PACIFIC GAS AND ELECTRIC COMPANY

TRANSMISSION & GAS DISTRIBUTION
GAS ASSET STRATEGY
SYSTEM INTEGRITY SECTION
Risk Management

Procedure for Risk Management

Procedure No. RMP-08

Identification, Location, and Documentation of High Consequence Areas (HCAs)

Prepared By: [redacted] Date: 3/1/2004

Approved By: [redacted] Date: 3/1/2004

Approved By: [redacted] Date: 3/1/2004

Rev. No	Date	Description	Prepared By	Approved By	Approved Manager, System Integrity
1	5/19/04	Revisions as Noted	[redacted]		
2	1/28/05	Revisions as Noted			
3	9/28/05	Revisions as Noted			
4	10/26/05	Revisions as Noted			
5	1/12/07	Revisions as Noted			

material redacted

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1.0 PURPOSE

The purpose of this procedure is to provide the requirements used to identify, locate, document, and retain records for High Consequence Areas (HCAs), as defined within this procedure. This procedure is written to meet the requirements of Gas Asset Strategy Procedure RMP-06 and 49 CFR Part 192 Subpart O.

2.0 SCOPE

This procedure is applicable to all PG&E and StanPac gas transmission pipeline facilities, including line pipe and regulating station facilities. At this time, the scope of this procedure is not applicable to the following:

- Gas Gathering Facilities

The Risk Management Program (RMP) is responsible for managing the identification, location, documentation, and record retention activities associated with this procedure for Gas Asset Strategy. The RMP shall establish and manage the activities associated with this procedure by utilizing industry and regulatory accepted methodologies appropriate for PG&E's gas transmission facilities and shall be in conformance with this procedure. The Integrity Management Program Manager shall be responsible for compliance with this procedure.

3.0 INTRODUCTION

High Consequence Areas (HCAs) are areas in proximity to gas transmission pipelines that have the added consequence of larger population densities or structures that contain people who would have a greater difficulty in evacuating if a failure were to occur. (A detailed definition of HCAs is provided in RMP-06) The accurate identification, location, documentation, and record retention of information regarding HCAs is necessary to reliably and accurately assess the risk of PG&E and StanPac gas transmission facilities and to be in compliance with federal regulations. The presence of an HCA is a significant factor in the consequence portion of gas transmission risk algorithm (see RMP-01 §4.4.3B) and is vital in the identification of Integrity Management Areas (IMA) required by Federal Regulations. s

Data Quality and Integration is the key to reliably and accurately identifying, recording, and maintaining HCAs. Parcel data, aerial photography, pipeline information, GPS information of the pipeline and surrounding structures, responses from public safety officials, personal knowledge, and feedback from integrity assessment teams shall all be used in the identification of HCAs. This procedure provides the methodology.

4.0 Roles and Responsibility

Specific responsibilities for ensuring compliance with this procedure are as follows:

Title	Reports to:	Responsibilities
Integrity Management Program Manager	Director System Integrity	• Parcel Data Procurement • Supervise completion of work (schedule/quality) • Monitor compliance to procedure – take corrective actions as necessary. • Assign qualified individuals • Ensure Training of assigned individuals
GIS Application Engineer	Manager GIS	• Develop and maintain Automated PIC Tool program. • Run PIC Tool program using parcel data and pipeline data as supplied by the Risk Management Engineer , as requested
Risk Management Engineers	Integrity Management Program Manager	• Ensure that the Trans_Def Field is defined for all potential transmission lines within the county. • Review and determine land use based on parcel data and aerial photos per this procedure as assigned. • Review and determine HCAs based on automated PIC tool data, parcel data and aerial photos per this procedure as assigned. • Check pipe segments codes as "Z" as assigned. • Run PIC Tool program using parcel data and pipeline data.
Assessment Field Engineers	DA Program Manager	• Identify HCAs that may have been missed or have been incorrectly identified and report to the Integrity Management Program Manager per the FE Module.

5.0 Training and Qualifications

Specific training to ensure compliance with this procedure is as follows:

Position	Type of Training:	How Often
Risk Management Engineers	Procedure Review	• Upon initial assignment • Annually • As changes are made to the procedure
Assessment Field Engineers	RMP-08 Overview and detailed review of § 6.0 and 7.6	• Upon initial assignment • Annually • As changes are made to the procedure

6.0 Definitions

High Consequence Area is defined by 49 CFR Part 192 Subpart O § 192.903) as:

"High Consequence area means an area established by one of the methods described in paragraphs (1) or (2) as follows:

(1) An area defined as –
(i) A Class 3 location under § 192.5; or
(ii) A Class 4 location under § 192.5; or
(iii) Any area outside a Class 3 or Class 4 location where the potential impact radius is greater than 660 feet (200 meters), and the area within a potential impact circle contains 20 or more buildings intended for human occupancy; or
(iv) The area within a potential impact circle containing an identified site.
(2) The area within a potential impact circle containing
(i) 20 or more buildings intended for human occupancy, unless the exception in paragraph (4) applies; or
(ii) An identified site."

Identified site is defined by 49 CFR Part 192 Subpart O § 192.903) as:

"Identified site means each of the following areas:
(a) An outside area or open structure that is occupied by twenty (20) or more persons on at least 50 days in any twelve (12)-month period. (The days need not be consecutive.) Examples include but are not limited to, beaches, playgrounds, recreational facilities, camping grounds, outdoor theaters, stadiums, recreational areas near a body of water, or areas outside a rural building such as a religious facility); or
(b) A building that is occupied by twenty (20) or more persons on at least five (5) days a week for ten (10) weeks in any twelve (12) month period. (The days and weeks need not be consecutive.) Examples include, but are not limited to, religious facilities, office buildings, community centers, general stores, 4-H facilities, or roller skating rinks) or
(c) A facility occupied by persons who are confined, are of impaired mobility, or would be difficult to evacuate. Examples include but are not limited to hospitals, prisons, schools day-care facilities, retirement facilities or assisted-living facilities."

Use code descriptions in parcel data information shall be used as the primary source of information to define identified sites. All of the following uses shall be considered as "identified sites" unless verification is performed to determine that there are fewer than 20 people that occupy a building or to re-define the building use:

Airport terminals/Hangers[1]	Food Processing[1]	Prisons/Calif. Youth Facilities[1]
Auto/Sales Repair[1]	Hotels/Motels[1]	Restaurants[1]
Cannery[1]	Indoor Recreational[1]	Retirement or Assisted Living Facilities[1]
Church[1]	Hospitals[1]	Schools (Elementary, Middle, High)[2]
Club/Lodge[1]	Manufacturing Facilities[1]	Shopping Centers[1]
College/University[1]	Nursing/Convalescent Homes[1]	Stores[1]
Day-Care Facilities[2]	Office Building[1]	Supermarkets[1]
	Parks/Playgrounds/Camp Grounds Outdoor Gathering Areas[2]	Theaters (In-Door)[1]
Amusement Park/Auditorium[2]	Post Office[1]	Wholesale[1]
Financial[1]	Professional Building[1]	

Note:

[1] Identified Site consists of Building Structure.

[2] Identified Site consists of Property boundary. Exception: Property boundaries shall be used unless, based on a visual review of the aerial photography or site inspection, it is obvious that the area does not constitute a gathering area, as defined in § (a) above. This exception does not apply to schools. Examples include large regional parks or unutilized boundaries of parks or very small city parks that do not meet the definition of a gathering area.

In addition to the information contained in parcel data, California Department of Social Services data containing identified sites (Licensed Day Care centers, Care Homes, and Health Maintenance Facilities) shall be used to define HCAs (This information shall be utilized by merging the data with parcel data or as a separate theme.) Information obtained from Public Safety Officials during First Responder meetings regarding Outdoor Gathering Areas (See RMP-06 § 14.4) shall also be included during the review of HCAs. (This information may also be utilized by merging the data with parcel data or as a separate theme.) Documentation of the data used shall be as required in § 7.3 of this procedure.

Aerial photography shall also be used to verify exclusion of pipeline segments from the integrity management rule and to identify sites that may have been missed by all of the different data sources. Items to consider include size of building, number of vehicles/ spaces available at the facility (Note that the time/day/season the aerial photo was taken may affect the number of vehicles observed and should be taken into consideration. Recreational sites that have been missed by all of the different data souses can be identified by careful observation as to the number of vehicles in the vicinity of the pipeline.) Finally, feedback from

assessment teams and personal knowledge shall be used to define HCAs.

Potential Impact Circle (PIC) is defined as:

"Potential impact circle is a circle of radius equal to the potential impact radius (PIR).
Potential impact radius (PIR) means the radius of a circle within which the potential failure of a pipeline could have significant impact on people or property.

$$PIR = 0.69 * (P*OD^2)^{1/2}$$

Where, PIR = *Potential Impact Radius in feet.*
P = *MOP (Maximum Operating Pressure psi. which, for PG&E and StanPac utilization is equivalent to Regulation required MAOP or Maximum Allowable Operating Pressure)*
OD = Outside Diameter of Pipe Segment (in.)

[Note: the above formula was based on ASME B31.8S-2001 Para. 3.2. It is the same as required by 49 CFR Part 192 Subpart O §192.903(c) (issued after ASME B31.8S) with the exception that this formula requires Outside Diameter and §192.903(c) specifies nominal diameter. The difference is small and this formula is more conservative. It will therefore continue to be used to establish PIRs.]

Transmission Line is defined by CFR Part 192 Subpart A § 192.3 Definitions) as:

"Transmission line means a pipeline, other than a gathering line, that:
(e) Transports gas from a gathering line or storage facility to a distribution center, storage facility to a distribution center, storage facility, or large volume customer that is not downstream from a distribution center;
(e) Operates at a hoop stress of 20 percent or more of SMYS; or
(f) Transports gas within a storage field. A large volume customer may receive similar volumes of gas as a distribution center, and includes factories, power plants, and institutional users of gas."

For the purpose of classifying all of PG&E and StanPac gas transmission pipelines, the Risk Management Program has defined the following as transmission:

Any pipeline segment, (other than Gas Gathering) that:
(a) Is a numbered Transmission Pipelines; or
(b) Operates at a stress (at MOP) of equal to or greater than 20% SMYS or has a downstream segment operating at 20% SMYS or more; or
(c) Transports gas to a large volume customer. (These customers are identified in GIS in the theme "All_Ncore_0903" on shared drive (Cgt on 'WalnutCrk01'\ENG\LIBRARY\GISDATA\POR\Ncorecust\All_Ncore_0903))

Pipeline Segments meeting this criteria are identified in GIS in the Pipeline Theme, (Trans_Def Field) as: "T" (meets transmission definition based on function or operating stress), "Tf" (may meet transmission definition, further investigation needed), "TC" (meets transmission definition based on function as service to large volume customer), or "TP" (defined as transmission based on stress of a pipe segment downstream operating at 20% or more SMYS.)

7.0 HCA Determination

PG&E and StanPac shall use the Potential Impact Circle (PIC) method to identify HCAs (Method 2 of CFR Part 192 Subpart O § 192.903 (see Definitions). HCAs will be determined by calculating the PIC for each pipeline segment and superimposing that circle on Parcel Data and aerial photographs to determine the potential impact of the pipeline on structures contained in the circle. The process shall be performed as follows: (Note that a flowchart showing the process details is included on page 11 of this procedure.)

7.1 Parcel Data within the PIC plus a buffer that envelopes the relevant default tolerance in Section 7.6 shall be obtained for all PG&E and StanPac transmission pipelines from appropriate county officials. Transmission pipelines shall be defined by a Risk Management Engineer and identified in GIS as described in 6.0 Definitions – Transmission Lines prior to the HCA identification. The Risk Management Engineer shall ensure that all Trans_Def Fields have been coded per the requirements of the Transmission Line definition given in § 6.0 of this procedure.

7.2 It is recommended that a join of high consequence structures obtained from Public Safety Officials and state licensing agencies and the parcel data will be performed based on street address. (Note: Although a complete match is not anticipated and a visual review is performed per Para. 7.6, any structures identified at this early stage will be helpful in providing additional assurance that these structures and sites are not inadvertently omitted from the program.) An alternative is to include this information as a separate shape file. The method used to integrate this information shall be documented as required by § 7.3. Although this work can be done by other individuals or contracted to outside parties, the integration of this data is the responsibility of the Risk Management Engineer.

7.3 Parcel Data within the PIC, plus a buffer that envelopes the relevant default tolerance in Section 7.6, of the pipe shall be reviewed by a Risk Management Engineer to ensure that is of sufficient quality to be used for determining HCAs. The review shall consist of ensuring that the parcels within the PIC have been provided, that land use codes are specified for each parcel, and that the use codes are sufficiently clear to make a determination as to the site use so that a structure count or identified site determination can be made. Parcels without a land use code or having an ambiguous land use code shall be field inspected or inspected using aerial photographs to make a determination as to the land use. Where a determination cannot be made, conservative assumptions shall be made. Assumptions made as to site use or structure counts per land use code shall be recorded in a excel spreadsheet and filed electronically in the same folder as the parcel data. Four fields (columns) shall be added to the parcel data layer to record identified sites, structure counts, descriptions, and whether the parcel is in the PIC and whether the parcel is in the PIC plus a buffer that envelopes the relevant default tolerance in Section 7.6. Documentation of the data used to establish identified sites shall also be provided with the parcel assumptions. This documentation shall include the source of data, the shapefiles containing the data, and the Risk Management Engineer providing the review. This documentation shall be approved by the Integrity Management Program Manager.

7.4 A Risk Management Engineer shall provide codes for whether the parcel is within the PIC, for identified sites (See Definitions), whether the parcel is within the PIC plus a buffer that envelopes the relevant default tolerance in Section 7.6, and the number of structures per use code in the parcel data shape file. Coding for identified sites and number of structures shall be consistent with the excel spreadsheet prepared per Para 7.3 above. An identified site shall be coded as "20" in the ID Site Field. The "number of structures field" shall be entered, as appropriate, based on the land use. Where, in the opinion of the Risk Management Engineer, it would be advantageous to provide notes regarding the parcel, they may be added to the description field. The layer file shall be stored electronically in the Risk Management Shared Directory (WalnutCrk01\Mapping\RiskMgmt\Integrity Management Plans\HCA determination\Parcels_in_PIC_by_County). △5

7.5 The Risk Management Engineer shall superimpose the Potential Impact Circle (PIC) on the Parcel Data and a count shall be performed to determine the number of structures intended for human occupancy or identified sites. The Risk Management Engineer shall also superimpose the PIC plus a buffer that envelopes the relevant default tolerance in Section 7.6 on the Parcel Data and a count shall be performed to determine the number of structures intended for human occupancy or identified sites. If there are 20 or more structures intended for human occupancy or an identified site within the PIC, the portion of the segment within the PIC shall be identified as an HCA. If there are 20 or more structures intended for human occupancy or identified sites within the PIC plus a buffer that envelopes the relevant default tolerance in Section 7.6, that portion of the HCA shall be identified as a Potential HCA. As a first pass, the process shall be automated through the use of a GIS Script prepared for this task and shall be run by county. Results shall be electronically stored by county as a layer file in the Risk Management Shared Directory (WalnutCrk01\Mapping\RiskMgmt\Integrity Management Plans\HCA determination\HCAs_per_PICTool_by_County). (Because the automated structure count process uses a large buffer, parcel boundaries and not structures for determining the extent of an HCA, manual structure counts may occasionally be necessary in making the final HCA identification and avoid undue conservatism or to ensure that pipeline tolerance has been considered in selecting HCAs – see §7.6.) △5 △5 △5

7.6 HCA Identification results based on the superposition of PICs on Parcel Data, and the PIC plus a buffer that envelopes the relevant default tolerance in Section 7.6 shall be reviewed by a Risk Management Engineer to verify the results of the HCA identification through the automated process (Paragraph 7.5). The review shall consist of superimposing Potential Impact Zones, Parcel Data, Identified Sites obtained from Public Safety Officials and state licensing agencies (if they were not integrated with the parcel data), and HCA Identification results on Aerial photos and reviewing the reasonableness of the results based on observable landbase information, appropriate pipeline tolerance and structure features. (Special attention should be given to ensure that all identified sites have been correctly identified. Building size, and observed parking or traffic surrounding a structure or site are useful tools in the review process. Consideration as to the date, season, and time the aerial photo was taken can also be of value in understanding expected site usage. For example, an aerial photo taken on a weekend may show recreation or shopping sites at a maximum, but work sites may be at a minimum and vice versa.) The review shall be done at a sufficient magnification such that details as to possible structure or land usage can be observed without being blurred. Typically this would △5 △5

require scanning each pipeline identified as being transmission from beginning to end at a 1:1000 to 1:5000 projection.

It is essential that the reviewer consider the accuracy of the pipeline location when doing the visual review and incorporate any structures or identified sites that may be within that tolerance. If the pipeline has been located based on GPS data, a tolerance of 15' on either side of the pipeline may be assumed. (This would account for possible errors in Mark and Locate, GPS, and aerial photography.) Within GIS, the pipeline layer QA Field in the Attribute Table can be used to identify lines that have been located based on GPS. (They are coded as 23.) If the pipeline has not been GPSed, the Default Tolerances provided below shall be assumed. These tolerances will be verified by visually reviewing the distance the land base differs from the aerial photography. If the land base differs from aerial photography by an amount that is greater than that required by the Default Tolerance shown below, the greater difference shall be used to locate structures and HCAs. For example, if the land base is 50' from where it is shown based on aerial photography, a tolerance of 50' shall considered for determining whether a structure or identified site is within the PIR and should be considered an HCA.

Also, because the automated HCA process utilizes parcel boundaries rather distances to a structure, some portions of a pipeline may have been identified as being within an HCA that are not. These segments of the pipeline may be excluded from an HCA provided a manual measurement of the distance from an identified site to the pipeline is greater than the PIC or if a manual count of the number of structures within the PIC is less than 20. If a HCA is to be excluded based on distance from the structure to the pipeline, the tolerance (shown below or as discussed in the previous paragraph) shall be manually added to the PIC to account for tolerances in the location of the pipeline/imagery. (Note that, except for pipeline services to an identified site, the added tolerance need not exceed the space available for potential pipeline location error. Division Plat Sheets provide valuable information regarding the location of the pipeline with reference to the land base and should be utilized for considering the appropriate tolerance. For example, if an identified site is shown on the Plat Sheets to be on the north side of the street and the pipeline is shown in the franchise area on the north side of the street, the tolerance need not exceed the distance from the pipeline to the north edge of the franchise area.)

Default Tolerance:

100' – Pipeline in open country
40' – Pipeline in urban areas within Right of Way/Franchise Area or Street
15' – Pipeline GPSed

Results of the review shall be recorded by pipeline segment in the Pipeline Layer Theme (HCA_ID field) as follows:

A - HCA based on structure Count (20 or more structures intended for human occupancy within the PIC)
B - HCA based on both Identified Site and Structure Count
I - HCA based on Identified Site
N - Not an HCA (Note: When a pipe segment is identified as NOT being within a HCA, the Risk Management Engineer shall place a uniquely

assigned number following the "N"[1]. The Integrity Management Program Manager shall assign unique numbers to each engineer conducting the review. Documentation of such shall be retained in the RMP Files.)

Z - Not an HCA based on distance from the identified site to the pipeline, based on a manual structure count, or based on a reconsideration of a land use definition. (Note: these are typically where there is a conflict with the automated definition of an HCA, however, they can also be at locations where the Risk Management Engineer would like a second opinion on the exclusion of a pipe segment from the integrity management program.) Uniquely assigned numbers/letter shall added following the "Z" as is required by "N" above[1].

7.7 The Risk Management Engineer shall edit pipeline segments, as necessary, to define the extents of HCA boundaries. The length of the HCA shall be established per 49 CFR Part 192 Subpart O § 192.903 as the "length of pipeline from the outermost edge of the first potential impact circle that contains either an identified site or 20 or more buildings intended for human occupancy to the outermost edge of the last contiguous potential impact circle that contains either an identified site or 20 or more buildings intended for human occupancy." In cases were the distance between two HCAs is equal to or less than 500', the HCAs may be combined to form one HCA.

7.8 HCA's shall also be identified for stations. The process shall be as follows:

7.8.1 Using GIS, create a buffer of pipelines that are to be assessed.

7.8.2 Using GIS, select by locations, Stations were selected that intersect the buffer. (Select both Stations and Station Opdia themes.)

7.8.3 For stations that could potentially be defined as an HCA, Print Operating Diagrams for the stations and perform a more detailed review to determine if they could be defined as an HCA. If none of the piping entering or exiting an unmanned station defines an HCA, and the piping in the station is no larger than the piping operating at the same pressure that is entering or exiting that station, no further HCA review is required and the station piping shall be assumed not to define an HCA. When a review of the Operating Diagrams is necessary, it shall consist of:

a. Calculating the Potential Impact Radius ($PIR = 0.69*OD*MOP^{1/2}$),
b. Superimposing the Potential Impact Circle within GIS and determining if the pipeline meets the definition of an HCA as required by RMP-08, and
c. Color code the results of the determination on the operating diagrams.
d. Review and check of results by the Integrity Manager Program Manager.

7.8.4 Meet with the Direct Assessment Team and turn over the marked-up Operating Diagrams that were determined to be HCAs.

7.8.5 Document process and results. Note: these evaluations should review all high risk HCA stations (as of 12/17/04) on a schedule that will allow the completion of their

1. The review of pipelines provides a quality assurance check of the automated GIS Tool used as a preliminary screening tool to identify covered and non-covered pipeline segments and is a check of the parcel data. Providing codes for the non-covered pipeline segments demonstrates that a quality assurance check was performed.

assessment by 12/17/07 and a review of the remainder of stations that defined HCAs (on 12/17/04) so that they can be assessed by 12/17/12.

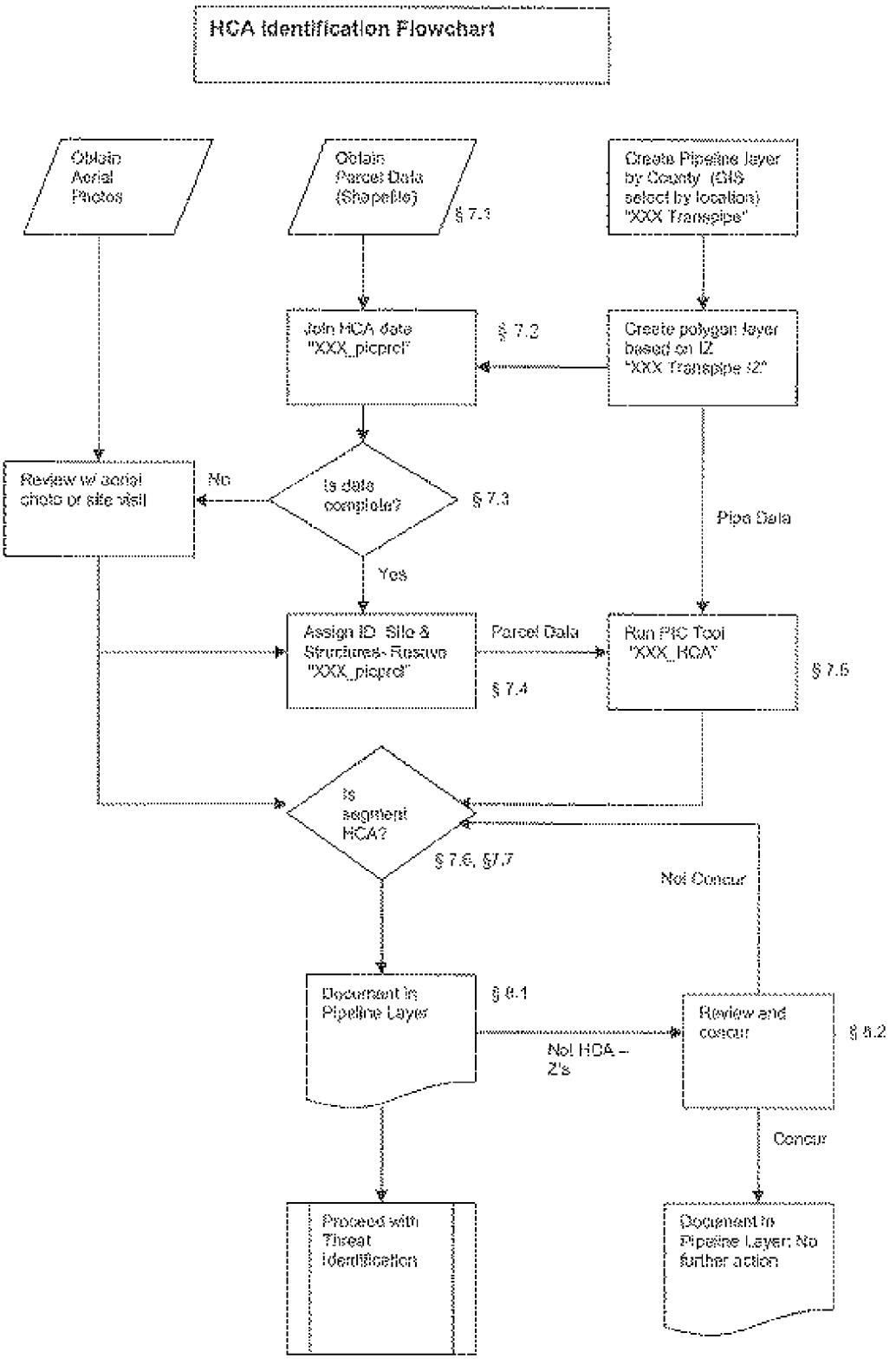
8.0 HCA Data Verification, Integration and Record Retention

8.1 HCA identification shall be maintained in the Pipeline theme for as long as the pipeline is active.

8.2 Pipelines identified by the PIC tool as being within an HCA but manually excluded from the Integrity Management Rule (based on a review of structures or gathering areas in the parcel, but outside the PIC with appropriate tolerance per §7.6) shall be coded as "Z" in the HCA_ID Field of the Pipeline Theme. These segments shall be independently reviewed and verified by another Risk Management Engineer. Verification shall be documented by placing a unique number assigned to the engineer after the "Zx". (Example "Z21", where the number 2 represents the individual who determined that the pipeline segment was NOT within an HCA and the number 1 represents the individual that verified that the segment was not within an HCA.) This requirement provides a quality check of pipelines to be excluded from the Integrity Management Rule and is a further check of the automated GIS Tool used as a preliminary screening tool to identify covered and non-covered pipeline segments and parcel data. Providing reviewer codes for the non-covered pipeline segments demonstrates that this quality assurance check was performed.

8.3 HCAs will be re-verified as required by RMP-06. Factors that shall be included in the re-verification include the following:

- New Pipelines
- Relocated Pipelines (either physically or in GIS based on more accurate geospacial information such as GPS)
- New Parcel Data (either new parcels or changes in Land Use)
- Modification to the pipeline that my affect the PIC such as Outside Diameter (OD) or Maximum Operating Pressure (MOP)
- New aerial photography.



Note: XXX in the file name refers to a county abbreviation