Geologic log and measured air-dry gas content desorption data from coals of the AK-94 CBM-1 coal-bed methane well.

Alaska Department of Natural Resources

Created 1 March 2000.

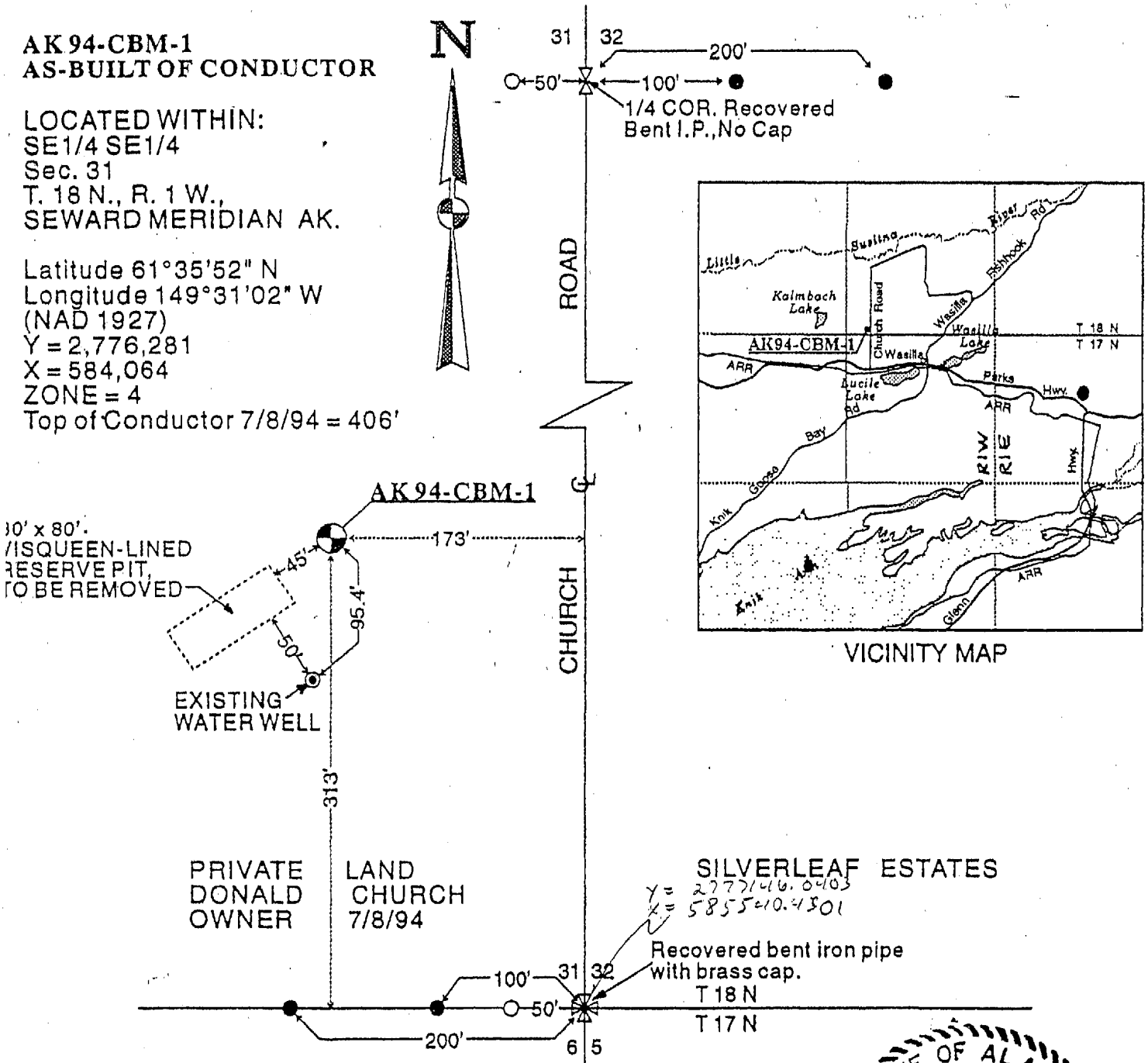
Total of 48 pages in report.

Alaska Geologic Materials Center Data Report No. 291

AK 94-CBM-1
AS-BUILT OF CONDUCTOR

LOCATED WITHIN:
SE1/4 SE1/4
Sec. 31
T. 18 N., R. 1 W.,
SEWARD MERIDIAN AK.

Latitude 61°35'52" N
Longitude 149°31'02" W
(NAD 1927)
Y = 2,776,281
X = 584,064
ZONE = 4
Top of Conductor 7/8/94 = 406'



○ Found 3" Aluminum monument no marks

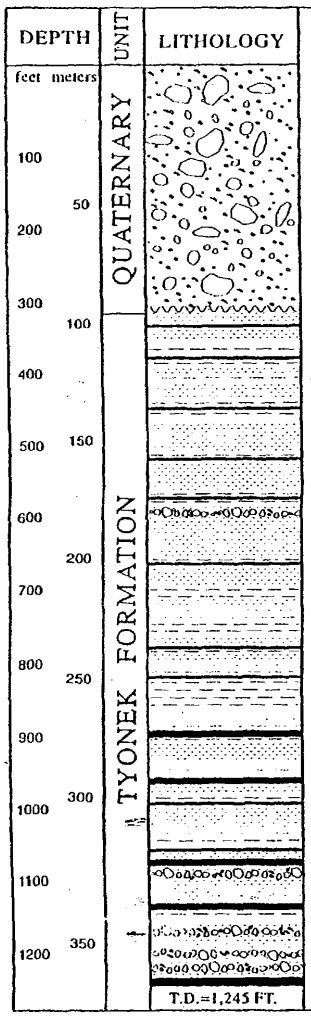
● Found 5/8" rebar with Aluminum cap marked DB 100' R.P. 1/4 Cor. 4118-S 77. (typical)

I HEREBY CERTIFY THAT I AM PROPERLY REGISTERED AND LICENSED TO PRACTICE LAND SURVEYING IN THE STATE OF ALASKA, THAT THIS AS-BUILT REPRESENTS A SURVEY MADE BY ME OR UNDER MY DIRECT SUPERVISION, THAT THE MONUMENTS SHOWN HEREON ACTUALLY EXIST AS DESCRIBED, AND THAT ALL DIMENSIONS AND OTHER DETAILS ARE CORRECT.

DATE 7/27/94 REGISTRATION NO. 6885

STATE OF ALASKA 49TH Steve Schmitz Steven Schmitz LS 6885 REGISTERED PROFESSIONAL LAND SURVEYOR

PREPARED BY:	DATE OF SURVEY:	PREPARED FOR:	LEGAL DESCRIPTION:		
MEP	July 8, 1994	State of Alaska Department of Natural Resources Division of Oil and Gas P.O. Box 107034 Anchorage, AK 99510-7034	SE1/4 SE1/4 SEC. 31 TOWNSHIP: 18N RANGE: 1W		SEWARD MERIDIAN
			SHEET: 1	NUMBER 1	SCALE: 1" = 100'



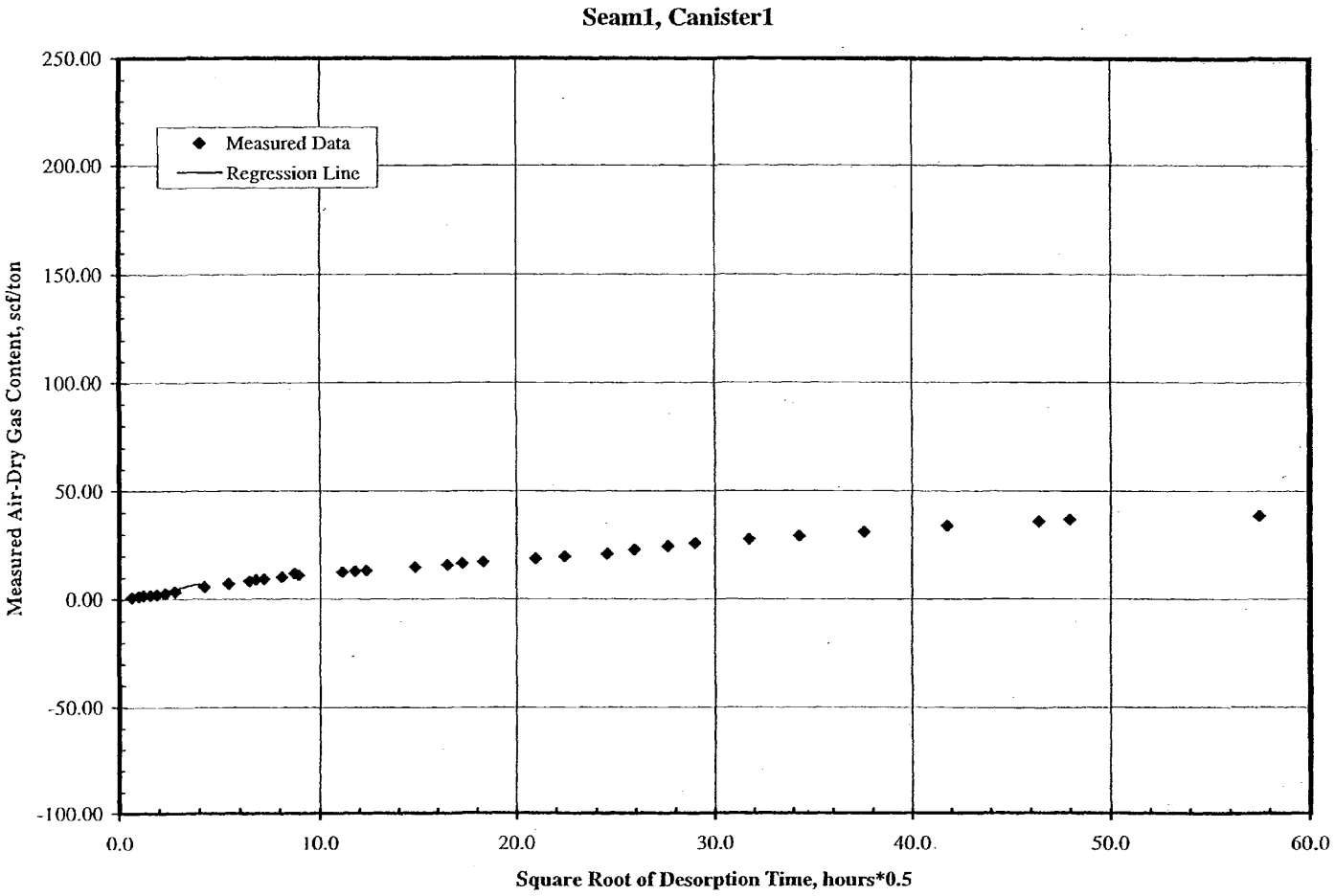
Legend

- Coal
- Siltstone and mudstone
- Sandstone
- Conglomerate
- Glacial deposits

Seam No.	Gas (DAF) cm^3/gram	Gas (DAF) scf/ton	Moisture %	Ash %	Volatile Matter %	Fixed Carbon %	Ro %	$\delta^{13}C$
1	1.96	63	9.02	8.47	33.80	48.71	0.48	
2	4.14	132	7.13	19.60	32.78	40.49		
3	4.99	160	7.43	11.80	34.34	46/43		-48.9
4	5.31	170	7.96	8.26	34.55	49.23	0.47	
5	5.16	165	5.06	49.80	21.93	23.21		-49.3
6	5.54	177	6.02	14.30	33.84	45.84	0.56	-48.3
7	4.42	141	6.15	26.84	29.47	37.54		-47.0
8	5.94	190	7.17	5.57	37.50	49.76	0.52	
9/10	5.10	163	6.25	14.62	35.18	43.95		
11	5.73	183	5.53	40.18	23.42	30.87		
12	5.72	183	5.23	44.74	22.85	27.18	0.58	-43.3
13	7.66	245	4.82	42.00	30.15	23.03	0.58	-44.0

Figure 9. Coal analyses for AK-94CBM-1.

D.T. SEAMOUNT
NOV 13 1997



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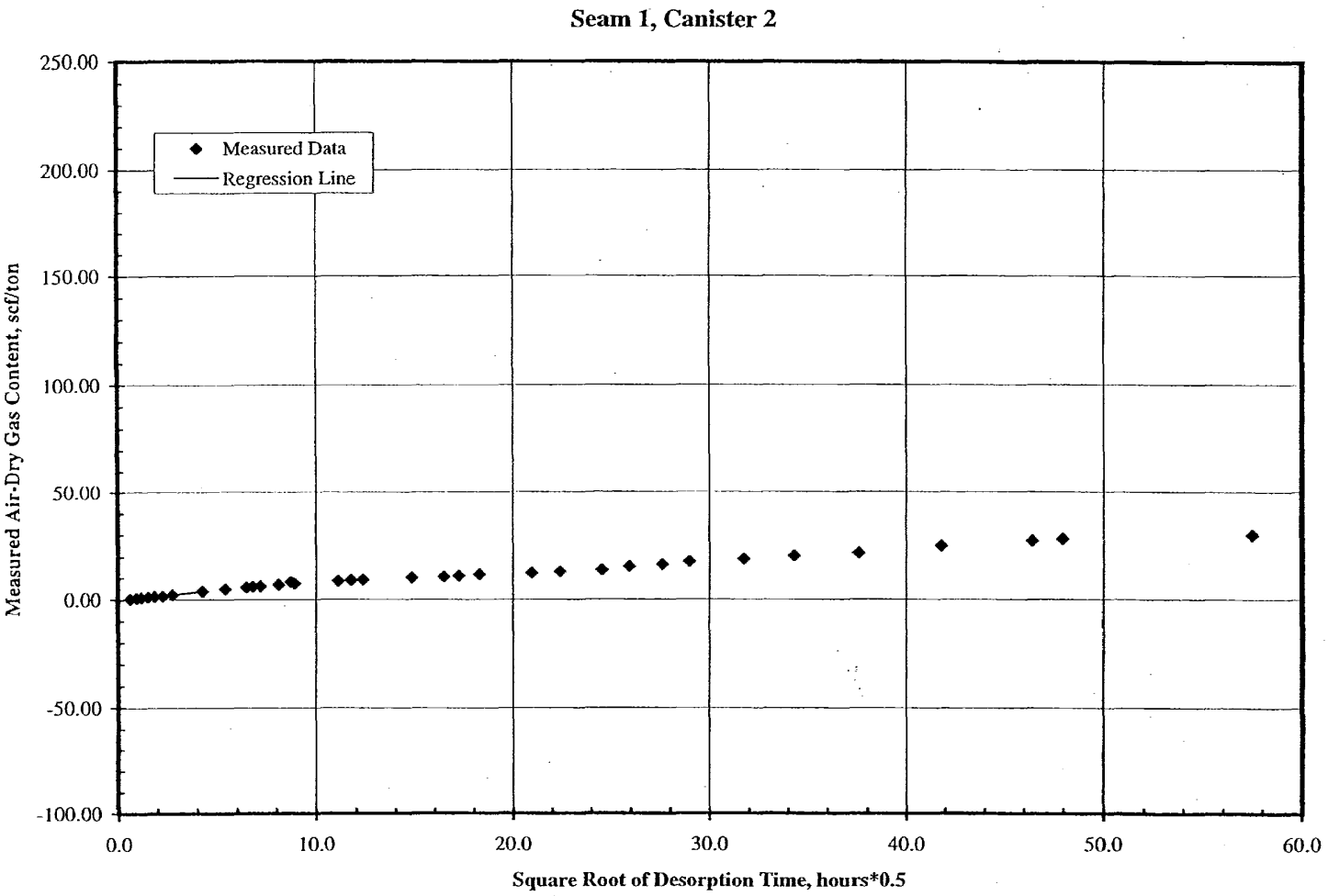

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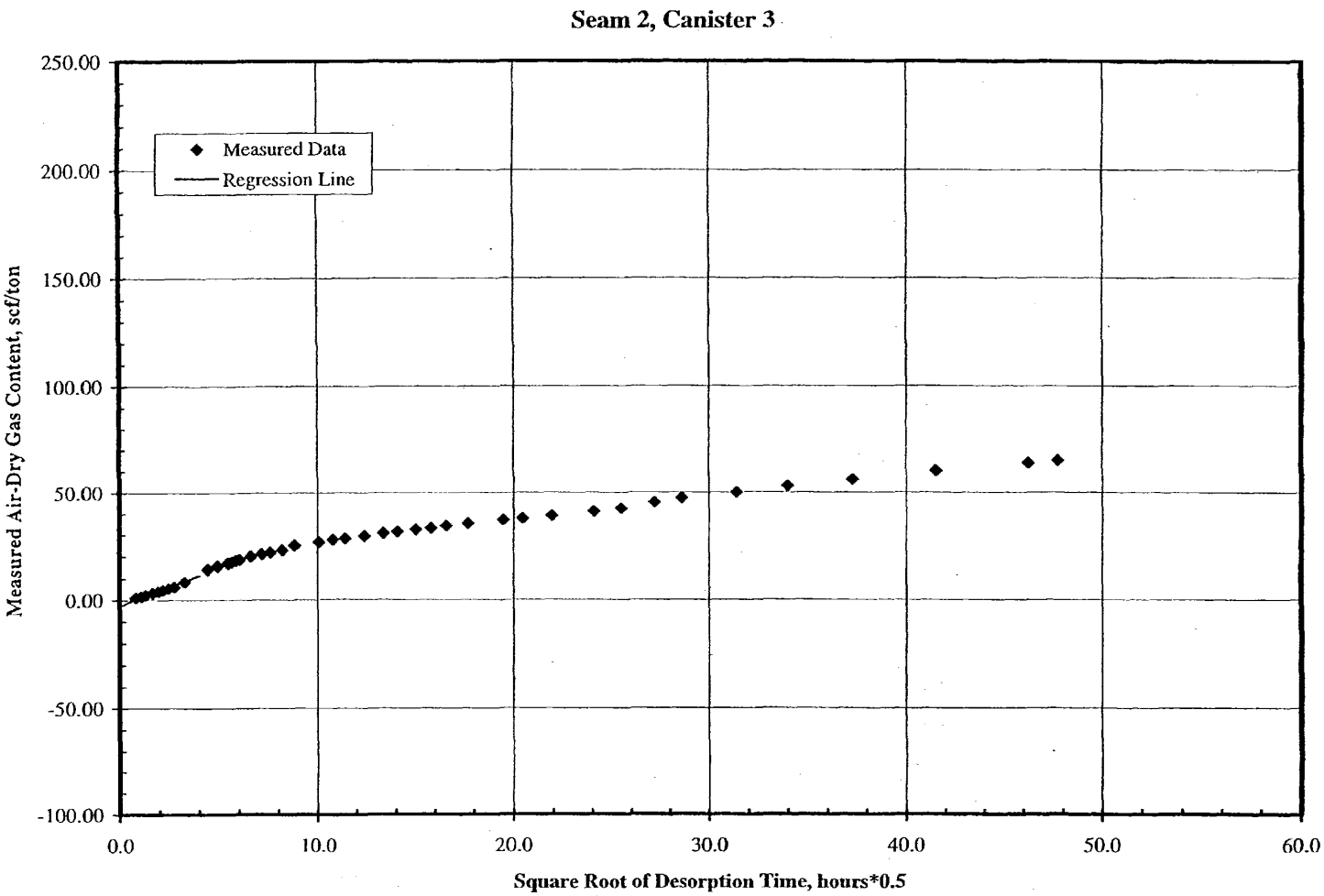

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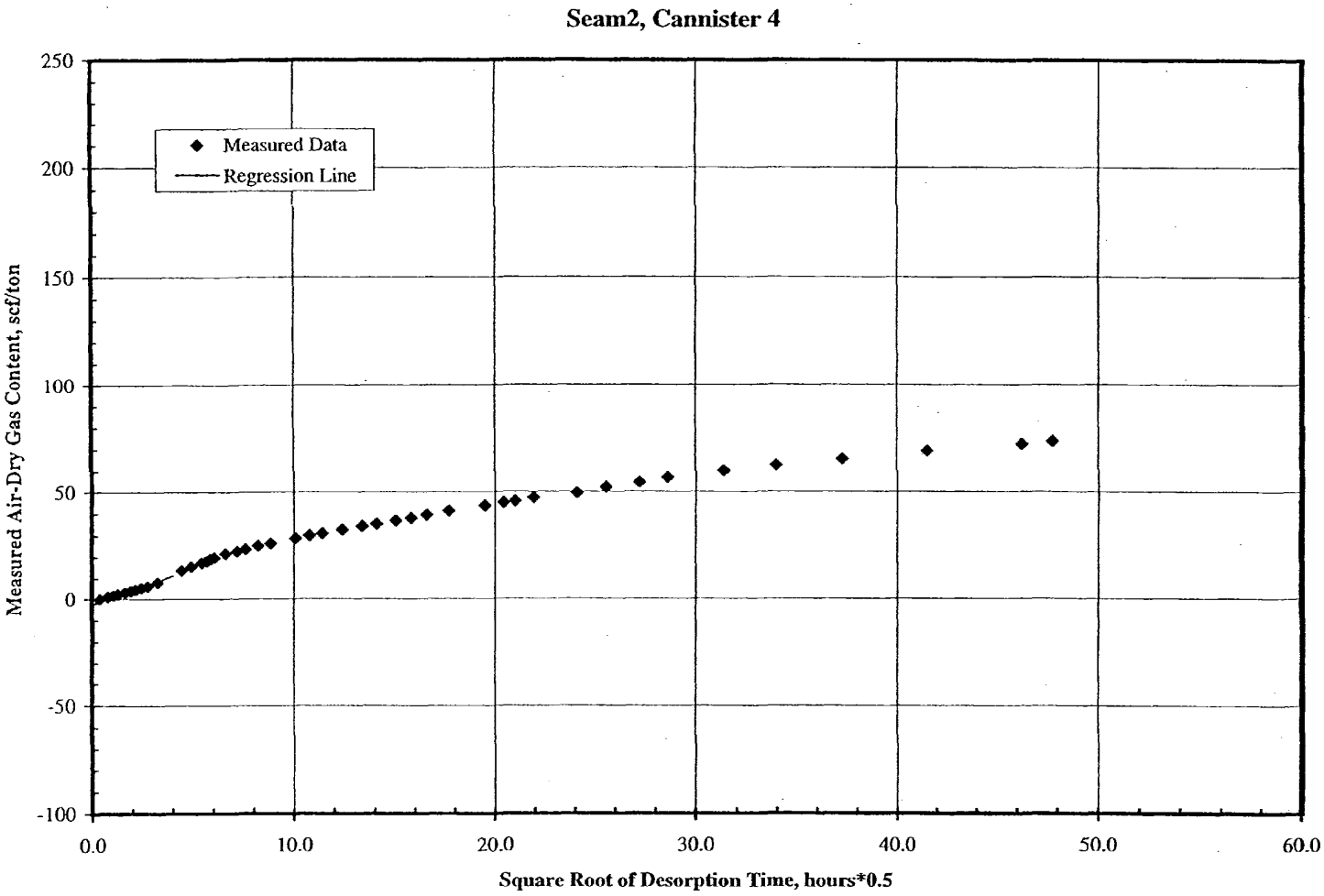

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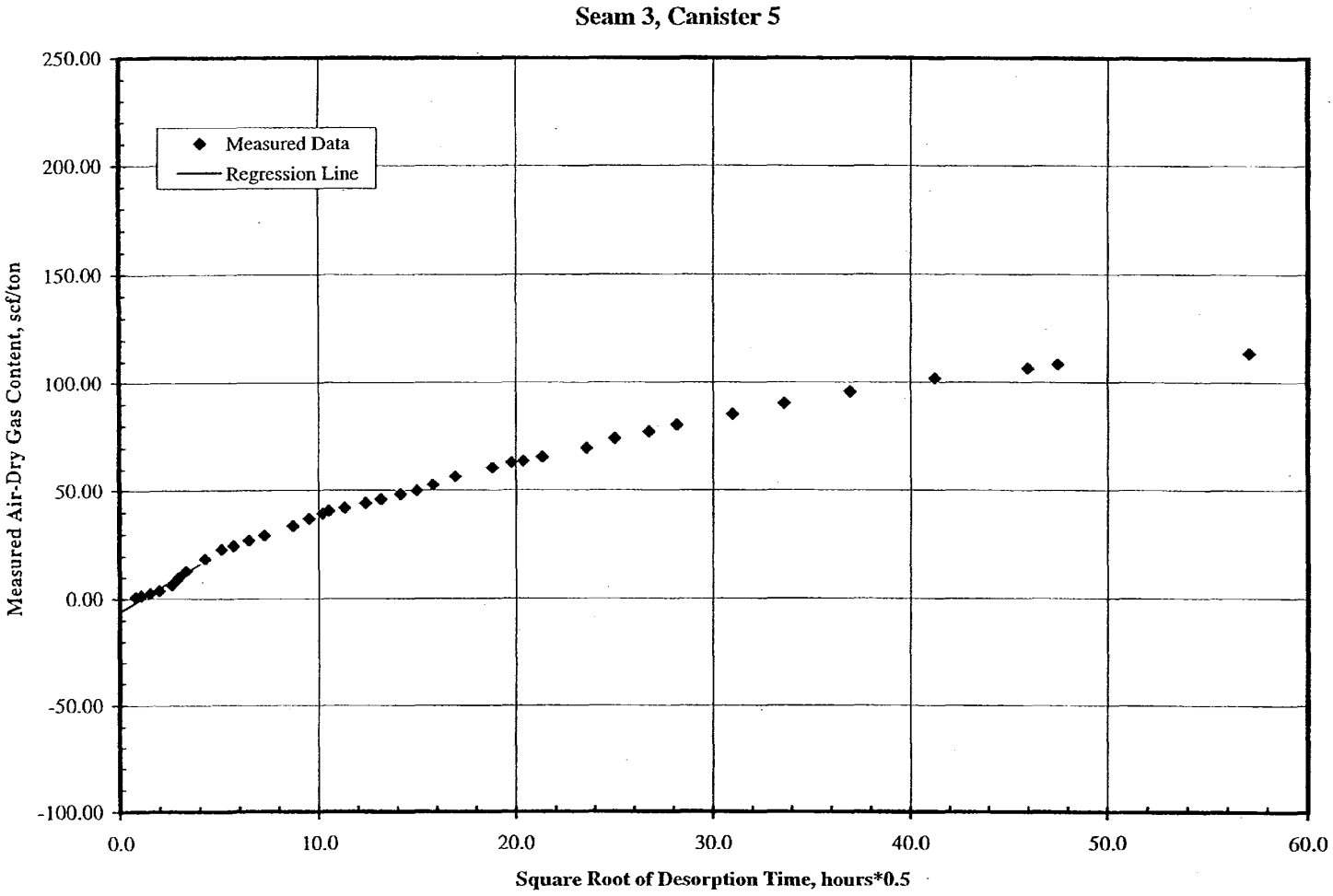

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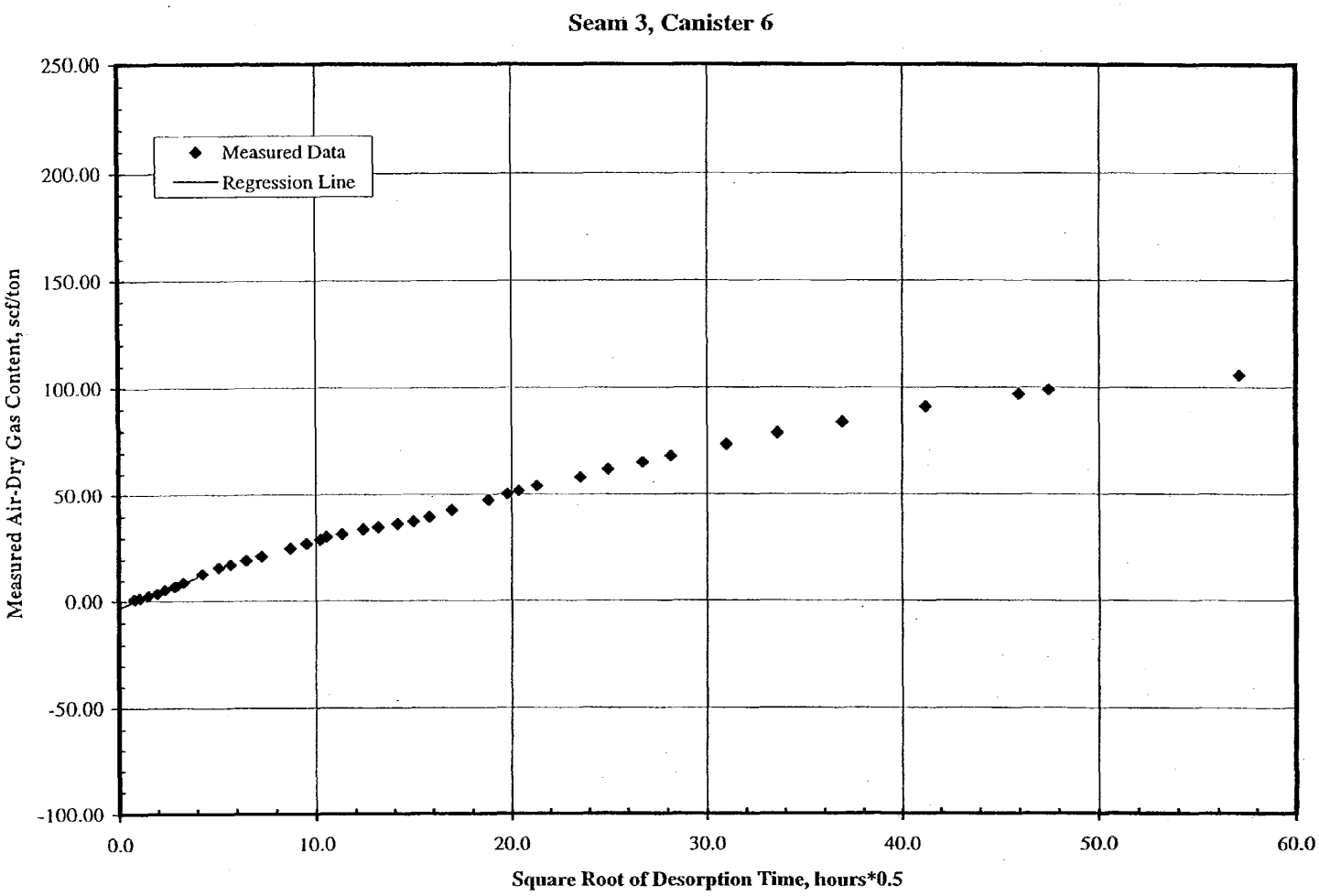

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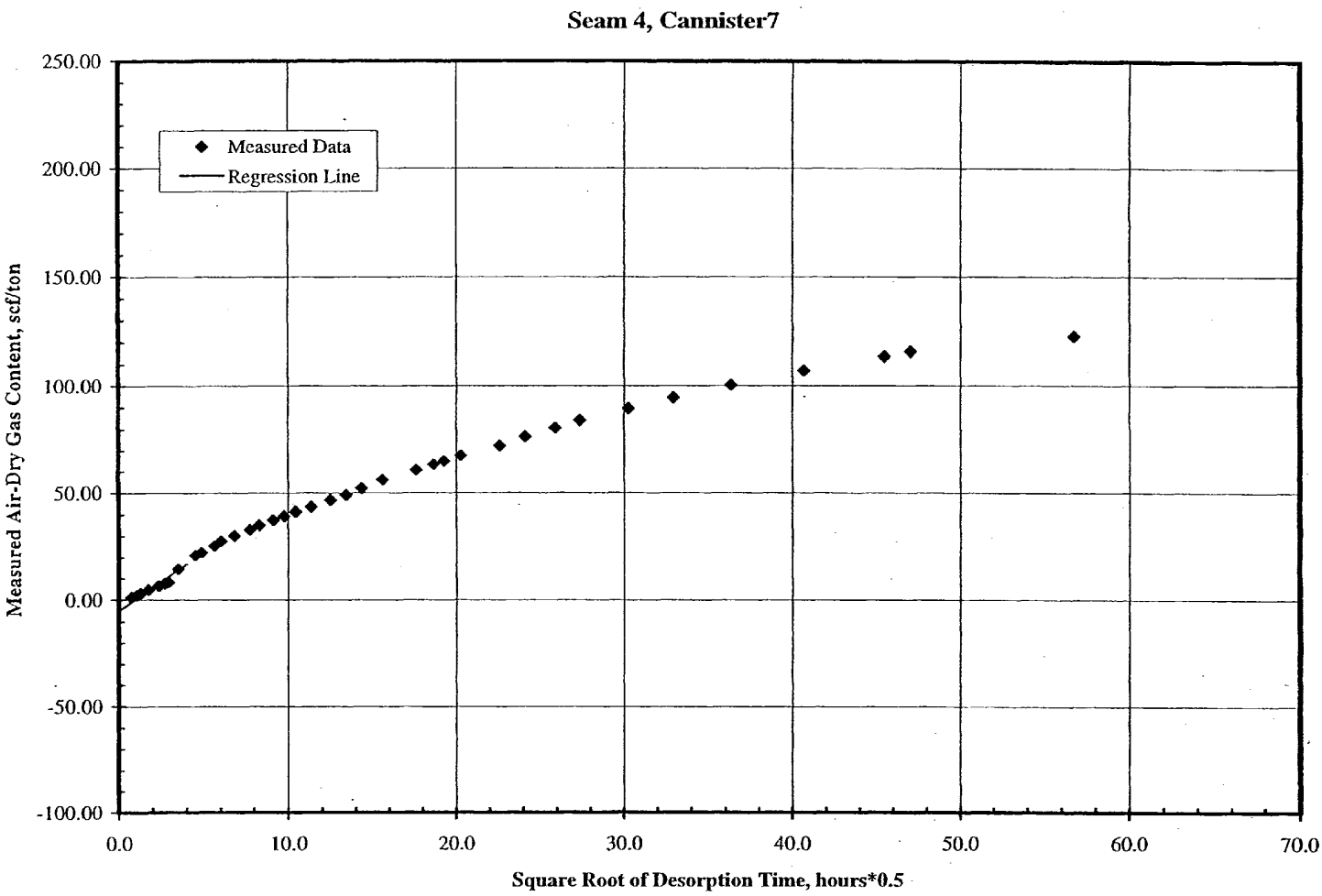

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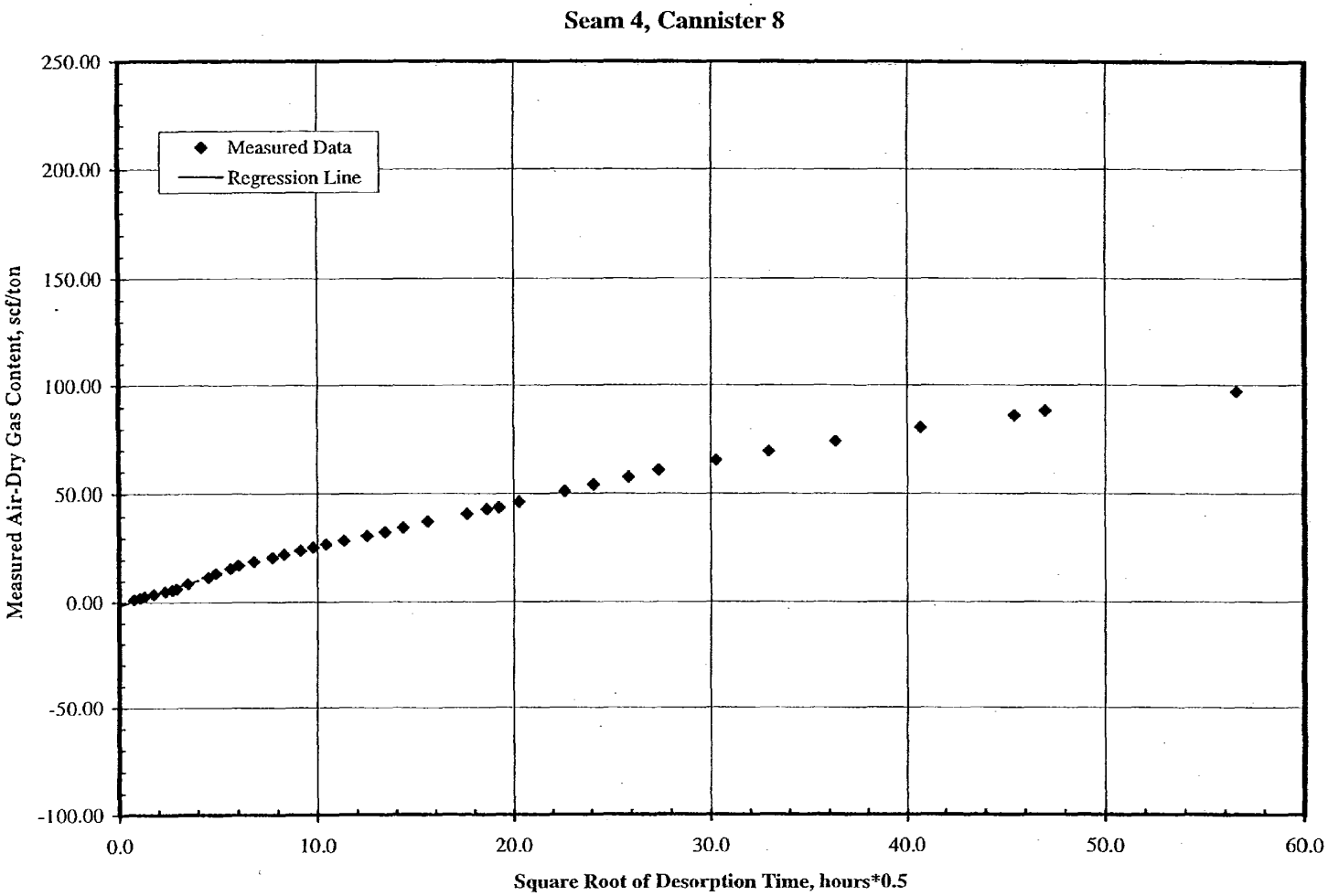

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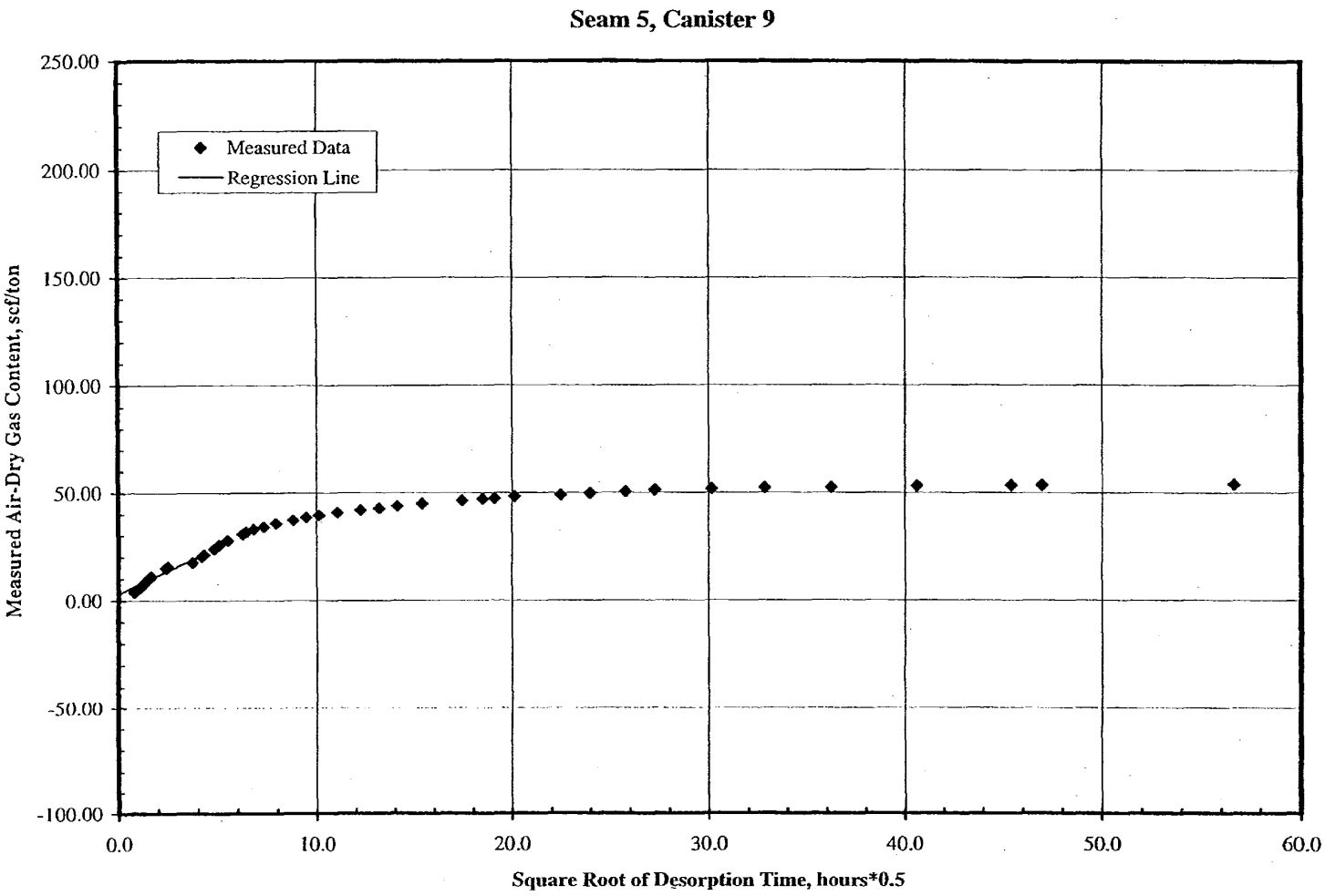

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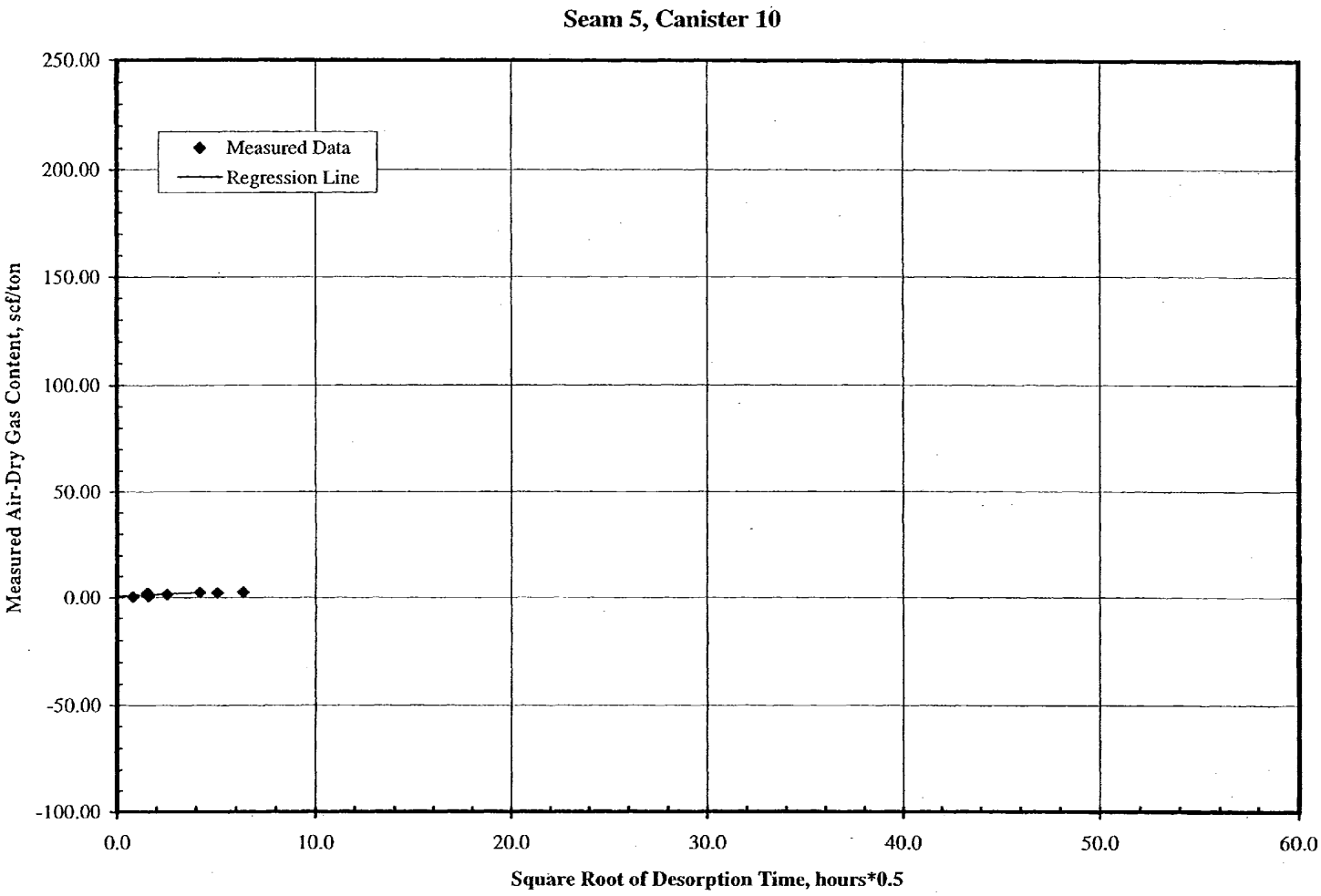

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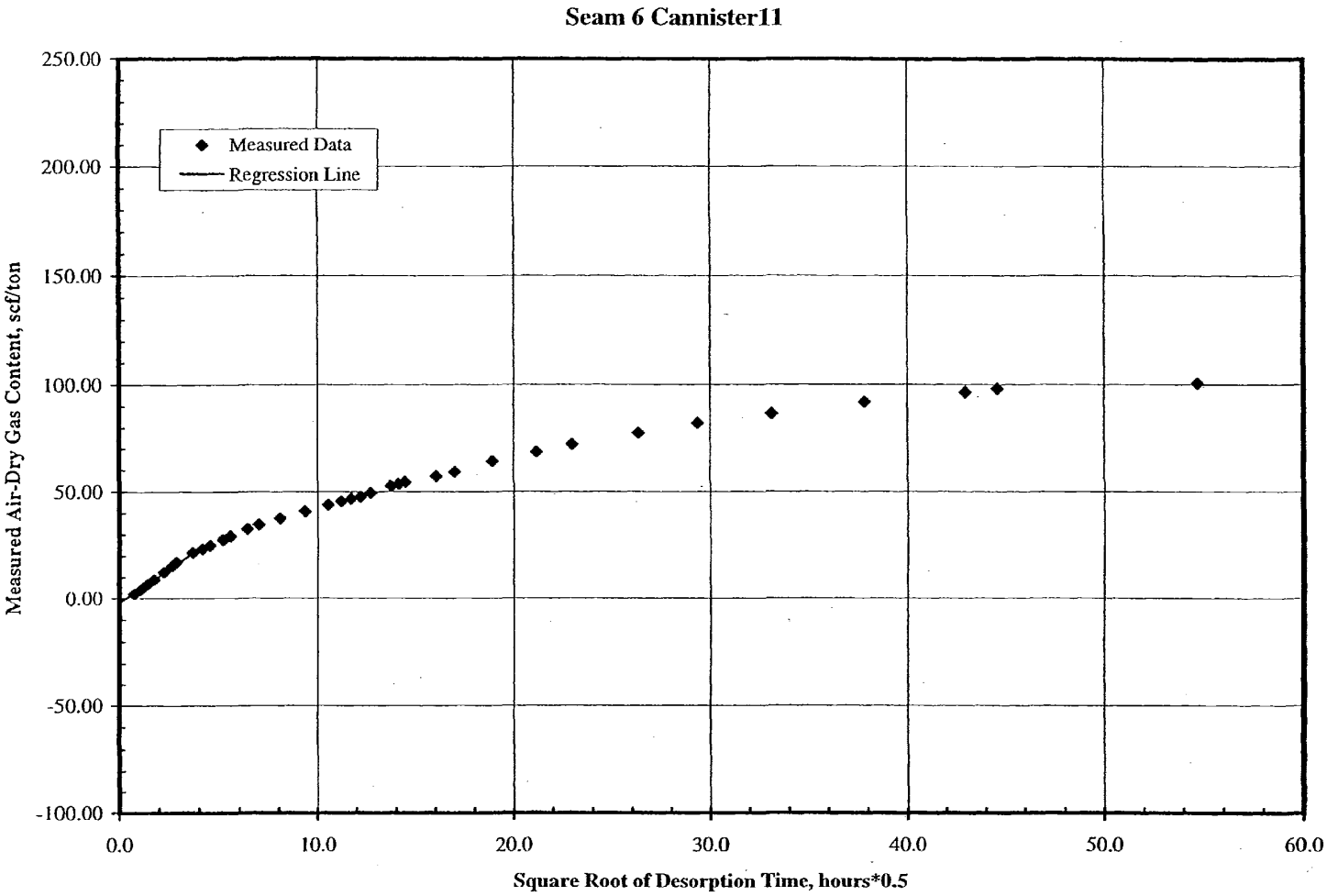

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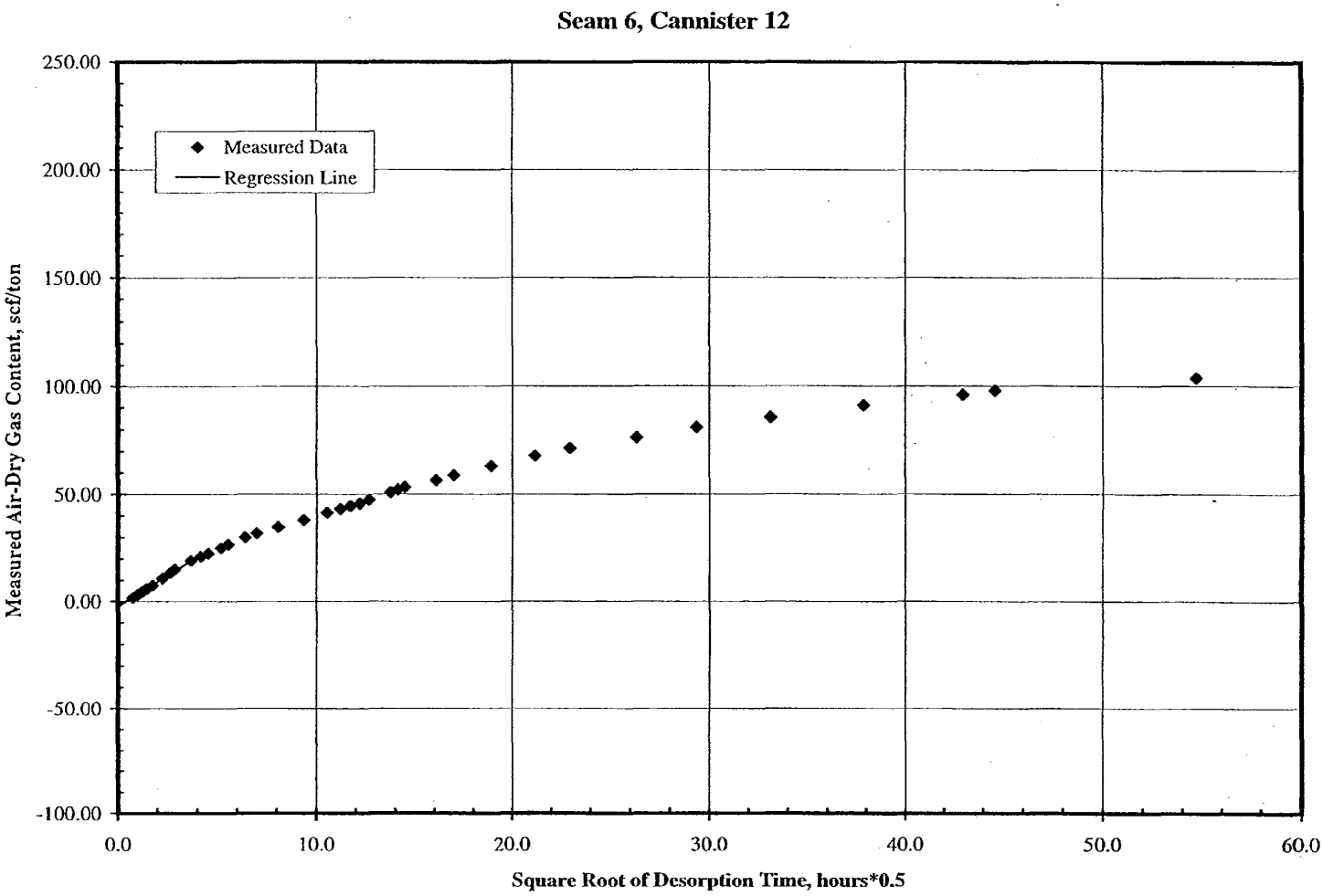

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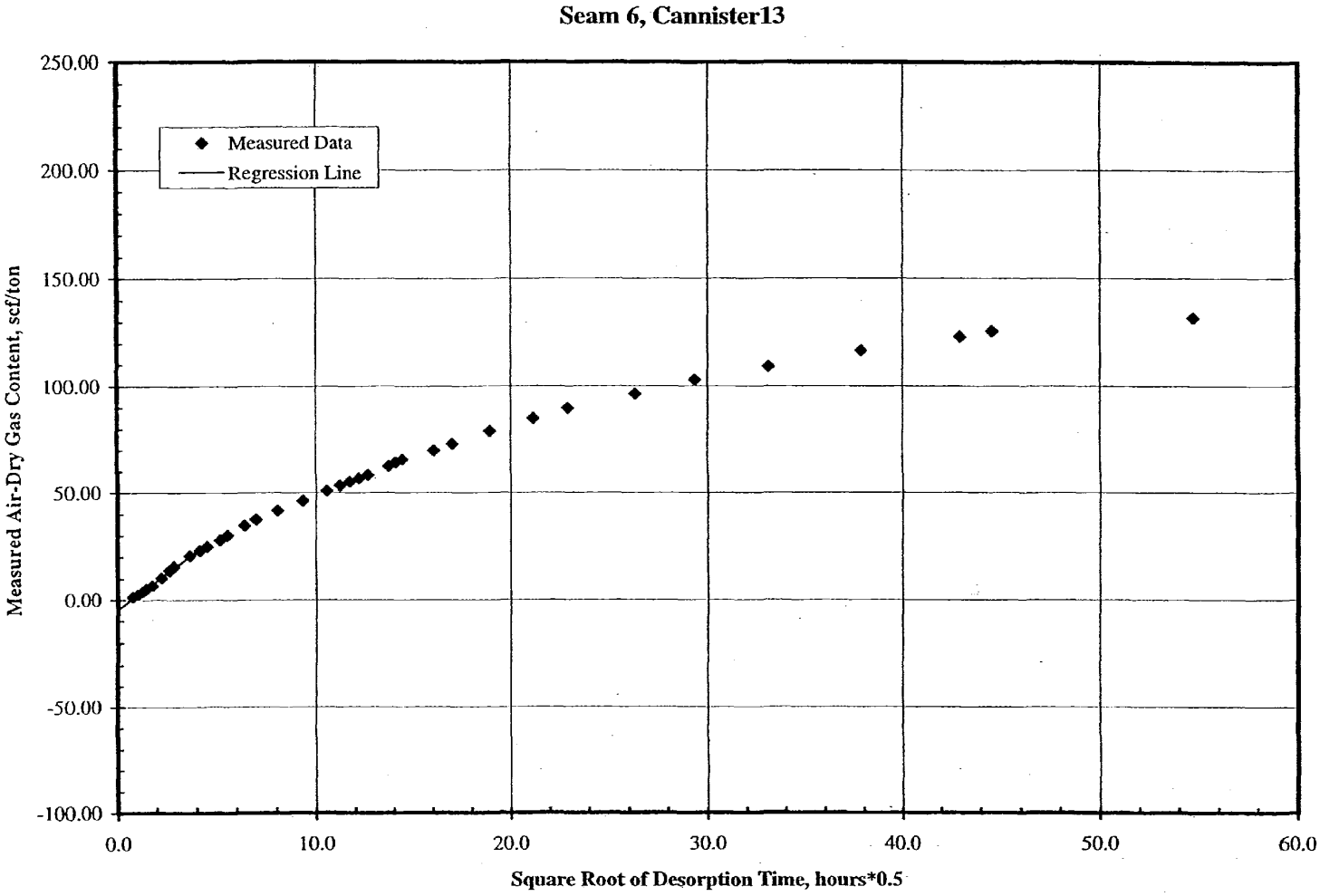

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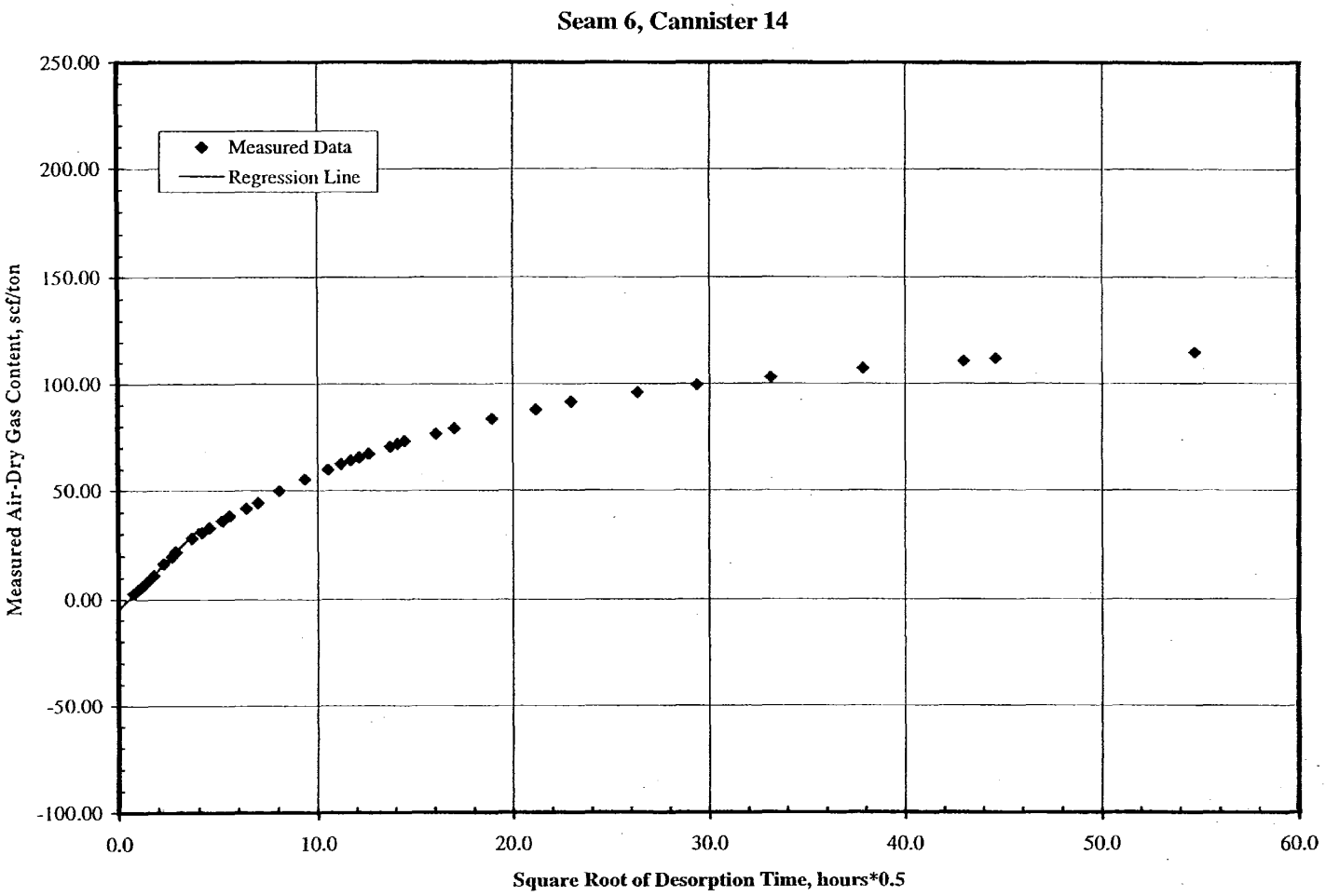

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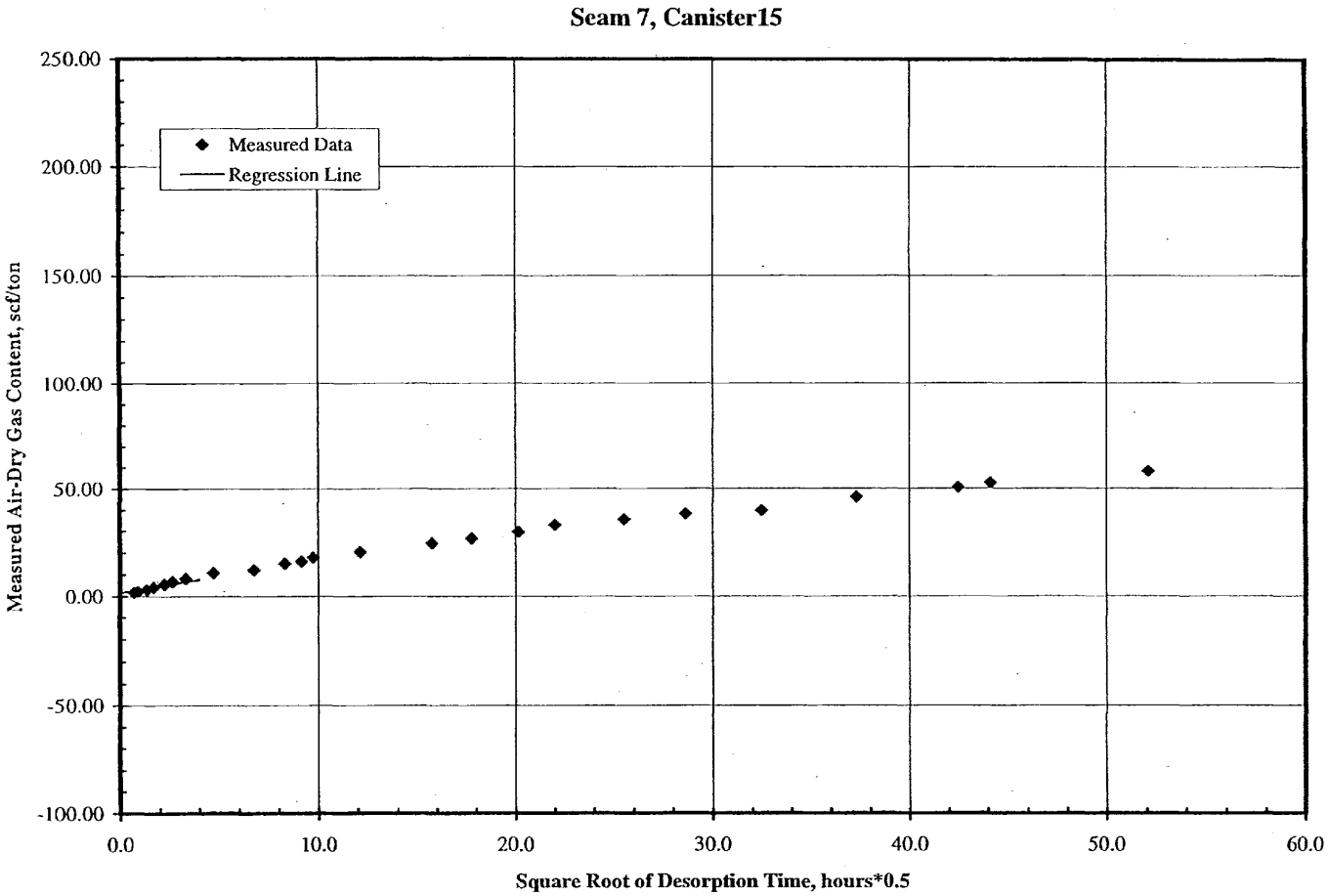

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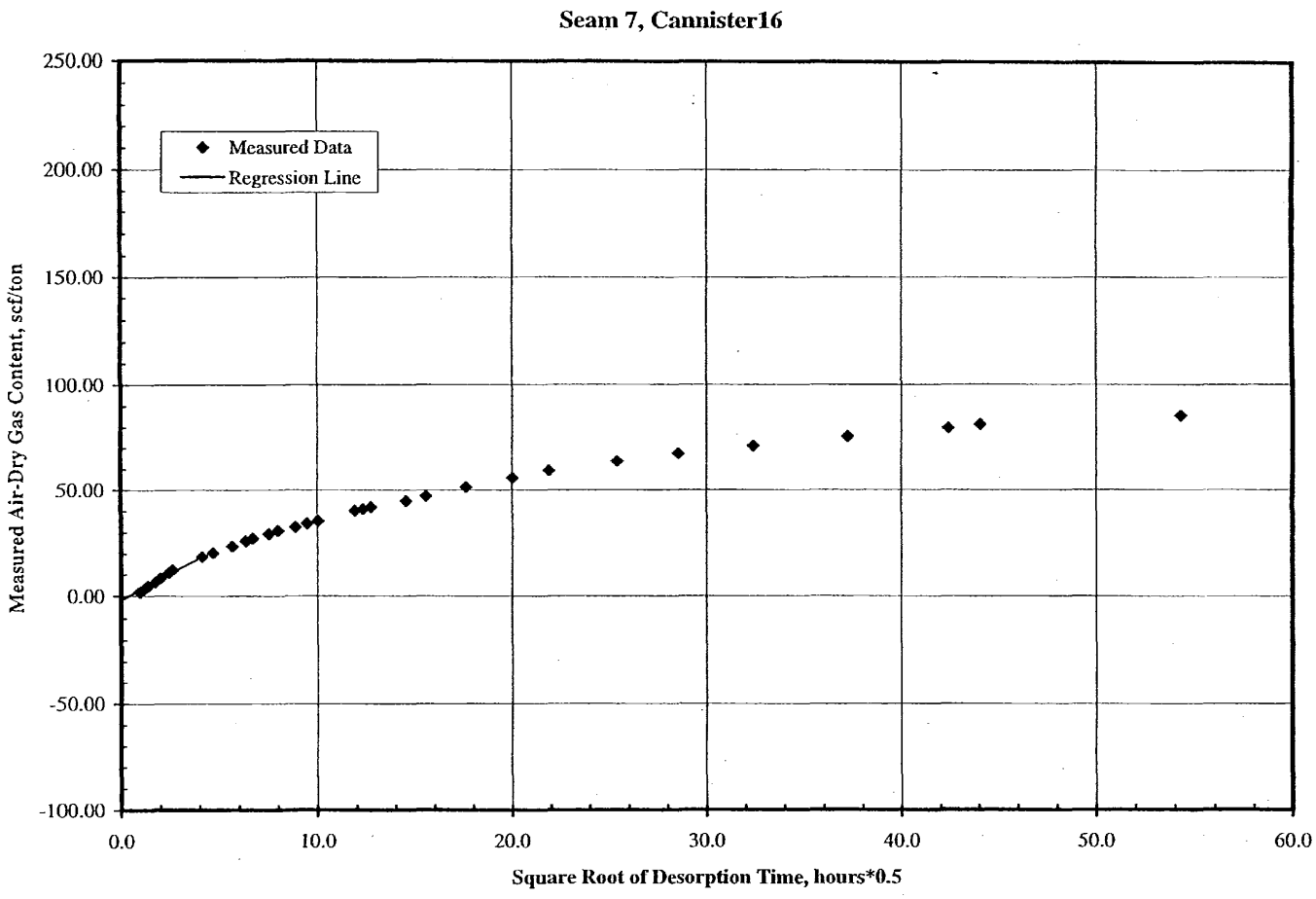

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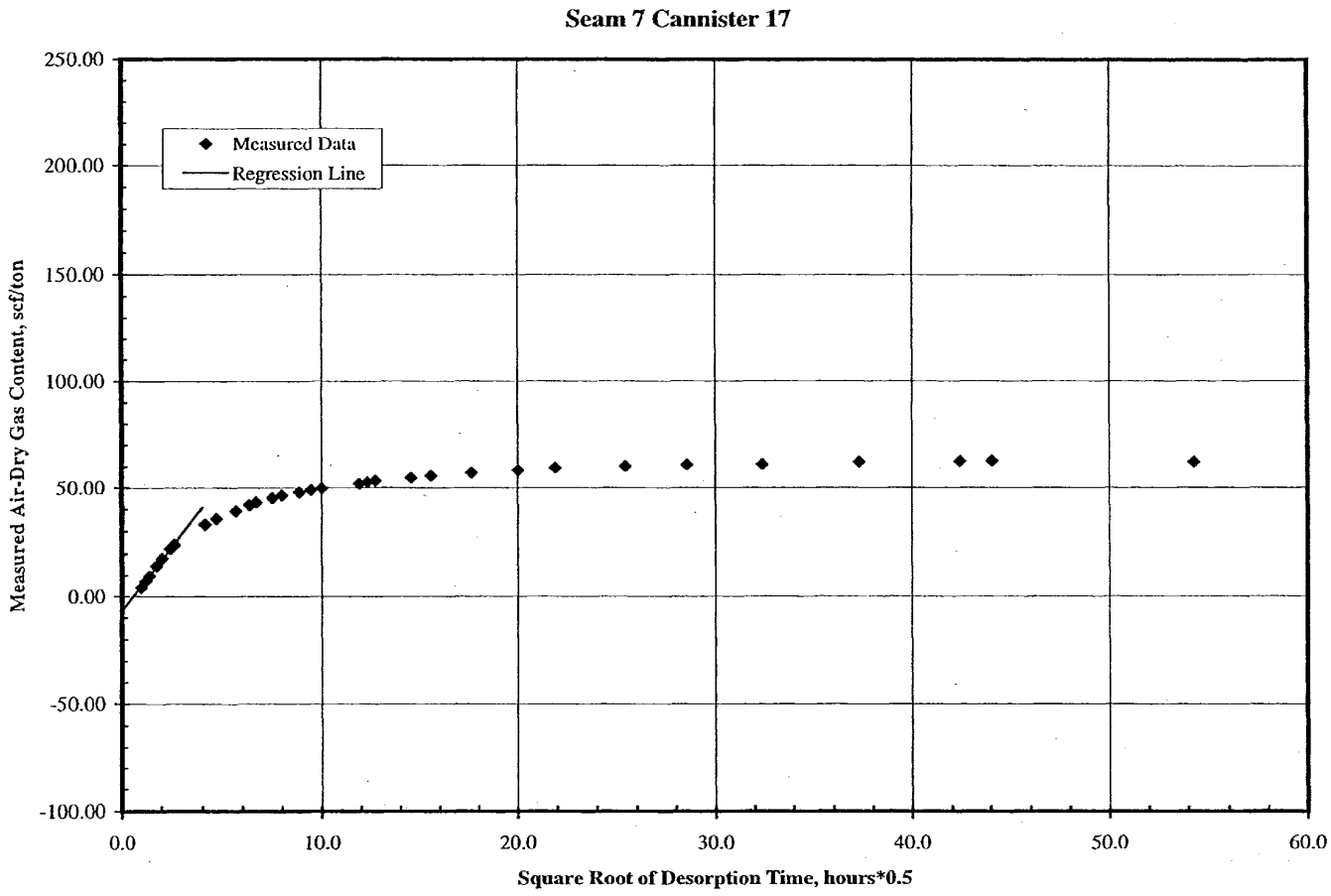

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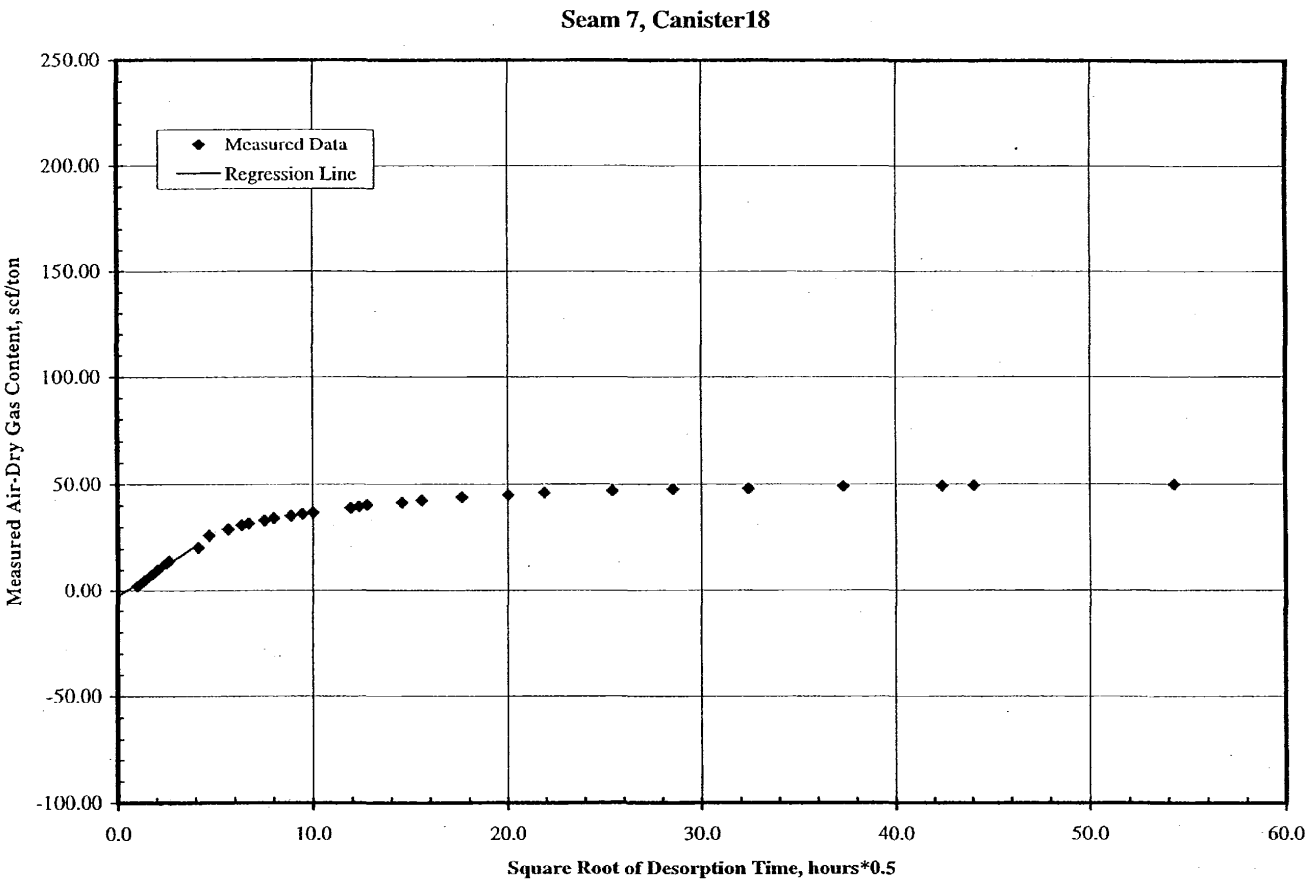

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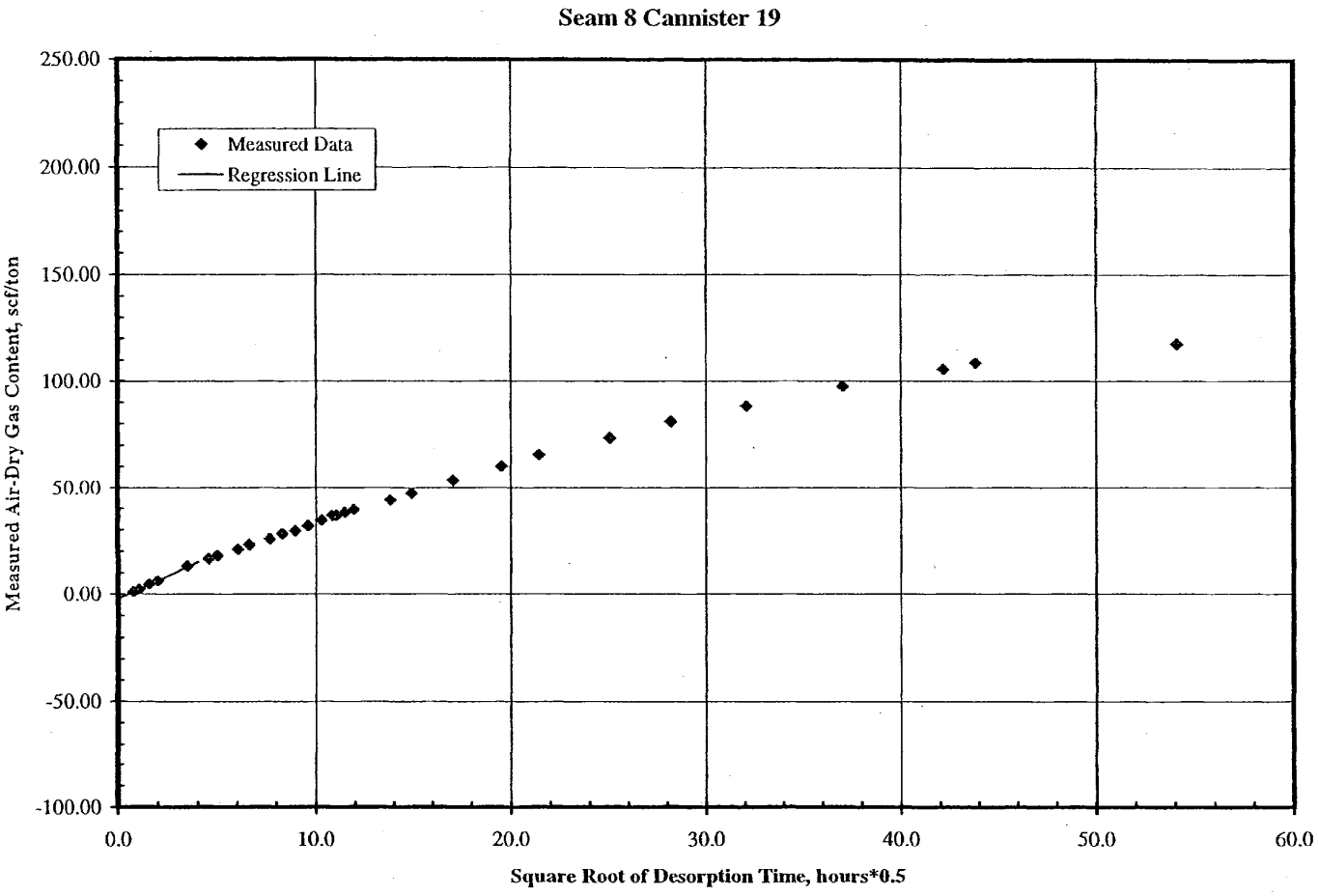

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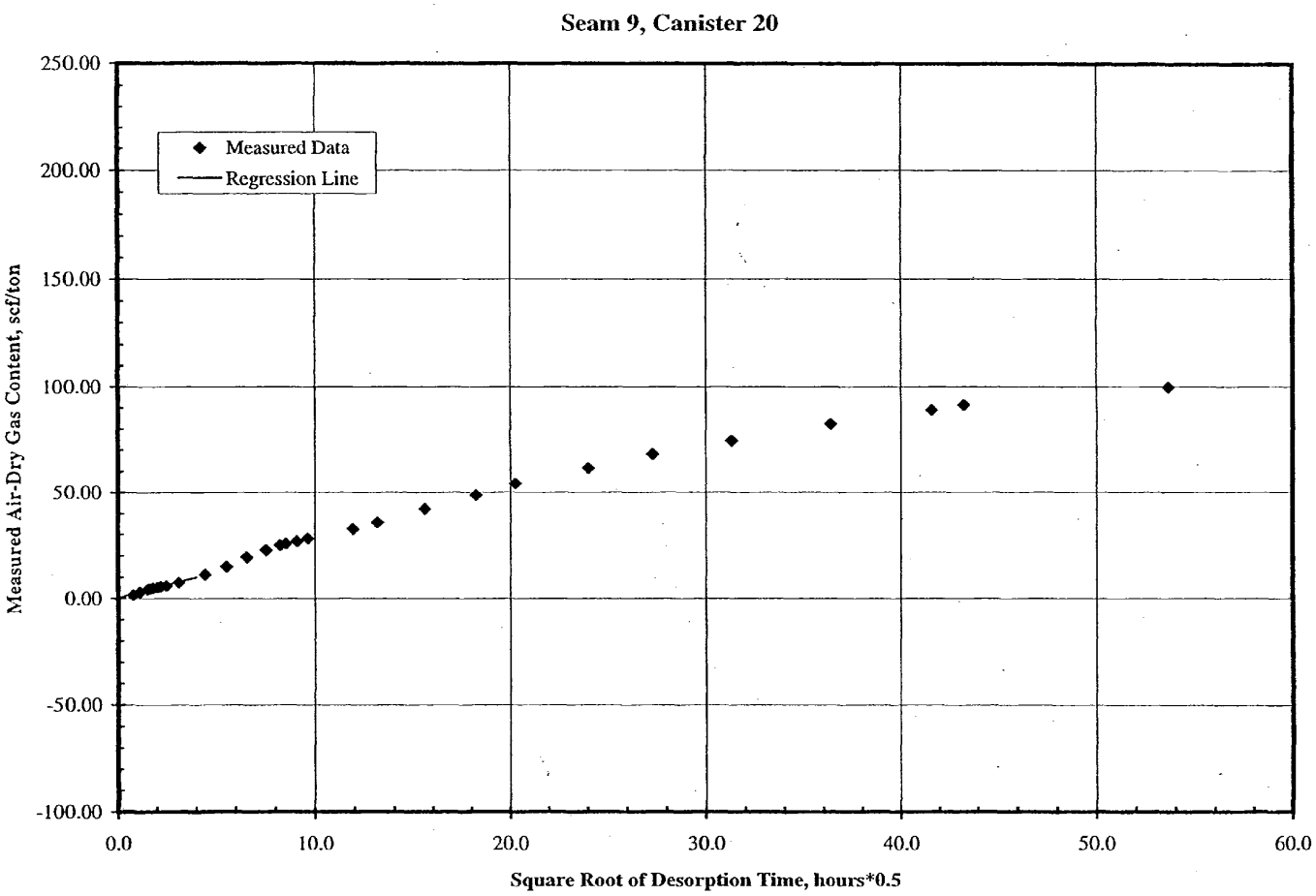

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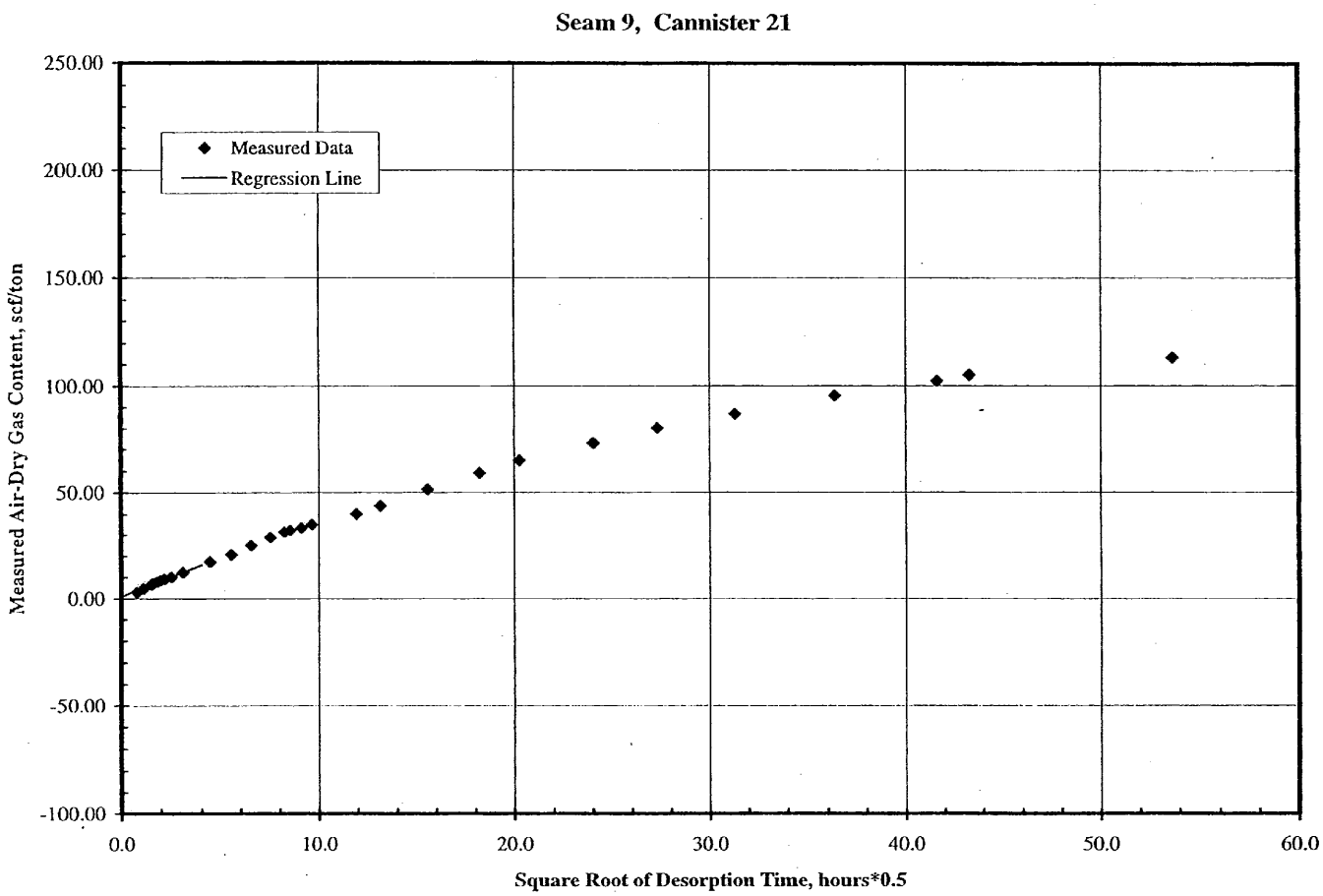

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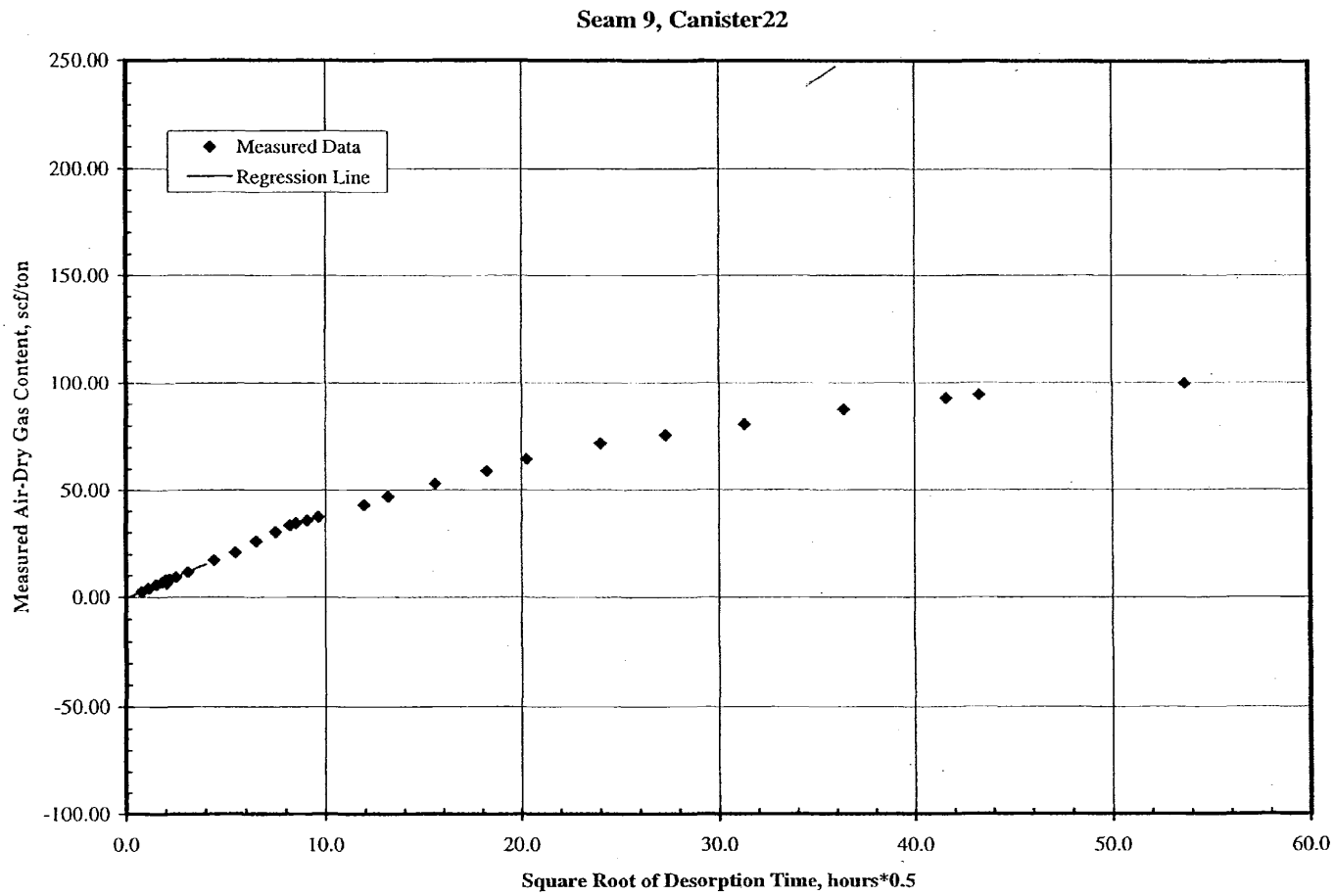

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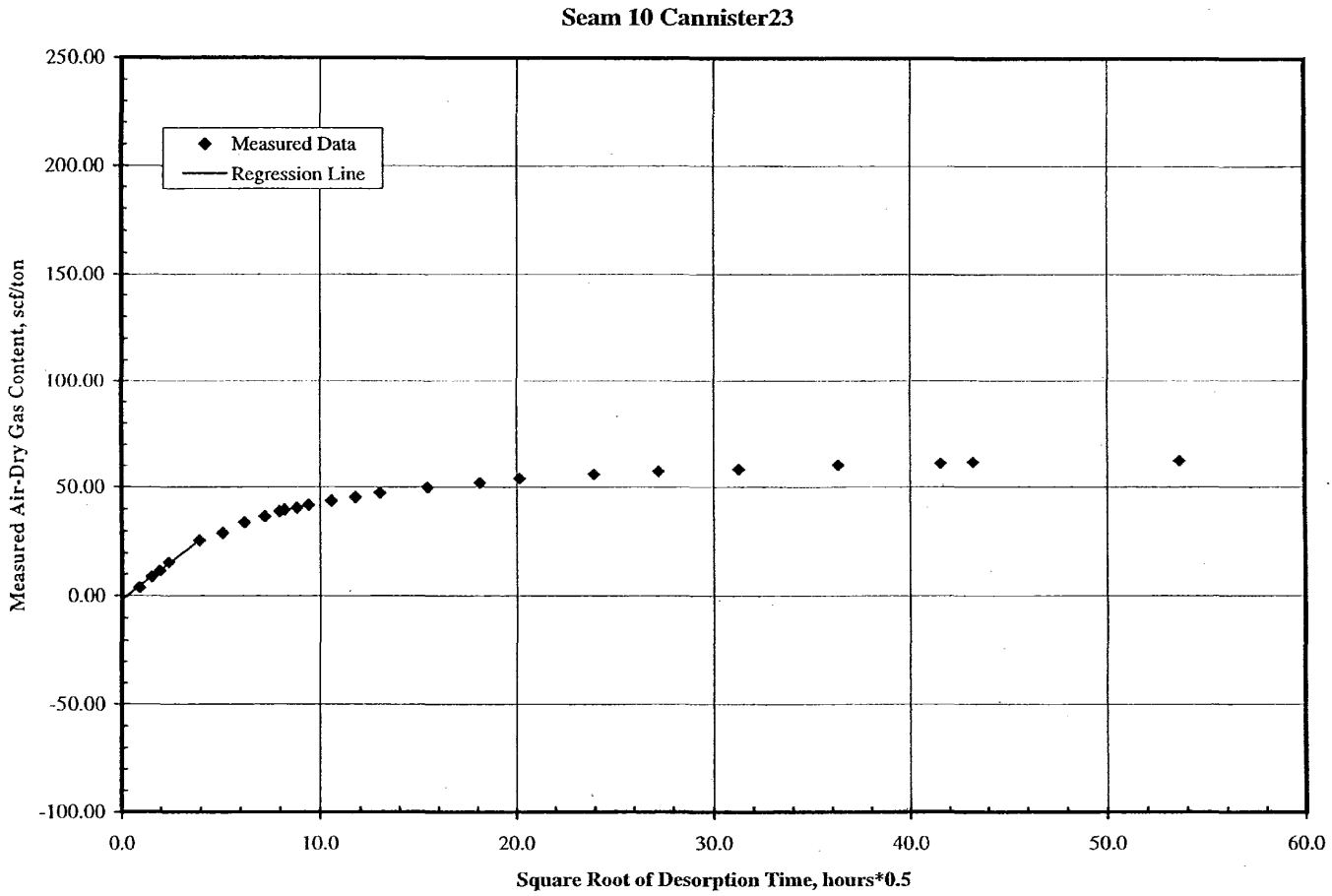

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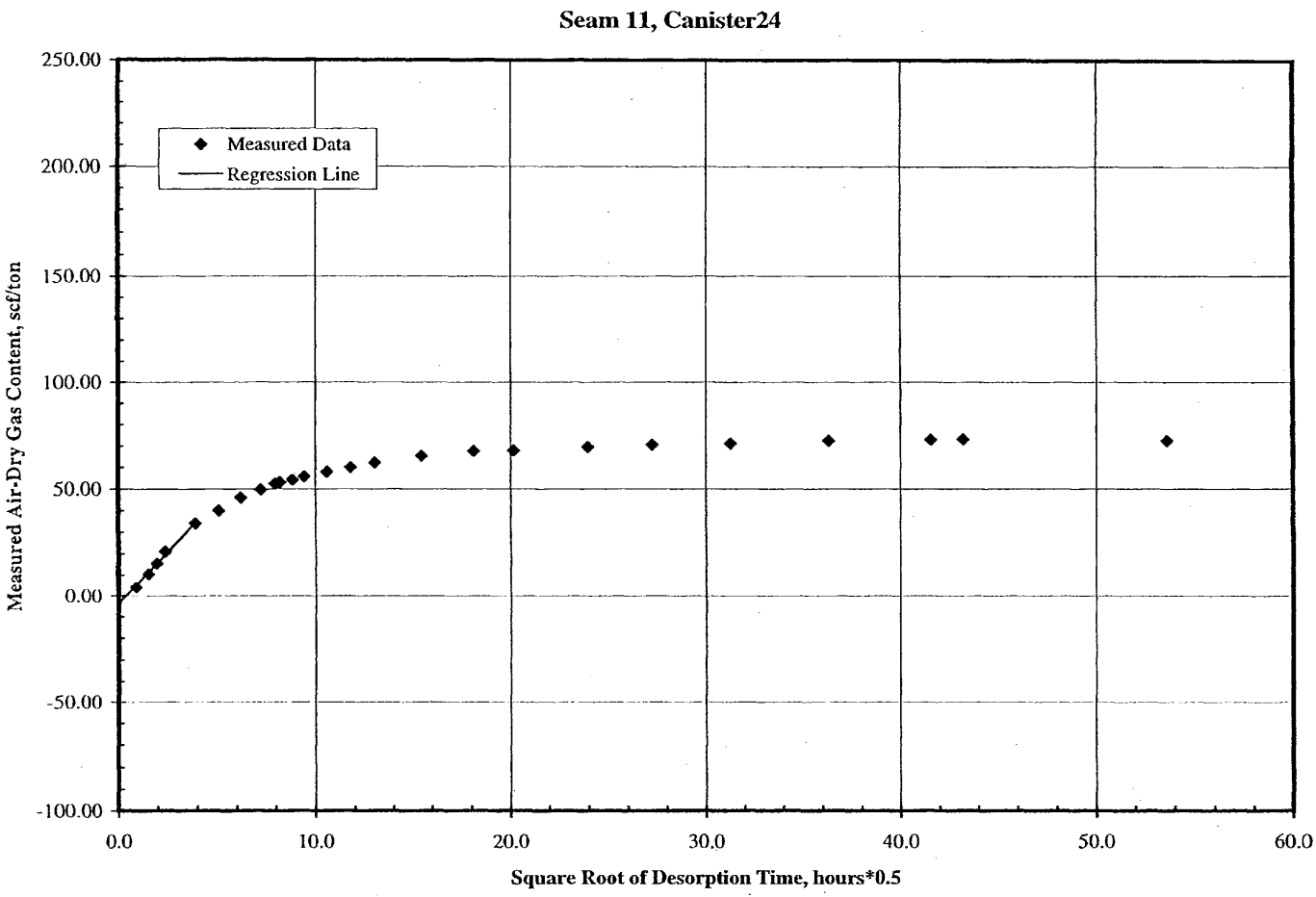
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Regression Line
Measured Air-Dry Gas Content, scf/ton
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200.00
150.00
100.00
50.00
0.00
-50.00
-100.00
0.0
10.0
20.0
30.0
40.0
50.0
60.0
Square Root of Desorption Time, hours*0.5

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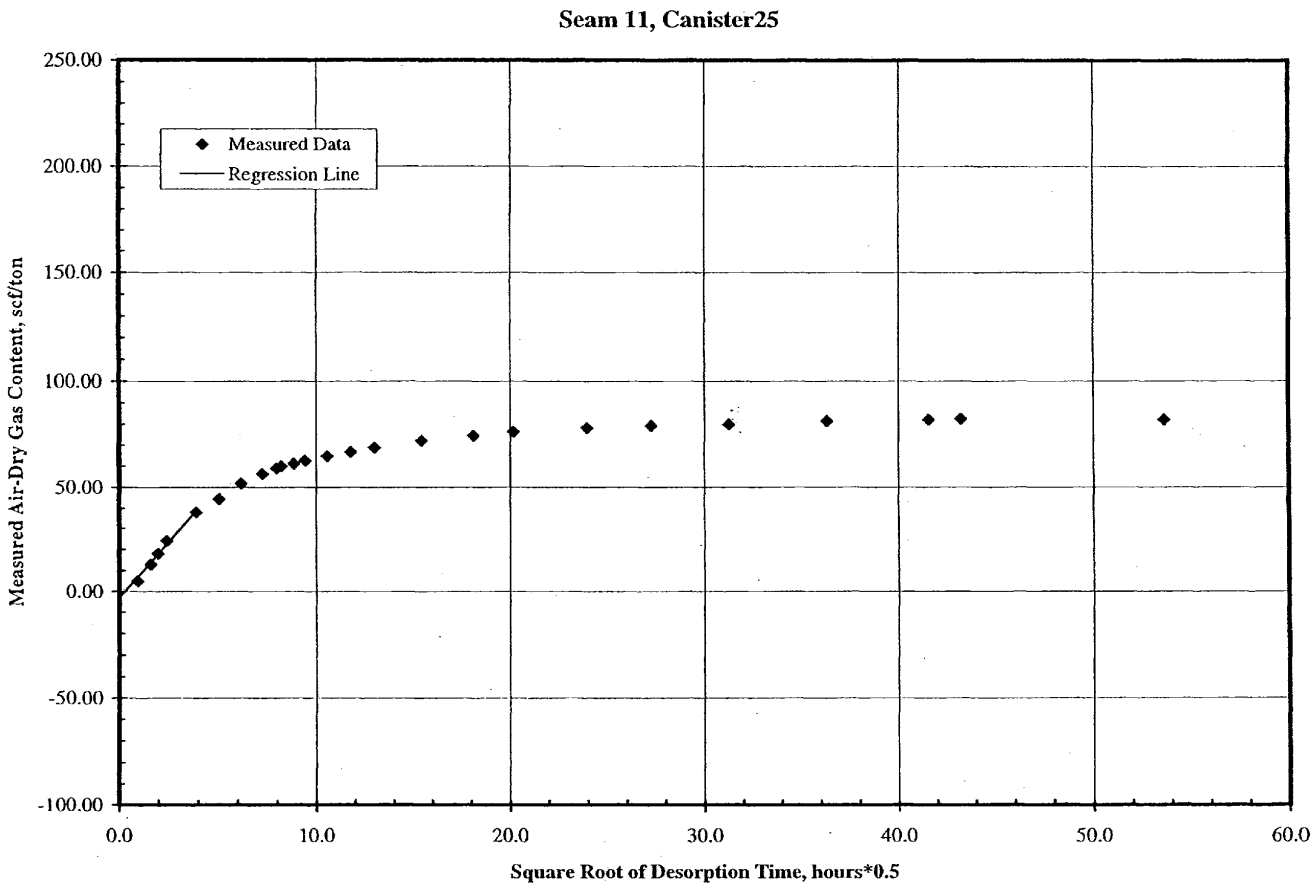
NOV 15 1997



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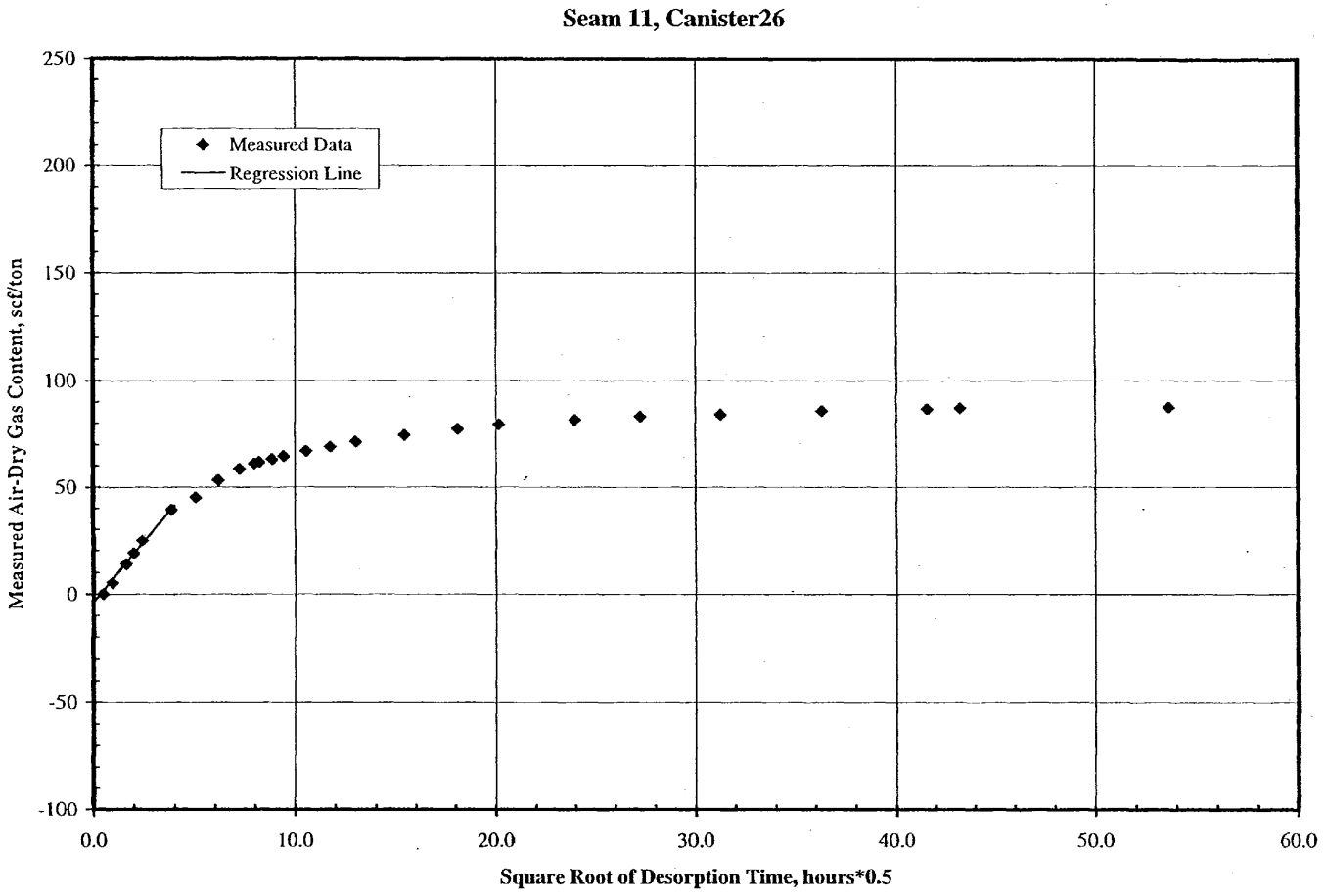

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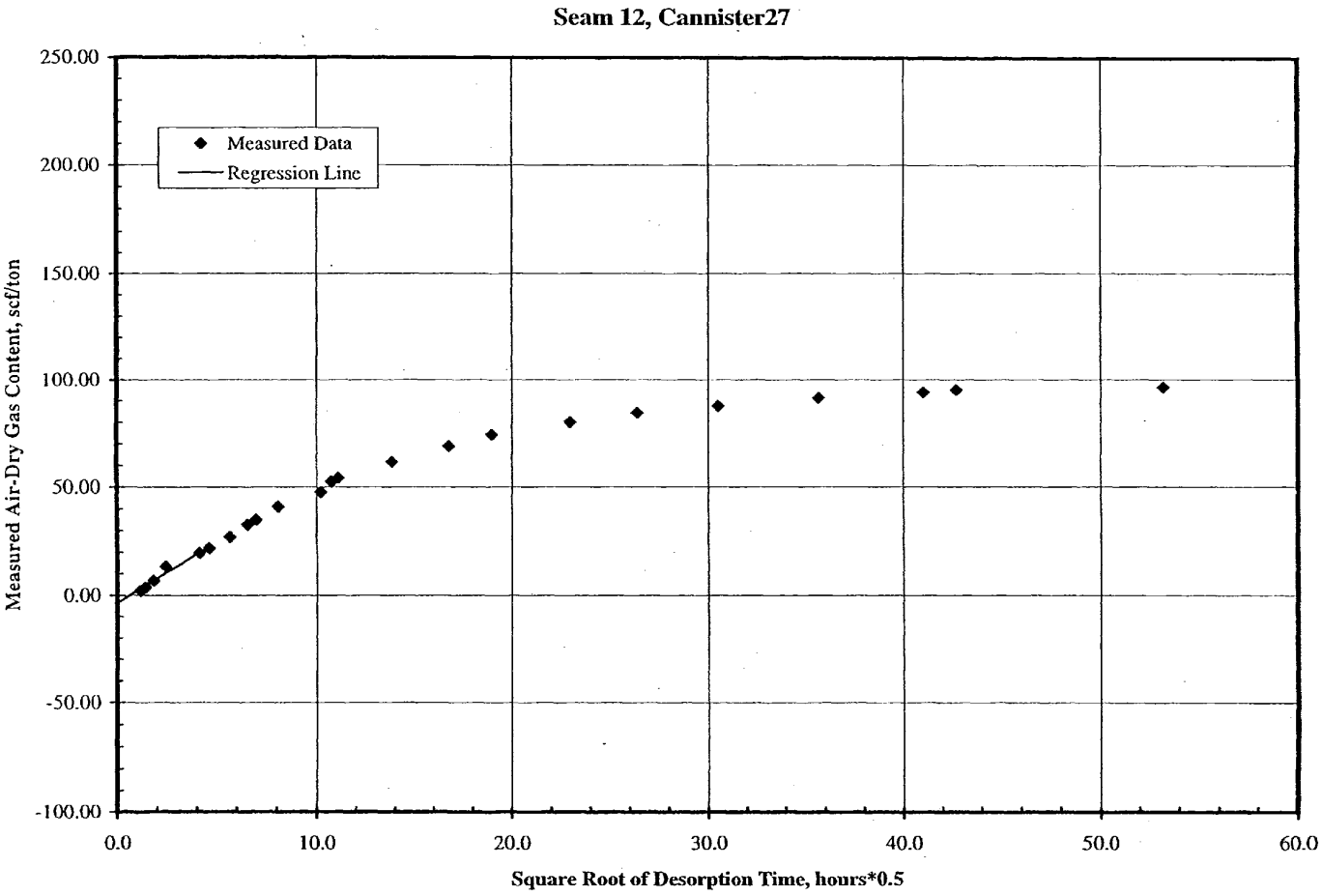

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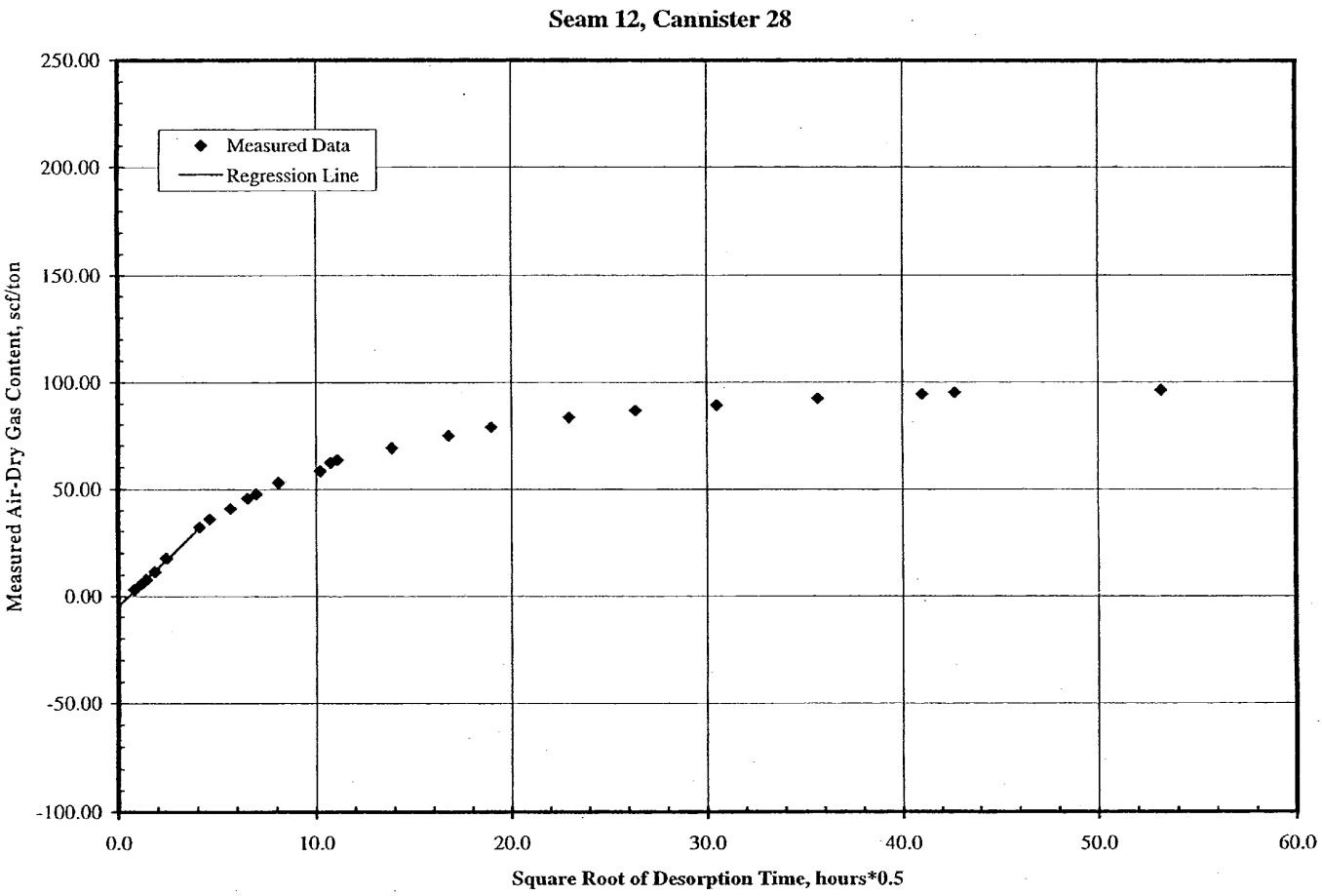

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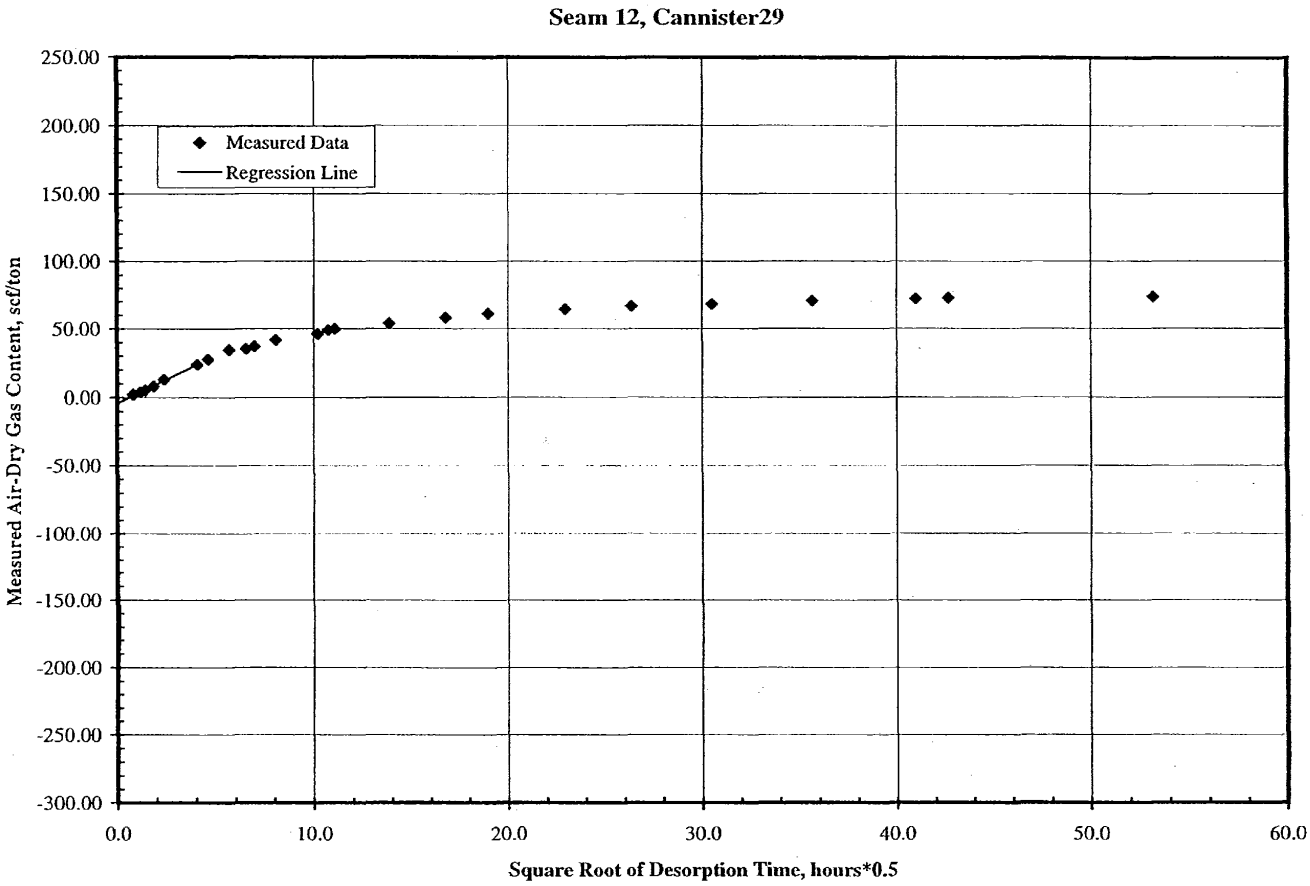

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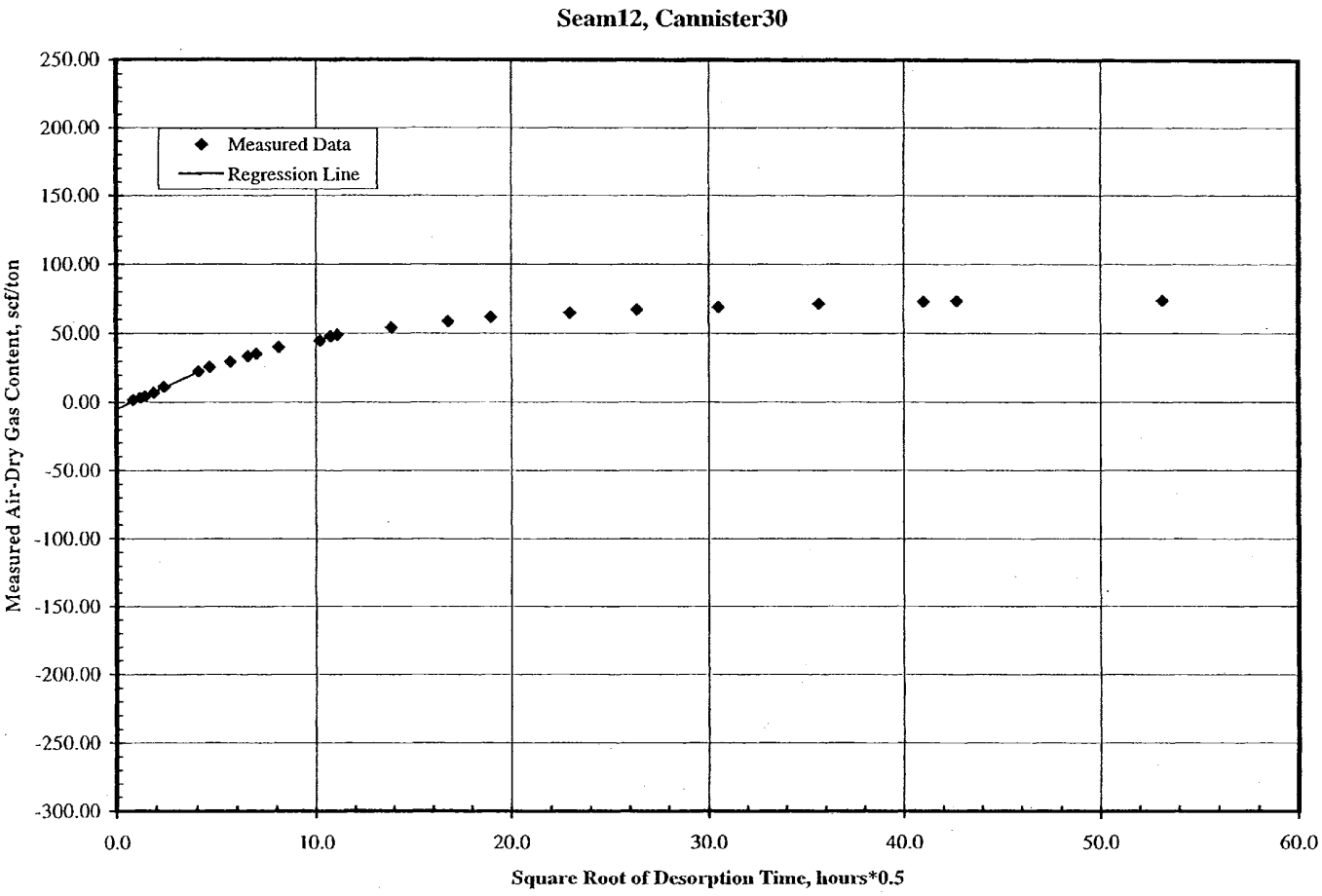

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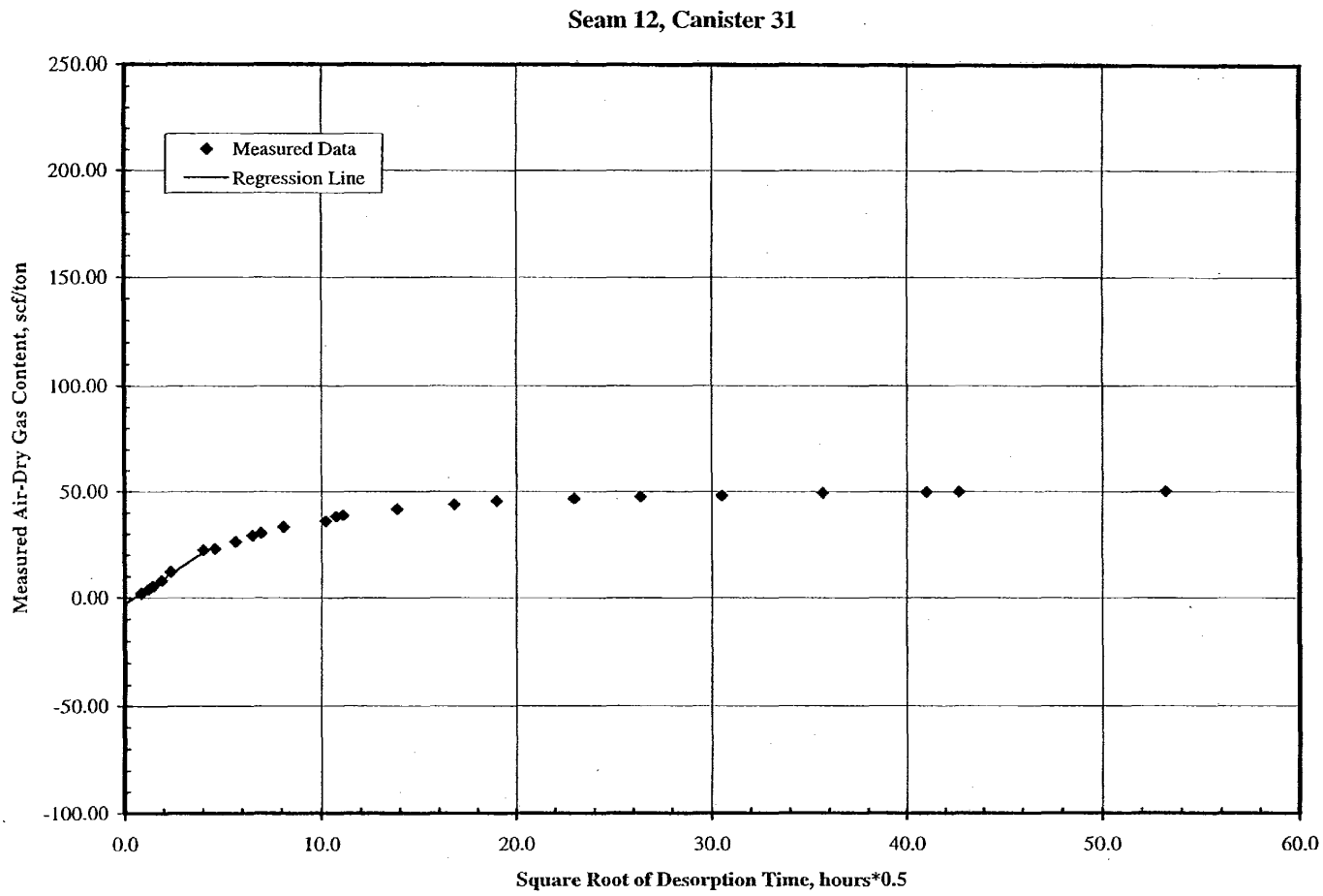
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Regression Line
Measured Air-Dry Gas Content, scf/ton
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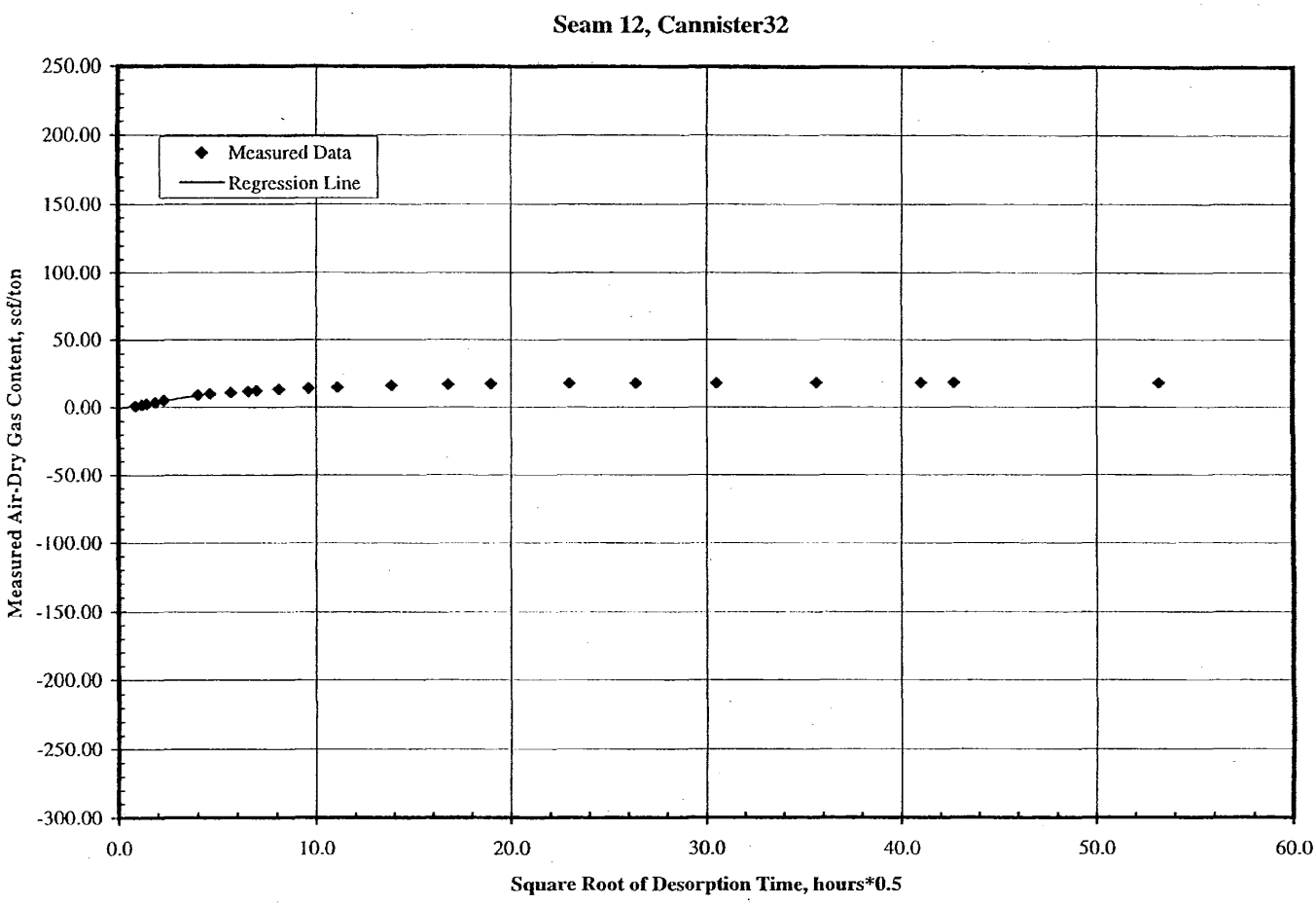
200.00
150.00
100.00
50.00
0.00
-50.00
-100.00
0.0
10.0
20.0
30.0
40.0
50.0
60.0
Square Root of Desorption Time, hours*0.5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100.00
50.00
0.00
-50.00
-100.00
-150.00
-200.00
-250.00
-300.00
0.0
10.0
20.0
30.0
40.0
50.0
60.0
Square Root of Desorption Time, hours*0.5

O. T. SEAMOUNT
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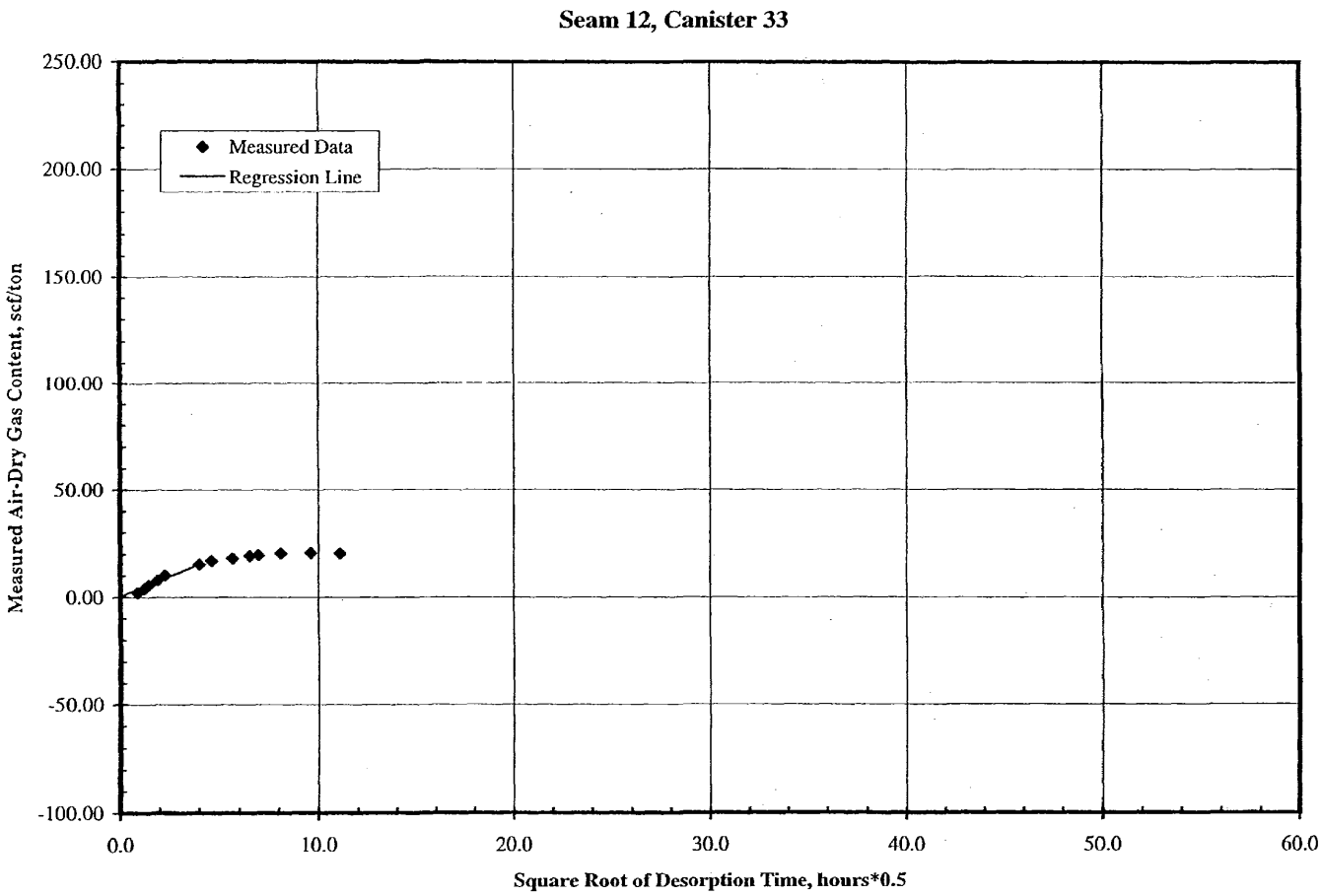

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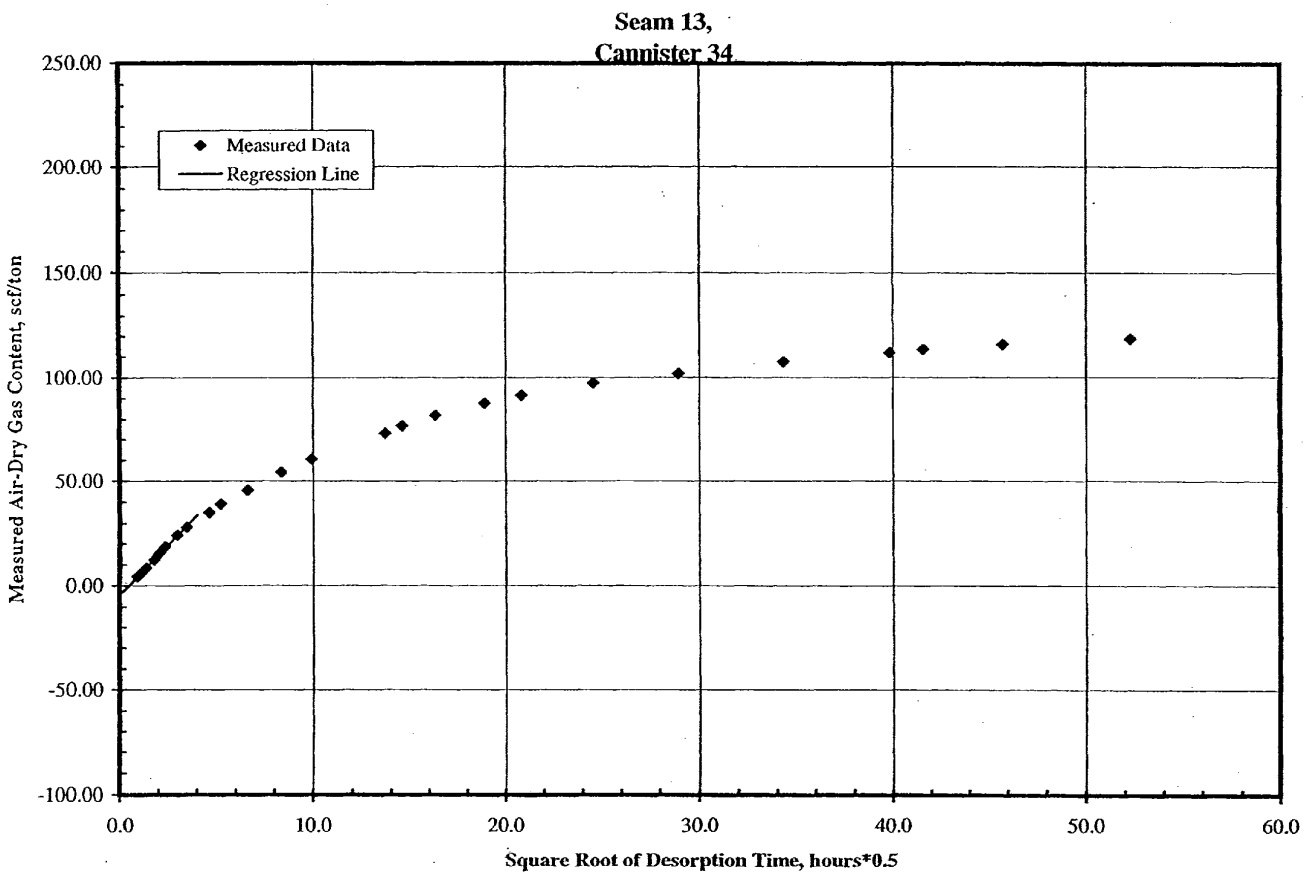

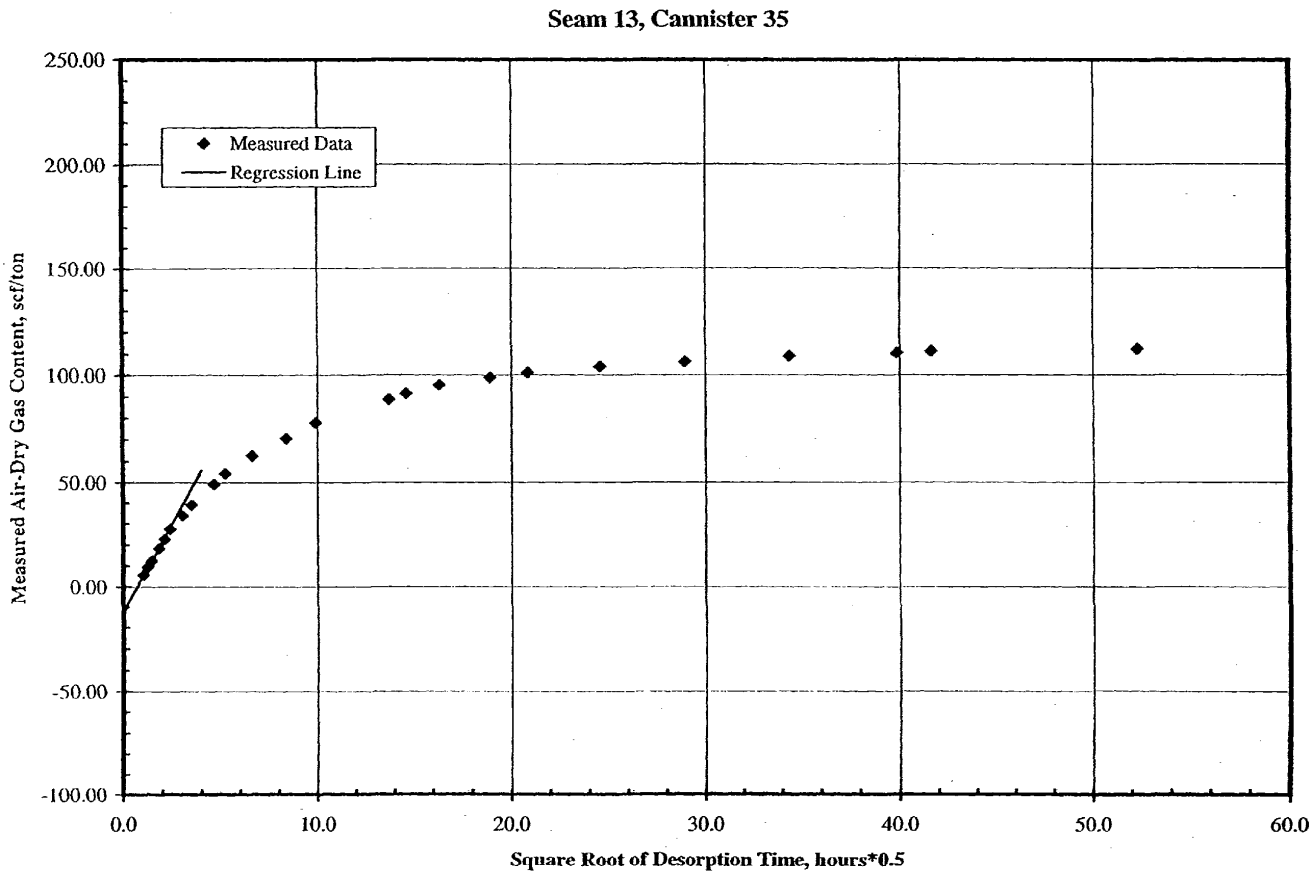
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Regression Line
Measured Air-Dry Gas Content, scf/ton
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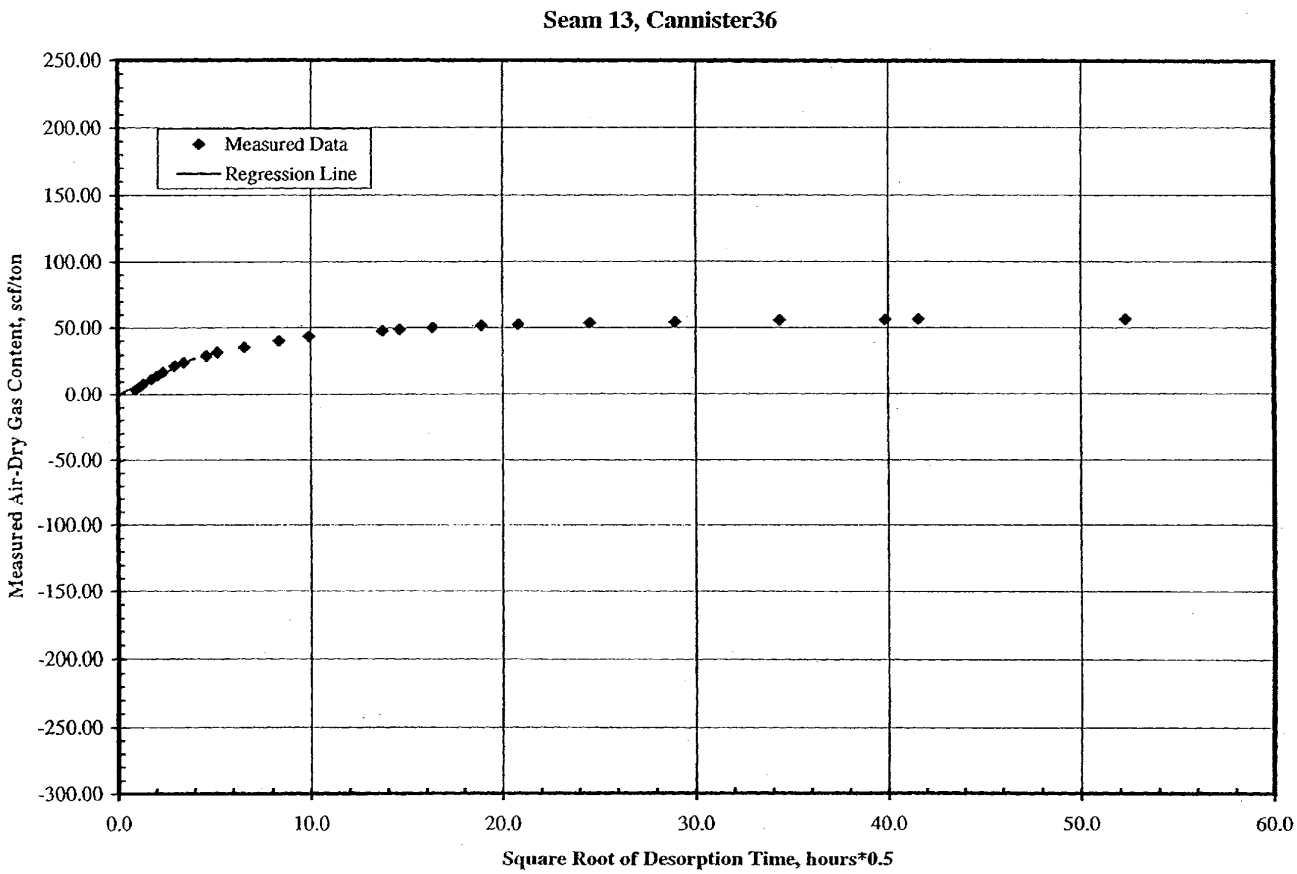
200.00
150.00
100.00
50.00
0.00
-50.00
-100.00
0.0
10.0
20.0
30.0
40.0
50.0
60.0
Square Root of Desorption Time, hours*0.5

D. T. SEAMOUNT
NOV 15 1997



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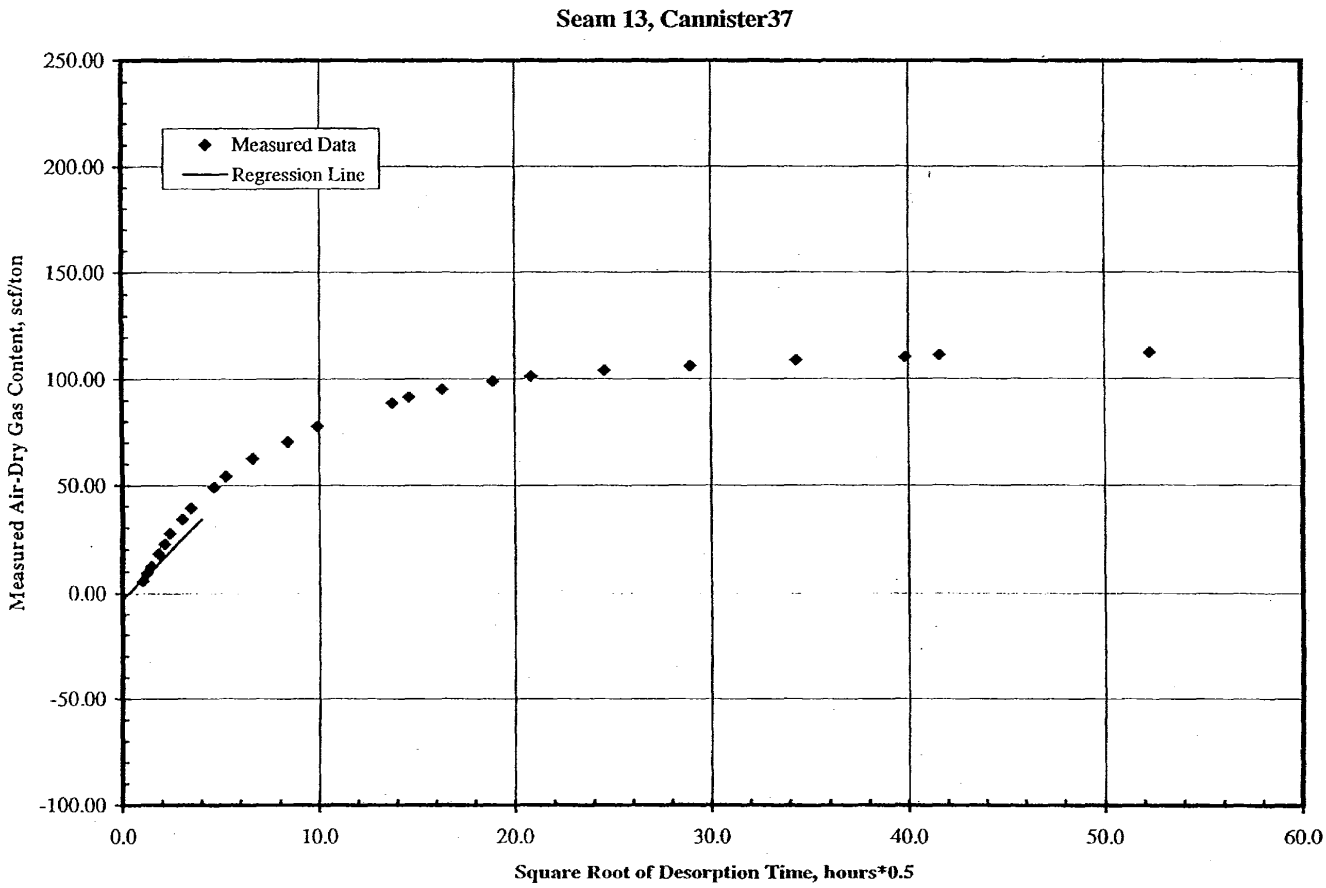

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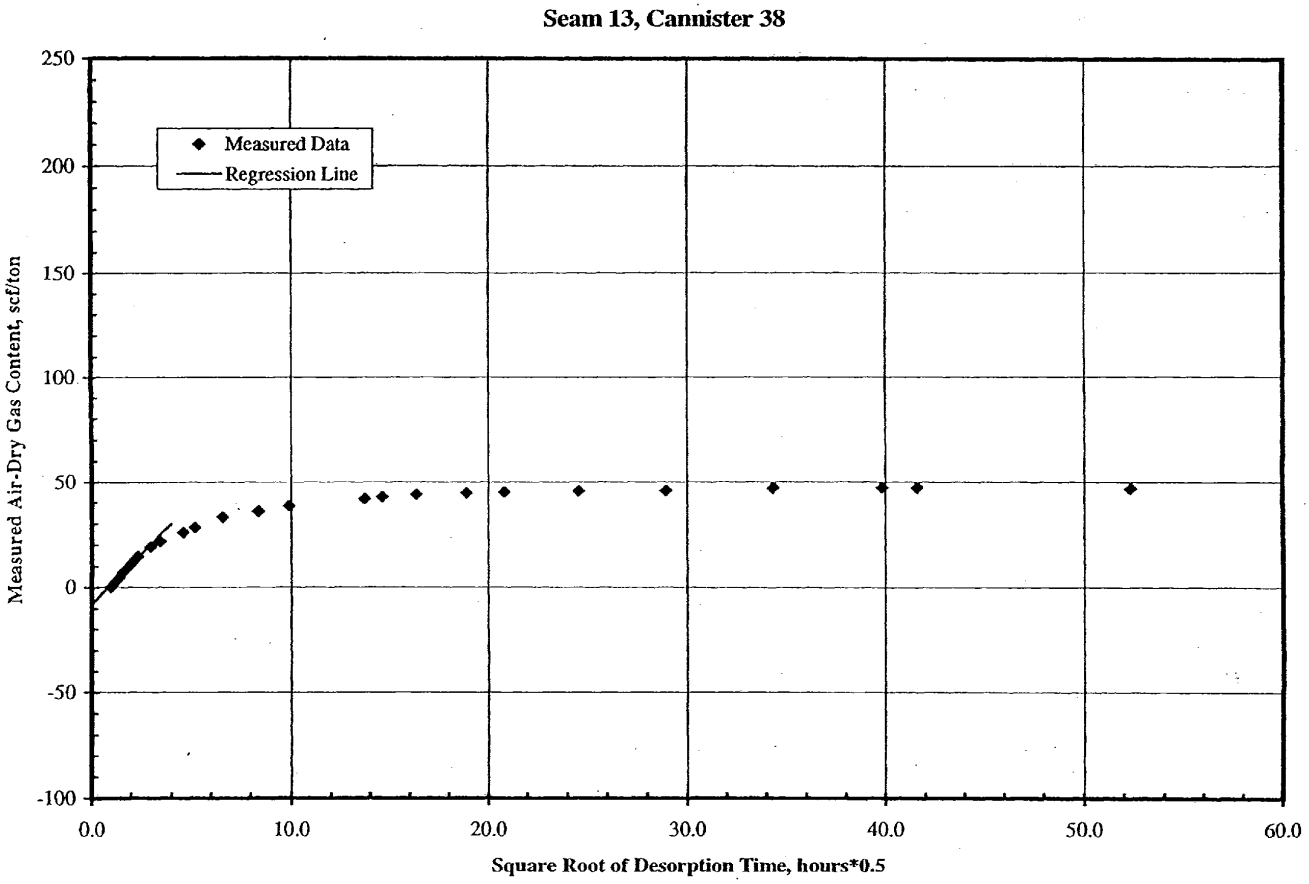

(1) Page 1 WELL: AK94-CBM-1 LOCATION: DATE:

SHEET NO. 1 OF 1

PLANAR, NONPARALLEL
CURVED, PARALLEL
CURVED, NONPARALLEL

WAVY, PARALLEL
WAVY, NONPARALLEL

BED TYPE INTERPRETATION
FESTOON OR TROUGH CROSS BEDS
PLANAR CROSS BEDS
CURRENT RIPPLES
CLIMBING RIPPLES
IN-PHASE CURRENT RIPPLES
HUMMOCKY CROSS BEDS
WAVE OSCILLATION RIPPLES
PLANAR BED
FLASER BED
HOMOGENEOUS BED

SEDIMENTARY STRUCTURES
ROOTS
CHURNED
BURROWED

SWIRLED, FLOW
CONTORTED
MICROFAULT
FLAME CAST
LOAD CAST
GROOVE CAST
FLUTE CAST
STYLOLITE
MUDCRACK
SCOUR
SYMMETRICAL RIPPLE MARK
ASYMMETRICAL RIPPLE MARK
FOSSIL
FORAM
GLAUCONITE

CONCRETION
ORGANIC MATERIAL
SHALE CLAST
PYRITE

DEPTH		LITH CG	SS	SHLY SS	SDY SH	MDST	SH	GRAIN SIZE VC	VC	C	M	F	VF	SLT	CLAY	BED SURFACE	LAM. GEOM.	SED. STRUC.	NOTES	BED INTERP.	ENVIRONMENT
																			Glacial – Qal		

100

200

Page 2

WELL: AK94 CBM-1 LOCATION: DATE:

SHEET NO. 2 OF 1

DEPTH	LITH (CG, SS, SHLY SS, SDY SH, MDST, Coal)	GRAIN SIZE (VC, C, M, F, VF, SLT, CLAY)	BED SURFACE	LAM. GEOM.	SED. STRUC.	NOTES	BED INTERP.	ENVIRONMENT
						Top Tyonek		
						Fine-Med Gr SS, planar X Bedded Silty, v. carbonaceous, mod Sat. 70% SS. Minor clay ripups - Scoured contact		
						Silty mudstone - coarsening up minor carb. debris, starved climbing ripples. VFG SS int. at top, thin (1') Bony coal near base		
						SS - lamin to X Lamin - F-M Gr. silty muds		
						SS to Groove		

PLANAR, NONPARALLEL
CURVED, PARALLEL
CURVED, NONPARALLEL 200
WAVY, PARALLEL
WAVY, NONPARALLEL

BED TYPE INTERPRETATION
FESTOON OR TROUGH CROSS BEDS
PLANAR CROSS BEDS
CURRENT RIPPLES
CLIMBING RIPPLES
IN-PHASE CURRENT RIPPLES
HUMMOCKY CROSS BEDS
WAVE OSCILLATION RIPPLES
PLANAR BED
FLASER BED
HOMOGENEOUS BED

SEDIMENTARY STRUCTURES
ROOTS
CHURNED
BURROWED
SWIRLED, FLOW
CONTORTED 300
MICROFAULT
FLAME CAST
LOAD CAST
GROOVE CAST
FLUTE CAST
STYLOLITE
MUDCRACK
SCOUR
SYMMETRICAL RIPPLE MARK
Casing
ASYMMETRICAL RIPPLE MARK
FOSSIL
FORAM 41
GLAUCONITE
CONCRETION
ORGANIC MATERIAL
SHALE CLAST
PYRITE 400

Page 3

WELL: AK 94 CBM-1 LOCATION: DATE:

PLANAR, NONPARALLEL
CURVED, PARALLEL
CURVED, NONPARALLEL
WAVY, PARALLEL
WAVY, NONPARALLEL

BED TYPE INTERPRETATION
FESTOON OR TROUGH CROSS BEDS
PLANAR CROSS BEDS
CURRENT RIPPLES
CLIMBING RIPPLES
IN-PHASE CURRENT RIPPLES
HUMMOCKY CROSS BEDS
WAVE OSCILLATION RIPPLES
PLANAR BED
FLASER BED
HOMOGENEOUS BED

SEDIMENTARY STRUCTURES
ROOTS
CHURNED
BURROWED
SWIRLED, FLOW
CONTORTED
MICROFAULT
FLAME CAST
LOAD CAST
GROOVE CAST
FLUTE CAST
STYLOLITE
MUDCRACK
SCOUR
SYMMETRICAL RIPPLE MARK
ASYMMETRICAL RIPPLE MARK
FOSSIL
FORAM
GLAUCONITE
CONCRETION
ORGANIC MATERIAL
SHALE CLAST

DEPTH		LITH (CG, SS, SHY SS, SOV SH, SDST, SH, Coal) / GRAIN SIZE (VC, VF, U, E, L, VF, SLT, CLAY)	BED SURFACE	LAM. GEOM.	SED. STRUC.	NOTES	BED INTERP.	ENVIRON-MENT
400						Tuffaceous mudst, coaly at base, many sequoia & leaf material		
						SS - f-med carb, finely laminated to x-bedded to massive - fines upward		
						mudstone, silty, lin, lam, - g's dimbum nodules		
						tuffaceous SS, vag		
						mudstone, silty, occasional grading, dark, lin, lam		
						carb, g SS, tuffaceous		
						med-fgr SS, vl clean, x-bedded, low x planar, 80% qtz, places of convolute lamin		
500						mudstone grading up to sandy silts - finely lam, tuffaceous		
						coal - com lt 2		
						silty v.f.g. SS, abundant carbonaceous debris		
						soft sed. deformation		
						SS - coarse grained, conglomeratic - becoming finer top, dewatering structures, places x-bedded, pebble lags, clasts to 2mm, SS very gassy, carbonaceous		
						mudstone - finely lamin		
						coal - com. 3 + 4		
						muddy silts - finely lam, v. carbonaceous		
						SS - med gr., abund carb.		
600								

WELL: AK 94 CBM-1 LOCATION: DATE:

PLANAR, NONPARALLEL
CURVED, PARALLEL
CURVED, NONPARALLEL
WAVY, PARALLEL
WAVY, NONPARALLEL

BED TYPE INTERPRETATION
FESTOON OR TROUGH CROSS BEDS
PLANAR CROSS BEDS
CURRENT RIPPLES
CLIMBING RIPPLES
UNPHASE CURRENT RIPPLES
HUMMOCKY CROSS BEDS
WAVE OSCILLATION RIPPLES
PLANAR BED
FLASER BED
HOMOGENEOUS BED

SEDIMENTARY STRUCTURES
ROOTS
CURVED
BURROWED
SWIRLED, FLOW
CONTORTED
MICROFAULT
FLAME CAST
LOAD CAST
GROOVE CAST
FLUTE CAST
STYLOLITE
MUDCRACK
SCOUR
SYMMETRICAL RIPPLE MARK
ASYMMETRICAL RIPPLE MARK
FOSSIL
FORAM
GLAUCONITE
CONCRETION
ORGANIC MATERIAL
SHALE CLAST
PYRITE

DEPTH	LITH.	SIZE (CS, MS, FS, SILTY VF, SILTY SS, MUDST, VC, VF, U, E, L, VL, SILT, CLAY)	BED SURFACE	LAM. GEOM.	SED. STRUC.	NOTES	BED INTERP.	ENVIRONMENT
600						carbonaceous mudstone		
						SS - conglomeratic fining upward, cross bedded - to massive - clasts to 1½"		
						mudstone - dense, dk gray, laminated - coaly		
						silts - tuffaceous - vf - ss		
						SS - vf to f gr., tuffaceous coaly laminae		
						claystone - w/ sg to silty laminae, carbonaceous		
						coal - can SS 6		
						SS - fine - med. gr., interb tuffaceous mod. SS x-bedded - to lamin to ripple lamin.		
700						mudstone - as above		
						coal		
						SS + silts - interbedded tuffaceous + w/ carbonaceous debris, rootlets possible burrows some contorted bedding		
						SS - finely bedded to x-bedded		
						SS + silts as above		
						SS - lam. to x-laminated to massive tuffaceous carbonaceous some clay pupus		
						coal + interb. claystone can #7+8		
						SS + silts interbedded as above		
800						silty clay stone - v. carbonaceous		

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WELL: AK 94 CBM-1 LOCATION: DATE:

SHEET NO. 5 OF 6

PLANAR, NONPARALLEL
CURVED, PARALLEL
CURVED, NONPARALLEL
WAVY, PARALLEL
WAVY, NONPARALLEL

BED TYPE INTERPRETATION
FESTOON OR TROUGH CROSS BEDS
PLANAR CROSS BEDS
CURRENT RIPPLES
CLIMBING RIPPLES
IN-PHASE CURRENT RIPPLES
HUMMOCKY CROSS BEDS
WAVE OSCILLATION RIPPLES
PLANAR BED
FLASER BED
HOMOGENEOUS BED

SEDIMENTARY STRUCTURES
ROOTS
CHURNED
BURROWED
SWIRLED, FLOW
CONTORTED
MICROFAULT
FLAME CAST
LOAD CAST
GROOVE CAST
FLUTE CAST
STYLOLITE
MUDCRACK
SCOUR
SYMMETRICAL RIPPLE MARK
ASYMMETRICAL RIPPLE MARK
FOSSIL
FORAM
GLAUCONITE
CONCRETION
ORGANIC MATERIAL
SHALE CLAST
PYRITE

DEPTH	LITH (CG, SS, SILTY SS, SILTY SH, MUDST, Coal)	GRAIN SIZE (VC, C, M, F, VF, SILT, CLAY)	BED SURFACE	LAM. GEOM.	SED. STRUC.	NOTES	BED INTERP.	ENVIRON-MENT
						Siltstone + mudstone interbedded w/ fg SS		
						Bony coal - cam 9		
						SS - carbonaceous		
						silts + muds interbedded w/ occ. SS. mostly fractured - some bituminous		
						Rootlets		
						Thin coal		
						coal - cam 11, 12, 13, 14		
						well cleated - carbonate along fractures		
						sands/silts - fining up		
						Conglomeratic SS - fining up - long lenses w/ clasts to 10 mm - X-bedded - very carb. with scattered coaly material - tuffaceous layers - conglag at base of unit - scoured		
						Interb. silts + muds fining down - finely lam		
						coal - cam 15, 16, 17, 18		
						Interb. silts + muds carbonaceous interb w/ med. gr. SS, X-bedded		
						coal - cam 19		

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WELL: AK94CBM-1 LOCATION: DATE:

SHEET NO. 6 OF 1

PLANAR, NONPARALLEL
CURVED, PARALLEL
CURVED, NONPARALLEL 1000
WAVY, PARALLEL
WAVY, NONPARALLEL
BED TYPE INTERPRETATION
FESTOON OR TROUGH CROSS BEDS
PLANAR CROSS BEDS
CURRENT RIPPLES
CLIMBING RIPPLES
IN-PHASE CURRENT RIPPLES
HUMMOCKY CROSS BEDS
WAVE OSCILLATION RIPPLES
PLANAR BED
FLASER BED
HOMOGENEOUS BED
4
SEDIMENTARY STRUCTURES
ROOTS
CHURNED
BURROWED 4
SWIRLED, FLOW
1100
CONTORTED
MICROFAULT
FLAME CAST
LOAD CAST
GROOVE CAST
FLUTE CAST
STYLOLITE
MUDCRACK 6.5
SCOUR
SYMMETRICAL RIPPLE MARK
ASYMMETRICAL RIPPLE MARK
FOSSIL
FORAM
GLAUCONITE
CONCRETION
ORGANIC MATERIAL
SHALE CLAST
PYRITE
1200

DEPTH	LITH	IN SIZE	BED SURFACE	LAM. GEOM.	SED. STRUC.	NOTES	BED INTERP.	ENVIRONMENT
						SS - Finely bedded, clayey v. tuffaceous		
						SS - F-mgr x bedded tightly cemented wood material		
						mudstone - dk gray like deposit - clam shell found on Bedding surface		
						Bony coal - can 20, 21, 22		
						can. 23, 24, 25, 26		
						Pebbly SS - x bedded clasts to 1.5 cm coaly debris Tuffaceous layers		
						Dirty coal - can. 27, 28, 29, 30, 31, 32, 33		
						Finely Int. Tuffaceous silty mudstone + coal		
						SS + Cong - interbedded clean, alt cemented sections + good Ø clasts to 3" Steeply x bedded planar		

Page 7 WELL: AK94 CBM-1 LOCATION: DATE:

PLANAR, NONPARALLEL
CURVED, PARALLEL
CURVED, NONPARALLEL 1200
WAVY, PARALLEL
WAVY, NONPARALLEL

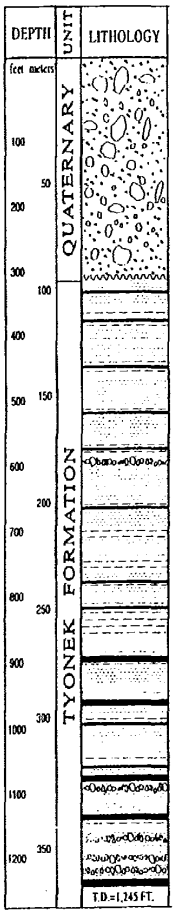
BED TYPE INTERPRETATION
FESTOON OR TROUGH CROSS BEDS
PLANAR CROSS BEDS
CURRENT RIPPLES
CLIMBING RIPPLES 5
IN-PHASE CURRENT RIPPLES
HUMMOCKY CROSS BEDS
WAVE OSCILLATION RIPPLES
PLANAR BED
FLASER BED
HOMOGENEOUS BED

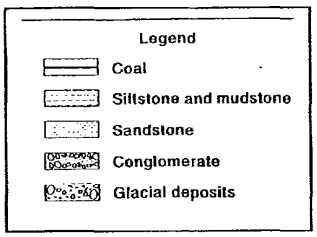
SEDIMENTARY STRUCTURES
ROOTS
CHURNED
BURROWED

SWIRLED FLOW
CONTORTED
MICROFAULT
FLAME CAST
LOAD CAST
GROOVE CAST
FLUTE CAST
STYLOLITE
MUDCRACK
SCOUR
SYMMETRICAL RIPPLE MARK
ASYMMETRICAL RIPPLE MARK
FOSSIL
FORAM
G GLAUCONITE

CONCRETION
ORGANIC MATERIAL
SHALE CLAST
PYRITE

DEPTH		LITH (CG, SS, SHY SS, SDY SH, MUST, Coal)	N SIZE (VC, VC, C, M, F, VF, SLT, CLAY)	BED SURFACE	LAM. GEOM.	SED. STRUC.	NOTES	BED INTERP.	ENVIRON-MENT
							Silty SS w/ Ab coal mat		
							Coal in tarb. w/ clay		
							Cam. 34, 35, 36, 37, 38		
							mudstone - silty in-tarb		
TD 1245									





Seam No. -	Gas (DAF) cc/gram	scf/ton	Moisture %	Ash %	Volatile Matter %	Fixed Carbon %	Ro %	&13C	Cannister #'s
1	1.96	63	9.02	8.47	33.80	48.71	0.48		1, 2
2	4.14	132	7.13	19.60	32.78	40.49			3, 4
3	4.99	160	7.43	11.80	34.34	46/43		-48.9	5, 6
4	5.31	170	7.96	8.26	34.55	49.23	0.47		7, 8
5	5.16	165	5.06	49.80	21.93	23.21		-49.3	9
6	5.54	177	6.02	14.30	33.84	45.84	0.56	-48.3	11, 12, 13, 14
7	4.42	141	6.15	26.84	29.47	37.54		-47.0	15, 16, 17, 18
8	5.94	190	7.17	5.57	37.50	49.76	0.52		19
9/10	5.10	163	6.25	14.62	35.18	43.95			20, 21, 22
11	5.73	183	5.53	40.18	23.42	30.87			23, 24, 25, 26
12	5.72	183	5.23	44.74	22.85	27.18	0.58	-43.3	27, 28, 29, 30, 31, 32, 33
13	7.66	245	4.82	42.00	30.15	23.03	0.58	-44.0	34, 35, 37, 36, 38

Figure 9. Coal analyses for AK-94CBM- 1. (Modified from Smith, 1995)