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TECHNICAL ASSOCIATION
OF THE EUROPEAN NATURAL GAS INDUSTRY

Terms and definitions related to external interference on underground pipelines

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1. Introduction

External interference, or Third-Party Interference (TPI), is a topic within which a number of terms and expressions are used. In order to achieve a common understanding, a list of definitions is composed, in which the most terms and expressions that are used, are explained.
Originally, this table was an appendix of MARCOGAZ document GI-TP-13-23. It is updated with new insights since then and will be if needed.

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keyword	definition	source	other languages, different definitions & synonyms	remarks
abandonment	Permanent decommissioning where a pipeline or pipeline section is physically isolated from the gas pipeline system	CEN EN 1594		
acoustic monitoring	No def, only keyword	Keyword from GERG TPI guidelines; not defined	Forms a part of the 'Detection systems'	See e.g. article in GWF International 2-2011, Investigation of systems for the detection of third-party impact on high-pressure pipelines, G. Linke, Ch. Hille
acceptable risk	No strict definition. Societal or individual risk that is accepted by authorities or the public; risk in terms of quantitative (x lethality's per year or per event) or qualitative measures.	Own	Example: 'societal risk acceptance', risks that society "accepts." This means that society is unwilling to expend resources to reduce these risks. (source: NASA, 2002)	
accident	A sudden, not intended, event that causes loss of human life, personal injury, damage to the environment, and/or loss of assets and financial interests.	NTNU, Norway (2004)	In terms of pipeline accidents mostly a 'full bore rupture' is meant. See also guidelines for Quantitative Risk assessment (Purple Book), Committee for the Prevention of Disasters (CPR), Directorate of Labour of the Ministry of Social Affars, The Hague, 1999, CPR 18E	
aerial patrols	Maintaining the safety and the welfare of the community through aerial observation and support.	Australian aerial patrol website www.aerialpatrol.com.au/	Keyword used by Enbridge, USA	

keyword	definition	source	other languages, different definitions & synonyms	remarks
building proximity zone	The allowed distance from the pipeline to the closest build up area, taking into account the activities employed inside the buildings.	Keyword used in several publications; own definition, needs improvement	The allowed distance is a function of the type of building: individual housing, community buildings (school, hospital etc.) and thus the distance is related to the individual and societal risk criteria.	
cathodic corrosion protection (CP) system	No def, only keyword	Keyword from GERG TPI guidelines; not defined		
contingency plan	Plan describing actions to be taken in the event of an incident to minimize consequential damage and harm to persons	KEMA		
control zone	Strip of land over which the pipeline operator has a right to control activities.	CEN TC 234, draft 2, definitions, April 2006	**Zone de surveillance** Bande de terrain sur laquelle l'exploitant de réseau a le droit de contrôler l'activité. **Schutzstreifen** Geländestreifen, in dem der Leitungsbetreiber das Recht hat, Aktivitäten zu kontrollieren. Synonym: 'consequence area'	Source complies with CEN 1594
dangerous dose level	Amount of heat radiation, equivalent to a 1% chance of fatality when a healthy person receives the dose.	www.hse.gov.uk/pipelines, Pipelines and gas supply industry: Frequently asked questions - FAQs		
decommissioning	Activities required to take out of service any pipework, station, equipment of assemblies filled with gas and to disconnect them from the system	CEN EN 1594		

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depth of cover - DOC	The cover depth is the distance, in meters (m), from the ground surface to the location of the uppermost soil sample on top of the pipe including coatings and attachments.	Adapted from http://web.ead.anl.gov/resrad/datacoll/kd.htm also ISO 13623:2000(E), table 4.	Also: minimum depth requirements (source: www.HSE/gov.uk/pipelines/faqs.htm)	
deterministic approach	The evaluation of the risk introduced by an activity / process is made only on the basis of the entity of the consequences, without taking into account the probability of the related events. So, even an event presenting a very low probability of occurrence is evaluated in terms of consequences on the plant, people and/or environment. In other words, a logic of threshold is applied to each event. In this approach, the entity of the consequences are compared to fixed values listed in national regulations or proposed in several standards – acceptance criteria.	Summer school on hydrogen safety (Belfast, 2006)		
dwelling class	No clear definition	Used in several publications	Clarification: Type of building used in determination of societal risk (building accommodating a few persons such as a private house, or more people such as a school, hospital, office, factory.	
effect distance	Distance to the pipeline at which the radiation rate of a gas fire is such that lethality	Gasunie/KEMA	Heat radiation level or cumulative dose of heat and (acceptable) probability to lethal dose has to be taken into account and is a criterion	

keyword	definition	source	other languages, different definitions & synonyms	remarks
	could occur in case of a pipeline rupture with ignited gas flow.		for acceptance of this distance when granting a permit.	
emergency	Situation which could affect the safe operation of the gas supply system and/or the safety of the surrounding area, requiring urgent action.	CEN TC 234, draft 2, definitions, April 2006	**Situation d'urgence** Situation pouvant affecter le fonctionnement en toute sécurité du système d'approvisionnement en gaz et/ou la sécurité de la zone environnante, et nécessitant une intervention urgente. **Notfall** Situation, die den sicheren Betrieb des Gasversorgungssystems und/oder die Sicherheit der Umgebung beeinträchtigen kann und einen Eingriff dringend erforderlich macht. Synonym: A situation that endangers life, health, or property or a situation in which the public need for uninterrupted service and immediate re-establishment of service if services are interrupted compels immediate action (Source: Texas Administrative Code).	Source complies with CEN 1594 and EN 12583
emergency planning	The duty (for the pipeline operator) to prepare and test emergency procedures for dealing with the consequences of a major accident involving a pipeline.	www.hse.gov.uk/pipelines, Pipelines and gas supply industry: Frequently asked questions - FAQs	Also 'emergency plan': usually the local authority must prepare a plan in which details how an emergency relating to a possible major accident in its area will be dealt with.	
emergency planning distance		Keyword used in several publications; no clear definition		
excavation operation	Any operation using non-mechanical or mechanical equipment in the movement of			

keyword	definition	source	other languages, different definitions & synonyms	remarks
	earth, rock or other material below existing grade. This includes, but is not limited to, augering, boring, digging, ditching, dredging, drilling, driving-in, trenching and tunneling			
exposure time	Time during which the person or object is exposed to heat flux	Keyword used in several publications		
external interference	Impact on the pipeline by forces coming from the environment of the pipeline	Gasunie/KEMA		
external safety	The control of risks to the environment of the use, storage and transport of dangerous goods.	Gasunie/KEMA		
Exclusion zone	No definition	http://www.ukopa.co.uk/wp-content/uploads/2013/02/UKOPA-13-012.pdf	An appropriate exclusion zone for wind turbines would be a minimum distance of 1.5 times the turbine mast height from the pipeline (measured from the nearest point on the base of the turbine mast to the nearest point on the pipeline circumference	
fibre optic sensing	No def, only keyword	Keyword from GERG TPI guidelines; not defined		
generic zoning distances	No def, only keyword	Analysis of failure causes of pipelines transporting dangerous substances R.J. Hansler, J.M. Ham, G.M.H. Laheij, at 6th Pipeline Technology Conference 2011		
group risk	See 'societal risk'.			
hand digging	Any movement of earth using non-mechanized tools or	Texas Administrative Code TITLE 16		

keyword	definition	source	other languages, different definitions & synonyms	remarks
	equipment, soft digging, or vacuum excavation. Hand digging includes but is not limited to digging with shovels, picks, and manual post hole diggers.	PART 1 CHAPTER 18, RULE §18.2, UNDERGROUND PIPELINE DAMAGE PREVENTION		
hazard	Potential source of material damage, physical injury, or adverse health effects. Examples include radiation and toxic or carcinogenic substances. For this survey, concerning the transportation of gas through pipes, the hazard is a pipe rupture, leading to a gas fire (thermal radiation), which can have the effect of people dying from exposure to the thermal radiation.	Gasunie/KEMA	Synonym: any physical activity, situation or condition with the potential to cause harm (Source: NTNU< Norway (2004))	
hazardous area	PREFERENCE OF THE DEFINITIONS GROUP: Area in which an explosive or flammable gas atmosphere is present, or may exist, in quantities which require special precautions (EN12583). Area in which an explosive or flammable gas atmosphere is present, or may be expected to be present, in quantities such as to require special precautions for the construction, installation and use of apparatus (EN12186) (EN12279).	CEN TC 234, draft 2, definitions, April 2006	**Zone dangereuse** PREFERENCE DU GROUPE DEFINITIONS : Zone dans laquelle règne ou peut régner une atmosphère contenant du gaz explosif ou inflammable, dans des quantités telles que des précautions particulières s'imposent (EN12583). Zone dans laquelle règne une atmosphère contenant du gaz explosif ou inflammable, ou susceptible d'en contenir, dans des quantités telles qu'il est nécessaire de prendre des précautions particulières pour la construction, l'installation et l'utilisation des	Source complies with CEN 1594 Also 'hasardous'

keyword	definition	source	other languages, different definitions & synonyms	remarks
			appareils électriques (EN12186) (EN12279). **Explosionsgefährdeter Bereich** VORZUG DER DEFINITIONEN GRUPPE: Bereich, in dem eine explosionsfähige oder zündfähige Gasatmosphäre vorliegt oder erwartet werden kann, und zwar in solchen Mengen so daß besondere Vorsichtsmaßnahmen erforderlich sind (EN12583). Bereich, in dem eine explosionsfähige Gasatmosphäre vorliegt oder erwartet werden kann, und zwar in solchen Mengen, daß besondere Maßnahmen hinsichtlich der Bauweise, der Installation und der Verwendung von Betriebsmitteln erforderlich sind (EN12186) (EN12279).	
hazardous area zones	NEW PROPOSAL OF THE DEFINITIONS GROUP: Classified zones based upon the frequency of the occurrence and the duration of a flammable atmosphere (ref.: EN60079-10). Hazardous areas are classified in zones based upon the frequency of the occurrence and the duration of a flammable atmosphere (see EN 60079-10).	CEN TC 234, draft 2, definitions, April 2006	**Classification de zone dangereuse** NOUVELLE PROPOSITION DU GROUPE DEFINITION: zones classées en fonction de la fréquence d'occurrence et de la durée d'apparition d'une atmosphère inflammable (voir l'EN 60079-10). Zones dangereuses classées en fonction de la fréquence d'occurrence et de la durée d'apparition d'une	Source complies with CEN 1594 Also 'hasardous'

keyword	definition	source	other languages, different definitions & synonyms	remarks
			atmosphère inflammable (voir l'EN 60079-10). **Ex-Zonen** NEUER ANTRAG DER DEFINITIONEN GRUPPE: Zoneeinteilung nach der Häufigkeit des Auftretens und der Dauer des Vorhandenseins einer explosionsfähigen Atmosphäre (siehe EN 60079-10).	
hole	Leak size: the effective diameter of the hole is larger than 2 cm and smaller than or equal to the diameter of the pipe	EGIG	Other leak sizes are: Pinhole/crack and Rupture	
incident	PREFERENCE OF THE DEFINITIONS GROUP: Unexpected occurrence, which could lead to an emergency situation (EN12583). Unexpected occurrence, which could lead to an emergency situation. This includes a leakage of gas or plant failure (EN1594).	CEN TC 234, draft 2, definitions, April 2006	**Incident** PREFERENCE DU GROUPE DEFINITIONS : Evénement inattendu pouvant générer une situation d'urgence (EN12583). Evénement inattendu pouvant générer une situation d'urgence. Ceci inclut une fuite de gaz ou une défaillance de l'installation (EN1594). **Störung** VORZUG DER DEFINITIONEN GRUPPE: Ein unerwartetes Ereignis, das zu einem Notfall führen könnte (EN12583). Ein nicht erwartetes Ereignis, das zu einem Notfall führen könnte. Zu den Störungen gehören insbesondere das Austreten von Gas oder der Ausfall einer Anlage (EN1594).	Source complies with CEN 1594
individual risk	The annual likelihood that someone who spends a	Gasunie/KEMA	Synonym 'location specific risk'	

keyword	definition	source	other languages, different definitions & synonyms	remarks
	continuous period of 24 hours without protection at a location outside an installation or beside a transport route or pipe will die as a direct consequence of an abnormal event involving a hazardous substance within that installation, on that transport route or involving that pipe.		the risk of fatality per year; this is defined as the probability that an unprotected individual residing permanently at a fixed location will be killed as a result of an accident (source: Analysis of failure causes of pipelines transporting dangerous substances R.J. Hansler, J.M. Ham, G.M.H. Laheij, at 6th Pipeline Technology Conference 2011) Synonym: The individual risk index (IR) is the probability that an average Unprotected person, permanently present at a certain location, is killed in a period of one year due to an accident resulting from a hazardous activity. The IR is mainly used for land-use planning. Source: NTNU presentation,)	
in-line inspection	Inspection tool, driven through a pipeline by gas pressure, often utilizing longitudinal pipe magnetization, optimized to detect and accurately measure pipeline anomalies such as corrosion, girth weld cracks, mill defects and others.	ROOSEN brochure, text adapted for gas pipelines	Methods are e.g. MFL (magnetic flux leakage) and TFI (transferse field inspection), both working with magnetic flux (see a.o. inspection companies Roosen and Weatherford)	
inspection	Process of measuring, examining, testing, gauging or otherwise determining the status of items of the pipeline system or installation and comparing it with the applicable requirements.	CEN TC 234, draft 2, definitions, April 2006	**Contrôle** Activités de mesurage, examen, essai, calibrage ou autres permettant de déterminer l'état des composants du système de canalisations ou de l'installation et de les comparer aux prescriptions applicables.	Source complies with CEN 1594

keyword	definition	source	other languages, different definitions & synonyms	remarks
			Überprüfung Ermittlung des Zustands der Teile eines Rohrleitungssystems oder einer Anlage durch Messen, Prüfen, Eichen oder sonstige Verfahren sowie Vergleich dieses Zustands mit den jeweiligen Anforderungen.	
land use planning	Zoning, real estate permitting, planning and use, and those aspects of environmental law as apply to such real estate matters.	legal dictionary; in respect of the issue to be covered, read for 'real estate', 'pipeline'		
leak	A leak' is a hole or other opening, usually unintended and therefore undesired, through which the contents of the pipeline can escape or outside matter can enter the pipeline.	Wikipedia, adapted for gas pipeline.	Several sizes: Pinhole Hole Rupture	
location specific risk	See 'individual risk'.			
loss of containment - LOC	usually unintended and therefore undesired, escaping of pipeline content			
mechanical equipment	Any powered excavator or any other device that may damage the pipeline.			
Maintenance	Combination of all technical and associated administrative actions intended to keep an item in, or restore it to, a state in which it can perform its required function.	CEN TC 234, draft 2, definitions, April 2006	**Maintenance** Combinaison de toutes les actions techniques et administratives associées, destinées à maintenir ou remettre un élément dans l'état lui permettant d'assurer sa fonction spécifiée. **Instandhaltung**	Source complies with CEN 1594

keyword	definition	source	other languages, different definitions & synonyms	remarks
			Gesamtheit der Maßnahmen zur Bewahrung oder Wiederherstellung des Zustandes, in dem ein Bauteil die geforderten Funktionen erfüllen kann.	
mitigation measure	An engineering or procedural control measure designed to reduce the severity of the consequences of an accidental event / incident	NTNU, Norway (2004)	Note: 1) Relationship with 'contingency plan'; 2) Measure may be meant to reduce the consequences of the incident or also the probability of the occurrence of the consequences.	
patrolling	Inspection of pipeline surroundings by foot, car or helicopter	This document		
pinhole/crack	Leak size: the effective diameter of the hole is smaller than or equal to 2 cm	EGIG	Other leak sizes are: "Hole" and "Rupture"	
pipeline	System of pipework with all associated equipment and stations up to the point of delivery.	CEN EN 1594		Within the considerations regarding external safety, the word "pipeline" often refers to the pipeline without above ground facilities like regulator and compressor stations, but including valve stations, liquid catchers and similar

keyword	definition	source	other languages, different definitions & synonyms	remarks
pipeline failure	Loss of containment, due to any cause	KEMA	Not necessarily rupture; also leakage	
pipeline integrity management	Pipeline Integrity Management is process of managing pipeline operational risk and mitigating the risks effectively to ensure pipeline assets are maintained in safe and reliable condition.	Wikipedia, short definition based on NPR-CEN/TS 15173:2006 en; also NEN 2006	PIMS is defined as Pipeline Integrity Management System. It is a safety management system, whose field is pipeline integrity. The field does not cover occupational health. Each natural gas pipeline operator has a system to manage all its resources and activities. This management system is specific to each operator. It generally integrates all the following activities: storage, compression, transportation and delivery of natural gas (see diagram below). PIMS is based on such principles as: - adoption of high technological standards in construction; - carrying out of proactive measures for ensuring that the pipeline system is maintained fit for purpose; - working out of emergency procedures; - incidents investigation; - training of personnel; - definition of roles and responsibilities of personnel. It follows the basic principle plan, do, check and act (PDCA) which includes policy, planning, implementation and operation, inspection and corrective actions, and management review. (source: **NPR-CEN/TS 15173:2006 en; also NEN 2006)**	Background: The concept of pipeline integrity management became especially important as a result of the Pipeline Safety Improvement Act of 2002 signed by President Bush on December, 12 2002.
pipeline operator	Private or public organization authorized to design, construct and/or operate and maintain the gas infrastructure	CEN EN 1594	Synonyms are: network operator, grid operator	

keyword	definition	source	other languages, different definitions & synonyms	remarks
preventive measure	Design, constructive or operational & maintenance measure or procedure to prevent damage to a pipeline	KEMA	Prevention to pipeline damage is part of the design (e.g. wall thickness, depth of cover), construction (e.g. inspection) and operation (e.g. surveillance)	
probabilistic approach	The risk (probabilities as well as consequences) is evaluated by taking into account some acceptance criteria. These criteria can be related with Individual and Social Risk	Summer school on hydrogen safety, (Belfast, 2006)	Keyword: Analysis of failure causes of pipelines transporting dangerous substances, R.J. Hansler, J.M. Ham, G.M.H. Laheij, at 6th Pipeline Technology Conference 2011	
protected area	A clearly defined geographical space, recognized, dedicated and managed through legal or other effective means, to achieve the long-term safe operation of a pipeline.	Adapted from UCN definition, considering the aim of the area is to protect the pipeline from interference by third parties	Definition for area to be protected against human interference: The International Union for Conservation of Nature (IUCN) defines a protected area as 'a clearly defined geographical space, recognized, dedicated and managed through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values. (source: BP website)	
proximity zoning	Required distance between the pipeline and the built-up environment following from a safety consideration.	Gasunie/KEMA		
quantitative risk analysis - QRA	Qualitative risk analysis is a technique used to quantify risk associated with a particular hazard.	https://en.wikipedia.org/wiki/Qualitative_risk_analysis	QRA is a formal and systematic approach to estimating the likelihood and consequences of hazardous events, and expressing the results quantitatively as risk to people, the environment or your business https://www.dnvgl.com/services/quantitative-risk-assessment-qra--1397	Also often referred to as Quantitative Risk Assessment
restricted zone	An area around pipeline in which special measures and	This document		

keyword	definition	source	other languages, different definitions & synonyms	remarks
	requirements are employed to prevent unauthorized activities			
right of way	The right to build and operate a railway line, road, or utility on land belonging to another.	Oxford Dictionary	NL: 'zakelijk recht'	
risk	Probability x effect: the likelihood of someone suffering physical injury or an adverse health effect as a result of exposure to a hazard, or of material damage being done.	Gasunie/KEMA	Synonym: the number of people harmed, and the probability of occurrence of this harm. Sometimes, risk is defined as the expected value of these consequences. (source: NASA, 2002) Synonym: a social construct that cannot be easily reconciled by simple quantification, a much wider context than simply the product of consequence and likelihood, and this view is often subjective because it is very much dependent upon your position and attitude to risk. (source: Lloyds)	
risk contour	Contour on map, along the pipeline route, marking a location specific risk level	KEMA	Location specific risk = individual risk; contour = iso-risk contour	Societal risk cannot be drawn in this way
rupture	The process or instance of breaking open or bursting. and. The state of being broken apart or burst open.	dictionary	EGIG: the effective diameter of the hole is larger than the pipeline diameter. Other leak sizes are "Pinhole/crack" and "hole".	
safe	People are considered to be safe when they are exposed to an acceptable level of individual or societal risk.	Gasunie/KEMA		
safety consideration	The approved method to determine the proximity zoning.	Gasunie/KEMA	The method can in general be the application of industry standards, a	

keyword	definition	source	other languages, different definitions & synonyms	remarks
			calculation method or a qualitative description.	
safety distance	The prescribed distance (meters, yards) from a pipeline where a person or a group of persons is safe from being harmed by a pipeline incident.	Gasunie/KEMA	Similar to 'effect distance' however there is no quantification of the risk in terms of lethality; this definition belongs to the deterministic approach. Relationship with 'building proximity zone' with the exception that the activities inside the buildings are not taken into account.	The incident envisaged is a pipeline rupture followed by a fire that radiates heat in such an amount that people may incur fatal injuries.
safe radiation level	Value of thermal radiation (heat) at which infinite exposure would cause no harm	Gasunie/KEMA		
satellite surveillance	No def, only keyword	Keyword from GERG TPI guidelines; not defined		
societal risk	The cumulative annual likelihood that at least 10, 100 or 1000 people will die as a direct consequence of their presence in the influence zone of an installation, a transport route or a pipe and an abnormal event involving a hazardous substance within that installation, on that transport route or involving that pipe, plotted on a graph where the horizontal axis represents the number of fatalities and the vertical axis the cumulative annual likelihood of at least that number of fatalities.	Gasunie/KEMA	Synonym: the probability that a certain number of deaths will be exceeded as a result of a single accident; it is expressed as the relationship between the number of people killed (N) and the frequency per year (F) (source: Analysis of failure causes of pipelines transporting dangerous substances R.J. Hansler, J.M. Ham, G.M.H. Laheij, at 6th Pipeline Technology Conference 2011) Synonym: Likelihood of a number of people being harmed in an incident (source: Lloyds, 2009; based on UK HSE info)	Acceptance criteria are usually presented in the form of $F \cdot N^2 \leq X$

keyword	definition	source	other languages, different definitions & synonyms	remarks
			Synonym: the relationship between frequency and the number of people suffering from a specified level of harm in a given population from the realization of specified hazards [Jones, 1985, Institution of Chemical Engineers (1985): Nomenclature for hazard and risk assessment in the process industries; from a presentation by health and safety laboratory at SIESO workshop March 2010) Sometimes called 'group risk'	
surveillance	Inspection of pipeline surroundings by foot, car or helicopter	This document		
third party interference	No clear definition; common understanding in legal literature Usually, it is referring to all human activity in the close vicinity of the pipeline		Synonyms: 'External interference'; 'Third party damage' (USA) MARCOGAZ document WG_TP-71 about external interference: Causes include but are not limited to excavation, piling, groundworks and ploughing but also the use of explosives (e.g. quarries), demolition activities or construction works near the pipeline that lead to vibrations damaging the pipeline. All incidents involving own operator's personnel (oftentimes referred to as "first party" excavation damage) or the operator's contractor (oftentimes referred to as "second party" excavation damage) or people or contractors not associated with the operator (oftentimes referred to as "third party" excavation damage) are included.	MARCOGAZ document WG_TP-121 "General practices for managing external interference on underground pipelines" provides more details

keyword	definition	source	other languages, different definitions & synonyms	remarks
tolerance zone	Half the nominal diameter of the underground pipeline plus a minimum of 18 inches on either side of the outside edge of the underground pipeline on a horizontal plane.	Texas Administrative Code TITLE 16 PART 1 CHAPTER 18, RULE §18.2, UNDERGROUND PIPELINE DAMAGE PREVENTION		
threat	A foreign or domestic entity possessing both the capability and the intention to make damage to a system. A threat may be an individual, an organization, or a nation.	NTNU, Norway (2004)		
working distance	Area around a pipeline where pipeline company has exclusive rights	Gasunie/KEMA; Keyword used in several publications	Also: Zone around pipeline dedicated to pipeline company for operations and maintenance activities	
zoning (plan)	A system of developing a city or county plan in which various geographic areas (zones) are restricted to certain uses and development, such as industrial, light industrial, commercial, light-commercial, agricultural, single-family residential, multi-unit residential, parks, schools, and other purposes.	http://legal-dictionary.thefreedictionary.com/Zoning (American website 'the free dictionary' on legal matters)	Also: zoning distance (keyword in Analysis of failure causes of pipelines transporting dangerous substances R.J. Hansler, J.M. Ham, G.M.H. Laheij, at 6th Pipeline Technology Conference 2011	