

600861

CENTRAL COOLING AND HEATING FACILITY

FEASIBILITY STUDY

PROGRESS BRIEFING

MARTIN MARIETTA

PREPARED BY
THE RALPH M. PARSONS COMPANY
FEBRUARY 20, 1981

OVERVIEW

- CENTRAL COOLING/HEATING FACILITY B-4 SPECIFICATION ISSUED OCTOBER 1980

- DESIGN CRITERIA REVIEW CONDUCTED AT SAN FRANCISCO ON OCTOBER 29, 1980

- CCHF FEASIBILITY STUDY INITIATED DECEMBER 15, 1980 TO DEVELOP INFORMATION NECESSARY TO INITIATE DESIGN
 - DETERMINE COOLING AND HEATING REQUIREMENTS
 - DETERMINE IF CCHF WILL INCORPORATE COGENERATION OF ELECTRICAL ENERGY
 - ESTABLISH COST EFFECTIVE CCHF CONCEPT AND OUTPUT CAPACITIES

SUMMARY AND CONCLUSIONS

o COMPARISON OF ON-SITE COGENERATION OF TOTAL ELECTRIC DEMAND VS COOLING/HEATING ONLY WITH PURCHASED TOTAL POWER INDICATES \$50 MILLION 30 YEAR LCC SAVING AT COYOTE SPRING.

o COGENERATION UTILIZING WASTE HEAT ONLY AT COYOTE SPRING IS MARGINALLY COST EFFECTIVE.

o PRELIMINARY END USER DESIGN CAPACITIES:

HEATING	176 MILLION BTU/HOUR
COOLING	270 MILLION BTU/HOUR
ELECTRICITY	29.5 MEGAWATTS

(A) Peak Hour	during Av. Peak Month
305	114
386	250

o FAST TRACK DESIGN/CONSTRUCTION SCHEDULE COULD EXPEDITE STARTUP FROM 43 MONTHS TO 30 MONTHS. HOWEVER, TIME FOR ACQUISITION OF AIR QUALITY PERMIT MAY CONTROL ACTUAL STARTUP DATE.

$178\ 787 \times 10^6$ BTU

$60\ 00 \times 10^6$ BTU/day

250×10^6 BTU/hr.

GENERAL CRITERIA

- DAA/CSA FACILITIES PER DAA ROADS, UTILITIES AND FACILITY SUPPORT SITE PLAN FOR MX OPERATING BASE/DAA
- MAIN BASE/HOUSING FACILITIES PER BASE DEVELOPMENT SCHEDULE AND FACILITY SIZES PROVIDED BY AFRCE-MX DECEMBER 4, 1980
- 350°F HIGH TEMPERATURE HOT WATER DISTRIBUTED TO COMMERCIAL AND INDUSTRIAL FACILITIES ON BASE
- STEAM LINES MAY BE USED FOR DISTRIBUTION TO SATELLITE FACILITY; NO STEAM DISTRIBUTION TO END USERS
- LIFE CYCLE COSTS BASED ON AFRCE-WR FY 82/83 DESIGN GUIDANCE FOR 30 YEAR CCHF LIFE
- CCHF TO BE A CONVENTIONAL COAL FIRED PLANT WITH NO BACKUP FUEL

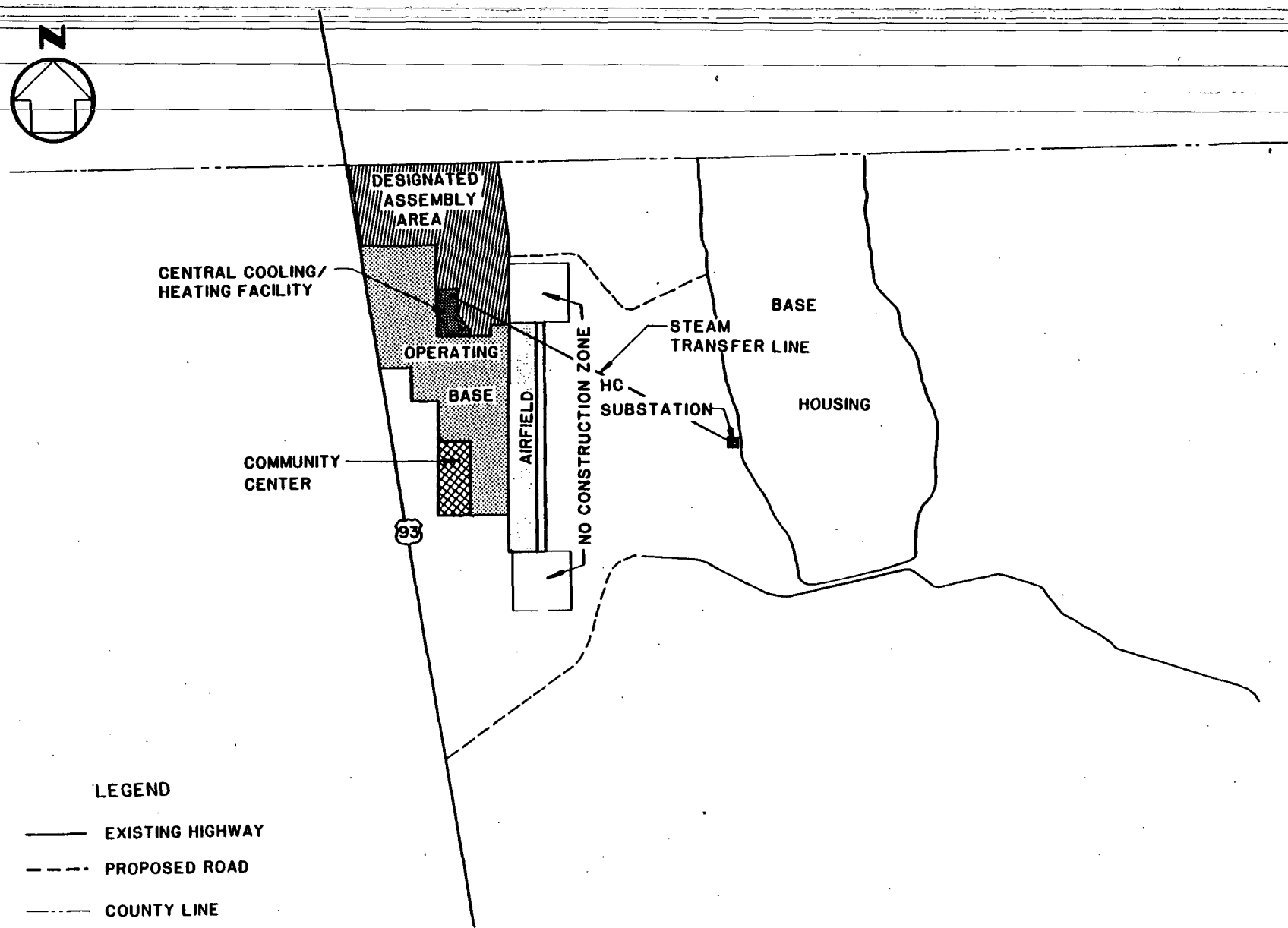
OBJECTIVES

- A. DEFINE HEATING AND COOLING REQUIREMENTS AND SYSTEMS TO BE SERVED FROM THE CENTRAL FACILITY.
- B. DETERMINE ECONOMIC FEASIBILITY OF INCORPORATING COGENERATION WITH THE CCHF THROUGH LIFE CYCLE COSTING OF ALTERNATIVES.
- C. DEVELOP CAPACITIES AND LOAD GENERATING CHARACTERISTICS.
- D. IDENTIFY CHARACTERISTICS OF COAL, COAL STORAGE AND HANDLING SYSTEMS, ASSOCIATED ENVIRONMENTAL CONTROL EQUIPMENT, DAILY AND ANNUAL CONSUMPTION RATES AND SUPPLY VOLUMES.
- E. DEVELOP ORDER OF MAGNITUDE COST ESTIMATES FOR CCHF BASED ON MID-POINT OF CONSTRUCTION.
- F. DEVELOP TYPICAL SITING, ACCESS, STORAGE AND SECURITY REQUIREMENTS IN RELATIONSHIP TO CURRENT BASE CONCEPTUAL ARRANGEMENTS.
- G. CONSIDER FIRE PROTECTION AND SAFETY REQUIREMENTS.
- H. COORDINATE WITH AFRCE-MX TO DEVELOP POLLUTION ABATEMENT REQUIREMENTS, AIR MONITORING AND PERMITS REQUIRED AND AGENCIES INVOLVED TO DETERMINE PROJECT TIME LINES. IDENTIFY PROPOSED TYPES OF EQUIPMENT TO MEET ENVIRONMENTAL REQUIREMENTS.
- I. CONSIDER METHODS FOR DISPOSAL OF BY-PRODUCTS FOR DEFINING COSTS.
- J. IDENTIFY LONG LEAD ITEMS AND DETERMINE POTENTIAL IMPACT ON CONSTRUCTION SCHEDULE.

CLIMATIC CONDITIONS AT MX BASE - ALTERNATIVE LOCATIONS

	<u>COYOTE SPRING</u>	<u>MILFORD/BERYL</u>	<u>CLOVIS</u>
DESIGN TEMP			
HEATING	14 ⁰ F	5 ⁰ F	13 ⁰ F
COOLING	108 ⁰ F	91 ⁰ F	93 ⁰ F
DEGREE DAYS			
HEATING	2,709	6,497	4,046
COOLING	2,906	786	1,297

CCHF SERVICE AREAS - COYOTE SPRING OPTION



- LEGEND**
- EXISTING HIGHWAY
 - - - PROPOSED ROAD
 - - - COUNTY LINE

STUDY RESULTS - COYOTE SPRING

LIFE CYCLE COST - \$MILLION

<u>LEVEL OF ELECTRICAL COGENERATION</u>	<u>CAPITAL COST*</u>	<u>PURCHASED POWER</u>	<u>OPERATIONS & MAINTENANCE</u>	<u>TOTAL</u>
NONE	139.5	172.5	65.9	377.9
BASIC (WASTE HEAT RECOVERY)	174.0	103.9	93.3	371.2
TOTAL DEMAND (1500 PSIA, 950°F)	183.3	0	144.1	327.4

* MID-POINT CONSTRUCTION: 4TH QUARTER FY 83

= July 1, 1984

CAPITAL COST SUMMARY - COYOTE SPRING

COST IN \$MILLION 4TH QUARTER FY 83	HEATING & COOLING ONLY	BASIC POWER PRODUCTION	TOTAL POWER PRODUCTION
POWER PLANT	37.6	56.0	59.5
STEAM BOILERS	11.4	18.2	19.2
POWER GENERATORS & DRIVERS	-	8.8	9.3
DESULFURIZATION	4.8	4.8	4.8
PRECIPITATORS	3.6	3.6	3.6
DEAERATORS	1.4	1.4	1.4
MAT'L HANDLING EQUIPMENT	1.4	1.4	1.4
ASH HANDLING SYSTEM	1.1	1.1	1.1
OTHER MAJOR EQUIPMENT	3.0	3.1	3.1
OTHER MISC. WORK	10.9	13.6	15.6
HEATING & COOLING PLANT	2.6	2.6	2.6
CHILLERS	1.6	1.6	1.6
PUMPS & DRIVERS	0.1	0.1	0.1
OTHER MAJOR EQUIPMENT	0.7	0.7	0.7
OTHER MISC. WORK	0.2	0.2	0.2
BASE HOUSING AREA SUBSTATION	99.3	115.4	121.2
CHILLERS	5.1	5.1	5.1
COOLING TOWER	1.7	1.7	1.7
PUMPS & DRIVERS	1.3	1.3	1.3
OTHER MAJOR EQUIPMENT	0.9	0.9	0.9
OTHER MISC. WORK	16.2	16.2	16.2
OTHER COSTS; OH&P, TEST, ETC.	44.6	53.4	57.7
ESCALATION, LOCATION, INT.	29.5	36.8	38.3
TOTAL	139.5	174.0	183.3

ANNUAL OPERATING COSTS SUMMARY - COYOTE SPRING

COST IN \$MILLION

LEVEL OF
ELECTRICAL
COGENERATION

PURCHASED POWER

FUEL

OPERATION &
MAINTENANCE

NONE

8.6

2.3

4.3

BASIC

5.2

3.3

6.0

TOTAL DEMAND

0

6.7

6.3

COAL CONSUMPTION

<u>LEVEL OF ELECTRICAL COGENERATION</u>	<u>ANNUAL TONS/YEAR</u>	<u>MAXIMUM TONS/DAY</u>	<u>MINIMUM TONS/DAY</u>
NONE	67,000	219	160
BASIC	95,000	311	227
TOTAL DEMAND	192,000	630	460

COAL CHARACTERISTICS *

SULFUR

LESS THAN 1%

ASH

6.2%

HEATING VALUE

12,000 BTU/LB

COST (DELIVERED)

\$35/TON

Today 1981

* BASED ON TELEPHONE CONTACTS WITH THE FOLLOWING SUPPLIERS:

SOUTHERN UTAH FUEL CO.; SALINA, UTAH MINE
KAISER STEEL CORP.; SUNNYSIDE MINE
CONSOLIDATION COAL CO.; EMERY, UTAH

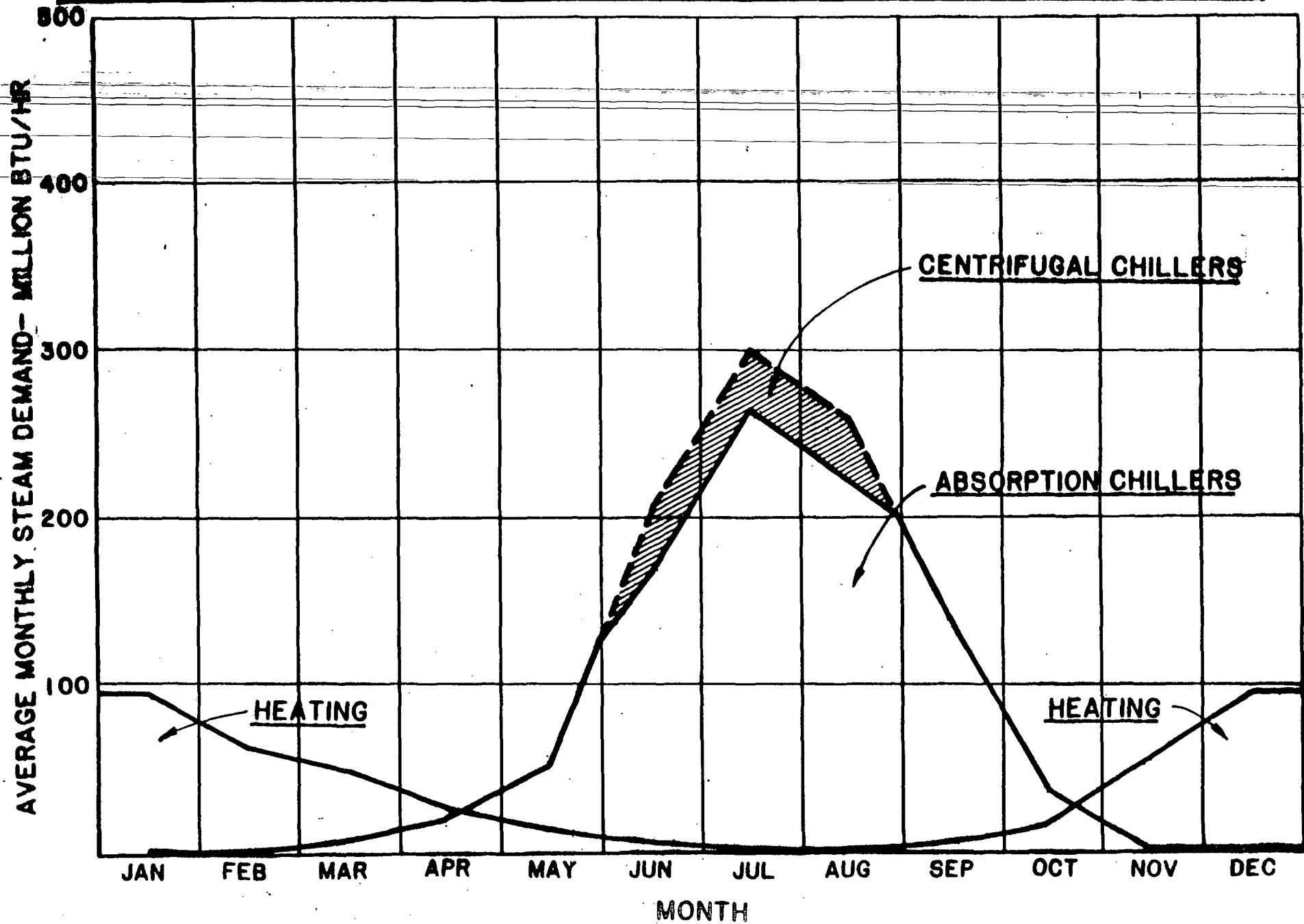
HEATING AND COOLING BASIS OF ESTIMATE

- DWELLING UNIT DEMANDS ESTIMATED BY USING ENGINEERING RULE OF THUMB FOR TYPICAL RESIDENTIAL HOUSING WITH APPROPRIATE ADJUSTMENTS FOR CLIMATE CONDITIONS.
- DEMANDS FOR VARIOUS FUNCTIONAL BUILDINGS DETERMINED BY REFERENCE TO AFM 88-2, DEFINITIVE DRAWINGS, FOR COMPARABLE TYPES OF FACILITIES.
- ASSIGNMENT OF HEATING AND COOLING LEVELS FOR FACILITIES IN CONFORMANCE WITH GUIDELINES IN AFM 88-15.
- ALL HEATING AND COOLING DEMANDS BASED ON CONVENTIONAL ESTIMATING METHODS REDUCED 50%.

HEATING, COOLING AND ELECTRICAL DESIGN CAPACITY - COYOTE SPRING

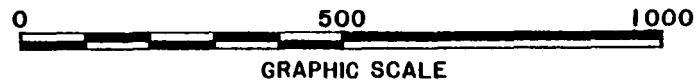
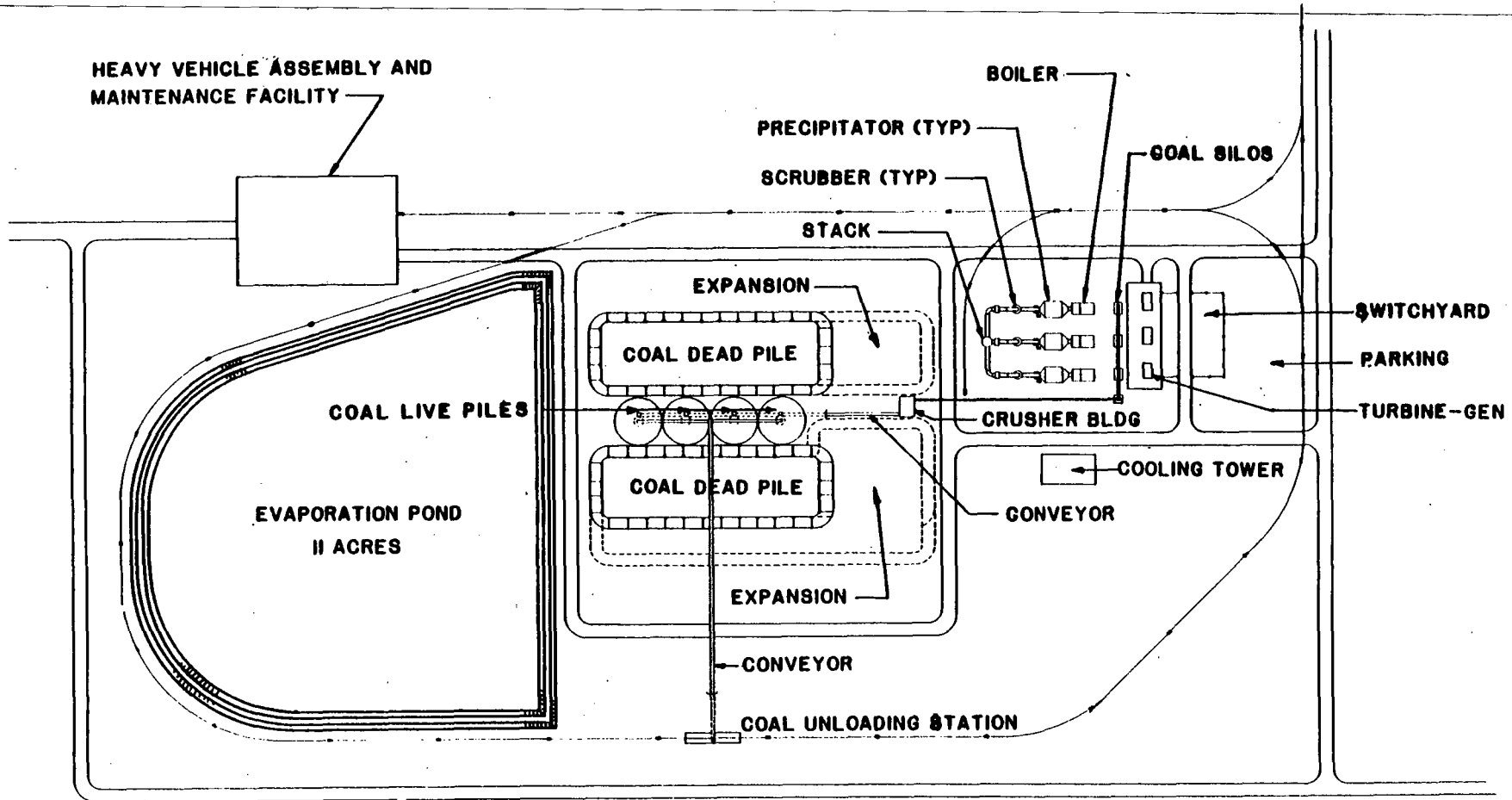
	HEATING BTU/HOUR	COOLING BTU/HOUR	ELECTRICAL MW
DESIGNATED ASSEMBLY AREA	7,860,500	9,600,000	10.78
AIRFIELD	3,762,000	3,024,000	2.30
WORK AREA	18,865,500	18,540,000	3.36
COMMUNITY CENTER	<u>14,306,000</u>	<u>21,456,000</u>	<u>4.36</u>
SUB TOTAL	44,794,000	52,620,000	20.80
BASE HOUSING	<u>131,244,200</u>	<u>217,284,000</u>	<u>8.66</u>
TOTAL	176,038,200	269,904,000	29.46

SEASONAL THERMAL DEMAND FOR HEATING AND COOLING - COYOTE SPRING

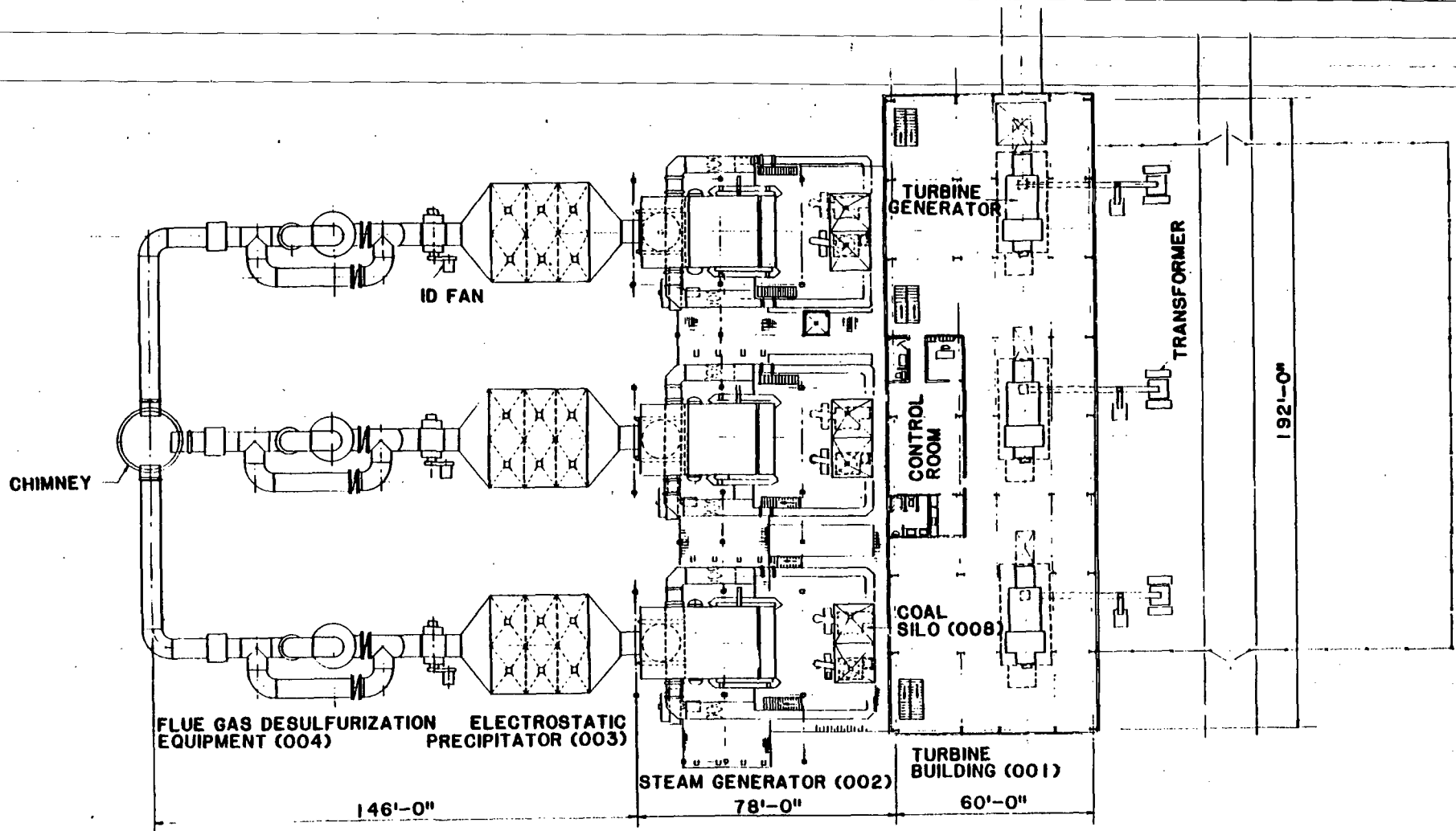


*W. L. ...
Tracked*

CCHF SITE PLAN CONCEPT

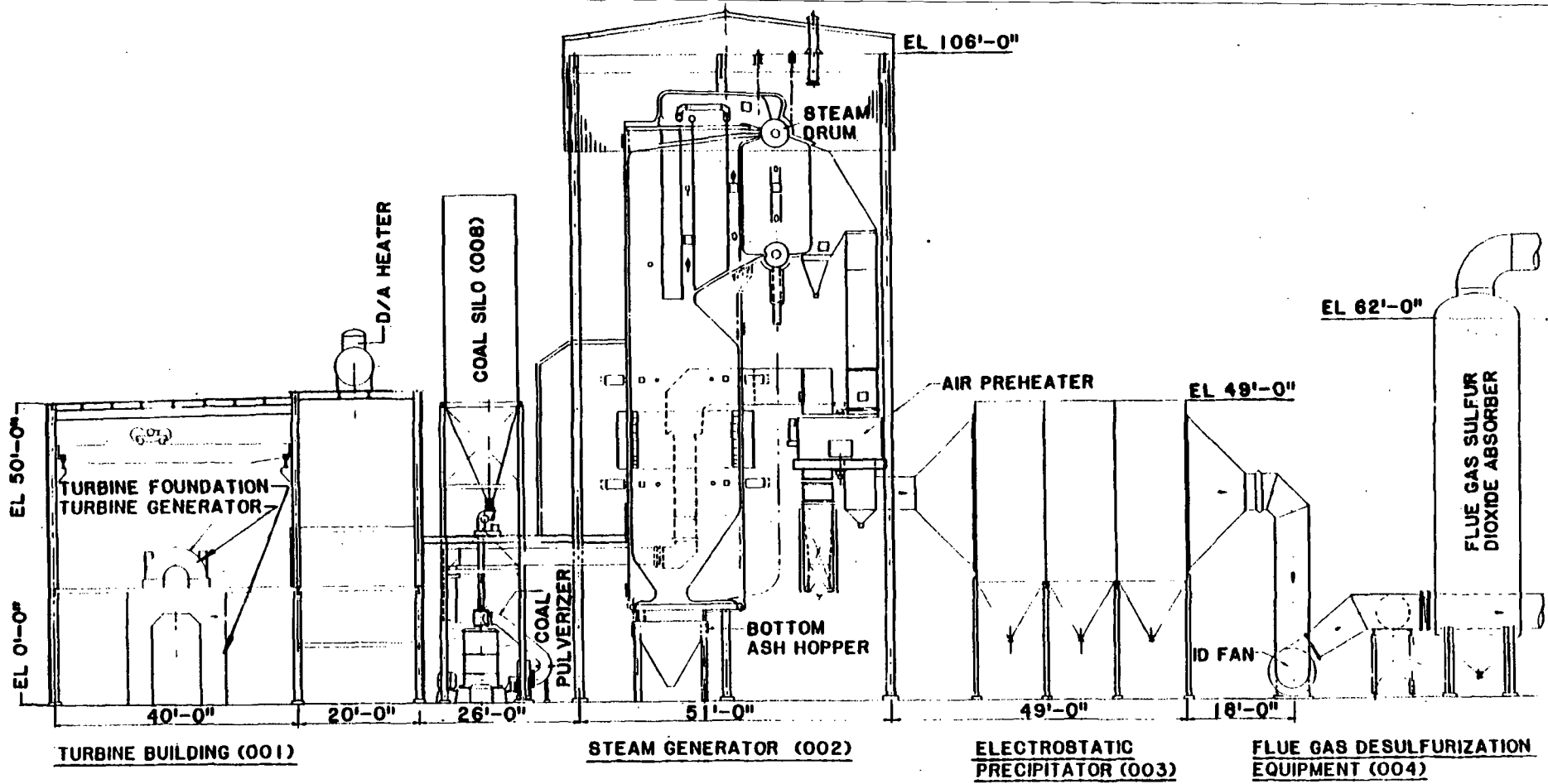


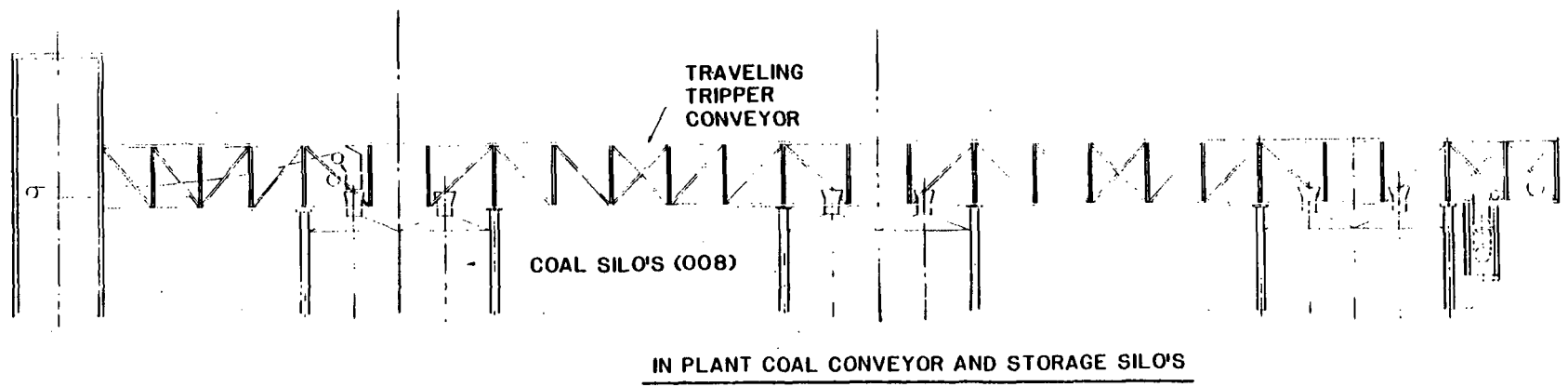
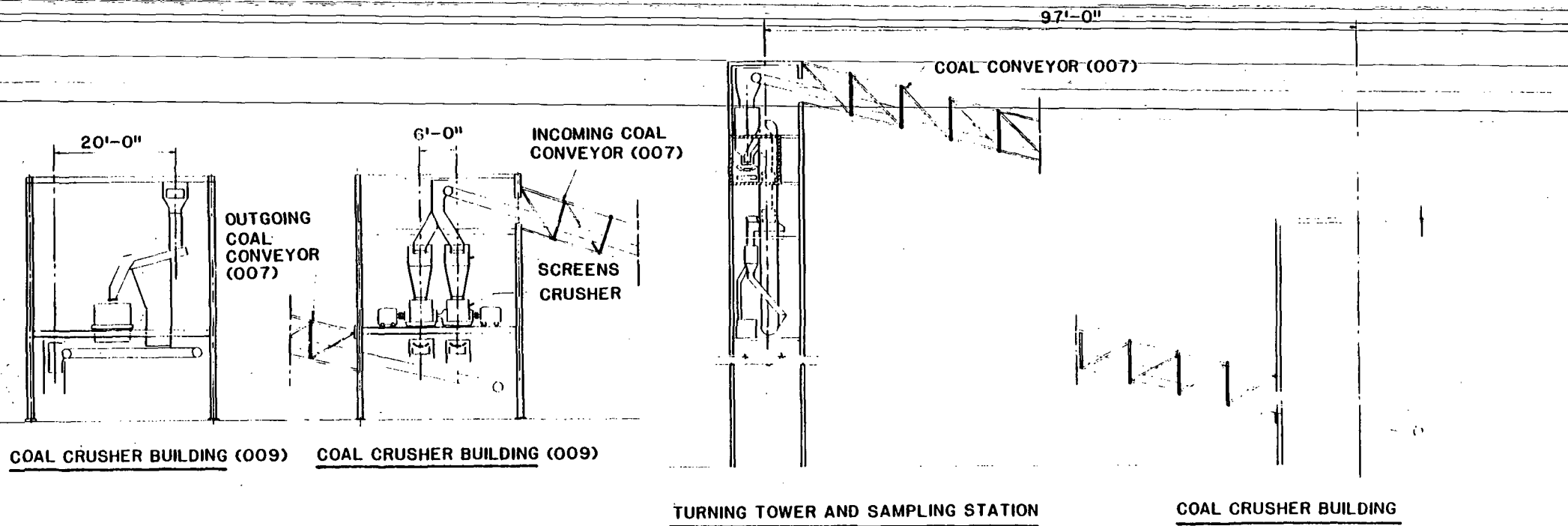
POWER TRAINS PLAN



POWER TRAIN ELEVATION

POWER TRAIN ELEVATION







PLAN



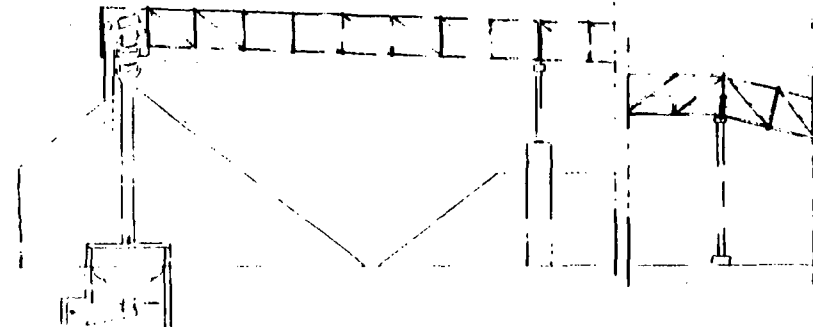
COAL UNLOADING STATION (013)



COAL UNLOADING STATION (013)



PRIMARY SAMPLE CUTTER



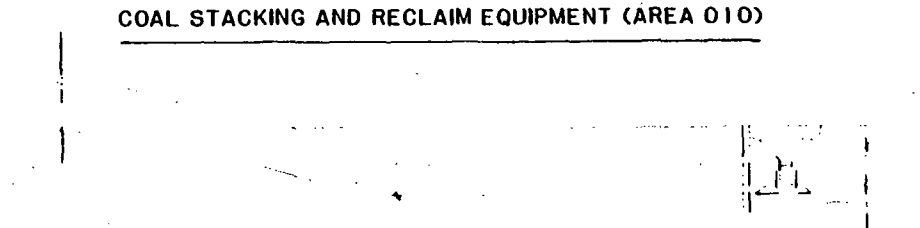
COAL STACKING EQUIPMENT (010 AREA)



COAL STACKING AND RECLAIM EQUIPMENT (AREA 010)



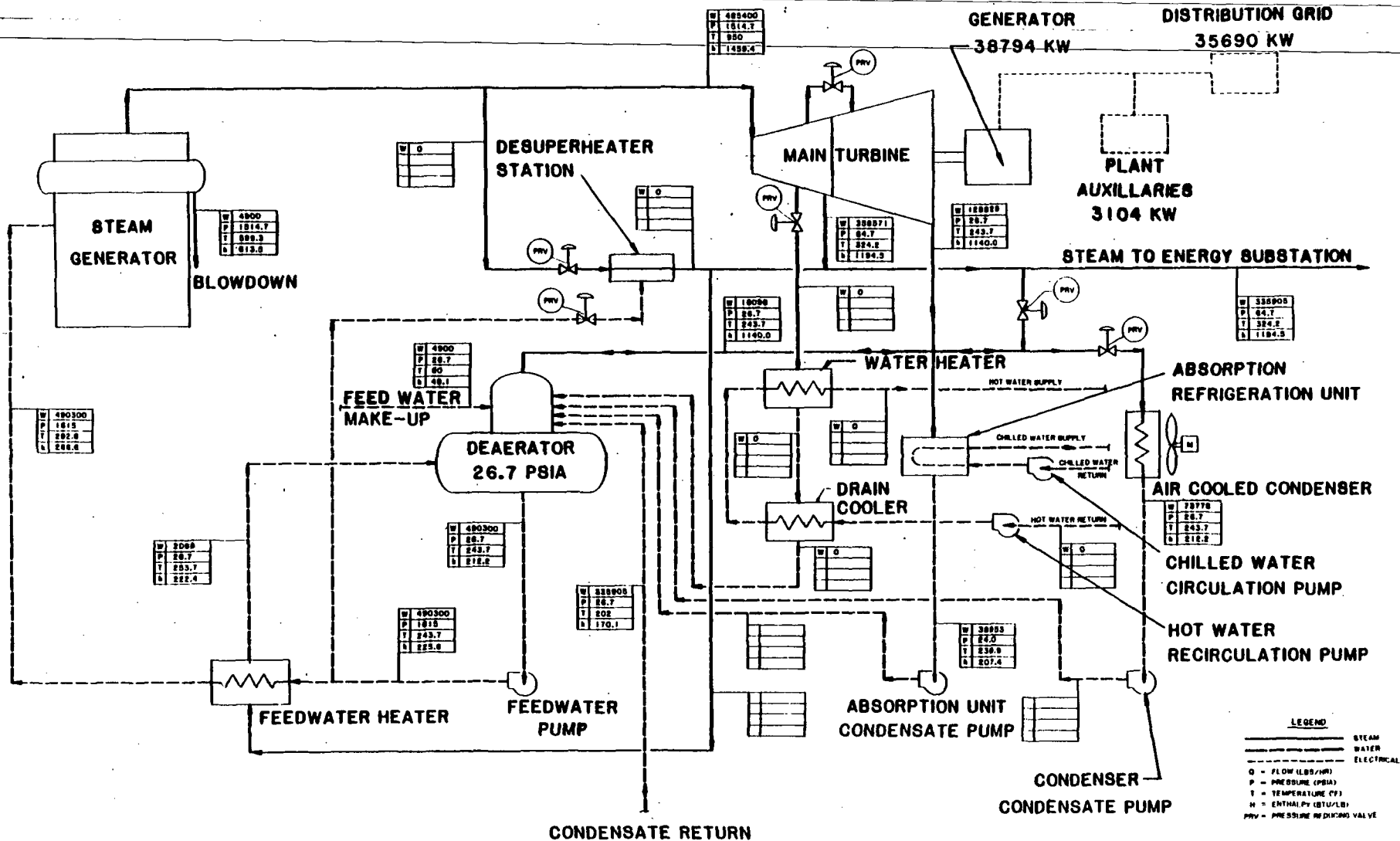
COAL CONVEYOR TO CRUSHER BUILDING (007 & 009)



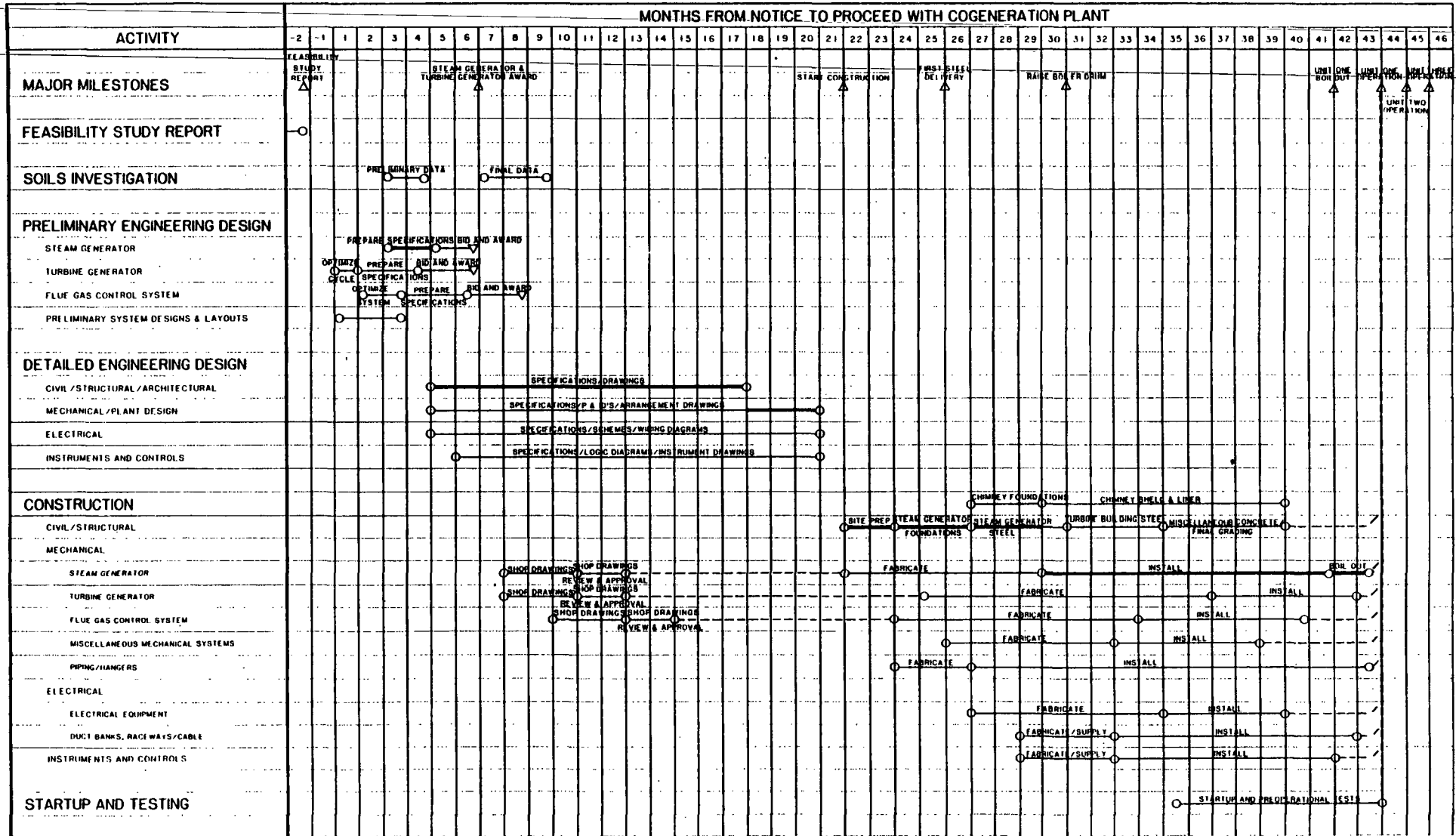
COAL RECLAIM CONVEYOR

TYPICAL HEAT AND MASS BALANCE - COYOTE SPRING

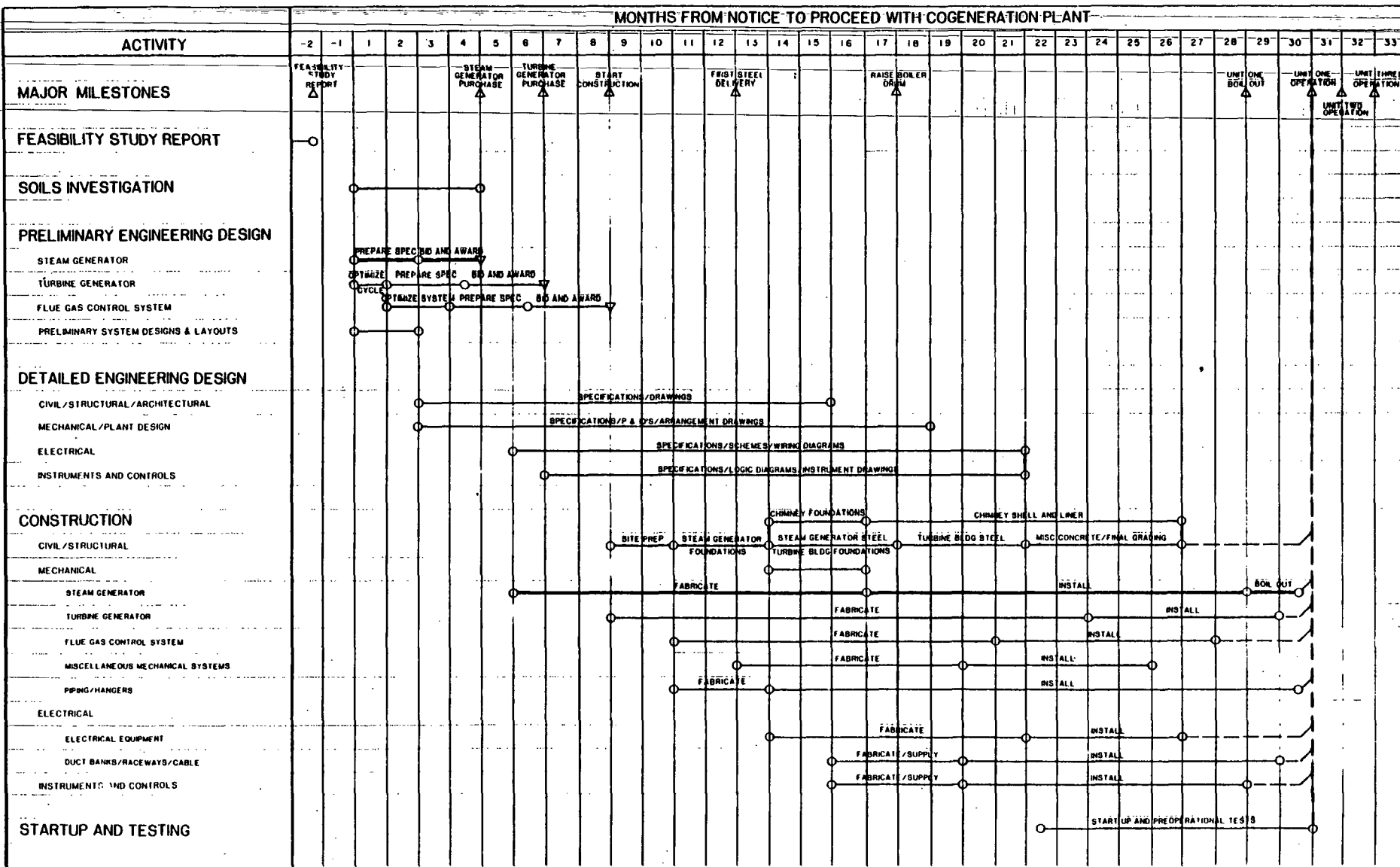
TYPICAL HEAT AND MASS BALANCE - COYOTE SPRING



MX AT&SS PROJECT: COGENERATION IMPLEMENTATION SCHEDULE - NORMAL CONSTRUCTION



MX AT&SS PROJECT: COGENERATION IMPLEMENTATION SCHEDULE - FAST TRACK



ENVIRONMENTAL ASSESSMENTS - PRELIMINARY RESULTS

AIR QUALITY

- PROCUREMENT TIME OF 1½ - 2½ YEARS FOR PREVENTION OF SIGNIFICANT DETERIORATION (PSD) PERMIT TO CONSTRUCT
- PERMIT APPROVAL BY EPA/STATE PROBABLE
- REQUIRES APPLICATION OF BEST AVAILABLE CONTROL TECHNOLOGY (BACT)

WATER QUALITY

- ZERO DISCHARGE DESIGN
- FEW PERMIT PROBLEMS ANTICIPATED
- WATER DEMAND APPROXIMATELY ^{22%} ~~3%~~ OF BASE TOTAL WATER DEMAND

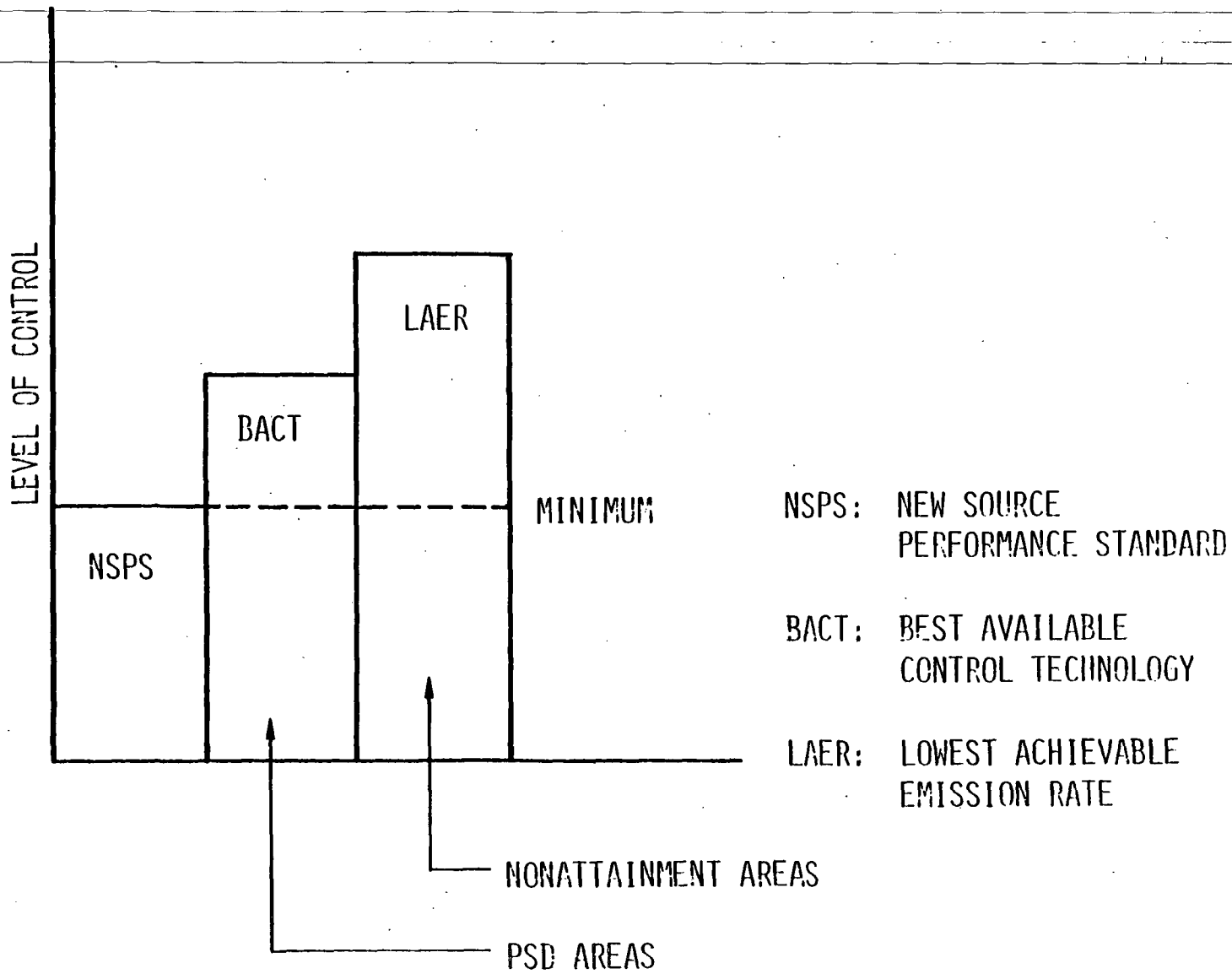
SOLID WASTE DISPOSAL

- SOLID WASTES TO SANITARY LANDFILL
- NO PERMIT PROBLEMS ANTICIPATED

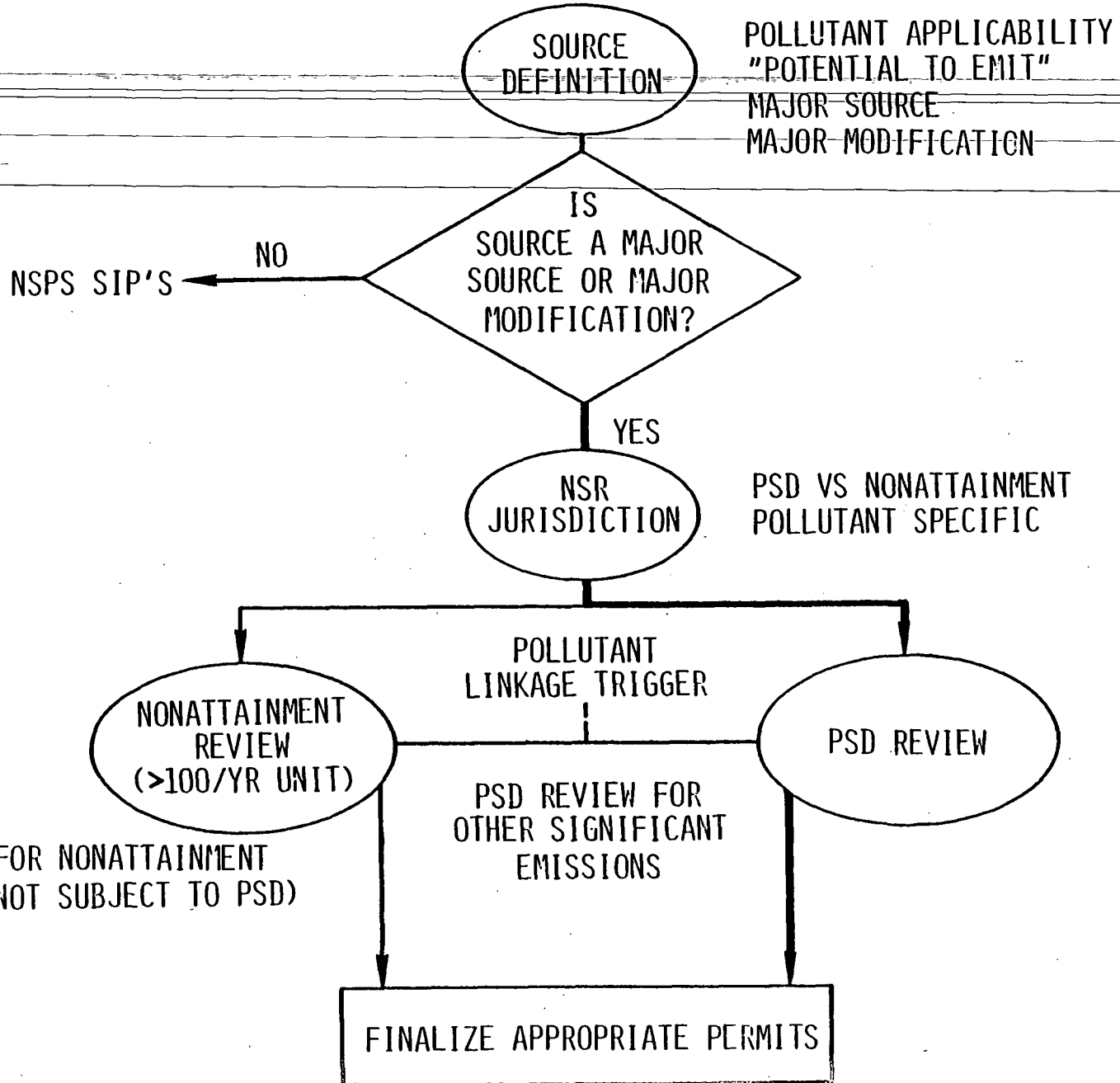
ENVIRONMENTAL IMPACT STATEMENT

- TIER II OR III STATEMENT

APPLICABLE STANDARDS



PSD/NONATTAINMENT REVIEW



- LAER (ONLY FOR NONATTAINMENT POLLUTANTS NOT SUBJECT TO PSD)
- OFFSETS

PSD CONSIDERATIONS

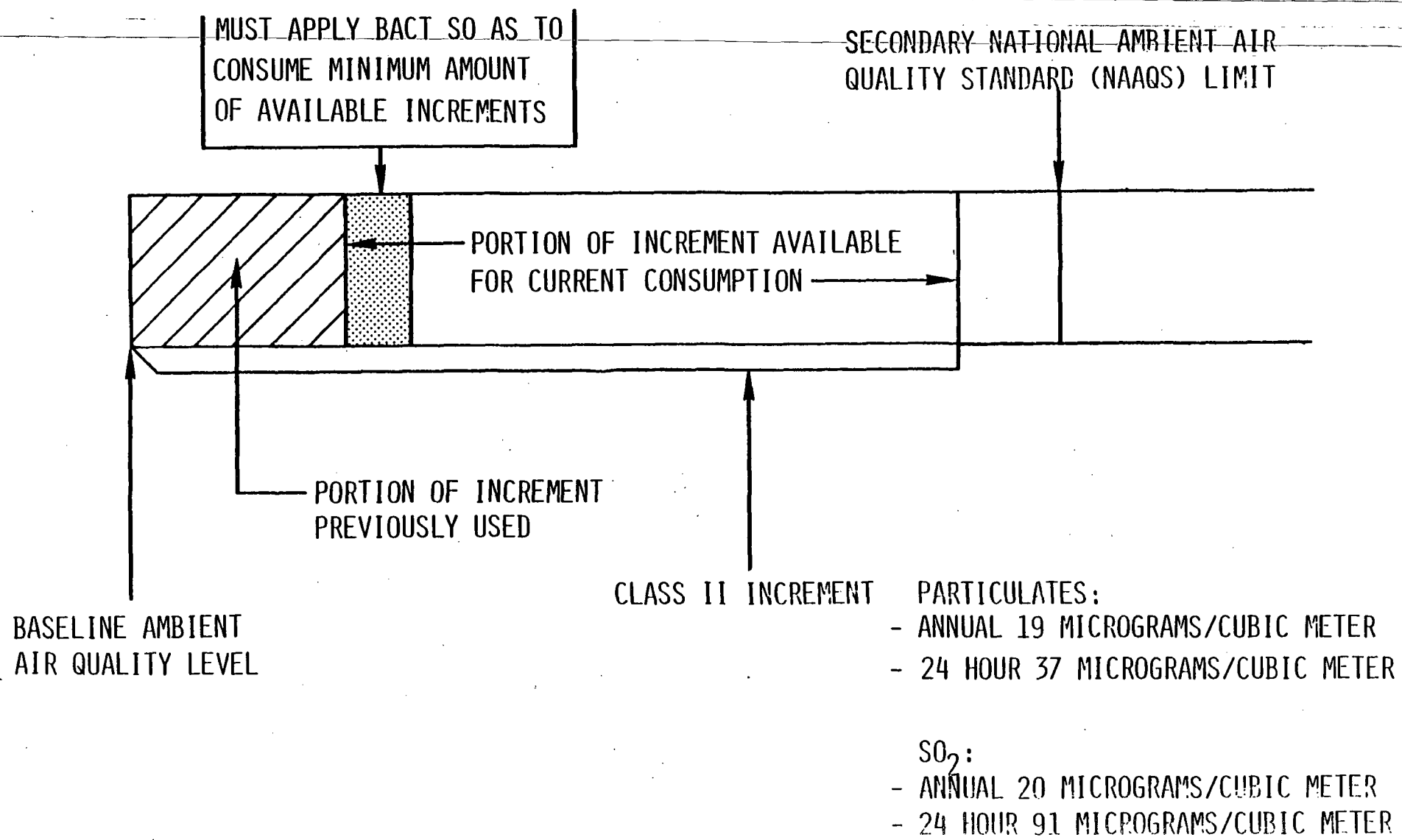
- MAJOR SOURCE
- DE MINIMIS
- BACT
- CASE BY CASE
- MORE EFFICIENT CONTROLS
- ENERGY, ENVIRONMENTAL & ECONOMIC IMPACTS
- AMBIENT AIR ANALYSIS
- SOIL, VEGETATION & VISIBILITY IMPACTS
- CLASS I IMPACT
- BUBBLE
- STRATEGY ITERATIONS

ESTIMATED COGENERATION PLANT EMISSIONS AND PSD REGULATIONS STANDARDS (TONS/YEAR)

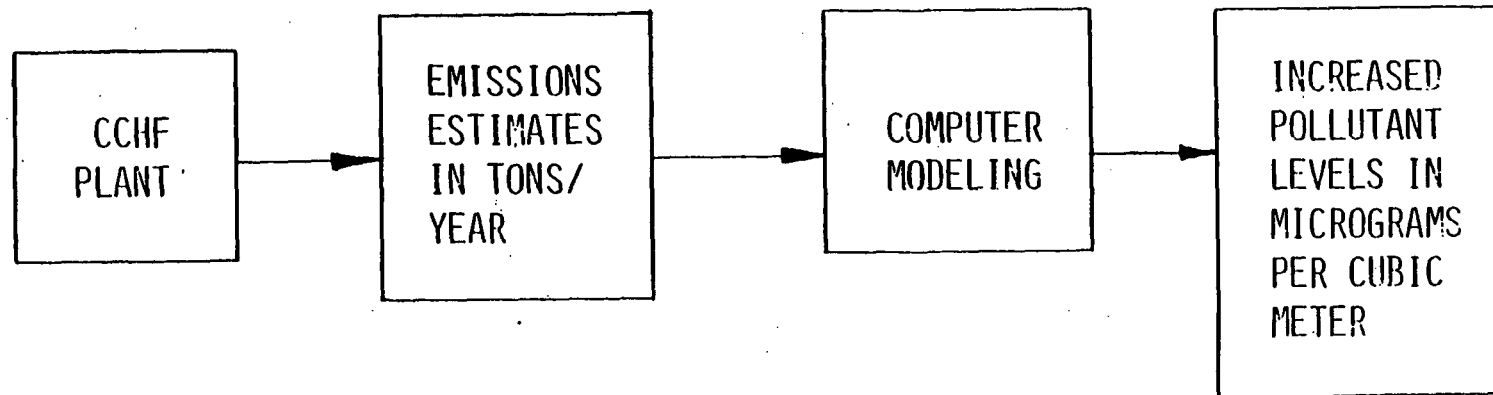
<u>POLLUTANT</u>	<u>SIGNIFICANT LEVELS</u>	<u>ESTIMATED CONTROLLED EMISSIONS</u>	<u>REQUIRES PSD NEW SOURCE REVIEW?</u>
CO	100	153	YES
NO _x	40	1707	YES
SO ₂	40	625	YES
PM	25	68	YES
VOC	40	0.153	NO
LEAD*	0.6	0.00981	NO
ASBESTOS*	0.007	NONE EXPECTED	NO
BERYLLIUM*	0.0004	0.0098	YES
MERCURY*	0.1	0.0037	NO
VINYL CHLORIDE*	1.0	NONE EXPECTED	NO
FLUORIDES*	3.0	6.4	YES
SULFURIC ACID MIST	7.0	1.9	NO
HYDROGEN SULFIDE*	10.0	NONE EXPECTED	NO
ARSENIC*	0.0	0.674	YES

* ESTIMATES BASED ON ALTON COAL FROM THE PROPOSED HARRY ALLEN PLANT

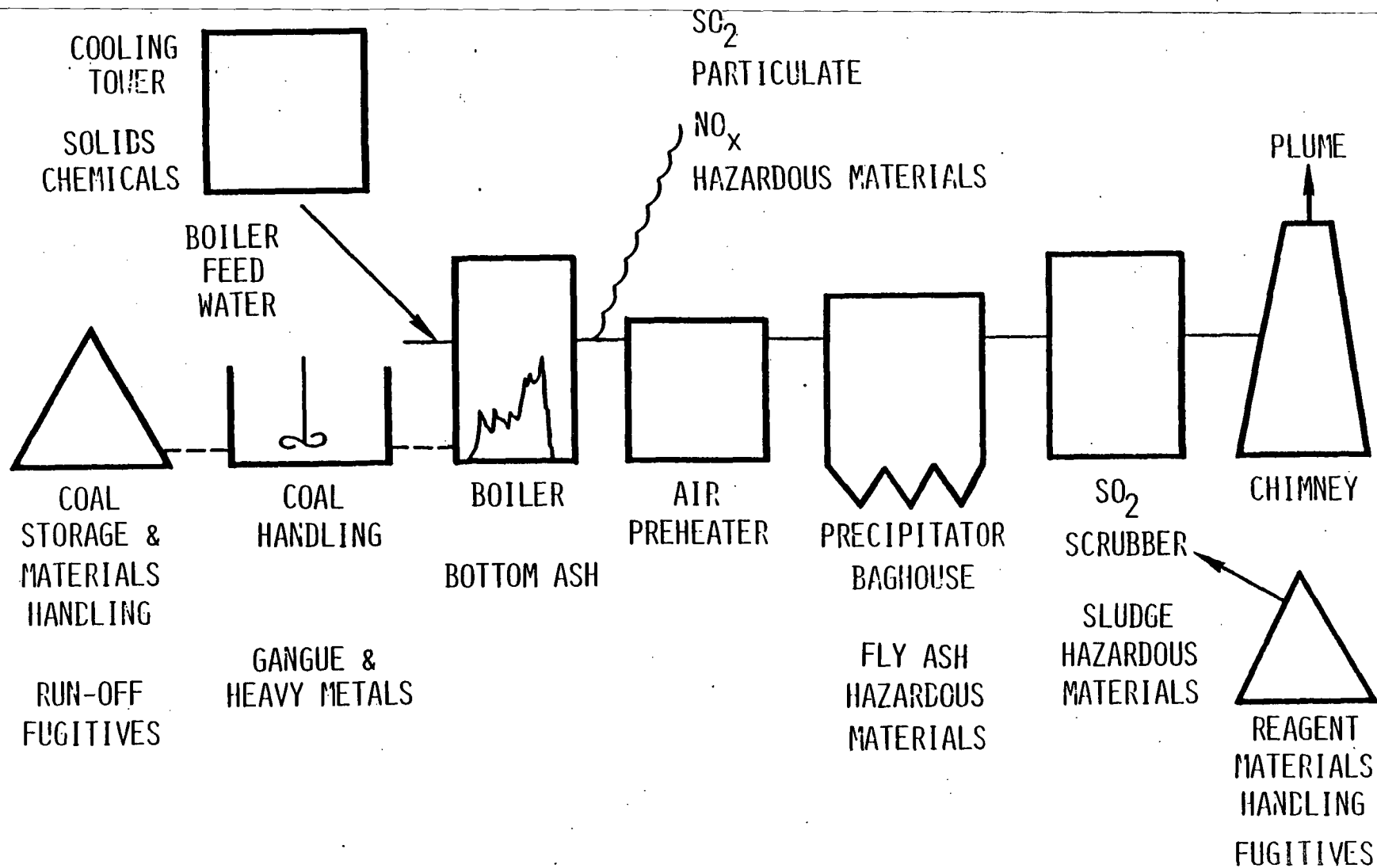
PREVENTION OF SIGNIFICANT DETERIORATION - CLASS II INCREMENTS



PSD INCREMENT CONSUMPTION ESTIMATES



TYPICAL PLANT WIDE ANALYSIS



INFORMATION SOURCES

- PROCESS AND CONTROL EQUIPMENT SUPPLIERS
- EMISSION TESTS
- MATERIAL BALANCES
- EPA DOCUMENT "COMPILATION OF AIR POLLUTANT EMISSION FACTORS", AP-42
- CONTROL TECHNOLOGY GUIDELINES
- BACT GUIDELINES
- LITERATURE REFERENCES

BACT GUIDELINES

- PROPOSE CONTROL SYSTEM FOR EACH POLLUTANT AND EACH SOURCE "CASE BY CASE"

- PRESENT MORE EFFICIENT ALTERNATIVES NOT SELECTED

- PROVIDE RATIONALE (INCREMENTAL ANALYSIS):
 - ENERGY
 - ENVIRONMENT
 - ECONOMICS

- IMPACT STATEMENT
 - SOIL, VEGETATION, VISIBILITY, GROWTH, SECONDARY POLLUTION

PSD ENGINEERING REVIEW

IN SUMMARY THE PSD ENGINEERING REVIEW INVOLVES

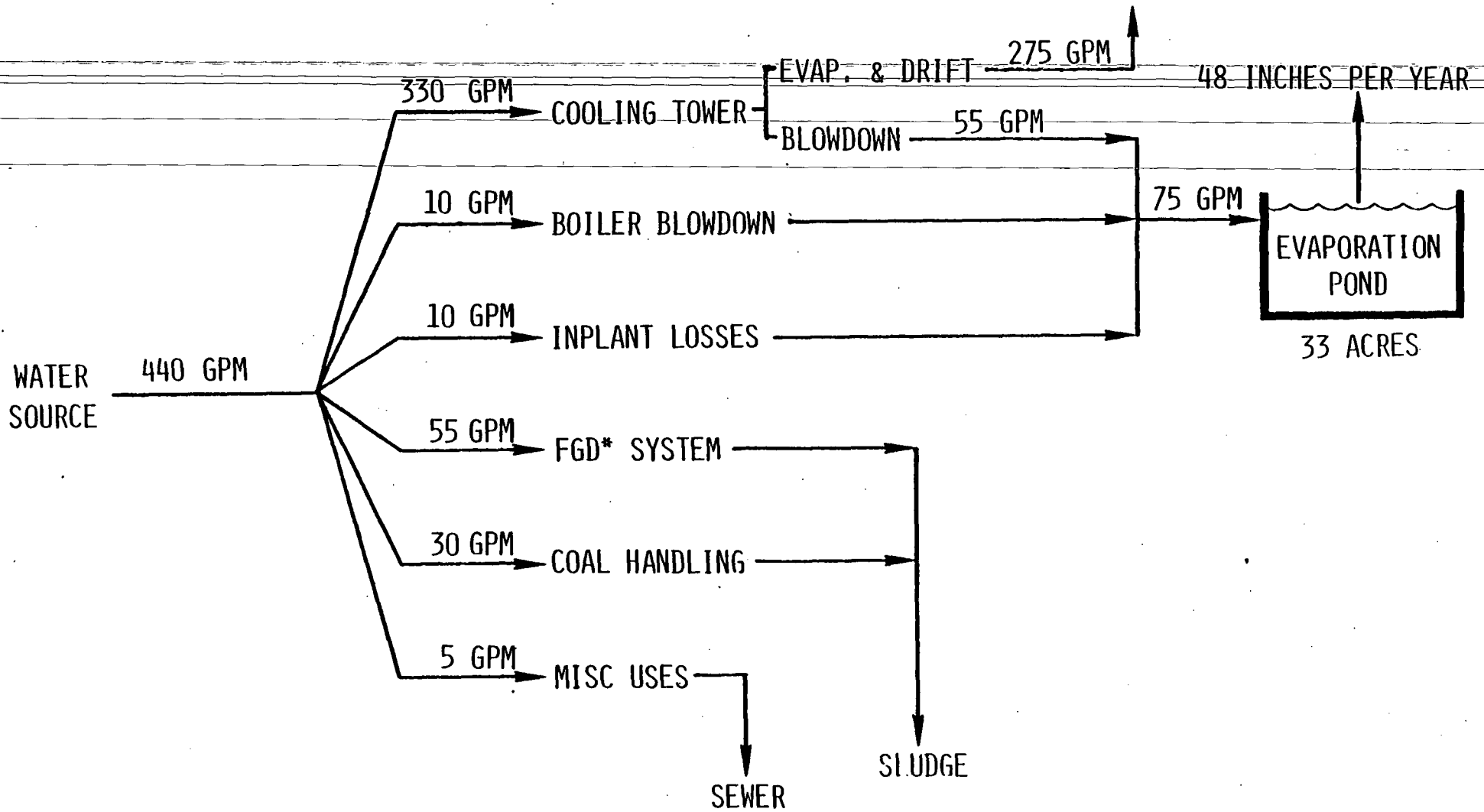
- ACCURATE SOURCE DEFINITION
- "CASE BY CASE" CONSIDERATION OF ALTERNATIVES
- ITERATIVE STRATEGY DEVELOPMENT
- STRONG BACK-UP DOCUMENTATION

CCHF WATER REQUIREMENTS - COYOTE SPRING.

	<u>SUPPLY REQUIREMENT</u>	<u>PERCENT OF BASE CONSUMPTION*</u>
COOLING/HEATING ONLY	1.9×10^8 GAL/YR	19%
COGENERATION	2.3×10^8 GAL/YR	22%
DIFFERENCE	0.4×10^8 GAL/YR	3%

* ESTIMATED BASE CONSUMPTION WITHOUT CCHF: 8.2×10^8 GAL/YR

WATER UTILIZATION SCHEME - COYOTE SPRING (APPROXIMATE VALUES)



* FLUE GAS DESULFURIZATION

SOLID WASTES ESTIMATE - COGENERATION PLANT

<u>WASTE TYPE</u>	<u>WEIGHT (TONS/YEAR)</u>	<u>VOLUME (YD³/YEAR)</u>
FLY ASH <i>Dry</i>	11,000	13,200
BOTTOM ASH	3,000	3,800
TOTAL - ASH	14,000	17,000
SCRUBBER SLUDGE <i>55% Dry D-A</i>	30,000	23,000
TOTAL WASTE	44,000	40,000

80% Dry

PERMIT REQUIREMENTS - CONSTRUCTION

GOVERNING AGENCY

TYPE OF PERMIT

TIME REQUIREMENTS

ENVIRONMENTAL PROTECTION
AGENCY

PREVENTION OF SIGNIFICANT
DETERIORATION

6 MO - 1½ YR
PLUS 1 YR OF PPE-
APPLICATION MONITORING

DIVISION OF ENVIRONMENTAL
PROTECTION (NEVADA)

AIR QUALITY PERMIT TO
CONSTRUCT

30 - 90 DAYS

DIVISION OF ENVIRONMENTAL
PROTECTION (NEVADA)

NATIONAL POLLUTANT DISCHARGE
ELIMINATION SYSTEM (NPDES)
PERMIT OR "ZERO DISCHARGE"
PERMIT

60 - 120 DAYS

STATE ENGINEER
(NEVADA)

PERMIT TO APPROPRIATE
SURFACE WATER

90 - 180 DAYS

STATE ENGINEER
(NEVADA)

PERMIT TO APPROPRIATE
UNDERGROUND WATER

90 - 180 DAYS

PERMIT REQUIREMENTS (CONT'D)

2 OF 2

GOVERNING AGENCY	TYPE OF PERMIT	TIME REQUIREMENTS
LOCAL COUNTY PLANNING COMMISSION (NEVADA)	BUILDING PERMITS	30 - 60 DAYS
UTAH STATE DEPT. OF SOCIAL SERVICES, DIV. OF HEALTH	APPROVAL FOR SOLID WASTE DISPOSAL	30 DAYS
STATE OF UTAH	WATER APPROPRIATION	30 - 60 DAYS
STATE OF NEW MEXICO	PERMIT FOR EVAPORATION POND	60 - 120 DAYS
NEW MEXICO AIR QUALITY	PRE-CONSTRUCTION AIR PERMIT	30 DAYS - 4 MONTHS
OTHER AGENCIES EG. U.S. FOREST SERVICE, STATE CONSERVATION DISTRICTS, STATE PUBLIC SERVICE, DEPT. OF WILDLIFE, ETC.	TBD	TBD

PLANNING GUIDELINES/REQUIREMENTS FOR PERMIT ACQUISITION PLAN

PURPOSE

- IDENTIFY ADMINISTERING AGENCIES, PROCUREMENT RESPONSIBILITIES, TIMELINES, MILESTONES, MONITORING AND MODELING REQUIREMENTS FOR THE FOLLOWING PERMITS:

AIR PERMITS

- EPA PREVENTION OF SIGNIFICANT DETERIORATION (PSD) PERMIT
- STATE/LOCAL PERMITS

WATER PERMITS

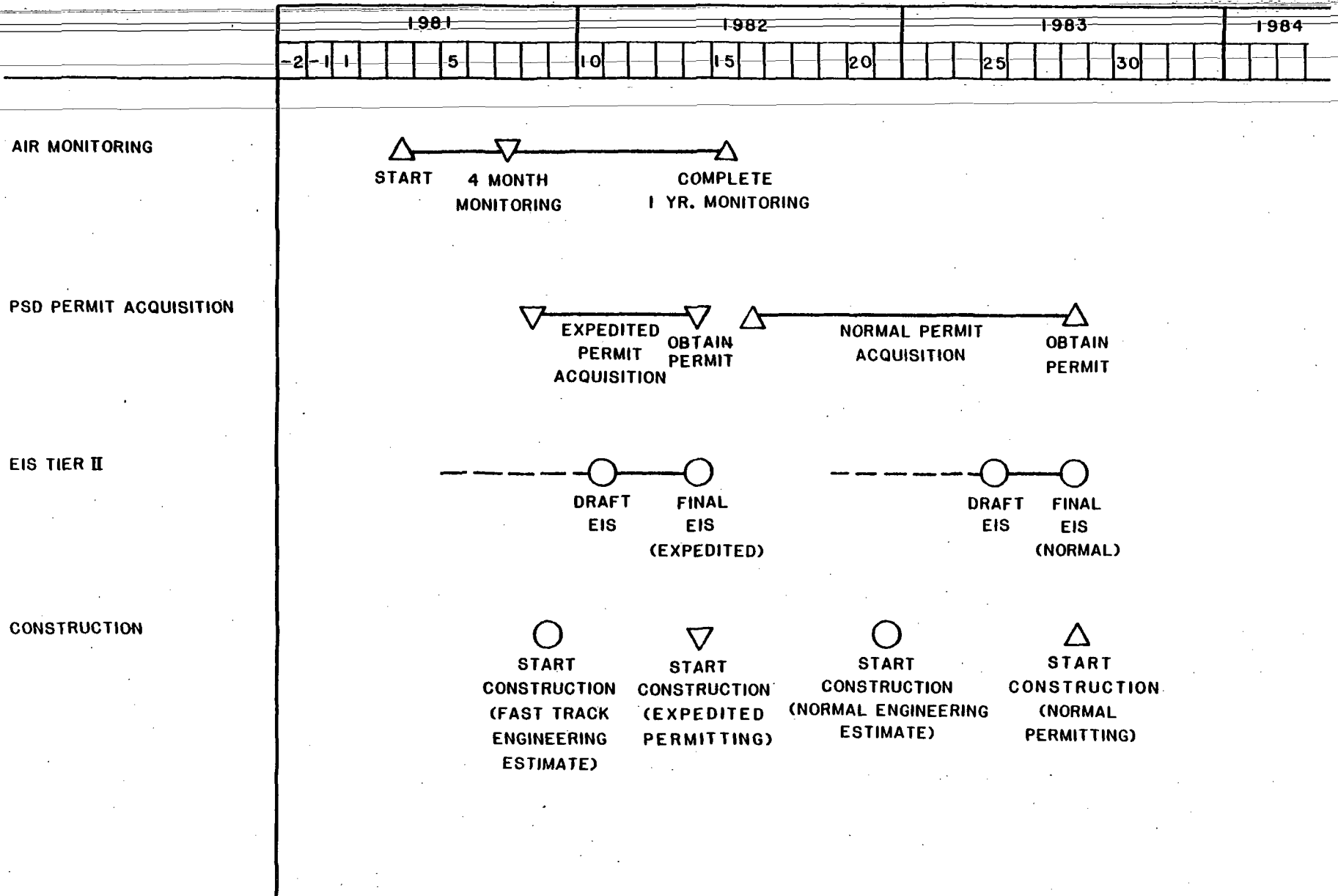
- NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT
- SAFE DRINKING WATER ACT (SDWA) PERMIT
- STATE/LOCAL PERMITS
 - WATER POLLUTION
 - WATER APPROPRIATIONS

SOLID WASTE PERMITS

- RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) PERMIT
- STATE/LOCAL PERMITS
 - LANDFILL CONSTRUCTION/OPERATION

OTHER PERMITS

CCHF ENVIRONMENTAL MILESTONES



CCHIF FEASIBILITY STUDY STATUS

- COYOTE SPRING FINAL REPORT DUE MARCH 27, 1981

- PROPOSED BERYL/MILFORD AND CLOVIS FINAL REPORT DATES:

BERYL/MILFORD

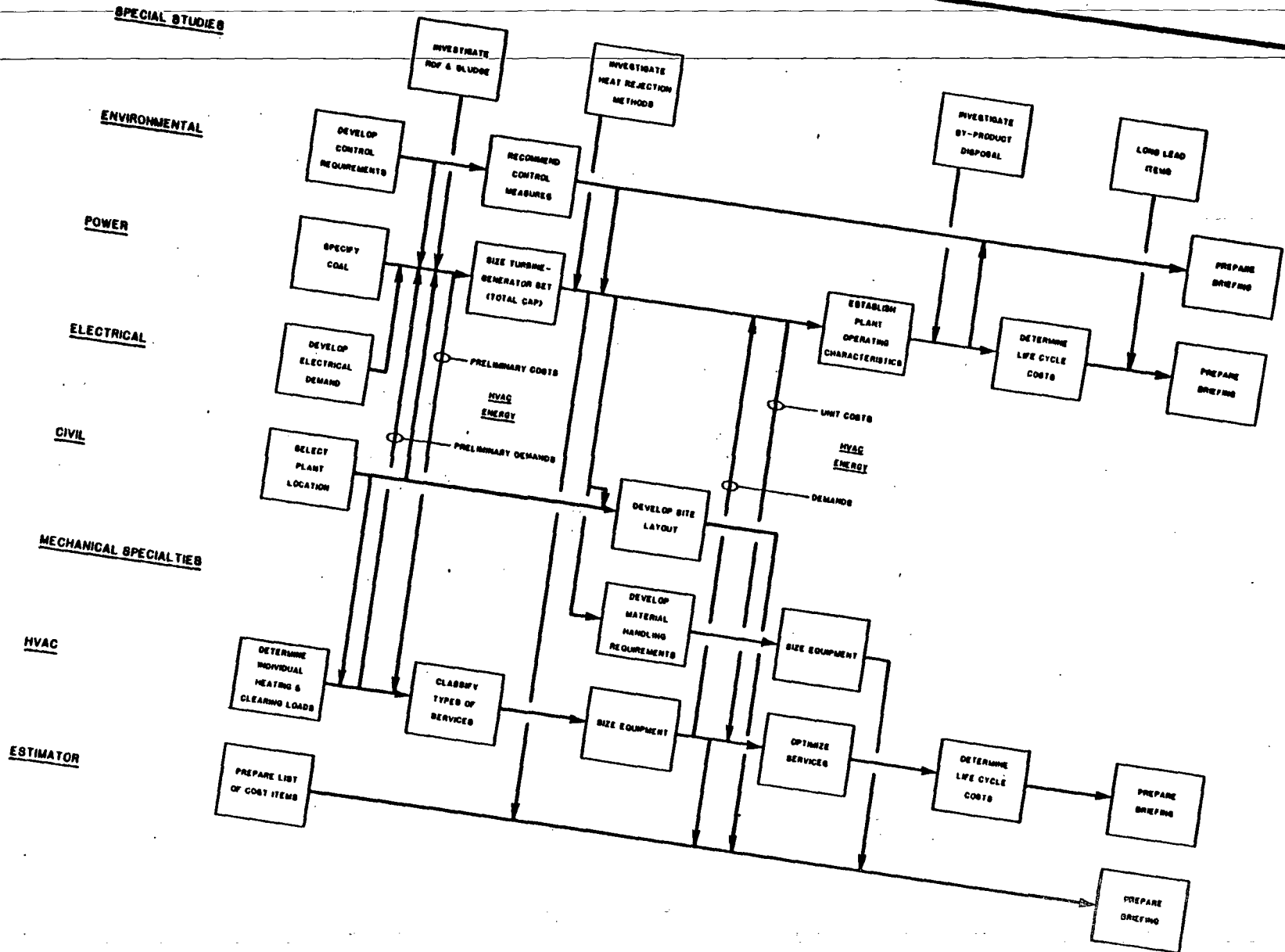
APRIL 24, 1981

CLOVIS

MAY 22, 1981

STUDY STATUS

STUDY STATUS



ISSUES AND CONCERNS

- IMPACT OF CONCURRENT PLANNING

- BASE COMPREHENSIVE PLAN
- RENEWABLE ENERGY STUDY COMPATIBILITY

- AIR QUALITY PROVISIONS

- PERMIT ACQUISITION PLAN
- PSD MONITORING PROGRAM
- MULTIPLE LOCATIONS

- COAL SUPPLY

- COAL ACQUISITION
- TRANSPORTATION

- SCHEDULE DISCREPANCIES

- 30 TO 43 MONTH SPAN TIME REQUIRED
- MOST CSA/DAA FACILITIES REQUIRED PRIOR TO CCHF START-UP

CCHF B-4 SPECIFICATION STATUS

● FINAL B-4 SPECIFICATION REQUIRES UPDATING:

- INCORPORATE COMMENTS RECEIVED AT CRITERIA REVIEW CONFERENCE
 - INCORPORATE RESULTS OF FEASIBILITY STUDY
 - ADD POWER PLANT CRITERIA AND REQUIREMENTS IF COGENERATION IS INCORPORATED
 - ACCOMMODATE ALTERNATIVE LOCATIONS
- UPDATE REQUESTED MARCH 16, 1981 -- NOT COMPATIBLE WITH ALL UPDATING REQUIREMENTS