A.K. (BEN) SHARMA, P.E.
DIRECTOR OF POWER SUPPLY

KUA
KISSIMMEE UTILITY AUTHORITY

P.O. BOX 423219 KISSIMMEE, FLORIDA 34742-3219
(407) 933-7777 FAX: (407) 847-0787

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AIR REGULATION

August 3, 1998

Mr. Hamilton S. Oven, Jr.
Office of Siting Coordination
Florida Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, FL 32399-2400

PA 98-38

Dear Mr. Oven:

The Kissimmee Utility (KUA) and the Florida Municipal Power Agency (FMPA) are pleased to submit this Site Certification Application (SCA) for Units 1-3 at the Cane Island Power Park in Osceola County. Units 1 and 2 are existing facilities; Unit 3 is proposed for development. All units are combustion turbines in either simple or combined cycle mode firing natural gas as the primary fuel. Certification is sought for these three units and a new associated transmission line. Fifteen copies of the SCA and a check for the application fee are enclosed with this letter.

A petition to determine the need for Unit 3 was jointly filed with the Public Service Commission (PSC) by KUA and FMPA on July 1, 1998. The PSC has scheduled a prehearing for August 31, and the formal Need hearing for September 17-18, 1998.

We look forward to working with you and your staff as this request progresses through the certification process.

Sincerely,

AK Sharma

A. K. (Ben) Sharma, P.E.
Director of Power Supply

AKS/rdw

Enclosures:

cc: Robert Williams, FMPA

2 note books Vol 2 + Vol 3 on top of KT's file cabinet 8/12/99

now in main file rm 3/00 KT

Black & Veatch

MEMORANDUM

RM File 49.000
August 3, 1998

KUA/FMPA
Cane Island Power Park
Site Certification Application
Volumes 2,3 & Appendix 10.7

To: Distribution of KUA/FMPA Manual

From: Controlled Documents Center

Project Management has placed the subject manual under controlled distribution through the Controlled Documents Center (CDC).

This memo conveys your assigned copy of the manual. It is serialized and your name is recorded as the holder. Revisions to the manual will be distributed by this office; however, keeping the manual current shall be the responsibility of the individual holder.

Should your job status change and you no longer require this manual, please return it to the Controlled Documents Center PGE, for reassignment.

ksb
Attachment

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Roy Young	KUA/FMPA-07 *	
Ken Van Assenderp	KUA/FMPA-08 *	c/o Young, VanAssenderp & Varnadoe Firm
Tasha Buford	KUA/FMPA-09 *	
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H. S. Oven/FDEP	KUA/FMPA-19 thru 38	(20 copies)

cc: M. Soltys

2-3

BLACK & VEATCH LLP

8400 Ward Parkway, P.O. Box No. 8405, Kansas City, Missouri 64114, (913) 458-2000

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AIR REGULATION

Kissimmee Utility Authority
Cane Island Unit 3

B&V Project 59140
B&V File 15.0203
May 26, 1998

Via FEDEX and Fax

Florida Department of Environmental Protection
Division of Air Resources Management
Bureau of Air Regulation
Twin Towers Office Building, MS #5505
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Subject: Pre-Application Meeting-
Air Dispersion Modeling
Methodology

Attention: Cleave Holladay

Gentlemen:

Thank-you for the opportunity to meet with you last Wednesday, May 20, 1998, regarding PSD pre-application issues for the proposed Cane Island Power Park modifications. As you recall, the purpose of the meeting was to review and agree on the proposed methodology and content of the Cane Island Unit 3 PSD air permit application and air dispersion modeling workplan. Throughout the course of the meeting, several air dispersion modeling issues pertaining to the PSD air quality impact analysis were discussed. The purpose of this letter is to summarize the proposed air dispersion modeling methodology in order that it may serve as a workplan for conducting the forthcoming PSD air quality impact analysis.

The following decisions regarding the air dispersion modeling analysis were made during the course of the meeting:

- Air Dispersion Model: ISCST3 (Ver. 97363).
- Model Options: EPA default and flat terrain.
- Screening Modeling: Envelope worst-case emission and stack parameter data across multiple vendor and ambient temperature data for each of 3 load points. *The term envelope refers to selecting the highest emission rate, lowest exit velocity, and lowest exit temperature*

from a range of operating conditions. Model each "enveloped" representative load data set to determine which results in the highest impact on a 1-hour basis using SCREEN3 worst-case meteorological data in ISC on a pollutant by pollutant basis.

- Refined Modeling: The enveloped load data resulting in the highest ground-level impact for each pollutant in the screening analysis will be used in the refined modeling analysis with sequential meteorological data.

- GEP & Downwash: EPA's BPIP program will be used to determine GEP stack height and direction specific building downwash for the HRSG stack and bypass stack.

- Receptor Grids: The modeling analysis will use a 10 km nested rectangular receptor grid consisting of 100 m spacing out to 1 km, 500 m spacing from 1 to 5 km, and 1,000 m spacing from 5 to 10 km. Additionally, fenceline receptors at 50 m spacing and 100 m fine grids at the maximum impact locations will be used.

- Dispersion Coefficients: Rural; based on a visual inspection of a 7.5 minute USGS topographic map of the site using the Auer method.

- Meteorological Data: For screening level modeling, a matrix of worst-case meteorological parameters based on the SCREEN3 model will be used. Refined level modeling will use sequential meteorological data consisting of the most recent 5 years of surface and upper air data available for Orlando and Tampa/Ruskin, respectively.

- Modeled Impacts: It is anticipated that the maximum model predicted impacts will be less than the PSD significant impact levels (SILs) for all applicable pollutants and averaging times. If this is not the case, additional agency consultation regarding increment and ambient air quality impact analyses will be initiated.

- Class I Analysis: A regional haze visibility study and Class I SIL analysis will be performed for the Chassahowitzka NWR located approximately 105 km northwest of the site.

- Toxics: A toxic modeling analysis is not required.

If you have any questions or comments regarding the aforementioned air dispersion modeling methodology, please do not hesitate to call me at 913-458-7928.

Very truly yours,

BLACK & VEATCH

T. M. Hillman
Air Quality Scientist

tmh

cc: Al Linero (FDEP/DARM/BAR)
Ben Sharma (KUA)
Jeff Ling (KUA)
Tasha Buford (YVV)

5-20-98

TERESA HERON	DEP/BAR	850-921-9529
CLEVE HOLLADAY	DEP/BAR	850-921-9530
Myron Rollins	KUA/B&V	913-458-7432
Tasha Buford	KUA/YVVB	850-222-7206
Buck Oven	DEP/Siting	850-487-0472
Al Linero	DARM/BAR	850-921-9523
Tim Hillman	B+V - Air Permitting	913-458-[illegible]
Brian Petermann	B&V, Air Quality Unit Leader	913-458-7459
Jeff King	KUA	407 933 7777

Meeting Agenda

Cane Island Power Park - Unit 3

Purpose: **Air Permitting Requirements**
Location: **FDEP/DARM/BAR - Tallahassee Offices**
Date: **May 20, 1998**

I. Introductions

II. Project Overview (Attachment 1)
- A. Project Location
- B. Project Description
- C. Schedule

III. PSD and other Air Requirements
- A. Attainment Status
- B. NSR PSD Applicability
- C. BACT
  - 1. Expected Emission Levels
  - 2. Recent BACT Determinations
- D. Air Quality Impact Analysis
  - 1. Air Dispersion Modeling Workplan
    - a. Emission Unit Description and Operating Scenarios
    - b. Air Dispersion Model
      - (1) Model Options
      - (2) Screening Modeling
      - (3) Refined Modeling
    - c. GEP and Building Downwash
    - d. Receptor Grids and Terrain
    - e. Dispersion Coefficients
    - f. Meteorological Data
  - 2. Model Predicted Impacts
    - a. Significant Impact Area
    - b. Determination of Preconstruction Monitoring Requirements
    - c. Ambient Air Quality Standards
    - d. Increment Analysis
  - 3. Additional Impact Analyses
    - a. Commercial, Residential, and Industrial Growth
    - b. Vegetation and Soils
    - c. Visibility
    - d. Class I analysis
- E. Toxics

IV. PSD Application

- A. Application Forms
- B. Submittal Format
  1. FL Electric Power Plant Siting Act
  2. Technical Support Document Format (Proposed TOC-Attachment 2)
- C. Concurrent Operating Permit Processing
- D. Review Schedule
- E. Application Fees

Cane Island Power Park - Unit 3
Kissimmee Utility Authority/Florida Municipal Power Agency

KUA and FMPA are proposing to develop a new electrical power generating unit at the Cane Island Power Park near Intercession City in Osceola County. The Power Park currently includes a 40 megawatt (MW) simple cycle combustion turbine unit (Unit 1) and a 120 MW combined cycle combustion turbine unit (Unit 2). Cane Island 3 will be a combined cycle combustion turbine unit rated at 250 MW (nominal). The combustion turbine generator will be rated at approximately 150 MW; the steam turbine generator will be rated at approximately 100 MW. The new unit will fire natural gas as the primary fuel. No.2 fuel oil is stored onsite as backup fuel for Units 1 and 2. A final decision has not been made as to whether Unit 3 will use No. 2 fuel oil as backup fuel. All equipment will be installed with modern pollution control devices to meet environmental quality standards. The proposed construction start date is Fall 1999. The proposed commercial operation date is June 2001.

Cane Island 3 will be located within the 47 acre ultimate site development area previously permitted. The generation building will be adjacent to and north of Unit 2. New major support facilites include a cooling tower, water and wastewater treatment facilities, water storage tanks, storm water detention pond, a small pumping station near the site entrance, a 230 kV transmission line, and possibly a new fuel oil storage tank. The Unit 3 facilities on Cane Island will occupy 5 acres.

The size of the steam turbine generator will require the unit to be certified under the Florida Electrical Power Plant Siting Act. The Siting Act review process evaluates the need for the new power plant and the potential impacts on human health, welfare, and environmental resources. The participation of federal, state, and local agencies in the certification process is required under the Siting Act. The FDEP administers and coordinates the certification process which typically requires about 14 months to complete.

The certification process concludes with approval (certification) of the power plant and associated facilites by the Siting Board. The certification will include project-specific conditions; however, the project will be subject to federally issued programs/conditions such as the Clean Air Act or Clean Water Act.

Attachment 2

Proposed PSD Permit Application Table of Contents

1.0 Introduction and Executive Summary

2.0 Applicant Information (i.e., forms)

3.0 Project Characterization
- 3.1 Project Location
- 3.2 Project Description
- 3.3 Project Emissions and NSR PSD Applicability

4.0 Best Available Control Technology

5.0 Air Quality Data
- 5.1 Existing Ambient Air Quality
- 5.2 Meteorological Data and Climatology

6.0 Air Quality Impact Analysis
- 6.1 Model Selection
- 6.2 Model Options
  - 6.2.1 Land Use Dispersion Coefficient Determination
  - 6.2.2 GEP Stack Height Determination
  - 6.2.3 Model Defaults
  - 6.2.4 Receptor Grid and Terrain Considerations
- 6.3 Maximum Predicted Impacts
- 6.4 Comparison to Preconstruction Monitoring Requirements
- 6.5 National Ambient Air Quality Standards
- 6.6 PSD Increment Analysis

7.0 Additional Impact Analysis
- 7.1 Commercial, Residential, and Industrial Growth
- 7.2 Vegetation and Soils
- 7.3 Visibility
- 7.4 Class I Analysis

5-15-98

Cane Island Power Park - Unit 3
Kissimmee Utility Authority/Florida Municipal Power Agency

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The certification process concludes with approval (certification) of the power plant and associated facilites by the Siting Board. The certification will include project-specific conditions; however, the project will be subject to federally issued programs/conditions such as the Clean Air Act or Clean Water Act.

SITE CERTIFICATION APPLICATION

CANE ISLAND POWER PARK - UNIT 3

VOLUME 2

Submitted by:

Kissimmee Utility Authority/Florida Municipal Power Agency

1998

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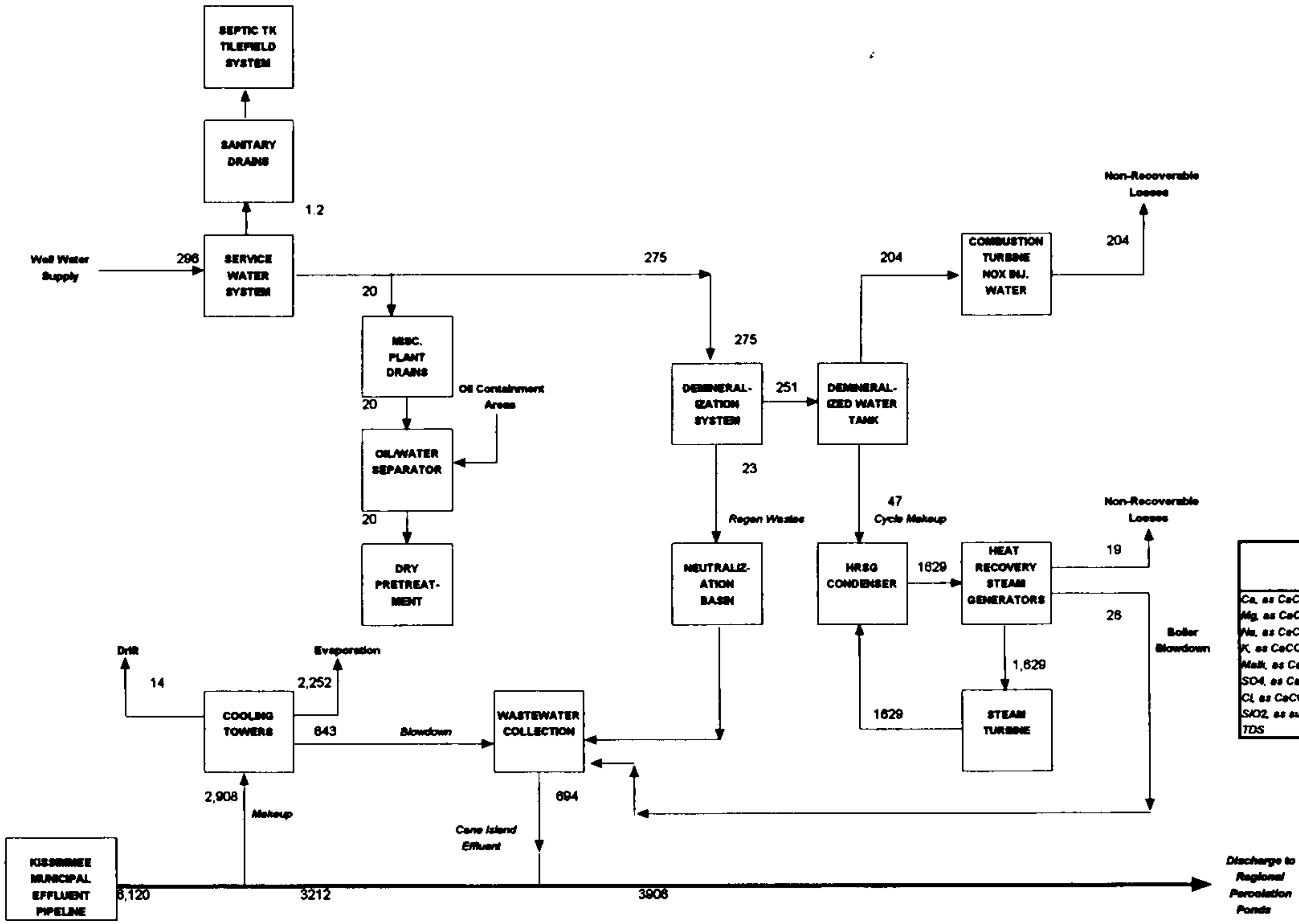
A Cane Island Vascular Plants



WATER ANALYSIS DATA

	Municipal Effluent Analysis	Cane Island Effluent Analysis	Combined Effluent Analysis
Ca, as CaCO3	90	416	148
Mg, as CaCO3	28	138	48
Na, as CaCO3	111	473	175
K, as CaCO3	14	58	22
Malk, as CaCO3	91	188	108
SO4, as CaCO3	34	408	101
Cl, as CaCO3	91	378	142
SiO2, as such	16	124	35
TDS	329	1477	533

KISSIMMEE UTILITY AUTHORITY

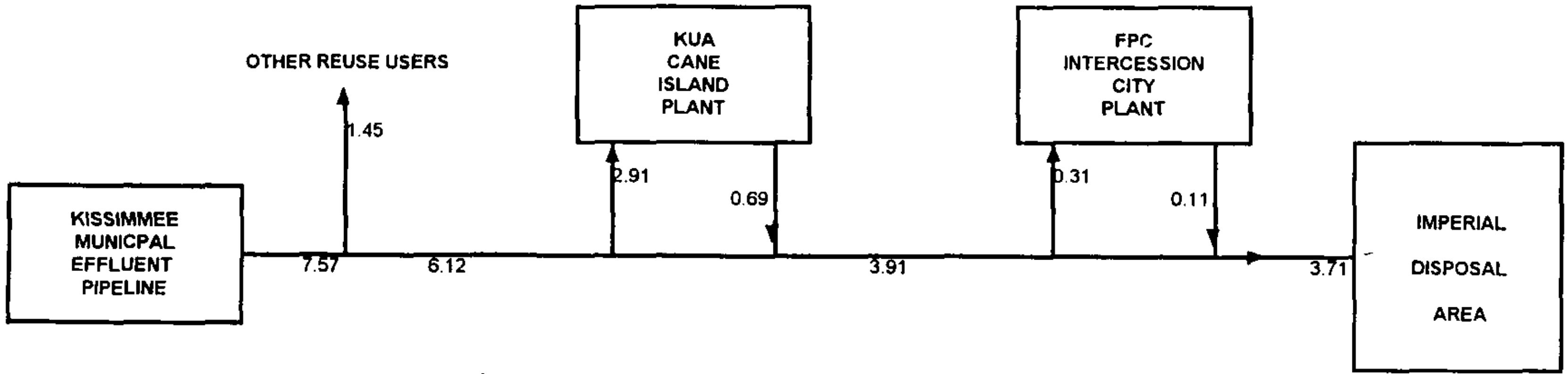
WATER MASS BALANCE

100% LOAD CONDITION

UNITS 1 THRU 3 COMBINED
NATURAL GAS FIRED

ALL FLOWS ARE GIVEN IN 1000 GALLONS PER DAY

06-May-[illegible]



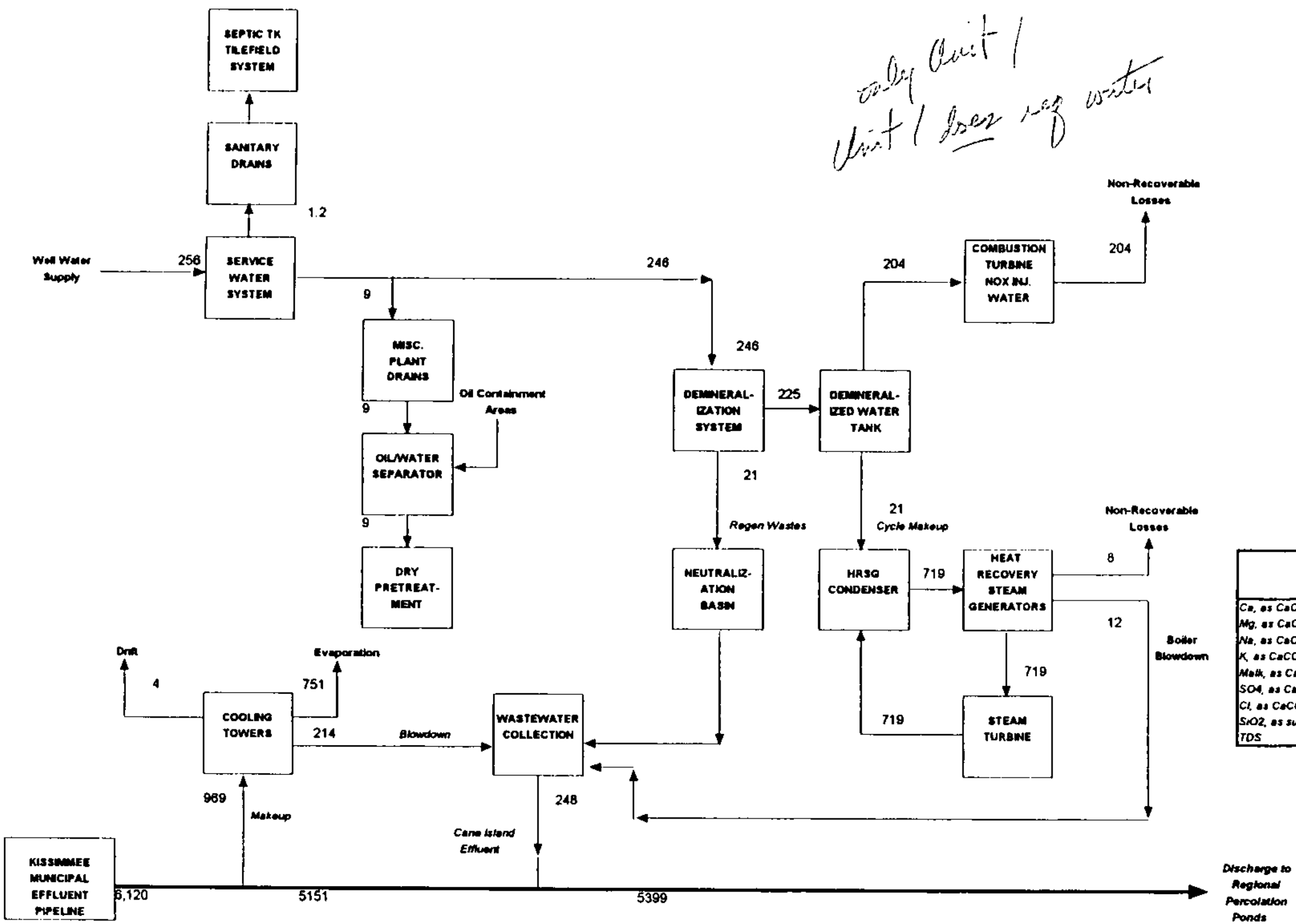
ANTICIPATED WATER ANALYSIS IN PIPELINE

Constituent	Pipeline Effluent Analysis	Cane Island Effluent	Pipeline After Cane Island	Pipeline After FPC
	mg/l	mg/l	mg/l	mg/l
*Ca**	90	417	148	156
*Mg**	28	139	48	50
*Na**	111	475	176	185
*K**	14	58	22	23
*MAlk**	91	190	109	114
*SO4**	34	410	101	106
*Cl**	91	378	142	150
SiO2	16	124	35	37
TDS	329	1482	534	563
CBOD5	2.0	8.0	3.1	3.2
TSS	2.0	8.0	3.1	3.2
Nitrate N	5.5	14.2	7.0	7.4
Total N	6.5	17.1	8.4	8.8

* Given as CaCO3 equivilent

Note: Flows are given in millions of gallons per day

OVERALL WATER MASS BALANCE
REUSE PIPELINE
CANE ISLAND UNITS 1, 2, & 3



only Unit 1
Unit 1 lose reg water

Unit 2 = 80 gpm
120,000/day on oil

WATER ANALYSIS DATA

	Municipal Effluent Analysis	Cane Island Effluent Analysis	Combined Effluent Analysis
Ca, as CaCO3	90	459	107
Mg, as CaCO3	28	166	34
Na, as CaCO3	111	466	127
K, as CaCO3	14	55	16
Malk, as CaCO3	81	178	95
SO4, as CaCO3	34	510	56
Cl, as CaCO3	81	353	103
SiO2, as such	18	206	25
TDS	329	1646	389

ALL FLOWS ARE GIVEN IN 1000 GALLONS PER DAY

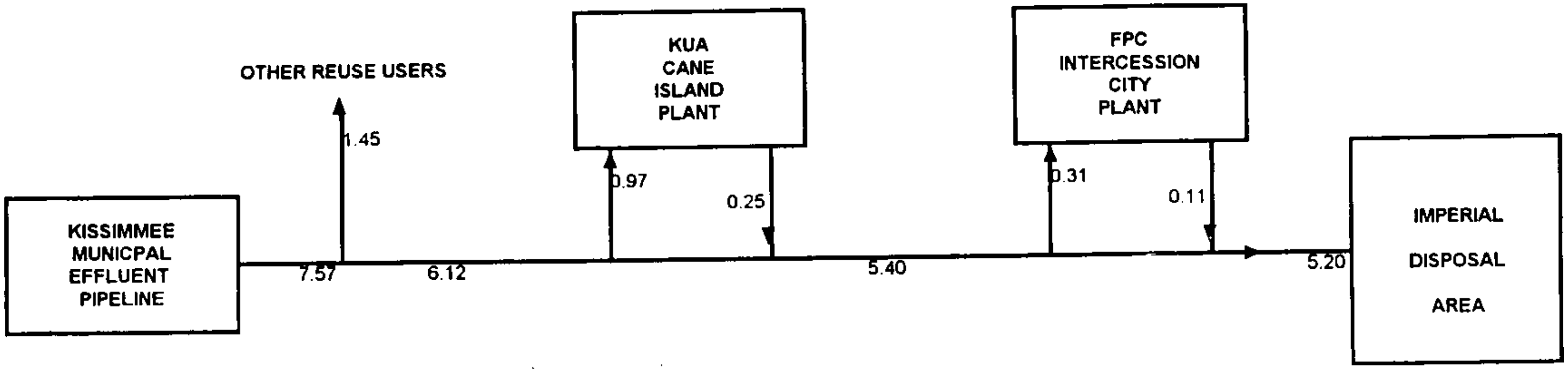
08-Apr-98

KISSIMMEE UTILITY AUTHORITY

WATER MASS BALANCE

100% LOAD CONDITION

UNITS 1 & 2 ONLY
NATURAL GAS FIRED



ANTICIPATED WATER ANALYSIS IN PIPELINE

Constituent	Pipeline Effluent Analysis	Cane Island Effluent	Pipeline After Cane Island	Pipeline After FPC
	mg/l	mg/l	mg/l	mg/l
Ca	90	459	107	111
Mg	28	166	34	36
Na	111	466	127	132
K	14	55	16	17
MAlk	91	178	95	99
SO4	34	510	56	58
Cl	91	353	103	107
SiO2	16	206	25	26
TDS	329	1646	389	404
CBOD5	2.0	8.0	2.3	2.4
TSS	2.0	8.0	2.3	2.4
Nitrate N	5.5	14.2	5.9	6.1
Total N	6.5	17.1	7.0	7.3

Note: Flows are given in millions of gallons per day

OVERALL WATER MASS BALANCE
REUSE PIPELINE
CANE ISLAND 1 & 2 ONLY

Cane Island Power Park

Site Certification Application

APPENDIX 10.7

Manual Number KUA/FMPA-24

Issued to ______________________

Location ______________________

Appendix 10.7

PREVENTION OF SIGNIFICANT DETERIORATION AIR PERMIT APPLICATION FOR CANE ISLAND UNIT 3

Submitted by:

Kissimmee Utility Authority
and the
Florida Municipal Power Agency

Prepared by:

Black & Veatch

July 31, 1998
Project No. 59140

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1.0 Introduction

Kissimmee Utility Authority (KUA) and Florida Municipal Power Agency (FMPA) propose to develop a new electrical power generating unit at the Cane Island Power Park near Intercession City. The Cane Island Power Park currently includes a nominal 40 megawatt (MW) simple cycle combustion turbine (SCCT) unit (Unit 1) and a nominal 120 MW combined cycle combustion turbine (CCCT) with heat recovery steam generator (HRSG) and steam turbine (Unit 2).

The proposed unit (Unit 3), will be a CCCT unit rated at approximately 250 MW, firing natural gas as the primary fuel and No. 2 distillate fuel oil as a backup fuel. Unit 3 will occupy approximately 5 acres adjacent to and north of Unit 2. New major support facilities for Unit 3 will include a cooling tower, water and wastewater treatment facilities, water storage tanks, storm water detention pond, 230 kV transmission line, and a fuel oil storage tank.

This report is technical support document for the Prevention of Significant Deterioration Air Permit Application. The following sections contain a project characterization, Best Available Control Technology (BACT) determination, air quality impact analysis (AQIA), and additional impact analyses designed to provide a basis for the Florida Department of Environmental Protection's preparation of an air construction permit for Unit 3.

2.0 Project Characterization

The following sections briefly characterize Unit 3 including a general description of the location, facility, and emission units, as well as a summary of the estimated emissions and a discussion of New Source Review (NSR) applicability.

2.1 Project Location

Unit 3 will be located on the Cane Island Power Park (Power Park) in rural northwest Osceola County, Florida. Figure 2-1 shows the general location of the Power Park which is approximately 20 miles southwest of Orlando, 5 miles west of Kissimmee, and 1 mile northwest of Intercession City. The nearest Federal PSD Class I Area is the Chassahowitzka National Wildlife Refuge located approximately 105 kilometers northwest of the Power Park.

The Power Park is situated on a slightly elevated ridge of dry sand surrounded by the wetlands of the Reedy Creek Swamp. The topography of the area is unpronounced and considered relatively flat.

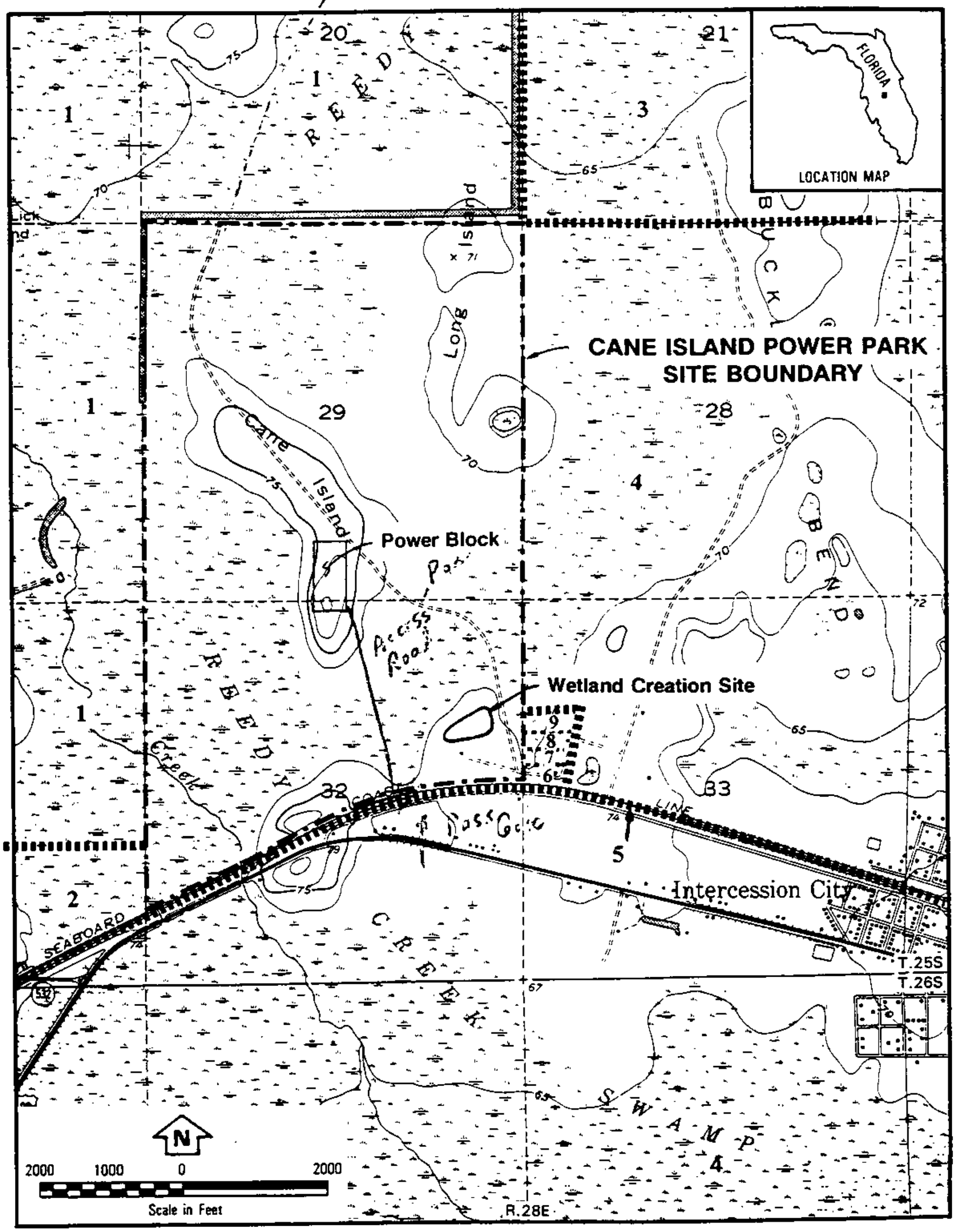
2.2 Project Description

Unit 3 will be located at the Power Park which currently includes two existing units (Units 1 and 2) and related support facilities. Unit 1 is a nominal 40 MW simple cycle combustion turbine (SCCT). Unit 2 is a nominal 120 MW combined cycle combustion turbine (CCCT). Both existing units fire natural gas as the primary fuel, with distillate fuel as backup.

The addition of Unit 3 will constitute a modification to the Power Park. Unit 3 will be an approximately 250 MW CCCT generating unit firing natural gas and the primary fuel and distillate oil as backup for up to 720 hours per year. Unit 3 will occupy approximately 5 acres north of the existing Units 1 and 2. Major equipment associated with Unit 3 will consist of a combustion turbine generator, heat recovery steam generator (HRSG) with supplemental firing, steam generator, cooling tower, and a fuel oil storage tank.

The CCCT/HRSG will use evaporative coolers as necessary to cool the compressor inlet air prior to its combining with fuel in the combustor of the CCCT. The thermal energy of the combustion gases exiting the combustor will be transformed into rotating mechanical energy

No road



Base Map Source: USGS, Intercession City, FL quad.

Figure 2-1
Site Location

Is there anything going

as these gases expand through the turbine sections of the CCCTs. The rotating mechanical energy will be converted into electrical energy via a shaft on the CCCT connected to an electrical generator. The remaining usable thermal energy in the combustion gases will be exchanged with water/steam in the HRSG. The HRSG will be equipped with a bypass stack and guillotine damper to permit simple cycle operation prior to HRSG installation or while the HRSG is out of service.

While operating in combined cycle mode, supplemental (duct) firing with natural gas will be used to increase the thermal energy of the combustion gases exhausting from the CCCT. The resulting high pressure steam produced in the HRSG will be expanded through a single steam turbine. The rotating mechanical energy generated by the steam turbine will be converted into electrical energy via a shaft connected to an electrical generator. The exhaust gases will exit to the atmosphere after leaving the HRSG stack or bypass stack when operating in simple cycle mode.

2.3 Project Emissions

This section discusses the potential to emit (PTE) of all regulated PSD air pollutants resulting from Unit 3. Emissions from Unit 3 will be generated from the following sources:

- Unit 3: One CCCT/HRSG with supplemental firing, or as a SCCT while operating in simple cycle mode with the bypass stack.
- Tank: One approximately 1,000,000 gallon No. 2 distillate fuel oil storage tank.

2.3.1 Unit 3 Emissions

Performance data for the CCCT/HRSG, based on vendor data from GE and Westinghouse at design loads of 50, 70, and 100 percent, natural gas and distillate fuel firing, and ambient air temperatures of 19° F, 72° F, and 102° F are provided in Attachment 1. Performance data for simple cycle operation at base load, natural gas and distillate fuel oil firing, and ambient air temperatures of 19° F, 72° F, and 102° F are also included in Attachment 1 for each turbine vendor.

Ambient temperature data were selected based on meteorological data from Orlando, FL. An ambient temperature of 19° F represents the lowest anticipated site temperature and maximum power generation. An ambient temperature of 72° F represents the average annual site temperature which is representative of the average heat input rate. An ambient temperature of 102° F represents the highest anticipated site temperature which corresponds to the lowest heat input rate for the combustion turbine and results in the maximum required duct firing and evaporative cooling rates to maintain the desired plant electrical output.

The maximum pound per hour emission rates considering all ambient temperatures, both turbine vendors, combined and simple cycle operation, and partial load operation for natural gas and distillate fuel oil firing are presented in Table 2-1.

2.3.2 No. 2 Distillate Fuel Oil Storage Tank

The fuel oil storage tank will have a capacity of 1,000,000 gallons. Emissions of VOCs from the fuel oil storage tank were estimated using the EPA's TANKS (Ver. 3.1) program. Results of the TANKS emission modeling are included in Attachment 2. The VOC emissions from the fuel oil storage tank are approximately 0.32 tpy and are included in the total PTE calculations.

2.4 Maximum Potential to Emit

At the time of this application, a turbine vendor had not yet been selected. As such, the potential to emit was estimated from the maximum hourly emission rate for each pollutant at an ambient temperature of 72° F (average annual) considering two turbine vendors, combined and simple cycle operation, 50 to 100 percent load, and 720 hours of distillate fuel oil firing (0.05 percent sulfur) with the remainder of the year on natural gas. The Unit 3 potential to emit for each pollutant is summarized in Table 2-2. The applicable PSD significant emission levels for each pollutant are included for reference purposes in the table, and a spreadsheet used to calculate the potential to emit is included in Attachment 3.

2.5 New Source Review Applicability

The federal Clean Air Act (CAA) NSR provisions are implemented for new major stationary sources and major modifications under two programs: the PSD program outlined in 40 CFR 52.21; and, the Nonattainment NSR program outlined in 40 CFR 51 and 52. The proposed facility is in an attainment area with respect to all pollutants. As such, the PSD program will apply to Unit 3, as administered by the State of Florida under 62-212.400, FAC, Stationary Sources - Preconstruction Review, Prevention of Significant Deterioration.

Table 2-1
Unit 3 Maximum Emission Rates (lb/h)*

Pollutant	Natural Gas Firing (lb/h)	Distillate Oil Firing (lb/h)
NO_x	195.80	328.50
SO_2	1.03	102.67
CO	790.60	2,908.20
PM/PM_{10}	18.60	112.60
VOC	30.20	195.30

*Maximum pound per hour emission rates considering all ambient temperatures, two turbine vendors, combined and simple cycle operation, and partial load operation for natural gas and distillate fuel oil firing.

Table 2-2
PSD Applicability

Pollutant	Project PTE (tpy)	PSD Significant Emission Rate (tpy)	PSD Review Required
NO_x	823.3[a]	40	**yes**
SO_2	38.1[a,b]	40	no
CO	3,818.4[a]	100	**yes**
PM/PM_{10}	109.1[a,c]	25/15	**yes**
VOC	173.3[a]	40	**yes**
Sulfuric Acid Mist	4.7[a,d]	7	no
Total Reduced Sulfur	negl.	10	no
Hydrogen Sulfide	negl.	10	no
Vinyl Chloride	negl.	1	no
Total Fluorides	negl.	3	no
Mercury	0.00067[e]	0.1	no
Beryllium	0.00024[e]	0.0004	no
Lead	0.043[e]	0.6	no

[a]Based on maximum lb/h emission rate at 72° F conditions for all loads and operating scenarios; assuming 8,040 and 720 hours per year of natural gas and distillate fuel oil firing, respectively.
[b]Based on 0.05% sulfur distillate fuel oil and 0.2 gr/100 scf sulfur natural gas.
[c]Assumes front and back half PM/PM_{10} emissions.
[d]Conservatively assuming a 10 percent conversion of SO_2 to SO_3, and a molecular ratio of 1.22 from SO_3 to H_2SO_4.
[e]Based on AP-42 emission factors, a maximum heat input of 2,039.4 MBtu/h (considering both vendors and all operating scenarios), and distillate fuel oil firing for 720 hours per year.

Note: PTE calculations are provided in a spreadsheet included in Attachment 3.

50% load

2.5.1 Prevention of Significant Deterioration

The PSD regulations are designed to ensure that the air quality in existing attainment areas does not significantly deteriorate or exceed the ambient air quality standards (AAQS) while providing a margin for future industrial and commercial growth. PSD regulations apply to major stationary sources and major modifications at major existing sources undergoing construction in areas designated as attainment or unclassifiable.

A major stationary source is defined as any one of the listed major source categories which emits, or has the potential to emit, 100 tpy or more of any regulated pollutant, or 250 tpy or more of any regulated pollutant if the facility is not one of the listed major source categories. The Power Park is one of the 28 major source categories (i.e., fossil fuel fired steam electric plant) which has a PTE greater than 100 tpy for at least one regulated pollutant. Additionally, the estimated emission increases of NO_x, CO, VOCs, and PM/PM_{10} resulting from the proposed modification (i.e., addition of Unit 3), exceed the PSD significant emissions levels of 40, 100, 40, 25/15 tpy, respectively. Therefore, the Unit 3 emissions of NO_x, CO, VOC, and PM/PM_{10} are subject to PSD review as a modification to an existing major source. The PSD review includes a BACT analysis, air quality impact analysis, and an assessment of the total project's (Units 1-3) impact on general commercial, residential, and commercial growth, soils and vegetation, and visibility, as well as a Class I impact analysis.

3.0 Best Available Control Technology

The 1977 Clean Air Act (CAA) established revised conditions for the approval of preconstruction permit applications under the PSD program. One of these requirements is that the Best Available Control Technology (BACT) be installed for all pollutants regulated under the Act which are emitted in significant amounts from new major sources or modifications located in an attainment area. BACT is defined as an emission limitation based on the maximum degree of pollutant reduction determined on a case-by-case basis considering technical, economic, energy, and environmental considerations. However, BACT cannot be less stringent than the emissions limits established by an applicable New Source Performance Standard (NSPS).

To bring consistency to the BACT process, the EPA has authorized the use of the "top-down" approach to BACT determinations. The first step in a top-down BACT analysis is to determine, for the pollutant in question, the most stringent control technology and emission limit available for a similar source or source category. Technologies required under lowest achievable emission rate (LAER) determinations must be considered. These technologies represent the top control alternative under the BACT analysis. If it can be shown that this level of control is infeasible on the basis of technical, economic, energy, and environmental impacts for the source in question, then the next most stringent level of control is identified and similarly evaluated. This process continues until the BACT level under consideration cannot be eliminated by any technical, economic, energy, or environmental consideration. As stated above, in no event can BACT be less restrictive than NSPS.

3.1 Basis of Analysis

This section presents the project configuration, requirements and assumptions, and economic basis.

3.1.1 Project Configuration

As previously noted elsewhere in this permit application document, Unit 3 will consist of one combustion turbine which can be operated in either simple cycle or combined cycle mode. The combustion turbine will fire primarily natural gas with No. 2 fuel oil as a backup fuel. Unit 3 will be limited to operating on this backup fuel for a maximum of 720 hours per year. Emissions are currently based on a General Electric (GE) Frame 7 FA size combustion turbine or a Westinghouse 501F combustion turbine.

An HRSG will recover energy from the high temperature flue gas exiting the combustion turbine (CT). A steam turbine will be used to generate electricity from the steam produced in the HRSG. The total unit output will be nominally rated at 250 MW.

The proposed operating scenarios for the CT include natural gas firing at loads from 50 to 100 percent of capacity. The CT may operate up to 8,760 hours per year in either simple cycle or combined cycle mode.

3.1.2 Requirements and Assumptions

The following is a summary of the requirements and assumptions that this BACT analysis is based upon:

- Federal ambient air quality standards, emission limitations, and other applicable regulations will be met.
- Federal NSPS for combustion turbines with heat input greater than 10 MBtu/h (40 CFR 60 Subpart GG) establish limiting criteria for SO_2 and NO_x emissions only. No NSPS criteria have been established for limiting CO, SO_3, volatile organic compounds (VOC), and PM/PM_{10} emissions. The following flue gas emission limits are established by NSPS for Subpart GG units:
  - -- NO_x: 75 ppmdv at 15 percent O_2, corrected for fuel nitrogen content and turbine heat rate.
  - -- SO_2: 150 ppmdv at 15 percent O_2 or any fuel that contains less then 0.8 percent sulfur by weight.
- The emissions estimates and BACT costs presented in this analysis are based on operating the CT for 8,760 hrs/yr. All annual emissions are based on operation at full load in combined cycle mode while firing natural gas at the yearly average ambient temperature of 72 F. The emissions for this case are as follows:

NO_x, ppmdv @ 15% O_2:	15.0	(0.06 lb/MBtu)
CO, ppmdv @ 15% O_2:	25.0	(0.061 lb/MBtu)
VOC, ppmdv @ 15% O_2:	4	(0.006 lb/MBtu)
PM/PM_{10}, lb/hr:	16.1	(0.01 lb/MBtu)

- As discussed elsewhere in the application, the Power Park is located in an EPA designated attainment area for all criteria air pollutants.

3.1.3 Economic Basis

Table 3-1 lists the economic criteria used in the analysis of BACT alternatives. Economic analysis used to determine the capital and annual costs of the control technologies were based on EPA methodologies shown in the EPA Best Available Control Technology Draft Guidance Document (October 1990), EPA BACT Guidelines, The Office of Air Quality Planning and Standards (OAQPS) Control Cost Manual (Fourth Edition), and vendor budgetary cost quotes.

3.2 NO_x BACT Analysis

The objective of this analysis is to determine BACT for NO_x, emissions from the Unit 3 combustion turbine. Unless otherwise noted, the emission concentrations described in this section are corrected to 15 percent oxygen.

3.2.1 BACT/LAER Clearinghouse Reviews

A review of the EPA BACT/LAER Clearinghouse Bulletin Board and the California Air Resource Board (BACT/LAER) indicates that the most stringent NO_x permitted emissions limit for a gas fired CT is 3.5 ppmdv for the Brooklyn Navy Yard Cogeneration Project located in New York. The emissions from that unit are controlled through the use of dry low NO_x burners and SCR. This CT emission limit is noted in the Clearinghouse as being representative of LAER at the time of the permit (1995).

Black & Veatch spoke with Alan Dominitz of the New York State Department of Environmental Conservation, Region 2, regarding the NO_x compliance status of the Brooklyn Navy Yard unit. Mr. Dominitz indicated that startup stack testing demonstrated compliance with the 3.5 ppm limit. Since that time, the unit emissions have typically been in the 2.9 to 3.3 ppm range. However, there have been occasional exceedances of the 3.5 ppm limit as shown in the facility quarterly reports.

It should also be noted that recently the South Coast Management District in California has officially declared LAER for NO_x as 2.5 ppm. This emission rate is based on the results of operation by the Federal Plant in Vernon, CA. This unit is a 32 MW natural gas fired combined cycle facility which utilizes a new technology called $SCONO_x$ for NO_x control.

Table 3-2 lists representative BACT determinations for NO_x control.

Table 3-1
Unit 3 Economic Evaluation Criteria

Economic Parameters	Value
Present Worth Discount Rate, percent	5.5
Capital Recovery Factor (EPA Method)	0.0745
Economic Life, years	20
Labor Cost, $/h	26
Aqueous Ammonia Cost, $/ton	350
Energy Cost, $/kWh	0.023
Lost Power Generation Cost, $/kWh	0.10
Natural Gas Cost, $/MBtu	3.20

Table 3-2
Summary of NO_x BACT Determinations

Facility	Description	Permit Limit ppm@15% O_2	BACT
Cataula, GA	1200 MW, Simple Cycle Unit	25--Natural Gas 42--Fuel Oil	Dry Low NO_x Burners Water Injection
Tiger Bay, FL	270 MW Combined Cycle	15/10--Natural Gas 42--Fuel Oil	Dry Low NO_x Burners Water Injection
Hines Polk, FL	485 MW Combined Cycle	12--Natural Gas	Dry Low NO_x Burners Water Injection
Tallahassee, FL	260 MW Combined Cycle	12--Natural Gas	Dry Low NO_x Burners Water Injection
Mcintosh, AL	100 MW Combined Cycle	15--Natural Gas	Dry Low NO_x Burners
Perryman, MD	280 MW Combined Cycle	15--Natural Gas	Dry Low NO_x Burners Water Injection
Comstock, MI		15--Natural Gas	Dry Low NO_x Burners Water Injection
Sithe/IPP, NY	1012 MW Combined Cycle	4.5--Natural Gas	Selective Catalytic Reduction
Hermiston, OR	474 MW Combined Cycle	4.5--Natural Gas	Selective Catalytic Reduction
Brooklyn, NY	240 MW Combined Cycle	3.5--Natural Gas (LAER) 10--Fuel Oil	Selective Catalytic Reduction Selective Catalytic Reduction
Berkshire, MA	272 MW Combined Cycle	3.5--Natural Gas (LAER) 9--Fuel Oil	Selective Catalytic Reduction Selective Catalytic Reduction
Gainesville, FL	74 MW Simple Cycle	15--Natural Gas 42--Fuel Oil	Dry Low NO_x Burners Water Injection

3.2.2 Alternative NO_x Emission Reduction Systems

During combustion, NO_x is formed from two sources. Emissions formed through the oxidation of the fuel bound nitrogen are called fuel NO_x. NO_x emissions formed through the oxidation of a portion of the nitrogen contained in the combustion air are called thermal NO_x and are a function of combustion temperature.

Nitrogen oxides control methods may be divided into two categories: in-combustor NO_x formation control, and post-combustion emission reduction. An in-combustor NO_x formation control process reduces the quantity of NO_x formed in the combustion process. For combustion turbines, NO_x can be limited by lowering combustion temperatures and by staging combustion (i.e., creating a reducing atmosphere followed by an oxidizing atmosphere). Post-combustion NO_x control systems can subsequently reduce a portion of the NO_x exiting the CT. Selective non-catalytic reduction (SNCR) is one method of post-combustion control. However, the exhaust temperature at the exit of a CT, which is typically less than 1,100° F, is too low to meet the 1,500-1,900° F temperature range required for this technology. Another post-combustion method is selective catalytic reduction (SCR). SCR systems have been used quite extensively in combustion turbine projects for the past several years. In addition to SCR, the $SCONO_x$ technology has had limited commercial operation at the Federal Plant. In-combustor control technology along with both of these methods of post-combustion control will be discussed and considered further in this BACT analysis as stand alone technologies and in combination with other systems and configurations.

CT Combustor NO_x Control. The reduction of thermal NO_x formation in CT combustors has been a major design focus over the last twenty years. The formation of thermal NO_x is a function of flame temperature and time. By limiting the flame temperatures and the amount of time which the combustion gases spend at elevated temperatures, CT designers have achieved substantial reductions in thermal NO_x formation. Until recently, diluent injection (e.g. water or steam) has been the primary means of controlling flame temperature. The degree of reduction in NO_x formation is proportional to the amount of water or steam injected into the CT. Since the combustion turbine NSPS was last revised in 1982, manufacturers have improved CT tolerances to the water necessary to control NO_x emissions below the current NSPS level of 75 ppmdv at 15 percent O_2. However, there is a point at which the amount of water injected into the CT seriously degrades its reliability and operational life.

Diluent injection systems have several operational drawbacks one of which is that even the most sophisticated arrangements have not been able to achieve better than 25 ppmdv NO_x.

Although water injection is an effective means of lowering NO_x emissions, it can be counterproductive with regard to carbon monoxide (CO) and volatile organic compounds (VOC) emissions that are formed as a result of incomplete combustion. NO_x control methods of lowering the combustion temperature result in higher CO and VOC emissions. High combustion temperatures, adequate excess air, and good air/fuel mixing during combustion will minimize CO and VOC emissions.

As an alternative to water injection, dry low NO_x (DLN) combustors have been developed. This burner design does not need water to be injected into the combustion chamber to achieve low NO_x emissions. The DLN combustors control the actual fuel-air ratio so that combustion occurs in the lean region, thus limiting flame temperature. The new designs have also altered the combustion gas flow path so that compressor discharge air bypasses the combustor and reenters the flow path immediately after combustion, thus limiting the amount of time that the gases spend at elevated temperatures.

Also, as with the standard combustor with water or steam injection, the DLN combustors can also be counterproductive with regard to CO and VOC emissions. The staged combustion and lower combustion temperatures will result in higher CO and VOC emissions.

Both GE and Westinghouse are currently willing to guarantee 15 ppm using dry low NO_x technology. Emissions achieved by DLN are as low as 9 ppm. GE has recently met a 9 ppm guarantee with "DLN-2.6" burners at Fort St. Vrain, CO and Clark County, WA. Westinghouse and GE continue to develop further advancements and refinements on the DLN technology. Both companies are partners with the Department of Energy (DOE) in the Advanced Turbine Systems (ATS) Program. Among the goals of the Program is to develop 60 percent combined cycle efficiencies while achieving NO_x emissions of 9 ppm or less.

Selective Catalytic Reduction. SCR is a post-combustion method for control of NO_x emissions. The SCR process combines vaporized ammonia with NO_x in the presence of a catalyst to form nitrogen and water. The vaporized ammonia is injected into the CT exhaust gases prior to passage through the catalyst bed. The use of SCR results in small levels of ammonia emissions (ammonia slip). As the catalyst degrades, ammonia slip will increase to a level that requires catalyst replacement.

The performance and effectiveness of SCR systems are directly dependent on the temperature of the flue gas when it passes through the catalyst. The optimum flue gas temperature range for SCR operation using a conventional vanadia/titania catalyst is approximately 600° to 750° F. At temperatures above 800° F permanent damage to the vanadia/titania catalyst occurs. For a combined cycle project, this temperature window occurs at an intermediate point inside the HRSG.

In order to control NO_x during simple cycle operation, the only location for the catalyst is in the path of the high temperature flue gas directly exiting the CT where temperatures typically range from 1,000° to 1,150° F. To control NO_x emissions during this operation, a more expensive zeolite catalyst must be used to prevent rapid degradation of the catalyst by the high temperatures.

$SCONO_x$ System. $SCONO_x$ is a new system produced by Goal Line Environmental Technologies that began commercial operation on a LM2500 combustion turbine (approximately 32 MW) in December 1996. This system uses a coated oxidation catalyst to remove both NO_x and CO without a reagent such as ammonia. Based on the operational experience of this plant, the South Coast Management District (SCAQMD) in California has recently declared LAER for NO_x as 2.5 ppm.

The system consists of a catalyst which is installed in the flue gas at a point where the temperature is between 280° F and 650° F. For a new unit, where the facility can be designed to place the catalyst in the optimum location, the catalyst can be placed in an area of the HRSG where the temperature is between 550° F and 650° F. CO emissions are reduced by the oxidation of CO to CO_2. The NO emissions are reduced by a two step process. First, NO emissions are oxidized to NO_2 and then absorbed onto the catalyst. In the second step, a proprietary regenerative gas is then passed through the catalyst. This gas de-absorbs the NO_2 from the catalyst and reduces it to N_2.

The regenerative gas is produced from natural gas. For systems where the $SCONO_x$ catalyst is located in an area with low flue gas temperatures, the gas is produced by processing a small stream of natural gas through a separate, skid mounted processing unit. The resulting regenerative gas is approximately 3 percent nitrogen, 1.5 percent CO_2 and 4 percent H_2, with steam making up the balance. For systems where the $SCONO_x$ catalyst is located in an area with flue gas temperatures above 500° F, the regeneration gas can be produced in the flue gas before it regenerates the catalyst. In the high temperature case, a separate processing unit is not required.

Dampers are used to isolate a portion of the catalyst for regeneration. The regenerative gas is passed through the isolated portion of the catalyst while the remaining catalyst stays in contact with the flue gas. After the isolated portion has been regenerated, the dampers open, the next set of dampers close, and the next portion of the catalyst is isolated and regenerated. This cycle repeats continuously. As a result, each section of the catalyst is regenerated about once every 15 minutes.

The catalyst is very susceptible to fouling by sulfur in the flue gas. Sulfur causes the catalyst to lose activity. The impact of sulfur can be minimized by a sulfur absorption catalyst, called $SCOSO_x$, located upstream of the $SCONO_x$ catalyst. The SO_2 is oxidized to SO_3 by the catalyst. The SO_3 is then deposited on the catalyst and removed from the catalyst when it is regenerated with the $SCONO_x$ catalyst. The resulting byproduct of the regeneration is either H_2S (for systems with flue gas below 450° F at the $SCONO_x$ catalyst) or SO_2 (for systems with flue gas above 450° F). As of the writing of this document, the $SCOSO_x$ portion of the system has not yet been implemented at any facility. Because the $SCOSO_x$ system is not installed, the sulfur is being removed from the natural gas before combustion to protect the $SCONO_x$ catalyst from excessive sulfur contamination.

The existing system at the Federal Plant has not been exposed to the levels of sulfur found in flue gas during fuel oil firing. Since this system has shown to be highly susceptible to even natural gas-fired levels of sulfur, there is concern about the application of this system on a unit with fuel oil fired operation. Because of these concerns, this technology is not considered further for use on Unit 3.

3.2.3 Evaluation of Feasible Technologies

The NO_x control technologies that can be considered for use on Unit 3 to comply with NSPS restrictions include water/steam injection, dry low NO_x combustor technology, and SCR control technology. The following control technologies will be evaluated in this BACT analysis:

- The addition of a low temperature SCR system to reduce outlet NO_x emissions from the dry low NO_x burners to 3.5 ppmdv. This system would not reduce NO_x emissions from the dry low NO_x burners during simple cycle operation.

However, this is not reflected in the BACT analysis since it has been performed for combined cycle operation.

- The addition of a high temperature SCR system to reduce outlet NO_x emissions from the dry low NO_x burners to 3.5 ppmdv. This system will reduce NO_x emissions during simple cycle operation.
- Advanced combustion controls (dry low NO_x burners) to limit outlet NO_x emissions to 15 ppmdv.

The following evaluation considers energy, environmental, and economic impacts for the potential BACT scenarios evaluated. Table 3-3 lists estimated NO_x emissions from the CT for the alternative control technologies.

Energy Impacts. The SCR systems impacts the energy requirements of Unit 3. SCRs require vaporizers and blowers to vaporize and dilute the aqueous ammonia reagent for injection. In addition, both systems will increase the backpressure on the CT. The low temperature SCR system will add 2 inches water gauge (in. w.g.) backpressure. The high temperature SCR system will add 2.5 in. w.g. Decreased energy sales are included in the annual cost estimate.

Environmental Impacts. The feasibility of reducing NO_x emissions to 3.5 ppm or even less is highly dependent on the ability to measure this low level of emissions. Because the SCR system requires the regulation of ammonia injection based on the emission monitors, the accuracy of the emission reading directly influences the amount of actual error in the ammonia injection rate. Therefore, erroneous emission readings can result in excess ammonia levels even when the actual NO_x values is below the permitted values. This may result in excessive ammonia "slip" being discharged to the atmosphere with little or no improvement in NO_x emissions. Limitations to accurate measurements of emissions at this level include sampling methods, analyzer limitations, and calibration gas error. Current EPA procedures and standards recognize such limitations. Currently, 40 CFR Part 75 allows emission monitors with span ranges of less than 200 ppm have calibrations that deviate by up to 10 ppm and can still be considered "in control."

Table 3-3
NO_x Reduction by Control Technology Alternatives

Control Technology	Uncontrolled Emissions (ppmdv)	Emissions Reduction (percent)	Emissions Achievable (ppmdv)	Annual Emissions (tons per year)
High Temperature SCR	15	77	3.5	101
Low Temperature SCR	15	77	3.5	101
Dry Low NO_x Burners	15	N/A	15	433

Note: All listed emissions are based on full load operation in combined cycle mode at an ambient temperature of 72 F. Annual emissions are based on 8,760 hours of operation.

The use of ammonia in an SCR system introduces an element of environmental risk. Ammonia is listed as a hazardous substance under Title III Section 302 of the Superfund Amendments and Reauthorization Act of 1986 (SARA) and Section 112(r) of the Accidental Release Provisions. According to Committee on Toxicology of the National Academy of Sciences and the Committee on Medical and Biological Effects of Environmental Pollutants (both of the National Research Council), the following threshold concentrations exist for ammonia:

Human Response	Concentration (ppm)
Immediate throat irritation	equal to or greater than 400
Eye irritation	equal to or greater than 700
Coughing	equal to or greater than 1,700
Life threatening for short exposure	2,500 to 6,500
Rapidly fatal for short exposure	5,000 to 10,000

Some ammonia slip from the HRSG stack is unavoidable due to the imperfect distribution of the reagent and catalyst deactivation. Although ammonia emissions are not regulated nationally, the Northeast States for Coordinated Air Use Management (NESCAUM) has recommended an ammonia slip emissions limit of 10 ppmdv (uncorrected), unless that limit is shown to be inappropriate. Ammonia slip emissions from an SCR system is a design consideration that establishes catalyst size and life. Therefore, lower ammonia slip requirements ultimately limit catalyst life and dictates associated catalyst replacement. A design value of 10 ppmdv (uncorrected) is appropriate for a clean fuel facility such as Unit 3.

The vanadium content of the low temperature SCR catalyst may contribute to its classification as a hazardous waste. Therefore, spent catalyst may need to be handled and disposed of following hazardous waste procedures. Because of this, recycling of SCR catalysts for vanadium has become common.

The SCR catalyst will oxidize approximately 1 to 3 percent of the SO_2 in the flue gas to SO_3. The ammonia present in the flue gas will react with the SO_3 to form ammonium sulfate and bisulfate salts. Ammonium bisulfate will condense on the downstream HRSG tubes as a sticky white substance. This will need to be periodically washed off to avoid corrosion of boiler tubes or reduced HRSG efficiency. Ammonium sulfate will exit the stack as a vapor and condense into a particulate form downstream. This is primarily of concern during fuel oil fired operation.

Economic Impacts. Table 3-4 presents the capital cost for installing each of the control alternatives. The cost of the systems include: catalyst; ammonia receiving, storage, transfer, vaporization, and injection; catalytic reactor; HRSG modifications; and, balance of plant equipment. Capital costs were based on budgetary quotations from equipment manufacturers and other engineering estimates. The high temperature SCR costs are significantly greater than low temperature SCR system costs due to the greater costs of high temperature zeolite catalyst.

Table 3-5 presents the annual operating costs and emission rates for each control technologies applied to Unit 3. Annual operating costs include catalyst replacement, energy impacts, operating personnel, maintenance, and reagent consumption.

Throughout the life of Unit 3, catalyst elements will require periodic replacement. Currently, SCR catalyst manufacturers are willing to guarantee a catalyst life of three years.

For conservatism in cost, ammonia consumption rates were based on a stoichiometric ratio of 1.05 for the low temperature catalyst and 1.5 for the high temperature catalyst. The use of each of these systems increases the energy requirements for Unit 3. The SCR system requires vaporizers and blowers to vaporize and dilute the aqueous ammonia reagent for injection. Maintenance costs consist of routine system maintenance. The replacement materials are assumed to be two percent of the original cost for moving equipment. Labor for operation and maintenance of the SCR systems is assumed to be 2 hours per day.

3.2.4 Conclusions

The cost effectiveness of a low temperature SCR system is $3,481 per ton of NO_x removed. However, this system does not reduce NO_x emissions during simple cycle operation. The cost effectiveness for a high temperature SCR is $10,376 per ton of NO_x removed. Both of these systems result in environmental impacts such as ammonia storage, ammonia slip, and higher particulate emissions. In addition, each consumes energy and reduces the output of the combustion turbines.

Dry low NO_x burners are being continually improved by both GE and Westinghouse. Emissions of less than 9 ppm are expected to be easily achieved in the year 2002. In addition, these DLN combustors do not have the environmental impacts of SCR. Because of these benefits, the proposed BACT for Unit 3 is dry low NO_x combustors to achieve 15 ppmdv during the first two years of operation and less than 9 ppmdv after the first 2 years. If the dry

Table 3-4
Capital Cost of NO_x Control Alternatives

	Dry Low NO_x Burners	Low Temp SCR	High Temp SCR	Remarks
Direct Capital Cost				
Catalyst	Not Applicable	480,000	3,520,000	Provided by vendors, scaled to this unit
Catalyst Reactor	Not Applicable	186,000	279,000	Calculated based on catalyst size
Control/Instrumentation	Base	140,000	140,000	
Ammonia Storage and Injection	Not Applicable	250,000	350,000	Scaled from previous project
Balance of Plant	Base	345,000	1,458,000	32 % of equipment costs
Total Direct Capital Cost	Base	1,361,000	5,747,000	
Indirect Capital Costs				
Contingency	Base	340,000	1,437,000	25% of Direct Capital Cost
Engineering and Supervision	Base	136,000	575,000	10% of Direct Capital Cost
Construction & Field Expense	Base	68,000	287,000	5% of Direct Capital Cost
Construction Fees	Base	136,000	575,000	10% of Direct Capital Cost
Start-Up Assistance	Base	27,000	115,000	2% of Direct Capital Cost
Performance Test	Base	27,000	27,000	
Total Indirect Capital Cost	Base	734,000	3,016,000	
Total Installed Cost	**Base**	**2,095,000**	**8,763,000**	

Table 3-5
Annual Cost of NO_x Control Alternatives

	Dry Low NO_x Burners	Low Temp SCR	High Temp SCR	Remarks
Direct Annual Cost				
Catalyst Replacement	Not Applicable	183,000	1,467,000	3 year catalyst life
O&M	Base	27,000	29,000	See text for description
Reagent Feed	Not Applicable	216,000	281,000	See text for description
Power Consumption	Base	58,000	75,000	Vaporizers and dilution blowers
Lost Power Generation	Not Applicable	388,000	485,000	Based on backpressure on turbine
Annual Distribution Check	Not Applicable	14,000	15,000	
Total Direct Annual Cost	Not Applicable	886,000	2,351,000	
Indirect Annual Costs				
Overhead	Base	11,000	11,000	60 % of O&M labor
Administrative Charges	Base	42,000	175,000	2 % of Total Installed Cost (TIC)
Property Taxes	Base	21,000	88,000	1 % of Total Installed Cost (TIC)
Insurance	Base	21,000	88,000	1 % of Total Installed Cost (TIC)
Capital Recovery	Base	175,000	733,000	Capital Recover Factor * TIC
Total Indirect Annual Cost	Base	270,000	1,095,000	
Total Annual Cost	**Base**	**1,156,000**	**3,446,000**	
Annual Emissions, tpy	433	101	101	Emission from Table 3-2
Emissions Reduction, tpy	Base	332	332	
Total Cost Effectiveness, $/ton	**Base**	**3,481**	**10,376**	**Annual Cost/Emission Reduction**

low NO_x burners are not capable of meeting this value within 2 years of commercial operation, the unit will be equipped with a low temperature SCR to reduce emissions to 7 ppmdv. This proposed BACT is consistent with the permitting strategy of the City of Lakeland project.

3.3 CO and VOC BACT Analysis

The objective of this analysis is to determine BACT for CO and VOC emissions from the Unit 3 combustion turbine. Unless otherwise noted the emission rates described in this section are corrected to 15 percent oxygen.

3.3.1 BACT/LAER Clearinghouse Reviews

A review of the EPA BACT/LAER Clearinghouse Bulletin Board indicates that the most stringent CO emission level for a CT is 1.8 ppmdv for the Newark Bay Cogeneration L.P. project located in New Jersey. These emissions are achieved by reducing CO emissions by 80 percent (from 9 ppmdv to 1.8) through the use of an oxidation catalyst. It should be noted that the Newark Bay project is located in non-attainment areas for CO and ozone.

The BACT/LAER Clearinghouse documents indicate that the most stringent VOC emission level for a CT is 1.5 ppmdv at 15 percent O_2 for the Lakewood Cogeneration L.P. project located in New Jersey. These emissions are achieved by combustion controls and is for a unit which is approximately half the size of the unit proposed for this project.

Table 3-6 lists representative BACT determinations for CO and VOC control.

3.3.2 Alternative CO and VOC Emission Reduction Systems

CO and VOCs are formed during the combustion process due to incomplete oxidation of the carbon contained in the fuel. CO and VOC formation is limited by ensuring complete and efficient combustion of the fuel in the CT. High combustion temperatures, adequate excess air, and good air/fuel mixing during combustion minimize CO emissions. Typically, measures taken to minimize the formation of NO_x during combustion inhibit complete combustion, which increases the emissions of CO and VOC. Lowering combustion temperatures through steam/water injection or staged combustion, which is used to reduce combustor based NO_x formation, can be counterproductive with regard to CO and VOC emissions.

Table 3-6
Summary of CO and VOC BACT Determinations

Facility	Description	CO Permit Limit ppm@15% O_2	VOC Permit Limit ppm@15% O_2	BACT
Hines Polk, FL	485 MW Combined Cycle	25--Natural Gas 30--Fuel Oil	7--Natural Gas 7--Fuel Oil	Clean fuel and good combustion Clean fuel and good combustion
Tallahassee, FL	260 MW Combined Cycle	25--Natural Gas 90--Fuel Oil		Clean fuel and good combustion Clean fuel and good combustion
Perryman, MD	280 MW Combined Cycle	20--Natural Gas		Clean fuel and good combustion
Comstock, MI		20--Natural Gas		Clean fuel and good combustion
Plattsburgh, NY		3--Natural Gas	0.0045 lb/MBtu, Natural Gas	Oxidation Catalyst
Sithe/IPP, NY	1012 MW Combined Cycle	13--Natural Gas		Clean fuel and good combustion Clean fuel and good combustion
Hermiston, OR	474 MW Combined Cycle	15--Natural Gas		Clean fuel and good combustion Clean fuel and good combustion
Brooklyn, NY	240 MW Combined Cycle	4--Natural Gas 5--Fuel Oil	3.5--Natural Gas 10--Fuel Oil	Clean fuel and good combustion CO Catalyst
Berkshire, MA	272 MW Combined Cycle	4--Natural Gas 5--Fuel Oil	4--Natural Gas 16--Fuel Oil	Clean fuel and good combustion Clean fuel and good combustion
Newark Bay, NJ	136 MW Cogeneration	1.8--Natural Gas 2.6--Kerosene	4--Natural Gas 6.1--Kerosene	Oxidation catalyst for CO, Turbine design for VOC
Lakewood, NJ		12--Natural Gas 25--Fuel Oil	1.5--Natural Gas 3--Fuel Oil	Clean fuel and good combustion Clean fuel and good combustion

An alternative is catalytic oxidation, which is a post-combustion method for reduction of CO and VOC emissions. The process uses a catalyst located in an appropriate temperature zone to promote the oxidation of CO to CO_2 and VOCs to CO_2 and water. Higher temperatures promote better oxidation of CO. No reagent injection is necessary and oxidizing catalysts are capable of reducing CO emissions by 80 percent and VOC emissions by 20 percent. The oxidation catalyst is typically a precious metal catalyst. None of the catalyst components are considered toxic.

3.3.3 Evaluation of Feasible Technologies

Good combustion practice is considered as the baseline control technology for CO emissions. The addition of an oxidation catalyst to reduce outlet CO emissions to 5 ppmdv at full load will be evaluated in this BACT analysis. This is an 80 percent reduction in CO emissions. The following evaluation considers energy, environmental, and economic impacts for the potential BACT scenarios evaluated. Table 3-7 lists estimated CO emissions from the CT for the alternate control technologies.

Energy Impacts. The oxidation catalyst system impacts the energy requirements of Unit 3. The system will increase the backpressure on the CT of 1.2 in. w.g. Decreased energy sales are included in the annual cost estimate.

Environmental Impacts. The spent catalyst is made up of precious metals that are not considered toxic. This allows the catalyst to be handled and disposed of following normal waste procedures. Because of the precious metal content of the catalyst, the oxidation catalyst can also be recycled to recover the precious metals.

An oxidation catalyst will oxidize 20 to 80 percent of the SO_2 to SO_3, depending on the flue gas temperature at the catalyst location and catalyst formulation. This SO_3 will react with moisture in the flue gas to form sulfuric acid. Sulfuric acid will exit the stack in either vapor form (sulfuric acid mist) or in particulate form, depending on the flue gas temperature at the stack and the concentration of sulfuric acid in the flue gas. This is primarily a concern during oil firing.

Economic Impacts. Table 3-8 presents the capital cost for installing an oxidation catalyst on Unit 3. The cost of the oxidation catalyst system includes: catalyst; catalytic reactor;

Table 3-7
CO and VOC Reduction by Control Technology Alternatives

Control Technology	Uncontrolled Emissions (ppmdv)	Emissions Reduction (percent)	Emissions Achievable (ppmdv)	Annual Emissions (tons per year)
Oxidation Catalyst				
CO	25	80	5	87
VOC	4	20	3.2	32
Combustion Controls				
CO				
VOC	25	N/A	25	435
	4	N/A	4	40

Note: All listed emissions are based on full load operation in combined cycle mode at an ambient temperature of 72° F. Annual emissions are based on 8,760 hours of operation.

Table 3-8
Capital Cost of CO and VOC Control Alternatives

	Combustion Controls	Oxidation Catalyst	Remarks
Direct Capital Cost			
Catalyst	Not Applicable	600,000	Scaled from previous project vendor quote
Catalyst Reactor	Not Applicable	60,000	Based on catalyst size
Control and Instrumentation	Base	40,000	
Balance of Plant	Not Applicable	105,000	15% of equipment costs
Total Direct Capital Cost	Base	805,000	
Indirect Capital Costs			
Contingency	Base	201,000	25% of Direct capital cost
Engineering and Supervision	Base	40,000	5% of Direct capital cost
Construction & Field Expense	Base	16,000	2% of Direct capital cost
Construction Fees	Base	8,000	1% of Direct capital cost
Start-Up Assistance	Base	8,000	1 % of Direct capital cost
Performance Test	Base	4,000	
Total Indirect Capital Cost	Base	277,000	
Total Installed Cost	**Base**	**1,082,000**	

HRSG modifications; and balance of plant equipment. Capital costs were based on scaled estimates of previous budgetary quotations from equipment manufacturers and other engineering estimates.

Table 3-9 present the annual operating costs and emission rates for applying the oxidation catalyst technology to Unit 3. Annual operating costs include catalyst replacement, energy impacts, operating personnel, and maintenance.

Throughout the life of the plant, catalyst elements will require periodic replacement. Currently, oxidation catalyst manufacturers are willing to guarantee a catalyst life of 3 years.

3.3.4 Conclusions

The cost effectiveness of an oxidation catalyst is $1,680 per ton of emissions removed. This value is high for CO and VOC reduction. In addition, the environmental impact of high SO_2 to SO_3 oxidation by the catalyst makes it an unattractive option on units that fire fuel oil. Therefore, the proposed BACT for Unit 3 CO and VOC emissions is combustion controls to maintain CO emissions at 25 ppmdv and VOC emissions at 4 ppmdv at the full load, natural gas fired condition.

3.4 PM/PM_{10} BACT Analysis

The emission of particulate matter from Unit 3 will be controlled by ensuring as complete combustion of the fuel as possible and by minimizing SO_2 to SO_3 oxidation. The NSPS for combustion turbines do not establish an emission limit for particulate.

Natural gas and fuel oil contain only small quantities of non-combustible material. The manufacturer's standard operating procedures include filtering the turbine inlet air and combustion controls. The BACT/LAER Clearinghouse documents do not list any post-combustion particulate matter control technologies being used on combustion turbines. Consistent with the previous determinations, the use of combustion controls is the proposed BACT for particulate matter.

3.5 Summary

Table 3-10 provides a listing of the selected BACT technologies for Unit 3. The associated emission rates are also summarized in various units for comparison to the various applicable standards.

Table 3-9
Annual Cost of CO and VOC Control Alternatives

	Combustion Controls	Oxidation Catalyst	Remarks
Direct Annual Cost			
Catalyst Replacement	Not Applicable	230,000	3 year catalyst life
Lost Power Generation	Not Applicable	233,000	Based on backpressure on the turbine
Total Direct Annual Cost	Base	463,000	
Indirect Annual Costs			
Administrative Charges	Base	22,000	2% of Total Installed Cost (TIC)
Property Taxes	Base	11,000	1% of TIC
Insurance	Base	11,000	1% of TIC
Capital Recovery	Base	91,000	Capital Recovery Factor TIC
Total Indirect Annual Cost	Base	135,000	
Total Annual Cost	**Base**	**598,000**	
Annual Emissions, tpy	475	119	Emissions from Table 3-5
Emissions Reduction, tpy	Base	356	
Total Cost Effectiveness, $/ton	**Base**	**1,680**	**Annual Cost/Emissions Reduction**

Table 3-10
Summary of BACT Determinations

Pollutant	BACT	Emission Rate (lb/hr)	Annual Emissions (tons/year)
NO_x	Dry Low NO_x Burners	99	433
CO	Combustion Controls	99	435
VOC	Combustion Controls	9.1	40
PM	Low Ash Fuels	16	71

Notes: Emissions are based on full load operation firing natural gas and an ambient temperature of 72° F.

4.0 Air Quality Impact Analysis

The following sections discuss the air dispersion modeling performed for the PSD air quality impact analysis for those PSD pollutants which will have a PTE greater than the PSD significant emission rate (i.e., NO_x, CO, and PM/PM_{10}). The air dispersion modeling analysis was conducted in accordance with EPA's air dispersion modeling guidelines (incorporated as Appendix W of 40 CFR 51), as well as a mutually agreed upon air dispersion modeling protocol submitted to FDEP on behalf of KUA in a letter from Black & Veatch dated May 26, 1998 (Attachment 4).

4.1 Model Selection

The Industrial Source Complex Short-Term (ISCST3 Version 97363) air dispersion model was used to predict maximum ground level concentrations associated with Unit 3 emissions. The ISCST3 model is an EPA approved, steady-state, straight-line Gaussian plume model, which may be used to access pollutant concentrations from a wide variety of sources associated with an industrial source complex. In addition, ISCST3, unlike its predecessors, incorporates the COMPLEX1 dispersion algorithm for determining intermediate and complex terrain concentration impacts in accordance with EPA guidance.

4.2 Model Input and Options

This section discusses the model input parameters, source and emission parameters, and the ISCST3 model default options and input databases.

4.2.1 Model Input Source Parameters

The ISCST3 model was used determine the maximum predicted ground-level concentration for each pollutant and applicable averaging period resulting from various operating loads, operating scenarios (i.e., combined or simple cycle operation), fuels (i.e., natural gas and distillate fuel oil), and ambient temperatures. This was accomplished by representing Unit 3's proposed operating load range (i.e., 50, 70, and 100 percent loads) with a representative set of stack parameters and pollutant emission rates that were conservatively selected from multiple vendor performance data to produce the worst-case plume dispersion

Simple cycle
Newer PM/NOx numbers
Revised Regional Haze

conditions and highest model predicted concentrations (i.e., lowest exhaust temperature and exit velocity and the highest emission rate). This process is referred to as enveloping.

The representative stack parameters and emission rates for each load, fuel type, and operating scenario considered in the analysis are presented in Table 4-1. A Lotus spreadsheet used in determining the load based representative emissions and stack parameters from the vendor performance data is included in Attachment 3.

4.2.2 Land Use Dispersion Coefficient Determination

The EPA's land use method was used to determine whether rural or urban dispersion coefficients should be used in the ISCST3 air dispersion model. In this procedure, land circumscribed within a 3 km radius of the site was classified as rural or urban using the Auer l and use classification method. Based on a visual inspection of the USGS 7.5 minute topographic map of the Power Park location, it was concluded that over 50 percent of the area surrounding the Power Park is classified as rural. Accordingly, the rural dispersion modeling option was used in the ISCST3 air dispersion modeling.

4.2.3 GEP Stack Height Determination

Existing (Units 1 and 2) and proposed (Unit 3) buildings and structures were analyzed to determine the potential to influence the dispersion of stack emissions. EPA's Guideline for Determination of Good Engineering Practice Stack Height guidance document was followed in this evaluation. Structure dimensions and relative locations were entered into EPA's Building Profile Input Program (BPIP) to produce an ISCST3 input file with the proper Huber-Snyder or Schulman-Scire direction specific building downwash parameters. The BPIP formula GEP height for Unit 3 is 45.72 m (150 ft).

4.2.4 Model Defaults

The following standard USEPA default regulatory modeling options were initialized in the ISCST3 air dispersion modeling:

- Final plume rise.
- Stack-tip downwash.
- Buoyancy induced dispersion.

Table 4-1
Representative (*Enveloped*) Stack Parameters and Pollutant Emissions Used in ISCST3 Modeling Analysis

							Pollutant Emission Rate (g/s)		
Operating Scenario/Fuel	ISCST3 Source ID*	Load	Stack Height (m)	Stack Diameter (m)	Exit Velocity (m/s)	Exit Temp (K)	NO_x***	PM/PM_{10}	CO
CCCT/HRSG Natural Gas	#SCC1NG	100	39.62	5.49	17.86	356.48	12.91	2.34	12.79
	#SCC7NG	70	39.62	5.49	14.60	352.59	10.71	2.27	85.91
	#SCC5NG	50	39.62	5.49	12.68	351.48	24.67	2.27	99.61
CCCT/HRSG Distillate Fuel Oil	#SCC1FO	100	39.62	5.49	20.60	408.15	41.39	10.75	350.56
	#SCC7FO	70	39.62	5.49	16.86	398.15	32.29	12.59	366.43
	#SCC5FO	50	39.62	5.49	14.66	398.15	26.31	14.19	360.03
CCCT/HRSG Annualized**	#ACC1	100	39.62	5.49	17.86	356.48	15.26	3.03	n/a
	#ACC7	70	39.62	5.49	14.60	352.59	12.48	3.12	n/a
	#ACC5	50	39.62	5.49	12.68	351.48	24.81	3.25	n/a
SCCT - Natural Gas	#SSC1NG	100	30.48	5.49	44.32	851.48	12.90	2.27	12.70
SCCT - Fuel Oil	#SSC1FO	100	30.48	5.49	43.86	802.59	41.38	10.80	48.17
SCCT- Annualized**	#ASC1	100	30.48	5.49	44.32	851.48	15.24	2.97	n/a

*The "#" character in the ISCST3 Source ID name refers to either N, P, or C, which denote NO_x, PM/PM_{10}, and CO; S or A refer to short or annualized emission rate; CC or SC refer to combined or simple cycle; 1,7,or 5 refer to 100, 70, or 50 percent load; and NG or FO refer to natural gas or distillate fuel oil fired.

**Annualized emission rate based on 720 hours of distillate fuel oil firing.

***Short-term NO_x emission rates are used in the region haze analysis modeling presented in Subsection 5.4.2.2.

- Default vertical wind profile exponents and vertical potential temperature gradient values.
- Calm processing option.
- Flat terrain option.

4.2.5 Receptor Grid and Terrain Considerations

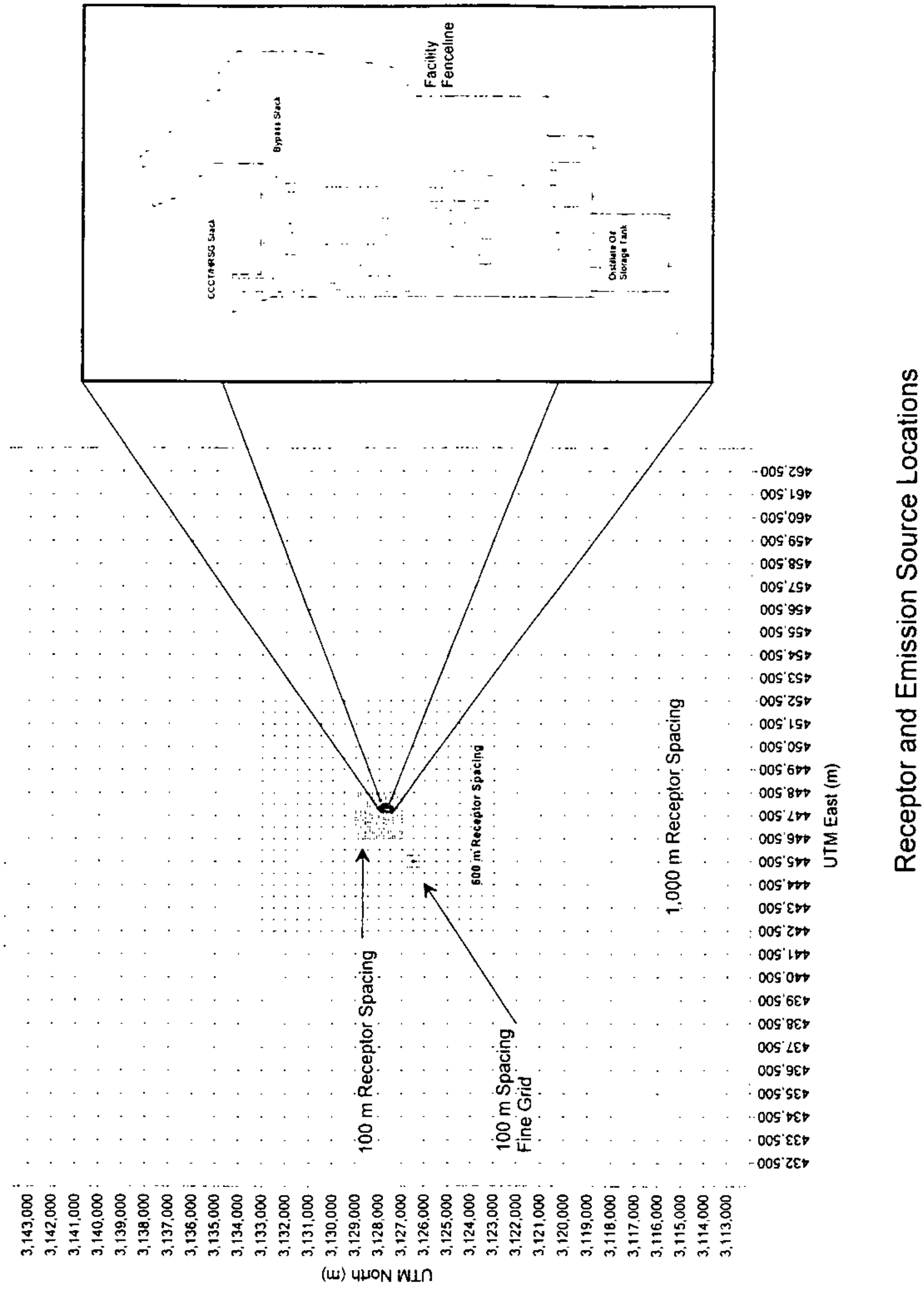
The air dispersion modeling receptor locations were established at appropriate distances to ensure sufficient density and aerial extent to adequately characterize the pattern of pollutant impacts in the area. Specifically, a nested rectangular grid network that extends 15 km from the center of Unit 3 was used. The rectangular grid network consists of 100 m spacing from the proposed fenceline out to 1,000 m, 500 m spacing out to 5 km, and then 1,000 m spacing from 5 to 15 km. Receptor spacing of 25 m intervals was used along the Power Park fenceline, and a 100 m fine grid was used at the maximum impact receptors. Figure 4-1 illustrates the nested rectangular grid, fence line receptors, and the relative location of the emission sources and downwash structures. The flat terrain option was used for all receptor points.

4.2.6 Meteorological Data

The ISCST3 air dispersion model requires hourly input of specific surface and upper-air meteorological data. These data include the wind flow vector, wind speed, ambient temperature, stability category, and the mixing height. Five years (1987-1991) of surface and upper air meteorological data from Orlando and Tampa, respectively, were used in the ISCST3 air dispersion modeling analysis. These meteorological data were downloaded from EPA's SCRAM web site and processed with PCRAMMET to combine the surface and mixing height data, interpolate hourly mixing heights from the twice-daily mixing heights, and calculate atmospheric stability class.

4.3 Model Results

As presented in Section 2.0, the Unit 3 PTE exceeds the PSD significant emission thresholds for NO_x, CO, and PM/PM_{10}. In accordance with the approved modeling protocol,



Receptor Location Plot
Figure 4-1

ISCST3 air dispersion modeling was performed (as described in the preceding sections) using the enveloped emission rates for NO_x, CO, and PM/PM_{10} for each applicable averaging period.

Tables 4-2 through 4-6 present the results for the 5 year refined modeling period (1987-1991) for each pollutant and applicable averaging period. The shaded concentrations in each table represent the maximum modeled predicted impacts in each case.

4.3.1 Comparison to PSD Significant Impact Levels and Preconstruction Monitoring Requirements

Table 4-7 compares the maximum model predicted concentrations for each pollutant and applicable averaging period with the PSD Class II significant impact levels and the preconstruction monitoring requirements. As Table 4-7 indicates, the Unit 3 maximum predicted concentrations are less than the PSD Class II significant impact levels (SILs) for each pollutant and applicable averaging period. Therefore, under the PSD program, no further air quality impact analyses (i.e., PSD increment and AAQS analyses) are required.

Additionally, the maximum predicted concentrations are less than the preconstruction monitoring de minus levels for each pollutant and applicable averaging period. Therefore, by this application, the applicant requests an exemption from the PSD preconstruction monitoring requirements.

Table 4-2
ISCST3 Model Predicted Maximum Annual Concentrations of NO_x

ISCST Operating Scenario Source Code	Averaging Period	Load	Year	Maximum Predicted Conc. ($\mu g/m^3$)	UTM Location	
					East (m)	North (m)
NACC1	Annual	100	1987	0.17	444,500.0	3,125,500.0
NACC7		70		0.18	444,500.0	3,126,000.0
NACC5		50		0.41	444,500.0	3,126,000.0
NACC1		100	1988	0.16	444,500.0	3,126,000.0
NACC7		70		0.16	445,500.0	3,126,000.0
NACC5		50		0.38	445,500.0	3,126,000.0
NACC1		100	1989	0.16	448,000.0	3,130,500.0
NACC7		70		0.17	448,000.0	3,130,500.0
NACC5		50		0.38	448,000.0	3,130,000.0
NACC1		100	1990	0.19	444,000.0	3,125,500.0
NACC7		70		0.20	445,000.0	3,126,000.0
NACC5		50		0.47	445,350.0	3,126,350.0
NACC1		100	1991	0.17	447,500.0	3,131,000.0
NACC7		70		0.18	447,500.0	3,130,500.0
NACC5		50		0.42	447,500.0	3,130,500.0
NASC1	Annual	100	1987	0.018	433,500.0	3,120,000.0
NASC1		100	1988	0.018	433,500.0	3,119,000.0
NASC1		100	1989	0.016	448,500.0	3,140,000.0
NASC1		100	1990	0.020	435,500.0	3,120,000.0
NASC1		100	1991	0.016	447,500.0	3,139,000.0

Table 4-3
ISCST3 Model Predicted Maximum 1-Hour Concentrations of CO

ISCST Operating Scenario Source Code	Averaging Period	Load	Year	Maximum Predicted Conc. (μg/m³)	UTM Location	
					East (m)	North (m)
CSCC1NG	1-Hour	100	1987	20.17	447,800.0	3,128,700.0
CSCC7NG		70		153.32	447,900.0	3,127,000.0
CSCC5NG		50		183.12	447,900.0	3,127,000.0
CSCC1NG		100	1988	13.83	448,000.0	3,128,800.0
CSCC7NG		70		392.15	447,891.2	3,127,873.0
CSCC5NG		50		549.61	447,891.2	3,127,873.0
CSCC1NG		100	1989	14.85	447,000.0	3,127,300.0
CSCC7NG		70		107.35	447,000.0	3,127,300.0
CSCC5NG		50		155.00	448,500.0	3,126,500.0
CSCC1NG		100	1990	15.22	448,500.0	3,129,500.0
CSCC7NG		70		118.14	448,500.0	3,126,500.0
CSCC5NG		50		420.63	447,700.0	3,128,000.0
CSCC1NG		100	1991	27.54	447,600.0	3,128,100.0
CSCC7NG		70		444.50	447,858.8	3,127,911.0
CSCC5NG		50		621.26	447,858.8	3,127,911.0
CSCC1FO	1-Hour	100	1987	250.78	448,800.0	3,127,200.0
CSCC7FO		70		288.09	448,500.0	3,127,200.0
CSCC5FO		50		299.37	448,500.0	3,127,300.0
CSCC1FO		100	1988	257.86	449,000.0	3,127,500.0
CSCC7FO		70		371.82	448,000.0	3,128,800.0
CSCC5FO		50		1,278.43	447,891.2	3,127,873.0
CSCC1FO		100	1989	229.45	446,900.0	3,128,700.0
CSCC7FO		70		406.33	446,900.0	3,127,200.0
CSCC5FO		50		403.98	446,900.0	3,127,200.0
CSCC1FO		100	1990	259.69	448,500.0	3,130,000.0
CSCC7FO		70		273.70	448,500.0	3,130,000.0
CSCC5FO		50		277.96	448,200.0	3,128,500.0
CSCC1FO		100	1991	286.34	448,500.0	3,127,100.0
CSCC7FO		70		680.95	447,600.0	3,128,100.0
CSCC5FO		50		1,421.39	447,858.8	3,127,911.0
CSSC1NG	1-Hour	100	1987	2.72	449,500.0	3,128,000.0
CSSC1NG		100	1988	2.78	446,700.0	3,129,000.0
CSSC1NG		100	1989	2.75	446,000.0	3,128,000.0
CSSC1NG		100	1990	2.72	449,000.0	3,129,000.0
CSSC1NG		100	1991	9.72	447,700.0	3,128,000.0
CSSC1FO	1-Hour	100	1987	10.38	449,500.0	3,128,000.0
CSSC1FO		100	1988	10.61	446,700.0	3,129,000.0
CSSC1FO		100	1989	11.21	449,000.0	3,127,000.0
CSSC1FO		100	1990	10.38	449,000.0	3,129,000.0
CSSC1FO		100	1991	38.47	447,700.0	3,128,000.0

Table 4-4
ISCST3 Model Predicted Maximum 8-Hour Concentrations of CO

ISCST Operating Scenario Source Code	Averaging Period	Load	Year	Maximum Predicted Conc. (μg/m³)	UTM Location	
					East (m)	North (m)
CSCC1NG	8-Hour	100	1987	4.72	448,500.0	3,126,600.0
CSCC7NG		70		38.68	450,000.0	3,127,000.0
CSCC5NG		50		53.29	448,500.0	3,127,200.0
CSCC1NG		100	1988	4.42	446,500.0	3,128,800.0
CSCC7NG		70		49.02	447,891.2	3,127,873.0
CSCC5NG		50		135.64	447,826.6	3,127,864.0
CSCC1NG		100	1989	5.05	445,500.0	3,127,500.0
CSCC7NG		70		42.55	445,500.0	3,127,500.0
CSCC5NG		50		55.39	448,500.0	3,128,800.0
CSCC1NG		100	1990	4.63	449,500.0	3,127,000.0
CSCC7NG		70		38.58	449,000.0	3,127,000.0
CSCC5NG		50		57.69	447,700.0	3,128,000.0
CSCC1NG		100	1991	4.30	447,000.0	3,129,500.0
CSCC7NG		70		55.56	447,858.8	3,127,911.0
CSCC5NG		50		166.68	447,858.8	3,127,911.0
CSCC1FO	8-Hour	100	1987	67.24	451,500.0	3,126,500.0
CSCC7FO		70		91.69	448,500.0	3,126,000.0
CSCC5FO		50		103.04	448,500.0	3,126,000.0
CSCC1FO		100	1988	73.19	448,100.0	3,129,000.0
CSCC7FO		70		88.90	448,000.0	3,128,800.0
CSCC5FO		50		159.80	447,891.2	3,127,873.0
CSCC1FO		100	1989	69.77	449,500.0	3,130,000.0
CSCC7FO		70		97.77	445,000.0	3,127,500.0
CSCC5FO		50		109.77	445,000.0	3,127,500.0
CSCC1FO		100	1990	61.41	450,000.0	3,126,500.0
CSCC7FO		70		81.27	445,500.0	3,128,000.0
CSCC5FO		50		92.64	445,500.0	3,128,000.0
CSCC1FO		100	1991	62.52	448,000.0	3,130,500.0
CSCC7FO		70		85.22	448,000.0	3,130,000.0
CSCC5FO		50		177.67	447,858.8	3,127,911.0
CSSC1NG	8-Hour	100	1987	0.52	446,000.0	3,127,000.0
CSSC1NG		100	1988	0.54	446,500.0	3,128,800.0
CSSC1NG		100	1989	0.56	447,000.0	3,129,500.0
CSSC1NG		100	1990	0.45	446,500.0	3,126,500.0
CSSC1NG		100	1991	1.23	447,700.0	3,128,000.0
CSSC1FO	8-Hour	100	1987	2.00	446,000.0	3,127,000.0
CSSC1FO		100	1988	2.08	446,500.0	3,128,800.0
CSSC1FO		100	1989	2.14	447,000.0	3,129,500.0
CSSC1FO		100	1990	2.40	446,500.0	3,126,500.0
CSSC1FO		100	1991	4.86	447,700.0	3,128,000.0

Table 4-5 ISCST3 Model Predicted Maximum Annual Concentrations of PM/PM_{10}						
ISCST Operating Scenario Source Code	Averaging Period	Load	Year	Maximum Predicted Conc. (μg/m³)	UTM Location	
					East (m)	North (m)
PACC1	Annual	100	1987	0.03	444,500.0	3,126,000.0
PACC7		70		0.04	444,500.0	3,126,000.0
PACC5		50		0.05	444,500.0	3,126,000.0
PACC1		100	1988	0.03	444,500.0	3,126,000.0
PACC7		70		0.04	445,500.0	3,126,500.0
PACC5		50		0.05	445,500.0	3,126,500.0
PACC1		100	1989	0.03	448,000.0	3,130,500.0
PACC7		70		0.04	448,000.0	3,130,500.0
PACC5		50		0.05	448,000.0	3,130,000.0
PACC1		100	1990	0.04	444,000.0	3,125,500.0
PACC7		70		0.05	445,000.0	3,126,000.0
PACC5		50		0.06	445,350.0	3,126,350.0
PACC1		100	1991	0.04	447,500.0	3,131,000.0
PACC7		70		0.04	447,500.0	3,130,500.0
PACC5		50		0.05	447,500.0	3,130,500.0
PASC1	Annual	100	1987	0.003	433,500.0	3,120,000.0
PASC1		100	1988	0.004	433,500.0	3,119,000.0
PASC1		100	1989	0.003	448,500.0	3,140,000.0
PASC1		100	1990	0.004	435,500.0	3,120,000.0
PASC1		100	1991	0.003	447,500.0	3,139,000.0

Table 4-6 ISCST3 Model Predicted Maximum 24-Hour Concentrations of PM/PM_{10}						
ISCST Operating Scenario Source Code	Averaging Period	Load	Year	Maximum Predicted Conc. ($\mu g/m^3$)	UTM Location	
					East (m)	North (m)
PSCC1NG	24-Hour	100	1987	0.29	447,900.0	3,128,800.0
PSCC7NG		70		0.35	451,000.0	3,126,500.0
PSCC5NG		50		0.42	451,000.0	3,126,500.0
PSCC1NG		100	1988	0.31	446,000.0	3,125,500.0
PSCC7NG		70		0.43	447,891.2	3,127,873.0
PSCC5NG		50		1.39	447,891.2	3,127,873.0
PSCC1NG		100	1989	0.33	445,500.0	3,126,500.0
PSCC7NG		70		0.40	446,500.0	3,127,100.0
PSCC5NG		50		0.47	446,500.0	3,127,100.0
PSCC1NG		100	1990	0.31	444,000.0	3,125,500.0
PSCC7NG		70		0.39	444,000.0	3,125,500.0
PSCC5NG		50		0.45	448,100.0	3,129,000.0
PSCC1NG		100	1991	0.33	449,500.0	3,127,000.0
PSCC7NG		70		0.49	447,858.8	3,127,911.0
PSCC5NG		50		1.27	447,858.8	3,127,911.0
PSCC1FO	24-Hour	100	1987	0.70	445,000.0	3,129,000.0
PSCC7FO		70		1.08	452,000.0	3,126,000.0
PSCC5FO		50		1.44	452,000.0	3,126,000.0
PSCC1FO		100	1988	0.80	448,100.0	3,129,000.0
PSCC7FO		70		1.21	445,500.0	3,125,000.0
PSCC5FO		50		2.10	447,891.2	3,127,873.0
PSCC1FO		100	1989	0.83	445,500.0	3,126,500.0
PSCC7FO		70		1.22	445,500.0	3,126,500.0
PSCC5FO		50		1.53	445,500.0	3,126,500.0
PSCC1FO		100	1990	0.74	441,500.0	3,124,000.0
PSCC7FO		70		1.15	443,000.0	3,125,000.0
PSCC5FO		50		1.48	443,000.0	3,125,000.0
PSCC1FO		100	1991	0.73	447,500.0	3,131,500.0
PSCC7FO		70		1.24	450,000.0	3,127,000.0
PSCC5FO		50		2.33	447,858.5	3,127,911.0
PSSC1NG	24-Hour	100	1987	0.03	452,500.0	3,114,000.0
PSSC1NG		100	1988	0.04	446,500.0	3,128,800.0
PSSC1NG		100	1989	0.04	447,000.0	3,129,500.0
PSSC1NG		100	1990	0.04	433,500.0	3,137,000.0
PSSC1NG		100	1991	0.07	447,700.0	3,128,000.0
PSSC1FO	24-Hour	100	1987	0.19	461,500.0	3,121,000.0
PSSC1FO		100	1988	0.18	446,500.0	3,128,800.0
PSSC1FO		100	1989	0.21	447,000.0	3,129,500.0
PSSC1FO		100	1990	0.22	446,500.0	3,126,500.0
PSSC1FO		100	1991	0.36	447,700.0	3,128,000.0

Table 4-7
Comparison of Maximum Predicted Impacts with the PSD Class II Significant Impact Levels and the PSD De Minimis Monitoring Levels

Pollutant	Averaging Period	Maximum Predicted Impact (μg/m^3)	PSD Class II Significant Impact Level	PSD De Minimis Monitoring Level
NO_x	Annual	0.47	1	14
CO	1-Hour	1,421.39	2,000	-
	8-Hour	177.67	500	575
PM/PM_{10}	Annual	0.06	1	-
	24-Hour	2.33	5	10
VOC (Ozone)	N/A	45.2 tpy*	N/A	100 tpy

*Ozone preconstruction monitoring applicability based on an annualized Unit 3 emission rate assuming 720 hours of distillate fuel oil firing and 8,040 hours of natural gas firing during base load (100 percent) conditions at 72° F ambient temperature, as well as emissions from the distillate fuel oil storage tank.

Expected operating at baseload conditions

5.0 Additional and Class I Area Impact Analyses

The following sections discuss the Unit 3 impacts on commercial, residential, and industrial growth, vegetation and soils, visibility, and nearby Class I areas.

5.1 Commercial, Residential, and Industrial Growth

Unit 3 is within the Cane Island Power Park (Power Park) which is located within an unincorporated area of Osceola County. There will be a increase in the local labor force during the construction phase of Unit 3, but this increase will be temporary, short-lived, and will not result in permanent/significant commercial and residential growth occurring in the Power Park vicinity.

It is anticipated that most of the labor force during the construction phase will commute from nearby communities. The electrical generating capacity created by Unit 3 will not have a significant effect upon the industrial growth in the immediate area considering that the electrical generating capacity will be sold to the grid as opposed to a nearby industrial host.

Population increase is a secondary growth indicator of potential increases in air quality levels. Changes in air quality due to population increase are related to the amount of vehicle traffic, commercial/institutional facilities, and home fuel use. The net number of new, permanent jobs which will be created by the Project is estimated to be two. It can be concluded that the air quality impacts associated with secondary growth will not be significant because the increase in population due to the operation of Unit 3 will be very small, compared to the overall population size of the surrounding area.

5.2 Vegetation and Soils

Combustion turbine projects are typically considered "clean facilities" that have very low predicted ground level pollutant impacts. The low predicted impacts are the direct result of complete combustion and very effective pollutant dispersion. Dispersion is enhanced by the thermal and momentum buoyancy characteristics of the combustion turbine exhaust. Therefore, the Unit 3 impacts on soils and vegetation will be minimal.

The National Ambient Air Quality Standards (NAAQS) were established to protect public health and welfare from any adverse effects of air pollutants. The definition of public welfare also encompasses vegetation and soils. Specifically, ambient concentrations of NO_2, CO, and PM/PM_{10} below the secondary NAAQS will not result in harmful effects for most types of soils and vegetation.

The criteria pollutants which triggered an additional impact analysis include NO_x, CO, and PM/PM_{10}. The modeled impacts were compared to the secondary NAAQS as the basis for assessing cumulative impacts. The modeling in Section 4.0 showed that the NO_x, CO, and PM/PM_{10} impacts are below the NAAQS. The impacts are even less than the much lower significant impact level thresholds. Because Unit 3 emissions do not even significantly impact the NAAQS, it is reasonable to conclude that no adverse effects on soils and vegetation will occur.

5.3 Visibility Impairment Analysis

The additional impact analysis requirements of a PSD permit application are concerned with visibility impairment within the Unit 3 impact area. The general components of a visibility impairment analysis include:

- Determine the visual quality of the area.
- Determine the potential for visibility impairment with a screening level assessment.
- If warranted, conduct a more in-depth analysis of the visibility impairment potential.

5.3.1 Visual Quality of the Area

The Power Park is located in the central section of the Florida peninsula, immediately surrounded by lakes and swamp land. The climate is characterized as nearly tropical with warm temperatures and abundant moisture. The high relative humidity and coastal influence generally result in moderate visibility with relatively low background visual ranges.

5.3.2 Visual Impairment Screening Assessment

A visibility impairment screening analysis was conducted for the nearest Class I Area to the Power Park to provide a conservative indication of the perceptibility of plumes from the proposed emission source. The nearest Class I Area is the Chassahowitzka National Wildlife Refuge located approximately 105 km northwest of the Power Park.

The analysis was performed in accordance with EPA's Workbook for Plume Visual Impact Screening and Analysis (EPA-450/4-88-015, September 1988, hereinafter referred to as the Workbook), using the VISCREEN model. In accordance with Workbook visual screening procedures, the VISCREEN plume visual impact screening model was used with default worst-case Level-1 visual screening parameters using the maximum estimated emission rates of NO_x and PM/PM_{10} for distillate oil firing as presented in Table 2-1.

The report output of the VISCREEN model is included in Attachment 5. Results of the Level-1 visual screening analysis indicate that the conservative screening criteria are not exceeded. Therefore, further analyses to quantify the extent of any reductions in visibility due to Unit 3 emissions are not warranted based on the results of the Level-1 visual impairment screening analysis.

5.4 Class I Area Impact Analysis

Class I areas are afforded special attention based on the value of natural, scenic, recreational, or historic perspective. Emission sources subject to PSD review are analyzed to determine the potential for deteriorating the particular properties that make these areas worthy of a Class I designation. These properties are known as air quality related values (AQRVs), and typically include such attributes as flora and fauna, visibility, and scenic value.

The Power Park is located approximately 105 km southeast from the closest boundary of the Chassahowitzka Wilderness Area The area is designated as mandatory Class I area, under the jurisdiction of the Fish and Wildlife Service as the Federal Land Manager (FLM). The FLM typically establishes indicators and thresholds to measure a source's potential for impacting the AQRV's of a Class I area. These indicators are typically measured by assessing a project's impact on air the quality and visibility/regional haze.

5.4.1 Class I Air Quality Impact Analysis

Air dispersion modeling was performed to determine the Unit 3 maximum predicted impact at the Class I area. The ISCST3 air dispersion model was used in the flat terrain mode to determine the maximum predict impacts of NO_x and PM/PM_{10} at a receptor placed at the closest boundary point of the Power Park. The 5 year meteorological data set, model options, and operating scenarios used in the refined modeling analysis presented in Section 4.0, were also used in the Class I air quality impact analyses.

5.4.1.1 Class I Significant Impact Level Modeling Results. Tables 5-1 through 5-3 present the results of the Class I area air dispersion modeling for each pollutant and applicable averaging period. The maximum predicted concentrations are presented for each

Table 5-1
ISCST3 Model Predicted Maximum Annual Concentrations of NO_x at Chassahowitzka

ISCST Operating Scenario Source Code	Averaging Period	Load	Year	Maximum Predicted Conc. (μg/m³)	Class I Increment (μg/m³)	Class I SIL* (μg/m³)
NACC1	Annual	100	1987	0.009	2.5	0.1
NACC7		70		0.008	2.5	0.1
NACC5		50		0.016	2.5	0.1
NACC1		100	1988	0.009	2.5	0.1
NACC7		70		0.008	2.5	0.1
NACC5		50		0.017	2.5	0.1
NACC1		100	1989	0.012	2.5	0.1
NACC7		70		0.011	2.5	0.1
NACC5		50		0.022	2.5	0.1
NACC1		100	1990	0.011	2.5	0.1
NACC7		70		0.009	2.5	0.1
NACC5		50		0.019	2.5	0.1
NACC1		100	1991	0.010	2.5	0.1
NACC7		70		0.009	2.5	0.1
NACC5		50		0.018	2.5	0.1
NASC1	Annual	100	1987	0.004	2.5	0.1
NASC1		100	1988	0.004	2.5	0.1
NASC1		100	1989	0.005	2.5	0.1
NASC1		100	1990	0.005	2.5	0.1
NASC1		100	1991	0.004	2.5	0.1

*Calculated as 4 percent of the PSD Class I Increment.

Table 5-2
ISCST3 Model Predicted Maximum Annual Concentrations
of PM/PM_{10} at Chassahowitzka

ISCST Operating Scenario Source Code	Averaging Period	Load	Year	Maximum Predicted Conc. (μg/m³)	Class I Increment (μg/m³)	Class I SIL* (μg/m³)
PACC1	Annual	100	1987	0.002	4	0.16
PACC7		70		0.002	4	0.16
PACC5		50		0.002	4	0.16
PACC1		100	1988	0.002	4	0.16
PACC7		70		0.002	4	0.16
PACC5		50		0.002	4	0.16
PACC1		100	1989	0.002	4	0.16
PACC7		70		0.003	4	0.16
PACC5		50		0.003	4	0.16
PACC1		100	1990	0.002	4	0.16
PACC7		70		0.002	4	0.16
PACC5		50		0.003	4	0.16
PACC1		100	1991	0.002	4	0.16
PACC7		70		0.002	4	0.16
PACC5		50		0.002	4	0.16
PASC1	Annual	100	1987	0.001	4	0.16
PASC1		100	1988	0.001	4	0.16
PASC1		100	1989	0.001	4	0.16
PASC1		100	1990	0.001	4	0.16
PASC1		100	1991	0.001	4	0.16

*Calculated as 4 percent of the PSD Class I Increment.

Table 5-3
ISCST3 Model Predicted Maximum 24-Hour Concentrations
of PM/PM_{10} at Chassahowitzka

ISCST Operating Scenario Source Code	Averaging Period	Load	Year	Maximum Predicted Conc. (μg/m³)	Class I Increment (μg/m³)	Class I SIL* (μg/m³)
PSCC1NG	24-Hour	100	1987	0.024	8	0.32
PSCC7NG		70		0.026	8	0.32
PSCC5NG		50		0.027	8	0.32
PSCC1NG		100	1988	0.021	8	0.32
PSCC7NG		70		0.021	8	0.32
PSCC5NG		50		0.022	8	0.32
PSCC1NG		100	1989	0.025	8	0.32
PSCC7NG		70		0.029	8	0.32
PSCC5NG		50		0.030	8	0.32
PSCC1NG		100	1990	0.033	8	0.32
PSCC7NG		70		0.035	8	0.32
PSCC5NG		50		0.036	8	0.32
PSCC1NG		100	1991	0.029	8	0.32
PSCC7NG		70		0.030	8	0.32
PSCC5NG		50		0.031	8	0.32
PSCC1FO	24-Hour	100	1987	0.083	8	0.32
PSCC7FO		70		0.112	8	0.32
PSCC5FO		50		0.134	8	0.32
PSCC1FO		100	1988	0.085	8	0.32
PSCC7FO		70		0.106	8	0.32
PSCC5FO		50		0.123	8	0.32
PSCC1FO		100	1989	0.086	8	0.32
PSCC7FO		70		0.115	8	0.32
PSCC5FO		50		0.138	8	0.32
PSCC1FO		100	1990	0.120	8	0.32
PSCC7FO		70		0.157	8	0.32
PSCC5FO		50		0.186	8	0.32
PSCC1FO		100	1991	0.110	8	0.32
PSCC7FO		70		0.141	8	0.32
PSCC5FO		50		0.167	8	0.32
PSSC1NG	24-Hour	100	1987	0.008	8	0.32
PSSC1NG		100	1988	0.010	8	0.32
PSSC1NG		100	1989	0.010	8	0.32
PSSC1NG		100	1990	0.011	8	0.32
PSSC1NG		100	1991	0.012	8	0.32
PSSC1FO	24-Hour	100	1987	0.039	8	0.32
PSSC1FO		100	1988	0.050	8	0.32
PSSC1FO		100	1989	0.046	8	0.32
PSSC1FO		100	1990	0.054	8	0.32
PSSC1FO		100	1991	0.058	8	0.32

*Calculated as 4 percent of the PSD Class I Increment.

year and compared with the Class I SILs. The Class I SILs were calculated as 4 percent of the PSD Class I increments. As the results indicated, the maximum predicted concentrations of NO_x and PM/PM_{10} are considerably less than the applicable Class I SILs.

5.4.2 Regional Haze Analysis

A regional haze analysis was performed to evaluate the potential for a visibility impairment (significant increase in uniform haze) at the Chassahowitzka Class I area. Visibility impairment occurs as a result of the scattering and absorption of light due to particles and gasses in the atmosphere. On a local-scale, visual impairment is generally defined as a plume or layered haze from a single source or small group of sources. This phenomena, known as regional haze, impairs visibility in all directions over a large area by obscuring the clarity, color, texture, and form of what is seen.

The regional haze analysis was performed in accordance with guidance published in the Interagency Workgroup on Air Quality Modeling (IWAQM) (EPA-454/R-93-015) document, as well as technical guidance and an example provide by the NPS. The methodology, input, and results are described in the following subsections.

5.4.2.1 Analysis Methodology and Input. The reduction of image forming light per unit distance in the atmosphere due to the sum of scattering (light redirected away from the sight path) and adsorption (light captured by aerosols and turned into heat energy) is represented by a term known as the extinction coefficient (b_{ext}). Visual range (vr) is a measure of how far away a large black object can be seen in the atmosphere under several severe assumptions including: an absolutely dark target, uniform lighting conditions (cloud free skies), uniform extinction in all directions, a limiting contrast discrimination level (usually set at 2% difference between target and sky), a target high enough in elevation to account for earth curvature, and several other factors. Visual range is, at best, a limited concept that allows relatively simple comparisons between visual air quality levels and should not be thought of as the absolute distance that can be seen through the atmosphere. With the aforementioned assumptions, extinction can be related to visual range with the following equation:

$$b_{ext} = \frac{3.912}{vr}$$

Where: b_{ext} = extinction coefficient, 1/km vr = visual range, km

A uniform incremental change in b_{ext} or visual range does not necessarily result in uniform changes in perceived visual air quality. In fact, perceived changes in visibility are best related to a change in b_{ext}, or; percent change in extinction. Based on NPS guidance, if the change in extinction is less than 5 percent, the Level I screening analysis is satisfied, and no further analysis is required. The percent change in extinction is calculated as follows:

$$= \frac{b_{exts}}{b_{extb}}(100\%)$$

Where: b_{exts} = source extinction coefficient

b_{extb} = background extinction coefficient

The source extinction coefficient is calculated as a function of the source's NO_x, SO_2, and fine PM model predicted concentration levels at the Class I area, as well as the ambient relative humidity. Although relative humidity does not by itself cause visibility to be degraded, some particles in the atmosphere accumulate water and grow to just the right size to be very efficient at scattering light. Based on guidance from the IWAQM document and NPS, the source extinction coefficient may be calculated as follows:

$$b_{exts} = (0.003)(RH_f)[(NH_4)_2SO_4 + NH_4NO_3] + (0.003)(PM_{fine})$$

Where: RH_f = relative humidity correction factor to adjust for the effects of ambient humidity on light extinction calculations.

$(NH_4)_2SO_4$= concentration of ammonium sulfate in units of $\mu g/m^3$, calculated as (SO_2 24-h concentration, $\mu g/m^3$)(1.5)(1.375), assuming all SO_2 converts to ammonium sulfate.

NH_4NO_3 = concentration of ammonium nitrate in units of $\mu g/m^3$, calculated as (NO_x 24-h concentration, $\mu g/m^3$)(1.35)(1.29), assuming all NO_x converts to ammonium nitrate.

PM_{fine}= concentration of primary fine particulate in units of $\mu g/m^3$, calculated as (PM/PM_{10} 24-h concentration, $\mu g/m^3$)(1.0), assuming all PM/PM_{10} is primary fine particulate.

The background extinction coefficient is calculated as a function of the estimated visual range as follows:

$$b_{extb} = \frac{3.912}{vr}$$

Where: b_{extb} = background extinction coefficient, 1/km
vr = background visual range, km

5.4.2.2 Regional Haze Calculations and Results. Based on the aforementioned methodology, the percent change in extinction was calculated for each of the operating scenarios and 5 years of meteorological data assessed in the refined modeling analysis presented in Section 4.0. The results of the analysis are presented in a spreadsheet included as Attachment 6. The ISCST3 air dispersion model was used in the flat terrain mode to determine the maximum predict 24-hour impacts of NO_x and PM/PM_{10} at a receptor placed at the closest boundary point of the Power Park. Actual relative humidity data corresponding to the date of the maximum predicted NO_x impacts for each scenario were used in the regional haze calculations.

As the results in Attachment 6 indicate, the percent change in extinction for each year and operating scenario is less than screening threshold for Level I analyses of 5 percent. Therefore, further analysis of potential visibility impairment is not warranted.

Attachments

Attachment 1

(Turbine Vendor Data)

KUA Cane Island Unit 3

WEC 501F 1x1 Combined Cycle

	* 100 Percent Load - Natural Gas*				
Case Name	Case 1	Case 2	Case 3	Case 4	Case 5
CTG Model	WEC 501F	WEC 501F	WEC 501F	WEC 501F	WEC 501F
Combustor/NOx Emission Rate	DLN/15 ppm	DLN/15 ppm	DLN/15 ppm	DLN/15 ppm	DLN/15 ppm
CTG Fuel Type	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas
CTG Load Level (percent of Base Load)	90 Percent	Base	Base	Base	Base
CTG Performance Reference	WEC 05/21/98	WEC 05/21/98	WEC 05/21/98	WEC 05/21/98	WEC 05/21/98
Evaporative Cooler On/Off	Off	On	Off	On	Off
HRSG Duct Firing On/Off	Off	Off	Off	Off	Off
Ambient Temperature	19	72	72	102	102
Ambient Relative Humidity	55	74	74	45	45
CTG Compressor Inlet Temperature, F	19	66.7	72	84.7	102
CTG Compr. Inlet Relative Humidity, %	55	96	74	92	45
Atmospheric Pressure, psia	14.656	14.656	14.656	14.656	14.656
Site Elevation, ft	75	75	75	75	75
Inlet Loss, in. H2O	3.9	4.0	4.0	3.8	3.7
Exhaust Loss, in. H2O	14.0	13.5	13.2	12.4	11.7
CTG Load Level (percent of Base Load)	90 Percent	Base	Base	Base	Base
Number of CTGs	1	1	1	1	1
Gross CTG Output, kW	185,000	177,100	173,750	166,650	156,090
Gross CTG Heat Rate, Btu/kWh (LHV)	9,040	9,235	9,270	9,395	9,540
CTG Heat Input, MBtu/h (LHV)	1,672.40	1,635.52	1,610.66	1,565.68	1,489.10
CTG Heat Input, MBtu/h (HHV)	1,855.50	1,814.59	1,787.00	1,737.10	1,652.13
CTG Fuel Flow, lb/h	79,710	77,960	76,770	74,630	70,980
CTG Water Injection Flow, lb/h	0	0	0	0	0
CTG Steam Injection Flow, lb/h	0	0	0	0	0
Injection Ratio	0.000	0.000	0.000	0.000	0.000
CTG Exhaust Flow, lb/h	3,604,762	3,505,556	3,469,805	3,350,992	3,236,818
CTG Exhaust Temperature, F	1,077	1,120	1,123	1,138	1,148
Duct Burner Heat Input, MBtu/h (LHV)	0	0	0	0	0
Duct Burner Heat Input, MBtu/h (HHV)	0	0	0	0	0
Stack Exit Temperature, F	182	188	187	189	187
Stack Exhaust Pressure, in. H2O above Patm	0	0	0	0	0
Stack Diameter, ft	18.0	18.0	18.0	18.0	18.0
Stack Exit Velocity, ft/s	64.9	64.2	63.4	61.8	59.4

KUA Cane Island Unit 3

WEC 501F 1x1 Combined Cycle

	* 100 Percent Load - Natural Gas*				
Case Name	Case 1	Case 2	Case 3	Case 4	Case 5
CTG Model	WEC 501F	WEC 501F	WEC 501F	WEC 501F	WEC 501F
Combustor/NOx Emission Rate	DLN/15 ppm	DLN/15 ppm	DLN/15 ppm	DLN/15 ppm	DLN/15 ppm
CTG Fuel Type	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas
CTG Load Level (percent of Base Load)	90 Percent	Base	Base	Base	Base
CTG Performance Reference	WEC 05/21/98	WEC 05/21/98	WEC 05/21/98	WEC 05/21/98	WEC 05/21/98
Evaporative Cooler On/Off	Off	On	Off	On	Off
HRSG Duct Firing On/Off	Off	Off	Off	Off	Off
CTG Exhaust Analysis (Volume Basis - Wet)					
O2	12.50%	12.12%	12.20%	11.84%	12.07%
CO2	3.88%	3.88%	3.86%	3.86%	3.81%
H2O	7.75%	9.61%	9.41%	11.09%	10.40%
N2	74.93%	73.47%	73.61%	72.30%	72.80%
Ar	0.94%	0.92%	0.92%	0.91%	0.91%
SO2	0.00001%	0.00001%	0.00001%	0.00001%	0.00001%
Total	100.00%	100.00%	100.00%	100.00%	100.00%
Emissions (at CTG exhaust flange)					
NOx, ppmvd @ 15% O2	15.0	15.0	15.0	15.0	15.0
NOx, lb/h as NO2	101.1	98.9	97.4	94.7	90.1
CO, ppmvd	31.0	31.6	31.4	32.0	31.4
CO, ppmvw	28.6	28.6	28.5	28.5	28.1
CO, ppmvd @ 15% O2	25.0	25.0	25.0	25.0	25.0
CO, lb/h	101.5	99.3	97.8	95.1	90.4
UHC, ppmvd	6.61	6.75	6.70	6.83	6.69
UHC, ppmvw	6.10	6.10	6.07	6.07	5.99
UHC, ppmvd @ 15% O2	5.33	5.33	5.33	5.33	5.33
UHC, lb/h as CH4	12.39	12.14	11.94	11.61	11.04
VOC, ppmvd	4.97	5.06	5.03	5.12	5.02
VOC, ppmvw	4.58	4.57	4.55	4.55	4.50
VOC, ppmvd @ 15% O2	4.00	4.00	4.00	4.00	4.00
VOC, lb/h as CH4	9.30	9.10	8.96	8.71	8.28
SO2, ppmvd	0.14	0.14	0.14	0.14	0.14
SO2, ppmvw	0.13	0.13	0.12	0.12	0.12
SO2, lb/h	1.02	1.00	0.98	0.95	0.91
Particulates (TSP = PM10), lb/h (dry filterables only)	16.80	16.10	16.00	15.00	15.00
CTG Fuel LHV, Btu/lb	20,980	20,980	20,980	20,980	20,980
CTG Fuel HHV, Btu/lb	23,277	23,277	23,277	23,277	23,277
HHV/LHV Ratio	1.1095	1.1095	1.1095	1.1095	1.1095
CTG Fuel Composition (Ultimate Analysis by Weight)					
Ar	0.000000%	0.000000%	0.000000%	0.000000%	0.000000%
C	74.043570%	74.043570%	74.043570%	74.043570%	74.043570%
H2	24.256660%	24.256660%	24.256660%	24.256660%	24.256660%
N2	0.575950%	0.575950%	0.575950%	0.575950%	0.575950%
O2	1.123180%	1.123180%	1.123180%	1.123180%	1.123180%
S	0.000640%	0.000640%	0.000640%	0.000640%	0.000640%
Total	100.00%	100.00%	100.00%	100.00%	100.00%
CTG Wet (Total) Exhaust Gas Analysis					
Molecular Wt, lb/mol	28.47	28.27	28.29	28.10	28.17
Gas Constant, ft-lbf/lbm-R	54.262	54.655	54.616	54.974	54.836
Specific Volume, ft^3/lb	38.19	39.59	39.67	40.38	40.60
Exhaust Gas Flow, acfm	2,294,431	2,313,083	2,294,119	2,255,218	2,190,247
Specific Volume, scf/lb	13.32	13.42	13.41	13.50	13.47
Exhaust Gas Flow, scfm	800,257	784,076	775,501	753,973	726,666
Exhaust Gas Flow, lb/h	3,604,762	3,505,556	3,469,805	3,350,992	3,236,818

KUA Cane Island Unit 3

WEC 501F 1x1 Combined Cycle

	* 100 Percent Load - Natural Gas*				
Case Name	Case 1	Case 2	Case 3	Case 4	Case 5
CTG Model	WEC 501F	WEC 501F	WEC 501F	WEC 501F	WEC 501F
Combustor/NOx Emission Rate	DLN/15 ppm	DLN/15 ppm	DLN/15 ppm	DLN/15 ppm	DLN/15 ppm
CTG Fuel Type	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas
CTG Load Level (percent of Base Load)	90 Percent	Base	Base	Base	Base
CTG Performance Reference	WEC 05/21/98	WEC 05/21/98	WEC 05/21/98	WEC 05/21/98	WEC 05/21/98
Evaporative Cooler On/Off	Off	On	Off	On	Off
HRSG Duct Firing On/Off	Off	Off	Off	Off	Off
Stack Exhaust Analysis (Volume Basis - Wet)					
Ar	0.94%	0.92%	0.92%	0.91%	0.91%
CO2	3.88%	3.88%	3.86%	3.86%	3.81%
H2O	7.75%	9.61%	9.41%	11.09%	10.40%
N2	74.93%	73.47%	73.61%	72.30%	72.80%
O2	12.50%	12.12%	12.20%	11.84%	12.07%
SO2	0.00001%	0.00001%	0.00001%	0.00001%	0.00001%
Total	100.00%	100.00%	100.00%	100.00%	100.00%
Stack Exhaust Gas Analysis (Wet)					
Molecular Wt, lb/mol	28.47	28.27	28.29	28.10	28.17
Gas Constant, ft-lbf/lbm-R	54.262	54.655	54.616	54.974	54.836
Specific Volume, ft^3/lb	16.50	16.77	16.73	16.90	16.80
Exhaust Gas Flow, acfm	991,310	979,803	967,497	943,863	906,309
Specific Volume, scf/lb	13.32	13.42	13.41	13.50	13.47
Exhaust Gas Flow, scfm	800,257	784,076	775,501	753,973	726,666
Exhaust Gas Flow, lb/h	3,604,762	3,505,556	3,469,805	3,350,992	3,236,818
Emissions (at Stack exit)					
NOx, ppmvd @15% O2 without SCR	15.0	15.0	15.0	15.0	15.0
NOx, lb/h as NO2 without SCR	101.1	98.9	97.4	94.7	90.1
NOx, ppmvd @15% O2 with SCR	4.0	4.0	4.0	4.0	4.0
NOx, lb/h as NO2 with SCR	26.7	26.1	25.7	25.0	23.8
NH3 slip, ppmvd @15% O2 with SCR	10.0	10.0	10.0	10.0	10.0
NH3 slip, lb/h with SCR	24.7	24.2	23.8	23.1	22.0
CO, ppmvd without Catalyst	31.0	31.6	31.4	32.0	31.4
CO, lb/h without Catalyst	101.5	99.3	97.8	95.1	90.4
CO, ppmvd @ 15% O2 without Catalyst	25.0	25.0	25.0	25.0	25.0
CO, ppmvd with Catalyst	31.0	31.6	31.4	32.0	31.4
CO, lb/h with Catalyst	101.5	99.3	97.8	95.1	90.4
CO, ppmvd @ 15% O2 with Catalyst	25.0	25.0	25.0	25.0	25.0
SO2, ppmvd	0.14	0.14	0.14	0.14	0.14
SO2, ppmvw	0.13	0.13	0.12	0.12	0.12
SO2, lb/h	1.02	1.00	0.98	0.95	0.91
UHC, ppmvd	6.6	6.7	6.7	6.8	6.7
UHC, ppmvw	6.1	6.1	6.1	6.1	6.0
UHC, ppmvd @ 15% O2	5.3	5.3	5.3	5.3	5.3
UHC, lb/h as CH4	12.4	12.1	11.9	11.6	11.0
VOC, ppmvd	5.0	5.1	5.0	5.1	5.0
VOC, ppmvw	4.6	4.6	4.6	4.6	4.5
VOC, ppmvd @ 15% O2	4.0	4.0	4.0	4.0	4.0
VOC, lb/h as CH4	9.3	9.1	9.0	8.7	8.3
Particulates (TSP = PM10), lb/h (dry filterables only)	16.8	16.1	16.0	15.0	15.0

Notes:

1. Values shown above are for one combustion turbine/HRSG unit only.
2. Sample analysis for natural gas fuel received from KUA, sulfur at 0.2 gr/100scf for illustration purposes only.
3. 73% effective SCR and no CO catalyst.
4. Particulates are per EPA Method 201A/202 (front and back half) and include H2SO4 mist.
5. CTG performance from Westinghouse data received 05/21/98, 05/22/98 and 05/27/98 for KUA.

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	* 70 & 50 Percent Load - Natural Gas *					
Case Name	Case 6	Case 7	Case 8	Case 9	Case 10	Case 11
CTG Model	WEC 501F	WEC 501F	WEC 501F	WEC 501F	WEC 501F	WEC 501F
Combustor/NOx Emission Rate	DLN/15 ppm	DLN/45 ppm	DLN/15 ppm	DLN/45 ppm	DLN/15 ppm	DLN/45 ppm
CTG Fuel Type	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas
CTG Load Level (percent of Base Load)	70 Percent	50 Percent	70 Percent	50 Percent	70 Percent	50 Percent
CTG Performance Reference	WEC 05/27/98	WEC 05/27/98	WEC 05/27/98	WEC 05/27/98	WEC 05/27/98	WEC 05/27/98
Evaporative Cooler On/Off	Off	Off	Off	Off	Off	Off
HRSG Duct Firing On/Off	Off	Off	Off	Off	Off	Off
Ambient Temperature	19	19	72	72	102	102
Ambient Relative Humidity	55	55	74	74	45	45
CTG Compressor Inlet Temperature, F	19	19	72	72	102	102
CTG Compr. Inlet Relative Humidity, %	55	55	74	74	45	45
Atmospheric Pressure, psia	14.656	14.656	14.656	14.656	14.656	14.656
Site Elevation, ft	75	75	75	75	75	75
Inlet Loss, in. H2O	2.5	2.4	2.5	2.3	2.4	2.2
Exhaust Loss, in. H2O	9.6	8.0	8.5	7.0	7.8	6.4
CTG Load Level (percent of Base Load)	70 Percent	50 Percent	70 Percent	50 Percent	70 Percent	50 Percent
Number of CTGs	1	1	1	1	1	1
Gross CTG Output, kW	143,390	102,030	121,270	86,190	108,860	77,310
Gross CTG Heat Rate, Btu/kWh (LHV)	9,790	10,638	10,351	11,421	10,731	11,908
CTG Heat Input, MBtu/h (LHV)	1,403.79	1,085.40	1,255.27	984.38	1,168.18	920.61
CTG Heat Input, MBtu/h (HHV)	1,557.48	1,204.24	1,392.70	1,092.16	1,296.08	1,021.40
CTG Fuel Flow, lb/h	66,910	51,730	59,830	46,920	55,680	43,880
CTG Water Injection Flow, lb/h	0	0	0	0	0	0
CTG Steam Injection Flow, lb/h	0	0	0	0	0	0
Injection Ratio	0.000	0.000	0.000	0.000	0.000	0.000
CTG Exhaust Flow, lb/h	2,890,793	2,814,086	2,725,887	2,597,939	2,623,298	2,476,057
CTG Exhaust Temperature, F	1,156	977	1,156	1,023	1,156	1,041
Duct Burner Heat Input, MBtu/h (LHV)	0	0	0	0	0	0
Duct Burner Heat Input, MBtu/h (HHV)	0	0	0	0	0	0
Stack Exit Temperature, F	175	185	181	186	185	188
Stack Exhaust Pressure, in. H2O above Patm	0	0	0	0	0	0
Stack Diameter, ft	18.0	18.0	18.0	18.0	18.0	18.0
Stack Exit Velocity, ft/s	51.5	50.8	49.3	47.2	47.9	45.4

	* 70 & 50 Percent Load - Natural Gas *					
Case Name	Case 6	Case 7	Case 8	Case 9	Case 10	Case 11
CTG Model	WEC 501F	WEC 501F	WEC 501F	WEC 501F	WEC 501F	WEC 501F
Combustor/NOx Emission Rate	DLN/15 ppm	DLN/45 ppm	DLN/15 ppm	DLN/45 ppm	DLN/15 ppm	DLN/45 ppm
CTG Fuel Type	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas
CTG Load Level (percent of Base Load)	70 Percent	50 Percent	70 Percent	50 Percent	70 Percent	50 Percent
CTG Performance Reference	WEC 05/27/98	WEC 05/27/98	WEC 05/27/98	WEC 05/27/98	WEC 05/27/98	WEC 05/27/98
Evaporative Cooler On/Off	Off	Off	Off	Off	Off	Off
HRSG Duct Firing On/Off	Off	Off	Off	Off	Off	Off
CTG Exhaust Analysis (Volume Basis - Wet)						
O2	12.12%	13.91%	12.26%	13.72%	12.34%	13.64%
CO2	4.06%	3.24%	3.83%	3.16%	3.69%	3.09%
H2O	8.09%	6.49%	9.35%	8.06%	10.17%	9.02%
N2	74.79%	75.42%	73.63%	74.13%	72.89%	73.33%
Ar	0.94%	0.95%	0.92%	0.93%	0.92%	0.92%
SO2	0.00001%	0.00001%	0.00001%	0.00001%	0.00001%	0.00001%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Emissions (at CTG exhaust flange)						
NOx, ppmvd @ 15% O2	15.0	45.0	15.0	45.0	15.0	45.0
NOx, lb/h as NO2	85.0	195.8	76.1	177.7	70.9	166.2
CO, ppmvd	260.6	306.3	249.2	304.1	242.3	300.4
CO, ppmvw	239.6	286.4	225.9	279.6	217.7	273.3
CO, ppmvd @ 15% O2	200.0	300.0	200.0	300.0	200.0	300.0
CO, lb/h	681.8	790.6	609.8	717.1	567.3	670.7
UHC, ppmvd	6.95	27.23	6.64	27.03	6.46	26.70
UHC, ppmvw	6.39	25.46	6.02	24.85	5.80	24.30
UHC, ppmvd @ 15% O2	5.33	26.67	5.33	26.67	5.33	26.67
UHC, lb/h as CH4	10.42	40.26	9.30	36.51	8.66	34.15
VOC, ppmvd	5.21	20.42	4.98	20.28	4.85	20.02
VOC, ppmvw	4.79	19.09	4.52	18.64	4.35	18.22
VOC, ppmvd @ 15% O2	4.00	20.00	4.00	20.00	4.00	20.00
VOC, lb/h as CH4	7.81	30.19	6.98	27.38	6.50	25.61
SO2, ppmvd	0.14	0.11	0.14	0.11	0.13	0.11
SO2, ppmvw	0.13	0.10	0.12	0.10	0.12	0.10
SO2, lb/h	0.86	0.68	0.77	0.60	0.71	0.56
Particulates (TSP = PM10), lb/h (dry filterables only)	15.00	15.00	15.00	15.00	15.00	15.00
CTG Fuel LHV, Btu/lb	20,980	20,980	20,980	20,980	20,980	20,980
CTG Fuel HHV, Btu/lb	23,277	23,277	23,277	23,277	23,277	23,277
HHV/LHV Ratio	1.1095	1.1095	1.1095	1.1095	1.1095	1.1095
CTG Fuel Composition (Ultimate Analysis by Weight)						
Ar	0.000000%	0.000000%	0.000000%	0.000000%	0.000000%	0.000000%
C	74.043570%	74.043570%	74.043570%	74.043570%	74.043570%	74.043570%
H2	24.256660%	24.256660%	24.256660%	24.256660%	24.256660%	24.256660%
N2	0.575950%	0.575950%	0.575950%	0.575950%	0.575950%	0.575950%
O2	1.123180%	1.123180%	1.123180%	1.123180%	1.123180%	1.123180%
S	0.000640%	0.000640%	0.000640%	0.000640%	0.000640%	0.000640%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
CTG Wet (Total) Exhaust Gas Analysis						
Molecular Wt, lb/mol	28.45	28.55	28.29	28.37	28.19	28.26
Gas Constant, ft-lbf/lbm-R	54.304	54.112	54.609	54.454	54.808	54.668
Specific Volume, ft^3/lb	40.61	36.12	40.95	37.61	41.17	38.27
Exhaust Gas Flow, acfm	1,956,585	1,694,080	1,860,418	1,628,475	1,800,020	1,579,312
Specific Volume, scf/lb	13.34	13.29	13.41	13.37	13.46	13.42
Exhaust Gas Flow, scfm	642,720	623,320	609,236	578,907	588,493	553,811
Exhaust Gas Flow, lb/h	2,890,793	2,814,086	2,725,887	2,597,939	2,623,298	2,476,057

KUA Cane Island Unit 3

WEC 501F 1x1 Combined Cycle

	* 70 & 50 Percent Load - Natural Gas *					
Case Name CTG Model Combustor/NOx Emission Rate CTG Fuel Type CTG Load Level (percent of Base Load) CTG Performance Reference Evaporative Cooler On/Off HRSG Duct Firing On/Off	Case 6 WEC 501F DLN/15 ppm Natural Gas 70 Percent WEC 05/27/98 Off Off	Case 7 WEC 501F DLN/45 ppm Natural Gas 50 Percent WEC 05/27/98 Off Off	Case 8 WEC 501F DLN/15 ppm Natural Gas 70 Percent WEC 05/27/98 Off Off	Case 9 WEC 501F DLN/45 ppm Natural Gas 50 Percent WEC 05/27/98 Off Off	Case 10 WEC 501F DLN/15 ppm Natural Gas 70 Percent WEC 05/27/98 Off Off	Case 11 WEC 501F DLN/45 ppm Natural Gas 50 Percent WEC 05/27/98 Off Off
Stack Exhaust Analysis (Volume Basis - Wet)						
Ar	0.94%	0.95%	0.92%	0.93%	0.92%	0.92%
CO2	4.06%	3.24%	3.83%	3.16%	3.69%	3.09%
H2O	8.09%	6.49%	9.35%	8.06%	10.17%	9.02%
N2	74.79%	75.42%	73.63%	74.13%	72.89%	73.33%
O2	12.12%	13.91%	12.26%	13.72%	12.34%	13.64%
SO2	0.00001%	0.00001%	0.00001%	0.00001%	0.00001%	0.00001%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Stack Exhaust Gas Analysis (Wet)						
Molecular Wt, lb/mol	28.45	28.55	28.29	28.37	28.19	28.26
Gas Constant, ft-lbf/lbm-R	54.304	54.112	54.609	54.454	54.808	54.668
Specific Volume, ft^3/lb	16.33	16.53	16.58	16.66	16.74	16.78
Exhaust Gas Flow, acfm	786,777	775,281	753,253	721,361	731,900	692,471
Specific Volume, scf/lb	13.34	13.29	13.41	13.37	13.46	13.42
Exhaust Gas Flow, scfm	642,720	623,320	609,236	578,907	588,493	553,811
Exhaust Gas Flow, lb/h	2,890,793	2,814,086	2,725,887	2,597,939	2,623,298	2,476,057
Emissions (at Stack exit)						
NOx, ppmvd @15% O2 without SCR	15.0	45.0	15.0	45.0	15.0	45.0
NOx, lb/h as NO2 without SCR	85.0	195.8	76.1	177.7	70.9	166.2
NOx, ppmvd @15% O2 with SCR	4.0	12.0	4.0	12.0	4.0	12.0
NOx, lb/h as NO2 with SCR	22.4	51.9	20.0	47.1	18.8	44.1
NH3 slip, ppmvd @15% O2 with SCR	10.0	10.0	10.0	10.0	10.0	10.0
NH3 slip, lb/h with SCR	20.7	16.0	18.5	14.5	17.2	13.8
CO, ppmvd without Catalyst	260.6	306.3	249.2	304.1	242.3	300.4
CO, lb/h without Catalyst	681.8	790.6	609.6	717.1	567.3	670.7
CO, ppmvd @ 15% O2 without Catalyst	200.0	300.0	200.0	300.0	200.0	300.0
CO, ppmvd with Catalyst	260.6	306.3	249.2	304.1	242.3	300.4
CO, lb/h with Catalyst	681.8	790.6	609.6	717.1	567.3	670.7
CO, ppmvd @ 15% O2 with Catalyst	200.0	300.0	200.0	300.0	200.0	300.0
SO2, ppmvd	0.14	0.11	0.14	0.11	0.13	0.11
SO2, ppmvw	0.13	0.10	0.12	0.10	0.12	0.10
SO2, lb/h	0.86	0.66	0.77	0.60	0.71	0.56
UHC, ppmvd	7.0	27.2	6.6	27.0	6.5	26.7
UHC, ppmvw	6.4	25.5	6.0	24.9	5.8	24.3
UHC, ppmvd @ 15% O2	5.3	26.7	5.3	26.7	5.3	26.7
UHC, lb/h as CH4	10.4	40.3	9.3	36.5	8.7	34.1
VOC, ppmvd	5.2	20.4	5.0	20.3	4.8	20.0
VOC, ppmvw	4.8	19.1	4.5	18.6	4.4	18.2
VOC, ppmvd @ 15% O2	4.0	20.0	4.0	20.0	4.0	20.0
VOC, lb/h as CH4	7.8	30.2	7.0	27.4	6.5	25.6
Particulates (TSP = PM10), lb/h (dry filterables only)	15.0	15.0	15.0	15.0	15.0	15.0

Notes:
1. Values shown above are for one combustion turbine/HRSG unit only.
2. Sample analysis for natural gas fuel received from KUA, sulfur at 0.2 gr/100scf for illustration purposes only.
3. 73% effective SCR and no CO catalyst.
4. Particulates are per EPA Method 201A/202 (front and back half) and include H2SO4 mist.
5. CTG performance from Westinghouse data received 05/21/98, 05/22/98 and 05/27/98 for KUA.

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KUA Cane Island Unit 3

WEC 501F 1x1 Combined Cycle

	* 100 Percent Load - Duct Fired - NG & DO *			
Case Name	Case 23	Case 24	Case 25	Case 26
CTG Model	WEC 501F	WEC 501F	WEC 501F	WEC 501F
Combustor/NOx Emission Rate	DLN/15 ppm	DLN/15 ppm	DLN/42 ppm	DLN/42 ppm
CTG Fuel Type	Natural Gas	Natural Gas	Distillate	Distillate
CTG Load Level (percent of Base Load)	Base	Base	Base	Base
CTG Performance Reference	WEC 05/21/98	WEC 05/21/98	WEC 05/21/98	WEC 05/21/98
Evaporative Cooler On/Off	On	Off	On	Off
HRSG Duct Firing On/Off	On	On	On	On
Ambient Temperature	102	102	102	102
Ambient Relative Humidity	45	45	45	45
CTG Compressor Inlet Temperature, F	84.7	102	84.7	102
CTG Compr. Inlet Relative Humidity, %	92	45	92	45
Atmospheric Pressure, psia	14.656	14.656	14.656	14.656
Site Elevation, ft	75	75	75	75
Inlet Loss, in. H2O	3.8	3.7	3.8	3.7
Exhaust Loss, in. H2O	12.4	11.7	12.2	11.4
CTG Load Level (percent of Base Load)	Base	Base	Base	Base
Number of CTGs	1	1	1	1
Gross CTG Output, kW	166,650	156,090	160,210	149,700
Gross CTG Heat Rate, Btu/kWh (LHV)	9,395	9,540	9,720	9,890
CTG Heat Input, MBtu/h (LHV)	1,565.68	1,489.10	1,557.24	1,480.53
CTG Heat Input, MBtu/h (HHV)	1,737.10	1,652.13	1,662.73	1,580.82
CTG Fuel Flow, lb/h	74,630	70,980	83,790	79,660
CTG Water Injection Flow, lb/h	0	0	33,516	31,864
CTG Steam Injection Flow, lb/h	0	0	0	0
Injection Ratio	0.000	0.000	0.400	0.400
CTG Exhaust Flow, lb/h	3,350,992	3,236,818	3,393,166	3,276,886
CTG Exhaust Temperature, F	1,138	1,148	1,101	1,112
Duct Burner Heat Input, MBtu/h (LHV)	40.07	55.6	55.2	62.63
Duct Burner Heat Input, MBtu/h (HHV)	44.46	61.69	58.94	66.87
Stack Exit Temperature, F	187	184	279	275
Stack Exhaust Pressure, in. H2O above Patm	0	0	0	0
Stack Diameter, ft	18.0	18.0	18.0	18.0
Stack Exit Velocity, ft/s	61.7	59.2	70.5	67.6

	* 100 Percent Load - Duct Fired - NG & DO *			
Case Name	Case 23	Case 24	Case 25	Case 26
CTG Model	WEC 501F	WEC 501F	WEC 501F	WEC 501F
Combustor/NOx Emission Rate	DLN/15 ppm	DLN/15 ppm	DLN/42 ppm	DLN/42 ppm
CTG Fuel Type	Natural Gas	Natural Gas	Distillate	Distillate
CTG Load Level (percent of Base Load)	Base	Base	Base	Base
CTG Performance Reference	WEC 05/21/98	WEC 05/21/98	WEC 05/21/98	WEC 05/21/98
Evaporative Cooler On/Off	On	Off	On	Off
HRSG Duct Firing On/Off	On	On	On	On
CTG Exhaust Analysis (Volume Basis - Wet)				
O2	11.84%	12.07%	11.98%	12.21%
CO2	3.86%	3.81%	5.03%	4.97%
H2O	11.09%	10.40%	9.92%	9.24%
N2	72.30%	72.80%	72.17%	72.67%
Ar	0.91%	0.91%	0.91%	0.91%
SO2	0.00001%	0.00001%	0.00109%	0.00108%
Total	100.00%	100.00%	100.00%	100.00%
Emissions (at CTG exhaust flange)				
NOx, ppmvd @ 15% O2	15.0	15.0	42.0	42.0
NOx, lb/h as NO2	94.7	90.1	268.0	254.8
CO, ppmvd	32.0	31.4	115.6	113.2
CO, ppmvw	28.5	28.1	104.1	102.8
CO, ppmvd @ 15% O2	25.0	25.0	90.0	90.0
CO, lb/h	95.1	90.4	348.3	331.2
UHC, ppmvd	6.83	6.69	12.84	12.58
UHC, ppmvw	6.07	5.99	11.57	11.42
UHC, ppmvd @ 15% O2	5.33	5.33	10.00	10.00
UHC, lb/h as CH4	11.61	11.04	22.17	21.07
VOC, ppmvd	5.12	5.02	12.84	12.58
VOC, ppmvw	4.55	4.50	11.57	11.42
VOC, ppmvd @ 15% O2	4.00	4.00	10.00	10.00
VOC, lb/h as CH4	8.71	8.28	22.17	21.07
SO2, ppmvd	0.14	0.14	12.15	11.90
SO2, ppmvw	0.12	0.12	10.94	10.80
SO2, lb/h	0.95	0.91	83.71	79.59
Particulates (TSP = PM10), lb/h (dry filterables only)	15.00	15.00	69.20	66.90
CTG Fuel LHV, Btu/lb	20,980	20,980	18,586	18,586
CTG Fuel HHV, Btu/lb	23,277	23,277	19,845	19,845
HHV/LHV Ratio	1.1095	1.1095	1.0677	1.0677
CTG Fuel Composition (Ultimate Analysis by Weight)				
Ar	0.000000%	0.000000%	0.000000%	0.000000%
C	74.043570%	74.043570%	86.135000%	86.135000%
H2	24.256660%	24.256660%	13.800000%	13.800000%
N2	0.575950%	0.575950%	0.015000%	0.015000%
O2	1.123180%	1.123180%	0.000000%	0.000000%
S	0.000640%	0.000640%	0.050000%	0.050000%
Total	100.00%	100.00%	100.00%	100.00%
CTG Wet (Total) Exhaust Gas Analysis				
Molecular Wt, lb/mol	28.10	28.17	28.42	28.48
Gas Constant, ft-lbf/lbm-R	54.974	54.836	54.373	54.245
Specific Volume, ft^3/lb	40.38	40.60	39.03	39.29
Exhaust Gas Flow, acfm	2,255,218	2,190,247	2,207,254	2,145,814
Specific Volume, scf/lb	13.50	13.47	13.35	13.32
Exhaust Gas Flow, scfm	753,973	726,666	754,979	727,469
Exhaust Gas Flow, lb/h	3,350,992	3,236,818	3,393,166	3,276,886

KUA Cane Island Unit 3

WEC 501F 1x1 Combined Cycle

	* 100 Percent Load - Duct Fired - NG & DO *			
Case Name	Case 23	Case 24	Case 25	Case 26
CTG Model	WEC 501F	WEC 501F	WEC 501F	WEC 501F
Combustor/NOx Emission Rate	DLN/15 ppm	DLN/15 ppm	DLN/42 ppm	DLN/42 ppm
CTG Fuel Type	Natural Gas	Natural Gas	Distillate	Distillate
CTG Load Level (percent of Base Load)	Base	Base	Base	Base
CTG Performance Reference	WEC 05/21/98	WEC 05/21/98	WEC 05/21/98	WEC 05/21/98
Evaporative Cooler On/Off	On	Off	On	Off
HRSG Duct Firing On/Off	On	On	On	On
Stack Exhaust Analysis (Volume Basis - Wet)				
Ar	0.91%	0.91%	0.91%	0.91%
CO2	3.95%	3.95%	5.21%	5.17%
H2O	11.27%	10.67%	10.08%	9.43%
N2	72.23%	72.70%	72.11%	72.60%
O2	11.64%	11.78%	11.70%	11.89%
SO2	0.00001%	0.00001%	0.00113%	0.00112%
Total	100.00%	100.00%	100.00%	100.00%
Stack Exhaust Gas Analysis (Wet)				
Molecular Wt, lb/mol	28.09	28.16	28.42	28.48
Gas Constant, ft-lbf/lbm-R	54.996	54.868	54.371	54.244
Specific Volume, ft^3/lb	16.85	16.73	19.03	18.88
Exhaust Gas Flow, acfm	941,607	903,272	1,077,141	1,032,187
Specific Volume, scf/lb	13.51	13.47	13.35	13.32
Exhaust Gas Flow, scfm	754,962	727,261	755,640	728,217
Exhaust Gas Flow, lb/h	3,352,902	3,239,468	3,396,136	3,280,256
Emissions (at Stack exit)				
NOx, ppmvd @15% O2 without SCR	15.2	15.3	41.3	41.1
NOx, lb/h as NO2 without SCR	98.2	95.0	272.7	260.2
NOx, ppmvd @15% O2 with SCR	4.0	4.1	11.0	11.0
NOx, lb/h as NO2 with SCR	25.9	25.1	72.5	69.1
NH3 slip, ppmvd @15% O2 with SCR	10.0	10.0	10.0	10.0
NH3 slip, lb/h with SCR	23.7	22.8	24.4	23.3
CO, ppmvd without Catalyst	33.5	33.5	117.7	115.6
CO, lb/h without Catalyst	99.5	96.6	354.2	337.8
CO, ppmvd @ 15% O2 without Catalyst	25.5	25.7	88.4	88.1
CO, ppmvd with Catalyst	33.5	33.5	117.7	115.6
CO, lb/h with Catalyst	99.5	96.6	354.2	337.8
CO, ppmvd @ 15% O2 with Catalyst	25.5	25.7	88.4	88.1
SO2, ppmvd	0.14	0.14	12.59	12.41
SO2, ppmvw	0.13	0.13	11.32	11.24
SO2, lb/h	0.98	0.94	86.68	82.95
UHC, ppmvd	8.4	8.9	14.9	15.0
UHC, ppmvw	7.5	8.0	13.4	13.6
UHC, ppmvd @ 15% O2	6.4	6.9	11.2	11.4
UHC, lb/h as CH4	14.3	14.7	25.7	25.1
VOC, ppmvd	5.4	5.5	13.3	13.1
VOC, ppmvw	4.8	4.9	11.9	11.8
VOC, ppmvd @ 15% O2	4.1	4.2	10.0	10.0
VOC, lb/h as CH4	9.2	9.0	22.9	21.9
Particulates (TSP = PM10), lb/h (dry filterables only)	15.7	15.9	70.1	67.9

Notes:

1. Values shown above are for one combustion turbine/HRSG unit only.
2. Sample analysis for natural gas fuel received from KUA, sulfur at 0.2 gr/100scf for illustration purposes only.
3. 73% effective SCR and no CO catalyst.
4. Particulates are per EPA Method 201A/202 (front and back half) and include H2SO4 mist.
5. CTG performance from Westinghouse data received 05/21/98, 05/22/98 and 05/27/98 for KUA.
6. CTG performance from Westinghouse data received 05/21/98, 05/22/98 and 05/27/98 for KUA.
7. Duct Burner NOx, lb/MBtu (HHV) is 0.0800
8. Duct Burner CO, lb/MBtu (HHV) is 0.1000
9. Duct Burner Particulate, lb/MBtu (HHV) is 0.0150
10. Duct Burner UHC (CH4), lb/MBtu (HHV) is 0.0600
11. Duct Burner VOC (CH4), lb/MBtu (HHV) is 0.0120

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	* 100 Percent Load - Distillate Oil*				
Case Name	Case 12	Case 13	Case 14	Case 15	Case 16
CTG Model	WEC 501F	WEC 501F	WEC 501F	WEC 501F	WEC 501F
Combustor/NOx Emission Rate	Water/42 ppm	Water/42 ppm	Water/42 ppm	Water/42 ppm	Water/42 ppm
CTG Fuel Type	Distillate	Distillate	Distillate	Distillate	Distillate
CTG Load Level (percent of Base Load)	93 Percent	Base	Base	Base	Base
CTG Performance Reference	WEC 05/21/98	WEC 05/21/98	WEC 05/21/98	WEC 05/21/98	WEC 05/21/98
Evaporative Cooler On/Off	Off	On	Off	On	Off
HRSG Duct Firing On/Off	Off	Off	Off	Off	Off
Ambient Temperature	19	72	72	102	102
Ambient Relative Humidity	55	74	74	45	45
CTG Compressor Inlet Temperature, F	19	66.7	72	84.7	102
CTG Compr. Inlet Relative Humidity, %	55	96	74	92	45
Atmospheric Pressure, psia	14.656	14.656	14.656	14.656	14.656
Site Elevation, ft	75	75	75	75	75
Inlet Loss, in. H2O	4.5	4.0	4.0	3.8	3.7
Exhaust Loss, in. H2O	15.2	13.2	13.0	12.2	11.4
CTG Load Level (percent of Base Load)	93 Percent	Base	Base	Base	Base
Number of CTGs	1	1	1	1	1
Gross CTG Output, kW	185,000	170,310	167,040	160,210	149,700
Gross CTG Heat Rate, Btu/kWh (LHV)	9,310	9,555	9,595	9,720	9,890
CTG Heat Input, MBtu/h (LHV)	1,722.35	1,627.31	1,602.75	1,557.24	1,480.53
CTG Heat Input, MBtu/h (HHV)	1,839.02	1,737.54	1,711.32	1,662.73	1,580.82
CTG Fuel Flow, lb/h	92,670	87,560	86,230	83,790	79,660
CTG Water Injection Flow, lb/h	37,068	35,024	34,492	33,516	31,864
CTG Steam Injection Flow, lb/h	0	0	0	0	0
Injection Ratio	0.400	0.400	0.400	0.400	0.400
CTG Exhaust Flow, lb/h	3,909,771	3,549,621	3,513,227	3,393,166	3,276,886
CTG Exhaust Temperature, F	996	1,085	1,087	1,101	1,112
Duct Burner Heat Input, MBtu/h (LHV)	0	0	0	0	0
Duct Burner Heat Input, MBtu/h (HHV)	0	0	0	0	0
Stack Exit Temperature, F	290	283	282	285	281
Stack Exhaust Pressure, in. H2O above Patm	0	0	0	0	0
Stack Diameter, ft	18.0	18.0	18.0	18.0	18.0
Stack Exit Velocity, ft/s	81.3	73.7	72.8	71.1	68.1

KUA Cane Island Unit 3

WEC 501F 1x1 Combined Cycle

	* 100 Percent Load - Distillate Oil*				
Case Name	Case 12	Case 13	Case 14	Case 15	Case 16
CTG Model	WEC 501F	WEC 501F	WEC 501F	WEC 501F	WEC 501F
Combustor/NOx Emission Rate	Water/42 ppm	Water/42 ppm	Water/42 ppm	Water/42 ppm	Water/42 ppm
CTG Fuel Type	Distillate	Distillate	Distillate	Distillate	Distillate
CTG Load Level (percent of Base Load)	93 Percent	Base	Base	Base	Base
CTG Performance Reference	WEC 05/21/98	WEC 05/21/98	WEC 05/21/98	WEC 05/21/98	WEC 05/21/98
Evaporative Cooler On/Off	Off	On	Off	On	Off
HRSG Duct Firing On/Off	Off	Off	Off	Off	Off
CTG Exhaust Analysis (Volume Basis - Wet)					
O2	12.92%	12.26%	12.33%	11.98%	12.21%
CO2	4.89%	5.06%	5.03%	5.03%	4.97%
H2O	6.36%	8.43%	8.24%	9.92%	9.24%
N2	74.89%	73.33%	73.47%	72.17%	72.67%
Ar	0.94%	0.92%	0.92%	0.91%	0.91%
SO2	0.00106%	0.00110%	0.00109%	0.00109%	0.00108%
Total	100.00%	100.00%	100.00%	100.00%	100.00%
Emissions (at CTG exhaust flange)					
NOx, ppmvd @ 15% O2	42.0	42.0	42.0	42.0	42.0
NOx, lb/h as NO2	296.3	280.0	275.8	268.0	254.8
CO, ppmvd	781.1	114.3	113.5	* 115.6	113.2
CO, ppmvw	731.4	104.6	104.2	104.1	102.8
CO, ppmvd @ 15% O2	650.0	90.0	90.0	90.0	90.0
CO, lb/h	2,782.3	364.0	358.5	348.3	331.2
UHC, ppmvd	19.22	12.70	12.61	12.84	12.58
UHC, ppmvw	18.00	11.63	11.58	11.57	11.42
UHC, ppmvd @ 15% O2	16.00	10.00	10.00	10.00	10.00
UHC, lb/h as CH4	39.21	23.16	22.81	22.17	21.07
VOC, ppmvd	19.23	12.70	12.61	12.84	12.58
VOC, ppmvw	18.01	11.63	11.58	11.57	11.42
VOC, ppmvd @ 15% O2	16.00	10.00	10.00	10.00	10.00
VOC, lb/h as CH4	39.22	23.16	22.81	22.17	21.07
SO2, ppmvd	11.36	12.01	11.93	12.15	11.90
SO2, ppmvw	10.64	10.99	10.95	10.94	10.80
SO2, lb/h	92.58	87.48	86.15	83.71	79.59
Particulates (TSP = PM10), lb/h (dry filterables only)	85.30	73.00	72.30	69.20	66.90
CTG Fuel LHV, Btu/lb	18,586	18,586	18,586	18,586	18,586
CTG Fuel HHV, Btu/lb	19,845	19,845	19,845	19,845	19,845
HHV/LHV Ratio	1.0677	1.0677	1.0677	1.0677	1.0677
CTG Fuel Composition (Ultimate Analysis by Weight)					
Ar	0.000000%	0.000000%	0.000000%	0.000000%	0.000000%
C	86.135000%	86.135000%	86.135000%	86.135000%	86.135000%
H2	13.800000%	13.800000%	13.800000%	13.800000%	13.800000%
N2	0.015000%	0.015000%	0.015000%	0.015000%	0.015000%
O2	0.000000%	0.000000%	0.000000%	0.000000%	0.000000%
S	0.050000%	0.050000%	0.050000%	0.050000%	0.050000%
Total	100.00%	100.00%	100.00%	100.00%	100.00%
CTG Wet (Total) Exhaust Gas Analysis					
Molecular Wt, lb/mol	28.79	28.58	28.60	28.42	28.48
Gas Constant, ft-lbf/lbm-R	53.664	54.059	54.024	54.373	54.245
Specific Volume, ft^3/lb	35.68	38.32	38.36	39.03	39.29
Exhaust Gas Flow, acfm	2,325,010	2,267,025	2,246,123	2,207,254	2,145,814
Specific Volume, scf/lb	13.18	13.27	13.27	13.35	13.32
Exhaust Gas Flow, scfm	858,846	785,058	777,009	754,979	727,469
Exhaust Gas Flow, lb/h	3,909,771	3,549,621	3,513,227	3,393,166	3,276,886

KUA Cane Island Unit 3

WEC 501F 1x1 Combined Cycle

	* 100 Percent Load - Distillate Oil*				
Case Name	Case 12	Case 13	Case 14	Case 15	Case 16
CTG Model	WEC 501F	WEC 501F	WEC 501F	WEC 501F	WEC 501F
Combustor/NOx Emission Rate	Water/42 ppm	Water/42 ppm	Water/42 ppm	Water/42 ppm	Water/42 ppm
CTG Fuel Type	Distillate	Distillate	Distillate	Distillate	Distillate
CTG Load Level (percent of Base Load)	93 Percent	Base	Base	Base	Base
CTG Performance Reference	WEC 05/21/98	WEC 05/21/98	WEC 05/21/98	WEC 05/21/98	WEC 05/21/98
Evaporative Cooler On/Off	Off	On	Off	On	Off
HRSG Duct Firing On/Off	Off	Off	Off	Off	Off
Stack Exhaust Analysis (Volume Basis - Wet)					
Ar	0.94%	0.92%	0.92%	0.91%	0.91%
CO2	4.89%	5.06%	5.03%	5.03%	4.97%
H2O	6.36%	8.43%	8.24%	9.92%	9.24%
N2	74.89%	73.33%	73.47%	72.17%	72.67%
O2	12.92%	12.26%	12.33%	11.98%	12.21%
SO2	0.00106%	0.00110%	0.00109%	0.00109%	0.00108%
Total	100.00%	100.00%	100.00%	100.00%	100.00%
Stack Exhaust Gas Analysis (Wet)					
Molecular Wt, lb/mol	28.79	28.58	28.60	28.42	28.48
Gas Constant, ft-lbf/lbm-R	53.664	54.059	54.024	54.373	54.245
Specific Volume, ft^3/lb	19.06	19.02	18.99	19.19	19.04
Exhaust Gas Flow, acfm	1,242,004	1,125,230	1,111,936	1,085,248	1,039,865
Specific Volume, scf/lb	13.18	13.27	13.27	13.35	13.32
Exhaust Gas Flow, scfm	858,846	785,058	777,009	754,979	727,469
Exhaust Gas Flow, lb/h	3,909,771	3,549,621	3,513,227	3,393,166	3,276,886
Emissions (at Stack exit)					
NOx, ppmvd @15% O2 without SCR	42.0	42.0	42.0	42.0	42.0
NOx, lb/h as NO2 without SCR	296.3	280.0	275.8	268.0	254.8
NOx, ppmvd @15% O2 with SCR	11.2	11.2	11.2	11.2	11.2
NOx, lb/h as NO2 with SCR	78.7	74.4	73.3	71.2	67.7
NH3 slip, ppmvd @15% O2 with SCR	10.0	10.0	10.0	10.0	10.0
NH3 slip, lb/h with SCR	26.0	24.6	24.2	23.5	22.4
CO, ppmvd without Catalyst	781.1	114.3	113.5	115.6	113.2
CO, lb/h without Catalyst	2,782.3	364.0	358.5	348.3	331.2
CO, ppmvd @ 15% O2 without Catalyst	650.0	90.0	90.0	90.0	90.0
CO, ppmvd with Catalyst	781.1	114.3	113.5	115.6	113.2
CO, lb/h with Catalyst	2,782.3	364.0	358.5	348.3	331.2
CO, ppmvd @ 15% O2 with Catalyst	650.0	90.0	90.0	90.0	90.0
SO2, ppmvd	11.36	12.01	11.93	12.15	11.90
SO2, ppmvw	10.64	10.99	10.95	10.94	10.80
SO2, lb/h	92.58	87.48	86.15	83.71	79.59
UHC, ppmvd	19.2	12.7	12.6	12.8	12.6
UHC, ppmvw	18.0	11.6	11.6	11.6	11.4
UHC, ppmvd @ 15% O2	16.0	10.0	10.0	10.0	10.0
UHC, lb/h as CH4	39.2	23.2	22.8	22.2	21.1
VOC, ppmvd	19.2	12.7	12.6	12.8	12.6
VOC, ppmvw	18.0	11.6	11.6	11.6	11.4
VOC, ppmvd @ 15% O2	16.0	10.0	10.0	10.0	10.0
VOC, lb/h as CH4	39.2	23.2	22.8	22.2	21.1
Particulates (TSP = PM10), lb/h (dry filterables only)	85.3	73.0	72.3	69.2	66.9

Notes:

1. Values shown above are for one combustion turbine/HRSG unit only.
2. Sample analysis for natural gas fuel received from KUA, sulfur at 0.2 gr/100scf for illustration purposes only.
3. 73% effective SCR and no CO catalyst.
4. Particulates are per EPA Method 201A/202 (front and back half) and include H2SO4 mist.
5. CTG performance from Westinghouse data received 05/21/98, 05/22/98 and 05/27/98 for KUA.

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KUA Cane Island Unit 3
WEC 501F 1x1 Combined Cycle

	"70 & 50 Percent Load - Distillate Oil"					
Case Name	Case 17	Case 18	Case 19	Case 20	Case 21	Case 22
CTG Model	WEC 501F	WEC 501F	WEC 501F	WEC 501F	WEC 501F	WEC 501F
Combustor/NOx Emission Rate	DLN/42 ppm	DLN/42 ppm	DLN/42 ppm	DLN/42 ppm	DLN/42 ppm	DLN/42 ppm
CTG Fuel Type	Distillate	Distillate	Distillate	Distillate	Distillate	Distillate
CTG Load Level (percent of Base Load)	70 Percent	50 Percent	70 Percent	50 Percent	70 Percent	50 Percent
CTG Performance Reference	WEC 06/03/98	WEC 06/03/98	WEC 06/03/98	WEC 06/03/98	WEC 06/03/98	WEC 06/03/98
Evaporative Cooler On/Off	Off	Off	Off	Off	Off	Off
HRSG Duct Firing On/Off	Off	Off	Off	Off	Off	Off
Ambient Temperature	19	19	72	72	102	102
Ambient Relative Humidity	55	55	74	74	45	45
CTG Compressor Inlet Temperature, F	19	19	72	72	102	102
CTG Compr. Inlet Relative Humidity, %	55	55	74	74	45	45
Atmospheric Pressure, psia	14.656	14.656	14.656	14.656	14.656	14.656
Site Elevation, ft	75	75	75	75	75	75
Inlet Loss, in. H2O	3.9	2.8	3.6	2.6	3.3	2.5
Exhaust Loss, in. H2O	12.1	8.6	10.2	7.5	9.2	6.8
CTG Load Level (percent of Base Load)	70 Percent	50 Percent	70 Percent	50 Percent	70 Percent	50 Percent
Number of CTGs	1	1	1	1	1	1
Gross CTG Output, kW	138,350	98,420	116,560	82,820	104,380	74,110
Gross CTG Heat Rate, Btu/kWh (LHV)	9,722	10,908	10,324	11,755	10,789	12,282
CTG Heat Input, MBtu/h (LHV)	1,345.04	1,073.57	1,203.37	973.55	1,126.16	910.22
CTG Heat Input, MBtu/h (HHV)	1,436.15	1,146.29	1,284.89	1,039.50	1,202.45	971.88
CTG Fuel Flow, lb/h	72,370	57,760	64,750	52,380	60,590	48,970
CTG Water Injection Flow, lb/h	18,093	11,552	16,188	10,476	15,148	9,794
CTG Steam Injection Flow, lb/h	0	0	0	0	0	0
Injection Ratio	0.250	0.200	0.250	0.200	0.250	0.200
CTG Exhaust Flow, lb/h	3,639,112	3,041,793	3,284,857	2,789,277	3,074,954	2,643,062
CTG Exhaust Temperature, F	877	899	932	952	969	973
Duct Burner Heat Input, MBtu/h (LHV)	0	0	0	0	0	0
Duct Burner Heat Input, MBtu/h (HHV)	0	0	0	0	0	0
Stack Exit Temperature, F	291	280	289	277	288	277
Stack Exhaust Pressure, in. H2O above Patm	0	0	0	0	0	0
Stack Diameter, ft	18.0	18.0	18.0	18.0	18.0	18.0
Stack Exit Velocity, ft/s	75.6	62.2	68.5	57.2	64.3	54.4

KUA Cane Island Unit 3

WEC 501F 1x1 Combined Cycle

	* 70 & 50 Percent Load - Distillate Oil*					
Case Name	Case 17	Case 18	Case 19	Case 20	Case 21	Case 22
CTG Model	WEC 501F	WEC 501F	WEC 501F	WEC 501F	WEC 501F	WEC 501F
Combustor/NOx Emission Rate	DLN/42 ppm	DLN/42 ppm	DLN/42 ppm	DLN/42 ppm	DLN/42 ppm	DLN/42 ppm
CTG Fuel Type	Distillate	Distillate	Distillate	Distillate	Distillate	Distillate
CTG Load Level (percent of Base Load)	70 Percent	50 Percent	70 Percent	50 Percent	70 Percent	50 Percent
CTG Performance Reference	WEC 06/03/98	WEC 06/03/98	WEC 06/03/98	WEC 06/03/98	WEC 06/03/98	WEC 06/03/98
Evaporative Cooler On/Off	Off	Off	Off	Off	Off	Off
HRSG Duct Firing On/Off	Off	Off	Off	Off	Off	Off
CTG Exhaust Analysis (Volume Basis - Wet)						
O2	14.29%	14.62%	14.03%	14.37%	13.83%	14.24%
CO2	4.12%	3.93%	4.05%	3.87%	4.04%	3.80%
H2O	4.90%	4.54%	6.56%	6.19%	7.64%	7.22%
N2	75.74%	75.96%	74.42%	74.64%	73.58%	73.81%
Ar	0.95%	0.95%	0.93%	0.94%	0.92%	0.93%
SO2	0.00090%	0.00086%	0.00088%	0.00084%	0.00088%	0.00083%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Emissions (at CTG exhaust flange)						
NOx, ppmvd @ 15% O2	42.0	42.0	42.0	42.0	42.0	42.0
NOx, lb/h as NO2	231.6	185.1	207.3	167.9	194.1	157.0
CO, ppmvd	866.0	1,014.9	867.0	1,015.7	866.1	1,017.4
CO, ppmvw	823.6	968.8	810.1	952.7	799.9	943.9
CO, ppmvd @ 15% O2	870.0	1,071.0	869.0	1,072.0	862.0	1,081.0
CO, lb/h	2,908.2	2,857.4	2,599.0	2,593.6	2,412.4	2,445.1
UHC, ppmvd	101.54	101.39	101.76	101.38	101.48	101.65
UHC, ppmvw	96.56	96.79	95.09	95.10	93.73	94.31
UHC, ppmvd @ 15% O2	102.00	107.00	102.00	107.00	101.00	108.00
UHC, lb/h as CH4	195.28	163.49	174.72	148.27	161.89	139.91
VOC, ppmvd	101.54	101.39	101.76	101.38	101.48	101.65
VOC, ppmvw	96.56	96.79	95.09	95.10	93.73	94.31
VOC, ppmvd @ 15% O2	102.00	107.00	102.00	107.00	101.00	108.00
VOC, lb/h as CH4	195.28	163.49	174.72	148.27	161.89	139.91
SO2, ppmvd	9.41	8.96	9.44	8.96	9.50	8.90
SO2, ppmvw	8.95	8.56	8.82	8.41	8.78	8.26
SO2, lb/h	72.30	57.71	64.69	52.33	60.53	48.92
Particulates (TSP = PM10), lb/h (dry filterables only)	99.90	112.60	89.20	102.10	82.90	96.00
CTG Fuel LHV, Btu/lb	18,586	18,586	18,586	18,586	18,586	18,586
CTG Fuel HHV, Btu/lb	19,845	19,845	19,845	19,845	19,845	19,845
HHV/LHV Ratio	1.0677	1.0677	1.0677	1.0677	1.0677	1.0677
CTG Fuel Composition (Ultimate Analysis by Weight)						
Ar	0.000000%	0.000000%	0.000000%	0.000000%	0.000000%	0.000000%
C	86.135000%	86.135000%	86.135000%	86.135000%	86.135000%	86.135000%
H2	13.800000%	13.800000%	13.800000%	13.800000%	13.800000%	13.800000%
N2	0.015000%	0.015000%	0.015000%	0.015000%	0.015000%	0.015000%
O2	0.000000%	0.000000%	0.000000%	0.000000%	0.000000%	0.000000%
S	0.050000%	0.050000%	0.050000%	0.050000%	0.050000%	0.050000%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
CTG Wet (Total) Exhaust Gas Analysis						
Molecular Wt, lb/mol	28.87	28.89	28.68	28.70	28.56	28.58
Gas Constant, ft-lbf/lbm-R	53.520	53.482	53.871	53.834	54.098	54.060
Specific Volume, ft^3/lb	32.92	33.72	34.65	35.36	35.81	36.09
Exhaust Gas Flow, acfm	1,996,659	1,709,488	1,897,005	1,643,814	1,835,235	1,589,802
Specific Volume, scf/lb	13.14	13.13	13.23	13.22	13.28	13.28
Exhaust Gas Flow, scfm	796,966	665,646	724,311	614,571	680,590	584,998
Exhaust Gas Flow, lb/h	3,639,112	3,041,793	3,284,857	2,789,277	3,074,954	2,643,062

KUA Cane Island Unit 3

WEC 501F 1x1 Combined Cycle

	"70 & 50 Percent Load - Distillate Oil"					
Case Name	Case 17	Case 18	Case 19	Case 20	Case 21	Case 22
CTG Model	WEC 501F	WEC 501F	WEC 501F	WEC 501F	WEC 501F	WEC 501F
Combustor/NOx Emission Rate	DLN/42 ppm	DLN/42 ppm	DLN/42 ppm	DLN/42 ppm	DLN/42 ppm	DLN/42 ppm
CTG Fuel Type	Distillate	Distillate	Distillate	Distillate	Distillate	Distillate
CTG Load Level (percent of Base Load)	70 Percent	50 Percent	70 Percent	50 Percent	70 Percent	50 Percent
CTG Performance Reference	WEC 06/03/98	WEC 06/03/98	WEC 06/03/98	WEC 06/03/98	WEC 06/03/98	WEC 06/03/98
Evaporative Cooler On/Off	Off	Off	Off	Off	Off	Off
HRSG Duct Firing On/Off	Off	Off	Off	Off	Off	Off
Stack Exhaust Analysis (Volume Basis - Wet)						
Ar	0.95%	0.95%	0.93%	0.94%	0.92%	0.93%
CO2	4.12%	3.93%	4.05%	3.87%	4.04%	3.80%
H2O	4.90%	4.54%	6.56%	6.19%	7.64%	7.22%
N2	75.74%	75.96%	74.42%	74.64%	73.58%	73.81%
O2	14.29%	14.62%	14.03%	14.37%	13.83%	14.24%
SO2	0.00090%	0.00086%	0.00088%	0.00084%	0.00088%	0.00083%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Stack Exhaust Gas Analysis (Wet)						
Molecular Wt, lb/mol	28.87	28.89	28.68	28.70	28.56	28.58
Gas Constant, ft-lbf/lbm-R	53.520	53.482	53.871	53.834	54.098	54.060
Specific Volume, ft^3/lb	19.04	18.74	19.11	18.79	19.17	18.87
Exhaust Gas Flow, acfm	1,154,812	950,053	1,048,227	873,509	982,448	831,243
Specific Volume, scf/lb	13.14	13.13	13.23	13.22	13.28	13.28
Exhaust Gas Flow, scfm	796,966	665,646	724,311	614,571	680,590	584,998
Exhaust Gas Flow, lb/h	3,639,112	3,041,793	3,284,857	2,789,277	3,074,954	2,643,062
Emissions (at Stack exit)						
NOx, ppmvd @15% O2 without SCR	42.0	42.0	42.0	42.0	42.0	42.0
NOx, lb/h as NO2 without SCR	231.6	185.1	207.3	167.9	194.1	157.0
NOx, ppmvd @15% O2 with SCR	11.2	11.2	11.2	11.2	11.2	11.2
NOx, lb/h as NO2 with SCR	61.5	49.1	55.0	44.5	51.5	41.6
NH3 slip, ppmvd @15% O2 with SCR	10.0	10.0	10.0	10.0	10.0	10.0
NH3 slip, lb/h with SCR	20.3	16.2	18.2	14.7	17.0	13.8
CO, ppmvd without Catalyst	866.0	1,014.9	867.0	1,015.7	866.1	1,017.4
CO, lb/h without Catalyst	2,908.2	2,857.4	2,599.0	2,593.6	2,412.4	2,445.1
CO, ppmvd @ 15% O2 without Catalyst	870.0	1,071.0	869.0	1,072.0	862.0	1,081.0
CO, ppmvd with Catalyst	866.0	1,014.9	867.0	1,015.7	866.1	1,017.4
CO, lb/h with Catalyst	2,908.2	2,857.4	2,599.0	2,593.6	2,412.4	2,445.1
CO, ppmvd @ 15% O2 with Catalyst	870.0	1,071.0	869.0	1,072.0	862.0	1,081.0
SO2, ppmvd	9.41	8.96	9.44	8.96	9.50	8.90
SO2, ppmvw	8.95	8.56	8.82	8.41	8.78	8.26
SO2, lb/h	72.30	57.71	64.69	52.33	60.53	48.92
UHC, ppmvd	101.5	101.4	101.8	101.4	101.5	101.6
UHC, ppmvw	96.6	96.8	95.1	95.1	93.7	94.3
UHC, ppmvd @ 15% O2	102.0	107.0	102.0	107.0	101.0	108.0
UHC, lb/h as CH4	195.3	163.5	174.7	148.3	161.9	139.9
VOC, ppmvd	101.5	101.4	101.8	101.4	101.5	101.6
VOC, ppmvw	96.6	96.8	95.1	95.1	93.7	94.3
VOC, ppmvd @ 15% O2	102.0	107.0	102.0	107.0	101.0	108.0
VOC, lb/h as CH4	195.3	163.5	174.7	148.3	161.9	139.9
Particulates (TSP = PM10), lb/h (dry filterables only)	99.9	112.6	89.2	102.1	82.9	96.0

Notes:

1. Values shown above are for one combustion turbine/HRSG unit only.
2. Sample analysis for natural gas fuel received from KUA, sulfur at 0.2 gr/100scf for illustration purposes only.
3. 73% effective SCR and no CO catalyst.
4. Particulates are per EPA Method 201A/202 (front and back half) and include H2SO4 mist.
5. CTG performance from Westinghouse data received 05/21/98, 05/22/98 and 05/27/98 for KUA.

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	* Simple Cycle - 100 Percent Load - NG & DO *					
Case Name	Case 1	Case 3	Case 5	Case 12	Case 14	Case 16
CTG Model	WEC 501F	WEC 501F	WEC 501F	WEC 501F	WEC 501F	WEC 501F
Combustor/NOx Emission Rate	DLN/15 ppm	DLN/15 ppm	DLN/15 ppm	DLN/42 ppm	DLN/42 ppm	DLN/42 ppm
CTG Fuel Type	Natural Gas	Natural Gas	Natural Gas	Distillate	Distillate	Distillate
CTG Load Level (percent of Base Load)	90 Percent	Base	Base	93Percent	Base	Base
CTG Performance Reference	WEC 05/22/98	WEC 05/22/98	WEC 05/22/98	WEC 05/22/98	WEC 05/22/98	WEC 05/22/98
Evaporative Cooler On/Off	Off	Off	Off	Off	Off	Off
HRSG Duct Firing On/Off	Off	Off	Off	Off	Off	Off
Ambient Temperature	19	72	102	19	72	102
Ambient Relative Humidity	55	74	45	55	74	45
CTG Compressor Inlet Temperature, F	19	72	102	19	72	102
CTG Compr. Inlet Relative Humidity, %	55	74	45	55	74	45
Atmospheric Pressure, psia	14.656	14.656	14.656	14.656	14.656	14.656
Site Elevation, ft	75	75	75	75	75	75
Inlet Loss, in. H2O	3.8	4.0	3.7	4.5	4.0	3.7
Exhaust Loss, in. H2O	4.9	4.7	4.1	5.4	4.7	4.0
CTG Load Level (percent of Base Load)	90 Percent	Base	Base	93Percent	Base	Base
Number of CTGs	1	1	1	1	1	1
Gross CTG Output, kW	185,000	175,310	157,520	185,000	168,520	151,180
Gross CTG Heat Rate, Btu/kWh (LHV)	8,975	9,190	9,455	9,240	9,510	9,795
CTG Heat Input, MBtu/h (LHV)	1,660.38	1,611.10	1,489.35	1,709.40	1,602.63	1,480.81
CTG Heat Input, MBtu/h (HHV)	1,842.17	1,787.49	1,652.41	1,825.19	1,711.19	1,581.12
CTG Fuel Flow, lb/h	79,140	76,790	70,990	91,970	86,230	79,670
CTG Water Injection Flow, lb/h	0	0	0	36,788	34,492	31,868
CTG Steam Injection Flow, lb/h	0	0	0	0	0	0
Injection Ratio	0.000	0.000	0.000	0.400	0.400	0.400
CTG Exhaust Flow, lb/h	3,576,914	3,469,805	3,236,818	3,909,057	3,513,227	3,276,886
CTG Exhaust Temperature, F	1,073	1,118	1,143	985	1,082	1,106
Duct Burner Heat Input, MBtu/h (LHV)	0	0	0	0	0	0
Duct Burner Heat Input, MBtu/h (HHV)	0	0	0	0	0	0
Stack Exit Temperature, F	1073	1118	1143	985	1082	1106
Stack Exhaust Pressure, in. H2O above Patm	0	0	0	0	0	0
Stack Diameter, ft	18.0	18.0	18.0	18.0	18.0	18.0
Stack Exit Velocity, ft/s	153.9	154.6	147.1	156.7	151.3	143.9

	* Simple Cycle - 100 Percent Load - NG & DO *					
Case Name	Case 1	Case 3	Case 5	Case 12	Case 14	Case 16
CTG Model	WEC 501F	WEC 501F	WEC 501F	WEC 501F	WEC 501F	WEC 501F
Combustor/NOx Emission Rate	DLN/15 ppm	DLN/15 ppm	DLN/15 ppm	DLN/42 ppm	DLN/42 ppm	DLN/42 ppm
CTG Fuel Type	Natural Gas	Natural Gas	Natural Gas	Distillate	Distillate	Distillate
CTG Load Level (percent of Base Load)	90 Percent	Base	Base	93Percent	Base	Base
CTG Performance Reference	WEC 05/22/98	WEC 05/22/98	WEC 05/22/98	WEC 05/22/98	WEC 05/22/98	WEC 05/22/98
Evaporative Cooler On/Off	Off	Off	Off	Off	Off	Off
HRSG Duct Firing On/Off	Off	Off	Off	Off	Off	Off
CTG Exhaust Analysis (Volume Basis - Wet)						
O2	12.50%	12.19%	12.07%	12.97%	12.33%	12.21%
CO2	3.88%	3.86%	3.81%	4.86%	5.03%	4.97%
H2O	7.75%	9.41%	10.40%	6.31%	8.24%	9.24%
N2	74.93%	73.61%	72.80%	74.91%	73.47%	72.67%
Ar	0.94%	0.92%	0.91%	0.94%	0.92%	0.91%
SO2	0.00001%	0.00001%	0.00001%	0.00106%	0.00109%	0.00108%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Emissions (at CTG exhaust flange)						
NOx, ppmvd @ 15% O2	15.0	15.0	15.0	42.0	42.0	42.0
NOx, lb/h as NO2	100.3	97.4	90.1	294.1	275.8	254.9
CO, ppmvd	31.1	31.4	31.4	107.3	113.5	113.2
CO, ppmvw	28.6	28.5	28.1	100.5	104.2	102.8
CO, ppmvd @ 15% O2	25.0	25.0	25.0	90.0	90.0	90.0
CO, lb/h	100.8	97.8	90.4	382.3	358.5	331.2
UHC, ppmvd	4.97	5.03	5.02	20.27	12.61	12.58
UHC, ppmvw	4.58	4.55	4.50	18.99	11.58	11.42
UHC, ppmvd @ 15% O2	4.00	4.00	4.00	17.00	10.00	10.00
UHC, lb/h as CH4	9.24	8.96	8.29	41.36	22.81	21.08
VOC, ppmvd	3.73	3.77	3.76	20.27	12.61	12.58
VOC, ppmvw	3.44	3.42	3.37	18.99	11.58	11.42
VOC, ppmvd @ 15% O2	3.00	3.00	3.00	17.00	10.00	10.00
VOC, lb/h as CH4	6.93	6.72	6.21	41.36	22.81	21.08
SO2, ppmvd	0.14	0.14	0.14	11.28	11.93	11.90
SO2, ppmvw	0.13	0.12	0.12	10.56	10.95	10.80
SO2, lb/h	1.01	0.98	0.91	91.88	86.15	79.60
Particulates (TSP = PM10), lb/h (dry filterables only)	16.70	16.00	15.00	85.70	72.30	66.90
CTG Fuel LHV, Btu/lb	20,980	20,980	20,980	18,586	18,586	18,586
CTG Fuel HHV, Btu/lb	23,277	23,277	23,277	19,845	19,845	19,845
HHV/LHV Ratio	1.1095	1.1095	1.1095	1.0677	1.0677	1.0677
CTG Fuel Composition (Ultimate Analysis by Weight)						
Ar	0.000000%	0.000000%	0.000000%	0.000000%	0.000000%	0.000000%
C	74.043570%	74.043570%	74.043570%	86.135000%	86.135000%	86.135000%
H2	24.256660%	24.256660%	24.256660%	13.800000%	13.800000%	13.800000%
N2	0.575950%	0.575950%	0.575950%	0.015000%	0.015000%	0.015000%
O2	1.123180%	1.123180%	1.123180%	0.000000%	0.000000%	0.000000%
S	0.000640%	0.000640%	0.000640%	0.050000%	0.050000%	0.050000%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
CTG Wet (Total) Exhaust Gas Analysis						
Molecular Wt, lb/mol	28.47	28.29	28.17	28.79	28.60	28.48
Gas Constant, ft-lbf/lbm-R	54.263	54.617	54.836	53.662	54.024	54.245
Specific Volume, ft^3/lb	38.94	40.36	41.23	36.25	39.01	39.85
Exhaust Gas Flow, acfm	2,321,417	2,334,022	2,224,233	2,361,722	2,284,183	2,176,398
Specific Volume, scf/lb	13.33	13.41	13.47	13.18	13.27	13.32
Exhaust Gas Flow, scfm	794,671	775,501	726,666	858,690	777,009	727,469
Exhaust Gas Flow, lb/h	3,576,914	3,469,805	3,236,818	3,909,057	3,513,227	3,276,886

KUA Cane Island Unit 3

WEC 501F 1x1 Combined Cycle

	* Simple Cycle - 100 Percent Load - NG & DO *					
Case Name	Case 1	Case 3	Case 5	Case 12	Case 14	Case 16
CTG Model	WEC 501F	WEC 501F	WEC 501F	WEC 501F	WEC 501F	WEC 501F
Combustor/NOx Emission Rate	DLN/15 ppm	DLN/15 ppm	DLN/15 ppm	DLN/42 ppm	DLN/42 ppm	DLN/42 ppm
CTG Fuel Type	Natural Gas	Natural Gas	Natural Gas	Distillate	Distillate	Distillate
CTG Load Level (percent of Base Load)	90 Percent	Base	Base	93Percent	Base	Base
CTG Performance Reference	WEC 05/22/98	WEC 05/22/98	WEC 05/22/98	WEC 05/22/98	WEC 05/22/98	WEC 05/22/98
Evaporative Cooler On/Off	Off	Off	Off	Off	Off	Off
HRSG Duct Firing On/Off	Off	Off	Off	Off	Off	Off
Stack Exhaust Analysis (Volume Basis - Wet)						
Ar	0.94%	0.92%	0.91%	0.94%	0.92%	0.91%
CO2	3.88%	3.86%	3.81%	4.86%	5.03%	4.97%
H2O	7.75%	9.41%	10.40%	6.31%	8.24%	9.24%
N2	74.93%	73.61%	72.80%	74.91%	73.47%	72.67%
O2	12.50%	12.19%	12.07%	12.97%	12.33%	12.21%
SO2	0.00001%	0.00001%	0.00001%	0.00106%	0.00109%	0.00108%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Stack Exhaust Gas Analysis (Wet)						
Molecular Wt, lb/mol	28.47	28.29	28.17	28.79	28.60	28.48
Gas Constant, ft-lbf/lbm-R	54.263	54.617	54.836	53.682	54.024	54.245
Specific Volume, ft^3/lb	39.41	40.83	41.64	36.73	39.46	40.24
Exhaust Gas Flow, acfm	2,349,436	2,361,202	2,246,352	2,392,994	2,310,532	2,197,698
Specific Volume, scf/lb	13.33	13.41	13.47	13.18	13.27	13.32
Exhaust Gas Flow, scfm	794,671	775,501	726,666	858,690	777,009	727,469
Exhaust Gas Flow, lb/h	3,576,914	3,469,805	3,236,818	3,909,057	3,513,227	3,276,886
Emissions (at Stack exit)						
NOx, ppmvd @15% O2 without SCR	15.0	15.0	15.0	42.0	42.0	42.0
NOx, lb/h as NO2 without SCR	100.3	97.4	90.1	294.1	275.8	254.9
NOx, ppmvd @15% O2 with SCR	4.0	4.0	4.0	11.2	11.2	11.2
NOx, lb/h as NO2 with SCR	26.5	25.7	23.8	78.2	73.3	67.7
NH3 slip, ppmvd @15% O2 with SCR	10.0	10.0	10.0	10.0	10.0	10.0
NH3 slip, lb/h with SCR	24.5	23.8	22.0	25.8	24.2	22.4
CO, ppmvd without Catalyst	31.1	31.4	31.4	107.3	113.5	113.2
CO, lb/h without Catalyst	100.8	97.8	90.4	382.3	358.5	331.2
CO, ppmvd @ 15% O2 without Catalyst	25.0	25.0	25.0	90.0	90.0	90.0
CO, ppmvd with Catalyst	31.1	31.4	31.4	107.3	113.5	113.2
CO, lb/h with Catalyst	100.8	97.8	90.4	382.3	358.5	331.2
CO, ppmvd @ 15% O2 with Catalyst	25.0	25.0	25.0	90.0	90.0	90.0
SO2, ppmvd	0.14	0.14	0.14	11.28	11.93	11.90
SO2, ppmvw	0.13	0.12	0.12	10.56	10.95	10.80
SO2, lb/h	1.01	0.98	0.91	91.88	86.15	79.60
UHC, ppmvd	5.0	5.0	5.0	20.3	12.6	12.6
UHC, ppmvw	4.6	4.6	4.5	19.0	11.6	11.4
UHC, ppmvd @ 15% O2	4.0	4.0	4.0	17.0	10.0	10.0
UHC, lb/h as CH4	9.2	9.0	8.3	41.4	22.8	21.1
VOC, ppmvd	3.7	3.8	3.8	20.3	12.6	12.6
VOC, ppmvw	3.4	3.4	3.4	19.0	11.6	11.4
VOC, ppmvd @ 15% O2	3.0	3.0	3.0	17.0	10.0	10.0
VOC, lb/h as CH4	6.9	6.7	6.2	41.4	22.8	21.1
Particulates (TSP = PM10), lb/h (dry filterables only)	16.7	16.0	15.0	85.7	72.3	66.9

Notes:
1. Values shown above are for one combustion turbine/HRSG unit only.
2. Sample analysis for natural gas fuel received from KUA, sulfur at 0.2 gr/100scf for illustration purposes only.
3. 73% effective SCR and no CO catalyst.
4. Particulates are per EPA Method 201A/202 (front and back half) and include H2SO4 mist.
5. CTG performance from Westinghouse data received 05/21/98, 05/22/98 and 05/27/98 for KUA.

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KUA Cane Island Unit 3

GE 7FA 1x1 Combined Cycle

	* 100 Percent Load - Natural Gas *				
Case Name	Case 1	Case 2	Case 3	Case 4	Case 5
CTG Model	GE 7241FA	GE 7241FA	GE 7241FA	GE 7241FA	GE 7241FA
Combustor/NOx Emission Rate	DLN/15 ppm	DLN/15 ppm	DLN/15 ppm	DLN/15 ppm	DLN/15 ppm
CTG Fuel Type	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas
CTG Load Level (percent of Base Load)	Base	Base	Base	Base	Base
CTG Performance Reference	**GE 05/21/98**	**GE 05/21/98**	**GE 05/21/98**	**GE 05/21/98**	**GE 05/21/98**
Evaporative Cooler On/Off	Off	On	Off	On	Off
HRSG Duct Firing On/Off	Off	Off	Off	Off	Off
Ambinet Temperature, F	19	72	72	102	102
Ambient Relative Humidity, %	55	74	74	45	45
CTG Compressor Inlet Temperature, F	19	66.7	72	84.7	102
CTG Compr. Inlet Relative Humidity, %	55	96	74	92	45
Atmospheric Pressure, psia	14.656	14.656	14.656	14.656	14.656
Site Elevation, ft	75	75	75	75	75
Inlet Loss, in. H2O	4.5	4.5	4.5	4.5	4.5
Exhaust Loss, in. H2O	14.0	14.0	14.0	14.0	14.0
CTG Fuel Type	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas
Number of CTGs	1	1	1	1	1
Gross CTG Output, kW	183,000	164,200	161,100	152,900	141,500
Gross CTG Heat Rate, Btu/kWh (LHV)	9,270	9,460	9,490	9,680	9,900
CTG Heat Input, MBtu/h (LHV)	1,696.41	1,553.33	1,528.84	1,480.07	1,400.85
CTG Heat Input, MBtu/h (HHV)	1,882.14	1,723.40	1,696.23	1,642.12	1,554.22
CTG Fuel Flow, lb/h	80,860	74,040	72,870	70,550	66,770
CTG Water Injection Flow, lb/h	0	0	0	0	0
CTG Steam Injection Flow, lb/h	0	0	0	0	0
Injection Ratio	0.000	0.000	0.000	0.000	0.000
CTG Exhaust Flow, lb/h	3,785,000	3,454,000	3,429,000	3,307,000	3,184,000
CTG Exhaust Temperature, F	1,083	1,128	1,131	1,143	1,157
Duct Burner Heat Input, MBtu/h (LHV)	0	0	0	0	0
Duct Burner Heat Input, MBtu/h (HHV)	0	0	0	0	0
Stack Exit Temperature, F	190	192	192	194	192
Stack Exhaust Pressure, in. H2O above Patm	0	0	0	0	0
Stack Diameter, ft	18.0	18.0	18.0	18.0	18.0
Stack Exit Velocity, ft/s	69.0	63.6	63.1	61.4	58.8

	* 100 Percent Load - Natural Gas *				
Case Name	Case 1	Case 2	Case 3	Case 4	Case 5
CTG Model	GE 7241FA	GE 7241FA	GE 7241FA	GE 7241FA	GE 7241FA
Combustor/NOx Emission Rate	DLN/15 ppm	DLN/15 ppm	DLN/15 ppm	DLN/15 ppm	DLN/15 ppm
CTG Fuel Type	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas
CTG Load Level (percent of Base Load)	Base	Base	Base	Base	Base
CTG Performance Reference	**GE 05/21/98**	**GE 05/21/98**	**GE 05/21/98**	**GE 05/21/98**	**GE 05/21/98**
Evaporative Cooler On/Off	Off	On	Off	On	Off
HRSG Duct Firing On/Off	Off	Off	Off	Off	Off
CTG Exhaust Analysis (Volume Basis - Wet)					
O2	12.79%	12.42%	12.52%	12.19%	12.43%
CO2	3.75%	3.74%	3.71%	3.70%	3.65%
H2O	7.49%	9.34%	9.12%	10.78%	10.09%
N2	75.03%	73.57%	73.72%	72.42%	72.92%
Ar	0.94%	0.92%	0.93%	0.91%	0.92%
SO2	0.00001%	0.00001%	0.00001%	0.00001%	0.00001%
Total	100.00%	100.00%	100.00%	100.00%	100.00%
Emissions (at CTG exhaust flange)					
NOx, ppmvd @ 15% O2	15.0	15.0	15.0	15.0	15.0
NOx, lb/h as NO2	102.5	93.9	92.5	89.6	84.8
CO, ppmvd	15.0	15.0	15.0	15.0	15.0
CO, ppmvw	13.9	13.6	13.6	13.4	13.5
CO, ppmvd @ 15% O2	12.5	12.3	12.5	12.3	12.5
CO, lb/h	51.6	46.5	46.3	44.1	42.7
UHC, ppmvd	7.57	7.72	7.70	7.85	7.79
UHC, ppmvw	7.00	7.00	7.00	7.00	7.00
UHC, ppmvd @ 15% O2	6.32	6.35	6.40	6.41	6.51
UHC, lb/h as CH4	14.92	13.71	13.60	13.20	12.68
VOC, ppmvd	1.51	1.54	1.54	1.57	1.56
VOC, ppmvw	1.40	1.40	1.40	1.40	1.40
VOC, ppmvd @ 15% O2	1.26	1.27	1.28	1.28	1.30
VOC, lb/h as CH4	2.98	2.74	2.72	2.64	2.54
SO2, ppmvd	0.13	0.13	0.13	0.13	0.13
SO2, ppmvw	0.12	0.12	0.12	0.12	0.12
SO2, lb/h	1.03	0.95	0.93	0.90	0.85
Particulates (TSP = PM10), lb/h (dry filterables only)	18.00	18.00	18.00	18.00	18.00
CTG Fuel LHV, Btu/lb	20,980	20,980	20,980	20,980	20,980
CTG Fuel HHV, Btu/lb	23,277	23,277	23,277	23,277	23,277
HHV/LHV Ratio	1.1095	1.1095	1.1095	1.1095	1.1095
CTG Fuel Composition (Ultimate Analysis by Weight)					
Ar	0.000000%	0.000000%	0.000000%	0.000000%	0.000000%
C	74.043570%	74.043570%	74.043570%	74.043570%	74.043570%
H2	24.256660%	24.256660%	24.256660%	24.256660%	24.256660%
N2	0.575950%	0.575950%	0.575950%	0.575950%	0.575950%
O2	1.123180%	1.123180%	1.123180%	1.123180%	1.123180%
S	0.000640%	0.000640%	0.000640%	0.000640%	0.000640%
Total	100.00%	100.00%	100.00%	100.00%	100.00%
CTG Wet (Total) Exhaust Gas Analysis					
Molecular Wt, lb/mol	28.49	28.28	28.31	28.12	28.19
Gas Constant, ft-lbf/lbm-R	54.232	54.623	54.581	54.937	54.798
Specific Volume, ft^3/lb	38.32	39.72	39.77	40.33	40.58
Exhaust Gas Flow, acfm	2,417,353	2,286,548	2,272,856	2,222,855	2,153,445
Specific Volume, scf/lb	13.32	13.41	13.40	13.49	13.46
Exhaust Gas Flow, scfm	840,270	771,969	765,810	743,524	714,277
Exhaust Gas Flow, lb/h	3,785,000	3,454,000	3,429,000	3,307,000	3,184,000

KUA Cane Island Unit 3

GE 7FA 1x1 Combined Cycle

* 100 Percent Load - Natural Gas *					
Case Name	Case 1	Case 2	Case 3	Case 4	Case 5
CTG Model	GE 7241FA	GE 7241FA	GE 7241FA	GE 7241FA	GE 7241FA
Combustor/NOx Emission Rate	DLN/15 ppm	DLN/15 ppm	DLN/15 ppm	DLN/15 ppm	DLN/15 ppm
CTG Fuel Type	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas
CTG Load Level (percent of Base Load)	Base	Base	Base	Base	Base
CTG Performance Reference	**GE 05/21/98**	**GE 05/21/98**	**GE 05/21/98**	**GE 05/21/98**	**GE 05/21/98**
Evaporative Cooler On/Off	Off	On	Off	On	Off
HRSG Duct Firing On/Off	Off	Off	Off	Off	Off
Stack Exhaust Analysis (Volume Basis - Wet)					
Ar	0.94%	0.92%	0.93%	0.91%	0.92%
CO2	3.75%	3.74%	3.71%	3.70%	3.65%
H2O	7.49%	9.34%	9.12%	10.78%	10.09%
N2	75.03%	73.57%	73.72%	72.42%	72.92%
O2	12.79%	12.42%	12.52%	12.19%	12.43%
SO2	0.00001%	0.00001%	0.00001%	0.00001%	0.00001%
Total	100.00%	100.00%	100.00%	100.00%	100.00%
Stack Exhaust Gas Analysis (Wet)					
Molecular Wt, lb/mol	28.49	28.28	28.31	28.12	28.19
Gas Constant, ft-lbf/lbm-R	54.232	54.623	54.581	54.937	54.798
Specific Volume, ft^3/lb	16.69	16.87	16.85	17.02	16.92
Exhaust Gas Flow, acfm	1,052,861	971,150	962,978	938,086	897,888
Specific Volume, scf/lb	13.32	13.41	13.40	13.49	13.46
Exhaust Gas Flow, scfm	840,270	771,969	765,810	743,524	714,277
Exhaust Gas Flow, lb/h	3,785,000	3,454,000	3,429,000	3,307,000	3,184,000
Emissions (at Stack exit)					
NOx, ppmvd @15% O2 without SCR	15.0	15.0	15.0	15.0	15.0
NOx, lb/h as NO2 without SCR	102.5	93.9	92.5	89.6	84.8
NOx, ppmvd @15% O2 with SCR	4.0	4.0	4.0	4.0	4.0
NOx, lb/h as NO2 with SCR	27.1	24.8	24.4	23.6	22.3
NH3 slip, ppmvd @15% O2 with SCR	10.0	10.0	10.0	10.0	10.0
NH3 slip, lb/h with SCR	25.0	22.9	22.6	21.9	20.7
CO, ppmvd without Catalyst	15.0	15.0	15.0	15.0	15.0
CO, lb/h without Catalyst	51.6	46.5	46.3	44.1	42.7
CO, ppmvd @ 15% O2 without Catalyst	12.5	12.3	12.5	12.3	12.5
CO, ppmvd with Catalyst	15.0	15.0	15.0	15.0	15.0
CO, lb/h with Catalyst	51.6	46.5	46.3	44.1	42.7
CO, ppmvd @ 15% O2 with Catalyst	12.5	12.3	12.5	12.3	12.5
SO2, ppmvd	0.13	0.13	0.13	0.13	0.13
SO2, ppmvw	0.12	0.12	0.12	0.12	0.12
SO2, lb/h	1.03	0.95	0.93	0.90	0.85
UHC, ppmvd	7.6	7.7	7.7	7.8	7.8
UHC, ppmvw	7.0	7.0	7.0	7.0	7.0
UHC, ppmvd @ 15% O2	6.3	6.3	6.4	6.4	6.5
UHC, lb/h as CH4	14.9	13.7	13.6	13.2	12.7
VOC, ppmvd	1.5	1.5	1.5	1.6	1.6
VOC, ppmvw	1.4	1.4	1.4	1.4	1.4
VOC, ppmvd @ 15% O2	1.3	1.3	1.3	1.3	1.3
VOC, lb/h as CH4	3.0	2.7	2.7	2.6	2.5
Particulates (TSP = PM10), lb/h (dry filterables only)	18.0	18.0	18.0	18.0	18.0

Notes:

1. Values shown above are for one combustion turbine/HRSG unit only.
2. Sample analysis for natural gas fuel received from KUA, sulfur at 0.2 gr/100 scf added for illustration purposes only.
3. 73% effective SCR and no CO catalyst.
4. Particulates are front and back half.
5. CTG performance from General Electric data received 5/21/98 for KUA.

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	* 70 & 50 Percent Load - Natural Gas *					
Case Name	Case 6	Case 7	Case 8	Case 9	Case 10	Case 11
CTG Model	GE 7241FA	GE 7241FA	GE 7241FA	GE 7241FA	GE 7241FA	GE 7241FA
Combustor/NOx Emission Rate	DLN/15 ppm	DLN/15 ppm	DLN/15 ppm	DLN/15 ppm	DLN/15 ppm	DLN/15 ppm
CTG Fuel Type	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas
CTG Load Level (percent of Base Load)	70 Percent	50 Percent	70 Percent	50 Percent	70 Percent	50 Percent
CTG Performance Reference	GE 05/21/98	GE 05/21/98	GE 05/21/98	GE 05/21/98	GE 05/21/98	GE 05/21/98
Evaporative Cooler On/Off	Off	Off	Off	Off	Off	Off
HRSG Duct Firing On/Off	Off	Off	Off	Off	Off	Off
Ambinet Temperature, F	19	19	72	72	102	102
Ambient Relative Humidity, %	55	55	74	74	45	45
CTG Compressor Inlet Temperature, F	19	19	72	72	102	102
CTG Compr. Inlet Relative Humidity, %	55	55	74	74	45	45
Atmospheric Pressure, psia	14.656	14.656	14.656	14.656	14.656	14.656
Site Elevation, ft	75	75	75	75	75	75
Inlet Loss, in. H2O	4.5	4.5	4.5	4.5	4.5	4.5
Exhaust Loss, in. H2O	14.0	14.0	14.0	14.0	14.0	14.0
CTG Fuel Type	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas
Number of CTGs	1	1	1	1	1	1
Gross CTG Output, kW	128,100	91,500	114,900	82,100	107,100	76,500
Gross CTG Heat Rate, Btu/kWh (LHV)	10,220	11,920	10,580	12,380	10,880	12,700
CTG Heat Input, MBtu/h (LHV)	1,309.18	1,090.68	1,215.64	1,016.40	1,165.25	971.55
CTG Heat Input, MBtu/h (HHV)	1,452.52	1,210.09	1,348.73	1,127.68	1,292.83	1,077.92
CTG Fuel Flow, lb/h	62,400	51,990	57,940	48,450	55,540	46,310
CTG Water Injection Flow, lb/h	0	0	0	0	0	0
CTG Steam Injection Flow, lb/h	0	0	0	0	0	0
Injection Ratio	0.000	0.000	0.000	0.000	0.000	0.000
CTG Exhaust Flow, lb/h	2,904,000	2,485,000	2,745,000	2,355,000	2,668,000	2,309,000
CTG Exhaust Temperature, F	1,126	1,163	1,162	1,197	1,180	1,200
Duct Burner Heat Input, MBtu/h (LHV)	0	0	0	0	0	0
Duct Burner Heat Input, MBtu/h (HHV)	0	0	0	0	0	0
Stack Exit Temperature, F	178	180	180	173	183	177
Stack Exhaust Pressure, in. H2O above Patm	0	0	0	0	0	0
Stack Diameter, ft	18.0	18.0	18.0	18.0	18.0	18.0
Stack Exit Velocity, ft/s	52.0	44.6	49.6	42.0	48.6	41.6

KUA Cane Island Unit 3

GE 7FA 1x1 Combined Cycle

	* 70 & 50 Percent Load - Natural Gas *					
Case Name	Case 6	Case 7	Case 8	Case 9	Case 10	Case 11
CTG Model	GE 7241FA	GE 7241FA	GE 7241FA	GE 7241FA	GE 7241FA	GE 7241FA
Combustor/NOx Emission Rate	DLN/15 ppm	DLN/15 ppm	DLN/15 ppm	DLN/15 ppm	DLN/15 ppm	DLN/15 ppm
CTG Fuel Type	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas
CTG Load Level (percent of Base Load)	70 Percent	50 Percent	70 Percent	50 Percent	70 Percent	50 Percent
CTG Performance Reference	GE 05/21/98	GE 05/21/98	GE 05/21/98	GE 05/21/98	GE 05/21/98	GE 05/21/98
Evaporative Cooler On/Off	Off	Off	Off	Off	Off	Off
HRSG Duct Firing On/Off	Off	Off	Off	Off	Off	Off
CTG Exhaust Analysis (Volume Basis - Wet)						
O2	12.74%	12.95%	12.58%	12.77%	12.49%	12.77%
CO2	3.77%	3.68%	3.68%	3.59%	3.62%	3.49%
H2O	7.53%	7.34%	9.07%	8.90%	10.04%	9.79%
N2	75.01%	75.08%	73.74%	73.81%	72.94%	73.04%
Ar	0.94%	0.94%	0.93%	0.93%	0.92%	0.92%
SO2	0.00001%	0.00001%	0.00001%	0.00001%	0.00001%	0.00001%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Emissions (at CTG exhaust flange)						
NOx, ppmvd @ 15% O2	15.0	15.0	15.0	15.0	15.0	15.0
NOx, lb/h as NO2	79.3	66.3	73.7	61.8	70.7	59.1
CO, ppmvd	15.0	15.0	15.0	15.0	15.0	15.0
CO, ppmvw	13.9	13.9	13.6	13.7	13.5	13.5
CO, ppmvd @ 15% O2	12.5	12.8	12.5	12.9	12.6	13.1
CO, lb/h	39.6	33.9	37.0	31.8	35.8	31.0
UHC, ppmvd	7.57	7.55	7.70	7.68	7.78	7.76
UHC, ppmvw	7.00	7.00	7.00	7.00	7.00	7.00
UHC, ppmvd @ 15% O2	6.29	6.45	6.44	6.61	6.56	6.80
UHC, lb/h as CH4	11.45	9.79	10.89	9.34	10.62	9.19
VOC, ppmvd	1.51	1.51	1.54	1.54	1.56	1.55
VOC, ppmvw	1.40	1.40	1.40	1.40	1.40	1.40
VOC, ppmvd @ 15% O2	1.26	1.29	1.29	1.32	1.31	1.36
VOC, lb/h as CH4	2.29	1.96	2.18	1.87	2.12	1.84
SO2, ppmvd	0.13	0.13	0.13	0.13	0.13	0.13
SO2, ppmvw	0.12	0.12	0.12	0.12	0.12	0.11
SO2, lb/h	0.80	0.66	0.74	0.62	0.71	0.59
Particulates (TSP = PM10), lb/h (dry filterables only)	18.00	18.00	18.00	18.00	18.00	18.00
CTG Fuel LHV, Btu/lb	20,980	20,980	20,980	20,980	20,980	20,980
CTG Fuel HHV, Btu/lb	23,277	23,277	23,277	23,277	23,277	23,277
HHV/LHV Ratio	1.1095	1.1095	1.1095	1.1095	1.1095	1.1095
CTG Fuel Composition (Ultimate Analysis by Weight)						
Ar	0.000000%	0.000000%	0.000000%	0.000000%	0.000000%	0.000000%
C	74.043570%	74.043570%	74.043570%	74.043570%	74.043570%	74.043570%
H2	24.256660%	24.256660%	24.256660%	24.256660%	24.256660%	24.256660%
N2	0.575950%	0.575950%	0.575950%	0.575950%	0.575950%	0.575950%
O2	1.123180%	1.123180%	1.123180%	1.123180%	1.123180%	1.123180%
S	0.000640%	0.000640%	0.000640%	0.000640%	0.000640%	0.000640%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
CTG Wet (Total) Exhaust Gas Analysis						
Molecular Wt, lb/mol	28.49	28.50	28.31	28.32	28.20	28.21
Gas Constant, ft-lbf/lbm-R	54.237	54.214	54.576	54.554	54.792	54.761
Specific Volume, ft^3/lb	39.39	40.29	40.54	41.40	41.15	41.63
Exhaust Gas Flow, acfm	1,906,476	1,668,678	1,854,705	1,624,950	1,829,803	1,602,061
Specific Volume, scf/lb	13.32	13.31	13.40	13.40	13.45	13.45
Exhaust Gas Flow, scfm	644,688	551,256	613,050	525,950	598,077	517,601
Exhaust Gas Flow, lb/h	2,904,000	2,485,000	2,745,000	2,355,000	2,668,000	2,309,000

KUA Cane Island Unit 3

GE 7FA 1x1 Combined Cycle

	* 70 & 50 Percent Load - Natural Gas *					
Case Name	Case 6	Case 7	Case 8	Case 9	Case 10	Case 11
CTG Model	GE 7241FA	GE 7241FA	GE 7241FA	GE 7241FA	GE 7241FA	GE 7241FA
Combustor/NOx Emission Rate	DLN/15 ppm	DLN/15 ppm	DLN/15 ppm	DLN/15 ppm	DLN/15 ppm	DLN/15 ppm
CTG Fuel Type	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas
CTG Load Level (percent of Base Load)	70 Percent	50 Percent	70 Percent	50 Percent	70 Percent	50 Percent
CTG Performance Reference	GE 05/21/98	GE 05/21/98	GE 05/21/98	GE 05/21/98	GE 05/21/98	GE 05/21/98
Evaporative Cooler On/Off	Off	Off	Off	Off	Off	Off
HRSG Duct Firing On/Off	Off	Off	Off	Off	Off	Off
Stack Exhaust Analysis (Volume Basis - Wet)						
Ar	0.94%	0.94%	0.93%	0.93%	0.92%	0.92%
CO2	3.77%	3.68%	3.68%	3.59%	3.62%	3.49%
H2O	7.53%	7.34%	9.07%	8.90%	10.04%	9.79%
N2	75.01%	75.08%	73.74%	73.81%	72.94%	73.04%
O2	12.74%	12.95%	12.58%	12.77%	12.49%	12.77%
SO2	0.00001%	0.00001%	0.00001%	0.00001%	0.00001%	0.00001%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Stack Exhaust Gas Analysis (Wet)						
Molecular Wt, lb/mol	28.49	28.50	28.31	28.32	28.20	28.21
Gas Constant, ft-lbf/lbm-R	54.237	54.214	54.576	54.554	54.792	54.761
Specific Volume, ft^3/lb	16.39	16.43	16.54	16.35	16.69	16.52
Exhaust Gas Flow, acfm	793,276	680,476	756,705	641,738	742,149	635,745
Specific Volume, scf/lb	13.32	13.31	13.40	13.40	13.45	13.45
Exhaust Gas Flow, scfm	644,688	551,256	613,050	525,950	598,077	517,601
Exhaust Gas Flow, lb/h	2,904,000	2,485,000	2,745,000	2,355,000	2,668,000	2,309,000
Emissions (at Stack exit)						
NOx, ppmvd @15% O2 without SCR	15.0	15.0	15.0	15.0	15.0	15.0
NOx, lb/h as NO2 without SCR	79.3	66.3	73.7	61.8	70.7	59.1
NOx, ppmvd @15% O2 with SCR	4.0	4.0	4.0	4.0	4.0	4.0
NOx, lb/h as NO2 with SCR	20.9	17.4	19.4	16.2	18.6	15.5
NH3 slip, ppmvd @15% O2 with SCR	10.0	10.0	10.0	10.0	10.0	10.0
NH3 slip, lb/h with SCR	19.3	16.1	17.9	15.0	17.2	14.3
CO, ppmvd without Catalyst	15.0	15.0	15.0	15.0	15.0	15.0
CO, lb/h without Catalyst	39.6	33.9	37.0	31.8	35.8	31.0
CO, ppmvd @ 15% O2 without Catalyst	12.5	12.8	12.5	12.9	12.6	13.1
CO, ppmvd with Catalyst	15.0	15.0	15.0	15.0	15.0	15.0
CO, lb/h with Catalyst	39.6	33.9	37.0	31.8	35.8	31.0
CO, ppmvd @ 15% O2 with Catalyst	12.5	12.8	12.5	12.9	12.6	13.1
SO2, ppmvd	0.13	0.13	0.13	0.13	0.13	0.13
SO2, ppmvw	0.12	0.12	0.12	0.12	0.12	0.11
SO2, lb/h	0.80	0.66	0.74	0.62	0.71	0.59
UHC, ppmvd	7.6	7.6	7.7	7.7	7.8	7.8
UHC, ppmvw	7.0	7.0	7.0	7.0	7.0	7.0
UHC, ppmvd @ 15% O2	6.3	6.5	6.4	6.6	6.6	6.8
UHC, lb/h as CH4	11.4	9.8	10.9	9.3	10.6	9.2
VOC, ppmvd	1.5	1.5	1.5	1.5	1.6	1.6
VOC, ppmvw	1.4	1.4	1.4	1.4	1.4	1.4
VOC, ppmvd @ 15% O2	1.3	1.3	1.3	1.3	1.3	1.4
VOC, lb/h as CH4	2.3	2.0	2.2	1.9	2.1	1.8
Particulates (TSP = PM10), lb/h (dry filterables only)	18.0	18.0	18.0	18.0	18.0	18.0

Notes:

1. Values shown above are for one combustion turbine/HRSG unit only.
2. Sample analysis for natural gas fuel received from KUA, sulfur at 0.2 gr/100 scf added for illustration purposes only.
3. 73% effective SCR and no CO catalyst.
4. Particulates are front and back half.
5. CTG performance from General Electric data received 5/21/98 for KUA.

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KUA Cane Island Unit 3

GE 7FA 1x1 Combined Cycle

	* 100 Percent Load - Duct Firing - NG & DO *			
Case Name	Case 23	Case 24	Case 25	Case 26
CTG Model	GE 7241FA	GE 7241FA	GE 7241FA	GE 7241FA
Combustor/NOx Emission Rate	DLN/15 ppm	DLN/15 ppm	DLN/42 ppm	DLN/42 ppm
CTG Fuel Type	Natural Gas	Natural Gas	Distillate	Distillate
CTG Load Level (percent of Base Load)	Base	Base	Base	Base
CTG Performance Reference	**GE 05/21/98**	**GE 05/21/98**	**GE 05/21/98**	**GE 05/21/98**
Evaporative Cooler On/Off	On	Off	On	Off
HRSG Duct Firing On/Off	On	On	On	On
Ambinet Temperature, F	102	102	102	102
Ambient Relative Humidity, %	45	45	45	45
CTG Compressor Inlet Temperature, F	84.7	102	84.7	102
CTG Compr. Inlet Relative Humidity, %	92	45	92	45
Atmospheric Pressure, psia	14.656	14.656	14.656	14.656
Site Elevation, ft	75	75	75	75
Inlet Loss, in. H2O	4.5	4.5	4.5	4.5
Exhaust Loss, in. H2O	14.0	14.0	14.0	14.0
CTG Fuel Type	Natural Gas	Natural Gas	Distillate	Distillate
Number of CTGs	1	1	1	1
Gross CTG Output, kW	152,900	141,500	161,500	151,300
Gross CTG Heat Rate, Btu/kWh (LHV)	9,680	9,900	10,260	10,480
CTG Heat Input, MBtu/h (LHV)	1,480.07	1,400.85	1,656.99	1,585.62
CTG Heat Input, MBtu/h (HHV)	1,642.12	1,554.22	1,769.23	1,693.03
CTG Fuel Flow, lb/h	70,550	66,770	89,150	85,310
CTG Water Injection Flow, lb/h	0	0	94,100	93,960
CTG Steam Injection Flow, lb/h	0	0	0	0
Injection Ratio	0.000	0.000	1.056	1.101
CTG Exhaust Flow, lb/h	3,307,000	3,184,000	3,416,600	3,296,660
CTG Exhaust Temperature, F	1,143	1,157	1,131	1,145
Duct Burner Heat Input, MBtu/h (LHV)	39.02	36.72	16.91	32.53
Duct Burner Heat Input, MBtu/h (HHV)	43.29	40.74	18.06	34.73
Stack Exit Temperature, F	192	189	282	278
Stack Exhaust Pressure, in. H2O above Patm	0	0	0	0
Stack Diameter, ft	18.0	18.0	18.0	18.0
Stack Exit Velocity, ft/s	61.3	58.6	72.0	69.0

	* 100 Percent Load - Duct Firing - NG & DO *			
Case Name	Case 23	Case 24	Case 25	Case 26
CTG Model	GE 7241FA	GE 7241FA	GE 7241FA	GE 7241FA
Combustor/NOx Emission Rate	DLN/15 ppm	DLN/15 ppm	DLN/42 ppm	DLN/42 ppm
CTG Fuel Type	Natural Gas	Natural Gas	Distillate	Distillate
CTG Load Level (percent of Base Load)	Base	Base	Base	Base
CTG Performance Reference	**GE 05/21/98**	**GE 05/21/98**	**GE 05/21/98**	**GE 05/21/98**
Evaporative Cooler On/Off	On	Off	On	Off
HRSG Duct Firing On/Off	On	On	On	On
CTG Exhaust Analysis (Volume Basis - Wet)				
O2	12.19%	12.43%	11.06%	11.20%
CO2	3.70%	3.65%	5.26%	5.23%
H2O	10.78%	10.09%	12.77%	12.32%
N2	72.42%	72.92%	70.02%	70.37%
Ar	0.91%	0.92%	0.88%	0.88%
SO2	0.00001%	0.00001%	0.00114%	0.00114%
Total	100.00%	100.00%	100.00%	100.00%
Emissions (at CTG exhaust flange)				
NOx, ppmvd @ 15% O2	15.0	15.0	42.0	42.0
NOx, lb/h as NO2	89.6	84.8	285.1	272.8
CO, ppmvd	15.0	15.0	20.0	20.0
CO, ppmvw	13.4	13.5	17.4	17.5
CO, ppmvd @ 15% O2	12.3	12.5	14.4	14.6
CO, lb/h	44.1	42.7	59.4	57.5
UHC, ppmvd	7.85	7.79	8.02	7.98
UHC, ppmvw	7.00	7.00	7.00	7.00
UHC, ppmvd @ 15% O2	6.41	6.51	5.78	5.82
UHC, lb/h as CH4	13.20	12.68	13.64	13.14
VOC, ppmvd	1.57	1.56	4.01	3.99
VOC, ppmvw	1.40	1.40	3.50	3.50
VOC, ppmvd @ 15% O2	1.28	1.30	2.89	2.91
VOC, lb/h as CH4	2.64	2.54	6.82	6.57
SO2, ppmvd	0.13	0.13	13.12	12.97
SO2, ppmvw	0.12	0.12	11.45	11.37
SO2, lb/h	0.90	0.85	89.07	85.23
Particulates (TSP = PM10), lb/h (dry filterables only)	18.00	18.00	43.00	43.00
CTG Fuel LHV, Btu/lb	20,980	20,980	18,586	18,586
CTG Fuel HHV, Btu/lb	23,277	23,277	19,845	19,845
HHV/LHV Ratio	1.1095	1.1095	1.0677	1.0677
CTG Fuel Composition (Ultimate Analysis by Weight)				
Ar	0.000000%	0.000000%	0.000000%	0.000000%
C	74.043570%	74.043570%	86.135000%	86.135000%
H2	24.256660%	24.256660%	13.800000%	13.800000%
N2	0.575950%	0.575950%	0.015000%	0.015000%
O2	1.123180%	1.123180%	0.000000%	0.000000%
S	0.000640%	0.000640%	0.050000%	0.050000%
Total	100.00%	100.00%	100.00%	100.00%
CTG Wet (Total) Exhaust Gas Analysis				
Molecular Wt, lb/mol	28.12	28.19	28.13	28.17
Gas Constant, ft-lbf/lbm-R	54.937	54.798	54.930	54.841
Specific Volume, ft^3/lb	40.33	40.58	40.02	40.31
Exhaust Gas Flow, acfm	2,222,855	2,153,445	2,278,872	2,214,806
Specific Volume, scf/lb	13.49	13.46	13.49	13.47
Exhaust Gas Flow, scfm	743,524	714,277	768,166	740,100
Exhaust Gas Flow, lb/h	3,307,000	3,184,000	3,416,600	3,296,660

KUA Cane Island Unit 3

GE 7FA 1x1 Combined Cycle

	* 100 Percent Load - Duct Firing - NG & DO *			
Case Name	Case 23	Case 24	Case 25	Case 26
CTG Model	GE 7241FA	GE 7241FA	GE 7241FA	GE 7241FA
Combustor/NOx Emission Rate	DLN/15 ppm	DLN/15 ppm	DLN/42 ppm	DLN/42 ppm
CTG Fuel Type	Natural Gas	Natural Gas	Distillate	Distillate
CTG Load Level (percent of Base Load)	Base	Base	Base	Base
CTG Performance Reference	**GE 05/21/98**	**GE 05/21/98**	**GE 05/21/98**	**GE 05/21/98**
Evaporative Cooler On/Off	On	Off	On	Off
HRSG Duct Firing On/Off	On	On	On	On
Stack Exhaust Analysis (Volume Basis - Wet)				
Ar	0.91%	0.91%	0.88%	0.88%
CO2	3.79%	3.74%	5.32%	5.33%
H2O	10.96%	10.27%	12.82%	12.41%
N2	72.35%	72.85%	70.01%	70.33%
O2	11.99%	12.23%	10.98%	11.04%
SO2	0.00001%	0.00001%	0.00116%	0.00116%
Total	100.00%	100.00%	100.00%	100.00%
Stack Exhaust Gas Analysis (Wet)				
Molecular Wt, lb/mol	28.11	28.18	28.13	28.17
Gas Constant, ft-lbf/lbm-R	54.959	54.819	54.930	54.840
Specific Volume, ft^3/lb	16.97	16.85	19.30	19.17
Exhaust Gas Flow, acfm	935,856	894,665	1,099,299	1,053,842
Specific Volume, scf/lb	13.50	13.46	13.49	13.47
Exhaust Gas Flow, scfm	744,494	714,670	768,370	740,493
Exhaust Gas Flow, lb/h	3,308,860	3,185,750	3,417,510	3,298,410
Emissions (at Stack exit)				
NOx, ppmvd @15% O2 without SCR	15.2	15.2	41.8	41.6
NOx, lb/h as NO2 without SCR	93.0	88.1	286.5	275.6
NOx, ppmvd @15% O2 with SCR	4.0	4.0	11.1	11.1
NOx, lb/h as NO2 with SCR	24.5	23.2	76.1	73.2
NH3 slip, ppmvd @15% O2 with SCR	10.0	10.0	10.0	10.0
NH3 slip, lb/h with SCR	22.4	21.2	25.3	24.5
CO, ppmvd without Catalyst	16.5	16.4	20.6	21.2
CO, lb/h without Catalyst	48.4	46.7	61.2	61.0
CO, ppmvd @ 15% O2 without Catalyst	13.1	13.4	14.7	15.2
CO, ppmvd with Catalyst	16.5	16.4	20.6	21.2
CO, lb/h with Catalyst	48.4	46.7	61.2	61.0
CO, ppmvd @ 15% O2 with Catalyst	13.1	13.4	14.7	15.2
SO2, ppmvd	0.14	0.13	13.26	13.24
SO2, ppmvw	0.12	0.12	11.56	11.60
SO2, lb/h	0.93	0.88	89.98	86.98
UHC, ppmvd	9.4	9.3	8.7	9.3
UHC, ppmvw	8.4	8.3	7.6	8.1
UHC, ppmvd @ 15% O2	7.5	7.6	6.2	6.6
UHC, lb/h as CH4	15.8	15.1	14.7	15.2
VOC, ppmvd	1.9	1.9	4.1	4.2
VOC, ppmvw	1.7	1.7	3.6	3.7
VOC, ppmvd @ 15% O2	1.5	1.5	3.0	3.0
VOC, lb/h as CH4	3.2	3.0	7.0	7.0
Particulates (TSP = PM10), lb/h (dry filterables only)	18.6	18.6	43.3	43.5

Notes:

1. Values shown above are for one combustion turbine/HRSG unit only.
2. Sample analysis for natural gas fuel received from KUA, sulfur at 0.2 gr/100 scf added for illustration purposes only.
3. 73% effective SCR and no CO catalyst.
4. Particulates are front and back half.
5. CTG performance from General Electric data received 5/21/98 for KUA.
6. Duct Burner NOx, lb/MBtu (HHV) is 0.0800
7. Duct Burner CO, lb/MBtu (HHV) is 0.1000
8. Duct Burner Particulate, lb/MBtu (HHV) is 0.0150
9. Duct Burner UHC (CH4), lb/MBtu (HHV) is 0.0600
10. Duct Burner VOC (CH4), lb/MBtu (HHV) is 0.0120

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06/05/98

	* 100 Percent Load - Distillate Oil *				
Case Name	Case 12	Case 13	Case 14	Case 15	Case 16
CTG Model	GE 7241FA	GE 7241FA	GE 7241FA	GE 7241FA	GE 7241FA
Combustor/NOx Emission Rate	DLN/42 ppm	DLN/42 ppm	DLN/42 ppm	DLN/42 ppm	DLN/42 ppm
CTG Fuel Type	Distillate	Distillate	Distillate	Distillate	Distillate
CTG Load Level (percent of Base Load)	Base	Base	Base	Base	Base
CTG Performance Reference	**GE 05/21/98**	**GE 05/21/98**	**GE 05/21/98**	**GE 05/21/98**	**GE 05/21/98**
Evaporative Cooler On/Off	Off	On	Off	On	Off
HRSG Duct Firing On/Off	Off	Off	Off	Off	Off
Ambinet Temperature, F	19	72	72	102	102
Ambient Relative Humidity, %	55	74	74	45	45
CTG Compressor Inlet Temperature, F	19	66.7	72	84.7	102
CTG Compr. Inlet Relative Humidity, %	55	96	74	92	45
Atmospheric Pressure, psia	14.656	14.656	14.656	14.656	14.656
Site Elevation, ft	75	75	75	75	75
Inlet Loss, in. H2O	4.5	4.5	4.5	4.5	4.5
Exhaust Loss, in. H2O	14.0	14.0	14.0	14.0	14.0
CTG Fuel Type	Distillate	Distillate	Distillate	Distillate	Distillate
Number of CTGs	1	1	1	1	1
Gross CTG Output, kW	189,300	174,000	171,500	161,500	151,300
Gross CTG Heat Rate, Btu/kWh (LHV)	10,090	10,110	10,150	10,260	10,480
CTG Heat Input, MBtu/h (LHV)	1,910.04	1,759.14	1,740.73	1,656.99	1,585.62
CTG Heat Input, MBtu/h (HHV)	2,039.42	1,878.30	1,858.65	1,769.23	1,693.03
CTG Fuel Flow, lb/h	102,770	94,650	93,660	89,150	85,310
CTG Water Injection Flow, lb/h	131,760	110,720	111,020	94,100	93,960
CTG Steam Injection Flow, lb/h	0	0	0	0	0
Injection Ratio	1.282	1.170	1.185	1.056	1.101
CTG Exhaust Flow, lb/h	3,901,400	3,586,520	3,552,540	3,416,600	3,296,660
CTG Exhaust Temperature, F	1,068	1,112	1,116	1,131	1,145
Duct Burner Heat Input, MBtu/h (LHV)	0	0	0	0	0
Duct Burner Heat Input, MBtu/h (HHV)	0	0	0	0	0
Stack Exit Temperature, F	281	282	281	284	281
Stack Exhaust Pressure, in. H2O above Patm	0	0	0	0	0
Stack Diameter, ft	18.0	18.0	18.0	18.0	18.0
Stack Exit Velocity, ft/s	81.4	75.3	74.5	72.2	69.3

	* 100 Percent Load - Distillate Oil *				
Case Name	Case 12	Case 13	Case 14	Case 15	Case 16
CTG Model	GE 7241FA	GE 7241FA	GE 7241FA	GE 7241FA	GE 7241FA
Combustor/NOx Emission Rate	DLN/42 ppm	DLN/42 ppm	DLN/42 ppm	DLN/42 ppm	DLN/42 ppm
CTG Fuel Type	Distillate	Distillate	Distillate	Distillate	Distillate
CTG Load Level (percent of Base Load)	Base	Base	Base	Base	Base
CTG Performance Reference	**GE 05/21/98**	**GE 05/21/98**	**GE 05/21/98**	**GE 05/21/98**	**GE 05/21/98**
Evaporative Cooler On/Off	Off	On	Off	On	Off
HRSG Duct Firing On/Off	Off	Off	Off	Off	Off
CTG Exhaust Analysis (Volume Basis - Wet)					
O2	11.38%	11.13%	11.16%	11.06%	11.20%
CO2	5.36%	5.34%	5.34%	5.26%	5.23%
H2O	10.60%	11.90%	11.80%	12.77%	12.32%
N2	71.76%	70.73%	70.81%	70.02%	70.37%
Ar	0.90%	0.89%	0.89%	0.88%	0.88%
SO2	0.00117%	0.00116%	0.00116%	0.00114%	0.00114%
Total	100.00%	100.00%	100.00%	100.00%	100.00%
Emissions (at CTG exhaust flange)					
NOx, ppmvd @ 15% O2	42.0	42.0	42.0	42.0	42.0
NOx, lb/h as NO2	328.5	302.6	299.4	285.1	272.8
CO, ppmvd	20.0	20.0	20.0	20.0	20.0
CO, ppmvw	17.9	17.6	17.6	17.4	17.5
CO, ppmvd @ 15% O2	14.5	14.3	14.4	14.4	14.6
CO, lb/h	68.9	62.7	62.2	59.4	57.5
UHC, ppmvd	7.83	7.95	7.94	8.02	7.98
UHC, ppmvw	7.00	7.00	7.00	7.00	7.00
UHC, ppmvd @ 15% O2	5.68	5.70	5.70	5.78	5.82
UHC, lb/h as CH4	15.44	14.27	14.13	13.64	13.14
VOC, ppmvd	3.91	3.97	3.97	4.01	3.99
VOC, ppmvw	3.50	3.50	3.50	3.50	3.50
VOC, ppmvd @ 15% O2	2.84	2.85	2.85	2.89	2.91
VOC, lb/h as CH4	7.72	7.13	7.06	6.82	6.57
SO2, ppmvd	13.04	13.19	13.17	13.12	12.97
SO2, ppmvw	11.66	11.62	11.61	11.45	11.37
SO2, lb/h	102.67	94.56	93.57	89.07	85.23
Particulates (TSP = PM10), lb/h (dry filterables only)	44.00	44.00	44.00	43.00	43.00
CTG Fuel LHV, Btu/lb	18,586	18,586	18,586	18,586	18,586
CTG Fuel HHV, Btu/lb	19,845	19,845	19,845	19,845	19,845
HHV/LHV Ratio	1.0677	1.0677	1.0677	1.0677	1.0677
CTG Fuel Composition (Ultimate Analysis by Weight)					
Ar	0.000000%	0.000000%	0.000000%	0.000000%	0.000000%
C	86.135000%	86.135000%	86.135000%	86.135000%	86.135000%
H2	13.800000%	13.800000%	13.800000%	13.800000%	13.800000%
N2	0.015000%	0.015000%	0.015000%	0.015000%	0.015000%
O2	0.000000%	0.000000%	0.000000%	0.000000%	0.000000%
S	0.050000%	0.050000%	0.050000%	0.050000%	0.050000%
Total	100.00%	100.00%	100.00%	100.00%	100.00%
CTG Wet (Total) Exhaust Gas Analysis					
Molecular Wt, lb/mol	28.37	28.23	28.24	28.13	28.17
Gas Constant, ft-lbf/lbm-R	54.449	54.729	54.708	54.930	54.841
Specific Volume, ft^3/lb	38.10	39.40	39.48	40.02	40.31
Exhaust Gas Flow, acfm	2,477,389	2,355,148	2,337,571	2,278,872	2,214,806
Specific Volume, scf/lb	13.37	13.44	13.43	13.49	13.47
Exhaust Gas Flow, scfm	869,362	803,380	795,177	768,166	740,100
Exhaust Gas Flow, lb/h	3,901,400	3,586,520	3,552,540	3,416,600	3,296,660

KUA Cane Island Unit 3
GE 7FA 1x1 Combined Cycle

	* 100 Percent Load - Distillate Oil *				
Case Name	Case 12	Case 13	Case 14	Case 15	Case 16
CTG Model	GE 7241FA	GE 7241FA	GE 7241FA	GE 7241FA	GE 7241FA
Combustor/NOx Emission Rate	DLN/42 ppm	DLN/42 ppm	DLN/42 ppm	DLN/42 ppm	DLN/42 ppm
CTG Fuel Type	Distillate	Distillate	Distillate	Distillate	Distillate
CTG Load Level (percent of Base Load)	Base	Base	Base	Base	Base
CTG Performance Reference	**GE 05/21/98**	**GE 05/21/98**	**GE 05/21/98**	**GE 05/21/98**	**GE 05/21/98**
Evaporative Cooler On/Off	Off	On	Off	On	Off
HRSG Duct Firing On/Off	Off	Off	Off	Off	Off
Stack Exhaust Analysis (Volume Basis - Wet)					
Ar	0.90%	0.89%	0.89%	0.88%	0.88%
CO2	5.36%	5.34%	5.34%	5.26%	5.23%
H2O	10.60%	11.90%	11.80%	12.77%	12.32%
N2	71.76%	70.73%	70.81%	70.02%	70.37%
O2	11.38%	11.13%	11.16%	11.06%	11.20%
SO2	0.00117%	0.00116%	0.00116%	0.00114%	0.00114%
Total	100.00%	100.00%	100.00%	100.00%	100.00%
Stack Exhaust Gas Analysis (Wet)					
Molecular Wt, lb/mol	28.37	28.23	28.24	28.13	28.17
Gas Constant, ft-lbf/lbm-R	54.449	54.729	54.708	54.930	54.841
Specific Volume, ft^3/lb	19.11	19.23	19.20	19.36	19.25
Exhaust Gas Flow, acfm	1,242,596	1,149,480	1,136,813	1,102,423	1,057,678
Specific Volume, scf/lb	13.37	13.44	13.43	13.49	13.47
Exhaust Gas Flow, scfm	869,362	803,380	795,177	768,166	740,100
Exhaust Gas Flow, lb/h	3,901,400	3,586,520	3,552,540	3,416,600	3,296,660
Emissions (at Stack exit)					
NOx, ppmvd @15% O2 without SCR	42.0	42.0	42.0	42.0	42.0
NOx, lb/h as NO2 without SCR	328.5	302.6	299.4	285.1	272.8
NOx, ppmvd @15% O2 with SCR	11.2	11.2	11.2	11.2	11.2
NOx, lb/h as NO2 with SCR	87.3	80.4	79.6	75.8	72.5
NH3 slip, ppmvd @15% O2 with SCR	10.0	10.0	10.0	10.0	10.0
NH3 slip, lb/h with SCR	28.9	26.6	26.3	25.0	24.0
CO, ppmvd without Catalyst	20.0	20.0	20.0	20.0	20.0
CO, lb/h without Catalyst	68.9	62.7	62.2	59.4	57.5
CO, ppmvd @ 15% O2 without Catalyst	14.5	14.3	14.4	14.4	14.6
CO, ppmvd with Catalyst	20.0	20.0	20.0	20.0	20.0
CO, lb/h with Catalyst	68.9	62.7	62.2	59.4	57.5
CO, ppmvd @ 15% O2 with Catalyst	14.5	14.3	14.4	14.4	14.6
SO2, ppmvd	13.04	13.19	13.17	13.12	12.97
SO2, ppmvw	11.66	11.62	11.61	11.45	11.37
SO2, lb/h	102.67	94.56	93.57	89.07	85.23
UHC, ppmvd	7.8	7.9	7.9	8.0	8.0
UHC, ppmvw	7.0	7.0	7.0	7.0	7.0
UHC, ppmvd @ 15% O2	5.7	5.7	5.7	5.8	5.8
UHC, lb/h as CH4	15.4	14.3	14.1	13.6	13.1
VOC, ppmvd	3.9	4.0	4.0	4.0	4.0
VOC, ppmvw	3.5	3.5	3.5	3.5	3.5
VOC, ppmvd @ 15% O2	2.8	2.8	2.9	2.9	2.9
VOC, lb/h as CH4	7.7	7.1	7.1	6.8	6.6
Particulates (TSP = PM10), lb/h (dry filterables only)	44.0	44.0	44.0	43.0	43.0

Notes:
1. Values shown above are for one combustion turbine/HRSG unit only.
2. 73% effective SCR and no CO catalyst.
3. Particulates are front and back half.
4. CTG performance from General Electric data received 5/21/98 for KUA.

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KUA Cane Island Unit 3

GE 7FA 1x1 Combined Cycle

	* 70 & 50 Percent Load - Distillate Oil *					
Case Name	Case 17	Case 18	Case 19	Case 20	Case 21	Case 22
CTG Model	GE 7241FA	GE 7241FA	GE 7241FA	GE 7241FA	GE 7241FA	GE 7241FA
Combustor/NOx Emission Rate	DLN/42 ppm	DLN/42 ppm	DLN/42 ppm	DLN/42 ppm	DLN/42 ppm	DLN/15 ppm
CTG Fuel Type	Distillate	Distillate	Distillate	Distillate	Distillate	Distillate
CTG Load Level (percent of Base Load)	70 Percent	50 Percent	70 Percent	50 Percent	70 Percent	50 Percent
CTG Performance Reference	GE 05/21/98	GE 05/21/98	GE 05/21/98	GE 05/21/98	GE 05/21/98	GE 05/21/98
Evaporative Cooler On/Off	Off	Off	Off	Off	Off	Off
HRSG Duct Firing On/Off	Off	Off	Off	Off	Off	Off
Ambinet Temperature, F	19	19	72	72	102	102
Ambient Relative Humidity, %	55	55	74	74	45	45
CTG Compressor Inlet Temperature, F	19	19	72	72	102	102
CTG Compr. Inlet Relative Humidity, %	55	55	74	74	45	45
Atmospheric Pressure, psia	14.656	14.656	14.656	14.656	14.656	14.656
Site Elevation, ft	75	75	75	75	75	75
Inlet Loss, in. H2O	4.5	4.5	4.5	4.5	4.5	4.5
Exhaust Loss, in. H2O	14.0	14.0	14.0	14.0	14.0	14.0
CTG Fuel Type	Distillate	Distillate	Distillate	Distillate	Distillate	Distillate
Number of CTGs	1	1	1	1	1	1
Gross CTG Output, kW	132,500	94,600	121,800	87,000	113,100	80,800
Gross CTG Heat Rate, Btu/kWh (LHV)	11,240	12,810	11,260	12,970	11,510	13,260
CTG Heat Input, MBtu/h (LHV)	1,489.30	1,211.83	1,371.47	1,128.39	1,301.78	1,071.41
CTG Heat Input, MBtu/h (HHV)	1,590.18	1,293.92	1,464.37	1,204.83	1,389.96	1,143.99
CTG Fuel Flow, lb/h	80,130	65,200	73,790	60,710	70,040	57,650
CTG Water Injection Flow, lb/h	96,600	69,650	78,790	57,160	68,770	49,220
CTG Steam Injection Flow, lb/h	0	0	0	0	0	0
Injection Ratio	1.206	1.068	1.068	0.942	0.982	0.854
CTG Exhaust Flow, lb/h	2,806,750	2,446,980	2,715,850	2,398,050	2,676,900	2,357,100
CTG Exhaust Temperature, F	1,200	1,200	1,200	1,200	1,200	1,200
Duct Burner Heat Input, MBtu/h (LHV)	0	0	0	0	0	0
Duct Burner Heat Input, MBtu/h (HHV)	0	0	0	0	0	0
Stack Exit Temperature, F	257	264	264	257	270	263
Stack Exhaust Pressure, in. H2O above Patm	0	0	0	0	0	0
Stack Diameter, ft	18.0	18.0	18.0	18.0	18.0	18.0
Stack Exit Velocity, ft/s	56.7	49.7	55.5	48.4	55.3	48.1

	* 70 & 50 Percent Load - Distillate Oil *					
Case Name	Case 17	Case 18	Case 19	Case 20	Case 21	Case 22
CTG Model	GE 7241FA	GE 7241FA	GE 7241FA	GE 7241FA	GE 7241FA	GE 7241FA
Combustor/NOx Emission Rate	DLN/42 ppm	DLN/42 ppm	DLN/42 ppm	DLN/42 ppm	DLN/42 ppm	DLN/15 ppm
CTG Fuel Type	Distillate	Distillate	Distillate	Distillate	Distillate	Distillate
CTG Load Level (percent of Base Load)	70 Percent	50 Percent	70 Percent	50 Percent	70 Percent	50 Percent
CTG Performance Reference	**GE 05/21/98**	**GE 05/21/98**	**GE 05/21/98**	**GE 05/21/98**	**GE 05/21/98**	**GE 05/21/98**
Evaporative Cooler On/Off	Off	Off	Off	Off	Off	Off
HRSG Duct Firing On/Off	Off	Off	Off	Off	Off	Off
CTG Exhaust Analysis (Volume Basis - Wet)						
O2	10.66%	11.43%	10.96%	11.69%	11.19%	11.86%
CO2	5.81%	5.44%	5.51%	5.15%	5.30%	4.96%
H2O	11.12%	9.85%	11.63%	10.50%	11.96%	10.93%
N2	71.51%	72.37%	71.01%	71.75%	70.67%	71.35%
Ar	0.90%	0.91%	0.89%	0.90%	0.89%	0.90%
SO2	0.00126%	0.00118%	0.00120%	0.00112%	0.00115%	0.00108%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Emissions (at CTG exhaust flange)						
NOx, ppmvd @ 15% O2	42.0	42.0	42.0	42.0	42.0	42.0
NOx, lb/h as NO2	256.3	208.8	236.1	194.5	224.2	184.7
CO, ppmvd	20.0	27.0	20.0	32.0	21.0	36.0
CO, ppmvw	17.8	24.3	17.7	28.6	18.5	32.1
CO, ppmvd @ 15% O2	13.3	19.5	13.9	24.2	15.2	28.1
CO, lb/h	49.3	58.6	47.5	67.8	49.1	74.8
UHC, ppmvd	7.88	7.77	7.92	7.82	7.95	7.86
UHC, ppmvw	7.00	7.00	7.00	7.00	7.00	7.00
UHC, ppmvd @ 15% O2	5.24	5.60	5.52	5.91	5.75	6.13
UHC, lb/h as CH4	11.11	9.65	10.78	9.49	10.65	9.35
VOC, ppmvd	3.94	3.88	3.96	3.91	3.98	3.93
VOC, ppmvw	3.50	3.50	3.50	3.50	3.50	3.50
VOC, ppmvd @ 15% O2	2.62	2.80	2.76	2.96	2.87	3.07
VOC, lb/h as CH4	5.56	4.83	5.39	4.75	5.33	4.68
SO2, ppmvd	14.21	13.12	13.56	12.51	13.08	12.12
SO2, ppmvw	12.63	11.83	11.98	11.20	11.51	10.79
SO2, lb/h	80.06	65.14	73.72	60.65	69.97	57.60
Particulates (TSP = PM10), lb/h (dry filterables only)	42.00	41.00	41.00	40.00	41.00	40.00
CTG Fuel LHV, Btu/lb	18,586	18,586	18,586	18,586	18,586	18,586
CTG Fuel HHV, Btu/lb	19,845	19,845	19,845	19,845	19,845	19,845
HHV/LHV Ratio	1.0677	1.0677	1.0677	1.0677	1.0677	1.0677
CTG Fuel Composition (Ultimate Analysis by Weight)						
Ar	0.000000%	0.000000%	0.000000%	0.000000%	0.000000%	0.000000%
C	86.135000%	86.135000%	86.135000%	86.135000%	86.135000%	86.135000%
H2	13.800000%	13.800000%	13.800000%	13.800000%	13.800000%	13.800000%
N2	0.015000%	0.015000%	0.015000%	0.015000%	0.015000%	0.015000%
O2	0.000000%	0.000000%	0.000000%	0.000000%	0.000000%	0.000000%
S	0.050000%	0.050000%	0.050000%	0.050000%	0.050000%	0.050000%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
CTG Wet (Total) Exhaust Gas Analysis						
Molecular Wt, lb/mol	28.36	28.46	28.28	28.36	28.22	28.30
Gas Constant, ft-lbf/lbm-R	54.469	54.277	54.636	54.472	54.751	54.600
Specific Volume, ft^3/lb	41.41	41.26	41.53	41.41	41.62	41.51
Exhaust Gas Flow, acfm	1,937,125	1,682,707	1,879,821	1,655,054	1,856,876	1,630,720
Specific Volume, scf/lb	13.38	13.33	13.42	13.38	13.44	13.41
Exhaust Gas Flow, scfm	625,905	543,637	607,445	534,765	599,626	526,812
Exhaust Gas Flow, lb/h	2,806,750	2,446,980	2,715,850	2,398,050	2,676,900	2,357,100

KUA Cane Island Unit 3

GE 7FA 1x1 Combined Cycle

	* 70 & 50 Percent Load - Distillate Oil *					
Case Name	Case 17	Case 18	Case 19	Case 20	Case 21	Case 22
CTG Model	GE 7241FA	GE 7241FA	GE 7241FA	GE 7241FA	GE 7241FA	GE 7241FA
Combustor/NOx Emission Rate	DLN/42 ppm	DLN/42 ppm	DLN/42 ppm	DLN/42 ppm	DLN/42 ppm	DLN/15 ppm
CTG Fuel Type	Distillate	Distillate	Distillate	Distillate	Distillate	Distillate
CTG Load Level (percent of Base Load)	70 Percent	50 Percent	70 Percent	50 Percent	70 Percent	50 Percent
CTG Performance Reference	GE 05/21/98	GE 05/21/98	GE 05/21/98	GE 05/21/98	GE 05/21/98	GE 05/21/98
Evaporative Cooler On/Off	Off	Off	Off	Off	Off	Off
HRSG Duct Firing On/Off	Off	Off	Off	Off	Off	Off
Stack Exhaust Analysis (Volume Basis - Wet)						
Ar	0.90%	0.91%	0.89%	0.90%	0.89%	0.90%
CO2	5.81%	5.44%	5.51%	5.15%	5.30%	4.96%
H2O	11.12%	9.85%	11.63%	10.50%	11.96%	10.93%
N2	71.51%	72.37%	71.01%	71.75%	70.67%	71.35%
O2	10.66%	11.43%	10.96%	11.69%	11.19%	11.86%
SO2	0.00126%	0.00118%	0.00120%	0.00112%	0.00115%	0.00108%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Stack Exhaust Gas Analysis (Wet)						
Molecular Wt, lb/mol	28.36	28.46	28.28	28.36	28.22	28.30
Gas Constant, ft-lbf/lbm-R	54.469	54.277	54.636	54.472	54.751	54.600
Specific Volume, ft^3/lb	18.50	18.61	18.73	18.50	18.93	18.70
Exhaust Gas Flow, acfm	865,415	758,972	847,798	739,399	844,562	734,630
Specific Volume, scf/lb	13.38	13.33	13.42	13.38	13.44	13.41
Exhaust Gas Flow, scfm	625,905	543,637	607,445	534,765	599,626	526,812
Exhaust Gas Flow, lb/h	2,806,750	2,446,980	2,715,850	2,398,050	2,676,900	2,357,100
Emissions (at Stack exit)						
NOx, ppmvd @15% O2 without SCR	42.0	42.0	42.0	42.0	42.0	42.0
NOx, lb/h as NO2 without SCR	256.3	208.8	236.1	194.5	224.2	184.7
NOx, ppmvd @15% O2 with SCR	11.2	11.2	11.2	11.2	11.2	11.2
NOx, lb/h as NO2 with SCR	68.1	55.4	62.7	51.6	59.5	49.0
NH3 slip, ppmvd @15% O2 with SCR	10.0	10.0	10.0	10.0	10.0	10.0
NH3 slip, lb/h with SCR	22.5	18.3	20.7	17.1	19.7	16.2
CO, ppmvd without Catalyst	20.0	27.0	20.0	32.0	21.0	36.0
CO, lb/h without Catalyst	49.3	58.6	47.5	67.8	49.1	74.8
CO, ppmvd @ 15% O2 without Catalyst	13.3	19.5	13.9	24.2	15.2	28.1
CO, ppmvd with Catalyst	20.0	27.0	20.0	32.0	21.0	36.0
CO, lb/h with Catalyst	49.3	58.6	47.5	67.8	49.1	74.8
CO, ppmvd @ 15% O2 with Catalyst	13.3	19.5	13.9	24.2	15.2	28.1
SO2, ppmvd	14.21	13.12	13.56	12.51	13.08	12.12
SO2, ppmvw	12.63	11.83	11.98	11.20	11.51	10.79
SO2, lb/h	80.06	65.14	73.72	60.65	69.97	57.60
UHC, ppmvd	7.9	7.8	7.9	7.8	8.0	7.9
UHC, ppmvw	7.0	7.0	7.0	7.0	7.0	7.0
UHC, ppmvd @ 15% O2	5.2	5.6	5.5	5.9	5.7	6.1
UHC, lb/h as CH4	11.1	9.7	10.8	9.5	10.7	9.4
VOC, ppmvd	3.9	3.9	4.0	3.9	4.0	3.9
VOC, ppmvw	3.5	3.5	3.5	3.5	3.5	3.5
VOC, ppmvd @ 15% O2	2.6	2.8	2.8	3.0	2.9	3.1
VOC, lb/h as CH4	5.6	4.8	5.4	4.7	5.3	4.7
Particulates (TSP = PM10), lb/h (dry filterables only)	42.0	41.0	41.0	40.0	41.0	40.0

Notes:

1. Values shown above are for one combustion turbine/HRSG unit only.
2. 73% effective SCR and no CO catalyst.
3. Particulates are front and back half.
4. CTG performance from General Electric data received 5/21/98 for KUA.

B&V Project 59140.0031

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06/05/98

	* Simple Cycle - 100 Percent Load - NG & DO *					
Case Name	Case 1	Case 3	Case 5	Case 12	Case 14	Case 16
CTG Model	GE 7241FA	GE 7241FA	GE 7241FA	GE 7241FA	GE 7241FA	GE 7241FA
Combustor/NOx Emission Rate	DLN/15 ppm	DLN/15 ppm	DLN/15 ppm	DLN/42 ppm	DLN/42 ppm	DLN/42 ppm
CTG Fuel Type	Natural Gas	Natural Gas	Natural Gas	Distillate	Distillate	Distillate
CTG Load Level (percent of Base Load)	Base	Base	Base	Base	Base	Base
CTG Performance Reference	GE 05/21/98	GE 05/21/98	GE 05/21/98	GE 05/21/98	GE 05/21/98	GE 05/21/98
Evaporative Cooler On/Off	Off	Off	Off	Off	Off	Off
HRSG Duct Firing On/Off	Off	Off	Off	Off	Off	Off
Ambinet Temperature, F	19	72	102	19	72	102
Ambient Relative Humidity, %	55	74	45	55	74	45
CTG Compressor Inlet Temperature, F	19	72	102	19	72	102
CTG Compr. Inlet Relative Humidity, %	55	74	45	55	74	45
Atmospheric Pressure, psia	14.656	14.656	14.656	14.656	14.656	14.656
Site Elevation, ft	75	75	75	75	75	75
Inlet Loss, in. H2O	4.5	4.5	4.5	4.5	4.5	4.5
Exhaust Loss, in. H2O	5.5	5.5	5.5	5.5	5.5	5.5
CTG Fuel Type	Natural Gas	Natural Gas	Natural Gas	Distillate	Distillate	Distillate
Number of CTGs	1	1	1	1	1	1
Gross CTG Output, kW	183,700	162,800	143,000	189,800	172,500	152,800
Gross CTG Heat Rate, Btu/kWh (LHV)	9,230	9,410	9,800	10,060	10,080	10,370
CTG Heat Input, MBtu/h (LHV)	1,695.55	1,531.95	1,401.40	1,909.39	1,738.80	1,584.54
CTG Heat Input, MBtu/h (HHV)	1,881.19	1,699.68	1,554.83	2,038.73	1,856.58	1,691.88
CTG Fuel Flow, lb/h	80,820	73,020	66,800	102,730	93,550	85,250
CTG Water Injection Flow, lb/h	0	0	0	131,790	110,950	93,940
CTG Steam Injection Flow, lb/h	0	0	0	0	0	0
Injection Ratio	0.000	0.000	0.000	1.283	1.186	1.102
CTG Exhaust Flow, lb/h	3,785,000	3,420,000	3,184,000	3,903,000	3,554,000	3,298,000
CTG Exhaust Temperature, F	1,080	1,127	1,151	1,067	1,112	1,139
Duct Burner Heat Input, MBtu/h (LHV)	0	0	0	0	0	0
Duct Burner Heat Input, MBtu/h (HHV)	0	0	0	0	0	0
Stack Exit Temperature, F	1080	1127	1151	1067	1112	1139
Stack Exhaust Pressure, in. H2O above Patm	0	0	0	0	0	0
Stack Diameter, ft	18.0	18.0	18.0	18.0	18.0	18.0
Stack Exit Velocity, ft/s	163.4	153.2	145.4	167.8	158.1	149.5

KUA Cane Island Unit 3

GE 7FA 1x1 Combined Cycle

	* Simple Cycle - 100 Percent Load - NG & DO *					
Case Name	Case 1	Case 3	Case 5	Case 12	Case 14	Case 16
CTG Model	GE 7241FA	GE 7241FA	GE 7241FA	GE 7241FA	GE 7241FA	GE 7241FA
Combustor/NOx Emission Rate	DLN/15 ppm	DLN/15 ppm	DLN/15 ppm	DLN/42 ppm	DLN/42 ppm	DLN/42 ppm
CTG Fuel Type	Natural Gas	Natural Gas	Natural Gas	Distillate	Distillate	Distillate
CTG Load Level (percent of Base Load)	Base	Base	Base	Base	Base	Base
CTG Performance Reference	GE 05/21/98	GE 05/21/98	GE 05/21/98	GE 05/21/98	GE 05/21/98	GE 05/21/98
Evaporative Cooler On/Off	Off	Off	Off	Off	Off	Off
HRSG Duct Firing On/Off	Off	Off	Off	Off	Off	Off
CTG Exhaust Analysis (Volume Basis - Wet)						
O2	12.79%	12.48%	12.43%	11.39%	11.17%	11.21%
CO2	3.75%	3.73%	3.65%	5.36%	5.33%	5.22%
H2O	7.49%	9.15%	10.09%	10.59%	11.79%	12.31%
N2	75.03%	73.71%	72.92%	71.76%	70.81%	70.37%
Ar	0.94%	0.93%	0.92%	0.90%	0.89%	0.88%
SO2	0.00001%	0.00001%	0.00001%	0.00116%	0.00116%	0.00114%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Emissions (at CTG exhaust flange)						
NOx, ppmvd @ 15% O2	15.0	15.0	15.0	42.0	42.0	42.0
NOx, lb/h as NO2	102.4	92.7	84.8	328.4	299.1	272.7
CO, ppmvd	15.0	15.0	15.0	20.0	20.0	20.0
CO, ppmvw	13.9	13.6	13.5	17.9	17.6	17.5
CO, ppmvd @ 15% O2	12.5	12.4	12.5	14.5	14.4	14.6
CO, lb/h	51.6	46.1	42.7	68.9	62.2	57.5
UHC, ppmvd	7.57	7.71	7.79	7.83	7.94	7.98
UHC, ppmvw	7.00	7.00	7.00	7.00	7.00	7.00
UHC, ppmvd @ 15% O2	6.33	6.37	6.51	5.68	5.71	5.83
UHC, lb/h as CH4	14.92	13.57	12.68	15.45	14.13	13.15
VOC, ppmvd	1.51	1.54	1.56	3.91	3.97	3.99
VOC, ppmvw	1.40	1.40	1.40	3.50	3.50	3.50
VOC, ppmvd @ 15% O2	1.27	1.27	1.30	2.84	2.86	2.91
VOC, lb/h as CH4	2.98	2.71	2.54	7.72	7.07	6.57
SO2, ppmvd	0.13	0.13	0.13	13.03	13.14	12.95
SO2, ppmvw	0.12	0.12	0.12	11.65	11.59	11.36
SO2, lb/h	1.03	0.93	0.85	102.63	93.46	85.17
Particulates (TSP = PM10), lb/h (dry filterables only)	18.00	18.00	18.00	44.00	44.00	43.00
CTG Fuel LHV, Btu/lb	20,980	20,980	20,980	18,586	18,586	18,586
CTG Fuel HHV, Btu/lb	23,277	23,277	23,277	19,845	19,845	19,845
HHV/LHV Ratio	1.1095	1.1095	1.1095	1.0677	1.0677	1.0677
CTG Fuel Composition (Ultimate Analysis by Weight)						
Ar	0.000000%	0.000000%	0.000000%	0.000000%	0.000000%	0.000000%
C	74.043570%	74.043570%	74.043570%	86.135000%	86.135000%	86.135000%
H2	24.256660%	24.256660%	24.256660%	13.800000%	13.800000%	13.800000%
N2	0.575950%	0.575950%	0.575950%	0.015000%	0.015000%	0.015000%
O2	1.123180%	1.123180%	1.123180%	0.000000%	0.000000%	0.000000%
S	0.000640%	0.000640%	0.000640%	0.050000%	0.050000%	0.050000%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
CTG Wet (Total) Exhaust Gas Analysis						
Molecular Wt, lb/mol	28.49	28.30	28.19	28.38	28.24	28.17
Gas Constant, ft-lbf/lbm-R	54.232	54.585	54.798	54.449	54.707	54.840
Specific Volume, ft^3/lb	39.04	40.49	41.26	38.86	40.20	40.99
Exhaust Gas Flow, acfm	2,462,773	2,307,930	2,189,531	2,527,843	2,381,180	2,253,084
Specific Volume, scf/lb	13.32	13.40	13.46	13.37	13.43	13.47
Exhaust Gas Flow, scfm	840,270	763,800	714,277	869,719	795,504	740,401
Exhaust Gas Flow, lb/h	3,785,000	3,420,000	3,184,000	3,903,000	3,554,000	3,298,000

KUA Cane Island Unit 3

GE 7FA 1x1 Combined Cycle

	* Simple Cycle - 100 Percent Load - NG & DO *					
Case Name	Case 1	Case 3	Case 5	Case 12	Case 14	Case 16
CTG Model	GE 7241FA	GE 7241FA	GE 7241FA	GE 7241FA	GE 7241FA	GE 7241FA
Combustor/NOx Emission Rate	DLN/15 ppm	DLN/15 ppm	DLN/15 ppm	DLN/42 ppm	DLN/42 ppm	DLN/42 ppm
CTG Fuel Type	Natural Gas	Natural Gas	Natural Gas	Distillate	Distillate	Distillate
CTG Load Level (percent of Base Load)	Base	Base	Base	Base	Base	Base
CTG Performance Reference	GE 05/21/98	GE 05/21/98	GE 05/21/98	GE 05/21/98	GE 05/21/98	GE 05/21/98
Evaporative Cooler On/Off	Off	Off	Off	Off	Off	Off
HRSG Duct Firing On/Off	Off	Off	Off	Off	Off	Off
Stack Exhaust Analysis (Volume Basis - Wet)						
Ar	0.94%	0.93%	0.92%	0.90%	0.89%	0.88%
CO2	3.75%	3.73%	3.65%	5.36%	5.33%	5.22%
H2O	7.49%	9.15%	10.09%	10.59%	11.79%	12.31%
N2	75.03%	73.71%	72.92%	71.76%	70.81%	70.37%
O2	12.79%	12.48%	12.43%	11.39%	11.17%	11.21%
SO2	0.00001%	0.00001%	0.00001%	0.00116%	0.00116%	0.00114%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Stack Exhaust Gas Analysis (Wet)						
Molecular Wt, lb/mol	28.49	28.30	28.19	28.38	28.24	28.17
Gas Constant, ft-lbf/lbm-R	54.232	54.585	54.798	54.449	54.707	54.840
Specific Volume, ft^3/lb	39.56	41.04	41.82	39.39	40.74	41.54
Exhaust Gas Flow, acfm	2,495,577	2,339,280	2,219,248	2,562,320	2,413,166	2,283,315
Specific Volume, scf/lb	13.32	13.40	13.46	13.37	13.43	13.47
Exhaust Gas Flow, scfm	840,270	763,800	714,277	869,719	795,504	740,401
Exhaust Gas Flow, lb/h	3,785,000	3,420,000	3,184,000	3,903,000	3,554,000	3,298,000
Emissions (at Stack exit)						
NOx, ppmvd @15% O2 without SCR	15.0	15.0	15.0	42.0	42.0	42.0
NOx, lb/h as NO2 without SCR	102.4	92.7	84.8	328.4	299.1	272.7
NOx, ppmvd @15% O2 with SCR	4.0	4.0	4.0	11.2	11.2	11.2
NOx, lb/h as NO2 with SCR	27.1	24.4	22.4	87.3	79.5	72.4
NH3 slip, ppmvd @15% O2 with SCR	10.0	10.0	10.0	10.0	10.0	10.0
NH3 slip, lb/h with SCR	25.0	22.6	20.7	28.9	26.3	23.9
CO, ppmvd without Catalyst	15.0	15.0	15.0	20.0	20.0	20.0
CO, lb/h without Catalyst	51.6	46.1	42.7	68.9	62.2	57.5
CO, ppmvd @ 15% O2 without Catalyst	12.5	12.4	12.5	14.5	14.4	14.6
CO, ppmvd with Catalyst	15.0	15.0	15.0	20.0	20.0	20.0
CO, lb/h with Catalyst	51.6	46.1	42.7	68.9	62.2	57.5
CO, ppmvd @ 15% O2 with Catalyst	12.5	12.4	12.5	14.5	14.4	14.6
SO2, ppmvd	0.13	0.13	0.13	13.03	13.14	12.95
SO2, ppmvw	0.12	0.12	0.12	11.65	11.59	11.36
SO2, lb/h	1.03	0.93	0.85	102.63	93.46	85.17
UHC, ppmvd	7.6	7.7	7.8	7.8	7.9	8.0
UHC, ppmvw	7.0	7.0	7.0	7.0	7.0	7.0
UHC, ppmvd @ 15% O2	6.3	6.4	6.5	5.7	5.7	5.8
UHC, lb/h as CH4	14.9	13.6	12.7	15.4	14.1	13.1
VOC, ppmvd	1.5	1.5	1.6	3.9	4.0	4.0
VOC, ppmvw	1.4	1.4	1.4	3.5	3.5	3.5
VOC, ppmvd @ 15% O2	1.3	1.3	1.3	2.8	2.9	2.9
VOC, lb/h as CH4	3.0	2.7	2.5	7.7	7.1	6.6
Particulates (TSP = PM10), lb/h (dry filterables only)	18.0	18.0	18.0	44.0	44.0	43.0

Notes:

1. Values shown above are for one combustion turbine/HRSG unit only.
2. Sample analysis for natural gas fuel received from KUA, sulfur at 0.2 gr/100 scf added for illustration purposes only.
3. 73% effective SCR and no CO catalyst.
4. Particulates are front and back half.
5. CTG performance from General Electric data received 5/21/98 for KUA.

Rev. 1

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07/14/98

Attachment 2
(Tanks Model Output)

TANKS PROGRAM 3.1
EMISSIONS REPORT - DETAIL FORMAT
TANK IDENTIFICATION AND PHYSICAL CHARACTERISTICS

Identification

Identification No.:	67
City:	Cane Island
State:	FL
Company:	KUA
Type of Tank:	Vertical Fixed Roof
Description:	Fuel Oil Storage Tank

Tank Dimensions

Shell Height (ft):	35.0
Diameter (ft):	70.0
Liquid Height (ft):	34.8
Avg. Liquid Height (ft):	17.0
Volume (gallons):	1000000
Turnovers:	10.5
Net Throughput (gal/yr):	10495660

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition:	Good
Roof Color/Shade:	White/White
Roof Condition:	Good

Roof Characteristics

Type:	Dome
Height (ft):	0.00
Radius (ft) (Dome Roof):	56.00
Slope (ft/ft) (Cone Roof):	0.0000

Breather Vent Settings

Vacuum Setting (psig):	-0.03
Pressure Setting (psig):	0.03

Meteorological Data Used in Emission Calculations: Orlando, Florida (Avg Atmospheric Pressure = 14.7 psia)

Mixture/Component	Month	Daily Liquid Surf. Temperatures (deg F) Avg.	Min.	Max.	Liquid Bulk Temp. (deg F)	Vapor Pressures (psia) Avg.	Min.	Max.	Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Distillate fuel oil no. 2	All	74.41	68.90	79.92	72.42	0.0103	0.0087	0.0122	130.000			188.00	Option 3: A=12.1010, B=8907.0

Annual Emission Calculations

Standing Losses (lb):	295.6338
Vapor Space Volume (cu ft):	93882.05
Vapor Density (lb/cu ft):	0.0002
Vapor Space Expansion Factor:	0.037443
Vented Vapor Saturation Factor:	0.986867
Tank Vapor Space Volume	
Vapor Space Volume (cu ft):	93882.05
Tank Diameter (ft):	70.0
Vapor Space Outage (ft):	24.39
Tank Shell Height (ft):	35.0
Average Liquid Height (ft):	17.0
Roof Outage (ft):	6.39
Roof Outage (Dome Roof)	
Roof Outage (ft):	6.39
Dome Radius (ft):	56
Shell Radius (ft):	35.0
Vapor Density	
Vapor Density (lb/cu ft):	0.0002
Vapor Molecular Weight (lb/lb-mole):	130.000000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.010293
Daily Avg. Liquid Surface Temp.(deg. R):	534.08
Daily Average Ambient Temp. (deg. R):	532.07
Ideal Gas Constant R (psia cuft /(lb-mole-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	532.09
Tank Paint Solar Absorptance (Shell):	0.17
Tank Paint Solar Absorptance (Roof):	0.17
Daily Total Solar Insolation Factor (Btu/sqftday):	1487.00
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.037443
Daily Vapor Temperature Range (deg.R):	22.05
Daily Vapor Pressure Range (psia):	0.003554
Breather Vent Press. Setting Range(psia):	0.06
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.010293
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.008651
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.012204
Daily Avg. Liquid Surface Temp. (deg R):	534.08
Daily Min. Liquid Surface Temp. (deg R):	528.57
Daily Max. Liquid Surface Temp. (deg R):	539.59
Daily Ambient Temp. Range (deg.R):	20.80

Annual Emission Calculations	
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.986867
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.010293
Vapor Space Outage (ft):	24.39
Working Losses (lb):	334.3891
Vapor Molecular Weight (lb/lb-mole):	130.000000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.010293
Annual Net Throughput (gal/yr):	10495660
Turnover Factor:	1.0000
Maximum Liquid Volume (cuft):	133926
Maximum Liquid Height (ft):	34.8
Tank Diameter (ft):	70.0
Working Loss Product Factor:	1.00
Total Losses (lb):	630.02

Annual Emissions Report

Liquid Contents	Losses (lbs.): Standing	Working	Total
Distillate fuel oil no. 2	295.63	334.39	630.02
Total:	295.63	334.39	630.02

Attachment 3
(Emission Calculation Spreadsheet)

Attachment 4
(Dispersion Modeling Protocol)

BLACK & VEATCH

8400 Ward Parkway, P.O. Box No. 8405, Kansas City, Missouri 64114, (913) 458-2000

Kissimmee Utility Authority
Cane Island Unit 3

B&V Project 59140
B&V File 15.0203
May 26, 1998

Via FEDEX and Fax

Florida Department of Environmental Protection
Division of Air Resources Management
Bureau of Air Regulation
Twin Towers Office Building, MS #5505
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Subject: Pre-Application Meeting-Air Dispersion Modeling Methodology

Attention: Cleave Holladay

Gentlemen:

Thank-you for the opportunity to meet with you last Wednesday, May 20, 1998, regarding PSD pre-application issues for the proposed Cane Island Power Park modifications. As you recall, the purpose of the meeting was to review and agree on the proposed methodology and content of the Cane Island Unit 3 PSD air permit application and air dispersion modeling workplan. Throughout the course of the meeting, several air dispersion modeling issues pertaining to the PSD air quality impact analysis were discussed. The purpose of this letter is to summarize the proposed air dispersion modeling methodology in order that it may serve as a workplan for conducting the forthcoming PSD air quality impact analysis.

The following decisions regarding the air dispersion modeling analysis were made during the course of the meeting:

- Air Dispersion Model: ISCST3 (Ver. 97363).
- Model Options: EPA default and flat terrain.
- Screening Modeling: Envelope worst-case emission and stack parameter data across multiple vendor and ambient temperature data for each of 3 load points. *The term envelope refers to selecting the highest emission rate, lowest exit velocity, and lowest exit temperature*

from a range of operating conditions. Model each "enveloped" representative load data set to determine which results in the highest impact on a 1-hour basis using SCREEN3 worst-case meteorological data in ISC on a pollutant by pollutant basis.

- Refined Modeling: The enveloped load data resulting in the highest ground-level impact for each pollutant in the screening analysis will be used in the refined modeling analysis with sequential meteorological data.

- GEP & Downwash: EPA's BPIP program will be used to determine GEP stack height and direction specific building downwash for the HRSG stack and bypass stack.

- Receptor Grids: The modeling analysis will use a 10 km nested rectangular receptor grid consisting of 100 m spacing out to 1 km, 500 m spacing from 1 to 5 km, and 1,000 m spacing from 5 to 10 km. Additionally, fenceline receptors at 50 m spacing and 100 m fine grids at the maximum impact locations will be used.

- Dispersion Coefficients: Rural; based on a visual inspection of a 7.5 minute USGS topographic map of the site using the Auer method.

- Meteorological Data: For screening level modeling, a matrix of worst-case meteorological parameters based on the SCREEN3 model will be used. Refined level modeling will use sequential meteorological data consisting of the most recent 5 years of surface and upper air data available for Orlando and Tampa/Ruskin, respectively.

- Modeled Impacts: It is anticipated that the maximum model predicted impacts will be less than the PSD significant impact levels (SILs) for all applicable pollutants and averaging times. If this is not the case, additional agency consultation regarding increment and ambient air quality impact analyses will be initiated.

- Class I Analysis: A regional haze visibility study and Class I SIL analysis will be performed for the Chassahowitzka NWR located approximately 105 km northwest of the site.

- Toxics: A toxic modeling analysis is not required.

If you have any questions or comments regarding the aforementioned air dispersion modeling methodology, please do not hesitate to call me at 913-458-7928.

Very truly yours,

BLACK & VEATCH

T. M. Hillman
Air Quality Scientist

tmh

cc: Al Linero (FDEP/DARM/BAR)
Ben Sharma (KUA)
Jeff Ling (KUA)
Tasha Buford (YVV)

BLACK & .EATCH

TELEPHONE MEMORANDUM

KUA
KUA Unit 3
Alternate Meteorological Data
for Air Dispersion Modeling

B&V Project 591490.0030
B&V File 32.0000
June 11, 1998
3 p.m.

To: Cleve Holiday
Company: FDEP
Phone No.: 850-921-9530

Recorded by: K. J. Lucas

Tim Hillman contacted Mr. Cleve Holiday at the FDEP on June 10, 1998 to discuss NCDC's current meteorological data processing and availability problems and to request the alternate use of meteorological data from the USEPA SCRAM bulletin board for the years 1987 through 1991. This alternate meteorological data (Orlando surface data and Tampa upper air data) would be used for KUA's proposed Unit 3 AQIA. Mr. Holiday was unavailable, but returned the phone call later in the day stating the alternate choice of meteorological data would be acceptable.

kjl

Attachment 5
(VISCREEN Model Output)

Visual Effects Screening Analysis for
Source: Unit 3
Class I Area: Chassahowitzka

*** Level-1 Screening ***

Input Emissions for

Particulates	112.60	LB /HR
NOx (as NO2)	328.50	LB /HR
Primary NO2	.00	LB /HR
Soot	.00	LB /HR
Primary SO4	.00	LB /HR

**** Default Particle Characteristics Assumed

Transport Scenario Specifications:

Background Ozone:	.04 ppm
Background Visual Range:	25.00 km
Source-Observer Distance:	105.00 km
Min. Source-Class I Distance:	105.00 km
Max. Source-Class I Distance:	125.00 km
Plume-Source-Observer Angle:	11.25 degrees
Stability:	6
Wind Speed:	1.00 m/s

R E S U L T S

Asterisks (*) indicate plume impacts that exceed screening criteria

Maximum Visual Impacts INSIDE Class I Area
Screening Criteria ARE NOT Exceeded

					Delta E		Contrast	
Backgrnd	Theta	Azi	Distance	Alpha	Crit	Plume	Crit	Plume
SKY	10.	84.	105.0	84.	2.00	.089	.05	.000
SKY	140.	84.	105.0	84.	2.00	.015	.05	-.001
TERRAIN	10.	84.	105.0	84.	2.00	.006	.05	.000
TERRAIN	140.	84.	105.0	84.	2.00	.002	.05	.000

Maximum Visual Impacts OUTSIDE Class I Area
Screening Criteria ARE NOT Exceeded

					Delta E		Contrast	
Backgrnd	Theta	Azi	Distance	Alpha	Crit	Plume	Crit	Plume
SKY	10.	75.	101.6	94.	2.00	.093	.05	.000
SKY	140.	75.	101.6	94.	2.00	.016	.05	-.001
TERRAIN	10.	60.	96.0	109.	2.00	.008	.05	.000
TERRAIN	140.	60.	96.0	109.	2.00	.002	.05	.000

Attachment 6

(Regional Haze Calculation Spreadsheet)

Calculation of Extinction per Year Maximum Impact

Background Visibility 25.0 km
Background Extinction 0.15648 km^-1

	Scenario Name	Actual 24-hr Impact (ug/m^3)	Date (yr/mo/dy/hr)	X Coordinate	Y Coordinate	NO2 Impact (ug/m^3)	NO3 Impact (ug/m^3)	NH4NO3 (ug/m^3)	Minimum Daily Relative Humidity (%)	Maximum Daily Relative Humidity (%)	Average Daily Relative Humidity (%)	Estimated Relative Humidity Factor	NH4NO3 Source Extinction (km^-1)
	NOx												
1987	NSCC1NG	0.1338	87070224	348451.5	3165401.0	0.13380	0.18063	0.23301	51	97	74.0	2.6	0.00182
	NSCC7NG	0.1221	87070224	348451.5	3165401.0	0.12210	0.16484	0.21264	51	97	74.0	2.6	0.00166
	NSCC5NG	0.2965	87070224	348451.5	3165401.0	0.29650	0.40028	0.51635	51	97	74.0	2.6	0.00403
	NSCC1FO	0.3214	87070224	348451.5	3165401.0	0.32140	0.43389	0.55972	51	97	74.0	2.6	0.00437
	NSCC7FO	0.2860	87070224	348451.5	3165401.0	0.28600	0.38610	0.49807	51	97	74.0	2.6	0.00388
	NSCC5FO	0.2480	87070224	348451.5	3165401.0	0.24800	0.33480	0.43189	51	97	74.0	2.6	0.00337
	NSSC1NG	0.0462	87061824	348451.5	3165401.0	0.04620	0.06237	0.08046	40	91	65.5	1.9	0.00046
	NSSC1FO	0.1511	87061824	348451.5	3165401.0	0.15110	0.20399	0.26314	40	91	65.5	1.9	0.00150
	NOx												
1988	NSCC1NG	0.1163	88020124	348451.5	3165401.0	0.11625	0.15694	0.20245	49	100	74.5	2.6	0.00158
	NSCC7NG	0.1009	88020124	348451.5	3165401.0	0.10090	0.13622	0.17572	49	100	74.5	2.6	0.00137
	NSCC5NG	0.2386	88020124	348451.5	3165401.0	0.23860	0.32211	0.41552	49	100	74.5	2.6	0.00324
	NSCC1FO	0.3262	88020124	348451.5	3165401.0	0.32620	0.44037	0.56808	49	100	74.5	2.6	0.00443
	NSCC7FO	0.2714	88020124	348451.5	3165401.0	0.27140	0.36639	0.47264	49	100	74.5	2.6	0.00369
	NSCC5FO	0.2280	88020124	348451.5	3165401.0	0.22800	0.30780	0.39706	49	100	74.5	2.6	0.00310
	NSSC1NG	0.0592	88020124	348451.5	3165401.0	0.05920	0.07992	0.10310	49	100	74.5	2.6	0.00080
	NSSC1FO	0.1934	88020124	348451.5	3165401.0	0.19340	0.26109	0.33681	49	100	74.5	2.6	0.00263
	NOx												
1989	NSCC1NG	0.1386	89091524	348451.5	3165401.0	0.13860	0.18711	0.24137	52	97	74.5	2.6	0.00188
	NSCC7NG	0.1355	89082724	348451.5	3165401.0	0.13550	0.18293	0.23597	52	97	74.5	2.6	0.00184
	NSCC5NG	0.3232	89082724	348451.5	3165401.0	0.32325	0.43639	0.56294	52	97	74.5	2.6	0.00439
	NSCC1FO	0.3314	89091524	348451.5	3165401.0	0.33140	0.44739	0.57713	52	97	74.5	2.6	0.00450
	NSCC7FO	0.2952	89091524	348451.5	3165401.0	0.29520	0.39852	0.51409	52	97	74.5	2.6	0.00401
	NSCC5FO	0.2563	89091524	348451.5	3165401.0	0.25630	0.34600	0.44635	52	97	74.5	2.6	0.00348
	NSSC1NG	0.0540	89101724	348451.5	3165401.0	0.05400	0.07290	0.09404	44	97	70.5	2.4	0.00068
	NSSC1FO	0.1761	89101724	348451.5	3165401.0	0.17610	0.23774	0.30668	44	97	70.5	2.4	0.00221
	NOx												
1990	NSCC1NG	0.1818	90020124	348451.5	3165401.0	0.18180	0.24543	0.31660	53	100	76.5	2.8	0.00266
	NSCC7NG	0.1631	90020124	348451.5	3165401.0	0.16310	0.22018	0.28404	53	100	76.5	2.8	0.00239
	NSCC5NG	0.3924	90020124	348451.5	3165401.0	0.39240	0.52974	0.68338	53	100	76.5	2.8	0.00574
	NSCC1FO	0.4619	90020124	348451.5	3165401.0	0.46190	0.62356	0.80440	53	100	76.5	2.8	0.00676
	NSCC7FO	0.4016	90020124	348451.5	3165401.0	0.40160	0.54216	0.69939	53	100	76.5	2.8	0.00587
	NSCC5FO	0.3446	90020124	348451.5	3165401.0	0.34460	0.46521	0.60012	53	100	76.5	2.8	0.00504
	NSSC1NG	0.0630	90020124	348451.5	3165401.0	0.06300	0.08505	0.10971	53	100	76.5	2.8	0.00092
	NSSC1FO	0.2073	90020124	348451.5	3165401.0	0.20730	0.27986	0.36101	53	100	76.5	2.8	0.00303
	NOx												
1991	NSCC1NG	0.1602	91020624	348451.5	3165401.0	0.16020	0.21627	0.27899	35	93	64.0	1.8	0.00151
	NSCC7NG	0.1424	91020624	348451.5	3165401.0	0.14240	0.19224	0.24799	35	93	64.0	1.8	0.00134
	NSCC5NG	0.3413	91020624	348451.5	3165401.0	0.34130	0.46075	0.59437	35	93	64.0	1.8	0.00321
	NSCC1FO	0.4245	91020624	348451.5	3165401.0	0.42450	0.57308	0.73927	35	93	64.0	1.8	0.00399
	NSCC7FO	0.3629	91020624	348451.5	3165401.0	0.36290	0.48992	0.63199	35	93	64.0	1.8	0.00341
	NSCC5FO	0.3092	91020624	348451.5	3165401.0	0.30920	0.41742	0.53847	35	93	64.0	1.8	0.00291
	NSSC1NG	0.0683	91020624	348451.5	3165401.0	0.06830	0.09221	0.11894	35	93	64.0	1.8	0.00064
	NSSC1FO	0.2235	91020624	348451.5	3165401.0	0.22350	0.30173	0.38923	35	93	64.0	1.8	0.00210

Scenario Name	Actual 24-hr Impact (ug/m^3)	X Coordinate	Y Coordinate	PM Source Extinction (km^-1)	Source Change in Extinction (%)	Pass/Fail 5.0% Change
PM						
PSCC1NG	0.0243	348451.5	3165401.0	0.00007	1.21	PASS
PSCC7NG	0.0259	348451.5	3165401.0	0.00008	1.11	PASS
PSCC5NG	0.0273	348451.5	3165401.0	0.00008	2.63	PASS
PSCC1FO	0.0835	348451.5	3165401.0	0.00025	2.95	PASS
PSCC7FO	0.1115	348451.5	3165401.0	0.00033	2.70	PASS
PSCC5FO	0.1338	348451.5	3165401.0	0.00040	2.41	PASS
PSSC1NG	0.0081	348451.5	3165401.0	0.00002	0.31	PASS
PSSC1FO	0.0354	348451.5	3165401.0	0.00011	1.03	PASS
PM						
PSCC1NG	0.0211	348451.5	3165401.0	0.00006	1.05	PASS
PSCC7NG	0.0214	348451.5	3165401.0	0.00006	0.92	PASS
PSCC5NG	0.0220	348451.5	3165401.0	0.00007	2.11	PASS
PSCC1FO	0.0847	348451.5	3165401.0	0.00025	2.99	PASS
PSCC7FO	0.1058	348451.5	3165401.0	0.00032	2.56	PASS
PSCC5FO	0.1230	348451.5	3165401.0	0.00037	2.22	PASS
PSSC1NG	0.0104	348451.5	3165401.0	0.00003	0.53	PASS
PSSC1FO	0.0505	348451.5	3165401.0	0.00015	1.78	PASS
PM						
PSCC1NG	0.0251	348451.5	3165401.0	0.00008	1.25	PASS
PSCC7NG	0.0287	348451.5	3165401.0	0.00009	1.23	PASS
PSCC5NG	0.0297	348451.5	3165401.0	0.00009	2.86	PASS
PSCC1FO	0.0861	348451.5	3165401.0	0.00026	3.04	PASS
PSCC7FO	0.1151	348451.5	3165401.0	0.00035	2.78	PASS
PSCC5FO	0.1382	348451.5	3165401.0	0.00041	2.49	PASS
PSSC1NG	0.0095	348451.5	3165401.0	0.00003	0.45	PASS
PSSC1FO	0.0460	348451.5	3165401.0	0.00014	1.50	PASS
PM						
PSCC1NG	0.0330	348451.5	3165401.0	0.00010	1.76	PASS
PSCC7NG	0.0348	348451.5	3165401.0	0.00010	1.59	PASS
PSCC5NG	0.0361	348451.5	3165401.0	0.00011	3.74	PASS
PSCC1FO	0.1200	348451.5	3165401.0	0.00036	4.55	PASS
PSCC7FO	0.1566	348451.5	3165401.0	0.00047	4.05	PASS
PSCC5FO	0.1858	348451.5	3165401.0	0.00056	3.58	PASS
PSSC1NG	0.0111	348451.5	3165401.0	0.00003	0.61	PASS
PSSC1FO	0.0541	348451.5	3165401.0	0.00016	2.04	PASS
PM						
PSCC1NG	0.0292	348451.5	3165401.0	0.00009	1.02	PASS
PSCC7NG	0.0302	348451.5	3165401.0	0.00009	0.91	PASS
PSCC5NG	0.0314	348451.5	3165401.0	0.00009	2.11	PASS
PSCC1FO	0.1103	348451.5	3165401.0	0.00033	2.76	PASS
PSCC7FO	0.1415	348451.5	3165401.0	0.00042	2.45	PASS
PSCC5FO	0.1668	348451.5	3165401.0	0.00050	2.18	PASS
PSSC1NG	0.0120	348451.5	3165401.0	0.00004	0.43	PASS
PSSC1FO	0.0583	348451.5	3165401.0	0.00017	1.45	PASS

Kissimmee Utility Authority
Cane Island Power Park

Construction Permit Application

July 1998

BLACK & VEATCH

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Attachments

Facility

Attachment A	Area Map Showing Facility Location
Attachment B	Facility Plot Plan
Attachment C	Process Flow Diagrams
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Combustion Turbine

Attachment E	Unit Specific Applicable Requirements
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Fuel Storage Tank

Attachment M	Unit Specific Applicable Requirements
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I. Application Information

Department of
Environmental Protection

DIVISION OF AIR RESOURCES MANAGEMENT

APPLICATION FOR AIR PERMIT - LONG FORM

I. APPLICATION INFORMATION

Identification of Facility Addressed in This Application

1. Facility Owner/Company Name : Kissimmee Utility Authority	
2. Site Name : Cane Island Power Park	
3. Facility Identification Number : 0970043	[ ] Unknown
4. Facility Location : Kissimee Utility Authority Cane Island Power Park Located 10 km west fo Kissimmee, near Intrecession City, Osceola County, Florida Street Address or Other Locator : 6075 Old Tampa Highway City : Intercession City County : Osceola	Zip Code : 33848-9999
5. Relocatable Facility? [ ] Yes [X] No	6. Existing Permitted Facility? [X] Yes [ ] No

Owner/Authorized Representative or Responsible Official

1. Name and Title of Owner/Authorized Representative or Responsible Official :

Name : A. K. Sharma
Title : Director of Power Supply

2. Owner or Authorized Representative or Responsible Official Mailing Address :

Organization/Firm : Kissimmee Utility Authority
Street Address : 1701 West Carroll Street
City : Kissimmee
State : FL Zip Code : 34741-6804

3. Owner/Authorized Representative or Responsible Official Telephone Numbers :

Telephone : (407)933-7777 Fax : (407)847-0787

4. Owner/Authorized Representative or Responsible Official Statement :

I, the undersigned, am the owner or authorized representative of the non-Title V source addressed in this Application for Air Permit or the responsible official, as defined in Rule 62-210.200, F.A.C., of the Title V source addressed in this application, whichever is applicable. I hereby certify, based on information and belief formed after reasonable inquiry, that the statements made in this application are true, accurate and complete and that, to the best of my knowledge, any estimates of emissions reported in this application are based upon reasonable techniques for calculating emissions. The air pollutant emissions units and air pollution control equipment described in this application will be operated and maintained so as to comply with all applicable standards for control of air pollutant emissions found in the statutes of the State of Florida and rules of the Department of Environmental Protection and revisions thereof. I understand that a permit, if granted by the Department, cannot be transferred without authorization from the Department, and I will promptly notify the Department upon sale or legal transfer of any permitted emissions units.*

AK Sharma 7/28/98
Signature Date

* Attach letter of authorization if not currently on file.

Scope of Application

Emissions Unit ID	Description of Emissions Unit	Permit Type
005	Unit 3 - 250 MW Combined Cycle Combustion Turbine	NA
006	Distillate Fuel Oil Storage Tank (1,000,000 gal) No. 3	NA

Purpose of Application and Category

ategory I : All Air Operation Permit Applications Subject to Processing Under Chapter 62-213, .A.C.

This Application for Air Permit is submitted to obtain :

[ ] Initial air operation permit under Chapter 62-213, F.A.C., for an existing facility which is classified as a Title V source.

[ ] Initial air operation permit under Chapter 62-213, F.A.C., for a facility which, upon start up of one or more newly constructed or modified emissions units addressed in this application, would become classified as a Title V source.

Current construction permit number :

[ ] Air operation permit renewal under Chapter 62-213, F.A.C., for a Title V source.

Operation permit to be renewed :

[ ] Air operation permit revision for a Title V source to address one or more newly constructed or modified emissions units addressed in this application.

Current construction permit number :

Operation permit to be revised :

[ ] Air operation permit revision or administrative correction for a Title V source to address one or more proposed new or modified emissions units and to be processed concurrently with the air construction permit application.

Operation permit to be revised/corrected :

[ ] Air operation permit revision for a Title V source for reasons other than construction or modification of an emissions unit.

Operation permit to be revised :

Reason for revision :

ategory II : All Air Operation Permit Applications Subject to Processing Under Rule 2-210.300(2)(b), F.A.C.

This Application for Air Permit is submitted to obtain :

[ ] Initial air operation permit under Rule 62-210.300(2)(b), F.A.C., for an existing facility seeking classification as a synthetic non-Title V source.

Current operation/construction permit number(s) :

[ ] Renewal air operation permit under Fule 62-210.300(2)(b), F.A.C., for a synthetic non-Title V source.

Operation permit to be renewed :

[ ] Air operation permit revision for a synthetic non-Title V source.

Operation permit to be revised :

Reason for revision :

Category III : All Air Construction Permit Applications for All Facilities and Emissions Units

This Application for Air Permit is submitted to obtain :

[X] Air construction permit to construct or modify one or more emissions units within a facility (including any facility classified as a Title V source).

Current operation permit number(s), if any :

[ ] Air construction permit to make federally enforceable an assumed restriction on the potential emissions of one or more existing, permitted emissions units.

Current operation permit number(s) :

[ ] Air construction permit for one or more existing, but unpermitted, emissions units.

Application Processing Fee

Check one :

[ ] Attached - Amount : $0.00 [X] Not Applicable.

Construction/Modification Information

1. Description of Proposed Project or Alterations : See project description in SCA Appendix 10.7	
2. Projected or Actual Date of Commencement of Construction :	01-Oct-1999
3. Projected Date of Completion of Construction :	01-Jun- 01

Professional Engineer Certification

1. Professional Engineer Name : D. D. Schultz Registration Number : 30304
2. Professional Engineer Mailing Address : Organization/Firm : Black & Veatch Street Address : 8400 Ward Parkway City : Kansas City State : MO Zip Code : 64114-2031
3. Professional Engineer Telephone Numbers : Telephone : (913)458-2028 Fax : (913)458-2934

Note: The reviewing engineer was unavailable for signature during final document reproduction and assembly. As such, a signed and sealed Professional Engineer Statement will be forwarded to the application distribution list during the week of August 10, 1998.

4. Professional Engineer Statement :

I, the undersigned, hereby certify, except as particularly noted herein, that :*

(1) To the best of my knowledge, there is reasonable assurance that the air pollutant emissions unit(s) and the air pollutant control equipment described in this Application for Air Permit, when properly operated and maintained, will comply with all applicable standards for control of air pollutant emissions found in the Florida Statutes and rules of the Department of Environmental Protection; and

(2) To the best of my knowledge, any emission estimates reported or relied on in this application are true, accurate, and complete and are either based upon reasonable techniques available for calculating emissions or, for emission estimates of hazardous air pollutants not regulated for an emissions unit addressed in this application, based solely upon the materials, information and calculations submitted with this application.

If the purpose of this application is to obtain a Title V source air operation permit (check here [ ] if so), I further certify that each emissions unit described in this Application for Air Permit, when properly operated and maintained, will comply with the applicable requirements identified in this application to which the unit is subject, except those emissions units for which a compliance schedule is submitted with this application.

If the purpose of this application is to obtain an air construction permit for one or more proposed new or modified emissions units (check here [X] if so), I further certify that the engineering features of each such emissions unit described in this application have been designed or examined by me or individuals under my direct supervision and found to be in conformity with sound engineering principles applicable to the control of emissions of the air pollutants characterized in this application.

If the purpose of this application is to obtain an initial air operation permit or operation permit revision for one or more newly constructed or modified emissions units (check here [ ] if so), I further certify that, with the exception of any changes detailed as part of this application, each such emissions has been constructed or modified in substantial accordance with the information given in the corresponding application for air construction permit and with all provisions contained in such permit.

Signature ______________________ Date ______________________
(seal)

* Attach any exception to certification statement.

Application Contact

1. Name and Title of Application Contact : Name : A. K. Sharma Title : Director of Power Supply
2. Application Contact Mailing Address : Organization/Firm : Kissimmee Utility Authority Street Address : 1701 West Carrol Street City : Kissimmee State : FL Zip Code : 34741-6804
3. Application Contact Telephone Numbers : Telephone : (407)933-7777 Fax : (407)847-0787

Application Comment

The facility has submitted an intital operating permit application. This applicaiton is for a construction permit for a new combustion turbine and a fuel oil storage tank.

II. Facility Information

General Facility Information

II. FACILITY INFORMATION

A. GENERAL FACILITY INFORMATION

Facility, Location, and Type 2

1. Facility UTM Coordinates : Zone : 17 East (km) : 447.72 North (km) : 3127.68			
2. Facility Latitude/Longitude : Latitude (DD/MM/SS) : 28 16 32 Longitude (DD/MM/SS) : 81 31 59			
3. Governmental Facility Code :	4. Facility Status Code : A	5. Facility Major Group SIC Code : 49	6. Facility SIC(s) :
7. Facility Comment : Construction of new emission sources at an existing facility which will not be permanently shut down.			

Facility Contact

1. Name and Title of Facility Contact : Jeff Ling Plant Manager
2. Facility Contact Mailing Address : Organization/Firm : KUA Cane Island Power Plant Street Address : 6075 Old Tampa Highway City : Intercession City State : FL Zip Code : 33848-9999
3. Facility Contact Telephone Numbers : Telephone : (417)846-7070 Fax : (407)846-6485

Facility Regulatory Classifications

1. Small Business Stationary Source?	N
2. Title V Source?	Y
3. Synthetic Non-Title V Source?	N
4. Major Source of Pollutants Other than Hazardous Air Pollutants (HAPs)?	Y
5. Synthetic Minor Source of Pollutants Other than HAPs?	N
6. Major Source of Hazardous Air Pollutants (HAPs)?	Y
7. Synthetic Minor Source of HAPs?	N
8. One or More Emissions Units Subject to NSPS?	Y
9. One or More Emission Units Subject to NESHAP?	N
10. Title V Source by EPA Designation?	N
11. Facility Regulatory Classifications Comment : Facility units currently exempt under NESHAPs. The cooling tower is not subject to a NESHAP because chromium-based chemical treatment is not used--the cooling tower is not a major source of HAPs.	

Facility Regulations

B. FACILITY REGULATIONS

Rule Applicability Analysis

N/A - Facility is a Title V Source. See Attachment D for Facility applicable requirements.

B. FACILITY REGULATIONS

List of Applicable Regulations

FDEP Title V Core List (effective 3/25/95) incorporated by reference

40 CFR Part 60, Subpart A - Standards of Performance for New Stationary Sources

40 CFR Part 60, Subpart Kb - Standards of Performance for Volatile Organic Liquid

40 CFR Part 60, Subpart GG - Standards of Performance for Stationary Gas Turbines

40 CFR Part 61, Subpart A - National Emission Standards for Hazardous Air Pollutants (NESHAP)

40 CFR Part 61, Subpart M - National Emissions Standard for Asbestos

Part 70 - State Operating Permit Programs

Section 70.1 - Program Overview

Section 70.2 - Defintions

Section 70.3 - Applicability

Section 70.4 - State Program Submittals and Transition

Section 70.5 - Permit Applications

Section 70.6 - Permit Content

Section 70.7 - Permit Issuance, Renewal, Reopenings, and Revisions

B. FACILITY REGULATIONS

List of Applicable Regulations

Section 70.8 - Permit Review by the EPA and Affected States

Section 70.9 - Fee Determination and Certification

Section 70.10 -Federal Oversight and Sanctions

Sectin 70.11 - Requirements for Enforcement Authority

Part 72 - Regulations on Permits

Subpart A - Acid Rain Program General Provisions

Section 72.1 Purpose and Scope

Section 72.2 - Definitions

Section 72.3 - Measurements, Abbbreviations, and Acronyms

Section 72.4 - Federal Authority

Section 72.5 - State Authority

Sectin 72.6 - Applicability

Section 72.9 - Standard Requirements

Sectin 72.10 - Availability of Information

B. FACILITY REGULATIONS

List of Applicable Regulations

Section 72.11 - Computation of Time

Section 72.12 - Admistrative Appeals

Section 72.13 - Incorporation by Reference

Subpart B - Designated Representative

Section 72.20 - Authorization and Responsibilities of the Designated

Section 72.21 - Submissions

Sectin 72.22 - Alternate Designated Representative

Section 72.23 - Changing the Seignated Representative, Alternate Designated

Section 72.24 - Certificate of Representation

Section 72.25 - Objections

Subpart C- Acid Rain Application

Section 72.30 - Requirements to Apply

Section 72.31 - Information Requirements for Acid Rain Permit

Section 72.32 - Permit Application Shield and Binding Effect of Permit

B. FACILITY REGULATIONS

List of Applicable Regulations

Section 72.33 - Identification of Dispatch System

Subpart D - Acid Rain Compliance Plan and Compliance Options

Section 72.40 - General

Subpart E - Acid Rain Permit Conditions

Section 72.50 - General

Section 72.51 - Permit Shield

Subpart F - Federal Acid Rain Permit Issuance Procedure

Section 72.60 - General

Section 72.61 - Completeness

Section 72.62 - Draft Permit

Section 72.63 - Administrative Record

Section 72.64 - Statement of Basis

Section 72.65 - Public Notice of Opportunities for Public Comment

B. FACILITY REGULATIONS

List of Applicable Regulations

Section 72.66 - Public Comments

Section 72.67 - Opportunity for Public Hearing

Section 72.68 - Response to Comments

Section 72.69 - Issuance and Effective Date of Acid Rain Permits

Subpart G - Acid Rain Phase II Implementation

Section 72.70 - Relationship to Title V Operating Permit Program

Section 71.71 - Approval of State Programs--General

Section 72.72 - State Permit Prgram Approval Criteria

Section 72.73 - State Issuance of Phase II Permits

Section 72.74 - Federal Issuance of Phase II Permits

Subpart H - Permit Revisions

Section 72.80 - General

Section 72.81 - Permit Modifications

Section 72.82 - Fast-Track Modifications

B. FACILITY REGULATIONS

List of Applicable Regulations

Section 72.83 - Administrative Permit Amendment

Section 72.84 - Automatic permit Amendment

Section 72.85 - Permit Reopenings

Subpart I - Compliance Certification

Section 72.90 - Annual Compliance Certification Report

Section 72.95 - Allowance Deduction Formula

Section 72.96 - Administrator's Action on Compliance Certifications

Part 73 - Sulufr Dioxide Allowance Systems

Subpart A - Background and Summary

Section 73.1 - Purpose and Scope

Section 73.2 - Applicability

Section 73.3 - General

Subpart B - Allowance Allocations

Section 73.10 - Inital Allocations for Phase I and II

B. FACILITY REGULATIONS

List of Applicable Regulations

Section 73.11 - Revision of Allocations

Section 73.12 - Rounding Procedures

Section 73.13 - Procedures for Submittals

Section 73.26 - Conservation and Renewable Energy Reserve

Section 73.27 - Special Allowance Reserve

Subpart C - Allowance Tracking System

Section 73.30 - Allowance Tracking System Accounts

Section 73.31 - Establish ment of Accounts

Section 73.32 - Allowance Accounts Contents

Section 73.33 - Authorized Account Representative

Section 73.34 - Recordation in Accounts

Section 73.35 - Compliance

Section 73.36 - Banking

Section 73.37 - Account Error and Dispute Resolution

B. FACILITY REGULATIONS

List of Applicable Regulations

Section 73.38 - Closing of Accounts

Subpart D - Allowance Transfers

Section 73.50 - Scope and Submission of Transfers

Section 73.51 - Prohibition

Section 73.52 - EPA Recordation

Section 73.53 - Notification

Subpart E - Auctions, Direct Sales, and Independent Power Producers Written

Section 73.70 - Auctions

Section 73.71 - Bidding

Section 73.72 - Direct Sales

Section 73.73 - Selegation of Auctions and Sales and Termination of Auctions

Section 73.74 - Independent Power Producers Written Guarantee

Section 73.75 - Application for an IPP Written Guarantee

Section 73.76 - Approval and Excercise of the IPP Written Guarantee

B. FACILITY REGULATIONS

List of Applicable Regulations

Section 73.77 - Relationship of Independent Power Producers Written Guarantee

Section 75.5 - Prohibitions

Section 75.6 - Incorporation by Reference

Section 76.7 - EPA Study

Section 76.8 [Reserved]

Subpart - Monitoring Provisions

Section 75.10 - General Operating Requirements

Section 75.11 - Specific Provisions for Monitoring SO2 Emissions

Section 75.12 - Specific Provisions for Monitoring NOx Emissions (NOx and Flow)

Section 75.13 - Specific Provisions for Monitoring CO2 Emissions

Section 75.14 - Specific Provisions for Monitoring Opacity

Section 75.15 - Specific Provisions for Monitoring SO2 Emissions Removal by

Section 75.16 - Specific Provisions for Monitoring Emissions from Common, By-

Section 75.17 - Specific Provisions for Monitoring Emissions from Common, By

B. FACILITY REGULATIONS

List of Applicable Regulations

Section 75.18 - Specific Provisions for Monitoring Emissions from Common and

Section 75.41 Precision Criteria

Section 75.42 - Reliability Criteria

Section 75.43 - Accessibility Criteria

Section 75.44 - Timelines Criteria

Section 75.45 - Daily Quality Assurance Criteria

Section 75.46 - Missing data Substitution Criteria

Section 75.47 - Criteria for a Class of Affecteed Units

Section 75.48 - Petition for an Alternative Monitoring System

Subpart F - Recordkeeping Requirements

Section 75.50 - General Recordkeeping Provisions

Section 75.51 - General Recordkeeping Provisions for Specific Situations

Section 75.52 - Certifications, Quality Assurance and Quality Control Record

Section 75.53 - Monitoring Plan

B. FACILITY REGULATIONS

List of Applicable Regulations

Subpart G - Reporting Requirements

Section 75.60 - General Provisions

Section 75.61 - Notification and Recertification Test Dates

Section 75.62 - Monitoring Plan

Section 75.63 - Certification or Recertification Applications

Section 75.64 - Quarterly Reports

Section 75.65 - Opacity Reports

Section 75.66 - Petitions to the Administrator

Section 75.67 - Retired Units Petitions

Part 76 - EPA Regulations on Acid Rain Nitrogen Oxides

Section 76.1 - Applicability

Section 76.2 - Definitions

Section 76.3 - General Acid Rain Program Provisions

Section 76.4 - Incorporation by Reference

B. FACILITY REGULATIONS

List of Applicable Regulations

Section 76.5 - NOx Emission Limitations for Group 1 Boilers

Section 76.6 - NOx Emission Limitations for Group 2 Boilers [Reserved]

Section 76.7 - Revised NOx Emission Limitations for Group 1, Phase II Boilers

Section 76.8 - Early Election for Group 1, Phase II Boilers

Section 76.9 - Permit Application and Compliance Plans

Section 76.10 - Alernative Emission Limitations

Section 76.11 - Emissions Averaging

Section 76.12 - Phase I NOx Compliance Extensions

Section 76.13 - Compliance and Excess Emissions

Section 76.14 - Monitoring, Recordkeeping, and Reporting

Section 76.15 - Test Methods and Procedures

Section 76.16 - [Reserved]

Part 77 - Excess Emissions

State Applicable Requirements

B. FACILITY REGULATIONS

List of Applicable Regulations

Chapter 62-4, F.A.C.; PERMITS

62-4.055 - Permit Processing

Chapter 62-210, F.A.C.; STATIONARY SOURCES - GENERAL REQUIREMENTS

62-210.550 - Stack Height Policy

62-210.700 Excess Emissions

Chapter 62-212, F.A.C.; STATIONARY SOURCES - PRECONSTRUCTION REVIEW

62-212.300 - General Preconstruction Review Requirements

62-212.400 - Prevention of Significant Deterioration

62-212.410 - Best Available Control Technology

Chapter 62-213, F.A.C.; OPERATION PERMITS FOR MAJOR SOURCES OF AIR POLLUTION

62-213.413 - Fast-Track Revisions of Acid Rain Parts

Chapter 62-214, F.A.C.; REQUIREMENTS FOR SOURCES SUBJECT TO THE FEDERAL ACID RAIN PR

62-214.300 - Applicability

62-214.320 - Applications

B. FACILITY REGULATIONS

List of Applicable Regulations

62-214.330 - Acid Rain Compliance Plan and Compliance Options

62-214.350 - Certification

62-214.370 - Revisions and Adminstrative Corrections

62-214.420 - Acid Rain Part Content

62-214.430 - Implementation and Termination of Compliance Options

Chapter 62-272, F.A.C.; AMBIENT AIR QUALITY STANDARDS

62-272.500 - Maximum Allowable Increases

Chapter 62-273, F.A.C.; AIR POLLUTION EPISODES

62-273.300 - Air Pollution Episodes

62-273.400 - Air Alert

62-273.500 - Air Warning

62-273.600 - Air Emergency

Chapter 62-296, F.A.C.; STATIONARY SOURCES - EMISSION STANDARDS

B. FACILITY REGULATIONS

List of Applicable Regulations

62-296.405 - Fossil Fuel Steam Generators

Chapter 62-297, F.A.C.; STATIONARY SOURCES - EMISSIONS MONITORING

62-297.401 - Compliance Test Methods

62-297.440 - Supplementary Test Procedures

62-297.520 - EPA Performance Specifications

62-297.620 - Exceptions and Approval of Alternate Procudures and Requirements

62-297.310 - General Test Requirements

Subpart F - Energy Conservation and Renewable Energy Reserve

Section 73.80 - Operation of Allwance Reserve Program for Conservation ..

Section 73.81 - Quantified Conservation Measures and Renewable Energy

Section 73.82 - Application for Allwances from Reserve Program

Section 73.83 - Secretary of Energy's Action on New Income Neutality

Section 73.84 - Administrator's Action on Applications

B. FACILITY REGULATIONS

List of Applicable Regulations

Section 73.85 - Administrator Review of the Reserve Program

Section 73.86 - State Regulatory Autonomy, Appendix A to Subpart F -- List of

Part 75 - Emission Monitoring

Subpart A - General

Section 75.1 - Purpose and Scope

Section 75.2 - Applicability

Section 75.3 - General Acid Rain Program Provisions

Section 75.4 - Compliance Dates

Subpart C - Operation and Maintenance Requirements

Section 75.20 - Certification and Recertification Procedures

Section 75.21 - Quality Assurance and Quality Control Requirements

Scetion 75.22 - Reference Test Methods

Section 75.23 - Alternatives to ASTM Methods

Section 75.24 - Out-of-Control Periods

B. FACILITY REGULATIONS

List of Applicable Regulations

Subpart D - Missing Data Substitution Procedures

Section 75.30 - General Procedures

Section 75.31 - Initial Missing Data Procedures

Section 75.32 - Determinations of Monitor Data Availability for Standard Missing Data

Section 75.33 - Standard Missing Data Procedures

Section 75.34 - Units with Add-on Emission Controls

Subpart E - Alternative Monitoring Systems

Subaprt 75.40 - General Demonstration Requirementrs

Facility Pollutants

C. FACILITY POLLUTANTS

Facility Pollutant Information

1. Pollutant Emitted	2. Pollutant Classification
VOC	A
CO	A
NOX	A
PM	A
PM10	A
SO2	A
PB	B
H095	A
H021	B
H015	B
H114	B

Facility Pollutant Detail Information

D. FACILITY POLLUTANT DETAIL INFORMATION

Facility Pollutant Information Pollutant 1

1. Pollutant Emitted : VOC		
2. Requested Emissions Cap :	(lbs/hour)	(tons/year)
3. Basis for Emissions Cap Code :		
4. Facility Pollutant Comment :		

D. FACILITY POLLUTANT DETAIL INFORMATION

Facility Pollutant Information Pollutant 2

1. Pollutant Emitted : CO		
2. Requested Emissions Cap :	(lbs/hour)	(tons/year)
3. Basis for Emissions Cap Code :		
4. Facility Pollutant Comment :		

D. FACILITY POLLUTANT DETAIL INFORMATION

Facility Pollutant Information Pollutant 3

1. Pollutant Emitted : NOX		
2. Requested Emissions Cap :	(lbs/hour)	(tons/year)
3. Basis for Emissions Cap Code :		
4. Facility Pollutant Comment :		

D. FACILITY POLLUTANT DETAIL INFORMATION

Facility Pollutant Information Pollutant 4

1. Pollutant Emitted : PM	
2. Requested Emissions Cap : (lbs/hour)	(tons/year)
3. Basis for Emissions Cap Code :	
4. Facility Pollutant Comment :	

D. FACILITY POLLUTANT DETAIL INFORMATION

Facility Pollutant Information Pollutant 5

1. Pollutant Emitted :	PM10
2. Requested Emissions Cap :	(lbs/hour) (tons/year)
3. Basis for Emissions Cap Code :	
4. Facility Pollutant Comment :	

D. FACILITY POLLUTANT DETAIL INFORMATION

Facility Pollutant Information Pollutant 6

1. Pollutant Emitted :	SO2	
2. Requested Emissions Cap :	(lbs/hour)	(tons/year)
3. Basis for Emissions Cap Code :		
4. Facility Pollutant Comment :		

D. FACILITY POLLUTANT DETAIL INFORMATION

Facility Pollutant Information Pollutant 7

1. Pollutant Emitted : PB	
2. Requested Emissions Cap : (lbs/hour)	(tons/year)
3. Basis for Emissions Cap Code :	
4. Facility Pollutant Comment :	

D. FACILITY POLLUTANT DETAIL INFORMATION

Facility Pollutant Information Pollutant 8

1. Pollutant Emitted : H095		
2. Requested Emissions Cap :	(lbs/hour)	(tons/year)
3. Basis for Emissions Cap Code :		
4. Facility Pollutant Comment :		

D. FACILITY POLLUTANT DETAIL INFORMATION

Facility Pollutant Information Pollutant 9

1. Pollutant Emitted :	H021
2. Requested Emissions Cap :	(lbs/hour) (tons/year)
3. Basis for Emissions Cap Code :	
4. Facility Pollutant Comment :	

D. FACILITY POLLUTANT DETAIL INFORMATION

Facility Pollutant Information Pollutant ___10___

1. Pollutant Emitted : H015		
2. Requested Emissions Cap :	(lbs/hour)	(tons/year)
3. Basis for Emissions Cap Code :		
4. Facility Pollutant Comment :		

D. FACILITY POLLUTANT DETAIL INFORMATION

Facility Pollutant Information Pollutant ____11____

1. Pollutant Emitted : H114		
2. Requested Emissions Cap :	(lbs/hour)	(tons/year)
3. Basis for Emissions Cap Code :		
4. Facility Pollutant Comment :		

Facility Supplemental Information

D. FACILITY SUPPLEMENTAL INFORMATION

Supplemental Requirements for All Applications

1. Area Map Showing Facility Location :	Attachment A
2. Facility Plot Plan :	Attachment B
3. Process Flow Diagram(s) :	Attachment C
4. Precautions to Prevent Emissions of Unconfined Particulate Matter :	SCA Section 4.5
5. Fugitive Emissions Identification :	NA
6. Supplemental Information for Construction Permit Application :	SCA APPENDIX 10.7

Additional Supplemental Requirements for Category I Applications Only

7. List of Proposed Exempt Activities :	NA
8. List of Equipment/Activities Regulated under Title VI :	NA
9. Alternative Methods of Operation :	NA
10. Alternative Modes of Operation (Emissions Trading) :	NA
11. Identification of Additional Applicable Requirements :	NA
12. Compliance Assurance Monitoring Plan :	NA
13. Risk Management Plan Verification :	Plan Submit
14. Compliance Report and Plan :	NA
15. Compliance Certification (Hard-copy Required) :	NA

III. Emissions Unit Information

III. EMISSIONS UNIT INFORMATION

A. TYPE OF EMISSIONS UNIT
(Regulated and Unregulated Emissions Units)

Emissions Unit Information Section ___1___

Unit 3 - 250 MW Combined Cycle Combustion Turbine

Type of Emissions Unit Addressed in This Section

1. Regulated or Unregulated Emissions Unit? Check one :

   [X] The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit.

   [ ] The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.

2. Single Process, Group of Processes, or Fugitive Only? Check one :

   [X] This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent).

   [ ] This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions.

   [ ] This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.

Emissions Unit Information Section 1

B. GENERAL EMISSIONS UNIT INFORMATION
(Regulated and Unregulated Emissions Units)

Emissions Unit Description and Status

1. Description of Emissions Unit Addressed in This Section : Unit 3 - 250 MW Combined Cycle Combustion Turbine		
2. Emissions Unit Identification Number : 005 [ ] No Corresponding ID [ ] Unknown		
3. Emissions Unit Status Code : C	4. Acid Rain Unit? [X] Yes [ ] No	5. Emissions Unit Major Group SIC Code : 49
6. Emissions Unit Comment : The 250 MW combined cycle combustion turbine is comprised of one combustion turbine which exhausts through a heat recovery steam generator (HRSG) which is used to power a steam turbine. Natural gas or low sulfur distillate fuel oil fired.		

Emissions Unit Information Section 1

Unit 3 - 250 MW Combined Cycle Combustion Turbine

Emissions Unit Control Equipment 1

1. Description : A. Low NOx Burner Technology: For natural gas firing the use of dry low NOx burner technology to control NOx emissions. This technology uses a two-stage combustor that premixes a portion of the air and fuel in the first stage and the remaining air and fuel are injected into the second stage.	
2. Control Device or Method Code :	25

Emissions Unit Information Section 1

Unit 3 - 250 MW Combined Cycle Combustion Turbine

Emissions Unit Control Equipment 2

1. Description : B. Use of low sulfur fuel oil (0.05 percent) and the use of natural gas to control emissions of SO_2.	
2. Control Device or Method Code :	30

Emissions Unit Information Section 1

Unit 3 - 250 MW Combined Cycle Combustion Turbine

Emissions Unit Control Equipment 3

1. Description : C. Water Injection: Used to limit NOx emissions by lowering the combustion temperature through the use of water injection. This control will be used for fuel oil firing.	
2. Control Device or Method Code :	28

C. EMISSIONS UNIT DETAIL INFORMATION
(Regulated Emissions Units Only)

Emissions Unit Information Section 1
Unit 3 - 250 MW Combined Cycle Combustion Turbine

Emissions Unit Details

1. Initial Startup Date :	01-Jun- 01	
2. Long-term Reserve Shutdown Date :		
3. Package Unit : Manufacturer : Unknown		Model Number : Unknown
4. Generator Nameplate Rating :	250 MW	
5. Incinerator Information : Dwell Temperature : Dwell Time : Incinerator Afterburner Temperature :		 Degrees Fahrenheit Seconds Degrees Fahrenheit

Emissions Unit Operating Capacity

1. Maximum Heat Input Rate : 1696	mmBtu/hr	
2. Maximum Incinerator Rate :	lb/hr	tons/day
3. Maximum Process or Throughput Rate :		
4. Maximum Production Rate :		
5. Operating Capacity Comment : The maximum heat input (MBtu/h): Natural gas firing at 19 F@ 100 % = 1,696 LHV, 1,882 HHV No. 2 distillate fuel oil firing at 19 F@ 100 % = 1,910 LHV, 2,039 HHV		

Emissions Unit Operating Schedule

Requested Maximum Operating Schedule : 24 hours/day	7 days/week

52 weeks/year	8,760 hours/year

D. EMISSIONS UNIT REGULATIONS
(Regulated Emissions Units Only)

Emissions Unit Information Section 1

Unit 3 - 250 MW Combined Cycle Combustion Turbine

Rule Applicability Analysis

N/A - Facility is a Title V Source.

Emissions Unit Information Section 1

Unit 3 - 250 MW Combined Cycle Combustion Turbine

List of Applicable Regulations

See Attachment E for unit specific applicable requirements.

E. EMISSION POINT (STACK/VENT) INFORMATION

Emissions Unit Information Section 1

Unit 3 - 250 MW Combined Cycle Combustion Turbine

Emission Point Description and Type :

1. Identification of Point on Plot Plan or Flow Diagram :	S-6 HRSG/S-7 Bypass	
2. Emission Point Type Code :	3	
3. Descriptions of Emission Points Comprising this Emissions Unit : Two emission points are associated with the combustion turbine - the Bypass and HRSG. (S-6 HRSG)		
4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common : N/A		
5. Discharge Type Code :	V	
6. Stack Height :	130	feet
7. Exit Diameter :	18.00	feet
8. Exit Temperature :	173	°F
9. Actual Volumetric Flow Rate :	635,155	acfm
10. Percent Water Vapor :		%
11. Maximum Dry Standard Flow Rate :		dscfm
12. Nonstack Emission Point Height :		feet
13. Emission Point UTM Coordinates : Zone : 17 East (km) : 447.722 North (km) : 3,127.785		
14. Emission Point Comment : Exit temperature and flow rate conservatively reflect worst-case combined cycle low load and natural gas operation.		

E. EMISSION POINT (STACK/VENT) INFORMATION

Emissions Unit Information Section 1

Unit 3 - 250 MW Combined Cycle Combustion Turbine

Emission Point Description and Type :

1. Identification of Point on Plot Plan or Flow Diagram :	S-6 HRSG/S-7 Bypass	
2. Emission Point Type Code :	3	
3. Descriptions of Emission Points Comprising this Emissions Unit : When the unit operates in simple cycle mode the exhaust gas exits through the Bypass (S-7 Bypass).		
4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common : N/A		
5. Discharge Type Code :	V	
6. Stack Height :	100	feet
7. Exit Diameter :	18.00	feet
8. Exit Temperature :	1,073	°F
9. Actual Volumetric Flow Rate :	2,195,520	acfm
10. Percent Water Vapor :		%
11. Maximum Dry Standard Flow Rate :		dscfm
12. Nonstack Emission Point Height :		feet
13. Emission Point UTM Coordinates : Zone : 17 East (km) : 447.758 North (km) : 3,127.785		
14. Emission Point Comment : Exit temperature and flow rate conservatively reflect worst-case simple cycle low load and natural gas operation.		

F. SEGMENT (PROCESS/FUEL) INFORMATION

Emissions Unit Information Section 1

Unit 3 - 250 MW Combined Cycle Combustion Turbine

Segment Description and Rate : Segment 1

1. Segment Description (Process/Fuel Type and Associated Operating Method/Mode) : Combustion Turbine operating in either combined cycle or simple cycle mode on natural gas. This unit is allowed to operate on natural gas for an entire year (i.e., 8,760 hours).	
2. Source Classification Code (SCC) : 2-01-002-01	
3. SCC Units : Million Cubic Feet Burned (all gaseous fuels)	
4. Maximum Hourly Rate : 1.92	5. Maximum Annual Rate : 16,819.00
6. Estimated Annual Activity Factor :	
7. Maximum Percent Sulfur : 0.00	8. Maximum Percent Ash :
9. Million Btu per SCC Unit : 978	
10. Segment Comment : (fuel flow)x(fuel density) = Maximum Hourly Rate (80,860 lb/h)x(23.8 scf/lb)x(Mscf/10^6 scf) = 1.92 Mscf/h (1.92 Mscf/h)x(8,760 h/yr) = 16,819 mscf/yr (23,277 MBtu/lb)x(lb/23.8 scf) =978 MBtu/Mscf	

F. SEGMENT (PROCESS/FUEL) INFORMATION

Emissions Unit Information Section 1

Unit 3 - 250 MW Combined Cycle Combustion Turbine

Segment Description and Rate : Segment 2

1. Segment Description (Process/Fuel Type and Associated Operating Method/Mode) :

   Combustion turbine operating in either combined or simple cycle mode on No. 2 distillate fuel oil. Unit 3 allowed to operate on No. 2 distillate fuel oil for 720 hours/yr.

2. Source Classification Code (SCC) : 2-01-001-01

3. SCC Units : Thousand Gallons Burned (all liquid fuels)

4. Maximum Hourly Rate : 14.58

5. Maximum Annual Rate : 10,498.00

6. Estimated Annual Activity Factor :

7. Maximum Percent Sulfur : 0.05

8. Maximum Percent Ash :

9. Million Btu per SCC Unit : 140

10. Segment Comment :

    (fuel flow)x(fuel density)=Max Hrly Rate
    (102770 lb/h)/(7.05 lb/gal)/(1000 gal)=14.58 1000gal/h
    (14.58 gal/h)x(720 h/yr)=10498 1000gal/yr
    (19485 Btu/lb)x(7.05 lb/gal)/(1000 gal)=140 Btu/1000gal

G. EMISSIONS UNIT POLLUTANTS
(Regulated and Unregulated Emissions Units)

Emissions Unit Information Section 1
Unit 3 - 250 MW Combined Cycle Combustion Turbine

1. Pollutant Emitted	2. Primary Control Device Code	3. Secondary Control Device Code	4. Pollutant Regulatory Code
1 - PM			EL
2 - SO2	030		EL
3 - NOX	025	028	EL
4 - VOC			EL
5 - CO			EL
6 - H114			EL
7 - H015			EL
8 - H021			EL
9 - PB			EL
10 - H095			NS
11 - PM10			EL

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Emissions Unit Information Section 1
Unit 3 - 250 MW Combined Cycle Combustion Turbine

Pollutant Potential/Estimated Emissions : Pollutant 1

1. Pollutant Emitted : **PM**

2. Total Percent Efficiency of Control : %

3. Potential Emissions :
102.1000000 lb/hour 109.1200000 tons/year

4. Synthetically Limited?
[ ] Yes [X] No

5. Range of Estimated Fugitive/Other Emissions:
to tons/year

6. Emissions Factor Units :
Reference : Manufacturer

7. Emissions Method Code : 0

8. Calculations of Emissions :

Highest hourly emissions for either combined or simple cycle operation:
Natural gas = 18 lb/h
Fuel oil = 102.1 lb/h

Potential hours of operation:
Natural gas = 8,760 h/yr
Fuel Oil = 720 h/yr

Potential annual emissions:
[(18 lb/h x 8,040 h/yr) + (102.1 lb/h x 720 h/yr)] / (2,000 lb/ton) = 109.12 tons/yr

9. Pollutant Potential/Estimated Emissions Comment :

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Emissions Unit Information Section 1

Unit 3 - 250 MW Combined Cycle Combustion Turbine

Emission calculations based on manufacturer's guarantees. Based on 72°F ambient conditions.

Emissions Unit Information Section 1
Unit 3 - 250 MW Combined Cycle Combustion Turbine

Pollutant Information Section 1

Allowable Emissions 1

1. Basis for Allowable Emissions Code :	OTHER			
2. Future Effective Date of Allowable Emissions :				
3. Requested Allowable Emissions and Units :	18.60	lb/h		
4. Equivalent Allowable Emissions :	18.60	lb/hour	81.50	tons/year
5. Method of Compliance :				
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) : Natural gas firing for 8,760 h/yr. Expected lb/h operating limit for forthcoming air constr. permit. Max lb/h emission rate considering all temps, vendors, modes of operation, and loads.				

Emissions Unit Information Section 1
Unit 3 - 250 MW Combined Cycle Combustion Turbine

Pollutant Information Section 1

Allowable Emissions 2

1. Basis for Allowable Emissions Code :	OTHER
2. Future Effective Date of Allowable Emissions :	
3. Requested Allowable Emissions and Units :	112.60 lb/h
4. Equivalent Allowable Emissions :	112.60 lb/hour 40.50 tons/year
5. Method of Compliance :	
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) :	Oil firing 720 h/yr. Expected lb/h operating limit for forthcoming air constr. permit. Max lb/h emission rate considering all temps, vendors, modes of operation, and loads.

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Emissions Unit Information Section 1

Unit 3 - 250 MW Combined Cycle Combustion Turbine

Pollutant Potential/Estimated Emissions : Pollutant 2

1. Pollutant Emitted : **SO2**

2. Total Percent Efficiency of Control : %

3. Potential Emissions :
94.5600000 lb/hour 38.0600000 tons/year

4. Synthetically Limited?
[ ] Yes [X] No

5. Range of Estimated Fugitive/Other Emissions:
to tons/year

6. Emissions Factor Units :
Reference : Manufacturer

7. Emissions Method Code : 0

8. Calculations of Emissions :

Highest hourly emissions for either combined or simple cycle operation:
Natural gas = 1.0 lb/h
Fuel oil = 94.56 lb/h

Potential hours of operation:
Natural gas = 8,760 h/yr
Fuel Oil = 720 h/yr

Potential annual emissions:
[(1.0 lb/h x 8,040 h/yr) + (94.56 lb/h x 720 h/yr)] / (2,000 lb/ton) = 38.06 tons/yr

9. Pollutant Potential/Estimated Emissions Comment :

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Emissions Unit Information Section 1

Unit 3 - 250 MW Combined Cycle Combustion Turbine

Emission calculations based on manufacturer's guarantees. Based on 72°F Ambient conditions.

Emissions Unit Information Section 1
Unit 3 - 250 MW Combined Cycle Combustion Turbine

Pollutant Information Section 2

Allowable Emissions 1

1. Basis for Allowable Emissions Code :	OTHER			
2. Future Effective Date of Allowable Emissions :				
3. Requested Allowable Emissions and Units :	1.03	lb/h		
4. Equivalent Allowable Emissions :	1.03	lb/hour	4.50	tons/year
5. Method of Compliance :				
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) : Natural gas firing for 8,760 h/yr. Expected lb/h operating limit for forthcoming air constr. permit. Max lb/h emission rate considering all temps, vendors, modes of operation, and loads.				

Emissions Unit Information Section 1
Unit 3 - 250 MW Combined Cycle Combustion Turbine

Pollutant Information Section 2

Allowable Emissions 2

1. Basis for Allowable Emissions Code :	OTHER			
2. Future Effective Date of Allowable Emissions :				
3. Requested Allowable Emissions and Units :	102.67	lb/h		
4. Equivalent Allowable Emissions :	102.67	lb/hour	37.00	tons/year
5. Method of Compliance :				
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) : Oil firing 720 h/yr. Expected lb/h operating limit for forthcoming air constr. permit. Max lb/h emission rate considering all temps, vendors, modes of operation, and loads.				

Emissions Unit Information Section 1
Unit 3 - 250 MW Combined Cycle Combustion Turbine

Pollutant Information Section 2

Allowable Emissions 3

1. Basis for Allowable Emissions Code :	RULE	
2. Future Effective Date of Allowable Emissions :		
3. Requested Allowable Emissions and Units :	0.80	% by weight
4. Equivalent Allowable Emissions :	lb/hour	tons/year
5. Method of Compliance : NSPS 40 CFR 60.334(b) Subpart GG		
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) : RULE: NSPS 40 CFR 60.334(b) Subpart GG - Standards of Performance for Stationary Gas Turbines.		

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Emissions Unit Information Section 1

Unit 3 - 250 MW Combined Cycle Combustion Turbine

Pollutant Potential/Estimated Emissions : Pollutant 3

1. Pollutant Emitted : **NOX**

2. Total Percent Efficiency of Control : %

3. Potential Emissions :
   302.6000000 lb/hour 823.2900000 tons/year

4. Synthetically Limited?
   [ ] Yes [X] No

5. Range of Estimated Fugitive/Other Emissions:
   to tons/year

6. Emissions Factor Units :
   Reference : Manufacturer

7. Emissions Method Code : 0

8. Calculations of Emissions :

   Highest hourly emissions for either combined or simple cycle operation:
   Natural gas = 177.7 lb/h
   Fuel oil = 302.6 lb/h

   Potential hours of operation:
   Natural gas = 8,760 h/yr
   Fuel Oil = 720 h/yr

   Potential annual emissions:
   [(177.7 lb/h x 8,040 h/yr) + (302.6 lb/h x 720 h/yr)] / (2,000 lb/ton) = 823.29 tons/y

9. Pollutant Potential/Estimated Emissions Comment :

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Emissions Unit Information Section 1

Unit 3 - 250 MW Combined Cycle Combustion Turbine

Emission calculations based on manufacturer's guarantees. Based on 72°F ambient conditions.

Emissions Unit Information Section 1
Unit 3 - 250 MW Combined Cycle Combustion Turbine

Pollutant Information Section 3

Allowable Emissions 1

1. Basis for Allowable Emissions Code :	OTHER			
2. Future Effective Date of Allowable Emissions :				
3. Requested Allowable Emissions and Units :	15.00	ppm@15%O2		
4. Equivalent Allowable Emissions :	195.80	lb/hour	857.60	tons/year
5. Method of Compliance :				
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) : Natural gas firing for 8,760 h/yr. Expected lb/h operating limit for forthcoming air constr. permit. Max lb/h emission rate considering all temps, vendors, modes of operation, and loads.				

DEP Form No. 62-210.900(1) - Form
Effective : 3-21-96

Emissions Unit Information Section 1

Unit 3 - 250 MW Combined Cycle Combustion Turbine

Pollutant Information Section 3

Allowable Emissions 2

1. Basis for Allowable Emissions Code :	OTHER			
2. Future Effective Date of Allowable Emissions :				
3. Requested Allowable Emissions and Units :	42.00	ppm@15%O2		
4. Equivalent Allowable Emissions :	328.50	lb/hour	118.30	tons/year
5. Method of Compliance :				
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) : Oil firing 720 h/yr Expected lb/h operating limit for forthcoming air constr. permit. Max lb/h emission rate considering all temps, vendors, modes of operation, and loads.				

Emissions Unit Information Section 1
Unit 3 - 250 MW Combined Cycle Combustion Turbine

Pollutant Information Section 3

Allowable Emissions 3

1. Basis for Allowable Emissions Code :	RULE	
2. Future Effective Date of Allowable Emissions :		
3. Requested Allowable Emissions and Units :	75.00	ppm@15%O2
4. Equivalent Allowable Emissions :	lb/hour	tons/year
5. Method of Compliance : NSPS 40 CFR 60.334(b) Subpart GG		
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) : RULE: 40 CFR 60.334(b) Subpart GG - Standards of Performance for Stationary Gas Turbines. NOTE: 75 ppm@15%O2 is based on the equation in 40 CFR 60.332 (a)(1)		

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Emissions Unit Information Section 1
Unit 3 - 250 MW Combined Cycle Combustion Turbine

Pollutant Potential/Estimated Emissions : Pollutant 4

1. Pollutant Emitted : **VOC**

2. Total Percent Efficiency of Control : %

3. Potential Emissions :
174.7000000 lb/hour 173.0400000 tons/year

4. Synthetically Limited?
[ ] Yes [X] No

5. Range of Estimated Fugitive/Other Emissions:
to tons/year

6. Emissions Factor Units :
Reference : Manufacturer

7. Emissions Method Code : 0

8. Calculations of Emissions :

Highest hourly emissions for either combined or simple cycle operation:
Natural gas = 27.4 lb/h
Fuel oil = 174.7 lb/h

Potential hours of operation:
Natural gas = 8,760 h/yr
Fuel Oil = 720 h/yr

Potential annual emissions:
[(27.4 lb/h x 8,040 h/yr) + (174.7 lb/h x 720 h/yr)] / (2,000 lb/ton) = 173.04 tons/y

9. Pollutant Potential/Estimated Emissions Comment :

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Emissions Unit Information Section 1

Unit 3 - 250 MW Combined Cycle Combustion Turbine

Emission calculations based on manufacturer's guarantees. Based on 72°F ambient conditions.

Emissions Unit Information Section 1
Unit 3 - 250 MW Combined Cycle Combustion Turbine

Pollutant Information Section 4

Allowable Emissions 1

1. Basis for Allowable Emissions Code :	OTHER			
2. Future Effective Date of Allowable Emissions :				
3. Requested Allowable Emissions and Units :	30.20	lb/h		
4. Equivalent Allowable Emissions :	30.20	lb/hour	132.30	tons/year
5. Method of Compliance :				
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) : Natural gas firing for 8,760 h/yr. Expected lb/h operating limit for forthcoming air constr. permit. Max lb/h emission rate considering all temps, vendors, modes of operation, and loads.				

DEP Form No. 62-210.900(1) - Form
Effective : 3-21-96

Emissions Unit Information Section 1
Unit 3 - 250 MW Combined Cycle Combustion Turbine

Pollutant Information Section 4

Allowable Emissions 2

1. Basis for Allowable Emissions Code :	OTHER			
2. Future Effective Date of Allowable Emissions :				
3. Requested Allowable Emissions and Units :	195.30	lb/h		
4. Equivalent Allowable Emissions :	195.30	lb/hour	70.30	tons/year
5. Method of Compliance :				
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) : Oil firing 720 h/yr. Expected lb/h operating limit for forthcoming air constr. permit. Max lb/h emission rate considering all temps, vendors, modes of operation, and loads.				

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Emissions Unit Information Section 1

Unit 3 - 250 MW Combined Cycle Combustion Turbine

Pollutant Potential/Estimated Emissions : Pollutant 5

1. Pollutant Emitted : **CO**	
2. Total Percent Efficiency of Control : %	
3. Potential Emissions : 2,599.0000000 lb/hour	3,818.3800000 tons/year
4. Synthetically Limited? [ ] Yes [X] No	
5. Range of Estimated Fugitive/Other Emissions: to	tons/year
6. Emissions Factor Reference : Manufacturer	Units :
7. Emissions Method Code : 0	
8. Calculations of Emissions : Highest hourly emissions for either combined or simple cycle operation: Natural gas = 717.1 lb/h Fuel oil = 2599.0 lb/h Potential hours of operation: Natural gas = 8,760 h/yr Fuel Oil = 720 h/yr Potential annual emissions: [(717.1 lb/h x 8,040 h/yr) + (2599.0 lb/h x 720 h/yr)] / (2,000 lb/ton) = 3818.38 tons/y	
9. Pollutant Potential/Estimated Emissions Comment :	

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Emissions Unit Information Section 1

Unit 3 - 250 MW Combined Cycle Combustion Turbine

Emission calculations based on manufacturer's guarantees. Based on 72°F ambient conditions.

Emissions Unit Information Section 1

Unit 3 - 250 MW Combined Cycle Combustion Turbine

Pollutant Information Section 5

Allowable Emissions 1

1. Basis for Allowable Emissions Code :	OTHER			
2. Future Effective Date of Allowable Emissions :				
3. Requested Allowable Emissions and Units :	25.00	ppm@15%O2		
4. Equivalent Allowable Emissions :	760.60	lb/hour	3,462.80	tons/year
5. Method of Compliance :				
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) : Natural gas firing for 8,760 h/yr. Expected lb/h operating limit for forthcoming air constr. permit. Max lb/h emission rate considering all temps, vendors, modes of operation, and loads.				

Emissions Unit Information Section 1
Unit 3 - 250 MW Combined Cycle Combustion Turbine

Pollutant Information Section 5

Allowable Emissions 2

1. Basis for Allowable Emissions Code :	OTHER			
2. Future Effective Date of Allowable Emissions :				
3. Requested Allowable Emissions and Units :	90.00	ppm@15%O2		
4. Equivalent Allowable Emissions :	2,908.20	lb/hour	1,047.00	tons/year
5. Method of Compliance :				
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) : Oil firing 720 h/yr. Expected lb/h operating limit for forthcoming air constr. permit. Max lb/h emission rate considering all temps, vendors, modes of operation, and loads.				

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Emissions Unit Information Section 1
Unit 3 - 250 MW Combined Cycle Combustion Turbine

Pollutant Potential/Estimated Emissions : Pollutant 6

1. Pollutant Emitted : **H114**	
2. Total Percent Efficiency of Control : %	
3. Potential Emissions : 0.0019000 lb/hour	0.0007000 tons/year
4. Synthetically Limited? [ ] Yes [X] No	
5. Range of Estimated Fugitive/Other Emissions: to	tons/year
6. Emissions Factor 0 Reference : AP-42	Units : lb/mmBtu
7. Emissions Method Code : 0	
8. Calculations of Emissions : Heat input for oil firing = 2039.42 MBtu/h (2039.42 MBtu/h)x(0.00000091 lb/MBtu)x(720 h/yr)/(2,000 lb/ton) = 0.0007 ton/yr Ref: AP-42 (fifth edition) Ref: 2039.42 MBtu/h is the maximum heat input for fuel oil firing based on the higher heating value (HHV).	
9. Pollutant Potential/Estimated Emissions Comment : Mercury (Hg)	

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Emissions Unit Information Section 1
Unit 3 - 250 MW Combined Cycle Combustion Turbine

Pollutant Potential/Estimated Emissions : Pollutant 7

1. Pollutant Emitted : **H015**		
2. Total Percent Efficiency of Control :	%	
3. Potential Emissions :	0.0100000 lb/hour	0.0040000 tons/year
4. Synthetically Limited? [ ] Yes [X] No		
5. Range of Estimated Fugitive/Other Emissions:	to	tons/year
6. Emissions Factor 0 Reference : AP-42	Units : lb/MBtu	
7. Emissions Method Code : 0		

8. Calculations of Emissions :

Heat input for oil firing = 2039.42 MBtu/h
(2039.42 MBtu/h)x(4.9E-6 lb/MBtu) = 0.01 lb/h
(0.01 lb/h)x(720 h/yr)/(2,000 lb/ton) = 0.004 ton/yr

Ref: AP-42 (fifth edition)
Ref: 2039.42 MBtu/h is the maximum hear input for fuel oil firing based on the higher heating value (HHV).

9. Pollutant Potential/Estimated Emissions Comment :

Arsenic (As)

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Emissions Unit Information Section 1
Unit 3 - 250 MW Combined Cycle Combustion Turbine

Pollutant Potential/Estimated Emissions : Pollutant 8

1. Pollutant Emitted : **H021**

2. Total Percent Efficiency of Control : %

3. Potential Emissions :
0.0007000 lb/hour 0.0002500 tons/year

4. Synthetically Limited?
[ ] Yes [X] No

5. Range of Estimated Fugitive/Other Emissions:
to tons/year

6. Emissions Factor 0 Units : lb/mmBtu
Reference : AP-42

7. Emissions Method Code : 0

8. Calculations of Emissions :

Heat input for oil firing = 2039.42 MBtu/h
(2039.42 MBtu/h)x(3.3E-7 lb/MBtu) = 0.0007 lb/h
(0.0007 lb/h)x(720 h/yr)/(2,000 lb/ton) = 0.00025 ton/yr

Ref: AP-42 (fifth edition)
Ref: 2039.42 MBtu/h is the maximum hear input for fuel oil firing based on the higher heating value (HHV).

9. Pollutant Potential/Estimated Emissions Comment :

Beryllium

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Emissions Unit Information Section 1

Unit 3 - 250 MW Combined Cycle Combustion Turbine

Pollutant Potential/Estimated Emissions : Pollutant 9

1. Pollutant Emitted : **PB**

2. Total Percent Efficiency of Control : %

3. Potential Emissions :
   0.1200000 lb/hour 0.0400000 tons/year

4. Synthetically Limited?
   [ ] Yes [X] No

5. Range of Estimated Fugitive/Other Emissions:
   to tons/year

6. Emissions Factor 0 Units : lb/mmBtu
   Reference : AP-42

7. Emissions Method Code : 0

8. Calculations of Emissions :

   Heat input for oil firing = 2039.42 MBtu/h
   (2039.42 MBtu/h)x(5.8E-5 lb/MBtu) = 0.12 lb/h
   (0.12 lb/h)x(720 h/yr)/(2,000 lb/ton) = 0.04 ton/yr

   Ref: AP-42 (fifth edition)
   Ref: 2039.42 MBtu/h is the maximum hear input for fuel oil firing based on the higher heating value (HHV).

9. Pollutant Potential/Estimated Emissions Comment :

   Lead (Pb)

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Emissions Unit Information Section 1
Unit 3 - 250 MW Combined Cycle Combustion Turbine

Pollutant Potential/Estimated Emissions : Pollutant 10

1. Pollutant Emitted : **H095**	
2. Total Percent Efficiency of Control : %	
3. Potential Emissions : lb/hour	tons/year
4. Synthetically Limited? [ ] Yes [X] No	
5. Range of Estimated Fugitive/Other Emissions: to	tons/year
6. Emissions Factor Reference :	Units :
7. Emissions Method Code :	
8. Calculations of Emissions :	
9. Pollutant Potential/Estimated Emissions Comment :	

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Emissions Unit Information Section 1

Unit 3 - 250 MW Combined Cycle Combustion Turbine

Pollutant Potential/Estimated Emissions : Pollutant 11

1. Pollutant Emitted : **PM10**

2. Total Percent Efficiency of Control : %

3. Potential Emissions :
102.1000000 lb/hour 109.1200000 tons/year

4. Synthetically Limited?
[ ] Yes [X] No

5. Range of Estimated Fugitive/Other Emissions:
to tons/year

6. Emissions Factor Units :
Reference : Manufacturer

7. Emissions Method Code : 0

8. Calculations of Emissions :

Highest hourly emissions for either combined or simple cycle operation:
Natural gas = 18 lb/h
Fuel oil = 102.1 lb/h

Potential hours of operation:
Natural gas = 8,760 h/yr
Fuel Oil = 720 h/yr

Potential annual emissions:
[(18 lb/h x 8,040 h/yr) + (102.1 lb/h x 720 h/yr)] / (2,000 lb/ton) = 109.12 tons/y

9. Pollutant Potential/Estimated Emissions Comment :

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Emissions Unit Information Section 1

Unit 3 - 250 MW Combined Cycle Combustion Turbine

Emission calculations based on manufacturer's guarantees. Based on 72°F ambient conditions.

Emissions Unit Information Section 1
Unit 3 - 250 MW Combined Cycle Combustion Turbine

Pollutant Information Section 11

Allowable Emissions 1

1. Basis for Allowable Emissions Code :	OTHER			
2. Future Effective Date of Allowable Emissions :				
3. Requested Allowable Emissions and Units :	18.60	lb/h		
4. Equivalent Allowable Emissions :	18.60	lb/hour	81.50	tons/year
5. Method of Compliance :				
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) : Natural gas firing for 8,760 h/yr. Expected lb/h operating limit for forthcoming air constr. permit. Max lb/h emission rate considering all temps, vendors, modes of operation, and loads.				

Emissions Unit Information Section 1

Unit 3 - 250 MW Combined Cycle Combustion Turbine

Pollutant Information Section 11

Allowable Emissions 2

1. Basis for Allowable Emissions Code :	OTHER
2. Future Effective Date of Allowable Emissions :	
3. Requested Allowable Emissions and Units :	112.60 lb/h
4. Equivalent Allowable Emissions :	112.60 lb/hour 40.50 tons/year
5. Method of Compliance :	
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) :	Oil firing 720 h/yr Expected lb/h operating limit for forthcoming air constr. permit. Max lb/h emission rate considering all temps, vendors, modes of operation, and loads.

I. VISIBLE EMISSIONS INFORMATION
(Regulated Emissions Units Only)

Emissions Unit Information Section 1
Unit 3 - 250 MW Combined Cycle Combustion Turbine

Visible Emissions Limitation : Visible Emissions Limitation 1

1. Visible Emissions Subtype :			
2. Basis for Allowable Opacity : OTHER			
3. Requested Allowable Opacity :			
	Normal Conditions :	10	%
	Exceptional Conditions :	20	%
	Maximum Period of Excess Opacity Allowed :	6	min/hour
4. Method of Compliance : USEPA Method 9 - Visual Determination of Opacity			
5. Visible Emissions Comment :			

J. CONTINUOUS MONITOR INFORMATION
(Regulated Emissions Units Only)

Emissions Unit Information Section 1
Unit 3 - 250 MW Combined Cycle Combustion Turbine

Continuous Monitoring System Continuous Monitor 1

1. Parameter Code : EM	2. Pollutant(s):
3. CMS Requirement OTHER	
4. Monitor Information Manufacturer : Unkown Model Number : Unknown Serial Number : Unknown	
5. Installation Date :	
6. Performance Specification Test Date :	
7. Continuous Monitor Comment : CEM will be installed before operation of emission source. Required as a condition of 40 CFR 75. This CEM will be installed on the HSRG stack.	

Continuous Monitoring System Continuous Monitor 2
:

1. Parameter Code : EM	2. Pollutant(s):
3. CMS Requirement OTHER	
4. Monitor Information Manufacturer : Unknown Model Number : Unknown Serial Number : Unknown	
5. Installation Date :	
6. Performance Specification Test Date :	
7. Continuous Monitor Comment : CEM will be installed before operation of the emission unit. Required as a condition of 40 CFR 75. This CEM will be installed on the Bypass stack.	

J. CONTINUOUS MONITOR INFORMATION
(Regulated Emissions Units Only)

Emissions Unit Information Section 1

Unit 3 - 250 MW Combined Cycle Combustion Turbine

Continuous Monitoring System Continuous Monitor 3

1. Parameter Code : WTF	2. Pollutant(s):
3. CMS Requirement RULE	
4. Monitor Information Manufacturer : Unknown Model Number : Unknown Serial Number : Unknown	
5. Installation Date :	
6. Performance Specification Test Date :	
7. Continuous Monitor Comment : CEM will be installed before operation of the emission source. Rule: New Source Performance Standards, 40 CFR 60, Subpart GG.	

Continuous Monitoring System Continuous Monitor 4

1. Parameter Code : FLOW	2. Pollutant(s):
3. CMS Requirement OTHER	
4. Monitor Information Manufacturer : Unknown Model Number : Unknown Serial Number : Unknown	
5. Installation Date :	
6. Performance Specification Test Date :	
7. Continuous Monitor Comment : CEM will be installed before operation of the emission source. Fuel oil flow monitoring will be operated pursuant to 40 CFR Part 75.	

J. CONTINUOUS MONITOR INFORMATION
(Regulated Emissions Units Only)

Emissions Unit Information Section 1

Unit 3 - 250 MW Combined Cycle Combustion Turbine

Continuous Monitoring System Continuous Monitor 5

1. Parameter Code : FLOW	2. Pollutant(s):
3. CMS Requirement OTHER	
4. Monitor Information Manufacturer : Unknown Model Number : Unknown Serial Number : Unknown	
5. Installation Date :	
6. Performance Specification Test Date :	
7. Continuous Monitor Comment : CEM will be installed before operation of the emission source. Natural Gas flow monitor installed pursuant to 40 CFR Part 75.	

Continuous Monitoring System Continuous Monitor 6

1. Parameter Code : O2	2. Pollutant(s):
3. CMS Requirement OTHER	
4. Monitor Information Manufacturer : Unknown Model Number : Unknown Serial Number : Unknown	
5. Installation Date :	
6. Performance Specification Test Date :	
7. Continuous Monitor Comment : CEM will be installed before operation of the emission source. This CEM will be installed on the HRSG stack. Required by 40 CFR Part 75.	

J. CONTINUOUS MONITOR INFORMATION
(Regulated Emissions Units Only)

Emissions Unit Information Section 1
Unit 3 - 250 MW Combined Cycle Combustion Turbine

Continuous Monitoring System Continuous Monitor 7

1. Parameter Code : O2	2. Pollutant(s):
3. CMS Requirement OTHER	
4. Monitor Information Manufacturer : Unknown Model Number : Unknown Serial Number : Unknown	
5. Installation Date :	
6. Performance Specification Test Date :	
7. Continuous Monitor Comment : CEM will be installed before operation of the emission source. This CEM will be installed on the By-pass stack. Required by 40 CFR Part 75.	

K. PREVENTION OF SIGNIFICANT DETERIORATION (PSD) INCREMENT
TRACKING INFORMATION

Emissions Unit Information Section 1

Unit 3 - 250 MW Combined Cycle Combustion Turbine

PSD Increment Consumption Determination

1. Increment Consuming for Particulate Matter or Sulfur Dioxide?

[X] The emissions unit is undergoing PSD review as part of this application, or has undergone PSD review previously, for particulate matter or sulfur dioxide. If so, emissions unit consumes increment.

[ ] The facility addressed in this application is classified as an EPA major source pursuant to paragraph (c) of the definition of "major source of air pollution" in Chapter 62-213, F.A.C., and the emissions unit addressed in this section commenced (or will commence) construction after January 6, 1975. If so, baseline emissions are zero, and emissions unit consumes increment.

[ ] The facility addressed in this application is classified as an EPA major source, and the emissions unit began initial operation after January 6, 1975, but before December 27, 1977. If so, baseline emissions are zero, and emissions unit consumes increment.

[ ] For any facility, the emissions unit began (or will begin) initial operation after December 27, 1977. If so, baseline emissions are zero, and emissions unit consumes increment.

[ ] None of the above apply. If so, the baseline emissions of the emissions unit are nonzero. In such case, additional analysis, beyond the scope of this application, is needed to determine whether changes in emissions have occurred (or will occur) after the baseline date that may consume or expand increment.

2. Increment Consuming for Nitrogen Dioxide?

[X] The emissions unit addressed in this section is undergoing PSD review as part of this application, or has undergone PSD review previously, for nitrogen dioxide. If so, emissions unit consumes increment.

[ ] The facility addressed in this application is classified as an EPA major source pursuant to paragraph (c) of the definition of "major source of air pollution" in Chapter 62-213, F.A.C., and the emissions unit addressed in this section commenced (or will commence) construction after February 8, 1988. If so, baseline emissions are zero, and emissions unit consumes increment.

[ ] The facility addressed in this application is classified as an EPA major source, and the emissions unit began initial operation after February 8, 1988, but before March 28, 1988. If so, baseline emissions are zero, and emissions unit consumes increment.

[ ] For any facility, the emissions unit began (or will begin) initial operation after March 28, 1988. If so, baseline emissions are zero, and emissions unit consumes increment.

[ ] None of the above apply. If so, baseline emissions of the emissions unit are nonzero. In such case, additional analysis, beyond the scope of this application, is needed to determine whether changes in emissions have occurred (or will occur) after the baseline date that may consume or expand increment.

3. Increment Consuming/Expanding Code :

PM : C SO2 : C NO2 : C

4. Baseline Emissions :

PM :	lb/hour	tons/year
SO2 :	lb/hour	tons/year
NO2 :		tons/year

5. PSD Comment :

Refer to the attached PSD Air Quality Analysis for further information regarding unit emissions and subsequent air quality impacts.

L. EMISSIONS UNIT SUPPLEMENTAL INFORMATION

Emissions Unit Information Section 1

Unit 3 - 250 MW Combined Cycle Combustion Turbine

Supplemental Requirements for All Applications

1. Process Flow Diagram :	Attachment F
2. Fuel Analysis or Specification :	Attachment G
3. Detailed Description of Control Equipment :	Attachment H
4. Description of Stack Sampling Facilities :	Attachment I
5. Compliance Test Report :	Attachment J
6. Procedures for Startup and Shutdown :	Attachment K
7. Operation and Maintenance Plan :	Attachment L
8. Supplemental Information for Construction Permit Application :	SCA Appnd. 10.7
9. Other Information Required by Rule or Statue :	NA

Additional Supplemental Requirements for Category I Applications Only

10. Alternative Methods of Operations :	NA
11. Alterntive Modes of Operation (Emissions Trading) :	NA

12. Identification of Additional Applicable Requirements :	NA
13. Compliance Assurance Monitoring Plan :	NA
14. Acid Rain Application (Hard-copy Required) : Acid Rain Part - Phase II (Form No. 62-210.900(1)(a)) Repowering Extension Plan (Form No. 62-210.900(1)(a)1.) New Unit Exemption (Form No. 62-210.900(1)(a)2.) Retired Unit Exemption (Form No. 62-210.900(1)(a)3.)	

III. Emissions Unit Information

III. EMISSIONS UNIT INFORMATION

A. TYPE OF EMISSIONS UNIT
(Regulated and Unregulated Emissions Units)

Emissions Unit Information Section 2

Distillate Fuel Oil Storage Tank (1,000,000 gal) No. 3

Type of Emissions Unit Addressed in This Section

1. Regulated or Unregulated Emissions Unit? Check one :

[X] The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit.

[ ] The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.

2. Single Process, Group of Processes, or Fugitive Only? Check one :

[ ] This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent).

[X] This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions.

[ ] This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.

Emissions Unit Information Section 2

B. GENERAL EMISSIONS UNIT INFORMATION
(Regulated and Unregulated Emissions Units)

Emissions Unit Description and Status

1. Description of Emissions Unit Addressed in This Section : Distillate Fuel Oil Storage Tank (1,000,000 gal) No. 3		
2. Emissions Unit Identification Number : 006 [ ] No Corresponding ID [ ] Unknown		
3. Emissions Unit Status Code : C	4. Acid Rain Unit? [ ] Yes [X] No	5. Emissions Unit Major Group SIC Code : 49
6. Emissions Unit Comment : This distillate fuel oil storage tank (1,000,000 gal) is reported as an emission unit because it is subject to regulations based on the emissions guidelines of the New Source Performance Standards 40 CFR 60, Subpart Kb. The tank is a verticle fixed roof design.		

Distillate Fuel Oil Storage Tank (1,000,000 gal) No. 3

Emissions Unit Control Equipment

1. Description :
2. Control Device or Method Code :

C. EMISSIONS UNIT DETAIL INFORMATION
(Regulated Emissions Units Only)

Emissions Unit Information Section 2
Distillate Fuel Oil Storage Tank (1,000,000 gal) No. 3

Emissions Unit Details

1. Initial Startup Date :	01-Jun- 01
2. Long-term Reserve Shutdown Date :	
3. Package Unit : Manufacturer : Unknown	Model Number : Unknown
4. Generator Nameplate Rating :	MW
5. Incinerator Information : Dwell Temperature : Dwell Time : Incinerator Afterburner Temperature :	 Degrees Fahrenheit Seconds Degrees Fahrenheit

Emissions Unit Operating Capacity

1. Maximum Heat Input Rate :	mmBtu/hr	
2. Maximum Incinerator Rate :	lb/hr	tons/day
3. Maximum Process or Throughput Rate :	10496	thousand gal/yr
4. Maximum Production Rate :		
5. Operating Capacity Comment : The maximum throughput rate corresponds to the use of No. 2 fuel oil for 720 hour/year		

Emissions Unit Operating Schedule

Requested Maximum Operating Schedule :	
hours/day	days/week
weeks/year	hours/year

D. EMISSIONS UNIT REGULATIONS
(Regulated Emissions Units Only)

Emissions Unit Information Section 2

Distillate Fuel Oil Storage Tank (1,000,000 gal) No. 3

Rule Applicability Analysis

N/A

List of Applicable Regulations

See Attachment M for list of applicable regulations.

E. EMISSION POINT (STACK/VENT) INFORMATION

Emissions Unit Information Section 2

Distillate Fuel Oil Storage Tank (1,000,000 gal) No. 3

Emission Point Description and Type :

1. Identification of Point on Plot Plan or Flow Diagram : S-8		
2. Emission Point Type Code : 1		
3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking : (limit to 100 characters per point) The emission point for a vertical fixed roof storage tank is the breather valve on the dome roof.		
4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common : There are two types of emissions associated with the breather valve of a vertical fixed roof storage tank as described below. 1.) Storage Loss: Emissions resulting from the expulsion of vapor from a tank through vapor expansion and contraction which are the result of changes in ambient temperature and barometric pressure. (Also known as standing loss). 2.) Working Loss: Emissions resulting from the filling and emptying of the storage tank which are associated with the change in liquid level within the tank.		
5. Discharge Type Code :	P	
6. Stack Height :	0	feet
7. Exit Diameter :	0.0	feet
8. Exit Temperature :	72	°F
9. Actual Volumetric Flow Rate :	0	acfm
10. Percent Water Vapor :	0.00	%
11. Maximum Dry Standard Flow Rate :	0	dscfm
12. Nonstack Emission Point Height :	35	feet

13. Emission Point UTM Coordinates :					
Zone :	17	East (km) :	447.743	North (km) :	3127.475
14. Emission Point Comment :					

F. SEGMENT (PROCESS/FUEL) INFORMATION

Emissions Unit Information Section 2

Distillate Fuel Oil Storage Tank (1,000,000 gal) No. 3

Segment Description and Rate : Segment 1

1. Segment Description (Process/Fuel Type and Associated Operating Method/Mode) : Storage Loss: Emissions resulting from the expulsion of vapor from a tank through vapor expansion and contraction which are the result of changes in ambient temperature and barometric pressure (also known as standing loss or breathing loss).	
2. Source Classification Code (SCC) : 4-03-010-19	
3. SCC Units : Thousand Gallons Stored	
4. Maximum Hourly Rate :	5. Maximum Annual Rate :
6. Estimated Annual Activity Factor : 1,000.00	
7. Maximum Percent Sulfur :	8. Maximum Percent Ash :
9. Million Btu per SCC Unit :	
10. Segment Comment : (1000000 gal stored)/(1000 gal) = 1000 capacity factor	

F. SEGMENT (PROCESS/FUEL) INFORMATION

Emissions Unit Information Section 2

Distillate Fuel Oil Storage Tank (1,000,000 gal) No. 3

Segment Description and Rate : Segment 2

1. Segment Description (Process/Fuel Type and Associated Operating Method/Mode) : Working Loss: Emissions resulting from the filling and emptying of the storage tank which are associated with the change in the liquid level within the tank.	
2. Source Classification Code (SCC) : 4-03-010-21	
3. SCC Units : Thousand Gallons Transferred or Handled	
4. Maximum Hourly Rate :	5. Maximum Annual Rate :
6. Estimated Annual Activity Factor : 10,496.00	
7. Maximum Percent Sulfur :	8. Maximum Percent Ash :
9. Million Btu per SCC Unit :	
10. Segment Comment : (10,495,660 gal of fuel oil consumed by the turbine/year)/(1,000 gal) = 10496.0 gal/yr	

G. EMISSIONS UNIT POLLUTANTS
(Regulated and Unregulated Emissions Units)

Emissions Unit Information Section 2
Distillate Fuel Oil Storage Tank (1,000,000 gal) No. 3

1. Pollutant Emitted	2. Primary Control Device Code	3. Secondary Control Device Code	4. Pollutant Regulatory Code
1 - VOC			NS

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Emissions Unit Information Section 2
Distillate Fuel Oil Storage Tank (1,000,000 gal) No. 3

Pollutant Potential/Estimated Emissions : Pollutant 1

1. Pollutant Emitted : **VOC**	
2. Total Percent Efficiency of Control : %	
3. Potential Emissions : lb/hour	0.3200000 tons/year
4. Synthetically Limited? [ ] Yes [X] No	
5. Range of Estimated Fugitive/Other Emissions: to tons/year	
6. Emissions Factor Units : Reference : TANKS 3.1	
7. Emissions Method Code : 3	
8. Calculations of Emissions : Emissions calculations are based on USEPA's TANKS Version 3.1 program which include both breathing and working loss emissions. See Attachment O	
9. Pollutant Potential/Estimated Emissions Comment : Maximum estimated emissions based on No. 2 distillate fuel oil firing for 720 hours/year,	

Emissions Unit Information Section 2
Distillate Fuel Oil Storage Tank (1,000,000 gal) No. 3

Pollutant Information Section 1

Allowable Emissions 1

1. Basis for Allowable Emissions Code :	RULE
2. Future Effective Date of Allowable Emissions :	
3. Requested Allowable Emissions and Units :	
4. Equivalent Allowable Emissions : lb/hour	tons/year
5. Method of Compliance : As specified in 40 CFR 60.116 (a) and (b), Subpart Kb	
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) : RULE: 40 CFR 60, Subpart Kb - Standards of Performance for Volatile Organic Liquid Storage Vessels for which Construction, Reconstruction, or Modification Commenced after July 23, 1984.	

K. PREVENTION OF SIGNIFICANT DETERIORATION (PSD) INCREMENT TRACKING INFORMATION

Emissions Unit Information Section 2

Distillate Fuel Oil Storage Tank (1,000,000 gal) No. 3

PSD Increment Consumption Determination

1. Increment Consuming for Particulate Matter or Sulfur Dioxide?

[ ] The emissions unit is undergoing PSD review as part of this application, or has undergone PSD review previously, for particulate matter or sulfur dioxide. If so, emissions unit consumes increment.

[ ] The facility addressed in this application is classified as an EPA major source pursuant to paragraph (c) of the definition of "major source of air pollution" in Chapter 62-213, F.A.C., and the emissions unit addressed in this section commenced (or will commence) construction after January 6, 1975. If so, baseline emissions are zero, and emissions unit consumes increment.

[ ] The facility addressed in this application is classified as an EPA major source, and the emissions unit began initial operation after January 6, 1975, but before December 27, 1977. If so, baseline emissions are zero, and emissions unit consumes increment.

[ ] For any facility, the emissions unit began (or will begin) initial operation after December 27, 1977. If so, baseline emissions are zero, and emissions unit consumes increment.

[X] None of the above apply. If so, the baseline emissions of the emissions unit are nonzero. In such case, additional analysis, beyond the scope of this application, is needed to determine whether changes in emissions have occurred (or will occur) after the baseline date that may consume or expand increment.

2. Increment Consuming for Nitrogen Dioxide?

[ ] The emissions unit addressed in this section is undergoing PSD review as part of this application, or has undergone PSD review previously, for nitrogen dioxide. If so, emissions unit consumes increment.

[ ] The facility addressed in this application is classified as an EPA major source pursuant to paragraph (c) of the definition of "major source of air pollution" in Chapter 62-213, F.A.C., and the emissions unit addressed in this section commenced (or will commence) construction after February 8, 1988. If so, baseline emissions are zero, and emissions unit consumes increment.

[ ] The facility addressed in this application is classified as an EPA major source, and the emissions unit began initial operation after February 8, 1988, but before March 28, 1988. If so, baseline emissions are zero, and emissions unit consumes increment.

[ ] For any facility, the emissions unit began (or will begin) initial operation after March 28, 1988. If so, baseline emissions are zero, and emissions unit consumes increment.

[X] None of the above apply. If so, baseline emissions of the emissions unit are nonzero. In such case, additional analysis, beyond the scope of this application, is needed to determine whether changes in emissions have occurred (or will occur) after the baseline date that may consume or expand increment.

3. Increment Consuming/Expanding Code :		
PM :	SO2 :	NO2 :
4. Baseline Emissions :		
PM :	lb/hour	tons/year
SO2 :	lb/hour	tons/year
NO2 :		tons/year
5. PSD Comment :		
Tank does not emit PSD increment consuming pollutants.		

L. EMISSIONS UNIT SUPPLEMENTAL INFORMATION

Emissions Unit Information Section 2

Distillate Fuel Oil Storage Tank (1,000,000 gal) No. 3

Supplemental Requirements for All Applications

1. Process Flow Diagram :	Attachment N
2. Fuel Analysis or Specification :	NA
3. Detailed Description of Control Equipment :	NA
4. Description of Stack Sampling Facilities :	NA
5. Compliance Test Report :	NA
6. Procedures for Startup and Shutdown :	NA
7. Operation and Maintenance Plan :	NA
8. Supplemental Information for Construction Permit Application :	SCA Appnd. 10.7
9. Other Information Required by Rule or Statue :	NA

Additional Supplemental Requirements for Category I Applications Only

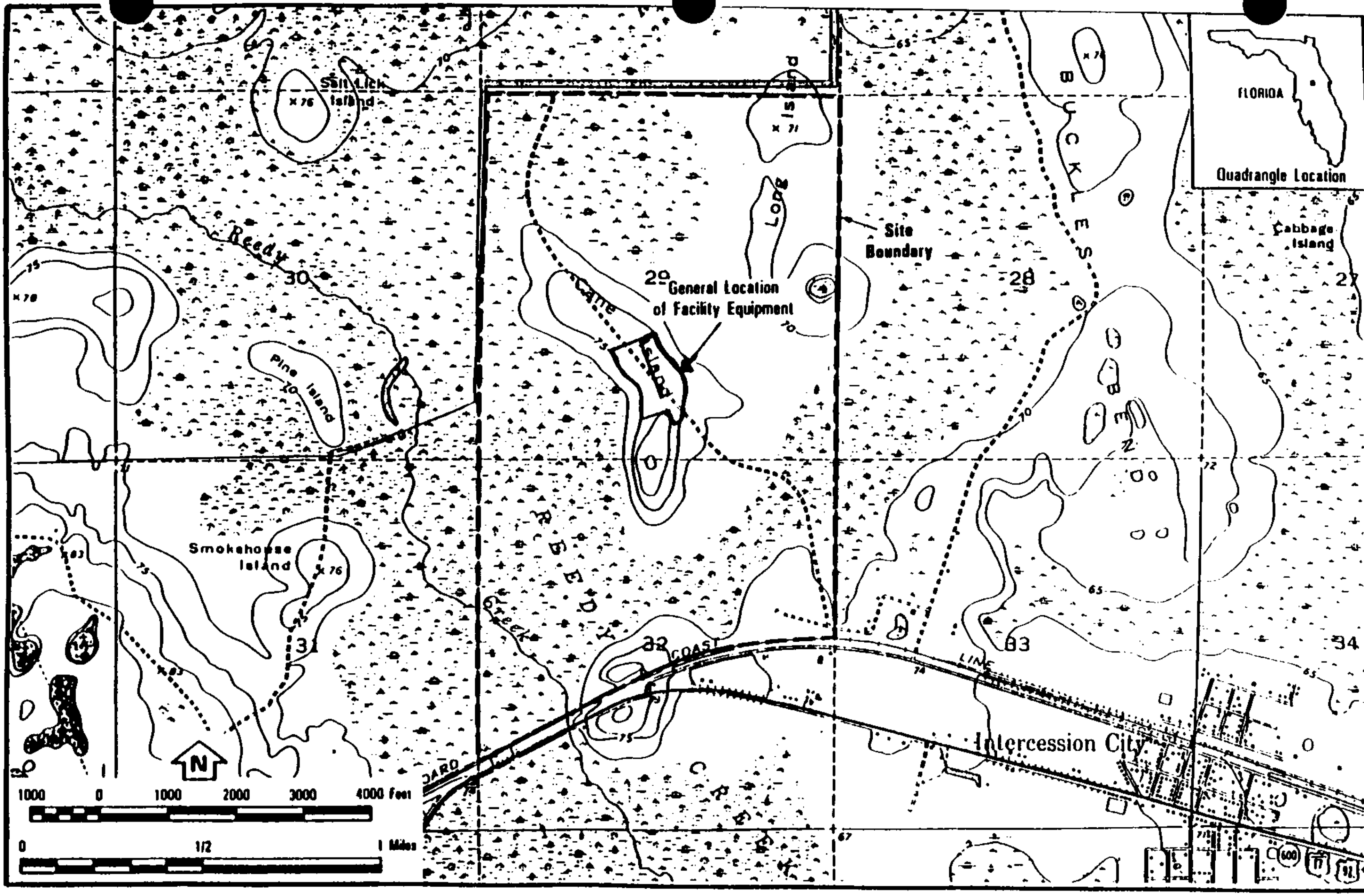
10. Alternative Methods of Operations :	NA
11. Alterntive Modes of Operation (Emissions Trading) :	NA

12. Identification of Additional Applicable Requirements :	NA
13. Compliance Assurance Monitoring Plan :	NA
14. Acid Rain Application (Hard-copy Required) :	
NA	Acid Rain Part - Phase II (Form No. 62-210.900(1)(a))
NA	Repowering Extension Plan (Form No. 62-210.900(1)(a)1.)
NA	New Unit Exemption (Form No. 62-210.900(1)(a)2.)
NA	Retired Unit Exemption (Form No. 62-210.900(1)(a)3.)

Attachment A

Attachment A

Area Map Showing Facility Location



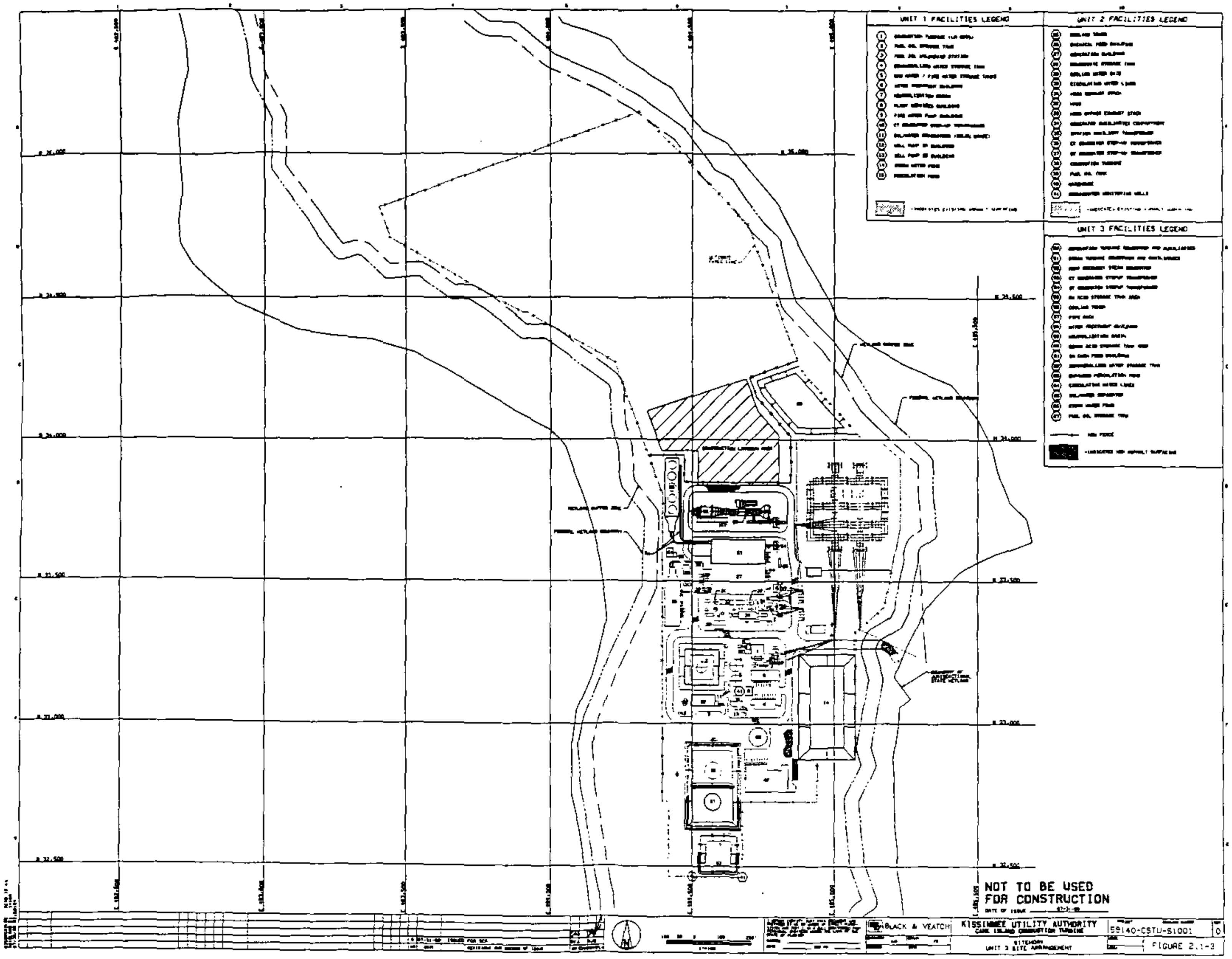
Base Map Source: USGS,
Intercession City, FL, 1970, quad.

CANE ISLAND SITE LOCATION

Attachment B

Attachment B

Facility Plot Plan


UNIT 1 FACILITIES LEGEND
UNIT 2 FACILITIES LEGEND
UNIT 3 FACILITIES LEGEND
NOT TO BE USED
FOR CONSTRUCTION
BLACK & VEATCH
KISSIMMEE UTILITY AUTHORITY
UNIT 3 SITE ARRANGEMENT
59140-CSTU-S1001
0
FIGURE 2.1-3

Attachment C

Attachment C

Process Flow Diagrams
(See individual unit process flow diagrams, Attachments F, and N)

Attachment D

Attachment D

Facility Applicable Requirements

Facility Applicable Requirements

Applicable Regulation	Applicable Requirement
40 CFR 60.7, Notification and recordkeeping	Any physical or operational change to an existing facility which may increase the emission of any air pollutant requires notification pursuant to this rule, postmarked 60 days before the change is commenced.
	An excess emissions and monitoring systems performance report shall be submitted semiannually. The facility shall maintain records of the occurrence and duration of any startup, shutdown, or malfunction in the operation of the facility; any malfunction of the air pollution control equipment; or any period the CEMS is inoperable.
	The owner or operator of an affected facility shall maintain a file of CEMS and performance test measurements, evaluations, and calibration checks for two years following the date of such activity.
40 CFR 60.8 (d), Testing	Notify the Administrator of any performance test at least 30 days prior to the test.
40 CFR 60.8 (e), Testing	Provide sampling ports, safe sampling platform, utilities and testing equipment prior to stack test.
40 CFR 60.13, Monitoring Requirements	For CEMS subject to this part, the owner or operator shall check the zero and span calibration drifts at least once daily. The zero and span shall be adjusted whenever the 24-hour zero drift or span drift exceeds two times the limits of the performance specification.
40 CFR 61.5, Prohibited activities	Ninety days after the effective date of any standard pursuant to this part, no owner or operator shall operate any existing source subject to that standard in violation of the standard.
40 CFR 72.9, Standard requirements	A complete Acid Rain permit application shall be submitted for the affected facility by January 1, 1998.
40 CFR 72.21, Submissions	Each submission under the Acid Rain program shall be submitted, signed, and certified by the designated representative.

Applicable Regulation	Applicable Requirement
40 CFR 72.90, Annual compliance certification report	Sixty days after the end of the calendar year, the designated representative shall submit an annual compliance certification report for each affected unit.
40 CFR 75.3, Compliance dates	Gas or oil fired Acid Rain affected units commencing operation after Nov. 15, 1990 which are not located in an ozone nonattainment area or the ozone transport region shall complete all NO_x and CO_2 CEMS certification tests by Jan. 1, 1996.
40 CFR 75.5, Prohibitions	No owner or operator of an affected Acid Rain unit shall operate the unit without complying with the requirements of 40 CFR 75.2 through 40 CFR 75.67 and appendices A through I of Part 75.
F.A.C. 62-4.030, General Prohibition	Any stationary installation which will be a source of air pollution shall not be operated, maintained, constructed, expanded, or modified without appropriate and valid permits issued by the DEP.
F.A.C. 62-4.090, Renewals	Submit an operating permit renewal application to the FDEP 180 days before the expiration of the operating permit.
F.A.C. 62-4.130, Plant Operation - Problems	If a facility is temporarily unable to comply with any of the conditions of a permit due to breakdown of equipment or destruction by hazard of fire, wind, or by other cause, the permittee shall immediately notify the DEP.
F.A.C. 62-4.160, Permit Conditions	The permittee shall allow authorized DEP personnel access to the facility where the permitted activity is located to have access to and copy any records that must be kept under conditions of the permit; inspect the facility, equipment, practices, or operations regulated or required under the permit; and sample or monitor any substances or parameters at any location reasonable necessary to assure compliance with permit conditions.

Applicable Regulation	Applicable Requirement
	If the permittee does not comply with or will be unable to comply with any condition or limitation of permit number AC 49-205703, the permittee shall immediately provide the DEP with a description of and cause of noncompliance; the period of noncompliance including dates and times, or, if not corrected, the anticipated time the noncompliance is expected to continue; and steps being taken to reduce, eliminate, and prevent recurrence of the noncompliance.
	Permits, or a copy thereof, shall be kept at the work site of the permitted activity.
	The permittee shall furnish all records and plans required under DEP rules; hold at the facility all monitoring information, reports, and records of data for at least three years from the date of the sample, measurement, report, or application.
F.A.C. 62-4.160, Permit Conditions (continued)	When requested by DEP, the permittee shall furnish, within a reasonable time, any information required by law which is needed to determine compliance with any permit.
F.A.C. 62-4.210, Construction Permits	No person shall construct any installation or facility which will reasonably be expected to be a source of air pollution without first applying for and receiving a construction permit from the DEP unless exempted by statute or DEP rule.
F.A.C. 62-210.300, Permits Required	An air construction permit shall be obtained by the owner or operator of any proposed new or modified facility or emissions unit prior to the beginning of construction or modification
F.A.C. 62-210.350, Public Notice and Comment	A notice of proposed agency action on a permit application as described in F.A. C. 62-210.350(1)(a), where the proposed agency action is to issue the permit, shall be published by the applicant.
F.A.C. 62-210.360, Administrative Permit Corrections	A facility owner shall notify the DEP by letter of minor corrections to information contained in a permit. For operating permits, a copy shall be provided to the EPA.

Applicable Regulation	Applicable Requirement
F.A.C. 62-210.370, Reports	An Annual Operating Report for Air Pollution Emitting Facility (DEP Form No. 62-210.900(5)) shall be completed each year for all Title V sources. The annual operating report shall be submitted by March 1 of the following year.
F.A.C. 62-210.650, Circumvention	No person shall circumvent any air pollution control device, or allow the emission of air pollutants without the applicable air pollution control device operating properly.
F.A.C. 62-210.700, Excess Emissions	In case of excess emissions resulting form malfunctions, each owner or operator shall notify the DEP in accordance with F.A.C. 62-4.130.
F.A.C. 62-213.205, Annual Emissions Fee	Each Title V source must pay an annual emissions fee between January 15 and March 1 based on the factors identified in this rule.
F.A.C. 62-213.420, Permit Applications	Each Title V Acid Rain source that commenced operation on or before October 25, 1995 shall submit an operating permit application by June 15, 1996.
F.A.C. 62-214.320, Applications	New acid rain sources must submit an Acid Rain Part application in accordance with the provisions of 40 CFR Part 72.
F.A.C. 62-273.400, Air Pollution Episodes	Upon a declaration that an air pollution episode level exists (alert, warning, or emergency), any person responsible for the operation or conduct of activities which result in emission of air pollutants shall take actions as required in F.A.C. 62-273.400, 62-273.500, and 62-273.600.
F.A.C. 62-273.400, Air Alert	Upon a declaration of an air alert, open burning will be prohibited and motor vehicle operation minimized.
F.A.C. 62-273.500, Air Warning	Upon a declaration of an air warning, open burning will be prohibited and motor vehicle operation minimized. In addition, unnecessary space heating/cooling is prohibited.
F.A.C. 62-273.600, Air Emergency	Upon a declaration of an air emergency, operations will be restricted as prescribed under 62-273.600.

Applicable Regulation	Applicable Requirement
F.A.C. 62-296.320, General Pollutant Emission Limiting Standards	No person shall store, pump, handle, process, load, unload, or use in any process or installation, VOCs or organic solvents without applying known and existing vapor emission control devices or systems deemed necessary by the DEP.
	No person shall cause, suffer, allow, or permit the discharge of air pollutants which cause or contribute to an objectionable odor.
	Open burning in connection with industrial, commercial, or municipal operations is prohibited except if an emergency exists which requires immediate action to protect human health and safety.
	No person shall cause, let, permit, suffer, or allow the emissions of unconfined particulate matter from any activity without taking reasonable precautions to prevent such emissions.

Applicable Regulation	Applicable Requirement
F.A.C. 62-296.405, Fossil Fuel Steam Generators with more than 250 MBtu/hour Heat Input	The test method for visible emissions shall be DEP Method 9 as incorporated in F.A.C. 62-297.
	The test method for particulate emissions shall be EPA Methods 17, 5, 5B, or 5F as incorporated in F.A.C. 62-297.
F.A.C. 62-296.405, Fossil Fuel Steam Generators with more than 250 MBtu/hour Heat Input (continued)	The test method for sulfur dioxide emissions shall be DEP Methods 6, 6A, 6B, or 6C as incorporated in F.A.C. 62-297. Fuel sampling and analysis may be used as an alternate sampling procedure if such a procedure is incorporated in the operation permit for the emissions unit.
	Each owner or operator of an emission unit subject to this rule shall install, calibrate, operate, and maintain a continuous monitoring system according to the requirements of 40 CFR 51, Appendix P and 40 CFR 60, Appendix B.
F.A.C. 62-297.310, General Test Requirements	Compliance tests for mass emission limitations shall consist of three complete and separate determinations of the total air pollutant emission rate, and three complete and separate determinations of any applicable process variables according to the test procedures delineated in this rule.

Attachment E

Attachment E

Unit Specific Applicable Requirements

250 MW Combined Cycle Combustion Turbine
Unit Specific Applicable Requirements

Applicable Regulations	Applicable Requirement
40 CFR 60.8, Performance tests	Within 60 days after achieving the maximum production rate, but not later than 180 days after initial startup, the owner or operator shall conduct performance tests in accordance with applicable methods and procedures contained in 40 CFR 60.
40 CFR 60.13, Monitoring Requirements	For CEMS subject to this part, the owner or operator shall check the zero and span calibration drifts at least once daily. The zero and span shall be adjusted whenever the 24-hour zero drift or span drift exceeds two times the limits of the performance specification.
40 CFR 60.332, Standard for nitrogen oxides	No owner or operator shall discharge into the atmosphere from any stationary gas turbine, any gases which contain nitrogen oxides in excess of the equation specified in 40 CFR 60.332(a)(1).
40 CFR 60.333, Standard for sulfur dioxide	No owner or operator shall burn in any stationary gas turbine any fuel which contains sulfur in excess of 0.8 percent by weight.
40 CFR 60.334, Monitoring of operations	The owner or operator of any stationary gas turbine which uses water injection to control NO_x emissions shall install and operate a continuous monitoring system to monitor and record the fuel consumption and ratio or water to fuel.
	The owner or operator of any stationary gas turbine shall monitor sulfur and nitrogen content as follows: For fuel oil from bulk storage tank, the values shall be determined each time fuel is transferred to the storage tank. For natural gas (no bulk storage), the values shall be determined and recorded daily.

Applicable Regulations	Applicable Requirement
	The following periods of excess emissions shall be reported as defined in 40 CFR 60.334(c)(1): Any one-hour period where the average water-to-fuel ratio falls below required limits or the nitrogen content of the fuel exceeds allowable limits. Any daily period during which the sulfur content of the fuel fired exceeds 0.8 percent.
40 CFR 60.335, Test methods and procedures	The facility shall comply with the test methods and monitoring procedures defined in these provisions.
40 CFR 72.9, Standard requirements	A complete Acid Rain permit application shall be submitted for the affected facility by January 1, 1998.
40 CFR 72.21, Submissions	Each submission under the Acid Rain program shall be submitted, signed, and certified by the designated representative.
40 CFR 75.3, SUBPART A - General, Compliance dates	Gas or oil fired Acid Rain affected units commencing operation after Nov. 15, 1990 which are not located in an ozone nonattainment area or the ozone transport region shall complete all NO_x and CO_2 CEMS certification tests by Jan. 1, 1996.
40 CFR 75.5, Prohibitions	No owner or operator of an affected Acid Rain unit shall operate the unit without complying with the requirements of 40 CFR 75.2 through 40 CFR 75.67 and appendices A through I of Part 75.
	No owner or operator of an affected unit shall use any alternative monitoring system or reference method without written approval from the DEP.
40 CFR 75.5, Prohibitions (continued)	No owner or operator of an affected unit shall disrupt the continuous emission monitoring system, any portion thereof, or any other approved emission monitoring method except for periods of recertification, or periods when calibrations, quality assurance, or maintenance is performed pursuant to 40 CFR 75.21 and Appendix B.

Applicable Regulations	Applicable Requirement
	No owner or operator shall retire or permanently discontinue use of the CEMS, any component thereof, except as allowed in 40 CFR 75.5(f).
40 CFR 75.10, SUBPART B - Monitoring Provisions, General operating requirements	The owner or operator shall install, certify, operate, and maintain a NO_x continuous emission monitoring system (NO_x pollutant monitor and an O_2 or CO_2 diluent gas monitor) with automated DAHS which records NO_x concentration, O_2 or CO_2 concentration, and NO_x emission rate.
	The owner or operator shall measure CO_2 emissions using a method specified in 40 CFR 75.10 through 75.16 and Appendices E and G.
	The owner or operator shall determine and record the heat input to the affected unit for every hour any fuel is combusted according to the procedures in Appendix F of this subpart.
	The owner or operator shall ensure that each CEMS, and component thereof, is capable of completing a minimum of one cycle of operation for each successive 15-minute interval.
40 CFR 75.11, Specific provisions for monitoring SO_2	Gas and oiled fired units shall measure and record SO_2 emissions as specified in 40 CFR 75, Appendix D.
40 CFR 75.20, SUBPART C - Operation and Maintenance Requirements, Certification and recertification procedures	The owner or operator shall ensure that each CEMS meets the initial certification requirements as specified in this section including notification and certification application.
	Whenever a replacement, modification, or change in the certified CEMS (including the DAHS and CO_2 systems) is made, the owner or operator shall recertify the CEMS, or component thereof, according to the procedures identified in 40 CFR 75.20(b) and (c).
	The owner or operator of a by-pass stack CEMS shall comply with all the requirements of 40 CFR 75.20 (a), (b), and (c) except only one nine-run relative accuracy test audit for certification or recertification of the flow monitor needs to be performed.

Applicable Regulations	Applicable Requirement
	The owner or operator using the optional SO_2 monitoring protocol of Appendix D of this subpart shall ensure that this system meets the certification requirements of 40 CFR 75.20(g).
40 CFR 75.21, Quality assurance and quality control requirements	The provisions of this part are suspended from July 17, 1995 through December 31, 1996. The owner or operator shall operate, calibrate, and maintain each CEMS according to the procedures of 40 CFR 75, Appendix B.
40 CFR 75.24, Out-of-control periods	If an out-of-control period occurs to a CEMS, the owner or operator shall take corrective action, as delineated in 40 CFR 75.24(c) through (e), and repeat tests applicable to the "out-of-control" parameter.
40 CFR 75.30, SUBPART D - Missing Data Substitution Procedures	The owner or operator shall provide substitute data according to the missing data procedures provided in 40 CFR 75.30 through 75.36.
40 CFR 75.51, SUBPART F - Recordkeeping Requirements, General recordkeeping provisions for specific situations	The owner or operator shall comply with the recordkeeping requirements of 40 CFR 75.51(c)(1) through (3) when combusting natural gas and fuel oil.
40 CFR 75.52, Certification, quality assurance, and quality control record provisions	The owner or operator shall record the applicable information listed in 40 CFR 75.52(a)(1) through (3) and 40 CFR 75.52(a)(5) through (7).
40 CFR 75.53, Monitoring Plan	The owner or operator shall prepare and maintain a monitoring plan pursuant to all applicable portions of this section.
40 CFR 75.54, General recordkeeping provisions	The owner or operator shall maintain a file of applicable measurements, data, reports, and other information required by 40 CFR 75 at the source for at least three (3) years according to the provisions of this section.
40 CFR 75.55, General recordkeeping provisions for specific situations	For SO_2 emission records, the owner or operator shall record information as required in 40 CFR 75.55(c) in lieu of the provisions of 40 CFR 75.54(c).
40 CFR 75.56, Certification, quality assurance, and quality control record provisions	The owner or operator shall record the applicable information listed in 40 CFR 75.56(a)(1) through (3) and 40 CFR 75.56(a)(5) through (7).

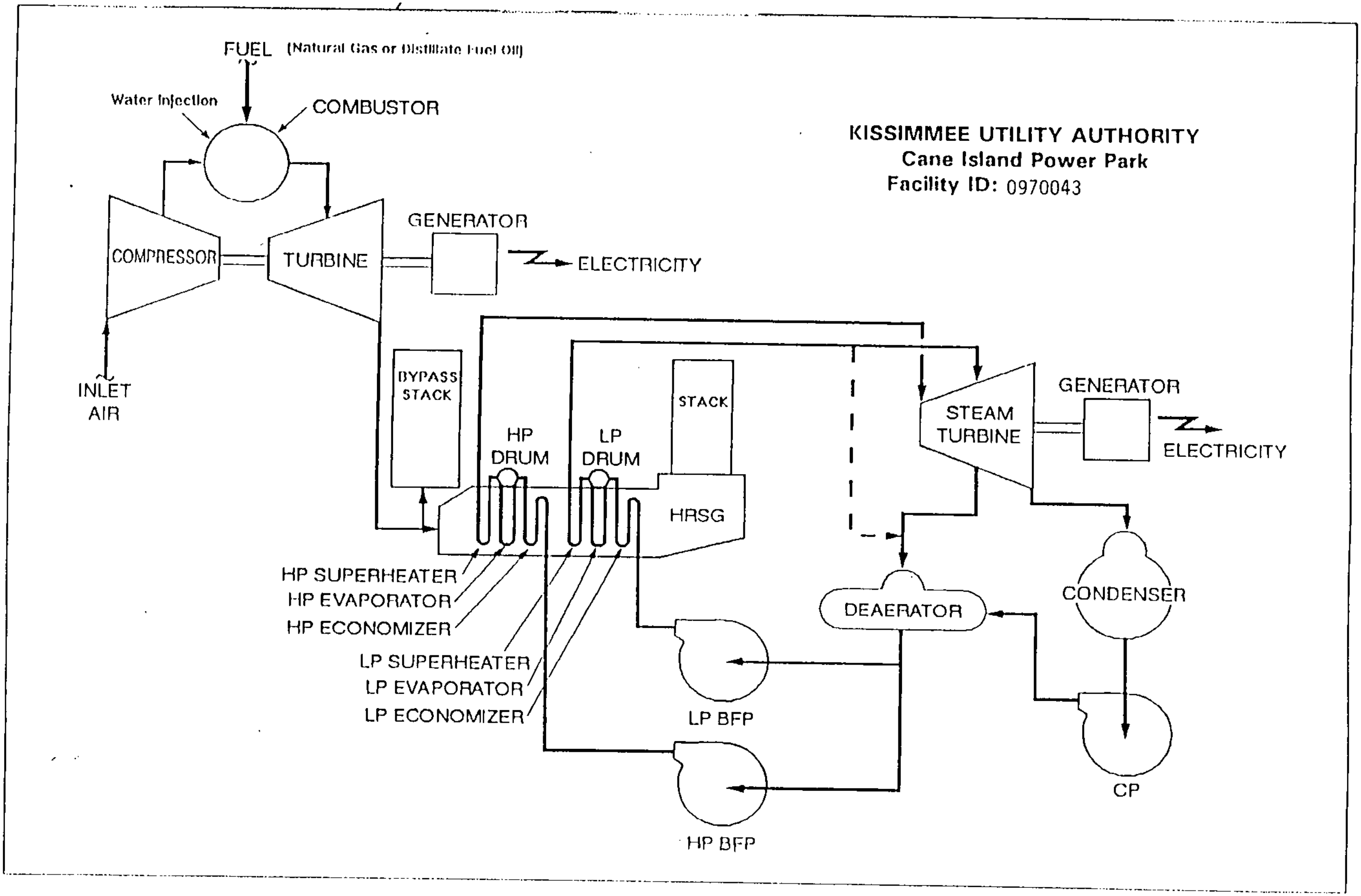
Applicable Regulations	Applicable Requirement
40 CFR 75.60, SUBPART G - Reporting Requirements, General Provisions	The designated representative shall comply with all reporting requirements of this section for all submissions, and follow the procedures of 40 CFR 75.60(c) for any claims of confidential data.
40 CFR 75.61, Notifications	The designated representative shall submit proper notifications of specified data in this section.
40 CFR 75.62, Monitoring plan	The designated representative shall submit the monitoring plan no later than 45 days prior to the first scheduled certification test except as noted in this section.
40 CFR 75.64, Quarterly reports	The designated representative shall electronically submit the data specified in 40 CFR 75.64 (a), (b), and (c) on a quarterly basis.
40 CFR 75, Appendix A	The owner or operator shall adhere to all applicable specifications and test procedures identified in this section.
40 CFR 75, Appendix B	The owner or operator shall adhere to all applicable quality assurance and quality control procedures identified in this section.
40 CFR 75, Appendix C	The owner or operator shall adhere to all applicable missing data estimation procedures identified in this section.
40 CFR 75, Appendix D	The owner or operator shall adopt the protocol for SO_2 emissions monitoring, and adhere to all applicable requirements, as identified in this section.
40 CFR 75, Appendix F	The owner or operator shall adhere to all applicable conversion procedures identified in this section.
40 CFR 75, Appendix H, Revised Traceability Protocol No. 1	The owner or operator shall adhere to all applicable requirements identified in this section
40 CFR 75, Appendix J	The owner or operator shall adhere to all applicable requirements identified in this appendix.
F.A.C. 62-210.650, Circumvention	No person shall circumvent any air pollution control device, or allow the emission of air pollutants without the applicable air pollution control device operating properly.

Applicable Regulations	Applicable Requirement
F.A.C. 62-210.700, Excess Emissions	In case of excess emissions resulting from malfunctions, each owner or operator shall notify the DEP in accordance with F.A.C. 62-4.130.
F.A.C. 62-296.405	The owner must submit a written report of excess emissions for each unit requiring NSPS monitoring each calendar quarter to the FDEP.
F.A.C. 62-297.310, General Test Requirements	Compliance tests for mass emission limitations shall consist of three complete and separate determinations of the total air pollutant emissions rate, and three complete and separate determinations of any applicable process variables according to the test procedures delineated in this rule.

Attachment F

Attachment F

Process Flow Diagram



250 MW Combined Cycle Combustion Turbine
Process Flow Diagram

Attachment G

Attachment G

Fuel Analysis or Specification

3075 CORNERS NORTH COURT
NORCROSS, GEORGIA 30091-5000
(770) 448-5235
(800) 241-6315

KISSIMMEE UTL AUTHORITY - CANE ISLAND
SCOTT YELVINGTON
P O BOX 423219
KISSIMMEE FL 34742-3219

Lab Number : 9568
Logged Date : 29-MAY-96
Sample Drawn : 28-MAY-96
Report Date : 31-MAY-96
Record Ref.# : 366310

Unit ID : UNIT 2
Sample ID : FUEL OIL #2
Worksite : CANE ISLAND
Time On Fluid :

Mfg. : UNKNOWN
Model : -
PO No.: 10114
Time On System :

TESTING PERFORMED:	MEASURED
Heat of Combustion Calc (Fuel oil) D4868	
Ash Content, % wt. - D482	0.001
Sulfur Content by XRF, % wt - D4294	0.03
Water Content KF (ppm) D1744	77
Density,Kg/L @ 15'C - D1298	00.8450
Gross Heat Value, BTU/gl - ASTM D4868	138064
Net Heat Value, BTU/gl - ASTM D4868	129550
Gross Heat Value, BTU/lb - ASTM D4868	19615
Net Heat Value, BTU/lb - ASTM D4868	18405
Arsenic, ppm, EPA 7060	<0000.05
Beryllium, ppm, EPA 7091	<0000.05
Mercury, ppm, EPA 7471	<0000.05
Lead, ppm, EPA 7421	0000.07

RECOMMENDATIONS / COMMENTS:

SAMPLE SUBMITTED AND PROCESSED FOR THE TEST DATA (ONLY).

Respectfully Submitted,

Analysts, Inc.

ANALYTICAL CHEMISTS SINCE 1900

NICHOLS LABORATORY, INC.

1924 Tennessee Avenue • Knoxville, Tennessee 37921 • (615) 523-6449

Certificate of Analysis

April 25, 1995

Power Generation Technologies
200 Tech Center Drive
Knoxville, TN 37912

Received: 4/20/95

Purchase Order No: ESC 05093

Lab ID # NF-2893

Sample ID # Kissimmee Utility Authority, Composite Sample
(50 ml each of ten samples)

	T – 60°F	70°F	100°F
1) Specific Gravity @ T ....:	0.8475	0.8455	0.8412
2) Density @ T, g/cc ....:	0.8467	0.8438	0.8412
3) Pounds Per U.S. Gallon @ T ....:	7.0652	7.0408	6.9700
4) Gross Heating Value, Btu/lb ....:	19505		
5) Btu Per Gallon ....:	137,807		

Ref: ASTM D 1250 (tables); D 1298; D 4809-90.

Ultimate Analysis

6) % Carbon ....: 87.16

7) % Hydrogen ....: 12.68

8) % Nitrogen ....:< 0.50

9) % Sulfur ....: 0.0435

10) % Ash ....:< 0.001

11) % Oxygen by Difference ....: 0.00

Ref: ASTM D 129; D 482; D 5291

Sincerely yours,
Nichols Laboratory, Inc.

David V. Deitz
President

Microbac Labo...
ERIE TESTING LAB
1962 WAGER ROAD
ERIE PA 16509
(814)825-8533

Microbac

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CERTIFICATE OF ANALYSIS

ENVIRONMENTAL SYSTEMS CORP.
.
200 TECH CENTER DRIVE
ATTN: JAMES M. SUTTON
KNOXVILLE TN 37912

Date Reported	4/27/95
Date Received	4/21/95
Order No	9504-01099
Invoice No	038527
Cust #	005186
Sampled Date	4/12/95
Sampled Time	00:00
Sample Id	

Permit No
Cust P.O. #ESC07184

Subject: 11-GAS SAMPLES FOR LHV/DENSITY, RECD. 4/21/95

SMP	TEST	METHOD	RESULT	UNITS	DATE	TIME	TECH
1	GAS 01, #1						
	LOWER HEATING VALUE (GAS)	ASTM 1945-80/GPA 2261-90			4/25/95	15:00	EVM
	[illegible]EN		0.32	%	4/25/95	15:00	EVM
	ME[illegible]NE		95.33	%	4/25/95	15:00	EVM
	ETHANE		2.56	%	4/25/95	15:00	EVM
	PROPANE		0.67	%	4/25/95	15:00	EVM
	ISO-BUTANE		0.19	%	4/25/95	15:00	EVM
	N-BUTANE		0.15	%	4/25/95	15:00	EVM
	ISO-PENTANE		0.06	%	4/25/95	15:00	EVM
	N-PENTANE		0.03	%	4/25/95	15:00	EVM
	HEXANES		<0.02	%	4/25/95	15:00	EVM
	CARBON DIOXIDE		0.68	%	4/25/95	15:00	EVM
	BTU, DRY (HIGH HEAT VAL)		1041.89	BTU/CU.FT.	4/25/95	15:00	EVM
	BTU, SAT. (HIGH HEAT VAL)		1023.76	BTU/CU.FT.	4/25/95	15:00	EVM
	NET BTU, DRY (LOW HEAT VAL)		939.43	BTU/CU.FT.	4/25/95	15:00	EVM
	NET BTU, SAT.(LOW HEAT VAL)		923.08	BTU/CU.FT	4/25/95	15:00	EVM
	REAL SPECIFIC GRAVITY		0.5875		4/25/95	15:00	EVM
	ACTUAL NET BTU		939.43	BTU/CU.FT.	4/25/95	15:00	EVM
	ACTUAL NET BTU		20,986.10	BTU/LB.	4/25/95	15:00	EVM
	DENSITY		0.000719717	G/ML	4/25/95	15:00	EVM
	DENSITY		0.04493573	LBS/CU.FT.	4/25/95	15:00	EVM
2	GAS 01, #2						
	LOWER HEATING VALUE (GAS)	ASTM 1945-80/GPA 2261-90			4/25/95	15:00	EVM
	NITROGEN		0.49	%	4/25/95	15:00	EVM
	METHANE		95.24	%	4/25/95	15:00	EVM
	[illegible]		2.54	%	4/25/95	15:00	EVM

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ENVIRONMENTAL SYSTEMS CORP.
.
200 TECH CENTER DRIVE
ATTN: JAMES M. SUTTON
KNOXVILLE TN 37912

Date Reported 4/27/95
Date Received 4/21/95
Order No 9504-01099
Invoice No 038527
Cust # 005186
Sampled Date 4/12/95
Sampled Time 00:00
Sample Id

Permit No
Cust P.O. #ESC07184

Subject: 11-GAS SAMPLES FOR LHV/DENSITY, RECD. 4/21/95

SMP	TEST	METHOD	RESULT	UNITS	DATE	TIME	TECH
2	GAS 01, #2						
	PROP--E		0.65	%	4/25/95	15:00	EVM
	I---TANE		0.19	%	4/25/95	15:00	EVM
	---ANE		0.14	%	4/25/95	15:00	EVM
	ISO-PENTANE		0.05	%	4/25/95	15:00	EVM
	N-PENTANE		0.03	%	4/25/95	15:00	EVM
	HEXANES		(0.02	%	4/25/95	15:00	EVM
	CARBON DIOXIDE		0.67	%	4/25/95	15:00	EVM
	BTU, DRY (HIGH HEAT VAL)		1039.41	BTU/CU.FT.	4/25/95	15:00	EVM
	BTU, SAT. (HIGH HEAT VAL)		1021.32	BTU/CU.FT.	4/25/95	15:00	EVM
	NET BTU, DRY (LOW HEAT VAL)		937.17	BTU/CU.FT.	4/25/95	15:00	EVM
	NET BTU, SAT.(LOW HEAT VAL)		920.86	BTU/CU.FT	4/25/95	15:00	EVM
	REAL SPECIFIC GRAVITY		0.5874		4/25/95	15:00	EVM
	ACTUAL NET BTU		937.17	BTU/CU.FT.	4/25/95	15:00	EVM
	ACTUAL NET BTU		20,857.83	BTU/LB.	4/25/95	15:00	EVM
	DENSITY		0.000719646	G/ML	4/25/95	15:00	EVM
	DENSITY		0.044931297	LBS/CU.FT.	4/25/95	15:00	EVM
3	GAS 01-02, #3						
	LOWER HEATING VALUE (GAS)	ASTM 1945-80/GPA 2261-90			4/25/95	15:00	EVM
	NITROGEN		0.35	%	4/25/95	15:00	EVM
	METHANE		95.31	%	4/25/95	15:00	EVM
	ETHANE		2.56	%	4/25/95	15:00	EVM
	PROPANE		0.67	%	4/25/95	15:00	EVM
	ISO-BUTANE		0.19	%	4/25/95	15:00	EVM
	N-BUTANE		0.14	%	4/25/95	15:00	EVM
	ISO-PENTANE		0.06	%	4/25/95	15:00	EVM

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CERTIFICATE OF ANALYSIS

ENVIRONMENTAL SYSTEMS CORP.
200 TECH CENTER DRIVE
ATTN: JAMES M. SUTTON
KNOXVILLE TN 37912

Date Reported	4/27/95
Date Received	4/21/95
Order No	9504-01099
Invoice No	038527
Cust #	005186
Sampled Date	4/12/95
Sampled Time	00:00
Sample Id	

Permit No
Cust P.O. #ESC07184

Subject: 11-GAS SAMPLES FOR LHV/DENSITY, RECD. 4/21/95

SMP	TEST	METHOD	RESULT	UNITS	DATE	TIME	TECH
3	GAS 01-02, #3						
	N-PENTANE		0.03	%	4/25/95	15:00	EVM
	ES		<0.02	%	4/25/95	15:00	EVM
	CARBON DIOXIDE		0.68	%	4/25/95	15:00	EVM
	BTU, DRY (HIGH HEAT VAL)		1041.58	BTU/CU.FT.	4/25/95	15:00	EVM
	BTU, SAT. (HIGH HEAT VAL)		1023.46	BTU/CU.FT.	4/25/95	15:00	EVM
	NET BTU, DRY (LOW HEAT VAL)		939.15	BTU/CU.FT.	4/25/95	15:00	EVM
	NET BTU, SAT.(LOW HEAT VAL)		922.81	BTU/CU.FT	4/25/95	15:00	EVM
	REAL SPECIFIC GRAVITY		0.5876		4/25/95	15:00	EVM
	ACTUAL NET BTU		939.15	BTU/CU.FT.	4/25/95	15:00	EVM
	ACTUAL NET BTU		20,897.28	BTU/LB.	4/25/95	15:00	EVM
	DENSITY		0.000719887	G/ML	4/25/95	15:00	EVM
	DENSITY		0.044941301	LBS/CU.FT.	4/25/95	15:00	EVM
4	GAS 02, #4						
	LOWER HEATING VALUE (GAS)	ASTM 1945-80/GPA 2261-90			4/25/95	15:00	EVM
	NITROGEN		0.36	%	4/25/95	15:00	EVM
	METHANE		95.36	%	4/25/95	15:00	EVM
	ETHANE		2.55	%	4/25/95	15:00	EVM
	PROPANE		0.65	%	4/25/95	15:00	EVM
	ISO-BUTANE		0.19	%	4/25/95	15:00	EVM
	N-BUTANE		0.14	%	4/25/95	15:00	EVM
	ISO-PENTANE		0.05	%	4/25/95	15:00	EVM
	N-PENTANE		0.03	%	4/25/95	15:00	EVM
	HEXANES		<0.02	%	4/25/95	15:00	EVM
	CARBON DIOXIDE		0.67	%	4/25/95	15:00	EVM
	DRY (HIGH HEAT VAL)		1040.72	BTU/CU.FT.	4/25/95	15:00	EVM

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ENVIRONMENTAL SYSTEMS CORP.
.
200 TECH CENTER DRIVE
ATTN: JAMES M. SUTTON
KNOXVILLE TN 37912

Date Reported 4/27/95
Date Received 4/21/95
Order No 9504-01099
Invoice No 038527
Cust # 005186
Sampled Date 4/12/95
Sampled Time 00:00
Sample Id

Permit No
Cust P.O. #ESC07184

Subject: 11-GAS SAMPLES FOR LHV/DENSITY, RECD. 4/21/95

SMP	TEST	METHOD	RESULT	UNITS	DATE	TIME	TECH
4	GAS 02, #4						
	BTU, SAT. (HIGH HEAT VAL)		1022.61	BTU/CU.FT.	4/25/95	15:00	EVM
	DRY (LOW HEAT VAL)		938.35	BTU/CU.FT.	4/25/95	15:00	EVM
	NET BTU, SAT.(LOW HEAT VAL)		922.02	BTU/CU.FT	4/25/95	15:00	EVM
	REAL SPECIFIC GRAVITY		0.5869		4/25/95	15:00	EVM
	ACTUAL NET BTU		938.35	BTU/CU.FT.	4/25/95	15:00	EVM
	ACTUAL NET BTU		20,991.34	BTU/LB.	4/25/95	15:00	EVM
	DENSITY		0.000719052	G/ML	4/25/95	15:00	EVM
	DENSITY		0.044894187	LBS/CU.FT.	4/25/95	15:00	EVM
	GAS 02, #5						
	LOWER HEATING VALUE (GAS)	ASTM 1945-80/GPA 2261-90			4/25/95	15:00	EVM
	NITROGEN		0.53	%	4/25/95	15:00	EVM
	METHANE		95.21	%	4/25/95	15:00	EVM
	ETHANE		2.54	%	4/25/95	15:00	EVM
	PROPANE		0.65	%	4/25/95	15:00	EVM
	ISO-BUTANE		0.19	%	4/25/95	15:00	EVM
	N-BUTANE		0.14	%	4/25/95	15:00	EVM
	ISO-PENTANE		0.05	%	4/25/95	15:00	EVM
	N-PENTANE		0.03	%	4/25/95	15:00	EVM
	HEXANES		(0.02	%	4/25/95	15:00	EVM
	CARBON DIOXIDE		0.67	%	4/25/95	15:00	EVM
	BTU, DRY (HIGH HEAT VAL)		1038.98	BTU/CU.FT.	4/25/95	15:00	EVM
	BTU, SAT. (HIGH HEAT VAL)		1020.83	BTU/CU.FT.	4/25/95	15:00	EVM
	NET BTU, DRY (LOW HEAT VAL)		936.71	BTU/CU.FT.	4/25/95	15:00	EVM
	NET BTU, SAT.(LOW HEAT VAL)		920.41	BTU/CU.FT	4/25/95	15:00	EVM
	SPECIFIC GRAVITY		0.5875		4/25/95	15:00	EVM

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CERTIFICATE OF ANALYSIS

ENVIRONMENTAL SYSTEMS CORP.
200 TECH CENTER DRIVE
ATTN: JAMES M. SUTTON
KNOXVILLE TN 37912

Date Reported 4/27/95
Date Received 4/21/95
Order No 9504-01099
Invoice No 038527
Cust # 005186
Sampled Date 4/12/95
Sampled Time 00:00
Sample Id

Permit No
Cust P.O. #ESC07184

Subject: 11-GAS SAMPLES FOR LHV/DENSITY, RECD. 4/21/95

SMP	TEST	METHOD	RESULT	UNITS	DATE	TIME	TECH
5	GAS 02, #5						
	ACTUAL NET BTU		936.71	BTU/CU.FT.	4/25/95	15:00	EVM
	[illegible]CT[illegible] [illegible]ET BTU		20,844.55	BTU/LB.	4/25/95	15:00	EVM
	[illegible]EN[illegible]		0.000719751	G/ML	4/25/95	15:00	EVM
	DENSITY		0.044937841	LBS/CU.FT.	4/25/95	15:00	EVM
7	GAS 03, #7						
	LOWER HEATING VALUE (GAS)	ASTM 1945-88/GPA 2261-90			4/25/95	15:00	EVM
	NITROGEN		0.58	%	4/25/95	15:00	EVM
	[illegible]THANE		95.35	%	4/25/95	15:00	EVM
	[illegible]HANE		2.49	%	4/25/95	15:00	EVM
	[illegible]ROPANE		0.65	%	4/25/95	15:00	EVM
	ISO-BUTANE		0.20	%	4/25/95	15:00	EVM
	N-BUTANE		0.15	%	4/25/95	15:00	EVM
	ISO-PENTANE		0.06	%	4/25/95	15:00	EVM
	N-PENTANE		0.03	%	4/25/95	15:00	EVM
	HEXANES		<0.02	%	4/25/95	15:00	EVM
	CARBON DIOXIDE		0.57	%	4/25/95	15:00	EVM
	BTU, DRY (HIGH HEAT VAL)		1040.62	BTU/CU.FT.	4/25/95	15:00	EVM
	BTU, SAT. (HIGH HEAT VAL)		1022.52	BTU/CU.FT.	4/25/95	15:00	EVM
	NET BTU, DRY (LOW HEAT VAL)		938.27	BTU/CU.FT.	4/25/95	15:00	EVM
	NET BTU, SAT.(LOW HEAT VAL)		921.94	BTU/CU.FT	4/25/95	15:00	EVM
	REAL SPECIFIC GRAVITY		0.5867		4/25/95	15:00	EVM
	ACTUAL NET BTU		938.27	BTU/CU.FT.	4/25/95	15:00	EVM
	ACTUAL NET BTU		20,908.20	BTU/LB.	4/25/95	15:00	EVM
	DENSITY		0.000718756	G/ML	4/25/95	15:00	EVM
	[illegible]		0.044875676	LBS/CU.FT.	4/25/95	15:00	EVM

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ERIE PA 16509
(814)825-8533

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CERTIFICATE OF ANALYSIS

Attn: James Sutton

ENVIRONMENTAL SYSTEMS CORP.
200 TECH CENTER DRIVE
KNOXVILLE TN 37912

Date Reported	5/15/95
Date Received	5/11/95
Order No	9505-00639
Invoice No	039261
Cust #	005186
Sampled Date	0/00/00
Sampled Time	00:00
Sample Id	

Permit No
Cust P.O.

Subject: GAS SAMPLES (MILFORD PLANT, KISSIMMEE UTILITY), RECD.5/11.

ID	TEST	METHOD	RESULT	UNITS	DATE	TIME	TECH
1	MILFORD PLANT, 5/5/95 @ 07:00						
	LOWER HEATING VALUE (GAS)	ASTM 1945-88/GPA 2261-90			5/12/95	10:00	EVH
	NITROGEN		1.02	%	5/12/95	10:00	EVH
	METHANE		95.86	%	5/12/95	10:00	EVH
	[illegible]		2.16	%	5/12/95	10:00	EVH
	[illegible]		0.28	%	5/12/95	10:00	EVH
	ISO-BUTANE		0.06	%	5/12/95	10:00	EVH
	N-BUTANE		0.04	%	5/12/95	10:00	EVH
	ISO-PENTANE		0.02	%	5/12/95	10:00	EVH
	N-PENTANE		0.02	%	5/12/95	10:00	EVH
	HEXANES		<0.02	%	5/12/95	10:00	EVH
	CARBON DIOXIDE		0.51	%	5/12/95	10:00	EVH
	BTU, DRY (HIGH HEAT VAL)		1021.15	BTU/CU.FT.	5/12/95	10:00	EVH
	BTU, SAT. (HIGH HEAT VAL)		1003.39	BTU/CU.FT.	5/12/95	10:00	EVH
	NET BTU, DRY (LOW HEAT VAL)		920.86	BTU/CU.FT.	5/12/95	10:00	EVH
	NET BTU, SAT. (LOW HEAT VAL)		904.24	BTU/CU.FT	5/12/95	10:00	EVH
	REAL SPECIFIC GRAVITY		0.5787		5/12/95	10:00	EVH
	ACTUAL NET BTU		920.25	BTU/CU.FT.	5/12/95	10:00	EVH
	ACTUAL NET BTU		20,785.88	BTU/LB.	5/12/95	10:00	EVH
	DENSITY		0.000704968	G/ML	5/12/95	10:00	EVH
	DENSITY		0.044264565	LBS/CU.FT.	5/12/95	10:00	EVH
2	KISSIMMEE UTILITY, CANE ISLAND GAS REG. STATION, 5/9/95 @ 13:15 BY J. LOONEY						
	SULFUR, TOTAL (NATURAL GAS)	ASTM D1072-80			5/11/95	15:00	EVH
	TOTAL SULFUR		<1.0	GR/100CF	5/11/95	15:00	EVH
	TOTAL SULFUR (% BY WEIGHT)		<0.0031	%	5/11/95	15:00	EVH

<0.0031%

Certificate Of Analysis Continued On Next Page

Attachment H

Attachment H

Detailed Description of Control Equipment

Detailed Description of Control Equipment

1.) Low NO_x Burner: A technology that uses a two-stage combustor that premixes a portion of the air and fuel in the first stage and the remaining air and fuel are injected into the second stage. this two-stage process ensures good mixing of the air and fuel, and minimizes the amount of air required which results in low NO_x emissions.

2.) Use of low sulfur fuel oil (0.05 percent) and the use of natural gas.

3.) Water Injection: A control technology used to limit NO_x emissions. The thermal NO_x contribution to total NO_x emission is reduced by lowering the combustion temperature through the use of water injection in the combustion zones of the combustion turbine. Water injection will be used only during oil firing.

Attachment I

Attachment I

Description of Stack Sampling Facilities

Stack Sampling Facilities

Vendors for these items have not yet been identified. A detailed description of the stack sampling facilities will be included with the operating permit application.

Attachment J

Attachment J

Compliance Test Report

Compliance Test Report

A compliance test report will be included with the operating permit application after construction and initial testing has been completed.

Attachment K

Attachment K

Procedures for Startup and Shutdown

Procedures for Startup and Shutdown

After a normal start up is initiated, the time is documented when the turbine starts firing. The turbine then continues with a normal start up and warm up. Time is documented again when the breaker closes. Upon the generator reaching 60 MW, the water injection pump is turned on (fuel oil only), and flow is established to the turbine. When the NO_x emissions are controlled and stable, the time is again documented. The turbine is then released to dispatch the necessary load.

When a shut down occurs, the load on the generator is reduced to 60 MW and the water injection pumps are taken out of service (fuel oil only-this time is documented). Time is again recorded when the turbine stops firing.

Attachment L

Attachment L

Operation and Maintenance Plan

Operation and Maintenance Plan

An operation and maintenance plan will be submitted if required by the construction permit.

Attachment M

Attachment M

Unit Specific Applicable Requirements

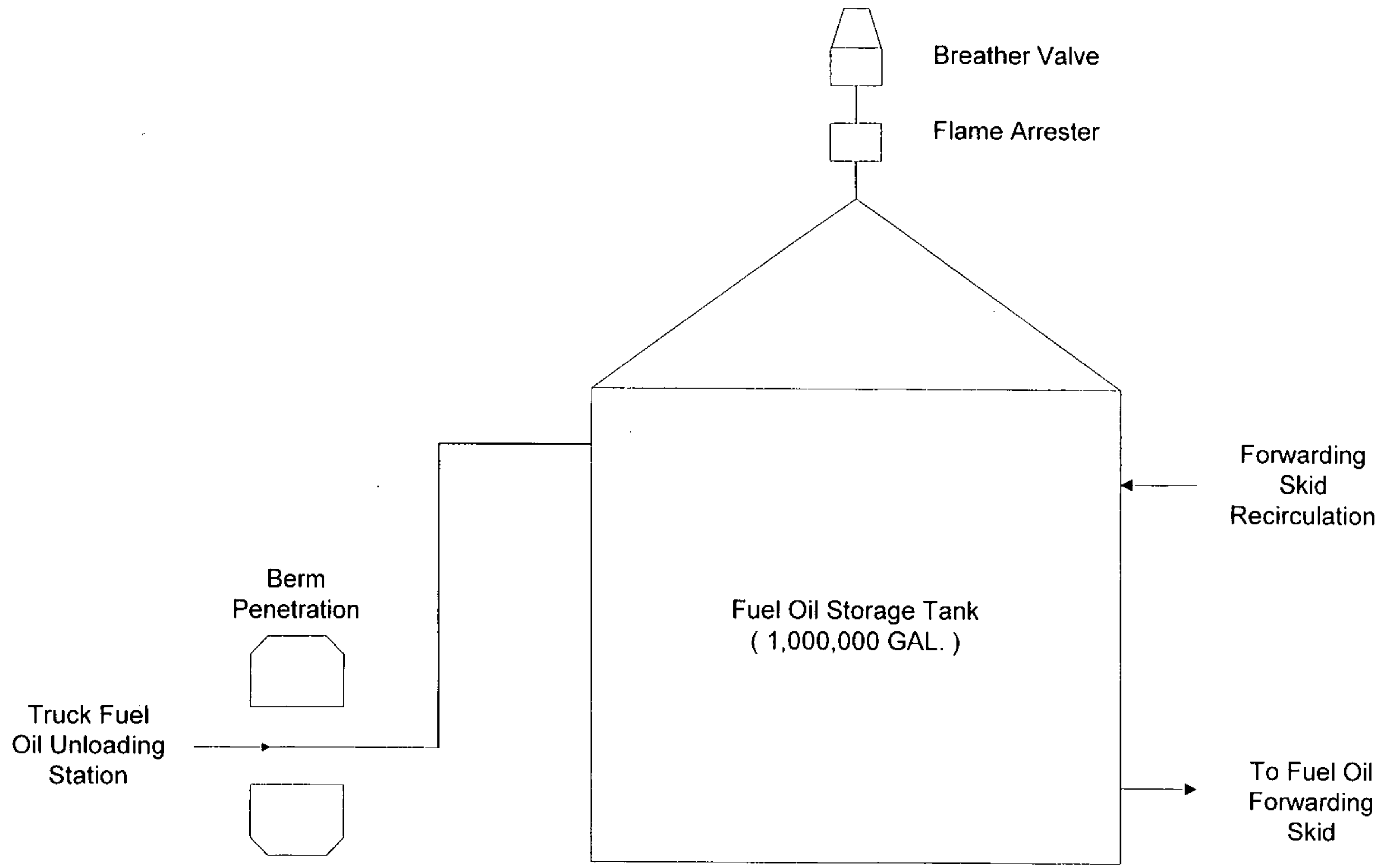
1,000,000 Gallon Fuel Oil Storage Tank
Unit Specific Applicable Requirements

Applicable Regulations	Applicable Requirement
40 CFR 60, Subpart Kb	Stanbdards of Performance for Volatile Organic Liquid Storage Vellessels for Which Construction, Reconstruction, or Modification Commenced after July 23, 1984.
40 CFR 60.116b, Monitoring of OpOperations	The owner / operator shall keep records according to the provisions of 40 CFR 60.116b (a) and (b) for a period of at least two (2) years.
F.A.C. 62-210.650, Circumvention	No person shall circumvent any air pollution control device, or allow the emission f air pollutants without the applical.e air pollution control device operating properly.
F.A.C. 62-210.700, Excess Emissions	In case of Excess emissions resulting from malfunctions, each owner or operator shall notify the DEP in accordance with F.A.C. 62-4.130.

Attachment N

Attachment N

Process Flow Diagram


Breather Valve
Flame Arrester
Forwarding
Skid
Recirculation
Berm
Penetration
Fuel Oil Storage Tank
(1,000,000 GAL.)
Truck Fuel
Oil Unloading
Station
To Fuel Oil
Forwarding
Skid

Attachment O

Attachment O

Emission Source Calculations

TANKS PROGRAM 3.1
EMISSIONS REPORT - DETAIL FORMAT
TANK IDENTIFICATION AND PHYSICAL CHARACTERISTICS

Identification

Identification No.:	67
City:	Cane Island
State:	FL
Company:	KUA
Type of Tank:	Vertical Fixed Roof
Description:	Fuel Oil Storage Tank

Tank Dimensions

Shell Height (ft):	35.0
Diameter (ft):	70.0
Liquid Height (ft):	34.8
Avg. Liquid Height (ft):	17.0
Volume (gallons):	1000000
Turnovers:	10.5
Net Throughput (gal/yr):	10495660

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition:	Good
Roof Color/Shade:	White/White
Roof Condition:	Good

Roof Characteristics

Type:	Dome
Height (ft):	0.00
Radius (ft) (Dome Roof):	56.00
Slope (ft/ft) (Cone Roof):	0.0000

Breather Vent Settings

Vacuum Setting (psig):	-0.03
Pressure Setting (psig):	0.03

Meteorological Data Used in Emission Calculations: Orlando, Florida (Avg Atmospheric Pressure = 14.7 psia)

Mixture/Component	Month	Daily Liquid Surf. Temperatures (deg F) Avg.	Min.	Max.	Liquid Bulk Temp. (deg F)	Vapor Pressures (psia) Avg.	Min.	Max.	Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Distillate fuel oil no. 2	All	74.41	68.90	79.92	72.42	0.0103	0.0087	0.0122	130.000			188.00	Option 3: A=12.1010, B=8907.0

Annual Emission Calculations

Standing Losses (lb):	295.6338
Vapor Space Volume (cu ft):	93882.05
Vapor Density (lb/cu ft):	0.0002
Vapor Space Expansion Factor:	0.037443
Vented Vapor Saturation Factor:	0.986867

Tank Vapor Space Volume	
Vapor Space Volume (cu ft):	93882.05
Tank Diameter (ft):	70.0
Vapor Space Outage (ft):	24.39
Tank Shell Height (ft):	35.0
Average Liquid Height (ft):	17.0
Roof Outage (ft):	6.39

Roof Outage (Dome Roof)	
Roof Outage (ft):	6.39
Dome Radius (ft):	56
Shell Radius (ft):	35.0

Vapor Density	
Vapor Density (lb/cu ft):	0.0002
Vapor Molecular Weight (lb/lb-mole):	130.000000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.010293
Daily Avg. Liquid Surface Temp.(deg. R):	534.08
Daily Average Ambient Temp. (deg. R):	532.07
Ideal Gas Constant R (psia cuft /(lb-mole-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	532.09
Tank Paint Solar Absorptance (Shell):	0.17
Tank Paint Solar Absorptance (Roof):	0.17
Daily Total Solar Insolation Factor (Btu/sqftday):	1487.00

Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.037443
Daily Vapor Temperature Range (deg.R):	22.05
Daily Vapor Pressure Range (psia):	0.003554
Breather Vent Press. Setting Range(psia):	0.06
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.010293
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.008651
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.012204
Daily Avg. Liquid Surface Temp. (deg R):	534.08
Daily Min. Liquid Surface Temp. (deg R):	528.57
Daily Max. Liquid Surface Temp. (deg R):	539.59
Daily Ambient Temp. Range (deg.R):	20.80

Annual Emission Calculations

Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.986867
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.010293
Vapor Space Outage (ft):	24.39
Working Losses (lb):	334.3891
Vapor Molecular Weight (lb/lb-mole):	130.000000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.010293
Annual Net Throughput (gal/yr):	10495660
Turnover Factor:	1.0000
Maximum Liquid Volume (cuft):	133926
Maximum Liquid Height (ft):	34.8
Tank Diameter (ft):	70.0
Working Loss Product Factor:	1.00
Total Losses (lb):	630.02

Annual Emissions Report

Liquid Contents	Losses (lbs.): Standing	Working	Total
Distillate fuel oil no. 2	295.63	334.39	630.02
Total:	295.63	334.39	630.02

BLACK & VEATCH LLP

8400 Ward Parkway, P.O. Box No. 8405, Kansas City, Missouri 64114, (913) 458-2000

Cane Island Power Park
Site Certification Application

B&V Project 59140
B&V File 32.0403
November 5, 1998

Hamilton S. Oven, P.E.
Administrator
Siting Coordination Office
Department of Environmental Protection
2720 Blair Stone Road, Suite H
Tallahassee, FL 32399-2400

RE: Kissimmee Utility Authority-Florida Municipal Power Agency
Site Certification Application - Cane Island Power Park
DOAH Case No. 98-3619 EPP
DEP Case No. 98-2297
Response to Statement of Sufficiency

Dear Mr. Oven:

On behalf of the applicants, and as required by Chapter 403.5067(1)(a) of the Florida Statutes, Black & Veatch submits the enclosed response to the Statement of Sufficiency received from the Department on October 8, 1998.

We appreciate the Department's cooperation and efforts to assist us during its review of the Site Certification Application. Please contact me at (913) 458-7563 if you have questions regarding this submittal.

Very truly yours,

Mike Soltys

J. Michael Soltys

Enclosure
cc: Service List

RECEIVED
NOV 6 1998
DEPARTMENT OF
ENVIRONMENTAL PROTECTION
OFFICE OF GENERAL COUNSEL

CERTIFICATE OF SERVICE

I CERTIFY that a true and correct copy of the enclosed Sufficiency Statement Response was mailed on November 5, 1998, to:

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Tallahassee, Florida 32399-2100

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7335 Lake Ellenor Drive
Orlando, Florida 32809

J. Michael Soltys

CANE ISLAND POWER PARK

RESPONSE TO SUFFICIENCY QUESTIONS

The following information is provided in response to the Notice of Statement of Sufficiency, included as Attachment A, received from the Florida Department of Environmental Protection on October 8, 1998.

Department of Environmental Protection

1. *The application states the combustion turbine will operate in simple cycle mode or combined cycle mode with supplemental firing. Please clarify the proposed hours of operation in the simple cycle mode. Is this an initial operational mode lasting several years or is it a permanent operating scenario in addition to combined cycle operation?*

   Response: As noted in Appendix 10.7 - PSD Application, Section 3.1.1, Page 3-2 of the Site Certification Application (SCA), it is proposed that the combustion turbine operate 8,760 hours per year in either simple cycle or combined cycle mode. As noted in Appendix 10.7 - PSD Application, Section 2.2, Page 2-3, the combustion turbine heat recovery steam generator (HRSG) will be equipped with a bypass stack and guillotine damper to permit simple cycle operation prior to the HRSG installation and/or while the HRSG is out of service for any duration at any time thereafter. It should be noted that both the air quality impact analysis and BACT analysis contained in the PSD Application have considered operating scenarios of combined and/or simple cycle operation for the entire year.

   The proposed schedule calls for the project to begin commercial operation in a combined cycle mode. From a practical standpoint, simple cycle operation would only occur if there was an outage of the HRSG or steam turbine, or if there is some significant unforseen change in the future power market.

2. *Is KUA considering power augmentation? If so, explain the overall operation in the power augmentation mode. What technology is used to generate extra power (i.e., steam or water injection)? How much more power output is due to operation in the power augmentation mode? Provide an schematic of the power augmentation operation mode. What is the maximum manufacturer's recommended period (hr/year, hr/month) for operation in the power augmentation mode?*

   Response: Power augmentation is not proposed for Unit 3.

3. *It appears the proposed project potential to emit (PTE) is high compared to other recent applications for the same size turbine. Please submit GE and Westinghouse manufacturer data at ambient conditions. Are the proposed emissions limits (Table 2-2 Page 2-6) based on the worst case scenario for each cycle, including the HRSG duct firing operational mode?*

Response: As noted in Appendix 10.7 - PSD Application, Section 2.3.1, Page 2-3 of the SCA, manufacturer's data from GE and Westinghouse are included in Attachment 1 of the PSD Application. As noted in Appendix 10.7 - PSD Application, Section 2.4, Page 2-4, and Table 2-2 footnotes, the PTE calculations in Table 2-2 were based on the maximum hourly emission rate for each pollutant at an ambient temperature of 72°F (average ambient conditions) considering both turbine manufacturers (i.e., GE or Westinghouse), combined or simple cycle operation, 50 to 100 percent load combined cycle operation and 100 percent load simple cycle operation, and 720 hours of distillate fuel oil firing (0.05 percent sulfur) with the remainder of the year on natural gas.

The details of the calculations are included in Attachment 3 to Appendix 10.7 - PSD Application, and may be summarized as follows:

- To calculate the PTE for a given pollutant, the maximum lb/hr emission rate considering both combustion turbine manufacturers (GE and Westinghouse) were determined for each of four possible operating scenarios at the ambient condition of 72°F. These four scenarios include combined cycle operation on natural gas, combined cycle operation on distillate oil, simple cycle operation on natural gas, and simple cycle operation on distillate oil. (These lb/hr data are summarized at the bottom of Attachment 3 to Appendix 10.7 - PSD Application for each pollutant). In the case of combined cycle operation, the maximum lb/hr emission rate for either natural gas or distillate oil firing represents the highest emission rate over the proposed operating load range (i.e., 50 to 100 percent load), while the simple cycle operation maximum lb/hr emission rates consider base load operation only.

- Using the natural gas and distillate oil maximum lb/hr emission rates established in step one above for combined and simple cycle operation, ton per year calculations were made for the combined and simple cycle operating scenarios assuming each scenario was independent of the other and operated the entire year (i.e., 8,760 hr/yr) assuming 8,040 hr/yr of natural gas firing and 720 hr/yr of distillate oil firing. (These calculations are summarized at the bottom of Attachment 3 to Appendix 10.7 - PSD Application for each pollutant).

- The highest ton per year calculation resulting from either combined or simple cycle operation was presented in Table 2-2.

4. What is the proposed design heat capacity of the duct burner (MMBtu/hr)? What type of fuel will be used to fire the duct burner? What are the proposed emissions from this unit?

Response: As noted in the performance data in Attachment 1 to Appendix 10.7 - PSD Application of the SCA, the design heat capacity of the duct burner is 67 MMBtu/hr (HHV) if a Westinghouse combustion turbine is selected, and 44 MMBtu/hr (HHV) if a General Electric combustion turbine is used. The duct burner will fire natural gas exclusively. As noted in the performance data in Attachment 1 to Appendix 10.7 - PSD Application, the estimated emissions from the duct burner are:

NO_x:	0.080 lb/MMBtu (HHV)
CO:	0.100 lb/MMBtu (HHV)
PM/PM_{10}:	0.015 lb/MMBtu (HHV)
VOC:	0.012 lb/MMBtu (HHV)

5. *What is the maximum steam production rate (lb steam/hr) from the HRSG?*

   Response: The maximum steam production rate of the HRSG is approximately 544,000 lb/hr at 19 F ambient temperature.

6. *Refer to the DEP's letter of August 17, 1998 and respond to questions regarding the BACT analysis.*

   Response: A re-evaluation of the NO_x BACT analysis as recommended in the DEP's letter of August 17, 1998, was completed as follows. Assuming uncontrolled NO_x emissions of 200 ppm, estimates of the minimum cost to achieve 15, 9, 7.5, and 3.5 ppm with any combination of NO_x control technologies were developed. The results of this analysis are presented in the following Table 1.

   It should be noted that subsequent to DEP's August 17, 1998 letter, KUA has taken competitive bids as required by their municipal purchasing rules from combustion turbine vendor's and only received one bid which was for a GE 7FA combustion turbine. Based on the GE 7FA NO_x emission guarantees, the aforementioned NO_x BACT re-evaluation, recent NO_x limits established for similar facilities, as well as the energy, social, economic, and environmental considerations associated with SCR systems as described in Appendix 10.7 - PSD Application, Section 3.0, KUA proposes the following NO_x BACT options:

NO_x BACT Options	Emissions (ppm @ at 15 % O_2)	Control Technology
Option 1 (gas)	9	Dry Low NO_x (DLN)
(oil)	42	Water Injection (WI)
Option 2 (gas)	7	Selective Catalytic Reduction (SCR)
(oil)	15	SCR

Table 1

KISSIMMEE UTILITY AUTHORITY - STANDARD COMBUSTOR
NOX CONTROL ECONOMIC EVALUATION

	STANDARD COMBUSTOR TO 200.0 ppm @ 15% O_2	STANDARD COMBUSTOR WITH SCR TO 15.0 ppm @ 15% O_2	STANDARD COMBUSTOR WITH SCR TO 9.0 ppm @ 15% O_2	DRY LOW NOx COMBUSTOR TO 9.0 ppm @ 15% O_2	DRY LOW NOx COMBUSTOR WITH SCR TO 7.5 ppm @ 15% O_2	DRY LOW NOx COMBUSTOR WITH SCR TO 3.5 ppm @ 15% O_2
Capital Cost						
Direct Capital Costs						
Dry Low NOx Combustors		0	0	1,000,000	1,000,000	1,000,000
Catalyst		1,100,000	1,210,000	0	176,000	341,000
Catalyst Reactor		250,000	279,000	0	150,000	186,000
Control and Instrumentation		140,000	140,000	0	70,000	140,000
Ammonia Storage and Injection Equipment		400,000	425,000	0	125,000	175,000
Balance of Plant		643,000	698,000	0	177,000	286,000
Subtotal		2,533,000	2,752,000	1,000,000	1,698,000	2,128,000
Indirect Capital Costs						
Contingency		633,000	688,000	250,000	425,000	532,000
Engineering & Supervision		253,000	275,000	10,000	170,000	213,000
Construction & Field Expenses		127,000	138,000	50,000	85,000	106,000
Construction Fee		253,000	275,000	0	170,000	213,000
Start-up Assistance		51,000	55,000	20,000	34,000	43,000
Performance Test		51,000	51,000	20,000	43,000	43,000
Subtotal		1,368,000	1,482,000	350,000	927,000	1,150,000
Total Installed Costs	**Base**	**3,901,000**	**4,234,000**	**1,350,000**	**2,625,000**	**3,278,000**
Annual Cost						
Direct Annual Costs						
Catalyst Replacement		458,000	504,000	Base	73,000	142,000
O&M Labor		19,000	19,000	Base	19,000	19,000
Maintenance Materials		11,000	11,000	Base	4,000	6,000
Reagent Feed		2,522,000	2,602,000	Base	83,000	136,000
Power Consumption		670,000	691,000	Base	23,000	37,000
Lost Power Generation		485,000	485,000	97,000	291,000	388,000
Annual Distribution Check		25,000	25,000	Base	21,000	21,000
Subtotal		4,190,000	4,337,000	97,000	514,000	749,000
Indirect Annual Cost						
Overhead (Labor)		11,000	11,000	0	11,000	11,000
Administrative Charges		78,000	85,000	0	53,000	66,000
Property Taxes		39,000	42,000	14,000	26,000	33,000
Insurance		39,000	42,000	14,000	26,000	33,000
Capital Recovery		326,000	354,000	113,000	220,000	274,000
Subtotal		493,000	534,000	141,000	336,000	417,000
Total Annual Cost		**4,683,000**	**4,871,000**	**238,000**	**850,000**	**1,166,000**
Annual NOx Emissions, tpy	5775.8	433.2	259.9	259.9	216.6	101.1
NOx Reduction, tpy	Base	5342.6	5515.9	5515.9	5559.2	5674.7
NOx Removal Costs, $/ton	**Base**	**877**	**883**	**43**	**153**	**205**

In the event the GE 7FA is unable to achieve the emission limits described in NO_x BACT Option 1, then Option 2 levels will be obtained with an SCR.

7. *What is the nominal power output (MW) for the combustion turbine? What is the nominal power output (MW) associated with the HRSG?*

   Response: The proposed combined cycle combustion turbine unit is rated at 250 MW (nominal). The proposed combustion turbine generator is rated at approximately 150 MW and the proposed associated steam turbine generator is rated at approximately 100 MW.

8. *The Department may grant authorization in accordance with Rule 62.210.710 F.A. C., to allow for excess emissions beyond the regulatory limit during periods of startup/shutdown and power augmentation periods (if requested). If excess emissions are requested during those periods, please, submit specific details about the frequency of these periods. Attach manufacturer support data.*

   Response: The number of necessary starts is difficult to predict especially as the electric utility industry becomes deregulated and with the uncertainty of future fuel prices. In the near term, Cane Island Unit 3 is expected to be a base load unit, but it is not unreasonable to project scenarios where it cycles weekly resulting in 52 starts per year.

9. *Please submit the application information on an ELSA disk. This will facilitate the input of the application data in the Department's ARIMS system.*

   Response: An ELSA disk of the application is enclosed as Attachment B.

10. *Quantify emissions associated with the cooling tower.*

    Response: A comprehensive analysis of cooling tower emissions and impacts is quantified in Volume 2 of the Site Certification Application, Section 5.1.4, Page 5-1.

11. *Additional comments from EPA and the National Park Service will be forwarded when received.*

    Response: In a letter dated September 23, 1998, the DEP forwarded a letter from the Department of the Interior, Fish and Wildlife Service (FWS) requesting that the regional haze and visibility study conducted for the Chassahowitzka Class I Area consider a background visual range (BVR) of 65 km (40 mi) instead of 25 km (15 mi). A revised analysis using a BVR of 65 km (40 mi) as well as lower NO_x emission levels based on the revised BACT discussed in response to sufficiency Question 6 above. The revised regional haze study is included as Attachment C.

12. *Was a figure showing the location of the piezometers and soil infiltrometer tests provided in the submittal?*

Response: Locations of the piezometers and soil infiltrometer tests are noted in SCA Appendix 10.8 Site Subsurface Data, within the report titled "Subsurface Investigation Data Report, Units 1 and 2". Note that the piezometers installed during the investigation were temporary and were removed during construction of Units 1 and 2. There are three monitoring wells currently installed at the site. Locations of these monitoring wells are presented in Figure 2.1-3, page 2-5, of the SCA.

13. *At what depth were the double ring infiltrometer tests performed?*

Response: The tests were performed at the ground surface. There was minimal site preparation required that included only leveling the rings and removing surface debris.

14. *According to the table on page 2-33, the water table elevations vary widely over the site.*

A. How was the maximum high and low water table elevations derived?

Response: High and low groundwater elevations were determined using results of the piezometers and test pits completed during the subsurface investigation during 1992 (see SCA Appendix 10.8), and the groundwater data measured in the existing monitoring wells (see SCA Figure 2.3-2, page 2-35).

B. What is the maximum high water table elevation at the location of the Unit 3 stormwater pond?

Response: The maximum high water table elevation at the location of the Unit 3 stormwater pond is 74 feet MSL.

15. *According to the table on page 2-34, infiltration rates vary widely over the three tests conducted.*

A. Be advised that infiltration is NOT synonymous with hydraulic conductivity, and any calculations showing storage recovery in the percolation ponds and stormwater ponds must use the latter test value.

Response: Hydraulic conductivity was determined by slug tests performed in piezometers installed at the site. Please refer to SCA Section 5.3.4 Leachate and Runoff for a description of the slug tests and how the hydraulic conductivity was determined for the study.

B. Be advised that when test results vary by at least one order of magnitude, it is not appropriate to average the values. If the higher test value is to be used, it must be quantified by further testing.

Response: The infiltration tests presented on SCA page 2-34 represent double ring infiltrometer test data from the plant site, I-1, and two tests within the access road corridor, I-2 and I-3. The surficial soils varied significantly from the higher elevation of the plant location to the lowland areas within the corridor and are reflected in the test results. Test results from the infiltrometer tests were used in design for the appropriate facility: I-1 for surface infiltration for the main plant facility; and, I-2 and I-3 for surface infiltration for the access road corridor. Results determined from I-2 and I-3 are not appropriate for design of the main plant area. As stated in Item 15.A above, slug tests performed in piezometers were used for determination of hydraulic conductivity for the ponds in the main plant area.

C. Why was the lowest test value omitted to obtain the "estimated" infiltration rate of 30 feet per day?

Response: The infiltration rate for the ponds was determined from the results of the slug tests performed in piezometers installed within the main plant area. The double ring infiltrometer tests were used for other miscellaneous calculations, not for determination of the percolation rates for the design of the ponds. The values determined from the double ring infiltrometer tests represent significantly different site conditions based on the tested location. Tests performed within the access road corridor resulted in a much lower value than was measured on Cane Island. The results of the double ring infiltrometer tests were not averaged; rather, the data collected for specific areas was used for design within that specific area.

D. Why are infiltration rates for units 1 and 2 used for unit 3?

Response: Units 1, 2, and 3 use some common facilities, such as the percolation pond. Unit 3 will employ the use of a separate stormwater detention pond located immediately north of the switchyard. Test results from slug tests performed in piezometers P-3 and P-4, see 15A above, are representative for the entire plant site on Cane Island.

16. *What is the minimum and average wetland buffer zone proposed on Figure 3.2-1?*

Response: 50 foot minimum around perimeter of Cane Island as shown on SCA Figure 3.2-2, Site Arrangement.

17. *Page 3-20 refers to percolation of retained runoff within 24 hours. Was a groundwater mounding analysis provided to demonstrate this?*

Response: A mounding analysis was performed for the expanded percolation pond. The results of that mounding study indicate that the site soils have the capacity to percolate runoff in the percolation pond and the adjacent onsite detention basins. Operation of Units 1 and 2 since 1993 have demonstrated more than adequate percolation within the existing detention basin.

18. *Page 3-23 states that the design storm used was the 25-year, 72-hour storm. However, the appropriate storm for Osceola County is the 10-year, 72-hour storm. Revise as necessary.*

Response: The 25-year, 72-hour design storm was chosen to meet the requirements of the South Florida Water Management District, as stated in Chapter 6 of their Management and Storage of Surface Waters Permit Information Manual, Volume IV, dated May 1994. The 10-year, 72 hour event was also modeled and the HEC-1 output files are attached as the KUA Cane Island "Unit 3 Hydrologic Analysis - Response to Sufficiency Questions" calculation set included with the sufficiency response package as Attachment D.

19. *Provide calculations showing, the following:*
    - *A. Water quality;*
    - *B. sizing of the orifice;*
    - *C. impervious and pervious surfaces;*

Response: These calculations are included as Section 3.10 of the SCA. Additional calculations are provided in the "Unit 3 Hydrologic Analysis - Response to Sufficiency Questions" calculation set (Attachment D).

20. *Was a map provided that shows the location of the 100-year flood plain in reference to the project site?*

Response: The maximum floodstage at the project site in response to the 100 year recurrence interval precipitation event was estimated during Units 1 and 2 development. These units were previously permitted by SFWMD and FDEP. Figure E-2 in Section 10.4 of the SCA illustrates the 100-year flood plain in the vicinity of the Power Park.

21. *Was a map provided that shows the location and direction of on-site and off-site runoff for pre- and post-development?*

Response: Offsite runoff is not affected by Unit 3 construction. Drainage patterns are discussed in sections 2.3.4 and 3.8 of the SCA. Drainage associated with Unit 3 construction is shown (in bold line type) on Figure 3.8.1 of the SCA.

22. *Please provide a full-sized set of the figures pertaining to stormwater management in the application (many of the ones provided in the application are illegible).*

Response: A full-sized set of figures is included in the sufficiency response package as Attachment E.

23. *Page 3-25 states that straw bale dikes will be used to minimize sediments flowing off-site and into the stormwater pond. The DEP strongly discourages the usage of straw bale dikes and recommends a double row of silt fencing (separated by at least 3 feet width) for the following reasons:*
1. Straw bale dikes are rarely installed correctly and less frequently maintained;
2. Straw bale dikes are very labor-intensive and require frequent replacement;
3. An exotic and invasive species called the tropical soda apple is associated with straw bales and has potential to adversely affect the ecosystem; and
4. Straw bale dikes are more expensive than silt fencing; Straw bale dikes cost approximately $4 per foot while silt fencing costs less than $2 per foot.

    Response: Straw bale dikes have been deleted from the SCA and Figure 3.8-2 of the SCA. The silt fence detail and notes have been updated to meet the double row recommendation, and is included in Attachment E.

24. *Page 3-25 states that ALL significant vegetation will be removed except for SOME trees in the construction/lay-down staging area. What criterion will be used to determine which trees will remain standing?*

    Response: Trees will be removed from the construction/laydown staging area as required to support plant construction, equipment movement, and storage requirements. Minimizing tree removal will be a priority in the utilization of this area.

25. *Why is a handrail provided at a stormwater outfall structure?*

    Response: The handrail is provided as a safety measure for plant personnel working in the area.

26. *Provide cross-sections of the percolation and detention ponds.*

    Response: The percolation pond cross-section is provided as Section 3 of Drawing 59140-CSTF-S3011 included in Attachment E to this sufficiency response package. The detention pond cross-section is included as <u>Section 5 - Wet Detention Basin Section</u> on Figure 3.8-2 of the SCA.

27. *Demonstrate that the proposed pond meets the following criterion as found on page 82 of the SFWMD Basis of Review:*
    A. minimum area;
    B. width;
    C. depth;
    D. side slopes;

Response: The pond area is approximately 1 acre which is greater than the 0.5 acre minimum area specified. The bottom of pond width of 135 feet is greater than the minimum width of 100 feet. The pond depth is less than 6 feet. This matches the design criteria of the Units 1 and 2 stormwater pond which is already in operation at the site. Side slopes have been changed from 3:1 to 4:1 to meet the basis of review criteria.

28. *Can the percolation ponds be demonstrated to meet the criterion as found in Appendix 6 of the Basis of Review?*

Response: The percolation pond and the detention ponds meet the criterion stated for minor impoundments as defined by Appendix 6 of the Basis of Review. The ponds satisfy all general requirements as defined by Appendix 6 as well as specific criteria such as sideslopes of 2H:1V, top widths no less than 5 feet, and minimum freeboard of not less than 2 feet.

29. *Page 4-2 states that compensating storage within the 100-year flood plain will be provided by the new stormwater pond. Were these calculations provided in the submittal?*

Response: Compensating storage for Units 1 and 2 construction was provided by the Units 1 and 2 Stormwater Pond. These Units were previously permitted. There is no additional construction within the 100-year flood plain for Unit 3 Construction. The referenced statement on page 4-2 is incorrect.

30. *The proposed power transmission line system required for the Cane Island Plant will impact a total of 19.7 acres of wetland (section 6.0). Table 6.1-2 provides a very basic breakdown of the impacts but does not provide the location indicating where these impacts will be located. In addition there is no discussion of alternative corridors which may reduce wetland impacts, nor is mitigation for the destruction of the wetlands discussed.*

Response: The proposed power transmission line system required for the Cane Island Plant will impact a total of 11.3 acres of wetlands (section 6.0). The revised Figure 6.1-1 enclosed as Attachment F indicates wetlands impact areas. Attachment F also includes signed/sealed transmission line construction drawings. Two other routes options were evaluated (Figure 6.1-1); however, these routes would result in greater impacts because of potentially longer line lengths, and additional vegetation clearing and construction within wetland areas. The proposed mitigation plan for the impacts to wetlands in the transmission line corridor is included as Attachment G.

31a. *Does the 19.7 acres of wetland impact discussed in section 6.0 include both direct impacts from the access road construction, filling, clearing within the corridor and the indirect impacts such as clearing for the conflict line.*

Response: The 11.3 acres of wetland impact discussed in section 6.0, includes direct impacts.

31b. *In section 6.0, (transmission lines), it is stated that access roads will be required through the wetland areas and that fill will be placed and culverts may be utilized. Figure 6. 1 -1 is identified as showing the location of the proposed fill locations, unfortunately Figure 6. 1-1 is a blank page. If fill is used to construct access roads and culverts are not utilized, how will surface water flows be maintained? Will the project result in flooding to adjacent areas? If culverts are to be utilized, where will they be placed and will they maintain historic water flow patterns.*

Response: Section 6.1.8.1 states that culverts, if required will be installed as the road construction progresses to maintain drainage and water flow. Section 6.1.8.4 states that in forested wetlands, appropriately sized drainage structures will be place in the access road to maintain existing drainage patterns and to allow the movement of aquatic organisms. Culverts will be utilized and the project will not result in flooding to adjacent areas. Figure 6.1-1 (Attachment F) illustrates the location of the wetlands, the existing transmission structures and line, the new transmission structures and line, access roads, and structure pads. However, as stated in section 6.1.8.2 the information is preliminary design regarding the wetland impacts of the proposed transmission line and access roads. According to the Instruction Guide for Certification Applications, submittal of detailed wetland impacts information either during the certification process or post-certification for later review is allowed. The additional information is being developed and is expected to be available by May 1999 during the certification process.

32. *What type of fill will be used for construction of the access roads? Will that fill be a source of nuisance or exotic plant species?*

Response: The fill will be from an approved local source.

33. *Why are the access roads necessary?*

Response: The access roads are necessary for initial construction and future maintenance of the transmission line.

34. *Details regarding long term maintenance of the transmission line corridors, access roads and culverts were not provided. How will the vegetated and non-vegetated areas be maintained?*

Response: Details regarding long term maintenance of the transmission line corridors, access roads, and culverts are provided in Section 6.1.9 of the SCA.

35. *Will maintenance of the transmission line corridor and access road involve monitoring for the presence of exotic or nuisance plant species?*

Response: The vegetation in the corridor will be monitored for transmission line clearance and safety purposes, but there are no plans to monitor the transmission line corridor for exotic or nuisance plant species.

36. *How will the construction areas be delineated to prevent unnecessary impacts to wetland areas outside the work area? How will the delineation indicators be maintained during construction? How will contractors be educated as to the location of the work area? Who will be responsible for ensuring that impacts are limited to the designated work area?*

Response: Construction areas will be surveyed and staked to prevent unnecessary impacts to wetland areas outside the work area. Stakes indicating the construction areas will be replaced if knocked down or inadvertently removed. If the stakes are knocked down and cannot be replaced accurately, the construction area will be resurveyed. Contractors will be educated as to the location of the work area during pre-construction meetings and during construction activities by the onsite construction manager. The construction manager will be responsible for ensuring that impacts are limited to the designated work area.

37. *The allowable discharge for projects within Reedy Creek watershed is 67 CFS per square mile. Does the stormwater management system meet these criteria?*

Response: The stormwater management system is designed to limit the post-development peak discharge to the pre-development peak discharge rate of runoff. In response to the 10 year-72 hour precipitation event, the pre- and post-development peak discharge rate is 1 cfs. For an area of 0.01184 square miles, this corresponds to a rate of 84 CFS per square mile.

DCA SUFFICIENCY COMMENTS

Land use map legend

Fig. 2.2-1, "Vegetation and Land Use Within a 5-mile Radius," does not have a legend by which to identify the vegetation and land use.

Should we substitute the legend from Fig. 2.3-3 on p. 2-40? What land use categories are used in Fig. 2.3.3? Are they from the Osceola County Future Land Use Plan or are they from some other classification?

Response: Yes, substitute the legend from Fig. 2.3-3 on p. 2-40 of the SCA. The land use categories used in Fig. 2.3-3 are Residential, Wet Natural, Upland Natural, Industrial/Commercial, and Agricultural. These categories are not from the Osceola County Future Land Use Plan. The categories are based on the Kissimmee, Florida, 30 X 60 Minute, USGS topographic map and observations of the existing conditions in the area.

Noise

KUA's noise modeling predicts that the C-weighted sound levels of "the full Power Park" will be 66 dBC at the main gate and 64 dBC at the nearest residence (SCA vol. 2, p. 5-48). The SCA gives the measured C-weighted sound level from Power Park Units 1 and 2 as 55 dBC at the main gate and at the nearest residence. KUA concludes therefore that its noise model is conservative in its predictions by 9-11 dBC.

<u>Please clarify whether "full Power Park" refers to the existing Power Park, comprising Units 1 and 2, or to the future Power Park, comprising Units 1, 2, and 3.</u>

(If the predicted noise level is from all three units, then it would not be fair to compare a predicted noise level from three generating units to a measured noise level from two units. If the predicted noise level is from the existing two units, then this suggests that the noise model is inaccurate, since its predicted noise level varies from the measured noise level by 9-11 dBC.)

Response: The existing measured sound levels were incorrectly compared to the "full Power Park" modeled sound levels. Full Power Park operation refers to Units 1, 2, and 3. The correct comparison would be between the measured existing facility sound level of 55 dBC at both NML-1 (entrance gate to the facility) and NML-2 (nearest residence) to the modeled sound level for the existing facility of 64 dBC at NML-1 and 63 dBC at NML-2. Therefore the modeling results are conservative by 8 to 9 dBC.

KUA states that the predicted C-weighted sound level from the full Power Park at the nearest residential locations is 64 dBC. This exceeds the 45 dBC standard from the county code. KUA states that past experience indicates that residents are unlikely to experience any disturbance when exposed to broad-band sound levels below 70 dBC, so that the people in the nearest residences should not be disturbed by the noise of the new unit (SCA vol. 2, p. 5-53). KUA appears to be saying that noise from the Power Park can exceed the county's noise standard by 19 decibels (dBC) without disturbing the nearest residents. A noise level of 64 dBC is, according to the Department's calculation, over eight times as loud as the county's 45 dBC noise-level standard.

<u>Please explain why a noise level that is much louder than the county's noise-level standard will not disturb the affected residents.</u>

Response: The purpose of a C-weighted noise criterion is to protect neighboring residents from excess low frequency "rumble" noise. A C-weighted noise criterion of 45 dBC is extremely stringent and is not readily feasible at a power plant. Typical noise criteria within community locations will range from 45 to 55 dBA, and 65 to 75 dBC. These levels are generally considered adequate to protect the public from excess noise emissions. For comparison, the community sound levels as measured prior to any construction at the Cane Island facility ranged from 36.4 dBA to 50.9 dBA and 52.4 dBC to 65 dBC. As this data indicates, the preconstruction noise environment was well in excess of the current Osceola County C-weighted Noise Criteria of 45 dBC. However, Power Park noise emissions are restricted to 55 dBA by the Osceola County Conditional Use Permit.

Please explain why the SCA's discussion of noise emphasizes the C-weighted noise level.

Response: The Osceola County noise criteria were recently changed to include C-weighted noise limitations. This change was made subsequent to the construction of Cane Island Units 1 and 2. The SCA was written to address these new C-weighted noise requirements.

Following submittal of the SCA, KUA requested and received a letter from Mr. Ted Garrod of the Osceola County Zoning and Code Enforcement Department verifying that the applicable noise limitation at the Power Park is specified in Special Condition 15 of the Conditional Use Permit CU/SDP 92-86. A copy of Mr. Garrod's letter follows this page. This limitation is 55 dBA as measured at the property boundary.

Please explain why KUA has not used the Equivalent Sound Level (L_{eq}) or Day-Night Level (L_{dn}) or any kind of cumulative sound exposure measurement in describing the noise to be generated at the Power Park.

Response: The equivalent sound level is a logarithmically averaged sound level as measured over a specific sampling period. All modeled noise levels for the facility are assumed to be a continuous, maximum sound level as produced by the power station equipment. Therefore, all predictive sound levels, as determined through modeling, represent continuous worst-case Leq sound values.

The modeling results as represented in the SCA were developed for comparison with the applicable noise criteria. As such, an Ldn sound level or other cumulative sound exposure levels are not applicable to this site.

Transportation

At the peak of the construction phase, which will last about 15 weeks, 240 workers will be traveling to and from the site. This will create additional traffic on area roadways, particularly Old Tampa Highway and US Highway 17/92. Despite this increase in local traffic, KUA says that level of service standards should not be exceeded by the construction-related traffic (SCA vol. 2, p. 4-27).

Please cite the LOS standards referred to.

Response: Level of Service C was assumed based on Osceola County service standards.

Zoning & Code Enforcement Department

17 S. Vernon Avenue
Room 225
Kissimmee, FL
34741
(407) 847-1495
fax (407) 847-1488

Osceola County

August 10, 1998

Mike Soltys
Black & Veech
11401 Lamar
Overland Park, Kansas 66211

Ref: Osceola County Noise Ordinance

Dear Mr. Soltys:

The KUA-Cane Island electrical generation plant was approved as a Conditional Use according to our file reference CU/ SDP 92-86. According to Special Condition 15, KUA agreed not to exceed a sound level of 55 decibel measured at the property boundary. Although the condition lacks specificity, I believe the intention at the time of approval was to measure the decibels in the A weighted scale.

Subsequent to the approval of CU/SDP 92-86, Osceola County adopted by ordinance a code restricting maximum noise levels throughout the county. According to Osceola County Code, Chapter 9, Article IV, Section 9-110, (c) the maximum sound level which may emit from mechanical equipment between 7 a.m. through sunset is 50 decibels (C- scale). One minute after sunset through 6:59 a.m. the decibel limitation is reduced to 45. Section 9-110, (c), requires sound measurements to be conducted at the real property boundary of sound source.

In respect to compliance with CU/SDP 92-86, the County Attorney's office advises me, Special Condition 15 continues to govern sound limitations in effect at the KUA-Cane Island site. In accordance with the approved Conditional Use Site Development Plan (CU/SDP), 55 decibels (A-scale) is the maximum sound decibel which may be measured at the property boundary. Osceola County Code, Chapter 9, Article IV, Section 9-110, (c) does not apply unless the Conditional Use Site Development Plan is amended. However, if KUA chooses to amend the approved site development plan, Osceola County must apply sound limitation criteria as regulated by Osceola County Code, Article IV. These criterion include provisions for a Special Variance. According to Chapter 9, Article IV, Section 9-109, (a), (1), the Planning Commission may grant a Special Variance for a period of time not to exceed 365 calendar days. According to established variance procedures, extensions of time may be granted in accordance with Chapter 9, Article IV, Section 9-109,(a), (5).

I trust this letter clarifies the sound measurement criteria Osceola County will utilize regarding sound limitations at the KUA-Cane Island electrical generation plant. If you have any further questions, please do not hesitate to contact me. In closing, I remain.

Respectfully yours,

Ted Garrod, AICP
Zoning & Code Enforcement Manager

cc: Ben Sharma, KUA

Air quality- NO_x emissions

KUA is apparently seeking to have BACT for NO_x emissions established as follows: the use of dry low NO_x combustors to limit emissions to 15 ppmdv for the first 2 years of operation, with the limit dropping to 9 ppmdv after that (SCA appendix 10-7, p, 3-13-16).

Please explain why BACT for Unit 3 should be set at high as 15 ppmdv NO_x for the first 2 years, when the recently certified City of Tallahassee Purdom Unit 8 power plant was required to meet 12- ppmdv NO_x.

Response: A revised BACT for Unit 3 NO_x emissions is under consideration by the DEP, and consists of the following NO_x limits:

NO_x BACT Options	Emissions (ppm)	Control Technology
Option 1 (gas)	9	Dry Low NO_x (DLN)
(oil)	42	Water Injection (WI)
Option 2 (gas)	7	Selective Catalytic Reduction (SCR)
(oil)	15	SCR

Refer to the response to Question 6 for detailed information regarding the revised NO_x BACT.

Cooling towers and sewage effluent

Treated sewage effluent supplied by the City of Kissimmee (Water and Sewer Department) effluent pipeline adjacent to the Cane Island Power Park will be the primary source of cooling water. The combined cooling tower blowdown, neutralization basin effluent, and boiler blowdown will be returned to the effluent pipeline and thence to the Imperial regional percolation pond treatment facility.

Will the return of this plant water to the effluent pipeline have any adverse effect on the Kissimmee water treatment system?

Response: The return of plant water to the regional effluent pipeline will not have any adverse effects on the Kissimmee water treatment system. Per an agreement between the City of Kissimmee and the Kissimmee Utility Authority, the combined effluent downstream of the Power Park will continue to meet the governing permit requirements and F.A.C 62.610.

Does the addition of plant water increase the temperature of the water in the pipeline, and, if so, will that promote the growth of microorganisms in the pipeline?

Response: A large portion of the plant discharge to the regional effluent pipeline consists of cooling tower blowdown. However, the majority of heat rejection at the site occurs via evaporative cooling within the cooling tower. Cooling tower blowdown is obtained from the cool side of the circulating water system downstream of cooling tower. The return of plant wastewater to the regional effluent pipeline will not have a significant impact on the temperature of the pipeline or the potential for microbial growth.

Please discuss the public health implications of using treated sewage effluent in the cooling towers at the Power Park.

Response: The water obtained from the Kissimmee effluent pipeline to be used for makeup to the cooling towers will be treated by the City of Kissimmee prior to use at the Power Park to meet the public access levels of treatment standards as defined in F.A.C. 62.610. The circulating water systems will be chemically conditioned with intermittent use of both oxidizing and non-oxidizing biocides to control microbial growth within the Cane Island cooling tower systems. Proper upstream treatment by the City of Kissimmee and a proper circulating water chemical conditioning program at the Power Park will provide adequate safeguards regarding public health and safety.

Dewatering and stormwater runoff

Dewatering will be necessary in order to construct the neutralization basin and the oil/water separator, which will both require below-grade excavations. Discharge from dewatering will be directed to the existing stormwater pond.

Will this dewatering discharge increase the probability of overflow of the stormwater pond during storm events?

Response: The storm water wet detention basin associated with Unit 3 is designed based on a 25 year 72 hour event (SFWMD requirements). The EPA generally requires that a Storm Water Pollution Prevention Plan and Best Management Practices be generated to support construction activities. The EPA requires within the SWPPP guidelines that the construction drainage system be designed to handle a 10-year, 24-hour event.

The storm water system associated with Unit 3 is designed to handle an event twice the size of the requirements set forth by the EPA for construction activities. Therefore, the applicants do not anticipate overflowing the storm water basin during storm events while dewatering activities are underway.

Based on Units 1 and 2 construction it was observed that the flow from dewatering activities was between 50 and 100 gpm. This same type of flow is expected during the construction of Unit 3.

Disabling of the effluent pipeline

If the effluent pipeline is disabled, the combined cooling tower blowdown, neutralization basin effluent, and boiler blowdown will be temporarily discharged to the stormwater runoff ponds. If the effluent pipeline is out of service for longer than 3 days, the capacity of the ponds will be overwhelmed and the excess will be discharged over the ponds' overflow structures into Reedy Creek swamp. KUA notes that the effluent pipeline has never been out of service since the Power Park has been in operation (SCA vol. 2, p. 5-28).

Please explain what kind of event would cause the effluent pipeline to be out of action? Given the occurrence of such an event, what is a likely time period for the effluent pipeline to be out of action? What actions would be necessary to bring the pipeline back on line?

Response: Although very unlikely, possible scenarios may include a pipeline failure upstream or downstream of the Cane Island site, or out-of-service upstream treatment plant(s). (Note this has not occurred with the existing units in 3-1/2 years of operation). Corrective actions by the responsible party will likely be taken as soon as possible to minimize the duration of the event and restore treatment or delivery functions. Actual durations or corrective actions are dependent upon the type and severity of the unforeseen failure. The effluent pipeline provides the City of Kissimmee's treated sewage effluent disposal and must be returned to service as quickly as possible.

Oil storage tank containment

The new fuel oil storage tank and the transformers will be constructed with a secondary containment area. The transformer secondary containment will be designed to accommodate 110 percent of the volume of oil stored and a sufficient allowance for the rainfall from the design storm event (SCA vol. 2, p. 3-28).

Please describe the containment capacity for the new oil storage tank.

Response: The capacity of the new fuel oil storage tank will be approximately 1,000,000 gallons. The secondary containment area associated with this new tank will have a minimum of 1,100,000 gallons of secondary containment plus capacity for the 10 year 24 hour storm event (approximately 7 inches) and 1 foot of free board.

Fire protection

The SCA states that fire protection for the Power Park is provided by the Osceola County Department of Public Safety (SCA vol. 2, p. 2-22).

Does the Power Park have any on-site fire protection capability?

Response: The Power Park is protected by it's own fire protection system of pumps (1 electric and diesel driven) and fire hydrants. Each fire hydrant is equipped with a hose house, which contains fire-fighting equipment. Sensitive equipment (i.e.: transformers) and buildings which are occupied are equipped with a deluge or sprinkler system. The water source for the fire protection system at the Power Park are two wells that pump water into a raw water/fire water storage tank. The fire protection pumps are capable of delivering 1000 gpm each. The fire protection system associated with Unit 3 will tie into the existing system. Additional fire hydrants and hose houses will be installed with Unit 3.

Transmission line

One new transmission line is proposed to connect the Power Park with FPC's Intercession City Plant, located only 0.25 mile west of the Power Park boundary.

Please explain the purpose of having the new transmission line go to the FPC power plant. Does the existing transmission line from the Power Park into Kissimmee (Clay Street substation) have enough capacity to carry the additional power from Unit 3 or will all the power from Unit 3 go to the FPC plant on the new transmission line?

Response: The purpose of the transmission line from the Power Park to Intercession City is to satisfy overloads on KUA's transmission system which occur during the outage of the Cane Island-Taft interconnection. This single contingency design criteria is standard practice for the electric utility industry.

The new line will be a single circuit 230-kV line supported by steel poles. The line will be approximately 3 miles in length from switchyard to switchyard and will be constructed entirely on KUA or FPC property, adjacent to an existing transportation/utility corridor (SCA vol. 2, p. 612). The SCA states that both the Power Park site and the FPC Intercession City plant site have been zoned for industrial use and therefore the installation of the transmission line complies with the existing zoning.

Is this use consistent with the Osceola County Future Land Use Plan/Map?

Response: Yes, the use is consistent with the Osceola County Future Land Use Plan/Map.

The corridor crosses Reedy Creek and its swampy flood plain. The 120-foot ROW will take in 11.3 acres of jurisdictional wetlands, which will be subject to Environmental Resource Permitting. This area will be cleared and apparently some of it will be filled. Minor wetland dredge and fill will be necessary in a few locations to construct transmission pole foundations; fill will also be necessary in a number of locations associated with the construction of access *and maintenance roads. The map following p. 6-1 appears to show some access roads paralleling the transmission line where it crosses wetlands.*

Please explain why KUA wishes to construct long paralleling access roads, which require filling wetlands, when shorter perpendicular roads from the adjacent uplands to the transmission line corridor could be used for access?

Response: The parallel access road proposed west of Reedy Creek is necessary to provide access to the proposed structures. This access is necessary for initial construction and future maintenance. Perpendicular roads from the CSX railroad would not only create a transportation safety hazard, but would also be prohibited by CSX. Through this west section, the upland areas to the north are too distant to be of benefit for structure access.

The short parallel access road proposed just west of the Cane Island entrance road is to be located on the southern edge of a previously disturbed wetland. Providing a perpendicular access road north to the existing dirt road would further divide the existing wetlands and uplands in this area.

The unnamed map following p. 6-1 is unclear. The legend does not distinguish between existing and proposed transmission lines. It does not identify the black dots on the map or the features identified by the circled numbers 1, 2, and 3.

Please furnish a revised legend that provides this information.

Response: The map was printed incorrectly and some information was not as clear as it should have been. The revised Figure 6.1-1 is enclosed as Attachment F.

There appear to be two different transmission line corridors connecting the Cane Island Power Park with the FPC Intercession City plant site, one along US 17-92 and one to the north.

If this is a correct interpretation of the map, please explain why two corridors are needed.

Response: This not a correct interpretation of the map. The route shown to the north is an alternative that is not preferred because of the significantly higher costs and associated wetland impacts.

KUA proposes to install steel monopoles capable of carrying two 230-kV circuits, although only one will be installed (SCA vol. 2, p. 6-3).

Please explain the purpose of using poles capable of carrying two circuits when only one will be installed.

Response: The purpose of using poles capable of carrying two circuits when only one will be installed is to have the option to install a second circuit in the future without the impacts of constructing another transmission line.

Units of measurement

This is not a sufficiency question, but an editorial comment and recommendation, in the event there are future amendments or revisions to the SCA. Because the SCA is being reviewed by planners and other persons who do not normally use the metric system of measurement, it is recommended that the appropriate U.S. Customary System measurement unit (inch, foot, mile, pound, ton) be provided, except for cases where the use of the metric system is long established, as in scientific measurement.

Response: Comment noted.

Department of Transportation

In Section 7.2.1.1 of the application, the applicant states that the gated access was designed and constructed during the construction of Units 1 and 2 with appropriate geometric improvements and deceleration, acceleration and turn lanes, which meet MOT standards. Further, it is stated that the proposed construction of Unit 3 does not warrant further improvements. However, the figure (which is a drawing of the entrance to the facility) entitled Site Preparation-Grading and Drainage, Access Road Grading, Plan and Profile-Area 4 does not show the aforementioned deceleration or acceleration lanes. The applicant is requested to clarify the current access configuration at the gated entrance including deceleration, accelerationand turn lanes, provide an updated drawing as necessary, and clarify any associated narrative relative to the entire access configuration.

To enable the Department to conduct a site impact analysis resulting from the Cane Island Facility expansion, the applicant is requested to provide the statewide routes which will be used by overweight/overdimensional vehicles, if any; the types of overweight/overdimensional vehicles to be used and anticipated weight loads to be carried on the vehicles. In addition, the applicant is asked to estimate the number of trips which will be generated by the construction work force and allocate those trips to anticipated routes. The Florida Department of Transportation's District 5 Planning Office in Orlando will work with the applicant to determine an acceptable methodology for determining the trips generated and the scope of the trip distribution. Mr. Jim Hayden, District 5 Planning Office, can be contacted at telephone number (407) 623 -103 5, Ext. 13 1, for specific directions in determining methodology and scope of trip distribution.

Response: The statement within Section 7.2.1.1 stating "this entrance was designed with appropriate geometric improvements, deceleration, acceleration and turn lanes, all based on Florida Department of Transportation (FDOT) standards, so that the construction and operational traffic could be appropriately accommodated" is correct from the standpoint that the entrance road was designed with the appropriate geometric improvements so that the construction and operational traffic could be appropriately accommodated. However, the statement that deceleration, acceleration, and turn lanes are present is incorrect.

KUA is not responsible for the transportation of any of overweight/overdimensional loads, which may be delivered to the site during the construction of Unit 3. This responsibility will be borne by the equipment vendors. At this point in time, KUA has no equipment contracts with manufacturers. Therefore, the applicants cannot provide accurate information with regards to weights, sizes, or potential routes of travel.

In response to the construction work force trips and routes, the applicants have assumed that 25 % of the work force will car pool on a daily basis. This car pooling results in 360 trips per day to and from the site. This number of trips is a 3% increase of vehicles per day in the site area (traffic count site 29). The applicants also assume that 90 % of the workforce will come from Orlando. Routes from Orlando include the Florida Turnpike or I-4 to U.S. Highway 192. Workers can proceed on U.S. 192 to Poinciana Boulevard, then south to Highway 17/92. Travel on Old Tampa Highway will be discouraged. Workers will be encouraged to proceed through Intercession City to the junction of Old Tampa Highway and Highway 17/92, then turn east on Old Tampa Highway to the site entrance. Any workers originating from south of the site area can exit I-4 North at State Route 532 and proceed to Old Tampa Highway.

Attachment A

Statement of Sufficiency

STATE OF FLORIDA
DIVISION OF ADMINISTRATIVE HEARINGS

In Re: Kissimmee Utility Authority -) Florida Municipal Power Agency) Cane Island Power Park) Power Plant Siting Application) PA 98-38))	DOAH CASE NO. 98-3619EPP DEP CASE NO. 98-2297

NOTICE OF STATEMENT OF SUFFICIENCY

The state of Florida Department of Environmental Protection (Department), pursuant to Section 403.5066, Florida Statutes, gives notice to the Division of Administrative Hearings:

An application for power plant site certification was filed with the Department on August 5, 1998, by the Kissimmee Utility Authority and the Florida Municipal Power Agency pursuant to the Florida Electrical Power Plant Siting Act, section 403.501 **et seq.**, Florida Statutes. Pursuant to section 403.5067, Florida Statutes, the Department finds the application to be not sufficient. The areas of insufficiency are listed on Attachment A.

Respectfully submitted,

Hamilton S. Oven

Hamilton S. Oven, P.E.
Administrator, Siting
Coordination Office

ATTACHMENT A

CANE ISLAND POWER PARK

SUFFICIENCY QUESTIONS

Department of Environmental Protection

The following information is needed in order to continue processing the KUA application:

1. The application states the combustion turbine will operate in simple cycle mode or combined cycle mode with supplemental firing. Please clarify the proposed hours of operation in the simple cycle mode. Is this an initial operational mode lasting several years or is it a permanent operating scenario in addition to combined cycle operation?
2. Is KUA considering power augmentation? If so, explain the overall operation in the power augmentation mode. What technology is used to generate extra power (i.e., steam or water injection)? How much more power output is due to operation in the power augmentation mode. Provide an schematic of the power augmentation operation mode. What is the maximum manufacturer's recommended period (hr/year, hr/month) for operation in the power augmentation mode?
3. It appears the proposed project potential to emit (PTE) is high compare to other recent applications for the same size turbine. Please submit GE and Westinghouse manufacturer data at ambient conditions. Are the proposed emissions limits (Table 2-2 Page 2-6) based on the worst case scenario for each cycle, including the HRSG duct firing operational mode?
4. What is the proposed design heat capacity of the duct burner (MMBtu/hr)? What type of fuel will be used to fire the duct burner? What are the proposed emissions from this unit?
5. What is the maximum steam production rate (lb steam/hr) from the HRSG?
6. Refer to the DEP's letter of August 17, 1998 and respond to questions regarding the BACT analysis.
7. What is the nominal power output (MW) for the combustion turbine? What is the nominal power output (MW) associated with the HRSG?
8. The Department may grant authorization in accordance with Rule 62.210.710 F.A.C., to allow for excess emissions beyond the regulatory limit during periods of startup/shutdown and power augmentation periods (if requested). If excess emissions are requested during those periods, please, submit specific details about the frequency of these periods. Attach manufacturer support data.
9. Please submit the application information on an ELSA disk. This will facilitate the input of the application data in the Department's ARMS system.
10. Quantify emissions associated with the cooling tower.
11. Additional comments from EPA and the National Park Service will be forwarded when received.

12. Was a figure showing the location of the piezometers and soil infiltrometer tests provided in the submittal?

13. At what depth were the double ring infiltrometer tests performed?

14. According to the table on page 2-33, the water table elevations vary widely over the site.

A. How was the maximum high and low water table elevations derived?

B. What is the maximum high water table elevation at the location of the Unit 3 stormwater pond?

15. According to the table on page 2-34, infiltration rates vary widely over the three tests conducted.

A. Be advised that infiltration is NOT synonymous with hydraulic conductivity, and any calculations showing storage recovery in the percolation ponds and stormwater ponds must use the latter test value.

B. Be advised that when test results vary by at least one order of magnitude, it is not appropriate to average the values. If the higher test value is to be used, it must be quantified by further testing.

C. Why was the lowest test value omitted to obtain the "estimated" infiltration rate of 30 feet per day?

D. Why are infiltration rates for units 1 and 2 used for unit 3?

16. What is the minimum and average wetland buffer zone proposed on Figure 3.2-1?

17. Page 3-20 refers to percolation of retained runoff within 24 hours. Was a groundwater mounding analysis provided to demonstrate this?

18. Page 3-23 states that the design storm used was the 25-year, 72-hour storm. However, the appropriate storm for Osceola County is the 10-year, 72-hour storm. Revise as necessary.

19. Provide calculations showing the following:

A. Water quality ;
B. sizing of the orifice;
C. impervious and pervious surfaces;

20. Was a map provided that shows the location of the 100-year floodplain in reference to the project site?

21. Was a map provided that shows the location and direction of on-site and off-site runoff for pre- and post-development?

22. Please provide a full-sized set of the figures pertaining to stormwater management in the application (many of the ones provided in the application are illegible).

23. Page 3-25 states that straw bale dikes will be used to minimize sediments flowing off-site and into the stormwater pond. The DEP strongly discourages the usage of straw bale dikes and recommends a double row of silt fencing (separated by at least 3 feet width) for the following reasons:

1. Straw bale dikes are rarely installed correctly and less frequently maintained;
2. Straw bale dikes are very labor-intensive and require frequent replacement;
3. An exotic and invasive species called the tropical soda apple is associated with straw bales and has potential to adversely affect the ecosystem; and
4. Straw bale dikes are more expensive than silt fencing; Straw bale dikes cost approximately $4 per foot while silt fencing costs less than $2 per foot.

24. Page 3-25 states that ALL significant vegetation will be removed except for SOME trees in the construction/lay-down staging area. What criterion will be used to determine which trees will remain standing?

25. Why is a handrail provided at a stormwater outfall structure?

26. Provide cross-sections of the percolation and detention ponds.

27. Demonstrate that the proposed pond meets the following criterion as found on page 82 of the SFWMD Basis of Review:

A. minimum area;
B. width;
C. depth;
D. side slopes;

28. Can the percolation ponds be demonstrated to meet the criterion as found in Appendix 6 of the Basis of Review?

29. Page 4-2 states that compensating storage within the 100-year flood plain will be provided by the new stormwater pond. Were these calculations provided in the submittal?

30. The proposed power transmission line system required for the Cane Island Plant will impact a total of 19.7 acres of wetland (section 6.0). Table 6.1-2 provides a very basic breakdown of the impacts but does not provide the location indicating where these impacts will be located. In addition there is no discussion of alternative corridors which may reduce wetland impacts, nor is mitigation for the destruction of the wetlands discussed.

31. Does the 19.7 acres of wetland impact discussed in section 6.0, include both direct impacts from the access road construction, filling, clearing within the corridor and the indirect impacts such as clearing for the conflict line.

31. In section 6.0, (transmission lines), it is stated that access roads will be required through the wetland areas and that fill will be placed and culverts may be utilized. Figure 6.1-1 is identified as showing the location of the proposed fill locations, unfortunately Figure 6.1-1 is a blank page. If fill is used to construct access roads and culverts are not utilized, how will surface water flows be maintained ? Will the project result in flooding to adjacent areas ? If culverts are to be utilized, where will they be placed and will they maintain historic water flow patterns.

32. What type of fill will be used for construction of the access roads. Will that fill be a source of nuisance or exotic plant species.

33. Why are the access roads necessary.

34. Details regarding long term maintenance of the transmission line corridors, access roads and culverts were not provided. How will the vegetated and non-vegetated areas be maintained.

35. Will maintenance of the transmission line corridor and access road involve monitoring for the presence of exotic or nuisance plant species.

36. How will the construction areas be delineated to prevent unnecessary impacts to wetland areas outside the work area. How will the delineation indicators be maintained during construction. How will contractors be educated as to the location of the work area. Who will be responsible for ensuring that impacts are limited to the designated work area.

37. The allowable discharge for projects within Reedy Creek watershed is 67 CFS per square mile. Does the stormwater management system meet this criteria.

D C A SUFFICIENCY COMMENTS

Land use map legend

Fig. 2.2-1, "Vegetation and Land Use Within a 5-mile Radius," does not have a legend by which to identify the vegetation and land use.

Should we substitute the legend from Fig. 2.3-3 on p. 2-40? What land use categories are used in Fig. 2.3.3? Are they from the Osceola County Future Land Use Plan or are they from some other classification?

Noise

KUA's noise modeling predicts that the C-weighted sound levels of "the full Power Park" will be 66 dBC at the main gate and 64 dBC at the nearest residence (SCA vol. 2, p. 5-48). The SCA gives the measured C-weighted sound level from Power Park Units 1 and 2 as 55 dBC at the main gate and at the nearest residence. KUA concludes therefore that its noise model is conservative in its predictions by 9–11 dBC.

Please clarify whether "full Power Park" refers to the existing Power Park, comprising Units 1 and 2, or to the future Power Park, comprising Units 1, 2, and 3.

(If the predicted noise level is from all three units, then it would not be fair to compare a predicted noise level from three generating units to a measured noise level from two units. If the predicted noise level is from the existing two units, then this suggests that the noise model is inaccurate, since its predicted noise level varies from the measured noise level by 9–11 dBC.)

KUA states that the predicted C-weighted sound level from the full Power Park at the nearest residential locations is 64 dBC. This exceeds the 45 dBC standard from the county code. KUA states that past experience indicates that residents are unlikely to experience any disturbance when exposed to broad-band sound levels below 70 dBC, so that the people in the nearest residences should not be disturbed by the noise of the new unit (SCA vol. 2, p. 5-53). KUA appears to be saying that noise from the Power Park can exceed the county's noise standard by 19 decibels (dBC) without disturbing the nearest residents. A noise level of 64 dBC is, according to the Department's calculation, over eight times as loud as the county's 45 dBC noise-level standard.

Please explain why a noise level that much louder than the county's noise-level standard will not disturb the affected residents.

Please explain why the SCA's discussion of noise emphasizes the C-weighted noise level.

Please explain why KUA has not used the Equivalent Sound Level (L_{eq}) or Day-Night Level (L_{dn}) or any kind of cumulative sound exposure measurement in describing the noise to be generated at the Power Park.

Transportation

At the peak of the construction phase, which will last about 15 weeks, 240 workers will be traveling to and from the site. This will create additional traffic on area roadways, particularly Old Tampa Highway and US Highway 17/92. Despite this increase in local traffic, KUA says that level of service standards should not be exceeded by the construction-related traffic (SCA vol. 2, p. 4-27).

Please cite the LOS standards referred to.

Air quality— NO_x emissions

KUA is apparently seeking to have BACT for NO_x emissions established as follows: the use of dry low NO_x combustors to limit emissions to 15 ppmdv for the first 2 years of operation, with the limit dropping to 9 ppmdv after that (SCA appendix 10-7, p. 3-13–16).

Please explain why BACT for Unit 3 should be set at high as 15 ppmdv NO_x for the first 2 years, when the recently certified City of Tallahassee Purdom Unit 8 power plant was required to meet 12 ppmdv NO_x.

Cooling towers and sewage effluent

Treated sewage effluent supplied by the City of Kissimmee (Water and Sewer Department) effluent pipeline adjacent to the Cane Is. Power Park will be the primary source of cooling water. The combined cooling tower blowdown, neutralization basin effluent, and boiler blowdown will be returned to the effluent pipeline and thence to the Imperial regional percolation pond treatment facility.

Will the return of this plant water to the effluent pipeline have any adverse effect on the Kissimmee water treatment system? Does the addition of plant water increase the temperature of the water in the pipeline, and, if so, will that promote the growth of microorganisms in the pipeline?

Please discuss the public health implications of using treated sewage effluent in the cooling towers at the Power Park.

Dewatering and stormwater runoff

Dewatering will be necessary in order to construct the neutralization basin and the oil/water separator, which will both require below-grade excavations. Discharge from dewatering will be directed to the existing stormwater pond.

Will this dewatering discharge increase the probability of overflow of the stormwater pond during storm events?

Disabling of the effluent pipeline

If the effluent pipeline is disabled, the combined cooling tower blowdown, neutralization basin effluent, and boiler blowdown will be temporarily discharged to the stormwater runoff ponds. If the effluent pipeline is out of service for longer than 3 days, the capacity of the ponds will be overwhelmed and the excess will be discharged over the ponds' overflow structures into Reedy Creek swamp. KUA notes that the effluent pipeline has never been out of service since the Power Park has been in operation (SCA vol. 2, p. 5-28).

Please explain what kind of event would cause the effluent pipeline to be out of action? Given the occurrence of such an event, what is a likely time period for the effluent pipeline to be out of action? What actions would be necessary to bring the pipeline back on line?

Oil storage tank containment

The new fuel oil storage tank and the transformers will be constructed with a secondary containment area. The transformer secondary containment are will be designed to accommodate 110 percent of the volume of oil stored and a sufficient allowance for the rainfall from the design storm event (SCA vol. 2, p. 3-28).

Please describe the containment capacity for the new oil storage tank.

Fire protection

The SCA states that fire protection for the Power Park is provided by the Osceola County Department of Public Safety (SCA vol. 2, p. 2-22).

Does the Power Park have any on-site fire protection capability?

Transmission line

One new transmission line is proposed to connect the Power Park with FPC's Intercession City Plant, located only 0.25 mile west of the Power Park boundary.

Please explain the purpose of having the new transmission line go to the FPC power plant. Does the existing transmission line from the Power Park into Kissimmee (Clay Street substation) have enough capacity to carry the additional power from Unit 3 or will all the power from Unit 3 go to the FPC plant on the new transmission line?

This line will be a single circuit 230-kV line supported by steel poles. The line will be approximately 3 miles in length from switchyard to switchyard and will be constructed entirely on KUA or FPC property, adjacent to an existing transportation/utility corridor (SCA vol. 2, p. 6-12). The SCA states that both the Power Park site and the FPC Intercession City plant site have been zoned for industrial use and therefore the installation of the transmission line complies with the existing zoning.

Is this use consistent with the Osceola County Future Land Use Plan/Map?

The corridor crosses Reedy Creek and its swampy floodplain. The 120-foot ROW will take in 11.3 acres of jurisdictional wetlands, which will be subject to Environmental Resource Permitting. This area will be cleared and apparently some of it will be filled. Minor wetland dredge and fill will be necessary in a few locations to construct transmission pole foundations; fill will also be necessary in a number of locations associated with the construction of access and maintenance roads. The map following p. 6-1 appears to show some access roads paralleling the transmission line where it crosses wetlands.

Please explain why KUA wishes to construct long paralleling access roads, which require filling wetlands, when shorter perpendicular roads from the adjacent uplands to the transmission line corridor could be used for access?

The unnamed map following p. 6-1 is unclear. The legend does not distinguish between existing and proposed transmission lines. It does not identify the black dots on the map or the features identified by the circled numbers 1, 2, and 3.

Please furnish a revised legend that provides this information.

There appear to be two different transmission line corridors connecting the Cane Island Power Park with the FPC Intercession City plant site, one along US 17-92 and one to the north.

If this is a correct interpretation of the map, please explain why two corridors are needed.

KUA proposes to install steel monopoles capable of carrying two 230-kV circuits, although only one will be installed (SCA vol. 2, p. 6-3)

Please explain the purpose of using poles capable of carrying two circuits when only one will be installed.

Units of measurement

This is not a sufficiency question, but an editorial comment and recommendation, in the event there are future amendments or revisions to the SCA. Because the SCA is being reviewed by planners and other persons who do not normally use the metric system of measurement, it is recommended that the appropriate U.S. Customary System measurement unit (inch, foot, mile, pound, ton) be provided, except for cases where the use of the metric system is long established, as in scientific measurement.

Department of Transportation

In Section 7.2.1.1. of the application, the applicant states that the gated access was designed and constructed during the construction of Units 1 and 2 with appropriate geometric improvements and deceleration, acceleration and turn lanes, which meet FDOT standards. Further, it is stated that the proposed construction of Unit 3 does not warrant further improvements. However, the figure (which is a drawing of the entrance to the facility) entitled Site Preparation-Grading and Drainage, Access Road Grading, Plan and Profile-Area 4 does not show the aforementioned deceleration or acceleration lanes. The applicant is requested to clarify the current access configuration at the gated entrance including deceleration, acceleration and turn lanes, provide an updated drawing as necessary, and clarify any associated narrative relative to the entire access configuration.

To enable the Department to conduct a site impact analysis resulting from the Cane Island Facility expansion, the applicant is requested to provide the statewide routes which will be used by overweight/overdimensional vehicles, if any; the types of overweight/overdimensional vehicles to be used and anticipated weight loads to be carried on the vehicles. In addition, the applicant is asked to estimate the number of trips which will be generated by the construction work force and allocate those trips to anticipated routes. The Florida Department of Transportaion's District 5 Planning Office in Orlando will work with the applicant to determine an acceptable methodology for determining the trips generated and the scope of the trip distribution. Mr. Jim Hayden, District 5 Planning Office, can be contacted at telephone number (407) 623-1035, Ext. 131, for specific directions in determining methodology and scope of trip distribution.

CERTIFICATE OF SERVICE

I CERTIFY that a true and correct copy of the foregoing Statement of Sufficiency was mailed on October 5, 1998, to:

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Attachment B
ELSA Disk

Attachment C

Regional Haze Study

Regional Haze Analysis

A regional haze analysis was performed to evaluate the potential for visibility impairment (significant increase in uniform haze) at the Chassahowitzka Class I area. The regional haze analysis was performed in accordance with guidance published in the Interagency Workgroup on Air Quality Modeling (IWAQM) (EPA-454/R-93-015) document, as well as technical guidance and an example provide by the NPS. The methodology and input are described in Section 5.4 of the Site Certification Application; Appendix 10.7 – PSD Application for the Kissimmee Utility Authority Cane Island Project document submitted in August 1998 (hereinafter referred to as the Document).

The percent change in extinction was calculated for base load operation in both the simple and combined cycle operating using the refined modeling methodology presented in Section 4.0 of the Document. The analysis was performed using a background visual rage of 65 kilometers (km). The ISCST3 air dispersion model was used in the flat terrain mode to determine the maximum predict highest first-highest 24-hour impacts of NO_x and PM/PM_{10} at a receptor placed at the closest boundary point of the park. Actual relative humidity data corresponding to the date of the maximum predicted NO_x impacts for each scenario were used in the regional haze calculations. It should be noted that the NO_x emission levels in this revised regional haze analysis are based on 9 ppm natural gas firing. The results of the analysis are presented in a spreadsheet included as Table 1 and the model results are included on the attached diskette.

As the results in Table 1 indicate, the percent change in extinction for each year and operating scenario is less than screening threshold for Level I analyses of 5 percent. Therefore, further analysis of potential visibility impairment is not warranted.

Calculation of Extinction per Year Maximum Impact

Table 1

Background Visibility 65.0 km
Background Extinction 0.06018 km^-1

Scenario Name	Actual 24-hr Impact (ug/m^3)	Date (yr/mo/dy/hr)	X Coordinate	Y Coordinate	NO2 Impact (ug/m^3)	NO3 Impact (ug/m^3)	NH4NO3 (ug/m^3)	Minimum Daily Relative Humidity (%)	Maximum Daily Relative Humidity (%)	Average Daily Relative Humidity (%)	Estimated Relative Humidity Factor	NH4NO3 Source Extinction (km^-1)	Scenario Name	Actual 24-hr Impact (ug/m^3)	X Coordinate	Y Coordinate	PM Source Extinction (km^-1)	Source Change in Extinction (%)	Pass/Fail 5.0% Change
NOx													*PM*						
1987 NSCC1NG	0.0803	87070224	348451.5	3165401.0	0.08029	0.10839	0.13983	51	97	74 0	2.6	0.00109	PSCC1NG	0.0243	348451.5	3165401.0	0.00007	1.93	PASS
NSSC1NG	0.0277	87061824	348451.5	3165401.0	0.02770	0.03740	0.04824	40	91	65.5	1.9	0.00027	PSSC1NG	0.0081	348451.5	3165401.0	0.00002	0.50	PASS
NOx													*PM*						
1988 NSCC1NG	0.0698	88020124	348451.5	3165401.0	0.06975	0 09416	0.12147	49	100	74.5	2.6	0.00095	PSCC1NG	0.0211	348451.5	3165401.0	0.00006	1.68	PASS
NSSC1NG	0 0355	88020124	348451.5	3165401.0	0.03550	0 04793	0.06182	49	100	74.5	2.6	0.00048	PSSC1NG	0.0104	348451.5	3165401.0	0.00003	0.85	PASS
NOx													*PM*						
1989 NSCC1NG	0.0832	89091524	348451.5	3165401.0	0.08316	0.11227	0.14482	52	97	74.5	2 6	0 00113	PSCC1NG	0 0251	348451.5	3165401.0	0.00008	2.00	PASS
NSSC1NG	0.0324	89101724	348451.5	3165401.0	0.03240	0.04374	0.05642	44	97	70.5	2.4	0.00041	PSSC1NG	0 0095	348451.5	3165401.0	0.00003	0.72	PASS
NOx													*PM*						
1990 NSCC1NG	0.1091	90020124	348451.5	3165401.0	0.10908	0.14723	0.18993	53	100	76 5	2.8	0.00160	PSCC1NG	0.0330	348451.5	3165401.0	0.00010	2.82	PASS
NSSC1NG	0 0378	90020124	348451.5	3165401.0	0.03782	0 05106	0 06586	53	100	76 5	2.8	0.00055	PSSC1NG	0.0111	348451.5	3165401.0	0.00003	0.97	PASS
NOx													*PM*						
1991 NSCC1NG	0.0961	91020624	348451.5	3165401.0	0.09612	0 12976	0.16739	35	93	64 0	1.8	0.00090	PSCC1NG	0.0292	348451.5	3165401.0	0 00009	1.65	PASS
NSSC1NG	0.0410	91020624	348451.5	3165401.0	0.04096	0.05530	0.07133	35	93	64 0	1.8	0 00039	PSSC1NG	0.0120	348451.5	3165401.0	0 00004	0.70	PASS

Attachment D
Unit 3 Hydrologic Analysis

BLACK & VEATCH

Owner KUA — Computed By GV Johnson
Plant Cane Island — Unit — Date 10/26 1998
Project No. 59140 — File No. — Verified By MDA
Title Unit 3 Hydrologic Analysis Response to Sufficiency Questions — Date 10/29 1998
Page 1 of

DO NOT WRITE IN THIS SPACE

Objective: Review and update the Unit 3 Hydrologic Analysis to address issues raised during the sufficiency phase of the evaluation process.

References:

1. KUA Cane Island, "Unit 3 Hydrologic Analysis," Calc. set, G.V. Johnson, B&V, July 17, 1998
2. State of Florida, Division of Administative Hearings, "Notice of Statement of Sufficiency," Oct. 5, 1998.

PGN-175B

DO NOT WRITE IN THIS SPACE

PGN-175B

Water Quality Treatment:

↳ Compare 1 inch of runoff vs. (2.5" x impervious area)

⇒ from ref ①, p. 7/14,

Impervious Area = $58,994\ ft^2$

TOTAL AREA (w/o POND) = $268,138\ ft^2$

$1"$ Runoff $= \left(\frac{1"}{12"}\right)(268,138\ ft^2) = 22,345\ ft^3$

$2\frac{1}{2}"$ x Imp. Area $= \left(\frac{2.5"}{12}\right)(58,994\ ft^2) = 12,290\ ft^3$

⇒ Use 1 inch of Runoff off Entire Area.

Update HEC-1 Model:

Post-Development CASE II from Ref ① {Pages 7-10 and attached HEC-1 Output} was updated to model 1.0 inches of runoff as calculated above. The stage-storage relationship in the model was also updated to reflect 4:1 side slopes. The pond was modified by keeping the bottom area the same, (Approximately 135 ft x 235 ft), and sloping up at 4:1 instead of 3:1. The peak stage in the pond resulting from a rainfall event that produces 1 inch of runoff is 75.67 feet MSL. This elevation is below the discharge structure orifice invert elevation of 76.0 ft MSL; therefore the discharge structure will work without modification. (The updated output file is included as CASE V.)

Design Storm Event:

A 10 year - 72 hour storm event was specified in Ref ②.

A 25 year - 72 hour storm event was used in Ref ①. The storage in the pond increased slightly when the side slopes were changed from 3:1 to 4:1. Therefore, the peak discharge flow rates and peak pond stages estimated in Ref ①, CASES III and IV, will decrease slightly. The discharge structure

DO NOT WRITE IN THIS SPACE

PGN-173B

BLACK & VEATCH

Owner KUA | Computed By GVJ
Plant Cane Island | Unit | Date 10/26 1998
Project No. 59140 | File No. | Verified By [illegible]
Title Unit 3 Hydrologic Analysis | Date 10/28 1998
Response to Sufficiency Questions | Page 4 of

will continue to control these events without modification.

From Ref ①, the 10 year - 72 hour storm event produces 9.65 inches of rainfall. CASE VI attached to this calculation contains the output file of the HEC-1 model for this event.

Add discharge @ elev. 77

↳ from Ref ①, $Q = (0.61)(\frac{\pi}{4}(\frac{6}{12})^2)(2 \times 32.2 \times 0.667)^{1/2}$

$= \underline{1.4 \text{ cfs}}$

The peak stage in the pond in response to this event is 76.94 feet MSL. This correlates to a peak discharge rate of 1 cfs.

Discharge per Square Mile:

$Q_{(CASE\ VI)} = 1 \text{ cfs} / (0.01184 \text{ mi}^2) = \underline{84 \text{ cfs/mi}^2}$

DO NOT WRITE IN THIS SPACE

PGN-173B

DO NOT WRITE IN THIS SPACE

Pre-Development Model for 10yr-72 hour event:

HEC-1 CASE VII attached to these calculations provides the estimated response of the pre-development watershed to the 10yr-72hr. storm event. The peak discharge estimated for this event is 1 cfs.

Pre- vs. Post-Development Peak Discharge:

The discharge per square mile of 84 cfs exceeds the allowable 67 cfs/mi^2 defined for the Reedy Creek watershed. However, the post-development peak discharge matches the pre-development peak discharge rate.

BLACK & VEATCH

Owner KUA
Computed By GVJ
Plant Cane Island Unit
Date 10/26 1998
Project No. 59140 File No.
Verified By [illegible]
Title Unit 3 Hydrologic Analysis
Date 10/28 1998
Response to Sufficiency Questions

DO NOT WRITE IN THIS SPACE

SIZING SPREADER SWALE:

Spreader Swale Width = 45 feet

Peak Flow Rate = 1 cfs

Existing Grade D/S of Swale = 1'/135' = 0.0074 ft/ft

Mannings "n" of Existing Grade = 0.035 (sand w/ some Grass)

⇒ Velocity = 0.47 ft/sec

↳ from FlowMaster Output (see p. 7)

PGN-173B

p.7/

WCM
10/28/98

Rectangular Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: KUA - Cane Island

Comment: Velocity Immediately D/S of Spreader Swale

Solve For Depth

Given Input Data:

Bottom Width.....	45.00 ft
Manning's n......	0.035
Channel Slope....	0.0074 ft/ft
Discharge........	1.00 cfs

Computed Results:

Depth............	0.05 ft
Velocity.........	0.47 fps ⟵
Flow Area........	2.11 sf
Flow Top Width...	45.00 ft
Wetted Perimeter.	45.09 ft
Critical Depth...	0.02 ft
Critical Slope...	0.0613 ft/ft
Froude Number....	0.39 (flow is Subcritical)

CASE V

```
1*****************************************                     ****************************************
*                                       *                     *                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                     *   U.S. ARMY CORPS OF ENGINEERS       *
*            FEBRUARY 1981              *                     *   THE HYDROLOGIC ENGINEERING CENTER  *
*          REVISED 02 AUG 88            *                     *        609 SECOND STREET             *
*                                       *                     *      DAVIS, CALIFORNIA 95616         *
* RUN DATE  10/26/1998  TIME  13:56:42  *                     *         (916) 551-1748               *
*                                       *                     *                                      *
*****************************************                     ****************************************
```

```
X      X  XXXXXXX   XXXXX           X
X      X  X        X     X         XX
X      X  X        X                X
XXXXXXX   XXXX     X         XXXXX  X
X      X  X        X                X
X      X  X        X     X          X
X      X  XXXXXXX   XXXXX          XXX
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1


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LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  1         ID    KUA - Cane Island Unit 3
  2         ID    Site Certification Application
  3         ID    HEC-1 Analysis of Unit 3:  3.95 Inch Precipitation Event
  4         ID    This Storm Event Produces 1.0 Inches of Runoff.
  5         ID    Black & Veatch Project No. 59140     Modelled By: Gregory V. Johnson
  6         ID    Post-Construction Model
  7         ID    Input File: k395.in   Output File:  k395.out
  8         IT       10 260CT98    0600      300
  9         IO        0       0
 10         IN       15
            * **********

 11         KK     SITE
 12         KM    Runoff From Unit 3 Power Block and Construction Laydown Area
 13         BA   .00964
 14         PB     3.95
 15         PC    0.002   0.003   0.005   0.006   0.008   0.009   0.011   0.012   0.014   0.015
 16         PC    0.017   0.018   0.020   0.021   0.023   0.024   0.026   0.027   0.029   0.030
 17         PC    0.032   0.033   0.035   0.036   0.038   0.040   0.041   0.043   0.044   0.046
 18         PC    0.047   0.049   0.050   0.052   0.053   0.055   0.056   0.058   0.059   0.061
 19         PC    0.062   0.064   0.065   0.067   0.068   0.070   0.071   0.073   0.075   0.076
 20         PC    0.078   0.079   0.081   0.082   0.084   0.085   0.087   0.088   0.090   0.091
 21         PC    0.093   0.094   0.096   0.097   0.099   0.100   0.102   0.103   0.105   0.106
 22         PC    0.108   0.110   0.111   0.113   0.114   0.116   0.117   0.119   0.120   0.122
 23         PC    0.123   0.125   0.126   0.128   0.129   0.131   0.132   0.134   0.135   0.137
 24         PC    0.138   0.140   0.141   0.143   0.144   0.146   0.148   0.150   0.153   0.155
 25         PC    0.157   0.159   0.162   0.164   0.166   0.168   0.170   0.173   0.175   0.177
 26         PC    0.179   0.182   0.184   0.186   0.188   0.190   0.193   0.195   0.197   0.199
 27         PC    0.201   0.204   0.206   0.208   0.210   0.213   0.215   0.217   0.219   0.221
 28         PC    0.224   0.226   0.228   0.230   0.233   0.235   0.237   0.239   0.241   0.244
 29         PC    0.246   0.248   0.250   0.252   0.255   0.257   0.259   0.261   0.264   0.266
 30         PC    0.268   0.270   0.272   0.275   0.277   0.279   0.281   0.284   0.286   0.288
 31         PC    0.290   0.292   0.295   0.297   0.299   0.301   0.304   0.306   0.308   0.310
 32         PC    0.312   0.315   0.317   0.319   0.321   0.324   0.326   0.328   0.330   0.332
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             33          PC   0.335   0.337   0.339   0.341   0.343   0.346   0.348   0.350   0.352   0.355
             34          PC   0.357   0.359   0.362   0.364   0.367   0.369   0.372   0.374   0.377   0.379
             35          PC   0.382   0.385   0.388   0.391   0.394   0.397   0.400   0.404   0.408   0.412
             36          PC   0.417   0.421   0.426   0.431   0.437   0.442   0.448   0.454   0.461   0.467
             37          PC   0.474   0.481   0.488   0.496   0.504   0.512   0.521   0.530   0.540   0.550
             38          PC   0.561   0.572   0.584   0.596   0.612   0.628   0.653   0.678   0.847   1.015
             39          PC   1.052   1.088   1.107   1.126   1.140   1.154   1.166   1.177   1.186   1.194
             40          PC   1.202   1.209   1.217   1.224   1.232   1.239   1.243   1.248   1.253   1.257
             41          PC   1.262   1.266   1.271   1.275   1.280   1.284   1.289   1.293   1.298   1.302
             42          PC   1.307   1.311   1.314   1.317   1.320   1.323   1.326   1.329   1.332   1.335
             43          PC   1.338   1.341   1.344   1.347   1.350   1.353   1.356   1.359
             44          LS       0      65       0
             45          UD    0.26
                         * **********

             46          KK    POND
             47          KM   Unit 3 Stormwater Pond
             48          BA   .00152
             49          LS       0      49     100
             50          UD    0.01
                         * **********
1                                           HEC-1 INPUT                                                    PAGE  2

          LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


             51          KK    COMB
             52          KM   Combining Two Hydrographs in Reservoir
             53          HC       2
                         * **********

             54          KK    RES1
             55          KM   Reservoir Routing Operation
             56          RS       1    ELEV    74.0
             57          SA   .01313 0.76079 0.83623 0.94231 1.07782 2.22002
             58          SE    74.0    75.0    76.0    77.0    78.0    79.0
             59          SQ       0       0       0       0       0       0
             60          SE    74.0    75.0    76.0    77.0    78.0    79.0
                         * **********
                         *DIAGRAM
             61          ZZ
1
               SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

    11        SITE
                .
                .
    46          .          POND
                .              .
                .              .
    51        COMB............
                V
                V
    54        RES1

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1*****************************************                              ****************************************
 *                                       *                              *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                              *   U.S. ARMY CORPS OF ENGINEERS
 *             FEBRUARY 1981             *                              * THE HYDROLOGIC ENGINEERING CENTER
 *           REVISED 02 AUG 88           *                              *          609 SECOND STREET
 *                                       *                              *       DAVIS, CALIFORNIA 95616
 *  RUN DATE  10/26/1998  TIME  13:56:42 *                              *            (916) 551-1748
 *                                       *                              *
 *****************************************                              ****************************************
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                    KUA - Cane Island Unit 3
                    Site Certification Application
                    HEC-1 Analysis of Unit 3:   3.95 Inch Precipitation Event
                    This Storm Event Produces 1.0 Inches of Runoff.
                    Black & Veatch Project No. 59140     Modelled By: Gregory V. Johnson
                    Post-Construction Model
                    Input File: k395.in   Output File:  k395.out

*** ERROR *** SPECIFIED START AND END DATES RESULT IN TOO MANY TIME PERIODS

   9 IO        OUTPUT CONTROL VARIABLES
                     IPRNT          0  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE

     IT        HYDROGRAPH TIME DATA
                      NMIN         10  MINUTES IN COMPUTATION INTERVAL
                     IDATE    26OCT98  STARTING DATE
                     ITIME       1200  STARTING TIME
                        NQ        300  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE    30OCT98  ENDING DATE
                    NDTIME       1350  ENDING TIME
                     ICENT         19  CENTURY MARK

          COMPUTATION INTERVAL     .17 HOURS
               TOTAL TIME BASE   49.83 HOURS

       ENGLISH UNITS
            DRAINAGE AREA          SQUARE MILES
            PRECIPITATION DEPTH    INCHES
            LENGTH, ELEVATION      FEET
            FLOW                   CUBIC FEET PER SECOND
            STORAGE VOLUME         ACRE-FEET
            SURFACE AREA           ACRES
            TEMPERATURE            DEGREES FAHRENHEIT

*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** **

          ***************
          *             *
  11 KK   *     SITE    *
          *             *
          ***************
                    Runoff From Unit 3 Power Block and Construction Laydown Area

  10 IN        TIME DATA FOR INPUT TIME SERIES
                     JXMIN         15  TIME INTERVAL IN MINUTES
                    JXDATE    26OCT98  STARTING DATE
                    JXTIME       6000  STARTING TIME

             SUBBASIN RUNOFF DATA

  13 BA        SUBBASIN CHARACTERISTICS
                     TAREA        .01  SUBBASIN AREA

               PRECIPITATION DATA

  14 PB              STORM       3.95  BASIN TOTAL PRECIPITATION

  15 PI          INCREMENTAL PRECIPITATION PATTERN
                      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                      .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
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.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	

44 LS SCS LOSS RATE

- STRTL 1.08 INITIAL ABSTRACTION
- CRVNBR 65.00 CURVE NUMBER
- RTIMP .00 PERCENT IMPERVIOUS AREA

45 UD SCS DIMENSIONLESS UNITGRAPH

- TLAG .26 LAG

***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

UNIT HYDROGRAPH
10 END-OF-PERIOD ORDINATES

6.	14.	10.	4.	2.	1.	0.	0.	0.	0.

****

HYDROGRAPH AT STATION SITE

****

DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
28	OCT	1200	1	.00	.00	.00	0.	*	29	OCT	1300	151	.01	.01	.00	0.
28	OCT	1210	2	.01	.01	.00	0.	*	29	OCT	1310	152	.01	.01	.00	0.
28	OCT	1220	3	.01	.01	.00	0.	*	29	OCT	1320	153	.02	.01	.00	0.
28	OCT	1230	4	.01	.01	.00	0.	*	29	OCT	1330	154	.02	.02	.00	0.
28	OCT	1240	5	.01	.01	.00	0.	*	29	OCT	1340	155	.01	.01	.00	0.
28	OCT	1250	6	.01	.01	.00	0.	*	29	OCT	1350	156	.01	.01	.00	0.
28	OCT	1300	7	.01	.01	.00	0.	*	29	OCT	1400	157	.01	.01	.00	0.
28	OCT	1310	8	.01	.01	.00	0.	*	29	OCT	1410	158	.01	.01	.00	0.
28	OCT	1320	9	.01	.01	.00	0.	*	29	OCT	1420	159	.01	.01	.00	0.
28	OCT	1330	10	.01	.01	.00	0.	*	29	OCT	1430	160	.01	.01	.00	0.
28	OCT	1340	11	.01	.01	.00	0.	*	29	OCT	1440	161	.02	.02	.00	0.
28	OCT	1350	12	.01	.01	.00	0.	*	29	OCT	1450	162	.02	.01	.00	0.
28	OCT	1400	13	.01	.01	.00	0.	*	29	OCT	1500	163	.01	.01	.00	0.
28	OCT	1410	14	.01	.01	.00	0.	*	29	OCT	1510	164	.01	.01	.00	0.
28	OCT	1420	15	.01	.01	.00	0.	*	29	OCT	1520	165	.01	.01	.00	0.
28	OCT	1430	16	.01	.01	.00	0.	*	29	OCT	1530	166	.01	.01	.00	0.
28	OCT	1440	17	.01	.01	.00	0.	*	29	OCT	1540	167	.02	.02	.00	0.
28	OCT	1450	18	.01	.01	.00	0.	*	29	OCT	1550	168	.02	.01	.00	0.
28	OCT	1500	19	.01	.01	.00	0.	*	29	OCT	1600	169	.01	.01	.00	0.
28	OCT	1510	20	.01	.01	.00	0.	*	29	OCT	1610	170	.01	.01	.00	0.
28	OCT	1520	21	.01	.01	.00	0.	*	29	OCT	1620	171	.01	.01	.00	0.
28	OCT	1530	22	.01	.01	.00	0.	*	29	OCT	1630	172	.01	.01	.00	0.
28	OCT	1540	23	.01	.01	.00	0.	*	29	OCT	1640	173	.01	.01	.00	0.
28	OCT	1550	24	.01	.01	.00	0.	*	29	OCT	1650	174	.02	.01	.00	0.
28	OCT	1600	25	.01	.01	.00	0.	*	29	OCT	1700	175	.02	.02	.01	0.

28 OCT 1610	26	.01	.01	.00	0.	*	29 OCT 1710	176	.01	.01	.00	0.
28 OCT 1620	27	.01	.01	.00	0.	*	29 OCT 1720	177	.01	.01	.00	0.
28 OCT 1630	28	.01	.01	.00	0.	*	29 OCT 1730	178	.01	.01	.00	0.
28 OCT 1640	29	.01	.01	.00	0.	*	29 OCT 1740	179	.01	.01	.00	0.
28 OCT 1650	30	.01	.01	.00	0.	*	29 OCT 1750	180	.01	.01	.00	0.
28 OCT 1700	31	.01	.01	.00	0.	*	29 OCT 1800	181	.01	.01	.00	0.
28 OCT 1710	32	.01	.01	.00	0.	*	29 OCT 1810	182	.02	.01	.01	0.
28 OCT 1720	33	.01	.01	.00	0.	*	29 OCT 1820	183	.02	.01	.01	0.
28 OCT 1730	34	.01	.01	.00	0.	*	29 OCT 1830	184	.01	.01	.00	0.
28 OCT 1740	35	.01	.01	.00	0.	*	29 OCT 1840	185	.01	.01	.00	0.
28 OCT 1750	36	.01	.01	.00	0.	*	29 OCT 1850	186	.01	.01	.00	0.
28 OCT 1800	37	.01	.01	.00	0.	*	29 OCT 1900	187	.01	.01	.00	0.
28 OCT 1810	38	.01	.01	.00	0.	*	29 OCT 1910	188	.02	.01	.01	0.
28 OCT 1820	39	.01	.01	.00	0.	*	29 OCT 1920	189	.02	.01	.01	0.
28 OCT 1830	40	.01	.01	.00	0.	*	29 OCT 1930	190	.01	.01	.00	0.
28 OCT 1840	41	.01	.01	.00	0.	*	29 OCT 1940	191	.01	.01	.00	0.
28 OCT 1850	42	.01	.01	.00	0.	*	29 OCT 1950	192	.01	.01	.00	0.
28 OCT 1900	43	.01	.01	.00	0.	*	29 OCT 2000	193	.01	.01	.00	0.
28 OCT 1910	44	.01	.01	.00	0.	*	29 OCT 2010	194	.01	.01	.00	0.
28 OCT 1920	45	.01	.01	.00	0.	*	29 OCT 2020	195	.02	.01	.01	0.
28 OCT 1930	46	.01	.01	.00	0.	*	29 OCT 2030	196	.02	.01	.01	0.
28 OCT 1940	47	.01	.01	.00	0.	*	29 OCT 2040	197	.01	.01	.00	0.
28 OCT 1950	48	.01	.01	.00	0.	*	29 OCT 2050	198	.01	.01	.00	0.
28 OCT 2000	49	.01	.01	.00	0.	*	29 OCT 2100	199	.01	.01	.00	0.
28 OCT 2010	50	.01	.01	.00	0.	*	29 OCT 2110	200	.01	.01	.00	0.
28 OCT 2020	51	.01	.01	.00	0.	*	29 OCT 2120	201	.02	.01	.01	0.
28 OCT 2030	52	.01	.01	.00	0.	*	29 OCT 2130	202	.02	.01	.01	0.
28 OCT 2040	53	.01	.01	.00	0.	*	29 OCT 2140	203	.01	.01	.01	0.
28 OCT 2050	54	.01	.01	.00	0.	*	29 OCT 2150	204	.01	.01	.01	0.
28 OCT 2100	55	.01	.01	.00	0.	*	29 OCT 2200	205	.01	.01	.01	0.
28 OCT 2110	56	.01	.01	.00	0.	*	29 OCT 2210	206	.01	.01	.01	0.
28 OCT 2120	57	.01	.01	.00	0.	*	29 OCT 2220	207	.01	.01	.01	0.
28 OCT 2130	58	.01	.01	.00	0.	*	29 OCT 2230	208	.01	.01	.01	0.
28 OCT 2140	59	.01	.01	.00	0.	*	29 OCT 2240	209	.02	.01	.01	0.
28 OCT 2150	60	.01	.01	.00	0.	*	29 OCT 2250	210	.02	.01	.01	0.
28 OCT 2200	61	.01	.01	.00	0.	*	29 OCT 2300	211	.01	.01	.01	0.
28 OCT 2210	62	.01	.01	.00	0.	*	29 OCT 2310	212	.01	.01	.01	0.
28 OCT 2220	63	.01	.01	.00	0.	*	29 OCT 2320	213	.01	.01	.01	0.
28 OCT 2230	64	.01	.01	.00	0.	*	29 OCT 2330	214	.01	.01	.01	0.
28 OCT 2240	65	.01	.01	.00	0.	*	29 OCT 2340	215	.01	.01	.01	0.
28 OCT 2250	66	.01	.01	.00	0.	*	29 OCT 2350	216	.02	.01	.01	0.
28 OCT 2300	67	.01	.01	.00	0.	*	30 OCT 0000	217	.02	.01	.01	0.
28 OCT 2310	68	.01	.01	.00	0.	*	30 OCT 0010	218	.01	.01	.01	0.
28 OCT 2320	69	.01	.01	.00	0.	*	30 OCT 0020	219	.01	.01	.01	0.
28 OCT 2330	70	.01	.01	.00	0.	*	30 OCT 0030	220	.01	.01	.01	0.
28 OCT 2340	71	.01	.01	.00	0.	*	30 OCT 0040	221	.01	.01	.01	0.
28 OCT 2350	72	.01	.01	.00	0.	*	30 OCT 0050	222	.02	.01	.01	0.
29 OCT 0000	73	.01	.01	.00	0.	*	30 OCT 0100	223	.02	.01	.01	0.
29 OCT 0010	74	.01	.01	.00	0.	*	30 OCT 0110	224	.01	.01	.01	0.
29 OCT 0020	75	.01	.01	.00	0.	*	30 OCT 0120	225	.01	.01	.01	0.
29 OCT 0030	76	.01	.01	.00	0.	*	30 OCT 0130	226	.01	.01	.01	0.
29 OCT 0040	77	.01	.01	.00	0.	*	30 OCT 0140	227	.01	.01	.01	0.
29 OCT 0050	78	.01	.01	.00	0.	*	30 OCT 0150	228	.01	.01	.01	0.
29 OCT 0100	79	.01	.01	.00	0.	*	30 OCT 0200	229	.01	.01	.01	0.
29 OCT 0110	80	.01	.01	.00	0.	*	30 OCT 0210	230	.02	.01	.01	0.
29 OCT 0120	81	.01	.01	.00	0.	*	30 OCT 0220	231	.02	.01	.01	0.
29 OCT 0130	82	.01	.01	.00	0.	*	30 OCT 0230	232	.01	.01	.01	0.
29 OCT 0140	83	.01	.01	.00	0.	*	30 OCT 0240	233	.01	.01	.01	0.
29 OCT 0150	84	.01	.01	.00	0.	*	30 OCT 0250	234	.01	.01	.01	0.
29 OCT 0200	85	.01	.01	.00	0.	*	30 OCT 0300	235	.01	.01	.01	0.
29 OCT 0210	86	.01	.01	.00	0.	*	30 OCT 0310	236	.02	.01	.01	0.
29 OCT 0220	87	.01	.01	.00	0.	*	30 OCT 0320	237	.02	.01	.01	0.
29 OCT 0230	88	.01	.01	.00	0.	*	30 OCT 0330	238	.01	.01	.01	0.
29 OCT 0240	89	.01	.01	.00	0.	*	30 OCT 0340	239	.01	.01	.01	0.
29 OCT 0250	90	.01	.01	.00	0.	*	30 OCT 0350	240	.01	.01	.01	0.
29 OCT 0300	91	.01	.01	.00	0.	*	30 OCT 0400	241	.01	.01	.01	0.
29 OCT 0310	92	.01	.01	.00	0.	*	30 OCT 0410	242	.01	.01	.01	0.
29 OCT 0320	93	.01	.01	.00	0.	*	30 OCT 0420	243	.02	.01	.01	0.
29 OCT 0330	94	.01	.01	.00	0.	*	30 OCT 0430	244	.02	.01	.01	0.
29 OCT 0340	95	.01	.01	.00	0.	*	30 OCT 0440	245	.01	.01	.01	0.
29 OCT 0350	96	.01	.01	.00	0.	*	30 OCT 0450	246	.01	.01	.01	0.
29 OCT 0400	97	.01	.01	.00	0.	*	30 OCT 0500	247	.01	.01	.01	0.

29 OCT	0410	98	.01	.01	.00	0.	*	30 OCT	0510	248	.01	.01	.01	0.
29 OCT	0420	99	.01	.01	.00	0.	*	30 OCT	0520	249	.02	.01	.01	0.
29 OCT	0430	100	.01	.01	.00	0.	*	30 OCT	0530	250	.02	.01	.01	0.
29 OCT	0440	101	.01	.01	.00	0.	*	30 OCT	0540	251	.01	.01	.01	0.
29 OCT	0450	102	.01	.01	.00	0.	*	30 OCT	0550	252	.01	.01	.01	0.
29 OCT	0500	103	.01	.01	.00	0.	*	30 OCT	0600	253	.01	.01	.01	0.
29 OCT	0510	104	.01	.01	.00	0.	*	30 OCT	0610	254	.01	.01	.01	0.
29 OCT	0520	105	.01	.01	.00	0.	*	30 OCT	0620	255	.01	.01	.01	0.
29 OCT	0530	106	.01	.01	.00	0.	*	30 OCT	0630	256	.01	.01	.01	0.
29 OCT	0540	107	.01	.01	.00	0.	*	30 OCT	0640	257	.02	.01	.01	0.
29 OCT	0550	108	.01	.01	.00	0.	*	30 OCT	0650	258	.02	.01	.01	0.
29 OCT	0600	109	.01	.01	.00	0.	*	30 OCT	0700	259	.01	.01	.01	0.
29 OCT	0610	110	.01	.01	.00	0.	*	30 OCT	0710	260	.01	.01	.01	0.
29 OCT	0620	111	.01	.01	.00	0.	*	30 OCT	0720	261	.01	.01	.01	0.
29 OCT	0630	112	.01	.01	.00	0.	*	30 OCT	0730	262	.01	.01	.01	0.
29 OCT	0640	113	.01	.01	.00	0.	*	30 OCT	0740	263	.02	.01	.01	0.
29 OCT	0650	114	.01	.01	.00	0.	*	30 OCT	0750	264	.02	.01	.01	0.
29 OCT	0700	115	.01	.01	.00	0.	*	30 OCT	0800	265	.01	.01	.01	0.
29 OCT	0710	116	.01	.01	.00	0.	*	30 OCT	0810	266	.01	.01	.01	0.
29 OCT	0720	117	.01	.01	.00	0.	*	30 OCT	0820	267	.01	.01	.01	0.
29 OCT	0730	118	.01	.01	.00	0.	*	30 OCT	0830	268	.01	.01	.01	0.
29 OCT	0740	119	.01	.01	.00	0.	*	30 OCT	0840	269	.01	.01	.01	0.
29 OCT	0750	120	.01	.01	.00	0.	*	30 OCT	0850	270	.02	.01	.01	0.
29 OCT	0800	121	.01	.01	.00	0.	*	30 OCT	0900	271	.02	.01	.01	0.
29 OCT	0810	122	.01	.01	.00	0.	*	30 OCT	0910	272	.01	.01	.01	0.
29 OCT	0820	123	.01	.01	.00	0.	*	30 OCT	0920	273	.01	.01	.01	0.
29 OCT	0830	124	.01	.01	.00	0.	*	30 OCT	0930	274	.01	.01	.01	0.
29 OCT	0840	125	.01	.01	.00	0.	*	30 OCT	0940	275	.01	.01	.01	0.
29 OCT	0850	126	.01	.01	.00	0.	*	30 OCT	0950	276	.01	.01	.01	0.
29 OCT	0900	127	.01	.01	.00	0.	*	30 OCT	1000	277	.01	.01	.01	0.
29 OCT	0910	128	.01	.01	.00	0.	*	30 OCT	1010	278	.02	.01	.01	0.
29 OCT	0920	129	.01	.01	.00	0.	*	30 OCT	1020	279	.02	.01	.01	0.
29 OCT	0930	130	.01	.01	.00	0.	*	30 OCT	1030	280	.01	.01	.01	0.
29 OCT	0940	131	.01	.01	.00	0.	*	30 OCT	1040	281	.01	.01	.01	0.
29 OCT	0950	132	.01	.01	.00	0.	*	30 OCT	1050	282	.01	.01	.01	0.
29 OCT	1000	133	.01	.01	.00	0.	*	30 OCT	1100	283	.01	.01	.01	0.
29 OCT	1010	134	.01	.01	.00	0.	*	30 OCT	1110	284	.02	.01	.01	0.
29 OCT	1020	135	.01	.01	.00	0.	*	30 OCT	1120	285	.02	.01	.01	0.
29 OCT	1030	136	.01	.01	.00	0.	*	30 OCT	1130	286	.01	.01	.01	0.
29 OCT	1040	137	.01	.01	.00	0.	*	30 OCT	1140	287	.01	.01	.01	0.
29 OCT	1050	138	.01	.01	.00	0.	*	30 OCT	1150	288	.02	.01	.01	0.
29 OCT	1100	139	.01	.01	.00	0.	*	30 OCT	1200	289	.02	.01	.01	0.
29 OCT	1110	140	.01	.01	.00	0.	*	30 OCT	1210	290	.01	.01	.01	0.
29 OCT	1120	141	.01	.01	.00	0.	*	30 OCT	1220	291	.02	.01	.01	0.
29 OCT	1130	142	.01	.01	.00	0.	*	30 OCT	1230	292	.02	.01	.01	0.
29 OCT	1140	143	.01	.01	.00	0.	*	30 OCT	1240	293	.01	.01	.01	0.
29 OCT	1150	144	.01	.01	.00	0.	*	30 OCT	1250	294	.02	.01	.01	0.
29 OCT	1200	145	.01	.01	.00	0.	*	30 OCT	1300	295	.02	.01	.01	0.
29 OCT	1210	146	.01	.01	.00	0.	*	30 OCT	1310	296	.01	.01	.01	0.
29 OCT	1220	147	.02	.01	.00	0.	*	30 OCT	1320	297	.02	.01	.01	0.
29 OCT	1230	148	.02	.02	.00	0.	*	30 OCT	1330	298	.02	.01	.01	0.
29 OCT	1240	149	.01	.01	.00	0.	*	30 OCT	1340	299	.01	.01	.01	0.
29 OCT	1250	150	.01	.01	.00	0.	*	30 OCT	1350	300	.02	.01	.01	0.

****

TOTAL RAINFALL = 3.95, TOTAL LOSS = 2.95, TOTAL EXCESS = 1.00

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	49.83-HR
+ (CFS)	(HR)					
		(CFS)				
+ 0.	49.67		0.	0.	0.	0.
		(INCHES)	.312	.920	.979	.979
		(AC-FT)	0.	0.	1.	1.

CUMULATIVE AREA = .01 SQ MI

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              ***************
              *             *
 46 KK        *    POND     *
              *             *
              ***************
                       Unit 3 Stormwater Pond

                SUBBASIN RUNOFF DATA

 48 BA           SUBBASIN CHARACTERISTICS
                       TAREA          .00  SUBBASIN AREA

                 PRECIPITATION DATA

 14 PB                 STORM         3.95  BASIN TOTAL PRECIPITATION

 15 PI             INCREMENTAL PRECIPITATION PATTERN
                       .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                       .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                       .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                       .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                       .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                       .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                       .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                       .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                       .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                       .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                       .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                       .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                       .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                       .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                       .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                       .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                       .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                       .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                       .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                       .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                       .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                       .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                       .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                       .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                       .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                       .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                       .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                       .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                       .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                       .00      .00      .00      .00      .00      .00      .00      .00      .00

 49 LS           SCS LOSS RATE
                       STRTL         2.08  INITIAL ABSTRACTION
                      CRVNBR        49.00  CURVE NUMBER
                       RTIMP       100.00  PERCENT IMPERVIOUS AREA

 50 UD           SCS DIMENSIONLESS UNITGRAPH
                        TLAG          .01  LAG

                                                  ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                        UNIT HYDROGRAPH
                                                    5 END-OF-PERIOD ORDINATES
                 4.         1.         0.         0.         0.

*************************************************************************************************************************************

                                                HYDROGRAPH AT STATION     POND

*************************************************************************************************************************************
                                                                       *
      DA MON HRMN  ORD    RAIN    LOSS  EXCESS     COMP Q             *      DA MON HRMN  ORD    RAIN    LOSS  EXCESS     COMP Q
```

28 OCT 1200	1	.00	.00	.00	0.	*
28 OCT 1210	2	.01	.00	.01	0.	*
28 OCT 1220	3	.01	.00	.01	0.	*
28 OCT 1230	4	.01	.00	.01	0.	*
28 OCT 1240	5	.01	.00	.01	0.	*
28 OCT 1250	6	.01	.00	.01	0.	*
28 OCT 1300	7	.01	.00	.01	0.	*
28 OCT 1310	8	.01	.00	.01	0.	*
28 OCT 1320	9	.01	.00	.01	0.	*
28 OCT 1330	10	.01	.00	.01	0.	*
28 OCT 1340	11	.01	.00	.01	0.	*
28 OCT 1350	12	.01	.00	.01	0.	*
28 OCT 1400	13	.01	.00	.01	0.	*
28 OCT 1410	14	.01	.00	.01	0.	*
28 OCT 1420	15	.01	.00	.01	0.	*
28 OCT 1430	16	.01	.00	.01	0.	*
28 OCT 1440	17	.01	.00	.01	0.	*
28 OCT 1450	18	.01	.00	.01	0.	*
28 OCT 1500	19	.01	.00	.01	0.	*
28 OCT 1510	20	.01	.00	.01	0.	*
28 OCT 1520	21	.01	.00	.01	0.	*
28 OCT 1530	22	.01	.00	.01	0.	*
28 OCT 1540	23	.01	.00	.01	0.	*
28 OCT 1550	24	.01	.00	.01	0.	*
28 OCT 1600	25	.01	.00	.01	0.	*
28 OCT 1610	26	.01	.00	.01	0.	*
28 OCT 1620	27	.01	.00	.01	0.	*
28 OCT 1630	28	.01	.00	.01	0.	*
28 OCT 1640	29	.01	.00	.01	0.	*
28 OCT 1650	30	.01	.00	.01	0.	*
28 OCT 1700	31	.01	.00	.01	0.	*
28 OCT 1710	32	.01	.00	.01	0.	*
28 OCT 1720	33	.01	.00	.01	0.	*
28 OCT 1730	34	.01	.00	.01	0.	*
28 OCT 1740	35	.01	.00	.01	0.	*
28 OCT 1750	36	.01	.00	.01	0.	*
28 OCT 1800	37	.01	.00	.01	0.	*
28 OCT 1810	38	.01	.00	.01	0.	*
28 OCT 1820	39	.01	.00	.01	0.	*
28 OCT 1830	40	.01	.00	.01	0.	*
28 OCT 1840	41	.01	.00	.01	0.	*
28 OCT 1850	42	.01	.00	.01	0.	*
28 OCT 1900	43	.01	.00	.01	0.	*
28 OCT 1910	44	.01	.00	.01	0.	*
28 OCT 1920	45	.01	.00	.01	0.	*
28 OCT 1930	46	.01	.00	.01	0.	*
28 OCT 1940	47	.01	.00	.01	0.	*
28 OCT 1950	48	.01	.00	.01	0.	*
28 OCT 2000	49	.01	.00	.01	0.	*
28 OCT 2010	50	.01	.00	.01	0.	*
28 OCT 2020	51	.01	.00	.01	0.	*
28 OCT 2030	52	.01	.00	.01	0.	*
28 OCT 2040	53	.01	.00	.01	0.	*
28 OCT 2050	54	.01	.00	.01	0.	*
28 OCT 2100	55	.01	.00	.01	0.	*
28 OCT 2110	56	.01	.00	.01	0.	*
28 OCT 2120	57	.01	.00	.01	0.	*
28 OCT 2130	58	.01	.00	.01	0.	*
28 OCT 2140	59	.01	.00	.01	0.	*
28 OCT 2150	60	.01	.00	.01	0.	*
28 OCT 2200	61	.01	.00	.01	0.	*
28 OCT 2210	62	.01	.00	.01	0.	*
28 OCT 2220	63	.01	.00	.01	0.	*
28 OCT 2230	64	.01	.00	.01	0.	*
28 OCT 2240	65	.01	.00	.01	0.	*
28 OCT 2250	66	.01	.00	.01	0.	*
28 OCT 2300	67	.01	.00	.01	0.	*
28 OCT 2310	68	.01	.00	.01	0.	*
28 OCT 2320	69	.01	.00	.01	0.	*
28 OCT 2330	70	.01	.00	.01	0.	*
28 OCT 2340	71	.01	.00	.01	0.	*

29 OCT 1300	151	.01	.00	.01	0.
29 OCT 1310	152	.01	.00	.01	0.
29 OCT 1320	153	.02	.00	.02	0.
29 OCT 1330	154	.02	.00	.02	0.
29 OCT 1340	155	.01	.00	.01	0.
29 OCT 1350	156	.01	.00	.01	0.
29 OCT 1400	157	.01	.00	.01	0.
29 OCT 1410	158	.01	.00	.01	0.
29 OCT 1420	159	.01	.00	.01	0.
29 OCT 1430	160	.01	.00	.01	0.
29 OCT 1440	161	.02	.00	.02	0.
29 OCT 1450	162	.02	.00	.02	0.
29 OCT 1500	163	.01	.00	.01	0.
29 OCT 1510	164	.01	.00	.01	0.
29 OCT 1520	165	.01	.00	.01	0.
29 OCT 1530	166	.01	.00	.01	0.
29 OCT 1540	167	.02	.00	.02	0.
29 OCT 1550	168	.02	.00	.02	0.
29 OCT 1600	169	.01	.00	.01	0.
29 OCT 1610	170	.01	.00	.01	0.
29 OCT 1620	171	.01	.00	.01	0.
29 OCT 1630	172	.01	.00	.01	0.
29 OCT 1640	173	.01	.00	.01	0.
29 OCT 1650	174	.02	.00	.02	0.
29 OCT 1700	175	.02	.00	.02	0.
29 OCT 1710	176	.01	.00	.01	0.
29 OCT 1720	177	.01	.00	.01	0.
29 OCT 1730	178	.01	.00	.01	0.
29 OCT 1740	179	.01	.00	.01	0.
29 OCT 1750	180	.01	.00	.01	0.
29 OCT 1800	181	.01	.00	.01	0.
29 OCT 1810	182	.02	.00	.02	0.
29 OCT 1820	183	.02	.00	.02	0.
29 OCT 1830	184	.01	.00	.01	0.
29 OCT 1840	185	.01	.00	.01	0.
29 OCT 1850	186	.01	.00	.01	0.
29 OCT 1900	187	.01	.00	.01	0.
29 OCT 1910	188	.02	.00	.02	0.
29 OCT 1920	189	.02	.00	.02	0.
29 OCT 1930	190	.01	.00	.01	0.
29 OCT 1940	191	.01	.00	.01	0.
29 OCT 1950	192	.01	.00	.01	0.
29 OCT 2000	193	.01	.00	.01	0.
29 OCT 2010	194	.01	.00	.01	0.
29 OCT 2020	195	.02	.00	.02	0.
29 OCT 2030	196	.02	.00	.02	0.
29 OCT 2040	197	.01	.00	.01	0.
29 OCT 2050	198	.01	.00	.01	0.
29 OCT 2100	199	.01	.00	.01	0.
29 OCT 2110	200	.01	.00	.01	0.
29 OCT 2120	201	.02	.00	.02	0.
29 OCT 2130	202	.02	.00	.02	0.
29 OCT 2140	203	.01	.00	.01	0.
29 OCT 2150	204	.01	.00	.01	0.
29 OCT 2200	205	.01	.00	.01	0.
29 OCT 2210	206	.01	.00	.01	0.
29 OCT 2220	207	.01	.00	.01	0.
29 OCT 2230	208	.01	.00	.01	0.
29 OCT 2240	209	.02	.00	.02	0.
29 OCT 2250	210	.02	.00	.02	0.
29 OCT 2300	211	.01	.00	.01	0.
29 OCT 2310	212	.01	.00	.01	0.
29 OCT 2320	213	.01	.00	.01	0.
29 OCT 2330	214	.01	.00	.01	0.
29 OCT 2340	215	.01	.00	.01	0.
29 OCT 2350	216	.02	.00	.02	0.
30 OCT 0000	217	.02	.00	.02	0.
30 OCT 0010	218	.01	.00	.01	0.
30 OCT 0020	219	.01	.00	.01	0.
30 OCT 0030	220	.01	.00	.01	0.
30 OCT 0040	221	.01	.00	.01	0.

28 OCT 2350	72	.01	.00	.01	0.	*	30 OCT 0050	222	.02	.00	.02	0.
29 OCT 0000	73	.01	.00	.01	0.	*	30 OCT 0100	223	.02	.00	.02	0.
29 OCT 0010	74	.01	.00	.01	0.	*	30 OCT 0110	224	.01	.00	.01	0.
29 OCT 0020	75	.01	.00	.01	0.	*	30 OCT 0120	225	.01	.00	.01	0.
29 OCT 0030	76	.01	.00	.01	0.	*	30 OCT 0130	226	.01	.00	.01	0.
29 OCT 0040	77	.01	.00	.01	0.	*	30 OCT 0140	227	.01	.00	.01	0.
29 OCT 0050	78	.01	.00	.01	0.	*	30 OCT 0150	228	.01	.00	.01	0.
29 OCT 0100	79	.01	.00	.01	0.	*	30 OCT 0200	229	.01	.00	.01	0.
29 OCT 0110	80	.01	.00	.01	0.	*	30 OCT 0210	230	.02	.00	.02	0.
29 OCT 0120	81	.01	.00	.01	0.	*	30 OCT 0220	231	.02	.00	.02	0.
29 OCT 0130	82	.01	.00	.01	0.	*	30 OCT 0230	232	.01	.00	.01	0.
29 OCT 0140	83	.01	.00	.01	0.	*	30 OCT 0240	233	.01	.00	.01	0.
29 OCT 0150	84	.01	.00	.01	0.	*	30 OCT 0250	234	.01	.00	.01	0.
29 OCT 0200	85	.01	.00	.01	0.	*	30 OCT 0300	235	.01	.00	.01	0.
29 OCT 0210	86	.01	.00	.01	0.	*	30 OCT 0310	236	.02	.00	.02	0.
29 OCT 0220	87	.01	.00	.01	0.	*	30 OCT 0320	237	.02	.00	.02	0.
29 OCT 0230	88	.01	.00	.01	0.	*	30 OCT 0330	238	.01	.00	.01	0.
29 OCT 0240	89	.01	.00	.01	0.	*	30 OCT 0340	239	.01	.00	.01	0.
29 OCT 0250	90	.01	.00	.01	0.	*	30 OCT 0350	240	.01	.00	.01	0.
29 OCT 0300	91	.01	.00	.01	0.	*	30 OCT 0400	241	.01	.00	.01	0.
29 OCT 0310	92	.01	.00	.01	0.	*	30 OCT 0410	242	.01	.00	.01	0.
29 OCT 0320	93	.01	.00	.01	0.	*	30 OCT 0420	243	.02	.00	.02	0.
29 OCT 0330	94	.01	.00	.01	0.	*	30 OCT 0430	244	.02	.00	.02	0.
29 OCT 0340	95	.01	.00	.01	0.	*	30 OCT 0440	245	.01	.00	.01	0.
29 OCT 0350	96	.01	.00	.01	0.	*	30 OCT 0450	246	.01	.00	.01	0.
29 OCT 0400	97	.01	.00	.01	0.	*	30 OCT 0500	247	.01	.00	.01	0.
29 OCT 0410	98	.01	.00	.01	0.	*	30 OCT 0510	248	.01	.00	.01	0.
29 OCT 0420	99	.01	.00	.01	0.	*	30 OCT 0520	249	.02	.00	.02	0.
29 OCT 0430	100	.01	.00	.01	0.	*	30 OCT 0530	250	.02	.00	.02	0.
29 OCT 0440	101	.01	.00	.01	0.	*	30 OCT 0540	251	.01	.00	.01	0.
29 OCT 0450	102	.01	.00	.01	0.	*	30 OCT 0550	252	.01	.00	.01	0.
29 OCT 0500	103	.01	.00	.01	0.	*	30 OCT 0600	253	.01	.00	.01	0.
29 OCT 0510	104	.01	.00	.01	0.	*	30 OCT 0610	254	.01	.00	.01	0.
29 OCT 0520	105	.01	.00	.01	0.	*	30 OCT 0620	255	.01	.00	.01	0.
29 OCT 0530	106	.01	.00	.01	0.	*	30 OCT 0630	256	.01	.00	.01	0.
29 OCT 0540	107	.01	.00	.01	0.	*	30 OCT 0640	257	.02	.00	.02	0.
29 OCT 0550	108	.01	.00	.01	0.	*	30 OCT 0650	258	.02	.00	.02	0.
29 OCT 0600	109	.01	.00	.01	0.	*	30 OCT 0700	259	.01	.00	.01	0.
29 OCT 0610	110	.01	.00	.01	0.	*	30 OCT 0710	260	.01	.00	.01	0.
29 OCT 0620	111	.01	.00	.01	0.	*	30 OCT 0720	261	.01	.00	.01	0.
29 OCT 0630	112	.01	.00	.01	0.	*	30 OCT 0730	262	.01	.00	.01	0.
29 OCT 0640	113	.01	.00	.01	0.	*	30 OCT 0740	263	.02	.00	.02	0.
29 OCT 0650	114	.01	.00	.01	0.	*	30 OCT 0750	264	.02	.00	.02	0.
29 OCT 0700	115	.01	.00	.01	0.	*	30 OCT 0800	265	.01	.00	.01	0.
29 OCT 0710	116	.01	.00	.01	0.	*	30 OCT 0810	266	.01	.00	.01	0.
29 OCT 0720	117	.01	.00	.01	0.	*	30 OCT 0820	267	.01	.00	.01	0.
29 OCT 0730	118	.01	.00	.01	0.	*	30 OCT 0830	268	.01	.00	.01	0.
29 OCT 0740	119	.01	.00	.01	0.	*	30 OCT 0840	269	.01	.00	.01	0.
29 OCT 0750	120	.01	.00	.01	0.	*	30 OCT 0850	270	.02	.00	.02	0.
29 OCT 0800	121	.01	.00	.01	0.	*	30 OCT 0900	271	.02	.00	.02	0.
29 OCT 0810	122	.01	.00	.01	0.	*	30 OCT 0910	272	.01	.00	.01	0.
29 OCT 0820	123	.01	.00	.01	0.	*	30 OCT 0920	273	.01	.00	.01	0.
29 OCT 0830	124	.01	.00	.01	0.	*	30 OCT 0930	274	.01	.00	.01	0.
29 OCT 0840	125	.01	.00	.01	0.	*	30 OCT 0940	275	.01	.00	.01	0.
29 OCT 0850	126	.01	.00	.01	0.	*	30 OCT 0950	276	.01	.00	.01	0.
29 OCT 0900	127	.01	.00	.01	0.	*	30 OCT 1000	277	.01	.00	.01	0.
29 OCT 0910	128	.01	.00	.01	0.	*	30 OCT 1010	278	.02	.00	.02	0.
29 OCT 0920	129	.01	.00	.01	0.	*	30 OCT 1020	279	.02	.00	.02	0.
29 OCT 0930	130	.01	.00	.01	0.	*	30 OCT 1030	280	.01	.00	.01	0.
29 OCT 0940	131	.01	.00	.01	0.	*	30 OCT 1040	281	.01	.00	.01	0.
29 OCT 0950	132	.01	.00	.01	0.	*	30 OCT 1050	282	.01	.00	.01	0.
29 OCT 1000	133	.01	.00	.01	0.	*	30 OCT 1100	283	.01	.00	.01	0.
29 OCT 1010	134	.01	.00	.01	0.	*	30 OCT 1110	284	.02	.00	.02	0.
29 OCT 1020	135	.01	.00	.01	0.	*	30 OCT 1120	285	.02	.00	.02	0.
29 OCT 1030	136	.01	.00	.01	0.	*	30 OCT 1130	286	.01	.00	.01	0.
29 OCT 1040	137	.01	.00	.01	0.	*	30 OCT 1140	287	.01	.00	.01	0.
29 OCT 1050	138	.01	.00	.01	0.	*	30 OCT 1150	288	.02	.00	.02	0.
29 OCT 1100	139	.01	.00	.01	0.	*	30 OCT 1200	289	.02	.00	.02	0.
29 OCT 1110	140	.01	.00	.01	0.	*	30 OCT 1210	290	.01	.00	.01	0.
29 OCT 1120	141	.01	.00	.01	0.	*	30 OCT 1220	291	.02	.00	.02	0.
29 OCT 1130	142	.01	.00	.01	0.	*	30 OCT 1230	292	.02	.00	.02	0.
29 OCT 1140	143	.01	.00	.01	0.	*	30 OCT 1240	293	.01	.00	.01	0.

29 OCT 1150	144	.01	.00	.01	0.	*	30 OCT 1250	294	.02	.00	.02	0.
29 OCT 1200	145	.01	.00	.01	0.	*	30 OCT 1300	295	.02	.00	.02	0.
29 OCT 1210	146	.01	.00	.01	0.	*	30 OCT 1310	296	.01	.00	.01	0.
29 OCT 1220	147	.02	.00	.02	0.	*	30 OCT 1320	297	.02	.00	.02	0.
29 OCT 1230	148	.02	.00	.02	0.	*	30 OCT 1330	298	.02	.00	.02	0.
29 OCT 1240	149	.01	.00	.01	0.	*	30 OCT 1340	299	.01	.00	.01	0.
29 OCT 1250	150	.01	.00	.01	0.	*	30 OCT 1350	300	.02	.00	.02	0.

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TOTAL RAINFALL = 3.95, TOTAL LOSS = .00, TOTAL EXCESS = 3.95

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	49.83-HR
+ (CFS)	(HR)					
		(CFS)				
+ 0.	24.50		0.	0.	0.	0.
		(INCHES)	.581	2.248	3.936	3.936
		(AC-FT)	0.	0.	0.	0.

CUMULATIVE AREA = .00 SQ MI

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  51 KK       *      COMB   *
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Combining Two Hydrographs in Reservoir

53 HC HYDROGRAPH COMBINATION

ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

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HYDROGRAPH AT STATION COMB

SUM OF 2 HYDROGRAPHS

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DA MON HRMN	ORD	FLOW	*	DA MON HRMN	ORD	FLOW	*	DA MON HRMN	ORD	FLOW	*	DA MON HRMN	ORD	FLOW
28 OCT 1200	1	0.	*	29 OCT 0030	76	0.	*	29 OCT 1300	151	0.	*	30 OCT 0130	226	0.
28 OCT 1210	2	0.	*	29 OCT 0040	77	0.	*	29 OCT 1310	152	0.	*	30 OCT 0140	227	0.
28 OCT 1220	3	0.	*	29 OCT 0050	78	0.	*	29 OCT 1320	153	0.	*	30 OCT 0150	228	0.
28 OCT 1230	4	0.	*	29 OCT 0100	79	0.	*	29 OCT 1330	154	0.	*	30 OCT 0200	229	0.
28 OCT 1240	5	0.	*	29 OCT 0110	80	0.	*	29 OCT 1340	155	0.	*	30 OCT 0210	230	0.
28 OCT 1250	6	0.	*	29 OCT 0120	81	0.	*	29 OCT 1350	156	0.	*	30 OCT 0220	231	0.
28 OCT 1300	7	0.	*	29 OCT 0130	82	0.	*	29 OCT 1400	157	0.	*	30 OCT 0230	232	0.
28 OCT 1310	8	0.	*	29 OCT 0140	83	0.	*	29 OCT 1410	158	0.	*	30 OCT 0240	233	0.
28 OCT 1320	9	0.	*	29 OCT 0150	84	0.	*	29 OCT 1420	159	0.	*	30 OCT 0250	234	0.
28 OCT 1330	10	0.	*	29 OCT 0200	85	0.	*	29 OCT 1430	160	0.	*	30 OCT 0300	235	0.
28 OCT 1340	11	0.	*	29 OCT 0210	86	0.	*	29 OCT 1440	161	0.	*	30 OCT 0310	236	0.
28 OCT 1350	12	0.	*	29 OCT 0220	87	0.	*	29 OCT 1450	162	0.	*	30 OCT 0320	237	0.
28 OCT 1400	13	0.	*	29 OCT 0230	88	0.	*	29 OCT 1500	163	0.	*	30 OCT 0330	238	0.
28 OCT 1410	14	0.	*	29 OCT 0240	89	0.	*	29 OCT 1510	164	0.	*	30 OCT 0340	239	0.
28 OCT 1420	15	0.	*	29 OCT 0250	90	0.	*	29 OCT 1520	165	0.	*	30 OCT 0350	240	0.
28 OCT 1430	16	0.	*	29 OCT 0300	91	0.	*	29 OCT 1530	166	0.	*	30 OCT 0400	241	0.
28 OCT 1440	17	0.	*	29 OCT 0310	92	0.	*	29 OCT 1540	167	0.	*	30 OCT 0410	242	0.
28 OCT 1450	18	0.	*	29 OCT 0320	93	0.	*	29 OCT 1550	168	0.	*	30 OCT 0420	243	0.
28 OCT 1500	19	0.	*	29 OCT 0330	94	0.	*	29 OCT 1600	169	0.	*	30 OCT 0430	244	0.
28 OCT 1510	20	0.	*	29 OCT 0340	95	0.	*	29 OCT 1610	170	0.	*	30 OCT 0440	245	0.
28 OCT 1520	21	0.	*	29 OCT 0350	96	0.	*	29 OCT 1620	171	0.	*	30 OCT 0450	246	0.
28 OCT 1530	22	0.	*	29 OCT 0400	97	0.	*	29 OCT 1630	172	0.	*	30 OCT 0500	247	0.
28 OCT 1540	23	0.	*	29 OCT 0410	98	0.	*	29 OCT 1640	173	0.	*	30 OCT 0510	248	0.

28 OCT 1550	24	0.	*	29 OCT 0420	99	0.	*	29 OCT 1650	174	0.	*	30 OCT 0520	249	0.
28 OCT 1600	25	0.	*	29 OCT 0430	100	0.	*	29 OCT 1700	175	0.	*	30 OCT 0530	250	0.
28 OCT 1610	26	0.	*	29 OCT 0440	101	0.	*	29 OCT 1710	176	0.	*	30 OCT 0540	251	0.
28 OCT 1620	27	0.	*	29 OCT 0450	102	0.	*	29 OCT 1720	177	0.	*	30 OCT 0550	252	0.
28 OCT 1630	28	0.	*	29 OCT 0500	103	0.	*	29 OCT 1730	178	0.	*	30 OCT 0600	253	0.
28 OCT 1640	29	0.	*	29 OCT 0510	104	0.	*	29 OCT 1740	179	0.	*	30 OCT 0610	254	0.
28 OCT 1650	30	0.	*	29 OCT 0520	105	0.	*	29 OCT 1750	180	0.	*	30 OCT 0620	255	0.
28 OCT 1700	31	0.	*	29 OCT 0530	106	0.	*	29 OCT 1800	181	0.	*	30 OCT 0630	256	0.
28 OCT 1710	32	0.	*	29 OCT 0540	107	0.	*	29 OCT 1810	182	0.	*	30 OCT 0640	257	0.
28 OCT 1720	33	0.	*	29 OCT 0550	108	0.	*	29 OCT 1820	183	0.	*	30 OCT 0650	258	0.
28 OCT 1730	34	0.	*	29 OCT 0600	109	0.	*	29 OCT 1830	184	0.	*	30 OCT 0700	259	0.
28 OCT 1740	35	0.	*	29 OCT 0610	110	0.	*	29 OCT 1840	185	0.	*	30 OCT 0710	260	0.
28 OCT 1750	36	0.	*	29 OCT 0620	111	0.	*	29 OCT 1850	186	0.	*	30 OCT 0720	261	0.
28 OCT 1800	37	0.	*	29 OCT 0630	112	0.	*	29 OCT 1900	187	0.	*	30 OCT 0730	262	0.
28 OCT 1810	38	0.	*	29 OCT 0640	113	0.	*	29 OCT 1910	188	0.	*	30 OCT 0740	263	0.
28 OCT 1820	39	0.	*	29 OCT 0650	114	0.	*	29 OCT 1920	189	0.	*	30 OCT 0750	264	0.
28 OCT 1830	40	0.	*	29 OCT 0700	115	0.	*	29 OCT 1930	190	0.	*	30 OCT 0800	265	0.
28 OCT 1840	41	0.	*	29 OCT 0710	116	0.	*	29 OCT 1940	191	0.	*	30 OCT 0810	266	0.
28 OCT 1850	42	0.	*	29 OCT 0720	117	0.	*	29 OCT 1950	192	0.	*	30 OCT 0820	267	0.
28 OCT 1900	43	0.	*	29 OCT 0730	118	0.	*	29 OCT 2000	193	0.	*	30 OCT 0830	268	0.
28 OCT 1910	44	0.	*	29 OCT 0740	119	0.	*	29 OCT 2010	194	0.	*	30 OCT 0840	269	0.
28 OCT 1920	45	0.	*	29 OCT 0750	120	0.	*	29 OCT 2020	195	0.	*	30 OCT 0850	270	0.
28 OCT 1930	46	0.	*	29 OCT 0800	121	0.	*	29 OCT 2030	196	0.	*	30 OCT 0900	271	0.
28 OCT 1940	47	0.	*	29 OCT 0810	122	0.	*	29 OCT 2040	197	0.	*	30 OCT 0910	272	0.
28 OCT 1950	48	0.	*	29 OCT 0820	123	0.	*	29 OCT 2050	198	0.	*	30 OCT 0920	273	0.
28 OCT 2000	49	0.	*	29 OCT 0830	124	0.	*	29 OCT 2100	199	0.	*	30 OCT 0930	274	0.
28 OCT 2010	50	0.	*	29 OCT 0840	125	0.	*	29 OCT 2110	200	0.	*	30 OCT 0940	275	0.
28 OCT 2020	51	0.	*	29 OCT 0850	126	0.	*	29 OCT 2120	201	0.	*	30 OCT 0950	276	0.
28 OCT 2030	52	0.	*	29 OCT 0900	127	0.	*	29 OCT 2130	202	0.	*	30 OCT 1000	277	0.
28 OCT 2040	53	0.	*	29 OCT 0910	128	0.	*	29 OCT 2140	203	0.	*	30 OCT 1010	278	0.
28 OCT 2050	54	0.	*	29 OCT 0920	129	0.	*	29 OCT 2150	204	0.	*	30 OCT 1020	279	0.
28 OCT 2100	55	0.	*	29 OCT 0930	130	0.	*	29 OCT 2200	205	0.	*	30 OCT 1030	280	0.
28 OCT 2110	56	0.	*	29 OCT 0940	131	0.	*	29 OCT 2210	206	0.	*	30 OCT 1040	281	0.
28 OCT 2120	57	0.	*	29 OCT 0950	132	0.	*	29 OCT 2220	207	0.	*	30 OCT 1050	282	0.
28 OCT 2130	58	0.	*	29 OCT 1000	133	0.	*	29 OCT 2230	208	0.	*	30 OCT 1100	283	0.
28 OCT 2140	59	0.	*	29 OCT 1010	134	0.	*	29 OCT 2240	209	0.	*	30 OCT 1110	284	0.
28 OCT 2150	60	0.	*	29 OCT 1020	135	0.	*	29 OCT 2250	210	0.	*	30 OCT 1120	285	0.
28 OCT 2200	61	0.	*	29 OCT 1030	136	0.	*	29 OCT 2300	211	0.	*	30 OCT 1130	286	0.
28 OCT 2210	62	0.	*	29 OCT 1040	137	0.	*	29 OCT 2310	212	0.	*	30 OCT 1140	287	0.
28 OCT 2220	63	0.	*	29 OCT 1050	138	0.	*	29 OCT 2320	213	0.	*	30 OCT 1150	288	0.
28 OCT 2230	64	0.	*	29 OCT 1100	139	0.	*	29 OCT 2330	214	0.	*	30 OCT 1200	289	0.
28 OCT 2240	65	0.	*	29 OCT 1110	140	0.	*	29 OCT 2340	215	0.	*	30 OCT 1210	290	0.
28 OCT 2250	66	0.	*	29 OCT 1120	141	0.	*	29 OCT 2350	216	0.	*	30 OCT 1220	291	0.
28 OCT 2300	67	0.	*	29 OCT 1130	142	0.	*	30 OCT 0000	217	0.	*	30 OCT 1230	292	0.
28 OCT 2310	68	0.	*	29 OCT 1140	143	0.	*	30 OCT 0010	218	0.	*	30 OCT 1240	293	0.
28 OCT 2320	69	0.	*	29 OCT 1150	144	0.	*	30 OCT 0020	219	0.	*	30 OCT 1250	294	0.
28 OCT 2330	70	0.	*	29 OCT 1200	145	0.	*	30 OCT 0030	220	0.	*	30 OCT 1300	295	0.
28 OCT 2340	71	0.	*	29 OCT 1210	146	0.	*	30 OCT 0040	221	0.	*	30 OCT 1310	296	0.
28 OCT 2350	72	0.	*	29 OCT 1220	147	0.	*	30 OCT 0050	222	0.	*	30 OCT 1320	297	0.
29 OCT 0000	73	0.	*	29 OCT 1230	148	0.	*	30 OCT 0100	223	0.	*	30 OCT 1330	298	0.
29 OCT 0010	74	0.	*	29 OCT 1240	149	0.	*	30 OCT 0110	224	0.	*	30 OCT 1340	299	0.
29 OCT 0020	75	0.	*	29 OCT 1250	150	0.	*	30 OCT 0120	225	0.	*	30 OCT 1350	300	0.
			*				*				*			

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	49.83-HR
+ (CFS)	(HR)					
		(CFS)				
+ 0.	49.50		0.	0.	0.	0.
		(INCHES)	.348	1.101	1.381	1.381
		(AC-FT)	0.	1.	1.	1.

CUMULATIVE AREA = .01 SQ MI

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              *           *
 54 KK        *   RES1    *
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Reservoir Routing Operation

HYDROGRAPH ROUTING DATA

56 RS	STORAGE ROUTING		
	NSTPS	1	NUMBER OF SUBREACHES
	ITYP	ELEV	TYPE OF INITIAL CONDITION
	RSVRIC	74.00	INITIAL CONDITION
	X	.00	WORKING R AND D COEFFICIENT

57 SA	AREA	.0	.8	.8	.9	1.1	2.2
58 SE	ELEVATION	74.00	75.00	76.00	77.00	78.00	79.00
59 SQ	DISCHARGE	0.	0.	0.	0.	0.	0.
60 SE	ELEVATION	74.00	75.00	76.00	77.00	78.00	79.00

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COMPUTED STORAGE-ELEVATION DATA

STORAGE	.00	.29	1.09	1.98	2.99	4.60
ELEVATION	74.00	75.00	76.00	77.00	78.00	79.00

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	.29	1.09	1.98	2.99	4.60
OUTFLOW	.00	.00	.00	.00	.00	.00
ELEVATION	74.00	75.00	76.00	77.00	78.00	79.00

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HYDROGRAPH AT STATION RES1

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DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
28	OCT	1200	1	0.	.0	74.0	*	29	OCT	0440	101	0.	.1	74.3	*	29	OCT	2120	201	0.	.3	75.0
28	OCT	1210	2	0.	.0	74.0	*	29	OCT	0450	102	0.	.1	74.3	*	29	OCT	2130	202	0.	.3	75.0
28	OCT	1220	3	0.	.0	74.0	*	29	OCT	0500	103	0.	.1	74.3	*	29	OCT	2140	203	0.	.3	75.0
28	OCT	1230	4	0.	.0	74.0	*	29	OCT	0510	104	0.	.1	74.3	*	29	OCT	2150	204	0.	.3	75.1
28	OCT	1240	5	0.	.0	74.0	*	29	OCT	0520	105	0.	.1	74.3	*	29	OCT	2200	205	0.	.3	75.1
28	OCT	1250	6	0.	.0	74.0	*	29	OCT	0530	106	0.	.1	74.3	*	29	OCT	2210	206	0.	.3	75.1
28	OCT	1300	7	0.	.0	74.0	*	29	OCT	0540	107	0.	.1	74.3	*	29	OCT	2220	207	0.	.3	75.1
28	OCT	1310	8	0.	.0	74.0	*	29	OCT	0550	108	0.	.1	74.3	*	29	OCT	2230	208	0.	.3	75.1
28	OCT	1320	9	0.	.0	74.0	*	29	OCT	0600	109	0.	.1	74.3	*	29	OCT	2240	209	0.	.4	75.1
28	OCT	1330	10	0.	.0	74.0	*	29	OCT	0610	110	0.	.1	74.3	*	29	OCT	2250	210	0.	.4	75.1
28	OCT	1340	11	0.	.0	74.0	*	29	OCT	0620	111	0.	.1	74.3	*	29	OCT	2300	211	0.	.4	75.1
28	OCT	1350	12	0.	.0	74.0	*	29	OCT	0630	112	0.	.1	74.3	*	29	OCT	2310	212	0.	.4	75.1
28	OCT	1400	13	0.	.0	74.0	*	29	OCT	0640	113	0.	.1	74.3	*	29	OCT	2320	213	0.	.4	75.1
28	OCT	1410	14	0.	.0	74.0	*	29	OCT	0650	114	0.	.1	74.3	*	29	OCT	2330	214	0.	.4	75.1
28	OCT	1420	15	0.	.0	74.0	*	29	OCT	0700	115	0.	.1	74.3	*	29	OCT	2340	215	0.	.4	75.1
28	OCT	1430	16	0.	.0	74.0	*	29	OCT	0710	116	0.	.1	74.3	*	29	OCT	2350	216	0.	.4	75.1
28	OCT	1440	17	0.	.0	74.0	*	29	OCT	0720	117	0.	.1	74.3	*	30	OCT	0000	217	0.	.4	75.1
28	OCT	1450	18	0.	.0	74.0	*	29	OCT	0730	118	0.	.1	74.3	*	30	OCT	0010	218	0.	.4	75.1
28	OCT	1500	19	0.	.0	74.0	*	29	OCT	0740	119	0.	.1	74.4	*	30	OCT	0020	219	0.	.4	75.1
28	OCT	1510	20	0.	.0	74.1	*	29	OCT	0750	120	0.	.1	74.4	*	30	OCT	0030	220	0.	.4	75.1
28	OCT	1520	21	0.	.0	74.1	*	29	OCT	0800	121	0.	.1	74.4	*	30	OCT	0040	221	0.	.4	75.1
28	OCT	1530	22	0.	.0	74.1	*	29	OCT	0810	122	0.	.1	74.4	*	30	OCT	0050	222	0.	.4	75.1
28	OCT	1540	23	0.	.0	74.1	*	29	OCT	0820	123	0.	.1	74.4	*	30	OCT	0100	223	0.	.4	75.2
28	OCT	1550	24	0.	.0	74.1	*	29	OCT	0830	124	0.	.1	74.4	*	30	OCT	0110	224	0.	.4	75.2
28	OCT	1600	25	0.	.0	74.1	*	29	OCT	0840	125	0.	.1	74.4	*	30	OCT	0120	225	0.	.4	75.2
28	OCT	1610	26	0.	.0	74.1	*	29	OCT	0850	126	0.	.1	74.4	*	30	OCT	0130	226	0.	.4	75.2
28	OCT	1620	27	0.	.0	74.1	*	29	OCT	0900	127	0.	.1	74.4	*	30	OCT	0140	227	0.	.4	75.2
28	OCT	1630	28	0.	.0	74.1	*	29	OCT	0910	128	0.	.1	74.4	*	30	OCT	0150	228	0.	.4	75.2
28	OCT	1640	29	0.	.0	74.1	*	29	OCT	0920	129	0.	.1	74.4	*	30	OCT	0200	229	0.	.4	75.2

28 OCT	1650	30	0.	.0	74.1	*	29 OCT	0930	130	0.	.1	74.4	*	30 OCT	0210	230	0.	.4	75.2
28 OCT	1700	31	0.	.0	74.1	*	29 OCT	0940	131	0.	.1	74.4	*	30 OCT	0220	231	0.	.5	75.2
28 OCT	1710	32	0.	.0	74.1	*	29 OCT	0950	132	0.	.1	74.4	*	30 OCT	0230	232	0.	.5	75.2
28 OCT	1720	33	0.	.0	74.1	*	29 OCT	1000	133	0.	.1	74.4	*	30 OCT	0240	233	0.	.5	75.2
28 OCT	1730	34	0.	.0	74.1	*	29 OCT	1010	134	0.	.1	74.4	*	30 OCT	0250	234	0.	.5	75.2
28 OCT	1740	35	0.	.0	74.1	*	29 OCT	1020	135	0.	.1	74.4	*	30 OCT	0300	235	0.	.5	75.2
28 OCT	1750	36	0.	.0	74.1	*	29 OCT	1030	136	0.	.1	74.4	*	30 OCT	0310	236	0.	.5	75.2
28 OCT	1800	37	0.	.0	74.1	*	29 OCT	1040	137	0.	.1	74.4	*	30 OCT	0320	237	0.	.5	75.2
28 OCT	1810	38	0.	.0	74.1	*	29 OCT	1050	138	0.	.1	74.4	*	30 OCT	0330	238	0.	.5	75.2
28 OCT	1820	39	0.	.0	74.1	*	29 OCT	1100	139	0.	.1	74.4	*	30 OCT	0340	239	0.	.5	75.2
28 OCT	1830	40	0.	.0	74.1	*	29 OCT	1110	140	0.	.1	74.4	*	30 OCT	0350	240	0.	.5	75.3
28 OCT	1840	41	0.	.0	74.1	*	29 OCT	1120	141	0.	.1	74.5	*	30 OCT	0400	241	0.	.5	75.3
28 OCT	1850	42	0.	.0	74.1	*	29 OCT	1130	142	0.	.1	74.5	*	30 OCT	0410	242	0.	.5	75.3
28 OCT	1900	43	0.	.0	74.1	*	29 OCT	1140	143	0.	.1	74.5	*	30 OCT	0420	243	0.	.5	75.3
28 OCT	1910	44	0.	.0	74.1	*	29 OCT	1150	144	0.	.1	74.5	*	30 OCT	0430	244	0.	.5	75.3
28 OCT	1920	45	0.	.0	74.1	*	29 OCT	1200	145	0.	.1	74.5	*	30 OCT	0440	245	0.	.5	75.3
28 OCT	1930	46	0.	.0	74.1	*	29 OCT	1210	146	0.	.1	74.5	*	30 OCT	0450	246	0.	.5	75.3
28 OCT	1940	47	0.	.0	74.1	*	29 OCT	1220	147	0.	.1	74.5	*	30 OCT	0500	247	0.	.5	75.3
28 OCT	1950	48	0.	.0	74.1	*	29 OCT	1230	148	0.	.1	74.5	*	30 OCT	0510	248	0.	.5	75.3
28 OCT	2000	49	0.	.0	74.1	*	29 OCT	1240	149	0.	.1	74.5	*	30 OCT	0520	249	0.	.5	75.3
28 OCT	2010	50	0.	.0	74.1	*	29 OCT	1250	150	0.	.2	74.5	*	30 OCT	0530	250	0.	.5	75.3
28 OCT	2020	51	0.	.0	74.1	*	29 OCT	1300	151	0.	.2	74.5	*	30 OCT	0540	251	0.	.5	75.3
28 OCT	2030	52	0.	.0	74.1	*	29 OCT	1310	152	0.	.2	74.5	*	30 OCT	0550	252	0.	.6	75.3
28 OCT	2040	53	0.	.0	74.1	*	29 OCT	1320	153	0.	.2	74.5	*	30 OCT	0600	253	0.	.6	75.3
28 OCT	2050	54	0.	.0	74.2	*	29 OCT	1330	154	0.	.2	74.6	*	30 OCT	0610	254	0.	.6	75.3
28 OCT	2100	55	0.	.0	74.2	*	29 OCT	1340	155	0.	.2	74.6	*	30 OCT	0620	255	0.	.6	75.3
28 OCT	2110	56	0.	.0	74.2	*	29 OCT	1350	156	0.	.2	74.6	*	30 OCT	0630	256	0.	.6	75.4
28 OCT	2120	57	0.	.0	74.2	*	29 OCT	1400	157	0.	.2	74.6	*	30 OCT	0640	257	0.	.6	75.4
28 OCT	2130	58	0.	.0	74.2	*	29 OCT	1410	158	0.	.2	74.6	*	30 OCT	0650	258	0.	.6	75.4
28 OCT	2140	59	0.	.0	74.2	*	29 OCT	1420	159	0.	.2	74.6	*	30 OCT	0700	259	0.	.6	75.4
28 OCT	2150	60	0.	.0	74.2	*	29 OCT	1430	160	0.	.2	74.6	*	30 OCT	0710	260	0.	.6	75.4
28 OCT	2200	61	0.	.1	74.2	*	29 OCT	1440	161	0.	.2	74.6	*	30 OCT	0720	261	0.	.6	75.4
28 OCT	2210	62	0.	.1	74.2	*	29 OCT	1450	162	0.	.2	74.6	*	30 OCT	0730	262	0.	.6	75.4
28 OCT	2220	63	0.	.1	74.2	*	29 OCT	1500	163	0.	.2	74.6	*	30 OCT	0740	263	0.	.6	75.4
28 OCT	2230	64	0.	.1	74.2	*	29 OCT	1510	164	0.	.2	74.7	*	30 OCT	0750	264	0.	.6	75.4
28 OCT	2240	65	0.	.1	74.2	*	29 OCT	1520	165	0.	.2	74.7	*	30 OCT	0800	265	0.	.6	75.4
28 OCT	2250	66	0.	.1	74.2	*	29 OCT	1530	166	0.	.2	74.7	*	30 OCT	0810	266	0.	.6	75.4
28 OCT	2300	67	0.	.1	74.2	*	29 OCT	1540	167	0.	.2	74.7	*	30 OCT	0820	267	0.	.6	75.4
28 OCT	2310	68	0.	.1	74.2	*	29 OCT	1550	168	0.	.2	74.7	*	30 OCT	0830	268	0.	.6	75.4
28 OCT	2320	69	0.	.1	74.2	*	29 OCT	1600	169	0.	.2	74.7	*	30 OCT	0840	269	0.	.6	75.4
28 OCT	2330	70	0.	.1	74.2	*	29 OCT	1610	170	0.	.2	74.7	*	30 OCT	0850	270	0.	.6	75.4
28 OCT	2340	71	0.	.1	74.2	*	29 OCT	1620	171	0.	.2	74.7	*	30 OCT	0900	271	0.	.7	75.5
28 OCT	2350	72	0.	.1	74.2	*	29 OCT	1630	172	0.	.2	74.7	*	30 OCT	0910	272	0.	.7	75.5
29 OCT	0000	73	0.	.1	74.2	*	29 OCT	1640	173	0.	.2	74.7	*	30 OCT	0920	273	0.	.7	75.5
29 OCT	0010	74	0.	.1	74.2	*	29 OCT	1650	174	0.	.2	74.8	*	30 OCT	0930	274	0.	.7	75.5
29 OCT	0020	75	0.	.1	74.2	*	29 OCT	1700	175	0.	.2	74.8	*	30 OCT	0940	275	0.	.7	75.5
29 OCT	0030	76	0.	.1	74.2	*	29 OCT	1710	176	0.	.2	74.8	*	30 OCT	0950	276	0.	.7	75.5
29 OCT	0040	77	0.	.1	74.2	*	29 OCT	1720	177	0.	.2	74.8	*	30 OCT	1000	277	0.	.7	75.5
29 OCT	0050	78	0.	.1	74.2	*	29 OCT	1730	178	0.	.2	74.8	*	30 OCT	1010	278	0.	.7	75.5
29 OCT	0100	79	0.	.1	74.2	*	29 OCT	1740	179	0.	.2	74.8	*	30 OCT	1020	279	0.	.7	75.5
29 OCT	0110	80	0.	.1	74.2	*	29 OCT	1750	180	0.	.2	74.8	*	30 OCT	1030	280	0.	.7	75.5
29 OCT	0120	81	0.	.1	74.2	*	29 OCT	1800	181	0.	.2	74.8	*	30 OCT	1040	281	0.	.7	75.5
29 OCT	0130	82	0.	.1	74.2	*	29 OCT	1810	182	0.	.2	74.8	*	30 OCT	1050	282	0.	.7	75.5
29 OCT	0140	83	0.	.1	74.2	*	29 OCT	1820	183	0.	.3	74.9	*	30 OCT	1100	283	0.	.7	75.5
29 OCT	0150	84	0.	.1	74.2	*	29 OCT	1830	184	0.	.3	74.9	*	30 OCT	1110	284	0.	.7	75.5
29 OCT	0200	85	0.	.1	74.2	*	29 OCT	1840	185	0.	.3	74.9	*	30 OCT	1120	285	0.	.7	75.5
29 OCT	0210	86	0.	.1	74.2	*	29 OCT	1850	186	0.	.3	74.9	*	30 OCT	1130	286	0.	.7	75.6
29 OCT	0220	87	0.	.1	74.2	*	29 OCT	1900	187	0.	.3	74.9	*	30 OCT	1140	287	0.	.7	75.6
29 OCT	0230	88	0.	.1	74.3	*	29 OCT	1910	188	0.	.3	74.9	*	30 OCT	1150	288	0.	.7	75.6
29 OCT	0240	89	0.	.1	74.3	*	29 OCT	1920	189	0.	.3	74.9	*	30 OCT	1200	289	0.	.8	75.6
29 OCT	0250	90	0.	.1	74.3	*	29 OCT	1930	190	0.	.3	75.0	*	30 OCT	1210	290	0.	.8	75.6
29 OCT	0300	91	0.	.1	74.3	*	29 OCT	1940	191	0.	.3	75.0	*	30 OCT	1220	291	0.	.8	75.6
29 OCT	0310	92	0.	.1	74.3	*	29 OCT	1950	192	0.	.3	75.0	*	30 OCT	1230	292	0.	.8	75.6
29 OCT	0320	93	0.	.1	74.3	*	29 OCT	2000	193	0.	.3	75.0	*	30 OCT	1240	293	0.	.8	75.6
29 OCT	0330	94	0.	.1	74.3	*	29 OCT	2010	194	0.	.3	75.0	*	30 OCT	1250	294	0.	.8	75.6
29 OCT	0340	95	0.	.1	74.3	*	29 OCT	2020	195	0.	.3	75.0	*	30 OCT	1300	295	0.	.8	75.6
29 OCT	0350	96	0.	.1	74.3	*	29 OCT	2030	196	0.	.3	75.0	*	30 OCT	1310	296	0.	.8	75.6
29 OCT	0400	97	0.	.1	74.3	*	29 OCT	2040	197	0.	.3	75.0	*	30 OCT	1320	297	0.	.8	75.6
29 OCT	0410	98	0.	.1	74.3	*	29 OCT	2050	198	0.	.3	75.0	*	30 OCT	1330	298	0.	.8	75.6
29 OCT	0420	99	0.	.1	74.3	*	29 OCT	2100	199	0.	.3	75.0	*	30 OCT	1340	299	0.	.8	75.7
29 OCT	0430	100	0.	.1	74.3	*	29 OCT	2110	200	0.	.3	75.0	*	30 OCT	1350	300	0.	.8	75.7
						*							*						

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*******************************************************************************************************
 PEAK FLOW     TIME                                  MAXIMUM AVERAGE FLOW
                                         6-HR        24-HR       72-HR      49.83-HR
+   (CFS)      (HR)
                            (CFS)
+       0.       .17                      0.          0.          0.          0.
                          (INCHES)       .000        .000        .000        .000
                          (AC-FT)         0.          0.          0.          0.

 PEAK STORAGE  TIME                                  MAXIMUM AVERAGE STORAGE
                                         6-HR        24-HR       72-HR      49.83-HR
+ (AC-FT)      (HR)
        1.    49.83                       1.          0.          0.          0.

 PEAK STAGE    TIME                                  MAXIMUM AVERAGE STAGE
                                         6-HR        24-HR       72-HR      49.83-HR
+  (FEET)      (HR)
     75.67    49.83                     75.53       75.17       74.68       74.68

                          CUMULATIVE AREA =      .01 SQ MI

1
                                               RUNOFF SUMMARY
                                          FLOW IN CUBIC FEET PER SECOND
                                        TIME IN HOURS,  AREA IN SQUARE MILES

                                 PEAK   TIME OF   AVERAGE FLOW FOR MAXIMUM PERIOD      BASIN    MAXIMUM    TIME OF
       OPERATION     STATION     FLOW    PEAK                                          AREA     STAGE     MAX STAGE
+                                                 6-HOUR     24-HOUR     72-HOUR

       HYDROGRAPH AT
+                      SITE        0.    49.67        0.         0.          0.        .01

       HYDROGRAPH AT
+                      POND        0.    24.50        0.         0.          0.        .00

       2 COMBINED AT
+                      COMB        0.    49.50        0.         0.          0.        .01

       ROUTED TO
+                      RES1        0.      .17        0.         0.          0.        .01
+                                                                                               75.67      49.83

*** NORMAL END OF HEC-1 ***
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CASE VI

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1******************************************
*                                        *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)    *
*             FEBRUARY 1981              *
*           REVISED 02 AUG 88            *
*                                        *
*  RUN DATE  10/27/1998  TIME  11:31:34  *
*                                        *
******************************************
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*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*  THE HYDROLOGIC ENGINEERING CENTER    *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 551-1748              *
*                                       *
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X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X               X
XXXXXXX  XXXX     X       XXXXX   X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX         XXX
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1


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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  1           ID    KUA - Cane Island Unit 3
  2           ID    Site Certification Application
  3           ID    HEC-1 Analysis of Unit 3:   10 Year - 72 Hour Precipitation Event
  4           ID    Black & Veatch Project No. 59140     Modelled By: Gregory V. Johnson
  5           ID    Post-Construction Model
  6           ID    Input File: kua10-72.in   Output File:  kua10-72.out
  7           IT      10 27OCT98    0600      300
  8           IO       0        0
  9           IN      15
              * **********

 10           KK     SITE
 11           KM    Runoff From Unit 3 Power Block and Construction Laydown Area
 12           BA   .00964
 13           PB     9.65
 14           PC    0.002   0.003   0.005   0.006   0.008   0.009   0.011   0.012   0.014   0.015
 15           PC    0.017   0.018   0.020   0.021   0.023   0.024   0.026   0.027   0.029   0.030
 16           PC    0.032   0.033   0.035   0.036   0.038   0.040   0.041   0.043   0.044   0.046
 17           PC    0.047   0.049   0.050   0.052   0.053   0.055   0.056   0.058   0.059   0.061
 18           PC    0.062   0.064   0.065   0.067   0.068   0.070   0.071   0.073   0.075   0.076
 19           PC    0.078   0.079   0.081   0.082   0.084   0.085   0.087   0.088   0.090   0.091
 20           PC    0.093   0.094   0.096   0.097   0.099   0.100   0.102   0.103   0.105   0.106
 21           PC    0.108   0.110   0.111   0.113   0.114   0.116   0.117   0.119   0.120   0.122
 22           PC    0.123   0.125   0.126   0.128   0.129   0.131   0.132   0.134   0.135   0.137
 23           PC    0.138   0.140   0.141   0.143   0.144   0.146   0.148   0.150   0.153   0.155
 24           PC    0.157   0.159   0.162   0.164   0.166   0.168   0.170   0.173   0.175   0.177
 25           PC    0.179   0.182   0.184   0.186   0.188   0.190   0.193   0.195   0.197   0.199
 26           PC    0.201   0.204   0.206   0.208   0.210   0.213   0.215   0.217   0.219   0.221
 27           PC    0.224   0.226   0.228   0.230   0.233   0.235   0.237   0.239   0.241   0.244
 28           PC    0.246   0.248   0.250   0.252   0.255   0.257   0.259   0.261   0.264   0.266
 29           PC    0.268   0.270   0.272   0.275   0.277   0.279   0.281   0.284   0.286   0.288
 30           PC    0.290   0.292   0.295   0.297   0.299   0.301   0.304   0.306   0.308   0.310
 31           PC    0.312   0.315   0.317   0.319   0.321   0.324   0.326   0.328   0.330   0.332
 32           PC    0.335   0.337   0.339   0.341   0.343   0.346   0.348   0.350   0.352   0.355
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          33             PC   0.357    0.359    0.362    0.364    0.367    0.369    0.372    0.374    0.377    0.379
          34             PC   0.382    0.385    0.388    0.391    0.394    0.397    0.400    0.404    0.408    0.412
          35             PC   0.417    0.421    0.426    0.431    0.437    0.442    0.448    0.454    0.461    0.467
          36             PC   0.474    0.481    0.488    0.496    0.504    0.512    0.521    0.530    0.540    0.550
          37             PC   0.561    0.572    0.584    0.596    0.612    0.628    0.653    0.678    0.847    1.015
          38             PC   1.052    1.088    1.107    1.126    1.140    1.154    1.166    1.177    1.186    1.194
          39             PC   1.202    1.209    1.217    1.224    1.232    1.239    1.243    1.248    1.253    1.257
          40             PC   1.262    1.266    1.271    1.275    1.280    1.284    1.289    1.293    1.298    1.302
          41             PC   1.307    1.311    1.314    1.317    1.320    1.323    1.326    1.329    1.332    1.335
          42             PC   1.338    1.341    1.344    1.347    1.350    1.353    1.356    1.359
          43             LS       0       65        0
          44             UD    0.26
                         * **********

          45             KK    POND
          46             KM   Unit 3 Stormwater Pond
          47             BA  .00152
          48             LS       0       49      100
          49             UD    0.01
                         * **********
1                                                   HEC-1 INPUT                                                   PAGE  2

        LINE             ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


          50             KK    COMB
          51             KM   Combining Two Hydrographs in Reservoir
          52             HC       2
                         * **********

          53             KK    RES1
          54             KM   Reservoir Routing Operation
          55             RS       1     ELEV     74.0
          56             SA  .01313 0.76079 0.83623 0.94231 1.07782 2.22002
          57             SE    74.0     75.0     76.0     77.0     78.0     79.0
          58             SQ       0        0        0      1.4      2.2     33.7
          59             SE    74.0     75.0     76.0     77.0     78.0     79.0
                         * **********
                         *DIAGRAM
          60             ZZ
1
               SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
 LINE     (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

 NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

  10       SITE
             .
             .
  45         .        POND
             .           .
             .           .
  50       COMB............
             V
             V
  53       RES1

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION
```

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             FEBRUARY 1981             *
*           REVISED 02 AUG 88           *
*                                       *
*  RUN DATE  10/27/1998  TIME  11:31:34 *
*                                       *
*****************************************
```

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*****************************************
*                                       *
*     U.S. ARMY CORPS OF ENGINEERS      *
*  THE HYDROLOGIC ENGINEERING CENTER    *
*         609 SECOND STREET             *
*       DAVIS, CALIFORNIA 95616         *
*          (916) 551-1748               *
*                                       *
*****************************************
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                    KUA - Cane Island Unit 3
                    Site Certification Application
                    HEC-1 Analysis of Unit 3:   10 Year - 72 Hour Precipitation Event
                    Black & Veatch Project No. 59140     Modelled By: Gregory V. Johnson
                    Post-Construction Model
                    Input File: kua10-72.in   Output File:  kua10-72.out

*** ERROR *** SPECIFIED START AND END DATES RESULT IN TOO MANY TIME PERIODS

  8 IO        OUTPUT CONTROL VARIABLES
                    IPRNT          0  PRINT CONTROL
                    IPLOT          0  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE

    IT        HYDROGRAPH TIME DATA
                    NMIN          10  MINUTES IN COMPUTATION INTERVAL
                    IDATE    270CT98  STARTING DATE
                    ITIME       1200  STARTING TIME
                    NQ           300  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE   310CT98  ENDING DATE
                    NDTIME      1350  ENDING TIME
                    ICENT         19  CENTURY MARK

              COMPUTATION INTERVAL     .17 HOURS
                   TOTAL TIME BASE   49.83 HOURS

       ENGLISH UNITS
            DRAINAGE AREA           SQUARE MILES
            PRECIPITATION DEPTH     INCHES
            LENGTH, ELEVATION       FEET
            FLOW                    CUBIC FEET PER SECOND
            STORAGE VOLUME          ACRE-FEET
            SURFACE AREA            ACRES
            TEMPERATURE             DEGREES FAHRENHEIT

*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** **

         **************
         *            *
 10 KK   *     SITE   *
         *            *
         **************
                   Runoff From Unit 3 Power Block and Construction Laydown Area

  9 IN        TIME DATA FOR INPUT TIME SERIES
                    JXMIN         15  TIME INTERVAL IN MINUTES
                    JXDATE   270CT98  STARTING DATE
                    JXTIME      6000  STARTING TIME

           SUBBASIN RUNOFF DATA

 12 BA        SUBBASIN CHARACTERISTICS
                    TAREA        .01  SUBBASIN AREA

              PRECIPITATION DATA

 13 PB              STORM       9.65  BASIN TOTAL PRECIPITATION

 14 PI          INCREMENTAL PRECIPITATION PATTERN
                  .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
                  .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
                  .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
                  .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
                  .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
                  .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
                  .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
                  .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
                  .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
                  .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
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.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	

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43 LS          SCS LOSS RATE
                     STRTL        1.08  INITIAL ABSTRACTION
                     CRVNBR      65.00  CURVE NUMBER
                     RTIMP         .00  PERCENT IMPERVIOUS AREA

44 UD          SCS DIMENSIONLESS UNITGRAPH
                     TLAG          .26  LAG
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***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

UNIT HYDROGRAPH
10 END-OF-PERIOD ORDINATES

6.	14.	10.	4.	2.	1.	0.	0.	0.	0.

****

HYDROGRAPH AT STATION SITE

****

DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
29	OCT	1200	1	.00	.00	.00	0.	*	30	OCT	1300	151	.03	.01	.02	1.
29	OCT	1210	2	.02	.02	.00	0.	*	30	OCT	1310	152	.03	.01	.02	1.
29	OCT	1220	3	.03	.03	.00	0.	*	30	OCT	1320	153	.04	.02	.02	1.
29	OCT	1230	4	.03	.03	.00	0.	*	30	OCT	1330	154	.05	.02	.03	1.
29	OCT	1240	5	.02	.02	.00	0.	*	30	OCT	1340	155	.03	.01	.02	1.
29	OCT	1250	6	.03	.03	.00	0.	*	30	OCT	1350	156	.03	.01	.02	1.
29	OCT	1300	7	.03	.03	.00	0.	*	30	OCT	1400	157	.03	.01	.02	1.
29	OCT	1310	8	.02	.02	.00	0.	*	30	OCT	1410	158	.03	.01	.02	1.
29	OCT	1320	9	.03	.03	.00	0.	*	30	OCT	1420	159	.03	.01	.02	1.
29	OCT	1330	10	.03	.03	.00	0.	*	30	OCT	1430	160	.03	.01	.02	1.
29	OCT	1340	11	.02	.02	.00	0.	*	30	OCT	1440	161	.05	.02	.03	1.
29	OCT	1350	12	.03	.03	.00	0.	*	30	OCT	1450	162	.04	.02	.03	1.
29	OCT	1400	13	.03	.03	.00	0.	*	30	OCT	1500	163	.03	.01	.02	1.
29	OCT	1410	14	.02	.02	.00	0.	*	30	OCT	1510	164	.03	.01	.02	1.
29	OCT	1420	15	.03	.03	.00	0.	*	30	OCT	1520	165	.03	.01	.02	1.
29	OCT	1430	16	.03	.03	.00	0.	*	30	OCT	1530	166	.03	.01	.02	1.
29	OCT	1440	17	.02	.02	.00	0.	*	30	OCT	1540	167	.05	.02	.03	1.
29	OCT	1450	18	.03	.03	.00	0.	*	30	OCT	1550	168	.04	.02	.03	1.
29	OCT	1500	19	.03	.03	.00	0.	*	30	OCT	1600	169	.03	.01	.02	1.
29	OCT	1510	20	.02	.02	.00	0.	*	30	OCT	1610	170	.03	.01	.02	1.
29	OCT	1520	21	.03	.03	.00	0.	*	30	OCT	1620	171	.03	.01	.02	1.
29	OCT	1530	22	.03	.03	.00	0.	*	30	OCT	1630	172	.03	.01	.02	1.
29	OCT	1540	23	.02	.02	.00	0.	*	30	OCT	1640	173	.03	.01	.02	1.
29	OCT	1550	24	.03	.03	.00	0.	*	30	OCT	1650	174	.04	.01	.03	1.
29	OCT	1600	25	.03	.03	.00	0.	*	30	OCT	1700	175	.05	.02	.03	1.
29	OCT	1610	26	.02	.02	.00	0.	*	30	OCT	1710	176	.03	.01	.02	1.
29	OCT	1620	27	.03	.03	.00	0.	*	30	OCT	1720	177	.03	.01	.02	1.

29 OCT 1630	28	.03	.03	.00	0.	*
29 OCT 1640	29	.02	.02	.00	0.	*
29 OCT 1650	30	.03	.03	.00	0.	*
29 OCT 1700	31	.03	.03	.00	0.	*
29 OCT 1710	32	.02	.02	.00	0.	*
29 OCT 1720	33	.03	.03	.00	0.	*
29 OCT 1730	34	.03	.03	.00	0.	*
29 OCT 1740	35	.02	.02	.00	0.	*
29 OCT 1750	36	.03	.03	.00	0.	*
29 OCT 1800	37	.03	.03	.00	0.	*
29 OCT 1810	38	.03	.03	.00	0.	*
29 OCT 1820	39	.03	.03	.00	0.	*
29 OCT 1830	40	.02	.02	.00	0.	*
29 OCT 1840	41	.03	.03	.00	0.	*
29 OCT 1850	42	.03	.03	.00	0.	*
29 OCT 1900	43	.02	.02	.00	0.	*
29 OCT 1910	44	.03	.03	.00	0.	*
29 OCT 1920	45	.03	.03	.00	0.	*
29 OCT 1930	46	.02	.02	.00	0.	*
29 OCT 1940	47	.03	.03	.00	0.	*
29 OCT 1950	48	.03	.02	.00	0.	*
29 OCT 2000	49	.02	.02	.00	0.	*
29 OCT 2010	50	.03	.03	.00	0.	*
29 OCT 2020	51	.03	.02	.00	0.	*
29 OCT 2030	52	.02	.02	.00	0.	*
29 OCT 2040	53	.03	.03	.00	0.	*
29 OCT 2050	54	.03	.02	.00	0.	*
29 OCT 2100	55	.02	.02	.00	0.	*
29 OCT 2110	56	.03	.03	.00	0.	*
29 OCT 2120	57	.03	.02	.00	0.	*
29 OCT 2130	58	.02	.01	.00	0.	*
29 OCT 2140	59	.03	.03	.00	0.	*
29 OCT 2150	60	.03	.02	.00	0.	*
29 OCT 2200	61	.02	.01	.00	0.	*
29 OCT 2210	62	.03	.03	.01	0.	*
29 OCT 2220	63	.03	.02	.00	0.	*
29 OCT 2230	64	.02	.01	.00	0.	*
29 OCT 2240	65	.03	.03	.01	0.	*
29 OCT 2250	66	.03	.02	.00	0.	*
29 OCT 2300	67	.02	.01	.00	0.	*
29 OCT 2310	68	.03	.03	.01	0.	*
29 OCT 2320	69	.03	.02	.01	0.	*
29 OCT 2330	70	.02	.01	.00	0.	*
29 OCT 2340	71	.03	.03	.01	0.	*
29 OCT 2350	72	.03	.03	.01	0.	*
30 OCT 0000	73	.03	.03	.01	0.	*
30 OCT 0010	74	.02	.01	.00	0.	*
30 OCT 0020	75	.03	.02	.01	0.	*
30 OCT 0030	76	.03	.03	.01	0.	*
30 OCT 0040	77	.02	.01	.00	0.	*
30 OCT 0050	78	.03	.02	.01	0.	*
30 OCT 0100	79	.03	.02	.01	0.	*
30 OCT 0110	80	.02	.01	.00	0.	*
30 OCT 0120	81	.03	.02	.01	0.	*
30 OCT 0130	82	.03	.02	.01	0.	*
30 OCT 0140	83	.02	.01	.01	0.	*
30 OCT 0150	84	.03	.02	.01	0.	*
30 OCT 0200	85	.03	.02	.01	0.	*
30 OCT 0210	86	.02	.01	.01	0.	*
30 OCT 0220	87	.03	.02	.01	0.	*
30 OCT 0230	88	.03	.02	.01	0.	*
30 OCT 0240	89	.02	.01	.01	0.	*
30 OCT 0250	90	.03	.02	.01	0.	*
30 OCT 0300	91	.03	.02	.01	0.	*
30 OCT 0310	92	.02	.01	.01	0.	*
30 OCT 0320	93	.03	.02	.01	0.	*
30 OCT 0330	94	.03	.02	.01	0.	*
30 OCT 0340	95	.02	.01	.01	0.	*
30 OCT 0350	96	.03	.02	.01	0.	*
30 OCT 0400	97.	.03	.02	.01	0.	*
30 OCT 0410	98	.02	.01	.01	0.	*
30 OCT 0420	99	.03	.02	.01	0.	*

30 OCT 1730	178	.03	.01	.02	1.
30 OCT 1740	179	.03	.01	.02	1.
30 OCT 1750	180	.03	.01	.02	1.
30 OCT 1800	181	.03	.01	.02	1.
30 OCT 1810	182	.05	.02	.03	1.
30 OCT 1820	183	.04	.01	.03	1.
30 OCT 1830	184	.03	.01	.02	1.
30 OCT 1840	185	.03	.01	.02	1.
30 OCT 1850	186	.03	.01	.02	1.
30 OCT 1900	187	.03	.01	.02	1.
30 OCT 1910	188	.05	.02	.04	1.
30 OCT 1920	189	.04	.01	.03	1.
30 OCT 1930	190	.03	.01	.02	1.
30 OCT 1940	191	.03	.01	.02	1.
30 OCT 1950	192	.03	.01	.02	1.
30 OCT 2000	193	.03	.01	.02	1.
30 OCT 2010	194	.03	.01	.02	1.
30 OCT 2020	195	.04	.01	.03	1.
30 OCT 2030	196	.05	.01	.04	1.
30 OCT 2040	197	.03	.01	.02	1.
30 OCT 2050	198	.03	.01	.02	1.
30 OCT 2100	199	.03	.01	.02	1.
30 OCT 2110	200	.03	.01	.02	1.
30 OCT 2120	201	.04	.01	.03	1.
30 OCT 2130	202	.05	.01	.04	1.
30 OCT 2140	203	.03	.01	.02	1.
30 OCT 2150	204	.03	.01	.02	1.
30 OCT 2200	205	.03	.01	.02	1.
30 OCT 2210	206	.03	.01	.02	1.
30 OCT 2220	207	.03	.01	.02	1.
30 OCT 2230	208	.03	.01	.02	1.
30 OCT 2240	209	.05	.01	.04	1.
30 OCT 2250	210	.04	.01	.03	1.
30 OCT 2300	211	.03	.01	.03	1.
30 OCT 2310	212	.03	.01	.03	1.
30 OCT 2320	213	.03	.01	.03	1.
30 OCT 2330	214	.03	.01	.03	1.
30 OCT 2340	215	.03	.01	.03	1.
30 OCT 2350	216	.04	.01	.03	1.
31 OCT 0000	217	.05	.01	.04	1.
31 OCT 0010	218	.03	.01	.03	1.
31 OCT 0020	219	.03	.01	.03	1.
31 OCT 0030	220	.03	.01	.03	1.
31 OCT 0040	221	.03	.01	.03	1.
31 OCT 0050	222	.04	.01	.03	1.
31 OCT 0100	223	.05	.01	.04	1.
31 OCT 0110	224	.03	.01	.03	1.
31 OCT 0120	225	.03	.01	.03	1.
31 OCT 0130	226	.03	.01	.03	1.
31 OCT 0140	227	.03	.01	.03	1.
31 OCT 0150	228	.03	.01	.03	1.
31 OCT 0200	229	.03	.01	.03	1.
31 OCT 0210	230	.05	.01	.04	1.
31 OCT 0220	231	.04	.01	.03	1.
31 OCT 0230	232	.03	.01	.03	1.
31 OCT 0240	233	.03	.01	.03	1.
31 OCT 0250	234	.03	.01	.03	1.
31 OCT 0300	235	.03	.01	.03	1.
31 OCT 0310	236	.05	.01	.04	1.
31 OCT 0320	237	.04	.01	.03	1.
31 OCT 0330	238	.03	.01	.03	1.
31 OCT 0340	239	.03	.01	.03	1.
31 OCT 0350	240	.03	.01	.03	1.
31 OCT 0400	241	.03	.01	.03	1.
31 OCT 0410	242	.03	.01	.03	1.
31 OCT 0420	243	.04	.01	.03	1.
31 OCT 0430	244	.05	.01	.04	1.
31 OCT 0440	245	.03	.01	.03	1.
31 OCT 0450	246	.03	.01	.03	1.
31 OCT 0500	247	.03	.01	.03	1.
31 OCT 0510	248	.03	.01	.03	1.
31 OCT 0520	249	.04	.01	.03	1.

30	OCT	0430	100	.03	.02	.01	0.	*	31	OCT	0530	250	.05	.01	.04	1.
30	OCT	0440	101	.02	.01	.01	0.	*	31	OCT	0540	251	.03	.01	.03	1.
30	OCT	0450	102	.03	.02	.01	0.	*	31	OCT	0550	252	.03	.01	.03	1.
30	OCT	0500	103	.03	.02	.01	0.	*	31	OCT	0600	253	.03	.01	.03	1.
30	OCT	0510	104	.02	.01	.01	0.	*	31	OCT	0610	254	.03	.01	.03	1.
30	OCT	0520	105	.03	.02	.01	0.	*	31	OCT	0620	255	.03	.01	.03	1.
30	OCT	0530	106	.03	.02	.01	0.	*	31	OCT	0630	256	.03	.01	.03	1.
30	OCT	0540	107	.03	.02	.01	0.	*	31	OCT	0640	257	.05	.01	.04	1.
30	OCT	0550	108	.03	.01	.01	0.	*	31	OCT	0650	258	.04	.01	.03	1.
30	OCT	0600	109	.02	.01	.01	0.	*	31	OCT	0700	259	.03	.01	.03	1.
30	OCT	0610	110	.03	.02	.01	0.	*	31	OCT	0710	260	.03	.01	.03	1.
30	OCT	0620	111	.03	.01	.01	0.	*	31	OCT	0720	261	.03	.01	.03	1.
30	OCT	0630	112	.02	.01	.01	0.	*	31	OCT	0730	262	.03	.01	.03	1.
30	OCT	0640	113	.03	.02	.01	0.	*	31	OCT	0740	263	.05	.01	.04	1.
30	OCT	0650	114	.03	.01	.01	0.	*	31	OCT	0750	264	.04	.01	.03	1.
30	OCT	0700	115	.02	.01	.01	0.	*	31	OCT	0800	265	.03	.01	.03	1.
30	OCT	0710	116	.03	.02	.02	0.	*	31	OCT	0810	266	.03	.01	.03	1.
30	OCT	0720	117	.03	.01	.01	0.	*	31	OCT	0820	267	.03	.01	.03	1.
30	OCT	0730	118	.02	.01	.01	0.	*	31	OCT	0830	268	.03	.01	.03	1.
30	OCT	0740	119	.03	.02	.02	0.	*	31	OCT	0840	269	.03	.01	.03	1.
30	OCT	0750	120	.03	.01	.01	0.	*	31	OCT	0850	270	.04	.01	.03	1.
30	OCT	0800	121	.02	.01	.01	0.	*	31	OCT	0900	271	.05	.01	.04	1.
30	OCT	0810	122	.03	.02	.02	0.	*	31	OCT	0910	272	.03	.01	.03	1.
30	OCT	0820	123	.03	.01	.01	0.	*	31	OCT	0920	273	.03	.01	.03	1.
30	OCT	0830	124	.02	.01	.01	0.	*	31	OCT	0930	274	.03	.01	.03	1.
30	OCT	0840	125	.03	.02	.02	0.	*	31	OCT	0940	275	.03	.01	.03	1.
30	OCT	0850	126	.03	.01	.01	0.	*	31	OCT	0950	276	.03	.01	.03	1.
30	OCT	0900	127	.02	.01	.01	0.	*	31	OCT	1000	277	.03	.01	.03	1.
30	OCT	0910	128	.03	.02	.02	0.	*	31	OCT	1010	278	.05	.01	.04	1.
30	OCT	0920	129	.03	.01	.01	0.	*	31	OCT	1020	279	.04	.01	.04	1.
30	OCT	0930	130	.02	.01	.01	0.	*	31	OCT	1030	280	.03	.01	.03	1.
30	OCT	0940	131	.03	.02	.02	0.	*	31	OCT	1040	281	.03	.01	.03	1.
30	OCT	0950	132	.03	.01	.01	0.	*	31	OCT	1050	282	.03	.01	.03	1.
30	OCT	1000	133	.02	.01	.01	0.	*	31	OCT	1100	283	.03	.01	.03	1.
30	OCT	1010	134	.03	.02	.02	0.	*	31	OCT	1110	284	.05	.01	.04	1.
30	OCT	1020	135	.03	.01	.01	1.	*	31	OCT	1120	285	.04	.01	.04	1.
30	OCT	1030	136	.02	.01	.01	0.	*	31	OCT	1130	286	.03	.01	.03	1.
30	OCT	1040	137	.03	.02	.02	0.	*	31	OCT	1140	287	.03	.01	.03	1.
30	OCT	1050	138	.03	.01	.01	1.	*	31	OCT	1150	288	.04	.01	.04	1.
30	OCT	1100	139	.02	.01	.01	0.	*	31	OCT	1200	289	.05	.01	.04	1.
30	OCT	1110	140	.03	.02	.02	0.	*	31	OCT	1210	290	.03	.01	.03	1.
30	OCT	1120	141	.03	.01	.01	1.	*	31	OCT	1220	291	.04	.01	.04	1.
30	OCT	1130	142	.02	.01	.01	1.	*	31	OCT	1230	292	.05	.01	.04	1.
30	OCT	1140	143	.03	.02	.02	0.	*	31	OCT	1240	293	.03	.01	.03	1.
30	OCT	1150	144	.03	.02	.02	1.	*	31	OCT	1250	294	.04	.01	.04	1.
30	OCT	1200	145	.03	.02	.02	1.	*	31	OCT	1300	295	.05	.01	.04	1.
30	OCT	1210	146	.03	.02	.02	1.	*	31	OCT	1310	296	.03	.01	.03	1.
30	OCT	1220	147	.04	.02	.02	1.	*	31	OCT	1320	297	.04	.01	.04	1.
30	OCT	1230	148	.05	.02	.03	1.	*	31	OCT	1330	298	.05	.01	.04	1.
30	OCT	1240	149	.03	.01	.02	1.	*	31	OCT	1340	299	.03	.01	.03	1.
30	OCT	1250	150	.03	.01	.02	1.	*	31	OCT	1350	300	.04	.01	.04	1.

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*******************************************************************************************************

   TOTAL RAINFALL =    9.65, TOTAL LOSS =    4.38, TOTAL EXCESS =    5.27

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                   6-HR        24-HR       72-HR      49.83-HR
+   (CFS)       (HR)
                         (CFS)
+       1.     49.67                  1.          1.          1.           1.
                       (INCHES)   1.178       4.119       5.189        5.189
                        (AC-FT)      1.          2.          3.           3.

                        CUMULATIVE AREA =     .01 SQ MI


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** **
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              ***************
              *             *
  45 KK       *     POND    *
              *             *
              ***************
                        Unit 3 Stormwater Pond

                SUBBASIN RUNOFF DATA

  47 BA           SUBBASIN CHARACTERISTICS
                      TAREA         .00   SUBBASIN AREA

                 PRECIPITATION DATA

  13 PB               STORM        9.65   BASIN TOTAL PRECIPITATION

  14 PI            INCREMENTAL PRECIPITATION PATTERN
                      .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
                      .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
                      .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
                      .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
                      .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
                      .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
                      .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
                      .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
                      .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
                      .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
                      .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
                      .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
                      .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
                      .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
                      .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
                      .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
                      .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
                      .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
                      .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
                      .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
                      .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
                      .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
                      .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
                      .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
                      .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
                      .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
                      .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
                      .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
                      .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
                      .00     .00     .00     .00     .00     .00     .00     .00     .00

  48 LS           SCS LOSS RATE
                     STRTL          2.08  INITIAL ABSTRACTION
                    CRVNBR         49.00  CURVE NUMBER
                     RTIMP        100.00  PERCENT IMPERVIOUS AREA

  49 UD           SCS DIMENSIONLESS UNITGRAPH
                      TLAG           .01  LAG

                                                   ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                              UNIT HYDROGRAPH
                                          5 END-OF-PERIOD ORDINATES
               4.       1.       0.       0.       0.
*************************************************************************************************************

                                         HYDROGRAPH AT STATION     POND

*************************************************************************************************************
                                                          *
       DA MON HRMN  ORD    RAIN    LOSS  EXCESS    COMP Q *   DA MON HRMN  ORD    RAIN    LOSS  EXCESS    COMP Q
                                                          *
```

29 OCT	1200	1	.00	.00	.00	0.	*
29 OCT	1210	2	.02	.00	.02	0.	*
29 OCT	1220	3	.03	.00	.03	0.	*
29 OCT	1230	4	.03	.00	.03	0.	*
29 OCT	1240	5	.02	.00	.02	0.	*
29 OCT	1250	6	.03	.00	.03	0.	*
29 OCT	1300	7	.03	.00	.03	0.	*
29 OCT	1310	8	.02	.00	.02	0.	*
29 OCT	1320	9	.03	.00	.03	0.	*
29 OCT	1330	10	.03	.00	.03	0.	*
29 OCT	1340	11	.02	.00	.02	0.	*
29 OCT	1350	12	.03	.00	.03	0.	*
29 OCT	1400	13	.03	.00	.03	0.	*
29 OCT	1410	14	.02	.00	.02	0.	*
29 OCT	1420	15	.03	.00	.03	0.	*
29 OCT	1430	16	.03	.00	.03	0.	*
29 OCT	1440	17	.02	.00	.02	0.	*
29 OCT	1450	18	.03	.00	.03	0.	*
29 OCT	1500	19	.03	.00	.03	0.	*
29 OCT	1510	20	.02	.00	.02	0.	*
29 OCT	1520	21	.03	.00	.03	0.	*
29 OCT	1530	22	.03	.00	.03	0.	*
29 OCT	1540	23	.02	.00	.02	0.	*
29 OCT	1550	24	.03	.00	.03	0.	*
29 OCT	1600	25	.03	.00	.03	0.	*
29 OCT	1610	26	.02	.00	.02	0.	*
29 OCT	1620	27	.03	.00	.03	0.	*
29 OCT	1630	28	.03	.00	.03	0.	*
29 OCT	1640	29	.02	.00	.02	0.	*
29 OCT	1650	30	.03	.00	.03	0.	*
29 OCT	1700	31	.03	.00	.03	0.	*
29 OCT	1710	32	.02	.00	.02	0.	*
29 OCT	1720	33	.03	.00	.03	0.	*
29 OCT	1730	34	.03	.00	.03	0.	*
29 OCT	1740	35	.02	.00	.02	0.	*
29 OCT	1750	36	.03	.00	.03	0.	*
29 OCT	1800	37	.03	.00	.03	0.	*
29 OCT	1810	38	.03	.00	.03	0.	*
29 OCT	1820	39	.03	.00	.03	0.	*
29 OCT	1830	40	.02	.00	.02	0.	*
29 OCT	1840	41	.03	.00	.03	0.	*
29 OCT	1850	42	.03	.00	.03	0.	*
29 OCT	1900	43	.02	.00	.02	0.	*
29 OCT	1910	44	.03	.00	.03	0.	*
29 OCT	1920	45	.03	.00	.03	0.	*
29 OCT	1930	46	.02	.00	.02	0.	*
29 OCT	1940	47	.03	.00	.03	0.	*
29 OCT	1950	48	.03	.00	.03	0.	*
29 OCT	2000	49	.02	.00	.02	0.	*
29 OCT	2010	50	.03	.00	.03	0.	*
29 OCT	2020	51	.03	.00	.03	0.	*
29 OCT	2030	52	.02	.00	.02	0.	*
29 OCT	2040	53	.03	.00	.03	0.	*
29 OCT	2050	54	.03	.00	.03	0.	*
29 OCT	2100	55	.02	.00	.02	0.	*
29 OCT	2110	56	.03	.00	.03	0.	*
29 OCT	2120	57	.03	.00	.03	0.	*
29 OCT	2130	58	.02	.00	.02	0.	*
29 OCT	2140	59	.03	.00	.03	0.	*
29 OCT	2150	60	.03	.00	.03	0.	*
29 OCT	2200	61	.02	.00	.02	0.	*
29 OCT	2210	62	.03	.00	.03	0.	*
29 OCT	2220	63	.03	.00	.03	0.	*
29 OCT	2230	64	.02	.00	.02	0.	*
29 OCT	2240	65	.03	.00	.03	0.	*
29 OCT	2250	66	.03	.00	.03	0.	*
29 OCT	2300	67	.02	.00	.02	0.	*
29 OCT	2310	68	.03	.00	.03	0.	*
29 OCT	2320	69	.03	.00	.03	0.	*
29 OCT	2330	70	.02	.00	.02	0.	*
29 OCT	2340	71	.03	.00	.03	0.	*
29 OCT	2350	72	.03	.00	.03	0.	*
30 OCT	1300	151	.03	.00	.03	0.	
30 OCT	1310	152	.03	.00	.03	0.	
30 OCT	1320	153	.04	.00	.04	0.	
30 OCT	1330	154	.05	.00	.05	0.	
30 OCT	1340	155	.03	.00	.03	0.	
30 OCT	1350	156	.03	.00	.03	0.	
30 OCT	1400	157	.03	.00	.03	0.	
30 OCT	1410	158	.03	.00	.03	0.	
30 OCT	1420	159	.03	.00	.03	0.	
30 OCT	1430	160	.03	.00	.03	0.	
30 OCT	1440	161	.05	.00	.05	0.	
30 OCT	1450	162	.04	.00	.04	0.	
30 OCT	1500	163	.03	.00	.03	0.	
30 OCT	1510	164	.03	.00	.03	0.	
30 OCT	1520	165	.03	.00	.03	0.	
30 OCT	1530	166	.03	.00	.03	0.	
30 OCT	1540	167	.05	.00	.05	0.	
30 OCT	1550	168	.04	.00	.04	0.	
30 OCT	1600	169	.03	.00	.03	0.	
30 OCT	1610	170	.03	.00	.03	0.	
30 OCT	1620	171	.03	.00	.03	0.	
30 OCT	1630	172	.03	.00	.03	0.	
30 OCT	1640	173	.03	.00	.03	0.	
30 OCT	1650	174	.04	.00	.04	0.	
30 OCT	1700	175	.05	.00	.05	0.	
30 OCT	1710	176	.03	.00	.03	0.	
30 OCT	1720	177	.03	.00	.03	0.	
30 OCT	1730	178	.03	.00	.03	0.	
30 OCT	1740	179	.03	.00	.03	0.	
30 OCT	1750	180	.03	.00	.03	0.	
30 OCT	1800	181	.03	.00	.03	0.	
30 OCT	1810	182	.05	.00	.05	0.	
30 OCT	1820	183	.04	.00	.04	0.	
30 OCT	1830	184	.03	.00	.03	0.	
30 OCT	1840	185	.03	.00	.03	0.	
30 OCT	1850	186	.03	.00	.03	0.	
30 OCT	1900	187	.03	.00	.03	0.	
30 OCT	1910	188	.05	.00	.05	0.	
30 OCT	1920	189	.04	.00	.04	0.	
30 OCT	1930	190	.03	.00	.03	0.	
30 OCT	1940	191	.03	.00	.03	0.	
30 OCT	1950	192	.03	.00	.03	0.	
30 OCT	2000	193	.03	.00	.03	0.	
30 OCT	2010	194	.03	.00	.03	0.	
30 OCT	2020	195	.04	.00	.04	0.	
30 OCT	2030	196	.05	.00	.05	0.	
30 OCT	2040	197	.03	.00	.03	0.	
30 OCT	2050	198	.03	.00	.03	0.	
30 OCT	2100	199	.03	.00	.03	0.	
30 OCT	2110	200	.03	.00	.03	0.	
30 OCT	2120	201	.04	.00	.04	0.	
30 OCT	2130	202	.05	.00	.05	0.	
30 OCT	2140	203	.03	.00	.03	0.	
30 OCT	2150	204	.03	.00	.03	0.	
30 OCT	2200	205	.03	.00	.03	0.	
30 OCT	2210	206	.03	.00	.03	0.	
30 OCT	2220	207	.03	.00	.03	0.	
30 OCT	2230	208	.03	.00	.03	0.	
30 OCT	2240	209	.05	.00	.05	0.	
30 OCT	2250	210	.04	.00	.04	0.	
30 OCT	2300	211	.03	.00	.03	0.	
30 OCT	2310	212	.03	.00	.03	0.	
30 OCT	2320	213	.03	.00	.03	0.	
30 OCT	2330	214	.03	.00	.03	0.	
30 OCT	2340	215	.03	.00	.03	0.	
30 OCT	2350	216	.04	.00	.04	0.	
31 OCT	0000	217	.05	.00	.05	0.	
31 OCT	0010	218	.03	.00	.03	0.	
31 OCT	0020	219	.03	.00	.03	0.	
31 OCT	0030	220	.03	.00	.03	0.	
31 OCT	0040	221	.03	.00	.03	0.	
31 OCT	0050	222	.04	.00	.04	0.	

30	OCT	0000	73	.03	.00	.03	0.	*
30	OCT	0010	74	.02	.00	.02	0.	*
30	OCT	0020	75	.03	.00	.03	0.	*
30	OCT	0030	76	.03	.00	.03	0.	*
30	OCT	0040	77	.02	.00	.02	0.	*
30	OCT	0050	78	.03	.00	.03	0.	*
30	OCT	0100	79	.03	.00	.03	0.	*
30	OCT	0110	80	.02	.00	.02	0.	*
30	OCT	0120	81	.03	.00	.03	0.	*
30	OCT	0130	82	.03	.00	.03	0.	*
30	OCT	0140	83	.02	.00	.02	0.	*
30	OCT	0150	84	.03	.00	.03	0.	*
30	OCT	0200	85	.03	.00	.03	0.	*
30	OCT	0210	86	.02	.00	.02	0.	*
30	OCT	0220	87	.03	.00	.03	0.	*
30	OCT	0230	88	.03	.00	.03	0.	*
30	OCT	0240	89	.02	.00	.02	0.	*
30	OCT	0250	90	.03	.00	.03	0.	*
30	OCT	0300	91	.03	.00	.03	0.	*
30	OCT	0310	92	.02	.00	.02	0.	*
30	OCT	0320	93	.03	.00	.03	0.	*
30	OCT	0330	94	.03	.00	.03	0.	*
30	OCT	0340	95	.02	.00	.02	0.	*
30	OCT	0350	96	.03	.00	.03	0.	*
30	OCT	0400	97	.03	.00	.03	0.	*
30	OCT	0410	98	.02	.00	.02	0.	*
30	OCT	0420	99	.03	.00	.03	0.	*
30	OCT	0430	100	.03	.00	.03	0.	*
30	OCT	0440	101	.02	.00	.02	0.	*
30	OCT	0450	102	.03	.00	.03	0.	*
30	OCT	0500	103	.03	.00	.03	0.	*
30	OCT	0510	104	.02	.00	.02	0.	*
30	OCT	0520	105	.03	.00	.03	0.	*
30	OCT	0530	106	.03	.00	.03	0.	*
30	OCT	0540	107	.03	.00	.03	0.	*
30	OCT	0550	108	.03	.00	.03	0.	*
30	OCT	0600	109	.02	.00	.02	0.	*
30	OCT	0610	110	.03	.00	.03	0.	*
30	OCT	0620	111	.03	.00	.03	0.	*
30	OCT	0630	112	.02	.00	.02	0.	*
30	OCT	0640	113	.03	.00	.03	0.	*
30	OCT	0650	114	.03	.00	.03	0.	*
30	OCT	0700	115	.02	.00	.02	0.	*
30	OCT	0710	116	.03	.00	.03	0.	*
30	OCT	0720	117	.03	.00	.03	0.	*
30	OCT	0730	118	.02	.00	.02	0.	*
30	OCT	0740	119	.03	.00	.03	0.	*
30	OCT	0750	120	.03	.00	.03	0.	*
30	OCT	0800	121	.02	.00	.02	0.	*
30	OCT	0810	122	.03	.00	.03	0.	*
30	OCT	0820	123	.03	.00	.03	0.	*
30	OCT	0830	124	.02	.00	.02	0.	*
30	OCT	0840	125	.03	.00	.03	0.	*
30	OCT	0850	126	.03	.00	.03	0.	*
30	OCT	0900	127	.02	.00	.02	0.	*
30	OCT	0910	128	.03	.00	.03	0.	*
30	OCT	0920	129	.03	.00	.03	0.	*
30	OCT	0930	130	.02	.00	.02	0.	*
30	OCT	0940	131	.03	.00	.03	0.	*
30	OCT	0950	132	.03	.00	.03	0.	*
30	OCT	1000	133	.02	.00	.02	0.	*
30	OCT	1010	134	.03	.00	.03	0.	*
30	OCT	1020	135	.03	.00	.03	0.	*
30	OCT	1030	136	.02	.00	.02	0.	*
30	OCT	1040	137	.03	.00	.03	0.	*
30	OCT	1050	138	.03	.00	.03	0.	*
30	OCT	1100	139	.02	.00	.02	0.	*
30	OCT	1110	140	.03	.00	.03	0.	*
30	OCT	1120	141	.03	.00	.03	0.	*
30	OCT	1130	142	.02	.00	.02	0.	*
30	OCT	1140	143	.03	.00	.03	0.	*
30	OCT	1150	144	.03	.00	.03	0.	*

31	OCT	0100	223	.05	.00	.05	0.
31	OCT	0110	224	.03	.00	.03	0.
31	OCT	0120	225	.03	.00	.03	0.
31	OCT	0130	226	.03	.00	.03	0.
31	OCT	0140	227	.03	.00	.03	0.
31	OCT	0150	228	.03	.00	.03	0.
31	OCT	0200	229	.03	.00	.03	0.
31	OCT	0210	230	.05	.00	.05	0.
31	OCT	0220	231	.04	.00	.04	0.
31	OCT	0230	232	.03	.00	.03	0.
31	OCT	0240	233	.03	.00	.03	0.
31	OCT	0250	234	.03	.00	.03	0.
31	OCT	0300	235	.03	.00	.03	0.
31	OCT	0310	236	.05	.00	.05	0.
31	OCT	0320	237	.04	.00	.04	0.
31	OCT	0330	238	.03	.00	.03	0.
31	OCT	0340	239	.03	.00	.03	0.
31	OCT	0350	240	.03	.00	.03	0.
31	OCT	0400	241	.03	.00	.03	0.
31	OCT	0410	242	.03	.00	.03	0.
31	OCT	0420	243	.04	.00	.04	0.
31	OCT	0430	244	.05	.00	.05	0.
31	OCT	0440	245	.03	.00	.03	0.
31	OCT	0450	246	.03	.00	.03	0.
31	OCT	0500	247	.03	.00	.03	0.
31	OCT	0510	248	.03	.00	.03	0.
31	OCT	0520	249	.04	.00	.04	0.
31	OCT	0530	250	.05	.00	.05	0.
31	OCT	0540	251	.03	.00	.03	0.
31	OCT	0550	252	.03	.00	.03	0.
31	OCT	0600	253	.03	.00	.03	0.
31	OCT	0610	254	.03	.00	.03	0.
31	OCT	0620	255	.03	.00	.03	0.
31	OCT	0630	256	.03	.00	.03	0.
31	OCT	0640	257	.05	.00	.05	0.
31	OCT	0650	258	.04	.00	.04	0.
31	OCT	0700	259	.03	.00	.03	0.
31	OCT	0710	260	.03	.00	.03	0.
31	OCT	0720	261	.03	.00	.03	0.
31	OCT	0730	262	.03	.00	.03	0.
31	OCT	0740	263	.05	.00	.05	0.
31	OCT	0750	264	.04	.00	.04	0.
31	OCT	0800	265	.03	.00	.03	0.
31	OCT	0810	266	.03	.00	.03	0.
31	OCT	0820	267	.03	.00	.03	0.
31	OCT	0830	268	.03	.00	.03	0.
31	OCT	0840	269	.03	.00	.03	0.
31	OCT	0850	270	.04	.00	.04	0.
31	OCT	0900	271	.05	.00	.05	0.
31	OCT	0910	272	.03	.00	.03	0.
31	OCT	0920	273	.03	.00	.03	0.
31	OCT	0930	274	.03	.00	.03	0.
31	OCT	0940	275	.03	.00	.03	0.
31	OCT	0950	276	.03	.00	.03	0.
31	OCT	1000	277	.03	.00	.03	0.
31	OCT	1010	278	.05	.00	.05	0.
31	OCT	1020	279	.04	.00	.04	0.
31	OCT	1030	280	.03	.00	.03	0.
31	OCT	1040	281	.03	.00	.03	0.
31	OCT	1050	282	.03	.00	.03	0.
31	OCT	1100	283	.03	.00	.03	0.
31	OCT	1110	284	.05	.00	.05	0.
31	OCT	1120	285	.04	.00	.04	0.
31	OCT	1130	286	.03	.00	.03	0.
31	OCT	1140	287	.03	.00	.03	0.
31	OCT	1150	288	.04	.00	.04	0.
31	OCT	1200	289	.05	.00	.05	0.
31	OCT	1210	290	.03	.00	.03	0.
31	OCT	1220	291	.04	.00	.04	0.
31	OCT	1230	292	.05	.00	.05	0.
31	OCT	1240	293	.03	.00	.03	0.
31	OCT	1250	294	.04	.00	.04	0.

							*							
30 OCT 1200	145	.03	.00	.03	0.		*	31 OCT 1300	295	.05	.00	.05	0.	
30 OCT 1210	146	.03	.00	.03	0.		*	31 OCT 1310	296	.03	.00	.03	0.	
30 OCT 1220	147	.04	.00	.04	0.		*	31 OCT 1320	297	.04	.00	.04	0.	
30 OCT 1230	148	.05	.00	.05	0.		*	31 OCT 1330	298	.05	.00	.05	0.	
30 OCT 1240	149	.03	.00	.03	0.		*	31 OCT 1340	299	.03	.00	.03	0.	
30 OCT 1250	150	.03	.00	.03	0.		*	31 OCT 1350	300	.04	.00	.04	0.	

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TOTAL RAINFALL = 9.65, TOTAL LOSS = .00, TOTAL EXCESS = 9.65

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	49.83-HR
+ (CFS)	(HR)					
		(CFS)				
+ 0.	24.50		0.	0.	0.	0.
		(INCHES)	1.420	5.492	9.616	9.616
		(AC-FT)	0.	0.	1.	1.

CUMULATIVE AREA = .00 SQ MI

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          **************
          *            *
50 KK     *     COMB   *
          *            *
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Combining Two Hydrographs in Reservoir

52 HC HYDROGRAPH COMBINATION
ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

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HYDROGRAPH AT STATION COMB
SUM OF 2 HYDROGRAPHS

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DA MON HRMN	ORD	FLOW	*	DA MON HRMN	ORD	FLOW	*	DA MON HRMN	ORD	FLOW	*	DA MON HRMN	ORD	FLOW
29 OCT 1200	1	0.	*	30 OCT 0030	76	0.	*	30 OCT 1300	151	1.	*	31 OCT 0130	226	1.
29 OCT 1210	2	0.	*	30 OCT 0040	77	0.	*	30 OCT 1310	152	1.	*	31 OCT 0140	227	1.
29 OCT 1220	3	0.	*	30 OCT 0050	78	0.	*	30 OCT 1320	153	1.	*	31 OCT 0150	228	1.
29 OCT 1230	4	0.	*	30 OCT 0100	79	0.	*	30 OCT 1330	154	1.	*	31 OCT 0200	229	1.
29 OCT 1240	5	0.	*	30 OCT 0110	80	0.	*	30 OCT 1340	155	1.	*	31 OCT 0210	230	1.
29 OCT 1250	6	0.	*	30 OCT 0120	81	0.	*	30 OCT 1350	156	1.	*	31 OCT 0220	231	1.
29 OCT 1300	7	0.	*	30 OCT 0130	82	0.	*	30 OCT 1400	157	1.	*	31 OCT 0230	232	1.
29 OCT 1310	8	0.	*	30 OCT 0140	83	0.	*	30 OCT 1410	158	1.	*	31 OCT 0240	233	1.
29 OCT 1320	9	0.	*	30 OCT 0150	84	0.	*	30 OCT 1420	159	1.	*	31 OCT 0250	234	1.
29 OCT 1330	10	0.	*	30 OCT 0200	85	0.	*	30 OCT 1430	160	1.	*	31 OCT 0300	235	1.
29 OCT 1340	11	0.	*	30 OCT 0210	86	0.	*	30 OCT 1440	161	1.	*	31 OCT 0310	236	1.
29 OCT 1350	12	0.	*	30 OCT 0220	87	0.	*	30 OCT 1450	162	1.	*	31 OCT 0320	237	1.
29 OCT 1400	13	0.	*	30 OCT 0230	88	0.	*	30 OCT 1500	163	1.	*	31 OCT 0330	238	1.
29 OCT 1410	14	0.	*	30 OCT 0240	89	0.	*	30 OCT 1510	164	1.	*	31 OCT 0340	239	1.
29 OCT 1420	15	0.	*	30 OCT 0250	90	0.	*	30 OCT 1520	165	1.	*	31 OCT 0350	240	1.
29 OCT 1430	16	0.	*	30 OCT 0300	91	0.	*	30 OCT 1530	166	1.	*	31 OCT 0400	241	1.
29 OCT 1440	17	0.	*	30 OCT 0310	92	0.	*	30 OCT 1540	167	1.	*	31 OCT 0410	242	1.
29 OCT 1450	18	0.	*	30 OCT 0320	93	0.	*	30 OCT 1550	168	1.	*	31 OCT 0420	243	1.
29 OCT 1500	19	0.	*	30 OCT 0330	94	1.	*	30 OCT 1600	169	1.	*	31 OCT 0430	244	1.
29 OCT 1510	20	0.	*	30 OCT 0340	95	0.	*	30 OCT 1610	170	1.	*	31 OCT 0440	245	1.
29 OCT 1520	21	0.	*	30 OCT 0350	96	0.	*	30 OCT 1620	171	1.	*	31 OCT 0450	246	1.
29 OCT 1530	22	0.	*	30 OCT 0400	97	1.	*	30 OCT 1630	172	1.	*	31 OCT 0500	247	1.
29 OCT 1540	23	0.	*	30 OCT 0410	98	0.	*	30 OCT 1640	173	1.	*	31 OCT 0510	248	1.
29 OCT 1550	24	0.	*	30 OCT 0420	99	0.	*	30 OCT 1650	174	1.	*	31 OCT 0520	249	1.

29 OCT	1600	25	0.	30 OCT	0430	100	1.	30 OCT	1700	175	1.	31 OCT	0530	250	1.
29 OCT	1610	26	0.	30 OCT	0440	101	0.	30 OCT	1710	176	1.	31 OCT	0540	251	1.
29 OCT	1620	27	0.	30 OCT	0450	102	0.	30 OCT	1720	177	1.	31 OCT	0550	252	1.
29 OCT	1630	28	0.	30 OCT	0500	103	1.	30 OCT	1730	178	1.	31 OCT	0600	253	1.
29 OCT	1640	29	0.	30 OCT	0510	104	1.	30 OCT	1740	179	1.	31 OCT	0610	254	1.
29 OCT	1650	30	0.	30 OCT	0520	105	1.	30 OCT	1750	180	1.	31 OCT	0620	255	1.
29 OCT	1700	31	0.	30 OCT	0530	106	1.	30 OCT	1800	181	1.	31 OCT	0630	256	1.
29 OCT	1710	32	0.	30 OCT	0540	107	1.	30 OCT	1810	182	1.	31 OCT	0640	257	1.
29 OCT	1720	33	0.	30 OCT	0550	108	1.	30 OCT	1820	183	1.	31 OCT	0650	258	2.
29 OCT	1730	34	0.	30 OCT	0600	109	1.	30 OCT	1830	184	1.	31 OCT	0700	259	1.
29 OCT	1740	35	0.	30 OCT	0610	110	1.	30 OCT	1840	185	1.	31 OCT	0710	260	1.
29 OCT	1750	36	0.	30 OCT	0620	111	1.	30 OCT	1850	186	1.	31 OCT	0720	261	1.
29 OCT	1800	37	0.	30 OCT	0630	112	1.	30 OCT	1900	187	1.	31 OCT	0730	262	1.
29 OCT	1810	38	0.	30 OCT	0640	113	1.	30 OCT	1910	188	1.	31 OCT	0740	263	1.
29 OCT	1820	39	0.	30 OCT	0650	114	1.	30 OCT	1920	189	1.	31 OCT	0750	264	2.
29 OCT	1830	40	0.	30 OCT	0700	115	1.	30 OCT	1930	190	1.	31 OCT	0800	265	1.
29 OCT	1840	41	0.	30 OCT	0710	116	1.	30 OCT	1940	191	1.	31 OCT	0810	266	1.
29 OCT	1850	42	0.	30 OCT	0720	117	1.	30 OCT	1950	192	1.	31 OCT	0820	267	1.
29 OCT	1900	43	0.	30 OCT	0730	118	1.	30 OCT	2000	193	1.	31 OCT	0830	268	1.
29 OCT	1910	44	0.	30 OCT	0740	119	1.	30 OCT	2010	194	1.	31 OCT	0840	269	1.
29 OCT	1920	45	0.	30 OCT	0750	120	1.	30 OCT	2020	195	1.	31 OCT	0850	270	1.
29 OCT	1930	46	0.	30 OCT	0800	121	1.	30 OCT	2030	196	1.	31 OCT	0900	271	2.
29 OCT	1940	47	0.	30 OCT	0810	122	1.	30 OCT	2040	197	1.	31 OCT	0910	272	2.
29 OCT	1950	48	0.	30 OCT	0820	123	1.	30 OCT	2050	198	1.	31 OCT	0920	273	1.
29 OCT	2000	49	0.	30 OCT	0830	124	1.	30 OCT	2100	199	1.	31 OCT	0930	274	1.
29 OCT	2010	50	0.	30 OCT	0840	125	1.	30 OCT	2110	200	1.	31 OCT	0940	275	1.
29 OCT	2020	51	0.	30 OCT	0850	126	1.	30 OCT	2120	201	1.	31 OCT	0950	276	1.
29 OCT	2030	52	0.	30 OCT	0900	127	1.	30 OCT	2130	202	1.	31 OCT	1000	277	1.
29 OCT	2040	53	0.	30 OCT	0910	128	1.	30 OCT	2140	203	1.	31 OCT	1010	278	1.
29 OCT	2050	54	0.	30 OCT	0920	129	1.	30 OCT	2150	204	1.	31 OCT	1020	279	2.
29 OCT	2100	55	0.	30 OCT	0930	130	1.	30 OCT	2200	205	1.	31 OCT	1030	280	2.
29 OCT	2110	56	0.	30 OCT	0940	131	1.	30 OCT	2210	206	1.	31 OCT	1040	281	1.
29 OCT	2120	57	0.	30 OCT	0950	132	1.	30 OCT	2220	207	1.	31 OCT	1050	282	1.
29 OCT	2130	58	0.	30 OCT	1000	133	1.	30 OCT	2230	208	1.	31 OCT	1100	283	1.
29 OCT	2140	59	0.	30 OCT	1010	134	1.	30 OCT	2240	209	1.	31 OCT	1110	284	1.
29 OCT	2150	60	0.	30 OCT	1020	135	1.	30 OCT	2250	210	1.	31 OCT	1120	285	2.
29 OCT	2200	61	0.	30 OCT	1030	136	1.	30 OCT	2300	211	1.	31 OCT	1130	286	2.
29 OCT	2210	62	0.	30 OCT	1040	137	1.	30 OCT	2310	212	1.	31 OCT	1140	287	1.
29 OCT	2220	63	0.	30 OCT	1050	138	1.	30 OCT	2320	213	1.	31 OCT	1150	288	1.
29 OCT	2230	64	0.	30 OCT	1100	139	1.	30 OCT	2330	214	1.	31 OCT	1200	289	2.
29 OCT	2240	65	0.	30 OCT	1110	140	1.	30 OCT	2340	215	1.	31 OCT	1210	290	2.
29 OCT	2250	66	0.	30 OCT	1120	141	1.	30 OCT	2350	216	1.	31 OCT	1220	291	2.
29 OCT	2300	67	0.	30 OCT	1130	142	1.	31 OCT	0000	217	1.	31 OCT	1230	292	2.
29 OCT	2310	68	0.	30 OCT	1140	143	1.	31 OCT	0010	218	1.	31 OCT	1240	293	2.
29 OCT	2320	69	0.	30 OCT	1150	144	1.	31 OCT	0020	219	1.	31 OCT	1250	294	2.
29 OCT	2330	70	0.	30 OCT	1200	145	1.	31 OCT	0030	220	1.	31 OCT	1300	295	2.
29 OCT	2340	71	0.	30 OCT	1210	146	1.	31 OCT	0040	221	1.	31 OCT	1310	296	2.
29 OCT	2350	72	0.	30 OCT	1220	147	1.	31 OCT	0050	222	1.	31 OCT	1320	297	2.
30 OCT	0000	73	0.	30 OCT	1230	148	1.	31 OCT	0100	223	1.	31 OCT	1330	298	2.
30 OCT	0010	74	0.	30 OCT	1240	149	1.	31 OCT	0110	224	1.	31 OCT	1340	299	2.
30 OCT	0020	75	0.	30 OCT	1250	150	1.	31 OCT	0120	225	1.	31 OCT	1350	300	2.

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	49.83-HR
+ (CFS)	(HR)					
		(CFS)				
+ 2.	49.50		1.	1.	1.	1.
		(INCHES)	1.211	4.306	5.792	5.792
		(AC-FT)	1.	3.	3.	3.

CUMULATIVE AREA = .01 SQ MI

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53 KK      *      RES1  *
           *            *
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                  Reservoir Routing Operation

           HYDROGRAPH ROUTING DATA

55 RS        STORAGE ROUTING
                  NSTPS          1  NUMBER OF SUBREACHES
                   ITYP       ELEV  TYPE OF INITIAL CONDITION
                 RSVRIC      74.00  INITIAL CONDITION
                      X        .00  WORKING R AND D COEFFICIENT

56 SA               AREA        .0        .8        .8        .9       1.1       2.2

57 SE          ELEVATION     74.00     75.00     76.00     77.00     78.00     79.00

58 SQ          DISCHARGE        0.        0.        0.        1.        2.       34.

59 SE          ELEVATION     74.00     75.00     76.00     77.00     78.00     79.00

                                                            ***

                                             COMPUTED STORAGE-ELEVATION DATA

          STORAGE       .00       .29      1.09      1.98      2.99      4.60
        ELEVATION     74.00     75.00     76.00     77.00     78.00     79.00

                                         COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE       .00       .29      1.09      1.98      2.99      4.60
          OUTFLOW       .00       .00       .00      1.40      2.20     33.70
        ELEVATION     74.00     75.00     76.00     77.00     78.00     79.00
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HYDROGRAPH AT STATION RES1

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DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
29	OCT	1200	1	0.	.0	74.0	*	30	OCT	0440	101	0.	.4	75.1	*	30	OCT	2120	201	1.	1.5	76.4
29	OCT	1210	2	0.	.0	74.0	*	30	OCT	0450	102	0.	.4	75.1	*	30	OCT	2130	202	1.	1.5	76.4
29	OCT	1220	3	0.	.0	74.0	*	30	OCT	0500	103	0.	.4	75.1	*	30	OCT	2140	203	1.	1.5	76.4
29	OCT	1230	4	0.	.0	74.0	*	30	OCT	0510	104	0.	.4	75.1	*	30	OCT	2150	204	1.	1.5	76.4
29	OCT	1240	5	0.	.0	74.0	*	30	OCT	0520	105	0.	.4	75.1	*	30	OCT	2200	205	1.	1.5	76.5
29	OCT	1250	6	0.	.0	74.0	*	30	OCT	0530	106	0.	.4	75.1	*	30	OCT	2210	206	1.	1.5	76.5
29	OCT	1300	7	0.	.0	74.0	*	30	OCT	0540	107	0.	.4	75.1	*	30	OCT	2220	207	1.	1.5	76.5
29	OCT	1310	8	0.	.0	74.0	*	30	OCT	0550	108	0.	.4	75.2	*	30	OCT	2230	208	1.	1.5	76.5
29	OCT	1320	9	0.	.0	74.0	*	30	OCT	0600	109	0.	.4	75.2	*	30	OCT	2240	209	1.	1.5	76.5
29	OCT	1330	10	0.	.0	74.1	*	30	OCT	0610	110	0.	.4	75.2	*	30	OCT	2250	210	1.	1.5	76.5
29	OCT	1340	11	0.	.0	74.1	*	30	OCT	0620	111	0.	.4	75.2	*	30	OCT	2300	211	1.	1.5	76.5
29	OCT	1350	12	0.	.0	74.1	*	30	OCT	0630	112	0.	.4	75.2	*	30	OCT	2310	212	1.	1.5	76.5
29	OCT	1400	13	0.	.0	74.1	*	30	OCT	0640	113	0.	.5	75.2	*	30	OCT	2320	213	1.	1.6	76.5
29	OCT	1410	14	0.	.0	74.1	*	30	OCT	0650	114	0.	.5	75.2	*	30	OCT	2330	214	1.	1.6	76.5
29	OCT	1420	15	0.	.0	74.1	*	30	OCT	0700	115	0.	.5	75.2	*	30	OCT	2340	215	1.	1.6	76.5
29	OCT	1430	16	0.	.0	74.1	*	30	OCT	0710	116	0.	.5	75.2	*	30	OCT	2350	216	1.	1.6	76.5
29	OCT	1440	17	0.	.0	74.1	*	30	OCT	0720	117	0.	.5	75.2	*	31	OCT	0000	217	1.	1.6	76.6
29	OCT	1450	18	0.	.0	74.1	*	30	OCT	0730	118	0.	.5	75.3	*	31	OCT	0010	218	1.	1.6	76.6
29	OCT	1500	19	0.	.0	74.1	*	30	OCT	0740	119	0.	.5	75.3	*	31	OCT	0020	219	1.	1.6	76.6
29	OCT	1510	20	0.	.0	74.1	*	30	OCT	0750	120	0.	.5	75.3	*	31	OCT	0030	220	1.	1.6	76.6
29	OCT	1520	21	0.	.0	74.1	*	30	OCT	0800	121	0.	.5	75.3	*	31	OCT	0040	221	1.	1.6	76.6
29	OCT	1530	22	0.	.0	74.1	*	30	OCT	0810	122	0.	.5	75.3	*	31	OCT	0050	222	1.	1.6	76.6
29	OCT	1540	23	0.	.0	74.1	*	30	OCT	0820	123	0.	.5	75.3	*	31	OCT	0100	223	1.	1.6	76.6
29	OCT	1550	24	0.	.0	74.2	*	30	OCT	0830	124	0.	.5	75.3	*	31	OCT	0110	224	1.	1.6	76.6
29	OCT	1600	25	0.	.0	74.2	*	30	OCT	0840	125	0.	.6	75.3	*	31	OCT	0120	225	1.	1.6	76.6
29	OCT	1610	26	0.	.0	74.2	*	30	OCT	0850	126	0.	.6	75.3	*	31	OCT	0130	226	1.	1.6	76.6
29	OCT	1620	27	0.	.1	74.2	*	30	OCT	0900	127	0.	.6	75.3	*	31	OCT	0140	227	1.	1.6	76.6
29	OCT	1630	28	0.	.1	74.2	*	30	OCT	0910	128	0.	.6	75.4	*	31	OCT	0150	228	1.	1.7	76.6
29	OCT	1640	29	0.	.1	74.2	*	30	OCT	0920	129	0.	.6	75.4	*	31	OCT	0200	229	1.	1.7	76.6
29	OCT	1650	30	0.	.1	74.2	*	30	OCT	0930	130	0.	.6	75.4	*	31	OCT	0210	230	1.	1.7	76.6

29 OCT 1700	31	0.	.1	74.2 *	30 OCT 0940	131	0.	.6	75.4 *	31 OCT 0220	231	1.	1.7	76.6	
29 OCT 1710	32	0.	.1	74.2 *	30 OCT 0950	132	0.	.6	75.4 *	31 OCT 0230	232	1.	1.7	76.7	
29 OCT 1720	33	0.	.1	74.2 *	30 OCT 1000	133	0.	.6	75.4 *	31 OCT 0240	233	1.	1.7	76.7	
29 OCT 1730	34	0.	.1	74.2 *	30 OCT 1010	134	0.	.6	75.4 *	31 OCT 0250	234	1.	1.7	76.7	
29 OCT 1740	35	0.	.1	74.2 *	30 OCT 1020	135	0.	.6	75.4 *	31 OCT 0300	235	1.	1.7	76.7	
29 OCT 1750	36	0.	.1	74.2 *	30 OCT 1030	136	0.	.6	75.4 *	31 OCT 0310	236	1.	1.7	76.7	
29 OCT 1800	37	0.	.1	74.2 *	30 OCT 1040	137	0.	.7	75.5 *	31 OCT 0320	237	1.	1.7	76.7	
29 OCT 1810	38	0.	.1	74.3 *	30 OCT 1050	138	0.	.7	75.5 *	31 OCT 0330	238	1.	1.7	76.7	
29 OCT 1820	39	0.	.1	74.3 *	30 OCT 1100	139	0.	.7	75.5 *	31 OCT 0340	239	1.	1.7	76.7	
29 OCT 1830	40	0.	.1	74.3 *	30 OCT 1110	140	0.	.7	75.5 *	31 OCT 0350	240	1.	1.7	76.7	
29 OCT 1840	41	0.	.1	74.3 *	30 OCT 1120	141	0.	.7	75.5 *	31 OCT 0400	241	1.	1.7	76.7	
29 OCT 1850	42	0.	.1	74.3 *	30 OCT 1130	142	0.	.7	75.5 *	31 OCT 0410	242	1.	1.7	76.7	
29 OCT 1900	43	0.	.1	74.3 *	30 OCT 1140	143	0.	.7	75.5 *	31 OCT 0420	243	1.	1.7	76.7	
29 OCT 1910	44	0.	.1	74.3 *	30 OCT 1150	144	0.	.7	75.5 *	31 OCT 0430	244	1.	1.7	76.7	
29 OCT 1920	45	0.	.1	74.3 *	30 OCT 1200	145	0.	.7	75.5 *	31 OCT 0440	245	1.	1.7	76.7	
29 OCT 1930	46	0.	.1	74.3 *	30 OCT 1210	146	0.	.7	75.6 *	31 OCT 0450	246	1.	1.7	76.7	
29 OCT 1940	47	0.	.1	74.3 *	30 OCT 1220	147	0.	.8	75.6 *	31 OCT 0500	247	1.	1.7	76.7	
29 OCT 1950	48	0.	.1	74.3 *	30 OCT 1230	148	0.	.8	75.6 *	31 OCT 0510	248	1.	1.7	76.7	
29 OCT 2000	49	0.	.1	74.3 *	30 OCT 1240	149	0.	.8	75.6 *	31 OCT 0520	249	1.	1.8	76.7	
29 OCT 2010	50	0.	.1	74.3 *	30 OCT 1250	150	0.	.8	75.6 *	31 OCT 0530	250	1.	1.8	76.8	
29 OCT 2020	51	0.	.1	74.4 *	30 OCT 1300	151	0.	.8	75.7 *	31 OCT 0540	251	1.	1.8	76.8	
29 OCT 2030	52	0.	.1	74.4 *	30 OCT 1310	152	0.	.8	75.7 *	31 OCT 0550	252	1.	1.8	76.8	
29 OCT 2040	53	0.	.1	74.4 *	30 OCT 1320	153	0.	.8	75.7 *	31 OCT 0600	253	1.	1.8	76.8	
29 OCT 2050	54	0.	.1	74.4 *	30 OCT 1330	154	0.	.9	75.7 *	31 OCT 0610	254	1.	1.8	76.8	
29 OCT 2100	55	0.	.1	74.4 *	30 OCT 1340	155	0.	.9	75.7 *	31 OCT 0620	255	1.	1.8	76.8	
29 OCT 2110	56	0.	.1	74.4 *	30 OCT 1350	156	0.	.9	75.7 *	31 OCT 0630	256	1.	1.8	76.8	
29 OCT 2120	57	0.	.1	74.4 *	30 OCT 1400	157	0.	.9	75.8 *	31 OCT 0640	257	1.	1.8	76.8	
29 OCT 2130	58	0.	.1	74.4 *	30 OCT 1410	158	0.	.9	75.8 *	31 OCT 0650	258	1.	1.8	76.8	
29 OCT 2140	59	0.	.1	74.4 *	30 OCT 1420	159	0.	.9	75.8 *	31 OCT 0700	259	1.	1.8	76.8	
29 OCT 2150	60	0.	.1	74.5 *	30 OCT 1430	160	0.	.9	75.8 *	31 OCT 0710	260	1.	1.8	76.8	
29 OCT 2200	61	0.	.1	74.5 *	30 OCT 1440	161	0.	1.0	75.8 *	31 OCT 0720	261	1.	1.8	76.8	
29 OCT 2210	62	0.	.1	74.5 *	30 OCT 1450	162	0.	1.0	75.8 *	31 OCT 0730	262	1.	1.8	76.8	
29 OCT 2220	63	0.	.1	74.5 *	30 OCT 1500	163	0.	1.0	75.9 *	31 OCT 0740	263	1.	1.8	76.8	
29 OCT 2230	64	0.	.1	74.5 *	30 OCT 1510	164	0.	1.0	75.9 *	31 OCT 0750	264	1.	1.8	76.8	
29 OCT 2240	65	0.	.2	74.5 *	30 OCT 1520	165	0.	1.0	75.9 *	31 OCT 0800	265	1.	1.8	76.8	
29 OCT 2250	66	0.	.2	74.5 *	30 OCT 1530	166	0.	1.0	75.9 *	31 OCT 0810	266	1.	1.8	76.8	
29 OCT 2300	67	0.	.2	74.6 *	30 OCT 1540	167	0.	1.0	75.9 *	31 OCT 0820	267	1.	1.8	76.8	
29 OCT 2310	68	0.	.2	74.6 *	30 OCT 1550	168	0.	1.1	76.0 *	31 OCT 0830	268	1.	1.8	76.8	
29 OCT 2320	69	0.	.2	74.6 *	30 OCT 1600	169	0.	1.1	76.0 *	31 OCT 0840	269	1.	1.8	76.8	
29 OCT 2330	70	0.	.2	74.6 *	30 OCT 1610	170	0.	1.1	76.0 *	31 OCT 0850	270	1.	1.8	76.8	
29 OCT 2340	71	0.	.2	74.6 *	30 OCT 1620	171	0.	1.1	76.0 *	31 OCT 0900	271	1.	1.8	76.8	
29 OCT 2350	72	0.	.2	74.6 *	30 OCT 1630	172	0.	1.1	76.0 *	31 OCT 0910	272	1.	1.8	76.8	
30 OCT 0000	73	0.	.2	74.7 *	30 OCT 1640	173	0.	1.1	76.1 *	31 OCT 0920	273	1.	1.8	76.8	
30 OCT 0010	74	0.	.2	74.7 *	30 OCT 1650	174	0.	1.1	76.1 *	31 OCT 0930	274	1.	1.8	76.8	
30 OCT 0020	75	0.	.2	74.7 *	30 OCT 1700	175	0.	1.2	76.1 *	31 OCT 0940	275	1.	1.8	76.8	
30 OCT 0030	76	0.	.2	74.7 *	30 OCT 1710	176	0.	1.2	76.1 *	31 OCT 0950	276	1.	1.8	76.8	
30 OCT 0040	77	0.	.2	74.7 *	30 OCT 1720	177	0.	1.2	76.1 *	31 OCT 1000	277	1.	1.8	76.8	
30 OCT 0050	78	0.	.2	74.8 *	30 OCT 1730	178	0.	1.2	76.1 *	31 OCT 1010	278	1.	1.8	76.9	
30 OCT 0100	79	0.	.2	74.8 *	30 OCT 1740	179	0.	1.2	76.1 *	31 OCT 1020	279	1.	1.8	76.9	
30 OCT 0110	80	0.	.2	74.8 *	30 OCT 1750	180	0.	1.2	76.2 *	31 OCT 1030	280	1.	1.9	76.9	
30 OCT 0120	81	0.	.2	74.8 *	30 OCT 1800	181	0.	1.2	76.2 *	31 OCT 1040	281	1.	1.9	76.9	
30 OCT 0130	82	0.	.2	74.8 *	30 OCT 1810	182	0.	1.3	76.2 *	31 OCT 1050	282	1.	1.9	76.9	
30 OCT 0140	83	0.	.2	74.8 *	30 OCT 1820	183	0.	1.3	76.2 *	31 OCT 1100	283	1.	1.9	76.9	
30 OCT 0150	84	0.	.3	74.9 *	30 OCT 1830	184	0.	1.3	76.2 *	31 OCT 1110	284	1.	1.9	76.9	
30 OCT 0200	85	0.	.3	74.9 *	30 OCT 1840	185	0.	1.3	76.2 *	31 OCT 1120	285	1.	1.9	76.9	
30 OCT 0210	86	0.	.3	74.9 *	30 OCT 1850	186	0.	1.3	76.2 *	31 OCT 1130	286	1.	1.9	76.9	
30 OCT 0220	87	0.	.3	74.9 *	30 OCT 1900	187	0.	1.3	76.3 *	31 OCT 1140	287	1.	1.9	76.9	
30 OCT 0230	88	0.	.3	75.0 *	30 OCT 1910	188	0.	1.3	76.3 *	31 OCT 1150	288	1.	1.9	76.9	
30 OCT 0240	89	0.	.3	75.0 *	30 OCT 1920	189	0.	1.3	76.3 *	31 OCT 1200	289	1.	1.9	76.9	
30 OCT 0250	90	0.	.3	75.0 *	30 OCT 1930	190	0.	1.4	76.3 *	31 OCT 1210	290	1.	1.9	76.9	
30 OCT 0300	91	0.	.3	75.0 *	30 OCT 1940	191	0.	1.4	76.3 *	31 OCT 1220	291	1.	1.9	76.9	
30 OCT 0310	92	0.	.3	75.0 *	30 OCT 1950	192	0.	1.4	76.3 *	31 OCT 1230	292	1.	1.9	76.9	
30 OCT 0320	93	0.	.3	75.0 *	30 OCT 2000	193	0.	1.4	76.3 *	31 OCT 1240	293	1.	1.9	76.9	
30 OCT 0330	94	0.	.3	75.0 *	30 OCT 2010	194	0.	1.4	76.3 *	31 OCT 1250	294	1.	1.9	76.9	
30 OCT 0340	95	0.	.3	75.0 *	30 OCT 2020	195	0.	1.4	76.3 *	31 OCT 1300	295	1.	1.9	76.9	
30 OCT 0350	96	0.	.3	75.0 *	30 OCT 2030	196	1.	1.4	76.4 *	31 OCT 1310	296	1.	1.9	76.9	
30 OCT 0400	97	0.	.3	75.1 *	30 OCT 2040	197	1.	1.4	76.4 *	31 OCT 1320	297	1.	1.9	76.9	
30 OCT 0410	98	0.	.3	75.1 *	30 OCT 2050	198	1.	1.4	76.4 *	31 OCT 1330	298	1.	1.9	76.9	
30 OCT 0420	99	0.	.3	75.1 *	30 OCT 2100	199	1.	1.4	76.4 *	31 OCT 1340	299	1.	1.9	76.9	
30 OCT 0430	100	0.	.4	75.1 *	30 OCT 2110	200	1.	1.4	76.4 *	31 OCT 1350	300	1.	1.9	76.9	
				*					*						

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	49.83-HR
(CFS)	(HR)					
		(CFS)				
+ 1.	49.83		1.	1.	0.	0.
		(INCHES)	1.014	2.557	2.557	2.557
		(AC-FT)	1.	2.	2.	2.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	49.83-HR
+ (AC-FT)	(HR)				
2.	49.83	2.	2.	1.	1.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	49.83-HR
+ (FEET)	(HR)				
76.94	49.83	76.87	76.54	75.62	75.62

CUMULATIVE AREA = .01 SQ MI

1

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

+	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	HYDROGRAPH AT	SITE	1.	49.67	1.	1.	1.	.01		
+	HYDROGRAPH AT	POND	0.	24.50	0.	0.	0.	.00		
+	2 COMBINED AT	COMB	2.	49.50	1.	1.	1.	.01		
+	ROUTED TO	RES1	1.	49.83	1.	1.	0.	.01		
+									76.94	49.83

*** NORMAL END OF HEC-1 ***

CASE VII

```
1*****************************************                         ****************************************
*                                         *                         *                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)     *                         *   U.S. ARMY CORPS OF ENGINEERS       *
*            FEBRUARY 1981                *                         *  THE HYDROLOGIC ENGINEERING CENTER   *
*          REVISED 02 AUG 88              *                         *         609 SECOND STREET            *
*                                         *                         *       DAVIS, CALIFORNIA 95616        *
*  RUN DATE  10/27/1998  TIME  13:01:33   *                         *          (916) 551-1748              *
*                                         *                         *                                      *
*****************************************                         ****************************************


                         X      X  XXXXXXX   XXXXX          X
                         X      X  X        X     X        XX
                         X      X  X        X               X
                         XXXXXXX   XXXX     X        XXXXX  X
                         X      X  X        X               X
                         X      X  X        X     X         X
                         X      X  XXXXXXX   XXXXX         XXX
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

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1                                      HEC-1 INPUT                                              PAGE  1

 LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

   1           ID    KUA - Cane Island Unit 3
   2           ID    Site Certification Application
   3           ID    HEC-1 Analysis of Unit 3:   10 Year - 72 Hour Precipitation Event
   4           ID    Black & Veatch Project No. 59140     Modelled By: Gregory V. Johnson
   5           ID    Pre-Construction Model
   6           ID    Input File: kua-pre2.in   Output File:  kua-pre2.out
   7           IT       10 27OCT98    0600     300
   8           IO        0        0
   9           IN       15
               * **********

  10           KK     SITE
  11           KM    Runoff From Pre-Construction Site Area
  12           BA    .01184
  13           PB     9.65
  14           PC    0.002   0.003   0.005   0.006   0.008   0.009   0.011   0.012   0.014   0.015
  15           PC    0.017   0.018   0.020   0.021   0.023   0.024   0.026   0.027   0.029   0.030
  16           PC    0.032   0.033   0.035   0.036   0.038   0.040   0.041   0.043   0.044   0.046
  17           PC    0.047   0.049   0.050   0.052   0.053   0.055   0.056   0.058   0.059   0.061
  18           PC    0.062   0.064   0.065   0.067   0.068   0.070   0.071   0.073   0.075   0.076
  19           PC    0.078   0.079   0.081   0.082   0.084   0.085   0.087   0.088   0.090   0.091
  20           PC    0.093   0.094   0.096   0.097   0.099   0.100   0.102   0.103   0.105   0.106
  21           PC    0.108   0.110   0.111   0.113   0.114   0.116   0.117   0.119   0.120   0.122
  22           PC    0.123   0.125   0.126   0.128   0.129   0.131   0.132   0.134   0.135   0.137
  23           PC    0.138   0.140   0.141   0.143   0.144   0.146   0.148   0.150   0.153   0.155
  24           PC    0.157   0.159   0.162   0.164   0.166   0.168   0.170   0.173   0.175   0.177
  25           PC    0.179   0.182   0.184   0.186   0.188   0.190   0.193   0.195   0.197   0.199
  26           PC    0.201   0.204   0.206   0.208   0.210   0.213   0.215   0.217   0.219   0.221
  27           PC    0.224   0.226   0.228   0.230   0.233   0.235   0.237   0.239   0.241   0.244
  28           PC    0.246   0.248   0.250   0.252   0.255   0.257   0.259   0.261   0.264   0.266
  29           PC    0.268   0.270   0.272   0.275   0.277   0.279   0.281   0.284   0.286   0.288
  30           PC    0.290   0.292   0.295   0.297   0.299   0.301   0.304   0.306   0.308   0.310
  31           PC    0.312   0.315   0.317   0.319   0.321   0.324   0.326   0.328   0.330   0.332
  32           PC    0.335   0.337   0.339   0.341   0.343   0.346   0.348   0.350   0.352   0.355
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 33          PC   0.357   0.359   0.362   0.364   0.367   0.369   0.372   0.374   0.377   0.379
 34          PC   0.382   0.385   0.388   0.391   0.394   0.397   0.400   0.404   0.408   0.412
 35          PC   0.417   0.421   0.426   0.431   0.437   0.442   0.448   0.454   0.461   0.467
 36          PC   0.474   0.481   0.488   0.496   0.504   0.512   0.521   0.530   0.540   0.550
 37          PC   0.561   0.572   0.584   0.596   0.612   0.628   0.653   0.678   0.847   1.015
 38          PC   1.052   1.088   1.107   1.126   1.140   1.154   1.166   1.177   1.186   1.194
 39          PC   1.202   1.209   1.217   1.224   1.232   1.239   1.243   1.248   1.253   1.257
 40          PC   1.262   1.266   1.271   1.275   1.280   1.284   1.289   1.293   1.298   1.302
 41          PC   1.307   1.311   1.314   1.317   1.320   1.323   1.326   1.329   1.332   1.335
 42          PC   1.338   1.341   1.344   1.347   1.350   1.353   1.356   1.359
 43          LS       0      47       0
 44          UD    0.25
             * **********
             *DIAGRAM
 45          ZZ
1
               SCHEMATIC DIAGRAM OF STREAM NETWORK
INPUT
 LINE      (V) ROUTING         (--->) DIVERSION OR PUMP FLOW

  NO.      (.) CONNECTOR       (<---) RETURN OF DIVERTED OR PUMPED FLOW

  10        SITE

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1*****************************************                                        ****************************************
*                                         *                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)     *                                       *   U.S. ARMY CORPS OF ENGINEERS
*             FEBRUARY 1981               *                                       * THE HYDROLOGIC ENGINEERING CENTER
*           REVISED 02 AUG 88             *                                       *         609 SECOND STREET
*                                         *                                       *      DAVIS, CALIFORNIA 95616
*  RUN DATE  10/27/1998  TIME  13:01:33   *                                       *          (916) 551-1748
*                                         *                                       *
*******************************************                                       ****************************************


                  KUA - Cane Island Unit 3
                  Site Certification Application
                  HEC-1 Analysis of Unit 3:   10 Year - 72 Hour Precipitation Event
                  Black & Veatch Project No. 59140     Modelled By: Gregory V. Johnson
                  Pre-Construction Model
                  Input File: kua-pre2.in   Output File:  kua-pre2.out

*** ERROR *** SPECIFIED START AND END DATES RESULT IN TOO MANY TIME PERIODS

  8 IO         OUTPUT CONTROL VARIABLES
                     IPRNT          0  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE

    IT         HYDROGRAPH TIME DATA
                      NMIN         10  MINUTES IN COMPUTATION INTERVAL
                     IDATE    270CT98  STARTING DATE
                     ITIME       1200  STARTING TIME
                        NQ        300  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE    310CT98  ENDING DATE
                    NDTIME       1350  ENDING TIME
                    ICENT          19  CENTURY MARK

                COMPUTATION INTERVAL     .17 HOURS
                     TOTAL TIME BASE   49.83 HOURS

       ENGLISH UNITS
           DRAINAGE AREA          SQUARE MILES
           PRECIPITATION DEPTH    INCHES
           LENGTH, ELEVATION      FEET
           FLOW                   CUBIC FEET PER SECOND
           STORAGE VOLUME         ACRE-FEET
           SURFACE AREA           ACRES
```

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           TEMPERATURE          DEGREES FAHRENHEIT

*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *

         **************
         *            *
 10 KK   *    SITE    *
         *            *
         **************
                         Runoff From Pre-Construction Site Area

  9 IN          TIME DATA FOR INPUT TIME SERIES
                      JXMIN         15  TIME INTERVAL IN MINUTES
                     JXDATE    270CT98  STARTING DATE
                     JXTIME       6000  STARTING TIME

           SUBBASIN RUNOFF DATA

 12 BA          SUBBASIN CHARACTERISTICS
                      TAREA        .01  SUBBASIN AREA

                PRECIPITATION DATA

 13 PB                STORM       9.65  BASIN TOTAL PRECIPITATION

 14 PI            INCREMENTAL PRECIPITATION PATTERN
                      .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
                      .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
                      .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
                      .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
                      .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
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                      .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
                      .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
                      .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
                      .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
                      .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
                      .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
                      .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
                      .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
                      .00        .00        .00        .00        .00        .00        .00        .00        .00

 43 LS          SCS LOSS RATE
                      STRTL       2.26  INITIAL ABSTRACTION
                     CRVNBR      47.00  CURVE NUMBER
                      RTIMP        .00  PERCENT IMPERVIOUS AREA

 44 UD          SCS DIMENSIONLESS UNITGRAPH
                       TLAG        .25  LAG

                                                        ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG
```

UNIT HYDROGRAPH
10 END-OF-PERIOD ORDINATES

8.	17.	12.	5.	2.	1.	0.	0.	0.	0.

****

HYDROGRAPH AT STATION SITE

****

DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
29	OCT	1200	1	.00	.00	.00	0.	*	30	OCT	1300	151	.03	.03	.01	0.
29	OCT	1210	2	.02	.02	.00	0.	*	30	OCT	1310	152	.03	.03	.01	0.
29	OCT	1220	3	.03	.03	.00	0.	*	30	OCT	1320	153	.04	.03	.01	0.
29	OCT	1230	4	.03	.03	.00	0.	*	30	OCT	1330	154	.05	.04	.01	0.
29	OCT	1240	5	.02	.02	.00	0.	*	30	OCT	1340	155	.03	.03	.01	0.
29	OCT	1250	6	.03	.03	.00	0.	*	30	OCT	1350	156	.03	.03	.01	0.
29	OCT	1300	7	.03	.03	.00	0.	*	30	OCT	1400	157	.03	.02	.01	0.
29	OCT	1310	8	.02	.02	.00	0.	*	30	OCT	1410	158	.03	.02	.01	0.
29	OCT	1320	9	.03	.03	.00	0.	*	30	OCT	1420	159	.03	.02	.01	0.
29	OCT	1330	10	.03	.03	.00	0.	*	30	OCT	1430	160	.03	.02	.01	0.
29	OCT	1340	11	.02	.02	.00	0.	*	30	OCT	1440	161	.05	.04	.01	0.
29	OCT	1350	12	.03	.03	.00	0.	*	30	OCT	1450	162	.04	.03	.01	1.
29	OCT	1400	13	.03	.03	.00	0.	*	30	OCT	1500	163	.03	.02	.01	1.
29	OCT	1410	14	.02	.02	.00	0.	*	30	OCT	1510	164	.03	.02	.01	1.
29	OCT	1420	15	.03	.03	.00	0.	*	30	OCT	1520	165	.03	.02	.01	0.
29	OCT	1430	16	.03	.03	.00	0.	*	30	OCT	1530	166	.03	.02	.01	0.
29	OCT	1440	17	.02	.02	.00	0.	*	30	OCT	1540	167	.05	.04	.02	1.
29	OCT	1450	18	.03	.03	.00	0.	*	30	OCT	1550	168	.04	.03	.01	1.
29	OCT	1500	19	.03	.03	.00	0.	*	30	OCT	1600	169	.03	.02	.01	1.
29	OCT	1510	20	.02	.02	.00	0.	*	30	OCT	1610	170	.03	.02	.01	1.
29	OCT	1520	21	.03	.03	.00	0.	*	30	OCT	1620	171	.03	.02	.01	1.
29	OCT	1530	22	.03	.03	.00	0.	*	30	OCT	1630	172	.03	.02	.01	1.
29	OCT	1540	23	.02	.02	.00	0.	*	30	OCT	1640	173	.03	.02	.01	1.
29	OCT	1550	24	.03	.03	.00	0.	*	30	OCT	1650	174	.04	.03	.01	1.
29	OCT	1600	25	.03	.03	.00	0.	*	30	OCT	1700	175	.05	.03	.02	1.
29	OCT	1610	26	.02	.02	.00	0.	*	30	OCT	1710	176	.03	.02	.01	1.
29	OCT	1620	27	.03	.03	.00	0.	*	30	OCT	1720	177	.03	.02	.01	1.
29	OCT	1630	28	.03	.03	.00	0.	*	30	OCT	1730	178	.03	.02	.01	1.
29	OCT	1640	29	.02	.02	.00	0.	*	30	OCT	1740	179	.03	.02	.01	1.
29	OCT	1650	30	.03	.03	.00	0.	*	30	OCT	1750	180	.03	.02	.01	1.
29	OCT	1700	31	.03	.03	.00	0.	*	30	OCT	1800	181	.03	.02	.01	1.
29	OCT	1710	32	.02	.02	.00	0.	*	30	OCT	1810	182	.05	.03	.02	1.
29	OCT	1720	33	.03	.03	.00	0.	*	30	OCT	1820	183	.04	.03	.02	1.
29	OCT	1730	34	.03	.03	.00	0.	*	30	OCT	1830	184	.03	.02	.01	1.
29	OCT	1740	35	.02	.02	.00	0.	*	30	OCT	1840	185	.03	.02	.01	1.
29	OCT	1750	36	.03	.03	.00	0.	*	30	OCT	1850	186	.03	.02	.01	1.
29	OCT	1800	37	.03	.03	.00	0.	*	30	OCT	1900	187	.03	.02	.01	1.
29	OCT	1810	38	.03	.03	.00	0.	*	30	OCT	1910	188	.05	.03	.02	1.
29	OCT	1820	39	.03	.03	.00	0.	*	30	OCT	1920	189	.04	.03	.02	1.
29	OCT	1830	40	.02	.02	.00	0.	*	30	OCT	1930	190	.03	.02	.01	1.
29	OCT	1840	41	.03	.03	.00	0.	*	30	OCT	1940	191	.03	.02	.01	1.
29	OCT	1850	42	.03	.03	.00	0.	*	30	OCT	1950	192	.03	.02	.01	1.
29	OCT	1900	43	.02	.02	.00	0.	*	30	OCT	2000	193	.03	.02	.01	1.
29	OCT	1910	44	.03	.03	.00	0.	*	30	OCT	2010	194	.03	.02	.01	1.
29	OCT	1920	45	.03	.03	.00	0.	*	30	OCT	2020	195	.04	.03	.02	1.
29	OCT	1930	46	.02	.02	.00	0.	*	30	OCT	2030	196	.05	.03	.02	1.
29	OCT	1940	47	.03	.03	.00	0.	*	30	OCT	2040	197	.03	.02	.01	1.
29	OCT	1950	48	.03	.03	.00	0.	*	30	OCT	2050	198	.03	.02	.01	1.
29	OCT	2000	49	.02	.02	.00	0.	*	30	OCT	2100	199	.03	.02	.01	1.
29	OCT	2010	50	.03	.03	.00	0.	*	30	OCT	2110	200	.03	.02	.01	1.
29	OCT	2020	51	.03	.03	.00	0.	*	30	OCT	2120	201	.04	.02	.02	1.
29	OCT	2030	52	.02	.02	.00	0.	*	30	OCT	2130	202	.05	.03	.02	1.
29	OCT	2040	53	.03	.03	.00	0.	*	30	OCT	2140	203	.03	.02	.01	1.
29	OCT	2050	54	.03	.03	.00	0.	*	30	OCT	2150	204	.03	.02	.01	1.
29	OCT	2100	55	.02	.02	.00	0.	*	30	OCT	2200	205	.03	.02	.01	1.
29	OCT	2110	56	.03	.03	.00	0.	*	30	OCT	2210	206	.03	.02	.01	1.
29	OCT	2120	57	.03	.03	.00	0.	*	30	OCT	2220	207	.03	.02	.01	1.
29	OCT	2130	58	.02	.02	.00	0.	*	30	OCT	2230	208	.03	.02	.02	1.
29	OCT	2140	59	.03	.03	.00	0.	*	30	OCT	2240	209	.05	.03	.02	1.
29	OCT	2150	60	.03	.03	.00	0.	*	30	OCT	2250	210	.04	.02	.02	1.

29 OCT 2200	61	.02	.02	.00	0.	*
29 OCT 2210	62	.03	.03	.00	0.	*
29 OCT 2220	63	.03	.03	.00	0.	*
29 OCT 2230	64	.02	.02	.00	0.	*
29 OCT 2240	65	.03	.03	.00	0.	*
29 OCT 2250	66	.03	.03	.00	0.	*
29 OCT 2300	67	.02	.02	.00	0.	*
29 OCT 2310	68	.03	.03	.00	0.	*
29 OCT 2320	69	.03	.03	.00	0.	*
29 OCT 2330	70	.02	.02	.00	0.	*
29 OCT 2340	71	.03	.03	.00	0.	*
29 OCT 2350	72	.03	.03	.00	0.	*
30 OCT 0000	73	.03	.03	.00	0.	*
30 OCT 0010	74	.02	.02	.00	0.	*
30 OCT 0020	75	.03	.03	.00	0.	*
30 OCT 0030	76	.03	.03	.00	0.	*
30 OCT 0040	77	.02	.02	.00	0.	*
30 OCT 0050	78	.03	.03	.00	0.	*
30 OCT 0100	79	.03	.03	.00	0.	*
30 OCT 0110	80	.02	.02	.00	0.	*
30 OCT 0120	81	.03	.03	.00	0.	*
30 OCT 0130	82	.03	.03	.00	0.	*
30 OCT 0140	83	.02	.02	.00	0.	*
30 OCT 0150	84	.03	.03	.00	0.	*
30 OCT 0200	85	.03	.03	.00	0.	*
30 OCT 0210	86	.02	.02	.00	0.	*
30 OCT 0220	87	.03	.03	.00	0.	*
30 OCT 0230	88	.03	.03	.00	0.	*
30 OCT 0240	89	.02	.02	.00	0.	*
30 OCT 0250	90	.03	.03	.00	0.	*
30 OCT 0300	91	.03	.03	.00	0.	*
30 OCT 0310	92	.02	.02	.00	0.	*
30 OCT 0320	93	.03	.03	.00	0.	*
30 OCT 0330	94	.03	.03	.00	0.	*
30 OCT 0340	95	.02	.02	.00	0.	*
30 OCT 0350	96	.03	.02	.00	0.	*
30 OCT 0400	97	.03	.03	.00	0.	*
30 OCT 0410	98	.02	.02	.00	0.	*
30 OCT 0420	99	.03	.02	.00	0.	*
30 OCT 0430	100	.03	.03	.00	0.	*
30 OCT 0440	101	.02	.02	.00	0.	*
30 OCT 0450	102	.03	.02	.00	0.	*
30 OCT 0500	103	.03	.03	.00	0.	*
30 OCT 0510	104	.02	.02	.00	0.	*
30 OCT 0520	105	.03	.02	.00	0.	*
30 OCT 0530	106	.03	.03	.00	0.	*
30 OCT 0540	107	.03	.03	.00	0.	*
30 OCT 0550	108	.03	.02	.00	0.	*
30 OCT 0600	109	.02	.02	.00	0.	*
30 OCT 0610	110	.03	.03	.00	0.	*
30 OCT 0620	111	.03	.02	.00	0.	*
30 OCT 0630	112	.02	.02	.00	0.	*
30 OCT 0640	113	.03	.03	.00	0.	*
30 OCT 0650	114	.03	.02	.00	0.	*
30 OCT 0700	115	.02	.02	.00	0.	*
30 OCT 0710	116	.03	.03	.00	0.	*
30 OCT 0720	117	.03	.02	.00	0.	*
30 OCT 0730	118	.02	.01	.00	0.	*
30 OCT 0740	119	.03	.03	.00	0.	*
30 OCT 0750	120	.03	.02	.00	0.	*
30 OCT 0800	121	.02	.01	.00	0.	*
30 OCT 0810	122	.03	.03	.00	0.	*
30 OCT 0820	123	.03	.02	.00	0.	*
30 OCT 0830	124	.02	.01	.00	0.	*
30 OCT 0840	125	.03	.03	.00	0.	*
30 OCT 0850	126	.03	.02	.00	0.	*
30 OCT 0900	127	.02	.01	.00	0.	*
30 OCT 0910	128	.03	.03	.01	0.	*
30 OCT 0920	129	.03	.02	.00	0.	*
30 OCT 0930	130	.02	.01	.00	0.	*
30 OCT 0940	131	.03	.03	.01	0.	*
30 OCT 0950	132	.03	.02	.00	0.	*

30 OCT 2300	211	.03	.02	.02	1.
30 OCT 2310	212	.03	.02	.02	1.
30 OCT 2320	213	.03	.02	.02	1.
30 OCT 2330	214	.03	.02	.02	1.
30 OCT 2340	215	.03	.02	.02	1.
30 OCT 2350	216	.04	.02	.02	1.
31 OCT 0000	217	.05	.03	.02	1.
31 OCT 0010	218	.03	.02	.02	1.
31 OCT 0020	219	.03	.02	.02	1.
31 OCT 0030	220	.03	.02	.02	1.
31 OCT 0040	221	.03	.02	.02	1.
31 OCT 0050	222	.04	.02	.02	1.
31 OCT 0100	223	.05	.03	.02	1.
31 OCT 0110	224	.03	.02	.02	1.
31 OCT 0120	225	.03	.02	.02	1.
31 OCT 0130	226	.03	.02	.02	1.
31 OCT 0140	227	.03	.02	.02	1.
31 OCT 0150	228	.03	.02	.02	1.
31 OCT 0200	229	.03	.02	.02	1.
31 OCT 0210	230	.05	.03	.03	1.
31 OCT 0220	231	.04	.02	.02	1.
31 OCT 0230	232	.03	.02	.02	1.
31 OCT 0240	233	.03	.02	.02	1.
31 OCT 0250	234	.03	.02	.02	1.
31 OCT 0300	235	.03	.02	.02	1.
31 OCT 0310	236	.05	.02	.03	1.
31 OCT 0320	237	.04	.02	.02	1.
31 OCT 0330	238	.03	.02	.02	1.
31 OCT 0340	239	.03	.02	.02	1.
31 OCT 0350	240	.03	.02	.02	1.
31 OCT 0400	241	.03	.02	.02	1.
31 OCT 0410	242	.03	.02	.02	1.
31 OCT 0420	243	.04	.02	.02	1.
31 OCT 0430	244	.05	.02	.03	1.
31 OCT 0440	245	.03	.02	.02	1.
31 OCT 0450	246	.03	.02	.02	1.
31 OCT 0500	247	.03	.02	.02	1.
31 OCT 0510	248	.03	.02	.02	1.
31 OCT 0520	249	.04	.02	.02	1.
31 OCT 0530	250	.05	.02	.03	1.
31 OCT 0540	251	.03	.02	.02	1.
31 OCT 0550	252	.03	.02	.02	1.
31 OCT 0600	253	.03	.02	.02	1.
31 OCT 0610	254	.03	.02	.02	1.
31 OCT 0620	255	.03	.02	.02	1.
31 OCT 0630	256	.03	.02	.02	1.
31 OCT 0640	257	.05	.02	.03	1.
31 OCT 0650	258	.04	.02	.02	1.
31 OCT 0700	259	.03	.01	.02	1.
31 OCT 0710	260	.03	.01	.02	1.
31 OCT 0720	261	.03	.01	.02	1.
31 OCT 0730	262	.03	.01	.02	1.
31 OCT 0740	263	.05	.02	.03	1.
31 OCT 0750	264	.04	.02	.02	1.
31 OCT 0800	265	.03	.01	.02	1.
31 OCT 0810	266	.03	.01	.02	1.
31 OCT 0820	267	.03	.01	.02	1.
31 OCT 0830	268	.03	.01	.02	1.
31 OCT 0840	269	.03	.01	.02	1.
31 OCT 0850	270	.04	.02	.02	1.
31 OCT 0900	271	.05	.02	.03	1.
31 OCT 0910	272	.03	.01	.02	1.
31 OCT 0920	273	.03	.01	.02	1.
31 OCT 0930	274	.03	.01	.02	1.
31 OCT 0940	275	.03	.01	.02	1.
31 OCT 0950	276	.03	.01	.02	1.
31 OCT 1000	277	.03	.01	.02	1.
31 OCT 1010	278	.05	.02	.03	1.
31 OCT 1020	279	.04	.02	.03	1.
31 OCT 1030	280	.03	.01	.02	1.
31 OCT 1040	281	.03	.01	.02	1.
31 OCT 1050	282	.03	.01	.02	1.

30 OCT	1000	133	.02	.01	.00	0.	*	31 OCT	1100	283	.03	.01	.02	1.
30 OCT	1010	134	.03	.03	.01	0.	*	31 OCT	1110	284	.05	.02	.03	1.
30 OCT	1020	135	.03	.02	.00	0.	*	31 OCT	1120	285	.04	.02	.03	1.
30 OCT	1030	136	.02	.01	.00	0.	*	31 OCT	1130	286	.03	.01	.02	1.
30 OCT	1040	137	.03	.03	.01	0.	*	31 OCT	1140	287	.03	.01	.02	1.
30 OCT	1050	138	.03	.02	.00	0.	*	31 OCT	1150	288	.04	.02	.03	1.
30 OCT	1100	139	.02	.01	.00	0.	*	31 OCT	1200	289	.05	.02	.03	1.
30 OCT	1110	140	.03	.03	.01	0.	*	31 OCT	1210	290	.03	.01	.02	1.
30 OCT	1120	141	.03	.02	.01	0.	*	31 OCT	1220	291	.04	.02	.03	1.
30 OCT	1130	142	.02	.01	.00	0.	*	31 OCT	1230	292	.05	.02	.03	1.
30 OCT	1140	143	.03	.03	.01	0.	*	31 OCT	1240	293	.03	.01	.02	1.
30 OCT	1150	144	.03	.03	.01	0.	*	31 OCT	1250	294	.04	.02	.03	1.
30 OCT	1200	145	.03	.03	.01	0.	*	31 OCT	1300	295	.05	.02	.03	1.
30 OCT	1210	146	.03	.03	.01	0.	*	31 OCT	1310	296	.03	.01	.02	1.
30 OCT	1220	147	.04	.03	.01	0.	*	31 OCT	1320	297	.04	.02	.03	1.
30 OCT	1230	148	.05	.04	.01	0.	*	31 OCT	1330	298	.05	.02	.03	1.
30 OCT	1240	149	.03	.03	.01	0.	*	31 OCT	1340	299	.03	.01	.02	1.
30 OCT	1250	150	.03	.03	.01	0.	*	31 OCT	1350	300	.04	.02	.03	1.

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TOTAL RAINFALL = 9.65, TOTAL LOSS = 6.72, TOTAL EXCESS = 2.93

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	49.83-HR
+ (CFS)	(HR)					
		(CFS)				
+ 1.	49.67		1.	1.	0.	0.
		(INCHES)	.852	2.621	2.874	2.874
		(AC-FT)	1.	2.	2.	2.

CUMULATIVE AREA = .01 SQ MI

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RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD			BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+					6-HOUR	24-HOUR	72-HOUR			
	HYDROGRAPH AT									
+		SITE	1.	49.67	1.	1.	0.	.01		

*** NORMAL END OF HEC-1 ***