ATTACHMENT 1

Letter from M. L. Marchi (WPSC)

To

Document Control Desk (NRC)

Dated

September 4, 1997

TABLE 1

TABLE 1

TEST SECTION PARAMETERS

TEST ASSEMBLY	TOTAL NO. OF PTS	NO. OF HTD RODS	ROD PITCH (IN)	ROD DIAM (IN)	UNHEATED ROD DIAM (IN)	TEST SECTION LENGTH (IN)	NO. OF SPACERS	SPACER PITCH*	AXIAL POWER DISTRIB	AXIAL PEAKING FACTOR	RADIAL PEAKING FACTOR
39	81	24	0.496	0.372	0.480	144.0	10	9.4	UNIFORM	1.000	1.107
40	82	24	0.496	0.372	0.480	144.0	10	9.1	UPSKEW	1.608	1.102
48	59	24	0.563	0.424	0.540	144.0	8	9.6	UNIFORM	1.000	1.085
49	84	24	0.563	0.424	0.540	144.0	5	22.4	UNIFORM	1.000	1.085
51	185	32	0.580	0.440	1.115	144.0	8	16.6	CHOPPED COSINE	1.268	1.073
52	61	24	0.496	0.360	0.480	144.0	10	8.6	CHOPPED COSINE	1.474	1.102
53	52	24	0.496	0.360	0.480	144.0	7	18.0	CHOPPED COSINE	1.474	1.099
57	76	25	0.563	0.424	---	144.0	9	13.0	UNIFORM	1.000	1.084
65	174	24	0.500	0.372	0.480	144.0	7	18.3	UNIFORM	1.000	1.114/1.111 @
KNPP**	---	179	0.556	0.424	0.541	144.0	7	26.2	---	---	---

* Spacer Pitch = Distance between top of upstream spacer to bottom of downstream spacer

** Kewaunee Fuel Design Parameters

@ Test 65 was performed in two sections. The two sections had slightly different radial power distributions.

ATTACHMENT 2

Letter from M. L. Marchi (WPSC)

To

Document Control Desk (NRC)

Dated

September 4, 1997

STATISTICAL ASSESSMENT OF DNB TEST DATA RESULTS

STATISTICAL ASSESSMENT OF DNB

TEST DATA RESULTS

1.0 Introduction and Summary

Wisconsin Public Service has performed Thermal Hydraulic Calculations using the VIPRE[1] computer code and the HTP correlation from Siemens Power Corporation. Critical heat flux WPS computed for nine test sections typical of current SPC product lines, which envelope the current Kewaunee fuel designs. The results from these calculations were reduced by Wisconsin Public Service to tables of predicted critical heat flux, measured critical heat flux, and departure from nucleate boiling ratio predicted to measured (DNBR - P/M). This report documents the statistical treatment of the data and affirms that the HTP limit of 1.14 conservatively bounds the 95/95 limit of the data analyzed. Based upon this data, HTP is concluded to be an acceptable correlation for predicting DNB performance when used with the hydraulic conditions calculated in the VIPRE code.

2.0 Statistical Treatment of the Data

The VIPRE results are shown in Appendix A. All of these data points were analyzed to determine the appropriate 95/95 safety limit. This is the value of the ratio of the predicted DNB heat flux to the measured DNB heat flux (P/M ratio). The safety limit is the value of the P/M ratio below which, with 95% confidence, 95% of the population of P/M values fall. The safety limit is derived using the same distribution-free method that WPS used by SPC in their qualification of the HTP DNB correlation[2].

To evaluate the safety limit, the P/M ratio data is sorted in descending order. There are 854 data points in the sample. Sommerville[3] defines the degree of confidence, g, associated with the fractional probability, P, that P/M values chosen at random from the population will fall below the m^{th} largest P/M value. This degree of confidence, g, is defined in terms of the incomplete beta function, I; for tabulated values of g, the following inequality applies:

$$g \leq I_{1-P}(m, n - m + 1) * 100$$

For n equal to 854 data points, and a g corresponding to 95% confidence at the 95% probability level, m is equal to 32. The 32^{nd} largest P/M value is 1.080. Hence, the value of the 95/95 limit for this data set is 1.080. With 95% confidence, at least 95% of the population of P/M ratios will be less than this value.

Appendix B shows the behavior of DNBR (P/M) for the data base in trend plots as functions of loop pressure, local quality, local mass flux, inlet enthalpy, and measured DNB heat flux.

Appendix C shows the predicted versus measured critical heat flux for each test case along a line fitting the data, an ideal line where predicted and measured heat flux would equal one another, and lines ±14% from the ideal line.

Appendix D shows the predicted versus measured critical heat flux for the entire data base, with the 95/95 limit of 1.080 derived from this analysis, the HTP correlation 95/95 safety limit of 1.14, and an ideal line where predicted and measured heat flux would be exactly equal to one another.

Also shown in Appendix D is a histogram of the Table A MDNBR data, along with a super-imposed normal distribution that is based upon the data's mean MDNBR of 0.9501 and its standard deviation of 0.0708.

3.0 Conclusions

Based on the distribution-free analysis in Section 2.0, the following statement, regarding avoidance of DNB, is supported by this analysis:

A rod operating with a DNB ratio of 1.080 is assured that with 95% confidence, there is a 95% probability of avoiding DNB.

This analysis verifies that the HTP DNB correlation safety limit of 1.14 conservatively bounds the 95/95 limit for the data analyzed.

4.0 References

1. Cuta, J.M., Koontz, A.S., VIPRE-01: A Thermal Hydraulic Analysis Code for Reactor Cores, Battelle - Pacific Northwest Labs, EPRI-NP-2511-CCM, Vol. 2

2. "HTP: Departure From Nucleate Boiling Correlation for High Thermal Performance Fuel," EMF-92-153(P)(A) and Supplement 1, March 1994.

3. Sommerville, P.N., "Tables for Obtaining Non-Parametric Tolerance Limits," Annals of Mathematical Statistics, Vol. 29, No. 2, June 1958, pp. 599-601.

APPENDIX A

Tabular data showing run number, DNBR-P/M, predicted heat flux, and measured heat flux based upon VIPRE calculations.

TABLE A - DNB RESULTS FROM VIPRE

TITLE	RUN	DNBR P/M	MEASURED FLUX MBTU/HR-FT2	PREDICTED FLUX MBTU/HR-FT2
TEST 39	12	0.833	0.367	0.306
TEST 39	13	0.947	0.357	0.338
TEST 39	14	0.922	0.359	0.331
TEST 39	15	0.823	0.377	0.311
TEST 39	16	0.834	0.460	0.383
TEST 39	17	0.923	0.451	0.416
TEST 39	18	1.015	0.438	0.444
TEST 39	19	0.988	0.445	0.440
TEST 39	21	0.920	0.537	0.495
TEST 39	22	0.914	0.546	0.499
TEST 39	23	0.924	0.549	0.508
TEST 39	24	1.015	0.542	0.550
TEST 39	26	0.994	0.618	0.614
TEST 39	27	0.915	0.616	0.564
TEST 39	28	0.905	0.624	0.565
TEST 39	29	0.990	0.631	0.625
TEST 39	36	0.915	0.419	0.383
TEST 39	37	0.969	0.404	0.391
TEST 39	38	1.024	0.405	0.414
TEST 39	39	0.912	0.427	0.389
TEST 39	40	0.897	0.546	0.490
TEST 39	41	0.925	0.524	0.485
TEST 39	42	1.011	0.518	0.524
TEST 39	43	1.080	0.522	0.564
TEST 39	44	0.922	0.640	0.590
TEST 39	45	0.926	0.641	0.593
TEST 39	46	0.923	0.644	0.594
TEST 39	47	1.069	0.614	0.656
TEST 39	48	0.961	0.746	0.717
TEST 39	49	0.948	0.746	0.707
TEST 39	50	0.943	0.758	0.715
TEST 39	51	0.988	0.751	0.742
TEST 39	52	0.955	0.485	0.463
TEST 39	53	0.952	0.487	0.464
TEST 39	54	0.898	0.473	0.424
TEST 39	55	0.972	0.618	0.600
TEST 39	56	0.959	0.611	0.586
TEST 39	57	0.938	0.609	0.571

TABLE A - DNB RESULTS FROM VIPRE

TITLE	RUN	DNBR P/M	MEASURED FLUX MBTU/HR-FT2	PREDICTED FLUX MBTU/HR-FT2
TEST 39	58	0.948	0.756	0.717
TEST 39	59	0.948	0.752	0.713
TEST 39	60	0.965	0.741	0.715
TEST 39	61	0.950	0.861	0.818
TEST 39	64	0.918	0.687	0.631
TEST 39	65	0.938	0.829	0.777
TEST 39	67	0.944	0.931	0.879
TEST 39	69	0.957	0.851	0.814
TEST 39	70	0.959	0.844	0.810
TEST 39	77	0.900	0.363	0.327
TEST 39	78	0.949	0.280	0.266
TEST 39	79	0.947	0.292	0.277
TEST 39	80	0.829	0.308	0.255
TEST 39	81	0.779	0.325	0.253
TEST 39	82	0.951	0.363	0.345
TEST 39	83	1.014	0.360	0.365
TEST 39	84	1.024	0.371	0.380
TEST 39	85	0.965	0.378	0.365
TEST 39	86	0.979	0.424	0.415
TEST 39	87	0.874	0.447	0.391
TEST 39	88	0.961	0.437	0.420
TEST 39	89	0.942	0.434	0.408
TEST 39	90	0.974	0.494	0.480
TEST 39	91	0.916	0.504	0.462
TEST 39	92	0.964	0.494	0.476
TEST 39	93	1.116	0.478	0.533
TEST 39	94	0.998	0.223	0.222
TEST 39	95	0.992	0.219	0.217
TEST 39	96	1.000	0.227	0.227
TEST 39	97	0.830	0.251	0.208
TEST 39	98	1.021	0.269	0.274
TEST 39	99	0.980	0.274	0.268
TEST 39	100	0.994	0.282	0.280
TEST 39	101	0.974	0.275	0.268
TEST 39	102	1.005	0.321	0.322
TEST 39	103	0.989	0.322	0.318
TEST 39	104	0.964	0.325	0.313
TEST 39	105	1.002	0.325	0.326

TABLE A - DNB RESULTS FROM VIPRE

TITLE	RUN	DNBR P/M	MEASURED FLUX MBTU/HR-FT2	PREDICTED FLUX MBTU/HR-FT2
TEST 39	106	0.966	0.368	0.355
TEST 39	107	0.967	0.364	0.352
TEST 39	108	1.013	0.367	0.372
TEST 39	109	0.913	0.377	0.344
TEST 39	110	1.158	0.482	0.558

TABLE A - DNB RESULTS FROM VIPRE

TITLE	RUN	DNBR P/M	MEASURED FLUX MBTU/HR-FT2	PREDICTED FLUX MBTU/HR-FT2
TEST 40	8	0.942	0.757	0.713
TEST 40	10	0.748	0.575	0.430
TEST 40	11	0.836	0.561	0.469
TEST 40	12	0.871	0.550	0.479
TEST 40	13	0.857	0.562	0.482
TEST 40	14	0.940	0.674	0.634
TEST 40	15	0.929	0.696	0.646
TEST 40	16	0.927	0.697	0.646
TEST 40	17	0.953	0.680	0.648
TEST 40	19	0.991	0.796	0.789
TEST 40	20	0.987	0.789	0.779
TEST 40	21	0.966	0.811	0.784
TEST 40	24	1.038	0.901	0.935
TEST 40	25	0.956	0.949	0.907
TEST 40	26	0.931	0.951	0.885
TEST 40	34	0.912	0.635	0.579
TEST 40	35	0.916	0.639	0.585
TEST 40	36	0.886	0.650	0.576
TEST 40	37	0.831	0.637	0.529
TEST 40	38	0.916	0.632	0.579
TEST 40	39	0.965	0.780	0.753
TEST 40	40	0.968	0.809	0.783
TEST 40	41	0.941	0.800	0.753
TEST 40	42	0.950	0.788	0.749
TEST 40	43	0.961	0.927	0.891
TEST 40	44	0.917	0.975	0.894
TEST 40	45	0.911	0.960	0.875
TEST 40	46	0.986	0.906	0.893
TEST 40	47	0.946	1.095	1.037
TEST 40	48	0.938	1.104	1.035
TEST 40	49	0.925	1.097	1.015
TEST 40	51	0.982	1.081	1.062
TEST 40	52	0.923	1.109	1.024
TEST 40	54	0.880	0.367	0.323
TEST 40	55	0.923	0.330	0.304
TEST 40	56	1.051	0.315	0.331
TEST 40	57	1.039	0.346	0.359
TEST 40	58	0.986	0.411	0.406

TABLE A - DNB RESULTS FROM VIPRE

TITLE	RUN	DNBR P/M	MEASURED FLUX MBTU/HR-FT2	PREDICTED FLUX MBTU/HR-FT2
TEST 40	59	0.973	0.415	0.403
TEST 40	60	1.035	0.396	0.410
TEST 40	61	1.002	0.420	0.421
TEST 40	62	0.965	0.473	0.457
TEST 40	63	0.988	0.480	0.475
TEST 40	64	0.970	0.505	0.490
TEST 40	65	0.881	0.503	0.443
TEST 40	66	0.976	0.562	0.549
TEST 40	67	0.947	0.584	0.553
TEST 40	68	1.000	0.594	0.594
TEST 40	69	0.890	0.596	0.531
TEST 40	70	0.957	0.454	0.435
TEST 40	71	0.929	0.435	0.404
TEST 40	72	0.968	0.455	0.441
TEST 40	73	1.021	0.455	0.465
TEST 40	74	1.027	0.503	0.517
TEST 40	75	0.949	0.571	0.541
TEST 40	76	0.915	0.574	0.525
TEST 40	77	0.997	0.556	0.554
TEST 40	78	1.010	0.657	0.664
TEST 40	79	0.963	0.659	0.635
TEST 40	80	0.950	0.668	0.635
TEST 40	81	0.946	0.659	0.624
TEST 40	82	0.972	0.751	0.730
TEST 40	83	0.996	0.740	0.737
TEST 40	84	0.933	0.797	0.743
TEST 40	85	0.925	0.768	0.710
TEST 40	86	0.942	0.685	0.645
TEST 40	87	0.930	0.709	0.660
TEST 40	88	0.957	0.702	0.672
TEST 40	89	0.959	0.900	0.863
TEST 40	90	0.899	0.932	0.838
TEST 40	91	0.915	0.928	0.849
TEST 40	96	0.935	0.540	0.505
TEST 40	97	0.942	0.756	0.712
TEST 40	99	0.947	0.986	0.934
TEST 40	100	0.909	1.203	1.094
TEST 40	102	0.880	1.415	1.246

TABLE A - DNB RESULTS FROM VIPRE

TITLE	RUN	DNBR P/M	MEASURED FLUX MBTU/HR-FT2	PREDICTED FLUX MBTU/HR-FT2
TEST 40	104	0.949	1.116	1.059
TEST 40	105	0.941	1.087	1.023
TEST 40	106	0.928	1.088	1.010
TEST 40	107	0.949	1.249	1.186
TEST 40	108	0.954	1.260	1.202
TEST 40	109	0.936	1.237	1.157

TABLE A - DNB RESULTS FROM VIPRE

TITLE	RUN	DNBR P/M	MEASURED FLUX MBTU/HR-FT2	PREDICTED FLUX MBTU/HR-FT2
TEST 48	25	0.988	0.379	0.374
TEST 48	34	0.908	0.391	0.355
TEST 48	35	0.955	0.372	0.355
TEST 48	37	0.904	0.369	0.334
TEST 48	38	0.833	0.387	0.322
TEST 48	39	0.867	0.424	0.367
TEST 48	40	0.951	0.475	0.452
TEST 48	41	0.958	0.476	0.457
TEST 48	42	0.933	0.474	0.442
TEST 48	43	0.937	0.456	0.427
TEST 48	44	0.918	0.474	0.436
TEST 48	47	0.983	0.546	0.536
TEST 48	48	0.937	0.565	0.530
TEST 48	49	0.904	0.569	0.515
TEST 48	50	0.899	0.593	0.534
TEST 48	51	0.914	0.673	0.615
TEST 48	52	0.920	0.661	0.607
TEST 48	53	0.913	0.649	0.593
TEST 48	54	0.859	0.651	0.559
TEST 48	59	1.097	0.568	0.623
TEST 48	60	0.994	0.503	0.500
TEST 48	61	0.931	0.462	0.431
TEST 48	62	0.959	0.394	0.378
TEST 48	63	0.980	0.424	0.415
TEST 48	64	1.001	0.429	0.429
TEST 48	65	0.993	0.429	0.425
TEST 48	66	1.009	0.425	0.429
TEST 48	67	0.929	0.421	0.391
TEST 48	68	0.989	0.481	0.476
TEST 48	69	0.991	0.556	0.551
TEST 48	70	1.006	0.546	0.549
TEST 48	71	0.991	0.543	0.538
TEST 48	72	0.983	0.545	0.536
TEST 48	73	0.982	0.562	0.551
TEST 48	74	0.951	0.682	0.649
TEST 48	75	0.993	0.649	0.645
TEST 48	76	1.031	0.634	0.653
TEST 48	77	0.944	0.648	0.611

TABLE A - DNB RESULTS FROM VIPRE

TITLE	RUN	DNBR P/M	MEASURED FLUX MBTU/HR-FT2	PREDICTED FLUX MBTU/HR-FT2
TEST 48	78	0.958	0.729	0.698
TEST 48	79	0.966	0.721	0.697
TEST 48	80	1.043	0.710	0.740
TEST 48	81	0.997	0.716	0.714
TEST 48	82	0.953	0.500	0.476
TEST 48	83	0.984	0.480	0.472
TEST 48	84	0.931	0.503	0.468
TEST 48	85	0.977	0.642	0.627
TEST 48	86	0.971	0.632	0.614
TEST 48	87	1.019	0.624	0.636
TEST 48	88	0.954	0.735	0.701
TEST 48	89	0.983	0.694	0.682
TEST 48	90	0.981	0.722	0.709
TEST 48	91	1.026	0.695	0.713
TEST 48	92	1.040	0.726	0.756
TEST 48	93	0.985	0.727	0.716
TEST 48	97	0.915	0.554	0.506
TEST 48	99	1.044	0.676	0.706
TEST 48	100	1.037	0.747	0.774
TEST 48	103	1.043	0.364	0.380
TEST 48	104	1.005	0.384	0.386

TABLE A - DNB RESULTS FROM VIPRE

TITLE	RUN	DNBR P/M	MEASURED FLUX MBTU/HR-FT2	PREDICTED FLUX MBTU/HR-FT2
TEST 49	24	0.883	0.380	0.335
TEST 49	26	0.939	0.342	0.321
TEST 49	27	1.054	0.335	0.353
TEST 49	28	1.114	0.336	0.375
TEST 49	29	0.883	0.465	0.411
TEST 49	30	0.900	0.462	0.416
TEST 49	31	0.977	0.455	0.445
TEST 49	33	1.021	0.438	0.447
TEST 49	34	0.958	0.547	0.524
TEST 49	35	0.971	0.547	0.531
TEST 49	36	0.911	0.551	0.502
TEST 49	38	0.919	0.537	0.493
TEST 49	39	1.040	0.616	0.640
TEST 49	40	0.992	0.638	0.633
TEST 49	41	0.968	0.630	0.610
TEST 49	43	0.940	0.631	0.593
TEST 49	47	0.868	0.381	0.331
TEST 49	48	0.888	0.431	0.383
TEST 49	49	0.899	0.432	0.389
TEST 49	50	0.983	0.412	0.405
TEST 49	51	1.079	0.398	0.430
TEST 49	52	0.939	0.544	0.511
TEST 49	53	0.946	0.543	0.513
TEST 49	54	0.966	0.541	0.523
TEST 49	55	0.979	0.531	0.520
TEST 49	56	1.011	0.638	0.645
TEST 49	57	0.965	0.640	0.618
TEST 49	58	0.971	0.638	0.620
TEST 49	59	0.979	0.632	0.619
TEST 49	60	1.170	0.685	0.802
TEST 49	61	0.983	0.721	0.709
TEST 49	62	0.977	0.722	0.705
TEST 49	63	0.982	0.721	0.708
TEST 49	66	0.889	0.377	0.335
TEST 49	67	0.890	0.508	0.453
TEST 49	68	0.938	0.492	0.462
TEST 49	69	0.992	0.464	0.461
TEST 49	70	0.913	0.634	0.579

TABLE A - DNB RESULTS FROM VIPRE

TITLE	RUN	DNBR P/M	MEASURED FLUX MBTU/HR-FT2	PREDICTED FLUX MBTU/HR-FT2
TEST 49	71	0.934	0.613	0.572
TEST 49	72	0.958	0.618	0.592
TEST 49	73	0.951	0.711	0.676
TEST 49	74	0.961	0.692	0.665
TEST 49	75	0.969	0.678	0.657
TEST 49	76	1.033	0.699	0.722
TEST 49	77	0.982	0.729	0.716
TEST 49	78	0.999	0.722	0.721
TEST 49	79	1.003	0.541	0.543
TEST 49	81	1.027	0.659	0.676
TEST 49	83	1.005	0.747	0.751
TEST 49	88	1.030	0.290	0.298
TEST 49	89	1.007	0.295	0.297
TEST 49	90	1.066	0.294	0.313
TEST 49	91	1.181	0.279	0.330
TEST 49	92	1.012	0.360	0.364
TEST 49	93	0.928	0.375	0.348
TEST 49	94	1.016	0.364	0.370
TEST 49	95	1.049	0.359	0.377
TEST 49	96	1.020	0.424	0.432
TEST 49	97	0.990	0.440	0.435
TEST 49	98	0.926	0.447	0.414
TEST 49	99	0.946	0.444	0.421
TEST 49	100	0.999	0.496	0.495
TEST 49	101	0.948	0.510	0.483
TEST 49	102	0.917	0.506	0.464
TEST 49	103	0.902	0.509	0.459
TEST 49	104	1.078	0.207	0.223
TEST 49	105	1.102	0.210	0.232
TEST 49	106	1.217	0.208	0.253
TEST 49	107	1.225	0.218	0.267
TEST 49	108	0.962	0.285	0.274
TEST 49	109	0.919	0.278	0.255
TEST 49	110	0.944	0.292	0.275
TEST 49	111	1.055	0.273	0.289
TEST 49	113	0.984	0.337	0.332
TEST 49	114	0.899	0.333	0.299
TEST 49	115	0.976	0.309	0.302

TABLE A - DNB RESULTS FROM VIPRE

TITLE	RUN	DNBR P/M	MEASURED FLUX MBTU/HR-FT2	PREDICTED FLUX MBTU/HR-FT2
TEST 49	116	0.935	0.334	0.313
TEST 49	117	0.888	0.343	0.305
TEST 49	118	0.912	0.365	0.333
TEST 49	119	0.829	0.385	0.319
TEST 49	120	0.863	0.383	0.331
TEST 49	121	0.896	0.390	0.350
TEST 49	128	0.884	0.377	0.334
TEST 49	129	1.056	0.713	0.753

TABLE A - DNB RESULTS FROM VIPRE

TITLE	RUN	DNBR P/M	MEASURED FLUX MBTU/HR-FT2	PREDICTED FLUX MBTU/HR-FT2
TEST 51	23	0.954	0.427	0.407
TEST 51	24	0.975	0.402	0.391
TEST 51	25	0.910	0.485	0.441
TEST 51	26	0.990	0.415	0.411
TEST 51	27	0.961	0.464	0.446
TEST 51	28	1.001	0.416	0.416
TEST 51	29	0.984	0.544	0.535
TEST 51	30	1.017	0.455	0.463
TEST 51	31	0.934	0.526	0.491
TEST 51	32	1.021	0.474	0.484
TEST 51	33	0.896	0.561	0.503
TEST 51	34	0.919	0.493	0.453
TEST 51	35	0.913	0.560	0.511
TEST 51	36	0.980	0.542	0.531
TEST 51	37	0.973	0.642	0.625
TEST 51	38	0.913	0.558	0.510
TEST 51	39	0.953	0.614	0.586
TEST 51	40	0.964	0.581	0.560
TEST 51	41	0.963	0.687	0.662
TEST 51	42	0.987	0.627	0.618
TEST 51	43	0.939	0.327	0.307
TEST 51	44	0.934	0.328	0.307
TEST 51	45	0.950	0.368	0.349
TEST 51	46	0.955	0.330	0.315
TEST 51	47	0.962	0.362	0.348
TEST 51	48	0.968	0.327	0.316
TEST 51	49	0.948	0.408	0.387
TEST 51	50	0.985	0.358	0.352
TEST 51	51	0.921	0.414	0.381
TEST 51	52	1.025	0.386	0.396
TEST 51	53	0.942	0.453	0.427
TEST 51	54	0.948	0.419	0.397
TEST 51	55	0.965	0.436	0.421
TEST 51	56	0.999	0.402	0.401
TEST 51	57	0.980	0.489	0.479
TEST 51	58	0.949	0.477	0.453
TEST 51	59	0.928	0.486	0.450
TEST 51	60	1.010	0.470	0.474

TABLE A - DNB RESULTS FROM VIPRE

TITLE	RUN	DNBR P/M	MEASURED FLUX MBTU/HR-FT2	PREDICTED FLUX MBTU/HR-FT2
TEST 51	61	1.061	0.526	0.558
TEST 51	62	0.979	0.510	0.499
TEST 51	63	0.971	0.484	0.470
TEST 51	64	0.975	0.486	0.474
TEST 51	65	1.073	0.560	0.601
TEST 51	66	0.965	0.514	0.496
TEST 51	67	1.040	0.539	0.560
TEST 51	68	1.033	0.554	0.572
TEST 51	71	0.943	0.430	0.405
TEST 51	72	0.894	0.460	0.411
TEST 51	73	0.905	0.476	0.431
TEST 51	74	0.924	0.557	0.514
TEST 51	75	0.977	0.481	0.470
TEST 51	76	0.932	0.548	0.511
TEST 51	78	0.936	0.623	0.583
TEST 51	79	0.963	0.552	0.532
TEST 51	80	0.959	0.613	0.588
TEST 51	81	0.963	0.548	0.528
TEST 51	83	0.958	0.634	0.607
TEST 51	84	0.945	0.655	0.620
TEST 51	85	0.980	0.632	0.620
TEST 51	77	0.959	0.473	0.453
TEST 51	86	0.964	0.749	0.722
TEST 51	87	0.924	0.686	0.634
TEST 51	88	1.006	0.717	0.721
TEST 51	89	1.004	0.686	0.689
TEST 51	90	1.003	0.815	0.817
TEST 51	91	0.976	0.741	0.724
TEST 51	92	0.980	0.811	0.795
TEST 51	93	0.932	0.742	0.691
TEST 51	94	0.979	0.789	0.772
TEST 51	95	0.963	0.753	0.725
TEST 51	96	0.969	0.689	0.667
TEST 51	97	0.939	0.634	0.596
TEST 51	98	1.005	0.732	0.735
TEST 51	99	0.963	0.679	0.654
TEST 51	100	1.017	0.699	0.711
TEST 51	101	0.960	0.685	0.658

TABLE A - DNB RESULTS FROM VIPRE

TITLE	RUN	DNBR P/M	MEASURED FLUX MBTU/HR-FT2	PREDICTED FLUX MBTU/HR-FT2
TEST 51	102	1.026	0.724	0.743
TEST 51	103	1.008	0.740	0.746
TEST 51	104	0.915	0.566	0.518
TEST 51	105	0.909	0.558	0.507
TEST 51	106	1.097	0.251	0.275
TEST 51	107	0.965	0.237	0.229
TEST 51	108	1.001	0.265	0.265
TEST 51	109	1.151	0.255	0.294
TEST 51	110	0.895	0.274	0.245
TEST 51	111	1.104	0.251	0.277
TEST 51	112	0.962	0.314	0.302
TEST 51	113	0.816	0.259	0.211
TEST 51	114	0.923	0.307	0.284
TEST 51	115	1.064	0.282	0.300
TEST 51	116	0.954	0.335	0.319
TEST 51	117	1.048	0.308	0.322
TEST 51	118	1.001	0.330	0.331
TEST 51	119	1.021	0.310	0.317
TEST 51	120	0.990	0.351	0.348
TEST 51	121	1.000	0.338	0.338
TEST 51	122	1.047	0.348	0.364
TEST 51	123	0.988	0.332	0.328
TEST 51	124	1.016	0.384	0.390
TEST 51	125	0.936	0.361	0.338
TEST 51	126	0.946	0.385	0.364
TEST 51	127	1.134	0.377	0.428
TEST 51	128	0.989	0.413	0.409
TEST 51	129	0.968	0.391	0.378
TEST 51	130	0.894	0.401	0.358
TEST 51	131	1.112	0.393	0.437
TEST 51	132	0.985	0.403	0.397
TEST 51	133	1.080	0.411	0.444
TEST 51	136	0.933	0.419	0.391
TEST 51	142	1.016	0.580	0.589
TEST 51	144	0.966	0.570	0.550
TEST 51	145	1.020	0.620	0.633
TEST 51	147	1.008	0.624	0.629
TEST 51	148	1.007	0.690	0.695

TABLE A - DNB RESULTS FROM VIPRE

TITLE	RUN	DNBR P/M	MEASURED FLUX MBTU/HR-FT2	PREDICTED FLUX MBTU/HR-FT2
TEST 51	149	0.992	0.628	0.622
TEST 51	150	1.026	0.692	0.711
TEST 51	151	0.993	0.761	0.756
TEST 51	152	0.974	0.690	0.672
TEST 51	153	0.996	0.734	0.731
TEST 51	154	1.008	0.788	0.795
TEST 51	155	0.991	0.741	0.734
TEST 51	156	0.954	0.787	0.750
TEST 51	157	0.980	0.776	0.760
TEST 51	158	0.975	0.364	0.355
TEST 51	160	0.972	0.448	0.435
TEST 51	163	0.930	0.453	0.422
TEST 51	164	1.031	0.426	0.439
TEST 51	165	0.979	0.471	0.461
TEST 51	166	0.952	0.508	0.483
TEST 51	167	0.992	0.484	0.481
TEST 51	168	1.051	0.528	0.554
TEST 51	169	1.024	0.576	0.590
TEST 51	170	1.029	0.518	0.533
TEST 51	171	1.012	0.556	0.563
TEST 51	172	1.103	0.594	0.655
TEST 51	173	0.984	0.529	0.520
TEST 51	174	1.004	0.591	0.593
TEST 51	175	1.077	0.646	0.696
TEST 51	176	0.987	0.577	0.570
TEST 51	177	1.027	0.646	0.663
TEST 51	178	1.007	0.649	0.654
TEST 51	190	0.981	0.650	0.638
TEST 51	191	1.055	0.302	0.319
TEST 51	192	1.015	0.274	0.278
TEST 51	193	0.994	0.304	0.302
TEST 51	194	1.002	0.282	0.283
TEST 51	195	0.993	0.316	0.314
TEST 51	196	1.078	0.302	0.326
TEST 51	197	0.837	0.360	0.301
TEST 51	198	1.001	0.313	0.313
TEST 51	201	0.877	0.377	0.330
TEST 51	202	1.031	0.349	0.360

TABLE A - DNB RESULTS FROM VIPRE

TITLE	RUN	DNBR P/M	MEASURED FLUX MBTU/HR-FT2	PREDICTED FLUX MBTU/HR-FT2
TEST 51	203	1.074	0.351	0.377
TEST 51	204	1.027	0.383	0.393
TEST 51	205	1.039	0.353	0.366
TEST 51	206	0.990	0.393	0.390
TEST 51	207	1.053	0.376	0.396
TEST 51	208	1.022	0.410	0.419
TEST 51	209	1.028	0.398	0.409
TEST 51	210	0.944	0.426	0.402
TEST 51	211	1.057	0.416	0.439
TEST 51	212	1.103	0.457	0.504
TEST 51	213	1.031	0.417	0.430
TEST 51	214	1.035	0.436	0.451
TEST 51	215	1.074	0.431	0.462
TEST 51	216	1.127	0.489	0.551
TEST 51	217	0.984	0.451	0.444
TEST 51	218	1.000	0.473	0.473
TEST 51	219	1.055	0.439	0.464
TEST 51	220	1.052	0.479	0.504
TEST 51	221	1.086	0.501	0.544
TEST 51	231	0.940	0.633	0.595
TEST 51	232	0.992	0.551	0.547
TEST 51	233	0.921	0.712	0.656
TEST 51	234	0.974	0.641	0.624
TEST 51	235	0.947	0.702	0.665
TEST 51	236	1.070	0.605	0.647
TEST 51	237	0.916	0.800	0.733
TEST 51	238	1.051	0.667	0.701
TEST 51	239	0.985	0.666	0.656
TEST 51	241	0.927	0.765	0.710
TEST 51	242	0.977	0.754	0.736
TEST 51	243	0.943	0.829	0.782
TEST 51	244	0.948	0.820	0.777
TEST 51	245	0.994	0.774	0.769

TABLE A - DNB RESULTS FROM VIPRE

TITLE	RUN	DNBR P/M	MEASURED FLUX MBTU/HR-FT2	PREDICTED FLUX MBTU/HR-FT2
TEST 52	14	1.005	0.415	0.417
TEST 52	15	1.003	0.389	0.390
TEST 52	16	1.002	0.400	0.401
TEST 52	17	0.929	0.420	0.390
TEST 52	18	0.977	0.512	0.500
TEST 52	19	0.867	0.532	0.461
TEST 52	20	0.803	0.535	0.429
TEST 52	22	0.795	0.546	0.434
TEST 52	23	0.973	0.619	0.603
TEST 52	24	0.802	0.654	0.525
TEST 52	25	0.836	0.633	0.529
TEST 52	27	0.878	0.636	0.559
TEST 52	28	0.884	0.499	0.441
TEST 52	29	0.909	0.489	0.445
TEST 52	30	0.872	0.497	0.434
TEST 52	31	0.828	0.515	0.427
TEST 52	32	0.898	0.621	0.558
TEST 52	33	0.849	0.650	0.552
TEST 52	34	0.880	0.627	0.552
TEST 52	35	0.913	0.601	0.549
TEST 52	36	0.920	0.764	0.702
TEST 52	37	0.932	0.358	0.334
TEST 52	38	0.973	0.333	0.324
TEST 52	39	1.000	0.346	0.346
TEST 52	41	0.970	0.429	0.416
TEST 52	42	0.899	0.425	0.382
TEST 52	43	0.839	0.450	0.378
TEST 52	46	0.849	0.531	0.450
TEST 52	47	0.855	0.517	0.442
TEST 52	48	0.897	0.516	0.463
TEST 52	50	1.108	0.475	0.527
TEST 52	55	0.977	0.416	0.406
TEST 52	56	0.947	0.338	0.320
TEST 52	58	1.139	0.434	0.494
TEST 52	59	0.866	0.651	0.564
TEST 52	60	1.033	0.406	0.419
TEST 52	61	1.044	0.259	0.271
TEST 52	62	0.884	0.254	0.224

TABLE A - DNB RESULTS FROM VIPRE

TITLE	RUN	DNBR P/M	MEASURED FLUX MBTU/HR-FT2	PREDICTED FLUX MBTU/HR-FT2
TEST 52	63	1.198	0.266	0.318
TEST 52	64	1.071	0.271	0.290
TEST 52	65	1.093	0.310	0.339
TEST 52	66	0.841	0.337	0.283
TEST 52	67	1.006	0.309	0.310
TEST 52	69	0.917	0.340	0.312
TEST 52	70	0.833	0.420	0.349
TEST 52	71	0.882	0.390	0.344
TEST 52	72	0.856	0.380	0.325
TEST 52	74	1.028	0.358	0.368
TEST 52	76	0.967	0.708	0.684
TEST 52	77	0.954	0.696	0.663
TEST 52	78	0.893	0.704	0.628
TEST 52	79	0.886	0.710	0.629
TEST 52	80	0.926	0.888	0.822
TEST 52	81	0.869	0.902	0.784
TEST 52	82	0.835	0.711	0.593
TEST 52	83	0.856	0.693	0.593
TEST 52	85	0.922	1.023	0.944
TEST 52	86	0.861	1.023	0.880
TEST 52	87	0.800	0.807	0.646
TEST 52	88	0.851	0.816	0.695
TEST 52	91	0.870	0.736	0.640

TABLE A - DNB RESULTS FROM VIPRE

TITLE	RUN	DNBR P/M	MEASURED FLUX MBTU/HR-FT2	PREDICTED FLUX MBTU/HR-FT2
TEST 53	14	0.854	0.420	0.359
TEST 53	15	0.851	0.406	0.346
TEST 53	16	0.955	0.428	0.409
TEST 53	17	0.996	0.500	0.498
TEST 53	18	0.920	0.552	0.508
TEST 53	19	0.927	0.487	0.452
TEST 53	20	0.947	0.535	0.506
TEST 53	22	0.949	0.531	0.504
TEST 53	23	0.947	0.782	0.740
TEST 53	24	0.857	0.625	0.536
TEST 53	25	0.857	0.615	0.527
TEST 53	27	0.864	0.617	0.533
TEST 53	29	0.840	0.339	0.285
TEST 53	30	0.854	0.328	0.281
TEST 53	31	0.979	0.324	0.318
TEST 53	32	1.068	0.408	0.436
TEST 53	33	0.824	0.441	0.363
TEST 53	34	0.852	0.383	0.327
TEST 53	35	0.822	0.428	0.352
TEST 53	36	0.802	0.428	0.343
TEST 53	38	0.946	0.393	0.371
TEST 53	39	0.914	0.507	0.463
TEST 53	40	0.887	0.453	0.402
TEST 53	41	0.789	0.508	0.401
TEST 53	42	0.855	0.501	0.428
TEST 53	44	0.856	0.478	0.409
TEST 53	46	0.825	0.265	0.219
TEST 53	47	0.898	0.245	0.220
TEST 53	48	0.933	0.252	0.235
TEST 53	49	1.058	0.258	0.273
TEST 53	50	0.770	0.336	0.259
TEST 53	51	0.807	0.318	0.256
TEST 53	52	0.928	0.297	0.276
TEST 53	54	0.944	0.319	0.301
TEST 53	55	0.887	0.376	0.334
TEST 53	56	0.800	0.374	0.300
TEST 53	57	0.912	0.385	0.351
TEST 53	58	0.919	0.366	0.336

TABLE A - DNB RESULTS FROM VIPRE

TITLE	RUN	DNBR P/M	MEASURED FLUX MBTU/HR-FT2	PREDICTED FLUX MBTU/HR-FT2
TEST 53	62	0.832	0.707	0.588
TEST 53	69	0.912	0.768	0.700
TEST 53	70	0.917	0.854	0.783
TEST 53	71	0.898	0.774	0.694
TEST 53	73	0.895	0.793	0.709
TEST 53	74	0.894	0.916	0.819
TEST 53	75	0.892	0.855	0.763
TEST 53	77	0.872	0.839	0.732
TEST 53	79	0.939	0.907	0.852
TEST 53	80	0.913	0.981	0.896
TEST 53	81	0.853	0.980	0.836
TEST 53	82	0.893	0.960	0.857
TEST 53	84	0.932	0.918	0.855
TEST 53	85	0.837	0.744	0.623

TABLE A - DNB RESULTS FROM VIPRE

TITLE	RUN	DNBR P/M	MEASURED FLUX MBTU/HR-FT2	PREDICTED FLUX MBTU/HR-FT2
TEST 57	7	1.083	0.346	0.375
TEST 57	8	0.989	0.357	0.353
TEST 57	9	1.078	0.353	0.381
TEST 57	10	1.044	0.364	0.380
TEST 57	11	1.053	0.453	0.477
TEST 57	12	1.080	0.455	0.492
TEST 57	13	1.000	0.460	0.460
TEST 57	14	0.977	0.464	0.453
TEST 57	16	1.031	0.554	0.571
TEST 57	17	1.055	0.537	0.567
TEST 57	18	0.995	0.542	0.539
TEST 57	19	0.990	0.557	0.551
TEST 57	22	1.011	0.649	0.656
TEST 57	23	0.989	0.630	0.623
TEST 57	24	1.004	0.640	0.643
TEST 57	25	0.919	0.674	0.619
TEST 57	27	0.988	0.297	0.293
TEST 57	28	0.984	0.300	0.295
TEST 57	29	1.012	0.305	0.308
TEST 57	30	0.987	0.311	0.307
TEST 57	31	0.980	0.373	0.366
TEST 57	32	0.924	0.378	0.349
TEST 57	33	0.976	0.374	0.365
TEST 57	34	0.998	0.377	0.377
TEST 57	37	0.984	0.448	0.441
TEST 57	38	1.006	0.445	0.448
TEST 57	39	0.881	0.465	0.409
TEST 57	40	0.941	0.464	0.436
TEST 57	41	1.001	0.503	0.503
TEST 57	42	0.962	0.516	0.497
TEST 57	43	0.892	0.536	0.479
TEST 57	44	0.918	0.527	0.484
TEST 57	47	1.061	0.420	0.445
TEST 57	48	1.060	0.411	0.435
TEST 57	49	1.048	0.415	0.435
TEST 57	50	1.044	0.435	0.454
TEST 57	51	0.995	0.533	0.531
TEST 57	52	1.064	0.533	0.567

TABLE A - DNB RESULTS FROM VIPRE

TITLE	RUN	DNBR P/M	MEASURED FLUX MBTU/HR-FT2	PREDICTED FLUX MBTU/HR-FT2
TEST 57	53	0.978	0.553	0.541
TEST 57	54	0.997	0.539	0.538
TEST 57	57	0.955	0.645	0.616
TEST 57	58	0.988	0.646	0.638
TEST 57	59	1.021	0.632	0.645
TEST 57	60	0.983	0.646	0.636
TEST 57	61	1.047	0.481	0.504
TEST 57	62	1.065	0.474	0.505
TEST 57	63	1.043	0.468	0.488
TEST 57	64	1.120	0.485	0.543
TEST 57	65	0.963	0.652	0.628
TEST 57	66	1.005	0.643	0.646
TEST 57	67	1.069	0.624	0.667
TEST 57	68	1.072	0.608	0.651
TEST 57	69	1.019	0.237	0.241
TEST 57	70	1.029	0.229	0.235
TEST 57	71	1.082	0.230	0.249
TEST 57	72	1.004	0.245	0.246
TEST 57	73	1.027	0.282	0.290
TEST 57	74	0.949	0.287	0.272
TEST 57	75	1.002	0.288	0.288
TEST 57	76	1.088	0.284	0.309
TEST 57	79	1.006	0.334	0.336
TEST 57	80	0.924	0.345	0.318
TEST 57	81	0.842	0.351	0.296
TEST 57	82	0.978	0.346	0.338
TEST 57	83	0.982	0.374	0.367
TEST 57	84	0.869	0.387	0.336
TEST 57	85	0.868	0.395	0.343
TEST 57	86	0.963	0.381	0.367
TEST 57	90	0.930	0.744	0.691
TEST 57	91	0.963	0.724	0.697
TEST 57	92	0.997	0.706	0.704
TEST 57	93	1.003	0.710	0.712
TEST 57	98	0.928	0.740	0.686
TEST 57	99	0.954	0.739	0.705
TEST 57	100	0.983	0.730	0.718
TEST 57	101	1.059	0.713	0.755

TABLE A - DNB RESULTS FROM VIPRE

TITLE	RUN	DNBR P/M	MEASURED FLUX MBTU/HR-FT2	PREDICTED FLUX MBTU/HR-FT2
TEST 65	25	0.901	0.341	0.307
TEST 65	26	0.890	0.331	0.294
TEST 65	27	0.929	0.331	0.308
TEST 65	28	1.040	0.320	0.333
TEST 65	29	0.929	0.421	0.391
TEST 65	30	0.885	0.417	0.369
TEST 65	31	0.921	0.419	0.386
TEST 65	33	0.986	0.420	0.414
TEST 65	34	0.959	0.493	0.473
TEST 65	35	0.961	0.499	0.480
TEST 65	36	0.904	0.506	0.458
TEST 65	38	0.868	0.504	0.438
TEST 65	40	0.969	0.378	0.366
TEST 65	41	1.100	0.347	0.382
TEST 65	42	0.880	0.394	0.347
TEST 65	43	0.970	0.382	0.370
TEST 65	44	1.013	0.372	0.377
TEST 65	45	0.855	0.505	0.432
TEST 65	46	0.893	0.492	0.439
TEST 65	47	0.909	0.494	0.449
TEST 65	49	0.926	0.479	0.443
TEST 65	50	0.878	0.609	0.534
TEST 65	51	0.890	0.586	0.521
TEST 65	52	0.937	0.585	0.548
TEST 65	54	0.883	0.604	0.534
TEST 65	56	0.905	0.273	0.247
TEST 65	57	0.997	0.269	0.269
TEST 65	58	1.115	0.258	0.287
TEST 65	59	1.234	0.254	0.313
TEST 65	60	0.946	0.341	0.322
TEST 65	61	0.833	0.342	0.285
TEST 65	62	0.922	0.338	0.312
TEST 65	64	1.004	0.331	0.332
TEST 65	65	0.901	0.406	0.366
TEST 65	66	0.832	0.411	0.342
TEST 65	67	0.798	0.424	0.339
TEST 65	69	0.874	0.413	0.361
TEST 65	71	0.893	0.205	0.183

TABLE A - DNB RESULTS FROM VIPRE

TITLE	RUN	DNBR P/M	MEASURED FLUX MBTU/HR-FT2	PREDICTED FLUX MBTU/HR-FT2
TEST 65	72	0.914	0.208	0.190
TEST 65	73	0.975	0.217	0.211
TEST 65	75	0.755	0.261	0.197
TEST 65	76	0.739	0.265	0.196
TEST 65	77	0.875	0.255	0.224
TEST 65	79	1.008	0.254	0.256
TEST 65	80	0.757	0.305	0.231
TEST 65	81	0.737	0.315	0.232
TEST 65	82	0.790	0.310	0.245
TEST 65	84	0.954	0.304	0.290
TEST 65	86	0.847	0.337	0.285
TEST 65	87	0.823	0.457	0.376
TEST 65	88	0.827	0.460	0.380
TEST 65	89	0.874	0.455	0.397
TEST 65	90	0.919	0.443	0.407
TEST 65	91	0.841	0.586	0.493
TEST 65	92	0.891	0.569	0.507
TEST 65	93	0.884	0.566	0.501
TEST 65	95	0.888	0.555	0.492
TEST 65	96	0.904	0.561	0.507
TEST 65	97	0.900	0.686	0.617
TEST 65	98	0.880	0.681	0.599
TEST 65	99	0.911	0.668	0.609
TEST 65	101	0.896	0.672	0.602
TEST 65	112	0.889	0.503	0.447
TEST 65	113	0.779	0.317	0.247
TEST 65	114	0.965	0.401	0.387
TEST 65	115	0.923	0.490	0.452
TEST 65	116	0.884	0.408	0.360
TEST 65	117	0.913	0.417	0.381
TEST 65	118	0.926	0.451	0.417
TEST 65	119	0.848	0.457	0.388
TEST 65	120	0.841	0.394	0.331
TEST 65	121	0.801	0.398	0.319
TEST 65	122	0.843	0.359	0.303
TEST 65	123	0.868	0.384	0.333
TEST 65	124	0.862	0.418	0.361
TEST 65	125	0.871	0.481	0.419

TABLE A - DNB RESULTS FROM VIPRE

TITLE	RUN	DNBR P/M	MEASURED FLUX MBTU/HR-FT2	PREDICTED FLUX MBTU/HR-FT2
TEST 65	126	0.866	0.296	0.257
TEST 65	127	0.864	0.381	0.329
TEST 65	128	0.873	0.407	0.355
TEST 65	129	0.926	0.355	0.329
TEST 65	130	0.913	0.392	0.358
TEST 65	131	0.882	0.388	0.342
TEST 65	132	0.890	0.426	0.379
TEST 65	133	0.901	0.407	0.367
TEST 65	134	0.888	0.442	0.393
TEST 65	135	0.898	0.377	0.339
TEST 65	136	0.920	0.403	0.371
TEST 65	137	0.852	0.418	0.356
TEST 65	138	0.898	0.442	0.397
TEST 65	139	0.904	0.415	0.375
TEST 65	140	0.891	0.456	0.406
TEST 65	141	0.895	0.464	0.415
TEST 65	142	0.920	0.473	0.435
TEST 65	143	0.914	0.477	0.436
TEST 65	144	0.898	0.493	0.443
TEST 65	145	0.923	0.496	0.458
TEST 65	146	0.899	0.397	0.357
TEST 65	147	0.879	0.414	0.363
TEST 65	148	0.925	0.421	0.389
TEST 65	149	0.922	0.439	0.405
TEST 65	150	0.909	0.463	0.421
TEST 65	151	0.891	0.428	0.382
TEST 65	152	0.902	0.438	0.395
TEST 65	153	0.922	0.448	0.413
TEST 65	154	0.917	0.458	0.420
TEST 65	155	0.904	0.441	0.399
TEST 65	156	0.927	0.481	0.446
TEST 65	157	0.910	0.460	0.419
TEST 65	158	0.927	0.497	0.460
TEST 65	159	0.903	0.482	0.435
TEST 65	160	0.930	0.517	0.481
TEST 65	161	0.899	0.496	0.446
TEST 65	162	0.948	0.522	0.495
TEST 65	163	0.880	0.447	0.394

TABLE A - DNB RESULTS FROM VIPRE

TITLE	RUN	DNBR P/M	MEASURED FLUX MBTU/HR-FT2	PREDICTED FLUX MBTU/HR-FT2
TEST 65	164	0.896	0.480	0.430
TEST 65	165	0.888	0.462	0.411
TEST 65	166	0.912	0.502	0.458
TEST 65	167	0.888	0.480	0.426
TEST 65	168	0.914	0.513	0.470
TEST 65	169	0.840	0.507	0.425
TEST 65	170	0.928	0.534	0.495
TEST 65	171	0.917	0.557	0.511
TEST 65	180	0.928	0.362	0.336
TEST 65	181	0.924	0.372	0.344
TEST 65	182	0.884	0.362	0.320
TEST 65	183	0.885	0.384	0.340
TEST 65	184	0.881	0.395	0.348
TEST 65	185	0.892	0.230	0.205
TEST 65	186	0.915	0.241	0.221
TEST 65	187	0.876	0.276	0.242
TEST 65	188	0.805	0.298	0.240
TEST 65	189	0.896	0.364	0.326
TEST 65	190	0.905	0.357	0.324
TEST 65	191	0.844	0.332	0.281
TEST 65	192	0.842	0.321	0.271
TEST 65	193	0.878	0.335	0.294
TEST 65	194	0.890	0.336	0.299
TEST 65	195	0.880	0.342	0.301
TEST 65	196	0.874	0.330	0.288
TEST 65	172	0.890	0.425	0.378
TEST 65	173	0.896	0.439	0.393
TEST 65	174	0.871	0.458	0.399
TEST 65	175	0.864	0.481	0.416
TEST 65	176	0.882	0.490	0.432
TEST 65	177	0.890	0.473	0.421
TEST 65	178	0.861	0.521	0.449
TEST 65	179	0.883	0.477	0.421
TEST 65	197	0.908	0.462	0.420
TEST 65	198	0.928	0.476	0.442
TEST 65	199	0.893	0.534	0.477
TEST 65	200	0.869	0.507	0.441
TEST 65	201	0.917	0.494	0.453

TABLE A - DNB RESULTS FROM VIPRE

TITLE	RUN	DNBR P/M	MEASURED FLUX MBTU/HR-FT2	PREDICTED FLUX MBTU/HR-FT2
TEST 65	202	0.907	0.517	0.468
TEST 65	203	0.876	0.526	0.461
TEST 65	204	0.879	0.541	0.476
TEST 65	205	0.907	0.551	0.499
TEST 65	206	0.874	0.547	0.478
TEST 65	207	0.915	0.540	0.494
TEST 65	208	0.910	0.542	0.493
TEST 65	209	0.909	0.519	0.472
TEST 65	210	0.920	0.531	0.489
TEST 65	211	0.917	0.553	0.507
TEST 65	212	0.934	0.577	0.538
TEST 65	213	0.904	0.546	0.494
TEST 65	215	0.932	0.626	0.583
TEST 65	216	0.927	0.589	0.546
TEST 65	214	0.939	0.637	0.598
TEST 65	217	0.931	0.661	0.615
TEST 65	218	0.886	0.607	0.537
TEST 65	219	0.879	0.641	0.564
TEST 65	220	0.922	0.574	0.529
TEST 65	221	0.895	0.665	0.595
TEST 65	222	0.867	0.542	0.470
TEST 65	223	0.879	0.560	0.492

APPENDIX B

Trend plots of DNBR.

DNBR vs. Loop Pressure

DNBR vs. Local Quality

DNBR vs. Local Mass Flux

DNBR vs. Inlet Enthalpy

DNBR vs. Measured DNB Heat Flux

All Data via HTP Correlation

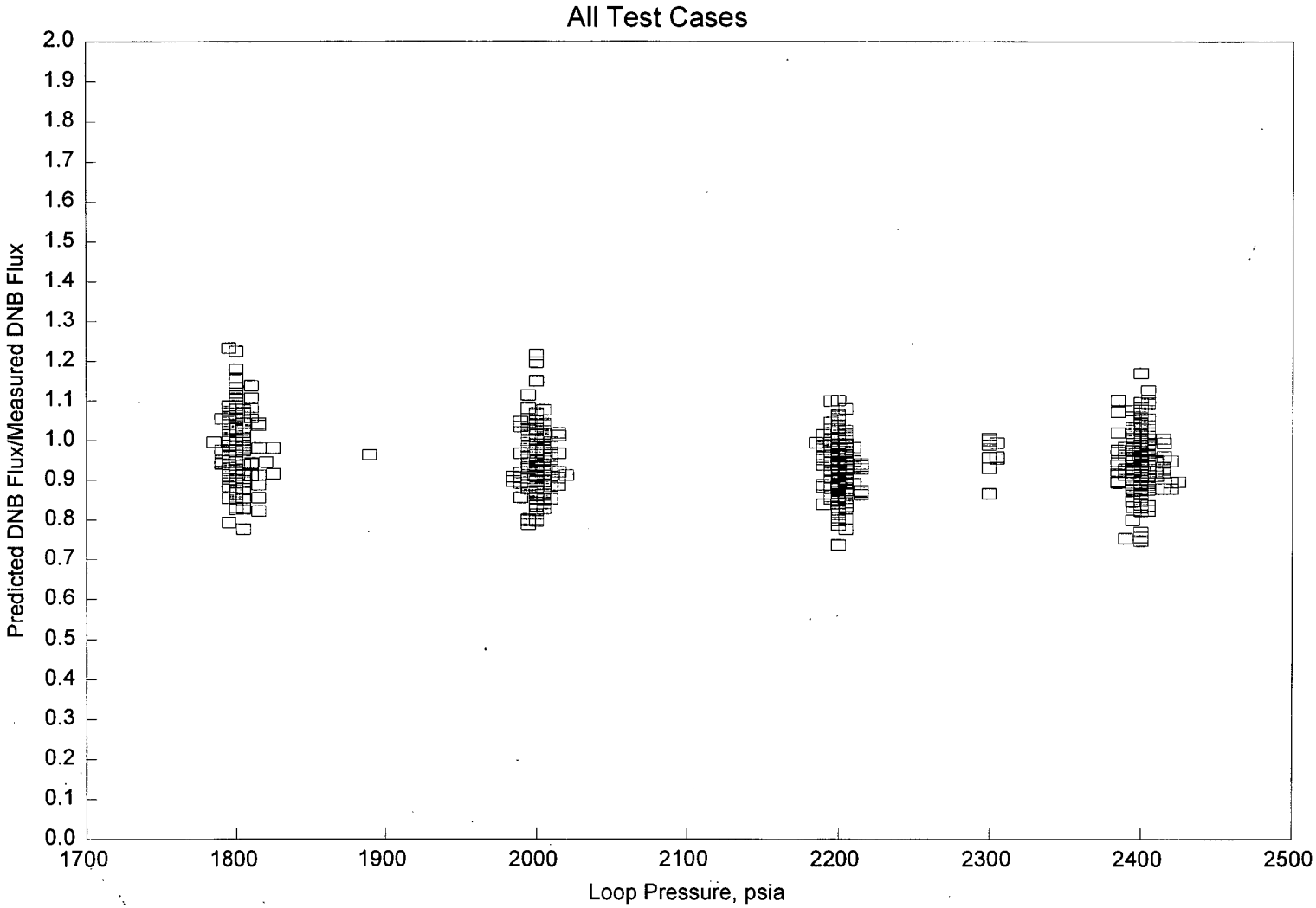

FIGURE B.1

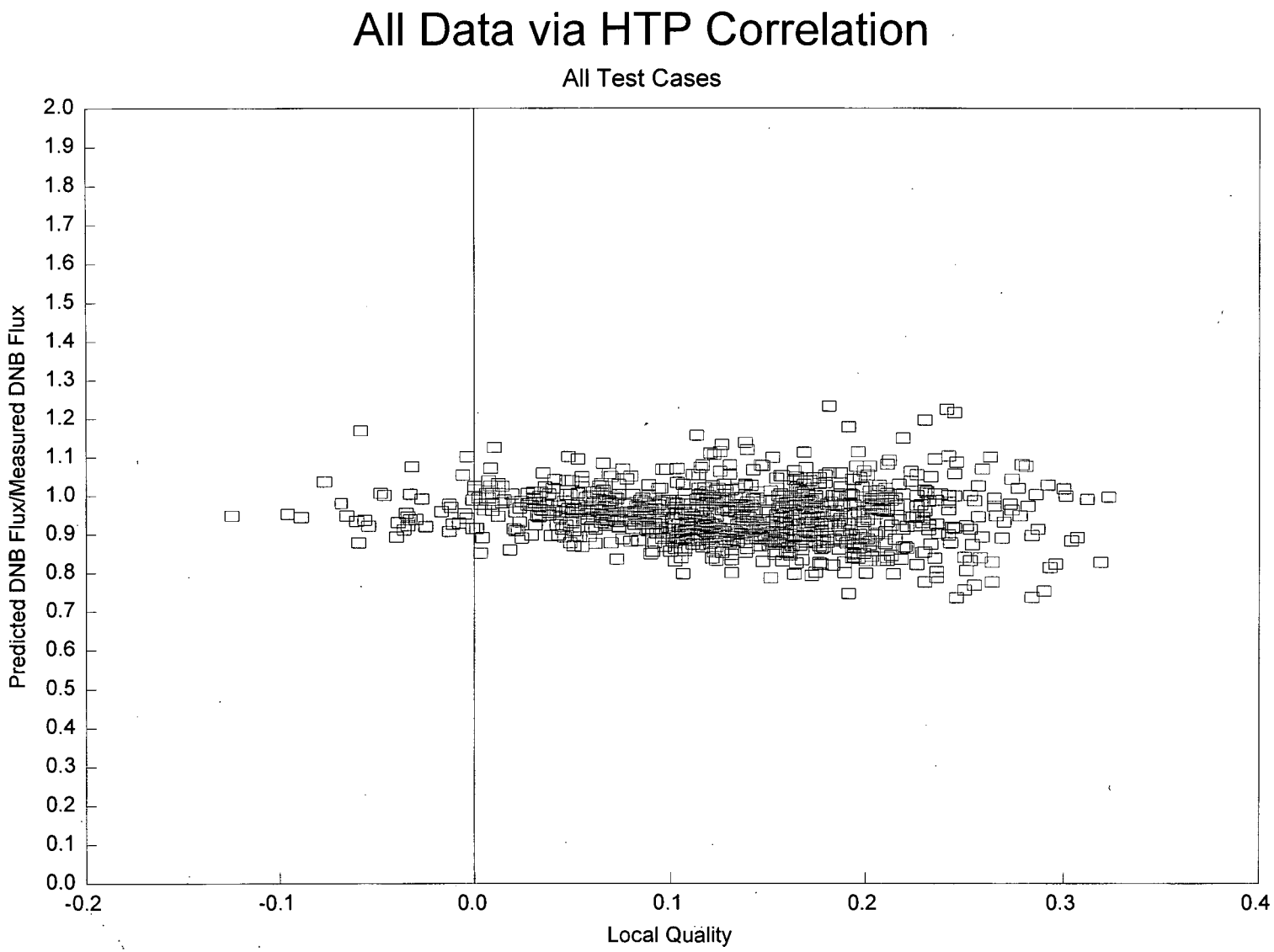
All Data via HTP Correlation
All Test Cases
Predicted DNB Flux/Measured DNB Flux
2.0
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.2
-0.1
0.0
0.1
0.2
0.3
0.4
Local Quality

FIGURE B.2

All Data via HTP Correlation

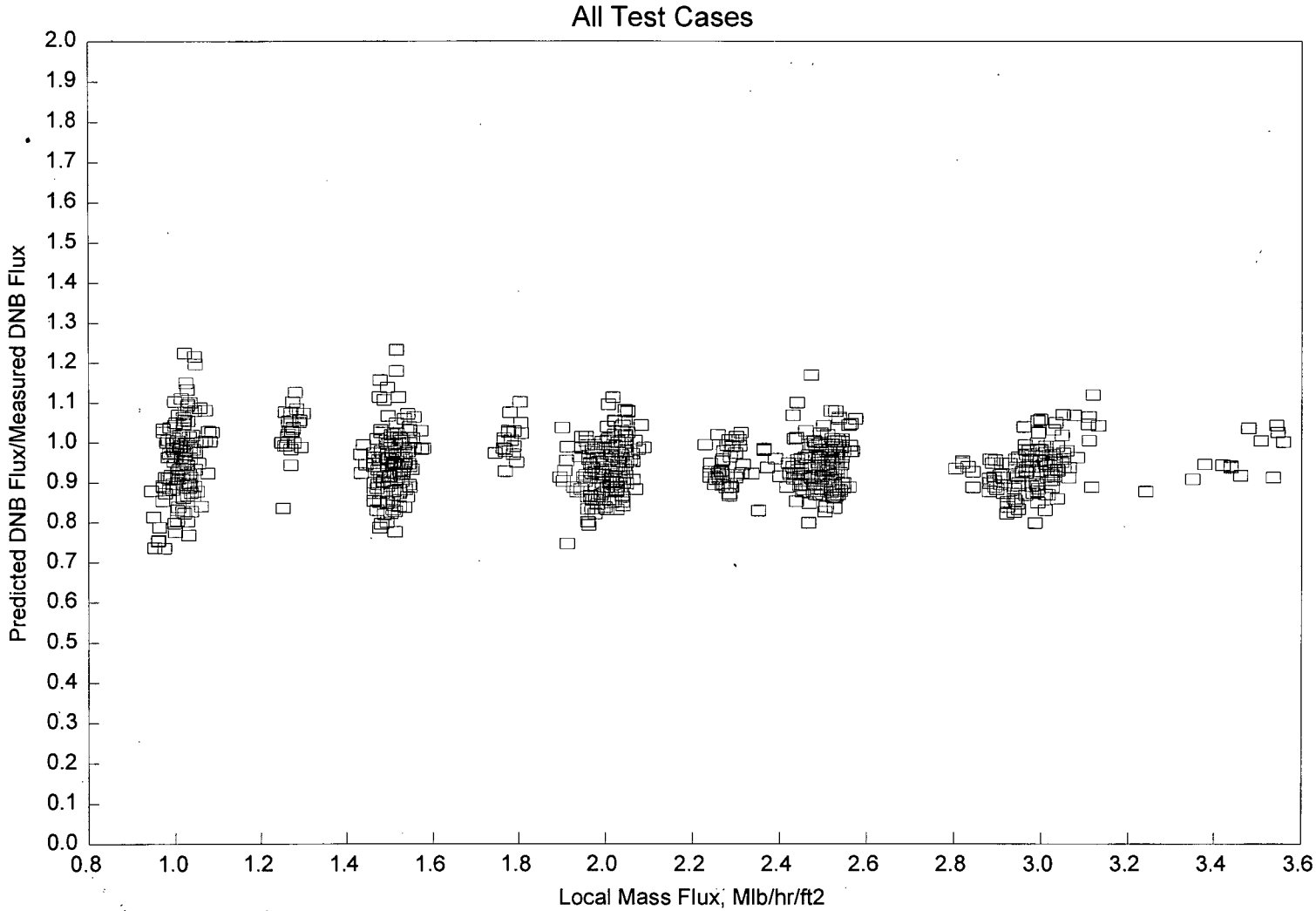

FIGURE B.3

All Data via HTP Correlation

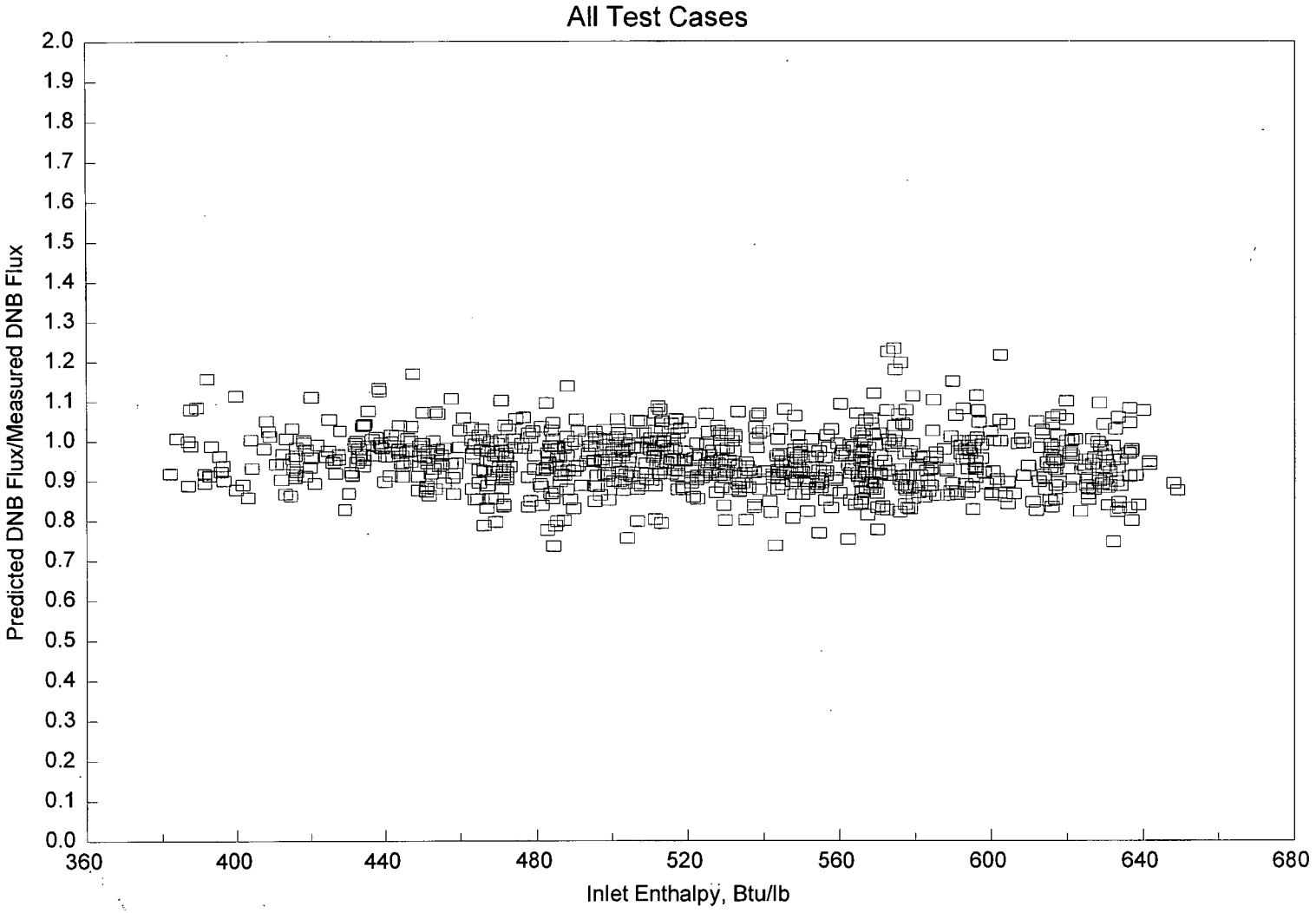

FIGURE B.4

All Data via HTP Correlation

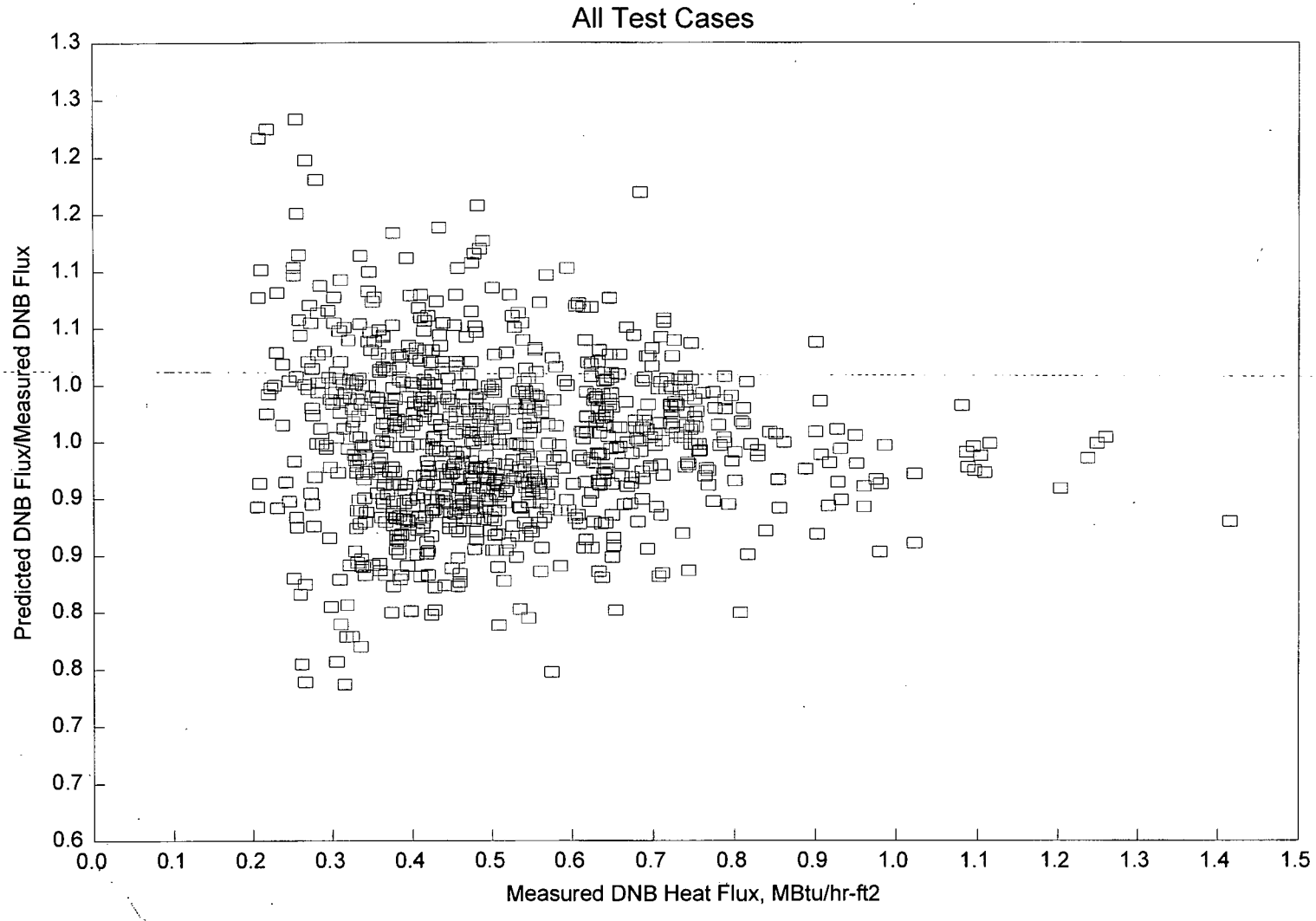

FIGURE B.5

APPENDIX C

Predicted vs. Measured heat flux for each test case.

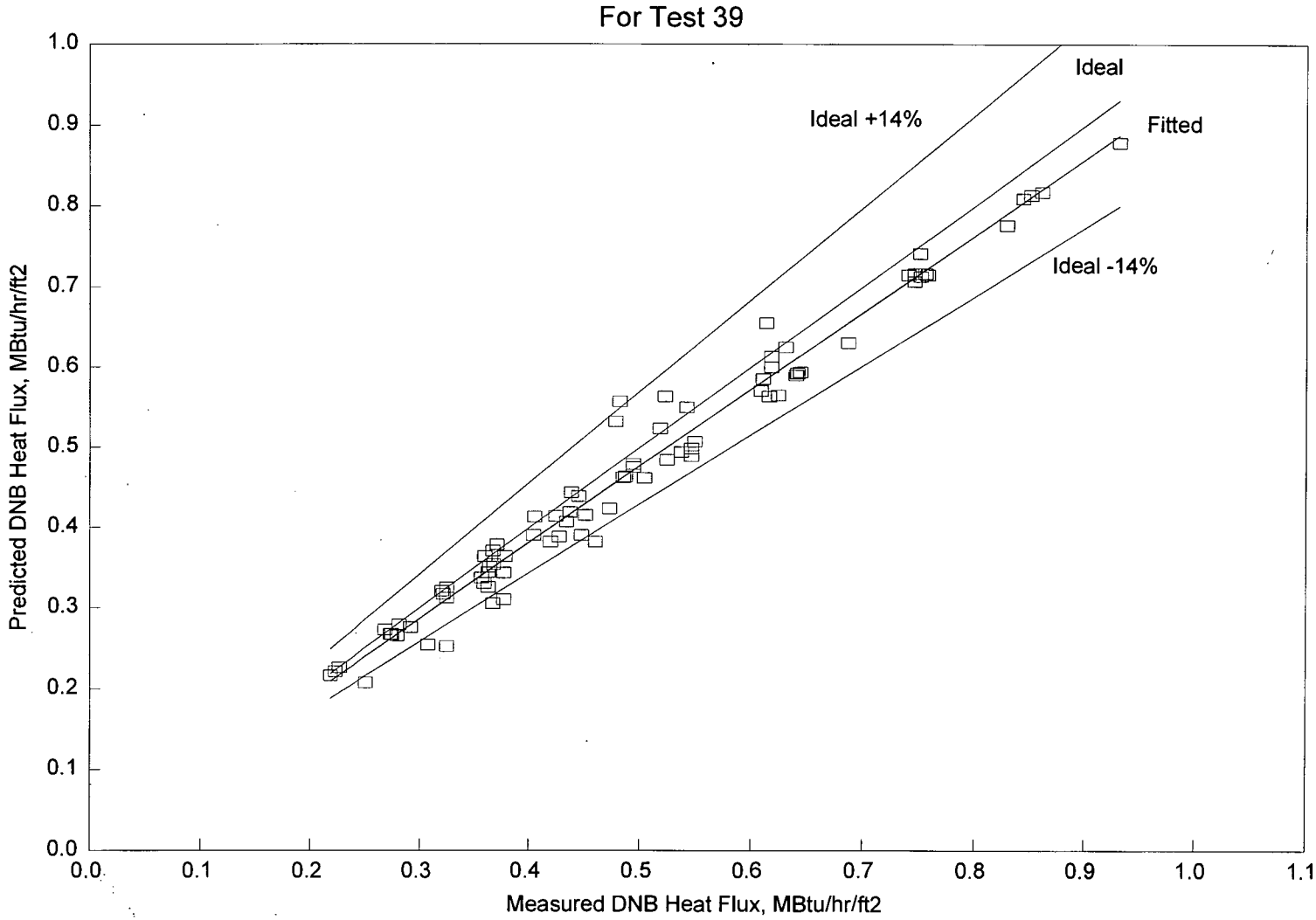
Predicted vs. Measured DNB Heat Flux
For Test 39
Ideal
Ideal +14%
Fitted
Ideal -14%
Predicted DNB Heat Flux, MBtu/hr/ft2
Measured DNB Heat Flux, MBtu/hr/ft2
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
1.1

FIGURE C.1

Predicted vs. Measured DNB Heat Flux

For Test 40

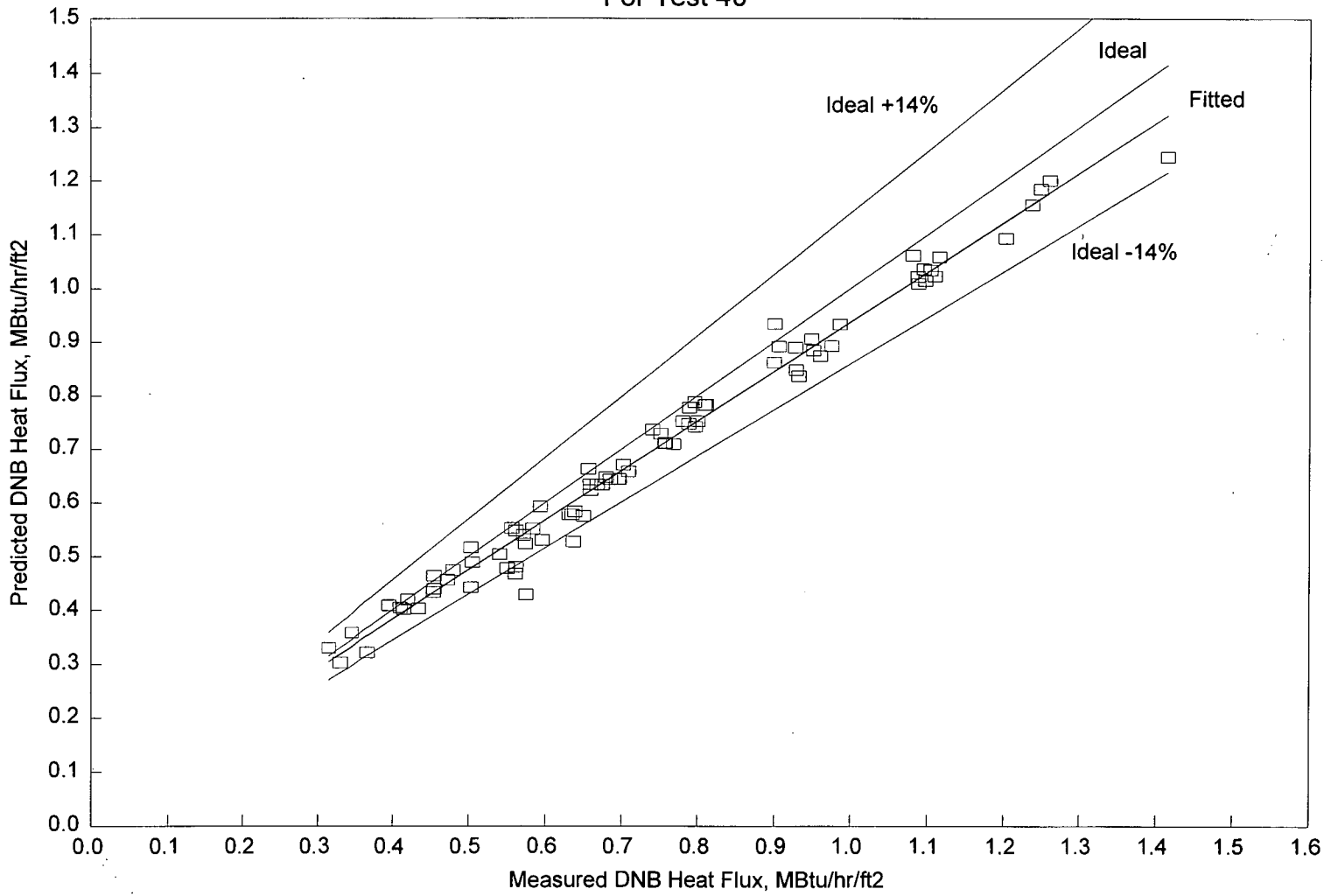

FIGURE C.2

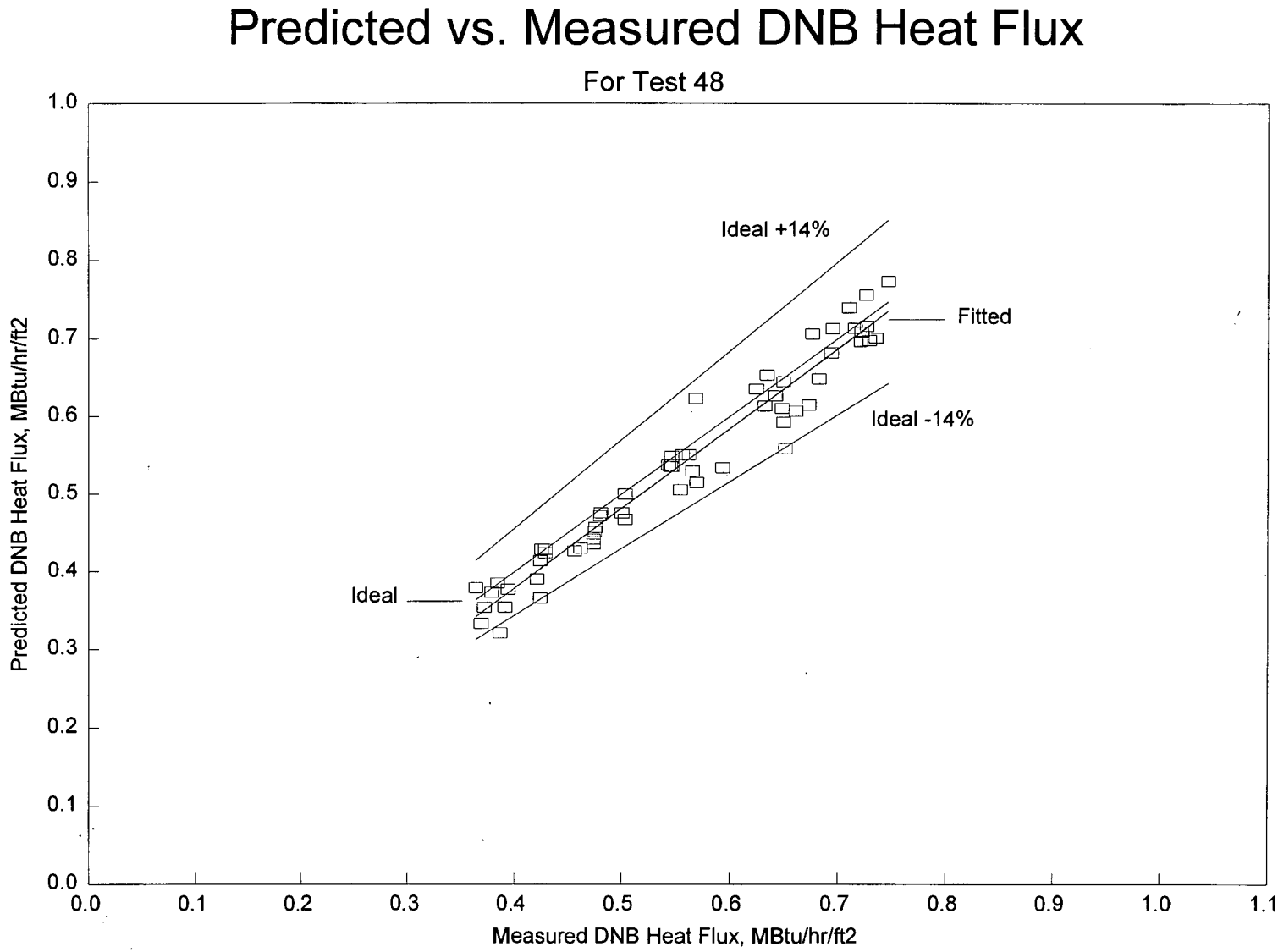
Predicted vs. Measured DNB Heat Flux
For Test 48
Ideal +14%
Fitted
Ideal -14%
Ideal
Predicted DNB Heat Flux, MBtu/hr/ft2
Measured DNB Heat Flux, MBtu/hr/ft2
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
1.1

FIGURE C.3

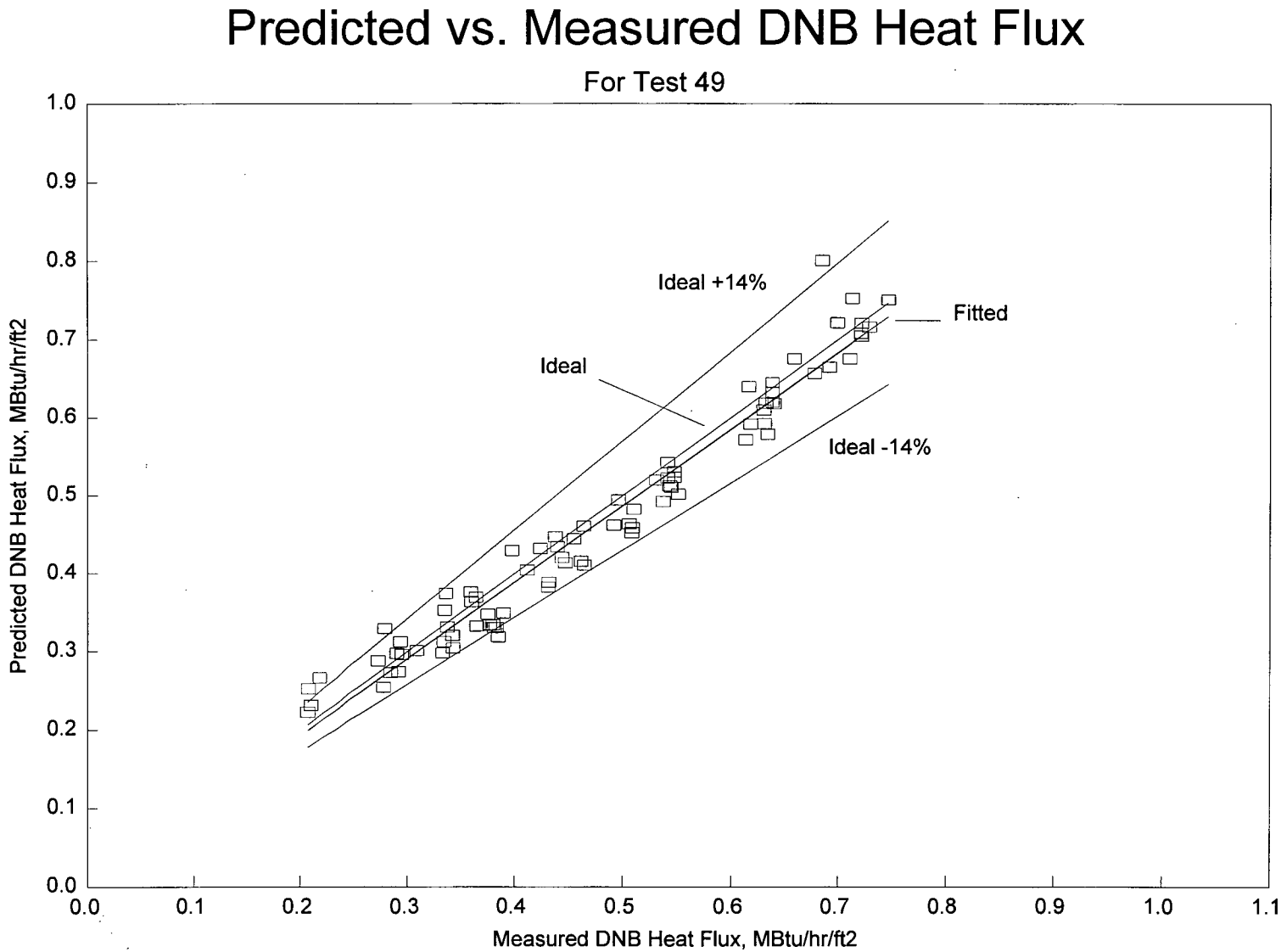
Predicted vs. Measured DNB Heat Flux
For Test 49
Ideal +14%
Fitted
Ideal
Ideal -14%
Predicted DNB Heat Flux, MBtu/hr/ft2
Measured DNB Heat Flux, MBtu/hr/ft2
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
1.1

FIGURE C.4

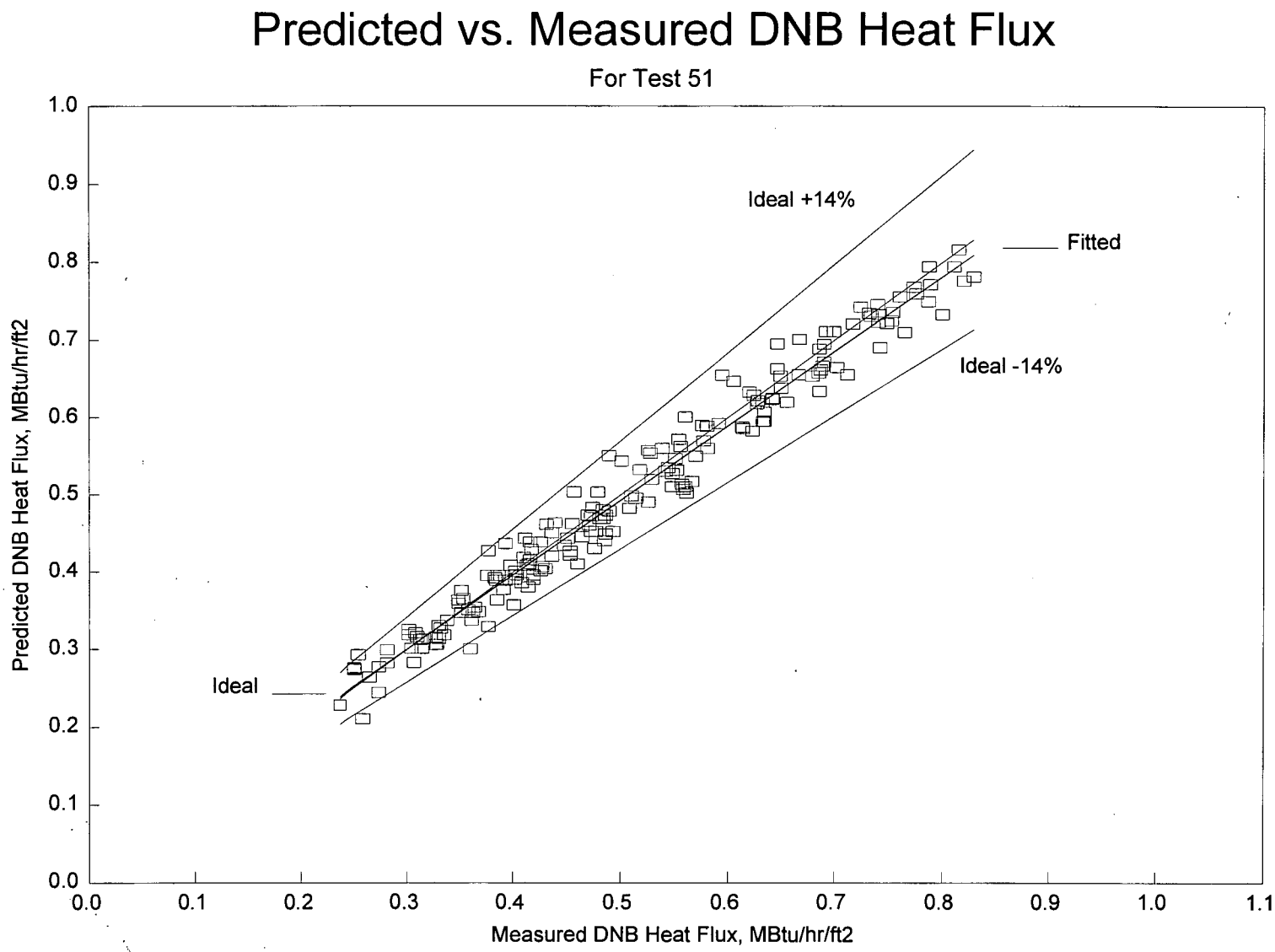
Predicted vs. Measured DNB Heat Flux
For Test 51
Ideal +14%
Fitted
Ideal -14%
Ideal
Predicted DNB Heat Flux, MBtu/hr/ft2
Measured DNB Heat Flux, MBtu/hr/ft2
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
1.1

FIGURE C.5

Predicted vs. Measured DNB Heat Flux

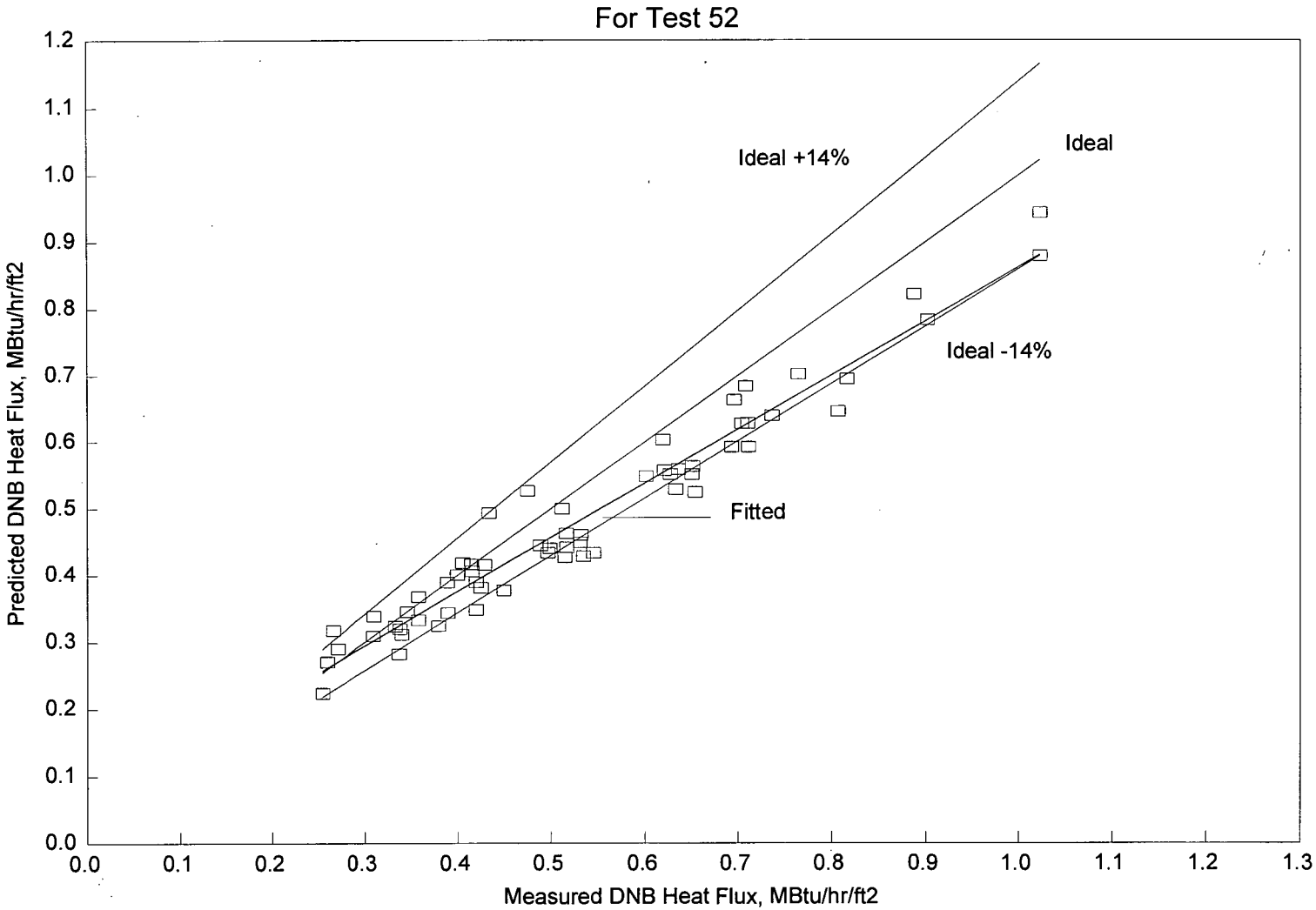

FIGURE C.6

Predicted vs. Measured DNB Heat Flux

For Test 53

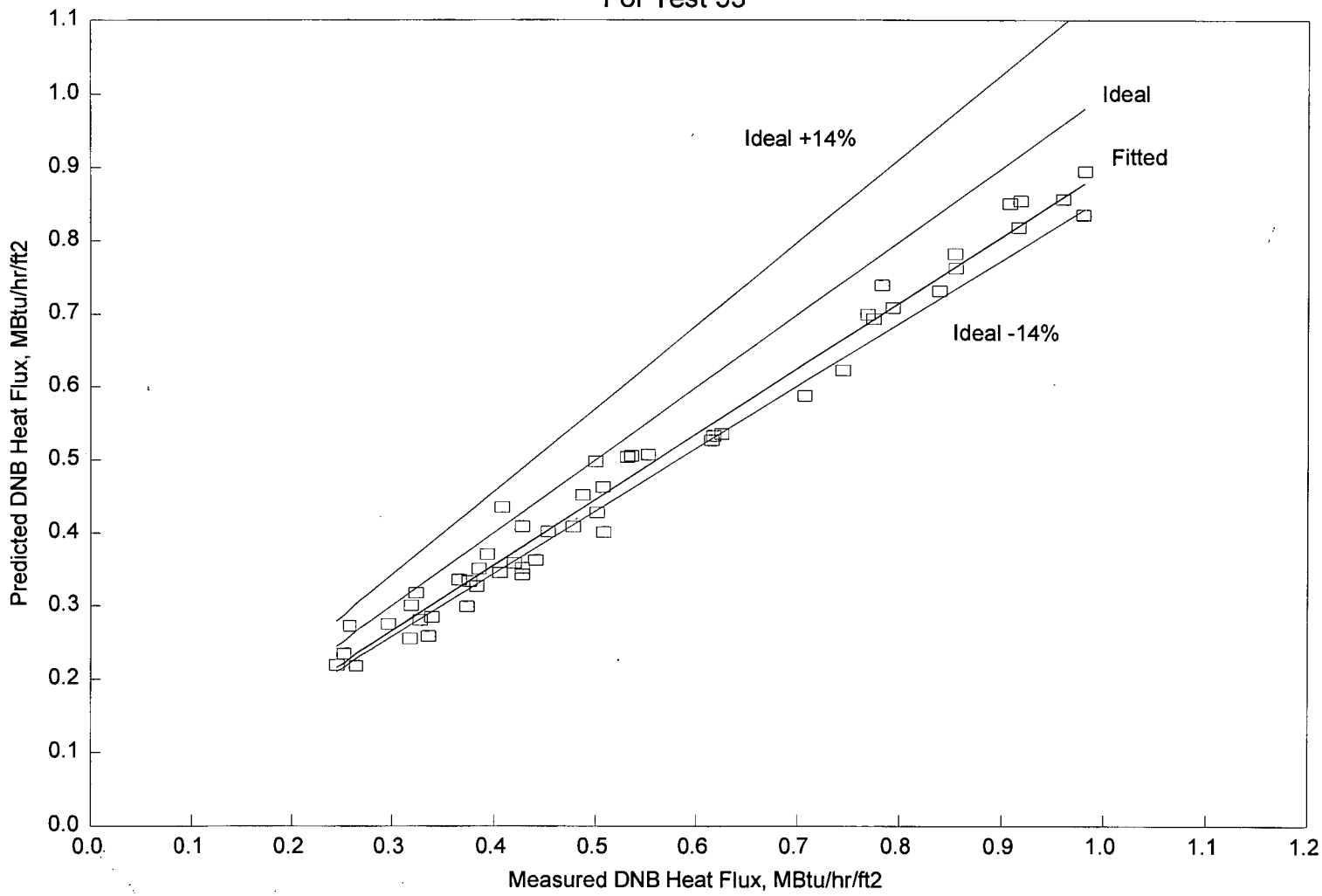

FIGURE C.7

Predicted vs. Measured DNB Heat Flux

For Test 57

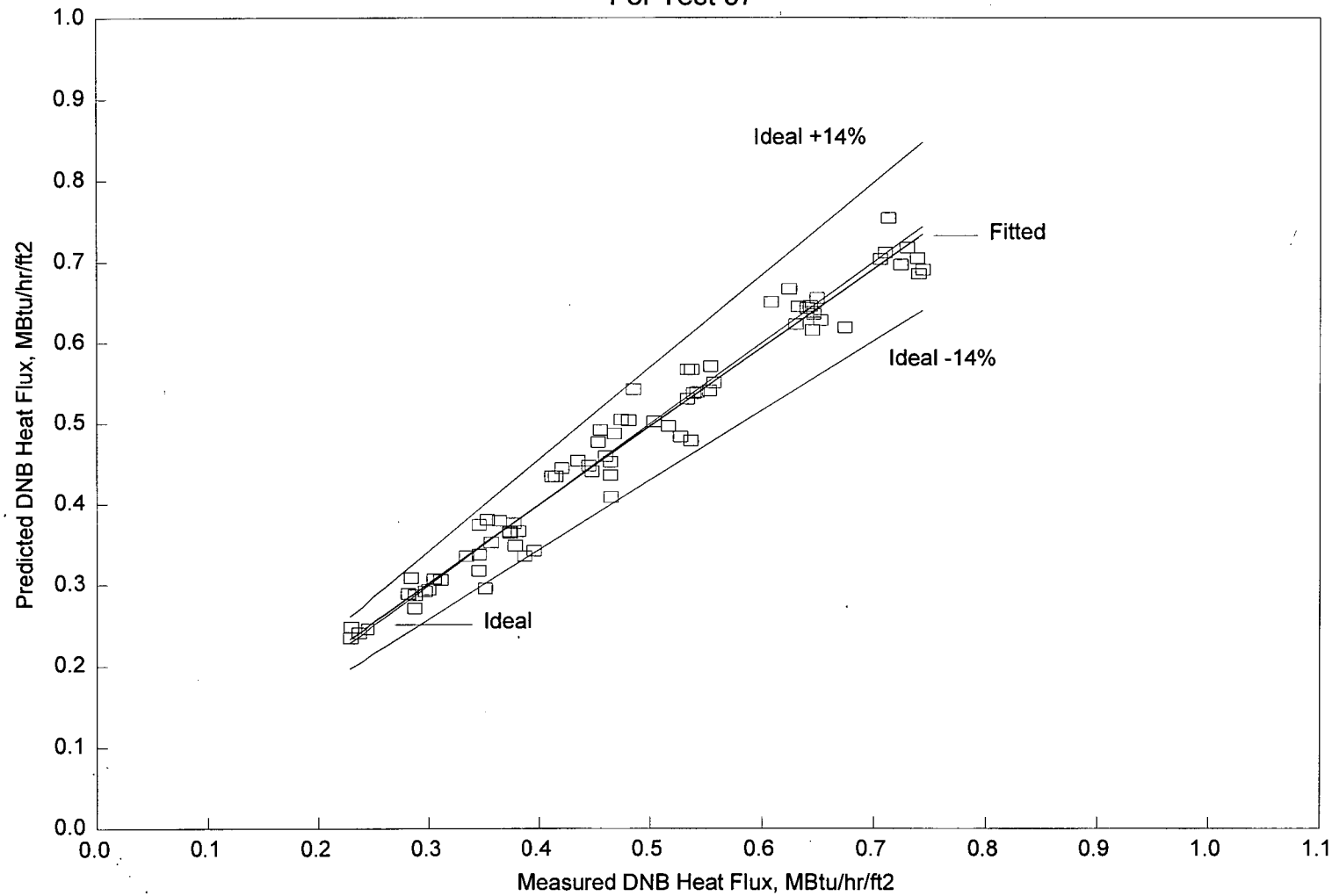

FIGURE C.8

Predicted vs. Measured DNB Heat Flux

For Test 65

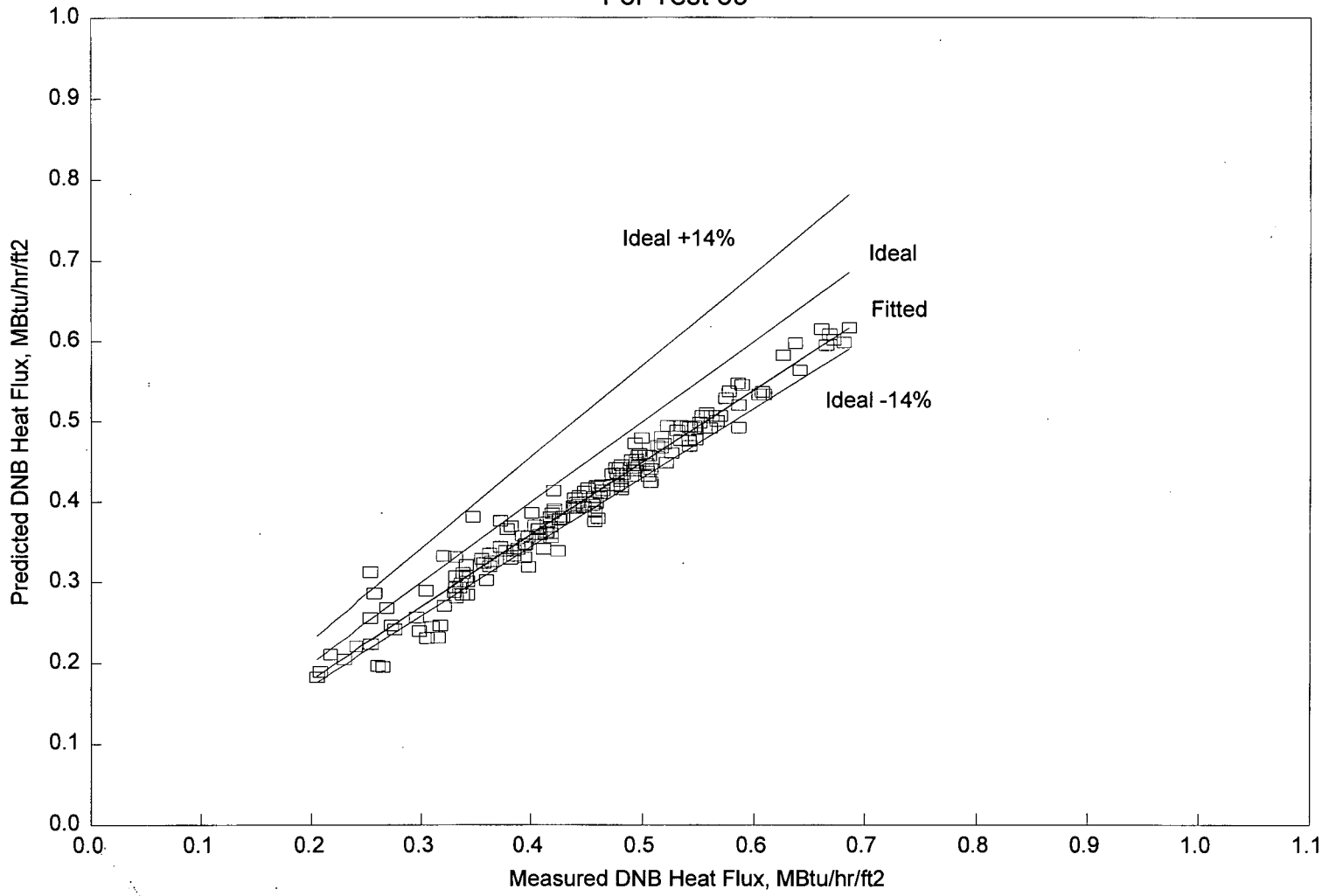

FIGURE C.9

APPENDIX D

Predicted vs. Measured heat flux for all test cases.

Predicted vs. Measured DNB Heat Flux

For All Test Cases

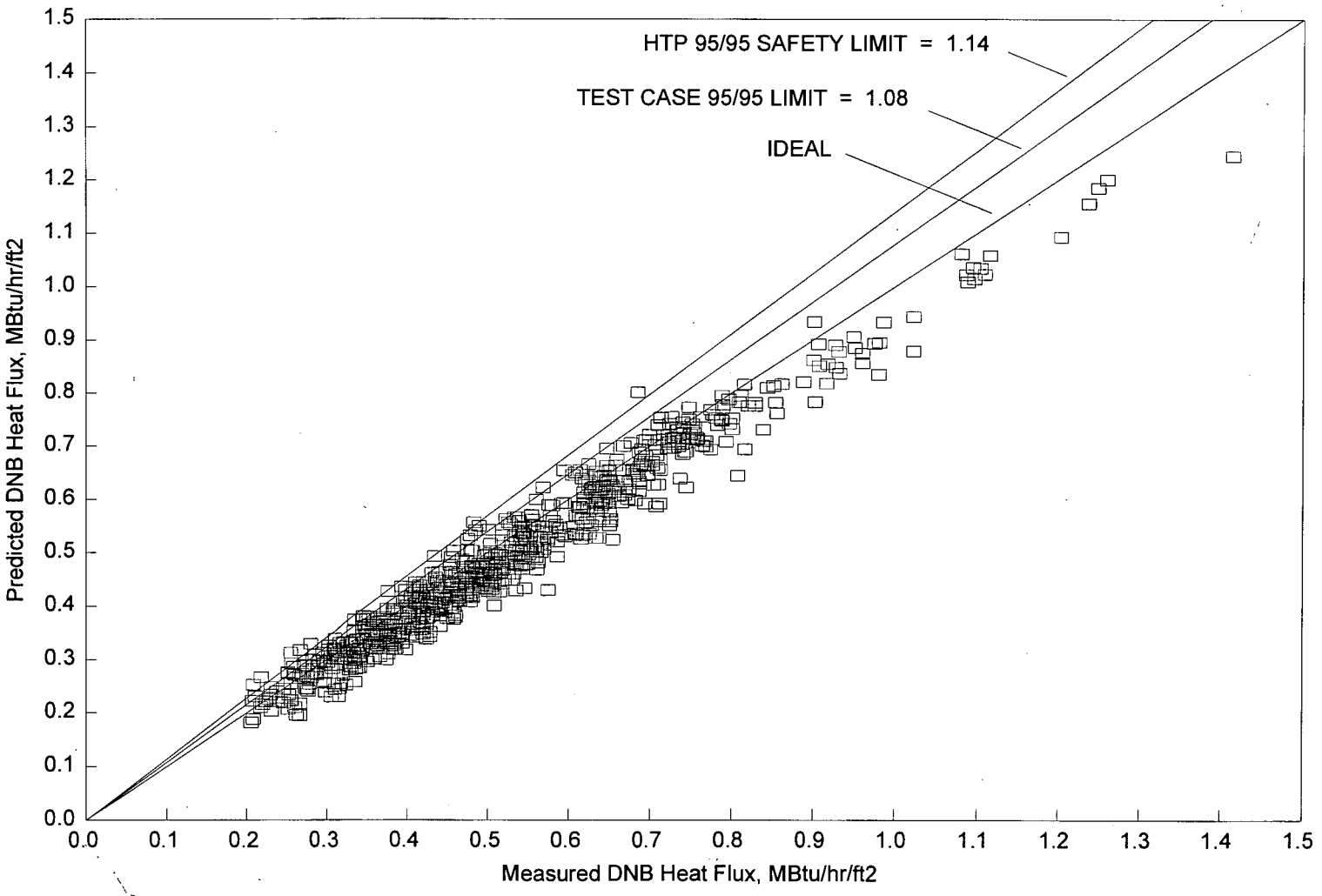

FIGURE D.1

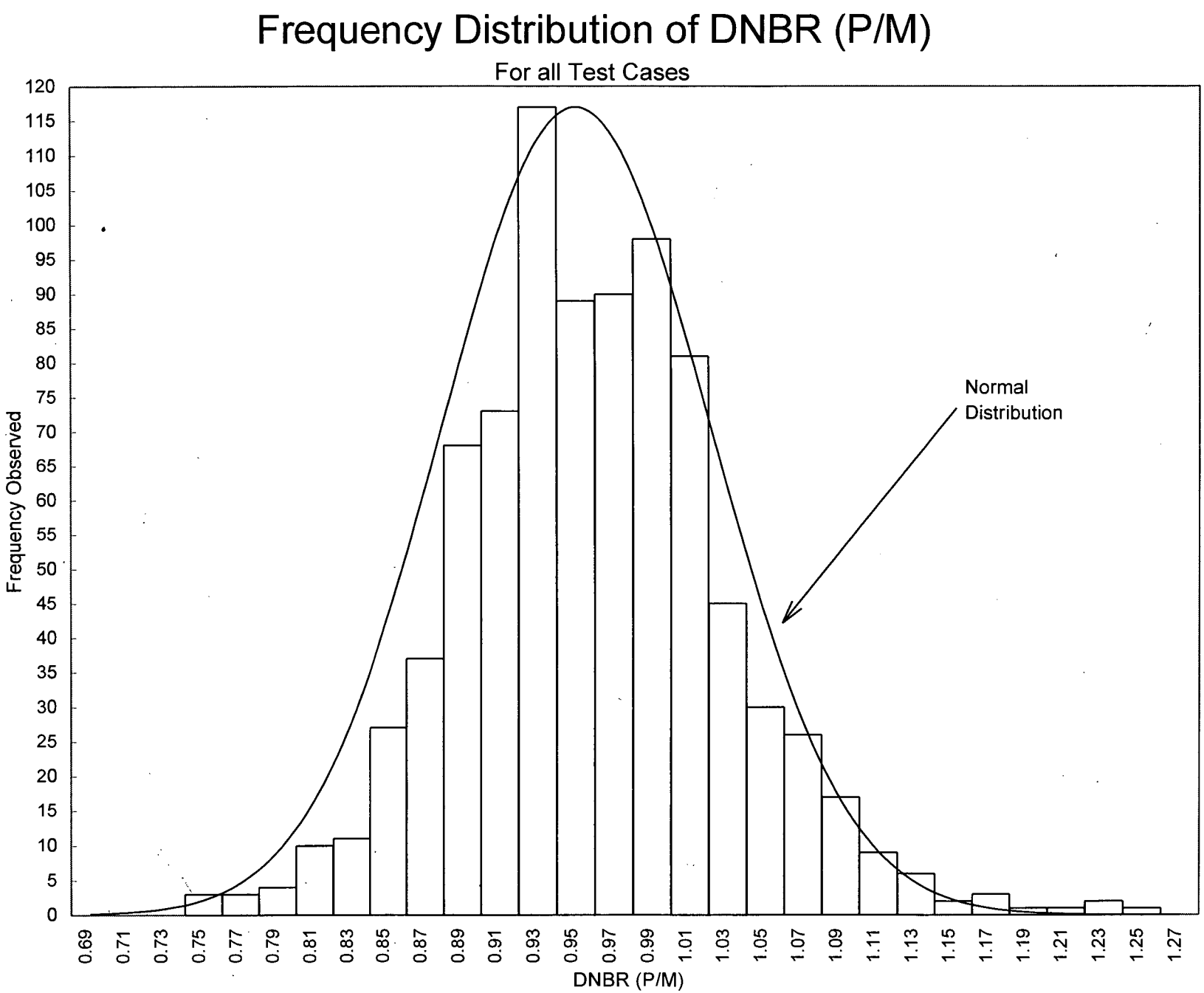
Frequency Distribution of DNBR (P/M)
For all Test Cases
Frequency Observed
DNBR (P/M)
Normal
Distribution
120
115
110
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0
0.69
0.71
0.73
0.75
0.77
0.79
0.81
0.83
0.85
0.87
0.89
0.91
0.93
0.95
0.97
0.99
1.01
1.03
1.05
1.07
1.09
1.11
1.13
1.15
1.17
1.19
1.21
1.23
1.25
1.27

FIGURE D.2