



4810-93 Street, Edmonton, Alberta T6E 5M4  
 Phone: (780) 469-2401 Fax: (780) 468-2422

Report No: KC1000888

|                        |                    |                         |                   |                   |                   |
|------------------------|--------------------|-------------------------|-------------------|-------------------|-------------------|
| <b>Client</b>          | Apache Canada Ltd. | <b>Inspection Date</b>  | Sep 30, 2012      |                   |                   |
| <b>Prov. Reg. #</b>    | AB 0573595         | <b>Inspection Type</b>  | VE / INSTALL      |                   |                   |
| <b>Equipment Type</b>  | Line Heater        | <b>Location</b>         | HZ Patry          |                   |                   |
| <b>Tag/Equip.</b>      |                    | <b>LSD</b>              | BC d-34-K/94-O-5  |                   |                   |
| <b>Status</b>          | In Service         | <b>Downhole LSD</b>     |                   |                   |                   |
| <b>Manufacturer</b>    | NWP Industries Inc | <b>Area</b>             | Liard             |                   |                   |
| <b>Serial Number</b>   | 2631-01            | <b>Year Built</b>       | 2010              |                   |                   |
| <b>CRN #</b>           | P9417.213          | <b>Service</b>          | Sour              |                   |                   |
| <b>Comp/Unit Id</b>    | Line Heater Skid   | <b>Manway</b>           | None              |                   |                   |
| <b>Nat.Board #</b>     |                    | <b>Coating</b>          |                   |                   |                   |
| <b>Interim Insp'n</b>  |                    | <b>Interim Type</b>     |                   |                   |                   |
| <b>Next Inspection</b> | 2017               | <b>Next Insp Type</b>   | VE / VI / UT      |                   |                   |
| <b>Length</b>          |                    | <b>Height</b>           |                   |                   |                   |
| <b>Volume</b>          |                    | <b>Client Reference</b> | d-34-K            |                   |                   |
| <b>Owner</b>           | Apache Canada Ltd. | <b>RT</b>               | 100%              | <b>HT</b>         | YES               |
| <b>Foreman</b>         | Tom Jensen         | <b>RAE Job No.</b>      | 3192              |                   |                   |
| <b>ABSA</b>            | <b>Plant: H</b>    | <b>Vessel: G</b>        | <b>Process: W</b> | <b>Special: B</b> | <b>ASME</b> B31.3 |
| <b>History Log</b>     |                    |                         |                   |                   |                   |

|                            |                            |                           |  |  |  |
|----------------------------|----------------------------|---------------------------|--|--|--|
| <b>Component</b>           | Shell - non code component |                           |  |  |  |
| <b>MAWP</b>                |                            | <b>MDMT</b>               |  |  |  |
| <b>Material</b>            |                            | <b>Material Thickness</b> |  |  |  |
| <b>Diameter</b>            |                            | <b>Length</b>             |  |  |  |
| <b>Corrosion Allowance</b> |                            |                           |  |  |  |



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|                            |                      |                           |                     |
|----------------------------|----------------------|---------------------------|---------------------|
| <b>Component</b>           | Coil                 |                           |                     |
| <b>MAWP</b>                | 4503.0 PSIG @ 200 °F | <b>MDMT</b>               | -20 °F @ 4503.0 PSI |
| <b>Material</b>            | SA-333-Gr.6          | <b>Material Thickness</b> | 0.6457 in           |
| <b>Diameter</b>            |                      | <b>Length</b>             |                     |
| <b>Corrosion Allowance</b> | 0.126 in             |                           |                     |

|                        |                      |                         |                       |
|------------------------|----------------------|-------------------------|-----------------------|
| <b>Valve Tag No</b>    | 570139-2-A10         | <b>Relief Type</b>      | Pressure Safety Valve |
| <b>Manufacturer</b>    | Farris               | <b>Set Pressure</b>     | 1813 PSI              |
| <b>Serial Number</b>   | 570139-2-A10         | <b>Capacity</b>         | 500 m³/min            |
| <b>Model</b>           | 26GA15-120           | <b>Last Service</b>     | Oct 1, 2010           |
| <b>CRN</b>             | 0G8842.5C            | <b>Next Service</b>     | 2013                  |
| <b>Service Co.</b>     | Manufacturer         | <b>Service Interval</b> | 36 Months             |
| <b>Service Co. Tag</b> |                      | <b>Inlet Size</b>       | 2 in                  |
| <b>ASME Stamp</b>      | UV                   | <b>Outlet Size</b>      | 3 in                  |
| <b>NB Stamp</b>        | YES                  | <b>Connection</b>       | Flanged               |
| <b>Relief Dest.</b>    | To Atmosphere        | <b>Valve Loc.</b>       | On Piping             |
| <b>Comments</b>        | 12500 kpa = 1813 psi |                         |                       |

|                       |                      |                               |                 |
|-----------------------|----------------------|-------------------------------|-----------------|
| <b>Component</b>      | Firetube - 2.5 MMBTU |                               |                 |
| <b>Material</b>       |                      | <b>Material Thickness</b>     |                 |
| <b>Tube Size</b>      | 20 in                | <b>Flange Plate Geometry</b>  |                 |
| <b>Tube Length</b>    |                      | <b>Flange Plate Thickness</b> |                 |
| <b>Tube Height</b>    |                      | <b>Stack Size</b>             |                 |
| <b>No. of Tubes</b>   | 1                    | <b>No. of Segments</b>        |                 |
| <b>Flame Arrester</b> |                      | <b>No. of Burner Tips</b>     | <b>Fire Eye</b> |

**Comments**

This vessel was inspected to the Apache 4.4PRD-008VS Category 8 Indirect Fired Heaters (Firetube style) procedure.

The following appendices are attached to this inspection report:

- Scanned inspection form
- Scanned P&ID



Figure: 1



Vessel location

**Building Observations**

The vessel was located outside any building structures.

**Piping Observations**

The attached piping was generally in serviceable condition. The piping was sufficiently supported. There was no damage, distortion, short bolting or stress evident on the piping. The inlet/outlet piping was insulated. There were no relevant indications of defects or damage on the insulation cladding. There were flanged and threaded connections on the piping which showed no signs of leakage and appeared to be in serviceable condition.

Figure: 2



Inlet Piping

Figure: 3



Outlet piping

**PSV Observations**

Line heater coils are protected by the downstream separator PSV.

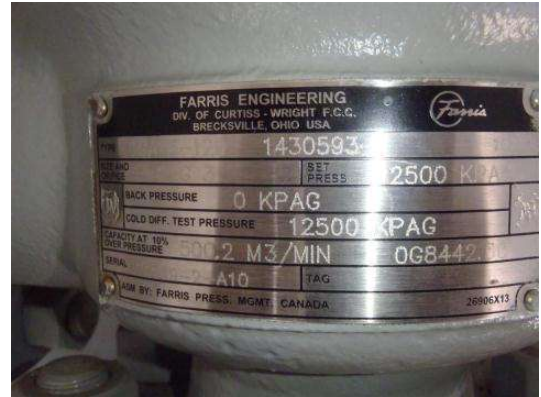


Figure: 4



PSV overview

Figure: 5



PSV nameplate

**External Observations**

The vessel is located outside of any buildings. The nameplate were legible and securely mounted to the vessel. There was no damage, distortion, or stress evident on piping connections. The vessel was horizontal and adequately supported by saddles attached to the skid. There are no makeshift structural attachments on vessel.

The shell of the vessel was 100% insulated. The insulation cladding was sealed with no relevant indications of defects/damage/corrosion under insulation (CUI). The heads of the line heater were not insulated. The heads were fully painted and the paint was in serviceable condition. The heads were fully bolted and showed no signs of leakage.

The firetube to shell flange showed no evidence of leakage. The sight glass on the firebox were clear and in serviceable condition. The flame arrestor was clean and in serviceable condition.

The glycol column was mounted horizontally with welded connections to the shell. The column was insulated/clad. The insulation cladding was sealed with no relevant indications of defects/damage/corrosion under insulation (CUI).

The stack was fully painted steel. The paint was in serviceable condition. The stack to firetube exhaust flange was fully bolted and showed no signs of leakage..

Figure: 6



Manufacturers nameplate

Figure: 7



Line heater overview



Figure: 8



Line heater overview 1

Figure: 9



Line heater overview 2

Figure: 10



Flame arrested burner

Figure: 11



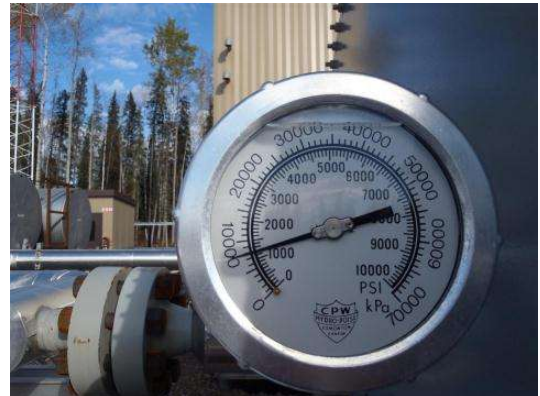
Firetube/head connection

Figure: 12



Stack connection

Figure: 13



Pressure gauge



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**Internal Observations**

No internal inspection was performed at this time.

**UT1 Observations**

Thickness data was not taken this inspection as the inlet/outlet piping was fully insulated which did not allow access. Recommend installing removable access covers so UT can be done on inlet/outlet piping.

**Recommendations**

1. Recommend installing removable access covers so UT can be done on inlet/outlet piping.

Based on the scope of this inspection the vessel appears suitable for continued service.

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Trevor Paananen  
IBPV INSPECTOR  
IBSA Certificate # 167

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**Inspector:** Keith Courneyea

**Reviewed By:** Trevor Paananen

*Supervisor*

### 4.4-FRM-001VS Visual External Inspection Report

Job 3192 Sep-11  Installation  External  Internal

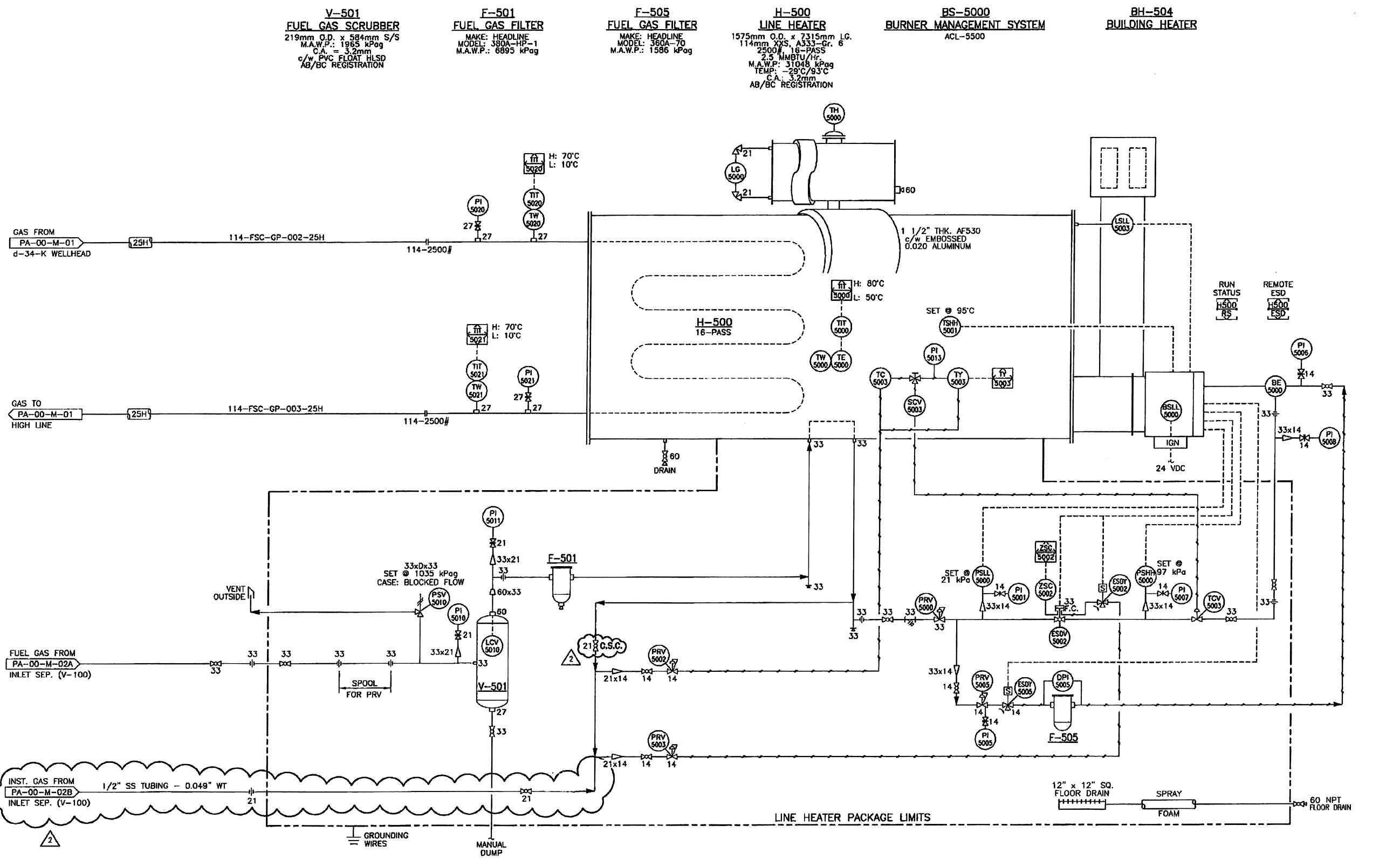
|  |  |   |  |   |  |
|--|--|---|--|---|--|
| Date: <u>Sep 30/12</u>   |  | WO #: <u>50009795</u>                             |  | Sketch/Notes:   |  |
| Inspected By: <u>Keith Courne</u>  |  | Cert. #: <u>API 510 31740</u>                     |  | HT = <u>YES</u>   |  |
| Coordinator:   |  |   |  | RT = <u>100% coil</u>   |  |
| Ops Foreman:   |  |   |  | CRN (PSV) =   |  |
| Region:  |  | Area: <u>Liard.</u>                               |  | PSV. MODEL =  |  |
| Facility: <u>H2 PATRY</u>  |  |   |  | PSV. SERIAL =   |  |
| Location, LSD: <u>1-34-K/94-0-5</u>  |  |   |  | PSV. DISCHARGES TO:   |  |
| Description: <input type="checkbox"/> Vessel <input type="checkbox"/> Exchanger <input type="checkbox"/> Tank <input checked="" type="checkbox"/> Heater   |  |   |  | <u>inlet pipe 2500" 4"</u>  |  |
| Service Fluid: <input type="checkbox"/> Sweet <input checked="" type="checkbox"/> Sour Fluid Name:   |  |   |  | <u>outlet pipe 2500" 4"</u>   |  |
| Unit Name / #:   |  | Equip#:   |  | <u>20" Firecl</u>   |  |
| Equip. Name: <u>Line Heater</u>  |  |   |  | <u>25 MA BTU</u>  |  |
| Jurisdiction #: <u>A 573595</u>  |  | CRN: <u>P9417.213</u>                             |  | <input checked="" type="checkbox"/> Photographed Photo ID#:   |  |
| Manufacturer: <u>NUP</u>   |  |   |  | Block Valve(s) Installed: <input type="checkbox"/> Yes <input type="checkbox"/> No Car-sealed Open: <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A |  |
| Year Built: <u>2010</u> S/N: <u>2031-01</u>  |  | PSV Data:   |  |   |  |
| Zones: <u>MDMT</u> <u>Design I</u> <u>MAWP</u>   |  | Set Press. <u> </u> Tag# <u> </u>                 |  | Manufacturer <u> </u> Serial Number <u> </u>  |  |
| Shell Side:  |  | Tube Side:  |  | In. <u> </u> Out. <u> </u> Capacity <u> </u> Serv. Co. <u> </u> Serv. Date <u> </u>   |  |
| Other: <u>Coil - 20F 200F 4503PS</u>   |  | 'protected by downflow Sep upstream ESD & piping. |  |   |  |
| Components: <u>Coil</u>  |  |   |  |   |  |
| Diameter <u>62"</u> Length <u>288"</u> Material <u> </u> Nominal t <u> </u> CA <u> </u> Retire t <u> </u> Lowest t <u> </u> LOK? <input type="checkbox"/> Y <input type="checkbox"/> N Calc. t-min <u> </u> Comment <u> </u>   |  |   |  |   |  |
| Shell: <u>62" 288"</u>   |  |   |  | Good Insul & Clad   |  |
| Head:  |  |   |  | <input type="checkbox"/> Y <input type="checkbox"/> N   |  |
| Channel:   |  |   |  | <input type="checkbox"/> Y <input type="checkbox"/> N   |  |
| Tube:  |  |   |  | <input type="checkbox"/> Y <input type="checkbox"/> N   |  |
| Other: <u>Coil</u>   |  |   |  | <input type="checkbox"/> Y <input type="checkbox"/> N <u>4" CL 2500 COIL A</u>  |  |
| Orientation: <input checked="" type="checkbox"/> Hor. <input type="checkbox"/> Ver. Foundation: <input type="checkbox"/> Concrete <input type="checkbox"/> Gravel <input type="checkbox"/> Timbers <input checked="" type="checkbox"/> Steel <input type="checkbox"/> Other: <u> </u> Condition: <u> </u>  |  |   |  |   |  |
| Support: <input checked="" type="checkbox"/> Saddle: <input type="checkbox"/> Seal-welded <input type="checkbox"/> Free to move Condition: <u>Good</u>   |  |   |  |   |  |
| <input type="checkbox"/> Skirt: <input type="checkbox"/> Free of debris Comment: <u> </u> Condition: <u>NA</u>   |  |   |  |   |  |
| <input type="checkbox"/> Hangers: <input type="checkbox"/> Secure Comment: <u> </u> Condition: <u>NA</u>   |  |   |  |   |  |
| <input checked="" type="checkbox"/> Other (Specify): <u>on skid / on piles</u> Condition: <u>Good</u>  |  |   |  |   |  |
| Overall: General Condition: <u> </u> <input type="checkbox"/> Dead Legs Exist <input type="checkbox"/> Electrical Grounding: <input type="checkbox"/> None <input checked="" type="checkbox"/> Indirect <input type="checkbox"/> Direct <input type="checkbox"/> Secure  |  |   |  |   |  |
| Ext. Surface: <input type="checkbox"/> Painted <input type="checkbox"/> Fire-proofed <input checked="" type="checkbox"/> Cladded <input checked="" type="checkbox"/> Insulated <input type="checkbox"/> Other: <u> </u> Condition: <u>Good</u>   |  |   |  |   |  |
| Ext. Fixtures: <input checked="" type="checkbox"/> Ladder <input type="checkbox"/> Platform(s) <input type="checkbox"/> Other (Specify): <u> </u> Condition: <u>Good</u>   |  |   |  |   |  |
| Int. Surface: <input type="checkbox"/> Coated <input type="checkbox"/> Weld Overlay <input type="checkbox"/> Cladded <input type="checkbox"/> Lined <input type="checkbox"/> Thermal Sprayed Condition: <u>NA</u>  |  |   |  |   |  |
| Int. Fixtures: <input type="checkbox"/> Baffle <input type="checkbox"/> Vortex Breaker <input type="checkbox"/> Float <input type="checkbox"/> Weir <input type="checkbox"/> Impingement plate Condition: <u>NA</u>  |  |   |  |   |  |
| Nozzles: <input type="checkbox"/> MW <input type="checkbox"/> Inspection port only Size: <u> </u> <input type="checkbox"/> Davit arm: <input type="checkbox"/> Greased <input type="checkbox"/> Double-nutted Condition: <u> </u>  |  |   |  |   |  |
| <input type="checkbox"/> Reinforcement pads used <input type="checkbox"/> Weep holes visible <input type="checkbox"/> No evidence of weeping Comment: <u> </u>   |  |   |  |   |  |
| Piping: Well-coated <input type="checkbox"/> Proper joints <input type="checkbox"/> Free of leaks <input type="checkbox"/> Proper supports <input type="checkbox"/> Max. Spans <input type="checkbox"/> Fluid is identified <input type="checkbox"/> Flow dir. shown <input type="checkbox"/> Drains properly <input type="checkbox"/> Comments: <u> </u>  |  |   |  |   |  |
| <input type="checkbox"/> PSV piping: <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> PSV is mounted on: <u>Separate</u>   |  |   |  |   |  |
| <input type="checkbox"/> Inlet piping: <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <u>Good Insul &amp; Clad</u>              |  |   |  |   |  |
| <input type="checkbox"/> Outlet piping: <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <u>Good Insul &amp; Clad to Sep Bldg</u> |  |   |  |   |  |
| <input type="checkbox"/> Drain piping: <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <u>glycol drain</u>                       |  |   |  |   |  |
| <input type="checkbox"/> Instrument piping: <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <u>NA</u>   |  |   |  |   |  |
| Valves: <input checked="" type="checkbox"/> Manual isolation valves: <input checked="" type="checkbox"/> Free from leaks Comment: <u>Good</u>  |  |   |  |   |  |
| <input type="checkbox"/> Automated control valves: <input type="checkbox"/> Free from leaks Comment: <u>Auto valves inside Sep Bldg.</u>   |  |   |  |   |  |
| <input type="checkbox"/> Vents and/or drains: <input type="checkbox"/> Properly plugged Comment: <u> </u>  |  |   |  |   |  |
| Gauges: <input checked="" type="checkbox"/> Pressure: Range: <u>0 - 10 000 psi</u> Reading: <u>1000psi</u> Condition: <u> </u>   |  |   |  |   |  |
| <input type="checkbox"/> Temperature: Range: <u> </u> Reading: <u> </u> Condition: <u>NA</u>   |  |   |  |   |  |
| <input type="checkbox"/> Liquid Level: Reading: <u> </u> Condition: <u>NA</u>  |  |   |  | NCR#  |  |
| Recommended Actions: 1. <u>None</u>  |  |   |  |   |  |
| 2. <u> </u>  |  |   |  |   |  |
| 3. <u> </u>  |  |   |  |   |  |
| Summary: The vessel exterior and the associated piping are considered to be in <u>Good</u> condition.  |  |   |  |   |  |

Additional notes are attached:  Item  is suitable for service. Inspector's Signature: [Signature] Page 1 of 1

TEAL A1 SIZE TITLEBLOCK V2

PLOTTED DATE: 6/1/2012 1:35:15 PM BY: TODD DREBIT

H:\DRAFTING\CLIENTS\APACHE\PATRY\0010-34-K-94-0-5\PIP\PA00M04.DWG  
LAST SAVED DATE: 6/1/2012 1:35:30 PM BY: TODD DREBIT



| REFERENCE DWG. NO. | REFERENCE DRAWINGS          | REV. | REVISION DESCRIPTION             | PROJ. NO.    | BY | DATE     | CHD | APPD |
|--------------------|-----------------------------|------|----------------------------------|--------------|----|----------|-----|------|
| 101897-1           | NWP INDUSTRIES INC. (REV 1) | A    | ISSUED FOR O.G.C. APPROVAL       | 100-10-003   | TD | 10.09.17 |     |      |
|                    |                             | B    | ISSUED FOR BID                   | 100-10-003   | CP | 11.02.01 | BW  | FDC  |
|                    |                             | 0    | ISSUED FOR CONSTRUCTION          | 100-10-003   | TD | 11.02.24 | TD  | FDC  |
|                    |                             | 1    | AS-BUILT                         | 100-10-003   | CP | 11.06.03 | TD  | FDC  |
|                    |                             | 2    | INSTALL INST. GAS TO LINE HEATER | 121-12657-00 | TD | 12.06.01 | TD  | MCC  |

ENGINEER'S STAMP

PERMIT STAMP

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GENIVAR INC.  
Signature: *[Signature]*  
Date: *4 Jun 12*

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**Apache CANADA LTD**  
PATRY  
d-34-K/94-0-5  
LINE HEATER (H-500)  
PIPING & INSTRUMENTATION DIAGRAM

|           |              |        |                |      |
|-----------|--------------|--------|----------------|------|
| DRAWN BY  | DATE CREATED | SCALE  | DRAWING NUMBER | REV. |
| T. DREBIT | 10.07.19     | N.T.S. | A1-PA-00-M-04  | 2    |