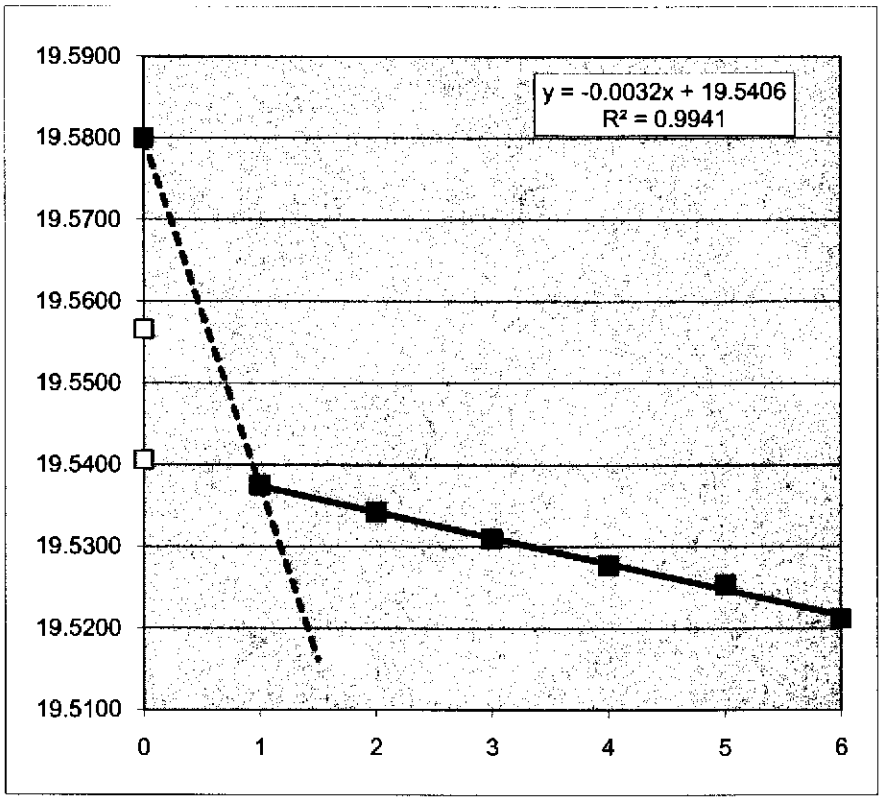
Cleaning Cycle	Wt (g)
0	19.4996
1	19.4156
2	19.4110
3	19.4071
4	19.4025
5	19.3975
6	19.3937



Coupon:	268
Test Matrix:	Fe-E-1500-18-2p
Initial wt (g)	19.5566
Removal wt (g)	19.5800

Calculated final wt (g)	19.5406
Total wt loss (g)	0.0160
Total wt loss (mg)	16.0

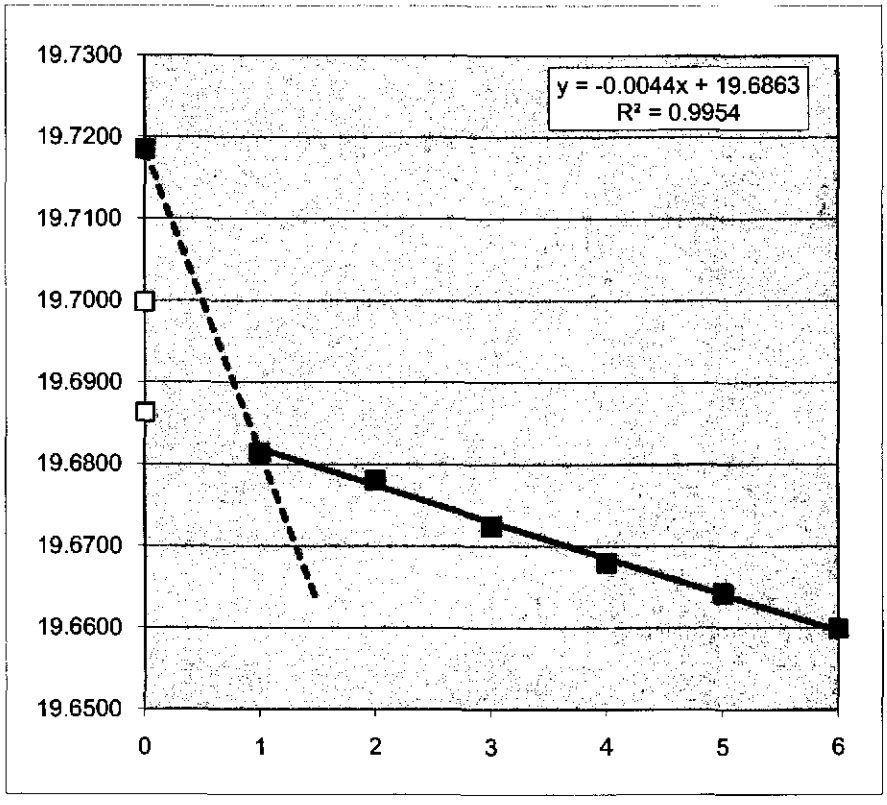
Cleaning Cycle	Wt (g)
0	19.5800
1	19.5375
2	19.5342
3	19.5310
4	19.5278
5	19.5254
6	19.5212



Coupon:	269
Test Matrix:	Fe-E-1500-18-3p
Initial wt (g)	19.6998
Removal wt (g)	19.7185

Calculated final wt (g)	19.6863
Total wt loss (g)	0.0135
Total wt loss (mg)	13.5

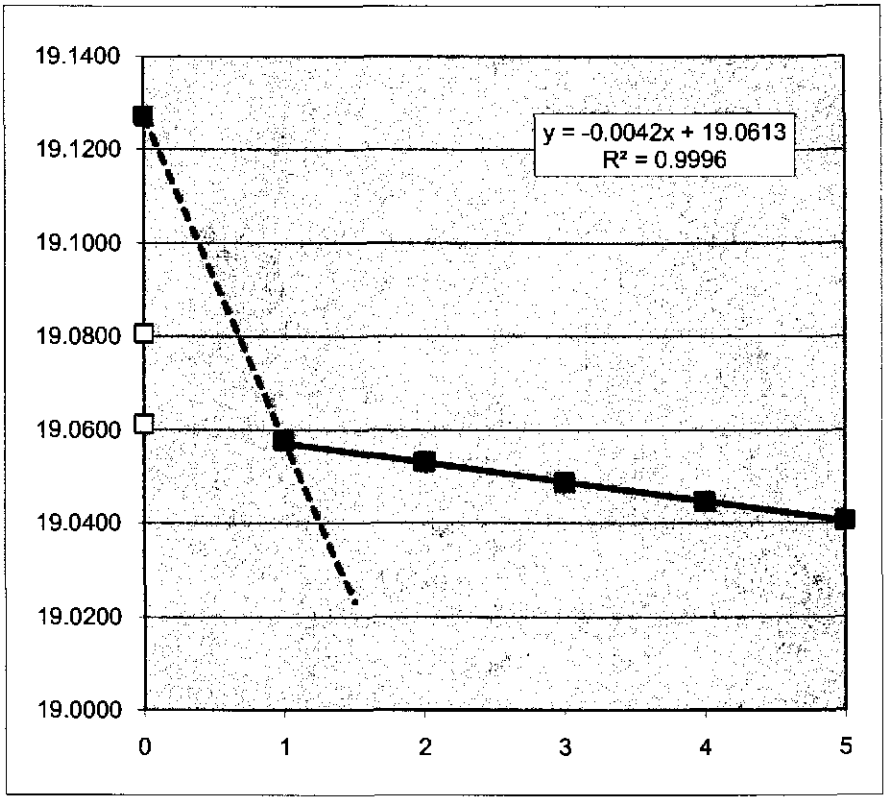
Cleaning Cycle	Wt (g)
0	19.7185
1	19.6814
2	19.6780
3	19.6725
4	19.6680
5	19.6642
6	19.6599



Coupon:	271
Test Matrix:	Fe-Eo-1500-18-2f
Initial wt (g)	19.0806
Removal wt (g)	19.1271

Calculated final wt (g)	19.0613
Total wt loss (g)	0.0193
Total wt loss (mg)	19.3

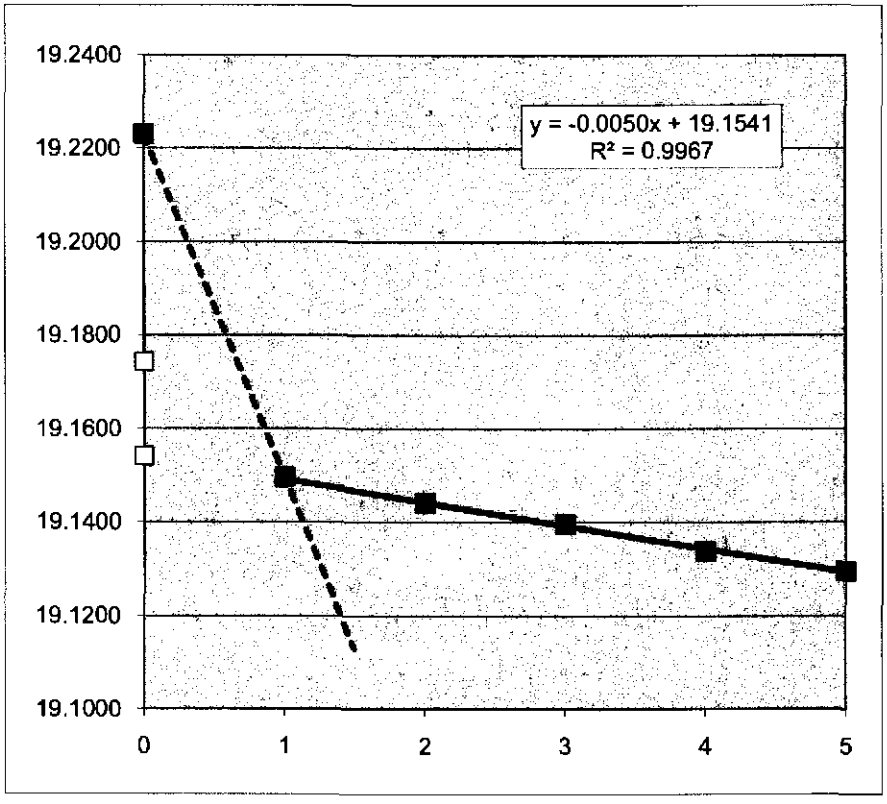
Cleaning Cycle	Wt (g)
0	19.1271
1	19.0578
2	19.0531
3	19.0487
4	19.0447
5	19.0406



Coupon:	272
Test Matrix:	*Fe-Eo-1500-18-3f*
Initial wt (g)	19.1743
Removal wt (g)	19.2230

Calculated final wt (g)	19.1541
Total wt loss (g)	0.0202
Total wt loss (mg)	20.2

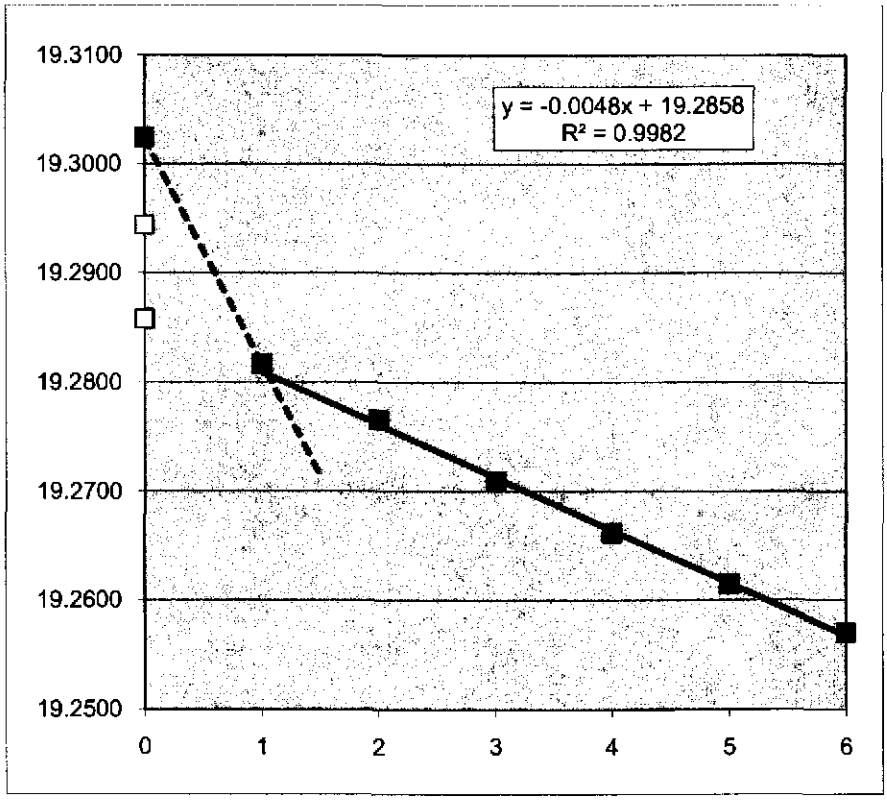
Cleaning Cycle	Wt (g)
0	19.2230
1	19.1496
2	19.1441
3	19.1396
4	19.1338
5	19.1295



Coupon:	274
Test Matrix:	Fe-Eo-1500-18-2p
Initial wt (g)	19.2944
Removal wt (g)	19.3024

Calculated final wt (g)	19.2858
Total wt loss (g)	0.0086
Total wt loss (mg)	8.6

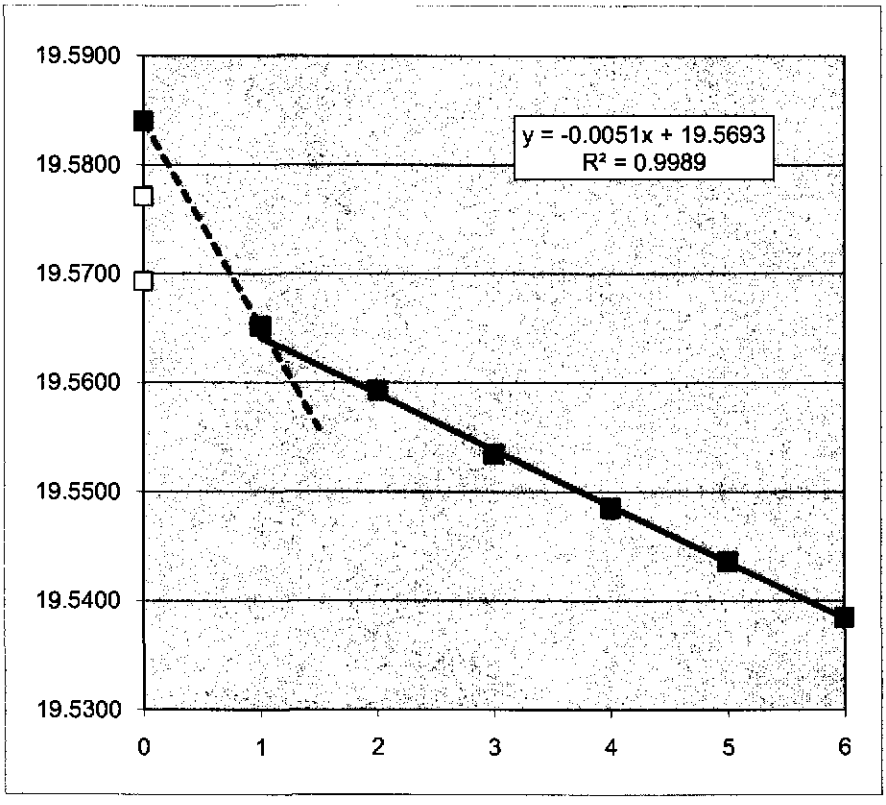
Cleaning Cycle	Wt (g)
0	19.3024
1	19.2817
2	19.2765
3	19.2709
4	19.2662
5	19.2615
6	19.2570



Coupon:	275
Test Matrix:	Fe-Eo-1500-18-3p
Initial wt (g)	19.5771
Removal wt (g)	19.5840

Calculated final wt (g)	19.5693
Total wt loss (g)	0.0078
Total wt loss (mg)	7.8

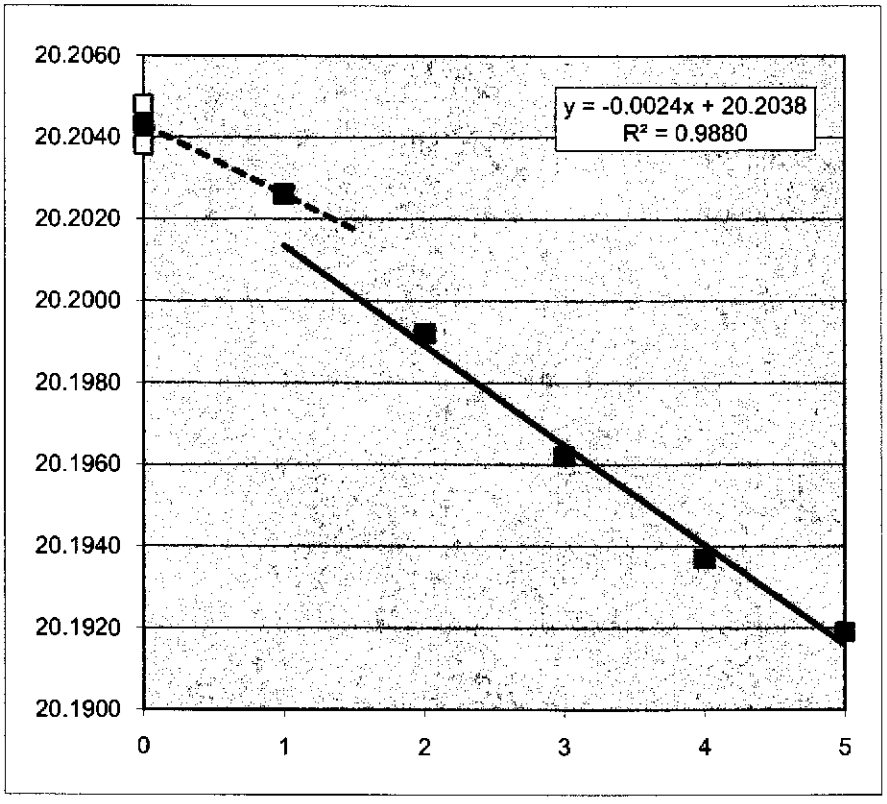
Cleaning Cycle	Wt (g)
0	19.5840
1	19.5652
2	19.5593
3	19.5535
4	19.5485
5	19.5437
6	19.5385



Coupon:	277
Test Matrix:	Fe-Atm-1500-18-2
Initial wt (g)	20.2048
Removal wt (g)	20.2043

Calculated final wt (g)	20.2038
Total wt loss (g)	0.0010
Total wt loss (mg)	1.0

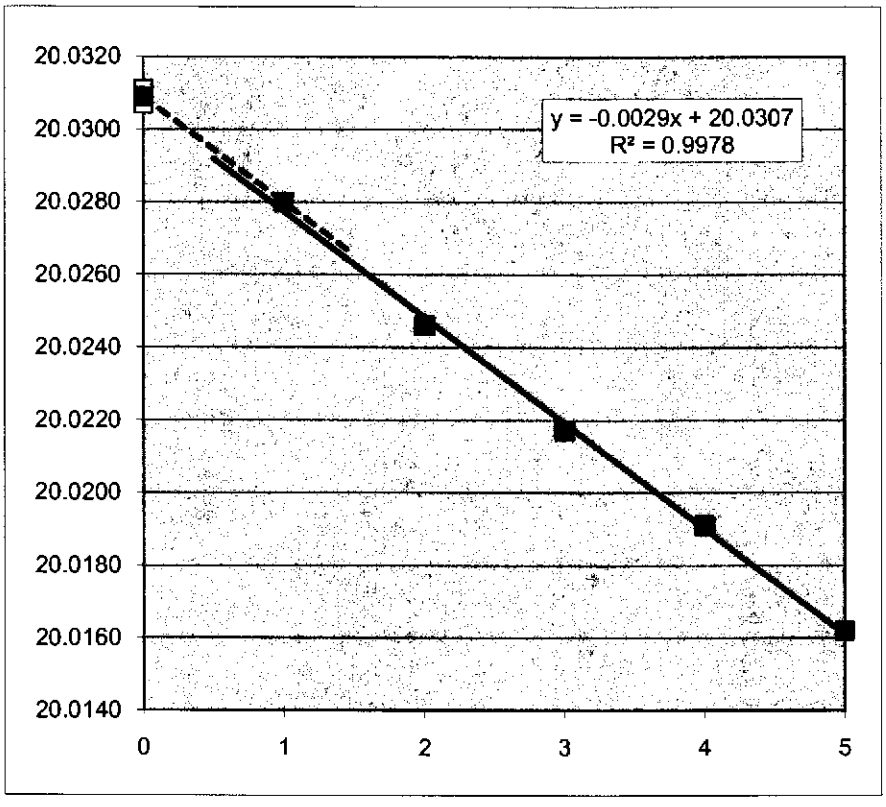
Cleaning Cycle	Wt (g)
0	20.2043
1	20.2026
2	20.1992
3	20.1962
4	20.1937
5	20.1919



Coupon:	278
Test Matrix:	Fe-Atm-1500-18-3
Initial wt (g)	20.0311
Removal wt (g)	20.0309

Calculated final wt (g)	20.0307
Total wt loss (g)	0.0004
Total wt loss (mg)	0.4

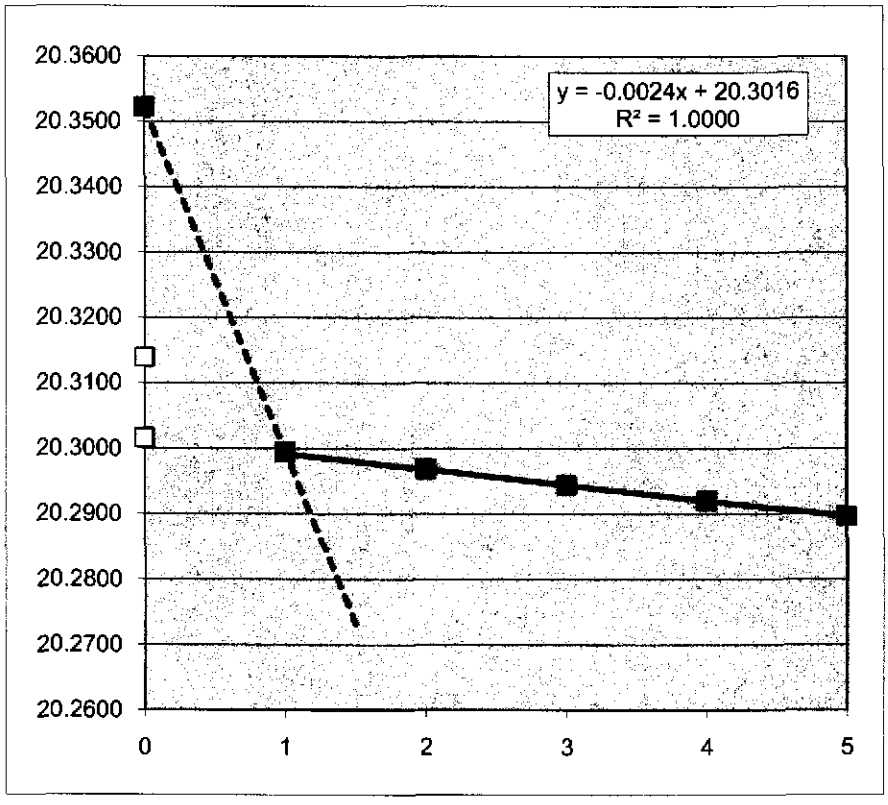
Cleaning Cycle	Wt (g)
0	20.0309
1	20.0280
2	20.0246
3	20.0217
4	20.0191
5	20.0162



Coupon:	362
Test Matrix:	Fe-G-3500-18-2f
Initial wt (g)	20.3139
Removal wt (g)	20.3522

Calculated final wt (g)	20.3016
Total wt loss (g)	0.0123
Total wt loss (mg)	12.3

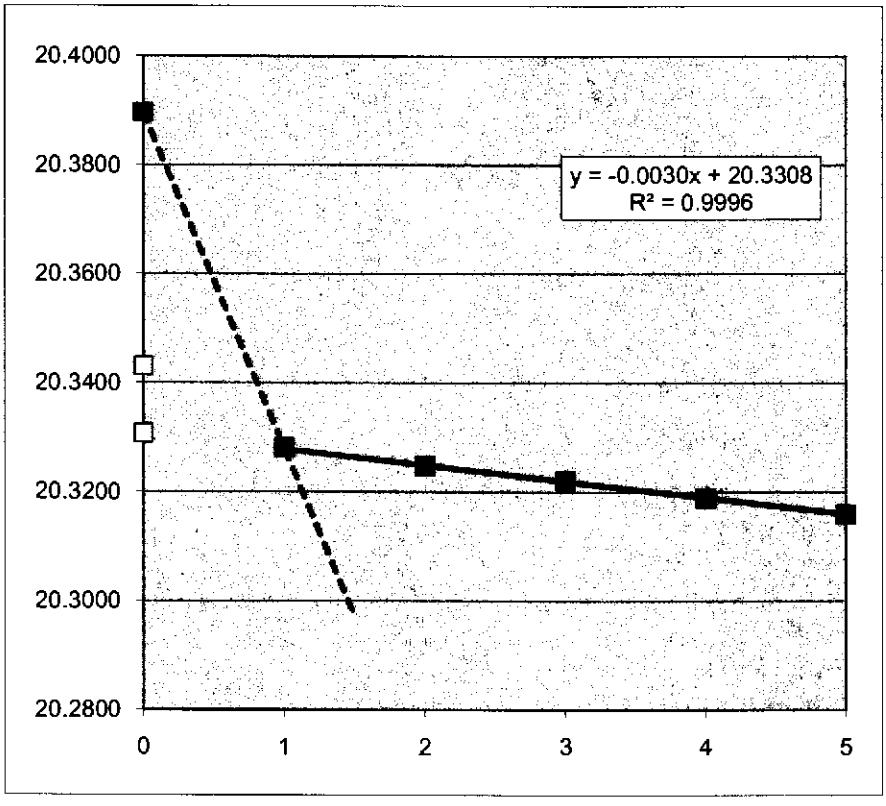
Cleaning Cycle	Wt (g)
0	20.3522
1	20.2995
2	20.2968
3	20.2944
4	20.2920
5	20.2896



Coupon:	363
Test Matrix:	Fe-G-3500-18-3f
Initial wt (g)	20.3431
Removal wt (g)	20.3896

Calculated final wt (g)	20.3308
Total wt loss (g)	0.0123
Total wt loss (mg)	12.3

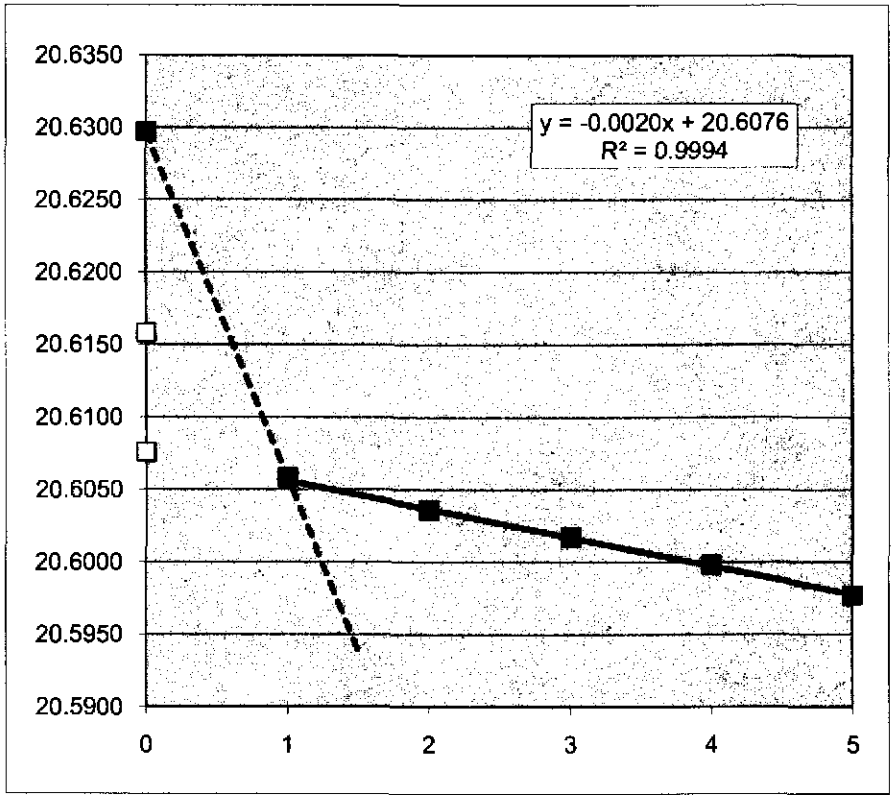
Cleaning Cycle	Wt (g)
0	20.3896
1	20.3281
2	20.3248
3	20.3220
4	20.3189
5	20.3159



Coupon:	365
Test Matrix:	Fe-G-3500-18-2p
Initial wt (g)	20.6158
Removal wt (g)	20.6297

Calculated final wt (g)	20.6076
Total wt loss (g)	0.0082
Total wt loss (mg)	8.2

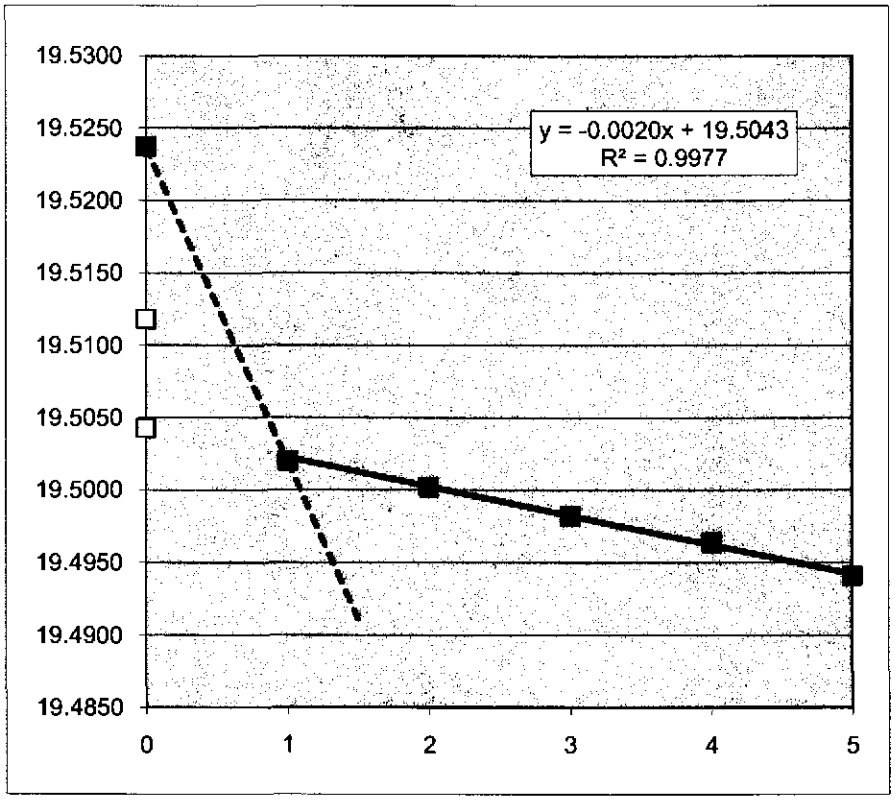
Cleaning Cycle	Wt (g)
0	20.6297
1	20.6058
2	20.6036
3	20.6017
4	20.5998
5	20.5977



Coupon:	366
Test Matrix:	Fe-G-3500-18-3p
Initial wt (g)	19.5118
Removal wt (g)	19.5237

Calculated final wt (g)	19.5043
Total wt loss (g)	0.0075
Total wt loss (mg)	7.5

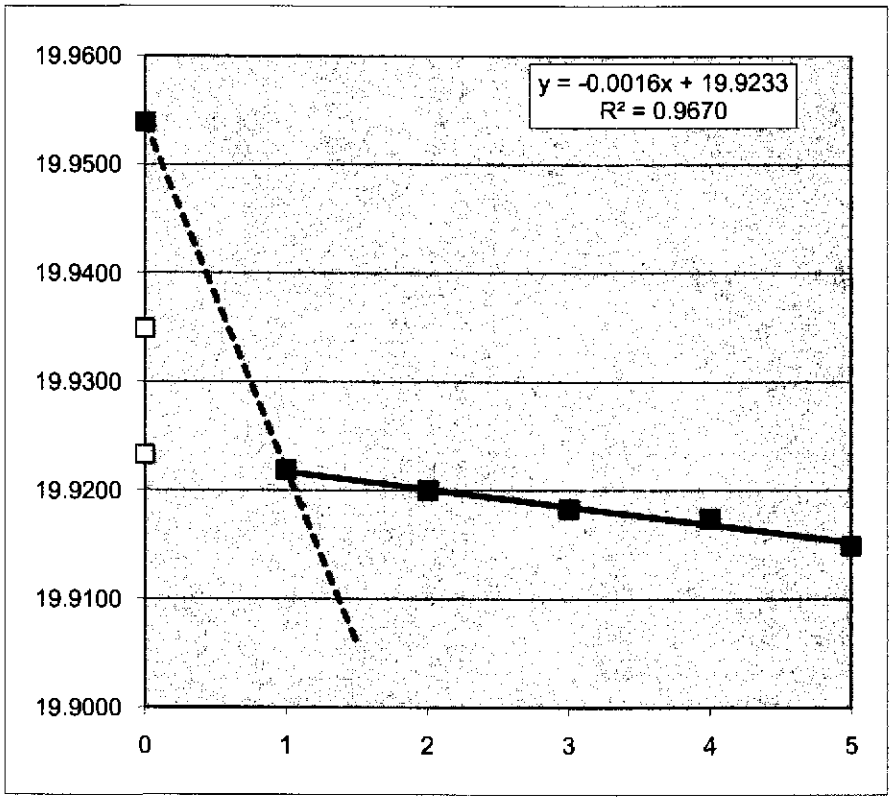
Cleaning Cycle	Wt (g)
0	19.5237
1	19.5020
2	19.5002
3	19.4982
4	19.4964
5	19.4941



Coupon:	368
Test Matrix:	Fe-Go-3500-18-2f
Initial wt (g)	19.9349
Removal wt (g)	19.9539

Calculated final wt (g)	19.9233
Total wt loss (g)	0.0116
Total wt loss (mg)	11.6

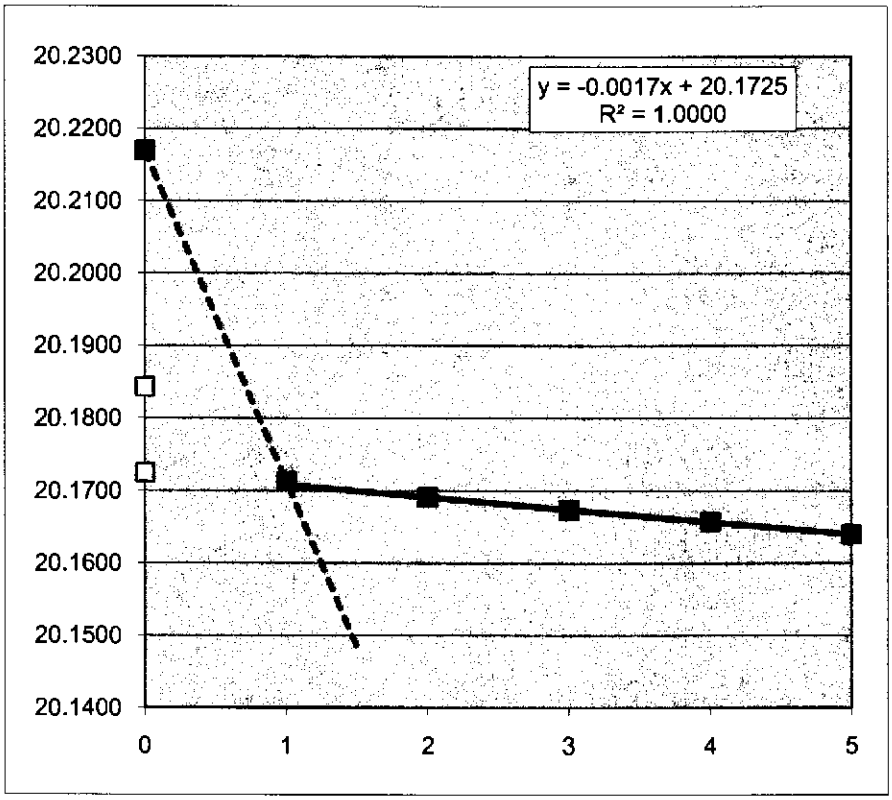
Cleaning Cycle	Wt (g)
0	19.9539
1	19.9219
2	19.9200
3	19.9183
4	19.9174
5	19.9149



Coupon:	369
Test Matrix:	Fe-Go-3500-18-3f
Initial wt (g)	20.1843
Removal wt (g)	20.2170

Calculated final wt (g)	20.1725
Total wt loss (g)	0.0118
Total wt loss (mg)	11.8

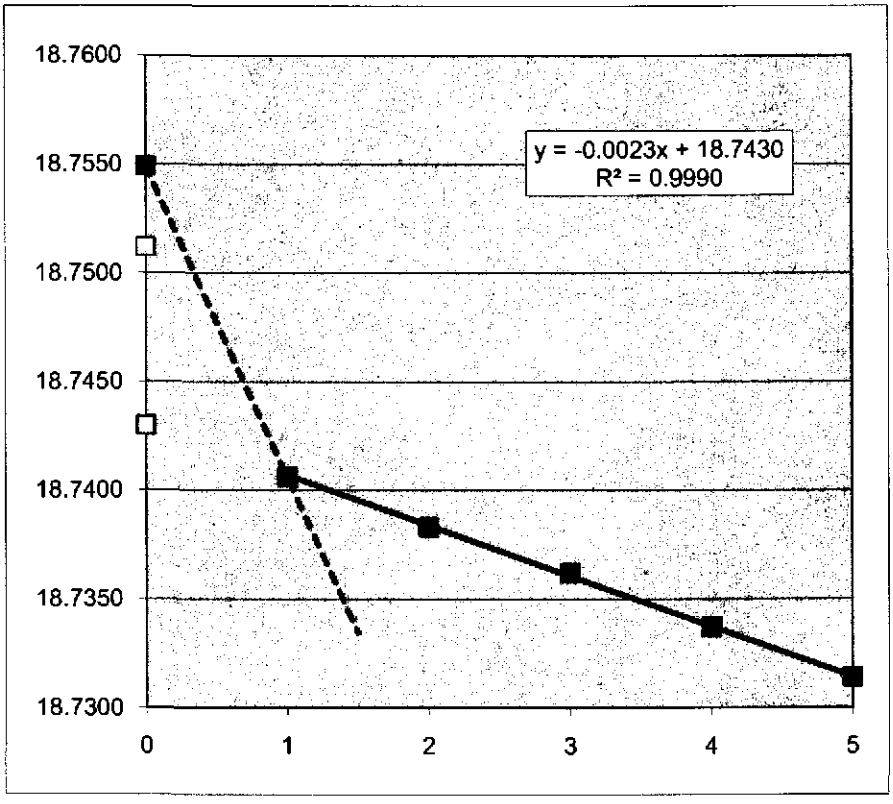
Cleaning Cycle	Wt (g)
0	20.2170
1	20.1713
2	20.1691
3	20.1674
4	20.1657
5	20.1640



Coupon:	371
Test Matrix:	Fe-Go-3500-18-2p
Initial wt (g)	18.7512
Removal wt (g)	18.7549

Calculated final wt (g)	18.7430
Total wt loss (g)	0.0082
Total wt loss (mg)	8.2

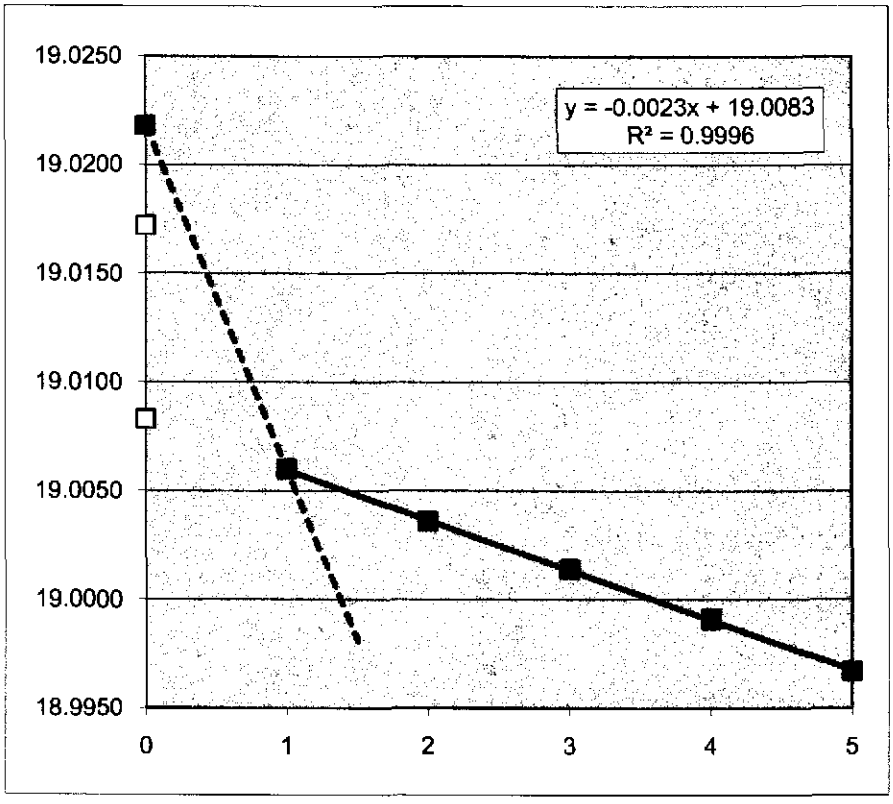
Cleaning Cycle	Wt (g)
0	18.7549
1	18.7406
2	18.7383
3	18.7362
4	18.7337
5	18.7314



Coupon:	372
Test Matrix:	Fe-Go-3500-18-3p
Initial wt (g)	19.0172
Removal wt (g)	19.0218

Calculated final wt (g)	19.0083
Total wt loss (g)	0.0089
Total wt loss (mg)	8.9

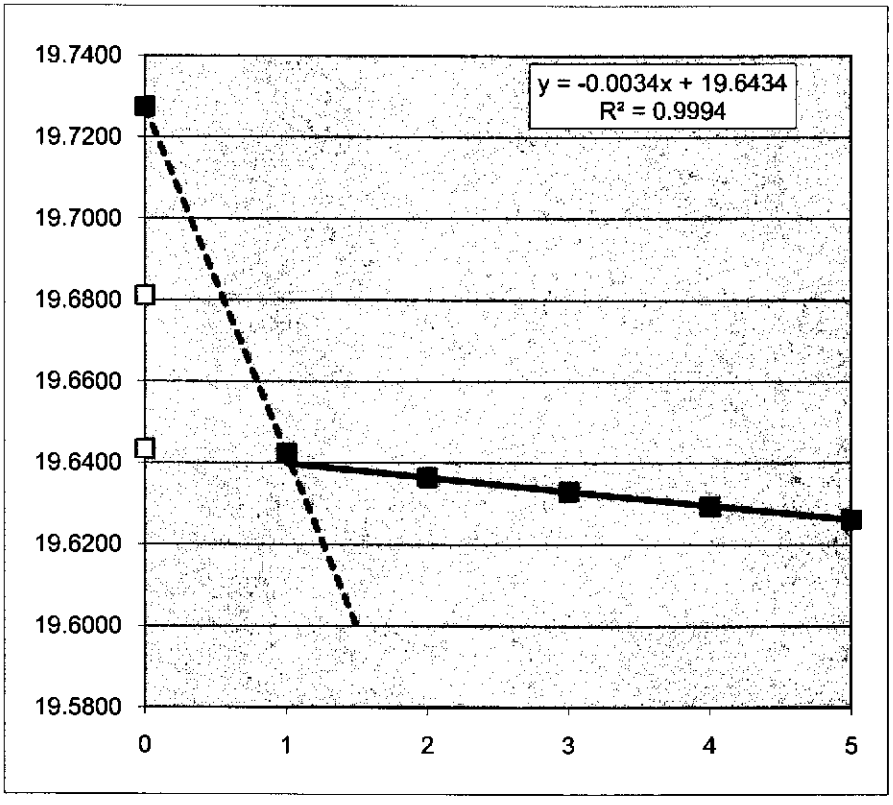
Cleaning Cycle	Wt (g)
0	19.0218
1	19.0060
2	19.0036
3	19.0014
4	18.9991
5	18.9967



Coupon:	374
Test Matrix:	Fe-E-3500-18-2f
Initial wt (g)	19.6811
Removal wt (g)	19.7274

Calculated final wt (g)	19.6434
Total wt loss (g)	0.0377
Total wt loss (mg)	37.7

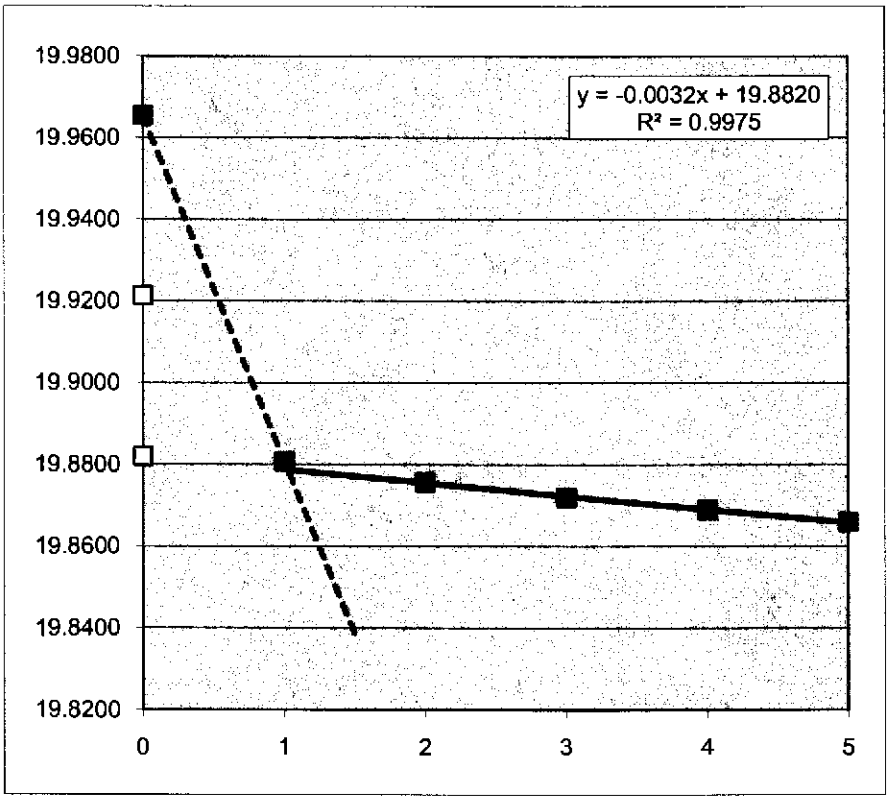
Cleaning Cycle	Wt (g)
0	19.7274
1	19.6423
2	19.6365
3	19.6330
4	19.6294
5	19.6262



Coupon:	375
Test Matrix:	Fe-E-3500-18-3f
Initial wt (g)	19.9213
Removal wt (g)	19.9654

Calculated final wt (g)	19.8820
Total wt loss (g)	0.0393
Total wt loss (mg)	39.3

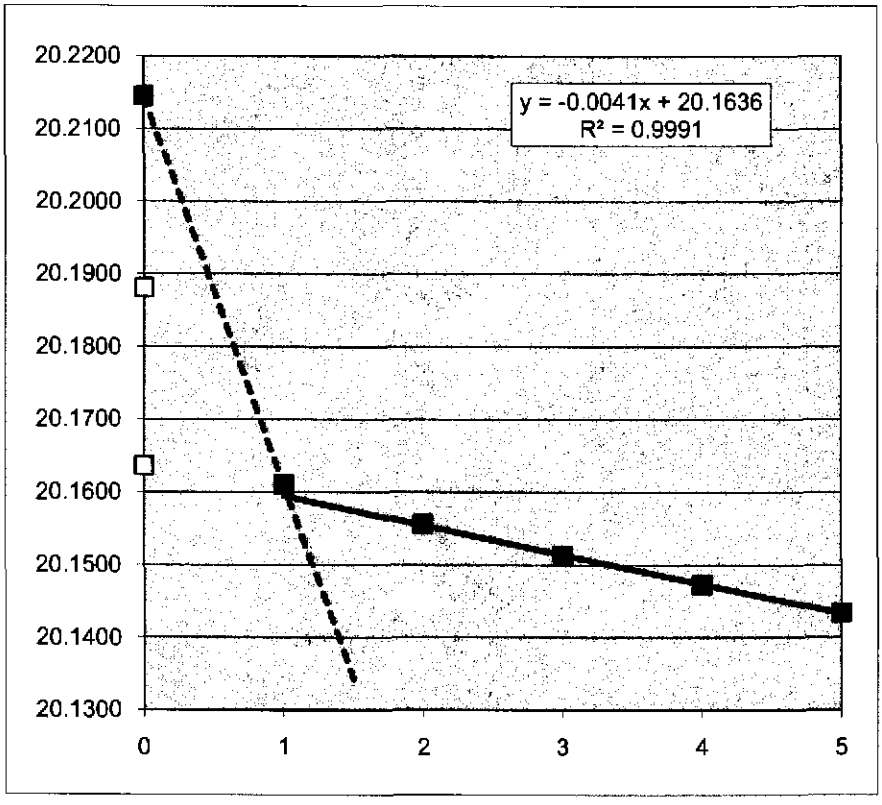
Cleaning Cycle	Wt (g)
0	19.9654
1	19.8808
2	19.8757
3	19.8720
4	19.8689
5	19.8659



Coupon:	377
Test Matrix:	Fe-E-3500-18-2p
Initial wt (g)	20.1881
Removal wt (g)	20.2145

Calculated final wt (g)	20.1636
Total wt loss (g)	0.0245
Total wt loss (mg)	24.5

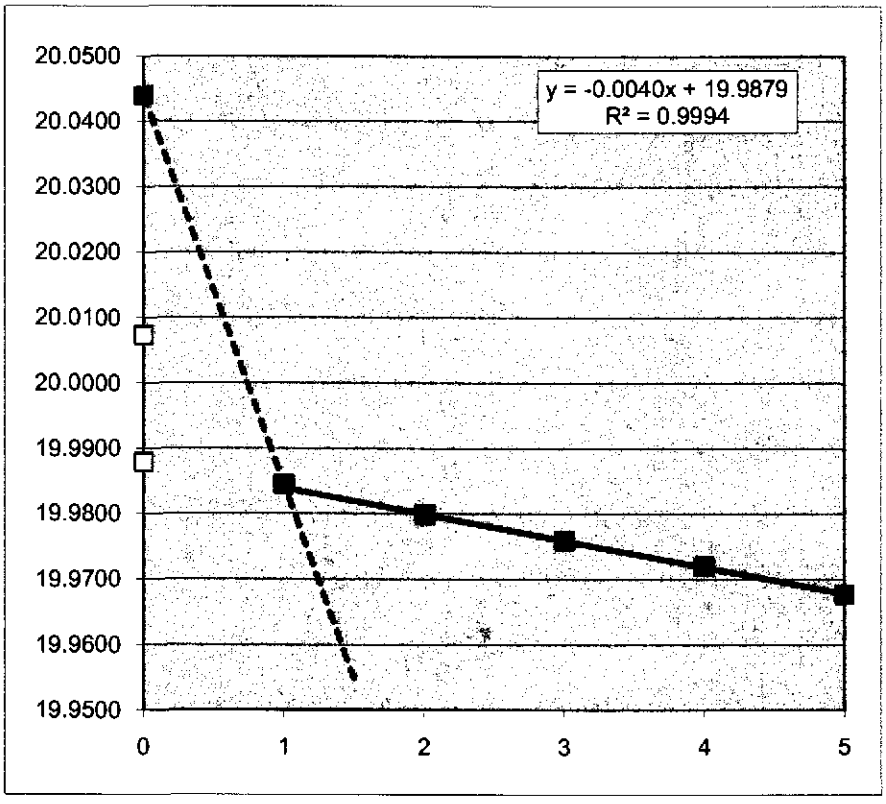
Cleaning Cycle	Wt (g)
0	20.2145
1	20.1610
2	20.1556
3	20.1512
4	20.1473
5	20.1434



Coupon:	378
Test Matrix:	Fe-E-3500-18-3p
Initial wt (g)	20.0073
Removal wt (g)	20.0439

Calculated final wt (g)	19.9879
Total wt loss (g)	0.0194
Total wt loss (mg)	19.4

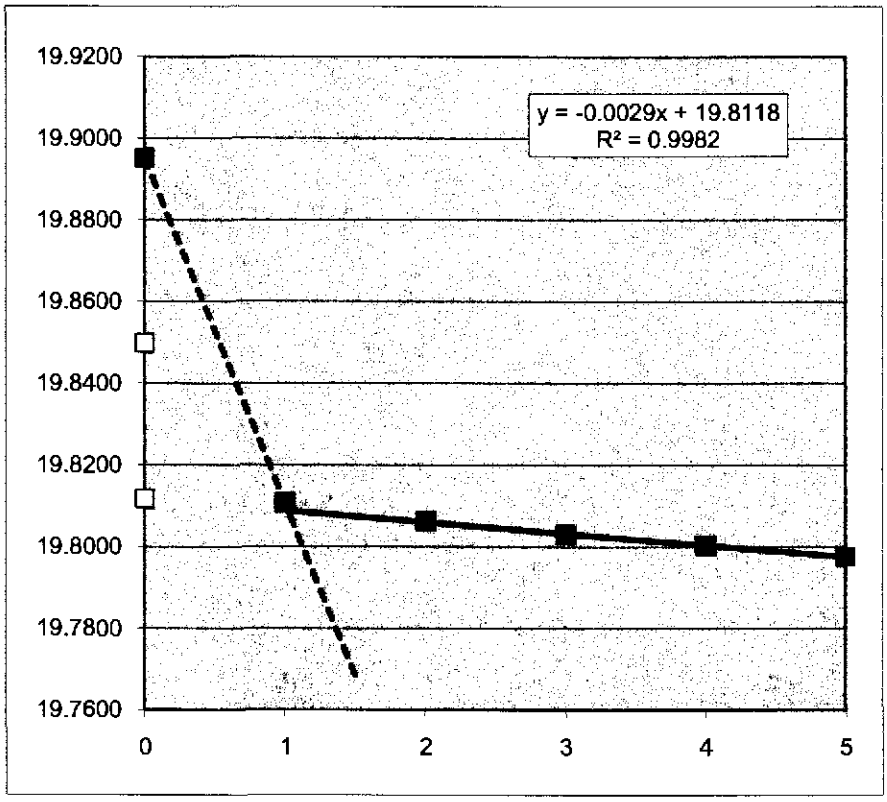
Cleaning Cycle	Wt (g)
0	20.0439
1	19.9845
2	19.9798
3	19.9759
4	19.9720
5	19.9677



Coupon:	380
Test Matrix:	Fe-Eo-3500-18-2f
Initial wt (g)	19.8498
Removal wt (g)	19.8951

Calculated final wt (g)	19.8118
Total wt loss (g)	0.0380
Total wt loss (mg)	38.0

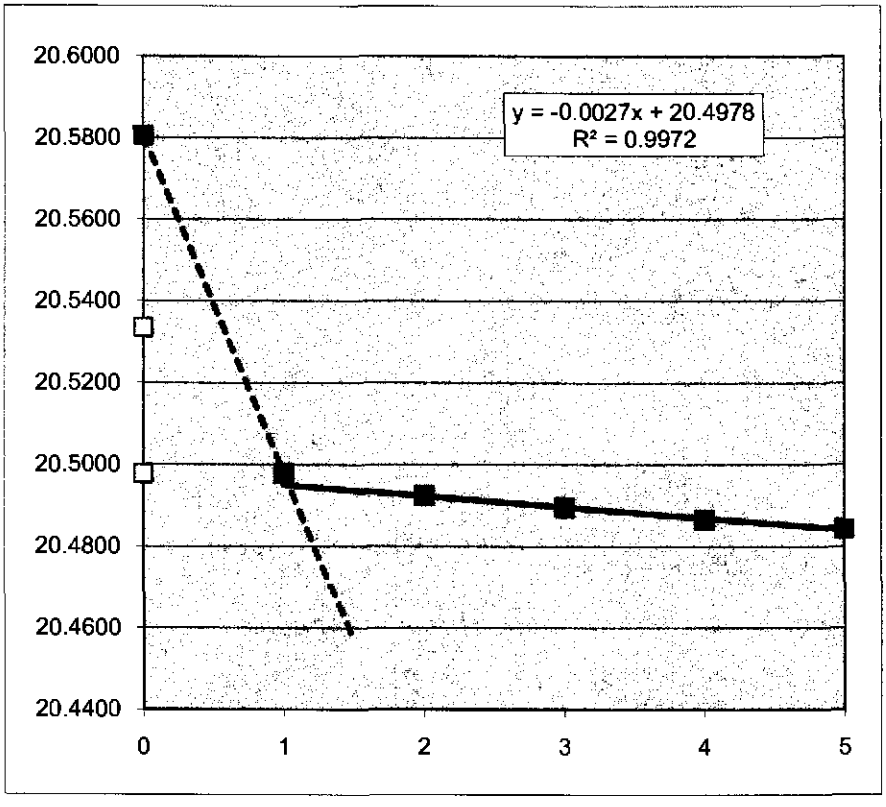
Cleaning Cycle	Wt (g)
0	19.8951
1	19.8107
2	19.8062
3	19.8030
4	19.8003
5	19.7976



Coupon:	381
Test Matrix:	Fe-Eo-3500-18-3f
Initial wt (g)	20.5335
Removal wt (g)	20.5805

Calculated final wt (g)	20.4978
Total wt loss (g)	0.0357
Total wt loss (mg)	35.7

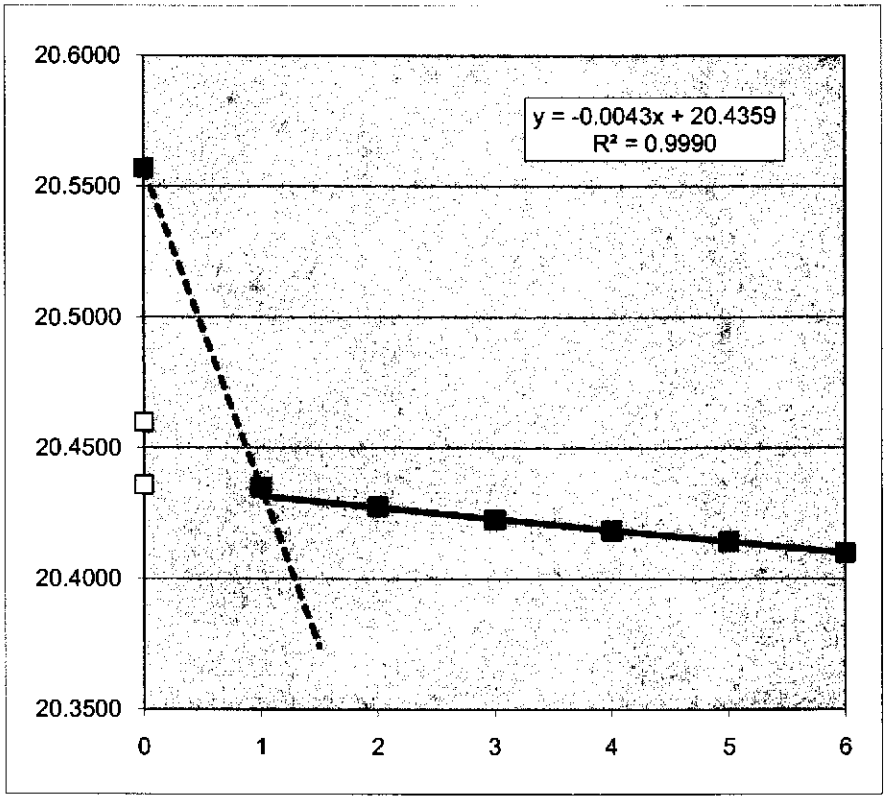
Cleaning Cycle	Wt (g)
0	20.5805
1	20.4980
2	20.4924
3	20.4896
4	20.4866
5	20.4843



Coupon:	383
Test Matrix:	Fe-Eo-3500-18-2p
Initial wt (g)	20.4598
Removal wt (g)	20.5570

Calculated final wt (g)	20.4359
Total wt loss (g)	0.0239
Total wt loss (mg)	23.9

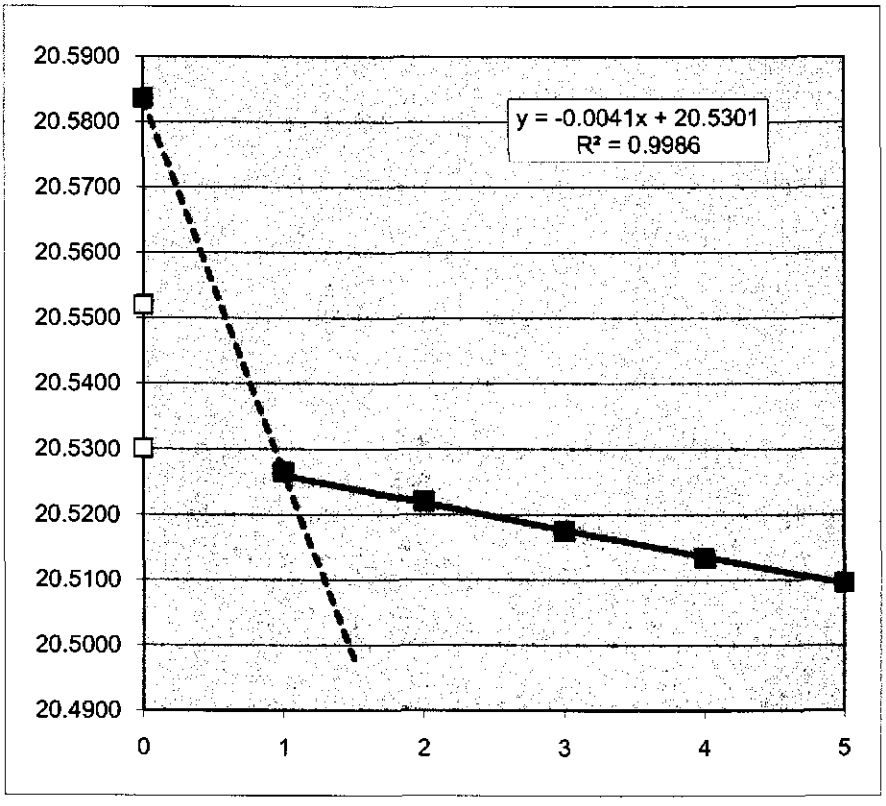
Cleaning Cycle	Wt (g)
0	20.5570
1	20.4350
2	20.4275
3	20.4226
4	20.4185
5	20.4141
6	20.4100



Coupon:	384
Test Matrix:	Fe-Eo-3500-18-3p
Initial wt (g)	20.5520
Removal wt (g)	20.5836

Calculated final wt (g)	20.5301
Total wt loss (g)	0.0219
Total wt loss (mg)	21.9

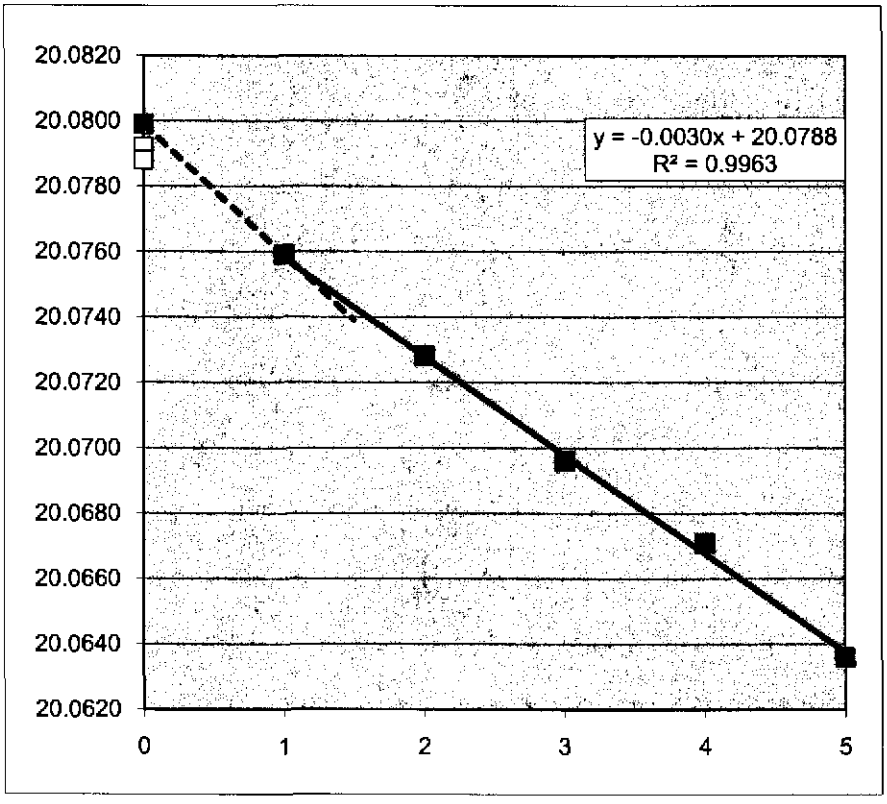
Cleaning Cycle	Wt (g)
0	20.5836
1	20.5265
2	20.5220
3	20.5175
4	20.5134
5	20.5096



Coupon:	386
Test Matrix:	Fe-Atm-3500-18-2
Initial wt (g)	20.0792
Removal wt (g)	20.0799

Calculated final wt (g)	20.0788
Total wt loss (g)	0.0004
Total wt loss (mg)	0.4

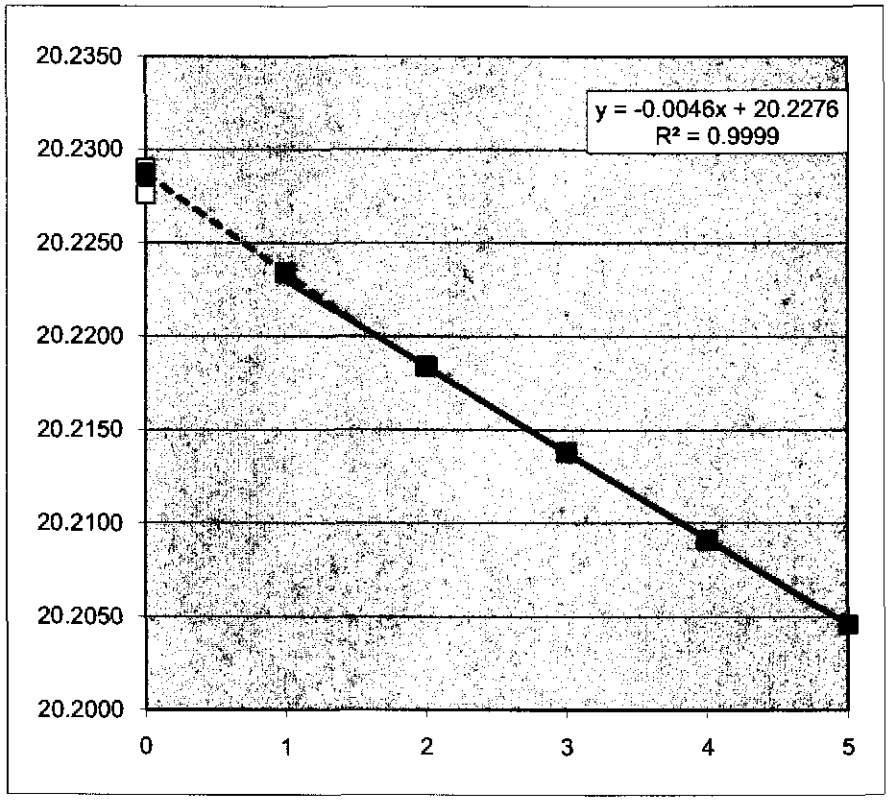
Cleaning Cycle	Wt (g)
0	20.0799
1	20.0759
2	20.0728
3	20.0696
4	20.0671
5	20.0636



Coupon:	387
Test Matrix:	Fe-Atm-3500-18-3
Initial wt (g)	20.2290
Removal wt (g)	20.2287

Calculated final wt (g)	20.2276
Total wt loss (g)	0.0014
Total wt loss (mg)	1.4

Cleaning Cycle	Wt (g)
0	20.2287
1	20.2234
2	20.2184
3	20.2138
4	20.2091
5	20.2046



APPENDIX D

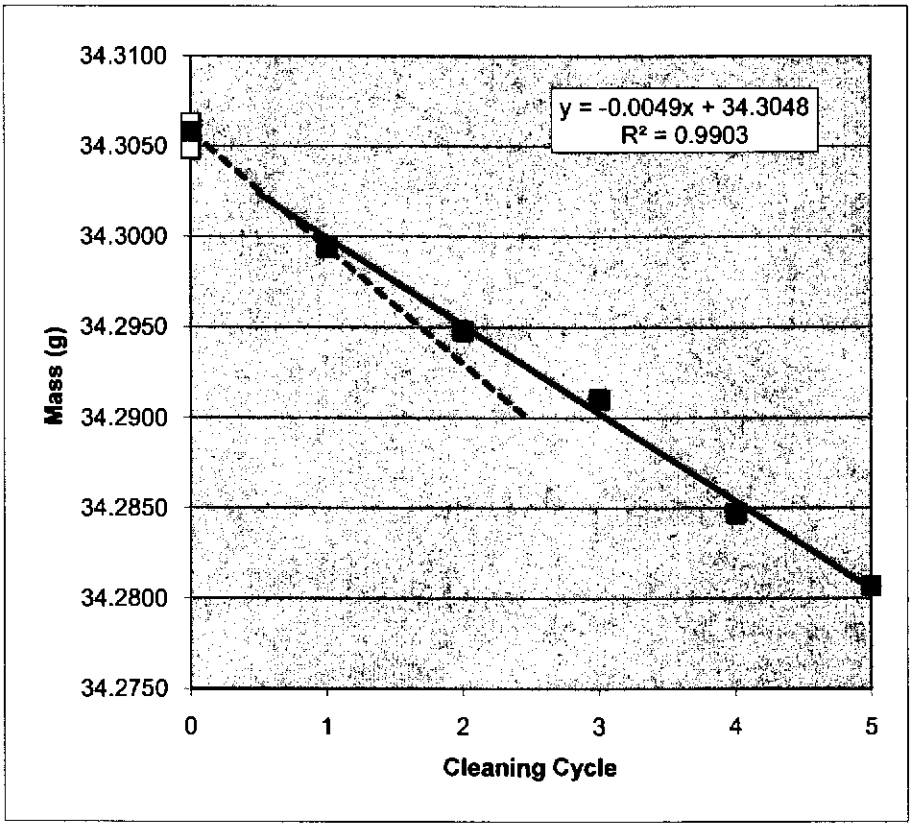
This appendix contains all of the weight loss cleaning cycle data, as well as the results of the graphical analysis of that data for each of the lead coupons (see individual data sheets for each coupon in WIPP-FePb-3 Supplemental Binder C). Each of the following pages lists the initial coupon weight, removal weight, cleaning cycle weights, calculated final weight and the resulting weight loss. The environmental conditions for each coupon can be read from the test matrix label that is given for each coupon. The meaning of the test matrix labels is discussed in Section 2.

For each coupon the graphical analysis is shown (see Section 3.1 for details of the process). The blue symbols indicate those parts of the cleaning cycle data used to determine the calculated final weight, which is the y-intercept of the line fit to the blue symbols. The red symbols show the cleaning cycle data not used in the linear regression. Yellow symbols indicate the initial coupon weight (prior to the experiment) and the final calculated weight.

Coupon:	L029
Test Matrix:	Pb-G-0000-18-2f
Initial wt (g)	34.3063
Removal wt (g)	34.3058

Calculated final wt (g)	34.3048
Total wt loss (g)	0.0015
Total wt loss (mg)	1.5

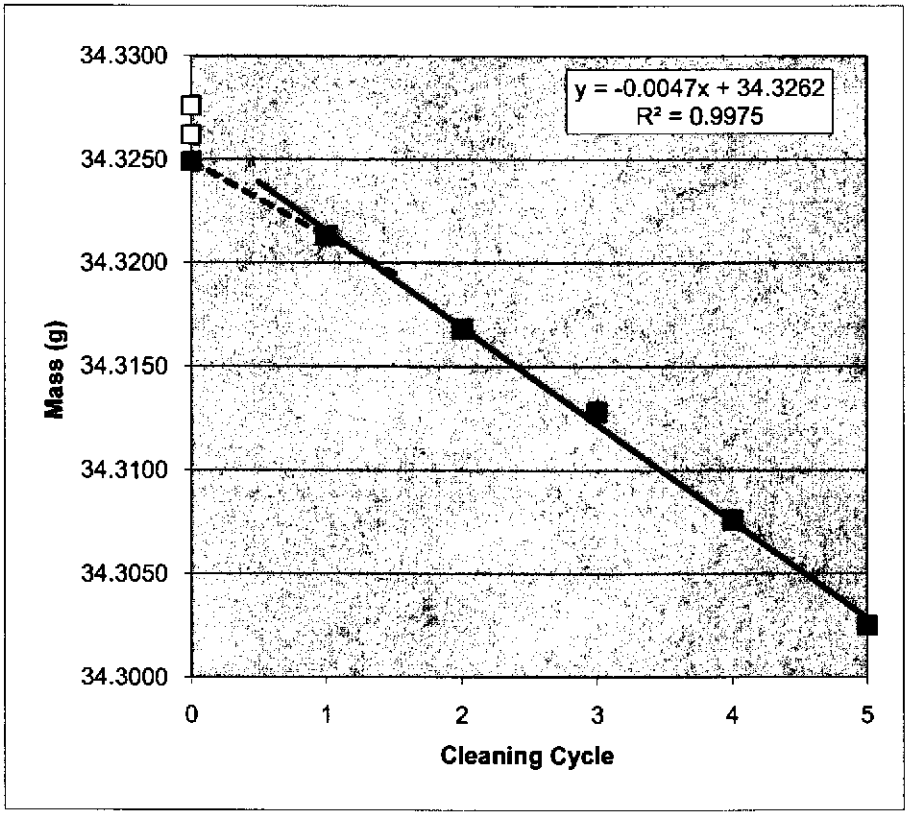
Cleaning Cycle	Wt (g)
0	34.3058
1	34.2994
2	34.2948
3	34.2910
4	34.2847
5	34.2807



Coupon:	L030
Test Matrix:	Pb-G-0000-18-3f
Initial wt (g)	34.3276
Removal wt (g)	34.3249

Calculated final wt (g)	34.3262
Total wt loss (g)	0.0014
Total wt loss (mg)	1.4

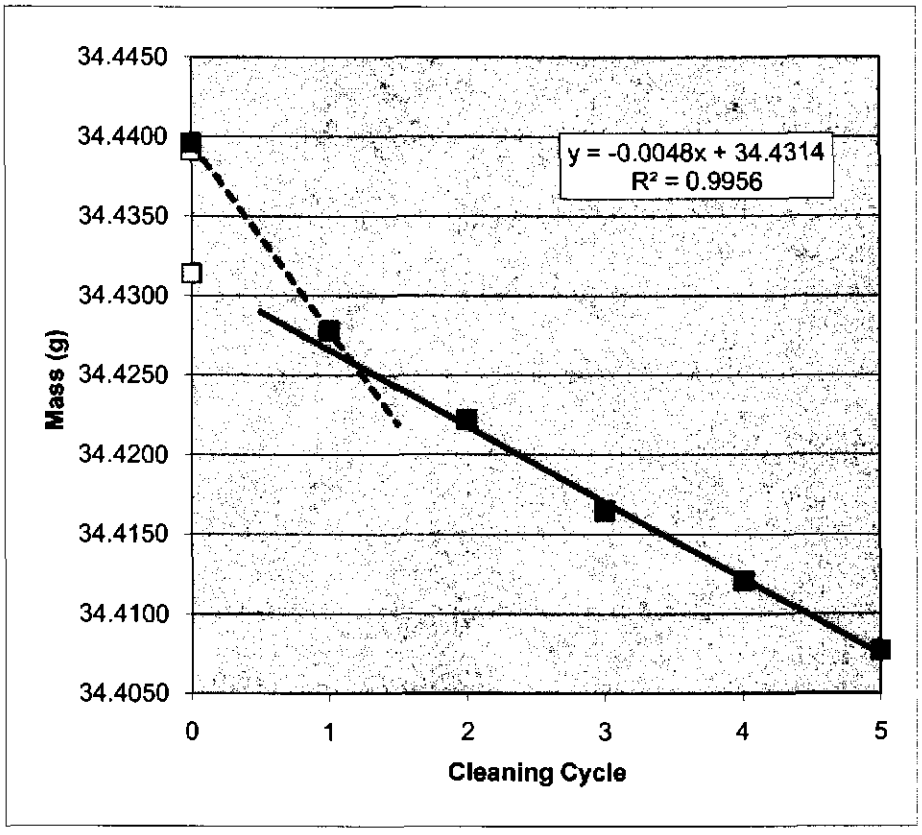
Cleaning Cycle	Wt (g)
0	34.3249
1	34.3213
2	34.3168
3	34.3128
4	34.3076
5	34.3025



Coupon:	L032
Test Matrix:	Pb-G-0000-18-2p
Initial wt (g)	34.4391
Removal wt (g)	34.4396

Calculated final wt (g)	34.4314
Total wt loss (g)	0.0077
Total wt loss (mg)	7.7

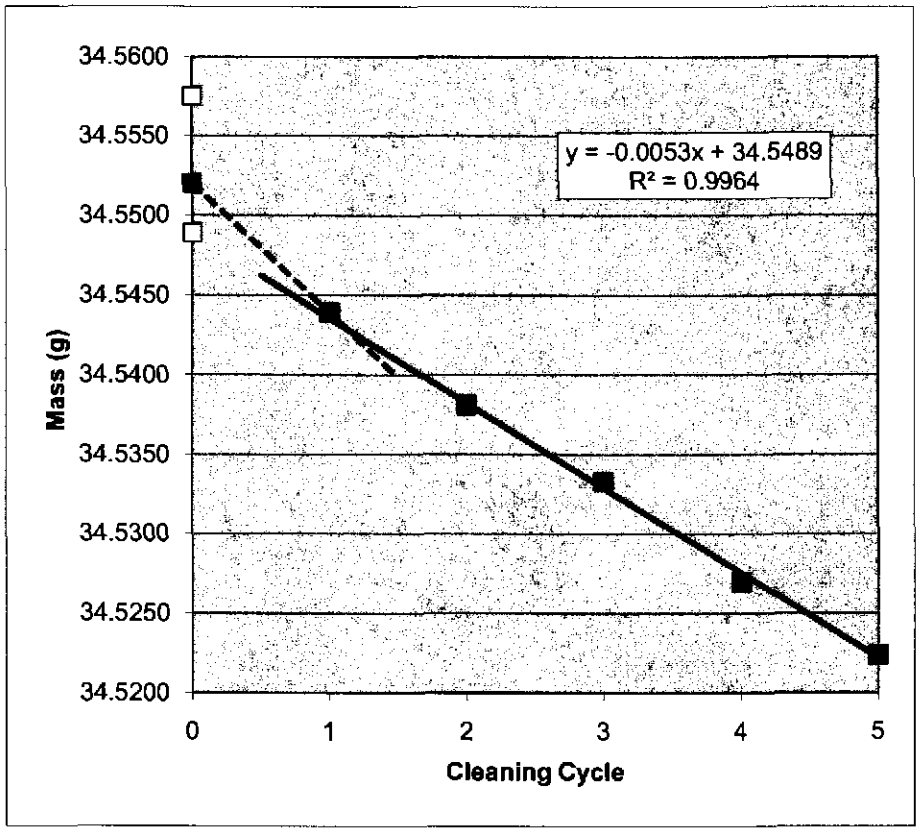
Cleaning Cycle	Wt (g)
0	34.4396
1	34.4278
2	34.4222
3	34.4165
4	34.4121
5	34.4077



Coupon:	L033
Test Matrix:	Pb-G-0000-18-3p
Initial wt (g)	34.5575
Removal wt (g)	34.5520

Calculated final wt (g)	34.5489
Total wt loss (g)	0.0086
Total wt loss (mg)	8.6

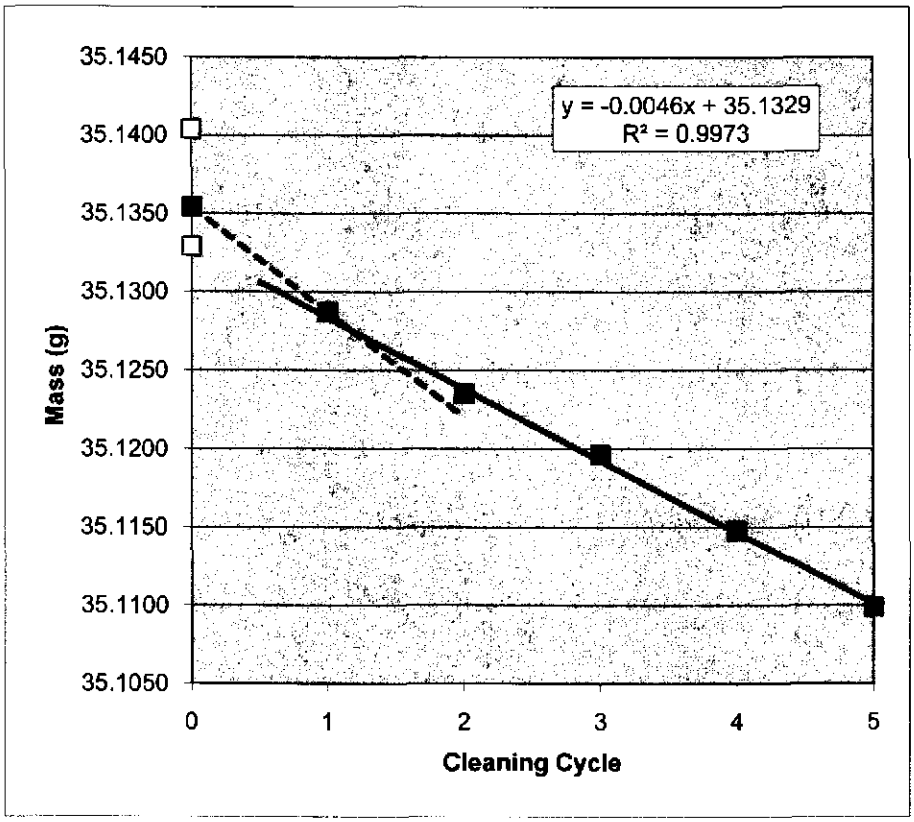
Cleaning Cycle	Wt (g)
0	34.5520
1	34.5439
2	34.5381
3	34.5333
4	34.5270
5	34.5224



Coupon:	L035
Test Matrix:	Pb-Go-0000-18-2f
Initial wt (g)	35.1404
Removal wt (g)	35.1354

Calculated final wt (g)	35.1329
Total wt loss (g)	0.0075
Total wt loss (mg)	7.5

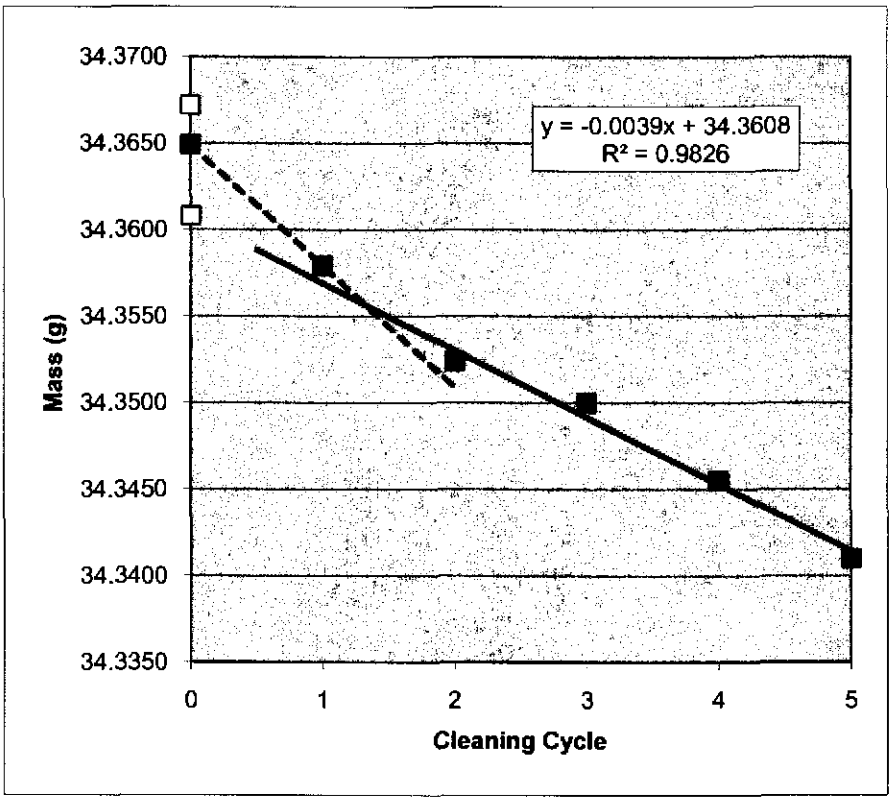
Cleaning Cycle	Wt (g)
0	35.1354
1	35.1287
2	35.1235
3	35.1196
4	35.1148
5	35.1099



Coupon:	L036
Test Matrix:	Pb-Go-0000-18-3f
Initial wt (g)	34.3672
Removal wt (g)	34.3649

Calculated final wt (g)	34.3608
Total wt loss (g)	0.0064
Total wt loss (mg)	6.4

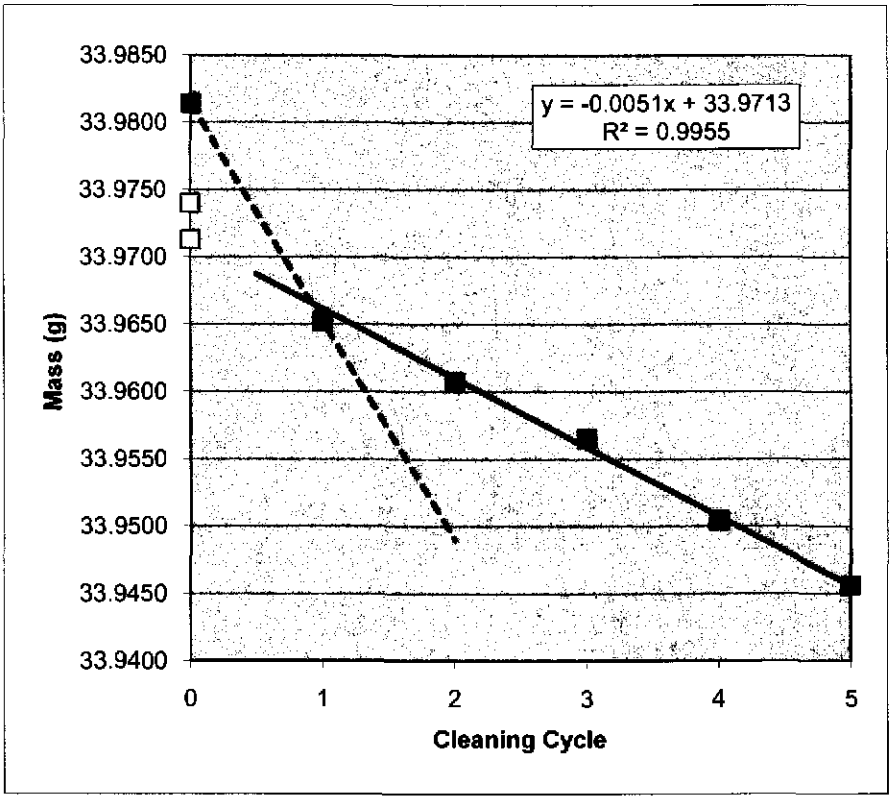
Cleaning Cycle	Wt (g)
0	34.3649
1	34.3579
2	34.3524
3	34.3500
4	34.3455
5	34.3410



Coupon:	L038
Test Matrix:	Pb-Go-0000-18-2p
Initial wt (g)	33.9740
Removal wt (g)	33.9814

Calculated final wt (g)	33.9713
Total wt loss (g)	0.0027
Total wt loss (mg)	2.7

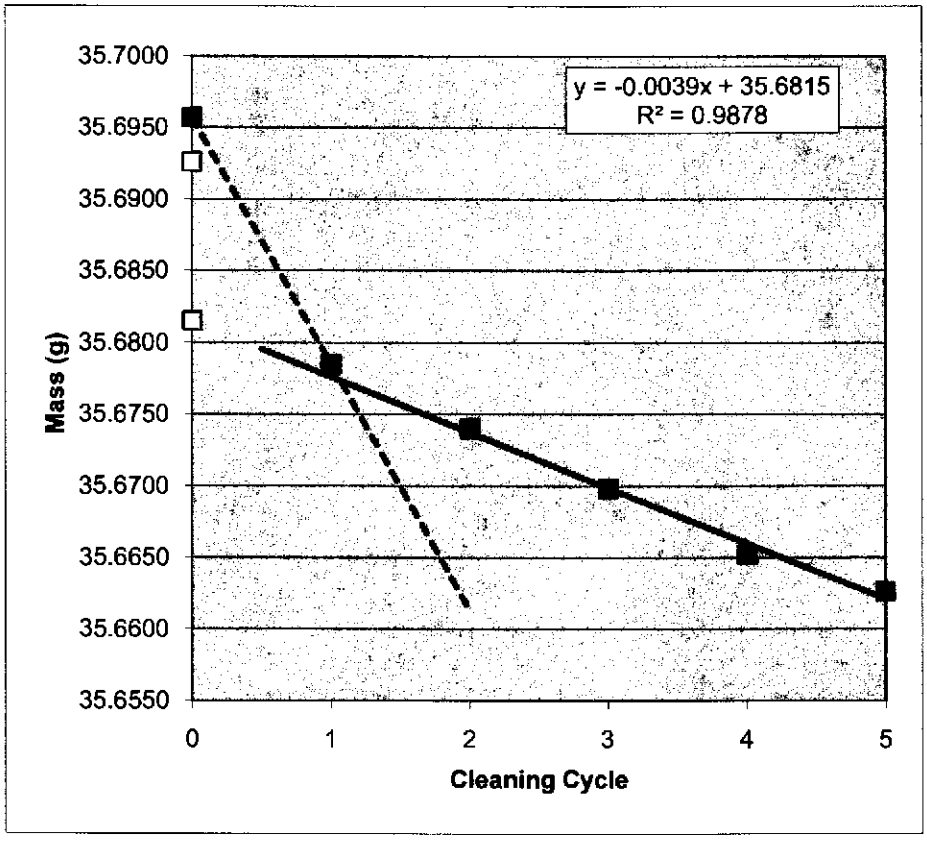
Cleaning Cycle	Wt (g)
0	33.9814
1	33.9652
2	33.9607
3	33.9565
4	33.9504
5	33.9456



Coupon:	L039
Test Matrix:	Pb-Go-0000-18-3p
Initial wt (g)	35.6926
Removal wt (g)	35.6957

Calculated final wt (g)	35.6815
Total wt loss (g)	0.0111
Total wt loss (mg)	11.1

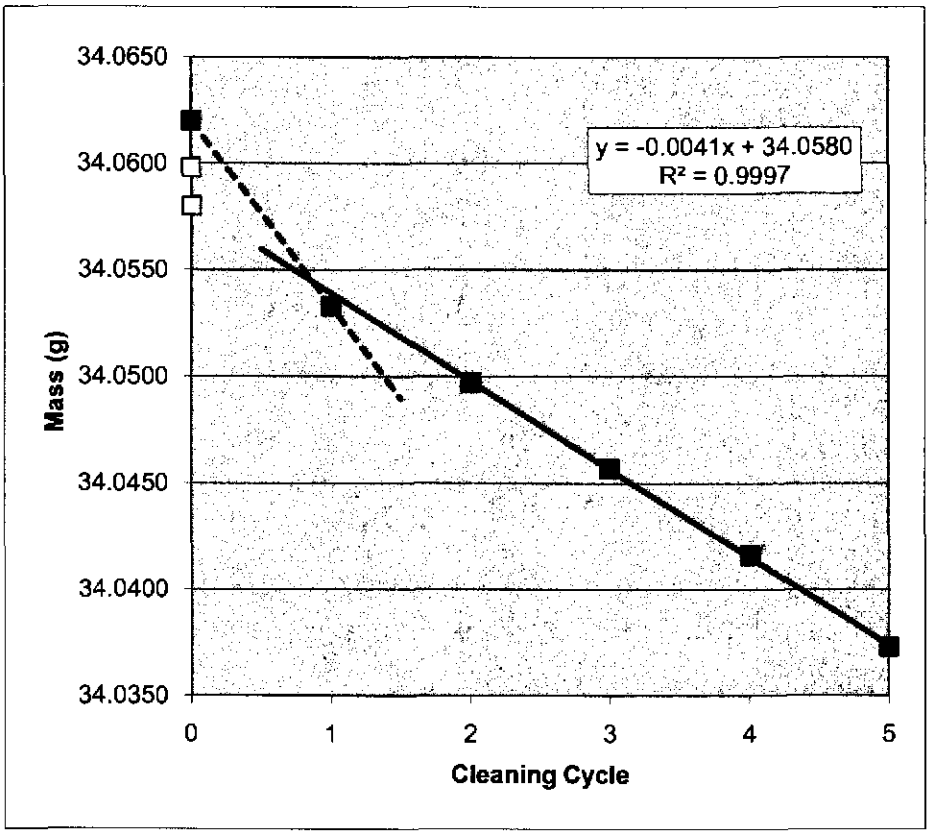
Cleaning Cycle	Wt (g)
0	35.6957
1	35.6785
2	35.6740
3	35.6698
4	35.6652
5	35.6626



Coupon:	L041
Test Matrix:	Pb-E-0000-18-2f
Initial wt (g)	34.0598
Removal wt (g)	34.0620

Calculated final wt (g)	34.0580
Total wt loss (g)	0.0018
Total wt loss (mg)	1.8

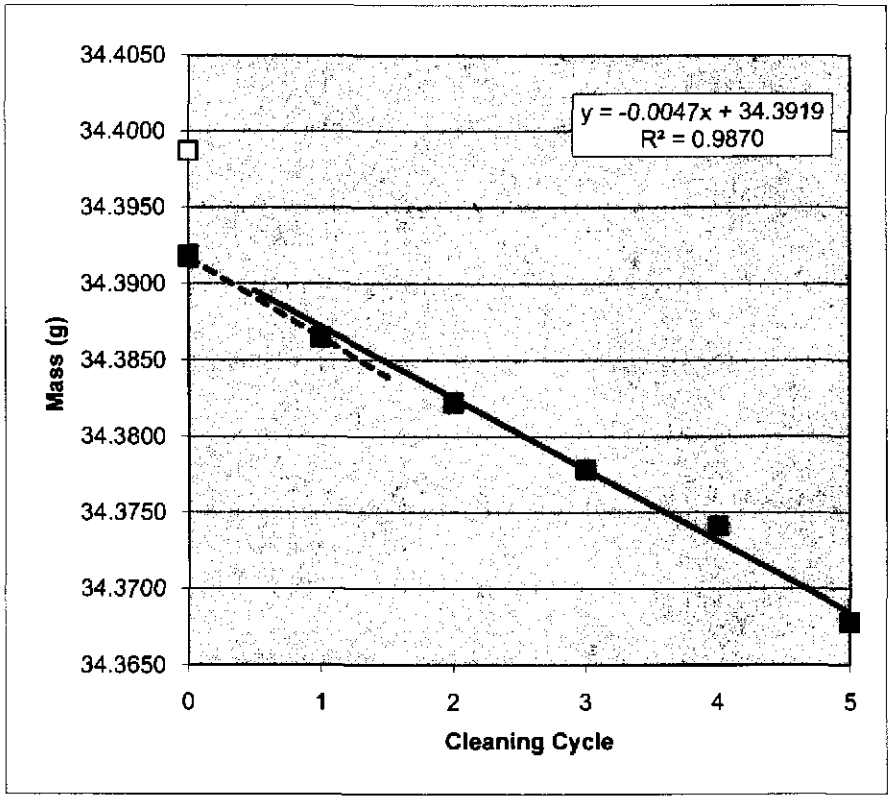
Cleaning Cycle	Wt (g)
0	34.0620
1	34.0533
2	34.0497
3	34.0457
4	34.0416
5	34.0373



Coupon:	L042
Test Matrix:	Pb-E-0000-18-3f
Initial wt (g)	34.3987
Removal wt (g)	34.3917

Calculated final wt (g)	34.3919
Total wt loss (g)	0.0068
Total wt loss (mg)	6.8

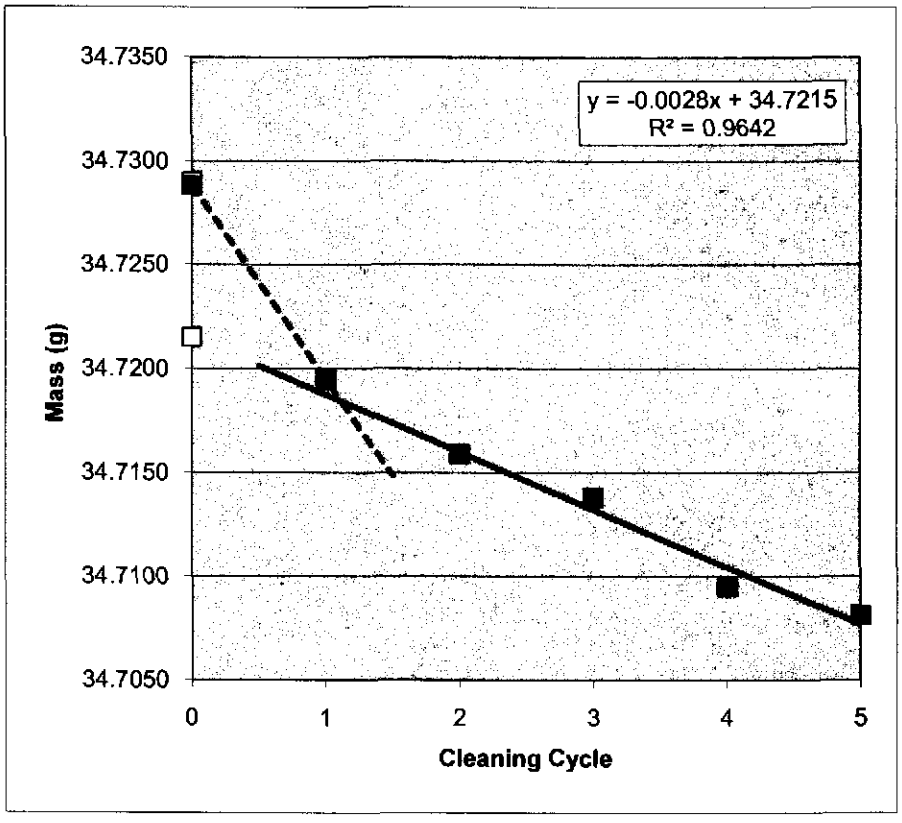
Cleaning Cycle	Wt (g)
0	34.3917
1	34.3865
2	34.3822
3	34.3778
4	34.3741
5	34.3678



Coupon:	L044
Test Matrix:	Pb-E-0000-18-2p
Initial wt (g)	34.7290
Removal wt (g)	34.7288

Calculated final wt (g)	34.7215
Total wt loss (g)	0.0075
Total wt loss (mg)	7.5

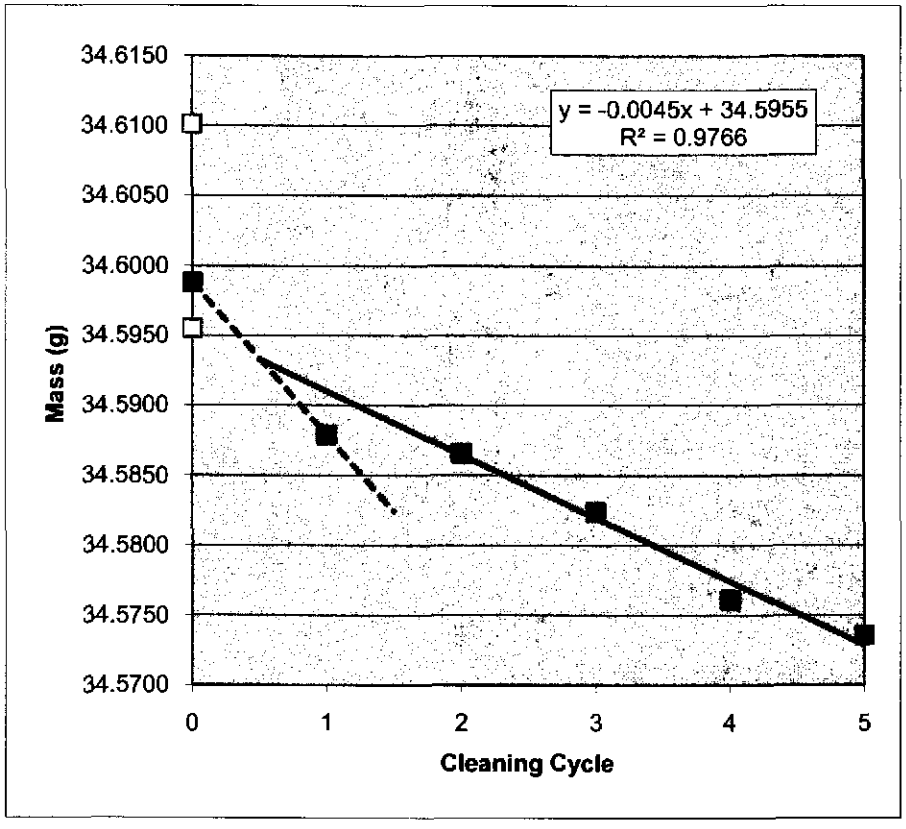
Cleaning Cycle	Wt (g)
0	34.7288
1	34.7195
2	34.7159
3	34.7138
4	34.7095
5	34.7081



Coupon:	L045
Test Matrix:	Pb-E-0000-18-3p
Initial wt (g)	34.6101
Removal wt (g)	34.5988

Calculated final wt (g)	34.5955
Total wt loss (g)	0.0146
Total wt loss (mg)	14.6

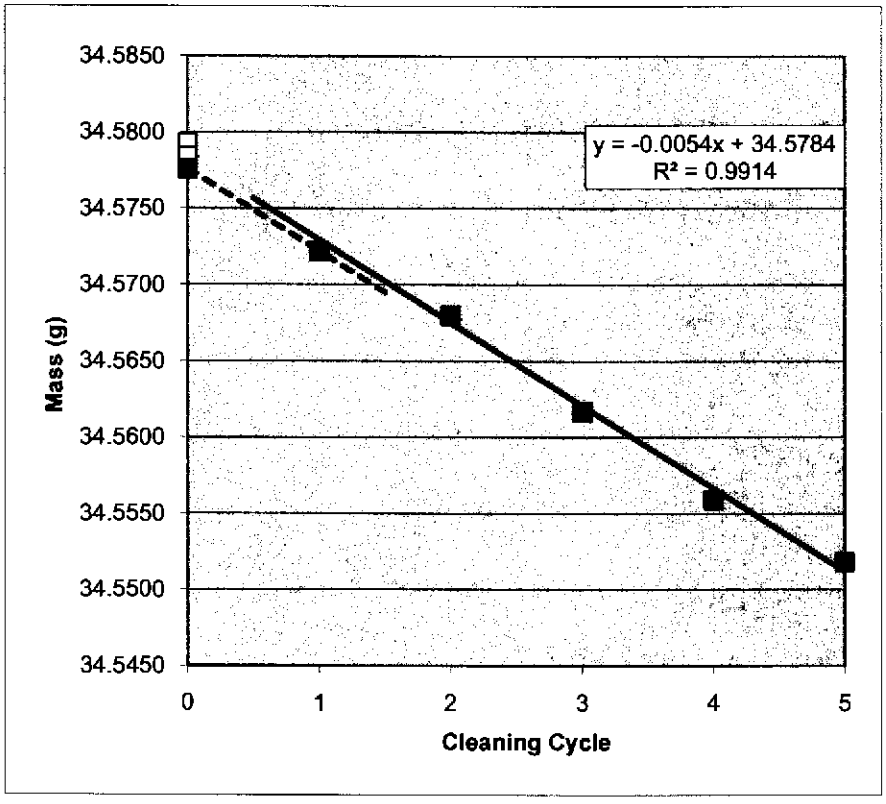
Cleaning Cycle	Wt (g)
0	34.5988
1	34.5879
2	34.5866
3	34.5824
4	34.5761
5	34.5736



Coupon:	L047
Test Matrix:	Pb-Eo-0000-18-2f
Initial wt (g)	34.5793
Removal wt (g)	34.5776

Calculated final wt (g)	34.5784
Total wt loss (g)	0.0009
Total wt loss (mg)	0.9

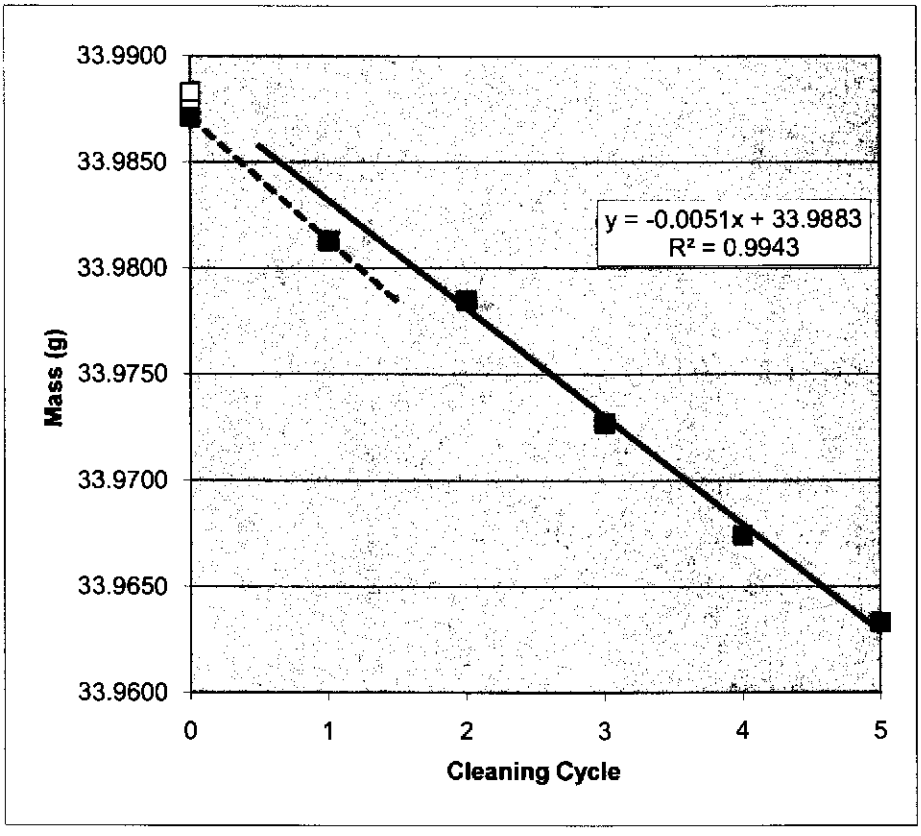
Cleaning Cycle	Wt (g)
0	34.5776
1	34.5722
2	34.5680
3	34.5617
4	34.5559
5	34.5518



Coupon:	L048
Test Matrix:	Pb-Eo-0000-18-3f
Initial wt (g)	33.9877
Removal wt (g)	33.9871

Calculated final wt (g)	33.9883
Total wt loss (g)	-0.0006
Total wt loss (mg)	-0.6

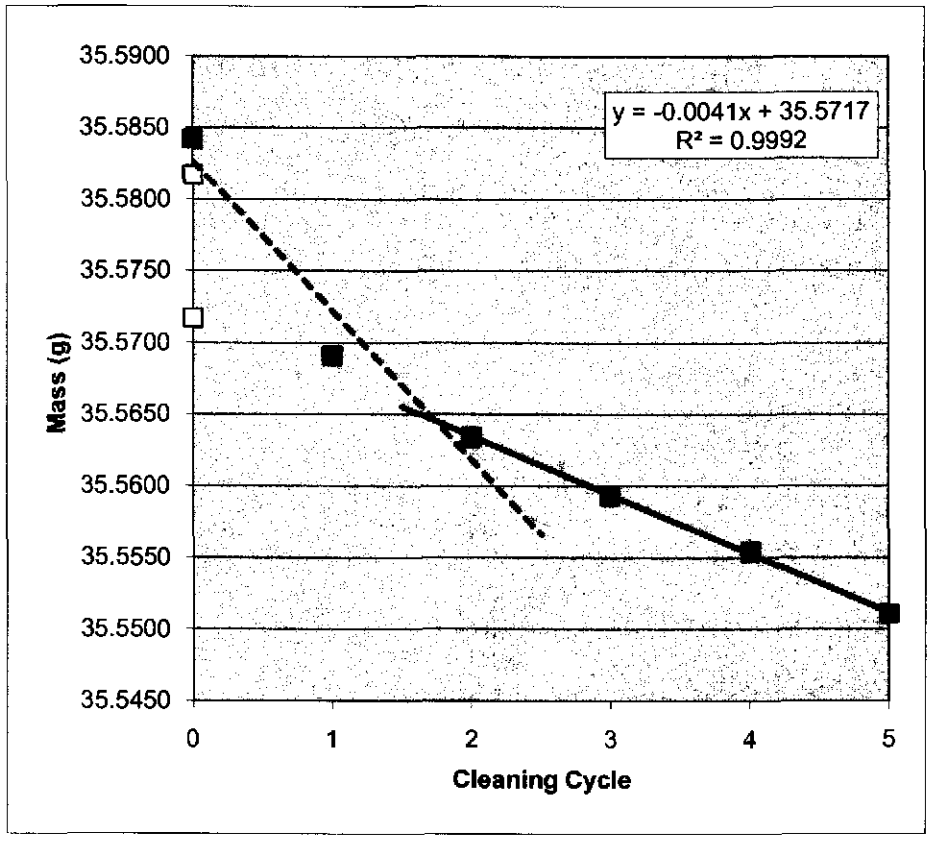
Cleaning Cycle	Wt (g)
0	33.9871
1	33.9813
2	33.9785
3	33.9727
4	33.9674
5	33.9633



Coupon:	L050
Test Matrix:	Pb-Eo-0000-18-2p
Initial wt (g)	35.5817
Removal wt (g)	35.5842

Calculated final wt (g)	35.5717
Total wt loss (g)	0.0100
Total wt loss (mg)	10.0

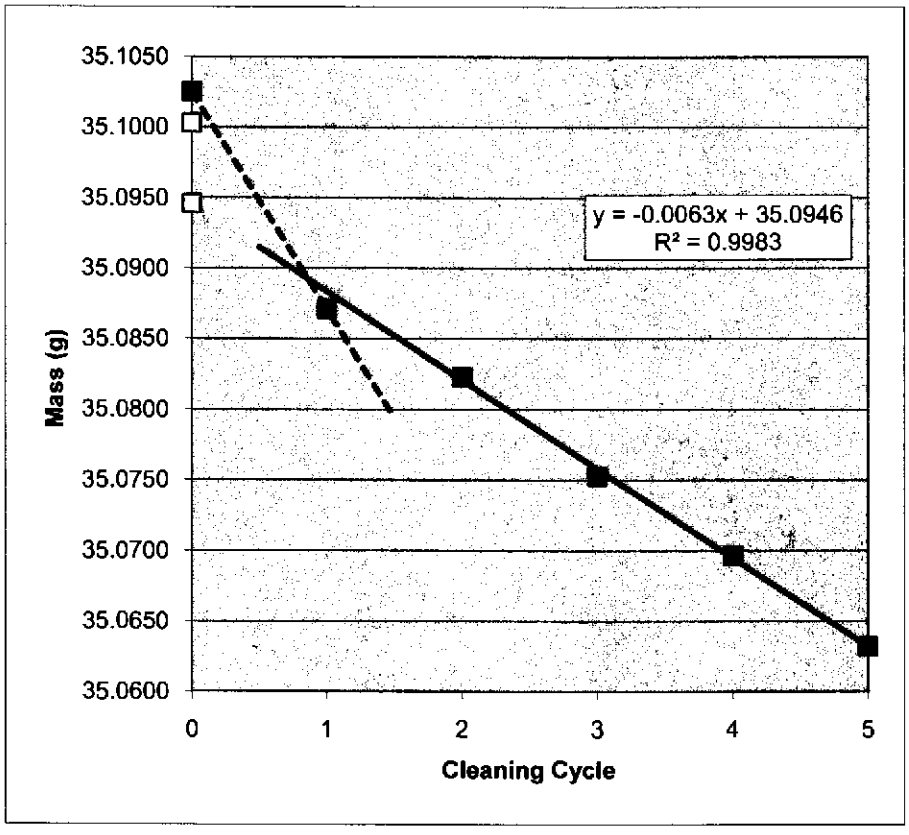
Cleaning Cycle	Wt (g)
0	35.5842
1	35.5691
2	35.5634
3	35.5593
4	35.5554
5	35.5511



Coupon:	L051
Test Matrix:	Pb-Eo-0000-18-3p
Initial wt (g)	35.1003
Removal wt (g)	35.1025

Calculated final wt (g)	35.0946
Total wt loss (g)	0.0057
Total wt loss (mg)	5.7

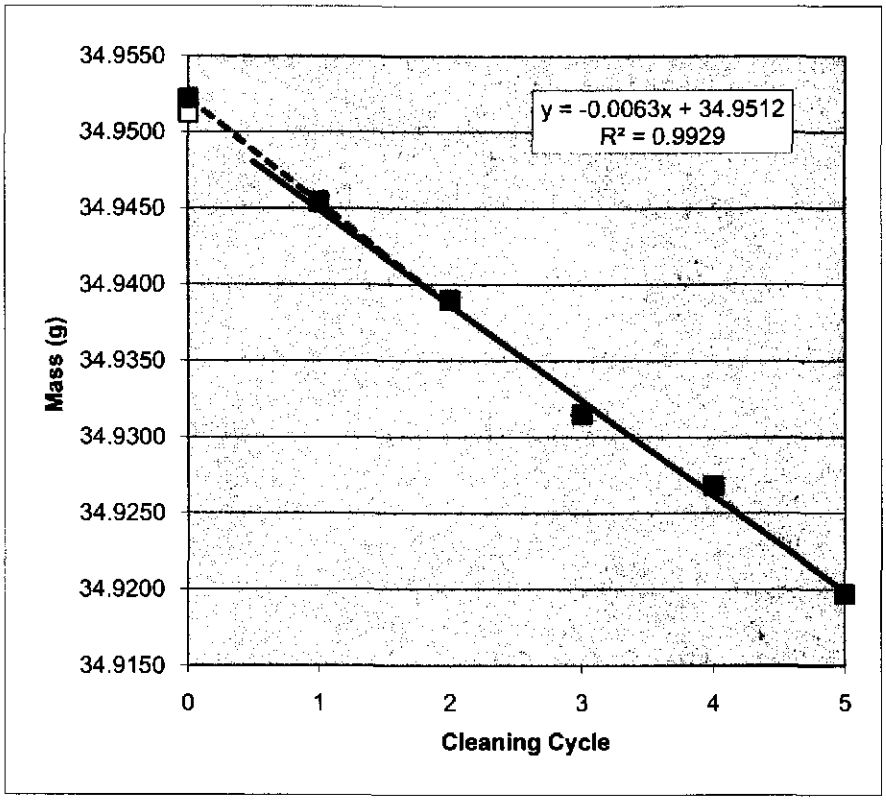
Cleaning Cycle	Wt (g)
0	35.1025
1	35.0871
2	35.0823
3	35.0753
4	35.0697
5	35.0632



Coupon:	L053
Test Matrix:	Pb-Atm-0000-18-2
Initial wt (g)	34.9513
Removal wt (g)	34.9522

Calculated final wt (g)	34.9512
Total wt loss (g)	0.0001
Total wt loss (mg)	0.1

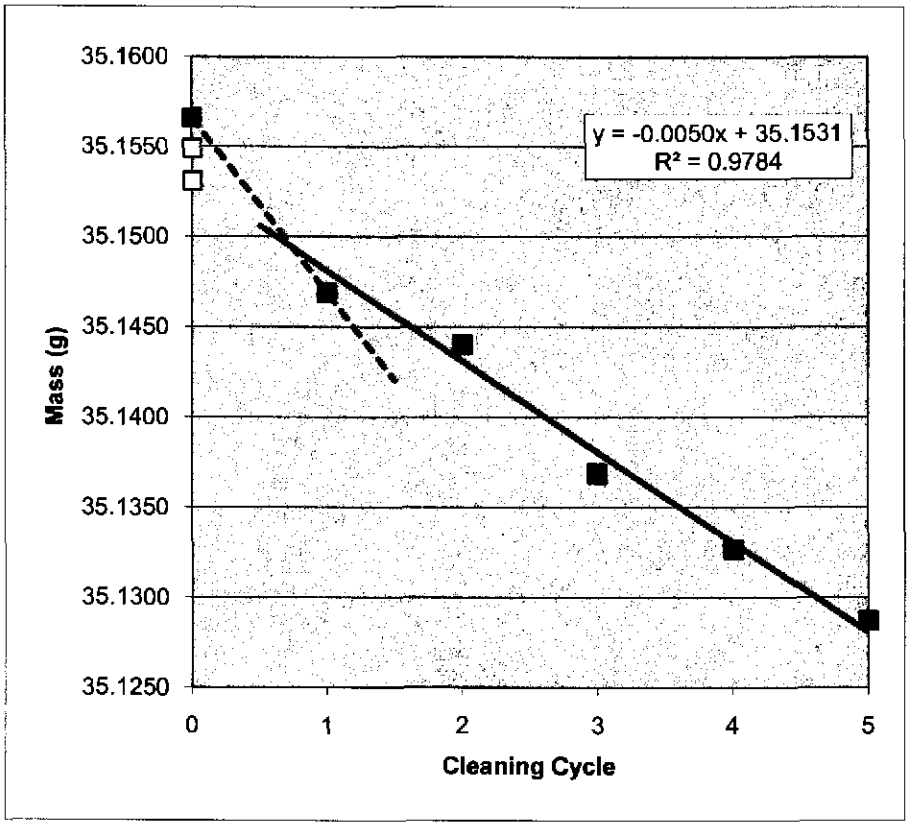
Cleaning Cycle	Wt (g)
0	34.9522
1	34.9454
2	34.9390
3	34.9315
4	34.9268
5	34.9197



Coupon:	L054
Test Matrix:	Pb-Atm-0000-18-3
Initial wt (g)	35.1549
Removal wt (g)	35.1566

Calculated final wt (g)	35.1531
Total wt loss (g)	0.0018
Total wt loss (mg)	1.8

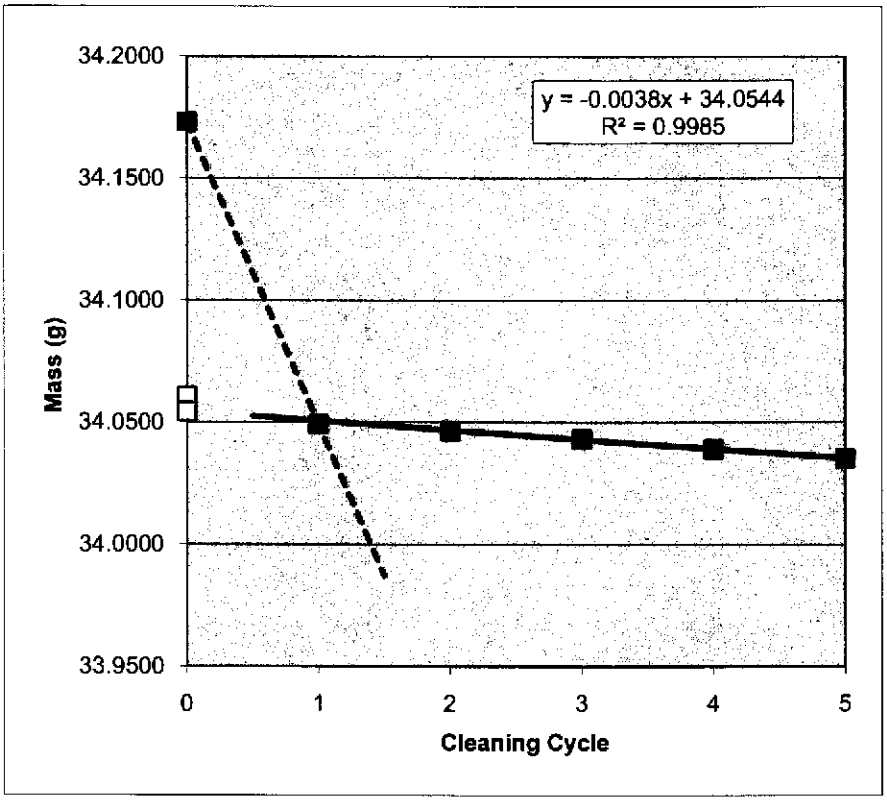
Cleaning Cycle	Wt (g)
0	35.1566
1	35.1469
2	35.1440
3	35.1369
4	35.1327
5	35.1287



Coupon:	L164
Test Matrix:	Pb-G-0350-18-2f
Initial wt (g)	34.0606
Removal wt (g)	34.1731

Calculated final wt (g)	34.0544
Total wt loss (g)	0.0062
Total wt loss (mg)	6.2

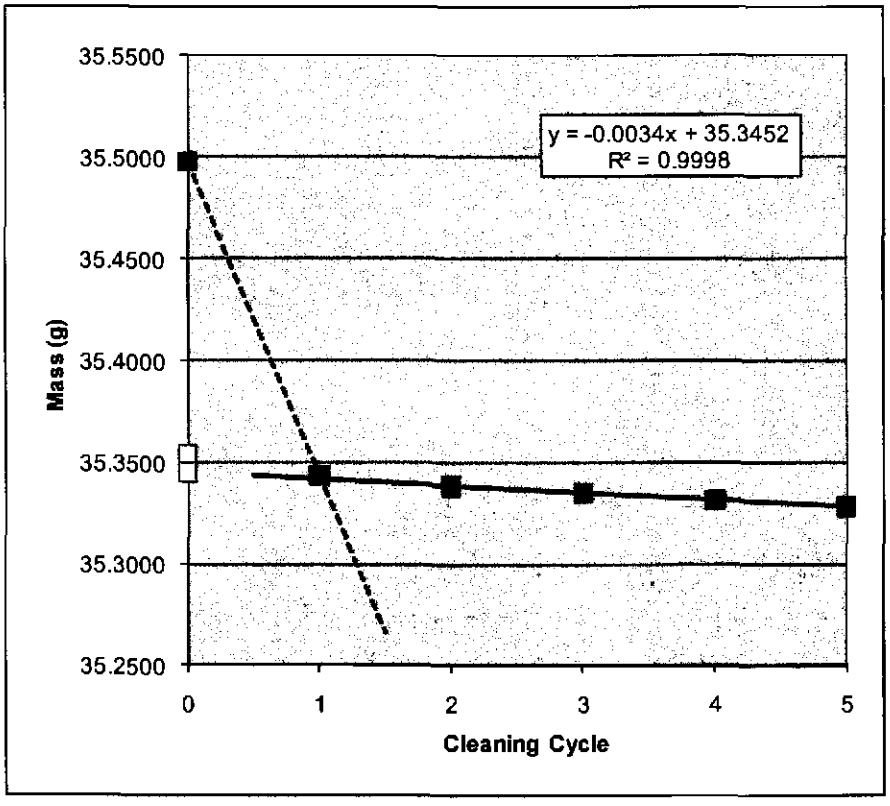
Cleaning Cycle	Wt (g)
0	34.1731
1	34.0491
2	34.0466
3	34.0432
4	34.0390
5	34.0352



Coupon:	L165
Test Matrix:	Pb-G-0350-18-3f
Initial wt (g)	35.3544
Removal wt (g)	35.4978

Calculated final wt (g)	35.3452
Total wt loss (g)	0.0092
Total wt loss (mg)	9.2

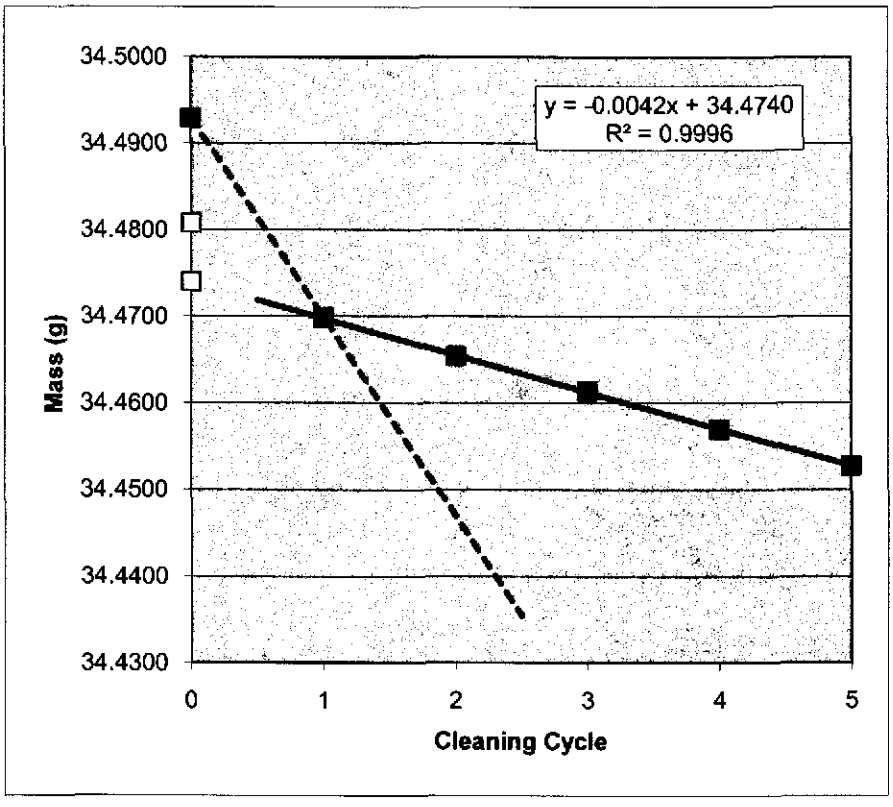
Cleaning Cycle	Wt (g)
0	35.4978
1	35.3436
2	35.3384
3	35.3351
4	35.3317
5	35.3282



Coupon:	L167
Test Matrix:	Pb-G-0350-18-2p
Initial wt (g)	34.4808
Removal wt (g)	34.4929

Calculated final wt (g)	34.4740
Total wt loss (g)	0.0068
Total wt loss (mg)	6.8

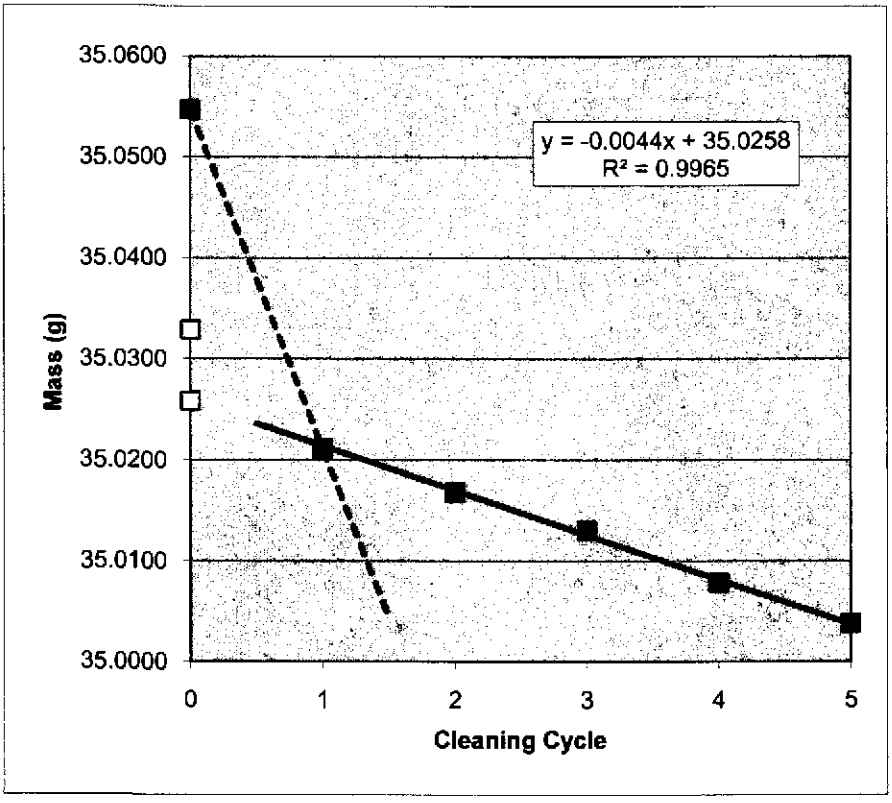
Cleaning Cycle	Wt (g)
0	34.4929
1	34.4699
2	34.4654
3	34.4614
4	34.4570
5	34.4527



Coupon:	L168
Test Matrix:	Pb-G-0350-18-3p
Initial wt (g)	35.0329
Removal wt (g)	35.0547

Calculated final wt (g)	35.0258
Total wt loss (g)	0.0071
Total wt loss (mg)	7.1

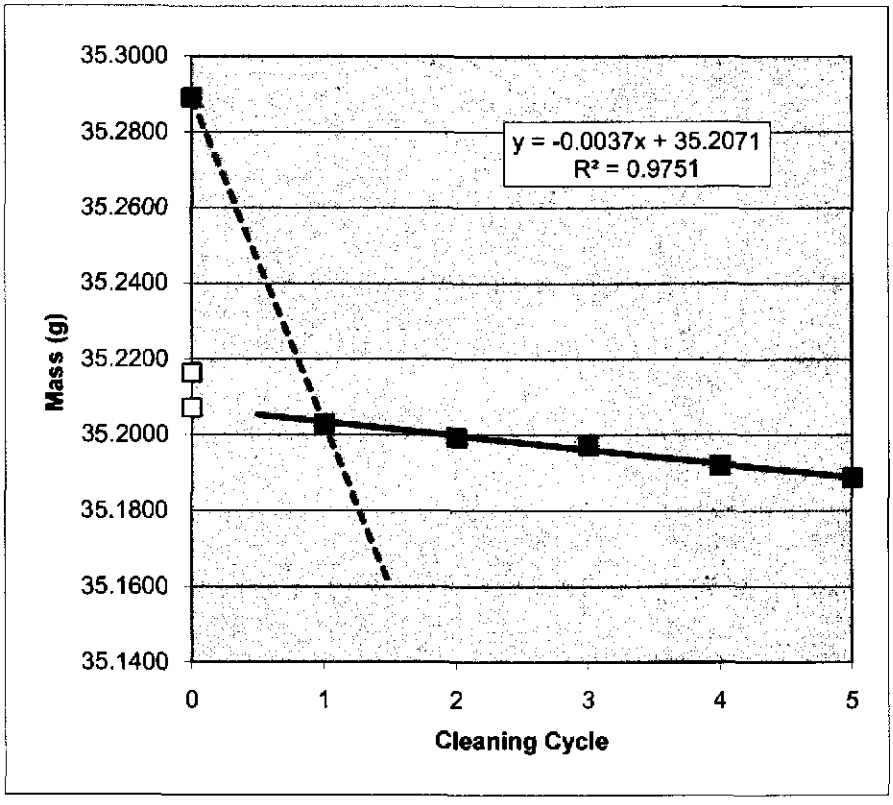
Cleaning Cycle	Wt (g)
0	35.0547
1	35.0211
2	35.0168
3	35.0130
4	35.0078
5	35.0038



Coupon:	L170
Test Matrix:	Pb-Go-0350-18-2f
Initial wt (g)	35.2164
Removal wt (g)	35.2890

Calculated final wt (g)	35.2071
Total wt loss (g)	0.0093
Total wt loss (mg)	9.3

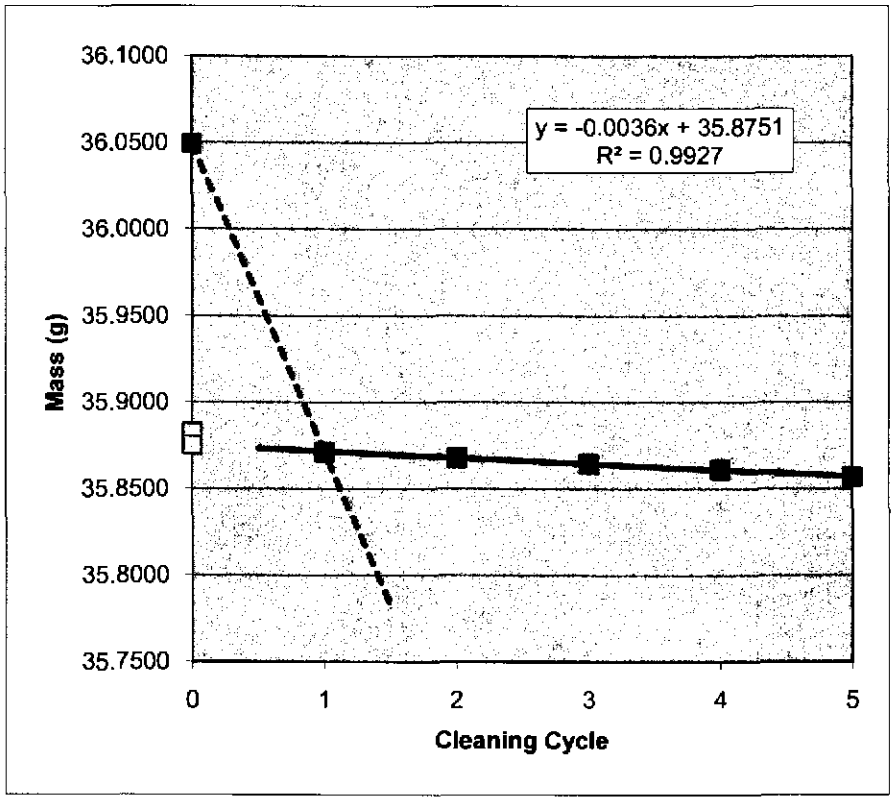
Cleaning Cycle	Wt (g)
0	35.2890
1	35.2030
2	35.1992
3	35.1972
4	35.1920
5	35.1887



Coupon:	L171
Test Matrix:	Pb-Go-0350-18-3f
Initial wt (g)	35.8826
Removal wt (g)	36.0492

Calculated final wt (g)	35.8751
Total wt loss (g)	0.0075
Total wt loss (mg)	7.5

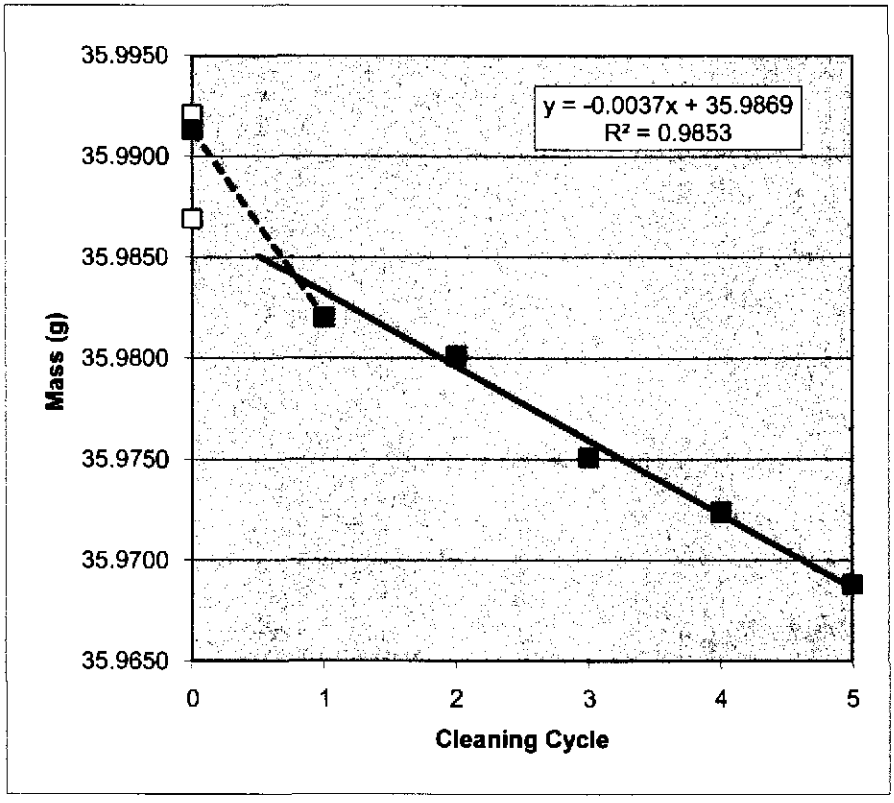
Cleaning Cycle	Wt (g)
0	36.0492
1	35.8712
2	35.8676
3	35.8644
4	35.8611
5	35.8566



Coupon:	L173
Test Matrix:	Pb-Go-0350-18-2p
Initial wt (g)	35.9921
Removal wt (g)	35.9913

Calculated final wt (g)	35.9869
Total wt loss (g)	0.0052
Total wt loss (mg)	5.2

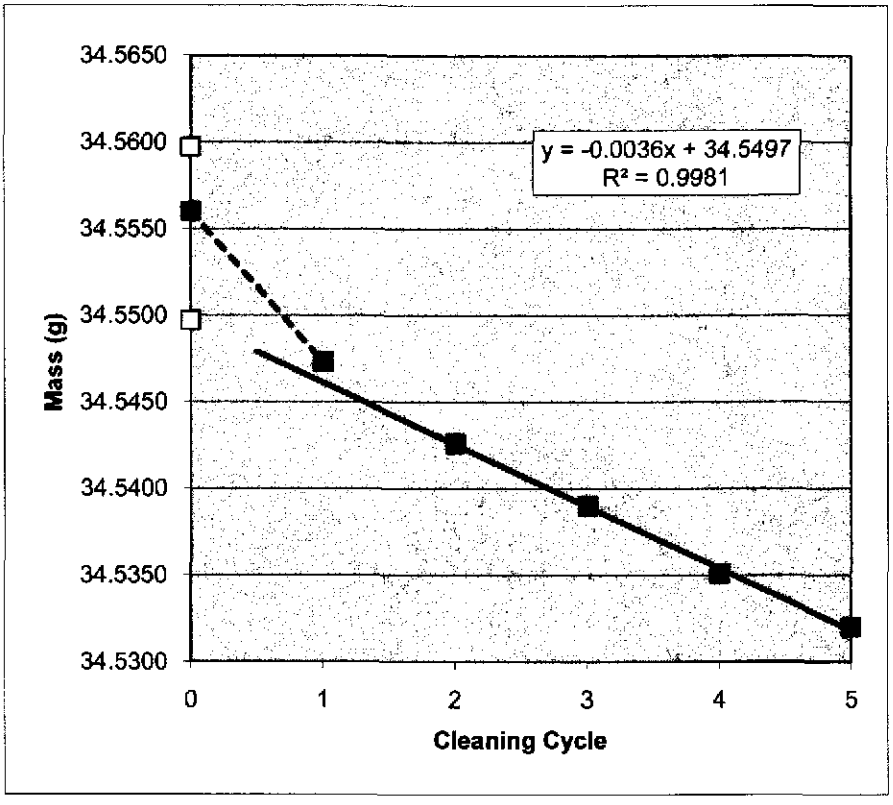
Cleaning Cycle	Wt (g)
0	35.9913
1	35.9820
2	35.9801
3	35.9751
4	35.9724
5	35.9688



Coupon:	L174
Test Matrix:	Pb-Go-0350-18-3p
Initial wt (g)	34.5597
Removal wt (g)	34.5560

Calculated final wt (g)	34.5497
Total wt loss (g)	0.0100
Total wt loss (mg)	10.0

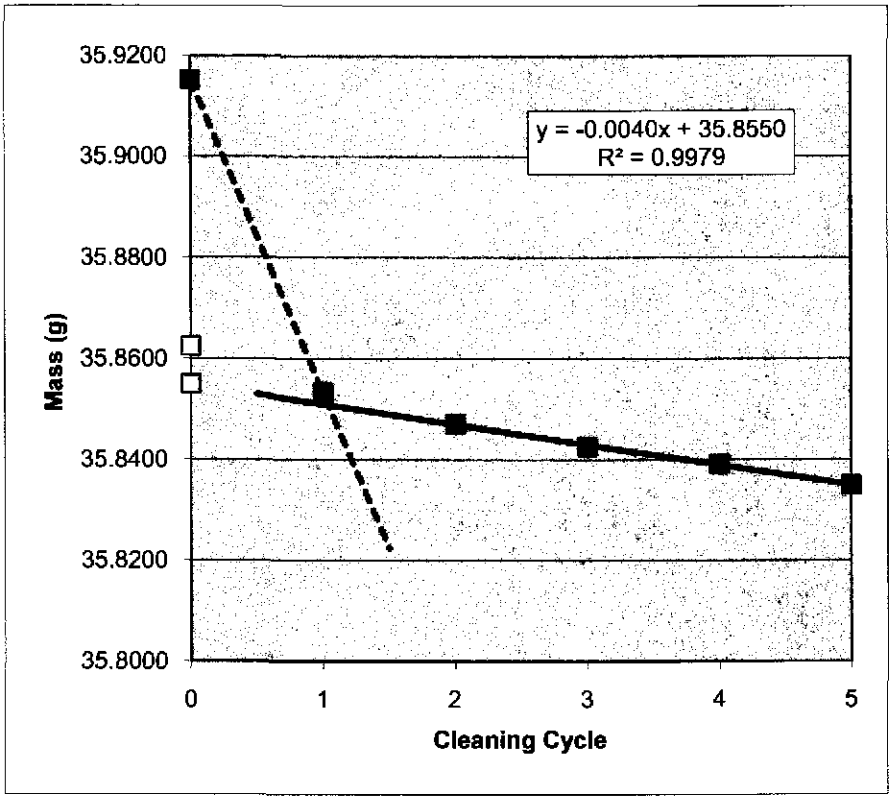
Cleaning Cycle	Wt (g)
0	34.5560
1	34.5473
2	34.5426
3	34.5390
4	34.5351
5	34.5320



Coupon:	L176
Test Matrix:	Pb-E-0350-18-2f
Initial wt (g)	35.8624
Removal wt (g)	35.9152

Calculated final wt (g)	35.8550
Total wt loss (g)	0.0074
Total wt loss (mg)	7.4

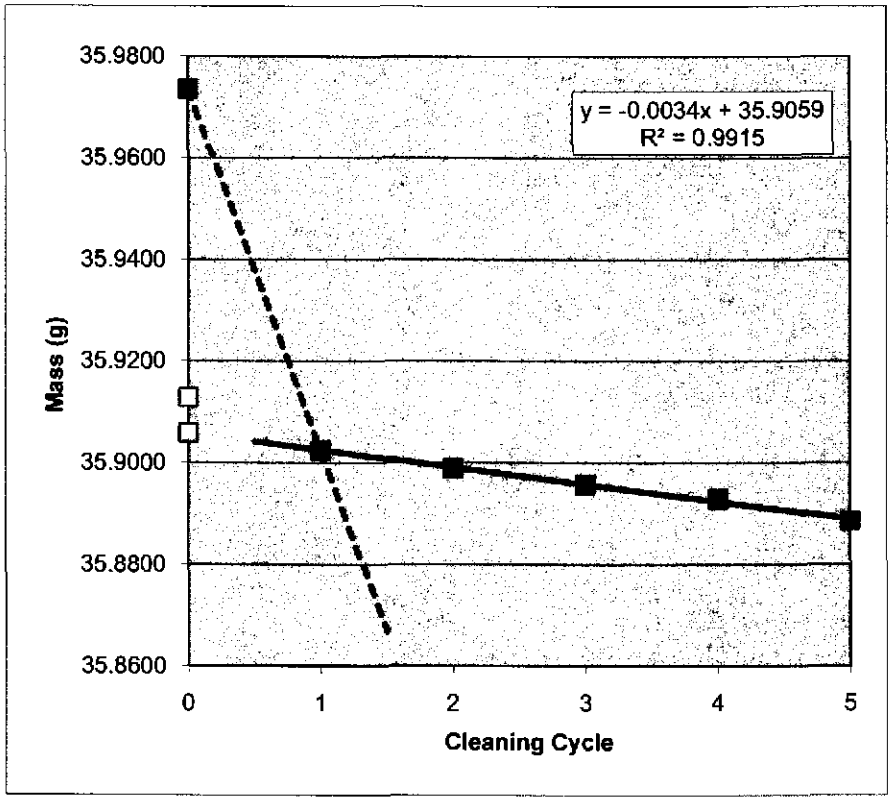
Cleaning Cycle	Wt (g)
0	35.9152
1	35.8533
2	35.8471
3	35.8426
4	35.8391
5	35.8349



Coupon:	L177
Test Matrix:	Pb-E-0350-18-3f
Initial wt (g)	35.9128
Removal wt (g)	35.9735

Calculated final wt (g)	35.9059
Total wt loss (g)	0.0069
Total wt loss (mg)	6.9

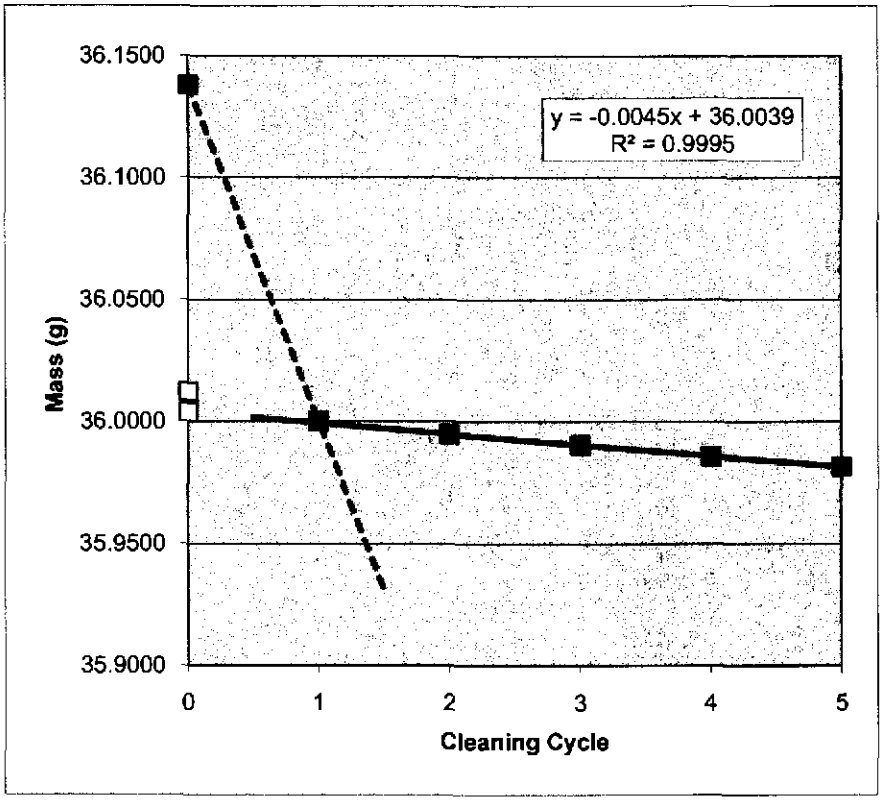
Cleaning Cycle	Wt (g)
0	35.9735
1	35.9024
2	35.8989
3	35.8958
4	35.8929
5	35.8886



Coupon:	L179
Test Matrix:	Pb-E-0350-18-2p
Initial wt (g)	36.0121
Removal wt (g)	36.1379

Calculated final wt (g)	36.0039
Total wt loss (g)	0.0082
Total wt loss (mg)	8.2

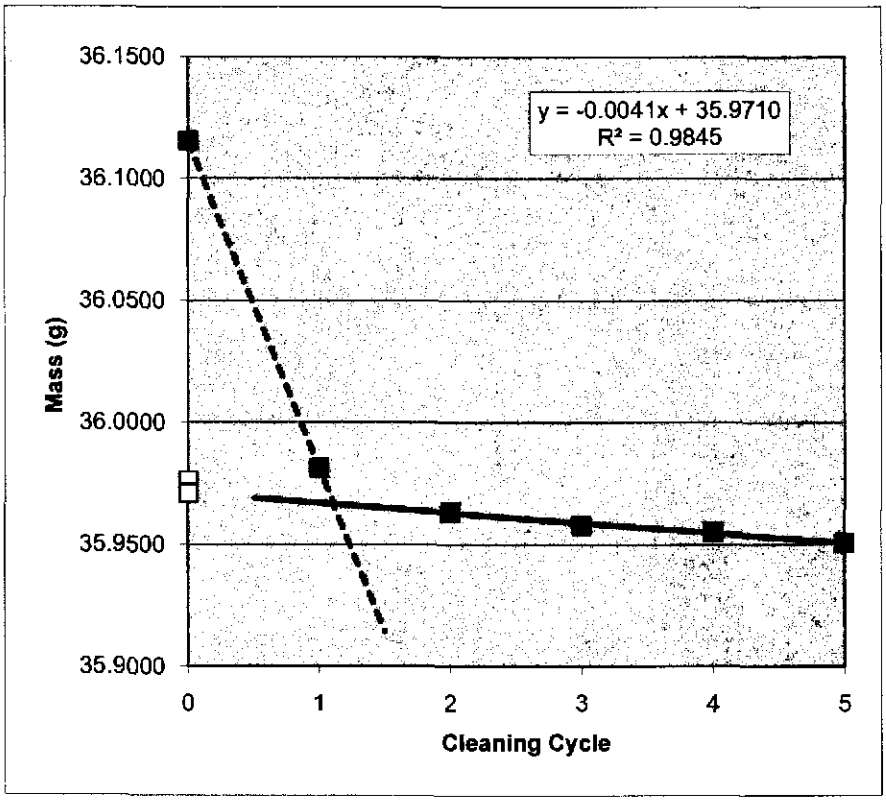
Cleaning Cycle	Wt (g)
0	36.1379
1	36.0003
2	35.9950
3	35.9905
4	35.9858
5	35.9816



Coupon:	L180
Test Matrix:	Pb-E-0350-18-3p
Initial wt (g)	35.9762
Removal wt (g)	36.1155

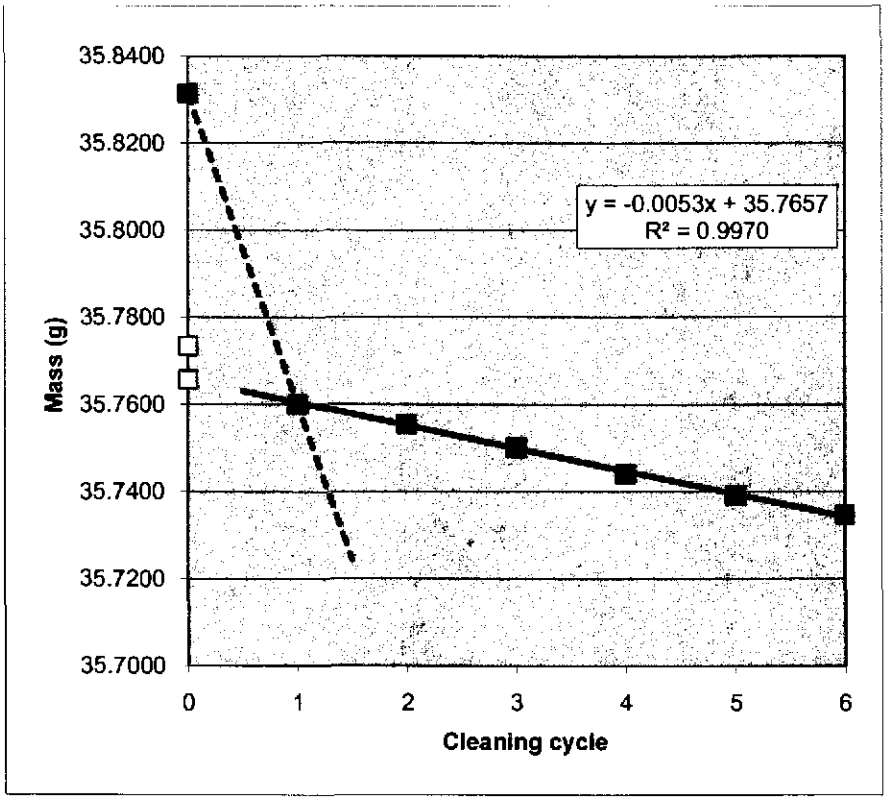
Calculated final wt (g)	35.9710
Total wt loss (g)	0.0052
Total wt loss (mg)	5.2

Cleaning Cycle	Wt (g)
0	36.1155
1	35.9813
2	35.9633
3	35.9578
4	35.9551
5	35.9506



Coupon:	L182		
Test Matrix:	Pb-Eo-0350-18-2f		
Initial wt (g)	35.7734	**Calculated final wt (g)**	35.7657
Removal wt (g)	35.8314	**Total wt loss (g)**	0.0077
		Total wt loss (mg)	7.7

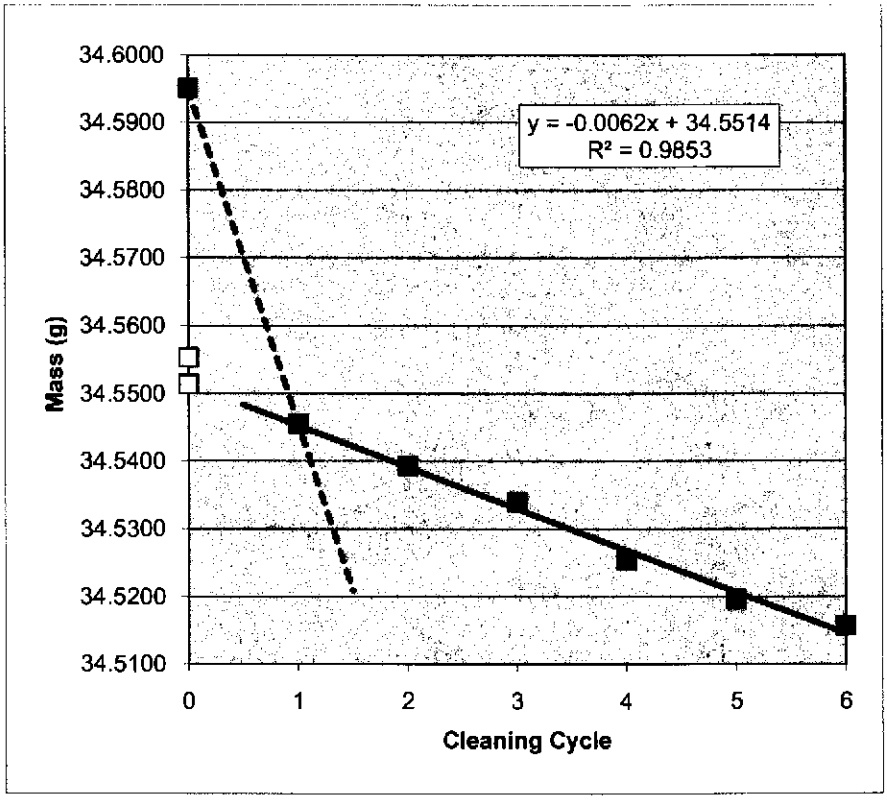
Cleaning Cycle	Wt (g)
0	35.8314
1	35.7600
2	35.7555
3	35.7501
4	35.7441
5	35.7391
6	35.7347



Coupon:	L183
Test Matrix:	Pb-Eo-0350-18-3f
Initial wt (g)	34.5553
Removal wt (g)	34.5951

Calculated final wt (g)	34.5514
Total wt loss (g)	0.0039
Total wt loss (mg)	3.9

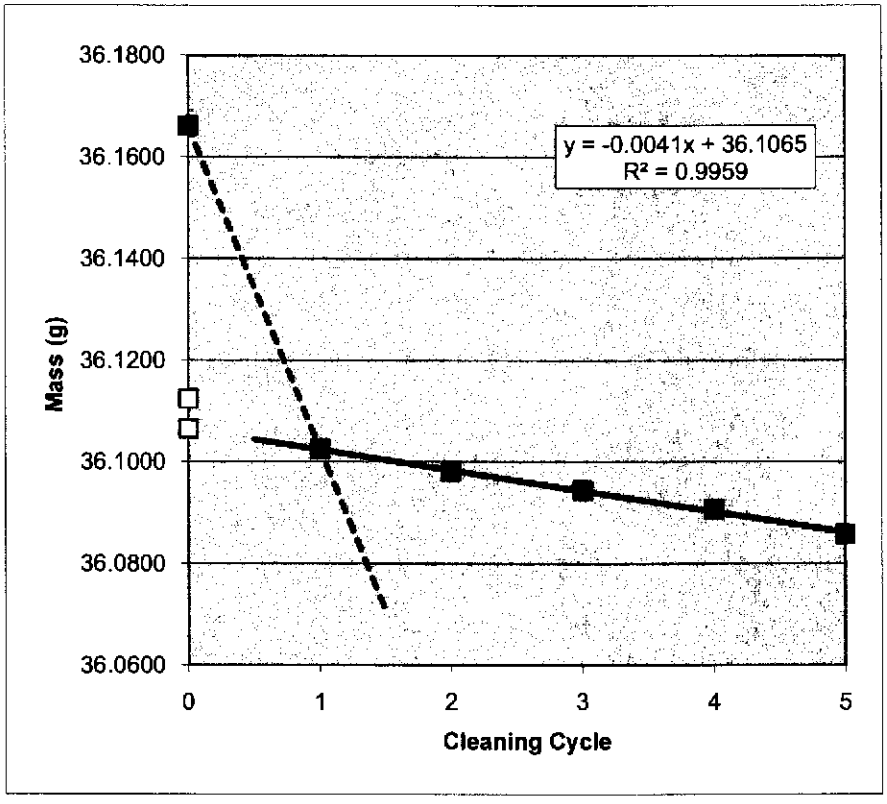
Cleaning Cycle	Wt (g)
0	34.5951
1	34.5456
2	34.5393
3	34.5340
4	34.5254
5	34.5196
6	34.5157



Coupon:	L185
Test Matrix:	Pb-Eo-0350-18-2p
Initial wt (g)	36.1124
Removal wt (g)	36.1661

Calculated final wt (g)	36.1065
Total wt loss (g)	0.0059
Total wt loss (mg)	5.9

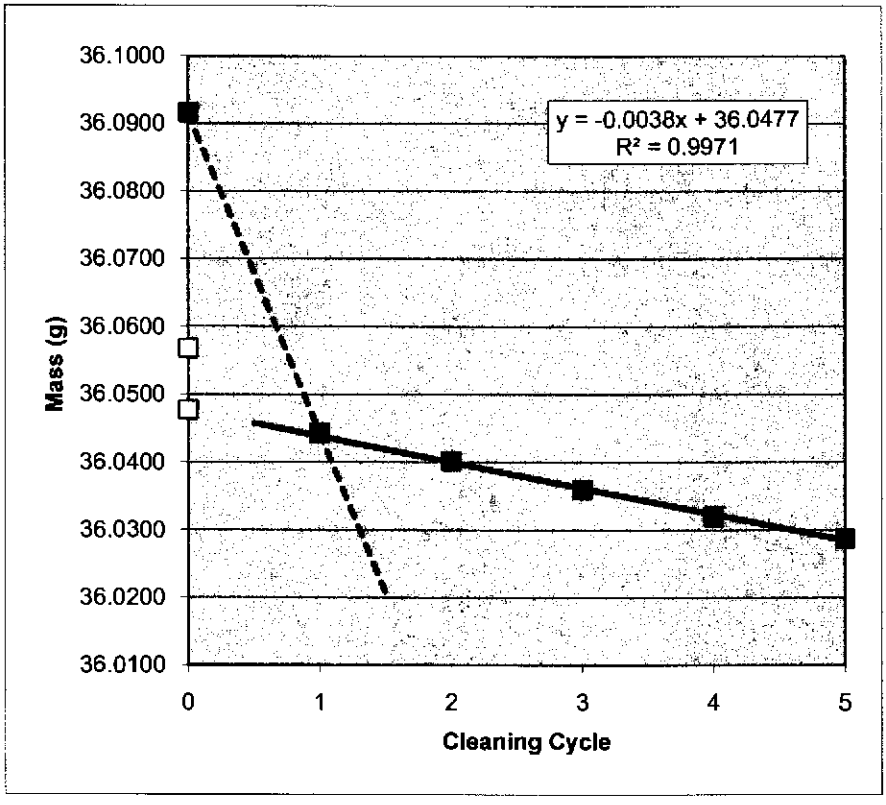
Cleaning Cycle	Wt (g)
0	36.1661
1	36.1025
2	36.0981
3	36.0944
4	36.0906
5	36.0858



Coupon:	L186
Test Matrix:	Pb-Eo-0350-18-3p
Initial wt (g)	36.0568
Removal wt (g)	36.0916

Calculated final wt (g)	36.0477
Total wt loss (g)	0.0091
Total wt loss (mg)	9.1

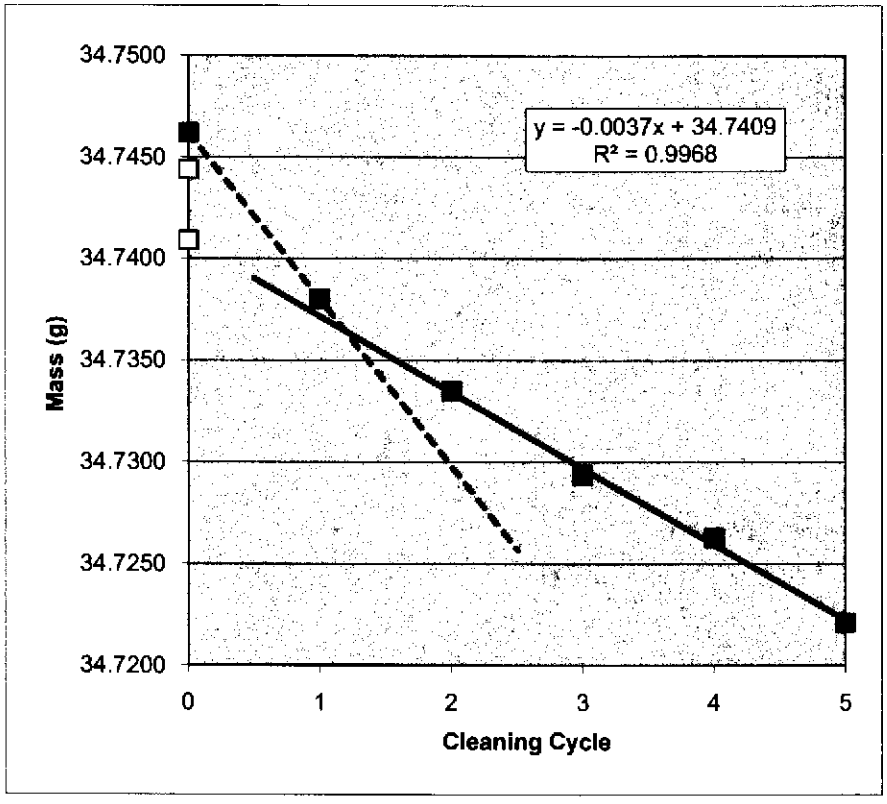
Cleaning Cycle	Wt (g)
0	36.0916
1	36.0443
2	36.0402
3	36.0360
4	36.0320
5	36.0287



Coupon:	L188
Test Matrix:	Pb-Atm-0350-18-2
Initial wt (g)	34.7444
Removal wt (g)	34.7462

Calculated final wt (g)	34.7409
Total wt loss (g)	0.0035
Total wt loss (mg)	3.5

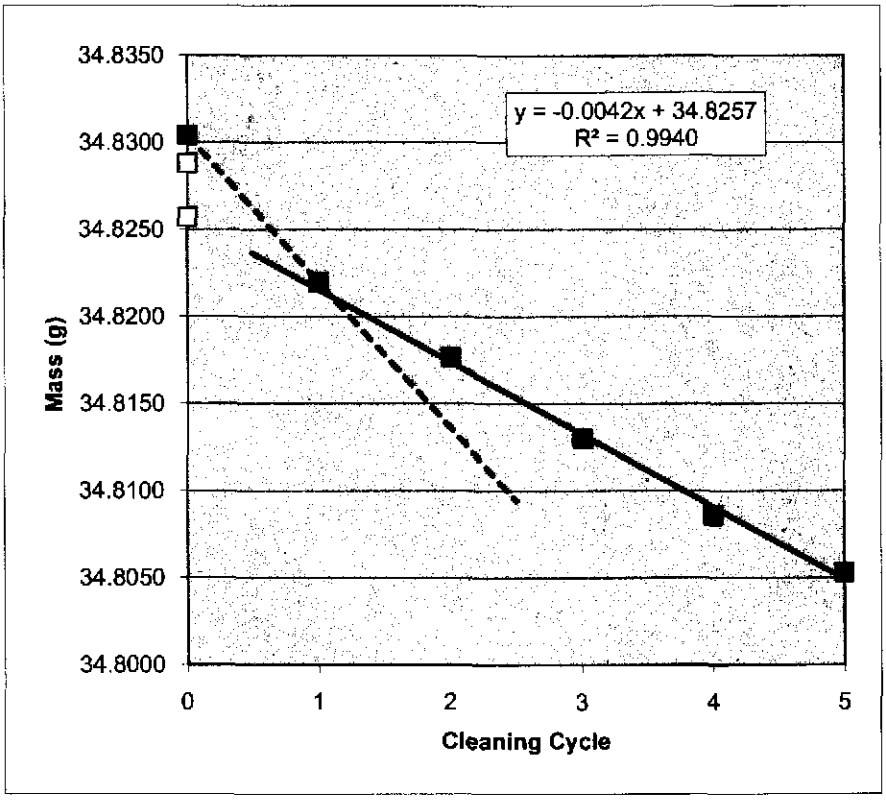
Cleaning Cycle	Wt (g)
0	34.7462
1	34.7380
2	34.7335
3	34.7294
4	34.7263
5	34.7221



Coupon:	L189
Test Matrix:	Pb-Atm-0350-18-3
Initial wt (g)	34.8288
Removal wt (g)	34.8304

Calculated final wt (g)	34.8257
Total wt loss (g)	0.0031
Total wt loss (mg)	3.1

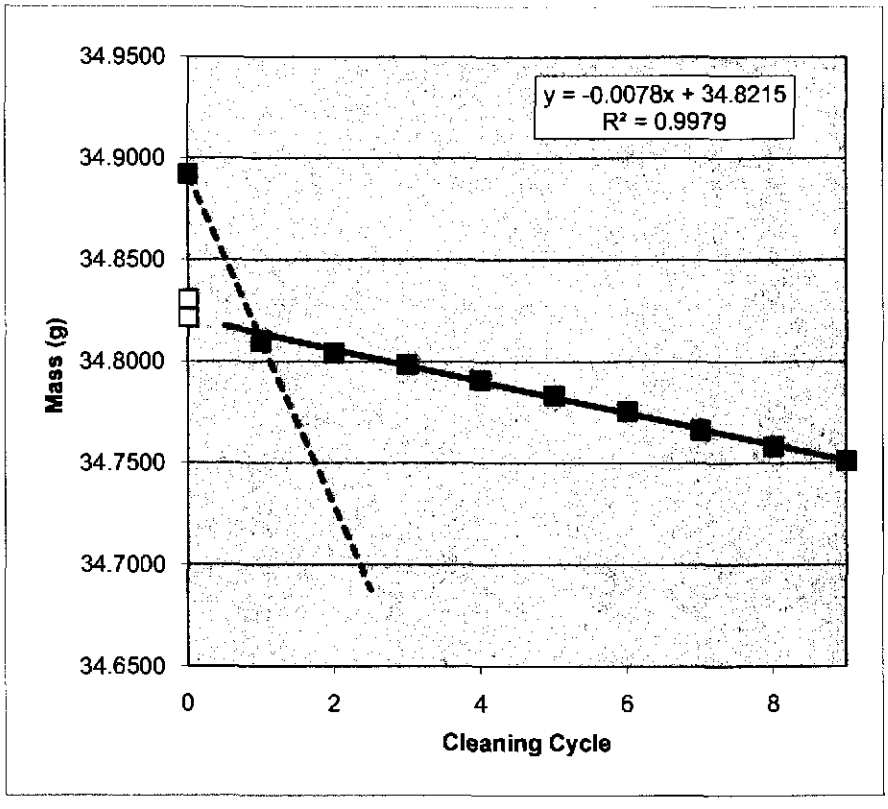
Cleaning Cycle	Wt (g)
0	34.8304
1	34.8220
2	34.8177
3	34.8130
4	34.8086
5	34.8053



Coupon:	L245
Test Matrix:	Pb-G-1500-18-2f
Initial wt (g)	34.8306
Removal wt (g)	34.8919

Calculated final wt (g)	34.8215
Total wt loss (g)	0.0091
Total wt loss (mg)	9.1

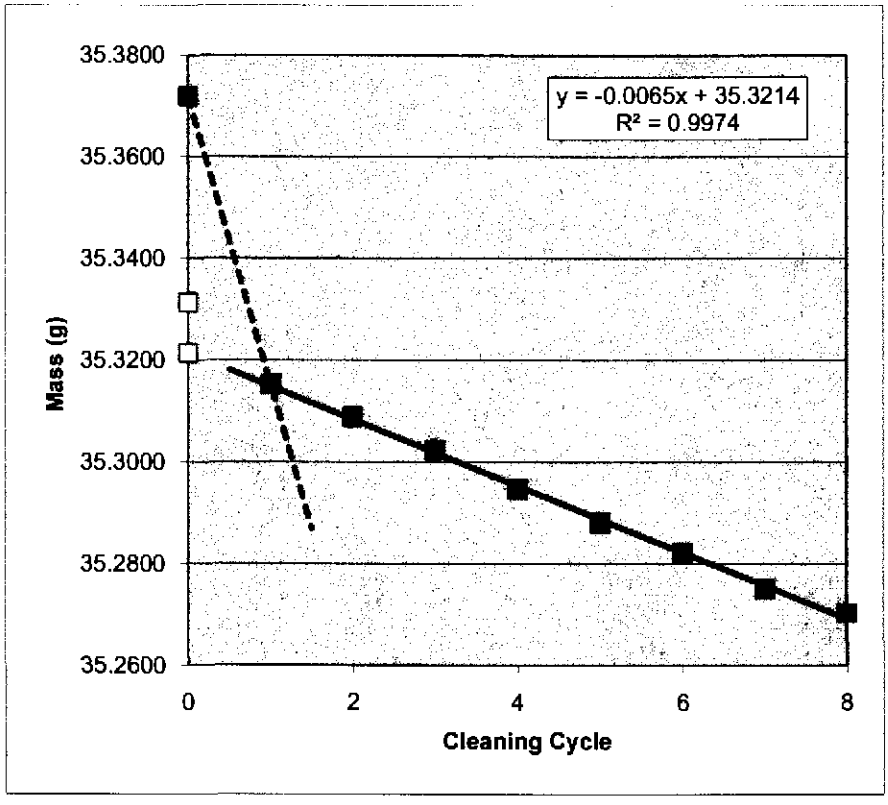
Cleaning Cycle	Wt (g)
0	34.8919
1	34.8103
2	34.8043
3	34.7986
4	34.7910
5	34.7833
6	34.7754
7	34.7663
8	34.7584
9	34.7511



Coupon:	L246
Test Matrix:	Pb-G-1500-18-3f
Initial wt (g)	35.3314
Removal wt (g)	35.3719

Calculated final wt (g)	35.3214
Total wt loss (g)	0.0100
Total wt loss (mg)	10.0

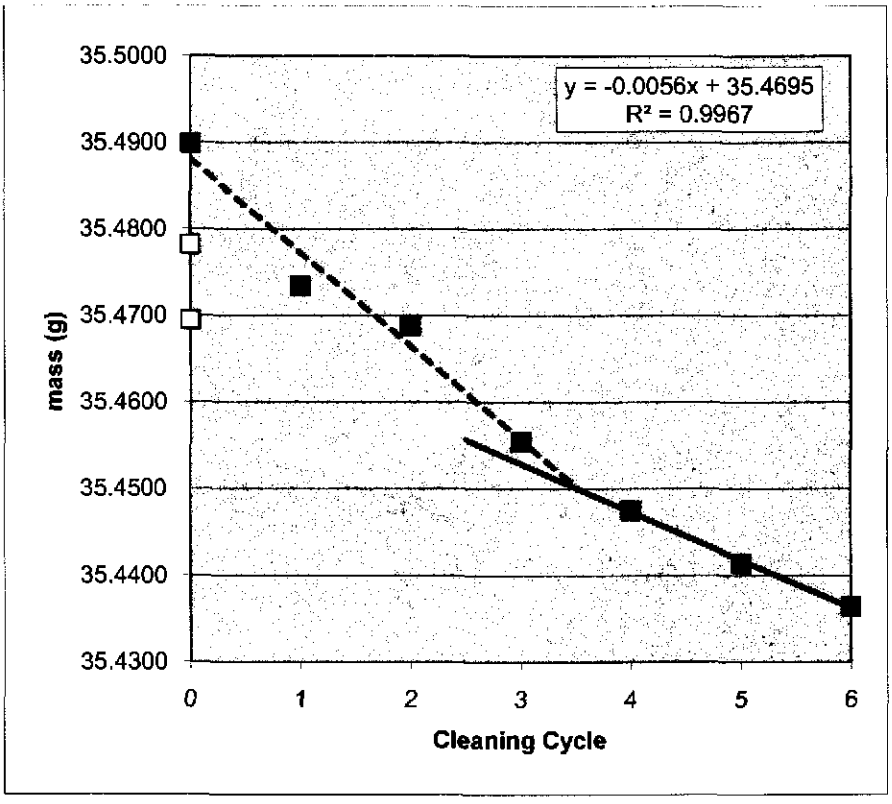
Cleaning Cycle	Wt (g)
0	35.3719
1	35.3152
2	35.3088
3	35.3023
4	35.2946
5	35.2881
6	35.2821
7	35.2750
8	35.2703



Coupon:	L248
Test Matrix:	Pb-G-1500-18-2p
Initial wt (g)	35.4782
Removal wt (g)	35.4899

Calculated final wt (g)	35.4695
Total wt loss (g)	0.0087
Total wt loss (mg)	8.7

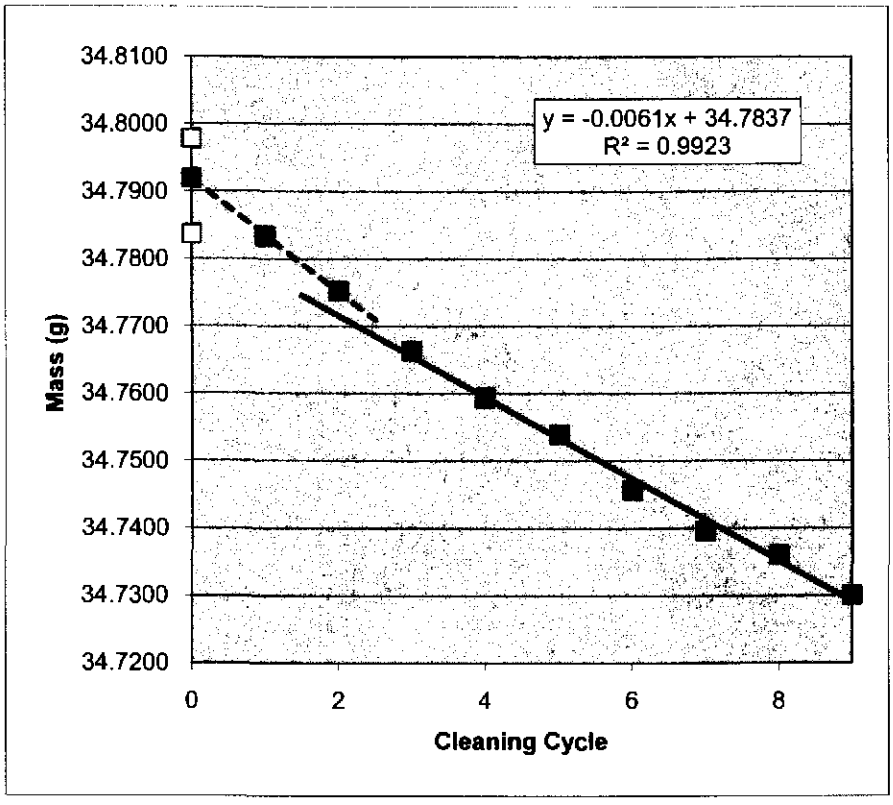
Cleaning Cycle	Wt (g)
0	35.4899
1	35.4734
2	35.4688
3	35.4554
4	35.4475
5	35.4414
6	35.4364



Coupon:	L249
Test Matrix:	Pb-G-1500-18-3p
Initial wt (g)	34.7978
Removal wt (g)	34.7919

Calculated final wt (g)	34.7837
Total wt loss (g)	0.0141
Total wt loss (mg)	14.1

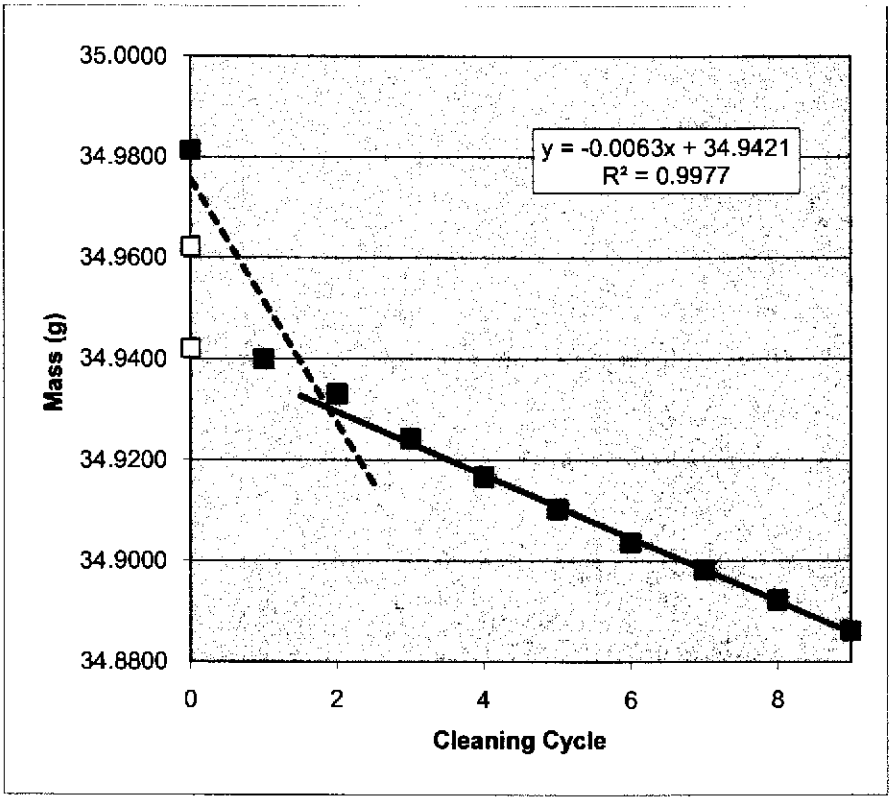
Cleaning Cycle	Wt (g)
0	34.7919
1	34.7834
2	34.7752
3	34.7663
4	34.7594
5	34.7540
6	34.7457
7	34.7396
8	34.7360
9	34.7301



Coupon:	L251
Test Matrix:	Pb-Go-1500-18-2f
Initial wt (g)	34.9622
Removal wt (g)	34.9813

Calculated final wt (g)	34.9421
Total wt loss (g)	0.0201
Total wt loss (mg)	20.1

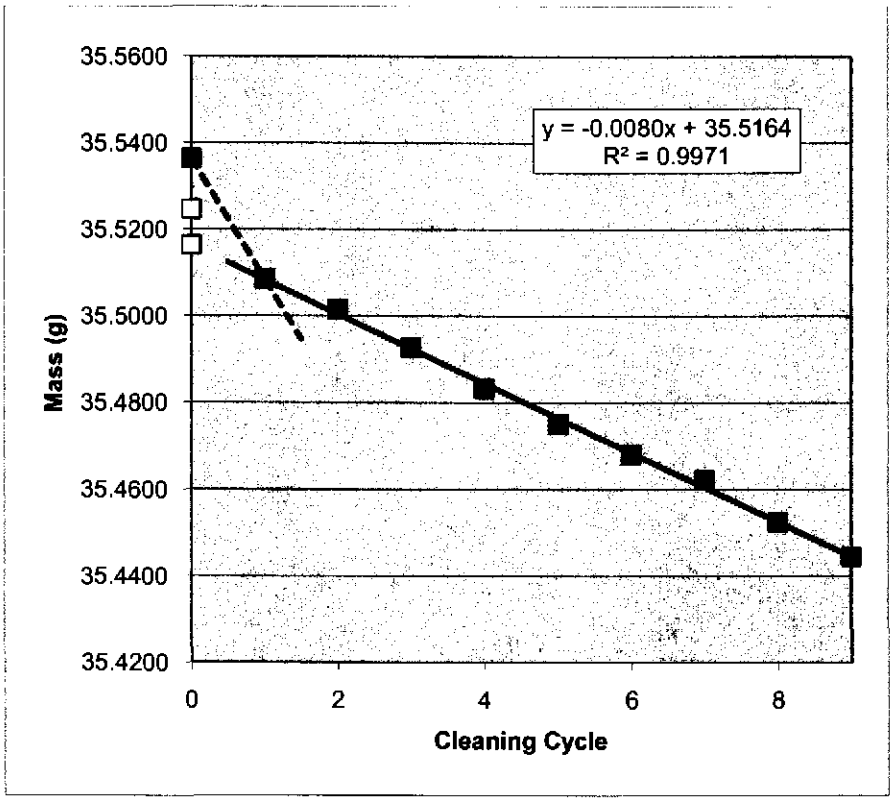
Cleaning Cycle	Wt (g)
0	34.9813
1	34.9400
2	34.9331
3	34.9243
4	34.9167
5	34.9103
6	34.9036
7	34.8982
8	34.8923
9	34.8862



Coupon:	L252
Test Matrix:	Pb-Go-1500-18-3f
Initial wt (g)	35.5246
Removal wt (g)	35.5364

Calculated final wt (g)	35.5164
Total wt loss (g)	0.0082
Total wt loss (mg)	8.2

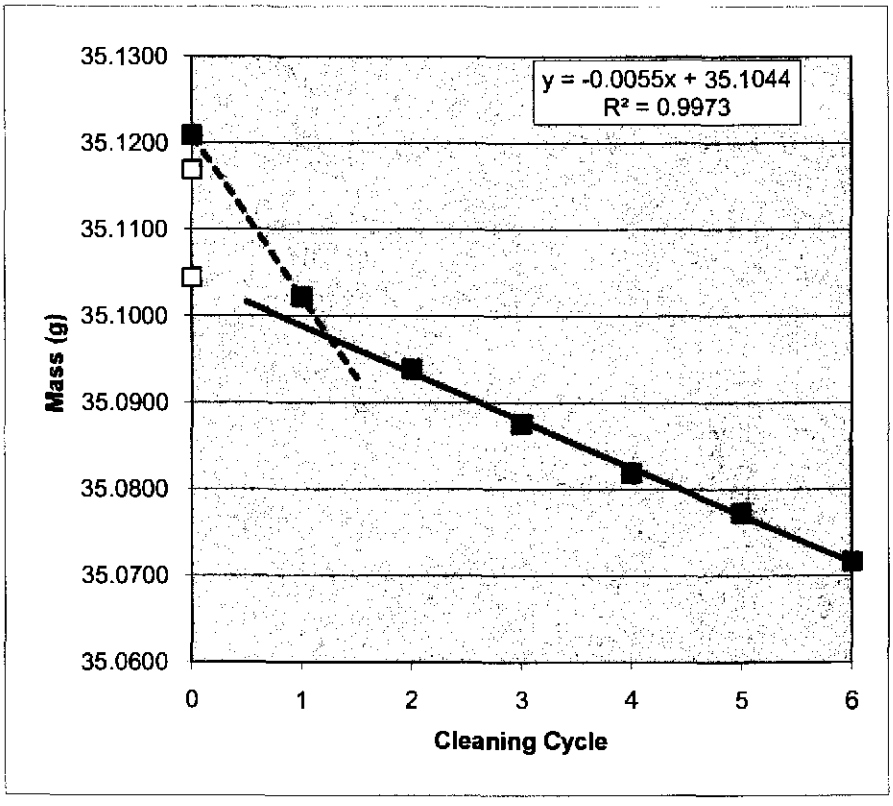
Cleaning Cycle	Wt (g)
0	35.5364
1	35.5086
2	35.5016
3	35.4927
4	35.4832
5	35.4750
6	35.4681
7	35.4621
8	35.4524
9	35.4445



Coupon:	L254
Test Matrix:	Pb-Go-1500-18-2p
Initial wt (g)	35.1169
Removal wt (g)	35.1209

Calculated final wt (g)	35.1044
Total wt loss (g)	0.0125
Total wt loss (mg)	12.5

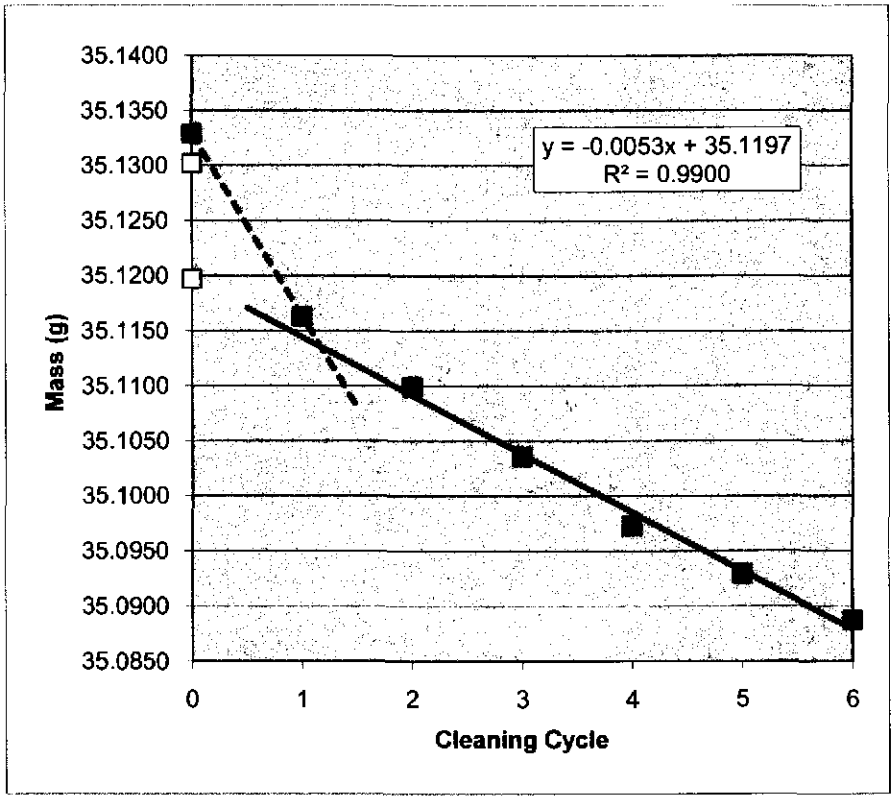
Cleaning Cycle	Wt (g)
0	35.1209
1	35.1022
2	35.0939
3	35.0876
4	35.0819
5	35.0773
6	35.0717



Coupon:	L255
Test Matrix:	Pb-Go-1500-18-3p
Initial wt (g)	35.1302
Removal wt (g)	35.1329

Calculated final wt (g)	35.1197
Total wt loss (g)	0.0105
Total wt loss (mg)	10.5

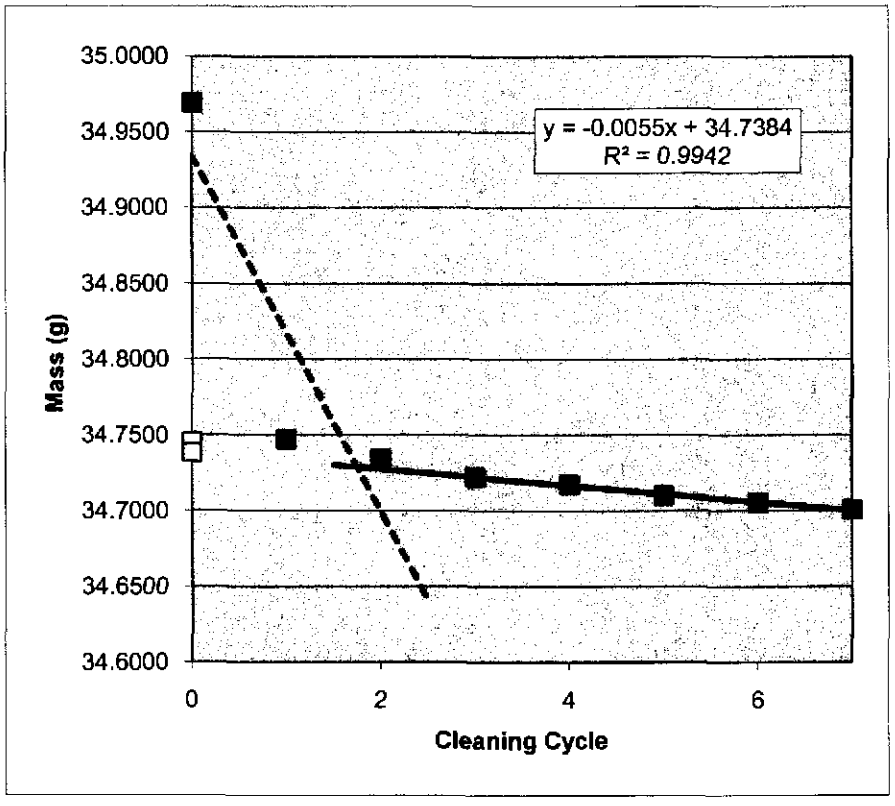
Cleaning Cycle	Wt (g)
0	35.1329
1	35.1163
2	35.1099
3	35.1036
4	35.0973
5	35.0929
6	35.0887



Coupon:	L257
Test Matrix:	Pb-E-1500-18-2f
Initial wt (g)	34.7452
Removal wt (g)	34.9691

Calculated final wt (g)	34.7384
Total wt loss (g)	0.0068
Total wt loss (mg)	6.8

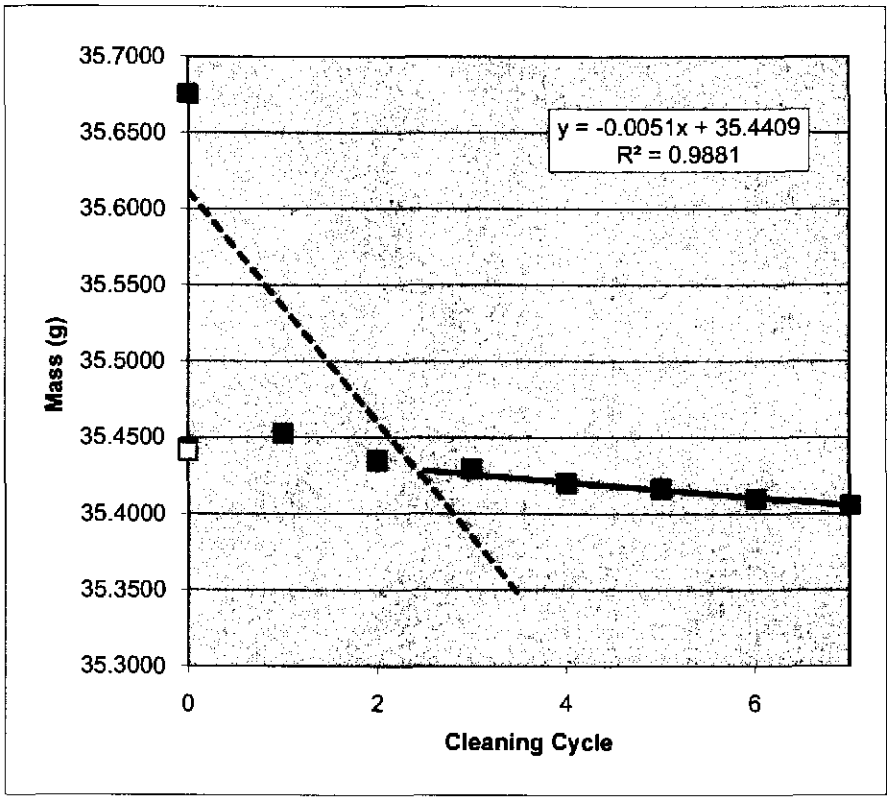
Cleaning Cycle	Wt (g)
0	34.9691
1	34.7474
2	34.7339
3	34.7221
4	34.7172
5	34.7101
6	34.7054
7	34.7007



Coupon:	L258
Test Matrix:	Pb-E-1500-18-3f
Initial wt (g)	35.4430
Removal wt (g)	35.6755

Calculated final wt (g)	35.4409
Total wt loss (g)	0.0021
Total wt loss (mg)	2.1

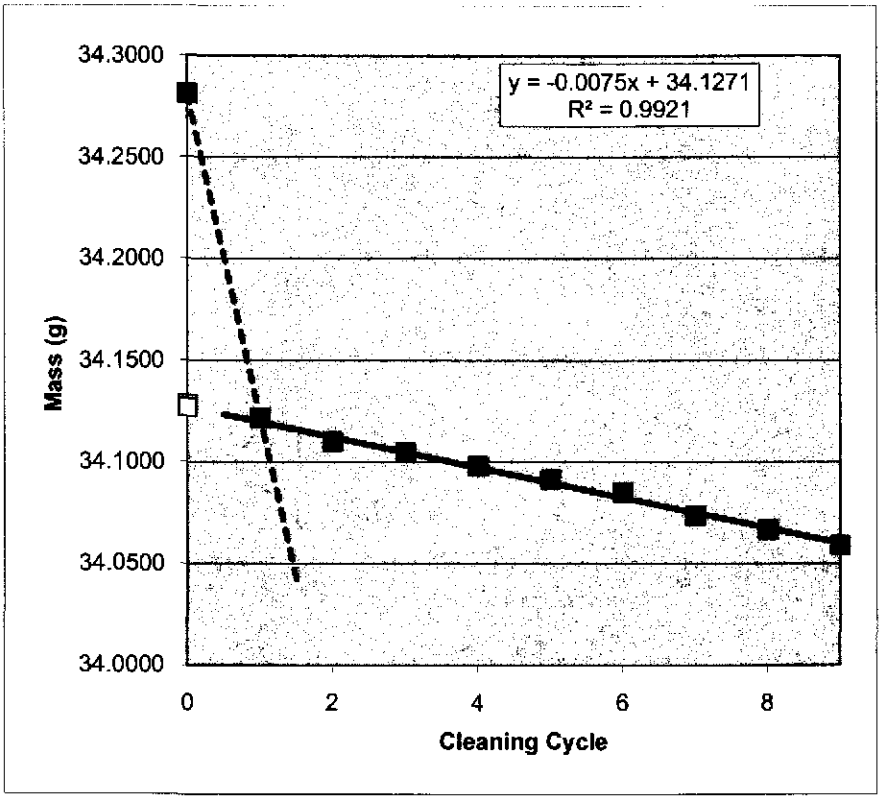
Cleaning Cycle	Wt (g)
0	35.6755
1	35.4526
2	35.4348
3	35.4292
4	35.4202
5	35.4165
6	35.4098
7	35.4055



Coupon:	L260
Test Matrix:	Pb-E-1500-18-2p
Initial wt (g)	34.1285
Removal wt (g)	34.2813

Calculated final wt (g)	34.1271
Total wt loss (g)	0.0014
Total wt loss (mg)	1.4

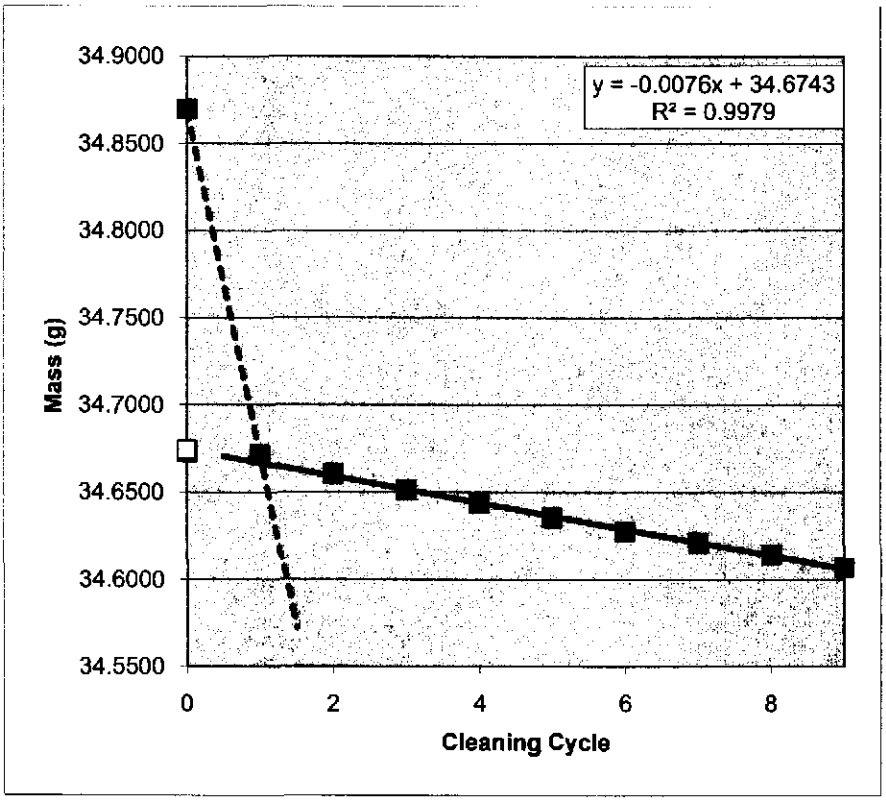
Cleaning Cycle	Wt (g)
0	34.2813
1	34.1218
2	34.1100
3	34.1047
4	34.0980
5	34.0914
6	34.0851
7	34.0736
8	34.0667
9	34.0590



Coupon:	L261
Test Matrix:	Pb-E-1500-18-3p
Initial wt (g)	34.6729
Removal wt (g)	34.8697

Calculated final wt (g)	34.6743
Total wt loss (g)	-0.0014
Total wt loss (mg)	-1.4

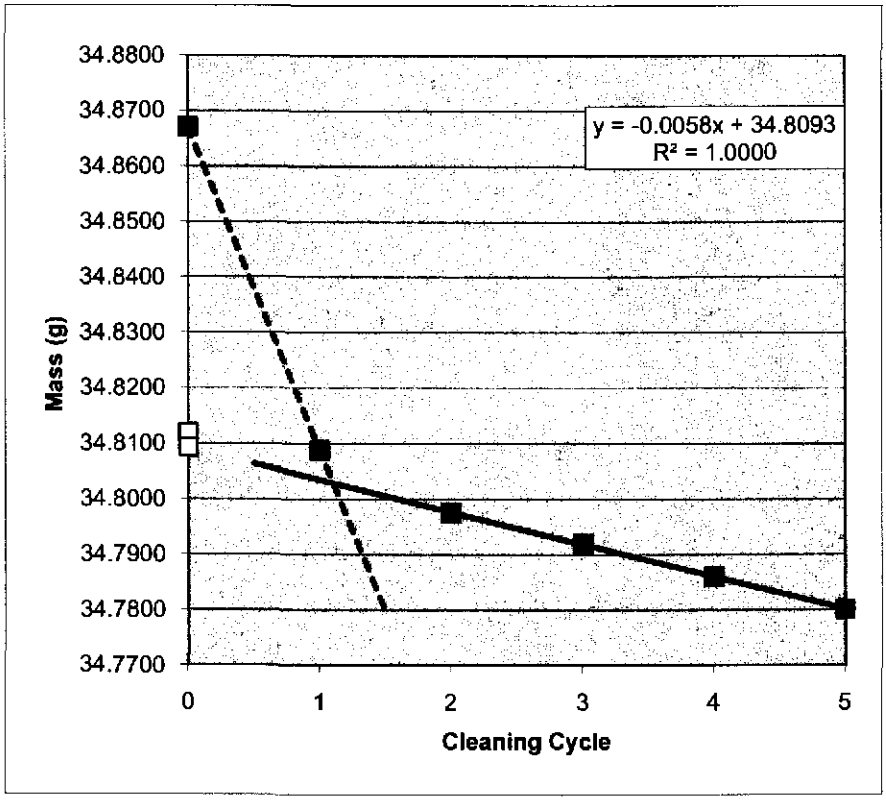
Cleaning Cycle	Wt (g)
0	34.8697
1	34.6713
2	34.6605
3	34.6513
4	34.6435
5	34.6356
6	34.6276
7	34.6211
8	34.6141
9	34.6068



Coupon:	L263
Test Matrix:	Pb-Eo-1500-18-2f
Initial wt (g)	34.8119
Removal wt (g)	34.8671

Calculated final wt (g)	34.8093
Total wt loss (g)	0.0026
Total wt loss (mg)	2.6

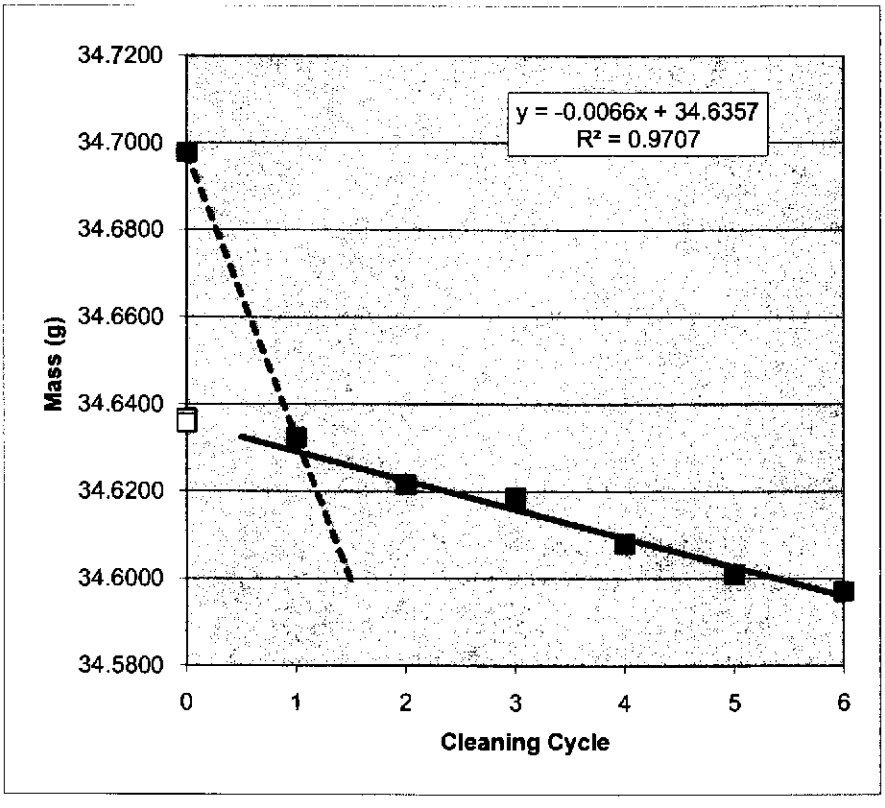
Cleaning Cycle	Wt (g)
0	34.8671
1	34.8088
2	34.7976
3	34.7919
4	34.7860
5	34.7802



Coupon:	L264
Test Matrix:	Pb-Eo-1500-18-3f
Initial wt (g)	34.6367
Removal wt (g)	34.6978

Calculated final wt (g)	34.6357
Total wt loss (g)	0.0010
Total wt loss (mg)	1.0

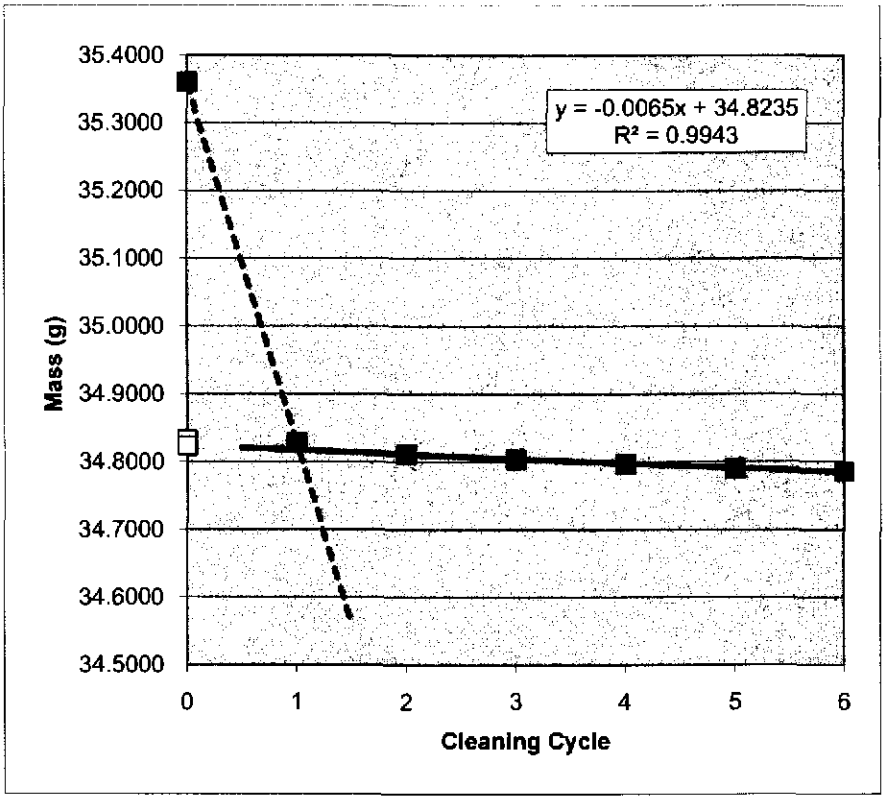
Cleaning Cycle	Wt (g)
0	34.6978
1	34.6323
2	34.6215
3	34.6185
4	34.6079
5	34.6011
6	34.5971



Coupon:	L266
Test Matrix:	Pb-Eo-1500-18-2p
Initial wt (g)	34.8324
Removal wt (g)	35.3600

Calculated final wt (g)	34.8235
Total wt loss (g)	0.0089
Total wt loss (mg)	8.9

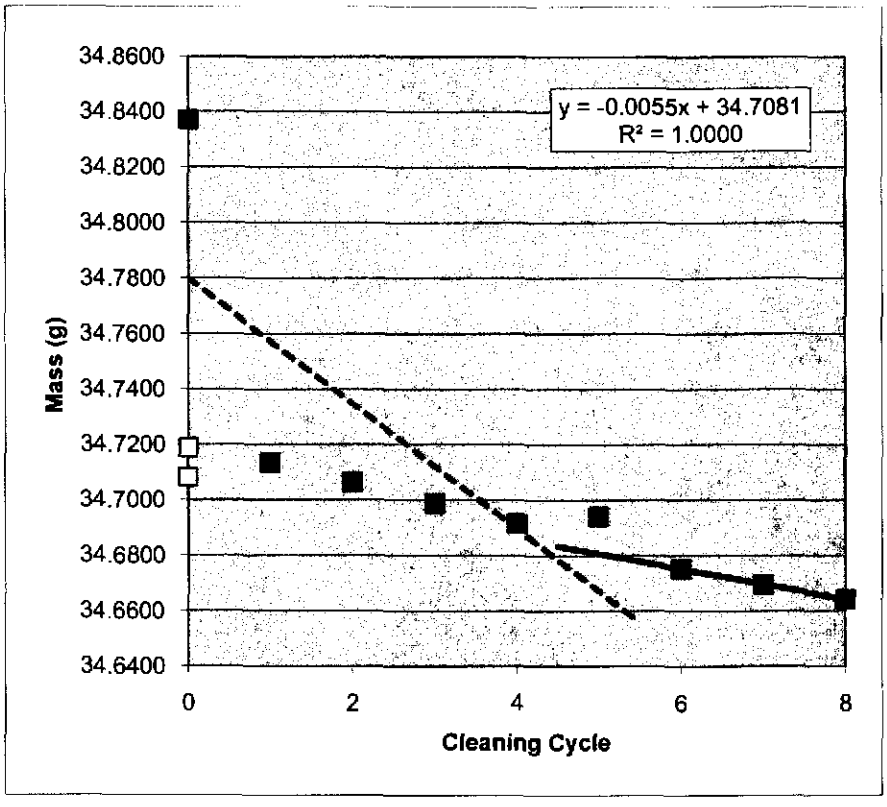
Cleaning Cycle	Wt (g)
0	35.3600
1	34.8283
2	34.8111
3	34.8040
4	34.7965
5	34.7905
6	34.7854



Coupon:	L267
Test Matrix:	Pb-Eo-1500-18-3p
Initial wt (g)	34.7187
Removal wt (g)	34.8371

Calculated final wt (g)	34.7081
Total wt loss (g)	0.0106
Total wt loss (mg)	10.6

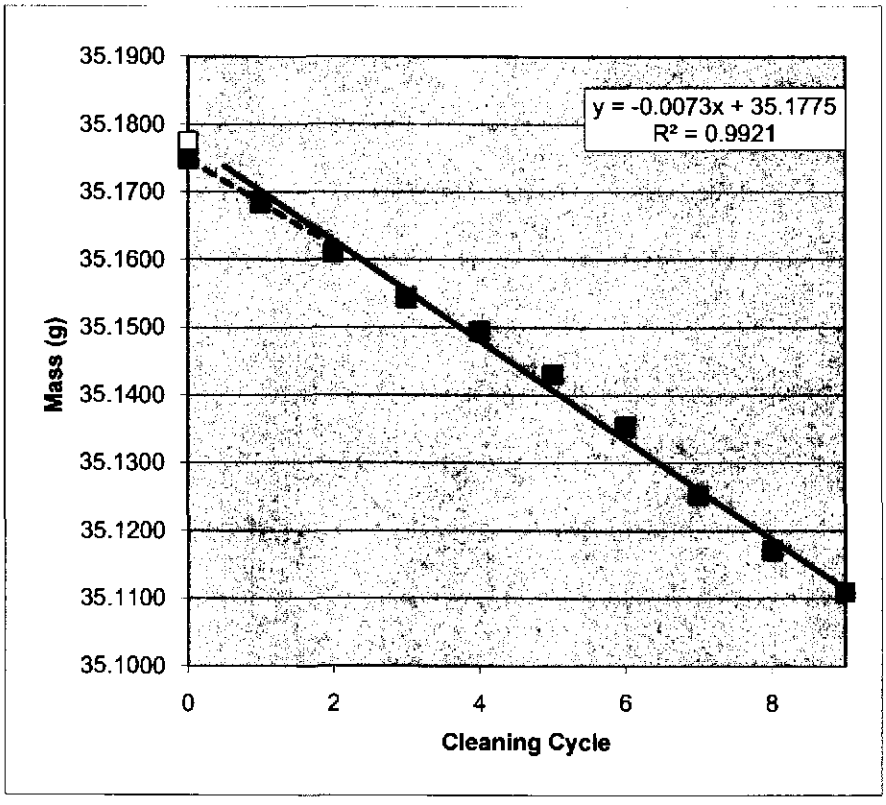
Cleaning Cycle	Wt (g)
0	34.8371
1	34.7134
2	34.7063
3	34.6988
4	34.6915
5	34.6939
6	34.6751
7	34.6696
8	34.6641



Coupon:	L269
Test Matrix:	Pb-Atm-1500-18-2
Initial wt (g)	35.1766
Removal wt (g)	35.1748

Calculated final wt (g)	35.1775
Total wt loss (g)	-0.0009
Total wt loss (mg)	-0.9

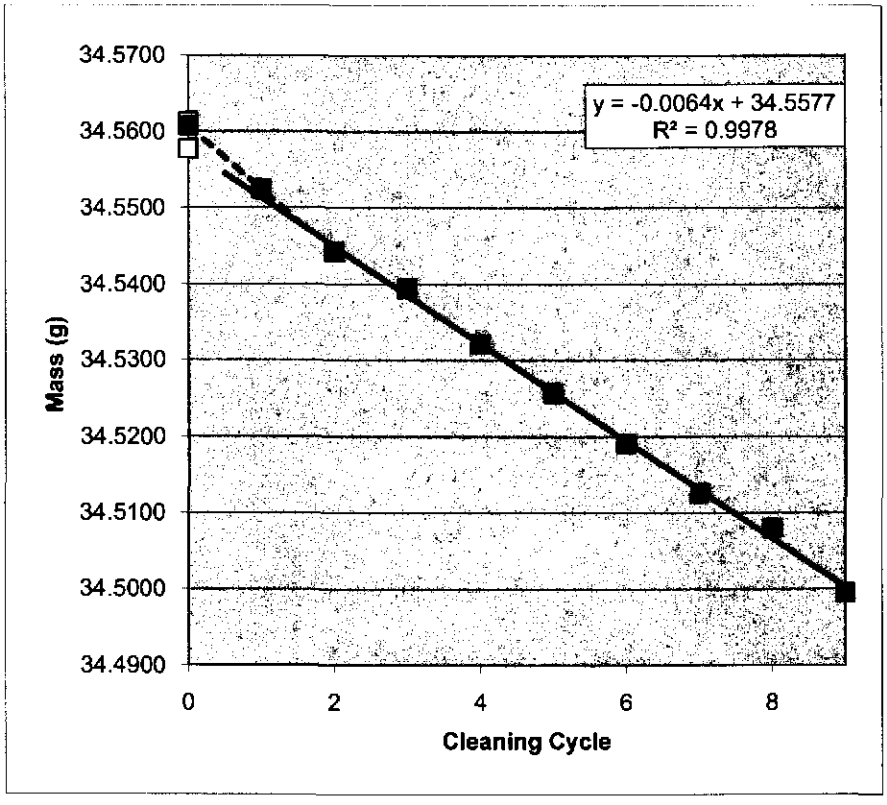
Cleaning Cycle	Wt (g)
0	35.1748
1	35.1684
2	35.1610
3	35.1544
4	35.1494
5	35.1430
6	35.1353
7	35.1253
8	35.1171
9	35.1109



Coupon:	L270
Test Matrix:	Pb-Atm-1500-18-3
Initial wt (g)	34.5613
Removal wt (g)	34.5607

Calculated final wt (g)	34.5577
Total wt loss (g)	0.0036
Total wt loss (mg)	3.6

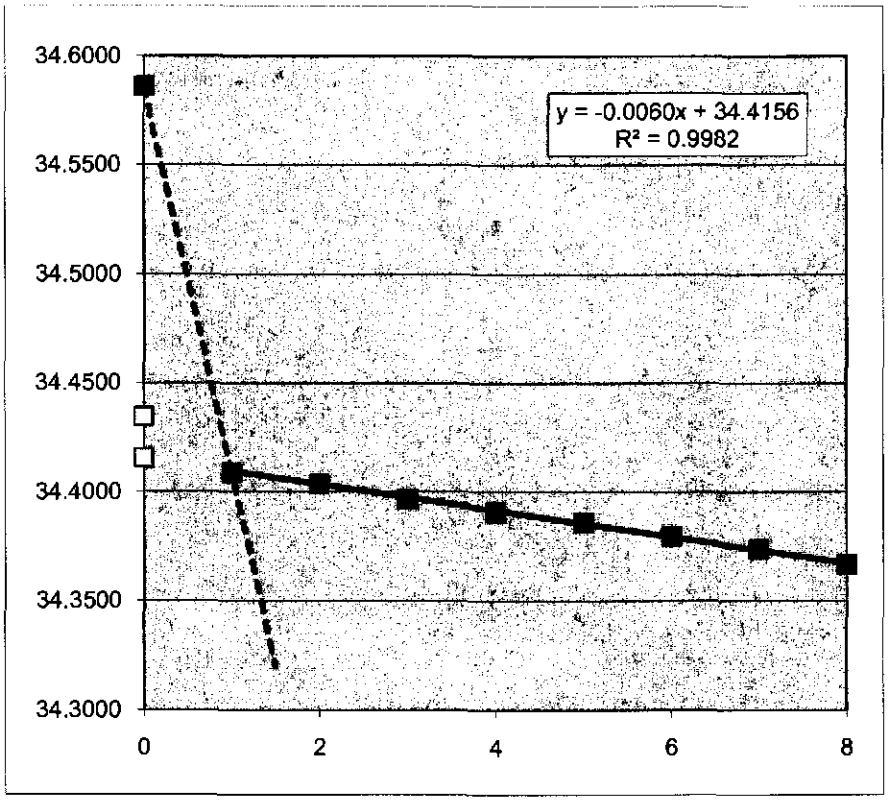
Cleaning Cycle	Wt (g)
0	34.5607
1	34.5524
2	34.5443
3	34.5394
4	34.5321
5	34.5257
6	34.5191
7	34.5126
8	34.5080
9	34.4995



Coupon:	L359
Test Matrix:	Pb-G-3500-18-2f
Initial wt (g)	34.4345
Removal wt (g)	34.5861

Calculated final wt (g)	34.4156
Total wt loss (g)	0.0189
Total wt loss (mg)	18.9

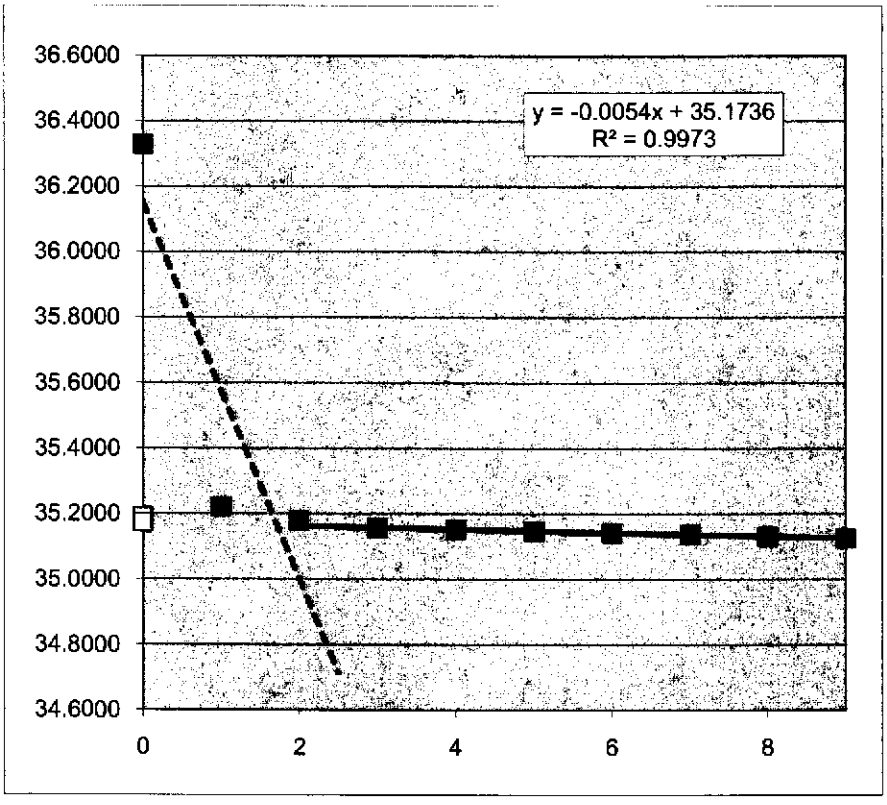
Cleaning Cycle	Wt (g)
0	34.5861
1	34.4087
2	34.4040
3	34.3968
4	34.3910
5	34.3858
6	34.3798
7	34.3738
8	34.3667



Coupon:	L360
Test Matrix:	Pb-G-3500-18-3f
Initial wt (g)	35.1906
Removal wt (g)	36.3285

Calculated final wt (g)	35.1736
Total wt loss (g)	0.0170
Total wt loss (mg)	17.0

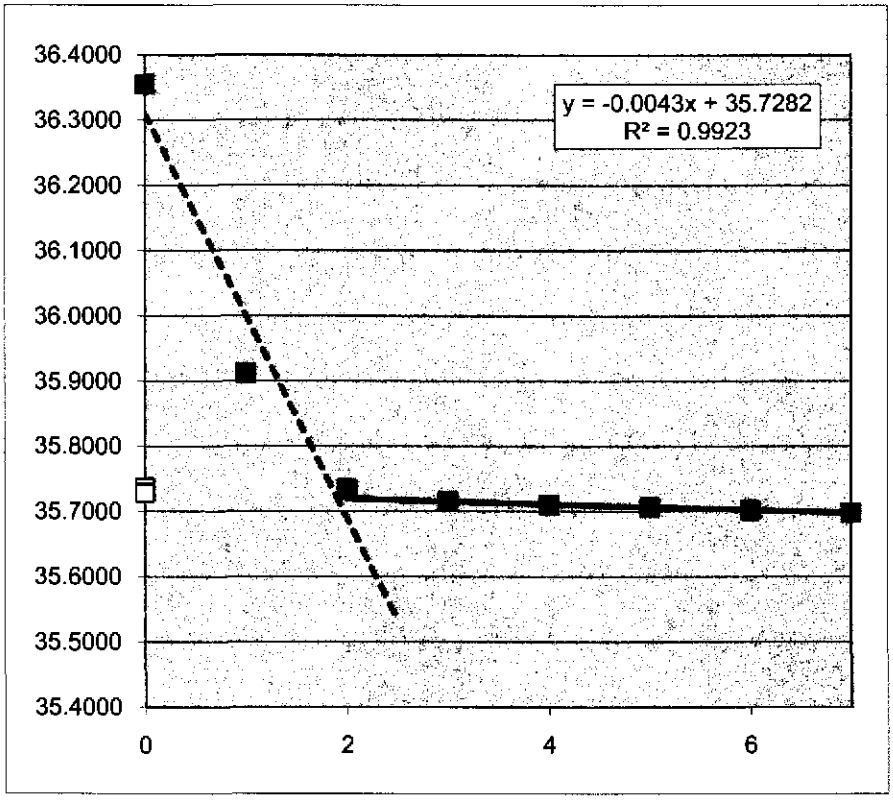
Cleaning Cycle	Wt (g)
0	36.3285
1	35.2216
2	35.1782
3	35.1570
4	35.1514
5	35.1467
6	35.1418
7	35.1364
8	35.1300
9	35.1240



Coupon:	L362
Test Matrix:	Pb-G-3500-18-2p
Initial wt (g)	35.7358
Removal wt (g)	36.3548

Calculated final wt (g)	35.7282
Total wt loss (g)	0.0076
Total wt loss (mg)	7.6

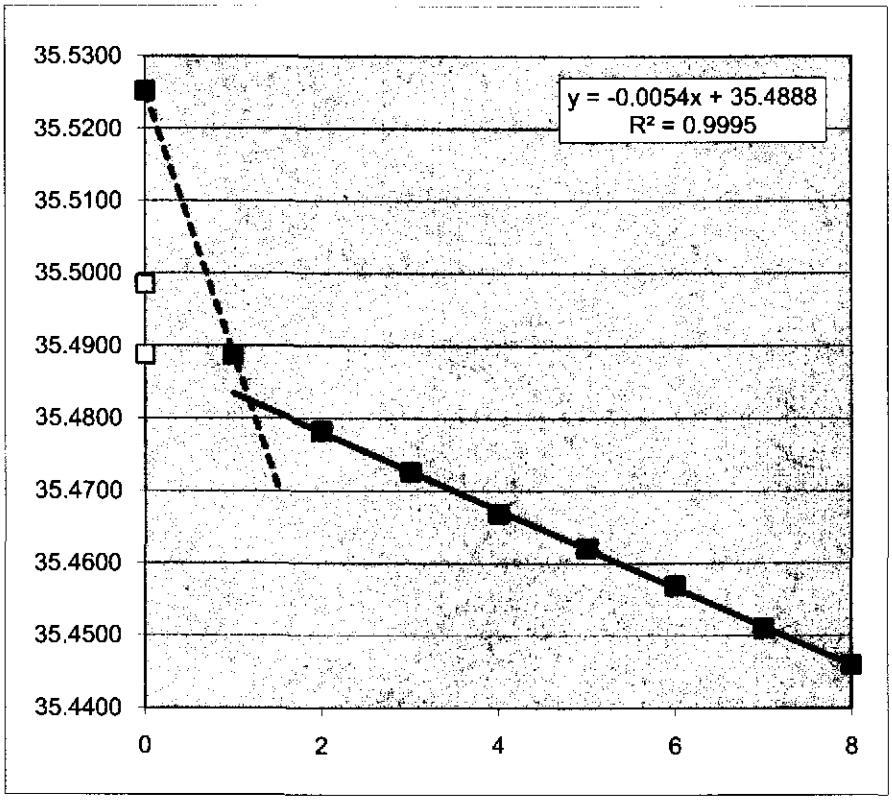
Cleaning Cycle	Wt (g)
0	36.3548
1	35.9121
2	35.7338
3	35.7159
4	35.7100
5	35.7063
6	35.7019
7	35.6982



Coupon:	L363
Test Matrix:	Pb-G-3500-18-3p
Initial wt (g)	35.4985
Removal wt (g)	35.5252

Calculated final wt (g)	35.4888
Total wt loss (g)	0.0097
Total wt loss (mg)	9.7

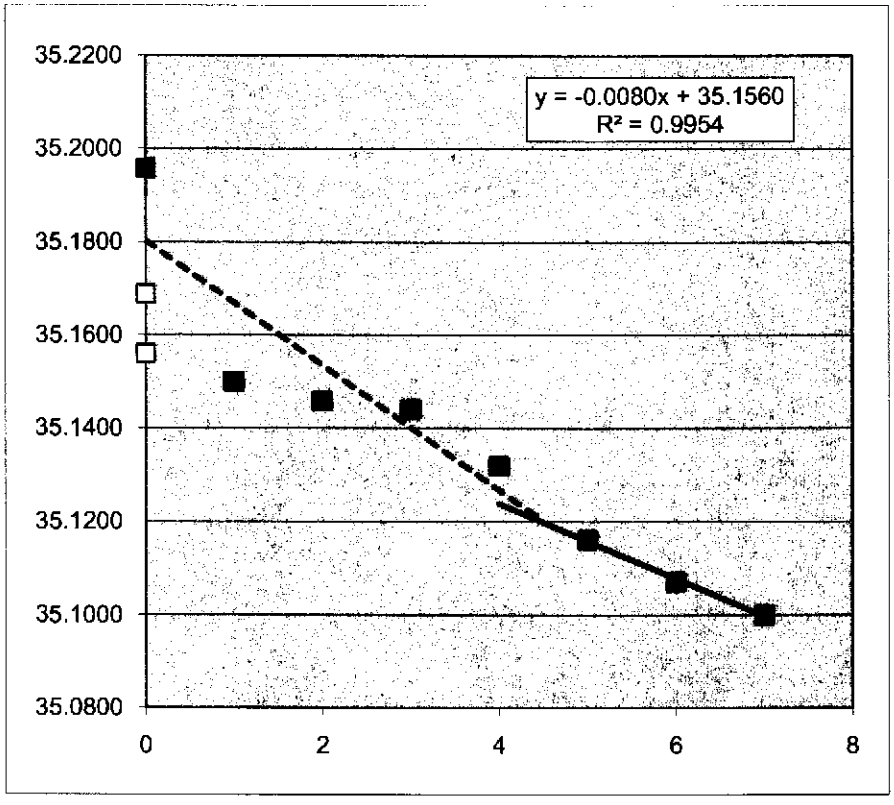
Cleaning Cycle	Wt (g)
0	35.5252
1	35.4888
2	35.4783
3	35.4726
4	35.4669
5	35.4621
6	35.4569
7	35.4510
8	35.4460



Coupon:	L365
Test Matrix:	Pb-Go-3500-18-2f
Initial wt (g)	35.1688
Removal wt (g)	35.1958

Calculated final wt (g)	35.1560
Total wt loss (g)	0.0128
Total wt loss (mg)	12.8

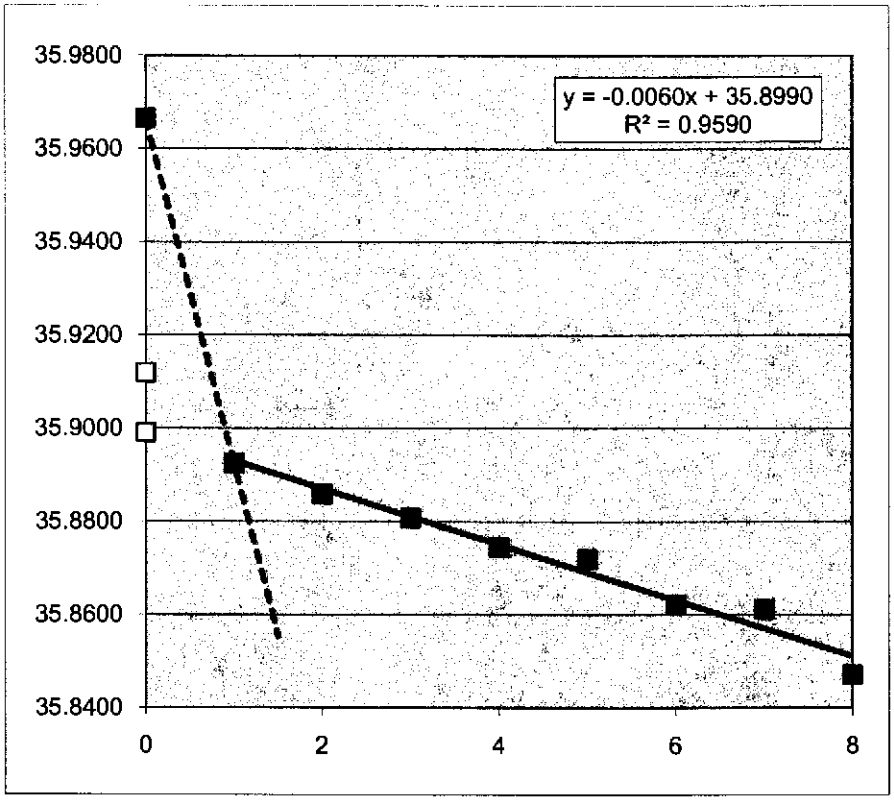
Cleaning Cycle	Wt (g)
0	35.1958
1	35.1500
2	35.1458
3	35.1440
4	35.1319
5	35.1161
6	35.1071
7	35.1000
8	35.0994



Coupon:	L366
Test Matrix:	Pb-Go-3500-18-3f
Initial wt (g)	35.9119
Removal wt (g)	35.9665

Calculated final wt (g)	35.8990
Total wt loss (g)	0.0129
Total wt loss (mg)	12.9

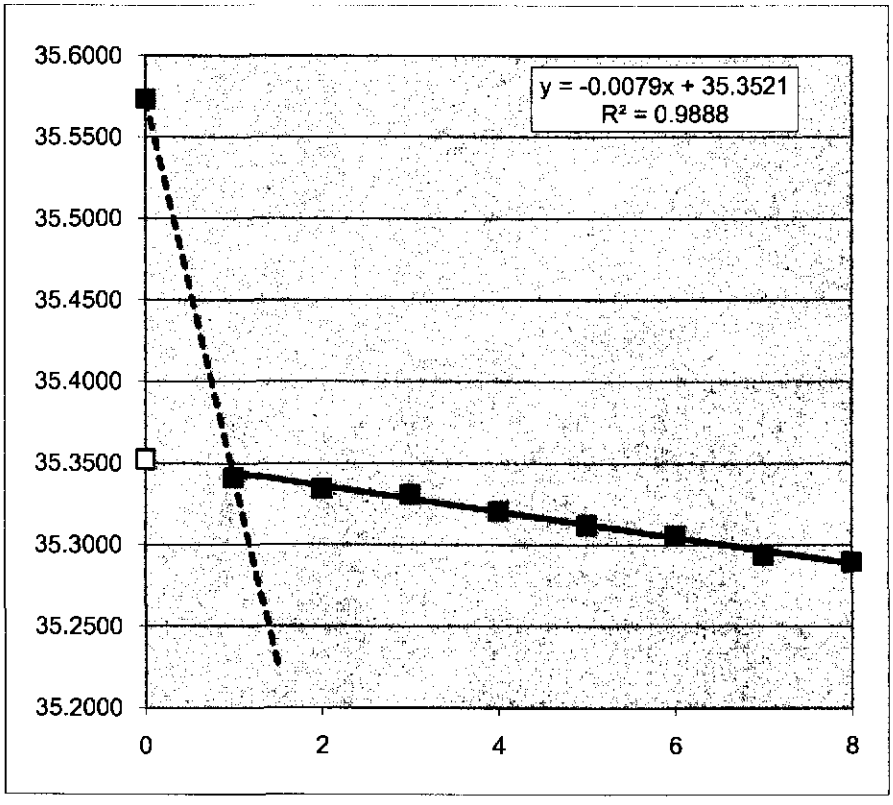
Cleaning Cycle	Wt (g)
0	35.9665
1	35.8924
2	35.8858
3	35.8808
4	35.8744
5	35.8719
6	35.8622
7	35.8611
8	35.8471



Coupon:	L368
Test Matrix:	Pb-Go-3500-18-2p
Initial wt (g)	35.3528
Removal wt (g)	35.5735

Calculated final wt (g)	35.3521
Total wt loss (g)	0.0007
Total wt loss (mg)	0.7

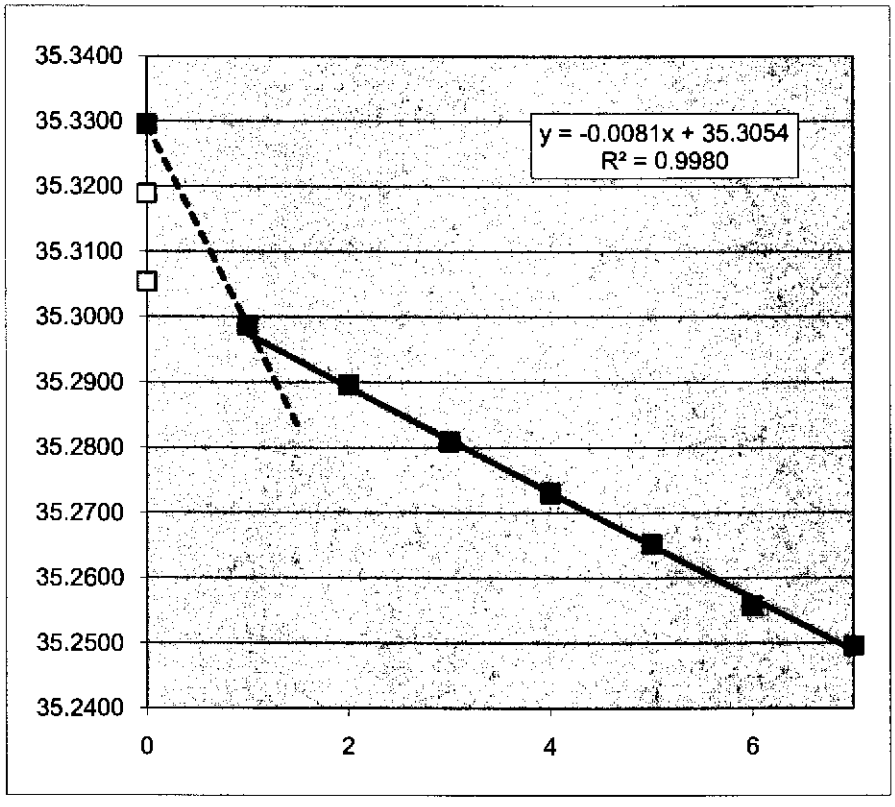
Cleaning Cycle	Wt (g)
0	35.5735
1	35.3411
2	35.3342
3	35.3308
4	35.3204
5	35.3122
6	35.3057
7	35.2939
8	35.2896



Coupon:	L369
Test Matrix:	Pb-Go-3500-18-3p
Initial wt (g)	35.3189
Removal wt (g)	35.3296

Calculated final wt (g)	35.3054
Total wt loss (g)	0.0135
Total wt loss (mg)	13.5

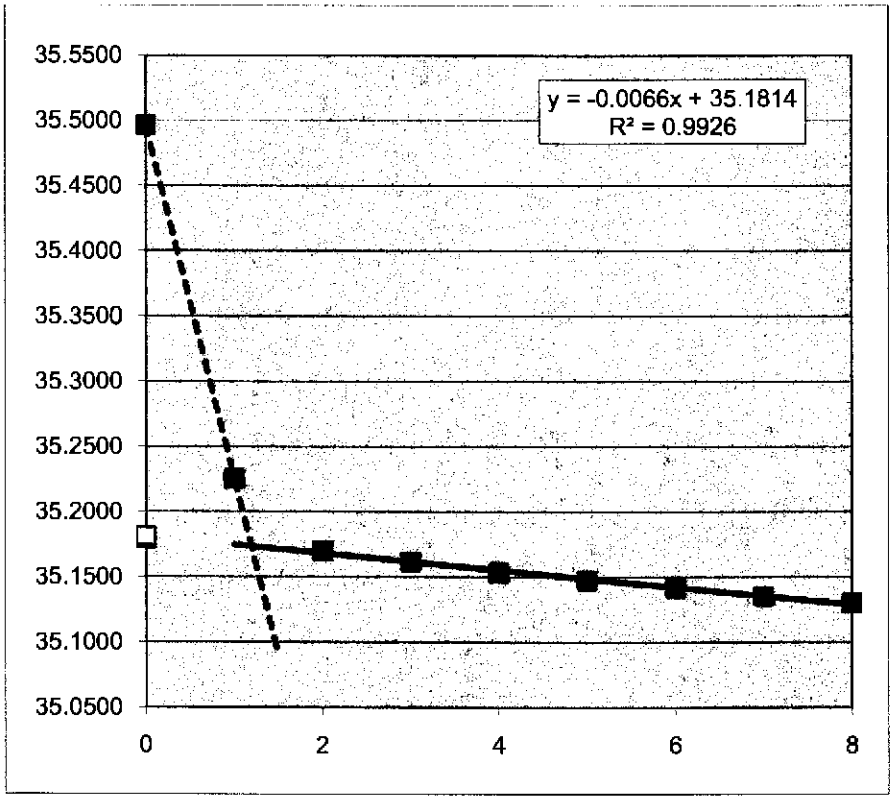
Cleaning Cycle	Wt (g)
0	35.3296
1	35.2986
2	35.2896
3	35.2809
4	35.2730
5	35.2652
6	35.2557
7	35.2496



Coupon:	L371
Test Matrix:	Pb-E-3500-18-2f
Initial wt (g)	35.1792
Removal wt (g)	35.4965

Calculated final wt (g)	35.1814
Total wt loss (g)	-0.0022
Total wt loss (mg)	-2.2

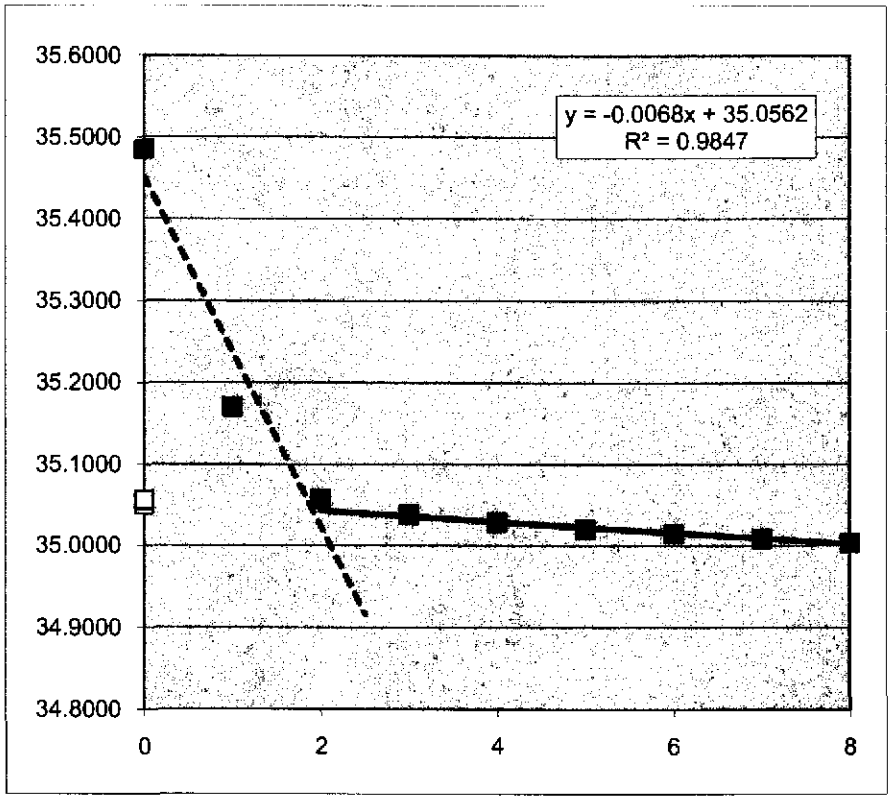
Cleaning Cycle	Wt (g)
0	35.4965
1	35.2252
2	35.1700
3	35.1616
4	35.1533
5	35.1474
6	35.1416
7	35.1351
8	35.1300



Coupon:	L372
Test Matrix:	Pb-E-3500-18-3f
Initial wt (g)	35.0504
Removal wt (g)	35.4848

Calculated final wt (g)	35.0562
Total wt loss (g)	-0.0058
Total wt loss (mg)	-5.8

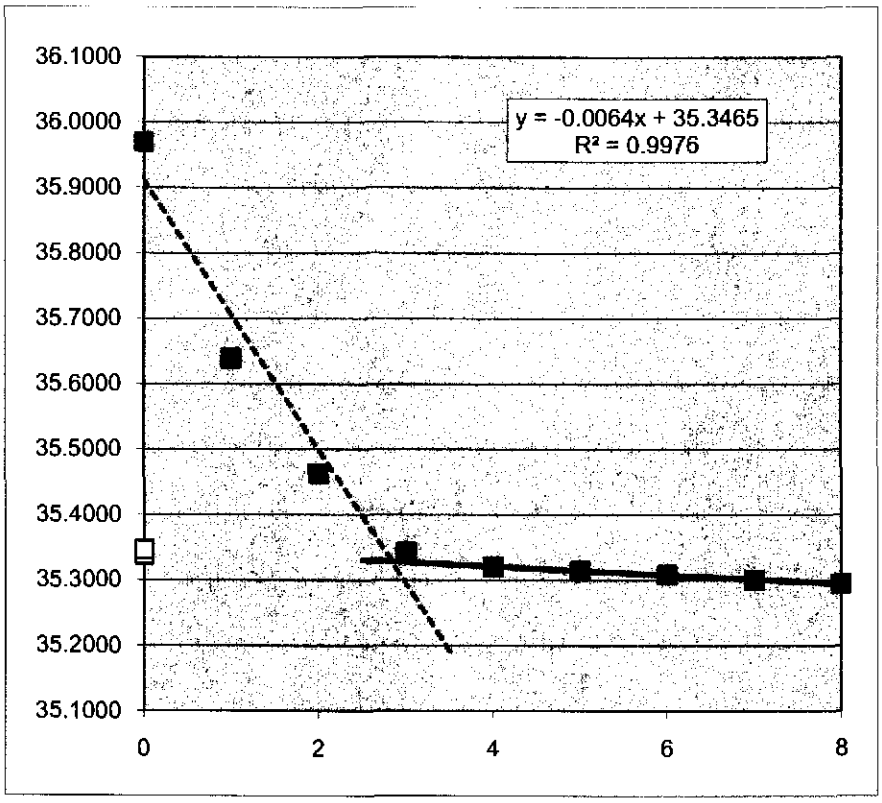
Cleaning Cycle	Wt (g)
0	35.4848
1	35.1700
2	35.0566
3	35.0380
4	35.0285
5	35.0203
6	35.0146
7	35.0088
8	35.0036



Coupon:	L374
Test Matrix:	Pb-E-3500-18-2p
Initial wt (g)	35.3381
Removal wt (g)	35.9691

Calculated final wt (g)	35.3465
Total wt loss (g)	-0.0084
Total wt loss (mg)	-8.4

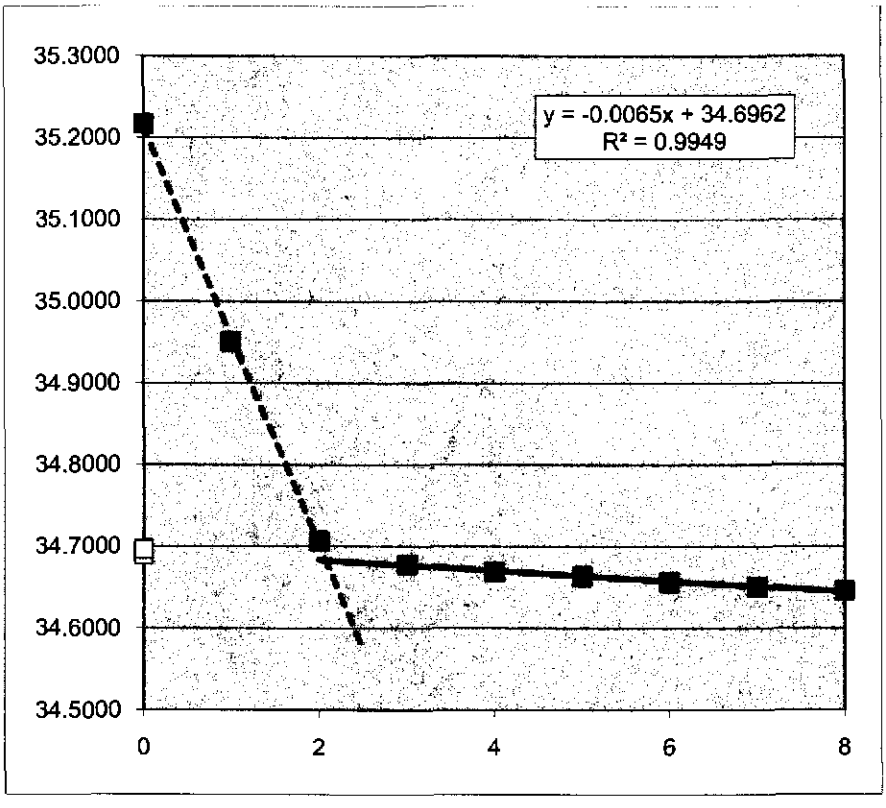
Cleaning Cycle	Wt (g)
0	35.9691
1	35.6395
2	35.4629
3	35.3418
4	35.3206
5	35.3141
6	35.3084
7	35.3006
8	35.2951



Coupon:	L376
Test Matrix:	Pb-E-3500-18-3p
Initial wt (g)	34.6894
Removal wt (g)	35.2170

Calculated final wt (g)	34.6962
Total wt loss (g)	-0.0068
Total wt loss (mg)	-6.8

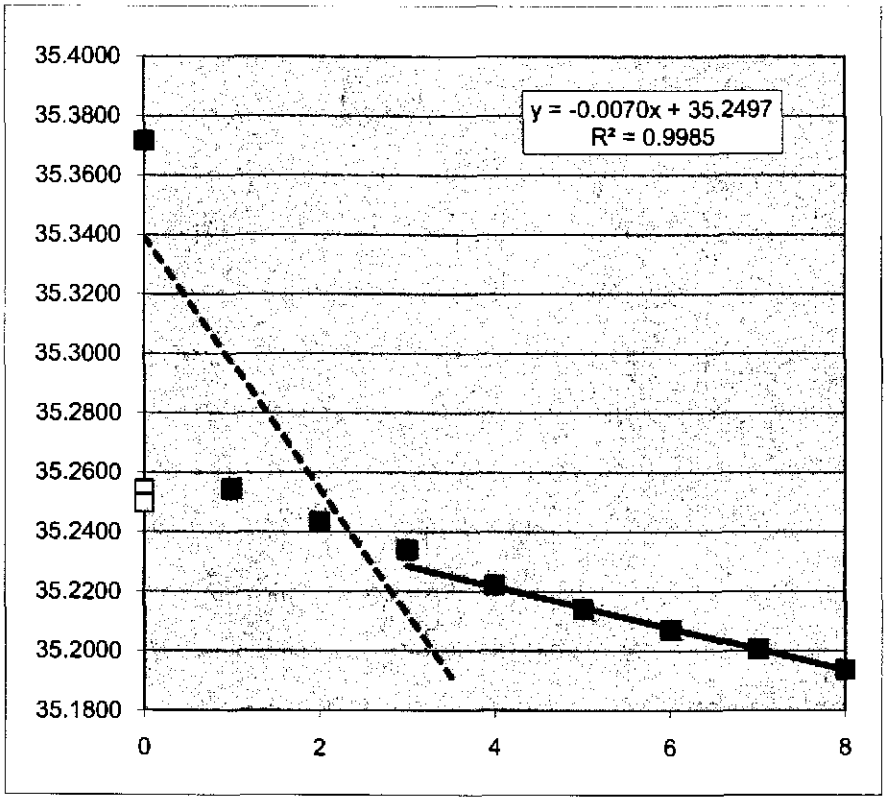
Cleaning Cycle	Wt (g)
0	35.2170
1	34.9506
2	34.7064
3	34.6780
4	34.6694
5	34.6636
6	34.6565
7	34.6509
8	34.6452



Coupon:	L378
Test Matrix:	Pb-Eo-3500-18-2f
Initial wt (g)	35.2542
Removal wt (g)	35.3717

Calculated final wt (g)	35.2497
Total wt loss (g)	0.0045
Total wt loss (mg)	4.5

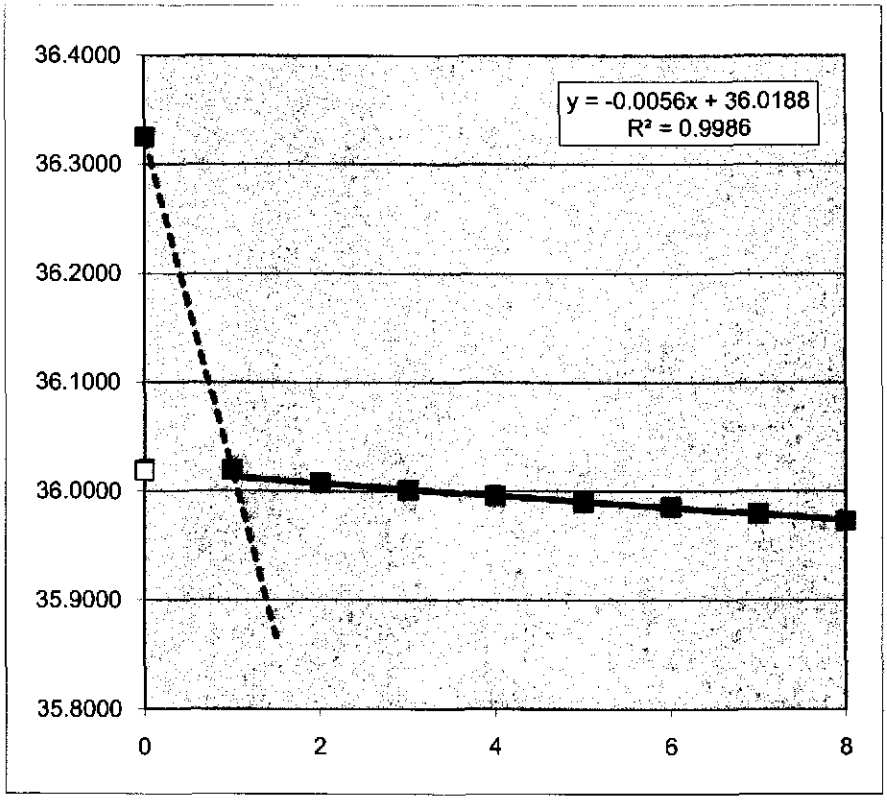
Cleaning Cycle	Wt (g)
0	35.3717
1	35.2543
2	35.2434
3	35.2341
4	35.2221
5	35.2141
6	35.2071
7	35.2007
8	35.1937



Coupon:	L379
Test Matrix:	Pb-Eo-3500-18-3f
Initial wt (g)	36.0201
Removal wt (g)	36.3250

Calculated final wt (g)	36.0188
Total wt loss (g)	0.0013
Total wt loss (mg)	1.3

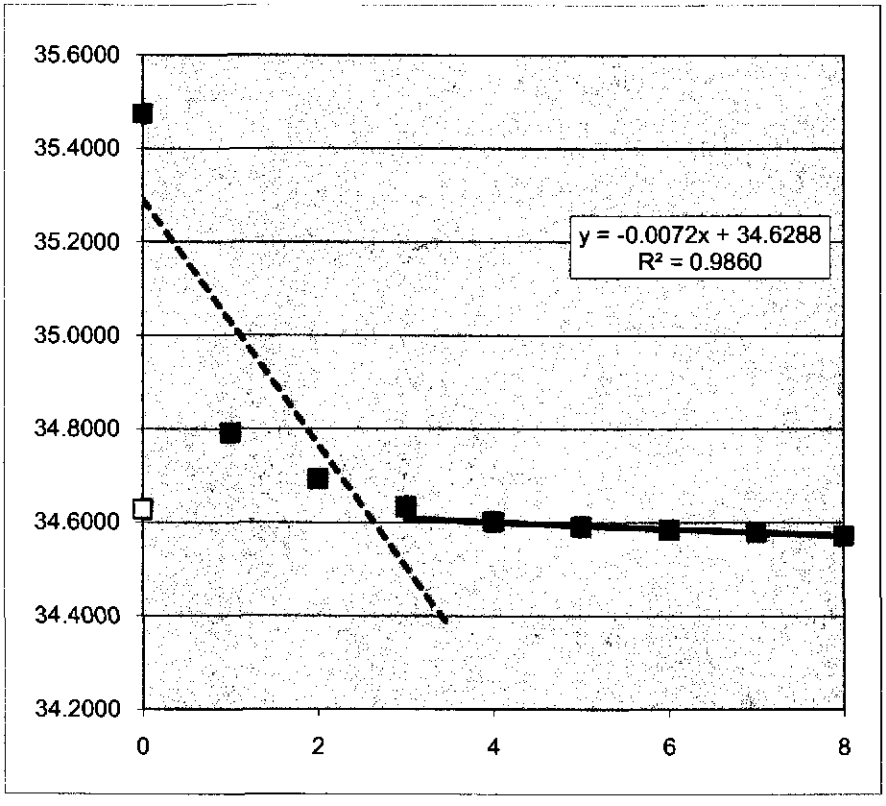
Cleaning Cycle	Wt (g)
0	36.3250
1	36.0195
2	36.0078
3	36.0014
4	35.9959
5	35.9905
6	35.9857
7	35.9794
8	35.9732



Coupon:	L381
Test Matrix:	Pb-Eo-3500-18-2p
Initial wt (g)	34.6266
Removal wt (g)	35.4744

Calculated final wt (g)	34.6288
Total wt loss (g)	-0.0022
Total wt loss (mg)	-2.2

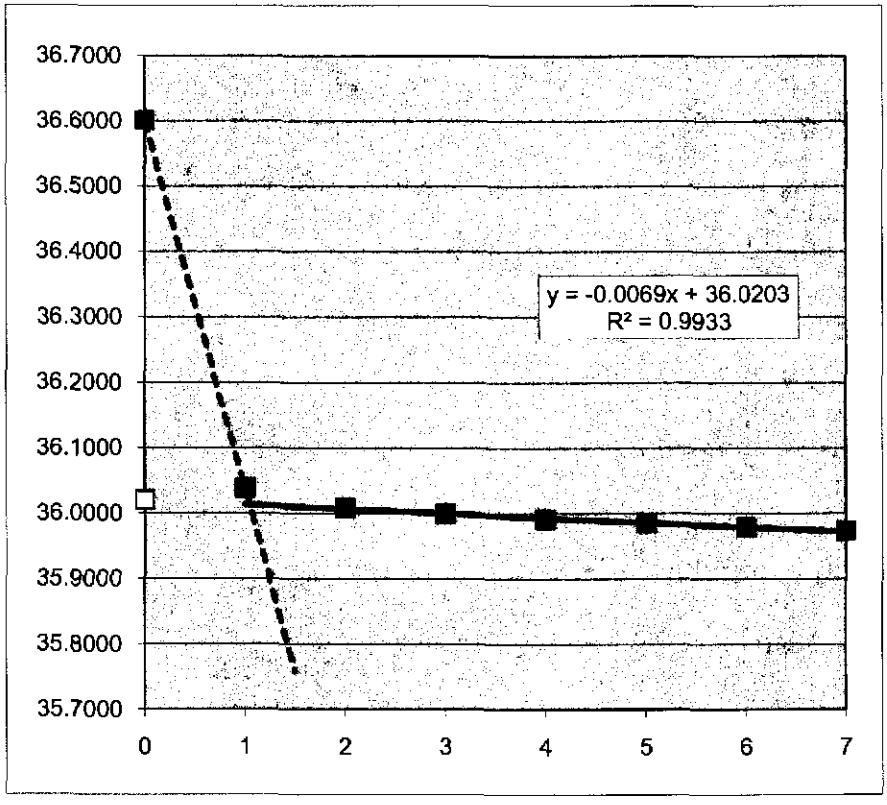
Cleaning Cycle	Wt (g)
0	35.4744
1	34.7920
2	34.6924
3	34.6338
4	34.6017
5	34.5910
6	34.5850
7	34.5792
8	34.5717



Coupon:	L382
Test Matrix:	Pb-Eo-3500-18-3p
Initial wt (g)	36.0202
Removal wt (g)	36.6006

Calculated final wt (g)	36.0203
Total wt loss (g)	-0.0001
Total wt loss (mg)	-0.1

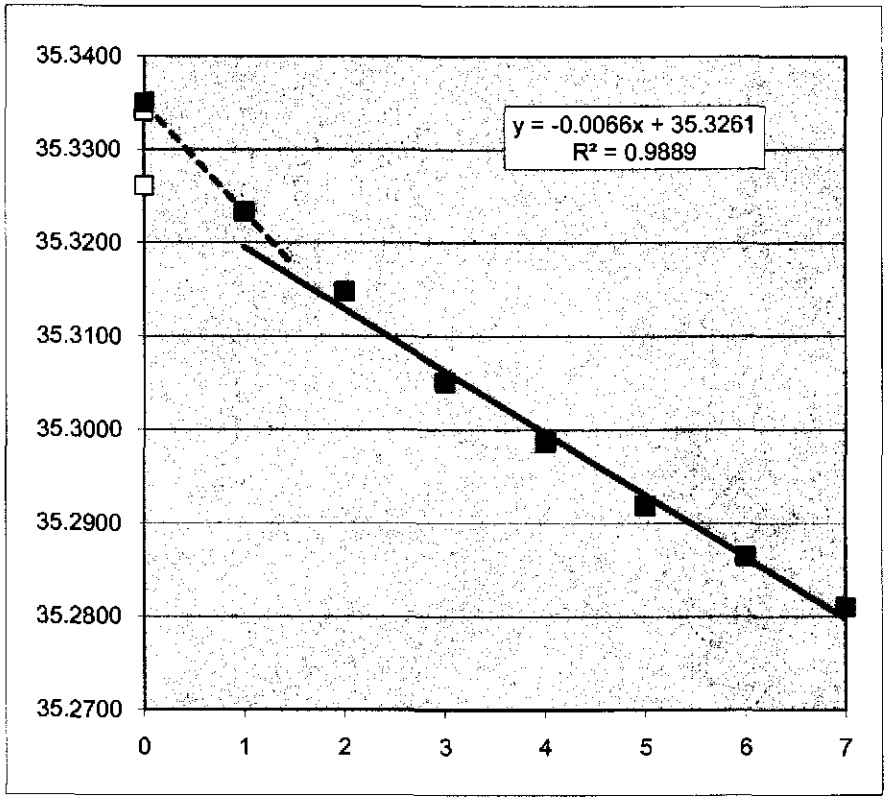
Cleaning Cycle	Wt (g)
0	36.6006
1	36.0387
2	36.0080
3	35.9990
4	35.9915
5	35.9852
6	35.9787
7	35.9731



Coupon:	L384
Test Matrix:	Pb-Atm-3500-18-2
Initial wt (g)	35.3341
Removal wt (g)	35.3350

Calculated final wt (g)	35.3261
Total wt loss (g)	0.0080
Total wt loss (mg)	8.0

Cleaning Cycle	Wt (g)
0	35.3350
1	35.3233
2	35.3148
3	35.3051
4	35.2987
5	35.2919
6	35.2864
7	35.2810



Coupon:	L385
Test Matrix:	Pb-Atm-3500-18-3
Initial wt (g)	36.0778
Removal wt (g)	36.0804

Calculated final wt (g)	36.0753
Total wt loss (g)	0.0025
Total wt loss (mg)	2.5

Cleaning Cycle	Wt (g)
0	36.0804
1	36.0707
2	36.0636
3	36.0579
4	36.0529
5	36.0468
6	36.0409
7	36.0349
8	36.0293