SCOPE OF WORK

CONTRACTOR TO SUPPLY ALL LABOR, SUPERVISION, TOOLS, MATERIAL, AND EQUIPMENT IN ACCORDANCE WITH CU STANDARDS, B31.1 POWER PIPING CODE, AND THE DRAWING SET TO WORK CONTINUOUSLY DURING THE MAY 10, 2013 TO MAY 13, 2013 STEAM OUTAGE, INCLUDING BUT NOT LIMITED TO THE FOLLOWING WORK:

1. INSTALL ONE (1) NEW 10" SLIP TYPE Expansion Joint in line with Tunnel No. 7 at station T78-EX-3 as shown on the Drawings.
2. INSTALL NEW EQUIPMENT SUPPORT RACK FOR NEW Expansion Joint.
3. INSTALL NEW EQUIPMENT SUPPORT RACK FOR INSTALLATION OF AN ALIGNMENT GUIDE FOR THE NEW Expansion Joint as indicated on the Drawings.
4. REMOVE HOLLOW TYPE Expansion JOINTS, ANCHORS, AND INSTALL NEW 10" PIPE SECTION at the following stations:
   4.1. STATION T78-EX-2
   4.2. STATION T78-EX-3
   4.3. STATION T78-EX-4
   4.4. STATION T78-EX-5
   4.5. STATION T78-EX-6
   4.6. STATION T78-AW-1
5. INSTALL NEW PRE-FABRICATED ANCHOR ASSEMBLY, 16" ADAMS TYPE ROTARY VALVE, PIPE AND FITTINGS AS SHOWN ON THE DRAWINGS.
6. INSTALL NEW EQUIPMENT SUPPORT RACK FOR THE NEW 16" ADAMS ROTARY VALVE.
7. CONTRACTOR SHALL RE-ROUTE EXISTING 6" CONDENSATE PIPE THAT IS LOCATED UNDER THE EXITING STEAM MAIN AS NECESSARY TO FACILITATE THE INSTALLATION OF THE NEW STEAM EQUIPMENT. ALL CONDENSATE RE-WORK SHALL BE COMPLETED PRIOR TO END OF OUTAGE. CONTRACTOR IS RESPONSIBLE FOR ALL 6" PIPE (SCM 80) AND FITTINGS FOR THE CONDENSATE RETURN SYSTEM.
8. ALL STRUCTURAL STEEL FOR THE FABRICATION AND INSTALLATION OF PIPE EQUIPMENT RACKS INCLUDING ANCHOR BOLTS SHALL BE PROVIDED BY CONTRACTOR.

PLAN VIEW

EXPANSION J OINT INSTALLATION NOTE
OWNER SHALL PROVIDE ALL CUT MARKS TO CONTRACTOR. PIPE SHALL NOT BE CUT WITHOUT OWNER APPROVED CUT MARKS.
**CONSTRUCTION MATERIAL**

<table>
<thead>
<tr>
<th>PART NO.</th>
<th>PART</th>
<th>MATERIAL</th>
<th>SPECIFICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SLIP</td>
<td>CARBON STEEL</td>
<td>ASTM A 106 GRADE B SEAMLESS OR EQUAL</td>
</tr>
<tr>
<td>2</td>
<td>STUFFING BOX</td>
<td>CARBON STEEL</td>
<td>ASTM A 106 GRADE B SEAMLESS OR EQUAL</td>
</tr>
<tr>
<td>3</td>
<td>TRAVERSE CHAMBER</td>
<td>CARBON STEEL</td>
<td>ASTM A 106 GRADE B SEAMLESS OR EQUAL</td>
</tr>
<tr>
<td>4</td>
<td>ANCHOR</td>
<td>CARBON STEEL</td>
<td>ASTM A 35 OR EQUIVALENT</td>
</tr>
<tr>
<td>5</td>
<td>TYPE A' PACKING CYLINDER</td>
<td>CARBON STEEL</td>
<td>AISI C1018</td>
</tr>
<tr>
<td>6</td>
<td>PLUNGER</td>
<td>CARBON STEEL</td>
<td>AISI C1214</td>
</tr>
<tr>
<td>7</td>
<td>CONTAINMENT RINGS</td>
<td>REINFORCED GRAPHITE</td>
<td>BRONZALON</td>
</tr>
<tr>
<td>8</td>
<td>INJECTABLE PACKING</td>
<td>HIP® FLAME GRAPHITE</td>
<td>350H</td>
</tr>
<tr>
<td>9</td>
<td>LID FRICTION INSERTS</td>
<td>BRONZE FILLED TEFLOC</td>
<td>BRONZALON</td>
</tr>
<tr>
<td>10</td>
<td>LIMIT STEP PIN</td>
<td>CARBON STEEL</td>
<td>AISI C1018</td>
</tr>
<tr>
<td>11</td>
<td>12' X 10' REDUCER</td>
<td>CARBON STEEL</td>
<td>A105</td>
</tr>
</tbody>
</table>

**NOTES:**

1. THIS DIMENSION IS THE EXPANSION JOINT SHIP LENGTH WHICH INCLUDES 1'- FACTORY PRECOMPRESSION OF THE SLIP. ALLOWABLE MOVEMENTS OF THE SLIP FROM THE SHIP LENGTH ARE:
   - EXTENSION 3'-1/2''
   - COMPRESSION 13'-1/2''

2. SLIDING SURFACE OF SLIP IS CHROME PLATED WITH .002'' OF HARD CHROME VIA THE HEAT 25 PROCESS PERMOSCOPE INSPECTED IN ACCORDANCE WITH A-490.

3. PROTECTION: ONE COAT OF RED OXIDIZER PRIMER PAINT IS APPLIED TO ALL EXTERNAL SURFACES.

4. FACTORY INJECTABLE PACKING FILL CONNECTIONS. NOT TO BE FIELD REMOVED.

5. EXPANSION JOINTS FURNISHED WITH 2' THE LT350SM REMOVABLE/ REUSABLE INSULATION BLANKET.

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**EXPANSION JOINT SCHEDULE**

<table>
<thead>
<tr>
<th>EJ SIZE</th>
<th>QTY</th>
<th>EST. WT. (LBS)</th>
<th>TRAV</th>
<th>DIMENSIONS (INCHES)</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>10'</td>
<td>1</td>
<td>450</td>
<td>16'</td>
<td></td>
<td>43</td>
<td>3/4</td>
<td>10</td>
<td>12</td>
<td>3/4</td>
</tr>
</tbody>
</table>

**PACKING CYLINDER ORIENTATION**

**PROJECT:** TUNNEL 6
**CONSULTANT:** KENKO CO INC.
**CUSTOMER:** UNIVERSITY OF COLORADO

**P.O. No:** 1000188775

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**GENERAL ARRANGEMENT:** TYPE 'TP2' THERMAL PACK SINGLE SLIP EXPANSION JOINT W/ WELD ENDS
- ATS MODEL NO: TPW-132-

**DRAWN DATE:** 03/27/13
**DRAWING NO:** GA-22-3402
SUPPORT SCHEDULE

<table>
<thead>
<tr>
<th>SIZE</th>
<th>QTY</th>
<th>DIMENSIONS (INCHES)</th>
<th>GRAPHITE BEARING AREA (sq. in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10&quot;</td>
<td>1</td>
<td>A 11 7/8 4 20 5 1/2 3 1/2 7 3/8 15 13 24</td>
<td></td>
</tr>
</tbody>
</table>

NOTES:
1. GRAPHITE PROPERTIES: COMpressive STRENGTH 2000 PSI TEMPERATURE RANGE -40 TO +750°F COEFFICIENT OF STATIC FRICTION 0.15
2. FINISH: RED OXIDE PRIMER

PROJECT: TUNNEL 6
CUSTOMER: UNIVERSITY OF COLORADO

CONSULTANT: KENKO CO INC.

P.D. No.: 1000108775

REFERENCE:
ADVANCED THERMAL SYSTEMS INC.
LANCASTER, NEW YORK
DRAWING NO. LF-22-1033
NOTES:
1. ANCHOR COMPONENTS ARE FABRICATED FROM ASTM A36 MATERIAL.
2. FINISH: RED OXIDE PRIMER PAINT
3. QTY: 1
GENERAL NOTES

1. GENERAL:
   a. REFERENCES: REFERENCES TO THE STRUCTURAL DRAWINGS TO BE ENHANCED TO THE STRUCTURAL ENGINEER IN RECORD OF OTHER ENTITIES AS SPECIFICALLY NOTED AS "CONTRACTOR'S ENGINEER", "MECHANICAL ENGINEER", ETC.

2. DESIGN DRAWINGS:
   a. CONTRACT DOCUMENTS HAVE BEEN PREPARED USING SITE OBSERVATIONS AS PERMITTED BY ACCESS ONLY TO INSTALL CROSS SUPPORT FRAME PL CONN.
   b. CONTRACTOR SHALL FIELD VERIFY ALL CONNECTIONS FOR SUCH DISCOVERIES IN THE CONSTRUCTION SCHEDULE.
   c. CONTRACTOR SHALL FIELD VERIFY ALL CONNECTIONS FOR SUCH DISCOVERIES IN THE CONSTRUCTION SCHEDULE.
   d. CONTRACTOR SHALL FIELD VERIFY ALL CONNECTIONS FOR SUCH DISCOVERIES IN THE CONSTRUCTION SCHEDULE.

3. USE OF DRAWINGS:
   a. DO NOT SCALE DRAWINGS.
   b. WHERE DISCREPANCIES OCCUR BETWEEN PLANS, DETAILS, AND GENERAL NOTES, THE MORE STRINGENT VERIFY IN FIELD Apply.
   c. WHERE DISCREPANCIES OCCUR BETWEEN PLANS, DETAILS, AND GENERAL NOTES, THE MORE STRINGENT VERIFY IN FIELD Apply.

4. TEMPORARY CONDITIONS:
   a. THE STRUCTURE IS DESIGNED TO FUNCTION AS A UNIT UPON COMPLETION. THE CONTRACTOR IS RESPONSIBLE FOR FURNISHING ALL TEMPORARY BRACING AND SUPPORTS THAT MAY BE REQUIRED AS THE RESULT OF THE CONTRACTOR'S CONSTRUCTION METHODS AND/OR SEQUENCES.
   b. THE STRUCTURE IS DESIGNED TO FUNCTION AS A UNIT UPON COMPLETION. THE CONTRACTOR IS RESPONSIBLE FOR FURNISHING ALL TEMPORARY BRACING AND SUPPORTS THAT MAY BE REQUIRED AS THE RESULT OF THE CONTRACTOR'S CONSTRUCTION METHODS AND/OR SEQUENCES.

5. SUBSTITUTIONS AND ALTERNATIVES:
   a. SUBMIT THE FOLLOWING DRAWINGS:
      i. STEEL MATERIAL TABLE
      ii. CONNECTIONS:
         1A. GENERAL DESIGN
         1B. GRAVITY LOADS
         1C. HORIZONTAL LOADS
   b. STEEL MATERIAL TABLE
   c. STEEL MATERIAL TABLE
   d. STEEL MATERIAL TABLE

DESIGN CRITERIA

1. LOADS AND STANDARDS:
   a. INTERNATIONAL BUILDING CODE 2009
   b. GRAVITY LOADS
   c. HORIZONTAL LOADS

2. METAL SIZE AND LENGTHS:
   a. STEEL ELEMENT ASTM/TYPE Fy (KSI) Fu (KSI) COMMENTS
   b. STEEL ELEMENT ASTM/TYPE Fy (KSI) Fu (KSI) COMMENTS
   c. STEEL ELEMENT ASTM/TYPE Fy (KSI) Fu (KSI) COMMENTS

STEEL NOTES

1. CONNECTIONS:
   a. PRECAUTIONS: AS SHOWN DETAILS.
   b. HORIZONTAL GUSSETS
   c. CONNECTIONS:

2. FIELD WELDING:
   a. WELD SIZES AND LENGTHS CALLED FOR ON THE DRAWINGS ARE THE NET EFFECTIVE REQUIRED.
   b. WELD SIZES AND LENGTHS CALLED FOR ON THE DRAWINGS ARE THE NET EFFECTIVE REQUIRED.
   c. WELD SIZES AND LENGTHS CALLED FOR ON THE DRAWINGS ARE THE NET EFFECTIVE REQUIRED.

3. FIELD HOLE PUNCHES:
   a. FIELD-HOLE PUNCHES ARE SUGGESTED CONSTRUCTION PROCEDURES.
   b. FIELD-HOLE PUNCHES ARE SUGGESTED CONSTRUCTION PROCEDURES.
   c. FIELD-HOLE PUNCHES ARE SUGGESTED CONSTRUCTION PROCEDURES.

4. NOTE:
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   c. STEEL MATERIAL TABLE
   d. STEEL MATERIAL TABLE

6. DESIGN CRITERIA:
   a. DESIGN CRITERIA
   b. DESIGN CRITERIA
   c. DESIGN CRITERIA

7. STEEL NOTES:
   a. CONNECTIONS:
   b. FIELD WELDING:
   c. FIELD HOLE PUNCHES:

FOR INTERMEDIATE PIPE SUPPORTS ONLY - NOT FOR ANCHOR OR SLIP TYPE EXPANSION JOINT ALIGNMENT GUIDES
FOR ANCHOR & ALIGNMENT GUIDE LOCATIONS