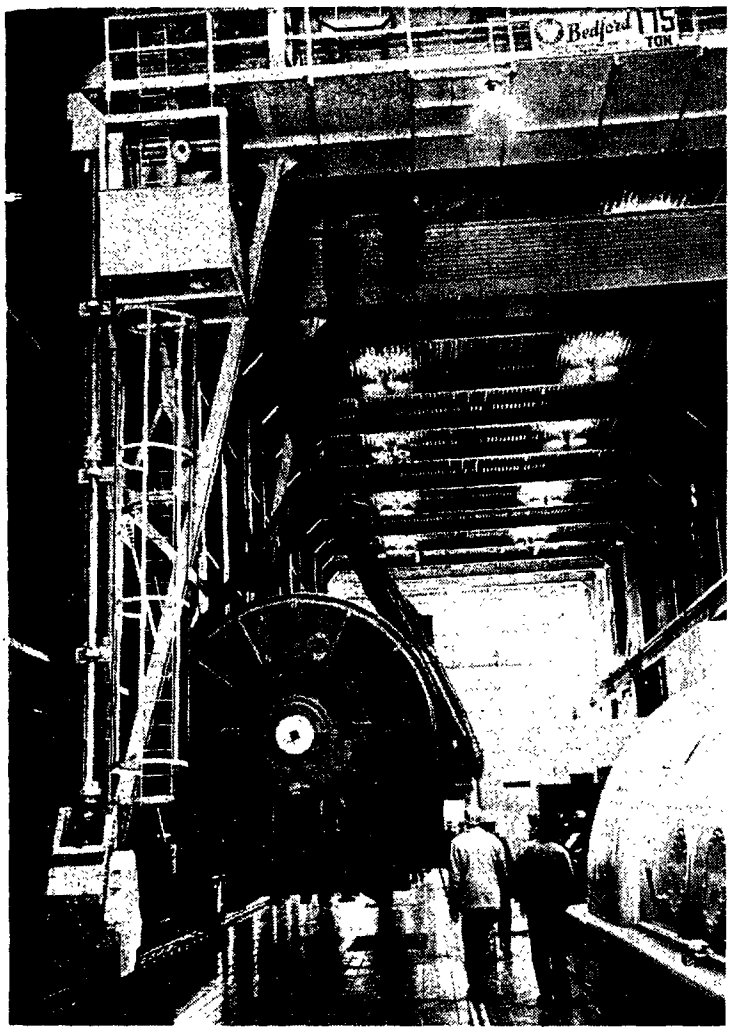
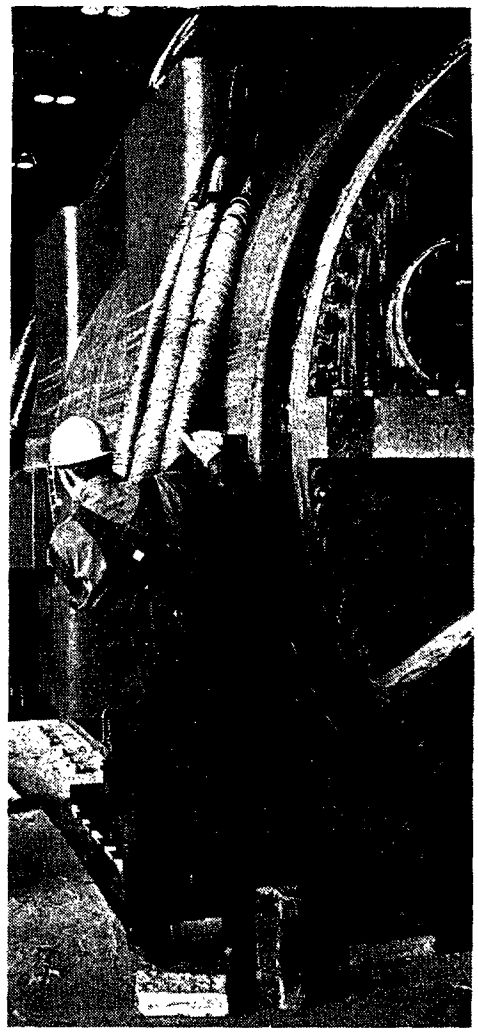
*THE DENVER POST
Thurs., April 20, 1961 3

PLAINTIFF'S EXHIBIT

GE-99



INDOOR CRANE MAKES KING-SIZE PICKUP
Huge generator is lifted by traveling crane for trip to other end of building.



Denver Post Photos by Bill Johnson

AFTER THE MOVE
Workmen install the generator in its new position.

150,000 KILOWATT MACHINE

Huge Generator Hoisted Into Place at PSC Plant

By GENE LINDBERG
Denver Post Staff Writer

The stator of the most powerful electric generator in the Rocky Mountain Empire—a 150,000-kilowatt machine—was hoisted 25 feet from a flatcar and trundled smoothly into place Thursday at the Public Service Co. Cherokee Station, 6198 N. Franklin St., in Adams County.

The great metal cylinder weighed 174½ tons. It swayed gently in a sling of braided steel cables hooked to a 175-ton traveling crane.

This General Electric machine, capable of supplying current to a city of 300,000 population, will boost the total generating capacity of the Public Service Co. Colorado network to 1 million kilowatts, L. M. Robertson, chief electrical engineer for Public Service, said Thursday.

The generator is the heart of Cherokee Station's Unit No. 3, a $24,500,000 addition to the plant which will go into operation a year from now.

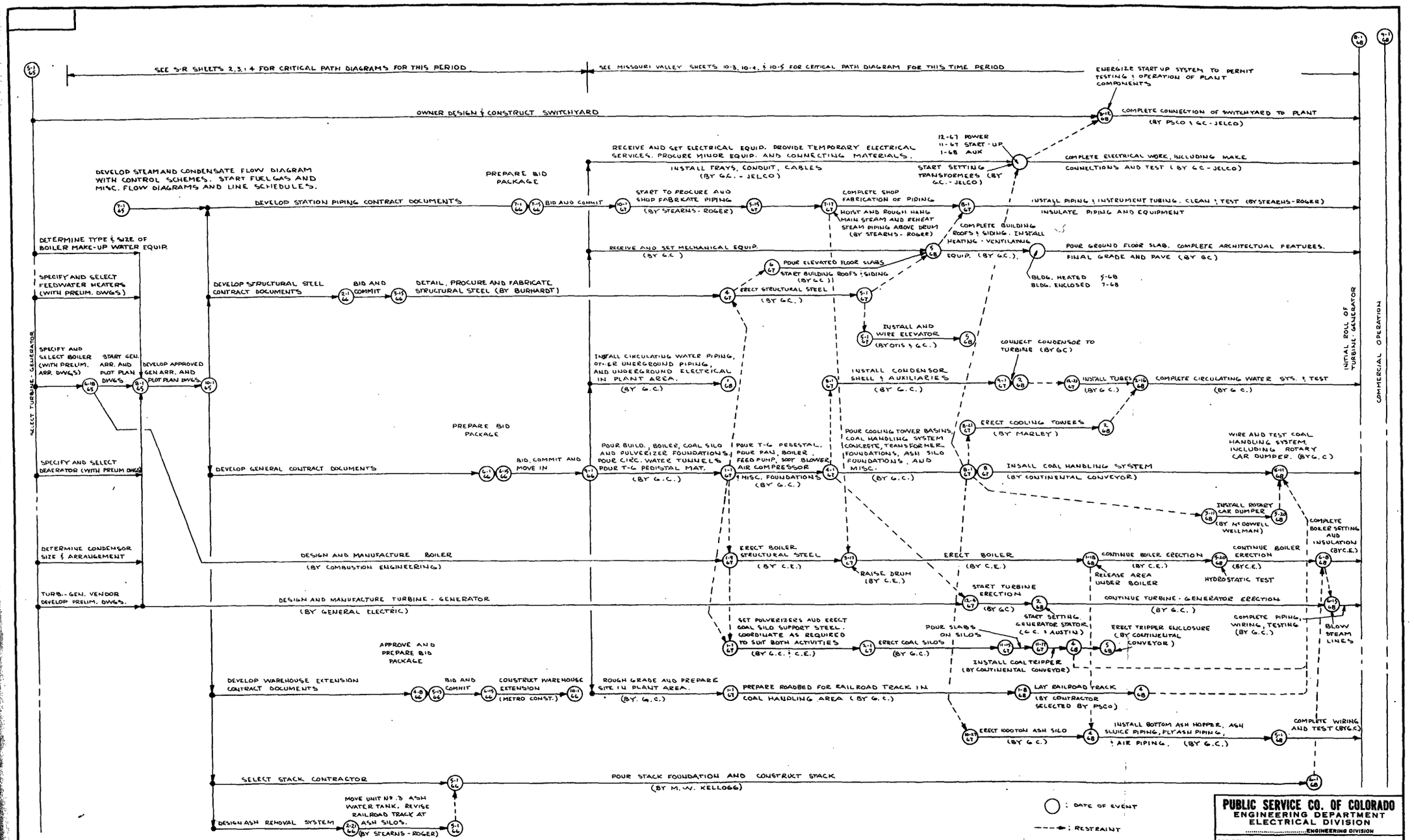
The two units already in operation have a capacity of 210,000 kilowatts. Eventually Cherokee will be a 6-unit plant, with a capacity of nearly a million kilowatts.

The 349,000-pound stator lifted Thursday is just over 24 feet long, and its outside diameter is 12 feet 7 inches. Robertson said Thursday it weighs less than the stator of Unit No. 1 because of improved cooling design. Oil is pumped directly through the windings to carry off excess heat.

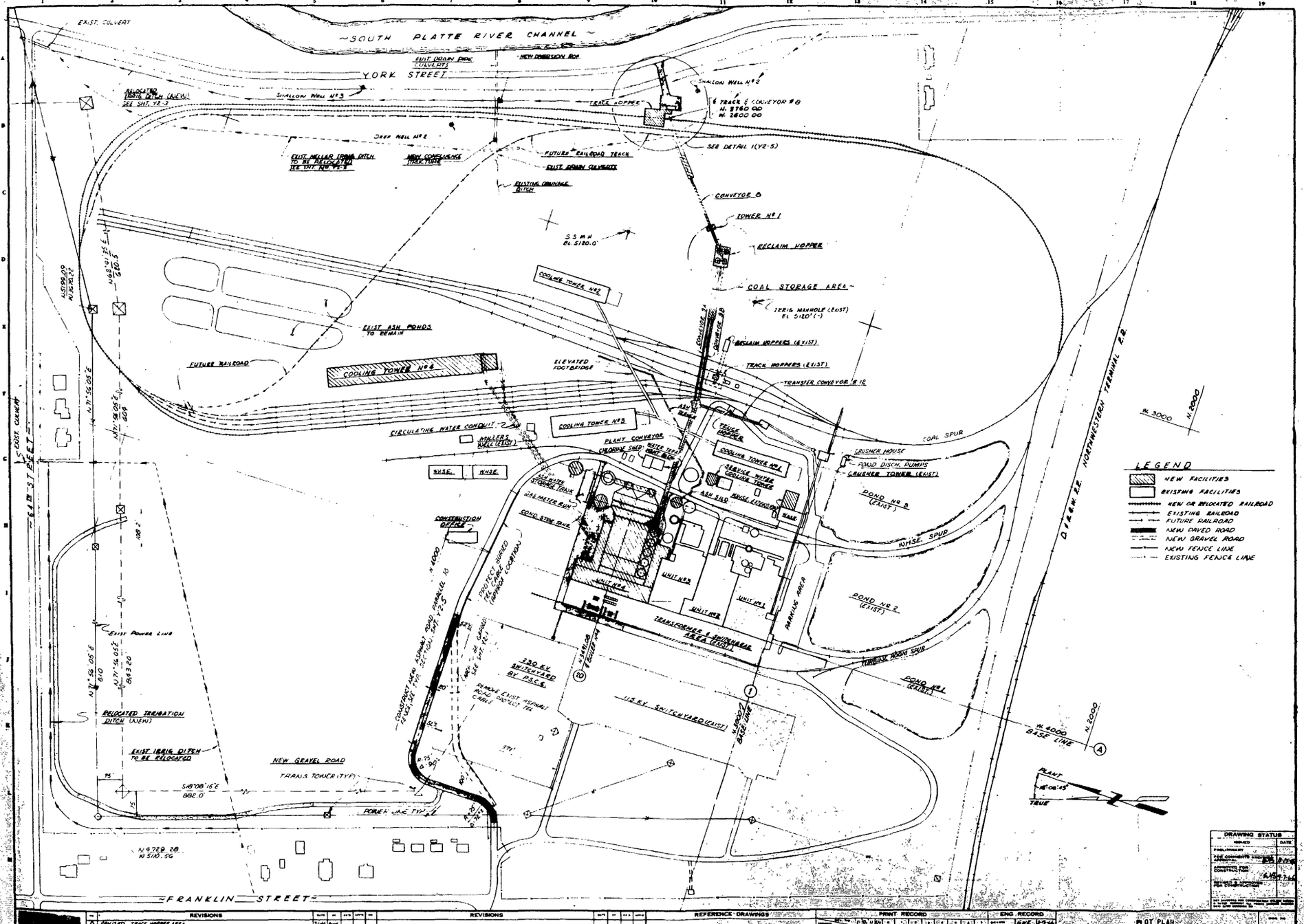
The generator's magnet iron will be cooled in the now customary manner, with hydrogen gas. The rotor, which spins inside the stator, will be installed and aligned in June.

It weighs 67,300 pounds—more than 33½ tons—and is 39 inches in diameter. It will be turned 3,600 times a minute by a 200,000 horsepower steam turbine, also built at General Electric's steam turbine-generator plant in Schenectady, N. Y.

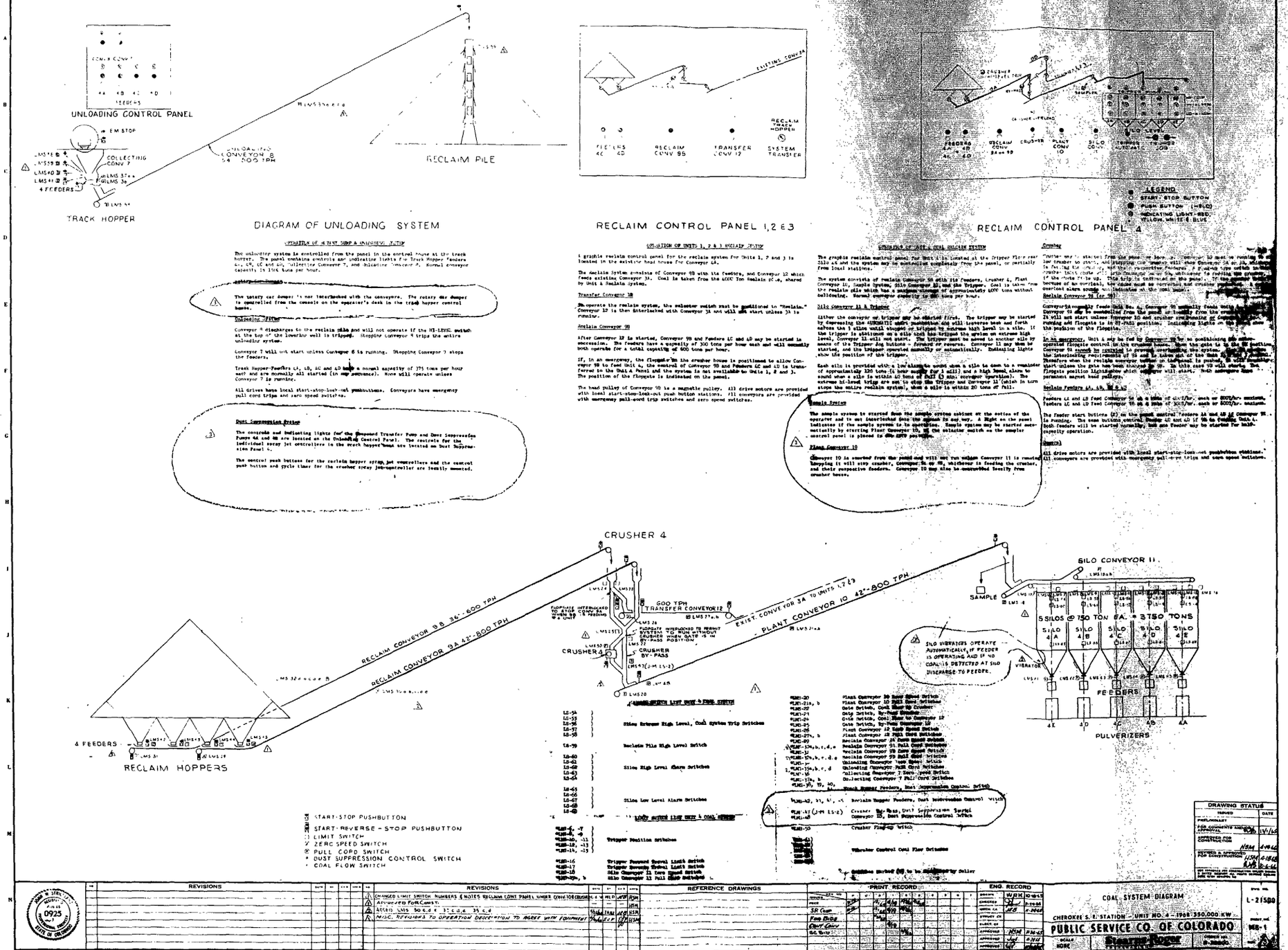
The turbine, to be installed, will operate at a steam pressure of 1,800 pounds per square inch and a temperature of 1,000 degrees Fahrenheit, gulping 1,140,000 pounds of steam an hour. At that temperature steam glows cherry red. The boiler serving this unit will use 1,498 tons of coal a day.


SEE S-R SHEETS 2, 3, & 4 FOR CRITICAL PATH DIAGRAMS FOR THIS PERIOD
SEE MISSOURI VALLEY SHEETS 10-3, 10-4, & 10-5 FOR CRITICAL PATH DIAGRAM FOR THIS TIME PERIOD
ENERGIZE START UP SYSTEM TO PERMIT TESTING & OPERATION OF PLANT COMPONENTS
OWNER DESIGN & CONSTRUCT SWITCHYARD
COMPLETE CONNECTION OF SWITCHYARD TO PLANT (BY PSCO & GC - JELCO)
RECEIVE AND SET ELECTRICAL EQUIP. PROVIDE TEMPORARY ELECTRICAL SERVICES. PROCURE MINOR EQUIP. AND CONNECTING MATERIALS.
12-67 POWER
11-67 START-UP
1-68 AUX
INSTALL TRAYS, CONDUIT, CABLES (BY GC. - JELCO)
START SETTING TRANSFORMERS (BY GC. - JELCO)
COMPLETE ELECTRICAL WORK, INCLUDING MAKE CONNECTIONS AND TEST (BY GC - JELCO)
DEVELOP STEAM AND CONDENSATE FLOW DIAGRAM WITH CONTROL SCHEMES. START FUEL GAS AND MISC. FLOW DIAGRAMS AND LINE SCHEDULES.
PREPARE BID PACKAGE
DEVELOP STATION PIPING CONTRACT DOCUMENTS
BID AND COMMIT
START TO PROCURE AND SHOP FABRICATE PIPING (BY STEARNS - ROGER)
COMPLETE SHOP FABRICATION OF PIPING
HOIST AND ROUGH HANG MAIN STEAM AND REHEAT STEAM PIPING ABOVE DRUM (BY STEARNS - ROGER)
INSTALL PIPING & INSTRUMENT TUBING, CLEAN & TEST (BY STEARNS - ROGER)
INSULATE PIPING AND EQUIPMENT
DETERMINE TYPE & SIZE OF BOILER MAKE-UP WATER EQUIP.
RECEIVE AND SET MECHANICAL EQUIP. (BY GC)
COMPLETE BUILDING ROOFS & SIDING. INSTALL HEATING - VENTILATING EQUIP. (BY GC.).
POUR GROUND FLOOR SLAB. COMPLETE ARCHITECTURAL FEATURES. FINAL GRADE AND PAVE (BY GC)
BLDG. HEATED 5-68
BLDG. ENCLOSED 7-68
SPECIFY AND SELECT FEEDWATER HEATERS (WITH PRELIM. DWGS)
DEVELOP STRUCTURAL STEEL CONTRACT DOCUMENTS
BID AND COMMIT
DETAIL, PROCURE AND FABRICATE STRUCTURAL STEEL (BY BURHARDT)
POUR ELEVATED FLOOR SLABS
START BUILDING ROOFS & SIDING (BY GC)
ERECT STRUCTURAL STEEL (BY G.C.)
INSTALL AND WIRE ELEVATOR (BY OTIS & G.C.)
INITIAL ROLL OF TURBINE-GENERATOR
COMMERCIAL OPERATION
SELECT TURBINE-GENERATOR
SPECIFY AND SELECT BOILER (WITH PRELIM. ARR. DWGS)
START GEN. ARR. AND PLOT PLAN DWGS
DEVELOP APPROVED GEN ARR. AND PLOT PLAN DWGS
INSTALL CIRCULATING WATER PIPING, OTHER UNDERGROUND PIPING, AND UNDERGROUND ELECTRICAL IN PLANT AREA. (BY G.C.)
CONNECT CONDENSOR TO TURBINE (BY GC)
INSTALL CONDENSOR SHELL & AUXILIARIES (BY G.C.)
INSTALL TUBES (BY G.C.)
COMPLETE CIRCULATING WATER SYS. & TEST (BY G.C.)
PREPARE BID PACKAGE
SPECIFY AND SELECT DEAERATOR (WITH PRELIM DWGS)
DEVELOP GENERAL CONTRACT DOCUMENTS
BID, COMMIT AND MOVE IN
POUR BUILD., BOILER, COAL SILO AND PULVERIZER FOUNDATIONS, POUR CIRC. WATER TUNNELS, POUR T-G PEDISTAL MAT. (BY G.C.)
POUR T-G PEDESTAL, POUR PAN, BOILER, FEED PUMP, SOOT BLOWER, AIR COMPRESSOR & MISC. FOUNDATIONS (BY G.C.)
POUR COOLING TOWER BASINS, COAL HANDLING SYSTEM CONCRETE, TRANSFORMER FOUNDATIONS, ASH SILO FOUNDATIONS, AND MISC. (BY G.C.)
ERECT COOLING TOWERS (BY MARLEY)
INSTALL COAL HANDLING SYSTEM (BY CONTINENTAL CONVEYOR)
WIRE AND TEST COAL HANDLING SYSTEM, INCLUDING ROTARY CAR DUMPER. (BY G.C.)
INSTALL ROTARY CAR DUMPER (BY McDOWELL WELLMAN)
DETERMINE CONDENSOR SIZE & ARRANGEMENT
DESIGN AND MANUFACTURE BOILER (BY COMBUSTION ENGINEERING)
ERECT BOILER STRUCTURAL STEEL (BY C.E.)
RAISE DRUM (BY C.E.)
ERECT BOILER (BY C.E.)
CONTINUE BOILER ERECTION (BY C.E.)
RELEASE AREA UNDER BOILER
CONTINUE BOILER ERECTION (BY C.E.)
HYDROSTATIC TEST
COMPLETE BOILER SETTING AND INSULATION (BY C.E.)
TURB.-GEN. VENDOR DEVELOP PRELIM. DWGS.
DESIGN AND MANUFACTURE TURBINE - GENERATOR (BY GENERAL ELECTRIC)
START TURBINE ERECTION (BY GC)
START SETTING GENERATOR STATOR (CC & AUSTIN)
CONTINUE TURBINE - GENERATOR ERECTION (BY G.C.)
COMPLETE PIPING, WIRING, TESTING (BY G.C.)
BLOW STEAM LINES
SET PULVERIZERS AND ERECT COAL SILO SUPPORT STEEL. COORDINATE AS REQUIRED TO SUIT BOTH ACTIVITIES (BY G.C. & C.E.)
ERECT COAL SILOS (BY G.C.)
POUR SLABS ON SILOS
ERECT TRIPPER ENCLOSURE (BY CONTINENTAL CONVEYOR)
INSTALL COAL TRIPPER (BY CONTINENTAL CONVEYOR)
APPROVE AND PREPARE BID PACKAGE
DEVELOP WAREHOUSE EXTENSION CONTRACT DOCUMENTS
BID AND COMMIT
CONSTRUCT WAREHOUSE EXTENSION (METRO CONST.)
ROUGH GRADE AND PREPARE SITE IN PLANT AREA. (BY G.C.)
PREPARE ROADBED FOR RAILROAD TRACK IN COAL HANDLING AREA (BY G.C.)
LAY RAILROAD TRACK (BY CONTRACTOR SELECTED BY PSCO)
ERECT TODTON ASH SILO (BY G.C.)
INSTALL BOTTOM ASH HOPPER, ASH SLUICE PIPING, FLY ASH PIPING, & AIR PIPING. (BY G.C.)
COMPLETE WIRING AND TEST (BY G.C.)
SELECT STACK CONTRACTOR
POUR STACK FOUNDATION AND CONSTRUCT STACK (BY M.W. KELLOGG)
MOVE UNIT NO. 3 ASH WATER TANK, REVISE RAILROAD TRACK AT ASH SILOS. (BY STEARNS - ROGER)
DESIGN ASH REMOVAL SYSTEM
○ : DATE OF EVENT
----→ : RESTRAINT
PUBLIC SERVICE CO. OF COLORADO
ENGINEERING DEPARTMENT
ELECTRICAL DIVISION
ENGINEERING DIVISION
LOCATION CHEROKEE S.G. STATION UNIT NO. 4
SUBJECT PROJECT BASIC PLAN AND SCHEDULE
APPROVALS
MECH. STRUCT. ELECT. FINAL
BY JRS DATE 12/3/71
CKD. DATE 12/3/71
NO.
NO. DATE BY CK. REVISION MECH. STRUCT. ELEC. FINAL
SCALE
EP NO.
SHEET OF

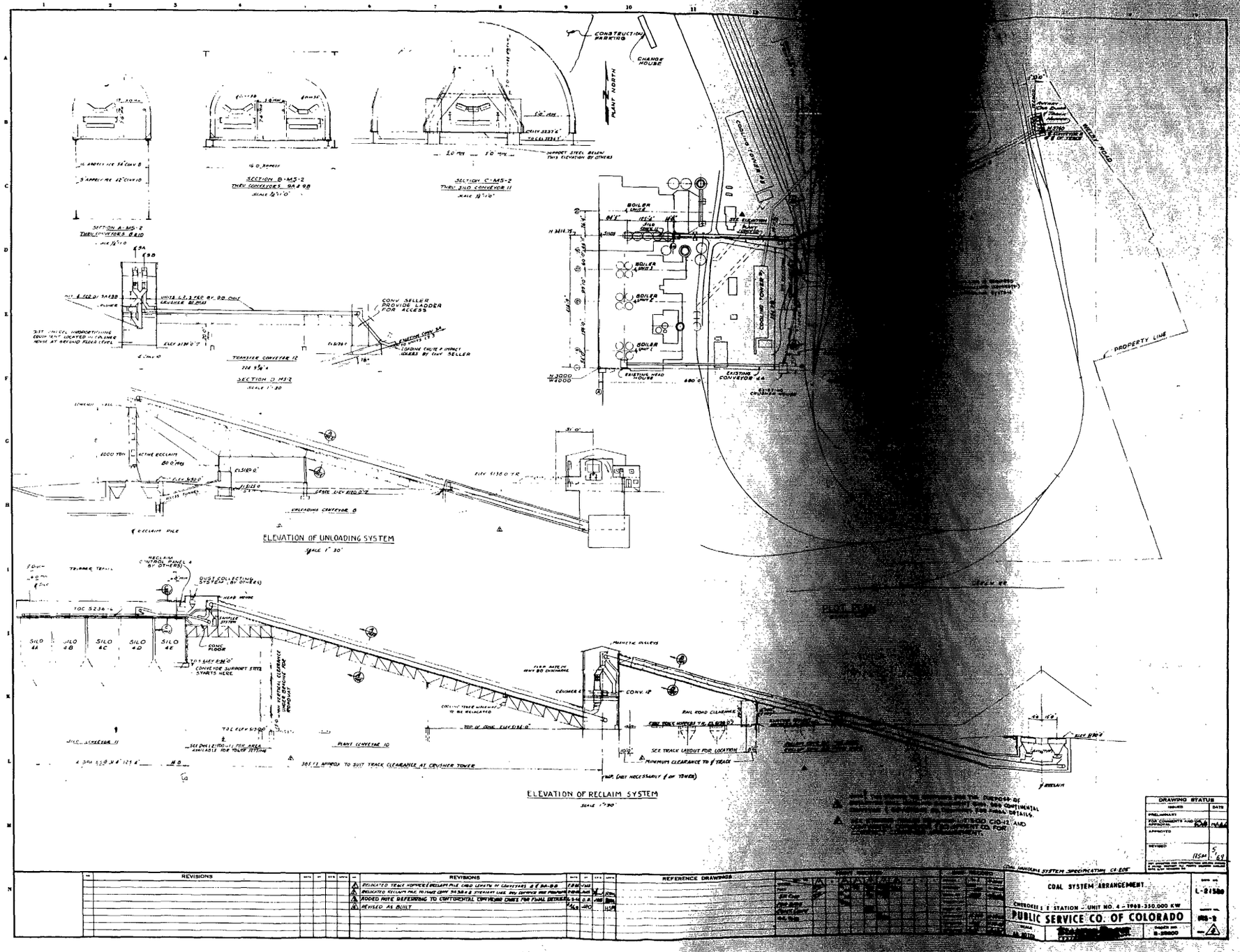
WAD00624


SOUTH PLATTE RIVER CHANNEL
YORK STREET
FRANKLIN STREET
EXIST. CULVERT
SHALLOW WELL Nº 3
SHALLOW WELL Nº 2
DEEP WELL Nº 2
TRACK HOPPER
SEE DETAIL 1(Y2-5)
FUTURE RAILROAD TRACK
EXIST. DRAIN CULVERTS
EXISTING DRAINAGE DITCH
CONVEYOR 8
TOWER Nº 1
RECLAIM HOPPER
COAL STORAGE AREA
COOLING TOWER Nº 2
COOLING TOWER Nº 4
COOLING TOWER Nº 3
EXIST ASH PONDS TO REMAIN
FUTURE RAILROAD
ELEVATED FOOTBRIDGE
CIRCULATING WATER CONDUIT
MILLERS WELL (EXIST)
PLANT CONVEYOR
CHLORINE SHED
WHSE.
WHSE.
COAL SPUR
CRUSHER HOUSE
POND DISCH. PUMPS
CRUSHER TOWER (EXIST)
POND Nº 3 (EXIST)
WHSE. SPUR
POND Nº 2 (EXIST)
POND Nº 1 (EXIST)
TURBINE ROOM SPUR
PARKING AREA
UNIT Nº 4
UNIT Nº 3
UNIT Nº 2
UNIT Nº 1
TRANSFORMER & SWITCHGEAR AREA (EXIST)
115 KV SWITCHYARD (EXIST)
230 KV SWITCHYARD BY PSCG
CONSTRUCTION OFFICE
GAS METER RUN
COND. STOR. TANK
EXIST POWER LINE
RELOCATED IRRIGATION DITCH (NEW)
EXIST IRRIG DITCH TO BE RELOCATED
NEW GRAVEL ROAD
TRANS TOWER (TYP)
POWER LINE TYP
64TH STREET
D.&R.G.W. R.R. NORTHWESTERN TERMINAL R.R.
W. 3000
N. 2000
W. 4000
BASE LINE
PLANT
TRUE
LEGEND
NEW FACILITIES
EXISTING FACILITIES
NEW OR RELOCATED RAILROAD
EXISTING RAILROAD
FUTURE RAILROAD
NEW PAVED ROAD
NEW GRAVEL ROAD
NEW FENCE LINE
EXISTING FENCE LINE
DRAWING STATUS
REVISIONS
REFERENCE DRAWINGS
PRINT RECORD
ENG. RECORD
PLOT PLAN
CHEROKEE S. E. STATION - UNIT NO. 4 - 1968-350,000 KW
PUBLIC SERVICE CO. OF COLORADO
L-21500
VI-1

WAD00625


UNLOADING CONTROL PANEL
TRACK HOPPER
RECLAIM PILE
DIAGRAM OF UNLOADING SYSTEM
RECLAIM CONTROL PANEL 1,2 & 3
RECLAIM CONTROL PANEL 4
CRUSHER 4
RECLAIM HOPPERS
SILO CONVEYOR 11
PULVERIZERS
LEGEND
START-STOP PUSHBUTTON
START-REVERSE-STOP PUSHBUTTON
LIMIT SWITCH
ZERO SPEED SWITCH
PULL CORD SWITCH
DUST SUPPRESSION CONTROL SWITCH
COAL FLOW SWITCH
DRAWING STATUS
COAL SYSTEM DIAGRAM
CHEROKEE S. S. STATION - UNIT NO. 4 - 1968 - 350,000 KW
PUBLIC SERVICE CO. OF COLORADO
L-21580
M8-1

WAD00626


SECTION A-MS-1
THRU CONVEYORS 8 & 10
SECTION B-MS-3
THRU CONVEYORS 9A & 9B
SECTION C-MS-2
THRU 2ND CONVEYOR 11
SECTION D-MS-2
TRANSFER CONVEYOR 12
CONV. SELLER PROVIDE LADDER FOR ACCESS
ELEVATION OF UNLOADING SYSTEM
UNLOADING CONVEYOR 8
ACTIVE RECLAIM
1000 TPH
RECLAIM PILE
ELEVATION OF RECLAIM SYSTEM
SILO 4A
SILO 4B
SILO 4C
SILO 4D
SILO 4E
CONC FLOOR
PLANT CONVEYOR 10
SILO CONVEYOR 11
CRUSHER TOWER
CONV. 12
BOILER UNIT 4
BOILER UNIT 3
BOILER UNIT 2
BOILER UNIT 1
COOLING TOWER #3
COOLING TOWER #4
EXISTING CONVEYOR 4A
EXISTING DEAD HOUSE
CONSTRUCTION PARKING
CHANGE HOUSE
PLANT NORTH
BELLEVUE ROAD
PROPERTY LINE
RAIL ROAD CLEARANCE
SEE TRACK LAYOUT FOR LOCATION
MINIMUM CLEARANCE TO ℄ TRACK
305'-0" APPROX. TO SUIT TRACK CLEARANCE AT CRUSHER TOWER
MAGNETIC PULLEYS
DUST COLLECTING SYSTEM (BY OTHERS)
RECLAIM CONTROL PANEL A (BY OTHERS)
TRIPPER TROLLEY
REAR HOUSE
TOC 5236'-6"
TOC ELEV 5300'-0"
TOP OF CONC ELEV 5316'-0"
CONC FLOOR ELEV 5316'-0"
ELEV 5316'-0" TYP.
ELEV 5316'-0"
ELEV 5316'-0"
ELEV 5316'-0"

LINE SYMBOLS

- PROCESS PIPING
- INSTRUMENT AIR PIPING
- INSTRUMENT ELECTRICAL LEADS
- CAPILLARY TUBING
- FLEXIBLE HOSE
- EXISTING

INSTRUMENTATION & MISCELLANEOUS FLOW SYMBOLS

- LOCALLY MOUNTED INSTRUMENT
- PANEL MOUNTED INSTRUMENT
- FLOW ELEMENT
- FLOW ORIFICE (RESTRICTION)
- SETTLING CHAMBER
- SEPARATION CHAMBER
- RESERVOIR
- CONTROL DRIVE
- RUPTURE DISC
- COMB. FILTER-REGULATOR
- COIL SYPHON
- TRAP (OR DRAINER)
- OPEN FUNNEL
- BOOTLEG
- DUPLEX STRAINER
- Y-TYPE STRAINER
- TEMPORARY STRAINER
- EXPANSION JOINT
- UNION
- LINE SIZE CHANGE
- FLOW ARROW
- COOLING COIL (HEAT EXCHANGER)
- SOCKET OR BUTT WELDED JOINT
- SCREWED JOINT
- FLANGED JOINT
- BELL & SPIGOT JOINT
- FIRE HYDRANT

VALVE SYMBOLS

	FLANGED	SCREWED	SOCKET OR BUTT WELD	END VIEW
GATE TOP				
GATE SIDE				
GLOBE TOP				
GLOBE SIDE				
CHECK TOP				
CHECK SIDE				
PLUG TOP				
WRENCH OPERATED SIDE				
PLUG GEAR OPERATED TOP				
PLUG GEAR OPERATED SIDE				
BUTTERFLY TOP				
BUTTERFLY SIDE				

	FLANGED	SCREWED	SOCKET OR BUTT WELD	END VIEW
DIAPHRAGM TOP				
DIAPHRAGM SIDE				
DIAPHRAGM OPERATED TOP				
DIAPHRAGM OPERATED SIDE				
SAFETY TOP				
SAFETY SIDE				
ANGLE TOP				
ANGLE SIDE				
MECHANICAL OPERATED VALVES	(H) MOTOR	(J) DAC FLOAT	(G) DAC GEAR	
	(I) CYLINDER	(S) SOLENOID	(Q) QUICK OPENING	
BALL				
3-WAY VALVE				
4-WAY VALVE	OR			

NOTE - TOP VIEW SCREWED VALVE SYMBOLS WITHOUT HANDLES ARE USED ON FLOW DIAGRAM

INSTRUMENT NOMENCLATURE

A	ALARM
AR	ANALYZER RECORDER
AT	ANALYZER TRANSMITTER
CE	CONDUCTIVITY ELEMENT
CR	CONDUCTIVITY RECORDER
E/P C	ELECTRIC TO PNEUMATIC CONVERTER
ER	ELECTRIC RELAY
FC	FLOW CONTROLLER
FCD	FLOW CONTROL DRIVE
FCV	FLOW CONTROL VALVE
FE	FLOW ELEMENT
FI	FLOW INDICATOR
FIC	FLOW INDICATOR CONTROLLER
FO	FLOW ORIFICE (RESTRICTION)
FR	FLOW RECORDER
FS	FLOW SWITCH
FT	FLOW TRANSMITTER
FG	FLOW GLASS
FH	FIRE HYDRANT
HCV	FLUID CONTROL VALVE
HIC	HAND INDICATOR CONTROLLER
IL	INDICATING LIGHT
IN	INDICATOR
LC	LEVEL CONTROLLER
LCV	LEVEL CONTROL VALVE
LG	LEVEL GLASS
LI	LEVEL INDICATOR
LIC	LEVEL INDICATOR CONTROLLER
LMS	LIMIT SWITCH
LR	LEVEL RECORDER
LRC	LEVEL RECORDER CONTROLLER
LS	LEVEL SWITCH
LT	LEVEL TRANSMITTER
M	METER (ELECTRICAL)
PB	PUSHBUTTON
PC	PRESSURE CONTROLLER
PCV	PRESSURE CONTROL VALVE
P/E C	PNEUMATIC TO ELECTRIC CONVERTER
pHC	pH CONTROLLER
pHE	pH ELEMENT
pHR	pH RECORDER
pHT	pH TRANSMITTER
PI	PRESSURE INDICATOR
PIC	PRESSURE INDICATOR CONTROLLER
PR	PRESSURE RECORDER
PRC	PRESSURE RECORDER CONTROLLER
PS	PRESSURE SWITCH
PSV	PRESSURE SAFETY VALVE
PT	PRESSURE TRANSMITTER
RE	RESISTOR
SC	SAMPLE COOLER
SV	SOLENOID VALVE
SW	SWITCH (ELECTRICAL)
T	TRAP
TB	TEST BLOCK
TC	TEMPERATURE CONTROLLER
TCV	TEMPERATURE CONTROL VALVE
TE	TEMPERATURE ELEMENT
TI	TEMPERATURE INDICATOR
TIC	TEMPERATURE INDICATOR CONTROLLER
TR	TEMPERATURE RECORDER
TRC	TEMPERATURE RECORDER CONTROLLER
TS	TEMPERATURE SWITCH
TT	TEMPERATURE TRANSMITTER
TW	TEMPERATURE WELL
Tv	TELEVISION
UBS	UNDER BELT SWITCH
ZSS	ZERO SPEED SWITCH

PIPE LINE NUMBERING SYSTEM

Example: ST - S - 4 — SPEC. LETTER; LINE NO.; SERVICE TO PIPE; SIZE

SERVICE ABBREVIATIONS

ST	STEAM (INCL. TRAPS)
CD	CONDENSATE
RW	RAW WATER
FP	FIRE PROTECTION WATER
CW	CIRCULATING WATER
TW	TREATED WATER
PW	POTABLE WATER
SW	SERVICE WATER & EQUIPMENT COOLING WATER
BD	BLOWDOWN
DR	DRAINS
VT	VENTS (INCL. RELIEF VALVES)
CH	CHEMICAL
SS	SANITARY SEWER
SA	SERVICE AIR
IA	INSTRUMENT AIR
N	NITROGEN
FD	FLOOR DRAIN
LO	LUBE OIL
RD	ROOF DRAINS
MM	MISCELLANEOUS MATERIAL
ED	EQUIPMENT DRAIN
FG	FUEL GAS
FA	FLY ASH
TA	TRANSFER AIR
WA	WET ASH
SBA	SOOT BLOWER AIR

CONTRACT TERMINAL DESIGNATION

TERMINAL POINTS REQUIRING CLASSIFICATION ARE INDICATED AS PER FOLLOWING EXAMPLE:

Above Line Only Denotes Furnished & Installed by GC — Denotes Furnished By CE

GC — CE — PC

*Denotes Installed by PC

Terminal Point

INDEX

2500-P1-1	PIPING SYMBOLS AND NOMENCLATURE
P2-1	LINE SCHEDULE
P2-2	LINE SCHEDULE
P2-3	LINE SCHEDULE
P2-4	LINE SCHEDULE
P2-5	LINE SCHEDULE
P3-1	COMPOSITE STEAM & CONDENSATE FLOW DIAGRAM
P3-2	STEAM FLOW DIAGRAM
P3-3	CONDENSATE & BOILER FEED WATER FLOW DIAGRAM
P3-4	HEATERS, VENTS & DRAINS FLOW DIAGRAM
P3-5	BOILER & TURBINE VENTS & DRAINS FLOW DIAGRAMS
P3-6	COMBUSTION AIR & FLUE GAS FLOW DIAGRAM
P3-7	SERVICE WATER FLOW DIAGRAM
P3-8	CIRCULATING WATER & POTABLE WATER FLOW DIAGRAMS
P3-9	FIRE PROTECTION, WATER TREATING & CHEMICAL FEED FLOW DIAGRAM
P3-10	SOOTBLOWER, SERVICE & INSTRUMENT AIR FLOW DIAGRAMS
P3-11	AUXILIARY STEAM FLOW DIAGRAM
P3-12	H-CO- & TURBINE LUBE OIL FLOW DIAGRAMS
P3-13	FUEL GAS FLOW DIAGRAM
P3-14	EQUIPMENT TRIM DIAGRAM
P3-15	ASH WATER SUPPLY FLOW DIAGRAM
P3-16	ASH CONVEYING & TRANSFER AIR FLOW DIAGRAM
P3-17	MISCELLANEOUS FLOW DIAGRAMS

DRAWING STATUS

ISSUED	DATE
PRELIMINARY — VJS	4/4/66
FOR COMMENTS AND/OR APPROVAL — GJS	5/11/66
APPROVED FOR CONSTRUCTION — HSM	9/66
REVISED & APPROVED FOR CONSTRUCTION	

REVISIONS

NO.	APPROVED	CHECKED	DRAWN	DATE
1	APPROVED FOR CONSTRUCTION	GJS	HSM	9/66

REVISIONS

REFERENCE DRAWINGS

PRINT RECORD

ISSUED FOR	DATE	BY
S.R. CORD		
SC-B-D		
PC-B-D		

ENG RECORD

DRAWN	D.V.N. 3-25-66
CHECKED	C.E.B. 3-29-66
MECH. EX.	
SUPVSY. EX.	
ELECT. EX.	
SUPVSY. EX.	
APPROVED	J.M. 3-29-66
APPROVED	

PIPING SYMBOLS & NOMENCLATURE

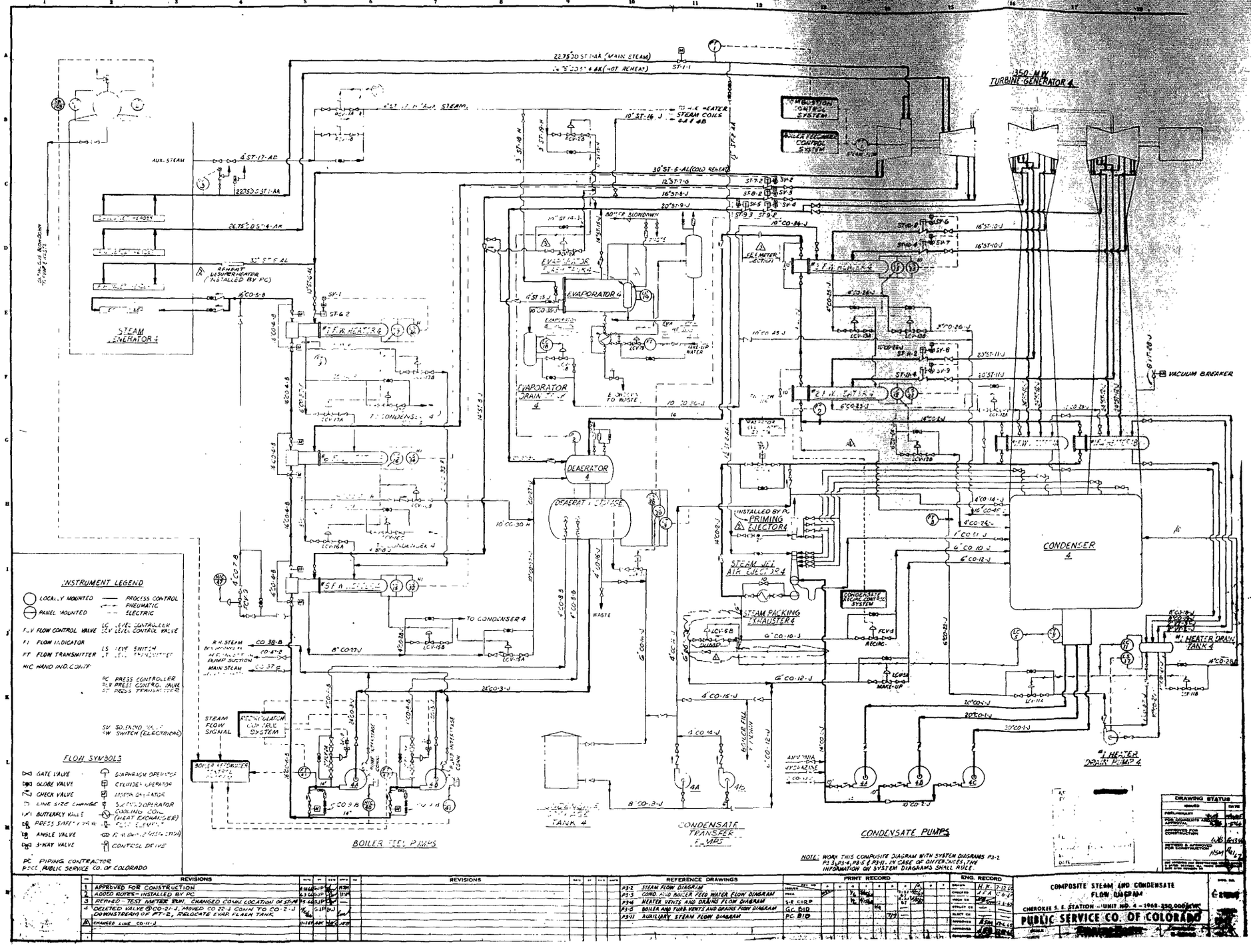
CHEROKEE S. E. STATION - UNIT NO. 4 - 1968-350,000 KW

PUBLIC SERVICE CO. OF COLORADO

SCALE NONE — Stearns-Roger — ORDER NO. B-28900

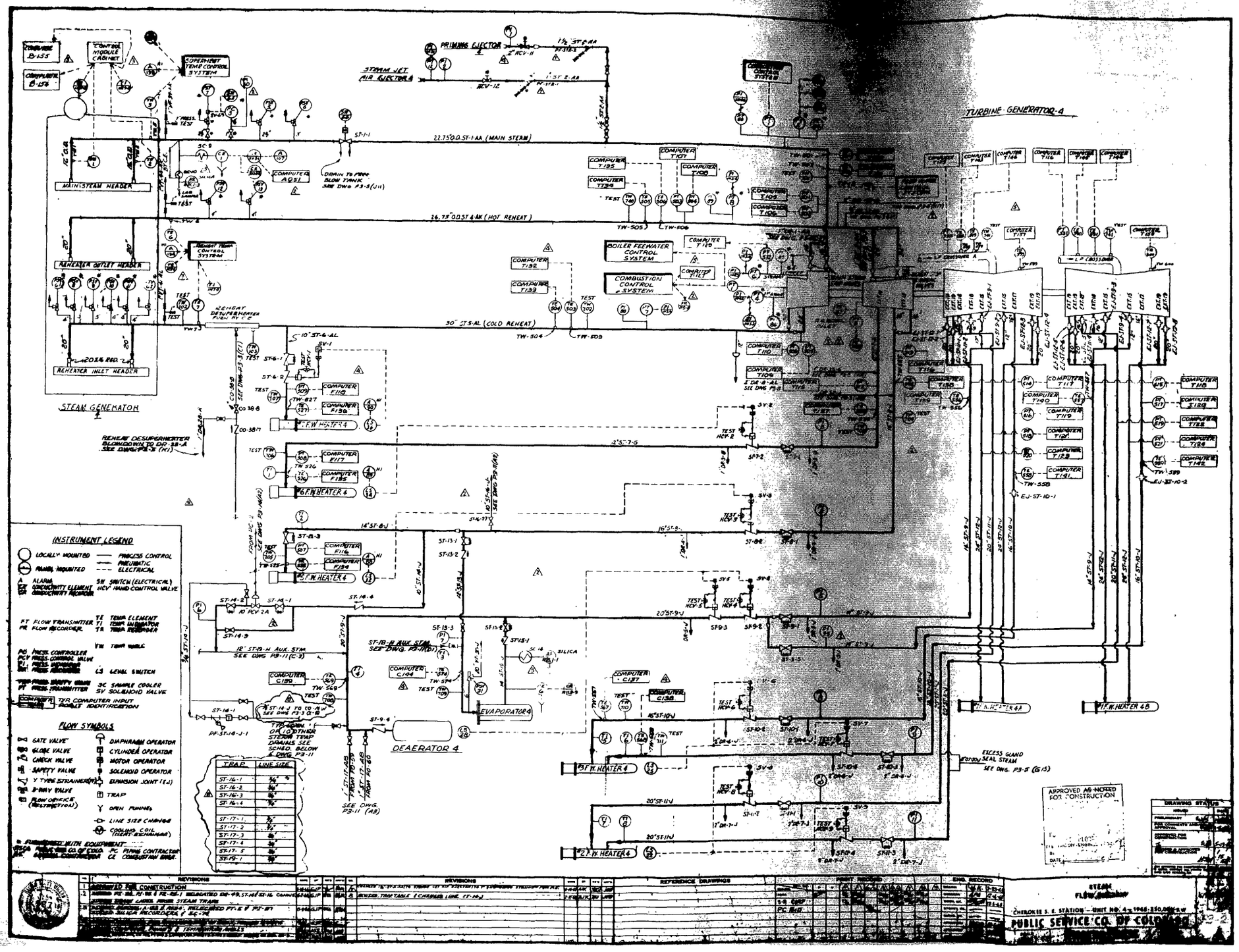
DWG NO. L-21500 — SHEET NO. P1-1 — REV. 4

WAD00628



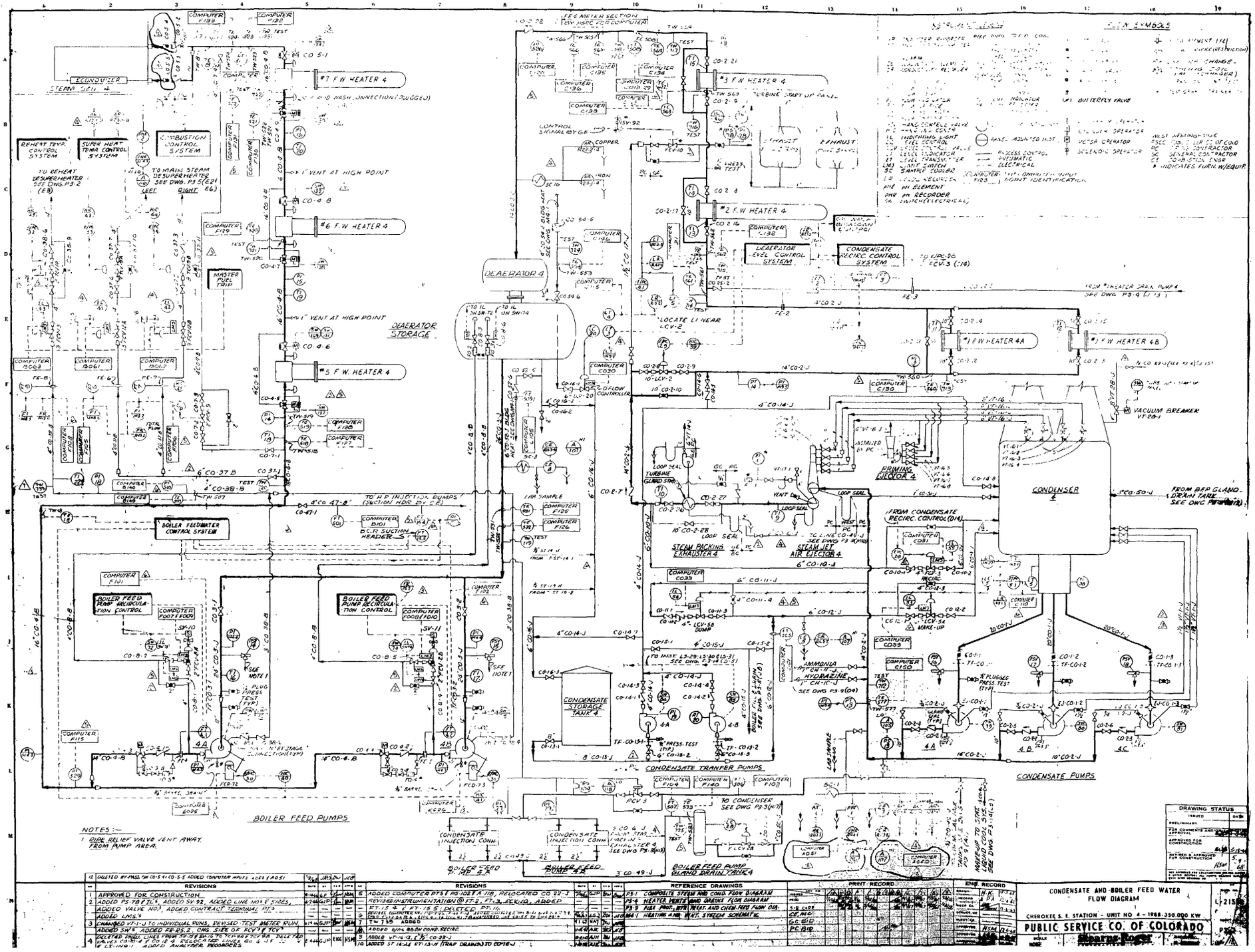
350 MW TURBINE GENERATOR 4
STEAM GENERATOR 4
EVAPORATOR 4
EVAPORATOR DRAIN TANK 4
DEAERATOR 4
CONDENSER 4
STEAM JET AIR EJECTOR 4
STEAM PACKING EXHAUSTER 4
PRIMING EJECTOR 4
VACUUM BREAKER
#1 HEATER DRAIN TANK 4
#1 HEATER DRAIN PUMP 4
CONDENSATE TRANSFER PUMPS
CONDENSATE PUMPS
BOILER FEED PUMPS
INSTRUMENT LEGEND
LOCALLY MOUNTED
PANEL MOUNTED
PROCESS CONTROL
PNEUMATIC
ELECTRIC
FLOW SYMBOLS
GATE VALVE
GLOBE VALVE
CHECK VALVE
LINE SIZE CHANGE
BUTTERFLY VALVE
ANGLE VALVE
3-WAY VALVE
PC PIPING CONTRACTOR
PSCC PUBLIC SERVICE CO. OF COLORADO
NOTE: WORK THIS COMPOSITE DIAGRAM WITH SYSTEM DIAGRAMS P3-2 P3-3, P3-4, P3-5 & P3-11. IN CASE OF DIFFERENCES, THE INFORMATION ON SYSTEM DIAGRAMS SHALL RULE.
REVISIONS
1 APPROVED FOR CONSTRUCTION
2 ADDED NOTES - INSTALLED BY PC
3 REVISED - TEST METER RUN, CHANGED CONN LOCATION OF ST-14
4 DELETED VALVE @ CO-21-J, MOVED CO 22-J CONN TO CO-2-J DOWNSTREAM OF FT-2, RELOCATE EVAP FLASH TANK
A CHANGED LINE CO-11-J
REFERENCE DRAWINGS
P3-2 STEAM FLOW DIAGRAM
P3-3 COND. AND BOILER FEED WATER FLOW DIAGRAM
P3-4 HEATER VENTS AND DRAINS FLOW DIAGRAM
P3-5 BOILER AND TURB. VENTS AND DRAINS FLOW DIAGRAM
P3-11 AUXILIARY STEAM FLOW DIAGRAM
PRINT RECORD
ENG. RECORD
COMPOSITE STEAM AND CONDENSATE FLOW DIAGRAM
CHEROKEE S. E. STATION - UNIT NO. 4 - 1968 - 350,000 KW
PUBLIC SERVICE CO. OF COLORADO

WAD00629



TURBINE GENERATOR-4
STEAM GENERATOR
DEAERATOR 4
MAIN STEAM HEADER
REHEATER OUTLET HEADER
REHEATER INLET HEADER
PRIMING EJECTOR
STEAM JET AIR EJECTOR
BOILER FEEWATER CONTROL SYSTEM
COMBUSTION CONTROL SYSTEM
EVAPORATOR 4
INSTRUMENT LEGEND
FLOW SYMBOLS
APPROVED AS NOTED FOR CONSTRUCTION
PUBLIC SERVICE CO. OF COLORADO

WAD00630



NOTES:-
1 PIPE RELIEF VALVE VENT AWAY FROM PUMP AREA.

REVISIONS	REFERENCE DRAWINGS
12 DELETED BYPASS ON CO-5-4 & CO-5-5 ADDED COMPUTER INPUTS ADE5 & AO51	
1 APPROVED FOR CONSTRUCTION	5 ADDED COMPUTER PTS & PS-108 & 118, RELOCATED CO 22-J — P3-4 COMPOSITE STEAM AND COND. FLOW DIAGRAM
2 ADDED PS-78 & TL-6, ADDED SV 92, ADDED LINE NO'S & SIZES, ADDED VALVE NO3, ADDED CONTRACT TERMINAL PTS & ADDED LMS's	6 REVISED INSTRUMENTATION @ FT-2, FT-3, EXCLUD. ADDED FT-15 & FT-15-5 DELETED PT-16 — P3-9 FLAT PLATE, WITH VENT AND CHECK FEED FLOW DIA.
3 CHANGED VT-1-J TO INDIVIDUAL RUNS, REVISED TEST METER RUN	7 TW 135 ADDED — H-1-4 HEATING AND VENT. STREAM SCHEMATIC
4 ADDED SW's, ADDED FE-25-2, CHG. SIZE OF FCV's & TCV's, DELETED VALVES CO-11-4 & CO-12-4 RELOCATED LINES CO-6-J & CO-7-J	8 ADDED R/R COND. RECIRC. — P3-4
5 DELETED PNEU. LINES FROM SV-15-5 & SV-16-5 TO TCV & FCV, DELETED VALVES CO-11-4 & CO-12-4 RELOCATED LINES CO-6-J & CO-7-J, ADDED ANALYZER RECORDERS	9 ADDED VT-14-J, FT-13-J, CO-22-J
	10 ADDED ST 18-J & ST-13-J (TRAP DRAINS) TO CO-14-J

PRINT RECORD

ENG. RECORD

DRAWING STATUS

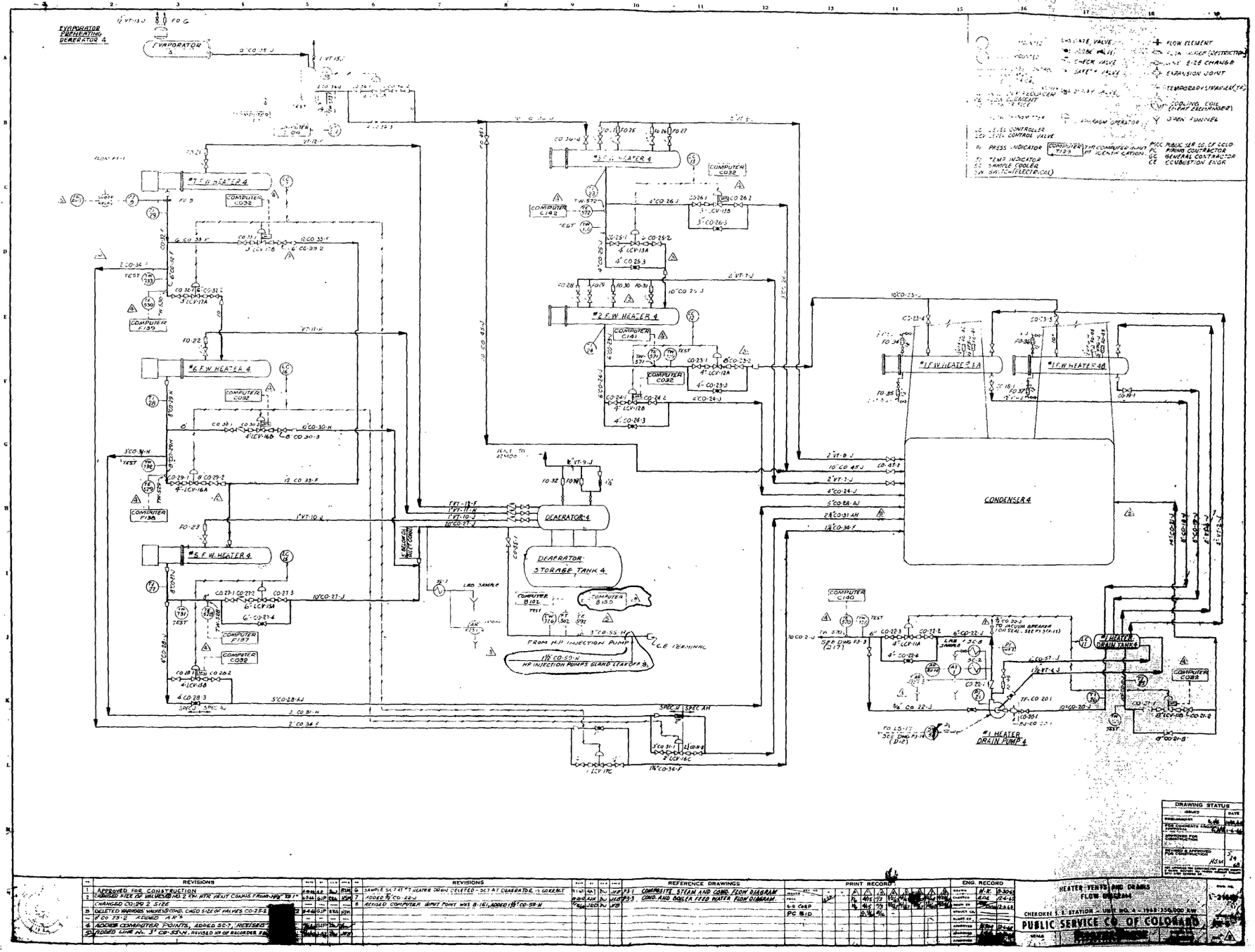
CONDENSATE AND BOILER FEED WATER FLOW DIAGRAM

CHEROKEE S. S. STATION - UNIT NO 4 - 1968-350,000 KW

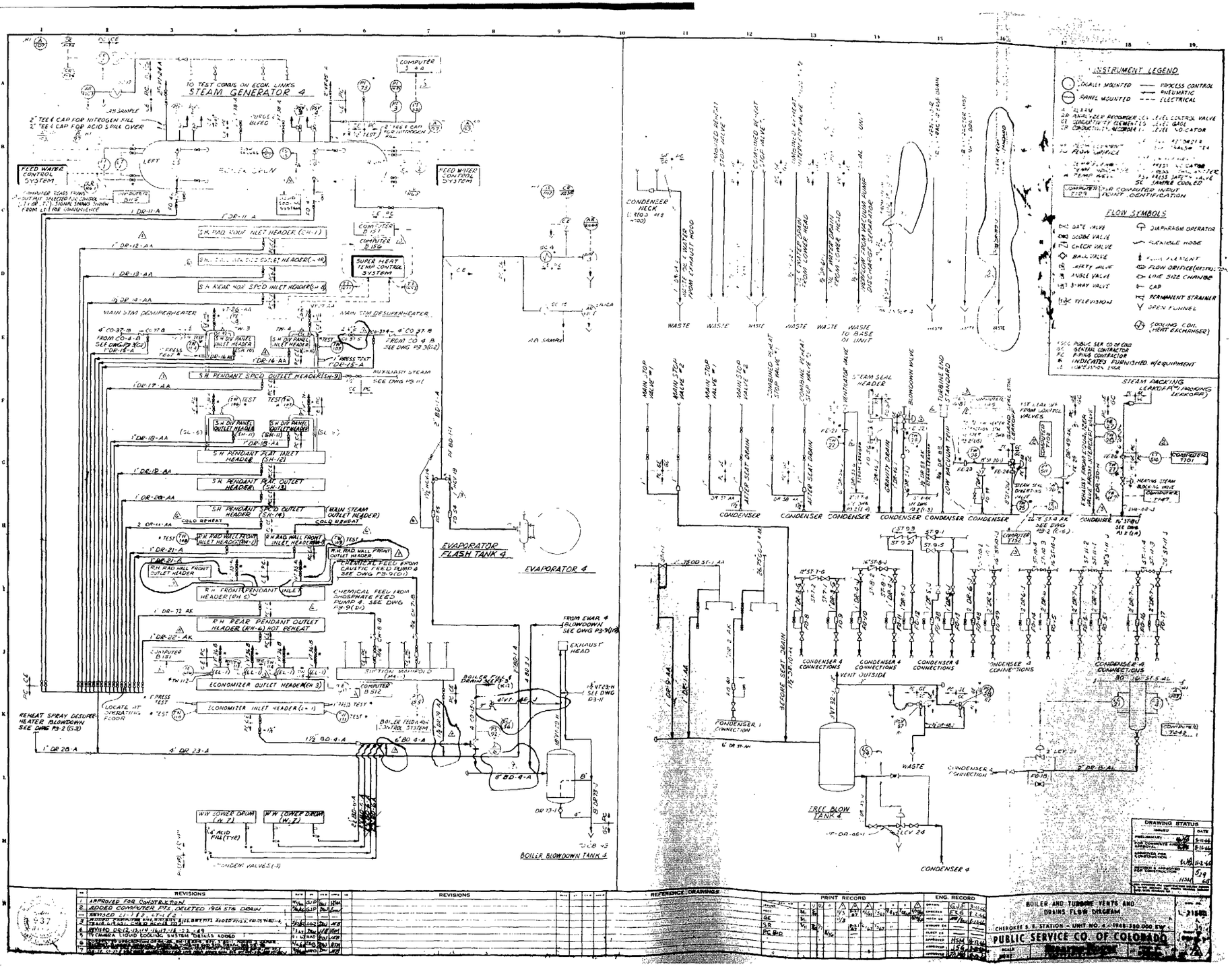
PUBLIC SERVICE CO. OF COLORADO

Stearns-Roger

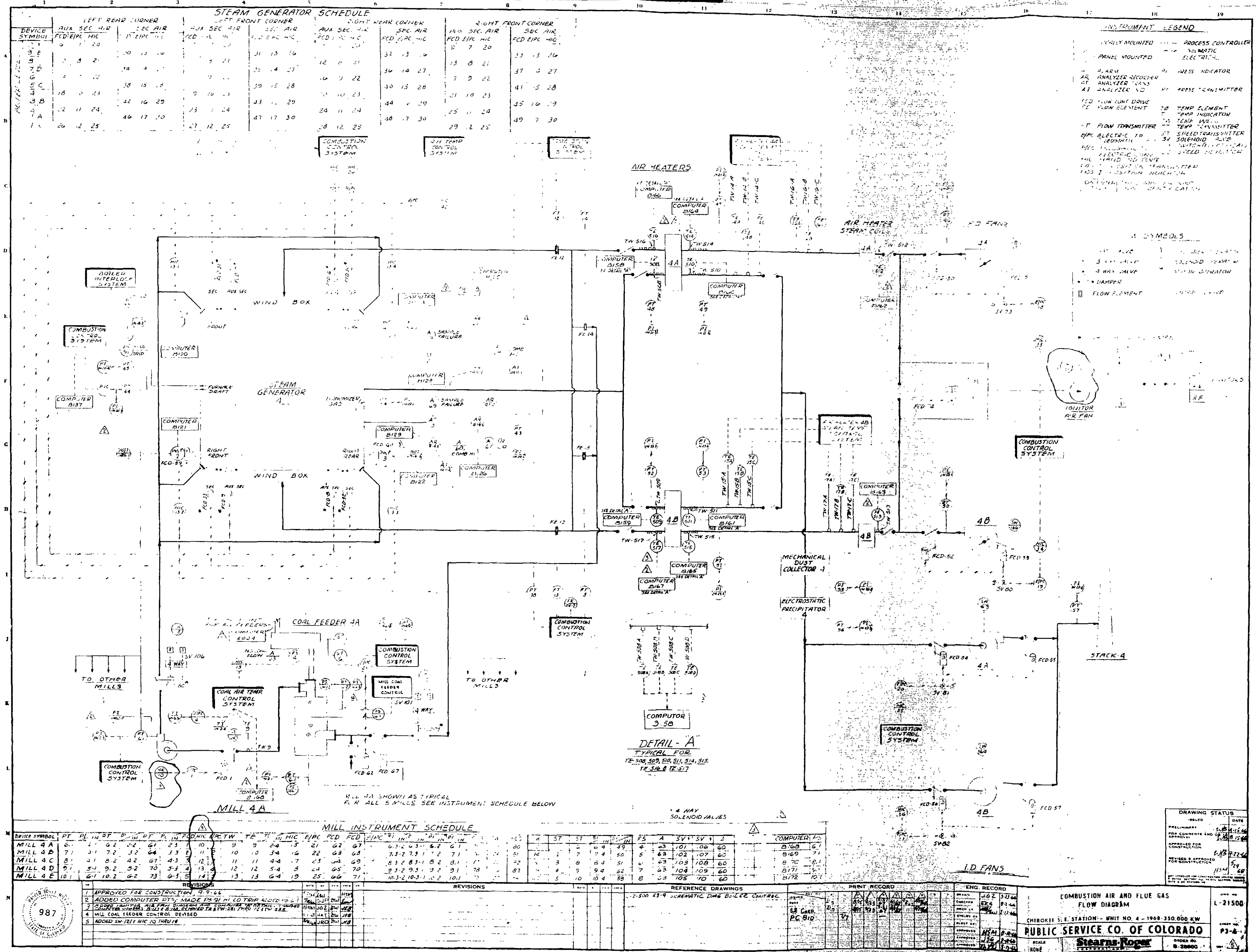
WAD00631


EVAPORATOR PREHEATING DEAERATOR 4
EVAPORATOR 4
#7 F.W. HEATER 4
#6 F.W. HEATER 4
#5 F.W. HEATER 4
#3 F.W. HEATER 4
#2 F.W. HEATER 4
#1 F.W. HEATER 4A
#1 F.W. HEATER 4B
DEAERATOR 4
DEAERATOR STORAGE TANK 4
CONDENSER 4
#1 HEATER DRAIN PUMP 4
#1 HEATER DRAIN TANK 4
COMPUTER C032
COMPUTER C142
COMPUTER C141
COMPUTER C100
COMPUTER F139
COMPUTER F138
COMPUTER F137
COMPUTER B102
COMPUTER B150
FROM H.P. INJECTION PUMP
HP INJECTION PUMPS GLAND LEAK OFF
LAB SAMPLE
C.E. TERMINAL
FLOW ELEMENT
EXPANSION JOINT
COOLING COIL (HEAT EXCHANGER)
OPEN FUNNEL
LEVEL CONTROLLER
LEVEL CONTROL VALVE
PRESS INDICATOR
TEMP INDICATOR
SAMPLE COOLER
SWITCH (ELECTRICAL)
PRINCIPAL CONTRACTOR
GENERAL CONTRACTOR
COMBUSTION ENGR
REVISIONS
REFERENCE DRAWINGS
PRINT RECORD
ENG. RECORD
DRAWING STATUS
APPROVED FOR CONSTRUCTION
CHANGED SIZE OF VALVES NO. 2 KW. HTR VENT CONNS FROM
CHANGED CO-29 2 SIZE
DELETED VARIOUS VALVES & COND. CHGD SIZE OF VALVES CO-25-2
ADDED COMPUTER POINTS, ADDED SC-7, REVISED
ADDED LINE NO. 3" CO-55-H. REVISED NO OF RECORDER
SAMPLE SC-7 AT #7 HEATER DRAIN DELETED - SC-7 AT DEAERATOR IS CORRECT
ADDED 3/4" CO-22-J
REVISED COMPUTER INPUT POINT WAS B-161, ADDED 1 1/2" CO-59-H
COMPOSITE STEAM AND COND. FLOW DIAGRAM
COND. AND BOILER FEED WATER FLOW DIAGRAM
PC 810
HEATER VENTS AND DRAINS FLOW DIAGRAM
CHEROKEE S. S. STATION - UNIT NO. 4 - 1968 - 350,000 KW
PUBLIC SERVICE CO. OF COLORADO

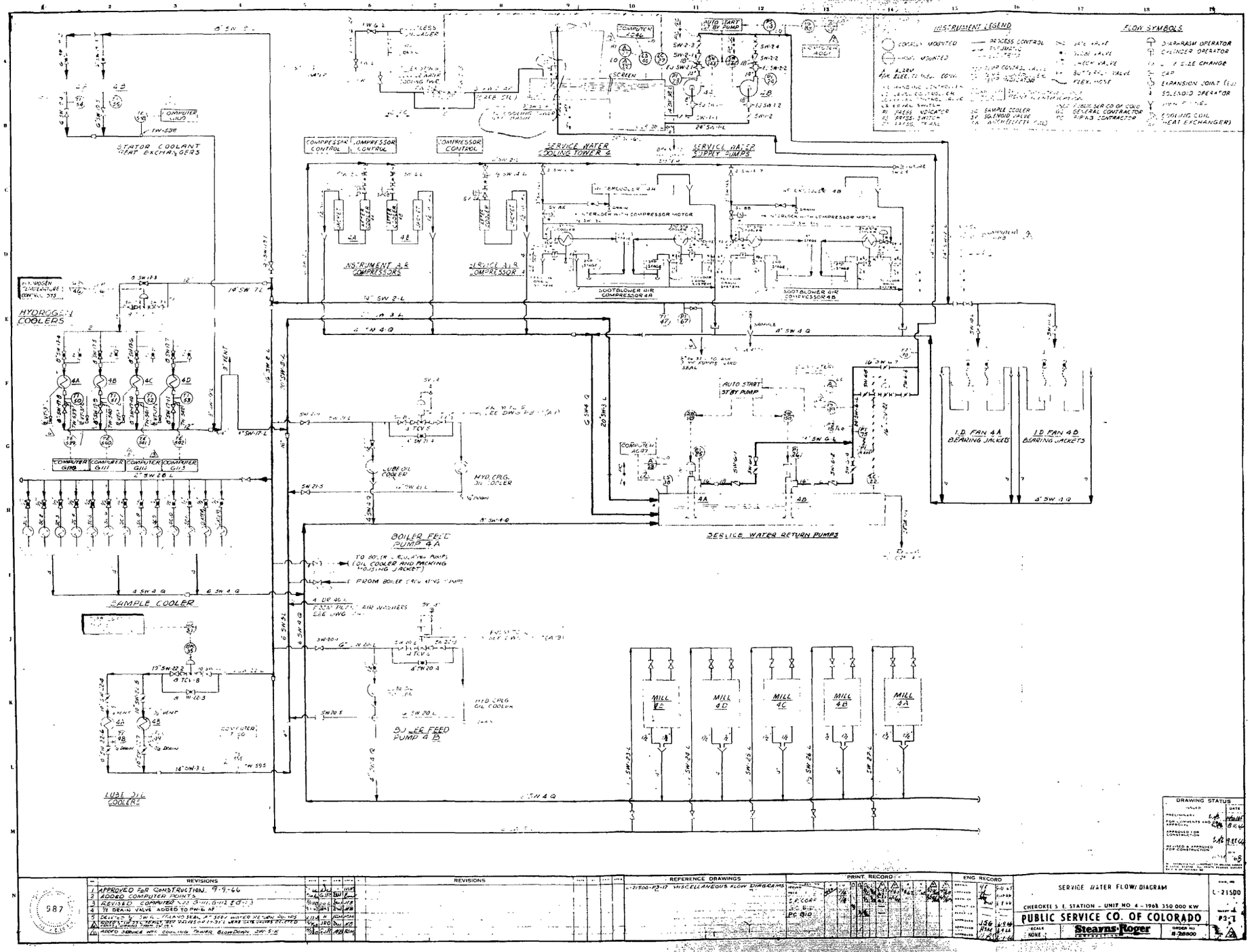
WAD00632


STEAM GENERATOR 4
BOILER DRUM
FEED WATER CONTROL SYSTEM
SUPER HEAT TEMP CONTROL SYSTEM
MAIN STM DESUPERHEATER
EVAPORATOR FLASH TANK 4
EVAPORATOR 4
BOILER BLOWDOWN TANK 4
FLASH TANK 4
CONDENSER 4
INSTRUMENT LEGEND
FLOW SYMBOLS
BOILER AND TURBINE VENTS AND DRAINS FLOW DIAGRAM
CHEROKEE 3 & 4 STATION - UNIT NO. 4 - 1948-350 000 KW
PUBLIC SERVICE CO. OF COLORADO
DRAWING STATUS
REVISIONS
REFERENCE DRAWINGS
PRINT RECORD
ENG. RECORD

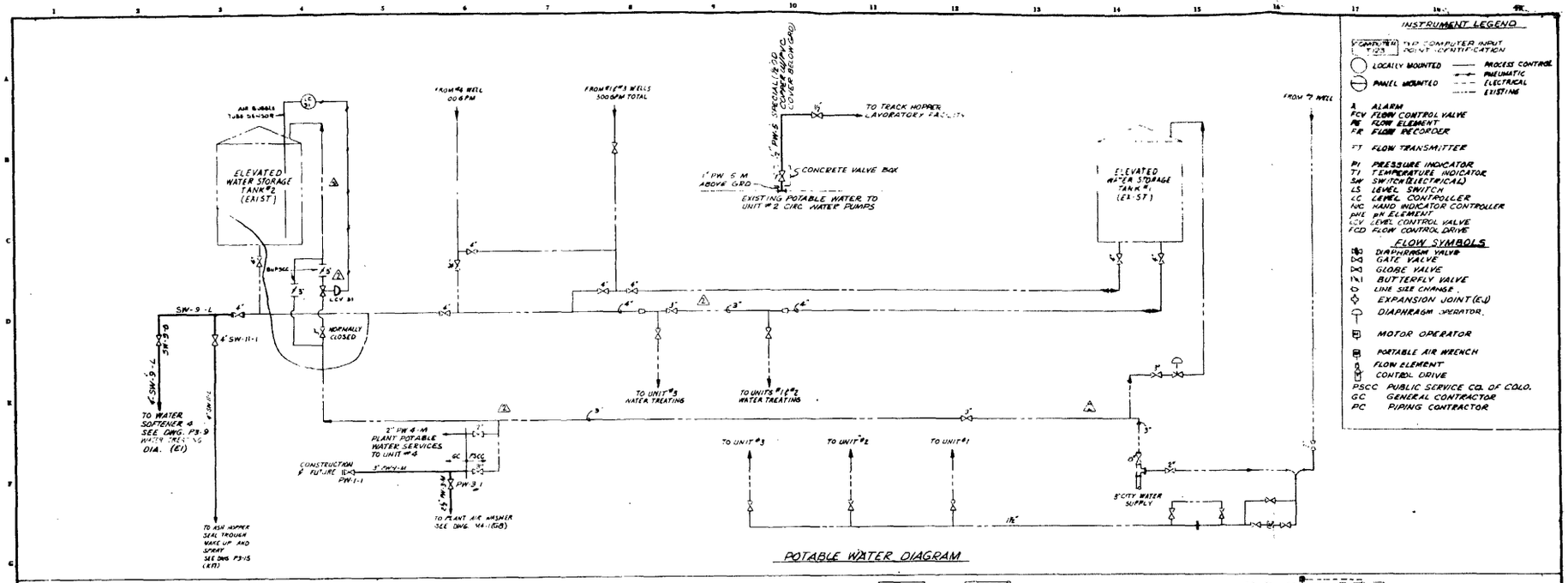
WAD00633


STEAM GENERATOR SCHEDULE
LEFT REAR CORNER
LEFT FRONT CORNER
RIGHT REAR CORNER
RIGHT FRONT CORNER
DEVICE SYMBOL
AUX SEC AIR
SEC AIR
INSTRUMENT LEGEND
PANEL MOUNTED
PROCESS CONTROLLER
FLOW TRANSMITTER
TEMP ELEMENT
TEMP INDICATOR
SOLENOID VALVE
DAMPER
FLOW ELEMENT
SYMBOLS
AIR HEATERS
AIR HEATER STEAM COILS
F.D. FANS
IGNITOR AIR FAN
COMBUSTION CONTROL SYSTEM
BOILER INTERLOCK SYSTEM
RH TEMP CONTROL SYSTEM
STEAM GENERATOR 4
WIND BOX
FRONT
RIGHT FRONT
RIGHT REAR
FURNACE DRAFT
COMPUTER B120
COMPUTER B121
COMPUTER B122
COMPUTER B128
COMPUTER B129
COMPUTER B126
COMPUTER B137
COMPUTER B158
COMPUTER B159
COMPUTER B161
COMPUTER B164
COMPUTER B165
COMPUTER B166
COMPUTER B167
COMPUTER B163
MECHANICAL DUST COLLECTOR 4
ELECTROSTATIC PRECIPITATOR 4
I.D. FANS
STACK 4
4A
4B
COAL FEEDER 4A
MILL COAL FEEDER CONTROL
COAL AIR TEMP. CONTROL SYSTEM
TO OTHER MILLS
MILL 4A
MILL 4A SHOWN AS TYPICAL
FOR ALL 5 MILLS SEE INSTRUMENT SCHEDULE BELOW
DETAIL "A"
TYPICAL FOR
TE-508, 509, 510, 511, 514, 515, TE-516 & TE-517
COMPUTOR 3.58
4 WAY SOLENOID VALVES
MILL INSTRUMENT SCHEDULE
MILL 4A
MILL 4B
MILL 4C
MILL 4D
MILL 4E
REVISIONS
1 APPROVED FOR CONSTRUCTION 9-9-66
2 ADDED COMPUTER PTS; MADE PS-91 HI CO TRIP
4 MILL COAL FEEDER CONTROL REVISED
5 ADDED SW-1211 HIC 10 THRU 14
REFERENCE DRAWINGS
PRINT RECORD
ENG. RECORD
DRAWING STATUS
PRELIMINARY
FOR COMMENTS AND APPROVAL
APPROVED FOR CONSTRUCTION
REVISED & APPROVED FOR CONSTRUCTION
COMBUSTION AIR AND FLUE GAS
FLOW DIAGRAM
CHEROKEE S. E. STATION - UNIT NO. 4 - 1968 - 350,000 KW
PUBLIC SERVICE CO. OF COLORADO
Stearns-Roger
SCALE NONE
L-21500
987

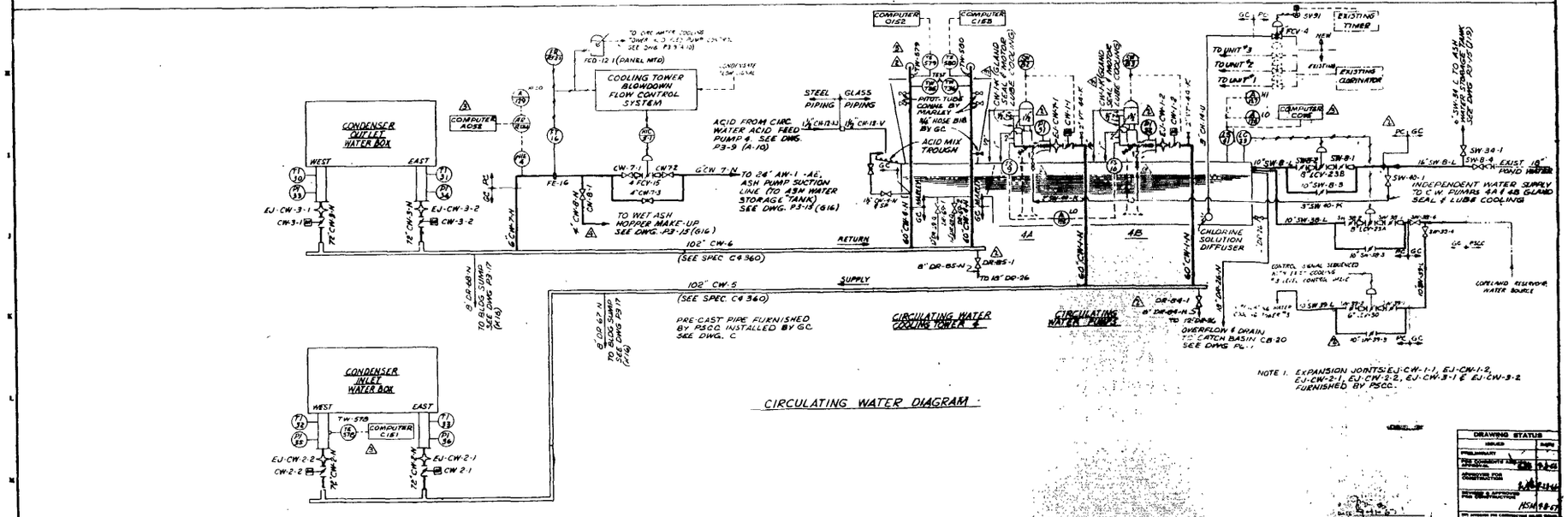
WAD00634


INSTRUMENT LEGEND
FLOW SYMBOLS
STATOR COOLANT HEAT EXCHANGERS
SERVICE WATER BOOSTER PUMPS
SERVICE WATER SUPPLY HEADER
INSTRUMENT AIR COMPRESSORS
SERVICE AIR COMPRESSOR
SOOTBLOWER AIR COMPRESSOR 4A
SOOTBLOWER AIR COMPRESSOR 4B
HYDROGEN COOLERS
SAMPLE COOLER
LUBE OIL COOLERS
BOILER FEED PUMP 4A
BOILER FEED PUMP 4B
SERVICE WATER RETURN PUMPS
I.D. FAN 4A BEARING JACKET
I.D. FAN 4B BEARING JACKETS
MILL 4E
MILL 4D
MILL 4C
MILL 4B
MILL 4A
AUTO START ST BY PUMP
HYD. CPLG. OIL COOLER
DRAWING STATUS
REVISIONS
REFERENCE DRAWINGS
PRINT RECORD
ENG RECORD
SERVICE WATER FLOW DIAGRAM
CHEROKEE 5 & 6, STATION – UNIT NO. 4 – 1968 350 000 KW
PUBLIC SERVICE CO. OF COLORADO
Stearns-Roger
L-21500

WAD00635



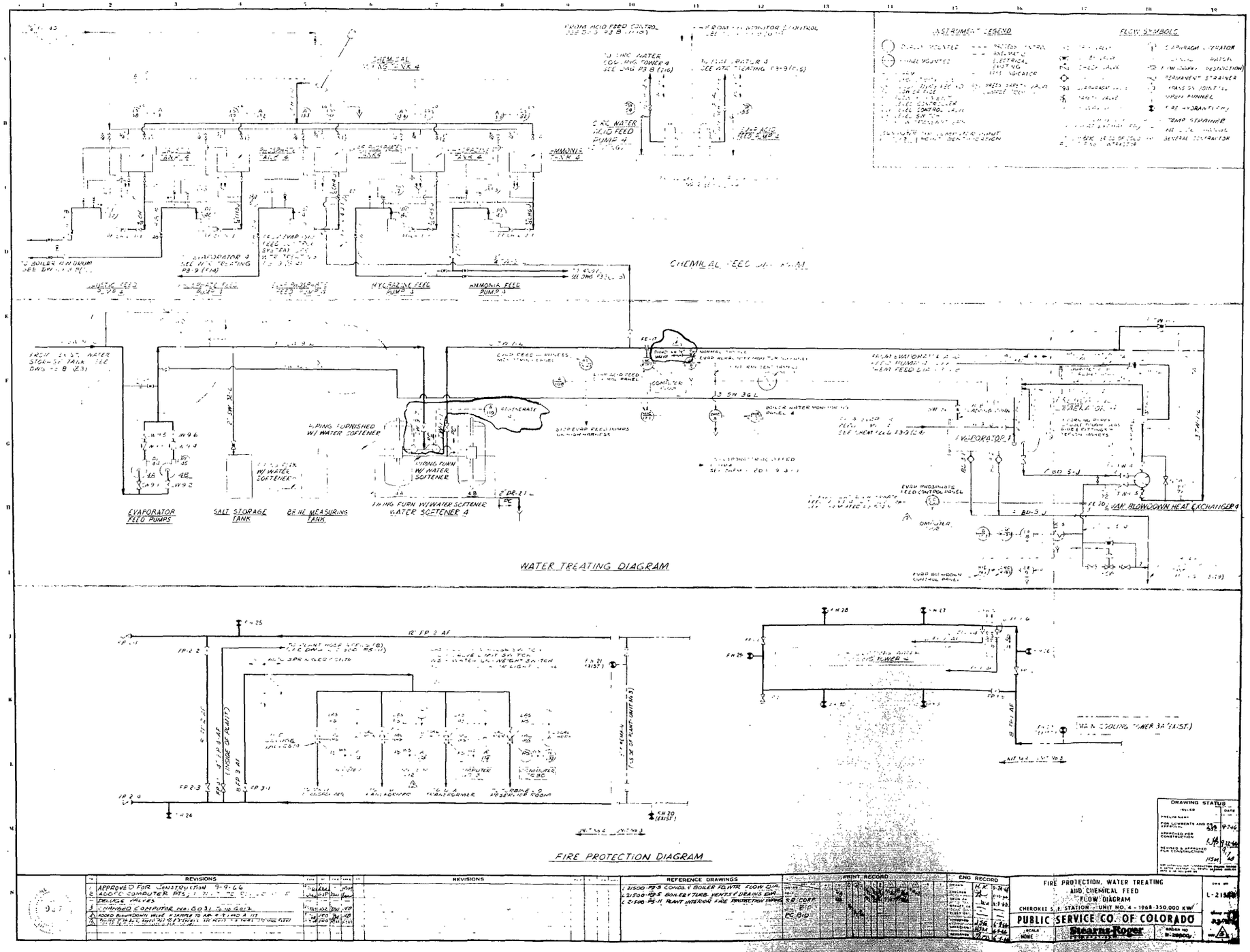
POTABLE WATER DIAGRAM



CIRCULATING WATER DIAGRAM

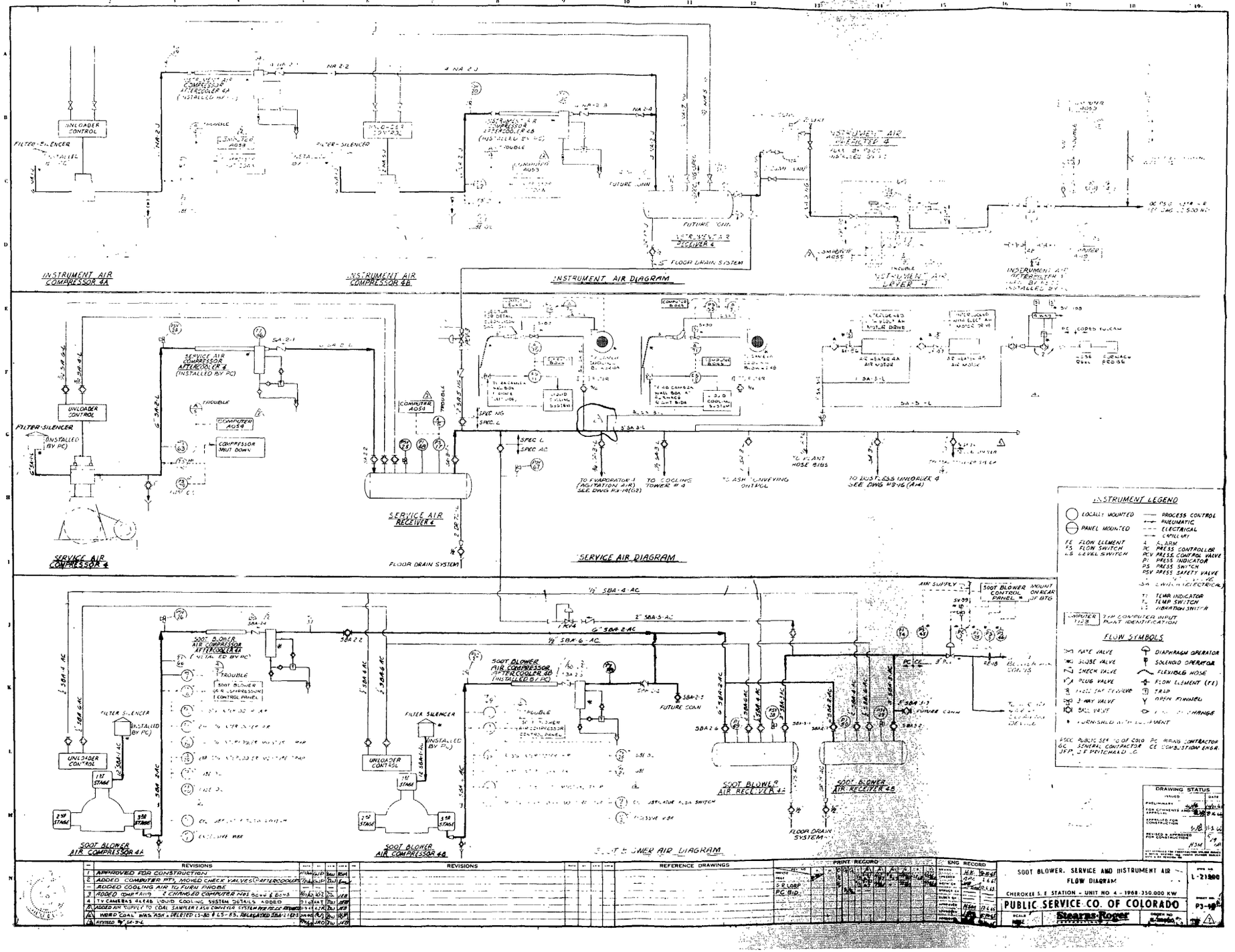
NOTE 1. EXPANSION JOINTS: EJ-CW-1-1, EJ-CW-1-2, EJ-CW-2-1, EJ-CW-2-2, EJ-CW-3-1 & EJ-CW-3-2 FURNISHED BY PSCC.

| REVISIONS | | |

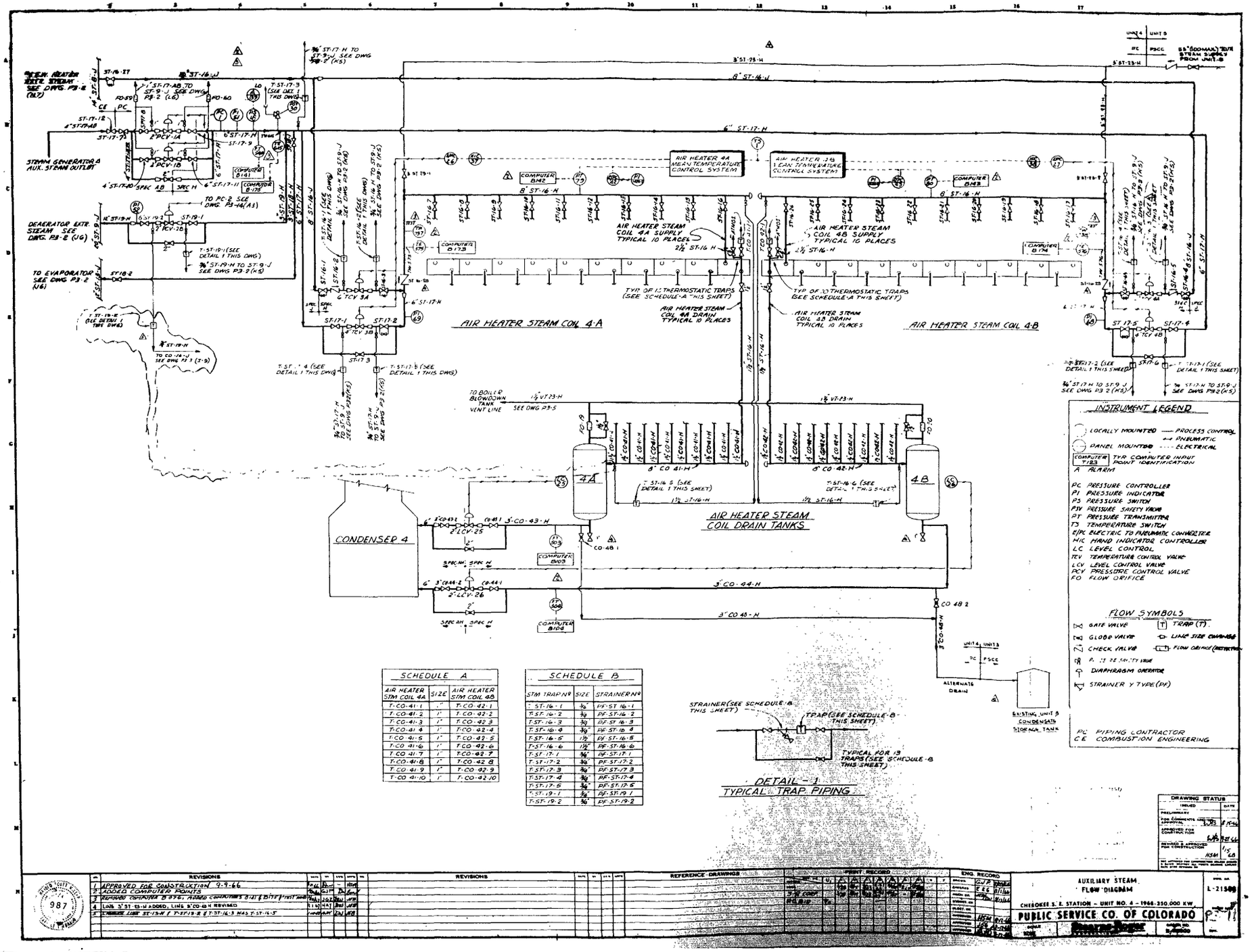


INSTRUMENT LEGEND
FLOW SYMBOLS
CHEMICAL FEED DIAGRAM
HYDRAZINE FEED PUMP 4
AMMONIA FEED PUMP 4
EVAPORATOR FEED PUMPS
SALT STORAGE TANK
BRINE MEASURING TANK
WATER SOFTENER 4
WATER TREATING DIAGRAM
EVAP. BLOWDOWN HEAT EXCHANGER 4
FIRE PROTECTION DIAGRAM
DRAWING STATUS
REVISIONS
REFERENCE DRAWINGS
PRINT RECORD
ENG RECORD
FIRE PROTECTION, WATER TREATING AND CHEMICAL FEED FLOW DIAGRAM
CHEROKEE S. S. STATION - UNIT NO. 4 - 1968-350,000 KW
PUBLIC SERVICE CO. OF COLORADO
Stearns-Roger

WAD00637


INSTRUMENT AIR COMPRESSOR 4A
INSTRUMENT AIR COMPRESSOR 4B
INSTRUMENT AIR DIAGRAM
INSTRUMENT AIR DRYER 4
SERVICE AIR COMPRESSOR 4
SERVICE AIR RECEIVER 4
SERVICE AIR DIAGRAM
SOOT BLOWER AIR COMPRESSOR 4A
SOOT BLOWER AIR COMPRESSOR 4B
SOOT BLOWER AIR RECEIVER 4A
SOOT BLOWER AIR RECEIVER 4B
SOOT BLOWER AIR DIAGRAM
INSTRUMENT LEGEND
FLOW SYMBOLS
DRAWING STATUS
REVISIONS
REFERENCE DRAWINGS
PRINT RECORD
ENG RECORD
SOOT BLOWER, SERVICE AND INSTRUMENT AIR FLOW DIAGRAM
CHEROKEE S. E. STATION - UNIT NO. 4 - 1968-350,000 KW
PUBLIC SERVICE CO. OF COLORADO
Stearns-Roger

WAD00638



SCHEDULE A		
AIR HEATER STM COIL 4A	SIZE	AIR HEATER STM COIL 4B
T-CO-41-1	1"	T-CO-42-1
T-CO-41-2	1"	T-CO-42-2
T-CO-41-3	1"	T-CO-42-3
T-CO-41-4	1"	T-CO-42-4
T-CO-41-5	1"	T-CO-42-5
T-CO-41-6	1"	T-CO-42-6
T-CO-41-7	1"	T-CO-42-7
T-CO-41-8	1"	T-CO-42-8
T-CO-41-9	1"	T-CO-42-9
T-CO-41-10	1"	T-CO-42-10

SCHEDULE B		
STM TRAP Nº	SIZE	STRAINER Nº
T-ST-16-1	½"	PF-ST-16-1
T-ST-16-2	¾"	PF-ST-16-2
T-ST-16-3	¾"	PF-ST-16-3
T-ST-16-4	¾"	PF-ST-16-4
T-ST-16-5	1½"	PF-ST-16-5
T-ST-16-6	1½"	PF-ST-16-6
T-ST-17-1	¾"	PF-ST-17-1
T-ST-17-2	¾"	PF-ST-17-2
T-ST-17-3	¾"	PF-ST-17-3
T-ST-17-4	¾"	PF-ST-17-4
T-ST-17-5	¾"	PF-ST-17-5
T-ST-19-1	¾"	PF-ST-19-1
T-ST-19-2	¾"	PF-ST-19-2

DRAWING STATUS

ISSUED	DATE
PRELIMINARY	
FOR COMMENTS AND APPROVAL	9/9/66
SCHEDULED FOR CONSTRUCTION	
REVISED & APPROVED FOR CONSTRUCTION	1/5/68

REVISIONS

1	APPROVED FOR CONSTRUCTION 9-9-66	PHG	9/9/66		
2	ADDED COMPUTER POINTS	PHG	9/9/66		
3	REVISED CONTROLS & STEAM PIPING CONNECTIONS 3-9-67 & DITS	PHG	3/9/67		
4	LINE 3"ST-13-H ADDED, LINE 8"CO-48-H REVISED	PHG	10/2/67		
5	CHANGED LINE ST-13-H TO T-ST-19-2 & T-ST-16-3 WAS T-ST-16-5	PHG	12/4/67		

ENG. RECORD

DESIGNED	C.J.P.	8/66			
DRAWN	F.E.S.	8/66			
TRACED					
CHECKED					
PROJ. ENGR.					
PROJ. MGR.					
ENGR. MGR.					
SUPT. OF PLT.					
APPROVED					

PRINT RECORD

ORIGINAL					
1ST CORR.					
REVISED					

AUXILIARY STEAM FLOW DIAGRAM

CHEROKEE 3, 4 STATION - UNIT NO. 4 - 1966-350,000 KW

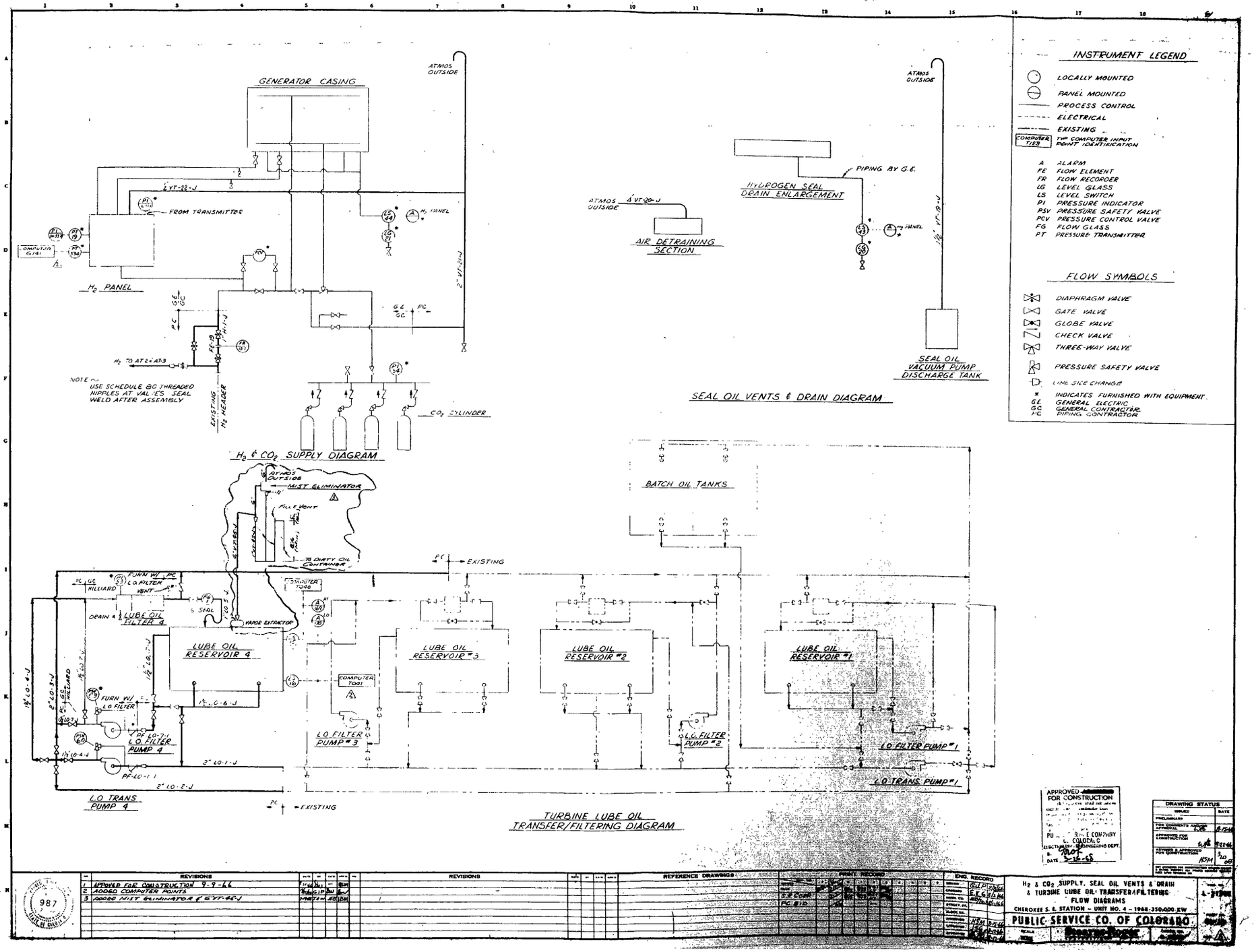
PUBLIC SERVICE CO. OF COLORADO

DENVER, COLORADO

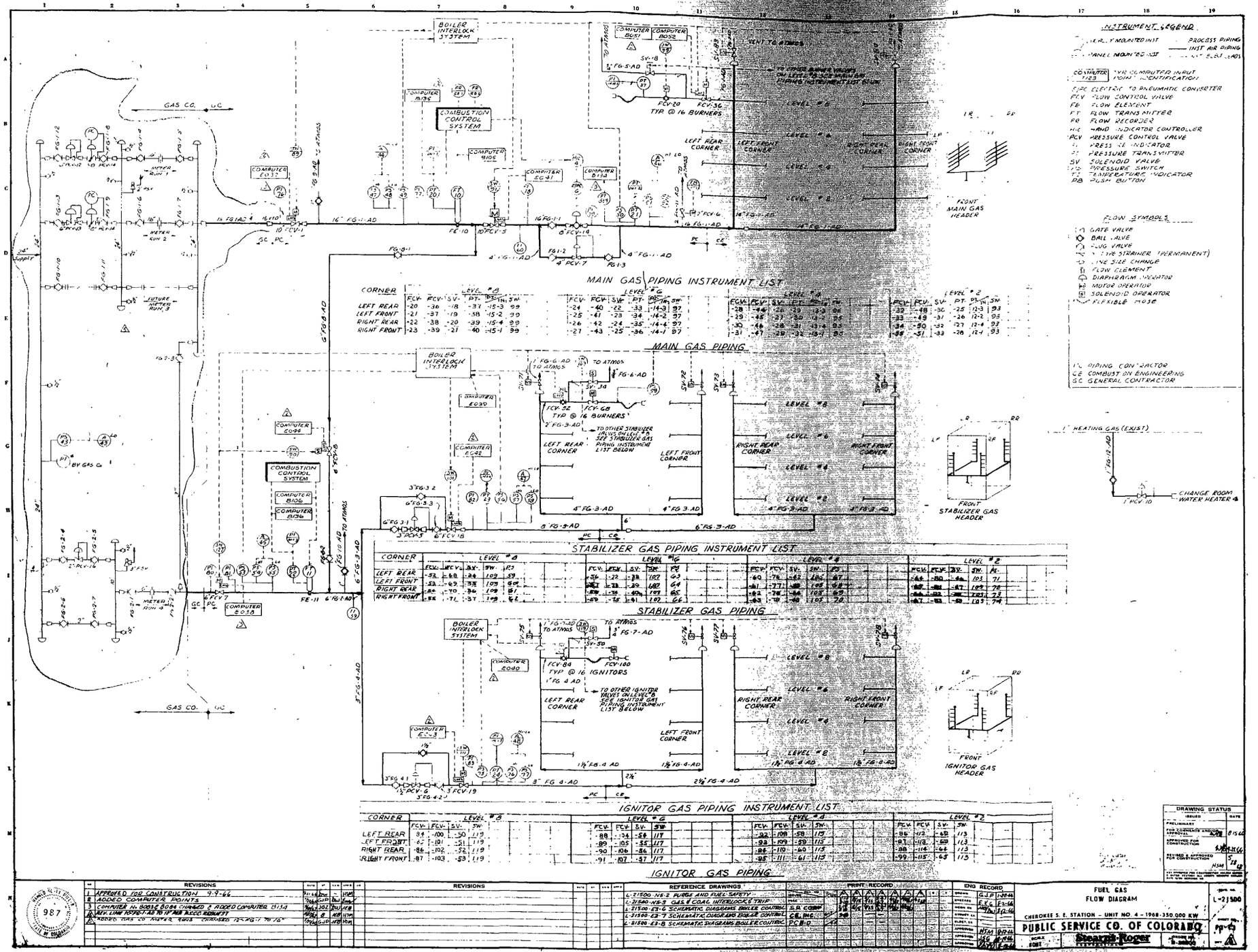
DRAWING NO. L-21508

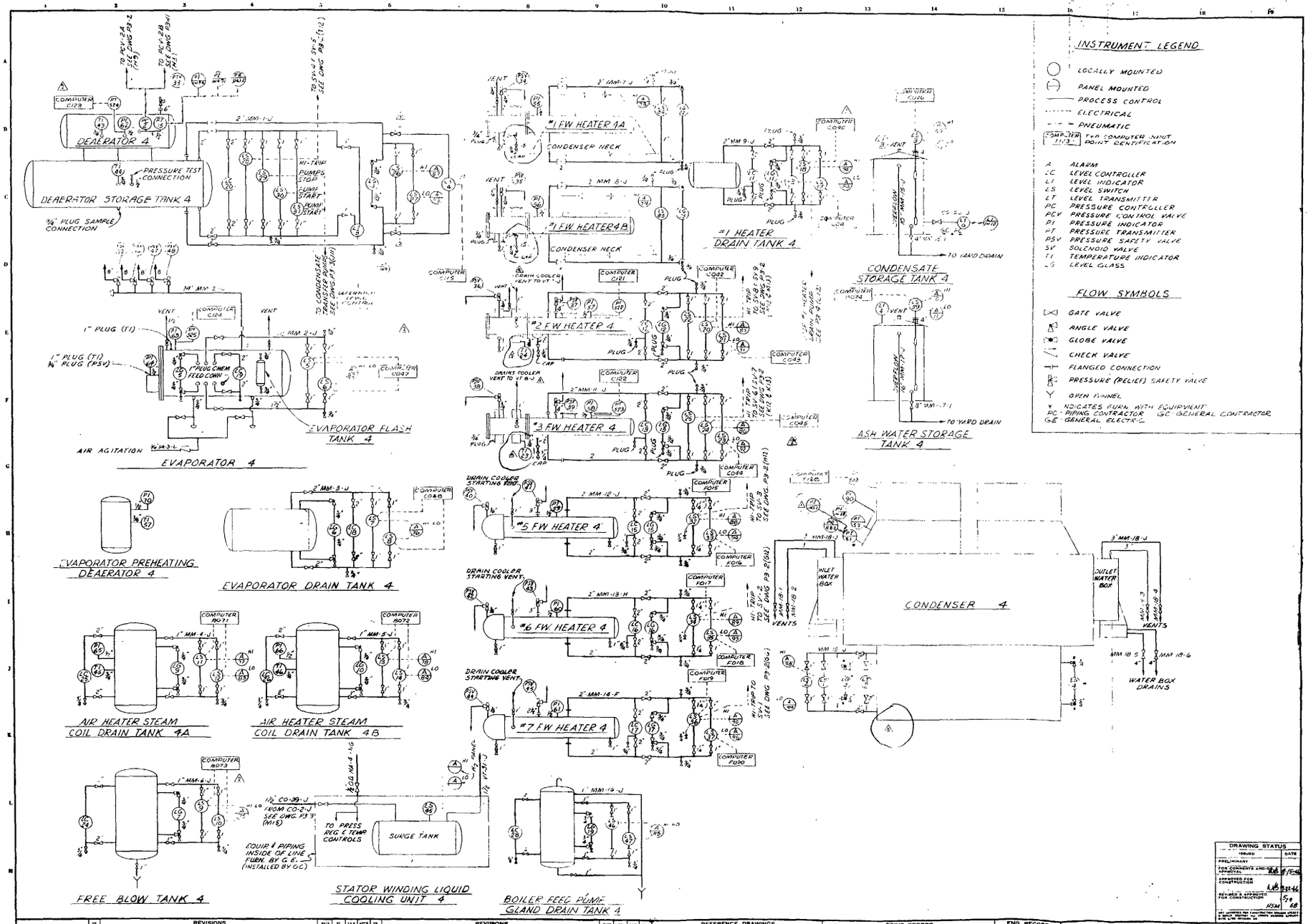
SHEET NO. M-11

WAD00639


GENERATOR CASING
ATMOS OUTSIDE
FROM TRANSMITTER
H2 PANEL
NOTE:- USE SCHEDULE 80 THREADED NIPPLES AT VALVES SEAL WELD AFTER ASSEMBLY
EXISTING H2 HEADER
CO2 CYLINDER
H2 & CO2 SUPPLY DIAGRAM
HYDROGEN SEAL DRAIN ENLARGEMENT
PIPING BY G.E.
AIR DETRAINING SECTION
SEAL OIL VACUUM PUMP DISCHARGE TANK
SEAL OIL VENTS & DRAIN DIAGRAM
INSTRUMENT LEGEND
LOCALLY MOUNTED
PANEL MOUNTED
PROCESS CONTROL
ELECTRICAL
EXISTING
COMPUTER 7123 TYP COMPUTER INPUT POINT IDENTIFICATION
A ALARM
FE FLOW ELEMENT
FR FLOW RECORDER
LG LEVEL GLASS
LS LEVEL SWITCH
PI PRESSURE INDICATOR
PSV PRESSURE SAFETY VALVE
PCV PRESSURE CONTROL VALVE
FG FLOW GLASS
PT PRESSURE TRANSMITTER
FLOW SYMBOLS
DIAPHRAGM VALVE
GATE VALVE
GLOBE VALVE
CHECK VALVE
THREE-WAY VALVE
PRESSURE SAFETY VALVE
LINE SIZE CHANGE
INDICATES FURNISHED WITH EQUIPMENT
GE GENERAL ELECTRIC
GC GENERAL CONTRACTOR
PC PIPING CONTRACTOR
BATCH OIL TANKS
MIST ELIMINATOR
TO DIRTY OIL CONTAINER
VAPOR EXTRACTOR
LUBE OIL RESERVOIR 4
LUBE OIL RESERVOIR #3
LUBE OIL RESERVOIR #2
LUBE OIL RESERVOIR #1
L.O. FILTER PUMP #3
L.O. FILTER PUMP #2
L.O. FILTER PUMP #1
L.O. TRANS PUMP #1
L.O. TRANS PUMP 4
EXISTING
TURBINE LUBE OIL TRANSFER/FILTERING DIAGRAM
APPROVED FOR CONSTRUCTION
DRAWING STATUS
REVISIONS
1 APPROVED FOR CONSTRUCTION 9-9-66
2 ADDED COMPUTER POINTS
3 ADDED MIST ELIMINATOR & 6"VT-26-J
REFERENCE DRAWINGS
PRINT RECORD
ENG. RECORD
H2 & CO2 SUPPLY, SEAL OIL VENTS & DRAIN & TURBINE LUBE OIL TRANSFER/FILTERING FLOW DIAGRAMS
CHEROKEE S. E. STATION - UNIT NO. 4 - 1968-350,000 KW
PUBLIC SERVICE CO. OF COLORADO
987

WAD00640


INSTRUMENT LEGEND
PROCESS PIPING
INST. AIR PIPING
COMPUTER 1123 TYP. COMPUTER INPUT POINT IDENTIFICATION
E/P E. TO P. CONVERTER
FCV FLOW CONTROL VALVE
FE FLOW ELEMENT
FT FLOW TRANSMITTER
FR FLOW RECORDER
HIC HAND INDICATOR CONTROLLER
PCV PRESSURE CONTROL VALVE
PI PRESSURE INDICATOR
PS PRESSURE TRANSMITTER
SV SOLENOID VALVE
PSL PRESSURE SWITCH
TI TEMPERATURE INDICATOR
PB PUSH BUTTON
FLOW SYMBOLS
GATE VALVE
BALL VALVE
PLUG VALVE
Y LINE STRAINER (PERMANENT)
LINE SIZE CHANGE
FLOW ELEMENT
DIAPHRAGM OPERATOR
MOTOR OPERATOR
SOLENOID OPERATOR
FLEXIBLE HOSE
P.C. PIPING CONTRACTOR
C.E. COMBUST ON ENGINEERING
G.C. GENERAL CONTRACTOR
MAIN GAS PIPING INSTRUMENT LIST
MAIN GAS PIPING
STABILIZER GAS PIPING INSTRUMENT LIST
STABILIZER GAS PIPING
IGNITOR GAS PIPING INSTRUMENT LIST
IGNITOR GAS PIPING
FRONT MAIN GAS HEADER
FRONT STABILIZER GAS HEADER
FRONT IGNITOR GAS HEADER
HEATING GAS (EXIST)
CHANGE ROOM WATER HEATER 4
BOILER INTERLOCK SYSTEM
COMBUSTION CONTROL SYSTEM
GAS CO.
LEFT REAR CORNER
LEFT FRONT CORNER
RIGHT REAR CORNER
RIGHT FRONT CORNER
DRAWING STATUS
FUEL GAS FLOW DIAGRAM
CHEROKEE S. E. STATION - UNIT NO. 4 - 1968-350,000 KW
PUBLIC SERVICE CO. OF COLORADO
Stearns-Roger
L-21500
WAD00641



REVISIONS					REVISIONS					REFERENCE DRAWINGS	PRINT RECORD	ENG. RECORD
1	APPROVED FOR CONSTRUCTION	9-9-66	TWG	BSP								
2	ADDED COMPUTER POINTS, I LI 9-1		TWG	BSP								
3	LT4 REPOSITIONED & 2" GATE VALVES WERE 1"		HAT	BSP								
4	ADDED PI-1163 P REF DRAIN COOLER VENTS P-287 & #4 HEATERS		TWG	BSP								
5	DELETED PI-1163 P REF DRAIN COOLER VENTS P-287 & #4 HEATERS		TWG	BSP								

DRAWING STATUS	ISSUED	DATE
PRELIMINARY		
FOR COMMENTS AND/OR APPROVAL		
APPROVED FOR CONSTRUCTION		
REVISED & APPROVED FOR CONSTRUCTION		

EQUIPMENT TRIM DIAGRAM

CHEROKEE 5 & 6 STATION - UNIT NO. 4 - 1968-350,000 KW

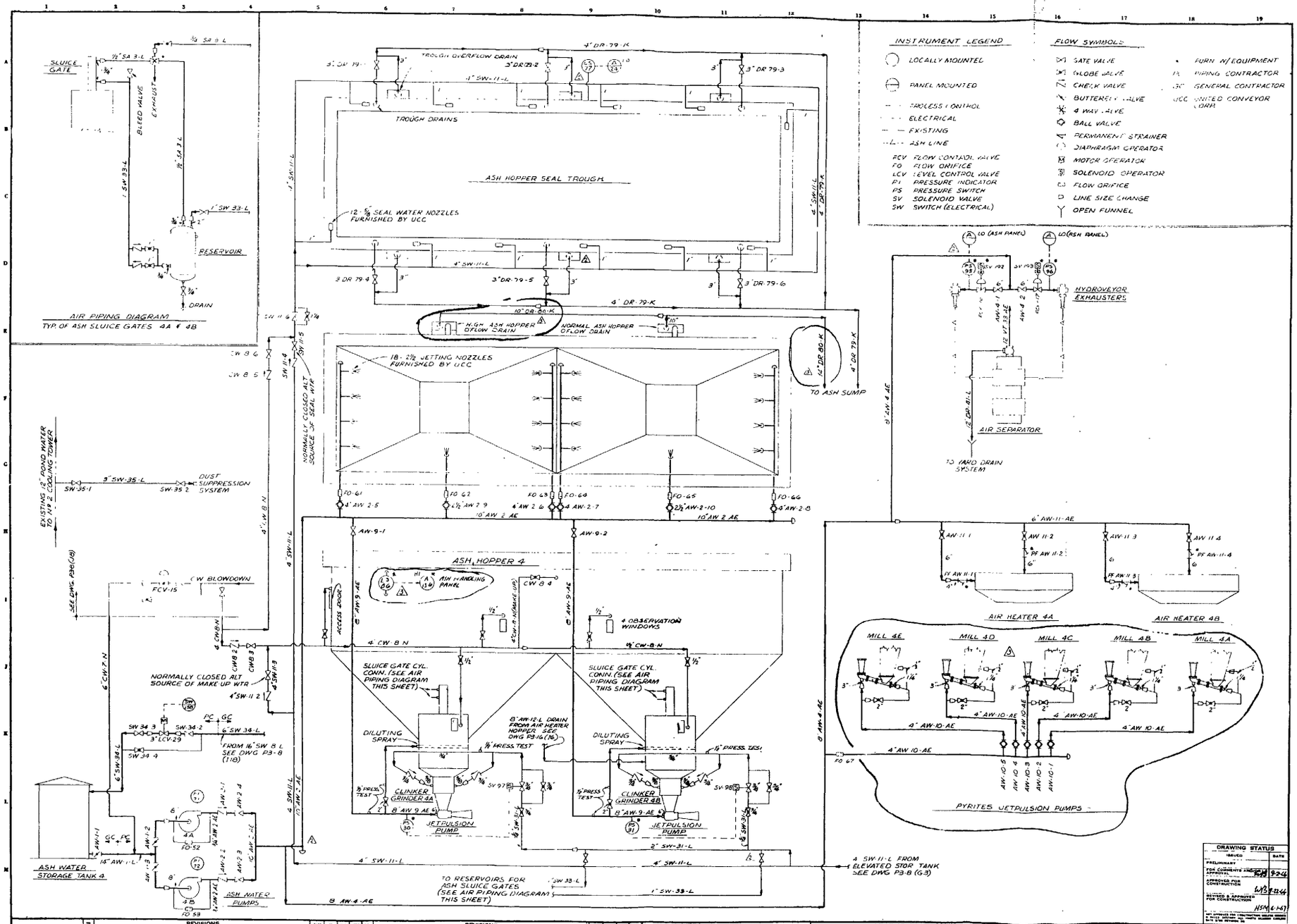
PUBLIC SERVICE CO. OF COLORADO

Stearns-Roger

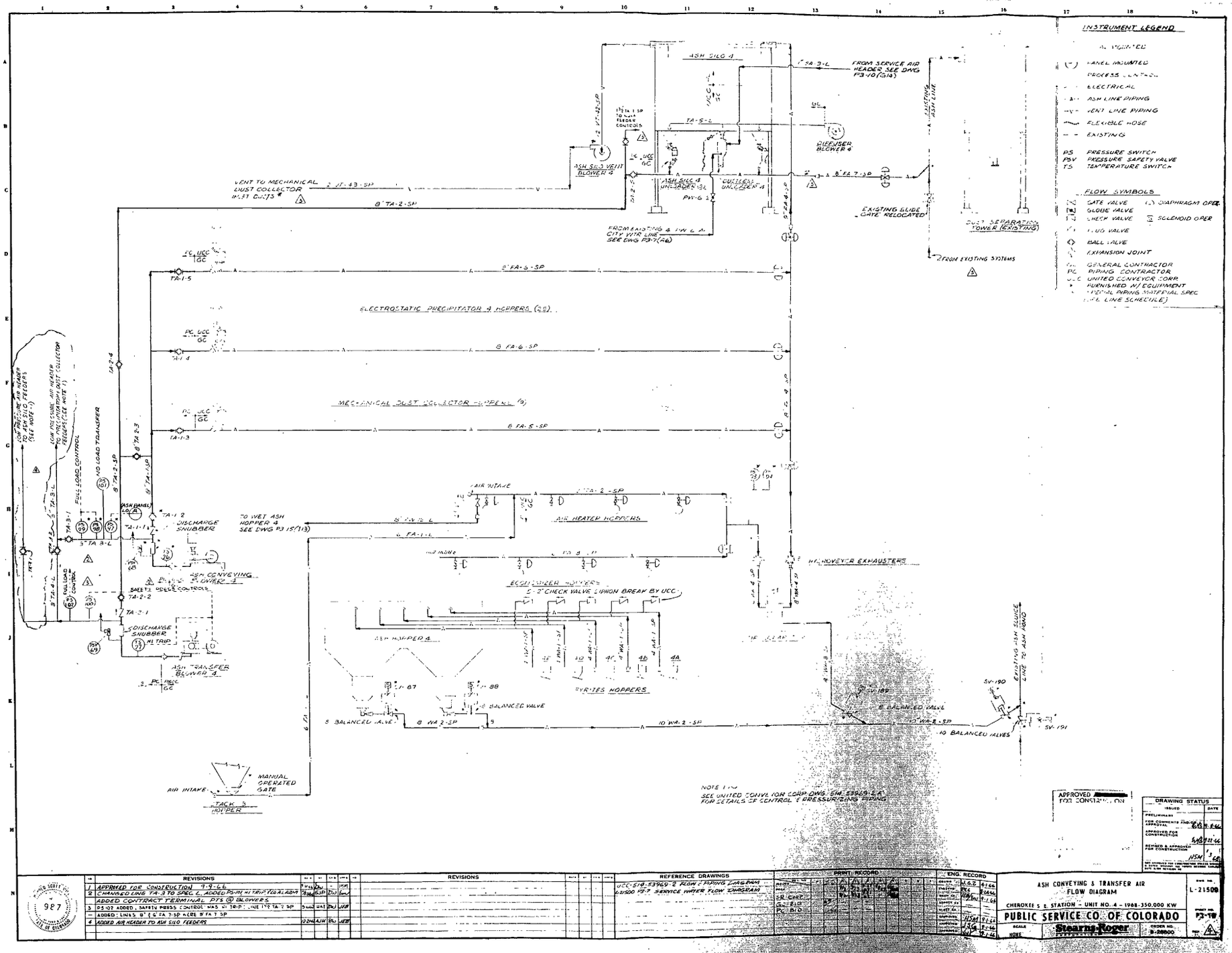
L-21508

P3-1.14

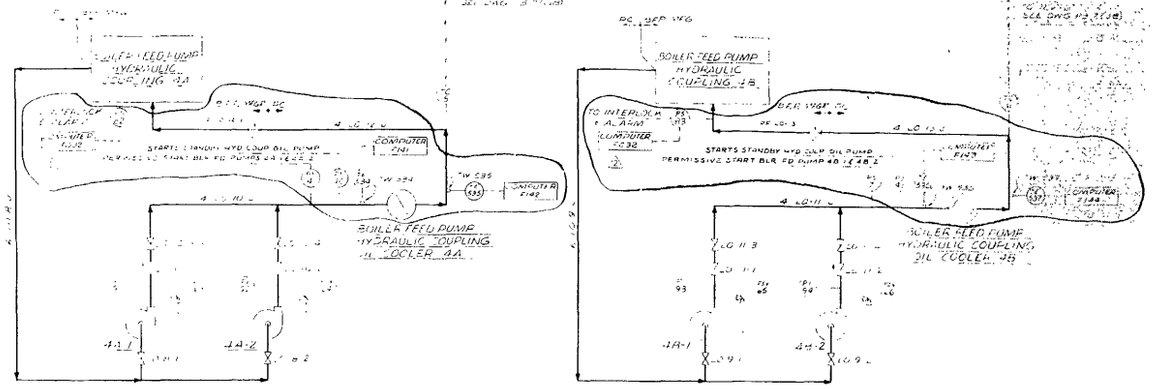
WAD00642


INSTRUMENT LEGEND
LOCALLY MOUNTED
PANEL MOUNTED
PROCESS CONTROL
ELECTRICAL
EXISTING
ASH LINE
FCV FLOW CONTROL VALVE
FO FLOW ORIFICE
LCV LEVEL CONTROL VALVE
PI PRESSURE INDICATOR
PS PRESSURE SWITCH
SV SOLENOID VALVE
SW SWITCH (ELECTRICAL)
FLOW SYMBOLS
GATE VALVE
GLOBE VALVE
CHECK VALVE
BUTTERFLY VALVE
4 WAY VALVE
BALL VALVE
PERMANENT STRAINER
DIAPHRAGM OPERATOR
MOTOR OPERATOR
SOLENOID OPERATOR
FLOW ORIFICE
LINE SIZE CHANGE
OPEN FUNNEL
FURN W/EQUIPMENT
PIPING CONTRACTOR
GC GENERAL CONTRACTOR
UCC UNITED CONVEYOR CORP.
SLUICE GATE
BLEED VALVE
EXHAUST
RESERVOIR
DRAIN
AIR PIPING DIAGRAM
TYP. OF ASH SLUICE GATES 4A & 4B
TROUGH OVERFLOW DRAIN
TROUGH DRAINS
ASH HOPPER SEAL TROUGH
12-5/8 SEAL WATER NOZZLES FURNISHED BY UCC
HIGH ASH HOPPER OFLOW DRAIN
NORMAL ASH HOPPER OFLOW DRAIN
18-2 1/2 JETTING NOZZLES FURNISHED BY UCC
TO ASH SUMP
NORMALLY CLOSED ALT SOURCE OF SEAL WTR
EXISTING 12" POND WATER TO No 2 COOLING TOWER
DUST SUPPRESSION SYSTEM
CW BLOWDOWN
ASH HOPPER 4
ASH HANDLING PANEL
ACCESS DOOR
4 OBSERVATION WINDOWS
NORMALLY CLOSED ALT SOURCE OF MAKE UP WTR
SLUICE GATE CYL. CONN. (SEE AIR PIPING DIAGRAM THIS SHEET)
DILUTING SPRAY
CLINKER GRINDER 4A
CLINKER GRINDER 4B
JETPULSION PUMP
ASH WATER STORAGE TANK 4
ASH WATER PUMPS
TO RESERVOIRS FOR ASH SLUICE GATES (SEE AIR PIPING DIAGRAM THIS SHEET)
4 SW-11-L FROM ELEVATED STOR TANK SEE DWG P3-8 (G3)
HYDROVEYOR EXHAUSTERS
AIR SEPARATOR
TO YARD DRAIN SYSTEM
AIR HEATER 4A
AIR HEATER 4B
MILL 4E
MILL 4D
MILL 4C
MILL 4B
MILL 4A
PYRITES JETPULSION PUMPS
DRAWING STATUS
ISSUED
DATE
PRELIMINARY
FOR COMMENTS AND APPROVAL
APPROVED FOR CONSTRUCTION
REVISED & APPROVED FOR CONSTRUCTION
REVISIONS
1 APPROVED FOR CONSTRUCTION 9-9-66
2 ADDED ALARMS @ P3-95 & P3-96; REVISED AW-2 AE
— AW-4-AE, RW-2-AE, SW-11-L, SW-31-L, SW-33L, CW-8 N, DR-79-K AND DR-80-K TO MATCH PHYSICAL
3 ADDED LS 86 & A13.6 AND 1/2" RUSH TO PYRITES PUMP
ADDED HIGH OFLOW TO ASH HOPPER
REFERENCE DRAWINGS
L-21500-P3-8 CHC. WTR. & POTABLE WTR. FLOW DIA.
L-21500-P3-16 ASH CONVEYING & TRANS. AIR DIA.
PRINT RECORD
ENG. RECORD
ASH WATER SUPPLY FLOW DIAGRAM
CHEROKEE S. E. STATION - UNIT NO. 4 - 1968-350 000 KW
PUBLIC SERVICE CO. OF COLORADO
Stearns-Roger
SCALE NONE
ORDER NO B-28600
DWG. NO. L-21500
SHEET NO. P3-15
REV. 3

WAD00643


INSTRUMENT LEGEND
PANEL MOUNTED
PROCESS CONTROL
ELECTRICAL
ASH LINE PIPING
VENT LINE PIPING
FLEXIBLE HOSE
EXISTING
PS PRESSURE SWITCH
PSV PRESSURE SAFETY VALVE
TS TEMPERATURE SWITCH
FLOW SYMBOLS
GATE VALVE
GLOBE VALVE
CHECK VALVE
PLUG VALVE
BALL VALVE
EXPANSION JOINT
GENERAL CONTRACTOR
PC PIPING CONTRACTOR
UCC UNITED CONVEYOR CORP.
FURNISHED W/ EQUIPMENT
SPECIAL PIPING MATERIAL SPEC
(SEE LINE SCHEDULE)
ASH SILO 4
FROM SERVICE AIR HEADER SEE DWG P3-10 (G14)
DIFFUSER BLOWER 4
ASH SILO VENT BLOWER 4
ASH SILO 4 UNLOADER
VENT TO MECHANICAL DUST COLLECTOR INLET DUCTS
FROM EXISTING 4 PW & A CITY WTR LINE SEE DWG P3-7 (A6)
EXISTING SLIDE GATE RELOCATED
DUST SEPARATION TOWER (EXISTING)
FROM EXISTING SYSTEMS
ELECTROSTATIC PRECIPITATOR 4 HOPPERS (2S)
MECHANICAL DUST COLLECTOR HOPPERS (3)
AIR INTAKE
AIR HEATER HOPPERS
TO WET ASH HOPPER 4 SEE DWG P3-15 (T13)
DISCHARGE SNUBBER
ASH CONVEYING BLOWER 4
ASH TRANSFER BLOWER 4
FULL LOAD CONTROL
NO LOAD TRANSFER
ECONOMIZER HOPPERS
5-2" CHECK VALVE DIPHON BREAK BY UCC
ASH HOPPER 4
PYRITES HOPPERS
HYDROVEYOR EXHAUSTERS
8 BALANCED VALVE
10 BALANCED VALVES
EXISTING ASH SLUICE LINE TO ASH POND
MANUAL OPERATED GATE
AIR INTAKE
STACK 3 HOPPER
NOTE 1 IN
SEE UNITED CONVEYOR CORP. DWG. 514-53969-2 A FOR DETAILS OF CONTROL & PRESSURIZING PIPING
APPROVED FOR CONSTRUCTION
DRAWING STATUS
ISSUED
DATE
PRELIMINARY
FOR COMMENTS AND/OR APPROVAL
APPROVED FOR CONSTRUCTION
REVISED & APPROVED FOR CONSTRUCTION
REVISIONS
1 APPROVED FOR CONSTRUCTION 9-9-66
2 CHANGED LINE TA-3 TO SPEC L, ADDED PS-101 HI TRIP, FEG ALARM
ADDED CONTRACT TERMINAL PTS @ BLOWERS
3 PS-102 ADDED, SAFETY PRESS CONTROL WAS HI TRIP; LINE TYP TA-2 SP
ADDED; LINES 8" & 6" FA 7-SP WERE 8" FA 7 SP
4 ADDED AIR HEADER TO ASH SILO FEEDERS
REFERENCE DRAWINGS
UCC-514-53969-2 FLOW & PIPING DIAGRAM
U-1500 P3-7 SERVICE WATER FLOW DIAGRAM
PRINT RECORD
ENG. RECORD
ASH CONVEYING & TRANSFER AIR FLOW DIAGRAM
CHEROKEE S. E. STATION - UNIT NO. 4 - 1968-350,000 KW
PUBLIC SERVICE CO. OF COLORADO
Stearns-Roger
SCALE NONE
ORDER NO. B-28800
DWG. NO. L-21500
SHEET NO. P3-10
987

WAD00644



BOILER FEED PUMP HYDRAULIC COUPLING OIL PUMPS

INSTRUMENT LEGEND

PANEL MOUNTED — PROCESS CONTROL; --- PNEUMATIC; - - - ELECTRICAL

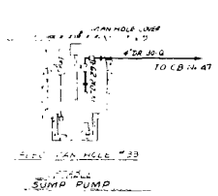
L LEVEL SWITCH — A ALARM
PS PRESS SWITCH — PI PRESS INDICATOR
PSV PRESS SAFETY VALVE
TC TEMP CONTROLLER

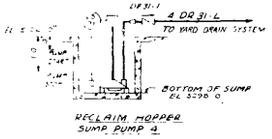
COMPUTER TYP COMPUTER INPUT
182 POINT IDENTIFICATION

FLOW SYMBOLS

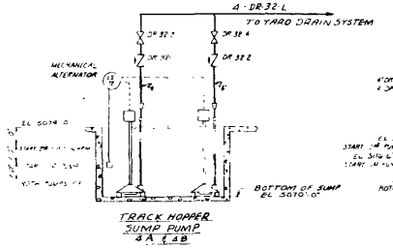
GATE VALVE — CI LINE SIZE CHANGE
GLOBE VALVE
CHECK VALVE
PRESS SAFETY VALVE
PERM STRAINER

PC PIPING CONTRACTOR

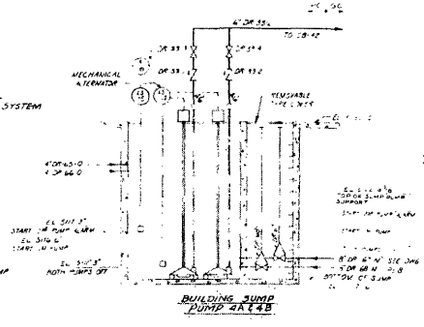




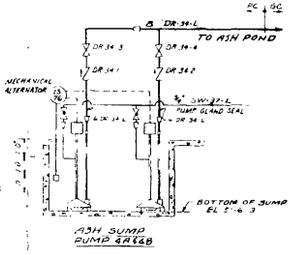
RECLAIM HOPPER SUMP PUMP 4



TRACK HOPPER SUMP PUMP 4A & 4B

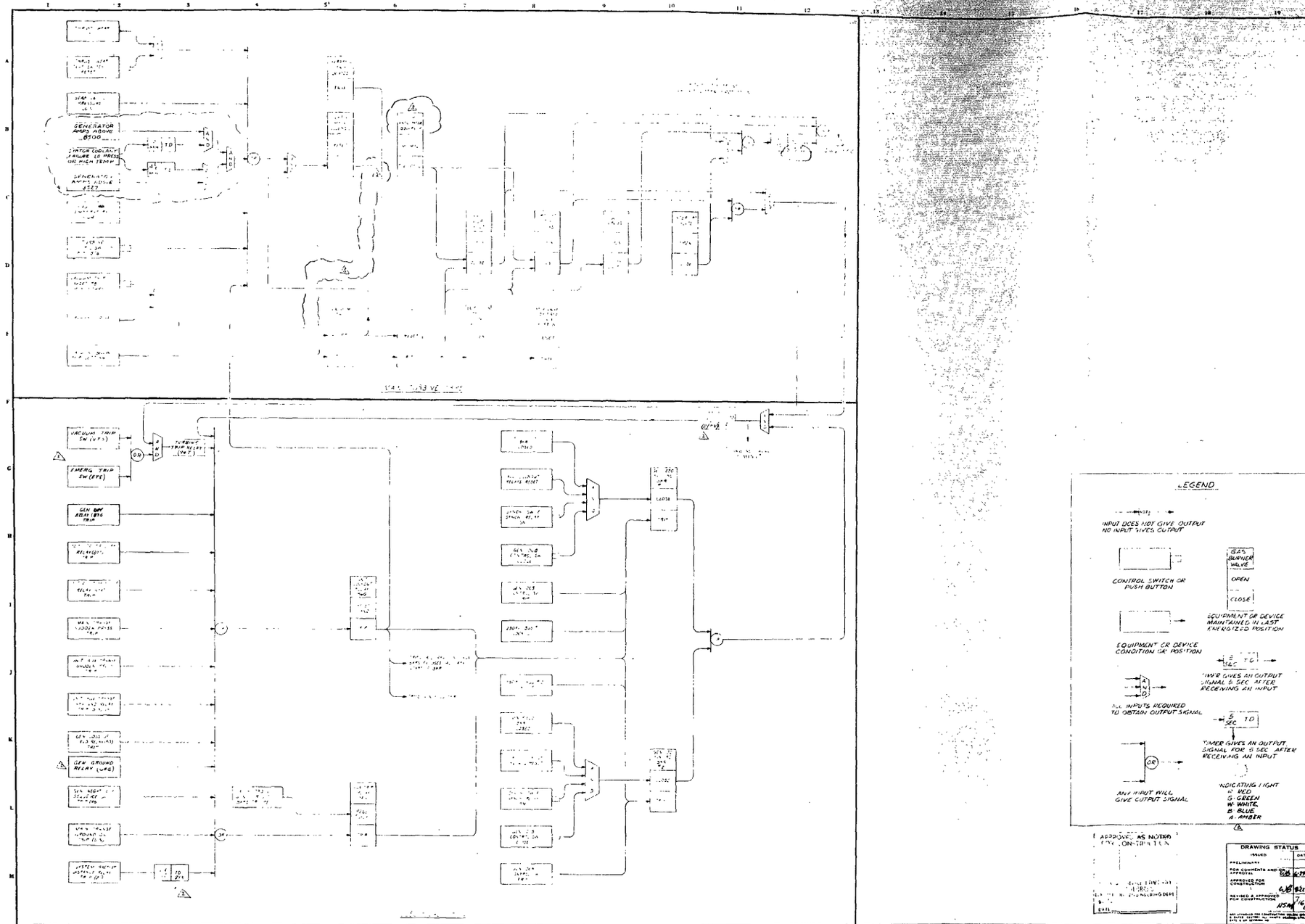


BUILDING SUMP PUMP 4A & 4B

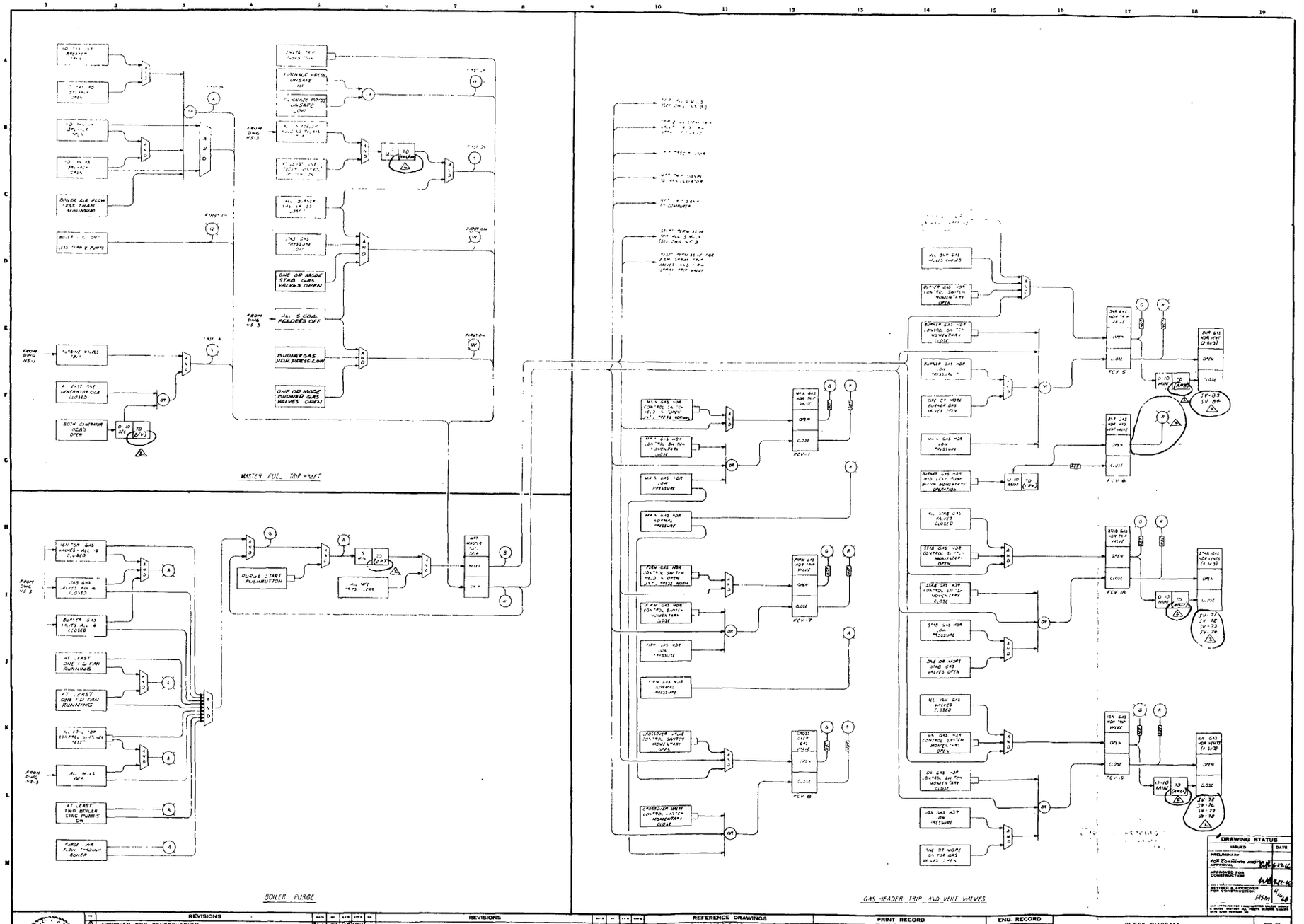


ASH SUMP PUMP 4A & 4B

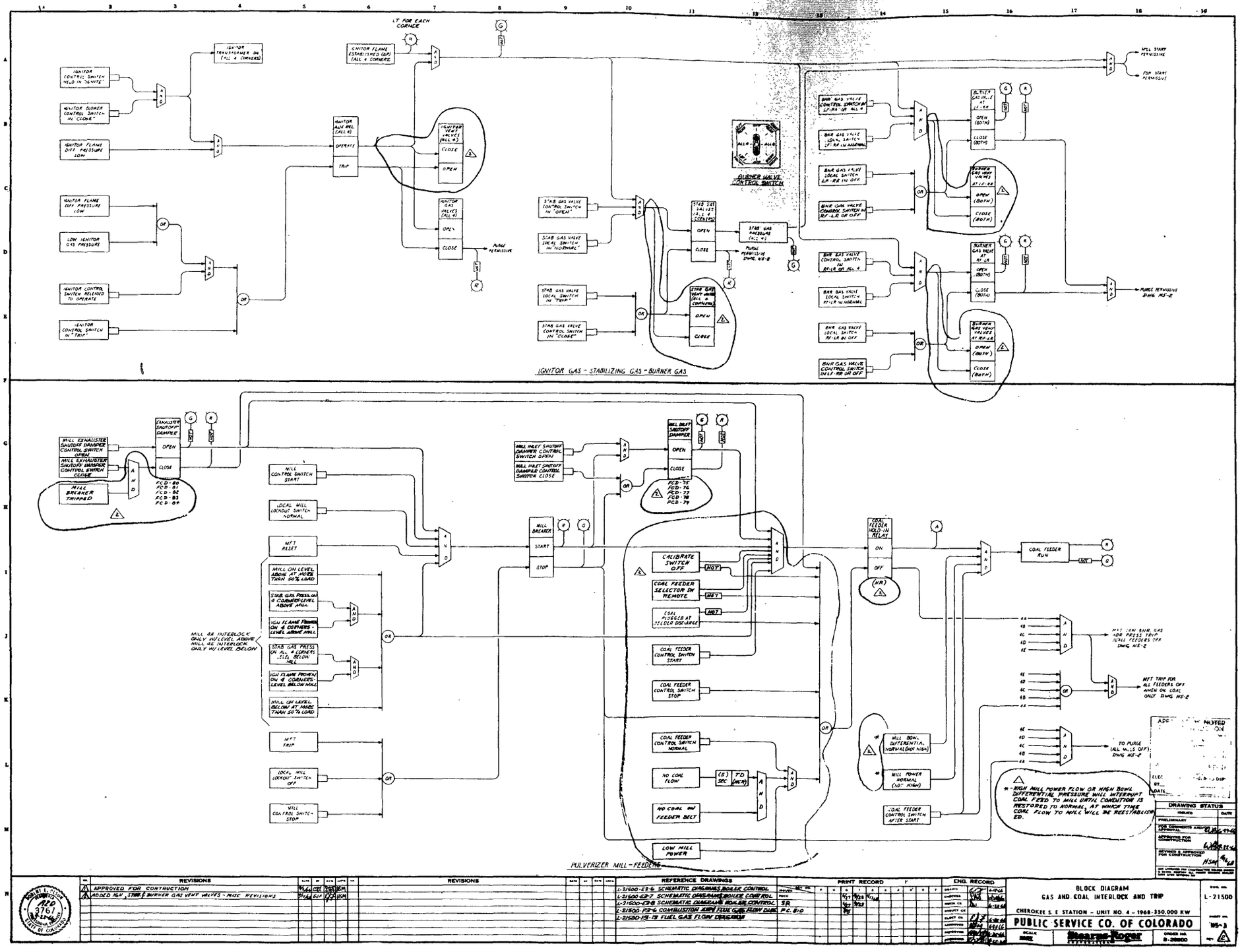
| REVISIONS | | |


GENERATOR AMPS ABOVE 8500
VACUUM TRIP SW (VTS)
EMERG TRIP SW (ETS)
GEN GROUND RELAY (GRG)
LEGEND
INPUT DOES NOT GIVE OUTPUT
NO INPUT GIVES OUTPUT
CONTROL SWITCH OR PUSH BUTTON
GAS BURNER VALVE
OPEN
CLOSE
EQUIPMENT OR DEVICE MAINTAINED IN LAST ENERGIZED POSITION
EQUIPMENT OR DEVICE CONDITION OR POSITION
TIMER GIVES AN OUTPUT SIGNAL 5 SEC AFTER RECEIVING AN INPUT
ALL INPUTS REQUIRED TO OBTAIN OUTPUT SIGNAL
TIMER GIVES AN OUTPUT SIGNAL FOR 5 SEC AFTER RECEIVING AN INPUT
ANY INPUT WILL GIVE OUTPUT SIGNAL
INDICATING LIGHT
R RED
G GREEN
W WHITE
B BLUE
A AMBER
APPROVED AS NOTED FOR CONSTRUCTION
DRAWING STATUS
ISSUED
DATE
PRELIMINARY
FOR COMMENTS AND OR APPROVAL
APPROVED FOR CONSTRUCTION
REVISED & APPROVED FOR CONSTRUCTION
REVISIONS
APPROVED FOR CONSTRUCTION
ADDED GRG, TRIP, VTS AND MISC MINOR REVISIONS
REVISED MAIN TURBINE TRIPS AS NOTED BY ENCIRCLEMENT
REFERENCE DRAWINGS
PRINT RECORD
ENG RECORD
BLOCK DIAGRAM
TURBINE-GENERATOR
TRIPPING & CONTROL
CHEROKEE S.E. STATION - UNIT NO. 4 - 1968-350 000 KW
PUBLIC SERVICE CO. OF COLORADO
Stearns-Roger
SCALE NONE
ORDER NO. B-25000
L-21500
MS-1
REV. A

WAD00646


MASTER FUEL TRIP - MFT
BOILER PURGE
GAS HEADER TRIP AND VENT VALVES

| REVISIONS | | |



REVISIONS						REVISIONS						REFERENCE DRAWINGS
	APPROVED FOR CONSTRUCTION	4-6-66	CRT									L-21600-ES-6 SCHEMATIC DIAGRAMS BOILER CONTROL
1	ADDED 4A-4E, STAB & BURNER GAS VENT VALVES - MISC. REVISIONS	11-4-66	GJF	11-9-66	BM							L-21600-EP-7 SCHEMATIC DIAGRAMS BOILER CONTROL
				11-9-66	HSM							L-21600-ES-8 SCHEMATIC DIAGRAMS BOILER CONTROL
												L-21600-PS-6 COMBUSTION AIRFLOW GAS FLOW DUCT
												L-21620-PS-13 FUEL GAS FLOW DIAGRAM

| PRINT RECORD | | | | | | | | | | | |

LEGEND

GENERAL SYMBOLS

SYMBOL	DESCRIPTION
	EXPOSED CONDUIT
	EXPOSED CONDUIT GOING AWAY FROM OBSERVER
	EXPOSED CONDUIT COMING TOWARDS OBSERVER
	EXPOSED CONDUIT HIDDEN FROM VIEW
	EMBEDDED CONDUIT
JB	JUNCTION BOX
	FITTINGS
	FLEXIBLE CONDUIT
	GROUND WIRE (#4) GROUND WIRE (#6)
	GROUND WIRE CONNECTION
	GROUND ROD
	HORIZONTAL A.C. OR D.C. MOTOR OR GENERATOR ANY VOLTAGE, ANY PHASE
	VERTICAL A.C. OR D.C. MOTOR, ANY VOLTAGE, ANY PHASE
	POWER RECEPTACLE, ANY VOLTAGE, ANY PHASE, ANY RATING
	SPECIAL RECEPTACLE, SINGLE PHASE, 115 VOLT
	DUPLEX RECEPTACLE, SINGLE PHASE, 115 VOLT
	CEILING MOUNTED FIXTURE, * LETTER INDICATES FIXTURE TYPE
	WALL MOUNTED FIXTURE, * LETTER INDICATES FIXTURE TYPE
	FLUORESCENT FIXTURE, * LETTER INDICATES FIXTURE TYPE
	SWITCH DESIGNATOR, * LETTER INDICATES CONTROLLING SWITCH.
S	SINGLE POLE LIGHTING SWITCH
S_3	THREE WAY LIGHTING SWITCH
S_D	SWITCH DESIGNATOR, * LETTER INDICATES CONTROLLED FIXTURES
	LIGHTING OR POWER PANEL BOARD
	LIGHTING CONDUCTOR DESIGNATOR, NEUTRAL SHOWN OPPOSITE
	CIRCUIT DESIGNATOR, * CIRCUIT NUMBER SHOWN IN BLOCK
	PIGTAIL FOR EQUIPMENT GROUNDING
	DUPLEX RECEPTACLE, SINGLE PHASE, 277 VOLT (FOR LIGHTING FIXTURES)
M	MANUAL MOTOR STARTER ⚠
	WELDING RISER (FEMALE PIGTAIL) ⚠

ONE LINE DIAGRAM SYMBOLS

SYMBOL	DESCRIPTION
	BUS OR CABLE RUN
	CONTROL OR METERING RUN
	FUTURE BUS OR CABLE RUN
	FUTURE CONTROL OR METERING RUN
	POTENTIAL TRANSFORMER DRAWOUT TYPE WITH PRIMARY FUSES
	CURRENT TRANSFORMER WYE CONNECTED
	CURRENT TRANSFORMER, DELTA CONNECTED
	BUSHING TYPE CURRENT TRANSFORMER WYE CONNECTED
	BUSHING TYPE CURRENT TRANSFORMER DELTA CONNECTED

TRANSFORMER CONNECTIONS

△	DELTA
Y	WYE, FLOATING NEUTRAL
Y	WYE, SOLIDLY GROUNDED NEUTRAL
Y	WYE, RESISTOR GROUNDED NEUTRAL
Y	WYE, REACTOR GROUNDED NEUTRAL
V	OPEN DELTA
V	BRIDGED DELTA
	AIR CIRCUIT BREAKER, FIXED TYPE MANUAL OPERATOR
	AIR CIRCUIT BREAKER, DRAWOUT TYPE, MOTOR OPERATED, SOLENOID OPERATED OR STORED ENERGY MECHANISM
A	OIL CIRCUIT BREAKER, FIXED TYPE, AIR OPERATED MECHANISM
CS	CONTROL SWITCH WITH RED AND GREEN INDICATING LIGHTS
	CAPACITOR
	LIGHTNING ARRESTER
	FUSE
	DISCONNECT SWITCH
	GROUND CONNECTION
G	MOTOR, GENERATOR OR EXCITER, * NUMBER INDICATES RATING
	FUSED DISCONNECT
AS AM	AMMETER SWITCH AND AMMETER
VS VM	VOLTMETER SWITCH AND VOLTMETER
TS TI	TEMPERATURE SWITCH & TEMPERATURE INDICATOR
SY	SYNCHRONIZING SWITCH
WHM	WATTHOUR METER
WHD	WATTHOUR METER WITH DEMAND REGISTER
T	THERMOSTAT

SYMBOL	DESCRIPTION
WHM	WATTHOUR METER WITH DIRECTIONAL RATCHET
AM	AMMETER
PFM	POWER FACTOR METER
WM	WATTMETER
SYN	SYNCHROSCOPE
FM	FREQUENCY METER
GOV CS	GOVERNOR CONTROL SWITCH WITH LIMIT INDICATING LIGHTS
CS A	RHEOSTAT CONTROL SWITCH WITH LIMIT INDICATING LIGHTS
	TYPICAL RELAY & DEVICE SYMBOL * INTERNAL NUMBER IS IN ACCORDANCE WITH STANDARD ASA DESIGNATIONS. † EXTERNAL NUMBER INDICATES MORE THAN ONE RELAY OR DEVICE. MANUFACTURER'S LETTER DESIGNATIONS ARE ADDED ONLY IF ALL DEVICES ARE OF THE SAME MANUFACTURE.
	STARTER, ACROSS THE LINE (SIZE INDICATED)
	TYPICAL PUSHBUTTON STATION
	SELECTOR SWITCH - LETTERS INDICATE DESIGNATIONS
	RED INDICATING LIGHT
	JOG
	START
	STOP
	COUPLING CAPACITOR WITH POTENTIAL DEVICE
	COUPLING CAPACITOR
	WAVE TRAP
	POWER TRANSFORMER, TWO WINDING
	KEY INTERLOCK, * LETTER INDICATES IDENTICAL KEYS

WIRING DIAGRAM SYMBOLS

SYMBOL	DESCRIPTION
	N.O. CONTACT
	N.C. CONTACT
	COIL, * LETTER INDICATES DESIGNATION
	BREAKER, SINGLE POLE
	FUSE
	DISCONNECT SWITCH
	FUSED DISCONNECT SWITCH
	THERMAL HEATER ELEMENT
	TRANSFORMER
	RESISTOR
	PILOT LIGHT (TRANSFORMER TYPE), * LETTER INDICATES LENS COLOR
	PILOT LIGHT (RESISTOR TYPE), * LETTER INDICATES LENS COLOR
	PILOT LIGHT (FULL VOLTAGE TYPE), * LETTER INDICATES LENS COLOR
	PUSHBUTTON STATION (MOMENTARY)
	REACTOR
	MAINTAINED CONTACT PUSHBUTTON STATION
a b	SELECTOR SWITCH, * LETTERS INDICATE DESIGNATIONS
	EXTRA WIRE CABLE - END TO BE TAPED IN FIELD
	RHEOSTAT
	SOLENOID VALVE

SCHEMATIC DIAGRAM SYMBOLS

SYMBOL	DESCRIPTION
	N.O. CONTACT
	N.C. CONTACT
	COIL, * LETTER INDICATES DESIGNATION
	BREAKER, SINGLE POLE
	FUSE
	DISCONNECT SWITCH
	FUSED DISCONNECT SWITCH
	THERMAL HEATER ELEMENT
	TRANSFORMER
	RESISTOR
	N.O. PUSHBUTTON
	N.C. PUSHBUTTON
	RHEOSTAT
	PILOT LIGHT, * LETTER INDICATES LENS COLOR
a b c d	SELECTOR SWITCH, * LETTERS INDICATE DESIGNATIONS
	REACTOR
	TERMINAL BLOCK POINT INDICATING AN EXTERNAL CONNECTION BETWEEN TWO OR MORE EQUIPMENTS.
52/STA a	CELL MOUNTED AUXILIARY SWITCH ACTUATED BY THE BREAKER MECHANISM WHEN THE BREAKER IS IN THE OPERATING POSITION ONLY, CLOSED WHEN BREAKER IS CLOSED.
52/STA b	CELL MOUNTED AUXILIARY SWITCH ACTUATED BY THE BREAKER MECHANISM WHEN THE BREAKER IS IN THE OPERATING POSITION ONLY, CLOSED WHEN BREAKER IS TRIPPED.
52 a	AUXILIARY SWITCH MOUNTED DIRECTLY ON THE BREAKER MECHANISM, CLOSED WHEN THE BREAKER IS CLOSED. DISCONNECTED WHEN BREAKER IS IN THE TEST OR FULLY WITHDRAWN POSITIONS.
52 b	AUXILIARY SWITCH MOUNTED DIRECTLY ON THE BREAKER MECHANISM, CLOSED WHEN THE BREAKER IS TRIPPED. DISCONNECTED WHEN THE BREAKER IS IN THE TEST OR FULLY WITHDRAWN POSITIONS.
TOC	TRIP COIL OPERATED BY A THIN [illegible] MAN.
52 a	AUXILIARY SWITCH MOUNTED DIRECTLY ON THE BREAKER MECHANISM, CLOSED WHEN THE BREAKER IS CLOSED, OPENABLE WHEN THE BREAKER IS IN THE OPERATING POSITION OR IN THE TEST POSITION. DISCONNECTED WHEN THE BREAKER IS IN FULLY WITHDRAWN POSITION.
52 b	AUXILIARY SWITCH MOUNTED DIRECTLY ON THE BREAKER MECHANISM, CLOSED WHEN THE BREAKER IS TRIPPED. OPENABLE WHEN THE BREAKER IS IN THE OPERATING POSITION OR IN THE TEST POSITION. DISCONNECTED WHEN THE BREAKER IS IN FULLY WITHDRAWN POSITION.
	INTERNAL CONNECTION BETWEEN [illegible] THIS CONNECTION WILL BE FURNISHED AS PART OF THE SWITCHGEAR OR POWER CENTER. TERMINAL BLOCK

CONTROL SWITCH TERMINOLOGY

* CS C	CONTACTS CLOSE MOMENTARILY IN "CLOSE" OR START POSITION
* CS T	CONTACTS CLOSE MOMENTARILY IN "TRIP" OR "STOP" POSITION
* CS V	CONTACTS CLOSED AFTER "CLOSE" AND "TRIP"
* CS SC	CONTACTS CLOSED DURING "CLOSE" AND AFTER "CLOSE"
* CS ST	CONTACTS CLOSED DURING "TRIP" AND AFTER "TRIP"
* CS A	CONTACTS CLOSED IN "AUTO" POSITION
* CS M	CONTACTS CLOSED IN "MANUAL" POSITION
* CS O	CONTACTS CLOSED IN "OFF" POSITION
* CS CTD	CONTACTS CLOSED DURING "CLOSE" AND AFTER "CLOSE", DURING "TRIP" AND AFTER "TRIP"
*	SWITCH NUMBER OF SERVICE UNIT

MISCELLANEOUS

DEVICE NUMBERS AND FUNCTIONS

2 - TIME DELAY STARTING OR CLOSING RELAY
5 - STOPPING DEVICE
20 - ELECTRICALLY OPERATED VALVE
21 - DISTANCE RELAY
23 - TEMPERATURE CONTROL DEVICE
25 - SYNCHRONIZING OR SYNCHRONISM CHECK DEVICE
27 - UNDERVOLTAGE RELAY
30 - ANNUNCIATOR RELAY
32 - DIRECTIONAL POWER RELAY
33 - POSITION SWITCH
37 - UNDERCURRENT OR UNDERPOWER RELAY
40 - FIELD RELAY
41 - FIELD CIRCUIT BREAKER
42 - RUNNING TRANSFER OR SELECTOR SWITCH
46 - REVERSE PHASE OR PHASE BALANCE CURRENT RELAY
47 - PHASE SEQUENCE VOLTAGE RELAY
49 - MACHINE OR TRANSFORMER THERMAL RELAY
50 - INSTANTANEOUS OVERCURRENT OR RATE OF RISE RELAY
51 - AC TIME OVERCURRENT RELAY
52 - AC CIRCUIT BREAKER
57 - TIME DELAY STOPPING OR OPENING RELAY
63 - LIQUID OR GAS PRESSURE, LEVEL OR FLOW RELAY
64 - GROUND PROTECTIVE RELAY
65 - GOVERNOR
67 - AC DIRECTIONAL OVERCURRENT RELAY
68 - BLOCKING RELAY
69 - PERMISSIVE CONTROL DEVICE
74 - ALARM RELAY
78 - PHASE ANGLE MEASURING OR OUT-OF-STEP PROTECTIVE RELAY
79 - AC RECLOSING RELAY
81 - FREQUENCY RELAY
83 - AUTOMATIC SELECTIVE CONTROL OR TRANSFER RELAY
85 - CARRIER OR PILOT WIRE RECEIVER RELAY
86 - LOCKING-OUT RELAY
87 - DIFFERENTIAL PROTECTIVE RELAY
88 - [illegible] SWITCH
90 - REGULATING DEVICE
94 - TRIPPING OR TRIP FREE RELAY
[illegible] - OVERSPEED RELAY ⚠
[illegible] - [illegible] RELAY
[illegible] - VOLTAGE BALANCE RELAY
-26 - OVERTEMPERATURE DEVICE

ABBREVIATIONS

AUX	AUXILIARY
BFP	BOILER FEED PUMP AUXILIARY PANEL 4
BTG	BOILER-TURBINE-GENERATOR PANEL 4
CAP	CONDENSER AUXILIARY PANEL 4
CP	HELLMAN CONTROL PANEL 4
EC	EXCITER CUBICLE 4
ERE	ELECTRICAL RELAY [illegible] 4
H2P	[illegible] HYDROGEN PANEL 4
HPA CYC	[illegible]
	[illegible] MAIN CABINET 4
MP	SOOT [illegible]
P	[illegible] PANEL ⚠
TSS	TURBINE STARTING AND SUPERVISORY PANEL 4 ⚠
CPP	[illegible] PANEL 4
HVA	HEATING AND VENTILATING PANEL 4
EPA	GAS (LIQUID INVENTORY) TRIP PANEL 4A
ETP	GAS BLOWER EMERGENCY TRIP PANEL 4B
VHC	VIBRATION SPEED CONTROL CONSOLE 4
CPP UP	[illegible] CONTROL RELAY PANEL 4 ⚠ UNLOADING CONTROL PANEL 4

[illegible] ACCEPTED [illegible] INSPECTION

DRAWING STATUS	
ISSUED	DATE
PRELIMINARY	
FOR COMMENTS APPROVAL	5/8
APPROVED FOR CONSTRUCTION	5/8
[illegible]	6/5

REVISIONS					
NO.		BY	CHK	APP	DATE
1	APPROVED FOR CONSTRUCTION	RT	WSM	WSM	7-1-65
2	MISC. NOMENCLATURE REVISIONS	RT	WSM	WSM	2-10-65
3	ADDED SCP GROUP TO ABBREV. & MISC NOMEN ITEMS PRIOR TO 3 ISSUES	RT	WSM	WSM	12-7-67

REFERENCE DRAWINGS	
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]

PRINT RECORD	
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]

ENG. RECORD		
DRAWN	RT	7-1-65
CHECKED	WSM	7-1-65
DESIGN CK		
STRUCT CK		
ELECT CK		
APPROVED	WSM	12-7-67
APPROVED	WSM	2-10-65
APPROVED	WSM	7-1-65

ELECTRICAL LEGEND & SYMBOLS

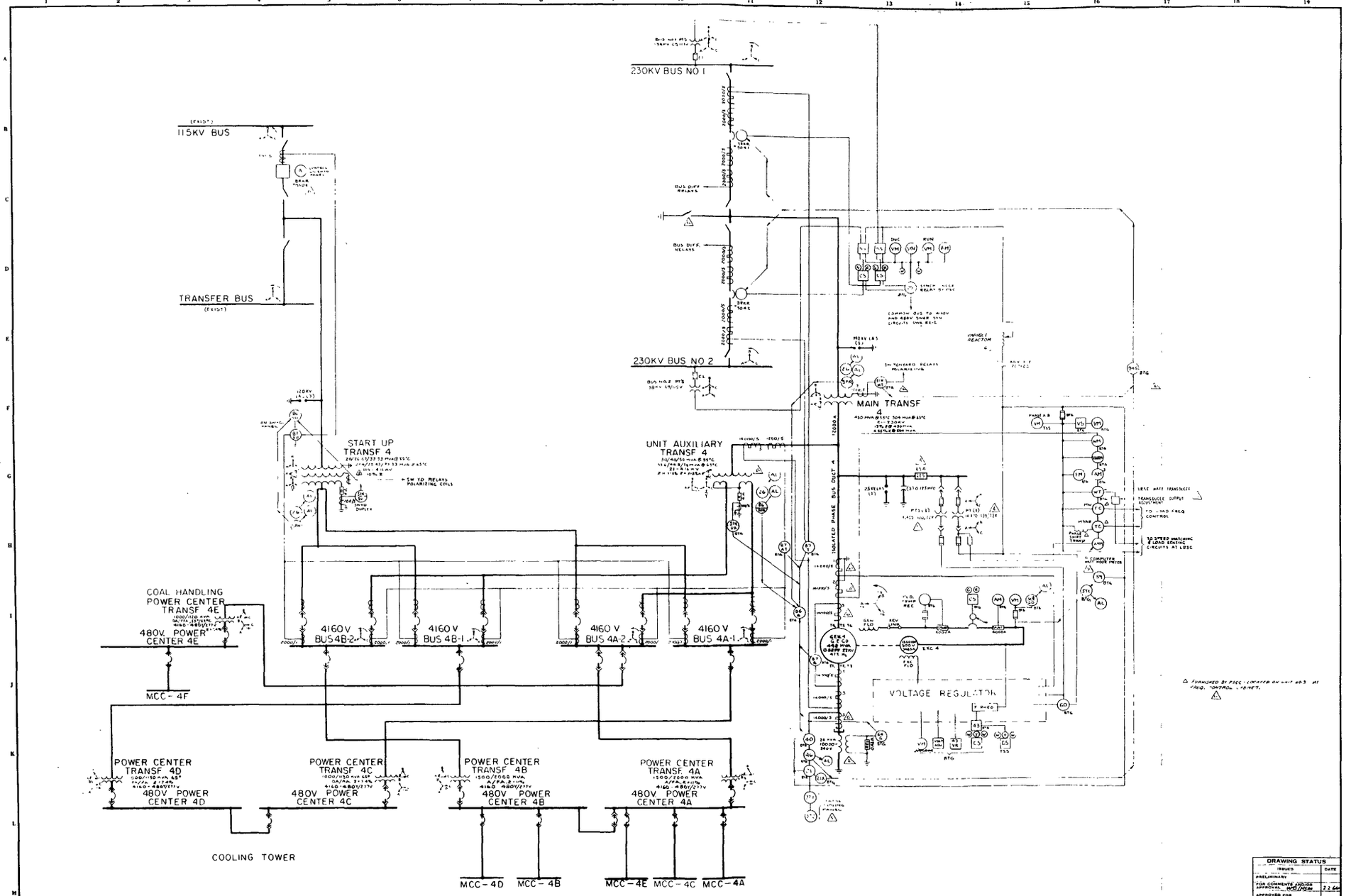
CHEROKEE 5 & 6 STATION - UNIT NO. 4 - 1968-350,000 KW

PUBLIC SERVICE CO. OF COLORADO

SCALE NONE | Stearns-Roger | ORDER NO. 0-28800

DRAWING NO. E-21500 | SHEET NO. E1-1 | REV. 3

WAD00649



DRAWING STATUS	
ISSUED	DATE
PRELIMINARY	
FOR COMMENTS AND/OR APPROVAL WB/HSM	2-2-66
APPROVED FOR CONSTRUCTION WB	3-17-66
REVISED & APPROVED FOR CONSTRUCTION HSM	12

REVISIONS					
1	REVISED PER CUSTOMERS REQUEST - APPROVED FOR CONSTRUCTION	3-11-66	RJA		HSM
2	MISC. MINOR REVISIONS	4-26-66	BJP		HSM
3	REV'D START UP TRANSF. RATING	5-26-66	HSM		HSM
4	REVISED TO AGREE WITH VENDORS EQUIPMENT & REVISED AS NOTED	5-6-67	HPB		HSM
5	REVISED WATT TRANSDUCER & REVISED AS NOTED	7-28-67	RJA		HSM
6	AS BUILT	12-1-68	GAS		HSM

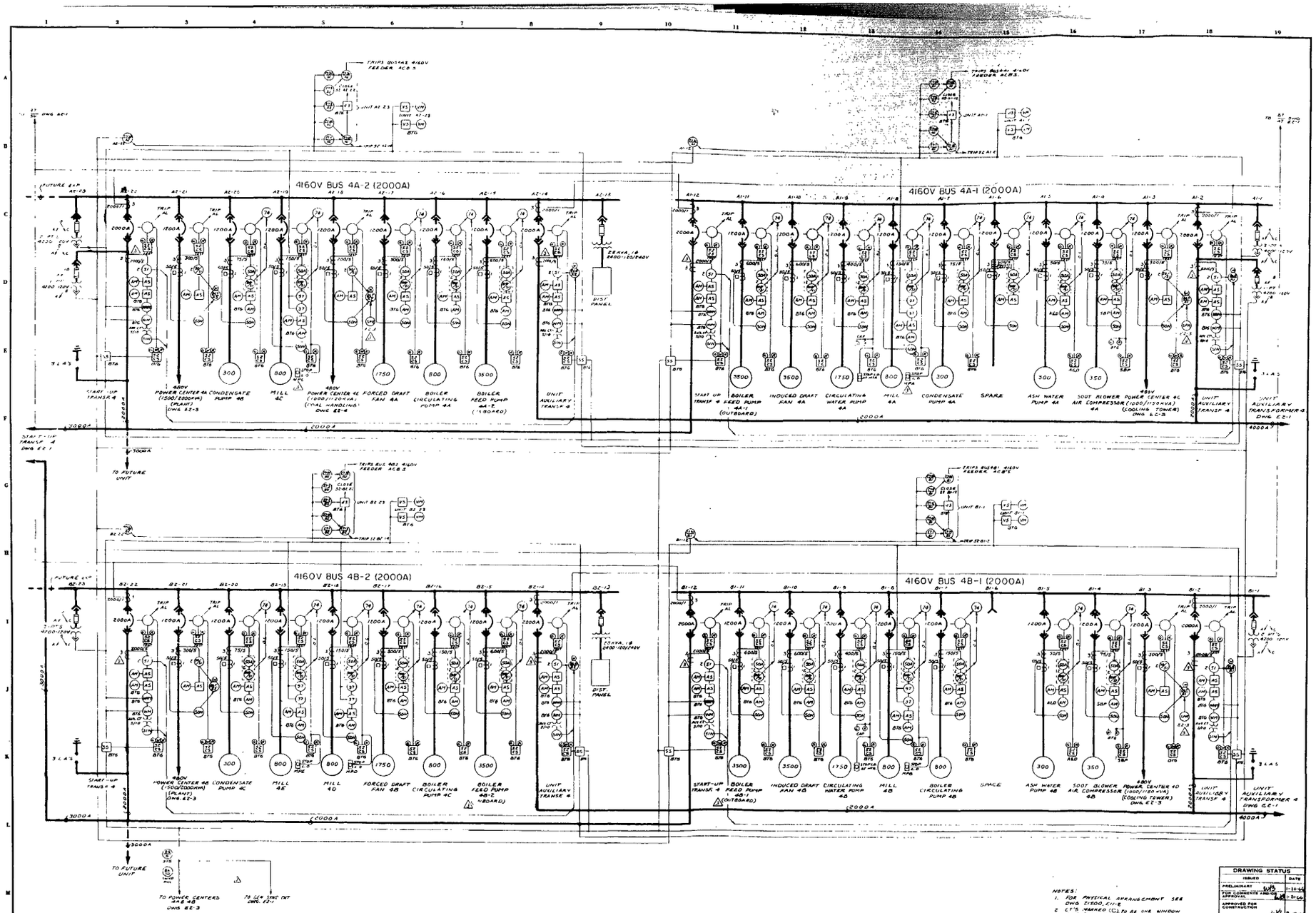
REFERENCE DRAWINGS

PRINT RECORD

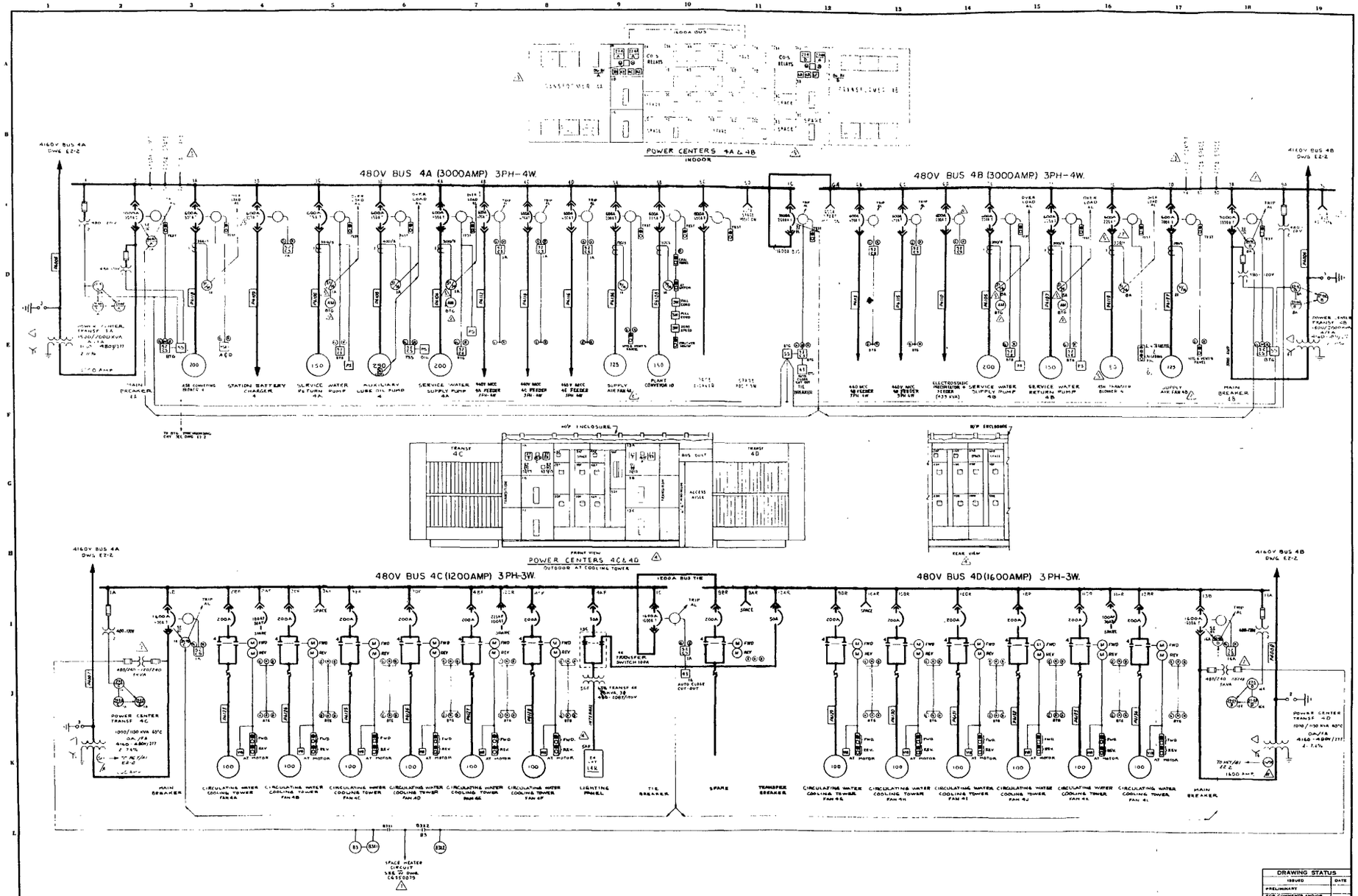
ENG RECORD

ONE LINE DIAGRAM
MASTER
CHEROKEE S E STATION - UNIT NO 4 - 1968 350 000 KW
PUBLIC SERVICE CO. OF COLORADO
SCALE NONE
Stearns-Roger
ORDER NO B-28800
DWG NO L-21500
SHEET NO E2-1
REV 2

WAD00650


4160V BUS 4A-2 (2000A)
4160V BUS 4A-1 (2000A)
4160V BUS 4B-2 (2000A)
4160V BUS 4B-1 (2000A)
480V POWER CENTER 4A (1500/2000KVA) (PLANT) DWG EE-3
CONDENSATE PUMP 4B
MILL 4C
480V POWER CENTER 4C (1000/1200KVA) (COAL HANDLING) DWG EE-4
FORCED DRAFT FAN 4A
BOILER CIRCULATING PUMP 4A
BOILER FEED PUMP 4A-2 (1/3 BOARD)
UNIT AUXILIARY TRANSF 4
START-UP TRANSF 4
BOILER FEED PUMP 4A-1 (OUTBOARD)
INDUCED DRAFT FAN 4A
CIRCULATING WATER PUMP 4A
MILL 4A
CONDENSATE PUMP 4A
SPARE
ASH WATER PUMP 4A
SOOT BLOWER AIR COMPRESSOR 4A
480V POWER CENTER 4C (COOLING TOWER) DWG. EC-3
UNIT AUXILIARY TRANSFORMER 4 DWG EE-1
480V POWER CENTER 4B (1500/2000KVA) (PLANT) DWG EE-3
CONDENSATE PUMP 4C
MILL 4E
MILL 4D
FORCED DRAFT FAN 4B
BOILER CIRCULATING PUMP 4C
BOILER FEED PUMP 4B-2 (1/3 BOARD)
BOILER FEED PUMP 4B-1 (OUTBOARD)
INDUCED DRAFT FAN 4B
CIRCULATING WATER PUMP 4B
MILL 4B
BOILER CIRCULATING PUMP 4B
SPACE
ASH WATER PUMP 4B
SOOT BLOWER AIR COMPRESSOR 4B
480V POWER CENTER 4D (COOLING TOWER) DWG EE-3
UNIT AUXILIARY TRANSF 4
UNIT AUXILIARY TRANSFORMER 4 DWG EE-1
TO FUTURE UNIT
TO POWER CENTERS 4A & 4B DWG EE-3
TO GEN SYNC CKT DWG. EJ-1
NOTES:
1. FOR PHYSICAL ARRANGEMENT SEE DWG. T1500, E1-8.
2. CT'S MARKED (C) TO BE SIX WINDOW TYPE ENCLOSING ALL THREE PHASES WITH MATCHING RELAY, 5-0-80 IN ACCORDANCE WITH SPECIFICATIONS.
DRAWING STATUS
ISSUED
PRELIMINARY
FOR COMMENTS AND/OR APPROVAL
APPROVED FOR CONSTRUCTION
REVISED & APPROVED FOR CONSTRUCTION
REVISIONS
A APPROVED FOR CONSTRUCTION
B ADDED SYN. SWGR. & PM'S, ALSO DET. TO SYNC CKT
C AS BUILT
REFERENCE DRAWINGS
21500-E2-1 ONE LINE DIAGRAM-MASTER
21500-E2-3 ONE LINE DIAGRAM-FOUR CTGS 4A,4B,4C,4D
21500-E2-4 ONE LINE DIAGRAM-POWER CENTER 4B
PRINT RECORD
ENG RECORD
ONE LINE DIAGRAM
4160V SWITCHGEAR
CHEROKEE S. E. STATION - UNIT NO. 4 - 1968 350,000 KW
PUBLIC SERVICE CO. OF COLORADO
Stearns-Roger
DWG NO. L-21500
SHEET NO. E2-2
SCALE NONE
ORDER NO. B-28800

WAD00651



DRAWING STATUS	
ISSUED	DATE
PRELIMINARY	
FOR COMMENTS AND/OR APPROVAL	
APPROVED FOR CONSTRUCTION	
REVISED & APPROVED FOR CONSTRUCTION	

REVISIONS						

REVISIONS						
7	GENERAL REVISION TO BUSES 4A & 4B — APPROVED FOR CONSTRUCTION	8-20-68	DMA	RJA	RJA	RJA
6	ADDED 4W TO SERVICE WATER SUPPLY & RETURN PUMPS, MISC MISCELLANEOUS REVISIONS	7-26-68	DMA	RJA	RJA	RJA
5	REVISED SEC "B" BUSES WITH VENDORS EQUIPMENT	6-13-68	DMA	RJA	RJA	RJA
4	REVISED TO AGREE WITH LATEST VENDORS EQUIPMENT	4-17-68	DMA	RJA	RJA	RJA
3	REVISED TO AGREE WITH VENDORS EQUIPMENT & REVISED AS NOTED	2-21-68	DMA	RJA	RJA	RJA
2	REVISED AS NOTED	12-26-67	DMA	RJA	RJA	RJA
1	ADDED SPACE HEATER CKT & MINOR REVISIONS	11-29-67	DMA	RJA	RJA	RJA
0	AS BUILT	9-29-67	DMA	RJA	RJA	RJA

REFERENCE DRAWINGS

PRINT RECORD												
ISSUED	REV	A	B	C	D	E	F	G	H	I	J	K
TRACE			9/4	9/5	9/6	9/7	9/8	9/9	9/10	9/11	9/12	9/13
50 CDRD			9/4	9/5	9/6	9/7						
CC Bids			9/4	9/5	9/6	9/7						

ENG. RECORD		
DRAWN	R.J.A.	8-20-68
TRACE	R.S. 9/6	9/9/68
DESIGN SUP.		
DESIGN ENGR.		
CHECK SUP.		
CHECK ENGR.		7-15-68
APPROVED		11-4-68
APPROVED		11-4-68
APPROVED		11-4-68

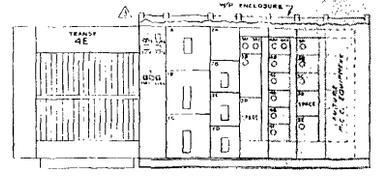
ONE LINE DIAGRAMS
480 V POWER CENTERS 4A, 4B, 4C AND 4D
CHEROKEE S. E STATION – UNIT NO 4 – 1968-350,000 KW
PUBLIC SERVICE CO. OF COLORADO

SCALE	ORDER NO	WPR NO	SHEET NO	REV
NONE	B-28800	L-21500	E2-3	7

Stearns-Roger

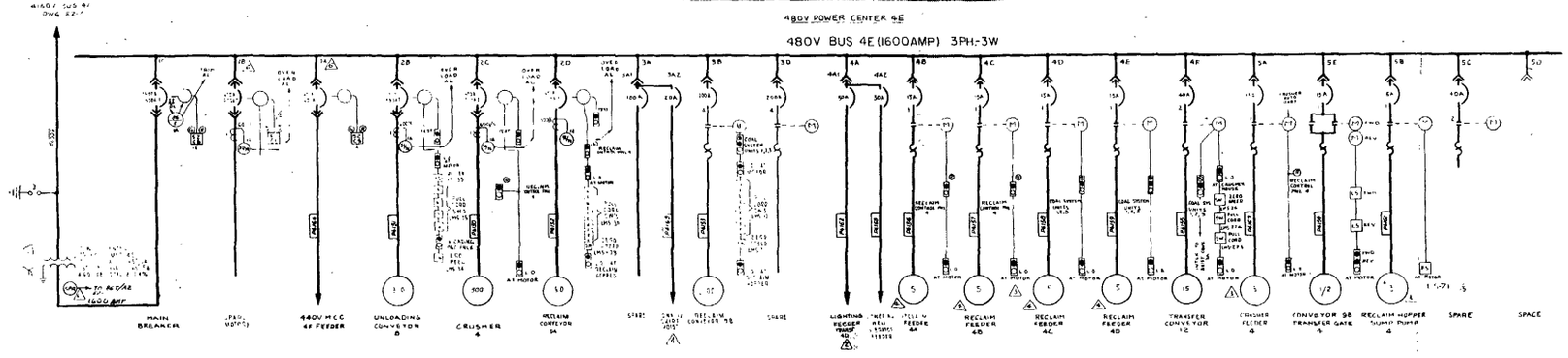
EDWARD JOHN FELT — REGISTERED — 6676 — STATE OF COLORADO

WAD00652



480V POWER CENTER 4E

480V BUS 4E (1600AMP) 3PH-3W



DRAWING STATUS		
	ISSUED	DATE
PRELIMINARY		
FOR COMMENTS AND/OR APPROVAL		3-10 1-14-66
APPROVED FOR CONSTRUCTION		4-12 4-11-66
REVISED & APPROVED FOR CONSTRUCTION		11 5-4

REVISIONS					
NO.		DATE	BY	CHK'D	APP'D
1	ADDED TOP HORIZONTAL CAM & RELEASE LEVER TO 4E1 & 4E2 LOADING VALVE FEEDER CONTROL RELAYS, ELECTRICAL INTERLOCKING, PUSH & SPRINGS FOR CONTRACTION	2-14-66	RMK	WAS	RSM
2	REVISED HEATING TRANSF FEEDER 4K TO 4U	3-8-66	RMK	WAS	RSM
3	[illegible]	3-8-66	RMK	WAS	RSM
4	[illegible]	3-10-66	RMK	WAS	RSM
5	REVISE TO DESIGNATE SUMP PUMP	3-22-66	RMK	WAS	RSM
6	AS BUILT	5-4-66	DK		RSM

REFERENCE DRAWINGS

PRINT RECORD														
ISSUED														
PREL														
50 COMP														
G.C. Bids														

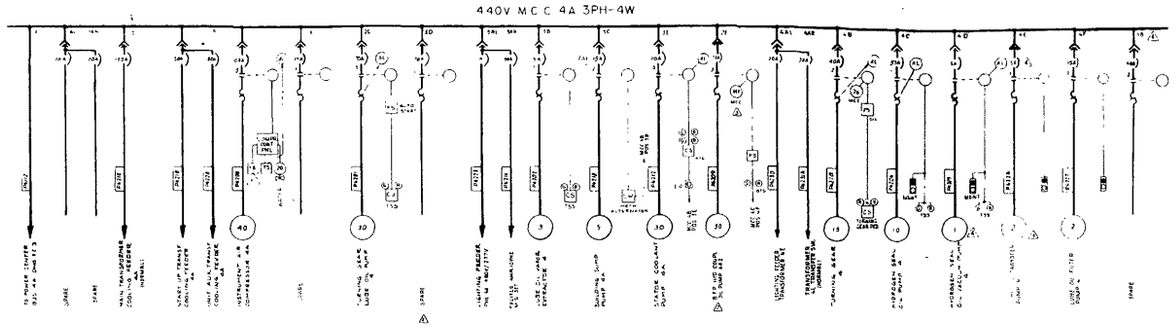
ENG. RECORD		
DESIGN	R.K.S.	10-25-65
DETAILED	P.S.W.	11-8-65
CHK'D		
APPROVED		
PROJ. ENGR.		
APPROVED		
APPROVED		

ONE LINE DIAGRAMS
480 V POWER CENTER 4E
CHEROKEE 5 & 6 STATION - UNIT NO. 4 - 1962 350,000 KW
PUBLIC SERVICE CO. OF COLORADO
SCALE 3/8"=1'-0"
Stearns-Roger
ORDER NO. B-22800

DWG. NO. E-21500
SHEET NO. E2-4
REV. 6

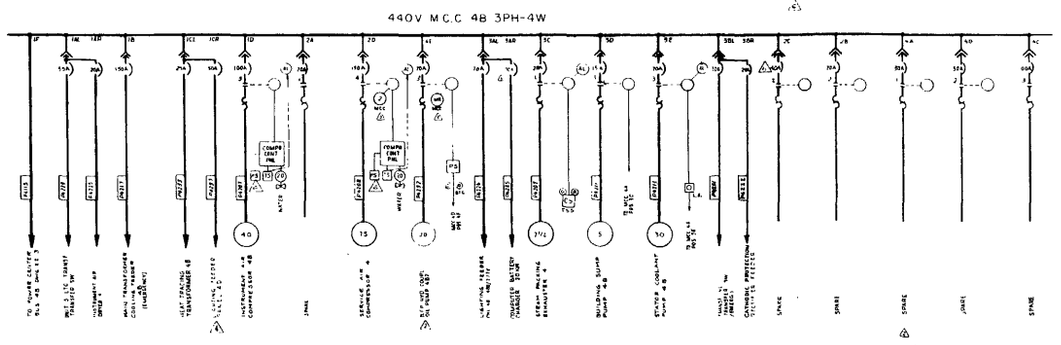
EDWARD JOHN RICE 6676 REGISTERED PROFESSIONAL ENGINEER STATE OF COLORADO

WAD00653









DRAWING STATUS

ISSUED	DATE
PRELIMINARY	
FOR COMMENTS AND OR APPROVAL	5/13/66
APPROVED FOR CONSTRUCTION	
REVISED & APPROVED FOR CONSTRUCTION	

REVISIONS

NO	REVISIONS	BY	CHK	APP'D
1	SOLID HEAT TRACING TRANSFORMER 4B — APPROVED FOR CONSTRUCTION	JHM	HSM	
2	ZONE SECTION 4 TO MCC 4B, FEED 6TP AND 7DOPL OIL PUMPS WERE 25 HP	JHM	HSM	
3	MISC. MINOR CHANGES	JHM	HSM	
4	ADDED 10 HP 3 PH MOTOR FOR CONDENSATE RECIRC. PUMP	JHM	HSM	
5	AS BUILT	JHM	HSM	

REFERENCE DRAWINGS

JHM 1A CONNECTIONS & SCHEMATICS FOR VOLTAGE CONTROL

PRINT RECORD

SR COPY
GC Bldg

ENG RECORD

DESIGN	JHM 3-28-66
DRAWN	
CHECKED	HSM 3/31/66
QUAL. CK.	
ENGR'G GP.	
ELECT. GP.	
APPROVED	JHM 3/31/66
APPROVED	HSM 3/31/66
APPROVED	

ONE LINE DIAGRAMS
440 V MOTOR CONTROL CENTERS 4A AND 4B

CHEROKEE S. E. STATION – UNIT NO. 4 – 1968-350,000 KW

PUBLIC SERVICE CO. OF COLORADO

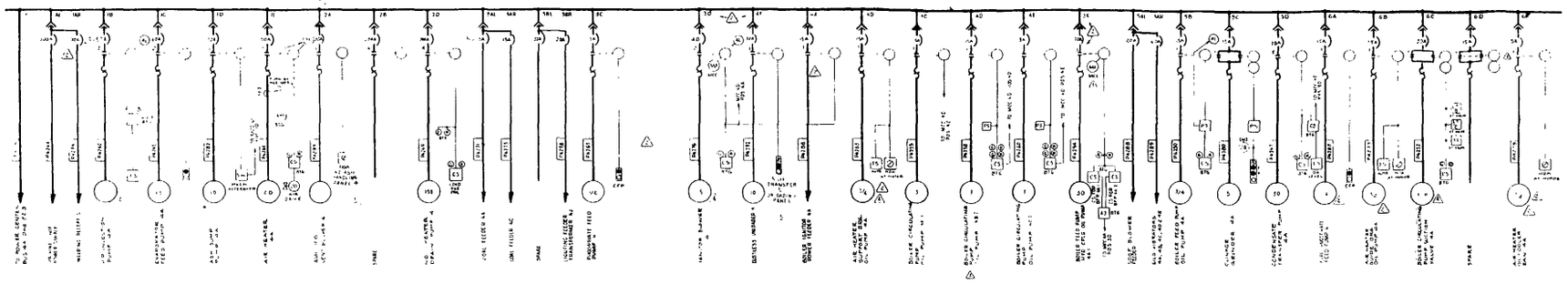
SCALE		ORDER NO	
NONE	Stearns-Roger	B-28800	

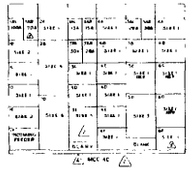
DWG NO L-21500
SHEET NO E2-5
REV 4

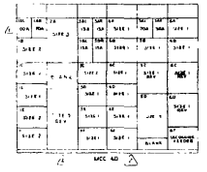
LOVELAND ENGINEERING SOCIETY 6676 STATE OF COLORADO

WAD00654

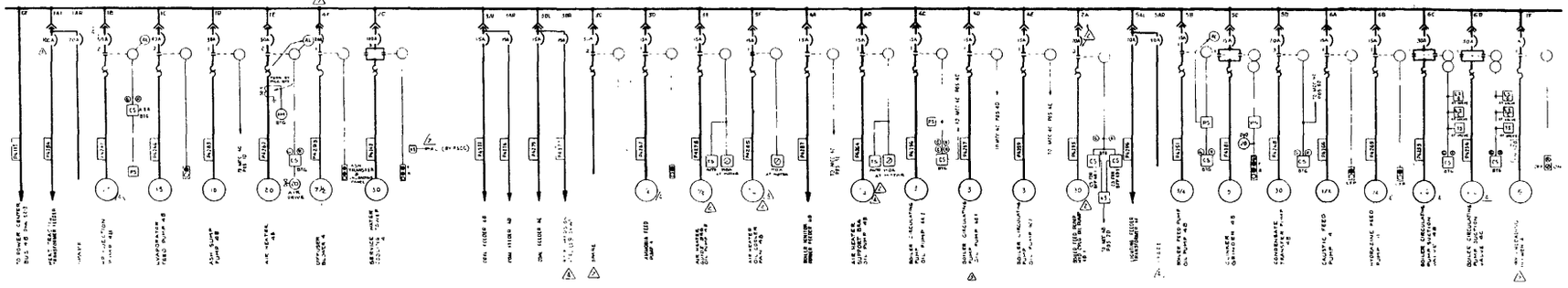
440V M.C.C. 4C





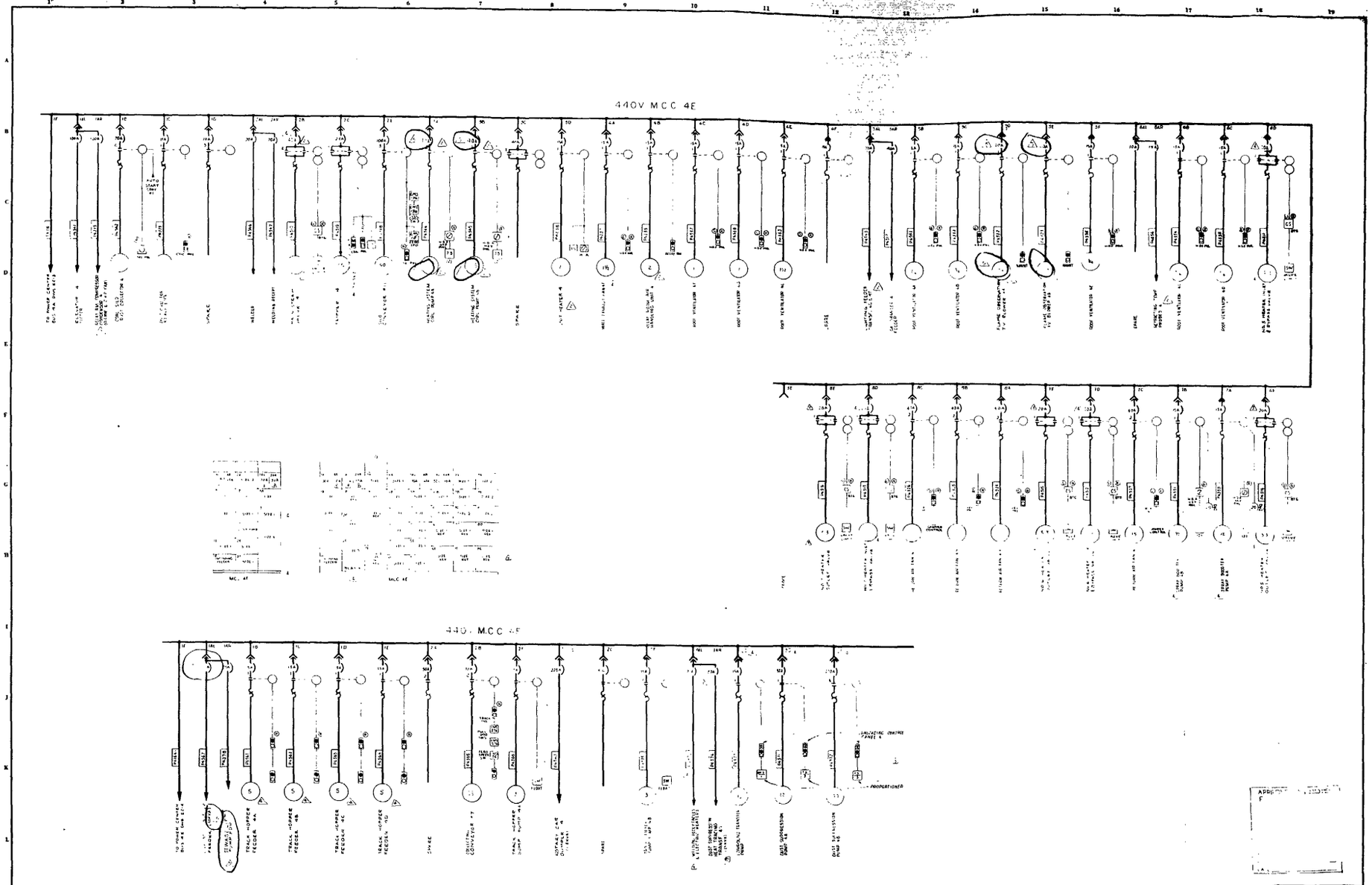


440V M.C.C. 4D



DRAWING STATUS	
ISSUED	DATE
PRELIMINARY	
FOR COMMENTS AND/OR APPROVAL	5/16/64
APPROVED FOR CONSTRUCTION	MSM 4-11-64
REVISED & APPROVED FOR CONSTRUCTION	MSM 6-8

| REVISIONS | | |



DRAWING STATUS	
ISSUED	DATE
PRELIMINARY	
FOR COMMENTS AND/OR APPROVAL	4/23/64
APPROVED FOR CONSTRUCTION	4/24/64
REVISED & APPROVED FOR CONSTRUCTION	5/1/67

REVISIONS					
4	REVISED SHS, TRIP UNIT, LOAD & RELAY TRIP SETTINGS PER SCAT 7-1-67	5/1/67	DM	HSM	
3	REVISED MCC 4E & 4F TRIP UNIT SETTINGS PER SCAT 7-1-67	4/24/64	DM	HSM	
2	MISC. MINOR CHANGES	3/31/64	RW	DTH	
1	REVISED TO AGREE WITH VENDORS EQUIPMENT & REVISED AS NOTED	3/13/64	MWB	HSM	
0	REVISED TO CHANGE CKT BREAKER AMP & SEWAGE LIFT PUMP FOR 40HP	1/22/64	JAM	DTH	

REFERENCE DRAWINGS	
E 21000 SERIES	CONNECTIONS & SCHEMATICS LOW VOLTAGE CONTROL

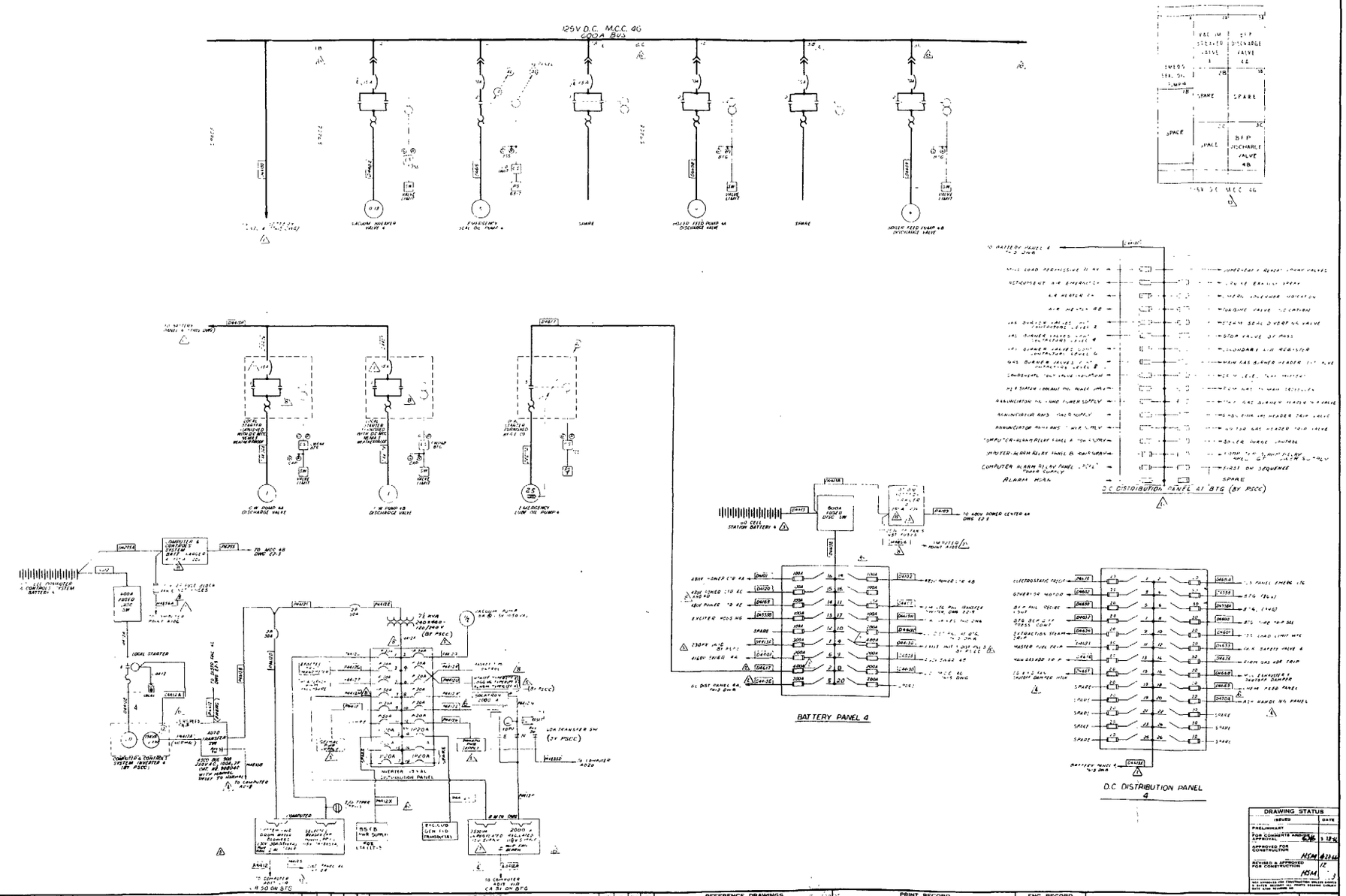
PRINT RECORD																
DESIGN	REC'D															
CHECKED	SR Coop															
DRAWN	G.E. 8/10															
TRACED																
APPROVED																
APPROVED																
APPROVED																

ENG RECORD	
DESIGN	HSM 10-7-63
CHECKED	GES 10-8-63
DRAWN	
TRACED	
APPROVED	
APPROVED	
APPROVED	

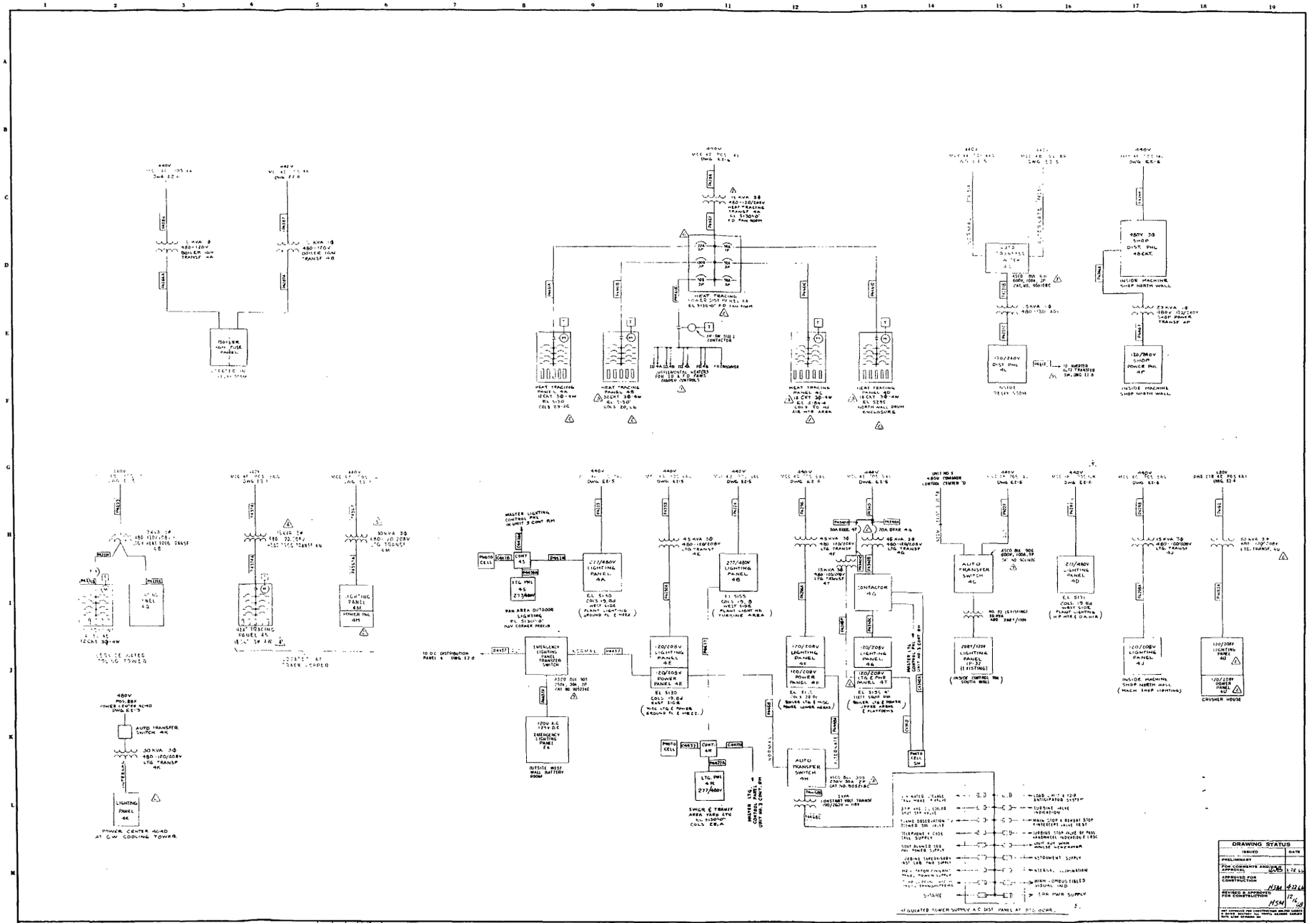
ONE LINE DIAGRAMS
440 V MOTOR CONTROL CENTERS 4E AND 4F
CHEROKEE S. E. STATION - UNIT NO. 4 - 1968-350,000 KW
PUBLIC SERVICE CO. OF COLORADO

SCALE		ORDER NO.	DWG NO.	SHEET NO.	REV.
NONE	Stearns-Roger	B-28600	E-21508	E2-7	4

WAD00656


125V D.C. M.C.C. 4G
COOA BUS
BATTERY PANEL 4
D.C. DISTRIBUTION PANEL 4
D.C DISTRIBUTION PANEL AT BTG (BY PSCC)
ONE LINE DIAGRAMS
125V DC SYSTEM
CHEROKEE 5 & 6 STATION - UNIT NO 4 - 1968 350 000 KW
PUBLIC SERVICE CO. OF COLORADO
Stearns-Roger
DRAWING STATUS
REVISIONS
REFERENCE DRAWINGS
PRINT RECORD
ENG. RECORD
L-21500
E2-8
B-28800

WAD00657



DRAWING STATUS	
ISSUED	DATE
PRELIMINARY FOR COMMENTS AND/OR APPROVAL	4/26/66
APPROVED FOR CONSTRUCTION	4/26/66 HSM
REVISED & APPROVED FOR CONSTRUCTION	12/14/66 HSM

REVISIONS					
NO.		DATE	BY	CK'D	APP'D

REVISIONS					
NO.		DATE	BY	CK'D	APP'D
1	CORRECTED LOCATIONS OF EQUIPMENT —— ARRANGED FOR CONSTRUCTION	9-66	DR	SW	HSM
2	ADDED PANELS 4H, 4T. REVISED PANELS 4H, 4U & HT TRACING PANELS	10-66	KJR	KJR	HSM
3	INCO INDIRECT & 4000D ADDITIONS INFO	11-66	GW	GW	HSM
4	REVISED TO AGREE WITH VENDORS EQUIPMENT & REVISED AS NOTED	12-66	WPB	WPB	HSM
5	CHANGED PWR SUPPLY A.C. DIST PNL BTG BOARD, REV. TRANSF 4H	1-67	WPB/JAM	WPB	HSM
6	AS BUILT	3-68	RAS	RAS	HSM

REFERENCE DRAWINGS	
ISSUED	MECH. NO.
MECH.	
E&I	
STRUCT.	
ELECT.	
APPROVED	
APPROVED	
APPROVED	
APPROVED	

PRINT RECORD										
ISSUED	MECH.	E&I	STRUCT.	ELECT.	APPROVED	APPROVED	APPROVED	APPROVED		
9/26/66	9/26/66	9/26/66	9/26/66	9/26/66	9/26/66	9/26/66	9/26/66	9/26/66		
12/14/66	12/14/66	12/14/66	12/14/66	12/14/66	12/14/66	12/14/66	12/14/66	12/14/66		

ENG RECORD		
DRAWN	[illegible]	10-25-66
CHECKED	[illegible]	3-25-66
STRUCT CK	—	—
ELECT CK	[illegible]	3-25-66
APPROVED	[illegible]	3-25-66
APPROVED	[illegible]	3-28-66
APPROVED	[illegible]	3-28-66

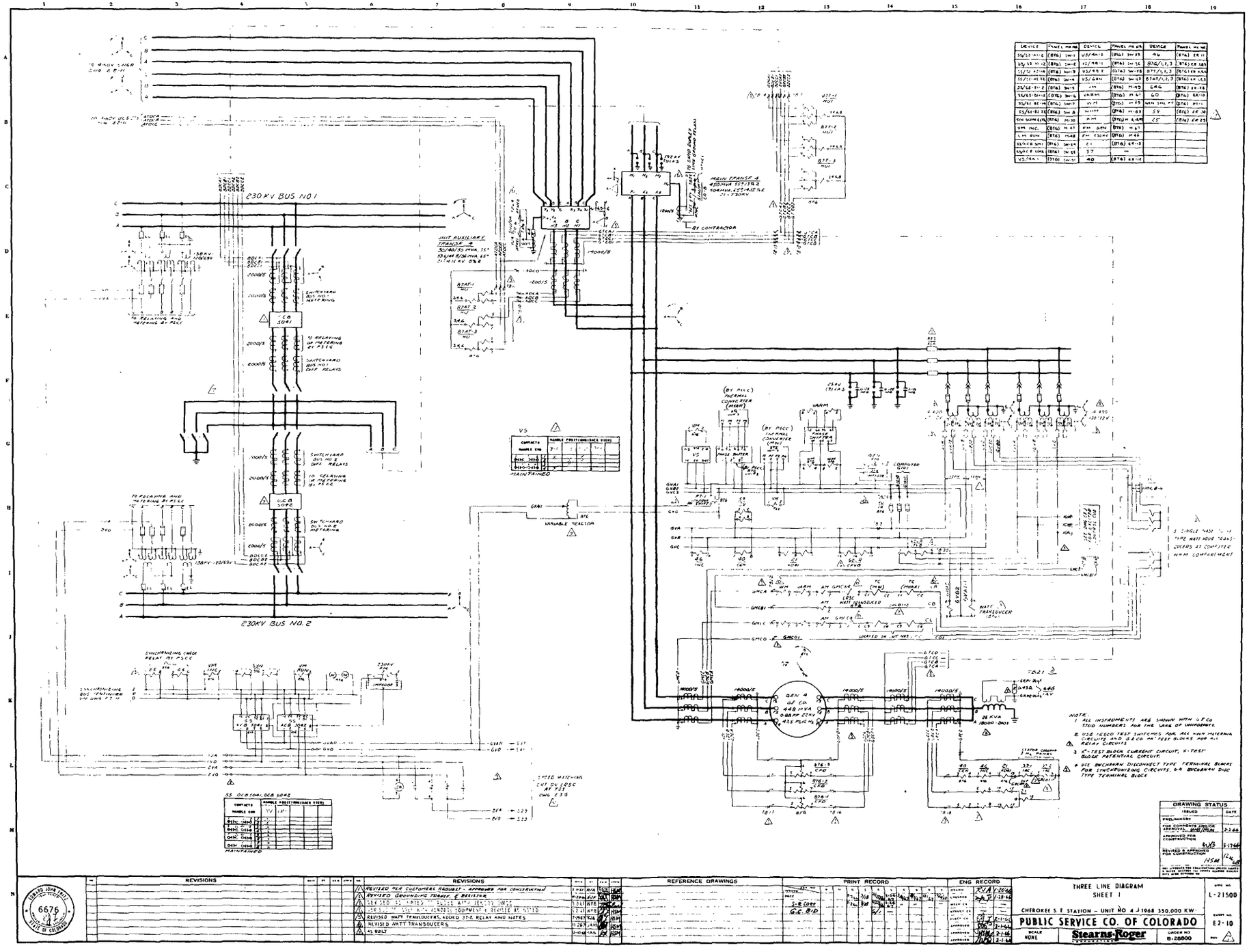
SR COOP
CF BID

COLORADO JOINT VENTURE
6676
CERTIFICATE OF AUTHORITY
STATE OF COLORADO

ONE LINE DIAGRAM
LIGHTING & LOW VOLTAGE DISTRIBUTION
CHEROKEE S. E. STATION – UNIT NO. 4 – 1968-350,000 KW
PUBLIC SERVICE CO. OF COLORADO

DWG. NO. L-21500
SHEET NO. E2-9
REV. 6
SCALE NONE
Stearns-Roger
ORDER NO. 5-28800

WAD00658



DEVICE	PANEL NO.	DEVICE	PANEL NO.	DEVICE	PANEL NO.
25/27-81-2	(87G) SW-1	V5/46-1	(87G) SW-15	49	(87G) ER-11
25/27-81-2	(87G) SW-2	V5/49-1	(87G) SW-16	87G/1,2,3	(87G) ER-13,5
25/27-81-2	(87A) SW-3	V5/49-2	(87A) SW-17	87T/1,2,3	(87G) ER-13,6
27/27-81-2	(87A) SW-4	V5/46-1	(87A) SW-18	87AT/1,2,3	(87G) ER-13,7
25/62-81-2	(87A) SW-5	1/M	(87G) M-13	64G	(87G) ER-13
25/62-81-2	(87G) SW-6	VARMS	(87G) M-61	60	(87G) ER-19
25/62-81-1&2	(87G) SW-7	W.M.	(87G) M-59	GEN SYN. AT	(87G) PT-1
25/81-81-1&2	(87G) SW-8	WATTS	(87G) M-63	59	(87G) ER-14
SYN SCANNER	(87A) M-30	A.M.	(87G) M-64	25	(87G) ER-23
VM INC.	(87G) M-67	KW. GEN.	(87G) M-61		
I.M. KVM	(87G) M-68	KW. 230KV	(87A) M-62		
25/62-SYN	(87A) SW-14	21	(87A) ER-13		
25/62 E SYN.	(87A) SW-15	27	—		
V5/46-1	(87G) SW-14	40	(87G) ER-12		

V5 CONTACTS	HANDLE POSITIONS (BACK VIEW)			
HANDLE CKT.	1	2	3	4
86K-3416				
86K0-3416				

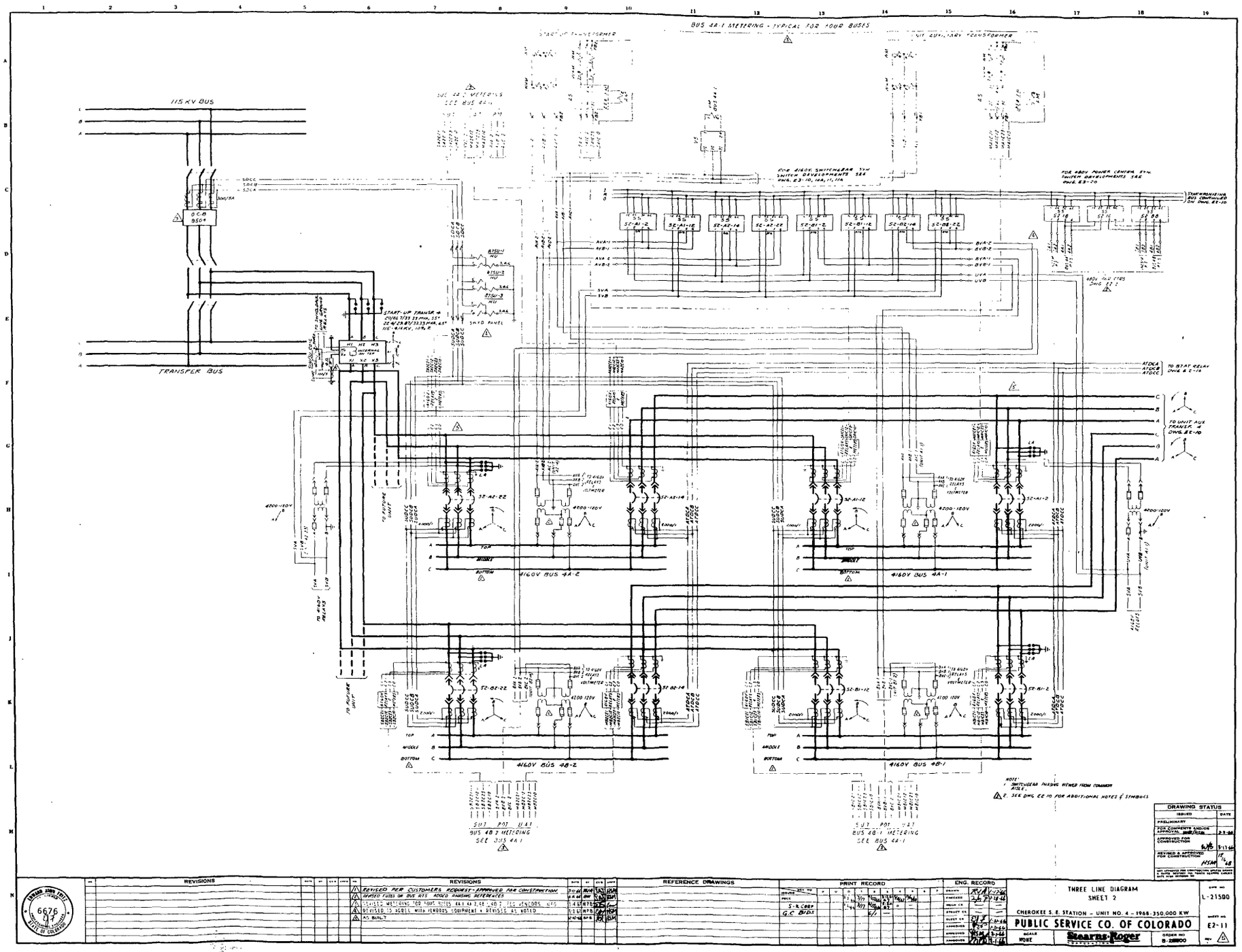
52 OCB 1041, OCB 1042 CONTACTS	HANDLE POSITIONS (BACK VIEW)			
HANDLE CKT.	W	LP		
86K-3416				
86K0-3416				
86K-3416				
86K0-3416				

DRAWING STATUS	
ISSUED	DATE
PRELIMINARY	
FOR CONSTRUCTION (FOR CONTROL WIRE ONLY)	2-1-66
APPROVED FOR CONSTRUCTION	6-13 3-17-66
REVISED & APPROVED FOR CONSTRUCTION	12-6

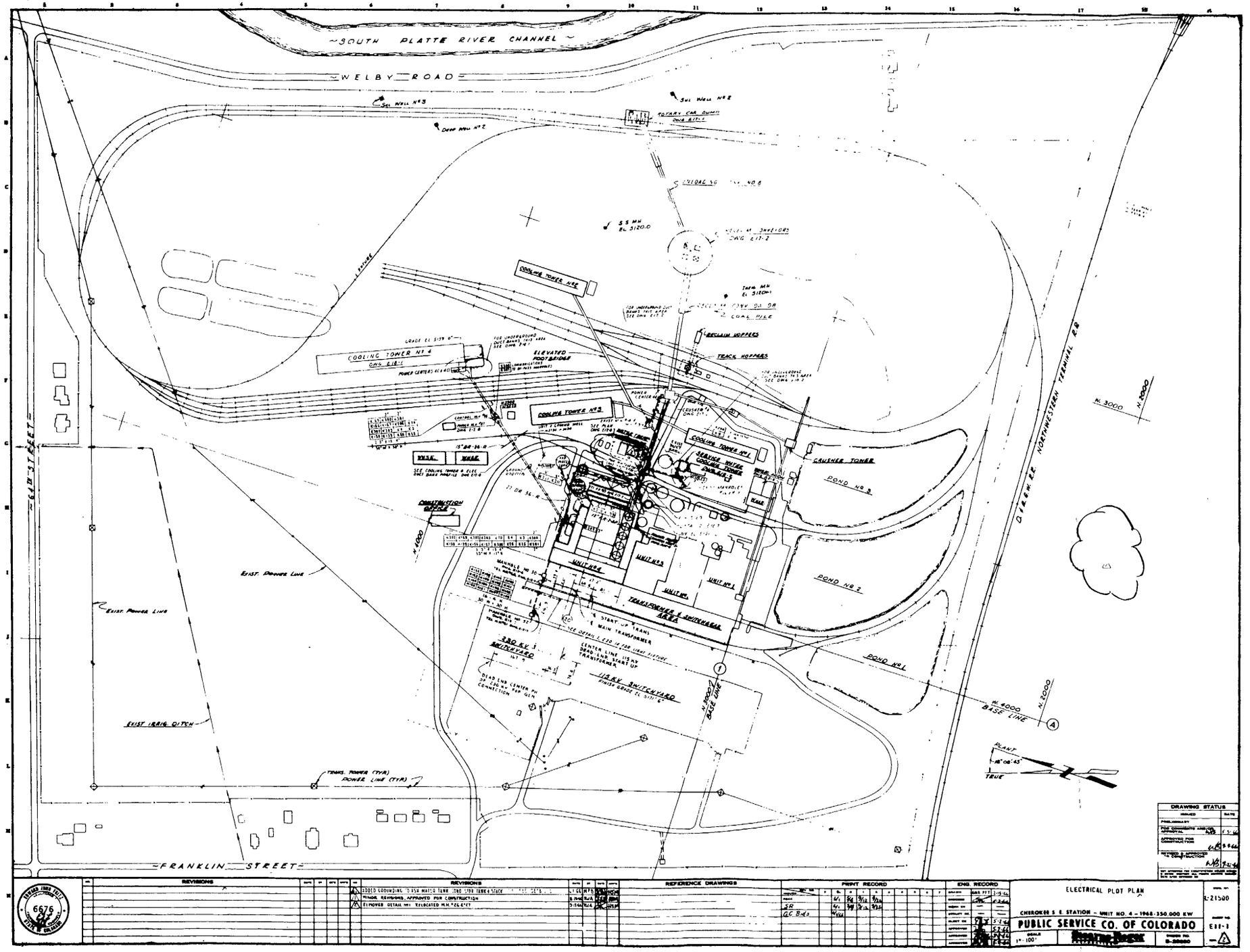
REVISIONS				
NO.	REVISIONS	BY	CHK'D	APP'D
1	REVISED PER CUSTOMERS REQUEST - APPROVED FOR CONSTRUCTION	EJK		
2	REVISED GROUNDING TRANSF. & RESISTOR	EJK		
3	SEE SHEET 2 FOR NOTES	WTB		
4	SEE SHEET 2 FOR ADDITIONAL EQUIPMENT & REVISED AT VOLTS	WTB		
5	REVISED WATT TRANSDUCERS, ADDED 27-2 RELAY AND NOTES	WTB		
6	REVISED WATT TRANSDUCERS	WTB		
7	AS BUILT	CAS		

REFERENCE DRAWINGS

| PRINT RECORD | | | |


BUS 4A-1 METERING - TYPICAL FOR 4 BUSES
115 KV BUS
TRANSFER BUS
START-UP TRANSFORMER
UNIT AUXILIARY TRANSFORMER
SWITCHBOARD PANEL
4160V BUS 4A-2
4160V BUS 4A-1
4160V BUS 4B-2
4160V BUS 4B-1
SUT POT U A1
BUS 4B-2 METERING
SEE DWG 4A-1
SUT POT U A1
BUS 4B-1 METERING
SEE BUS 4A-1
TO UNIT AUX TRANSF. 4 DWG. E2-10
TO STAT. RELAY DWG. E-18
NOTE:
1. SWITCHGEAR PHASING VIEWED FROM COMMON AISLE.
2. SEE DWG. EE 10 FOR ADDITIONAL NOTES & SYMBOLS

REVISIONS							


SOUTH PLATTE RIVER CHANNEL
WELBY ROAD
FRANKLIN STREET
64TH STREET
D.&R.G.W. R.R. NORTHWESTERN TERMINAL R.R.
COOLING TOWER No 4
COOLING TOWER No 3
COOLING TOWER No 2
COOLING TOWER No 1
ELEVATED FOOTBRIDGE
RECLAIM HOPPERS
TRACK HOPPERS
CRUSHER TOWER
POND No 3
POND No 2
POND No 1
CONSTRUCTION OFFICE
UNIT No 4
UNIT No 3
UNIT No 2
UNIT No 1
TRANSFORMER & SWITCHGEAR AREA
230 KV SWITCHYARD
115 KV SWITCHYARD
EXIST. POWER LINE
EXIST. IRRIG. DITCH
TRANS. TOWER (TYP)
POWER LINE (TYP)
BASE LINE
PLANT
TRUE
DRAWING STATUS
REVISIONS
REFERENCE DRAWINGS
PRINT RECORD
ENG. RECORD
ELECTRICAL PLOT PLAN
CHEROKEE S. E. STATION - UNIT NO. 4 - 1968-350,000 KW
PUBLIC SERVICE CO. OF COLORADO
SCALE 1" = 100'
E11-1
6676

WAD00661