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Scientific Notebook No. 731: Radionuclide Transport (RT) Key Technical Issues - Continuation of Scientific Notebook No. 721 (07/27/2005 through 11/02/2005)

LABORATORY NOTEBOOK

731

CNWRA/SwRI

CNWRA SINGLE DOCUMENT SUBMISSION FORM

Document Date:	07/27/2005
Document Type:	CNWRA Scientific Notebooks and Supplemental Material
Availability:	☐ Publicly Available ☐ Non-Publicly Available
Title:	Scientific Notebook No. 731: Radionuclide Transport (RT) Key Technical Issues - Continuation of Scientific Notebook No. 721 (07/27/2005 through 11/02/2005)
Author Name:	Werling B, Roberts M
Author Affiliation:	Center for Nuclear Waste Regulatory Analyses
Docket Number:	WM-00011
License Number:	Pre
Case/Reference Number:	
Document Report Number:	Q200511080002 and Notebook Number 731
Keyword:	
Comment:	Best available copy.
Document Sensitivity:	■ Non-Sensitive ☐ Sensitive ☐ Non-Sensitive - Copyright ☐ Sensitive - Copyright
Text Source:	■ No Text Source (Image only) ☐ OCRed from scanned image - no corrections made ☐ OCRed from scanned image - corrections made

TITLE 27 July 05 MR

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Investigator	Signature	Initials
Marla Roberts	Marla Roberts	MR
Bradley Werling	Bradley Werling	BAW

Initial Entry for Scientific Notebook 731

This notebook contains work for Radionuclide Transport (RT) in both the saturated zone and unsaturated zone (ISIs 20.06002.01.242 and 20.06002.01.232 respectively). RT is concerned with identification of key geochemical processes that may control radionuclide transport at Yucca Mountain. Radionuclide retardation is dependent on the hydrochemistry and mineralogy along the groundwater flow paths from the proposed repository. Typical activities associated with these investigations would include conducting laboratory batch sorption experiments, collecting field samples, and analyses of field samples.

Current experimental activities are focused on characterization of materials collected from the Yucca Mountain region and laboratory batch sorption experiments that incorporate these materials. One method used in the alluvium characterization work is surface area analyses of sonic core samples. Typical surface area analyses steps include the following:

- Partitioning the alluvium sample into various size fractions.
- Surface area sample preparation by outgassing.
- Surface area analyses by N-BET method (Brunauer-Emmett-Teller with nitrogen as carrier).

Further details of these tasks are recorded in initial and in-process entries.

This scientific notebook (SN) is a continuation of SN 721. The last entries in SN 721 are surface area analyses of NC-EWDP-22PC Sonic Core Samples that will continue forth in this notebook. The original initial entry for the surface area analyses is on 710/18-19. The method described in this initial entry was changed (Please see 710/80). Changes primarily addressed concerns that the initial parameters (high temperature and long run times) were potentially altering the material and affecting the surface area results. The beginning of SN 721 included an updated version of the surface area analyses initial entry that reflects the method currently employed.

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Continuation from SN 721 of Surface Area Analyses of NC-EWDP-22PC-0305 less than (<) Mesh # 35 Sonic Core Samples

Personnel initially involved: Marla Roberts

Objectives: To characterize alluvium in the Forty Mile Wash area of the Yucca Mountain region by determining the surface area of a particular grain size range (< mesh # 35) from sonic core samples collected from NC-EWDP-22PC.

Samples: The 59 samples analyzed were the less than (<) mesh # 35 subsamples derived from the sonic core collected from the May 2005 sampling event described in 631/55-64. The samples that were analyzed were labeled "NC-EWDP-22PC-0305-XXX,<#35 " where XXX represents the specific depth interval (ie 471.3-473.2) and are found in 631/72-95 and 710/2-11. The <#35 mesh samples were also analyzed for XRF, LOI, ICP-MS, and XRD analyses.

Previous Key Entries for these analyses:
Original Initial Entry: 710/18-19
Method Change: 710/80
Continuation in new scientific notebook: 721/2-3

Equipment: Coulter Surface Area Analyzer model SA 3100, serial number 46020
Mettler Electronic Balance model AE240, serial number 101237

Reagents: NIST silicon nitride surface area standard 1899 ($10m^2/g$)
NIST silicon nitride surface area standard 1900 ($3m^2/g$)
Helium - Zero grade - 99.995%
Nitrogen - UHP grade - 99.999%
Liquid nitrogen
DOW Corning high vacuum grease
Type I water

Supplies: Loading funnel
3cc to 9cc glass surface area sample tubes with glass inserts and tube caps
Weighing paper
Spatulas

Procedure

Prior to using the surface area analyzer, the O-rings were checked for integrity and replaced with new ones if brittle or cracked. The O-rings were lubricated with high vacuum grease.

About every 12th sample, the surface area analyzer was challenged with either the NIST 1899 standard or the NIST 1900 standard. These standards are of known surface areas and are expected to have a surface areas similar to the samples. The surface area analyzer can outgas three different samples at a time but can only perform the surface area determination one sample at a time.

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The mass of the empty glass sample tube with glass stirrer and cap was recorded. To prevent biasing due to grain settling within the container, the container will be gently rolled by hand prior to aliquot removal. An appropriate amount (between 1.7 to 2.0 g) of sample was added to a tared weigh paper and the mass recorded. The aliquot was transferred into a glass sample tube with a loading funnel on top. The loading funnel was removed. The glass stirrer was inserted back into the sample tube and the tube cap was replaced. This process was repeated for two other samples since three samples can be outgassed at one time.

The following sample information was entered into the surface area analyzer data acquisition software prior to outgassing: sample ID, operator, and sample mass. The software limits to sample ID to six characters so another sample ID was created for each sample. This new ID was recorded (along with the original sample ID) when the initial aliquot mass was recorded. This new sample ID had a prefix "22-" on all of the samples to indicate that the samples came from the NC-EWDP-22PC well. The last three characters were unique numbers that represents the sample interval depth. A single number (depth) was selected within the original sample interval range that did not overlap with any other sample interval range.

The tube caps were removed and the samples were inserted into the surface area analyzer for outgassing under the following conditions: outgas temperature of 200°C and outgas time of 360 minutes. Once the outgas process was complete, the samples could be removed. Each sample tube was promptly recapped and the "total mass" after outgassing is recorded. The sample mass after the outgassing process, referred to as the "outgas sample mass", was calculated by subtracting the mass of the empty sample tube with glass stirrer and cap from the "total mass".

The surface area analyses proceeded one sample at a time. An outgassed sample was uncapped and reloaded into the analyzer. The sample mass information in the data acquisition software was updated with the "outgas sample mass". Liquid nitrogen was added to the analyzer and the analysis automatically starts. Surface area was analyzed by N-BET (Brunaurer-Emmett-Teller with nitrogen as a carrier). At the completion of the analyses a hardcopy of the results was generated and placed in the scientific notebook. The process was repeated for the remaining two outgassed samples.

After the analysis was complete, the sample aliquot was discarded. The sample glass tubes, inserts and caps were cleaned with type I water and oven dried. The whole process was repeated for another set of three samples.

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27 July 05 MR July

See initial entry: 731/2-3
Sample ID ~~prefix~~ prefix: NCEWDP 22PC 0305 ①
27 July 05 MR

Surface Area Analyses of NCEWDP22PC 0305 < #35 Sonic Core Sample Before Outgassing

Before Outgassing

Sample ID ①	Surface Area Analyses Sample ID	Mass(g) of tube, cap & insert	Aliquot Mass (g)
492.7-493.8 < #35	22-492	29.4560	2.0734
700.9-702.1 < #35	22-701	29.1883	2.1081
707.0-707.8 < #35	22-707	29.5787	2.0187

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See initial entry: 731/2-3
Sample ID prefix: NCEWDP 22PC 0305 ①

Surface Area Analyses of NCEWDP22PC 0305 < #35 Sonic Core Samples After Outgassing

After outgassing

Sample ID ①	Surface Area Analyses Sample ID	Total Mass(g)	Outgassed Aliquot Mass (g)*
492.7-493.8 < #35	22-492	31.3967	1.9407
707.0-707.8 < #35	22-707	31.4937	1.9150
700.9-702.1 < #35 **			

*calculation

** During outgassing the surface area analyzer had a leak which only affected the aliquot from NCEWDP-22-PC0305 700.9-702.1 < #35. A new aliquot will be removed following methods 731/2-3 and outgassed with future samples. The new aliquot ~~will~~ 28 July 05 MR will be labeled 22-701B.

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28 July 05 MR cont.
Sample ID: NLEWDP 22PC 0305 492.7-493.8 < #35
surface area analyses ID: 22-492
mass(g) before outgassing: 731/4
mass(g) after outgassing: 731/5

Serial No.	w46020	Software Version	2.13
Sample ID	22-492	Start Date	04/28/04
Customer	CNWRA	Start Time	01:26:30
Operator	MR	Elapsed Time	56 min
Sample Wt	1.9407 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

Summary

t-Plot Surface Area Report

t-Plot Surface Area	16.978 sq.m/g
Micropore Surface Area	7.376 sq.m/g
Micropore Volume	0.00319 ml/g
Correlation Coefficient	0.99937

Serial No.	w46020	Software Version	2.13
Sample ID	22-492	Start Date	04/28/04
Customer	CNWRA	Start Time	01:26:30
Operator	MR	Elapsed Time	56 min
Sample Wt	1.9407 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

t-Plot Surface Area Report

t-Plot Surface Area	16.978 sq.m/g
Total Surface Area	24.354 sq.m/g
Micropore Surface Area	7.376 sq.m/g
Micropore Volume	0.00319 ml/g
Film Thickness Range	0.35 to 0.50
Slope	10.9747
Intercept	2.06441
Correlation Coefficient	0.99937

Film Thickness (nm)	Vads (cc/g STP)
0.3527	5.910
0.3685	6.100
0.3799	6.235
0.3935	6.395
0.4083	6.563
0.4228	6.723
0.4356	6.859
0.4604	7.115
0.4867	7.380

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Sample ID	22-492	Start Date	04/28/04
Customer	CNWRA	Start Time	01:26:30
Operator	MR	Elapsed Time	56 min
Sample Wt	1.9407 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

Isotherm Data

Freespace Calculation

Slope	0.0171
Intercept	0.0030
Correlation Coefficient	1.00000

Isotherm Data Table

Ps/Po	Vads cc/g(STP)	Ps mmHg	Po mmHg
0.0000	0.000	0.001	751.05
0.0001	0.227	0.063	751.06
0.0002	0.457	0.162	751.06
0.0003	0.723	0.207	751.07
0.0005	1.016	0.348	751.08
0.0005	1.304	0.372	751.10
0.0006	1.672	0.461	751.14
0.0007	1.992	0.522	751.16
0.0009	2.329	0.684	751.16
0.0012	2.689	0.926	751.21
0.0018	3.064	1.384	751.22
0.0029	3.456	2.159	751.25
0.0045	3.861	3.387	751.28
0.0073	4.273	5.517	751.33
0.0111	4.565	8.333	751.37
0.0169	4.826	12.732	751.38
0.0247	5.051	18.554	751.45
0.0297	5.169	22.306	751.48
0.0356	5.285	26.760	751.49
0.0421	5.399	31.633	751.54
0.0488	5.505	36.692	751.56
0.0558	5.604	41.930	751.58
0.0604	5.668	45.415	751.61
0.0696	5.782	52.339	751.63
0.0811	5.910	60.985	751.62
0.1008	6.100	75.784	751.63
0.1161	6.235	87.254	751.63
0.1350	6.395	101.483	751.58
0.1567	6.563	117.750	751.56
0.1785	6.723	134.115	751.54
0.1981	6.859	148.846	751.50
0.2367	7.115	177.835	751.46
0.2776	7.380	208.577	751.41
0.3174	7.631	238.516	751.38
0.3599	7.887	270.388	751.34
0.3993	8.130	300.027	751.30
0.4377	8.357	328.818	751.28

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28 July 05 MR cont.
Sample ID: NCEWDP22PC0305 707.0-707.8 <#35
surface area analyses ID: 22-707
mass(g) before outgassing: 731/4
mass(g) after outgassing: 731/5

Serial No.	w46020	Software Version	2.13
Sample ID	22-707	Start Date	04/28/04
Customer	CNWRA	Start Time	03:03:42
Operator	MR	Elapsed Time	52 min
Sample Wt	1.915 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

Summary

t-Plot Surface Area Report

t-Plot Surface Area	12.265 sq.m/g
Micropore Surface Area	4.868 sq.m/g
Micropore Volume	0.00212 ml/g
Correlation Coefficient	0.99975

Serial No.	w46020	Software Version	2.13
Sample ID	22-707	Start Date	04/28/04
Customer	CNWRA	Start Time	03:03:42
Operator	MR	Elapsed Time	52 min
Sample Wt	1.915 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

t-Plot Surface Area Report

t-Plot Surface Area	12.265 sq.m/g
Total Surface Area	17.133 sq.m/g
Micropore Surface Area	4.868 sq.m/g
Micropore Volume	0.00212 ml/g
Film Thickness Range	0.35 to 0.50
Slope	7.9284
Intercept	1.36751
Correlation Coefficient	0.99975

Film Thickness (nm)	Vads (cc/g STP)
0.3518	4.144
0.3688	4.288
0.3808	4.389
0.3943	4.500
0.4091	4.618
0.4225	4.725
0.4358	4.828
0.4615	5.025
0.4870	5.217

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Sample ID	22-707	Start Date	04/28/04
Customer	CNWRA	Start Time	03:03:42
Operator	MR	Elapsed Time	52 min
Sample Wt	1.915 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

Isotherm Data

Freespace Calculation

Slope	0.0162
Intercept	0.0026
Correlation Coefficient	1.00000

Isotherm Data Table

Ps/Po	Vads cc/g(STP)	Ps mmHg	Po mmHg
0.0000	0.000	0.001	752.33
0.0001	0.233	0.050	752.33
0.0002	0.465	0.146	752.33
0.0004	0.731	0.291	752.36
0.0004	1.006	0.338	752.35
0.0006	1.336	0.477	752.35
0.0008	1.641	0.636	752.36
0.0014	1.958	1.057	752.35
0.0023	2.294	1.703	752.35
0.0040	2.638	3.040	752.35
0.0070	2.981	5.294	752.34
0.0124	3.262	9.316	752.33
0.0211	3.487	15.871	752.35
0.0272	3.596	20.437	752.33
0.0340	3.695	25.569	752.33
0.0417	3.790	31.371	752.32
0.0494	3.878	37.197	752.31
0.0577	3.957	43.381	752.30
0.0630	4.005	47.395	752.31
0.0696	4.062	52.357	752.29
0.0801	4.144	60.292	752.27
0.1013	4.288	76.209	752.25
0.1172	4.389	88.188	752.23
0.1362	4.500	102.480	752.20
0.1578	4.618	118.683	752.19
0.1779	4.725	133.785	752.16
0.1983	4.828	149.186	752.14
0.2383	5.025	179.242	752.13
0.2780	5.217	209.099	752.12
0.3183	5.412	239.374	752.07
0.3591	5.609	270.095	752.06
0.3992	5.801	300.236	752.05
0.4399	5.995	330.847	752.02

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See initial entry: 731/2-3
Sample ID prefix: NCEWDP 22PC 0305 (1)

Surface Area Analyses of NCEWDP 22PC 0305
<#35 Sonic Core Samples Before Outgassing

Before Outgassing

Sample ID (1)	Surface Area Analyses Sample ID	Mass(g) of tube, cap & insert	Aliquot Mass(g)
700.9-702.1 <#35	22-701B #	28.4849	2.0402
625.2-626.7 <#35	22-625	29.3156	2.0354
745.0-745.9 <#35	22-745	28.6289	2.0383

#See 731/5 for explanation for reanalysis

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See initial entry: 731/2-3
Sample prefix: NCEWDP 22PC 0305 (1)

Surface Area Analyses of NCEWDP 22PC 0305
<#35 Sonic Core Samples After Outgassing

After Outgassing

Sample ID (1)	Surface Area Analyses Sample ID	Total Mass(g)	Outgassed Aliquot Mass(g)*
700.9-702.1 <#35	22-701B #	30.3674	1.8825
625.2-626.7 <#35	22-625	31.2034	1.8878
745.0-745.9 <#35	22-745	30.5328	1.9039

*calculation

#See 731/5 for explanation of reanalysis

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Sample ID: NCEWDP22PC0305 700.9-702.1 <#35
Surface area analyses ID: 22-701B
mass (g) before outgassing: 731/10
mass (g) after outgassing 731/11

Serial No.	w46020	Software Version	2.13
Sample ID	22-701B	Start Date	04/29/04
Customer	CNWRA	Start Time	04:50:06
Operator	MR	Elapsed Time	35 min
Sample Wt	1.8825 g	Outgas Time	0 min
Profile	BET5-T	Outgas Temperature	0 C

Summary

t-Plot Surface Area Report

t-Plot Surface Area	11.473 sq.m/g
Micropore Surface Area	0.000 sq.m/g
Micropore Volume	0.00000 ml/g
Correlation Coefficient	1.00000

Serial No.	w46020	Software Version	2.13
Sample ID	22-701B	Start Date	04/29/04
Customer	CNWRA	Start Time	04:50:06
Operator	MR	Elapsed Time	35 min
Sample Wt	1.8825 g	Outgas Time	0 min
Profile	BET5-T	Outgas Temperature	0 C

t-Plot Surface Area Report

t-Plot Surface Area	11.473 sq.m/g
Total Surface Area	11.145 sq.m/g
Micropore Surface Area	0.000 sq.m/g
Micropore Volume	0.00000 ml/g
Film Thickness Range	0.35 to 0.50
Slope	7.4162
Intercept	-0.19170
Correlation Coefficient	1.00000

Film Thickness (nm)	Vads (cc/g STP)
0.3522	2.420
0.3682	2.539
0.3804	2.631
0.3949	2.737
0.4096	2.845
0.4226	2.943
0.4362	3.041
0.4621	3.236
0.4873	3.422

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Sample ID	22-701B	Start Date	04/29/04
Customer	CNWRA	Start Time	04:50:06
Operator	MR	Elapsed Time	35 min
Sample Wt	1.8825 g	Outgas Time	0 min
Profile	BET5-T	Outgas Temperature	0 C

Isotherm Data

Freespace Calculation

Slope	0.0168
Intercept	0.0019
Correlation Coefficient	1.00000

Isotherm Data Table

Ps/Po	Vads cc/g(STP)	Ps mmHg	Po mmHg
0.0000	0.000	0.001	758.55
0.0000	0.235	0.005	758.53
0.0002	0.470	0.118	758.51
0.0007	0.740	0.523	758.51
0.0019	1.003	1.454	758.47
0.0042	1.268	3.162	758.46
0.0082	1.519	6.253	758.42
0.0165	1.763	12.540	758.41
0.0275	1.948	20.828	758.42
0.0339	2.030	25.694	758.41
0.0412	2.109	31.251	758.39
0.0498	2.190	37.766	758.37
0.0584	2.261	44.257	758.35
0.0637	2.304	48.325	758.35
0.0703	2.351	53.281	758.37
0.0806	2.420	61.137	758.35
0.1005	2.539	76.190	758.34
0.1168	2.631	88.545	758.33
0.1370	2.737	103.906	758.32
0.1586	2.845	120.256	758.30
0.1781	2.943	135.060	758.32
0.1989	3.041	150.808	758.31
0.2393	3.236	181.430	758.30
0.2785	3.422	211.184	758.30
0.3192	3.622	242.013	758.25
0.3585	3.817	271.867	758.25
0.3999	4.027	303.198	758.23
0.4394	4.231	333.134	758.18

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Sample ID: NCEWDP 22PC0305 625.2-626.7 <#35
Surface area analyses ID: 22-625
mass(g) before outgassing: 731/10
mass(g) after outgassing: 731/11

Serial No.	w46020	Software Version	2.13

Sample ID	22-625	Start Date	04/29/04
Customer	CNWRA	Start Time	02:12:00
Operator	MR	Elapsed Time	48 min
Sample Wt	1.8878 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

Summary

t-Plot Surface Area Report

t-Plot Surface Area	14.518 sq.m/g
Micropore Surface Area	5.638 sq.m/g
Micropore Volume	0.00243 ml/g
Correlation Coefficient	0.99960

Serial No.	w46020	Software Version	2.13

Sample ID	22-625	Start Date	04/29/04
Customer	CNWRA	Start Time	02:12:00
Operator	MR	Elapsed Time	48 min
Sample Wt	1.8878 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

t-Plot Surface Area Report

t-Plot Surface Area	14.518 sq.m/g
Total Surface Area	20.156 sq.m/g
Micropore Surface Area	5.638 sq.m/g
Micropore Volume	0.00243 ml/g
Film Thickness Range	0.35 to 0.50
Slope	9.3845
Intercept	1.56865
Correlation Coefficient	0.99960

Film Thickness (nm)	Vads (cc/g STP)
0.3514	4.848
0.3689	5.027
0.3829	5.164
0.3947	5.280
0.4087	5.415
0.4226	5.545
0.4360	5.670
0.4608	5.892
0.4875	6.125

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Sample ID	22-625	Start Date	04/29/04
Customer	CNWRA	Start Time	02:12:00
Operator	MR	Elapsed Time	48 min
Sample Wt	1.8878 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

Isotherm Data

Freespace Calculation

Slope	0.0176
Intercept	0.0033
Correlation Coefficient	1.00000

Isotherm Data Table

Ps/Po	Vads cc/g(STP)	Ps mmHg	Po mmHg
0.0000	0.000	0.001	752.57
0.0001	0.233	0.054	752.56
0.0002	0.469	0.128	752.56
0.0003	0.741	0.257	752.58
0.0004	1.019	0.278	752.58
0.0005	1.357	0.383	752.63
0.0006	1.669	0.455	752.73
0.0009	1.996	0.679	752.70
0.0014	2.341	1.036	752.79
0.0023	2.699	1.750	752.81
0.0039	3.068	2.933	752.89
0.0067	3.445	5.008	752.99
0.0110	3.739	8.313	753.04
0.0181	3.990	13.641	753.17
0.0273	4.194	20.592	753.15
0.0331	4.295	24.903	753.28
0.0394	4.394	29.659	753.21
0.0468	4.495	35.244	753.33
0.0542	4.586	40.840	753.32
0.0590	4.643	44.414	753.38
0.0647	4.704	48.711	753.41
0.0704	4.762	53.005	753.40
0.0797	4.848	60.036	753.50
0.1014	5.027	76.429	753.54
0.1202	5.164	90.540	753.53
0.1368	5.280	103.086	753.60
0.1572	5.415	118.480	753.63
0.1781	5.545	134.214	753.60
0.1986	5.670	149.675	753.62
0.2371	5.892	178.709	753.60
0.2789	6.125	210.164	753.62
0.3180	6.346	239.638	753.58
0.3584	6.567	270.038	753.55
0.4000	6.794	301.462	753.65
0.4405	7.012	331.975	753.66

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From Page No. 29 July 05 MR cont

Sample ID: NCEWDP 22PC 0305 745.0-745.9 <#35
surface area analyses ID: 22-745
mass(g) before outgassing: 731/10
mass(g) after outgassing: 731/11

Serial No.	w46020	Software Version	2.13
Sample ID	22-745	Start Date	04/29/04
Customer	CNWRA	Start Time	03:22:57
Operator	MR	Elapsed Time	55 min
Sample Wt	1.9039 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

Summary

t-Plot Surface Area Report

t-Plot Surface Area	16.254 sq.m/g
Micropore Surface Area	6.195 sq.m/g
Micropore Volume	0.00266 ml/g
Correlation Coefficient	0.99969

Serial No.	w46020	Software Version	2.13
Sample ID	22-745	Start Date	04/29/04
Customer	CNWRA	Start Time	03:22:57
Operator	MR	Elapsed Time	55 min
Sample Wt	1.9039 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

t-Plot Surface Area Report

t-Plot Surface Area	16.254 sq.m/g
Total Surface Area	22.449 sq.m/g
Micropore Surface Area	6.195 sq.m/g
Micropore Volume	0.00266 ml/g
Film Thickness Range	0.35 to 0.50
Slope	10.5070
Intercept	1.72163
Correlation Coefficient	0.99969

Film Thickness (nm)	Vads (cc/g STP)
0.3522	5.405
0.3681	5.584
0.3801	5.717
0.3937	5.867
0.4085	6.025
0.4230	6.176
0.4354	6.307
0.4603	6.556
0.4877	6.829

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From Page No. 29 July 05 MR cont.

Sample ID	22-745	Start Date	04/29/04
Customer	CNWRA	Start Time	03:22:57
Operator	MR	Elapsed Time	55 min
Sample Wt	1.9039 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

Isotherm Data

Freespace Calculation

Slope	0.0171
Intercept	0.0033
Correlation Coefficient	1.00000

Isotherm Data Table

Ps/Po	Vads cc/g(STP)	Ps mmHg	Po mmHg
0.0000	0.000	0.001	758.11
0.0001	0.232	0.057	758.10
0.0002	0.465	0.134	758.11
0.0004	0.734	0.268	758.10
0.0004	1.010	0.292	758.09
0.0005	1.345	0.391	758.10
0.0006	1.657	0.427	758.06
0.0008	1.984	0.578	758.06
0.0010	2.330	0.791	758.06
0.0016	2.695	1.221	758.08
0.0026	3.074	1.962	758.09
0.0042	3.467	3.148	758.10
0.0069	3.864	5.198	758.12
0.0108	4.160	8.225	758.10
0.0172	4.416	13.073	758.08
0.0256	4.633	19.394	758.04
0.0310	4.745	23.476	758.02
0.0370	4.853	28.040	757.98
0.0439	4.961	33.262	757.94
0.0508	5.061	38.506	757.88
0.0555	5.124	42.055	757.83
0.0607	5.190	46.015	757.78
0.0703	5.299	53.265	757.71
0.0805	5.405	61.018	757.68
0.1004	5.584	76.058	757.61
0.1164	5.717	88.161	757.57
0.1353	5.867	102.485	757.52
0.1569	6.025	118.828	757.47
0.1787	6.176	135.339	757.43
0.1977	6.307	149.769	757.40
0.2365	6.556	179.080	757.37
0.2792	6.829	211.412	757.34
0.3175	7.070	240.448	757.31
0.3588	7.331	271.671	757.23
0.3993	7.579	302.339	757.19
0.4413	7.837	334.152	757.18

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From Page No. 29 July 05 MR cont.

See initial entry: 731/2-3
Sample ID prefix: NCEWDP22PC0305 ①

Surface Area Analyses of NCEWDP22PC0305 <#35 Sonic Core Sample Before Outgassing

Before outgassing

Sample ID ①	Surface Area Analyses Sample ID	~~Total~~ 1 August 05 MR Mass(g) of tube, cap + insert	Aliquot Mass(g)
29 July 05 MR ~~464.9-5~~ 464.9-466.5 <#35	22-465	29.8433	2.1234
502.5-504.2 <#35	22-503	29.5309	2.0367

29 July 05 MR

Witnessed & Understood by me, Date Invented by Date Recorded by

From Page No. 1 August 05 MR cont.

See initial entry: 731/2-3
Sample ID prefix: NCEWDP22PC0305 ①

Surface Area Analyses of NCEWDP22PC0305 <#35 Sonic Core Sample ~~Before~~ After 1 August 05 MR outgassing

After outgassing

Sample ID ①	Surface Area Analyses Sample ID	Total Mass(g)	Outgassed Aliquot Mass(g) *
464.9-466.5 <#35	22-465	31.7932	1.9499
502.5-504.2 <#35	22-503	31.4749	1.9440

*calculation

1 August 05 MR

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1 August 05 MR cont.
Sample ID: NCFWDP22PC0305 464.9-4665 <#35
Surface area analysis ID: 22-465
mass(g) before outgassing: 731/18
mass(g) after outgassing: 731/19

Serial No.	w46020	Software Version	2.13
Sample ID	22-465	Start Date	05/02/04
Customer	CNWRA	Start Time	02:04:21
Operator	MR	Elapsed Time	57 min
Sample Wt	1.9499 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

Summary

t-Plot Surface Area Report

t-Plot Surface Area	21.627 sq.m/g
Micropore Surface Area	8.826 sq.m/g
Micropore Volume	0.00381 ml/g
Correlation Coefficient	0.99953

Serial No.	w46020	Software Version	2.13
Sample ID	22-465	Start Date	05/02/04
Customer	CNWRA	Start Time	02:04:21
Operator	MR	Elapsed Time	57 min
Sample Wt	1.9499 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

t-Plot Surface Area Report

t-Plot Surface Area	21.627 sq.m/g
Total Surface Area	30.453 sq.m/g
Micropore Surface Area	8.826 sq.m/g
Micropore Volume	0.00381 ml/g
Film Thickness Range	0.35 to 0.50
Slope	13.9800
Intercept	2.46145
Correlation Coefficient	0.99953

Film Thickness (nm)	Vads (cc/g STP)
0.3520	7.354
0.3684	7.605
0.3798	7.773
0.3939	7.978
0.4075	8.178
0.4214	8.374
0.4365	8.578
0.4610	8.902
0.4853	9.218

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1 August 05 MR cont.

Sample ID	22-465	Start Date	05/02/04
Customer	CNWRA	Start Time	02:04:21
Operator	MR	Elapsed Time	57 min
Sample Wt	1.9499 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

Isotherm Data

Freespace Calculation

Slope	0.0156
Intercept	0.0028
Correlation Coefficient	1.00000

Isotherm Data Table

Ps/Po	Vads cc/g(STP)	Ps mmHg	Po mmHg
0.0000	0.000	0.001	744.00
0.0001	0.226	0.049	744.05
0.0002	0.454	0.131	744.09
0.0004	0.714	0.265	744.14
0.0004	0.983	0.288	744.24
0.0005	1.309	0.367	744.25
0.0005	1.612	0.379	744.31
0.0006	2.021	0.468	744.38
0.0007	2.360	0.506	744.44
0.0008	2.717	0.622	744.50
0.0010	3.098	0.744	744.55
0.0014	3.499	1.026	744.60
0.0020	3.919	1.501	744.64
0.0030	4.359	2.238	744.72
0.0045	4.821	3.367	744.81
0.0070	5.297	5.227	744.89
0.0098	5.605	7.327	744.95
0.0141	5.891	10.522	745.01
0.0200	6.151	14.907	745.08
0.0243	6.298	18.123	745.12
0.0292	6.438	21.781	745.16
0.0347	6.574	25.885	745.21
0.0405	6.703	30.205	745.25
0.0467	6.825	34.814	745.26
0.0530	6.941	39.497	745.31
0.0575	7.017	42.838	745.35
0.0622	7.094	46.395	745.37
0.0699	7.210	52.122	745.39
0.0804	7.354	59.919	745.42
0.1007	7.605	75.082	745.42
0.1159	7.773	86.376	745.43
0.1356	7.978	101.106	745.41
0.1554	8.178	115.868	745.41
0.1762	8.374	131.368	745.40
0.1994	8.578	148.656	745.37
0.2375	8.902	177.014	745.33
0.2754	9.218	205.253	745.26
0.3177	9.554	236.776	745.22
0.3592	9.889	267.680	745.16
0.3978	10.194	296.387	745.11
0.4414	10.527	328.864	745.06

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From Page No. 1 August 05 MR cont.

Sample ID: NC EWDP 22PC 0305 502.5-504.2 <#35
Surface area analyses ID: 22-503
mass(g) before outgassing: 731/18
mass(g) after outgassing: 731/19

Serial No.	w46020	Software Version	2.13
Sample ID	22-503	Start Date	05/02/04
Customer	CNWRA	Start Time	03:13:15
Operator	MR	Elapsed Time	51 min
Sample Wt	1.944 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

Summary

t-Plot Surface Area Report

t-Plot Surface Area	16.476 sq.m/g
Micropore Surface Area	6.475 sq.m/g
Micropore Volume	0.00279 ml/g
Correlation Coefficient	0.99956

Serial No.	w46020	Software Version	2.13
Sample ID	22-503	Start Date	05/02/04
Customer	CNWRA	Start Time	03:13:15
Operator	MR	Elapsed Time	51 min
Sample Wt	1.944 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

t-Plot Surface Area Report

t-Plot Surface Area	16.476 sq.m/g
Total Surface Area	22.951 sq.m/g
Micropore Surface Area	6.475 sq.m/g
Micropore Volume	0.00279 ml/g
Film Thickness Range	0.35 to 0.50
Slope	10.6503
Intercept	1.80096
Correlation Coefficient	0.99956

Film Thickness (nm)	Vads (cc/g STP)
0.3519	5.528
0.3689	5.725
0.3802	5.852
0.3942	6.010
0.4083	6.163
0.4230	6.321
0.4354	6.449
0.4612	6.709
0.4868	6.965

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From Page No. 1 August 05 MR cont.

Serial No.	w46020	Software Version	2.13
Sample ID	22-503	Start Date	05/02/04
Customer	CNWRA	Start Time	03:13:15
Operator	MR	Elapsed Time	51 min
Sample Wt	1.944 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

Isotherm Data

Freespace Calculation

Slope	0.0175
Intercept	0.0033
Correlation Coefficient	1.00000

Isotherm Data Table

Ps/Po	Vads cc/g(STP)	Ps mmHg	Po mmHg
0.0000	0.000	0.001	752.19
0.0001	0.227	0.040	752.22
0.0001	0.455	0.108	752.23
0.0003	0.718	0.211	752.25
0.0003	0.989	0.233	752.25
0.0004	1.317	0.311	752.30
0.0005	1.620	0.356	752.30
0.0007	2.029	0.529	752.32
0.0010	2.367	0.724	752.34
0.0015	2.722	1.126	752.34
0.0024	3.093	1.835	752.34
0.0039	3.477	2.910	752.37
0.0062	3.870	4.680	752.37
0.0095	4.171	7.145	752.35
0.0149	4.441	11.195	752.40
0.0224	4.673	16.885	752.39
0.0276	4.793	20.735	752.39
0.0334	4.908	25.122	752.35
0.0399	5.020	30.031	752.32
0.0468	5.125	35.181	752.28
0.0537	5.223	40.425	752.25
0.0586	5.285	44.057	752.22
0.0639	5.350	48.073	752.23
0.0698	5.418	52.480	752.21
0.0803	5.528	60.375	752.21
0.1015	5.725	76.309	752.17
0.1165	5.852	87.648	752.17
0.1360	6.010	102.295	752.15
0.1566	6.163	117.760	752.09
0.1786	6.321	134.353	752.10
0.1978	6.449	148.735	752.01
0.2378	6.709	178.816	751.98
0.2777	6.965	208.856	751.96
0.3177	7.212	238.887	751.91
0.3593	7.475	270.167	751.87
0.3986	7.712	299.641	751.82
0.4413	7.976	331.746	751.79

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From Page No.___ 1 August 05 MR cont.

See initial entry: 731/2-3
Sample ID prefix: NCEWDP22PC0305 ①

Surface area analysis of NCEWDP22PC0305 <#35 Sonic Core Samples Before Outgassing

Before Outgassing

Sample ID ①	Surface Area Analyses Sample ID	Mass(g) of tube, cap & insert	Aliquot Mass(g)
604.9-606.3 <#35	22-605	29.2963	1.9975
546.7-548.5 <#35	~~22-4~~ 1 Aug 05 MR 22-547	29.4033	2.0652
534.5-536.2 <#35	22-535	28.5867	2.0701

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From Page No.___ 2 August 05 MR

See initial entry: 731/2-3
Sample ID prefix: NCEWDP22PC0305 ①

Surface Area Analyses of NCEWDP22PC0305 <#35 Sonic Core Samples After Outgassing

After Outgassing

Sample ID ①	Surface Area Analyses Sample ID	Total Mass(g)	Outgassed Aliquot Mass(g) *
604.9-606.3 <#35	22-605	31.1561	1.8598
546.7-548.5 <#35	22-547	31.3417	1.9384
534.5-536.2 <#35	22-535	30.5149	1.9282

* calculation

2 August 05 MR

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2 August 05 MR cont.
Sample ID: NCEWDP22PC0305 6049-6063 <#35
Surface area analyses ID: 22-605
mass(g) before outgassing: 731/24
mass(g) after outgassing: 731/25

Serial No.	w46020	Software Version	2.13
Sample ID	22-605	Start Date	05/03/04
Customer	CNWRA	Start Time	02:54:18
Operator	MR	Elapsed Time	52 min
Sample Wt	1.8598 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

Summary

t-Plot Surface Area Report

t-Plot Surface Area	20.398 sq.m/g
Micropore Surface Area	8.041 sq.m/g
Micropore Volume	0.00346 ml/g
Correlation Coefficient	0.99956

Serial No.	w46020	Software Version	2.13
Sample ID	22-605	Start Date	05/03/04
Customer	CNWRA	Start Time	02:54:18
Operator	MR	Elapsed Time	52 min
Sample Wt	1.8598 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

t-Plot Surface Area Report

t-Plot Surface Area	20.398 sq.m/g
Total Surface Area	28.438 sq.m/g
Micropore Surface Area	8.041 sq.m/g
Micropore Volume	0.00346 ml/g
Film Thickness Range	0.35 to 0.50
Slope	13.1852
Intercept	2.23743
Correlation Coefficient	0.99956

Film Thickness (nm)	Vads (cc/g STP)
0.3529	6.862
0.3677	7.078
0.3796	7.246
0.3950	7.458
0.4085	7.641
0.4221	7.818
0.4355	7.993
0.4600	8.301
0.4871	8.634

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2 August 05 MR cont.

Sample ID	22-605	Start Date	05/03/04
Customer	CNWRA	Start Time	02:54:18
Operator	MR	Elapsed Time	52 min
Sample Wt	1.8598 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

Isotherm Data

Freespace Calculation

Slope	0.0177
Intercept	0.0036
Correlation Coefficient	1.00000

Isotherm Data Table

Ps/Po	Vads cc/g(STP)	Ps mmHg	Po mmHg
0.0000	0.000	0.001	749.43
0.0001	0.238	0.049	749.41
0.0002	0.479	0.119	749.47
0.0003	0.754	0.239	749.48
0.0003	1.037	0.256	749.51
0.0004	1.383	0.335	749.55
0.0005	1.702	0.346	749.58
0.0006	2.132	0.456	749.59
0.0007	2.490	0.527	749.64
0.0010	2.865	0.727	749.70
0.0013	3.262	1.009	749.75
0.0021	3.678	1.558	749.78
0.0031	4.112	2.349	749.84
0.0048	4.561	3.600	749.89
0.0077	5.018	5.769	749.92
0.0112	5.325	8.435	750.01
0.0167	5.604	12.492	750.07
0.0238	5.846	17.859	750.10
0.0286	5.977	21.481	750.18
0.0340	6.105	25.509	750.17
0.0401	6.233	30.069	750.16
0.0465	6.350	34.874	750.19
0.0529	6.462	39.690	750.20
0.0575	6.534	43.116	750.22
0.0622	6.610	46.701	750.24
0.0697	6.712	52.267	750.23
0.0814	6.862	61.044	750.22
0.0998	7.078	74.854	750.27
0.1157	7.246	86.768	750.26
0.1371	7.458	102.887	750.24
0.1569	7.641	117.709	750.23
0.1774	7.818	133.054	750.22
0.1979	7.993	148.481	750.20
0.2360	8.301	177.030	750.20
0.2781	8.634	208.649	750.18
0.3174	8.940	238.132	750.15
0.3593	9.255	269.542	750.12
0.3996	9.557	299.740	750.10
0.4398	9.847	329.918	750.08

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2 August 05 MR cont.
Sample ID: NCEWDP22PC0305 546.7-548.5 <#35
Surface area analyses ID: 22-547
mass(g) before outgassing: 731/24
mass(g) after outgassing: 731/25

Serial No.	w46020	Software Version	2.13
Sample ID	22-547	Start Date	05/03/04
Customer	CNWRA	Start Time	04:02:52
Operator	MR	Elapsed Time	55 min
Sample Wt	1.9384 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

Summary

t-Plot Surface Area Report

t-Plot Surface Area	19.077 sq.m/g
Micropore Surface Area	7.697 sq.m/g
Micropore Volume	0.00333 ml/g
Correlation Coefficient	0.99960

Serial No.	w46020	Software Version	2.13
Sample ID	22-547	Start Date	05/03/04
Customer	CNWRA	Start Time	04:02:52
Operator	MR	Elapsed Time	55 min
Sample Wt	1.9384 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

t-Plot Surface Area Report

t-Plot Surface Area	19.077 sq.m/g
Total Surface Area	26.774 sq.m/g
Micropore Surface Area	7.697 sq.m/g
Micropore Volume	0.00333 ml/g
Film Thickness Range	0.35 to 0.50
Slope	12.3318
Intercept	2.15510
Correlation Coefficient	0.99960

Film Thickness (nm)	Vads (cc/g STP)
0.3521	6.473
0.3678	6.684
0.3798	6.841
0.3940	7.026
0.4081	7.203
0.4225	7.380
0.4356	7.539
0.4603	7.827
0.4872	8.141

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2 August 05 MR cont.

Serial No.	w46020	Software Version	2.13
Sample ID	22-547	Start Date	05/03/04
Customer	CNWRA	Start Time	04:02:52
Operator	MR	Elapsed Time	55 min
Sample Wt	1.9384 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

Isotherm Data

Freespace Calculation

Slope	0.0164
Intercept	0.0030
Correlation Coefficient	1.00000

Isotherm Data Table

Ps/Po	Vads cc/g(STP)	Ps mmHg	Po mmHg
0.0000	0.000	0.001	753.01
0.0001	0.227	0.051	753.00
0.0002	0.458	0.120	752.98
0.0003	0.721	0.244	752.98
0.0004	0.993	0.266	752.93
0.0005	1.323	0.350	752.92
0.0005	1.628	0.375	752.91
0.0006	2.039	0.486	752.86
0.0007	2.381	0.556	752.87
0.0010	2.740	0.757	752.81
0.0013	3.122	1.009	752.79
0.0022	3.520	1.635	752.77
0.0033	3.936	2.462	752.72
0.0050	4.364	3.758	752.68
0.0081	4.803	6.114	752.69
0.0121	5.093	9.086	752.68
0.0180	5.354	13.511	752.67
0.0256	5.583	19.293	752.68
0.0306	5.703	23.058	752.65
0.0363	5.821	27.319	752.60
0.0426	5.940	32.085	752.61
0.0493	6.050	37.069	752.58
0.0559	6.155	42.060	752.56
0.0604	6.221	45.477	752.54
0.0707	6.356	53.200	752.52
0.0804	6.473	60.511	752.49
0.1000	6.684	75.227	752.48
0.1159	6.841	87.249	752.48
0.1358	7.026	102.203	752.47
0.1564	7.203	117.651	752.44
0.1780	7.380	133.931	752.43
0.1980	7.539	148.946	752.40
0.2364	7.827	177.838	752.39
0.2783	8.141	209.430	752.44
0.3166	8.422	238.226	752.40
0.3593	8.727	270.301	752.40
0.3995	9.018	300.566	752.39
0.4391	9.296	330.337	752.39

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From Page No. 2 August 05 MR cont.

Sample ID: NCEWBP22PC 0305 5345-536.2 <#35
Surface area analyses ID: 22-535
mass (g) before outgassing: 731/24
mass (g) after outgassing: 731/25

Serial No.	w46020	Software Version	2.13
Sample ID	22-535	Start Date	05/03/04
Customer	CNWRA	Start Time	05:10:42
Operator	MR	Elapsed Time	56 min
Sample Wt	1.9282 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

Summary

t-Plot Surface Area Report

t-Plot Surface Area	22.589 sq.m/g
Micropore Surface Area	9.528 sq.m/g
Micropore Volume	0.00411 ml/g
Correlation Coefficient	0.99940

Serial No.	w46020	Software Version	2.13
Sample ID	22-535	Start Date	05/03/04
Customer	CNWRA	Start Time	05:10:42
Operator	MR	Elapsed Time	56 min
Sample Wt	1.9282 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

t-Plot Surface Area Report

t-Plot Surface Area	22.589 sq.m/g
Total Surface Area	32.118 sq.m/g
Micropore Surface Area	9.528 sq.m/g
Micropore Volume	0.00411 ml/g
Film Thickness Range	0.35 to 0.50
Slope	14.6019
Intercept	2.65560
Correlation Coefficient	0.99940

Film Thickness (nm)	Vads (cc/g STP)
0.3519	7.759
0.3691	8.036
0.3803	8.213
0.3936	8.419
0.4079	8.634
0.4224	8.844
0.4353	9.028
0.4600	9.371
0.4869	9.732

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From Page No. 2 August 05 MR cont.

Sample ID	22-535	Start Date	05/03/04
Customer	CNWRA	Start Time	05:10:42
Operator	MR	Elapsed Time	56 min
Sample Wt	1.9282 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

Isotherm Data

Freespace Calculation

Slope	0.0176
Intercept	0.0037
Correlation Coefficient	0.99999

Isotherm Data Table

Ps/Po	Vads cc/g(STP)	Ps mmHg	Po mmHg
0.0000	0.000	0.001	753.51
0.0001	0.230	0.052	753.51
0.0001	0.460	0.100	753.53
0.0002	0.727	0.144	753.53
0.0004	1.023	0.264	753.51
0.0004	1.312	0.264	753.48
0.0005	1.682	0.348	753.51
0.0005	2.008	0.353	753.50
0.0006	2.470	0.462	753.50
0.0007	2.832	0.556	753.46
0.0009	3.217	0.699	753.48
0.0013	3.624	1.003	753.48
0.0019	4.052	1.418	753.46
0.0028	4.498	2.099	753.48
0.0041	4.967	3.085	753.47
0.0062	5.450	4.648	753.43
0.0084	5.770	6.346	753.44
0.0118	6.069	8.913	753.42
0.0167	6.347	12.615	753.40
0.0230	6.595	17.304	753.38
0.0274	6.733	20.609	753.37
0.0322	6.867	24.268	753.36
0.0376	7.000	28.294	753.32
0.0432	7.127	32.552	753.27
0.0492	7.247	37.024	753.23
0.0554	7.363	41.742	753.21
0.0597	7.439	44.954	753.19
0.0643	7.517	48.436	753.15
0.0701	7.610	52.798	753.12
0.0802	7.759	60.397	753.08
0.1016	8.036	76.517	753.04
0.1166	8.213	87.832	752.99
0.1352	8.419	101.790	752.97
0.1561	8.634	117.523	752.94
0.1778	8.844	133.849	752.91
0.1975	9.028	148.718	752.89
0.2359	9.371	177.605	752.87
0.2780	9.732	209.260	752.82
0.3182	10.064	239.553	752.80
0.3585	10.396	269.856	752.77
0.3988	10.713	300.226	752.73
0.4412	11.047	332.111	752.69

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From Page No. 2 August 05 MR cont.

See initial entry: 731/2-3
Sample ID prefix: NCEWDP 22PC 0305 (I)

Surface Area Analysis of NCEWDP 22PC0305 <#35 Sonic Core Samples Before Outgassing

Before Outgassing

Sample ID (I)	Surface Area Analyses Sample ID	Mass(g) of tube, cap + insert	Aliquot Mass(g)
670.5-672.0 <#35	22-671	29.1332	2.0283

3 August 05 MR
Surface Area cont.

After Outgassing

Sample ID (II)	Surface Area Analyses Sample ID	Total Mass(g)	Outgassed Aliquot Mass(g) *
670.5-672.0 <#35	22-671	31.0614	1.9282

* Calculation

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From Page No. 3 August 05 MR cont.

Sample ID: NCEWDP 22PC 0305 670.5-672.0 <#35
Surface area analysis ID: 22-671
mass(g) before outgassing: 731/32
mass(g) after outgassing: 731/32

Serial No.	w46020	Software Version	2.13
Sample ID	22-671	Start Date	05/04/04
Customer	CNWRA	Start Time	01:26:46
Operator	MR	Elapsed Time	52 min
Sample Wt	1.9282 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

Summary

t-Plot Surface Area Report

t-Plot Surface Area	13.876 sq.m/g
Micropore Surface Area	5.754 sq.m/g
Micropore Volume	0.00251 ml/g
Correlation Coefficient	0.99977

Serial No.	w46020	Software Version	2.13
Sample ID	22-671	Start Date	05/04/04
Customer	CNWRA	Start Time	01:26:46
Operator	MR	Elapsed Time	52 min
Sample Wt	1.9282 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

t-Plot Surface Area Report

t-Plot Surface Area	13.876 sq.m/g
Total Surface Area	19.630 sq.m/g
Micropore Surface Area	5.754 sq.m/g
Micropore Volume	0.00251 ml/g
Film Thickness Range	0.35 to 0.50
Slope	8.9693
Intercept	1.62058
Correlation Coefficient	0.99977

Film Thickness (nm)	Vads (cc/g STP)
0.3526	4.769
0.3681	4.918
0.3803	5.034
0.3942	5.163
0.4091	5.298
0.4225	5.419
0.4356	5.533
0.4612	5.755
0.4871	5.978

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From Page No. 3 August 05 MR cont.

Sample ID	22-671	Start Date	05/04/04
Customer	CNWRA	Start Time	01:26:46
Operator	MR	Elapsed Time	52 min
Sample Wt	1.9282 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

Isotherm Data

Freespace Calculation

Slope	0.0179
Intercept	0.0026
Correlation Coefficient	1.00000

Isotherm Data Table

Ps/Po	Vads cc/g(STP)	Ps mmHg	Po mmHg
0.0000	0.000	0.001	747.93
0.0001	0.230	0.055	747.95
0.0001	0.462	0.099	748.01
0.0002	0.732	0.152	748.02
0.0004	1.028	0.293	748.06
0.0004	1.315	0.321	748.08
0.0006	1.683	0.483	748.12
0.0009	2.005	0.676	748.14
0.0015	2.341	1.117	748.18
0.0024	2.692	1.798	748.20
0.0040	3.052	3.011	748.23
0.0068	3.417	5.080	748.25
0.0111	3.706	8.335	748.26
0.0184	3.950	13.739	748.30
0.0279	4.148	20.841	748.30
0.0335	4.244	25.050	748.28
0.0400	4.339	29.919	748.28
0.0477	4.436	35.665	748.26
0.0553	4.524	41.410	748.24
0.0602	4.577	45.057	748.24
0.0700	4.672	52.342	748.22
0.0810	4.769	60.631	748.22
0.1003	4.918	75.037	748.21
0.1165	5.034	87.187	748.19
0.1360	5.163	101.741	748.19
0.1578	5.298	118.064	748.17
0.1780	5.419	133.154	748.12
0.1981	5.533	148.196	748.11
0.2378	5.755	177.873	748.10
0.2782	5.978	208.125	748.08
0.3184	6.198	238.172	748.04
0.3590	6.427	268.560	748.03
0.3990	6.648	298.451	748.00
0.4412	6.879	330.028	747.99

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See initial entry: 731/2-3

Surface Area Analyses of Known NIST Standard

Before Outgassing

Sample ID	Surface Area Analyses Sample ID	Mass(g) of tube, cap & insert	Aliquot Mass(g)
NIST-Silicon nitride surface area standard - 1900	1900-2	29.7237	1.2251

After Outgassing

Sample ID	Surface Area Analyses Sample ID	Total Mass(g)	Outgassed Aliquot Mass(g)*
NIST-silicon nitride surface area standard - 1900	1900-2	30.9515	1.2201

*calculation

3 Aug 05 MR

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From Page No.

5 August 05 MR.
sample ID: NIST Silicon nitride surface area standard-1900
surface area analyses ID: 1900-2
mass(g) before outgassing: 731/35
mass(g) after outgassing: 731/35
accepted value: 2.85 ± 0.19 m²/g

Serial No.	w46020	Software Version	2.13
Sample ID	1900-2	Start Date	05/05/04
Customer	CNWRA	Start Time	01:54:26
Operator	MR	Elapsed Time	26 min
Sample Wt	1.2201 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

Summary

t-Plot Surface Area Report

t-Plot Surface Area	2.748 sq.m/g
Micropore Surface Area	0.102 sq.m/g
Micropore Volume	0.00002 ml/g
Correlation Coefficient	0.99997

Serial No.	w46020	Software Version	2.13
Sample ID	1900-2	Start Date	05/05/04
Customer	CNWRA	Start Time	01:54:26
Operator	MR	Elapsed Time	26 min
Sample Wt	1.2201 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

t-Plot Surface Area Report

t-Plot Surface Area	2.748 sq.m/g
Total Surface Area	2.850 sq.m/g
Micropore Surface Area	0.102 sq.m/g
Micropore Volume	0.00002 ml/g
Film Thickness Range	0.35 to 0.50
Slope	1.7764
Intercept	0.01293
Correlation Coefficient	0.99997

Film Thickness (nm)	Vads (cc/g STP)
0.3517	0.638
0.3678	0.667
0.3829	0.693
0.3965	0.717
0.4102	0.741
0.4236	0.764
0.4365	0.788
0.4622	0.834
0.4883	0.882

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5 August 05 MR cont.

Sample ID	1900-2	Start Date	05/05/04
Customer	CNWRA	Start Time	01:54:26
Operator	MR	Elapsed Time	26 min
Sample Wt	1.2201 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

Isotherm Data

Freespace Calculation

Slope	0.0175
Intercept	0.0039
Correlation Coefficient	0.99999

Isotherm Data Table

Ps/Po	Vads cc/g(STP)	Ps mmHg	Po mmHg
0.0000	0.000	0.001	750.12
0.0022	0.324	1.673	750.14
0.0136	0.471	10.190	750.18
0.0356	0.553	26.688	750.24
0.0426	0.570	31.940	750.24
0.0511	0.588	38.311	750.28
0.0597	0.605	44.774	750.29
0.0680	0.619	51.018	750.33
0.0799	0.638	59.987	750.37
0.1000	0.667	75.056	750.39
0.1201	0.693	90.156	750.44
0.1394	0.717	104.589	750.46
0.1595	0.741	119.676	750.49
0.1796	0.764	134.770	750.53
0.1995	0.788	149.707	750.56
0.2394	0.834	179.679	750.57
0.2801	0.882	210.231	750.58
0.3194	0.930	239.777	750.60
0.3595	0.981	269.847	750.61
0.3995	1.034	299.876	750.65
0.4400	1.089	330.278	750.66

5 August 05 MR

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From Page No. 22 August 05 MR

The first 13 (of 59) NCEWDP22PC0305 "interval" <#35 (710/59) analyzed for surface area analyses were analyzed with the old method parameters of outgassing temperature 350°C and outgassing time of 12 hours. Using the new parameters of outgassing temperature 200°C and outgassing time of 6 hours, new aliquots will be removed from the respective NCEWDP 22PC0305 "interval" <#35 samples. The new aliquots will have a "B" added to the end of the surface area analyses sample ID in order to differentiate from previous results. (See 731/39)

For full procedure see 731/2-3

For method parameter change explanation ~~det~~ 22 Aug 05 MR see 710/~~60~~ 80 22 Aug 05 MR

First 13 (of 59) NCEWDP22PC0305 "interval" <#35 can be found 710/20-59.

22 August 05 MR

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From Page No. 22 August 05 MR cont.

See initial entry 731/2-3 and 731/38 sample ID prefix NCEWDP 22PC 0305 (1)

Surface ~~Area~~ 22 Aug 05 MR Area Analyses of NCEWDP 22PC 0305 <#35 Sonic Core Samples Before Outgassing

Before Outgassing

Sample ID (1)	Surface Area ~~Analys~~ 22 Aug 05 MR Analyses Sample ID	Mass (g) of tube, cap & insert	Aliquot Mass (g)
555.3-556.8 <#35	22555B	29.4570	2.0077
614.1-615.5 <#35	22614B	29.3830	2.0038
618.5-620.5 <#35	22619B	29.4148	2.0899

22 August 05 MR

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From Page No. 23 August 05 MR

see initial entry: 731/2-3 and 731/38 (1)
Sample ID prefix: NCEWDP22PC0305

Surface Area Analyses of NCEWDP22PC 0305 <#35 After outgassing

After Outgassing

Sample ID (1)	Surface Area Analyses Sample ID	Total Mass (g)	Outgassed Aliquot Mass (g)*
555.3-556.8 <#35	22555B	31.2951	1.8381
614.1-615.5 <#35	22614B	31.2544	1.8714
618.5-620.5 <#35	22619B	31.3922	1.9774

*calculation

23 August 05 MR

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From Page No. 23 August 05 MR cont.

Sample ID: NCEWDP22PC 0305 555.3-556.8 <#35
Surface area analyses ID: 22555B
mass (g) before outgassing: 731/39
mass (g) after outgassing: 731/40

Serial No.	w46020	Software Version	2.13
Sample ID	22555B	Start Date	05/06/04
Customer	CNWRA	Start Time	10:15:35
Operator	MR	Elapsed Time	53 min
Sample Wt	1.8381 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

Summary

t-Plot Surface Area Report

t-Plot Surface Area	21.228 sq.m/g
Micropore Surface Area	8.448 sq.m/g
Micropore Volume	0.00364 ml/g
Correlation Coefficient	0.99945

Serial No.	w46020	Software Version	2.13
Sample ID	22555B	Start Date	05/06/04
Customer	CNWRA	Start Time	10:15:35
Operator	MR	Elapsed Time	53 min
Sample Wt	1.8381 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

t-Plot Surface Area Report

t-Plot Surface Area	21.228 sq.m/g
Total Surface Area	29.676 sq.m/g
Micropore Surface Area	8.448 sq.m/g
Micropore Volume	0.00364 ml/g
Film Thickness Range	0.35 to 0.50
Slope	13.7219
Intercept	2.35498
Correlation Coefficient	0.99945

Film Thickness (nm)	Vads (cc/g STP)
0.3515	7.148
0.3684	7.400
0.3837	7.627
0.3941	7.774
0.4083	7.977
0.4218	8.163
0.4361	8.352
0.4604	8.673
0.4862	8.995

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From Page No.___ 23 August 05 MR cont.

Sample ID	22555B	Start Date	05/06/04
Customer	CNWRA	Start Time	10:15:35
Operator	MR	Elapsed Time	53 min
Sample Wt	1.8381 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

Isotherm Data

Freespace Calculation

Slope	0.0178
Intercept	0.0036
Correlation Coefficient	1.00000

Isotherm Data Table

Ps/Po	Vads cc/g(STP)	Ps mmHg	Po mmHg
0.0000	0.000	0.001	747.14
0.0001	0.241	0.055	747.15
0.0002	0.482	0.144	747.17
0.0003	0.762	0.187	747.15
0.0004	1.070	0.310	747.19
0.0005	1.372	0.337	747.19
0.0005	1.759	0.405	747.23
0.0006	2.101	0.437	747.24
0.0008	2.584	0.573	747.27
0.0010	2.966	0.716	747.32
0.0013	3.366	0.994	747.37
0.0020	3.786	1.469	747.43
0.0030	4.226	2.210	747.45
0.0045	4.684	3.357	747.51
0.0071	5.151	5.295	747.61
0.0102	5.470	7.615	747.63
0.0150	5.762	11.197	747.72
0.0215	6.020	16.044	747.86
0.0260	6.162	19.424	747.95
0.0312	6.299	23.342	748.04
0.0370	6.433	27.646	748.13
0.0429	6.559	32.094	748.20
0.0493	6.679	36.860	748.29
0.0557	6.793	41.658	748.33
0.0601	6.865	45.009	748.40
0.0704	7.018	52.673	748.47
0.0798	7.148	59.700	748.50
0.1007	7.400	75.364	748.52
0.1213	7.627	90.801	748.54
0.1358	7.774	101.690	748.57
0.1567	7.977	117.272	748.56
0.1769	8.163	132.426	748.56
0.1987	8.352	148.772	748.56
0.2366	8.673	177.070	748.54
0.2768	8.995	207.229	748.54
0.3191	9.327	238.821	748.51
0.3584	9.629	268.248	748.47
0.3990	9.934	298.660	748.46
0.4408	10.239	329.885	748.42

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From Page No.___ 23 August 05 MR cont.
Sample ID: NCEWADP22PC0305 614.1-615.5 <#35
Surface area analyses ID: 22614B
mass (g) before outgassing: 731/39
mass (g) after outgassing: 731/40

Serial No.	w46020	Software Version	2.13

Sample ID	22614B	Start Date	05/06/04
Customer	CNWRA	Start Time	11:18:52
Operator	MR	Elapsed Time	50 min
Sample Wt	1.8714 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

Summary

t-Plot Surface Area Report

t-Plot Surface Area	16.014 sq.m/g
Micropore Surface Area	6.648 sq.m/g
Micropore Volume	0.00287 ml/g
Correlation Coefficient	0.99959

Serial No.	w46020	Software Version	2.13

Sample ID	22614B	Start Date	05/06/04
Customer	CNWRA	Start Time	11:18:52
Operator	MR	Elapsed Time	50 min
Sample Wt	1.8714 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

t-Plot Surface Area Report

t-Plot Surface Area	16.014 sq.m/g
Total Surface Area	22.662 sq.m/g
Micropore Surface Area	6.648 sq.m/g
Micropore Volume	0.00287 ml/g
Film Thickness Range	0.35 to 0.50
Slope	10.3516
Intercept	1.85509
Correlation Coefficient	0.99959

Film Thickness (nm)	Vads (cc/g STP)
0.3520	5.480
0.3679	5.657
0.3823	5.815
0.3939	5.940
0.4085	6.095
0.4223	6.237
0.4356	6.377
0.4607	6.626
0.4886	6.891

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From Page No. 23 August 05 MR cont.

Sample ID	22614B	Start Date	05/06/04
Customer	CNWRA	Start Time	11:18:52
Operator	MR	Elapsed Time	50 min
Sample Wt	1.8714 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

Isotherm Data

Freespace Calculation

Slope	0.0172
Intercept	0.0038
Correlation Coefficient	0.99999

Isotherm Data Table

Ps/Po	Vads cc/g(STP)	Ps mmHg	Po mmHg
0.0000	0.000	0.001	747.68
0.0001	0.235	0.050	747.71
0.0001	0.474	0.098	747.73
0.0002	0.749	0.148	747.75
0.0004	1.056	0.287	747.78
0.0004	1.355	0.308	747.75
0.0006	1.733	0.457	747.78
0.0007	2.069	0.554	747.76
0.0011	2.419	0.826	747.79
0.0017	2.787	1.248	747.77
0.0027	3.171	2.014	747.77
0.0043	3.567	3.224	747.77
0.0072	3.968	5.370	747.80
0.0114	4.268	8.525	747.81
0.0181	4.527	13.530	747.77
0.0269	4.744	20.138	747.77
0.0325	4.853	24.288	747.75
0.0388	4.961	29.000	747.72
0.0459	5.070	34.339	747.75
0.0531	5.168	39.733	747.72
0.0580	5.230	43.395	747.71
0.0633	5.295	47.355	747.71
0.0701	5.370	52.418	747.67
0.0804	5.480	60.096	747.66
0.1001	5.657	74.849	747.63
0.1193	5.815	89.170	747.61
0.1356	5.940	101.344	747.58
0.1569	6.095	117.305	747.55
0.1777	6.237	132.809	747.58
0.1980	6.377	148.042	747.53
0.2370	6.626	177.189	747.49
0.2806	6.891	209.705	747.42
0.3182	7.119	237.847	747.42
0.3578	7.358	267.404	747.42
0.3988	7.601	298.048	747.44
0.4423	7.852	330.608	747.42

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From Page No. 23 August 05 MR cont.
sample ID: NCEWDP 22PC 0305 618.5-620.5 <#35
surface area analyses ID: 22619B
mass(g) before outgassing: 731/39
mass(g) after outgassing: 731/40

Serial No.	w46020	Software Version	2.13

Sample ID	22619B	Start Date	05/06/04
Customer	CNWRA	Start Time	12:34:06
Operator	MR	Elapsed Time	51 min
Sample Wt	1.9774 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

Summary

t-Plot Surface Area Report

t-Plot Surface Area	14.011 sq.m/g
Micropore Surface Area	5.693 sq.m/g
Micropore Volume	0.00246 ml/g
Correlation Coefficient	0.99966

Serial No.	w46020	Software Version	2.13

Sample ID	22619B	Start Date	05/06/04
Customer	CNWRA	Start Time	12:34:06
Operator	MR	Elapsed Time	51 min
Sample Wt	1.9774 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

t-Plot Surface Area Report

t-Plot Surface Area	14.011 sq.m/g
Total Surface Area	19.704 sq.m/g
Micropore Surface Area	5.693 sq.m/g
Micropore Volume	0.00246 ml/g
Film Thickness Range	0.35 to 0.50
Slope	9.0569
Intercept	1.59255
Correlation Coefficient	0.99966

Film Thickness (nm)	Vads (cc/g STP)
0.3520	4.764
0.3692	4.933
0.3801	5.036
0.3946	5.173
0.4084	5.302
0.4224	5.428
0.4362	5.551
0.4606	5.762
0.4871	5.988

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From Page No. 23 August 05 MR cont

Sample ID	22619B	Start Date	05/06/04
Customer	CNWRA	Start Time	12:34:06
Operator	MR	Elapsed Time	51 min
Sample Wt	1.9774 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

Isotherm Data

Freespace Calculation

Slope	0.0164
Intercept	0.0029
Correlation Coefficient	1.00000

Isotherm Data Table

Ps/Po	Vads cc/g(STP)	Ps mmHg	Po mmHg
0.0000	0.000	0.001	749.10
0.0001	0.224	0.054	749.10
0.0002	0.450	0.140	749.11
0.0004	0.708	0.269	749.11
0.0004	0.972	0.304	749.11
0.0005	1.293	0.411	749.10
0.0006	1.592	0.483	749.09
0.0009	1.906	0.684	749.10
0.0014	2.235	1.015	749.08
0.0022	2.579	1.627	749.09
0.0036	2.938	2.669	749.07
0.0059	3.305	4.387	749.08
0.0104	3.661	7.773	749.09
0.0170	3.910	12.732	749.07
0.0259	4.113	19.431	749.06
0.0318	4.214	23.855	749.07
0.0383	4.313	28.705	749.09
0.0458	4.411	34.304	749.07
0.0533	4.501	39.960	749.06
0.0584	4.556	43.714	749.06
0.0640	4.614	47.972	749.05
0.0698	4.671	52.254	749.04
0.0803	4.764	60.165	749.03
0.1017	4.933	76.209	749.00
0.1163	5.036	87.093	749.02
0.1366	5.173	102.283	749.00
0.1567	5.302	117.390	748.96
0.1777	5.428	133.104	748.96
0.1989	5.551	148.955	748.90
0.2369	5.762	177.401	748.89
0.2781	5.988	208.286	748.87
0.3180	6.200	238.159	748.83
0.3591	6.421	268.902	748.80
0.3988	6.631	298.576	748.78
0.4411	6.848	330.259	748.75

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See initial entry: 731/2-3 and 731/38
Sample ID prefix: NCEWDP22PC0305 (1)

Surface Area Analyses of NCEWDP22PC0305 <#35: Sonic Core Samples Before Outgassing

Before Outgassing

Sample ID (1)	Surface Area Analyses Sample ID	Mass(g) of cap, tube & insert	Aliquot Mass(g)
640.3-641.4 <#35	22640B	29.8117	2.0218
647.1-648.4 <#35	22647B	29.3901	2.0219
694.3-695.6 <#35	22695B	28.4301	2.0413

23 August 05 MR

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From Page No. 24 August 05 MR

See initial entry: 731/2-3 and 731/38 24 August 05 MR (1)
Sample ID prefix: NCEWDP22PC 0305 <#35

Surface Area Analyses of NCEWDP22PC 0305 <#35 Sonic Core Samples After Outgassing

After Outgassing

Sample ID (1)	Surface Area Analyses Sample ID	Total Mass (g)	Outgassed Aliquot Mass (g) *
640.3-641.4 <#35	22640B	31.6957	1.8840
647.1-648.4 <#35	22647B	31.2922	1.9021
694.3-695.6 <#35	24 Aug 05 MR ~~22695B~~ 22695B	30.3367	1.9066

* calculation

24 Aug 05 MR

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Sample ID: NCEWDP 22PC 0305 647.1-648.4 <#35
Surface area analyses ID: 22647B
mass (g) before outgassing: 731/47
mass (g) after outgassing: 731/48

Serial No.	w46020	Software Version	2.13
Sample ID	22647B	Start Date	05/07/04
Customer	CNWRA	Start Time	10:56:49
Operator	MR	Elapsed Time	47 min
Sample Wt	1.9021 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

Summary

t-Plot Surface Area Report

t-Plot Surface Area	13.030 sq.m/g
Micropore Surface Area	5.248 sq.m/g
Micropore Volume	0.00227 ml/g
Correlation Coefficient	0.99962

Serial No.	w46020	Software Version	2.13
Sample ID	22647B	Start Date	05/07/04
Customer	CNWRA	Start Time	10:56:49
Operator	MR	Elapsed Time	47 min
Sample Wt	1.9021 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

t-Plot Surface Area Report

t-Plot Surface Area	13.030 sq.m/g
Total Surface Area	18.278 sq.m/g
Micropore Surface Area	5.248 sq.m/g
Micropore Volume	0.00227 ml/g
Film Thickness Range	0.35 to 0.50
Slope	8.4228
Intercept	1.47011
Correlation Coefficient	0.99962

Film Thickness (nm)	Vads (cc/g STP)
0.3524	4.422
0.3678	4.562
0.3801	4.674
0.3942	4.800
0.4094	4.929
0.4231	5.043
0.4354	5.144
0.4609	5.351
0.4871	5.559

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24 August 05 MR cont.

Sample ID	22647B	Start Date	05/07/04
Customer	CNWRA	Start Time	10:56:49
Operator	MR	Elapsed Time	47 min
Sample Wt	1.9021 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

Isotherm Data

Freespace Calculation

Slope	0.0173
Intercept	0.0037
Correlation Coefficient	0.99999

Isotherm Data Table

Ps/Po	Vads cc/g(STP)	Ps mmHg	Po mmHg
0.0000	0.000	0.001	752.61
0.0001	0.233	0.050	752.63
0.0002	0.465	0.131	752.62
0.0003	0.733	0.246	752.64
0.0004	1.008	0.273	752.63
0.0005	1.341	0.378	752.61
0.0007	1.651	0.492	752.59
0.0012	2.065	0.939	752.59
0.0020	2.403	1.529	752.62
0.0036	2.748	2.680	752.63
0.0061	3.100	4.596	752.63
0.0106	3.395	7.941	752.63
0.0180	3.640	13.573	752.62
0.0277	3.835	20.856	752.60
0.0337	3.929	25.357	752.60
0.0405	4.022	30.510	752.57
0.0484	4.115	36.395	752.54
0.0560	4.200	42.163	752.49
0.0611	4.252	45.977	752.47
0.0703	4.335	52.882	752.45
0.0808	4.422	60.799	752.42
0.1000	4.562	75.240	752.38
0.1164	4.674	87.544	752.31
0.1361	4.800	102.383	752.22
0.1583	4.929	119.060	752.15
0.1788	5.043	134.491	752.09
0.1977	5.144	148.718	752.09
0.2374	5.351	178.572	752.06
0.2783	5.559	209.268	752.02
0.3180	5.764	239.164	752.00
0.3588	5.972	269.841	751.96
0.3999	6.180	300.731	751.93
0.4400	6.384	330.843	751.89

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24 August 05 MR cont.
Sample ID: NCEWDP 22PC 0305 694.3-695.6 <#35
Surface area analyses ID: 22695B
mass(g) before outgassing: 731/47
mass(g) after outgassing: 731/40

Serial No.	w46020	Software Version	2.13

Sample ID	22695B	Start Date	05/07/04
Customer	CNWRA	Start Time	12:17:16
Operator	MR	Elapsed Time	49 min
Sample Wt	1.9066 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

Summary

t-Plot Surface Area Report

t-Plot Surface Area	13.786 sq.m/g
Micropore Surface Area	5.384 sq.m/g
Micropore Volume	0.00233 ml/g
Correlation Coefficient	0.99968

Serial No.	w46020	Software Version	2.13

Sample ID	22695B	Start Date	05/07/04
Customer	CNWRA	Start Time	12:17:16
Operator	MR	Elapsed Time	49 min
Sample Wt	1.9066 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

t-Plot Surface Area Report

t-Plot Surface Area	13.786 sq.m/g
Total Surface Area	19.169 sq.m/g
Micropore Surface Area	5.384 sq.m/g
Micropore Volume	0.00233 ml/g
Film Thickness Range	0.35 to 0.50
Slope	8.9112
Intercept	1.50686
Correlation Coefficient	0.99968

Film Thickness (nm)	Vads (cc/g STP)
0.3516	4.625
0.3685	4.786
0.3831	4.923
0.3946	5.029
0.4085	5.158
0.4228	5.282
0.4361	5.402
0.4600	5.607
0.4882	5.841

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24 August 05 MR cont.

Sample ID	22695B	Start Date	05/07/04
Customer	CNWRA	Start Time	12:17:16
Operator	MR	Elapsed Time	49 min
Sample Wt	1.9066 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

Isotherm Data

Freespace Calculation

Slope	0.0175
Intercept	0.0031
Correlation Coefficient	1.00000

Isotherm Data Table

Ps/Po	Vads cc/g(STP)	Ps mmHg	Po mmHg
0.0000	0.000	0.001	754.67
0.0001	0.234	0.052	754.65
0.0002	0.467	0.132	754.68
0.0003	0.735	0.257	754.66
0.0004	1.011	0.285	754.68
0.0005	1.345	0.385	754.69
0.0007	1.654	0.491	754.66
0.0010	1.976	0.761	754.63
0.0016	2.315	1.207	754.63
0.0027	2.669	2.041	754.59
0.0045	3.034	3.417	754.57
0.0078	3.394	5.916	754.56
0.0133	3.669	10.015	754.54
0.0215	3.897	16.240	754.54
0.0272	4.010	20.506	754.51
0.0334	4.113	25.212	754.46
0.0408	4.216	30.752	754.43
0.0482	4.308	36.388	754.40
0.0556	4.394	41.966	754.36
0.0607	4.448	45.819	754.31
0.0705	4.543	53.162	754.27
0.0799	4.625	60.259	754.20
0.1008	4.786	76.031	754.15
0.1204	4.923	90.785	754.10
0.1367	5.029	103.065	754.07
0.1570	5.158	118.366	754.03
0.1783	5.282	134.462	754.00
0.1988	5.402	149.918	753.96
0.2360	5.607	177.946	753.91
0.2799	5.841	210.992	753.86
0.3186	6.045	240.129	753.81
0.3584	6.258	270.132	753.73
0.3985	6.471	300.341	753.65
0.4416	6.694	332.789	753.60

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24 August 05 MR cont.
Sample ID: NCEWDP22PC0305 640.3-641.4 <#35
Surface area analyses ID. 22640B
mass(g) before outgassing: 731/47
mass(g) after outgassing: 731/48

Serial No.	w46020	Software Version	2.13

Sample ID	22640B	Start Date	05/07/04
Customer	CNWRA	Start Time	09:42:19
Operator	MR	Elapsed Time	58 min
Sample Wt	1.884 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

Summary

t-Plot Surface Area Report

t-Plot Surface Area	16.645 sq.m/g
Micropore Surface Area	6.143 sq.m/g
Micropore Volume	0.00264 ml/g
Correlation Coefficient	0.99972

Serial No.	w46020	Software Version	2.13

Sample ID	22640B	Start Date	05/07/04
Customer	CNWRA	Start Time	09:42:19
Operator	MR	Elapsed Time	58 min
Sample Wt	1.884 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

t-Plot Surface Area Report

t-Plot Surface Area	16.645 sq.m/g
Total Surface Area	22.787 sq.m/g
Micropore Surface Area	6.143 sq.m/g
Micropore Volume	0.00264 ml/g
Film Thickness Range	0.35 to 0.50
Slope	10.7594
Intercept	1.70585
Correlation Coefficient	0.99972

Film Thickness (nm)	Vads (cc/g STP)
0.3519	5.474
0.3682	5.662
0.3803	5.801
0.3938	5.950
0.4090	6.117
0.4220	6.256
0.4358	6.404
0.4607	6.662
0.4872	6.931

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From Page No. 24 August 05 MR cont.

Serial No.	w46020	Software Version	2.13
Sample ID	22640B	Start Date	05/07/04
Customer	CNWRA	Start Time	09:42:19
Operator	MR	Elapsed Time	58 min
Sample Wt	1.884 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

Isotherm Data

Freespace Calculation

Slope	0.0161
Intercept	0.0033
Correlation Coefficient	1.00000

Isotherm Data Table

Ps/Po	Vads cc/g(STP)	Ps mmHg	Po mmHg
0.0000	0.000	0.001	751.42
0.0001	0.236	0.061	751.45
0.0001	0.473	0.112	751.47
0.0002	0.748	0.178	751.50
0.0004	1.051	0.334	751.53
0.0005	1.348	0.351	751.57
0.0006	1.726	0.477	751.58
0.0008	2.056	0.584	751.61
0.0012	2.401	0.870	751.62
0.0017	2.768	1.280	751.63
0.0028	3.148	2.141	751.64
0.0045	3.541	3.394	751.68
0.0075	3.939	5.615	751.71
0.0117	4.236	8.804	751.71
0.0184	4.496	13.816	751.75
0.0270	4.714	20.299	751.80
0.0323	4.828	24.299	751.80
0.0386	4.938	29.003	751.79
0.0457	5.049	34.331	751.75
0.0529	5.151	39.752	751.79
0.0576	5.217	43.267	751.79
0.0630	5.286	47.378	751.75
0.0707	5.373	53.127	751.73
0.0802	5.474	60.287	751.72
0.1005	5.662	75.565	751.73
0.1166	5.801	87.616	751.69
0.1355	5.950	101.850	751.68
0.1576	6.117	118.456	751.66
0.1771	6.256	133.137	751.63
0.1984	6.404	149.093	751.58
0.2371	6.662	178.185	751.52
0.2784	6.931	209.240	751.50
0.3178	7.188	238.835	751.45
0.3586	7.451	269.477	751.42
0.3992	7.712	299.946	751.41
0.4404	7.977	330.888	751.33

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See initial entry: 731/2-3 and 731/38
Sample ID prefix: NC EWDP 22PC 0305 (1)

Surface Area Analyses of NC EWDP 22PC 0305 <#35 Sonic Core Samples

Before Outgassing

Sample ID (1)	Surface Area Analyses Sample ID	Mass(g) of tube, insert + cap	Aliquot Mass(g)
710.6-712.1 <#35	24 Aug 05 MR ~~22741B~~ 22711B	28.7459	2.0410
740.5-742.0 <#35	22741B	29.1772	2.0470
747.4-748.8 <#35	22748B	29.2279	24 Aug 05 MR * removed, but not used ↳ 2.0192 2.0329

24 Aug 05 MR

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25 August 05 MR

See initial entry: 731/2-3 and 731/38
Sample ID prefix: NCEWDP 22PC 0305 (1)

Surface Area Analysis of NCEWDP 22PC 0305 Sonic Core Samples After Outgassing

After outgassing

Sample ID (1)	25 Aug 05 MR ~~Surface~~ Surface Area Analyses Sample ID	Total Mass (g) ~~Mass (g) of Tube, Cap & Insert~~ 25 Aug 05 MR	Aliquot Mass (g)*
710.6-712.1 <#35	22711B	30.7068	1.9609
740.5-742.0 <#35	22741B	31.0724	1.8952
747.4-748.8 <#35	22748B	31.0971	25 Aug 05 MR ~~1.8692~~ 1.7864

* calculation

25 Aug 05 MR

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25 August 05 MR cont.
Sample ID: NCEWDP 22PC 0305 710.6-712.1 <#35
Surface area Sample ID: 22711B
mass (g) before outgassing: 731/55
mass (g) after outgassing: 731/56

Serial No.	W46020	Software Version	2.13
Sample ID	22711B	Start Date	05/08/04
Customer	CNWRA	Start Time	09:57:30
Operator	MR	Elapsed Time	36 min
Sample Wt	1.9609 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

Summary

t-Plot Surface Area Report

t-Plot Surface Area	7.199 sq.m/g
Micropore Surface Area	2.394 sq.m/g
Micropore Volume	0.00103 ml/g
Correlation Coefficient	0.99990

Serial No.	W46020	Software Version	2.13
Sample ID	22711B	Start Date	05/08/04
Customer	CNWRA	Start Time	09:57:30
Operator	MR	Elapsed Time	36 min
Sample Wt	1.9609 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

t-Plot Surface Area Report

t-Plot Surface Area	7.199 sq.m/g
Total Surface Area	9.593 sq.m/g
Micropore Surface Area	2.394 sq.m/g
Micropore Volume	0.00103 ml/g
Film Thickness Range	0.35 to 0.50
Slope	4.6535
Intercept	0.66718
Correlation Coefficient	0.99990

Film Thickness (nm)	Vads (cc/g STP)
0.3521	2.301
0.3681	2.379
0.3810	2.441
0.3951	2.508
0.4095	2.576
0.4229	2.638
0.4362	2.699
0.4619	2.816
0.4875	2.932

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From Page No. 25 August 05 MR cont.

Sample ID	22711B	Start Date	05/08/04
Customer	CNWRA	Start Time	09:57:30
Operator	MR	Elapsed Time	36 min
Sample Wt	1.9609 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

Isotherm Data

Freespace Calculation

Slope	0.0171
Intercept	0.0023
Correlation Coefficient	1.00000

Isotherm Data Table

Ps/Po	Vads cc/g(STP)	Ps mmHg	Po mmHg
0.0000	0.000	0.001	748.93
0.0000	0.224	0.037	748.93
0.0001	0.452	0.107	748.94
0.0004	0.711	0.274	748.95
0.0008	0.973	0.620	748.97
0.0021	1.241	1.582	749.00
0.0046	1.508	3.430	749.05
0.0101	1.749	7.560	749.13
0.0219	1.935	16.404	749.19
0.0297	2.009	22.242	749.26
0.0377	2.071	28.230	749.33
0.0470	2.131	35.243	749.38
0.0566	2.185	42.396	749.44
0.0622	2.216	46.632	749.49
0.0698	2.254	52.307	749.52
0.0805	2.301	60.335	749.57
0.1003	2.379	75.192	749.64
0.1175	2.441	88.090	749.67
0.1373	2.508	102.957	749.70
0.1584	2.576	118.764	749.72
0.1785	2.638	133.863	749.75
0.1990	2.699	149.187	749.79
0.2389	2.816	179.143	749.82
0.2789	2.932	209.120	749.86
0.3185	3.047	238.827	749.84
0.3593	3.169	269.400	749.87
0.3991	3.289	299.249	749.88
0.4404	3.415	330.227	749.89

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Sample ID: NCEWDP22PC0305 740.5-742.0 <#35
Surface area analyses ID: 22741B
mass(g) before outgassing: 731/55
mass(g) after outgassing: 731/56

Serial No.	w46020	Software Version	2.13

Sample ID	22741B	Start Date	05/08/04
Customer	CNWRA	Start Time	12:06:34
Operator	MR	Elapsed Time	50 min
Sample Wt	1.8952 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

Summary

t-Plot Surface Area Report

t-Plot Surface Area	15.909 sq.m/g
Micropore Surface Area	6.428 sq.m/g
Micropore Volume	0.00278 ml/g
Correlation Coefficient	0.99972

Serial No.	w46020	Software Version	2.13

Sample ID	22741B	Start Date	05/08/04
Customer	CNWRA	Start Time	12:06:34
Operator	MR	Elapsed Time	50 min
Sample Wt	1.8952 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

t-Plot Surface Area Report

t-Plot Surface Area	15.909 sq.m/g
Total Surface Area	22.337 sq.m/g
Micropore Surface Area	6.428 sq.m/g
Micropore Volume	0.00278 ml/g
Film Thickness Range	0.35 to 0.50
Slope	10.2837
Intercept	1.79700
Correlation Coefficient	0.99972

Film Thickness (nm)	Vads (cc/g STP)
0.3521	5.401
0.3678	5.574
0.3807	5.715
0.3942	5.857
0.4088	6.010
0.4221	6.147
0.4357	6.288
0.4608	6.537
0.4881	6.799

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Sample ID	22741B	Start Date	05/08/04
Customer	CNWRA	Start Time	12:06:34
Operator	MR	Elapsed Time	50 min
Sample Wt	1.8952 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

Isotherm Data

Freespace Calculation

Slope	0.0180
Intercept	0.0037
Correlation Coefficient	0.99999

Isotherm Data Table

Ps/Po	Vads cc/g(STP)	Ps mmHg	Po mmHg
0.0000	0.000	0.001	750.94
0.0001	0.234	0.062	750.92
0.0002	0.467	0.142	750.94
0.0004	0.737	0.281	750.94
0.0004	1.015	0.318	750.93
0.0006	1.349	0.423	750.95
0.0006	1.661	0.481	750.98
0.0008	1.986	0.621	751.01
0.0010	2.331	0.784	751.02
0.0016	2.695	1.181	751.03
0.0025	3.074	1.877	751.05
0.0040	3.467	3.011	751.06
0.0067	3.867	5.005	751.09
0.0105	4.167	7.864	751.10
0.0167	4.428	12.575	751.14
0.0251	4.645	18.885	751.15
0.0306	4.755	22.947	751.14
0.0367	4.862	27.537	751.15
0.0436	4.969	32.734	751.16
0.0508	5.067	38.135	751.13
0.0554	5.128	41.604	751.15
0.0607	5.194	45.605	751.15
0.0707	5.303	53.094	751.10
0.0804	5.401	60.426	751.11
0.1000	5.574	75.081	751.10
0.1171	5.715	87.940	751.07
0.1360	5.857	102.178	751.05
0.1573	6.010	118.172	751.03
0.1773	6.147	133.182	751.04
0.1982	6.288	148.852	751.01
0.2373	6.537	178.206	751.01
0.2797	6.799	210.091	751.00
0.3177	7.037	238.595	750.93
0.3579	7.285	268.790	750.92
0.3993	7.542	299.796	750.85
0.4414	7.794	331.439	750.80

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Sample ID: NCEWDP22PC0305 747.4-748.8 <#35
Surface area analyses ID: 22748B
mass (g) before outgassing: 731/55
mass (g) after outgassing: 731/56

Serial No.	w46020	Software Version	2.13

Sample ID	22748B	Start Date	05/12/04
Customer	CNWRA	Start Time	09:33:42
Operator	MR	Elapsed Time	50 min
Sample Wt	1.7864 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

Summary

t-Plot Surface Area Report

t-Plot Surface Area	12.459 sq.m/g
Micropore Surface Area	5.029 sq.m/g
Micropore Volume	0.00218 ml/g
Correlation Coefficient	0.99963

Serial No.	w46020	Software Version	2.13

Sample ID	22748B	Start Date	05/12/04
Customer	CNWRA	Start Time	09:33:42
Operator	MR	Elapsed Time	50 min
Sample Wt	1.7864 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

t-Plot Surface Area Report

t-Plot Surface Area	12.459 sq.m/g
Total Surface Area	17.489 sq.m/g
Micropore Surface Area	5.029 sq.m/g
Micropore Volume	0.00218 ml/g
Film Thickness Range	0.35 to 0.50
Slope	8.0539
Intercept	1.40787
Correlation Coefficient	0.99963

Film Thickness (nm)	Vads (cc/g STP)
0.3532	4.237
0.3670	4.359
0.3803	4.473
0.3947	4.594
0.4086	4.710
0.4228	4.820
0.4361	4.928
0.4597	5.108
0.4878	5.322

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Sample ID	22748B	Start Date	05/12/04
Customer	CNWRA	Start Time	09:33:42
Operator	MR	Elapsed Time	50 min
Sample Wt	1.7864 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

Isotherm Data

Freespace Calculation

Slope	0.0166
Intercept	0.0034
Correlation Coefficient	1.00000

Isotherm Data Table

Ps/Po	Vads cc/g(STP)	Ps mmHg	Po mmHg
0.0000	0.000	0.001	738.14
0.0001	0.247	0.070	738.16
0.0003	0.494	0.193	738.21
0.0003	0.773	0.258	738.26
0.0006	1.090	0.437	738.27
0.0007	1.399	0.510	738.33
0.0010	1.722	0.735	738.40
0.0014	2.070	1.031	738.47
0.0026	2.422	1.951	738.48
0.0046	2.786	3.434	738.59
0.0086	3.140	6.349	738.66
0.0155	3.414	11.465	738.74
0.0257	3.629	18.982	738.81
0.0318	3.730	23.513	738.92
0.0388	3.826	28.661	738.99
0.0471	3.921	34.826	739.07
0.0555	4.006	41.027	739.10
0.0605	4.060	44.711	739.13
0.0698	4.140	51.574	739.13
0.0817	4.237	60.402	739.16
0.0989	4.359	73.092	739.13
0.1166	4.473	86.180	739.14
0.1368	4.594	101.094	739.12
0.1571	4.710	116.093	738.98
0.1784	4.820	131.857	738.98
0.1989	4.928	146.946	738.95
0.2355	5.108	173.982	738.91
0.2792	5.322	206.312	738.89
0.3184	5.511	235.237	738.82
0.3592	5.704	265.364	738.79
0.3994	5.897	295.087	738.76
0.4399	6.084	324.930	738.71

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See initial entry: 731/2-3 and 731/38
Sample ID prefix: NCEWDP22PC 0305 (1)

Surface Area Analyses of NCEWDP22PC 0305 Sonic Core Samples Before Outgassing

Before Outgassing

Sample ID (1)	Surface Area Analyses Sample ID	Mass (g) of tube, cap + insert	Aliquot Mass (g)
760.3-761.6 <#35	22760B	29.4259	2.0597
476.9-478.5 <#35	22477B	29.4795	2.0027
522.1-523.5 <#35	22522B	29.7308	2.0417

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See initial entry: 731/2-3 and 731/38

sample ID Prefix: NCEWDP22PC0305 ①

Surface Area Analyses of NCEWDP22PC0305 <#35 Sonic Core Samples After Outgassing

After Outgassing

Sample ID ①	Surface Area Analyses Sample ID	Total Mass (g)	Outgassed Aliquot Mass (g) *
760.3-761.6 <#35	22760B	26 Aug 05 MR ~~31.3607~~ 31.4093	1.9834
476.9-478.5 <#35	22477B	31.3607	1.8812
522.1-523.5 <#35	22522B	31.6143	1.8835

*calculation

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Sample ID: NCEWDP22PC0305 760.3-761.6 <#35

surface area analyses ID: 22760B

mass (g) before outgassing: 731/63

mass (g) after outgassing: 731/64

Serial No.	w46020	Software Version	2.13
Sample ID	22760B	Start Date	05/09/04
Customer	CNWRA	Start Time	09:29:28
Operator	MR	Elapsed Time	44 min
Sample Wt	1.9834 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

Summary

t-Plot Surface Area Report

t-Plot Surface Area	9.095 sq.m/g
Micropore Surface Area	2.918 sq.m/g
Micropore Volume	0.00125 ml/g
Correlation Coefficient	0.99986

Serial No.	w46020	Software Version	2.13
Sample ID	22760B	Start Date	05/09/04
Customer	CNWRA	Start Time	09:29:28
Operator	MR	Elapsed Time	44 min
Sample Wt	1.9834 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

t-Plot Surface Area Report

t-Plot Surface Area	9.095 sq.m/g
Total Surface Area	12.012 sq.m/g
Micropore Surface Area	2.918 sq.m/g
Micropore Volume	0.00125 ml/g
Film Thickness Range	0.35 to 0.50
Slope	5.8788
Intercept	0.80806
Correlation Coefficient	0.99986

Film Thickness (nm)	Vads (cc/g STP)
0.3522	2.871
0.3686	2.974
0.3801	3.045
0.3951	3.134
0.4096	3.219
0.4224	3.297
0.4360	3.374
0.4624	3.525
0.4871	3.667

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Sample ID	22760B	Start Date	05/09/04
Customer	CNWRA	Start Time	09:29:28
Operator	MR	Elapsed Time	44 min
Sample Wt	1.9834 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

Isotherm Data

Freespace Calculation

Slope	0.0174
Intercept	0.0026
Correlation Coefficient	1.00000

Isotherm Data Table

Ps/Po	Vads cc/g(STP)	Ps mmHg	Po mmHg
0.0000	0.000	0.001	747.47
0.0001	0.225	0.050	747.46
0.0002	0.448	0.149	747.48
0.0003	0.698	0.193	747.50
0.0005	0.980	0.391	747.46
0.0010	1.256	0.721	747.52
0.0024	1.601	1.771	747.55
0.0047	1.882	3.491	747.54
0.0094	2.147	7.037	747.60
0.0188	2.360	14.060	747.64
0.0310	2.510	23.187	747.67
0.0374	2.575	27.975	747.72
0.0452	2.641	33.789	747.77
0.0543	2.710	40.620	747.78
0.0599	2.749	44.785	747.82
0.0661	2.790	49.463	747.89
0.0806	2.871	60.278	747.90
0.1010	2.974	75.557	747.93
0.1163	3.045	87.007	747.98
0.1374	3.134	102.741	747.99
0.1585	3.219	118.553	748.03
0.1779	3.297	133.041	748.03
0.1986	3.374	148.561	748.03
0.2398	3.525	179.376	748.06
0.2782	3.667	208.145	748.08
0.3182	3.813	238.033	748.06
0.3598	3.968	269.117	748.06
0.3996	4.114	298.893	748.05
0.4403	4.267	329.339	748.04

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sample ID: NCEWDP22PC030 476.9-478.5 <#35
surface area analyses ID: 22477B
mass(g) before outgassing: 731/63
mass(g) ~~before~~ after outgassing: 731/64
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Serial No.	w46020	Software Version	2.13

Sample ID	22477B	Start Date	05/09/04
Customer	CNWRA	Start Time	10:37:03
Operator	MR	Elapsed Time	51 min
Sample Wt	1.8812 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

Summary

t-Plot Surface Area Report

t-Plot Surface Area	15.958 sq.m/g
Micropore Surface Area	6.564 sq.m/g
Micropore Volume	0.00283 ml/g
Correlation Coefficient	0.99953

Serial No.	w46020	Software Version	2.13

Sample ID	22477B	Start Date	05/09/04
Customer	CNWRA	Start Time	10:37:03
Operator	MR	Elapsed Time	51 min
Sample Wt	1.8812 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

t-Plot Surface Area Report

t-Plot Surface Area	15.958 sq.m/g
Total Surface Area	22.522 sq.m/g
Micropore Surface Area	6.564 sq.m/g
Micropore Volume	0.00283 ml/g
Film Thickness Range	0.35 to 0.50
Slope	10.3154
Intercept	1.82791
Correlation Coefficient	0.99953

Film Thickness (nm)	Vads (cc/g STP)
0.3518	5.434
0.3692	5.631
0.3797	5.748
0.3944	5.906
0.4088	6.059
0.4220	6.196
0.4358	6.331
0.4613	6.584
0.4858	6.819

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Sample ID	22477B	Start Date	05/09/04
Customer	CNWRA	Start Time	10:37:03
Operator	MR	Elapsed Time	51 min
Sample Wt	1.8812 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

Isotherm Data

Freespace Calculation

Slope	0.0174
Intercept	0.0035
Correlation Coefficient	1.00000

Isotherm Data Table

Ps/Po	Vads cc/g(STP)	Ps mmHg	Po mmHg
0.0000	0.000	0.001	750.46
0.0001	0.235	0.048	750.48
0.0002	0.471	0.152	750.49
0.0002	0.735	0.182	750.50
0.0004	1.033	0.274	750.49
0.0004	1.330	0.314	750.49
0.0005	1.634	0.387	750.49
0.0006	1.962	0.484	750.51
0.0009	2.304	0.703	750.49
0.0012	2.677	0.912	750.50
0.0024	3.058	1.788	750.51
0.0039	3.456	2.960	750.53
0.0066	3.857	4.962	750.52
0.0105	4.161	7.856	750.53
0.0166	4.425	12.458	750.54
0.0248	4.648	18.614	750.53
0.0303	4.763	22.706	750.54
0.0361	4.874	27.087	750.53
0.0431	4.985	32.316	750.54
0.0502	5.088	37.656	750.52
0.0547	5.151	41.050	750.49
0.0600	5.218	45.032	750.48
0.0659	5.287	49.433	750.46
0.0801	5.434	60.125	750.43
0.1018	5.631	76.370	750.37
0.1158	5.748	86.874	750.35
0.1364	5.906	102.308	750.32
0.1574	6.059	118.093	750.29
0.1771	6.196	132.908	750.28
0.1983	6.331	148.811	750.25
0.2380	6.584	178.542	750.22
0.2762	6.819	207.195	750.18
0.3190	7.076	239.288	750.13
0.3584	7.320	268.859	750.10
0.3987	7.560	299.091	750.08
0.4417	7.814	331.311	750.05

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26 Aug 05 MR cont
Sample ID: NC EWDP 22PC0305 522.1-523.5 <#35
Surface area analyses ID: 22522B
mass (g) before outgassing: 73.1163
mass (g) after outgassing: 73.1164

Serial No.	w46020	Software Version	2.13
Sample ID	22522B	Start Date	05/09/04
Customer	CNWRA	Start Time	11:39:36
Operator	MR	Elapsed Time	56 min
Sample Wt	1.8835 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

Summary

t-Plot Surface Area Report

t-Plot Surface Area	20.765 sq.m/g
Micropore Surface Area	7.997 sq.m/g
Micropore Volume	0.00343 ml/g
Correlation Coefficient	0.99941

Serial No.	w46020	Software Version	2.13
Sample ID	22522B	Start Date	05/09/04
Customer	CNWRA	Start Time	11:39:36
Operator	MR	Elapsed Time	56 min
Sample Wt	1.8835 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

t-Plot Surface Area Report

t-Plot Surface Area	20.765 sq.m/g
Total Surface Area	28.762 sq.m/g
Micropore Surface Area	7.997 sq.m/g
Micropore Volume	0.00343 ml/g
Film Thickness Range	0.35 to 0.50
Slope	13.4229
Intercept	2.21579
Correlation Coefficient	0.99941

Film Thickness (nm)	Vads (cc/g STP)
0.3517	6.904
0.3685	7.154
0.3832	7.365
0.3947	7.527
0.4083	7.716
0.4220	7.900
0.4359	8.082
0.4605	8.396
0.4864	8.713

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Sample ID	22522B	Start Date	05/09/04
Customer	CNWRA	Start Time	11:39:36
Operator	MR	Elapsed Time	56 min
Sample Wt	1.8835 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

Isotherm Data

Freespace Calculation

Slope	0.0158
Intercept	0.0047
Correlation Coefficient	0.99999

Isotherm Data Table

Ps/Po	Vads cc/g(STP)	Ps mmHg	Po mmHg
0.0000	0.000	0.001	751.43
0.0001	0.235	0.056	751.44
0.0001	0.471	0.109	751.45
0.0002	0.743	0.183	751.44
0.0003	1.050	0.209	751.45
0.0004	1.387	0.328	751.44
0.0004	1.699	0.331	751.46
0.0005	2.117	0.408	751.47
0.0006	2.470	0.469	751.44
0.0010	2.991	0.729	751.44
0.0014	3.380	1.049	751.45
0.0021	3.789	1.565	751.44
0.0033	4.217	2.464	751.44
0.0051	4.663	3.822	751.47
0.0083	5.112	6.268	751.46
0.0123	5.413	9.252	751.45
0.0181	5.683	13.567	751.44
0.0254	5.924	19.104	751.41
0.0304	6.055	22.822	751.41
0.0359	6.182	26.973	751.40
0.0420	6.310	31.561	751.38
0.0484	6.430	36.383	751.35
0.0550	6.543	41.320	751.32
0.0594	6.616	44.621	751.30
0.0644	6.693	48.405	751.25
0.0704	6.777	52.863	751.23
0.0799	6.904	60.048	751.21
0.1009	7.154	75.783	751.19
0.1206	7.365	90.563	751.13
0.1368	7.527	102.766	751.10
0.1567	7.716	117.653	751.03
0.1772	7.900	133.072	750.99
0.1985	8.082	149.084	750.96
0.2367	8.396	177.734	750.91
0.2770	8.713	208.027	750.87
0.3182	9.029	238.897	750.83
0.3586	9.333	269.243	750.79
0.3991	9.632	299.586	750.74
0.4399	9.932	330.246	750.72

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See initial entry: ~~731/2~~ 26Aug05MR 731/2-3 and 731/38
Sample ID prefix: NCEWDP22PC0305 ①

Surface Area Analyses of NCEWDP22PC0305 <#35 Sonic Core Samples Before Outgassed

Before Outgassing

Sample ID ①	~~Surface~~ 26Aug05MR Surface Area Analyses Sample ID	Mass(g) of tube cap & insert	Aliquot Mass(g)
6846.1-6874 <#35	226846B	28.7489	2.0796

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29 August 2005 MR
See initial entry: 731/2-3 and 731/38
Sample ID prefix: NCEWDP22PC0305 ①

Surface area analyses of NCEWDP22PC0305 <#35 Sonic Core Samples After outgassing

After Outgassing

Sample ID ①	Surface Area Analyses Sample ID	Total Mass (g)	Outgassed Aliquot Mass (g)*
686.1-687.4 <#35	22686B	30.7855	2.03666

* calculation

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Sample ID: NCEWDP22PC0305 686.1-687.4 <#35
Surface area analyses: 22686B
mass (g) before outgassing: 731/71
mass (g) after outgassing 731/72

Serial No.	w46020	Software Version	2.13
Sample ID	22686B	Start Date	05/12/04
Customer	CNWRA	Start Time	10:41:33
Operator	MR	Elapsed Time	49 min
Sample Wt	2.0366 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

Summary

t-Plot Surface Area Report

t-Plot Surface Area	14.459 sq.m/g
Micropore Surface Area	5.726 sq.m/g
Micropore Volume	0.00247 ml/g
Correlation Coefficient	0.99960

Serial No.	w46020	Software Version	2.13
Sample ID	22686B	Start Date	05/12/04
Customer	CNWRA	Start Time	10:41:33
Operator	MR	Elapsed Time	49 min
Sample Wt	2.0366 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

t-Plot Surface Area Report

t-Plot Surface Area	14.459 sq.m/g
Total Surface Area	20.184 sq.m/g
Micropore Surface Area	5.726 sq.m/g
Micropore Volume	0.00247 ml/g
Film Thickness Range	0.35 to 0.50
Slope	9.3462
Intercept	1.59945
Correlation Coefficient	0.99960

Film Thickness (nm)	Vads (cc/g STP)
0.3528	4.879
0.3675	5.027
0.3807	5.161
0.3940	5.290
0.4091	5.434
0.4224	5.558
0.4357	5.680
0.4605	5.903
0.4873	6.136

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Sample ID	22686B	Start Date	05/12/04
Customer	CNWRA	Start Time	10:41:33
Operator	MR	Elapsed Time	49 min
Sample Wt	2.0366 g	Outgas Time	360 min
Profile	BET5-T	Outgas Temperature	200 C

Isotherm Data

Freespace Calculation

Slope	0.0173
Intercept	0.0031
Correlation Coefficient	1.00000

Isotherm Data Table

Ps/Po	Vads cc/g(STP)	Ps mmHg	Po mmHg
0.0000	0.000	0.001	744.22
0.0001	0.218	0.042	744.24
0.0001	0.436	0.105	744.26
0.0003	0.686	0.212	744.28
0.0003	0.945	0.232	744.28
0.0004	1.258	0.319	744.30
0.0005	1.548	0.365	744.31
0.0008	1.938	0.594	744.33
0.0012	2.260	0.906	744.35
0.0019	2.596	1.430	744.34
0.0031	2.945	2.327	744.38
0.0051	3.305	3.813	744.39
0.0090	3.662	6.680	744.40
0.0146	3.915	10.889	744.42
0.0227	4.128	16.920	744.43
0.0281	4.237	20.945	744.41
0.0343	4.341	25.499	744.44
0.0413	4.443	30.724	744.43
0.0484	4.537	36.058	744.43
0.0558	4.624	41.515	744.44
0.0605	4.680	45.066	744.42
0.0698	4.772	51.986	744.45
0.0813	4.879	60.501	744.44
0.0995	5.027	74.085	744.45
0.1172	5.161	87.228	744.41
0.1357	5.290	101.026	744.41
0.1578	5.434	117.465	744.41
0.1778	5.558	132.319	744.39
0.1981	5.680	147.481	744.41
0.2368	5.903	176.291	744.40
0.2786	6.136	207.357	744.41
0.3180	6.353	236.706	744.37
0.3590	6.574	267.217	744.35
0.3995	6.789	297.332	744.34
0.4403	7.001	327.682	744.30

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Re-Analysis of NCEWDP22PC0305 <#35

At Paul Bertetti's request an additional aliquot will be removed from NCEWDP22PC0305 700.9-702.1 <#35 for surface area analysis. The previous surface area analysis of this sample (731/4-12) resulted in a lower total surface area value (11.145 m^2/g) relative to the clay content as reported by core lab Petroleum Services (total phyllosilicates 37% weight of total sample mineralogy).

The new aliquot will be labelled 22701C to differenciate this analysis from previous analysis.

The procedure will be according to 731/2-3

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See initial entry: 731/2-3
Sample ID prefix: NCEWDP 22PC 0305 (1)

Re-Analysis of NCEWDP 22PC 0305 <#35
Surface Area Analysis

Before Outgassing

Sample ID (1)	Surface Area Analysis Sample ID	Mass(g) of tube, cap & insert	Aliquot Mass(g)
700.9-702.1 <#35	22701C	29.4186	2.0062

After outgassing

Sample ID (1)	Surface Area Analysis Sample ID	Total Mass(g)	Outgassed Aliquot Mass(g)
700.9-702.1 <#35	22701C	31.1693	1.7507

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Sample ID: NCEWDP 22PC 0305 700.9-702.1 <#35
Surface area analyser: 22701C
mass(g) before outgassing: 731/76
mass(g) after outgassing: 731/76

Serial No.	w46020	Software Version	2.13
Sample ID	22701C	Start Date	05/16/04
Customer	CNWRA	Start Time	16:01:37
Operator	MR	Elapsed Time	56 min
Sample Wt	1.7507 g	Outgas Time	0 min
Profile	BET5-T	Outgas Temperature	0 C

Summary

t-Plot Surface Area Report

t-Plot Surface Area	26.492 sq.m/g
Micropore Surface Area	10.927 sq.m/g
Micropore Volume	0.00476 ml/g
Correlation Coefficient	0.99986

Serial No.	w46020	Software Version	2.13
Sample ID	22701C	Start Date	05/16/04
Customer	CNWRA	Start Time	16:01:37
Operator	MR	Elapsed Time	56 min
Sample Wt	1.7507 g	Outgas Time	0 min
Profile	BET5-T	Outgas Temperature	0 C

t-Plot Surface Area Report

t-Plot Surface Area	26.492 sq.m/g
Total Surface Area	37.419 sq.m/g
Micropore Surface Area	10.927 sq.m/g
Micropore Volume	0.00476 ml/g
Film Thickness Range	0.35 to 0.50
Slope	17.1249
Intercept	3.07576
Correlation Coefficient	0.99986

Film Thickness (nm)	Vads (cc/g STP)
0.3527	9.095
0.3678	9.370
0.3800	9.586
0.3940	9.829
0.4079	10.075
0.4215	10.308
0.4360	10.552
0.4606	10.960
0.4863	11.386

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Sample ID	22701C	Start Date	05/16/04
Customer	CNWRA	Start Time	16:01:37
Operator	MR	Elapsed Time	56 min
Sample Wt	1.7507 g	Outgas Time	0 min
Profile	BET5-T	Outgas Temperature	0 C

Isotherm Data

Freespace Calculation

Slope	0.0177
Intercept	0.0027
Correlation Coefficient	1.00000

Isotherm Data Table

Ps/Po	Vads cc/g(STP)	Ps mmHg	Po mmHg
0.0000	0.000	0.001	750.71
0.0001	0.255	0.038	750.75
0.0001	0.508	0.076	750.76
0.0002	0.802	0.126	750.78
0.0003	1.126	0.231	750.83
0.0003	1.445	0.241	750.86
0.0004	1.777	0.283	750.90
0.0004	2.134	0.300	750.92
0.0005	2.507	0.353	750.95
0.0005	2.910	0.390	750.99
0.0007	3.331	0.489	751.01
0.0008	3.781	0.616	751.01
0.0012	4.250	0.878	751.02
0.0016	4.752	1.199	751.05
0.0031	5.528	2.304	751.05
0.0045	6.069	3.394	751.05
0.0069	6.620	5.191	751.07
0.0094	6.964	7.049	751.09
0.0131	7.288	9.837	751.07
0.0184	7.587	13.798	751.11
0.0249	7.853	18.695	751.08
0.0293	8.001	22.019	751.05
0.0343	8.147	25.777	751.04
0.0400	8.293	30.009	751.04
0.0457	8.430	34.351	751.04
0.0517	8.563	38.833	751.00
0.0559	8.649	41.957	750.98
0.0604	8.740	45.325	750.96
0.0702	8.916	52.734	750.93
0.0812	9.095	60.952	750.88
0.1000	9.370	75.059	750.87
0.1161	9.586	87.189	750.84
0.1357	9.829	101.893	750.84
0.1561	10.075	117.176	750.83
0.1765	10.308	132.511	750.79
0.1987	10.552	149.166	750.79
0.2369	10.960	177.881	750.73
0.2769	11.386	207.880	750.68
0.3178	11.812	238.532	750.64
0.3595	12.250	269.809	750.60
0.3990	12.663	299.493	750.52
0.4406	13.089	330.683	750.49

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Surface Area Analyses Summary for NC-EWDP-22PC-0305 <#35

Surface area analyses for NC-EWDP-22PC-0305 -"interval" <#35 was initially begun in scientific notebook (SN) 710/18-19. 13 of 59 total NC-EWDP-22PC-0305 <#35 samples (710/20-58) were analyzed using the method parameters of outgassing temperature 350°C and outgassing time 12 hours (further referred to as old method parameters). The possibility of altering the sample composition due to high temperature and long outgassing time led to a method change. The new method parameters were changed to 200°C and 6 hours (see 710/80 for method parameter change explanation). The 13 samples analyzed using the old method parameters were re-analyzed using the new parameters. A summary of samples analyzed using the old method can be found on 731/82, and a comparison of those 13 samples using the old and new method parameters can be found on 731/83. About every 12th analysis, a standard was analyzed to challenge the accuracy of the surface area analyzer (731/86). In total, surface area analyses for NC-EWDP-22PC-0305 <#35 samples spanned 3 scientific notebooks (710,721 and 731). The following pages (731/80-86) contain summary information for the surface area analyses.

731/80-81: Detailed summary of the 59 NC-EWDP-22PC-0305 <#35 surface area analyses

731/82: Detailed summary of the 13 NC-EWDP-22PC-0305 <#35 samples run using old method parameters of outgassing temperature 350°C and outgassing time 12 hours

731/83: Comparison of surface area results for the 13 NC-EWDP-22PC-0305 <#35 samples using the different method parameters

731/84: Summary of surface area results for all 59 NC-EWDP-22PC-0305 <#35 surface area analyses using the new method parameters

731/86: Detailed summary of standards analyzed during surface area analyses

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Detailed Table for Surface Area Analyses

Explanation for method parameter change: 710/80
*Original sample ID prefix: NC-EWDP-22PC-0305

*Original Sample ID	Surface Area Analyses ID	Empty Mass (g) [1]	Aliquot Mass (g) [2]	Reference	Total Mass (g) [3]	Outgassed Mass (g) [4]	Reference	Total Surface Area Results (m^2/g)	Reference
462.0-462.9 <#35	22-462	28.6876	1.9838	721/49	30.5642	1.8766	721/56	19.254	721/61
464.9-466.5 <#35	22-465	29.8433	2.1234	731/18	31.7932	1.9499	731/19	30.453	731/20
471.3-473.2 <#35	22-472	29.5415	2.0272	721/4	31.4476	1.9061	721/5	22.593	721/10
476.9-478.5 <#35	22477B	29.4795	2.0027	731/63	31.3607	1.8812	731/64	22.522	731/67
480.0-481.8 <#35	22-480	29.8920	2.0516	721/44	31.8034	1.9114	721/45	30.985	721/54
486.9-488.5 <#35	22-487	29.3359	2.0559	721/75	31.2570	1.9211	721/77	31.081	721/90
492.7-493.8 <#35	22-492	29.4560	2.0734	731/4	31.3967	1.9407	731/5	24.354	731/6
497.7-499.3 <#35	22-498	29.4848	2.0591	721/71	31.4228	1.9380	721/72	27.196	721/78
502.5-504.2 <#35	22-503	29.5309	2.0367	731/18	31.4749	1.9440	731/19	22.951	731/22
507.4-509.1 <#35	22-508	29.4691	2.0085	721/44	31.3415	1.8724	721/45	25.958	721/50
513.3-515.3 <#35	22-514	29.2970	1.7645	710/89	30.9700	1.6730	710/90	24.090	710/91
517.4-519.2 <#35	22.518	29.7955	2.0197	721/28	31.6945	1.8990	721/29	26.927	721/30
522.1-523.5 <#35	22522B	29.7308	2.0417	731/63	31.6143	1.8835	731/64	28.762	731/69
529.8-531.6 <#35	22-530	29.1590	1.9737	721/20	31.0077	1.8487	721/21	30.666	721/22
534.5-536.2 <#35	22-535	28.5867	2.0701	731/24	30.5149	1.9282	731/25	32.118	731/30
539.2-540.8 <#35	22-540	29.4678	2.0086	721/28	31.3311	1.8633	721/29	29.409	721/32
540.8-542.4 <#35	22-541	29.0207	2.0611	721/49	30.9304	1.9097	721/56	28.518	721/59
546.7-548.5 <#35	22-547	29.4033	2.0652	731/24	31.3417	1.9384	731/25	26.774	731/28
550.2-551.8 <#35	22-550	29.2728	2.0295	721/71	31.1888	1.9160	721/72	25.828	721/80
555.3-556.8 <#35	22555B	29.4570	2.0077	731/39	31.2951	1.8381	731/40	29.676	731/41
560.6-562.2 <#35	22-561	29.1601	2.0406	721/20	31.0958	1.9357	721/21	24.349	721/24
566.2-568.1 <#35	22-567	28.7777	1.9344	721/36	30.5883	1.8106	721/37	25.768	721/38
571.3-573.0 <#35	22-572	29.8513	2.0635	721/63	31.7491	1.8978	721/64	28.389	721/65
576.3-578.1 <#35	22-577	28.3985	2.0207	721/36	30.2703	1.8718	721/37	18.541	721/40
580.6-581.9 <#35	22-580	29.4302	2.0066	721/75	31.3497	1.9195	721/77	12.920	721/92
588.3-589.9 <#35	22-589	29.7375	1.9283	721/4	31.5361	1.7986	721/5	17.700	721/6
595.0-596.6 <#35	22-596	29.7307	1.7664	710/81	31.3471	1.6164	710/82	19.536	710/83
600.5-602.0 <#35	22-601	29.5764	2.0031	721/73	31.3920	1.8156	721/74	27.271	721/84
604.9-606.3 <#35	22-605	29.2963	1.9975	731/24	31.1561	1.8598	731/25	28.438	731/26
610.1-611.0 <#35	22-610	29.1878	2.0049	721/73	31.0541	1.8663	721/74	20.788	721/86

[1] *Empty Mass (g)* is the mass (g) of the empty sample tube with glass stirrer and cap
[2] *Aliquot Mass* (g) is the mass (g) removed from NC-EWDP-22PC-0305 'interval' <#35. Weighing paper was tared, and mass recoreded.
[3] *Total Mass* (g) is the mass (g) of the sample tube, glass stirrer, cap and sample after outgassing.
[4] *Outgassed Mass (g)* is a calculation. The outgassed mass (g) was calculated by subtracting the mass of the empty sample tube, glass stirrer and cap (*Empty Mass (g)*) from the *Total Mass (g)*

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Explanation for method parameter change: 710/80
*Original sample ID prefix: NC-EWDP-22PC-0305

*Original Sample ID	Surface Area Analyses ID	Empty Mass (g) [1]	Aliquot Mass (g) [2]	Reference	Total Mass (g) [3]	Outgassed Mass (g) [4]	Reference	Total Surface Area Results (m^2/g)	Reference
636.7-637.9 <#35	22-636	29.2109	2.0210	721/44	31.1917	1.9808	721/45	10.340	721/52
640.3-641.4 <#35	22640B	29.8117	2.0218	731/47	31.6957	1.8840	731/48	22.787	731/53
644.6-645.0 <#35	22-645	28.6414	1.6475	721/73	30.2545	1.6131	721/74	10.149	721/88
647.1-648.4 <#35	22647B	29.3901	2.0219	731/47	31.2922	1.9021	731/48	18.278	731/49
653.1-654.5 <#35	22-653	29.3481	2.0568	721/71	31.2319	1.8838	721/72	22.428	721/82
658.3-659.7 <#35	22-659	28.3687	1.9950	721/4	30.2395	1.8708	721/5	22.053	721/8
663.7-665.2 <#35	22-664	28.7621	1.9472	721/12	30.6062	1.8441	721/13	18.181	721/14
670.5-672.0 <#35	22-671	29.1332	2.0283	731/32	31.0614	1.9282	731/25	19.630	731/34
675.9-677.3 <#35	22-676	29.6321	1.9242	721/20	31.4458	1.8137	721/21	23.020	721/26
681.9-683.3 <#35	22.682	29.4611	1.9260	721/36	31.3219	1.8608	721/37	19.610	721/42
686.1-687.4 <#35	22686B	28.7489	2.0796	731/71	30.7855	2.0366	731/72	20.184	731/73
694.3-695.6 <#35	22695B	28.4301	2.0413	731/47	30.3367	1.9066	731/48	19.169	731/51
700.9-702.1 <#35	22701C	29.4186	2.0062	731/76	31.1693	1.7507	731/76	37.419	731/77
707.0-707.8 <#35	22-707	29.5787	2.0187	731/4	31.4937	1.9150	731/5	17.133	731/8
710.6-712.1 <#35	22711B	28.7459	2.0410	731/55	30.7068	1.9609	731/56	9.593	731/57
715.0-717.1 <#35	22-716	29.5238	1.8197	710/81	31.2432	1.7194	710/82	11.033	710/85
721.5-722.5 <#35	22-722	28.6658	2.0851	721/63	30.6552	1.9894	721/64	18.438	721/67
726.4-727.8 <#35	22-726	29.4980	2.0059	721/12	31.4072	1.9092	721/13	18.306	721/16
735.7-736.4 <#35	22.736	28.6500	1.9429	721/12	30.4831	1.8331	721/13	23.970	721/18
740.5-742.0 <#35	22741B	29.1772	2.0470	731/55	31.0724	1.8952	731/56	22.337	731/59
745.0-745.9 <#35	22-745	28.6289	2.0383	731/10	30.5328	1.9039	731/11	22.449	731/16
747.4-748.8 <#35	22748B	29.2279	2.0329	731/55	31.0971	1.7864	731/56	17.489	731/61
753.2-754.9 <#35	22.753	29.3490	1.8091	710/81	31.0059	1.6569	710/82	18.911	710/87
756.3-758.1 <#35	22.757	29.1068	1.9597	710/89	30.9716	1.8648	710/90	15.815	710/95
760.3-761.6 <#35	22760B	29.4259	2.0597	731/63	31.4093	1.9834	731/64	12.012	731/65

[1] *Empty Mass (g)* is the mass (g) of the empty sample tube with glass stirrer and cap
[2] *Aliquot Mass* (g) is the mass (g) removed from NC-EWDP-22PC-0305 'interval' <#35. Weighing paper was tared, and mass recoreded.
[3] *Total Mass* (g) is the mass (g) of the sample tube, glass stirrer, cap and sample after outgassing.
[4] *Outgassed Mass (g)* is a calculation. The outgassed mass (g) was calculated by subtracting the mass of the empty sample tube, glass stirrer and cap (*Empty Mass (g)*) from the *Total Mass (g)*

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Continuation of Detailed Table for Surface Area Analyses

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From

Witne

Initial entry for surface area analyes: 710/18-19
*Original sample ID prefix: NC-EWDP-22PC-0305

First B samples Analyzed - used 'old' method

*Original Sample ID	Surface Area Analyses ID	Empty Mass (g)[1]	Aliquot Mass (g)[2]	Reference	Total Mass (g)[3]	Outgassed Mass (g)[4]	Reference	Total Surface Area Results (m^2/g)	Reference
555.3-556.8 <#35	22-555	29.3265	2.0481	710/20	31.1851	1.8586	710/21	29.810	710/22
614.1-615.5 <#35	22-614	28.7584	1.8848	710/30	30.4984	1.7400	710/31	24.044	710/32
618.5-620.5 <#35	22-619	29.4939	1.7715	710/44	31.1672	1.6733	710/45	20.368	710/46
640.3-641.4 <#35	22-640	29.4243	1.7570	710/20	31.0499	1.6255	710/21	23.704	710/25
647.1-648.4 <#35	22-647	29.0327	1.7094	710/30	30.6302	1.5975	710/31	19.626	710/34
694.3-695.6 <#35	22-695	29.8203	1.7227	710/20	31.4246	1.6043	710/21	19.453	710/28
710.6-712.1 <#35	22-711	29.8117	1.8989	710/38	31.6041	1.7924	710/39	10.211	710/40
740.5-742.0 <#35	22-741	29.0830	1.9858	710/44	30.9143	1.8313	710/45	22.410	710/48
747.4-748.8 <#35	22-748	29.5351	1.8451	710/38	31.1945	1.6594	710/39	16.841	710/42
760.3-761.6 <#35	22-760	28.6473	1.8663	710/44	30.4329	1.7856	710/45	12.086	710/50
476.9-478.5 <#35	22-477	29.7787	1.7018	710/52	31.3723	1.5936	710/53	22.717	710/54
522.1-523.5 <#35	22-522	29.5287	1.8681	710/52	31.2069	1.6782	710/53	29.614	710/56
686.1-687.4 <#35	22-686	29.5451	1.8304	710/52	31.2799	1.7348	710/53	21.257	710/58

[1] *Empty Mass (g)* is the mass (g) of the empty sample tube with glass stirrer and cap
[2] *Aliquot Mass* (g) is the mass (g) removed from NC-EWDP-22PC-0305 'interval' <#35. Weighing paper was tared, and mass recoreded.
[3] *Total Mass* (g) is the mass (g) of the sample tube, glass stirrer, cap and sample after outgassing.
[4] *Outgassed Mass (g)* is a calculation. The outgassed mass (g) was calculated by subtracting the mass of the empty sample tube, glass stirrer and cap *(Empty Mass (g))* from the *Total Mass (g)*

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Comparison of results for surface area analyses - old and new data - ~~#~~ 12 Sept 05 MR. Different method parameters

Initial entry for surface area analyes: 710/18-19
Explanation for method parameter change: 710/80
*Original sample ID prefix: NC-EWDP-22PC-0305

*Original Sample ID	OLD DATA Total Surface Area Results (m^2/g)	NEW DATA Total Surface Area Results (m^2/g)
555.3-556.8 <#35	29.810	29.676
614.1-615.5 <#35	24.044	22.662
618.5-620.5 <#35	20.368	19.704
640.3-641.4 <#35	23.704	22.787
647.1-648.4 <#35	19.626	18.278
694.3-695.6 <#35	19.453	19.169
710.6-712.1 <#35	10.211	9.593
740.5-742.0 <#35	22.410	22.337
747.4-748.8 <#35	16.841	17.489
760.3-761.6 <#35	12.086	12.012
476.9-478.5 <#35	22.717	22.522
522.1-523.5 <#35	29.614	28.762
686.1-687.4 <#35	21.257	20.184

Note: Detailed information concerning surface area analyses ID, Mass (g) before and after outgassing, aliquot mass (g), and scientific notebook references can be found on 731/80-81

Scientific Notebook for Old Data: 710/22-58
Scientific Notebook for New Data: 731/41-73

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Summary Table of Surface Area Analyses Results using new method parameter.

Original sample ID prefix: NC-EWDP-22PC-0305

Original Sample ID	Total Surface Area Results (m^2/g)	Reference
462.0-462.9 <#35	19.254	721/61
464.9-466.5 <#35	30.453	731/20
471.3-473.2 <#35	22.593	721/10
476.9-478.5 <#35	22.522	731/67
480.0-481.8 <#35	30.985	721/54
486.9-488.5 <#35	31.081	721/90
492.7-493.8 <#35	24.354	731/6
497.7-499.3 <#35	27.196	721/78
502.5-504.2 <#35	22.951	731/22
507.4-509.1 <#35	25.958	721/50
513.3-515.3 <#35	24.090	710/91
517.4-519.2 <#35	26.927	721/30
522.1-523.5 <#35	28.762	731/69
529.8-531.6 <#35	30.666	721/22
534.5-536.2 <#35	32.118	731/30
539.2-540.8 <#35	29.409	721/32
540.8-542.4 <#35	28.518	721/59
546.7-548.5 <#35	26.774	731/28
550.2-551.8 <#35	25.828	721/80
555.3-556.8 <#35	29.676	731/41
560.6-562.2 <#35	24.349	721/24
566.2-568.1<#35	25.768	721/38
571.3-573.0 <#35	28.389	721/65
576.3-578.1 <#35	18.541	721/40
580.6-581.9 <#35	12.920	721/92
588.3-589.9 <#35	17.700	721/6
595.0-596.6 <#35	19.536	710/83
600.5-602.0 <#35	27.271	721/84
604.9-606.3 <#35	28.438	731/26
610.1-611.0 <#35	20.788	721/86
614.1-615.5 <#35	22.662	731/43
618.5-620.5 <#35	19.704	731/45
625.2-626.7 <#35	20.156	731/14
630.2-631.9 <#35	18.011	710/93
636.7-637.9 <#35	10.340	721/52
640.3-641.4 <#35	22.787	731/53
644.6-645.0 <#35	10.149	721/88

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Continuation of Summary ~~For~~ Table of Surface ~~Art~~ Area Analyses ~~Results~~ Results using new method parameter.

Original Sample ID	Total Surface Area Results (m^2/g)	Reference
647.1-648.4 <#35	18.278	731/49
653.1-654.5 <#35	22.428	721/82
658.3-659.7 <#35	22.053	721/8
663.7-665.2 <#35	18.181	721/14
670.5-672.0 <#35	19.630	731/34
675.9-677.3 <#35	23.020	721/26
681.9-683.3 <#35	19.610	721/42
686.1-687.4 <#35	20.184	731/73
694.3-695.6 <#35	19.169	731/51
700.9-702.1 <#35	37.419	731/76
707.0-707.8 <#35	17.133	731/8
710.6-712.1 <#35	9.593	731/57
715.0-717.1 <#35	11.033	710/85
721.5-722.5 <#35	18.438	721/67
726.4-727.8 <#35	18.306	721/16
735.7-736.4 <#35	23.970	721/18
740.5-742.0 <#35	22.337	731/59
745.0-745.9 <#35	22.449	731/16
747.4-748.8 <#35	17.489	731/61
753.2-754.9 <#35	18.911	710/87
756.3-758.1 <#35	15.815	710/95
760.3-761.6 <#35	12.012	731/65

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Initial entry for surface area analyes: 710/18-19
Explanation for method parameter change: 710/80

Standards

Original Sample ID	Surface Area Analyses ID	Empty Mass (g) [1]	Aliquot Mass (g) [2]	Reference	Total Mass Outgassed Mass (g) [4]	Reference	Total Mass (g) [3]	Reference	Total Surface Area Results (m^2/g)	Reference	Expected	Acceptance
NIST 1899 Silicon Nitride	1899S	29.4326	1.1455	710/30	1.1444	710/31	30.5790	710/36	10.435	710/36	10.67 ± 0.19	no*
NIST 1899 Silicon Nitride	1899-2	28.5106	1.0460	721/63	1.0445	721/64	29.5551	721/69	10.654	721/69	10.67 ± 0.19	yes
NIST 1900 Silicon Nitride	1900S	28.6837	1.5667	721/28	1.3155	721/29	29.9992	721/34	2.845	721/34	2.85 ± 0.09	yes
NIST 1900 Silicon Nitride	1900-2	29.7237	1.2251	731/35	1.2201	731/35	30.9515	731/36	2.850	731/36	2.85 ± 0.09	yes

[1] *Empty Mass (g)* is the mass (g) of the empty sample tube with glass stirrer and cap
[2] *Aliquot Mass* (g) is the mass (g) removed from NC-EWDP-22PC-0305 'interval' <#35. Weighing paper was tared, and mass recoreded.
[3] *Total Mass* (g) is the mass (g) of the sample tube, glass stirrer, cap and sample after outgassing.
[4] *Outgassed Mass (g)* is a calculation. The outgassed mass (g) was calculated by subtracting the mass of the empty sample tube, glass stirrer and cap (Empty Mass (g)) from the Total Mass (g)

* This standard was analyzed with the old parameters of outgassing temperature and time. See summary write-up for further explanation.

Summary of standards used to challenge surface area analyzer

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Aliquot Removal from NC-EWDP-22PC-0305 'interval' <#35 for NC-EWDP-22PC-0305 Sonic Core Composite and Thin Sections

Personnel involved: Marla Roberts

Objectives: For use in future sorption experiments a composite sample will be made from NC-EWDP-22PC-0305-'interval' less than 35 mesh (<#35). The composite will be comprised of 19 aliquots representative of the entire depth of the well. The composite will be labeled, NC-EWDP-22PC-0305 Sonic Core Composite. An aliquot will also be removed and set aside from the same <#35 intervals as used in the composite with the possibility of being sent away to be made into thin sections and for a HCl carbonate effervescence test.

Samples:
NC-EWDP-22PC-0305 464.9-466.5 <#35
NC-EWDP-22PC-0305 486.9-488.5 <#35
NC-EWDP-22PC-0305 502.5-504.2 <#35
NC-EWDP-22PC-0305 522.1-523.5 <#35
NC-EWDP-22PC-0305 539.2-540.8 <#35
NC-EWDP-22PC-0305 555.3-556.8 <#35
NC-EWDP-22PC-0305 571.3-573.0 <#35
NC-EWDP-22PC-0305 588.3-589.9 <#35
NC-EWDP-22PC-0305 610.1-611.0 <#35
NC-EWDP-22PC-0305 625.2-626.7 <#35
NC-EWDP-22PC-0305 640.3-641.4 <#35
NC-EWDP-22PC-0305 658.3-659.7 <#35
NC-EWDP-22PC-0305 675.9-677.3 <#35
NC-EWDP-22PC-0305 686.1-687.4 <#35
NC-EWDP-22PC-0305 715.0-717.1 <#35
NC-EWDP-22PC-0305 735.7-736.4 <#35
NC-EWDP-22PC-0305 760.3-761.6 <#35

Equipment:
Mettler Electronic Balance model AE240, serial number 101237

Supplies:
Polystryrene containers (5 dram)
Spatula
Weighing Paper

Basic Outline Procedure:
To prevent biasing due to grain settling within the container, the container will be gently rolled by hand prior to aliquot removal. An appropriate amount (approximately 7grams) of sample was added to a tared weigh paper and the mass recorded, along with the

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original sample ID. The aliquots were then placed in a polystyrene container labeled with the original sample ID, initials, SN reference and date. A "C" was added to the end of the sample ID to identify it as an aliquot to be used in the composite. The aliquots will not be combined until after the HCl carbonate effervescence test is performed.

An additional aliquot is removed, approximately 3 grams, from NC-EWDP-22PC-0305-'interval' <#35 to be used in and HCl carbonate effervescence test and making of thin sections. About 3 grams of sample was added to a tared weigh paper and the mass recorded, along with the original sample ID. The aliquots were then placed in a polystyrene container labeled with the original sample ID, initials, SN reference and date. The label was also marked 'thin sections' to differentiate the aliquot from those used to comprise the composite.

Important Change/Note

To lessen the amount of text on the aliquot sample containers, the labelling will not include the original sample ID as stated in initial entry (78/87-88). The labelling will follow the table ~~(upcoming Aliquot 12Sept05 MR~~ set up in the following pages. Aliquots will be numbered 1-17, and the composite aliquots will have a "C" added after the number. Thin section aliquots will have a "T" added after the number

***Samples taken for composite combined, see 733/95

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Aliquot Removal from NCEWDP 22PC 0305 <#35 for Composite Sample and Thin Sections.

Composite

*original Sample ID prefix: NCEWDP 22PC 0305

Original Sample ID*	Composite ID	Mass(g) of Composite Aliquot
464.9-466.5 <#35	1C	7.3059
486.9-488.5 <#35	2C	7.4222
502.5-504.2 <#35	3C	7.5218
522.1-~~528.~~ 523.5 <#35 12Sept05 MR	4C	7.0332
539.2-540.8 <#35	5C	7.4660
555.3-556.8 <#35	6C	7.2600
571.3-573.0 <#35	7C	7.1881
588.3-589.9 <#35	8C	7.2759
610.1-611.0 <#35	9C	7.3412
625.2-~~626.~~ 626.7 <#35 12Sept05 MR	10C	7.3441
640.3-641.4 <#35	11C	7.1489

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*original sample ID prefix: NCEWDP22PC0305

Composite - cont.

Original Sample ID*	Composite ID	Mass (g) of Composite Aliquot
658.3-659.7 <#35	12C	7.2429
675.9-677.3 <#35	13C	7.4042
686.1-687.4 <#35	14C	7.4319
715.0-717.1 <#35	15C	7.3457
735.7-736.4 <#35	16C	7.5226
760.3-761.6 <#35	17C	7.6201

Thin Sections

Original Sample ID*	Thin Section ID	Mass (g) of Thin Section Aliquot
464.9-466.5 <#35	1T	3.3396
486.9-488.5 <#35	2T	3.1319
502.5-504.2 <#35	3T	3.4160
522.1-523.5 <#35	4T	3.2504

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*original sample ID prefix: NCEWDP22PC0305

Thin Sections

Original Sample ID*	Thin Section ID	Mass (g) of Thin Section Aliquot
539.2-540.8 <#35	5T	3.2825
555.3-556.8 <#35	6T	3.4207
571.3-573.0 <#35	7T	3.3206
588.3-589.9 <#35	8T	3.3687
610.1-611.0 <#35	9T	3.1149
625.2-626.7 <#35	10T	3.3622
640.3-641.4 <#35	11T	3.4045
658.3-659.7 <#35	12T	3.3470
675.9-677.3 <#35	13T	3.2826
686.1-687.4 <#35	14T	3.1736
715.0-717.1 <#35	15T	3.2931
735.7-736.4 <#35	16T	3.5908
760.3-761.6 <#35	17T	3.2827

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Determination of Carbonate in Aliquots from NC-EWDP-22PC-0305 'interval' <#35

Task assigned to: Marla Roberts

Objective: Determination of carbonate present in aliquots removed from NC-EWDP-22PC-0305 'interval' <#35 (731/87-92) prior to aliquots being combined to compose the NC-EWDP-22PC-0305 Sonic Core Composite.

Samples: Samples were given a new label according to the following table (731/87-92)

NC-EWDP-22PC-0305 464.9-466.5 <#35…1T
NC-EWDP-22PC-0305 486.9-488.5 <#35…2T
NC-EWDP-22PC-0305 502.5-504.2 <#35…3T
NC-EWDP-22PC-0305 522.1-523.5 <#35…4T
NC-EWDP-22PC-0305 539.2-540.8 <#35…5T
NC-EWDP-22PC-0305 555.3-556.8 <#35…6T
NC-EWDP-22PC-0305 571.3-573.0 <#35…7T
NC-EWDP-22PC-0305 588.3-589.9 <#35…8T
NC-EWDP-22PC-0305 610.1-611.0 <#35…9T
NC-EWDP-22PC-0305 625.2-626.7 <#35…10T
NC-EWDP-22PC-0305 640.3-641.4 <#35…11T
NC-EWDP-22PC-0305 658.3-659.7 <#35…12T
NC-EWDP-22PC-0305 675.9-677.3 <#35…13T
NC-EWDP-22PC-0305 686.1-687.4 <#35…14T
NC-EWDP-22PC-0305 715.0-717.1 <#35…15T
NC-EWDP-22PC-0305 735.7-736.4 <#35…16T
NC-EWDP-22PC-0305 760.3-761.6 <#35…17T

Reagent: 10% HCl (721/46)

Equipment:
Mettler Electronic Balance model AE240, serial number 101237

Supplies: Weighing boat
Disposable pipet

Procedure: About 1 gram is removed from each sample and placed on in a tared weighing boat. Each weighing boat is labeled with the corresponding sample label without the 'T' (i.e. 1, 2, 3…17). Using a disposable pipet, the dilute acid solution was released drop by drop onto the grains within the weighing boat. If the grains effervesce, carbonate is present. If the grains do not effervesce, carbonate is not present. The presence/absence of carbonate was recorded.

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Carbonate Test Using 10% HCl

Sample ID	Carbonate Test ID	Carbonate Presence/Absence
1T	1	no
2T	2	faint - a few visible bubbles.
3T	3	no
4T	4	faint - few visible bubbles
13 Sept 05 MR ~~4~~ 5T	5	faint - few visible bubbles
6T	6	faint - few visible bubbles.
7T	7	faint - few visible bubbles
8T	8	faint - few visible bubbles.
9T	9	no
10T	10	no
11T	11	faint - few visible bubbles
12T	12	faint - few visible bubbles.
13T	13	faint - few visible bubbles
14T	14	faint - few visible bubbles.

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Carbonate Test Using HCl - continued

See initial entry: 731/92

Sample ID	Carbonate Test ID	Carbonate Presence / Absence
15T	13Sep05MR ~~17~~ 15	faint - some bubbles
16T	16	faint - few visible bubbles.
17T	17	faint - some bubbles.

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28 Oct 05 MR

Creation of NC-EWDP-22PC-0305 - Sonic Core Composite

Task initially assigned to: Marla Roberts

Objective: Create a representative sample of NC-EWDP-22PC-0305 well using the material from the <#35 mesh for future use in sorption experiments.

Samples: Aliquots were removed from 17 different intervals within the NC-EWDP-22PC-0305 ~~interval <#35~~ 28Oct05MR well. See 731/87-90 for description of aliquot removal and interval identification.

Procedure: Aliquots will be poured into a glass container labeled with NC-EWDP-22PC-0305 - Sonic Core Composite, SN reference, date and initials. After all aliquots have been added to glass container, the container will be rolled gently to mix sediment contents.

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END OF SN
CONTINUED in SN 742

I have reviewed this scientific notebook and find it in agreement with QAP-001. There is sufficient information regarding methods used for conducting tests, acquiring and analyzing data so that another qualified individual could repeat the activity.

R. C. 11/4/05

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