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APPENDIX D

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Dept. of Environmental Protection
MAY 02 2008
Southwest District

May 2, 2008
File No. 09206059.02

Ms. Mara G. Nasca
Florida Department of Environmental Protection
Division of Air Resource Management-Southwest District
13051 North Telecom Parkway
Temple Terrace, Florida 33637-0926

Subject: Request for Higher Operating Temperature for Landfill Gas Extraction Wells
North Central Landfill, Polk County
Facility ID No. 1050298

Dear Mara:

On behalf of the Polk County Solid Waste Division, SCS Engineers (SCS) is submitting this letter requesting to establish alternative operating temperatures for several landfill gas (LFG) extraction wells at the North Central Landfill. As you know, the federal New Source Performance Standards (NSPS) for municipal solid waste landfills require that the landfill gas collection and control system (GCCS) comply with several operating criteria, one of which is that each wellhead must be operated with a LFG temperature less than 55 degrees Celsius (°C), or 131 degrees Fahrenheit (°F). However, the NSPS (40 CFR 60.753(c)) allows the landfill owner to establish a higher operating temperature if supporting data show that the elevated temperature does not cause a fire or significantly inhibit anaerobic decomposition by killing methane-producing microbes (methanogens).

Polk County wishes to request a temperature variance for the following extraction wells: W-19, W-20, W-21, W-22, W-24, W-25, W-27, W-28, W-125, W-131, and W-202 through W-231.

REFUSE TEMPERATURES DURING WELL DRILLING

During the installation of the LFG extraction wells at North Central Landfill, the temperature of the excavated refuse was recorded at various depths (typically at 10-foot intervals); the range of values measured at the wells for which higher operating temperatures are being requested are shown in Appendix 1. As shown in this table, the temperature of the excavated refuse exceeded 120 °F in many of these wells. The highest temperatures were recorded in the Class I, Phase I landfill.

As shown in Appendix 1, in some of these wells the temperature of the refuse was near or exceeded 131 °F even prior to LFG extraction being initiated. Gas temperatures recently recorded at these wells are summarized in Appendix 2.

VERIFICATION OF ANAEROBIC CONDITIONS

In addition to reviewing refuse temperatures, SCS also reviewed recent wellhead monitoring data for the wells in the Class I, Phase I and II and Class III landfills. Appendix 2 presents the methane and oxygen concentration and gas temperatures recorded over the past three months at these wells.

The high methane concentration (i.e., approximately 50 percent and higher) and low oxygen content at these wells demonstrates that the landfill is operating under anaerobic conditions and that the elevated temperatures are not adversely affecting methane-producing bacteria.

RESULTS OF CARBON MONOXIDE SAMPLING

In order to confirm that the elevated temperatures in the wells are not caused by a landfill fire, SCS Field Services obtained field measurements of carbon monoxide in the 40 wells for which higher operating temperatures are being requested in the Class I, Phase I and II and Class III landfills. The results are summarized in Appendix 3.

Concentrations of carbon monoxide below 500 ppm in a landfill environment can be attributed to many sources, such as a residual from foundry sand, ash or similar wastes. As shown in Appendix 3, W-125 contained LFG with carbon monoxide concentrations that exceeded 1,000 ppm; carbon monoxide was less than 500 ppm in all of the other wells. Because the methane concentration in W-125 was approximately 50 percent by volume during each monitoring event and there are no visible signs of a subsurface fire (e.g., localized settlement, fissures in the ground surface, or smoke emanating from the ground surface or wells in the vicinity), it is likely that the elevated carbon monoxide levels are residual from a past landfill fire in the Class III landfill that was successfully extinguished. In addition, Wheelabrator Ridge Energy, the operator of the GCCS, is operating this well with minimal vacuum (i.e., approximately 0.1 inches of water column) which will minimize the potential for pulling oxygen into the landfill.

CONCLUSIONS

Based on our experience at landfills in the southeast United States, elevated LFG temperatures are not uncommon and typically occur at landfills that receive a significant amount of annual rainfall or where leachate recirculation is practiced. These conditions are present at North Central Landfill and likely result in enhanced waste decomposition and higher LFG temperatures.

Therefore, the County requests a variance of the temperature threshold specified in 40 CFR Part 60.753(c) for the wells listed in Table 1.

Table 1. Requested Temperature Variance Summary, North Central Landfill

Well ID	Requested Temperature Variance (°F)
W-19	165
W-20	165
W-21	165
W-22	165
W-24	165
W-25	165
W-27	165
W-28	165
W-125	140
W-131	145
W-202	145
W-203	150
W-204	145
W-205	145
W-206	150
W-207	145
W-208	145
W-209	145
W-210	145
W-211	145

Well ID	Requested Temperature Variance (°F)
W-212	145
W-213	145
W-214	145
W-215	145
W-216	145
W-217	145
W-218	150
W-219	150
W-220	145
W-221	145
W-222	145
W-223	145
W-224	145
W-225	145
W-226	145
W-227	150
W-228	145
W-229	145
W-230	145
W-231	145

As a precaution, the County will continue to review wellhead temperature monitoring data and closely monitor any field conditions that would indicate the presence of a subsurface fire. In addition, the County will also periodically review the wellhead monitoring data for trends that indicate the destruction of methane-producing bacteria within the landfill, which would warrant a decrease in LFG extraction rates or other remedial actions in order to minimize the conditions that can lead to a subsurface fire.

Polk County and SCS appreciate your consideration of this request. Please call Allan Choate of Polk County at (863) 284-4319 if you have any questions or need additional information.

Sincerely,

Lindsey E. Kennelly, P.E.
Senior Project Engineer

No. 56045

David H. Penoyer, P.E.
Project Manager
SCS ENGINEERS

cc: Allan Choate, P.E., Polk County
Phil Tuohy, Wheelabrator Ridge Energy, Inc.
Tom Brislin, Wheelabrator
Bill Meyer, Waste Management
USEPA Region 4

APPENDIX 1
TEMPERATURE OF EXCAVATED REFUSE RECORDED DURING DRILLING
NORTH CENTRAL LANDFILL, POLK COUNTY, FLORIDA

Well ID	Temperature (°F)
W-19	94-160
W-20	80-160
W-21	84-160
W-22	80-160
W-24	84-143
W-25	100-160
W-27	70-160
W-28	87-160
W-125	103-112
W-131	99-111
W-202	90-121
W-203	85-114
W-204	84-114
W-205	87-119
W-206	86-120
W-207	86-114
W-208	85-129
W-209	97-111
W-210	86-114
W-211	92-109

Well ID	Temperature (°F)
W-212	88-123
W-213	99-121
W-214	93-125
W-215	99-119
W-216	85-112
W-217	99-122
W-218	91-118
W-219	84-118
W-220	91-113
W-221	90-121
W-222	92-108
W-223	95-104
W-224	90-114
W-225	83-131
W-226	83-119
W-227	109-119
W-228	92-116
W-229	84-122
W-230	83-115
W-231	104-115

Notes:
1. Temperatures taken from Waste Energy Technologies (WET) and SCS-Field Services (SCS_FS) drilling logs.

APPENDIX 2
LANDFILL GAS EXTRACTION WELL MONITORING DATA
NORTH CENTRAL LANDFILL, POLK COUNTY, FLORIDA

Location	Date	Methane (%)	Oxygen (%)	Temperature (°F)
W-19	1/29/08	55.0	0.0	130
W-19	02/28/08	57.4	0.0	134
W-19	03/21/08	55.5	0.0	134
	AVERAGE:	**56.0**	**0.0**	**132.7**
W-20	1/29/08	58.9	0.0	111
W-20	02/28/08	59.8	0.0	120
W-20	03/21/08	58.6	0.1	126
	AVERAGE:	**59.1**	**0.0**	**119.0**
W-21	1/29/08	56.3	0.0	94
W-21	02/28/08	57.3	0.0	122
W-21	03/21/08	55.5	0.0	126
	AVERAGE:	**56.4**	**0.0**	**114.0**
W-22	1/29/08	58.0	0.0	140
W-22	02/28/08	58.2	0.0	140
W-22	03/21/08	56.9	0.1	140
W-22	04/04/08	55.8	0.0	140
	AVERAGE:	**57.2**	**0.0**	**140.0**
W-24	1/29/08	60.8	0.0	119
W-24	02/29/08	51.1	0.0	110
W-24	03/21/08	49.4	0.0	136
W-24	04/04/08	57.8	0.0	138
	AVERAGE:	**54.8**	**0.0**	**125.8**
W-25	1/29/08	60.6	0.0	130
W-25	02/29/08	59.2	0.0	122
W-25	03/21/08	46.3	3.8	129
	AVERAGE:	**55.4**	**1.3**	**127.0**
W-27	1/29/08	61.2	0.1	142
W-27	02/29/08	60.8	0.0	108
W-27	03/04/08	61.8	0.0	143
W-27	03/21/08	59.5	0.0	148
W-27	04/04/08	58.8	0.0	142
	AVERAGE:	**60.4**	**0.0**	**136.6**
W-28	1/29/08	62.5	0.0	165
W-28	02/29/08	44.5	3.6	138

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NORTH CENTRAL LANDFILL, POLK COUNTY, FLORIDA

Location	Date	Methane (%)	Oxygen (%)	Temperature (°F)
W-28	03/04/08	59.7	1.2	160
W-28	03/21/08	58.8	0.0	168
W-28	04/04/08	59.3	0.0	144
	AVERAGE:	**57.0**	**1.0**	**155.0**
W-125	03/21/08	52.0	0.0	84
W-125	04/04/08	47.7	0.0	133
W-125	04/18/08	50.3	0.1	124
	AVERAGE:	**50.0**	**0.0**	**113.7**
W-131	03/21/08	53.5	0.0	88
W-131	04/04/08	28.3	0.1	126
	AVERAGE:	**40.9**	**0.1**	**107.0**
W-202	4/24/08	59.2	0.2	90
W-202	4/24/08	59.2	0.0	122
W-202	4/25/08	56.4	0.0	124
	AVERAGE:	**58.3**	**0.1**	**112**
W-203	4/24/08	56.7	0.0	88
W-203	4/24/08	56.9	0.0	142
W-203	4/25/08	54.4	0.0	138
	AVERAGE:	**56.0**	**0.0**	**123**
W-204	4/24/08	56.1	0.2	86
W-204	4/24/08	56.7	0.0	118
W-204	4/25/08	53.6	0.0	128
	AVERAGE:	**55.5**	**0.1**	**111**
W-205	4/24/08	55.2	0.0	115
W-205	4/25/08	52.4	0.0	126
	AVERAGE:	**53.8**	**0.0**	**121**
W-206	4/24/08	56.1	0.0	134
W-206	4/25/08	54.0	0.0	142
	AVERAGE:	**55.1**	**0.0**	**138**
W-207	4/24/08	56.0	0.0	125
W-207	4/25/08	55.6	0.0	132
	AVERAGE:	**55.8**	**0.0**	**129**
W-208	4/24/08	56.2	0.0	122
W-208	4/25/08	54.0	0.0	125

APPENDIX 2
LANDFILL GAS EXTRACTION WELL MONITORING DATA
NORTH CENTRAL LANDFILL, POLK COUNTY, FLORIDA

Location	Date	Methane (%)	Oxygen (%)	Temperature (°F)
	AVERAGE:	**55.1**	**0.0**	**124**
W-209	4/24/08	55.4	0.0	118
W-209	4/25/08	47.8	0.0	125
	AVERAGE:	**51.6**	**0.0**	**122**
W-210	4/24/08	54.2	0.0	126
W-210	4/24/08	53.6	0.0	120
W-210	4/25/08	55.4	0.0	126
	AVERAGE:	**54.4**	**0.0**	**124**
W-211	4/24/08	54.1	0.0	130
W-211	4/24/08	54.1	0.0	129
W-211	4/25/08	55.9	0.0	133
	AVERAGE:	**54.7**	**0.0**	**131**
W-212	4/24/08	54.1	0.0	115
W-212	4/25/08	52.7	0.0	133
	AVERAGE:	**53.4**	**0.0**	**124**
W-213	4/24/08	50.3	0.0	129
W-213	4/25/08	52.7	0.0	140
	AVERAGE:	**51.5**	**0.0**	**135**
W-214	4/24/08	54.1	0.0	128
W-214	4/25/08	54.6	0.0	135
	AVERAGE:	**54.4**	**0.0**	**132**
W-215	4/24/08	48.5	0.0	118
W-215	4/25/08	52.8	0.0	140
	AVERAGE:	**50.7**	**0.0**	**129**
W-216	4/25/08	54.0	0.0	138
	AVERAGE:	**54.0**	**0.0**	**138**
W-217	4/24/08	52.4	0.0	115
W-217	4/25/08	51.9	0.0	140
	AVERAGE:	**52.2**	**0.0**	**128**
W-218	4/25/08	54.2	0.0	140
	AVERAGE:	**54.2**	**0.0**	**140**
W-219	4/24/08	53.7	0.0	135
W-219	4/25/08	52.9	0.0	142
	AVERAGE:	**53.3**	**0.0**	**139**

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LANDFILL GAS EXTRACTION WELL MONITORING DATA
NORTH CENTRAL LANDFILL, POLK COUNTY, FLORIDA

Location	Date	Methane (%)	Oxygen (%)	Temperature (°F)
W-220	4/24/08	55.2	0.0	125
W-220	4/25/08	56.4	0.0	129
	AVERAGE:	**55.8**	**0.0**	**127**
W-221	4/24/08	57.9	0.0	105
W-221	4/24/08	59.9	0.1	138
W-221	4/25/08	57.4	0.0	132
	AVERAGE:	**58.4**	**0.0**	**125**
W-222	4/24/08	56.9	0.0	92
W-222	4/24/08	58.9	0.0	130
W-222	4/25/08	55.8	0.0	123
	AVERAGE:	**57.2**	**0.0**	**115**
W-223	4/24/08	56.5	0.0	88
W-223	4/24/08	58.1	0.1	114
W-223	4/25/08	52.7	0.0	136
	AVERAGE:	**55.8**	**0.0**	**113**
W-224	4/24/08	13.9	15.3	82
W-224	4/24/08	57.9	0.3	128
W-224	4/25/08	55.2	0.0	128
	AVERAGE:	**42.3**	**5.2**	**113**
W-225	4/24/08	54.3	0.2	84
W-225	4/24/08	59.9	0.1	126
W-225	4/24/08	56.7	0.0	125
W-225	4/25/08	55.8	0.0	125
	AVERAGE:	**56.7**	**0.1**	**115**
W-226	4/24/08	53.3	0.0	92
W-226	4/24/08	55.6	0.0	136
W-226	4/25/08	55.3	0.0	125
	AVERAGE:	**54.7**	**0.0**	**118**
W-227	4/24/08	60.4	0.1	108
W-227	4/24/08	63.3	0.0	142
W-227	4/25/08	60.4	0.0	142
	AVERAGE:	**61.4**	**0.0**	**131**
W-228	4/24/08	55.5	0.0	84
W-228	4/24/08	58.6	0.0	128

APPENDIX 2
LANDFILL GAS EXTRACTION WELL MONITORING DATA
NORTH CENTRAL LANDFILL, POLK COUNTY, FLORIDA

Location	Date	Methane (%)	Oxygen (%)	Temperature (°F)
W-228	4/25/08	59.5	0.0	122
	AVERAGE:	**57.9**	**0.0**	**111**
W-229	4/24/08	55.6	0.0	96
W-229	4/24/08	58.0	0.0	134
W-229	4/25/08	56.8	0.0	126
W-229	4/25/08	55.9	0.0	127
	AVERAGE:	**56.6**	**0.0**	**121**
W-230	4/24/08	56.1	0.0	94
W-230	4/24/08	58.4	0.0	132
W-230	4/25/08	55.7	0.0	129
	AVERAGE:	**56.7**	**0.0**	**118**
W-231	4/24/08	57.8	0.0	105
W-231	4/24/08	59.5	0.0	138
W-231	4/25/08	56.8	0.0	135
	AVERAGE:	**58.0**	**0.0**	**126**

APPENDIX 3
CARBON MONOXIDE CONCENTRATIONS
NORTH CENTRAL LANDFILL, POLK COUNTY, FLORIDA

Well ID	Carbon Monoxide (parts per million)
W-19	20
W-20	20
W-21	20
W-22	20
W-24	10
W-25	20
W-27	70
W-28	50
W-125	>1,000
W-131	300
W-202	100
W-203	0
W-204	140
W-205	20
W-206	130
W-207	20
W-208	40
W-209	40
W-210	230
W-211	40

Well ID	Carbon Monoxide (parts per million)
W-212	20
W-213	80
W-214	80
W-215	80
W-216	100
W-217	100
W-218	50
W-219	30
W-220	80
W-221	80
W-222	10
W-223	20
W-224	20
W-225	20
W-226	40
W-227	100
W-228	80
W-229	40
W-230	50
W-231	120

Notes:
1. CO readings obtained from field-work conducted by SCS-FS in April and May 2008.