

APPENDIX A
(CONFIDENTIAL, SUBMITTED SEPARATELY)

APPENDIX B
MATERIAL HANDLING EMISSIONS ESTIMATES

Table B-1
Material Handling Emission Estimates
Truck Traffic on Paved Roads
Project: St. Lucie Plasma Gasification

Parameters		TRUCK TRAFFIC Delivery of Lime	TRUCK TRAFFIC Delivery of Gypsum	TRUCK TRAFFIC Delivery of Coke	TRUCK TRAFFIC Delivery of PAC	TRUCK TRAFFIC Shipping of Spent Carbon	TRUCK TRAFFIC Shipping of Vitrified Material
Emission Point/Area	Flow Diagram ID	L1	L3	C1	P1	A3	S2
Operational Data							
Activity, hours	Daily	24	24	24	24	24	24
days	Annual	365	365	365	365	365	365
Material Handling Data							
Material type		Lime	Gypsum	Coke	PAC	Spent Carbon	Vitrified Material
Material throughput, ton/hr ^a		2.12	0.46	1.00	0.019	0.02	7
ton/day	Daily	50.93	11.0	24.0	0.457	0.46	159
ton/yr	Annual	18,588	4,015	8,758	167	167	57,869
Truck Capacity (tons)	Capacity	25	25	25	25	25	25.0
Vehicle weight (W) (tons)	Unloaded	12.5	12.5	12.5	12.5	12.5	12.5
	Loaded	37.5	37.5	37.5	37.5	37.5	37.5
	Average	25	25	25	25	25	25
Number of truck trips	Daily Avg/ Annual Avg	1.0	1.0	1.0	0.02	1	6
Number of miles/per truck round trip	Daily Avg/ Annual Avg	0.2	0.2	0.2	0.2	0.2	0.2
Total road transport (miles/day)	Daily Avg	0.2	0.2	0.2	0.2	0.2	1.3
Total road transport (miles-yr)	Annual Avg	149	32	70	1	1	463
General/ Site Characteristics							
Particle size multiplier, PM (k)		0.082	0.082	0.082	0.082	0.082	0.082
Particle size multiplier, PM10 (k)		0.016	0.016	0.016	0.016	0.016	0.016
Particle size multiplier, PM2.5 (k)		0.0024	0.0024	0.0024	0.0024	0.0024	0.0024
Days of precipitation greater than or equal to 0.01 inch (P)	Short term	16.2	16.2	16.2	16.2	16.2	16.2
	Annual	8.1	8.1	8.1	8.1	8.1	8.1
Silt loading (sL) (g/m ²) ^b		1	1	1	1	1	1
Emission Factor Fleet Exhaust (C), lb/VMT	PM, PM10	0.00047	0.00047	0.00047	0.00047	0.00047	0.00047
	PM2.5	0.00036	0.00036	0.00036	0.00036	0.00036	0.00036
Emission Control Data							
Emission control method		None	None	None	None	None	None
Emission control removal efficiency, %		0	0	0	0	0	0
Emission Factor (E) Equation for Paved Roads							
Uncontrolled EF (UEF) Equation	UEF (lb/mile) = [k x (sL/2) ^{0.65} x (W/3) ^{1.5} - C] (1 - 1.2P/N), hourly basis where N = 8760						
Controlled EF (CEF) Equation	CEF(lb/mile) = CEF(lb/mile) x [100% - Removal efficiency (%)]						
Calculated PM Emission Factor (EF)							
Uncontrolled EF, lb/mile	Short term	1.254	1.254	1.254	1.254	1.254	1.254
	Annual	1.255	1.255	1.255	1.255	1.255	1.255
Controlled EF, lb/mile	Short term	1.254	1.254	1.254	1.254	1.254	1.254
	Annual	1.255	1.255	1.255	1.255	1.255	1.255
Calculated PM10 Emission Factor (EF)							
Uncontrolled EF, lb/mile	Short term	2.44E-01	2.44E-01	2.44E-01	2.44E-01	2.44E-01	2.44E-01
	Annual	2.45E-01	2.45E-01	2.45E-01	2.45E-01	2.45E-01	2.45E-01
Controlled EF, lb/mile	Short term	2.44E-01	2.44E-01	2.44E-01	2.44E-01	2.44E-01	2.44E-01
	Annual	2.45E-01	2.45E-01	2.45E-01	2.45E-01	2.45E-01	2.45E-01
Calculated PM2.5 Emission Factor (EF)							
Uncontrolled EF, lb/mile	Short term	3.64E-02	3.64E-02	3.64E-02	3.64E-02	3.64E-02	3.64E-02
	Annual	3.64E-02	3.64E-02	3.64E-02	3.64E-02	3.64E-02	3.64E-02
Controlled EF, lb/mile	Short term	3.64E-02	3.64E-02	3.64E-02	3.64E-02	3.64E-02	3.64E-02
	Annual	3.64E-02	3.64E-02	3.64E-02	3.64E-02	3.64E-02	3.64E-02
Estimated Emission Rate (CER)							
PM ER lb/hr (daily basis)	TPY	1.04E-02	1.04E-02	1.04E-02	1.04E-02	1.04E-02	6.63E-02
		9.33E-02	2.02E-02	4.40E-02	8.38E-04	8.38E-04	2.91E-01
PM10 ER lb/hr (daily basis)	TPY	2.04E-03	2.04E-03	2.04E-03	2.04E-03	2.04E-03	1.29E-02
		1.82E-02	3.93E-03	8.57E-03	1.63E-04	1.63E-04	5.66E-02
PM2.5 ER lb/hr (daily basis)	TPY	3.03E-04	3.03E-04	3.03E-04	3.03E-04	3.03E-04	1.92E-03
		2.71E-03	5.84E-04	1.27E-03	2.43E-05	2.43E-05	8.42E-03

Source: USEPA, 2006; AP-42, Section 13.2.1.3 for Paved Roads. Factor Documentation for AP-42, Section 13.2.1 Paved Roads.

^b Based on Golder 2001 Port Transportation Study

**Table B-2
Material Storage - Silos Emissions
Project: St. Lucie Plasma Gasification**

Parameter	Units	Limestone Silo	Coke Silo	PAC Silo	Spent Carbon Silo	Total Silos
Emission Point/Area	Flow Diagram ID	L2	C2	P2	A1	
Operational Data (Silo Loading)						
Activity, hours	Daily	1	1	1	24	
	Annual	531	175	7	8760	
Air Flow	scfm	2,500	2,500	2,500	2,500	
Emission Control Data						
Emission control method		Fabric Filter	Fabric Filter	Fabric Filter	Fabric Filter	
PM/PM10 Emission Factor (EF)						
Controlled Emissions ^a	grain/scf	0.01	0.01	0.01	0.01	
PM2.5 Emission Factor (EF)						
Controlled Emissions ^b	grain/scf	0.0015	0.0015	0.0015	0.0015	
Estimated Emission Rate (CER)						
PM/PM10 ER (daily basis)	lb/hr	0.009	0.009	0.009	0.21	0.24
	TPY	0.057	0.019	0.001	0.94	1.01
PM2.5 ER (daily basis)	lb/hr	0.001	0.001	0.0014	0.03	0.04
	TPY	0.009	0.003	0.0001	0.14	0.15

^a Based on typical bin vent fabric filter controlled emission factor.

^b PM_{2.5} Emission Rate was based on the ratio of the particle size multipliers from EPA's batch drop equation.

Particle size multiplier, PM2.5(k)	0.053
Particle size multiplier, PM10(k)	0.35
Ratio PM2.5(k)/PM10(k)	0.15

Table B-3
Spent Carbon and Vitrified Material Truck Loading
Project: St. Lucie Plasma Gasification

Parameters		TRUCK LOADING Spent Carbon	TRUCK LOADING Vitrified Material
Emission Point/Area	Flow Diagram ID	A2	S1
Operational Data			
Activity, hours	Daily	24	24
days	Annual	8760	8760
Material Handling Data			
Material type		Spent Carbon	Vitrified Material
Material throughput, ton/hr (design)		0.02	6.61
ton/day	Daily	0	159
ton/yr	Annual	167	57,869
Moisture content (M), % (estimated)		10	4
Number of transfers		1	1
General/ Site Characteristics			
Mean wind speed, mph	Daily	16.2	16.2
	Annual	8.1	8.1
Particle size multiplier, PM (k)		0.082	0.082
Particle size multiplier, PM10 (k)		0.016	0.016
Particle size multiplier, PM2.5 (k)		0.0024	0.0024
Emission Control Data			
Emission control method		Low Drop	Low Drop
Emission control removal efficiency, %		70	70
Emission Factor (EF) Equations for Transfer Operations			
Uncontrolled EF (UEF) Equation	UEF (lb/ton) = k x (0.0032) x (U / 5) ^{1.3} / [(M / 2) ^{1.4}]		
Controlled EF (CEF) Equation	CEF (lb/ton) = UEF (lb/ton) x [100% - Removal efficiency (%)]		
Calculated PM Emission Factor (EF)			
Uncontrolled EF, lb/ton	Short term	0.000127	0.000458
	Annual	0.000052	0.000186
Controlled EF, lb/ton	Short term	0.000038	0.000138
	Annual	0.000015	0.000056
Calculated PM10 Emission Factor (EF)			
Uncontrolled EF, lb/ton	Short term	0.000025	0.000089
	Annual	0.000010	0.000036
Controlled EF, lb/ton	Short term	0.000007	0.000027
	Annual	0.000003	0.000011
Calculated PM2.5 Emission Factor (EF)			
Uncontrolled EF, lb/ton	Short term	0.0000037	0.0000134
	Annual	0.0000015	0.0000054
Controlled EF, lb/ton	Short term	0.0000011	0.0000040
	Annual	0.0000005	0.0000016
Estimated Emission Rate (CER)			
PM ER lb/hr (daily basis)		7.3E-07	9.1E-04
TPY		1.3E-06	1.6E-03
PM10 ER lb/hr (daily basis)		1.4E-07	1.8E-04
TPY		2.5E-07	3.2E-04
PM2.5 ER lb/hr (daily basis)		2.1E-08	2.7E-05
TPY		3.8E-08	4.7E-05

Source: USEPA, 2006; AP-42, Section 13.2.4 for Aggregate Handling and Storage Piles.

APPENDIX C
AIR QUALITY MODELING SUPPORT MATERIALS

STLUCIE1.INP

CO STARTING
TITLEONE 2001 Port St. Lucie - Class II Sig. Impact Analysis 12-11-09
TITLETWO WESTPALMBEACH/MIAMI metdata 2001-2005
MODELOPT DFAULT CONC
AVERTIME 1 3 8 24 PERIOD
POLLUTID OTHER
RUNORNOT RUN
CO FINISHED

**

** AERMOD Source Pathway

**

SO STARTING
** Source Location **
** Source ID - Type - X Coord. - Y Coord. **
LOCATION STCK1 POINT 560145.490 3029055.790 5.000
** Source Parameters **
SRCPARAM STCK1 1 38.1 333.150 18.288 1.524

Table with columns for source type (e.g., BUI LDHGT, BUI LDWI D, BUI LDLEN, XBADJ, YBADJ) and STCK1, and 7 columns of numerical values representing various parameters.

SRCGROUP ALL
SO FINISHED

**

** AERMOD Receptor Pathway

**

RE STARTING
INCLUDED STLUCIE1.rou
RE FINISHED

**

** AERMOD Meteorology Pathway

**

ME STARTING
SURFFILE ..\METDATA\PBIMIA01.SFC
PROFFILE ..\METDATA\PBIMIA01.PFL
SURFDATA 12844 2001 WEST_PALM_BEACH\INT'L_ARPT
UAI RDATA 92803 2001

PROFBASE 19 FEET
ME FINISHED

**

** AERMOD Output Pathway

**

**

OU STARTING
RECTABLE ALLAVE FIRST
OU FINISHED

C:\St Lucie GEOPLASMA\STLUCIE.isc

BPIP (Dated: 04274)

DATE : 12/ 9/2009

TIME : 16:27: 8

C:\St Lucie GEOPLASMA\STLUCIE.isc

=====
BPIP PROCESSING INFORMATION:
=====

The P flag has been set for preparing downwash related data for a model run utilizing the PRIME algorithm.

Inputs entered in METERS will be converted to meters using a conversion factor of 1.0000. Output will be in meters.

The UTM variable is set to UTM. The input is assumed to be in UTM coordinates. BPIP will move the UTM origin to the first pair of UTM coordinates read. The UTM coordinates of the new origin will be subtracted from all the other UTM coordinates entered to form this new local coordinate system.

Plant north is set to 0.00 degrees with respect to True North.

C:\St Lucie GEOPLASMA\STLUCIE.isc

PRELIMINARY* GEP STACK HEIGHT RESULTS TABLE
(Output Units: meters)

Stack Name	Stack Height	Stack-Building Base Elevation Differences	GEP** EQN1	Preliminary* GEP Stack Height Value
STCK1	30.48	0.00	38.10	65.00

* Results are based on Determinants 1 & 2 on pages 1 & 2 of the GEP Technical Support Document. Determinant 3 may be investigated for additional stack height credit. Final values result after Determinant 3 has been taken into consideration.

** Results were derived from Equation 1 on page 6 of GEP Technical Support Document. Values have been adjusted for any stack-building base elevation differences.

Note: Criteria for determining stack heights for modeling emission limitations for a source can be found in Table 3.1 of the GEP Technical Support Document.

BPIP (Dated: 04274)

DATE : 12/ 9/2009

TIME : 16:27: 8

C:\St Lucie GEOPLASMA\STLUCIE.isc

BPIP output is in meters

SO BUILDHGT STCK1	15.24	15.24	15.24	15.24	15.24	15.24
SO BUILDHGT STCK1	15.24	15.24	15.24	15.24	15.24	15.24
SO BUILDHGT STCK1	15.24	15.24	15.24	15.24	15.24	15.24
SO BUILDHGT STCK1	15.24	15.24	15.24	15.24	15.24	15.24
SO BUILDHGT STCK1	15.24	15.24	15.24	15.24	15.24	15.24
SO BUILDHGT STCK1	15.24	15.24	15.24	15.24	15.24	15.24
SO BUILDWID STCK1	113.90	120.06	122.57	121.36	116.46	108.03
SO BUILDWID STCK1	96.31	81.66	183.76	189.43	190.07	184.94
SO BUILDWID STCK1	174.19	158.75	162.19	115.48	112.13	105.37

SO BUILDWID	STCK1	113.90	120.06	122.57	121.36	116.46	108.03
SO BUILDWID	STCK1	96.31	81.66	183.76	189.43	190.07	184.94
SO BUILDWID	STCK1	174.19	158.75	162.19	115.48	112.13	105.37
SO BUILDLEN	STCK1	77.06	87.61	95.50	104.60	111.65	115.32
SO BUILDLEN	STCK1	115.48	112.13	143.29	172.24	196.69	215.16
SO BUILDLEN	STCK1	227.09	232.12	230.10	96.31	81.66	65.26
SO BUILDLEN	STCK1	77.06	87.61	95.50	104.60	111.65	115.32
SO BUILDLEN	STCK1	115.48	112.13	143.29	172.24	196.69	215.16
SO BUILDLEN	STCK1	227.09	232.12	230.10	96.31	81.66	65.26
SO XBADJ	STCK1	11.83	15.27	18.25	16.56	13.23	9.51
SO XBADJ	STCK1	5.49	1.31	-55.05	-73.99	-91.05	-105.33
SO XBADJ	STCK1	-116.42	-123.97	-127.76	-69.49	-72.49	-73.29
SO XBADJ	STCK1	-88.89	-102.88	-113.75	-121.16	-124.89	-124.82
SO XBADJ	STCK1	-120.97	-113.43	-88.23	-98.25	-105.64	-109.82
SO XBADJ	STCK1	-110.67	-108.15	-102.35	-26.82	-9.17	8.02
SO YBADJ	STCK1	-42.43	-33.25	-23.06	-12.18	-0.92	10.37
SO YBADJ	STCK1	21.34	31.66	24.06	18.37	12.48	6.21
SO YBADJ	STCK1	-0.24	-6.39	-0.49	63.23	57.37	49.77
SO YBADJ	STCK1	42.43	33.25	23.06	12.18	0.92	-10.37
SO YBADJ	STCK1	-21.34	-31.66	-24.06	-18.37	-12.48	-6.21
SO YBADJ	STCK1	0.24	6.39	0.49	-63.23	-57.37	-49.77

PROJECT TITLE:

**Geoplasma St. Lucie County Project
WEST PALM BEACH/MIAMI Met Data 2001- 2005**

COMMENTS:

SOURCES:

1

RECEPTORS:

2480

COMPANY NAME:

Golder Associates

MODELER:

DATE:

12/15/2009

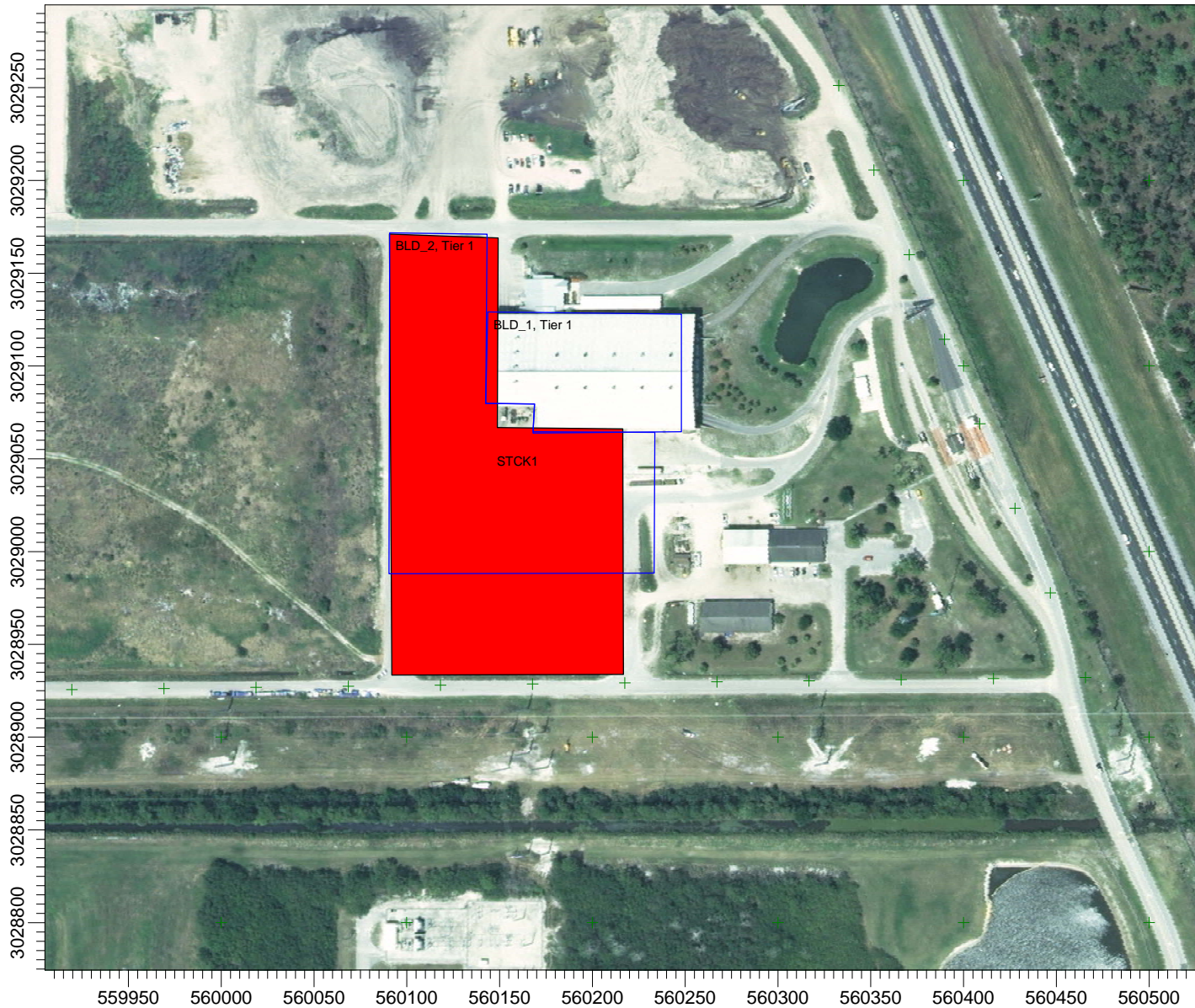
SCALE:

1:3,429

0  0.1 km

PROJECT NO.:

083-89629



PROJECT TITLE:

**Geoplasma St. Lucie County Project - Class II Sig. Impact Levels
WEST PALM BEACH/MIAMI Met Data 2001- 2005**

COMMENTS:

Fenceline Receptor Grid

SOURCES:

1

RECEPTORS:

2480

COMPANY NAME:

Golder Associates

MODELER:

DATE:

12/15/2009

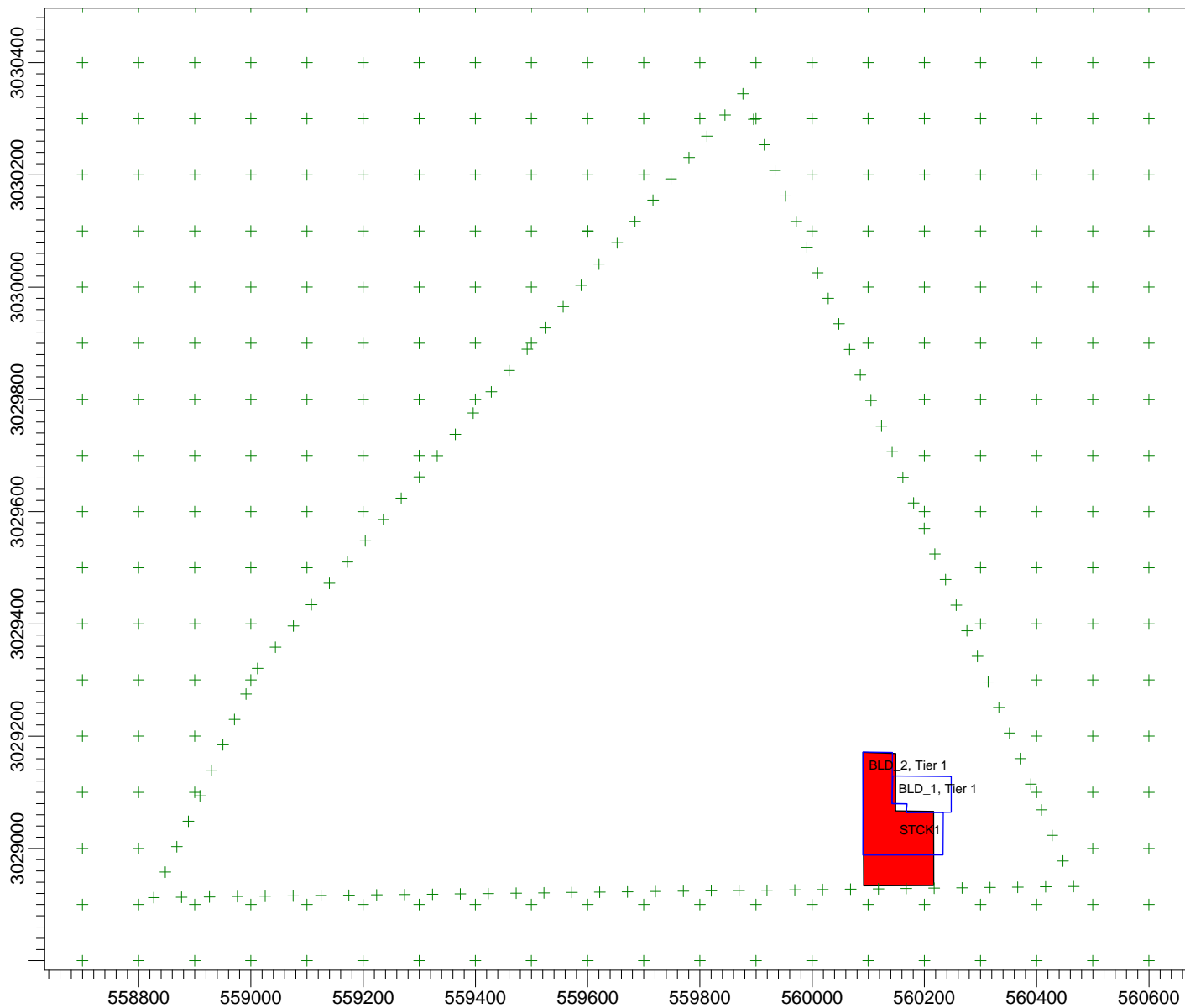
SCALE:

1:11,300

0  0.3 km

PROJECT NO.:

083-89629



PROJECT TITLE:

**Geoplasma St. Lucie County Project - Class II Sig. Impact Levels
WEST PALM BEACH/MIAMI Met Data 2001- 2005**

COMMENTS:

SOURCES:

1

RECEPTORS:

2480

COMPANY NAME:

MODELER:

DATE:

12/15/2009

SCALE:

1:55,591

0  1 km

PROJECT NO.:

083-89629

