

AD-A173 981

RDF (REFUSE-DERIVED FUEL) CO-FIRING COST/BENEFIT
ANALYSIS USING THE NCEL R. (U) SYSTECH CORP KENIA OH
H BELENCAN ET AL. AUG 86 NCEL-CR-86.012-VOL-2
N00123-83-D-0149 F/G 21/4

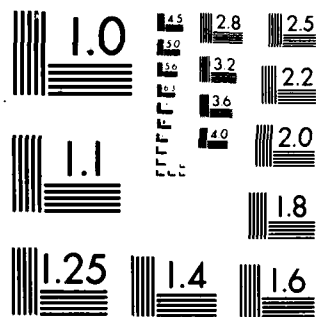
1/3

UNCLASSIFIED

F/G 21/4

NL

[illegible]



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

12

CR 86 012

August 1986

NCEL

Contract Report

An Investigation Conducted
By SYSTECH Corporation

Sponsored By Naval Facilities
Engineering Command

AD-A173 981

FINAL REPORT: RDF CO-FIRING COST/BENEFIT ANALYSIS USING THE NCEL RDF COST MODEL VOLUME II, APPENDIXES

ABSTRACT The object of this effort was to determine the cost effectiveness of co-firing RDF in existing Navy boilers. The cost-benefit analysis was performed using the NCEL RDF Cost Model and site specific boiler and cost data acquired from four naval activities that were determined to have the highest probability of successful co-firing. The cost effectiveness was measured by the savings to investment ratio (SIR) and computed over a range of cost and operating conditions to determine optimum RDF co-firing scenarios for each facility. Based on present laid-down coal costs and solid waste disposal charges, no set of operating conditions could be identified wherein the use of either co-fired RDF-3 or RDF-5 could be economically justified. Volume I presents the report; Volume II contains appendixes, and Volume III is the terminal manual of RDF cost model.

DTIC
ELECTE
NOV 05 1986
S E D

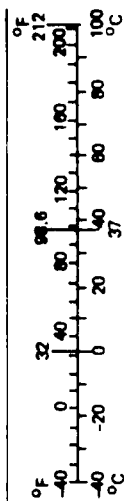
NAVAL CIVIL ENGINEERING LABORATORY FORT HUENEME, CALIFORNIA 93043

Approved for public release, distribution is unlimited.

METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures				Approximate Conversions from Metric Measures			
Symbol	When You Know	Multiply by	To Find	Symbol	When You Know	Multiply by	To Find
LENGTH				LENGTH			
in	inches	2.5	centimeters	mm	millimeters	0.04	inches
ft	feet	30	centimeters	cm	centimeters	0.4	inches
yd	yards	0.9	meters	m	meters	3.3	feet
mi	miles	1.6	kilometers	km	kilometers	1.1	yards
AREA				AREA			
in ²	square inches	6.5	square centimeters	cm ²	square centimeters	0.16	square inches
ft ²	square feet	0.09	square meters	m ²	square meters	1.2	square yards
yd ²	square yards	0.8	square meters	km ²	square kilometers	0.4	square miles
mi ²	square miles	2.6	square kilometers	ha	hectares (10,000 m ²)	2.5	acres
MASS (weight)				MASS (weight)			
oz	ounces	28	grams	g	grams	0.035	ounces
lb	pounds	0.45	kilograms	kg	kilograms	2.2	pounds
	short tons	0.9	tonnes	t	tonnes (1,000 kg)	1.1	short tons
VOLUME				VOLUME			
tsd	teaspoons	5	milliliters	ml	milliliters	0.03	fluid ounces
Tbsp	tablespoons	15	milliliters	l	liters	2.1	pints
fl oz	fluid ounces	30	milliliters	ml	liters	1.06	quarts
c	cups	0.24	liters	l	liters	0.26	gallons
pt	pints	0.47	liters	l	cubic meters	35	cubic feet
qt	quarts	0.95	liters	m ³	cubic meters	1.3	cubic yards
gal	gallons	3.8	liters	m ³			
ft ³	cubic feet	0.03	cubic meters	°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature
yd ³	cubic yards	0.76	cubic meters				
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature				

*1 in. = 2.54 (exactly) For other exact conversions and more detailed tables, see NBS Mon. Publ. 286, Units of Weights and Measures, Price \$2.25, SO Catalog No. C13.10.286.



Unclassified

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER CR 86.012	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Final Report: RDF Co-Firing Cost/Benefit Analysis Using the NCEL RDF Cost Model - Volume II, Appendixes		5. TYPE OF REPORT & PERIOD COVERED Final Sep 1985 - Aug 1986
7. AUTHOR(s) Helen Belencan Gary Smith		6. PERFORMING ORG. REPORT NUMBER
8. PERFORMING ORGANIZATION NAME AND ADDRESS SYSTECH Corporation 245 North Valley Road Xenia, OH 45385		9. CONTRACT OR GRANT NUMBER(s) N00123-83-D-0149
11. CONTROLLING OFFICE NAME AND ADDRESS Naval Civil Engineering Laboratory Port Hueneme, CA 93043-5003		10. PROGRAM ELEMENT PROJECT TASK AREA & WORK UNIT NUMBERS WU R0371-013-431C
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) Naval Facilities Engineering Command 200 Stovall Street Alexandria, VA 22332-2300		12. REPORT DATE August 1986
		13. NUMBER OF PAGES 244
		15. SECURITY CLASS (of this report) Unclassified
		15a. DECLASSIFICATION DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release; distribution is unlimited.		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) refuse derived fuel, RDF, co-fired waste fuels, refuse fired boilers, cost/benefit analysis, RDF Cost Model		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) The object of this effort was to determine the cost effectiveness of co-firing RDF in existing Navy boilers. The cost-benefit analysis was performed using the NCEL RDF Cost Model and site specific boiler and cost data acquired from four naval activities that were determined to have the highest probability of success- ful co-firing. The cost effectiveness was measured by the		

DD FORM 1473 EDITION OF 1 NOV 65 IS OBSOLETE

Unclassified

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

Unclassified

SECURITY CLASSIFICATION OF THIS PAGE(When Data Entered)

savings to investment ratio (SIR) and computed over a range of cost and operating conditions to determine the optimum RDF co-firing scenarios for each facility. Based on present laid-down coal costs and solid waste disposal charges, no set of operating conditions could be identified wherein the use of either co-fired RDF-3 or RDF-5 could be economically justified. Volume I presents the report; Volume II contains appendixes, and Volume III is the terminal manual of RDF cost model.

Unclassified

SECURITY CLASSIFICATION OF THIS PAGE(When Data Entered)

VOLUME II

TABLE OF CONTENTS

Appendices

- A Facility Input Data Questionnaires
- B Telephone Logs
- C Modifications to the NCEL RDF Cost Model
- D NCEL RDF Cost Model: Multiplan® Formula Listings
- E Complete Operational and Economic Data Outputs for the
Sensitivity and Best Case Analysis

Accession For	
NTIS GRA&I	☒
DTIC TAB	☐
Unannounced	☐
Justification	
By _____	
Distribution/	
Availability Codes	
Dist	Avail and/or Special
A-1	



APPENDIX A
FACILITY INPUT DATA QUESTIONNAIRES



DEPARTMENT OF THE NAVY
NAVAL CIVIL ENGINEERING LABORATORY
PORT HUENEME, CA 93043

IN REPLY REFER TO
3900
Ser L71/RMR RDF
24 October 1985

From: Commanding Officer, Naval Civil Engineering Laboratory,
Port Hueneme, CA 93043

To: Commanding Officer, Naval Amphibious Base Little Creek,
PWD (Code N46), Norfolk, VA

Subj: INPUT DATA REQUIRED FOR COST/BENEFIT MODELLING OF
RDF FUELS FOR COFIRING WITH COAL IN STOKER FURNACES

Ref: (a) NAVFAC Energy Project Work Unit Z0371-01-421D/E
(b) Phonecon from NCEL R. M. Roberts to your office 24
OCT 85

Encl: (1) RDF/Coal Cofired Boiler Model Input Data
Questionnaire

1. Enclosure (1) is transmitted for your completion. It is requested that the subject data be provided for use in reference (a) as explained by reference (b).

2. It is expected that there may be some difficulty with some of the model input information requested. Determination of the limits of information availability is an important consideration in the configuring of the RDF/Coal Cofired Boiler Model. We will therefore be as interested in examining what data you can supply us with as we will be in finding out what data you cannot. To ensure that our questions are clear and properly structured, we urge you to solicit as often as necessary the assistance of the contractor who is responsible for the final design of the model. He may be reached as follows:

Mr. Gary E. Smith
Systech Corporation
245 No. Valley Rd.
Xenia, OH 45385
(513) 372-8077 or (513) 429-2533

3. When you have completed the questionnaire, please mail it to the contractor. If there are any administrative issues that need attention, please contact me on A/V 360-4193, FTS 799-4193, or comm'l (805) 982-4193. We will appreciate having your questionnaire by 15 November 1985.


Richard M. Roberts
Chemical Engineer
Code L71

ENCLOSURE (1)

NAVAL BASE

Naval Amphibious Base Little Creek

BLD #

757

BOILER #

107

PRIMARY CONTACT PERSON

Mr. Robert S. Acra, Jr.

TITLE

Boiler Plant Operator Foreman

PHONE #

804-464-8675DESIGN FUEL INFORMATION

DESIGN TOTAL FUEL VALUE TO BOILER AT MCR (MAXIMUM CONTINUOUS RATING) (BTU/HR)

112 MBTU/HR

DESIGN FUEL TYPE

Bituminous Coal

HIGHER HEATING VALUE OF DESIGN FUEL (BTU/LB)

13400 TYP 12500 MIN. Allow

FRACTIONAL ASH CONTENT OF DESIGN FUEL, AS-RECEIVED

9.0%

FRACTIONAL MOISTURE CONTENT OF DESIGN FUEL

5.0%

HYDROGEN MASS FRACTION OF AS-RECEIVED DESIGN FUEL

36.0%

SPECIFIC HEAT OF DESIGN FUEL

12,500 BTU per lb.

DESIGN CARBON LOSSES AS PERCENT OF MAXIMUM FUEL VALUE TO BOILER AT MCR

~8% TYP (NOT DESIGN)

DESIGN RADIATION LOSSES AS PERCENT OF MAXIMUM FUEL VALUE TO BOILER AT MCR

~4%

DESIGN TEMPERATURE OF DESIGN FUEL AT BOILER BOUNDARY (DEG F)

Ambient

DESIGN EXCESS AIR REQUIRED FOR DESIGN FUEL AT MCR (%)

25%

CURRENT FUEL INFORMATION

CURRENT FUEL TYPE

CURRENT FUEL VALUE TO BOILER AT MCR (BTU/HR)

Bituminous Coal

(FOR THE FOLLOWING, SUPPLY FUEL ANALYSIS REPORT IF AVAILABLE)

HIGHER HEATING VALUE OF CURRENT FUEL (BTU/LB)

14,319 BTU per lb

FRACTIONAL ASH CONTENT OF CURRENT FUEL, AS-RECEIVED

7.53%

FRACTIONAL MOISTURE CONTENT OF CURRENT FUEL

4.65%

HYDROGEN MASS FRACTION OF AS-RECD CURRENT FUEL

32.04%

SULFUR MASS FRACTION OF AS-RECD CURRENT FUEL

0.5% TYP 1.5% SPEC

SPECIFIC HEAT OF CURRENT FUEL

13,653 BTU per lb

CURRENT CARBON LOSSES AS PERCENT OF MAXIMUM FUEL VALUE TO BOILER AT MCR

~8%

CURRENT RADIATION LOSSES AS PERCENT OF MAXIMUM FUEL VALUE TO BOILER AT MCR

~4%

TEMPERATURE OF CURRENT FUEL AT BOILER BOUNDARY (DEG F)

Ambient

EXCESS AIR REQUIRED FOR CURRENT FUEL AT MCR (%)

~25%

MAXIMUM BOILER TURNDOWN ACHIEVABLE WITH CURRENT FUEL (%)

90 → 40 KLB/HR

EXCESS AIR REQUIRED FOR CURRENT FUEL AT NEAR MAXIMUM TURNDOWN (%)

~25%BOILER AND EQUIPMENT INFORMATION

FOR THE FOLLOWING, GIVE THE MANUFACTURER, EQUIPMENT DESCRIPTION AND RATED CAPACITIES OR THROUGHPUTS

FUEL FEED SYSTEM

DETROIT ROTOGRADE STOKERS, Type RG-3, 3m. 27" RATES ON EA. Boiler

GRATE SYSTEM

DETROIT ROTOGRADE

ASH HANDLING SYSTEM

NATIONAL CONVEYORS CO. - Vacuum System with Storage Silo

MULTICLONES OR CYCLONES

NONE

SCRUBBERS

NONE

ESP

NONE

BAGHOUSE

GRIFFIN ENVIRONMENTAL B. INC. - RA-90 Reverse Air Cluster
(8 modules on 3 Boilers)

IS THE BOILER EQUIPPED WITH :

AN ID FAN

Yes

SOOTBLOWERS FOR THE CONVECTIVE

Yes

AN ECONOMIZER

Yes

SOOTBLOWERS FOR THE ECONOMIZER

Yes

WHAT TYPE OF ECONOMIZER TUBES?

Extended Gill RingOPERATIONS INFORMATION

AVAILABILITY OF EXISTING BOILER FIRED WITH CURRENT FUEL (%)

~ 90%

DOES ADEQUATE BACKUP CAPABILITY EXIST

YES - 2 BOILER'S MAX REQ'D + 1 STANDEY

DOES BOILER HAVE A HISTORY OF SLAGGING

No

FOR THE FOLLOWING, SUPPLY TEST REPORTS ON PARTICULATE EMISSIONS COMPLIANCE OR BOILER EFFICIENCY TESTS IF AVAILABLE

APPLICABLE PARTICULATE EMISSIONS STANDARD

.23 lb/MBTU

ACTUAL PARTICULATE EMISSIONS

13.91 lbs/hr or 13694 lbs/MB
.13694 lbs/MB

STACK TEMPERATURE (DEG F)

450 °F

STACK VOLUMETRIC FLOW RATE (ACFM)

42893 ACFM

AIR TEMP AT FD OR AIR-HEATING INLET (DEG F)

80-100 °F

PREHEAT COMBUSTION AIR TEMP (DEG F)

370 °F

FUEL TEMP AT BOILER BOUNDARY (DEG F)

~ 60 °F

BOTTOM ASH TEMP AT BOILER BOUNDARY (DEG F)

?

FLY ASH TEMP AT BOILER BOUNDARY (DEG F)

ECONOMIC INFORMATION

BASIC UNBURDENED OPERATOR WAGERATE (\$/HR)

BURDENING ON BASIC WAGE RATE, A MULTIPLIER

COST OF CONVENTIONAL FUEL (\$/TON)

COST OF ELECTRICITY (\$/KWH)

DISPOSAL COST FOR ASH (\$/TON)

254/9. ASH - TON

STEAM DEMAND BY SHIFT BY SEASON BY DAY, AVERAGE HOURLY (BTU/HR)

SUMMER

SHIFT 1

SHIFT 2

SHIFT 3

MON-FRI

SAT

SUN

WINTER

MON-FRI

SAT

SUN

SPRING AND FALL

MON-FRI

SAT

SUN

DISPOSAL COST FOR MUNICIPAL SOLID WASTE OR BASE WASTE (\$/TON)

PROJECTED FUTURE DISPOSAL COST FOR MUNICIPAL SOLID WASTE OR BASE WASTE

PROJECTED LIFE OF LOCAL LANDFILL(S)

ANNUAL GENERATION RATE OF BASE WASTES (TON/YR)

NAME AND PHONE NUMBER OF CONTACT PERSON IN CHARGE OF:

NAVAL WASTE DISPOSAL ACTIVITIES

NAME

PHONE #

LOCAL COMMUNITY OR COUNTY SOLID WASTE AUTHORITY

NAME

PHONE #

38 + 21 shipping

0.021

\$25

40,000 MBTU
g.w./hr

120,000

ROUTINE REPLY, ENDORSEMENT, TRANSMITTAL OR INFORMATION SHEET

OPNAV 5216/158 (Rev. 7-78)
SN 0107 LF 052 1691

A WINDOW ENVELOPE MAY BE USED
Formerly NAVEXOS 3789

CLASSIFICATION (UNCLASSIFIED when detached from enclosures, unless otherwise indicated)

FROM (Show telephone number in addition to address)

Commander, Puget Sound Naval Shipyard
Bremerton, Washington 98314

SUBJECT

MCON P-500, Steam Plant

TO

Systech Corporation
245 No. Valley Rd.
Xenia, OH 45385

ATTN: Mr. Gary E. Smith

DATE

10 Dec 1985

SERIAL OR FILE NO.

440.9:CKD:ca

REFERENCE

ENCLOSURE

RDF/Coal Cofired
Boiler Model Input
Data Questionnaire

VIA

ENDORSEMENT ON

☒ FORWARDED

☐ RETURNED

☐ FOLLOW UP, OR
TRACER

☐ REQUEST

☐ SUBMIT

☐ CERTIFY

☐ MAIL

☐ FILE

GENERAL ADMINISTRATION

FOR APPROPRIATE ACTION

UNDER YOUR COGNIZANCE

INFORMATION

APPROVAL RECOMMENDED

☐ YES ☐ NO

☐ APPROVED

☐ DISAPPROVED

COMMENT AND/OR CONCURRENCE

CONCUR

LOANED RETURN BY

SIGN RECEIPT & RETURN

REPLY TO THE ABOVE BY

REFERENCE NOT RECEIVED

SUBJECT DOCUMENT FORWARDED TO

SUBJECT DOCUMENT RETURNED FOR

SUBJECT DOCUMENT HAS BEEN
REQUESTED AND WILL BE
FORWARDED WHEN RECEIVED

COPY OF THIS CORRESPONDENCE
WITH YOUR REPLY

ENCLOSURE NOT RECEIVED

☒ ENCLOSURE FORWARDED AS REQUESTED

ENCLOSURE RETURNED FOR
CORRECTION AS INDICATED

CORRECTED ENCLOSURE AS REQUESTED

REMOVE FROM DISTRIBUTION LIST
REDUCE DISTRIBUTION AMOUNT TO

CONTRACT ADMINISTRATION

NAME & LOCATION OF SUPPLIER
OF SUBJECT ITEMS

SUBCONTRACT NO. OF SUBJECT ITEM

APPROPRIATION SYMBOL, SUBHEAD
AND CHARGEABLE ACTIVITY

SHIPPING AT GOVERNMENT EXPENSE

☐ YES ☐ NO

A CERTIFICATE, VICE BILL
OF LADING

COPIES OF CHANGE ORDERS,
AMENDMENT OR MODIFICATION

CHANGE NOTICE TO SUPPLIER

STATUS OF MATERIAL ON
PURCHASE DOCUMENT

PERSONNEL

REPORTED TO THIS COMMAND

DETACHED FROM THIS COMMAND

OTHER

REMARKS (Continue on reverse)

SIGNATURE & TITLE

W. Maupin for

W. MAUPIN

by direction

COPY TO

NAVSHIPYD PUGET Codes: 440.9, 402.23

CLASSIFICATION (UNCLASSIFIED when detached from enclosures, unless otherwise indicated)

GPO 1982-587-016-5220



DEPARTMENT OF THE NAVY

NAVAL CIVIL ENGINEERING LABORATORY
PORT HUENEME, CA 93043

IN REPLY REFER TO

3900
Ser L71/RMR RDF
24 October 1985

From: Commanding Officer, Naval Civil Engineering Laboratory,
Port Hueneme, CA 93043

To: Commanding Officer, Puget Sound Naval Shipyard, PWD
(Code 53.1), Bremerton, WA

Subj: INPUT DATA REQUIRED FOR COST/BENEFIT MODELLING OF
RDF FUELS FOR COFIRING WITH COAL IN STOKER FURNACES

Ref: (a) NAVFAC Energy Project Work Unit Z0371-01-421D/E
(b) Phonecon from NCEL R. M. Roberts to your office 24
OCT 85

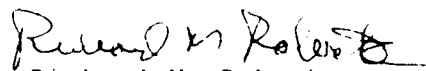
Encl: (1) RDF/Coal Cofired Boiler Model Input Data
Questionnaire

1. Enclosure (1) is transmitted for your completion. It is requested that the subject data be provided for use in reference (a) as explained by reference (b).

2. It is expected that there may be some difficulty with some of the model input information requested. Determination of the limits of information availability is an important consideration in the configuring of the RDF/Coal Cofired Boiler Model. We will therefore be as interested in examining what data you can supply us with as we will be in finding out what data you cannot. To ensure that our questions are clear and properly structured, we urge you to solicit as often as necessary the assistance of the contractor who is responsible for the final design of the model. He may be reached as follows:

Mr. Gary E. Smith
Systech Corporation
245 No. Valley Rd.
Xenia, OH 45385
(513) 372-8077 or (513) 429-2533

3. When you have completed the questionnaire, please mail it to the contractor. If there are any administrative issues that need attention, please contact me on A/V 360-4193, FTS 799-4193, or comm'l (805) 982-4193. We will appreciate having your questionnaire by 15 November 1985.


Richard M. Roberts
Chemical Engineer
Code L71

ENCLOSURE (1)

NAVAL BASE PUGET SOUND NAVAL SHIPYARD
 BLD # 900
 BOILER # NO 1, 2, 3
 PRIMARY CONTACT PERSON CURT DUEVER
 TITLE Project Engineer
 PHONE # 206-476-3879

DESIGN FUEL INFORMATION

DESIGN TOTAL FUEL VALUE TO BOILER AT MCR (MAXIMUM CONTINUOUS RATING) (BTU/HR)

 172.84×10^6 BTU/HR (Per Boiler)
 (Per Boiler)

DESIGN FUEL TYPE

COAL or grade #2 oil

HIGHER HEATING VALUE OF DESIGN FUEL (BTU/LB)

10290 BTU/LB

FRACTIONAL ASH CONTENT OF DESIGN FUEL, AS-RECEIVED

9.13 %

FRACTIONAL MOISTURE CONTENT OF DESIGN FUEL

15.48 %

HYDROGEN MASS FRACTION OF AS-RECEIVED DESIGN FUEL

4.05 %

SPECIFIC HEAT OF DESIGN FUEL

10290 BTU/LB

DESIGN CARBON LOSSES AS PERCENT OF MAXIMUM FUEL VALUE TO BOILER AT MCR

4.05 %

DESIGN RADIATION LOSSES AS PERCENT OF MAXIMUM FUEL VALUE TO BOILER AT MCR

.41 %

DESIGN TEMPERATURE OF DESIGN FUEL AT BOILER BOUNDARY (DEG F)

80°f

DESIGN EXCESS AIR REQUIRED FOR DESIGN FUEL AT MCR (%)

30 %

NOTE: This steam plant currently under construction
will go on line OCT 1988

CURRENT FUEL INFORMATION

CURRENT FUEL TYPE

CURRENT FUEL VALUE TO BOILER AT MCR (BTU/HR)

172.89 x 10⁶ BTU/HR

(FOR THE FOLLOWING, SUPPLY FUEL ANALYSIS REPORT IF AVAILABLE)

HIGHER HEATING VALUE OF CURRENT FUEL (BTU/LB)

9200-12200 BTU/Lb range

FRACTIONAL ASH CONTENT OF CURRENT FUEL, AS-RECEIVED

3-11% range

FRACTIONAL MOISTURE CONTENT OF CURRENT FUEL

5-23% range

HYDROGEN MASS FRACTION OF AS-RECD CURRENT FUEL

3.8 - 5.2% range

SULFUR MASS FRACTION OF AS-RECD CURRENT FUEL

* 0.30 - 1.67% range

SPECIFIC HEAT OF CURRENT FUEL

9200-12200 BTU/Lb range

CURRENT CARBON LOSSES AS PERCENT OF MAXIMUM FUEL VALUE TO BOILER AT MCR

4.05%

CURRENT RADIATION LOSSES AS PERCENT OF MAXIMUM FUEL VALUE TO BOILER AT MCR

.41%

TEMPERATURE OF CURRENT FUEL AT BOILER BOUNDARY (DEG F)

30°-100° F range

EXCESS AIR REQUIRED FOR CURRENT FUEL AT MCR (%)

25-50% range

MAXIMUM BOILER TURNDOWN ACHIEVABLE WITH CURRENT FUEL (%)

COAL 42% - COAL/OIL 18%

EXCESS AIR REQUIRED FOR CURRENT FUEL AT NEAR MAXIMUM TURNDOWN (%)

50% COAL10% OILBOILER AND EQUIPMENT INFORMATION

FOR THE FOLLOWING, GIVE THE MANUFACTURER, EQUIPMENT DESCRIPTION AND RATED CAPACITIES OR THROUGHPUTS

FUEL FEED SYSTEM

Four RILEY Vari-Flex 15" Feeders 5100 lb/hr

GRATE SYSTEM

RILEY Traveling grate spreader stoker 16' wide x 19' long 20,400 lb/hr

ASH HANDLING SYSTEM

Hydro-Ash vacuum Pneumatic 15 Ton/hr

MULTICLONES OR CYCLONES

N/A

SCRUBBERS

ANhydro Dry scrubber 85% sulfur dioxide removal 173,888 lb/hr

ESP

N/A

BAGHOUSE

GEESI, Reverse Air 190,312 lb/hr

* limited to 1% by Permit

IS THE BOILER EQUIPPED WITH :

AN ID FAN

YES 80,000 ACFM

SOOTBLOWERS FOR THE CONVECTIVE

YES 2ea 99B Diamond Rotary

AN ECONOMIZER

YES

SOOTBLOWERS FOR THE ECONOMIZER

YES 3ea 99B Diamond Rotary

WHAT TYPE OF ECONOMIZER TUBES?

Bare steel Tube - RICEY

OPERATIONS INFORMATION

AVAILABILITY OF EXISTING BOILER FIRED WITH CURRENT FUEL (%)

N/A

DOES ADEQUATE BACKUP CAPABILITY EXIST

YES 1cc Reserve UNIT

DOES BOILER HAVE A HISTORY OF SLAGGING

N/A

FOR THE FOLLOWING, SUPPLY TEST REPORTS ON PARTICULATE EMISSIONS COMPLIANCE OR BOILER EFFICIENCY TESTS IF AVAILABLE

APPLICABLE PARTICULATE EMISSIONS STANDARD

EPA MAY 1983 - PSAPCA ^{*} SEPT 1984

ACTUAL PARTICULATE EMISSIONS

N/A

STACK TEMPERATURE (DEG F)

150°f

STACK VOLUMETRIC FLOW RATE (ACFM)

102,200 ACFM

AIR TEMP AT FD OR AIR-HEATING INLET (DEG F)

70°-100°f Range

PREHEAT COMBUSTION AIR TEMP (DEG F)

N/A

FUEL TEMP AT BOILER BOUNDARY (DEG F)

80°f

BOTTOM ASH TEMP AT BOILER BOUNDARY (DEG F)

300°-600°f

FLY ASH TEMP AT BOILER BOUNDARY (DEG F)

340°f

* PSAPCA - Puget Sound Air Pollution Control Agency.

ECONOMIC INFORMATION

BASIC UNBURDENED OPERATOR WAGERATE (\$/HR)

\$ 13.68

BURDENING ON BASIC WAGE RATE, A MULTIPLIER

1.305

COST OF CONVENTIONAL FUEL (\$/TON)

\$ 78/TON

COST OF ELECTRICITY (\$/KWH)

\$ 0.0227 KWH

DISPOSAL COST FOR ASH (\$/TON)

\$ 16/TON

STEAM DEMAND BY SHIFT BY SEASON BY DAY, AVERAGE HOURLY (BTU/HR)

SUMMER

SHIFT 1

SHIFT 2

SHIFT 3

MON-FRI

50,00045,00045,000

SAT

40,00040,00040,000

SUN

40,00040,00040,000

WINTER

MON-FRI

150,000140,000135,000

SAT

130,000130,000130,000

SUN

130,000130,000130,000

SPRING AND FALL

MON-FRI

100,00092,50090,000

SAT

85,00085,00085,000

SUN

85,00085,00085,000

DISPOSAL COST FOR MUNICIPAL SOLID WASTE OR BASE WASTE (\$/TON)

\$ 16/TON

PROJECTED FUTURE DISPOSAL COST FOR MUNICIPAL SOLID WASTE OR BASE WASTE

\$ 25-30 TON 1987

PROJECTED LIFE OF LOCAL LANDFILL(S)

1996

ANNUAL GENERATION RATE OF BASE WASTES (TON/YR)

42,000 TON/YR

NAME AND PHONE NUMBER OF CONTACT PERSON IN CHARGE OF:

NAVAL WASTE DISPOSAL ACTIVITIES

NAME JIM WILLIAMSONPHONE # 206-476-2427

LOCAL COMMUNITY OR COUNTY SOLID WASTE AUTHORITY

NAME Brem Air DisposalPHONE # 206-479-1755

4 December 1985

From: Brian Pedersen, Naval Submarine Base, Bangor
To: Gary E. Smith, Systech Corporation

Subj: INPUT DATA FOR COST/BENEFIT OF CO FIRING WITH COAL IN STOKER FURNACES.

Ref: (a) Naval Civil Engineering Laboratory letter Ser L71/RMRDf dated 24 October 1985

1. The accompanying information is provided as requested by reference (a).
2. Further questions may be addressed to the undersigned.



BRIAN PEDERSEN
C/O Naval Submarine Base Bangor
Bremerton, WA 98315



DEPARTMENT OF THE NAVY

NAVAL CIVIL ENGINEERING LABORATORY
PORT HUENEME, CA 93043

IN REPLY REFER TO:

3900

Ser L71/RMR RDF

24 October 1985

From: Commanding Officer, Naval Civil Engineering Laboratory,
Port Hueneme, CA 93043

To: Commanding Officer, Naval Submarine Base, Bangor
PWD (Code 821), Bremerton, WA

Subj: INPUT DATA REQUIRED FOR COST/BENEFIT MODELLING OF
RDF FUELS FOR COFIRING WITH COAL IN STOKER FURNACES

Ref: (a) NAVFAC Energy Project Work Unit Z0371-01-421D/E
(b) Phonecon from NCEL R. M. Roberts to your office 24
OCT 85

Encl: (1) RDF/Coal Cofired Boiler Model Input Data
Questionnaire

1. Enclosure (1) is transmitted for your completion. It is requested that the subject data be provided for use in reference (a) as explained by reference (b).

2. It is expected that there may be some difficulty with some of the model input information requested. Determination of the limits of information availability is an important consideration in the configuring of the RDF/Coal Cofired Boiler Model. We will therefore be as interested in examining what data you can supply us with as we will be in finding out what data you cannot. To ensure that our questions are clear and properly structured, we urge you to solicit as often as necessary the assistance of the contractor who is responsible for the final design of the model. He may be reached as follows:

Mr. Gary E. Smith
Systech Corporation
245 No. Valley Rd.
Xenia, OH 45385
(513) 372-8077 or (513) 429-2533

3. When you have completed the questionnaire, please mail it to the contractor. If there are any administrative issues that need attention, please contact me on A/V 360-4193, FTS 799-4193, or comm'l (805) 982-4193. We will appreciate having your questionnaire by 15 November 1985.

Richard M. Roberts
Chemical Engineer
Code L71

ENCLOSURE (1)

NAVAL BASE Subase Bangor
BLD # 2800
BOILER # 1
PRIMARY CONTACT PERSON Richard Jackson
TITLE Supervisor
PHONE # 206-396-6801

DESIGN FUEL INFORMATION

DESIGN TOTAL FUEL VALUE TO BOILER AT MCR (MAXIMUM CONTINUOUS RATINGS) (BTU/HR)

DESIGN FUEL TYPE

HIGHER HEATING VALUE OF DESIGN FUEL (BTU/LB)

FRACTIONAL ASH CONTENT OF DESIGN FUEL, AS-RECEIVED

FRACTIONAL MOISTURE CONTENT OF DESIGN FUEL

HYDROGEN MASS FRACTION OF AS-RECEIVED DESIGN FUEL

SPECIFIC HEAT OF DESIGN FUEL

DESIGN CARBON LOSSES AS PERCENT OF MAXIMUM FUEL VALUE TO BOILER AT MCR

DESIGN RADIATION LOSSES AS PERCENT OF MAXIMUM FUEL VALUE TO BOILER AT MCR

DESIGN TEMPERATURE OF DESIGN FUEL AT BOILER BOUNDARY (DEG F)

DESIGN EXCESS AIR REQUIRED FOR DESIGN FUEL AT MCR (%)

subbituminous or
bituminous coal

9,400 to 13,000 Btu

6% to 8% min

10%

A-15

CURRENT FUEL INFORMATION

CURRENT FUEL TYPE

bituminous coal

CURRENT FUEL VALUE TO BOILER AT MCR (BTU/HR)

(FOR THE FOLLOWING, SUPPLY FUEL ANALYSIS REPORT IF AVAILABLE)

HIGHER HEATING VALUE OF CURRENT FUEL (BTU/LB)

12300

FRACTIONAL ASH CONTENT OF CURRENT FUEL, AS-RECEIVED

7.5%

FRACTIONAL MOISTURE CONTENT OF CURRENT FUEL

5.1%

HYDROGEN MASS FRACTION OF AS-RECD CURRENT FUEL

SULFUR MASS FRACTION OF AS-RECD CURRENT FUEL

.6%

SPECIFIC HEAT OF CURRENT FUEL

CURRENT CARBON LOSSES AS PERCENT OF MAXIMUM FUEL VALUE TO BOILER AT MCR

CURRENT RADIATION LOSSES AS PERCENT OF MAXIMUM FUEL VALUE TO BOILER AT MCR

TEMPERATURE OF CURRENT FUEL AT BOILER BOUNDARY (DEG F)

EXCESS AIR REQUIRED FOR CURRENT FUEL AT MCR (%)

MAXIMUM BOILER TURNDOWN ACHIEVABLE WITH CURRENT FUEL (%)

16%

EXCESS AIR REQUIRED FOR CURRENT FUEL AT NEAR MAXIMUM TURNDOWN (%)

BOILER AND EQUIPMENT INFORMATION

FOR THE FOLLOWING, GIVE THE MANUFACTURER, EQUIPMENT DESCRIPTION AND RATED CAPACITIES OR THROUGHPUTS

FUEL FEED SYSTEM

Detroit spreader stokers

GRATE SYSTEM

Detroit traveling Grate

ASH HANDLING SYSTEM

United conveyor Pneumatic system

MULTICLONES OR CYCLONES

N/A

SCRUBBERS

N/A

ESP

Belco model 27(999) 1x10-3 Electrostatic precipitator

BAGHOUSE

N/A

IS THE BOILER EQUIPPED WITH :

AN ID FAN

yes

SOOTBLOWERS FOR THE CONVECTIVE

yes

AN ECONOMIZER

yes

SOOTBLOWERS FOR THE ECONOMIZER

yes

WHAT TYPE OF ECONOMIZER TUBES?

straight

OPERATIONS INFORMATION

AVAILABILITY OF EXISTING BOILER FIRED WITH CURRENT FUEL (%)

94%

DOES ADEQUATE BACKUP CAPABILITY EXIST

yes

DOES BOILER HAVE A HISTORY OF SLAGGING

no

FOR THE FOLLOWING, SUPPLY TEST REPORTS ON PARTICULATE EMISSIONS COMPLIANCE OR BOILER EFFICIENCY TESTS IF AVAILABLE

APPLICABLE PARTICULATE EMISSIONS STANDARD

ACTUAL PARTICULATE EMISSIONS

STACK TEMPERATURE (DEG F)

335°F

STACK VOLUMETRIC FLOW RATE (ACFM)

33,350

AIR TEMP AT FD OR AIR-HEATING INLET (DEG F)

Ambient

PREHEAT COMBUSTION AIR TEMP (DEG F)

FUEL TEMP AT BOILER BOUNDARY (DEG F)

BOTTOM ASH TEMP AT BOILER BOUNDARY (DEG F)

FLY ASH TEMP AT BOILER BOUNDARY (DEG F)

ECONOMIC INFORMATION

BASIC UNBURDENED OPERATOR WAGERATE (\$/HR) _____

BURDENING ON BASIC WAGE RATE, A MULTIPLIER _____

COST OF CONVENTIONAL FUEL (\$/TON) _____

COST OF ELECTRICITY (\$/KWH) _____

DISPOSAL COST FOR ASH (\$/TON) _____

\$ 25.50 TON FOR COAL

\$ 28.06 FOR MWH

\$ 4.00 YARD

STEAM DEMAND BY SHIFT BY SEASON BY DAY, AVERAGE HOURLY (BTU/HR)

SUMMER

SHIFT 1

SHIFT 2

SHIFT 3

MON-FRI

16,800,00016,160,00016,160,000

SAT

14,800,00014,800,00014,800,000

SUN

14,000,00014,000,00014,000,000

WINTER

MON-FRI

31,735,00031,735,00031,735,000

SAT

27,475,00027,475,00027,475,000

SUN

26,300,00026,300,00026,300,000

SPRING AND FALL

MON-FRI

27,220,00027,220,00027,220,000

SAT

24,975,00024,975,00024,975,000

SUN

23,400,00023,400,00023,400,000

DISPOSAL COST FOR MUNICIPAL SOLID WASTE OR BASE WASTE (\$/TON) _____

\$ 4.00 YARD

PROJECTED FUTURE DISPOSAL COST FOR MUNICIPAL SOLID WASTE OR BASE WASTE _____

PROJECTED LIFE OF LOCAL LANDFILL(S) _____

ANNUAL GENERATION RATE OF BASE WASTES (TON/YR) _____

1,100

NAME AND PHONE NUMBER OF CONTACT PERSON IN CHARGE OF:

NAVAL WASTE DISPOSAL ACTIVITIES

NAME _____

PHONE # _____

LOCAL COMMUNITY OR COUNTY SOLID WASTE AUTHORITY

NAME

BREMEN LANDFILL

PHONE #

674-2331



RECEIVED NOV 21 1985

UNITED STATES MARINE CORPS
MARINE CORPS AIR STATION
CHERRY POINT, NORTH CAROLINA 28533

11300
LCU
19 NOVEMBER 1985

Systech Corporation
Attn: Mr. Gary E. Smith
245 North Valley Road
Xenia, Ohio 45385

Gentlemen:

Enclosed is the input data questionnaire required for cost/benefit modelling of RDF fuels for cofiring with coal in stoker furnaces.

Any questions concerning the information provided may be directed to Mr. John Parsons, 1-(919)-466-2890.

Sincerely,

S. W. Miko

STEPHEN W. MIKO
Deputy Facilities Maintenance Officer
By direction of the
Commanding General

Encl:
(1) RDF/Coal Cofired Boiler Model Input
Data, Completed Questionnaire

Copy to:
Commanding Officer
(Attn: Mr. Richard M. Roberts, Code L71)
Naval Civil Engineering Laboratory
Port Hueneme, CA 93043

A-1

NAVAL BASE Marine Corps Air Station, Cherry Point, NC
BLD # Building #152
BOILER # No. 1 and No. 2
PRIMARY CONTACT PERSON John M. Parson
TITLE Boiler Plant Operator, Foreman
PHONE # 1-(919)-466-2890

DESIGN FUEL INFORMATION

DESIGN TOTAL FUEL VALUE TO BOILER AT MCR (MAXIMUM CONTINUOUS RATING) (BTU/HR)	<u>110,000,000/B1r</u>
DESIGN FUEL TYPE	<u>Coal</u>
HIGHER HEATING VALUE OF DESIGN FUEL (BTU/LB)	<u>14,724</u>
FRACTIONAL ASH CONTENT OF DESIGN FUEL, AS-RECEIVED	<u>10%, maximum</u>
FRACTIONAL MOISTURE CONTENT OF DESIGN FUEL	<u>10%, maximum</u>
HYDROGEN MASS FRACTION OF AS-RECEIVED DESIGN FUEL	<u>5.39</u>
SPECIFIC HEAT OF DESIGN FUEL	<u>13,000 BTU/min</u>
DESIGN CARBON LOSSES AS PERCENT OF MAXIMUM FUEL VALUE TO BOILER AT MCR	<u>79.46%</u>
DESIGN RADIATION LOSSES AS PERCENT OF MAXIMUM FUEL VALUE TO BOILER AT MCR	<u>0.53%</u>
DESIGN TEMPERATURE OF DESIGN FUEL AT BOILER BOUNDARY (DEG F)	<u>80°</u>
DESIGN EXCESS AIR REQUIRED FOR DESIGN FUEL AT MCR (%)	<u>15%</u>

CURRENT FUEL INFORMATION

CURRENT FUEL TYPE	Coal
CURRENT FUEL VALUE TO BOILER AT MCR (BTU/HR)	91,000,000
(FOR THE FOLLOWING, SUPPLY FUEL ANALYSIS REPORT IF AVAILABLE)	
HIGHER HEATING VALUE OF CURRENT FUEL (BTU/LB)	14,724
FRACTIONAL ASH CONTENT OF CURRENT FUEL, AS-RECEIVED	6%
FRACTIONAL MOISTURE CONTENT OF CURRENT FUEL	4.50%
HYDROGEN MASS FRACTION OF AS-RECD CURRENT FUEL	1.41
SULFUR MASS FRACTION OF AS-RECD CURRENT FUEL	0.68
SPECIFIC HEAT OF CURRENT FUEL	13,000/min
CURRENT CARBON LOSSES AS PERCENT OF MAXIMUM FUEL VALUE TO BOILER AT MCR	51%
CURRENT RADIATION LOSSES AS PERCENT OF MAXIMUM FUEL VALUE TO BOILER AT MCR	0.74
TEMPERATURE OF CURRENT FUEL AT BOILER BOUNDARY (DEG F)	70%
EXCESS AIR REQUIRED FOR CURRENT FUEL AT MCR (%)	17%
MAXIMUM BOILER TURNDOWN ACHIEVABLE WITH CURRENT FUEL (%)	33%
EXCESS AIR REQUIRED FOR CURRENT FUEL AT NEAR MAXIMUM TURNDOWN (%)	21%

BOILER AND EQUIPMENT INFORMATION

FOR THE FOLLOWING, GIVE THE MANUFACTURER, EQUIPMENT DESCRIPTION AND RATED CAPACITIES OR THROUGHPUTS

FUEL FEED SYSTEM	Roto grate Stoker
GRATE SYSTEM	Detroit Stoker Company
ASH HANDLING SYSTEM	Allen Sherman Hoff
MULTICLONES OR CYCLONES	Multiclone
SCRUBBERS	NO
ESP	YES
BAGHOUSE	NO

IS THE BOILER EQUIPPED WITH :

AN ID FAN	<u>YES</u>
SOOTBLOWERS FOR THE CONVECTIVE	<u>YES</u>
AN ECONOMIZER	<u>YES</u>
SOOTBLOWERS FOR THE ECONOMIZER	<u>YES</u>
WHAT TYPE OF ECONOMIZER TUBES?	<u>Honz-SA-178-A-fin</u>

OPERATIONS INFORMATION

AVAILABILITY OF EXISTING BOILER FIRED WITH CURRENT FUEL (%)	<u>As needed (95+%)</u>
DOES ADEQUATE BACKUP CAPABILITY EXIST	<u>YES</u>
DOES BOILER HAVE A HISTORY OF SLAGGING	<u>NO</u>
FOR THE FOLLOWING, SUPPLY TEST REPORTS ON PARTICULATE EMISSIONS COMPLIANCE OR BOILER EFFICIENCY TESTS IF AVAILABLE	
APPLICABLE PARTICULATE EMISSIONS STANDARD	<u>State of North Carolina</u>
ACTUAL PARTICULATE EMISSIONS	<u>1.2lbs/million BTU</u>
STACK TEMPERATURE (DEG F)	<u>540°F</u>
STACK VOLUMETRIC FLOW RATE (ACFM)	<u>36,000</u>
AIR TEMP AT FD OR AIR-HEATING INLET (DEG F)	<u>70°F</u>
PREHEAT COMBUSTION AIR TEMP (DEG F)	<u>NONE</u>
FUEL TEMP AT BOILER BOUNDARY (DEG F)	<u>70°F</u>
BOTTOM ASH TEMP AT BOILER BOUNDARY (DEG F)	<u>150°F</u>
FLY ASH TEMP AT BOILER BOUNDARY (DEG F)	<u>120°F</u>

ECONOMIC INFORMATION

BASIC UNBURDENED OPERATOR WAGERATE (\$/HR)	<u>Average \$13.50/hr</u>
BURDENING ON BASIC WAGE RATE, A MULTIPLIER	<u>30%</u>
COST OF CONVENTIONAL FUEL (\$/TON)	<u>\$54.74/ton</u>
COST OF ELECTRICITY (\$/KWH)	<u>\$53.50/MWH</u>
DISPOSAL COST FOR ASH (\$/TON)	<u>MCAS Landfill on Station</u>

STEAM DEMAND BY SHIFT BY SEASON BY DAY, AVERAGE HOURLY (BTU/HR)

SUMMER	SHIFT 1	SHIFT 2	SHIFT 3
MON-FRI	<u>46000</u>	<u>44000</u>	<u>44000</u>
SAT	<u>45000</u>	<u>43000</u>	<u>43000</u>
SUN	<u>45000</u>	<u>43000</u>	<u>43000</u>
WINTER			
MON-FRI	<u>225000</u>	<u>198000</u>	<u>198000</u>
SAT	<u>207000</u>	<u>191000</u>	<u>191000</u>
SUN	<u>207000</u>	<u>191000</u>	<u>191000</u>
SPRING AND FALL			
MON-FRI	<u>75000</u>	<u>72000</u>	<u>72000</u>
SAT	<u>73000</u>	<u>70000</u>	<u>70000</u>
SUN	<u>73000</u>	<u>70000</u>	<u>70000</u>

DISPOSAL COST FOR MUNICIPAL SOLID WASTE OR BASE WASTE (\$/TON)	<u>\$3.40 plus \$6.00/T Transport</u>
PROJECTED FUTURE DISPOSAL COST FOR MUNICIPAL SOLID WASTE OR BASE WASTE	<u>Increase 5%/year</u>
PROJECTED LIFE OF LOCAL LANDFILL(S)	<u>5+ years</u>
ANNUAL GENERATION RATE OF BASE WASTES (TON/YR)	<u>10,000T/year</u>

NAME AND PHONE NUMBER OF CONTACT PERSON IN CHARGE OF:

NAVAL WASTE DISPOSAL ACTIVITIES	NAME	<u>E. E. Smith</u>	PHONE # <u>919-466-4139</u>
LOCAL COMMUNITY OR COUNTY SOLID WASTE AUTHORITY	NAME	<u>G. B. Sawyer</u>	PHONE # <u>919-637-3338</u>
		<u>Asst. County Mgr.</u>	
		<u>Craven County, NC</u>	

APPENDIX B
TELEPHONE LOGS



SYSTECH TELEPHONE/VISIT RECORD

Project 8017 Sales _____ Date 2/28 Time _____To/From: NAME Refuse collection dispatchCOMPANY Sub-base Bunker waste data Phone 206-396-4210

Subject _____

Referred by Dick Jackson

206 - 396 - 4216 EXT 320 Transportation Office/Director
Public Works

Dave Amos - EXT 340 206-396-4216

Referred to Environmental

Hayden Street EXT 251 : 206-396-4216

10,000 people

1,000 TPY Hwy

5,000 TPY Indust

→ They don't maintain wt or vol
records→ Landfilled @ BremAn - Private City
Sanitary Landfill

10,000 x 316/yr/day x 365

5,475 TPY

EST. 5500 TPY ?

→ charged per truck-load

→ Some are compacted, others aren't

→ Includes sand black & asbestos waste
under special permit

→ No on site disposal

Future contact date _____

By Helen Belencan

They have done an energy evaluation
Sally Plaggenier 206-396-4192



SYSTECH TELEPHONE/VISIT RECORD

Project 8017-20 Sales _____ Date 2/10 Time 12:00To/From: NAME Brian Pederson^eCOMPANY Sub-base Bangor WA Phone 206-396-4253³⁵Subject Completion of boiler survey

Out until 10:30. Left return call message

Called back @ 4:00 EST - not in - has message

2/11 Acceptance test - talk to boiler inspector
Rudy Clark - does not have copy of
acceptance - Keeler BoilerSan Bruno - Public Work ~~415-859-7506~~ 877-7506
HDA John JohnstonDick Jackson - 206-396-6801
in charge of boilerAsh handling system out of commission
currentlyO₂ { 11% @ low loads now ~ 95% EA
9% @ max ~ 65% EAStack ~~stacks~~ tests by San Bruno - 3

Future contact date _____

By Helen Belencon

two steam turbine pumps
use exhaust steam in DA
& other heaters

Current coal contract
\$43.80/T delivered

Last years coal
\$25.50 @ mine
\$93.64 delivered

217
\$74851 /gal oil

Pacific Basin Coal & Carbon Company

Moisture 5.1 %

Volatile 41 %

F. CAR 51.5 %

Ash 7.5 %

Sul 0.6 %

Operator wage rate - cannot release



SYSTECH TELEPHONE/VISIT RECORD

Project 8017 Sales _____ Date 1/8/86 Time 9:45
To/From: NAME John Parson
COMPANY Boiler Plant Operator, Cherry Point, NC Phone _____
Subject Boiler data 919-466-2890

Precipitators are out - process of rebuilding
to start in Jan-Feb '86

Design carbon loss - should be 0.792 %,
not 79.46% as indicated

Will assume compliance for model runs

- Current emissions with cyclones 1.2 lb/mm Btu

@ 85% efficiency for cyclones, uncontrolled
emissions would be 8 lbs/mm Btu
w/new ESP @ 98.5% and Cyclones, new
emissions would be 0.02 lb/mm Btu
Input 0.02 for current emissions
$$[(1-.998) * 8 - 0.02]$$

Future contact date _____

By Helen Belencon



SYSTECH TELEPHONE/VISIT RECORD

Project 8017 Sales _____ Date 1-22-86 Time 11:15

To/From: NAME John Parson

COMPANY Cherry Point Marine Phone 919-466-2890

Subject _____

Capacity of ash handling system ?

Vacuum system - 75 T storage in hopper

6 in vac. line

60 T coal / day @ 6% ash

1.3 T / HR AT MCR

Future contact date _____

By Klein Belenec

4 MCAS ✓



SYSTECH TELEPHONE/VISIT RECORD

Project 2207 Sales _____ Date 11-13-85 Time 1500

From: NAME JE Parker Facilities Maint Dept

COMPANY Marine Corps Air Station Phone 919-466-5334

Subject _____

(2 x 15 min)

11-7 No Answer 15:00

11-11 No Answer 15:00

11-13 15:00 - return call

1500 - returned call

- have completed the forms as of last week
- the info is in the mail

- called 11/13/85

- calling any questions

Future contact date _____

By Cary



SYSTECH TELEPHONE/VISIT RECORD

Project 8017 Sales _____ Date 2/28 Time _____
To/From. NAME Dale Pluggeneis
COMPANY _____ Phone 206-396-4142
Subject Sub base Bangor data

Max Speed - NCEL

Survey for NAVFAC of coal fired boilers will
be @ Bangor Mar 10-11

Peat for coal fired boilers

5 yrs ago - Woodex - excessive dust
Poor economics

Currently looking at using wood chips &
possibly tires

1 Studies of combustible waste
He will look for numbers

Art Fyber - West Dr. Utilities - tire plant & wood
& RDF in general

Oregon -

He will call back with data

Future contact date _____

By Kileen Selinca

SYSTECH TELEPHONE/VISIT RECORD

Project 8017-20 Sales _____ Date 2/12 Time _____To/From: NAME JW (Wickett)
COMPANY Sub base Bangor Phone _____Subject Boiler Data

Proximate Analysis 8400 - 13000 Btu/lb

Design Fuel 10% Moist Ash fusion 2200°F

40% Vol

43% F. Carb

6-8% Ash

0.5-1.0% Sul

12,000 Btu/lb

Source - operation & maintenance instructions exec. summary

Questions raised (answered) 1-4-78 Acceptance Test

~~Excess~~ Excess Air 32.15 CO₂ 13.3%

O₂ 5.31%

Answers given (received)

CO 0.0%

N₂ 21.39

Hydrogen 0.061

Unresolved items

~~Ash~~

~~Moist~~

Heat loss dry gas 8.84%

Moist 1.01

H₂O 4.41

unb. carb 0.38

radiation 0.52

unmeas. 1.42

efficiency 83.42

Action(s) to be taken

#41 13107

#28 5300 lb/hr

#28 77331 Btu/hr

Future contact date _____

By _____



SYSTECH TELEPHONE/VISIT RECORD

Project 8017-20 Sales _____ Date 1-31-86 Time 2:20To/From: NAME Curt Wexel - EngineeringCOMPANY Naval Amphibious Base Phone 804-464-7302
Little Creek

Subject _____

Not in - left message to return call 29 year old
RDF Boilers at PWC -> Naval Shipyard

NEESA 32-017 Report - Boiler Performance Equal
L 805-982-4758 Feb 85
Peter K. Fanning
Report from
miles 1/31/86

Questions raised (answered)

Fixed 85 Net 6012.72 m lbs steam - 1985
+ 18% input - Gross Steam produced
= 7332.56 MBtu

Answers given (received)

- Ash 7,337 Cu yds
\$15.38/cu yd

Unresolved items

Cost of Steam 3.97 MBtu Operations Only
No labor

Action(s) to be taken

Future contact date _____

By H. Belencon



SYSTECH TELEPHONE/VISIT RECORD

Project 8017 Sales _____ Date 2/20-2/21-86 Time _____To/From NAME Mike RobertsCOMPANY NCEL Phone _____Subject Little Creek boiler data

1. Ash disposal \$15³⁸/cubic yard
2. Solid waste - charged per pick-up
annually: \$102,370⁰⁰
3. Ash temperatures unknown - dry system,
estimate based on similar facility
4. Solid waste generation: 28-29 T/day, 5 day/wk

Questions raised (answered)

Answers given (received)

Unresolved items

Action(s) to be taken

Future contact date _____

By Allen Belencon

Little Creek



SYSTECH TELEPHONE/VISIT RECORD

Project 8017-20 Sales _____ Date 1/30/86 Time 2:10

To/From: NAME Robert Acra

COMPANY Naval Amphibious Phone 804-464-8675

Subject _____

Steam Demand

AVG WINTER 150,000 lbs/hr - might be lower

Summer 60,000 lb/hr

Spring/Fall 100,000 lb/hr

Referred to:

→ Fred Tody 464-7851

• Engineering dept Curt Wexel 464-7302

Questions raised (answered)

Answers given (received)

Unresolved items

Action(s) to be taken

Future contact date _____

By _____



SYSTECH TELEPHONE/VISIT RECORD

Project 8017 Sales _____ Date 1/30/86 Time 3:00

To/From: NAME _____

COMPANY Ecology Dept - Haz Waste & Air Phone 206-459-6023Subject Puget Sound particulate emissions standards

Puget Sound Air Pollution Control Agency - 206-383-5851
.05 gis/dscf - includes impinger & filter
catch

$$2.2 \times .05 = 0.11 \text{ lb/mmBtu}$$

Questions raised (answered)

Answers given (received)

Unresolved items

Action(s) to be taken

Future contact date _____

By H Belincan

B15

SYSTECH SOLID-WASTE-TO-ENERGY
SALES CALL REPORTING FORM

PHONE CALL _____ DATE 8/14/85 TIME _____
☒ VISIT _____ COMPANY CAG Partnerships, Henrico Co. Va
LETTER/BROCHURE _____ CONTACT PERSON Steve Cue

SYSTECH SALESPERSON: Richard Frompke

SUMMARY OF SALES CALL

Plant rebuilt several times
Current line processes Industrial and MSW
in separate lines, mixed at final shredder
before pellet mills

Process Line - hand pick, load by front loader
primary shred, disk screen, ferrous
magnet, secondary shred 50/50 mix MSW
to industrial

Pellet mills - about 5 TPH from each mill
≈ 1 1/4 cubes, 10 TPH is desired rate
if possible

Cost - Price of \$18/ton delivered to Sunle
Rudins was given

APPENDIX C

MODIFICATIONS TO THE NCEL RDF COST MODEL

APPENDIX C
MODIFICATIONS TO THE NCEL RDF COST MODEL

Modifications

As discussed in Section 3.2, twelve modifications were necessary to correct transcription and logic errors in the RDF Cost Model. Two additional modifications were implemented to facilitate data entry. The first was a reorganization of the input data sheet (RDFMDLIN). The original format did not follow a logical sequence. It had requests for information on the same topic scattered throughout the sheet. The inputs are now grouped into the following categories: current boiler operating conditions, conventional fuel characteristics, RDF characteristics, economic factors, true/false questions, and original boiler design information. The second change was to clarify the wording of two of the true/false questions. Line 73 "The boiler has no history of slagging" was changed to "The boiler has a history of slagging," and Line 86 "The boiler has no ID fan" was changed to "The boiler has an ID fan." This re-wording eliminates the potential confusion caused by the use of a negative statement. The original algorithm and the modified final version are summarized in Table C-1 and discussed below.

Modification 1. Three errors that were identified were transcription errors in which the algorithms in the final model differed from the algorithms proposed by WETCO.

- 1(a). To accommodate additional ash which may be generated during co-firing the model estimates the cost of upgrading the existing ash handling system or develops a cost for a new system if one does not currently exist. The logic for assigning the cost of a new system was reversed. The model assigned a cost multiplier of 10 if an ash handling system was in place and a multiplier of 1 if there was not an ash handling system. These multipliers are applied correctly in the final version.
- 1(b). The model contains an algorithm which computes the total hours when co-firing is possible. Two of the intermediate sums were added twice, thus incorrectly stating the grand total. This was corrected by eliminating the duplicate values.
- 1(c). A portion of the algorithm for derating the boiler during co-firing was inverted, resulting in a negative value. This was corrected by putting the factors in the proper order.

Modification 2. The original algorithm for determining air pollution control (APC) device efficiency assumed that various APC devices are mutually exclusive. In actual practice, APC devices are not mutually exclusive; they are commonly used in conjunction with one another to achieve

TABLE C-1. RDF COST MODEL MODIFICATIONS LIST

Modification Number	Sheet Name	Row #	Column #	Description
1	WORK1	84	2	$((r1c1-r11c1/r1c1)*100$
	WORK1	89	3	$(520*SUM(r62:64c3,r71:73c3,r80:82c3))+$ $(104*SUM(r65:70c3,r74:79c3,r83:88c3))$
2	WORK2	46	5	$(if(r59c1=1,1,10))*(r96c4/100000000*$ $r21c1/0.2*r26c5/r9c5/2000)^{0.261*32461}$
	WORK2	21	5	$(1-((if(r53c1=1,0.01,1))*(if(r54c1=1,0.015,$ $1,))*(if(r55c1=1,0.05,1))*($ $(if(r56c1=1,0.15,1))))$
3	WORK1	57	3	$if(r67c1=1,0.25,0.6)*r1c1/r11c1$
4	WORK1	80	2	$if(r67c1=1,r15c1,(r15c1+r23c1+0.5*r24c1$ $-r13c1-0.5*r14c1+(r25c1/0.75)^{0.67*0.05}))$
5	WORK2	42	5	$if(r67c1=1,0.25,1)*((5/r26c1*r96c4*r9c5/$ $r1c5*r36c1*24/40)^{0.39*672000}$
6	RDFMDLIN	52	6	Input 1 day storage
	WORK2	45	5	$(if(r66c1=1,1,0.3))*((r21c1/0.2$ $*r96c4/100000000)^{0.368*259691})$
7	WORK2	46	5	$if(and(r59c1=1,r26c5<=(1.25*r96c1)),$ $0,10)*(r96c4/100000000*r21c1/0.2*r26c5$ $/r9c5/2000)^{0.261*32461}$
8	RDFMDLIN	37	6	Input ash handling capacity in TPH
	WORK2	43	5	$if(r37c1<=0.0189,0,(5/r26c1*r21c1/$ $0.1*(r96c4/150000000))^{0.274}$ $*r37c1/0.25*1125000$
9	WORK2	44	5	$(if(and(r37c1<=0.0189,r37c1=0),0,(5/r26c1*$ $r21c1/0.2*(r96c4/100000000))^{0.508*64923})$
	RDFMDLIN	53	6	Input O length
10	WORK2	13	5	$(r97c1/(1-r21c5))/(r26c5/(r2c5/1000000))$
	RDFMDLIN	35	6	Input current particulate emissions, lb/mmBtu
11	WORK2	51	5	Input discount factor
	WORK2	52	5	R39c1
12	WORK2	54	5	blank
	WORK2	56	5	blank
11	WORK2	99	5	$((r98c5-r57c5)*r39c1)/(r50c5/(r35c5/1000000))$
	WORK2	100	5	$(r45c1)*(r43c1/2)$
11	WORK2	101	5	$(r98c5-r102c5)*r39c1/(r50c5/(r35c5/1000000))$
	WORK2	102	5	$r53c5-r99c5$
11	OUT4	68	3	$r101c5*1000000/r35c5$
	OUT4	69	3	r99c12
11	OUT4	69	3	r100c12
	RDFMDLIN	63	6	Input MSW tipping fee, \$/ton
12	RDFMDLIN	64	6	Input MSW transportation cost, \$/ton
	RDFMDLIN	34	6	Input boiler exit temperature, deg F
12	True/false	WORK2	33	$((If(r51c1=1,0.46,0.036))*...(unchanged)$
	WORK2	80	5	$(if(r64c1=1,1,0))*...(unchanged)$

a cumulative particulate removal efficiency. For example, it is not uncommon to have multiclones followed by an ESP (Cherry Point) or to have a scrubber and a baghouse (Puget Sound). The erroneous algorithm added the individual efficiencies when two devices were present, yielding an efficiency of greater than 100 percent. The algorithm was modified to reflect the cumulative efficiency of multiple APC devices.

Modification 3. The original algorithm for determining co-fire boiler flows at maximum turndown was biased towards RDF-3 utilization. When co-firing RDF-3, it is not generally possible to maintain stable combustion at boiler loads of less than 60 percent of the design MCR. However, field test co-fire evaluations at Hagerstown, Maryland; Erie, Pennsylvania; and Wright-Patterson Air Force Base, Ohio (References 6, 7, and 8), respectively, have demonstrated the ability to successfully co-fire RDF-5/Coal as low as 25 percent of design ratings. The algorithm assumed maximum turndown to be 60 percent of MCR irrespective of the type of RDF specified in the input data. Since 60 percent is appropriate for RDF-3, the algorithm was modified to use either 60 percent or 25 percent, depending on the type of RDF utilized.

Modification 4. The algorithm for estimating excess air requirements did not appropriately address excess air requirements for co-firing RDF-5. The algorithm estimated excess air based on RDF-3 burned in suspension but not on RDF-5, which has essentially the same excess air requirements as coal (References 6, 7, and 8). To account for RDF-5 utilization, a logic gate was added which uses the existing algorithm when RDF-3 co-firing is specified or uses the excess air value which was input for coal when RDF-5 co-firing is specified.

Modification 5. RDF storage was based on the use of an Atlas storage silo. This is not appropriate for RDF-5 and may not even be the most appropriate for RDF-3 (Reference 11). RDF-5 is physically similar to coal and, therefore, can be stored in existing coal bunkers, silos, etc., with only minor modifications (Reference 8). The modified algorithm currently uses the initial Atlas storage cost calculation for RDF-3 but uses 25 percent of that storage cost for RDF-5. This results in an adequate amount of capital for one of several storage options appropriate for RDF-5. Furthermore, RDF storage should be limited to only a one day supply on hand at any given time since coal would still be available as the primary fuel.

Modification 6. The proposed system for delivering RDF from storage to the boiler is a pneumatic system. Although applicable to RDF-3, it is not appropriate for RDF-5. Unlike RDF-3, RDF-5 can be transferred from storage to the boiler on the same conveyors used for coal, with only minimal modifications required (Reference 7 and 8). The original algorithm priced out an entirely new delivery system for either RDF-3 or RDF-5. The portion of the algorithm which priced the RDF-3 pneumatic delivery system was left intact, but it was appended with a subordinate algorithm which applies one-third the cost calculated for the pneumatic system when RDF-5 is specified.

Modification 7. As addressed in Modification 1(a), the model did account for the potential need to upgrade the existing ash handling system to accommodate the additional ash associated with RDF co-firing. However, that algorithm assumed that an upgrade would always be necessary. There was no check to compare the co-fire ash generation rate to the capacity of the current ash handling system, thereby verifying the need for upgrading. This problem was addressed by adding an additional model input to identify the design capacity of the ash handling system and a logic gate to compare the co-fire ash generation rate against the system capacity. If the co-fire ash generation is more than 125 percent of design ash capacity, the cost to upgrade the ash system is calculated as before; otherwise, no additional cost is assigned for ash handling system modifications.

Modification 8. The model contained an algorithm which estimated capital costs for long or short conveyors. This was used to establish an RDF delivery cost and was based on the assumption that the RDF production plant is on base, near the boiler. In this situation, it would be more appropriate to assign the cost of the delivery conveyors to the RDF producer, incorporate any additional cost into the delivered RDF price, and avoid addressing RDF delivery cost as a separate item. In many instances, the production facility may not be near the base and transportation would be via truck. Thus, the algorithm was modified to yield a zero cost for RDF delivery via conveyors and to assume the input RDF price includes delivery costs.

Modification 9. The original model estimated a theoretical flyash fraction as a function of furnace velocity only. Although that approach is not incorrect, flyash fraction can be more accurately estimated by back-calculating it based on the following: $(\text{current particulate emissions}) / (1 - \text{APC efficiencies}) = \text{total ash lofted as flyash}$. This assumes that the flyash fraction is constant and that APC efficiencies are constant. A model input for the current emissions rate was also added.

Modification 10. The original SIR algorithm did not follow Military Specification, NAVFAC P-442 (Reference 5). The SIR algorithm used an annualized capital cost based on annual interest rate and represented only the first year costs. It did not yield the return on investment (ROI) over the life of the project, which in this case is 25 years. To correct this, the SIR was changed to a Type I SIR analysis. A Type I analysis is utilized when "a given requirement is already being met at the present time, but a better solution is perceived. In the context of economic analysis, 'better' specifically refers to a proposed alternative whose total NPV [net present value] cost is lower than that of the existing alternative (the status quo) over the same period (project life). In such a case, the justification for implementing the proposed alternative is primarily economic...." (page 28, Economic Analysis Handbook, NAVFAC P-442, July 1980).

Modification 11. To account for the utilization of base-generated solid waste to support an RDF production facility, an algorithm was added which applies a credit to the SIR algorithm for avoided solid waste disposal cost. Therefore, for each analysis, two SIRs are estimated; one includes the credit for avoided cost, and one does not. The estimate of avoided cost is based on the following assumptions: transportation and collection costs cannot be

avoided. The solid waste still has to be collected and then transported, whether to landfill or to the RDF production facility. Furthermore, only one-half of the disposal cost can be avoided because RDF production facilities typically have a 50 percent fuel, 50 percent rejects ratio. The rejects must still be landfilled.

Modification 12. The model originally used the flue gas temperature at the stack for the boiler efficiency calculation. This can lead to erroneous results, especially if a wet scrubber is used, which lowers the flue gas temperature without reclaiming the energy. The ASME Power Test Code efficiency test uses the flue gas temperature at the boiler, economizer, or air preheater exit. To correct this, the model input was changed to ask for boiler exit temperature rather than stack temperature. The algorithm was correct in all other respects and was, therefore, left unchanged.

The following computer printouts are the output data obtained as each modification was implemented. The outputs show the individual effects of each modifications as well as the final, cumulative effects. Modifications 1 through 11 are based on Cherry Point data. Modification 12 is illustrated with Puget Sound data, as Puget Sound was the only facility affected by this modification. The individual outputs, which were effected by the modification, are underlined and can be compared to the original program (Run 1 outputs).

Summary of Out + data

variable

definition

ENTHALPY TRANSFERRED TO STEAM, AVG HOURLY, 100% AVAILABILITY

MCR, ABS MAX FOR CONTROLLED CASE (HEATED AT W/ VELOCITY)

MAXIMUM TURNDOWN STEAM RATING, SEAM BTU/H

BOILER EFFICIENCY AT MCR

BOILER EFFICIENCY AT AVERAGE OUTPUT

MAXIMUM STEAM DEMAND (MSD)

DEGRATE

TOTAL FUEL INPUT ENTHALPY, AVERAGE

RDF FLOWRATE, AVERAGE

CONVENTIONAL FUEL INPUT ENTHALPY, AVERAGE

SOLID RESIDUE GENERATED, AVERAGE

CARBON CONTENT OF SOLID RESIDUE, MAX HOURLY AT MCR

FLYASH FRACTION OF SOLID RESIDUE, AVERAGE

FLYASH EMISSION ABSOLUTE AVG EXISTING CONTROL DEVICE AT MCR

EMISSION OF TSP, MAX HOURLY W/ EXISTING CONTRL AT MCR

UNCONTROLLED FLYASH EMISSION, MAX HOURLY AT MCR

COMBUSTION AIR RATE, AVERAGE

COMBUSTION AIR VOLUMETRIC FLOWRATE, AVERAGE

NET FUEL GAS RATE, AVERAGE

NET FUEL GAS VOLUMETRIC FLOW, AVERAGE

EMISSION CONTRL DEVICE ASSUMED EFFICIENCY (EXISTING DEVICE)

NEW EMISSION CONTROL DEVICE REQUIRED 1= YES

Original Program

Run #1

Modification #1

Basic errors

Modification #2

APC efficiency

Modification #3

Max turndown

Modification #4

Excess air

UNITS

RDF CONVENTIONAL

RDF CONVENTIONAL

RDF CONVENTIONAL

RDF CONVENTIONAL

RDF CONVENTIONAL

RDF CONVENTIONAL

RDF CONVENTIONAL

RDF CONVENTIONAL

RDF CONVENTIONAL

RDF CONVENTIONAL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

CONFIRING FUEL

Summary of Out & data

variable	Original Program	Modification #1	Modification #2	Modification #3	Modification #4
definition	Run #1	Basic errors	APC efficiency	Max turndown	Excess air
ELECTRIC POWER COST FOR FD SYSTEM, AVERAGE	RD# CONVENTIONAL	RD# CONVENTIONAL	RD# CONVENTIONAL	RD# CONVENTIONAL	RD# CONVENTIONAL
	CONFIRING FUEL	CONFIRING FUEL	CONFIRING FUEL	CONFIRING FUEL	CONFIRING FUEL
	\$2.63	\$1.76	\$1.47	\$1.71	\$1.66
	\$2.17	\$1.47	\$1.47	\$1.42	\$1.54
ELECTRIC POWER COST FOR ID SYSTEM, AVERAGE	\$9.95	\$3.55	\$0.00	\$3.35	\$0.00
MISC ELECTRIC POWER COSTS, AVERAGE	\$9.77	\$6.92	\$0.00	\$6.76	\$0.00
SOLID RESIDUE GENERATED, MAX HOURLY AT MCR	1169	1170	1170	1170	1257
ANNUAL LABOR COST, BURDOWEN	\$314056	\$226777	\$226777	\$314056	\$226777
OPERATIONS PER SHIFT	2.15	1.55	1.55	2.15	1.55
CONVENTIONAL FUEL COST, AVERAGE	\$114	\$76	\$76	\$74	\$78
RD# FUEL COST, AVERAGE	\$41	\$54	\$54	\$52	\$56
ASH DISPOSAL COST, AVERAGE	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
OPERATING HRS/YR IN CONFIDED STEAM SUPPLY RANGE	4717	6224	4717	6290	4717
INCREMENTAL MAINTENANCE COST, ANNUAL	\$220445	\$0	\$0	\$0	\$0
AVAILABILITY, FRACTION	0.72	0.72	0.72	0.72	0.72
ANNUAL STEAM PRODUCTION, NET	3.53E+11	2.39E+11	2.39E+11	3.09E+11	2.50E+11
RELATIVE ELECTRIC POWER ANNUAL COST	\$105445	\$57711	\$57711	\$74327	\$57315
ANNUAL CONVENTIONAL FUEL COST	536779	357931	357931	464113	368721
ANNUAL RD# FUEL COST	\$381548	\$254421	\$254421	\$329896	\$262090
ANNUAL ASH DISPOSAL COST	\$0	\$0	\$0	\$0	\$0
ANNUAL MISC DISPOSAL COST	\$0	\$0	\$0	\$0	\$0
FURNACE COLD (WORKING CO & SHOWN) IF = 1	0	0	0	0	0
NEW MAX EMISSIONS RATE W/ NEW CONTROL DEVICE	4.69	4.69	4.69	4.69	4.69
INCLUDED IN CAPITAL COST					
BARE CAPITAL COST OF STORAGE SUBSYSTEM	\$547129	\$547797	\$547797	\$544595	\$558624

Summary of Out + data

variable

definition

Variable	Definition	Original Program		Modification #1		Modification #2		Modification #3		Modification #4	
		Run #1	Basic errors	RDF	CONVENTIONAL FUEL	RDF	CONVENTIONAL FUEL	RDF	CONVENTIONAL FUEL	RDF	CONVENTIONAL FUEL
UNIT											
\$	BASE CAPITAL COST OF LONG MECHANICAL CONVEYOR	\$162383	NA	\$162291	NA	\$162291	NA	\$162291	NA	\$166085	NA
\$	BASE CAPITAL COST OF SHORT MECHANICAL CONVEYOR	\$0	NA	\$0	NA	\$0	NA	\$0	NA	\$0	NA
\$	BASE CAPITAL COST OF RDF DELIVERY SYSTEM	\$400705	NA	\$400731	NA	\$400731	NA	\$400731	NA	\$413363	NA
\$	BASE INCREMENTAL COST OF ASH HANDLING SYSTEM	\$234549	NA	\$26074	NA	\$26074	NA	\$26265	NA	\$26952	NA
\$	BASE INCREMENTAL CAPITAL COSTS FOR EMISSIONS CONTROL	\$0	NA	\$0	NA	\$0	NA	\$0	NA	\$0	NA
\$	BASE INCREMENTAL COST FOR BOILER MODIFICATIONS	\$327229	NA	\$327251	NA	\$327251	NA	\$327251	NA	\$338165	NA
\$	BASE TOTAL INCREMENTAL CAPITAL COSTS	\$1671894	NA	\$1460145	NA	\$1460145	NA	\$1461133	NA	\$1503189	NA
\$	BURDENED TOTAL INCREMENTAL CAPITAL COSTS	\$2206900	NA	\$1927391	NA	\$1927391	NA	\$1928695	NA	\$1984209	NA
NONE	CAPITAL RECOVERY FACTOR	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
\$/YR	ANNUALIZED COST OF CAPITAL	\$281380	NA	\$245742	NA	\$245742	NA	\$245905	NA	\$252987	NA
\$/YR	TOTAL ANNUAL O&M COST	\$1538273	\$1296518	\$1072777	\$951482	\$1072777	\$951482	\$1271112	\$1162947	\$1093454	\$984884
\$/YR	TOTAL ANNUAL COST INCLUDING COST OF CAPITAL	\$1879632	\$1296518	\$1318520	\$951482	\$1318520	\$951482	\$1517020	\$1162947	\$1346441	\$984884
\$/MMBTU	TOTAL COST PER MILLION BTU OF STEAM	\$5.21	\$2.78	\$5.51	\$3.02	\$5.51	\$3.02	\$4.91	\$2.85	\$5.38	\$2.98
NONE	SIR (SAVINGS/INVESTMENT) AT EQUAL ANNUAL STEAM PRODUCTION	-2.05	NA	-1.43	NA	-1.43	NA	-1.58	NA	-1.37	NA
\$/MMBTU	TOTAL O&M COST PER MILLION BTU OF STEAM	\$4.41	\$2.78	\$4.49	\$3.02	\$4.49	\$3.02	\$4.11	\$2.85	\$4.37	\$2.98
\$/YR	O&M COSTS FOR PULVERIZER IF NOT RDF BUT COAL USED AS ASF	\$0.00	NA	\$0.00	NA	\$0.00	NA	\$0.00	NA	\$0.00	NA
TPY	TONS PER YEAR RDF REQUIRED	15262	NA	10177	NA	10177	NA	13196	NA	10484	NA

১৯৯৩

definition

ENTHUSIASTICALLY TRANSFERRED TO STEAM. AVG HOURLY, 100% AVAILABILITY

PCA, ABS MAY FOR CONFINED CASE (RATED AT HI VELOCITY)

47118 4635 'B' 1.106 463.5 4640.0 47118

BOMBER EFFICIENCY AT MCR

ROUTER EFFICIENCY AT OVERALL OUTPUT

(L5M) UNCLASSIFIED and E.O. 1.1.0m

5-06*

TOTAL FUEL INPUT ENTHALPY SURFACE

3000 JVC 3100 MC 3000

...AND NOT ENTHALPY. OVERCOME

TO: DIRECTOR, FBI

TOBACCO CONTENT: 90.10 RESIDUE. MAX. HUMIDITY AT 100°C

[illegible]

1. "OS-EMISSIOM ABSOLUTE AVG EXISTING CONTROL DEVICE AT MCR

EMISSION OF TSP, NOX HOURLY W/ EXISTING CONTRL AT MCR

NOON-COLLECTED FLVASH EMISSION. MAY HOURLY AT MCR

COMBUSTION AIR RATE, AVERAGE

COMBUSTION AIR VOLUMETRIC FLOWRATE, AVERAGE

WE'VE GOT RATE. AVERAGE

NET FLUE GAS VOLUMETRIC FLOW, AVERAGE

EMISSION ON "R" DEVICE ASSUMED EFFICIENCY (EXISTING DEVICE)

NEW EMISSION CONTROL DEVICE REQUIRED 1 = YES

Summary of Cost & Data

variable

definition

ELECTRIC POWER COST FOR FD SYSTEM, AVERAGE

ELECTRIC POWER COST FOR ID SYSTEM, AVERAGE

MISC ELECTRIC POWER COSTS, AVERAGE

SOLID RESIDUE GENERATED, MAX HOURLY AT MCR

ANNUAL LABOR COST, BOURNED

OPERATORS PER SHIFT

CONVENTIONAL FUEL COST, AVERAGE

RDF FUEL COST, AVERAGE

ASH DISPOSAL COST, AVERAGE

OPERATING HRS/YR IN COFRED STEAM SUPPLY RANGE

INCREMENTAL MAINTENANCE COST, ANNUAL

AVAILABILITY, FRACTION

ANNUAL STEAM PRODUCTION, NET

RELATIVE ELECTRIC POWER ANNUAL COST

ANNUAL CONVENTIONAL FUEL COST

ANNUAL RDF FUEL COST

ANNUAL ASH DISPOSAL COST

ANNUAL MWD DISPOSAL COST

FURNACE COLD (INFLUENCING CO & SMOKE) IF = 1

NEW MAX EMISSIONS RATE W/ NEW CONTROL DEVICE

INCLUDED IN CAPITAL COST

BASE CAPITAL COST OF STORAGE SUBSYSTEM

	Modification #5	Modification #6	Modification #7	Modification #8	Modification #9
	RDF storage	RDF delivery	Ash handling	Delivery cost added, and short conv. del.	flyash fraction
UNITS	RDF CONVENTIONAL	RDF CONVENTIONAL	RDF CONVENTIONAL	RDF CONVENTIONAL	RDF CONVENTIONAL
	COFIRING FUEL	COFIRING FUEL	COFIRING FUEL	COFIRING FUEL	COFIRING FUEL
\$/HR	\$1.76 \$1.47	\$1.76 \$1.47	\$1.76 \$1.47	\$1.76 \$1.47	\$1.76 \$1.47
\$/HR	\$3.55 \$0.00	\$3.55 \$0.00	\$3.55 \$0.00	\$3.55 \$0.00	\$3.55 \$0.00
\$/HR	\$6.92 \$0.00	\$6.92 \$0.00	\$6.92 \$0.00	\$6.92 \$0.00	\$6.92 \$0.00
LB/HR	1170 409	1170 409	1170 409	1170 409	1170 409
\$/YR	\$314056 \$226777	\$314056 \$226777	\$314056 \$226777	\$314056 \$226777	\$314056 \$226777
MAN/SHIFT	2.15 1.55	2.15 1.55	2.15 1.55	2.15 1.55	2.15 1.55
\$/HR	\$76 \$115	\$76 \$115	\$76 \$115	\$76 \$115	\$76 \$115
\$/HR	\$54 NA	\$54 NA	\$54 NA	\$54 NA	\$54 NA
\$/HR	\$0.00 \$0.00	\$0.00 \$0.00	\$0.00 \$0.00	\$0.00 \$0.00	\$0.00 \$0.00
HOURS	4717 6224	4717 6224	4717 6224	4717 6224	4717 6224
\$/YR	\$61940 NA	\$61943 NA	\$102309 NA	\$78406 NA	\$88650 NA
NONE	0.72 0.95	0.72 0.95	0.72 0.95	0.72 0.95	0.72 0.95
BTU	2.39E+11 3.16E+11	2.39E+11 3.16E+11	2.39E+11 3.16E+11	2.39E+11 3.16E+11	2.39E+11 3.16E+11
\$/YR	\$57711 \$9138	\$57711 \$9138	\$57711 \$9138	\$57711 \$9138	\$57711 \$9138
\$/YR	357931 715567	357931 715567	357931 715567	357931 715567	357931 715567
\$/YR	\$254421 NA	\$254421 NA	\$254421 NA	\$254421 NA	\$254421 NA
\$/YR	\$0 \$0	\$0 \$0	\$0 \$0	\$0 \$0	\$0 \$0
\$/YR	NA \$94000	NA \$94000	NA \$94000	NA \$94000	NA \$94000
NONE	0 NA	0 NA	0 NA	0 NA	0 NA
LB/MMBTU	4.69 NA	4.69 NA	4.69 NA	4.69 NA	4.69 NA
\$	\$103747 NA	\$543797 NA	\$543797 NA	\$543797 NA	\$543797 NA

Summary of Out & data

variable

definition

	Modification #5	Modification #6	Modification #7	Modification #8	Modification #9
	RFDF storage	RFDF delivery	Ash handling	Delivery cost added, long/short conv. cell.	Flvash fraction
	RFDF CONVENTIONAL	RFDF CONVENTIONAL	RFDF CONVENTIONAL	RFDF CONVENTIONAL	RFDF CONVENTIONAL
	CONFIRING FUEL	CONFIRING FUEL	CONFIRING FUEL	CONFIRING FUEL	CONFIRING FUEL
BAKE CAPITAL COST OF LONG MECHANICAL CONVEYER	\$	\$162291	\$162291	\$0	\$162291
BAKE CAPITAL COST OF SHORT MECHANICAL CONVEYER	\$	\$0	\$0	\$0	\$0
BAKE CAPITAL COST OF RFDF DELIVERY SYSTEM	\$	\$400731	\$400731	\$400731	\$400731
BAKE INCREMENTAL COST OF ASH HANDLING SYSTEM	\$	\$26074	\$26074	\$26074	\$26074
BAKE INCREMENTAL CAPITAL COSTS FOR EMISSIONS CONTROL	\$	\$0	\$0	\$0	\$0
BAKE INCREMENTAL COST FOR BOILER MODIFICATIONS	\$	\$327251	\$327251	\$327251	\$327251
BAKE TOTAL INCREMENTAL CAPITAL COSTS	\$	\$1020094	\$1151890	\$1297854	\$1460145
BURDENED TOTAL INCREMENTAL CAPITAL COSTS	\$	\$1346524	\$1520495	\$1713167	\$1927391
CAPITAL RECOVERY FACTOR	NONE	0.13	0.13	0.13	0.13
ANNUALIZED COST OF CAPITAL	\$/YR	\$171682	\$193863	\$218429	\$245742
TOTAL ANNUAL O&M COST	\$/YR	\$1046058	\$1054060	\$1083277	\$1072777
TOTAL ANNUAL COST INCLUDING COST OF CAPITAL	\$/YR	\$1217739	\$1247923	\$1301706	\$1318520
TOTAL COST PER MILLION BTU OF STEAM	\$/MMBTU	\$5.09	\$5.22	\$5.44	\$5.51
SIR (SAVINGS/INVESTMENT) AT EQUAL ANNUAL STEAM PRODUCTION	NONE	-1.89	-1.72	-1.66	-1.43
TOTAL O&M COST PER MILLION BTU OF STEAM	\$/MMBTU	\$4.37	\$4.41	\$4.53	\$4.49
O&M COSTS FOR PULVERIZER IF NOT RFDF BUT COAL USED AS ASF	\$/YR	\$0.00	\$0.00	\$0.00	\$0.00
TONS PER YEAR RFDF REQUIRED	TPY	10177	10177	10177	10177

2014/01/01

Summary of Out & data

Modification 10 & 11 Cumulative changes

Type 1 SIR RDF # 42/1

variable

definition

W/disposal credit

RDF CONVENTIONAL

COKERING FUEL

UNITS

5.07E+07 5.07E+07 5.09E+07 5.09E+07

7.97E+07 7.47E+07 8.67E+07 7.47E+07

4.70E+07 1.98E+07

0.75 0.82 0.76 0.82

0.75 0.82 0.75 0.82

2.25E+08 2.3E+08 2.3E+08 2.25E+08

0 0

6.80E+07 6.18E+07 6.75E+07 6.20E+07

2.16 2.14

2769 4196 2749 4210

777 277 774 278

0.23 0.09 0.23 0.09

0.42 0.29 0.74 0.29

-415 -98 2 0

-3.92 -1.07 0.02 0

4.69 1.28 8.11 1.28

63091 52764 57618 52944

14020 11725 12804 11765

63398 56682 63875 56876

21893 17334 20019 23192

2 2 1 1

0 0 0 0

ENTHALPY TRANSFERRED TO STEAM, AVG HOURLY, 100% AVAILABILITY

MCR, ABS MAX FOR COKING CASE (HEATED AT 11 VELOCITY)

WATLING TURNDOWN STEAM RATING, SEEM BTU/H

BOILER EFFICIENCY AT MCR

BOILER EFFICIENCY AT AVERAGE OUTPUT

WATLING STEAM DEMAND (MSD)

DERATE

TOTAL FUEL INPUT ENTHALPY, AVERAGE

RDF FLOWRATE, AVERAGE

CONVENTIONAL FUEL INPUT ENTHALPY, AVERAGE

SOLID RESIDUE GENERATED, AVERAGE

CARBON CONTENT OF SOLID RESIDUE, MAX HOURLY AT MCR

FLYASH FRACTION OF SOLID RESIDUE, AVERAGE

FLYASH EMISSION ABSOLUTE AVG EXISTING CONTROL DEVICE AT MCR

EMISSION OF TSP, MAX HOURLY W/ EXISTING CNTRL AT MCR

UNCONTROLLED FLYASH EMISSION, MAX HOURLY AT MCR

COMBUSTION AIR RATE, AVERAGE

COMBUSTION AIR VOLUMETRIC FLOWRATE, AVERAGE

NET FUE GAS RATE, AVERAGE

NET FUE GAS VOLUMETRIC FLOW, AVERAGE

EMISSION CNTRL DEVICE ASSUMED EFFICIENCY (EXISTING DEVICE)

NEW EMISSION CONTROL DEVICE REQUIRED 1= YES

PROGRAM MODS

Summary of Out & data

variable definition	UNITS	Modification 10 & 11		Cumulative changes	
		Type 1 SIR		RDF @ \$2/T	
		w/disposal credit			
		RDF	CONVENTIONAL	RDF	CONVENTIONAL
		COFIRING	FUEL	COFIRING	FUEL
BASE CAPITAL COST OF LONG MECHANICAL CONVEYOR	\$	\$162,291		\$0	
BASE CAPITAL COST OF SHORT MECHANICAL CONVEYOR	\$	\$0		\$0	
BASE CAPITAL COST OF RDF DELIVERY SYSTEM	\$	\$400,731		\$95,391	
BASE INCREMENTAL COST OF ASH HANDLING SYSTEM	\$	\$26,074		\$0	
BASE INCREMENTAL CAPITAL COSTS FOR EMISSIONS CONTROL	\$	\$0		\$0	
BASE INCREMENTAL COST FOR BOILER MODIFICATIONS	\$	\$327,251		\$338,165	
BASE TOTAL INCREMENTAL CAPITAL COSTS	\$	\$1,460,145		\$540,326	
BURDENED TOTAL INCREMENTAL CAPITAL COSTS	\$	\$1,927,391		\$713,230	
CAPITAL RECOVERY FACTOR	NONE	9.54	9.54	9.54	9.54
ANNUALIZED COST OF CAPITAL	\$/YR	\$0		\$0	
TOTAL ANNUAL O&M COST	\$/YR	\$1,072,777	\$951,482	\$920,615	\$1,196,348
TOTAL ANNUAL COST INCLUDING COST OF CAPITAL	\$/YR	\$0	\$951,482	\$0	\$1,196,348
TOTAL COST PER MILLION BTU OF STEAM	\$/MMBTU	\$0.00	\$3.02	\$0.00	\$2.83
SIR (SAVINGS/INVESTMENT) AT EQUAL ANNUAL STEAM PRODUCTION	NONE	-1.74		-0.19	
TOTAL O&M COST PER MILLION BTU OF STEAM	\$/MMBTU	\$4	\$3	\$3	\$3
O&M COSTS FOR PULVERIZER IF NOT RDF BUT COAL USED AS ASF	\$/YR	\$0		\$0	
TONS PER YEAR RDF REQUIRED	TPY	10177		\$13,470	
Avoided MSW disposal cost		\$17,000		\$17,000	
SIR with disposal credit		-1.66		0.04	

Summary of Out 4 data

Cumulative

Changes

variable definition	UNITS	CONFIRMING	FUEL	CONVENTIONAL
ENTHALPY TRANSFERRED TO STEAM, AVG HOURLY, 100% AVAILABILITY	BTUH	5.09E+07	5.09E+07	
MCR, AVG MAX FOR DEFINED CASE (HEATED AT HI VELOCITY)	BTUH	8.67E+07	7.47E+07	
MAXIMUM TURBIDITY STEAM RATING, SEAM BTUH	BTUH	1.98E+07	N/A	
BOILER EFFICIENCY AT MCR	NONE	0.75	0.82	
BOILER EFFICIENCY AT AVERAGE OUTPUT	NONE	0.75	0.82	
MAXIMUM STEAM DEMAND (MSD)	BTUH	2.25E+08	2.25E+08	
DEWITE	NONE	0.00	N/A	
TOTAL FUEL INPUT ENTHALPY, AVERAGE	BTUH	6.75E+07	6.20E+07	
REF FLOWRATE, AVERAGE	TPH	2.14	N/A	
CONVENTIONAL FUEL INPUT ENTHALPY, AVERAGE	LB/HR	2749	4210	
SOLID RESIDUE GENERATED, AVERAGE	LB/HR	774	278	
CARBON CONTENT OF SOLID RESIDUE, MAX HOURLY AT MCR	NONE	0.23	0.09	
FLYASH FRACTION OF SOLID RESIDUE, AVERAGE	NONE	0.74	0.29	
FLYASH EMISSION ABSOLUTE AVG EXISTING CONTROL DEVICE AT MCR	LB/HR	2	0	
EMISSION OF TSP, MAX HOURLY W/ EXISTING CNTRL AT MCR	LB/MMBTU	0.02	0.00	
UNCONTROLLED FLYASH EMISSION, MAX HOURLY AT MCR	LB/MMBTU	8.11	1.28	
COMBUSTION AIR RATE, AVERAGE	LB/HR	57618	52944	
COMBUSTION AIR VOLUMETRIC FLOWRATE, AVERAGE	ACFM	18804	11763	
WET FLE GAS RATE, AVERAGE	LB/HR	63875	56876	
WET FLE GAS VOLUMETRIC FLOW, AVERAGE	ACFM	20019	23192	
EMISSION CNTRL DEVICE ASSUMED EFFICIENCY (EXISTING DEVICE)	NONE	1	1	
NEW EMISSION CONTROL DEVICE REQUIRED 1= YES	NONE	0	0	

Summary of Out & data

variable definition	UNITS	Cumulative Changes	
		ROF	CONVENTIONAL COFIRING FUEL
ELECTRIC POWER COST FOR FD SYSTEM, AVERAGE	\$/HR	\$1.60	\$1.47
ELECTRIC POWER COST FOR ID SYSTEM, AVERAGE	\$/HR	\$3.13	\$0.00
MISC ELECTRIC POWER COSTS, AVERAGE	\$/HR	\$6.88	\$0.00
SOLID RESIDUE GENERATED, MAX HOURLY AT MCR	LB/HR	1257	409
ANNUAL LABOR COST, BURDENED	\$/YR	\$314056	\$226777
OPERATIONS PER SHIFT	MAN/SHIFT	2.15	1.33
CONVENTIONAL FUEL COST, AVERAGE	\$/HR	\$75	\$115
ROF FUEL COST, AVERAGE	\$/HR	\$58	NR
ASH DISPOSAL COST, AVERAGE	\$/HR	\$0.00	\$0.00
OPERATING MRS/YR IN DEFINED STEAM SUPPLY RANGE	HOURS	6290	8299
INCREMENTAL MAINTENANCE COST, ANNUAL	\$/YR	\$49333	NR
AVAILABILITY, FRACTION	NONE	0.72	0.93
ANNUAL STEAM PRODUCTION, NET	BTU	3.20E+11	4.22E+11
RELATIVE ELECTRIC POWER ANNUAL COST	\$/YR	\$73041	\$12226
ANNUAL CONVENTIONAL FUEL COST	\$/YR	473769	957346
ANNUAL ROF FUEL COST	\$/YR	\$363701	NR
ANNUAL ASH DISPOSAL COST	\$/YR	90	90
ANNUAL MSH DISPOSAL COST	\$/YR	NR	994000
FURNACE COLD (MAKING CO & SMOKE) IF = 1	NONE	0	NR
NEW MAX EMISSIONS RATE W/ NEW CONTROL DEVICE	LB/MMBTU	8.11	NR
INCLUDED IN CAPITAL COST			
BASE CAPITAL COST OF STORAGE SUBSYSTEM	\$	\$106769	NR

Summary of Out & data

Cumulative

Changes

variable definition	UNITS	ROF	CONVENTIONAL CONFIRMING FUEL
BASE CAPITAL COST OF LONG MECHANICAL CONVEYOR	\$	\$0	NA
BASE CAPITAL COST OF SHORT MECHANICAL CONVEYOR	\$	\$0	NA
BASE CAPITAL COST OF ROF DELIVERY SYSTEM	\$	\$95391	NA
BASE INCREMENTAL COST OF ASH HANDLING SYSTEM	\$	\$272138	NA
BASE INCREMENTAL CAPITAL COSTS FOR EMISSIONS CONTROL	\$	\$0	NA
BASE INCREMENTAL COST FOR BOILER MODIFICATIONS	\$	\$338165	NA
BASE TOTAL INCREMENTAL CAPITAL COSTS	\$	\$812464	NA
BURDENED TOTAL INCREMENTAL CAPITAL COSTS	\$	\$1072832	NA
CAPITAL RECOVERY FACTOR	NONE	0.13	0.13
ANNUALIZED COST OF CAPITAL	\$/YR	\$136738	NA
TOTAL ANNUAL O&M COST	\$/YR	\$1273899	\$1196349
TOTAL ANNUAL COST INCLUDING COST OF CAPITAL	\$/YR	\$1410637	\$1196349
TOTAL COST PER MILLION BTU OF STEAM	\$/MMBTU	\$4.41	\$2.83
SIR (SAVINGS/INVESTMENT) AT EQUAL ANNUAL STEAM PRODUCTION	NONE	-2.69	NA
TOTAL O&M COST PER MILLION BTU OF STEAM	\$/MMBTU	\$3.98	\$2.83
O&M COSTS FOR PULVERIZER IF NOT ROF BUT COAL USED AS REF	\$/YR	\$0.00	NA
TONS PER YEAR ROF REQUIRED	TPY	13470	NA
			800

Summary of Out & data

variable	Modification 88-1	Cumulative	Modification 88-2	Cumulative changes
definition	90/T RDF plus	Changes	930.31/T RDF cost	(2:RDF cost equal
	92/T delivery	(1: 90 +92/T RDF cost)	(same \$/btu as coal)	to coal: \$/btu)
UNITS	RDF CONVENTIONAL	RDF CONVENTIONAL	RDF CONVENTIONAL	RDF CONVENTIONAL
	CONFIRING FUEL	CONFIRING FUEL	CONFIRING FUEL	CONFIRING FUEL
ENTHALPY TRANSFERRED TO STEAM, AVG HOURLY, 100% AVAILABILITY	5.07E+07	5.09E+07	5.07E+07	5.09E+07
MCR, ABS MAX FOR DEFINED CASE (HEATED AT HI VELOCITY)	7.97E+07	7.47E+07	7.97E+07	7.47E+07
MAXIMUM TURBIDITY STEAM RATING, SEAM BTU/H	4.70E+07	NA	4.70E+07	NA
BOILER EFFICIENCY AT MCR	0.75	0.82	0.75	0.82
BOILER EFFICIENCY AT AVERAGE OUTPUT	0.75	0.82	0.75	0.82
MAXIMUM STEAM DEMAND (MSD)	2.25E+08	2.25E+08	2.25E+08	2.25E+08
DEBRATE	0.00	NA	0.00	NA
TOTAL FUEL INPUT ENTHALPY, AVERAGE	6.80E+07	6.20E+07	6.80E+07	6.20E+07
RDF FLOWRATE, AVERAGE	2.16	2.14	2.16	2.14
CONVENTIONAL FUEL INPUT ENTHALPY, AVERAGE	2769	4196	2769	4196
SOLID RESIDUE GENERATED, AVERAGE	777	774	777	774
CARBON CONTENT OF SOLID RESIDUE, MAX HOURLY AT MCR	0.23	0.09	0.23	0.09
FLYASH FRACTION OF SOLID RESIDUE, AVERAGE	0.42	0.29	0.42	0.29
FLYASH EMISSION ABSOLUTE AND EXISTING CONTROL DEVICE AT MCR	-415	-98	-415	-98
EMISSION OF TSP, MAX HOURLY W/ EXISTING CTRL AT MCR	-3.92	-1.07	-3.92	-1.07
UNCONTROLLED FLYASH EMISSION, MAX HOURLY AT MCR	4.69	1.28	4.69	1.28
COMBUSTION AIR RATE, AVERAGE	63091	52764	63091	52764
COMBUSTION AIR VOLUMETRIC FLOWRATE, AVERAGE	14020	11765	14020	11765
NET FUEL BBS RATE, AVERAGE	69398	56682	69398	56682
NET FUEL BBS VOLUMETRIC FLOW, AVERAGE	21893	17334	21893	17334
EMISSION CTRL DEVICE ASSUMED EFFICIENCY (EXISTING DEVICE)	2	2	2	2
NEW EMISSION CONTROL DEVICE REQUIRED 1= YES	0	0	0	0

Summary of Data

variable	Modification #0-1	Cumulative	Modification #0-2	Cumulative changes
definition				
	90/T RDF plus	Changes	\$30.31/t RDF cost	(2:RDF cost equal
	92/T delivery	(1: 90 +42/T RDF cost)	(same \$/btu as coal)	to coal \$/btu)
	RDF CONVENTIONAL	RDF CONVENTIONAL	RDF CONVENTIONAL	RDF CONVENTIONAL
	COFIRING FUEL	COFIRING FUEL	COFIRING FUEL	COFIRING FUEL
ELECTRIC POWER COST FOR PD SYSTEM, AVERAGE	\$/HR	\$1.76 \$1.47 \$1.60 \$1.47 \$1.60 \$1.47		
ELECTRIC POWER COST FOR ID SYSTEM, AVERAGE	\$/HR	\$3.35 90.00 \$3.13 90.00 \$3.35 90.00		\$3.13 90.00
WTSC ELECTRIC POWER COSTS, AVERAGE	\$/HR	\$6.92 90.00 \$6.88 90.00 \$6.92 90.00		\$6.88 90.00
SOLID RESIDUE GENERATED, MAX HOURLY AT MCR	LB/HR	1170 409	1170 409	1257 409
ANNUAL LABOR COST, BUNDLED	\$/YR	\$314056 \$226777	\$314056 \$226777	\$314056 \$226777
OPERATIONS PER SHIFT	MAN/SHIFT	2.15 1.35	2.15 1.35	2.15 1.35
CONVENTIONAL FUEL COST, AVERAGE	\$/HR	\$76 \$115	\$76 \$115	\$75 \$115
RDF FUEL COST, AVERAGE	\$/HR	\$4 NA	\$4 NA	\$63 NA
ASH DISPOSAL COST, AVERAGE	\$/HR	90.00 90.00	90.00 90.00	90.30 90.00
OPERATING HRS/YR IN DEFINED STEAM SUPPLY RANGE	HOURS	4717 6224	4717 6224	6290 6299
INCREMENTAL MAINTENANCE COST, ANNUAL	\$/YR	\$78806 NA	\$78806 NA	\$45333 NA
AVAILABILITY, FRACTION	NONE	0.72 0.95	0.72 0.95	0.72 0.95
ANNUAL STEAM PRODUCTION, NET	BTU	2.39E+11 3.16E+11	2.39E+11 3.16E+11	3.20E+11 4.22E+11
RELATIVE ELECTRIC POWER ANNUAL COST	\$/YR	\$57711 \$9138	\$57711 \$9138	\$73041 \$12226
ANNUAL CONVENTIONAL FUEL COST	\$/YR	357931 715567	357931 715567	473769 957346
ANNUAL RDF FUEL COST	\$/YR	\$20354 NA	\$20354 NA	\$408288 NA
ANNUAL ASH DISPOSAL COST	\$/YR	\$0 90	\$0 90	\$0 90
ANNUAL MSW DISPOSAL COST	\$/YR	NA \$94000	NA \$94000	NA \$94000
FURNACE COLD MAKING CO & SMOKE IF = 1	NONE	0 NA	0 NA	0 NA
NEW MSW EMISSIONS RATE W/ NEW CONTROL DEVICE	LB/MSW/TU	4.69 NA	4.69 NA	4.69 NA
INCLUDED IN CAPITAL COST				
BARE CAPITAL COST OF STORAGE SUBSYSTEM	\$	\$543797 NA	\$543797 NA	\$106769 NA

variable definition	units	\$0/T RDF plus \$2/T delivery				Changes (1: \$) +\$2/T RDF cost)				\$30.31/t RDF cost (same \$/btu as coal)				(\$2 RDF cost equal to coal: \$/btu)			
		RDF COFIRING	CONVENTIONAL FUEL	RDF COFIRING	CONVENTIONAL FUEL	RDF COFIRING	CONVENTIONAL FUEL	RDF COFIRING	CONVENTIONAL FUEL	RDF COFIRING	CONVENTIONAL FUEL	RDF COFIRING	CONVENTIONAL FUEL	RDF COFIRING	CONVENTIONAL FUEL		
BASE CAPITAL COST OF LONG MECHANICAL CONVEYOR	\$	\$0	NA	\$0	NA	\$0	NA	\$0	NA	\$0	NA	\$0	NA	\$0	NA		
BASE CAPITAL COST OF SHORT MECHANICAL CONVEYOR	\$	\$0	NA	\$0	NA	\$0	NA	\$0	NA	\$0	NA	\$0	NA	\$0	NA		
BASE CAPITAL COST OF RDF DELIVERY SYSTEM	\$	\$400731	NA	\$95391	NA	\$95391	NA	\$400731	NA	\$95391	NA	\$95391	NA	\$95391	NA		
BASE INCREMENTAL COST OF ASH HANDLING SYSTEM	\$	\$26074	NA	\$272138	NA	\$272138	NA	\$26074	NA	\$26074	NA	\$272138	NA	\$272138	NA		
BASE INCREMENTAL CAPITAL COSTS FOR EMISSIONS CONTROL	\$	\$0	NA	\$0	NA	\$0	NA	\$0	NA	\$0	NA	\$0	NA	\$0	NA		
BASE INCREMENTAL COST FOR BOILER MODIFICATIONS	\$	\$327251	NA	\$338165	NA	\$338165	NA	\$327251	NA	\$338165	NA	\$338165	NA	\$338165	NA		
BASE TOTAL INCREMENTAL CAPITAL COSTS	\$	\$1297854	NA	\$812464	NA	\$812464	NA	\$1297854	NA	\$1297854	NA	\$812464	NA	\$812464	NA		
BUDGETED TOTAL INCREMENTAL CAPITAL COSTS	\$	\$1713167	NA	\$1072452	NA	\$1072452	NA	\$1713167	NA	\$1713167	NA	\$1072452	NA	\$1072452	NA		
CAPITAL RECOVERY FACTOR	NONE	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13		
ANNUALIZED COST OF CAPITAL	\$/YR	\$218429	NA	\$136738	NA	\$136738	NA	\$218429	NA	\$218429	NA	\$136738	NA	\$136738	NA		
TOTAL ANNUAL O&M COST	\$/YR	\$828856	\$951482	\$937140	\$1196348	\$951482	\$951482	\$1116962	\$951482	\$1318486	\$1196349	\$1318486	\$1196349	\$1196349	\$1196349		
TOTAL ANNUAL COST INCLUDING COST OF CAPITAL	\$/YR	\$1047285	\$951482	\$1073877	\$1196348	\$951482	\$951482	\$1335391	\$951482	\$1453224	\$1196349	\$1453224	\$1196349	\$1196349	\$1196349		
TOTAL COST PER MILLION BTU OF STEAM	\$/MMBTU	\$4.38	\$3.02	\$3.36	\$2.83	\$2.83	\$2.83	\$5.58	\$3.02	\$4.55	\$2.83	\$4.55	\$2.83	\$2.83	\$2.83		
SIR (SAVINGS/INVESTMENT) AT EQUAL ANNUAL STEAM PRODUCTION	NONE	-0.49	NA	-0.22	NA	-0.22	NA	-1.81	NA	-3.01	NA	-3.01	NA	-3.01	NA		
TOTAL O&M COST PER MILLION BTU OF STEAM	\$/MMBTU	\$3.47	\$3.02	\$2.93	\$2.83	\$2.83	\$2.83	\$4.67	\$3.02	\$4.12	\$2.83	\$4.12	\$2.83	\$2.83	\$2.83		
O&M COSTS FOR PULVERIZER IF NOT RDF BUT COAL USED AS REF	\$/YR	\$0.00	NA	\$0.00	NA	\$0.00	NA	\$0.00	NA	\$0.00	NA	\$0.00	NA	\$0.00	NA		
TONS PER YEAR RDF REQUIRED	TPY	10177	NA	13470	NA	13470	NA	10177	NA	13470	NA	13470	NA	13470	NA		
					800		800								800		

Summary of Data

Variable	Definition	Modification #0-1	Cumulative Changes	Modification #0-2	Cumulative changes
		\$0/T RDF plus	(1: \$0 +\$2/T RDF cost)	\$30.31/t RDF cost	(2: RDF cost equal to coal \$/btu)
		\$2/T delivery		(same \$/btu as coal)	
UNITS		RDF CONVENTIONAL	RDF CONVENTIONAL	RDF CONVENTIONAL	RDF CONVENTIONAL
		CONFIRING FUEL	CONFIRING FUEL	CONFIRING FUEL	CONFIRING FUEL
BTU/H	ENTHALPY TRANSFERRED TO STEAM, AVG HOURLY, 100% AVAILABILITY	5.07E+07	5.09E+07	5.07E+07	5.09E+07
BTU/H	MCR, ABS MAX FOR COPIED CASE (OPERATED AT W1 VELOCITY)	7.97E+07	8.67E+07	7.97E+07	8.67E+07
BTU/H	MAXIMUM TURBIDITY STEAM RATING, SEAM BTU/H	4.70E+07	1.98E+07	4.70E+07	1.98E+07
NONE	BOILER EFFICIENCY AT MCR	0.75	0.76	0.75	0.76
NONE	BOILER EFFICIENCY AT AVERAGE OUTPUT	0.75	0.75	0.75	0.75
BTU/H	MAXIMUM STEAM DEMAND (MSD)	2.25E+08	2.25E+08	2.25E+08	2.25E+08
NONE	DERATE	0.00	0.00	0.00	0.00
BTU/H	TOTAL FUEL INPUT ENTHALPY, AVERAGE	6.80E+07	6.75E+07	6.80E+07	6.75E+07
T/H	RDF FLOWRATE, AVERAGE	2.16	2.14	2.16	2.14
LB/HR	CONVENTIONAL FUEL INPUT ENTHALPY, AVERAGE	2769	2749	2769	2749
LB/HR	SOLID RESIDUE GENERATED, AVERAGE	777	774	777	774
NONE	CARBON CONTENT OF SOLID RESIDUE, MAX HOURLY AT MCR	0.23	0.23	0.23	0.23
NONE	FLYASH FRACTION OF SOLID RESIDUE, AVERAGE	0.42	0.42	0.42	0.42
LB/HR	FLYASH EMISSION ABSOLUTE AVG EXISTING CONTROL DEVICE AT MCR	-415	-98	-415	-98
LB/MSBTU	EMISSION OF TSP, MAX HOURLY W/ EXISTING CTRL AT MCR	-3.92	-1.07	-3.92	-1.07
LB/MSBTU	UNCONTROLLED FLYASH EMISSION, MAX HOURLY AT MCR	4.69	4.69	4.69	4.69
LB/HR	COMBUSTION AIR RATE, AVERAGE	63091	52764	63091	52764
ACFM	COMBUSTION AIR VOLUMETRIC FLOWRATE, AVERAGE	14020	11725	14020	11725
LB/HR	NET FUE GAS RATE, AVERAGE	69398	56682	69398	56682
ACFM	NET FUE GAS VOLUMETRIC FLOW, AVERAGE	21893	17334	21893	17334
NONE	EMISSION CTRL DEVICE ASSUMED EFFICIENCY (EXISTING DEVICE)	2	2	2	2
NONE	NEW EMISSION CONTROL DEVICE REQUIRED [= YES	0	0	0	0

Summary of Cost & Data

Variable	Definition	Modification 88-1	Cumulative	Modification 88-2	Cumulative changes
		\$0/T RDF plus	Changes	\$30.31/t RDF cost	(2:RDF cost equal
		\$2/T delivery	(1: \$0 +\$2/T RDF cost:	(same \$/btu as coal)	to coal) \$/btu)
UNITS		RDF CONVENTIONAL	RDF CONVENTIONAL	RDF CONVENTIONAL	RDF CONVENTIONAL
		CONFIRING FUEL	CONFIRING FUEL	CONFIRING FUEL	CONFIRING FUEL
ELECTRIC POWER COST FOR TD SYSTEM, AVERAGE	\$/HR	\$1.76	\$1.60	\$1.76	\$1.60
ELECTRIC POWER COST FOR TD SYSTEM, AVERAGE	\$/HR	\$3.55	\$3.13	\$3.55	\$3.13
MISC ELECTRIC POWER COSTS, AVERAGE	\$/HR	\$6.92	\$6.88	\$6.92	\$6.88
SOLID RESIDUE GENERATED, MAX HOURLY AT MCR	LB/HR	1170	1257	1170	1257
ANNUAL LABOR COST, BURDENED	\$/YR	\$314056	\$226777	\$314056	\$226777
OPERATORS PER SHIFT	MAN/SHIFT	2.15	2.15	2.15	2.15
CONVENTIONAL FUEL COST, AVERAGE	\$/HR	\$76	\$75	\$76	\$75
RDF FUEL COST, AVERAGE	\$/HR	\$4	\$4	\$45	\$45
ASH DISPOSAL COST, AVERAGE	\$/HR	\$0.00	\$0.00	\$0.00	\$0.00
OPERATING HRS/YR IN CONFIRMED STEAM SUPPLY RANGE	HOURS	4717	6290	4717	6290
INCREMENTAL MAINTENANCE COST, ANNUAL	\$/YR	\$78806	\$49333	\$78806	\$49333
AVAILABILITY, FRACTION	NONE	0.72	0.72	0.72	0.72
ANNUAL STEAM PRODUCTION, NET	BTU	2.39E+11	3.20E+11	2.39E+11	3.20E+11
RELATIVE ELECTRIC POWER ANNUAL COST	\$/YR	\$57711	\$73041	\$57711	\$73041
ANNUAL CONVENTIONAL FUEL COST	\$/YR	357931	473769	357931	473769
ANNUAL RDF FUEL COST	\$/YR	\$20354	\$28941	\$308460	\$408288
ANNUAL ASH DISPOSAL COST	\$/YR	\$0	\$0	\$0	\$0
ANNUAL MSH DISPOSAL COST	\$/YR	\$0	\$0	\$0	\$0
FURNACE COLD (WORKING CO & SMOKE) IF = 1	NONE	0	0	0	0
NEW MSH EMISSIONS RATE W/ NEW CONTROL DEVICE	LB/MHBTU	4.69	4.69	4.69	4.69
INCLUDED IN CAPITAL COST					
BASE CAPITAL COST OF STORAGE SUBSYSTEM	\$	\$543797	\$106769	\$543797	\$106769

Summary of Out & data		Modification #8-1		Cumulative		Modification #8-2		Cumulative changes	
variable		\$0/T RDF plus	Changes	(\$0 +\$2/T RDF cost)	\$0.31/t RDF cost	(2:RDF cost equal to coal \$/btu)			
definition					(same \$/btu as coal)				
	UNITS	RDF CONVENTIONAL	RDF CONVENTIONAL	RDF CONVENTIONAL	RDF CONVENTIONAL	RDF CONVENTIONAL	RDF CONVENTIONAL	RDF CONVENTIONAL	RDF CONVENTIONAL
		COF:RING FUEL	COF:RING FUEL	COF:RING FUEL	COF:RING FUEL	COF:RING FUEL	COF:RING FUEL	COF:RING FUEL	COF:RING FUEL
BARE CAPITAL COST OF LONG MECHANICAL CONVEYOR	\$	\$0	NA	\$0	NA	\$0	NA	\$0	NA
BARE CAPITAL COST OF SHORT MECHANICAL CONVEYOR	\$	\$0	NA	\$0	NA	\$0	NA	\$0	NA
BARE CAPITAL COST OF RDF DELIVERY SYSTEM	\$	\$400731	NA	\$95391	NA	\$400731	NA	\$95391	NA
BARE INCREMENTAL COST OF ASH HANDLING SYSTEM*	\$	\$26074	NA	\$272138	NA	\$26074	NA	\$272138	NA
BARE INCREMENTAL CAPITAL COSTS FOR EMISSIONS CONTROL	\$	\$0	NA	\$0	NA	\$0	NA	\$0	NA
BARE INCREMENTAL COST FOR BOILER MODIFICATIONS	\$	\$327251	NA	\$338165	NA	\$327251	NA	\$338165	NA
BARE TOTAL INCREMENTAL CAPITAL COSTS	\$	\$1297854	NA	\$812464	NA	\$1297854	NA	\$812464	NA
BURDENED TOTAL INCREMENTAL CAPITAL COSTS	\$	\$1713167	NA	\$1072452	NA	\$1713167	NA	\$1072452	NA
CAPITAL RECOVERY FACTOR	NONE	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
ANNUALIZED COST OF CAPITAL	\$/YR	\$218429	NA	\$136738	NA	\$218429	NA	\$136738	NA
TOTAL ANNUAL O&M COST	\$/YR	\$828856	\$951482	\$937140	\$1196348	\$1116962	\$951482	\$1318486	\$1196349
TOTAL ANNUAL COST INCLUDING COST OF CAPITAL	\$/YR	\$1047285	\$951482	\$1073877	\$1196348	\$1335391	\$951482	\$1455224	\$1196349
TOTAL COST PER MILLION BTU OF STEAM	\$/MMBTU	\$4.38	\$3.02	\$3.36	\$2.83	\$5.58	\$3.02	\$4.55	\$2.83
STR (SAVINGS/INVESTMENT) AT EQUAL ANNUAL STEAM PRODUCTION	NONE	-0.49	NA	-0.22	NA	-1.81	NA	-3.01	NA
TOTAL O&M COST PER MILLION BTU OF STEAM	\$/MMBTU	\$3.47	\$3.02	\$2.93	\$2.83	\$4.67	\$3.02	\$4.12	\$2.83
O&M COSTS FOR PULVERIZER IF NOT RDF BUT COAL USED AS RDF	\$/YR	\$0.00	NA	\$0.00	NA	\$0.00	NA	\$0.00	NA
TONS PER YEAR RDF REQUIRED	TPY	10177	NA	13470	NA	10177	NA	13470	NA
					800				800

000

Summary of Out & data

variable definition	UNITS	Modification 12		Modification 12	
		Puget Sound		Puget Sound	
		W/Stack Temperature		W/Boiler exit temp.	
		ROF	CONVENTIONAL	ROF	CONVENTIONAL
		CONFIRMS	FUEL	CONFIRMS	FUEL
ENTHALPY TRANSFERRED TO STEAM, AVG HOURLY, 100% AVAILABILITY	BTU/H	6.87E+07	6.87E+07	6.82E+07	6.82E+07
MCR, AVG MW FOR OPTIMED CASE (HEATED AT HI VELOCITY)	BTU/H	1.53E+08	1.50E+08	1.42E+08	1.38E+08
MAXIMUM TURBIDITY STEAM ROTING, SEAM BTU/H	BTU/H	3.50E+07		3.20E+07	
BOILER EFFICIENCY AT MCR	NONE	0.84	0.87	0.77	0.8
BOILER EFFICIENCY AT AVERAGE OUTPUT	NONE	0.74	0.87	0.68	0.8
MAXIMUM STEAM DEMAND (MCD)	BTU/H	1.50E+08	1.50E+08	1.50E+08	1.50E+08
DEWITE	NONE	0		0	
TOTAL FUEL INPUT ENTHALPY, AVERAGE	BTU/H	9.24E+07	7.91E+07	9.59E+07	8.51E+07
ROF FLOWRATE, AVERAGE	TPH	2.93		3.17	
CONVENTIONAL FUEL INPUT ENTHALPY, AVERAGE	LB/H	5281	7531	5709	8107
SOLID RESIDUE GENERATED, AVERAGE	LB/H	1859	748	1949	805
CARBON CONTENT OF SOLID RESIDUE, MAX HOURLY AT MCR	NONE	0.49	0.3	0.47	0.3
FLYASH FRACTION OF SOLID RESIDUE, AVERAGE	NONE	2.46	0.37	2.26	0.37
FLYASH EMISSION ABSOLUTE AND EXISTING CONTROL DEVICE AT MCR	LB/H	3	0	3	0
EMISSION OF TSP, MAX HOURLY W/ EXISTING CTRL AT MCR	LB/HHSTU	0.02	0	0.02	0
UNCONTROLLED FLYASH EMISSION, MAX HOURLY AT MCR	LB/HHSTU	33.49	3.43	30.71	3.43
COMBUSTION AIR RATE, AVERAGE	LB/H	87711	75044	94819	80778
COMBUSTION AIR VOLUMETRIC FLOWRATE, AVERAGE	ACFM	19491	16676	21071	17951
WET FLE GAS RATE, AVERAGE	LB/H	97001	81827	104284	88080
WET FLE GAS VOLUMETRIC FLOW, AVERAGE	ACFM	10226	20415	17437	30981
EMISSION CTRL DEVICE ASSUMED EFFICIENCY (EXISTING DEVICE)	NONE	1	1	1	1
NEW EMISSION CONTROL DEVICE REQUIRED 1= YES	NONE	0	0	0	0

c:\navy\7\cherry

Summary of Out & data

variable definition	UNITS	Modification 12		Modification 12	
		Puget Sound		Puget Sound	
		W/Stack Temperature		W/Boiler exit temp.	
		ROF	CONVENTIONAL	ROF	CONVENTIONAL
		CONFIRMING	FUEL	CONFIRMING	FUEL
ELECTRIC POWER COST FOR FD SYSTEM, AVERAGE	\$/HR	\$1.04	\$0.89	\$1.12	\$0.95
ELECTRIC POWER COST FOR ID SYSTEM, AVERAGE	\$/HR	\$1.39	\$0.00	\$1.63	\$0.00
MISC ELECTRIC POWER COSTS, AVERAGE	\$/HR	\$3.82	\$0.00	\$4.08	\$0.00
SOLID RESIDUE GENERATED, MAX HOURLY AT MCR	LB/HR	2520	1635	2520	1635
ANNUAL LABOR COST, BURDENED	\$/YR	\$478,870	\$345,788	\$457,072	\$330,048
OPERATORS PER SHIFT	MAN/SHIFT	3.22	2.33	3.08	2.22
CONVENTIONAL FUEL COST, AVERAGE	\$/HR	\$206	\$294	\$223	\$316
ROF FUEL COST, AVERAGE	\$/HR	\$6.00		\$6.00	
ASH DISPOSAL COST, AVERAGE	\$/HR	\$14.87	\$5.98	\$15.59	\$6.44
OPERATING HRS/YR IN DEFINED STEAM SUPPLY RANGE	HOURS	6290	8561	6290	8561
INCREMENTAL MAINTENANCE COST, ANNUAL	\$/YR	\$40,580		\$40,030	
AVAILABILITY, FRACTION	NONE	0.72	0.98	0.72	0.98
ANNUAL STEAM PRODUCTION, NET	BTU	4.320E+11	5.880E+11	4.290E+11	5.840E+11
RELATIVE ELECTRIC POWER ANNUAL COST	\$/YR	\$39,255	\$7,585	\$42,934	\$8,164
ANNUAL CONVENTIONAL FUEL COST	\$/YR	\$1,295,582	\$2,514,574	\$1,400,561	\$2,706,711
ANNUAL ROF FUEL COST	\$/YR	\$36,911		\$39,902	
ANNUAL ASH D/YR COST	\$/YR	\$93,548	\$51,234	\$98,056	\$55,149
ANNUAL MSW DISPOSAL COST	\$/YR	\$672,000		\$672,000	
FURNACE COLD (MAKING CO & SMOKE) IF = 1	NONE	0		0	
NEW MAX EMISSIONS RATE W/ NEW CONTROL DEVICE	LB/MMBTU	33.49		30.71	
INCLUDED IN CAPITAL COST					
BASE CAPITAL COST OF STORAGE SUBSYSTEM	\$	\$133,007		\$134,675	

program mods

Summary of Out & data

variable definition	Modification 12		Modification 12	
	UNITS	RF	RF	RF
		CONFIRING	CONFIRING	CONFIRING
		FUEL	FUEL	FUEL
BASE CAPITAL COST OF LONG MECHANICAL CONVEYOR	\$	90	90	90
BASE CAPITAL COST OF SHORT MECHANICAL CONVEYOR	\$	90	90	90
BASE CAPITAL COST OF ROF DELIVERY SYSTEM	\$	9116,724	9116,724	9116,724
BASE INCIDENTAL COST OF ASH HANDLING SYSTEM	\$	90	90	90
BASE INCIDENTAL CAPITAL COSTS FOR EMISSIONS CONTROL	\$	90	90	90
BASE INCIDENTAL COST FOR BOILER MODIFICATIONS	\$	9418,582	9418,582	9418,582
BASE TOTAL INCIDENTAL CAPITAL COSTS	\$	9668,313	9668,313	9668,313
BURDENED TOTAL INCIDENTAL CAPITAL COSTS	\$	9882,173	9882,173	9882,173
CAPITAL RECOVERY FACTOR	NONE	9.54	9.54	9.54
ANNUALIZED COST OF CAPITAL	\$/YR	90	90	90
TOTAL ANNUAL O&M COST	\$/YR	91,984,723	92,919,181	92,919,181
TOTAL ANNUAL COST INCLUDING COST OF CAPITAL	\$/YR	90	92,919,181	90
TOTAL COST PER MILLION BTU OF STEAM	\$/MMBTU	90	95	95
SIR (SAVINGS/INVESTMENT) AT EQUAL ANNUAL STEAM PRODUCTION	NONE	1.73	2.18	2.18
TOTAL O&M COST PER MILLION BTU OF STEAM	\$/MMBTU	94.60	94.97	94.85
O&M COSTS FOR PULVERIZER IF NOT ROF BUT COAL USED AS REF	\$/YR	90	90	90
TONS PER YEAR ROF REQUIRED	TPY	18,433	18,433	18,433
Avoided MSW disposal cost		9210,000	9210,000	9210,000
SIR with disposal credit		4	4	4

APPENDIX D

NCEL RDF COST MODEL: MULTIPLAN® FORMULA LISTINGS

RDFMDLIN

	1	2	3
1 1		"PORT HUENEME ALGORITHM. REVISED AND SIMPLIFIED 12 /01/84"	
2 2			"MODIFIED JANUARY 1 986"
3 3		"Facility:"	
4 4			
5 5		"SUMMER STEAM DEMANDS:"	
6 6			"AVERAGE HOURLY BTU INPUT IN THESE MAT RICES"
7 7			
8 8			"MON-FRI"
9 9			"SAT"
10 10			"SUN"
11 11		"WINTER STEAM DEMANDS:"	
12 12			"AVERAGE HOURLY BTU STEAM"
13 13			
14 14			"MON-FRI"
15 15			"SAT"
16 16			"SUN"
17 17		"SPRING AND FALL STEAM DE MANDS:"	
18 18			"AVERAGE HOURLY BTU "
19 19			
20 20			"MON-FRI"
21 21			"SAT"
22 22			"SUN"
23 23			
24 24		"CURRENT BOILER OPERATING CONDITIONS"	
25 25		"Boiler availability"	
26 26		"Excess air required at M CR"	
27 27		"Total heat release at MC R"	
28 28		"Fuel temperature at boil er boundary"	
29 29		"Radiation losses"	
30 30		"Carbon losses"	
31 31		"Air temperature at FD or airheater inlet"	
32 32		"Preheated combustion air temperature"	
33 33		"Ash temperature at boile r boundary"	
34 34		"Gas temperature at boile r/economizer exit"	
35 35		"Particulate emissions ra te"	

	1	2	3
36	36	"Applicable particulate emissions standard"	
37	37	"Ash handling system capacity"	
38	38	"CONVENTIONAL FUEL CHARACTERISTICS: AS RECEIVED"	
39	39	"Moisture"	
40	40	"Ash"	
41	41	"Hydrogen"	
42	42	"Higher heating value"	
43	43	"Specific heat"	
44	44	"RDF CHARACTERISTICS : AS RECEIVED"	
45	45	"Moisture"	
46	46	"Ash"	
47	47	"Hydrogen"	
48	48	"Moisture-ash-free heating value"	
49	49	"Bulk density"	
50	50	"Size (passes through screen opening)"	
51	51	"Cofire ratio"	"(based on heating value)"
52	52	"Days of storage desired"	
53	53	"Length of mechanical transfer conveyor"	
54	54	"Fuel temperature at boiler boundary"	
55	55	"ECONOMIC FACTORS"	
56	56	"Financial life of project"	
57	57	"Discount factor"	
58	58	"Cost of electricity"	
59	59	"Ash disposal cost"	
60	60	"Operator wage rate, unburdened"	
61	61	"Burdening rate (a multiplier)"	
62	62	"Annual quantity of MSW generated on base"	
63	63	"MSW disposal cost: tipping fee"	
64	64	"trans	
		portation"	
65	65	"Conventional fuel cost, delivered"	
66	66	"RDF cost, delivered"	
67	67	"IF THE FOLLOWING STATEMENTS ARE TRUE, ENTER 1 :"	
68	68		
69	69	"BOILER HAS SOOT BLOWERS FOR THE CONVECTIVE"	

	1	2	3
70	70	"BOILER HAS SOOT BLOWERS FOR THE ECONOMIZER"	
71	71	"BOILER HAS AN ECONOMIZER "	
72	72	"ECONOMIZER IF PRESENT IS BARE TUBE"	
73	73	"Boiler has a history of slagging"	
74	74	"ADEQUATE BACKUP CAPABILI TY EXISTS"	
75	75	"BOILER IS EQUIPPED WITH A BAGHOUSE"	
76	76	"BOILER IS EQUIPPED WITH AN ESP"	
77	77	"BOILER IS EQUIPPED WITH A VENTURI SCRUBBER"	
78	78	"BOILER HAS MULTICLONES O R CYCLONES"	
79	79	"BOILER WAS ORIGINALLY DE SIGNED FOR COAL"	
80	80	"BOILER HAS MOVING OR DUM PING GRATE"	
81	81	"BOILER HAS AN ASH HANDLI NG SYSTEM"	
82	82	"THE CF ASSUMED COFIRED I S OIL"	
83	83	"THE CF ASSUMED COFIRED I S COAL"	
84	84	"THE CF ASSUMED COFIRED I S GAS"	
85	85	"THE FURNACE IS PC OR CYC LONE TYPE"	
86	86	"The boiler has an ID fan "	
87	87	"ALTERNATIVE SOLID FUEL I S NOT RDF BUT COAL"	
88	88	"ALTERNATIVE SOLID FUEL I S RDF-3"	
89	89	"ALTERNATIVE SOLID FUEL I S RDF-5 (d-RDF)"	
90	90		
91	91		
92	92		
93	93	"ADDITIONAL INPUT REGARDI NG ORIGINAL BOILER DESIGN FOLLOWS:"	
94	94		
95	95	"FRACTIONAL MOISTURE OF A S RCVD DESIGN CF"	
96	96	"FRACTIONAL ASH CONTENT O F AS RCVD DCF"	
97	97	"FRACTIONAL EXCESS AIR RE QD FOR DCF AT MCR"	

	1	2	3
98	98	"TOTAL FUEL VALUE TO BOILER AT MCR"	
99	99	" NAMEPLATE WITH DCF"	
100	100	"HIGHER HEATING VALUE OF DCF"	
101	101	"FRACTION OF HHVCFD LOST DUE TO CARBON LOSS"	
102	102	"DESIGN FUEL SPECIFIC HEAT"	
103	103	"TEMPERATURE OF DCF AT BOILER BOUNDARY"	
104	104	"HYDROGEN MASS FRACTION OF AS-RCVD CFD"	
105	105	"RADIATION LOSSES AS A FRACTION OF DTOTHHVCF"	
106	106		
107	107		
108	108		
109	109		
110	110		
111	111		
112	112		
113	113		
114	114	"IF THE ALTERNATIVE SOLID FUEL BEING FIRED IS WOOD (HOG FUEL OR"	
115	115	"WHOLE TREE CHIPS) THE RDF EXPRESSIONS ARE REASONABLE. SIMPLY"	
116	116	"SUBSTITUTE THE WOOD MOISTURE, ASH, PARTICLE SIZE, AND BULK"	
117	117	"DENSITY INTO THE RDF VARIABLES. HOWEVER, IF THE ASH BEING FIRED"	
118	118	"IS COAL, SUBSTITUTE THE COAL HHV FOR RDF HHV (HHV RDF), AND "	
119	119	"ALSO ENTER OTHER SOLIDS CHARACTERISTICS APPROPRIATELY."	

	4	5	6
1			
2			
3			
4	"INPUTS(LINES 3 TO 105):"		
5			
6			
7	"SHIFT 1"	"SHIFT 2"	
8	50000000	45000000	
9	40000000	40000000	
10	40000000	40000000	
11			
12			
13	"SHIFT 1"	"SHIFT 2"	
14	150000000	140000000	
15	130000000	130000000	
16	130000000	130000000	
17			
18			
19	"SHIFT 1"	"SHIFT 2"	
20	100000000	92500000	
21	85000000	85000000	
22	85000000	85000000	
23			
24		"INPUT IN THIS COLUMN"	
25		0.98	
26		0.3	
27		172840000	
28		70	
29		0.0041	
30		0.0405	
31		70	
32		70	
33		450	
34		340	
35		0.02	

	4	5	6
36			0.11
37			15
38			
39			0.12
40			0.07
41			0.04
42			10500
43			0.3
44			
45			0.2
46			0.1
47			0.07
48			9000
49			35
50			1.5
51			0.4
52			1
53			0
54			70
55			
56			25
57			9.54
58			0.0227
59			16
60			13.68
61			1.305
62			42000
63			10
64			6
65			78
66			2
67			
68			1
69			

	4	5	6
70			1
71			1
72			1
73			0
74			1
75			1
76			0
77			1
78			0
79			1
80			1
81			1
82			0
83			1
84			0
85			0
86			1
87			0
88			0
89			1
90			
91			
92			
93			
94			
95			0.1548
96			0.0913
97			0.3

	4	5	6
98			
99			172840000
100			10290
101			0.0405
102			0.3
103			80
104			0.0405
105			0.0041
106			
107			
108			
109			
110			
111			
112			
113			
114			
115			
116			
117			
118			
119			

	7	8	9
1			R99C6
2			R100C6
3			R95C6
4			R96C6
5			R97C6
6			R101C6
7	"SHIFT 3"		R102C6
8	45000000		R103C6
9	40000000		R104C6
10	40000000		R105C6
11			R27C6
12			+R42C6
13	"SHIFT 3"		+R39C6
14	135000000		+R40C6
15	130000000		+R26C6
16	130000000		+R30C6
17			+R43C6
18			+R28C6
19	"SHIFT 3"		+R41C6
20	90000000		+R29C6
21	85000000		+R51C6
22	85000000		+R47C6
23			+R45C6
24			+R46C6
25	"Fraction"		+R50C6
26	"Fraction"		+R49C6
27	"Btu/hr"		+R66C6
28	"Deg F"		+R54C6
29	"Fraction"		+R34C6
30	"Fraction"		+R31C6
31	"Deg F"		+R32C6
32	"Deg F"		+R33C6
33	"Deg F"		+R58C6
34	"Deg F"		+R65C6/2000
35	"lb/mmBtu"		+R59C6

	7	8	9
36	"lb/mmBtu"		+R52C6
37	"TPH"		+R53C6
38			+R56C6
39	"Fraction"		+R57C6
40	"Fraction"		+R60C6
41	"Fraction"		+R25C6
42	"Btu/lb"		+R36C6
43	"Btu/lb/deg F"		R62C6
44			+R61C6
45	"Fraction"		+R63C6
46	"Fraction"		+R48C6
47	"Fraction"		R69C6
48	"Btu/lb"		R70C6
49	"lb/cf"		R71C6
50	"Inches"		R72C6
51	"Fraction"		R73C6
52	"days"		R74C6
53	"Miles"		R75C6
54	"Deg F"		R76C6
55			R77C6
56	"Years"		R78C6
57			R79C6
58	"\$/kWh"		R80C6
59	"\$/ton"		R81C6
60	"\$/hr"		R82C6
61			R83C6
62	"Tons/yr"		R84C6
63	"\$/ton"		R85C6
64	"\$/ton"		R86C6
65	"\$/ton"	0.039*2000	R87C6
66	"\$/ton"		R88C6
67			R89C6
68			R90C6
69			R8C5

	7	8	9
70			R8C6
71			R8C7
72			R9C5
73			R9C6
74			R9C7
75			R10C5
76			R10C6
77			R10C7
78			R14C5
79			R14C6
80			R14C7
81			R15C5
82			R15C6
83			R15C7
84			R16C5
85			R16C6
86			R16C7
87			R20C5
88			R20C6
89			R20C7
90			R21C5
91			R21C6
92			R21C7
93			R22C5
94			R22C6
95	"Fraction"		R22C7
96	"Fraction"		R37C6*2000
97	"Fraction"		+R35C6

	7	8	9
98			+R64C6
99	"BTUH"		
100	"BTU/LB"		
101	"Fraction"		
102	"BTU/LB/DEG F"		
103	"DEG F"		
104	"Fraction"		
105	"Fraction"		
106			
107			
108			
109			
110			
111			
112			
113			
114			
115			
116			
117			
118			
119			

10
1 "DTOTHHVCF"

2 "HHVCFD"

3 "MCFD"
4 "ACFD"

5 "EACFD"
6 "XCLOSD"

7 "CPCFD"
8 "TCFD"
9 "XHCFD"
10 "LOSRADD"
11 "TOTHHVCF"
12 "HHVCF"

13 "MCF"
14 "ACF"
15 "EACF"
16 "XCLOS"
17 "CPCF"

18 "TCF"

19 "XHCF"
20 "LOSRAD"
21 "X"
22 "XHRDF"
23 "MRDF"
24 "ARDF"

25 "DP"
26 "RHDRDF"

27 "RDFCST"

28 "TRDF"

29 "TSTK"
30 "TAIR"
31 "TCAPH"

32 "TASH"

33 "ELCOST"

34 "CFCOST"

35 "DISPCOST"

10
36 "STORTIME"

37 "MILES"

38 "LIFE"

39 "INTEREST"

40 "WAGE"

41 "AVAILCF"

42 "TSPSTD"

43 "MSWPROD"

44 "WGBURDON"

45 "DISPMSW"

46 "MAF HHV"

47

48

49

50

51

52

53

54

55

56

57

58

59

60

61

62

63

64

65

66

67

68

69

70

71

72

73

74

75

76

77

78

79

80

81

82

83

84

85

86

87

88

89

90

91

92

93

94

95

96 "ash capacity"

97 "emissions"

10
98 "transport"

99

100

101

102

103

104

105

106

107

108

109

110

111

112

113

114

115

116

117

118

119

WORK 1

	1	2	3
1	[rddfmdlin xferdata]	R24C2*(1-R3C1-R4C1)	R53C2*R26C3
2	[rddfmdlin xferdata]	R24C2*R4C1	R54C2*R26C3
3	[rddfmdlin xferdata]	R24C2*R3C1	R55C2*R26C3
4	[rddfmdlin xferdata]	R26C2	R56C2*R26C3
5	[rddfmdlin xferdata]	SUM(R1:4C2)	R57C2*R26C3
6	[rddfmdlin xferdata]	R1C2*R7C1*(R8C1-32)	SUM(R1:5C3)
7	[rddfmdlin xferdata]	R1C1	R59C2*R26C3
8	[rddfmdlin xferdata]	R24C2*R3C1*(R8C1-32)	R60C2*R26C3
9	[rddfmdlin xferdata]	R4C2*0.24*(R30C1-32)	R61C2*R26C3
10	[rddfmdlin xferdata]	SUM(R6:9C2)	R62C2*R26C3
11	[rddfmdlin xferdata]	R2C2	R63C2*R26C3
12	[rddfmdlin xferdata]	R5C2-R11C2-R13C2-R14C2	R64C2*R26C3
13	[rddfmdlin xferdata]	R24C2*(R3C1+(R9C1*9))	SUM(R7:12C3)
14	[rddfmdlin xferdata]	IF(R6C1=0, R103C1*R1C1/14500, R6C1*R1C1/14500)	R66C2*R26C3
15	[rddfmdlin xferdata]	SUM(R11:14C2)	R6C3-R14C3-R16C3-R17C3
16	[rddfmdlin xferdata]	R11C2*0.2*(R32C1-32)	R68C2*R26C3
17	[rddfmdlin xferdata]	R12C2*0.25*(R29C1-32)	((1-R21C1)*R11C1*R25C3*R28C3/R113C2+R21C1*R11C1*R25C3*R29C3/R113C2)/14500
18	[rddfmdlin xferdata]	R13C2*(1128+(0.455*(R29C1-160)))	SUM(R14:17C3)
19	[rddfmdlin xferdata]	R14C2*14500	R71C2*R26C3
20	[rddfmdlin xferdata]	(R10C1+0.016)*R1C1	R15C3*0.25*(R29C1-32)
21	[rddfmdlin xferdata]	SUM(R16:20C2)	R73C2*R26C3
22	[rddfmdlin xferdata]	R10C2-R21C2	R17C3*14500
23	[rddfmdlin xferdata]	R22C2/R7C2	R75C2*R26C3
24	[rddfmdlin xferdata]	R1C1/R2C1	SUM(R19:23C3)
25	[rddfmdlin xferdata]	R12C2/1.2792+R13C2/0.78	1.105*R25C2
26	[rddfmdlin xferdata]	0.00073*R1C1*(1+R5C1)	R25C3/R113C2
27	[rddfmdlin xferdata]	R50C2*(1-R13C1-R14C1)	((R1C1-(R25C3/R113C2)*R11C1)/R1C1)*100
28	[rddfmdlin xferdata]	R50C2*R14C1	IF(AND(R63C1=0, R56C1=0), 0.02*(1.105)^2, 0)
29	[rddfmdlin xferdata]	R50C2*R13C1	IF(R27C3)=0, ((R25C1/0.75)^0.41*0.05+(R27C3/20)^2.58*0.01)*(1.105)^2, ((R25C1/0.75)^0.41*0.05)*(1.105)^2
30	[rddfmdlin xferdata]	R52C2	R13C3-R24C3

	1	2	3
31 [rdfmdlin xferdata]	SUM(R27:30C2)	R30C3/(R8C3+R10C3)	
32 [rdfmdlin xferdata]	R27C2*R17C1*(R18C1-32)	R53C2*R57C3	
33 [rdfmdlin xferdata]	R11C1	R54C2*R57C3	
34 [rdfmdlin xferdata]	R50C2*R13C1*(R18C1-32)	R55C2*R57C3	
35 [rdfmdlin xferdata]	R30C2*0.24*(R30C1-32)	R56C2*R57C3	
36 [rdfmdlin xferdata]	SUM(R32:35C2)	R57C2*R57C3	
37 [rdfmdlin xferdata]	R28C2	SUM(R32:36C3)	
38 [rdfmdlin xferdata]	R31C2-R37C2-R39C2-R40C2	R59C2*R57C3	
39 [rdfmdlin xferdata]	R50C2*(R13C1+(R19C1*9))	R60C2*R57C3	
40 [rdfmdlin xferdata]	IF(R16C1=0,R103C1*R11C1/14500,R16C1*R1C1/14500)	R61C2*R57C3	
41 [rdfmdlin xferdata]	SUM(R37:40C2)	R62C2*R57C3	
42 [rdfmdlin xferdata]	R37C2*0.2*(R32C1-32)	R63C2*R57C3	
43 [rdfmdlin xferdata]	R38C2*0.25*(R29C1-32)	R64C2*R57C3	
44 [rdfmdlin xferdata]	R39C2*(1128+(0.455*(R29C1-160)))	SUM(R38:43C3)	
45 [rdfmdlin xferdata]	R40C2*14500	R66C2*R57C3	
46 [rdfmdlin xferdata]	(R20C1+0.016)*R11C1	R37C3-R45C3-R47C3-R48C3	
47 [rdfmdlin xferdata]	SUM(R42:46C2)	R68C2*R57C3	
48 [rdfmdlin xferdata]	R36C2-R47C2	(R57C3*(1-R21C1)*R1C1*R58C3+R57C3*R21C1*R11C1*R59C3)/14500	
49 [rdfmdlin xferdata]	R48C2/R33C2	SUM(R45:48C3)	
50 [rdfmdlin xferdata]	R11C1/R12C1	R71C2*R57C3	
51 [rdfmdlin xferdata]	R38C2/1.2792+R39C2/0.78	R46C3*0.25*(R29C1-32)	
52 [rdfmdlin xferdata]	0.00073*R11C1*(1+R15C1)	R73C2*R57C3	
53 [rdfmdlin xferdata]	R78C2*(1-R13C1-R14C1)	R48C3*14500	
54 [rdfmdlin xferdata]	R77C2*(1-R23C1-R24C1)	R75C2*R57C3	
55 [rdfmdlin xferdata]	R78C2*R14C1+R77C2*R24C1	SUM(R50:54C3)	
56 [rdfmdlin xferdata]	R78C2*R13C1+R77C2*R23C1	R113C2*R57C3	
57 [rdfmdlin xferdata]	R11C1*R21C1*0.00073*(1+R80C2)+R11C1*(1-R21C1)*0.00073*(1+R15C1)	IF(R67C1=1,0.25,0.6)*R1C1/R11C1	
58 [rdfmdlin xferdata]	SUM(R53:57C2)	R103C1	

	1	2	3
59 [ndfmdlin xferdata]	R53C2*R17C1*(R18C1-32)	(R25C1/0.75)^0.41*0.05+(2)^2.58*0.01	
60 [ndfmdlin xferdata]	(1-R21C1)*R11C1	R44C3-R55C3	
61 [ndfmdlin xferdata]	R54C2*0.6*(R28C1-32)	R60C3/(R39C3+R41C3)	
62 [ndfmdlin xferdata]	R21C1*R11C1	(IF (AND (R69C1<=R30C3, R69C1)=R60C3), R69C1, 0)+IF (R69C1) R30C3, R30C3, 0))	
63 [ndfmdlin xferdata]	R78C2*R13C1*(R18C1-32)+R77C2*R23C1*(R28C1-32)	(IF (AND (R70C1<=R30C3, R70C1)=R60C3), R70C1, 0)+IF (R70C1) R30C3, R30C3, 0))	
64 [ndfmdlin xferdata]	R57C2*0.24*(R30C1-32)	(IF (AND (R71C1<=R30C3, R71C1)=R60C3), R71C1, 0)+IF (R71C1) R30C3, R30C3, 0))	
65 [ndfmdlin xferdata]	SUM(R59:64C2)	(IF (AND (R72C1<=R30C3, R72C1)=R60C3), R72C1, 0)+IF (R72C1) R30C3, R30C3, 0))	
66 [ndfmdlin xferdata]	R55C2	(IF (AND (R73C1<=R30C3, R73C1)=R60C3), R73C1, 0)+IF (R73C1) R30C3, R30C3, 0))	
67 [ndfmdlin xferdata]	R58C2-R66C2-R68C2-R69C2	(IF (AND (R74C1<=R30C3, R74C1)=R60C3), R74C1, 0)+IF (R74C1) R30C3, R30C3, 0))	
68 [ndfmdlin xferdata]	9*((R19C1*R78C2)+R22C1*R77C2*(1-R23C1-R24C1))+R23C1*R77C2+R13C1*R78C2	(IF (AND (R75C1<=R30C3, R75C1)=R60C3), R75C1, 0)+IF (R75C1) R30C3, R30C3, 0))	
69 [ndfmdlin xferdata]	(1-R21C1)*R40C2+0.05*R62C2/14500	(IF (AND (R76C1<=R30C3, R76C1)=R60C3), R76C1, 0)+IF (R76C1) R30C3, R30C3, 0))	
70 [ndfmdlin xferdata]	SUM(R66:69C2)	(IF (AND (R77C1<=R30C3, R77C1)=R60C3), R77C1, 0)+IF (R77C1) R30C3, R30C3, 0))	
71 [ndfmdlin xferdata]	R66C2*0.2*(R32C1-32)	(IF (AND (R78C1<=R30C3, R78C1)=R60C3), R78C1, 0)+IF (R78C1) R30C3, R30C3, 0))	
72 [ndfmdlin xferdata]	R67C2*0.25*(R29C1-32)	(IF (AND (R79C1<=R30C3, R79C1)=R60C3), R79C1, 0)+IF (R79C1) R30C3, R30C3, 0))	
73 [ndfmdlin xferdata]	R68C2*(1128+(0.455*(R29C1-160)))	(IF (AND (R80C1<=R30C3, R80C1)=R60C3), R80C1, 0)+IF (R80C1) R30C3, R30C3, 0))	

	1	2	3
74 [rddfmdlin xferdata]	R69C2*14500		(IF (AND (R81C1 (=R30C3, R81C1)=R60C3), R81C1, 0)+IF (R81C1) R30C3, R30C3, 0))
75 [rddfmdlin xferdata]	(R20C1+0.016)*R11C1		(IF (AND (R82C1 (=R30C3, R82C1)=R60C3), R82C1, 0)+IF (R82C1) R30C3, R30C3, 0))
76 [rddfmdlin xferdata]	SUM(R71:75C2)		(IF (AND (R83C1 (=R30C3, R83C1)=R60C3), R83C1, 0)+IF (R83C1) R30C3, R30C3, 0))
77 [rddfmdlin xferdata]	R21C1*R11C1/R79C2		(IF (AND (R84C1 (=R30C3, R84C1)=R60C3), R84C1, 0)+IF (R84C1) R30C3, R30C3, 0))
78 [rddfmdlin xferdata]	(1-R21C1)*R11C1/R12C1		(IF (AND (R85C1 (=R30C3, R85C1)=R60C3), R85C1, 0)+IF (R85C1) R30C3, R30C3, 0))
79 [rddfmdlin xferdata]	R46C1*(1-R23C1-R24C1)		(IF (AND (R86C1 (=R30C3, R86C1)=R60C3), R86C1, 0)+IF (R86C1) R30C3, R30C3, 0))
80 [rddfmdlin xferdata]	IF (R67C1=1, R15C1, (R15C1+R23C1+0.5*R24C1-R13C1-0.5*R14C1+(R25C1/0.75)^0.67*0.05))		(IF (AND (R87C1 (=R30C3, R87C1)=R60C3), R87C1, 0)+IF (R87C1) R30C3, R30C3, 0))
81 [rddfmdlin xferdata]	R65C2-R76C2		(IF (AND (R88C1 (=R30C3, R88C1)=R60C3), R88C1, 0)+IF (R88C1) R30C3, R30C3, 0))
82 [rddfmdlin xferdata]	R81C2/R11C1		(IF (AND (R89C1 (=R30C3, R89C1)=R60C3), R89C1, 0)+IF (R89C1) R30C3, R30C3, 0))
83 [rddfmdlin xferdata]	R67C2/1.2792+R68C2/0.78		(IF (AND (R90C1 (=R30C3, R90C1)=R60C3), R90C1, 0)+IF (R90C1) R30C3, R30C3, 0))
84 [rddfmdlin xferdata]	((R1C1-R11C1)/R1C1)*100		(IF (AND (R91C1 (=R30C3, R91C1)=R60C3), R91C1, 0)+IF (R91C1) R30C3, R30C3, 0))
85 [rddfmdlin xferdata]	R107C1		(IF (AND (R92C1 (=R30C3, R92C1)=R60C3), R92C1, 0)+IF (R92C1) R30C3, R30C3, 0))
86 [rddfmdlin xferdata]	R112C1		(IF (AND (R93C1 (=R30C3, R93C1)=R60C3), R93C1, 0)+IF (R93C1) R30C3, R30C3, 0))

1	2	3
87 [rdfmdlin xferdata] R53C2		(IF (AND (R94C1 <=R30C3, R94C1)=R60C3), R94C1, 0)+IF (R94C1) R30C3, R30C3, 0))
88 [rdfmdlin xferdata] R54C2		(IF (AND (R95C1 <=R30C3, R95C1)=R60C3), R95C1, 0)+IF (R95C1) R30C3, R30C3, 0))
89 [rdfmdlin xferdata] R55C2		(520*SUM(R62:64C3, R71:73C3, R80:82C3))+ (104*SUM(R65:70C3, R74:79C3, R83:88C3)) R89C3/8760
90 [rdfmdlin xferdata] R56C2		SUM(R96:100C3)
91 [rdfmdlin xferdata] R57C2		IF (R91C3=0, 0, R89C3/R91C3)
92 [rdfmdlin xferdata] R58C2		
93 [rdfmdlin xferdata] R59C2		
94 [rdfmdlin xferdata] R60C2		
95 [rdfmdlin xferdata] R61C2		
96 [rdfmdlin xferdata] R62C2		(IF (R62C3) 0, 520, 0)) +(IF (R63C3) 0, 520, 0)) +(IF (R64C3) 0, 520, 0)) +(IF (R65C3) 0, 104, 0)) +(IF (R66C3) 0, 104, 0)) +(IF (R67C3) 0, 104, 0))
97 [rdfmdlin xferdata] R63C2		(IF (R68C3) 0, 104, 0)) +(IF (R69C3) 0, 104, 0)) +(IF (R70C3) 0, 104, 0)) +(IF (R71C3) 0, 520, 0)) +(IF (R72C3) 0, 520, 0)) +(IF (R73C3) 0, 520, 0))
98 [rdfmdlin xferdata] R64C2		(IF (R74C3) 0, 104, 0)) +(IF (R75C3) 0, 104, 0)) +(IF (R76C3) 0, 104, 0)) +(IF (R77C3) 0, 104, 0)) +(IF (R78C3) 0, 104, 0)) +(IF (R79C3) 0, 104, 0))
99 R65C2		(IF (R80C3) 0, 1040, 0)) +(IF (R81C3) 0, 1040, 0)) +(IF (R82C3) 0, 1040, 0)) +(IF (R83C3) 0, 208, 0)) +(IF (R84C3) 0, 208, 0)) +(IF (R85C3) 0, 208, 0))
100 IF (AND (R63C1=1, R56C1=1), 0.02, 0)	R66C2	(IF (R86C3) 0, 208, 0)) +(IF (R87C3) 0, 208, 0)) +(IF (R88C3) 0, 208, 0))
101 IF (AND (R63C1=0, R56C1=1), 0.03, 0)	R92C2-R100C2-R102C2-R103C2	R92C3/R30C4

	1	2	3
102	IF (AND (R61C1=1, R56C1=0), 0.04, 0)	R68C2	R92C3/R48C2
103	SUM (R100:102C1)	(R107C1*R94C2+R112C1*R96C2)/14500	
104	R83C2/R25C2	SUM (R100:103C2)	R25C4/R25C2
105	IF (R104C1) 1, (R104C1)^2, 1)	R71C2	IF (R104C3) 1, (R104C3)^2, 1)
106	IF (AND (R104C1) 1, R84C2 (0, R100C1=0.02), 2, 1)	R101C2*0.25*(R29C1-32)	IF (AND (R104C3) 1, R27C4 (0, R100C1=0.02), 2, 1)
107	R103C1*R105C1*R106C1	R73C2	R103C1*R105C3*R106C3
108	IF (AND (R104C1 (1, R84C2)=0), (R25C1/0.75)^0.41*0.05+(R84C2/20)^2.58*0.01, 0)	R103C2*14500	IF (AND (R104C3 (1, R27C4)=0), (R35C1/0.75)^0.41*0.05+(R27C4/20)^2.58*0.01, 0)
109	IF (AND (R104C1 (1, R84C2 (0), (R25C1/0.75)^0.41*0.05, 0)	R75C2	IF (AND (R104C3 (1, R27C4 (0), (R25C1/0.75)^0.41*0.05, 0)
110	IF (AND (R104C1) 1, R84C2)=0), ((R25C1/0.75)^0.41*0.05+(R84C2/20)^2.58*0.01)*(R104C1)^2, 0)	SUM (R105:109C2)	IF (AND (R104C3) 1, R27C4)=0), ((R25C1/0.75)^0.41*0.05+(R27C4/20)^2.58*0.01)*(R104C3)^2, 0)
111	IF (AND (R104C1) 1, R84C2 (0), (R25C1/0.75)^0.41*0.05*(R104C1)^2, 0)	R99C2-R110C2	IF (AND (R104C3) 1, R27C4 (0), (R25C1/0.75)^0.41*0.05*(R104C3)^2, 0)
112	SUM (R108:111C1)	R111C2/R11C1	SUM (R108:111C3)
113		R101C2/1.2792+R102C2/0.78	

4
 1 R53C2*R26C4
 2 R54C2*R26C4
 3 R55C2*R26C4
 4 R56C2*R26C4
 5 R57C2*R26C4
 6 SUM(R1:5C4)
 7 R59C2*R26C4
 8 R60C2*R26C4
 9 R61C2*R26C4
 10 R62C2*R26C4
 11 R63C2*R26C4
 12 R64C2*R26C4
 13 SUM(R7:12C4)
 14 R66C2*R26C4
 15 R6C4-R14C4-R16C4-R1
 7C4
 16 R68C2*R26C4
 17 (R10C4*R29C4+R8C4*R
 28C4)/14500
 18 SUM(R14:17C4)
 19 R71C2*R26C4
 20 R15C4*0.25*(R29C1-3
 2)
 21 R73C2*R26C4
 22 R17C4*14500
 23 R75C2*R26C4
 24 SUM(R19:23C4)
 25 R113C2*R26C4
 26 R92C3/R111C2
 27 ((R1C1-R11C1*R26C4)
 /R1C1)*100
 28 R107C3
 29 R112C3
 30 R13C4-R24C4

AD-A173 981

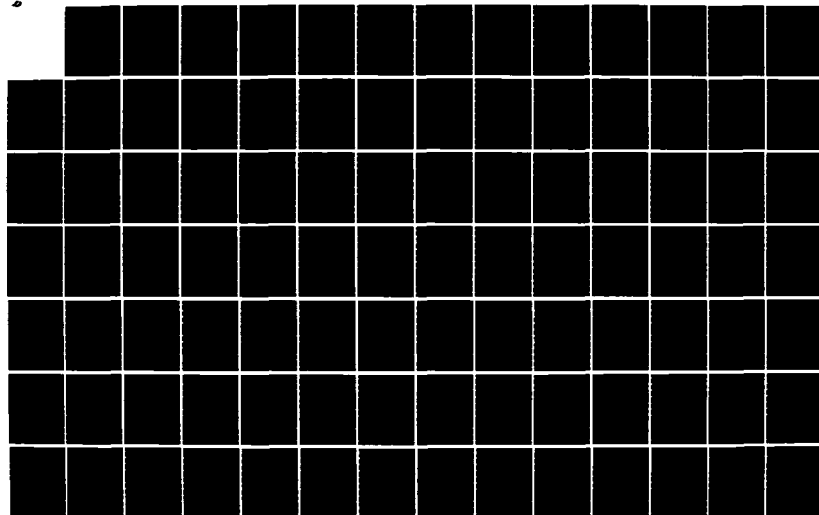
RDF (REFUSE-DERIVED FUEL) CO-FIRING COST/BENEFIT
ANALYSIS USING THE NCEL R. (U) SYSTECH CORP XENIA OH
H BELENCAN ET AL. AUG 86 NCEL-CR-86.012-VOL-2
N00123-83-D-0149

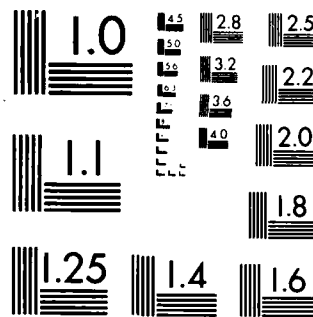
2/3

UNCLASSIFIED

F/G 21/4

NL





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963-A

4

31 R1C4**R101C3
 32 R2C4**R101C3

33 R3C4**R101C3
 34 R4C4**R101C3

35 R5C4**R101C3

36 R6C4**R101C3
 37 R7C4**R101C3
 38 R8C4**R101C3

39 R9C4**R101C3

40 R10C4**R101C3

41 R11C4**R101C3
 42 R12C4**R101C3

43 R13C4**R101C3

44 R14C4**R101C3

45 R15C4**R101C3
 46 R16C4**R101C3

47 R17C4**R101C3
 48 R18C4**R101C3

49 R19C4**R101C3
 50 R20C4**R101C3
 51 R21C4**R101C3

52 R22C4**R101C3

53 R23C4**R101C3

54 R24C4**R101C3

55 R25C4**R101C3

56 R43C4-R42C4+R35C4*0
 .24*R31C1

57 (R56C4-(1160*R46C4)
 +0.445*160*R46C4-R5
 2C4-R53C4)/(0.2*R44
 C4+0.25*R45C4+0.445
 *R46C4)

58 R43C4-R54C4

4

59 R58C4/(R38C4+R40C4)

60 R27C2*R102C3

61 R28C2*R102C3

62 R29C2*R102C3

63 R30C2*R102C3

64 R31C2*R102C3

65 R32C2*R102C3

66 R33C2*R102C3

67 R34C2*R102C3

68 R35C2*R102C3

69 R36C2*R102C3

70 R37C2*R102C3

71 R38C2*R102C3

72 R39C2*R102C3

73 R40C2*R102C3

4
74 R41C2*R102C3

75 R42C2*R102C3

76 R43C2*R102C3

77 R44C2*R102C3

78 R45C2*R102C3

79 R46C2*R102C3

80 R47C2*R102C3

81 R51C2*R102C3

82 R69C4-R80C4

83 R82C4/R66C4

84

85

86

87

88

89

90

91

92

93

94

95

96

97

98

99

100

101

102

103

104

105

106

107

108

109

110

111

112

113

WORK 2

1	2
1 [rdfmdlin xferdata]	[work1 xferdat2]
2 [rdfmdlin xferdata]	[work1 xferdat2]
3 [rdfmdlin xferdata]	[work1 xferdat2]
4 [rdfmdlin xferdata]	[work1 xferdat2]
5 [rdfmdlin xferdata]	[work1 xferdat2]
6 [rdfmdlin xferdata]	[work1 xferdat2]
7 [rdfmdlin xferdata]	[work1 xferdat2]
8 [rdfmdlin xferdata]	[work1 xferdat2]
9 [rdfmdlin xferdata]	[work1 xferdat2]
10 [rdfmdlin xferdata]	[work1 xferdat2]
11 [rdfmdlin xferdata]	[work1 xferdat2]
12 [rdfmdlin xferdata]	[work1 xferdat2]
13 [rdfmdlin xferdata]	[work1 xferdat2]
14 [rdfmdlin xferdata]	[work1 xferdat2]
15 [rdfmdlin xferdata]	[work1 xferdat2]
16 [rdfmdlin xferdata]	[work1 xferdat2]
17 [rdfmdlin xferdata]	[work1 xferdat2]
18 [rdfmdlin xferdata]	[work1 xferdat2]
19 [rdfmdlin xferdata]	[work1 xferdat2]
20 [rdfmdlin xferdata]	[work1 xferdat2]
21 [rdfmdlin xferdata]	[work1 xferdat2]
22 [rdfmdlin xferdata]	[work1 xferdat2]
23 [rdfmdlin xferdata]	[work1 xferdat2]
24 [rdfmdlin xferdata]	[work1 xferdat2]
25 [rdfmdlin xferdata]	[work1 xferdat2]
26 [rdfmdlin xferdata]	[work1 xferdat2]
27 [rdfmdlin xferdata]	[work1 xferdat2]
28 [rdfmdlin xferdata]	[work1 xferdat2]
29 [rdfmdlin xferdata]	[work1 xferdat2]
30 [rdfmdlin xferdata]	[work1 xferdat2]
31 [rdfmdlin xferdata]	[work1 xferdat2]
32 [rdfmdlin xferdata]	[work1 xferdat2]
33 [rdfmdlin xferdata]	[work1 xferdat2]
34 [rdfmdlin xferdata]	[work1 xferdat2]
35 [rdfmdlin xferdata]	[work1 xferdat2]

1	2
36 [rdfmdlin xferdata]	[work1 xferdat2]
37 [rdfmdlin xferdata]	[work1 xferdat2]
38 [rdfmdlin xferdata]	[work1 xferdat2]
39 [rdfmdlin xferdata]	[work1 xferdat2]
40 [rdfmdlin xferdata]	[work1 xferdat2]
41 [rdfmdlin xferdata]	[work1 xferdat2]
42 [rdfmdlin xferdata]	[work1 xferdat2]
43 [rdfmdlin xferdata]	[work1 xferdat2]
44 [rdfmdlin xferdata]	[work1 xferdat2]
45 [rdfmdlin xferdata]	[work1 xferdat2]
46 [rdfmdlin xferdata]	[work1 xferdat2]
47 [rdfmdlin xferdata]	[work1 xferdat2]
48 [rdfmdlin xferdata]	[work1 xferdat2]
49 [rdfmdlin xferdata]	[work1 xferdat2]
50 [rdfmdlin xferdata]	[work1 xferdat2]
51 [rdfmdlin xferdata]	[work1 xferdat2]
52 [rdfmdlin xferdata]	[work1 xferdat2]
53 [rdfmdlin xferdata]	[work1 xferdat2]
54 [rdfmdlin xferdata]	[work1 xferdat2]
55 [rdfmdlin xferdata]	[work1 xferdat2]
56 [rdfmdlin xferdata]	[work1 xferdat2]
57 [rdfmdlin xferdata]	[work1 xferdat2]
58 [rdfmdlin xferdata]	[work1 xferdat2]
59 [rdfmdlin xferdata]	[work1 xferdat2]
60 [rdfmdlin xferdata]	[work1 xferdat2]
61 [rdfmdlin xferdata]	[work1 xferdat2]
62 [rdfmdlin xferdata]	[work1 xferdat2]
63 [rdfmdlin xferdata]	[work1 xferdat2]
64 [rdfmdlin xferdata]	[work1 xferdat2]
65 [rdfmdlin xferdata]	[work1 xferdat2]
66 [rdfmdlin xferdata]	[work1 xferdat2]
67 [rdfmdlin xferdata]	[work1 xferdat2]
68 [rdfmdlin xferdata]	[work1 xferdat2]

	1	2
69	[rdfmdlin xferdata]	[work1 xferdat2]
70	[rdfmdlin xferdata]	[work1 xferdat2]
71	[rdfmdlin xferdata]	[work1 xferdat2]
72	[rdfmdlin xferdata]	[work1 xferdat2]
73	[rdfmdlin xferdata]	[work1 xferdat2]
74	[rdfmdlin xferdata]	[work1 xferdat2]
75	[rdfmdlin xferdata]	[work1 xferdat2]
76	[rdfmdlin xferdata]	[work1 xferdat2]
77	[rdfmdlin xferdata]	[work1 xferdat2]
78	[rdfmdlin xferdata]	[work1 xferdat2]
79	[rdfmdlin xferdata]	[work1 xferdat2]
80	[rdfmdlin xferdata]	[work1 xferdat2]
81	[rdfmdlin xferdata]	[work1 xferdat2]
82	[rdfmdlin xferdata]	[work1 xferdat2]
83	[rdfmdlin xferdata]	[work1 xferdat2]
84	[rdfmdlin xferdata]	[work1 xferdat2]
85	[rdfmdlin xferdata]	[work1 xferdat2]
86	[rdfmdlin xferdata]	[work1 xferdat2]
87	[rdfmdlin xferdata]	[work1 xferdat2]
88	[rdfmdlin xferdata]	[work1 xferdat2]
89	[rdfmdlin xferdata]	[work1 xferdat2]
90	[rdfmdlin xferdata]	[work1 xferdat2]
91	[rdfmdlin xferdata]	[work1 xferdat2]
92	[rdfmdlin xferdata]	[work1 xferdat2]
93	[rdfmdlin xferdata]	[work1 xferdat2]
94	[rdfmdlin xferdata]	[work1 xferdat2]
95	[rdfmdlin xferdata]	[work1 xferdat2]
96	[rdfmdlin xferdata]	[work1 xferdat2]
97	[rdfmdlin xferdata]	[work1 xferdat2]
98	[rdfmdlin xferdata]	[work1 xferdat2]
99		[work1 xferdat2]
100		[work1 xferdat2]
101		[work1 xferdat2]

	1	2
102		[work1 xferdat2]
103		[work1 xferdat2]
104		[work1 xferdat2]
105		[work1 xferdat2]
106		[work1 xferdat2]
107		[work1 xferdat2]

3	4
1 [work1 xferdat3]	[work1 xferdat4]
2 [work1 xferdat3]	[work1 xferdat4]
3 [work1 xferdat3]	[work1 xferdat4]
4 [work1 xferdat3]	[work1 xferdat4]
5 [work1 xferdat3]	[work1 xferdat4]
6 [work1 xferdat3]	[work1 xferdat4]
7 [work1 xferdat3]	[work1 xferdat4]
8 [work1 xferdat3]	[work1 xferdat4]
9 [work1 xferdat3]	[work1 xferdat4]
10 [work1 xferdat3]	[work1 xferdat4]
11 [work1 xferdat3]	[work1 xferdat4]
12 [work1 xferdat3]	[work1 xferdat4]
13 [work1 xferdat3]	[work1 xferdat4]
14 [work1 xferdat3]	[work1 xferdat4]
15 [work1 xferdat3]	[work1 xferdat4]
16 [work1 xferdat3]	[work1 xferdat4]
17 [work1 xferdat3]	[work1 xferdat4]
18 [work1 xferdat3]	[work1 xferdat4]
19 [work1 xferdat3]	[work1 xferdat4]
20 [work1 xferdat3]	[work1 xferdat4]
21 [work1 xferdat3]	[work1 xferdat4]
22 [work1 xferdat3]	[work1 xferdat4]
23 [work1 xferdat3]	[work1 xferdat4]
24 [work1 xferdat3]	[work1 xferdat4]
25 [work1 xferdat3]	[work1 xferdat4]
26 [work1 xferdat3]	[work1 xferdat4]
27 [work1 xferdat3]	[work1 xferdat4]
28 [work1 xferdat3]	[work1 xferdat4]
29 [work1 xferdat3]	[work1 xferdat4]
30 [work1 xferdat3]	[work1 xferdat4]
31 [work1 xferdat3]	[work1 xferdat4]
32 [work1 xferdat3]	[work1 xferdat4]
33 [work1 xferdat3]	[work1 xferdat4]
34 [work1 xferdat3]	[work1 xferdat4]
35 [work1 xferdat3]	[work1 xferdat4]

3	4
36 [work1 xferdat3]	[work1 xferdat4]
37 [work1 xferdat3]	[work1 xferdat4]
38 [work1 xferdat3]	[work1 xferdat4]
39 [work1 xferdat3]	[work1 xferdat4]
40 [work1 xferdat3]	[work1 xferdat4]
41 [work1 xferdat3]	[work1 xferdat4]
42 [work1 xferdat3]	[work1 xferdat4]
43 [work1 xferdat3]	[work1 xferdat4]
44 [work1 xferdat3]	[work1 xferdat4]
45 [work1 xferdat3]	[work1 xferdat4]
46 [work1 xferdat3]	[work1 xferdat4]
47 [work1 xferdat3]	[work1 xferdat4]
48 [work1 xferdat3]	[work1 xferdat4]
49 [work1 xferdat3]	[work1 xferdat4]
50 [work1 xferdat3]	[work1 xferdat4]
51 [work1 xferdat3]	[work1 xferdat4]
52 [work1 xferdat3]	[work1 xferdat4]
53 [work1 xferdat3]	[work1 xferdat4]
54 [work1 xferdat3]	[work1 xferdat4]
55 [work1 xferdat3]	[work1 xferdat4]
56 [work1 xferdat3]	[work1 xferdat4]
57 [work1 xferdat3]	[work1 xferdat4]
58 [work1 xferdat3]	[work1 xferdat4]
59 [work1 xferdat3]	[work1 xferdat4]
60 [work1 xferdat3]	[work1 xferdat4]
61 [work1 xferdat3]	[work1 xferdat4]
62 [work1 xferdat3]	[work1 xferdat4]
63 [work1 xferdat3]	[work1 xferdat4]
64 [work1 xferdat3]	[work1 xferdat4]
65 [work1 xferdat3]	[work1 xferdat4]
66 [work1 xferdat3]	[work1 xferdat4]
67 [work1 xferdat3]	[work1 xferdat4]
68 [work1 xferdat3]	[work1 xferdat4]

	3	4
69	[work1 xferdat3]	[work1 xferdat4]
70	[work1 xferdat3]	[work1 xferdat4]
71	[work1 xferdat3]	[work1 xferdat4]
72	[work1 xferdat3]	[work1 xferdat4]
73	[work1 xferdat3]	[work1 xferdat4]
74	[work1 xferdat3]	[work1 xferdat4]
75	[work1 xferdat3]	[work1 xferdat4]
76	[work1 xferdat3]	[work1 xferdat4]
77	[work1 xferdat3]	[work1 xferdat4]
78	[work1 xferdat3]	[work1 xferdat4]
79	[work1 xferdat3]	[work1 xferdat4]
80	[work1 xferdat3]	[work1 xferdat4]
81	[work1 xferdat3]	[work1 xferdat4]
82	[work1 xferdat3]	[work1 xferdat4]
83	[work1 xferdat3]	[work1 xferdat4]
84	[work1 xferdat3]	
85	[work1 xferdat3]	R26C4*R25C4/R25C2
86	[work1 xferdat3]	R52C2*R90C3/R48C2/R26C2
87	[work1 xferdat3]	
88	[work1 xferdat3]	
89	[work1 xferdat3]	
90	[work1 xferdat3]	
91	[work1 xferdat3]	
92	[work1 xferdat3]	
93		
94		
95		
96		MIN(R6C5,R2C5)
97		IF(AND(R60C1=1,R57C1=0),(
		R96C4/50000000)^0.263*162
		307,0)
98		IF(AND(R61C1=1,R63C1=1),(
		R96C4/150000000)^0.263*20
		5850,0)
99		IF(AND(R57C1=1,R60C1=1,R6
		3C1=1),(R96C4/150000000)^
		0.263*205850,0)
100		IF(AND(R61C1=1,R63C1=0),(
		R96C4/50000000)^0.389*273
		011,0)
101		IF(AND(R57C1=1,R60C1=1,R6
		3C1=0),(R96C4/50000000)^0
		.389*273011,0)

3

4

102

IF(R25C3>=1.1*R25C2,((R15
C3+R16C3)/1000*1.3*(R25C3
/R25C2*R96C4/R2C5)^2)^0.8
86*606,0)

103

(5/R26C1*R21C1/0.2*R96C4/
150000000)^0.39*94800

104

IF(R47C1=0,0.01*70*R96C4/
1000,0)

105

IF(AND(R49C1=1,R48C1=0),0
.01*70*R96C4/1000,0)

106

IF(AND(R49C1=1,R50C1=0),0
.15*70*R96C4/1000,0)

107

IF(R59C1=0,0.08*70*R96C4/
1000,0)

```

1 R58C4
2 R30C3
3 R60C3
4 R31C3
5 R58C4/(R38C4+R40C4)
6 MAX(R69:95C1)
7 IF((R48C2-R30C3)/R48C2>=0,(R4
8 8C2-R30C3)/R48C2,0)
9 R38C4+R40C4
9 R40C4/(R79C2*2000)
10 R38C4/R12C1
11 R44C4+R47C4
12 R47C4/R11C5
13 (R97C1/(1-R21C5))/(R26C5/(R2C
14 5/1000000))
14 R26C5*R13C5*(1-R21C5)
15 R14C5*1000000/(R8C3+R10C3)
16 R26C5*R13C5*1000000/(R8C3+R10
17 C3)
17 R35C4
18 R17C5/4.5
19 R45C4+R46C4
20 R25C4+R26C4*(R29C1+460)/1969
21 (1-((IF(R53C1=1,0.01,1))*(IF(
22 R54C1=1,0.015,1))*(IF(R55C1=1
23 ,0.05,1))*(IF(R56C1=1,0.15,1)
24 )))
22 IF(R15C5>R42C1,1,0)
23 0.00052*R33C1*R35C4
24 (R19C5/1000+1.3*R33C1)*(IF(R8
25 5C4<=1,(R85C4)^0.5,(R85C4)^2)
26 )
25 (2000*R9C5/7619)^0.85*R33C1/0
26 .055*101115/8760
26 R17C3+R14C3
27 R28C5*8320*R40C1*R44C1
28 ((R48C2/200000000)^0.58)*((IF
29 (R60C1=1,3*(R21C1/0.2)^0.33,0
30 ))+(IF(R61C1=1,4*(R21C1/0.5)^
31 0.22,0)))
29 R10C5*R34C1
30 R9C5*R27C1
31 R11C5/2000*R35C1
32 R91C3*R34C5
33 ((IF(R51C1=1,0.046,0.036))*R5
34 0C5)*((IF(R51C1=1,1.5,1))*(IF
35 (R85C4>1,R22C2/1000*70*0.015*
36 ((R85C4)^3-1)*R11C5/(R14C2+R1
37 1C2),0)))
34 (IF(R60C1=1,0.8,0))*(IF(AND(R
35 61C1=1,R63C1=1),0.76,0))*(IF(
36 AND(R61C1=1,R63C1=0),0.72,0))
35 R32C5*R1C5

```

```

36 (SUM(R23:25C5))*R32C5
37 R29C5*R32C5
38 R30C5*R32C5
39 R31C5*R32C5
40 IF(R57C4<2500,1,0)
41 R16C5*(IF(R22C5=1,1-(IF(R17C3
  /(R17C3+R14C3)>0.21,0.985,0.9
  9)),1))
42 IF(R67C1=1,0.25,1)*((5/R26C1*
  R96C4*R9C5/R1C5*R36C1*24/40)^
  0.39*672000)
43 IF(R37C1<=0.0189,0,(5/R26C1*R
  21C1/0.1*(R96C4/150000000))^0
  .274*R37C1/0.25*1125000)
44 IF(AND(R37C1<=0.0189,R37C1=0)
  ,0,(5/R26C1*R21C1/0.2*(R96C4/
  100000000))^0.508*64923)
45 (IF(R66C1=1,1,0.3))*((R21C1/0
  .2*R96C4/100000000)^0.368*259
  691)
46 IF(AND(R59C1=1,R26C5<=(1.25*R
  96C1)),0,10)*(R96C4/100000000
  *R21C1/0.2*R26C5/R9C5/2000)^0
  .261*32461
47 IF(R15C5>R42C1,((IF(R17C3/(R1
  4C3+R17C3)>0.21,1.25,1))*(782
  20+3.747*R25C3*(R29C1+460)/19
  60*R96C4/R2C5)),0)
48 SUM(R97:101C4)
49 SUM(R42:48C5)
50 R49C5*1.32
51 R39C1
52
53 R39C5+R38C5+R37C5+R36C5+R33C5
  +R27C5+R58C5
54
55 R54C5*1000000/R35C5
56 ((R98C5-R57C5)*R39C1)/(R50C5/
  (R35C5/1000000))
57 R53C5*1000000/R35C5
58 IF(R65C1=1,R32C5*R9C5*14*R33C
  1+0.165*R32C5*R9C5,0)
59 R38C5/R27C1
60 R82C4
61 R48C2
62 R49C2
63 R82C4/R66C4
64 R6C5
65 R66C4
66 R66C4/R12C1
67 R79C4+R73C4
68 R73C4/R67C5

```

```

69 IF(R51C2/R25C2<=2,(R51C2/R25C
2)^1.44*0.368,1)
70 R82C5=R69C5*(1-R77C5)
71 R70C5=1000000/(R36C2)
72 R82C5=R69C5*1000000/(R36C2)
73 R63C4
74 R73C5/4.5
75 R71C4+R72C4
76 R90C3*(R51C2/R48C2)*(R29C1+46
0)/1960
77 R21C5
78 IF(R71C5>R42C1,1,0)
79 0.00052*R33C1*R63C4
80 (IF(R64C1=1,1,0))*(R57C5/1000
*1.3*R33C1)*(IF(R86C4<=1,(R86
C4)^0.5,(R86C4)^2))
81 0
82 R40C2+R37C2
83 R84C5*8320*R40C1*R44C1
84 ((R48C2/200000000)^0.58)*((IF
(R60C1=1,1,0)+(IF(R61C1=1,2,
75,0)))
85 R66C5*R34C1
86 R67C5/2000*R35C1
87 R91C3+R88C5
88 IF(R41C1=0,(IF(R60C1=1,0.95,0
))+(IF(AND(R61C1=1,R63C1=1),0
.903,0))+(IF(AND(R61C1=1,R63C
1=0),0.855,0)),R41C1)
89 R87C5*R60C5
90 (SUM(R79:81C5))*R87C5
91 R85C5*R87C5
92 R86C5*R87C5
93 R43C1*R45C1
94 R51C5
95 R92C5+R91C5+R90C5+R83C5
96 R95C5
97 R96C5=1000000/R89C5

98 R95C5=1000000/R89C5

99 (R45C1)*(R43C1/2) "avoided disposal cost"

100 (R98C5-R102C5)*R39C1/(R50C5/( "sir w/disposal credit"
R35C5/1000000))

101 R53C5-R99C5 "O&M w/disposal credit"

```

5

102 R101C5*1000000/R35C5

6

"O&M/mmBtu w/disposal cre
dit"

103

104

105

106

107

OUT 1

	1	2	3	4
1	115	"THE INFORMATION ON LINES 17-105 REGARD THE ORIGINAL"		
2	R[-1]C+	"BOILER DESIGN AND THE FUEL FOR WHICH THE"		
	1			
3	R[-1]C+	"BOILER WAS DESIGNED. DCF MEANS DESIGN CONVENTIONAL FUEL"		
	1			
4	R[-1]C+			
	1			
5	R[-1]C+	"THE INFORMATION ON LINES 151-172 REGARD THE CONVENTIONA L"		
	1			
6	R[-1]C+	"FUEL CURRENTLY BEI NG UTILIZED IN THE BOILER. THE DESIGN "		
	1			
7	R[-1]C+	"AND CURRENT FUELS ARE NOT NECESSARILY THE SAME. NEITHER ARE"		
	1			
8	R[-1]C+	"THE AMOUNT OF FUEL HEAT VALUE ORIGINAL LY INPUT (NAMEPLAT E AND"		
	1			
9	R[-1]C+	"(DTOTHHVCF) AND THE MAXIMUM AMOUNT OF FUEL HEAT VALUE CUR RENTLY"		
	1			
10	R[-1]C+	"INPUT AT 100% MCR (TOTHHVCF)."		
	1			
11	R[-1]C+			
	1			
12	R[-1]C+			
	1			
13	R[-1]C+	"----- ----- ----- -----"		
	1			
14	R[-1]C+	"MCR FLOWS USING OR IGINAL DESIGN CONVE NTIONAL FUEL (DCF) ONLY W/OUT RDF"		
	1			
15	R[-1]C+			
	1			
16	R[-1]C+		"IN"	
	1			
17	R[-1]C+		"M, LB/HR"	
	1			
18	R[-1]C+			
	1			

	1	2	3	4
19	R[-1]C+	"DCF SH MAF"		R1C10
20	R[-1]C+	"DCF HHV MAF"		
21	R[-1]C+	"ASH"		R2C10
22	R[-1]C+	"H2O LIQUID"		R3C10
23	R[-1]C+	"AIR,CP=.24"		R4C10
24	R[-1]C+	"DPC,CP=.25"		
25	R[-1]C+	"H2O VAPOR"		
26	R[-1]C+	"CARBON, HHV ONLY"		
27	R[-1]C+	"LOSSES"		
28	R[-1]C+	"TOTALS"		R5C10
29	R[-1]C+			
30	R[-1]C+	"ENTHALPY TRANSFERE D TO STEAM USING DC F"		
31	R[-1]C+	"BOILER EFFICIENCY USING DCF, A FRACTI ON"		
32	R[-1]C+	"MASS FLOWRATE OF D CF"		
33	R[-1]C+	"VOLUMETRIC FLOWRAT E FROM FURNACE W/ D CF"		
34	R[-1]C+	"MASS FLOWRATE OF C OMBUSTION AIR W/ DC F"		
35	R[-1]C+	"----- ----- -----"		
36	R[-1]C+	"MCR FLOWS USING CU RRENT CONVENTIONAL FUEL (CF) ONLY WITH OUT RDF"		
37	R[-1]C+			
38	R[-1]C+			"IN"
39	R[-1]C+			"M, LB\HR"
40	R[-1]C+			

	1	2	3	4
41	R[-1]C+	"CF SH MAF"		R27C10
	1			
42	R[-1]C+	"CF HHV MAF"		
	1			
43	R[-1]C+	"ASH"		R28C10
	1			
44	R[-1]C+	"H2O LIQUID"		R29C10
	1			
45	R[-1]C+	"AIR,CP=.24"		R30C10
	1			
46	R[-1]C+	"DPC,CP=.25"		
	1			
47	R[-1]C+	"H2O VAPOR"		
	1			
48	R[-1]C+	"CARBON, HHV ONLY"		
	1			
49	R[-1]C+	"LOSSES"		
	1			
50	R[-1]C+	"TOTALS"		R31C10
	1			
51	R[-1]C+			
	1			
52	R[-1]C+	"ENTHALPY TRANSFERE		
	1	D TO STEAM USING CF		
		"		
53	R[-1]C+	"BOLIER EFFICIENCY		
	1	USING CF, A FRACTIO		
		N"		
54	R[-1]C+	"MASS FLOWRATE OF C		
	1	F"		
55	R[-1]C+	"VOLUMETRIC FLOWRAT		
	1	E FROM FURNACE W/ C		
		F"		
56	R[-1]C+	"MASS FLOWRATE OF C		
	1	OMBUSTION AIR W/ DC		
		F"		
57	R[-1]C+	"-----"		
	1	-----		

		-----"		
58	R[-1]C+			
	1			
59	R[-1]C+	"THESE CALCULATIONS		
	1	REPRESENT AN ITERA		
		TIVE PROCEDURE"		
60	R[-1]C+	"BY MEANS OF WHICH		
	1	COFIRED MCR CAN BE		
		DEVELOPED. THE BES		
		T"		
61	R[-1]C+	"APPROXIMATION OF C		
	1	OFIRED MCR IS ON LI		
		NE 268"		

	1	2	3	4
62	R[-1]C+	"RDF COFIRING FLOWS 1 , ZEROth ITERATION, CURRENT CONVENTION AL FUEL AND RDF"		
63	R[-1]C+			
64	R[-1]C+		"IN"	
65	R[-1]C+		"M, LB/HR"	
66	R[-1]C+			
67	R[-1]C+			
68	R[-1]C+	"CF SH MAF"	R53C10	
69	R[-1]C+	"CF HHV MAF"		
70	R[-1]C+	"RDF SH MAF"	R54C10	
71	R[-1]C+	"RDF HHV MAF"		
72	R[-1]C+	"ASH"	R55C10	
73	R[-1]C+	"H2O LIQUID"	R56C10	
74	R[-1]C+	"AIR,CP=.24"	R57C10	
75	R[-1]C+	"DPC,CP=.25"		
76	R[-1]C+	"H2O VAPOR"		
77	R[-1]C+	"CARBON, HHV ONLY"		
78	R[-1]C+	"LOSSES"		
79	R[-1]C+	"TOTALS"	R58C10	
80	R[-1]C+			
81	R[-1]C+	"MASS FLOWRATE OF A S RCVD RDF, OIT"		
82	R[-1]C+	"MASS FLOWRATE OF C F, OIT"		
83	R[-1]C+	"HIGHER HEATING VAL UE OF RDF, AS-RCVD"		
84	R[-1]C+	"FRAC EXCESS AIR RE QD FOR RDF COMBUSTI ON"		
85	R[-1]C+	"ENTHALPY TRANSFERE D TO STEAM, OIT"		
86	R[-1]C+	"BOILER EFFICIENCY, A FRACTION, OIT"		

	1	2	3	4
87	R[-1]C+	"VOLUMETRIC FLOWRAT E FROM FURNACE W/ C F"		
88	R[-1]C+	"QUOTE TURNDOWN UNQ UOTE"		
89	R[-1]C+	"CARBON LOSS AS A F RAC OF CF FUEL VALU E"		
90	R[-1]C+	"CARBON LOSS AS A F RAC OF RDF FUEL VAL UE"		
91	R[-1]C+	"----- ----- ----- -----"		
92	R[-1]C+			
93	R[-1]C+	"RDF COFIRING FLOWS , FIRST ITERATION, CURRENT CONVENTIONA L FUEL AND RDF"		
94	R[-1]C+			
95	R[-1]C+		"IN"	
96	R[-1]C+		"M, LB/HR"	
97	R[-1]C+			
98	R[-1]C+	"CF SH MAF"	R87C10	
99	R[-1]C+	"CF HHV MAF"		
100	R[-1]C+	"RDF SH MAF"	R88C10	
101	R[-1]C+	"RDF HHV MAF"		
102	R[-1]C+	"ASH"	R89C10	
103	R[-1]C+	"H2O LIQUID"	R90C10	
104	R[-1]C+	"AIR,CP=.24"	R91C10	
105	R[-1]C+	"DPC,CP=.25"		
106	R[-1]C+	"H2O VAPOR"		
107	R[-1]C+	"CARBON, HHV ONLY"		
108	R[-1]C+	"LOSSES"		

	1	2	3	4
109	R[-1]C+	"TOTALS"		R92C10
	1			
110	R[-1]C+			
	1			
111	R[-1]C+	"ENTHALPY TRANSFERE		
	1	D TO STEAM ,1 IT"		
112	R[-1]C+	"BOILER EFFICIENCY,		
	1	A FRACTION, 1 IT"		
113	R[-1]C+	"VOLUMETRIC FLOWRAT		
	1	E FROM FURNACE, 1 I		
		T"		

1	5	6	7
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16 "IN"	"OUT"	"OUT"	
17 "E, BTUH"	"M, LB/HR"	"E, BTUH"	
18			

	5	6	7
19	R6C10		
20	R7C10		
21		R11C10	R16C10
22	R8C10		
23	R9C10		
24		R12C10	R17C10
25		R13C10	R18C10
26		R14C10	R19C10
27			R20C10
28	R10C10	R15C10	R21C10
29			
30		R22C10	"BTUH"
31		R23C10	"NONE"
32		R24C10	"LB/HR"
33		R25C10	"ACFM"
34		R26C10	"LB/HR"
35			
36			
37			
38	"IN"	"OUT"	"OUT"
39	"E, BTUH"	"M, LB\HR"	"E, BTUH"
40			

	5	6	7
41	R32C10		
42	R33C10		
43		R37C10	R42C10
44	R34C10		
45	R35C10		
46		R38C10	R43C10
47		R39C10	R44C10
48		R40C10	R45C10
49			R46C10
50	R36C10	R41C10	R47C10
51			
52		R48C10	"BTUH"
53		R49C10	"NONE"
54		R50C10	"LB/HR"
55		R51C10	"ACFM"
56		R52C10	"LB/HR"
57			
58			
59			
60			
61			

62	5	6	7
63			
64 "IN"		"OUT"	"OUT"
65 "E, BTUH"		"M, LB/HR"	"E, BTUH"
66			
67			
68 R59C10			
69 R60C10			
70 R61C10			
71 R62C10			
72		R66C10	R71C10
73 R63C10			
74 R64C10			
75		R67C10	R72C10
76		R68C10	R73C10
77		R69C10	R74C10
78			R75C10
79 R65C10		R70C10	R76C10
80			
81		R77C10	"lb/hr"
82		R78C10	"lb/hr"
83		R79C10	"btu/lb"
84		R80C10	"NONE"
85		R81C10	"btuh"
86		R82C10	"none"

	5	6	7
87		R83C10	"acfm"
88		R84C10	"percent"
89		R85C10	"none"
90		R86C10	"none"
91			
92			
93			
94			
95 "IN"		"OUT"	"OUT"
96 "E, BTUH"		"M, LB/HR"	"E, BTUH"
97			
98 R93C10			
99 R94C10			
100 R95C10			
101 R96C10			
102		R100C10	R105C10
103 R97C10			
104 R98C10			
105		R101C10	R106C10
106		R102C10	R107C10
107		R103C10	R108C10
108			R109C10

109 R99C10	5	R104C10	6	R110C10	7
110					
111		R111C10		"BTUH"	
112		R112C10		"NONE"	
113		R113C10		"ACFN"	

	8	9	10
1			[work1 xferdat2]
2			[work1 xferdat2]
3			[work1 xferdat2]
4			[work1 xferdat2]
5			[work1 xferdat2]
6			[work1 xferdat2]
7			[work1 xferdat2]
8			[work1 xferdat2]
9			[work1 xferdat2]
10			[work1 xferdat2]
11			[work1 xferdat2]
12			[work1 xferdat2]
13			[work1 xferdat2]
14			[work1 xferdat2]
15			[work1 xferdat2]
16			[work1 xferdat2]
17			[work1 xferdat2]
18			[work1 xferdat2]

	8	9	10
19			[work1 xferdat2]
20			[work1 xferdat2]
21			[work1 xferdat2]
22			[work1 xferdat2]
23			[work1 xferdat2]
24			[work1 xferdat2]
25			[work1 xferdat2]
26			[work1 xferdat2]
27			[work1 xferdat2]
28			[work1 xferdat2]
29			[work1 xferdat2]
30			[work1 xferdat2]
31			[work1 xferdat2]
32			[work1 xferdat2]
33			[work1 xferdat2]
34			[work1 xferdat2]
35			[work1 xferdat2]
36			[work1 xferdat2]
37			[work1 xferdat2]
38			[work1 xferdat2]
39			[work1 xferdat2]
40			[work1 xferdat2]

	8	9	10
41			[work1 xferdat2]
42			[work1 xferdat2]
43			[work1 xferdat2]
44			[work1 xferdat2]
45			[work1 xferdat2]
46			[work1 xferdat2]
47			[work1 xferdat2]
48			[work1 xferdat2]
49			[work1 xferdat2]
50			[work1 xferdat2]
51			[work1 xferdat2]
52			[work1 xferdat2]
53			[work1 xferdat2]
54			[work1 xferdat2]
55			[work1 xferdat2]
56			[work1 xferdat2]
57			[work1 xferdat2]
58			[work1 xferdat2]
59			[work1 xferdat2]
60			[work1 xferdat2]
61			[work1 xferdat2]

	8	9	10
62			[work1 xferdat2]
63			[work1 xferdat2]
64			[work1 xferdat2]
65			[work1 xferdat2]
66			[work1 xferdat2]
67			[work1 xferdat2]
68			[work1 xferdat2]
69			[work1 xferdat2]
70			[work1 xferdat2]
71			[work1 xferdat2]
72			[work1 xferdat2]
73			[work1 xferdat2]
74			[work1 xferdat2]
75			[work1 xferdat2]
76			[work1 xferdat2]
77			[work1 xferdat2]
78			[work1 xferdat2]
79			[work1 xferdat2]
80			[work1 xferdat2]
81			[work1 xferdat2]
82			[work1 xferdat2]
83			[work1 xferdat2]
84			[work1 xferdat2]
85			[work1 xferdat2]
86			[work1 xferdat2]

	8	9	10
87			[work1 xferdat2]
88			[work1 xferdat2]
89			[work1 xferdat2]
90			[work1 xferdat2]
91			[work1 xferdat2]
92			[work1 xferdat2]
93			[work1 xferdat2]
94			[work1 xferdat2]
95			[work1 xferdat2]
96			[work1 xferdat2]
97			[work1 xferdat2]
98			[work1 xferdat2]
99			[work1 xferdat2]
100			[work1 xferdat2]
101			[work1 xferdat2]
102			[work1 xferdat2]
103			[work1 xferdat2]
104			[work1 xferdat2]
105			[work1 xferdat2]
106			[work1 xferdat2]
107			[work1 xferdat2]
108			[work1 xferdat2]

	8	9	10
109			[work1 xferdat2]
110			[work1 xferdat2]
111			[work1 xferdat2]
112			[work1 xferdat2]
113			[work1 xferdat2]

OUT 2

	1	2	3
1	232	"THE FOLLOWING TABLES REPRESENT THE LIMITS OF STEAM PRODUCTION BETWEEN"	
2	R[-1]C+	"WHICH RDF MAY BE COF IRED. THESE ARE THE M CR (MAXIMUM CONTINUOU S RATING)"	
3	R[-1]C+	"AND THE MAXIMUM COFI RED TURNDOWN."	
4	R[-1]C+		
5	R[-1]C+	"----- ----- ----- ----- -----"	
6	R[-1]C+	"MCR WHILE COFIRING R DF AND CURRENT CONVEN TIONAL FUEL:"	
7	R[-1]C+		
8	R[-1]C+		
9	R[-1]C+		
10	R[-1]C+		
11	R[-1]C+	"CF SH MAF"	
12	R[-1]C+	"CF HHV MAF"	
13	R[-1]C+	"RDF SH MAF"	
14	R[-1]C+	"RDF HHV MAF"	
15	R[-1]C+	"ASH"	
16	R[-1]C+	"H2O LIQUID"	
17	R[-1]C+	"AIR, CP=.24"	
18	R[-1]C+	"DPC, CP=.25"	
19	R[-1]C+	"H2O VAPOR"	
20	R[-1]C+	"CARBON, HHV ONLY"	
21	R[-1]C+	"LOSSES"	
22	R[-1]C+	"TOTALS"	

	1	2	3
23	R(-1)C+		
	1		
24	R(-1)C+		
	1		
25	R(-1)C+	"MAX ALLOW VOLUMETRIC	
	1	FLOWRATE FROM FURN"	
26	R(-1)C+	"RATIO OF VDOTMCR TO	
	1	VDOT1"	
27	R(-1)C+	"CARBON LOSS AS A FRA	
	1	C OF CF FUEL VALUE"	
28	R(-1)C+	"CARBON LOSS AS A FRA	
	1	C OF RDF FUEL VALUE"	
29	R(-1)C+	"MAXIMUM CONTINUOUS R	
	1	ATING WHILE COFIRING"	
30	R(-1)C+	"BOILER EFFICIENCY AT	
	1	MCR WHILE COFIRING"	
31	R(-1)C+	"-----"	
	1	-----"	
32	R(-1)C+	"MAXIMUM COFIRED TURN	
	1	DOWN, RDF AND CURRENT	
		CONVENTIONAL FUEL:"	
33	R(-1)C+		
	1		
34	R(-1)C+		
	1		
35	R(-1)C+		
	1		
36	R(-1)C+		
	1		
37	R(-1)C+	"CF SH MAF"	
	1		
38	R(-1)C+	"CF HHV MAF"	
	1		
39	R(-1)C+	"RDF SH MAF"	
	1		
40	R(-1)C+	"RDF HHV MAF"	
	1		
41	R(-1)C+	"ASH"	
	1		
42	R(-1)C+	"H2O LIQUID"	
	1		
43	R(-1)C+	"AIR, CP=.24"	
	1		
44	R(-1)C+	"DPC, CP=.25"	
	1		
45	R(-1)C+	"H2O VAPOR"	
	1		
46	R(-1)C+	"CARBON. HHV ONLY"	
	1		
47	R(-1)C+	"LOSSES"	
	1		

	1	2	3
48	R[-1]C+	"TOTALS"	
	1		
49	R[-1]C+		
	1		
50	R[-1]C+	"VOL FLOWRATE FROM FU	
	1	RNACE AT MMAX TURNDOW	
		N"	
51	R[-1]C+	"XXX TIMES RATIO OF D	
	1	TOTHHVCF TO TOTHHVCF"	
52	R[-1]C+	"CARBON LOSS AS A FRA	
	1	C OF CF FUEL VALUE"	
53	R[-1]C+	"CARBON LOSS AS A FRA	
	1	C OF RDF FUEL VALUE"	
54	R[-1]C+	"MAX TURNDOWN COFIRED	
	1	STEAMRATE, BT STEAM"	
55	R[-1]C+	"BOLIER EFFICIENCY AT	
	1	MAX COFIRE TURNDOWN"	
56	R[-1]C+	"-----	
	1	-----	

		--"	
57	R[-1]C+	"LINES BELOW SHOW THE	
	1	AMOUNT OF COFIRED ST	
		EAM WHICH AMY BE"	
58	R[-1]C+	"SUPPLIED BY SHIFT, D	
	1	AY, AND SEASON. IT A	
		LSO RESULTS IN HOURS,	
		"	
59	R[-1]C+	"THE TIME PER YEAR TH	
	1	AT COFIRING TAKES PLA	
		CE IF AVAILABILITY WE	
		RE"	
60	R[-1]C+	"100% AND REALDOT, AN	
	1	AVERAGE ANNUAL COFIR	
		ED STEAMRATE AT 100%"	
61	R[-1]C+	"AVAILABILITY."	
	1		
62	R[-1]C+		
	1		
63	R[-1]C+	" SUMMER STEAM SU	
	1	PPLY, COFIRED, AVERAG	
		E HOURLY, BTUH STEAM:	
		"	
64	R[-1]C+		
	1		
65	R[-1]C+		
	1		
66	R[-1]C+	"MON-FRI"	
	1		
67	R[-1]C+	"SAT"	
	1		

	1	2	3
68	R[-1]C+		"SUN"
	1		
69	R[-1]C+		
	1		
70	R[-1]C+	" WINTER STEAM SU	
	1	PPLY, COFIRED, AVERAG	
		E HOURLY, BTUH STEAM:	
		"	
71	R[-1]C+		
	1		
72	R[-1]C+		
	1		
73	R[-1]C+		"MON-FRI"
	1		
74	R[-1]C+		"SAT"
	1		
75	R[-1]C+		"SUN"
	1		
76	R[-1]C+		
	1		
77	R[-1]C+	"SPRING/FALL STEAM SU	
	1	PPLY, COFIRED, AVERAG	
		E HOURLY, BTUH STEAM:	
		"	
78	R[-1]C+		
	1		
79	R[-1]C+		
	1		
80	R[-1]C+		
	1		
81	R[-1]C+		"MON-FRI"
	1		
82	R[-1]C+		"SAT"
	1		
83	R[-1]C+		"SUN"
	1		
84	R[-1]C+	"TOTAL ANNUAL STEAM S	
	1	UPPLIED COFIRED"	
85	R[-1]C+	"AVG COFIRED STEAM SU	
	1	PPLY RATE, THEORITICA	
		L"	
86	R[-1]C+	"HOURS/YR COFIRING AS	
	1	SUMING 100% AVAILABIL	
		ITY"	
87	R[-1]C+	"REAL AVG HOURLY COFI	
	1	RED STEAMRATE"	
88	R[-1]C+		
	1		
89			
90			
91			
92			

1	4	5	6
2			
3			
4			
5			
6			
7			
8 "IN"	"IN"	"OUT"	
9 "M. LB/HR"	"E, BTUH"	"M, LB/HR"	
10			
11 R1C10	R7C10		
12	R8C10		
13 R2C10	R9C10		
14	R10C10		
15 R3C10		R14C10	
16 R4C10	R11C10		
17 R5C10	R12C10		
18		R15C10	
19		R16C10	
20		R17C10	
21			
22 R6C10	R13C10	R18C10	

	4	5	6
23			
24			R25C10
25			R26C10
26			R27C10
27			R28C10
28			R29C10
29			R30C10
30			R31C10
31			
32			
33			
34	"IN"	"IN"	"OUT"
35	"M, LB/HR"	"E, BTUH"	"M, LB/HR"
36			
37	R32C10	R38C10	
38		R39C10	
39	R33C10	R40C10	
40		R41C10	
41	R34C10		R45C10
42	R35C10	R42C10	
43	R36C10	R43C10	
44			R46C10
45			R47C10
46			R48C10
47			

48	R37C10	4	R44C10	5	R49C10	6
49						
50					R56C10	
51					R57C10	
52					R58C10	
53					R59C10	
54					R60C10	
55					R61C10	
56						
57						
58						
59						
60						
61						
62						
63						
64						
65			"SHIFT 1"		"SHIFT 2"	
66			R62C10		R63C10	
67			R65C10		R66C10	

	4	5	6
68	R68C10		R69C10
69			
70			
71			
72	"SHIFT 1"		"SHIFT 2"
73	R71C10		R72C10
74	R74C10		R75C10
75	R77C10		R78C10
76			
77			
78			
79			
80	"SHIFT 1"		"SHIFT 2"
81	R80C10		R81C10
82	R83C10		R84C10
83	R86C10		R87C10
84			R89C10
85			R90C10
86			R91C10
87			R92C10
88			
89			
90			
91			
92			

1

7

8

9

2

3

4

5

6

7

8 "OUT"

9 "E, BTUH"

10

11

12

13

14

15 R19C10

16

17

18 R20C10

19 R21C10

20 R22C10

21 R23C10

22 R24C10

7

8

9

23

24 "ACFM"

25 "NONE"

26 "PERCENT"

27 "NONE"

28 "NONE"

29 "BTUH"

30 "NONE"

31

32

33

34 "OUT"

35 "E, BTUH"

36

37

38

39

40

41 R50C10

42

43

44 R51C10

45 R52C10

46 R53C10

47 R54C10

7

8

9

48 R55C10

49

50 "CFM"

51 "NONE"

52 "NONE"

53 "NONE"

54 "BTUH"

55 "NONE"

56

57

58

59

60

61

62

63

64

65 "SHIFT 3"

66 R64C10

67 R67C10

7

8

9

68 R70C10

69

70

71

72 "SHIFT 3"

73 R73C10

74 R76C10

75 R79C10

76

77

78

79

80 "SHIFT 3"

81 R82C10

82 R85C10

83 R88C10

84 "BTU"

85 "BTUH"

86 "HOURS"

87 "BTUH"

88

89

90

91

92

10

1 [WORK1 XFERDAT3]

2 [WORK1 XFERDAT3]

3 [WORK1 XFERDAT3]

4 [WORK1 XFERDAT3]

5 [WORK1 XFERDAT3]

6 [WORK1 XFERDAT3]

7 [WORK1 XFERDAT3]

8 [WORK1 XFERDAT3]

9 [WORK1 XFERDAT3]

10 [WORK1 XFERDAT3]

11 [WORK1 XFERDAT3]

12 [WORK1 XFERDAT3]

13 [WORK1 XFERDAT3]

14 [WORK1 XFERDAT3]

15 [WORK1 XFERDAT3]

16 [WORK1 XFERDAT3]

17 [WORK1 XFERDAT3]

18 [WORK1 XFERDAT3]

19 [WORK1 XFERDAT3]

20 [WORK1 XFERDAT3]

21 [WORK1 XFERDAT3]

22 [WORK1 XFERDAT3]

10

23 [WORK1 XFERDAT3]

24 [WORK1 XFERDAT3]

25 [WORK1 XFERDAT3]

26 [WORK1 XFERDAT3]

27 [WORK1 XFERDAT3]

28 [WORK1 XFERDAT3]

29 [WORK1 XFERDAT3]

30 [WORK1 XFERDAT3]

31 [WORK1 XFERDAT3]

32 [WORK1 XFERDAT3]

33 [WORK1 XFERDAT3]

34 [WORK1 XFERDAT3]

35 [WORK1 XFERDAT3]

36 [WORK1 XFERDAT3]

37 [WORK1 XFERDAT3]

38 [WORK1 XFERDAT3]

39 [WORK1 XFERDAT3]

40 [WORK1 XFERDAT3]

41 [WORK1 XFERDAT3]

42 [WORK1 XFERDAT3]

43 [WORK1 XFERDAT3]

44 [WORK1 XFERDAT3]

45 [WORK1 XFERDAT3]

46 [WORK1 XFERDAT3]

47 [WORK1 XFERDAT3]

10

48 [WORK1 XFERDAT3]

49 [WORK1 XFERDAT3]

50 [WORK1 XFERDAT3]

51 [WORK1 XFERDAT3]

52 [WORK1 XFERDAT3]

53 [WORK1 XFERDAT3]

54 [WORK1 XFERDAT3]

55 [WORK1 XFERDAT3]

56 [WORK1 XFERDAT3]

57 [WORK1 XFERDAT3]

58 [WORK1 XFERDAT3]

59 [WORK1 XFERDAT3]

60 [WORK1 XFERDAT3]

61 [WORK1 XFERDAT3]

62 [WORK1 XFERDAT3]

63 [WORK1 XFERDAT3]

64 [WORK1 XFERDAT3]

65 [WORK1 XFERDAT3]

66 [WORK1 XFERDAT3]

67 [WORK1 XFERDAT3]

10

68 [WORK1 XFERDAT3]

69 [WORK1 XFERDAT3]

70 [WORK1 XFERDAT3]

71 [WORK1 XFERDAT3]

72 [WORK1 XFERDAT3]

73 [WORK1 XFERDAT3]

74 [WORK1 XFERDAT3]

75 [WORK1 XFERDAT3]

76 [WORK1 XFERDAT3]

77 [WORK1 XFERDAT3]

78 [WORK1 XFERDAT3]

79 [WORK1 XFERDAT3]

80 [WORK1 XFERDAT3]

81 [WORK1 XFERDAT3]

82 [WORK1 XFERDAT3]

83 [WORK1 XFERDAT3]

84 [WORK1 XFERDAT3]

85 [WORK1 XFERDAT3]

86 [WORK1 XFERDAT3]

87 [WORK1 XFERDAT3]

88 [WORK1 XFERDAT3]

89 [WORK1 XFERDAT3]

90 [WORK1 XFERDAT3]

91 [WORK1 XFERDAT3]

92 [WORK1 XFERDAT3]

OUT 3

1	2	3	4
1 328	"-----"		
	"-----"		
	"-----"		
	"-----"		
2 R[-1]C+	"AVERAGE COFIED FL		
1	OWS, ZERO TH ITERATI		
	ON, RDF AND CURREN		
	T CONVENTIONAL FUEL		
	"		
3 R[-1]C+			
1			
4 R[-1]C+			"IN"
1			
5 R[-1]C+			"M, LB/HR"
1			
6 R[-1]C+			
1			
7 R[-1]C+	"CF SH MAF"		R1C10
1			
8 R[-1]C+	"CF HHV MAF"		
1			
9 R[-1]C+	"RDF SH MAF"		R2C10
1			
10 R[-1]C+	"RDF HHV MAF"		
1			
11 R[-1]C+	"ASH"		R3C10
1			
12 R[-1]C+	"H2O LIQUID"		R4C10
1			
13 R[-1]C+	"AIR, CP=.24"		R5C10
1			
14 R[-1]C+	"DPC, CP=.25"		
1			
15 R[-1]C+	"H2O VAPOR"		
1			
16 R[-1]C+	"CARBON, HHV ONLY"		
1			
17 R[-1]C+	"LOSSES"		
1			
18 R[-1]C+	"TOTALS"		R6C10
1			
19 R[-1]C+			
1			
20 R[-1]C+	"AVERAGE VOLUMETRIC		
1	FLOWRATE FURNACE"		
21 R[-1]C+	"RATIO OF REALDOT T		
1	O HSTM1"		
22 R[-1]C+	"QUOTE AVERAGE TURN		
1	DOWN UNQUOTE"		
23 R[-1]C+	"AVG CARBON LOSS AS		
1	A FRAC OF CF FUEL		
	VALUE"		

	1	2	3	4
24	R[-1]C+	"AVG CARBON LOSS AS A FRAC OF RDF FUEL VALUE"		
25	R[-1]C+	"ITERATION ZERO STE AM SUPPLY COMPARED"		
26	R[-1]C+	"----- ----- ----- -----"		
27	R[-1]C+	"THE LAST TWO TABLE S LINES XXX-XXX REP RESENT THE FINAL"		
28	R[-1]C+	"CALCULATIONS FOR F LOWS AT THE AVG COF IRED STEAM DEMAND"		
29	R[-1]C+	"ASSUMING COMPLETE AVAILABILITY."		
30	R[-1]C+			
31	R[-1]C+	"AVERAGE COFIRED FL OWS, FINAL ITERATIO N, RDF AND CURRENT CONVENTIONAL FUEL"		
32	R[-1]C+			
33	R[-1]C+		"IN"	
34	R[-1]C+		"M, LB/HR"	
35	R[-1]C+			
36	R[-1]C+	"CF SH MAF"	R31C10	
37	R[-1]C+	"CF HHV MAF"		
38	R[-1]C+	"RDF SH MAF"	R32C10	
39	R[-1]C+	"RDF HHV MAF"		
40	R[-1]C+	"ASH"	R33C10	
41	R[-1]C+	"H2O LIQUID"	R34C10	
42	R[-1]C+	"AIR, CP=.24"	R35C10	
43	R[-1]C+	"DPC, CP=.25"		
44	R[-1]C+	"H2O VAPOR"		
45	R[-1]C+	"CARBON, HHV ONLY"		

	1	2	3	4
46	R[-1]C+	"LOSSES"		
	1			
47	R[-1]C+	"TOTALS"		R36C10
	1			
48	R[-1]C+			
	1			
49	R[-1]C+	"FINAL AVG VOLUMETR IC FLOWRATE FROM FU RN"		
	1			
50	R[-1]C+	"ENTHALPY INTO FURN ACE INC. AIR PREHEA T"		
	1			
51	R[-1]C+	"FURNACE ADIABATIC FLAME TEMP"		
	1			
52	R[-1]C+	"FINAL AVERAGE COFI RED STEAM"		
	1			
53	R[-1]C+	"FINAL AVERAGE CIFI RED BOILER EFFICIEN CY"		
	1			
54	R[-1]C+	"----- ----- ----- -----"		
	1			
55	R[-1]C+	"AVERAGE NON-COFIRE D FLOWS (NO RDF), C URRENT CONVENTIONAL FUEL"		
	1			
56	R[-1]C+			
	1			
57	R[-1]C+		"IN"	
	1			
58	R[-1]C+		"M, LB/HR"	
	1			
59	R[-1]C+			
	1			
60	R[-1]C+	"CF SH MAF"		R60C10
	1			
61	R[-1]C+	"CF HHV MAF"		
	1			
62	R[-1]C+	"ASH"		R61C10
	1			
63	R[-1]C+	"H2O LIQUID"		R62C10
	1			
64	R[-1]C+	"AIR, CP=.24"		R63C10
	1			
65	R[-1]C+	"DPC, CP=.25"		
	1			
66	R[-1]C+	"H2O VAPOR"		
	1			
67	R[-1]C+	"CARBON, HHV ONLY"		
	1			

	1	2	3	4
68	R[-1]C+	"LOSSES"		
	1			
69	R[-1]C+	"TOTALS"		R64C10
	1			
70	R[-1]C+			
	1			
71	R[-1]C+	"FINAL AVG NON-COFI		
	1	RED VOLUMETRIC FLOW		
		"		
72	R[-1]C+	"FINAL AVG NON-COFI		
	1	RED STEAM RATE"		
73	R[-1]C+	"FINAL AVG BOILER E		
	1	FFICIENCY W/ 100%"		
74	R[-1]C+	"-----"		
	1	-----		

		-----"		
75				
76				
77				
78				
79				
80				
81				
82				
83				

	5	6	7
1			
2			
3			
4	"IN"	"OUT"	"OUT"
5	"E, BTUH"	"M, LB/HR"	"E, BTUH"
6			
7	R7C10		
8	R8C10		
9	R9C10		
10	R10C10		
11		R14C10	R19C10
12	R11C10		
13	R12C10		
14		R15C10	R20C10
15		R16C10	R21C10
16		R17C10	R22C10
17			R23C10
18	R13C10	R18C10	R24C10
19			
20		R25C10	"ACFM"
21		R26C10	"NONE"
22		R27C10	"PERCENT"
23		R28C10	"NONE"

	5		6		7
24		R29C10		"NONE"	
25		R30C10		"BTUH"	
26					
27					
28					
29					
30					
31					
32					
33	"IN"	"OUT"		"OUT"	
34	"E, BTUH"	"M, LB/HR"		"E, BTUH"	
35					
36	R37C10				
37	R38C10				
38	R39C10				
39	R40C10				
40		R44C10		R49C10	
41	R41C10				
42	R42C10				
43		R45C10		R50C10	
44		R46C10		R51C10	
45		R47C10		R52C10	

	5	6	7
46			R53C10
47	R43C10	R48C10	R54C10
48			
49		R55C10	"ACFM"
50		R56C10	"BTUH"
51		R57C10	"DEG F"
52		R58C10	"BTUH"
53		R59C10	"NONE"
54			
55			
56			
57	"IN"	"OUT"	"OUT"
58	"E, BTUH"	"M, LB/HR"	"E, BTUH"
59			
60	R65C10		
61	R66C10		
62		R70C10	R75C10
63	R67C10		
64	R68C10		
65		R71C10	R76C10
66		R72C10	R77C10
67		R73C10	R78C10

	5	6	7
68			R79C10
69	R69C10	R74C10	R80C10
70			
71		R81C10	"ACFM"
72		R82C10	"BTUH"
73		R83C10	"NONE"
74			
75			
76			
77			
78			
79			
80			
81			
82			
83			

	8	9	10
1			[WORK1 XFERDAT4]
2			[WORK1 XFERDAT4]
3			[WORK1 XFERDAT4]
4			[WORK1 XFERDAT4]
5			[WORK1 XFERDAT4]
6			[WORK1 XFERDAT4]
7			[WORK1 XFERDAT4]
8			[WORK1 XFERDAT4]
9			[WORK1 XFERDAT4]
10			[WORK1 XFERDAT4]
11			[WORK1 XFERDAT4]
12			[WORK1 XFERDAT4]
13			[WORK1 XFERDAT4]
14			[WORK1 XFERDAT4]
15			[WORK1 XFERDAT4]
16			[WORK1 XFERDAT4]
17			[WORK1 XFERDAT4]
18			[WORK1 XFERDAT4]
19			[WORK1 XFERDAT4]
20			[WORK1 XFERDAT4]
21			[WORK1 XFERDAT4]
22			[WORK1 XFERDAT4]
23			[WORK1 XFERDAT4]

	8	9	10
24			[WORK1 XFERDAT4]
25			[WORK1 XFERDAT4]
26			[WORK1 XFERDAT4]
27			[WORK1 XFERDAT4]
28			[WORK1 XFERDAT4]
29			[WORK1 XFERDAT4]
30			[WORK1 XFERDAT4]
31			[WORK1 XFERDAT4]
32			[WORK1 XFERDAT4]
33			[WORK1 XFERDAT4]
34			[WORK1 XFERDAT4]
35			[WORK1 XFERDAT4]
36			[WORK1 XFERDAT4]
37			[WORK1 XFERDAT4]
38			[WORK1 XFERDAT4]
39			[WORK1 XFERDAT4]
40			[WORK1 XFERDAT4]
41			[WORK1 XFERDAT4]
42			[WORK1 XFERDAT4]
43			[WORK1 XFERDAT4]
44			[WORK1 XFERDAT4]
45			[WORK1 XFERDAT4]

	8	9	10
46			[WORK1 XFERDAT4]
47			[WORK1 XFERDAT4]
48			[WORK1 XFERDAT4]
49			[WORK1 XFERDAT4]
50			[WORK1 XFERDAT4]
51			[WORK1 XFERDAT4]
52			[WORK1 XFERDAT4]
53			[WORK1 XFERDAT4]
54			[WORK1 XFERDAT4]
55			[WORK1 XFERDAT4]
56			[WORK1 XFERDAT4]
57			[WORK1 XFERDAT4]
58			[WORK1 XFERDAT4]
59			[WORK1 XFERDAT4]
60			[WORK1 XFERDAT4]
61			[WORK1 XFERDAT4]
62			[WORK1 XFERDAT4]
63			[WORK1 XFERDAT4]
64			[WORK1 XFERDAT4]
65			[WORK1 XFERDAT4]
66			[WORK1 XFERDAT4]
67			[WORK1 XFERDAT4]

	8	9	10
68			[WORK1 XFERDAT4]
69			[WORK1 XFERDAT4]
70			[WORK1 XFERDAT4]
71			[WORK1 XFERDAT4]
72			[WORK1 XFERDAT4]
73			[WORK1 XFERDAT4]
74			[WORK1 XFERDAT4]
75			[WORK1 XFERDAT4]
76			[WORK1 XFERDAT4]
77			[WORK1 XFERDAT4]
78			[WORK1 XFERDAT4]
79			[WORK1 XFERDAT4]
80			[WORK1 XFERDAT4]
81			[WORK1 XFERDAT4]
82			[WORK1 XFERDAT4]
83			[WORK1 XFERDAT4]

OUT 4

1	2	3
1 "SUMMARY		
RESULTS B		
EGIN ON L		
INE 410:"		
2 407		
3 R[-1]C+1 "UNITS"		"RDF"
4 R[-1]C+1		"COFIRING"
5 R[-1]C+1 "BTUH"		R1C12
6 R[-1]C+1 "BTUH"		R2C12
7 R[-1]C+1 "BTUH"		R3C12
8 R[-1]C+1 "NONE"		R4C12
9 R[-1]C+1 "NONE"		R5C12
10 R[-1]C+1 "BTUH"		R6C12
11 R[-1]C+1 "NONE"		R7C12
12 R[-1]C+1 "BTUH"		R8C12
13 R[-1]C+1 "TPH"		R9C12
14 R[-1]C+1 "LB/HR"		R10C12
15 R[-1]C+1 "LB/HR"		R11C12
16 R[-1]C+1 "NONE"		R12C12
17 R[-1]C+1 "NONE"		R13C12
18 R[-1]C+1 "LB/HR"		R14C12
19 R[-1]C+1 "LB/MMBTU"		R15C12
20 R[-1]C+1 "LB/MMBTU"		R16C12
21 R[-1]C+1 "LB/HR"		R17C12

	1	2	3
22	R[-1]C+1	"ACFM"	R18C12
23	R[-1]C+1	"LB/HR"	R19C12
24	R[-1]C+1	"ACFM"	R20C12
25	R[-1]C+1	"NONE"	R21C12
26	R[-1]C+1	"NONE"	R22C12
27	R[-1]C+1	"\$/HR"	R23C12
28	R[-1]C+1	"\$/HR"	R24C12
29	R[-1]C+1	"\$/HR"	R25C12
30	R[-1]C+1	"LB/HR"	R26C12
31	R[-1]C+1	"\$/YR"	R27C12
32	R[-1]C+1	"MAN/SHIFT"	R28C12
33	R[-1]C+1	"\$/HR"	R29C12
34	R[-1]C+1	"\$/HR"	R30C12
35	R[-1]C+1	"\$/HR"	R31C12
36	R[-1]C+1	"HOURS"	R32C12
37	R[-1]C+1	"\$/YR"	R33C12
38	R[-1]C+1	"NONE"	R34C12
39	R[-1]C+1	"BTU"	R35C12
40	R[-1]C+1	"\$/YR"	R36C12
41	R[-1]C+1	"\$/YR"	R37C12
42	R[-1]C+1	"\$/YR"	R38C12
43	R[-1]C+1	"\$/YR"	R39C12

	1	2	3
44 R[-1]C+1	"\$/YR"		0
45 R[-1]C+1			
46 R[-1]C+1	"NONE"		R40C12
47 R[-1]C+1	"LB/MMBTU"		R41C12
48 R[-1]C+1			
49 R[-1]C+1			
50 R[-1]C+1	"\$"		R42C12
51 R[-1]C+1	"\$"		R43C12
52 R[-1]C+1	"\$"		R44C12
53 R[-1]C+1	"\$"		R45C12
54 R[-1]C+1	"\$"		R46C12
55 R[-1]C+1	"\$"		R47C12
56 R[-1]C+1	"\$"		R48C12
57 R[-1]C+1	"\$"		R49C12
58 R[-1]C+1	"\$"		R50C12
59 R[-1]C+1	"NONE"		R51C12
60 R[-1]C+1	"\$/YR"		R52C12
61 R[-1]C+1	"\$/YR"		R53C12
62 R[-1]C+1	"\$/YR"		R54C12
63 R[-1]C+1	"\$/MMBTU"		R55C12
64 R[-1]C+1	"NONE"		R56C12

	1	2	3
65	R[-1]C+1	"\$/MMBTU"	R57C12
66	R[-1]C+1	"\$/YR"	R58C12
67	R[-1]C+1	"TPY"	R59C12
68	473	"\$/YR"	R99C12
69	474	"NONE"	R100C12

70
 71
 72
 73
 74
 75
 76
 77
 78
 79
 80
 81
 82
 83
 84
 85
 86
 87
 88
 89
 90
 91
 92
 93
 94
 95
 96
 97
 98
 99
 100
 101
 102

1	4	5	6
2			
3	"CONVENTIONAL"		"VARIABLE"
4	"FUEL"		"DEFINITION"
5	R60C12		"ENTHALPY TRANSFERRED TO STEAM, AVG HOURLY, 100% AVAILABILITY"
6	R61C12		"MCR, ABS MAX FOR COFIRE CASE (RATED AT HI VELOCITY)"
7	"NA"		"MAXIMUM TURNDOWN STEAM RATING, SEAM BTU"
8	R62C12		"BOILER EFFICIENCY AT MCR"
9	R63C12		"BOILER EFFICIENCY AT AVERAGE OUTPUT"
10	R64C12		"MAXIMUM STEAM DEMAND (MSD)"
11	"NA"		"DERATE"
12	R65C12		"TOTAL FUEL INPUT ENTHALPY, AVERAGE"
13	"NA"		"RDF FLOWRATE, AVERAGE"
14	R66C12		"CONVENTIONAL FUEL INPUT ENTHALPY, AVERAGE"
15	R67C12		"SOLID RESIDUE GENERATED, AVERAGE"
16	R68C12		"CARBON CONTENT OF SOLID RESIDUE, MAX HOURLY AT MCR"
17	R69C12		"FLYASH FRACTION OF SOLID RESIDUE, AVERAGE"
18	R70C12		"FLYASH EMISSION ABSOLUTE AVG EXISTING CONTROL DEVICE AT MCR"
19	R71C12		"EMISSION OF TSP, MAX HOURLY W/ EXISTING CNTRL AT MCR"
20	R72C12		"UNCONTROLLED FLYASH EMISSION, MAX HOURLY AT MCR"
21	R73C12		"COMBUSTION AIR RATE, AVERAGE"

4

5

6

22 R74C12

"COMBUSTION AIR VOL
UMETRIC FLOWRATE, A
VERAGE"

23 R75C12

"WET FLUE GAS RATE,
AVERAGE"

24 R76C12

"WET FLUE GAS VOLUM
ETRIC FLOW, AVERAGE
"

25 R77C12

"EMISSION CNTRL DEV
ICE ASSUMED EFFICIE
NCY (EXISTING DEVIC
E)"

26 R78C12

"NEW EMISSION CONRT
OL DEVICE REQUIRED
1= YES"

27 R79C12

"ELECTRIC POWER COS
T FOR FD SYSTEM, AV
ERAGE"

28 R80C12

"ELECTRIC POWER COS
T FOR ID SYSTEM, AV
ERAGE"

29 R81C12

"MISC ELECTRIC POWE
R COSTS, AVERAGE"

30 R82C12

"SOLID RESIDUE GENE
RATED, MAX HOURLY A
T MCR"

31 R83C12

"ANNUAL LABOR COST,
BURDENED"

32 R84C12

"OPERATORS PER SHIF
T"

33 R85C12

"CONVENTIONAL FUEL
COST, AVERGAE"

34 "NA"

"RDF FUEL COST, AVE
RAGE"

35 R86C12

"ASH DISPOSAL COST,
AVERAGE"

36 R87C12

"OPERATING HRS/YR I
N COFIRED STEAM SUP
PLY RANGE"

37 "NA"

"INCREMENTAL MAINTe
NANCE COST, ANNUAL"

38 R88C12

"AVAILABILITY, FRAC
TION"

39 R89C12

"ANNUAL STEAM PRODU
CTION, NET"

40 R90C12

"RELATIVE ELECTRIC
POWER ANNUAL COST"

41 R91C12

"ANNUAL CONVENTIONA
L FUEL COST"

42 "NA"

"ANNUAL RDF FUEL CO
ST"

43 R92C12

"ANNUAL ASH DISPOSA
L COST"

	4	5	6
44	R93C12		"ANNUAL MSW DISPOSAL COST"
45			
46	"NA"		"FURNACE COLD (MAKING CO & SMOKE) IF = 1"
47	"NA"		"NEW MAX EMISSIONS RATE W/ NEW CONTROL DEVICE"
48			" INCLUDED IN CAPITAL COST"
49			
50	"NA"		"BARE CAPITAL COST OF STORAGE SUBSYSTEM"
51	"NA"		"BARE CAPITAL COST OF LONG MECHANICAL CONVEYOR"
52	"NA"		"BARE CAPITAL COST OF SHORT MECHANICAL CONVEYOR"
53	"NA"		"BARE CAPITAL COST OF RDF DELIVERY SYSTEM"
54	"NA"		"BARE INCREMENTAL COST OF ASH HANDLING SYSTEM"
55	"NA"		"BARE INCREMENTAL CAPITAL COSTS FOR EMISSIONS CONTROL"
56	"NA"		"BARE INCREMENTAL COST FOR BOILER MODIFICATIONS"
57	"NA"		"BARE TOTAL INCREMENTAL CAPITAL COSTS"
58	"NA"		"BURDENED TOTAL INCREMENTAL CAPITAL COSTS"
59	R94C12		"CAPITAL RECOVERY FACTOR"
60	"NA"		"ANNUALIZED COST OF CAPITAL"
61	R95C12		"TOTAL ANNUAL O&M COST"
62	R96C12		"TOTAL ANNUAL COST INCLUDING COST OF CAPITAL"
63	R97C12		"TOTAL COAT PER MILLION BTU OF STEAM"
64	"NA"		"SIR (SAVINGS/INVESTMENT) AT EQUAL ANNUAL STEAM PRODUCTION"

	4	5	6
65	R98C12		"TOTAL O&M COST PER MILLION BTU OF STE AM"
66	"NA"		"O&M COSTS FOR PULV ERIZER IF NOT RDF B UT COAL USED AS ASF "
67	"NA"		"TONS PER YEAR RDF REQUIRED"
68	"NA"		"Avoided disposal c ost"
69	"NA"		"SIR w/disposal cre dit"
70			
71			
72			
73			
74			
75			
76			
77			
78			
79			
80			
81			
82			
83			
84			
85			
86			
87			
88			
89			
90			
91			
92			
93			
94			
95			
96			
97			
98			
99			
100			
101			
102			

1 7 8 9

2
3
4
5

6

7

8

9

10

11
12

13

14

15

16

17

18

19

20

21

7

8

9

22

23

24

25

26

27

28

29

30

31

32

33

34

35

36

37

38

39

40

41

42

43

7

8

9

44

45

46

47

48

49

50

51

52

53

54

55

56

57

58

59

60

61

62

63

64

7

8

9

65

66

67

68

69

70

71

72

73

74

75

76

77

78

79

80

81

82

83

84

85

86

87

88

89

90

91

92

93

94

95

96

97

98

99

100

101

102

	10	11	12
1			[WORK2 xferdat5]
2			[WORK2 xferdat5]
3			[WORK2 xferdat5]
4			[WORK2 xferdat5]
5			[WORK2 xferdat5]
6			[WORK2 xferdat5]
7			[WORK2 xferdat5]
8			[WORK2 xferdat5]
9			[WORK2 xferdat5]
10			[WORK2 xferdat5]
11			[WORK2 xferdat5]
12			[WORK2 xferdat5]
13			[WORK2 xferdat5]
14			[WORK2 xferdat5]
15			[WORK2 xferdat5]
16			[WORK2 xferdat5]
17			[WORK2 xferdat5]
18			[WORK2 xferdat5]
19			[WORK2 xferdat5]
20			[WORK2 xferdat5]
21			[WORK2 xferdat5]

	10	11	12
22			[WORK2 xferdat5]
23			[WORK2 xferdat5]
24			[WORK2 xferdat5]
25			[WORK2 xferdat5]
26			[WORK2 xferdat5]
27			[WORK2 xferdat5]
28			[WORK2 xferdat5]
29			[WORK2 xferdat5]
30			[WORK2 xferdat5]
31			[WORK2 xferdat5]
32			[WORK2 xferdat5]
33			[WORK2 xferdat5]
34			[WORK2 xferdat5]
35			[WORK2 xferdat5]
36			[WORK2 xferdat5]
37			[WORK2 xferdat5]
38			[WORK2 xferdat5]
39			[WORK2 xferdat5]
40			[WORK2 xferdat5]
41			[WORK2 xferdat5]
42			[WORK2 xferdat5]
43			[WORK2 xferdat5]

	10	11	12
44			[WORK2 xferdat5]
45			[WORK2 xferdat5]
46			[WORK2 xferdat5]
47			[WORK2 xferdat5]
48			[WORK2 xferdat5]
49			[WORK2 xferdat5]
50			[WORK2 xferdat5]
51			[WORK2 xferdat5]
52			[WORK2 xferdat5]
53			[WORK2 xferdat5]
54			[WORK2 xferdat5]
55			[WORK2 xferdat5]
56			[WORK2 xferdat5]
57			[WORK2 xferdat5]
58			[WORK2 xferdat5]
59			[WORK2 xferdat5]
60			[WORK2 xferdat5]
61			[WORK2 xferdat5]
62			[WORK2 xferdat5]
63			[WORK2 xferdat5]
64			[WORK2 xferdat5]

	10	11	12
65			[WORK2 xferdat5]
66			[WORK2 xferdat5]
67			[WORK2 xferdat5]
68			[WORK2 xferdat5]
69			[WORK2 xferdat5]
70			[WORK2 xferdat5]
71			[WORK2 xferdat5]
72			[WORK2 xferdat5]
73			[WORK2 xferdat5]
74			[WORK2 xferdat5]
75			[WORK2 xferdat5]
76			[WORK2 xferdat5]
77			[WORK2 xferdat5]
78			[WORK2 xferdat5]
79			[WORK2 xferdat5]
80			[WORK2 xferdat5]
81			[WORK2 xferdat5]
82			[WORK2 xferdat5]
83			[WORK2 xferdat5]
84			[WORK2 xferdat5]
85			[WORK2 xferdat5]
86			[WORK2 xferdat5]
87			[WORK2 xferdat5]
88			[WORK2 xferdat5]
89			[WORK2 xferdat5]
90			[WORK2 xferdat5]
91			[WORK2 xferdat5]
92			[WORK2 xferdat5]
93			[WORK2 xferdat5]
94			[WORK2 xferdat5]
95			[WORK2 xferdat5]
96			[WORK2 xferdat5]
97			[WORK2 xferdat5]
98			[WORK2 xferdat5]
99			[WORK2 xferdat5]
100			[WORK2 xferdat5]
101			[WORK2 xferdat5]
102			[WORK2 xferdat5]

APPENDIX E

COMPLETE OPERATIONAL AND ECONOMIC DATA OUTPUTS
FOR THE SENSITIVITY AND BEST CASE ANALYSIS

Summary of Sensitivity Analysis
Little Green Ammonious Base

definition	A		1		2		3		4	
	Baseline RDF	Conventional Fuel	Steam demand RDF	Conventional Fuel	RDF Cofiring	Conventional Fuel	RDF Cofiring	Moisture RDF	Conventional Fuel	RDF Cofiring
ENTHALPY TRANSFERRED TO STEAM, AVG HOURLY, 100% AVAILABILITY	5.82E+07	5.82E+07	6.48E+07	6.48E+07	6.48E+07	6.48E+07	6.48E+07	5.91E+07	5.91E+07	5.91E+07
MCR, ASS W/MT FOR COPIED CASE (REBATED AT MT VELOCITY)	8.64E+07	8.45E+07	8.64E+07	8.45E+07	8.64E+07	8.45E+07	8.64E+07	8.83E+07	8.45E+07	8.45E+07
MAXIMUM TURNDOWN STEAM RATINGS, SERP RTH	2.06E+07	2.06E+07	2.06E+07	2.06E+07	2.06E+07	2.06E+07	2.06E+07	2.06E+07	2.06E+07	2.06E+07
BOILER EFFICIENCY AT MCR	0.76	0.83	0.76	0.83	0.76	0.83	0.76	0.77	0.83	0.83
BOILER EFFICIENCY AT AVERAGE OUTPUT	0.71	0.83	0.71	0.83	0.71	0.83	0.71	0.71	0.83	0.83
MAXIMUM STEAM DEMAND (MSD)	1.50E+08	1.50E+08	1.50E+08	1.50E+08	1.50E+08	1.50E+08	1.50E+08	1.50E+08	1.50E+08	1.50E+08
DEBRATE	0	0	0	0	0	0	0	0	0.01	0.01
TOTAL FUEL INPUT ENTHALPY, AVERAGE	8.24E+07	7.00E+07	9.09E+07	7.79E+07	9.09E+07	7.79E+07	9.09E+07	8.27E+07	7.12E+07	6.85E+07
RDF FLOWRATE, AVERAGE	2.62	2.62	2.89	2.89	2.89	2.89	2.89	2.33	3.04	3.04
CONVENTIONAL FUEL INPUT ENTHALPY, AVERAGE	5073	5073	3953	3953	3953	3953	3953	3597	5158	4964
SOLID RESIDUE GENERATED, AVERAGE	1375	425	1475	474	1475	474	1475	1313	432	416
CARBON CONTENT OF SOLID RESIDUE, MAX HOURLY AT MCR	0.44	0.17	0.42	0.17	0.42	0.17	0.42	0.46	0.17	0.17
FLYASH FRACTION OF SOLID RESIDUE, AVERAGE	0.15	0.34	0.15	0.34	0.15	0.34	0.15	0.16	0.34	0.34
FLYASH EMISSION ABSOLUTE AND EXISTING CONTROL DEVICE AT MCR	2	2	2	2	2	2	2	2	2	2
EMISSION OF TSP, MAX HOURLY W/ EXISTING CONTROL DEVICE AT MCR	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
UNCONTROLLED FLYASH EMISSION, MAX HOURLY AT MCR	1.83	2.06	1.83	2.06	1.83	2.06	1.83	1.85	2.06	2.06
COMBUSTION AIR RATE, AVERAGE	80045	67977	88277	75677	88277	75677	88277	80333	69105	79685
COMBUSTION AIR VOLUMETRIC FLOWRATE, AVERAGE	17788	15106	19617	16817	19617	16817	19617	17852	15357	14788
NET FUEL GAS RATE, AVERAGE	87489	72625	96328	80851	96328	80851	96328	87214	73830	87874
NET FUEL GAS VOLUMETRIC FLOW, AVERAGE	22971	26798	28470	25834	28470	25834	28470	22954	27243	23066
EMISSION CONTROL DEVICE ASSUMED EFFICIENCY (EXISTING DEVICE)	1	1	1	1	1	1	1	1	1	1
NEW EMISSION CONTROL DEVICE REQUIRED 1= YES	0	0	0	0	0	0	0	0	0	0
ELECTRIC POWER COST FOR FD SYSTEM, AVERAGE	\$0.87	\$0.74	\$0.96	\$0.83	\$0.96	\$0.83	\$0.96	\$0.88	\$0.75	\$0.87
ELECTRIC POWER COST FOR ID SYSTEM, AVERAGE	\$1.79	\$0.00	\$2.20	\$0.00	\$2.20	\$0.00	\$2.20	\$1.79	\$0.00	\$1.80
MISC ELECTRIC POWER COSTS, AVERAGE	\$3.20	\$0.00	\$3.48	\$0.00	\$3.48	\$0.00	\$3.48	\$2.87	\$0.00	\$3.64
SOLID RESIDUE GENERATED, MAX HOURLY AT MCR	1429	618	1429	618	1429	618	1429	1354	618	1527
ANNUAL LABOR COST, BURDENSED	\$337,406	\$243,638	\$337,406	\$243,638	\$337,406	\$243,638	\$337,406	\$337,406	\$243,638	\$243,638
OPERATIONS PER SHIFT	2.31	1.67	2.31	1.67	2.31	1.67	2.31	2.31	1.67	1.67
CONVENTIONAL FUEL COST, AVERAGE	\$106.00	\$150.00	\$117.00	\$167.00	\$117.00	\$167.00	\$117.00	\$106.00	\$152.00	\$146.00
RDF FUEL COST, AVERAGE	\$5.00	\$5.00	\$6.00	\$6.00	\$6.00	\$6.00	\$6.00	\$5.00	\$6.00	\$6.00
ASH DISPOSAL COST, AVERAGE	\$10.45	\$3.23	\$11.20	\$3.60	\$11.20	\$3.60	\$11.20	\$9.97	\$3.28	\$3.16
OPERATING HRS/YR IN COPIED STEAM SUPPLY RANGE	6290	7862	6290	7862	6290	7862	6290	6290	7862	7862
INCREMENTAL MAINTENANCE COST, ANNUAL	\$25,773	\$25,754	\$25,754	\$25,754	\$25,754	\$25,754	\$25,754	\$25,702	\$25,702	\$25,702
AVAILABILITY, FRACTION	0.72	0.9	0.72	0.9	0.72	0.9	0.72	0.72	0.9	0.9
ANNUAL STEAM PRODUCTION, NET	3.66E+11	4.57E+11	4.07E+11	5.09E+11	4.07E+11	5.09E+11	4.07E+11	3.72E+11	4.65E+11	4.48E+11
RELATIVE ELECTRIC POWER ANNUAL COST	\$36,923	\$5,837	\$41,810	\$6,498	\$41,810	\$6,498	\$41,810	\$34,796	\$5,934	\$5,711
ANNUAL CONVENTIONAL FUEL COST	\$665,122	\$1,176,749	\$733,517	\$1,310,042	\$733,517	\$1,310,042	\$733,517	\$667,511	\$1,196,276	\$1,151,398
ANNUAL RDF FUEL COST	\$32,925	\$32,925	\$36,311	\$36,311	\$36,311	\$36,311	\$36,311	\$38,239	\$38,239	\$38,239
ANNUAL ASH DISPOSAL COST	\$65,710	\$25,399	\$70,450	\$28,276	\$70,450	\$28,276	\$70,450	\$62,711	\$25,820	\$24,852
ANNUAL NEW DISPOSAL COST	\$0	\$102,353	\$0	\$102,353	\$0	\$102,353	\$0	\$0	\$102,353	\$102,353
FURNACE COLD (WAKING CO & SMOKE) IF = 1	0	0	0	0	0	0	0	0	0	0
NEW MAX EMISSIONS RATE W/ NEW CONTROL DEVICE INCLUDED IN CAPITAL COST	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.85	1.81	1.81
BASE CAPITAL COST OF STORAGE SUBSYSTEM	\$109,411	\$109,411	\$109,010	\$109,010	\$109,010	\$109,010	\$109,010	\$104,234	\$115,640	\$115,640
BASE CAPITAL COST OF LONG MECHANICAL CONVEYOR	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
BASE CAPITAL COST OF SHORT MECHANICAL CONVEYOR	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
BASE CAPITAL COST OF RDF DELIVERY SYSTEM	\$95,263	\$95,263	\$95,263	\$95,263	\$95,263	\$95,263	\$95,263	\$96,041	\$94,735	\$94,735
BASE INCREMENTAL COST OF ASH HANDLING SYSTEM	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
BASE INCREMENTAL CAPITAL COSTS FOR EMISSIONS CONTROL	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
BASE INCREMENTAL CAPITAL COSTS FOR BOILER MODIFICATIONS	\$337,682	\$337,682	\$337,682	\$337,682	\$337,682	\$337,682	\$337,682	\$340,600	\$333,825	\$333,825

BASE TOTAL INCREMENTAL CAPITAL COSTS	\$542,356	\$541,953	\$541,953	\$540,875	\$543,710
BURDENED TOTAL INCREMENTAL CAPITAL COSTS	\$715,910	\$715,380	\$715,360	\$713,955	\$717,697
CAPITAL RECOVERY FACTOR	9.54	9.54	9.54	9.54	9.54
ANNUALIZED COST OF CAPITAL	\$0	\$0	\$0	\$0	\$0
TOTAL ANNUAL O&M COST	\$1,163,858	\$1,451,622	\$1,245,248	\$1,157,039	\$1,172,970
TOTAL ANNUAL COST INCLUDING COST OF CAPITAL	\$0	\$1,451,622	\$1,588,454	\$1,588,454	\$1,425,599
TOTAL COST PER MILLION BTU OF STEAM	\$0.00	\$3.17	\$0.00	\$0.00	\$0
SIA (SAVINGS/INVESTMENT) AT EQUAL ANNUAL STEAM PRODUCTION	-0.03	\$3.17	0.34	0.27	\$3.19
TOTAL O&M COST PER MILLION BTU OF STEAM	\$3.18	\$3.17	\$3.06	\$3.11	\$3.28
O&M COSTS FOR PULVERIZER IF NOT POF BUT COAL USED AS ASF	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
TONS PER YEAR POF REQUIRED	16463	18155	18155	14456	19120

Summary of Sensitivity Analysis
Little Creek Ambitious Base

definition

	5	6	7	8
	Excess Air RDF Cofiring	Conventional Fuel	Percent Ash RDF Cofiring	Conventional Fuel
ENTHALPY TRANSFERRED TO STEAM, AVG HOURLY, 100% AVAILABILITY	6.17E+07	6.17E+07	5.79E+07	5.74E+07
MCR, ABS MAX FOR CERTIFIED CASE (HEATED AT HT VELOCITY)	9.33E+07	8.52E+07	8.57E+07	8.49E+07
MAXIMUM TURBIDITY STEAM RATING, SEEM BTU/H	2.07E+07	2.04E+07	2.05E+07	2.03E+07
BOILER EFFICIENCY AT MCR	0.77	0.84	0.76	0.83
BOILER EFFICIENCY AT AVERAGE OUTPUT	0.72	0.84	0.7	0.83
MAXIMUM STEAM DEMAND (MSD)	1.50E+08	1.50E+08	1.50E+08	1.50E+08
DEBRATE	0	0.04	0	0
TOTAL FUEL INPUT ENTHALPY, AVERAGE	8.61E+07	7.36E+07	8.24E+07	6.91E+07
RDF FLOWRATE, AVERAGE	2.73	2.51	3.05	3.66
CONVENTIONAL FUEL INPUT ENTHALPY, AVERAGE	3745	3444	3582	3578
SOLID RESIDUE GENERATED, AVERAGE	1417	1337	1337	1420
CARBON CONTENT OF SOLID RESIDUE, MAX HOURLY AT MCR	0.43	0.44	0.29	0.17
FLYASH FRACTION OF SOLID RESIDUE, AVERAGE	0.15	0.14	0.09	0.34
FLYASH EMISSION ABSOLUTE AND EXISTING CONTROL DEVICE AT MCR	2	2	2	2
EMISSION OF TSP, MAX HOURLY W/ EXISTING CTRL AT MCR	0.02	0.02	0.02	0.02
UNCONTROLLED FLYASH EMISSION, MAX HOURLY AT MCR	1.85	1.82	1.83	2.06
COMBUSTION AIR RATE, AVERAGE	77335	66076	79984	79899
COMBUSTION AIR VOLUMETRIC FLOWRATE, AVERAGE	17185	14684	17774	17755
NET FUEL GAS RATE, AVERAGE	85131	70962	87596	87746
NET FUEL GAS VOLUMETRIC FLOW, AVERAGE	23622	22780	22988	23030
EMISSION CTRL DEVICE ASSUMED EFFICIENCY (EXISTING DEVICE)	1	1	1	1
NEW EMISSION CONTROL DEVICE REQUIRED 1= YES	0	0	0	0
ELECTRIC POWER COST FOR FD SYSTEM, AVERAGE	\$0.84	\$0.90	\$0.87	\$0.73
ELECTRIC POWER COST FOR ID SYSTEM, AVERAGE	\$1.77	\$0.00	\$1.80	\$0.00
MISC ELECTRIC POWER COSTS, AVERAGE	\$3.32	\$0.00	\$3.65	\$0.00
SOLID RESIDUE GENERATED, MAX HOURLY AT MCR	1530	1342	2379	3638
OPERATORS PER SHIFT	2.32	2.3	2.31	2.31
CONVENTIONAL FUEL COST, AVERAGE	\$10.00	\$102.00	\$106.00	\$106.00
RDF FUEL COST, AVERAGE	\$5.00	\$5.00	\$6.00	\$7.00
ASH DISPOSAL COST, AVERAGE	\$10.76	\$3.40	\$15.74	\$3.21
OPERATING HRS/YR IN CERTIFIED STEAM SUPPLY RANGE	6290	7862	6290	7862
INCREMENTAL MAINTENANCE COST, ANNUAL	\$26,323	\$25,086	\$26,031	\$26,348
AVAILABILITY, FRACTION	0.72	0.72	0.72	0.9
ANNUAL STEAM PRODUCTION, NET	3,88E+11	4,34E+11	3,64E+11	4,52E+11
RELATIVE ELECTRIC POWER ANNUAL COST	\$37,359	\$36,684	\$39,742	\$5,805
ANNUAL CONVENTIONAL FUEL COST	\$634,841	\$639,052	\$664,612	\$1,170,352
ANNUAL RDF FUEL COST	\$34,396	\$31,635	\$38,383	\$46,011
ANNUAL ASH DISPOSAL COST	\$67,694	\$26,696	\$99,000	\$25,069
ANNUAL ASH DISPOSAL COST	\$0	\$102,393	\$0	\$102,393
NEW MAX EMISSIONS RATE W/ NEW CONTROL DEVICE	0	0	0	0
INCLUDED IN CAPITAL COST	1.85	1.82	1.83	1.81
BARE CAPITAL COST OF STORAGE SUBSYSTEM	\$112,137	\$106,911	\$116,070	\$124,442
BARE CAPITAL COST OF LONG MECHANICAL CONVEYOR	\$0	\$0	\$0	\$0
BARE CAPITAL COST OF SHORT MECHANICAL CONVEYOR	\$98,012	\$92,743	\$95,005	\$94,646
BARE INCREMENTAL COST OF ASH HANDLING SYSTEM	\$0	\$0	\$0	\$0
BARE INCREMENTAL CAPITAL COSTS FOR EMISSIONS CONTROL	\$0	\$0	\$0	\$0
BARE INCREMENTAL COST FOR BOILER MODIFICATIONS	\$347,993	\$328,249	\$336,718	\$335,373

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106	2107	2108	2109	2110	2111	2112	2113	2114	2115	2116	2117	2118	2119	2120	2121	2122	2123	2124	2125	2126	2127	2128	2129	2130	2131	2132	2133	2134	2135	2136	2137	2138	2139	2140	2141	2142	2143	2144	2145	2146	2147	2148	2149	2150	2151	2152	2153	2154	2155	2156	2157	2158	2159	2160	2161	2162	2163	2164	2165	2166	2167	2168	2169	2170	2171	2172	2173	2174	2175	2176	2177	2178	2179	2180	2181	2182	2183	2184	2185	2186	2187	2188	2189	2190	2191	2192	2193	2194	2195	2196	2197	2198	2199	2200	2201	2202	2203	2204	2205	2206	2207	2208	2209	2210	2211	2212	2213	2214	2215	2216	2217	2218	2219	2220	2221	2222	2223	2224	2225	2226	2227	2228	2229	2230	2231	2232	2233	2234	2235	2236	2237	2238	2239	2240	2241	2242	2243	2244	2245	2246	2247	2248	2249	2250	2251	2252	2253	2254	2255	2256	2257	2258	2259	2260	2261	2262	2263	2264	2265	2266	2267	2268	2269	2270	2271	2272	2273	2274	2275	2276	2277	2278	2279	2280	2281	2282	2283	2284	2285	2286	2287	2288	2289	2290	2291	2292	2293	2294	2295	2296	2297	2298	2299	2300	2301	2302	2303	2304	2305	2306	2307	2308	2309	2310	2311	2312	2313	2314	2315	2316	2317	2318	2319	2320	2321	2322	2323	2324	2325	2326	2327	2328	2329	2330	2331	2332	2333	2334	2335	2336	2337	2338	2339	2340	2341	2342	2343	2344	2345	2346	2347	2348	2349	2350	2351	2352	2353	2354	2355	2356	2357	2358	2359	2360	2361	2362	2363	2364	2365	2366	2367	2368	2369	2370	2371	2372	2373	2374	2375	2376	2377	2378	2379	2380	2381	2382	2383	2384	2385
--	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------

Summary of Sensitivity Analysis
Little Creek Dairies Base

definition

ENTHALPY TRANSFERRED TO STEAM, AVG HOURLY, 100% AVAILABILITY
MCR, AIR NOT FOR CIFIED CASE (REPORTED AT M VELOCITY)

MAXIMUM TURBIDITY STEAM BATING, SEAM BTM

ROLLER EFFICIENCY AT MCR

ROLLER EFFICIENCY AT AVERAGE OUTPUT

MAXIMUM STEAM DEMAND (MSD)

DEWITE

TOTAL FUEL INPUT ENTHALPY, AVERAGE

ROF FLOWRATE, AVERAGE

CONVENTIONAL FUEL INPUT ENTHALPY, AVERAGE

SOLID RESIDUE GENERATED, AVERAGE

CARBON CONTENT OF SOLID RESIDUE, MAX HOURLY AT MCR

FLYASH FRACTION OF SOLID RESIDUE, AVERAGE

FLYASH EMISSION ABSOLUTE AND EXISTING CONTROL DEVICE AT MCR

EMISSION OF TSP, MAX HOURLY W/ EXISTING CTRL AT MCR

UNCONTROLLED FLYASH EMISSION, MAX HOURLY AT MCR

COMBUSTION AIR RATE, AVERAGE

COMBUSTION AIR VOLUMETRIC FLOWRATE, AVERAGE

NET FUEL GAS RATE, AVERAGE

EMISSION CTRL DEVICE ASSUMED EFFICIENCY (EXISTING DEVICE)

NEW EMISSION CONTROL DEVICE REQUIRED 1= YES

ELECTRIC POWER COST FOR FD SYSTEM, AVERAGE

ELECTRIC POWER COST FOR ID SYSTEM, AVERAGE

MISC ELECTRIC POWER COSTS, AVERAGE

SOLID RESIDUE GENERATED, MAX HOURLY AT MCR

ANNUAL LABOR COST, BURDENED

OPERATORS PER SHIFT

CONVENTIONAL FUEL COST, AVERAGE

ROF FUEL COST, AVERAGE

ASH DISPOSAL COST, AVERAGE

OPERATING HRS/YR IN CIFIED STEAM SUPPLY RANGE

INCREMENTAL MAINTENANCE COST, ANNUAL

AVAILABILITY, FRACTION

ANNUAL STEAM PRODUCTION, NET

RELATIVE ELECTRIC POWER ANNUAL COST

ANNUAL CONVENTIONAL FUEL COST

ANNUAL ROF FUEL COST

ANNUAL ASH DISPOSAL COST

ANNUAL MSW DISPOSAL COST

FURNACE COLD (WAKING CO & SMOKE) IF = 1

NEW MCR EMISSIONS RATE W/ NEW CONTROL DEVICE

INCLUDED IN CAPITAL COST

BASE CAPITAL COST OF STORAGE SLUGS STEM

BASE CAPITAL COST OF LONG MECHANICAL CONVEYOR

BASE CAPITAL COST OF SHORT MECHANICAL CONVEYOR

BASE CAPITAL COST OF ROF DELIVERY SYSTEM

BASE INCREMENTAL COST OF ASH HANDLING SYSTEM

BASE INCREMENTAL CAPITAL COSTS FOR EMISSIONS CONTROL

BASE INCREMENTAL COST FOR BOILER MODIFICATIONS

	9	10	11	12
ROF HAV	ROF Cost	ROF Cost	ROF Cost	ROF Cost
Confining	Confining	Confining	Confining	Confining
Conventional	Conventional	Conventional	Conventional	Conventional
Fuel	Fuel	Fuel	Fuel	Fuel
5.65E+07	5.74E+07	5.82E+07	5.82E+07	5.82E+07
8.29E+07	8.48E+07	8.64E+07	8.64E+07	8.64E+07
2.01E+07	2.04E+07	2.06E+07	2.06E+07	2.06E+07
0.75	0.76	0.76	0.76	0.76
0.83	0.83	0.83	0.83	0.83
0.69	0.7	0.71	0.71	0.71
1.50E+08	1.50E+08	1.50E+08	1.50E+08	1.50E+08
0.02	0	0	0	0
8.18E+07	8.21E+07	8.24E+07	8.24E+07	8.24E+07
3.34	2.93	2.62	2.62	2.62
3556	3572	3585	3585	3585
1516	1437	1375	1375	1375
0.4	0.42	0.44	0.44	0.44
0.12	0.14	0.15	0.15	0.15
2	2	2	2	2
0.02	0.02	0.02	0.02	0.02
1.8	1.82	1.83	1.83	1.83
79405	79759	80045	80045	80045
17646	17724	17788	17788	17788
88121	87761	87489	87489	87489
23087	23002	22971	22971	22971
1	1	1	1	1
0	0	0	0	0
90.87	90.87	90.87	90.87	90.87
\$1.81	\$1.80	\$1.79	\$1.79	\$1.79
\$3.94	\$3.94	\$3.20	\$3.20	\$3.20
1600	1505	1429	1429	1429
\$337,406	\$337,406	\$337,406	\$337,406	\$337,406
\$105.00	\$105.00	\$106.00	\$106.00	\$106.00
\$7.00	\$6.00	\$101.00	\$101.00	\$101.00
\$11.52	\$10.92	\$10.45	\$10.45	\$10.45
\$25,946	\$25,859	\$25,773	\$25,773	\$25,773
0.72	0.72	0.72	0.72	0.72
3.55E+11	3.61E+11	3.66E+11	3.66E+11	3.66E+11
\$41,617	\$39,000	\$36,923	\$36,923	\$36,923
\$659,801	\$662,743	\$665,122	\$665,122	\$665,122
\$41,994	\$36,908	\$33,314	\$33,314	\$33,314
\$72,432	\$68,669	\$65,710	\$65,710	\$65,710
\$0	\$0	\$0	\$0	\$0
1.8	1.82	1.83	1.83	1.83
\$119,800	\$114,186	\$109,411	\$109,411	\$109,411
\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0
\$93,841	\$94,637	\$95,263	\$95,263	\$95,263
\$0	\$0	\$0	\$0	\$0
\$0	\$0	\$0	\$0	\$0
\$332,359	\$335,340	\$337,682	\$337,682	\$337,682

BARE TOTAL INCREMENTAL CAPITAL COSTS
 BURDENED TOTAL INCREMENTAL CAPITAL COSTS
 CAPITAL RECOVERY FACTOR
 ANNUALIZED COST OF CAPITAL
 TOTAL ANNUAL O&M COST
 TOTAL ANNUAL COST INCLUDING COST OF CAPITAL
 TOTAL COST PER MILLION BTU OF STEAM
 S/R (SAVINGS/INVESTMENT) AT EQUAL ANNUAL STEAM PRODUCTION
 TOTAL O&M COST PER MILLION BTU OF STEAM
 O&M COSTS FOR FERTILIZER IF NO RDF BUT IDEAL USED AS REF
 TONS PER YEAR RDF REQUIRED

\$546,001	\$544,163	\$542,356	\$542,356
\$720,721	\$718,298	\$715,910	\$715,910
9.54	9.54	9.54	9.54
\$0	\$0	\$0	\$0
\$1,179,196	\$1,170,584	\$1,764,247	\$1,447,672
\$1,415,741	\$1,435,724	\$1,451,623	\$1,451,623
\$0	\$0	\$0	\$0
\$0.00	\$0.00	\$0.00	\$0.00
-0.62	-0.29	-8.03	-3.82
\$3.32	\$3.24	\$4.82	\$3.96
\$0.00	\$0.00	\$0.00	\$0.00
20997	18454	16463	16463

Summary of Sensitivity Analysis
Little Creek Nonhazardous Base

Definition

Definition	13 Cofire Ratio		14		15		16	
	RDF	Conventional Fuel	RDF	Conventional Fuel	RDF	Conventional Fuel	RDF	Conventional Fuel
ENTHALPY TRANSFERRED TO STEAM, AVG HOURLY, 100% AVAILABILITY	6.08E+07	6.08E+07	5.57E+07	5.57E+07	5.82E+07	5.82E+07	5.82E+07	5.82E+07
MCR OBS WAT FOR DESIGNED CASE (REPORTED AT 11 VELOCITY)	5.15E+07	8.45E+07	8.14E+07	8.45E+07	8.64E+07	8.45E+07	8.64E+07	8.45E+07
MAXIMUM TURBIDITY STEAM RATING, SCHEM B704	2.15E+07		1.95E+07		2.06E+07		2.06E+07	
BOILER EFFICIENCY AT MCR	0.79	0.83	0.74	0.83	0.76	0.83	0.76	0.83
BOILER EFF. (CONST) AT AVERAGE OUTPUT	0.76	0.83	0.68	0.83	0.71	0.83	0.71	0.83
MAXIMUM STEAM DEMAND (MSD)	1.50E+08	1.50E+08	1.50E+08	1.50E+08	1.50E+08	1.50E+08	1.50E+08	1.50E+08
DEWATE	0		0.04		0		0	
TOTAL FUEL INPUT ENTHALPY, AVERAGE	8.04E+07	7.31E+07	8.51E+07	6.70E+07	8.24E+07	7.00E+07	8.24E+07	7.00E+07
RDF FLOWRATE, AVERAGE	1.28		4.05		2.62		2.62	
CONVENTIONAL FUEL INPUT ENTHALPY, AVERAGE	4660	5300	2466	4856	3585	5073	3585	5073
SOLID RESIDUE GENERATED, AVERAGE	982	444	1803	407	1375	425	1375	425
CARBON CONTENT OF SOLID RESIDUE, MAX HOURLY AT MCR	0.41	0.17	0.45	0.17	0.44	0.17	0.44	0.17
FLYASH FRACTION OF SOLID RESIDUE, AVERAGE	0.2	0.34	0.11	0.34	0.15	0.34	0.15	0.34
FLYASH EMISSION ABSOLUTE AND EXISTING CONTROL DEVICE AT MCR	2	2	2	2	2	2	2	2
EMISSION OF TSP, MAX HOURLY W/ EXISTING CNTRL AT MCR	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
UNCONTROLLED FLYASH EMISSION, MAX HOURLY AT MCR	1.9	2.06	1.76	2.06	1.83	2.06	1.83	2.06
COMBUSTION AIR RATE, AVERAGE	78041	71017	82611	65069	80045	67977	80045	67977
COMBUSTION AIR VOLUMETRIC FLOWRATE, AVERAGE	15742	15782	16358	14460	17788	15106	17788	15106
NET FUEL GAS RATE, AVERAGE	84270	75873	91378	69519	87489	72625	87489	72625
NET FUEL GAS VOLUMETRIC FLOW, AVERAGE	23119	27997	22972	25532	22971	26798	22971	26798
EMISSION CNTRL DEVICE ASSUMED EFFICIENCY (EXISTING DEVICE)	1	1	1	1	1	1	1	1
NEW EMISSION CONTROL DEVICE REQUIRED IF YES	0	0	0	0	0	0	0	0
ELECTRIC POWER COST FOR IO SYSTEM, AVERAGE	\$0.85	\$0.78	\$0.90	\$0.71	\$0.87	\$0.74	\$0.87	\$0.74
ELECTRIC POWER COST FOR IO SYSTEM, AVERAGE	\$1.73	\$0.00	\$1.87	\$0.00	\$1.79	\$0.00	\$1.79	\$0.00
MISC ELECTRIC POWER COSTS, AVERAGE	\$1.74	\$0.00	\$4.64	\$0.00	\$3.20	\$0.00	\$3.20	\$0.00
SOLID RESIDUE GENERATED, MAX HOURLY AT MCR	1121	618	1725	618	1429	618	1429	618
ANNUAL LABOR COST, BURDENED	\$289,685	\$243,638	\$368,836	\$243,638	\$337,406	\$243,638	\$337,406	\$243,638
OPERATORS PER SHIFT	1.98	1.67	2.53	1.67	2.31	1.67	2.31	1.67
CONVENTIONAL FUEL COST, AVERAGE	\$137.00	\$156.00	\$73.00	\$143.00	\$159.00	\$225.00	\$211.00	\$299.00
RDF FUEL COST, AVERAGE	\$3.00		\$8.00		\$5.00		\$5.00	
ASH DISPOSAL COST, AVERAGE	\$7.46	\$3.37	\$13.69	\$3.09	\$10.45	\$3.23	\$10.45	\$3.23
OPERATING HRS/YR IN CONTROLLED STEAM SUPPLY RANGE	6290	7862	6290	7862	6290	7862	6290	7862
INCREMENTAL MAINTENANCE COST, ANNUAL	\$23,952		\$26,950		\$25,773		\$25,773	
AVAILABILITY, FRACTION	0.72	0.9	0.72	0.9	0.72	0.9	0.72	0.9
ANNUAL STEAM PRODUCTION, MT	3.82E+11	4.78E+11	3.50E+11	4.38E+11	3.66E+11	4.57E+11	3.66E+11	4.57E+11
RELATIVE ELECTRIC POWER ANNUAL COST	\$27,196	\$6,098	\$46,665	\$5,587	\$36,923	\$5,837	\$36,923	\$5,837
ANNUAL CONVENTIONAL FUEL COST	\$864,619	\$1,229,386	\$457,627	\$1,126,416	\$997,683	\$1,765,123	\$1,330,245	\$2,353,497
ANNUAL RDF FUEL COST	\$16,050		\$50,971		\$32,925		\$32,925	
ANNUAL ASH DISPOSAL COST	\$46,934	\$26,535	\$86,135	\$24,313	\$65,710	\$25,399	\$65,710	\$25,399
ANNUAL ASH DISPOSAL COST*	\$0	\$102,393	\$0	\$102,393	\$0	\$102,393	\$0	\$102,393
FURNACE COLD (WORKING CO & SMOKE) IF = 1	0		0		0		0	
NEW MAX EMISSIONS RATE W/ NEW CONTROL DEVICE	1.9		1.76		1.83		1.83	
INCLUDED IN CAPITAL COST								
BASE CAPITAL COST OF STORAGE SILOS/STEIN	\$83,151		\$128,953		\$109,411		\$109,411	
BASE CAPITAL COST OF LONG MECHANICAL CONVEYOR	\$0		\$0		\$0		\$0	
BASE CAPITAL COST OF SHORT MECHANICAL CONVEYOR	\$0		\$0		\$0		\$0	
BASE CAPITAL COST OF RDF DELIVERY SYSTEM	\$75,422		\$108,202		\$95,263		\$95,263	
BASE INCREMENTAL COST OF ASH HANDLING SYSTEM	\$0		\$0		\$0		\$0	
BASE INCREMENTAL CAPITAL COSTS FOR EMISSIONS CONTROL	\$0		\$0		\$0		\$0	
BASE INCREMENTAL COST FOR BOILER MODIFICATIONS	\$345,458		\$329,974		\$337,682		\$337,682	

BARE TOTAL INCREMENTAL CAPITAL COSTS
 BURDENED TOTAL INCREMENTAL CAPITAL COSTS
 CAPITAL RECOVERY FACTOR
 ANNUALIZED COST OF CAPITAL
 TOTAL ANNUAL O&M COST
 TOTAL ANNUAL COST INCLUDING COST OF CAPITAL
 TOTAL COST PER MILLION BTU OF STEAM
 S/F (SAVINGS/INVESTMENT) AT EXAL ANNUAL STEAM PRODUCTION
 TOTAL O&M COST PER MILLION BTU OF STEAM
 24% COSTS FOR MAINTENANCE IF NOT ROP BUT O&M USED AS ROP
 TONS PER YEAR ROP REQUIRED

\$504,030	\$567,130	\$542,356	\$42,356,00
\$365,320	\$748,612	\$715,910	\$715,910
9.34	9.54	9.54	9.54
40	40	40	0
\$1,368,436	\$1,037,234	\$2,039,997	\$1,828,980
40	40	\$2,039,997	40
\$0.00	\$0.00	\$4.46	\$0.00
-0.92	1.05	3.65	3.65
\$3.32	\$2.96	\$4.46	\$5.00
\$0.00	\$0.00	\$0.00	\$0.00
8025	25485	16463	16463

Summary of Sensitivity Analysis
Little Creek Non-hazardous Base

definition

ENTHALPY TRANSMISSION TO STEAM, AVG HOURLY, 100% AVAILABILITY
WCR, ABS MAX FOR CONTROL CASE (OPERATED AT 10% VELOCITY)
MAXIMUM WINDOWN STEAM RATING, SEAP STOP
RELATIVE EFFICIENCY AT WCR
RELATIVE EFFICIENCY AT AVERAGE OUTPUT
MAXIMUM STEAM DEMAND (MSD)
DERATE
TOTAL FUEL INPUT ENTHALPY, AVERAGE
ROF FLOWRATE, AVERAGE
CONVENTIONAL FUEL INPUT ENTHALPY, AVERAGE
SOLID RESIDUE GENERATED, AVERAGE
CARBON CONTENT OF SOLID RESIDUE, MAX HOURLY AT WCR
FLYASH FRACTION OF SOLID RESIDUE, AVERAGE
FLYASH EMISSION ABSOLUTE AND EXISTING CONTROL DEVICE AT WCR
EMISSION OF TSP, MAX HOURLY W/ EXISTING CONTR. AT WCR
UNCONTROLLED FLYASH EMISSION, MAX HOURLY AT WCR
COMBUSTION AIR RATE, AVERAGE
COMBUSTION AIR VOLUMETRIC FLOWRATE, AVERAGE
NET FUEL GAS RATE, AVERAGE
NET FUEL GAS VOLUMETRIC FLOW, AVERAGE
EMISSION CONTR. DEVICE ASSUMED EFFICIENCY (EXISTING DEVICE)
NEW EMISSION CONTROL DEVICE REQUIRED IF YES
ELECTRIC POWER COST FOR FD SYSTEM, AVERAGE
ELECTRIC POWER COST FOR ID SYSTEM, AVERAGE
MISC ELECTRIC POWER COSTS, AVERAGE
SOLID RESIDUE GENERATED, MAX HOURLY AT WCR
ANNUAL LABOR COST, BURDENED
OPERATIONS PER SHIFT
CONVENTIONAL FUEL COST, AVERAGE
ROF FUEL COST, AVERAGE
ASH DISPOSAL COST, AVERAGE
OPERATING HRS/YR IN CONTROLLED STEAM SUPPLY RANGE
INCREMENTAL MAINTENANCE COST, ANNUAL
AVAILABILITY, FRACTION
ANNUAL STEAM PRODUCTION, M³
RELATIVE ELECTRIC POWER ANNUAL COST
ANNUAL CONVENTIONAL FUEL COST
ANNUAL ROF FUEL COST
ANNUAL ASH DISPOSAL COST
ANNUAL MSD DISPOSAL COST
FURNACE COLD (WINDING CO & SMOKE) IF = 1
NEW MAX EMISSIONS RATE W/ NEW CONTROL DEVICE
INCLUDED IN CAPITAL COST
BASE CAPITAL COST OF STORAGE BAGS STEEN
BASE CAPITAL COST OF LONG MECHANICAL CONVEYOR
BASE CAPITAL COST OF 5-40" MECHANICAL CONVEYOR
BASE CAPITAL COST OF ROF DELIVERY SYSTEM
BASE INCREMENTAL COST OF ASH HANDLING SYSTEM
BASE INCREMENTAL CAPITAL COSTS FOR EMISSIONS CONTROL
BASE INCREMENTAL COST FOR BOILER MODIFICATIONS

	17	18	19	20
	MSW Disposal ROF		Ash Disposal ROF	
	Confining	Confining	Confining	Confining
	Fuel	Fuel	Fuel	Fuel
ENTHALPY TRANSMISSION TO STEAM, AVG HOURLY, 100% AVAILABILITY	5.82E+07	5.82E+07	5.82E+07	5.82E+07
WCR, ABS MAX FOR CONTROL CASE (OPERATED AT 10% VELOCITY)	8.64E+07	8.64E+07	8.64E+07	8.64E+07
MAXIMUM WINDOWN STEAM RATING, SEAP STOP	2.06E+07	2.06E+07	2.06E+07	2.06E+07
RELATIVE EFFICIENCY AT WCR	0.76	0.76	0.76	0.76
RELATIVE EFFICIENCY AT AVERAGE OUTPUT	0.83	0.83	0.83	0.83
MAXIMUM STEAM DEMAND (MSD)	1.50E+08	1.50E+08	1.50E+08	1.50E+08
DERATE	0	0	0	0
TOTAL FUEL INPUT ENTHALPY, AVERAGE	8.24E+07	7.00E+07	8.35E+07	7.00E+07
ROF FLOWRATE, AVERAGE	2.62	2.62	2.66	2.7
CONVENTIONAL FUEL INPUT ENTHALPY, AVERAGE	3585	5073	3702	5073
SOLID RESIDUE GENERATED, AVERAGE	1375	1375	1472	1472
CARBON CONTENT OF SOLID RESIDUE, MAX HOURLY AT WCR	0.44	0.44	0.46	0.49
FLYASH FRACTION OF SOLID RESIDUE, AVERAGE	0.15	0.15	0.15	0.15
FLYASH EMISSION ABSOLUTE AND EXISTING CONTROL DEVICE AT WCR	2	2	2	2
EMISSION OF TSP, MAX HOURLY W/ EXISTING CONTR. AT WCR	0.02	0.02	0.02	0.02
UNCONTROLLED FLYASH EMISSION, MAX HOURLY AT WCR	1.83	1.83	1.83	1.83
COMBUSTION AIR RATE, AVERAGE	80045	67977	81470	67977
COMBUSTION AIR VOLUMETRIC FLOWRATE, AVERAGE	17788	15106	18371	15106
NET FUEL GAS RATE, AVERAGE	87489	72625	88974	72625
NET FUEL GAS VOLUMETRIC FLOW, AVERAGE	22971	26798	22971	26798
EMISSION CONTR. DEVICE ASSUMED EFFICIENCY (EXISTING DEVICE)	1	1	1	1
NEW EMISSION CONTROL DEVICE REQUIRED IF YES	0	0	0	0
ELECTRIC POWER COST FOR FD SYSTEM, AVERAGE	\$0.87	\$0.74	\$0.89	\$0.74
ELECTRIC POWER COST FOR ID SYSTEM, AVERAGE	\$1.79	\$1.79	\$1.82	\$1.85
MISC ELECTRIC POWER COSTS, AVERAGE	\$3.20	\$3.20	\$3.25	\$3.29
SOLID RESIDUE GENERATED, MAX HOURLY AT WCR	1429	1429	1429	1429
ANNUAL LABOR COST, BURDENED	\$337,406	\$243,638	\$337,406	\$243,638
OPERATIONS PER SHIFT	2.31	2.31	2.31	2.31
CONVENTIONAL FUEL COST, AVERAGE	\$106.00	\$106.00	\$108.00	\$108.00
ROF FUEL COST, AVERAGE	\$5.00	\$5.00	\$5.00	\$5.00
ASH DISPOSAL COST, AVERAGE	\$10.45	\$3.23	\$16.77	\$4.85
OPERATING HRS/YR IN CONTROLLED STEAM SUPPLY RANGE	6290	7862	6290	7862
INCREMENTAL MAINTENANCE COST, ANNUAL	\$25,773	\$25,773	\$25,809	\$25,839
AVAILABILITY, FRACTION	0.72	0.72	0.72	0.72
ANNUAL STEAM PRODUCTION, M ³	3.66E+11	4.57E+11	3.66E+11	4.57E+11
RELATIVE ELECTRIC POWER ANNUAL COST	\$36,923	\$5,837	\$37,516	\$5,837
ANNUAL CONVENTIONAL FUEL COST	\$665,122	\$1,176,749	\$676,955	\$1,176,749
ANNUAL ROF FUEL COST	\$32,925	\$32,925	\$33,511	\$34,005
ANNUAL ASH DISPOSAL COST	\$65,710	\$25,399	\$105,494	\$38,107
ANNUAL MSD DISPOSAL COST	\$0	\$0	\$0	\$0
FURNACE COLD (WINDING CO & SMOKE) IF = 1	0	0	0	0
NEW MAX EMISSIONS RATE W/ NEW CONTROL DEVICE	1.83	1.83	1.83	1.83
INCLUDED IN CAPITAL COST				
BASE CAPITAL COST OF STORAGE BAGS STEEN	\$109,411	\$109,411	\$110,167	\$110,797
BASE CAPITAL COST OF LONG MECHANICAL CONVEYOR	\$0	\$0	\$0	\$0
BASE CAPITAL COST OF 5-40" MECHANICAL CONVEYOR	\$0	\$0	\$0	\$0
BASE CAPITAL COST OF ROF DELIVERY SYSTEM	\$95,263	\$95,263	\$95,263	\$95,263
BASE INCREMENTAL COST OF ASH HANDLING SYSTEM	\$0	\$0	\$0	\$0
BASE INCREMENTAL CAPITAL COSTS FOR EMISSIONS CONTROL	\$0	\$0	\$0	\$0
BASE INCREMENTAL COST FOR BOILER MODIFICATIONS	\$337,682	\$337,682	\$337,682	\$337,682

BASE TOTAL INCREMENTAL CAPITAL COSTS
 BURDENED TOTAL INCREMENTAL CAPITAL COSTS
 CAPITAL RECOVERY FACTOR
 ANNUALIZED COST OF CAPITAL
 TOTAL ANNUAL O&M COST
 TOTAL ANNUAL COST INCLUDING COST OF CAPITAL
 TOTAL COST PER MILLION BTU OF STEAM
 SIR (SAVINGS/INVESTMENT) AT EQUAL ANNUAL STEAM PRODUCTION
 TOTAL O&M COST PER MILLION BTU OF STEAM
 O&M COSTS FOR PALMERIER IF NOT 40% FCU COAL USED AS ASF
 TONS PER YEAR HPF REQUIRED

542356.00	542356.00	543111.00	543742.00
\$715,910	\$715,910	\$716,907	\$717,739
\$9.54	\$9.54	\$9.54	\$9.54
0	0	0	0
\$1,163,858	\$1,163,858	\$1,216,690	\$1,270,586
\$0	\$0	\$0	\$0
\$0.00	\$0.00	\$0.00	\$0.00
-0.03	-0.03	-0.60	-1.18
\$3.18	\$3.18	\$3.32	\$3.47
\$0.00	\$0.00	\$0.00	\$0.00
16463	16463	16755	17062
			\$1,477.02*
			\$1,477.02*
			\$3.23
			\$3.23

AD-A173 981

RDF (REFUSE-DERIVED FUEL) CO-FIRING COST/BENEFIT
ANALYSIS USING THE NCEL R. (U) SYSTECH CORP XENIA OH
H BELENCAN ET AL. AUG 86 NCEL-CR-86.012-VOL-2

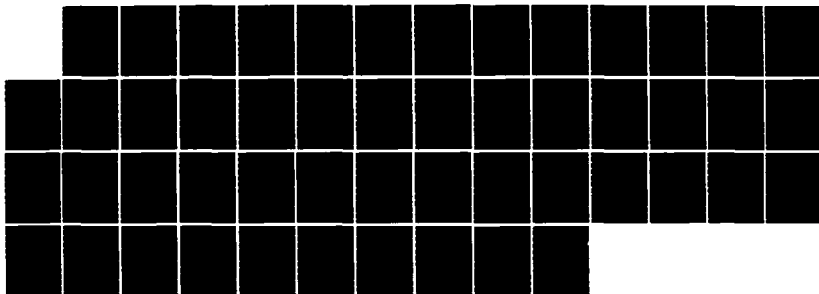
3/3

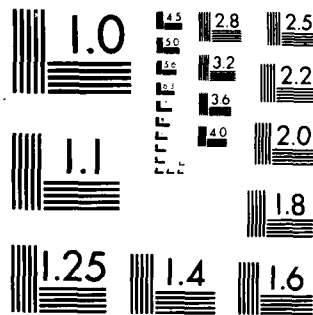
UNCLASSIFIED

N00123-83-D-0149

F/G 21/4

NL





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

BASE TOTAL INCREMENTAL CAPITAL COSTS
 BUDGETED TOTAL INCREMENTAL CAPITAL COSTS
 CAPITAL RECOVERY FACTOR
 ANNUALIZED COST OF CAPITAL
 TOTAL ANNUAL O&M COST
 TOTAL ANNUAL COST INCLUDING COST OF CAPITAL
 TOTAL COST PER MILLION BTU OF STEAM
 SIA (SINKING/INVESTMENT) AT EQUAL ANNUAL STEAM PRODUCTION
 TOTAL O&M COST PER MILLION BTU OF STEAM
 O&M COSTS FOR PULVERIZER IF NOT ROF BUT COAL USED AS ASF
 TONS PER YEAR ASF REQUIRED
 Avoided MSW disposal cost
 SIA w/disposal credit

6	6542,356	6542,356	6542,356	6542,356
6	6715,910	6715,910	6715,910	6715,910
NONE	9.54	9.54	9.54	9.54
6/YR	0	0	0	0
6/YR	60	60	60	60
6/YR	60	60	60	60
6/YR	60	60	60	60
NONE	-0.03	-0.03	-0.03	-0.03
6/YR	60	60	60	60
6/YR	60	60	60	60
TONS	16463	16463	16463	16463
6/YR	624,577	624,577	624,577	624,577
NONE	0.35	0.69	1.03	1.03

Summary of Sensitivity Analysis
Little Creek Ambitious Base

Definition

ENTHALPY TRANSFERRED TO STEAM, AVG. HOURLY, 100% AVAILABILITY
MCR, AVG. MAX. FOR CONTROLLED CASE (REPORTED AT 1% VELOCITY)
MAXIMUM TURNDOWN STEAM RATING, SCOP. B7C
ROLLER EFFICIENCY AT MCR
ROLLER EFFICIENCY AT AVERAGE OUTPUT
MAXIMUM STEAM DEMAND (MSD)
DERATE
TOTAL FUEL INPUT ENTHALPY, AVERAGE
RDF FLOWRATE, AVERAGE
CONVENTIONAL FUEL INPUT ENTHALPY, AVERAGE
SOLID RESIDUE GENERATED, AVERAGE
CARBON CONTENT OF SOLID RESIDUE, MAX. HOURLY AT MCR
FLYASH FRACTION OF SOLID RESIDUE, AVERAGE
FLYASH EMISSION ABSOLUTE AVG EXISTING CONTROL DEVICE AT MCR
EMISSION OF TSP, MAX. HOURLY W/ EXISTING CONTRL. AT MCR
UNCONTROLLED FLYASH EMISSION, MAX. HOURLY AT MCR
COMBUSTION AIR RATE, AVERAGE
COMBUSTION AIR VOLUMETRIC FLOWRATE, AVERAGE
NET FUEL GAS RATE, AVERAGE
NET FUEL GAS VOLUMETRIC FLOW, AVERAGE
EMISSION CONTRL. DEVICE ASSUMED EFFICIENCY (EXISTING DEVICES)
NEW EMISSION CONTRL. DEVICE REQUIRED IF = YES
ELECTRIC POWER COST FOR FD SYSTEM, AVERAGE
ELECTRIC POWER COST FOR ID SYSTEM, AVERAGE
WISC ELECTRIC POWER COSTS, AVERAGE
SOLID RESIDUE GENERATED, MAX. HOURLY AT MCR
ANNUAL LABOR COST, BURDENED
OPERATIONS PER SHIFT
CONVENTIONAL FUEL COST, AVERAGE
RDF FUEL COST, AVERAGE
ASH DISPOSAL COST, AVERAGE
OPERATING HRS/YR IN CONTROLLED STEAM SUPPLY RANGE
INCREMENTAL MAINTENANCE COST, ANNUAL
AVAILABILITY, FRACTION
ANNUAL STEAM PRODUCTION, NET
RELATIVE ELECTRIC POWER ANNUAL COST
ANNUAL CONVENTIONAL FUEL COST
ANNUAL RDF FUEL COST
ANNUAL ASH DISPOSAL COST
ANNUAL MSD DISPOSAL COST
FURNACE COLD (WAKING CO. & SMOKE) IF = 1
NEW MAX. EMISSIONS RATE W/ NEW CONTROL DEVICE
INCLUDED IN CAPITAL COST
BASE CAPITAL COST OF STORAGE SUBSYSTEM
BASE CAPITAL COST OF LONG MECHANICAL CONVEYOR
BASE CAPITAL COST OF SHORT MECHANICAL CONVEYOR
BASE CAPITAL COST OF RDF DELIVERY SYSTEM
BASE INCREMENTAL COST OF ASH HANDLING SYSTEM
BASE INCREMENTAL CAPITAL COSTS FOR EMISSIONS CONTROL
BASE INCREMENTAL COST FOR ROLLER MODIFICATIONS

UNITS	Conventional Fuel		Excess air Plus 20%		Best Case #1		Best Case #2		Best Case #3	
	RDF	Conventional Fuel	RDF	Conventional Fuel	RDF	Conventional Fuel	RDF	Conventional Fuel	RDF	Conventional Fuel
BTU/H	5.83E+07	5.83E+07	5.51E+07	5.51E+07	6.83E+07	6.83E+07	5.31E+07	5.31E+07	5.71E+07	5.71E+07
BTU/H	8.64E+07	8.64E+07	8.03E+07	8.03E+07	3.03E+07	3.03E+07	5.41E+07	5.41E+07	5.41E+07	5.41E+07
BTU/H	2.06E+07	2.06E+07	2.04E+07	2.04E+07	2.02E+07	2.02E+07	2.02E+07	2.02E+07	2.02E+07	2.02E+07
NONE	0.76	0.83	0.76	0.82	0.76	0.84	0.76	0.82	0.76	0.82
NONE	0.71	0.83	0.7	0.82	0.69	0.84	0.68	0.83	0.67	0.83
BTU/H	1.50E+08	1.50E+08	1.50E+08	1.50E+08	1.50E+08	1.50E+08	1.50E+08	1.50E+08	1.50E+08	1.50E+08
NONE	0	0	0.04	0	0	0	0	0	0	0
BTU/H	8.24E+07	7.00E+07	7.32E+07	6.69E+07	9.85E+07	8.14E+07	3.31E+07	7.59E+07	8.54E+07	6.87E+07
TPA	2.62	5073	2.51	3444	4.12	5896	3.88	5503	3.56	4977
LB/H	3585	4849	3444	4606	2866	3875	2695	3695	2476	3477
LB/H	1375	425	1337	406	1875	494	1796	461	1705	417
NONE	0.44	0.17	0.44	0.17	0.45	0.17	0.46	0.17	0.46	0.17
NONE	0.15	0.34	0.14	0.38	0.13	0.31	0.12	0.34	0.12	0.34
LB/H	2	2	2	2	2	2	2	2	2	2
LB/H	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
LB/H	1.83	2.06	1.82	2.27	1.81	1.86	1.6	2.06	1.8	2.06
LB/H	80045	67977	82691	69848	68777	73061	30392	73738	62929	66683
ACFM	17788	15106	18376	15322	19728	16236	20087	16386	18429	14818
LB/H	87489	72625	89828	74290	98008	78463	99053	78778	90818	71243
ACFM	22971	26798	22780	27378	29853	28994	27894	29069	22813	26288
NONE	0	0	0	0	0	0	0	0	0	0
NONE	0	0	0	0	0	0	0	0	0	0
\$/HR	\$0.87	\$0.74	\$0.90	\$0.76	\$0.77	\$0.56	\$0.99	\$0.81	\$0.91	\$0.73
\$/HR	\$1.79	\$0.00	\$1.83	\$0.00	\$2.29	\$0.00	\$2.24	\$0.00	\$1.85	\$0.00
\$/HR	\$3.20	\$0.00	\$3.10	\$0.00	\$4.71	\$0.00	\$4.48	\$0.00	\$4.16	\$0.00
LB/H	1429	618	1342	618	1732	618	1618	618	1618	618
\$/YR	\$337,406	\$243,638	\$335,804	\$242,482	\$370,631	\$244,790	\$368,686	\$243,638	\$368,686	\$243,638
MM\$/SH:15	2.31	1.67	2.3	1.66	2.54	1.68	2.53	1.67	2.52	1.67
\$/HR	\$79.00	\$112.00	\$102.00	\$143.00	\$169.00	\$348.00	\$159.00	\$325.00	\$146.00	\$294.00
\$/HR	\$5.00	\$3.23	\$5.00	\$3.09	\$8.00	\$3.75	\$8.00	\$3.50	\$7.00	\$3.17
\$/HR	\$10.45	\$10.45	\$10.15	\$3.09	\$14.24	\$3.75	\$13.64	\$3.50	\$12.35	\$3.17
HOURS	6290	7862	6290	7862	6290	7862	6290	7862	6290	7862
\$/YR	\$25,773	\$25,773	\$25,086	\$25,086	\$27,675	\$26,904	\$26,904	\$26,904	\$26,904	\$26,904
NONE	0.72	0.9	0.72	0.9	0.72	0.9	0.72	0.9	0.72	0.9
BTU	3.68E+11	4.57E+11	3.47E+11	4.34E+11	4.29E+11	5.38E+11	3.97E+11	4.96E+11	3.59E+11	4.49E+11
\$/YR	\$36,923	\$5,837	\$36,684	\$5,998	\$50,126	\$6,273	\$48,429	\$6,332	\$43,524	\$5,726
\$/YR	\$498,278	\$681,564	\$639,052	\$1,124,386	\$1,063,535	\$2,725,165	\$1,001,465	\$2,532,894	\$918,781	\$2,308,704
\$/YR	\$32,925	\$31,635	\$31,635	\$31,635	\$51,825	\$48,800	\$48,800	\$48,800	\$44,771	\$44,771
\$/YR	\$65,710	\$25,399	\$63,848	\$24,273	\$89,558	\$29,518	\$85,818	\$27,551	\$81,473	\$24,916
\$/YR	\$0	\$102,393	\$0	\$102,393	\$0	\$204,786	\$0	\$204,786	\$0	\$204,786
NONE	0	0	0	0	0	0	0	0	0	0
LB/H	1.83	1.82	1.82	1.82	1.81	1.81	1.8	1.8	1.8	1.8
\$	\$109,411	\$106,911	\$106,911	\$106,911	\$125,234	\$122,331	\$122,331	\$122,331	\$122,331	\$122,331
\$	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$	\$95,263	\$92,743	\$92,743	\$92,743	\$112,692	\$109,540	\$109,540	\$109,540	\$109,540	\$109,540
\$	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$	\$337,682	\$328,249	\$328,249	\$328,249	\$344,465	\$334,267	\$334,267	\$334,267	\$334,267	\$334,267

BASE TOTAL INCREMENTAL CAPITAL COSTS
 BURDENED TOTAL INCREMENTAL CAPITAL COSTS
 CAPITAL RECOVERY FACTOR
 ANNUALIZED COST OF CAPITAL
 TOTAL ANNUAL O&M COST
 TOTAL ANNUAL COST INCLUDING COST OF CAPITAL
 TOTAL COST PER MILLION BTU OF STEAM
 SIR (SAVINGS/INVESTMENT) AT EQUAL ANNUAL STEAM PRODUCTION
 TOTAL O&M COST PER MILLION BTU OF STEAM
 O&M COSTS FOR PULVERIZER IF NOT RDF BUT COAL USED AS REF
 TONS PER YEAR RDF REQUIRED
 Avoided MSW disposal cost
 SIR w/disposal credit

\$	\$542,356	\$527,904	\$582,391	\$566,158	\$566,845
\$	\$715,310	\$696,833	\$768,756	\$747,329	\$748,236
NONE	9.54	9.54	9.54	9.54	9.54
\$/YR	0	0	0	0	0
\$/YR	\$997,014	\$1,132,109	\$1,653,350	\$1,580,302	\$1,484,372
\$/MMBTU	\$0	\$0	\$0	\$0	\$0
\$/MMBTU	\$1,156,438	\$1,397,338	\$3,015,747	\$2,830,414	\$2,582,984
NONE	\$3	\$3	\$6	\$6	\$6
NONE	-0.96	-0.19	3.42	8.73	7.42
\$/MMBTU	\$2.72	\$3.26	\$3.86	\$3.98	\$4.13
\$/YR	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
TPY	16463	15817	25912	24400	22386
\$/YR	\$28,577	\$28,577	\$79,773	\$79,773	\$79,773
NONE	-0.58	0.2	10.41	9.75	8.44

Summary of Sensitivity Analysis
Little Creek Landfills Base

Definition	Units	Best Case #4		Best Case #5	
		Conf:ing	Conventional Fuel	Conf:ing	Conventional Fuel
ENTHALPY TRANSFERRED TO STEAM, AVG. HOURLY, 100% AVAILABILITY	BTU/H	5.71E+07	5.71E+07	5.71E+07	5.71E+07
MCR ASH RATE FOR COPIED CASE (HEATED AT 40 VELOCITY)	BTU/H	8.41E+07	8.41E+07	8.41E+07	8.41E+07
MAXIMUM CONSUMED STEAM RATE, SCAM SYSTEM	BTU/H	2.00E+07	2.00E+07	2.00E+07	2.00E+07
ROLLER EFFICIENCY AT MCR	NONE	0.75	0.83	0.75	0.83
ROLLER EFFICIENCY AT AVERAGE OUTPUT	NONE	0.67	0.83	0.67	0.83
SOLIDER EFFICIENCY AT AVERAGE OUTPUT	BTU/H	1.50E+08	1.50E+08	1.50E+08	1.50E+08
MAXIMUM STEAM DEMAND (MSD)	NONE	0	0	0	0
DERATE	NONE	0	0	0	0
TOTAL FUEL INPUT ENTHALPY, AVERAGE	BTU/H	8.54E+07	8.87E+07	8.54E+07	8.87E+07
RFU FLOWRATE, AVERAGE	TPH	3.56	3.56	3.56	3.56
CONVENTIONAL FUEL INPUT ENTHALPY, AVERAGE	LB/HR	2476	4977	2476	4977
SOLID RESIDUE GENERATED, AVERAGE	LB/HR	1705	417	1705	417
CARBON CONTENT OF SOLID RESIDUE, MAX HOURLY AT MCR	NONE	0.48	0.17	0.48	0.17
FLYASH FRACTION OF SOLID RESIDUE, AVERAGE	NONE	0.12	0.34	0.12	0.34
FLYASH EMISSION ABSOLUTE AND EXISTING CONTROL DEVICE AT MCR	LB/HR	2	2	2	2
EMISSION OF TSP, MAX HOURLY W/ EXISTING CNTRL AT MCR	LB/HRBTU	0.02	0.02	0.02	0.02
UNCONTROLLED FLYASH EMISSION, MAX HOURLY AT MCR	LB/HRBTU	1.8	2.06	1.8	2.06
COMBUSTION AIR RATE, AVERAGE	LB/HR	82929	66683	82929	66683
COMBUSTION AIR VOLUMETRIC FLOWRATE, AVERAGE	ACFM	18429	18429	18429	18429
NET FUEL GAS RATE, AVERAGE	LB/HR	90818	71243	90818	71243
NET FUEL GAS VOLUMETRIC FLOW, AVERAGE	ACFM	22813	26388	22813	26388
EMISSION CNTRL DEVICE ASSUMED EFFICIENCY (EXISTING DEVICE)	NONE	1	1	1	1
NEW EMISSION CONTROL DEVICE REQUIRED = YES	NONE	0	0	0	0
ELECTRIC POWER COST FOR FD SYSTEM, AVERAGE	\$/HR	\$0.91	\$0.73	\$0.91	\$0.73
ELECTRIC POWER COST FOR ID SYSTEM, AVERAGE	\$/HR	\$1.85	\$0.00	\$1.85	\$0.00
MISC ELECTRIC POWER COSTS, AVERAGE	\$/HR	\$4.16	\$0.00	\$4.16	\$0.00
SOLID RESIDUE GENERATED, MAX HOURLY AT MCR	LB/HR	1618	618	1618	618
ANNUAL LABOR COST, BURDENED	\$/YR	\$368,886	\$243,638	\$368,886	\$243,638
OPERATIONS PER SHIFT	MAN/SHIFT	2.53	1.67	2.53	1.67
CONVENTIONAL FUEL COST, AVERAGE	\$/HR	\$146.00	\$294.00	\$146.00	\$294.00
RFU FUEL COST, AVERAGE	\$/HR	\$68.00	\$68.00	\$68.00	\$68.00
ASH DISPOSAL COST, AVERAGE	\$/HR	\$12.95	\$3.17	\$12.95	\$3.17
OPERATING HRS/YR IN DEFINED STEAM SUPPLY RANGE	HOURS	6290	7862	6290	7862
INCREMENTAL MAINTENANCE COST, ANNUAL	\$/YR	\$26,936	\$26,936	\$26,936	\$26,936
AVAILABILITY, FRACTION	NONE	0.72	0.9	0.72	0.9
ANNUAL STEAM PRODUCTION, NET	BTU	3.59E+11	4.49E+11	3.59E+11	4.49E+11
RELATIVE ELECTRIC POWER ANNUAL COST	\$/YR	\$43,524	\$5,726	\$43,524	\$5,726
ANNUAL CONVENTIONAL FUEL COST	\$/YR	\$918,781	\$2,308,704	\$918,781	\$2,308,704
ANNUAL RFU FUEL COST	\$/YR	\$430,698	\$430,698	\$430,698	\$430,698
ANNUAL ASH DISPOSAL COST	\$/YR	\$81,473	\$24,916	\$81,473	\$24,916
ANNUAL NEW DISPOSAL COST	\$/YR	\$0	\$204,786	\$0	\$204,786
FURNACE COLD (WAKING CO & SHAKING) IF = 1	NONE	0	0	0	0
NEW MAX EMISSIONS RATE W/ NEW CONTROL DEVICE	LB/HRBTU	1.8	1.8	1.8	1.8
INCLUDED IN CAPITAL COST					
BARE CAPITAL COST OF STORAGE SUBSYSTEM	\$	\$123,019	\$123,019	\$123,019	\$123,019
BARE CAPITAL COST OF LONG MECHANICAL CONVEYOR	\$	\$0	\$0	\$0	\$0
BARE CAPITAL COST OF SHORT MECHANICAL CONVEYOR	\$	\$0	\$0	\$0	\$0
BARE CAPITAL COST OF RFU DELIVERY SYSTEM	\$	\$109,540	\$109,540	\$109,540	\$109,540
BARE INCREMENTAL CAPITAL COSTS FOR EMISSIONS CONTROL	\$	\$0	\$0	\$0	\$0
BARE INCREMENTAL COST FOR OTHER MODIFICATIONS	\$	\$334,287	\$334,287	\$334,287	\$334,287

BASE TOTAL INCREMENTAL CAPITAL COSTS
 BURDENED TOTAL INCREMENTAL CAPITAL COSTS
 CAPITAL RECOVERY FACTOR
 ANNUALIZED COST OF CAPITAL
 TOTAL ANNUAL O&M COST
 TOTAL ANNUAL COST INCLUDING COST OF CAPITAL
 TOTAL COST PER MILLION BTU OF STEAM
 SIR (SAVINGS/INVESTMENT) AT EQUAL ANNUAL STEAM PRODUCTION
 TOTAL O&M COST PER MILLION BTU OF STEAM
 O&M COSTS FOR PULVERIZER IF NOT RDP BUT COAL USED AS REF
 TONS PER YEAR RDP REQUIRED
 Avoided non disposal cost
 SIR w/disposal credit

\$	\$566,845	\$566,845
\$	\$748,236	\$748,236
NONE	9.54	9.54
\$/YR	0	0
\$/YR	\$1,870,299	\$1,428,632
\$/YR	\$0	\$0
\$/MMBTU	\$0	\$0
NONE	2.5	-3.42
\$/MMBTU	\$5.21	\$3.93
\$/YR	\$0.00	\$0.00
TON	22386	22386
\$/YR	\$79,773	\$79,773
NONE	3.52	-2.4

Summary of Sensitivity Analysis Cherry Point

variable definition	Units	Series A	Series 1	Series 2	Series - 3
ENTHALPY TRANSFERRED TO STEAM, AVG HOURLY, 100% AVAILABILITY					
MCR, ABS MAX FOR CONFIDED CASE (WEIGHTED AT HI VELOCITY)					
MAXIMUM TURBIDITY STEAM RATING, SEAM BTU/H					
BOILER EFFICIENCY AT MCR					
BOILER EFFICIENCY AT AVERAGE OUTPUT					
MAXIMUM STEAM DEMAND (MSD)					
DEWATE					
TOTAL FUEL INPUT ENTHALPY, AVERAGE					
REF FLOWRATE, AVERAGE					
CONVENTIONAL FUEL INPUT ENTHALPY, AVERAGE					
SOLID RESIDUE GENERATED, AVERAGE					
CARBON CONTENT OF SOLID RESIDUE, MAX HOURLY AT MCR					
FLYASH FRACTION OF SOLID RESIDUE, AVERAGE					
FLYASH EMISSION ABSOLUTE AND EXISTING CONTROL DEVICE AT MCR					
EMISSION OF TSP, MAX HOURLY W/ EXISTING CTRL AT MCR					
UNCONTROLLED FLYASH EMISSION, MAX HOURLY AT MCR					
COMBUSTION AIR RATE, AVERAGE					
COMBUSTION AIR VOLUMETRIC FLOWRATE, AVERAGE					
NET FUE GAS RATE, AVERAGE					
WET FUE GAS VOLUMETRIC FLOW, AVERAGE					
EMISSION CTRL DEVICE ASSUMED EFFICIENCY (EXISTING DEVICE)					
NEW EMISSION CONTROL DEVICE REQUIRED (YES)					
ELECTRIC POWER COST FOR FD SYSTEM, AVERAGE					
ELECTRIC POWER COST FOR ID SYSTEM, AVERAGE					
MISC ELECTRIC POWER COSTS, AVERAGE					
SOLID RESIDUE GENERATED, MAX HOURLY AT MCR					
ANNUAL LABOR COST, \$/HOUR					
OPERATORS PER SHIFT					
CONVENTIONAL FUEL COST, AVERAGE					
REF FUEL COST, AVERAGE					
ASH DISPOSAL COST, AVERAGE					
OPERATING HRS/YR IN CONFIDED STEAM SUPPLY RANGE					
INCREMENTAL MAINTENANCE COST, ANNUAL					
AVAILABILITY, FRACTION					
ANNUAL STEAM PRODUCTION, NET					
RELATIVE ELECTRIC POWER ANNUAL COST					
ANNUAL CONVENTIONAL FUEL COST					
ANNUAL REF FUEL COST					
ANNUAL ASH DISPOSAL COST					
ANNUAL NEW DISPOSAL COST					
FLUENCE COLD (WAKING CO & SMOKE) IF = 1					
NEW MAX EMISSIONS RATE W/ NEW CONTROL DEVICE					
INCLUDED IN CAPITAL COST					
BARE CAPITAL COST OF STORAGE SUBSYSTEM					
BARE CAPITAL COST OF LONG MECHANICAL CONVEYOR					
BARE CAPITAL COST OF SHORT MECHANICAL CONVEYOR					
BARE CAPITAL COST OF REF DELIVERY SYSTEM					
BARE INCREMENTAL COST OF ASH HANDLING SYSTEM					
BARE INCREMENTAL CAPITAL COSTS FOR EMISSIONS CONTROL					

BASE INCREMENTAL COST FOR SCILER MODIFICATIONS
 DAME TOTAL INCREMENTAL CAPITAL COSTS
 BURDENED TOTAL INCREMENTAL CAPITAL COSTS
 CAPITAL RECOVERY FACTOR
 ANNUALIZED COST OF CAPITAL
 TOTAL ANNUAL O&M COST
 TOTAL ANNUAL COST INCLUDING COST OF CAPITAL
 TOTAL COST PER MILLION BTU OF STEAM, (inc. cost of capital)
 SIA (SAVINGS/INVESTMENT) AT EQUAL ANNUAL STEAM PRODUCTION
 TOTAL O&M COST PER MILLION BTU OF STEAM
 O&M COSTS FOR PULVERIZER IF NOT R&F BUT COAL USED AS REF
 TONS PER YEAR R&F REQUIRED
 Avoided R&F disposal cost
 SIA w/disposal credit

\$	\$338,165	\$338,165	\$338,165	\$341,305
\$	\$540,326	\$539,584	\$539,534	\$539,364
\$	\$713,230	\$712,251	\$712,053	\$711,960
NONE	9.54	9.54	9.54	9.54
\$/YR	90	90	90	90
\$/YR	\$920,615	\$1,397,270	\$1,083,495	\$911,400
\$/YR	\$0	\$0	\$0	\$0
\$/YR	\$0	\$0	\$0	\$0
\$/YR	\$0	\$0	\$0	\$0
NONE	-0.19	0.38	0.35	0.04
\$/YR	\$2.88	\$2.67	\$2.62	\$2.82
\$/YR	\$0.00	\$0.00	\$0.00	\$0.00
TON	13470	15974	16848	11769

Series A

Series 1

Series 2

Series 3

Summary of Sensitivity Analysis

variable definition	Units	Sens 4	Sens 5	Sens 6	Sens 7
ENTHALPY TRANSFERRED TO STEAM, AVG HOURLY, 100% AVAILABILITY	BTU/LB/HR	5.00E+07	4.76E+07	4.91E+07	5.07E+07
MCR, AVG WAT FOR COINED CASE (HEATED AT 41 VELOCITY)	BTU/LB/HR	8.40E+07	7.37E+07	7.90E+07	8.61E+07
MAXIMUM TURBIDITY STEAM RATING, SEAM BTU/LB/HR	BTU/LB/HR	1.90E+07	1.94E+07	1.90E+07	1.90E+07
BOILER EFFICIENCY AT MCR	NONE	0.75	0.74	0.75	0.76
BOILER EFFICIENCY AT AVERAGE OUTPUT	NONE	0.74	0.73	0.74	0.75
MAXIMUM STEAM DEMAND (MSD)	BTU/LB/HR	2.20E+08	2.20E+08	2.20E+08	2.20E+08
DEBRITE	NONE	0	0	0	0
TOTAL FUEL INPUT ENTHALPY, AVERAGE	BTU/LB/HR	6.76E+07	6.49E+07	6.61E+07	6.76E+07
ROF FLOWRATE, AVERAGE	TON	2.5	2.06	2.1	2.5
CONVENTIONAL FUEL INPUT ENTHALPY, AVERAGE	BTU/LB/HR	2756	2644	2694	2731
SOLID RESIDUE GENERATED, AVERAGE	LB/HR	847	762	768	1346
CARBON CONTENT OF SOLID RESIDUE, MAX HOURLY AT MCR	NONE	0.21	0.23	0.24	0.13
FLYASH FRACTION OF SOLID RESIDUE, AVERAGE	NONE	0.66	0.71	0.73	0.41
FLYASH EMISSION ABSOLUTE AND EXISTING CONTROL DEVICE AT MCR	LB/HR	2	2	2	2
EMISSION OF TSP, MAX HOURLY W/ EXISTING CTRL AT MCR	LB/HR	0.02	0.02	0.02	0.02
UNCONTROLLED FLYASH EMISSION, MAX HOURLY AT MCR	LB/HR	7.98	7.92	8.02	8.08
COMBUSTION AIR RATE, AVERAGE	LB/HR	57753	64879	61288	57632
CONVENTIONAL AIR VOLUMETRIC FLOWRATE, AVERAGE	ACFM	12835	14417	13620	12812
NET FUEL GAS RATE, AVERAGE	LB/HR	64673	70879	67411	64057
NET FUEL GAS VOLUMETRIC FLOW, AVERAGE	ACFM	20435	21122	20540	20119
EMISSION CTRL DEVICE ASSUMED EFFICIENCY (EXISTING DEVICE)	NONE	1	1	1	1
NEW EMISSION CONTROL DEVICE REQUIRED I= YES	NONE	0	0	0	0
ELECTRIC POWER COST FOR FD SYSTEM, AVERAGE	\$/HR	\$1.61	\$1.80	\$1.71	\$1.60
ELECTRIC POWER COST FOR 10 SYSTEM, AVERAGE	\$/HR	\$3.20	\$3.57	\$3.34	\$3.14
MISC ELECTRIC POWER COSTS, AVERAGE	\$/HR	\$7.86	\$6.66	\$6.76	\$7.85
SOLID RESIDUE GENERATED, MAX HOURLY AT MCR	LB/HR	1356	1100	1171	2214
ANNUAL LABOR COST, BURDENED	\$/YR	\$314,056	\$310,219	\$312,141	\$314,056
OPERATIONS PER SHIFT	MAN/SH	2.15	2.12	2.14	2.15
CONVENTIONAL FUEL COST, AVERAGE	\$/HR	\$76	\$72	\$74	\$75
ROF FUEL COST, AVERAGE	\$/HR	\$5	\$4	\$4	\$5
ASH DISPOSAL COST, AVERAGE	\$/HR	\$0	\$0	\$0	\$0
OPERATING HRS/YR IN COINED STEAM SUPPLY RANGE	HOURS	6290	6290	6290	6290
INCREMENTAL MAINTENANCE COST, ANNUAL	\$/YR	\$32,849	\$30,891	\$31,812	\$33,127
AVAILABILITY, FRACTION	NONE	0.72	0.72	0.72	0.72
ANNUAL STEAM PRODUCTION, NET	BTU	3.160E+11	2.990E+11	3.090E+11	3.190E+11
RELATIVE ELECTRIC POWER ANNUAL COST	\$/YR	\$75,687	\$75,647	\$74,302	\$75,237
ANNUAL CONVENTIONAL FUEL COST	\$/YR	\$474,903	\$455,355	\$464,270	\$474,055
ANNUAL ROF FUEL COST	\$/YR	\$31,306	\$25,907	\$25,401	\$31,450
ANNUAL ASH DISPOSAL COST	\$/YR	\$0	\$0	\$0	\$0
ANNUAL NEW DISPOSAL COST	\$/YR	\$0	\$0	\$0	\$0
FLUORIDE COLD (WORKING CO & SMOKE) IF = 1	NONE	0	0	0	0
NEW NET EMISSIONS RATE W/ NEW CONTROL DEVICE INCLUDED IN CAPITAL COST	LB/HR	7.98	7.92	8.02	8.08
BARE CAPITAL COST OF STORAGE SUBSYSTEM	\$	\$112,683	\$101,348	\$103,948	\$113,227
BARE CAPITAL COST OF LONG MECHANICAL CONVEYOR	\$	\$0	\$0	\$0	\$0
BARE CAPITAL COST OF SHORT MECHANICAL CONVEYOR	\$	\$0	\$0	\$0	\$0
BARE CAPITAL COST OF ROF DELIVERY SYSTEM	\$	\$94,286	\$89,874	\$92,526	\$95,137
BARE INCREMENTAL COST OF ASH HANDLING SYSTEM	\$	\$0	\$0	\$0	\$0
BARE INCREMENTAL CAPITAL COSTS FOR EMISSIONS CONTROL	\$	\$0	\$0	\$0	\$0

NAME INCREMENTAL COST FOR BOILER MODIFICATIONS
 BASE TOTAL INCREMENTAL CAPITAL COSTS
 SUBSIDIZED TOTAL INCREMENTAL CAPITAL COSTS
 CAPITAL RECOVERY FACTOR
 ANNUALIZED COST OF CAPITAL
 TOTAL ANNUAL O&M COST
 TOTAL ANNUAL COST INCLUDING COST OF CAPITAL
 TOTAL COST PER MILLION BTU OF STEAM, (inc. cost of capital)
 S/R (SAVINGS/INVESTMENT) AT EQUAL ANNUAL STEAM PRODUCTION
 TOTAL O&M COST PER MILLION BTU OF STEAM
 O&M COSTS FOR PALMERIZER IF NOT REF BUT COAL USED AS REF
 TONS PER YEAR REF REDUCED
 Avoided fuel disposal cost
 S/R w/disposal credit

\$	\$334,023	\$317,526	\$327,439	\$317,212
\$	\$546,992	\$508,748	\$23913	545577
\$	\$714,109	\$671,548	\$691,566	\$720,161
NONE	9.54	9.54	9.54	9.54
\$/YR	\$0	\$0	\$0	\$0
\$/YR	\$933,001	\$1,151,812	\$908,926	\$1,131,363
\$/YR	\$0	\$0	\$0	\$0
\$/MMBT	\$0.00	\$2.92	\$2.88	\$2.84
NONE	-0.48	-0.36	(40.27)	-0.36
\$/MMBT	\$2.96	\$2.92	\$2.94	\$2.92
\$/YR	\$0.00	\$0.00	\$0.00	\$0.00
TON	15753	12554	13200	15725

Sens 4

Sens 5

Sens 6

Sens 7

citynavy17cherry

Summary of Sensitivity Analysis Cherry Point

variable
definition

ENTHALPY TRANSFERRED TO STEAM, AVG HOUR, 100% AVAILABILITY
 MCR, ONE MW FOR COPIED CASE (BEARER AT H1 VELOCITY)
 MAXIMUM TURBIDITY STEAM RATING, SEAM BTU/H
 BOILER EFFICIENCY AT MCR
 BOILER EFFICIENCY AT AVERAGE OUTPUT
 MAXIMUM STEAM DEMAND (MSD)
 DEBRATE
 TOTAL FUEL INPUT ENTHALPY, AVERAGE
 FUEL FLOWRATE, AVERAGE
 CONVENTIONAL FUEL INPUT ENTHALPY, AVERAGE
 SOLID RESIDUE GENERATED, AVERAGE
 CARBON CONTENT OF SOLID RESIDUE, MAX HOUR, AT MCR
 FLYASH FRACTION OF SOLID RESIDUE, AVERAGE
 FLYASH EMISSION ABSOLUTE AND EXISTING CONTROL DEVICE AT MCR
 EMISSION OF TSP, MAX HOUR, W/ EXISTING CTRL AT MCR
 UNCONTROLLED FLYASH EMISSION, MAX HOUR, AT MCR
 COMBUSTION AIR RATE, AVERAGE
 COMBUSTION AIR VOLUMETRIC FLOWRATE, AVERAGE
 NET FUEL GAS RATE, AVERAGE
 NET FUEL GAS VOLUMETRIC FLOW, AVERAGE
 EMISSION CTRL DEVICE ASSUMED EFFICIENCY (EXISTING DEVICE)
 NEW EMISSION CONTROL DEVICE REQUIRED 1= YES
 ELECTRIC POWER COST FOR FD SYSTEM, AVERAGE
 ELECTRIC POWER COST FOR ID SYSTEM, AVERAGE
 MISC ELECTRIC POWER COSTS, AVERAGE
 SOLID RESIDUE GENERATED, MAX HOUR, AT MCR
 ANNUAL LABOR COST, BURDENED
 OPERATIONS PER SHIFT
 CONVENTIONAL FUEL COST, AVERAGE
 ROF FUEL COST, AVERAGE
 ASH DISPOSAL COST, AVERAGE
 OPERATING HRS/YR IN COPIED STEAM SUPPLY RANGE
 INCREMENTAL MAINTENANCE COST, ANNUAL
 AVAILABILITY, FRACTION
 ANNUAL STEAM PRODUCTION, NET
 RELATIVE ELECTRIC POWER ANNUAL COST
 ANNUAL CONVENTIONAL FUEL COST
 ANNUAL ROF FUEL COST
 ANNUAL ASH DISPOSAL COST
 ANNUAL MSW DISPOSAL COST
 FURNACE COLD (WAKING CO & SMOKE) IF = 1
 NEW MAX EMISSIONS RATE W/ NEW CONTROL DEVICE
 INCLUDED IN CAPITAL COST
 BASE CAPITAL COST OF STORAGE SUBSYSTEM
 BASE CAPITAL COST OF LONG MECHANICAL CONVEYOR
 BASE CAPITAL COST OF SHORT MECHANICAL CONVEYOR
 BASE CAPITAL COST OF ROF DELIVERY SYSTEM
 BASE INCREMENTAL COST OF ASH HANDLING SYSTEM
 BASE INCREMENTAL CAPITAL COSTS FOR EMISSIONS CONTROL

	SENS - 8			SENS - 9			SENS - 10			SENS - 11		
	UNITS	ROF	CONVENTIONAL	ROF	CONVENTIONAL	ROF	CONVENTIONAL	ROF	CONVENTIONAL	ROF	CONVENTIONAL	ROF
		COPIRING	FUEL	COPIRING	FUEL	COPIRING	FUEL	COPIRING	FUEL	COPIRING	FUEL	COPIRING
BTU/H		5.05E+07	5.05E+07	5.05E+07	5.05E+07	5.05E+07	5.05E+07	5.05E+07	5.05E+07	5.05E+07	5.05E+07	5.05E+07
BTU/H		8.53E+07	7.47E+07	8.50E+07	7.47E+07	8.29E+07	7.47E+07	8.29E+07	7.47E+07	8.67E+07	7.47E+07	8.67E+07
BTU/H		1.96E+07		1.96E+07		1.96E+07		1.96E+07		1.96E+07		1.96E+07
NONE		0.75	0.82	0.75	0.82	0.75	0.82	0.75	0.82	0.75	0.82	0.75
NONE		0.75	0.82	0.75	0.82	0.75	0.82	0.75	0.82	0.75	0.82	0.75
BTU/H		2.25E+08	2.25E+08	2.25E+08	2.25E+08	2.25E+08	2.25E+08	2.25E+08	2.25E+08	2.25E+08	2.25E+08	2.25E+08
NONE		0		0		0		0		0		0
BTU/H		6.75E+07	6.15E+07	6.75E+07	6.15E+07	6.75E+07	6.15E+07	6.75E+07	6.15E+07	6.75E+07	6.15E+07	6.75E+07
T/H		3		2.41		2.41		2.76		2.14		2.76
LB/HR		2753	4179	2753	4176	2753	4176	2753	4132	2749	4210	2749
LB/HR		2147	276	828	276	828	276	897	273	774	278	897
NONE		0.08	0.09	0.22	0.09	0.22	0.09	0.2	0.09	0.23	0.09	0.23
NONE		0.26	0.29	0.68	0.29	0.68	0.29	0.62	0.29	0.74	0.29	0.74
LB/HR		2	0	2	0	2	0	2	0	2	0	2
LB/HR		0.02	0	0.02	0	0.02	0	0.02	0	0.02	0	0.02
LB/HR		8.04	1.28	8.04	1.28	8.04	1.28	7.95	1.28	8.11	1.28	7.95
LB/HR		57703	52555	57654	52512	57654	52512	57716	51969	57618	52944	57716
ACFM		12823	11679	12812	11669	12826	11669	12826	11549	12804	11763	12826
LB/HR		64314	56457	64399	56411	64399	56411	65088	55828	63875	56876	65088
ACFM		20261	23021	20264	23002	20264	23002	20591	22763	20019	23192	20591
NONE		1	1	1	1	1	1	1	1	1	1	1
NONE		0	0	0	0	0	0	0	0	0	0	0
H/R		11.61	11.46	11.60	11.46	11.60	11.46	11.61	11.45	11.60	11.47	11.61
H/R		13.17	10.00	13.17	10.00	13.17	10.00	13.23	10.00	13.13	10.00	13.23
H/R		19.17	10.00	19.17	10.00	19.17	10.00	19.53	10.00	19.48	10.00	19.53
LB/HR		3543	409	3543	409	3543	409	1430	409	1257	409	1430
H/R		1314,056	1226,777	1314,056	1226,777	1314,056	1226,777	1314,056	1226,777	1314,056	1226,777	1314,056
MM/SH		2.15	1.55	2.15	1.55	2.15	1.55	2.15	1.55	2.15	1.55	2.15
H/R		175	1115	175	1114	175	1114	175	1113	175	1115	175
H/R		16	16	16	16	16	16	16	16	16	16	16
H/R		10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
HOURS		6290	6299	6290	6299	6290	6299	6290	6299	6290	6299	6290
H/R		132,891		132,891		132,891		132,867		132,809		132,867
NONE		0.72	0.95	0.72	0.95	0.72	0.95	0.72	0.95	0.72	0.95	0.72
BTU		3.10E+11	4.19E+11	3.17E+11	4.19E+11	3.17E+11	4.19E+11	3.14E+11	4.19E+11	3.20E+11	4.22E+11	3.14E+11
H/R		187,715	112,135	177,914	112,125	187,914	112,125	184,102	112,000	173,041	112,226	184,102
H/R		1474,474	1950,308	1474,073	1949,532	1474,073	1949,532	1474,576	1939,721	1473,769	1957,346	1473,769
H/R		137,773		130,328		130,328		134,697		1408,288		134,697
H/R		10	10	10	10	10	10	10	10	10	10	10
H/R		10	10	10	10	10	10	10	10	10	10	10
NONE		0		0		0		0		0		0
LB/HR		8.04		8.04		8.04		7.95		8.11		7.95
\$		1121,336		1111,331		1111,331		1115,671		1106,769		1115,671
\$		10	10	10	10	10	10	10	10	10	10	10
\$		10	10	10	10	10	10	10	10	10	10	10
\$		194,782		194,715		194,715		194,715		195,391		194,715
\$		1323,041		1323,041		1323,041		1323,041		1323,041		1323,041
\$		10	10	10	10	10	10	10	10	10	10	10

10/1/84 4:10 PM

Sens 15

[illegible]

SOME INCREMENTAL COST FOR BOILER MAINTENANCES

AVERAGE TOTAL INCREMENTAL CAPITAL COSTS

UNBOUNDED TOTAL INCREMENTAL CAPITAL COSTS

CAPITAL RECOVERY FACTOR

UNANNUALIZED COST OF CAPITAL

TOTAL ANNUAL O&M COST

TOTAL ANNUAL COST INCLUDING COST OF CAPITAL

TOTAL COST PER MILLION BTU OF STEAM, (inc. cost of capital)

SIR (SAVINGS/INVESTMENT) AT EQUAL ANNUAL STEAM PRODUCTION

TOTAL O&M COST PER MILLION BTU OF STEAM

O&M COSTS FOR FULMERIZER IF NOT ROF BUT COOL USED AS REF

TONS PER YEAR ROF REQUIRED

Avoided H&M disposal cost.

SIR w/disposal credit

#	338165	347066	359324	338165
\$	540326	505549		540326
\$	\$713,230	\$667,325	\$739,765	\$713,230
NONE	\$10	\$10	\$10	\$10
s/YR	\$0	\$0	\$0	\$0
s/YR	\$1,095,730	\$1,196,348	\$824,843	\$1,157,500
s/YR	0	1196348	0	1675021
s/MHT	\$0.00	\$2.83	\$0.00	\$3.97
NONE	-2.53	-1.02	0.79	1.5
s/MHT	\$3.42	\$2.83	\$2.65	\$3.62
s/YR	\$0.00	\$0.00	\$0.00	\$0.00
TYP	13470	5744	\$20,190	\$13,470
Sens 12			Sens 14	Sens 15

IN OUT 4 January

c:\energy\cherry

Summary of Sensitivity Analysis Cherry Point

variable	definition	Sens 16	Sens 17	Sens 18	Sens 19
		UNIT	ROF	CONVENTIONAL FUEL	CONVENTIONAL FUEL
		DISPOSAL COST (NO CREDIT)	DISPOSAL COST (NO CREDIT)	DISPOSAL COST (NO CREDIT)	DISPOSAL COST (NO CREDIT)
ENTHALPY TRANSFERRED TO STEAM, AVG HOURLY, 100% AVAILABILITY					
MCR, AVG MAX FOR DEFINED CASE (GENERATED AT H ₂ VELOCITY)					
MAXIMUM TURNDOWN STEAM RATINGS, SEAM BTU/H					
BOILER EFFICIENCY AT MCR					
BOILER EFFICIENCY AT AVERAGE OUTPUT					
MAXIMUM STEAM DEMAND (MSD)					
DEBRATE					
TOTAL FUEL INPUT ENTHALPY, AVERAGE					
ROF FLOWRATE, AVERAGE					
CONVENTIONAL FUEL INPUT ENTHALPY, AVERAGE					
SOLID RESIDUE GENERATED, AVERAGE					
CARBON CONTENT OF SOLID RESIDUE, MAX HOURLY AT MCR					
FLYASH FRACTION OF SOLID RESIDUE, AVERAGE					
FLYASH EMISSION ABSOLUTE AND EXISTING CONTROL DEVICE AT MCR					
EMISSION OF TSP, MAX HOURLY W/ EXISTING CTRL AT MCR					
UNCONTROLLED FLYASH EMISSION, MAX HOURLY AT MCR					
COMBUSTION AIR RATE, AVERAGE					
COMBUSTION AIR VOLUMETRIC FLOWRATE, AVERAGE					
NET FUEL GAS RATE, AVERAGE					
NET FUEL GAS VOLUMETRIC FLOW, AVERAGE					
EMISSION CTRL DEVICE ASSUMED EFFICIENCY (EXISTING DEVICE)					
NEW EMISSION CONTROL DEVICE REQUIRED 1= YES					
ELECTRIC POWER COST FOR FD SYSTEM, AVERAGE					
ELECTRIC POWER COST FOR ID SYSTEM, AVERAGE					
MISC ELECTRIC POWER COSTS, AVERAGE					
SOLID RESIDUE GENERATED, MAX HOURLY AT MCR					
ANNUAL LABOR COST, BURDENED					
OPERATORS PER SHIFT					
CONVENTIONAL FUEL COST, AVERAGE					
ROF FUEL COST, AVERAGE					
ASH DISPOSAL COST, AVERAGE					
OPERATING HRS/YR IN DEFINED STEAM SUPPLY RANGE					
INCREMENTAL MAINTENANCE COST, ANNUAL					
AVAILABILITY, FRACTION					
ANNUAL STEAM PRODUCTION, NET					
RELATIVE ELECTRIC POWER ANNUAL COST					
ANNUAL CONVENTIONAL FUEL COST					
ANNUAL ROF FUEL COST					
ANNUAL ASH DISPOSAL COST					
ANNUAL NEW DISPOSAL COST					
FURNACE COLD STARTING CO & SMOKE IF = 1					
NEW MAX EMISSIONS RATE W/ NEW CONTROL DEVICE					
INCLUDED IN CAPITAL COST					
BARE CAPITAL COST OF STORAGE, SUBSYSTEM					
BARE CAPITAL COST OF LONG MECHANICAL CONVEYOR					
BARE CAPITAL COST OF SHORT MECHANICAL CONVEYOR					
BARE CAPITAL COST OF ROF DELIVERY SYSTEM					
BARE INCREMENTAL COST OF ASH HANDLING SYSTEM					
BARE INCREMENTAL CAPITAL COSTS FOR EMISSIONS CONTROL					

82-41-1-10000

c:\heavy\7cherry

BASE INCREMENTAL COST FOR MILLER MODIFICATIONS
 BASE TOTAL INCREMENTAL CAPITAL COSTS
 BURDENED TOTAL INCREMENTAL CAPITAL COSTS
 CAPITAL RECOVERY FACTOR
 ANNUALIZED COST OF CAPITAL
 TOTAL ANNUAL OWN COST
 TOTAL ANNUAL COST INCLUDING COST OF CAPITAL
 TOTAL COST PER MILLION BTU OF STEAM, (inc. cost of capital)
 SIR (SAVINGS/INVESTMENT) AT EQUAL ANNUAL STEAM PRODUCTION
 TOTAL OWN COST PER MILLION BTU OF STEAM
 OWN COSTS FOR PULVERIZER IF NOT NSF BUT COAL USED AS NSF
 TONS PER YEAR NSF REQUIRED
 Avoided NSM disposal cost
 SIR w/disposal credit

\$	338165	338165	338165
\$	540326	540326	540326
\$	\$713,230	\$713,230	\$717,328
NONE	\$10	\$10	\$10
\$/YR	\$0	\$0	\$0
\$/YR	\$1,354,385	\$2,153,694	\$959,229
\$/YR	\$0	\$0	\$0
\$/MWH	\$0.00	\$2.83	\$2.86
NONE	3.18	-0.19	-1.12
\$/MWH	\$4.36	\$2.88	\$3.12
\$/YR	\$0.00	\$0	\$0
TPV	\$13,470	\$13,470	\$14,549

Sens 19

Sens 18

Sens 17

Sens 16

no out 4 summary

Summary of Sensitivity Analysis

Cherry Point

variable
definition

Sens 20

Sens 21: SIR w/credit
Actual MSW \$

Sens 22: SIR w/credit
MSW +50%

Sens 23: SIR w/credit
MSW +100%

variable definition	UNITS	ROF	CONVENTIONAL FUEL	ROF COFIRING	CONVENTIONAL FUEL	ROF COFIRING	CONVENTIONAL FUEL	ROF COFIRING	CONVENTIONAL FUEL
ENTHALPY TRANSFERRED TO STEAM, AVG HOURLY, 100% AVAILABILITY	BTU	5.09E+07	5.09E+07	5.09E+07	5.09E+07	5.09E+07	5.09E+07	5.09E+07	5.09E+07
MCR, AVG MCR FOR COPIED CASE (HEATED AT M1 VELOCITY)	BTU	8.67E+07	7.47E+07	8.66E+07	7.46E+07	8.66E+07	7.46E+07	8.66E+07	7.46E+07
MAXIMUM TURNDOWN STEAM RATINGS, SEAM BTU	BTU	1.98E+07		1.98E+07		1.98E+07		1.98E+07	
BOILER EFFICIENCY AT MCR	NONE	0.76	0.82	0.76	0.82	0.76	0.82	0.76	0.82
BOILER EFFICIENCY AT AVERAGE OUTPUT	NONE	0.69	0.82	0.75	0.82	0.75	0.82	0.75	0.82
MAXIMUM STEAM DEMAND (MSD)	BTU	2.25E+08	2.25E+08	2.25E+08	2.25E+08	2.25E+08	2.25E+08	2.25E+08	2.25E+08
DEBRATE	NONE	0		0		0		0	
TOTAL FUEL INPUT ENTHALPY, AVERAGE	BTU	7.41E+07	6.20E+07	6.75E+07	6.20E+07	6.75E+07	6.20E+07	6.75E+07	6.20E+07
ROF FLOWRATE, AVERAGE	TPI	2.35	2.14	2.14	2.14	2.14	2.14	2.14	2.14
CONVENTIONAL FUEL INPUT ENTHALPY, AVERAGE	LB/HR	3019	4210	2749	4212	2749	4212	2749	4212
SOLID RESIDUE GENERATED, AVERAGE	LB/HR	1197	279	774	279	774	279	774	279
CARBON CONTENT OF SOLID RESIDUE, MAX HOURLY AT MCR	NONE	0.46	0.09	0.23	0.09	0.23	0.09	0.23	0.09
FLYASH FRACTION OF SOLID RESIDUE, AVERAGE	NONE	0.74	0.29	0.74	0.29	0.74	0.29	0.74	0.29
FLYASH EMISSION ABSOLUTE AND EXISTING CONTROL DEVICE AT MCR	LB/HR	2	0	2	0	2	0	2	0
EMISSION OF TSP, MAX HOURLY W/ EXISTING CTRL AT MCR	LB/HR	0.02	0	0.02	0	0.02	0	0.02	0
UNCONTROLLED FLYASH EMISSION, MAX HOURLY AT MCR	LB/HR	8.11	1.28	8.11	1.28	8.11	1.28	8.11	1.28
COMBUSTION AIR RATE, AVERAGE	LB/HR	53267	52944	57628	52966	57628	52966	57628	52966
COMBUSTION AIR VOLUMETRIC FLOWRATE, AVERAGE	ACFM	14059	11763	12806	11770	12806	11770	12806	11770
NET FUE GAS RATE, AVERAGE	LB/HR	69791	56076	63887	56899	63887	56899	63887	56899
NET FUE GAS VOLUMETRIC FLOW, AVERAGE	ACFM	20019	23192	20027	23201	20027	23201	20027	23201
EMISSION CTRL DEVICE ASSIGNED EFFICIENCY (EXISTING DEVICE)	NONE	1	1	1	1	1	1	1	1
NEW EMISSION CONTROL DEVICE REQUIRED 1= YES	NONE	0	0	0	0	0	0	0	0
ELECTRIC POWER COST FOR FD SYSTEM, AVERAGE	\$/HR	\$1.76	\$1.47	\$1.60	\$1.47	\$1.60	\$1.47	\$1.60	\$1.47
ELECTRIC POWER COST FOR ID SYSTEM, AVERAGE	\$/HR	\$3.42	\$0.00	\$3.13	\$0.00	\$3.13	\$0.00	\$3.13	\$0.00
MISC ELECTRIC POWER COSTS, AVERAGE	\$/HR	\$7.45	\$0.00	\$6.88	\$0.00	\$6.88	\$0.00	\$6.88	\$0.00
SOLID RESIDUE GENERATED, MAX HOURLY AT MCR	LB/HR	1257	409	1257	409	1257	409	1257	409
ANNUAL LABOR COST, BURHESED	\$/YR	\$314,056	\$226,777	\$313,953	\$226,703	\$313,953	\$226,703	\$313,953	\$226,703
OPERATIONS PER SHIFT	MAN/SH	2.15	1.55	2.15	1.55	2.15	1.55	2.15	1.55
CONVENTIONAL FUEL COST, AVERAGE	\$/HR	\$83	\$115	\$75	\$115	\$75	\$115	\$75	\$115
ROF FUEL COST, AVERAGE	\$/HR	5	92	4	90	4	90	4	90
ASH DISPOSAL COST, AVERAGE	\$/HR	\$9	\$2	\$9	\$2	\$9	\$2	\$9	\$2
OPERATING MCR/HR IN COPIED STEAM SUPPLY RANGE	HOURS	6290	8299	6290	8299	6290	8299	6290	8299
INCREMENTAL MAINTENANCE COST, ANNUAL	\$/YR	33049		32805		32805		32805	
AVAILABILITY, FRACTION	NONE	0.72	0.95	0.72	0.95	0.72	0.95	0.72	0.95
ANNUAL STEAM PRODUCTION, NET	BTU	3.200E+11	4.220E+11	3.200E+11	4.220E+11	3.200E+11	4.220E+11	3.200E+11	4.220E+11
RELATIVE ELECTRIC POWER ANNUAL COST	\$/YR	\$79,433	\$12,225	\$73,058	\$12,230	\$73,058	\$12,230	\$73,058	\$12,230
ANNUAL CONVENTIONAL FUEL COST	\$/YR	\$280,220	\$957,346	\$473,858	\$957,736	\$473,858	\$957,736	\$473,858	\$957,736
ANNUAL ROF FUEL COST	\$/YR	29882		26946		26946		26946	
ANNUAL ASH DISPOSAL COST	\$/YR	35732	17100	0	0	0	0	0	0
ANNUAL MSW DISPOSAL COST	\$/YR	90	\$94,000	90	\$94,000	90	\$94,000	90	\$94,000
FURNACE COLD (WAKING CO & SHOCK) IF = 1	NONE	0		0		0		0	
NEW MAX EMISSIONS RATE W/ NEW CONTROL DEVICE	LB/HR	8.11		8.11		8.11		8.11	
INCLUDED IN CAPITAL COST									
BASE CAPITAL COST OF STORAGE SUBSYSTEM	\$	110736		106768		106768		106768	
BASE CAPITAL COST OF LONG MECHANICAL CONVEYOR	\$	0		0		0		0	
BASE CAPITAL COST OF SHORT MECHANICAL CONVEYOR	\$	0		0		0		0	
BASE CAPITAL COST OF ROF DELIVERY SYSTEM	\$	\$95,391		\$95,379		\$95,379		\$95,379	
BASE INCREMENTAL COST OF ASH HANDLING SYSTEM	\$	90		90		90		90	
BASE INCREMENTAL CAPITAL COSTS FOR EMISSIONS CONTROL	\$	0		0		0		0	

c:\vepy\1\cherry

BASE INCREMENTAL COST FOR BOILER MODIFICATIONS

BASE TOTAL INCREMENTAL CAPITAL COSTS

BURDENED TOTAL INCREMENTAL CAPITAL COSTS

CAPITAL RECOVERY FACTOR

ANNUALIZED COST OF CAPITAL

TOTAL ANNUAL O&M COST

TOTAL ANNUAL COST INCLUDING COST OF CAPITAL

TOTAL COST PER MILLION BTU OF STEAM, (inc. cost of capital)

SIR (SAVINGS/INVESTMENT) AT EQUAL ANNUAL STEAM PRODUCTION

TOTAL O&M COST PER MILLION BTU OF STEAM

TOTAL COSTS FOR ALKALIZER IF NOT REQ BUT COAL USED AS ASF

TONS PER YEAR REQ REQUIRED

Avoided M&M disposal cost

SIR w/disposal credit

\$	338165	338117	338117	338117
\$	544292	540264	540264	540264
\$	9718,466	9713,149	9713,149	9713,149
NONE	910	910	910	910
\$/YR	90	90	90	90
\$/YR	\$1,032,073	\$1,196,669	\$1,196,669	\$1,196,669
\$/YR	0	0	0	0
\$/YR	90.00	92.83	90.00	92.83
NONE	-1.49	-0.18	-0.18	-0.18
\$/YR	90	90	90	90
TPY	914,791	913,473	913,473	913,473
		\$17,000	\$40,500	\$40,500
		0.04	0.36	0.67

Sums 20

up oct 4 summary

E30

C. Nappi/Cherry

Summary of Sensitivity Analysis Cherry Point

variable
definitionENTHALPY TRANSFERRED TO STEAM, AVG HOURLY, 100% AVAILABILITY
MCR, AHS MAX FOR CORRIDOR CASE (HEATED AT 11 VELOCITY)

MINIMUM TURNDOWN STEAM RATING, SEAM BTU/H

BOILER EFFICIENCY AT MCR

BOILER EFFICIENCY AT AVERAGE OUTPUT

MINIMUM STEAM DEMAND (MED)

DEARTE

TOTAL FUEL INPUT ENTHALPY, AVERAGE

REF FLOWRATE, AVERAGE

CONVENTIONAL FUEL INPUT ENTHALPY, AVERAGE

SOLID RESIDUE GENERATED, AVERAGE

CARBON CONTENT OF SOLID RESIDUE, MAX HOURLY AT MCR

FLYASH FRACTION OF SOLID RESIDUE, AVERAGE

FLYASH EMISSION ABSOLUTE AND EXISTING CONTROL DEVICE AT MCR

EMISSION OF TSP, MAX HOURLY W/ EXISTING CTRL AT MCR

UNCONTROLLED FLYASH EMISSION, MAX HOURLY AT MCR

COMBUSTION AIR RATE, AVERAGE

COMBUSTION AIR VOLUMETRIC FLOWRATE, AVERAGE

NET FUEL GAS RATE, AVERAGE

NET FUEL GAS VOLUMETRIC FLOW, AVERAGE

EMISSION CTRL DEVICE ASSURED EFFICIENCY (EXISTING DEVICE)

NEW EMISSION CONTROL DEVICE REQUIRED 1 = YES

ELECTRIC POWER COST FOR FD SYSTEM, AVERAGE

ELECTRIC POWER COST FOR ID SYSTEM, AVERAGE

MISC ELECTRIC POWER COSTS, AVERAGE

SOLID RESIDUE GENERATED, MAX HOURLY AT MCR

ANNUAL LABOR COST, BURDENED

OPERATIONS PER SHIFT

CONVENTIONAL FUEL COST, AVERAGE

REF FUEL COST, AVERAGE

ASH DISPOSAL COST, AVERAGE

OPERATING HRS/YR IN DEFINED STEAM SUPPLY RANGE

INCREMENTAL MAINTENANCE COST, ANNUAL

AVAILABILITY, FRACTION

ANNUAL STEAM PRODUCTION, NET

RELATIVE ELECTRIC POWER ANNUAL COST

ANNUAL CONVENTIONAL FUEL COST

ANNUAL REF FUEL COST

ANNUAL ASH DISPOSAL COST

ANNUAL NEW DISPOSAL COST

FURNACE COLD (WARMING CO & SHOLE) IF = 1

NEW MCR EMISSIONS RATE W/ NEW CONTROL DEVICE

INCLUDED IN CAPITAL COST

BASE CAPITAL COST OF STORAGE SYSTEM

BASE CAPITAL COST OF LONG MECHANICAL CONVEYOR

BASE CAPITAL COST OF SHORT MECHANICAL CONVEYOR

BASE CAPITAL COST OF REF DELIVERY SYSTEM

BASE INCREMENTAL COST OF ASH HANDLING SYSTEM

BASE INCREMENTAL CAPITAL COSTS FOR EMISSIONS CONTROL

Conventional Fuel
Cost -25%

Best Case #1

Best Case #2

Best Case #3

Best Case #4

UNITS	REF CONFIRMING	CONVENTIONAL FUEL	REF CONFIRMING	CONVENTIONAL FUEL	REF CONFIRMING	CONVENTIONAL FUEL	REF CONFIRMING	CONVENTIONAL FUEL
BTU/H	5.09E+07	5.09E+07	5.09E+07	5.09E+07	5.09E+07	5.09E+07	5.09E+07	5.09E+07
BTU/H	8.66E+07	7.46E+07	8.66E+07	7.46E+07	8.66E+07	7.46E+07	8.66E+07	7.46E+07
BTU/H	1.98E+07	1.98E+07	1.98E+07	1.98E+07	1.98E+07	1.98E+07	1.98E+07	1.98E+07
NONE	0.76	0.82	0.76	0.82	0.76	0.82	0.76	0.82
NONE	0.75	0.82	0.75	0.82	0.75	0.82	0.75	0.82
BTU/H	2.25E+08	2.25E+08	2.25E+08	2.25E+08	2.25E+08	2.25E+08	2.25E+08	2.25E+08
NONE	0	0	0	0	0	0	0	0
BTU/H	6.75E+07	6.75E+07	6.75E+07	6.75E+07	6.75E+07	6.75E+07	6.75E+07	6.75E+07
TH	2.14	3.41	2.14	3.41	2.14	3.41	2.14	3.41
LB/HR	2749	4212	1826	4155	1826	4155	1826	4155
LB/HR	774	279	869	275	1421	275	1421	275
NONE	0.23	0.09	0.23	0.09	0.23	0.09	0.23	0.09
NONE	0.74	0.29	0.59	0.29	0.59	0.29	0.59	0.29
LB/HR	2	0	2	0	2	0	2	0
LB/HR	0.02	0	0.02	0	0.02	0	0.02	0
LB/HR	8.11	1.28	7.9	1.28	7.9	1.28	7.9	1.28
LB/HR	57628	32566	57421	32256	57421	32256	57421	32256
ACFM	12806	11770	12760	11612	12760	11612	12760	11612
LB/HR	63887	56899	63980	56136	63980	56136	63980	56136
ACFM	2027	23201	20256	22890	20256	22890	20256	22890
NONE	1	1	1	1	1	1	1	1
NONE	0	0	0	0	0	0	0	0
\$/HR	\$1.60	\$1.47	\$1.60	\$1.45	\$1.60	\$1.45	\$1.60	\$1.45
\$/HR	\$2.13	\$0.00	\$2.13	\$0.00	\$2.13	\$0.00	\$2.13	\$0.00
\$/HR	\$6.88	\$0.00	\$6.88	\$0.00	\$6.88	\$0.00	\$6.88	\$0.00
\$/HR	1257	409	1509	409	1509	409	1509	409
\$/HR	\$313,953	\$226,703	\$343,245	\$226,703	\$343,245	\$226,703	\$343,245	\$226,703
\$/HR	2.15	1.55	2.35	1.55	2.35	1.55	2.35	1.55
\$/HR	\$57	\$87	\$100	\$228	\$100	\$228	\$100	\$228
\$/HR	\$4	\$7	\$6	\$114	\$6	\$114	\$6	\$114
\$/HR	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$/HR	\$290	\$299	\$290	\$299	\$290	\$299	\$290	\$299
\$/HR	\$2805	\$3583	\$3408	\$3408	\$3408	\$3408	\$3408	\$3408
NONE	0.72	0.95	0.72	0.95	0.72	0.95	0.72	0.95
BTU	3.20E+11	4.22E+11	3.16E+11	4.16E+11	3.16E+11	4.16E+11	3.16E+11	4.16E+11
\$/HR	\$73,058	\$12,230	\$84,252	\$12,067	\$84,252	\$12,067	\$84,252	\$12,067
\$/HR	\$356,258	\$720,050	\$429,533	\$1,689,800	\$429,533	\$1,689,800	\$429,533	\$1,689,800
\$/HR	\$596	\$2596	\$5239	\$5239	\$5239	\$5239	\$5239	\$5239
\$/HR	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
\$/HR	\$0	\$94,000	\$0	\$188,000	\$0	\$188,000	\$0	\$188,000
NONE	0	0	0	0	0	0	0	0
LB/HR	8.11	7.9	7.9	7.9	7.9	7.9	7.9	7.9
\$/	106768	116301	117695	117695	117695	117695	117695	117695
\$/	0	0	0	0	0	0	0	0
\$/	0	0	0	0	0	0	0	0
\$/	\$55,379	\$109,431	\$109,431	\$109,431	\$109,431	\$109,431	\$109,431	\$109,431
\$/	0	0	0	0	0	0	0	0
\$/	0	0	0	0	0	0	0	0

じら

c:\navy\7\cherry

Summary of Sensitivity Analysis

Cherry Point

Best Case #5

variable
definition

variable definition	UNITS	ROF	CONVENTIONAL FUEL
ENTHALPY TRANSFERRED TO STEAM, AVG HOURLY, 100% AVAILABILITY	BTU/H	6.29E+07	6.29E+07
MC, AVG MAX FOR CONFIDED CASE (HEATED AT HI VELOCITY)	BTU/H	8.39E+07	7.46E+07
MINIMUM TURNDOWN STEAM BOILING, SEAM BTU/H	BTU/H	1.92E+07	
BOILER EFFICIENCY AT MC	NONE	0.74	0.82
BOILER EFFICIENCY AT AVERAGE OUTPUT	NONE	0.77	0.82
MINIMUM STEAM DEMAND (MSD)	BTU/H	2.25E+08	2.25E+08
DEBATE	NONE	0	
TOTAL FUEL INPUT ENTHALPY, AVERAGE	BTU/H	8.18E+07	7.57E+07
ROF FLOWRATE, AVERAGE	TPH	3.41	
CONVENTIONAL FUEL INPUT ENTHALPY, AVERAGE	LB/H	2222	5212
SOLID RESIDUE GENERATED, AVERAGE	LB/H	926	345
CARBON CONTENT OF SOLID RESIDUE, MAX HOURLY AT MC	NONE	0.12	0.09
FLYASH FRACTION OF SOLID RESIDUE, AVERAGE	NONE	0.59	0.29
FLYASH EMISSION ABSOLUTE AVG EXISTING CONTROL DEVICE AT MC	LB/H	2	0
EMISSION OF TSP, MAX HOURLY W/ EXISTING CONTRL AT MC	LB/H	0.02	0
JACONTROLLED FLYASH EMISSION, MAX HOURLY AT MC	LB/H	7.9	1.28
COMBUSTION AIR RATE, AVERAGE	LB/H	69652	65541
COMBUSTION AIR VOLUMETRIC FLOWRATE, AVERAGE	ACFM	15323	14553
NET FUEL GAS RATE, AVERAGE	LB/H	77963	70408
NET FUEL GAS VOLUMETRIC FLOW, AVERAGE	ACFM	31864	28709
EMISSION CONTRL DEVICE ASSUMED EFFICIENCY (EXISTING DEVICE)	NONE	1	1
NEW EMISSION CONTRL DEVICE REQUIRED IF = YES	NONE	0	0
ELECTRIC POWER COST FOR FD SYSTEM, AVERAGE	\$/HR	\$1.94	\$1.82
ELECTRIC POWER COST FOR ID SYSTEM, AVERAGE	\$/HR	\$4.82	\$0.00
MISC ELECTRIC POWER COSTS, AVERAGE	\$/HR	\$10.21	\$0.00
SOLID RESIDUE GENERATED, MAX HOURLY AT MC	LB/H	1509	409
ANNUAL LOAD COST, BURDENED	\$/YR	\$341,245	\$225,703
OPERATORS PER SHIFT	MIN/SH	2.35	1.55
CONVENTIONAL FUEL COST, AVERAGE	\$/HR	\$122	\$286
ROF FUEL COST, AVERAGE	\$/HR	\$7	
ASH DISPOSAL COST, AVERAGE	\$/HR	\$0	\$0
OPERATING HRS/YR IN CONFIDED STEAM SUPPLY RANGE	HOURS	6290	8299
INCREMENTAL MAINTENANCE COST, ANNUAL	\$/YR	33983	
AVAILABILITY, FRACTION	NONE	0.72	0.95
ANNUAL STEAM PRODUCTION, NET	BTU	3.96E+11	5.22E+11
RELATIVE ELECTRIC POWER ANNUAL COST	\$/YR	\$106,758	\$15,134
ANNUAL CONVENTIONAL FUEL COST	\$/YR	\$753,823	\$2,370,239
ANNUAL ROF FUEL COST	\$/YR	\$2868	
ANNUAL ASH DISPOSAL COST	\$/YR	0	0
ANNUAL MSW DISPOSAL COST	\$/YR	\$0	\$94,000
FURNACE COLD (WAKING CO & SMOKE) IF = 1	NONE	0	
NEW MAX EMISSIONS RATE W/ NEW CONTROL DEVICE INCLUDED IN CAPITAL COST	LB/H	7.9	
BASE CAPITAL COST OF STORAGE TUBESYSTEM	\$	116301	
BASE CAPITAL COST OF LONG MECHANICAL CONVEYOR	\$	0	
BASE CAPITAL COST OF SHORT MECHANICAL CONVEYOR	\$	0	
BASE CAPITAL COST OF ROF DELIVERY SYSTEM	\$	\$109,431	
BASE INCREMENTAL COST OF ASH HANDLING SYSTEM	\$	\$0	
BASE INCREMENTAL CAPITAL COSTS FOR EMISSIONS CONTROL	\$	0	

NO. 100-1-100000

BASE INCREMENTAL COST FOR BOILER MODIFICATIONS
 BASE TOTAL INCREMENTAL CAPITAL COSTS
 ADJUSTED TOTAL INCREMENTAL CAPITAL COSTS
 CAPITAL RECOVERY FACTOR
 ANNUALIZED COST OF CAPITAL
 TOTAL ANNUAL O&M COST
 TOTAL ANNUAL COST INCLUDING COST OF CAPITAL
 TOTAL COST PER MILLION BTU OF STEAM, (inc. cost of capital)
 S/R (SAVINGS/INVESTMENT) AT EQUAL ANNUAL STEAM PRODUCTION
 TOTAL O&M COST PER MILLION BTU OF STEAM
 O&M COSTS FOR PULVERIZER IF NOT R/F BUT COAL USED AS REF
 TONS PER YEAR R/F REQUIRED
 Avoided RSM disposal cost
 S/R w/disposal credit

\$	33937	
\$	595670	
\$	\$738,763	
NONE	9.54	9.54
1/YR	0	
1/YR	\$1,292,678	\$2,612,076
1/YR	0	2512076
1/YR	\$0.00	\$5.00
NONE	6.87	
1/YR	\$3.27	\$5.00
1/YR	90	
TPY	\$21,434	
	\$17,000	
	9.09	

535

Sheet

Summary of Sensitivity Analysis

BASELINE

Definition	Units	Base Line		1		2		3		4		5	
		Conventional	Fuel	Conventional	Fuel	Conventional	Fuel	Conventional	Fuel	Conventional	Fuel	Conventional	Fuel
ENTHALPY TRANSFERRED TO STEAM, AVG. HOURLY, 100% AVAILABILITY	BTU/H	6,82E+07	6,82E+07	7,94E+07	7,94E+07	1,07E+08	1,07E+08	6,84E+07	6,84E+07	6,79E+07	6,79E+07	6,70E+07	6,70E+07
WATER, AVG. HOURLY, FOR COPIED CASE (HEATED AT 101 VELOCITY)	BTU/H	1,42E+08	1,38E+08	1,42E+08	1,38E+08	1,42E+08	1,38E+08	1,42E+08	1,38E+08	1,38E+08	1,38E+08	1,32E+08	1,32E+08
MAXIMUM TURBIDITY STEAM RATING, SEAM BTU/H	BTU/H	3,20E+07	3,20E+07	3,20E+07	3,20E+07	3,20E+07	3,20E+07	3,20E+07	3,20E+07	3,12E+07	3,12E+07	3,17E+07	3,17E+07
BOILER EFFICIENCY AT MCR	NONE	0.77	0.8	0.77	0.8	0.77	0.8	0.78	0.8	0.76	0.8	0.76	0.8
BOILER EFFICIENCY AT AVERAGE DUTY	NONE	0.68	0.8	0.7	0.8	0.72	0.8	0.69	0.8	0.67	0.8	0.68	0.8
MAXIMUM STEAM DEMAND (MSD)	BTU/H	1,50E+08	1,50E+08	1,50E+08	1,50E+08	1,50E+08	1,50E+08	1,50E+08	1,50E+08	1,50E+08	1,50E+08	1,50E+08	1,50E+08
DEBRITE	NONE	0	0	0	0	0	0	0	0	0	0	0.04	0.04
TOTAL FUEL INPUT ENTHALPY, AVERAGE	BTU/H	9,39E+07	8,51E+07	1,14E+08	9,91E+07	1,49E+08	1,33E+08	9,91E+07	8,54E+07	1,01E+08	8,47E+07	9,90E+07	8,43E+07
REF FLOWRATE, AVERAGE	T/H	3.17	3.17	3.61	3.61	4.72	4.72	3.74	3.74	3.74	3.74	3.14	3.14
CONVENTIONAL FUEL INPUT ENTHALPY, AVERAGE	LB/H	5709	8107	9437	5662	8129	5767	5662	8129	5767	5662	5662	8056
SOLID RESIDUE REGENERATED, AVERAGE	LB/H	1949	805	2100	937	2540	1260	1861	807	2066	801	1932	797
CARBON CONTENT OF SOLID RESIDUE, MAX HOURLY AT MCR	NONE	0.47	0.3	0.44	0.3	0.39	0.3	0.49	0.3	0.44	0.3	0.47	0.3
FLYASH EMISSION ABSOLUTE AND EXISTING CONTROL DEVICE AT MCR	LB/H	2,26	0.37	2,26	0.37	2,26	0.37	2,43	0.37	2,06	0.37	2,44	0.4
UNCONTROLLED FLYASH EMISSION, MAX HOURLY AT MCR	LB/H	0.02	0	0.02	0	0.02	0	0.02	0	0.02	0	0.02	0
COMBUSTION AIR RATE, AVERAGE	LB/H	30,71	3,43	30,71	3,43	30,71	3,43	31,05	3,43	30,25	3,43	30,47	3,78
NET FUEL GAS RATE, AVERAGE	LB/H	94019	80778	107804	94032	141156	126407	94037	81000	95768	80385	101229	86127
NET FUEL GAS VOLUMETRIC FLOW, AVERAGE	ACFM	21071	17951	23996	20996	31368	28991	20997	18000	21282	17859	22495	19139
ENTHALPY INPUT DEVICE ASSUMED EFFICIENCY (EXISTING DEVICE)	ACFM	104924	80080	119531	102531	156599	137833	103343	88321	106944	87629	111246	93356
NEW EMISSION CONTROL DEVICE REQUIRED 1+ YES	ACFM	17437	30981	23628	36064	42700	44481	16910	31066	18118	30823	18593	32777
ELECTRIC POWER COST FOR PD SYSTEM, AVERAGE	NONE	0	0	0	0	0	0	0	0	0	0	0	0
ELECTRIC POWER COST FOR ID SYSTEM, AVERAGE	\$/H	\$1.12	\$0.95	\$1.27	\$1.11	\$1.67	\$1.49	\$1.11	\$0.96	\$1.13	\$0.95	\$1.19	\$1.02
MISC. ELECTRIC POWER COSTS, AVERAGE	\$/H	\$1.63	\$0.00	\$2.16	\$0.00	\$3.80	\$0.00	\$1.58	\$0.00	\$1.69	\$0.00	\$1.78	\$0.00
SOLID RESIDUE REGENERATED, MAX HOURLY AT MCR	LB/H	94,08	90,00	94,35	90,00	95,72	90,00	93,61	90,00	94,69	90,00	94,05	90,00
ANNUAL LABOR COST, BUDGETED	\$/H	2320	1635	2920	1635	2920	1635	2399	1635	2679	1635	2365	1635
OPERATIONS PER SHIFT	\$/H	\$457,072	\$330,048	\$457,072	\$330,048	\$457,072	\$330,048	\$457,072	\$330,048	\$457,072	\$330,048	\$455,087	\$328,600
CONVENTIONAL FUEL COST, AVERAGE	\$/H	3,08	2,22	3,08	2,22	3,08	2,22	3,08	2,22	3,08	2,22	3,06	2,21
REF FUEL COST, AVERAGE	\$/H	\$223	\$316	\$254	\$368	\$331	\$495	\$221	\$317	\$225	\$315	\$221	\$313
OPERATING MCR IN COPIED STEAM SUPPLY RANGE	\$/H	\$6,00	\$6,44	\$7,00	\$7,50	\$9,00	\$9,00	\$6,00	\$6,44	\$7,00	\$7,00	\$6,00	\$6,44
INCIDENTAL MAINTENANCE COST, ANNUAL	HOURS	\$15,99	\$5,44	\$16,80	\$7,50	\$20,32	\$10,08	\$14,89	\$6,46	\$16,53	\$6,41	\$15,45	\$6,38
AVAILABILITY, FRACTION	\$/H	\$40,030	\$561	\$39,960	\$561	\$39,972	\$561	\$39,916	\$561	\$40,134	\$561	\$38,963	\$561
ANNUAL STEAM PRODUCTION, NET	BTU	4,290E+11	5,840E+11	4,990E+11	6,800E+11	6,710E+11	5,140E+11	4,300E+11	5,860E+11	4,270E+11	5,810E+11	4,200E+11	5,740E+11
RELATIVE ELECTRIC POWER ANNUAL COST	\$/H	\$42,934	\$6,164	\$50,260	\$9,504	\$70,378	\$12,775	\$39,656	\$6,186	\$47,243	\$6,122	\$44,193	\$6,706
ANNUAL CONVENTIONAL FUEL COST	\$/H	\$1,400,561	\$2,706,711	\$1,595,015	\$3,150,850	\$2,084,993	\$4,235,650	\$1,389,012	\$2,714,128	\$1,414,574	\$2,692,859	\$1,384,434	\$2,679,793
ANNUAL REF FUEL COST	\$/H	\$39,962	\$55,442	\$45,442	\$69,401	\$59,401	\$89,401	\$34,626	\$55,442	\$47,018	\$69,401	\$39,962	\$55,442
ANNUAL REF DISPOSAL COST	\$/H	\$98,056	\$55,149	\$105,659	\$64,198	\$127,877	\$66,301	\$95,661	\$55,300	\$105,957	\$64,867	\$97,202	\$54,650
ANNUAL REF DISPOSAL COST	\$/H	\$672,000	\$672,000	\$672,000	\$672,000	\$672,000	\$672,000	\$672,000	\$672,000	\$672,000	\$672,000	\$672,000	\$672,000
FURNACE COOLING/HEATING CD + SMOKE IF +	NONE	0	0	0	0	0	0	0	0	0	0	0	0
NEW MCR EMISSIONS RATE W/ NEW CONTROL DEVICE INCLUDED IN CAPITAL COST	LB/H	30,71	30,71	30,71	30,71	30,71	30,71	31,05	30,71	30,25	30,47	30,47	30,47
BASE CAPITAL COST OF STORAGE SUBSYSTEM	\$	\$134,675	\$134,675	\$133,529	\$133,529	\$132,079	\$132,079	\$128,381	\$128,381	\$142,239	\$142,239	\$131,412	\$131,412
BASE CAPITAL COST OF LONG REMEDIATION CORRECTOR	\$	90	90	90	90	90	90	90	90	90	90	90	90
BASE CAPITAL COST OF SHORT REMEDIATION CORRECTOR	\$	90	90	90	90	90	90	90	90	90	90	90	90

Sheet 1 of 4

Sheet

Summary of Sensitivity Analysis RUBET SOUND

definition

definition	UNITS	A		1		2		3		4		5	
		Baseline RF Coffing	Conventional Fuel	Steam demand RF Coffing	Conventional Fuel	RF Coffing	Conventional Fuel	RF Coffing	Conventional Fuel	RF Coffing	Conventional Fuel	Excess Air RF Coffing	Conventional Fuel
BASE CAPITAL COST OF ROF DELIVERY SYSTEM	\$	9114,463		9114,463		9114,463		9114,463		9114,463		9114,463	
BASE INCREMENTAL COST OF ASH HANDLING SYSTEM	\$	90		90		90		90		90		90	
BASE INCREMENTAL CAPITAL COSTS FOR EMISSIONS CONTROL	\$	90		90		90		90		90		90	
BASE INCREMENTAL COST FOR MILLER MODIFICATIONS	\$	9410,083		9410,083		9410,083		9410,083		9410,083		9410,083	
BASE TOTAL INCREMENTAL CAPITAL COSTS	\$	65252,00		65252,00		65252,00		65252,00		65252,00		65252,00	
BURDENED TOTAL INCREMENTAL CAPITAL COSTS	\$	6470,212		6464,699		6464,765		6467,737		6472,465		6471,059	
CAPITAL RECOVERY FACTOR	NONE	9.54	9.54	9.54	9.54	9.54	9.54	9.54	9.54	9.54	9.54	9.54	9.54
ANNUALIZED COST OF CAPITAL	\$/YR	90		90		90		90		90		90	
TOTAL ANNUAL O&M COST	\$/YR	92,078,355	93,104,072	92,293,409	93,324,359	92,439,579	94,564,775	92,653,943	93,107,563	92,109,998	93,083,896	92,063,418	93,071,698
TOTAL ANNUAL COST INCLUDING COST OF CAPITAL	\$/YR	90	93,104,072	90	93,324,359	90	94,564,775	90	93,107,563	90	93,083,896	90	93,071,698
TOTAL COST PER MILLION BTU OF STEAM	\$/MMBTU	90.00	95.31	90.00	95.23	90.00	95.11	90.00	95.31	90.00	95.31	90.00	95.35
STEAM (SAVINGS)/INVESTMENT AT EQUAL ANNUAL STEAM PRODUCTION	NONE	2.18		3.49		6.47		2.52		1.72		1.8	
TOTAL O&M COST PER MILLION BTU OF STEAM	\$/MMBTU	94.85	95.31	94.29	95.23	94.23	95.11	94.77	95.31	94.94	95.31	94.90	95.35
O&M COSTS FOR FULMERIZER IF NOT ROF BUT COAL USED AS ASF	\$/YR	90		90		90		90		90		90	
TONS PER YEAR ROF REQUIRED	TPY	19951		22721		29701		17313		23509		19778	
Avoided non disposal cost	\$/YR	9210,000		9210,000		9210,000		9210,000		9210,000		9210,000	
SAW disposal credit	NONE	4.48		5.8		8.78		4.83		4.01		4.54	

Sheet out 4

Summary of Sensitivity Analysis
BASE: SOUND

definition	UNITS	6		7		8		9		10		11	
		ROF Coffing	Conventional Fuel	ROF Coffing	Conventional Fuel	ROF Coffing	Conventional Fuel	ROF Coffing	Conventional Fuel	ROF Coffing	Conventional Fuel	ROF Coffing	Conventional Fuel
ENTHALPY TRANSFERRED TO STEAM, WAS HOURLY, 100% AVAILABILITY	BTU/H	6.50E+07	6.50E+07	6.01E+07	6.01E+07	6.00E+07	6.00E+07	6.00E+07	6.00E+07	6.77E+07	6.77E+07	6.02E+07	6.02E+07
WAS NOT FOR COFFED CASE (HEATED AT HI VELOCITY)	BTU/H	1.24E+08	1.38E+08	1.41E+08	1.38E+08	1.40E+08	1.38E+08	1.40E+08	1.38E+08	1.40E+08	1.38E+08	1.42E+08	1.38E+08
MAXIMUM TURBIDITY STEAM RATING, SEAM BTU/H	BTU/H	3.15E+07		3.15E+07		3.17E+07		3.17E+07		3.14E+07		3.20E+07	
BOILER EFFICIENCY AT WCR	NONE	0.76	0.79	0.76	0.8	0.76	0.8	0.76	0.8	0.75	0.8	0.77	0.8
BOILER EFFICIENCY AT AVERAGE OUTPUT	NONE	0.67	0.79	0.68	0.8	0.68	0.8	0.68	0.8	0.67	0.8	0.68	0.8
MAXIMUM STEAM DRAINING (HSD)	BTU/H	1.50E+08	1.50E+08	1.50E+08	1.50E+08	1.50E+08	1.50E+08	1.50E+08	1.50E+08	1.50E+08	1.50E+08	1.50E+08	1.50E+08
DEWITE	NONE	0.09		0		0		0		0.01		0	
TOTAL FUEL INPUT ENTHALPY, AVERAGE	BTU/H	9.71E+07	8.24E+07	1.00E+08	8.50E+07	1.01E+08	8.49E+07	1.01E+08	8.49E+07	1.01E+08	8.49E+07	9.99E+07	8.51E+07
ROF FLUORITE, AVERAGE	TM	3.08		3.71		4.48		3.99		4.12		3.17	
CONVENTIONAL FUEL INPUT ENTHALPY, AVERAGE	LB/H	5930	7843	5728	8099	5754	8088	5743	8088	5772	8043	5709	8107
SOLID RESIDUE GENERATED, AVERAGE	LB/H	1903	779	2801	804	4003	803	2034	803	2143	799	1949	805
CARBON CONTENT OF SOLID RESIDUE, WAS HOURLY AT WCR	NONE	0.47	0.3	0.33	0.3	0.23	0.3	0.43	0.3	0.43	0.3	0.47	0.3
FLUSH FRACTION OF SOLID RESIDUE, AVERAGE	NONE	2.22	0.44	1.39	0.37	0.9	0.37	2.12	0.37	1.95	0.37	2.26	0.37
FLUSH ENTHALPY ABSOLUTE WAS EXISTING CONTROL DEVICE AT WCR	LB/H	2	0	3	0	3	0	3	0	3	0	3	0
EMISSION OF TSP, WAS HOURLY W/ EXISTING CTRL AT WCR	LB/H	0.02	0	0.02	0	0.02	0	0.02	0	0.02	0	0.02	0
UNCONTROLLED FLUSH EMISSION, WAS HOURLY AT WCR	LB/H	30.22	4.13	30.38	3.43	30.4	3.43	30.43	3.43	30.13	3.43	30.71	3.43
COMBUSTION AIR RATE, AVERAGE	LB/H	106399	98200	93129	80705	93353	80589	93376	80589	93904	80147	94819	80778
COMBUSTION AIR RATE, AVERAGE	ACFM	23635	20043	21140	17934	21234	17999	21195	17999	21312	17810	21071	17981
NET FUEL GAS RATE, AVERAGE	LB/H	116173	97266	105481	87999	106254	87873	106254	87873	107785	87391	104924	88080
NET FUEL GAS VOLUMETRIC FLOW, AVERAGE	ACFM	15085	34096	17625	30953	17888	30908	17863	30909	18338	30739	17437	30981
EMISSION CTRL DEVICE ASSURED EFFICIENCY (EXISTING DEVICE)	NONE	1	1	1	1	1	1	1	1	1	1	1	1
NEW EMISSION CONTROL DEVICE REQUIRED? YES	NONE	0	0	0	0	0	0	0	0	0	0	0	0
ELECTRIC POWER COST FOR FD SYSTEM, AVERAGE	\$/HR	\$1.26	\$1.06	\$1.12	\$0.95	\$1.13	\$0.95	\$1.13	\$0.95	\$1.13	\$0.95	\$1.12	\$0.95
ELECTRIC POWER COST FOR ID SYSTEM, AVERAGE	\$/HR	\$1.90	\$0.00	\$1.65	\$0.00	\$1.67	\$0.00	\$1.67	\$0.00	\$1.72	\$0.00	\$1.53	\$0.00
MISC ELECTRIC POWER COSTS, AVERAGE	\$/HR	\$3.98	\$0.00	\$4.66	\$0.00	\$5.46	\$0.00	\$4.53	\$0.00	\$5.10	\$0.00	\$4.08	\$0.00
SOLID RESIDUE GENERATED, WAS HOURLY AT WCR	LB/H	2229	1635	4077	1635	6540	1635	2643	1635	2797	1635	2520	1635
ANNUAL LABOR COST, BUNDLED	\$/YR	\$433,036	\$27,148	\$457,072	\$330,048	\$457,072	\$330,048	\$457,072	\$330,048	\$457,072	\$330,048	\$457,072	\$330,048
OPERATIONS PER SHIFT	MAN/SHIFT	3.05	2.2	3.08	2.22	3.08	2.22	3.08	2.22	3.08	2.22	3.08	2.22
CONVENTIONAL FUEL COST, AVERAGE	\$/HR	\$216	\$306	\$223	\$316	\$224	\$315	\$224	\$315	\$225	\$314	\$223	\$316
ROF FUEL COST, AVERAGE	\$/HR	\$6.00		\$7.00		\$9.00		\$7.00		\$8.00		\$12.00	
ASH DISPOSAL COST, AVERAGE	\$/HR	\$15.22	\$6.23	\$22.41	\$6.44	\$32.02	\$6.43	\$16.28	\$6.43	\$17.15	\$6.39	\$13.59	\$6.44
OPERATING WASH IN COFFED STEAM SUPPLY RANGE	HOURS	\$290	\$561	\$290	\$561	\$290	\$561	\$290	\$561	\$290	\$561	\$290	\$561
INCIDENTAL MAINTENANCE COST, ANNUAL	\$/YR	\$37,987		\$40,436		\$40,433		\$40,167		\$40,307		\$40,030	
AVAILABILITY, FRACTION	NONE	0.72	0.98	0.72	0.98	0.72	0.98	0.72	0.98	0.72	0.98	0.72	0.98
ANNUAL STEAM PRODUCTION, NET	BTU	4,090E+11	5,570E+11	4,290E+11	5,830E+11	4,280E+11	5,830E+11	4,280E+11	5,830E+11	4,280E+11	5,790E+11	4,290E+11	5,840E+11
RELATIVE ELECTRIC POWER ANNUAL COST	\$/YR	\$44,868	\$9,116	\$46,739	\$8,157	\$51,568	\$8,145	\$46,075	\$8,145	\$49,979	\$8,100	\$42,934	\$8,165
ANNUAL CONVENTIONAL FUEL COST	\$/YR	\$1,361,359	\$2,704,243	\$1,405,131	\$2,704,243	\$1,411,401	\$2,700,361	\$1,408,792	\$2,700,376	\$1,416,586	\$2,685,351	\$1,400,561	\$2,706,711
ANNUAL ROF FUEL COST	\$/YR	\$38,790		\$46,704		\$56,295		\$45,154		\$51,890		\$1,333,925	
ANNUAL NEW DISPOSAL COST	\$/YR	\$55,744	\$53,371	\$140,436	\$55,099	\$201,418	\$55,080	\$102,370	\$55,080	\$107,858	\$54,718	\$98,056	\$55,149
ANNUAL NEW DISPOSAL COST	\$/YR	\$672,000		\$672,000		\$672,000		\$672,000		\$672,000		\$672,000	
NEW WASHING COST AS SHOWN IN 4.1	NONE	0		0		0		0		0		0	
NEW WASHING COST AT NEW CONTROL 36.125	LB/H	30.22		30.36		30.4		30.45		30.13		30.71	
INCLUDED A CAPITAL COST													
BASE CAPITAL COST OF STORAGE SUBSYSTEM	\$/YR	\$128,566		\$142,842		\$153,103		\$140,486		\$147,323		\$134,675	
BASE CAPITAL COST OF LONG-REACHING CONVEYOR	\$/YR	\$0		\$0		\$0		\$0		\$0		\$0	
BASE CAPITAL COST OF SCOP RECONSTRUCTION CONVEYOR	\$/YR	\$0		\$0		\$0		\$0		\$0		\$0	

output

Summary of Sensitivity Analysis
PLURTY SLEND

definition	6	7	8	9	10	11
	REF Conventional Fuel	REF Conventional Fuel	REF Conventional Fuel	REF Conventional Fuel	REF Conventional Fuel	REF Conventional Fuel
	Confining	Confining	Confining	Confining	Confining	Confining
UNITS						
BASE CAPITAL COST OF REF DELIVERY SYSTEM	\$108,736	\$114,173	\$113,740	\$113,741	\$112,795	\$114,463
BASE INCREMENTAL COST OF ASH HANDLING SYSTEM	90	90	90	90	90	90
BASE INCREMENTAL CAPITAL COSTS FOR EMISSIONS CONTROL	90	90	90	90	90	90
BASE INCREMENTAL COST FOR MILLER MODIFICATIONS	\$384,362	\$408,200	\$407,280	\$407,283	\$403,703	\$410,093
BASE TOTAL INCREMENTAL CAPITAL COSTS	\$625,094	\$659,534	\$651,123	\$651,130	\$638,251	\$652,522
BASED TOTAL INCREMENTAL CAPITAL COSTS	\$825,797	\$879,033	\$869,842	\$873,193	\$876,244	\$870,212
CAPITAL RECOVERY FACTOR	9.54	9.54	9.54	9.54	9.54	9.54
ANNUALIZED COST OF CAPITAL	90	90	90	90	90	90
TOTAL ANNUAL O&M COST	\$2,031,983	\$2,137,017	\$2,219,087	\$2,099,629	\$2,123,682	\$2,372,578
TOTAL ANNUAL COST INCLUDING COST OF CAPITAL	\$0 \$3,063,976	\$0 \$3,097,547	\$0 \$3,093,573	\$0 \$3,093,599	\$0 \$3,078,417	\$0 \$3,100,073
TOTAL COST PER MILLION BTU OF STEAM	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
SIR (SAVINGS/INVESTMENT) AT EQUAL ANNUAL STEAM PRODUCTION	2.07	1.31	0.56	1.89	1.5	-12
TOTAL O&M COST PER MILLION BTU OF STEAM	\$4.97	\$4.99	\$5.18	\$4.91	\$4.99	\$7.86
O&M COSTS FOR FULFILLER IF NOT REF BUT COAL USED AS REF	90	90	90	90	90	90
TOTAL PER YEAR REF REQUIRED	13385	23352	28148	22577	22945	19951
Avoided new disposal cost	\$210,000	\$210,000	\$210,000	\$210,000	\$210,000	\$210,000
SIR w/disposal credit	4.49	3.78	2.83	4.19	3.79	-9.7

output

Summary of Sensitivity Analysis

QUEST SUMO

definition

UNITS	12	13	14	15	16	17
	RF Conventional Fuel	RF Conventional Fuel	RF Conventional Fuel	RF Conventional Fuel	RF Conventional Fuel	RF Conventional Fuel
ENTHALPY TRANSMITTED TO STEAM, AVG HOURLY, 100% AVAILABILITY	6.82E+07	6.82E+07	6.75E+07	6.82E+07	6.82E+07	6.82E+07
ACH, AVG HOURLY FOR CIFIED CASE (HEATED AT 100% VELOCITY)	1.42E+08	1.38E+08	1.38E+08	1.42E+08	1.42E+08	1.42E+08
MAXIMUM THROUGH STEAM BOTTLE, SEEM BTU/H	3.20E+07	3.20E+07	3.07E+07	3.20E+07	3.20E+07	3.20E+07
BOILER EFFICIENCY AT MCR	0.77	0.8	0.74	0.77	0.8	0.8
BOILER EFFICIENCY AT AVERAGE OUTPUT	0.68	0.8	0.63	0.68	0.8	0.8
MAXIMUM STEAM DEMAND (MSD)	1.50E+08	1.50E+08	1.50E+08	1.50E+08	1.50E+08	1.50E+08
DEWATE	0	0	0.02	0	0	0
TOTAL FUEL INPUT ENTHALPY, AVERAGE	9.99E+07	8.51E+07	1.06E+08	9.99E+07	9.99E+07	9.99E+07
RF FLOWRATE, AVERAGE	3.17	3.17	3.14	3.17	3.17	3.17
CONVENTIONAL FUEL INPUT ENTHALPY, AVERAGE	5709	8107	8027	5709	8107	8107
SOLID RESIDUE GENERATED, AVERAGE	1949	805	2625	1949	805	805
CHARRED CONTENT OF SOLID RESIDUE, MAX HOURLY AT MCR	0.47	0.3	0.5	0.47	0.3	0.3
FLYASH FRACTION OF SOLID RESIDUE, AVERAGE	2.26	0.37	1.83	2.26	0.37	0.37
FLYASH EMISSION ABSOLUTE AND EXISTING CONTROL DEVICE AT MCR	3	0	3	3	0	0
EMISSION OF TSP, MAX HOURLY W/ EXISTING CONTROL AT MCR	0.02	0	0.01	0.02	0	0
UNCONTROLLED FLYASH EMISSION, MAX HOURLY AT MCR	30.71	3.43	29.72	30.71	3.43	3.43
COMBUSTION AIR RATE, AVERAGE	94819	80778	102396	94819	80778	80778
COMBUSTION AIR VOLUMETRIC FLOWRATE, AVERAGE	21071	17951	22725	21071	17951	17951
NET FUEL GAS RATE, AVERAGE	104924	88080	114156	104924	88080	88080
NET FUEL GAS VOLUMETRIC FLOW, AVERAGE	17437	30981	18371	17437	30981	30981
EMISSION CONTROL DEVICE ASSUMED EFFICIENCY (EXISTING DEVICE)	1	1	1	1	1	1
NEW EMISSION CONTROL DEVICE REQUIRED 1= YES	0	0	0	0	0	0
ELECTRIC POWER COST FOR FD SYSTEM, AVERAGE	11.12	40.95	11.21	11.12	40.95	40.95
ELECTRIC POWER COST FOR IO SYSTEM, AVERAGE	11.63	40.00	11.82	11.63	40.00	40.00
WISE ELECTRIC POWER COSTS, AVERAGE	44.08	40.00	46.14	44.08	40.00	40.00
SOLID RESIDUE GENERATED, MAX HOURLY AT MCR	457,072	1635	499,718	457,072	1635	1635
ANNUAL LABOR COST, BURDENED	3.08	2.22	3.36	3.08	2.22	2.22
OPERATIONS RED SHIFT	4223	8316	4160	4445	8474	8316
CONVENTIONAL FUEL COST, AVERAGE	1106.00	46.44	110.00	1106.00	46.44	46.44
ASH DISPOSAL COST, AVERAGE	115.59	46.44	121.01	115.59	46.44	46.44
OPERATING AND/OR IN CIFIED STEAM SUPPLY RANGE	6290	8561	6290	6290	8561	8561
INCREMENTAL MAINTENANCE COST, ANNUAL	440,030	440,030	442,083	440,030	440,030	440,030
AVAILABILITY, FRACTION	0.72	0.98	0.72	0.72	0.98	0.98
ANNUAL STEAM PRODUCTION, NET	4,290E+11	5.84E+11	4,250E+11	4,290E+11	5.84E+11	5.84E+11
RELATIVE ELECTRIC POWER ANNUAL COST	442,334	48,164	457,691	442,334	48,164	48,164
ANNUAL CONVENTIONAL FUEL COST	11,400,561	42,706,711	11,008,319	12,100,842	44,060,067	42,706,711
ANNUAL RF FUEL COST	6666,962	855,149	664,638	675,392	855,149	855,149
ANNUAL RF DISPOSAL COST	198,056	855,149	112,163	198,056	855,149	855,149
ANNUAL RF DISPOSAL COST	198,056	855,149	112,163	198,056	855,149	855,149
FLUORIDE COLD INPUTING CO 4/ NEW CONTROL DEVICE	1672,000	0	1672,000	1672,000	0	0
NEW RF EMISSIONS RATE 4/ NEW CONTROL DEVICE	30.71	31.7	29.72	30.71	31.7	31.7
INCLUDED IN CAPITAL COST	0	0	0	0	0	0
BARE CAPITAL COST OF STORAGE SUBSYSTEM	1134,675	1134,675	1160,195	1134,675	1134,675	1134,675
BARE CAPITAL COST OF LONG MECHANICAL CONVEYOR	90	90	90	90	90	90
BARE CAPITAL COST OF SHORT MECHANICAL CONVEYOR	90	90	90	90	90	90

QUEST

Sensitivity Analysis

PUFFET SOUND

definition

	9	\$114,483	\$90,283	\$130,350	\$114,483	\$114,483	\$114,483
NAME CAPITAL COST OF REF DELIVERY SYSTEM	9	\$114,483	\$90,283	\$130,350	\$114,483	\$114,483	\$114,483
NAME INCREMENTAL COST OF ASH HANDLING SYSTEM	9	90	90	90	90	90	90
NAME INCREMENTAL CAPITAL COSTS FOR EMISSIONS CONTROL	9	90	90	90	90	90	90
NAME INCREMENTAL COST FOR MILLER MODIFICATIONS	9	\$410,093	\$417,796	\$402,414	\$410,093	\$410,093	\$410,093
NAME TOTAL INCREMENTAL CAPITAL COSTS	9	\$29292	\$29496	\$29072	\$29292	\$29292	\$29292
NAME UNBUNDLED TOTAL INCREMENTAL CAPITAL COSTS	9	\$470,212	\$484,322	\$474,486	\$470,212	\$470,212	\$470,212
CAPITAL RECOVERY FACTOR	NONE	9.54	9.54	9.54	9.54	9.54	9.54
ANNUALIZED COST OF CAPITAL	9/YR	90	90	90	90	90	90
TOTAL ANNUAL OWN COST	9/YR	\$2,275,251	\$3,116,329	\$1,804,610	\$3,175,171	\$2,778,836	\$4,453,428
TOTAL CAPITAL COST INCLUDING COST OF CAPITAL	9/YR	\$2,365,616	\$3,206,649	\$1,894,700	\$3,265,346	\$2,869,326	\$4,543,889
TOTAL COST PER MILLION BTU OF STEAM	9/MBTU	\$0.00	\$5.31	\$0.00	\$0.00	\$5.31	\$0.00
TOTAL COST PER MILLION BTU OF STEAM PRODUCTION	NONE	-4.59	0.17	4.72	4.53	5.41	\$5.31
SIC (CAP/MW)/INVESTMENT AT EQUAL ANNUAL STEAM PRODUCTION	9/MBTU	\$6.31	\$5.27	\$4.25	\$4.11	\$9.94	\$7.63
TOTAL OWN COST PER MILLION BTU OF STEAM	9/YR	90	90	90	90	90	90
OWN COSTS FOR POLLUTANTS IF NOT REF MIT COST USED AS REF	9/YR	\$244	\$2218	\$2218	\$9581	\$9581	\$9581
TONS PER YEAR REF REDUCTIONS	9/YR	\$210,000	\$210,000	\$210,000	\$210,000	\$210,000	\$278,000
Avoided MW disposal cost	NONE	-2.39	2.66	5.91	10.53	7.71	6.33
Air w/disposal credit	NONE						

一、前言

EUO

sheet

Summary of Sensitivity Analysis

PURET SOUND

definition	UNITS	18		19		20	
		Confining	Conventional Fuel	Confining	Conventional Fuel	Confining	Conventional Fuel
ENTHALPY TRANSPORTED TO STEAM, AVG HOURLY, 100% AVAILABILITY	BTU	6.62E+07	6.62E+07	6.62E+07	6.62E+07	6.62E+07	6.62E+07
NET, NET FOR DEFINED CASE (HEATED AT HT VELOCITY)	BTU	1.42E+08	1.38E+08	1.42E+08	1.38E+08	1.42E+08	1.38E+08
MAXIMUM TURBIDITY STEAM EXITING, SEAM BTU	BTU	3.20E+07	3.20E+07	3.20E+07	3.20E+07	3.20E+07	3.20E+07
BOILER EFFICIENCY AT NCR	NONE	0.77	0.8	0.77	0.8	0.77	0.8
BOILER EFFICIENCY AT AVERAGE OUTPUT	NONE	0.68	0.8	0.67	0.8	0.66	0.8
MAXIMUM STEAM BEHIND (NCR)	BTU	1.50E+08	1.50E+08	1.50E+08	1.50E+08	1.50E+08	1.50E+08
DEWITE	NONE	0	0	0	0	0	0
TOTAL FUEL INPUT ENTHALPY, AVERAGE	BTU	9.95E+07	8.51E+07	1.02E+08	8.51E+07	1.02E+08	8.51E+07
REF FLOWRATE, AVERAGE	TN	3.17	3.23	3.23	3.28	3.28	3.28
CONVENTIONAL FUEL INPUT ENTHALPY, AVERAGE	L/HR	5709	8107	5817	8107	5908	8107
SOLID RESIDUE GENERATED, AVERAGE	L/HR	1949	805	2074	805	2181	805
CHROM CONTENT OF SOLID RESIDUE, NET HOURLY AT NCR	NONE	0.47	0.3	0.49	0.3	0.51	0.3
FLYASH FRACTION OF SOLID RESIDUE, AVERAGE	NONE	2.26	0.37	2.26	0.37	2.26	0.37
FLYASH EMISSION ABSOLUTE AND EXISTING CONTROL DEVICE AT NCR	L/HR	3	0	3	0	3	0
EMISSION OF TSP, NET HOURLY W/ EXISTING CTRL AT NCR	L/HR	0.02	0	0.02	0	0.02	0
UNCONTROLLED FLYASH EMISSION, NET HOURLY AT NCR	L/HR	30.71	3.43	30.71	3.43	30.71	3.43
COMBUSTION AIR RATE, AVERAGE	L/HR	94819	80778	96603	80778	98112	80778
COMBUSTION AIR VOLUMETRIC FLOWRATE, AVERAGE	ACFM	21071	17951	21467	17951	21803	17951
NET FUEL GAS RATE, AVERAGE	L/HR	104924	60080	106009	60080	108403	60080
NET FUEL GAS VOLUMETRIC FLOW, AVERAGE	ACFM	17437	30981	17437	30981	17437	30981
EMISSION CTRL DEVICE ASSURED EFFICIENCY (EXISTING DEVICE)	NONE	1	1	1	1	1	1
NEW EMISSION CONTROL DEVICE REQUIRED 1+ YES	NONE	0	0	0	0	0	0
ELECTRIC POWER COST FOR FD SYSTEM, AVERAGE	\$/HR	91.12	90.95	91.14	90.95	91.16	90.95
ELECTRIC POWER COST FOR ID SYSTEM, AVERAGE	\$/HR	91.63	90.00	91.66	90.00	91.68	90.00
MISC ELECTRIC POWER COSTS, AVERAGE	\$/HR	94.08	90.00	94.14	90.00	94.20	90.00
SOLID RESIDUE GENERATED, NET HOURLY AT NCR	L/HR	2320	1535	2320	1535	2320	1535
ANNUAL UNDER COST, BURDED	\$/HR	9457,072	8330,048	9457,072	8330,048	9457,072	8330,048
OPERATIONS PER SHIFT	HR/SHIFT	3.08	2.22	3.08	2.22	3.08	2.22
CONVENTIONAL FUEL COST, AVERAGE	\$/HR	8227	8316	8227	8316	8230	8316
REF FUEL COST, AVERAGE	\$/HR	96.00	96.44	96.00	96.44	96.00	96.44
ASH DISPOSAL COST, AVERAGE	\$/HR	913.95	8561	924.89	8561	934.89	8561
OPERATING WSP/HR IN DEFINED STEAM SUPPLY RANGE	\$/HR	6290	6561	6290	6561	6290	6561
INCREMENTAL MAINTENANCE COST, ANNUAL	\$/HR	940,000	940,000	940,000	940,000	940,000	940,000
AVAILABILITY, FRACTION	NONE	0.72	0.98	0.72	0.98	0.72	0.98
ANNUAL STEAM PRODUCTION, NET	BTU	4.290E+11	5.840E+11	4.290E+11	5.840E+11	4.290E+11	5.840E+11
RELATIVE ELECTRIC POWER ANNUAL COST	\$/HR	942,574	94,164	942,561	94,164	944,274	94,164
ANNUAL CONVENTIONAL FUEL COST	\$/HR	91,400,581	82,706,711	91,400,599	82,706,711	91,443,192	82,706,711
ANNUAL REF FUEL COST	\$/HR	935,902	935,902	940,633	935,902	941,288	935,902
ANNUAL ASH DISPOSAL COST	\$/HR	938,056	835,149	938,056	835,149	938,056	835,149
ANNUAL NEW DISPOSAL COST	\$/HR	91,344,000	91,344,000	91,344,000	91,344,000	91,344,000	91,344,000
FURNACE COLD (HOLDING CO A SHOPS) IF = 1	\$/HR	0	0	0	0	0	0
NEW NET EMISSIONS RATE W/ NEW CONTROL DEVICE	L/HR	30.71	30.71	30.71	30.71	30.71	30.71
INCLUDED IN CAPITAL COST	\$/HR	913,638	913,638	913,638	913,638	913,638	913,638
BASE CAPITAL COST OF STORAGE SUBSYSTEM	\$/HR	90	90	90	90	90	90
BASE CAPITAL COST OF LONG MEDIANION CONVEYOR	\$/HR	90	90	90	90	90	90
BASE CAPITAL COST OF SHORT MEDIANION CONVEYOR	\$/HR	90	90	90	90	90	90

sheet out 4

page 1

Summary of Sensitivity Analysis

PLANT SLM0

Definition	UNITS	18		19		20	
		RF	Conventional Fuel	RF	Conventional Fuel	RF	Conventional Fuel
BASE CAPITAL COST OF REF DELIVERY SYSTEM	\$	8114,483		8114,483		8114,483	
BASE INCREMENTAL COST OF ASH HANDLING SYSTEM	\$	90		90		90	
BASE INCREMENTAL CAPITAL COSTS FOR EMISSIONS CONTROL	\$	90		90		90	
BASE INCREMENTAL COST FOR MILLER MODIFICATIONS	\$	9410,093		9410,093		9410,093	
BASE TOTAL INCREMENTAL CAPITAL COSTS	\$	659292		660234		661006	
BLANDED TOTAL INCREMENTAL CAPITAL COSTS	\$	9470,212		9471,509		9472,594	
CAPITAL RECOVERY FACTOR	NONE	9.54	9.54	9.54	9.54	9.54	9.54
ANNUALIZED COST OF CAPITAL	\$/YR	90		90		90	
TOTAL ANNUAL OWN COST	\$/YR	92,078,555	93,100,072	92,154,936	93,127,647	92,251,429	93,155,221
TOTAL ANNUAL COST INCLUDING COST OF CAPITAL	\$/YR	90	93,100,072	90	93,127,647	90	93,155,221
TOTAL COST PER MILLION BTU OF STEAM	\$/MMBTU	90.00	95.31	90.00	95.36	90.00	95.40
STEAM (Btu/MMBtu) INVESTMENT AT EQUAL ANNUAL STEAM PRODUCTION	NONE	2.18	95.31	1.45	95.36	0.73	95.40
TOTAL OWN COST PER MILLION BTU OF STEAM	\$/MMBTU	94.85	95.31	95.05	95.36	95.25	95.40
OWN COSTS FOR VALVE/PISTON IF NOT REF BUT COAL USED AS REF	\$/YR	90		90		90	
TONS PER YEAR REF REQUIRED	TPY	19951		20356		20644	
Avoided new disposal cost	\$/YR	9346,000		9210,000		9210,000	
SLR (disposal) credit	NONE	8.17		3.75		3.03	

page 2 of 4

output

Summary of Sensitivity Analysis

PURE SMOG

definition

FURNACE COLD INHALES CO & SMOKE IF = 1
NEW HCU EMISSIONS RATE W/ NEW CONTROL DEVICE
INCLUDED IN CAPITAL COST
BASE CAPITAL COST OF STORAGE SUBSYSTEM
BASE CAPITAL COST OF LONG MECHANICAL CONVEYOR
BASE CAPITAL COST OF SHORT MECHANICAL CONVEYOR
BASE CAPITAL COST OF ROF DELIVERY SYSTEM
BASE INCREMENTAL COST OF ROF HANDLING SYSTEM
BASE INCREMENTAL CAPITAL COSTS FOR EMISSIONS CONTROL
BASE INCREMENTAL COST FOR ROILER MODIFICATIONS
BASE TOTAL INCREMENTAL CAPITAL COSTS
AUGMENTED TOTAL INCREMENTAL CAPITAL COSTS
CAPITAL RECOVERY FACTOR
ANNUALIZED COST OF CAPITAL
TOTAL ANNUAL O&M COST
TOTAL ANNUAL COST INCLUDING COST OF CAPITAL
TOTAL ANNUAL COST PER MILLION BTU OF STEAM
SIR (SWITCHES/INVESTMENT) AT EQUAL ANNUAL STEAM PRODUCTION
TOTAL O&M COST PER MILLION BTU OF STEAM
O&M COSTS FOR SULFURIZER IF NOT ROF BUT COAL USED AS ROF
TONS PER YEAR ROF REQUIRED
Avoided ROF disposal cost
SIR w/disposal credit

Best Case Analysis: 21 to 23; 10% moisture & ash, 60% ratio; 42/7 ROF unless otherwise noted

UNITS	21 ROF Confining high CF, high NSM	22 ROF Confining actual CF, high NSM	23 ROF Confining actual CF, actual NSM	24 ROF Confining high CF, high NSM
NONE	90	90	90	90
LJ/MBTU	30.24	30.24	30.24	430
\$	\$132,907	\$132,907	\$132,907	\$144,394
\$	90	90	90	90
\$	90	90	90	90
\$	\$132,146	\$132,146	\$132,146	\$132,146
\$	90	90	90	90
\$	90	90	90	90
\$	\$407,516	\$407,516	\$407,516	\$407,516
\$	635668	635668	635668	635668
\$	\$914,322	\$914,322	\$914,322	\$914,322
NONE	9.54	9.54	9.54	9.54
1/YR	90	90	90	90
1/YR	\$2,774,103	\$2,774,103	\$2,774,103	\$2,774,103
1/YR	90	90	90	90
1/YR	\$2,774,103	\$2,774,103	\$2,774,103	\$2,774,103
NONE	15.3	15.3	15.3	15.3
1/YR	46.48	46.48	46.48	46.48
1/YR	90	90	90	90
TPY	28000.00	28000.00	28000.00	28000.00
1/YR	\$546,000	\$546,000	\$546,000	\$546,000
NONE	21.2	10.91	7.4	34.43

Report end

End

definition

UNITS	1.81E+07	2.21E+07	2.35E+07	2.45E+07	2.55E+07	2.65E+07	2.75E+07	2.85E+07	2.95E+07	3.05E+07	3.15E+07	3.25E+07	3.35E+07	3.45E+07	3.55E+07	3.65E+07	3.75E+07	3.85E+07	3.95E+07	4.05E+07	4.15E+07	4.25E+07	4.35E+07	4.45E+07	4.55E+07	4.65E+07	4.75E+07	4.85E+07	4.95E+07	5.05E+07	5.15E+07	5.25E+07	5.35E+07	5.45E+07	5.55E+07	5.65E+07	5.75E+07	5.85E+07	5.95E+07	6.05E+07	6.15E+07	6.25E+07	6.35E+07	6.45E+07	6.55E+07	6.65E+07	6.75E+07	6.85E+07	6.95E+07	7.05E+07	7.15E+07	7.25E+07	7.35E+07	7.45E+07	7.55E+07	7.65E+07	7.75E+07	7.85E+07	7.95E+07	8.05E+07	8.15E+07	8.25E+07	8.35E+07	8.45E+07	8.55E+07	8.65E+07	8.75E+07	8.85E+07	8.95E+07	9.05E+07	9.15E+07	9.25E+07	9.35E+07	9.45E+07	9.55E+07	9.65E+07	9.75E+07	9.85E+07	9.95E+07	1.00E+08	1.01E+08	1.02E+08	1.03E+08	1.04E+08	1.05E+08	1.06E+08	1.07E+08	1.08E+08	1.09E+08	1.10E+08	1.11E+08	1.12E+08	1.13E+08	1.14E+08	1.15E+08	1.16E+08	1.17E+08	1.18E+08	1.19E+08	1.20E+08	1.21E+08	1.22E+08	1.23E+08	1.24E+08	1.25E+08	1.26E+08	1.27E+08	1.28E+08	1.29E+08	1.30E+08	1.31E+08	1.32E+08	1.33E+08	1.34E+08	1.35E+08	1.36E+08	1.37E+08	1.38E+08	1.39E+08	1.40E+08	1.41E+08	1.42E+08	1.43E+08	1.44E+08	1.45E+08	1.46E+08	1.47E+08	1.48E+08	1.49E+08	1.50E+08	1.51E+08	1.52E+08	1.53E+08	1.54E+08	1.55E+08	1.56E+08	1.57E+08	1.58E+08	1.59E+08	1.60E+08	1.61E+08	1.62E+08	1.63E+08	1.64E+08	1.65E+08	1.66E+08	1.67E+08	1.68E+08	1.69E+08	1.70E+08	1.71E+08	1.72E+08	1.73E+08	1.74E+08	1.75E+08	1.76E+08	1.77E+08	1.78E+08	1.79E+08	1.80E+08	1.81E+08	1.82E+08	1.83E+08	1.84E+08	1.85E+08	1.86E+08	1.87E+08	1.88E+08	1.89E+08	1.90E+08	1.91E+08	1.92E+08	1.93E+08	1.94E+08	1.95E+08	1.96E+08	1.97E+08	1.98E+08	1.99E+08	2.00E+08	2.01E+08	2.02E+08	2.03E+08	2.04E+08	2.05E+08	2.06E+08	2.07E+08	2.08E+08	2.09E+08	2.10E+08	2.11E+08	2.12E+08	2.13E+08	2.14E+08	2.15E+08	2.16E+08	2.17E+08	2.18E+08	2.19E+08	2.20E+08	2.21E+08	2.22E+08	2.23E+08	2.24E+08	2.25E+08	2.26E+08	2.27E+08	2.28E+08	2.29E+08	2.30E+08	2.31E+08	2.32E+08	2.33E+08	2.34E+08	2.35E+08	2.36E+08	2.37E+08	2.38E+08	2.39E+08	2.40E+08	2.41E+08	2.42E+08	2.43E+08	2.44E+08	2.45E+08	2.46E+08	2.47E+08	2.48E+08	2.49E+08	2.50E+08	2.51E+08	2.52E+08	2.53E+08	2.54E+08	2.55E+08	2.56E+08	2.57E+08	2.58E+08	2.59E+08	2.60E+08	2.61E+08	2.62E+08	2.63E+08	2.64E+08	2.65E+08	2.66E+08	2.67E+08	2.68E+08	2.69E+08	2.70E+08	2.71E+08	2.72E+08	2.73E+08	2.74E+08	2.75E+08	2.76E+08	2.77E+08	2.78E+08	2.79E+08	2.80E+08	2.81E+08	2.82E+08	2.83E+08	2.84E+08	2.85E+08	2.86E+08	2.87E+08	2.88E+08	2.89E+08	2.90E+08	2.91E+08	2.92E+08	2.93E+08	2.94E+08	2.95E+08	2.96E+08	2.97E+08	2.98E+08	2.99E+08	3.00E+08	3.01E+08	3.02E+08	3.03E+08	3.04E+08	3.05E+08	3.06E+08	3.07E+08	3.08E+08	3.09E+08	3.10E+08	3.11E+08	
-------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	--

BASE TOTAL INCREMENTAL CAPITAL COSTS
 BURDENED TOTAL INCREMENTAL CAPITAL COSTS
 CAP/ITL RECOVERY FRACTION
 ANNUALIZED COST OF CAPITAL
 TOTAL ANNUAL DAM COST
 TOTAL ANNUAL COST INCLUDING COST OF CAPITAL
 TOTAL COST PER MILLION BTU OF STEAM
 \$/B (INVESTMENT/INVESTMENT) AT EQUAL ANNUAL STEAM PRODUCTION
 TOTAL DAM COST PER MILLION BTU OF STEAM
 DAM COSTS FOR ALL VARIANTS IF NOT USED BUT COST USED AS REF
 TONS PER YEAR OF REQUIRED

1	8370.043	8377.802	8364.711	8365.959	8375.185
1	8488.456	8498.598	8486.698	8487.066	8495.245
NONE	9.54	9.54	9.54	9.54	9.54
8/78	80	80	80	80	80
8/78	8371.917 8631.541	8619.181 8724.652	8638.543 8764.695	8584.827 8628.745	8578.137 8628.745
8/78	80 8631.541	80 8724.652	80 8764.695	80 8628.745	80 8628.745
8/78	80.00 84.03	80.00 83.79	80.00 83.71	80.00 84.04	80.00 84.04
NONE	-2.20	-1.77	-1.62	-2.12	-2.33
8/78	85.01 84.03	84.46 83.79	84.27 83.71	84.99 84.04	85.10 84.04
8/78	80.00	80.00	80.00	80.00	80.00
TPV	5370	6328	6725	4625	6319

Summary of Sensitivity Analysis
Sno Base Banger, Washington

definition	UNITS	5		6		7		8	
		Excess Air RDF	Conventional Cofiring Fuel	RDF Cofiring Fuel	Conventional Fuel	RDF Cofiring Fuel	Conventional Fuel	RDF Cofiring Fuel	Conventional Fuel
ENTHALPY TRANSFERRED TO STEAM, Btu/Hr, 100% AVAILABILITY	Btu/Hr	1.80E+07	1.80E+07	1.80E+07	1.80E+07	1.80E+07	1.80E+07	1.80E+07	1.80E+07
REA, Btu/Hr FOR DEFINED CASE (HEATED AT 11 VELOCITY)	Btu/Hr	6.44E+07	6.16E+07	5.58E+07	6.09E+07	5.58E+07	6.13E+07	5.58E+07	6.13E+07
MAXIMUM TURBIDITY STEAM RATING, SCFM Btu/Hr	Btu/Hr	1.37E+07		1.35E+07		1.35E+07		1.35E+07	
BOILER EFFICIENCY AT MCR	None	0.79	0.86	0.78	0.85	0.78	0.85	0.77	0.85
BOILER EFFICIENCY AT AVERAGE OUTPUT	None	0.68	0.86	0.67	0.85	0.67	0.85	0.67	0.85
MAXIMUM STEAM DEMAND (MSD)	Btu/Hr	3.17E+07	3.17E+07	3.17E+07	3.17E+07	3.17E+07	3.17E+07	3.17E+07	3.17E+07
DENITE	None	0		0.08		0.03		0.04	
TOTAL FUEL INPUT ENTHALPY, AVERAGE	Btu/Hr	2.66E+07	2.10E+07	2.65E+07	2.13E+07	2.65E+07	2.12E+07	2.70E+07	2.12E+07
RDF FLOWRATE, AVERAGE	Ton/Hr	0.84		0.85		0.99		1.2	
CONVENTIONAL FUEL INPUT ENTHALPY, AVERAGE	Btu/Hr	1298	1711	1311	1730	1310	1721	1318	1721
SOLID RESIDUE GENERATED, AVERAGE	Lb/Hr	526	134	556	135	785	135	1109	135
CHARGE CONTENT OF SOLID RESIDUE, Wt% H ₂ O AT MCR	None	0.52	0.04	0.52	0.04	0.37	0.04	0.26	0.04
FLYASH FRACTION OF SOLID RESIDUE, AVERAGE	None	0.1	0.34	0.09	0.41	0.06	0.37	0.04	0.37
FLYASH EMISSION ABSOLUTE AND EXISTING CONTROL DEVICE AT MCR	Lb/Hr	2	2	1	3	1	3	1	3
EMISSION OF TSP, Wt% H ₂ O AT EXISTING CTRL. AT MCR	Lb/Hr	0.02	0.03	0.02	0.04	0.02	0.04	0.02	0.04
UNCONTROLLED FLYASH EMISSION, Wt% H ₂ O AT MCR	Lb/Hr	1.28	2.11	1.24	2.57	1.25	2.34	1.24	2.34
UNCONTROLLED FLYASH EMISSION, Wt% H ₂ O AT MCR	Lb/Hr	23899	18741	27853	22064	25880	20393	26028	20393
COMBUSTION AIR RATE, AVERAGE	ACFM	2566	4163	6190	4903	5751	4332	5784	4332
COMBUSTION AIR VOLUMETRIC FLOWRATE, AVERAGE	ACFM	26130	20318	30314	23859	28394	21979	28638	21979
NET FUEL GAS RATE, AVERAGE	ACFM	2393	6629	2886	7668	2856	7156	2703	7156
NET FUEL GAS VOLUMETRIC FLOW, AVERAGE	None	1	1	1	1	1	1	1	1
EMISSION CONTROL DEVICE REQUIRED EFFICIENCY (EXISTING DEVICE)	None	0	0	0	0	0	0	0	0
NEW ENTHALPY CONTROL DEVICE REQUIRED 1+ YES	None	0	0	0	0	0	0	0	0
ELECTRIC POWER COST FOR FD SYSTEM, AVERAGE	\$/Kwh	90.35	90.27	90.41	90.32	90.38	90.30	90.38	90.30
ELECTRIC POWER COST FOR ID SYSTEM, AVERAGE	\$/Kwh	90.30	90.00	90.38	90.00	90.34	90.00	90.35	90.00
RISE ELECTRIC POWER COSTS, AVERAGE	\$/Kwh	91.64	90.00	91.65	90.00	91.68	90.00	92.21	90.00
SOLID RESIDUE GENERATED, Wt% H ₂ O AT MCR	Lb/Hr	1084	458	951	458	1653	458	2547	458
ANNUAL LABOR COST, BUDGETED	\$/Yr	9285.79	9285.35	9283.903	9285.004	9284.848	9285.686	9284.848	9285.686
OPERATIONS PER SHIFT	None	1.92	1.39	1.91	1.38	1.92	1.38	1.92	1.38
CONVENTIONAL FUEL COST, AVERAGE	\$/Kwh	936.00	948.00	937.00	949.00	937.00	948.00	937.00	948.00
RDF FUEL COST, AVERAGE	\$/Kwh	92.00		92.00		92.00		92.00	
ASH DISPOSAL COST, AVERAGE	\$/Yr	91.11	90.27	91.11	90.27	91.57	90.27	92.22	90.27
OPERATING HRS/YR IN COFFRED STEAM SUPPLY RANGE	Hr/Yr	622.462	8649	622.479	8649	6290	8649	6290	8649
INCIDENTAL MAINTENANCE COST, ANNUAL	\$/Yr	922.462		922.479		922.762		922.762	
AVAILABILITY, FRACTION	None	0.72	0.99	0.72	0.99	0.72	0.99	0.72	0.99
ANNUAL STEAM PRODUCTION, NET	Btu	1.1E+11	1.6E+11	1.1E+11	1.6E+11	1.1E+11	1.6E+11	1.1E+11	1.6E+11
RELATIVE ELECTRIC POWER ANNUAL COST	\$/Yr	914.378	92.389	915.364	92.789	915.389	92.578	915.494	92.578
ANNUAL CONVENTIONAL FUEL COST	\$/Yr	9229.424	9415.776	9231.665	9420.355	9231.561	9418.152	9232.888	9418.152
ANNUAL RDF FUEL COST	\$/Yr	910.627		910.731		912.313		913.102	
ANNUAL ASH DISPOSAL COST	\$/Yr	96.999	92.315	96.993	92.341	95.880	92.328	913.946	92.328
ANNUAL NEW DISPOSAL COST	\$/Yr	90	942.500	90	942.500	90	942.500	90	942.500
FURNACE COLD STARTING CO & SHUTDOW IF = 1	None	0		0		0		0	
NEW TWO ENTHALPY RATE W/ NEW CONTROL DEVICE	Lb/Hr	1.26		1.24		1.25		1.24	
INCLUDED IN CAPITAL COST	None								
BASE CAPITAL COST OF STORAGE SUBSYSTEM	None	975.257		975.943		980.210		986.313	
BASE CAPITAL COST OF LONG MECHANICAL CONVEYOR	None	90		90		90		90	
BASE CAPITAL COST OF SHORT MECHANICAL CONVEYOR	None	90		90		90		90	
BASE CAPITAL COST OF RDF DELIVERY SYSTEM	None	965.906		965.906		965.906		965.906	
BASE INCIDENTAL COST OF ASH HANDLING SYSTEM	None	90		90		90		90	
BASE INCIDENTAL CAPITAL COSTS FOR EMISSIONS CONTROL	None	90		90		90		90	
BASE INCIDENTAL COST FOR BOILER MODIFICATIONS	None	9228.760		9228.760		9228.760		9228.760	

BASE TOTAL INCREMENTAL CAPITAL COSTS	1	36,9823	1370,208	1374,875	1380,978
BARRED TOTAL INCREMENTAL CAPITAL COSTS	1	1448,298	1448,675	1449,135	1452,892
CAPITAL RECOVERY FACTOR	NONE	9.54	9.54	9.54	9.54
ANNUALIZED COST OF CAPITAL	9.54	90	90	90	90
TOTAL ANNUAL O&M COST	9.54	1558,681	1571,133	1577,953	1588,412
TOTAL ANNUAL COST INCLUDING COST OF CAPITAL	9.54	0	1571,133	1577,953	1588,412
TOTAL COST PER MILLION BTU OF STEAM	9.54	1558,681	1571,133	1577,953	1588,412
STEAM (SWIMMING/INVESTMENT) AT EQUAL ANNUAL STEAM PRODUCTION	9.54	0	1571,133	1577,953	1588,412
TOTAL O&M COST PER MILLION BTU OF STEAM	9.54	1558,681	1571,133	1577,953	1588,412
O&M COSTS FOR ALUMINUM IF NOT USED BUT COAL USED AS REF	9.54	1558,681	1571,133	1577,953	1588,412
TONS PER YEAR REF REQUIRED	TPV	5313	5385	5257	7251

9		10		11		12	
RD#	RD#	RD#	RD#	RD#	RD#	RD#	RD#
Conventional	Conventional	Conventional	Conventional	Conventional	Conventional	Conventional	Conventional
Cofiring	Cofiring	Cofiring	Cofiring	Cofiring	Cofiring	Cofiring	Cofiring
1.00E+07	1.00E+07	1.00E+07	1.00E+07	1.00E+07	1.00E+07	1.00E+07	1.00E+07
5.75E+07	5.75E+07	5.75E+07	5.75E+07	5.75E+07	5.75E+07	5.75E+07	5.75E+07
1.35E+07	1.35E+07	1.35E+07	1.35E+07	1.35E+07	1.35E+07	1.35E+07	1.35E+07
0.77	0.85	0.78	0.85	0.78	0.85	0.78	0.85
0.66	0.85	0.67	0.85	0.67	0.85	0.67	0.85
3.17E+07	3.17E+07	3.17E+07	3.17E+07	3.17E+07	3.17E+07	3.17E+07	3.17E+07
0.06	0.04	0.04	0.02	0.02	0.02	0.02	0.02
2.75E+07	2.75E+07	2.75E+07	2.75E+07	2.75E+07	2.75E+07	2.75E+07	2.75E+07
1.11	0.96	0.96	0.85	0.85	0.85	0.85	0.85
126	1721	1315	1721	1305	1721	1305	1721
611	135	590	135	597	135	597	135
0.47	0.04	0.5	0.04	0.52	0.04	0.52	0.04
0.08	0.37	0.09	0.37	0.09	0.37	0.09	0.37
1	3	1	3	1	3	1	3
0.02	0.04	0.02	0.04	0.02	0.04	0.02	0.04
1.23	2.34	1.24	2.34	1.25	2.34	1.25	2.34
26230	20383	25972	20383	25775	20383	25775	20383
3829	4332	3772	4332	3728	4332	3728	4332
29168	21979	28632	21979	28221	21979	28221	21979
2797	7156	2698	7156	2623	7156	2623	7156
1	1	1	1	1	1	1	1
0	0	0	0	0	0	0	0
90.38	90.30	90.38	90.30	90.38	90.30	90.38	90.30
90.36	90.00	90.35	90.00	90.34	90.00	90.34	90.00
92.07	90.00	91.83	90.00	91.65	90.00	91.65	90.00
1128	458	1064	458	1013	458	1013	458
9294, 848	9205, 686	9294, 848	9205, 686	9294, 848	9205, 686	9294, 848	9205, 686
1.92	1.38	1.92	1.38	1.92	1.38	1.92	1.38
937.00	948.00	937.00	948.00	937.00	948.00	937.00	948.00
92.00	90.27	91.16	90.27	91.11	90.27	91.11	90.27
6290	8649	6290	8649	6290	8649	6290	8649
922, 977		922, 701		922, 471		922, 471	
0.72	0.99	0.72	0.99	0.72	0.99	0.72	0.99
1.15E+11	1.6E+11	1.15E+11	1.6E+11	1.15E+11	1.6E+11	1.15E+11	1.6E+11
917, 706	92, 578	916, 107	92, 578	914, 862	92, 578	914, 862	92, 578
9230, 650	9418, 152	9230, 650	9418, 152	9230, 650	9418, 152	9230, 650	9418, 152
913, 977		912, 110		9220, 025		9110, 027	
97, 690	92, 328	97, 302	92, 328	97, 004	92, 328	97, 004	92, 328
90	92, 500	90	92, 500	90	92, 500	90	92, 500
0	0	0	0	0	0	0	0
1.23		1.24		1.25		1.25	

	\$	\$378,410	\$372,855	\$779,859	\$628,745	\$659,832	\$628,745	\$370,075
BARE TOTAL INCREMENTAL CAPITAL COSTS								
BALANCED TOTAL INCREMENTAL CAPITAL COSTS								
CAPITAL RECOVERY FACTOR	NONE	\$499,502	\$493,469	\$498,499	\$498,499	\$498,499	\$498,499	\$498,499
ANNUALIZED COST OF CAPITAL			9.54	9.54	9.54	9.54	9.54	9.54
TOTAL ANNUAL OWN COST	\$/YR	90	90	90	90	90	90	90
TOTAL ANNUAL COST INCLUDING COST OF CAPITAL	\$/YR	\$581,489	\$628,745	\$757,433	\$628,745	\$779,859	\$628,745	\$659,832
TOTAL COST PER MILLION BTU OF STEAM	\$/MMBTU	90.00	\$628,745	90.00	\$628,745	90.00	\$628,745	90.00
NET SIFR (SAVINGS/INVESTMENT) AT EQUAL ANNUAL STEAM PRODUCTION	NONE	-2.38	94.04	90.00	94.04	90.00	94.04	94.04
TOTAL OWN COST PER MILLION BTU OF STEAM	\$/MMBTU	\$5.14	94.04	95.08	94.04	96.88	94.04	94.04
TOTAL OWN COSTS FOR BALANCEER IF NOT REQ BUT COAL USED AS REF	\$/YR	90.00	90.00	90.00	90.00	90.00	90.00	90.00
COST PER YEAR REQ REQUIRED	TPY	6386	6085	5341	5341	5341	5341	5341

definition

Summary of Sensitivity Analysis		13		14		15		16	
Two Base Scenario, Washington		Cofire Ratio		RDF Cofiring		Conventional RDF Cofiring		RDF Cofiring	
Definition	Units	RDF Cofiring	Fuel	RDF Cofiring	Fuel	RDF Cofiring	Fuel	RDF Cofiring	Fuel
CONVENTIONAL FUEL TRANSPORTED TO STEAM, AND HOURLY, 100% AVAILABILITY	BTU/H	1.00E+07	1.00E+07	1.00E+07	1.00E+07	1.00E+07	1.00E+07	1.00E+07	1.00E+07
NET PWR FOR COPIED CASE (HEATED AT HT VELOCITY)	BTU/H	5.20E+07	6.13E+07	5.63E+07	6.13E+07	5.96E+07	6.13E+07	5.96E+07	6.13E+07
CONVENTIONAL STEAM HEATING, SEAR BTU/H	BTU/H	1.41E+07	1.31E+07	1.35E+07	1.35E+07	1.35E+07	1.35E+07	1.35E+07	1.35E+07
BOILER EFFICIENCY AT HCR	NONE	0.81	0.85	0.76	0.85	0.78	0.85	0.78	0.85
BOILER EFFICIENCY AT AVERAGE OUTPUT	NONE	0.74	0.85	0.61	0.85	0.67	0.85	0.67	0.85
CONVENTIONAL STEAM HEATING (HCR)	BTU/H	3.17E+07	3.17E+07	3.17E+07	3.17E+07	3.17E+07	3.17E+07	3.17E+07	3.17E+07
NET PWR	NONE	0	0.07	0.07	0.02	0.02	0.02	0.02	0.02
TOTAL FUEL INPUT ENTHALPY, AVERAGE	BTU/H	2.44E+07	2.13E+07	2.97E+07	2.12E+07	2.67E+07	2.12E+07	2.67E+07	2.12E+07
NET FUEL FLOW, AVERAGE	TON	0.39	1.41	0.85	1.721	1.85	1.721	1.85	1.721
CONVENTIONAL FUEL INPUT ENTHALPY, AVERAGE	BTU/H	1369	1735	985	1721	1305	1721	1305	1721
SOLID RESIDUE GENERATED, AVERAGE	LB/H	3.64	1.8	705	1.83	357	1.83	357	1.83
CHAR CONTENT OF SOLID RESIDUE, AND HOURLY AT HCR	NONE	0.46	0.04	0.53	0.04	0.52	0.04	0.52	0.04
FUEL FLOW FRACTION OF SOLID RESIDUE, AVERAGE	NONE	0.12	0.37	0.08	0.37	0.09	0.37	0.09	0.37
FUEL FLOW FRACTION AVERAGE AND EXISTING CONTROL DEVICE AT HCR	LB/H	2	3	1	3	1	3	1	3
EXTENSION OF FCR, AND HOURLY W EXISTING CONTROL AT HCR	LB/H	0.02	0.04	0.02	0.04	0.02	0.04	0.02	0.04
CONTROLLED FUEL FLOW, AVERAGE	LB/H	1.29	2.34	1.21	2.34	1.25	2.34	1.25	2.34
COMBUSTION AIR RATE, AVERAGE	ACFM	23545	20561	26065	20383	25775	20383	25775	20383
COMBUSTION AIR VOLUMETRIC FLOWRATE, AVERAGE	LB/H	5232	4359	6350	4332	5708	4332	5708	4332
NET PWR AND RATE, AVERAGE	BTU/H	25046	22160	31390	21979	26221	21979	26221	21979
NET PWR AND RATE, AVERAGE	ACFM	2347	6307	2819	7156	2623	7156	2623	7156
NET PWR AND RATE, AVERAGE	NONE	1	1	1	1	1	1	1	1
EXTENSION CONTROL DEVICE REQUIRED EFFICIENCY (EXISTING DEVICE)	NONE	0	0	0	0	0	0	0	0
EXTENSION CONTROL DEVICE REQUIRED EFFICIENCY (EXISTING DEVICE)	\$/BTU	90.34	90.30	90.42	90.30	90.38	90.30	90.38	90.30
ELECTRIC POWER COST FOR FD SYSTEM, AVERAGE	\$/BTU	90.30	90.00	90.39	90.00	90.34	90.00	90.34	90.00
ELECTRIC POWER COST FOR FD SYSTEM, AVERAGE	\$/BTU	90.30	90.00	90.34	90.00	91.63	90.00	91.63	90.00
ELECTRIC POWER COSTS, AVERAGE	\$/BTU	819	458	1201	458	1013	458	1013	458
SOLID RESIDUE GENERATED, AND HOURLY AT HCR	\$/BTU	4244.50	4205.68	4311.42	4205.68	4294.04	4205.68	4294.04	4205.68
OPERATIONS PER SHIFT	NONE/SHIFT	1.65	1.38	2.1	1.38	1.92	1.38	1.92	1.38
CONVENTIONAL FUEL COST, AVERAGE	\$/BTU	945.00	945.00	927.00	945.00	933.00	973.00	973.00	973.00
NET FUEL COST, AVERAGE	\$/BTU	91.00	93.00	91.57	90.27	91.11	90.27	91.11	90.27
NET FUEL COST, AVERAGE	\$/BTU	90.73	90.27	91.57	90.27	90.27	90.27	90.27	90.27
OPERATING HRS/YR IN COPIED STEAM SUPPLY RANGE	HOURS	6085	6340	6290	6649	6290	6649	6290	6649
INCIDENTAL MAINTENANCE COST, AVERAGE	\$/BTU	420.353	0.99	924.120	0.99	922.471	0.99	922.471	0.99
AVAILABILITY, FRACTION	NONE	1.1E+11	1.3E+11	1.1E+11	1.6E+11	1.1E+11	1.6E+11	1.1E+11	1.6E+11
ANNUAL STEAM PRODUCTION, NET	BTU	93,033	92,506	92,069	92,578	914,862	92,578	914,862	92,578
RELATIVE ELECTRIC POWER ANNUAL COST	\$/BTU	970,861	9406.545	970,312	9418.152	9345,930	9627,228	9461,240	9636,304
ANNUAL CONVENTIONAL FUEL COST	\$/BTU	94,705	91,771	93,879	92,328	910,682	97,004	910,682	97,004
ANNUAL NET FUEL COST	\$/BTU	94,418	92,263	93,879	92,328	97,004	92,328	97,004	92,328
ANNUAL NET DISPOSER COST	\$/BTU	0	90	90	982,500	90	982,500	90	982,500
ANNUAL NET DISPOSER COST	\$/BTU	0	1	1	0	0	0	0	0
FURNACE COLD STARTING COST (1 SHOT) IF = 1	NONE	0	1	1	0	0	0	0	0
NET HCR EXTENSIONS RATE W/ NEW CONTROL DEVICE INCLUDED IN CAPITAL COST	LB/H/HR	1.29	1.21	1.21	1.25	1.25	1.25	1.25	1.25
ANNUAL CAPITAL COST OF STORAGE SUBSTATION	\$	935,375	951,968	951,968	975,410	975,410	975,410	975,410	975,410
ANNUAL CAPITAL COST OF LONG MECHANICAL CONVEYOR	\$	90	90	90	90	90	90	90	90
ANNUAL CAPITAL COST OF SHORT MECHANICAL CONVEYOR	\$	90	90	90	90	90	90	90	90
ANNUAL CAPITAL COST OF SHORT DELIVERY SYSTEM	\$	931,067	976,511	976,511	965,906	965,906	965,906	965,906	965,906
ANNUAL CAPITAL COST OF RSH HANDLING SYSTEM	\$	90	90	90	90	90	90	90	90
ANNUAL CAPITAL COST OF RSH HANDLING SYSTEM	\$	90	90	90	90	90	90	90	90
ANNUAL CAPITAL COST FOR MILLER MODIFICATIONS	\$	9228,760	9228,760	9228,760	9228,760	9228,760	9228,760	9228,760	9228,760
ANNUAL CAPITAL COST FOR MILLER MODIFICATIONS	\$	9228,760	9228,760	9228,760	9228,760	9228,760	9228,760	9228,760	9228,760

BASE TOTAL INCREMENTAL CAPITAL COSTS	1	6325,202	6397,238	6370,075	6370,075
SUBSIDIZED TOTAL INCREMENTAL CAPITAL COSTS	1	6442,466	6524,255	6448,499	6448,499
CAPITAL RECOVERY FACTOR	NONE	9.54	9.54	9.54	9.54
ANNUALIZED COST OF CAPITAL	8/1/78	90	90	90	90
TOTAL ANNUAL O&M COST	8/1/78	6553,331	6554,775	6685,797	6601,107
TOTAL ANNUAL COST INCLUDING COST OF CAPITAL	8/1/78	90	90	90	90
TOTAL COST PER MILLION BTU OF STEAM	8/1/78	90.00	90.00	90.00	90.00
SIA (SAVINGS/INVESTMENT) AT EQUAL ANNUAL STEAM PRODUCTION	NONE	-2.27	-1.77	-1.49	-0.78
TOTAL O&M COST PER MILLION BTU OF STEAM	8/1/78	90.00	94.90	96.05	97.07
O&M COSTS FOR PLANT/FEEDER IF NOT BPS BUT COAL USED AS FUEL	8/1/78	2352	8865	90.00	90.00
TONS PER YEAR NOT REQUIRED	1791			5341	5341

Summary of Technical Analysis				19	20
Sub Area: Boilers, Waste/Sludge				High Disposal Cost	RF
Definition				Co-firing Fuel	Co-firing Fuel
ENTHALPY TRANSFERRED TO STEAM, WAS VOLUME, 100% AVAILABILITY	BTU/H	1.80E+07	1.80E+07	1.80E+07	1.80E+07
HCL WAS NOT FOR COPIED CASE (HEATED AT W/ VELOCITY)	BTU/H	3.90E+07	6.1E+07	3.90E+07	6.1E+07
WATER THERMAL STEAM HEATING, SEAM BTU/H	BTU/H	1.3E+07		1.3E+07	
BOILER EFFICIENCY AT HCL	NONE	0.78	0.85	0.78	0.85
BOILER EFFICIENCY AT WASTE	NONE	0.67	0.85	0.67	0.85
WATER STEAM HEATING (HSD)	BTU/H	3.17E+07	3.17E+07	3.17E+07	3.17E+07
WASTE	NONE	0.02	0.02	0.02	0.02
TOTAL FUEL INPUT ENTHALPY, AVERAGE	BTU/H	2.67E+07	2.1E+07	2.67E+07	2.1E+07
RF FLOUORIDE, AVERAGE	TH	0.85	0.85	0.85	0.85
CONVENTIONAL FUEL INPUT ENTHALPY, AVERAGE	BTU/H	1305	1721	1305	1721
SOLID RESIDUE GENERATED, AVERAGE	LB/H/HR	537	125	537	125
CONCENTRATION OF SOLID RESIDUE, AVERAGE	LB/H/HR	0.52	0.04	0.53	0.04
FLUORINE FRACTION OF SOLID RESIDUE, AVERAGE	NONE	0.09	0.37	0.09	0.37
FLUORINE FRACTION OF SOLID RESIDUE, AVERAGE	NONE	1	3	1	3
FLUORINE FRACTION OF SOLID RESIDUE, AVERAGE	LB/H/HR	0.02	0.04	0.02	0.04
UNCONTROLLED FLUORINE EMISSION, WAS VOLUME AT HCL	LB/H/HR	1.25	2.34	1.25	2.34
UNCONTROLLED FLUORINE EMISSION, WAS VOLUME AT HCL	LB/H/HR	2575	2083	2601	2083
COMBUSTION AIR RATE, AVERAGE	BTU/H	5728	4332	5789	4332
COMBUSTION AIR VOLUMETRIC FLOWRATE, AVERAGE	BTU/H	2621	2179	2651	2179
NET FUEL WAS RATE, AVERAGE	NONE	2623	7156	2623	7156
NET FUEL WAS RATE, AVERAGE	NONE	1	1	1	1
NET FUEL WAS RATE, AVERAGE	NONE	0	0	0	0
NET FUEL WAS RATE, AVERAGE	BTU/H	90.38	90.30	90.38	90.30
NET FUEL WAS RATE, AVERAGE	BTU/H	90.34	90.00	90.34	90.00
NET FUEL WAS RATE, AVERAGE	BTU/H	91.65	90.00	91.66	90.00
NET FUEL WAS RATE, AVERAGE	BTU/H	1013	438	1013	438
NET FUEL WAS RATE, AVERAGE	BTU/H	9284.848	9205.586	9284.848	9205.586
NET FUEL WAS RATE, AVERAGE	BTU/H	1.32	1.38	1.32	1.38
NET FUEL WAS RATE, AVERAGE	BTU/H	937.00	948.00	937.00	948.00
NET FUEL WAS RATE, AVERAGE	BTU/H	92.00	92.00	92.00	92.00
NET FUEL WAS RATE, AVERAGE	BTU/H	91.73	90.40	91.73	90.40
NET FUEL WAS RATE, AVERAGE	BTU/H	6290	8649	6290	8649
NET FUEL WAS RATE, AVERAGE	BTU/H	922.471		922.456	
NET FUEL WAS RATE, AVERAGE	NONE	0.72	0.99	0.72	0.99
NET FUEL WAS RATE, AVERAGE	BTU/H	1.1E+11	1.6E+11	1.1E+11	1.6E+11
NET FUEL WAS RATE, AVERAGE	BTU/H	919.862	92.578	915.004	92.578
NET FUEL WAS RATE, AVERAGE	BTU/H	9230.620	9418.152	9233.094	9418.152
NET FUEL WAS RATE, AVERAGE	BTU/H	910.682		910.797	
NET FUEL WAS RATE, AVERAGE	BTU/H	91.004	92.328	910.871	93.450
NET FUEL WAS RATE, AVERAGE	BTU/H	90	91.63.000	90	982.500
NET FUEL WAS RATE, AVERAGE	NONE	0	0	0	0
NET FUEL WAS RATE, AVERAGE	BTU/H	1.25		1.25	
NET FUEL WAS RATE, AVERAGE	BTU/H	928.410		928.410	
NET FUEL WAS RATE, AVERAGE	BTU/H	9	9	9	9
NET FUEL WAS RATE, AVERAGE	BTU/H	9	9	9	9
NET FUEL WAS RATE, AVERAGE	BTU/H	928.410		928.410	
NET FUEL WAS RATE, AVERAGE	BTU/H	9	9	9	9
NET FUEL WAS RATE, AVERAGE	BTU/H	928.410		928.410	
NET FUEL WAS RATE, AVERAGE	BTU/H	9	9	9	9
NET FUEL WAS RATE, AVERAGE	BTU/H	928.410		928.410	
NET FUEL WAS RATE, AVERAGE	BTU/H	9	9	9	9
NET FUEL WAS RATE, AVERAGE	BTU/H	928.410		928.410	
NET FUEL WAS RATE, AVERAGE	BTU/H	9	9	9	9
NET FUEL WAS RATE, AVERAGE	BTU/H	928.410		928.410	
NET FUEL WAS RATE, AVERAGE	BTU/H	9	9	9	9
NET FUEL WAS RATE, AVERAGE	BTU/H	928.410		928.410	
NET FUEL WAS RATE, AVERAGE	BTU/H	9	9	9	9
NET FUEL WAS RATE, AVERAGE	BTU/H	928.410		928.410	
NET FUEL WAS RATE, AVERAGE	BTU/H	9	9	9	9
NET FUEL WAS RATE, AVERAGE	BTU/H	928.410		928.410	
NET FUEL WAS RATE, AVERAGE	BTU/H	9	9	9	9
NET FUEL WAS RATE, AVERAGE	BTU/H	928.410		928.410	
NET FUEL WAS RATE, AVERAGE	BTU/H	9	9	9	9
NET FUEL WAS RATE, AVERAGE	BTU/H	928.410		928.410	
NET FUEL WAS RATE, AVERAGE	BTU/H	9	9	9	9
NET FUEL WAS RATE, AVERAGE	BTU/H	928.410		928.410	
NET FUEL WAS RATE, AVERAGE	BTU/H	9	9	9	9
NET FUEL WAS RATE, AVERAGE	BTU/H	928.410		928.410	
NET FUEL WAS RATE, AVERAGE	BTU/H	9	9	9	9
NET FUEL WAS RATE, AVERAGE	BTU/H	928.410		928.410	
NET FUEL WAS RATE, AVERAGE	BTU/H	9	9	9	9
NET FUEL WAS RATE, AVERAGE	BTU/H	928.410		928.410	
NET FUEL WAS RATE, AVERAGE	BTU/H	9	9	9	9
NET FUEL WAS RATE, AVERAGE	BTU/H	928.410		928.410	
NET FUEL WAS RATE, AVERAGE	BTU/H	9	9	9	9
NET FUEL WAS RATE, AVERAGE	BTU/H	928.410		928.410	
NET FUEL WAS RATE, AVERAGE	BTU/H	9	9	9	9
NET FUEL WAS RATE, AVERAGE	BTU/H	928.410		928.410	
NET FUEL WAS RATE, AVERAGE	BTU/H	9	9	9	9
NET FUEL WAS RATE, AVERAGE	BTU/H	928.410		928.410	
NET FUEL WAS RATE, AVERAGE	BTU/H	9	9	9	9
NET FUEL WAS RATE, AVERAGE	BTU/H	928.410		928.410	
NET FUEL WAS RATE, AVERAGE	BTU/H	9	9	9	9
NET FUEL WAS RATE, AVERAGE	BTU/H	928.410		928.410	
NET FUEL WAS RATE, AVERAGE	BTU/H	9	9	9	9
NET FUEL WAS RATE, AVERAGE	BTU/H	928.410		928.410	
NET FUEL WAS RATE, AVERAGE	BTU/H	9	9	9	9
NET FUEL WAS RATE, AVERAGE	BTU/H	928.410		928.410	
NET FUEL WAS RATE, AVERAGE	BTU/H	9	9	9	9
NET FUEL WAS RATE, AVERAGE	BTU/H	928.410		928.410	
NET FUEL WAS RATE, AVERAGE	BTU/H	9	9	9	9
NET FUEL WAS RATE, AVERAGE	BTU/H	928.410		928.410	
NET FUEL WAS RATE, AVERAGE	BTU/H	9	9	9	9
NET FUEL WAS RATE, AVERAGE	BTU/H	928.410		928.410	
NET FUEL WAS RATE, AVERAGE	BTU/H	9	9	9	9
NET FUEL WAS RATE, AVERAGE	BTU/H	928.410		928.410	
NET FUEL WAS RATE, AVERAGE	BTU/H	9	9	9	9
NET FUEL WAS RATE, AVERAGE	BTU/H	928.410		928.410	
NET FUEL WAS RATE, AVERAGE	BTU/H	9	9	9	9
NET FUEL WAS RATE, AVERAGE	BTU/H	928.410		928.410	
NET FUEL WAS RATE, AVERAGE	BTU/H	9	9	9	9
NET FUEL WAS RATE, AVERAGE	BTU/H	928.410		928.410	
NET FUEL WAS RATE, AVERAGE	BTU/H	9	9	9	9
NET FUEL WAS RATE, AVERAGE	BTU/H	928.410		928.410	
NET FUEL WAS RATE, AVERAGE	BTU/H	9	9	9	9
NET FUEL WAS RATE, AVERAGE	BTU/H	928.410		928.410	
NET FUEL WAS RATE, AVERAGE	BTU/H	9	9	9	9
NET FUEL WAS RATE, AVERAGE	BTU/H	928.410		928.410	
NET FUEL WAS RATE, AVERAGE	BTU/H	9	9	9	9
NET FUEL WAS RATE, AVERAGE	BTU/H	928.410		928.410	
NET FUEL WAS RATE, AVERAGE	BTU/H	9	9	9	9
NET FUEL WAS RATE, AVERAGE					

NAME TOTAL INCIDENTAL CAPITAL COSTS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
-------------------------------------	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Summary of Sensitivity Analysis
Sub Base Ranger, Washington

Summary of Sensitivity Analysis		21: SIR w/ credit		22: SIR w/ credit		23: SIR w/ credit	
Sub Item Range, Washington		Actual RSR	M50 % + 50 %	M50 % + 50 %	M50 % + 100 %	Conventional	Conventional
definition		Coifing Fuel	Coifing Fuel	Coifing Fuel	Coifing Fuel	Coifing Fuel	Coifing Fuel
ENTHALPY TRANSFERRED TO STEAM, AND HOURLY, 100% AVAILABLE		1.00E+07	1.00E+07	1.00E+07	1.00E+07	1.00E+07	1.00E+07
FOR HCR, AND ARE FOR COPIED CASE (IDENTIFIED AT H1 VELOCITY)		5.90E+07	6.13E+07	5.90E+07	6.13E+07	5.90E+07	6.13E+07
MAXIMUM TURBIDITY STEAM INTAKE, SEAM ITEM		1.35E+07		1.35E+07		1.35E+07	
BOILER EFFICIENCY AT HCR		0.78	0.85	0.78	0.85	0.78	0.85
BOILER EFFICIENCY AT HCR		0.67	0.85	0.67	0.85	0.67	0.85
MAXIMUM STEAM BEHIND (HCR)		3.17E+07	3.17E+07	3.17E+07	3.17E+07	3.17E+07	3.17E+07
BEHIND		0.02	0.02	0.02	0.02	0.02	0.02
TOTAL FUEL UNIT ENTHALPY, AVERAGE		2.67E+07	2.12E+07	2.67E+07	2.12E+07	2.67E+07	2.12E+07
OF FLUORIDE, AVERAGE		0.85	0.85	0.85	0.85	0.85	0.85
CONVENTIONAL FUEL UNIT ENTHALPY, AVERAGE		1305	1721	1305	1721	1305	1721
SOLID REFINER REGENERATOR, AVERAGE		357	135	357	135	357	135
CORON CENTER OF SOLID REFINER, AND HOURLY AT HCR		0.52	0.04	0.52	0.04	0.52	0.04
FLOW FRACTION OF SOLID REFINER, AVERAGE		0.09	0.37	0.09	0.37	0.09	0.37
FLUORINE ENTHALPY AND EXISTING CONTROL DEVICE AT HCR		1	3	1	3	1	3
EXHUSTION OF TYP, AND HOURLY W/ EXISTING CTRL AT HCR		0.02	0.04	0.02	0.04	0.02	0.04
UNCONTROLLED FLOW ENTHALPY, AND HOURLY AT HCR		1.25	2.34	1.25	2.34	1.25	2.34
CONVENTIONAL FLOW ENTHALPY, AND HOURLY AT HCR		2375	20333	2375	20333	2375	20333
CONVENTIONAL FLOW ENTHALPY, AND HOURLY AT HCR		578	4532	578	4532	578	4532
NET FUEL AND RATE, AVERAGE		2821	21979	2821	21979	2821	21979
NET FUEL AND RATE, AVERAGE		2823	7156	2823	7156	2823	7156
NET FUEL AND RATE, AVERAGE		1	1	1	1	1	1
NET FUEL AND RATE, AVERAGE		0	0	0	0	0	0
NET FUEL AND RATE, AVERAGE		90.38	90.30	90.38	90.30	90.38	90.30
NET FUEL AND RATE, AVERAGE		90.34	90.00	90.34	90.00	90.34	90.00
NET FUEL AND RATE, AVERAGE		91.65	90.00	91.65	90.00	91.65	90.00
NET FUEL AND RATE, AVERAGE		1013	458	1013	458	1013	458
NET FUEL AND RATE, AVERAGE		6294	4405	6294	4405	6294	4405
NET FUEL AND RATE, AVERAGE		1.92	1.38	1.92	1.38	1.92	1.38
NET FUEL AND RATE, AVERAGE		837.00	948.00	837.00	948.00	837.00	948.00
NET FUEL AND RATE, AVERAGE		82.00	82.00	82.00	82.00	82.00	82.00
NET FUEL AND RATE, AVERAGE		91.11	90.27	91.11	90.27	91.11	90.27
NET FUEL AND RATE, AVERAGE		6290	8649	6290	8649	6290	8649
NET FUEL AND RATE, AVERAGE		622.471	0.99	622.471	0.99	622.471	0.99
NET FUEL AND RATE, AVERAGE		0.72	0.99	0.72	0.99	0.72	0.99
NET FUEL AND RATE, AVERAGE		1.1E+11	1.6E+11	1.1E+11	1.6E+11	1.1E+11	1.6E+11
NET FUEL AND RATE, AVERAGE		914.62	92.578	914.62	92.578	914.62	92.578
NET FUEL AND RATE, AVERAGE		9230.60	9418.12	9230.60	9418.12	9230.60	9418.12
NET FUEL AND RATE, AVERAGE		914.62		914.62		914.62	
NET FUEL AND RATE, AVERAGE		97.00	92.328	97.00	92.328	97.00	92.328
NET FUEL AND RATE, AVERAGE		0	0	0	0	0	0
NET FUEL AND RATE, AVERAGE		1.25	1.25	1.25	1.25	1.25	1.25
NET FUEL AND RATE, AVERAGE		975.410		975.410		975.410	
NET FUEL AND RATE, AVERAGE		90	90	90	90	90	90
NET FUEL AND RATE, AVERAGE		90	90	90	90	90	90
NET FUEL AND RATE, AVERAGE		90	90	90	90	90	90
NET FUEL AND RATE, AVERAGE		90	90	90	90	90	90
NET FUEL AND RATE, AVERAGE		90	90	90	90	90	90
NET FUEL AND RATE, AVERAGE		90	90	90	90	90	90
NET FUEL AND RATE, AVERAGE		90	90	90	90	90	90
NET FUEL AND RATE, AVERAGE		90	90	90	90	90	90
NET FUEL AND RATE, AVERAGE		90	90	90	90	90	90
NET FUEL AND RATE, AVERAGE		90	90	90	90	90	90
NET FUEL AND RATE, AVERAGE		90	90	90	90	90	90
NET FUEL AND RATE, AVERAGE		90	90	90	90	90	90
NET FUEL AND RATE, AVERAGE		90	90	90	90	90	90
NET FUEL AND RATE, AVERAGE		90	90	90	90	90	90
NET FUEL AND RATE, AVERAGE		90	90	90	90	90	90
NET FUEL AND RATE, AVERAGE		90	90	90	90	90	90
NET FUEL AND RATE, AVERAGE		90	90	90	90	90	90
NET FUEL AND RATE, AVERAGE		90	90	90	90	90	90
NET FUEL AND RATE, AVERAGE		90	90	90	90	90	90
NET FUEL AND RATE, AVERAGE		90	90	90	90	90	90
NET FUEL AND RATE, AVERAGE		90	90	90	90	90	90
NET FUEL AND RATE, AVERAGE		90	90	90	90	90	90
NET FUEL AND RATE, AVERAGE		90	90	90	90	90	90
NET FUEL AND RATE, AVERAGE		90	90	90	90	90	90
NET FUEL AND RATE, AVERAGE		90	90	90	90	90	90
NET FUEL AND RATE, AVERAGE		90	90	90	90	90	90
NET FUEL AND RATE, AVERAGE		90	90	90	90	90	90
NET FUEL AND RATE, AVERAGE		90	90	90	90	90	90
NET FUEL AND RATE, AVERAGE		90	90	90	90	90	90
NET FUEL AND RATE, AVERAGE		90	90	90	90	90	90
NET FUEL AND RATE, AVERAGE		90	90	90	90	90	90
NET FUEL AND RATE, AVERAGE		90	90	90	90	90	90
NET FUEL AND RATE, AVERAGE		90	90	90	90	90	90
NET FUEL AND RATE, AVERAGE		90	90	90	90	90	90
NET FUEL AND RATE, AVERAGE		90	90	90	90	90	90
NET FUEL AND RATE, AVERAGE		90	90	90	90	90	90
NET FUEL AND RATE, AVERAGE		90	90	90	90	90	90
NET FUEL AND RATE, AVERAGE		90	90	90	90	90	90
NET FUEL AND RATE, AVERAGE		90	90	90	90	90	90
NET FUEL AND RATE, AVERAGE		90	90	90	90	90	90
NET FUEL AND RATE, AVERAGE		90	90	90	90	90	90
NET FUEL AND RATE, AVERAGE		90	90	90	90	90	90
NET FUEL AND RATE, AVERAGE		90	90	90	90	90	90
NET FUEL AND RATE, AVERAGE		90	90	90	90	90	90
NET FUEL AND RATE, AVERAGE		90	90	90	90	90	90
NET FUEL AND RATE, AVERAGE		90	90	90	90	90	90
NET FUEL AND RATE, AVERAGE		90	90	90	90	90	90
NET FUEL AND RATE, AVERAGE		90	90	90	90	90	90
NET FUEL AND RATE, AVERAGE		90	90	90	90	90	90
NET FUEL AND RATE, AVERAGE		90	90	90	90		

Summary of Sensitivity Analysis
Subacute Infection, Washington

[illegible]

Henry's Lab-Base

Summary of Sensitivity Analysis
Sub Base Banger, Washington

BASE TOTAL INCREMENTAL CAPITAL COSTS
BASED TOTAL INCREMENTAL CAPITAL COSTS
CAPITAL RECOVERY FACTOR
ANNUALIZED COST OF CAPITAL
TOTAL ANNUAL COST INCLUDING COST OF CAPITAL
TOTAL ANNUAL COST PER MILLION BTU OF STEAM
SIN (SAVINGS/INVESTMENT) AT EQUAL ANNUAL STEAM PRODUCTION
TOTAL COST PER MILLION BTU OF STEAM
OWN COSTS FOR RELIEF IF NOT RELIEF BUT COAL USED AS REF
TURNS PER YEAR NOT REQUIRED
Assumed HSH disposal cost
SIR w/disposal credit

	Best Case Analysis							
	Conventional Fuel	1	2	3	4	5	6	
Down 255	RF	Conventional Fuel	RF	Conventional Fuel	RF	Conventional Fuel	RF	
	Costing	Costing	Costing	Costing	Costing	Costing	Costing	
1	\$370,075	\$389,530	\$389,530	\$389,052	\$392,052	\$392,052	\$392,052	
2	\$488,499	\$514,179	\$514,179	\$517,509	\$517,509	\$517,509	\$517,509	
3	NONE	9.54	9.54	9.54	9.54	9.54	9.54	
4	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
5	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
6	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
7	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
8	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
9	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
10	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
11	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
12	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
13	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
14	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
15	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
16	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
17	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
18	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
19	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
20	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
21	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
22	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
23	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
24	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
25	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
26	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
27	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
28	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
29	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
30	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
31	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
32	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
33	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
34	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
35	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
36	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
37	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
38	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
39	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
40	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
41	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
42	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
43	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
44	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
45	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
46	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
47	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
48	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
49	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
50	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
51	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
52	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
53	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
54	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
55	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
56	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
57	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
58	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
59	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
60	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
61	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
62	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
63	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
64	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
65	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
66	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
67	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
68	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
69	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
70	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
71	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
72	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
73	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
74	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
75	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
76	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
77	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
78	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
79	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
80	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
81	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
82	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
83	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
84	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
85	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
86	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
87	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
88	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
89	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
90	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
91	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
92	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
93	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
94	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
95	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
96	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
97	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
98	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
99	9.54	9.54	9.54	9.54	9.54	9.54	9.54	
100	9.54	9.54	9.54	9.54	9.54	9.54	9.54	

cost + sensory

ESP

DISTRIBUTION LIST

AFB HO TAC DEMM (Schmidt), Langley, VA
ARMY ARDC, Library, Dover, NJ; Ch of Engrs, DAEN-CWE-M, Washington, DC; Ch of Engrs,
DAEN-MPU, Washington, DC; ERADCOM Tech Supp Dir. (DELS-D), Ft Monmouth, NJ; R&D Cmd,
STRNC-WSA (Kwoh Hu), Natick, MA
ARMY AMMUNITION PLANT SARHW-FET, Hawthorne, NV
ARMY CRREL CRREL-EA, Hanover, NH
ARMY MAT & MECH RSCH CEN DRXMR-SM (Lenoe), Watertown, MA
CBC PWO (Code 80), Port Hueneme, CA; PWO, Davisville, RI; PWO, Gulfport, MS
CNO Code NOP-964, Washington, DC; Code OP 987, Washington, DC; Code OP 413, Washington, DC; Code
OPNAV 09B24 (H), Washington, DC
COMFLEACT PWO, Sasebo, Japan
COMNAVDIST PWO, Washington, DC
DOD DDR&E, Washington, DC
DTNSRDC PWO, Bethesda, MD
ENVIRONMENTAL PROTECTION AGENCY Reg III Lib, Philadelphia, PA
FCTC LANT, PWO, Virginia Bch, VA
FOREST SERVICE Engrg Staff, Washington, DC
MARINE CORPS BASE PWO, Camp Lejeune, NC; PWO, Camp Pendleton, CA
MCAS Code FDP, Kaneohe Bay, HI; Fac Offr, Iwakuni, Japan; PWO, Santa Ana, CA; PWO, Beaufort, SC;
PWO, Cherry Point, NC; PWO, Yuma, AZ
MCDEC PWO, Quantico, VA
MCLB PWO, Albany, GA; PWO, Barstow, CA
McRD PWO, Parris Island, SC
NAF PWO, Atsugi, Japan; PWO, El Centro, CA; Detroit, PWO, Mount Clemens, MI; PWO, Washington, DC
NAS PWO (Code 632), Point Mugu, CA; PWO, Jacksonville, FL; PWO, Meridian, MS; PWO, New Orleans,
LA; PWO, Alameda, CA; PWO, Fallon, NV; PWO, Beeville, TX; PWO, Cecil Field, FL; PWO, Corpus
Christi, TX; PWO, Dallas, TX; PWO, Glenview, IL; PWO, Key West, FL; PWO, Kingsville, TX; PWO,
Lemoore, CA; PWO, Marietta, GA; PWO, Millington, TN; Whiting Fld, PWO, Milton, FL; PWO,
Miramar, San Diego, CA; PWO, Moffett Field, CA; PWO, Norfolk, VA
AF 4700 ADS (SPT) (TAC), Peterson AFB, CO; ABG/DER, Patrick AFB, FL
AFB 3480 CES DEEV, Goodfellow AFB, TX; AUL/LSE 63-465, Maxwell, AL; HQ MAC/DEEE, Scott AFB,
IL; AFIT DET, Wright-Patterson AFB, OH
AFESC HQ AFESC TST, Tyndall AFB, FL; DEB, Tyndall AFB, FL; HQ TST, Tyndall AFB, FL
ARMY BMDSC-RE (H McClellan), Huntsville, AL; Engr Dist Memphis, Lib, Memphis, TN; FESA-EM
(Krajewski), Ft Belvoir, VA; FESA-EM, Ft Belvoir, VA
ARMY - CERL Library, Champaign, IL; CERL-ZN, Champaign, IL
ARMY CORPS OF ENGINEERS HNDED-CS, Huntsville, AL; HNDED-SY, Huntsville, AL
ARMY ENVIRON HYGIENE AGCY Dir, Env Qual, Aberdeen Proving Grnd, MD; HSE-RP-HG,
Aberdeen Proving Grnd, MD; HSHB-EW, Aberdeen Proving Grnd, MD
ARMY MISSILE R&D CMD Ch, Docs, Sci Info Ctr, Arsenal, AL
ARMY-BELVOIR R&D CTR STRBE-CFLO, Ft Belvoir, VA; STRBE-AALO, Ft Belvoir, VA;
STRBE-BLORE, Ft Belvoir, VA; STRBE-WC, Ft Belvoir, VA
BUREAU OF RECLAMATION Code 1512 (C Selander), Denver, CO
CNO Code OP-987J, Washington, DC; OP-098, Washington, DC
DEFUEL SUPPCEN DFSC-OWE, Alexandria, VA
DLSIE Army Logistics Mgt Center, Fort Lee, VA
DOE Wind/Ocean Tech Div, Tobacco, MD
ENVIRONMENTAL PROTECTION AGENCY Reb VIII, Lib, Denver, CO
FAA Code APM-740 (Tomita), Washington, DC
GSA Code FAIA, Washington, DC; Code PCDP, Washington, DC
IRE-ITTD Input Proc Dir (R. Danford), Eagan, MN
LIBRARY OF CONGRESS Sci & Tech Div, Washington, DC
NAS Lead CPO, PWD, Self Help Div, Beeville, TX; PWO, Oak Harbor, WA; Oceana, PWO, Virginia Bch,
VA; PWO, South Weymouth, MA; PWO, Willow Grove, PA
NATL RESEARCH COUNCIL Naval Studies Board, Washington, DC
NAVAIRDEV CEN PWO, Warminster, PA
NAVAIRENG CEN PWO, Lakehurst, NJ
NAVAIRPROPTST CEN PWO, Trenton, NJ
NAVAIRTEST CEN PWO, Patuxent River, MD
NAVAVIONIC CEN PW Div, Indianapolis, IN
NAVCOASTSYS CEN Code 630, Panama City, FL
NAVFAC PWO, Charleston, OR; PWO, Pacific Beach, WA

NAVFACENGCOM Code 03, Alexandria, VA; Code 032E, Alexandria, VA; Code 03T (Essoglou), Alexandria, VA; Code 04B3, Alexandria, VA
 AFB 82ABG DEMC, Williams AZ; AFSC DEEQ (P. Montoya), Peterson AFB, CO; SAMSO/MNND, Norton AFB CA; SAMSO DEC (Sauer), Vandenberg AFB, CA
 ARMY Facs Engr Dir, Contr Br, Ft Ord, CA; POJED-O, Okinawa, Japan; Comm Cmd, Tech Ref Div, Huachuca, AZ
 ARMY DEPOT Letterkenny, Fac Engr (SDSLE-SF), Chambersburg, PA
 ARMY ENGR DIST Library, Portland OR
 DTIC Alexandria, VA
 GIDEP OIC, Corona, CA
 KWAJALEIN MISRAN BMDSC-RKL-C
 NAVFACENGCOM Code 03, Alexandria, VA; Code 032E, Alexandria, VA; Code 04M, Alexandria, VA; Code FPO-3A2 (Bloom), Alexandria, VA; Code FPO-3C, Alexandria, VA; Code 0812, Alexandria, VA; Code 09M124 (Tech Lib), Alexandria, VA; Code 100, Alexandria, VA; Code 1113, Alexandria, VA; Code 111B (Hanneman), Alexandria, VA; Code 112, Alexandria, VA; Code 113C, Alexandria, VA
 NAVFACENGCOM - CHES DIV, Code FPO-1PL, Washington, DC; CO, Washington, DC
 NAVFACENGCOM - LANT DIV, Library, Norfolk, VA; CO, Norfolk, VA
 NAVFACENGCOM - NORTH DIV, CO, Philadelphia, PA
 NAVFACENGCOM - PAC DIV, CO, Pearl Harbor, HI; Library, Pearl Harbor, HI
 NAVFACENGCOM - SOUTH DIV, CO, Charleston, SC; Library, Charleston, SC
 NAVFACENGCOM - WEST DIV, Br Ofc, Code 114C, San Diego, CA; Br Ofc, Security Offr, San Diego, CA; CO, San Bruno, CA; Library (Code 04A2.2), San Bruno, CA
 NAVFACENGCOM CONTRACTS SW Pac, OICC, Manila, RP
 NAVHOSP PWO, Philadelphia, PA; PWO, Beaufort, SC; PWO, Portsmouth, VA
 NAVMEDCOM MIDLANT REG, PWO, Norfolk, VA; PWO, Bethesda, MD
 NAVOCEANO Library Bay St. Louis, MS
 NAVORDSTA PWO, Indian Head, MD; PWO, Louisville, KY
 NAVPHIBASE PWO, Norfolk, VA
 NAVSHIPYD Library, Portsmouth, NH; PWD, Long Beach, CA; PWO, Bremerton, WA; PWO, Charleston, SC; PWO, Mare Island, Vallejo, CA; PWO, Portsmouth, VA; PWO, Philadelphia, PA; PWO, Portsmouth, NH
 NAVSTA PWO, Brooklyn, NY; PWO, Mayport, FL; PWO, Treasure Is, San Francisco, CA; PWO, Seattle, WA; PWO, Vallejo, CA
 NAVSUPPFAC PWO, Thurmont MD
 NAVSURFWPCEN DET, White Oak Lab, Proj Mgr, Artic ASW, Silver Spring, MD; PWO, Dahlgren, VA
 NAVUSEAWARENGSTA PWO, Keyport, WA
 NAVWPNCEN PWO (Code 266), China Lake, CA
 NAVWPNSTA PWO, Charleston, SC; PWO, Concord, CA; PWO, Seal Beach, CA
 NAVWPNSTA PWO, Yorktown, VA
 NAVWPNSUPPCEN PWO, Crane, IN
 NOAA Library, Rockville, MD
 NSC Cheatham Annex, PWO, Williamsburg, VA; PWO, Norfolk, VA
 OFFICE SECRETARY OF DEFENSE OASD (MRA&L) Dir of Energy, Washington, DC
 PACMISRANFAC PWO, Kauai, HI
 PMTC Code 5054-S, Point Mugu, CA
 PWC CO, Great Lakes, IL; CO, Pensacola, FL; CO, Norfolk, VA; CO, Oakland, CA; CO, Yokosuka, Japan; Code 100E, Great Lakes, IL; Code 101 (Library), Oakland, CA; Code 110, San Diego, CA; Code 123-C, San Diego, CA; Code 420, Great Lakes, IL; CO, Pearl Harbor, HI; Library (Code 134), Pearl Harbor, HI; Library, Guam, Mariana Islands; Library, Norfolk, VA; Library, Pensacola, FL; Library, Yokosuka JA; Tech Library, Subic Bay, RP
 SPCC PWO (Code 08X), Mechanicsburg, PA
 U.S. MERCHANT MARINE ACADEMY Reprint Custodian, Kings Point, NY
 US DEPT OF INTERIOR Nat'l Park Svc, RMR/PC, Denver, CO
 US GEOLOGICAL SURVEY Marine Geology Offc (Piteleki), Reston, VA
 USAF REG HOSP SGPM, Fairchild AFB, WA
 USAFE DE-HFO, Ramstein AB, Germany
 USDA Ext Serv (T Maher), Washington, DC; Forest Prod Lab, Libr, Madison, WI; For Serv, Equip Dev Cen, San Dimas, CA
 USNA PWO, Annapolis, MD
 ADVANCED TECHNOLOGY Ops Cen Mgr (Moss), Camarillo, CA
 ARIZONA STATE UNIVERSITY Energy Prog Offc, Phoenix, AZ
 BONNEVILLE POWER ADMIN Energy Conserv Offc, Portland, OR
 BROOKHAVEN NATL LAB M. Steinberg, Upton, NY
 CALIF DEPT OF NAVIGATION & OCEAN DEV G Armstrong, Sacramento, CA
 CALIFORNIA STATE UNIVERSITY C.V. Chelapati, Long Beach, CA
 CITY OF AUSTIN Resource Mgmt Dept (G Arnold), Austin, TX

CITY OF LIVERMORE Project Engr (Dawkins), Livermore, CA
 COLORADO STATE UNIVERSITY CE Dept (Nelson), Ft Collins, CO
 CONNECTICUT Office of Policy & Mgt. Energy, Div. Hartford, CT
 DAMES & MOORE LIBRARY Los Angeles, CA
 DRURY COLLEGE Physics Dept, Springfield, MO
 FLORIDA ATLANTIC UNIVERSITY Ocean Engrg Dept (McAllister), Boca Raton, FL
 FOREST INST. FOR OCEAN & MOUNTAIN Library, Carson City, NV
 FRANKLIN RSCH CEN M Padusis, Philadelphia, PA
 GEORGIA INSTITUTE OF TECHNOLOGY Arch Col (Benton), Atlanta, GA
 HAWAII STATE DEPT OF PLAN. & ECON DEV. Tech Info Ctr, Honolulu, HI
 ILLINOIS STATE GEO. SURVEY Library, Urbana, IL
 WOODS HOLE OCEANOGRAPHIC INST. Proj Engr, Woods Hole, MA
 KEENE STATE COLLEGE Cunninham, Keene, NH
 LAWRENCE LIVERMORE LAB L-90 (F.J. Tokarz), Livermore, CA
 LEHIGH UNIVERSITY CE Dept. Hydraulics Lab, Bethlehem, PA; Linderman Libr. Ser Cataloguer,
 Bethlehem, PA
 LOUISIANA DIV NATURAL RESOURCES & ENERGY R&D Div. Baton Rouge, LA
 MAINE OFFICE OF ENERGY RESOURCES Augusta, ME
 MISSOURI ENERGY AGENCY Jefferson City, MO
 MIT Engrg Lib, Cambridge, MA; Hydrodynamics Lab (Harleman), Cambridge, MA; Lib, Tech Reports,
 Cambridge, MA
 MONTANA ENERGY OFFICE Anderson, Helena, MT
 NATURAL ENERGY LAB Library, Honolulu, HI
 NEW MEXICO SOLAR ENERGY INST. Dr. Zwibel Las Cruces NM
 NY CITY COMMUNITY COLLEGE Library, Brooklyn, NY
 NYS ENERGY OFFICE Library, Albany, NY
 PORT SAN DIEGO Proj Engr, Port Fac, San Diego, CA
 PURDUE UNIVERSITY Engrg Lib, Lafayette, IN
 SEATTLE UNIVERSITY CE Dept (Schwaegler), Seattle, WA
 SRI INTL Phillips, Chem Engr Lab, Menlo Park, CA
 ST. JOSEPHS HOSPITAL Phoenix, AZ
 STATE UNIV OF NEW YORK CE Dept, Buffalo, NY; Maritime Col (Longobardi), Bronx, NY
 TEXAS A&M UNIVERSITY CE Dept (Ledbetter), College Station, TX
 UNIVERSITY OF CALIFORNIA Energy Engr, Davis, CA; Prof E.A. Pearson, Berkeley, CA; CE Dept
 (Mitchell), Berkeley, CA; Physical Plant (Ross), San Francisco, CA
 UNIVERSITY OF DELAWARE CE Dept, Ocean Engrg (Dalrymple), Newark, DE
 UNIVERSITY OF HAWAII Library (Sci & Tech Div), Honolulu, HI
 UNIVERSITY OF ILLINOIS CE Dept (Hall), Urbana, IL; Library, Urbana, IL; Metz Ref Rm, Urbana, IL
 UNIVERSITY OF MASSACHUSETTS ME Dept (Heroneumus), Amherst, MA
 UNIVERSITY OF NEBRASKA-LINCOLN Ross Ice Shelf Proj, Lincoln, NE
 UNIVERSITY OF TEXAS AT AUSTIN CE Dept (Thompson), Austin, TX
 UNIVERSITY OF WASHINGTON Engrg Col (Carlson), Seattle, WA
 UNIVERSITY OF WISCONSIN Great Lakes Studies, Ctr, Milwaukee, WI
 VENTURA COUNTY PWA (Brownie), Ventura, CA
 APPLIED SYSTEMS R. Smith, Agana, Guam
 ARVID GRANT & ASSOC Olympia, WA
 ATLANTIC RICHFIELD CO R.E. Smith, Dallas, TX
 BRITISH EMBASSY Sci & Tech Dept (Wilkins), Washington, DC
 BROWN & ROOT Ward, Houston, TX
 CHEMED CORP Dearborn Chem Div Lib, Lake Zurich, IL
 COLUMBIA GULF TRANSMISSION CO. Engrg Lib, Houston, TX
 CONSTRUCTION TECH LAB A.E. Fiorato, Skokie, IL
 DIXIE DIVING CENTER Decatur, GA
 DURLACH, O'NEAL, JENKINS & ASSOC Columbia, SC
 GEOTECHNICAL ENGINEERS INC. (R.F. Murdock) Principal, Winchester, MA
 GRUMMAN AEROSPACE CORP. Tech Info Ctr, Bethpage, NY
 HALEY & ALDRICH, INC. HP Aldrich, Jr, Cambridge, MA
 LINDA HALL LIBRARY Doc Dept, Kansas City, MO
 LITHONIA LIGHTING Applications Engrg (B Helton), Conyers, GA
 MATRECON, INC H. Haxo, Oakland, CA
 MC DERMOTT, INC E&M Div, New Orleans, LA
 MEDERMOTT & CO. Diving Division, Harvey, LA
 MIDLAND-ROSS CORP. Surface Comb Div, Toledo, OH
 MOFFATT & NICHOL ENGRS R Palmer, Long Beach, CA
 PACIFIC MARINE TECHNOLOGY (M. Wagner) Duvall, WA
 PG&E Library, San Francisco, CA

PHELPS ASSOC P A Phelps, Rheem Valley, CA
PORTLAND CEMENT ASSOC Corlev, Skokie, IL; Klieger, Skokie, IL; Rsch & Dev Lab Lib, Skokie, IL
RAYMOND INTERNATIONAL INC E Colle Soil Tech Dept, Pennsauken, NJ
SANDIA LABORATORIES Library, Livermore, CA
SHANNON & WILSON, INC Librarian, Seattle, WA
TEXTRON INC Rsch Cen Lib, Buffalo, NY
THE AM WATERWAYS OPERATIONS, INC N Schuster, Arlington, VA
TRW SYSTEMS Dal, San Bernardino, CA
UNITED TECHNOLOGIES Hamilton Std Div, Lib, Windsor Locks, CT
WARD, WOUSTENHOLM ARCHITECTS Sacramento, CA
WESTINGHOUSE ELECTRIC CORP Library, Pittsburg, PA
WM CLAPP LABS - BATTELLE Library, Duxbury, MA
WOODWARD-CLYDE CONSULTANTS R Cross, Walnut Creek, CA
BULLOCK, TE La Canada, CA
KETRON, BOB Ft Worth, TX
MESSING, D W Voorhees, NJ
PETERSEN, CAPT N W Pleasanton, CA
SPIELVOGEL, LARRY Wyncote, PA
T W MERMEL Washington, DC
ENERGY RESOURCE ASSOC J P Waltz, Livermore, CA

END

12-86

DTIC