DRAWING NO: D-00-F1000

INSTRUMENTS

INSTRUMENT TERMINOLOGY

	FIRST LETTER		SUCCEEDING LETTERS		
	MEASURED OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A	ANALYSIS		ALARM		
B	BURNER		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
C	CONDUCTIVITY (ELECTRICAL)			CONTROL	
D	DENSITY OR SPECIFIC GRAVITY	DIFFERENTIAL			
E	VOLTAGE (EMF)		PRIMARY ELEMENT		
F	FLOW RATE	RATIO (FRACTION)			
G	GAGING (DIMENSIONAL)		GLASS		
H	HAND (MANUALLY INITIATED)				HIGH
I	CURRENT (ELECTRICAL)		INDICATE		
J	POWER	SCAN			
K	TIME OR TIME SCHEDULE				
L	LEVEL		LIGHT (PILOT)		LOW
M	MOISTURE OR HUMIDITY				
N	USER'S CHOICE		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
O	USER'S CHOICE		ORIFICE (RESTRICTION)		
P	PRESSURE OR VACUUM		POINT (TEST CONNECTION)		
Q	QUANTITY OR EVENT	INTERGRATE OR TOTALIZE			
R	RADIO-ACTIVITY		RECORD OR PRINT		
S	SPEED OR FREQUENCY	SAFETY		SWITCH	
T	TEMPERATURE			TRANSMIT	
U	MULTI-FUNCTION		MULTI-FUNCTION	MULTI-FUNCTION	MULTI-FUNCTION
V	VIBRATION			VALVE, DAMPER, OR LOUVER	
W	WEIGHT OR FORCE		WELL		
X	SHUTDOWN				
Y	USER'S CHOICE			RELAY OR COMPUTE	
Z	POSITION			UNCLASSIFIED FINAL CON-TROL ELEMENT	

REFERENCE: INSTRUMENT SOCIETY OF AMERICA "INSTRUMENTATION SYMBOLS AND INDENTIFICATION"

NOTE:
1) ALL MOTORS SHOWN ON P&ID'S SHALL HAVE LOCAL CONTROL STATIONS, UNLESS NOTED OTHERWISE.
2) VENTS/BLEEDERS NOT SHOWN AS GOING TO SEWERS TO BE CONSIDERED TO BE PLUGGED OR BLIND FLANGED
3) PUMPS RATED FLOW ## GPM MAX. △P ## PSI.

MISCELLANEOUS INSTRUMENT SYMBOLS

- DIAPHRAGM SEAL
- PATCHBOARD CONNECTION (PATCHBOARD "A", POINT "10")
- RUN LIGHT (LOCAL)
- RUN LIGHT (PANEL MOUNTED)

INSTRUMENT LINES

- PROCESS CONN. OR INSTR. SUPPLY
- PNEUMATIC SIGNAL
- ELECTRIC SIGNAL
- CAPILLARY SIGNAL
- HYDRAULIC SIGNAL
- ELECTROMAGNETIC OR RADIATION SIGNAL
- SOFTWARE (NOTE: SET BY ENTITY AND LTSCALE AT 0.5)

TAG BALLOONS

- LOCAL
- DISTRIBUTED CONTROL SYSTEM (DISPLAYED)
- DISTRIBUTED CONTROL SYSTEM (NOT DISPLAYED)
- PROGRAMMABLE LOGIC CONTROLLER (DISPLAYED)
- PROGRAMMABLE LOGIC CONTROLLER (NOT DISPLAYED)
- ON MAIN CONTROL PANEL (FRONT-DISPLAYED)
- ON MAIN CONTROL PANEL (REAR-NOT DISPLAYED)
- ON LOCAL PANEL (FRONT-DISPLAYED)
- ON LOCAL PANEL (REAR-NOT DISPLAYED)
- IDENTIFIES SOFTWARE ALARMS
  XXHH= LAHH, TAHH, PAHH OR FAHH
  XXLL= LALL, TALL, PALL OR FALL
- INTERLOCK
- COMPENSATED FOR TEMPERATURE AND PRESSURE

VALVE ACTUATORS

- DIAPHRAGM
- CYLINDER
- ELECTRIC MOTOR
- ELECTRO-HYDRAULIC
- SOLENOID
- HAND: SIDE OR TOP
- MANUAL - SPRING RETURN
- RESET FOR LATCH TYPE ACTUATOR IDENTIFIES WHICH LOCAL CONTROL PANEL RESET IS MOUNTED ON.

SELF ACTUATED REGULATORS

- PRESSURE REDUCING SELF CONTAINED
- BACK PRESSURE SELF CONTAINED
- PRESSURE REDUCING EXTERNAL TAP
- BACK PRESSURE EXTERNAL TAP
- DIFFERENTIAL PRESSURE INTERNAL & EXTERNAL TAP

NOTE:
GLOBE, PLUG & BALL TYPE ACTUATED VALVES ARE SHOWN AS GATE VALVE SYMBOL. BUTTERFLY VALVES WILL BE PER VALVE LEGEND

RELIEF DEVICES

- PRESSURE RELIEF OR SAFETY VALVE
- PRESSURE AND VACUUM RELIEF VALVE
- RUPTURE DISK OR SAFETY HEAD (PRESSURE)
- RUPTURE DISK OR SAFETY HEAD (VACUUM)
- PRESSURE & VACUUM RELIEF MANHOLE COVER

IN-LINE INSTRUMENTS

- VORTEX METER
- FLOW ORIFICE
- VENTURI OR FLOW TUBE
- ANNUBAR
- TURBINE METER
- QUICK CHANGE ORIFICE FITTING
- POSITIVE DISPLACEMENT OR MAGNETIC
- ROTAMETER
- SAMPLE COOLER
- INSTRUMENT PURGE
- FLOW SIGHT GLASS
- PI ASSEMBLY (SAMPLE)

NOTE:
BALL COCKS ON LG'S ARE INFERRED.

ALL PI, LT, FT HAVE ISOLATION VALVES UNLESS OTHERWISE NOTED.

PIPING

PIPING SYMBOLS

- CONCENTRIC REDUCER
- ECCENTRIC REDUCER
- SPECTACLE BLIND (NO - NC)
- SLIP BLIND
- SPACER
- WELD CAP
- THREADED CAP
- THREADED PLUG
- BLIND FLANGE (OR INLINE)
- HOSE FITTING
- FLEXIBLE HOSE
- EXPANSION JOINT
- UNION
- ORIFICE
- "Y" STRAINER
- QUICK COUPLE
- BASKET STRAINER
- CONE STRAINER
- FLAT STRAINER
- DUPLEX STRAINER
- EJECTOR
- TRAP
- FLAME ARRESTER
- EXHAUST HEAD
- SAFETY SHOWER
- EYE WASH
- INLET AIR FILTER
- RAIN CAP
- VENT TO ATMOSPHERE
- IN-LINE FILTER
- BLEED RING
- OPEN DRAIN
- CLOSED DRAIN
- VORTEX BREAKER

DRAIN VALVE — DRAIN VALVE PLUGGED

LINES

02-1000-HAGO-CS150-4"-GT
- UNIT NUMBER
- SEQUENCE NUMBER
- SERVICE
- MATERIAL CLASS
- LINE SIZE
- INSULATION CODE

- PRIMARY PROCESS LINE
- CS600 — CS150: LINE NUMBER BREAK/SPEC BREAK
- BATTERY LIMITS OR PIPING LIMITS
- OTHER — OWNER/USER
- PROCESS TO/FROM DRAWINGS #
- PROCESS TO/FROM DRAWING #
- PROCESS TO/FROM DRAWING #
- CONTINUATION ARROWS (LEFT & RIGHT AVAILABLE)

VALVES (FLANGED & UNFLANGED WHERE APPLICABLE)

- GATE
- GLOBE
- BALL
- BUTTERFLY
- CHECK
- NEEDLE
- PLUG
- DIAPHRAGM
- ANGLE
- ANGLE- NON-RETURN
- PRESSURE SAFETY VALVE
- THREE-WAY
- FOUR-WAY
- VACUUM BREAK

F — FAILURE OF MULTI-PORT VALVE. ARROW IN DIRECTION OF OPEN POSITION ON FAILURE

COMMODITY DESIGNATION

AE = Aromatic Extract
ARC = Atmospheric Reduced Crude
ASP = Asphalt
F = Corrosion Inhibitor
CKR = Cooling Kero Return
CKS = Cooling Kero Supply
COR = Cooling Oil Return
CR = Circulating Reflux
DM = Demulsifier
DR = Drain
FA = Filming Amine
FG = Refinery Fuel Gas
FOS = Refinery Fuel Oil Supply
FOR = Refinery Fuel Oil Return = Firewater
GL = Glycol
GCR = Glycol Cooling Return
GCS = Glycol Cooling Supply
GHR = Glycol Heating Return
GHS = Glycol Heating Supply
HAGO = Heavy Atmospheric Gas Oil, No. 4 Fuel Oil
HL = Hydrocarbon Liquid
HOR = Hot Oil Return
HOS = Hot Oil Supply
HV = Hydrocarbon Vapor
HK = Heavy Kerosene
HKE = Heavy Kerosene Extract
IA = Instrument Air
IGN = Inert Gas Nitrogen
JP4 = Military Jet Fuel, Jet B
JPE = JP-4 Extract
JPR = JP-4 Raffinate
LK = Light Kerosene
LKE = Light Kerosene Extract
KERO = Kerosene, No. 1 Heating/Diesel Fuel, Jet A-1
LAGO = Light Atmospheric Gas Oil, No. 2 (+ 5/F) Heating/Diesel Fuel
LD = Lead Gasoline Additive
LLKE = Lean Light Kerosene Extract
LKR = Light Kerosene Raffinate
LP2 = Low Pour No. 2 (-10/F, -15/F) Heating/Diesel Fuel
LPG3 = Liquefied Petroleum Gas - Propane
LPG4 = Liquefied Petroleum Gas - Butane
LSR = Light Straight Run Naphtha (OVHD Rec. Crude)
NA = Naphtha
OW = OVHD Water
PA = Plant Air
PC = Process Condensate
PW = Process Water
PLW = Plant Water
POLY = Polymer
POW = Potable Water
PRL = Pressure Relief Liquid
PRV = Pressure Relief Vapor
RLG = Regular Leaded Gasoline
RLKE = Rich Light Kerosene Extract
RSS = Rich Sulfolane Solvent
RUG = Regular Unleaded Gasoline
SO = Sewer, Oily Water
STB = Stabilizer Bottoms
STC = Steam Condensate
SR = Safety Relief
SRG = Straight Run Gasoline
SS = Sewer, Storm Water
ST = Steam
VGO = Vacuum Gas Oil
VOH = Vacuum Overhead
WS = Waste Solvent
WW = Waste Water
H = Hydrogen

PIPING LETTER NOTATIONS

CO	CLEAN OUT	NO	NORMALLY OPEN	FC	FAIL CLOSE
CSC	CAR SEAL CLOSED	QD	QUICK DISCONNECT	FO	FAIL OPEN
CSO	CAR SEAL OPEN	S	SAMPLE CONNECTION		
LC	LOCKED CLOSED	SO	STEAM OUT		
LO	LOCKED OPEN	TSO	TIGHT SHUT OFF		
NC	NORMALLY CLOSED	UG	UNDER GROUND		
WCV	WAFER CHECK VALVE	MFS	MINIMUM FLOW SHUT DOWN		

UTILITY & DRAIN NOTATIONS

CWR	COOLING WATER RETURN	LPS	LOW PRESSURE STEAM
CWS	COOLING WATER SUPPLY	LPC	LOW PRESSURE CONDENSATE
DEA	AMINE DRAIN	N_2	NITROGEN
DOS	DRY OIL SLOP	NG	NATURAL GAS
FD	FRENCH DRAIN	OWS	OILY WATER SEWER
FG	FUEL GAS	PWR	PROCESS WATER RETURN
FLR	FLARE	PWS	PROCESS WATER SUPPLY
FS	FIRE STEAM	SWD	SOUR WATER DRAIN
HPS	HIGH PRESSURE STEAM		

PIPING INSULATION CODES

IH = INSULATED - NOT TRACED
ET = INSULATED - ELECTRIC TRACED
GT = INSULATED - GLYCOL TRACED
OT = INSULATED - HOT OIL TRACED
ST = INSULATED - STEAM TRACED

MISCELLANEOUS SYMBOLS

- PUMP-HORIZONTAL
- PUMP-VERTICAL
- PUMP-SUMP
- MIXER
- FIN FAN
- PACKAGED UNIT
- HEATER1
- HEATER2
- PUMP-PFD
- EXCHANGER-PFD (CTW)
- TRUCK
- CONTINUE
- ARROW
- LOAD ARM
- MANWAY
- AIR ELIMINATOR
- AIR ELIMINATOR 2
- EXCHANGER
- EXCHANGER2
- RAILCAR
- BLOWER
- 00/00 1996 DATE
- TIE POINT
- REV3
- REV

REVISIONS

	DATE	BY	CHKD	DESCRIPTION
2				
0	05/27 1993	MC		ORIGINAL RELEASE AS D-00-A1000
1	05/16 2003	PGC		REDRAWN & RENUMBERED FROM ORIGINAL SHEET (D-00-A1000)

Williams

WILLIAMS ALASKA PETROLEUM, Inc.
NORTH POLE REFINERY
NORTH POLE, ALASKA

PIPING AND INSTRUMENTATION DIAGRAM SYMBOLS AND INSTRUMENTATION MATRIX

APPROVAL:	DRAWN:	DESIGN:	CHECKED:
-	PGC	-	-

PROJECT NO: | DATE: 5/16/03 | SCALE: NONE
PROJECT NAME: | DRAWING NO: D-00-F1000 | REV: 1