

BHP AFRICA

ENGINEERING AND CONSTRUCTION, LTD.

REFINERY TURNAROUND PLANING / MANAGEMENT & CONSTRUCTION



BHP ENGINEERING & CONSTRUCTION, L.P.

- **ESTABLISHED IN 1983, U.S.A.**
- **FULL SERVICE ENGINEERING & CONSTRUCTION MANAGEMENT**
- **REFINING, CHEMICALS, OIL & GAS**
- **LOCATIONS OF OPERATION:**
 - **CORPUS CHRISTI, U.S.A.**
 - **VICTORIA, U.S.A.**
 - **BAYPORT, U.S.A.**
 - **VICTORIA ISLAND, LAGOS, NIGERIA(2004)**
 - **VENEZUELA, S.A.**
 - **MANILA, PHILLIPINES**
 - **CAIRO, EGYPT**
- **OVER 350 TECHNICAL STAFF**
- **\$ U.S. 100 MM ANNUAL PROJECTS TIC VALUE**





REFINERY UNITS

TURN-AROUND EXPERIENCE SUMMARY

- **CRUDE UNIT**
- **VACCUM UNIT**
- **FCC**
- **PLATFORMER**
- **DELAYED COKER**
- **SULFOLANE RECOVERY**
- **AMINE TREATING**
- **KEROSENE HDS**
- **DIESEL HDS**
- **LIGHT ENDS**
- **HF ALKY**
- **STEAM METHANE REFORMER**
- **GAS OIL HDS**
- **NAPHTHA HDS**
- **BTX**
- **UTILITIES**
 - **STEAM GENERATION**
 - **POWER GENERATION**
 - **WASTE WATER TREATING**
 - **INSTRUMENT AIR**

WORK FORCE UP TO 1,100 MEN, DURATION UP TO 40 DAYS.



TURN-AROUND PLANNING PROCEDURE OVERVIEW

1. PREPLANNING & PROJECT DEVELOPMENT TIMETABLE

- 18-24 MONTHS BEFORE T/A ACTIVITIES
- ALLOW FOR ENGINEERING & PROCUREMENT OF REQUIRE EQUIPMENT

2. FORMULATION OF T/A MANAGEMENT TEAM

- CLIENT MANAGEMENT
- MAINTENANCE OF OPERATION
- T/A PROJECT MANAGER
- T/A PROJECT ENGINEER
- T/A CHIEF PLANNER
- T/A INSPECTOR
- T/A BUYER



3. PROJECT SCOPE DEVELOPMENT

- **BASED ON API & OSHA COMPLIANCE**
- **USE PAST REPAIR RECORDS**
- **USE ADVANCED INSPECTIONS TOOLS & TECHNIQUES TO DETERMINE EQUIPMENT CONDITIONS.**

4. DETAILED PLANING ACTIVITIES

- **DEVELOP EQUIPMENT LIST**
- **BUILD DETAILED WORK SCOPE FOR EACH PIECE OF EQUIPMENT**
- **ESTIMATE MANHOURS FOR EACH EQUIPMENT**
- **ESTIMATE CREW SIZE**

5. DETAILED SCHEDULE

- **USE PRIMEVERA PROGRAM**
- **INCLUDES SHUT DOWN AND START-UP ACTIVITIES**
- **ESTABLISH TOTAL T/A DURATION**



6. TURNAROUND MANAGEMENT

- **ISSUE DETAILED WORK LIST TO EACH CREW ON EACH SHIFT**
- **UPDATED SCHEDULE DAILY BASE ON INPUT FROM FIELD PLANNER**
- **REDIRECT CREWS TO CRITICAL PATH ACTIVITIES TO MAINTAIN T/A SCHEDULE**

7. BENEFITS

- **ORGANIZE AND PERCISE PLANNING**
- **EFFECTIVE AND EFFICIENT T/A ACTIVITIES**
- **PRODUCE DESIRED RESULTS**
- **REDUCES T/A COST.**



TURN AROUND PROJECT EXPERIENCE SUMMARY

Asphalt Modernization Project – 2003 - Trigeant, Corpus Christi, TX

**INCREASED CAPACITY FROM 23,000 BPD TO 30,000BPD
U.S. \$10 MM**

Quintana Plant - 1999 Valero Refining

**#2 REFORMER UNIT, #2 NAPHTHA HDS UNIT, SULFOLANE UNIT, BTX UNIT,
UTILITY UNITS, AND #4 PLATFORMATE SPLITTER UNIT
U.S. \$3.5 MILLION
38,000 MAN-HOURS
225 MEN, 40 DAYS**



West Plant Turnaround - 1998 – Valero Refining

#4 CRUDE/VACUUM UNIT, #4 PLATFORMER UNIT, KEROSENE HDS UNIT,
DIESEL HDS UNIT, BENZENE STRIPPER UNIT, AND #1 & #2 LIGHT ENDS UNIT
U.S. \$9.0 MILLION
75,000 MAN-HOURS
700 MEN, 21 DAYS

East Plant - 1997 - Valero Refining

FLUID CATALYST CRACKING UNIT, H.F. ALKY UNIT
U.S. \$8.0 MILLION
90,000 MAN-HOURS
450 MEN, 24 DAYS

West Plant - 1996 – Valero Refining

GAS OIL HDS UNIT, DELAYED COKER UNIT
U.S. \$3.0 MILLION
40,000 MAN-HOURS
300 MEN, 24 DAYS



Quintana Plant - 1995 – Valero Refining

HYDROCRACKER & STEAM METHANE REFORMER UNITS

U.S. \$2.5 MILLION

42,000 MAN-HOURS

200 MEN, 20 DAYS

East Plant - 1995 – Valero Refining

FLUID CATALYST CRACKING UNIT AND THE H.F. ALKY UNIT

U.S. \$5.0 MILLION

70,000 MAN-HOURS

350 MEN, 21 DAYS

East Plant II - 1995 – Citgo Refining Company

CRUDE/VACUUM UNIT (FIRE DAMAGE)

U.S. \$15.0 MILLION



West Plant Turnaround - 1994 – Valero Refining

**#4 CRUDE/VACUUM UNIT, KEROSENE HDS UNIT, DIESEL HDS UNIT,
#1 & #2 LIGHT ENDS UNIT
U.S. \$8.0 MILLION
80,000 MAN-HOURS
600 MEN, 21 DAYS**

VCM Plant - 1994 - Occidental Chemical Corp

**EDC - OHC
U.S. \$2.0 MILLION
20,000 MAN-HOURS
200 MEN, 24 DAYS**

West Plant Turnaround - 1993 – Valero Refining

**4 DELAYED COKER UNIT, #4 PLATFORMER UNIT AND GAS OIL TREATER UNIT
U.S. \$4.5 MILLION
68,000 MAN-HOURS
500 MEN, 16 DAYS.**



Quintana Plant - 1993 – Valero Refining

HYDROCRACKER & STEAM METHANE REFORMER UNITS

U.S. \$2.5 MILLION

43,000 MAN-HOURS

200 MEN, 20 DAYS

VCM Plant - 1992 - Occidental Chemical Corp.

EDC - OHC

\$7.5 MILLION

84,000 MAN-HOURS

800 MEN, 24 DAYS

East Plant - 1991 - Valero Refining

FLUID CATALYST CRACKING UNIT, H.F. ALKY UNIT.

\$5.0 MILLION

71,000 MAN-HOURS

400 MEN, 24 DAYS



West Plant Turnaround - 1990 - Valero Refining

**#4 CRUDE/VACUUM UNIT, KEROSENE HDS UNIT, DIESEL HDS UNIT,
DELAYED COKER UNIT AND #2 LIGHT ENDS UNIT**

**U.S. \$7.0 MILLION
60,000 MAN-HOURS
600 MEN, 18 DAYS**

EP II - 1990 – Citgo Refining Company - Corpus Christi, TX

CRUDE AND VACUUM UNIT

**\$10.0 MILLION
150,000 MAN-HOURS
1100 MEN, 28 DAYS**

#2 FCCU Turnaround - 1989 – Champlin Refining Company

FLUID CATALYST CRACKING UNIT

**\$6.0 MILLION
100,000 MAN-HOURS
900 MEN, 21 DAYS**

