



CERTIFIED MAIL – RETURN RECEIPT REQUESTED

January 9, 2012

Mr. Wayne T. Lemoi
Director, Office of Pipeline Safety
PHMSA Southern Region
233 Peachtree Street Ste. 600
Atlanta, GA 30303

Re: ~~CPF 2-2011-5010W~~

2-2011-5011M

Mr. Lemoi,

Denbury Onshore, LLC ("Denbury") is writing in response to your December 8, 2011, Notice of Amendment, which was received on December 13, 2011. Your Notice of Amendment listed certain items of concern based upon a Liquid Integrity Management Program (IMP) inspection conducted June 13-17, 2011. As was discussed with your staff at the inspection, Denbury is committed to the safe and compliant operation of its pipelines, and we appreciate your efforts in helping us to achieve this goal. We are writing today to respond to your areas of concern and provide you with updated information regarding our activities.

Our response is organized in the same format as in your Notice of Amendment referencing the number of each item of concern and our response. Within our response, italicized text contains actual revisions or excerpts from our compliance manuals and related documents. Plain text contains clarification for informational purposes.

1. 195.452 Pipeline integrity management in high consequence areas

Item 1A: § 195.452 (b)(4)(i)

The Denbury IMP framework did not address all elements of the integrity management regulation under paragraph (f) of this section (i.e. §195.452).

For example, Denbury's IMP procedures IMP-440 and IMP-410 for identifying and documenting high consequence area (HCA) changes use the management of change (MOC) process defined in Denbury's operations and maintenance (O&M)

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manual but the procedures had no instructions or reference to the MOC process for documenting HCA changes.

Denbury included each of the elements of 49 CFR 195.452(f) in Version 5.0 of the IMP as follows:

- (1) A process for identifying which pipeline segments could affect a high consequence area - included in Section 4.0 of the IMP.
- (2) A baseline assessment plan meeting the requirements of 49 CFR 195.452 (c) - included in Section 6.0 of the IMP.
- (3) An analysis that integrates all available information about the integrity of the entire pipeline and the consequences of a failure (see 49 CFR 195.452 (g)) - included in Section 5.0 of the IMP.
- (4) Criteria for remedial actions to address integrity issues raised by the assessment methods and information analysis (see 49 CFR 195.452 (h)) - included in Section 7.0 of the IMP.
- (5) A continual process of assessment and evaluation to maintain a pipeline's integrity (see 49 CFR 195.452 (j)) - included in Section 6.0 of the IMP.
- (6) Identification of preventive and mitigative measures to protect the high consequence area (see 49 CFR 195.452 (i)) - included in Section 8.0 of the IMP.
- (7) Methods to measure the program's effectiveness (see 49 CFR 195.452 (k)) - included in Section 10.0 of the IMP.
- (8) A process for review of integrity assessment results and information analysis by a person qualified to evaluate the results and information (see 49 CFR 195.452 (h)(2)) - included in Section 7.0 of the IMP.

For clarification purposes, Denbury assumes that the NOA Item 1A example intended to reference IMP-400 and IMP-410 rather than IMP-440 and IMP-410. Denbury does not have an IMP-440 procedure in Revision 5.0 of the IMP. To address changes to pipeline segments that could affect a high consequence area, Denbury has two independent methods for identifying such changes: normal IMP procedures and formal MOC procedures. Each of these areas is incorporated in the IMP as follows:

1. Denbury's normal IMP processes and procedures (including IMP-400 and IMP-410) provide for annual could affect segment identification. This annual process includes a method to systematically evaluate changes to each pipeline segment (physical or operational) as well as its surrounding environment. In following the annual could affect segment identification process, Denbury employees identify changes, evaluate whether these changes affect previous results, document these changes and communicate the results to Denbury personnel. Note: These processes do not employ the formal MOC procedure, but rather are an independent change process.
2. Changes that are not identified as part of the normal IMP processes are governed using formal MOC procedures. O&M Section 20.3, Recognizing Changes That Affect Regulatory Programs, identifies the following changes (excerpt presented below is relevant to could affect segment determination process):
 - *Additions/modifications to the pipeline system or appurtenant equipment*
 - *Changes to operating conditions (flow rate, operating pressure/temperature, MOP, pressure cycles, CP system, etc.)*
 - *Changes in the transported fluid (or its characteristics)*
 - *Restarting equipment that has been out of service for an extended period*
 - *Changes along the right-of-way, such as land use or activity level*

- *Population growth near the pipeline*

In conclusion, IMP Section 4.3.1.2 has been modified to clarify the use of MOC for could affect segment determinations as follows:

In the event that HCA, pipeline centerline, or potential release scenario changes are identified outside of the annual review process (Section 4.3.1.1), the Pipeline Regulatory Manager initiates could affect analysis of the potentially affected segments. In accordance with O&M Procedure 20, Management of Change, changes to pipe characteristics, product transported, or operations may be identified by the MOC process. The Pipeline Regulatory Manager evaluates each MOC request to determine whether could affect segment determination is required, and communicates limitations/obstacles to the change due to IMP requirements.

Item 1B: §195.452(b)(4)(ii)

The Denbury IMP framework did not address all elements in how decisions will be made to implement each element.

For example,

1. **Denbury's Direct Assessment & Corrosion Control (DACCP), Revision 4.0 dated July 2009, did not include instructions to meet the NACE SP0502, Section 5.7.1 Mitigation requirement to "take remediation activities to mitigate or preclude future external corrosion resulting from significant root causes."**

Denbury has amended the DACCP to include processes to address remediation activities to mitigate or preclude future external corrosion resulting from significant root causes. The following text has been added to Section 5.1.3 of the DACCP:

The Corrosion Foreman evaluates external corrosion to identify trends and recurring root causes. In the event that a significant root cause (systemic or widespread) is identified, the Corrosion Foreman and Integrity Management Engineer propose a solution for mitigating future external corrosion damage resulting from that root cause. The Pipeline Regulatory Manager and Operations Superintendent approve mitigation projects for implementation or recommend to higher levels of management for consideration of alternatives.

2. **Denbury's Corrosion Manual, Section 3.6 Coating, did not instruct employees to follow the manufacturer's specifications and recommendations for coating the pipeline.**

Denbury has requested clarification on this item via email on January 6, 2012 (see Exhibit A). Denbury requests an additional 30 days following receipt of additional clarification to reply to this item.

2. §195.452 Pipeline integrity management in high consequence areas

Item 2: § 195.452(f)(1)

Denbury's IMP did not include formalized written procedures for training field personnel to identify an HCA or changes to an HCA using the National Pipeline Mapping System (NPMS) and other information sources as necessary.

Training in 2011 was completed as part of the annual program review process. Denbury has documented training activities conducted in December 2011 (attached as Exhibit B).

Furthermore, Denbury has developed formalized written procedures for training of designated personnel to participate in the HCA identification and verification process as further

detailed in Section 4.3.8 of Denbury's IMP. A process for training Denbury personnel is included in the IMP Revision 6.0, and excerpted as follows:

The Pipeline Regulatory Manager schedules integrity management training for employees. Training is documented on the Meeting Sign-In Sheet.

Annual Awareness training is provided to employees designated to participate in the HCA identification and verification process as further detailed in the Section 4.0 of the IMP. In addition, initial training is provided at each revision of the IMP or for employees newly assigned to HCA identification and verification tasks. Awareness training includes, but is not limited to the following topics:

- *Integrity management overview*
- *HCA determination and notification*

3. §195.588 What standards apply to direct assessments?

Item 3A: §195.588(b)(2)(i)

Denbury's Direct Assessment & Corrosion Control, Revision 4.0 dated July 2009, Section 5.1.1 Pre-Assessment, did not include provisions for applying more restrictive criteria when conducting ECDA for the first time on a pipeline segment during the pre-assessment phase.

Denbury has amended the DACCP to include processes to apply more restrictive criteria. The following text has been added to Section 5.1.1 of the DACCP:

When conducting ECDA for the first time on a pipeline segment, the following more restrictive criteria is applied during the pre-assessment phase:

1. *For pipelines that have existing CP (more than one year of CP operations), collect additional CP data for use in region definition and inspection tool selection. Potential data may include more frequent surveys, additional rectifier data (real-time), or other collected.*
2. *For new pipelines without previous CP (just beginning CP operations), collect additional data for one year following indirect inspections. Following additional data collection, re-evaluate the pipeline regions and data following the pre-assessment methodology. Determine whether additional indirect inspections or direct examinations are required.*

Item 3B: §195.588(b)(3)(i)

Denbury's Direct Assessment & Corrosion Control, Revision 4.0 dated July 2009, Section 5.1.1 Pre-Assessment, did not include provisions for applying more restrictive criteria when conducting ECDA for the first time on a pipeline segment during the indirect inspection phase.

Denbury has amended the DACCP to include processes to apply more restrictive criteria. The following text has been added to Section 5.1.2 of the DACCP:

When conducting ECDA for the first time on a pipeline segment, the following more restrictive criteria is applied during the indirect examination phase:

1. *All Severe and at least 25% of the Moderate classified indications are scheduled and prioritized for direct examination.*
2. *Within a Could Affect Segment, all Severe and Moderate indications are prioritized and scheduled for direct examination.*

3. *Within close proximity to foreign crossings (within ¼ mile), all Severe and Moderate indications are prioritized and scheduled for direct examination.*

Note: Denbury assumes that Item 3B intended to cite Section 5.1.2, Indirect Inspections, rather than Section 5.1.1, Pre-Assessment.

Item 3C: §195.588(b)(4)(i)

Denbury's Direct Assessment & Corrosion Control, Revision 4.0 dated July 2009, Section 5.1.1 Pre-Assessment, did not include provisions for applying more restrictive criteria when conducting ECDA for the first time on a pipeline segment during the direct examination phase.

Denbury has amended the DACCP to include processes to apply more restrictive criteria. The following text has been added to Section 5.1.3 of the DACCP:

When conducting ECDA for the first time on a pipeline segment, the following more restrictive criteria is applied during the direct examination phase:

1. *For newly constructed pipeline segments, coating repair is the preferred method for external corrosion mitigation. Adding rectifiers or anodes to the cathodic protection system should be considered after coating is repaired in the event that subsequent surveys indicate CP is below acceptable criteria.*
2. *Perform additional excavations as required by Table 5.1.3 -1: Each Region Direct Examination Data Collection.*

Note: Denbury assumes that Item 3C intended to cite Section 5.1.3, Direct Examination, rather than Section 5.1.1, Pre-Assessment.

Item 3D: §195.588(b)(4)(iii)

Denbury's Direct Assessment & Corrosion Control, Revision 4.0 dated July 2009, Section 5.1.3 Direct Examination, did not have criteria and notification procedures for any changes in the ECDA plan, including changes that affect the severity classification, the priority of the direct examination, and the time frame for direct examination of indications.

Denbury has amended the DACCP to include processes to provide criteria and notification procedures for changes in the ECDA plan. The following text has been added to Section 5.1.3 of the DACCP:

During direct examinations, field personnel immediately notify the Corrosion Foreman or designee when external corrosion is discovered. In the event that any site of greater than 40% wall loss due to external corrosion is identified during direct examination, the entire ECDA region is re-evaluated for severity classification and direct examination prioritization. Changes to the severity classification, priority of classification, or timeframe for direct examination are communicated by the Corrosion Foreman to field corrosion personnel, the Integrity Management Engineer, Pipeline Regulatory Manager, and Pipeline Operations Superintendent via email. The reason for change, including preliminary direct examination findings, is documented, as well as the final revised schedule.

Item 3E: §195.588(b)(5)(i)

Denbury's Direct Assessment & Corrosion Control, Revision 4.0 dated July 2009, Section 5.1.4 Post Assessment, did not include measures for evaluating the long-

term effectiveness of ECDA in addressing external corrosion in pipeline segments.

Denbury uses close interval surveys (CIS) and ACVG as the tools for performing the ECDA assessment. All of the excavations performed on the Northeast Jackson Dome (NEJD) pipeline appear to have been driven by the ACVG results and not by the CIS data. Therefore, Denbury should have measures to determine the long-term effectiveness of CIS as an ongoing tool for ECDA, especially in consideration of other factors such as pipelines that are at deeper depths or under pavement where the CIS may not be a valid tool for ECDA.

Denbury has amended the DACCP to include processes to evaluate the long-term effectiveness of ECDA in addressing external corrosion in pipeline segments. The following text has been added to Section 5.1.4 of the DACCP:

The goals of Denbury's ECDA program are as follows:

- *identify and remediate external corrosion*
- *identify areas of concern where pipeline may be susceptible to future external corrosion and take subsequent efforts to mitigate and prevent future external corrosion*

To measure the effectiveness of ECDA in addressing external corrosion, and in meeting the above goals, Denbury performs the following activities:

1. *Evaluate the corrosion rate in units of mils per year (mpy) at corrosion sites. Determine whether the corrosion rate has accelerated, and consider which corrosion control measures have been effective based on changes in the corrosion rate.*
2. *As part of overall IMP performance, track the number of indications identified through ECDA as well as pipeline repairs made. These performance metrics facilitate evaluation of ECDA effectiveness in identifying corrosion and protecting the integrity of the pipeline.*
3. *To evaluate Denbury's ability to identify areas of concern where pipeline may be susceptible to future corrosion and take subsequent efforts to mitigate and prevent future corrosion, conduct follow-up CIS or ACVG surveys in areas where a substantial number of Severe and Moderate classified indications were examined and repaired (30 indications per mile density). Determine whether follow-up results successfully reflect the repairs made to the pipeline coating and/or CP system (e.g. previous indications are no longer identified by a repeated survey following the same specifications/methodology). In the event that the indirect inspection technology does not successfully reflect the repairs made to the coating and/or CP system, consider use of alternate technologies for future assessments.*

Note: Denbury assumes that the example in Item 3E intended to reference excavations performed on the Green pipeline rather than the NEJD pipeline. Denbury was unable to identify excavations performed on the NEJD pipeline solely on the basis of ACVG results.

For further clarification regarding the use of CIS and ACVG, Denbury has prepared the following technical explanation:

Results of indirect inspections are evaluated independently and in combination as follows:

- Combination of CIS and ACVG tools identify areas that have inadequate CP, pipeline coatings, or both. If CIS identifies areas not meeting criteria, this indicates that the pipeline does not have sufficient cathodic protection to mitigate corrosion. Similarly, ACVG provides indications of coating holidays, identifying areas where the coating is insufficient to protect pipe without additional cathodic protection. Indications of severe or

moderate severity (poor results for both CIS and ACVG) are addressed by Denbury through enhancing cathodic protection, repairing coating damage, or both. Long term effectiveness of these indirect inspection methods and subsequent mitigation efforts is measured by trending indications through subsequent inspections.

- CIS may be used independently of ACVG to identify widespread areas of insufficient cathodic protection. Denbury has previously identified portions of pipelines where CIS results are below acceptable criteria for a relatively long region. Within this region, multiple local ACVG indications were present; however Denbury conservatively relied on the CIS results to determine that the entire region should be exposed for direct examination and coating repair. Effectiveness of CIS was measured by scheduling follow-up surveys in a shorter timeframe for confirmation that repairs were completed thoroughly and corrosion mitigation efforts were successful (CP function).
- ACVG may be employed independently of CIS to identify local coating holidays. Areas where CIS results are within acceptable criteria indicating that corrosion is sufficiently mitigated by cathodic protection. Denbury's conservative practices also provide for direct examination and subsequent coating repair in areas where ACVG indicates a coating holiday regardless of sufficiency of CIS results. By repairing coating holidays, Denbury is able to protect the pipeline from corrosive environments.

Indirect inspection effectiveness is evaluated by comparing results of previous and subsequent inspections. Denbury's practice is to repeat inspections using similar specifications and technology. For example, an ACVG inspection may identify 15 total indications (5 severe, 5 moderate, and 5 minor). Following repair of the 5 severe and 5 moderate indications, Denbury may confirm protection of the pipeline by conducting a follow-up survey with the same specifications as the first survey. ACVG technology is such that the follow-up survey is likely to identify the 5 remaining indications, but may now classify them as 3 minor and 2 moderate. This result is to be expected. Subsequent indirect inspections following repair of conditions identified in the original inspection have enhanced resolution (less "noise") and allow for greater separation of conditions on the same scale of measurement. The effectiveness of these technologies is evaluated by tracking these indications from one inspection to the next, and trending total number of indications as well as number of indications within each severity classification.

Denbury appreciates your consideration of the information in this letter and we believe that we are taking adequate steps to resolve your items of concern. Please do not hesitate to contact me if you have any questions or need additional information.

Sincerely,



John Filiatrault

Vice President CO2 Supply and Pipelines

Denbury Onshore, LLC

Enclosures