



Enterprise Products

By Messenger and Certified Mail No. 7007 07700000 43115024

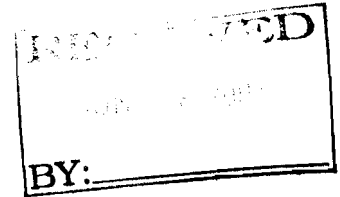
P.O. Box 4324
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Houston, Texas 77210-4324
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713.880.6500
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June 8, 2007

R.M. Seeley, Director
Southwest Region
Pipeline and Hazardous Materials Safety Administration
8701 S. Gessner
Houston, TX 77074



Re: Notice of Probable Violation, Proposed Civil Penalty and Proposed Compliance Order (the "Notice")
CPF-4-2007-5015

Dear Mr. Seeley:

Enterprise Products Operating L.P. ("Enterprise") submits this response to the Notice received on May 10, 2007.

General Comments: Enterprise notes and objects to the extremely vague and generalized descriptions of the violations alleged in the Notice. The lack of specificity makes it very difficult to understand where fault is being found in Enterprise's compliance efforts and to formulate responses to the allegations, especially in light of the discontinuity between the allegations and the substance of the inspector's exit interviews with Enterprise personnel and the lines of questions that were raised by the inspector during the separate pipeline safety inspections of the four widely dispersed pipeline operations covering three states and offshore waters that took place more than two years ago (the "Inspections"). For clarity in formulating its responses, Enterprise construes such terms in the Notice and the Proposed Compliance Order (the "Compliance Order") as, "their pipelines," "Enterprise's pipeline system," "all of Enterprise's pipelines," and other general references to include only those specific pipelines and facilities that were observed during the Inspections.

The Notice provisions and allegations and Enterprise's responses are as follows:

1. **§195.406 Maximum operating pressure:** *Enterprise could not show evidence that surge pressures had been considered on all of their pipelines. Enterprise should be able to show that their pipelines are adequately protected and that surge pressures have been considered on all of their pipelines.*

Response: Enterprise disputes the alleged violation. The cited regulation clearly requires that the operator of a pipeline provide adequate controls and protective equipment to maintain pressure within the prescribed limits, and Enterprise is confident that it provides adequate controls and equipment to achieve this requirement on each of its pipelines. The inspector appears to have focused on the consideration of surge pressures as a critical indicator of the adequacy of Enterprise's

controls and equipment on the audited pipelines. The issue of surge pressures was discussed with the inspector by Enterprise representatives in relation to Enterprise's natural gas liquids ("NGL") pipelines. The inspector was shown a specimen surge study of the type utilized by Enterprise in evaluating NGL pipelines, and he expressed no reservations about its suitability for such purpose. The inspector was told that such studies were routinely utilized when evaluating NGL pipelines, and he raised no objection. Enterprise would point out that operational experience has shown over the years that surge pressure is not a problem with relatively-light-molecular-weight NGLs and that modeling of Enterprise's NGL pipelines under transient conditions has shown no overpressure incidents. The inspector was also provided a copy of a transient model for the Cameron Highway Oil Pipeline ("CHOPS"). Moreover, in many years of operational experience on NGL pipelines, Enterprise has experienced no exceedences of the 110% operating pressure limit due to surge on any of the pipelines that were the subject of the Inspections. For the reasons stated above, Enterprise requests that this item of the Notice be withdrawn, the proposed civil penalty be stricken and paragraph 1 of the Compliance Order be deleted.

2. **§195.410(a)(1) Line markers:** *Enterprise does not have sufficient markers to adequately mark their pipelines. When crossing cultivated agricultural fields, often the markers on the far side of the field could not be seen. From valve sites, looking in both directions, the next marker for the pipeline could not be seen. The lack of pipeline marking is a widespread problem with the Enterprise pipelines that were inspected.*

Response: As stated in Enterprise's general comments, the generality and lack of specificity in this allegation make it difficult to formulate a response. Enterprise asserts that it has, in fact, more than sufficient quantities of markers to adequately mark its pipelines and has marked them adequately. As to the question of markers being in place across cultivated agricultural lands, Enterprise wishes to call the agency's attention to the Request of Waiver (the "Request") that was filed with the Administrator by letter dated July 18, 2005 (copy enclosed as **Exhibit 1**). In the Request Enterprise called attention to the impracticality of placing and maintaining line markers across large parcels of cultivated land -- where agricultural operations are likely to result in the removal or destruction of the markers -- and asked for a waiver of the provisions of 49 CFR §195.410 Line Markers. Concurrently with the request for the waiver, Enterprise described and asked for approval of several alternate means of compliance that would assure adequate safety for pipelines in these areas while avoiding a) the futility of erecting markers that would likely not remain in place and b) the inconvenience of the markers' presence to farmers conducting cropping operations on these tracts. As of this date, Enterprise has received no response to the Request and believes it is entitled to know whether the agency intends to act on it and the timetable for any such action. The delay in responding to the Request is all the more frustrating to Enterprise, because the Request was initiated at the suggestion of the Southwest Region inspector who recognized the widespread problem that large agricultural tracts present to pipeline operators in the region. For the reasons stated above, Enterprise requests that this item of the Notice be withdrawn and held in abeyance until such time as the PHMSA acts on the Request and that paragraph 2 of the Compliance Order be deleted.

3. **§195.420 Valve maintenance:** *During the inspections it was noted that Enterprise uses a mixture of methods of complying with 195.420c. The CHOPS Pipeline has installed locked chain link fencing around the valves or locating the valves within secured facilities. The methods of protection used in the six Enterprise units that were inspected, range from no fencing or security, to pipe post and beam enclosures with locked valves, to cyclone fencing with barbed wire around top, to enclosing the valves in welded steel plate, and covering the entire valve with concrete.*

A review of your procedures by our inspector did not reveal a plan or procedure to consistently specify the method of security for valve sites that is acceptable to you. Enterprise should review their program, procedures, and facilities to ensure they are consistent and compliant with this regulation.

Response: Enterprise disputes the alleged violation. The cited regulation requires that an operator provide protection for each valve; it specifies neither the type of protection to be provided nor that such protection be uniform across all types of pipeline systems and valve locations subject to the operator's control. Each valve in the inspected pipeline systems was protected, and Enterprise disputes the factual accuracy of the statement in the Notice that the observed methods of protection, "range from no fencing or security, to [various types of protection]," if that statement was intended to imply that no protection was provided. To the contrary, each and every one of the valves on the inspected pipelines was protected, and not a single instance where an absence of protection was observed was cited in the Notice. The fact that no fencing or "security" (meaning unclear) was provided for a given valve does not mean that the valve lacked protection by guardrails, locks or other devices or methods. It is obvious from the plain meaning of the regulation that §195.420 does not specify or contemplate that all valves, regardless of their location, surroundings or operational history be protected by identical measures or equipment. For the reasons stated above, Enterprise requests that this item of the Notice be withdrawn.

4. **§195.432 Breakout tanks:** *Enterprise had not set up an API-653 and/or API-510 inspection program, as required by §195.432. Enterprise could not demonstrate that breakout tanks have been inspected per the regulation.*

Response: Enterprise disputes the alleged violation. The Skellytown tanks that were observed by the inspector had been inspected by a third-party contractor according to API-510 and API-653 protocols, and the contractor's reports were provided to the inspector (copies attached as **Exhibit 2**).

For the reasons stated above, Enterprise requests that this item of the Notice be withdrawn and that paragraph 3 of the Compliance Order be deleted.

5. **§195.573 What must I do to monitor external corrosion control?:** *Enterprise is just beginning to implement surveys that consider IR drop. There is not dedicated Cathodic Protection (CP) for tank bottoms, and the tank bottoms are not surveyed during annual Cathodic Protection survey. The first interrupted survey (to account for IR drop) was being conducted on the Four Corners Pipeline, during the 2005 DOT inspection.*

Response: Enterprise disputes the allegation that “Enterprise is just beginning to implement surveys that consider IR drop.” To the contrary, since Enterprise began operating the subject pipeline systems in 2003, the issue of IR-drop has been considered through the application of recognized sound engineering practices such as corrosion leak history analysis, visual observation and measurement of pipe-wall thickness when lines are exposed, use of internal inspection devices, measurement of voltage drops via interrupted annual or close-interval cathodic protection surveys, use of IR-free coupon test stations, at-grade versus in-the-ditch pipe-to-soil potential measurements at pipeline excavation sites, and potential measurement techniques which consider proper reference cell placement and pipeline location. In addition, in 2004 Enterprise initiated a five-year plan under which a) approximately 20% of the annual cathodic protection surveys for all jurisdictional assets are conducted in an interrupted/IR-free manner, b) each close-interval cathodic protection survey is performed in an interrupted/IR-free manner and c) IR-free coupon test stations are installed. Under this five-year plan, Enterprise has conducted the following activities in consideration of IR drop across all jurisdictional assets:

- a. More than 7,000 miles of interrupted/IR-free annual or close-interval cathodic protection surveys have been completed.
- b. Two hundred sixty-three IR-free coupon test stations have been installed.

Moreover, prior to institution of the five-year plan, Enterprise conducted 396 miles of interrupted/IR-free annual or close-interval cathodic protection surveys across all jurisdictional assets in 2003.

Enterprise disputes that the allegation, “There is not dedicated Cathodic Protection (CP) for the tank bottoms, and the tank bottoms are not surveyed during annual Cathodic Protection Surveys” states a violation of PHMSA regulations or any industry standard. None of 49 CFR Part 195, NACE Standard RP0169-2002 *Control of External Corrosion on Underground or Submerged Metallic Piping Systems*, or API Recommended Practice 651 – *Cathodic Protection of Aboveground Storage Tanks*, requires that there be “dedicated Cathodic Protection (CP) for tank bottoms.” Enterprise’s cathodic protection system that protects the breakout aboveground storage tank at Skellytown Station is a deepwell-impressed-current cathodic protection system that protects the tank bottom as well as the below-grade station piping. Cathodic protection potentials are measured at the four compass bearing locations (North, South, East and West) around the perimeter of the tank and are recorded during the annual cathodic protection survey of the station. The inspector reviewed records of these surveys (copies enclosed as **Exhibit 3**) during the Inspections.

Enterprise disputes the allegation that, “The first interrupted survey (to account for IR drop) was being conducted on the Four Corners Pipeline, during the 2005 DOT inspection.” Enterprise had conducted 65 miles of interrupted close-interval cathodic protection survey in 2004 on the Four Corners Pipeline system utilizing the services of a third-party contractor (documentation of this activity enclosed as **Exhibit 4**).

For the reasons stated above, Enterprise requests that this item of the Notice be withdrawn and that paragraph 4 of the Compliance Order be deleted.

6. **§195.579 What must I do to mitigate internal corrosion?:** *Enterprise has not done investigations to determine whether there is internal corrosion or the potential for internal corrosion. Enterprise has performed little monitoring, and has not done inspections to investigate whether there could be internal corrosion. The investigation of internal corrosion appears to be based upon internal coupons, which are improperly located on pipelines, and no other evidence could be produced. No records of internal inspection of removed pipe could be located.*

Response: Enterprise disputes the allegations that, “Enterprise has not done investigations to determine whether there is internal corrosion or the potential for internal corrosion. Enterprise has performed little monitoring, and has not done inspections to investigate whether there could be internal corrosion.” Enterprise employs two separate and extensive avenues to investigate, prevent, detect and mitigate internal corrosion: first, the company’s pipeline integrity program and, second, its pipeline operations and maintenance programs. Enterprise conducts ILI tool runs that can identify various pipe-wall anomalies including internal corrosion and performs in-the-ditch investigations of such anomalies that meet established remediation criteria. Results of all in-the-ditch investigations are recorded on the Maintenance Report form. Representative samples of these forms (copies enclosed as **Exhibit 5**) were provided to the inspector for review during the Inspections.

Enterprise also disputes that the allegation, “The investigation of internal corrosion appears to be based upon internal coupons, which are improperly located on pipelines, and no other evidence could be produced,” states a violation. Contrary to the allegation’s implication, Enterprise investigates internal corrosion on the basis of much more than the examination of internal coupons of which approximately 30 are in use throughout the subject pipeline systems and which, Enterprise notes, are not even required by PHMSA’s regulations to be used for internal-corrosion monitoring or much less installed at a particular location. Use of these coupons for investigation of internal corrosion has given Enterprise confidence that they yield valid data, because these data correspond with results of in-the-ditch investigations of pipe-wall anomalies that are identified via ILI tool runs and visual inspections of the internal surfaces of the pipelines as recorded on the Maintenance Report form. Some coupons are inserted through the top of the line but the coupon is positioned at the bottom of the line, into the zone were it is most likely that water will drop out. In Enterprise’s experience, such a configuration does not affect the reliability of the data that is produced. Some of these devices are mounted on the bottom of the line of above-ground piping and as such create a water drop-out point which simulates areas that are most susceptible to corrosion (e.g., low areas/sags under rivers, creeks, roadways, etc.). Since it is impractical to locate internal-corrosion monitoring devices in sections of pipelines that are under rivers, creeks and roadways, Enterprise must rely on devices that are installed at accessible locations and that are mounted on the bottom of the lines and that create water drop-out points that simulate areas that are most susceptible to internal corrosion. As a point of information and without admitting any prior deficiency in its methods of investigating internal corrosion, Enterprise wishes to advise PHMSA that it is presently replacing internal coupons

R.M. Seeley, Director

June 8, 2007

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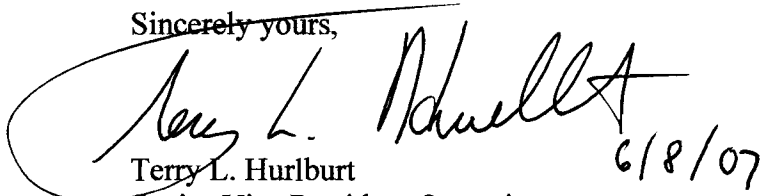
that are inserted through the top of the line with devices that are mounted on the bottom of the line.

Enterprise also disputes the allegation in the Notice that, "No records of internal inspection of removed pipe could be located." The inspector was shown a specimen report by Keifner & Associates on the internal inspection of removed pipe from a segment of the Rocky Mountain Pipeline (Red System) near Edgewood, NM (copy enclosed as **Exhibit 6**).

For the reasons stated above, Enterprise requests that this item of the Notice be withdrawn and that paragraph 5 of the Compliance Order be deleted.

Enterprise appreciates having the opportunity to respond to the Notice. Please contact me at 713/381-8298 or Joel E. Kohler at 225/675-2507 if you have any questions.

Sincerely yours,



Terry L. Hurlburt
Senior Vice President Operations

6/8/07

Enclosures

cc: Joel Kohler w/encls.

Enterprise Products Operating L.P.

CPF-4-2007-5015

EXHIBIT 1

Request for Waiver Dated July 18, 2005



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Enterprise

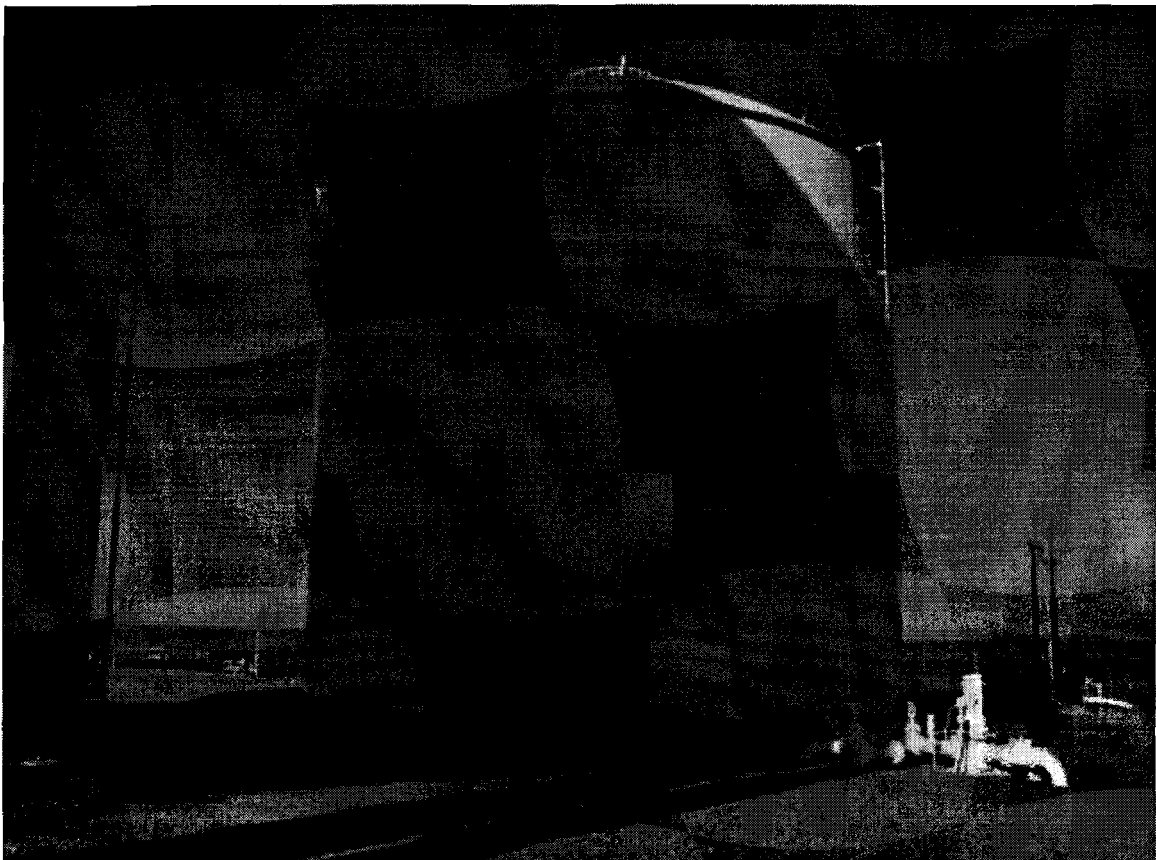
Skellytown, TX

4-27-2004

B-Scan Examination

Tank No.: VST-2030

Tank Name: Natural Gas Storage Tank



DBI Incorporated

Lincoln Nebraska

4223 Progressive Avenue.Lincoln NE 68504.Telephone: 402-467-1818 Fax: 402-467-1766

Omaha Nebraska

2211 S. 156th Circle.Omaha NE 68130.Telephone:402-330-9612.Fax: 402-330-9640

Overland Park Kansas

11660 West 90th.Overland Park KS 66214.Telephone: 913-888-2321 Fax: 913-888-2351



Summary Report

Client: Enterprise
Location: Skellytown, TX

Report Reviewed By: [Signature]

Tank No. : VST-2030
Tank Name: Natural Gas Storage Tank

Inspection Date: 4-27-2004

Type of Inspection: B-Scan

Note: A B-Scan baseline inspection was performed on the VST-2030. The VST-2030 meets the minimum required thickness at this time.

NEXT UT INSPECTION: 4/25/2014
NEXT VISUAL INSPECTION: 4/26/2009

Table with 5 columns: Shell Course No., T-MIN., T-NOM., Remaining Life (Years), Corrosion Rate (Per Year). Rows include Shell Course No. 1 through 6.

Table with 7 columns: Nozzle No., Thickness, T-MIN., T-NOM., Repad T-MIN, Repad T-NOM, Corrosion Rate (Per Year). Rows include Nozzle No. 1 through 8.



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Client: Enterprise
Location: Skellytown, TX

Tank No.: VST-2030
Tank Name: Natural Gas Storage Tank

Tank Data

| | | | |
|-------------------------|---------|---------------------------|-------------|
| Construction Date: | 1969 | Tank Configuration: | Vertical |
| In-Service Date: | 1969 | Shell Diameter: | 30' Assumed |
| Manufacturer: | Horton | Shell Height: | 48' |
| Mfg. Serial #: | Unknown | Max. Design Liquid Level: | 48' |
| Issue Date of API-650: | Unknown | Product: | Natural Gas |
| Tank Insulated: | No | Specific Gravity: | .70 |
| Openings in Insulation: | N/A | Capacity: | 20000 BBL |
| Design Temperature: | Ambient | Operating Temperature: | Unknown |
| No. of Shell Courses: | 6 | No. of Nozzles: | 8 |
| Type of Roof: | Domed | Coating Thickness: | 10 mils |
| Name Plate Condition: | Good | | |

| | | |
|---------------|------------------|-------------------|
| | Materials | Joint Eff. |
| Roof: | Unknown | Unknown |
| Shell: | Unknown | Unknown |
| Floor: | Unknown | Unknown |
| Annular Ring: | Unknown | Unknown |



STORAGE TANK EXTERNAL INSPECTION

Client: Enterprise
Location: Skellytown, TX
Tank No. VST-2030
Tank Name: Natural Gas Storage Tank

Date Inspected: 4-27-2004
Inspector(s): Greg Wiebelhaus
Josh Vinzant
Signature:

Handwritten signature

NAME PLATE

Table with 5 columns: Item Inspected, Yes, No, N/A, Comments. Rows include Name Plate present & legible, API Code Stamp #, Manufacturer, and Serial # & Year Built.

FOUNDATION

Table with 5 columns: Item Inspected, Yes, No, N/A, Comments. Rows include Concrete condition, Levelness, Coating condition, Drain openings in ring, Signs of settlement around tank, and Dike walls / Containment.

SHELL

Table with 5 columns: Item Inspected, Yes, No, N/A, Comments. Rows include Paint condition, Corrosion / Pitting, Bulges / Blisters / Deformations, Weld condition, Attachments, Insulation deterioration, Signs of 'chime' thinning, Overflow vents / piping, and UT measurements.

CATHODIC PROTECTION

Table with 5 columns: Item Inspected, Yes, No, N/A, Comments. Rows include Galvanic anode system and Impressed current system.



MANWAYS & NOZZLES

| Item Inspected | Yes | No | NA = Not Applicable | Comments: |
|-------------------------------|-------------------------------------|--------------------------|-------------------------------------|-----------------|
| Paint condition | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Good |
| Corrosion, pitting (describe) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | None noted |
| Weld condition | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Appear good |
| Flange condition | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Appear good |
| Bolting condition | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Appear good |
| Repad condition | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Appear good |
| Insulation deterioration | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | N/A |
| UT measurements | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | See cad drawing |

ROOF

| | | | | |
|-------------------------------|-------------------------------------|--------------------------|-------------------------------------|-----------------|
| Paint Condition | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Good |
| Corrosion, pitting (describe) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | None noted |
| Weld condition | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Appear good |
| Proper drainage | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Yes |
| Insulation deterioration | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | N/A |
| UT measurements | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | See cad drawing |

ROOF APPURTENANCES

| | | | | |
|-----------------------------------|-------------------------------------|--------------------------|-------------------------------------|-------------|
| Condition of hatch(s), manway(s) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Appear good |
| Condition of pressure/vacuum vent | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Appear good |
| Condition of screens on vents | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Appear good |
| Bolting condition | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Appear good |
| Insulation seal condition | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | N/A |

APPURTENANCES

| | | | | |
|-----------------------------------|-------------------------------------|--------------------------|-------------------------------------|-------------|
| Grounding (tightness & corrosion) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Ground good |
| Gauges, Sight glass (damage) | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | N/A |

HANDRAILS

| | | | | |
|-----------------------------------|-------------------------------------|--------------------------|-------------------------------------|-------------|
| Paint condition | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Good |
| Corrosion, pitting (describe) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | None noted |
| Attachment welds | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Appear good |
| Safety drop bar (chain) condition | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | N/A |



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PLATFORMS / STAIRS / LADDERS

| Item Inspected | Yes | No | NA = Not Applicable | Comments: |
|-------------------------------|-------------------------------------|--------------------------|-------------------------------------|--------------------|
| Paint condition | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Good |
| Corrosion, pitting (describe) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | None noted |
| Attachment weld condition | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Appear good |
| Bolting condition | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Appear good |
| Cage condition | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | N/A |
| Rung condition | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Appear good |
| Stairway tread condition | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Appear good |
| Concrete base condition | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Good |

GRATING

| | | | | |
|----------------------------|-------------------------------------|--------------------------|-------------------------------------|--------------------|
| Paint condition | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Good |
| Thinning on grating bars | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | None noted |
| Condition of grating welds | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Appear good |
| Tie down clips | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | N/A |

ADDITIONAL COMMENTS:



DBI, Inc. Quality Inspection and Consulting Services

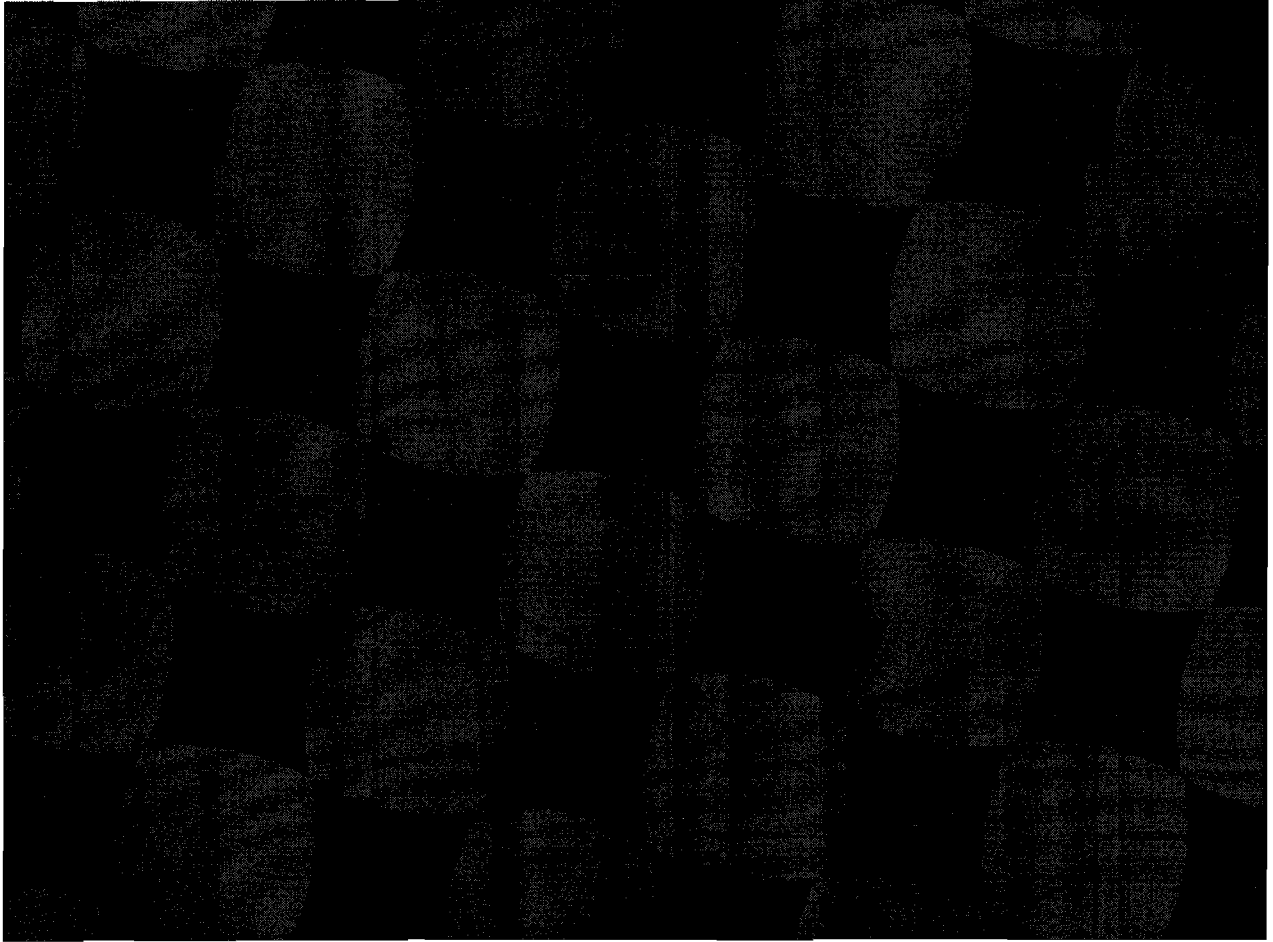
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Picture 1: Dents and flat spots on North side.



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Picture 2: Rock and dirt eroding and washing away from Southwest side of tank.

Enterprise Products Operating L.P.

CPF-4-2007-5015

EXHIBIT 2

Breakout Tank Inspections



DBI, Inc. Quality Inspection and Consulting Services
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Enterprise
Skellytown, TX

Tanks

DBI, Inc
Mechanical Integrity Inspection

| Tank No. | Tank Name | Next UT Inspections | Next Visual Inspections | Non-Conformities |
|-----------------|--------------------------|----------------------------|--------------------------------|--|
| VST-2030 | Natural Gas Storage Tank | 04/25/2014 | 04/26/2009 | Top 2 shell courses have dents on north side. Rock & dirt washing away for sw side |
| #2 North | Inhibitor Tank | 04/25/2014 | 04/25/2014 | |
| #1 South | Inhibitor Tank | 04/25/2014 | 04/25/2014 | |
| #1 | Methanol Tank | 04/25/2014 | 04/25/2014 | |



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Enterprise
Skellytown, TX

Vessels

DBI, Inc
Mechanical Integrity Inspection

| Vessel No. | Vessel Name | Next UT Inspections | Next Visual Inspections | Non-Conformities |
|------------|------------------------------------|---------------------|-------------------------|--|
| MR-9130 | South Red Scraper Trap Filter | 02/23/2011 | 04/19/2009 | |
| MR-9200-B | Blue Pump Header Filter | 12/30/2011 | 04/19/2009 | |
| VKO-2000 | Flare Knockout | 07/16/2012 | 04/19/2009 | |
| EM-1000 | Mainline Motor Filter | 04/18/2014 | 04/19/2009 | |
| EM-1020 | EM-1020 Motor Filter | 04/18/2014 | 04/19/2009 | |
| MR-9200-A | South Skelly Meter Run Filter | 04/18/2014 | 04/19/2009 | |
| TR-9010 | Emerald A Meter Run Filter | 04/18/2014 | 04/19/2009 | |
| TR-9020 | Pampa Lateral Scraper Trap Filter | 04/18/2014 | 04/19/2009 | |
| TR-9030 | Fritch Lateral Scraper Trap Filter | 04/18/2014 | 04/19/2009 | |
| VSP-2010 | C-Grade Sphere | 04/18/2014 | 04/19/2009 | Heavy laminations found on top of the sphere |
| VSP-2020 | C-Grade Sphere | 04/18/2014 | 04/19/2009 | |



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Skellytown, TX

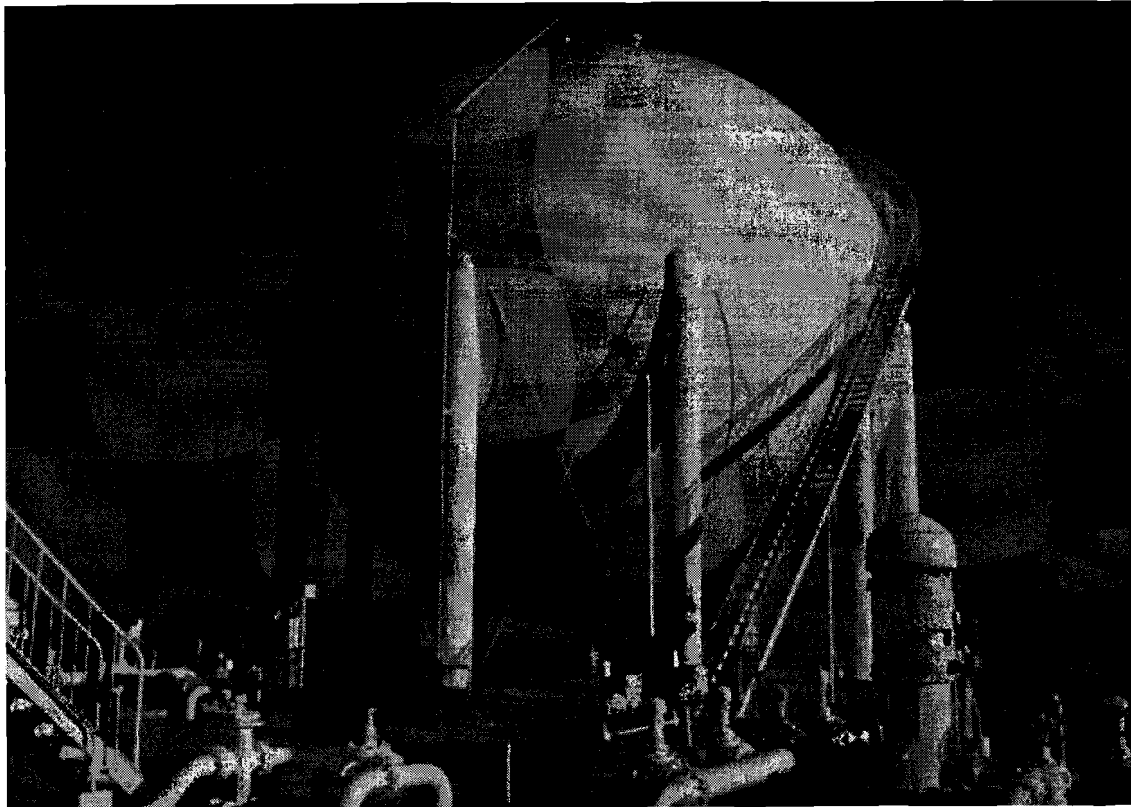
4-20-2004

B-Scan Examination

Vessel No.: VSP-2010

Vessel Name: C-Grade Sphere

P&ID No: SK-063



DBI Incorporated

Lincoln Nebraska

4223 Progressive Avenue.Lincoln NE 68504.Telephone: 402-467-1818 Fax: 402-467-1766

Omaha Nebraska

2211 S. 156th Circle.Omaha NE 68130.Telephone:402-330-9612.Fax: 402-330-9640

Overland Park Kansas

11660 West 90th.Overland Park KS 66214.Telephone: 913-888-2321 Fax: 913-888-2351



Summary Report

Client: Enterprise
Location: Skellytown, TX

Report Reviewed By:

Vessel No. : VSP-2010
Vessel Name: C-Grade Sphere

Inspection Date: 4-20-2004

Type of Inspection: B-Scan

Note: A B-Scan baseline inspection was performed on the VSP-2010. The VSP-2010 meets MAWP of 60 psi with remaining service life of 20+ years.

Note: The B-Scan inspection found heavy laminations on top of the sphere.

Next UT Inspection: 04/18/14 API 510 para. 6.4
Next Visual Inspection: 04/19/09

| | 2004 T-Min. | 2004 T-Nom. | Remaining Life (Years) | Corrosion Rate Per Year |
|----------|----------------|----------------|---------------------------|----------------------------|
| Shell 1 | 0.965 | 0.973 | 20+ | Less than 1 mil |
| Shell 2 | 0.948 | 0.965 | 20+ | Less than 1 mil |
| Shell 3 | 0.923 | 0.965 | 20+ | 0.001 |
| Shell 4 | 0.923 | 0.965 | 20+ | 0.001 |
| Shell 5 | 0.958 | 0.966 | 20+ | Less than 1 mil |
| Shell 6 | 0.940 | 0.956 | 20+ | Less than 1 mil |
| Shell 7 | 0.940 | 0.956 | 20+ | Less than 1 mil |
| Shell 8 | 0.923 | 0.948 | 20+ | 0.001 |
| Shell 9 | 0.940 | 0.956 | 20+ | Less than 1 mil |
| Shell 10 | 0.956 | 0.973 | 20+ | Less than 1 mil |
| Shell 11 | 0.940 | 0.956 | 20+ | Less than 1 mil |
| Shell 12 | 0.873 | 0.890 | 20+ | Less than 1 mil |
| Shell 13 | 0.881 | 0.898 | 20+ | Less than 1 mil |
| Shell 14 | 0.873 | 0.906 | 20+ | 0.001 |
| Shell 15 | 0.881 | 0.898 | 20+ | Less than 1 mil |



DBI, Inc. Quality Inspection and Consulting Services

Reliable...Responsive...Resourceful...Proactive

| | | | | |
|----------|-------|-------|-----|-----------------|
| Shell 16 | 0.865 | 0.898 | 20+ | 0.001 |
| Shell 17 | 0.873 | 0.898 | 20+ | 0.001 |
| Shell 18 | 0.865 | 0.898 | 20+ | 0.001 |
| Shell 19 | 0.790 | 0.806 | 20+ | Less than 1 mil |
| Shell 20 | 0.781 | 0.815 | 20+ | 0.001 |
| Shell 21 | 0.756 | 0.806 | 20+ | 0.001 |
| Shell 22 | 0.773 | 0.815 | 20+ | 0.001 |
| Shell 23 | 0.781 | 0.806 | 20+ | Less than 1 mil |
| Shell 24 | 0.748 | 0.781 | 20+ | Less than 1 mil |

| | 2004 | 2004 | Repad | | | Corrosion Rate |
|---------------|---------------|---------------|---------------|---------------|-------------|-----------------------|
| | T-Min. | T-Nom. | T-Min. | T-Nom. | Size | Per Year |
| Nozzle No. 1 | 0.910 | 0.918 | 0.960 | 0.968 | 26" | Less than 1 mil |
| Nozzle No. 2 | 0.290 | 0.298 | N/A | N/A | 2" | Less than 1 mil |
| Nozzle No. 3 | 0.520 | 0.528 | 0.960 | 0.968 | 10" | Less than 1 mil |
| Nozzle No. 4 | 0.440 | 0.448 | 0.789 | 0.796 | 6" | Less than 1 mil |
| Nozzle No. 5 | 0.360 | 0.368 | N/A | N/A | 2" | Less than 1 mil |
| Nozzle No. 6 | 0.250 | 0.258 | N/A | N/A | 2" | Less than 1 mil |
| Nozzle No. 7 | 0.240 | 0.248 | N/A | N/A | 2" | Less than 1 mil |
| Nozzle No. 8 | 0.360 | 0.368 | 0.810 | 0.818 | 4" | Less than 1 mil |
| Nozzle No. 9 | 0.430 | 0.438 | 0.800 | 0.808 | 6" | Less than 1 mil |
| Nozzle No. 10 | 0.260 | 0.268 | N/A | N/A | 2" | Less than 1 mil |
| Nozzle No. 11 | 0.890 | 0.898 | 0.960 | 0.968 | 26" | Less than 1 mil |
| Nozzle No. 12 | 0.340 | 0.348 | 0.880 | 0.888 | 6" | Less than 1 mil |
| Nozzle No. 13 | 0.520 | 0.528 | 0.800 | 0.808 | 6" | Less than 1 mil |
| Nozzle No. 14 | 0.430 | 0.438 | 0.810 | 0.816 | 8" | Less than 1 mil |



Client: Enterprise
Location: Skellytown, TX

Vessel No.: VSP-2010
Vessel Name: C-Grade Sphere

Vessel Parameters

| | | | |
|-------------------------|------------------|--------------------|------|
| Design Pressure (MAWP): | 60 psi | Head Material: | N/A |
| Design Temperature: | 450 F | Head Type: | N/A |
| Operating Pressure: | 50 psi | Allowable Stress: | N/A |
| Operating Temperature: | 80 F | Joint Efficiency: | N/A |
| Diameter: I.D or O.D | 69' 0" OD | Head Material | N/A |
| Length S/S: | N/A | Head Type: | N/A |
| Shell Material: | Case 1280 Gr. 70 | Allowable Stress: | N/A |
| Allowable Stress: | 17500 | Joint Efficiency: | N/A |
| Joint Efficiency: | 1.0 | Date Manufactured: | 1961 |
| Corrosion Allowance: | 0 | In Service Date: | 1961 |

ASME CODE EDITION USED FOR CALCULATIONS ASME Section VIII, Division 1. 1998 Edition

Paint Information

| | | | |
|----------------------------------|---------|-----------------------------------|------|
| Average paint coating thickness: | 10 mils | Thickness measured with paint: | .791 |
| Paint Multiplier: | 1 | Thickness measured without paint: | .781 |

Name Plate Information

| | | | |
|----------------------|-----|-------------------------------|---------|
| UIA Available: | No | ASME stamp present on vessel? | No |
| Name Plate present ? | Yes | Rubbing taken? | Picture |



Client: Enterprise
Location: Skellytown, TX

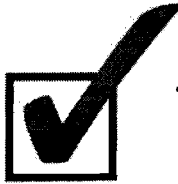
Vessel No.: VSP-2010
Vessel Name: C-Grade Sphere

Vessel Data

| | | | |
|-------------------------|---------------------------|-----------------------------|-------------|
| Vessel Class: | 2 | Date Manufactured: | 1961 |
| Manufactures Serial #: | 4009 | In Service Date: | 1961 |
| Product in Vessel: | C-Grade | Date of ASME VIII Vessel | N/A |
| | | Mfg. under: | |
| P&ID Drawing #: | SK-063 | Code Cases: | N/A |
| P&ID Prepared By: | Mid-America | Addenda: | N/A |
| Manufacturer: | Chicago Bridge & Iron Co. | National Board Number: | None |
| Vessel Length S/S | N/A | Vessel Insulated: | No |
| Diameter I.D or O.D: | 69' 0" OD | Describe openings (if any): | N/A |
| No. of Shell Sections: | 5 | ANSI Flange Rating: | 150 # |
| No. of Nozzles: | 14 | Vessel Orientation: | Vertical |
| Design Pressure (MAWP): | 60 psi | Operating Pressure: | 50 psi |
| Design Temperature: | 450 F | Operating Temperature: | 80 F |
| Head Type: | N/A | Head Type: | N/A |
| Head Material: | N/A | Head Material: | N/A |
| Head Weld Type: | N/A | Head Weld Type: | N/A |
| Shell Material: | Case 1280 Gr. 70 | Shell Weld Type | WDB Assumed |
| Radiography: | Unknown | Hydrostatic: | Unknown |

Relief Valve Information

| | | | |
|--------------------------|------|--------------------------------|---------|
| Relief Valve Tag Number: | 2010 | Relief Valve Pressure Setting: | 60 psi |
| Relief Valve Test Date: | 1999 | Relief Valve Size: | 6" x 8" |



PRESSURE VESSEL EXTERNAL INSPECTION

Client: Enterprise
Location: Skellytown, TX
Vessel No. VSP-2010
Vessel Name: C-Grade Sphere

Date Inspected: 4-20-2004
Inspector(s): Greg Wiebelhaus
Josh Vinzant

Signature:

NAME PLATE

| Item Inspected | Yes | No | NA = Not Applicable | Comments: |
|------------------------------|-------------------------------------|--------------------------|-------------------------------------|-----------------------|
| Name Plate present & legible | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Good |
| National Board # | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| Manufacturer | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Chicago Bridge & Iron |
| Serial # & Year Built | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4009/ 1961 |
| Repair or Rerate Name Plate | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |

FOUNDATION

| | | | | |
|---------------------------------------|-------------------------------------|--------------------------|-------------------------------------|------------|
| Concrete condition (spalling, cracks) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | None noted |
| Foundation settling | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | None noted |
| Coating condition | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| Cradle supports (moisture, cracks) | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |

SUPPORTS

| | | | | |
|--------------------------------------|-------------------------------------|--------------------------|-------------------------------------|-------------|
| Describe type (legs, saddle, etc.) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Legs good |
| Corrosion, pitting (describe) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | None noted |
| Weld condition | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Appear good |
| Paint condition | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Appear good |
| Anchor bolts (tightness & corrosion) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Appear good |
| Insulation deterioration | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |

SHELL

| | | | | |
|----------------------------------|-------------------------------------|--------------------------|-------------------------------------|-------------|
| Corrosion, pitting (describe) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | None noted |
| Bulges / Blisters / Deformations | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | None noted |
| Weld condition | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Appear good |
| Paint condition | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Good |
| Insulation deterioration | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| UT Measurements | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | See drawing |



HEADS

| Item Inspected | Yes | No | N/A | Comments: |
|----------------------------------|-------------------------------------|--------------------------|-------------------------------------|-------------|
| Corrosion, pitting (describe) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | None noted |
| Bulges / Blisters / Deformations | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | None noted |
| Weld condition | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Appear good |
| Paint condition | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Good |
| Insulation deterioration | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| UT Measurements | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | See drawing |

MANWAYS & NOZZLES

| | | | | |
|-------------------------------|-------------------------------------|--------------------------|-------------------------------------|-------------|
| Corrosion, pitting (describe) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | None noted |
| Weld condition | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Appear good |
| Flange condition | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Appear good |
| Bolting condition | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Appear good |
| Repad condition | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Appear good |
| Insulation deterioration | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| UT Measurements | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | See drawing |

APPURTENANCES

| | | | | |
|--------------------------------------|-------------------------------------|--------------------------|-------------------------------------|------------------------|
| Grounding (tightness & corrosion) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Ground good |
| Gauges, Sight glass (damage) | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| Relief Valve # / Size / Set Pressure | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2010/ 6" x 8" / 60 psi |

LADDERS, STAIRS, PLATFORMS

| | | | | |
|-----------------------------------|-------------------------------------|--------------------------|--------------------------|-------------|
| Corroded, Broken Parts | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | None noted |
| Paint condition | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Good |
| Wear (ladder rungs, stair treads) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Appear good |
| Handrails secure | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Good |
| Flooring condition | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Appear good |
| Tightness (bolts, tie down clips) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Appear good |
| Attachment welds | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Appear good |
| Corrosion, pitting (describe) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Appear good |

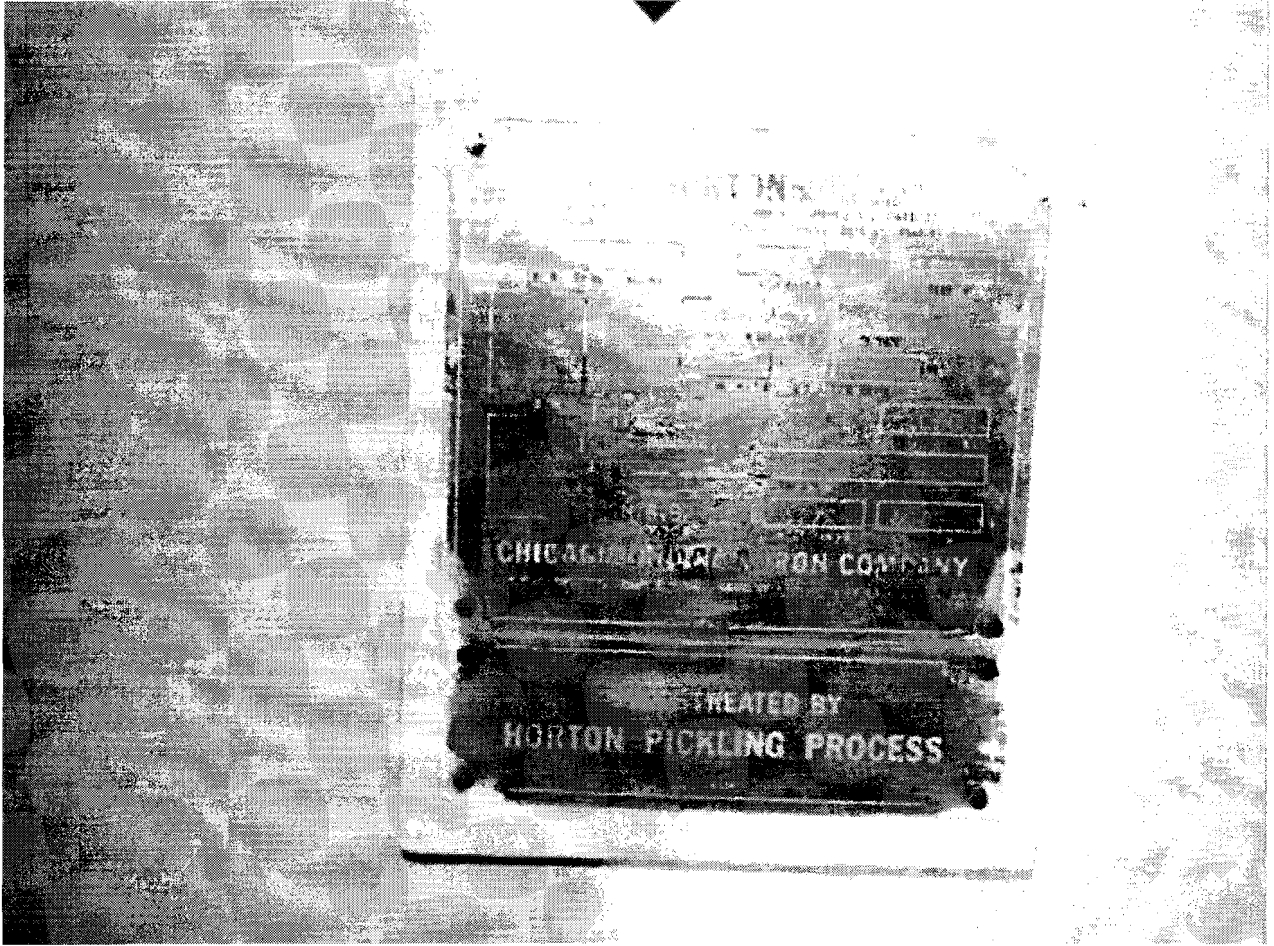
ADDITIONAL COMMENTS:

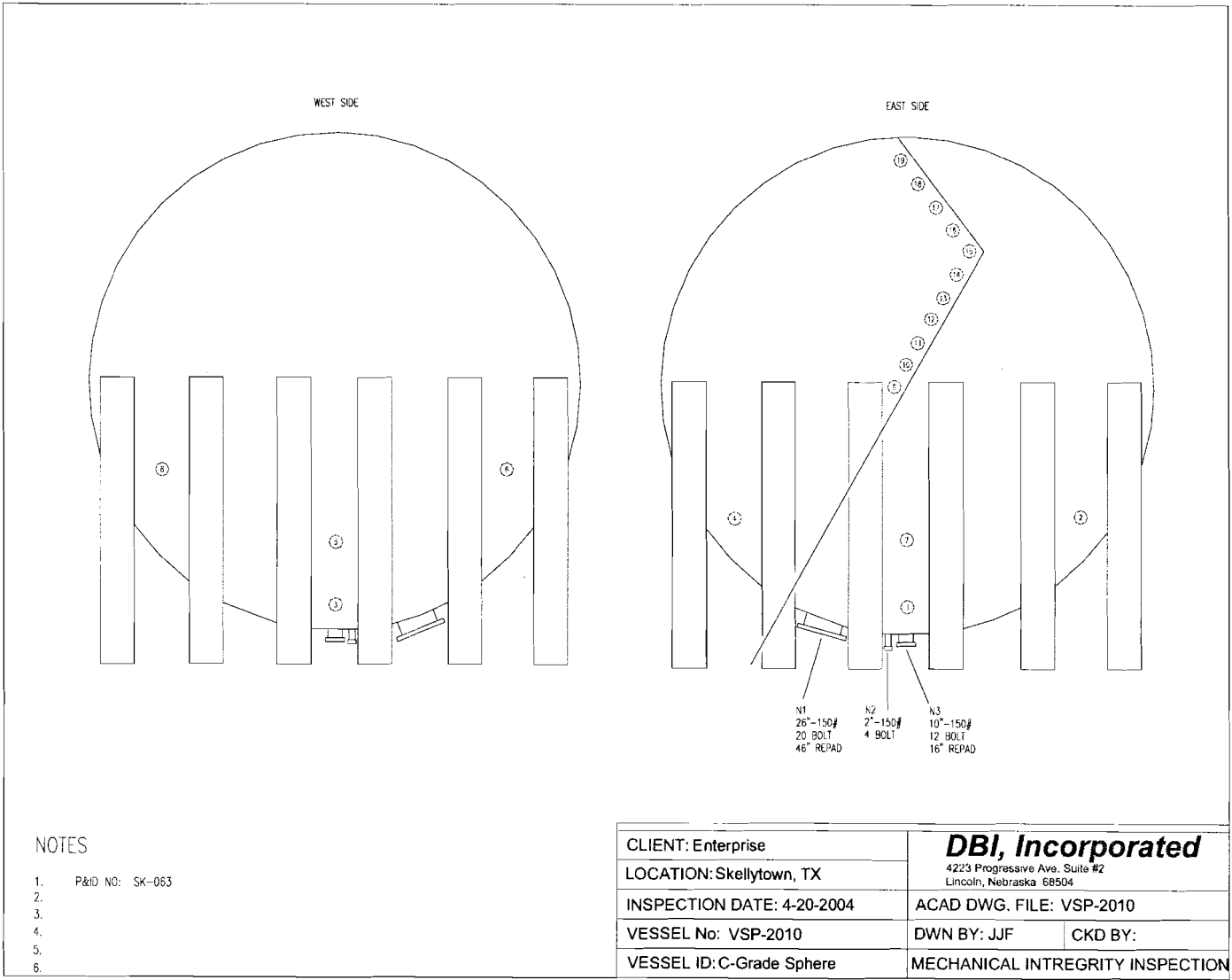
- 1) B-Scan found heavy laminations on the top of sphere.

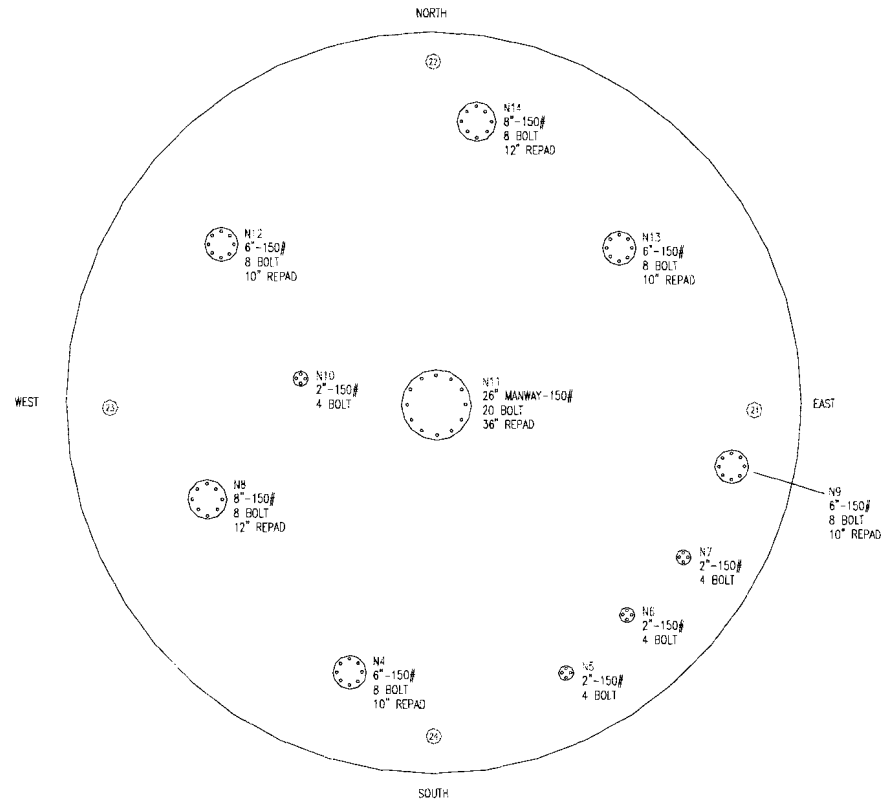


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NOTES

1. P&ID NO: SK-063
- 2.
- 3.
- 4.
- 5.
- 6.

| | | | |
|----------------------------|--|---|---------|
| CLIENT: Enterprise | | DBI, Incorporated | |
| LOCATION: Skellytown, TX | | 4223 Progressive Ave. Suite #2 Lincoln, Nebraska 68504 | |
| INSPECTION DATE: 4-20-2004 | | ACAD DWG. FILE: VSP-2010 Top | |
| VESSEL No: VSP-2010 | | DWN BY: JJF | CKD BY: |
| VESSEL ID: C-Grade Sphere | | MECHANICAL INTREGRITY INSPECTION | |



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Enterprise

Skellytown, TX

4-20-2004

B-Scan Examination

Vessel No.: VSP-2020

Vessel Name: C-Grade Sphere

P&ID No: SK-063



DBI Incorporated

Lincoln Nebraska

4223 Progressive Avenue.Lincoln NE 68504.Telephone: 402-467-1818 Fax: 402-467-1766

Omaha Nebraska

2211 S. 156th Circle.Omaha NE 68130.Telephone:402-330-9612.Fax: 402-330-9640

Overland Park Kansas

11660 West 90th.Overland Park KS 66214.Telephone: 913-888-2321 Fax: 913-888-2351



DBI, Inc. Quality Inspection and Consulting Services

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Summary Report

Client: Enterprise
Location: Skellytown, TX

Report Reviewed By:

Vessel No. : VSP-2020
Vessel Name: C-Grade Sphere

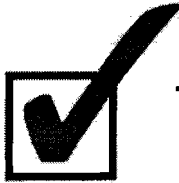
Inspection Date: 4-20-2004

Type of Inspection: B-Scan

Note: A B-Scan baseline inspection was performed on the VSP-2020. The VSP-2020 meets MAWP of 50 psi with remaining service life of 20+ years.

Next UT Inspection: 04/18/14 API 510 para 6.4
Next Visual Inspection: 04/19/09

| | 2004 | 2004 | Remaining Life | Corrosion Rate |
|----------|---------------|---------------|-----------------------|-----------------------|
| | T-Min. | T-Nom. | (Years) | Per Year |
| Shell 1 | 0.856 | 0.881 | 20+ | 0.001 |
| Shell 2 | 0.856 | 0.890 | 20+ | 0.001 |
| Shell 3 | 0.848 | 0.865 | 20+ | Less than 1 mil |
| Shell 4 | 0.840 | 0.856 | 20+ | Less than 1 mil |
| Shell 5 | 0.856 | 0.890 | 20+ | 0.001 |
| Shell 6 | 0.848 | 0.865 | 20+ | Less than 1 mil |
| Shell 7 | 0.848 | 0.856 | 20+ | Less than 1 mil |
| Shell 8 | 0.848 | 0.873 | 20+ | 0.001 |
| Shell 9 | 0.865 | 0.873 | 20+ | Less than 1 mil |
| Shell 10 | 0.823 | 0.831 | 20+ | Less than 1 mil |
| Shell 11 | 0.831 | 0.848 | 20+ | Less than 1 mil |
| Shell 12 | 0.833 | 0.841 | 20+ | Less than 1 mil |
| Shell 13 | 0.833 | 0.840 | 20+ | Less than 1 mil |
| Shell 14 | 0.831 | 0.856 | 20+ | 0.001 |
| Shell 15 | 0.815 | 0.840 | 20+ | 0.001 |
| Shell 16 | 0.831 | 0.848 | 20+ | Less than 1 mil |
| Shell 17 | 0.715 | 0.731 | 20+ | Less than 1 mil |



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| | | | | |
|----------|-------|-------|-----|-----------------|
| Shell 18 | 0.665 | 0.690 | 20+ | 0.001 |
| Shell 19 | 0.631 | 0.648 | 20+ | Less than 1 mil |
| Shell 20 | 0.656 | 0.681 | 20+ | 0.001 |
| Shell 21 | 0.698 | 0.715 | 20+ | Less than 1 mil |
| Shell 22 | 0.673 | 0.690 | 20+ | Less than 1 mil |
| Shell 23 | 0.681 | 0.706 | 20+ | 0.001 |

| | 2004 | 2004 | | Repad | | Corrosion Rate |
|---------------|---------------|---------------|-------------|---------------|--------------|-----------------------|
| | T-Min. | T-Nom. | Size | T-Min. | TNom. | Per Year |
| Nozzle No. 1 | 0.750 | 0.758 | 12" | 0.870 | 0.878 | Less than 1 mil |
| Nozzle No. 2 | 0.950 | 0.968 | 26" | 1.071 | 1.090 | Less than 1 mil |
| Nozzle No. 3 | 0.835 | 0.843 | 26" | 0.874 | 0.880 | Less than 1 mil |
| Nozzle No. 4 | 0.430 | 0.438 | 6" | 0.870 | 0.877 | Less than 1 mil |
| Nozzle No. 5 | 0.230 | 0.238 | 2" | N/A | N/A | Less than 1 mil |
| Nozzle No. 6 | 0.450 | 0.458 | 6" | 0.870 | 0.878 | Less than 1 mil |
| Nozzle No. 7 | 0.360 | 0.368 | 4" | 0.898 | 0.906 | Less than 1 mil |
| Nozzle No. 8 | 0.420 | 0.438 | 6" | 0.885 | 0.894 | Less than 1 mil |
| Nozzle No. 9 | 0.350 | 0.358 | 4" | 0.870 | 0.878 | Less than 1 mil |
| Nozzle No. 10 | 0.250 | 0.258 | 2" | N/A | N/A | Less than 1 mil |
| Nozzle No. 11 | N/A | N/A | 2" | N/A | N/A | Less than 1 mil |



Client: Enterprise
Location: Skellytown, TX

Vessel No.: VSP-2020
Vessel Name: C-Grade Sphere

Vessel Parameters

| | | | |
|-------------------------|------------------|--------------------|------|
| Design Pressure (MAWP): | 50 psi | Head Material: | N/A |
| Design Temperature: | Ambient | Head Type: | N/A |
| Operating Pressure: | 40 psi | Allowable Stress: | N/A |
| Operating Temperature: | Ambient | Joint Efficiency: | N/A |
| Diameter: I.D or O.D | 69' 0" OD | Head Material | N/A |
| Length S/S: | N/A | Head Type: | N/A |
| Shell Material: | Case 1280 Gr. 70 | Allowable Stress: | N/A |
| Allowable Stress: | 17500 | Joint Efficiency: | N/A |
| Joint Efficiency: | 1.0 | Date Manufactured: | 1967 |
| Corrosion Allowance: | 0 | In Service Date: | 1967 |

ASME CODE EDITION USED FOR CALCULATIONS ASME Section VIII, Division 1. 1998 Edition

Paint Information

| | | | |
|----------------------------------|---------|-----------------------------------|------|
| Average paint coating thickness: | 10 mils | Thickness measured with paint: | .841 |
| Paint Multiplier: | 1 | Thickness measured without paint: | .831 |

Name Plate Information

| | | | |
|----------------------|-----|-------------------------------|---------|
| U1A Available: | No | ASME stamp present on vessel? | No |
| Name Plate present ? | Yes | Rubbing taken? | Picture |



Client: Enterprise
Location: Skellytown, TX

Vessel No.: VSP-2020
Vessel Name: C-Grade Sphere

Vessel Data

| | | | |
|-------------------------|--------------------------|-----------------------------|-------------|
| Vessel Class: | 2 | Date Manufactured: | 1967 |
| Manufactures Serial #: | 9-7396 | In Service Date: | 1967 |
| Product in Vessel: | C Grade | Date of ASME VIII Vessel | N/A |
| | | Mfg. under: | |
| P&ID Drawing #: | SK-063 | Code Cases: | N/A |
| P&ID Prepared By: | Mid-America | Addenda: | N/A |
| Manufacturer: | Chicago Bridge & Iron | National Board Number: | None |
| Vessel Length S/S | N/A | Vessel Insulated: | No |
| Diameter I.D or O.D: | 69' 0" | Describe openings (if any): | N/A |
| No. of Shell Sections: | 5 | ANSI Flange Rating: | 150 # |
| No. of Nozzles: | 11 | Vessel Orientation: | Vertical |
| Design Pressure (MAWP): | 50 psi | Operating Pressure: | 40 psi |
| Design Temperature: | Ambient | Operating Temperature: | Ambient |
| Head Type: | N/A | Head Type: | N/A |
| Head Material: | N/A | Head Material: | N/A |
| Head Weld Type: | N/A | Head Weld Type: | N/A |
| Shell Material: | Case 1280 Gr. 70 | Shell Weld Type | WDB Assumed |
| Radiography: | N/A | Hydrostatic: | N/A |

Relief Valve Information

| | | | |
|--------------------------|--------|--------------------------------|----------|
| Relief Valve Tag Number: | 2020 | Relief Valve Pressure Setting: | 50 psi |
| Relief Valve Test Date: | 8-2000 | Relief Valve Size: | 8" x 10" |



PRESSURE VESSEL EXTERNAL INSPECTION

Client: Enterprise
Location: Skellytown, TX
Vessel No. VSP-2020
Vessel Name: C-Grade Sphere

Date Inspected: 4-20-2004
Inspector(s): Greg Wiebelhaus
Josh Vinzant

Signature:

NAME PLATE

Table with 5 columns: Item Inspected, Yes, No, N/A, Comments. Rows include Name Plate present & legible, National Board #, Manufacturer, Serial # & Year Built, Repair or Rerate Name Plate.

FOUNDATION

Table with 5 columns: Item Inspected, Yes, No, N/A, Comments. Rows include Concrete condition, Foundation settling, Coating condition, Cradle supports.

SUPPORTS

Table with 5 columns: Item Inspected, Yes, No, N/A, Comments. Rows include Describe type, Corrosion, pitting, Weld condition, Paint condition, Anchor bolts, Insulation deterioration.

SHELL

Table with 5 columns: Item Inspected, Yes, No, N/A, Comments. Rows include Corrosion, pitting, Bulges / Blisters / Deformations, Weld condition, Paint condition, Insulation deterioration, UT Measurements.



HEADS

| Item Inspected | Yes | No | NA = Not Applicable | Comments: |
|----------------------------------|-------------------------------------|--------------------------|-------------------------------------|-------------|
| Corrosion, pitting (describe) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | None noted |
| Bulges / Blisters / Deformations | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | None noted |
| Weld condition | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Appear good |
| Paint condition | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Appear good |
| Insulation deterioration | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| UT Measurements | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | See drawing |

MANWAYS & NOZZLES

| | | | | |
|-------------------------------|-------------------------------------|--------------------------|-------------------------------------|-------------|
| Corrosion, pitting (describe) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | None noted |
| Weld condition | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Appear good |
| Flange condition | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Appear good |
| Bolting condition | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Appear good |
| Repad condition | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Appear good |
| Insulation deterioration | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| UT Measurements | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | See drawing |

APPURTENANCES

| | | | | |
|--------------------------------------|-------------------------------------|--------------------------|-------------------------------------|------------------------|
| Grounding (tightness & corrosion) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Ground good |
| Gauges, Sight glass (damage) | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| Relief Valve # / Size / Set Pressure | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2020/ 8" x 10"/ 50 psi |

LADDERS, STAIRS, PLATFORMS

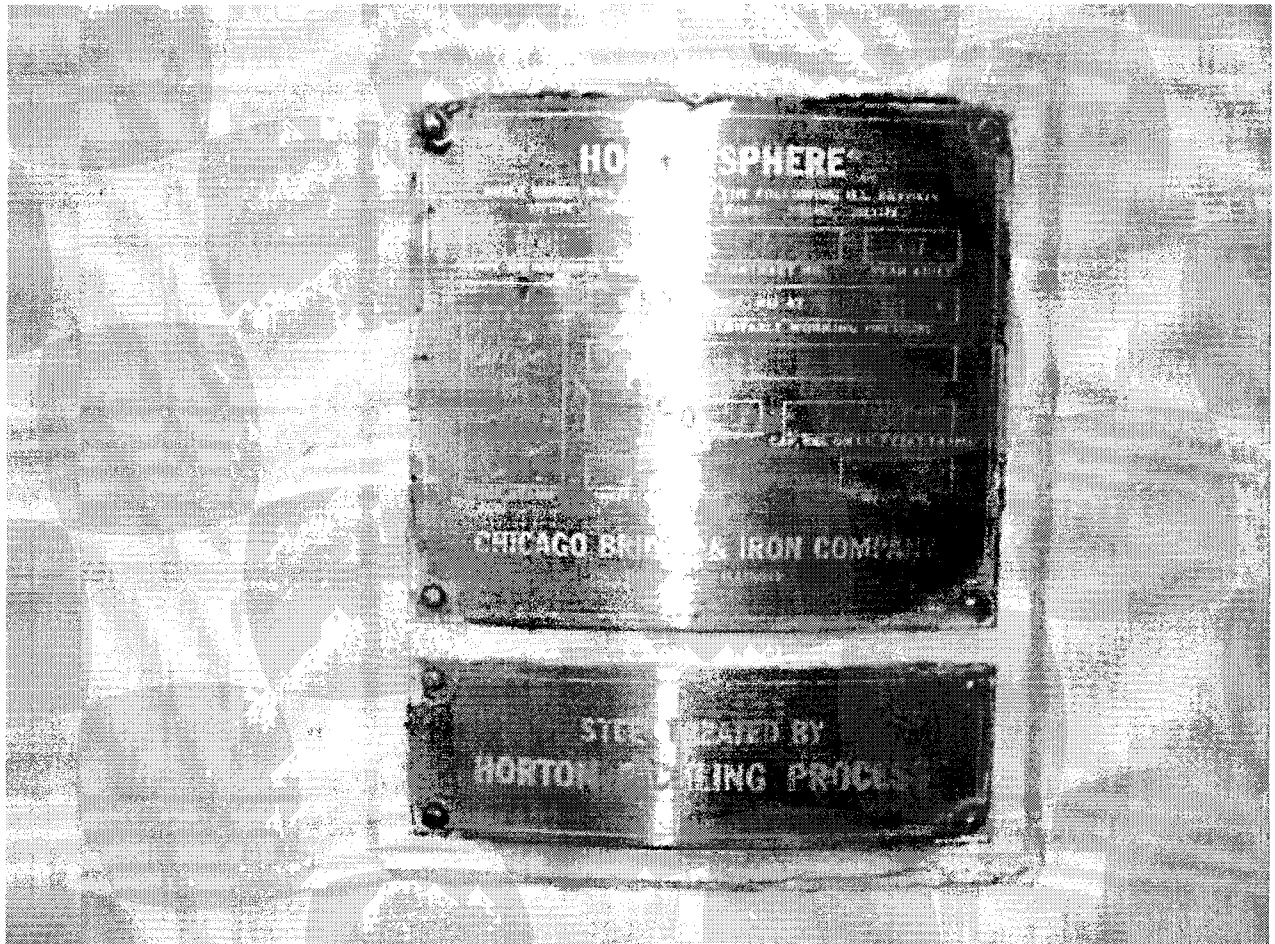
| | | | | |
|-----------------------------------|-------------------------------------|--------------------------|--------------------------|-------------|
| Corroded, Broken Parts | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | None noted |
| Paint condition | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Good |
| Wear (ladder rungs, stair treads) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Appear good |
| Handrails secure | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Good |
| Flooring condition | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Appear good |
| Tightness (bolts, tie down clips) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Appear good |
| Attachment welds | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Appear good |
| Corrosion, pitting (describe) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | None noted |

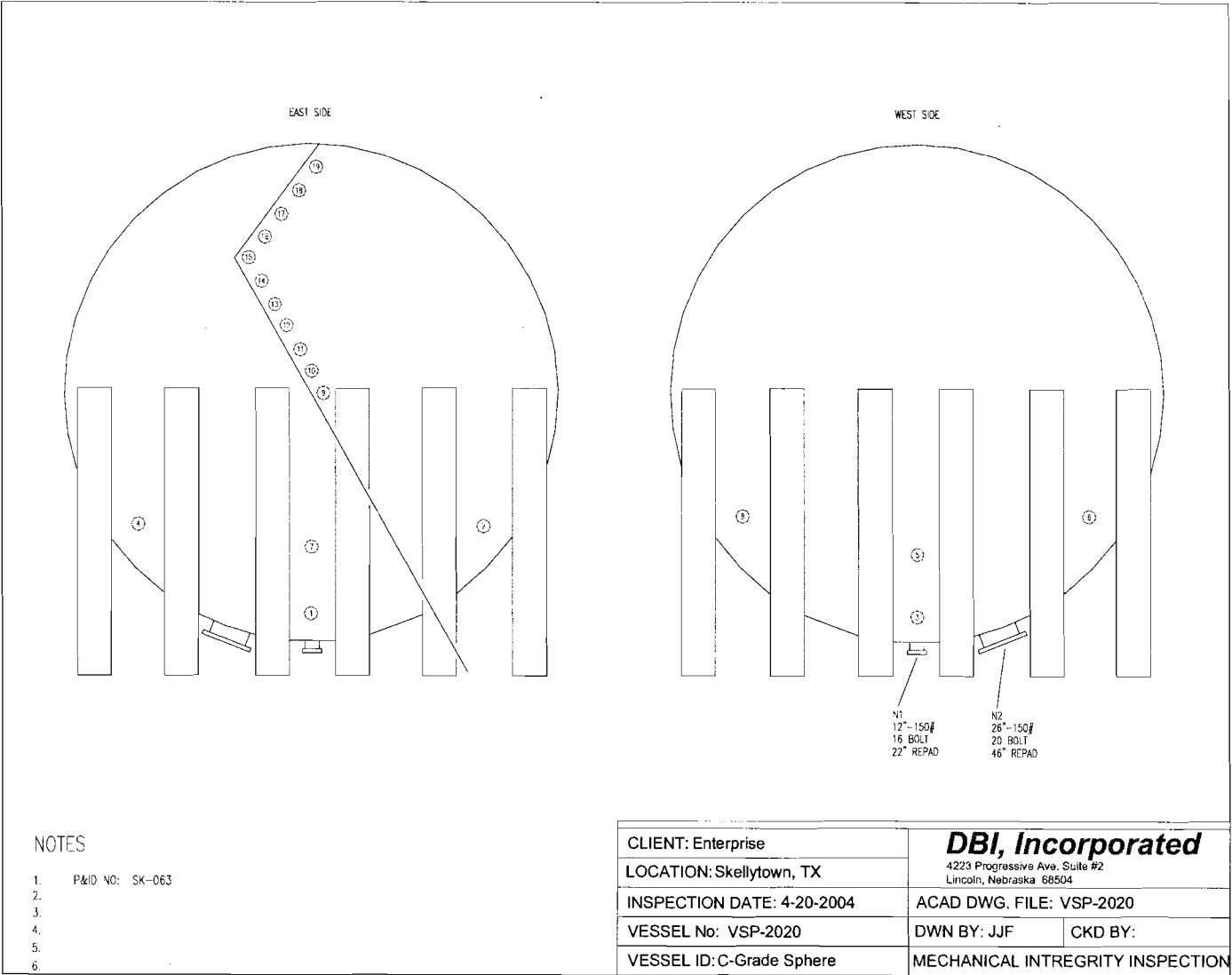
ADDITIONAL COMMENTS:

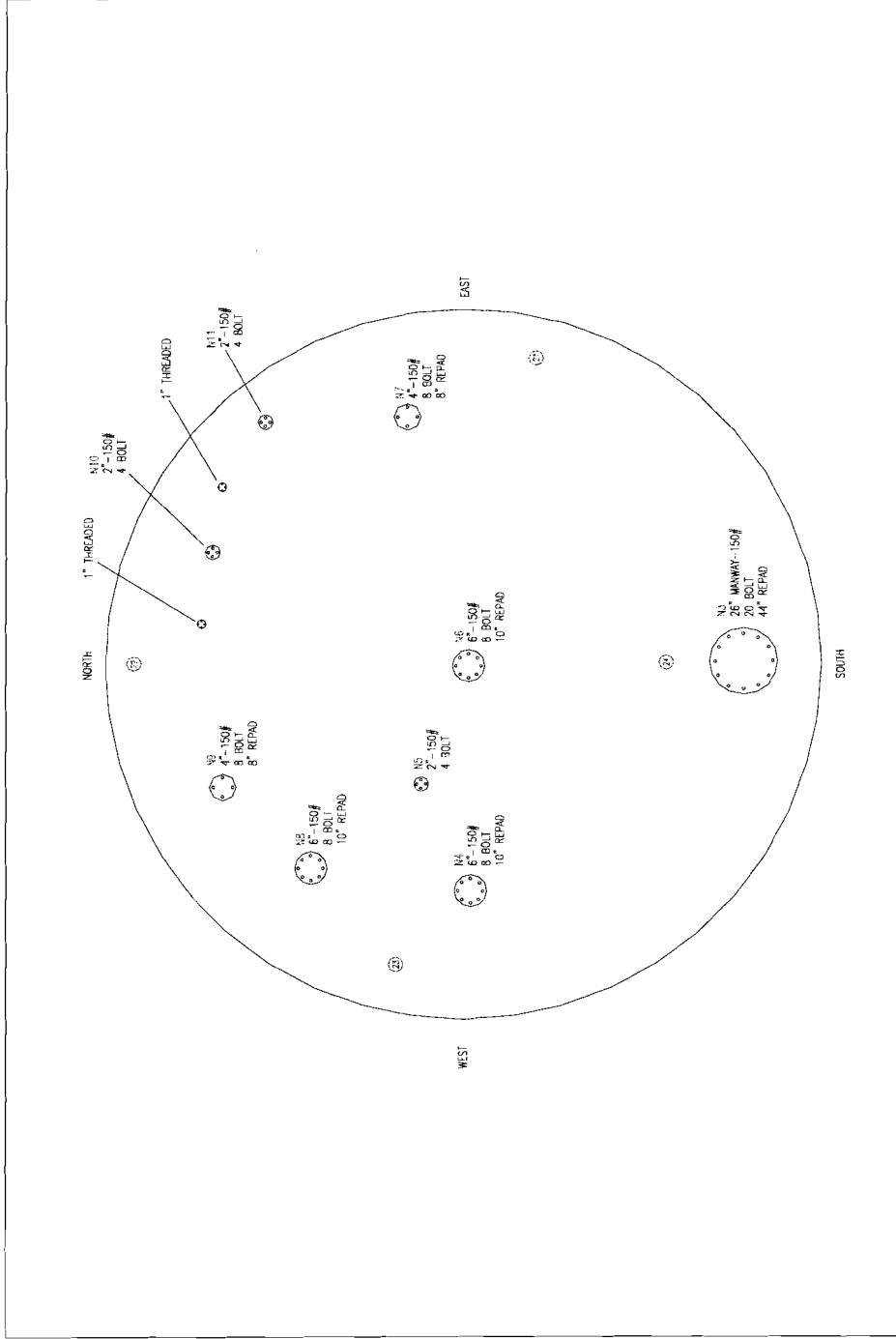


DBI, Inc. Quality Inspection and Consulting Services

Reliable...Responsive...Resourceful...Proactive







NOTES

1. P&ID NO: SK-063
- 2.
- 3.
- 4.
- 5.
- 6.

| | |
|---|---------------------------------|
| DBI, Incorporated | |
| 4223 Progressive Ave. Suite #2 Lincoln, Nebraska 68504 | |
| CLIENT: Enterprise | ACAD DWG. FILE: VSP-2020 Top |
| LOCATION: Skellytown, TX | DWN BY: JJF |
| INSPECTION DATE: 4-20-2004 | CKD BY: |
| VESSEL No: VSP-2020 | MECHANICAL INTEGRITY INSPECTION |
| VESSEL ID: C-Grade Sphere | |

Enterprise Products Operating L.P.

CPF-4-2007-5015

EXHIBIT 3

Cathodic Protection Surveys

Enterprise

Compliance Survey Report

SOUTH LEG; SKELLYTOWN STA.; 220; SKELLYTOWN STATION

Filters: 1. Survey = 2003 Annual Survey

| <u>Relative Milepost</u> | <u>Location</u> | <u>Survey Date</u> | <u>Structure P/S</u> | <u>Survey Remarks</u> |
|---|---|--------------------|----------------------|-----------------------|
| System: SOUTH LEG | | | | |
| Asset Gr: SKELLYTOWN STA. | | | | |
| Asset Id: 220 | | | | |
| Segment Code: SKELLYTOWN STATION | | | Segment Name: | |
| 0.000 | Station Piping: 8" Red Pump Manifold | 07/30/2003 | -1.028 | |
| 1.000 | Station Piping: 10" Blue Pump Manifold #1 | 07/30/2003 | -1.092 | |
| 2.000 | Station Piping: 10" Blue Pump Manifold #2 | 07/30/2003 | -1.061 | |
| 3.000 | Station Piping: 10" Blue Check Valve | 07/30/2003 | -1.316 | |
| 4.000 | Station Piping: Pumps To Spheres | 07/30/2003 | -1.011 | |
| 5.000 | Station Piping: North Sphere | 07/30/2003 | -1.176 | |
| 6.000 | Station Piping: Middle Sphere | 07/30/2003 | -1.134 | |
| 7.000 | Station Piping: South Sphere | 07/30/2003 | -1.163 | |
| 8.000 | Station Piping: Pump To Tank | 07/30/2003 | -1.038 | |
| 9.000 | Station Piping: North Tank Quadrant | 07/30/2003 | -1.010 | |
| 10.000 | Station Piping: East Tank Quadrant | 07/30/2003 | -1.038 | |
| 11.000 | Station Piping: South Tank Quadrant | 07/30/2003 | -1.013 | |
| 12.000 | Station Piping: West Tank Quadrant | 07/30/2003 | -1.014 | |
| 13.000 | Station Piping: Meters Conway (red Reversal) | 07/30/2003 | -1.083 | |
| 14.000 | Station Piping: Flare | 07/30/2003 | -1.821 | |
| 15.000 | Station Piping: Methanol Tank | 07/30/2003 | -1.055 | |

Compliance Survey Report
 SOUTH LEG; SKELLYTOWN STA.; 220; SKELLYTOWN STATION
 Filters: 1. Survey = 2003 Annual Survey

| <u>Relative Milepost</u> | <u>Location</u> | <u>Survey Date</u> | <u>Structure P/S</u> | <u>Survey Remarks</u> |
|--------------------------|---|--------------------|----------------------|-----------------------|
| 16.000 | Station Piping: Celanese (c) Pump | 07/30/2003 | -0.991 | |
| 17.000 | Station Piping: Tank Injection Booster | 07/30/2003 | -1.086 | |
| 18.000 | Station Piping: Tank Injection Pump | 07/30/2003 | -1.001 | |
| 19.000 | 8-inch Diamond Shamrock - I.f.: Mid-america Side | 07/30/2003 | -1.213 | |
| 20.000 | 8-inch Phillips Connection #1 - I.f.: Mid-america Side | 07/30/2003 | -1.261 | |
| 21.000 | 6-inch Phillips Connection #2 - I.f.: Mid-america Side | 07/30/2003 | -1.323 | |
| 22.000 | 6-inch Phillips Connection #3: Mid-america Side | 07/30/2003 | -1.251 | |
| 23.000 | 8-inch Phillips Connection #4 - I.f.: Mid-america Side | 07/30/2003 | -1.263 | |

Enterprise
 Compliance Survey Report
 SOUTH LEG; SKELLYTOWN STA.; 220; SKELLYTOWN STATION
 Filters: 1. Survey = 2004 Annual Survey

| Relative Milepost | Location | Survey Date | Structure P/S | Survey Remarks |
|---|--|-------------|----------------------|----------------|
| System: SOUTH LEG | | | | |
| Asset Gr: SKELLYTOWN STA. | | | | |
| Asset Id: 220 | | | | |
| Segment Code: SKELLYTOWN STATION | | | Segment Name: | |
| 0.000 | Station Piping: 8" Red Pump Manifold | 08/25/2004 | -1.018 | |
| 1.000 | Station Piping: 10" Blue Pump Manifold #1 | 08/25/2004 | -1.011 | |
| 2.000 | Station Piping: 10" Blue Pump Manifold #2 | 08/25/2004 | -0.997 | |
| 3.000 | Station Piping: 10" Blue Check Valve | 08/25/2004 | -1.301 | |
| 4.000 | Station Piping: Pumps To Spheres | 08/25/2004 | -1.075 | |
| 5.000 | Station Piping: North Sphere | 08/25/2004 | -1.031 | |
| 6.000 | Station Piping: Middle Sphere | 08/25/2004 | -1.056 | |
| 7.000 | Station Piping: South Sphere | 08/25/2004 | -1.124 | |
| 8.000 | Station Piping: Pump To Tank | 08/25/2004 | -1.053 | |
| 9.000 | Station Piping: North Tank Quadrant | 08/25/2004 | -1.032 | |
| 10.000 | Station Piping: East Tank Quadrant | 08/25/2004 | -1.046 | |
| 11.000 | Station Piping: South Tank Quadrant | 08/25/2004 | -1.043 | |
| 12.000 | Station Piping: West Tank Quadrant | 08/25/2004 | -1.021 | |
| 13.000 | Station Piping: Meters Conway (red Reversal) | 08/25/2004 | -1.026 | |
| 14.000 | Station Piping: Flare | 08/25/2004 | -1.806 | |
| 15.000 | Station Piping: Methanol Tank | 08/25/2004 | -1.051 | |

Compliance Survey Report
 SOUTH LEG; SKELLYTOWN STA.; 220; SKELLYTOWN STATION
 Filters: 1. Survey = 2004 Annual Survey

| <u>Relative Milepost</u> | <u>Location</u> | <u>Survey Date</u> | <u>Structure P/S</u> | <u>Survey Remarks</u> |
|--------------------------|--|--------------------|----------------------|-----------------------|
| 16.000 | Station Piping: Celanese (c) Pump | 08/25/2004 | -0.897 | |
| 17.000 | Station Piping: Tank Injection Booster | 08/25/2004 | -1.107 | |
| 18.000 | Station Piping: Tank Injection Pump | 08/25/2004 | -1.031 | |
| 19.000 | 8-inch Diamond Shamrock - l.f.: Mid-america Side | 08/25/2004 | -1.253 | |
| 20.000 | 8-inch Phillips Connection #1 - l.f.: Mid-america Side | 08/25/2004 | -1.267 | |
| 21.000 | 6-inch Phillips Connection #2 - l.f.: Mid-america Side | 08/25/2004 | -1.511 | |
| 22.000 | 6-inch Phillips Connection #3: Mid-america Side | 08/25/2004 | -1.366 | |
| 23.000 | 8-inch Phillips Connection #4 - l.f.: Mid-america Side | 08/25/2004 | -1.333 | |

Enterprise

Compliance Survey Report

SOUTH LEG; SKELLYTOWN STA.; 220; SKELLYTOWN STATION

Filters: 1. Survey = 2005 Annual Survey

| Relative Milepost | Location | Survey Date | Structure P/S | Survey Remarks |
|---|---|----------------|----------------------|----------------|
| System: SOUTH LEG | | | | |
| Asset Gr: SKELLYTOWN STA. | | | | |
| Asset Id: 220 | | | | |
| Segment Code: SKELLYTOWN STATION | | | Segment Name: | |
| 0.000 | Station Piping: 8" Red Pump Manifold | 09/03/2005 | -1.099 | |
| 1.000 | Station Piping: 10" Blue Pump Manifold #1 | 09/03/2005 | -1.078 | |
| 2.000 | Station Piping: 10" Blue Pump Manifold #2 | 09/03/2005 | -1.002 | |
| 3.000 | Station Piping: 10" Blue Check Valve | 09/03/2005 | -1.284 | |
| 4.000 | Station Piping: Pumps To Spheres | 09/03/2005 | -1.001 | |
| 5.000 | Station Piping: North Sphere | 09/03/2005 | -1.093 | |
| 6.000 | Station Piping: Middle Sphere | 09/03/2005 | -1.066 | |
| 7.000 | Station Piping: South Sphere | 09/03/2005 | -1.102 | |
| 8.000 | Station Piping: Pump To Tank | 09/03/2005 | -1.005 | |
| 9.000 | Station Piping: North Tank Quadrant | 09/03/2005 | -1.143 | |
| 10.000 | Station Piping: East Tank Quadrant | 09/03/2005 | -1.009 | |
| 11.000 | Station Piping: South Tank Quadrant | 09/03/2005 | -1.105 | |
| 12.000 | Station Piping: West Tank Quadrant | 09/03/2005 | -0.998 | |
| 13.000 | Station Piping: Meters Conway (red Reversal) | 09/03/2005 | -1.111 | |
| 14.000 | Station Piping: Flare | 09/03/2005 | -1.794 | |
| 15.000 | Station Piping: Methanol Tank | 09/03/2005 | -1.127 | |

Compliance Survey Report
 SOUTH LEG; SKELLYTOWN STA.; 220; SKELLYTOWN STATION
 Filters: 1. Survey = 2005 Annual Survey

| <u>Relative Milepost</u> | <u>Location</u> | <u>Survey Date</u> | <u>Structure P/S</u> | <u>Survey Remarks</u> |
|--------------------------|--|--------------------|----------------------|-----------------------|
| 16.000 | Station Piping: Celanese (c) Pump | 09/03/2005 | -0.969 | |
| 17.000 | Station Piping: Tank Injection Booster | 09/03/2005 | -1.112 | |
| 18.000 | Station Piping: Tank Injection Pump | 09/03/2005 | -1.031 | |
| 19.000 | 8-inch Diamond Shamrock - I.f.: Mid-america Side | 09/03/2005 | -1.282 | |
| 20.000 | 8-inch Phillips Connection #1 - I.f.: Mid-america Side | 09/03/2005 | -1.259 | |
| 21.000 | 6-inch Phillips Connection #2 - I.f.: Mid-america Side | 09/03/2005 | -1.483 | |
| 22.000 | 6-inch Phillips Connection #3: Mid-america Side | 09/03/2005 | -1.351 | |
| 23.000 | 8-inch Phillips Connection #4 - I.f.: Mid-america Side | 09/03/2005 | -1.307 | |

Enterprise Products Operating L.P.

CPF-4-2007-5015

EXHIBIT 4

Close Interval Survey – Four Corners - 2004



ONSHORE / OFFSHORE CATHODIC PROTECTION SERVICES

Close Interval Survey Report Red Pipeline Four Corners Area, New Mexico

| | |
|--|--|
| Customer Name: | Enterprise Products Operating L.P. |
| Customer Address: | 836 Highway 516, Flora Vista, NM 87454 |
| Customer Contact: | Mr. Joe McReynolds |
| Customer Purchase Order No.: | AFE & Sun Code # PO4535-987 |
| CCC Job No.: | S2093 |
| Pipeline Description: | 10" Dia. Red Pipeline |
| Pipeline Location: | Four Corners Area, New Mexico |
| Date Survey Was Performed: | October 24-31 & November 1-5, 2004 |
| Pipeline Section Surveyed: | Sta. No. 12471+57 to Sta. No. 14170+38 |
| Total Distance Surveyed: | 169,881' / 32.17 mi. |
| Type Right Of Way: | Wooded, Pasture, Cultivated, Open Range & Rural |
| Equipment Required to Transverse R.O.W.: | ATV |
| Type Survey Performed: | Interrupted |
| Interruption Cycle: | 7 Seconds on, 3 Seconds Off |
| Current Sources Interrupted: | See Current Source Data Sheet Attached |
| Depth Of Cover Survey Performed: | N/A |
| Global Positioning Data Provided: | N/A |
| Instrumentation: | |
| Data Collection: | Bass-Trigon Allegro CX |
| Calibration Date: | January 2004 |
| Reference Electrode: | Copper Copper Sulfate |
| Calibration Date: | Daily |
| Pipeline Locator/DOC: | Radiodetection RD 4000 |
| Global Positioning Equipment: | N/A |
| Current Interrupters: | GPS Synchronized/ Hanson |
| Relay Type: | AC/ Mercury |
| Electronic Data: | |
| CIS Data: | Bass-Trigon Close Interval Survey Manager (CISM) |
| GPS/DOC Data: | N/A |
| Cathodic Protection Related Deficiencies: | See Attached Sheet |



ONSHORE / OFFSHORE CATHODIC PROTECTION SERVICES

Close Interval Survey Report Blue Pipeline Four Corners Area, New Mexico

| | |
|--|--|
| Customer Name: | Enterprise Products Operating L.P. |
| Customer Address: | 836 Highway 516, Flora Vista, NM 87454 |
| Customer Contact: | Mr. Joe McReynolds |
| Customer Purchase Order No.: | AFE & Sun Code # PO4535-987 |
| CCC Job No.: | S2093 |
| Pipeline Description: | 8" Dia. Blue Pipeline |
| Pipeline Location: | Four Corners Area, New Mexico |
| Date Survey Was Performed: | October 24-31 & November 1-5, 2004 |
| Pipeline Section Surveyed: | Sta. No. 12470+67 to Sta. No. 14170+91 |
| Total Distance Surveyed: | 170,024' / 32.2 mi. |
| Type Right Of Way: | Wooded, Pasture, Cultivated, Open Range & Rural |
| Equipment Required to Transverse R.O.W.: | ATV |
| Type Survey Performed: | Interrupted |
| Interruption Cycle: | 7 Seconds on, 3 Seconds Off |
| Current Sources Interrupted: | See Current Source Data Sheet Attached |
| Depth Of Cover Survey Performed: | N/A |
| Global Positioning Data Provided: | N/A |
| Instrumentation: | |
| Data Collection: | Bass-Trigon Allegro CX |
| Calibration Date: | January 2004 |
| Reference Electrode: | Copper Copper Sulfate |
| Calibration Date: | Daily |
| Pipeline Locator/DOC: | Radiodetection RD 4000 |
| Global Positioning Equipment: | N/A |
| Current Interrupters: | GPS Synchronized/ Hanson |
| Relay Type: | AC/ Mercury |
| Electronic Data: | |
| CIS Data: | Bass-Trigon Close Interval Survey Manager (CISM) |
| GPS/DOC Data: | N/A |
| Cathodic Protection Related Deficiencies: | See Attached Sheet |



Close Interval Survey Report Brown Pipeline Four Corners Area, New Mexico

| | |
|--|--|
| Customer Name: | Enterprise Products Operating L.P. |
| Customer Address: | 836 Highway 516, Flora Vista, NM 87454 |
| Customer Contact: | Mr. Joe McReynolds |
| Customer Purchase Order No.: | AFE & Sun Code # PO4535-987 |
| CCC Job No.: | S2093 |
| Pipeline Description: | 12" Dia. Brown Pipeline |
| Pipeline Location: | Four Corners Area, New Mexico |
| Date Survey Was Performed: | November 5, 2004 |
| Pipeline Section Surveyed: | Sta. No. 0+00 to Sta. No. 1+42 |
| Total Distance Surveyed: | 142' |
| Type Right Of Way: | Rural |
| Equipment Required to Transverse R.O.W.: | N/A |
| Type Survey Performed: | Interrupted |
| Interruption Cycle: | 7 Seconds on, 3 Seconds Off |
| Current Sources Interrupted: | See Current Source Data Sheet Attached |
| Depth Of Cover Survey Performed: | Electronic |
| Global Positioning Data Provided: | DGPS |
| Instrumentation: | |
| Data Collection: | Bass-Trigon Allegro CX |
| Calibration Date: | January 2004 |
| Reference Electrode: | Copper Copper Sulfate |
| Calibration Date: | Daily |
| Pipeline Locator/DOC: | Radiodetection RD 4000 |
| Global Positioning Equipment: | N/A |
| Current Interrupters: | GPS Synchronized/ Hanson |
| Relay Type: | AC/ Mercury |
| Electronic Data: | |
| CIS Data: | Bass-Trigon Close Interval Survey Manager (CISM) |
| GPS/DOC Data: | N/A |
| Cathodic Protection Related Deficiencies: | See Attached Sheet |

Enterprise Products Operating L.P.

CPF-4-2007-5015

EXHIBIT 5

Maintenance Reports



MAINTENANCE REPORT

FORM REV 01/09/02

GENERAL DATA

| | | | |
|---|--|---|--|
| <input checked="" type="checkbox"/> MAINLINE (Send Original to Records/GIS 1800 S. Baltimore Ave. 3 rd Floor Tulsa, OK 74119) | <input type="checkbox"/> FACILITY (Original Stays at Location) | Tract Number 101-0-PA-20 | At Mile Post/Aerial Marker AM 50 |
| Pipeline Name / Facility Name Ammonia Pipeline Verdigras Lateral | | Line Section Number / Facility Number | |
| Reference Drawings (Alignment Sheet OR Engineering Dwg No.) 6741-AL-18.F 44 | | AFE Number | |
| State OK | County Pownsee | Legal Description NE 1/4 sec 17 T22 N R 4 E | |

LEAK DATA

| | | | | | |
|-------------------|--|---|---|--|--|
| Date Discovered | Time <input type="checkbox"/> am <input type="checkbox"/> pm | Date Stopped | Time <input type="checkbox"/> am <input type="checkbox"/> pm | Product | Barrels / MMCF Out of Line |
| Barrels Recovered | Barrels Lost | Cause <input type="checkbox"/> External Corrosion <input type="checkbox"/> Seem Failure <input type="checkbox"/> Washout <input type="checkbox"/> Vandalism | <input type="checkbox"/> Internal Corrosion <input type="checkbox"/> Operator Error <input type="checkbox"/> Fire/Explosion <input type="checkbox"/> Unknown | <input type="checkbox"/> Third Party Damage <input type="checkbox"/> Contractor Error <input type="checkbox"/> Pressure Testing <input type="checkbox"/> Water Freeze | <input type="checkbox"/> Pipe Failure <input type="checkbox"/> Frostheave <input type="checkbox"/> Overflow (Rain) <input type="checkbox"/> Other (Specify) |

Leak Reported By
Name _____ Address _____ Phone _____

WORK DONE AND REMARKS

| | | |
|---|---|--|
| Date Work Started (M/D/Y) | Date Work Completed (M/D/Y) | Ditch Was Open From (M/D/Y) To (M/D/Y) |
| Type of Repair <input type="checkbox"/> Tank Line <input type="checkbox"/> Valve <input type="checkbox"/> Tank Shell <input type="checkbox"/> Expansion Joint <input type="checkbox"/> Other | Location of Repair <input type="checkbox"/> Above Ground <input checked="" type="checkbox"/> Below Ground | |
| Description of Work Done Excavated valve setting, displaced product with nitrogen cut out valve setting, welded in pipe joint, Taped and back filled | | |

PROPERTY DAMAGE

| | | |
|-----------------------|---------|-----------|
| Owner | Address | Phone |
| Tenant | Address | Phone |
| Description of Damage | | |
| Check Written To | Date | Check No. |
| | | Amount |

LINE CONDITION AND CATHODIC PROTECTION STATUS

| | |
|---|---|
| External Pipe Condition (Describe) <input checked="" type="checkbox"/> Like New <input type="checkbox"/> Minor Pitting <input type="checkbox"/> Surface Rust <input type="checkbox"/> Moderate Pitting <input type="checkbox"/> Severe Pitting <input type="checkbox"/> Other | Existing Coating Type Polyken 919 Primer 980-15 Tape Thickness _____ Condition <input checked="" type="checkbox"/> Well Bonded <input type="checkbox"/> Partially Bonded <input type="checkbox"/> Totally Disbonded |
| Internal Pipe Condition (Describe, if Cut) <input checked="" type="checkbox"/> Like New <input type="checkbox"/> Minor Pitting <input type="checkbox"/> Surface Scale <input type="checkbox"/> Moderate Pitting <input type="checkbox"/> Severe Pitting | If Rectifier/ Ground Beds are damaged, record damage here and report to Eng. Corrosion Control |
| Corrosion Description (if Corrosion Present) Max. Pit Size L _____ x W _____ x D _____ Pit Orientation (Downstream - Clock Position) _____ Long. Seam Orientation (Downstream - Clock Position) _____ | PRB Reading Before Repair (Ground Level) _____ VDC Before Repair (in Ditch) _____ VDC After Repair (in Ditch) _____ VDC |

LINE WELDING DATA

| Welders | No. New Girth Welds | No. New Matnt. Welds | Date of Weld |
|---------------|---------------------|----------------------|--------------|
| Frank Alvarez | 5 | | 3-11-03 |
| | No. NDT | | |
| | No. Welds | | |
| | No. NDT | | |
| | No. Welds | | |
| | No. NDT | | |
| | No. Welds | | |
| | No. NDT | | |
| | No. Welds | | |
| | No. NDT | | |

NONDESTRUCTIVE TESTING AND PRESSURE TEST DATA

The following information must be documented and the original records submitted with the Maintenance Report to comply with DOT 195 266, 195 310, 192 517 and 192 243

| | | | | | |
|--|--|---|--|---|--|
| <input type="checkbox"/> Pressure Chart | <input type="checkbox"/> Inst. Calibration Certificate | <input type="checkbox"/> Testing Contractor | <input type="checkbox"/> Test Medium | <input type="checkbox"/> Date/Time of Test (Start & Finish) | <input type="checkbox"/> NDT Inspection Report |
| <input type="checkbox"/> Temperature Chart | <input type="checkbox"/> Pipe Mill Certificates | <input type="checkbox"/> Facility Description | <input type="checkbox"/> Elevation Profile | <input type="checkbox"/> Exp. Of Pressure Discontinuities | <input type="checkbox"/> NDT Qualification Sheet |

| | | | |
|---|------------------------|--|------|
| Submitted By (Print Name) Dick L. Karsens | Date 3-10-03 | Approved By (Supervisor or Project Manager) (Print Name) | Date |
| (Signature) <i>Dick L. Karsens</i> | | (Signature) | |

RETENTION: PERMANENT

DISTRIBUTION: SEE "GENERAL DATA" ABOVE.

MAINTENANCE REPORT (Pg. 2)



MINIMUM INFORMATION REQUIRED

Valves, flanges, stopples and other fittings shall be drawn on pipe detail below with ESNs and ANSI rating shown for each.
 Provide ESNs for all welds and changes in pipe wall thickness, pipe grade, pipe seam, pipe manufacturer and pipe specification on pipe detail.
 Provide ESNs for changes in coating and note type and manufacturer of coating, except for coating less than 8 feet in length.
 Provide ESNs for all repairs made to pipe, i.e., full encirclement sleeves, patches, etc., on pipe detail.
 Identify pipeline name, line number, line I.D., etc.
 If more space is needed, attach sketches as necessary.

PIPE INSTALLED

| | | | | | |
|---|----------------|------------------------|---------------|------------------|---------------------------|
| Total Feet of Pipe Added (Tie-in Weld to Tie-in Weld) | Size 6 5/8" | Wall Thickness .156 | Grade X 42 | Seam Type ERW | Manufacturer Lone Star |
| <input checked="" type="checkbox"/> Fusion Bond Epoxy <input type="checkbox"/> Polyken 1027 Primer <input type="checkbox"/> Polyken 930-50 Tape (Innerwrap) <input type="checkbox"/> Polyken 945-15 Tape (Outerwrap) <input type="checkbox"/> Other | | | | | |

PIPE RETIRED

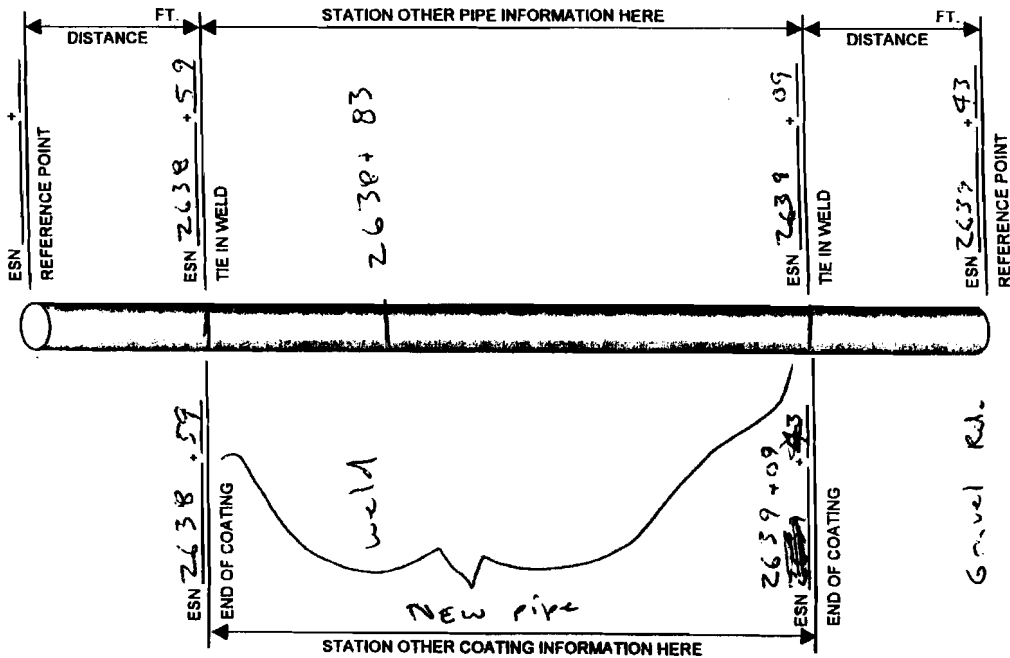
| | | | | | |
|----------------------------|------|----------------|-------|-----------|--------------|
| Total Feet of Pipe Retired | Size | Wall Thickness | Grade | Seam Type | Manufacturer |
|----------------------------|------|----------------|-------|-----------|--------------|

FABRICATED BENDS

| | | | | | |
|--|------|----------------|-------|-----------|--------------|
| Total Feet of Bends Added | Size | Wall Thickness | Grade | Seam Type | Manufacturer |
| <input type="checkbox"/> Fusion Bond Epoxy <input type="checkbox"/> Polyken 1027 Primer <input type="checkbox"/> Polyken 930-50 Tape (Innerwrap) <input type="checkbox"/> Polyken 945-15 Tape (Outerwrap) <input type="checkbox"/> Other | | | | | |

PIPE DETAIL

| | |
|---|--|
| Reference Point Description (Nearest C. Road, Fence, Valve, etc., from Alignment Street) Gravel Road | Engineering Station Number (ESN) of Reference Point 2639 + 43 |
| Distance from Ref. Pt. to nearest end of <u>34</u> (ie. in) coating, split tee, sleeve, etc.) | Direction from Ref. Pt. (Along Pipeline) <input type="checkbox"/> North <input type="checkbox"/> South <input type="checkbox"/> East <input checked="" type="checkbox"/> West |



| | |
|--|--|
| <input checked="" type="checkbox"/> Fusion Bond Epoxy | <input type="checkbox"/> Polyken 945-15 Tape (Outerwrap) |
| <input type="checkbox"/> Polyken 1027 Primer | <input type="checkbox"/> Other |
| <input type="checkbox"/> Polyken 930-50 Tape (Innerwrap) | |

Additional Sketch Area

ESN=Engineering Station Number

See Attached Drawings

RETENTION: PERMANENT

MAINTENANCE REPORT

Line ID#

OQ Task(s)

Date

5/28/2004

OQ Verification



(Check appropriate box)

MAINLINE Pipeline Name 4" PL Plains Union Texas Wellman Line Section Number _____ AFE No. _____

FACILITY Facility Name _____ Facility Number _____

Reference Drawings (Alignment Sheet OR Engineering Dwg. No.) 6742 AL 1 of 10 Tract Number 100-T-YO-3

GPS (DD.MM.mmm) Lat. _____ Long. _____ At Mile Post/Aerial Marker _____

County / Parish _____ State _____ Legal Description _____

State Type of Work to be Done Pipeline Cutout to allow El Paso to lower their lines

Date Work Started 1/21/2004 Date Work Completed 1/26/2004 Ditch Was Open From (M/D/Y) To (M/D/Y)
1/21/2004 To 1/24/2004

Was Control Center Notified of pending excavation? Yes No Was Line Probing Conducted? Yes No

Type of Repair or Installation

Tank Line Tank Shell Pipeline Valve Expansion Joint Other (Specify) _____

Location of Installation or Repair Above Ground Below Ground Were permanent or temporary line markers installed? Yes No

Description of Work Done
Displaced line with nitrogen, cut out section, welded in new pipe section.

External Pipe Condition (Describe)

Like New Surface Rust Severe Pitting

Minor Pitting Moderate Pitting Other

Existing Coating

Type Pilco 105 prim 340-15 tape Thickness _____

Condition

Well Bonded Partially Bonded Totally Disbonded

Internal Pipe Condition (Describe, if Cut)

Like New Surface Scale

Minor Pitting Moderate Pitting Severe Pitting

Corrosion Description (if Corrosion Present)

Max. Pit Size L _____ x W _____ x D _____

Pitting, Clock Position _____ (Facing Increasing Stationing)

Long Seam, Clock Position _____ (Facing Increasing Stationing)

If Rectifier / Ground Beds are damaged, record damage here and report to Corrosion Prevention Dept.

P/S Reading - Collect before & after PSP Readings with Rectifier Energized.

| | Before Repair | Before Repair | After Repair |
|-----------|----------------|---------------|--------------|
| | (Ground Level) | (in Ditch) | (in Ditch) |
| _____ VDC | _____ VDC | _____ VDC | _____ VDC |

State Type of Activity: Tie-In Pipe Replacement Replace other component

| Welders | | No. New Girth Welds | No. New Maint. Welds | Date of Weld |
|--------------|-----------|---------------------|----------------------|--------------|
| Gene Hopkins | No. Welds | 3 | | 1/24/2004 |
| | No. NDT | 3 | | |
| | No. Welds | | | |
| | No. NDT | | | |
| | No. Welds | | | |
| | No. NDT | | | |
| | No. Welds | | | |
| | No. NDT | | | |

Were Arc Burns Repaired? Yes No Explain: N/A

Were defective welds replaced or repaired? Yes No Explain: N/A

Submitted by: Dick Kovarna Date: 5/28/2004 Approved by: Dick Kovarna Date: 5/28/2004

Signature _____ Supervisor or Project Manager _____
 Dick Kovarna _____ Dick Kovarna _____
 Print Name _____ Print Name _____

MINIMUM INFORMATION REQUIRED

Valves, flanges, stopples and other fittings shall be drawn on pipe detail below with ESNs and ANSI rating shown for each.
 Provide ESNs for all welds and changes in pipe wall thickness, pipe grade, pipe seam, pipe manufacturer and pipe specification on pipe detail.
 Provide ESNs for changes in coating and note type and manufacturer of coating, except for coating less than 5 feet in length.
 Provide ESNs for all repairs made to pipe, i.e., full encirclement sleeves, patches, etc., on pipe detail.
 Identify pipeline name, line number, line I.D., etc.
 If more space is needed, attach sketches as necessary.

PIPE INSTALLED

Total Feet of Pipe Added (Tie-In Weld to Tie-In Weld) 63' Size 4 1/2" Wall Thickness 0.188
 Grade X42 Seam Type ERW Manufacturer LTV Steel

Fusion Bond Epoxy Polyken 1027 Primer Polyken 930-50 Tape (Innerwrap)
 Polyken 945-15 Tape (Outerwrap) Other (Specify) Tapecoat Grey

PIPE RETIRED

Total Feet of Pipe Retired 53' Size 4 1/2" Wall Thickness 0.125
 Grade B Seam Type Erw Manufacturer Republic Steel

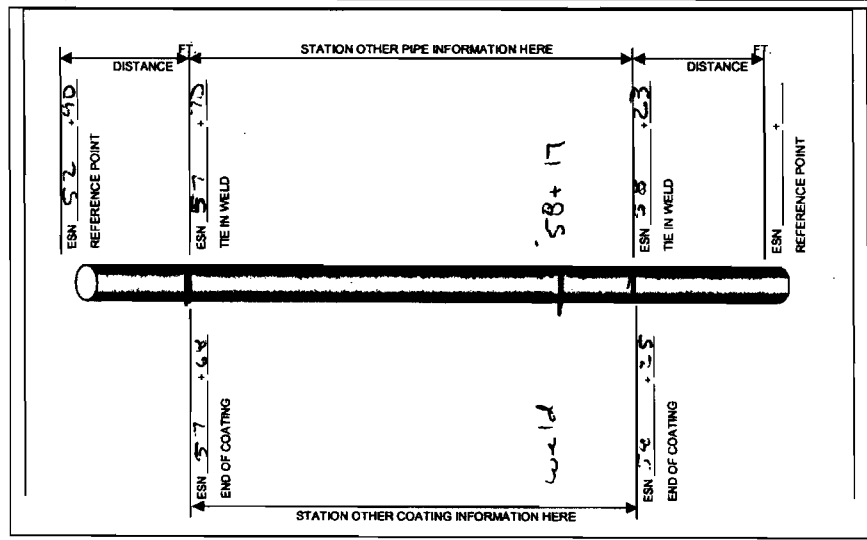
FABRICATED BENDS

Total Feet of Bends Added _____ Size _____ Wall Thickness _____ Bend Radius _____
 Grade _____ Seam Type _____ Manufacturer _____

Fusion Bond Epoxy Polyken 1027 Primer Polyken 930-50 Tape (Innerwrap)
 Polyken 945-15 Tape (Outerwrap) Other (Specify) _____

PIPE DETAIL

Reference Point Description (Nearest Road, Fence, Valve, etc., from Alignment Sheet) Road
 Engineering Station Number (ESN) of Reference Point 52 + 90
 Distance from Ref. Pt. To nearest end of 480 ft. Direction from Ref. Pt. (Along Pipeline)
(tie-in, coating, split tee, sleeve, etc.) North South East West



Fusion Bond Epoxy Polyken 1027 Primer Polyken 930-50 Tape (Innerwrap)
 Polyken 945-15 Tape (Outerwrap) Other Tapecoat Grey



Enterprise Products Company

MAINTENANCE REPORT

Line ID# 824

OQ Task(s) _____

Date 7/30/04

OQ Verification

GENERAL DATA

(Check appropriate box)

MANLINE Pipelines Name Colleyville Red line Line Section Number I.D. 824 AFE No. _____

FACILITY Facility Name _____ Facility Number _____

Reference Drawings (Alignment Sheet OR Engineering Dwg. No.) _____ Tract Number 165-KS-MO-40(P)

GPS (DD.mm.dddd) Lat. _____ Long. _____ At Mile Post/Aerial Marker 168.5

County / Parish Montgomery State KS Legal Description T34S; R16E; Sec 19

WORK DONE AND REMARKS

State Type of Work to be Done Repaired 55'-5" of line Pipe

Date Work Started 6-17-04 Date Work Completed 6-19-04 Ditch Was Open From (M/D/Y) To (M/D/Y) 6-18-04 To _____

Was Control Center Notified of pending excavation? Yes No Was Line Probing Conducted? Yes No

Type of Repair or Installation

Tank Line Tank Shell Pipeline Valve Expansion Joint Other (Specify) _____

Location of Installation or Repair Above Ground Below Ground

Were permanent or temporary line markers installed? Yes No

Description of Work Done

replace 55'-5" of 6" x 125 wt x 60
Repaired C-ville 6" lateral (Red Line)

LINE CONDITION AND CATHODIC PROTECTION STATUS

External Pipe Condition (Describe)

Like New Surface Rust Severe Pitting

Minor Pitting Moderate Pitting Other

Existing Coating

Type Polykote #780 Thickness _____

Condition

Well Bonded Partially Bonded Totally Disbonded

Internal Pipe Condition (Describe, if Cut)

Like New Surface Scale

Minor Pitting Moderate Pitting Severe Pitting

Corrosion Description (if Corrosion Present)

Max. Pit Size L _____ x W _____ x D _____

Pitting, Clock Position _____ (Facing Increasing Stationing)

Long Seam, Clock Position _____ (Facing Increasing Stationing)

If Rectifier / Ground Beds are damaged, record damage here and report to Corrosion Prevention Dept.

P/S Reading - Collect before & after PSP Readings with Rectifier Energized.

| | | |
|------------------|------------------|--------------|
| Before Repair | Before Repair | After Repair |
| (Ground Level) | (In Ditch) | (In Ditch) |
| <u>-1.21</u> VDC | <u>-1.19</u> VDC | _____ VDC |

LINE WELDING DATA

State Type of Activity: Tie-In Pipe Replacement Replace other component

| Welders | No. New Girth Welds | | No. New Maint. Welds | | Date of Weld |
|-------------------------|---------------------|----------------------|----------------------|---------|----------------|
| | No. Welds | No. NDT | No. Welds | No. NDT | |
| <u>Eduardo Huethelo</u> | <u>3</u> | <u>XR1, XR2, XR3</u> | | | <u>6-19-04</u> |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Were Arc Burns Repaired? Yes No Explain: _____

Were defective welds replaced or repaired? Yes No Explain: _____

Submitted by: Ronnie Reed Date: 7/30/04 Approved by: _____ Date: _____

Signature: Ronnie Reed Supervisor or Project Manager: _____

Print Name: _____ Print Name: _____

Enterprise Products Operating L.P.

CPF-4-2007-5015

EXHIBIT 6

Metallurgical Test – Keifner & Associates

December 4, 2003

Kevin Bodenhamer
Enterprise Pipeline Company
2727 North Loop West
Houston, Texas 77008

Dear Mr. Bodenhamer:

Enclosed is our draft report "Investigation of Mechanical Damage at ESN 13359+15 on the 12-Inch Rock Mountain Pipeline (Red System) near Edgewood, New Mexico".

If you have any questions or comments, please do not hesitate to contact me.

Sincerely,

Thomas F. Wahjudi
Engineer I

TFW:gw
Enclosure

Final Report No.

DRAFT FINAL REPORT

on

**INVESTIGATION OF MECHANICAL DAMAGE
AT ESN 13359+15 ON THE 12-INCH ROCKY MOUNTAIN
PIPELINE (RED SYSTEM) NEAR EDGEWOOD, NEW MEXICO**

to

ENTERPRISE PIPELINE COMPANY

December 4, 2003

by

Thomas F. Wahjudi

**KIEFNER AND ASSOCIATES, INC.
585 Scherers Court
Worthington, Ohio 43085**

0360-0305

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**INVESTIGATION OF MECHANICAL DAMAGE
AT ESN 13359+15 ON THE 12-INCH ROCKY MOUNTAIN
PIPELINE (RED SYSTEM) NEAR EDGEWOOD, NEW MEXICO**

by

Thomas F. Wahjudi

INTRODUCTION

This report presents the results of our investigation into a puncture of the Rocky Mountain pipeline that occurred on October 25, 2003 at Milepost 130+29. Mid-America Pipeline personnel were on site during the incident. At the time of the puncture, the pipeline was in service and transporting demethanized mix (ethane, propane, butane, and gasoline). The pipeline was repaired and a 3-foot-long pipe containing the puncture was sent to Kiefner and Associates, Inc. (KAI) for examination.

BACKGROUND

The Rocky Mountain pipeline is 12.75-inch outside diameter (OD) by 0.219-inch wall thickness (WT) API Grade X-65 line pipe manufactured by American Steel using the high-frequency electric-resistance-welding (ERW) process. The line was installed in 1980 with Polyken 929-40 primer protective coating, 980-15 Polyken, 15 mil tape, and placed under impressed-current cathodic protection. The pipeline was in service at an internal pressure of 425 psig (19 percent of SMYS) at the time of the puncture.

The maximum operating pressure (MOP) of the pipeline is 1,650 psig (73.9 percent of SMYS). The most recent hydrostatic test of the pipeline was conducted in January 11, 1981 at a minimum pressure of 2,169 psig (97 percent of SMYS). The test pressure was held for 24 hours.

SUMMARY

The failure resulted solely from an impact of a sharp-nosed tool that penetrated the pipe wall by a shearing action. No other contributing cause of the failure was identified. The pipe

segment that was examined on receipt showed no external or internal corrosion or other degradation. Examination of the fracture surfaces showed only shearing and ductile tearing of the pipe wall. There were no indications on the fracture surfaces of a stable, in-service crack-growth mechanism such as fatigue cracking, stress-corrosion cracking, or hydrogen embrittlement. The pipe material met the requirements for the API specifications that were in effect the year the pipeline was installed.

TECHNICAL INVESTIGATION

The pipe segment containing a puncture was sent to KAI for examination and confirmation that the puncture was the only cause of the failure.

Visual Appearance

The 3-foot-long pipe in as-received condition is shown in Figure 1. Figure 2 shows a close-up photograph of a 9.5-inch by 8-inch coupon removed from the pipe containing the puncture. The puncture and deformed area due to the gouge on the OD surface of the pipe is shown in Figure 2. The ID surface photograph is shown in Figure 3. Both the OD and ID surfaces of the pipe were free of surface corrosion and showed no indications of other degradation. The gouge was positioned away from the seam weld as indicated in Figure 1. It appears that the gouge was made first and, as the tool moved along the pipe, the indentation or dent became deeper until the pipe wall was punctured. The approximate area of the opening of the puncture was 0.4 in². The indentation extended about 1.1 inches inward from the OD surface.

Fractographic Examination

The fracture surfaces of the puncture as well as the surrounding area were closely examined. Visual examination of the fracture surfaces showed shearing and ductile tearing of the pipe wall a sharp-nosed tool. The puncture exhibited considerable plastic deformation and smearing of a portion of the fracture surface on one side of the opening. There was no evidence

on the exposed fracture surfaces of a stable, in-service crack-growth mechanism such as fatigue or stress-corrosion cracking.

Metallographic Section Examination

A metallographic section was created to permit characterization of the ERW seam. Figure 4 shows the metallographic section of the seam. The absence of defects, the presence of the hourglass-shaped heat-affected zone, and the absence of grain coarsening in the heat-affected zone strongly suggest that this is a soundly bonded high-frequency ERW seam.

Material Properties of the Pipe

A material-property coupon from the pipe was used to machine samples to measure transverse tensile properties and transverse base metal Charpy V-notch transition temperature and to conduct a chemical analysis of the base metal. The tensile and chemical data for the pipe are tabulated in Table 1. The pipe material met the requirements for the API specifications that were in effect the year the pipeline was installed, API Specification 5LX, 5th Edition, November 1980 for Grade X65 Welded Line Pipe.

The weldability of the pipe material is governed by its chemical composition, as expressed by its carbon equivalent (CE). The CE of low carbon steel is currently estimated using the International Institute for Welding (IIW) equation for steel with carbon content greater than 0.12 percent,

$$CE(IIW) = C + \frac{Mn}{6} + \frac{Cr + Mo + V}{5} + \frac{Cu + Ni}{15}$$

where the symbols are abbreviations for the elements and the quantities are expressed in percent by weight listed in Table 1. For this pipe material, a CE = 0.238 was determined.

Transverse Charpy V-notch impact tests were conducted on specimens away from the weld seam. The specimens were machined from flattened coupons to obtain specimens as thick as possible. Figure 5 shows plots of the transverse impact data, which are summarized in Table 2. In Table 2, the upper-shelf energy is the impact energy taken at the right end of the

curves in Figure 5a where the fracture behavior is fully ductile. The full-size equivalent in Row 3 is the upper-shelf energy in Row 2 multiplied by the ratio of the thickness of a standard full-thickness Charpy specimen, 0.394 inch, to the Charpy specimen thickness in Row 1. The CVN transition temperature, Row 4a, was established from the shear-area curve in Figure 5b at 85-percent shear area. The full pipe wall thickness transition temperature was determined* by correcting for the difference in pipe wall thickness, 0.220 inch, relative to the thickness of the CVN specimen in Row 1 as follows,

$$T_p = T_c + 66 \frac{t_w^{0.55}}{t_c^{0.7}} - 100$$

where

- T_p = Full-scale pipe transition temperature, Row 4b
- T_c = The Charpy transition temperature at 85-percent shear area, Row 4a
- t_w = Pipe nominal wall thickness, in this case 0.203 inch
- t_c = Charpy specimen thickness, Row 1.

From this equation, the full pipe wall thickness transition temperature was found to be approximately 78°F.

* Rosenfeld, M. J., "A Simple Procedure for Synthesizing Charpy Impact Energy Transition Curves from Limited Test Data", *ASME International Pipeline Conference*, Volume 1, pp 215-221 (1996).

Table 1. Tensile and Chemical Properties—Pipe Segment

| | Specimen | Requirements by API Specification 5LX, 23rd Edition, March 1980 for Welded, Non-Expanded Grade X65 Line Pipe |
|--|----------|---|
| Transverse Tensile Tests | | |
| Yield Strength, psi (at 0.5 percent total strain) | 68,500 | 65,000 |
| Ultimate Strength, psi | 82,000 | 77,000 |
| Elongation, percent (in a 2-inch gage length) | 25.0 | 20.0 |
| Chemical Analysis (percent by weight) | | |
| Carbon | 0.058 | 0.30 max |
| Manganese | 1.020 | 1.50 max |
| Phosphorus | 0.008 | 0.05 max |
| Sulfur | 0.016 | 0.06 max |
| Silicon | 0.024 | - |
| Copper | 0.037 | - |
| Tin | 0.002 | - |
| Nickel | 0.017 | - |
| Chromium | 0.024 | - |
| Molybdenum | 0.006 | - |
| Aluminum | 0.052 | - |
| Vanadium | 0.003 | 0.01 min |
| Niobium | 0.061 | - |
| Titanium | 0.004 | - |
| Cobalt | 0.005 | - |
| Carbon Equivalent | 0.238 | - |

Table 2. Charpy V-Notch/Transition Temperature Data

| | Pipe Segment |
|------------------------------------|---------------------|
| 1. Charpy Specimen Thickness, inch | 0.178 |
| 2. Upper-Shelf Energy, ft-lb | 11 |
| 3. Full-Size Equivalent, ft-lb | 24.3 |
| 4. Transition Temperature, EF | |
| a. CVN Specimen | 82 |
| b. Full Pipe Wall Thickness* | 78 |

* Based on a wall thickness of 0.22 inch.



Figure 1. Pipe Puncture—OD Surface

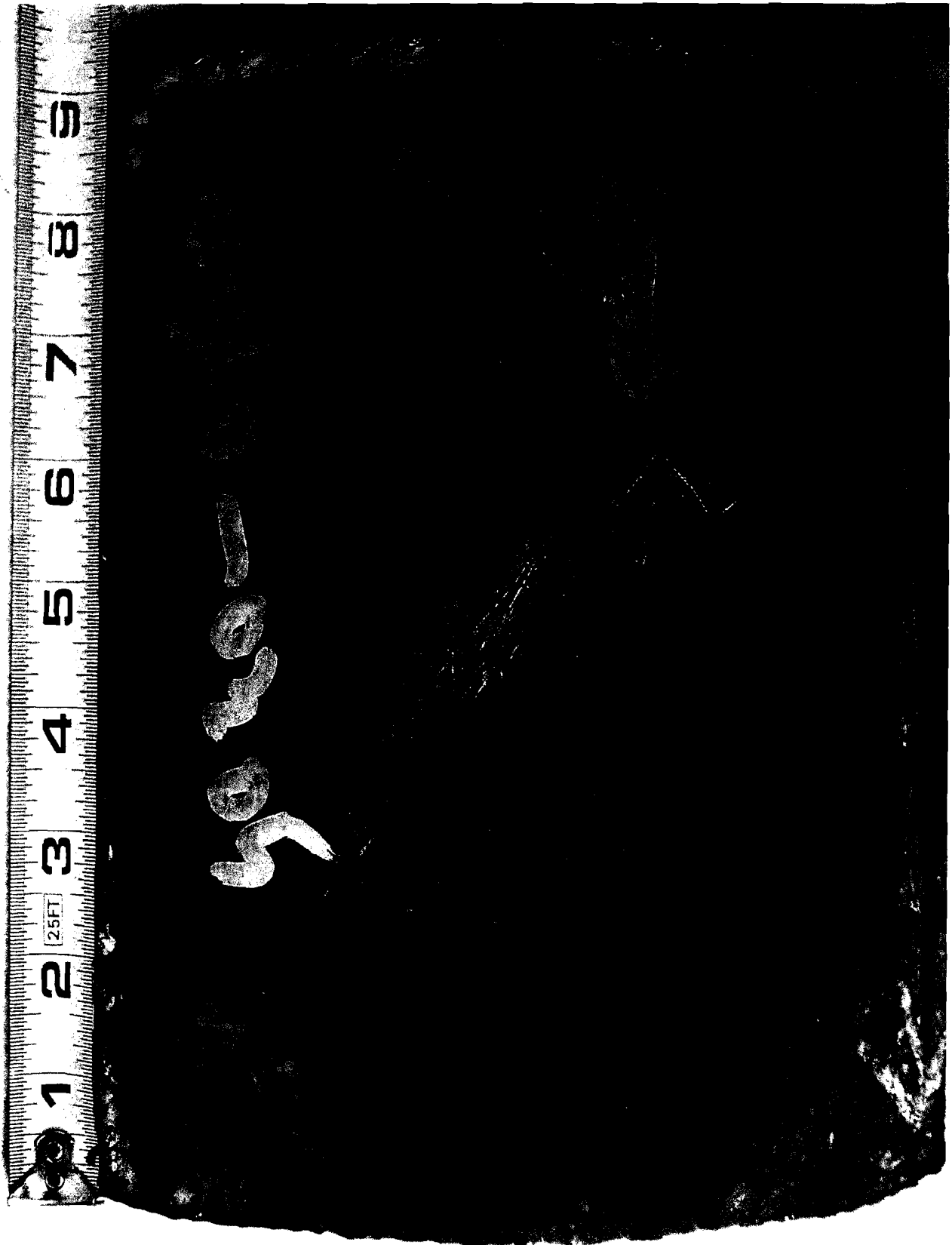


Figure 2. Pipe Puncture - OD Surface Close Up

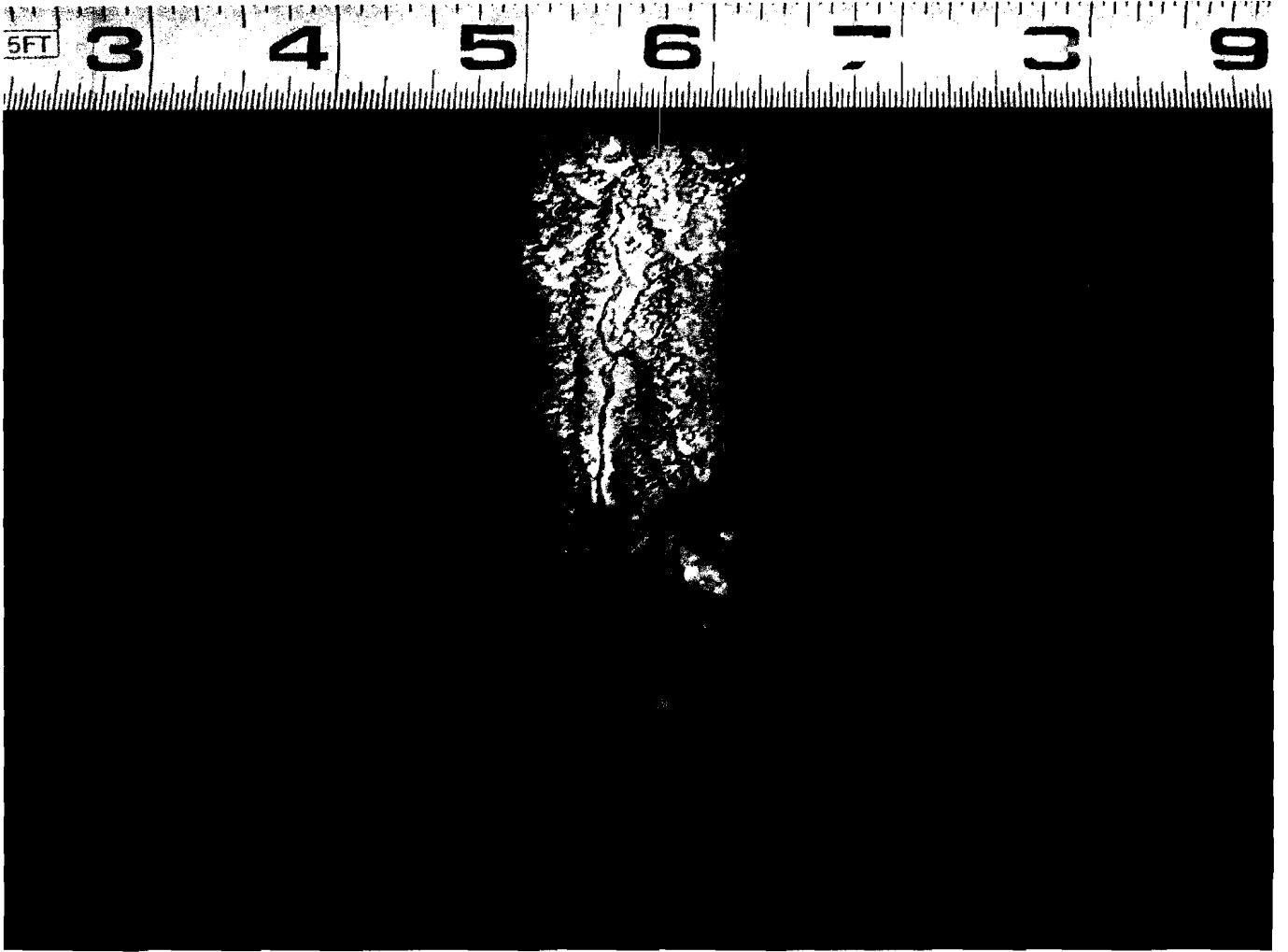


Figure 3. Pipe Puncture - ID Surface Close Up

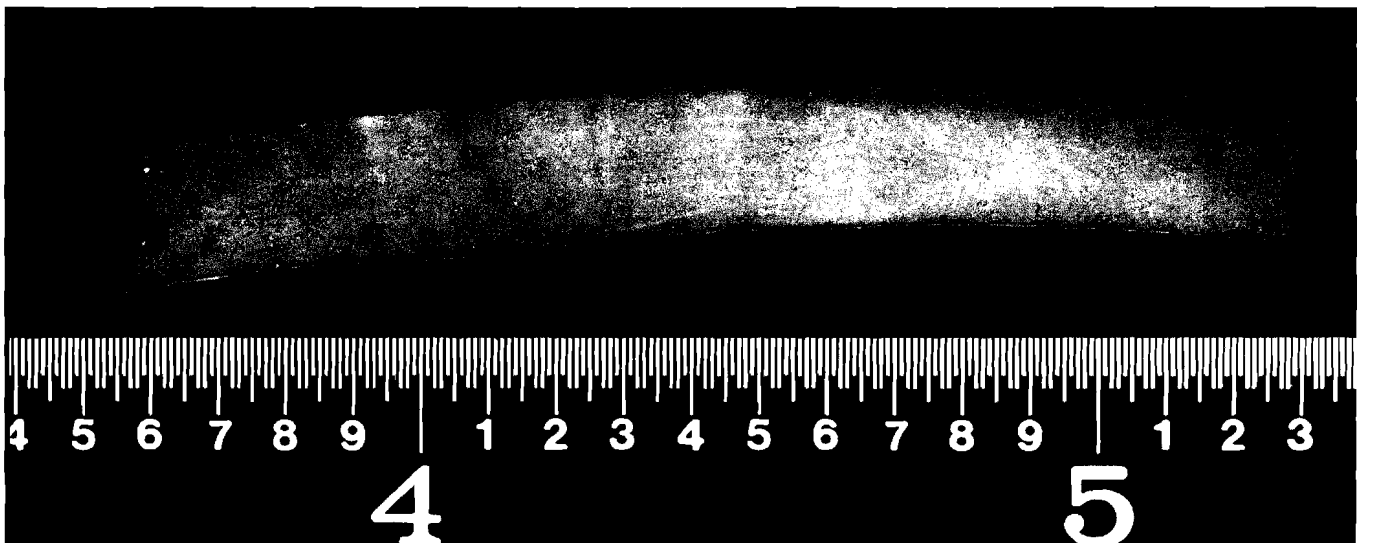
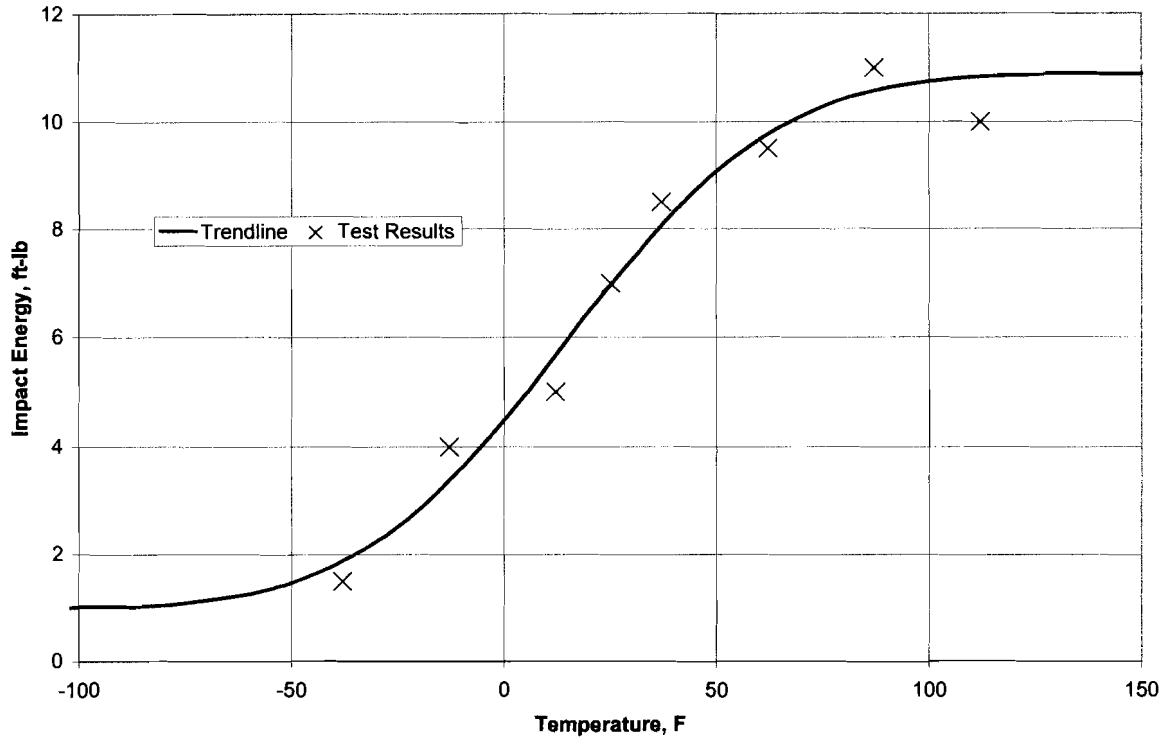
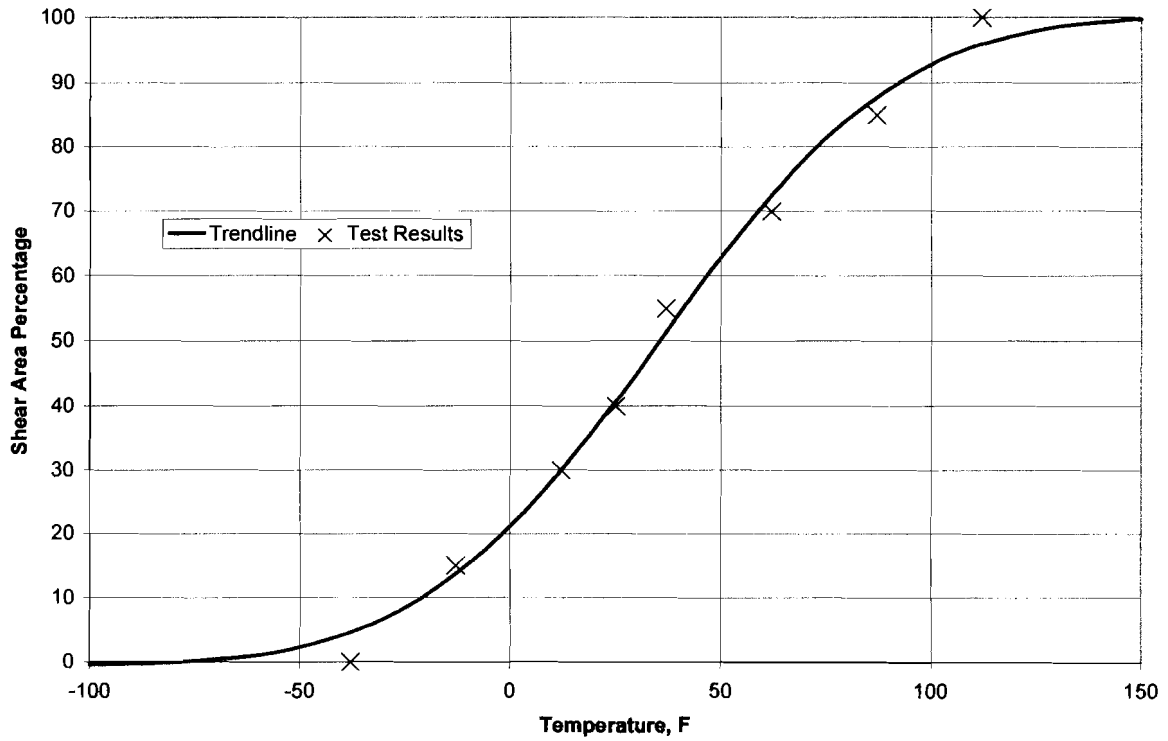


Figure 4. Metallographic Section of the ERW Seam



a. Impact Energy



b. Shear Area

Figure 5. Transverse Charpy V-Notch Data