ORIGINAL

BEFORE THE ARIZONA POWER PL[illegible]
TRANSMISSION LINE SITING COMMITTEE

IN THE MATTER OF THE APPLICATION OF NORTHERN ARIZONA ENERGY, LLC, IN CONFORMANCE WITH THE REQUIREMENTS OF ARIZONA REVISED STATUTES 40-360.03 AND 40-360.06, FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AUTHORIZING CONSTRUCTION OF A 175 MW NATURAL GAS-FIRED, SIMPLE CYCLE GENERATING FACILITY AND ASSOCIATED TRANSMISSION LINE INTERCONNECTING THE GENERATING FACILITY TO THE ADJACENT WESTERN AREA POWER ADMINISTRATION GRIFFITH SWITCHYARD, ALL LOCATED IN MOHAVE COUNTY APPROXIMATELY 9 MILES SOUTHWEST OF KINGMAN, ARIZONA.	DOCKET NO. L-00000FF-07-0134-00133 Case No. 133

APPLICANT'S NOTICE OF FILING SUPPLEMENTAL INFORMATION

Applicant, Northern Arizona Energy, LLC, hereby provides notice that it is filing herewith Supplemental Information in response to requests by Chairman Woodall, Committee members or parties.

RESPECTFULLY SUBMITTED this 2nd day of October, 2007.

MOYES STOREY, LTD.

Jay I. Moyes
1850 N. Central Avenue, Suite 1100
Phoenix, Arizona 85004
(602) 604-2141

Original and Twenty-Eight (28) copies of the foregoing filed this 3rd day of October 2007 with:

Docket Control
Arizona Corporation Commission
1200 West Washington Street
Phoenix, Arizona 85007

Copy of the foregoing hand-delivered and/or Federal Expressed this 3rd day of October 2007 to:

Laurie Woodall, Chairman
Arizona Power Plant & Transmission
Line Siting Committee
1275 West Washington
Phoenix, Arizona 85007
Laurie.Woodall@azag.gov

Maureen A. Scott, Senior Staff Counsel
Legal Division
Arizona Corporation Commission
1200 West Washington Street
Phoenix, Arizona 85007
mscott@azcc.gov

Kenneth C. Sundlof, Jr.
Jennings, Strouss & Salmon, PLC
The Collier Center, 11th Floor
201 East Washington Street
Phoenix, Arizona 85004-2385
Sundlof@sslaw.com

Jack Ehrhardt
P.O. Box 179
Peach Springs, AZ 86434
hualapaiplanning@citlink.net

Northern Arizona Energy Project
Case No. 00133
October 2, 2007
Supplemental Information Package

Applicant's Responses to Questions and Data Requests from the Arizona Power Plant and Transmission Line Siting Committee and/or Intervenors at the September 17-18, 2007 Public Hearing in Phoenix, Arizona

1. Provide the output and heat rate degradation for a peaking power plant that does not use any water for inlet air cooling, combustion enhancement, or NOx control.

Question submitted by Mr. Haenichen, Siting Committee member

Response 1

The combustion turbine generators are air-cooled, therefore, "dry-cooling" is part of the Project design.

Water is consumed by the Project for three processes. The chiller module cools the inlet air temperature. The lower inlet air temperature increases output and improves efficiency. Secondly, water is injected into the combustion turbine to reduce NOx emissions by 70%. This represents 40% of the water use. Finally, Spray Inter-cooling technology (sometimes referred to as fogging) sprays micro-droplets of atomized water into the inter-stage air stream between the low pressure and high pressure compressors. The water is atomized to a droplet diameter of less than 20 microns by using inter-stage bleed air and special nozzles. As the droplets evaporate, the air temperature is reduced and the mass flow is increased. This results in greater power output and better fuel efficiency. Of the proposed water use by the Project, inlet air cooling consumes 45%, NOx control consumes 40% and SPRINT consumes the remaining 15% of the water. The effect of eliminating water use in the Project is presented in the following table.

High temperature day (113F)		Average Day (90F)	
Output (MW)	Heat Rate (btu/kwh)	Output (MW)	Heat Rate (btu/kwh)
- 81.9	+ 685	- 61.5	213
- 47%	*7.6%*	*- 35%*	*2.4%*

For a peaking plant with no water use, the capacity of the units decreases 47% during a high temperature day and 35% on an average ambient condition day. The heat rate increases; therefore, the fuel efficiency of the units decrease 7.6% on a high temperature day and 2.4% on an average ambient condition day.

2. Provide information on the GE Spray-Intercooling or SPRINT technology

Question submitted by Mr. Ehrhardt, Intervenor

Response 2

Information describing this GE technology is provided in Section 4.2.1 of the CEC Application and reads:

"Each CTG will also be provided with a SPRINT (SPRay INTer-cooling) system, which enhances the efficiency and output of the gas turbine engine by spraying micro-droplets of atomized water into the inter-stage air stream between the low pressure and high pressure compressors. The water is atomized to a droplet diameter of less than 20 microns by using inter-stage bleed air and special nozzles. As the droplets evaporate, the air temperature is reduced and the mass flow is increased. This results in greater power output and better fuel efficiency."

Applicant has also provided as **Attachment 1** a power point presentation from General Electric providing additional information on the SPRINT technology.

3. Provide the Applicant's views on the definition of "Plant" in A.R.S. 40-360.06(9)

Question submitted by Chairman Woodall

Response 3

In October, 2006, Applicant sought guidance on this issue from Commission Staff in a formal meeting with Staff, including the Director of the Utilities Division. Applicant subsequently complied with the Director's request to further clarify the questions regarding the applicability of A.R.S. 40-360 *et seq.* to various alternative proposed configurations and locations then under consideration for NAEP. However, Commission Chief Counsel later communicated to Applicant's counsel that Staff would not be providing any guidance or direction on this issue as Staff did not want to prejudge any potential Commission ruling on the matter. Consequently, in the absence of any guidance or direction from Staff, Applicant and its counsel and advisors considered the overall legal, political, and public interest factors and implications for the permit schedule for the Project. After weighing, (i) the public's interest in full disclosure and public participation and input with respect to such a project, (ii) Applicant's goal to construct NAEP as expeditiously as possible with minimum exposure to the delay and expense of unpredictable legal or regulatory challenges, and (iii) the legal protections that the CEC process offers , it was determined that the most prudent course of action by which to achieve an expeditious permit process and minimize the risk of unpredictable challenge to the Project was to submit the Application and seek a CEC for NAEP.

Applicant then met with each member of the Commission and/or his/her policy advisor and discussed the proposed project, in preparation for and in advance of filing its Application. Those meetings produced no direction or feedback inconsistent with Applicant's expressed decision to pursue a CEC through an Application pursuant to A.R.S. 40-360 *et seq.*

Having voluntarily submitted an Application requesting a CEC, which Application was duly referred to the Committee, and having presented substantial supportive testimony and other evidence, which has been heard and considered by the Committee, Applicant believes that the Committee and the Commission have the requisite jurisdiction to issue a CEC for this specific project, under these specific facts, without regard to whether, in the abstract, the definition of "Plant" would have mandated such Application.

Accordingly, this Applicant expresses no legal opinion regarding the interpretation, in the abstract, of A.R.S 40-360 (9) defining "Plant".

It does appear to Applicant, however, based upon the interest in this question expressed to Applicant by third parties, that some clarification by the Commission on this issue in the abstract would probably be welcomed by future potential applicants.

4. Provide Applicant's view on whether the Siting Committee should make a finding of need.

Question submitted by Chairman Woodall

Response 4

While the applicable statutes and rules do not appear to expressly call for a finding by the Committee regarding need for the subject proposed facilities, neither do they preclude such. Inasmuch as the Committee has heard testimony and reviewed evidence, in this case and generally in other such cases, regarding the role of and need for the specific proposed facilities in the overall electric supply picture, it would seem both appropriate and legal for the Committee to express some finding or conclusion regarding that question, if it has formed one at the end of the proceedings. But, it would appear that it is not necessary for the Committee to do so in order to comply with its statutory duty.

Pursuant to A.R.S. 40-360.07(B), upon timely request by a qualified party for review by the Commission of a Committee decision, the Commission, in arriving at its decision to either confirm, deny, modify or grant a certificate, is charged with balancing, "in the broad public interest, the need for an adequate, economical and reliable supply of electric power with the desire to minimize the effect thereof on the environment and ecology of this state." The antecedent of "thereof" in this statutory charge can only reasonably be construed to be "the need for an adequate, economical and reliable supply of electric power". If such review is requested in this case, the Commission will consider the broader question of the need for electric power generally, against which to balance the broad issue of the environmental impact of providing such power. In Applicant's view, the broad need for reliable electric power is a statutory presumption, given that the expectation of reliable electric service has become a "birthright" foundation of modern life in America. Nevertheless, to the extent that the Committee reaches a conclusion that NAEP would help satisfy that broader need for electric power, Applicant would think it helpful to the Commission for the Committee to express such as a finding in the Certificate.

5. **Provide <u>hard copies</u> of the following cases that were part of the System Impact Study (SIS) performed by Western Area Power Administration.**

   a. Base Case (N-0)
   b. Western generation at minimum and Nevada generation displaced by NAEP
   c. Western generation at maximum and NAEP meeting incremental regional load growth
   d. One N-1 case which results in overloading of Davis-McConnico 230 kV line, resulting in 75 MW of generation curtailment.

   With each case, provide a Summary Table showing MW level of Arizona generators in the case.

   Data Request submitted by Mr. Prem Bahl on Wednesday, September 19, 2007

   <u>Response 5</u>

   These cases cannot be provided in hard copy. Applicant offered to provide the electronic version of each case in the GE Powerflow model to Mr. Bahl; however, Mr. Bahl communicated that he does not have access to the GE Powerflow model. Applicant issued an excel spreadsheet that presented the information requested by Mr. Bahl via email on September 24, 2007 at 10:41am.

6. **Is it correct that the load growth was only 180 MW in the cases that reflected NAEP serving incremental regional load growth? If the load growth was only 180 MW why does the SIS indicate that 2008 loads were increased to 2013 loads?**

   Data Request submitted by Mr. Prem Bahl on Wednesday, September 19, 2007

   <u>Response 6</u>
   Only the UNS loads were increased to the 2013 levels. In other words, the UNS load is anticipated to grow by 180 MW by the year 2013 relative to 2008 load levels.

7. **In the SIS, please confirm that generation was increased proportionately in the whole system.**

   Data Request submitted by Mr. Prem Bahl on Wednesday, September 19, 2007

   <u>Response 7</u>
   Generation levels of the surrounding system were determined by the WECC system members.

8. **Provide Applicant's opinion of pages 23 (Advantages of Dry Cooling) and 24 (Disadvantages of Dry Cooling) of Document I-2 (submitted by Mr. Ehrhardt) titled "Power Plant Cooling Technology, Prepared for: Mohave County Public Land Use Committee, June 18, 2002".**

Request submitted by Mr. Smith, Siting Committee Member

Response 8

Document I-2 is a power point presentation prepared by Kevin A Davidson, AICP, Planner II, Mohave County Planning and Zoning Department, based on a separate presentation made at a symposium sponsored by the Air and Waste Management Association, San Diego Chapter (May 31/June 1, 2002).

Document I-2 addresses Wet and Dry cooling systems for combined cycle power plants. Cooling in this context is addressing heat rejection (page 3). All technology descriptions, pictures, and water use quantities depicted in this presentation address combined cycle technology (gas turbine, heat recovery steam generator, steam turbine generator and cooling towers), not a simple cycle gas turbine technology such as that proposed for the Northern Arizona Energy Project. Consequently, this document has no real relevance to NAEP.

Even though this document (I-2) is not relevant to NAEP for the reasons discussed above, the Applicant does provide the following comments on the advantages and disadvantages of dry-cooling as specifically requested by Siting Committee Member, Mr. Smith, even though they apply only to combined-cycle projects.

FROM THE DOCUMENT I-2:

Page 23: Advantages of Dry Cooling

- No Makeup Water for the cooling system
- Less expensive to maintain
- Do not require chemical additives or periodic cleaning
- Lesser cycle makeup water supply
- Conform with the environmental legislation on thermal pollution and blow-down disposal.
- Good performance in cold weather
- Permit power plants sitting (sic) near the fuel sources and the utility load-distribution center
- The reduction of the total water consumption runs approximately 90%

Applicant's comments on purported Advantages:

- Good performance in cold weather may be an advantage but not very applicable to the desert southwest environmental. "Good Performance" is a relative term when comparing dry and wet cooling. For a combined cycle facility, Wet Cooling has a performance advantage over Dry Cooling for all ambient conditions. This comparative advantage is significantly greater at the high ambient conditions that are typical for Griffith.

- Do not agree that dry cooling allows power plants to be sited near a fuel source and utility load-distribution centers as many factors determine beneficial siting locations including transmission infrastructure, air regulations, etc. There is no discussion of noise or the physical size constraints associated with mechanical chillers (many large fans) that would make it prohibited to be near residential properties
- Maintenance of water system vs mechanical chillers

Page 24: Disadvantages of Dry Cooling

- Lower power plant efficiency
- Lower performance in hot weather
- More expensive than wet towers
- Possibility of hot air recirculation reentering into the heat exchanges, decreasing cooling performance.
- The warm air leaving the dry-cooling system may be mixed into the gas turbine intake air, greatly reducing the performance of the whole combined cycle.

Applicant's comments on purported Disadvantages:

- The combination of (i) lower output in hot weather, (ii) lower fuel efficiency and (iiii) high capital cost, presents a major economic impact for any combined cycle project.
- Noise should be listed as a disadvantage. Enclosures can be included in the design to control sound; however, enclosures lower the efficiency of the fans and circulation, requiring higher horse-power motors to produce equivalent cooling. This further lowers output of the combined cycle unit.

GE Aeroderivative and Package Services

A GE Power Systems Business

LM6000 SPRINT™

For PC or Uprated PA Models

SPRINT™ Kit Details

Description

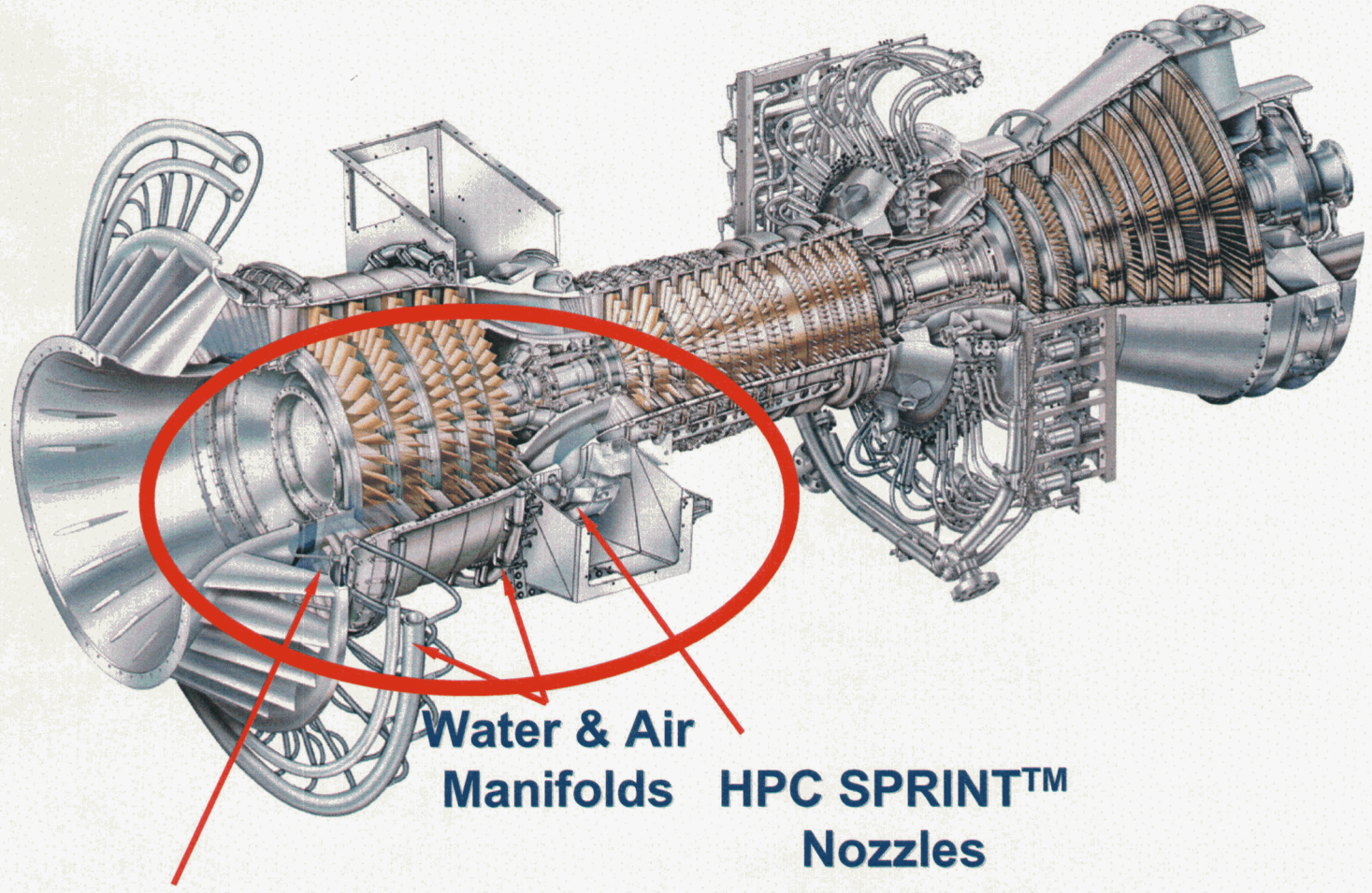
- SPRINT™ stands for **SPR**ay **INT**ercooling
- The SPRINT™ system increases power output by injecting water into the compressor
  - Allows engine to run at higher firing temperature—more power
  - Increases overall mass flow—more power

Operation

- Injection of water into the HPC (36F-45F)or LPC compressor (>45F)
- Water spray system operation at base load only

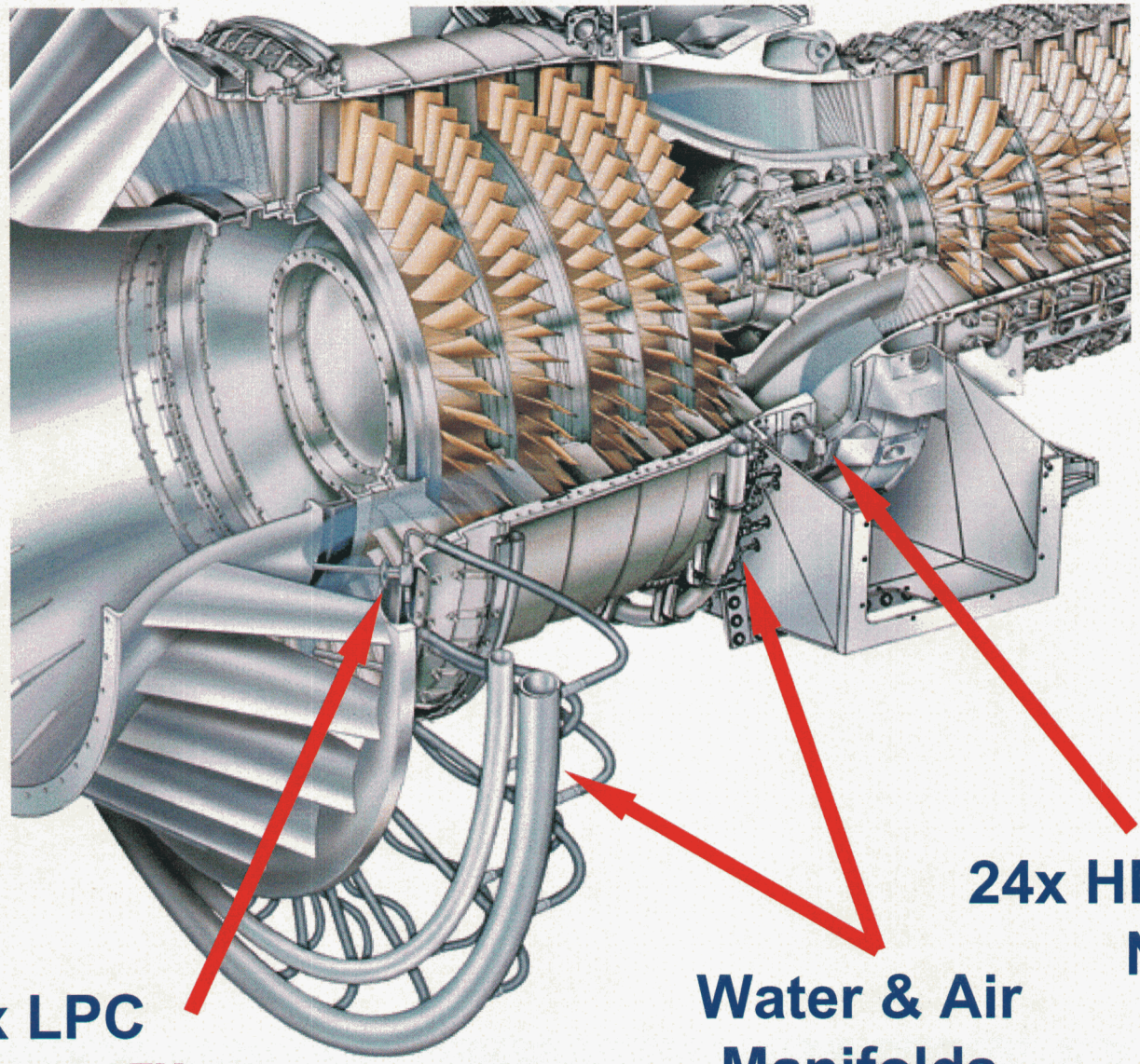
Sprint™ Features

Uses less than 5m³/hr of deionized water



imagination at work

Details



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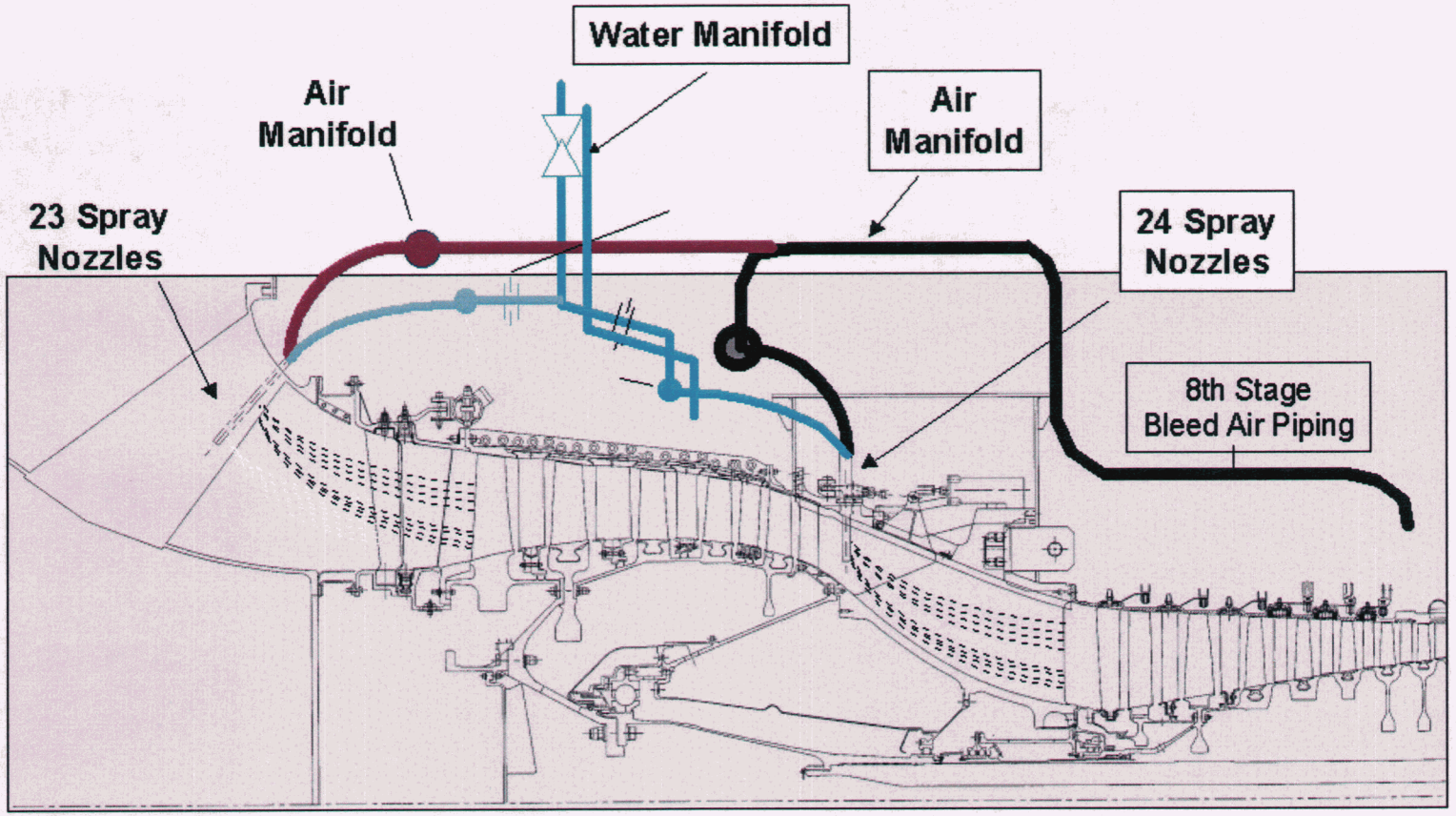
Enhanced SPRINT™ Cross-Section

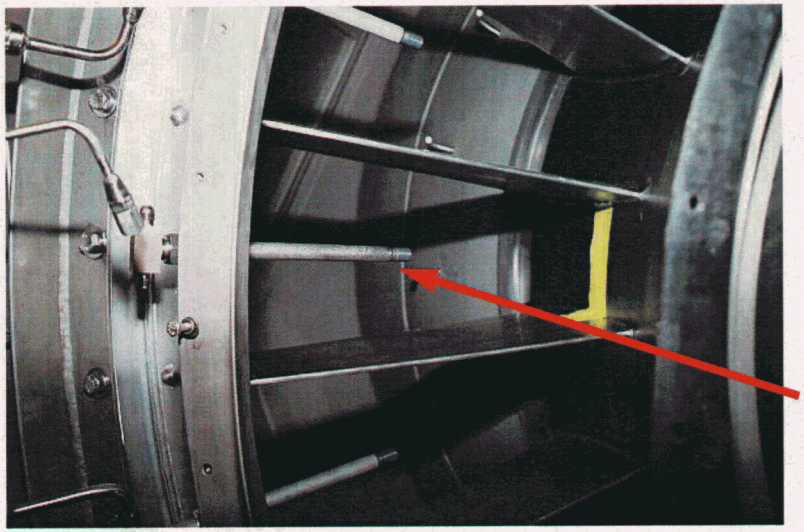
GE Aero Energy Products

Quality

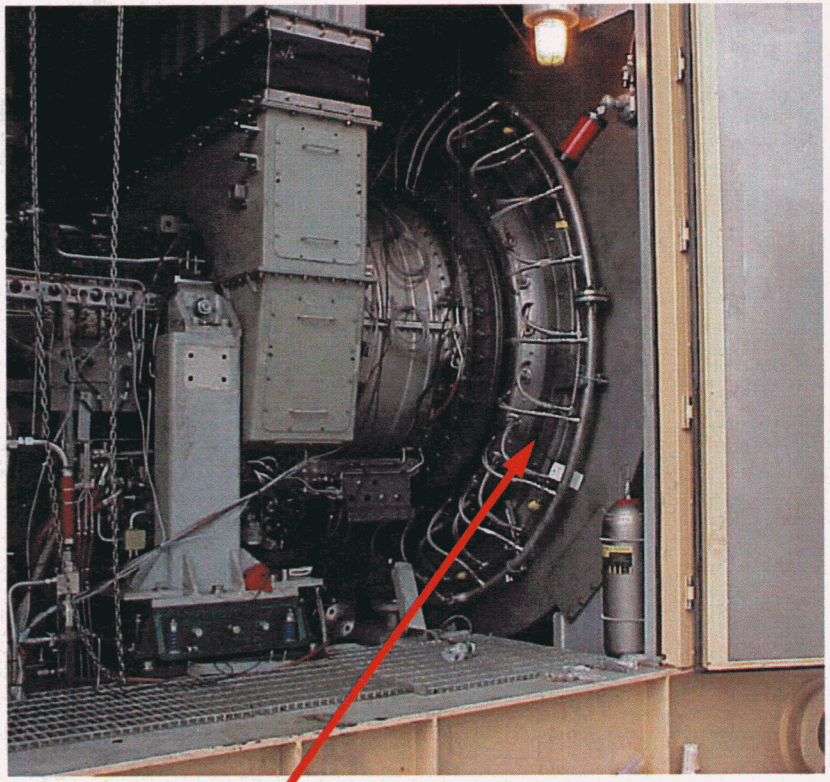


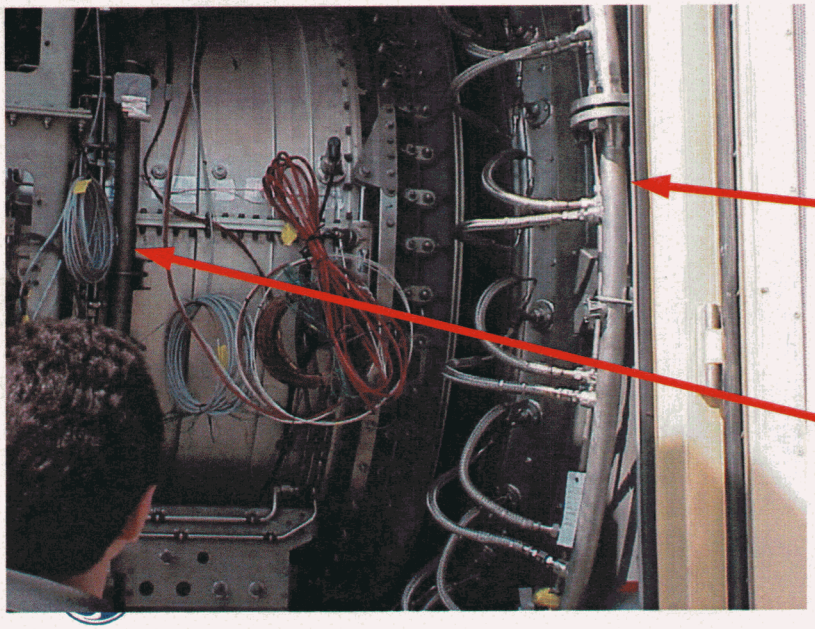
LM6000 Reliability . . . With Significantly More Power

Sprint™ System Components



LPC Inlet Nozzles





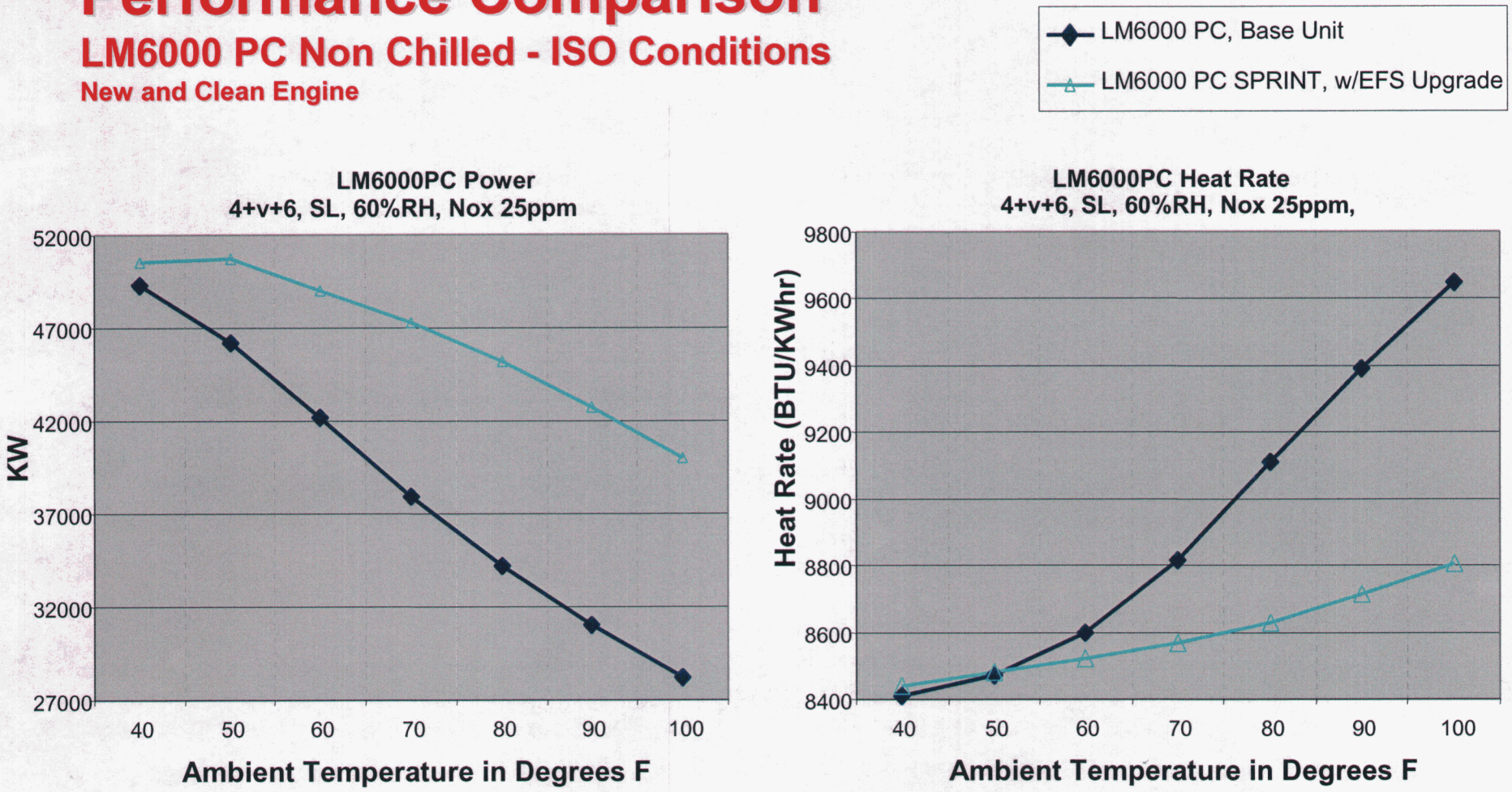
Sprint™ LPC Inlet Mist Spray Manifolds

Sprint™ HPC Inlet Mist Spray Manifolds

Performance Comparison

LM6000 PC Non Chilled - ISO Conditions

New and Clean Engine



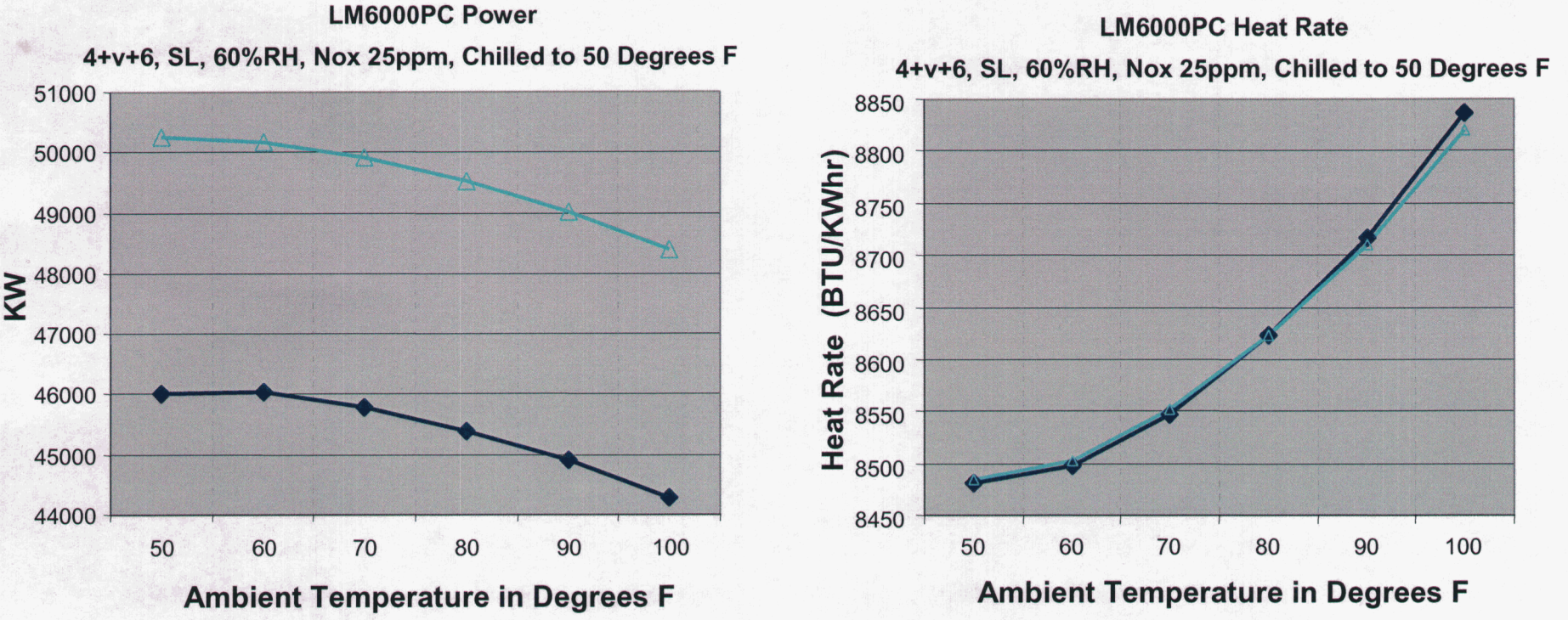
For Non Chilled Units SPRINT™ Uprate and EFS Upgrade Yields Average Power Increase of 9 MW Versus Base PC Units…With Heat Rate Improvement.

Performance Comparison

LM6000 PC Chilled to 50 Degrees F

New and Clean Engine

Note: Power and Heat Rate Adjusted for Parasitic Chiller Load



For Chilled Units SPRINT™ Uprate and EFS Upgrade Yields Average Power Increase of 4 MW Versus Base PC Units…with Slight Heat Rate Improvement.