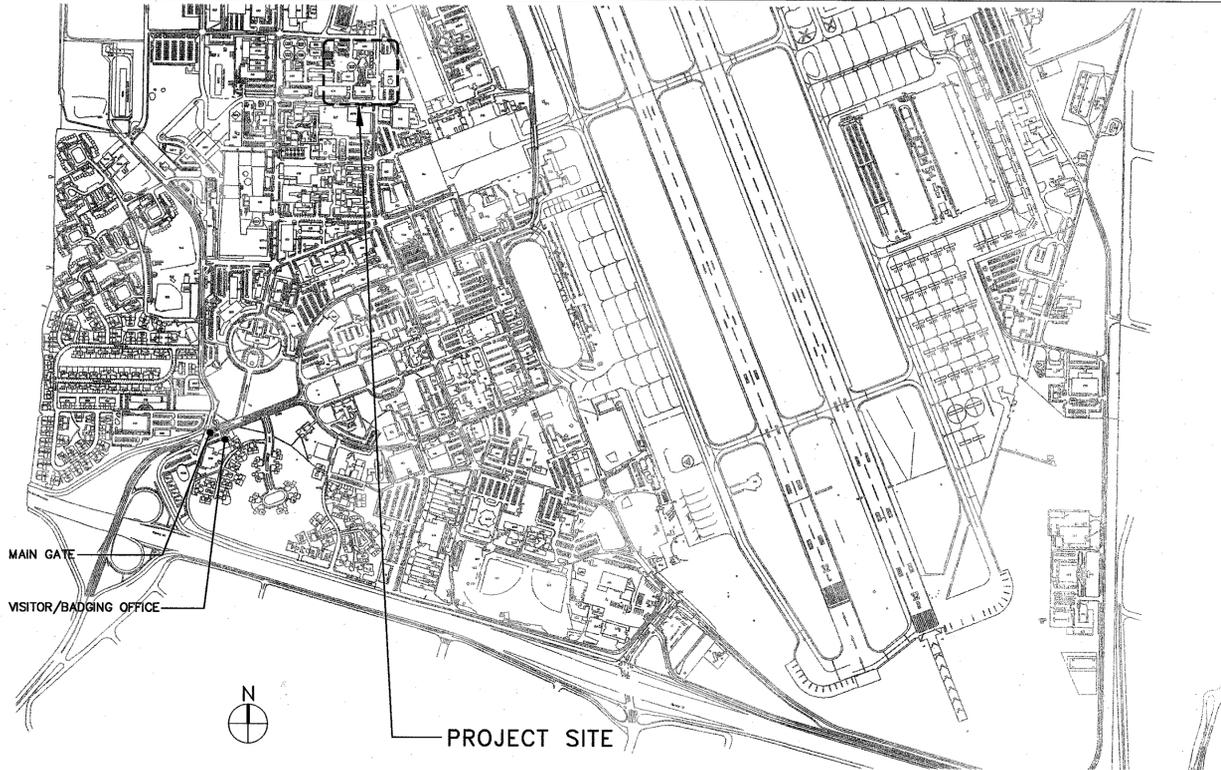


LOCATION MAP

PROJECT TITLE AND DRAWING INDEX

NASA AMES RESEARCH CENTER
MOFFETT FIELD, CA
STEAM VACUUM SYSTEM
NOx EMISSION REDUCTION SYSTEM



DRAWING & SPECIFICATION INDEX

SCOPE OF WORK:

DRAWINGS

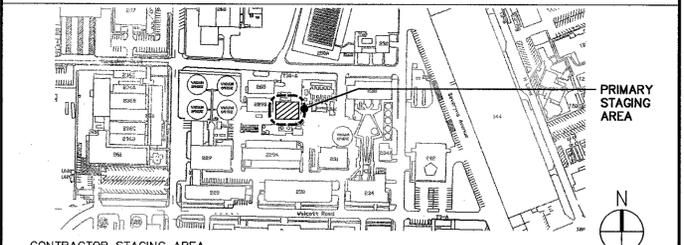
- GENERAL
A334A-1000-G1 TITLE SHEET
A334A-1000-G2 NOTES, ABBREVIATIONS, LEGEND AND SYMBOLS
DEMOLITION
A334A-1000-D1 OVERALL DEMOLITION PLAN
A334A-1000-D2 DEMOLITION PHOTOS
A334A-1000-D3 DEMOLITION PHOTOS
STRUCTURAL
A334A-1000-S1 STRUCTURAL NOTES AND ABBREVIATIONS
A334A-1000-S2 FOUNDATION PLAN
A334A-1000-S3 ENLARGED FOUNDATION PLAN
A334A-1000-S4 CONCRETE DETAILS
MECHANICAL
A334A-1000-M1 MECHANICAL NOTES
A334A-1000-M2 EQUIPMENT SCHEDULES
A334A-1000-M3 SITE PLAN
A334A-1000-M4 ENLARGED SITE PLAN
A334A-1000-M5 PARTIAL SITE PLAN - COOLING TOWER
A334A-1000-M6 PHOTOS & DETAILS
A334A-1000-M7 PROCESS PIPING DIAGRAM
A334A-1000-M8 PIPE SUPPORT DETAILS
A334A-1000-M9 PIPE SUPPORT DETAILS
ELECTRICAL
A334A-1000-E1 ELECTRICAL NOTES, SYMBOLS & ABBREVIATIONS
A334A-1000-E2 ELECTRICAL SITE PLAN - EXISTING/DEMO AND NEW WORK
A334A-1000-E3 'MCC 231' SINGLE LINE DIAGRAM - EXISTING/DEMOLITION
A334A-1000-E4 'MCC 231' SINGLE LINE DIAGRAM - NEW WORK
A334A-1000-E5 'MCC 1' SINGLE LINE DIAGRAM - EXISTING/DEMOLITION
A334A-1000-E6 'MCC 1' SINGLE LINE DIAGRAM - NEW WORK
REFERENCE DRAWINGS
A331-5903-M0 12 INCH HYPERSONIC HELIUM TUNNEL GENERAL ARRANGEMENT
A331-5903-M1 GENERAL PLAN 2-75'-3'-4" O VACUUM SPHERES
A331-5903-M2 SHELL PLATE DETAILS 75'-3'-4" O VACUUM SPHERE
A331-5903-M3 LAYOUT & DETAILS
A331-5903-M5 COLUMN DETAIL FOR 75'-3'-4" O HORTON SPHERE
A331-5903-M6 INTERNAL MOVABLE LADDER 75'-3'-4" ID HORTON SPHERE AMES AERONAUTICAL LABORATORY
A331-5903-M7 INTERNAL MOVABLE LADDER & TRUSS 75'-3'-4" ID HORTON SPHERE AMES AERONAUTICAL LAB
A331-5903-M15 12 INCH HYPERSONIC HELIUM TUNNEL FOUNDATIONS FOR VACUUM SPHERES

REFER TO THE DRAWING INDEX AND SPECIFICATION INDEX FOR LIST OF THE CONTRACT DOCUMENTS FOR THIS PROJECT. SCOPE INCLUDES ALL LABOR AND MATERIALS REQUIRED FOR A COMPLETE AND OPERATING INSTALLATION. IN THE CASE OF DISCREPANCY BETWEEN DRAWINGS AND SPECIFICATIONS, REQUIREMENTS DESCRIBED IN THE DRAWINGS SHALL PREVAIL. SEE PROJECT SEQUENCE NOTES FOR SEQUENCE OF CONSTRUCTION. SCOPE OF WORK INCLUDES, BUT NOT LIMITED TO THE FOLLOWING:
BASE BID:
BASE BID INCLUDES NOX EMISSION REDUCTION SYSTEM AND ALL OTHER WORK ON PLANS, EXCEPT THAT WORK WHICH IS SPECIFICALLY IDENTIFIED AS A BID ADDITIVE, INCLUDING:
1. REMOVE (E) FOUNDATIONS AND PADS.
2. INSTALL SVS NOX EMISSION REDUCTION SYSTEM WITH ASSOCIATED COLUMNS, PUMPS AND PIPING.
3. INSTALL COOLING TOWER AND HEAT EXCHANGER WITH ASSOCIATED PUMPS AND PIPING.
4. INSTALL STORAGE BUILDING WITH SECONDARY CONTAINMENT TO ENCLOSE NOX GAS ANALYZER, CHEMICAL FEED PUMPS, CONTROL PANEL, MOTOR CONTROL PANEL, AND EYE WASH STATION.
5. INSTALL NOX EMISSION CHART RECORDER, AND REMOTE CONTROL AND ALARM INSIDE CONTROL ROOM OF BUILDING N234A BOILER PLANT WITH REQUIRED CONNECTIONS FROM NOX EMISSION ANALYZER TO RECORD NOX EMISSIONS, AND
6. PROVIDE AND INSTALL CHEMICAL TANKS FOR NOX EMISSION REDUCTION SYSTEM.
7. PERFORM COMMISSIONING AND ACCEPTANCE TESTING OF ALL NEW SYSTEMS.
8. REMOVE (E) 18" SVS FIRST STAGE PIPING AT (E) FLANGED SPACER SECTION, AND INSTALL 18" BLIND FLANGE AFTER NOX EMISSION REDUCTION SYSTEM IS COMPLETELY INSTALLED AND TESTED.
9. INSTALL LIGHTING ON COOLING TOWER AND NOX EMISSION REDUCTION SYSTEM.
10. SUBMIT SYSTEM HAZARD ANALYSIS.
BID ADDITIVE:
1. DEMOLITION OF EXISTING NOX SCRUBBER VACUUM SPHERE AND STRUCTURAL SUPPORTS, EXISTING NOX SCRUBBER TOWER, EXISTING NOX SCRUBBER SURGE HOLDING TANK, EXISTING NOX SCRUBBER SURGE WASTE TANK, EXISTING STORAGE SHED, EXISTING CHEMICAL TANK AND ASSOCIATED PIPING, FLUSH WITH GRADE.

BID PROPOSAL

PRIOR TO BIDDING, CONTRACTOR AND ALL SUBCONTRACTORS SHALL VISIT JOB SITE TO BECOME FAMILIAR WITH THE EXISTING INSTALLATION AND SYSTEMS RELATED TO PROJECT WORK.
INCLUDE SEPARATE SUMS IN BID PROPOSALS FOR BASE BID AND EACH BID ADDITIVE, AS NOTED ABOVE.

STAGING PLAN



CONTRACTOR STAGING AREA
1. CONTRACTOR MAY ELECT AT HIS OPTION TO UTILIZE THE DESIGNATED AREA FOR FABRICATION OR STORAGE. THE DESIGNATED AREA IS UTILIZED, PROVIDE A 6'-0" HIGH TEMPORARY PERIMETER FENCE WITH LOCKED GATE.
2. NO UTILITIES ARE AVAILABLE AT THE SITE. CONTRACTOR IS RESPONSIBLE FOR ALL UTILITIES SUCH AS TEMPORARY SANITARY, FIRE PROTECTION, WATER, ELECTRICITY, GAS.

Approved for Construction
Moffett Field Permit Board

Chief Building Official
Permit No. 11P002

Table with columns: ZONE, LETTER, DESCRIPTION, DRAWN, DATE, APPRVD. Includes a 'REVISIONS' section.

Professional Engineer seal for J. H. Wang, State of California, License No. 105621. Includes project information: Ames Research Center, Moffett Field, California, Steam Vacuum System NOx Emission Reduction System, General. Title Sheet.

HEALTH, SAFETY & ENVIRONMENTAL COMPLIANCE

CODES AND REFERENCES

- 1. PERFORM ALL WORK IN STRICT ACCORDANCE WITH CAL-OSHA, FED-OSHA, CAL-EPA, FED-EPA, SANTA CLARA COUNTY AND BAAQMD (BAY AREA AIR QUALITY MANAGEMENT DISTRICT) REQUIREMENTS, RWQCB (REGIONAL WATER QUALITY CONTROL BOARD), AND THE SWPPP (STORM WATER POLLUTION PREVENTION PLAN).
2. FOR ALL WORK ON PROPERTY OF NASA AMES RESEARCH CENTER, COMPLY WITH NASA AMES HEALTH AND SAFETY MANUAL (APR 1700.1) AND NASA AMES ENVIRONMENTAL MANAGEMENT HANDBOOK (APR 8800.3). FOLLOW REQUIREMENTS FOR CONSTRUCTION SAFETY (CHAPTER 27), AND ALL OTHER APPLICABLE CHAPTERS. BOTH MANUALS ARE AVAILABLE ON-LINE:
HTTP://SERVER-MPO.ARC.NASA.GOV/SERVICES/CDMSDOCS/CENTERS/ARC/DIRS/APR/1700.1C27.HTML
3. CONDUCT ELECTRICAL WORK PER NFPA 70E, STANDARDS FOR ELECTRICAL SAFETY IN THE WORKPLACE.
4. UPDATE ELECTRICAL PANEL SCHEDULES TO REFLECT ALL CHANGES TO THE SYSTEM.
5. PROVIDE TRAFFIC CONTROL PER MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) 2003 EDITION, AND REVISIONS 1 AND 2 DATED 12/2007. (http://mutcd.fhwa.dot.gov/kno/2003r1r2.htm)
6. SUBMIT FALL PROTECTION PLAN, DEMOLITION PLAN, MATERIAL LIFTING PLAN, AND EXCAVATION PLAN PER SPECIFICATION SECTION 01 10 00. SUBMIT PLANS TO COTR, WHO SHALL SUBMIT TO NASA AMES SAFETY OFFICE.
7. ONLY TRAINED AND AUTHORIZED PERSONS MAY ENTER CONFINED SPACES.
8. OBTAIN HOT WORK PERMIT PER APR 1700.1 CHAPTER 20 AND 27, PRIOR TO START OF HOT WORK (WELDING, CUTTING, BRAZING).
9. MINIMIZE NOISE LEVELS AT ALL TIMES. IDENTIFY TIMES OF HIGH NOISE LEVEL IN WORK PLAN.
10. ADHERE TO NASA AMES LEAD MANAGEMENT PLANS, AND FEDERAL, STATE, AND LOCAL REQUIREMENTS FOR REMOVAL AND DISPOSAL OF THE MATERIALS CONTAINING LEAD. ALL SUSPECTED ITEMS BEING IMPACTED ARE ASSUMED TO CONTAIN LEAD UNLESS SAMPLING INDICATED OTHERWISE. SEE SPECIFICATIONS 02 09 00 & AMES HEALTH AND SAFETY MANUAL, CHAPTER 35 LEAD MANAGEMENT PLAN. MATERIALS TESTED POSITIVE FOR LEAD INCLUDE:
PAINT ON EXISTING STRUCTURAL STEEL.
11. CONTAIN WATER FROM CONCRETE REMOVAL OR INSTALLATION OPERATIONS, AND DISPOSE OFF SITE. DISCHARGE TO THE STORM DRAIN SYSTEM IS NOT ALLOWED. FOLLOW BEST MANAGEMENT PRACTICE AS REQUIRED IN THE NASA ARC INDUSTRIAL PERMIT FOR STORM WATER DISCHARGES (CAS000001)
12. NOTIFY COTR PRIOR TO ANY PLANNED DISCHARGE OF POTABLE WATER TO THE STORM DRAIN SYSTEM PER THE STORM WATER INDUSTRIAL PERMIT. INFORM COTR THE DATE, TIME, AMOUNT AND NATURE OF THE DISCHARGE. (CAS000001)
13. IF SOIL CONTAMINATION IS ENCOUNTERED, CONTACT COTR. THERE IS NO KNOWN SOIL CONTAMINATION IN THIS AREA. ON SITES LOCATED ADJACENT TO REGIONAL GROUND WATER PLUME, SHALLOW SOIL EXCAVATIONS (LESS THAN 3 FEET) SHOULD NOT ENCOUNTER CONTAMINATED GROUNDWATER. IF EXCAVATING DEEPER THAN 3 FEET BELOW GROUND SURFACE, CONTACT COTR.
14. DESIGN OF NOX REDUCTION SYSTEM SHALL COMPLY WITH OSHA 29 CFR 1910.119 AND CFR 1926.64.

PROJECT SPECIFICATIONS AND DRAWINGS LISTED IN INDEX CONSTITUTE THE CONTRACT DOCUMENTS FOR THIS PROJECT. PERFORM WORK ACCORDING TO THE PROJECT SPECIFICATIONS AND THE CODES AND STANDARDS LISTED IN APR 8829.1 (AMES PROCEDURAL REQUIREMENT) INCLUDING, BUT NOT LIMITED TO, THE FOLLOWING:
AMES RESEARCH CENTER HEALTH AND SAFETY MANUAL - APR 1700.1
ASME B31.3 PROCESS PIPING CODE - 2008
ASME B16.5 PIPE FLANGES AND FLANGED FITTINGS - 2009
ASME BOILER PRESSURE VESSEL CODE (BPVC) SECTION IX - 2010
ASCE 7 MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES - 2005
CALIFORNIA BUILDING CODE (CBC) - 2007
CALIFORNIA FIRE CODE (CFC) - 2007
CALIFORNIA MECHANICAL CODE (CMC) - 2007
CALIFORNIA PLUMBING CODE (CPC) - 2007
CALIFORNIA ELECTRICAL CODE (CEC) - 2007

PROJECT SEQUENCE NOTES

- GENERAL: NOT ALL CONSTRUCTION AND DEMOLITION WORK CAN PROCEED CONCURRENTLY.
(E) NOX REDUCTION SYSTEM SHALL REMAIN FUNCTIONAL AND OPERATIONAL DURING CONSTRUCTION OF NEW NOX REDUCTION SYSTEM. (E) SVS SYSTEM AND (E) NOX REDUCTION SYSTEM WILL BE OPERATING DURING CONSTRUCTION PERIOD. PERSONAL PROTECTIVE SAFETY EQUIPMENT MUST BE WORN TO MITIGATE HAZARDS ASSOCIATED WITH SVS OPERATION, INCLUDING HEARING PROTECTION.
CONSTRUCTION SHALL PROCEED ACCORDING TO THIS SEQUENCE:
1. CONSTRUCT NEW NOX REDUCTION SYSTEM. PREPARE FOR TESTING, AND PERFORM FUNCTIONAL TESTS. PERFORM HYDROSTATIC TESTS OF NEW PIPING.
2. WHEN NEW 18" SVS OUTLET PIPE IS COMPLETED FROM (E) PIPING TO NEW NOZZLE FLANGE ON GAS COOLING COLUMN, PREPARE FOR HYDROSTATIC TEST. SEE TEST PLAN ON M7 FOR TEST BOUNDARY AND LOCATIONS OF BLIND PADDLES. PERFORM HYDROSTATIC TEST OF 18" PIPING.
3. PREPARE NEW NOX SYSTEM FOR OPERATIONAL TESTING. RELOCATE 18" BLIND PADDLE FROM (E) VALVE IN VERTICAL PIPE TO (E) 18" FLANGE ON OVERHEAD PIPE TO (E) NOX SYSTEM. PERFORM OPERATIONAL TESTING, COMMISSIONING, AND CHECKOUT.
4. WHEN OPERATIONAL TESTS ARE COMPLETED, REMOVE (E) 18" OVERHEAD PIPE AND ASSOCIATED (E) FIRST STAGE SPRAY NOZZLE PIPING AS SHOWN ON DEMOLITION DRAWINGS, INCLUDING PIPE SPACER BETWEEN FLANGES. INSTALL BLIND FLANGE AT (E) FLANGED SVS CONNECTION TO REMAIN. INSTALL BLIND FLANGE AT FLANGED NOZZLE ON (E) SPHERE, UNLESS WORK FOR BID ADDITIVE IS READY TO COMMENCE.
5. WHEN BID ADDITIVE IS APPROVED TO PROCEED, AND NEW NOX SYSTEM IS TESTED AND OPERATIONAL, COMPLETE DEMOLITION OF (E) NOX REDUCTION SYSTEM AS SHOWN ON DEMOLITION DRAWINGS.

PROJECT SPECIFICATIONS

- DIVISION 01 - GENERAL REQUIREMENTS
SECTION 01 00 00 GENERAL REQUIREMENTS
SECTION 01 10 00 SAFETY AND HEALTH
SECTION 01 11 00 SUMMARY OF WORK
SECTION 01 33 00 SUBMITTALS PROCEDURES
SECTION 01 40 00 QUALITY CONTROL
SECTION 01 50 00 ENVIRONMENTAL COMPLIANCE AND POLLUTION PREVENTION
DIVISION 02 - EXISTING CONDITIONS
SECTION 02 05 00 ALTERATIONS AND DEMOLITION
SECTION 02 09 00 LEAD PAINT ABATEMENT/DEMOLITION
SECTION 02 20 00 SITE PREPARATION AND EARTHWORK
SECTION 02 50 00 ASPHALT-CONCRETE PAVING AND MARKINGS
DIVISION 03 - CONCRETE
SECTION 03 30 00 CAST-IN-PLACE CONCRETE
DIVISION 05 - METALS
SECTION 05 12 00 STRUCTURAL STEEL
DIVISION 15 - MECHANICAL
SECTION 15 00 00 GENERAL MECHANICAL
SECTION 15 05 00 BASIC MECHANICAL MATERIALS AND METHODS
SECTION 15 40 00 PLUMBING
DIVISION 23 - HEATING, VENTILATING AND AIR CONDITIONING
SECTION 23 65 00 COOLING TOWERS
SECTION 23 81 48 PLATE HEAT EXCHANGER
DIVISION 26 - ELECTRICAL
SECTION 26 00 00.00 20 BASIC ELECTRICAL MATERIALS AND METHODS
SECTION 26 05 00.00 40 COMMON WORK RESULTS FOR ELECTRICAL
SECTION 26 05 48.00 10 SEISMIC PROTECTION FOR ELECTRICAL EQUIPMENT
SECTION 26 05 71.00 40 LOW VOLTAGE OVERCURRENT PROTECTIVE DEVICES
SECTION 26 29 23 VARIABLE FREQUENCY DRIVES
SECTION 26 56 00 EXTERIOR LIGHTING
DIVISION 31 - EARTHWORK
SECTION 31 23 33 TRENCHING AND BACKFILL
DIVISION 40 - PROCESS INTEGRATION
SECTION 40 05 13.96 WELDING PROCESS PIPING
DIVISION 44 - POLLUTION AND WASTE CONTROL EQUIPMENT
SECTION 44 10 00 AIR POLLUTION CONTROL

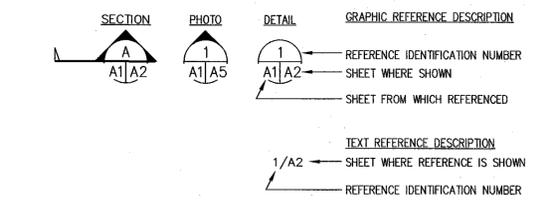
DWG: R:\234A\60101003\0001 (K90032) SVS NOx Emission Reduction System\500_CAD\G1\Sheet\A334A-1000-G1.dwg Version: 17.1s (LMS Tech) User: jho DATE: Dec 13, 2010 10:56:21 am

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GENERAL NOTES

- ALL DIMENSIONS SHOWN ARE APPROXIMATE. FIELD VERIFY DIMENSIONS PRIOR TO CUTTING, FABRICATING, INSTALLING AND ORDERING PARTS. NOTIFY COTR IMMEDIATELY OF ANY DISCREPANCIES.
- ALL MATERIALS AND EQUIPMENT ARE NEW, UNLESS CALLED OUT AS EXISTING. LOCATE AND ORIENT PIPING AS INDICATED ON THE DRAWINGS.
- ENSURE THAT NO FOREIGN MATTER ENTERS PIPING OR EQUIPMENT PRIOR TO INSTALLATION.
- LABEL ALL NEW NOx EMISSION REDUCTION SUCTION AND DISCHARGE PIPING ABOVE GRADE "NOx EMISSION REDUCTION" AND PAINT GRAY.
- SUBMIT SHOP DRAWINGS PER SPECIFICATION SECTION 44 10 00.
- REMOVE ALL TRASH AND CONSTRUCTION DEBRIS FROM GOVERNMENT PROPERTY, AND LEGALLY DISPOSED OF OFF SITE.
- PROVIDE SUPERVISION, LABOR, EQUIPMENT, TOOLS, MATERIALS, AND SUPPLIES TO COMPLETE THE WORK AS INDICATED.
- ALL DIMENSIONS ARE IN ENGLISH UNITS, UON. INSPECTIONS WILL BE MADE IN ENGLISH DIMENSIONS. SUBMIT SHOP DRAWINGS WITH ENGLISH UNITS, UNLESS OTHERWISE DIRECTED BY COTR.
- SUBMIT TO COTR ALL REQUESTS FOR MODIFICATIONS TO THE PLANS & SPECIFICATIONS IN WRITING.
- NOTIFY COTR OF ALL DRAWING DISCREPANCIES AND OMISSIONS, AND NOTIFY COTR IF CONTRACT DOCUMENTS CONFLICT WITH EXISTING CONDITIONS, BEFORE PROCEEDING WITH ANY ELEMENT OF THIS PROJECT.
- DETAILS NOT SHOWN ARE SIMILAR IN CHARACTER TO THOSE DETAILED. WHERE SPECIFIC DIMENSIONS, DETAILS OR DESIGN INTENT CANNOT BE DETERMINED CONSULT COTR BEFORE PROCEEDING WITH WORK. TYPICAL DETAILS APPLY AT ALL SIMILAR CONDITIONS WHETHER OR NOT CROSS REFERENCED.
- DO NOT SCALE DRAWINGS FOR DIMENSIONAL INFORMATION.
- LOCATION OF ALL EXISTING UNDERGROUND UTILITIES CROSSING OR ADJACENT TO PROPOSED WORK ARE NOT NECESSARILY SHOWN ON THE PLANS. LOCATIONS SHOWN ARE APPROXIMATE. NO CLAIM FOR DAMAGES OR EXTRA COMPENSATION WILL BE AWARDED TO CONTRACTOR FROM THE PRESENCE OF SUCH UTILITIES. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO SUCH UTILITIES.
- SUBMIT ALL MATERIAL CUT SHEETS TO COTR FOR APPROVAL BEFORE ORDERING MATERIALS.

LEGEND



SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	EQUIPMENT TAG IDENTIFICATION		BASKET STRAINER (SIMPLEX)
	EQUIPMENT SEQUENCE NUMBER		WATER METER
	KEY NOTE TAG		REDUCED PRESSURE ZONE BFP
	HYDROSTATIC TEST BOUNDARY TAG		ANSI FLANGED CONNECTION
	PIPE SUPPORT TAG WITH SEQUENCE NUMBER		ORIFICE TYPE FLOW MEASURING STATION
	POINT OF CONNECTION		UNION CONNECTION
	POINT OF DISCONNECTION		THERMOMETER
	CENTERLINE		PIPE DOWN
	PIPE OR EQUIPMENT TO BE DEMOLISHED		PIPE UP
	EXISTING PIPE, EQUIPMENT OR BUILDING TO REMAIN		PIPE CAP
	NEW PIPE, EQUIPMENT OR NEW WORK		CHEMICAL FEED
	HIDDEN OR UNDERGROUND PIPE OR EQUIPMENT		COOLING TOWER WATER SUPPLY
	CALIBRATED BALANCING VALVE (CIRCUIT SETTER)		COOLING TOWER WATER RETURN
	CHECK VALVE (CKV)		DRAIN
	FLEXIBLE PIPE CONNECTION (NEOPRENE TYPE)		FUEL GAS (NATURAL OR PROPANE)
	FLEXIBLE PIPE CONNECTION (BELLOW TYPE)		MAKE-UP WATER
	GATE VALVE		INDUSTRIAL WASTE
	BALL VALVE		STORM DRAIN
	BALL VALVE (FLANGED)		HIGH PRESSURE AIR (6000 PSIG)
	BUTTERFLY VALVE (BFV)		OXIDATION REDUCTION POTENTIAL SENSOR
	BUTTERFLY VALVE (DOUBLE LINE)		pH SENSOR
	GLOBE VALVE		LEVEL SENSOR
	PRESSURE REDUCING VALVE		NOX SENSOR
	PRESSURE RELIEF VALVE		GAS FLOW SENSOR
	PRESSURE SAFETY RELIEF VALVE		TEMPERATURE SENSOR
	PUMP		ELECTRICAL WIRING
	SOCKET WELDED JOINT		ELECTRICAL POWER CONNECTION
	BUTT-WELDED JOINT		DATA CABLE LINK (BLN OR FLN)
	BUTT-WELDED TEE (WTEE)		ELECTRICAL MOTOR
	BRANCH PIPE AWAY FROM VIEWER		MOTOR STARTER BY DIV. 23
	BRANCH PIPE TOWARD VIEWER		SHUNT TRIP CIRCUIT BREAKER
	PIPE OFFSET		VARIABLE FREQUENCY DRIVE
	PIPING CUT AWAY TO EXPOSE HIDDEN VIEW		ELECTRICAL DISCONNECT SWITCH
	PIPE CROSSING		MANUAL HAND-OFF-AUTOMATIC SWITCH
	MANUAL AIR VENT		CONTROL RELAY
	PIPE REDUCER (ECCENTRIC)		MANUAL SWITCH
	PIPE REDUCER (CONCENTRIC)		CURRENT SENSOR
	PRESSURE GAGE		AUTOMATIC CONTROL VALVE (2-WAY)
	PRESSURE AND TEMPERATURE TEST PLUG		AUTOMATIC CONTROL VALVE (2-WAY)
	PIPE SUPPORT		AUTOMATIC CONTROL VALVE (3-WAY)
	SHUT-OFF COCK		WATER TEMPERATURE SENSOR IN WELL
	TRIPLE DUTY VALVE		STEP-DOWN CONTROLS TRANSFORMER
	STRAINER WITH BLOW-DOWN VALVE		FIRE ALARM CONTROL PANEL
			FMCS DIGITAL INPUT
			FMCS DIGITAL OUTPUT
			FMCS ANALOG INPUT
			FMCS ANALOG OUTPUT

ABBREVIATIONS

(NOT ALL ITEMS ARE USED)

&	AND	FPS	FEET PER SECOND	PA	PIPE ANCHOR
AT	FIBERGLASS REINFORCED PLASTIC	FRP	FIBERGLASS REINFORCED PLASTIC	PEX	CROSS-LINKED POLYETHYLENE
Ø	ROUND OR DIAMETER	FSM	FACILITY SAFETY MANAGER	PG	PRESSURE GAUGE
#	POUND OR NUMBER	FSP	FAN STATIC PRESSURE	PH	ELECTRICAL PHASE
ACFM	ACTUAL CUBIC FEET PER MINUTE	FT (')	FEET	PL	PLATE
ACM	ASBESTOS CONTAINING MATERIAL	FTG	FOOTING	PLC	PROGRAMMABLE LOGIC CONTROLLER
ADA	AMERICANS WITH DISABILITY ACT	G	GAS	POC	POINT OF CONNECTION
AFG	ABOVE FINISHED GRADE	GA	U.S. GAUGE (OR GAGE)	POD	POINT OF DISCONNECTION
AG	AIR GAP	GAL	GALLONS	PP	POLYPROPYLENE
AL	ALUMINUM	GALV	GALVANIZED	PPH	POUNDS PER HOUR
AMB	AMBIENT TEMPERATURE	GC	GAS COOLING COLUMN	PPM	PARTS PER MILLION
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE	GCO	GRADE CLEANOUT	PSF	POUNDS PER SQUARE FOOT
AP	ACCESS PANEL	GPE	GOVERNMENT FURNISHED EQPT	PSI	POUNDS PER SQUARE INCH
APD	AIR PRESSURE DROP ("WG)	GI	GALVANIZED IRON	PSIA	PSI (ABSOLUTE)
ASCE	AMERICAN SOCIETY OF CIVIL ENGINEERS	GN	GENERAL NOTE	PSIG	PSI (GAUGE)
ASCS	AMES STD CONSTRUCTION SPECIFICATIONS	GPH	GALLONS PER HOUR	PT	PARTICLE WELD TEST (MAG OR LIQUID)
ASHRAE	AMERICAN SOCIETY OF HEATING REFRIGERATING AND AIR CONDITIONING ENGINEERS	GPM	GALLONS PER MINUTE	PTT	PRESSURE & TEMPERATURE TEST PLUG
ASME	AMERICAN SOCIETY OF MECHANICAL ENGINEERS	GSM	GALVANIZED SHEET METAL	PUC	PUBLIC UTILITY COMMISSION
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS	GV	GATE VALVE	PVC	POLYVINYL CHLORIDE
ATSC	ADVANCE TELEVISION SYSTEM COMMITTEE	H	HEIGHT	(R)	RELOCATED
AV	ATMOSPHERIC VENT	H2S	HYDROGEN DIOXIDE	RC	REDUCTION COLUMN
AVG	AVERAGE	H2SF04	SULFURIC ACID	REA	RURAL ELECTRIFICATION ADMINISTRATION
AWA	AMERICAN WATER WORKS ASSOCIATION	HD	HEAD	REF	REFERENCE ONLY (FIELD VERIFY)
AWWA	AMERICAN WATER WORKS ASSOCIATION	HGT	HEIGHT	REV	REVISION
BAAQMD	BAY AREA AIR QUALITY MANAGEMENT DISTRICT	H-O-A	HAND-OFF-AUTOMATIC SWITCH	RLA	RUNNING (RATED) LOAD AMPERES
BBFV	BALANCING BUTTERFLY VALVE	HORIZ	HORIZONTAL	RPM	REVOLUTIONS PER MINUTE
BF	BLIND FLANGE	HP	HORSEPOWER	RPZ	REDUCED PRESSURE ZONE BACKFLOW PREVENTION ASSEMBLY
BFP	BACKFLOW PREVENTION ASSEMBLY	HPA	HIGH PRESSURE AIR	RT	RADIOGRAPHIC WELD TEST
BFV	BUTTERFLY VALVE	HR	HOURS	RV	RELIEF VALVE
BHP	BRAKE HORSEPOWER	HZ	FREQUENCY (HERTZ)	RUS	RURAL UTILITY SERVICE
BIC	BUILDING INDUSTRY CONSULTANTS INSTITUTE	IA	INSTRUMENT AIR	SCH	PIPE SCHEDULE
BICSI	BUILDING INDUSTRY CONSULTANTS INSTITUTE	ID	INSIDE DIAMETER	SCW	SOFTEN COLD WATER
BLDG	BUILDING	IEEE	INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS	SD	STORM DRAIN
BOP	BOTTOM OF PIPE	IN (")	INCHES	SF	SQUARE FEET
BSS	BASE SPRING SUPPORT	IN (")	INCHES WATER GAUGE	SG	SPECIFIC GRAVITY
BTU	BRITISH THERMAL UNIT	IPS	IRON PIPE (THREAD) SIZE	SN	SHEET NOTE
BTUH	BTU PER HOUR	ISO	INTERNATIONAL ORGANIZATION FOR STANDARDIZATION	SOF	SLIP-ON FLANGE
BV	BALL VALVE	IVB	INVERTED BUCKET STEAM TRAP	SOV	SHUTOFF VALVE (MANUAL)
BW	BUTT WELD	IW	INDUSTRIAL WASTE	SQ	SQUARE
CC	CAUSTIC COLUMN	KN	KEY NOTE	SQ IN	SQUARE INCHES
CF	CHEMICAL FEED	KW	KILOWATTS	SP	STATIC PRESSURE
CFE	CAP FOR FUTURE CONNECTION	KWH	KILOWATT-HOUR	SPEC	SPECIFICATION
CFR	CODE OF FEDERAL REGULATION	LB	POUNDS	SR	SHORT RADIUS ELBOW
CFM	CUBIC FEET PER MINUTE	LB, LBS	POUNDS	SRV	SAFETY RELIEF VALVE
CKV	CHECK VALVE	LCV	LEVEL CONTROL VALVE	SS	STAINLESS STEEL
CO	CLEANOUT	LR	LONG RADIUS ELBOW	STD	STANDARD
COL	COLUMN	LRA	LOCKED ROTOR AMPERE	SUCT	SUCTION
CONC	CONCRETE	LWT	LEAVING WATER TEMPERATURE	SVS	STEAM VACUUM SYSTEM EFFLUENT GASES
COTR	CONTRACTING OFFICER'S TECHNICAL REPRESENTATIVE	MAMP	MAXIMUM ALLOWABLE WP	SW	SOCKET WELD
CP	CHEMICAL PROCESS PUMP	MBH	THOUSAND BTU PER HOUR	TCV	TEMPERATURE CONTROL VALVE
CSI	CONSTRUCTION SPECIFICATIONS INSTITUTE	MBV	MOTORIZED BUTTERFLY VALVE	TDH	TOTAL DYNAMIC HEAD
CTP	COOLING TOWER PUMP	MCA	MINIMUM CIRCUIT AMPACITY	TEMP	TEMPERATURE
CTS	COOLING TOWER WATER SUPPLY	MC	MOTOR CONTROL	TIA	TELECOMMUNICATION INDUSTRY ASSOCIATION
CTR	COOLING TOWER WATER RETURN	MCC	MOTOR CENTER	TL	THERMAL LOAD
CU FT	CUBIC FEET	MCE	MAXIMUM CREDIBLE EARTHQUAKE	TSB	TELECOMMUNICATION SYSTEMS BULLETIN
CU IN	CUBIC INCH	MECH	MECHANICAL	TSP	TWISTED SHIELDED PAIR
D	DRAIN	MER	MECHANICAL EQUIPMENT ROOM	TYP	TYPICAL
DB	DRY BULB	MFR	MANUFACTURER	UBC	UNIFORM BUILDING CODE
DCW	DOMESTIC COLD WATER	MFS	MAXIMUM FUSE SIZE	UG	UNDERGROUND
DF	DRAFT FAN	MH	MANHOLE	UL	UNDERWRITER LABORATORIES
DIA	DIAMETER	MHP	MOTOR HORSEPOWER	UNK	UNKNOWN SERVICE, MATERIAL AND SIZE
DISCH	DISCHARGE	MIN	MINIMUM	UON	UNLESS OTHERWISE NOTED
DIV	DIVISION	MISC	MISCELLANEOUS	USSG	UNITED STATES STANDARD GAUGE
DL	DEAD LOAD	MOC	MAXIMUM OVERLOAD CIRCUIT PROTECTION	V	VOLT
DOE	U.S. DEPARTMENT OF ENERGY	MOP	MOTOR OPERATED VALVE	VA	VOLT-AMPERE
DOT	DEPARTMENT OF TRANSPORTATION	MPa	MEGAPASCAL	VEL	VELOCITY
DWG	DRAWING	MS	MOTOR STARTER	VFD	VARIABLE FREQUENCY DRIVE
(E)	EXISTING	MTD	MOUNTED	VOL	VOLUME
EAC	ENTERING AIR TEMPERATURE	MU	MAKE-UP WATER	VTR	VENT TO ATMOSPHERE THROUGH ROOF
EAT	ENTERING AIR TEMPERATURE	N/A	NOT APPLICABLE	W	WATER
EFF	EFFICIENCY	N/C	NORMALLY CLOSED	W/O	WITHOUT
EIA	ELECTRONIC INDUSTRIES ASSOCIATION	NOCL02	SODIUM CHLORIDE	WG	FT (WATER GAUGE) PRESSURE
EL	ELEVATION	NOH	SODIUM HYDROXIDE	WLX	WIND LOAD (X-DIRECTION)
ELX	SEISMIC LOAD (X-DIRECTION)	NASA	NATIONAL AERONAUTICS & SPACE ADMINISTRATION	WLZ	WIND LOAD (Z-DIRECTION)
ELY	SEISMIC LOAD (Y-DIRECTION)	NCS	NATIONAL COMMUNICATION SYSTEM ASSOCIATION	WMS	WIRE MESH SCREEN
ELZ	SEISMIC LOAD (Z-DIRECTION)	NCTA	NATIONAL CABLE & TELECOMMUNICATIONS ASSOCIATION	WNF	WELDING NECK FLANGE
ELEC	ELECTRICAL	NDE	NON-DESTRUCTIVE EXAMINATION	WOG	WATER, OIL AND GAS
EQU	EQUAL	NEC	NATIONAL ELECTRIC CODE (NFPA 72)	WP	WORKING PRESSURE
EQPT	EQUIPMENT	NESC	NATIONAL ELECTRICAL SAFETY CODE	WPD	WATER PRESSURE DROP
EPA	ENVIRONMENTAL PROTECTION AGENCY (CLEAN WATER ACT)	NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION	WT	WEIGHT/WASTE TANK
ESP	EXTERNAL STATIC PRESSURE	NEPA	NATIONAL FIRE PROTECTION ASSOCIATION	WTU	WATER TREATMENT UNIT
EWB	ENTERING WET BULB TEMPERATURE	NIC	NOT IN CONTRACT		
EWT	ENTERING WATER TEMPERATURE	NIST	NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY		
EXP	EXPANSION	NO.	NUMBER		
EXT	EXTERNAL	N/O	NORMALLY OPEN		
F	DEGREES FAHRENHEIT	NSF	NATIONAL SANITATION FOUNDATION		
(F)	FUTURE	NPSH	NET POSITIVE SUCTION HEAD		
F&T	FLOAT & THERMOSTATIC STEAM TRAP	NPT	NATIONAL PIPE THREAD		
FACP	FIRE ALARM CONTROL PANEL	OC	ON CENTER / OXIDATION COLUMN		
FC	FLEXIBLE CONNECTION	OD	OUTSIDE DIAMETER		
FCC	FEDERAL COMMUNICATION COMMISSION	ORP	OXIDATION REDUCTION POTENTIAL		
FLA	FULL LOAD AMPERE	OPER	OPERATING		
FM	FACILITY MUTUAL	OSA	OUTSIDE AIR		
FMCS	FACILITY MANAGEMENT CONTROL SYSTEM	OSHA	OCCUPATIONAL SAFETY AND HEALTH ACT		
FFM	FEET PER MINUTE	OS&Y	OUTSIDE SCREW AND YOKE		
		OV	OUTLET VELOCITY		

DESIGN-BUILD SPECIFICATIONS

- DESIGN-BUILD SCOPE: DESIGN, FABRICATE, INSTALL AND TEST ALL NEW EQUIPMENT, PIPING, PIPING SUPPORTS AND CONTROLS, EXCEPT AS NOTED AS BUILD-TO-PRINT SCOPE OF WORK IN MECHANICAL GENERAL NOTES.
- DESIGN-BUILD CRITERIA: REFER TO ALL CONTRACT DOCUMENTS. DESIGN EQUIPMENT, SUPPORTS, PIPING AND PIPE SUPPORTS TO RESIST FORCES PER 2007 CBC. DESIGN FOR SITE SPECIFIC SEISMIC AND WIND LOADING CRITERIA LISTED:
 SEISMIC: Ip=1.0, gp=1.0, Rp=2.5, SITE CLASS=D (CHAPTER 13 & 15), UON WIND: 85 MPH (CHAPTER 6)
 HPA DESIGN: Ip=1.5 FOR HPA PIPING. USE ASCE 7 MCE RESPONSE SPECTRUM FOR DYNAMIC STRESS ANALYSIS OF OCCASIONAL LOADS.
- DESIGN-BUILD QUALITY: DESIGN MUST MEET SPECIFIED PERFORMANCE REQUIREMENTS INDICATED ON THE CONTRACT DOCUMENTS. CONCEPTUAL DESIGN DEPICTED ON THE DRAWINGS IS DIAGRAMMATIC, AND ILLUSTRATES DESIGN INTENT. IT IS NOT INTENDED TO SHOW THE ONLY ACCEPTABLE DESIGN, OR FORBID OTHER DESIGNS WHICH ACCOMPLISH THE REQUIRED PERFORMANCE. PROVIDE ALTERNATE ROUTING, OFFSETS AND TRANSITIONS, AND OTHER ELEMENTS NOT SHOWN ON PLANS WHERE REQUIRED FOR COMPLETION OF WORK, AT NO ADDITIONAL COST TO GOVERNMENT.
- DESIGN-BUILD DESIGNER QUALIFICATIONS: STRUCTURAL EQUIPMENT SUPPORTS AND PIPING SUPPORTS SHALL BE DESIGNED AND STAMPED BY A STRUCTURAL ENGINEER REGISTERED IN THE STATE OF CALIFORNIA. ALL OTHER DESIGN-BUILD ITEMS SHALL BE DESIGNED AND STAMPED BY A REGISTERED PROFESSIONAL ENGINEER.
- DESIGN-BUILD SUBMITTALS: SUBMIT STAMPED SHOP DRAWINGS AND STAMPED CALCULATIONS TO COTR FOR APPROVAL, AND PERMIT REVIEW BOARD FOR CONSTRUCTION PERMIT, PRIOR TO FABRICATION. CALCULATIONS SHALL INCLUDE PIPING ANALYSIS TO DEMONSTRATE THAT DESIGN OF PIPES AND PIPE SUPPORTS MEETS SPECIFIED CRITERIA, INCLUDING ASME B31.3, CBC, AND ASCE 7 FOR SEISMIC CALCULATIONS. SUBMIT HYDROSTATIC TEST PLAN FOR NORMAL SERVICE PROCESS PIPING, INCLUDING TEST PRESSURE, TEST BOUNDARIES, AND ALL TEST DEVICES AND EQUIPMENT REQUIRED. NASA APPROVAL OF STRESS ANALYSIS AND PIPE SUPPORTS IS REQUIRED PRIOR TO CONSTRUCTION.

DESIGN-BUILD SEISMIC NOTES

- DESIGN EQUIPMENT, SUPPORT, ANCHORAGE, AND BRACING TO MEET THE SITE SPECIFIC SEISMIC CRITERIA IN ACCORDANCE WITH THE 2007 CBC.
- SUBMIT SEISMIC CALCULATIONS AND DETAILS FOR SUPPORT, ANCHORAGE AND BRACING OF DESIGN-BUILD ELEMENTS. PREPARE CALCULATIONS WITH WET STAMP BY A CALIFORNIA LICENSED STRUCTURAL ENGINEER. SUBMIT CALCULATIONS AND DETAILS FOR REVIEW BY NASA STRUCTURAL ENGINEER. FURNISH SEISMIC CALCULATIONS AND DETAILS TO THE GENERAL CONTRACTOR FOR INSTALLATION.

Approved for Construction
 Moffett Field Permit Board
 Chief Building Official
 Permit No. 11P002

ZONE	LETTER	DESCRIPTION	DRAWN	DATE	APPRVD
REVISIONS					
DRAWN	J.H.O.	DATE	12/13/10		
DESIGNED	M. Callahan	DATE	12/13/10		
CHECKED	J. Jiang	DATE	12/13/10		
PROJECT MGR	P. Wan	DATE	12/13/10		
REQUESTER	R. Olivares	DATE	12/13/10		
R&QA		DATE			
<p>Ames Research Center Moffett Field, California</p> <p>STEAM VACUUM SYSTEM NOx EMISSION REDUCTION SYSTEM GENERAL</p> <p>NOTES, ABBREVIATIONS, LEGEND AND SYMBOLS</p>					
SUPV	D. Fraser	DATE	12/13/10		
DATE					
SCALE	NONE	CAGE CODE	25307	FILE NAME	A334A-1000-G2
INDEX		SHEET			

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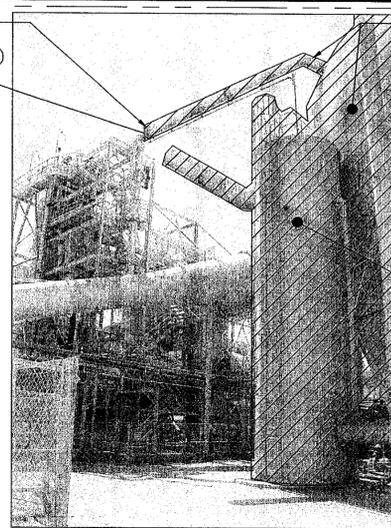
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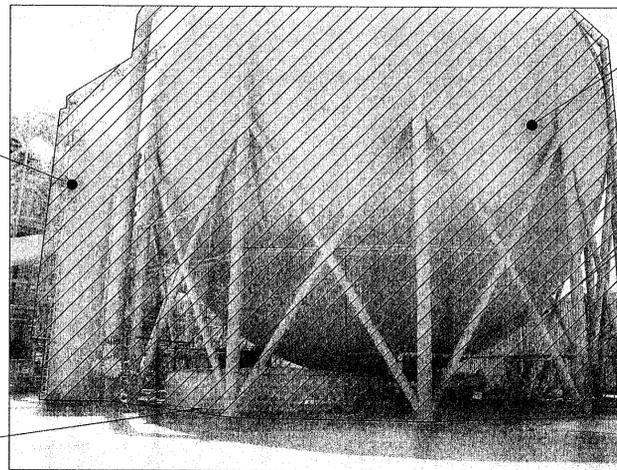
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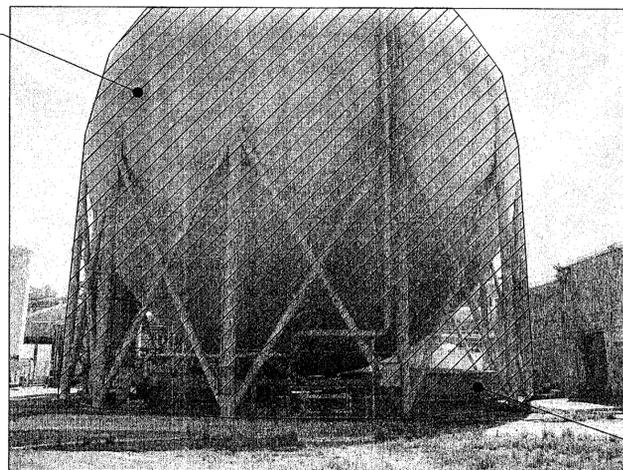
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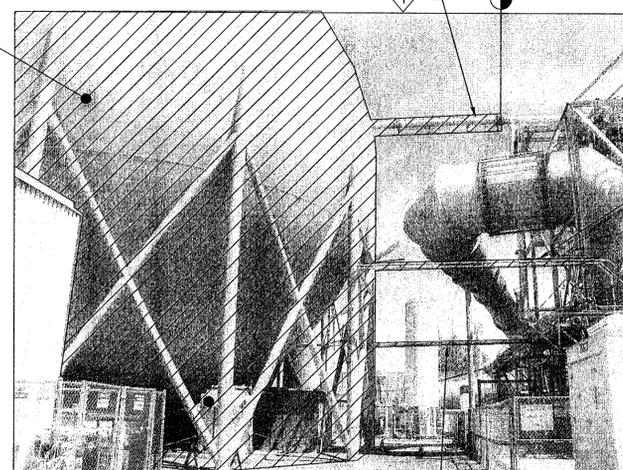
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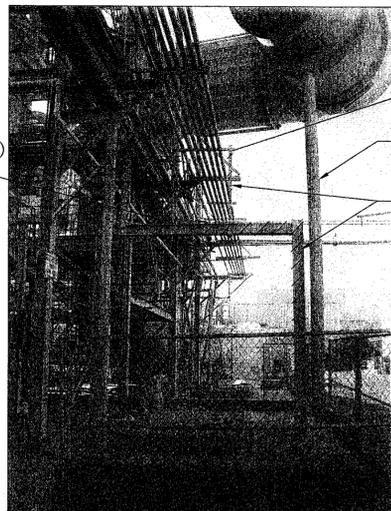
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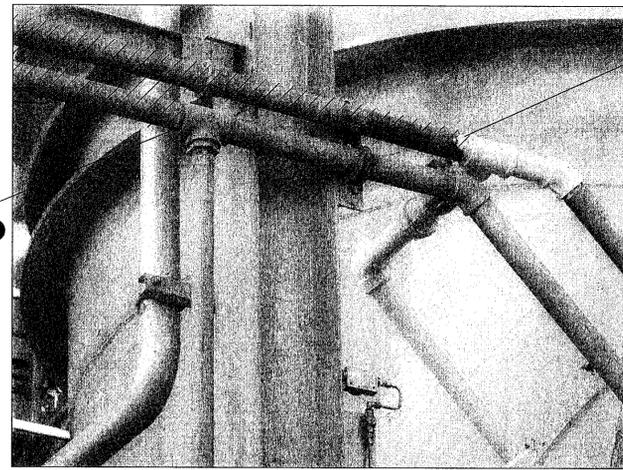
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4 DEMOLITION PHOTO 4
D1 D2 SCALE: NTS



5 DEMOLITION PHOTO 5
D1 D2 SCALE: NTS



6 DEMOLITION PHOTO 6
D2 D2 SCALE: NTS

SHEET NOTES

1. SEE SHEET G1 FOR BID ADDITIVE.
2. REMOVE ALL STRUCTURAL STEEL TO FOUNDATION. REMOVE ALL PROJECTIONS FLUSH WITH TOP OF FOUNDATION.

BID ADDITIVE

KEY NOTES

- 1 DISCONNECT AND REMOVE (E) 18" STAINLESS STEEL SVS PIPE AND CONNECTED SPRAY PIPING (FIRST STAGE OF EXISTING NOx SYSTEM) FROM (E) FLANGE CONNECTION TO SVS, TO (E) FLANGE CONNECTION ON (E) NOx SPHERE. CAP ENDS OF (E) PIPE TO REMAIN WITH 18" BLIND FLANGES.
- 2 REMOVE (E) NOx SCRUBBER SYSTEM, INCLUDING SCRUBBER SPHERE AND STRUCTURAL SUPPORTS, NOx SCRUBBER TOWER, NOx SCRUBBER SURGE HOLDING TANK, NOx SCRUBBER SURGE WASTE TANK, STORAGE SHED, CHEMICAL TANK AND ASSOCIATED PIPING. DEMOLISH FLUSH TO GRADE.
- 3 CUT, CAP AND REMOVE TWO (E) 2" INSTRUMENT (COMPRESSED) AIR PIPES OVER ROADWAY TO (E) SPHERE.
- 4 CUT, CAP AND REMOVE (E) 2" GALVANIZED WATER SUPPLY PIPE TO TANK, SCRUBBER AND HOSE BIBB. REMOVE (E) ABANDONED 2" GALVANIZED WATER PIPE. RECONNECT (E) NaOH TUBING WITH SECONDARY CONTAINMENT TO RELOCATED CHEMICAL FEED PUMP. REMOVE EXISTING WIRE ROPE TRAPEZE HANGER, AND REPLACE WITH NEW SUPPORT FOR (E) PIPES TO REMAIN.
- 5 UNTHREADED DEMOLITION PIPES AT POINT OF DISCONNECTION AND PLUG AT TEE FITTING.
- 6 (E) SVS SUPPORT AND CONCRETE SUPPORT PIER FOUNDATION TO REMAIN.
- 7 REMOVE (E) STRUCTURAL BEAM AND UNISTRUT SUPPORT. PROVIDE DIAGONAL BRACE SUPPORT TO PREVENT EXISTING UTILITIES AND EXISTING PIPE SUPPORT FROM FALLING.
- 8 REMOVE (E) FOUNDATION AND EQUIPMENT PAD.

BID ADDITIVE



Approved for Construction
Moffett Field Permit Board

[Signature]
Chief Building Official
Permit No. 11P002

ZONE	LETTER	DESCRIPTION	DRAWN	DATE	APPRVD
REVISIONS					

DRAWN J.HO	DATE 12/13/10
DESIGNED M.CALLAHAN	DATE 12/13/10
CHECKED J.XIANG	DATE 12/13/10
PROJ.MGR P.WAN	DATE 12/13/10
REQUESTER R.OLIVARES	DATE 12/13/10
RAQA	DATE
SAFETY	DATE
SUPERVISOR S.FRANKEL	DATE 12/13/10

Ames Research Center
Moffett Field, California

STEAM VACUUM SYSTEM NOx EMISSION REDUCTION SYSTEM
DEMOLITION

DEMOLITION PHOTOS

SIZE D	CAGE CODE 25307	INDEX 334A-1000-D2	REV -
SCALE NONE	SHEET -	OF -	

FILE NAME:
A334A-1000-D02 12-10-2010

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A334A-1000-D02 12-10-2010

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DWG: R:\234A\60101003\0001 (K90032) - SYS NOx Emission Reduction System\500_CAD\1\SHEET\A334A-1000-D03.dwg Version: 17.1s (LWS Tech) User: jho
 DATE: Dec 13, 2010 - 11:09:06 am

SHEET NOTES

1. SEE SHEET G1 FOR BID ADDITIVE.

BID ADDITIVE

KEY NOTES

- 1 REMOVE (E) NOx SCRUBBER VACUUM SPHERE AND STRUCTURAL SUPPORTS, (E) NOx SCRUBBER TOWER, (E) NOx SCRUBBER SURGE HOLDING TANK, (E) NOx SCRUBBER SURGE WASTE TANK, (E) STORAGE SHED, (E) CHEMICAL TANK AND ASSOCIATED PIPING, FLUSH WITH GRADE.
- 2 DISCONNECT AND INSTALL 18" BLIND FLANGE, CLASS 150.
- 3 REMOVE AND SALVAGE EXISTING GAS EMISSION ANALYZER.
- 4 REMOVE AND SALVAGE EXISTING CALIBRATION GAS CYLINDERS.
- 5 NOT USED.
- 6 PULL OUT ALL (E) CABLES. DEMOLISH (E) PULL BOX.
- 7 PULL OUT (E) CABLES UP TO THE PULL BOX LOCATED INSIDE BUILDING N234A AND DISPOSE THEM. REMOVE AND CAP EXISTING ELECTRICAL CONDUIT UP TO THE POINT SHOWN ON THE DETAIL 3.
- 8 REMOVE EXISTING FOUNDATION AND EQUIPMENT PAD.
- 9 REMOVE ABANDONED ELECTRICAL EQUIPMENT.
- 10 PULL OUT (E) CABLES. REMOVE EXISTING ELECTRICAL CONDUIT.
- 11 REMOVE AND SALVAGE EXISTING GAS CALIBRATION PANEL.
- 12 REMOVE (E) NOx DISCHARGE DUCT.

Approved for Construction
 Moffett Field Permit Board

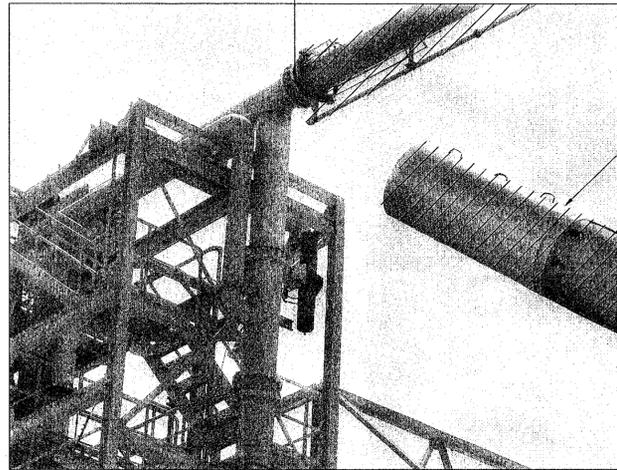
 Chief Building Official
 Permit No. 11P002

ZONE	LETTER	DESCRIPTION	DRAWN	DATE	APPRVD
REVISIONS					

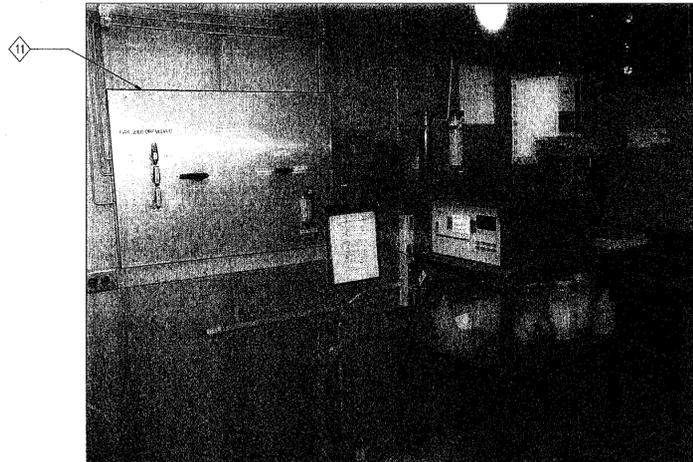
DRAWN J.HO	DATE 12/15/10
DESIGNED M.CALLAHAN	DATE 12/13/10
CHECKED J.XIANG	DATE 12/13/10
PROJECT MGR P.WAN	DATE 12/13/10
REQUESTOR R.OLIVARES	DATE 12/13/10
R&QA	DATE
SAFETY	DATE
SUPERVISOR S.FRANKEL	DATE 12/14/10


Ames Research Center
 Moffett Field, California
 STEAM VACUUM SYSTEM NOx EMISSION REDUCTION SYSTEM
 DEMOLITION
DEMOLITION PHOTOS

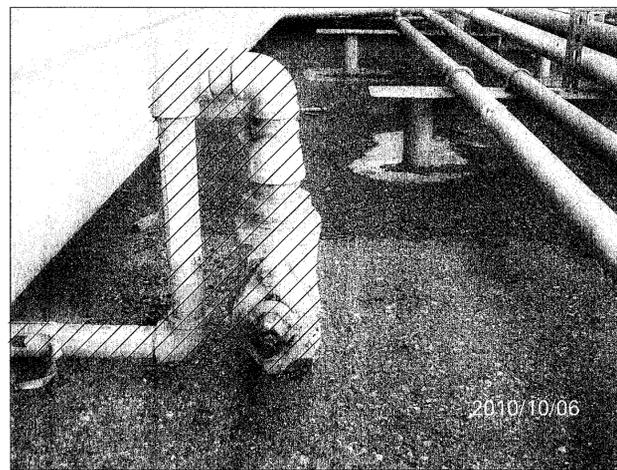
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SCALE NONE	INDEX	SHEET	OF



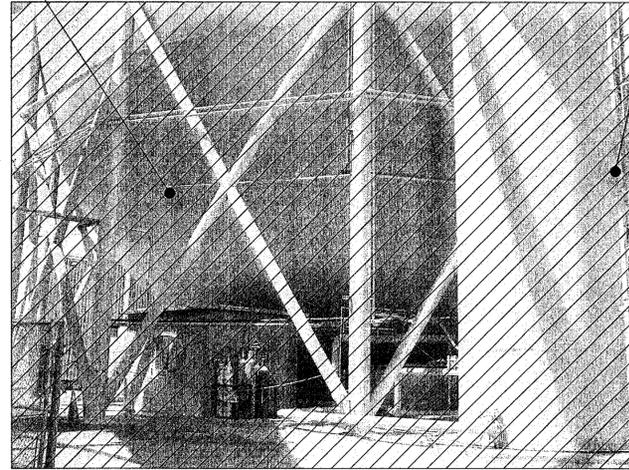
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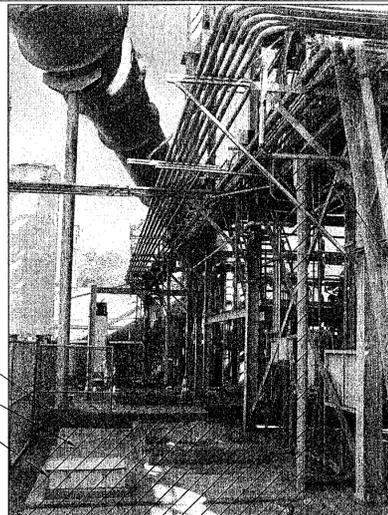
4 EXISTING GAS EMISSION ANALYZER
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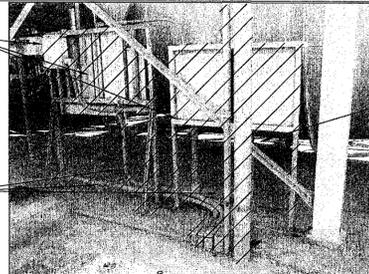
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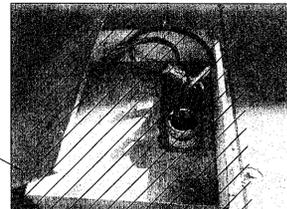
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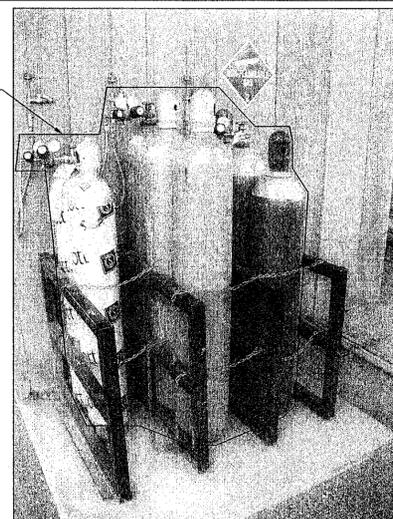
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3A DEMOLITION PHOTO 3A
 D1 D3 SCALE: NTS

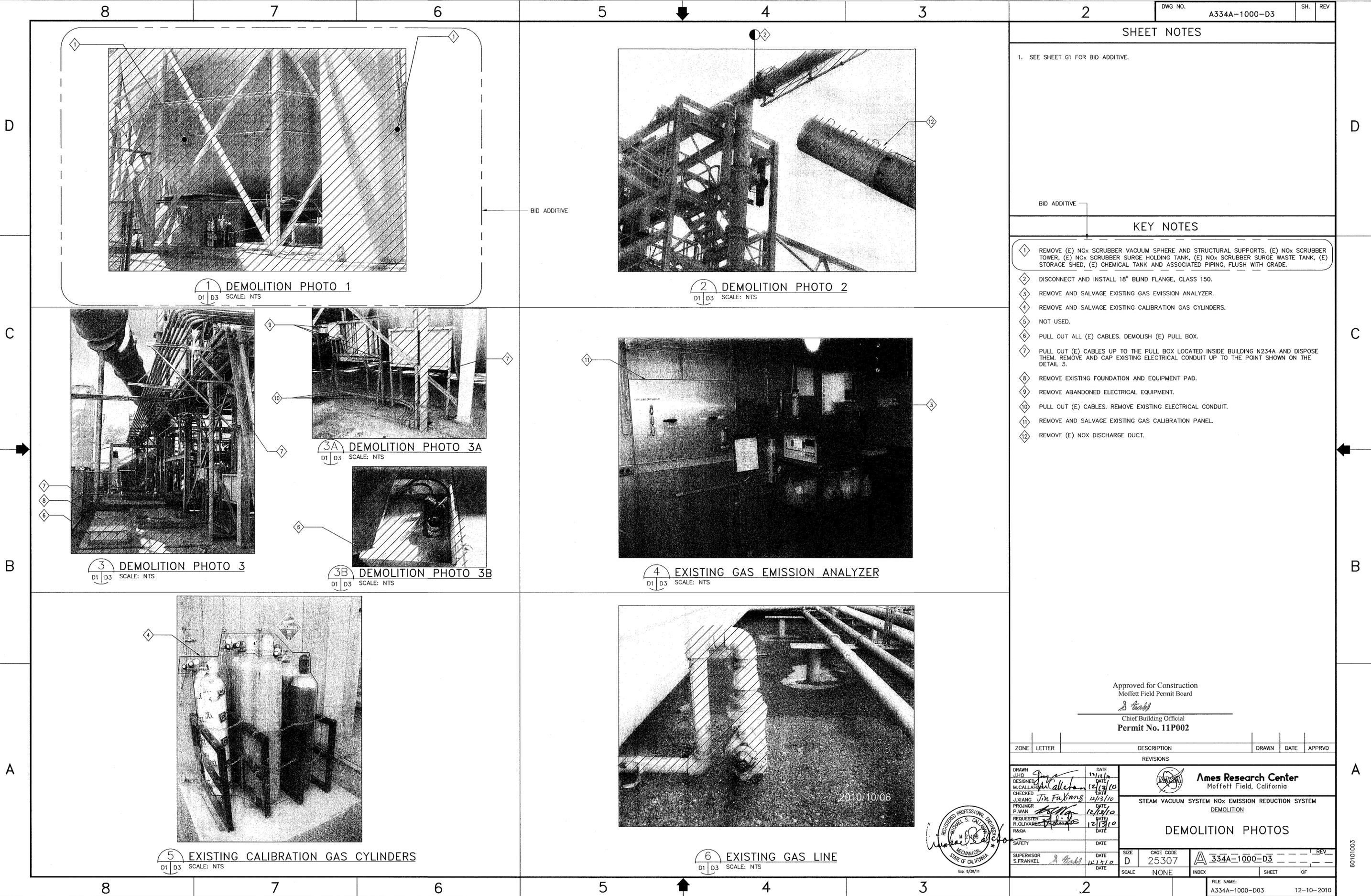


3B DEMOLITION PHOTO 3B
 D1 D3 SCALE: NTS



5 EXISTING CALIBRATION GAS CYLINDERS
 D1 D3 SCALE: NTS

BID ADDITIVE



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STRUCTURAL GENERAL NOTES

- 1. ALL WORK SHALL BE IN ACCORDANCE WITH ALL FEDERAL, STATE AND LOCAL BUILDING CODES AND SAFETY ORDINANCES IN EFFECT AT THE TIME AND PLACE OF BUILDING.
2. ANY CONFLICTS OR DISCREPANCIES BETWEEN THE DRAWINGS AND SITE CONDITIONS SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE COTR AND CORRECTED AS DIRECTED BY THE COTR.
3. CONTRACTOR AGREES THAT HE SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT INCLUDING SAFETY OF ALL PERSONS AND PROPERTY. THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND SHALL NOT BE LIMITED TO NORMAL WORKING HOURS.
4. NO PIPES OR SLEEVES SHALL PASS THROUGH STRUCTURAL MEMBERS WITHOUT APPROVAL OF CONTRACTING OFFICER UNLESS SHOWN ON STRUCTURAL DRAWINGS.
5. CONCRETE SUB CONTRACTOR SHALL PROVIDE TEMPORARY SHORING AS REQUIRED TO INSURE VERTICAL & LATERAL STABILITY OF SOIL FOR FOUNDATION DURING CONSTRUCTION.
6. ANY CONFLICT OR DISCREPANCY BETWEEN THE DRAWINGS & SPECIFICATION SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF COTR. IN THE CASE OF THE CONFLICT BETWEEN DRAWINGS & SPECIFICATION, DRAWINGS SUPERSEDE THE SPECIFICATION.
7. ALL DEBRIS AND WASTE GENERATED BY THIS PROJECT SHALL BE LEGALLY RECYCLED OR DISPOSED.
8. SAW CUT (E) A.C. FOR NEW FOOTINGS.
9. REPLACE ANY A.C. TO BE DAMAGED AND REMOVE IT DURING CONSTRUCTION.
10. DIMENSION ARE REFERENCE ONLY. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING SIZES, CONDITIONS, MEMBERS ELEVATIONS AND DIMENSIONS BEFORE BEGINNING CONSTRUCTION AND/OR ORDERING MATERIAL.

REINFORCEMENT STEEL

- 1. REINFORCING BARS SHALL BE IN ACCORDANCE WITH REQUIREMENTS OF ASTM A615, GRADE 60. DEFORMED BARS, EXCEPT #3 BAR GRADE 40.
2. LAP SPLICE LENGTH SCHEDULE:
F'c = 3,000 PSI
BASIC LAP
#4.....28 IN.
#5.....36 IN.
#6.....43 IN.
#7.....62 IN.
3. CONCRETE COVER:
UNLESS OTHERWISE NOTED, CONCRETE COVERAGE OF REINFORCING BARS SHALL BE AS FOLLOWS:
3" - ALL BARS WHERE CONCRETE IS DEPOSITED DIRECTLY AGAINST EARTH.
2" - FOR #6 AND LARGER BARS WHERE CONCRETE IS EXPOSED TO EARTH AND/OR WEATHER BUT DEPOSITED AGAINST FORMS.
1-1/2" - FOR #5 AND SMALLER BARS FOR SLABS, WALLS, BEAMS, COLUMNS AND EXTERIOR SURFACES EXPOSED TO EARTH OR WEATHER BUT DEPOSITED AGAINST FORMS.
4. ALL REINFORCING STEEL AND EMBEDMENTS TO BE HELD SECURELY IN PLACE PRIOR TO PLACING CONCRETE. PROVIDE SUFFICIENT SUPPORTS TO ALLOW WALKING ON REINFORCEMENT. NO BRICK OR POROUS MATERIAL SHALL BE USED TO SUPPORT REINFORCING.

STRUCTURAL ABBREVIATIONS

Table with 2 columns: Abbreviation and Full Name. Includes entries like C (CENTER LINE), A.C./AC (ASPHALT CONCRETE), A.B. (ANCHOR BOLT), B.PL (BASE PLATE), BOT (BOTTOM), B.O.S (BOTTOM OF STEEL), CJ (CONSTRUCTION JOINT), CLR (CLEAR), COL (COLUMN), CONT (CONTINUOUS), COTR (CONTRACTING OFFICER'S TECHNICAL REPRESENTATIVE), DET (DETAIL), DWL (DOWEL), DWG (DRAWING), (E) (EXISTING), EA (EACH), E.F. (EACH FACE), EMBED (EMBEDMENT), EQ (EQUAL), E.W. (EACH WAY), F.S. (FAR SIDE), F.F. (FINISH FLOOR), FTG (FOOTING), GA (GAUGE), GALV (GALVANIZED), H.R. (HAND RAIL), HSS (HOLLOW STEEL SECTION), HORIZ (HORIZONTAL), HT (HEIGHT), LLH (LONG LEG HORIZONTAL), LLV (LONG LEG VERTICAL), MAX (MAXIMUM), MIN (MINIMUM), (N) (NEW), N.S. (NEAR SIDE), N.T.S. (NOT TO SCALE), O.C. (ON CENTER), OEM (ORIGINAL EQUIPMENT), OPNG (OPENING), OPP (OPPOSITE), PL (PLATE), PLCS (PLACES), PS (PIPE SUPPORT), REINF (REINFORCING), REQ'D (REQUIRED), SIM (SIMILAR), SPEC (SPECIFICATION), SPC (SPACING), STL (STEEL), SYMM (SYMMETRICAL), T&B (TOP AND BOTTOM), TBM (TEMPORARY BENCH MARK), THK (THICK), T.O. (TOP OF), T.O.F (TOP OF FOOTING), T.O.S (TOP OF STEEL), T.O.C (TOP OF CONCRETE), TYP (TYPICAL), UNO (UNLESS NOTED OTHERWISE), VERT (VERTICAL), V.I.F. (VERIFY IN FIELD), W.W.F. (WELDED WIRE FABRIC), W.P. (WORK POINT).

FOUNDATIONS

- 1. UNDERLYING BASE OF NATIVE SOIL SHALL BE COMPACTED TO AT LEAST 90 PERCENT OF THE MAXIMUM DRY DENSITY. FOR DEPTH OF AT LEAST 12" UNDER FOOTING PER ASTM D1557.
2. NO CONCRETE SHALL BE POURED IN ANY FOUNDATION UNTIL EXCAVATION HAS BEEN INSPECTED AND APPROVED BY COTR.
3. FOUNDATION DESIGN IS BASED ON GEOTECHNICAL STUDY DONE BY FUGRO WEST INC. FOR NASA AMES N234A DEAERATOR/FEEDWATER TANK REPLACEMENT PROJECT DATED FEBRUARY 2010.
MAXIMUM ALLOWABLE BEARING PRESSURE UNDER MAT FOUNDATION:
a. DEAD LOAD PLUS LIVE LOAD 1,000 PSF.
b. SEISMIC LOAD COMBINATION WITH DEAD LOAD, 3,200 PSF.

QUALITY CONTROL

- 1. INSPECTIONS AND TESTING SHALL COMPLY WITH SPECIFICATIONS.
2. ALL INSPECTIONS INCLUDING SPECIAL INSPECTIONS AND CONTINUOUS INSPECTION SHALL BE DONE BY A QUALIFIED TESTING AGENCY AND QUALIFIED INSPECTORS AT THE EXPENSE OF THE CONTRACTOR. GOVERNMENT SHALL BE NOTIFIED IN ADVANCE TO WITNESS ALL THE TESTS. ALL TEST RESULTS DOCUMENTATIONS SHALL BE SUBMITTED TO THE GOVERNMENT.
3. SPECIAL INSPECTION SHALL COMPLY WITH 2007 CBC, CHAPTER 17. SPECIAL INSPECTION SHALL BE PROVIDED FOR THE FOLLOWING USE:
A) WELDING - WELDING SHALL BE DONE IN AN GOVERNMENT APPROVED SHOP. APPROVED FABRICATORS SHALL CONFORM TO CBC 1701. ALL FIELD WELDING SHALL HAVE CONTINUOUS INSPECTION.
B) EPOXY AND EXPANSION TYPE ANCHOR BOLTS.
C) REINFORCING STEEL PLACEMENT.
D) ALL CONCRETE WORK.

DESIGN CRITERIA FOR BUILD TO PRINT

- 1. APPLICABLE CODE 2007 CALIFORNIA BUILDING CODE, ASCE 7-05
2. SEISMIC DESIGN NON-STRUCTURAL COMPONENTS, CHAPTER 13 & CHAPTER 15 ASCE 7-05
V = Cs W
Cs = (Sds / R) = 0.286 GOVERN
Cs = (0.8 S1 / R) = 0.086
Wp = WEIGHT
Ss = 1.5
S1 = 0.6
Fa = 1
Fv = 1.5
Sds = 1
Sd1 = 0.6
I = 1
R = 3.5
Csm = (0.5 S1 / R)
3. WIND DESIGN PER CBC SECTION 1609 OR ASCE 7 CHAPTER 6
Fw = qz G Cf
qz = 0.00256 Kz Kzt Kd V^2
G = 0.85
Cf = SEE FIGURE 6-21 ASCE 7-05
Kz = SEE TABLE 6-3 ASCE 7-05
Kzt = 1
Kd = SEE TABLE 6-4 ASCE 7-05
I = 1
EXPOSURE B
V = 85 mph
OCCUPANCY CATEGORY II

STRUCTURAL STEEL

- 1. FABRICATION AND CONSTRUCTION SHALL CONFORM TO THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION, MANUAL OF STEEL CONSTRUCTION. ALLOWABLE STRESS DESIGN, SPECIFICATIONS AND CODES, 13TH EDITION.
2. STRUCTURAL STEEL SHAPES, EXCEPT W-SHAPES, BARS AND ROD SHALL CONFORM TO ASTM A36.
3. ALL STEEL PIPES SHALL BE STANDARD PIPE, SCHEDULE 40 (UNLESS INDICATED). CONFORMING TO ASTM A53, GRADE B Fy = 35 KSI
4. HOLLOW STRUCTURAL SECTION (HSS) SHALL BE ASTM A500 GRADE B, Fy = 46 KSI.
5. BOLT HOLES IN STEEL SHALL BE 1/16" LARGER THAN BOLTS, UNLESS OTHERWISE NOTED ON PLANS. ALL BOLT HOLES TO BE DRILLED OR PUNCHED. BURNING OF HOLES SHALL NOT BE PERMITTED.
6. ALL SHOP AND FIELD WELDING PER LATEST EDITION OF AWS, D1.1. STRUCTURAL WELDING CODE. WELDING ELECTRODE - E70XX.
7. DEFECTIVE WELDS SHALL BE GROUND OUT, REPAIRED, AND RE-TESTED AT CONTRACTORS EXPENSE.
8. ALL STRUCTURAL STEEL SHALL BE PRIMED AND PAINTED ACCORDING TO SPECIFICATION.
9. DEFECTIVE WELDS SHALL BE GROUND OUT, REPAIRED, AND RE-TESTED AT CONTRACTORS EXPENSE.
10. WELD LENGTHS SHOWN ARE EFFECTIVE LENGTH PER CODE. WHERE LENGTHS ARE NOT SHOWN, THE WELD SHALL BE FULL LENGTH OF JOINT.
11. ALL WELDING REQUIREMENTS SHOWN OR INDICATED ON THE DRAWINGS MAY BE FIELD OR SHOP WELDED AS REQUIRED FOR EFFICIENT ERECTION, SUBJECT TO THE APPROVAL OF THE COTR.
12. VISUAL INSPECTION IS REQUIRED FOR ALL SHOP WELDING AND SHALL BE PERFORMED BY CERTIFIED WELDING INSPECTOR.
13. CONTINUOUS INSPECTION IS REQUIRED FOR ALL FIELD WELDING AND SHALL BE PERFORMED BY AN INDEPENDENT QUALIFIED INSPECTOR.
14. VISUAL INSPECTION IS REQUIRED FOR ALL FIELD FILLET WELDING PERFORMED BY AN INDEPENDENT QUALIFIED INSPECTOR.
15. ALL FULL PENETRATION WELDING SHALL BE TESTED BY NON-DESTRUCTIVE METHODS (ULTRASONIC OR RADIOGRAPHIC TESTING) BY AN INDEPENDENT QUALIFIED INSPECTOR.
16. FURNISH COPIES OF MILL TEST REPORTS OF ALL STEEL MATERIALS TO THE GOVERNMENT SHOWING CONFORMANCE WITH SPECIFIED ASTM DESIGNATIONS PRIOR TO FABRICATION OF ANY WORK. CERTIFIED LOTS SHALL BE SO IDENTIFIED.

POST-INSTALLED CONCRETE ANCHORS

- CHEMICALLY BONDED ANCHORS:
1. ALL HOLES FOR POST-INSTALLED ANCHORS SHALL BE DRILLED, CLEANED AND PREPARED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND THE APPLICABLE ICC-ESR. WHERE AN ANCHOR DOES NOT SET PROPERLY, OR FAILS A TENSION TEST, OR REINFORCEMENT IS ENCOUNTERED DURING DRILLING, THE DRILLED HOLE MAY NOT BE REUSED. ABANDONED HOLES SHALL BE FILLED WITH NON-SHRINK GROUT. THE MINIMUM SPACING BETWEEN AN ABANDONED HOLE AND A DRILLED HOLE USED FOR A POST-INSTALLED ANCHOR SHALL NOT BE LESS THAN 1-1/2" ANCHOR DIAMETERS UNLESS OTHERWISE APPROVED BY THE COTR. IF THE ANCHOR OR DOWEL MAY NOT BE SHIFTED AS NOTED ABOVE, THE ENGINEER OF RECORD WILL DETERMINE A NEW LOCATION. LOCATE REINFORCEMENT, AVOID CUTTING (E) REBAR AND CONFIRM FINAL LOCATIONS PRIOR TO FABRICATING PLATES, MEMBERS, OR OTHER STEEL ASSEMBLIES ATTACHED WITH ADHESIVE ANCHORS.
2. COMPLY WITH 2007 CBC AND SHALL HAVE ESR REPORT NUMBER.
3. ADHESIVE ANCHOR SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATION & REQUIREMENT & THE PRODUCT ICC REPORT.
4. SPECIAL INSPECTION OF ADHESIVE ANCHOR SHALL BE IN ACCORDANCE WITH CBC SECTION 1701. ITEMS TO BE REPORTED ARE:
- ADHESIVE PRODUCT INCLUDING THE NAME AND EXPIRATION DATE.
- ANCHOR BOLT OR REBAR MATERIAL, GRADE DIAMETER, LENGTH & CLEANLINESS.
- DRILL BIT DIAMETER.
- HOLE DEPTH AND CLEANLINESS.
5. THE TESTING OF POST-INSTALLED ANCHOR SHALL BE DONE IN THE PRESENCE OF THE SPECIAL INSPECTOR AND A REPORT OF THE TEST RESULT SHALL BE SUBMITTED TO THE COTR.
6. POST-INSTALLED ANCHOR HAVE CONTINUOUS INSPECTION AS EXPLAINED IN CBC 2007 SECTION 1702.1.
7. A TENSION TEST IS REQUIRED ON 20% OF ALL BOLTS FOR EACH CONNECTION PLATE. IF ANY OF THE BOLTS FAIL THE TEST, 100% OF THE BOLTS SHALL BE TESTED. TEST LOCATIONS SHALL BE SELECTED BY THE COTR.

TENSION TEST LOADS (POUNDS)
HILTI HIT-RE 500 SD (ICC-ES ESR 2322)
CRACKED CONCRETE, SEISMIC, CONDITION B
Table with 4 columns: NOMINAL ANCHOR DIAMETER, EDGE DISTANCE (INCHES), EMBEDMENT DEPTH (INCHES), NORMAL-WEIGHT CONCRETE (f'c = 3000 psi) CARBON STEEL.
Rows: 5/8" BOLT (6, 5, 8,461), 5/8" BOLT (12, 8, 10,486), 3/4" BOLT (12, 6 3/4, 15,507), 3/4" BOLT (12, 12, 15,520), 1" BOLT (12, 12, 26,436)

CONCRETE

- 1. CONCRETE SHALL DEVELOP THE MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI AT 28 DAYS (MINIMUM F'c) WHEN TESTED IN ACCORDANCE WITH ASTM C39.
2. PORTLAND CEMENT SHALL CONFORM TO ASTM C-150 TYPE II LOW ALKALI.
3. PRIOR TO PLACING CONCRETE, THE CONTRACTOR SHALL ENSURE THAT ALL EMBEDMENTS, INCLUDING ANCHOR BOLTS, ARE PROPERLY LOCATED AND SECURELY TIED IN PLACE.
4. DIMENSIONAL TOLERANCE FOR ALL CONCRETE WORK SHALL BE WITHIN +/- 1/8" OF DIMENSION SHOWN ON DRAWINGS. TOP OF FOOTING ELEVATIONS SHALL BE WITHIN +/- 1/16 OF ELEVATIONS SHOWN ON DRAWINGS. U.O.N.

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Moffett Field Permit Board
Chief Building Official
Permit No. 11P002

Table with columns: ZONE, LETTER, DESCRIPTION, DRAWN, DATE, APPROVD. Includes a REVISIONS table and a stamp for Ames Research Center, Moffett Field, California, dated 12/13/10. Also includes a stamp for STRUCTURAL NOTES AND ABBREVIATIONS.

8

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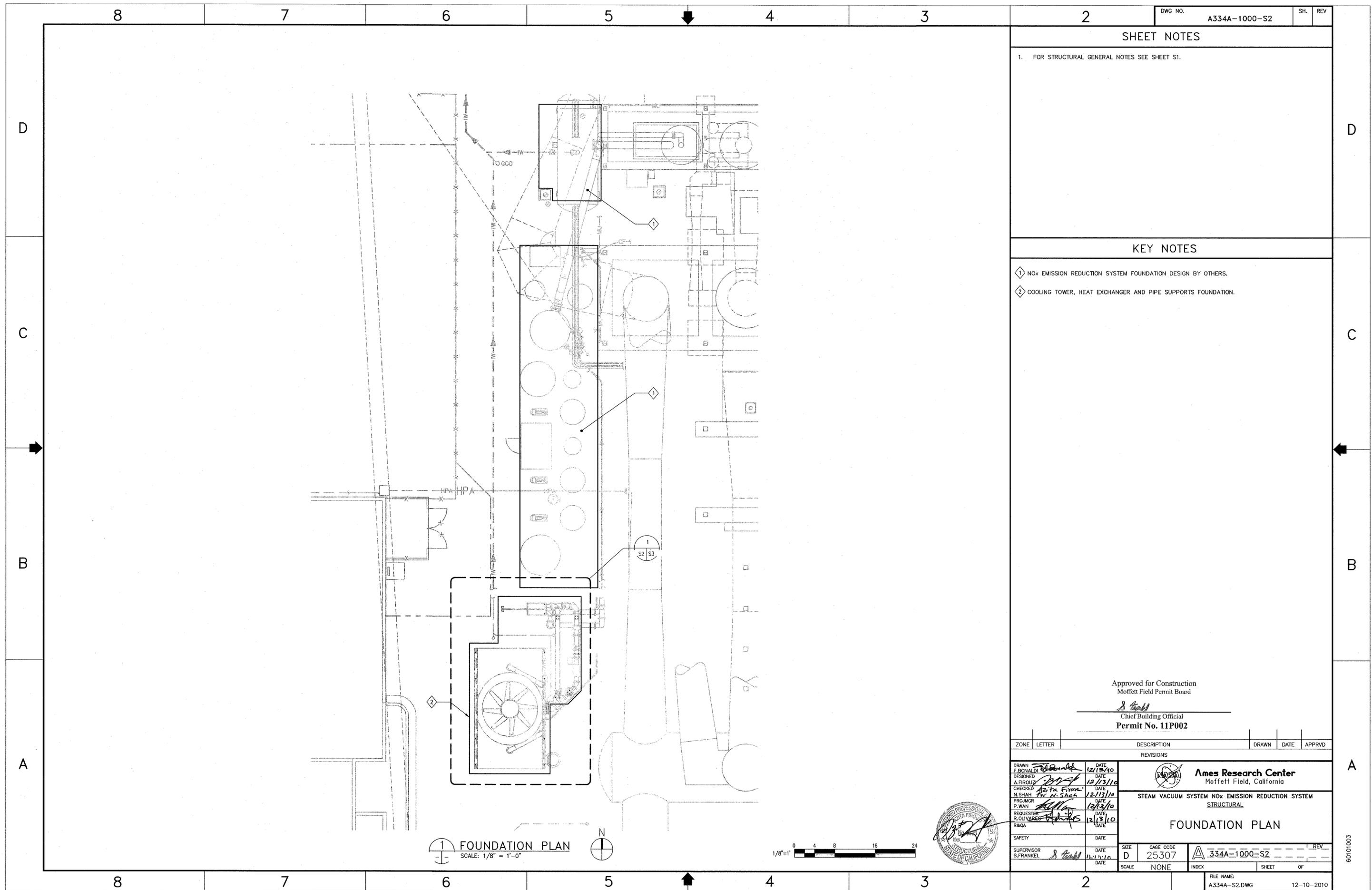
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2

User: jrho Version: 17.1s (LMS Tech) DWG: R:\234A\60101003.0001 (K90032) S\5 NOX Emission Reduction System\500_CAD\S\Sheet\A334A-1000-S01.dwg DATE: Dec 13, 2010 7:58:34 am

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 DATE: Dec 13, 2010 - 7:58:46 am



DWG NO. A334A-1000-S2 SH. REV

SHEET NOTES

1. FOR STRUCTURAL GENERAL NOTES SEE SHEET S1.

KEY NOTES

- ◇ NOx EMISSION REDUCTION SYSTEM FOUNDATION DESIGN BY OTHERS.
- ◇ COOLING TOWER, HEAT EXCHANGER AND PIPE SUPPORTS FOUNDATION.

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 Moffett Field Permit Board
 Chief Building Official
 Permit No. 11P002

ZONE	LETTER	DESCRIPTION	DRAWN	DATE	APPRVD
REVISIONS					

DRAWN F. BONALDI DESIGNED A. FIROUZ CHECKED N. SHAH PROJ MGR P. WAN REQUESTER R. OLIVARES R&QA	DATE 12/13/10 DATE 12/13/10 DATE 12/13/10 DATE 12/13/10 DATE 12/13/10	<p>Ames Research Center Moffett Field, California</p> <p>STEAM VACUUM SYSTEM NOx EMISSION REDUCTION SYSTEM STRUCTURAL</p> <p>FOUNDATION PLAN</p>	SIZE D CAGE CODE 25307 SCALE NONE	FILE NAME A334A-S2.DWG 12-10-2010
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1 FOUNDATION PLAN
 SCALE: 1/8" = 1'-0"



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 DATE: Dec 13, 2010 7:58:59 am

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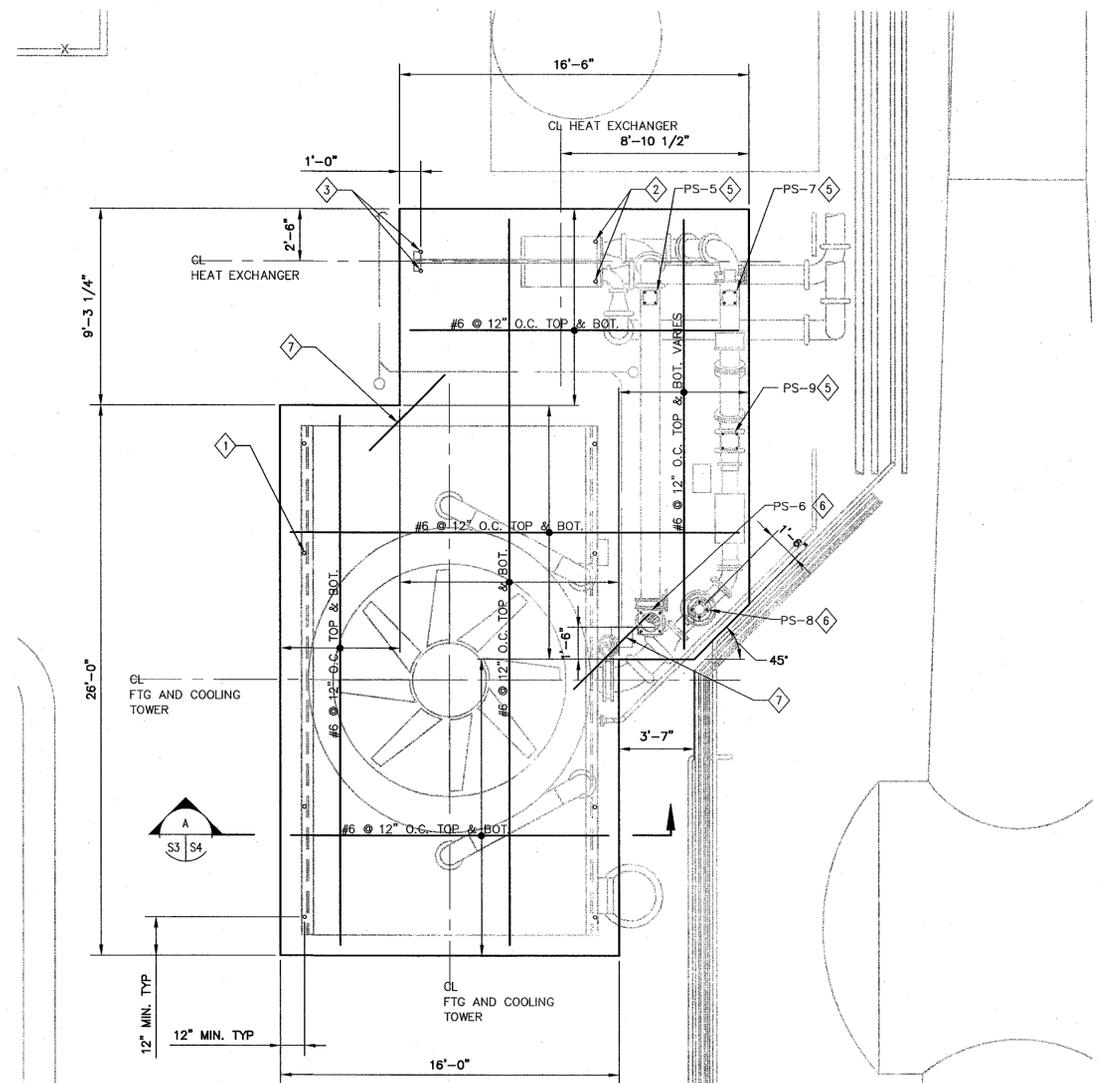
DWG NO. A334A-1000-S3 SH. REV

SHEET NOTES

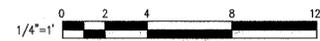
1. FOR STRUCTURAL GENERAL NOTES SEE SHEET S1.
2. SAW CUT (E) A.C. FOR NEW FOUNDATION.
3. AFTER CONSTRUCTION, REPAIR (E) DAMAGED A.C. MATCH EXISTING.

KEY NOTES

- ① COOLING TOWER ANCHOR BOLTS (TOTAL OF 8). SEE SECTION A ON SHEET S4.
- ② 3/4" HILTI HIT RE500-SD, 14" MIN. EMBEDMENT.
- ③ 1" HILTI HIT RE500-SD, 14" MIN. EMBEDMENT.
- ④ NOT USED.
- ⑤ 4-5/8" HILTI HIT RE500-SD, 5" MIN. EMBEDMENT. MINIMUM 6" EDGE DISTANCE.
- ⑥ 4-5/8" HILTI HIT RE500-SD, 8" MIN. EMBEDMENT.
- ⑦ #6 BAR 5'-0" LONG TOP & BOT.



1 ENLARGED FOUNDATION PLAN
 S2 S3 SCALE: 1/4" = 1'-0"



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 Chief Building Official
 Permit No. 11P002

ZONE	LETTER	DESCRIPTION	DRAWN	DATE	APPRVD
REVISIONS					

DRAWN F. RONALDI	DATE 12/21/10
DESIGNED A. FIROUZ	DATE 12/13/10
CHECKED N. SHAH	DATE 12/11/10
PROJ. ENGR P. WAN	DATE 12/15/10
REQUESTER R. OLIVARES	DATE 12/13/10
R&QA	DATE
SAFETY	DATE
SUPERVISOR S. FRANKEL	DATE 12-17-10

 Ames Research Center Moffett Field, California	
STEAM VACUUM SYSTEM NOx EMISSION REDUCTION SYSTEM STRUCTURAL	
ENLARGED FOUNDATION PLAN	
SIZE D	CAGE CODE 25307
SCALE NONE	INDEX
FILE NAME: A334A-S3.DWG	12-10-2010

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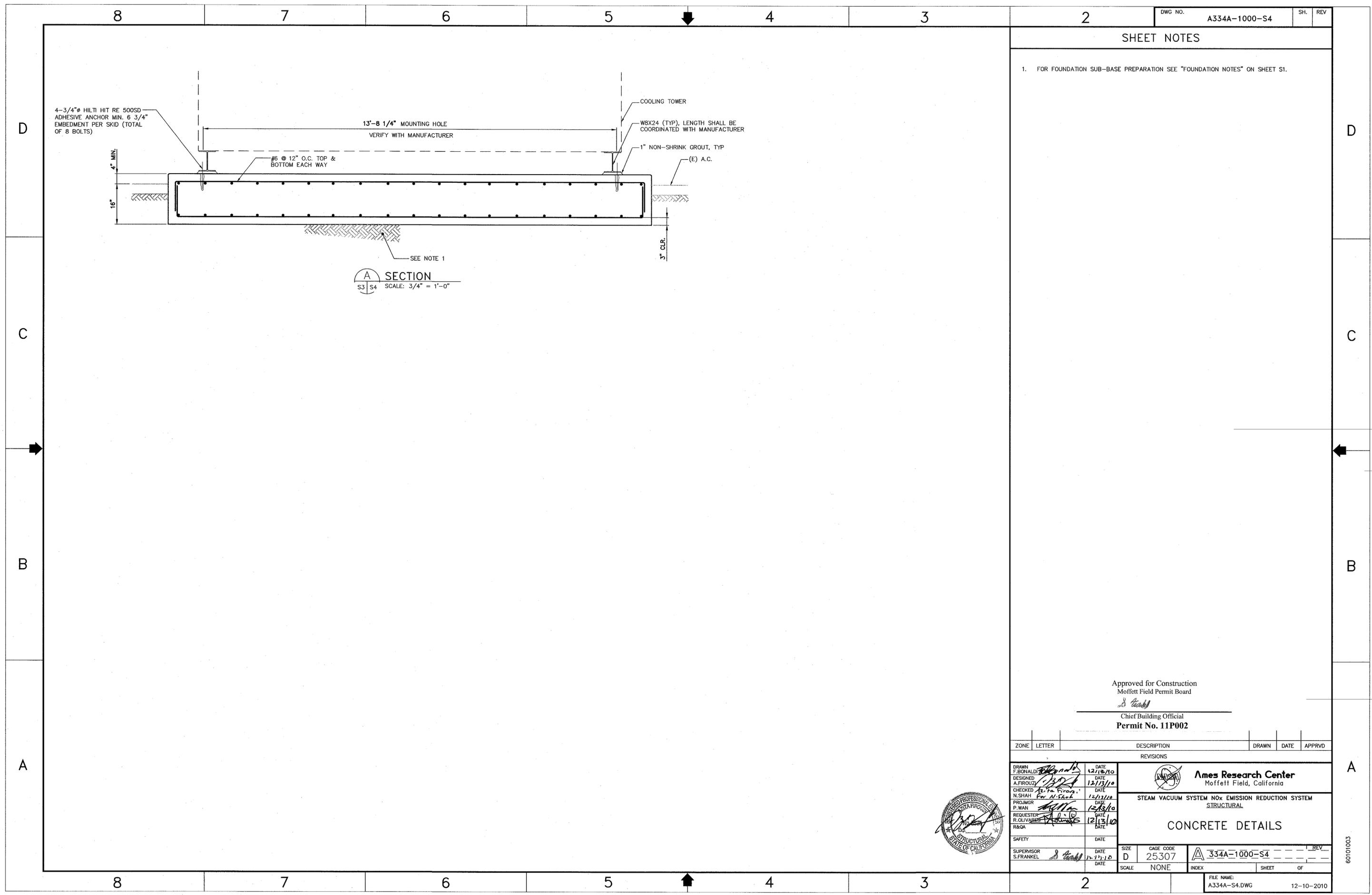
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DWG NO. A334A-1000-S4 SH. REV

SHEET NOTES

1. FOR FOUNDATION SUB-BASE PREPARATION SEE "FOUNDATION NOTES" ON SHEET S1.

Approved for Construction
 Moffett Field Permit Board
[Signature]
 Chief Building Official
 Permit No. 11P002

ZONE	LETTER	DESCRIPTION	DRAWN	DATE	APPRVD
REVISIONS					
DESIGN	F. BONALDI	DATE	12/12/10		
DESIGNED	A. FIROUZ	DATE	12/13/10		
CHECKED	<i>[Signature]</i>	DATE	12/13/10		
N. SHAH	For N. Shah	DATE	12/13/10		
PROJ MGR	P. WAN	DATE	12/13/10		
REQUESTER	R. OLIVARES	DATE	12/13/10		
R&QA		DATE			
<p style="text-align: center;"> </p>					
SAFETY		DATE			
SUPERVISOR	S. FRANKEL	DATE	12/13/10		
SIZE	D	CAGE CODE	25307		
SCALE	NONE	INDEX			
FILE NAME:		A334A-S4.DWG		12-10-2010	

Ames Research Center
 Moffett Field, California

STEAM VACUUM SYSTEM NOx EMISSION REDUCTION SYSTEM
 STRUCTURAL

CONCRETE DETAILS

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 DATE: Dec 13, 2010 10:57:46 am

SHEET NOTES

- EQUIPMENT DIMENSIONS ARE APPROXIMATE.
- SEE SHEET G2 FOR SYMBOLS AND ABBREVIATIONS.
- SEE SHEET M1 FOR MECHANICAL NOTES.
- DATA AND SELECTIONS LISTED FOR DESIGN-BUILD PROCESS EQUIPMENT IS APPROXIMATE ONLY. DESIGN-BUILD CONTRACTOR IS RESPONSIBLE FOR FINAL DESIGN (FLOW RATE, HEAD, STATIC PRESSURE, ETC.) AND SELECTION. SEE SHEET G2 FOR DESIGN-BUILD SPECIFICATIONS.

KEY NOTES

- 1 ACCEPTABLE PUMP MANUFACTURERS: PEERLESS, GOULD, AMERICAN MARSH, PACO, BELL & GOSSETT, TACO, PEERLESS, OR APPROVED EQUAL.
- 2 PUMP AND MOTOR RATED FOR OUTDOOR INSTALLATION. PUMP (MOTOR) RPM IS FLEXIBLE TO MEET SCHEDULE PERFORMANCE. PUMP INLET AND OUTLET SIZE IS FLEXIBLE TO MEET SCHEDULE PERFORMANCE. SELECT PUMP NOT TO EXCEED SCHEDULE BHP AND SCHEDULE NPSH REQUIRED. PUMP NO-FLOW ("DEAD HEAD") PRESSURE: 90"WG MAX.
- 3 ACCEPTABLE PLATE/FRAME HEAT EXCHANGER MANUFACTURERS: MUELLER, TRANTER, ALPHA-LAVAL, ITT STANDARD, TACO, OR APPROVED EQUAL.
- 4 ACCEPTABLE COOLING TOWER MANUFACTURERS: BALTIMORE AIRCOIL, SPX, EVAPCO, COOLING TOWER DEPOT, OR APPROVED EQUAL.
- 5 COOLING TOWER FEATURES: INVERTER DUTY PREMIUM EFFICIENCY MOTOR PER NEMA MG-1, VIBRATION CUTOFF SWITCH, INTEGRAL WATER BASIN, VELOCITY RECOVERY STACK, EXTENDED LUBRICATION LINES, AIR INLET SCREENS, GALVANIZED STEEL CONSTRUCTION, HIGH TEMPERATURE WET DECK FOR EWT UP TO 135°F, FACTORY MUTUAL APPROVAL, HYBRID POLYMER CORROSION PROTECTION COATING FOR GALVANIZED COMPONENTS WITH FUSE-BONDING THERMOSETTING CURE PROCESS, SIDE OUTLET, GROOVED PIPE CONNECTIONS. TOWER FRAMING MUST RESIST NOZZLE LOADS AS LISTED.
- 6 MAXIMUM OVERALL SOUND PRESSURE LEVEL AT 50 FEET FROM INTAKE LOUVER.
- 7 MAINTENANCE SAFETY: PROVIDE PERMANENT ACCESS FOR MAINTENANCE OF ALL EQUIPMENT TO MEET OSHA SAFETY REQUIREMENTS. PROVIDE PERMANENT LADDER, SAFETY GATE, SAFETY GATE, AND HANDRAILS FOR ACCESS TO FAN DECK. PROVIDE PERMANENT INTERNAL WALKWAY FOR ACCESS TO STRAINER, OUTLET AND MAKE-UP WATER ASSEMBLY. WALKWAYS SHALL BE FIRE RETARDANT, AND SLIP-RESISTANT.
- 8 WATER QUALITY DATA AT NASA AMES RESEARCH CENTER. VERIFY IN FIELD.

DETECTED CONTAMINANTS	UNIT	AVERAGE
TOTAL DISSOLVED SOLIDS	PPM	36
CALCIUM	PPM	4.7
HARDNESS (AS CaCO ₃)	PPM	15
pH	UNIT	9.0
CHLORIDE	PPM	3.25
SULFATE	PPM	2.9

- 9 EXHAUST FAN: FRP CONSTRUCTION, CLASS 3 WHEEL, RADIAL BLADE, INVERTER DUTY READY MOTOR.
- 10 WASTE TANK: TANK FOR OUTDOOR INSTALLATION ABOVE GROUND. PROVIDE PIPE CONNECTIONS AS REQUIRED FOR PUMP OUT AND PROCESSES, AND AS SHOWN ON PIPING DIAGRAM.
- 11 TANK MAINTENANCE SAFETY: PROVIDE PERMANENT ACCESS FOR MAINTENANCE OF ALL EQUIPMENT AND TANK INTERIOR. PROVIDE MANWAY AND INTERNAL LADDER FOR ACCESS TO TANK INTERIOR. PROVIDE PERMANENT LADDER, SAFETY GATE, SAFETY GATE, AND HANDRAILS FOR ACCESS TO MANWAY.
- 12 DESIGN-BUILD EQUIPMENT

Approved for Construction
Moffett Field Permit Board

[Signature]
Chief Building Official
Permit No. 11P002

ZONE	LETTER	DESCRIPTION	DRAWN	DATE	APPRVD
REVISIONS					

DRAWN: J.H.O. DESIGNED: M. Callahan CHECKED: J. Xiang PROJECTOR: P. Wan REQUESTER: R. Olivares R&QA:	DATE: 12/13/10 DATE: 12/13/10 DATE: 12/13/10 DATE: 12/13/10 DATE: 12/13/10	 Ames Research Center Moffett Field, California STEAM VACUUM SYSTEM NOx EMISSION REDUCTION SYSTEM MECHANICAL EQUIPMENT SCHEDULES	SAFETY SUPERVISOR: S. Frankel DATE: 12/13/10	FILE NAME: A334A-1000-M2 SHEET: 12-10-2010
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COOLING TOWER																						
UNIT TAG	GPM	EWB F	EWT F	LWT F	LIFT WS	PUMP HEAD WG	CELLS	CELL DIMENSIONS LxWxH	STACK HEIGHT	SOUND LEVEL dBA	FAN					MOTOR DATA				OPER WT LBS	MFR & MODEL NO.	REMARKS
											ESP	QTY	DIA.	CFM	RPM	HP	NO.	VOLTS/PHASE	VFD			
CT-1	1600	67"	120"	77"	12.3'	18.2'	ONE	24' x 14' x 20'	6'	71	0.0"	1	20"	236,000	-	50	1	460V / 3ø	YES	45,000	BALTIMORE AIRCOIL 31132C-QM/V	5 7 8

HEAT EXCHANGER																			
UNIT TAG	SERVICE	RATED TEMP F	MAWP PSIG	PRIMARY FLUID						SECONDARY FLUID						OPER WT LBS	MFR & MODEL NO.	UNIT DIMENSIONS LxWxH	REMARKS
				FLUID	GPM	WPD	EWT F	LWT F	PIPE CONN	FLUID	GPM	WPD	EWT F	LWT F	PIPE CONN				
HX-1	GAS COOLING COLUMN	150	75	GAS COOLING WATER	1500	21"	135"	90"	6"	TOWER WATER	1600	24"	77"	120"	6"	8,200	MUELLER ACCU-THERM	106" x 29" x 83"	PLATE/FRAME TYPE

PUMPS																			
UNIT TAG	SERVICE	GPM	TDH	EWT	RATED TEMP F	RATED PSIG	MAX NPSH REQ'D	INLET x OUTLET CONNECTION SIZE	MOTOR DATA					OPER WT LBS	MFR & MODEL NO.	TYPE	DETAILS	REMARKS	
									RPM	BHP	HP	VOLTS/PHASE	VFD						
CTP-1	COOLING TOWER CT-1	1600	60'	77"	275"	150	15.8'	8" x 8"	1770	30.1	40	460V / 3ø	YES	1600	B&G 80 8X8X9.5	VERTICAL IN-LINE	-	2	
CP-1	GAS COOLING COLUMN	1500	-	145"	275"	150	-	-	1770	-	50	460V / 3ø	YES	-	-	-	-	2 12	
CP-2	REDUCTION COLUMN	380	-	89"	275"	150	-	-	-	-	15	460V / 3ø	NO	-	-	-	-	2 12	
CP-3	REDUCTION COLUMN	380	-	89"	275"	150	-	-	-	-	15	460V / 3ø	NO	-	-	-	-	2 12	
CP-4	CAUSTIC COLUMN	380	-	89"	275"	150	-	-	-	-	15	460V / 3ø	NO	-	-	-	-	2 12	

FAN																			
UNIT TAG	SERVICE	CFM	FSP	TYPE	MAX SONES	WHEEL TYPE	DRIVE	OUTLET FPM	FAN RPM	MOTOR DATA				OPER WT LBS	MFR & MODEL NO.	REMARKS			
										BHP	MHP	RPM	VOLTS/PHASE						
DF-1	SVS DRAFT FAN	3,900	20"	UTILITY	-	RB	-	-	1800	20.9	30	960	460 / 3ø	-	-	9 12			

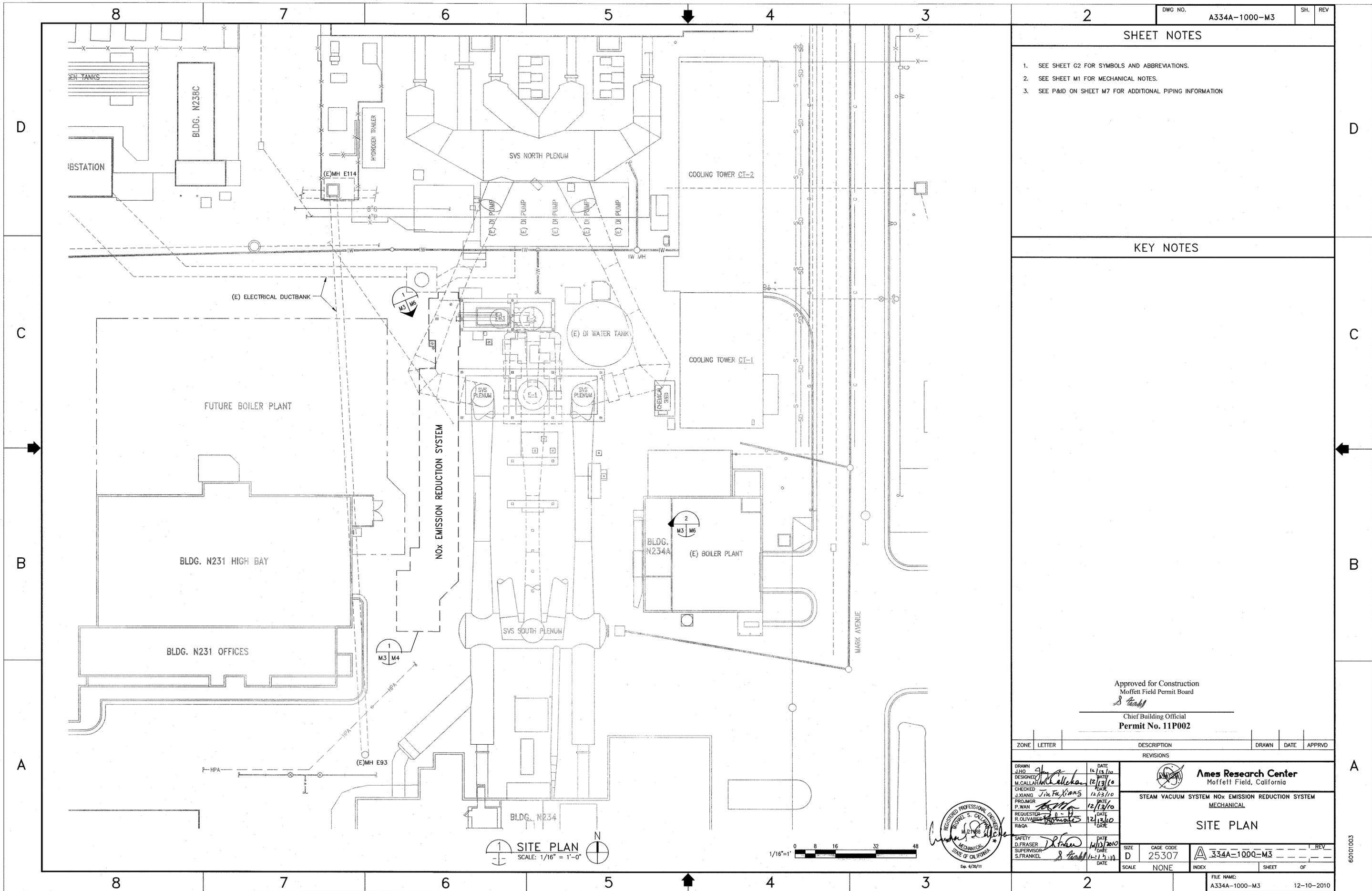
① FC=FORWARD CURVED BI=BACKWARD INCLINED CENTRIFUGAL AX=AXIAL RB=RADIAL BLADE

WASTE PRE-TREATMENT TANK									
UNIT TAG	SERVICE	VOLUME GAL	DIMENSIONS DIAM x HEIGHT	TYPE	DISCHARGE PUMP	TANK WT LBS	OPER WT LBS	MFR & MODEL NO.	REMARKS
WT-1	NOX EFFLUENT	8,360	8'øx24'	HORIZONTAL, ABOVE GROUND	NONE	-	-	XERES, OR EQUAL	10 11 12

NOZZLE LOAD SCHEDULE								
NOZZLE	SIZE	Fx (AXIAL) LBS	Fy (VERTICAL) LBS	Fz (LATERAL) LBS	Mx FT-LBS	My FT-LBS	Mz FT-LBS	REMARKS
COOLING TOWER	INLET	14"	±350	±150	±150	±0	±150	±100
COOLING TOWER	OUTLET	14"	±1,950	±700	±1,900	±50	±600	±50
HEAT EXCHANGER (COLD SIDE)	INLET	6"	±1,000	±550	±1,200	±1,200	±3,850	±550
HEAT EXCHANGER (COLD SIDE)	OUTLET	6"	±450	±250	±900	±350	±1,500	±250
GAS COOLING COLUMN	INLET	18"	±2,050	±1,250	±1,450	±1,000	±300	±250

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DWG NO. A334A-1000-M3 SH. REV

SHEET NOTES

- SEE SHEET G2 FOR SYMBOLS AND ABBREVIATIONS.
- SEE SHEET M1 FOR MECHANICAL NOTES.
- SEE P&ID ON SHEET M7 FOR ADDITIONAL PIPING INFORMATION

KEY NOTES

Approved for Construction
 Moffett Field Permit Board
[Signature]
 Chief Building Official
Permit No. 11P002

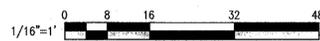
ZONE	LETTER	DESCRIPTION	DRAWN	DATE	APPRVD
REVISIONS					

DRAWN	J. HO	DATE	12/13/10
DESIGNED	M. CALLAHAN	DATE	12/13/10
CHECKED	J. XIANG	DATE	12/13/10
PROJ MGR	P. WAN	DATE	12/13/10
REQUESTER	R. OLIVARES	DATE	12/13/10
SAFETY	D. FRASER	DATE	12/13/10
SUPERVISOR	S. FRANKEL	DATE	12/13/10

Ames Research Center
 Moffett Field, California
STEAM VACUUM SYSTEM NOx EMISSION REDUCTION SYSTEM
 MECHANICAL
SITE PLAN

SIZE	D	CAGE CODE	25307	REV	1
SCALE	NONE	INDEX		SHEET	OF

SITE PLAN
 SCALE: 1/16" = 1'-0"



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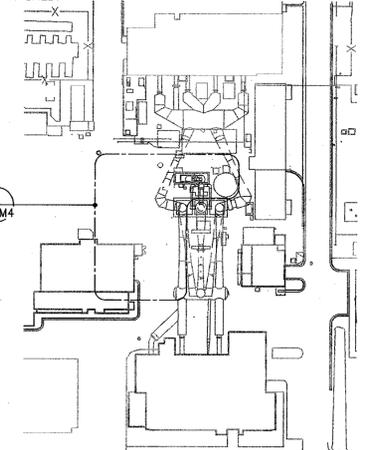
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 DATE: Dec 13, 2010 - 12:08:42 pm

SHEET NOTES

- SEE SHEET G2 FOR SYMBOLS AND ABBREVIATIONS.
- SEE SHEET M1 FOR MECHANICAL NOTES.
- SEE SHEET M2 FOR EQUIPMENT AND NOZZLE SCHEDULE.
- SEE SHEET M7 FOR ADDITIONAL PIPING INFORMATION.
- REFERENCE PIPE ELEVATIONS INDICATED BY [] ARE IN FEET FOR PIPE CENTERLINE RELATIVE TO TOP OF CONCRETE OF (E) SVS FOUNDATION.

KEY NOTES

- PURGE PIPING FROM CHEMICAL PROCESS COLUMNS (DESIGN-BUILD). SEE PIPING DIAGRAM FOR ADDITIONAL INFORMATION. MULTIPLE PIPES ARE SHOWN STACKED VERTICALLY AND CLAMPED TO FORMED CHANNEL.
- CUT, ROTATE AND WELD (E) 18" ELBOW AND RELATED PIPE SUPPORT AS REQUIRED TO CONNECT 18" SVS PIPING TO NOx EMISSION REDUCTION SYSTEM.
- 6'-0" HIGH PERIMETER FENCE WITH LOCKED GATE TO SECURE AND PREVENT UNAUTHORIZED ACCESS (BY OTHERS).
- BOUNDARY FOR LOCATION OF DESIGN-BUILD NOx PROCESS EQUIPMENT AND PIPING. FOR SCOPE OF DESIGN-BUILD WORK, SEE DESIGN-BUILD SPECIFICATIONS ON SHEET M1. SEE ALSO KEY NOTE #1 ON SHEET M7 FOR SCOPE OF WORK.
- (E) 2" UNDERGROUND HPA PIPING: IF BOTTOM OF FOUNDATION EXCEEDS 3 FEET BELOW GRADE, REROUTE HPA PIPE ABOVE NEW FOUNDATION. DESIGN OF REROUTE SHALL BE DESIGN-BUILD. COMPLY WITH ASME B31.3, WITH FULL RT OF ALL WELDS. HYDROSTATICALLY TEST ALL NEW WELDS. SUBMIT DYNAMIC SEISMIC ANALYSIS. REPLACE (E) HARDCAP DAMAGED BY CONSTRUCTION.
- 18" DOUBLE ARCHED RUBBER EXPANSION JOINT, FULL FACE FLANGES WITH RETAINING RINGS, 100 PSIG RATED, ASME B31.3 COMPLIANT. FLEXICRAFT ULTRASPOOL DOUBLE MODEL USL21800.
- SEE PHOTO REFERENCE 1/M6 FOR VIEW OF (E) PIPE SUPPORTS TO BE REPLACED (PS-1 AND PS-2). PIPE SUPPORT ELEVATION ARE: PS-1: [60.08']; PS-2: [55.42']
- 2" MAKE-UP WATER TO NOx PROCESS.
- 2" MAKE-UP WATER TO COOLING TOWER CT-1. SUPPORT AT 10' MAX. SPACING. SEE DETAIL 5 ON SHEET M6 FOR TYPICAL PIPE SUPPORT.
- RECONNECT (E) CHEMICAL FEED TUBING FROM NEW NaOH CHEMICAL FEED PUMP.
- CHEMICAL STORAGE SHEDS (DESIGN-BUILD): 2-HOUR FIRE RATED, FM APPROVED, EPA & OSHA COMPLIANT, SINGLE DOOR, NON-EXPLOSION INTERIOR LIGHT, PASSIVE VENT, STEEL GRATE DECK OVER SECONDARY CONTAINMENT FLOOR, PORTABLE EYEWASH STATION. COMPLY WITH EPA AND OSHA REGULATIONS FOR THE MATERIALS TO BE HOUSED IN EACH SHED. MFR: US CHEMICAL STORAGE FIRELOC. LOCATE H2SO4 FEED PUMP IN NORTH SHED. LOCATE ALL OTHER FEED PUMPS IN SOUTH SHED.



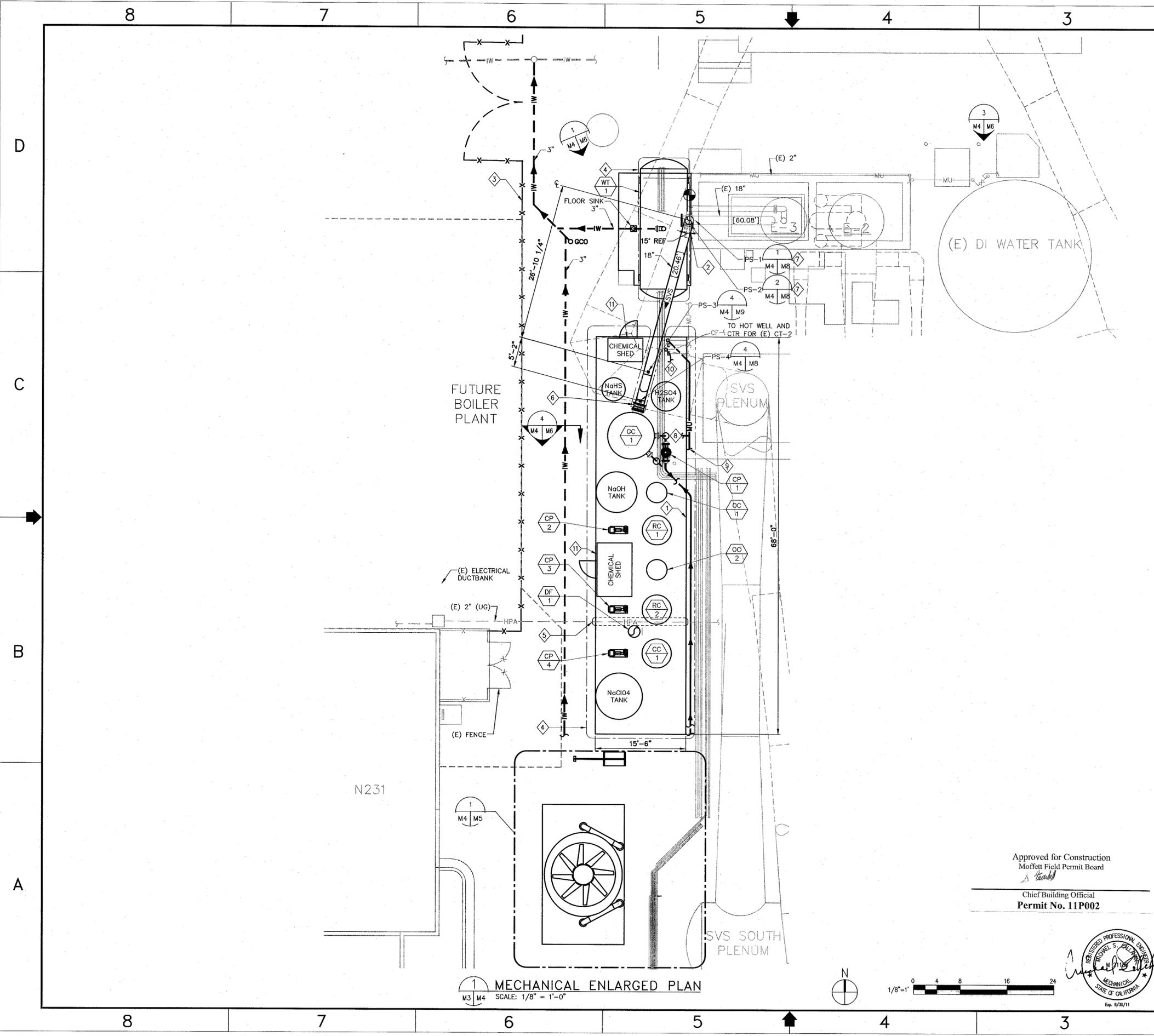
KEY PLAN

Approved for Construction
 Moffett Field Permit Board
 Chief Building Official
 Permit No. 11P002



1 MECHANICAL ENLARGED PLAN
 SCALE: 1/8" = 1'-0"

ZONE	LETTER	DESCRIPTION	DRAWN	DATE	APPRVD																								
REVISIONS																													
<table border="1"> <tr> <td>DRAWN</td> <td>J.HO</td> <td>DATE</td> <td>12/13/10</td> </tr> <tr> <td>DESIGNED</td> <td>M.CALLAHAN</td> <td>DATE</td> <td>12/13/10</td> </tr> <tr> <td>CHECKED</td> <td>J.XIANG</td> <td>DATE</td> <td>12/13/10</td> </tr> <tr> <td>PROJ.MGR</td> <td>P.WAN</td> <td>DATE</td> <td>12/13/10</td> </tr> <tr> <td>REQUESTER</td> <td>R.OLIVAREZ</td> <td>DATE</td> <td>12/13/10</td> </tr> <tr> <td>R&QA</td> <td></td> <td>DATE</td> <td></td> </tr> </table>						DRAWN	J.HO	DATE	12/13/10	DESIGNED	M.CALLAHAN	DATE	12/13/10	CHECKED	J.XIANG	DATE	12/13/10	PROJ.MGR	P.WAN	DATE	12/13/10	REQUESTER	R.OLIVAREZ	DATE	12/13/10	R&QA		DATE	
DRAWN	J.HO	DATE	12/13/10																										
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PROJ.MGR	P.WAN	DATE	12/13/10																										
REQUESTER	R.OLIVAREZ	DATE	12/13/10																										
R&QA		DATE																											
<p style="text-align: center;">Ames Research Center Moffett Field, California</p> <p style="text-align: center;">STEAM VACUUM SYSTEM NOx EMISSION REDUCTION SYSTEM MECHANICAL</p> <p style="text-align: center;">ENLARGED SITE PLAN</p>																													
SAFETY		D.FRASER	DATE	12/13/2010	SIZE																								
SUPERVISOR		S.FRANKEL	DATE	12/13/10	CAGE CODE																								
SCALE		NONE		INDEX	334A-1000-M4																								
SHEET		OF		FILE NAME: A334A-1000-M4																									
				12-10-2010																									



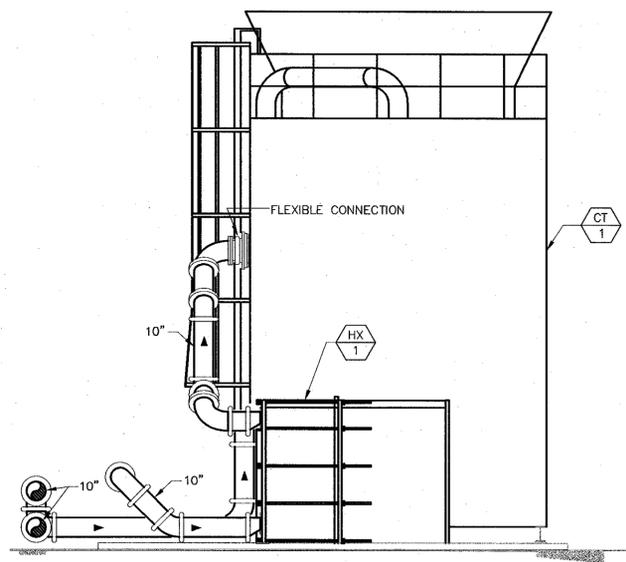
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 DATE: Dec 13, 2010 10:58:22 am

SHEET NOTES

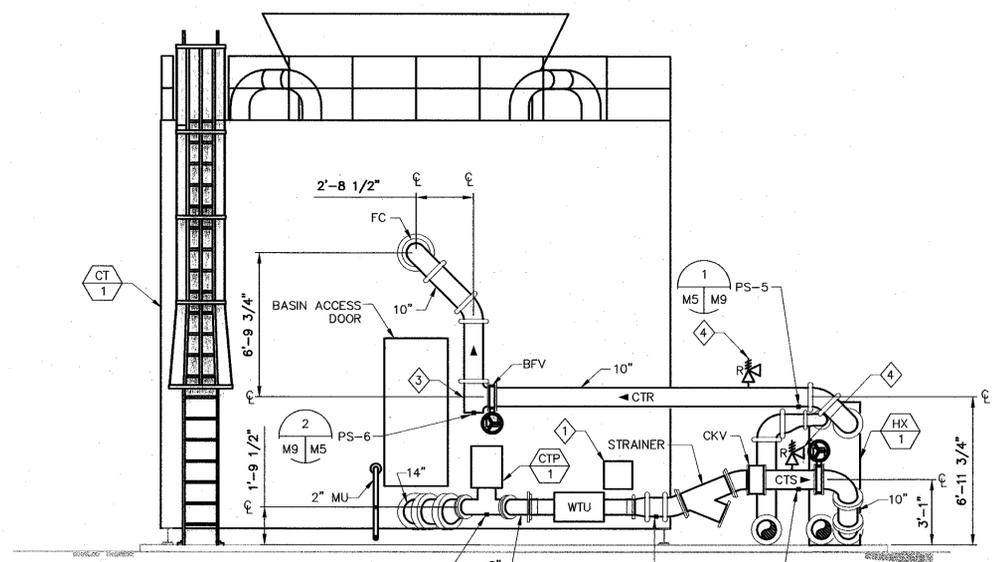
1. SEE SHEET G2 FOR SYMBOLS AND ABBREVIATIONS.
2. SEE SHEET M1 FOR MECHANICAL NOTES.
3. SEE SHEET M2 FOR EQUIPMENT AND NOZZLE SCHEDULE.
4. SEE P&ID ON SHEET M7 FOR ADDITIONAL PIPING INFORMATION.

KEY NOTES

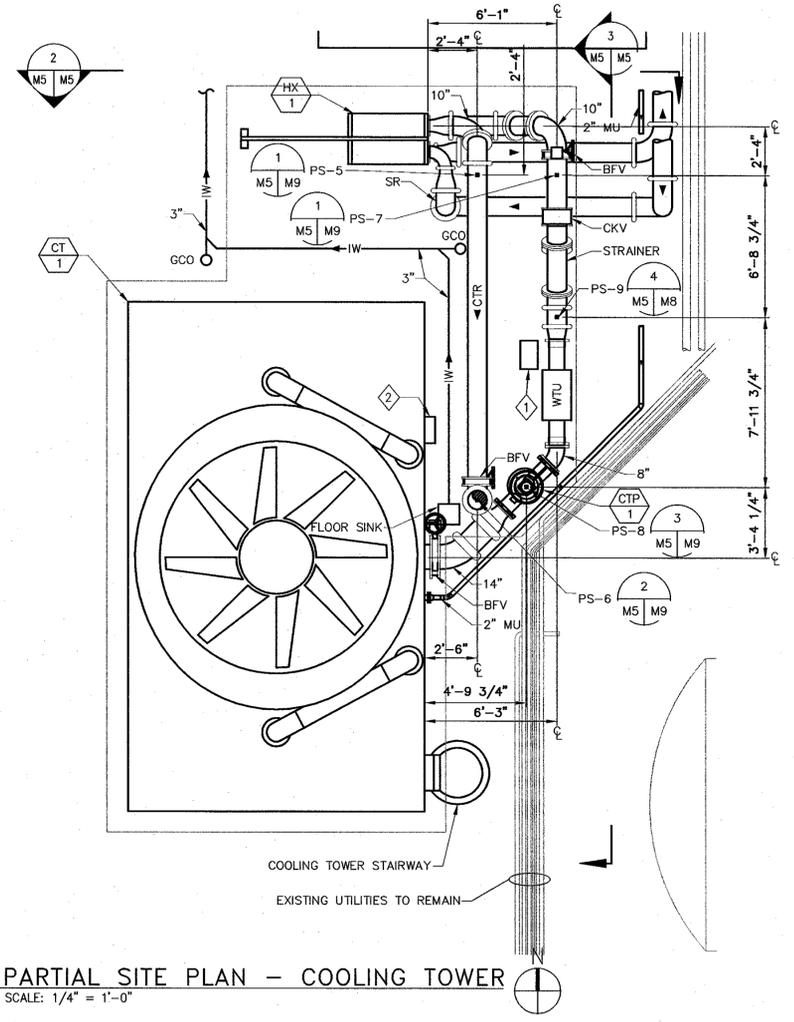
- 1 MOUNT TRANSFORMER PANEL FOR WATER TREATMENT UNIT
- 2 MOUNT WATER TREATMENT CONTROLLER IN WEATHERPROOF ENCLOSURE ON COOLING TOWER.
- 3 GROOVED TEE FITTING: STEEL FITTING. WELD TO SUPPORT WATER TIGHT.
- 4 3/4" X 1" DIRECT SPRING OPERATED PRESSURE SAFETY RELIEF VALVE SUITABLE FOR WATER SERVICE, 40 GPM MINIMUM CAPACITY AT 75 PSI SET PRESSURE AND 70F. UV STAMPED IN ACCORDANCE WITH ASME BPVC SECTION VIII DIV. 1, ASME SA216 WCB CARBON STEEL BODY, BUNA-N SEAT, FNPT ENDS, ANDERSON GREENWOOD MODEL 81PS1F68-4 OR APPROVED EQUAL.



2 SECTION - COOLING TOWER (LOOKING SOUTH)
 M5 M5 SCALE: 1/4" = 1'-0"



3 SECTION - COOLING TOWER (LOOKING EAST)
 M5 M5 SCALE: 1/4" = 1'-0"



1 PARTIAL SITE PLAN - COOLING TOWER
 M4 M5 SCALE: 1/4" = 1'-0"



Approved for Construction
 Moffett Field Permit Board

J. Frankel
 Chief Building Official
 Permit No. 11P002

ZONE	LETTER	DESCRIPTION	DRAWN	DATE	APPRVD
REVISIONS					

DRAWN	J.H.O.	DATE	12/13/10
DESIGNED	M. Callahan	DATE	12/13/10
CHECKED	J. Xiang	DATE	12/13/10
PROJECTOR	P. Wan	DATE	12/13/10
REQUESTER	R. Olivares	DATE	12/13/10
R&QA		DATE	
SAFETY	D. Fraser	DATE	12/13/2010
SUPERVISOR	S. Frankel	DATE	12-13-2010
DATE			

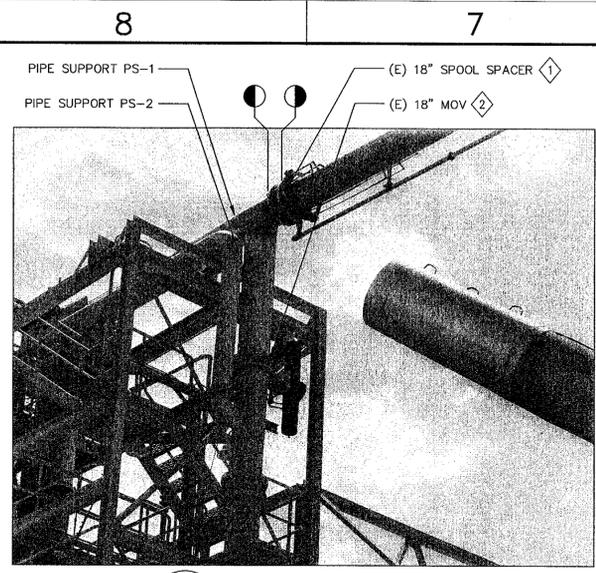
Ames Research Center
 Moffett Field, California

STEAM VACUUM SYSTEM NOx EMISSION REDUCTION SYSTEM
 MECHANICAL

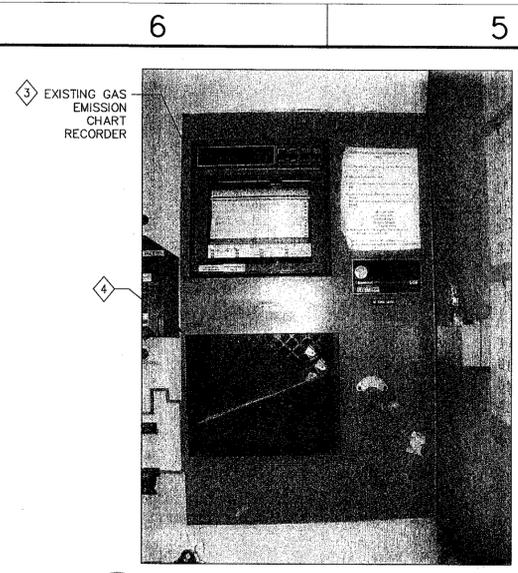
PARTIAL SITE PLAN -
 COOLING TOWER

SIZE	D	CAGE CODE	25307	FILE NAME:	A334A-1000-M05
SCALE	NONE	INDEX		SHEET	OF

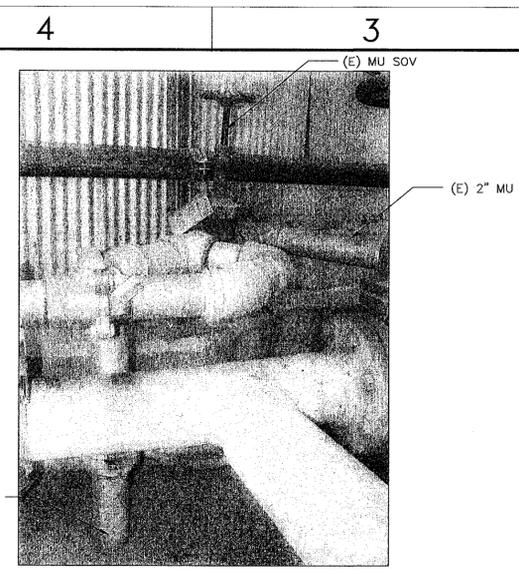
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 DATE: Dec 13, 2010 10:58:33 am



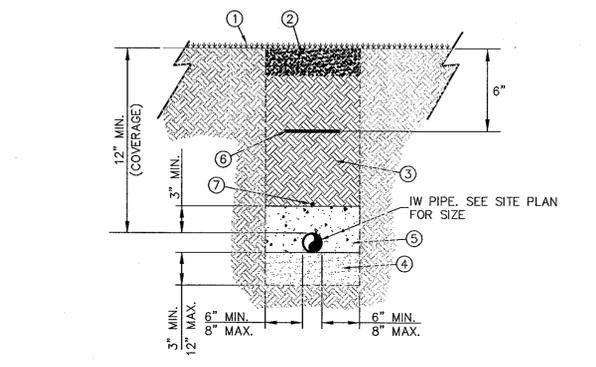
1 (E) 18" SVS PIPE
M3 M6 SCALE: NONE



2 (E) GAS EMISSION CHART RECORDER
M3 M6 SCALE: NONE

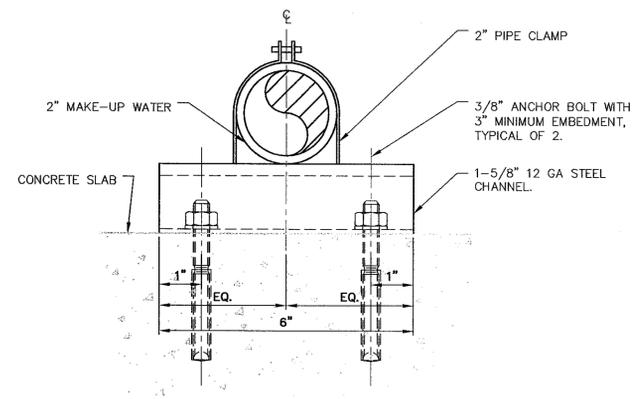


3 (E) MAKE-UP WATER SOV
M4 M6 SCALE: NONE



- DETAIL NOTES:
1. GRASS. SEE LANDSCAPE PLAN FOR DETAIL.
 2. PLACE 4" TOPSOIL IN LANDSCAPED AREAS.
 3. MECHANICALLY COMPACT BACKFILL.
 4. SAND BEDDING MATERIAL: COMPACT TO 95% RELATIVE DENSITY.
 5. SLURRY: TWO SACK CONCRETE SLURRY (GAS PIPING ONLY)
 6. TRACER WARNING TAPE: 12" BELOW GRADE.
 7. TRACER WIRE: 14 AWG AT 4" ABOVE TOP OF GAS PIPE.

4 TRENCH DETAIL
M4 M6 SCALE: NONE



5 MAKE-UP WATER PIPE SUPPORT
M4 M6 SCALE: NONE

SHEET NOTES

1. SEE SHEET G2 FOR SYMBOLS AND ABBREVIATIONS.
2. SEE SHEET M1 FOR MECHANICAL NOTES.

KEY NOTES

1. REPLACE AND SALVAGE (E) 18" SPOOL SPACER WITH 18" BLIND SPOOL DURING NEW NOX SCRUBBER OPERATIONAL TESTING. INSTALL (E) 18" SPOOL SPACER AT POINT OF DISCONNECTION AFTER OPERATION TESTING OF NEW NOX SCRUBBER IS COMPLETED.
2. (E) 18" MOV SHALL REMAIN OPEN DURING NEW NOX SCRUBBER SYSTEM OPERATION TESTING. (E) 18" MOV SHALL REMAIN CLOSED WHEN EXISTING NOX SCRUBBER SYSTEM IS IN OPERATION.
3. (E) GAS EMISSION CHART RECORDER SHALL REMAIN OPERATIONAL DURING INSTALLATION OF NEW NOX SCRUBBER SYSTEM. REMOVE, SALVAGE AND RETURN (E) GAS EMISSION CHART RECORDER TO GOVERNMENT AFTER INSTALLATION OF NEW NOX SCRUBBER SYSTEM IS COMPLETED.
4. LOCATE NEW GAS EMISSION CHART RECORDER IN OPEN SPACE ON CONTROL PANEL.

Approved for Construction
Moffett Field Permit Board
[Signature]
Chief Building Official
Permit No. 11P002

ZONE	LETTER	DESCRIPTION	DRAWN	DATE	APPRVD
REVISIONS					

DRAWN	J.HO	DATE	12/13/10
DESIGNED	M. CALLAHAN	DATE	12/13/10
CHECKED	J. XIANG	DATE	12/13/10
PROJ MGR	P. WAN	DATE	12/13/10
REQUESTER	R. OLIVARES	DATE	12/13/10
R&QA		DATE	
SAFETY	D. FRASER	DATE	12/13/10
SUPERVISOR	S. FRANKEL	DATE	12/13/10

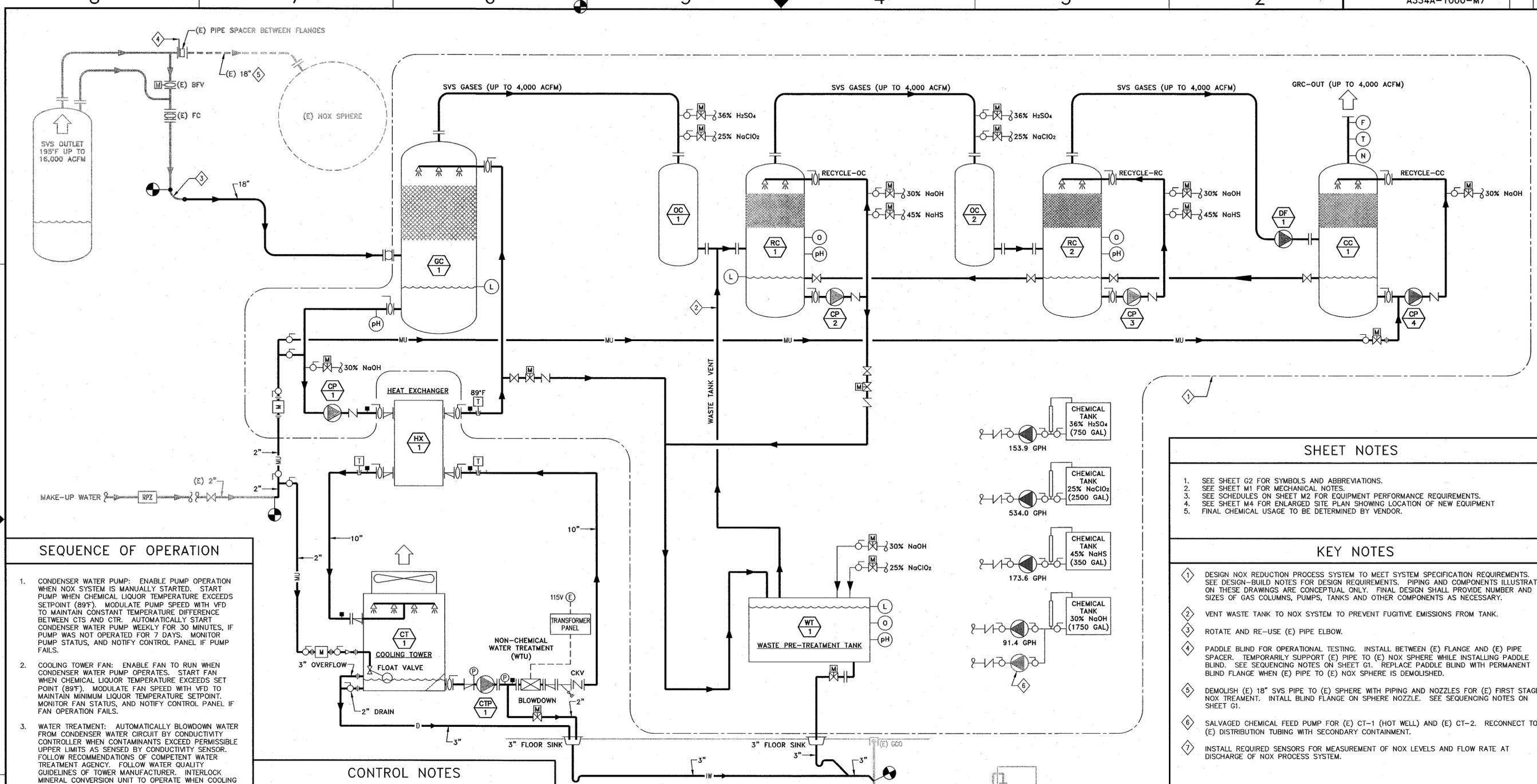
Ames Research Center
 Moffett Field, California
 STEAM VACUUM SYSTEM NOx EMISSION REDUCTION SYSTEM
 MECHANICAL
PHOTOS & DETAILS

SIZE	D	CAGE CODE	25307
SCALE	NONE	INDEX	334A-1000-M6
FILE NAME:	A334A-1000-M06		
SHEET	OF	12-10-2010	



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DWG: RA-234A 60101003.0001 (K90032) SVS NOx Emission Reduction System\500_CAD\Sheet\A334A-1000-M07.dwg Version: 17.1s (LMS Tech) User: jfno
 DATE: Dec 13, 2010 1:10:58:46 am



SEQUENCE OF OPERATION

- CONDENSER WATER PUMP: ENABLE PUMP OPERATION WHEN NOX SYSTEM IS MANUALLY STARTED. START PUMP WHEN CHEMICAL LIQUOR TEMPERATURE EXCEEDS SETPOINT (89°F). MODULATE PUMP SPEED WITH VFD TO MAINTAIN CONSTANT TEMPERATURE DIFFERENCE BETWEEN CTS AND CTR. AUTOMATICALLY START CONDENSER WATER PUMP WEEKLY FOR 30 MINUTES, IF PUMP WAS NOT OPERATED FOR 7 DAYS. MONITOR PUMP STATUS, AND NOTIFY CONTROL PANEL IF PUMP FAILS.
- COOLING TOWER FAN: ENABLE FAN TO RUN WHEN CONDENSER WATER PUMP OPERATES. START FAN WHEN CHEMICAL LIQUOR TEMPERATURE EXCEEDS SET POINT (89°F). MODULATE FAN SPEED WITH VFD TO MAINTAIN MINIMUM LIQUOR TEMPERATURE SETPOINT. MONITOR FAN STATUS, AND NOTIFY CONTROL PANEL IF FAN OPERATION FAILS.
- WATER TREATMENT: AUTOMATICALLY BLOWDOWN WATER FROM CONDENSER WATER CIRCUIT BY CONDUCTIVITY CONTROLLER WHEN CONTAMINANTS EXCEED PERMISSIBLE UPPER LIMITS AS SENSED BY CONDUCTIVITY SENSOR. FOLLOW RECOMMENDATIONS OF COMPETENT WATER TREATMENT AGENCY. FOLLOW WATER QUALITY GUIDELINES OF TOWER MANUFACTURER. INTERLOCK MINERAL CONVERSION UNIT TO OPERATE WHEN COOLING TOWER WATER PUMP OPERATES. REFER TO MAKEUP WATER QUALITY DATA ON SHEET M2.
- WASTE TANK: COLLECT CONCENTRATED WASTE CHEMICAL LIQUOR DELIVERED FROM NOX PROCESS. PRETREAT LIQUOR AS NEEDED FOR DISCHARGE TO PUBLIC SEWER. OPEN DRAIN VALVE TO DISCHARGE TANK CONTENTS TO NASA INDUSTRIAL WASTE SYSTEM FOR 24 HOURS ONLY ON DAYS THAT SVS SYSTEM IS OPERATING. BALANCE FLOW RATE TO MAXIMUM GPM SO THAT TOTAL DAILY DISCHARGE DOES NOT EXCEED VOLUMETRIC LIMIT. VOLUMETRIC LIMIT IS CALCULATED SO TDS LEVEL DOES NOT EXCEED 5000 PPM AFTER MIXING WITH ASSUMED DAILY PROCESS DILUTION FLOW RATE OF 30,000 GAL PER DAY. DO NOT OPEN VALVE WHEN SVS IS NOT OPERATING.
- HEAT EXCHANGER: NO CONTROL REQUIRED.
- NOX SCRUBBER SYSTEM: DESIGN-BUILD CONTROL SYSTEM TO MEET PERFORMANCE, MONITORING AND SAFETY REQUIREMENTS AS SPECIFIED. PROVIDE SENSORS, TRANSMITTERS FOR EACH PARAMETER REQUIRED FOR STABLE CONTROL, AND AN INDICATOR OR READOUT FOR EACH PARAMETER SENSED. PROVIDE LOCAL (AT NOX STATION) MONITORING, CONTROL, AND NOX RECORDING, AND REMOTE MONITORING AND CONTROL FROM BOILER PLANT IN N234A WHEN SELECTED BY LOCAL SWITCH.

CONTROL NOTES

- DESIGN AND INSTALL CONTROL SYSTEM TO PERFORM AND FUNCTION AS REQUIRED BY SEQUENCE OF OPERATION. PROVIDE ALL EQUIPMENT, SENSORS, ACTUATORS, TRANSDUCERS, DEVICES, COMPONENTS, WIRING, CONDUIT, INSTRUMENT AIR, CONNECTIONS AND PROGRAMMING NECESSARY FOR A FULLY FUNCTIONAL SYSTEM.
- CONTROLS: INDUSTRIAL GRADE QUALITY FOR RELIABILITY. CONTROL VALVES AND ALL PIPING DEVICES SHALL CONFORM TO ASME B31.3. SUBMIT CUT SHEETS FOR ALL PROPOSED EQUIPMENT, INCLUDING WIRING DIAGRAMS AND CONTROL DETAILS. ALL CONTROL DEVICES, WIRING AND CONDUIT SHALL BE NEW. SPLICING OF WIRES IS NOT ACCEPTABLE.
- INSTALL ALL WIRING AND CABLES IN CONDUIT PER ELECTRICAL SPECIFICATIONS. MINIMUM CONDUIT SIZE IS 3/4". INSTALL WIRING FOR CLASS 1 CIRCUITS (EQUAL OR >100 VA) AND CLASS 2 CIRCUITS (<100 VA) IN SEPARATE CONDUITS. SEE ELECTRICAL DRAWINGS FOR OTHER RELATED WORK.
- GROUND LOW VOLTAGE ANALOG TSP CABLE SHIELD IN LOCAL PANEL. GROUND LOW VOLTAGE TSP CABLE FOR DIGITAL CONTROLS AT FIELD DEVICE.
- COORDINATE NEW CONTROLS WITH EXISTING FUNCTIONS OF BOILER PLANT CONTROL AND MONITORING SYSTEM.

PIPING DIAGRAM
SCALE: NONE

SHEET NOTES

- SEE SHEET G2 FOR SYMBOLS AND ABBREVIATIONS.
- SEE SHEET M1 FOR MECHANICAL NOTES.
- SEE SCHEDULES ON SHEET M2 FOR EQUIPMENT PERFORMANCE REQUIREMENTS.
- SEE SHEET M4 FOR ENLARGED SITE PLAN SHOWING LOCATION OF NEW EQUIPMENT
- FINAL CHEMICAL USAGE TO BE DETERMINED BY VENDOR.

KEY NOTES

- DESIGN NOX REDUCTION PROCESS SYSTEM TO MEET SYSTEM SPECIFICATION REQUIREMENTS. SEE DESIGN-BUILD NOTES FOR DESIGN REQUIREMENTS. PIPING AND COMPONENTS ILLUSTRATED ON THESE DRAWINGS ARE CONCEPTUAL ONLY. FINAL DESIGN SHALL PROVIDE NUMBER AND SIZES OF GAS COLUMNS, PUMPS, TANKS AND OTHER COMPONENTS AS NECESSARY.
- VENT WASTE TANK TO NOX SYSTEM TO PREVENT FUGITIVE EMISSIONS FROM TANK.
- ROTATE AND RE-USE (E) PIPE ELBOW.
- PADDLE BLIND FOR OPERATIONAL TESTING. INSTALL BETWEEN (E) FLANGE AND (E) PIPE SPACER. TEMPORARILY SUPPORT (E) PIPE TO (E) NOX SPHERE WHILE INSTALLING PADDLE BLIND. SEE SEQUENCING NOTES ON SHEET G1. REPLACE PADDLE BLIND WITH PERMANENT BLIND FLANGE WHEN (E) PIPE TO (E) NOX SPHERE IS DEMOLISHED.
- DEMOLISH (E) 18" SVS PIPE TO (E) SPHERE WITH PIPING AND NOZZLES FOR (E) FIRST STAGE NOX TREATMENT. INSTALL BLIND FLANGE ON SPHERE NOZZLE. SEE SEQUENCING NOTES ON SHEET G1.
- SALVAGED CHEMICAL FEED PUMP FOR (E) CT-1 (HOT WELL) AND (E) CT-2. RECONNECT TO (E) DISTRIBUTION TUBING WITH SECONDARY CONTAINMENT.
- INSTALL REQUIRED SENSORS FOR MEASUREMENT OF NOX LEVELS AND FLOW RATE AT DISCHARGE OF NOX PROCESS SYSTEM.

Approved for Construction
Moffett Field Permit Board

S. Frankel
Chief Building Official
Permit No. 11P002

ZONE	LETTER	DESCRIPTION	DRAWN	DATE	APPRVD
REVISIONS					
DESIGN	J.F.	DATE	12/13/10		
DESIGNED	M. CALLAHAN	DATE	12/13/10		
CHECKED	J. XIANG	DATE	12/13/10		
PROJECTOR	P. WAN	DATE	12/13/10		
REQUESTER	R. OLIVARE	DATE	12/13/10		
R&QA		DATE			
Ames Research Center Moffett Field, California STEAM VACUUM SYSTEM NOx EMISSION REDUCTION SYSTEM MECHANICAL PROCESS PIPING DIAGRAM					
SHEET	D	GADE CODE	25307	334A-1000-M7	REV
SCALE	NONE	INDEX		SHEET	OF

DWG: R:\234A\60101003\001 (K90032) SYS NOx Emission Reduction System\500_CAD\A_Sheet\A334A-1000-M08.dwg Version: 17.1s (LMS Tech) User: jimo
 DATE: Dec 13, 2010 9:34:58 am

SHEET NOTES

- SEE SHEET G2 FOR SYMBOLS AND ABBREVIATIONS.
- SEE SHEET M1 FOR MECHANICAL NOTES.
- FINISH OF ALL PIPE SUPPORTS TO BE GALVANIZED U.O.N.

KEY NOTES

- FINISH TO MATCH EXISTING PIPE SUPPORT.
- FINISH TO MATCH EXISTING SIMILAR PIPE SUPPORTS ON VERTICAL LEG OF 18" PIPE.
- PIPE SUPPORT FOUNDATION LOAD TABLE AS SHOWN BELOW SHALL BE INTEGRATED INTO NOx EMISSION REDUCTION SYSTEM DESIGN-BUILD FOUNDATION:

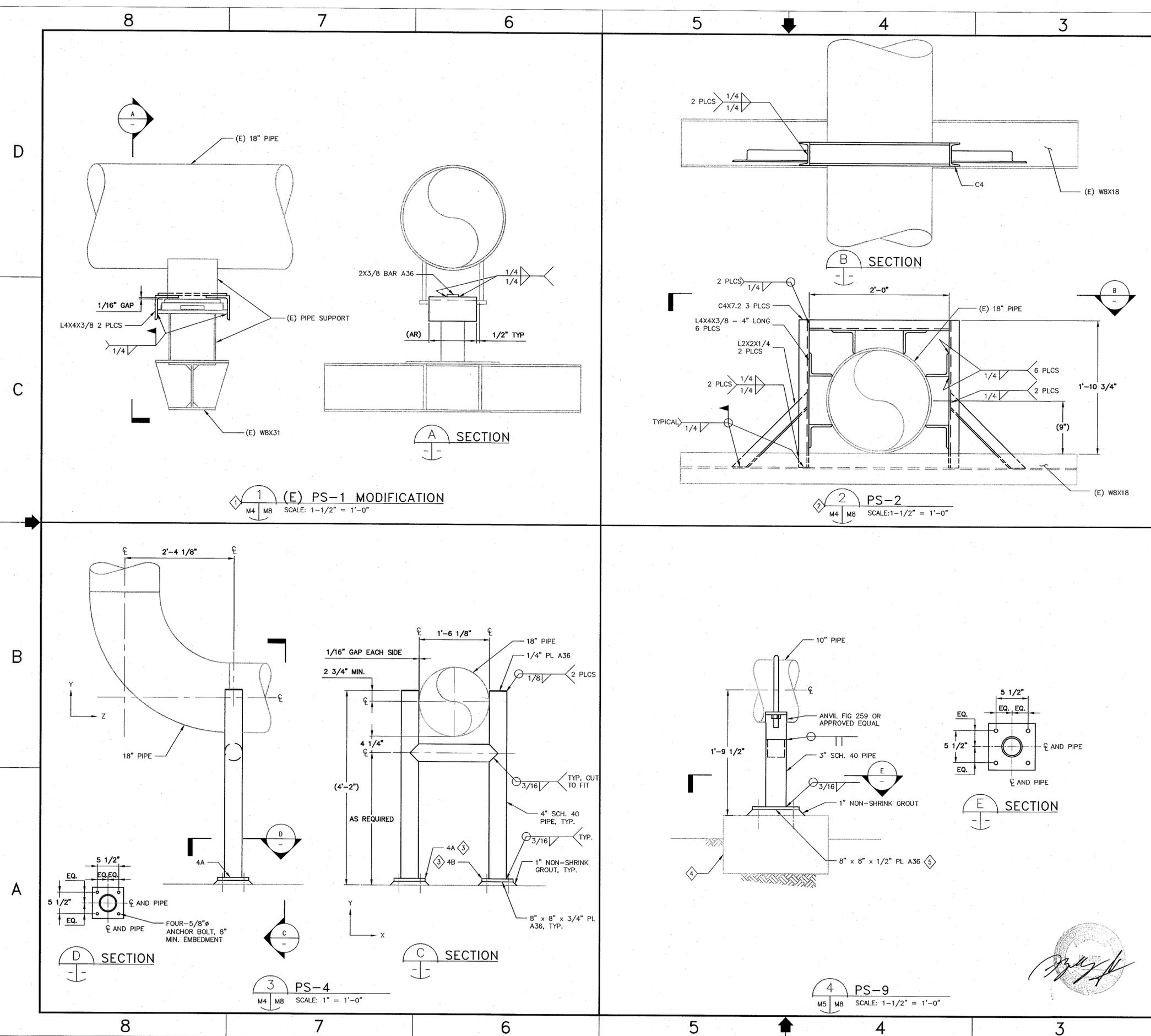
DESIGN-BUILD PIPE SUPPORT FOUNDATION LOAD				
PIPE SUPPORT	LOAD CASE	Fx (LBS)	Fy (LBS)	Fz (LBS)
PS-4A	DL	-2	50	0
	TL	0	2	0
	ELX (1)	-901	4493	0
	ELY (1)	0	-9	0
	ELZ (1)	0	0	-20
	WLZ (1)	-94	457	0
PS-4B	DL	-1	38	0
	TL	0	-2	0
	ELX (1)	-1235	-4493	0
	ELY (1)	0	-9	0
	ELZ (1)	0	0	-20
	WLX (1)	-133	-457	0

NOTE: (1) LOADS ARE REVERSIBLE

- SEE STRUCTURAL DRAWING FOR PIPE SUPPORT FOUNDATION DETAIL.
- SEE STRUCTURAL DRAWING FOR ANCHOR BOLT DETAIL.

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[Signature]
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ZONE	LETTER	DESCRIPTION	DRAWN	DATE	APPRVD
REVISIONS					
DESIGN	J.H.O.	DATE	12/13/10		
DESIGNED	J.VAN CORBACH	DATE	12/13/10		
CHECKED	A.FIROUZ	DATE	12/13/10		
PROJ.MGR	P.WAN	DATE	12/13/10		
REQUESTER	R.OLIVARES	DATE	12/13/10		
R&QA		DATE			
SAFETY		D.FRASER	DATE	12/13/10	
SUPERVISOR		S.FRANKEL	DATE	12/13/10	
SIZE	D	CAGE CODE	25307		
SCALE	NONE	INDEX	A334A-1000-M8		
FILE NAME:	A334A-1000-M08		SHEET	OF	
					12-10-2010



1 (E) PS-1 MODIFICATION
 M4 MB SCALE: 1-1/2" = 1'-0"

2 PS-2
 M4 MB SCALE: 1-1/2" = 1'-0"

3 PS-4
 M4 MB SCALE: 1" = 1'-0"

4 PS-9
 M5 MB SCALE: 1-1/2" = 1'-0"

60101003

DWG: R:\234A\60101003\0001 (K90032) SVS NOx Emission Reduction System\500_CAD\M\Sheet\A334A-M9-1000-M09.dwg User: jfho
 Version: 17.1s (LMS Tech)
 DATE: Dec 13, 2010 9:35:13 am

SHEET NOTES

- SEE SHEET G2 FOR SYMBOLS AND ABBREVIATIONS.
- SEE SHEET M1 FOR MECHANICAL NOTES.
- FINISH OF ALL PIPE SUPPORTS TO BE GALVANIZED U.O.N.
- ALL SUPPORT WELDS TO PIPE AND ASME WELDS TO BE INSPECTED PER ASME REQUIREMENTS. INSPECTIONS OF PIPE TO SUPPORT WELD ARE TO BE PERFORMED PRIOR TO PIPE HYDROSTATIC TEST.

KEY NOTES

1 PIPE SUPPORT FOUNDATION LOAD TABLE AS SHOWN BELOW SHALL BE INTEGRATED INTO NOX EMISSION REDUCTION SYSTEM DESIGN-BUILD FOUNDATION:

DESIGN-BUILD PIPE SUPPORT FOUNDATION LOAD				
PIPE SUPPORT	LOAD CASE	Fx (LBS)	Fy (LBS)	Fz (LBS)
PS-3A	DL	-155	1797	2
	TL	1	-13	0
	ELX (1)	-1924	19199	-93
	ELY (1)	-88	998	0
	ELZ (1)	51	-432	51
PS-3B	WLX (1)	-254	2359	-15
	WLZ (1)	36	-306	36
	DL	150	1746	2
PS-3C	TL	-3	-33	0
	ELX (1)	-2002	-19210	101
	ELY (1)	88	997	0
	ELZ (1)	-51	-432	51
	WLX (1)	-266	-2331	15
PS-3D	WLZ (1)	-36	-306	36
	DL	0	61	-5
	TL	0	0	0
	ELX (1)	-133	11	-9
	ELY (1)	0	-13	1
PS-3E	ELZ (1)	0	865	-479
	WLX (1)	-36	0	0
	WLZ (1)	0	612	-339

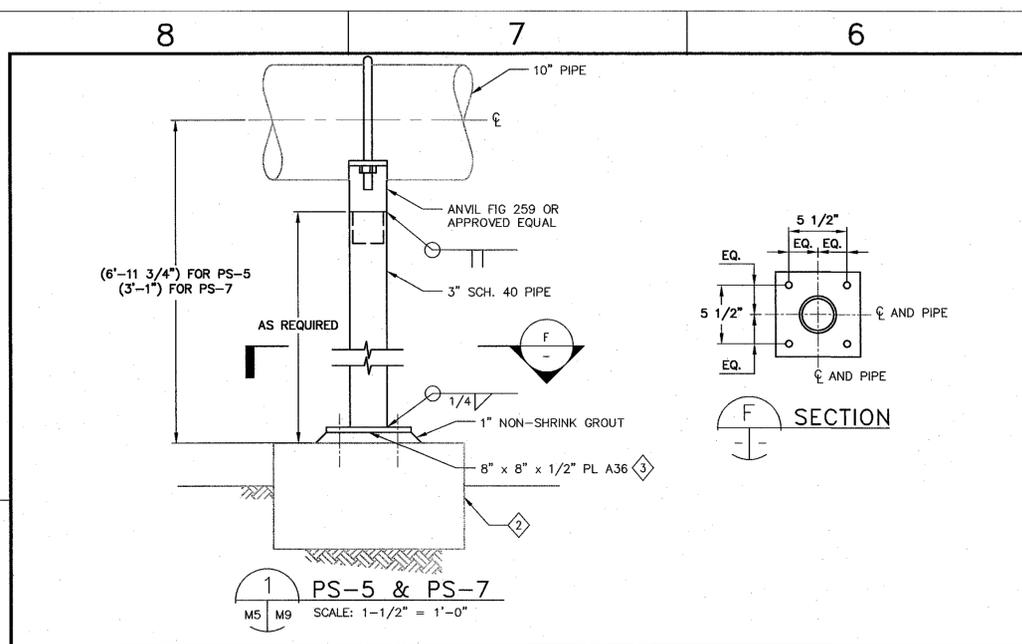
NOTE: (1) LOADS ARE REVERSIBLE

- 2 SEE STRUCTURAL DRAWING FOR PIPE SUPPORT FOUNDATION DETAIL.
- 3 SEE STRUCTURAL DRAWING FOR ANCHOR BOLT DETAILS.

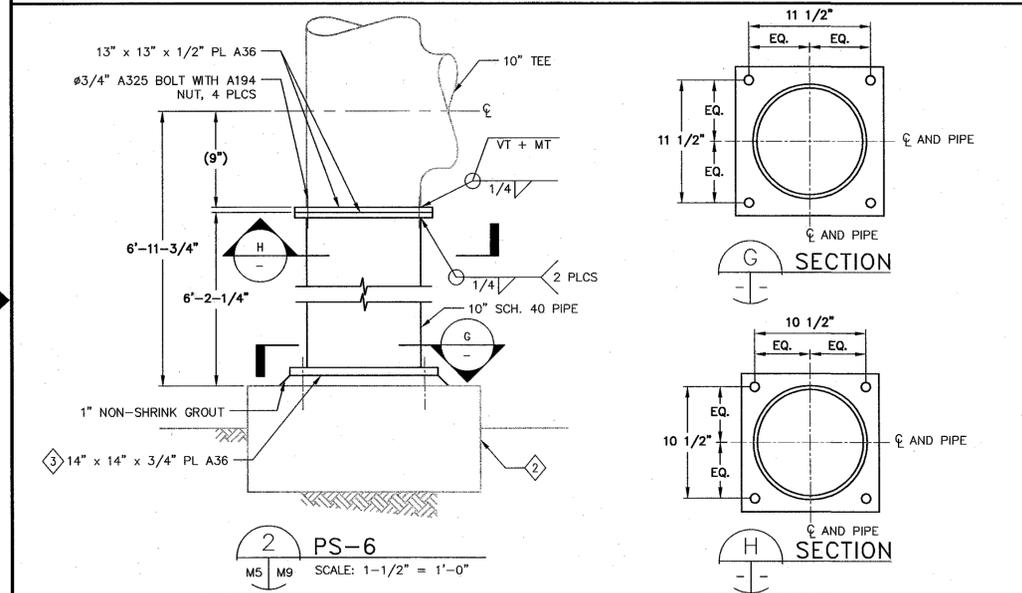
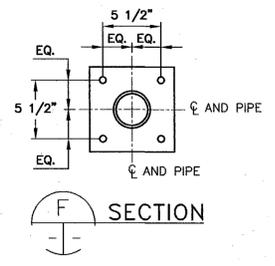
Approved for Construction
 Moffett Field Permit Board
 Chief Building Official
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ZONE	LETTER	DESCRIPTION	DRAWN	DATE	APPRVD
REVISIONS					

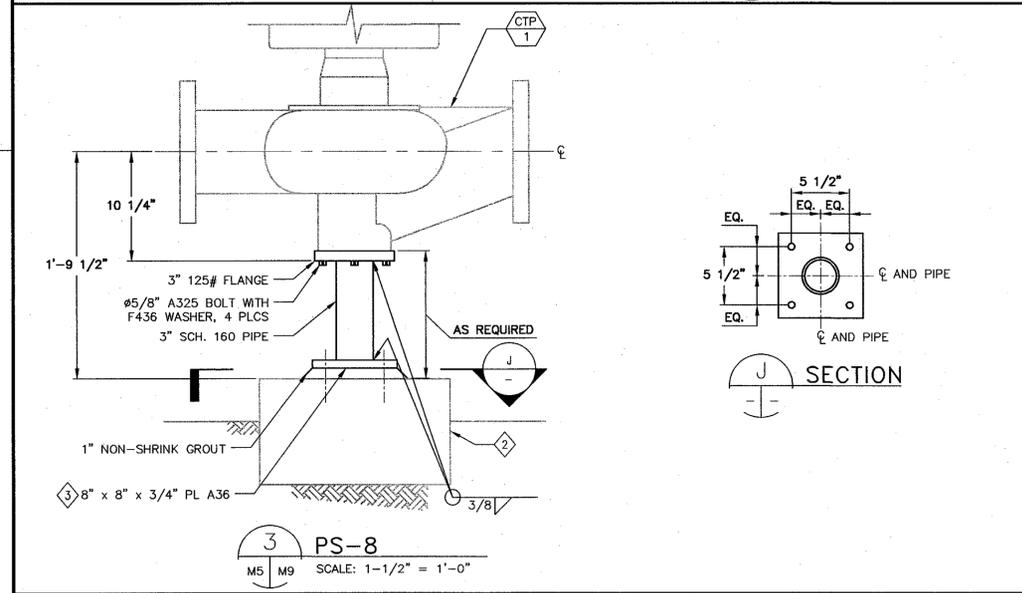
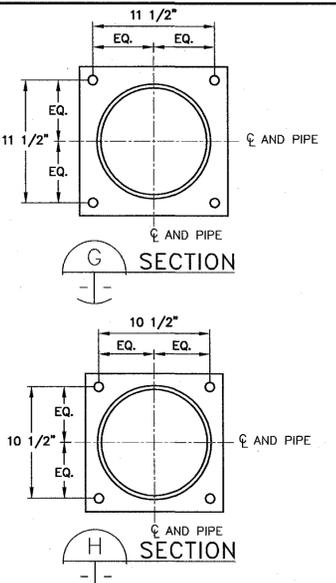
DRAWN: J.FIG DESIGNED: J.VAN CORBACH CHECKED: A.FIROUZ PROJECT: P.WAN REQUESTER: R.OLIVARES R&GA:	DATE: 12/13/10 DATE: 12/13/10 DATE: 12/13/10 DATE: 12/13/10 DATE: 12/13/10	 Ames Research Center Moffett Field, California STEAM VACUUM SYSTEM NOx EMISSION REDUCTION SYSTEM MECHANICAL PIPE SUPPORT DETAILS	DATE: 12/13/10 DATE: 12/13/10 DATE: 12/13/10	SIZE: D CAGE CODE: 25307 SCALE: NONE	FILE NAME: A334A-1000-M09 SHEET: 1 OF 1 DATE: 12-10-2010
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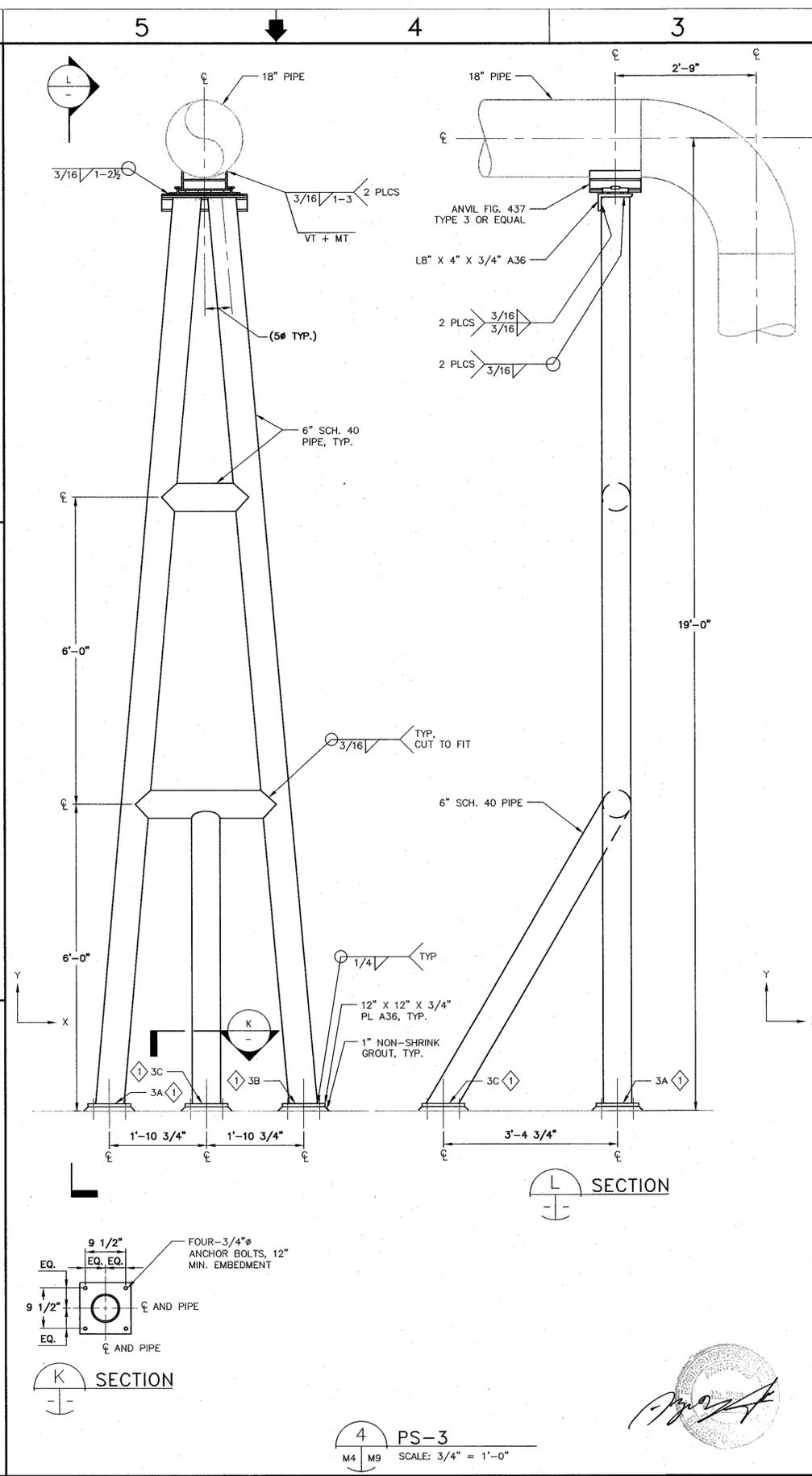
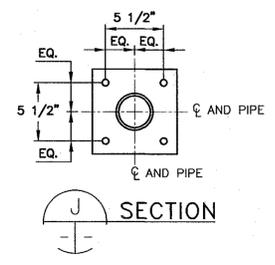
1 PS-5 & PS-7
 M5 M9 SCALE: 1-1/2" = 1'-0"



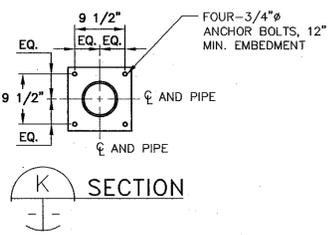
2 PS-6
 M5 M9 SCALE: 1-1/2" = 1'-0"



3 PS-8
 M5 M9 SCALE: 1-1/2" = 1'-0"



4 PS-3
 M4 M9 SCALE: 3/4" = 1'-0"



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ELECTRICAL NOTES

- THE COMPLETE ELECTRICAL INSTALLATION SHALL BE IN ACCORDANCE WITH THE CALIFORNIA ELECTRICAL CODE, 2007 AND NATIONAL ELECTRICAL SAFETY CODE (LATEST EDITION).
- CONDUCTOR SIZES ARE AWG & KCMIL, U.O.N.
- ALL ELECTRICAL ITEMS SHALL BE NEW U.O.N.
- DARK OR HEAVY LINES INDICATE NEW WORK. LIGHT LINES DENOTE EXISTING CONDITIONS.
- EXISTING CONDITIONS: THESE DRAWINGS SHOW EXISTING EQUIPMENT, MATERIAL, WIRING, ETC. BASED UPON THE BEST AVAILABLE INFORMATION. CONTRACTOR SHALL CONFIRM EXISTING CONDITIONS, WIRING, LOCATION OF EQUIPMENT, DIMENSIONS, ETC PRIOR TO STARTING ANY WORK OR ORDERING ANY MATERIAL. CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING EXISTING UNDERGROUND UTILITIES, CORRECTING DISCREPANCIES AND PROVIDING A COMPLETE PROPER OPERATING SYSTEM.
- WHEN USED IN THESE DRAWINGS AND THE ACCOMPANYING SPECIFICATIONS THE FOLLOWING DEFINITIONS APPLY:
 FURNISH: CONTRACTOR TO SUPPLY AND DELIVER COMPLETE.
 INSTALL: CONTRACTOR TO PLACE, SECURE AND CONNECT AND TEST AS REQUIRED TO MAKE FULLY OPERATIONAL.
 PROVIDE: CONTRACTOR TO FURNISH AND INSTALL AS DEFINED ABOVE.
- EXISTING EQUIPMENT AND/OR ELECTRICAL WIRING WHICH IS TO REMAIN, BUT HAS TO BE REMOVED TO FACILITATE THE INSTALLATION OF THE NEW EQUIPMENT SHALL BE RESTORED TO ITS ORIGINAL OPERATING CONDITION.
- ELECTRICAL EQUIPMENT AND RACEWAYS SHALL BE SUPPORTED AND ANCHORED IN ACCORDANCE WITH CALIFORNIA BUILDING CODE SEISMIC REQUIREMENTS.
- EXISTING CONDUITORS REMOVED FROM SERVICE SHALL NOT BE USED IN NEW WORK UNDER THIS CONTRACT, UNLESS OTHERWISE NOTED.
- PROVIDE ENGRAVED NAMEPLATES ON ALL NEW AND AFFECTED EXISTING EQUIPMENT AND DEVICES INCLUDING PULL BOXES. NAMEPLATES SHALL BE SCREWED ON PHENOLIC TYPE WITH WHITE LETTERS ON BLACK BACKGROUND. THE NAMEPLATE SHALL BE OF APPROPRIATE SIZE WITH LETTER HEIGHTS PER SPECIFICATIONS, AND SUBJECT TO APPROVAL BY THE CONTRACTING OFFICER.
- ALL POWER SHUTDOWN SHALL BE SCHEDULED ON WEEKENDS OR HOLIDAYS OR WITH PRIOR WRITTEN APPROVAL BY THE CONTRACTING OFFICER.
- THE CONTRACTOR SHALL SUBMIT A UTILITY OUTAGE REQUEST AND EXPECTED LENGTH OF THE POWER INTERRUPTION TO THE CONTRACTING OFFICER FOR APPROVAL IN NO LESS THAN TWENTY ONE (21) CALENDAR DAYS PRIOR TO A REQUIRED UTILITY OUTAGE (ELECTRICAL, TELEPHONE). NO OUTAGE SHALL BE ACCOMPLISHED PRIOR TO THE RECEIPT OF APPROVAL. NASA SHALL PERFORM ALL SWITCHING 6900V AND ABOVE. THE CONTRACTOR SHALL PERFORM ALL SWITCHING BELOW 6900V. THE CONTRACTOR/NASA-AMES SHALL LOCK OUT AND RED TAG THE APPROPRIATE CIRCUIT BREAKER, SWITCH, ETC. THE RED TAG SHALL LIST THE CIRCUIT, THE TIME OF OUTAGE, THE INDIVIDUAL AND FIRM EFFECTING THE OUTAGE, THE EXPECTED TIME THE OUTAGE WILL BE TERMINATED, AND PHONE NUMBER TO CONTACT REGARDING THE OUTAGE. THE TAG SHALL ALSO WARN PEOPLE NOT TO RE-ENERGIZE THE CIRCUIT SYSTEM BECAUSE THE POTENTIAL DANGER TO PERSONNEL/EQUIPMENT. TIMES FOR THESE SHUTDOWNS ARE FROM 6:00 AM, SATURDAY MORNING TO 5:00 PM, SUNDAY AFTERNOON; AND FROM 6:00 AM TO 5:00 PM ON HOLIDAYS.
- POWER DISRUPTION OVER 48 HOURS MAY CAUSE THE LOSE OF THE FIRE ALARM SYSTEM SERVICE. CONTRACTOR SHALL NOTIFY THE FIRE DEPARTMENT OF THE LOSS OF ALARMS IF THIS OCCURS.
- CONTRACTOR SHALL STRICTLY FOLLOW ALL STANDARD SAFETY PRACTICES, PRECAUTIONS, AND REQUIREMENTS OF NASA-AMES RESEARCH CENTER FOR ALL WORK INSIDE AN ENCLOSED AND ENERGIZED 115KV SUBSTATION. REFER TO AMES HEALTH & SAFETY MANUAL APR 1700.1.
- ALL WIRES SHALL BE TAGGED FOR IDENTIFICATION BEFORE DISCONNECTION.
- REPLACEMENT OF OTHER UNDERGROUND MEDIUM VOLTAGE DISTRIBUTION LINES, MANHOLES AND VAULTS, BY ANOTHER CONTRACTOR, MAY BE SCHEDULED DURING THE CONSTRUCTION PERIOD OF THIS CONTRACT. ALL WORK IN THIS CONTRACT SHALL BE COORDINATED WITH THE CONTRACTING OFFICER TO AVOID CONFLICT OF ACTIVITIES WITH OTHER CONTRACTS IN PROGRESS.
- REPAIR DAMAGES TO GALVANIZED STEEL MEMBERS USING ASTM A780 ZINC RICH PAINT. PAINT ALL NEW HOLES DRILLED ON EXISTING GALVANIZED STEEL MEMBERS. DO NOT HEAT SURFACES TO WHICH REPAIR PAINT HAS BEEN APPLIED.
- FIRE PROOFING TAPE SHALL BE WRAPPED AROUND EACH CABLE BEING WORKED ON IN THE MANHOLE, STARTING AND FINISHING OF FIRE PROOFING SHALL BE DONE WITH APPROVED FIBERGLASS TAPE.
- ALL CABLES SHALL BE SUPPORTED PROPERLY AND ROUTED NEATLY ALONG THE MANHOLE WALL. ALL NEW SPARE CONDUITS SHALL BE PROVIDED WITH A 1/4" NYLON PULL WIRE PRIOR TO CAPPING. PROVIDE IDENTIFICATION LABELS AND TAG SPARE CONDUITS INDICATING ORIGIN AND DESTINATION AT BOTH ENDS.
- NEW CONDUITS SHALL BE SEALED AND FIRE PROOFED AT ENTRIES TO MANHOLES/VAULTS.
- ALL MV FEEDER CABLES SHALL HAVE PHASE IDENTIFICATION AND FEEDER TAGS IN MANHOLES.
- CABLE AND WIRE USED SHALL MEET THE FOLLOWING:
 FOR SIZES #1 AND SMALLER CABLES SHALL BE RATED FOR 60°C, MINIMUM.
 FOR SIZES #1/0 AND LARGER CABLES SHALL BE RATED FOR 75°C, MINIMUM.
- ALL PENETRATIONS THROUGH FIRE RATED WALLS SHALL BE TOTALLY SEALED TO PREVENT THE SPREAD OF SMOKE, FIRE, TOXIC GASES, AND WATER THROUGH THE PENETRATION BEFORE, DURING AND AFTER A FIRE CONDITION. THE FIRE RATING OF THE SEALED PENETRATION SHALL BE AT LEAST THAT OF THE WALL INTO WHICH IT IS INSTALLED. THE SEAL SHALL PERMIT THE VIBRATION, EXPANSION AND/OR CONTRACTION OF THE CONDUIT PASSING THROUGH THE PENETRATION WITHOUT THE SEAL CRACKING OR CRUMBLING. CONFORM TO CEC, 2007.
- PRIOR TO START OF WORK, CONTRACTOR SHALL SUBMIT A COMPREHENSIVE SAFETY PROGRAM TO THE CONTRACTING OFFICER FOR APPROVAL BY THE NASA SAFETY OFFICE. ALL SAFETY ITEMS WILL BE DISCUSSED AT THE PRE-CONSTRUCTION MEETING.
- PROVIDE FIELD MARKINGS OF PROPER WARNING LABELS FOR ARC FLASH AND SHOCK HAZARD PROTECTION ON ALL SWITCHBOARDS, PANELBOARDS, INDUSTRIAL CONTROL PANELS AND MOTOR CONTROL CENTERS IN ACCORDANCE WITH CEC. WARNING LABELS SHALL CONFORM TO APPLICABLE PROVISIONS OF NFPA 70E AND ANSI Z535.4, AND SUBJECT TO APPROVAL BY THE CONTRACTING OFFICER.
- PRIOR TO ENERGIZATION OF EQUIPMENT OR CIRCUITS, THE CONTRACTOR SHALL DEVELOP A TEST PROCEDURE AND SUBMIT IT TO THE CONTRACTING OFFICER FOR REVIEW AND APPROVAL. THE CONTRACTOR SHALL PERFORM A COMPLETE FUNCTIONAL TEST TO DEMONSTRATE TO THE CONTRACTING OFFICER THAT THE NEW INSTALLATION IS OPERATING AS INTENDED. ANY DEFECTS OR DEFICIENCIES IN THE MATERIALS OR INSTALLATION WORK SHALL BE CORRECTED IMMEDIATELY BY AND AT THE CONTRACTOR'S EXPENSE.

ELECTRICAL NOTES

- PROVIDE GROUND FAULT PROTECTION EQUIPMENT FOR EACH SERVICE, FEEDER AND BRANCH CIRCUIT BREAKER OR DISCONNECT RATED 1000A OR MORE ON SOLIDLY GROUNDED SYSTEM OF MORE THAN 150V TO GROUND (AT 480Y/277V) IN ACCORDANCE WITH CEC.
- ALL PERSONNEL WORKING IN MANHOLES (MH) SHALL BE CERTIFIED IN ACCORDANCE WITH OSHA CONFINED SPACE REGULATION 29 CFR 1910.146 AND CAL OSHA CONFINED SPACE REGULATIONS CCR5156,5157,5158 AND 5159.
- CERTIFICATION OF THE QUALIFICATIONS OF THE MEDIUM VOLTAGE (MV) CABLE SPLICER/TERMINATOR SHALL BE SUBMITTED TO THE CONTRACTING OFFICER. THE CERTIFICATION SHALL INCLUDE THE TRAINING AND EXPERIENCE OF THE INDIVIDUAL. THE CERTIFICATION SHALL INDICATE THAT THE INDIVIDUAL HAS HAD THREE OR MORE YEARS OF EXPERIENCE SPLICING AND TERMINATING MEDIUM VOLTAGE CABLES. ONCE A MV TERMINATION OR SPLICE HAS BEEN STARTED BY A WORKER, THE SAME PERSON SHALL COMPLETE THAT PARTICULAR SPLICE. EACH MV TERMINATION AND SPLICE SHALL BE STARTED AND COMPLETED IN ONE CONTINUOUS WORK PERIOD.
- CONTRACTOR SHALL USE EXTREME CAUTION AND TAKE ALL NECESSARY SAFETY PRECAUTIONS WHEN WORKING IN THE MANHOLES. MULTIPLE SYSTEM VOLTAGES MAY EXIST IN THE MANHOLES AND CAN BE ANY COMBINATION OF THE FOLLOWING:
 13.8KV
 12KV
 6.9KV
 480V
 208Y/120V
 480Y/277V
 COMM CIRCUITS
- THE CONTRACTOR SHALL PROVIDE CABLE RACK CHANNELS, ARMS AND INSULATORS TO SUPPORT NEW CABLES, SPLICES, AND DEADBREAK JUNCTIONS IF NECESSARY.
- ALL NEW CONDUITS AND CONDUIT DUCT BANKS SHALL BE SLOPED DOWN IN THE DIRECTION OF THE EXISTING MANHOLES.

ELECTRICAL ABBREVIATIONS

A	AMPERE
AC	AIR CONDITIONER
AF	AMPERE FRAME OR FUSE RATING
AFF	ABOVE FINISHED FLOOR
ARF	ABOVE RAISED FLOOR
AWG	AMERICAN WIRE GAUGE
C	CONDUIT
CB	CIRCUIT BREAKER
CKT, CKTS	CIRCUIT/S
CLG.	CEILING
CO	CONDUIT ONLY
CORR	CORRIDOR
COTR	CONTRACTING OFFICER TECHNICAL REPRESENTATIVE
DE	DIESEL ENGINE
DET	DETAIL
DWG	DRAWING
(ER)	EXISTING TO BE RELOCATED
ELEC	ELECTRIC(AL)
EMT	ELECTRICAL METALLIC TUBING
FACP	FIRE ALARM CONTROL PANEL
FDS	FUSED DISCONNECT SWITCH
FMC	FLEXIBLE METAL CONDUIT
G; GND	GROUND(ED)
GFE	GOVERNMENT FURNISHED EQUIPMENT
GFI	GROUND FAULT INTERRUPTER
GSE	GROUND SUPPORT EQUIPMENT
HP	HORSE POWER
KMIL	THOUSAND CIRCULAR MILS
KVA	KILOVOLT AMPERE
JB	JUNCTION BOX
MCCB	MOLDED CASE CIRCUIT BREAKER
N	NEW
NEC	NATIONAL ELECTRICAL CODE
NEMA	NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION
NIC	NOT IN CONTRACT
NTS	NOT TO SCALE
P	POLE
PB	PULLBOX
PBS	PUSHBUTTON STATION
PCB	POLY CHLORINATED BIPHENYL
PH	PHASE
PNL	PANEL
(R)	RELOCATED
RECP	RECEPTACLE
RGS	RIGID GALVANIZED STEEL
RM	ROOM
RMC	RIGID METAL CONDUIT
SPEC	SPECIFICATIONS
TEL	TELEPHONE
TYP	TYPICAL
UON	UNLESS OTHERWISE NOTED
UPS	UNINTERRUPTIBLE POWER SUPPLY
V	VOLT
W	WIRE
W/	WITH
W/O	WITHOUT
XFMR	TRANSFORMER
ZAM	ZONE ADDRESSABLE INTERFACE MODULE

ELECTRICAL SYMBOLS

	DRAWOUT CIRCUIT BREAKER
	MOLDED CASE CIRCUIT BREAKER
	REACTOR
	MOTOR
	MOTOR 3 PHASE, HORSE POWER AS INDICATED
	WALL MOUNTED EXTERIOR LIGHTING FIXTURE
	DISCONNECT SWITCH, NON FUSED
	MOTOR STARTER
	VARIABLE FREQUENCY DRIVE
	CONDUIT TURNED UP
	CONDUIT TURNED DOWN
	JUNCTION BOX
	PULLBOX
	DUPLEX RECEPTACLE, WALL MOUNTED 125V, 20A, NEMA 5-20R, W/GROUND FAULT PROTECTION

Approved for Construction
 Moffett Field Permit Board

 Chief Building Official
 Permit No. 11P002

ZONE	LETTER	DESCRIPTION	DRAWN	DATE	APPRVD
REVISIONS					

DRAWN N. NIZAMOVA DESIGNED N. NIZAMOVA CHECKED J. MCCUSKER PROJ.MGR P. WAN REQUESTED E. OLIVASER R&QA	DATE 12-9-10 DATE 12-9-10 DATE 12-9-10 DATE 12/13/10 DATE 12/13/10 DATE 12/13/10	 Ames Research Center Moffett Field, California STEAM VACUUM SYSTEM NOx EMISSION REDUCTION SYSTEM GENERAL	ELECTRICAL NOTES, SYMBOLS & ABBREVIATIONS
SAFETY SUPERVISOR S. FRANKEL	DATE 12-13-10	SIZE D	CAGE CODE 25307
SCALE NONE		INDEX 334A-1000-E1	SHEET OF



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SHEET NOTES

- CONTRACTOR SHALL FIELD VERIFY ALL MEASUREMENTS AT THE SITE AND SHALL BE RESPONSIBLE FOR THEIR ACCURACY PRIOR TO STARTING ANY WORK OR ORDERING ANY MATERIAL.
- ELECTRICAL EQUIPMENT AND FEEDERS SHALL BE SUPPORTED AND ANCHORED IN ACCORDANCE WITH CALIFORNIA BUILDING CODE SEISMIC REQUIREMENTS.
- CONTRACTOR SHALL BE RESPONSIBLE FOR HAVING VISITED THE SITE AND SATISFIED HIMSELF AS TO THE CONDITIONS UNDER WHICH THE WORK WILL BE PERFORMED. THE CONTRACTOR SHALL CHECK ALL EXISTING CONDITIONS WHICH MAY AFFECT HIS WORK. NO ALLOWANCE WILL BE MADE FOR ANY EXTRA EXPENSE WHICH MAY BE INCURRED DUE TO NEGLIGENCE OR FAILURE TO EXAMINE THE SITE, EXISTING CONDITIONS, UTILITIES, ETC. THE SITE VISIT SHALL BE DURING THE BID WALK AND/OR PREARRANGED WITH THE CONTRACTING OFFICER.
- MANUFACTURER'S RECOMMENDATIONS FOR CONDUCTOR SIZING, CIRCUIT BREAKER OR FUSE RATING OF ELECTRICALLY OPERATED EQUIPMENT MAY DIFFER FROM THOSE INDICATED ON DRAWINGS. CONTRACTOR SHALL CONFIRM RATINGS PRIOR TO ORDERING EQUIPMENT.
- THE COMPLETE ELECTRICAL INSTALLATION SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE CALIFORNIA ELECTRICAL CODE (CEC) AND PROJECT SPECIFICATIONS.
- LABEL EACH RECEPTACLE OR ELECTRICAL EQUIPMENT WITH PANEL AND CIRCUIT NUMBER SIMILAR TO OTHERS IN THE AREA.
- UPDATE (E) PANEL DIRECTORIES WHEREVER CIRCUIT CHANGES ARE MADE.
- SEE MECHANICAL DRAWINGS FOR EXACT LOCATION AND SCHEDULE OF MECHANICAL EQUIPMENT.

KEY NOTES

- CONDUIT ROUTING SHOWN DIAGRAMMATICAL. VERIFY EXACT CONDUIT ROUTING IN FIELD. REFER TO FEEDER SCHEDULE ON SHEETS E4 & E6 FOR FEEDER SIZES.
- PROVIDE PULL BOX AS SHOWN ON THE DRAWING SIZED PER CEC.
- (E) MCC-N231 IS FED FROM MCC-4 LOCATED IN N229A.
- PROVIDE WALL MOUNTED LIGHTING FIXTURE LITHONIA CAT # TWAC 42TRT-120-CR-PE-LPI OR APPROVED EQUAL. PROVIDE ALL NECESSARY HARDWARE FOR A COMPLETE WORKING SYSTEM.
- DISCONNECT AND REMOVE (E) 2P 30A CIRCUIT BREAKER # 6. PROVIDE (1)-1P, 30A CIRCUIT BREAKER FOR CHEMICAL SHED LOAD AND (1)-1P, 20A CIRCUIT BREAKER FOR COOLING TOWER RECEPTACLES. LABEL CIRCUIT BREAKERS AS '#6A CHEMICAL SHED' AND '#6B COOLING TOWER RECEPTACLES'.
- DISCONNECT AND REMOVE (E) 3P 30A CIRCUIT BREAKER # 22. PROVIDE 1P, 20A CIRCUIT BREAKER FOR COOLING TOWER FLOOD LIGHTS. LABEL CIRCUIT BREAKER AS 'COOLING TOWER FLOOD LIGHTS'.
- PROVIDE NEW PLATFORM LIGHTING FIXTURE WITH APPROPRIATE MOUNTING POLE. CONTRACTOR TO PROVIDE ALL NECESSARY HARDWARE FOR A COMPLETE WORKING SYSTEM. LITHONIA CAT # TWAC 42TRT-120-CR-PE-LPI OR APPROVED EQUAL.
- PROVIDE 5-20R WEATHERPROOF NEMA 3R RECEPTACLE WITH 'IN-USE' COVER. LOCATE RECEPTACLE WITHIN 25' OF THE EQUIPMENT.
- PROVIDE VFD IN ACCORDANCE WITH SPECIFICATION SECTION 26 29 23. SEE DRAWING E6 FOR CONDUIT AND WIRE SIZE.
- DOLPHIN G3080-PVC ASSEMBLY. SEE MECHANICAL DRAWINGS FOR DETAILS. SEE DRAWING E6 FOR CONDUIT AND WIRE SIZE.
- TERMINATE AND LABEL WIRES FOR CP-1 INSIDE PULL BOX FOR FUTURE CONNECTION.
- TERMINATE AND LABEL ALL WIRES FOR CHEMICAL SHED, PUMPS CP-2, CP-3, CP-4 AND DRAFT FAN DF-1 INSIDE THE PULL BOX FOR FUTURE CONNECTION.
- (E) PULL BOX TO BE DEMOLISHED.
- (E) ELECTRICAL CONDUIT SHALL BE PARTIALLY DEMOLISHED. SEE DRAWING D3 FOR DETAILS.
- CONTRACTOR SHALL TAKE EXTREME CARE AND SHALL TAKE NECESSARY SAFETY PRECAUTIONS WHILE WORKING IN THIS AREA. (E) DUCT BANK WITH 2.4KV CABLES LOCATED BELOW THE GROUND.

Approved for Construction
Moffett Field Permit Board

J. Frankel
Chief Building Official
Permit No. 11P002

ZONE	LETTER	DESCRIPTION	DRAWN	DATE	APPRVD
REVISIONS					

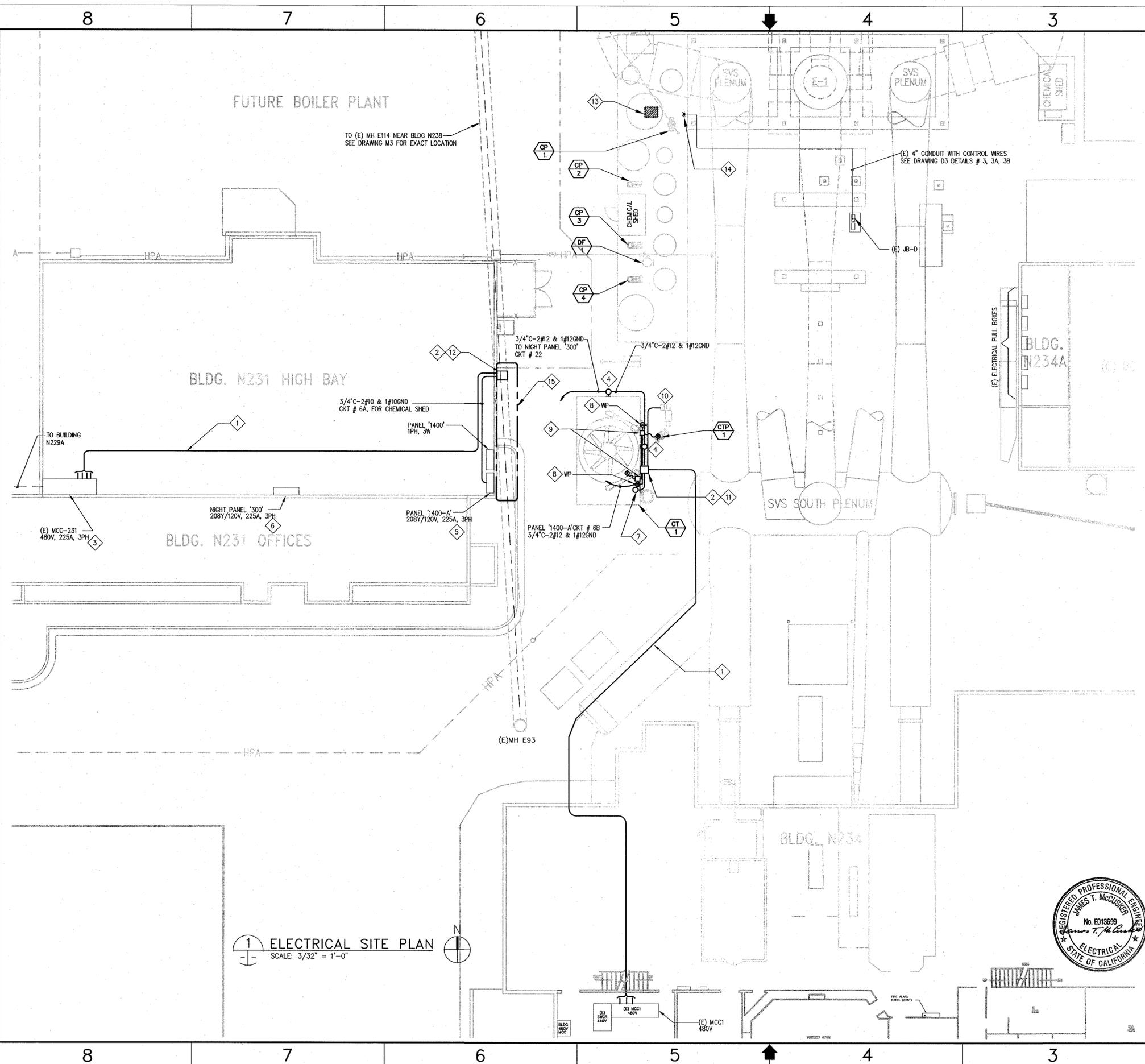
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DESIGNED	N. NIZAMOVA	DATE	12-9-10
CHECKED	J. McCusker	DATE	12-9-10
PROJ MGR	P. WAI	DATE	12/13/10
REQUESTED	R. OLIVARES	DATE	12/13/10
R&QA		DATE	
SAFETY		DATE	
SUPERVISOR	S. FRANKEL	DATE	12/13/10

Ames Research Center
Moffett Field, California
STEAM VACUUM SYSTEM NOx EMISSION REDUCTION SYSTEM
GENERAL

**ELECTRICAL SITE PLAN
EXISTING/DEMO AND NEW WORK**

SIZE	D	CAGE CODE	25307	REV	
SCALE	NONE	INDEX		SHEET	OF

FILE NAME:
A334A-1000-E2 12-10-2010



ELECTRICAL SITE PLAN
SCALE: 3/32" = 1'-0"



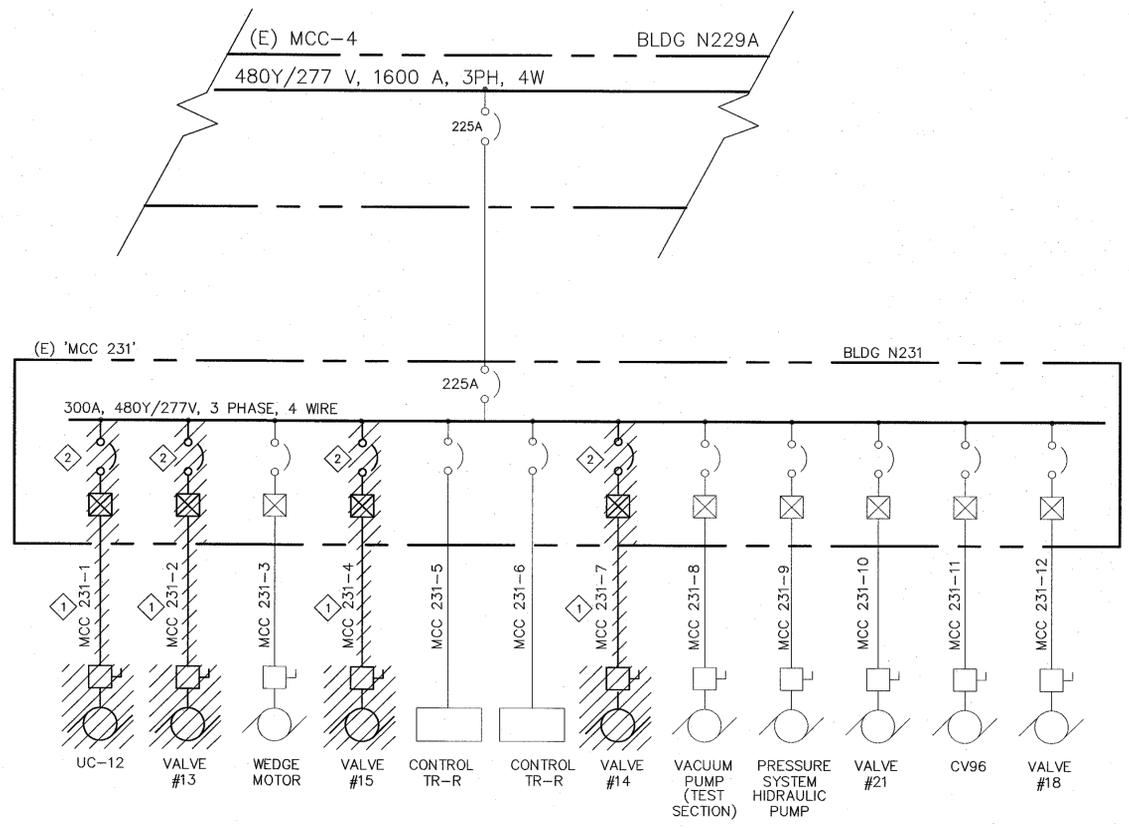
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SHEET NOTES

- SEE DRAWING E1 FOR GENERAL ELECTRICAL NOTES, SYMBOLS AND ABBREVIATIONS.
- LIGHT LINES INDICATE EXISTING ELECTRICAL CONDITIONS AND BACKGROUND WORK BY OTHER DISCIPLINES, DARK LINES INDICATE NEW ELECTRICAL WORK, UON.
- HATCH LINES INDICATE (E) ELECTRICAL ITEMS TO BE DISCONNECTED AND REMOVED, U.O.N.
- REFER TO MECHANICAL DRAWINGS FOR ACTUAL LOCATION, RATING AND SCHEDULE OF MECHANICAL EQUIPMENT.

KEY NOTES

- DISCONNECT AND REMOVE (E) POWER AND CONTROL CIRCUITS CONDUIT/WIRING FROM (E) EQUIPMENT, CONNECTED TO THE SOURCE 'MCC 231'.
- REMOVE (E) CIRCUIT BREAKERS & STARTERS AS SHOWN.



1 'MCC 231' SINGLE LINE DIAGRAM-EXISTING/DEMOLITION
SCALE: N.T.S.

FEEDER NUMBER	EQUIPMENT ID	MOTOR HP	CIRCUIT BREAKER	STARTER SIZE	CONDUIT SIZE	CONDUCTOR # & SIZE	DISCONNECT AT MOTOR	CONTROLS AT MCC 231	CONTROL AT MOTOR	POINT OF CONNECTION
MCC 231-1	UC-12							H-O-A & PILOT LIGHT		
MCC 231-2	VALVE #13							H-O-A & PILOT LIGHT		
MCC 231-3	WEDGE MOTOR							H-O-A & PILOT LIGHT		
MCC 231-4	VALVE #15							H-O-A & PILOT LIGHT		
MCC 231-5	CONTROL TR-R							H-O-A & PILOT LIGHT		
MCC 231-6	CONTROL TR-R							H-O-A & PILOT LIGHT		
MCC 231-7	VALVE #14							H-O-A & PILOT LIGHT		
MCC 231-8	VACUUM PUMP (TEST SECTION)							H-O-A & PILOT LIGHT		
MCC 231-9	PRESSURE SYSTEM HYDRAULIC PUMP							H-O-A & PILOT LIGHT		
MCC 231-10	VALVE #21							H-O-A & PILOT LIGHT		
MCC 231-11	CV96							H-O-A & PILOT LIGHT		
MCC 231-12	VALVE #18							H-O-A & PILOT LIGHT		

2 'MCC 231' FEEDER SCHEDULE-EXISTING/DEMOLITION
SCALE: N.T.S.

Approved for Construction
Moffett Field Permit Board

S. Frankel
Chief Building Official
Permit No. 11P002

ZONE	LETTER	DESCRIPTION	DRAWN	DATE	APPRVD
REVISIONS					

DRAWN N. NIZAMOVA	DATE 12-9-10
DESIGNED N. NIZAMOVA	DATE 12-9-10
CHECKED J.M. CUSKER	DATE 12-9-10
PROJ MGR P. WAN	DATE 12-13-10
REQUESTER R. OLIVARES	DATE 12-13-10
R&QA	DATE
SAFETY	DATE
SUPERVISOR S. FRANKEL	DATE 12-10-10

Ames Research Center
Moffett Field, California

STEAM VACUUM SYSTEM NOx EMISSION REDUCTION SYSTEM
ELECTRICAL

'MCC 231' SINGLE LINE DIAGRAM
EXISTING/DEMOLITION

SIZE D	CAGE CODE 25307	FILE NAME A334A-1000-E3	REV 1
SCALE AS NOTED	INDEX	SHEET OF	



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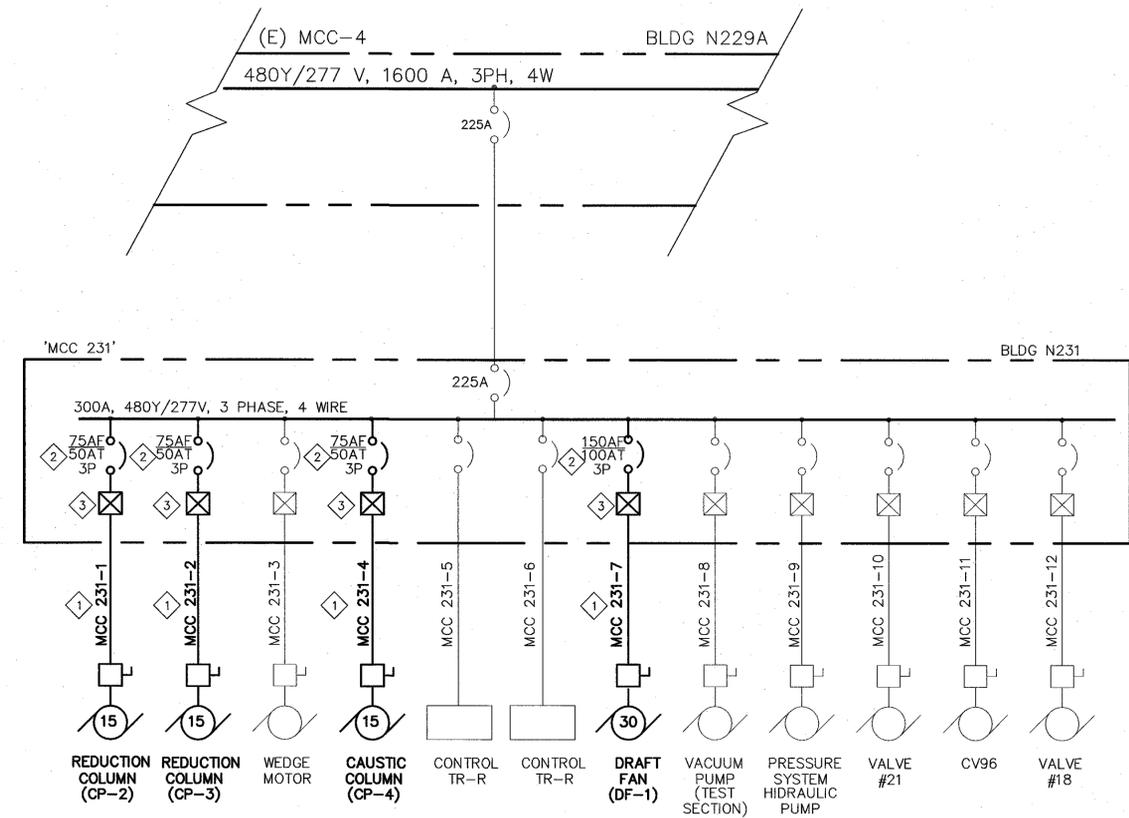
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SHEET NOTES

- SEE DRAWING E1 FOR GENERAL ELECTRICAL NOTES, SYMBOLS AND ABBREVIATIONS.
- LIGHT LINES INDICATE EXISTING ELECTRICAL CONDITIONS AND BACKGROUND WORK BY OTHER DISCIPLINES, DARK LINES INDICATE NEW ELECTRICAL WORK, UON.
- REFER TO MECHANICAL DRAWINGS FOR ACTUAL LOCATION, RATING AND SCHEDULE OF MECHANICAL EQUIPMENT.
- CIRCUIT CONNECTIONS TO MOTORS SHALL BE IN LIQUIDTIGHT FLEXIBLE METAL CONDUIT, UON.

KEY NOTES

- PROVIDE (N) POWER AND CONTROL CIRCUITS CONDUIT/WIRING FROM (N) EQUIPMENT AS SHOWN ON E2 UP TO THE SOURCE 'MCC 231'. SEE FEEDER SCHEDULE ON THIS DRAWING FOR FEEDER SIZE.
- PROVIDE (N) CIRCUIT BREAKERS, RATED AS SHOWN ON THIS DRAWING TO MATCH EXISTING KAIC RATING AND MANUFACTURER'S TYPE FOR (N) EQUIPMENT.
- PROVIDE STARTERS FOR NEW EQUIPMENT, SIZE AS INDICATED ON THE SCHEDULE.



'MCC 231' SINGLE LINE DIAGRAM-NEW WORK
SCALE: N.T.S.

FEEDER NUMBER	EQUIPMENT ID	MOTOR HP	CIRCUIT BREAKER	STARTER SIZE	CONDUIT SIZE	CONDUCTOR # & SIZE	DISCONNECT AT MOTOR	CONTROLS AT MCC 231	CONTROL AT MOTOR	POINT OF CONNECTION
MCC 231-1	REDUCTION COLUMN(CP-2)	15 HP	50A, 3P	2	3/4"	3 # 10 & 1 # 10 G	30A, 3P	H-O-A & PILOT LIGHT	DISCONNECT SWITCH	DISCONNECT SWITCH
MCC 231-2	REDUCTION COLUMN(CP-3)	15 HP	50A, 3P	2	3/4"	3 # 10 & 1 # 10 G	30A, 3P	H-O-A & PILOT LIGHT	DISCONNECT SWITCH	DISCONNECT SWITCH
MCC 231-3	WEDGE MOTOR							H-O-A & PILOT LIGHT		
MCC 231-4	CAUSTIC COLUMN(CP-4)	15 HP	50A, 3P	2	3/4"	3 # 10 & 1 # 10 G	30A, 3P	H-O-A & PILOT LIGHT	DISCONNECT SWITCH	DISCONNECT SWITCH
MCC 231-5	CONTROL TR-R							H-O-A & PILOT LIGHT		
MCC 231-6	CONTROL TR-R							H-O-A & PILOT LIGHT		
MCC 231-7	DRAFT FAN (DF-1)	30 HP	100A, 3P	3	3/4"	3 # 6 & 1 # 8 G	60A, 3P	H-O-A & PILOT LIGHT	DISCONNECT SWITCH	DISCONNECT SWITCH
MCC 231-8	VACUUM PUMP (TEST SECTION)							H-O-A & PILOT LIGHT		
MCC 231-9	PRESSURE SYSTEM HYDRAULIC PUMP							H-O-A & PILOT LIGHT		
MCC 231-10	VALVE #21							H-O-A & PILOT LIGHT		
MCC 231-11	CV96							H-O-A & PILOT LIGHT		
MCC 231-12	VALVE #18							H-O-A & PILOT LIGHT		

'MCC 231' FEEDER SCHEDULE-NEW WORK
SCALE: N.T.S.



Approved for Construction
Moffett Field Permit Board
S. Frankel
Chief Building Official
Permit No. 11P002

ZONE	LETTER	DESCRIPTION	DRAWN	DATE	APPRVD

Revisions table and project information including Ames Research Center logo, project name 'MCC 231' SINGLE LINE DIAGRAM NEW WORK, and drawing details like size D, cage code 25307, and scale AS NOTED.

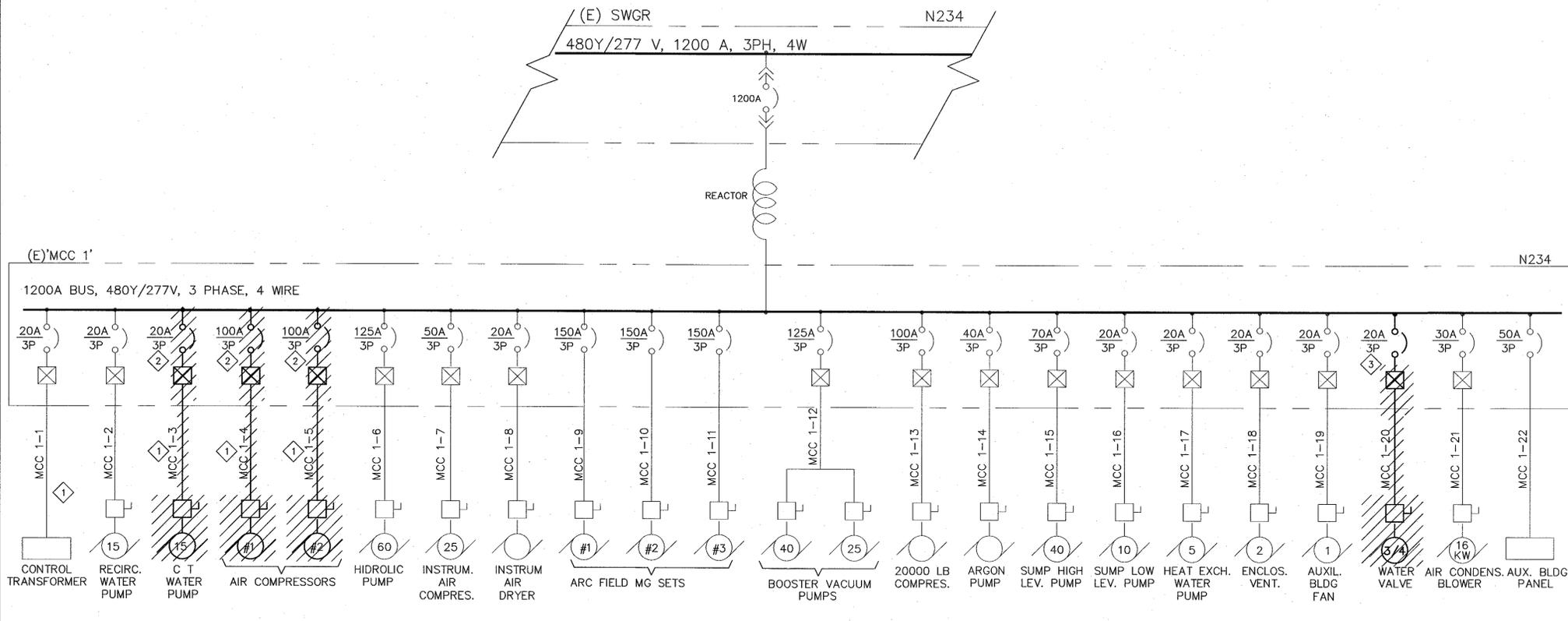
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 DATE: Dec 09, 2010 - 3:16:33 pm

SHEET NOTES

- SEE DRAWING E1 FOR GENERAL ELECTRICAL NOTES, SYMBOLS AND ABBREVIATIONS.
- SEE DRAWING E2 FOR LAYOUT.
- LIGHT LINES INDICATE EXISTING ELECTRICAL CONDITIONS AND BACKGROUND WORK BY OTHER DISCIPLINES, DARK LINES INDICATE NEW ELECTRICAL WORK, U.O.N.
- HATCH LINES INDICATE (E) ELECTRICAL ITEMS TO BE DISCONNECTED AND REMOVED, U.O.N.
- REFER TO MECHANICAL DRAWINGS FOR ACTUAL LOCATION, RATING AND SCHEDULE OF MECHANICAL EQUIPMENT.

KEY NOTES

- DISCONNECT AND REMOVE (E) POWER AND CONTROL CIRCUITS CONDUIT/WIRING FROM (E) EQUIPMENT, CONNECTED TO THE SOURCE 'MCC-1'.
- REMOVE (E) CIRCUIT BREAKERS & STARTERS AS SHOWN.
- DISCONNECT (E) STARTER AND TOL'S, TAPE AND SECURE WIRES FOR FUTURE CONNECTION OF NEW EQUIPMENT.



'MCC 1' SINGLE LINE DIAGRAM-EXISTING/DEMOLITION
SCALE: N.T.S.

FEEDER NUMBER	EQUIPMENT ID	MOTOR HP	CIRCUIT BREAKER	STARTER SIZE	CONDUIT SIZE	CONDUCTOR # & SIZE	DISCONNECT AT MOTOR	CONTROLS AT MCC 1	CONTROL AT MOTOR	POINT OF CONNECTION
MCC 1-1	CONTROL TRANSFORMER		20A, 3P					H-O-A & PILOT LIGHT		
MCC 1-2	RECIRC. WATER PUMP	15	20A, 3P					H-O-A & PILOT LIGHT	DISCONNECT SWITCH	DISCONNECT SWITCH
MCC 1-3	C T WATER PUMP	15	20A, 3P					H-O-A & PILOT LIGHT	DISCONNECT SWITCH	DISCONNECT SWITCH
MCC 1-4	AIR COMPRESSOR		100A, 3P					H-O-A & PILOT LIGHT	DISCONNECT SWITCH	DISCONNECT SWITCH
MCC 1-5	AIR COMPRESSOR		100A, 3P					H-O-A & PILOT LIGHT	DISCONNECT SWITCH	DISCONNECT SWITCH
MCC 1-6	HIDROLIC PUMP	60	125A, 3P					H-O-A & PILOT LIGHT	DISCONNECT SWITCH	DISCONNECT SWITCH
MCC 1-7	INSTRUM. AIR COMPRESSOR	25	50A, 3P					H-O-A & PILOT LIGHT	DISCONNECT SWITCH	DISCONNECT SWITCH
MCC 1-8	INSTRUM. AIR DRYER		20A, 3P					H-O-A & PILOT LIGHT	DISCONNECT SWITCH	DISCONNECT SWITCH
MCC 1-9	ARC FIELD MG SET		150A, 3P					H-O-A & PILOT LIGHT	DISCONNECT SWITCH	DISCONNECT SWITCH
MCC 1-10	ARC FIELD MG SET		150A, 3P					H-O-A & PILOT LIGHT	DISCONNECT SWITCH	DISCONNECT SWITCH
MCC 1-11	ARC FIELD MG SET		150A, 3P					H-O-A & PILOT LIGHT	DISCONNECT SWITCH	DISCONNECT SWITCH

FEEDER NUMBER	EQUIPMENT ID	MOTOR HP	CIRCUIT BREAKER	STARTER SIZE	CONDUIT SIZE	CONDUCTOR # & SIZE	DISCONNECT AT MOTOR	CONTROLS AT MCC 1	CONTROL AT MOTOR	POINT OF CONNECTION
MCC 1-12	BOOSTER VAC. PUMPS	40 25	125A, 3P					H-O-A & PILOT LIGHT	DISCONNECT SWITCH	DISCONNECT SWITCH
MCC 1-13	20000 LB COMPRESSOR		100A, 3P					H-O-A & PILOT LIGHT	DISCONNECT SWITCH	DISCONNECT SWITCH
MCC 1-14	ARGON PUMP		40A, 3P					H-O-A & PILOT LIGHT	DISCONNECT SWITCH	DISCONNECT SWITCH
MCC 1-15	SUMP HIGH LEVEL PUMP	40	70A, 3P					H-O-A & PILOT LIGHT	DISCONNECT SWITCH	DISCONNECT SWITCH
MCC 1-16	SUMP LOW LEVEL PUMP	10	20A, 3P					H-O-A & PILOT LIGHT	DISCONNECT SWITCH	DISCONNECT SWITCH
MCC 1-17	HEAT EXCH. WATER PUMP	5	20A, 3P					H-O-A & PILOT LIGHT	DISCONNECT SWITCH	DISCONNECT SWITCH
MCC 1-18	ENCLOSURE VENT.	2	20A, 3P					H-O-A & PILOT LIGHT	DISCONNECT SWITCH	DISCONNECT SWITCH
MCC 1-19	AUXILL. BLDG FAN	1	20A, 3P					H-O-A & PILOT LIGHT	DISCONNECT SWITCH	DISCONNECT SWITCH
MCC 1-20	WATER VALVE	3/4	20A, 3P					H-O-A & PILOT LIGHT	DISCONNECT SWITCH	DISCONNECT SWITCH
MCC 1-21	AIR CONDENS. BLOWER	16 kW	30A, 3P					H-O-A & PILOT LIGHT	DISCONNECT SWITCH	DISCONNECT SWITCH
MCC 1-22	AUX. BLDG PANEL		50A, 3P					H-O-A & PILOT LIGHT	PANEL	PANEL

'MCC 1' FEEDER SCHEDULE-EXISTING/DEMOLITION
SCALE: N.T.S.

Approved for Construction
Moffett Field Permit Board
S. Frankel
Chief Building Official
Permit No. 11P002

ZONE	LETTER	DESCRIPTION	DRAWN	DATE	APPRVD

REVISIONS

NO.	DATE	DESCRIPTION
1	12-9-10	DESIGNED
2	12-28-10	CHECKED
3	12-9-10	PROJECTOR
4	12-13-10	REQUESTER
5	12-13-10	R&QA
6		SAFETY
7		SUPERVISOR

Ames Research Center
Moffett Field, California
STEAM VACUUM SYSTEM NOx EMISSION REDUCTION SYSTEM
ELECTRICAL

'MCC 1' SINGLE LINE DIAGRAM EXISTING/DEMOLITION



SIZE	CAGE CODE	FILE NAME	REV
D	25307	A334A-1000-E5	1

SCALE	INDEX	SHEET	OF
AS NOTED			

60101003

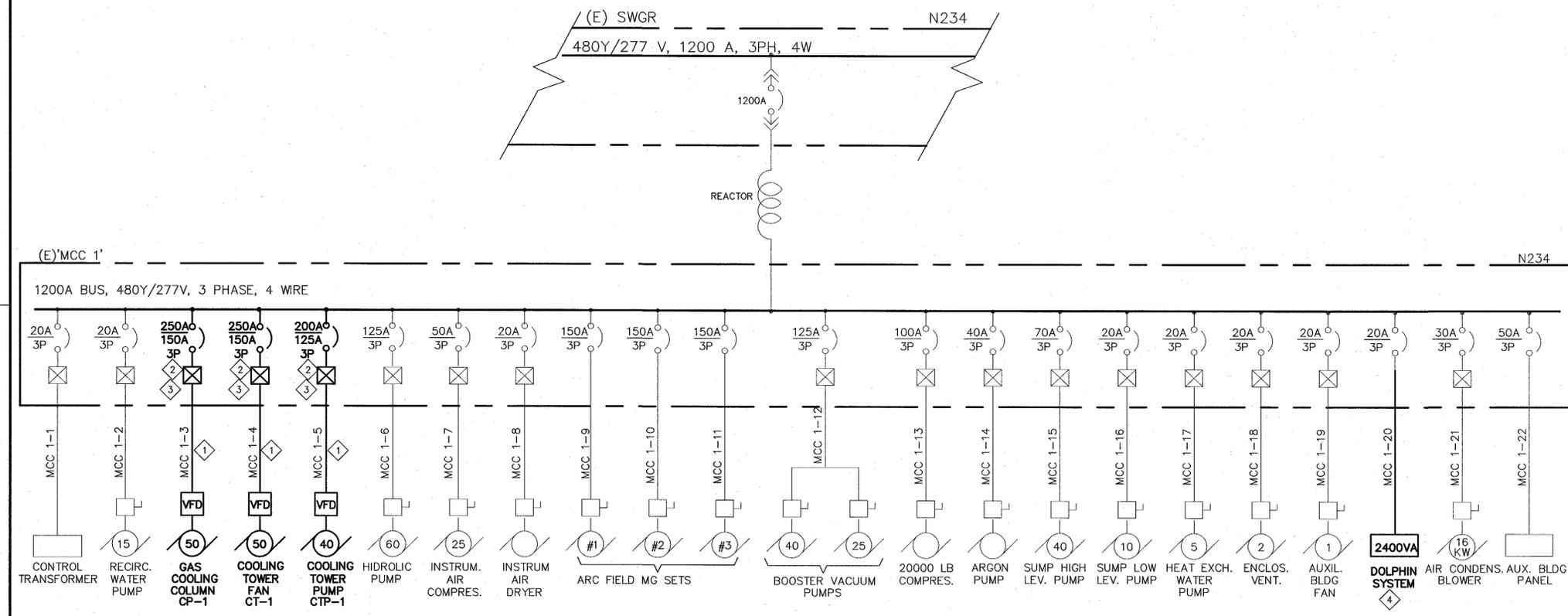
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SHEET NOTES

- SEE DRAWING E1 FOR GENERAL ELECTRICAL NOTES, SYMBOLS AND ABBREVIATIONS.
- LIGHT LINES INDICATE EXISTING ELECTRICAL CONDITIONS AND BACKGROUND WORK BY OTHER DISCIPLINES, DARK LINES INDICATE NEW ELECTRICAL WORK, UON.
- REFER TO MECHANICAL DRAWINGS FOR ACTUAL LOCATION, RATING AND SCHEDULE OF MECHANICAL EQUIPMENT.
- CIRCUIT CONNECTIONS TO MOTORS SHALL BE IN LIQUDTIGHT FLEXIBLE METAL CONDUIT, UON.

KEY NOTES

- PROVIDE (N) POWER AND CONTROL CIRCUITS CONDUIT/WIRING FROM (N) EQUIPMENT AS SHOWN ON E2 UP TO THE SOURCE 'MCC 1'. SEE FEEDER SCHEDULE ON THIS DRAWING FOR FEEDER SIZE.
- PROVIDE (N) CIRCUIT BREAKERS, RATED AS SHOWN ON THIS DRAWING TO MATCH EXISTING KAIC RATING AND MANUFACTURER'S TYPE FOR (N) EQUIPMENT.
- PROVIDE STARTERS FOR NEW EQUIPMENT, SIZE AS INDICATED ON THE SCHEDULE.
- 480V, 1-PHASE LOAD.



'MCC 1' SINGLE LINE DIAGRAM-NEW WORK
SCALE: N.T.S.

FEEDER NUMBER	EQUIPMENT ID	MOTOR HP	CIRCUIT BREAKER	STARTER SIZE	CONDUIT SIZE	CONDUCTOR # & SIZE	DISCONNECT AT MOTOR	CONTROLS AT MCC 1	CONTROL AT MOTOR	POINT OF CONNECTION
MCC 1-1	CONTROL TRANSFORMER		20A, 3P					H-O-A & PILOT LIGHT		
MCC 1-2	RECIRC. WATER PUMP	15	20A, 3P					H-O-A & PILOT LIGHT	DISCONNECT SWITCH	DISCONNECT SWITCH
MCC 1-3	COOLING COLUMN(CP-1)	50 HP	150A, 3P	3	1"	3 # 4 & 1 # 6 G	100A, 3P	H-O-A & PILOT LIGHT	VFD	VFD
MCC 1-4	COOLING TWR FAN(CT-1)	50 HP	150A, 3P	3	1"	3 # 4 & 1 # 6 G	100A, 3P	H-O-A & PILOT LIGHT	VFD	VFD
MCC 1-5	COOLING TWR PUMP(CTP-1)	40 HP	125A, 3P	3	1"	3 # 6 & 1 # 6 G	60A, 3P	H-O-A & PILOT LIGHT	VFD	VFD
MCC 1-6	HIDROLIC PUMP	60	125A, 3P					H-O-A & PILOT LIGHT	DISCONNECT SWITCH	DISCONNECT SWITCH
MCC 1-7	INSTRUM. AIR COMPRESSOR	25	50A, 3P					H-O-A & PILOT LIGHT	DISCONNECT SWITCH	DISCONNECT SWITCH
MCC 1-8	INSTRUM. AIR DRYER		20A, 3P					H-O-A & PILOT LIGHT	DISCONNECT SWITCH	DISCONNECT SWITCH
MCC 1-9	ARC FIELD MG SET		150A, 3P					H-O-A & PILOT LIGHT	DISCONNECT SWITCH	DISCONNECT SWITCH
MCC 1-10	ARC FIELD MG SET		150A, 3P					H-O-A & PILOT LIGHT	DISCONNECT SWITCH	DISCONNECT SWITCH
MCC 1-11	ARC FIELD MG SET		150A, 3P					H-O-A & PILOT LIGHT	DISCONNECT SWITCH	DISCONNECT SWITCH

FEEDER NUMBER	EQUIPMENT ID	MOTOR HP	CIRCUIT BREAKER	STARTER SIZE	CONDUIT SIZE	CONDUCTOR # & SIZE	DISCONNECT AT MOTOR	CONTROLS AT MCC 1	CONTROL AT MOTOR	POINT OF CONNECTION
MCC 1-12	BOOSTER VAC. PUMPS	40 25	125A, 3P					H-O-A & PILOT LIGHT	DISCONNECT SWITCH	DISCONNECT SWITCH
MCC 1-13	20000 LB COMPRESSOR		100A, 3P					H-O-A & PILOT LIGHT	DISCONNECT SWITCH	DISCONNECT SWITCH
MCC 1-14	ARGON PUMP		40A, 3P					H-O-A & PILOT LIGHT	DISCONNECT SWITCH	DISCONNECT SWITCH
MCC 1-15	SUMP HIGH LEVEL PUMP	40	70A, 3P					H-O-A & PILOT LIGHT	DISCONNECT SWITCH	DISCONNECT SWITCH
MCC 1-16	SUMP LOW LEVEL PUMP	10	20A, 3P					H-O-A & PILOT LIGHT	DISCONNECT SWITCH	DISCONNECT SWITCH
MCC 1-17	HEAT EXCH. WATER PUMP	5	20A, 3P					H-O-A & PILOT LIGHT	DISCONNECT SWITCH	DISCONNECT SWITCH
MCC 1-18	ENCLOSURE VENT.	2	20A, 3P					H-O-A & PILOT LIGHT	DISCONNECT SWITCH	DISCONNECT SWITCH
MCC 1-19	AUXILL. BLDG FAN	1	20A, 3P					H-O-A & PILOT LIGHT	DISCONNECT SWITCH	DISCONNECT SWITCH
MCC 1-20	DOLPHIN SYSTEM	3/4	20A, 3P		3/4"	2 # 12 & 1 # 12 G		H-O-A & PILOT LIGHT	DISCONNECT SWITCH	DISCONNECT SWITCH
MCC 1-21	AIR CONDENS BLOWER	16 kW	30A, 3P					H-O-A & PILOT LIGHT	DISCONNECT SWITCH	DISCONNECT SWITCH
MCC 1-22	AUX. BLDG PANEL		50A, 3P					H-O-A & PILOT LIGHT	PANEL	PANEL

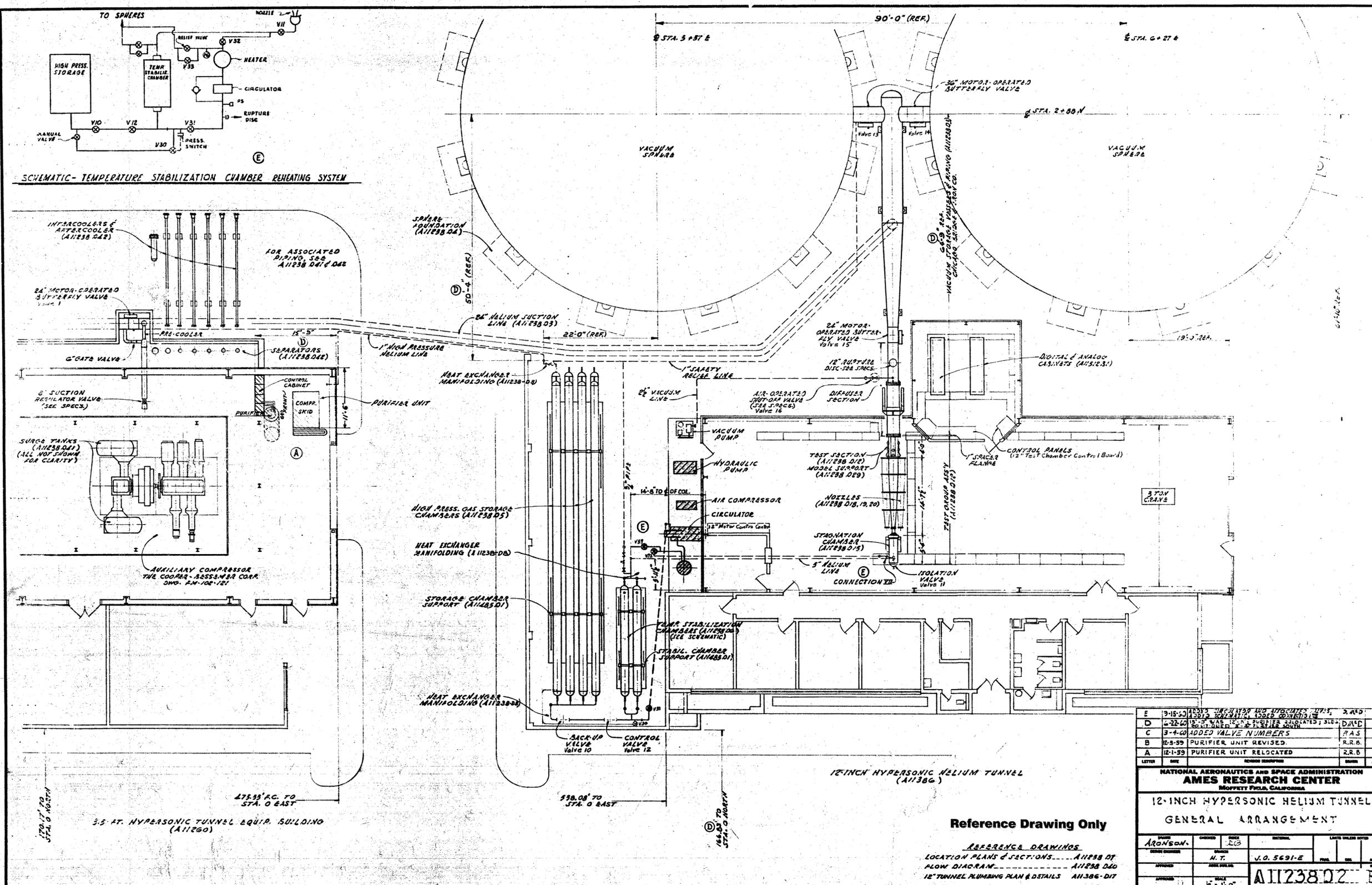
'MCC 1' FEEDER SCHEDULE-NEW WORK
SCALE: N.T.S.

Approved for Construction
Moffett Field Permit Board
S. Frankel
Chief Building Official
Permit No. 11P002

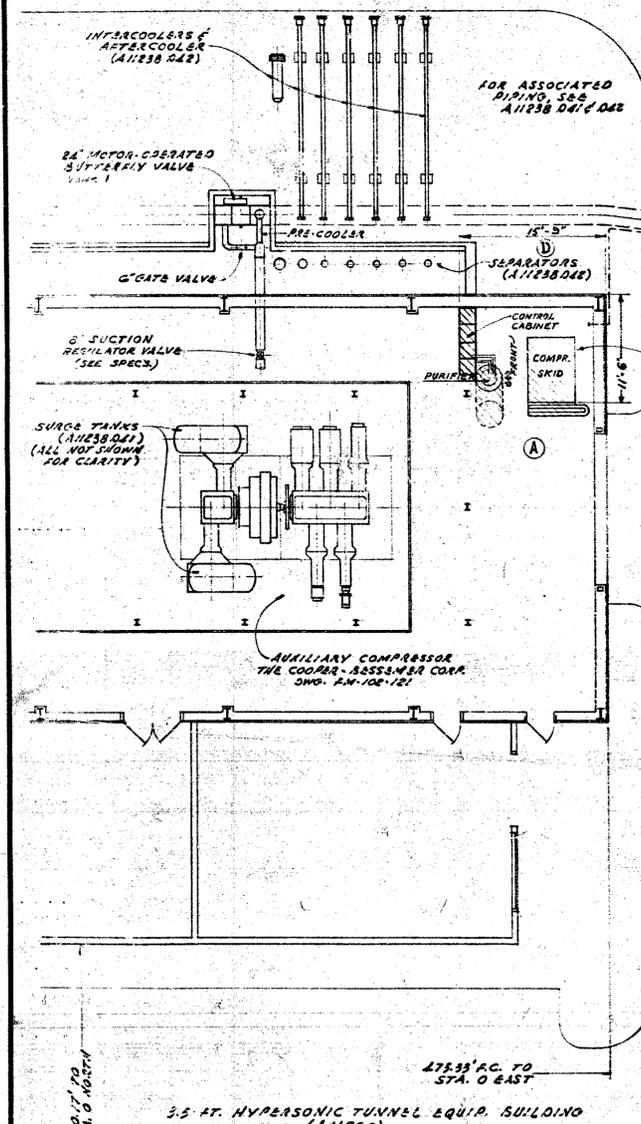
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DRAWN: N. NIZAMOVA DESIGNED: N. NIZAMOVA CHECKED: J. McCUSKER PROJECT: P. WAIN REQUESTER: R. OLIVARES R&QA:	DATE: 12-9-10 DATE: 12-9-10 DATE: 12-9-10 DATE: 12-13-10 DATE: 12-13-10	 Ames Research Center Moffett Field, California STEAM VACUUM SYSTEM NOx EMISSION REDUCTION SYSTEM ELECTRICAL
SAFETY:		'MCC-1' SINGLE LINE DIAGRAM NEW WORK
SUPERVISOR: S. FRANKEL	DATE: 12-11-10	SIZE: D CAGE CODE: 25307 SCALE: AS NOTED
FILE NAME: A334A-1000-E6		SHEET: OF





SCHEMATIC-TEMPERATURE STABILIZATION CHAMBER HEATING SYSTEM



E	9-15-53	DESIGN REVISIONS AND MODIFICATIONS	DAVE
D	6-22-53	DESIGN REVISIONS AND MODIFICATIONS	R.R.B.
C	3-4-50	ADDED VALVE NUMBERS	R.A.S.
B	8-8-49	PURIFIER UNIT REVISED	R.R.B.
A	12-1-49	PURIFIER UNIT RELOCATED	R.R.B.
LETTER	DATE	REVISION DESCRIPTION	DESIGNER

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
AMES RESEARCH CENTER
 MOFFETT FIELD, CALIFORNIA

12-INCH HYPERSONIC HELIUM TUNNEL
 GENERAL ARRANGEMENT

Reference Drawing Only

REFERENCE DRAWINGS
 LOCATION PLANS & SECTIONS A11238 D17
 FLOW DIAGRAM A11238 D40
 12" TUNNEL PUMPING PLAN & DETAILS A11238 D17

A11238 D2

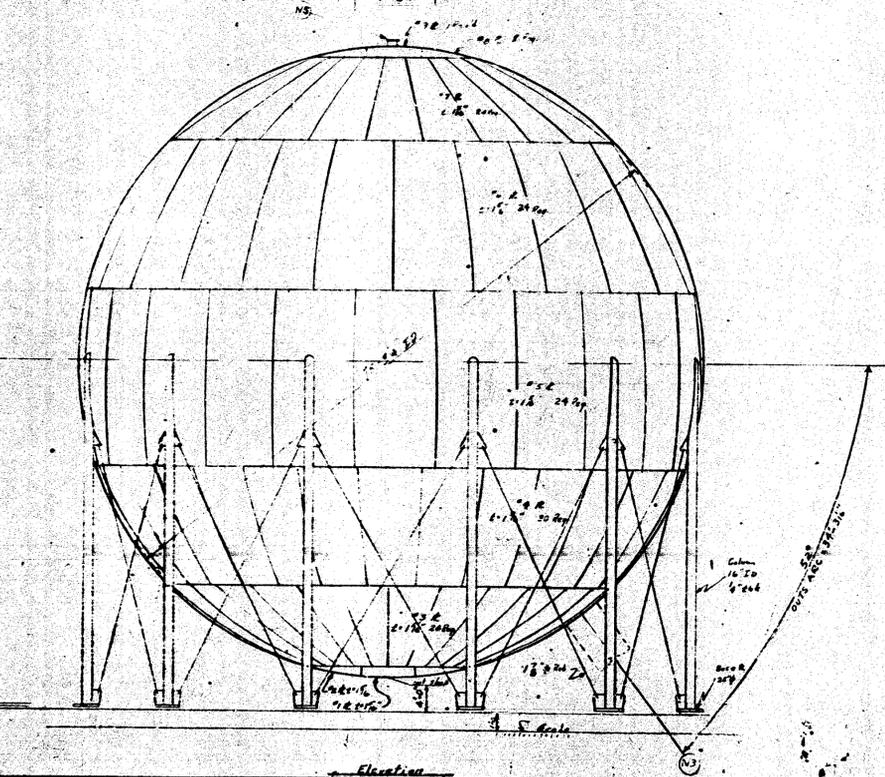
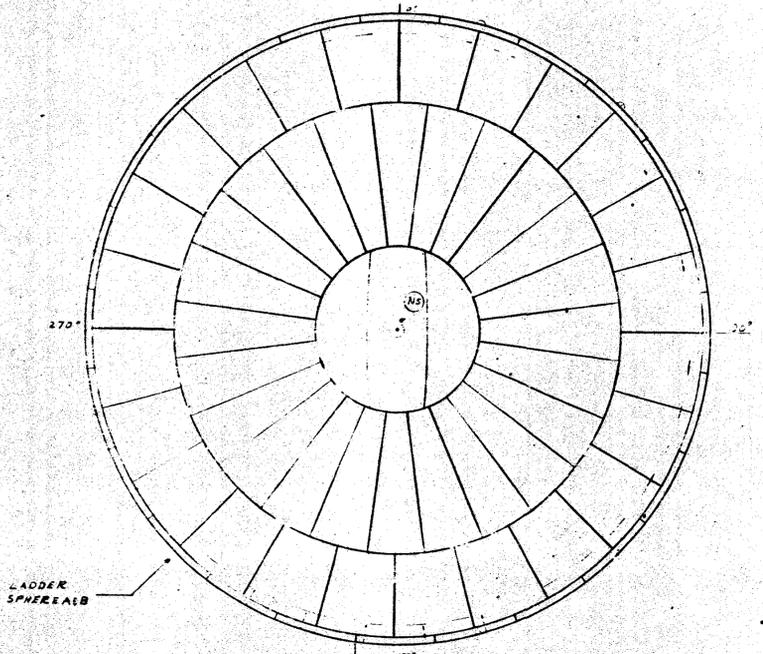
9/21/67 JCS:m

351-5903m-0
 12" H.T. & S.W.R. ASSEMBLY

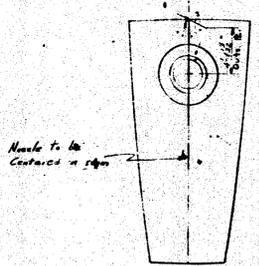
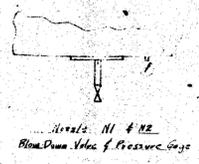
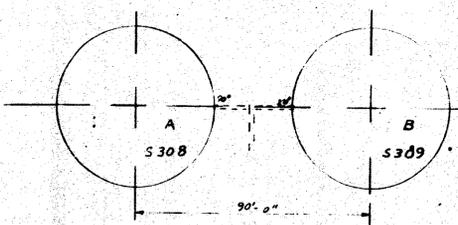


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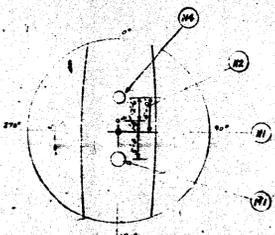
Spec. of R. 330
 1/2" R. 1/4" S.P.R. 9



FIELD NOTE:
 3/8" W/3 PLATE ON 10° FOR SPHERE A
 3/8" W/3 PLATE ON 270° FOR SPHERE B



NS - 2" Assembly
 with Nozzle N3



NOZZLE N3
 Inside View

NO.	DESCRIPTION
N1	3" Nozzle
N2	3" Nozzle
N3	3" Nozzle
N4	3" Nozzle
N5	3" Nozzle

Code: MSME (Modified)
 Material:
 Shell: A286 Fe, Column: A286 Fe, Figs: 1847, 1850
 Ribs: A7, Bolts: SAE 5028
 Design Pressure: 20 psig ~ 60 psig
 Test Pressure: Hydrostatic: 25 psig ~ 60 psig (by code)
 Stress Relief: Bottom R. Hydrostatic: 3/8" R. Assy. Hydrostatic
 X-Ray: Spot
 Fabric: Yes
 Paint:
 Shop: Coat spray, salture 30, yellow primer (also paint coat)
 Field: Coat spray, salture 30 and primer (interior only)
 Shop: Coat spray, salture 30, black aluminum
 Seismic: Force: 20%
 Number: 21674
 Wind: 30 psf
 Corrosion: None

SPHERICAL PATENT HAS
 DENIED UNDER DIV. OF ASPECT OF THE
 FOLLOWING UNITED STATES PATENTS:
 2,393,984 2,522,274 2,548,888
 2,417,053 2,544,151 2,544,887
 2,427,476 2,421,313
 OTHER PATENTS PENDING.
 ALSO PATENTED IN FOREIGN COUNTRIES.

Reference Drawing Only

831 5903M 111

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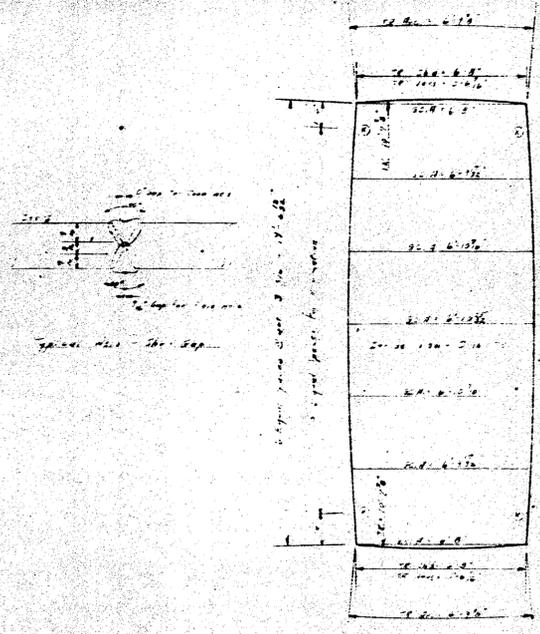
REVISIONS	DATE	BY	CHKD.
1	11/15/48	WPK	WPK

CHICAGO BRIDGE & IRON COMPANY
 CONTRACT NO. 12-1-38 7-7912
 GENERAL PLAN
 2-25'36" VACUUM SPHERE
 N308 Fe, A211 Fe
 DRAWN BY: A.P.R. 12-1-38
 CHECKED BY: W.P.K. 12-1-38
 DISAPPROVED BY: W.P.K. 12-1-38

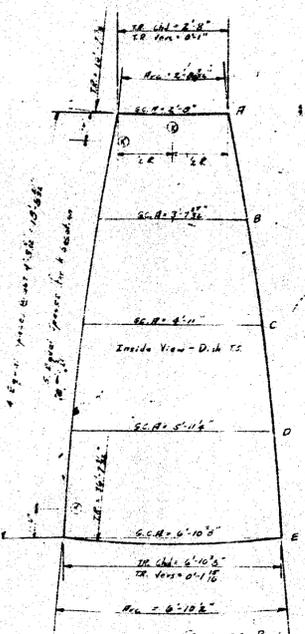
PLANS MADE AT SALT LAKE CITY

831-5903 M-1
 GENERAL PLAN 2 25' VACUUM SPHERE

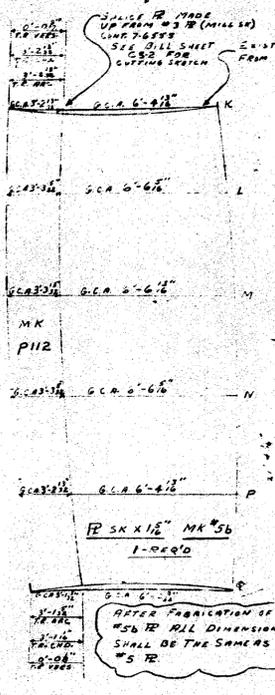
7-7912



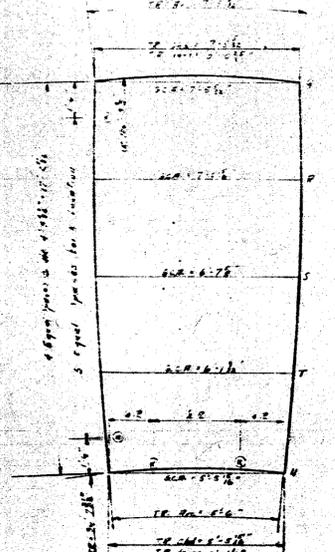
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 Order No. 1182 x 21'-0"
 Location FS



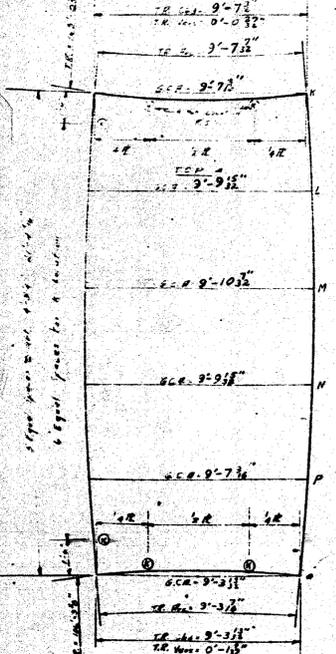
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 Order No. 1182 x 21'-0"
 Location FS



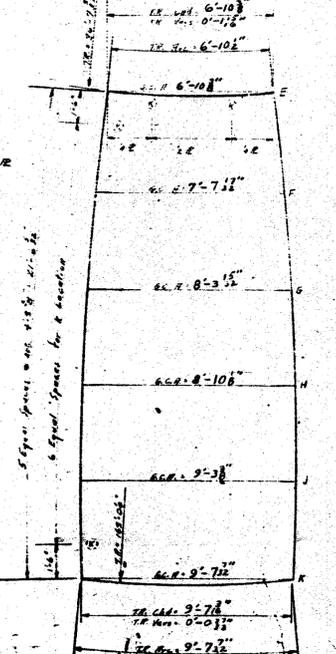
After fabrication of #56 all dimensions shall be the same as #52



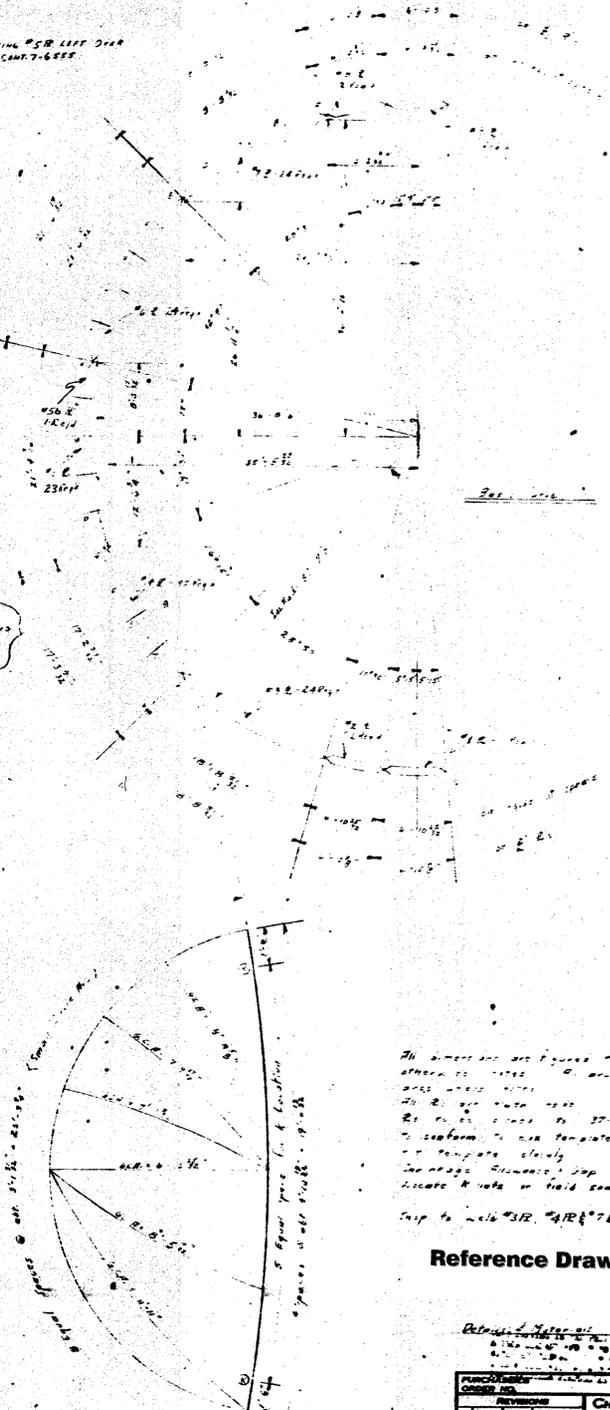
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 Order No. 1182 x 21'-0"
 Location FS



R 24 x 1 1/2" MK # 5 - 23 Rq'd
 Order No. 1182 x 21'-0"
 Location FS



R 24 x 1 1/2" MK # 6 - 24 Rq'd
 Order No. 1164 x 21'-8"
 Location FS



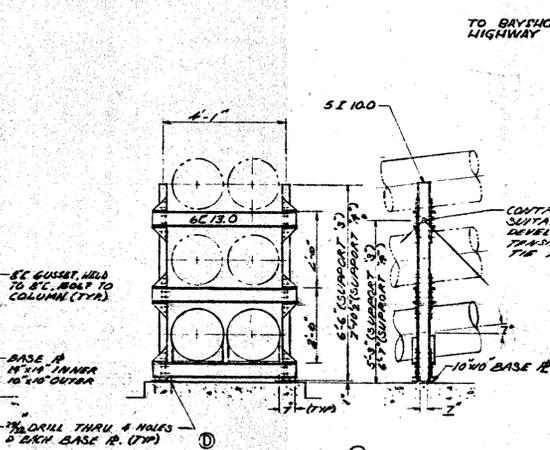
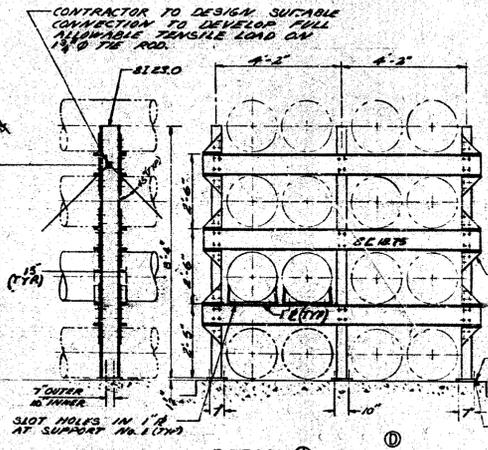
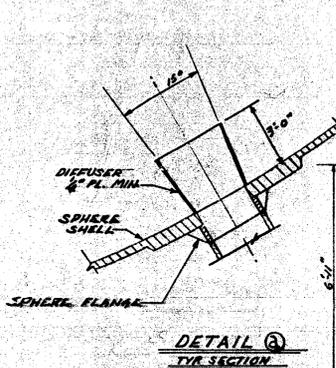
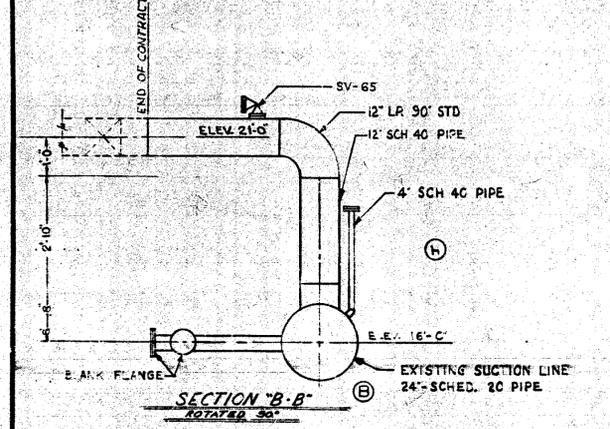
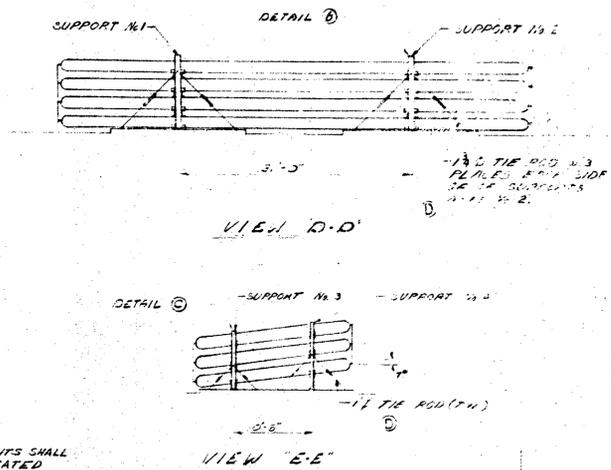
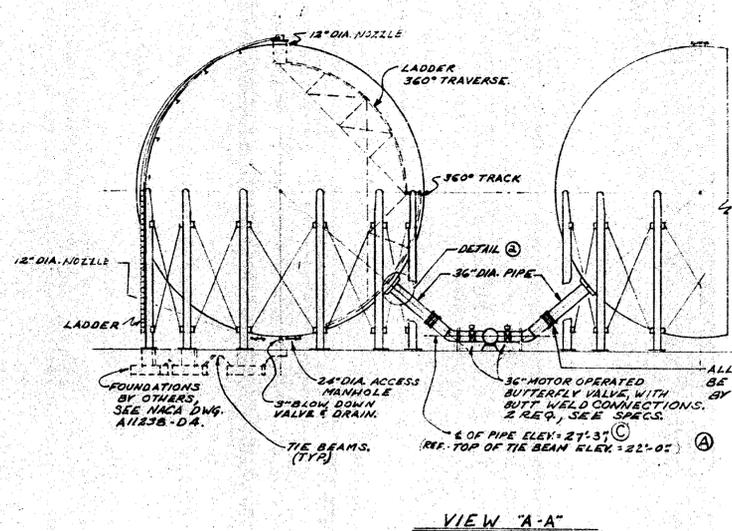
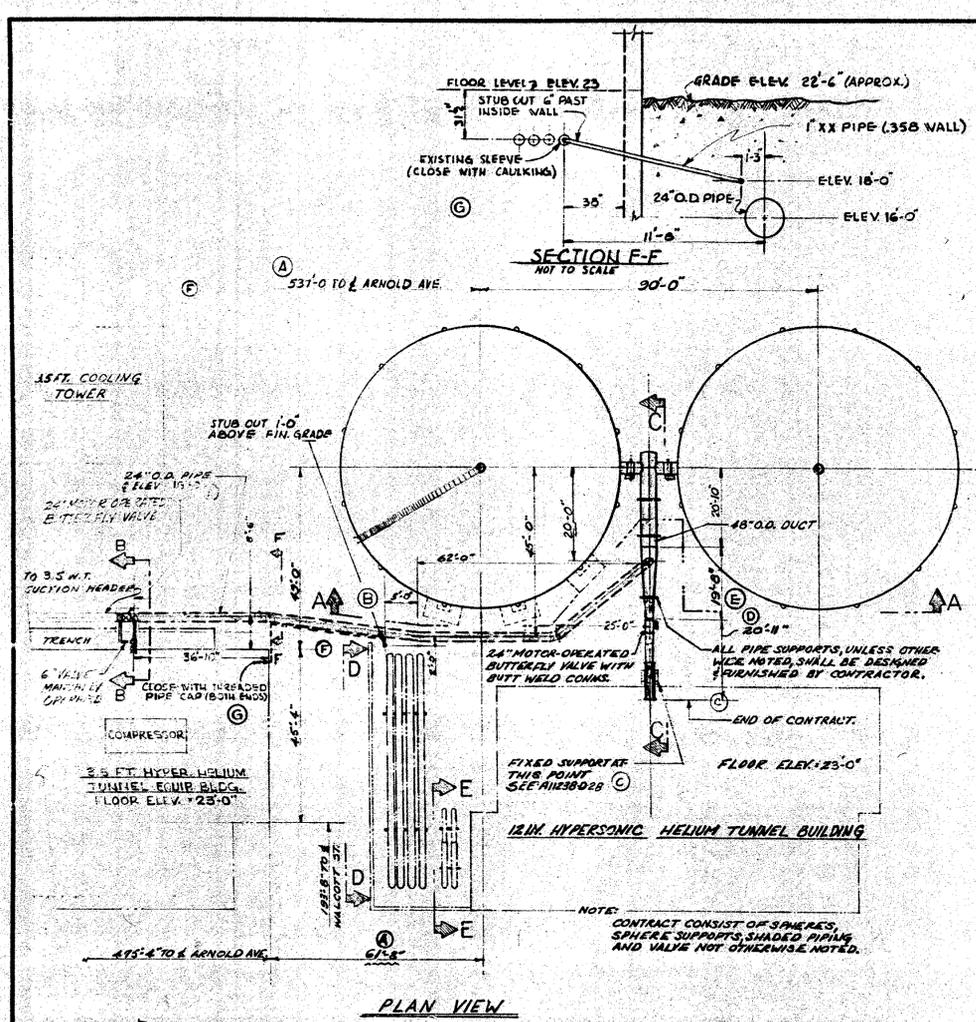
All dimensions are figured to include in thickness
 unless otherwise noted
 All radii shall be 37 1/2" unless otherwise noted
 All corners shall be 37 1/2" unless otherwise noted
 All dimensions shall be in feet and inches
 All dimensions shall be rounded to the nearest 1/8"

Reference Drawing Only

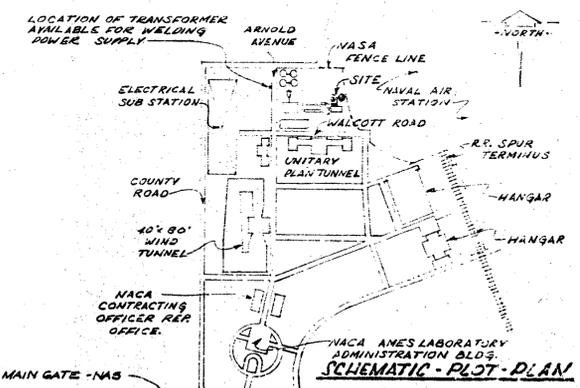
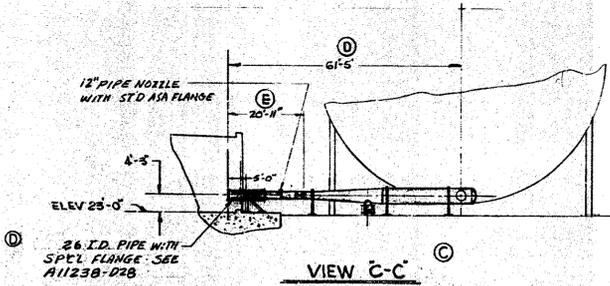
NO.	DATE	BY	REVISION
1			
2			
3			
4			
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6			
7			
8			
9			
10			

7-7912
 VACUUM SHEDS SHELL PLANS DETAILS

PLANS MADE AT SALT LAKE CITY



NOTE: HIGH PRESSURE STORAGE VESSEL SUPPORTS (DETAILS B & C, VIEWS D-D & C-C) NOT INCLUDED IN CONTRACT.



REV.	DATE	REVISIONS	CHK.	APP.
G	1/2/59	CHANGED SECTION F	JCC	
F	1/2/59	ADDED 1" XX PIPE (358 WALL)	JCC	
E	4/15/59	19'-8" WAS 20'-0" 20'-11" WAS 20'-7"	JCC	
D	3/30/59	61'-6" WERE 61'-0" 20'-0" WAS 20'-8" 26'-0" WAS 19'-9 1/2" 20" ADD'D VIEW D-D, VIEW E-E DETAIL C, DETAIL D	JCC	
C	2/10/59	CHANGED ARROW ON TEND OF CONTRACT NOTE DELETED BY OTHER'S PLUMB ELEV. 21'-0" WAS 21'-0" ADDED VIEW C-C	JCC	
B	2/1/59	GENERAL REVISION OF SPHERE ARRANGEMENT IN PLOT PLAN INCLUDING SECT. ON B-B	JCC	
A	1/2/59	537 WAS 532, 21" WAS 35'-8" ELEV. 22'-0" WAS 25'-0"	JCC	

SCALE: 1" = 20'-0"

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
AMES RESEARCH CENTER
MOFFETT FIELD, CALIFORNIA

12 INCH HYPERSONIC HELIUM TUNNEL
VACUUM STORAGE VESSELS PIPING
LAYOUT & DETAILS

DESIGN ENG. JCC
DRAWN BY R.W.P.O.E.
CHECKED BY JCC
PROJECT FINISH
QUAN. ASSEM. DRWG. NO. A11238-D3
REVISION 5407
DIVISION TAR
DATE 1-1-59

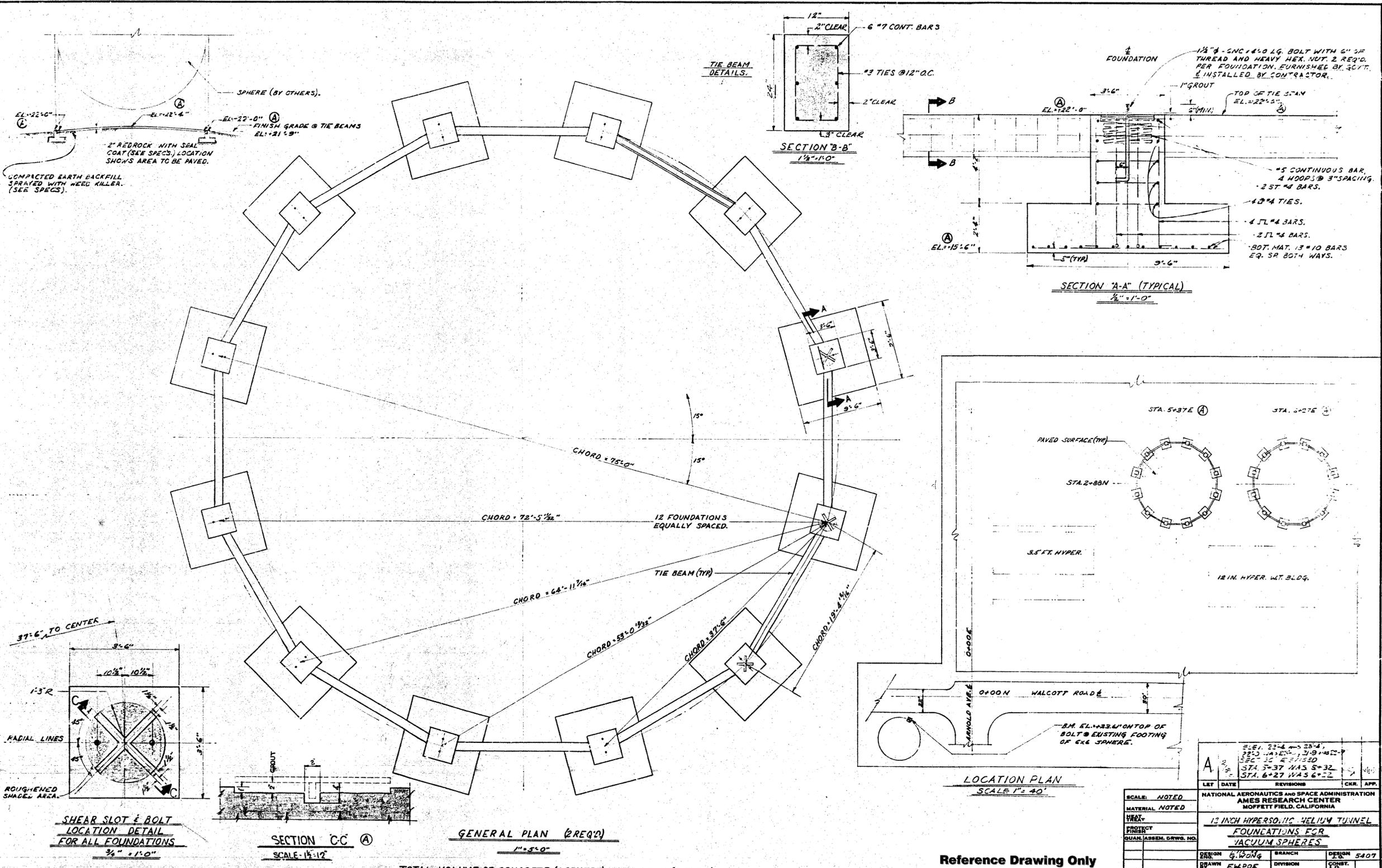
INDEX M.M.
LIMITS OR DIMENSIONS UNLESS OTHERWISE NOTED
FRACTIONAL 1/4"
DECIMAL 0.001"
ANGULAR 1/4"

9-15-53 PRE-COOLER REMOVED JCC 9-80

331-5903M-3
12" H.T. VACUUM STORAGE VESSELS PIPING

Reference Drawing Only

31-5903m-15
 12" H.H.T. FURN. FOR VACUUM SPHERES



TOTAL VOLUME OF CONCRETE (1 SPHERE) = 135 CU. YDS. (APPROX.)

Reference Drawing Only

SCALE: NOTED	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MATERIAL NOTED	AMES RESEARCH CENTER
PROJECT	MOFFETT FIELD, CALIFORNIA
PROJECT	12 INCH HYPERSONIC HELIUM TUNNEL
QUAN. ASSEM. DRWS. NO.	FOUNDATIONS FOR VACUUM SPHERES
DESIGNER	5-1208g
BRANCH	DESIGN 5407
DRAWN	KWDOE
DIVISION	CONSTR.
CHECKED	
RESEARCH	
FRACTIONAL	
DECIMAL	
ANGULAR	
APPROVED	
APPROVED	

A11238-D4A

3311-5903m-15