Paul H. Kinkel
Vice President

Consolidated Edison Company of New York, Inc.
Indian Point Station
Broadway & Bleakley Avenue
Buckanan, NY 10511
Telephone (914) 734-5340
Fax: (914) 734-5923
kinkelp@coned.com

July 22, 1998

Re: Indian Point Unit No. 2
Docket No. 50-247

Document Control Desk
US Nuclear Regulatory Commission
Mail Station P1-137
Washington, DC 20555-0001

Subject : Response to Request for Additional Information - Generic Letter 92-01, "Reactor Vessel Structural Integrity," for Indian Point Unit No. 2. (TAC No. MA0547)

Pursuant to 10 CFR 50.54(f), this letter and attachment provide the response of Consolidated Edison Company of New York, Inc. (Con Edison) to NRC's request for additional information dated April 15, 1998 on Generic Letter 92-01.

Should you or your staff have any concerns regarding this matter, please contact Mr. Charles W. Jackson, Manager, Nuclear Safety & Licensing.

Very truly yours,

Paul H Kinkel

Attachment

1/1

A028

c: Mr. Hubert J. Miller
Regional Administrator-Region I
US Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

Mr. Jefferey F. Harold, Project Manager
Project Directorate I-1
Division of Reactor Projects I/II
US Nuclear Regulatory Commission
Mail Stop 14B-2
Washington, DC 20555

Senior Resident Inspector
US Nuclear Regulatory Commission
PO Box 38
Buchanan, NY 10511

ATTACHMENT

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION REGARDING RESPONSE TO GENERIC LETTER 92-01, "REACTOR PRESSURE VESSEL INTEGRITY."

Consolidated Edison Company of New York, Inc.
Indian Point Unit No. 2
Docket No. 50-274
July 1998

Section 1 Assessment of Best-Estimate Chemistry

Based on the information provided to the NRC by the Combustion Engineering Owners' Group in Report CE NPSD-1039, Rev. 02, "Best Estimate Copper and Nickel Values in CE Fabricated Reactor Vessel Welds," dated June 1997 (Reference 1), in accordance with the provisions of Generic Letter 92-01, Rev.1, Supp. 1, you requested the following:

1. *An evaluation of the information in the reference above and an assessment of its applicability to the determination of the best-estimate chemistry for all of your RPV beltline welds. Based upon this reevaluation, supply the information necessary to completely fill out the data requested in Table 1 for each RPV beltline weld material. Also provide a discussion for the copper and nickel values chosen for each weld wire heat noting what heat-specific were included and excluded from the analysis and the analysis method chosen for determining the best-estimate. If the limiting material for your vessel's PTS/PT limits evaluation is not a weld, include the information requested in Table 1 for the limiting material also. Furthermore, you should consider the information provided in Section 2.0 of this RAI on the use of surveillance data when responding.*

Response:

The best estimate values for the two weld wire heats used in the Indian Point Unit 2 reactor vessel are those reported in Reference 1 which was submitted to you by the CE Owners' Group. The additional information obtained from Reference 1 slightly changed the copper and nickel values for the two heats of weld material present in the belt-line region of the Indian Point 2 reactor vessel previously submitted.

Both heats of wire used were copper coated and the welds used nickel additions. These best estimate values are shown in Table 1. For heat number W5214, coil weighted average was used for the copper determination and a best estimate for the nickel determination. For heat number 34B009, weighted average was used for copper and a best estimate for nickel determinations.

- The methodology used for determining best estimate chemistries is described in detail in Reference 1. One flow chart and process description are provided for the data pedigree process. This establishes the source information and validity of each weld deposit chemical analysis record. The second flow chart and process description are provided for the data analysis process. This establishes the mean values, identifies relevant supporting data, and enables selection of best estimate copper and nickel content.
- For each heat, observations concerning differences in mean weld chemistry obtained by each method are cited in that report in accordance with the data analysis process. The rationale used to select which mean value for the best estimate is documented in the report text.
- The overall process for best estimate determination was made as rigorous as possible to assure that careful consideration was given to all data and all known information. The independent third party review conducted by Mr. Art Lowe was intended to make sure the process was rigorous and not arbitrary.
- As noted, the consideration given for each heat is documented, as are the details of the process, such that a justification is provided or can be reconstructed for each and every heat.

Coil-weighted mean Copper Determination for Heat W 5214

The methods used for applying the sample weighting and coil weighting processes are described in detail in CE NPSD-1039 (Reference 1). Furthermore, the known information is summarized for each weld qualification record (as well as for other weld deposits) in the Appendix to the report. Careful consideration was given to each record before assigning to it a sample identification. The weld deposit chemistry log book from which the weld qualification data were extracted often provided information used for differentiating samples (e.g., retests on same sample, date of analysis, flux lot or type). Weld material certification reports and related engineering log books were used when necessary to supplement that information (such as tandem versus single arc weld procedure, weld consumable source, date of deposit, and purpose of test/analysis). Items such as weld heat input could be determined from the welding procedure but were not relevant to the sample identification process. (The weld procedures used for material qualification used essentially the same parameters for a given wire and flux type.) Therefore, the potential for inaccuracies when using weld data from weld qualification test results was minimized by using the detailed information available from the records and by employing personnel who are familiar with the interpretation of those records.

When identifying unique samples for a specific heat, the source information acquired during the data pedigree process was used to group records from the same weldment (and to identify duplicate records). If there was extraordinary information, it was summarized in the comment field for the database record and provided in more detail in a data evaluation sheet. Data from the same original weldment were assigned a "group tag" and valid results with the same group tag were used to establish a "sample mean." Data from a weld qualification test were assigned a unique group tag for each unique combination of wire heat number and flux lot and number of electrodes (i.e., single vs. tandem arc). Date of analysis was considered when assigning group tags.

When using the coil weighting method to determine the mean copper content, considerable effort was expended by the CEOG to characterize the welding details for all of the welds. In most cases for the weld qualification data, the number of coils used for a weld was determinable from the records. (That is, the records were available to show whether it was a single or tandem arc weld. One could also obtain information on the number of arcs for most of the surveillance program test plate welds and vessel welds fabricated by Combustion Engineering.) The information collected for assigning group tags was a significant input for determination of the number of coils and distribution of measurements.

In summary, it was determined with a high degree of certainty whether a weld qualification sample was unique and whether one or two coils were employed to make the weld deposit. This was also true when the analysis was for a surveillance program test plate weld and for a vessel weld. When analyzing the available data for a given heat, consideration was given to as many features as possible, including the balance between data from weld material qualification tests versus other welds. Because information on weld material qualification tests was reasonably available and careful consideration was given to it when establishing the CEOG report, it is not necessary to address that issue further.

Sample-weighted mean Copper Determination for Heat 34B009

The weighted mean was used to minimize the potential of bias between the three unique welds with varying numbers of individual copper measurements. It also is a more conservative number than a simple mean of all samples and has a smaller standard deviation.

Best Estimate Nickel for the Nickel Addition Welds in Heats W5214 and 34B009

Figure 5-4 and Table 5-4 of Reference 1 present the data used to develop a best estimate for the nickel content in welds fabricated using a combination of a Mn-Mo electrode and a Ni-200 cold wire feed. For this type of submerged arc weld process, there was insufficient nickel in the available wire heats, so pure nickel was added during welding to raise the nickel content of the weld deposit to approximately 1.0%. Combustion Engineering performed an analysis of chip samples from the weld groove during welding to ascertain that the Ni-200 wire feed rate was sufficient to yield the desired nickel content in the weld deposit. Additional analyses have been performed of the through-wall nickel content to determine the variation in the as-deposited nickel. In an evaluation cited in Reference 1, the nickel varied through-wall from 0.72% to 1.08% based on 20 separate analyses. It is assumed that the measurements were taken at the same interval through the thickness, but the available records are not conclusive with respect to sample location. However, other data in which the sample location was clearly documented gave similar results; that is, the nominal nickel content was 1% through the majority of the weld thickness but varied near the weld root and weld surfaces.

The nickel addition welding process was used for a limited period of time for beltline welds and was employed with about five unique heats of Mn-Mo electrodes and several heats of Ni-200 wire. [Note: A sixth heat, 3277, was used for fabrication of a weld for a surveillance program but was not used with Ni-200 in a vessel beltline weld. The data for heat 3277 with Ni-200 are included in Table 4. There are weld deposit nickel measurements available for all five Mn-Mo heats. There are only two nickel measurements representing nickel addition welds available for two of the five heats, whereas there are 8, 33 and 97 measurements, respectively, representing nickel addition welds available for the other three heats.

Given the definitions of best estimate nickel in paragraph (c)(1)(iv)(A) of Reference 2, consideration was given to using the mean nickel based on heat specific measurements or the stipulated default value of 1% Ni. In the former case, two of the Mn-Mo heats would have to rely on only two measurements if Mn-Mo heat specific results were to be used, whereas the three other heats would have from 8 to 97 measurements to determine the best estimate nickel content. [Note: The definition of "heat" in Reference 2 is interpreted to mean the heat of Mn-Mo weld wire and not the combination of Mn-Mo and pure nickel wire used in fabricating the weld. There were numerous combinations of Mn-Mo heats and Ni-200 wire heats used for various vessels such that use of the rigorous definition including both Mn-Mo and Ni-200 would unnecessarily complicate the determination of the best estimate nickel content. It is surmised that the heat-to-heat variation of nickel contributed from a 99% pure nickel wire in a weld deposit comprised of approximately 99% Mn-Mo electrode wire will not be detectable. Furthermore, the observed nickel variation of 0.72% to 1.08% would mask any variability from the heat of nickel. The unique heat of Ni-200 used was, therefore, not considered when establishing the best estimate nickel content of the weld deposit.]

If the stipulated default value of 1% Ni from reference 2 were used, it would provide a reasonable approximation of the nickel content given that it is the same as the specified target value of 1.0% for nickel addition welds. However, use of the default value would not account for the available measurements.

In Reference 1, the approach taken was to determine a best estimate specific to the nickel addition process using all of the data available on nickel addition welds from five specific Mn-Mo heats. The bulk of the nickel in the weld deposit came from the Ni-200 feed wire, not from the Mn-Mo electrode heat. (As discussed in Section 1, nickel was not intentionally added to the Mn-Mo wire, and the nickel content of such wires averaged 0.09%.) Therefore, the nickel content in the Ni-200 addition welds will be minimally sensitive to the heat of wire.

A best estimate value of 1.038% was determined for the nickel content in Ni-200 addition welds fabricated by Combustion Engineering. This value was based on the data shown in Table 4 which consist of 148 weld deposit nickel measurements from welds known to have been fabricated using Ni-200. [Note: Four of the nickel measurements were rejected as outliers and were not used to compute the mean value. As noted in Table 4, the rejected outliers were Source Identification Numbers WDC-1776, WDC-1789, WDC-1790, and WDC-1796. Each rejected value was in excess of three sigma from the mean of the data population, where sigma was computed to be 0.226%.]

The best estimate is specific to the process and not to the heat of Mn-Mo wire or the heat of Ni-200 wire. It is the mean of measured values for a weld deposit made using the Mn-Mo wire plus Ni-200 addition weld process. It is not "generic" because it employs data including the specific heats of Mn-Mo wire used, and it specifically considers results from the various heats of Ni-200 wire used. It is the best estimate nickel for nickel addition welds made by Combustion Engineering using the following Mn-Mo wire heats:

1248
1248 & 661H577
34B009
39B196
W5214

For welds made by Combustion Engineering using the nickel addition process with weld wire heats not listed above, the 1.038% nickel best estimate may also be applicable.

Section 2: Evaluation and use of Surveillance Data

You requested the following:

that (1) the information listed in Table 2, Table 3, and the chemistry factor from the surveillance data be provided for each heat of material for which surveillance weld data are available and a revision in the RPV integrity analyses (i.e., current licensing basis) is needed or (2) a certification that previously submitted evaluations remain valid. Separate tables should be used for each heat of material addressed. If the limiting material for your vessel's PTS/PT limits evaluated is not a weld, include the information requested in the tables for the limiting material (if surveillance data are available for this material).

Response:

A revision to the previously submitted information is not required since the additional information in Reference 1 did not change or affect the limiting material. The limiting material remains the intermediate course Heat B2002-3 plate. No additional information was found for that plate.

By letter dated October 12, 1993, Con Edison responded to a previous request for additional information from the NRC regarding Generic Letter 92-01, Revision 1. In response to question 2a.2 we believe that, although weld Heat 34B009 (9-042 weld) is not a surveillance weld, it is similar and more conservative than the surveillance weld Heat W5214 to make the data from the latter usable for analytical purposes. Consequently, it is our position that weld Heat 34B009 is not the limiting material, and that an evaluation of that weld based on the surveillance weld metal is conservative.

In addition, since the surveillance weld for the longitudinal weld has a copper and nickel content that is well above what is contained in the circumferential weld, the results for the surveillance weld (longitudinal weld) bound the circumferential weld. Therefore, the surveillance results can be used to bound the Adjusted Reference Temperature (ART) of the circumferential weld. Hence in the calculation of heatup and cooldown curves, the plate remains the lead material, not the weld.

Tables 2 and 3 are not required.

Section 3: PTS/PT Limit Evaluation

You request the following:

If the limiting material for your plant changes or if the adjusted reference temperature for the limiting material increases as a result of the above evaluations, provide the revised RT_{PTS} value for the limiting material in accordance with 10 CFR 50.61. In addition, if the adjusted RT_{NDT} value increased, provide a schedule for revising the PT and LTOP limits. The schedule should ensure that compliance with 10 CFR 50 Appendix G is maintained.

Response:

The limiting material has not changed.

Reference:

1. "Best Estimate Copper and Nickel Values in CE Fabricated Reactor Vessel Welds," Combustion Engineering Owners Group Report, CE NPSD-1039, Revision 02, June 1997.

TABLE 1

Facility: Indian Point Unit No. 2

Vessel Manufacturer: Combustion Engineering

Information Requested on RPV Wéld and/or Limiting Materials

RPV Weld Wire Heat	Best-Estimate Copper	Best-Estimate Nickel	EOL ID Fluence ($x10^{19}$)	Assigned Material Chemistry Factor (CF)	Method of Determining $CF^{(2)}$	Initial RT_{NDT} ($RT_{NDT(U)}$)	σ_{ι}	σ_{Δ}	Margin	ART or RT_{PTS} at EOL
34B009	0.192	1.038	1.2108	224.17	Table	-56 F	17	28	65.5	245.63
W5214	0.213	1.038	0.8526	236.15	Surveillance	-56 F	17	14	44.0	213.59
B2002-3 plate	0.20	0.59	1.2108	182.58	Surveillance	21 F	0	8.5	17.0	230.32

(1) or the material identification of the limiting material as requested in Section 1.0 (1.)
(2) determined from tables or from surveillance data

Discussion of the Analysis Method and Data used for Each Weld Wire Heat

Weld Wire Heat | Discussion

See text body

TABLE 4
WELD DEPOSIT NICKEL FOR NICKEL ADDITION WELDS

Rec #	Heat	Ni(%)	Analysis/ Report No.	Pedigree	Wgtd Cu	Wgtd Ni	# Coils (Est)	Source ID
1	1248	.94	D4347	VALID				WDC-0361
2	1248, 1248	1.20	D4322	VALID				WDC-0390
3	1248, 1248	1.15	D3911	VALID				WDC-0391
4	1248, 1248	1.23	D3912	VALID				WDC-0392
5	1248, 1248	.93	D4050	VALID				WDC-0393
6	1248, 1248	.94	D4049	VALID				WDC-0394
7	1248, 1248	.95	D4048	VALID				WDC-0395
8	1248, 1248	1.02	D4051	VALID				WDC-0396
9	1248, 661H577	1.09	D3862	VALID				WDC-0397
10	1248, 661H577	1.12	D3861	VALID				WDC-0398
11	3277, 3277	.43	BCL-(8-25-77)	VALID				WDC-0654
12	3277, 3277	.63	WCAP-10637	VALID				WDC-0655
13	3277, 3277	1.27	BCL-(8-25-77)	VALID				WDC-0656
14	3277, 3277	1.28	BCL-(8-25-77)	VALID				WDC-0658
15	3277, 3277	1.38	WCAP-10637	VALID				WDC-0659
16	3277, 3277	1.60	WCAP-10637	VALID				WDC-0660
17	34B009	.32	CPL-84-070 4/84	VALID				WDC-1776
18	34B009	.43	CPL-84-070 4/84	VALID				WDC-1774
19	34B009	.75	CPL-84-070 4/84	VALID				WDC-1775
20	34B009	.84	CPL-84-070 4/84	VALID				WDC-1777
21	34B009, 34B009	.08	NEDC-30299	VALID				WDC-1790
22	34B009, 34B009	.11	NEDC-30299	VALID				WDC-1789
23	34B009, 34B009	.38	NEDC-30299	VALID				WDC-1791
24	34B009, 34B009	.59	GE (SEE MEMO)	VALID				WDC-1793
25	34B009, 34B009	.86	NEDC-30299	VALID				WDC-1781
26	34B009, 34B009	.94	NEDC-30299	VALID				WDC-1792
27	34B009, 34B009	.95	NEDC-30299	VALID				WDC-1782
28	34B009, 34B009	.96	NEDC-30299	VALID				WDC-1783
29	34B009, 34B009	.99	GE (SEE MEMO)	VALID				WDC-1795
30	34B009, 34B009	.99	NEDC-30299	VALID				WDC-1784
31	34B009, 34B009	1.06	NEDC-30299	VALID				WDC-1788
32	34B009, 34B009	1.06	NEDC-30299	VALID				WDC-1785
33	34B009, 34B009	1.09	NEDC-30299	VALID				WDC-1786
34	34B009, 34B009	1.09	GE (SEE MEMO)	VALID				WDC-1794
35	34B009, 34B009	1.30	NEDC-30299	VALID				WDC-1787
36	34B009, 34B009	1.78	GE (SEE MEMO)	VALID				WDC-1796
37	34B009, 34B009	1.03	NEDC-30833	VALID				WDC-0869
38	34B009, 34B009	1.14	D44856	VALID				WDC-0870
39	34B009, 34B009	1.22	ICP	VALID				WDC-0871
40	34B009, 34B009	1.29	D44854	VALID				WDC-0872
41	34B009, 34B009	1.33	D44855	VALID				WDC-0873
42	34B009, 34B009	1.14	D44858	VALID				WDC-0874
43	34B009, 34B009	1.21	D44857	VALID				WDC-0875
44	34B009, 34B009	1.26	ICP	VALID				WDC-0876
45	34B009, 34B009	1.38	D44859	VALID				WDC-0877
46	34B009, 34B009	.94	D44852	VALID				WDC-0878
47	34B009, 34B009	1.05	ICP	VALID				WDC-0879

TABLE 4 (Cont'd)

Rec #	Heat	Ni (%)	Analysis/ Report No.	Pedigree	Wgtd Cu	Wgtd Ni	# Coils (Est)	Source ID
48	34B009, 34B009	1.05	D44853	VALID				WDC-0880
49	34B009, 34B009	1.18	D44851	VALID				WDC-0881
50	39B196, 39B196	1.14	WCAP-10694	VALID				WDC-0883
51	39B196, 39B196	1.26	WCAP-10694	VALID				WDC-0884
52	W5214	.99	D4688	VALID				WDC-1650
53	W5214	.63	WCAP-10304	VALID				WDC-1654
54	W5214	.66	WCAP-10304	VALID				WDC-1655
55	W5214	.69	WCAP-10304	VALID				WDC-1656
56	W5214	.90	T.R.Mager, 5/83	VALID				WDC-1771
57	W5214	.99	T.R.Mager, 5/83	VALID				WDC-1770
58	W5214	1.00	T.R.Mager, 5/83	VALID				WDC-1773
59	W5214	1.08	T.R.Mager, 5/83	VALID				WDC-1772
60	W5214, W5214	.96	D4660	VALID				WDC-1675
61	W5214, W5214	.92	D4687	VALID				WDC-1676
62	W5214, W5214	1.12	D4674	VALID				WDC-1677
63	W5214, W5214	.97	D4686	VALID				WDC-1678
64	W5214, W5214	1.05	D4673	VALID				WDC-1679
65	W5214, W5214	.72	D4494	VALID				WDC-1688
66	W5214, W5214	.76	D4494	VALID				WDC-1689
67	W5214, W5214	.77	D4494	VALID				WDC-1690
68	W5214, W5214	.81	D4494	VALID				WDC-1691
69	W5214, W5214	.81	D4494	VALID				WDC-1692
70	W5214, W5214	.81	D4494	VALID				WDC-1693
71	W5214, W5214	.96	D4494	VALID				WDC-1694
72	W5214, W5214	.96	D4494	VALID				WDC-1695
73	W5214, W5214	.97	D4494	VALID				WDC-1696
74	W5214, W5214	.98	D4494	VALID				WDC-1697
75	W5214, W5214	.98	D4494	VALID				WDC-1698
76	W5214, W5214	.99	D4494	VALID				WDC-1699
77	W5214, W5214	1.00	D4494	VALID				WDC-1700
78	W5214, W5214	1.01	D4494	VALID				WDC-1701
79	W5214, W5214	1.01	D4494	VALID				WDC-1702
80	W5214, W5214	1.03	D4494	VALID				WDC-1703
81	W5214, W5214	1.03	D4494	VALID				WDC-1704
82	W5214, W5214	1.05	D4494	VALID				WDC-1705
83	W5214, W5214	1.06	D4494	VALID				WDC-1706
84	W5214, W5214	1.08	D4494	VALID				WDC-1707
85	W5214, W5214	.69	SWRI-17-2108	VALID				WDC-1684
86	W5214, W5214	1.00	SWRI-17-2108	VALID				WDC-1685
87	W5214, W5214	1.02	SWRI-17-2108	VALID				WDC-1686
88	W5214, W5214	1.06	SWRI-17-2108	VALID				WDC-1687
89	W5214, W5214	1.15	WCAP-7323	INDETERMINATE				WDC-1836
90	W5214, W5214	.87	D4577	VALID				WDC-1710
91	W5214, W5214	.99	D4577	VALID				WDC-1711
92	W5214, W5214	1.07	D4604	VALID				WDC-1712
93	W5214, W5214	1.059	AEA-1	VALID				WDC-1713
94	W5214, W5214	1.066	AEA-2	VALID				WDC-1714

TABLE 4 (Cont'd)

Rec #	Heat	Ni(%)	Analysis/ Report No.	Pedigree	Wgtd Cu	Wgtd Ni	# Coils (Est)	Source ID
95	W5214, W5214	1.127	AEA-2	VALID				WDC-1715
96	W5214, W5214	1.154	AEA-1	VALID				WDC-1716
97	W5214, W5214	1.156	AEA-1	VALID				WDC-1717
98	W5214, W5214	1.16	D44847	VALID				WDC-1718
99	W5214, W5214	1.18	D44846	VALID				WDC-1719
100	W5214, W5214	1.193	AEA-2	VALID				WDC-1720
101	W5214, W5214	1.23	ICP	VALID				WDC-1721
102	W5214, W5214	1.23	D44845	VALID				WDC-1722
103	W5214, W5214	1.29	D44845	VALID				WDC-1723
104	W5214, W5214	.96	ICP	VALID				WDC-1724
105	W5214, W5214	.96	AEA-2	VALID				WDC-1725
106	W5214, W5214	1.024	AEA-1	VALID				WDC-1726
107	W5214, W5214	1.107	AEA-2	VALID				WDC-1727
108	W5214, W5214	1.11	D44850	VALID				WDC-1728
109	W5214, W5214	1.149	AEA-1	VALID				WDC-1729
110	W5214, W5214	1.15	D44848	VALID				WDC-1730
111	W5214, W5214	1.18	D44850	VALID				WDC-1731
112	W5214, W5214	1.203	AEA-1	VALID				WDC-1732
113	W5214, W5214	1.204	AEA-2	VALID				WDC-1733
114	W5214, W5214	1.22	D44849	VALID				WDC-1734
115	W5214, W5214	1.29	D44848	VALID				WDC-1735
116	W5214, W5214	.78	ICP	VALID				WDC-1736
117	W5214, W5214	1.003	AEA-1	VALID				WDC-1737
118	W5214, W5214	1.006	AEA-2	VALID				WDC-1738
119	W5214, W5214	1.05	D44843	VALID				WDC-1739
120	W5214, W5214	1.09	D44842	VALID				WDC-1740
121	W5214, W5214	1.090	AEA-1	VALID				WDC-1741
122	W5214, W5214	1.093	AEA-1	VALID				WDC-1742
123	W5214, W5214	1.10	D44844	VALID				WDC-1743
124	W5214, W5214	1.104	AEA-2	VALID				WDC-1744
125	W5214, W5214	1.116	AEA-2	VALID				WDC-1745
126	W5214, W5214	1.02	WCAP-11815	VALID				WDC-1746
127	W5214, W5214	1.21	WCAP-11815	VALID				WDC-1747
128	W5214, W5214	1.06	T.R.Mager,5/83	VALID				WDC-1767
129	W5214, W5214	1.09	T.R.Mager,5/83	VALID				WDC-1769
130	W5214, W5214	1.11	T.R.Mager,5/83	VALID				WDC-1768
131	W5214, W5214	1.01	D4295	INDETERMINATE				WDC-1749
132	W5214, W5214	1.03	D4278	INDETERMINATE				WDC-1750
133	W5214, W5214	1.03	D4283	INDETERMINATE				WDC-1751
134	W5214, W5214	1.04	D4293	INDETERMINATE				WDC-1752
135	W5214, W5214	1.04	D4296	INDETERMINATE				WDC-1753
136	W5214, W5214	1.04	D4311	INDETERMINATE				WDC-1754
137	W5214, W5214	1.06	D4277	INDETERMINATE				WDC-1755
138	W5214, W5214	1.06	D4284	INDETERMINATE				WDC-1756
139	W5214, W5214	1.06	D4286	INDETERMINATE				WDC-1757
140	W5214, W5214	1.06	D4292	INDETERMINATE				WDC-1758
141	W5214, W5214	1.07	D4345	INDETERMINATE				WDC-1759

TABLE 4 (Cont'd)

Rec #	Heat	Ni (%)	Analysis/ Report No.	Pedigree	Wgtd Cu	Wgtd Ni	# Coils (Est)	Source ID
142	W5214, W5214	1.08	D4282	INDETERMINATE				WDC-1760
143	W5214, W5214	1.10	D4294	INDETERMINATE				WDC-1761
144	W5214, W5214	1.15	D4279	INDETERMINATE				WDC-1762
145	W5214, W5214	1.15	D4281	INDETERMINATE				WDC-1763
146	W5214, W5214	1.15	D4298	INDETERMINATE				WDC-1764
147	W5214, W5214	1.15	D4312	INDETERMINATE				WDC-1765
148	W5214, W5214	1.16	D4280	INDETERMINATE				WDC-1766

	Ni XBar	Ni StdDev
Simple Mean	1.038	.226

The nickel values in records WDC-0660, WDC-1776, WDC-1789, WDC-1790, WDC-1791, and WDC-1796 were evaluated as outliers using Chauvenet's criterion. The nickel values were rejected in WDC-1776, WDC-1789, WDC-1790, and WDC-1796. The mean nickel and standard deviation were calculated based on the remaining 144 records.