

# Global Property Engineering 175 Water Street, 29<sup>th</sup> Floor, New York, NY 10038

# **Gainesville Renewable Energy Center** 11201 NW 13<sup>th</sup> Street Gainesville, FL 32653



# **PROPERTY LOSS CONTROL SURVEY REPORT** June 24, 2015



Gainesville Renewable Energy Center , LLP June 24, 2015 Page 2

# SUMMARY INFORMATION

RFS No.	5921-1
Survey date	June 24, 2015
Previous Survey	May 14, 2014
Engineer	Art Partin
EER Writing Office	Hartford, CT
Owner	Energy Management, Inc.
	Gainesville Renewable Energy Center (GREC), LLP
Operator	North American Energy Services
Location Address	11201 NW 13th Street (aka US 441)
	Gainesville, FL 32653
Web site	www.emienergy.com
	www.naes.com
Plant Type	IPP – Biomass Plant
Site Contacts	Russell Abel, Plant Manager
Name, Title, Phone and Email	(386) 315-8014 <u>Russell.Abel@grecbiomass.com</u>
	Steven Marsh, Operations Supervisor
	(386) 315-8015 <u>Steven.Marsh@grecbiomass.com</u>
	Tommy Gardner, Maintenance Supervisor
	(386) 315-8012 Tommy.Gardner@grecbiomass.com

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# **1. SUMMARY OF INSPECTION ACTIVITY**

This report documents the property loss prevention survey conducted on June 24, 2015 at the Gainesville Renewable Energy Center (GREC) in the City of Gainesville, Alachua County, Florida.

The purpose of this visit was to evaluate the present risk exposures for the All Risk Property Insurance Program. A tour of the facility was conducted and conversations were held with senior plant management.

The loss prevention evaluation consisted of a discussion and visual evaluation of the present overall occupancy, inspection of facility fire safety equipment and review of human element programs.

# 2. LOCATION OVERVIEW

This is a new Plant, located within the city limits of Gainesville in Alachua County, Florida. The site consists of 130 acres of which approximately 60 acres contain the power plant and fuel handling and storage operations.

The GREC Plant is designed to operate as a dispatched base-load plant. The major pieces of equipment consist of:

- One Metso Hybex BFB wood-biomass burning boiler, rated at 930,000 pph, 1620 psi @ 1005°F with a natural gas fired light-off system.
- One Siemens Steam Turbine with a Brush Generator (STG set) with a rated capacity of 116.1 MW at 13.8 KV.
- Fuel processing equipment (mills, conveyors, etc.).
- Ash handling equipment.
- Balance of Plant (BOP) equipment.

Date of Commercial Operation was December 17, 2013. It is owned by GREC Partners, and operated and maintained by North American Energy Services (NAES) Inc. This is a zero discharge Power Plant.

# 3. LOSS PREVENTION DISCUSSION

The plant is new, as stated above commercial operations began on December 17, 2013. At the time of the survey, the Plant's generating and balance of plant equipment was operating. The plant had an average net power output of 76 MW in 2014.

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The facility is a dispatchable unit and operates with Automatic Generation Control (AGC). The operating load is between 70 MW (minimum dispatch load) and the unit's maximum (permitted) net capacity is 102.5 MW. The plant has a parasitic load need of 10 to 12 MW to operate. It can generate from cold start-up in 16 hours. It does not have black start capabilities. The facility has a Power Purchase Agreement (PPA) with the Gainesville Regional Utilities (GRU). The agreement is for a nominal 100 MW net for a term of 30 years. The facility is connected to GRU's 138 kV transmission system.

The Plant is licensed to use:

- Locally available wood products from sources certified to meet forest sustainability standards. These include green sawdust and tree bark from tree processing mills, paper mills, etc.
- Urban Biomass: Tree trimmings, etc. primarily from private urban based gardens
- Other clean wood waste such as old pallets that have been turn to wood chips.

The plant currently has contracted with 12-14 fuel suppliers, to supply their fuel needs. All are within a 70-mile radius from the plant.

Plant structures were designed to withstand hurricane force winds. Buildings and structures are concrete block, poured concrete and steel.

There is a capital investment planned to build an oil storage area for new and used oil. The storage area will be outside away from other structures and will be a three (3) sided shed with a roof and with spill containment and drainage to an oil-water separator.

#### 3.1 CONCLUSION

The GREC is a newer power plant designed and built to good engineering and industry practices. The plant is new and still under warranty when surveyed. The operators, supervisors and managers are experienced and knowledgeable. The plant rates Very Good for insurance purposes.

# 4. **RECOMMENDATIONS**

#### 4.1 NEW RECOMMENDATIONS

There are no new recommendations resulting from this survey visit.

#### 4.2 PRIOR RECOMMENDATIONS

All prior recommendations have been completed. See below.

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#### 4.3 COMPLETED RECOMMENDATIONS

#### P20140501 Upgrade the Fire Protection Equipment Self-Inspection Program

An outside contractor is currently conducting inspections, testing, and maintenance of the water based fire protection systems per the NFPA quarterly and annual guidelines. These visits should be supplemented by weekly non-flow test runs of the two fire pumps and monthly visual inspections of all fire protection control valves to ensure they are locked in the open position.

Comment: Plant personnel are now doing weekly runs of the fire pumps and a contractor is doing the monthly visual inspections of the fire systems. Recommendation is considered completed.

#### P20140502 Develop a Hurricane Preparedness Plan

The plant's Safety Manual does not address hurricane preparation and response. Without, a detailed program in place, significant damage can be expected to the facility.

A detailed hurricane preparedness plan needs to be developed, since the plant is located in a hurricane prone area. This facility is in a 100 mph (3-second peak gust) wind prone area per ASCE 7-05.

Comment: A hurricane preparedness and response procedure has been written. Recommendation is considered completed.

#### P20140503 Impairment Handling Program

A system identifying impairments to fire protection systems, including the automatic sprinkler system is not in place. An impairment handling system will provide extra protection when fire protection systems for the building are placed out of service for repairs or other needs.

Implement a written fire protection equipment impairment handling program to supervise all impairments to water supplies, sprinkler systems, and alarm systems that includes the use of an impairment lockout tag and all applicable precautions, notification of the impairment to a representative of the property insurance company. Contact AIG via our Impairment number, 1-877-705-7287 or email, <u>GlobalProperty.Impairment@aig.com</u>, the fire alarm company, and fire department, plus fire watches, and follow up at the close of the impairment should be put into effect. A copy of the AIG fire protection equipment impairment program was sent to the facility.

Comment: The plant is using AIG's Impairment Handling program. Recommendation is considered completed.

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#### P2014-05-04 Upgrade the Facility's Safety Manual

The plant's Safety Manual is based on NAES's corporate safety manual. The plant's safety manual should be updated to include site-specific information such as specific contact persons' names, contact information, and site-specific building information etc.

Comment: Safety manual has been updated with site-specific information. Recommendation is considered completed.

#### **P2014-05-05** Invite Local Fire Department to Tour

An important part of overall fire safety at a facility is in the familiarity of the local fire department with the facility. Therefore, it is recommended that the local responding fire department(s) be invited to tour your facility in order for them to familiarize themselves with the layout and operations of the plant. This can greatly reduce the amount of damage to your plant if a fire would occur. Members of the local fire departments should be invited back on an annual basis.

Comment: The local fire department has toured the facility and done drills on site. Recommendation is considered completed.

#### P2014-05-06 Install Spray Shields/Guards on All Lubricating and Seal Oil Flanges

The shields should be US Navy listed or custom flange guards can be fabricated to prevent oil spray during a flange leak.

Lubricating and seal oils have relatively high flash point and therefore are generally not easily ignited. However, a leak of high pressure oil from a flange or other fitting will cause oil to atomize. Atomized oil can be easily ignited from a hot surface and the ensuing fire damage from the spray fire would be severe. The provision of spray shields will be considered.

Comments: Spray shields have been installed on the lube oil flanges of the steam turbine generator. Recommendation is considered completed.

# 5. HISTORY & OWNERSHIP

Date of Commercial Operation was December 17, 2013. It is owned by GREC Partners, and operated and maintained by North American Energy Services (NAES) Inc. The General Contractor was Fagen Inc., and the engineering firm was Zachry Engineering.

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# 6. PLANT LAYOUT & EXPOSURES

#### 6.1 SITE DESCRIPTION

This is a new single unit biomass power plant (116Mw gross), located on approximately 130 acres adjacent to the Gainesville Regional Utilities coal fired power plant. The site is level with open undeveloped land surrounding it.

#### 6.1.1 Location

The plant is located on approximately 130 acres within the city limits of Gainesville in Alachua County, Florida. Latitude: 29.7676 x Longitude: -82.3962 Elevation: 186 ft. amsl

#### 6.2 EXPOSURES

#### 6.2.1 Surrounding Exposures

North: Open land

**South:** Open land, GRU power plant to the SE > 1000+ ft.

East: Pond

West: Wood yard

#### 6.2.2 Natural Perils

#### Earthquake

The earthquake exposure is considered Low. The facility is in an area categorized by Munich RE as Zone 0: (MM V or below) on a scale of 0 to 4. This is the Probable maximum intensity (MM: modified Mercalli scale) with an exceedance probability of 10% in 50 years (equivalent to a "return period" of 475 years) for medium subsoil conditions.

#### Flood or Tsunami

This facility is located in a Flood Zone X (Unshaded), placing the plant outside the 500-year flood elevation. There is no storm surge exposure. All structures are above the surrounding grade elevation and would not be subject to flood exposures. Flood zone location has been determined from FEMA Alachua County/City of Gainesville Flood Map 125107C0145D, dated 06/16/2006 and storm surge from Munich Re NATHAN (See appendix).

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#### Windstorm

The facility is located in an area of Florida categorized by Munich RE as Zone 3 (213 - 251 km/h (132 - 156 mph) peak wind speeds) for tropical cyclones on a scale of 0 to 5. This is the Probable maximum intensity with an exceedance probability of 10% in 10 years (equivalent to a "return period" of 100 years). This facility is in a 100 mph (peak gust) wind prone area per ASCE 7-05. The structures and buildings appear secured but damage can be expected during a severe hurricane. Metal buildings, equipment, and insulation would be expected to receive damage during the windstorm.

#### Tornado

The plant is in an area categorized by Munich RE as Zone 4 for tornadoes on a scale of 1 to 4 (Frequency and intensity of tornados), a high frequency and intensity of tornadoes.

#### Lightning

Lightning poses a significant exposure in this region of the country. The plant is in an area categorized by Munich RE as Zone 5 for lightning on a scale of 1 to 6. Zone 5 represents a frequency of 20 - 40 lightning strokes per km<sup>2</sup> per year whether the strikes reach the ground or not. Ground charge dissipaters cover all main structures. Suitable grounding and bonding of key electrical components is provided.

#### Severe Weather

This facility is located above/north of the freeze line. However, damage from severe cold or snow loading is not a major concern.

Hail is a moderate exposure in this region of the country. The plant is in an area categorized by Munich RE as Zone 3 for hail on a scale of 1 to 6.

#### Other

Sinkholes are always possible in this region of Florida. There has been no recent sinkhole activity reported in the immediate area.

#### 6.3 LAYOUT & CONSTRUCTION

#### 6.3.1 Building & Plant Layout

This is an outdoor-type power station. The boiler structure's floor levels are of open steel-grate construction without enclosing walls. The steam turbine generator is within a metal panel enclosure

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located at the north end of the boiler structure. The overall layout of this plant is very good. There is good space separation between buildings and equipment and the wood yard.

#### 6.3.2 Construction

	Year	Height	ight Total Construction						
Building Name	Built	(ft.)	Area (ft <sup>2</sup> )	Walls	Roof	Floor	# Fire Areas	AS	Condition
Admin/Control	2013	18	5000	LNC	LNC	Concrete	1	Y	New
Maint./Whse	2013	24	6250	LNC	LNC	Concrete	1	Y	New
Water Treatment	2013	24	2000	LNC	LNC	Concrete	1	Y	New
Hogger/Screen House	2013	40	3300	LNC	LNC	Concrete	1	Y	New

# 7. MAJOR EQUIPMENT

#### 7.1 STEAM GENERATORS

#### 7.1.1 General Information

	STEAM GENERATORS										
Unit	Size (pph)	Туре	Mfg.	Year	Fuel 1	Fuel 2	MAWP	Temp (°F)	Asbestos		
1	930,000	BFB	Metso	2013	Biomass	N.G.	1945	1005	No		

The boiler is a Metso (now Valmet) Hybex wood-fired bubbling fluidized bed (BFB) boiler. The average burn rate is ~130 tph @ 42% moisture.

Burn Rate at 70 Mw is ~2100 tpd.

Burn Rate at 102 MW(net max load) is ~3,000 tpd.

FEEDWATER										
Boiler Feed Pumps				Water Chemistry						
Unit –	Туре	No.	Fixed Protection	Online	Grab	Dosing				
1	Elec.	2	Yes	Yes	Yes	-				

Each pump is rated for 100% of the boiler's needs.

#### 7.1.2 Fixed Protection Overview

	STEAM GENERATORS										
Unit		Burners	Stack								
Omt	No. /Levels/ Pattern	Controls / Trips	Protection	Height	Construction	Lining					
1	4 & 6/ 2 / front & back Complete N/A 230' Steel										

The boiler has automatic natural gas fired igniters(4) for light off only with a completed set of combustion controls. There are six wood feeders (3 on front and 3 on back).

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### **Global Property Engineering**

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	BOILER AUXILIARIES									
TI	Bag House			Precipi	tator	Air Preheater				
Unit	Temp Rating	<b>Temp Monitor</b>	Protection	O <sub>2</sub> Monitor	Protection	Туре	Protection			
1	500	Yes	No							

Includes two baghouses (only one is needed) with 10 compartments each using Teflon bags rated for 500°F. The baghouses are monitored for  $\Delta P$  and temperature. Normal inlet temperature is 445°F with alarms well below the 500°F level. There is also a Selective Catalyst Reduction (SCR), which uses 19.5% aqueous ammonia.

All ash is trucked to a landfill.

#### 7.2 PRIME MOVERS & GENERATORS

#### 7.2.1 General Information

	STEAM TURBINES										
Unit     Rating (MW)     Mfg.     Year     Model     Serial     Cases/Flows     Service     TDI							TDP-1				
1	116.1	Siemens	2013	SST900	-	3	base	-			

	GENERATORS										
Unit Rating (kVA) Mfg. Year Model Serial Volts (kV) Cooling Ring Mat'l								-			
1		Brush	2013	-	971007010	13.8	H2O	-			

The STG is a water-cooled unit. No hydrogen used or on site. The unit is located at the north end of the boiler structure within an elevated metal panel enclosure.

#### 7.2.3 Fixed Protection Overview

	STEAM & COMBUSTION TURBINES										
Units	Units Under deck Lube Oil Unit Lube Oil Piping Seal Oil Bearings Exciter Enclosure										
1	AS	AS	AS	AS	AS	-	-				

#### 7.3 TRANSFORMERS & ELECTRICAL SYSTEMS

#### 7.3.1 Transformers

	MAIN TRANSFORMERS									
Unit	Rating (MVA)	Mfg.	Year	Serial	Volts (kV)	Form	Phases	Oil Capacity		
GSU	104/139/173	Penn	2012	C-07987-5-1	13.8/138	Core	3	13,250		
SS	18/24	Penn	2012	C-07992-5-1	13.8/4.16	Core	3	5,990		

	PROTECTION										
Unit	Sepa	ration	Protection								
Umi	Transformers	Buildings	Fixed	Barrier Walls	Containment						
GSU	Adq.	Adq.	AS	Yes	Yes						
SS	Adq.	Adq.	AS	Yes	Yes						

The GSU has an on-line gas monitoring system (Calisto). In addition, oil sampling is done yearly.

The plant is not black start capable. However, there is an alternate electric feed (@13.8KV) with manual switchover should they loss the primary feed to the plant.

#### 7.3.2 Cable Spreading Rooms

	CABLE SPREADING							
Unit	Location	Size	No. Trays	Detection	Protection	Penetrations		
1	Perimeter of boiler	-	varies	-	AS	Sealed		

### 7.4 CONTROL ROOMS & CONTROL SYSTEMS

	CONTROL ROOMS						
Unit	Location	System Type	Size	Detection	Protection	Penetrations	Staffing
1	Admin Bldg.	DCS	1500	Smoke	AS	Sealed	Cont.

#### 7.5 FUEL STORAGE & HANDLING

#### 7.5.1 Solid Fuel Handing, Preparation & Storage

The biomass (wood) is received by truck from various suppliers within the local area (within 70mile radius). Wood is received Monday – Friday and occasionally on Saturday from 7:00 am – 8:00 pm. The plant averages 100-110 trucks per day (trucks avg. 23 tons of fuel each). The trucks are unloaded by hydraulic dumpers(3). Underground conveyor (belt #1) takes the wood from the unloading bins to the screen house/chipper where it is sized then conveyed to one of two wood piles via stack-out conveyors. The fuel handling equipment has magnets in several locations to remove any iron, or metal objects. The piles have two reclaimers (1 – under pile and a drag chain reclaimer). Frontend loaders are used to maintain the piles and push the wood fuel to the under pile reclaimer openings.

The plant's target is to maintain 20-22 days worth of fuel on site.

There is a contract with Bio Resource Management, Inc. (BRM) to manage fuel procurement and ensure forest sustainability standards are met. BRM is a locally based consulting firm that specializes in biomass supply services BMR Inc.





	CONVEYORS & TRANSFER HOUSES							
Location	Length	Enclosure	Protection	Detection	Trips/Alarms	Tramp Metal		
1 Truck Dumper to Hogger	270'	Underground	AS	-	Yes	Yes		
2 Hogger to belt 4	80'	Covered	AS	-	Yes	-		
3 Hogger to belt 4	80'	"	AS	-	Yes	-		
4 transfer to belts 5,6,8	270'	"	-	-	Yes	-		
5 to stacker	183'	"	-	-	Yes	-		
6 to stock-out	101'	"	-	-	Yes	-		
7 to reclaimer	185'		-	-	Yes	-		
8 from hogger/stacker to	180'	Covered			Yes	-		
belt 9	180	Covered	-	-				
9 Main feed to plant	285'	"	AS	-	Yes	Yes		
10 to surge bins	32'	-	-	-	Yes	-		
11 from stock-out reclaim	108'	Covered			Yes	-		
to belt 9	108	Covered	-	-				
Stacker	61		-	-	Yes	-		

The main boiler feed belt (#9) has 2-separate drive systems and the plant has a spare belt on site.

	BUNKERS & PULVERIZERS							
T Incit	Bunk	kers	Crushers/Chippers		Pulverizers			
Unit	Protection	Detection	Туре	Type No. Protection		Туре	No.	Protection
1	-	-	Chippers	2	AS	-	-	-

There are two 50% hoggers(chippers) for sizing any wood coming in that might be considered oversized. Wood chips will go through a screening process and any oversized pieces will be directed to the chippers.

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There are two silos/bunkers/surge bins located at the boiler, which if full could provide about 45 minutes of fuel to the boiler should the feed belt go down.

#### 7.5.2 Fuel Storage Tanks

None, except diesel fuel oil tank for emergency generator.

#### 7.6 ANCILLARY EQUIPMENT & SYSTEMS – BALANCE OF PLANT

#### **Condensing and Cooling Systems**

	COOLING TOWERS							
Unit	Unit Type Construction Fill Cells Cell Barriers Protection Fan Interlock							
1	Counterflow	FRP	PVC	5	Yes	No	No	

#### Hydrogen

No hydrogen on site. Not used to cool the STG.

#### Ammonia

There is one approximately 10,000 gallons tank that stores aqueous ammonia (19.5%) used for NOx reduction.

#### Water Supplies

From two – full capacity well pumps plus one- potable water well and a reclaim water pipeline from the City of Alachua. Plant design was for 1.2 million GPD.

#### **Process Water**

Obtained from the reclaim pipeline and the on-site wells. The Plant produces its own boiler feed water using a house facility that uses RO and electric ionic removal equipment. Demineralized water is stored in a steel tank.

#### Waste & Effluent Handling

The plant is a Zero Discharge facility. Wastewater (primarily from ash handling) is evaporated using a fallen film evaporator that uses a 700 HP compressor to pressurize waste steam. The resultant solids are compressed and land filled.

#### **Compressed Air**

125 HP Atlas/Copco units. Air compressors with redundancy with adequate supply for both service water and instrument air. Service air was reported to be dried and filtered.

#### **Emergency Power**

The plant has a 750 KW diesel engine generator to provide emergency power to critical equipment for safe shut down. The unit is self-contained (has its own fuel tank) and is in an enclosure northeast of the boiler. The enclosure has a fire detection system. Full load testing of the unit using a load bank is done every summer.

#### Warehousing and Storage Areas

WAREHOUSING / STORAGE							
Location	Commodity/	Storage	Clearance	Aisle	Rack	Storage	
Location	NFPA Class	Height (ft.)	Clearance	Width (ft.)	Туре	Depth	# Tiers
Admin Bldg.	2 - 3	12-15	5'	8	S/DDR	4	3

# **8. FIRE PROTECTION**

#### 8.1 FIRE BRIGADE / FIRE DEPARTMENT

FIRE BRIGADE / FIRE DEPARTMENT							
Organization	Туре	ISO Class	Distance	Response Time	Obstructions	Formal Pre-plan	
Gainesville FD	FT – paid	-	~3 miles	10 min	RR	TBD	

#### 8.2 FIRE WATER SUPPLY & FIRE PUMPS

FIRE WATER SUPPLIES					
Source	Size/ Capacity	Yard Main Size	No. Available Hydrants (Public & Private)	Adequacy/ Reliability	
Service H2O Tank	1 mil / 250K+ reserved	12"	22	Adequate & Reliable	

<b>FIRE PUMPS</b>						
Rated GPM	Rated PSI	Auto/ Manual	Suction Source			
2000	152	Auto.	Service H2O Tank			
2000	152	Auto.	Service H2O Tank			
	2000	Rated GPM     Rated PSI       2000     152	Rated GPMRated PSIAuto/ Manual2000152Auto.			

The fire pumps were flow tested on April 1, 2015 and the results were Satisfactory.

#### **8.3 MANUAL FIRE FIGHTING SYSTEMS**

Portable fire extinguishers are located throughout the facility and there are nine monitor nozzles located on fire hydrants. The boiler structure has a dry standpipe with hose stations.

#### **8.4 FIXED FIRE PROTECTION SYSTEMS**

#### 8.4.1 Sprinkler Systems

		SPRINKLER	PROTECTION			
Location	Trme	Design Dongity	Dequined Density	Existing	Demand	Adagmager
Location	Туре	Design Density	Required Density	GPM	PSI	Adequacy
Admin/Control Bldg.	Wet	0.25/1502	0.10/1500	593	94	Adq.
Maint/Whse	Wet	0.25/1950	0.20/1950	828	101	Adq.
STG Bearings	Dry	0.25/E.A.	0.25/E.A.	546	70	Adq.
STG Underdeck	Dry	0.3/E.A.	0.3/5000	1282	115	Adq.
STG Lube Oil	Deluge	0.3/E.A.	0.30/E.A.	830	118	Adq.
Boiler Feed Pump	Dry	0.30/E.A.	0.30/E.A.	563	66	Adq.
GSU Transformer	Deluge	0.25/E.A.	0.25/E.A.	1439	121	Adq.
SS Transformer	Deluge	0.25/E.A	0.25/E.A.	1025	135	Adq.
Fire Pump house	Wet	0.25/E.A.	0.25/E.A.	-	-	Adq.
Water Treatment Bldg.	Wet	0.25/1585	0.15/2000	958	84	Adq.
Fuel Unloading – Hyd.	Dry	0.50/E.A.	0.30/E.A.	617	27	Adq.
Fuel Unldg – Below grade conveyor	Dry	0.30/100' linear	0.30/EA	1196	92	Adq.
Screen/Hogger House	Dry	0.30/3277	0.30/E.A.	1926	98	Adq.
Scale House	Wet	0.10/1288	0.10/1500	581	70	Adq.

#### 8.4.2 Gaseous & Clean Agent Systems

GASEOUS EXTINGUISHING SYSTEMS							
Location	Type Density or Design Adequacy						
None	None						

#### 8.5 FIRE & GAS DETECTION SYSTEMS

FIRE & GAS DETECTION SYSTEMS					
Location	Туре	Adequacy			
PDC/MCC & Elec Rooms	Smoke	Adequate			
<b>Emerg. Generator Encl</b>	Smoke	Adequate			
CEM Shed	Smoke	Adequate			
Battery Rooms	Smoke & H2	Adequate			
Admin/Control Bldg.	Smoke	Adequate			

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ALARM & /MONITORING SYSTEMS							
Alarm System Type Alarms Supervised Alarm Location Test Frequency Adequacy							
Proprietary     Yes     Control Room     Annually     Adq.							

#### 8.6 FIRE PROTECTION SYSTEM MAINTENANCE & TESTING

The plant has contracted with W. W. Gay fire & Integrated Systems, Inc. to perform the inspections and testing of the fire safety equipment per NFPA Standards.

Plant needs to perform weekly runs of the fire pumps and the monthly visual inspections, see recommendation.

### 9. MANAGEMENT PROGRAMS

#### 9.1 GENERAL ORGANIZATION

The owners have contracted with NAES to act as the O&M contractor.

The Plant (NAES) employs 41 persons. There are 30 persons assigned to four shift groups following a modified DuPont schedule. There are also 5 BRM employees, 2 EMI employees, and 1 Valmet employee on site.

#### 9.2 **OPERATIONS**

#### 9.2.1 Organization, Qualifications & Experience

NAES has set up an organization and staffing structure that is standard in the power generation industry. All key Plant personnel have extensive power plant experience.

#### 9.2.2 Operator Training

Plant personnel were trained by the OEM of the various plant equipment. Personnel were reported to have come from similar power plants and have extensive experience.

#### 9.2.3 Operational Procedures & Routines

Operation procedures were reported to cover most Plant operations and maintenance work. There is a library with the equipment information.

#### 9.2.4 Permit To Work

Work permits are generated for maintenance tasks. Hot work permits are used where required. There is a Lock-Out/Tag-Out procedure, and Confined Space procedure.

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#### 9.3 MAINTENANCE, INSPECTION & TESTING

#### 9.3.1 Organization, Qualifications & Experience

The Plant uses a CMMS (MP2). Maintenance personnel are experienced. Maintenance personnel are qualified by education, training and experience.

#### 9.3.2 Contractors & Contractor Screening

NAES has a procurement and screening process, which evaluates a contractor's capacity to complete a task on time, safely and efficiently. Contractors are chosen by the Plant using NAES guidelines.

#### 9.4 RISK & SAFETY MANAGEMENT

#### 9.4.1 Organization & Safety Programs

NAES has safety programs that comply with all regulating agencies requirements and industry's best practices.

#### 9.4.2 Safety Awareness & Auditing

The Plant has established audit frequencies of monthly in-house and NEAS corporate does annual audits. In addition, the owners tour plant regularly and perform safety audits. All personnel are responsible for safety.

#### 9.4.3 Management of Change

There is a formal procedure for both engineering and operational changes. All changes are reviewed by appropriate personnel (NAES & Owners) and signed off by the plant manager.

#### 9.4.4 Control of Ignition Sources

Plant follows NAES's Safety Manual, which covers Hot Work Permitting and also covers smoking, which is limited to designated areas.

#### 9.4.5 Fire System Impairment Handling

The plant is using AIG's program.

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#### 9.4.6 Emergency Planning and Organization

The plant has adopted NAES's Safety Manual.

#### 9.4.7 Environmental Issues and Operational Permits

The plant is permitted to generate a maximum of 102.5 MW net, and has to abide by air permit requirements. The Plant is a Zero discharge facility.

#### 9.4.8 Housekeeping

Housekeeping was found to be excellent throughout the facility including around and below the conveyor belts.

#### 9.4.9 Security & Surveillance

There are no on-site security personnel at this facility but passive protection is considered acceptable as the plant is continuously manned. The Plant perimeter is enclosed by a 6-foot chain link fence with barbed wire above and cameras are strategically located at key areas.

The Plant uses CCTV for security and for monitoring plant processes. CCTV cameras are located throughout the Plant, and the CCTV Monitors are located in the Control Room. Communications is via plant wide PA, portable radio and/or cell phone.

# **10. LOSS HISTORY**

	LOSS HISTORY					
Date	Incident	Gross Claim	Final Settlement (Net of deductible)	Changes/Precautions		
None	Reported		-	-		

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# **<u>11. LOSS ESTIMATES</u>**

#### **11.1 PROPERTY LOSS ESTIMATES**

	Worst Case Property Loss Estimates						
Event	USD million	BI Time Element	Equipment Affected & Possible Event(s)				
PML	64.7						
PD	14.6	10 months	Steam Turbine + Generator; 116MW Capacity. Major fire in lube system resulting in casing, bearing, rotor, valve and piping damage				
BI	50.1						
EML	253.1		CFB - Sub-critical Circulating Fluidized Bed Boiler; 930000 lbs/hr				
PD	103.1	30 months	steam Capacity. Loss of flame with re-ignition, resulting in furnace				
BI	150.0		explosion. Furnace protection systems inoperative.				

**Notes on estimates:** PD and BI figures are without regard to deductibles or waiting periods **BI Notes:** BI calculated from average fixed mthly/annual revenue. Recovery periods are without regard to the availability of spare equipment. Any contractual or independent system operator penalties were not considered.

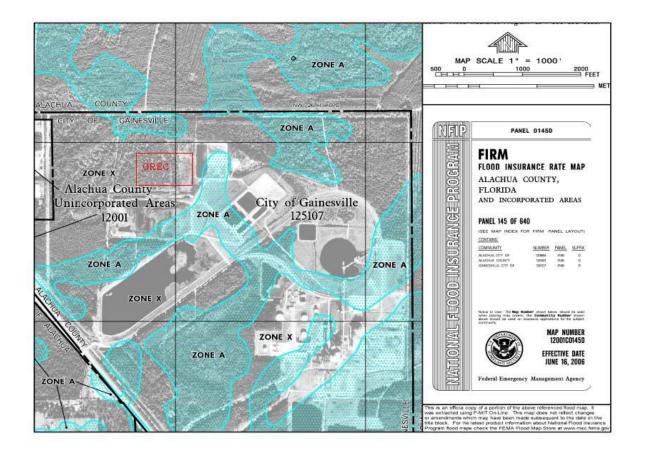
#### **11.2 INSURED VALUES**

	TOTAL INSURABLE VALUES:					
PD		TIME ELEMENT				
Buildings \$ 8,998,603		BI	\$ 90,185,000			
M & E	\$ 280,396,236	EE				
Contents	\$ 2,511,000	Rents				
Stock	\$ 4,000,000					
Tanks						
Other						
TOTAL	\$ 295,907,236	TOTAL	\$90,185,000			

Note: The reported BI value is for a period of 18 months.

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# **<u>12. APPENDIX</u>**



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#### NATHAN Single Risk Assessment Report

USA (United States)		
-82.3962E, 29.7676N		
Exact Coordinates (100)		
10 - 49		
67m		
USA_32653 (Gainesville)		
USA_FL (Florida)		
	-82.3962E, 29.7676N Exact Coordinates (100) 10 – 49 67m USA_32653 (Gainesville)	



@Munich Re, 2015

Overall Risk Score			Extreme
Hazard Score Rating Hazard zoning values for signifi			
	low	high	hazard rating
Earthquake			Zone 0
Volcanoes			No hazard
Tsunami			No hazard
Tropical cyclone			Zone 3
Extratropical storm			No hazard
Hail			Zone 3
Tornado			Zone 4
Lightning			Zone 5
Wildfire	2		Zone 2
River flood			Zone 0
Flash flood			Zone 3
Storm surge	Į.		No hazard



# Global Property Engineering 175 Water Street, New York, NY 10038

#### Legends

Ear	quake	
-	Zone 0: MM V and below	
	Zone 1: MM VI	
	Zone 2: MM VII	
	Zone 3: MM VIII	
	Zone 4: MM IX and above	
peri	% in 50 years (equivalent to a ,return t° of 475 years) for medium subsoil lons	١.
peri con	f of 475 years) for medium subsoil	
peri con Tro	l" of 475 years) for medium subsoil lons.	1
peri con Tro	f" of 475 years) for medium subsoil lons cal cyclone	
peri con Tro	f" of 475 years) for medium subsoil ions. cal cyclone wind speeds	
peri con Tro	f" of 475 years) for medium subsoil ions. cal cyclone wind speeds No hazard: < 76 km/h	
peri con Tro	f'of 475 years) for medium subsoil ions. cal cyclone wind speeds No hazard: < 76 km/h Zone 0: 76 - 141 km/h	
peri con Tro	f" of 475 years) for medium subsoil ions. cal cyclone wind speeds No hazard: < 76 km/h Zone 0: 76 - 141 km/h Zone 1: 142 - 184 km/h	n

Zone 5 ≥ 300 km/h Typical track directions

Probable maximum intensity with an exceedance probability of 10% in ten years (equivalent to "return period" of 100 years).

Tor	nado
1	Zone 1: low
	Zone 2
1	Zone 3
	Zone 4; high

C.	No hazard*
	Zone 1: Minor hazard
	Zone 2: Moderate hazard
8	Zone 3: High hazard
*Seo	ondary effects that can occur as a re lame-scale distribution of volcanic

particles (e.g. climate impacts. supraregional ash deposits) are not considered

Extratropical	storn	1		
Peak wind spe	eds			
No haza	end			
Zone 0:	Π	Ś	80 km/h	
Zone 1:	81	-	120 km/h	
Zone 2:	121	-	160 km/h	
Zone 3:	161	-	200 km/h	
Zone 4		5	200 km/h	

Probable maximum intensity with an average exceedance probability of 10% in ten years (equivalent to a "return period" of 100 years) Areas were examined in which there is a high frequency of extratropical storms (approx 30"-70" north and south of the equator).

Global frequency of lightning strokes per km<sup>2</sup>

4 - 1010 -

Lightning frequency is determined by counting the total number of lightning flashes independently of whether they strike the

20

Zone 1: 0,2 -Zone 2: 1 -Zone 3:

Zone 5: 20 - 40

Zone 6: 40 - 80

Zone 4:

ground or not.

54	
	No hazard
	Zone 1: Very low to low
	Zone 2: Medium to high

Detailed calculations for coasts and for the shores of large lakes between 60°S and 60"N, derived from the height above the mean sea or lake level and the distance from the respective body of water. Does not consider dykes.

Hail		
	Zone 1: low	
	Zone 2	
	Zone 3	
<u> </u>	Zone 4	
	Zane 5	
	Zane 6: high	
Frequ	ency and intensity of hailstorms.	

Wildfire		
	No hazard	
	Zane 1: law	
	Zane 2	
	Zone 3	
	Zone 4: high	
The	affacts of wind areas and firs prevention	

measures are not considered.

River flood			
	Zone 0 minimal flood risk		
	Zone 500 year return period		
	Zone 100 year return period		
NAT	as threatened by extreme floods. "HAN provides global flood maps with m periods of 100 and 500 years.		

Zone 1: low
Zone 2
Zone 3
Zone 4
Zone 5
Zone 6: high

	No hazard
	Zane 1: Very law to law
	Zone 2: Medium to high
of la deriv or la	while calculation for coasts and the shore rige lakes between 60'S and 60'N, ed from the height above the mean sea ke level and the distance from the extive body of water. Does not consider is

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Lightning

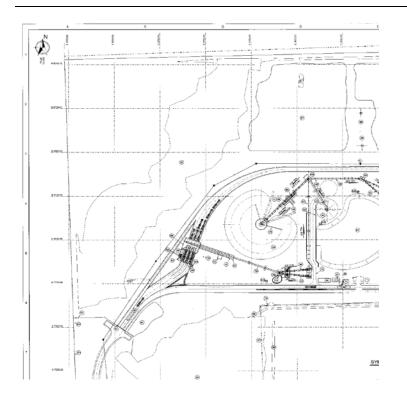
and year

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#### 25.06.2015



Global Property Engineering 175 Water Street, New York, NY 10038



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#### NFPA – 850/851 Checklist

NFPA - 850/851 CHECKLIST							
Equipment	Passive Protection	Fire Detection	Fire Protection				
Steam Turbine Generator Bearings	None	Heat	AS				
Steam Turbine Lubricating Oil Tank	Metal enclosure	Heat	AS				
Steam Turbine Control Oil Skid	Metal enclosure	Heat	AS				
Steam Turbine Lubricating Oil Piping	Welded	-	AS				
Steam Turbine Under deck Area	-	-	AS				
Generator Seal Oil Unit	Metal Enclosure	Heat	AS				
Steam Turbine Generator	Metal Enclosure	Heat	AS - Brgs				
Boiler Burner Front	Comb Controls	-	-				
Generator Transformer(s)	Walls	Heat	AS				
Auxiliary Transformer(s)	Walls	Heat	AS				
Cooling Tower(s) / Air Cooled Condenser(s)	N/A	N/A	-				
Control Room	Subdivision	Smoke	AS				
Control Room below raised floors	N/A	N/A	N/A				
Water Treatment Electrical Room	Subdivision	Smoke	AS				
HV and LV Switch Rooms	Subdivision	Smoke	N/A				
Cable Spread Areas	-	-	-				
DCS Control/Relay Rooms	Subdivision	Smoke	AS				
Local Control Centers/Essential Supplies Cubicles	Subdivision	Smoke	N/A				
Stores and Workshop	Separation	N/A	AS				
Administrative Buildings, Canteen and Offices	Subdivision	Smoke	AS				
Emergency Diesel Generator/s	Separation	Smoke	-				
Diesel Fire Pump/s	Subdivision	-	AS				
Conveyors	Interlocks	Partial	AS – some				
Conveyor Transfer Towers	Interlocks	-	AS				
Tripper Bay	Interlocks	-	-				
Bunkers	Interlocks	-	-				
Mills	Interlocks	-	AS				

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