Valero

CPF 4-2009-5003M

Exhibit 2

1. HCA Segment Identification

§195.452(f) (1) requires operators of hazardous liquids pipelines to define the process for identifying pipeline segments and facilities that could ~~have an impact on public safety or the environment in the event of a failure and to ensure that adequate measures are in place and can be implemented to protect these areas of high consequence. This rule requires~~ affect a High Consequence Area (HCA), as that term is defined in *§195.450.* ~~o~~Operators are required to identify these locations, referred to as HCA segments, with a technically sound and repeatable identification process.

Numerous factors affecting pipeline operation influence the identification of HCAs such as environmental conditions, terrain, and product characteristics. The following list provides factors to consider when determining HCA areas:

- Terrain surrounding the pipeline or facility
- Drainage systems such as small streams and other smaller waterways that could serve as a conduit to an HCA
- Crossing of farm field tiles (Business Unit personnel will confirm by conducting a field HCA verification)
- Crossing of roadways with ditches along the side
- The nature and characteristics of the product the pipeline is transporting
- Physical support of the pipeline segment such as by a cable suspension bridge
- Operating conditions of the pipeline (e.g., pressure and flow rate)
- The hydraulic gradient of the pipeline
- The physical characteristics of the pipeline (e.g., year manufactured/installed, OD, ID, and seam type), the potential release volume, and the distance between the isolation points
- Potential physical pathways between the pipeline and the HCA
- Response capability (time to respond and nature of response)
- Potential natural forces inherent in the area (e.g., flood zones, earthquakes, and subsidence areas)

NOTE: The Company will consider subsidence areas during the field HCA verification.

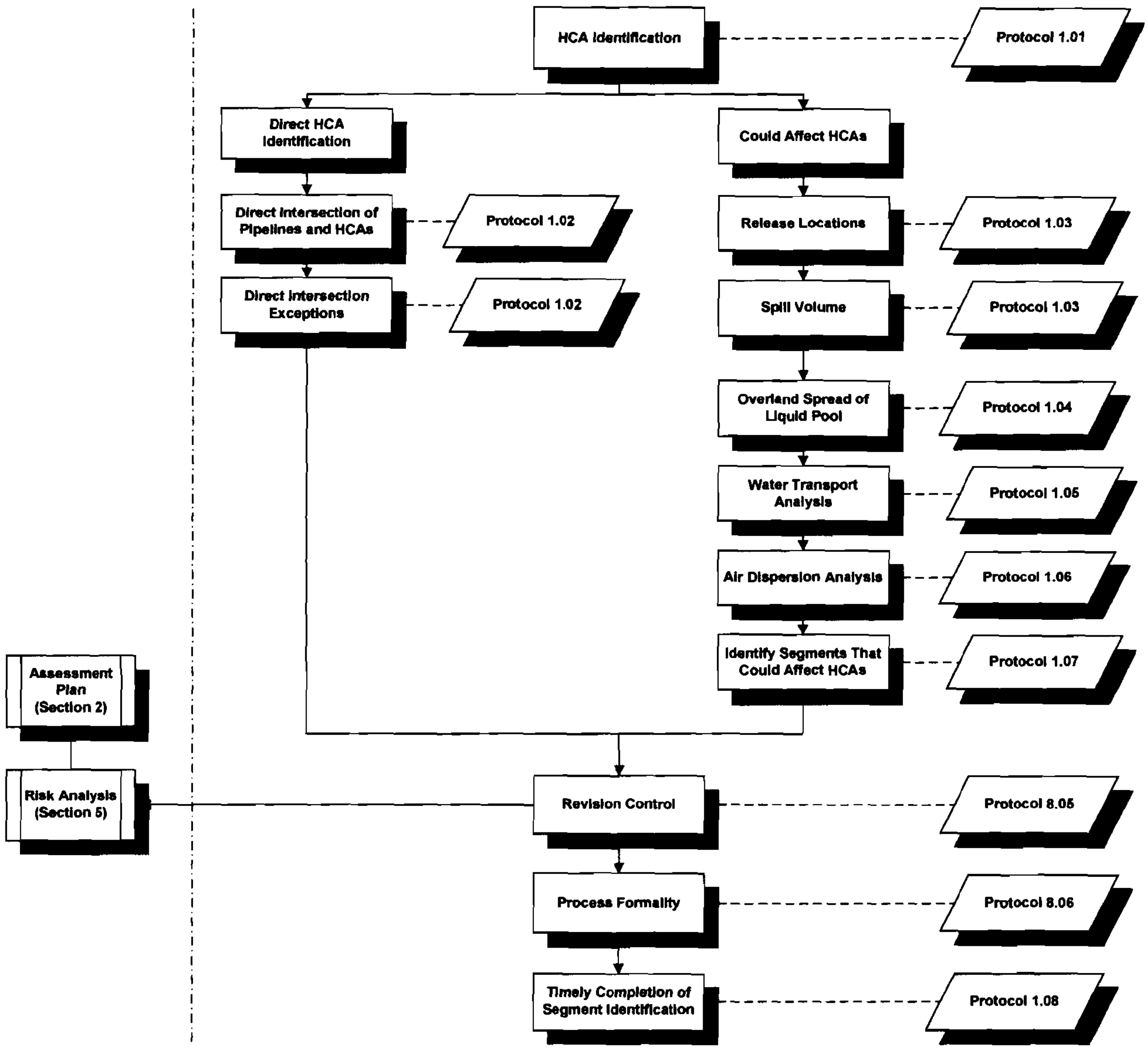
The Company obtains information that it uses to identify and categorize HCA segments from a number of different sources. Information consists of–but is not limited to–the following:

- National Pipeline Mapping System Geographic Information System (NPMS/GIS)
- One-Call program
- Business Unit personnel experience

This data provides the basis for field verification by Business Unit personnel at each site.

Using all available information on direct intersects and potential *Could Affects*, the Company chooses to be conservative when identifying HCA segments. The sections below briefly describe the segment identification process. Appendix A: IMP 101: HCA Segment Identification details the procedure for identifying HCA segments, and Figure 1–1: HCA Segment Identification Process Flowchart shows an overview of this process.

Figure 1–1: HCA Segment Identification Process Flowchart



1.1. HCA Identification

1.1.1. National Pipeline Mapping System Usage

The Pipeline Safety Improvement Act of 2002 requires that pipeline operators supply pipeline geographic data to the NPMS. The Pipeline and Hazardous Materials Safety Administration (PHMSA) uses the NPMS website to provide pipeline operators with GIS data on HCAs, categorized as follows:

- Populated Area
    - High Population Area (HPA)
    - Other Populated Area (OPA)
- Commercially Navigable Waterway (CNW)
- Unusually Sensitive Area (USA)
    - Drinking Water USA
    - Ecological USA

The Company downloads the HCA data from the NPMS website as a GIS file that uses a latitude/longitude coordinate system. The Company uses this information in its HCA analysis.

1.1.2. Unusually Sensitive Data Availability

At the time the *§195.452* regulations came into effect, NPMS did not have data for New York or Pennsylvania USAs. All pipeline operators in these states had to identify USAs without the help of the NPMS USA data. Since that time, NPMS has updated its website and now has USAs for all of the United States.

1.1.3. Field Identification of HCAs

Appendix A: IMP 102: Field HCA Identification and Review details how Business Unit personnel identify potential HCAs and other areas of concern. The Corporate IMP Team reviews the areas that Business Unit personnel have identified and updates the HCA maps if the areas represent new or modified HCAs.

1.2. Direct Intersection of Pipelines and HCAs

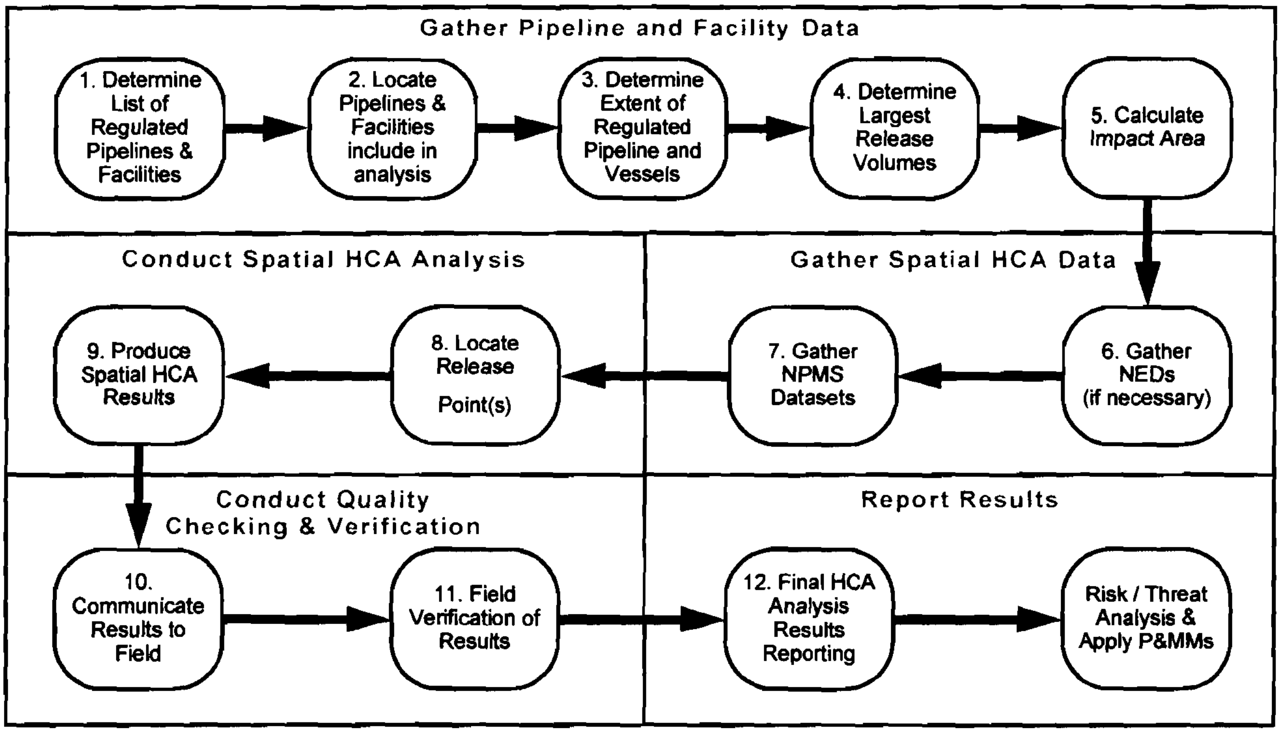
1.2.1. HCA Identification Process

The process of identifying hazardous liquid pipeline segments and facilities that directly intersect or indirectly could affect an HCA contains the following steps:

- Gather pipeline and facility data
- Gather spatial HCA data
- Conduct spatial HCA data analysis
- Conduct quality checking and field verification
- Report results

Figure 1–2: HCA Segment Identification Workflow illustrates the steps necessary to complete pipeline and facilities HCA identification and analysis.

Figure 1–2: HCA Segment Identification Workflow



1.2.2. Identifying Specific Locations of HCAs

The Corporate IMP Team identifies and documents all pipelines and facilities, which could ~~have an~~ affect ~~on~~ an ~~high consequence area~~HCA. This list is comprised of all pipelines that are regulated by *49 CFR Part 195* and should include any pipe that may fall outside any previously conducted line pipe HCA analysis. Once a list of possible pipelines is established, the next step is to determine the physical location of each. The Company identifies pipelines using any available maps and other spatial representations of pipelines and facilities. This step is essential to the Immediate Impact Analysis (described in Section 1.4), which identifies any HCAs that the pipeline intersects. The next step in the data gathering process is to determine the area that a pipeline or facility potentially could affect. The Company reviews plot plans and shape files and conducts personnel interviews to determine the extent of regulated piping, tanks, and equipment. The Company then analyzes these components to determine the largest possible release volume.

The "Risk-HCA Analysis Pipe-HCA – Aggregated" spreadsheet provides stationing for the beginning and end points of each identified HCA along the pipelines. In addition, the HCA Maps denote HCAs by a visual color change of the pipeline. For mapping purposes, the Company will identify the location of each of its pipelines through Global Positioning System (GPS), surveys, or digitization of the existing alignment sheets.

As part of its HCA analysis, the Company accounts for accuracy of the supporting data sets through the field verification process. This process is intended to identify and correct data inaccuracies, if any, in relation to several factors, including but not limited to the following:

- spatial reference
- naming conventions
- changes to the terrain

- product characteristics and type
- the absence or presence of identified and/or non-identified HCAs

The HCA analysis also includes a field review of the maps and data sets. Once the analysis is complete, Corporate GIS sends the maps and data sets to the appropriate Business Unit for review and verification of the HCA and segments that could affect an HCA. Field personnel then review and verify the following information:

- product type transported
- terrain/slope
- pipeline location
- NPMS HCA location and direction
- field identified HCAs
- alternate transport conduits such as drain tiles, storm sewers, etc.

If field personnel identify inaccuracies regarding the maps and data sets, Corporate GIS verifies both the maps and data sets and corrects, confirms, or updates the maps and data sets.

Additionally, the Company uses surveys in cases that require higher levels of accuracy to report back sub-meter resolution for pipelines and other data sets being used in the GIS.

1.2.2.1. Pipeline Facilities in HCAs

The Company maintains a complete list of facilities that could affect an HCA (see Appendix C).

1.2.2.2. Direct Intersection Exceptions

The Company is conservative when identifying HCAs and includes all pipeline segments that intersect an HCA. It will continue to make revisions to HCA segments as it updates information and makes improvements to its HCA identification methods and will track the justification of these changes.

1.2.3. Spatial HCA Data Collection

Once the Company has identified the physical data of the pipeline or facility, it collects the spatial (projected) data in the form of National Elevation Datasets (NEDs) for use in determining the surrounding topography for the liquid releases. This information consists of pixels of data containing elevations relative to sea level. It also collects and integrates NMPS datasets as described in Section 1.1.1. Because this process cannot model underground drains, farm field tiles, and other conduits not represented by a geospatial data source, Business Unit personnel are responsible for identifying and reporting these potential sources of transport to the Corporate IMP Team.

1.3. Release Locations

1.3.1. Release Locations for Liquid Pipelines

The Company calculates potential spill/release locations along liquid pipelines using the U.S. Geological Survey (USGS) 30-meter NED. Every NED grid (pixel) is 30m x 30m x 0.01m ($97^1/_2$ ft x $97^1/_2$ ft x 0.5 in.). The release point modeled in the analysis is the center of each NED pixel crossed by the pipeline.

The Company considers using adjacent NED grid points adequate for all water crossings and topography changes. *IMP 101: HCA Segment Identification* in Appendix A explains this process in greater detail.

1.3.2. Release Volumes

1.3.2.1. Leak Detection and Isolation

The Company Control Center integrates the data, alarms, and logs generated by Supervisory Control and Data Acquisition (SCADA) applications with alarms and logs to give a seamless view of pipeline status.

A formal pipeline shutdown procedure is available in the *Operations, Maintenance, and Emergency Procedures* and available at each Controller's workstation. The following steps summarize the Company Control Center's shutdown process:

1) Control Center monitors information about potential leaks and initiates pipeline shutdown procedure and/or notifies Business Unit personnel
2) Business Unit personnel investigate the potential leak.

Total time for the leak isolation process is dependent on factors particular to the specific operating area. For spill volume calculations, the Company determines the specific operating characteristics affecting leak detection and isolation times and accounts for any additional time taken for the operating area process. In the case of a catastrophic failure, safety shutdown mechanisms automatically initiate preempting any operator actions.

1.3.2.2. Leak Volumes for Liquid Pipelines

The rupture volume calculations presented in the HCA Summary Document are meant to model just that – a rupture volume from a guillotine break. These volumes are not necessarily the maximum amount of product that could be released by the pipeline under all scenarios. The guillotine break is meant to model the maximum short-term release that would come above the ground surface and cause maximum impact area when modeled with the surrounding topology of the land.

The Company recognizes that there might be times when the maximum possible release from the pipeline could, in fact, occur at the point of a small leak that goes undetected for a long period of time. It is the Company's experience that this type of leak manifests itself very close to the pipeline: in other words, it travels in the disturbed earth created during trenching at the point of construction. Additionally, leaked product migrates very slowly underground. These slow leaks are absorbed by the surrounding soils, and product that gets above ground is subject to evaporation and detection.

The analysis process described in this section and IMP 101: HCA Segment Identification has identified those locations along the "construction trench" that are within the NPMS HCAs. Recognizing that detection of these small leaks is paramount to a successful leak detection program, the Company is endeavoring to minimize the leak detection threshold as the SCADA system is enhanced and implemented for use on Company DOT pipelines.

A leak analysis (vs. the rupture analysis in Section 1.3.2.3) is determined by assuming a hole size and then multiplying an assumed response time by the maximum operating pressure (MOP) of the pipeline. If it is determined that a slow leak would result in a larger release volume than a rupture, the leak volume will be used in the potential Migration analysis.

1.3.2.3. Rupture Release Volumes for Liquid Pipelines

The liquid release volume potential at each release point is determined by multiplying the maximum flow rate of the pipeline by the time required for Business Unit personnel to shut down the pipeline and close the isolation valves and then adding in the pipeline drain down volumes based on pipeline elevations to the release point.

The Company assumes that a guillotine pipe break occurs at all release locations and that a worst-case discharge will occur. Additionally, the Company has analyzed the possibility of a half-inch hole that went undetected for three days and determined that the volume is smaller than a guillotine rupture volume; therefore, the Company always uses the guillotine rupture volume.

The equation becomes

Leak Detection & Isolation Time x Maximum Flow Rate + Drain Down Volumes = Total Release Volume

1.3.3. Undetectable Leaks

Leak detection capability varies within the Company's numerous Business Unit operating systems. To discover leaks that may normally go undetected by current leak detection systems, the Company considers many factors to reconcile these variations in leak detection levels. Release volume is generically calculated for each location or operating area by considering factors such as flow rate, product type, type of rupture, drain down volume, isolation time, leak detection technology employed, type of right-of-way (ROW) patrols, frequency of ROW patrols, SCADA or non-SCADA, frequency of tank and/or meter readings, etc. to calculate total release volume. During ROW patrols, Business Unit personnel pay special attention to indications such as pools, dead vegetation, and/or any other signs of a leak.

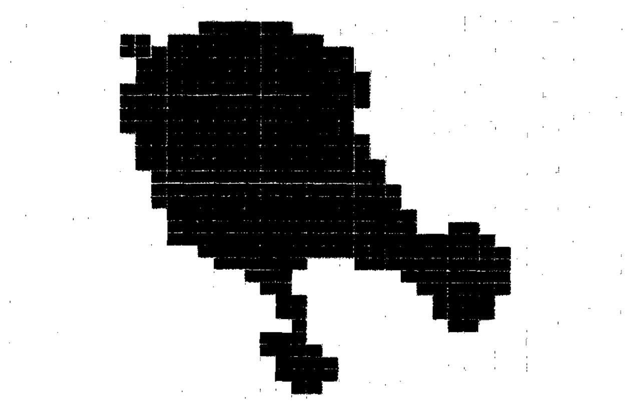
1.4. Spatial HCA Data Analysis

The spatial HCA analysis consists of an analysis engine of pre-programmed scripts within a geospatial tool such as ArcView. This tool combines the collected spatial information with the physical properties of the pipeline and/or facility to model a condition that could most likely result in a potential migration area. The analysis begins when a release point is identified. Once identified, an Immediate Impact Analysis is conducted on this point(s) to determine if any NPMS HCAs overlay the pipeline location.

1.4.1. Potential Migration Area (Spread Plume) Analysis

The potential migration impact analysis identifies HCA *Could Affect* areas by using the calculated maximum release volume and NED data to model the overland and downhill migration of a liquid release. From the release point, product fills the pixel at the release point and then "flows" to every adjacent pixel that has a lower or equal elevation. This process repeats itself from each pixel that fills with product until the product is exhausted (i.e., the number of pixels calculated from the release volume are filled). The example shown in Figure 1–3: Potential Migration NED Grid has the release point(s) modeled in red pixels, and the downhill spread of product in brown.

Figure 1–3: Potential Migration NED Grid



After gathering the release volumes for all release location points of the pipelines that the Company currently operates, the Corporate IMP Team conducts a potential migration area analysis for liquid product releases along the entire pipeline system. It calculates the impact zone as point releases along the length of the pipeline and bases the spread plume distance on a pool of product spreading (sheet flow) out from the centerline of the pipeline and traveling in all directions downhill until the maximum release volume is consumed. The impact calculation is the volume of product spread over a resulting area with a specified maximum depth. The following equations represent the area calculation:

$$V_p = L^2 \times D$$

Where	L	=	98.43 (ft) pixel length
	D	=	0.04167 ft. assumed pool depth
	V_p	=	Pixel Volume (ft^3)

and

$$A_s = (0.178)\, V_p/V_t$$

Where	A_s	=	Spread Area (pixels)
	V_t	=	Total Volume (bbl)

Thus, the entire calculation is as follows:

98.43 (ft) X 98.43 (ft) X 0.04167 (ft) = 403.69 ft^3 per Pixel (volume = Vp)

403.69 ft^3 X 7.48051 gal/ft^3 = 3,019.8 gallons per Pixel

3,019.8 gallons / 42 gal/bbl = 71.9 barrels per Pixel

NOTE 1: The area determined is represented by the number of NED pixels that can be filled with the product volume. Each pixel is 30 m (98.43 ft) by 30 m square and equates to a volume of approximately 72 bbls per grid.

NOTE 2: Surface roughness (natural obstacles and vegetation) relates to a pool depth figure of 0.5 in., referred to in the equation in Section 1.4.1. A conservative estimation of area of spread assumes no surface roughness and no ground absorption. A potential migration spread plume can be used if local Business Unit personnel can indicate that a deeper pooling depth should be used based on operating experience or the surrounding terrain and ground cover characteristics.

The dispersion area, or spread plumes (based on the release volume calculated in Section 1.3.2.3), has the potential to change at every release point location where the referenced information changes. Therefore, the Company conducts a spatial comparison between the pipeline and USGS 30-m NED to determine the potential spread plumes in the event of a release. The maximum transport area used in the analysis is based on the volume release calculated and the assumption that an amount of product is left behind in each NED grid encountered. The accuracy of the NEDs limits the maximum spread plume calculations. This resolution sensitivity creates the potential for two adjacent grids to appear equivalent, even if the actual terrain varies slightly.

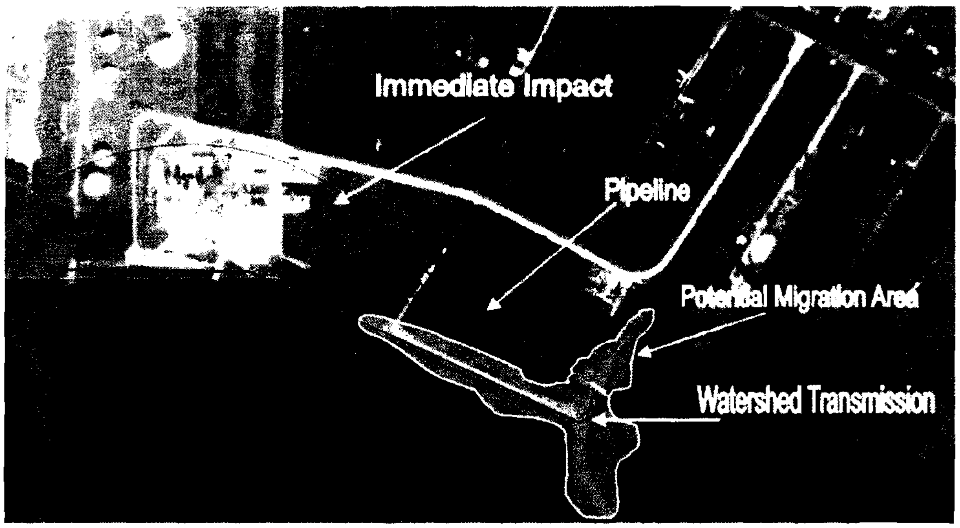
A further illustration is to imagine a box with dimensions 30 m x 30 m x 0.01 m ($98^1/_2$ ft x $98^1/_2$ ft x 0.5 in.). This pool depth equates to a volume of approximately 72 barrels per grid. For example, to spread to over 263 grids (~200,000 sq ft), the Company would need over 18,936 bbls of product released in an uncontrolled manner and migrate to the surrounding terrain. This example illustrates a worst-case scenario mimicking glass-surface flow with no soil absorption or vaporization. Product migrating parallel to the pipeline may not generate a large perpendicular buffer radius, but could still have a longer station-to-station HCA impact on the pipeline itself.

To determine spread zones, the process begins by identifying the NEDs through which the pipeline traverses. The analysis begins at each pixel that contacts the pipeline centerline and evaluates current elevation to that of the eight neighboring pixels and models product into each pixel with an elevation equal to, or less than, the current pixel.

After reaching the release volume or finding no more potential neighboring elevation pixels, the Company conducts a spatial comparison between the spread plume and the HCA types to determine if an intersection exists.

Figure 1–4: Potential Migration Impact Analysis shows how this analysis looks in an actual example with modeling of product migrating from a release point over the surrounding terrain. The pipeline is shown in red, and the potential migration shown in grey. The yellow and blue polygons are HCAs. The yellow section of pipeline identifies the area of pipeline that could affect the HCAs. The green line represents the Primary and Secondary Watershed Transmission flow lines. Appendix A: IMP 101: HCA Segment Identification explains this process in more detail.

Figure 1–4: Potential Migration Impact Analysis



1.4.2. Air Dispersion Analysis

Alternatively, if the pipeline transports highly volatile liquids (HVLs), then the Company uses the results from vapor release models, such as ARCHIE, to calculate a buffer around the pipeline. The following scenarios would constitute consideration for modeling a *Could Affect* buffer zone:

1) **Rupture with immediate ignition**. This scenario represents the aerosol emissions from the pipeline being immediately ignited. This scenario is modeled using the flame jet model in ARCHIE. The software model should characterize the expected length of the flame and the safe separation distance such that protection from the thermal hazards is anticipated.

2) **Rupture with delayed ignition**. This scenario represents a vapor cloud explosion model. The ARCHIE software would report various levels of damage to structures based on the overpressure created from the explosion shock wave.

3) **Rupture with no ignition**. This scenario represents a toxic vapor cloud model. The ARCHIE model calculates an anticipated downstream distance to where the concentration of the hazardous vapor in the air reaches the user input toxicity threshold level.

The Company bases toxic vapor cloud calculations on either a defined threshold limit value (TLV) or the Immediately Dangerous to Life and Health (IDLH) value defined by organizations such as Occupational Safety and Health Administration (OSHA) and/or Mine Safety and Health Administration (MSHA) for the product being transported. These calculations, along with the appropriate data for atmospheric conditions that determines the amount of mixing with air the product will undergo and the distance it could possibly travel, determine the appropriate buffer for pipelines transporting HVLs. Figure 1–5: HVL *Could Affect* Buffer Zone shows a buffered HVL pipeline.

Figure 1–5: HVL *Could Affect* Buffer Zone

1.4.3. Water Transport Analysis

The Company takes a very conservative approach in identifying potential *Could Affect* HCAs for all water transports and considers the following information for calculating water transport release volume potential:

1) The average flow velocity of United States rivers (as reported in the National Hydrology Dataset [NHD]) is four miles per hour.
2) The Company defines response time as the time it would take employees to arrive at the response equipment, deliver the equipment to a location, and achieve containment of the release. The Company determined that it could deploy either Company personnel and equipment or Contractor resources in a timely fashion to prevent a release from migrating more than eight hours downstream.

Typical formula for calculating water transport *Could Affects* is as follows:

Distance Traveled (ft) = Flow Velocity ($^{ft}/_{s}$) x Response Times (seconds)

Where	Velocity	=	4 mph
	Response Time	=	8 hours

NOTE: Based on the information above, the Company would normally calculate the downstream estimated release distance to be 32 linear miles for all water-body crossings of pipelines and assume a 35-mile linear buffer zone; however, this plan is a composite of the Company's 11 operating areas. Because of the variation in site-specific leak detection capabilities and response times, the Company has chosen to use a 100-mile water transport buffer, which is greater than the calculated flow rates of the fastest moving water body and provides an ultra-conservative analysis of HCA *Could Affects.* This figure may be pared back as data on specific location scenarios is developed.

1.4.3.1. Primary Watershed Analysis

Where the pipeline directly intersects NHD features, the Company records the name and length of each downstream adjoining NHD feature for a total distance of 100 miles. After building the water flow path, the Company applies the path against the HCA datasets. The result is the name of the HCA, distance to that HCA, and flow path information (water names and distances).

The USGS website that provides the NHD datasets has listed a series of problems with many of the datasets because of NHD production process oversights. The Company can review known problems at http://nhd.usgs.gov/problems.html. The issues that concem the Primary Watershed Analysis are the NHD river line work corruptions. Line lengths of topologically corrupt features are immeasurable and are not used in this analysis. USGS in conjunction with the NHD user community updated the NHD datasets in an irregular manner. The Company uses the most recent NHD watershed data available when analyses are performed. The Company does not monitor the NHD for updates or re-analyze upon the NHD completing an update.

1.4.3.2. Secondary Watershed Analysis

The Secondary Watershed process integrates the Potential Migration Analysis results with water features (from the NHD) to yield the transport flow path associated with a release that flows overland and indirectly spills into a watershed feature, and then moves downstream toward an HCA. The Company follows the watershed transmission pathway for 100 miles downstream. If Business Unit personnel have a viable reason for reducing this distance, it can be reduced during the field HCA verification process.

1.4.4. Additional Factors Considered in Water Transport Analysis

The Company uses Material Safety Data Sheets (MSDS) for information about specific products. The Corporate Health, Safety, and Environmental Group (HSE Group) maintains and updates MSDS and makes them available on the HSE website.

1.4.5. Changes in Commodity Properties

In reviewing the MSDS, the Company determined that the composition of its products does not change as a result of interaction with the environment. Its products include the following:

- Refined Products
- Crude
- HVLs

1.4.6. Commodity Solubility

The MSDS for each product shows that the products listed in Section 1.4.5 have, at the maximum, only trace solubility in water. The products carried by the Company's pipelines do not contain Methyl Tertiary-Butyl Ether (MTBE). The Company will address product solubility criteria if it adds products in the future.

1.4.7. Abnormal Stream Conditions

The Company's approach to considering water flow conditions such as storms or floods is conservative. The Company will either determine actual flood velocity or apply a factor to the average flow velocity to simulate flood velocity. The Company has initially implemented a 100-mile linear buffer zone downstream distance for all water-body crossings of pipelines. The Company will determine the downstream distance on an operating area by operating area basis and pare this figure back as appropriate, thus, the Company's water transport buffers should be sufficient to account for abnormal stream conditions.

1.4.8. Surface and Subsurface Water Transport

The Company will consider the modeling of subsurface water transport if more data becomes available for this analysis. Company personnel will consider conditions that would contribute to this situation during ROW surveillance surveys (e.g., storm drains, farm tiles, irrigation ditches). This consideration is a manual process that cannot be completed as part of the GIS analysis. As part of the field HCA verification process, Business Unit personnel will pay attention to areas of known farm tiles or mining subsidence risk.

1.4.9. Product Spray Releases

The Company includes potential product spray releases in the water flow analysis, and by using sufficient pipeline cover, it minimizes the potential for a spray release. In addition, the Water Transport Analyses are more than adequate to encompass spray. Without spray, the Company would treat the release as it would any other leak.

1.5. Quality Checking and Field Verification

Once the spatial analysis is complete, the next step is to verify the quality and accuracy of the spatial analysis results. The first step in this part of the process is to check the analysis results verses other GIS sources of information such as Google Earth™. Using this freely available tool, the Company can query identified site information and check against the analysis results. If the Company locates additional potential HCAs, it must add them to the overall spatial analysis results and recalculate. The Company then considers this combined and checked set of results the preliminary results, which then go through field verification.

Once Business Unit personnel complete checking and editing the preliminary results, they communicate back with the Corporate IMP Team, who integrate this updated information into the final HCA analysis report and risk database.

1.6. Identify Segments That *Could Affect* HCAs Review

The Company has identified HCA pipeline segments by using one or more of the following analytical methods:

- Direct Intersection of Pipelines and HCAs (shown in Section 1.2)
- Spatial HCA Data Analysis (shown in Section 1.4)
- Water Transport Analysis (shown in Section 1.4.3)

The Company declared that all segments intersecting a buffer zone could affect an HCA.

1.6.1. *Could Affects* and Water Transport–Liquid Pipelines

Figure 1–4 displays examples of Immediate, Potential Migration, Primary, and Secondary Watershed Transmission HCA analyses for liquid pipelines.

1.6.2. Facilities That *Could Affect* HCAs

The Company is responsible for identifying all facilities that affect HCAs along the pipeline. The Company applies the same methodology for non-line-pipe, DOT-jurisdictional facilities (e.g., breakout tanks).

1.7. Revision Control

1.7.1. HCA Segments

The Company will not shorten or modify any pipeline HCA segments to avoid making repairs after it has developed the baseline assessment. As the Company updates information and makes improvements on HCA identification methods, it will continue to make revisions to its HCA segments.

1.7.2. Periodic Review and Revision of HCA Boundaries

As detailed in Appendix A: IMP 101: HCA Segment Identification, the Corporate IMP Team checks the NPMS website for revised or updated HCA data throughout the year to determine if any new HCAs fall within the Company pipeline system. The Company also uses other sources of information such as Google Earth™ to review site information and identify potential new HCAs. The Company also signed up with the Federal Register Docket Management System (DMS) List Serve for e-mail notification of certain documents and NPMS updates when they are placed in a DMS docket. The Corporate IMP Team updates maps with new field-identified HCAs using information from Business Unit personnel as described in Appendix A: IMP 102: Field HCA Identification and Review, posts the maps on the Regulatory Compliance Intranet Portal, and then e-mails the appropriate personnel notifying them how to access the updated maps. The Corporate IMP Team also presents any changes to the maps at the Annual IMP Review Meeting.

1.7.3. Identifying and Analyzing Changes to the Pipeline

The Corporate IMP Team identifies, analyzes, incorporates, and tracks any HCA changes to the HCA maps as described in Appendix A: IMP 101: HCA Segment Identification.

1.7.4. Identifying and Analyzing Changes in Pipeline Terrain and Environment

The Company uses the field identification process as described in Section 1.1.3: Field Identification of HCAs to identify changes in the local terrain or environment near the pipeline. Appendix A: IMP 102: Field HCA Identification and Review describes this procedure in more detail.

1.7.5. Annual HCA Segment Review

Annually, not to exceed 15 months, the Corporate IMP Team identifies, analyzes, incorporates, and tracks any HCA changes to the HCA maps and evaluates HCA data to determine the need for a new HCA analysis. The segment identification process includes the following methods for identifying, documenting, and maintaining up-to-date segment boundaries:

- Annually verifying HCA segment boundary information
- Performing periodic reviews of new or changing HCA segments.

1.7.6. Annual Update

As the Company expands pipeline systems or acquires new systems, it will continually review the segment identification process and results as described in Appendix A: IMP 101: HCA Segment Identification. Formal, scheduled reviews of segment identifications occur once per calendar year, not to exceed 15 months; and the Company performs these reviews in conjunction with the Annual IMP Review as described in Section 8: Program Evaluation. During this Annual IMP Review, the Corporate IMP Team will present for review any updated segment identifications that have occurred during the year by showing the proposed changes/additions on the relevant maps and explaining the potential impact on HCAs and *Could Affects*. These updated segments include additions that resulted from any of the following:

- Changes to the pipeline
- Changes to the pipeline terrain and environment (e.g., significant One-Call activity)
- Purchase or construction of additional pipelines

The Company's process does not allow revisions to segment identification analysis to avoid remediation of assessment anomalies after the start of integrity assessments.

1.7.7. Interface with Other IMP Program Elements

As the Company makes changes to the HCA maps, the Corporate IMP Team integrates the information collected from the individual Business Units into the maps. Then, the Corporate IMP Team performs the appropriate risk analyses, integrates the updated information, as applicable, into the Assessment Schedule and P&M Analyses, and communicates that information to the Business Units.

1.7.8. Records Retention

The Company maintains all electronic files and documents in RIMS. The Company maintains these archived files for the appropriate retention period (shown in Appendix F: Consolidated Documentation and References).

1.8. Process Formality

1.8.1. Formal HCA Identification Process

The Company has a formal process to identify and review HCA segments. Appendix A: IMP 101: HCA Segment Identification describes the steps to accurately and consistently identify HCA segments. The Company has also developed Appendix A: IMP 102: Field HCA Identification and Review, which provides the process by which Business Unit personnel have direct input into the identification of HCA segments.

1.8.2. Idle Lines and New or Acquired Lines

As the Company expands pipeline systems or acquires new systems, it will continually review the segment identification process and results as described in Appendix A: IMP 101: HCA Segment Identification. The regulations for Integrity Management Programs (*§195.452*) do not recognize idle lines. The pipelines are either active or abandoned. The Company defines idle pipelines as being pipe that it is not currently using to move hazardous liquid, but that it could put back in service at a future date. These lines are either in-service idle pipelines (i.e., contains hazardous liquids, but are currently static or unused) or out-of-service idle pipelines (i.e., are effectively isolated from active pipe and contain de-product or inert gas). The in-service idle pipelines have direct HCA impact analyses completed and "drain-down" spread plumes generated. The out-of-service idle pipelines have only the direct HCA impact analyses performed. If the Company decides to put an idle line back into service, it will re-analyze HCA and *Could Affect* data for that line segment prior to placing the pipeline back into service.

As new pipelines are constructed, converted, or acquired, the Corporate IMP Team evaluates the appropriate segments in accordance with the procedures outlined in this section to determine if they could affect HCAs. The Corporate IMP Team will conduct this evaluation prior to the pipeline going into service and has the option of employing the services of a qualified vendor to assist with the analysis.

1.9. Timely Completion of Segment Identification

The Company has met the required time limit for segment identification as required per PHMSA's Integrity Management rule *§195.452*. The Company identified these segments for pipelines prior to the December 31, 2001 compliance date for Category 1 and November 18, 2002, for Category 2 pipelines.

1. HCA Segment Identification

§195.452(f) (1) requires operators of hazardous liquids pipelines to define the process for identifying pipeline segments and facilities that could affect a High Consequence Area (HCA), as that term is defined in *§195.450.* Operators are required to identify these locations, referred to as HCA segments, with a technically sound and repeatable identification process.

Numerous factors affecting pipeline operation influence the identification of HCAs such as environmental conditions, terrain, and product characteristics. The following list provides factors to consider when determining HCA areas:

- Terrain surrounding the pipeline or facility
- Drainage systems such as small streams and other smaller waterways that could serve as a conduit to an HCA
- Crossing of farm field tiles (Business Unit personnel will confirm by conducting a field HCA verification)
- Crossing of roadways with ditches along the side
- The nature and characteristics of the product the pipeline is transporting
- Physical support of the pipeline segment such as by a cable suspension bridge
- Operating conditions of the pipeline (e.g., pressure and flow rate)
- The hydraulic gradient of the pipeline
- The physical characteristics of the pipeline (e.g., year manufactured/installed, OD, ID, and seam type), the potential release volume, and the distance between the isolation points
- Potential physical pathways between the pipeline and the HCA
- Response capability (time to respond and nature of response)
- Potential natural forces inherent in the area (e.g., flood zones, earthquakes, and subsidence areas)

NOTE: The Company will consider subsidence areas during the field HCA verification.

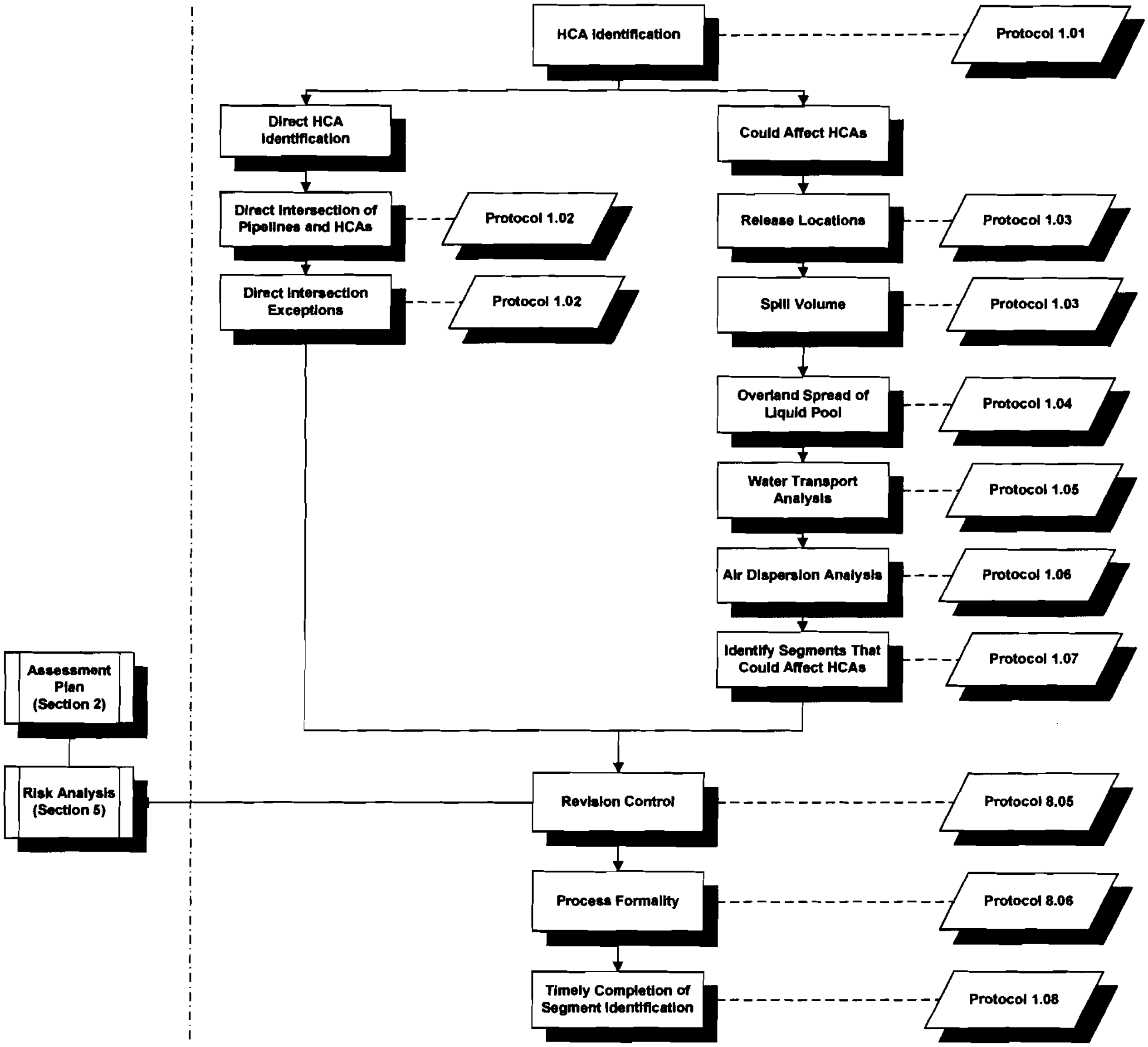
The Company obtains information that it uses to identify and categorize HCA segments from a number of different sources. Information consists of–but is not limited to–the following:

- National Pipeline Mapping System Geographic Information System (NPMS/GIS)
- One-Call program
- Business Unit personnel experience

This data provides the basis for field verification by Business Unit personnel at each site.

Using all available information on direct intersects and potential *Could Affects*, the Company chooses to be conservative when identifying HCA segments. The sections below briefly describe the segment identification process. Appendix A: IMP 101: HCA Segment Identification details the procedure for identifying HCA segments, and Figure 1–1: HCA Segment Identification Process Flowchart shows an overview of this process.

Figure 1–1: HCA Segment Identification Process Flowchart



1.1. HCA Identification

1.1.1. National Pipeline Mapping System Usage

The Pipeline Safety Improvement Act of 2002 requires that pipeline operators supply pipeline geographic data to the NPMS. The Pipeline and Hazardous Materials Safety Administration (PHMSA) uses the NPMS website to provide pipeline operators with GIS data on HCAs, categorized as follows:

- Populated Area
    - High Population Area (HPA)
    - Other Populated Area (OPA)
- Commercially Navigable Waterway (CNW)
- Unusually Sensitive Area (USA)
    - Drinking Water USA
    - Ecological USA

The Company downloads the HCA data from the NPMS website as a GIS file that uses a latitude/longitude coordinate system. The Company uses this information in its HCA analysis.

1.1.2. Unusually Sensitive Data Availability

At the time the *§195.452* regulations came into effect, NPMS did not have data for New York or Pennsylvania USAs. All pipeline operators in these states had to identify USAs without the help of the NPMS USA data. Since that time, NPMS has updated its website and now has USAs for all of the United States.

1.1.3. Field Identification of HCAs

Appendix A: IMP 102: Field HCA Identification and Review details how Business Unit personnel identify potential HCAs and other areas of concern. The Corporate IMP Team reviews the areas that Business Unit personnel have identified and updates the HCA maps if the areas represent new or modified HCAs.

1.2. Direct Intersection of Pipelines and HCAs

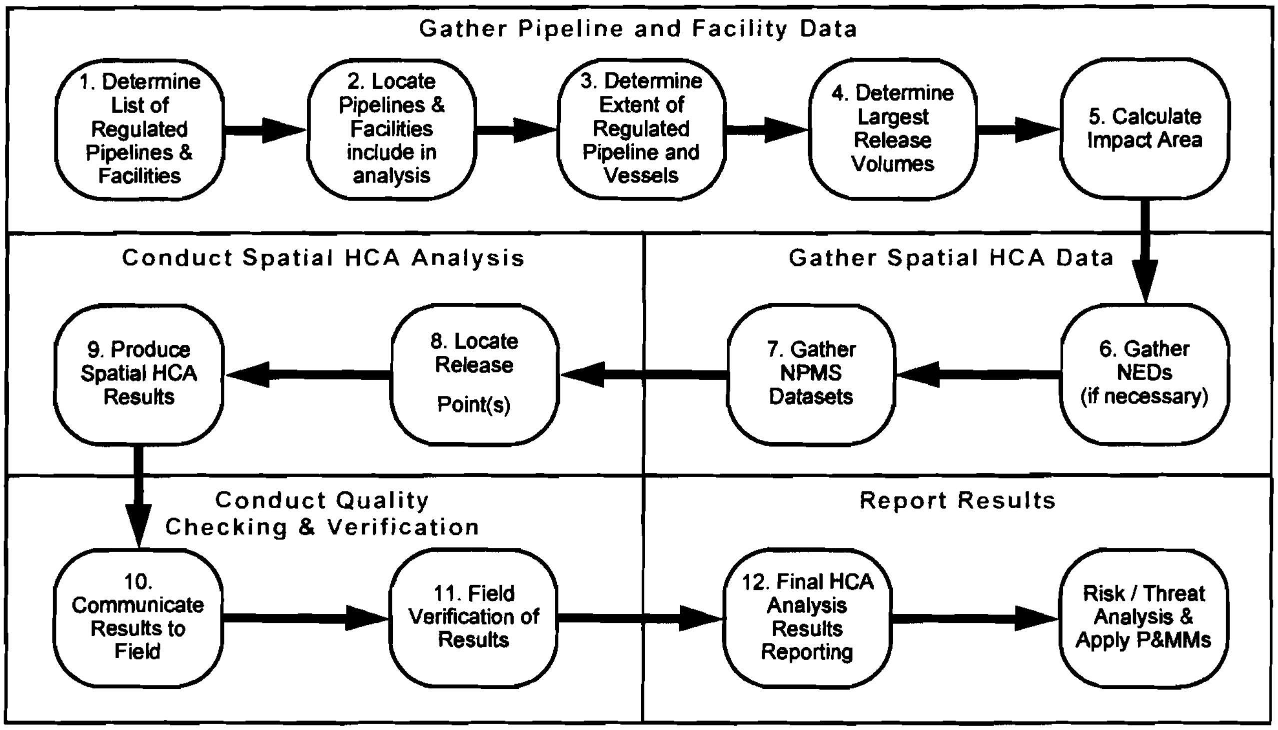
1.2.1. HCA Identification Process

The process of identifying hazardous liquid pipeline segments and facilities that directly intersect or indirectly could affect an HCA contains the following steps:

- Gather pipeline and facility data
- Gather spatial HCA data
- Conduct spatial HCA data analysis
- Conduct quality checking and field verification
- Report results

Figure 1–2: HCA Segment Identification Workflow illustrates the steps necessary to complete pipeline and facilities HCA identification and analysis.

Figure 1–2: HCA Segment Identification Workflow



1.2.2. Identifying Specific Locations of HCAs

The Corporate IMP Team identifies and documents all pipelines and facilities, which could affect an HCA. This list is comprised of all pipelines that are regulated by *49 CFR Part 195* and should include any pipe that may fall outside any previously conducted line pipe HCA analysis. Once a list of possible pipelines is established, the next step is to determine the physical location of each. The Company identifies pipelines using any available maps and other spatial representations of pipelines and facilities. This step is essential to the Immediate Impact Analysis (described in Section 1.4), which identifies any HCAs that the pipeline intersects. The next step in the data gathering process is to determine the area that a pipeline or facility potentially could affect. The Company reviews plot plans and shape files and conducts personnel interviews to determine the extent of regulated piping, tanks, and equipment. The Company then analyzes these components to determine the largest possible release volume.

The "Risk-HCA Analysis Pipe-HCA – Aggregated" spreadsheet provides stationing for the beginning and end points of each identified HCA along the pipelines. In addition, the HCA Maps denote HCAs by a visual color change of the pipeline. For mapping purposes, the Company will identify the location of each of its pipelines through Global Positioning System (GPS), surveys, or digitization of the existing alignment sheets.

As part of its HCA analysis, the Company accounts for accuracy of the supporting data sets through the field verification process. This process is intended to identify and correct data inaccuracies, if any, in relation to several factors, including but not limited to the following:

- spatial reference
- naming conventions
- changes to the terrain

- product characteristics and type
- the absence or presence of identified and/or non-identified HCAs

The HCA analysis also includes a field review of the maps and data sets. Once the analysis is complete, Corporate GIS sends the maps and data sets to the appropriate Business Unit for review and verification of the HCA and segments that could affect an HCA. Field personnel then review and verify the following information:

- product type transported
- terrain/slope
- pipeline location
- NPMS HCA location and direction
- field identified HCAs
- alternate transport conduits such as drain tiles, storm sewers, etc.

If field personnel identify inaccuracies regarding the maps and data sets, Corporate GIS verifies both the maps and data sets and corrects, confirms, or updates the maps and data sets.

Additionally, the Company uses surveys in cases that require higher levels of accuracy to report back sub-meter resolution for pipelines and other data sets being used in the GIS.

1.2.2.1. Pipeline Facilities in HCAs

The Company maintains a complete list of facilities that could affect an HCA (see Appendix C).

1.2.2.2. Direct Intersection Exceptions

The Company is conservative when identifying HCAs and includes all pipeline segments that intersect an HCA. It will continue to make revisions to HCA segments as it updates information and makes improvements to its HCA identification methods and will track the justification of these changes.

1.2.3. Spatial HCA Data Collection

Once the Company has identified the physical data of the pipeline or facility, it collects the spatial (projected) data in the form of National Elevation Datasets (NEDs) for use in determining the surrounding topography for the liquid releases. This information consists of pixels of data containing elevations relative to sea level. It also collects and integrates NMPS datasets as described in Section 1.1.1. Because this process cannot model underground drains, farm field tiles, and other conduits not represented by a geospatial data source, Business Unit personnel are responsible for identifying and reporting these potential sources of transport to the Corporate IMP Team.

1.3. Release Locations

1.3.1. Release Locations for Liquid Pipelines

The Company calculates potential spill/release locations along liquid pipelines using the U.S. Geological Survey (USGS) 30-meter NED. Every NED grid (pixel) is 30m x 30m x 0.01m ($97^1/_2$ ft x $97^1/_2$ ft x 0.5 in.). The release point modeled in the analysis is the center of each NED pixel crossed by the pipeline.

The Company considers using adjacent NED grid points adequate for all water crossings and topography changes. *IMP 101: HCA Segment Identification* in Appendix A explains this process in greater detail.

1.3.2. Release Volumes

1.3.2.1. Leak Detection and Isolation

The Company Control Center integrates the data, alarms, and logs generated by Supervisory Control and Data Acquisition (SCADA) applications with alarms and logs to give a seamless view of pipeline status.

A formal pipeline shutdown procedure is available in the *Operations, Maintenance, and Emergency Procedures* and available at each Controller's workstation. The following steps summarize the Company Control Center's shutdown process:

1) Control Center monitors information about potential leaks and initiates pipeline shutdown procedure and/or notifies Business Unit personnel
2) Business Unit personnel investigate the potential leak.

Total time for the leak isolation process is dependent on factors particular to the specific operating area. For spill volume calculations, the Company determines the specific operating characteristics affecting leak detection and isolation times and accounts for any additional time taken for the operating area process. In the case of a catastrophic failure, safety shutdown mechanisms automatically initiate preempting any operator actions.

1.3.2.2. Leak Volumes for Liquid Pipelines

The rupture volume calculations presented in the HCA Summary Document are meant to model just that – a rupture volume from a guillotine break. These volumes are not necessarily the maximum amount of product that could be released by the pipeline under all scenarios. The guillotine break is meant to model the maximum short-term release that would come above the ground surface and cause maximum impact area when modeled with the surrounding topology of the land.

The Company recognizes that there might be times when the maximum possible release from the pipeline could, in fact, occur at the point of a small leak that goes undetected for a long period of time. It is the Company's experience that this type of leak manifests itself very close to the pipeline: in other words, it travels in the disturbed earth created during trenching at the point of construction. Additionally, leaked product migrates very slowly underground. These slow leaks are absorbed by the surrounding soils, and product that gets above ground is subject to evaporation and detection.

The analysis process described in this section and IMP 101: HCA Segment Identification has identified those locations along the "construction trench" that are within the NPMS HCAs. Recognizing that detection of these small leaks is paramount to a successful leak detection program, the Company is endeavoring to minimize the leak detection threshold as the SCADA system is enhanced and implemented for use on Company DOT pipelines.

A leak analysis (vs. the rupture analysis in Section 1.3.2.3) is determined by assuming a hole size and then multiplying an assumed response time by the maximum operating pressure (MOP) of the pipeline. If it is determined that a slow leak would result in a larger release volume than a rupture, the leak volume will be used in the potential Migration analysis.

1.3.2.3. Rupture Release Volumes for Liquid Pipelines

The liquid release volume potential at each release point is determined by multiplying the maximum flow rate of the pipeline by the time required for Business Unit personnel to shut down the pipeline and close the isolation valves and then adding in the pipeline drain down volumes based on pipeline elevations to the release point.

The Company assumes that a guillotine pipe break occurs at all release locations and that a worst-case discharge will occur. Additionally, the Company has analyzed the possibility of a half-inch hole that went undetected for three days and determined that the volume is smaller than a guillotine rupture volume; therefore, the Company always uses the guillotine rupture volume.

The equation becomes

Leak Detection & Isolation Time x Maximum Flow Rate + Drain Down Volumes = Total Release Volume

1.3.3. Undetectable Leaks

Leak detection capability varies within the Company's numerous Business Unit operating systems. To discover leaks that may normally go undetected by current leak detection systems, the Company considers many factors to reconcile these variations in leak detection levels. Release volume is generically calculated for each location or operating area by considering factors such as flow rate, product type, type of rupture, drain down volume, isolation time, leak detection technology employed, type of right-of-way (ROW) patrols, frequency of ROW patrols, SCADA or non-SCADA, frequency of tank and/or meter readings, etc. to calculate total release volume. During ROW patrols, Business Unit personnel pay special attention to indications such as pools, dead vegetation, and/or any other signs of a leak.

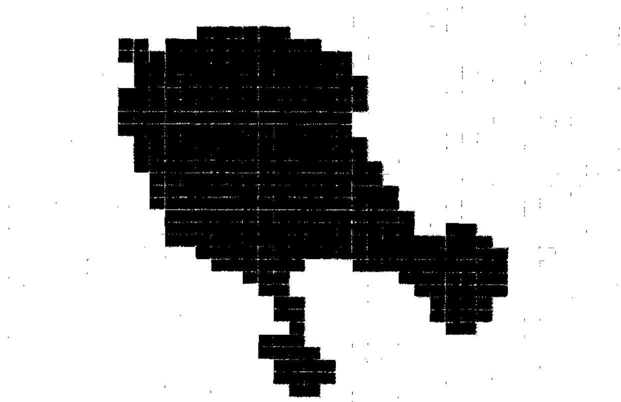
1.4. Spatial HCA Data Analysis

The spatial HCA analysis consists of an analysis engine of pre-programmed scripts within a geospatial tool such as ArcView. This tool combines the collected spatial information with the physical properties of the pipeline and/or facility to model a condition that could most likely result in a potential migration area. The analysis begins when a release point is identified. Once identified, an Immediate Impact Analysis is conducted on this point(s) to determine if any NPMS HCAs overlay the pipeline location.

1.4.1. Potential Migration Area (Spread Plume) Analysis

The potential migration impact analysis identifies HCA *Could Affect* areas by using the calculated maximum release volume and NED data to model the overland and downhill migration of a liquid release. From the release point, product fills the pixel at the release point and then "flows" to every adjacent pixel that has a lower or equal elevation. This process repeats itself from each pixel that fills with product until the product is exhausted (i.e., the number of pixels calculated from the release volume are filled). The example shown in Figure 1–3: Potential Migration NED Grid has the release point(s) modeled in red pixels, and the downhill spread of product in brown.

Figure 1–3: Potential Migration NED Grid



After gathering the release volumes for all release location points of the pipelines that the Company currently operates, the Corporate IMP Team conducts a potential migration area analysis for liquid product releases along the entire pipeline system. It calculates the impact zone as point releases along the length of the pipeline and bases the spread plume distance on a pool of product spreading (sheet flow) out from the centerline of the pipeline and traveling in all directions downhill until the maximum release volume is consumed. The impact calculation is the volume of product spread over a resulting area with a specified maximum depth. The following equations represent the area calculation:

$$V_p = L^2 \times D$$

	L	=	98.43 (ft) pixel length
Where	D	=	0.04167 ft. assumed pool depth
	V_p	=	Pixel Volume (ft^3)

and

$$A_s = (0.178)\ V_p/V_t$$

Where	A_s	=	Spread Area (pixels)
	V_t	=	Total Volume (bbl)

Thus, the entire calculation is as follows:

98.43 (ft) X 98.43 (ft) X 0.04167 (ft) = 403.69 ft^3 per Pixel (volume = Vp)

403.69 ft^3 X 7.48051 gal/ft^3 = 3,019.8 gallons per Pixel

3,019.8 gallons / 42 gal/bbl = 71.9 barrels per Pixel

NOTE 1: The area determined is represented by the number of NED pixels that can be filled with the product volume. Each pixel is 30 m (98.43 ft) by 30 m square and equates to a volume of approximately 72 bbls per grid.

NOTE 2: Surface roughness (natural obstacles and vegetation) relates to a pool depth figure of 0.5 in., referred to in the equation in Section 1.4.1. A conservative estimation of area of spread assumes no surface roughness and no ground absorption. A potential migration spread plume can be used if local Business Unit personnel can indicate that a deeper pooling depth should be used based on operating experience or the surrounding terrain and ground cover characteristics.

The dispersion area, or spread plumes (based on the release volume calculated in Section 1.3.2.3), has the potential to change at every release point location where the referenced information changes. Therefore, the Company conducts a spatial comparison between the pipeline and USGS 30-m NED to determine the potential spread plumes in the event of a release. The maximum transport area used in the analysis is based on the volume release calculated and the assumption that an amount of product is left behind in each NED grid encountered. The accuracy of the NEDs limits the maximum spread plume calculations. This resolution sensitivity creates the potential for two adjacent grids to appear equivalent, even if the actual terrain varies slightly.

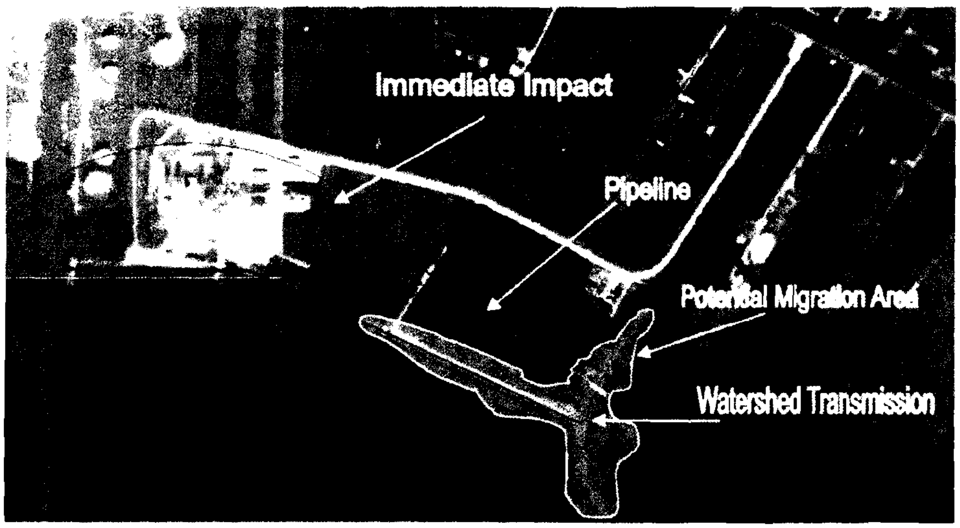
A further illustration is to imagine a box with dimensions 30 m x 30 m x 0.01 m ($98^1/_2$ ft x $98^1/_2$ ft x 0.5 in.). This pool depth equates to a volume of approximately 72 barrels per grid. For example, to spread to over 263 grids (~200,000 sq ft), the Company would need over 18,936 bbls of product released in an uncontrolled manner and migrate to the surrounding terrain. This example illustrates a worst-case scenario mimicking glass-surface flow with no soil absorption or vaporization. Product migrating parallel to the pipeline may not generate a large perpendicular buffer radius, but could still have a longer station-to-station HCA impact on the pipeline itself.

To determine spread zones, the process begins by identifying the NEDs through which the pipeline traverses. The analysis begins at each pixel that contacts the pipeline centerline and evaluates current elevation to that of the eight neighboring pixels and models product into each pixel with an elevation equal to, or less than, the current pixel.

After reaching the release volume or finding no more potential neighboring elevation pixels, the Company conducts a spatial comparison between the spread plume and the HCA types to determine if an intersection exists.

Figure 1–4: Potential Migration Impact Analysis shows how this analysis looks in an actual example with modeling of product migrating from a release point over the surrounding terrain. The pipeline is shown in red, and the potential migration shown in grey. The yellow and blue polygons are HCAs. The yellow section of pipeline identifies the area of pipeline that could affect the HCAs. The green line represents the Primary and Secondary Watershed Transmission flow lines. Appendix A: IMP 101: HCA Segment Identification explains this process in more detail.

Figure 1–4: Potential Migration Impact Analysis



1.4.2. Air Dispersion Analysis

Alternatively, if the pipeline transports highly volatile liquids (HVLs), then the Company uses the results from vapor release models, such as ARCHIE, to calculate a buffer around the pipeline. The following scenarios would constitute consideration for modeling a *Could Affect* buffer zone:

1) **Rupture with immediate ignition**. This scenario represents the aerosol emissions from the pipeline being immediately ignited. This scenario is modeled using the flame jet model in ARCHIE. The software model should characterize the expected length of the flame and the safe separation distance such that protection from the thermal hazards is anticipated.
2) **Rupture with delayed ignition**. This scenario represents a vapor cloud explosion model. The ARCHIE software would report various levels of damage to structures based on the overpressure created from the explosion shock wave.
3) **Rupture with no ignition.** This scenario represents a toxic vapor cloud model. The ARCHIE model calculates an anticipated downstream distance to where the concentration of the hazardous vapor in the air reaches the user input toxicity threshold level.

The Company bases toxic vapor cloud calculations on either a defined threshold limit value (TLV) or the Immediately Dangerous to Life and Health (IDLH) value defined by organizations such as Occupational Safety and Health Administration (OSHA) and/or Mine Safety and Health Administration (MSHA) for the product being transported. These calculations, along with the appropriate data for atmospheric conditions that determines the amount of mixing with air the product will undergo and the distance it could possibly travel, determine the appropriate buffer for pipelines transporting HVLs. Figure 1–5: HVL *Could Affect* Buffer Zone shows a buffered HVL pipeline.

Figure 1–5: HVL *Could Affect* Buffer Zone

1.4.3. Water Transport Analysis

The Company takes a very conservative approach in identifying potential *Could Affect* HCAs for all water transports and considers the following information for calculating water transport release volume potential:

1) The average flow velocity of United States rivers (as reported in the National Hydrology Dataset [NHD]) is four miles per hour.
2) The Company defines response time as the time it would take employees to arrive at the response equipment, deliver the equipment to a location, and achieve containment of the release. The Company determined that it could deploy either Company personnel and equipment or Contractor resources in a timely fashion to prevent a release from migrating more than eight hours downstream.

Typical formula for calculating water transport *Could Affects* is as follows:

Distance Traveled (ft) = Flow Velocity ($^{ft}/_{s}$) x Response Times (seconds)

Where	Velocity	=	4 mph
	Response Time	=	8 hours

NOTE: Based on the information above, the Company would normally calculate the downstream estimated release distance to be 32 linear miles for all water-body crossings of pipelines and assume a 35-mile linear buffer zone; however, this plan is a composite of the Company's 11 operating areas. Because of the variation in site-specific leak detection capabilities and response times, the Company has chosen to use a 100-mile water transport buffer, which is greater than the calculated flow rates of the fastest moving water body and provides an ultra-conservative analysis of HCA *Could Affects*. This figure may be pared back as data on specific location scenarios is developed.

1.4.3.1. Primary Watershed Analysis

Where the pipeline directly intersects NHD features, the Company records the name and length of each downstream adjoining NHD feature for a total distance of 100 miles. After building the water flow path, the Company applies the path against the HCA datasets. The result is the name of the HCA, distance to that HCA, and flow path information (water names and distances).

The USGS website that provides the NHD datasets has listed a series of problems with many of the datasets because of NHD production process oversights. The Company can review known problems at http://nhd.usgs.gov/problems.html. The issues that concern the Primary Watershed Analysis are the NHD river line work corruptions. Line lengths of topologically corrupt features are immeasurable and are not used in this analysis. USGS in conjunction with the NHD user community updated the NHD datasets in an irregular manner. The Company uses the most recent NHD watershed data available when analyses are performed. The Company does not monitor the NHD for updates or re-analyze upon the NHD completing an update.

1.4.3.2. Secondary Watershed Analysis

The Secondary Watershed process integrates the Potential Migration Analysis results with water features (from the NHD) to yield the transport flow path associated with a release that flows overland and indirectly spills into a watershed feature, and then moves downstream toward an HCA. The Company follows the watershed transmission pathway for 100 miles downstream. If Business Unit personnel have a viable reason for reducing this distance, it can be reduced during the field HCA verification process.

1.4.4. Additional Factors Considered in Water Transport Analysis

The Company uses Material Safety Data Sheets (MSDS) for information about specific products. The Corporate Health, Safety, and Environmental Group (HSE Group) maintains and updates MSDS and makes them available on the HSE website.

1.4.5. Changes in Commodity Properties

In reviewing the MSDS, the Company determined that the composition of its products does not change as a result of interaction with the environment. Its products include the following:

- Refined Products
- Crude
- HVLs

1.4.6. Commodity Solubility

The MSDS for each product shows that the products listed in Section 1.4.5 have, at the maximum, only trace solubility in water. The products carried by the Company's pipelines do not contain Methyl Tertiary-Butyl Ether (MTBE). The Company will address product solubility criteria if it adds products in the future.

1.4.7. Abnormal Stream Conditions

The Company's approach to considering water flow conditions such as storms or floods is conservative. The Company will either determine actual flood velocity or apply a factor to the average flow velocity to simulate flood velocity. The Company has initially implemented a 100-mile linear buffer zone downstream distance for all water-body crossings of pipelines. The Company will determine the downstream distance on an operating area by operating area basis and pare this figure back as appropriate, thus, the Company's water transport buffers should be sufficient to account for abnormal stream conditions.

1.4.8. Surface and Subsurface Water Transport

The Company will consider the modeling of subsurface water transport if more data becomes available for this analysis. Company personnel will consider conditions that would contribute to this situation during ROW surveillance surveys (e.g., storm drains, farm tiles, irrigation ditches). This consideration is a manual process that cannot be completed as part of the GIS analysis. As part of the field HCA verification process, Business Unit personnel will pay attention to areas of known farm tiles or mining subsidence risk.

1.4.9. Product Spray Releases

The Company includes potential product spray releases in the water flow analysis, and by using sufficient pipeline cover, it minimizes the potential for a spray release. In addition, the Water Transport Analyses are more than adequate to encompass spray. Without spray, the Company would treat the release as it would any other leak.

1.5. Quality Checking and Field Verification

Once the spatial analysis is complete, the next step is to verify the quality and accuracy of the spatial analysis results. The first step in this part of the process is to check the analysis results verses other GIS sources of information such as Google Earth™. Using this freely available tool, the Company can query identified site information and check against the analysis results. If the Company locates additional potential HCAs, it must add them to the overall spatial analysis results and recalculate. The Company then considers this combined and checked set of results the preliminary results, which then go through field verification.

Once Business Unit personnel complete checking and editing the preliminary results, they communicate back with the Corporate IMP Team, who integrate this updated information into the final HCA analysis report and risk database.

1.6. Identify Segments That *Could Affect* HCAs Review

The Company has identified HCA pipeline segments by using one or more of the following analytical methods:

- Direct Intersection of Pipelines and HCAs (shown in Section 1.2)
- Spatial HCA Data Analysis (shown in Section 1.4)
- Water Transport Analysis (shown in Section 1.4.3)

The Company declared that all segments intersecting a buffer zone could affect an HCA.

1.6.1. *Could Affects* and Water Transport–Liquid Pipelines

Figure 1–4 displays examples of Immediate, Potential Migration, Primary, and Secondary Watershed Transmission HCA analyses for liquid pipelines.

1.6.2. Facilities That *Could Affect* HCAs

The Company is responsible for identifying all facilities that affect HCAs along the pipeline. The Company applies the same methodology for non-line-pipe, DOT-jurisdictional facilities (e.g., breakout tanks).

1.7. Revision Control

1.7.1. HCA Segments

The Company will not shorten or modify any pipeline HCA segments to avoid making repairs after it has developed the baseline assessment. As the Company updates information and makes improvements on HCA identification methods, it will continue to make revisions to its HCA segments.

1.7.2. Periodic Review and Revision of HCA Boundaries

As detailed in Appendix A: IMP 101: HCA Segment Identification, the Corporate IMP Team checks the NPMS website for revised or updated HCA data throughout the year to determine if any new HCAs fall within the Company pipeline system. The Company also uses other sources of information such as Google Earth™ to review site information and identify potential new HCAs. The Company also signed up with the Federal Register Docket Management System (DMS) List Serve for e-mail notification of certain documents and NPMS updates when they are placed in a DMS docket. The Corporate IMP Team updates maps with new field-identified HCAs using information from Business Unit personnel as described in Appendix A: IMP 102: Field HCA Identification and Review, posts the maps on the Regulatory Compliance Intranet Portal, and then e-mails the appropriate personnel notifying them how to access the updated maps. The Corporate IMP Team also presents any changes to the maps at the Annual IMP Review Meeting.

1.7.3. Identifying and Analyzing Changes to the Pipeline

The Corporate IMP Team identifies, analyzes, incorporates, and tracks any HCA changes to the HCA maps as described in Appendix A: IMP 101: HCA Segment Identification.

1.7.4. Identifying and Analyzing Changes in Pipeline Terrain and Environment

The Company uses the field identification process as described in Section 1.1.3: Field Identification of HCAs to identify changes in the local terrain or environment near the pipeline. Appendix A: IMP 102: Field HCA Identification and Review describes this procedure in more detail.

1.7.5. Annual HCA Segment Review

Annually, not to exceed 15 months, the Corporate IMP Team identifies, analyzes, incorporates, and tracks any HCA changes to the HCA maps and evaluates HCA data to determine the need for a new HCA analysis. The segment identification process includes the following methods for identifying, documenting, and maintaining up-to-date segment boundaries:

- Annually verifying HCA segment boundary information
- Performing periodic reviews of new or changing HCA segments.

1.7.6. Annual Update

As the Company expands pipeline systems or acquires new systems, it will continually review the segment identification process and results as described in Appendix A: IMP 101: HCA Segment Identification. Formal, scheduled reviews of segment identifications occur once per calendar year, not to exceed 15 months; and the Company performs these reviews in conjunction with the Annual IMP Review as described in Section 8: Program Evaluation. During this Annual IMP Review, the Corporate IMP Team will present for review any updated segment identifications that have occurred during the year by showing the proposed changes/additions on the relevant maps and explaining the potential impact on HCAs and *Could Affects.* These updated segments include additions that resulted from any of the following:

- Changes to the pipeline
- Changes to the pipeline terrain and environment (e.g., significant One-Call activity)

- Purchase or construction of additional pipelines

The Company's process does not allow revisions to segment identification analysis to avoid remediation of assessment anomalies after the start of integrity assessments.

1.7.7. Interface with Other IMP Program Elements

As the Company makes changes to the HCA maps, the Corporate IMP Team integrates the information collected from the individual Business Units into the maps. Then, the Corporate IMP Team performs the appropriate risk analyses, integrates the updated information, as applicable, into the Assessment Schedule and P&M Analyses, and communicates that information to the Business Units.

1.7.8. Records Retention

The Company maintains all electronic files and documents in RIMS. The Company maintains these archived files for the appropriate retention period (shown in Appendix F: Consolidated Documentation and References).

1.8. Process Formality

1.8.1. Formal HCA Identification Process

The Company has a formal process to identify and review HCA segments. Appendix A: IMP 101: HCA Segment Identification describes the steps to accurately and consistently identify HCA segments. The Company has also developed Appendix A: IMP 102: Field HCA Identification and Review, which provides the process by which Business Unit personnel have direct input into the identification of HCA segments.

1.8.2. Idle Lines and New or Acquired Lines

As the Company expands pipeline systems or acquires new systems, it will continually review the segment identification process and results as described in Appendix A: IMP 101: HCA Segment Identification. The regulations for Integrity Management Programs (*§195.452*) do not recognize idle lines. The pipelines are either active or abandoned. The Company defines idle pipelines as being pipe that it is not currently using to move hazardous liquid, but that it could put back in service at a future date. These lines are either in-service idle pipelines (i.e., contains hazardous liquids, but are currently static or unused) or out-of-service idle pipelines (i.e., are effectively isolated from active pipe and contain de-product or inert gas). The in-service idle pipelines have direct HCA impact analyses completed and "drain-down" spread plumes generated. The out-of-service idle pipelines have only the direct HCA impact analyses performed. If the Company decides to put an idle line back into service, it will re-analyze HCA and *Could Affect* data for that line segment prior to placing the pipeline back into service.

As new pipelines are constructed, converted, or acquired, the Corporate IMP Team evaluates the appropriate segments in accordance with the procedures outlined in this section to determine if they could affect HCAs. The Corporate IMP Team will conduct this evaluation prior to the pipeline going into service and has the option of employing the services of a qualified vendor to assist with the analysis.

1.9. Timely Completion of Segment Identification

The Company has met the required time limit for segment identification as required per PHMSA's Integrity Management rule *§195.452*. The Company identified these segments for pipelines prior to the December 31, 2001 compliance date for Category 1 and November 18, 2002, for Category 2 pipelines.