

# Design Analysis Cover Sheet

Complete only applicable items.

1.

WBS: <sup>JK</sup> 03/28/95 1.2.6  
 QA: ~~QA~~ N/A  
 Page: 1 Of: 7

MOL.19951102.0095

2. DESIGN ANALYSIS TITLE			
LIFE-CYCLE COST ANALYSIS FOR CONDENSATE RECEIVING SYSTEM			
3. DOCUMENT IDENTIFIER		4. REV. NO.	5. TOTAL PAGES
BABDF000-01717-0200-00025 REV 00		00	7
6. TOTAL ATTACHMENTS/NO. OF PAGES IN EACH		7. SYSTEM ELEMENT	
(I-3pg)(II-7pg)(III-7pg)(IV-8pg)(V-3pg)(VI-25pg)(VII-2pg)		MGDS	
	Print Name	Signature	Date
8. Originator	Chris Mellen	<i>Chris Mellen</i>	1/18/95
9. Checker	RUSSELL E. FLYE	<i>Russell E. Flye</i>	1-18-95
10. Lead Discipline Engineer	RUSSELL E. FLYE	<i>Russell E. Flye</i>	1-18-95
11. Department Manager	GENE N. KIMURA	<i>Gene N. Kimura</i>	1-18-95
12. REMARKS			



## 1. PURPOSE

The purpose of this analysis is to determine the life-cycle costs of several options relevant to the Condensate Removal System serving the Compressed Air System (CAS) at the Yucca Mountain Site Characterization Project (YMP) Exploratory Studies Facility (ESF). The best option (least present value) will be selected as the preferred configuration to construct.

## 2. QUALITY ASSURANCE

The work developed within this analysis relates to temporary equipment not included on the Q-list.

No QA Controls are applicable; therefore, the Quality Assurance (QA) classification of this analysis is NONE.

## 3. METHOD

The method used for this analysis is to identify three alternative systems, develop cost estimates for each system, and finally to use the National Institute Of Standards and Technology (NIST) Building Life-Cycle Cost (LCC) computer program (BLCC 3.2) as prescribed under U.S. Department of Energy (DOE) 6430.1A to choose the most cost-effective alternative.

- 3.1 From Reference 8, Section 3.5: The discount rate used for this analysis is 10 percent.
- 3.2 From Reference 8, Section 3.4: Future energy prices are adjusted by DOE price escalation indices.

## 4. CODES AND STANDARDS

DOE 6430.1A

General Design Criteria, April 6, 1989

## 5. DESIGN INPUTS

North Portal Surface-Based Compressed Air System, BABBDF000-01717-0200-00023 REV 01:

- Condensate receiver size - 1500 gal.

## 6. CRITERIA

- 6.1 Exploratory Studies Facility Design Requirements (ESFDR), YMP/CM-0019, Rev. 1, Sect. 3.2.1.9.4. A.: "The ESF shall be designed for a maintainable service life of 25 years."

- 6.2 ESFDR; Sect. 3.2.1.9.3. C.1.(e): ESF shall be designed and constructed so that facilities are easily and economically maintained. Maintainability considerations shall include: "Life cycle costs in selection of features, systems, and finishes."

## 7. ASSUMPTIONS

- 7.1 Equipment, labor, and maintenance costs will rise with an estimated rate of inflation of three percent annually. Since all alternatives are weighted equally with this factor, no verification is required.
- 7.2 Energy usage costs are not adjusted for inflation other than for multipliers assigned by the DOE in the BLCC program. All alternatives use an initial electricity price of \$.07/kWH and DOE multipliers are applied equally to each alternative. Therefore, no verification is required. (in accordance with Reference 8, Sect. 3.3)

## 8. REFERENCES

National Bureau of Standards (NBS) Handbook 135, Life-Cycle Costing Manual for the Federal Energy Management Program, Rev. 1987.

## 9. COMPUTER PROGRAMS

- 9.1 "Lotus 123" spreadsheets are used for portions of this analysis. As described in NLP-19-1 Rev. 0, 5.11, spreadsheet software does not require qualification for work subjected to Quality Assurance Requirements and Description (QARD) requirements.
- 9.2 DOE-2.1D output weather data is used in this analysis. DOE-2.1D is developed and maintained by Lawrence Berkeley Laboratory under contract by the DOE. No verification or validation of this commercial off-the-shelf (COTS) software is required per NLP-19-1 Rev. 0 for the following reason: The work done by this software is not quality affecting and therefore, not subject to QARD requirements.
- 9.3 The NIST BLCC 3.2 program is used in this analysis. This program is developed and maintained by the U.S. Office of Applied Economics, Computing and Applied Mathematics Laboratory. The program is sponsored by the Federal Energy Management Program, DOE. DOE 6430.1A-0110-12.7.1 and Code of Federal Regulations 10 CFR 436 direct the use of this program along with the National Bureau of Standards (NBS) Handbook 135 for LCC analyses.

No verification or validation of this COTS software is required per NLP-19-1 Rev. 0 for the following reason: The work done by this software is not quality affecting and therefore, not subject to QARD requirements.

## 10. DESIGN ANALYSIS

**10.1** Three alternatives selected by the Civilian Radioactive Waste Management System Management and Operating Contractor (CRWMS M&O) and Raytheon Services Nevada as most applicable to the ESF are analyzed to determine the most cost effective alternative. Detailed cost data for each alternative are provided in Attachment VI and summarized in Attachment V. BLCC computer generated output is provided in Attachments I through IV. A general description of each alternative follows:

### 10.1.1 Alternative 1 - Oil/Water Separation

Condensate is purged by the CAS to a small separation facility adjacent to the CAS pad and separated into oil and water. The wastewater would be discarded into the sanitary sewer. The oil would initially be stored in the separation facility and later transported offsite for disposal. The facility will be a pre-fabricated building with environmental system controls.

### 10.1.2 Alternative 2 - Condensate Storage

Condensate purged by the CAS would be stored in a large tank adjacent to the CAS pad. Periodically, the oil/water mixture will be transferred to a tank truck, which would transport the mixture offsite for disposal.

The initial separation of oil and water from the condensate mixture will take place in Mercury, Nevada. Existing separation facilities located there will separate the water into Mercury's sanitary sewer system. The oil separated from the mixture would be transported off the Nevada Test Site to a suitable reclamation processing facility.

### 10.1.3 Alternative 3 - Transfer to Waste Water Pond

In the scenario, condensate purged by the CAS will be stored in a small tank adjacent to the CAS pad. Periodically, transfer pumps will empty the tank by pumping the condensate mixture to the subsurface wastewater evaporative pond located off the ESF pad. The water and oil will evaporate and the wastewater pond will be monitored for build-up of hydrocarbons. If a build-up occurs, the water mixture in the pond will be pumped into tanker trucks and disposed of offsite.

**10.2** The method employed for calculation and comparing the LCC for each alternative involves using software sponsored by the Federal Energy Management Program and DOE. The NIST BLCC program is used in conjunction with the NBS 135. This method is in compliance with requirements from DOE 6430.1A-0110-12.7.1 and 10 CFR 436.

**10.3** For each alternative, six categories of costs are established:

A. Equipment                      Tanks, valves, pumps, heat tracing, above ground piping, oil separators, instrumentation, electrical panels and labor.

- B. Site Preparation Temporary buildings, underground piping, trenching, grading, concrete work, and labor.
- C. Transportation Disposal fees, truck costs, and labor.
- D. Sampling Periodic sampling of wastes to determine composition as required by law.
- E. Permits State and local permitting agencies.
- F. Contingency Special considerations and costs specific to alternative.

## 11. CONCLUSIONS

- 11.1** Based on the least present value LCC analysis, the Transfer to Waste Water Pond Option (Alternative 3) is the most cost effective. LCCs are summarized as follows:

Alternatives	Life-Cycle Cost (Present Value)	Initial Cost (Present Value)
1	\$304,469	\$186,242
2	\$334,166	\$64,683
3	\$179,316	\$140,338

- 11.2** While the results of this analysis clearly indicate that Alternative 3 is the most LCC effective, other factors beyond the scope of this study may force another option to be implemented. For instance, if draining the condensate effluent into the wastewater pond initiated the need for expensive environmental controls, the cost of providing these controls could be prohibitive. Work is currently underway to determine the full extent of possible environmental restraints. If significant costs are found to occur, this analysis will be revised to show the impact on LCC. Currently, this is the recommended alternative to install at the ESF.
- 11.3** Alternative 2 (storage and transport) is the least cost-effective choice. This option has the smallest initial cost which may be attractive for initially restrictive budgets. Also, this option may also be commingled with Option 3 as both require similar equipment. Initially, Option 2 could be installed to minimize first costs; then as more funding is available, the line to the wastewater pond (Option 3) could be installed, eliminating the higher maintenance and operations cost of Alternative 2. By itself, storage and transportation of oily condensate is not recommended by this analysis.
- 11.4** Additional savings in trenching may be available for Option 3 if the drain line is installed at the same time as the mined wastewater line. This potential can be pursued to the point that the drain line is installed prior to understanding all of the environmental impacts as discussed in Section 11.2. The risk versus benefits scenario is beyond the scope of this analysis and must be determined by management.

**11.5** Alternative 1 (oil separation) is the runner-up cost effective choice. Because this alternative has higher life-cycle and initial costs than the other two, oil separation is not recommended by this analysis.

## 12. ATTACHMENTS

### ATTACHMENT

### TITLE

I	Comparative Economic Analysis Output
II	Alternative 1 Data
III	Alternative 2 Data
IV	Alternative 3 Data
V	Cost Estimate Summaries for the CAS Condensate Receiving System
VI	Detailed Cost Estimates for the CAS Condensate Receiving System
VII	DOE 2.1D Weather Data Summary for 1970

COMPARATIVE PRESENT-VALUE COSTS OF ALTERNATIVE PROJECTS  
(Shown in ascending order of initial cost, \* = lowest LCC)

PROJECT NAME	LCC FILENAME	INITIAL COST (PV)	LIFE CYCLE COST (PV)
CONDENSATE02	CRSALT02	\$64,683	\$334,166
CONDENSATE03	CRSALT03	\$140,338	\$179,316*
CONDENSATE01	CRSALT01	\$186,242	\$304,469



## NIST BLCC: COMPARATIVE ECONOMIC ANALYSIS

BASE CASE: CONDENSATE02  
ALTERNATIVE: CONDENSATE01

## PRINCIPAL STUDY PARAMETERS:

-----  
ANALYSIS TYPE: Generic LCC Analysis--No Tax Analysis  
STUDY PERIOD: 25 YEARS (1994 THROUGH 2018)  
DISCOUNT RATE: 10.0% Real (exclusive of general inflation)  
BASE CASE LCC FILE: CRSALT02.LCC  
ALTERNATIVE LCC FILE: CRSALT01.LCC

## COMPARISON OF PRESENT-VALUE COSTS

	BASE CASE: CONDENSATE02	ALTERNATIVE: CONDENSATE01	SAVINGS FROM ALT.
INITIAL INVESTMENT ITEM(S):			
CASH REQUIREMENTS AS OF OCCUPANCY	\$64,683	\$186,242	-\$121,559
	-----	-----	-----
SUBTOTAL	\$64,683	\$186,242	-\$121,559
FUTURE COST ITEMS:			
ANNUAL AND NON-AN. RECURRING COSTS	\$269,336	\$85,220	\$184,116
ENERGY EXPENDITURES	\$146	\$15,705	-\$15,558
REPLACEMENTS TO CAPITAL	\$0	\$17,302	-\$17,302
	-----	-----	-----
SUBTOTAL	\$269,483	\$118,227	\$151,256
	-----	-----	-----
TOTAL P.V. LIFE-CYCLE COST	\$334,166	\$304,469	\$29,697

## NET SAVINGS FROM PROJECT CONDENSATE01 COMPARED TO PROJECT CONDENSATE02

Net Savings	=	P.V. of Future Cost Savings	\$151,256
		- Increased Initial Invest.	\$121,559
			-----
		Net Savings:	\$29,697

SAVINGS-TO-INVESTMENT RATIO (SIR)  
FOR PROJECT CONDENSATE01 COMPARED TO PROJECT CONDENSATE02

SIR	=	P.V. of Future Cost Savings		=	1.24
		-----			
		Increased Initial Invest.			

ADJUSTED INTERNAL RATE OF RETURN (AIRR)  
FOR PROJECT CONDENSATE01 COMPARED TO PROJECT CONDENSATE02  
(Reinvestment rate = 10.00%; Study period = 25 years)

AIRR = 10.97%

Note: the NS, SIR, and AIRR computations include only initial costs (as of occupancy) as investment costs.

## NIST BLCC: COMPARATIVE ECONOMIC ANALYSIS

BASE CASE: CONDENSATE02  
ALTERNATIVE: CONDENSATE03

## PRINCIPAL STUDY PARAMETERS:

-----  
ANALYSIS TYPE: Generic LCC Analysis--No Tax Analysis  
STUDY PERIOD: 25 YEARS (1994 THROUGH 2018)  
DISCOUNT RATE: 10.0% Nominal (including general inflation)  
BASE CASE LCC FILE: CRSALT02.LCC  
ALTERNATIVE LCC FILE: CRSALT03.LCC

## COMPARISON OF PRESENT-VALUE COSTS

	BASE CASE: CONDENSATE02	ALTERNATIVE: CONDENSATE03	SAVINGS FROM ALT.
INITIAL INVESTMENT ITEM(S):	-----	-----	-----
CASH REQUIREMENTS AS OF OCCUPANCY	\$64,683	\$140,338	-\$75,655
SUBTOTAL	\$64,683	\$140,338	-\$75,655
FUTURE COST ITEMS:			
ANNUAL AND NON-AN. RECURRING COSTS	\$269,336	\$38,580	\$230,756
ENERGY EXPENDITURES	\$146	\$398	-\$251
SUBTOTAL	\$269,483	\$38,978	\$230,505
TOTAL P.V. LIFE-CYCLE COST	\$334,166	\$179,316	\$154,850

## NET SAVINGS FROM PROJECT CONDENSATE03 COMPARED TO PROJECT CONDENSATE02

Net Savings = P.V. of Future Cost Savings	\$230,505
- Increased Initial Invest.	\$75,655
Net Savings:	\$154,850

SAVINGS-TO-INVESTMENT RATIO (SIR)  
FOR PROJECT CONDENSATE03 COMPARED TO PROJECT CONDENSATE02

$$\text{SIR} = \frac{\text{P.V. of Future Cost Savings}}{\text{Increased Initial Invest.}} = 3.05$$

ADJUSTED INTERNAL RATE OF RETURN (AIRR)  
FOR PROJECT CONDENSATE03 COMPARED TO PROJECT CONDENSATE02  
(Reinvestment rate = 10.00%; Study period = 25 years)

$$\text{AIRR} = 15.01\%$$

Note: the NS, SIR, and AIRR computations include only initial costs (as of occupancy) as investment costs.

## BLCC SUMMARY FOR CONDENSATE01

	<u>PRESENT VALUE</u>	<u>ANNUAL VALUE</u>
INITIAL COST (AT OCCUPANCY)	\$186,242	\$20,518
ANNUALLY RECURRING O&M COSTS	\$85,220	\$9,389
ENERGY COSTS	\$15,705	\$1,730
REPLACEMENT COSTS	\$17,302	\$1,906
LESS: REMAINING VALUE	\$0	\$0
TOTAL LCC	\$304,469	\$33,543

\*\*\*\*\*  
 \* N I S T B L C C A N A L Y S I S \*  
 \*\*\*\*\*

PART I - INITIAL ASSUMPTIONS AND COST DATA

-----  
 Project name: CONDENSATE01  
 Run date:11-17-1994 08:50:44  
 Comment: ALT.1-OIL/WATER SEPARATION  
 Input data file: CRSALT01.DAT, last modified: 11-17-1994/08:50:00  
 LCC output file: CRSALT01.LCC, created: 11-17-1994 08:50:02  
 Study period: 25 years (1994 through 2018)  
 Discount rate: 10.0% Real (exclusive of general inflation)  
 Run type: Generic LCC Analysis--No Tax Analysis  
 BLCC uses end-of-year discounting convention

INITIAL CAPITAL ASSET COSTS (NOT DISCOUNTED)

-----

	TOTAL COST
TOTAL FOR EQUIPMENT	\$84,402
TOTAL FOR SITE PREP	\$13,110
TOTAL FOR TRANSPORT	\$0
TOTAL FOR SAMPLING	\$15,400
TOTAL FOR PERMITS	\$500
TOTAL FOR MISCELLANEOUS	\$72,830
TOTAL INITIAL CAPITAL ASSET COSTS	\$186,242

-----

ENERGY-RELATED COSTS

-----

ENERGY TYPE	UNITS/ YEAR	PRICE (\$/UNIT)	DEMAND COST	TOTAL P.V. COST
Electricity	23,173	\$0.070	\$0	\$15,705

-----

\*\*\*\*\*

PART II - LIFE-CYCLE COST ANALYSIS  
DISCOUNT RATE = 10.0% Real (exclusive of general inflation)

PROJECT NAME: CONDENSATE01

RUN DATE: 11-17-1994/08:50:44

	PRESENT VALUE (1994 DOLLARS)	ANNUAL VALUE (1994 DOLLARS)
A. CASH REQUIREMENTS AS OF OCCUPANCY	\$186,242	\$20,518
C. OPERATING, MAINTENANCE & RELATED COSTS:		
ANNUALLY RECURRING COSTS (NON-ENERGY)	\$85,220	\$9,389
ENERGY COSTS	\$15,705	\$1,730
SUBTOTAL	\$100,925	\$11,119
D. REPLACEMENTS TO INITIAL CAPITAL ASSETS	\$17,302	\$1,906
F. RESIDUAL VALUE OF CAPITAL ASSETS	( \$0)	( \$0)
G. TOTAL LIFE-CYCLE PROJECT COST	\$304,469	\$33,543

\*\*\*\*\*

\*\*\*\*\*  
 \* N I S T B L C C I N P U T D A T A L I S T I N G \*  
 \*\*\*\*\*

FILE NAME: CRSALT01  
 FILE LAST MODIFIED ON 11-17-1994/08:50:00  
 PROJECT TITLE: CONDENSATE01  
 COMMENT: ALT.1-OIL/WATER SEPARATION

GENERAL DATA:  
 -----

ANALYSIS TYPE: Generic LCC Analysis--No Tax Analysis  
 BASE DATE FOR LCC ANALYSIS: 1994  
 STUDY PERIOD: 25 YEARS  
 PLANNING/CONSTRUCTION PERIOD: 0 YEARS  
 OCCUPANCY DATE: 1994  
 DISCOUNT AND INTEREST RATES Real (exclusive of general inflation)  
 DISCOUNT RATE: 10.0%

CAPITAL ASSET COST DATA:  
 -----

NUMBER OF CAPITAL COMPONENTS: 6

COMPONENT NAME:	EQUIPMENT	SITE PREP	TRANSPORT
INITIAL COST (\$)	84,402	13,110	0
EXPECTED COMPONENT LIFE(YRS)	15	25	25
RESALE VALUE FACTOR	0.00%	0.00%	0.00%
AVG PRICE ESC RATE (OCCUPANCY)	3.00%	3.00%	3.00%
Escalation rates do not include general inflation			
NUMBER OF REPLACEMENTS	1	0	0

COMPONENT NAME:	SAMPLING	PERMITS	MISCELLANEOUS
INITIAL COST (\$)	15,400	500	72,830
EXPECTED COMPONENT LIFE(YRS)	25	25	25
RESALE VALUE FACTOR	0.00%	0.00%	0.00%
AVG PRICE ESC RATE (OCCUPANCY)	3.00%	0.00%	3.00%
Escalation rates do not include general inflation			
NUMBER OF REPLACEMENTS	0	0	0

REPLACEMENTS TO CAPITAL ASSETS:  
 -----

REPLACEMENTS TO EQUIPMENT:

REPLACEMENT NUMBER	1
YEAR OF REPLACEMENT	15
COST OF REPLACEMENT (\$)	46,391
EXPECTED REPL. LIFE (YRS)	15
RESALE VALUE FACTOR	0.00%

Title: Life-Cycle Cost Analysis For Condensate Receiving System

## OPERATING AND MAINTENANCE COST DATA BY COMPONENT:

	COMP 1	COMP 2	COMP 3	COMP 4	COMP 5	COMP 6
ANNUAL RECUR O&M COST (\$):	450	0	1,329	5,400	0	0
ESCALATION RATE FOR O&M:	3.00%	0.00%	3.00%	3.00%	0.00%	0.00%

Escalation rates do not include general inflation

## NON-AN RECURRING O&amp;M COSTS (\$):

COMP 1		COMP 2		COMP 3		COMP 4		COMP 5		COMP 6	
YR	AMOUNT	YR	AMOUNT	YR	AMOUNT	YR	AMOUNT	YR	AMOUNT	YR	AMOUNT

## ENERGY COST DATA:

NUMBER OF ENERGY TYPES = 1  
 DOE energy price escalation rates filename: ENCOST93.RAN  
 DOE region (state code): 4 (NV)  
 DOE rate schedule type: Industrial  
 DOE energy price escalation rates used with Energy Type(s) 1

TYPE 1	
ENERGY TYPE:	Electricity
AVG ANNUAL CONSUMPTION:	23173
UNITS:	KWH
PRICE PER UNIT (\$):	0.070
ANNUAL DEMAND CHARGE (\$):	0.00
ESCALATION RATES BY YEAR:	Escalation rates do not include general inflation
	1994 0.00
	1995 0.29
	1996 0.51
	1997 0.98
	1998 1.45
	1999 1.29
	2000 1.34
	2001 1.29
	2002 1.00
	2003 0.82
	2004 0.67
	2005 0.57
	2006 0.43
	2007 0.63
	2008 0.76
	2009 0.65
	2010 0.63
	2011 0.61
	2012 0.62
	2013 0.62
	2014 0.62
	2015 0.62
	2016 0.63
	2017 0.61
	2018 0.59

\*\*\*\*\*  
 \* N I S T B L C C C A S H F L O W A N A L Y S I S \*  
 \*\*\*\*\*

PROJECT NAME: CONDENSATE01  
 COMMENT: ALT.1-OIL/WATER SEPARATION  
 RUN DATE: 11-17-1994 08:50:52  
 INPUT DATA FILE: CRSALT01.DAT, LAST MODIFIED 11-17-1994/08:50:00  
 STUDY PERIOD: 25 YEARS (1994 THROUGH 2018)  
 ANALYSIS TYPE: Generic LCC Analysis--No Tax Analysis  
 All costs in constant 1994 dollars (i.e., excluding general inflation)

INITIAL CAPITAL COSTS

COMPONENT:	(1)	(2)	(3)	(4)	(5)	(6)	TOTAL (BY YEAR)
YEAR	EQUIPMENT	SITE PREP	TRANSPORT	SAMPLING	PERMITS	MISCELLAN	
1994	84402	13110	0	15400	500	72830	186242
TOTAL BY COMPONENT	84402	13110	0	15400	500	72830	186242

CAPITAL INVESTMENT COSTS

YEAR	INIT CAPITAL INVESTMENT	CAPITAL REPLACEMENTS	CAPITAL DISPOSAL	TOTAL CAP. INVESTMENT
1994	186,242	0	0	186,242
1995	0	0	0	0
1996	0	0	0	0
1997	0	0	0	0
1998	0	0	0	0
1999	0	0	0	0
2000	0	0	0	0
2001	0	0	0	0
2002	0	0	0	0
2003	0	0	0	0
2004	0	0	0	0
2005	0	0	0	0
2006	0	0	0	0
2007	0	0	0	0
2008	0	72,276	0	72,276
2009	0	0	0	0
2010	0	0	0	0
2011	0	0	0	0
2012	0	0	0	0
2013	0	0	0	0
2014	0	0	0	0
2015	0	0	0	0
2016	0	0	0	0
2017	0	0	0	0
2018	0	0	0	0
TOTAL	186,242	72,276	0	258,518



## OPERATING-RELATED COSTS DURING OCCUPANCY

YEAR	- OPERATING AND MAINTENANCE COSTS -			TOTAL
	AN RECURRING	NON-AN REC	ENERGY	OPER. COST
1994	7,394	0	1,622	9,016
1995	7,616	0	1,627	9,243
1996	7,845	0	1,635	9,480
1997	8,080	0	1,651	9,731
1998	8,322	0	1,675	9,998
1999	8,572	0	1,697	10,269
2000	8,829	0	1,720	10,549
2001	9,094	0	1,742	10,836
2002	9,367	0	1,759	11,126
2003	9,648	0	1,773	11,421
2004	9,937	0	1,785	11,723
2005	10,236	0	1,795	12,031
2006	10,543	0	1,803	12,346
2007	10,859	0	1,815	12,673
2008	11,185	0	1,828	13,013
2009	11,520	0	1,840	13,361
2010	11,866	0	1,852	13,718
2011	12,222	0	1,863	14,085
2012	12,588	0	1,875	14,463
2013	12,966	0	1,886	14,852
2014	13,355	0	1,898	15,253
2015	13,756	0	1,910	15,666
2016	14,168	0	1,922	16,090
2017	14,593	0	1,934	16,527
2018	15,031	0	1,945	16,976
TOTAL	269,593	0	44,854	314,447

## SUM OF ALL CASH FLOWS

YEAR	CAPITAL INVESTMENT	OPERATING COSTS	TOTAL COST
1994	186,242	9,016	195,258
1995	0	9,243	9,243
1996	0	9,480	9,480
1997	0	9,731	9,731
1998	0	9,998	9,998
1999	0	10,269	10,269
2000	0	10,549	10,549
2001	0	10,836	10,836
2002	0	11,126	11,126
2003	0	11,421	11,421
2004	0	11,723	11,723
2005	0	12,031	12,031
2006	0	12,346	12,346
2007	0	12,673	12,673
2008	72,276	13,013	85,289
2009	0	13,361	13,361
2010	0	13,718	13,718
2011	0	14,085	14,085
2012	0	14,463	14,463
2013	0	14,852	14,852
2014	0	15,253	15,253
2015	0	15,666	15,666
2016	0	16,090	16,090
2017	0	16,527	16,527
2018	0	16,976	16,976
TOTAL	258,518	314,447	572,965

## BLCC SUMMARY FOR CONDENSATE02

	PRESENT VALUE	ANNUAL VALUE
INITIAL COST (AT OCCUPANCY)	\$64,683	\$7,126
ANNUALLY RECURRING O&M COSTS	\$269,336	\$29,672
ENERGY COSTS	\$146	\$16
LESS: REMAINING VALUE	( \$0)	( \$0)
TOTAL LCC	\$334,166	\$36,814

\*\*\*\*\*  
 \* N I S T B L C C A N A L Y S I S \*  
 \*\*\*\*\*

PART I - INITIAL ASSUMPTIONS AND COST DATA

-----  
 Project name: CONDENSATE02  
 Run date:11-17-1994 08:48:45  
 Comment: ALT.2- COND. STORAGE AND REMOVAL  
 Input data file: CRSALT02.DAT, last modified: 11-17-1994/08:46:34  
 LCC output file: CRSALT02.LCC, created: 11-17-1994 08:46:38  
 Study period: 25 years (1994 through 2018)  
 Discount rate: 10.0% Nominal (including general inflation)  
 Run type: Generic LCC Analysis--No Tax Analysis  
 BLCC uses end-of-year discounting convention

INITIAL CAPITAL ASSET COSTS (NOT DISCOUNTED)

	TOTAL COST
TOTAL FOR EQUIPMENT	\$17,814
TOTAL FOR SITEPREP	\$9,150
TOTAL FOR TRANSPORT	\$0
TOTAL FOR SAMPLING	\$10,000
TOTAL FOR PERMITS	\$0
TOTAL FOR MISCELLANEOUS	\$27,719
TOTAL INITIAL CAPITAL ASSET COSTS	\$64,683

ENERGY-RELATED COSTS

ENERGY TYPE	UNITS/ YEAR	PRICE (\$/UNIT)	DEMAND COST	TOTAL P.V. COST
Electricity	216	\$0.070	\$0	\$146

\*\*\*\*\*  
\*\*\*\*\*

PART II - LIFE-CYCLE COST ANALYSIS  
DISCOUNT RATE = 10.0% Nominal (including general inflation)

PROJECT NAME: CONDENSATE02

RUN DATE: 11-17-1994/08:48:45

	PRESENT VALUE (1994 DOLLARS)	ANNUAL VALUE (1994 DOLLARS)
A. CASH REQUIREMENTS AS OF OCCUPANCY	\$64,683	\$7,126
C. OPERATING, MAINTENANCE & RELATED COSTS:		
ANNUALLY RECURRING COSTS (NON-ENERGY)	\$269,336	\$29,672
ENERGY COSTS	\$146	\$16
SUBTOTAL	\$269,483	\$29,688
F. RESIDUAL VALUE OF CAPITAL ASSETS	( \$0)	( \$0)
G. TOTAL LIFE-CYCLE PROJECT COST	\$334,166	\$36,814

\*\*\*\*\*



## ENERGY COST DATA:

-----  
 NUMBER OF ENERGY TYPES = 1  
 DOE energy price escalation rates filename: ENCOST93.RAN  
 DOE region (state code): 4 (NV)  
 DOE rate schedule type: Industrial  
 Underlying gen. inflation rate used with DOE rates: 0.00%  
 DOE energy price escalation rates used with Energy Type(s) 1

ENERGY TYPE:	TYPE 1
AVG ANNUAL CONSUMPTION:	Electricity 216
UNITS:	KWH
PRICE PER UNIT (\$):	0.070
ANNUAL DEMAND CHARGE (\$):	0.00
ESCALATION RATES BY YEAR:	Escalation rates include general inflation
1994	0.00
1995	0.29
1996	0.51
1997	0.98
1998	1.45
1999	1.29
2000	1.34
2001	1.29
2002	1.00
2003	0.82
2004	0.67
2005	0.57
2006	0.43
2007	0.63
2008	0.76
2009	0.65
2010	0.63
2011	0.61
2012	0.62
2013	0.62
2014	0.62
2015	0.62
2016	0.63
2017	0.61
2018	0.59

Title: Life-Cycle Cost Analysis For Condensate Receiving System

\*\*\*\*\*  
 \* N I S T B L C C C A S H F L O W A N A L Y S I S \*  
 \*\*\*\*\*

PROJECT NAME: CONDENSATE02  
 COMMENT: ALT.2- COND. STORAGE AND REMOVAL  
 RUN DATE: 11-17-1994 08:48:00  
 INPUT DATA FILE: CRSALT02.DAT, LAST MODIFIED 11-17-1994/08:46:34  
 STUDY PERIOD: 25 YEARS (1994 THROUGH 2018)  
 ANALYSIS TYPE: Generic LCC Analysis--No Tax Analysis  
 All costs in current dollars (i.e., including general inflation)

INITIAL CAPITAL COSTS

COMPONENT:	(1)	(2)	(3)	(4)	(5)	(6)	TOTAL (BY YEAR)
YEAR	EQUIPMENT	SITEPREP	TRANSPORT	SAMPLING	PERMITS	MISCELLAN	
1994	17814	9150	0	10000	0	27719	64683
TOTAL BY COMPONENT	17814	9150	0	10000	0	27719	64683

CAPITAL INVESTMENT COSTS

YEAR	INIT CAPITAL INVESTMENT	CAPITAL REPLACEMENTS	CAPITAL DISPOSAL	TOTAL CAP. INVESTMENT
1994	64,683	0	0	64,683
1995	0	0	0	0
1996	0	0	0	0
1997	0	0	0	0
1998	0	0	0	0
1999	0	0	0	0
2000	0	0	0	0
2001	0	0	0	0
2002	0	0	0	0
2003	0	0	0	0
2004	0	0	0	0
2005	0	0	0	0
2006	0	0	0	0
2007	0	0	0	0
2008	0	0	0	0
2009	0	0	0	0
2010	0	0	0	0
2011	0	0	0	0
2012	0	0	0	0
2013	0	0	0	0
2014	0	0	0	0
2015	0	0	0	0
2016	0	0	0	0
2017	0	0	0	0
2018	0	0	0	0
TOTAL	64,683	0	0	64,683

Title: Life-Cycle Cost Analysis For Condensate Receiving System

## OPERATING-RELATED COSTS DURING OCCUPANCY

YEAR	- OPERATING AND MAINTENANCE COSTS -			TOTAL
	AN RECURRING	NON-AN REC	ENERGY	OPER. COST
1994	23,370	0	15	23,385
1995	24,071	0	15	24,086
1996	24,793	0	15	24,808
1997	25,537	0	15	25,552
1998	26,303	0	16	26,318
1999	27,092	0	16	27,108
2000	27,905	0	16	27,921
2001	28,742	0	16	28,758
2002	29,604	0	16	29,620
2003	30,492	0	17	30,509
2004	31,407	0	17	31,424
2005	32,349	0	17	32,366
2006	33,320	0	17	33,336
2007	34,319	0	17	34,336
2008	35,349	0	17	35,366
2009	36,409	0	17	36,426
2010	37,501	0	17	37,519
2011	38,627	0	17	38,644
2012	39,785	0	17	39,803
2013	40,979	0	18	40,996
2014	42,208	0	18	42,226
2015	43,474	0	18	43,492
2016	44,779	0	18	44,797
2017	46,122	0	18	46,140
2018	47,506	0	18	47,524
TOTAL	852,041	0	418	852,459

## SUM OF ALL CASH FLOWS

YEAR	CAPITAL INVESTMENT	OPERATING COSTS	TOTAL COST
1994	64,683	23,385	88,068
1995	0	24,086	24,086
1996	0	24,808	24,808
1997	0	25,552	25,552
1998	0	26,318	26,318
1999	0	27,108	27,108
2000	0	27,921	27,921
2001	0	28,758	28,758
2002	0	29,620	29,620
2003	0	30,509	30,509
2004	0	31,424	31,424
2005	0	32,366	32,366
2006	0	33,336	33,336
2007	0	34,336	34,336
2008	0	35,366	35,366
2009	0	36,426	36,426
2010	0	37,519	37,519
2011	0	38,644	38,644
2012	0	39,803	39,803
2013	0	40,996	40,996
2014	0	42,226	42,226
2015	0	43,492	43,492
2016	0	44,797	44,797
2017	0	46,140	46,140
2018	0	47,524	47,524
TOTAL	64,683	852,459	917,142



## BLCC SUMMARY FOR CONDENSATE03

---

	PRESENT VALUE	ANNUAL VALUE
INITIAL COST (AT OCCUPANCY)	\$140,338	\$15,461
ANNUALLY RECURRING O&M COSTS	\$38,580	\$4,250
ENERGY COSTS	\$398	\$44
LESS: REMAINING VALUE	( \$0)	( \$0)
TOTAL LCC	\$179,316	\$19,755

---

## NIST BLCC ANALYSIS

## PART I - INITIAL ASSUMPTIONS AND COST DATA

Project name: CONDENSATE03  
 Run date: 11-09-1994 07:58:57  
 Comment: ALT. 3-COND. STORAGE & XFR TO POND  
 Input data file: CRSALT03.DAT, last modified: 11-09-1994/20:31:04  
 LCC output file: CRSALT03.LCC, created 11-08-1994 20:31:05  
 Study period: 25 years (1994 through 2018)  
 Discount rate: 10.0% Nominal (including general inflation)  
 Run type: General LCC Analysis--No Tax Analysis  
 BLCC uses end-of-year discounting convention

## INITIAL CAPITAL ASSET COSTS (NOT DISCOUNTED)

	<u>TOTAL COST</u>
TOTAL FOR EQUIPMENT	\$45,077
TOTAL FOR SITE PREP	\$17,004
TOTAL FOR TRANSPORT	\$0
TOTAL FOR SAMPLING	\$10,000
TOTAL FOR PERMITS	\$500
TOTAL FOR CONTINGENCY	<u>\$67,757</u>
TOTAL INITIAL CAPITAL ASSET COSTS	\$140,338

## ENERGY-RELATED COSTS

<u>ENERGY TYPE</u>	<u>UNITS/ YEAR</u>	<u>PRICE (\$/UNIT)</u>	<u>DEMAND COST</u>	<u>TOTAL P.V. COST</u>
Electricity	587	\$0.070	\$0	\$398

## PART II - LIFE-CYCLE COST ANALYSIS

DISCOUNT RATE = 10.0% Nominal (including general inflation)

PROJECT NAME: CONDENSATE03

RUN DATE: 11-09-1994/07:58:57

	PRESENT VALUE (1994 DOLLARS)	ANNUAL VALUE (1994 DOLLARS)
A. CASH REQUIREMENTS AS OF OCCUPANCY	\$140,338	\$15,461
C. OPERATING, MAINTENANCE & RELATED COSTS:		
ANNUALLY RECURRING COSTS (NON-ENERGY)	\$38,580	\$4,250
ENERGY COSTS	\$398	\$44
SUBTOTAL	\$38,978	\$4,294
F. RESIDUAL VALUE OF CAPITAL ASSETS	( \$0)	( \$0)
G. TOTAL LIFE-CYCLE PROJECT COST	\$179,316	\$19,755

## NIST BLCC INPUT DATA LISTING

FILE NAME: CRSALT03  
 FILE LAST MODIFIED ON: 11-08-1994/20:31:04  
 PROJECT TITLE: CONDENSATE03  
 COMMENT: ALT. 3-COND. STORAGE & XFR TO POND

GENERAL DATA:

ANALYSIS TYPE: Generic LCC Analysis--No Tax Analysis  
 BASE DATE FOR LCC ANALYSIS: 1994  
 STUDY PERIOD: 25 YEARS  
 PLANNING/CONSTRUCTION PERIOD: 0 YEARS  
 OCCUPANCY DATE: 1994  
 DISCOUNT AND INTEREST RATES: Nominal (including general inflation)  
 DISCOUNT RATE: 10.0%

CAPITAL ASSET COST DATA:

NUMBER OF CAPITAL COMPONENTS: 6

COMPONENT NAME:	EQUIPMENT	SITE PREP	TRANSPORT
INITIAL COST (\$)	45,077	17,004	0
EXPECTED COMPONENT LIFE (YRS)	25	25	25
RESALE VALUE FACTOR	0.00%	0.00%	0.00%
AVG PRICE ESC RATE (OCCUPANCY)	3.00%	3.00%	2.00%
Escalation rates include general inflation			
NUMBER OF REPLACEMENTS	0	0	0

COMPONENT NAME:	SAMPLING	PERMITS	CONTINGENCY
INITIAL COST (\$)	10,000	500	67,757
EXPECTED COMPONENT LIFE (YRS)	25	25	25
RESALE VALUE FACTOR	0.00%	0.00%	0.00%
AVG PRICE ESC RATE (OCCUPANCY)	3.00%	0.00%	3.00%
Escalation rates include general inflation			
NUMBER OF REPLACEMENTS	0	0	0

NO REPLACEMENTS

OPERATING AND MAINTENANCE COST DATA BY COMPONENT:

	COMP 1	COMP 2	COMP 3	COMP 4	COMP 5	COMP 6
ANNUAL RECUR O&M COST (\$):	250	0	0	3,000	0	0
ESCALATION RATE FOR O&M:	3.00%	0.00%	0.00%	3.00%	0.00%	0.00%

Escalation rates include general inflation

## NON-AN RECURRING O&amp;M COSTS (\$):

COMP 1		COMP 2		COMP 3		COMP 4		COMP 5		COM 6	
YR	AMOUNT	YR	AMOUNT	YR	AMOUNT	YR	AMOUNT	YR	AMOUNT	YR	AMOUNT

ENERGY COST DATA:

NUMBER OF ENERGY TYPES = 1

DOE energy price escalation rates filename: ENCOST93.RAN

DOE region (state code): 4 (NV)

DOE rate schedule type: Industrial

Underlying gen. inflation rate used with DOE rates: 0.00%

DOE energy price escalation rates used with Energy Type(s) 1

	TYPE 1
ENERGY TYPE:	Electricity
AVG ANNUAL CONSUMPTION:	587
UNITS:	KWH
PRICE PER UNIT (\$)	0.070
ANNUAL DEMAND CHARGE (\$):	0.00
ESCALATION RATES BY YEAR:	Escalation rates include general inflation
1994	0.00
1995	0.29
1996	0.51
1997	0.98
1998	1.45
1999	1.29
2000	1.34
2001	1.29
2002	1.00
2003	0.82
2004	0.67
2005	0.57
2006	0.43
2007	0.63
2008	0.76
2009	0.65
2010	0.63
2011	0.61
2012	0.62
2013	0.62
2014	0.62
2015	0.62
2016	0.63
2017	0.61
2018	0.59

Title: Life-Cycle Cost Analysis For Condensate Receiving System

PROJECT NAME: CONDENSATE03  
 COMMENT: ALT. 3-COND. STORAGE & XFR TO POND  
 RUN DATE: 11-09-1994 07:59:16  
 INPUT DATA FILE: CRSALT03.DAT, LAST MODIFIED 11-08-1994/20:31:04  
 STUDY PERIOD: 25 YEARS (1994 THROUGH 2018)  
 ANALYSIS TYPE: Generic LCC Analysis--No Tax Analysis  
 All costs in current dollars (i.e., including general inflation)

## INITIAL CAPITAL COSTS

COMPONENT:	(1)	(2)	(3)	(4)	(5)	(6)	TOTAL (BY YEAR)
YEAR	EQUIPMENT	SITE PREP	TRANSPORT	SAMPLING	PERMITS	CONTINGEN	
1994	45077	17004	0	10000	500	67757	140338
TOTAL BY COMPONENT	45077	17004	0	10000	500	67757	140338

## CAPITAL INVESTMENT COSTS

YEAR	INIT. CAPITAL INVESTMENT	CAPITAL REPLACEMENTS	CAPITAL DISPOSAL	TOTAL CAP. INVESTMENT
1994	140,338	0	0	140,338
1995	0	0	0	0
1996	0	0	0	0
1997	0	0	0	0
1998	0	0	0	0
1999	0	0	0	0
2000	0	0	0	0
2001	0	0	0	0
2002	0	0	0	0
2003	0	0	0	0
2004	0	0	0	0
2005	0	0	0	0
2006	0	0	0	0
2007	0	0	0	0
2008	0	0	0	0
2009	0	0	0	0
2010	0	0	0	0
2011	0	0	0	0
2012	0	0	0	0
2013	0	0	0	0
2014	0	0	0	0
2015	0	0	0	0
2016	0	0	0	0
2017	0	0	0	0
2018	0	0	0	0
TOTAL	140,338	0	0	140,338

## OPERATING-RELATED COSTS DURING OCCUPANCY

Title: Life-Cycle Cost Analysis For Condensate Receiving System

YEAR	- OPERATING AND MAINTENANCE COSTS -			TOTAL OPER. COST
	AN RECURRING	NON-AN REC	ENERGY	
1994	3,348	0	41	3,389
1995	3,448	0	41	3,489
1996	3,551	0	41	3,593
1997	3,658	0	42	3,700
1998	3,768	0	42	3,810
1999	3,881	0	43	3,924
2000	3,997	0	44	4,041
2001	4,117	0	44	4,161
2002	4,241	0	45	4,285
2003	4,368	0	45	4,413
2004	4,499	0	45	4,544
2005	4,634	0	45	4,679
2006	4,773	0	46	4,818
2007	4,916	0	46	4,962
2008	5,063	0	46	5,110
2009	5,215	0	47	5,262
2010	5,372	0	47	5,419
2011	5,533	0	47	5,580
2012	5,699	0	47	5,746
2013	5,870	0	48	5,918
2014	6,046	0	48	6,094
2015	6,227	0	48	6,276
2016	6,414	0	49	6,463
2017	6,607	0	49	6,656
2018	6,805	0	49	6,854
TOTAL	122,047	0	1,136	123,184

## SUM OF ALL CASH FLOWS

YEAR	CAPITAL INVESTMENT	OPERATING COSTS	TOTAL COST
1994	140,338	3,389	143,727
1995	0	3,489	3,489
1996	0	3,593	3,593
1997	0	3,700	3,700
1998	0	3,810	3,810
1999	0	3,924	3,924
2000	0	4,041	4,041
2001	0	4,161	4,161
2002	0	4,285	4,285
2003	0	4,413	4,413
2004	0	4,544	4,544
2005	0	4,679	4,679
2006	0	4,818	4,818
2007	0	4,962	4,962
2008	0	5,110	5,110
2009	0	5,161	5,262
2010	0	5,419	5,419
2011	0	5,580	5,580
2012	0	5,746	5,746
2013	0	5,918	5,918
2014	0	6,094	6,094
2015	0	6,276	6,276
2016	0	6,463	6,463
2017	0	6,656	6,656
2018	0	6,854	6,854
TOTAL	140,338	123,184	263,522



CAS CONDENSATE RECEIVING SYSTEM COST ESTIMATE SUMMARY

ALTERNATIVE #1 - OIL / WATER SEPARATION

Attachment ATTACHMENT V

Page 1 OF 3

Document BABBDF000-01717-0200-00012 Rev. 01

Author C Mefflen

Date 11/08/94

FN CNDEST1B.WK3

CATEGORY	ITEM	DESCRIPTION	M&O COST	CAPITAL COST	CATEGORY TOTAL		
EQUIPMENT	Capital Costs						
	1	(3) Deltech "Hydroclean" oil/water separators (15-year life)		\$46,391.00			
	2	Pre-fab building; 20' x 15' x 12'(h) w/ air conditioning and lighting		\$23,410.00			
	3	Electrical		\$4,391.00			
	4	Controls and Instrumentation (INCL W/EQUIP)		\$0.00			
	5	Heat tracing		\$758.00			
	6	Piping & insulation		\$9,452.00			
	7	Energy costs: separators, heat tracing, air conditioning. (see worksheet below)		\$1,622.10			
	8	Annual parts and labor: filter cleaning, instrument recalibration. (see worksheet below)	\$450.00				
		Subtotal:	\$2,072.10	\$84,402.00	\$86,474.10		
SITE PREP	1	Foundation pad and liner; 20' x 15'; volume control for 150 gal.		\$10,404.00			
	2	Trenching, backfill, & excavation		\$2,706.00			
		Subtotal:		\$13,110.00	\$13,110.00		
TRANSPORT	1	Transport oil to Mercury; 25 gal/yr @ \$1.00/gal	\$25.00				
	2	Disposal charge for oil; 25 gal/yr @ \$0.15/gal	\$3.75				
	3	Contract labor - @ \$50/hr x 2 hr x 13 trips	\$1,300.00				
		Subtotal:	\$1,329.00	\$0.00	\$1,329.00		
SAMPLING	1	Monthly sampling of discharge water (12 @ \$200)	\$2,400.00				
	2	Annual sampling of oil to be disposed	\$3,000.00				
	3	Initial sampling and characterization		\$10,000.00			
		Subtotal:	\$5,400.00	\$15,400.00	\$20,800.00		
PERMITS	1	Pretreatment permit		\$500.00			
		Subtotal:	\$0.00	\$500.00	\$500.00		
CONTINGENCY	1	Equipment rental		\$1,800.00			
	2	Labor load		\$8,700.00			
	3	Sales tax and freight		\$7,200.00			
	4	Material handling		\$13,100.00			
	5	G&A plus G&A subcontractors		\$23,300.00			
	6	10% of total costs		\$17,730.00			
		Subtotal:	\$0.00	\$72,830.00	\$72,830.00		
			TOTALS:	\$8,800.00	\$186,240.00	\$195,040.00	195040
ANNUAL OPERATING COST WORKSHEET			ENERGY @ \$0.07 /KWH	PARTS & LABOR	TOTALS		
1	(3) "HYDROCLEAN" separators @ 110V/15A	4950 watts					
2	2 shifts	5 dy/wk	4160 hrs/yr				
			20592 kwh		\$1,441.44		
2	HEAT-TRACING	720 hrs @	2 W/ft	150 ft			
			216 kwh		\$15.12		
3	AIR CONDITIONING	1-1/2 ton heat pump	18000 btuh	2.5 COP			
	HEATING: 30 DY @ 40F or below	720 hrs	KWH= 1520.235		\$106.42		
	COOLING: CDD @ 80F & above	0	KWH= 644.5748		\$59.12		
	2000 degree-dys	400 hrs					
4	Filter cleaning:						
	\$50.00 /hr labor	2 chng/yr	2 hr/chng	HOURS= 4	\$200.00		
	\$100.00 /pts change			PARTS=	\$200.00		
5	Instrument Recalibratio	1 hr/yr	\$50.00 /hr labor	HOURS= 1	\$50.00		
				KWH= 23173			
				Subtotal=	\$1,622.10		
					\$450.00		
					\$2,072.10		
REPLACEMENT COST WORKSHEET			M&O COST	CAPITAL COST	CATEGORY TOTAL		
			%				
1	Hydroclean separators at year 15		100.00%	\$46,391.00			
2	Equipment rental		30.00%	\$540.00			
3	Labor load		30.00%	\$2,910.00			
4	Sales tax and freight		30.00%	\$2,160.00			
5	Material handling		30.00%	\$3,930.00			
6	G&A plus G&A subcontractors		30.00%	\$6,990.00			
7	Air conditioner		30.00%	\$5,319.00			
8	10% of total costs		30.00%	\$0.00			
			\$3.10	\$68,240.00	\$68,243.10		

CAS CONDENSATE RECEIVING SYSTEM COST ESTIMATE SUMMARY

ALTERNATIVE: #2 - CONDENSATE STORAGE AND TRANSFER

Attachment: ATTACHMENT V

Page: 2 OF 3  
 Document: BABBDF000-01717-0200-00012 Rev. 01  
 Author: C. Mellen  
 Date: 11/08/94  
 FN: CNDEST2B.WK3

CATAGORY	ITEM	DESCRIPTION	M&O COST	CAPITAL COST	CATAGORY TOTAL
EQUIPMENT	1	1500 Gal tank		\$7,649.00	
	2	Electrical		\$2,413.00	
	3	Controls and Instrumentation		\$2,342.00	
	4	Heat tracing		\$1,689.00	
	5	Piping & insulation		\$3,721.00	
	6	Operation cost: heat tracing (see worksheet below)		\$15.19	
	7	Instrument recalibration (annual- see worksheet below)		\$50.00	
		Subtotal:	\$65.19	\$17,814.00	\$17,879.19
SITE PREP	1	Foundation pad and liner		\$9,035.00	
	2	Trenching, backfill, & excavation		\$115.00	
	3				
		Subtotal:	\$0.00	\$9,150.00	\$9,150.00
TRANSPORT	1	Transport oil to Mercury, 121 gal/yr @ \$1.00/gal	\$121.00		
	2	Disposal charge for oil, 121 gal/yr @ \$0.15/gal	\$18.15		
	3	Transport water (condensate) to Mercury, 75 gal/dy for 260 days @ \$1.00/gal	\$19,500.00		
	4				
		Subtotal:	\$19,639.15	\$0.00	\$19,639.15
SAMPLING	1	Monthly sampling of discharge water		\$0.00	
	2	Annual sampling of oil to be disposed	\$3,000.00		
	3	Initial sampling and characterization		\$10,000.00	
	4				
		Subtotal:	\$3,000.00	\$10,000.00	\$13,000.00
PERMITS	1	N/A			
	2				
		Subtotal:	\$0.00	\$0.00	\$0.00
CONTINGENCY	1	Equipment rental		\$1,200.00	
	2	Labor load		\$6,000.00	
	3	Sales tax and freight		\$2,200.00	
	4	Material handling		\$3,900.00	
	5	G&A plus G&A subcontractors		\$8,100.00	
	6	10% of total costs		\$6,318.92	
		Subtotal:	\$0.00	\$27,719.00	\$27,719.00
		TOTALS:	\$22,704.34	\$64,683.00	\$87,387.34

ANNUAL OPERATING COST WORKSHEET

	ENERGY @ \$0.07 /KWH	PARTS & LABOR	TOTALS
1 HEAT-TRACING \$0.07 /kwh heating 30 DY @ 40F or below	2 W/M 150 W HRS= 720 KW= 0.3 KWH= 216		\$15.12
2 Instrument Recalibratio	1 hr/yr \$50.00 /hr labor	HOURS: 1	\$50.00
		KWH= 216	
	Subtotal=		\$15.19
			\$50.00
			\$65.19

CAS CONDENSATE RECEIVING SYSTEM COST ESTIMATE SUMMARY

ALTERNATIVE: #3 - CONDENSATE TRANSFER TO WASTE WATER POND

Attachment ATTACHMENT V

Page: 3 OF 3

Document: BABBDF000-01717-0200-00012 Rev. 01

Author: C. Mellen

Date: 11/08/94

FN: CNDEST3B.WK3

CATAGORY	ITEM	DESCRIPTION	M&O COST	CAPITAL COST	CATAGORY TOTAL
EQUIPMENT	1	1500 Gal tank		\$7,649.00	
	2	Electrical		\$3,880.00	
	3	Controls and Instrumentation		\$3,484.00	
	4	Heat tracing		\$1,689.00	
	5	Piping & insulation		\$28,375.00	
	6	Operation cost: heat tracing & pumping. (see worksheet below)		\$41.09	
	7	Instrument recalibration and pump overhaul (annual- see worksheet below)		\$250.00	
		Subtotal:	\$291.09	\$45,077.00	\$45,368.09
SITE PREP	1	Foundation pad and liner		\$9,035.00	
	2	Trenching, backfill, & excavation		\$7,969.00	
	3				
	4				
		Subtotal:	\$0.00	\$17,004.00	\$17,004.00
TRANSPORT	1	N/A			
	2				
		Subtotal:	\$0.00	\$0.00	\$0.00
SAMPLING	1	Monthly sampling of discharge water		\$0.00	
	2	Annual sampling of oil to be disposed		\$3,000.00	
	3	Initial sampling and characterization		\$10,000.00	
	4				
		Subtotal:	\$3,000.00	\$10,000.00	\$13,000.00
PERMITS	1	Pretreatment permit		\$500.00	
				\$500.00	\$500.00
		Subtotal:	\$0.00	\$500.00	\$500.00
CONTINGENCY	1	Equipment rental		\$3,600.00	
	2	Labor load		\$20,000.00	
	3	Sales tax and freight		\$3,900.00	
	4	Material handling		\$7,100.00	
	5	G&A plus G&A subcontractors		\$20,100.00	
	6	10% of total costs		\$13,057.21	
		Subtotal:	\$0.00	\$67,757.21	\$67,757.21
		TOTALS:	\$3,000.00	\$78,257.21	\$81,257.21
ANNUAL OPERATING COST WORKSHEET			ENERGY @	PARTS & LABOR	TOTALS
1	HEAT-TRACING: 150 lin. ft @ 2 W/sqft		\$0.07 /KWH		
	heating 30 day @ 40F or below:	2 W/ft	150 lf	0.3 kw	
		720 hrs	KWH=	216	\$15.12
2	PUMPING TO POND:	75 gal/dy	60 ft TDH	65.00% pump eff.	
	95.00% motor eff.	16 hrs/dy	5 dy/wk	4160 hr/yr	
	WHP= 0.073864	BHP= 0.113636	KW= 0.089199	KWH= 371	\$25.97
3	Pump Maintenance:	2 hr/yr	50 \$/hr	LABOR=	\$100.00
		100 \$/yr parts		PARTS=	\$100.00
4	Instrument Recalibratio	1 hr/yr	\$50.00 /hr labor	HOURS=	\$50.00
				KWH=	587
				Subtotal=	\$41.09
					\$250.00
					\$291

**COST ESTIMATE SUMMARY  
COMPRESSED AIR CONDENSATE DRAIN SYSTEM  
ALTERNATE #1**

ACCOUNT	DESCRIPTION	MHR'S	LABOR DOLLARS	SUB-CONT'R DOLLARS	MATERIAL DOLLARS	TOTAL DOLLARS
00	Civil and Excavation	76	\$1,404		\$1,302	\$2,700
10	Concrete	174	\$3,672		\$6,732	\$10,400
20	Structural					
30	Building/Architectural			\$23,900		\$23,900
40	Equipment	27	\$659		\$45,732	\$46,391
50	Piping	161	\$4,339	\$1,041	\$3,035	\$8,400
60	Electrical	96	\$2,400		\$2,749	\$5,100
65	Instruments					
70	Controls					
80	Paint					
85	Insulation	36	\$769		\$268	\$1,000
200	HVAC	28	\$610		\$1,800	\$2,400
<b>TOTAL DIRECT FIELD COSTS</b>		<b>600</b>	<b>\$13,900</b>	<b>\$24,900</b>	<b>\$61,600</b>	<b>\$100,300</b>
Equipment Rental						\$1,800
Labor Load						\$9,700
Sales Tax and Freight						\$7,200
Material Handling						\$13,100
G&A Subcontractors						\$2,500
G&A						\$20,700
<b>TOTAL INDIRECT FIELD COSTS</b>						<b>\$55,000</b>
Contingency @ 10.00%						\$15,500
<b>TOTAL FIELD COSTS</b>						<b>\$170,800</b>

## Notes:

1. Wage rates are based on REECo Labor Agreements dated 10/01/93. The crew rates are adjusted for foreman and include a 2% misc. overtime allowance.
2. Indirect costs are based on REECo loads dated 9/3/93.

Title: Life-Cycle Cost Analysis For Condensate Receiving System

DIRECT FIELD COST ESTIMATE  
 COMPRESSOR CONDENSATE BUILDING  
 ALTERNATE #1

A/C NO.	DESCRIPTION	REF. QTY.	UNIT	MATERIAL		LABOR				SUBCONTRACT		TOTAL
				UNIT COST	TOTAL COST	UNIT MH	TOTAL HOURS	LABOR RATE	TOTAL LABOR	UNIT COST	TOTAL SUBLET	
00	EXCAVATION											
	Machine Trench 2.5' X 5' X 60' (Waste)	37	CY			0.30	11	\$18.42	\$205			\$205
	Haul & Dump (Ex + 15% Swell)	43	CY			0.10	4	\$18.42	\$78			\$78
	Select Fill	26	CY	\$17.00	\$434	0.40	10	\$18.42	\$188			\$622
	Pipe Bedding Material	17	CY	\$19.00	\$324	0.50	9	\$18.42	\$157			\$481
	Machine Trench 2.5' X ' x 100' (Elec)	28	CY			0.30	8	\$18.42	\$154			\$154
	Haul & Dump (Ex + 15% Swell)	32	CY			0.10	3	\$18.42	\$59			\$59
	Select Fill	16	CY	\$17.00	\$272	0.40	6	\$18.42	\$118			\$390
	Machine Trench 2.5' X ' X 100' (Fire Serv)	28	CY			0.30	8	\$18.42	\$154			\$154
	Haul & Dump (Ex + 15% Swell)	32	CY			0.10	3	\$18.42	\$59			\$59
	Select Fill	16	CY	\$17.00	\$272	0.40	6	\$18.42	\$118			\$390
	Foundation Excavation	15	CY			0.30	5	\$18.42	\$83			\$83
	Haul & Dump (Ex + 15% Swell)	17	CY			0.10	2	\$18.42	\$31			\$31
	TOTAL ACCOUNT				\$1,302		76		\$1,404			\$2,706

Title: Life-Cycle Cost Analysis For Condensate Receiving System

DIRECT FIELD COST ESTIMATE  
COMPRESSOR CONDENSATE BUILDING  
ALTERNATE #1

A/C NO.	DESCRIPTION	REFERENCE QUANTITY	UNIT	MATERIAL		LABOR				SUBCONTRACT		TOTAL
				UNIT COST	TOTAL COST	UNIT MH	TOTAL HOURS	LABOR RATE	TOTAL LABOR	UNIT COST	TOTAL SUBLET	
10	CONCRETE											
	Slab on Grade	15	CY	\$170.00	\$2,550	10.00	150	\$21.08	\$3,162			\$5,712
	Plastic Liner	374	SF	\$8.00	\$2,992	0.04	15	\$21.08	\$331			\$3,323
	Red Concrete	17	CY	\$70.00	\$1,190	0.50	9	\$21.08	\$179			\$1,369
	TOTAL ACCOUNT 10				\$6,732		174		\$3,672			\$10,404

Title: Life-Cycle Cost Analysis For Condensate Receiving System

DIRECT FIELD COST ESTIMATE  
 COMPRESSOR CONDENSATE BUILDING  
 ALTERNATE #1

A/C NO.	DESCRIPTION	REF. QTY.	UNIT	MATERIAL		LABOR				SUBCONTRACT		TOTAL	
				UNIT COST	TOTAL COST	UNIT MH	TOTAL HOURS	LABOR RATE	TOTAL LABOR	UNIT COST	TOTAL SUBLET		
30	ARCHITECTURAL												
	R42 Insulated "Bally" Building - 6" Panels	1	EA								\$21,000	\$21,000	\$21,000
	Pretreatment Permit	1	EA								\$500	\$500	\$500
	Monthly Sampling Cost	12	EA								\$200	\$2,400	\$2,400
	TOTAL ACCOUNT 30											\$23,900	\$23,900

Title: Life-Cycle Cost Analysis For Condensate Receiving System

DIRECT FIELD COST ESTIMATE  
COMPRESSOR CONDENSATE BUILDING  
ALTERNATE #1

A/C NO.	DESCRIPTION	REFERENCE QUANTITY	UNIT	MATERIAL		LABOR				SUBCONTRACT		TOTAL
				UNIT COST	TOTAL COST	UNIT MH	TOTAL HOURS	LABOR RATE	TOTAL LABOR	UNIT COST	TOTAL SUBLET	
40	MACHINERY & EQUIPMENT											
	Deltech #W21412 (Modules I & II)	3	EA	\$14,510	\$43,530	4.00	12	\$24.43	\$293			\$43,823
	Polypropylene Storage Tanks	6	EA	\$167.00	\$1,002	2.00	12	\$24.43	\$293			\$1,295
	Secondary Containment Tanks	6	EA	\$200.00	\$1,200	0.50	3	\$24.43	\$73			\$1,273
	TOTAL ACCOUNT 40				\$45,732		27		\$659			\$46,391



## Title: Life-Cycle Cost Analysis For Condensate Receiving System

DIRECT FIELD COST ESTIMATE  
COMPRESSOR CONDENSATE BUILDING  
ALTERNATE #1

A/C NO.	DESCRIPTION	REFERENCE QUANTITY	UNIT	MATERIAL		LABOR				SUBCONTRACT		TOTAL
				UNIT COST	TOTAL COST	UNIT MH	TOTAL HOURS	LABOR RATE	TOTAL LABOR	UNIT COST	TOTAL SUBLET	
50	PIPING & PLUMBING											
	Deluge sprinkler system	300	SF							\$3.47	\$1,041	\$1,041
	4" PVC Sanitary Sewer Line to 5'	85	LF	\$4.29	\$365	0.33	28	\$27.00	\$764			\$1,129
	Hot Manhole Connection	1	EA	\$100.00	\$100	4.00	4	\$27.00	\$108			\$208
	Catch Basin w/Sediment Bucket	1	EA	\$110.00	\$110	1.78	2	\$27.00	\$48			\$158
	P Trap w/Vent	1	EA	\$120.00	\$120	3.50	4	\$27.00	\$95			\$215
	Cleanout	1	EA	\$105.00	\$105	3.89	4	\$27.00	\$105			\$210
	3/4" Pneumatic Control Piping	150	LF	\$3.00	\$450	0.25	38	\$27.00	\$1,013			\$1,463
	1 1/2" CS Pipe	150	LF	\$4.00	\$600	0.30	45	\$27.00	\$1,215			\$1,815
	4" PVC Sprinkler Supply	100	LF	\$2.60	\$260	0.12	12	\$27.00	\$324			\$584
	4" CS Sprinkler Supply Above Ground	50	LF	\$13.50	\$675	0.44	22	\$27.00	\$599			\$1,274
	Water Gong Fire Sprinkler Alarm	1	EA	\$250.00	\$250	2.50	3	\$27.00	\$68			\$318
	TOTAL ACCOUNT 50				\$3,035		161		\$4,339		\$1,041	\$8,415

## Title: Life-Cycle Cost Analysis For Condensate Receiving System

## DIRECT FIELD COST ESTIMATE COMPRESSOR CONDENSATE BUILDING ALTERNATE #1

A/C NO.	DESCRIPTION	REF. QTY.	UNIT	MATERIAL		LABOR				SUBCONTRACT		TOTAL
				UNIT COST	TOTAL COST	UNIT MH	TOTAL HOURS	LABOR RATE	TOTAL LABOR	UNIT COST	TOTAL SUBLET	
60	ELECTRICAL											
	3/4" Galv Rigid Conduit UG PVC Coated	300	LF	\$3.15	\$945	0.114	34	\$25.08	\$858			\$1,803
	3/4" Galv Rigid Conduit AG	150	LF	\$1.55	\$233	0.100	15	\$25.08	\$376			\$609
	#12 THHN	450	LF	\$0.06	\$27	0.01	3	\$25.08	\$82			\$109
	#8 THHN	450	LF	\$0.19	\$85	0.01	5	\$25.08	\$113			\$198
	4S J Boxes	15	EA	\$1.20	\$18	0.40	6	\$25.08	\$150			\$168
	1P1S Switch, Box & Cover	1	EA	\$18.00	\$18	2.00	2	\$25.08	\$50			\$68
	20 AMP 110V Breaker (Convenience)	1	EA	\$9.55	\$10	0.80	1	\$25.08	\$20			\$30
	30 AMP 208V 3P Breaker (Heat Pump)	1	EA	\$63.50	\$64	1.29	1	\$25.08	\$32			\$96
	30 AMP WP Disconnect (Heat Pump)	1	EA	\$130.00	\$130	2.50	3	\$25.08	\$63			\$193
	150 W Incandescent Fixture	2	EA	\$35.00	\$70	1.40	3	\$25.08	\$70			\$140
	Control Cable #14/12C	250	LF	\$0.87	\$218	0.02	5	\$25.08	\$117			\$335
	#12 Terminations	10	EA	\$0.10	\$1	0.20	2	\$25.08	\$50			\$51
	#8 Terminations	6	EA	\$0.10	\$1	0.20	1.2	\$25.08	\$30			\$31
	#14 Terminations	24	EA	\$0.10	\$2	0.20	4.8	\$25.08	\$120			\$122
	Heat Tracing	150	LF	\$4.68	\$702	0.02	2	\$25.08	\$56			\$758
	Smoke Detector	1	EA	\$40.00	\$40	2.00	2	\$25.08	\$50			\$90
	Fire Alarm Pull Station	1	EA	\$40.00	\$40	2.00	2	\$25.08	\$50			\$90
	Horn	1	EA	\$65.00	\$65	2.00	2	\$25.08	\$50			\$115
	EOL	1	EA	\$15.00	\$15	0.50	1	\$25.08	\$13			\$28
	Flow Switch @ Fire Sprinkler	1	EA	\$65.00	\$65	2.00	2	\$25.08	\$50			\$115
	TOTAL ACCOUNT 60				\$2,749		96		\$2,400			\$5,149

DIRECT FIELD COST ESTIMATE

Title: Life-Cycle Cost Analysis For Condensate Receiving System

COMPRESSOR CONDENSATE BUILDING  
ALTERNATE #1

A/C NO.	DESCRIPTION	REF. QTY.	UNIT	MATERIAL		LABOR				SUBCONTRACT		TOTAL
				UNIT COST	TOTAL COST	UNIT MH	TOTAL HOURS	LABOR RATE	TOTAL LABOR	UNIT COST	TOTAL SUBLET	
90	1 1/2" Pipe Insulation	150	LF	\$0.85	\$128	0.08	12	\$21.36	\$256			\$384
	Add for Stainless Steel Jacket	150	LF	\$0.93	\$140	0.16	24	\$21.36	\$513			\$653
	TOTAL ACCOUNT 90				\$268		36		\$769			\$1,037

**Title:** Life-Cycle Cost Analysis For Condensate Receiving System

DIRECT FIELD COST ESTIMATE  
 COMPRESSOR CONDENSATE BUILDING  
 ALTERNATE #1

A/C NO.	DESCRIPTION	REFERENCE QUANTITY	UNIT	MATERIAL		LABOR				SUBCONTRACT		TOTAL
				UNIT COST	TOTAL COST	UNIT MH	TOTAL HOURS	LABOR RATE	TOTAL LABOR	UNIT COST	TOTAL SUBLET	
200	HVAC											
	1-1/2 Ton/18,000 BTU Heat Pump	1	EA	\$1,600	\$1,600	20.00	20	\$21.80	\$436			\$2,036
	Ductwork	1	LOT	\$200.00	\$200	8.00	8	\$21.80	\$174			\$374
	TOTAL ACCOUNT 200				\$1,800		28		\$610			\$2,410

**COST ESTIMATE SUMMARY  
COMPRESSED AIR CONDENSATE DRAIN SYSTEM  
ALTERNATE #2**

ACCOUNT	DESCRIPTION	MHR'S	LABOR DOLLARS	SUB-CONT'S DOLLARS	MATERIAL DOLLARS	TOTAL DOLLARS
00	Civil and Excavation	6	\$115			\$100
10	Concrete	116	\$3,493		\$5,542	\$9,000
20	Structural					
30	Building/Architectural					
40	Equipment	8	\$195		\$7,454	\$7,600
50	Piping	45	\$1,215		\$600	\$1,800
60	Electrical	57	\$1,431		\$2,671	\$4,100
65	Instruments					
70	Controls	32	\$802		\$1,540	\$2,300
80	Paint					
85	Insulation	59	\$1,269		\$637	\$1,900
200	HVAC					
<b>TOTAL DIRECT FIELD COSTS</b>		<b>400</b>	<b>\$8,500</b>		<b>\$18,400</b>	<b>\$26,800</b>
Equipment Rental						\$1,200
Labor Load						\$6,000
Sales Tax and Freight						\$2,200
Material Handling						\$3,900
G&A Subcontractors						
G&A						\$8,100
<b>TOTAL INDIRECT FIELD COSTS</b>						<b>\$21,400</b>
Contingency @ 10.00%						\$4,800
<b>TOTAL FIELD COSTS</b>						<b>\$53,000</b>

## Notes:

1. Wage rates are based on REECo Labor Agreements dated 10/01/93. The crew rates are adjusted for foreman and include a 2% misc. overtime allowance.
2. Indirect costs are based on REECo loads dated 9/3/93.

Title: Life-Cycle Cost Analysis For Condensate Receiving System

DIRECT FIELD COST ESTIMATE  
CONDENSATE DRAIN SYSTEM  
ALTERNATE #2

A/C NO.	DESCRIPTION	REF. QTY.	UNIT	MATERIAL		LABOR				SUBCONTRACT		TOTAL
				UNIT COST	TOTAL COST	UNIT MH	TOTAL HOURS	LABOR RATE	TOTAL LABOR	UNIT COST	TOTAL SUBLET	
00	EXCAVATION											
	Foundation Excavation	15	CY			0.30	5	\$18.42	\$83			\$83
	Haul & Dump (EX + 15% Swell)	17	CY			0.10	2	\$18.42	\$32			\$32
	TOTAL ACCOUNT 00						6		\$115			\$115

**Title: Life-Cycle Cost Analysis For Condensate Receiving System**

DIRECT FIELD COST ESTIMATE  
CONDENSATE DRAIN SYSTEM  
ALTERNATE #2

A/C NO.	DESCRIPTION	REF. QTY.	UNIT	MATERIAL		LABOR				SUBCONTRACT		TOTAL
				UNIT COST	TOTAL COST	UNIT MH	TOTAL HOURS	LABOR RATE	TOTAL LABOR	UNIT COST	TOTAL SUBLET	
10	CONCRETE											
	Slab on Grade & Foundation	15	CY	\$170.00	\$2,550	10.00	150	\$21.08	\$3,162			\$5,712
	Plastic Liner	374	SF	\$8.00	\$2,992	0.04	16	\$21.08	\$331			\$3,323
	TOTAL ACCOUNT 10				\$5,542		166		\$3,493			\$9,035

Title: Life-Cycle Cost Analysis For Condensate Receiving System

DIRECT FIELD COST ESTIMATE  
CONDENSATE DRAIN SYSTEM  
ALTERNATE #2

A/C NO.	DESCRIPTION	REF. QTY.	UNIT	MATERIAL		LABOR				SUBCONTRACT		TOTAL
				UNIT COST	TOTAL COST	UNIT MH	TOTAL HOURS	LABOR RATE	TOTAL LABOR	UNIT COST	TOTAL SUBLET	
40	MACHINERY & EQUIPMENT											
	1500 Gal. Dbl Wall "JOOR" Tank	1	EA	\$7,454	\$7,454	8.00	8	\$24.43	\$195			\$7,649
	TOTAL ACCOUNT 40				\$7,454		8		\$195			\$7,649



Title: Life-Cycle Cost Analysis For Condensate Receiving System

DIRECT FIELD COST ESTIMATE  
CONDENSATE DRAIN SYSTEM  
ALTERNATE #2

A/C NO.	DESCRIPTION	REF. QTY.	UNIT	MATERIAL		LABOR				SUBCONTRACT		TOTAL
				UNIT COST	TOTAL COST	UNIT MH	TOTAL HOURS	LABOR RATE	TOTAL LABOR	UNIT COST	TOTAL SUBLET	
50	PIPING & PLUMBING											
	1 1/2" CS Pipe	150	LF	\$4.00	\$600	0.30	45	\$27.00	\$1,215			\$1,815
	TOTAL ACCOUNT 50				\$600		45		\$1,215			\$1,815

Title: Life-Cycle Cost Analysis For Condensate Receiving System

DIRECT FIELD COST ESTIMATE  
 CONDENSATE DRAIN SYSTEM  
 ALTERNATE #2

A/C NO.	DESCRIPTION	REF. QTY.	UNIT	MATERIAL		LABOR				SUBCONTRACT		TOTAL
				UNIT COST	TOTAL COST	UNIT MH	TOTAL HOURS	LABOR RATE	TOTAL LABOR	UNIT COST	TOTAL SUBLET	
60	ELECTRICAL											
	3/4" Galv. Rigid Conduit UG PVC Coated	200	LF	\$3.15	\$630	0.114	23	\$25.08	\$572			\$1,202
	3/4" Galv. Rigid Conduit AG	100	LF	\$1.55	\$155	0.100	10	\$25.08	\$251			\$406
	4S J Boxes	10	EA	\$1.20	\$12	0.40	4	\$25.08	\$100			\$112
	Control Cable #14/12C	250	LF	\$0.87	\$218	0.02	5	\$25.08	\$117			\$335
	#14 Terminations	24	EA	\$0.10	\$2	0.20	4.8	\$25.08	\$120			\$122
	Heat Tracing 12" OC (184 + 150)	334	LF	\$4.68	\$1,563	0.02	5	\$25.08	\$126			\$1,689
	#12 THHN	450	LF	\$0.06	\$27	0.01	5	\$25.08	\$113			\$140
	30 AMP Breaker (Heat Trace)	1	EA	\$63.50	\$64	1.29	1	\$25.08	\$32			\$96
	TOTAL ACCOUNT 60				\$2,671		57		\$1,431			\$4,102

Title: Life-Cycle Cost Analysis For Condensate Receiving System

DIRECT FIELD COST ESTIMATE  
CONDENSATE DRAIN SYSTEM  
ALTERNATE #2

A/C NO.	DESCRIPTION	REF. QTY.	UNIT	MATERIAL		LABOR				SUBCONTRACT		TOTAL
				UNIT COST	TOTAL COST	UNIT MH	TOTAL HOURS	LABOR RATE	TOTAL LABOR	UNIT COST	TOTAL SUBLET	
70	CONTROLS											
	Control Panel	1	EA	\$900	\$1,200	24.00	24	\$25.08	\$602			\$1,802
	Leak Detector	1	EA	\$85	\$85	2.00	2	\$25.08	\$50			\$135
	Level Indicator	1	EA	\$85	\$85	2.00	2	\$25.08	\$50			\$135
	Temperature Sensor	1	EA	\$85	\$85	2.00	2	\$25.08	\$50			\$135
	Automatic Shutoff	1	EA	\$85	\$85	2.00	2	\$25.08	\$50			\$135
	TOTAL ACCOUNT 70				\$1,540		32		\$802			\$2,342

DIRECT FIELD COST ESTIMATE  
 CONDENSATE DRAIN SYSTEM  
 ALTERNATE #2

A/C NO.	DESCRIPTION	REF. QTY.	UNIT	MATERIAL		LABOR				SUBCONTRACT		TOTAL
				UNIT COST	TOTAL COST	UNIT MH	TOTAL HOURS	LABOR RATE	TOTAL LABOR	UNIT COST	TOTAL SUBLET	
90	INSULATION											
	1 1/2" Calcium Silicate Insulation @ Shell	184	SF	\$2.83	\$520	0.23	42	\$21.36	\$902			\$1,422
	1 1/2" Calcium Silicate Insulation @ Heads	32	SF	\$3.68	\$117	0.54	17	\$21.36	\$367			\$484
	TOTAL ACCOUNT 90				\$637		59		\$1,269			\$1,906

**COST ESTIMATE SUMMARY  
COMPRESSED AIR CONDENSATE DRAIN SYSTEM  
ALTERNATE #3**

ACCOUNT	DESCRIPTION	MHR'S	LABOR DOLLARS	SUB-CONT'S DOLLARS	MATERIAL DOLLARS	TOTAL DOLLARS
00	Civil and Excavation	177	\$3,263		\$4,726	\$8,000
10	Concrete	166	\$3,493		\$5,542	\$9,000
20	Structural					
30	Buildings/Architectural					
40	Equipment	8	\$195		\$ 7,454	\$ 7,600
50	Piping	613	\$16,563		\$9,906	\$26,500
60	Electrical	86	\$2,160		\$3,409	\$5,600
65	Instruments					
70	Controls	64	\$1,604		\$1,880	\$3,500
80	Paint					
85	Insulation	59	\$1,269		\$637	\$1,900
200	HVAC					
<b>TOTAL DIRECT FIELD COSTS</b>		<b>1,200</b>	<b>\$28,500</b>		<b>\$33,600</b>	<b>\$62,100</b>
Equipment Rental						\$3,600
Labor Load						\$20,000
Sales Tax and Freight						\$3,900
Material Handling						\$7,100
G&A Subcontractors						
G&A						\$20,100
<b>TOTAL INDIRECT FIELD COSTS</b>						<b>\$54,700</b>
Contingency @ 10.00%						\$11,700
<b>TOTAL FIELD COSTS</b>						<b>\$128,500</b>

## Notes:

1. Wage rates are based on REECo Labor Agreements dates 10/01/93. The crew rates are adjusted for foreman and include a 2% misc. overtime allowance.
2. Indirect costs are based on REECo loads dated 9/3/93.

Title: Life-Cycle Cost Analysis For Condensate Receiving System

DIRECT FIELD COST ESTIMATE  
CONDENSATE DRAIN SYSTEM  
ALTERNATE #3

A/C NO.	DESCRIPTION	REF. QTY.	UNIT	MATERIAL		LABOR				SUBCONTRACT		TOTAL
				UNIT COST	TOTAL COST	UNIT MH	TOTAL HOURS	LABOR RATE	TOTAL LABOR	UNIT COST	TOTAL SUBLET	
00	EXCAVATION											
	Foundation Excavation	15	CY			0.30	5	\$18.42	\$83			\$83
	Haul & Dump (EX + 15% Swell)	17	CY			0.10	2	\$18.42	\$32			\$32
	Machine Trench 2.5' x 5' x 600	278	CY			0.20	56	\$18.42	\$1,023			\$1,023
	Haul & Dump (Ex + 15%)	320	CY			0.10	32	\$18.42	\$589			\$589
	Select Fill	278	CY	\$17.00	\$4,726	0.30	83	\$18.42	\$1,536			\$6,262
	TOTAL ACCOUNT 00				\$4,726		177		\$3,263			\$7,989

Title: Life-Cycle Cost Analysis For Condensate Receiving System

DIRECT FIELD COST ESTIMATE  
CONDENSATE DRAIN SYSTEM  
ALTERNATE #3

A/C NO.	DESCRIPTION	REF. QTY.	UNIT	MATERIAL		LABOR				SUBCONTRACT		TOTAL
				UNIT COST	TOTAL COST	UNIT MH	TOTAL HOURS	LABOR RATE	TOTAL LABOR	UNIT COST	TOTAL SUBLET	
10	CONCRETE											
	Slab on Grade & Foundation	15	CY	\$170.00	\$2,550	10.00	150	\$21.08	\$3,162			\$5,712
	Plastic Liner	374	SF	\$8.00	\$2,992	0.04	16	\$21.08	\$331			\$3,323
	TOTAL ACCOUNT 10				\$5,542		166		\$3,493			\$9,035

Title: Life-Cycle Cost Analysis For Condensate Receiving System

DIRECT FIELD COST ESTIMATE  
CONDENSATE DRAIN SYSTEM  
ALTERNATE #3

A/C NO.	DESCRIPTION	REF. QTY.	UNIT	MATERIAL		LABOR				SUBCONTRACT		TOTAL
				UNIT COST	TOTAL COST	UNIT MH	TOTAL HOURS	LABOR RATE	TOTAL LABOR	UNIT COST	TOTAL SUBLET	
40	MACHINERY & EQUIPMENT											
	1500 Gal. DBL Wall "JOOR" Tank	1	EA	\$7,454	\$7,454	8.00	8	\$24.43	\$195			\$7,649
	TOTAL ACCOUNT 40				\$7,454		8		\$195			\$7,649



Title: Life-Cycle Cost Analysis For Condensate Receiving System

DIRECT FIELD COST ESTIMATE  
CONDENSATE DRAIN SYSTEM  
ALTERNATE #3

A/C NO.	DESCRIPTION	REF. QTY.	UNIT	MATERIAL		LABOR				SUBCONTRACT		TOTAL
				UNIT COST	TOTAL COST	UNIT MH	TOTAL HOURS	LABOR RATE	TOTAL LABOR	UNIT COST	TOTAL SUBLET	
50	PIPING & PLUMBING											
	1 1/2" CS Pipe	150	LF	\$4.00	\$600	0.30	45	\$27.00	\$1,215			\$1,815
	1 1/2" Piping @ Screwed Valves	6	EA	\$266.00	\$1,596	1.27	8	\$27.00	\$206			\$1,802
	1 1/2" @ Screwed Valves	6	EA	\$43.00	\$258	1.30	8	\$27.00	\$211			\$469
	ST-001 Duplex Strainer	1	EA	\$300.00	\$300	3.00	3	\$27.00	\$81			\$381
	60 GPM Pumps	2	EA	\$615.00	\$1,230	3.20	6	\$27.00	\$173			\$1,403
	3" PVC Piping to 5'	1,800	LF	\$3.29	\$5,922	0.30	544	\$27.00	\$14,677			\$20,599
	TOTAL ACCOUNT 50				\$9,906		613		\$16,563			\$26,469

Title: Life-Cycle Cost Analysis For Condensate Receiving SystemDIRECT FIELD COST ESTIMATE  
CONDENSATE DRAIN SYSTEM  
ALTERNATE #3

A/C NO.	DESCRIPTION	REF. QTY.	UNIT	MATERIAL		LABOR				SUBCONTRACT		TOTAL
				UNIT COST	TOTAL COST	UNIT MH	TOTAL HOURS	LABOR RATE	TOTAL LABOR	UNIT COST	TOTAL SUBLET	
60	ELECTRICAL											
	3/4" Galv. Rigid Conduit UG PVC Coated	300	LF	\$3.15	\$945	0.114	34	\$25.08	\$858			\$1,803
	3/4" Galv. Rigid Conduit AG	150	LF	\$1.55	\$233	0.100	15	\$25.08	\$376			\$609
	4S J Boxes	15	EA	\$1.20	\$18	0.40	6	\$25.08	\$150			\$168
	Control Cable #14/16C	250	LF	\$1.10	\$275	0.02	5	\$25.08	\$117			\$392
	#14 Terminations	30	EA	\$0.10	\$3	0.20	6	\$25.08	\$150			\$153
	Heat Tracing 12" OC (184 + 150)	334	LF	\$4.68	\$1,563	0.02	5	\$25.08	\$126			\$1,689
	#12 THHN	450	LF	\$0.06	\$27	0.01	5	\$25.08	\$113			\$140
	30 AMP Breaker (Heat Trace)	1	EA	\$63.50	\$64	1.29	1	\$25.08	\$32			\$96
	#8 THHN	450	LF	\$0.19	\$86	0.01	5	\$25.08	\$113			\$199
	#8 Terminations	6	EA	\$0.10	\$1	0.20	1	\$25.08	\$30			\$31
	30 AMP 208V WP Disconnect	1	EA	\$130.00	\$130	2.50	3	\$25.08	\$63			\$193
	30 AMP 208V 3P Breaker	1	EA	\$63.50	\$64	1.29	1	\$25.08	\$32			\$96
	TOTAL ACCOUNT 60				\$3,409		86		\$2,160			\$5,569



**Title:** Life-Cycle Cost Analysis For Condensate Receiving System

DIRECT FIELD COST ESTIMATE  
 CONDENSATE DRAIN SYSTEM  
 ALTERNATE #3

A/C NO.	DESCRIPTION	REF. QTY.	UNIT	MATERIAL		LABOR				SUBCONTRACT		TOTAL
				UNIT COST	TOTAL COST	UNIT MH	TOTAL HOURS	LABOR RATE	TOTAL LABOR	UNIT COST	TOTAL SUBLET	
90	INSULATION											
	1 1/2" Calcium Silicate Insulation @ Shell	184	SF	\$2.83	\$520	0.23	42	\$21.36	\$902			\$1,422
	1 1/2" Calcium Silicate Insulation @ Heads	32	SF	\$3.68	\$117	0.54	17	\$21.36	\$367			\$484
	TOTAL ACCOUNT 90				\$637		59		\$1,269			\$1,906

## Title: Life-Cycle Cost Analysis For Condensate Receiving System

## REPORT W01 PACKED WEATHER FILE SUMMARY - JAN. THRU DEC.

JUNE 25														
HOUR	WBT	DBT	PRESS	CLOUDS	SNOW	RAIN	WNDDIR	HUMID	DENSITY	ENTH	THZSOL	DNMSOL	CTYPE	WSPEED
1	46.	62.	26.1	0.	0	0		0.0036	0.066	19.0	0.0	0.0		0.
2	42.	57.	26.1	0.	0	0		0.0031	0.067	17.0	0.0	0.0		0.
3	45.	59.	26.1	0.	0	0		0.0039	0.066	18.5	0.0	0.0		0.
4	41.	56.	26.1	1.	0	0		0.0026	0.067	16.0	0.0	0.0	1	0.
5	42.	57.	26.1	5.	0	0		0.0031	0.067	17.0	0.0	0.0	2	0.
6	44.	61.	26.1	5.	0	0		0.0033	0.066	18.0	3.0	1.0	2	0.
7	49.	70.	26.2	5.	0	0		0.0034	0.065	20.5	35.0	50.0	2	0.
8	54.	81.	26.1	6.	0	0		0.0041	0.064	24.0	101.0	171.0	2	0.
9	58.	90.	26.1	6.	0	0	0	0.0044	0.063	26.5	163.0	222.0	2	2.
10	61.	97.	26.1	7.	0	0	6	0.0048	0.062	28.5	209.0	229.0	2	4.
11	62.	99.	26.1	7.	0	0	6	0.0051	0.061	29.5	244.0	228.0	2	3.
12	62.	102.	26.1	6.	0	0	1	0.0041	0.061	29.0	252.0	202.0	2	3.
13	62.	104.	26.1	3.	0	0	4	0.0043	0.061	30.0	267.0	209.0	2	8.
14	62.	104.	26.1	2.	0	0	8	0.0040	0.061	29.5	290.0	249.0	2	10.
15	63.	104.	26.0	1.	0	0	8	0.0047	0.061	30.0	300.0	286.0	2	12.
16	61.	104.	26.0	1.	0	0	10	0.0033	0.061	28.5	269.0	287.0	2	10.
17	63.	102.	26.0	3.	0	0	10	0.0052	0.061	30.0	219.0	279.0	2	7.
18	62.	100.	26.0	3.	0	0	10	0.0049	0.061	29.5	151.0	248.0	2	6.
19	60.	94.	26.0	3.	0	0	9	0.0049	0.062	28.0	75.0	154.0	2	7.
20	58.	89.	26.0	3.	0	0	10	0.0047	0.062	26.5	17.0	0.0	2	4.
21	57.	89.	26.0	2.	0	0	11	0.0041	0.062	26.0	0.0	0.0	2	7.
22	53.	79.	26.0	2.	0	0	11	0.0040	0.064	23.5	0.0	0.0	2	3.
23	53.	76.	26.0	2.	0	0		0.0045	0.064	23.0	0.0	0.0	2	0.
24	49.	71.	26.0	2.	0	0		0.0036	0.065	21.0	0.0	0.0	2	0.
JUNE 26														

Title: Life-Cycle Cost Analysis For Condensate Receiving System

HOUR	WBT	DBT	PRESS	CLOUDS	SNOW	RAIN	WNDDIR	HUMID	DENSITY	ENTH	THZSOL	DNMSOL	CTYPE	WSPEED
1	50.	71.	26.0	2.	0	0		0.0041	0.065	21.5	0.0	0.0	2	0.
2	50.	68.	26.0	4.	0	0		0.0046	0.065	21.5	0.0	0.0	2	0.
3	47.	69.	26.0	6.	0	0	0	0.0030	0.065	20.0	0.0	0.0	2	2.
4	47.	66.	26.0	5.	0	0	7	0.0034	0.065	19.5	0.0	0.0	2	4.
5	45.	63.	26.0	4.	0	0	11	0.0033	0.066	18.5	0.0	0.0	2	3.
6	49.	69.	26.1	4.	0	0	8	0.0038	0.065	20.5	3.0	2.0	2	2.
7	52.	74.	26.1	3.	0	0		0.0044	0.064	22.5	36.0	55.0	2	0.
8	59.	87.	26.1	1.	0	0		0.0058	0.063	27.0	105.0	190.0	2	0.
9	62.	96.	26.0	0.	0	0	0	0.0058	0.062	29.5	177.0	256.0		3.
10	63.	99.	26.0	0.	0	0	4	0.0059	0.061	30.0	244.0	285.0		2.
11	64.	102.	26.0	2.	0	0	4	0.0059	0.061	31.0	294.0	296.0	1	8.
12	64.	105.	26.0	2.	0	0	8	0.0053	0.061	31.0	321.0	296.0	2	10.
13	65.	105.	26.0	3.	0	0	8	0.0060	0.060	32.0	325.0	289.0	2	12.
14	64.	104.	26.0	3.	0	0	8	0.0055	0.061	31.0	322.0	289.0	2	14.
15	64.	102.	25.9	5.	0	0	8	0.0060	0.061	31.0	298.0	285.0	2	16.
16	65.	102.	25.9	4.	0	0	8	0.0068	0.060	32.0	259.0	276.0	2	12.
17	65.	101.	25.9	3.	0	0	9	0.0070	0.061	32.0	199.0	249.0	2	15.
18	63.	99.	25.9	2.	0	0	10	0.0059	0.061	30.5	144.0	230.0	2	18.
19	62.	95.	25.9	2.	0	0	9	0.0061	0.061	29.5	76.0	156.0	2	12.
20	62.	93.	25.9	4.	0	0	10	0.0066	0.061	29.5	17.0	0.0	2	11.
21	61.	89.	25.9	4.	0	0	9	0.0068	0.062	29.0	0.0	0.0	2	10.
22	60.	86.	25.9	3.	0	0	8	0.0068	0.062	28.0	0.0	0.0	2	9.
23	62.	87.	25.9	2.	0	0	8	0.0080	0.062	29.5	0.0	0.0	2	12.
24	60.	86.	25.9	2.	0	0	8	0.0068	0.062	28.0	0.0	0.0	2	13.