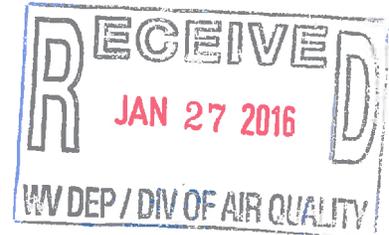




Steve Pursley
West Virginia Department of Environmental Protection
Division of Air Quality
601 57th Street, SE
Charleston, WV 25304



January 25, 2016

Re: Pleasants Energy, LLC Permit Determination for Inlet Fogging

Dear Mr. Pursley:

The Pleasants Energy facility is a 300-megawatt simple-cycle electric generating station that currently operates under Title V permit number R30-07300022-2014. Pleasants Energy, LLC plans to install inlet fogging on their existing combustion turbines at their facility located near Waverly, West Virginia. There will be no increase in overall pound per hour (lb/hr) or tons per year (tpy) emissions from the combustion turbines over their existing emission limits in their existing permit.

Project Description:

The inlet fogging will reduce the temperature of the inlet air to the combustion turbine. As a result of cooling the inlet air, the combustion turbines will be able to increase their output. Pleasants Energy will only use inlet fogging when the ambient temperature is between 73 and 92 degrees Fahrenheit and can actually not operate below temperatures of 70 degrees Fahrenheit. The inlet fogging is only beneficial at increasing output at these ambient temperatures. Because the inlet fogging will only be used during this specific temperature range, emissions will never increase above the maximum permitted emission rates for the combustion turbines. Emissions are worst-case at a low ambient temperature (when the combustion turbines ultimately have their maximum output and maximum air flow.). At the ambient temperatures of 73 to 92 degrees emissions are below their maximum permitted emission rate and with the increase of adding inlet fogging, emissions will not increase above their maximum permitted rates. Therefore, this project will not increase pound per hour (lb/hr) or tons per year (tpy) emissions for the combustion turbines. Annually, between the months of June and July, the inlet fogging may operate for up to 500 hours. (see also enclosed AMCO document, Attachment C)

Pleasants Energy seeks concurrence that no permit is required for the addition of inlet fogging. The appropriate permit determination form is included as Attachment A to this letter.

If WV DEP has any further questions on this request, please do not hesitate to contact me at 304-665-4201 or gerald.gatti@gdfsuezna.com. Thank you.

Yours Sincerely,

Gerald M Gatti
Plant Manager
Pleasants Energy LLC
Direct: 304-665-4201
gerald.gatti@gdfsuezna.com



WEST VIRGINIA
 DEPARTMENT OF ENVIRONMENTAL PROTECTION
 DIVISION OF AIR QUALITY
 601 57th Street, SE
 Charleston, WV 25304
 Phone: (304) 926-0475
 www.dep.wv.gov/daq

**PERMIT DETERMINATION FORM
(PDF)**

FOR AGENCY USE ONLY: PLANT I.D. # _____
 PDF # _____ PERMIT WRITER: _____

1. NAME OF APPLICANT (AS REGISTERED WITH THE WV SECRETARY OF STATE'S OFFICE): Pleasants Energy, LLC		
2. NAME OF FACILITY (IF DIFFERENT FROM ABOVE):		3. NORTH AMERICAN INDUSTRY CLASSIFICATION SYSTEM (NAICS) CODE: 221112
4A. MAILING ADDRESS: 10319 South Pleasants Highway, St. Mary's, WV 26170		4B. PHYSICAL ADDRESS: 10319 South Pleasants Highway, St. Mary's, WV 26170
5A. DIRECTIONS TO FACILITY (PLEASE PROVIDE MAP AS ATTACHMENT A): From 1 st Street in Waverly, head east on Highway 2 approximately 1 mile. The Pleasants Energy facility entrance is on the south side of the highway.		
5B. NEAREST ROAD: South Pleasants Highway	5C. NEAREST CITY OR TOWN: Waverly	5D. COUNTY: Pleasants
5E. UTM NORTHING (KM): 4353.573	5F. UTM EASTING (KM): 468.629	5G. UTM ZONE: 17
6A. INDIVIDUAL TO CONTACT IF MORE INFORMATION IS REQUIRED: Bruce Birbeck		6B. TITLE: Field Services Manager, Environmental Compliance
6C. TELEPHONE: 713-636-1133	6D. FAX:	6E. E-MAIL: Adam.Birbeck@gdfsuezna.com
7A. DAQ PLANT I.D. NO. (FOR AN EXISTING FACILITY ONLY): 073-00022	7B. PLEASE LIST ALL CURRENT 45CSR13, 45CSR14, 45CSR19 AND/OR TITLE V (45CSR30) PERMIT NUMBERS ASSOCIATED WITH THIS PROCESS (FOR AN EXISTING FACILITY ONLY): R30-0730022-2014 (Title V), R13-2373, R13-2373A, G60-C067	
7C. IS THIS PDF BEING SUBMITTED AS THE RESULT OF AN ENFORCEMENT ACTION? IF YES, PLEASE LIST: No		
8A. TYPE OF EMISSION SOURCE (CHECK ONE): <input type="checkbox"/> NEW SOURCE <input type="checkbox"/> ADMINISTRATIVE UPDATE <input type="checkbox"/> MODIFICATION <input checked="" type="checkbox"/> OTHER (PLEASE EXPLAIN IN 11B)		8B. IF ADMINISTRATIVE UPDATE, DOES DAQ HAVE THE APPLICANT'S CONSENT TO UPDATE THE EXISTING PERMIT WITH THE INFORMATION CONTAINED HEREIN? <input type="checkbox"/> YES <input type="checkbox"/> NO
9. IS DEMOLITION OR PHYSICAL RENOVATION AT AN EXISTING FACILITY INVOLVED? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		
10A. DATE OF ANTICIPATED INSTALLATION OR CHANGE: 04/01/2016		10B. DATE OF ANTICIPATED START-UP: 05/01/2016
11A. PLEASE PROVIDE A DETAILED PROCESS FLOW DIAGRAM SHOWING EACH PROPOSED OR MODIFIED PROCESS EMISSION POINT AS ATTACHMENT B.		
11B. PLEASE PROVIDE A DETAILED PROCESS DESCRIPTION AS ATTACHMENT C.		
12. PLEASE PROVIDE MATERIAL SAFETY DATA SHEETS (MSDS) FOR ALL MATERIALS PROCESSED, USED OR PRODUCED AS ATTACHMENT D. FOR CHEMICAL PROCESSES, PLEASE PROVIDE A MSDS FOR EACH COMPOUND EMITTED TO AIR.		

13A. REGULATED AIR POLLUTANT EMISSIONS:

⇒ **FOR A NEW FACILITY**, PLEASE PROVIDE PLANT WIDE EMISSIONS BASED ON THE POTENTIAL TO EMIT (PTE) FOR THE FOLLOWING AIR POLLUTANTS INCLUDING ALL PROCESSES.

⇒ **FOR AN EXISTING FACILITY**, PLEASE PROVIDE THE PROPOSED CHANGE IN EMISSIONS BASED ON THE PTE OF ALL PROCESS CHANGES FOR THE FOLLOWING AIR POLLUTANTS.

PTE FOR A GIVEN POLLUTANT IS TYPICALLY BEFORE AIR POLLUTION CONTROL DEVICES AND IS COLLECTED BASED ON THE MAXIMUM DESIGN CAPACITY OF PROCESS EQUIPMENT.

POLLUTANT	HOURLY PTE (LB/HR)	YEARLY PTE (TON/YR) (HOURLY PTE MULTIPLIED BY 8760 HR/YR) DIVIDED BY 2000 LB/TON
PM	No Change in Emissions	--
PM ₁₀	--	--
VOCs	--	--
CO	--	--
NO _x	--	--
SO ₂	--	--
Pb	--	--
HAPs (AGGREGATE AMOUNT)	--	--
TAPs (INDIVIDUALLY)*	--	--
OTHER (INDIVIDUALLY)*		

* ATTACH ADDITIONAL PAGES AS NEEDED

13B. PLEASE PROVIDE ALL SUPPORTING CALCULATIONS AS ATTACHMENT E.

CALCULATE AN HOURLY AND YEARLY PTE OF EACH PROCESS EMISSION POINT (SHOWN IN YOUR DETAILED PROCESS FLOW DIAGRAM) FOR ALL AIR POLLUTANTS LISTED ABOVE INCLUDING INDIVIDUAL HAP'S (LISTED IN SECTION 112[b] OF THE 1990 CAAA), TAP'S (LISTED IN 45CSR27), AND OTHER AIR POLLUTANTS (E.G. POLLUTANTS LISTED IN TABLE 45-13A OF 45CSR13, MINERAL ACIDS PER 45CSR7, ETC.).

14. CERTIFICATION OF DATA

I, Gerald Gatti (TYPE NAME) ATTEST THAT ALL THE REPRESENTATIONS CONTAINED IN THIS APPLICATION, OR APPENDED HERETO, ARE TRUE, ACCURATE, AND COMPLETE TO THE BEST OF MY KNOWLEDGE BASED ON INFORMATION AND BELIEF AFTER REASONABLE INQUIRY, AND THAT I AM A **RESPONSIBLE OFFICIAL**** (PRESIDENT, VICE PRESIDENT, SECRETARY OR TREASURER, GENERAL PARTNER OR SOLE PROPRIETOR) OF THE APPLICANT.

SIGNATURE OF RESPONSIBLE OFFICIAL: 

TITLE: Plant Manager

DATE: 01/25/2016

** THE DEFINITION OF THE PHRASE 'RESPONSIBLE OFFICIAL' CAN BE FOUND AT 45CSR13, SECTION 2.23.

NOTE: PLEASE CHECK ENCLOSED ATTACHMENTS:

ATTACHMENT A ATTACHMENT B ATTACHMENT C ATTACHMENT D ATTACHMENT E

RECORDS ON ALL CHANGES ARE REQUIRED TO BE KEPT AND MAINTAINED ON-SITE FOR TWO (2) YEARS.

THE PERMIT DETERMINATION FORM WITH THE INSTRUCTIONS CAN BE FOUND ON DAQ'S PERMITTING SECTION WEB SITE:

www.dep.wv.gov/daq

Increase Turbine Output

Gas Turbine Inlet Cooling

Attachment C

AMCO
AMERICAN MACHINERY
(704) 589-7281

AMCO



AMCO GAS TURBINE DIRECT SPRAY INLET COOLING

AMCO provides extensive engineering, manufacturing, and application knowledge of Inlet direct spray cooling systems for the gas turbine industry.

AMCO has thousands of high-pressure systems in a variety of industrial applications and is a world leader in the industry.

The AMCO Direct Spray Inlet Cooling System consists of one or more positive displacement

pumps that pressurize demineralized water to 3,000 psi. The pressurized water is fed into a series of seamless stainless steel headers connected to stainless steel nozzle manifolds, typically located immediately downstream of the high efficiency filters.

Specialized AMCO nozzles atomize the pressured water into ultra-fine droplets that evaporate quickly and efficiently even in the most humid conditions.

ADVANTAGES OF AMCO DIRECT SPRAY INLET COOLING

100% Evaporation Efficiency

Lowers inlet air to wet bulb temperature - maximizes power output

Easy to Install

Quick to install in existing inlets. Can be installed during an outage.

Low Capital Cost

Capital cost per KW generated is lowest of any power augmentation method on the market.

Low Inlet Pressure Drop

Close to zero as compared to 0.5 inch of water across media coolers and 1.0 inch of water across cooling coils.

Efficient and Durable

System operates at 3,000 psi generating the finest droplets possible. Skid and nozzle arrays made from high performance standards.

Performance

Delivers optimal power gains by tracking gradual changes in ambient temperatures through the use of multiple stages of flow.

It is a fact that turbine output increases when the mass-flow to the compressor increases as shown (Table 1). Since cooler air is denser, it provides more mass-flow.

Turbine output, depending on ambient conditions, can increase up to 20% or more.

AMCO Direct Spray Cooling is a proven, low capital method of cooling gas turbine inlet air that results in lowered operating and maintenance costs.

Quick return on investment.

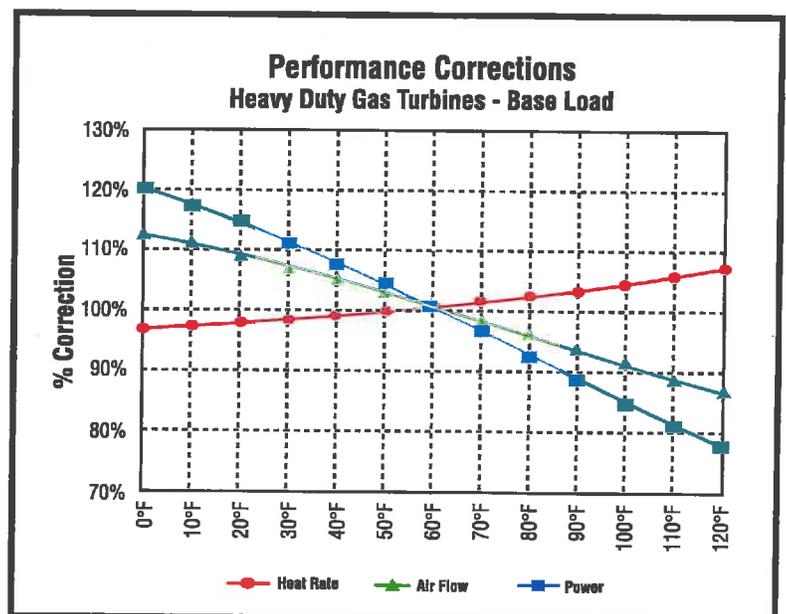


Table 1

AMCO "SWIRL JET" NOZZLE

- Higher nozzle flow - fewer nozzles required
- 90% droplet mass is less than 20 microns (Table 2)
- Smaller droplets - better evaporation
- Durable design - no impaction pin
- Safety lock wired to the manifold using aircraft industry standard locking methods
- Nozzle adapters are attached to seamless 316L SS tubing via a full penetration TIG weld in accordance with ANSI-B31.1 standards



Swirljet Nozzle
Droplet Size Distribution

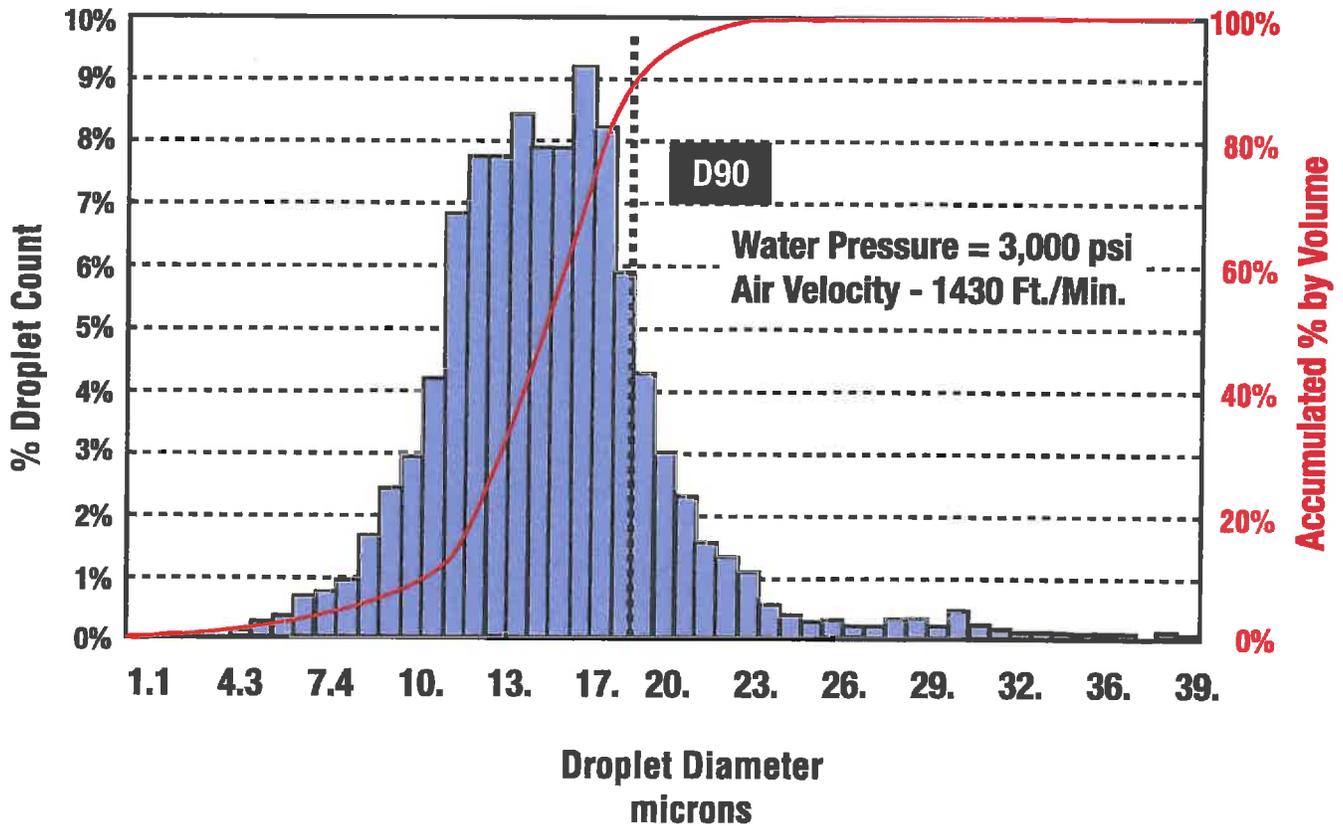


Table 2

AMCO - SIZING YOUR SYSTEM

EXAMPLE: Moisture (GPM) required to lower inlet temperature from:

Temp_{DB}=110°F to Temp_{WB}=70°F with a

Turbine Air Flow=745,388 ft³/min

Formula: See Psychrometrics (Table 3)

$$\text{GPM} = \frac{(745,388 \text{ ft}^3/\text{min})(64 \text{ grains/lb. of dry air})}{(7000 \text{ grains/lb. of water})(13.75 \text{ ft}^3/\text{lb. of dry air})(8.3\text{lbs/gallon})}$$

lbs. of moisture/hr required=59.7GPM ≈ 60GPM

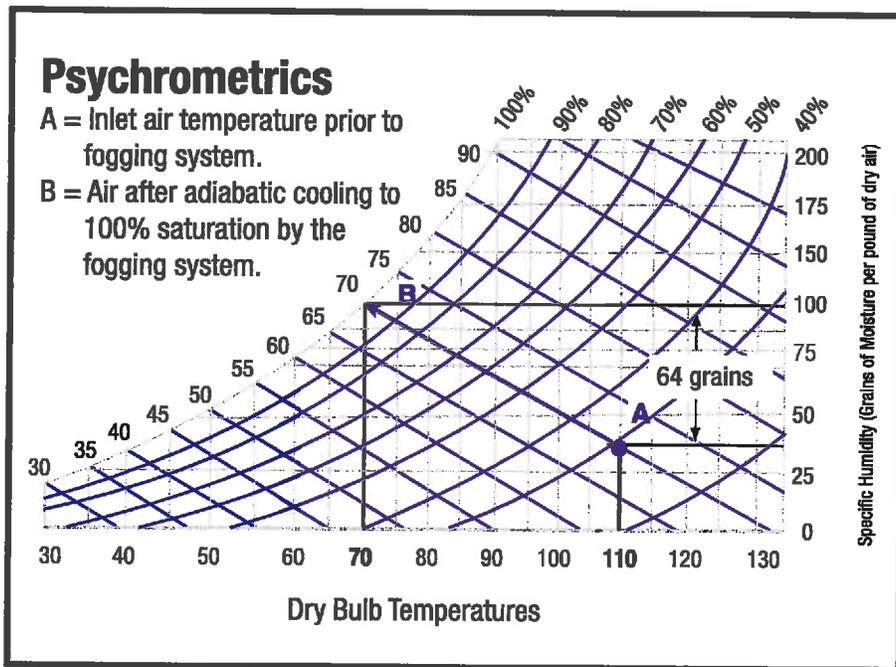


Table 3

Example continued on following page.
 See Table 4-Table 5+Figure 1- Figure 2

ACTUAL SYSTEM SIZING IS DEFINED BY SITE -
 SPECIFIC CLIMATE CONDITIONS AND GAS TURBINE INLET AIRFLOW

AMCO HIGH PRESSURE SKID AND INLET/NOZZLE ARRAY

The AMCO direct spray inlet cooling system is the pump and control skid, and inlet nozzle array engineered to meet or exceed the highest industry standards. In the example the AMCO skid is providing 60GPM with (6) cooling zones, (32) nozzle lines, allowing (33) separate stages of cooling at increments of 1.3°F (Fig 1-Table 4-Table 5)

High Pressure Skid



Spray Zone Flow Table

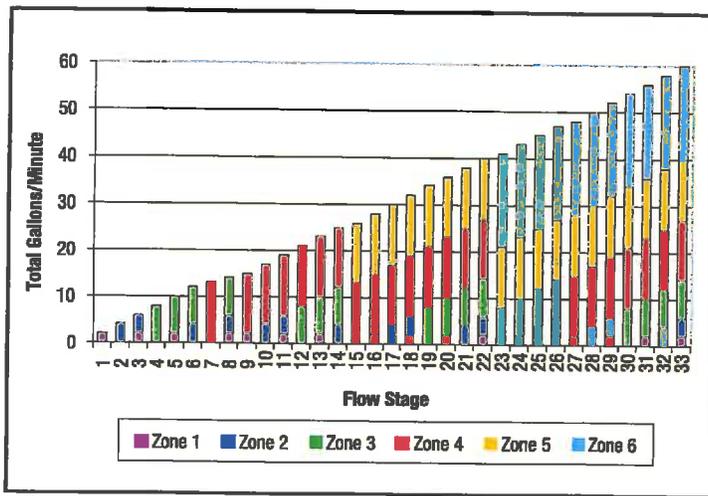


Table 4

Nozzle Array

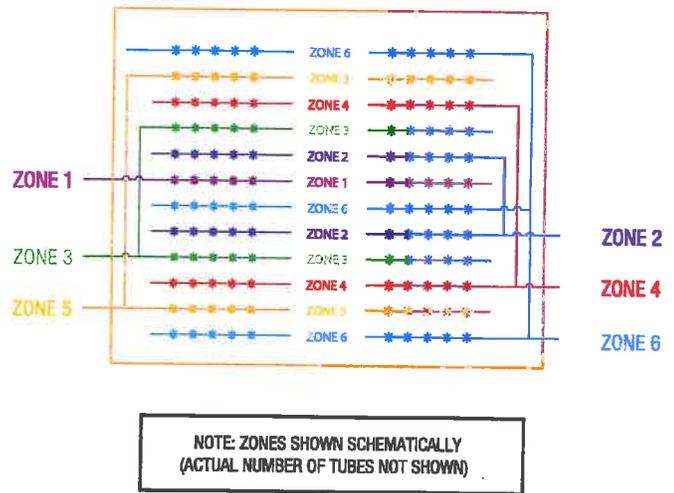


Figure 1

Cooling Increment Table

Zone Flow at 110°F, 70°F T _{wb} 40°F Cooling					
Zone	Lines	Nozzle	%Flow	GPM	Cooling
1	1	29	3.3%	2	1.3°F
2	2	58	6.6%	4	2.6°F
3	4	114	13.3%	8	5.3°F
4	7	186	21.7%	13	8.7°F
5	7	186	21.7%	13	8.7°F
6	11	286	33.4%	20	13.4°F

Flow to be provided in 33 stages, allowing cooling increments of ~1.3°F

Table 5

Inlet Side View

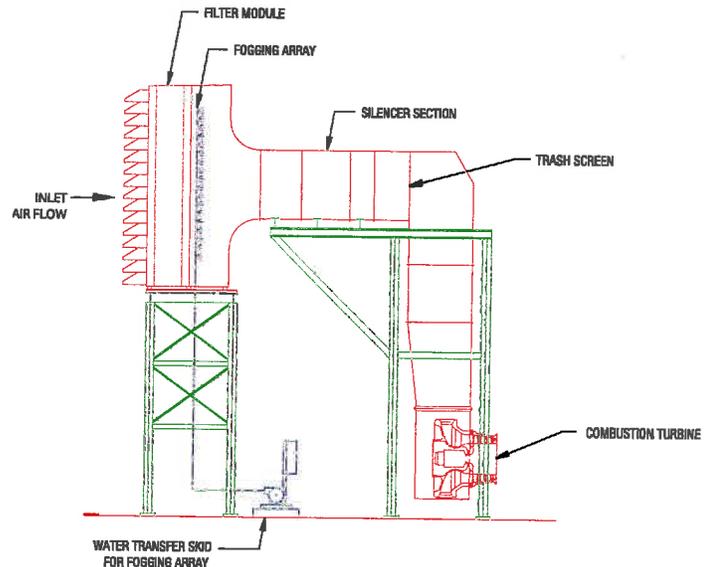


Figure 2

AMCO SYSTEM CONTROLS

Control of the inlet coolers can be accomplished with one of three methods:

- *Personal computer (PC)*
- *Programmable logic controller (PLC)*
- *Direct programming into a plant digital control system (DCS)*

A typical AMCO control system delivers precise cooling control with typical increments of 1°F with PLC logic managing multiple cooling zones.

Each zone consists of one or more nozzle manifold lines being opened. Optimum cooling is achieved with an algorithm that selects the needed flow stage of one or more zones.

Fig 3 and Fig 4 below represent (2) of many screens available on the user-friendly operator interface panels to monitor system performance and perform system diagnostics.

Control - Panel View - Operator Interface Screens

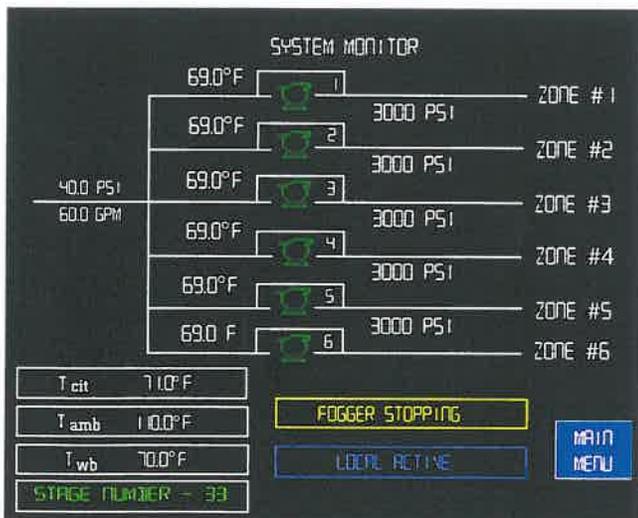


Figure 3

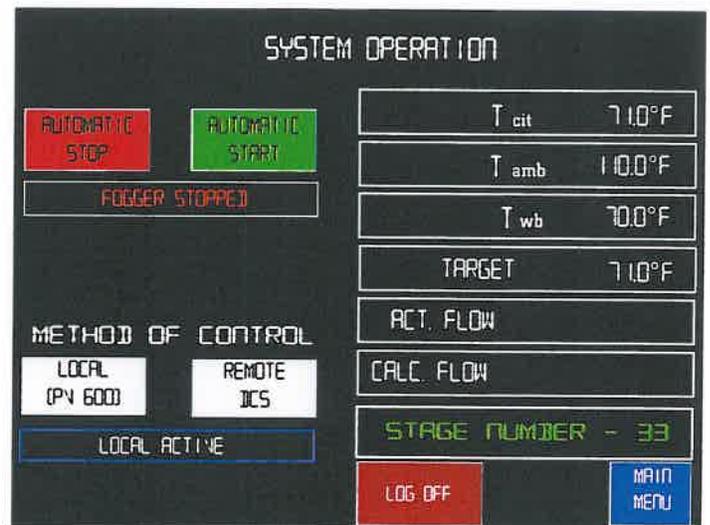
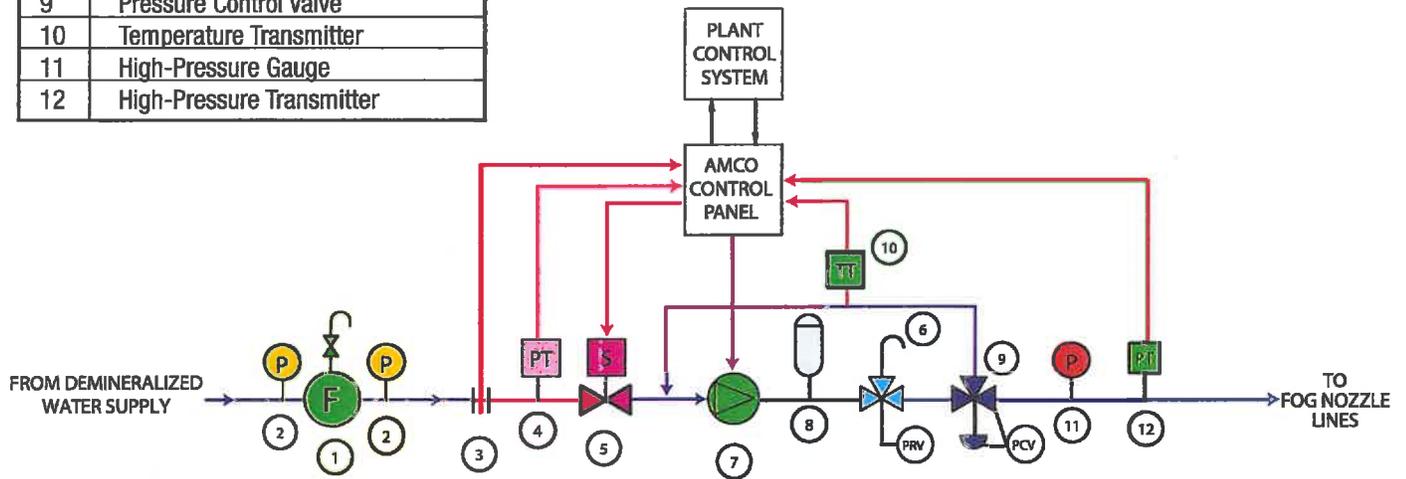


Figure 4

TYPICAL PIPING AND INSTRUMENTATION DIAGRAM

No.	Description
1	Filter
2	Low-Pressure Gauge
3	Flow Meter/Transmitter
4	Low-Pressure Transmitter
5	Low-Pressure Solenoid Valve
6	Pressure Relief Valve
7	High-Pressure Pump
8	Pulsation Dampener
9	Pressure Control Valve
10	Temperature Transmitter
11	High-Pressure Gauge
12	High-Pressure Transmitter



AMCO AUXILIARY PRODUCTS FOR THE GAS TURBINE INDUSTRY

- Enclosures
- Inlet filter houses
- Mist eliminators
- Water forwarding skids
- Water purification systems
- Evaporative coolers
- Water wash systems
- Direct evaporative cooling for heat exchangers
- Control Panels

Contact us for more information regarding the above products.

800 948 5540

ABOUT AMCO

American Moistening Company (AMCO) was founded in 1888 in Providence, Rhode Island, to service the air handling and humidifying needs of the textile industry. In 1929, it relocated to North Carolina to follow the movement of the textile industry to the southeast. In the early years, AMCO served the textile industry using compressed air atomization of water and conventional air washers.

In the 1970's, AMCO expanded to meet the needs of new industries. These markets demanded a more economical means of humidifying process air. In response, American Moistening Company introduced its direct spray, high-pressure water system. Since the introduction of its high-pressure system, AMCO has installed thousands of systems in the textile, woodworking, printing, automotive, and the industrial HVAC markets.

AMCO has applied its knowledge and technical know-how of high-pressure systems to the gas turbine inlet cooling market. AMCO is committed to providing the same high standards of engineering competency and excellence that it has been providing for years.

AMCO is capable and anxious to assist you with your inlet cooling requirements. Let our Sales Engineers show you the economic benefits of AMCO Direct Spray Cooling. Increase your power output by up to 20% or more with minimal outage and low capital cost.



10402 Rodney Street • Pineville, NC 28134
Phone: (704) 889-7281 • Toll Free In U.S.A.:(800) 948-5540 • Fax: (704) 889-7270
Email: amco@amco.com

the technically superior solution