SCHEDULE OF DRAWINGS:

M1.1 SCHEDULE OF DRAWINGS & MECHANICAL SPECIFICATIONS

M1.2 MECHANICAL WORK PLAN & NOTES

M2 PIPING DETAILS

M3 GENSETS #2 & #3 UPGRADE DETAILS

M4 GENSET #3 ENGINE MODIFICATION DETAILS

E1 ELECTRICAL WORK PLAN, NOTES, & SPECIFICATIONS

E2 ELECTRICAL DETAILS

ATTACHED REFERENCE DRAWING BY OTHERS

5216-10771 SWITCHGEAR ONE-LINE (WITH ANNOTATION NOTES)

PROJECT OVERVIEW

1. THE EXISTING TULUKSAK POWER PLANT WAS ORIGINALLY CONSTRUCTED IN 2003. THE PLANT INCLUDES A HEAT RECOVERY SYSTEM BUT NO END USER FACILITIES ARE CONNECTED.

2. THE POWER PLANT HAS SEVERAL MAJOR MECHANICAL PROBLEMS THAT HAVE RENDERED IT INOPERABLE. THE COMMUNITY IS CURRENTLY BEING POWERED BY A SELF CONTAINED EMERGENCY GENSET. THE POWER PLANT FEEDER BREAKER IS CLOSED AND THE BUS IS ENERGIZED TO PROVIDE POWER PLANT STATION SERVICE POWER.

3. THE MAIN PURPOSE OF THIS PROJECT IS TO PERFORM ALL OF THE BASE BID TASKS LISTED BELOW REQUIRED TO RETURN THE POWER PLANT TO OPERABLE CONDITION.

4. THE SECONDARY PURPOSE OF THIS PROJECT IS TO PERFORM AS MANY OF THE ADDITIVE ALTERNATE TASKS LISTED BELOW WITHIN THE PROJECT BUDGET IN ORDER TO IMPROVE THE FUNCTIONALITY OF THE POWER PLANT.

5. ALL WORK IS DESIGNATED AS EITHER BASE BID OR ADDITITIVE ALTERNATE. THE BASE BID WORK IS SHOWN AS INDIVIDUAL TASKS DESIGNATED WITH INDIVIDUAL LETTERS BUT IS A LUMP SUM BID. EACH ADDITIVE ALTERNATE TASK IS DESIGNATED BY A UNIQUE NUMBER FOLLWED BY THE LETTER A AND REQUIRES A SEPARATE LINE ITEM BID. SEE BID REQUEST DOCUMENTS.

PROJECT SCOPE BASE BID TASKS:

A CLEAN/FLUSH/REPAIR THE ENGINE COOLING SYSTEM

B INSTALL OWNER-FURNISHED ENGINE ON GENSET #3

C INSTALL FIRE EXTINGUISHERS

D RETURN FUNCTION TO RADIATOR VFD CONTROLS (SEE ELECTRICAL)

E OVERHEAD DOOR (INFORMATIONAL NOTE ONLY - NO WORK)

F SALVAGE PARTS FROM GEN#4 SWITCHGEAR SECTION (SEE ELECTRICAL)

G SALVAGE, SWAP, AND INSTALL NEW PARTS IN GEN#3 SWITCHGEAR SECTION (SEE ELECTRICAL)

H SALVAGE, SWAP, AND INSTALL NEW PARTS IN GEN#2 SWITCHGEAR SECTION (SEE ELECTRICAL)

PROJECT SCOPE ADDITIVE ALTERNATE TASKS:

1A INSTALL OWNER-FURNISHED GENERATOR ON GENSET #2

2A REPLACE ACTUATOR VALVE AT INTERMEDIATE TANK

3A VENTILATION SERVICE AND REPAIR

4A PLANT HEATING SYSTEM REPAIR

5A CLEAN/DEGREASE GENERATION ROOM

6A PREPARE QUOTE FOR REPAIR OF FIRE SUPPRESSION SYSTEM

7A DISPOSE OF CONTAMINATED COOLANT AND USED CLEANING SOLUTION

8A PREPARE QUOTE FOR REPAIR OF OVERHEAD DOOR

** GENERAL CONDITIONS **

PERFORM ALL WORK IN ACCORDANCE WITH THE LATEST ADOPTED EDITIONS OF THE INTERNATIONAL FIRE CODE AND THE INTERNATIONAL BUILDING CODE INCLUDING STATE OF ALASKA AMENDMENTS. COMPLY WITH ALL APPLICABLE STATE AND FEDERAL REGULATIONS.

THE DRAWINGS ARE DIAGRAMMATIC AND DO NOT NECESSARILY SHOW ALL FEATURES OF THE REQUIRED WORK. PROVIDE ALL EQUIPMENT AND MATERIALS REQUIRED FOR A COMPLETE SYSTEM. VERIFY EXISTING FIELD CONDITIONS PRIOR TO STARTING CONSTRUCTION. IMMEDIATELY CONTACT THE ENGINEER FOR CLARIFICATION OF QUESTIONABLE ITEMS OR APPARENT CONFLICTS.

ALL EQUIPMENT AND MATERIALS SHOWN ARE NEW UNLESS SPECIFICALLY INDICATED AS EXISTING. WHERE ADDITIONAL OR REPLACEMENT ITEMS ARE REQUIRED, PROVIDE LIKE ITEMS BY THE SAME MANUFACTURER TO THE MAXIMUM EXTENT PRACTICAL. INSTALL ALL MATERIALS IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS AND INSTRUCTIONS, UNLESS INDICATED OTHERWISE.

PROTECT ALL MATERIALS AND EQUIPMENT DURING THE ENTIRE DURATION OF CONSTRUCTION WORK AGAINST CONTAMINATION OR DAMAGE. REPLACE OR REPAIR TO ORIGINAL MANUFACTURED CONDITION ANY ITEMS DAMAGED DURING CONSTRUCTION. IMMEDIATELY REPORT TO THE ENGINEER ANY ITEMS FOUND DAMAGED PRIOR TO COMMENCING CONSTRUCTION.

PERFORM WORK WITH SKILLED CRAFTSMEN SPECIALIZING IN SAID WORK. INSTALL ALL MATERIALS IN A NEAT, ORDERLY, AND SECURE FASHION, AS REQUIRED BY THESE SPECIFICATIONS AND COMMONLY RECOGNIZED STANDARDS OF GOOD WORKMANSHIP.

DO NOT CUT, DRILL, OR NOTCH STRUCTURAL MEMBERS UNLESS SPECIFICALLY APPROVED BY THE ENGINEER. MINIMIZE PENETRATIONS AND DISRUPTION OF BUILDING FEATURES. WHERE PREVIOUSLY COMPLETED BUILDING SURFACES OR OTHER FEATURES MUST BE CUT, PENETRATED, OR OTHERWISE ALTERED, SUCH WORK SHALL BE CAREFULLY LAID OUT AND PATCHED TO ORIGINAL CONDITION. SEAL ALL EXTERIOR FLOOR AND WALL PENETRATIONS AS INDICATED.

CONTACT THE ENGINEER ONE-WEEK PRIOR TO COMPLETION OF ALL WORK TO SCHEDULE A SUBSTANTIAL COMPLETION INSPECTION. THE ENGINEER WILL GENERATE A PUNCH LIST OF CORRECTIVE ACTION ITEMS DURING THE INSPECTION. WORK WILL NOT BE CONSIDERED COMPLETE UNTIL ALL CORRECTIVE ACTION ITEMS IN THE ENGINEERS PUNCH LIST HAVE BEEN SATISFACTORILY COMPLETED AND PHOTOGRAPHIC OR OTHER POSITIVE DOCUMENTATION HAS BEEN PROVIDED TO THE ENGINEER.

PROVIDE ONE SET OF DRAWINGS CLEARLY MARKED UP WITH ALL AS-BUILT INFORMATION TO THE ENGINEER WITHIN TWO WEEKS OF COMPLETION.

** SPECIAL CONDITIONS **

ENSURE THAT APPROPRIATE SAFETY MEASURES ARE IMPLEMENTED AND THAT ALL WORKERS ARE AWARE OF THE POTENTIAL HAZARDS FROM ELECTRICAL SHOCK, BURN, ROTATING FANS, PULLEYS, BELTS, HOT MANIFOLDS, NOISE, ETC. ASSOCIATED WITH WORKING NEAR POWER GENERATION AND CONTROL EQUIPMENT.

** SUPPORTS AND FASTENERS **

SUPPORT PIPING AND EQUIPMENT AS SHOWN ON PLANS USING SPECIFIED SUPPORTS AND FASTENERS. IF NOT DETAILED ON PLANS, SUPPORT FROM STRUCTURAL MEMBERS WITH PIPE HANGERS, CLAMPS, OR PIPE STRAPS SPECIFICALLY INTENDED FOR THE APPLICATION. DO NOT SUPPORT PIPING FROM CONNECTIONS TO EQUIPMENT. INDEPENDENTLY SUPPORT PUMPS AND EQUIPMENT.

STRUT - COLD FORMED MILD STEEL CHANNEL STRUT, PRE-GALVANIZED FINISH AND SLOTTED BACK UNLESS SPECIFICALLY INDICATED OTHERWISE. STANDARD STRUT - 12 GA, 1-5/8" x 1-5/8", B-LINE B22-SH-GALV OR APPROVED EQUAL.

FITTINGS AND ACCESSORIES - PROVIDE FITTINGS, BRACKETS, CHANNEL NUTS, AND ACCESSORIES DESIGNED SPECIFICALLY FOR USE WITH SPECIFIED CHANNEL STRUT. GALVANIZED OR ZINC-PLATED CARBON STEEL.

PIPE CLAMPS - TWO-PIECE PIPE CLAMP DESIGNED TO SUPPORT PIPE TIGHT TO STRUT. B-LINE B20## OR APPROVED EQUAL. ZINC-PLATED CARBON STEEL. INSTALL RUBBER ISOLATION STRIP, B-LINE VIBRA CUSHION OR EQUAL, ON COPPER TUBING AND WHERE INDICATED.

FASTENERS - ALL BOLTS, NUTS, AND WASHERS ZINC-PLATED.

** PAINTING AND MARKING **

TOUCH UP - FINISH ALL CUT ENDS AND DAMAGED SURFACES OF GALVANIZED AND ZINC PLATED SUPPORTS AND FASTENERS WITH SPRAY ON COLD GALVANIZING COMPOUND, ZRC OR APPROVED EQUAL.

** INSULATION **

EXHAUST INSULATION - CUSTOM FIT THERMAL INSULATION PADS, DISTRIBUTION INTERNATIONAL OR APPROVED EQUAL.
HOT FACE LAYER: STAINLESS STEEL MESH.
INNER LAYER: 1" THICK CERAMIC BLANKET, 2000°F MIN. SERVICE RATING, THERMAL CERAMICS KAOWOOL OR EQUAL.
MID LAYER: 2" THICK HIGH TEMP FIBERGLASS BLANKET, 1000°F MIN. SERVICE RATING, JOHNS-MANVILLE HTB SPIN-GLAS OR EQUAL.
OUTER LAYER: PLAIN WEAVE CARMELIZED FIBERGLASS FABRIC, 17OZ WEIGHT, .028" THICKNESS, 1000°F MIN. SERVICE RATING, ALPHA-MARITEX STYLE 2025/9383 OR EQUAL.
PROVIDE ALL STAINLESS STEEL CLOSURE SYSTEM INCLUDING LACING ANCHORS, WASHERS AND WIRE.

** DIESEL FUEL AND LUBE OIL PIPING, VALVES & HOSES **

PROVIDE SPIRAL WOUND METALLIC GASKETS AND COAT WITH ANTI SEIZE COMPOUND PRIOR TO ASSEMBLING FLANGED JOINTS.

ELECTRIC ACTUATOR VALVES - LOW TEMPERATURE ACTUATED BALL VALVE ASSEMBLY RATED TO -50 DEG F. TYPE 304 STAINLESS STEEL FABRICATED COUPLING BRACKET, SHAFT, AND FASTENERS CONFIGURED TO ALLOW WRENCH ACCESS FOR MANUAL OPERATION OF VALVE WITHOUT REMOVING ACTUATOR. DG VALVE, OR EQUAL. LOW TEMP BALL VALVE, 150# RF FLANGED ENDS, NUTRON, NO SUBSTITUTES. ELECTRIC ACTUATOR WITH OPERATING VOLTAGE, NEMA RATING, AND TORQUE AS INDICATED. CONFIGURE WITHOUT MANUAL OVERRIDE SHAFT EXTENSION. FURNISH WITH PTC SELF REGULATING HEATER, AUXILIARY SWITCH SET (AUXILIARY SWITCHES 3 & 4), AND EXXON BEACON 325 SEVERE COLD LUBRICANT.

1" BALL VALVE - 151 IN-LB OPERATING TORQUE @ -50 DEG F.
NUTRON MODEL T3-R10R01LZ-06, NO SUBSTITUTES.

1" 120VAC NEMA 7 ACTUATOR - 600 IN-LBS TORQUE, 10 SECOND STROKE TIME, 0.50 LOCKED ROTOR AMPS. RCS MODEL SXR-1023, NO SUBSTITUTES.

SMALL HOSES - FUEL RATED HOSE, EATON WEATHERHEAD H569 OR APPROVED EQUAL. SIZE AS INDICATED ON DRAWINGS. PROVIDE RE-USABLE PLATED STEEL JIC SWIVEL ENDS, STRAIGHT OR 90° AS REQUIRED, WITH NPT ADAPTERS.

** CRANKCASE VENTILATION PIPING & HOSE **

CRANK VENT PIPING - TYPE "L" HARD DRAWN COPPER TUBE WITH WROUGHT COPPER FITTINGS. ALL JOINTS SOLDERED WITH 95/5 TIN/ANTIMONY SOLDER OR SILVER SOLDER.

CRANK VENT HOSE - HEAVY DUTY OIL RESISTANT PVC SUCTION HOSE. TIGERFLEX ORV OR APPROVED EQUAL. INSTALL ON BARBED HOSE (KING) NIPPLES AND FASTEN WITH LINED STAINLESS STEEL T-BOLT CLAMPS, NYCO SUPRA W2 OR APPROVED EQUAL.

** GLYCOL VALVES, AND SPECIALTIES **

GLYCOL THREADED CONNECTIONS - COVER MALE THREAD ENDS WITH TEFLON TAPE AND COAT FEMALE THREAD CONNECTIONS WITH TEFLON PASTE PRIOR TO ASSEMBLY.

ENGINE COOLANT HOSES - SIZE AS INDICATED ON DRAWINGS. WIRE REINFORCED CORRUGATED SILICONE HOSE, PARKER 6621, TUSIL RADFLEX, OR APPROVED EQUAL. INSTALL WITH STAINLESS STEEL T-BOLT CLAMPS.

BUTTERFLY VALVES - LUG STYLE DUCTILE OR CAST IRON BODY, ANSI 150# FLANGE PATTERN ENDS, STAINLESS STEEL STEM WITH BRONZE BUSHING, BRONZE DISC, EPDM SEATS, LOCKING HANDLE. MILWAUKEE ML-233E, BRAY SERIES 31, OR APPROVED EQUAL.

FLANGED IRON BODY SWING CHECK VALVES - IRON BODY, ANSI 125# FLANGED ENDS, BRONZE SEATS, SWING CHECK STYLE. MILWAUKEE F-2974A OR APPROVED EQUAL.

GAUGE COCK - BRASS BODY, MPT BY FPT ENDS, T-HANDLE. LEGEND VALVE ITEM 101-531 (1/4") OR ITEM 101-532 (3/8"), OR APPROVED EQUAL. INSTALL ON ALL AIR VENTS, PRESSURE GAUGES, SMALL HOSE CONNECTIONS, AND WHERE INDICATED.

GLYCOL FILTER: SCREW-ON CANISTER STYLE FILTER ELEMENT WITH 3/8" NPT CONNECTIONS ON HEAD, WIX #24019 (NAPA 4019) HEAD WITH #24069 (NAPA 4069) ELEMENT OR APPROVED EQUAL.

** INSTRUMENTATION **

PRESSURE GAUGE - 2-1/2" DIAL SIZE, DRY TYPE, STAINLESS STEEL CASE, TUBE, AND SOCKET, 1/4" NPT BOTTOM CONNECTION. TRERICE NO. 700SS-25, OR APPROVED EQUAL.
0-15 PSI 700SS-25-02-L-A-080 0-100 PSI 700SS-25-02-L-A-110

DIGITAL THERMOMETER - SOLAR POWERED, LCD DISPLAY, -50 TO +300 F RANGE OR DUAL F/C RANGE, 1% OF READING ACCURACY, VARIABLE ANGLE DISPLAY, 3-1/2" STEM LENGTH WEISS DVU35 OR APPROVED EQUAL, PROVIDE WITH A 3/4" NPT BRASS THERMOWELL.

ISSUED FOR CONSTRUCTION
JUNE 2019

STATE OF ALASKA 49TH
BRIAN C. GRAY
ME 8210
REGISTERED PROFESSIONAL ENGINEER

PROJECT: 2019 TULUKSAK POWER PLANT M&I PROJECT

TITLE: SCHEDULE OF DRAWINGS & MECHANICAL SPECIFICATIONS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD | SCALE: NO SCALE
DESIGNED BY: BCG | DATE: 6/17/19
FILE NAME: TULUKM&I M1-M4 | SHEET: M1.1 OF 4
PROJECT NUMBER:

BASE BID TASKS SPECIFIC NOTES:

A> THE COOLING SYSTEM CLEAN/FLUSH/REPAIR TASK INCLUDES:
- FLUSH & CLEAN ENGINE COOLING SYSTEM
- PRESSURE WASH/DEGREASE BOTH RADIATOR CORES
- REPLACE BUTTERFLY VALVES & CHECK VALVES
- REPAIR THERMOSTATIC VALVE
- INSTALL NEW THERMOMETERS, PRESSURE GAUGES, AND SITE GAUGE
- INSTALL NEW SILICONE HOSES
- FILL SYSTEM WITH NEW COOLANT

HATCHED AREA INDICATES THE EXTENTS OF THE ENGINE COOLING SYSTEM PIPING. COOLING SYSTEM PIPING AND EQUIPMENT NOT SHOWN THIS VIEW FOR CLARITY. SEE ISOMETRIC 1/M2 FOR ADDITIONAL TASK DETAILS.

B> GENSET #3 UPGRADES: SEE PLAN & ELEVATION 1/M3 AND SHEET E1.

C> FIRE EXTINGUISHERS: INSTALL 5 EACH WALL-MOUNT TYPE 3A-40BC FIRE EXTINGUISHERS WHERE INDICATED ON PLANS.

D> TEST AND CALIBRATE RADIATOR VFD'S, SEE ELECTRICAL.

E> THE EXISTING OVERHEAD DOOR IS CURRENTLY INOPERABLE, SEE ADDITIVE ALTERNATE ITEM 8A. MANUALLY OPEN DOOR AS REQUIRED FOR CONSTRUCTION ACTIVITIES. LEAVE DOOR CLOSED AND SECURE UPON COMPLETION.

F> G> H> SEE ELECTRICAL

ADDITIVE ALTERNATE TASKS SPECIFIC NOTES:

1A> GENSET #2 UPGRADES: SEE PLAN & ELEVATION 2/M3 AND SHEET E1. NOTE THAT THE EXISTING ENGINE IS OLD AND IN MARGINAL RUNNING CONDITION. IN ADDITION TO UPGRADE WORK SHOWN ON DRAWINGS PERFORM A DETAILED INSPECTION AND DIAGNOSTIC CHECK TO DETERMINE EXTENT OF PROBLEMS. PROVIDE A FIELD REPORT WITH ALL IDENTIFIED DEFICIENCIES, AND PROVIDE A QUOTE TO REPAIR ENGINE TO GOOD RUNNING CONDITION. (QUOTE ONLY THIS TASK, ACTUAL REPAIRS TO BE A SEPARATE WORK ORDER).

2A> THE 1" FLANGED ACTUATED BALL VALVE AT THE DAY TANK SUPPLY PIPELINE CONNECTION TO THE INTERMEDIATE TANK HAS FAILED AND IS CURRENTLY HELD OPEN WITH A WRENCH. REPLACE THE COMPLETE ACTUATED BALL VALVE ASSEMBLY. SEE DETAIL 3/M2 FOR REPLACEMENT.

3A> VENTILATION SERVICE AND REPAIR:
- FURNISH 32 EACH 18"x18"x1" THICK STANDARD FURNACE FILTERS
- INSTALL 16 FILTERS (4 FILTERS IN EACH OF 4 INTAKES) AND LEAVE 16 SPARES ON SITE
- INSTALL NEW BELIMO MODEL AF-BUP ACTUATORS ON RADIATOR R-1 & R-2 AIR INTAKE DAMPERS
- INSTALL NEW BELIMO MODEL AF-BUP ACTUATOR ON EXHAUST FAN EF-3 DAMPER
- RECONNECT ALL DAMPER LINKAGES AND WIRING AND TEST TO CONFIRM PROPER OPERATION

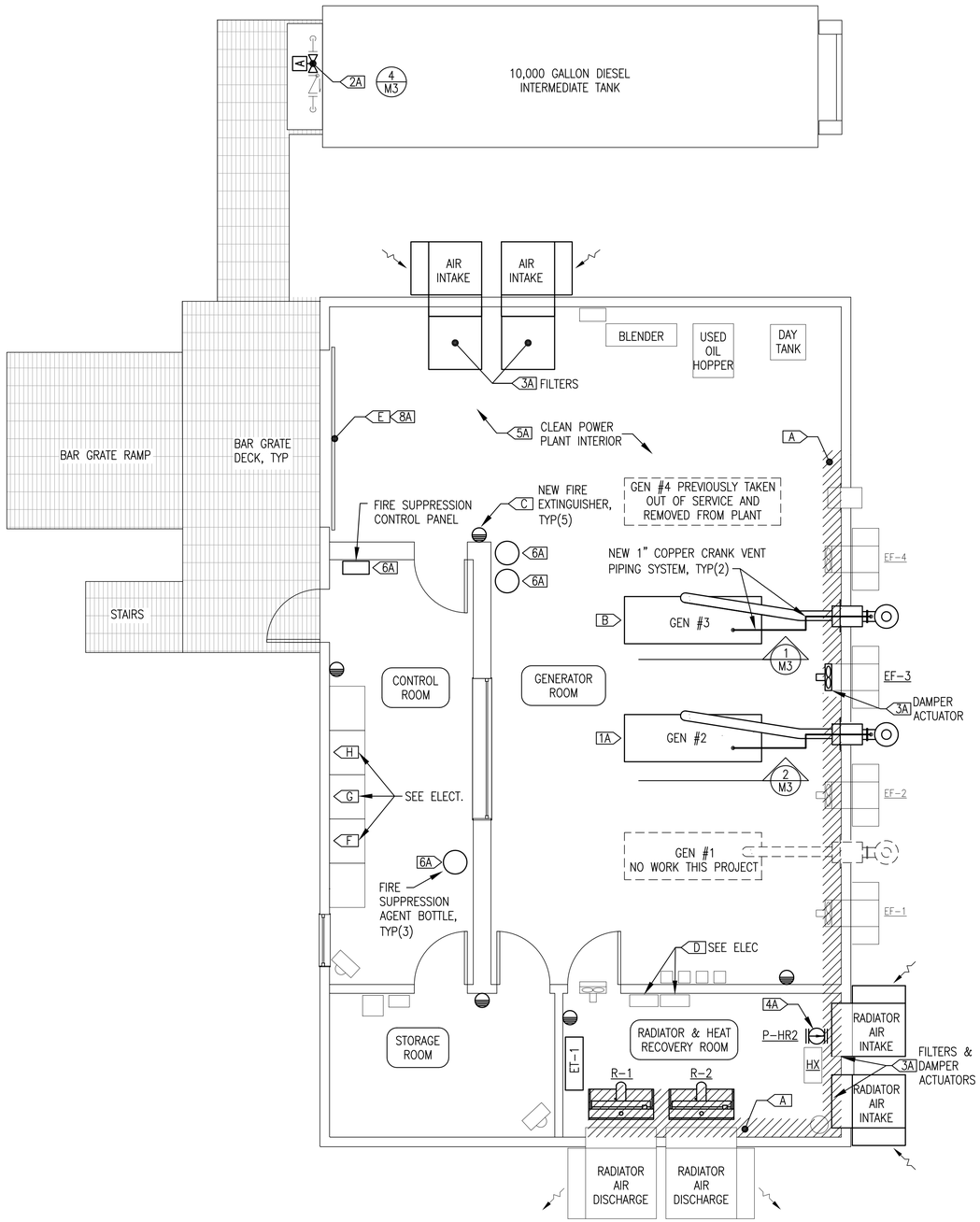
4A> HEAT RECOVERY PUMP P-HR2 PROVIDES HEAT TO THE PARTS ROOM AND CONTROL ROOM. THE EXISTING PUMP HAS FAILED. SEE ISOMETRIC 2/M2 FOR HEATING SYSTEM REPAIR DETAILS.

5A> ALL GENERATION ROOM SURFACES HAVE BEEN COATED WITH AN OIL FILM DUE TO IMPROPER VENTILATION OF CRANKCASE FUMES OVER MANY YEARS. DEGREASE AND CLEAN ALL INTERIOR SURFACES INCLUDING WALLS, CEILING, FLOOR, EQUIPMENT ENCLOSURES, LIGHT FIXTURES, PIPING AND TANKS WITH HEAVY DUTY INDUSTRIAL CLEANER/DEGREASER.

6A> THE FIRE SUPPRESSION SYSTEM IS EQUIPPED WITH A FIKE CHEETAH MODEL 10-052 CONTROL PANEL AND FM-200 AGENT BOTTLES. IT IS CURRENTLY OUT OF COMMISSION WITH MULTIPLE SENSOR FAULT INDICATIONS, LOW BOTTLE PRESSURES AND MISSING CONTROL PANEL BATTERIES. INSPECT THE FIRE SUPPRESSION SYSTEM WITH A CERTIFIED FIRE SYSTEM INSTALLER, PROVIDE A FIELD REPORT WITH ALL IDENTIFIED DEFICIENCIES, AND PROVIDE A QUOTE TO CORRECT ALL IDENTIFIED DEFICIENCIES. (QUOTE ONLY THIS TASK, ACTUAL REPAIRS AND RECERTIFICATION TO BE A SEPARATE WORK ORDER).

7A> REMOVE FROM SITE ALL DRUMS OF USED GLYCOL AND CLEANING SOLUTION DRAINED FROM SYSTEM UNDER BASE BID WORK AND DISPOSE OF IN ACCORDANCE WITH APPLICABLE STATE AND FEDERAL REGULATIONS.

8A> THE EXISTING 10'-2"Wx10'-0"H OVERHEAD DOOR IS CURRENTLY INOPERABLE. CURRENT DEFICIENCIES INCLUDE: 1) BOTTOM 10'-2"x24"x2" INSULATED METAL PANEL IS DAMAGED BEYOND REPAIR; 2) BOTH CABLES ARE BROKEN; AND 3) BOTH SPRINGS ARE UNWOUND AND IN NEED OF RE-TENSIONING. INSPECT THE OVERHEAD DOOR ASSEMBLY FOR THESE AND ANY OTHER REQUIRED REPAIRS AND PROVIDE A REPAIR QUOTE, INCLUDING LABOR AND DETAILED ITEMIZED PARTS LIST. (QUOTE ONLY THIS TASK, ACTUAL REPAIRS TO BE A SEPARATE WORK ORDER)



1 M1.2 MECHANICAL WORK PLAN
1/4"=1'-0"

ISSUED FOR CONSTRUCTION JUNE 2019

STATE OF ALASKA 49TH BRIAN C. GRAY ME 8210 REGISTERED PROFESSIONAL ENGINEER

PROJECT: 2019 TULUKSAK POWER PLANT M&I PROJECT

TITLE: MECHANICAL WORK PLAN & NOTES

Gray Stassel Engineering, Inc.
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DRAWN BY: JTD | SCALE: NO SCALE
DESIGNED BY: BCG | DATE: 6/17/19
FILE NAME: TULUKM&I M1-M4 | SHEET: M1.2 OF 4
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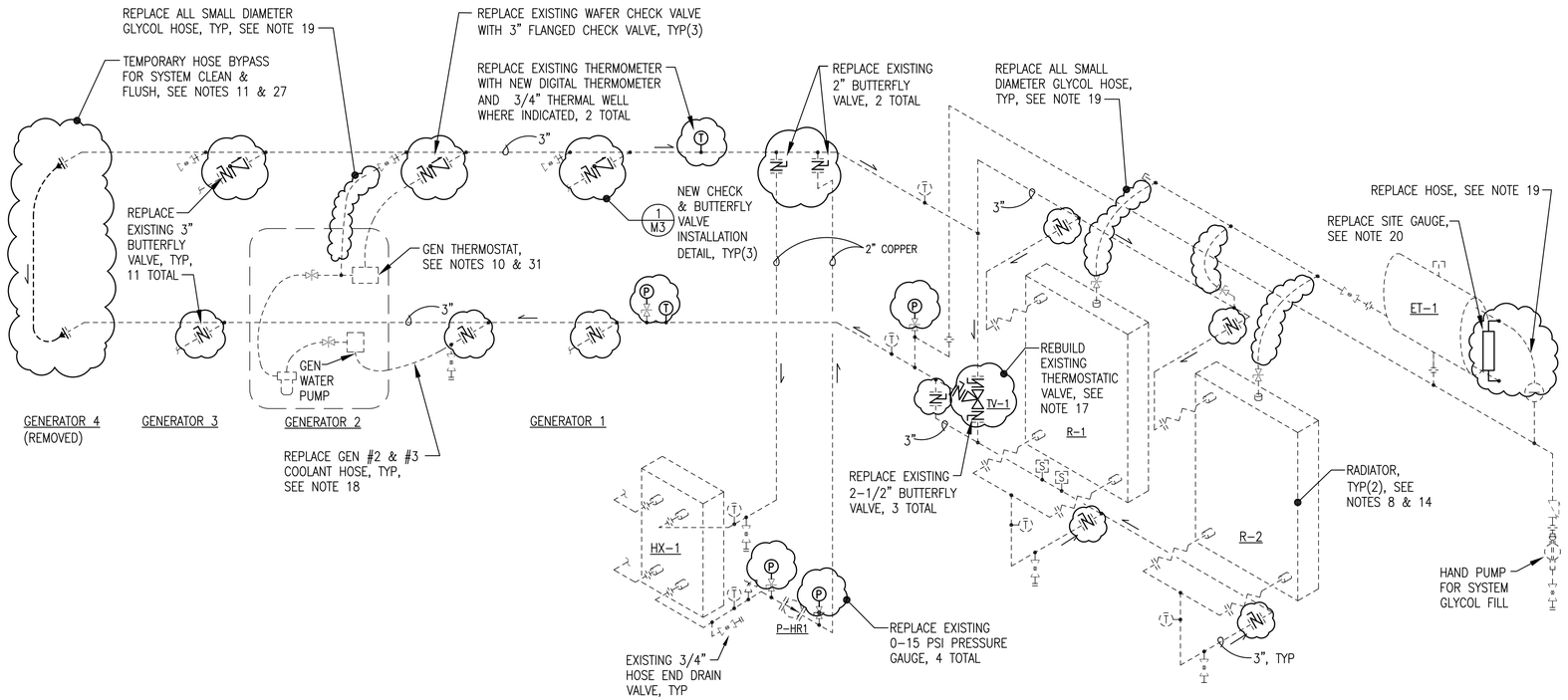


1 M2 BASE BID TASK A ENGINE COOLANT SYSTEM CLEAN/FLUSH/REPAIR ISOMETRIC

NO SCALE

ENGINE COOLING SYSTEM GENERAL NOTES:

1. ALL WORK INDICATED THIS ISOMETRIC IS INCLUDED IN BASE BID TASK A UNLESS SPECIFICALLY INDICATED OTHERWISE.
2. EXISTING ENGINE COOLING SYSTEM PIPING & DEVICES TO REMAIN UNCHANGED SHOWN WITH LIGHT DASHED LINES.
3. EXISTING ENGINE COOLING SYSTEM VALVES AND DEVICES TO BE REPLACED SHOWN WITH DARK SOLID LINES AND CLOUD OUTLINE.
4. ALL PIPING WELDED STEEL EXCEPT WHERE SPECIFICALLY NOTE OTHERAISE. ALL FLANGES ANSI 150# PATTERN.
5. ENGINE COOLANT SYSTEM VOLUME IS APPROXIMATELY 100 GALLONS. PROVIDE A MINIMUM OF 5 EACH NEW EMPTY 55 GALLON DRUMS TO CONTAIN CONTAMINATED COOLANT AND CLEANING SOLUTION.
6. PROVIDE 2 EACH 55 GALLON DRUMS NEW EXTENDED LIFE ETHYLENE GLYCOL SOLUTION, SHELL ROTELLA ELC OR APPROVED EQUAL, PRE-MIXED TO A RATIO OF 60% GLYCOL TO 40% WATER
7. THE COMMUNITY IS CURRENTLY BEING POWERED BY A SELF CONTAINED EMERGENCY GENSET. THE POWER PLANT FEEDER BREAKER IS CLOSED AND THE BUS IS ENERGIZED TO PROVIDE POWER PLANT STATION SERVICE POWER. GENERATOR #2 WILL BE RUN OFF-LINE TO ALLOW THE ENGINE WATER PUMP TO CIRCULATE THE CLEANING SOLUTION DURING THE FOLLOWING CLEANING & FLUSHING PROCEDURE.

STEP 1: ENGINE COOLING SYSTEM DRAIN/CLEAN

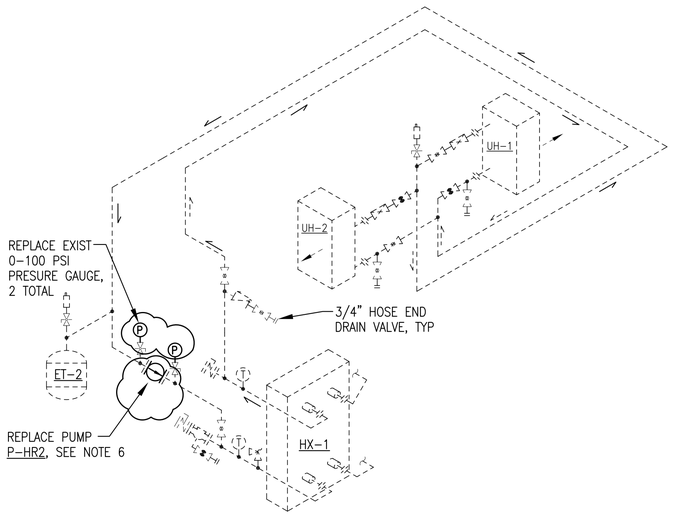
8. CLEAN AND DEGREASE RADIATOR AIR SURFACES. PRESSURE WASH TO REMOVE ALL DEBRIS.
9. DRAIN THE EXISTING COOLANT INTO DRUMS AND TURN OVER TO UTILITY. SEE ADDITIVE ALTERNATE TASK 7A, SHEET M1.2 FOR OPTIONAL DISPOSAL.
10. REMOVE GENERATOR #2 THERMOSTAT TO ENSURE FULL FLOW IN PIPING FROM ENGINE WATER PUMP.
11. PRIOR TO CLEANING THE SYSTEM INSTALL 3/4" TEMPORARY HOSE BYPASS IN MANIFOLD TO ALLOW FLOW THROUGH ALL SECTIONS OF THE MANIFOLD DURING SYSTEM CLEANING. REMOVE EXISTING (ABANDONED) GEN #4 CONNECTION FITTINGS AND INSTALL 3" THREADED FLANGE. INSTALL 3"x1-1/2" BUSHING, 1-1/2"x3/4" BUSHING AND 3/4" KING NIPPLE IN THREADED FLANGE. CONNECT 3/4" RUBBER HOSE BETWEEN KING NIPPLES. SEE ISOMETRIC FOR LOCATION.
12. FILL SYSTEM WITH HEAVY DUTY ALKYLINE-BASED ENGINE CLEANING SOLUTION, CUMMINS FLEETGUARD RESTORE, OR EQUAL, I GALLON (OR 4 LITRES) PER 10 GALLONS OF FRESH WATER.
13. START GENERATOR #2 AND OPERATE OFF-LINE AT 1,800 RPM TO CIRCULATE THE CLEANING SOLUTION. TURN ON PUMP P-HR1 TO ENSURE FLOW THROUGH THE HEAT EXCHANGER. OPERATE GEN #2 FOR 24 HOURS MINIMUM.
14. ALLOW CIRCULATION THROUGH ONE RADIATOR AT A TIME TO MAXIMIZE CLEANING SOLUTION FLOW VELOCITY THROUGH THE RADIATOR CORES. ALTERNATE BETWEEN THE TWO RADIATORS FOR APPROXIMATELY EQUAL TIME.
15. SHUT DOWN GENERATOR #2 AND LOCK OUT. TURN OFF PUMP P-HR1.

STEP 2: ENGINE COOLING SYSTEM DRAIN/REFURBISHMENT/FLUSH

16. DRAIN THE SYSTEM WITHIN 1/2 HOUR OF ENGINE SHUT DOWN TO AVOID SETTLING OUT SOLIDS. DRAIN THE USED CLEANING SOLUTION INTO DRUMS AND TURN OVER TO UTILITY. SEE ADDITIVE ALTERNATE TASK 7A, SHEET M2.1 FOR OPTIONAL DISPOSAL.
17. REBUILD EXISTING FPE MODEL A2510-180 THERMOSTATIC VALVE. PROVIDE FPE MODEL 2500 REPAIR KIT INCLUDING NEW COVER GASKET, 2 EACH NEW LIP SEALS, AND 2 EACH 180F THERMOSTATIC ELEMENTS.
18. REPLACE GEN #2 AND GEN #3 SUCTION AND DISCHARGE COOLANT HOSES. PROVIDE 2" SILICONE HOSE AND NEW CLAMPS.
19. REPLACE ALL SMALL DIAMETER GLYCOL HOSE FOR 2 EACH ENGINE VENT/PREHEAT CONNECTIONS, 2 EACH RADIATOR AIR VENTS, 1 PIPING HIGH POINT VENT, AND COOLANT LEVEL SWITCH TOP CONNECTION TO EXPANSION TANK. PROVIDE 1/2" SILICONE HOSE AND NEW CLAMPS AND INSTALL ON 5/8" BARB x 1/4" (3/8") (1/2") NPT KING NIPPLES AS REQUIRED.
20. REMOVE EXISTING SITE GAUGE, INSTALL 1/2" THREADED BRASS OR BRONZE STREET ELBOWS, AND INSTALL NEW SITE GAUGE. BOROSILICATE GLASS TUBE, ALUMINUM BODY, BUNA N SEALS, 1/2" MPT CONNECTIONS, 9" CENTERS. LUBE DEVICES G607-09-A-1-4 OR APPROVED EQUAL.
21. COMPLETE ALL OTHER COOLING SYSTEM REFURBISHMENT WORK SHOWN IN CLOUDED AREAS ON ISOMETRIC INCLUDING VALVE REPLACEMENTS AND INSTRUMENTATION REPLACEMENTS.
22. PROVIDE NEW CAP SCREWS FOR LUG STYLE BUTTERFLY VALVES. PROVIDE NEW BOLT SETS AND NEW FULL FACE GASKETS FOR ALL FLANGE CONNECTIONS AS REQUIRED.
23. FILL SYSTEM WITH FRESH WATER.
24. START GENERATOR #2 AND OPERATE OFF-LINE AT 1,800 RPM TO PROVIDE SYSTEM FLUSH. TURN ON PUMP P-HR1. BRING SYSTEM UP TO OPERATING TEMPERATURE. OPERATE GEN #2 FOR AN ADDITIONAL 2 HOURS MINIMUM. CAREFULLY INSPECT THE ENTIRE SYSTEM FOR ANY LEAKS WHILE FLUSHING. IF ANY LEAKS ARE DETECTED, SHUT OFF GENERATOR, REPAIR AS REQUIRED, AND BEGIN THIS STEP OVER.
25. SHUT DOWN GENERATOR #2 AND LOCK OUT. TURN OFF PUMP P-HR1.

STEP 3: ENGINE COOLING SYSTEM DRAIN/FILL

26. DRAIN THE WATER AND USE LOW PRESSURE AIR TO BLOW OUT AS MUCH RESIDUAL FLUSH WATER AS POSSIBLE.
27. REMOVE THE TEMPORARY 3/4" HOSE BYPASS AND INSTALL 3/4" PLUGS IN THREADED FLANGES, SEE ISOMETRIC.
28. FILL SYSTEM WITH A SOLUTION OF EXTENDED LIFE ETHYLENE GLYCOL, SHELL ROTELLA ELC OR APPROVED EQUAL, PRE-MIXED TO A RATIO OF 60% GLYCOL TO 40% WATER.
29. START GENERATOR #2 AND OPERATE OFF-LINE AT 1,800 RPM TO PROVIDE SYSTEM FINAL TEST. TURN ON PUMP P-HR1. BRING SYSTEM UP TO OPERATING TEMPERATURE. OPERATE GEN #2 FOR AN ADDITIONAL 2 HOURS MINIMUM. CAREFULLY PURGE ALL AIR FROM SYSTEM AND INSPECT THE ENTIRE SYSTEM FOR ANY LEAKS. ENSURE THAT COOLANT LEVEL IS MID WAY ON EXPANSION TANK SITE GUAGE AT CONCLUSION OF TEST.
30. SHUT DOWN GENERATOR #2 AND LOCK OUT. TURN OFF PUMP P-HR1.
31. REINSTALL GENERATOR #2 THERMOSTAT WITH NEW GASKETS.

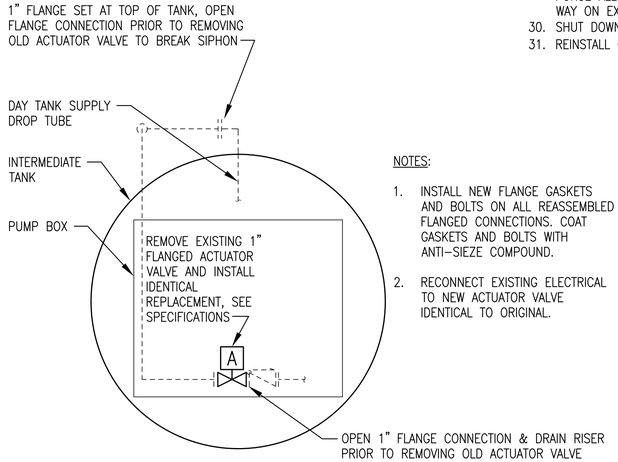


2 M2 ADDITIVE ALTERNATE TASK 4A HEATING SYSTEM REPAIRS ISOMETRIC

NO SCALE

HEATING SYSTEM REPAIRS NOTES:

1. ALL WORK INDICATED THIS ISOMETRIC IS INCLUDED IN ADDITIVE ALTERNATE TASK 1A UNLESS SPECIFICALLY INDICATED OTHERWISE.
2. EXISTING HEATING SYSTEM PIPING & DEVICES TO REMAIN UNCHANGED SHOWN WITH LIGHT DASHED LINES.
3. EXISTING HEATING SYSTEM EQUIPMENT TO BE REPLACED SHOWN WITH DARK SOLID LINES AND CLOUD OUTLINE.
4. HEATING SYSTEM VOLUME IS APPROXIMATELY 10 GALLONS. PROVIDE DRUM STORAGE CAPACITY FOR DRAINING SYSTEM.
5. DRAIN THE EXISTING HEATING SYSTEM FLUID INTO DRUM AND TURN OVER TO UTILITY. SEE ADDITIVE ALTERNATE TASK 7A, SHEET M1.2 FOR OPTIONAL DISPOSAL.
6. REPLACE EXISTING PUMP P-HR2 WITH NEW PUMP. EXISTING 3/4" COMPANION FLANGES TO REMAIN. PROVIDE NEW GRUNDOS UPS15-58FC PUMP WITH NEW GASKETS AND BOLT. SET TO SPEED 1. 2. RECONNECT EXISTING ELECTRICAL TO NEW PUMP IDENTICAL TO ORIGINAL.
7. FILL HEATING SYSTEM WITH WATER, TURN ON PUMP P-HR2 AND RUN FOR 1 HOUR TO FLUSH SYSTEM. CAREFULLY INSPECT THE ENTIRE SYSTEM FOR ANY LEAKS. IF ANY LEAKS ARE DETECTED, SHUT OFF PUMP, REPAIR AS REQUIRED, AND REPEAT.
8. DRAIN THE WATER AND USE LOW PRESSURE AIR TO BLOW OUT AS MUCH RESIDUAL FLUSH WATER AS POSSIBLE
9. FILL HEATING SYSTEM WITH A SOLUTION OF EXTENDED LIFE ETHYLENE GLYCOL, SHELL ROTELLA ELC OR APPROVED EQUAL, PRE-MIXED TO A RATIO OF 60% GLYCOL TO 40% WATER.
10. TURN ON PUMP P-HR2 FOR 1 HOUR. PURGE ALL AIR FROM SYSTEM. FILL TO A PRESSURE OF 20 PSIG MINIMUM WITH SYSTEM COLD OR 30 PSIG WITH SYSTEM HOT AND INSPECT THE ENTIRE SYSTEM FOR ANY LEAKS.



NOTES:

1. INSTALL NEW FLANGE GASKETS AND BOLTS ON ALL REASSEMBLED FLANGED CONNECTIONS. COAT GASKETS AND BOLTS WITH ANTI-SIEZE COMPOUND.
2. RECONNECT EXISTING ELECTRICAL TO NEW ACTUATOR VALVE IDENTICAL TO ORIGINAL.

3 M2 ADDITIVE ALTERNATE TASK 2A ACTUATOR VALVE REPLACEMENT

1/4"=1'-0"

ISSUED FOR CONSTRUCTION
JUNE 2019

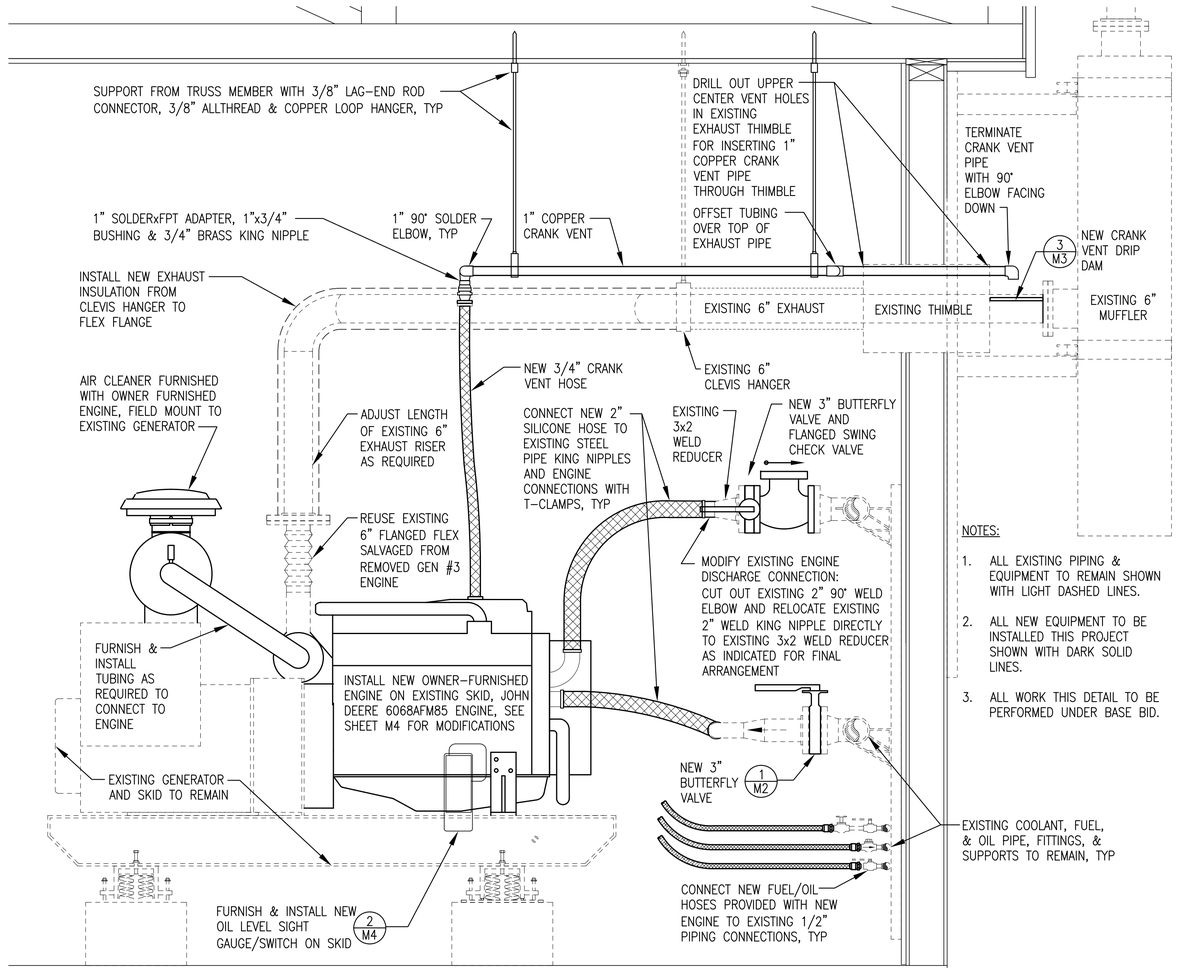
STATE OF ALASKA 49TH
BRIAN C. GRAY
ME 8210
REGISTERED PROFESSIONAL ENGINEER

PROJECT: 2019 TULUKSAK POWER PLANT M&I PROJECT

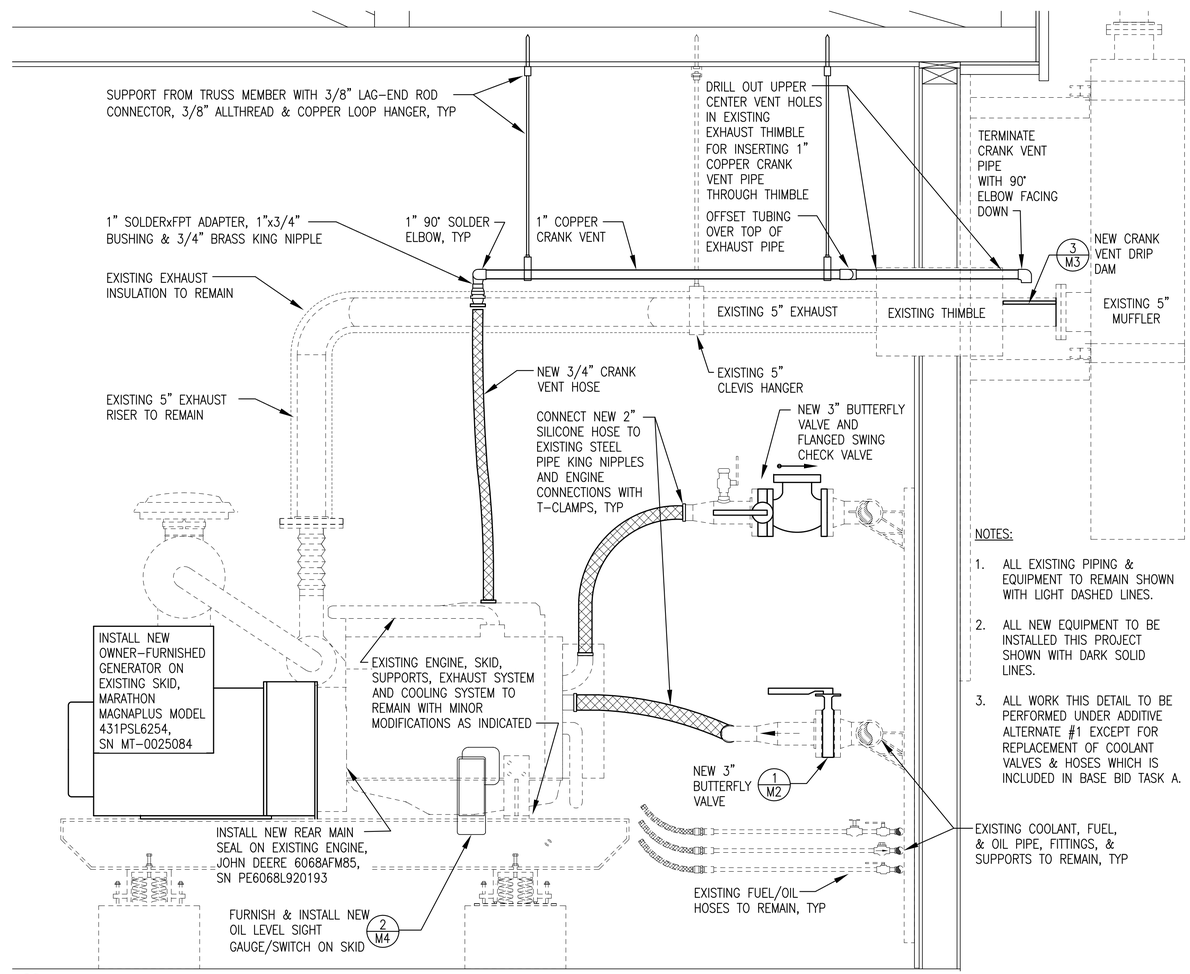
TITLE: PIPING DETAILS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

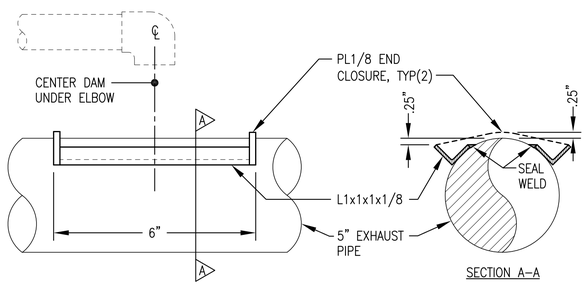
DRAWN BY: JTD | SCALE: NO SCALE
DESIGNED BY: BCG | DATE: 6/17/19
FILE NAME: TULUKM&I M1-M4 | SHEET: M2 OF 4
PROJECT NUMBER:



1 M3 BASE BID TASK B GEN #3 ENGINE REPLACEMENT & MISC. UPGRADES ELEVATION
3/8"=1'-0"



2 M3 ADDITIVE ALTERNATE 1A GEN #2 GENERATOR REPLACEMENT AND MISC. UPGRADES ELEVATION
3/8"=1'-0"



3 M3 CRANKCASE DRIP DAM FABRICATION DETAIL
NO SCALE

ISSUED FOR CONSTRUCTION JUNE 2019

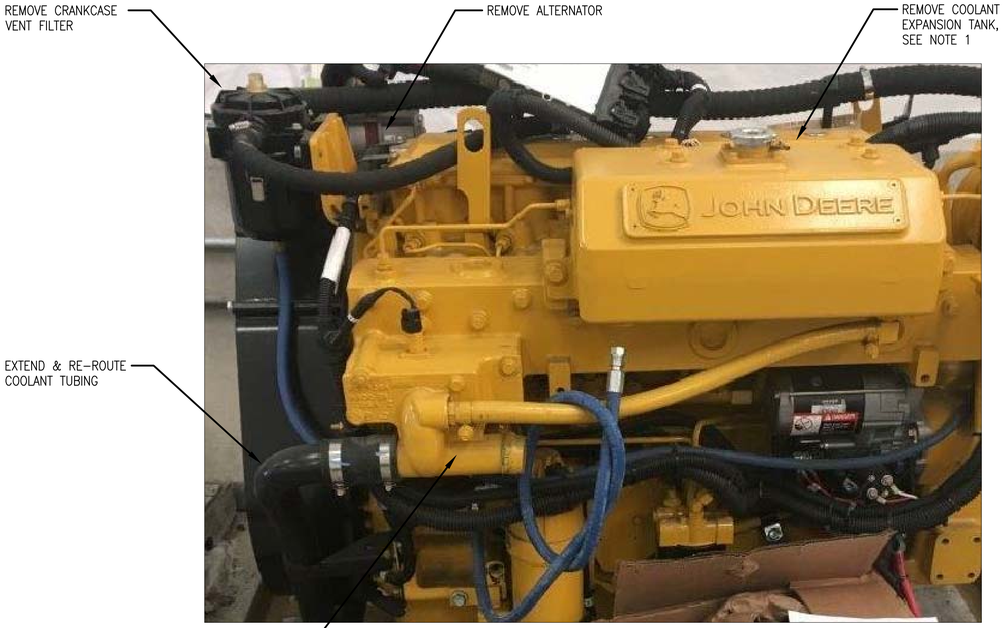
STATE OF ALASKA 49TH BRIAN C. GRAY ME 8210 REGISTERED PROFESSIONAL ENGINEER

PROJECT: 2019 TULUKSAK POWER PLANT M&I PROJECT

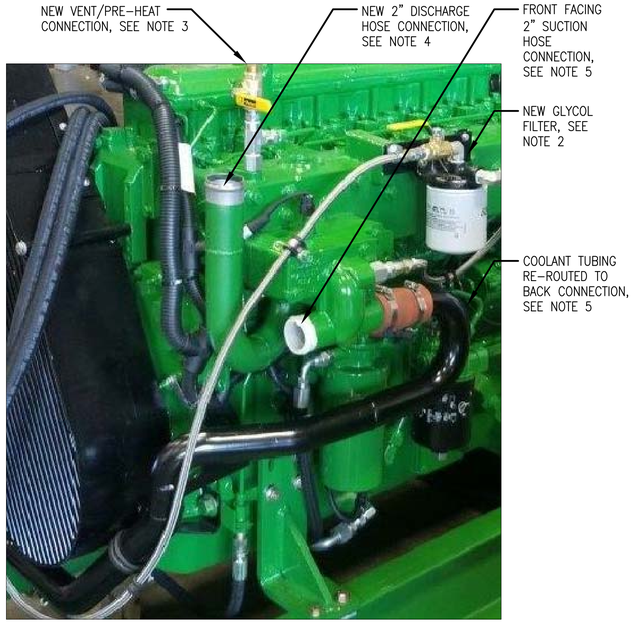
TITLE: GENSETS #2 & #3 UPGRADE DETAILS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 6/17/19
FILE NAME: TULUKM&I M1-M4	SHEET: M3 OF 4
PROJECT NUMBER:	



PRIOR TO MODIFICATION



AFTER MODIFICATION

ENGINE MODIFICATION NOTES:

1. REMOVE FACTORY-INSTALLED ACCESSORIES: REMOVE COOLANT TANK, ALTERNATOR, CRANKCASE FILTER AND ANY OTHER ACCESSORIES THAT ARE NOT REQUIRED.
2. INSTALL GLYCOL FILTER: PROVIDE SCREW-ON CANISTER STYLE FILTER ELEMENT WITH 3/8" NPT CONNECTIONS ON HEAD, WIX #24019 HEAD WITH #24069 ELEMENT OR APPROVED EQUAL. MOUNT HEAD ON STEEL BRACKET FIXED TO FRONT OR SIDE OF ENGINE. CONNECT TO ENGINE WITH GLYCOL HOSES WITH 3/8" NPT QUARTER TURN GAUGE COCK ISOLATION VALVES. CONNECT INLET TO THERMOSTAT HOUSING AND CONNECT OUTLET TO WATER PUMP INLET.
3. INSTALL VENT/PRE-HEAT CONNECTION: ON THERMOSTAT HOUSING PROVIDE 3/8" NPT TEE FITTING FOR ENGINE VENT/PRE-HEAT. PROVIDE PLUG IN BRANCH TEE FOR FIELD ENGINE PRE-HEAT CONNECTION. PROVIDE 3/8" NPT QUARTER TURN GAUGE COCK ISOLATION VALVE WITH 5/8" BARB x 3/8" NPT BRASS KING NIPPLE FOR FIELD CONNECTION OF 1/2" SILICONE HOSE.
4. MODIFY COOLANT DISCHARGE CONNECTION: MODIFY FOR 2" HOSE CONNECTION TO FACE VERTICALLY AT THE FRONT OF THE ENGINE. SEE PHOTO FOR ARRANGEMENT.
5. MODIFY COOLANT SUCTION CONNECTION: REROUTE ENGINE COOLANT TUBING TO BACK OF SUCTION CONNECTION HOUSING AS REQUIRED AND MODIFY FOR 2" HOSE CONNECTION TO FACE HORIZONTALLY AT THE FRONT OF THE ENGINE. SEE PHOTO FOR ARRANGEMENT.

NOTE: THIS PICTURE SHOWS THE OWNER FURNISHED ENGINE, SERIAL # PE6068L920596, IN PRESENT CONFIGURATION.

NOTE: THIS PICTURE SHOWS A COMPARABLE ENGINE FROM A PRIOR PROJECT IN FINAL CONFIGURATION.

1 M4 GENSET #3 ENGINE MODIFICATIONS

NO SCALE

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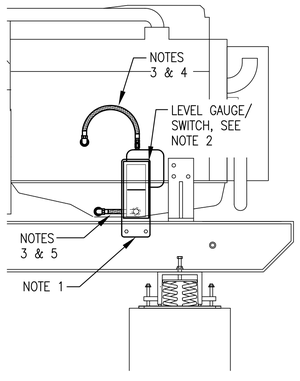


NOTES:

1) 1/4" STEEL SUPPORT PLATE PRE-DRILLED TO MATCH GAUGE/SWITCH MOUNTS, CHANNEL SKID HOLES AND BOTTOM HOSE ENTRANCE. BOLT TO INSIDE (BACK) OF CHANNEL SKID AT HEIGHT AS REQUIRED TO CENTER GAUGE AT NORMAL FULL OIL LEVEL. ADJUST SWITCH CONTACTS 1/2" ABOVE & BELOW.
2) MURPHY EL-150-K1 OIL LEVEL GAUGE/SWITCH OR EQUAL. MOUNT TO STEEL SUPPORT PLATE WITH RUBBER SHOCK MOUNTS.
3) #8 HOSE WITH 1/2" OR 3/8" NPT JIC SWIVEL ENDS AS REQUIRED.
4) CONNECT TOP (VENT) PORT TO ENGINE CRANK CASE WITH HOSE. ROUTE UPPER HOSE TO AVOID LOW POINT TRAPS.
5) CONNECT BOTTOM PORT TO ENGINE OIL PAN WITH HOSE. DO NOT TEE INTO OIL DRAIN LINE. ROUTE LOWER HOSE BACK THROUGH PRE-DRILLED HOLE IN STEEL PLATE.

2 M4 TYPICAL OIL LEVEL GAUGE/SWITCH FIELD INSTALLATION

NO SCALE

ISSUED FOR CONSTRUCTION JUNE 2019

STATE OF ALASKA 49TH BRIAN C. GRAY ME 8210 REGISTERED PROFESSIONAL ENGINEER

PROJECT: 2019 TULUKSAK POWER PLANT M&I PROJECT

TITLE: GENSET #3 ENGINE MODIFICATION DETAILS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 6/17/19
FILE NAME: TULUKM&I M1-M4	SHEET: M4 OF 4
PROJECT NUMBER:	

GENERAL NOTES:

1) COMMUNITY POWER IS CURRENTLY PROVIDED BY AN OUTDOOR STAND ALONE PACKAGED EMERGENCY GENERATOR AND THE POWER PLANT BUS IS BACK FED FROM THE GRID THROUGH THE FEEDER BREAKER TO PROVIDE STATION SERVICE POWER.

2) ALL ITEMS TO REMAIN UNLESS SPECIFICALLY INDICATED FOR REMOVAL.

3) ENSURE ALL EQUIPMENT AND CIRCUITS TO BE REMOVED ARE DE-ENERGIZED PRIOR TO BEGINNING DEMOLITION. LOCK AND TAG OUT ALL AFFECTED CIRCUIT BREAKERS AND DISCONNECTS.

4) TAKE ALL PRECAUTIONS TO MINIMIZE DAMAGE TO ELECTRICAL EQUIPMENT AND CONDUCTORS BEING SALVAGED FOR REUSE. TURN ALL REMOVED MATERIALS AND EQUIPMENT OVER TO THE UTILITY FOR FINAL DISPOSITION IF NOT REUSED.

5) SEE ATTACHED MARK UP OF EXISTING SWITCHGEAR ONE-LINE DIAGRAM FOR POWER CONDUCTOR AND SWITCHGEAR CHANGES.

BASE BID TASKS SPECIFIC NOTES:

A SALVAGE EXISTING CONDUCTOR FOR REUSE AND PLUG ABANDONED CONDUIT:
- AFTER REMOVAL OF GEN #4 THE POWER AND CONTROL CONDUCTORS WERE LEFT EXPOSED ON THE FLOOR.
- REMOVE TWO RUNS OF 4#3/0, #2G, 150C COBRA CABLE (EACH IN SEPARATE 3" CONDUIT UNDER FLOOR). CAREFULLY REMOVE POWER CONDUCTOR FROM BOTH CONDUIT AND TURN OVER TO UTILITY. UNDER FLOOR CONDUIT TO REMAIN.
- REMOVE ALL CONTROL CONDUCTORS FROM 1-1/2" CONDUIT UNDER FLOOR. CAREFULLY REMOVE CONDUCTORS AND TURN OVER TO UTILITY. UNDER FLOOR CONDUIT TO REMAIN.
- NOTE THAT CONDUIT COUPLINGS ARE WELDED THROUGH THE FLOOR. AFTER REMOVING ALL CONDUCTORS, REMOVE ALL CONDUIT ABOVE FLOOR AND INSTALL THREADED PLUGS IN CONDUIT COUPLINGS.

B GENSET #3 UPGRADES:
- CAREFULLY REMOVE 4#2, #2G, 150C COBRA CABLE FROM 2" UNDER FLOOR CONDUIT. 2" UNDER FLOOR CONDUIT TO REMAIN IN PLACE FOR REUSE THIS PROJECT.
- REMOVE EXISTING 2" CONDUIT RISER ABOVE FLOOR TO GENERATOR ENCLOSURE.
- INSTALL NEW 2-1/2" LT FLEX RISER ABOVE FLOOR TO GENERATOR ENCLOSURE, SEE DETAIL 1/E2.
- INSTALL NEW 3#2/0, #4N, #4G 150°C EXTRA FLEXIBLE CABLE FROM SWITCHGEAR TO GENERATOR #2. TERMINATE WITH LUGS RATED FOR 150°C EXTRA FLEXIBLE CABLE AND CONNECT TO GENERATOR.
- DISCONNECT ENGINE CONTROL CONDUCTORS INSIDE GENERATOR ENCLOSURE AND DISCONNECT STARTER CABLES IN PREPARATION FOR ENGINE REPLACEMENT (SEE MECHANICAL).
- AFTER ENGINE REPLACEMENT CONNECT EXISTING BATTERY CABLES TO STARTER AND CONNECT NEW ENGINE CONTROL CONDUCTORS TO EXISTING TERMINALS IN GENERATOR ENCLOSURE INCLUDING 12VDC POWER, STARTER SIGNAL, RUN SIGNAL, SPEED BIAS, LOW OIL LEVEL ALARM AND POWERVIEW CANBUS.

C FIRE EXTINGUISHERS, SEE MECHANICAL

D RADIATOR R-1 AND R-2 VFD CONTROLS:
- THE VFD'S ARE FUNCTIONAL BUT HAVE RECENTLY BEEN OPERATED IN BYPASS MODE.
- TEST AND CALIBRATE BOTH RADIATOR VFD CONTROLS AND CONFIRM PROPER RADIATOR FUNCTION. VFD CONTROL FOR EACH RADIATOR IS PROVIDED BY AN ALTIVAR DRIVE MODEL ATV58HU72M2ZU WITH REMOTE DISPLAY MOUNTED IN FACE OF DEDICATED CONTROL PANEL.

E OVERHEAD DOOR, SEE MECHANICAL

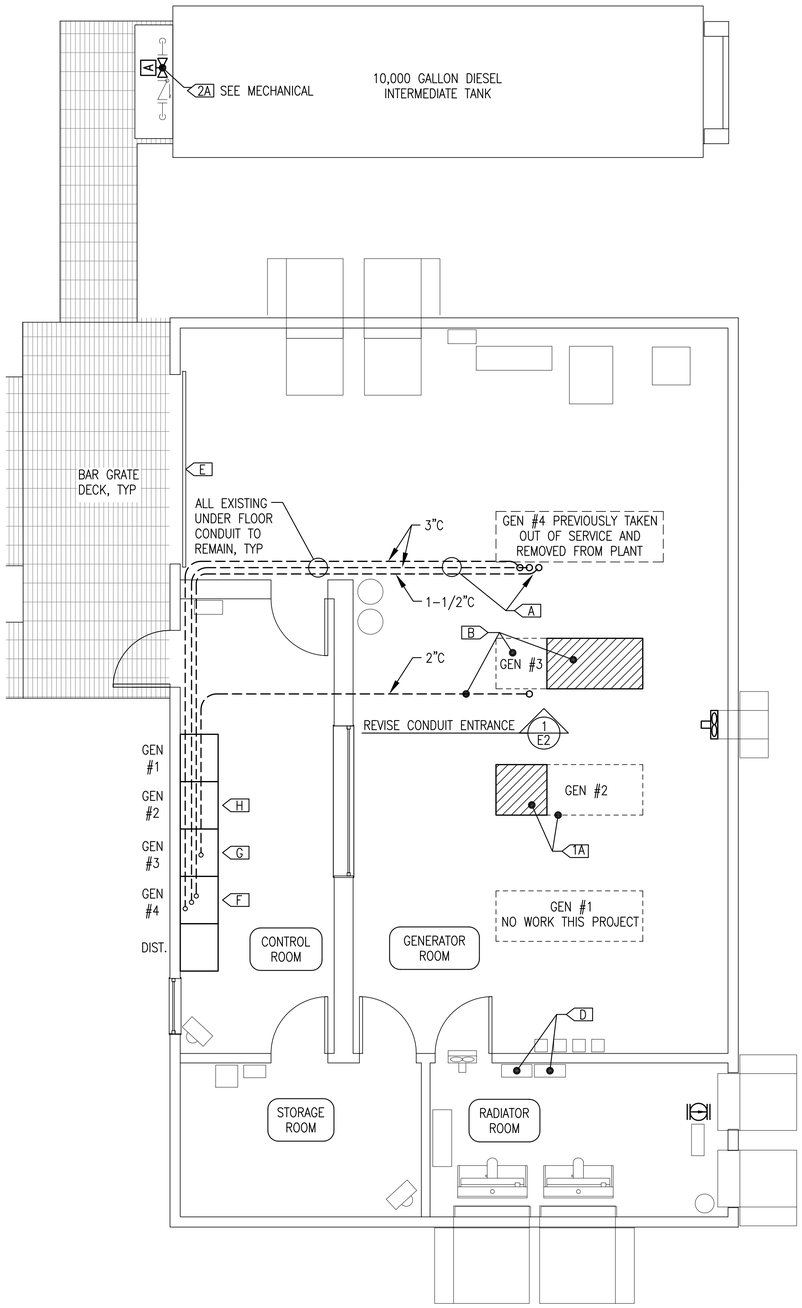
F GEN #4 SWITCHGEAR SECTION PARTS SALVAGE:
- CAREFULLY SALVAGE EXISTING 400A BREAKER FROM GEN #4 SECTION FOR INSTALLATION IN GEN #3 SECTION.
- REMOVE EXISTING 400A TRIP PLUG FROM BREAKER AND TURN OVER TO UTILITY.

G GEN #3 SWITCHGEAR SECTION UPGRADES:
- SALVAGE 3 EACH 200:5 CT'S FROM GENERATOR #3 SECTION AND SAVE FOR INSTALLATION IN GEN #2 SECTION.
- INSTALL 3 EACH 300:5 CT'S SALVAGED FROM GENERATOR #2 SECTION (SEE TASK H).
- INSTALL 400A BREAKER SALVAGED FROM GEN #4 SECTION (SEE TASK F).
- INSTALL NEW GE MODEL SRPG400A250 250A TRIP PLUG IN SALVAGED 400A BREAKER.
- INPUT NEW 300:5 CT SETTINGS IN GEN #3 LOAD SHARE MODULE AND POWER METER.

H GEN #2 SWITCHGEAR SECTION UPGRADES:
- SALVAGE 3 EACH 300:5 CT'S FROM GENERATOR #2 SECTION AND SAVE FOR INSTALLATION IN GEN #3 SECTION.
- INSTALL 3 EACH 200:5 CT'S SALVAGED FROM GENERATOR #3 SECTION (SEE TASK G).
- INSTALL NEW GE MODEL SRPF250A200 200A TRIP PLUG IN EXISTING 250A BREAKER.
- INPUT NEW 200:5 CT SETTINGS IN GEN #2 LOAD SHARE MODULE AND POWER METER.

ADDITIVE ALTERNATE TASKS SPECIFIC NOTES:

1A GENSET #2 UPGRADES:
- DISCONNECT ALL POWER & CONTROL CONDUCTORS INSIDE GENERATOR ENCLOSURE IN PREPARATION FOR GENERATOR REPLACEMENT.
- INSTALL REAR ENGINE SUPPORT, REMOVE GENERATOR FROM SKID AND TURN OVER TO UTILITY.
- INSTALL NEW GENERATOR ON SKID AFTER ENGINE REPAIRS (SEE MECHANICAL).
- CONNECT EXISTING CONDUIT RISERS TO NEW ENCLOSURE.
- CONNECT EXISTING #1/0 POWER CONDUCTORS TO GENERATOR.
- REMOVE EXISTING TERMINAL BLOCKS AND POWERVIEW UNIT FROM OLD UNIT AND INSTALL IN NEW GENERATOR.
- RECONNECT ALL EXISTING SWITCHGEAR CONTROL CONDUCTORS, SEE DIAGRAM 3/E2 FOR ORIGINAL TERMINATIONS.
- RECONNECT ALL ENGINE CONTROL CONDUCTORS INCLUDING 12VDC POWER, STARTER SIGNAL, RUN SIGNAL, SPEED BIAS, LOW OIL LEVEL ALARM AND POWERVIEW CANBUS.



1 / E1 ELECTRICAL WORK PLAN
1/4"=1'-0"

ELECTRICAL SPECIFICATIONS:

** GENERAL CONDITIONS **

PERFORM ALL WORK IN ACCORDANCE WITH THE LATEST ADOPTED EDITION OF THE NATIONAL ELECTRICAL CODE INCLUDING STATE OF ALASKA AMENDMENTS.

THE DRAWINGS ARE DIAGRAMMATIC AND DO NOT NECESSARILY SHOW ALL FEATURES OF THE REQUIRED WORK. PROVIDE ALL EQUIPMENT AND MATERIALS REQUIRED FOR A COMPLETE SYSTEM. VERIFY EXISTING FIELD CONDITIONS PRIOR TO STARTING CONSTRUCTION. IMMEDIATELY CONTACT THE ENGINEER FOR CLARIFICATION OF QUESTIONABLE ITEMS OR APPARENT CONFLICTS.

ALL EQUIPMENT AND MATERIALS SHOWN ARE NEW UNLESS SPECIFICALLY INDICATED AS EXISTING. INSTALL ALL MATERIALS IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS AND INSTRUCTIONS, UNLESS INDICATED OTHERWISE.

PERFORM WORK WITH SKILLED CRAFTSMEN SPECIALIZING IN SAID WORK. INSTALL ALL MATERIALS IN A NEAT, ORDERLY, AND SECURE FASHION, AS REQUIRED BY THESE SPECIFICATIONS AND COMMONLY RECOGNIZED STANDARDS OF GOOD WORKMANSHIP.

DO NOT CUT, DRILL, OR NOTCH STRUCTURAL MEMBERS UNLESS SPECIFICALLY APPROVED BY THE ENGINEER. MINIMIZE PENETRATIONS AND DISRUPTION OF BUILDING FEATURES.

** SPECIAL CONDITIONS **

ENSURE THAT APPROPRIATE SAFETY MEASURES ARE IMPLEMENTED AND THAT ALL WORKERS ARE AWARE OF THE POTENTIAL HAZARDS FROM ELECTRICAL SHOCK, BURN, ROTATING FANS, PULLEYS, BELTS, HOT MANIFOLDS, NOISE, ETC. ASSOCIATED WITH WORKING NEAR POWER GENERATION AND CONTROL EQUIPMENT.

** DEVICES AND EQUIPMENT **

DEVICES – LISTED FOR INTENDED SERVICE. INSTALL ALL DEVICES SUCH THAT MINIMUM REQUIRED ACCESS CLEARANCE IS MAINTAINED.

SUPPORT – INDEPENDENTLY SUPPORT EACH DEVICE FROM BUILDING STRUCTURAL MEMBERS WITH CHANNEL STRUT OR FABRICATED BRACKETS UTILIZING APPROPRIATE FASTENERS. ALL FASTENERS SHALL BE GALVANIZED OR ZINC PLATED .

** CONDUCTORS **

COLOR CODING – UNLESS SPECIFICALLY INDICATED OTHERWISE CONDUCTORS SHALL BE COLOR CODED AS FOLLOWS:

480-VOLT POWER CONDUCTORS (FOR GEN #4 ONLY IF THREE-PHASE CONVERSION COMPLETE)
- PHASE A – BROWN
- PHASE B – ORANGE
- PHASE C – YELLOW
- NEUTRAL – WHITE WITH YELLOW STRIPE

120/240-VOLT POWER CONDUCTORS (ALL CONDUCTORS IF THREE-PHASE CONVERSION NOT COMPLETE)
- PHASE A – BLACK
- PHASE B – RED
- NEUTRAL – WHITE

FOR NO. 6 AWG AND SMALLER CONDUCTORS COLOR CODING SHALL BE PROVIDED BY USING CONDUCTORS WITH CONTINUOUS COLOR EMBEDDED IN THE INSULATION. FOR ALL CONDUCTORS LARGER THAN NO. 6 SCOTCH 35 MARKING TAPE OR EQUIVALENT MAY BE USED TO COLOR CODE THE CABLE. WHERE MARKING TAPE IS USED THE CABLE SHALL BE IDENTIFIED AT EVERY ACCESSIBLE LOCATION. PROVIDE A MINIMUM OF 2 INCHES OF TAPE AT EACH LOCATION.

GENERATOR POWER CONDUCTORS – HIGH TEMPERATURE, EXTRA FLEXIBLE CABLE. 1000V, 150°C THERMOSET EPDM INSULATION WITH TIN COATED COPPER CONDUCTOR. COBRA CABLE, HOUSTON WIRE & CABLE, OR APPROVED EQUAL. TERMINATE WITH COPPER COMPRESSION LUGS RATED FOR THE FULL AMPACITY OF THE CABLE AT 150°C.

ISSUED FOR CONSTRUCTION JUNE 2019

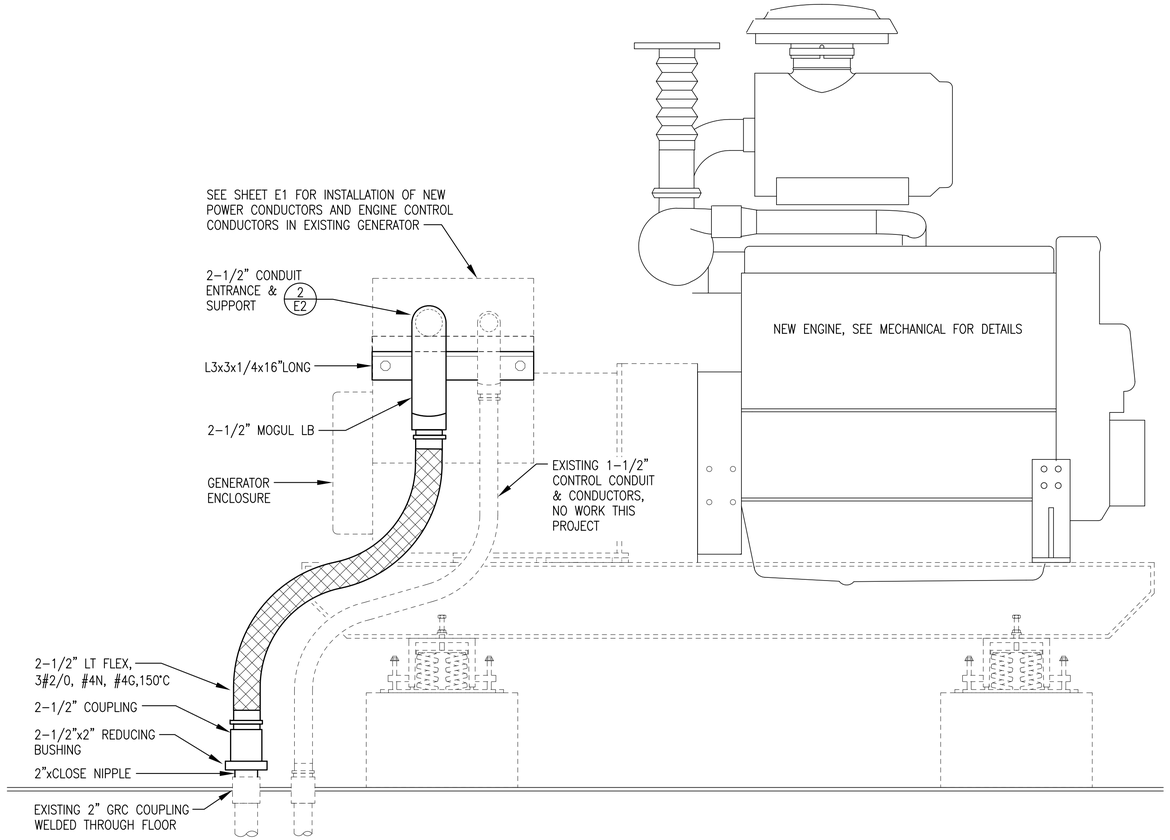
STATE OF ALASKA 49TH CLOIS W. VERSYP EE. 7802 REGISTERED PROFESSIONAL ENGINEER

PROJECT: 2019 TULUKSAK POWER PLANT M&I PROJECT

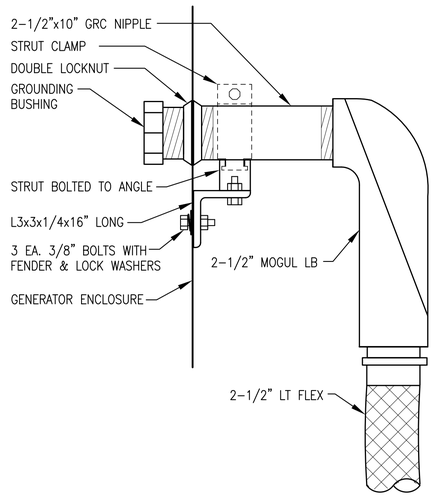
TITLE: ELECTRICAL WORK PLAN, NOTES, & SPECIFICATIONS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

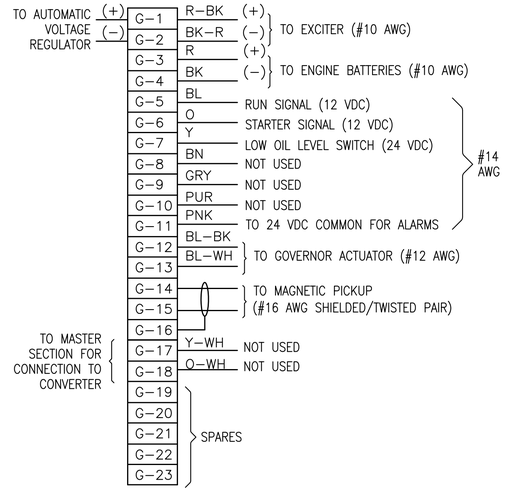
DRAWN BY: JTD | SCALE: NO SCALE
DESIGNED BY: CWV/BCG | DATE: 6/17/19
FILE NAME: TULUKM&I E1-E2 | SHEET: E1 OF 2
PROJECT NUMBER:



1 E2 BASE BID TASK B GEN #3 UPGRADES – CONDUIT ENTRANCE REVISION
1-1/2"=1'-0"



2 E2 2-1/2" POWER CONDUIT ENTRANCE & SUPPORT
NO SCALE



3 E2 TYPICAL GENERATOR CONNECTION TERMINALS
NO SCALE

NOTES:
1) CONTROL TERMINALS SHOWN BASED ON ORIGINAL INSTALLATION. REINSTALL TERMINALS FROM OLD GENERATOR #3 CAN INTO NEW GENERATOR #3 CAN AND RECONNECT.

ISSUED FOR CONSTRUCTION
JUNE 2019

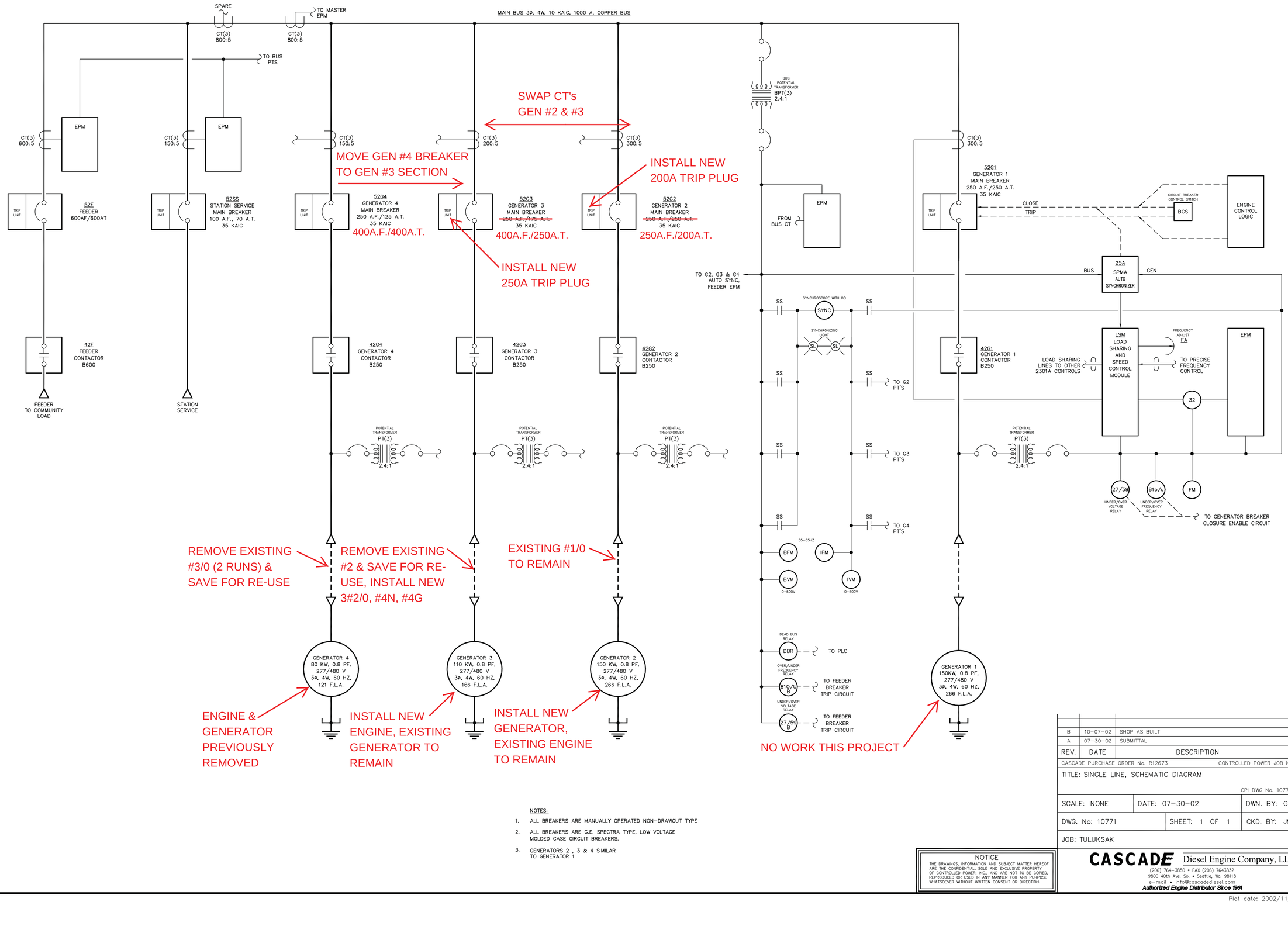
STATE OF ALASKA 49TH
CLOIS W. VERSYP
EE 7802
REGISTERED PROFESSIONAL ENGINEER

PROJECT: 2019 TULUKSAK POWER PLANT M&I PROJECT

TITLE: ELECTRICAL DETAILS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD | SCALE: NO SCALE
DESIGNED BY: CWV/BCG | DATE: 6/17/19
FILE NAME: TULUKM&I E1-E2 | SHEET: E2 OF 2
PROJECT NUMBER:



NOTES:

1. ALL BREAKERS ARE MANUALLY OPERATED NON-DRAWOUT TYPE
2. ALL BREAKERS ARE G.E. SPECTRA TYPE, LOW VOLTAGE MOLDED CASE CIRCUIT BREAKERS.
3. GENERATORS 2 , 3 & 4 SIMILAR TO GENERATOR 1

REV.	DATE	DESCRIPTION	BY
B	10-07-02	SHOP AS BUILT	CMD
A	07-30-02	SUBMITTAL	GPN

CASCADE PURCHASE ORDER No. R12673 — CONTROLLED POWER JOB No. 5216

TITLE: SINGLE LINE, SCHEMATIC DIAGRAM

CPI DWG No. 10771

SCALE: NONE	DATE: 07-30-02	DWN. BY: GPN
DWG. No: 10771	SHEET: 1 OF 1	CKD. BY: JMD
JOB: TULUKSAK		

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Plot date: 2002/11/22 – 12:50