IMPLEMENTATION OF ARTICLE 12 OF THE SEVESO II DIRECTIVE IN TURKEY

A THESIS SUBMITTED TO
THE GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES
OF
MIDDLE EAST TECHNICAL UNIVERSITY BY

BY

DURSUN BAŞ

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR
THE DEGREE OF MASTER OF SCIENCE
IN
EARTH SYSTEM SCIENCE

FEBRUARY 2014

Approval of the thesis:

IMPLEMENTATION OF ARTICLE 12 OF THE SEVESO II DIRECTIVE IN TURKEY

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ABSTRACT

IMPLEMENTATION OF ARTICLE 12 OF SEVESO II DIRECTVE IN TURKEY

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February 2014, 195 pages

Regulation on controlling major industrial accidents in the context of the Seveso II Directive has been newly introduced to the Turkish national legislation. However, transposition caused a new debate on how to implement the Article 12 Directive which defines a framework for risk informed land-use planning of (LUP) Seveso establishments and new developments around establishments.

The present study aims to assess current regulatory framework and highlight the gaps of implementation level of legislations related to the Article 12 and address their effectiveness.

In this thesis, general profile and compliance level Turkish Seveso establishments are investigated using notification raw data, inspection reports, surveys, interviews and satellite images which reveals past LUP practices around those establishments.

Existing approaches related to the risk informed LUP are put in perspective by tracing the legislation, EIA reports and procedures by focusing on their application problems and capabilities by taking into account of best practices in EU case.

The main problem is absence of regulatory framework ensures technical advice which explicitly corresponds to the LUP requirements of the Article 12. The existing LUP decisions do not incorporates accident scenarios based on risk assessment and vulnerability of population around establishments. Majority of the decisions are inconsistent and not proportional to the actual level of risk.

The need for establishment of risk acceptance criteria, technical advice procedure and incorporation of major accident risk notion and public vulnerability classes for better LUP decisions are main conclusions of the research. Several suggestions are also proposed to improve the existing regulations.

Keywords: Major Industrial Accidents, Risks, Risk Assessment, Land-Use Planning, Seveso II Directive

ÖZ

SEVESO II DİREKTİFİ MADDE 12'NİN TÜRKİYE'DE UYGULANMASI

Baş, Dursun
Yüksek Lisans. Yer Sistem Bilimleri Bölümü
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Şubat 2014, 195 sayfa

Türkiye, büyük endüstriyel kazaların kontrolünü amaçlayan Seveso II Direktifini iç hukuka yakın tarihlerde aktarmıştır. Ancak, Direktifin uyumlaştırılması ile birlikte, Seveso kuruluşları ve etrafındaki gelişmeler için risk esaslı arazi kullanım planlaması için bir çerçeve tanımlayan Direktifin 12. Maddesi hususlarının nasıl uygulanması gerektiğine dair tartışmalar ortaya atılmıştır.

Bu tezde, Seveso II Direktifi Madde 12 kapsamında belirtilen hususlarla ilgili olabilecek ulusal yasal çerçevesinin ve mevzuat uygulamalarının değerlendirilmesi, eksikliklerin ortaya çıkarılması ve bunların etkinliklerinin belirlenmesi amaçlanmıştır.

Çalışma kapsamında, Türkiye'de bulunan Seveso Kuruluşlarının genel profili ve Direktife uyumu; bildirim bilgileri, denetim raporları, anketler, röportajlar ve geçmiş arazi kullanım uygulamalarını içeren uydu resimleri incelenerek belirlenmiştir.

Risk esaslı arazi kullanım planlamasına karşılık gelebilecek mevcut yaklaşımlar, yasal mevzuat, ÇED raporları ve prosedürlerin uygulama sorunları; AB örneklerindeki iyi uygulamalar dikkate alınarak mercek altına alınmıştır.

Uygulamalardaki temel sorunun, Seveso kuruluşların yer seçimi ve mevcut kuruluşların etrafında gerçekleşen arazi kullanım değişikliklerini dikkate alan Madde 12 yükümlülüklerini yerine getiren gelişmiş ve sistematik arazi kullanım planlaması

uygulamalarının bulunmamasından kaynaklandığı tespit edilmiştir. Mevcut arazi kullanım planlaması kararlarının büyük kaza senaryolarını ve kuruluşlar etrafındaki nüfusun etkilenebilirlik derecelerini dikkate almadığı görülmüştür. Farklı yetkili idarelerce alınan kararların birçoğunun kendi içerisinde tutarsız olduğu ve mevcut risk seviyelerini gözetmediği ortaya konmuştur.

Bu tez çalışmasında, uygun arazi kullanım planlaması kararlarının yerine getirilmesi için; alınacak kararlarının karşılaştırılacağı kabul edilebilir risk ölçütünün tanımlanması, büyük kaza riski olgusunu ve toplumun çeşitli kesimleri için tanımlanacak etkilenebilirlik sınıflarını dikkate alan bir teknik tavsiyenin gerekliliği sonucuna ulaşılmıştır. Ayrıca, mevcut uygulamaların iyileştirilmesi için çeşitli tavsiyelerde bulunulmuştur.

Anahtar Kelimeler: Büyük Endüstriyel Kazalar, Risk, Risk Değerlendirmesi, Arazi Kullanım Planlaması, Seveso II Direktifi

To My Grandparents…

ACKNOWLEDGEMENTS

The author wishes to express his deepest gratitude to his supervisor Prof. Dr. Ülkü Yetiş and for their guidance, advice, criticism, encouragements and insight throughout the research.

The author would also like to thank his co-supervisor Assoc. Prof. Dr. Şule Güneş for her suggestions and comments.

I would also like to express my appreciation to my examining committee members

Prof. Dr. Ayşen Yılmaz, Prof. Dr. Ali Türel, Assoc. Prof. Dr. Emre Alp and Dr. Haluk Çeribaşı for their valuable suggestions and comments.

The assistance and company of Eren Demircan, Sedat Ilgaz Günay, Umut Kork, Mustafa Varan, Sinan Yamak and Emrah Altaca during long, hard days are gratefully acknowledged.

I am also thankful to REC Turkey for sharing Seveso II Directive RIA survey and my colleagues for their valuable support and comments on research.

Last, but not at all the least, thanks to my family for their patience and continuous support.

Finally, I would like to express my thanks Ülkem Evren for her encouragement, understanding and patience. It would be impossible to finish this work without her.

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CHAPTER 1

INTRODUCTION

1.1. The Concept of Risk, Major Accidents and Land-Use Planning

Risk is an important topic in our contemporary society. The sources of risks are diverse; from financial markets, nuclear power plants, natural disasters and privacy leaks in ICT systems. These are few examples of risk topic from our modern life [1]. With the increasing concern about risks in society, concurrently, both professional and non-professional awareness of risks are increasing, and much effort is put into risk assessment, risk management, and risk communication [2].

Although the risk term is commonly used in our daily life and in many fields and activities it does not necessarily the have the same meaning. There are different approaches to risk concept.

Ortwin Renn [3] has classified the risk approaches under seven categories: "(1) the actuarial approach, (2) the toxicological and epidemiological approach, (3) the engineering approach, (4) the economical approach, (5) the psychological approach, (6) social theories of risk, (7) cultural theory of risk".

One of the perspectives is an engineering perspective [3] which describes Risk as

"an objective hazard, threat or danger that exists and can be measured independently of social and cultural processes".

This research will also use "Risk" term from the engineering perspective which is defined as "the probability of an occurrence of a hazard multiplied by the magnitude of the consequences it may cause".

$$\text{Risk} = \text{frequency} \cdot \text{magnitude of consequences}$$

or

$$\text{Risk} = f(\text{consequence, likelihood})$$

One of the well-known types of engineering perspective type of risk is industrial accidents risks or technological risks, particularly **major accidents risk**, which are results serious danger to public health, the environment and properties due to the fires, explosions or releases.

The safety system failures can occur through industrial production or storage involves large quantities of energy and of substances could lead in disastrous effects on humans and the environment.

Either developed or developing country, the past major accidents stressed the need for a regulating hazardous industry as society has become increasingly aware of these hazards in the international area.

Two of the well-known important industrial major accidents are known as Flixborough accident (UK), in 1974 and Seveso accident (Italy), in 1976. These accidents pointed out need for establishing regulatory framework within which all shareholders (operators, competent authorities, and public) have a central role for the limiting the risks related to industrial accidents[4].

Taking into account lessons learned from the above mentioned accidents , European Commission (EC) proposed the Council Directive 82/501/EEC [5] on the *control of major accidents hazards of certain industrial activities*, which is also known as **Seveso I Directive** to prevent and control such accidents. Since the release of the original the Seveso Directive, it has been frequently amended based on lessons learned from past major accidents.

The extensive review of the Seveso I Directive resulted in adoption of *Council Directive 96/82/EC of 9 December 1996 on the control of major-accident hazards involving dangerous substances on the control of major accidents* so-called Seveso II Directive [6], and replaced the Seveso I Directive [7].

The Seveso II Directive covers establishments where dangerous substances are used, stored and produced in large amounts in different industrial sectors from refineries to food and beverages, from paint manufacturing to chemicals, power plants to metal refining sectors [7].

In most of the industrialized countries, to prevent and limit the consequences of major industrial accidents, two mitigation actions are being followed:

1) Safety measures and risk reduction and control at industrial establishments (on-site),
2) Limitation of impact to property and public exposed to the major accidents in proximity of hazardous establishment (off-site[1]) [8].

Seveso II Directive can be regarded as a unique example of which covers both above approaches.

The Directive is implemented across EU, which considers both *on-site risks* and *off-site risks* to people, property and the environment arising from atypical and abnormal hazardous events and conditions.

Growing public concern which aroused about the hazards stemming from industrial establishments neighboring housing areas with the Bhopal and Mexico City was one of the main driving forces for the adoption of the Seveso II Directive. These accidents have clearly revealed how the consequences of major industrial accidents can be severely intensified by high-density inhabitants who live in proximity to hazardous installations [9].

Therefore, ***Article 12*** [6], Land-Use Planning[2] (LUP) requirement was introduced to fulfill the need for land use regulations around establishments and mitigate the consequences of major accidents[3]. The Article 12 requires establishment and maintenance of **appropriate distances** between Seveso establishments and residential or sensitive area by **taking into account** of risks of major accidents of the establishment.

[1] Off-site is used to express area beyond the property boundaries of hazardous establishment.

[2] By capitalizing the "Land Use Planning" and its abbreviation LUP, it is aimed to refer land use planning requirement defined in Article 12 Seveso II Directive.

[3]The Land Use Planning is considered mainly as mitigation instrument to reduce the extent of the consequences, but it may also serve as a preventive in connection with utilization of technical settings and permit scheme [9].

However, the Directive neither defines appropriate distance nor provides a specific method on how to implement Article 12.

The EU experience reveals that legislative background, demographic and geographical contexts, economical relevance of the chemical industry, cultural orientation aspects are important determinants for LUP approach of Member States (MS) in context of the Seveso II Directive [9].

1.2. Major Industrial Accidents Policy in Turkey

Major hazards regulation in the context of the Seveso II Directive has been newly introduced to the Turkish Legislation. Turkish Republic Government transposed the Seveso II Directive in August 2010 with the *By-Law on Control of Major Industrial Accidents (COMIA)* which had been expected to entry into force in August 2012. However, the implementation and enforcement of the by-law had been postponed to January 2014 [10,11].

In December 2013, enforcement of the transposed Directive postponed again. Furthermore, the new by-law named as *By-Law on Prevention and Mitigation of Major Industrial Accidents (*PMMlA) has been introduced and it repealed COMIA. It will enter into force in 2016, approximately 17 years after the enforcement of the Seveso II Directive in EU [12].

Even though, Turkish government transposed the Seveso II Directive, the by-law neither anticipates LUP requirements nor refers other planning or related regulations that which are expected to respond the requirements of Article 12 of Seveso II Directive.

This caused a new debate on how to apply the Article 12 of the Seveso II Directive in Turkey. The Turkish By-Laws (former and current one) neither introduce new criteria for the siting of new Seveso establishments and new developments in the vicinity of establishments nor refer current planning regulations or other related regulations for requirements of Article 12.

As details will be given in Chapter 4, various regulations, permits and procedures exist in Turkey. However, none of these regulations are specifically targeted on LUP requirement.

Mainly due to lack of legislative provisions, major industrial accident hazards are a relatively ignored element in LUP policy framework. Past policies and practices regarding safety regulations mainly concentrated on on-site risks and ignored off-site risks of major industrial accidents hazards (fires, explosions, and toxic releases). Explicitly, existing policies in safety legislations and spatial planning procedure have focused on mainly occupational health risks and the control of natural disaster risks respectively.

One of the earlier legal instruments with the aim of minimizing the possible hazard to the public and environment by the major industrial accidents in provinces is named as “Circular on Local Emergency Plan for Major Industrial Accidents" was published in 1996 [13]. However, only 36 governorships performed and tested the local emergency plans requirement, and submitted to the Ministry, 18 governorships declared no need to local emergency plan due to the absence of establishments covered by the Circular [14]. Since, the Circular has no binding character, it had been implemented ineffectively.

In 1999, the draft regulation entitled “Regulation on Prevention of Major Industrial Accidents” was issued by a commission including the representatives of the Ministry of Health and Ministry of Labor and Social Security (MoLSS).The draft suggests that emergency response plans for accidents should be prepared by the operators of industrial establishments, but it does not refer impacts of the accident that goes beyond the boundaries of the establishment. The draft legislation had not been put into practice due to the required approval could not be taken from the Committee of the Ministries [15].

The 1999 Marmara Earthquake and consecutive major accidents in industrial sites had addressed integration between the approaches intended for disaster and risk prevention/reduction and spatial planning system in order to have safe and

sustainable urban development. However, main studies confined of earthquakes instead of focusing overall disaster management including technological accidents. More clearly, the provisions of the national laws and regulations are deficient of instituting a contemporary disaster management system and concentration has given to post-disaster activities [16].

As noted above, the past practices and transposed national legislation does not have any article or guidance which refers to Article 12, when the EU examples are investigated; it is a unique for Turkey case. Most of the EU countries either developed new regulations directly relates Seveso establishments or modified their legislations to address the requirements of Article 12. At least, the MS refer to their existing regulations which correspond to the Article 12 of the Directive.

Other than, LUP related problems; the critical issues on the prevention and mitigation of the major accidents are also listed below. These subjects will directly affect the successful implementation practices of the LUP in the context of the Directive.

- Implementation of the Directive requires involvement of different administrative bodies which needs human resources and technical capacity.
- The most of the operators have low capacity to implement the Seveso II Directive requirements and they concentrate mainly occupational health and safety.
- Majority of operator of establishments and local authorities do not perform consultation processes to inform and involve public to decision-making process of siting of hazardous establishments.

1.3. Aim of the Thesis

Due to the deficit in administrative regulations and enforcement of the existing ones in past, plus; the rapid and uncontrolled urbanization and housing process, the past practices have increased the risks arising from major hazard establishments in Turkey.

The rapid and uncontrolled urbanization and housing process in Turkey, has brought about growth of the cities which are highly vulnerable to natural disasters and man-made dangers. In past, due to the not taking into account major accidents risks in the land use and other relevant policies and the procedures, the hazardous establishments did not sustain appropriate safety distances between other hazardous establishments and housing areas, areas open to general public use and areas of particular natural sensitivity.

In certain provinces of Turkey having dense industrial areas or individual large scale establishments with high populations around them, arises the contradictions in terms of public safety with the emerging of deep "risk pools" in cities [17]. Major problems are connected with residential areas which are come close the hazardous establishments and they are not further controlled concerning appropriate safety distances.

Nevertheless, Turkey is densely populated country where significant population lives in industrial centers, there is yet no regulatory or planning provision that provides guidance or lay down criteria for incorporating major accident risk considerations into land use planning process of Seveso establishments. Consequently, the risk to population from such hazardous establishments continues to rise, with the potential for significant damage in case of serious accident like a toxic release, fire or explosion.

Taking the into account requirements of Article 12 mentioned in the previous section, the overall objective of this thesis is to assess current regulatory framework and highlight the gaps in current national implementation level of regulations -related to the Article 12 of the Seveso II Directive- to protect public and environmental health to and control major accidents.

Existing approaches for the LUP are put in perspective by tracing the legal and administrative structure, related reports and practices. By examining the existing procedures and tools within the scope of the Article 12 of the Directive, the study

aims to assess the current level of (major accident) risk informed decision making process and their effectiveness in LUP of hazardous establishments.

Moreover, this thesis presents general compliance level Turkish Seveso establishments and defines general profile of Seveso establishments under the scope of the PMMlA by analyzing their numbers, location and industrial category etc.

This thesis contributes to elaboration of major industrial risks concept in LUP and consideration in relevant procedures and draw attention to major accident risks which are not popular as traditional risk fields such as earthquake and flood risks.

In lights of the above, this study presents reflections regarding the application of Turkish national laws and regulations concerning major industrial risks in LUP, and focuses on their application problems and capabilities.

1.4. Scope, Methodology and Structure of the Thesis

The prevention and limitation major accidents do not only consider risks to employees or establishment properties, considered risks are not atypical or abnormal ones such that long-term effects of typical emissions to air water and soil. Therefore, it is worth to make the discriminate LUP from other examples of land use measures such as noise, nuisance and air pollution control etc.

More precisely, the LUP should be understood as a mitigation tool for addressing risks that may have immediate effects outside the plant fence namely acute risks such as explosions, fires, sudden and unintended releases of dangerous substances.

Important areas has excluded from the scope of this research namely; major accidents risk due to the nuclear safety, the transport of dangerous substances and intermediate temporary storage outside establishments and the transport of dangerous substances by pipelines. Moreover, exploitation of minerals in mines, quarries, or by means of boreholes are exempted from scope of the study.

To bring to the surface current and past practices in Turkey, the study deeply analyzed the legal basis and enforcement of its subsequent laws, regulations, and by-

laws for the LUP of hazardous establishments in Turkey and presented their drawbacks.

Health protection zones (HPZs) requirement under the By-Law on Permission for Opening and Operating of Working Place and Environmental Impact Assessment (EIA) reports, and implementation/enforcement level of other related regulations are investigated to generate picture of the hazardous establishments and their LUP practices.

Additionally, the Ministry of Environment and Urbanization Notification system raw data is used that includes information of Turkish Seveso establishments. General profile of Seveso establishments under the scope of the COMIA is presented by analyzing their numbers, location and industrial category.

Moreover, satellite images of potential Seveso establishments, interviews that conducted with government representatives from various competent authorities are presented in the annexes of this thesis.

The main uncertainty of this study comes from the restrictions to accession to data such as full name, chemicals, and full addresses for Seveso establishments and limited access to the Committee Reports which includes HPZs decisions for Class I Non-Sanitary establishments (NSEs) under By-Law on Permission for Opening and Operating of Working Place.

The methodology which is followed in this thesis can be found in Table 1.

In Chapter 2, summary of the development of major accident legislation and legal background relevant to major accidents in EU is summarized. Particularly, Article 12 of the Seveso II Directive, land use regulations around hazardous installations are introduced.

In chapter 3, based on an extensive review of literature, risk informed LUP, the major accidents risk assessment and associated terms in relevant LUP are discussed.

The Chapter 4, screening process of the national legislation; it is aimed to get all related information on administrative structure, procedures and main criteria which

determine the decisions for safety distances (health protections zones) regarding LUP of the establishments in the context of the Directive. Interviews conducted via e-mail with municipalities, provincial directorates and OIZ directorates. The certain questions related to the LUP are sent to authorities via e-mail.

The Chapter 5 presents general profile of Turkish Seveso establishments and their general compliance to requirements of the Turkish Seveso regulation. The data used in this chapter is taken from MoEU Notification System[4] and analyzed in broader terms; detailed analysis of their number, location and industrial sector. Moreover, REC RIA Survey and inspection reports were used to see general compliance level the hazardous establishments[5]. Additionally, to see the real life examples, satellite images of potential Seveso establishments are presented.

In chapter 6, main efforts are given to asses and evaluate current deficiencies, challenges and effectiveness level of the LUP practices in national legislation. Various parts of above mentioned and other regulations are used to assess highlight the baseline for handling (major accident) risk aspects (safety distances) as part of LUP decision making processes whether analytical techniques are adopted and adapted by the competent authorities and industry. The assessment presented overall effectiveness of the current framework with several recommendations.

This study considered HPZs decisions in related regulations, EIA reports, and relevant information from MoLSS inspection documents. Moreover, certain parts of the EIA reports are screened to see the major accident risks and LUP aspects whether they exist in EIA procedure. EIA reports are used that provide data on safety distances (health protection zones) around planned hazardous establishments.

Lastly, in Chapter 7, LUP advice and recommendations are developed considering the present laws and regulations which correspond to the requirements of the Article 12 of the Directive.

[4] The data which is taken from MoEU Notification system dates to December 2012.
[5] The RIA Survey was carried out in 2012.

Table 1 - Outline of the thesis

Background **Chapter 2**	- Summary of the development of major accident legislation and legal background relevant to major accidents in EU - Article 12 of the Seveso II Directive
Risk informed LUP **Chapter 3**	- Major accident risk assessment and associated terms in relevant LUP. - Practices and methodologies for LUP policies across the Member States.
Screening of Legislation and presentation of current framework **Chapter 4**	National Legislation (Laws, Regulations, By-Laws, Reports) was presented. - The overall administrative structure of Turkish Seveso Regulation - National disaster management structure and relevant legislation - Occupational Health and Safety legislation - Spatial Planning issues - Regulations including LUP requirements around major hazardous establishments
Profile of Seveso establishments **Chapter 5**	- Numbers and Industrial Categories, Geographical Distribution - Earthquake Zones Vulnerability, Organized Industrial Zones - Turkish Industrial Sector Profile - Turkish Oil, LPG Market and Natural Gas Market - Satellite images of potential Seveso establishments - REC Seveso RIA Survey
Assessment and evaluation of current framework **Chapter 6**	In this step, existing approaches for the land use planning are put in perspective by tracing the legal and administrative structure, procedures, related reports and practices. - Health Protection Zones Decisions - Generic safety distances - Certain parts of the EIA reports
Conclusion and Recommendations **Chapter 7**	Lastly, in Chapter 7, LUP advice and recommendations are developed considering the present laws and regulations which correspond to the requirements of the Article 12 of the Directive.

CHAPTER 2

DEVELOPMENT OF SEVESO DIRECTIVES AND ARTICLE 12

The objective of this chapter is to give a brief summary of the development of major accident legislation and legal background relevant to major accidents in EU.

The scope of the Seveso II Directive is examined and the information on EU Seveso establishments such as type, industrial category, and geographical location is provided.

Particularly, Article 12 of the Seveso II Directive, land use regulations around hazardous installations is introduced.

2.1. Development of Major Accident Legislation and the Seveso Directive

Although the technological risks as industrial accidents are not new topics, their scale and consequences intensified in the second half of the last century with diffusion of LPG storages and chemical facilities in the early 1970s [18].

Above developments highlighted the necessity for a well-defined and systematic approach to the control of accidents to protect workers, public and the environment. New regulations and laws were set off response to the catastrophic potentials of accidents, especially in UK, France and The Netherlands which were known industrial development together with rapid urban growth [19].

European Commission proposed the original Directive 82/501/EEC [5], which is also known as Seveso I Directive, in response to following an accident at a chemical plant in Seveso (1976, Italy). The accident resulted in the release of a cloud of chemicals containing dioxin, more than 600 people had to be displaced from their homes and nearly 2000 were treated for dioxin poisoning [7].

The Seveso I Directive had several regulatory developments from 1982 to 2010 regarding the lessons learned from the accidents which have been reflected in scope definition and requirements of the Directive.

In 1996, after several amendments in response to the two other major accidents, namely, Bhopal (1984, India) and Basel (1986, Switzerland), the Directive on the Control of Major Accident Hazards was adopted and started to known as the Seveso II Directive [7].

Seveso II Directive has introduced important new statements compared to the former Directive. Substances considered dangerous for the environment were introduced, in particular aquatoxics. Moreover, it has launched new management systems, which may minimize the occurrence of the major accidents and strengthened the information provided to the public and ensured the access to the environmental information in easier way [6].

The main differences between Seveso I and Seveso II could be summarized below [7]:

- Seveso II cover establishments not installations
- A category 'Dangerous to the Environment' has been introduced
- Requirements for safety reports are set out in more detail
- Strengthened the provisions on inspections and public information
- Safety management systems (SMS), emergency plans and LUP requirements introduced

Following enforcement of the Seveso II Directive on 3 February 1997, MS had transposed the Directive to their national laws, regulations and administrative provisions to comply with the Directive after two year transposition period. The implementation and enforcement of the Directive had become obligatory on 3 February 1999 [7].

In 2003, Directive 2003/105/EC [20] that amends Seveso II Directive had been adopted. Lessons learned from industrial accidents; Baia Mare (2000, Romania),

Enschede (2001, Netherlands), Toulouse (2001, France) resulted in extension of the scope of the Seveso II Directive. The amended Directive has started to cover the processing and storage of minerals containing dangerous substances extracted in mining and quarrying, and the tailings disposal facilities used in these activities [20].

On 20 January 2009, the new *Regulation on classification, labeling and packaging of substances and mixtures (CLP)* entered into force in EU. CLP Regulation aligns existing EU legislation with the United Nations Globally Harmonized System of classification and labeling of chemicals (GHS). The CLP Regulation will replace Directives 67/548/EEC (DSD)[6] and 1999/45/EC (DPD)[7] after a transitional period. Thus, dangerous substances must be classified according to the CLP as well as the DSD from 1 December 2010, and from 1 June 2015, the CLP will repeal the DSD/DPD for both substances and mixtures (currently called preparations) [7]. To response the above, *Directive dated 24 July 2012 on the control of major accident hazards involving dangerous substances* known as Seveso III Directive and subsequently repeal the Seveso II Directive. Table 2 summarizes the background information about Seveso I, II and III Directives.

Table 2 - Background Information about Seveso I, II and III [6,7,21]

Event	Explanation	Consequences	Resulted in
Seveso, Italy 1976	Dioxin escape, spread over countryside	3,000 pets and farm animals died, 70,000 animals slaughtered to prevent dioxins from entering the food chain	**82/5001/EEC Seveso I**
Bhopal, India 1984	Leak of Methyl Isocyanate	Estimates of its death toll range from 4,000 to 20,000.	**87/216/EEC (1st amendment)** Certain substances added and lowering the thresholds for others
Sandoz, Switzerland 1986	Fire in the storehouse	Tons of toxic agrochemicals released into the Rhine, death of half a million fish	**88/610/EC (2nd amendment)** Increase in number of warehouses under the Directive

[6]Council Directive 67/548/EEC of 27 June 1967

[7]Council Directive 1999/45/EC of 31 May 1999

Table 2 (cont)

Event	Explanation	Consequences	Resulted in
In 1988, fundamental review of Directive result in a proposal that would become 96/82/EC - **Seveso II Directive**			
Baia Mare, Romania 2000	Cyanide spill	Untreated cyanide waste has mixed with the Danube River.	**2003/105/EC (3rd Amendment)** -It extends the scope of the Directive -lower thresholds for substances dangerous for the environment - change to the aggregation rule
Enschede, The Netherlands 2001	Fireworks accident	21 people killed and 800 injured	
Toulouse, France 2001	explosion at a fertilizer plant	- 29 people killed and injured 2,500	
In 2008, F-Seveso Report	Report on implementation and effectiveness of the Directive	Views from 8 Member State(industry, CAs, NGOs)	Proposal for amended Directive
The EC published a proposal for an amended Directive, 21.11.2010	Changes to the EU system of classification of dangerous substances	In 2010, EC published a proposal (COM(2010)781) for amended Directive	**Seveso III Directive** To align Annex 1 of the Directive changes to the EU system classification of dangerous substances

2.1.1. Scope of the Seveso II Directive and Seveso establishments in EU

2.1.1.1. Scope

The Seveso II Directive has two important dimensions:

- preventing major accidents involves dangerous substances;
- limiting consequences on human health and the environment.

The schematic representation of the philosophy of Seveso II Directive is in given Figure 1.

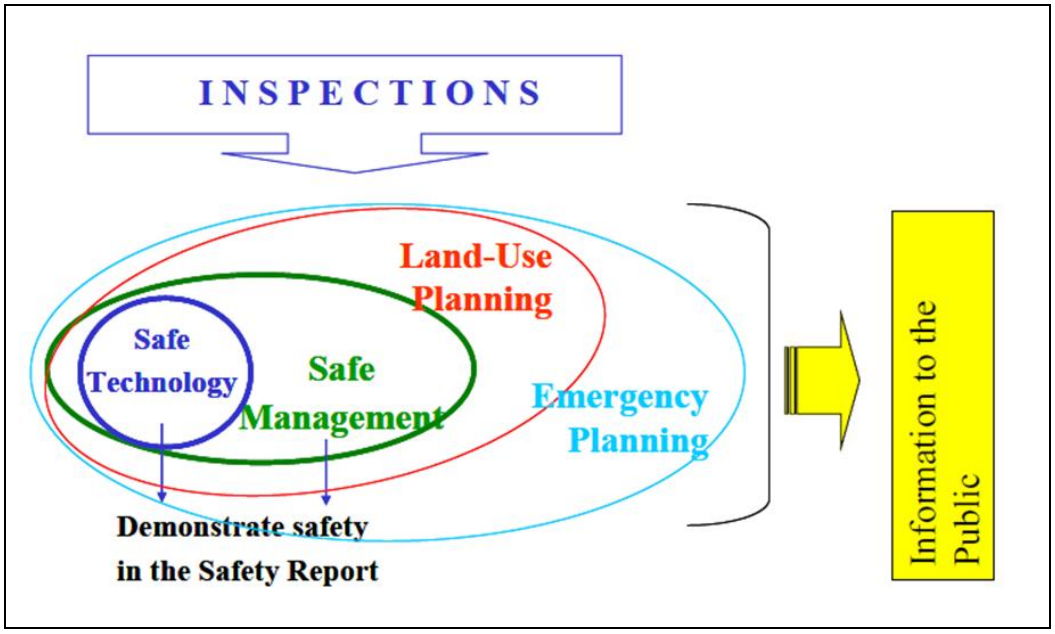


Figure 1 - Schematic representation of the philosophy of Seveso II Directive [22]

The scope of the Seveso II Directive takes into account presence of dangerous substances in establishments. It covers establishments (industrial and commercial) sectors such that chemical manufacturing and storage sites, refineries, pulp and paper mills, gas refining and storage, water treatment works, explosives, fireworks, manufacturing and storage.

The scope is determined by the quantity and nature of the specified dangerous substances defined in the Annex I of the Directive and it does not depend on size, location, industry or the ownership of the establishments. Establishments qualify as Seveso establishments if they hold dangerous substances quantities defined in Annex I.

The Annex I of Directive contains two lists, namely *Named Substances* and *Generic Categories of Substances and Preparations*. Both lists contain lower threshold of quantities and upper threshold of quantities[8]. The Seveso establishments are classified under two categories named *Upper-Tier* and *Lower-Tier* depending on the quantities of dangerous substances present.

[8]Articles 6, 7, and 9 and Annex 1 of the Directive

The Directive does not cover military establishments, hazards created by ionizing radiation, transport of dangerous substances e.g. on road, rail, loading and unloading, transport in pipelines, mining activities and waste landfill sites , which are dealt with by separate legislation [6]. The Directive assigns requirements both public authorities and operators (Table 3 and Table 4).

Table 3 - Obligations of the Seveso Operators

Operator	Prevention of Major Accidents	Limitation of consequences
All operators	-General obligations -Notification -Major Accident Prevention Policy -Controls in case of modifications -Be ready inspection by the Competent Authority -LUP	- LUP -Consideration of domino effects in Major Accident Prevention Policy.
Upper-Tier only	-Safety Report -Safety Management System (SMS)	-Emergency Planning -Information to the Public

Table 4 - Obligations of the Public Authorities

Obligations	Details
General Obligations	To Set-up Notification System and identify the scope of the establishments
Inspections	Preparation of inspection plans and Inspection reports
Safety Reports and MAPPs	Assessment and Approval of Safety Reports
LUP	Siting New establishments Land Use related activities for existing establishments
Domino Effects	Identification of Domino Effect
External Emergency Plan	Preparation and testing of External Emergency Plan
Investigation of Accidents	Incident investigation
Enforcement	Shut down/close establishment
Reporting to the EC	Accident Reports , General Implementation Report

2.1.1.2. Seveso establishments in EU

European Commission established different systems to avoid or limit the consequences of major accidents. One of these systems is Seveso Plants Information Retrieval System (SPIRS).

The SPIRS is a database system provides access to the European Commission on risk related information from major hazardous industrial Seveso establishments in Europe. The database contains Seveso establishments' data which reported by the 27 MS and three of the EEA/EFTA countries (Iceland, Norway and Switzerland) through the Committee of Competent Authorities (CCA) to the Seveso II Directive [23]. As of September 2010, there were 9937 Seveso establishments in the reporting countries in the SPIRS database of which 4575 (46 %) were Upper-Tier and 5323 (54 %) Lower-Tier. Among these countries, Germany had the largest number of establishments (2141, which corresponds to 21.55 %), followed by France (1106; 11.13 %), Italy (1095 or 11.02 %) and the United Kingdom (UK) (1082; 10.89 %) [23] (Figure 2).

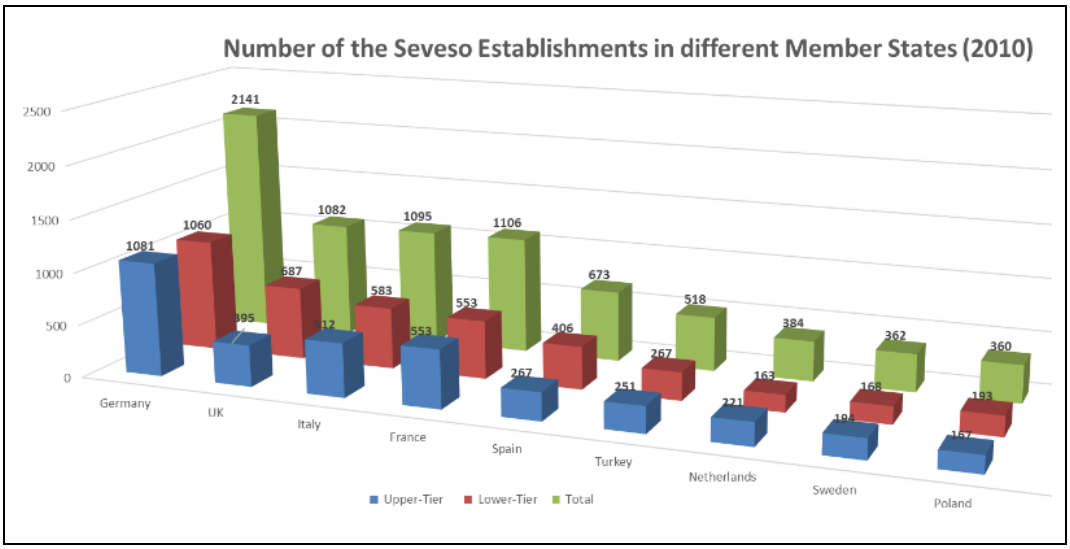


Figure 2 - Number of the Seveso establishments in different Member States Adapted from [23]

Industrial activities are classified according to SPIRS new aggregated industrial categories (Figure 3).

New SPIRS	Aggregated categories, sectors
Chemical installations - Industrial gases	Chemical installations (excluding petrochemical)
Chemical installations – ammonia	
Chemical installations – chlorine	
Chemical installations - fluorine or hydrogen fluoride	
Chemical installations – hydrogen	
Chemical installations - carbon oxides	
Chemical installations - sulphur oxides, oleum	
Chemical installations - nitrogen oxides	
Chemical installations - inorganic acids	
Chemical installations - other fine chemicals	
Production of basic organic chemicals	
General chemicals manufacture (not included above)	
Production of pharmaceuticals	
Production and storage of fertilizers	
Production and storage of pesticides, biocides, fungicides	
Handling and transportation centres (ports, airports, lorry parks, marshalling yards, etc.)	Transporting and storage
Fuel storage (including heating, retail sale, etc.)	
Wholesale and retail storage and distribution (excluding LPG)	
Manufacture of food products and beverages	Manufacturing
General engineering, manufacturing and assembly	
Textiles manufacturing and treatment	
Plastic and rubber manufacture	
Production and manufacturing of pulp and paper	
Wood treatment and furniture	
Manufacture of glass	
Manufacture of cement, lime and plaster	
Ceramics (bricks, pottery, glass, cement, etc.)	
Electronics & electrical engineering	
Production, destruction and storage of explosives	
Production and storage of fireworks	
Shipbuilding, shipbreaking, ship repair	
Building & works of engineering construction	
Petrochemical / Oil Refineries	Petrochemical (e.g. oil refineries, storage and distribution)
LPG production, bottling and bulk distribution	
LPG storage	
LNG storage and distribution	
Processing of metals	Processing of metals
Processing of ferrous metals (foundries, smelting, etc.)	
Processing of non-ferrous metals (foundries, smelting, etc.)	
Processing of metals using electrolytic or chemical processes	
Power generation, supply and distribution	Power generation, supply and distribution
Water and sewage (collection, supply, treatment)	Water and sewage and waste management
Waste storage, treatment and disposal	
Agriculture	Agriculture
Mining activities (tailings & physicochemical processes)	Mining activities
Other activity (not included above)	Other activity[14]
Leisure and sport activities (e.g. ice rink)	
Medical, research, education (including hospitals, universities, etc.)	

Figure 3 - Seveso Plants Information Retrieval System (SPIRS) new aggregated industrial activities categories [23]

Distribution of establishments based on the industrial activities in the EU is shown in Figure 4.

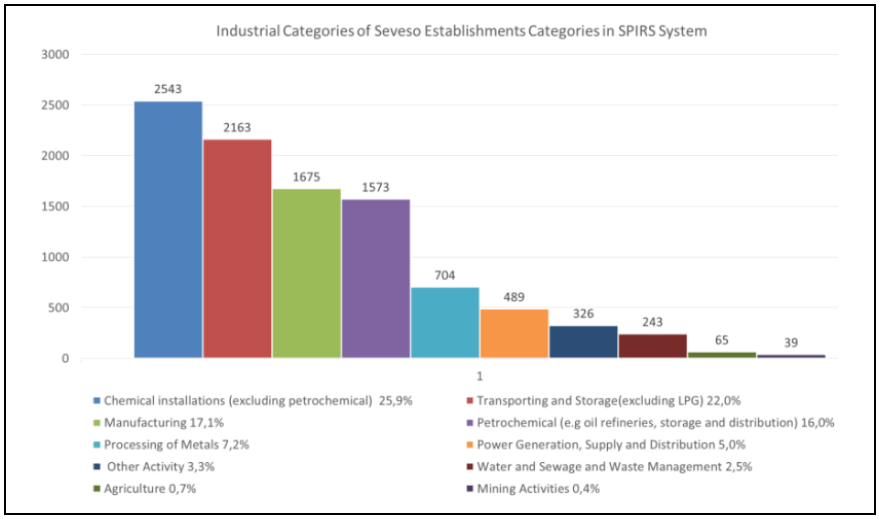


Figure 4 - Aggregated Industrial Categories of Seveso establishments Categories in SPIRS System. Adapted from [23]

2.1.2. Article 12

In majority of technologically advanced countries, to prevent and limit the consequences of major industrial accidents, there are mainly two mitigation actions: 1) safety measures and risk reduction and control in industrial establishments (on-site) and 2) limitation of major industrial accidents impacts to property and public around establishment (off-site) [8]. LUP belongs to second category of measures. It is the appropriate separation of establishments, planning infrastructures and urban settlements in industrial areas, which has to be considered in planning policies.

In Europe, specific legal requirements, for LUP policies initiated recently. The importance of LUP role in the prevention and the restriction of consequences of major hazard accidents drawn attention after seriously extent material damage accidents those of Bhopal (1984, India) and in Mexico City (1986, Mexico) .With reference to these accidents, a new requirement of Directive Seveso II with the introduction of Article of 12 Directive was established [6].

Article 12 of the Directive obliges LUP controls for both Upper and Lower-Tier establishments within the scope of the Directive. However, it applies only for cases of future development such that new sites, modifications or new developments in the vicinity of establishments.

In the following cases represented Figure 5, maintenance of appropriate distances required between establishments and other developments.

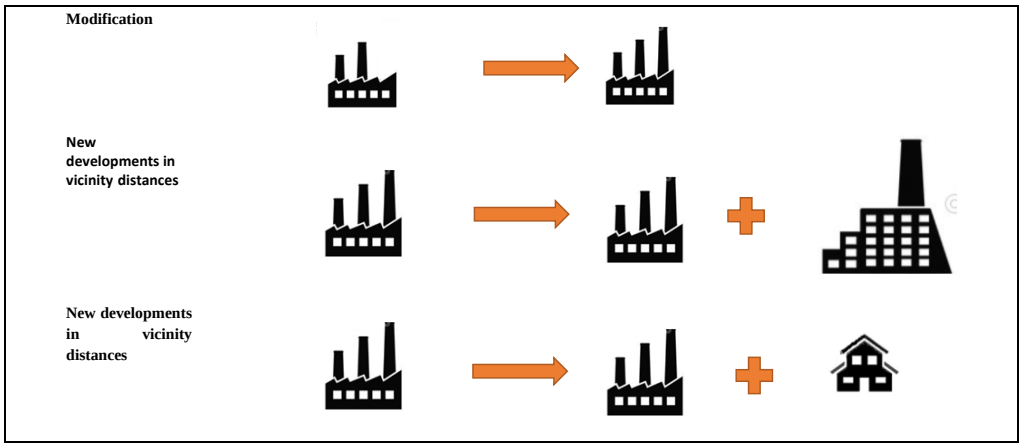


Figure 5 - LUP in the context of the Article 12

Firstly, there should be controls on

- the location of new Seveso establishments where other hazardous establishments may present
- modifications to existing establishments
- new developments in proximity of existing establishments that may increase and bring unacceptable high level of risk from the consequences of a major accident such as transport links, locations frequented by the public, and residential areas.

Article 12 of the Directive, the LUP requirement, requires member states to assess and maintain **appropriate distances** between Seveso establishment and establishments where hazardous substances are present, residential areas, areas of public use and areas of particular natural sensitivity by **taking into account** of risks of major accidents of establishment [6].

More precisely, the Article 12 of the Directive necessitates restrictions on LUP when new Seveso establishments are authorized/licensed/permitted or when urban development takes place around existing Seveso establishments [6].

Moreover, Article 12 requires the MS to introduce LUP criteria in their legislation such that MS have to ensure that all competent authorities and planning authorities responsible for decisions in this area set up **appropriate consultation procedures** to facilitate implementation of the policies established for siting new establishments or new developments in the vicinity of the Seveso establishment. The procedures will be designed to ensure that **technical advice** is available, either on a case-by-case or on a generic basis, when decisions are taken [6]. Public involvement is also important and the public must be able to give its opinion on LUP decisions.

Additionally, for existing establishments, **additional technical measures** in accordance with Article 5 can be taken into account, in order not to increase the risk to people.

Although the Directive provide regulatory framework for LUP, does not contain any detailed suggestion on how this should be done [24].

Across the EU variety of approaches to risk analysis and risk criteria exist. Each Member State has its own approach, which mainly social, cultural and geographical aspects are important determinants in LUP methodology of MS [25].

The EC LUP Guideline [22] describes these different approaches and these approaches are explained in following chapter.

CHAPTER 3

RISK INFORMED LAND USE PLANNING

Major accidents risk concept has received less, though increasing attention in the last decades in comparison to other "traditional" risk-fields, such as flood and hydro-geological risks [8,9].

Risk in the context of LUP can be categorized under three different forms. First, natural disaster such as floods, earthquakes, second; long-term or permanent impacts such as industrial emissions and third one is man-made disasters such as short-term accidental releases fires explosions and toxic clouds [26].

LUP activities in the context of the Seveso II Directive belong to the third one and it is implemented in two steps:

- "technical" phase (identification of accident scenarios, assessment of consequences, etc.)
- "policy" phase (acceptability criteria, zoning, spacing safeguards permits, etc) [26].

Based on an extensive review of literature on (major accidents) risk informed LUP, chapter provides an introduction to the conception of major accidents risk assessment and associated terms in relevant LUP.

3.1. The elements of (Major Accidents) Risk

Article 3 of the Seveso II Directive defines major accident as:

adverse occurrence such as a major emission, fire, or explosion resulting from uncontrolled developments in the course of the operation of any establishment covered by this Directive, and leading to serious danger to human health and/or the environment, immediate or delayed, inside or outside the establishment, and involving one or more dangerous substances.

Table 4 describes the hazard types and resulting major accidents with their consequences.

Table 4 - Hazard and Major Accident

Hazard	Major accident results
 Fire	*Flammable substances* Fire results in thermal radiation which in turn , burns to people; damage to installations & property
 Explosion	*Explosive substances* Explosions results in overpressure which causes harm to people; damage to installations & property
 Toxic	*Toxic substances* Toxic Release leads exposure to toxic concentrations by inhalation or other routes , intoxication of people
 *dangerous to the aquatic environment*	*Substances dangerous to the aquatic environment* release to water above ecotoxic concentrations results in pollution & damage to ecosystem

The Directive also includes the formal definition for “risk” and “hazard” terms. It is useful to draw a distinction between these terms for the rest of the chapter.

> *“risk shall mean the likelihood of a specific effect occurring within a specified period or in specified circumstances”*
>
> *“hazard shall mean the intrinsic property of a dangerous substance or physical situation, with a potential for creating damage to human health and/or the environment”*

The Directive obligates Seveso Operators to prevent or reduce the risks arising from hazards at their establishments to an acceptable level based on risk assessment.

3.2. (Major Accidents) Risk Assessment

According to Christou et al. [22], risk assessment procedure includes risk analysis and risk evaluation steps such that:

- In risk analysis step, hazards are identified and estimated by systematic use of available information and,
- In risk evaluation step, evaluation of the level of risk is carried and decided whether acceptable risk has been achieved.

In other words, risk assessment is the process of risk analysis and evaluation of the significance of the results. The risk analysis step may be qualitative, quantitative, or semi-quantitative. It identifies hazards and to estimates the risk to individuals, property, and the environment [27].

In risk evaluation step, process where decisions are made on the acceptability of the risk based on a risk analysis by considering factors such as socioeconomic and environmental aspects. The evaluation of resulted risk requires risk acceptance criteria: which is used as a basis for decisions about acceptable risk [27]:

EU Joint Research Centre guidance document [28] on the preparation of a safety report presents major accident risk assessment procedure in details. The risk assessment process can be viewed as concentrating on five basic questions [28] under two main steps namely risk analysis and risk evaluation. These questions and steps are summarized in Table 5.

Table 5 - Elements of Risk Assessment [22, 28, 29]

Risk Assessment	**Risk Analysis**	**1. What Can Go Wrong?** Potential accidents and the ways they could come about are identified.(hazard identification-accident scenario selection)
		2. How Often? Probability of their occurrence is estimated (scenarios' likelihood assessment - frequency assessment);
		3. What Are The Consequences? Potential consequences of the accidents are estimated. (accident scenarios' consequence assessment);
		4. What are The Risks? Risks are identified in terms of their level by using the above analyses, and their significance assessed (Risk Ranking); and compared with established criteria (Risk Criteria).
	Risk Evaluation	**5. So What?** Risk management actions are carried out Demonstration of resulting risk and evaluation with established tolerability criteria (Identification of mitigation measures, acceptance of result, modification or abandoning)

What Can Go Wrong?

Hazard identification process carried out for which a variety of instruments exist for systematic assessments, which are selected depending on the complexity of the individual case. Following the identification of hazards is, reference accidence scenarios[9] are selected which is the basis for determining whether the safety measures in place or planned are suitable [28].

After the identification of hazards and designation of reference accidence scenarios, second and third questions come respectively in risk assessment procedure.

How Often (Scenarios' likelihood)? - What are the Consequences? (Scenarios' consequences)

In these steps**, hazards** which are known to have the possibility further analyzed.

[9] For the specific purposes of safety reports in the context of Seveso II requirements, a scenario is always an undesirable event or a sequence of such events characterised by the loss of containment (LOC) or the loss of physical integrity and the immediate or delayed consequences of this occurrence [22].

To answer the questions; “How Often?” and “What are the consequences?”, the scenarios’ likelihood and consequence assessment have to be carry out , which are crucial stages in the risk analysis procedure. Different approaches are followed in likelihood and consequence assessment. These assessments need use of methodologies that are generally divided into different categories [28]. The categories of risk assessment methodologies will be given in detain in following section.

What are the risks?

The next question is the “What are the risks?”. In this step, determination of risk levels derived from the previous steps and assessment of their significance so called risk ranking is carried out. Then presentation of resulting risks and comparison with established acceptability criteria comes next.

So What?

The last question is “So What?”. It includes risk evaluation action by considering reliability and availability of safety systems and decision on whether mitigation measures are enough to decrease the risk to accepted risk level or modification or abandoning is needed.

To sum up, theoretically, all risk assessment methods have common relevant elements in Table 6.

Table 6 - Best Practice in Risk Assessment [28]

- Definition of scope, objectives and risk criteria
- Description of the object or area of concern
- Identification of hazards and vulnerable targets
- Assumption of source terms or hazardous incidents
- Development of escalation scenarios
- Estimation of consequences and likelihood
- Presentation of resulting risk and comparison with established tolerability criteria
- Identification of mitigation measures
- Acceptance of result, modification or abandoning
- Proportional to the severity of consequences;
- The use of acknowledged methods
- Reliability of data and relevant information and transparency of the process

3.3. Risk Assessment and LUP in the context of Seveso II Directive

This section examines risk informed LUP and gives information on risk assessment (RA) supporting in LUP.

Rausand [27] defines Risk-informed decision-making as "an approach to decision-making representing a philosophy whereby risk insights are considered together with other factors to establish requirements that better focus the attention on design and operational issues proportionate with their importance to health and safety".

Approaches to the risk concerns and assessment of hazard/risk are one of the critical components the Member States' LUP policies [28]. Characteristically, LUP is built on the rule that inappropriate uses of land should be separated by adequate distances. As a rule, it involves setting up limitations/constraints and their utilization. These limitations/constraints describe which uses of land are permitted at the various zones (safety distances) surrounding the dangerous establishments and plants [22].

Evidently, risk profile of dangerous establishments determines these zones. Therefore, it is important to have appropriate limitations/constraints which are proportional to the level of risk. This brings the importance of **hazard/risk assessment methods** and **criteria** for risk-informed LUP [22].

For that reason, LUP policies procedures used for dangerous establishments necessitate the presence of clearly established hazard/risk assessment methods and criteria (Figure 6). For example, to evaluate the whether additional safety measures are taken at establishments are enough and successful [22].

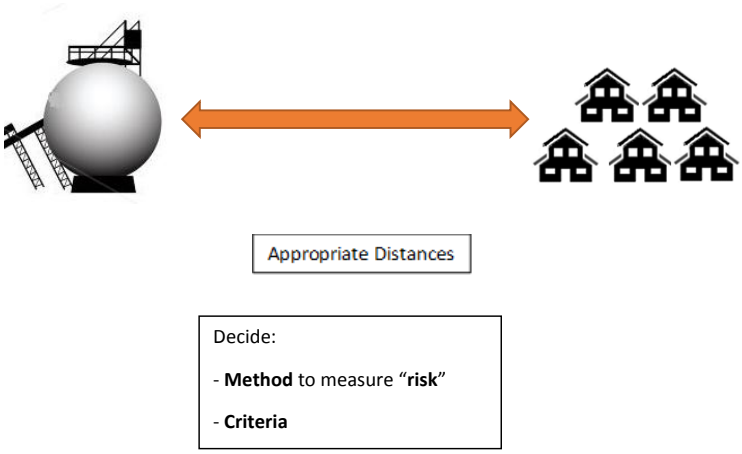


Figure 6 - Risk assessment (RA) supporting in LUP

3.4. Common risk assessment approaches used in supporting LUP decisions

The implication of LUP in risk management directly is related with its scope according to national legislation [25].

Currently, the practices and methodologies are so varied for Article 12 LUP policies throughout the MS. The different approaches to "How Often?" and "What are the consequences?" of the major accidents questions regarding the scenarios' likelihood and consequence assessment steps in the risk assessment process are the main reason for the variety of LUP practices across EU.

The different implementation of a risk informed LUP based on the 1) adopted definition of "risk" and 2) the way in which risk is evaluated and compared with a measuring scale [22].

- **Probabilistic (Risk Oriented):** Estimates the probability of a specific failure/accident or level of damage.
- **Deterministic (Consequence Oriented):** Assume that there are "worst-cases[10]" to be evaluated and their consequences to be taken into account.

The above categories are subdivided according to hazard identification and assessment compatible with the approach [22]:

1. Deterministic approach / Generic Safety Distance
2. Deterministic approach / Consequence-oriented
3. Probabilistic approach / Risk-oriented approach.
4. Hybrid approaches

Generic safety distance approach which uses tables with fixed distances is an example of a simplified approach for consequence-oriented method. It is used for standardised installations, deriving from standard risk/hazard assessment of a typical facility, and used as default or for screening purposes. Generic safety distances depend on the type of activity rather than on a detailed analysis of the specific site.

[10] Worst-case accident scenario: The scenario with the highest consequence that is physically possible regardless of likelihood [26].

They typically are used to quickly assess which circumstances necessitate more analysis. Generic safety distances are often considered as conservative such that they define comparatively large safety distances.

Consequence-oriented approach is based on analysis of the consequence of credible[11] accidents, without taking into account its probability. Assessment of number of reference accident scenarios either quantitatively or qualitatively is the focus of this approach. Damage thresholds values for accident physical effects (toxic concentration, thermal radiation, and overpressure) are determined concerning undesired consequences (fatalities, irreversible effects, reversible effects, etc.). It usually involves two zones are defined [22]:

- Internal zone – lethal effects – no urban development allowed
- External zone – beginning of irreversible effects – no sensitive population

Risk-oriented approach assesses quantitatively both the consequences and the likelihood of occurrence for a large number of accident scenarios. This approach results in two expressions of risk: location-based (individual) risk, and societal risk in the form of an F-N curve. Location-based (individual) risk expresses itself as geographic distribution of risk, while societal risk assesses whether areas with high population density might be exposed to risk [30].

Hybrid approaches can be classified as a subcategory of the risk-oriented or the consequence-oriented methods. The approaches incorporate risk and consequence elements either qualitative or quantitative. Semi quantitative approach is an example of hybrid methods. Use of a risk matrix is a characteristic example [30].

Table 7 summarizes risk informed LUP approaches and their zoning criteria.

[11] Worst credible accident scenario: The highest consequence accident scenario identified that is considered plausible or reasonably believable [26].

Table 7 - Risk informed LUP Approaches [22, 24, 25]:

Approaches	Probabilistic	Deterministic		Hybrid
	Risk Oriented	**Consequence oriented**	**Generic Distances (Fixed Distances)**	
Zoning criteria	Risk acceptance criteria: individual and societal risk	Consequence zoning criteria: LC1%, IDLH, ERPG, AEGLs.	Depend on the type of activity	Thresholds values identifying lethal and irreversible effects

Although, different approaches are being followed in EU, the current practices which aim to respond the requirements of Article 12 have common points, namely: hazard/risk assessment methods, reference scenarios[12] for the calculation of effects, frequency estimation for events of concerned, effect endpoints, separation distances and technical measures to replace separation distances [22].

Moreover, the best practice in the application of the general principles for LUP advices are set out by the European Guidelines. These principles are [22]:

- **Consistency** in results of similar situations under similar conditions
- Decisions should be **proportional** to the level of risk
- **Transparency** for the decision-making process.

Although, there are differences in methods and criteria, LUP approach essentially has the same starting point: for a given site, the approaches take into consideration of a technical evaluation of the risks of credible major accident scenarios considered [26] (Table 8).

Simply, accident scenario can be defined as a specific sequence of events from an initiating event to an undesired consequence [27].

[12] Scenario = "Top Event" (usually/mostly Loss of Containment (LOC)) and Dangerous Phenomenon (fire, explosion, toxic cloud) [22].

Table 8 - Major accident scenarios [22]

Typical scenario examples	The Loss-of-Containment	"dangerous phenomena"
vessel failure & vapor cloud explosion, hole in vessel wall & pool fire (ignition of released flammable liquid, pipe leak & toxic release etc.	vessel rupture vessel leak vessel roof collapse pipe rupture pipe leak loading connection release (leak or rupture)	pool fire tank fire fireball vapor cloud explosion flashfire jetfire toxic or flammable cloud release.

Final results of a risk assessment, concurrently LUP decisions such as safety distances, depend on strongly set of accident scenarios considered. Incorrect selection of accident scenarios may result in a significant reduction of the effectiveness of LUP decision [26].

Figure 7, Bow-Tie Diagram indicates causes and consequences of top event (loss of containment), and they can be used to define major accident scenarios [28].

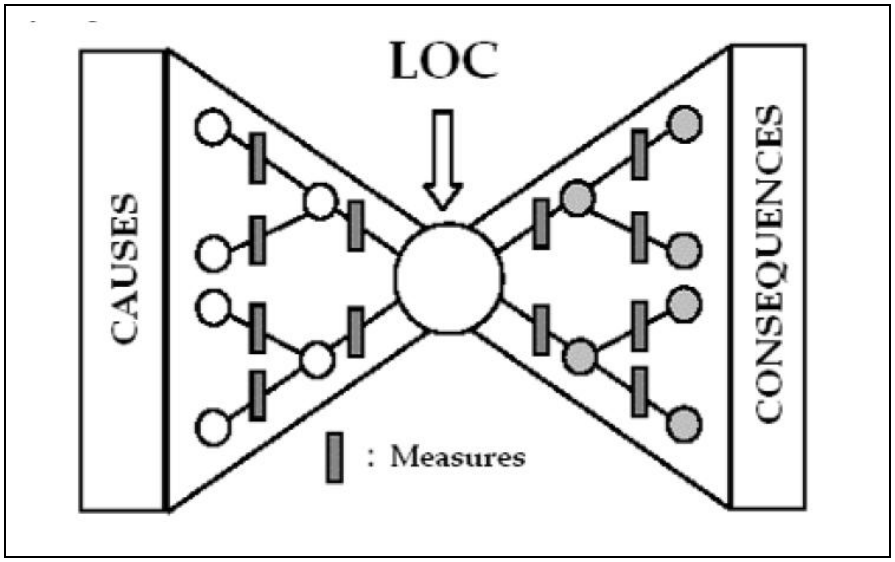


Figure 7 - Bow-Tie Diagram [28]

3.5. Risk Acceptance Criteria

As defined in Section 3.2, the risk assessment procedure requires definition of scope, objectives and risk criteria. When the risks are identified in terms of their level by using the risk analyses and their significance should be assessed and compared with established criteria (Risk Criteria) in decision-making process.

In the context of the Seveso II Directive, the risk acceptance criteria can be defined as qualitative or quantitative expression placing limits on the acceptable risk for a given establishment [27].

In the risk informed LUP, the risk-acceptance criteria imply that a level of acceptable risk is previously established and that risks are compared against them. In the case of Seveso establishments, the criteria relate to the health of humans and the environment [9].

In EU, the majority of regulations addressing the prevention of major accidents risks, their acceptance is expressed in terms of probability of fatality based threshold values. Threshold values identifying lethal and irreversible effects are often defined by law. In EU countries, generally accepted risk level is 10^{-6} per year as probability of dying due to the exposure to a major accident [9].

There are commonly used principles for risk acceptance is [27]:

- Individual risk criteria
- Societal risk criteria
- Precautionary principle

Acceptance criteria for public receptors around major hazard establishments can be defined in various ways. The most common ones are individual risk and societal risk. The concept of consequence distance is another approach for the ones who do not want to assess risk quantitatively [30] (Table 9).

Table 9 - Risk criteria for third parties [30]

The definitions below are taken from the Danish Environmental Protection Agency publication [20]:

Consequence distance and maximum consequence distance

Consequence distance is generally defined as the distance within which death or serious injury is expected. The consequence distance is either based on the distance within which a particular mortality rate would be expected or the distance to a particular end-point value for toxicity, heat radiation, or overpressure.

One can use the worst scenario and the worst case meteorological factors to determine the maximum consequence distance that applies to the establishment in question. The establishment will not represent a risk to human life outside the maximum consequence distance.

Location-based (individual) risk

The term, 'individual risk', is often used in relation to quantitative risk criteria. Individual risk is a risk that individual is exposed to, based on their distance from the risk source.

Location-based risk describes the geographic distribution of risk for the establishment in question. It is shown using iso-risk curves, and is not dependent on whether people or residences are present. Location-based risk is used to assess whether individuals are exposed to more than an acceptable risk in the locations where they may spend time.

Societal or group risk

Societal risk expresses the risk that a group of people is simultaneously exposed to the consequences of an accident. This is expressed – using an 'FN curve' – as a relationship between the expected frequency of the accident, and the number of people who will die (or be injured) as a result of the accident. 'F' is the (cumulative) frequency of an accident involving more than N deaths."

Figure 8 depicts the individual and societal risk and consequence distance concepts.

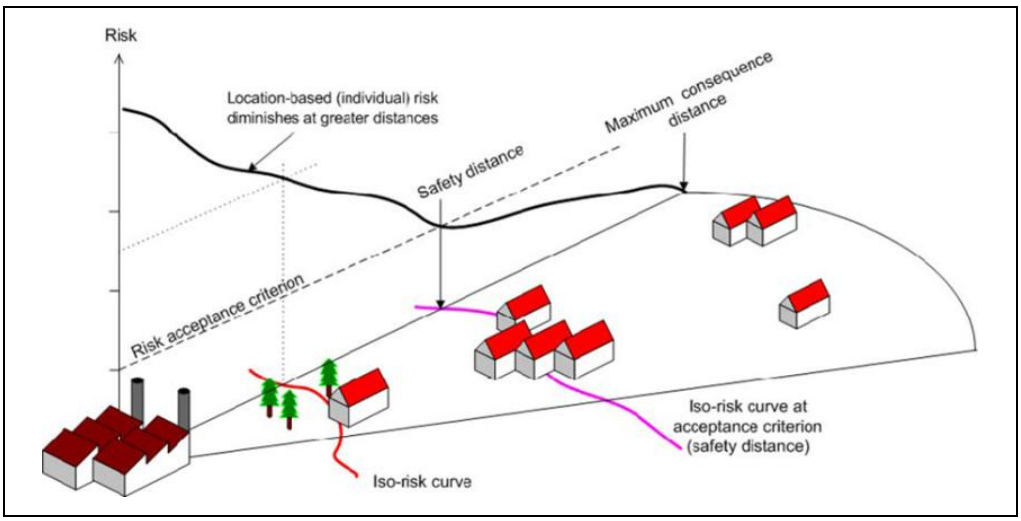


Figure 8 - Presentation of terms associated LUP [30]

3.6. Approaches to LUP in EU Member States

In EU examples, LUP decisions which involve restriction for developing land for certain uses in the vicinity of hazardous installations have become main strategy [22].

In accordance with the Directive, some of the EU countries have drawn up detailed risk criteria which are taken into account by planners and decision makers when considering development of land in areas where such establishments are located [25].

At present, the practices and methodologies vary for LUP policies across the MS [31]. In this section, LUP practices in the certain European Union (EU) countries are reviewed.

3.6.1. France

Until Toulouse accident in 2003, French approach used to follow consequence oriented approach such that it considers intensity of effects [32]. After the Toulouse accident, semi-quantitative probabilistic approach has been introduced. The safety reports provide the bow-tie and analysis performance of safety barriers. The main reason to develop new approach has stem from the criticizes in the assessment of likelihood of the accident scenarios of the quantitative risk assessment [31].

The technological risk prevention plan (PPRT) was introduced as a new instrument to manage LUP in the proximity of industrial establishments. It has established in France by so called ‘risk law’; the PPRT covers all establishments classified as top tier establishments. The aim is to limit the exposure of the population to the consequences of major accidents. Requirements are developed for existing and future buildings. The PPRT may constrain the future building rights [33].

PPRT plans are carried out on a local level under the coordination and responsibility of governor, following a public consultation.

PPRT employs representative scenarios by taking into account the *intensity*, *gravity* and probability of accidents. PPRT had developed new terminology which defines these specific terms as [25]:

- *Probability: frequency with which an accident may occur during the lifetime of an installation*
- *Gravity: effects of an accident on the population*
- *Risk: probability of occurrence of an accident combined with its gravity*

Endpoints values are used to calculate the intensity of the accidents based on possible effects of a dangerous phenomenon: toxic, fire and explosion which are given in Figure 9. The dangerous phenomena are evaluated according to four thresholds with increasing intensity: *indirect*, *irreversible (SEI)*, *lethal (SEL)* and *significantly lethal* (SELS) [25]:

Effects	**Level of effects on human**			
	Significant lethal effect threshold	**Lethal effect threshold**	**Irreversible effect threshold**	
Toxic	Lethal concentration 5%	Lethal concentration1%	Irreversible effect	
Thermal	8 kW /m2 or (1800 kW/m²)^4/3.s	5 kW / m2 or (1000 kW/m²)^4/3.s	3 kW / m2 or (600 kW/m²)^4/3.s	
Overpressure	200 mbar	140 mbar	50 mbar	**Indirect** 20 mbar

Figure 9 - Endpoint Values adopted in France [25]

Then, gravity of the effects is identified by assessing the number of potential victims in the accident (Figure 10).

Gravity	**Significant lethal effect threshold**	**Lethal effect threshold**	**Irreversible effect threshold**
Disastrous	>10	>100	>1000
Catastrophic	1 to 10	10 to 100	100 to 1000
Major	1	1 to 10	10 to 100
Serious	0	1	1 to 10
Moderate	0	0	<1

Figure 10 - Gravity of the Effects [25]

The probability is assessed in five categories from A (>10^{-2}/year) to E (<10^{-5}/year) in safety reports. After identifying the gravity and probability scales, governor use national acceptability matrix to permit the establishment (Figure 11).

Probability / Gravity	E	D	C	B	A
Disastrous	Non	Non	Non	Non	Non
Catastrophic	MMR	MMR	Non	Non	Non
Significant	MMR	MMR	MMR	Non	Non
Serious			MMR	MMR	Non
Moderate					MMR

Non: An inacceptable area
MMR: Approval is given after confirmation that all risk control measures at an acceptable cost have been put in place

Figure 11 - The MMR risk matrix Effects [25]

The PPRT involves assessing and prioritizing the risk level based on activity of the establishment and the impacted area. Risk levels enable the designation of zones that have specific LUP decision and construction rules. For the highest levels, areas for potential expropriation and/or relinquishment may also be suggested by the PPRT (Figure 12) [25].

Regulated zones	Future land-use planning and construction measures	Possible real-estate measures
Dark red	Ban on new construction	Expropriation Relinquishment
Light red	Ban on new construction but possibility to extend existing industrial buildings if they are protected	Relinquishment
Dark blue	New construction possible depending on limitations on use or protection measures	
Light blue	New construction possible depending on minor limitations	

Figure 12 - PPRT Zones and measures [25]

“Aléa” is a French term defined as “probability that a dangerous phenomenon creates effects of a given intensity, and over a determined period of time at a given point of the territory [28] used to decide LUP decisions” (Figure 13).

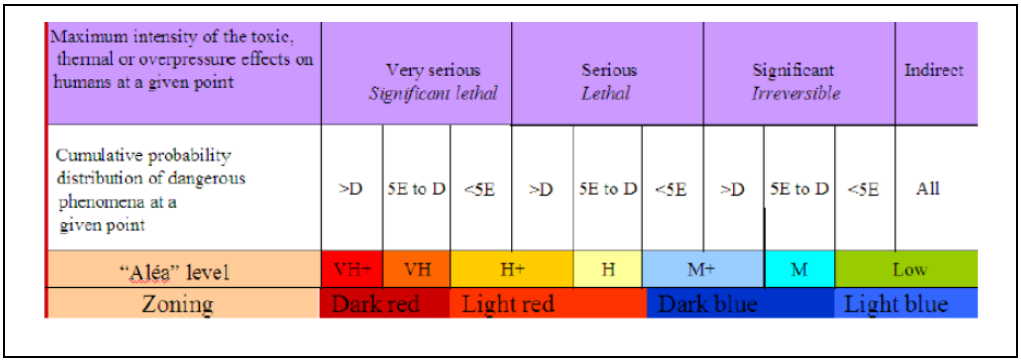


Figure 13 - General zoning principles [25]

3.6.2. Germany

The German approach [31] is deterministic which is based on the worst credible scenario and it does not calculate frequencies while developing the separation distance recommendations (Figure 14).

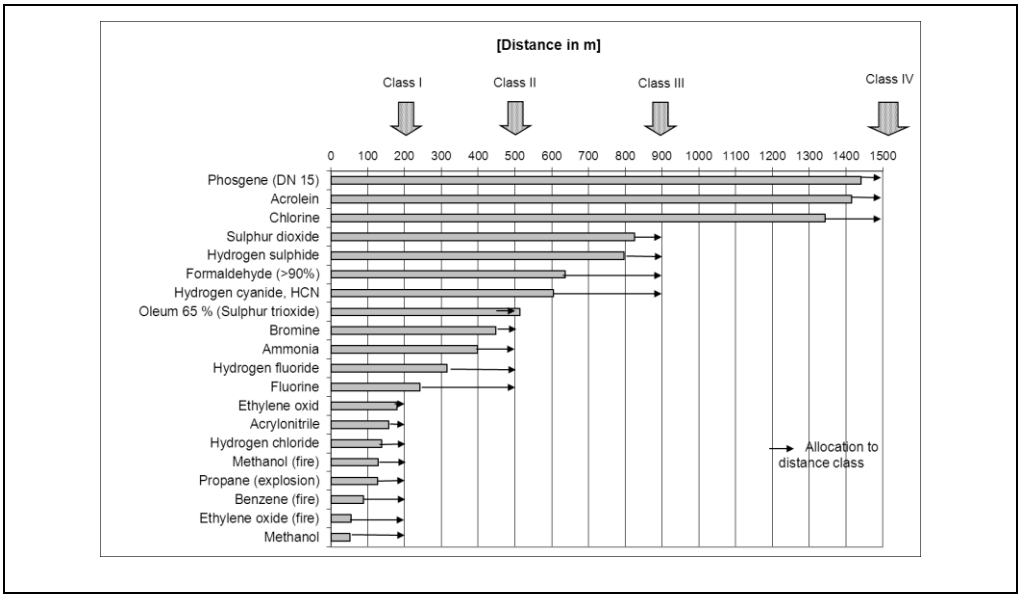


Figure 14 - Separation distance recommendations for Land-Use Planning without detailed knowledge [34]

The Guidance SFK/TAA-GS-1 [34] "Recommendations for separation distances between establishments covered by the Major Accidents Ordinance (Störfall-Verordnung) and areas which require protection within the framework of LUP

implementation of Article 50 of the Federal Immission Control Act (Bundes-Immissionsschutzgesetz)" establishes recommendations for separations distances.

The pre-defined separation distances differ based on category of dangerous substances present in the Seveso establishment [31]. The German approach calculates standardized accident scenarios based on agreed-upon conventions and compares them with data of past accidents. Separation distances are allocated to dangerous substances [34].

The guidance [34] presents separation distance recommendations and assessment methods. The aim is to assure that planning activities prevent incompatible usage which may locate at an inappropriate distance from another.

Generic (fixed) distances are determined for dealing with explosives and ammonium nitrate.

For all other hazardous substances, on a source term for the release of an area of 490 mm² was developed[13].

As scenarios fire / gas cloud explosion with immediate ignition and release of toxic substances were chosen, as the end-point for the thermal radiation a threshold value of 1.6 kW/m², for explosions 0.1 bar and for the toxic substances the concentration guidance value ERPG-2 were chosen [29].

Land-use plan are based on the following kind of building classification in Figure 15:

Figure 15 - Building classification in Germany [35]

- Housing Zones (HZ): Residential buildings, grocery stores, restaurants, non-disturbing commercial activities etc.
- Agricultural Zones (AZ): Agricultural farms, garden centers, kitchen gardens, restaurants, hotels, petrol stations etc.

[13] 490 mm² is equivalent to the cross-sectional area of a DN 25 pipe)

- Mixed Zones (MZ): Residential buildings, offices, restaurants, hotels, smaller commercial stores, facilities for ecclesiastical/cultural/sporting activities etc.
- Commercial Zones (CZ): Open for various commercial activities, warehouses, business and administration buildings, sporting activities etc.
- Industrial Zones (IZ): Open for all industrial activities, e.g. chemical plants, refineries, large-volume storage of flammable liquids, public utilities etc.

3.6.3. The Netherlands

Individual (Locational) Risk and Societal Risk are established as a risk criterion in Netherlands. The Dutch approach is fully probabilistic and it is described in CPR-18E: "Guidelines for Quantitative Risk Assessment, also called the Purple Book [18].

The value determined for the individual (location-based) risk of 10^{-6} is legally binding for vulnerable objects, while a target value of 10^{-5} applies to less vulnerable objects (Figure 16).

Vulnerable objects defined in The Netherlands for LUP purposes [25]:

- **vulnerable objects:** houses in non-rural areas, schools, elderly homes, child day-care facilities, camping sites, recreational facilities with accommodation for fifty or more visitors, large office buildings hotels and shopping centers;
- **non-vulnerable objects:** house in rural area (<2 houses/ha), and office buildings, shopping centers and recreational facilities with a limited number of people present.

In existing situations, vulnerable objects are not accepted in the area where the individual risk exceeds 10^{-6} per year. The risk informed LUP can solve problem by using additional safety measures or removing vulnerable objects. State funding is available for the implementation of this policy. Non-vulnerable objects can be found in the area where the individual risk exceeds 10^{-6} per year, but it undesirable. There is no obligation to solve the problem.

For future cases, vulnerable objects are not accepted in the area where the individual risk exceeds 10^{-6} per year. The non-vulnerable objects are highly undesirable in the

area where the individual risk exceeds 10^{-6} per year. It is needed to be approved by the council of the competent authority (Figure 16).

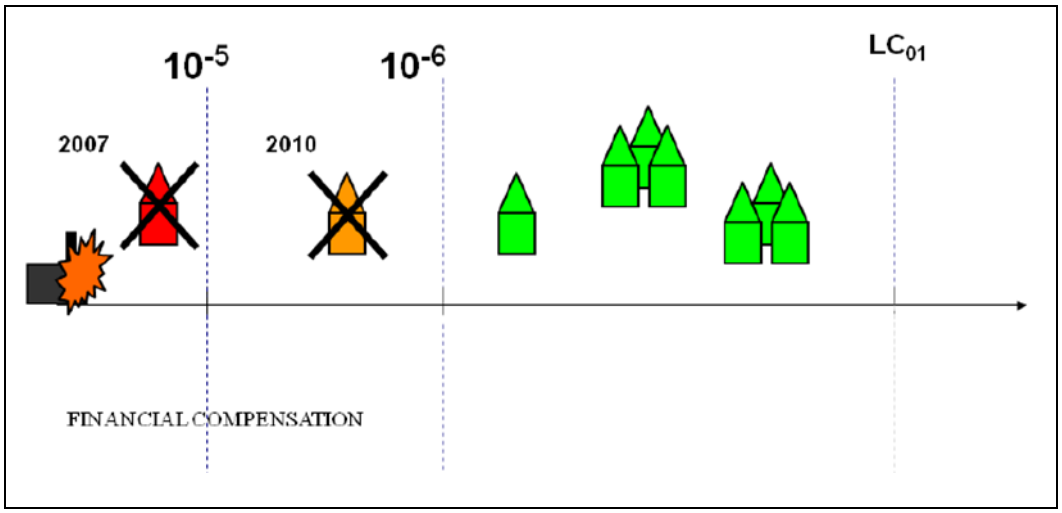


Figure 16 - Actions on existing situations in The Netherlands [36]

3.6.4. United Kingdom

Major accidents risk is taken into in consent procedure of new developments in the vicinity of Seveso establishments in UK [37].

Planning (Hazardous Substances) Regulations 1992 covers the LUP articles of the Seveso II Directive in the UK. These regulations obligate consents from the Hazardous Substances Authority (HSA), generally the local planning authority due to the presence of hazardous chemicals above specified thresholds [38].

Health and Safety Executive is assigned as legislative consultee in this consent procedure. The role of HSE is to consider the hazards and risks due to the hazardous substances to people in the vicinity and come with an advice.

UK HSE sets a consultation distance (CD) around major hazard sites and pipelines after assessing the risks and likely effects of major accidents at the installation (Figure 17).

Land Use Planning zones are designated around major hazard sites [39]:

- Inner zone corresponds to individual risk (IR) of fatality of 10 cpm (1 x 10-5 per year)
- Middle zone corresponds to IR of 1 cpm (1 x 10-6 per year)
- Outer zone corresponds to IR of 0.3 cpm (3 x 10-7 per year)
- Outer zone also corresponds to the consultation distance

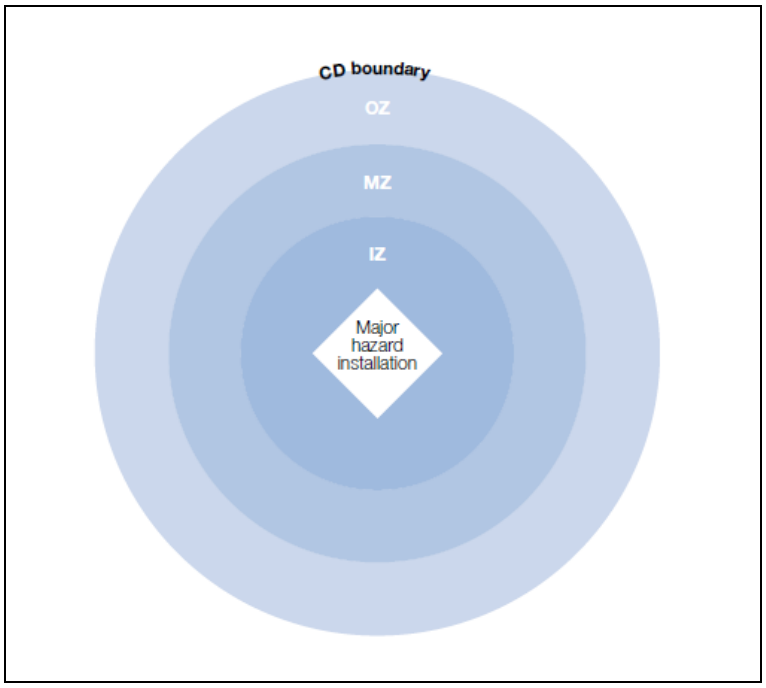


Figure 17 - Land Use Planning zones [39]

The Planning Authority is notified of the CD and has a statutory duty to consult the HSE on certain proposed developments within it including [39]:

- residential accommodation;
- more than 250 square meters of retail floor space;
- more than 500 square meters of office floor space;
- more than 750 square meters of floor space to be used for an industrial process;
- transport links (railways, major roads etc.);
- a material increase in the number of persons working within, or visiting, a CD.

When new developments and planning activities are around major hazard establishment are proposed; HSE or the local planning authority identifies where of the three zones the proposed development is located. Then, the proposed development is classified into one of four sensitivity levels [39].

- Sensitivity level 1 : normal working population e.g. factories
- Sensitivity level 2 : general public e.g. houses
- Sensitivity level 3 : vulnerable members of the public e.g primary school, old people's homes
- Sensitivity level 4 : large example of level 3 or very large example of level 2 e.g. outdoor Football ground, large hospitals.

With these two factors known, a simple decision matrix is used to give a clear 'Advise Against' or 'Do not advise Against' response to the local planning authority (Table 10).

Table 10 - Simple decision matrix in UK [39]

Level of sensitivity	Development in Inner Zone	Development in Middle Zone	Development in Outer Zone
1	DAA	DAA	DAA
2	AA	DAA	DAA
3	AA	AA	DAA
4	AA	AA	AA

3.6.5. Ireland

The approach in Ireland is similar to the UK. The Consultation distances are prescribed in planning legislation for different types of major hazard establishment. The Health and Safety Authority (HSA) uses these distances as a starting point to set Consultation Distances around major hazard sites [40].

On being notified of the existence of an establishment, the Authority formally writes to the relevant planning authority, giving them a consultation distance around the

establishment. The Authority recommends that developments within this consultation zone should be referred to it, for technical advice [41].

Inner, Middle and Outer, LUP zones (Figure 18) are determined using a quantitative risk assessment approach where

- Inner zone corresponds to Individual Risk of fatality (IR) of 10 cpm (1 x 10^{-5} per year)
- Middle zone corresponds to IR of 1 cpm (1 x 10^{-6} per year)
- Outer zone corresponds to IR of 0.1 cpm (1 x 10^{-7} per ye

Figure 18 - Land Use Planning Zones in Ireland [41]

Planning applications for developments within the CD are referred by planning authorities by the Health and Safety Authority for advice. The PADHI decision matrix is used by the HSA who then either 'Advise Against' or 'Don't Advise Against' [41] (Table 11).

Table 11 - Simple decision matrix in Ireland

	Zone 1 (Inner)	Zone 2 (Middle)	Zone 3 (Outer)
Level 1	✓	✓	✓
Level 2	✗	✓	✓
Level 3	✗	✗	✓
Level 4	✗	✗	✗

This table sets out the current consultation distances used by the Authority (taken from the Planning & Development Regulations 2001-2006) (

Table ***12***).

Table 12 - Consultation distances used by the Authority [42]

Activity	Consultation Distance (m)
LPG: Storage above ground	600
LPG: Mounded or underground	100
LPG: Mounded or underground > 100t	200
Refinery	1500
Ammonia	2000
Chemical Warehouse	700
Bulk Flammable Storage	300
Bulk Toxic Storage	700
Chemical Processing: Flammable or Toxic Substance	1000
Chemical Processing: Dust Explosion Risks	300
Explosives Manufacture	1000
ANF Storage	700

3.6.6. Italy

In Italy, the Ministerial Decree of 9th May 2001 was adopted to respond Article 12 [43]. The output of the Safety Report such as identification of accidents, their effects, their frequency of occurrence is used define if a plant is compatible or not with the surrounding territory, compatibility criteria shall be defined by authorities [44].

The criteria are based on definition by law of allowable land that uses function of expected accidental damage and associated frequency. The national legislation defines land use classes (A highly populated areas to F: Industrial Areas) to F such that compatible with a given hazardous installation [25].

Endpoints are reported in the following table: Endpoint values adopted in the Italian regulation [25] (Table 13).

Table 13 - Endpoint values adopted in the Italian regulation [25]

Scenario	high lethality 1	starting lethality 2	irreversible lesions 3	reversible lesions 4	Damages tostructures / domino effects 5
Fire (stationary thermal radiation)	12,5 kW/m^2	7 kW/m^2	5 kW/m^2	3 kW/m^2	12,5 kW/m^2
BLEVE/Fireball (variable thermal radiation)	fireball radius	350 kJ/m^2	200 kJ/m^2	125 kJ/m^2	200-800 m (*)
Flash-fire (instantaneous thermal radiation)	LFL	½ LFL			
VCE (overpressure)	0,3 bar (0,6 spazi aperti)	0,14 bar	0,07 bar	0,03 bar	0,3 bar
Toxic release (absorbed dose)	LC50 (30min,hmn)		IDLH		

(*) related to the typology of the tank

Competent authorities use the Table 14 in order to make LUP decision in Italy.

Table 14 - Territorial Compatibility Criteria [25]

Accident frequency	**Damage Effect Categories**			
	Fatalities	**Lethality Threshold**	**Serious injuries**	**Minor Injuries**
< 10^{-6}	DEF	CDEF	BCDEF	ABCDEF
10^{-4} – 10^{-6}	EF	DEF	CDEF	BCDEF
10^{-3} – 10^{-4}	F	EF	DEF	CDEF
> 10^{-3}	F	F	EF	DEF

3.7. Summary

In the lights of the above approaches in MS, it can be concluded significant differences in acceptance criteria and methods of implementing risk informed LUP in EU MS prevails.

Although the choice between the orientations is influenced by the policy and territorial context of regulations, there are common elements (Table 15 and Table 16).

Table 15 - The Risk Criteria

The Netherlands	Italy	UK	France	Germany
Individual risk (fully probabilistic)	Specific matrix (semi-quantitative)	Individual risk (probabilistic)	Alea zones	-
Societal risk	Specific matrix	Societal risk (not a regulatory tool)	Matrix probability - severity	-

Table 16 - Classes for vulnerable targets

	The Netherlands	Italy	UK	France
Number of classes for vulnerable targets	2 classes	6 classes	4 classes	≈ 3 classes

Germany follows deterministic approach; accident scenarios are selected based on a technical description of releases and relation to the surroundings. It does not consider accidents larger than the reference scenarios. Safety Distances requirements are can be regarded as risk acceptance criteria [30].

In Netherlands, quantitative risk acceptance criteria apply to both existing and new situations. These criteria examine both location-based (individual) risk and societal risk.

The UK approach employs a criteria based on location-based (individual) risk of a new development in the vicinity of existing plant. These criteria define limits on the

number of people who may be exposed to particular levels of risk, thus giving partial consideration to societal risk [30].

France follows a hybrid method that approximates to a through quantitative risk analysis. However, the qualitative aspects have been retained namely; frequency assessment, fixed end-point values, various types of consequences frequencies are calculated separately and the effects of wind direction and speed are not considered.

Hybrid approach in Italy, takes into account criterion that incorporates frequencies as a mitigation factor for the damage zones, but it does not necessitate the calculation of the individual and societal risk [44].

Although above mentioned EU countries have developed specific criteria for risk informed LUP; control of land use planning in the vicinity of Seveso establishments are implemented via non-specific legislation, and the risk is implicitly reflected in the land use policies [45].

In EU, various specific criteria and accepted base principles are constructed. It can be therefore generally concluded that it is the underlying *scope* and not the *result* of land use planning evaluations that appears to determine the adoption of one of the two methods. Here, the demographic variable and different national legislative contexts may be a determinant factor. In this perspective, the choice between the two orientations confirms to be influenced by the political and territorial context of regulations rather than by mere methodological considerations [9].

CHAPTER 4

NATIONAL LEGISLATION

In this chapter, existing approaches for the LUP were put in perspective by tracing the legal and administrative structure, procedures, related reports and practices.

Interviews conducted via e-mail with municipalities, provincial directorates and OIZ directorates that in order to get all related information regarding LUP. The questions sent to authorities focuses on legislations, administrative structure and procedures. The answers of the authorities are presented in APPENDIX I.

In screening process of the national legislation, it is aimed to get all related information on administrative structure, procedures and main criteria which determine the decisions for safety distances (health protections zones) regarding LUP of the establishments in the context of the Seveso II Directive.

4.1. National Legislation

Regarding the administrative structure, there are three central public administrations closely related with the prevention and control of major accidents: MoEU, MoLSS, and Disaster and Emergency Management Presidency (DEMP).

There are different authorities for the management of occupational and external risks. In other words, occupational and external risks are treated separately in Turkey (Figure 19).

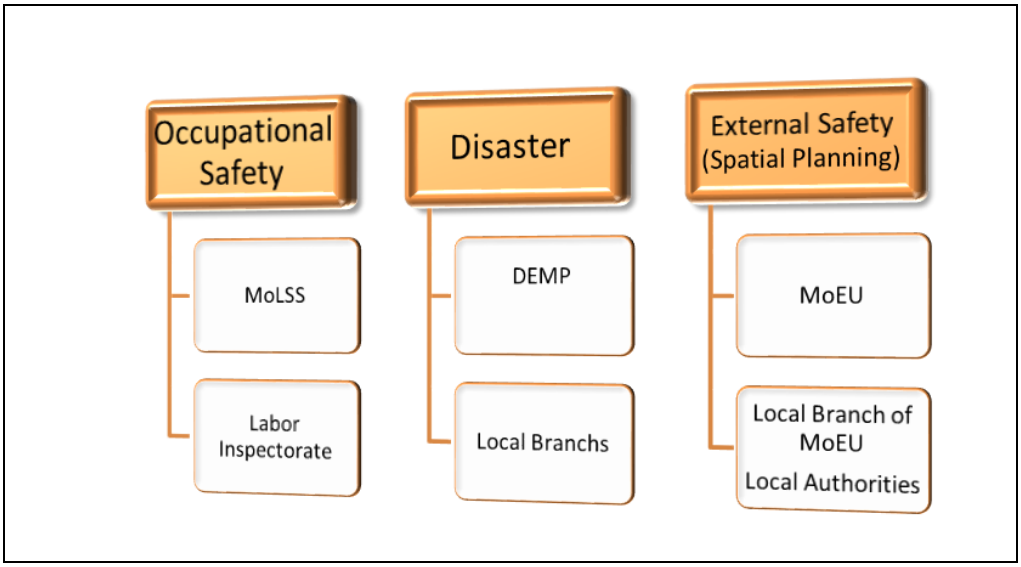


Figure 19 - Administrative Structure

4.1.1. National disaster management structure and relevant legislation

Disaster and Emergency Management Presidency (DEMP) working under the Prime Ministry and established in 2009 with the Law no 5902 dated 29.05.2009. The public authorities responsible for disaster risk management, which were the Turkish Emergency Management Agency; the General Directorate of Disaster Affairs and General Directorate Civil Defense are unified under the DEMP.

This law, Directorate General of Civil Defence operating under the Ministry of Interior, the Directorate General of Disaster Affairs functioning under the Ministry of Public Works and Settlement, and the Directorate General of Turkish Emergency Management functioning under the Prime Ministry were abolished.

The main administrative and legal framework in disaster management:

- Measures and Assistances to be put into Effect Regarding Natural Disasters Affecting the Life of the General Public Law no.7269 of 1959
- The Civil Defense Law no. 7126
- Establishment of Disaster and Emergency Management Presidency Law no. 5902

Although, Turkey's new Disaster Management System is expected to focus in pre-incident works and overall risk management approach, Balamir [46] states that the law mainly concentrates on disaster preparedness and response but do not directly respond risk reduction in a complete manner.

Law on Redevelopment of Areas under Disaster Risk, numbered 6306, which was adopted on May 16, 2012 and put into force by publication at the Official Gazette dated May 31, 2012. The Law No. 6306 defines risk areas only considering earthquake risks. The competent authority of the law is the MoEU.

Interestingly, the Disaster Law No. 7269 does not have even "risk" term as a word in law text. More importantly, though Turkish disaster concept/definition covers natural, technological and man-made disasters, the policies and strategies are mainly concentrated on natural disasters, particularly in earthquake risks. This is attributable to proneness to earthquake risks.

The DEMP Department of Planning and Mitigation have responsibilities on technological man-made disasters. Nevertheless, up to date there is no strategy or policy document for technological and man-made disasters[14].

4.1.2. Occupational Health and Safety

MoLSS is responsible for enforcing all labor legislation and regulation including occupational health and safety. MoLSS has issued occupational risk assessment requirements pursuant to occupational health and safety legislations. With recent legislative developments, risk assessment became obligatory at workplaces. The Labor Inspectorate is the enforcement authority for occupational risks concept. The MoLSS has distributed guideline on how to perform an occupational risk assessment for establishments[15].

[14] In late 2013, working group under Department of Planning and Mitigation recently started to project named as Preparation of National Strategy Plans for The Technological Disasters [47].

[15] These guidelines define five simple steps to perform the assessment: which information should be gathered, how hazards are identified, evaluation of the risks resulting from identified hazards, planning the precautions and additional measures that should be taken to prevent or mitigate risks resulting from hazards, preparing the written document for risk assessment process.

In Turkey, occupational safety concerns the whole range of incidents or accidents that can cause harm to personnel. Characteristically, occupational safety manages accidents with a relatively high frequency, low impact while major industrial accidents having off-site risks can harm more people and with lethal effects [48].

The Law on Occupational Health and Safety No. 6331 has been published in the Official Gazette No. 28339 dated 30 June 2012. Occupational Health and Safety Law No. 6331 ("OHS Law") was prepared based on the principles of the EU Directive No. 89/391.

Currently, all provisions of the OHS Law are enforceable for all private entity workplaces with 50 or more employees.

Law No. 6331 has introduced several new concepts and additional obligations to employers regarding to occupational health and safety related issues.

Article 10 of the Law obliges employers to conduct a risk assessment or have the same made by others for its workplace and to determine the precautions required for maintenance of occupational health and security and the use of protective equipment for such purpose.

The details of the principles and procedures to be followed in determining hazard classes and conducting risk assessments shall be further elaborated with regulations to be issued by the Ministry. Workplaces are categorized under hazard classes with a communiqué was issued by the MoLSS in accordance with the characteristics of each occupation.

Law No. 6331 refers the Seveso II Directive on obligations of major accident prevention policy and safety report in the Article 29. The Law required the workplaces where major industrial accidents may occur, operators/employers are required to prepare an accident prevention policy document or a safety report before starting operations. Accordingly, such employers under the obligation to prepare a safety report shall commence their operations once the content and sufficiency of their report is approved by the Ministry.

4.1.3. Spatial Planning

The rapid and uncontrolled urbanization and housing process experienced in Turkey after the 1950s has brought about growth of the cities which are highly vulnerable to natural disasters and man-made dangers.

In the areas which are vulnerable to natural disasters, particularly earthquake and flood, as well as the cities which have development patterns partially contradictory to the plans and public housing legislation, the rapidly-implemented reconstruction practices have been kept clear of planning approach and practice involving the risk reduction methods and, therefore, deep "risk pools" have emerged in our cities [13].

The general policy framework of the Turkish spatial planning system includes four main stages [49]:

- National Strategies and Development Plans
- Regional Development Strategy Plans
- Environmental Plans
- Land Development Plans

National Strategies and Development Plan is the main document adopted by the parliament and set macro-economic and social policies that are to be followed by all government institutions.

Regional Development Strategies are also socio-economic plans aims to respond the policies in regional level. These plans present socioeconomic development trends and potential of regions, sectoral objectives, and prioritized areas. Regional Development Strategies is an upper scale plan that shapes the all other strategy plans will be formed by public authorities, particularly local authorities. However, these strategy plans are criticized due to not have “spatial” part of strategies [50].

In Turkey, Local Authorities Metropolitan Municipalities, Municipalities and Special Provincial Administrations are responsible for the implementation of the spatial/urban[16] planning activities [50].

The MoEU is the ministry manages and controls the LUP practice in terms of providing technical advice, developing new legislation, by-laws and technical guidelines, and carrying out planning activities [52] (Figure 20).

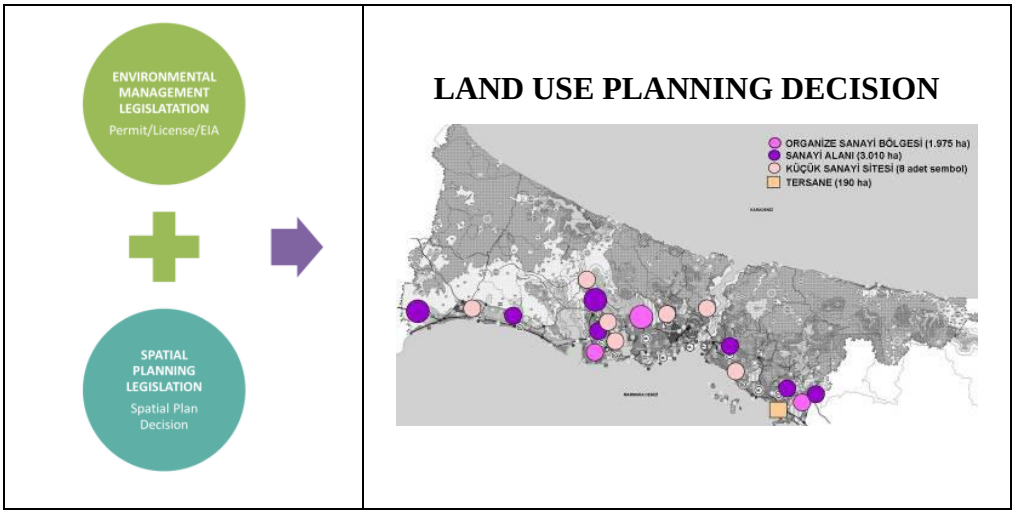


Figure 20 - Administrative and legal structure for Land Use Planning of dangerous establishments

The legal framework for spatial planning covers followings:

- Land Development Planning and Control Law (No:3194)
- The legal framework for Metropolitan Municipalities
- The legal framework for Special Provincial Administrations
- Other physical planning-related acts

Law No: 3194 aims to ensure that settlements and development therein come into being in compliance with plans, science, hygiene and environmental conditions.

[16] Spatial Planning, urban planning and physical planning terms were used interchangeably in the thesis.

As described by Balamir [46]:

The practice of land-use planning and zoning, transportation and infrastructure planning, procedures for density assignment, planning the open spaces, participation processes, strengthening and devising new methods of monitoring building- use control with structural safety standards in buildings etc., all of these are distinct aspects of disaster concerns that naturally need to be covered in the Development Law

Certain provisions for local spatial management plans and decisions on site development and land-use:

- Establishment of restricted-use areas or industrial zones
- Location of hazardous establishments in safe distances from each other, from residential areas, from commercial, educational and government buildings, valuable nature reserves, water intakes, etc.

According to Law No: 3194 , plans shall be prepared as “Regional Plans” and “Land Development Plans” in terms of area coverage and purpose; and land development plans as “Master plans” and “Implementation Plans”. If it is necessary, implementation plans may be prepared in stages.

4.2.By-Law on the Control and Mitigation of Major Industrial Accidents

By-Law on the Control of Major Industrial Accidents is the main legislative tool corresponds to the Seveso II Directive in Turkey.

However, the Seveso II Directive’s requirements such as major accident prevention policy, risks assessments, safety reports, domino effects, information to public on controlling major accident risks are new concepts for both competent authorities and Seveso operators.

One of the earlier legal instrument with the aim of minimizing the possible damage to the public and environment by the major industrial accidents in provinces is named as Circular on "Local Emergency Plan for Major Industrial Accidents" was published in 1996. It was based on the Seveso I Directive and the United Nations Environment Program / Awareness and Preparedness for Emergency at Local Level

(UNEP/APELL) Handbook. The Circular on Local Emergency Plan for Major Industrial Accidents was put into force on 29 July 1996.

Former Ministry of Environment and Forestry requested by from the Governorships to elaborate "Local Emergency plan for Major Industrial Accidents" in accordance with the Circular. However, only 36 governorships performed and tested the local emergency plans requirement, and submitted to the Ministry and 18 governorships declared no need to local emergency plan due to the absence of establishments covered by the Circular [14].

Since 1996, there have been some structural and legislative works that aim at preventing and minimizing damage by major industrial accidents to the public and environment. In particular,

- By 2003, through the EU LIFE project and by, the MoEU has undertaken data collection and review of current practices; strategy development; implementation plan preparation; preparation of draft By-Law transposing the provisions of the Seveso II Directive and establishment of an information system called Seveso Notification System.
- An EU funded Technical Assistance Project started in 2012, in order to develop capacity to implement the By-Law. The Project includes trainings, study visits, pilot studies and public awareness campaigns for MoEU and MoLSS, municipalities, special provincial administrations, as well to the operators and public.

4.2.1. Administrative and Legal Structure

Major hazards regulation in the context of the Directive has been recently introduced to the Turkish Legislation. Turkish Republic Government transposed the Seveso II Directive in August 2010 with the By-Law on Control of Major Industrial Accidents (COMIA) which had been expected to entry into force in August 2012. However, the implementation and enforcement of the by-law had been postponed to January 2014 [10,11].

In December 2013, enforcement of the transposed Directive postponed again. Furthermore, the new by-law named as By-Law on Prevention and Mitigation of Major Industrial Accidents (PMMlA) has been introduced and it repealed COMIA. It will enter into force in January 2016, approximately 17 years after the enforcement of the Seveso II Directive in EU [12].

The newest By-Law assigns MoEU, MoLSS as competent authorities. Moreover, DEMP and local authorities have also several responsibilities in the implementation of the Directive.

The MoEU has the main implementing responsibilities at national level related to Seveso II Directive. The MoEU co-ordinates the activities and makes harmonization studies under its responsibility in this field through its General Directorate of EIA, Permission and Inspection.

The Control of Major Industrial Accidents and Inspection Branch Office Directorate have been given the following tasks:

- to prevent Major Industrial Accidents involving dangerous substances and to designate practical procedures and principles in order to minimise the effects of possible accidents to the environment and human health.
- identification of the establishments involving the risk of major industrial accidents.
- ensure the inspection plan and program for the establishments involving the risk of major industrial accidents and its implementation.
- ensure the inspection of the establishments involving the risk of major industrial accidents.
- Ensure the cooperation with the related units, institutes, institutions and sectors in order to increase the technical and administrative capacity for the task related subjects.

MoEU is responsible for establishing a notification and a formal registration system, ensuring the preparation of major accident prevention policy by operators, ensuring the preparation of internal emergency plans by operators and external emergency

plans by the local authorities, ensuring development of a system for the classification of establishment groups with a potential for domino effect, ensuring that operators provide information to the competent authorities about major accidents, establishing procedures for investigation of major accidents, establishing procedures for information available to the public, establishing an effective inspection and enforcement/implementation system, establishing a reporting system and ensuring fulfillment of reporting.

MoLSS is responsible for analyzing accidents and domino effects, assessment of safety reports and informing operators in this direction, ensuring that operators provide information to the competent authorities about major accidents, establishing an effective inspection and enforcement/implementation system.

DEMP is responsible for preparing external emergency plans, establishing a system for the classification of establishments or establishment groups with risks, providing information to the competent authorities about major accidents, establishing procedures for information available to the public by local responsible institutions. MoEU, MoLSS and DEMP are responsible for the overall implementation of the Directive.

4.3. Legal Framework for LUP in the context of the Seveso II Directive in Turkey

Turkey's industrial risk management practices focus on safety measures and risk reduction in the establishment-installation itself (on-site). However, the Seveso II Directive also requires maintaining of external safety such that limitation of impacts to public health and environment exposed to the industrial accidents in the vicinity of the establishments (off-site).

Major accident hazards (fires, explosions, toxic releases) are a relatively new element in LUP. LUP policies for natural disasters such as earthquakes and floods are better known and considered in decision-making in a certain level.

The PMMlA obliges a risk assessment requirement procedure, at the end of risk assessment procedure; the risk of the establishment cannot exceed $1x10^{-4}$ at the fenceline.

However, it does not define quantitative or qualitative criteria out of border of the establishment, such that land owned by the municipality and/or for use as light industry locations, open spaces, recreational usage, transportation corridors, etc.

Although the current relevant Turkish legislation does not directly correspond to LUP practices in the context of the Directive, there are numbers of by-laws and circulars have several related to LUP practices. These are;

- By-Law on Permission for Opening and Operating of Working Place (Official Gazette: 10 August 2005, no 25902)
- By-Law on Environmental Impact Assessment;
- Organized Industrial Zones (OIZs) Law and Regulations
- Regulation on Measures to be taken in the Workplaces and Works Dealing with Flammable, Explosive, Dangerous and Hazardous Substances
- By-Law on Permission for Opening and Operating of Working Place for Non-Sanitary establishments at Airports open to the Civil Air Transport
- By-Law on Buildings Fire Protection
- Circular on Health Protection Zones required for Non-Sanitary establishments which have Negative Effect on Public and Environmental Health

Strategic Environmental Assessment (SEA) is also relevant to LUP purposes, such that it identifies consequences of certain plan and programs and assesses during their preparation and before their implementation. The consideration of the probability, duration, frequency and reversibility of the effects and the risks to human health or the environment due to accidents as a criterion to determining the likely significance of effects are relevant parts for Article 12 [25]. However, the SEA Directive has not been transposed to Turkish national legislation. Therefore it is not considered in above listed regulations.

In the followings sections, each piece of legislation mentioned above list will be described.

4.3.1. By-Law on Permission for Opening and Operating of Working Place (Official Gazette: 10 August 2005, no 25902)

The by-law was enacted in August 10, 2005. Amendments were made in March 19, 2007 to comply with further needs. It regulates the procedures and principles to be applicable for business and working licenses to be granted to non-sanitary establishments (NSEs). It covers works and transactions regarding licensing and auditing of establishments.

The by-law classifies the establishments in two groups

- Sanitary establishments
- NSEs

The extent of impacts on environment and human health are the main criteria for this classification.

Articles 268-275 of the Law on Public Hygiene define establishments causing health and environmental problems. According to the Law, NSEs are sub-classified into three groups:

- Class 1 establishments that should be located definitely far away from the settlements,
- Class 2 establishments that should be located at a specified distance away from the settlements,
- Class 3 establishments that can be located close to the settlements, but they will be inspected regularly by the competent authorities.

First class non-sanitary businesses have the most possible negative effect; the third class has the least. Lists of industrial activities for each class of NSEs are present in the list in Annex-II of this by-law.

Table 17 summarizes NSEs and their categorization. The scope of the by-law depends on establishment capacity and storage of named substances.

Table 17 - Classes of NSEs

Class I NSEs	Class II NSEs	Class III NSEs
Energy	Energy	Energy
Metallurgy and Machines	Metallurgy and Machines	Metallurgy and Machines
Mining	Mining	Mining
Chemicals	Chemicals	Chemicals
Petrochemicals	Petrochemicals (Fuel Stations, LPG, CNG)*	Petrochemicals
Food , Beverages, Agricultural Products	Food , Beverages, Agricultural Products	Food , Beverages, Agricultural Products
Waste Management and Waste Disposal	Waste Management and Waste Disposal	Textile
Textile	Textile	Other
Other	Other	

According to the by-law, Article 16, safety distances, which are also called **HPZ,** should be determined and applied in the boundaries of residential, commercial and industrial development parcels regarding Class 1 and Class 2 NSEs (Figure 21). An *examination committee* composed of local experts specialized in environment, health, law, planning and agriculture is assigned to determine HPZs.

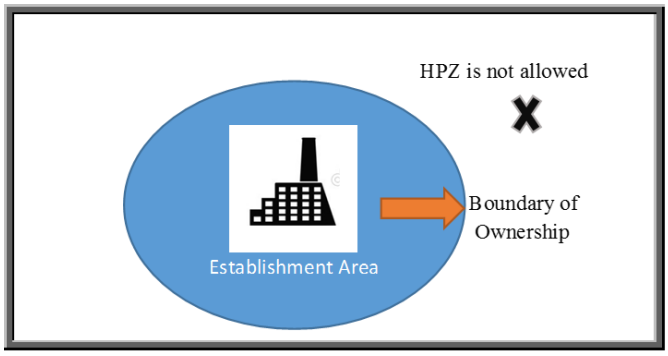


Figure 21 - Ownership Requirement

The committee takes the possible adverse effects of the establishment on the environment and human health into consideration while determining the dimensions of the HPZs.

At present, competent authorities for granting the operating licenses for NSEs are metropolitan municipalities, municipalities, special provincial administrations and managements of organized industrial zones.

For the first class NSEs must have a HPZ where residency is not allowed. HPZ that surrounds these facilities will be determined by the *examination committee*.

The By-Law on Permission for Opening and Operating of Working Place also requires determination of HPZs around NSEs in Organizes Industrial Zones. On the other hand, competent authorities differ; OIZ Board of Management decides the dimensions HPZs for the NSE. Examination Committee is not mandatory to determine the distances for NSEs in OIZ. An additional HPZ is determined according to the establishment parcel by the Governing Regulation of OIZ authorities.

Annexes of by-law includes application forms and for NSEs[17]. The below listed items are the stages required under the current License Framework for NSEs:

- *Site Selection Permit Issuance (SSP); Examination Committee Site Selection Report* is prepared to whether the planned facility can be built at the applied location.
- *Facility Permit Issuance*; when all necessary requirements are fulfilled by the project owner as it is listed in SSP, then the permit issued.
- *Trial Operating Permit Issuance;* this is a temporary permit that is issued after the construction of the facility. This permit allows the operation of the facility under monitoring of local health authorities.

4.3.2. By-Law on Environmental Impact Assessment

EIA regulation entered the Turkish law in 1983 and it became effective in 1993. The EIA procedure takes into consideration in the issuing a license procedure of range of activities from industrial to infrastructure projects defined in Annex I and II of the By-Law on EIA. Possible adverse impacts of the projects on human health and environment are investigated during the construction, operation, and post-operation phases of the projects under the scope of the By-Law on EIA.

[17] For the first class non-sanitary businesses, the Environment Impact Analysis (EIA) procedure must be carried out. Documents prepared before and during the EIA procedure will not be asked again for licensing.

By-Law on EIA lists the certain projects for which an EIA report is mandatory in Annex I. The projects listed in Annex II of by-law subject to selection and elimination criteria, decision "either preparation of EIA report is required or not required" based on the examination of preliminary assessment report by project owner. The preliminary assessment report should be prepared in accordance with the general format in the Annex III of the by-law.

If the project's impacts on environment seen significant after the examination of the preliminary assessment report, the decision "EIA report is required" means that project owner must complete the EIA process. In this case an EIA approval is required to start operation.

General format of the EIA report is given in annexes the by-law and related guidelines. The Committee is established by the Ministry in order to determine the scope and criteria of the special format given to a project and to examine and assess the EIA Report which is prepared in line with these principles.

The MoEU is the competent authority that issues the EIA approval after the finalization of EIA report procedure.

In the Annex IV of the by-law, screening and elimination criteria is described for the projects listed in Annex II. According the screening and elimination criteria, preliminary report should also include information on possible *accident risks*.

Moreover, for the projects which are classified as Non-Sanitary Establishment (first and second class) requires EIA approval, the EIA report must include HPZs decisions-suggestions, distances in report are accepted without further consultation to the site examination committee when the final EIA report is approved.

4.3.3. Organized Industrial Zones Law and Regulations

4.3.1.1. Organized Industrial Zones Law No.4562 and its Regulations

The OIZ law outlines the principles concerning the establishment, construction, and operation of organized industrial zones. HPZs requirement for the whole OIZ is mentioned in Article 4 of the OIZ Law. The HPZs must be allocated within the

boundaries of ownership. HPZ determination is only small part of the overall establishment and site selection procedure of OIZ zones (APPENDIX B.)

According to the Law, the HPZs for OIZs are defined by the Ministry of Health and it should be allocated within the boundaries of ownership.

The protocol between Ministry of Health and Ministry of Science, Industry and Technology introduced general obligations for the HPZs in mixed and specialized OIZs. The mixed OIZs, which include facilities operating in different sectors should allocated 50 meter HPZ within the boundaries of ownership. Establishments with high pollution potential should be located in center of zone. Relatively less polluter ones can be located near the boundary of the OIZ (Figure 22).

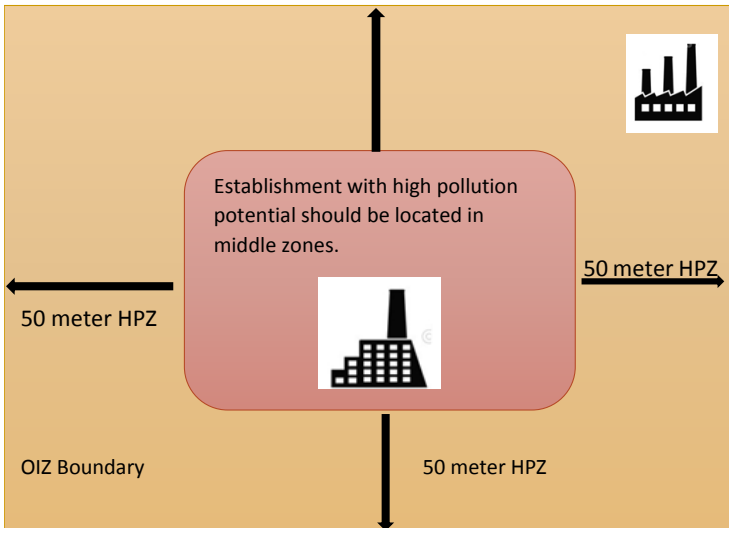


Figure 22 - HPZ Requirement for mixed OIZs

For mixed Specialized OIZ which include facilities that operate in the same sector group or in its sub-sectors and those OIZs that are established for logistic purposes, HPZs which are determined in EIA procedure should be taken account.

Specialized Industrial Zones with activities listed included in Annex I and Annex II of By-Law on EIA. According to the Article 24 of By-Law on EIA, the EIA procedure to be applied for the following projects is determined by the Ministry: projects which are planned to be established in Organized Industrial Zones, Specialist Organized Industrial Zones, Industrial Zones, Free Zones, areas for which

Strategic Environmental Assessment will be carried out, Potential Aquaculture Production Areas, and Technological Development Zones.

In the case of OIZs, the examination committee which determines the HPZ is not established.

Other than, HPZs, an additional safety distance is determined according to the size of the establishment parcel by the Governing Regulation of OIZ authorities (Table 18).

Table 18 - Safety Distance (Geri Çekme Mesafesi) and Environmental Green Zone in OIZ Code of Practice

	Safety Distance (Geri Çekme Mesafesi) (Including Environmental Green Zone) (m)			**Environmental Green Zone** (m)		
Parcel Area (m2)	front	sides	back	front	sides	back
2000 - 4000	8	7	7	1	2	2
4001 - 7000	12	8	8	2	2,5	2
7001- 10000	13	10	12	3	3	3
10001- 20000	20	12	16	5	4	4
20001- 30000	24	14	22	6	4,5	6
30001- 40000	26	15	24	7	5	6,5
40001- 50000	30	17	28	8	5,5	8
50001-100000	32	18	30	9	6	8,5
100001- -----	33	20	33	10	6,5	10

4.3.1.2.By-Law on Organized Industrial Zones Place Selection Regulation Official Gazette Dated: January 17, 2008 / Numbered: 26759

The By-Law describes the principles concerning the site selection of OIZs and covers the site selection assessment report and stages of organized industrial zones.

The site selection assessment report contains the general information related to the location where an OIZ is desired to be established. It specifies the justifications concerning the establishment of the OIZ. Ministry of Science, Industry and Technology determines contents of the report.

The OIZ site selection report contains following sections:

- Threshold analyses.
- Determination of alternative areas and entering of the boundaries.

- Characteristics of alternative areas.
- Conclusion and recommendations.
- References.
- Annexes.

The site selection decision considers places of settlement located in the surroundings, their distances and locations in terms of direction, current and planned status of the surrounding areas, dominant wind direction, whether the area has the potential to develop and expand, exposure to floods and environmental concerns.

4.3.2. Regulation on Measures to be taken in the Workplaces and Works Dealing with Flammable, Explosive, Dangerous and Hazardous Substances

The Regulation describes generic safety distances from the storage installation to the residential areas, highway and railways by taking into account the volume of the stored explosive or flammable substances with construction style of the installation.

The annexes of the Regulation (IV a, IV b, IV c, IV d and V) provides safety distances from establishments to residential areas, highway and railways which for explosives and flammable liquids stored underground or above ground. (APPENDIX C)

4.3.3. By-Law on Buildings Fire Protection

The by-law aims to prevent and control the consequences of the fires which emerge during design, construction and operation of the structures, buildings, installations and establishments and defines measures shall be taken before and during the fires.

In chapter eight of the by-law, general provision is described for the production and storage of dangerous substances. The third section under this chapter lists provisions for flammable and explosive substances.

In Article 106 (13) LPG Storage provisions obligate 25 meter distances between the schools and mosques parcels. For other buildings 15 meters is the limit distance.

The by-law defines several safety distance requirements;

- LPG Safety distances for LPG Bottle storage outside of the building,
- LPG Safety distances for Bulk LPG storage in tanks
- Safety distances for aboveground inflammable and flammable Liquids storage tanks established in open areas
- Minimum Safety Distances Fueling Stations.

Details of the by-law presented in APPENDIX D.

4.3.4. By-Law on Permission for Opening and Operating of Working Place for Non-Sanitary establishments at Airports open to the Civil Air Transport

The by-law regulates the procedures and principles to be applicable for business and working licenses to be granted to NSEs at the airports open to civil air transport. It covers works and transactions regarding licensing and auditing of non-utility workplaces at airports open to civil air transport.

The by-law defines NSEs as:

> "Non-Sanitary establishments: the workplace, which gives or is likely to give low or high biological, chemical, physical, spiritual and social damage to things around it or which is likely to pollute natural resources"

The covered NSEs are listed in the list in Annex-I of this by-law (APPENDIX E).

Natural or legal entities willing to establish NSEs shall apply to the airport operator with the application form Annex-2 of this by-law and documents mentioned in annex of this application form.

"EIA Positive" report or "No EIA Required" decision to be taken from the MoEU for structures within the scope of the EIA Regulation should be submitted to the airport operator at the application.

The airport operator shall consider the arrangements about not giving harm to human health, not causing environmental pollution, fire, explosion, general security, occupational safety, occupational health and protection of nature in statements and examinations regarding non-utility workplaces.

Article 19 - Health Protection Zone

It is the responsibility of airport operator to place HPZs at distances specified by the Ministry of Health for non- utility workplaces present in the list in Annex-I of this regulation. HPZs cannot be used outside the boundaries of the airport.

HPZs distance for facilities such as fire-brigade, fuel etc. in premises of the airport must be taken into consideration by the airport operator during planning for new structures in the airport. Moreover, below listed items (Table 19) are also important for consent procedure.

Table 19 - Annex-II of by-law

A part from Annex-II of the By-Law
7 - Usage area of workplace:
10 - Number of personnel to be employed.
15 - EIA Report or Environmental Impacts Not Significant Decision for facilities within EIA Regulation?
16 - Fire-fighting report if it is a workplace requiring this report
17 - Certificate if subject to discharge permit
18 - Certificate if subject to emission permit
19 - Certificate if subject to dangerous wastes license

4.3.5. Regulation on unmonopolized explosive substances and hunting equipment and similar items

The objective of this By-law is to regulate to procedures and principles for manufacture, import, transport, conservation, storage, marketing, usage, disposal, inspection of un-monopolized explosive substances and hunting equipment and similar items which came into force by Cabinet Decree dated 14/8/1987 and numbered 87/12028.

Annex I of the regulation defines the safety distances for the establishments covered by this regulation via mathematical equation for above ground storages. The safety distances are established from other explosive substances storage sites, transport

routes and residential areas according to the explosive substances capacity and construction type. The safety distance equation depends only explosive substances' quantity and construction type.

The regulation defines inappropriate uses of land that involves setting up limitations on their utilization. These limitations/constraints describe which uses of land are permitted at the safety distances surrounding the dangerous establishment. The operator has to purchase the certain amount of the resulted safety distance zone which also depends on another equation. The formula and the calculated distances are given in APPENDIX F .

Annex VI of the regulation defines generic safety distances for underground storage of explosive substances as:

- 20 meter from the transportation routes
- 50 meter from residential areas and other industrial establishments

4.3.6. Circular on Health Protection Zones required for Non-Sanitary establishments which have Negative Effect on Public and Environmental Health

The Circular has published Official Gazette dated on 17.02.2011 by Ministry of Health General Directorate of Basic Health Services. It was aimed to regulate the procedures and principles to determine HPZs around NSEs.

Similar to the By-Law on Permission for Opening and Operating of Working Place, the Article of the Circular defines NSEs as;

> "Non-Sanitary establishments: the workplace, which gives or is likely to give low or high biological, chemical, physical, spiritual and social damage to things around it or which is likely to pollute natural resources"
>
> "Health protection zones: The area which shall be close to the settlement by considering negative impacts of the establishments to the environment."

Moreover, in Article 4, definition of risk and environmental health are presented which are not given in By-Law on Permission for Opening and Operating of Working Place.

The circular has unique character, Annex I provide an excel document for the determination of the HPZs. It describes a methodology for the calculation of HPZs. The excel document has six sheets;

1. Hazard Identification note for the Installation (not technical, only explanation)
2. Natural Hazards Matrix
3. Technological Hazards Matrix
4. Human Induced Hazards Matrix
5. Dangerous Substance Matrix
6. Result of the Risk Coefficient.

The result of the matrices calculations in sheet 6 used to in Annex 2 to get the HPZ distance. According to the table, the HPZ distance cannot be less than 30 meter for every type of Category I NSE.

4.3.7. LPG and Petroleum Products Regulations

Oil, Natural Gas and LPG Market Laws with regulations of organizes licensing procedures and technical details for these markets.

Under the scope of the Law No. 5015 Petroleum Market Law Energy Market Regulatory Authority defines safety distances as follow:

The limitations regarding construction, agricultural and dangerous activities that may create risks; within a minimum of 15 meters and maximum of 100 meters distant on both sides of transmission lines, within a maximum of 500 meters distant surrounding the facilities necessary for pipelines and refineries and licensed storage facilities, together with the procedures and principles of the same shall be set forth in the regulation to be issued by the Authority.

Additionally, Law No 2565 on Military Restricted Areas and Security Zones sets requirements to provision of safety of land and offshore oil and gas pipeline systems. Responsibility of pipeline secure operation is based on the protocol between BOTAS and Military Forces in the context of Law No 2565.

CHAPTER 5

GENERAL PROFILE OF SEVESO ESTABLISHMENTS IN TURKEY

This chapter aims to give general profile of Seveso establishments in Turkey in terms of their number, industrial sector, locational distribution and their compliance to the Seveso II Directive.

In the first section, the raw data in MoEU Notification System is used to analyze the number, category and locations of the establishments.

Certain MoLSS Occupational Health and Safety Inspection Reports are presented which include data similar to the requirements of the Directive.

In the last section, REC Seveso RIA Survey data was analyzed in terms of compliance and main arguments summarized. The aim is to see general compliance level the hazardous establishments[18].

Land use practices around the potential Seveso establishments are also reviewed. Although, MoEU Notification System does not present full name and addresses of the Turkish Seveso establishments, potential Seveso establishments are introduced by using Turkey's Top 500 Industrial Enterprises and companies established at LPG and Natural Gas Market with their satellite images. The satellite images are used to show past and current LUP practices around the potential Seveso establishments. The comprehensive review of Turkish Industry and satellite images of the several establishments were presented in APPENDIX A. The logic behind the review of the list was that, the companies which took place in Top 500 industrial enterprises are

[18] The RIA Survey was carried out in 2011 under the scope of the project "Capacity Building in the field of Environment"

the leader ones in their sectors. Therefore, they could represent the overall situation of the Turkish Industry. However, it doesn't necessarily mean that the establishments with satellite images are under scope of the Directive.

5.1. Seveso establishments Information

After the transposition of the Seveso II Directive in August 2010 with the By-Law on Control of Major Industrial Accidents, establishments have started to notify their dangerous substances to MoEU Notification System.

The raw data taken MoEU Notification system does not contain dangerous substances information. Therefore, the number and type of chemicals could not be investigated.

Moreover, due to the restrictions for the Seveso establishments name and addresses, the research could not provide cleat picture for located near urban areas or located inside of the protected areas defined by national legislations etc.

One of the important priorities of this study is to know about the distribution of the industrial activities in establishments across Turkey.

The type of industrial activity of Seveso establishments is evaluated according to SPIRS new aggregated industrial activity categories.

5.1.1. Number of Seveso establishments

Total number of establishments, which have been registered and identified as "Seveso Establishment" in the MoEU Seveso Notification System, is 518 as of December 2011. Almost half of these establishments are Upper-Tier (251 - 48.5%), and the other half Lower-Tier (267 - 51.5%) (Figure 23).

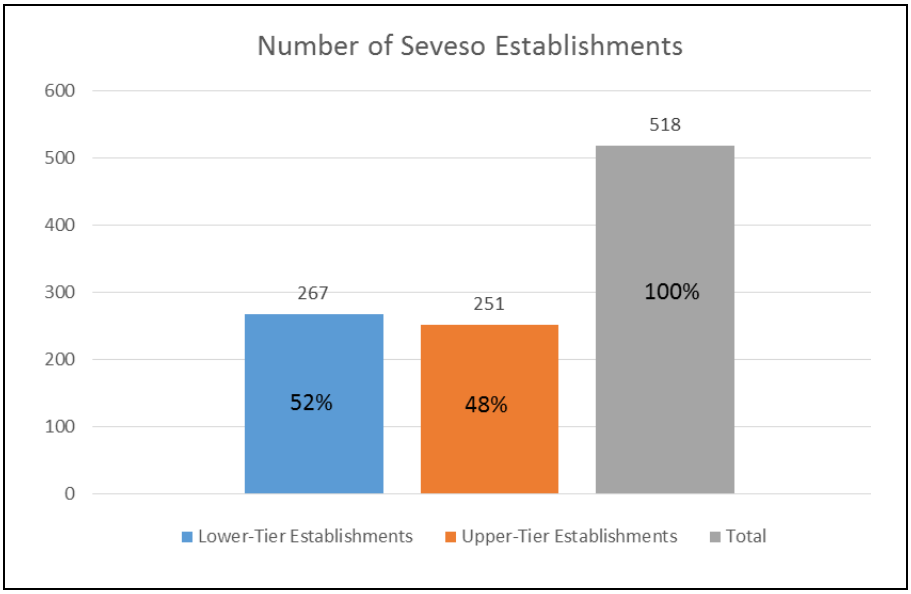


Figure 23 - Number of the Seveso establishments
Data source: MoEU Notification System (December, 2011)

The final number of establishments is not definitive given the serious non-compliance with the registration and the obligations regarding the notification of substances

- There are operators, who have to register to the Notification System, have not registered yet. Thus, their status is not known.
- Some of the operators who are registered to Notification System have not uploaded their dangerous substances information to the system yet. Thus, their status is not known.

5.1.2. Geographical Distribution of Seveso establishments

Seveso establishments operate in almost all provinces. Only in eight provinces there is no Seveso establishment.

Half of the establishments (50%) are concentrated in the six provinces namely Ankara, İstanbul, İzmir, Kırıkkale, Kocaeli, and Tekirdağ (Figure 24).

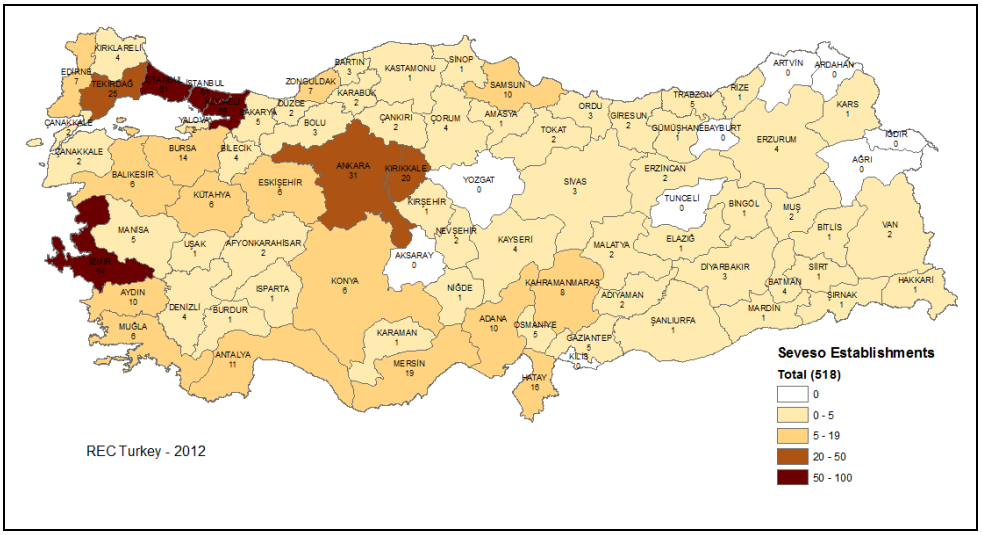
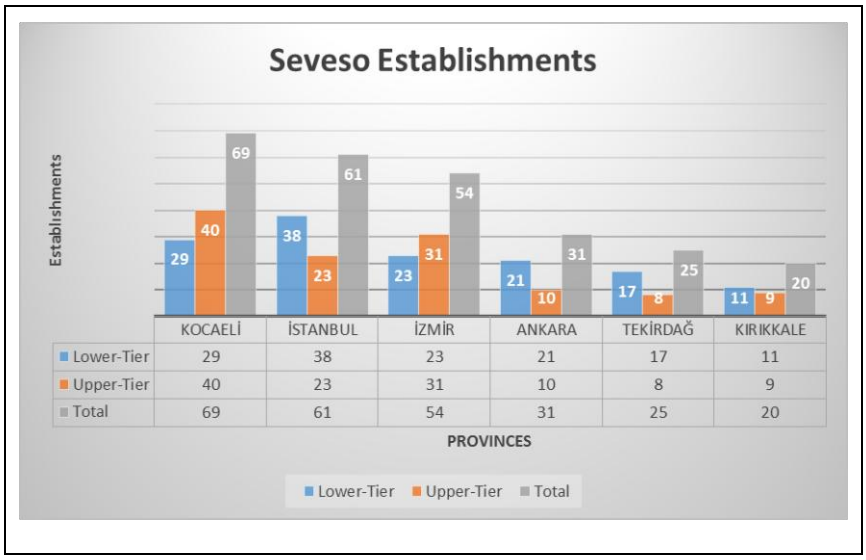


Figure 24 - Geographical Distribution of Seveso establishments

Data source: MoEU Seveso Notification Database (December 2011)

Kocaeli has the highest number of establishments followed by İstanbul, İzmir, Ankara, Tekirdağ and Kırıkkale (Figure 25).



	KOCAELİ	İSTANBUL	İZMİR	ANKARA	TEKİRDAĞ	KIRIKKALE
Lower-Tier	29	38	23	21	17	11
Upper-Tier	40	23	31	10	8	9
Total	69	61	54	31	25	20

Figure 25 - Provinces with highest number of Seveso establishments Data source: MoEU Notification System (December, 2011)

Districts with highest number of Seveso establishments are presented in Figure 26. Körfez and Aliağa Districts have the most number of Seveso establishments such

that they even more Seveso establishments than Tekirdağ and Kirikkale. These districts have total 82 Upper-Tier (33% of all establishments) and 56 Lower-Tier establishments (21% of all establishments). Akdeniz District almost has the all establishments in Mersin Province (Figure 26).

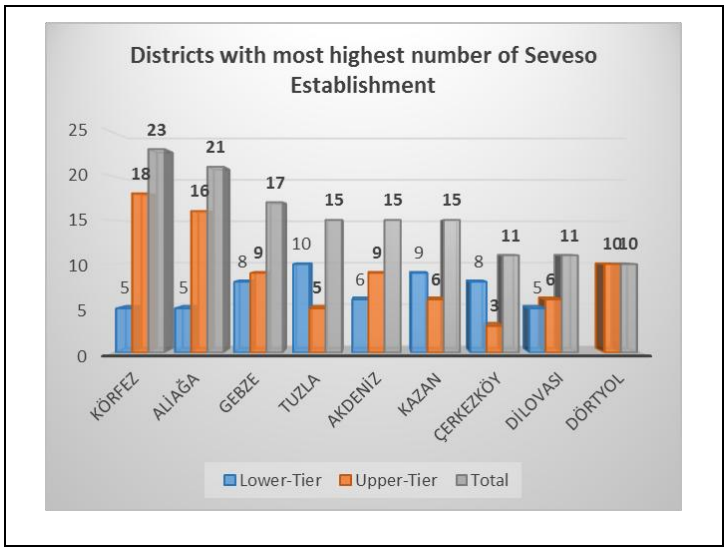


Figure 26 - Districts with highest number of Seveso establishments

Data source: MoEU Seveso Notification Database (December 2011)

Figure 27 clearly shows the concentration in Körfez, Aliağa, Gebze and Tuzla Districts, which have high number of Seveso establishments.

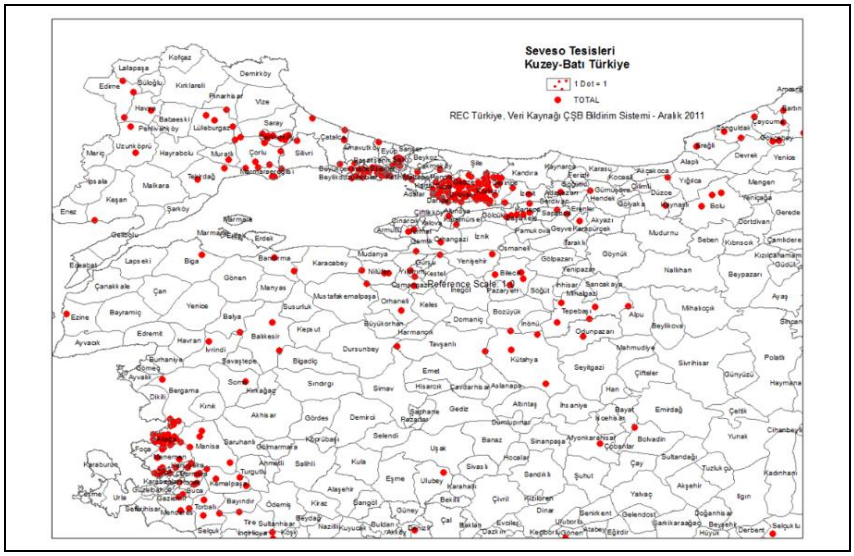
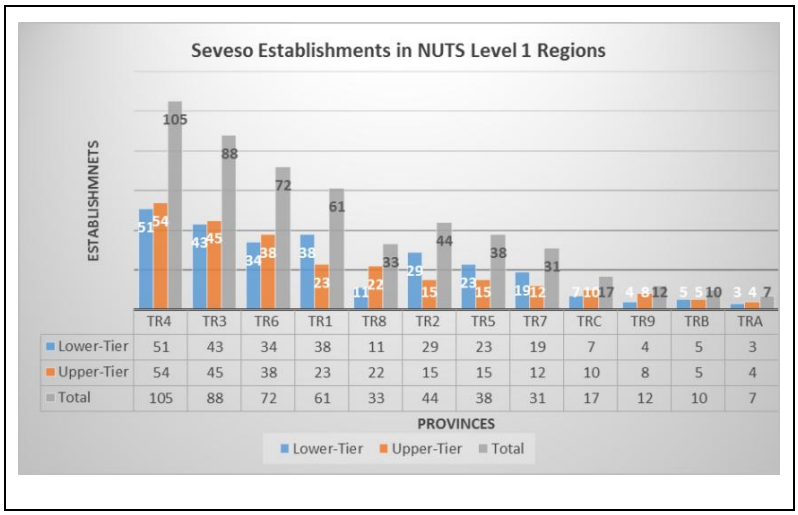


Figure 27 - Distribution of Seveso establishments in North-West of Turkey

Data source: MoEU Seveso Notification Database (December 2011)

Other than province and district level, the number of Seveso establishments according to NUTS Level 1 in Figure 28. TR4 EAST MARMARA, TR3 AGEAN, TR6 AKDENIZ, and TR1 ISTANBUL have 326 establishments which are 63% of the all establishments (Figure 28).



	TR4	TR3	TR6	TR1	TR8	TR2	TR5	TR7	TRC	TR9	TRB	TRA
Lower-Tier	51	43	34	38	11	29	23	19	7	4	5	3
Upper-Tier	54	45	38	23	22	15	15	12	10	8	5	4
Total	105	88	72	61	33	44	38	31	17	12	10	7

Figure 28 - Seveso establishments in NUTS Level 1

Data source: MoEU Seveso Notification Database (December 2011)

In summary, assessment of the above figures and facts provide:

- Seveso Establishments are distributed all over the country
- Both competent authorities and operators need to develop capacity in almost all provinces and efforts should be more intense in mentioned provinces mentioned and districts.
- Seveso establishments' numbers are relatively high in the Izmit, Izmir, Kırıkkale and Batman due to the TÜPRAŞ (Turkish Petroleum Refineries Corporation) refineries.
- Upper-Tier Seveso establishments' numbers are relatively high in some of the Districts such as Akdeniz District/Mersin, Dörtyol District/Hatay and Tekkeköy/Samsun, presence of terminals is the main reason.
- The Akdeniz District, Mersin hosts former refinery establishment named as Ataş Terminal directly affects the Seveso establishments number in that area -

5.1.3. Industrial Categories of Seveso establishments

The MoEU system classifies establishments over 20 different industrial activities. Seveso establishments reclassified according to SPIRS aggregated industrial categories.

As expected, the majority of industrial activities belong to the "LPG Storage", "wholesale and retail storage and distribution (excluding LPG) activities" and "general chemicals manufacture".

There might be small errors in the identification of the industrial categories of the establishments since; minority of the operators did not provide their industrial category information to MoEU Notification system raw data.

i. Petrochemicals, Chemical Installations and Manufacturing industrial sectors cover the 76% (392 of 518) of all Seveso establishments.

- **Petrochemical** (e.g. oil refineries, storage and distribution) industrial category includes; LPG production, bottling and bulk distribution, LPG storage, LNG storage and distribution. This group has the largest representation with 155 Seveso establishments (29.9 %).
- **Chemical installations** industrial category has the second largest representation, 120 establishments (23.2 %) which includes mainly producers of industrial chemicals paintings and coatings, pharmaceuticals, fertilizers, etc.
- **Manufacturing** industrial category covers 117 establishments (22.6%) of mostly establishments that produce food, beverages, textile, plastic, rubber, paper, wood, glass, cement, electronics, explosives, fireworks, general engineering, building and constructions. On the other hand, some categories of the activities are very rarely represented (Figure 29).

ii. As expected, Petrochemical group (39%) leads in Upper-Tier establishments and manufacturing group (33%) leads in Lower-Tier establishments.

iii. İstanbul, İzmir, Kocaeli, Ankara and Tekirdağ have 82% of Lower-Tier Chemical Establishments and 73% of Upper-Tier Chemical Establishments (Figure 30 and Figure 31).

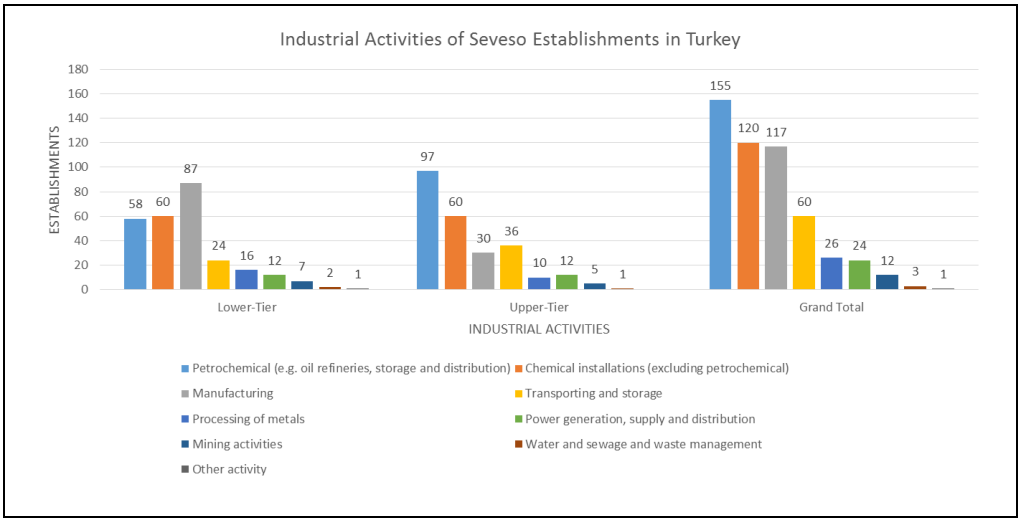


Figure 29 - Industrial Activities of Seveso establishments in Turkey

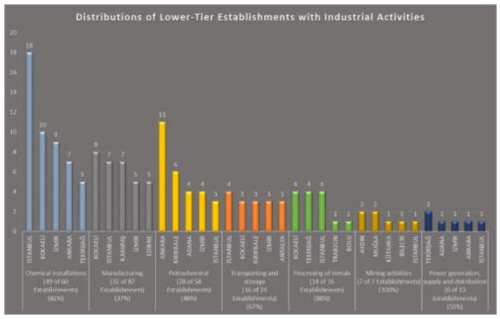


Figure 30 - Distribution of Lower-Tier establishments with Industrial Activities*

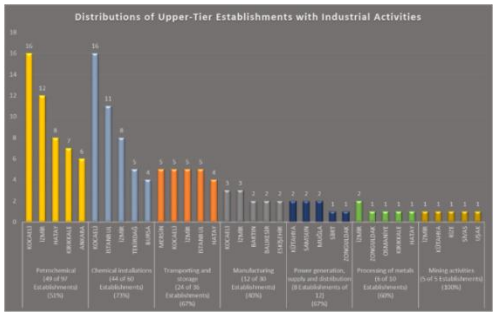


Figure 31 - Distribution of Upper-Tier establishments with Industrial Activities*

* For each industrial category, (five) provinces considered which have the most numbers of establishments within category.

5.1.4. Organized Industrial Zones (OIZs) and Seveso establishments

The logic behind the OIZs is to develop appropriate places for industrial activities and prevent environmental problems by providing information and informatics technologies. As August 2013, there are currently 277 OIZs, but not all of them are active and operating with full services. Only half of the OIZs areas actively operate.

The procedures for selection, expropriation, and the infrastructure are still in progress for many OIZs. Bursa (13), Kocaeli (13), İzmir (13), Tekirdağ (11) and Ankara (11) have majority of OIZs.

MoEU Notification System provides information on whether establishment within inside or outside the OIZs.

i. Majority of the Seveso establishments (76%) locates outside of the OIZs and those locates in OIZs have high number of Lower-Tier establishments. This implies that mostly small scale establishments locate in OIZs (Figure 32 and Figure 33).
ii. Chemical Installations is leading industrial activity for Seveso establishments in OIZs (Figure 34).

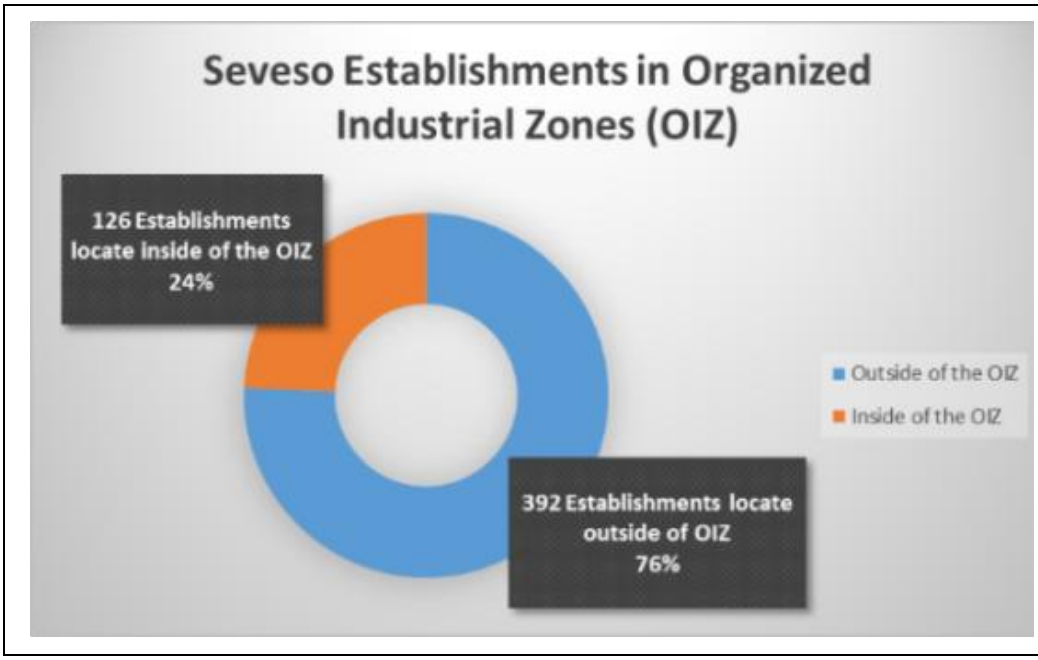


Figure 32 - Distribution of Seveso establishments according to OIZs data

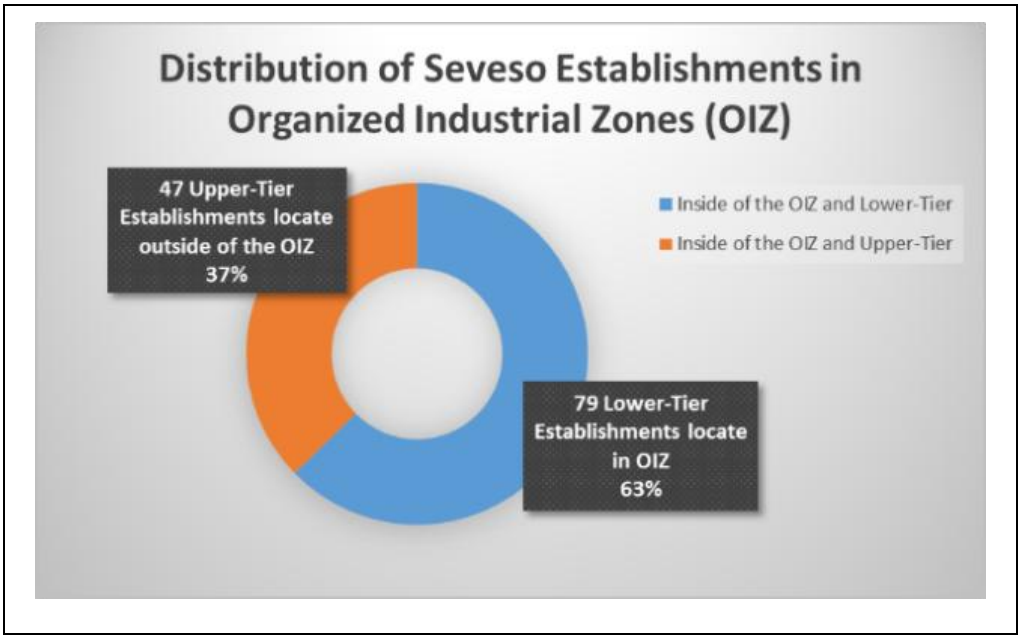


Figure 33 - Distribution of Upper Tier and Lower-Tier Seveso establishments according to OIZs data

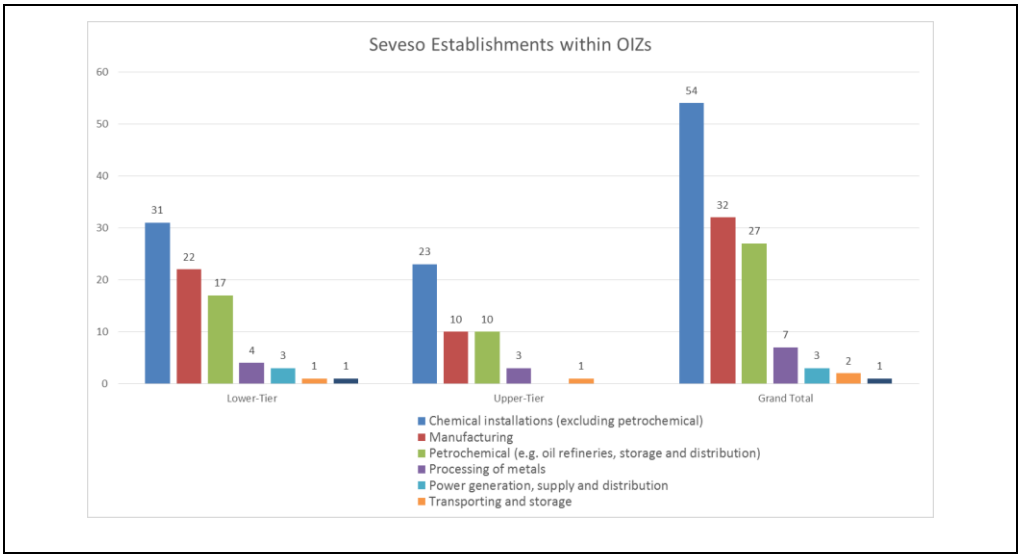


Figure 34 - Industrial Activities of Seveso establishments within OIZs

5.1.5. Location of Seveso establishments and Earthquake Risks

Recent examples in Turkey illustrate the serious consequences of earthquake disasters. The 1999 earthquake resulted in many deaths and loss of property due to the explosions in the TUPRAS refinery and Yalova AKSA facilities in İzmit.

The total number of Seveso establishments in the first degree earthquake zones is approximately %40 of all establishments which is increasing the major accident risks for public and environments (Figure 35 and Figure 36).

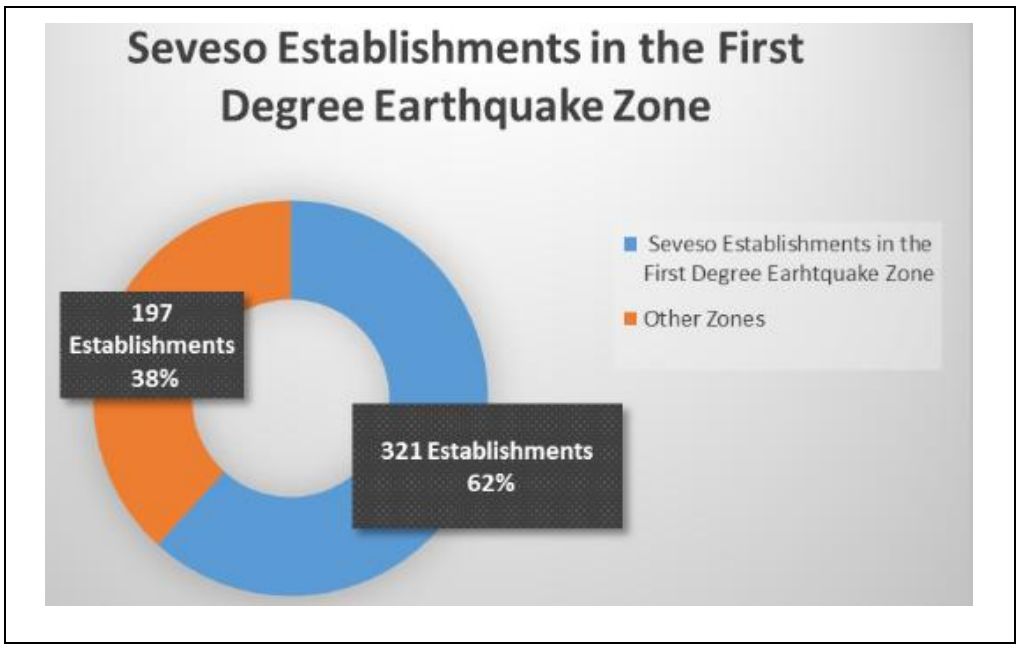


Figure 35 - Seveso establishments in the First Degree Earthquake Zone

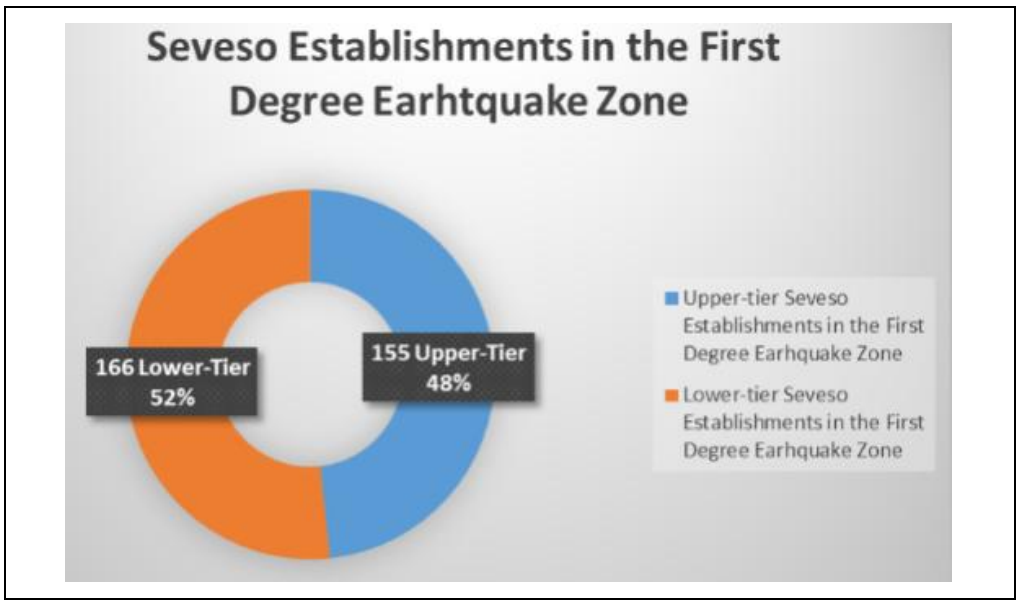


Figure 36 - Upper and Lower Tier Seveso establishments in the First Degree Earthquake Zone

Extent of joint disasters intensifies when industrial establishments are located in residential areas. LUP restrictions are used in earthquake-prone areas to limit the number of people living in proximity hazardous establishments [53].

5.1.6. Major Accidents and Seveso establishments

The analysis of past accidents is a useful method for identifying common aspects regarding the causes that triggered such accidents by collecting information. By analyzing the industrial accidents involving chemicals in a consistent way, establishments and CAs can learn lessons and prevent further accidents [54].

However, the number of the major accidents, which can be considered as Seveso accidents, is unknown due to the absence of systematic and detailed reporting of accidents.

In Turkey, although occupational accidents are registered in a systematic manner and wide range of statistics are available thereof, information on industrial accidents is very limited. Seveso II Directive requires a reporting system for industrial accidents and it is expected to solve mentioned problem in that sense. In order to record major accidents, MoEU Chemicals Department provided accident-reporting document as a requirement of the Directive. It will also be available in electronic medium. Operators will use this form to record the major accidents or near-miss accidents.

The only publicly available data on major accidents from the governmental resources is an inventory document prepared by the MoEU, which contains information on 26 accidents that occurred between 1997 and 2007 [55] (

Table **20**). Although this specific document gives a general idea; it shall not mean that those accidents represent the general trends.

Beside the governmental documents, Technological Accident Information System (TAIS), which is an academic effort [25] to collect and share information on technological accidents that occurred in Turkey, is currently the most comprehensive

data source on industrial accidents[1]. It contains over six hundreds of industrial accidents that spans between 1967 and 2012, together with reference information such as newspaper articles and photographs. In order to reach general facts about industrial accident history of Turkey, accidents were investigated in TAIS given the 2008-2013 periods. Selection is not based on solid criteria and is just for informative purposes. Number of fatalities and injuries are not official. Accident type column lists the major accidents as fire, explosion and release; in case of multiple events it lists the accidents as explosion and fire, explosion and chemical release.

Table 20 - Provincial distribution of industrial accidents between 1997-2007 [55]

No	Location	Date	Establishment	Event
1	İstanbul	14.02.1997	Tuzla Tersaneleri	Fire
2	Kırıkkale	03.07.1997	M.K.E.	Explosion
3	Denizli	11.10.1997	Aciselsan	Fire
4	Tekirdağ	21.10.1998	PEG Profilo Elektrikli Gereçler San A.Ş.	Fire
5	Kocaeli	22.07.1999	D-130 Karayolu	Release
6	Yalova	17.08.1999	Aksa	Release
7	İzmit	17.08.1999	Tüpraş	Explosion
8	Tekirdağ	21.12.1999	Likit Kimya San.ve Tic. Ltd.Şti.	Explosion
9	Kocaeli	23.06.2000	Altinel Melamin San:A.Ş.	Explosion
10	Kocaeli	04.08.2000	Total Oil	Fire
11	İzmit	15.08.2000	Serfleks Yer Karoları San.Tic.Turz. A.Ş.	Fire
12	Eskişehir	18.01.2001	Şeker Fab.	Explosion
13	Kocaeli	08.02.2001	Aysan boya ve Kimya San. A.Ş.	Explosion
14	İstanbul	16.02.2002	LPG Tesisi	Explosion
15	İzmit	28.07.2002	Akçagaz LPG Dolum Tesisleri	Explosion
16	İstanbul	22.05.2003	Büfe	Explosion
17	Ankara	05.08.2003	LPG Tesisi	Explosion
18	Kayseri	20.08.2003	Yatılı Okul	Explosion
19	Mersin	25.07.2004	Ataş	Fire
20	İstanbul	24.04.2006	Saf Kimya	Fire
21	Bursa	29.05.2006	Soykim Kimyevi Maddeler	Release
22	İstanbul	31.07.2006	Dicle Kimya	Fire
23	Gaziantep	21.09.2006	Alles Kimya	Explosion
24	Ankara	04.01.2007	Tüpgaz dolum tesisi	Explosion
25	Ankara	21.02.2007	İPRAGAZ Anonim Şirketi	Explosion
26	Denizli	04.03.2007	Gamateks	Fire

[1]www.teknolojikkazalar.org/

The TAIS is used to see the total number of industrial accidents have seen in the last five years. According to data, İstanbul, Kocaeli, İzmir, Ankara and Tekirdağ are province with the high number industrial accidents. Interestingly, this order is same as the order of province that has most Seveso establishments in number (Figure 37).

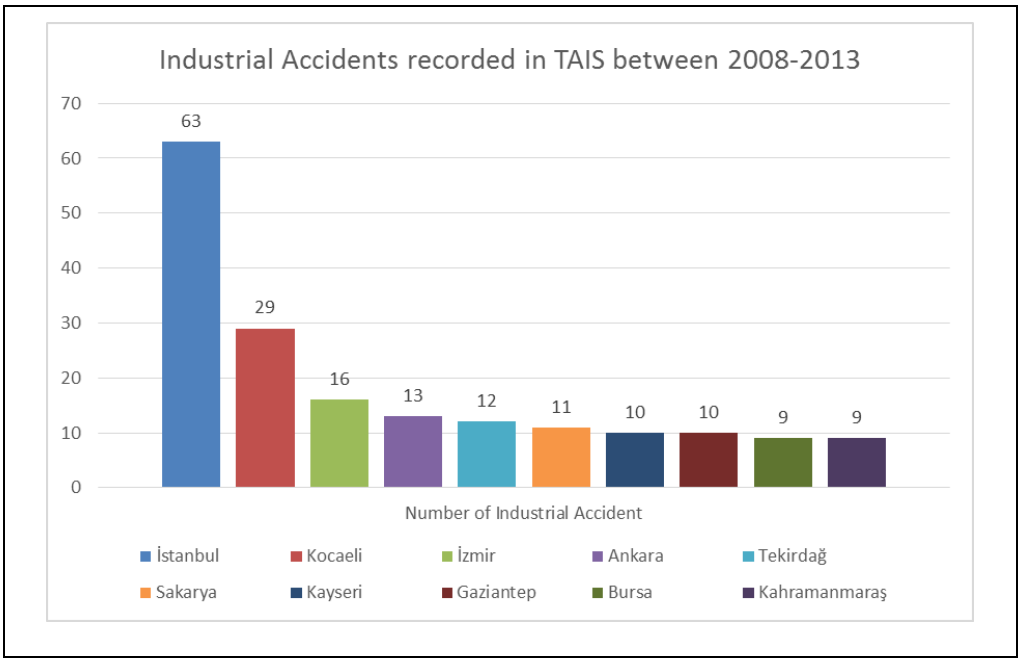


Figure 37 - Industrial accidents recorded in TAIS between the year 2008-2013

5.2. Industry Compliance Level for Major Accidents

5.2.1. Effectiveness of Risk Management and Emergency Management Practices at Industrial Facilities

The literature on major accidents is limited and compliance level of the operators (implementation of legal aspects) is not comprehensively reviewed in Turkey yet. The past studies were concentrated on lessons from the earthquake of August 17, 1999 in Kocaeli [53].

The plenty of information on external and internal emergency management practices, off-site consequence analysis; were gathered via interviews. The reported drawbacks in off-site consequence analysis and a risk analysis requirements and low efficiency in their implementation in the significant majority of damaged sites [53].

5.3. Occupational Health and Safety Inspection Reports

In this section, MoLSS inspectorate reports are used to reveal certain industrial sectors health and safety performance regarding Seveso II Directive requirements.

LPG and Petroleum Filling Facilities

Potential accident scenarios with off-site effects identified due to the involvement of bulk storage of LPG and transfer of LPG to/from road tankers that can give rise to explosion, over pressure effects and thermal hazards.

As August 2013, there were 6 refineries licensed and 110 petroleum storage facilities operating in the petroleum market with Energy Market Regulatory Authority (EMRA) licenses pose above risks. Geographic distribution of each license owner is listed in Table 21.

Table 21 - Licensed Petroleum Storage Facilities

Province	Licence Number	Province	Licence Number
Kocaeli	17	Konya	1
Mersin	12	Şanliurfa	1
Izmir	12	Elaziğ	1
Kirikkale	11	Mardin	1
Antalya	8	Isparta	1
Istanbul	8	Adana	1
Samsun	6	Nevşehir	1
Hatay	5	Giresun	1
Batman	3	Denizli	1
Muğla	3	Diyarbakir	1
Tekirdağ	3	Balikesir	1
Ankara	3	Van	1
Gaziantep	2	Kayseri	1
Trabzon	2	Artvin	1
Erzurum	1		

In the Liquefied Petroleum Gas (LPG) market, 83 LPG storage facilities were operating with EMRA licenses. Milangaz, İpragaz and Aygaz companies are major LPG storage facilities (Table 22).

Table 22 - Licensed LPG Storage Facilities

Province	License Number	Province	License Number	Province	License Number
Kocaeli	13	Istanbul	3	Giresun	1
Izmir	9	Van	2	Sivas	1
Ankara	5	Tekirdağ	2	Isparta	1
Hatay	5	Eskişehir	2	Denizli	1
Trabzon	3	Karabük	2	Adana	1
Antalya	3	Bursa	2	Zonguldak	1
Kirikkale	3	Konya	2	Osmaniye	1
Diyarbakir	3	Mersin	2	Aksaray	1
Samsun	3	Aydin	2	Elaziğ	1
Erzurum	3	Kahramanmaraş	1		
Gaziantep	3	Kirklareli	1		

In Turkey, currently BOTAŞ, TPAO, and Ege Gaz A.Ş. are engaged in natural gas storage activities by having acquired storage licenses Table 23.

Table 23 - BOTAŞ, TPAO, and Ege Gaz A.Ş Storage Areas

Company Name	License Type	Volume of Storage	Address
BOTAŞ	Storage License (LNG)	255.000 m^3 LNG (85.000 m^3 x 3)	Marmara ereğlisi / Tekirdağ
EGE GAZ A.Ş.	Storage License (Subsurface)	280.000 m^3 LNG (140.000 m^3 x 2)	Aliağa/İzmir
TPAO	Storage License (Subsurface)	2.661.000.000 m^3	Silivri/İstanbul
BOTAŞ	Storage License (LNG)	1.500.000.000 m^3	Sultanhani/Aksaray

The lists of these licensed operators are provided in table xxx. These companies are most relevant companies to Seveso establishments due to the storage of liquefied extremely flammable gases (including LPG) or Petroleum products defined in the Annex I of the Seveso II Directive (Table 24).

Table 24 - Liquefied extremely flammable gases and Petroleum products Thresholds in Annex I Part I of Seveso Directive

Liquefied extremely flammable gases (including LPG)	50/200 tonnes
Petroleum products (a) Gasolines and naphthas (b) Kerosenes (including jet fuels) (c) Gas oils (including diesel fuels, home heating oils and gas blending streams	2500/25000 tonnes

In Turkey, currently BOTAŞ, TPAO, and Ege Gaz A.Ş. are engaged in storage activities by having acquired storage licenses.

The MoLSS inspectors carried out inspections from between the dates of 01.10.2003 to 31.05.2005 for LPG and Petroleum Storage sites [56].

The inspections concentrated on health and safety risks and precautions to be taken. The reports summarize the both technical and legal deficiencies in the sites. Over 353 sites were inspected, the sites listed in Table 25.

Table 25 - Inspected Sites

Inspected Sites	Number
LPG Filling sites	145
Petroleum Filling Sites	87
Total	353

There are important deficiencies in terms of requirements of the Directive, particularly LUP (Table 26).

Table 26 - Drawbacks identified in inspections

Drawbacks identified in inspections	Number	Percentage
Site Selection Permit and Facility Permit Issuance		
Operating Permit	99	28%
Explosive locations determination	137	39%
Trainings of the employees on fire and labor safety	122	35%
Technical control of the tanks and pipes	121	34%
Emergency Plans	70	20%
Safety Distances of storage tanks to neighbor area	64	18%
Explosion Protection Document	62	18%
Chemicals storage	32	9%
Occupational Risk Analysis	27	8%

According to inspection reports, the too many facilities locate around refinery areas pose danger to the public health and environment which does not follow safety distances requirements.

5.3.1. Workplaces Dealing with Explosive Hazardous Substances

The MoLSS inspectors carried out inspections from between the dates of 05.01.2003 to 30.07.2004 for workplaces dealing with explosive hazardous substances [57].

The report summarizes the both technical and legal deficiencies in the sites. Over 30 sites were inspected. There are important deficiencies in terms of requirements of the Directive, particularly LUP (Table 27).

Table 27 - Drawbacks identified in inspections

Drawbacks identified in inspections	Number	Percentage
Site Selection Permit Issuance and Facility Permit Issuance	29	88%
Operating Permit	20	28%
Safety Distances of storage site	64	58%
Trainings of the employees on fire and labor safety	19	30%

The inspection report underlines the infringements in Site Facility Permit Issuance and safety distances defined for the storage sites which are directly related to the LUP practices.

5.4. Seveso II Directive RIA study

This section uses the survey carried out in the consultation process of Seveso II Directive RIA study; operators of establishments submitted 52 completed questionnaires (Table 28).

The questionnaire contains 36 principal questions. The questionnaire forms that were sent to the establishments located within the pilot provinces namely Izmir, Adana and Kocaeli and Yalova to determine strengths and weaknesses, together with an overall assessment of the implementation of the requirements imposed on operators of Seveso establishments. The data gathered in this survey was analyzed and results presented. The survey had focused on provinces covering more than 27% of the total number of Seveso establishments, and on the contributors of 25% of accidents

reported in TAIS during the period 1993-2010. Majority of the establishments (90%) are within the organized industrial zones (Table 28).

Table 28 - Target Industry Sectors and Pilot Provinces

Industrial Activities of Establishment	Number of Establishment	Location of establishments	Number of Establishment
Chemical Installations	27	Kocaeli	27
Petrochemicals	10	İzmir	20
Manufacturing	7	Adana	3
Processing of Metals	4	Sakarya	1
Water and sewage and waste management	4	Yalova	1

General Structure of the Survey

The survey enabled an analysis to be made of the situation as regards the following issues in Table 29.

Table 29 - Content of the Survey

– General Information – Notification – MAPP – Safety report – Internal Emergency Plans – SMS – Training – External emergency plans	– Information to public – Land use – Domino effect – Dangerous Substance Insurance – Burdens of Directive – Stakeholders – Accidents and emergency response history

Evaluations of the Results

– *General Information*

Most of the respondents are aware of Seveso II Directive; however, they do not know what the Directive brings in depth. In addition, the general organizational structure of the establishments for the prevention and limitation of major accident is mainly concentrated on mitigation of the accidents i.e. the emergency responses. The great majority of the respondents indicate that they implement the quality management

systems (ISO 9001, OHSAS 18001, and ISO 14001) and carry out risk analysis as a requirement of these systems.

– *Notification*

According to the answers, the notification of the establishment is still going on, there are some operators who did not register to the system and who registered but not notified the chemicals. Operators' answers indicate that notification procedure is so time consuming.

– *MAPP*

The respondents' answers show that 65% of them do not have MAPP. This indicates a level of knowledge for the general implementation of the Directive.

– *Safety Reports*

As Directive requires, the Upper-Tier establishments have to draw up safety reports, according to answers only 63% of operators have safety reports. These safety reports have some deficiencies in the context of the Directive such that 40% of them do not include the identification of major accident hazards and 20% of them do not have risk assessment practices.

– *Internal Emergency Plans*

Most of the establishments (94%) have internal emergency plans. Nearly half of the operators tend to receive consultancy for the preparation of the documents.

– *Safety Management Systems*

The respondents agreed that the approach of their safety management system is well-suited to prevent major accidents and mitigate their consequences. Respondents (83%) concluded that their SMS are sufficient for provisions in the Seveso II Directive.

– *Trainings*

There is also clear evidence that trainings are being carried out in the scope of Safety-Quality-Environment in a year in establishments. 46% of respondents carry

out 1 to 3 training in a year, 23% of the respondents carry out trainings over 11 in a year.

– *External emergency plans*

Majority of the respondents (75%) stated that they are not involved in any implementation of external emergency plans procedure.

– Public Information

Answers were mostly negative concerning information of the public provisions. Majority of the Respondents (80%) say that they do not inform public and do not have any mechanism for it. Only 15% of the respondents inform the public by own or via municipalities.

– LUP

Operators stated that distances to the residential areas before and after the operation of their establishment. Respondents answers indicates that there is a nearly 50% reduction in the distances to residential areas since their operation date.

Although the majority (94%) of the respondent say that there is no structure in their safety zones, safety distances are short in meter, which increases the exposure to negative consequences of the accidents for residential areas.

On the other hand, operators accepted responsibility in case of being in the vicinity of the residential area, they will tend to increase their investments on the safety measures, but operators are against the relocation of their establishments which costs heavily. Operators also say that they will establish insurance policy for the dangerous substances in case of high risk for the surrounding population.

Domino effect is also problematic issue. According to answers, average distance to possible neighbor establishment, which can results in domino effect, is less than 250 m. Most of the respondents gave the same answers that they gave for LUP. According to answers there is nearly no practice or cooperation considering domino effects.

To summarize, all target groups think that the implementation of the requirements of the Seveso II Directive will lead to a recognizably higher level of safety in comparison with non-Seveso establishments.

The survey shown that implementation of the requirements of the Seveso II Directive will lead to a higher level of safety, since the requirements of the Directive contributes to extra control on the major accident risks and enables developing measures to control risks.

Respondents accepted that Directive brings substantial requirements and they have to take additional measures, but these will not affect the product prices or will not require huge investments on safety measures.

The requirements of the Directive contribute to creating awareness of the hazards and develop measures to control risks. Responses to questionnaire showed that operators are aware of the Directive in certain areas and they have a good practice especially in Internal Emergency Plans.

5.5. **Summary**

Regarding above sections and satellite images provided in APPENDIX A, below listed issues are identified regarding Seveso establishments profile and compliance of hazardous establishments:

- The intensity of major accident damages or the number of fatalities can be high because many of these hazardous industries often coexist with densely populated areas in industrial towns where proper land use planning or zoning is absent.
- Seveso establishments located in large industrial complexes (OIZs) as well as areas where there is a high density of industrial operators creating a potential risk for domino effects (for example, port areas).
- Implementation of the Directive requires involvement of different administrative bodies which has limited human resources and technical

capacity. Technical capacity of local authorities who are expected deal with land use decisions of Seveso establishments is not at the desired level.

- Both competent authorities and operators need to develop capacity in almost all provinces and efforts should be more intense in the Kocaeli, İstanbul, İzmir, Ankara, Tekirdağ and Kırıkkale.
- There is a limited understanding and no consensus among the stakeholders on the definition and practice of risk assessment,
- The Marmara Region is one of the leading areas of the Turkey in terms of both Seveso Establishments and industrial accidents. This region also densely populated – nearly 30 % of Turkey's population –, which increases consequences of major industrial accidents.
- Moreover, in Turkey, the majority of Seveso Establishments that could be dangerous for the public health, environment and economy are located in active earthquake regions.
- Communication and interaction level between the authorities and the establishments, between domino establishments, between Seveso and non-Seveso establishments is very low.
- In general perspective, operators need technical assistance to implement the Directive. SMS and MAPP requirements have serious deficiencies and most of the operators do not have proper risk assessment practices. LUP and domino effect issues are also missing.

Based current profile of Seveso Establishments and compliance level, certain conclusions can be made on advantages/disadvantages of the different EU approaches for Turkey case.

Since consequence-oriented approach (or deterministic approach) propose larger safety zones around the establishments in comparison to risk-oriented approach for the same case (note that there may be certain accident scenarios, which will have the same safety zones around the Establishments with respect to both approach)[9].

The consequence-oriented approach may have severe cost implication for both new and existing establishments, which have developed in a dense urban context. New and existing establishments must invest either by buying directly surround land or asking the government to do so. Therefore, it brings severe administrative costs effects especially in the case of buying land. In addition, for existing establishments, the preparation and implementation of emergency responses, should take into account detailed mitigation actions, which will be expensive because due to the additional technical measures.

Moreover, existing establishments will have difficulties in expanding their current establishments and installations. This situation will be more acute in old industrial regions like Istanbul, Bursa, and Kocaeli. All these will also be reflected in higher premium paid to insurance companies.

Unlike conservative consequence-oriented approach, risk-oriented approach seeks to be realistic as possible by considering all potentially relevant events within the procedure. One of the underlying logic for the MS choosing this approach is to minimize the safety distances during planning and zoning because of the value and scarcity of the land as followed in the UK and Netherlands [9]. Although, small safety zones generate lower cost for operators due to the less land purchase, resettlement or compensation, risk assessment calculations of the risk-oriented approach are more complex and require more expertise which cost too much.

Moreover, the competent authorities will require more expertise to assess complex risk assessment procedures for LUP in risk-oriented approach.

In summary, the risk-oriented approach can be regarded suitable for the regions that existing Seveso Establishments are located in areas with high population density such as İstanbul, Kocaeli and İzmir. In other regions with low population density and less industrial development can follow may follow both of the approach.

CHAPTER 6

EVALUATION OF TURKISH CASE FOR ARTICLE 12

In this chapter, the national legislation and all related information on administrative procedures which are presented in Chapter 5 reviewed.

This review aims to present overall effectiveness of the current framework regarding LUP of the hazardous establishments.

By analyzing the gathered information, it is aimed to get answers on the implementation level of important areas such as utilization of technical information/advice needed for the siting of new Seveso establishments, consultation between authorities on new Seveso sites, cooperation between the planning and technical authorities.

The effort is given also for the EIA reports, since they provide data on safety distances (health protection zones) around planned hazardous establishments. The EIA reports are investigated whether they include evaluation of major accidents risks and safety measures. The list of EIA reports can be found in Appendix H.

6.1. General Evaluation of Legal Framework Article 12 LUP Practice in Turkey

This section analyses LUP policies and legislations which are summarized in Chapter 5. Whether they incorporate criteria required by Article 12 of the Directive for land that can be allocated for new establishments and other developments.

Moreover, e-mail interviews with municipalities, provincial directorates and OIZ directorates investigated, they provide plenty of information about legal procedure for determination of HPZs related to LUP.

The evaluation is carried out taking into account below elements and research questions:

- Article 12 of the Directive
- Main principles which are described in European Guideline for LUP [22]
- Effectiveness of relevant policies and procedures in ensuring that appropriate safety distances
- To what extent is there adequate consultation between the different competent authorities and planning authorities?
- Are land-use and/or other relevant policies and related implementing procedures ensures that where necessary appropriate safety distances are being maintained around establishments?
- What is the level of interaction with the EIA Directive?
- Are procedures relating to obtaining technical advice on the risks arising from the establishment when decisions are taken effective?

At present, there are two main relevant procedures that directly correspond to requirements of Article 12 of the Directive. The below items implicitly takes into account maintaining appropriate distances between establishments and residential areas by providing limited technical advice:

1. **Health Protection Zones** (HPZs): The **health protection zone** can be regarded as case-by-case appraisal, however each competent authority have its own way (without any formal guidance document). **Therefore, it is more suitable to categorize HPZs in "non-standardized" case-by-case appraisal.**
2. **Generic Safety Distances** are defined for specific establishments (it is more generic and robust). In Turkey, one of the available tool in so far to determine the appropriate distances between Seveso like sites and residential areas is **generic safety distances** – quantity related distance models- defined in several legal documents and standards for the storage tanks of certain dangerous substances category and volume. **The use of tables with fixed distances is a simplified approach for consequence-oriented method.**

According to the interviews with government officials and mail responses, the obligations of Circular on Determination of HPZ around Non-Sanitary Establishment are not enforced. The Circular proposes template for the identification of HPZ in a qualitative approach; unfortunately, it is not enforced by competent authorities.

The evaluations for By-Law on Permission for Opening and Operating of Working Place for Non-Sanitary Establishments at Airports open to the Civil Air Transport is categorized under the By-Law on Permission for Opening and Operating of Working Place.

Apart from HPZs and generic safety distances, practices under the spatial planning and development law and EIA procedure implicitly respond the Directive's obligations.

After the investigation of the legal documents and site selection examination reports, and interviews carried out, the challenges and problems in the HPZs procedure to ensure appropriate safety distances around establishments were evaluated in following sections.

6.1.1. Health Protection Zones

6.1.1.1. The By-Law on Permission for Opening and Operating of Working Place

The only legislative instrument which is most likely to respond the needs of Article 12 of the Seveso II Directive is By-Law on Permission for Opening and Operating of Working Place (Official Gazette: 10 August 2005, no 25902) that defines procedures and principles to be applicable for business and working licenses to be granted to NSEs .

In following sections problems are explained.

1. Definition of Scope

Though, it seems irrelevant to LUP considerations, serious problem arises from the **identification of establishments**. The criteria for to be Class I, Class II or Class III Non-Sanitary Establishment is given in Annex-2 of By-Law on Permission for Opening and Operating of Working Place (Table 30). The list takes into account the

either certain industrial activities or production capacities for different industrial categories.

Table 30 - Certain industrial categories of Class I NSEs

A) Class I NSEs
1-ENERGY SECTOR Thermal power stations and other combustion installations with a heat output of 20 megawatts or more.
4-CHEMICALS SECTOR 4.1- The Chemical establishments for the production of organic chemicals;
3-MINING INDUSTRY 3.1- Cement factories or clinker production facilities and cement establishments with 5tons/hour grinding capacities

However, Seveso II Directive defines the criteria as solely presence of dangerous substance. Due the differences in scope, the Seveso establishments which are under By-Law on Control of Major Accidents may not be classified as a Non-Sanitary Establishment, thus, they may start to operate without any HPZs. In other words no safety zone is assigned around the establishments; unless it is covered by fixed safety distances requirements. Even the establishments store the dangerous substances that enough be a Seveso Site, if their production capacity is lower than defined for Class I NSEs, then, they are not obliged to have HPZs.

2. Unclear Law Text

The Article 4 of the By-Law directly relates to the Article 12 of the Directive is the definitions for the NSEs. The definition emphasizes the need to maintain appropriate distances between establishments (covered by this Directive) residential areas. However, it does not describe suitable distance in quantitative terms or in terms of fixed distances. The language of the By-Law is open to disputes.

3. Location of the NSEs and surroundings

The Article 26 of by-law refers the some sites which are suitable for the NSEs. It is important have such a provision to fulfill the requirements of the Article 12 of the

Directive. The by-law recommends that NSEs should be established in industrial zones in which same NSEs establishments are present[2]. However, in practice, there are many establishments inside the industrial zone but locates the residential areas.

Article 5 of the by-law obliges specific provisions for the new amusement places. It states that establishments use or produce explosive, inflammable substances and gas storage establishments should be far away from amusement places according to respective legislations. This provision is descriptive and does not give technical advice for the proposed developments.

On the other hand, the limit distance is described as 100 meter between NSEs and schools and public houses. This provision may not follow proportionality criterion for the calculation of distances. The consequence distance for proposed establishment can be more than 100 meters even all the precautions are taken.

Moreover, there are no mention for new developments such as transport links and new workplaces and their distance requirement to existing NSEs.

4. Enforcement of the By-Law.

According to the interviews and mail responses:

- There are some NSEs which start to operate without any site selection permit issuance such that they have operating licenses but do not have HPZs.
- There are some cases in which HPZs are not defined by competent authorities and NSEs operates without HPZs.

According to the interviews and mail responses defined procedure for the licensing of the NSEs is not followed in some cases. If the occupancy permit is valid and approved, HPZs are not defined in several cases.

Normally, License Procedure for NSEs should follow below steps

- Site Selection Permit Issuance (which includes defined HPZs)
    - Other permits and required formal documents

[2] This article implicitly considers the domino effects due to the NHE.

    - Construction Permit (İnşaat ruhsatı)
    - Occupancy Permit (İskan belgesi-Yapı Kullanma İzni)
- Inspection of the NSE
- Operation License

5. Low capacity of the competent authorities.

Municipal bureaucrats generally do not have risk based approaches to assist with their decision-making.

Before the enactment of the By-Law on Permission for Opening and Operating of Working Place (2005) and recent local administration laws for Metropolitan Municipalities, Municipalities and Special Provincial Administrations Laws (2012), Ministry of Health and its local branches was the main authority to decide the HPZs. There was no pilot program or trainings for the new competent authorities and their staff to increase their capacity for the determination of HPZs. Currently, Ministry of Health gives opinion to Examination Committee for health protection bands only if they are invited as a member or asked to advice for opinion. In some of the municipalities which do not have technical capacity and expertise, it is asked to Governor for assigning needed committee members.

6. New Developments around NSEs

Article 12 of the Directive necessitates consultation procedure for the LUP requirements in certain cases listed paragraph 1. Nevertheless, Examination Committee responds this requirement only for the new NSEs. The committee does not have any responsibility for the new developments such as transport links, locations frequented by the public and residential areas in the vicinity of existing NSEs, where the siting or developments are such as to increase the risk or consequences of a major accident.

I. HPZ becomes shorter after the operation starts and HPZ zones are opened to construction works. Following the decrease in distances, residential areas may become and develop near to the NSEs. This leads increased risks for public health who live near to establishments.

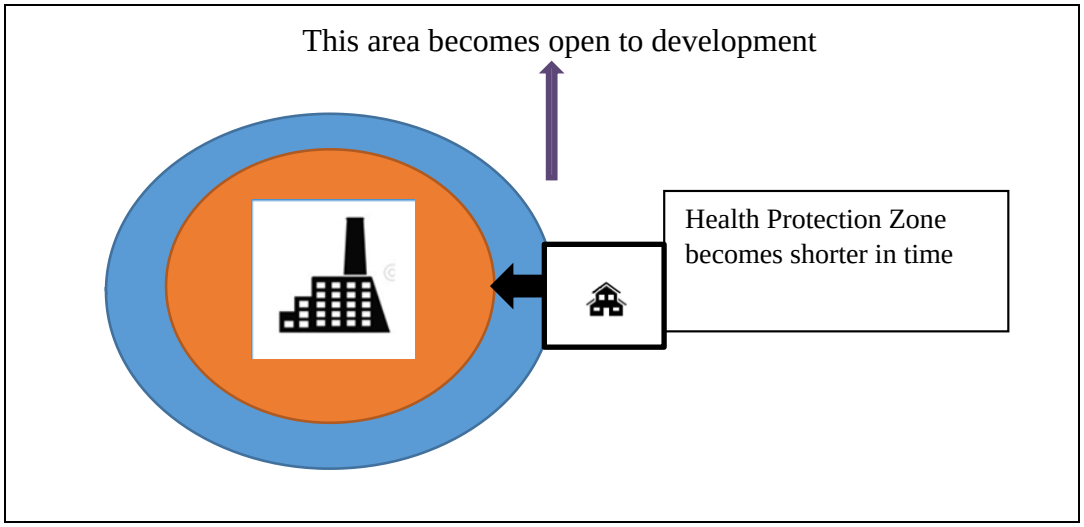


Figure 38 - Change in HPZ

II. One of the important provisions is that, HPZ and fixed safety distances must be in the ownership of the operator of NSE. It cannot go beyond boundaries of the NSE. If the HPZ is determined beyond the ownership, then operator must purchase these areas. In practice, there were several cases that, resident are still in the HPZs.

The HPZs are determined by considering industrial zone boundaries. However, in practice, this provision is one of the challenging issue, there were some cases such that project ownership was not followed and residential areas is developed in these zones.

7. Non-Defendable Decision for HPZs

The main conclusion after the investigation of Site Selection Reports and interview is that; Site Selection Report and particularly health protection band determination are not defendable and does present reproducible results/decisions. The interviews and mailings with competent authorities are provided in APPENDIX I.

The Examination Committee reports do not have explanation for technical aspects of the decisions. Moreover, the officials do not take into account accident scenarios while deciding the HPZs. The report content mainly concentrates on long term environmental impacts. Although, site selection reports do identify nearest residential

area, justifications or restrictions are not defined whether vulnerable receptors are present or not.

The regulations defines competent authorities for granting the operating licenses as metropolitan municipalities, municipalities, special provincial administrations and managements of organized industrial districts and obligates competent authorities to exercise HPZs, but does not specify the method that should be used. It does not address any formal or informal guidelines exist for HPZ determination such that separation distance recommendations and assessment methods, in order to guarantee that areas with incompatible usage may be located at an appropriate distance from another.

Moreover, Examination Committee has seven days to gather and evaluate the information in the Site Selection Report which is relatively short time.

In addition to the above, cooperation of between the competent authorities and technical authorities is neglected. The procedure is not transparent and the Site Selection Reports generally are not publicly available.

The Examination Committees of different competent authorities have some kind of verbal risk estimation depending on Non-Sanitary Establishment's industrial activity. They try to follow consistent approach to the same kind of establishments. Yet, decisions are not technically sound, therefore different results may arise even for the same type of establishment with the same process and capacity etc. in the same region or different regions (Figure 39).

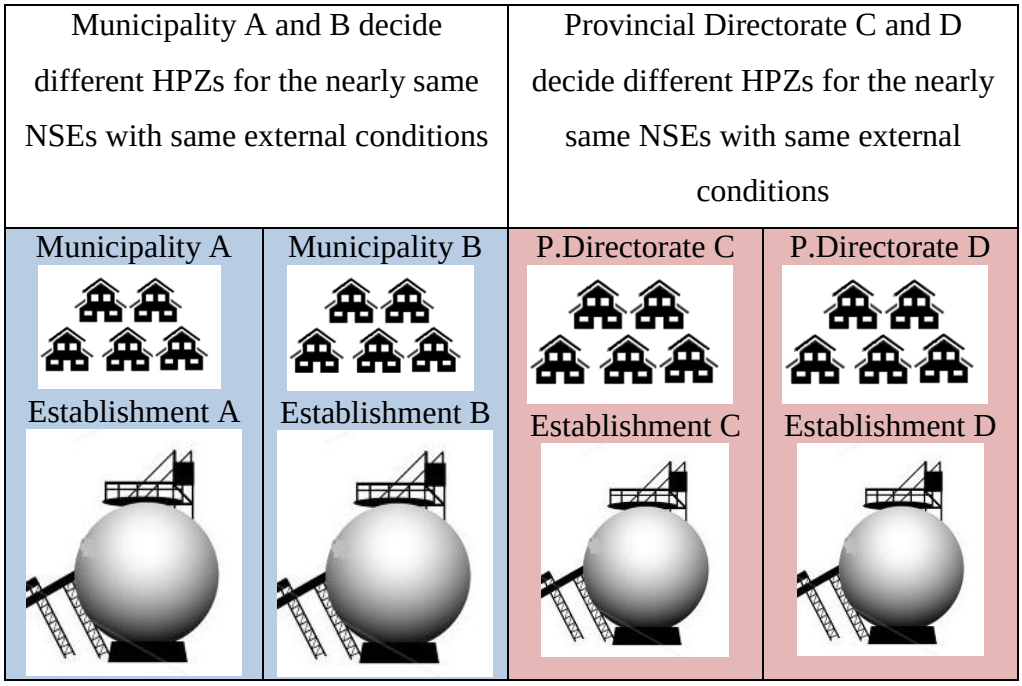


Figure 39 - Different HPZs decisions for similar cases

6.1.1.2. HPZs defined for 1st and 2nd Category Non-Sanitary establishments in scope of EIA procedure

The seven problems discussed in previous section for HPZs are also valid HPZ determination in EIA procedure. Addition to seven problems in previous section, specific challenges and drawbacks are evaluated for EIA reports (APPENDIX H).

The scope of Class I and II NSEs and projects listed in the annexes of By-Law on EIA differs. Yet, certain industrial categories of establishments are identical in the both regulations.

HPZs Decision for in EIA Reports

Certain Class I and II NSEs have to take EIA approval before start operation. For these establishments HPZs are determined within the scope of EIA Report. In EIA procedure, the consultant suggests the distances; no concrete criteria are defined for HPZ determination.

According to By-Law on Permission for Opening and Operating of Working Place, if final EIA report is approved by the competent authority, there is no need for

preparation of Examination Committee report to decide HPZs. The EIA approval stands for the Site Selection Issuance. Competent authorities must take into consideration the distances and documents provided in final EIA to issue a license.

The HPZs decision in EIA reports are generally defined by EIA consultant. In general, if the HPZs are determined in EIA procedure, this distance are accepted, further examination is not required.

The investigated reports indicates that there are significant number of final EIA reports that do not includes information on HPZ for Class I and II NSEs.

Moreover, during the EIA procedure, only MoEU EIA Commission issues an opinion about HPZs decisions. This results contradictions in the license stage. Since the other members are not asked to give advice and they form an advice after the approval of the final EIA reports.

In some cases, prior to permission of a license by competent authority, the examination committee members asked to give opinion (without establishment of the committee). For example, representative of Ministry of Health, it may give opinion to redefine the distances or gives negative opinions, but the negative opinions may not be taken into account.

HPZs Decisions

HPZ decisions in several reports can be regarded as short in meters when it compared major accidents risk level. In the selected EIA reports, the distances are general between 5-50 meters.

6.1.2. Generic Safety Distances

Turkish legislation and related regulations and standards consist of safety distance information only for storage of explosives and flammable substances. The safety distances practices are common for such LPG, LNG and Natural Gas Etc. The safety distances define minimum distance from storage installation (e.g. tank) to residential areas and highways and railways.

This approach is not strictly based on a risk analysis method. Tables of fixed safety distances are mostly used to quickly assess the distances. The fixed distances do not consider the consequences of the worst case accidents.

The main problems and drawbacks of the generic safety distances approach are provided below:

1. The safety distances relatively short when they are compared with EU examples.
2. The minimum distances and dangerous substances quantity/volume model do not correspond to proportionality principle.
3. Table 31 compares Generic Safety Distances requirement under by-law on buildings fire protection in Turkey and Ireland consultation distance case.

Table 31 - Comparison of Generic Safety Distances for Turkey and Ireland Case

<table>
<tr><th colspan="2">Turkish Case</th><th colspan="2">Ireland Case
Consultation distances used by the Authority [42]</th></tr>
<tr><td colspan="2">Distances to the Neighborhood parcel boundary, traffic networks and railways (m)</td><td colspan="2">Consultation Distance (m)</td></tr>
<tr><td rowspan="3">Inflammable and Flammable Liquids Storage for aboveground tanks established in open areas for

For more than 11.375.001 lt Tank Volume</td><td rowspan="3">55 m</td><td>LPG: Mounded or underground</td><td>600</td></tr>
<tr><td>LPG: Mounded or underground > 100t</td><td>100</td></tr>
<tr><td>Bulk Flammable Storage</td><td>700</td></tr>
</table>

APPENDIX C, APPENDIX D and Appendix F list the generic safety distances in Turkish Legislations. The one who compares the Turkish examples with EU examples should notice that the distances are relatively low in some range for the flammable substances storage areas.

4. Limited Dangerous Substances Category

The regulations which require generic safety distances are used only for the explosive and flammable dangerous substance category, however there is no common approach for toxic or corrosive dangerous substances such as chlorine (toxic, non-flammable), hydrogen chloride (corrosive, non-flammable gas), phosgene (very toxic, non-flammable), fluorine (very toxic, corrosive) oxidizing which are listed in the Annex I of the Directive.

Therefore, the scope problem is also valid for the fixed safety distances regulations. If the Seveso establishment is not covered by generic safety distances due to constrained scope, plus it is not a Class I or Class II NSE, it may take license and start to operate without any safety distances.

5. Enforcement of the generic distance requirements

The Inspections carried out in the in LPG and Fuel Stations concentrated on health and safety risks and precautions to be taken. The inspection reports summarize the both technical and legal definiteness in the sites.

In the significant proportion of the inspected sites, LPG and Fuel Stations do not follow legally requirements which are related topics with Article 12 of the Directive:

- Location of the sites
- Site Selection Permit Issuance and Facility Permit Issuance
- Technical requirements of the tanks in terms of layout distance to each other and roads, railways and residential areas.
- Overcapacity working
- Explosive requirements are not favored
- Operation in outer part of the defined project area

6.1.3. Planning

Apart from HPZs and generic safety distances, practices under the planning and development law and its regulations were evaluated limitedly.

Developments in the vicinity of Seveso II establishments

Major problems are connected with new developments (i.e. residential buildings and new transport routes) which are not further controlled concerning appropriate safety distances.

Although new developments are not in HPZs or fixed safety distances, the hazards arise from the hazardous establishments still pose significant risks for the proposed development, particularly the neighboring ones.

The competent authorities, generally planning authorities do not seek for advice to ensure exposure to risks from existing major hazard facilities is not increased by new modification to establishments or changes in land use surrounding them.

6.1.4. By-Law on Control of Major Accidents

According to the By-Law on Control of Major Accidents, the frequency of major accident cannot exceed $1x10^{-4}$/year at the fenceline.

However, the By-law does not define any criteria for LUP and refer to the planning or other regulations such that allowable land use out of the establishment.

Namely, it does not include requirements nor make any advice for the high density urban and commercial areas, hotels and tourist resorts which may locate near to the establishment.

In Figure 40 , Canadian Acceptable Level of Risk is given. The criteria apply to sensitive developments such as hospitals, schools, child care facilities and aged care housing development.

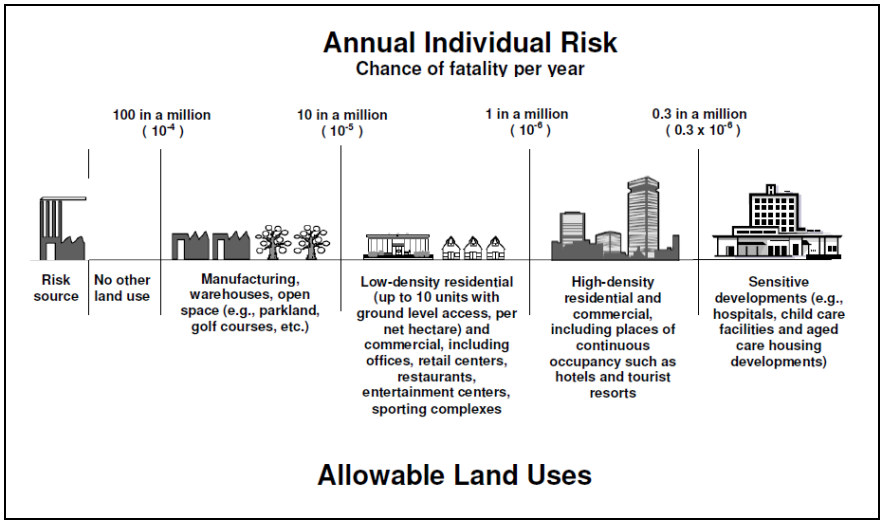


Figure 40 - Canadian Acceptable Level of Risk [58]

Risk informed LUP contains either a restriction of land uses for new developments or in the form of technical solutions additional technical measures for existing establishments. The By-Law does not refer additional technical measures. Moreover, HPZs and generic safety distances do not directly address the existing establishments and vulnerability of surrounding population.

EU examples indicate that the implementing the LUP requirement to existing establishments will bring physical modifications and expropriation is expected to bring huge administrative costs for existing establishments.

In the Austrian case, based on the 145 Austrian Seveso establishments with 300 m safety distances leads to about 250,000 m^2 of restricted area. Total costs amount to EUR 3.4 billion by applying a land value of 95 EUR/m^2.

These considerations reveal that costs of implementing the LUP requirement to existing establishments could results in very high costs [59].

6.2. Common problems for Health Protection Zones and Generic Safety Distances

Based on screening process of national legislation, inspection reports and HPZ decision making procedure and interviews, below common problems for HPZs and Safety Distances are listed:

- Responsibilities for competent authorities are not clearly defined in regulations,
- Lack of specific technical guidance,
- In similar cases, the competent authorities have different advices,
- The use of acknowledged methods for Hazards/Risk Assessment Methods are not fully employed, identification of all hazard types is not performing,
- Accident scenarios are not defined which provide information on the potential extent of consequences,
- Disproportionate safety distances such that short distances in each case either health protection bands or generic safety distances. They are not proportional to the severity of consequences,
- Probability or frequency of major accident risks are not assessed either qualitatively or quantitatively the will serve as a basis for LUP decision,
- Identification of vulnerable targets is performed in little extent and development types (workplaces, residential etc.) are not characterized in the vicinity of establishments,
- Risks to public with the development of near the establishments are not considered,
- Deficits in coordination with other procedures.

6.3.EIA Reports and Major Accidents Risk Perspective

Annex IV of By-Law on EIA comprises potential applicability to risk linked considerations. Under ‘characteristics of projects’, the screening criteria listed in Annex IV.1 include the criterion “risk of accident which may arise due to technology

and materials to be used in the project as selection elimination criteria basis for the project presentation file.

This thesis investigated consideration of major accidents risk in Turkish EIA procedure by analyzing the 30 EIA reports (APPENDIX H). It is aimed to reveal which extent different hazard categories and risk types are covered in selected EIA reports

The reports are selected according to following criteria:

- The establishments which are under the scope of EIA and
- The establishments which are under the scope of the By-Law on Permission for Opening and Operating of Working Place which requires health protection bands.

The followings section summarizes shortcomings reports in terms of prevention and mitigation of major accidents considering both public and environmental health. Other than, general analysis of the reports, this assessment concentrates on HPZs determination and the particular sections of EIA reports which are listed below:

- General
- HPZs Determination
- Emergency Plans
- Use and Storage of Flammable, Explosive, Toxic and Hazardous Substances
- Risk Analysis
- Dangerous and Risky Activities regarding public and environmental health and Precautions
- The materials and chemicals that will be used in scope of the project
- Location of projects

1. *General*

    - The risk concepts and risk assessment in reviewed EIA reports can be regarded as weak points in EIA procedure. The need for better integration and more consistency of risk assessments in EIA procedure,

- The screened EIA reports which provide potential major accident risks (mostly fires and release of dangerous substances, gives so little information mechanisms of the accidents such that, the potential sources of the fire hazards and dangerous substances which will release.
- The reports which consider major accident or accidents, do not take into account the vulnerable targets (their size and sensivity) which will be exposed potential consequences. As a consequence of that, prevention and mitigation actions are only limited to on-site protection; even the major accidents are taken into account.
- The EIA reports which consider the major accident risks do not provide detailed explanation how to prevent the accidents. In general, the reports concentrate mitigation activities due the hazards.
- Public participation sections of EIA reports also reviewed. The public participation meetings which are carried out by project owner inform public how and by which methods the public that is likely affected by the project and reflection of the public opinions and explanations in regard to the project are gathered.
- To inform the public about meeting date, hour, location and subject of the meeting, the advertisements are published in newspapers, national and local newspapers, before the meeting date. However, the public participation section of the reports merely refers major accident risks and reflection of the public on the issue.

2. *Emergency Plans*

- Emergency plan structure varies for the same type of establishments and generally studies natural disaster emergencies.
- In some of the reports, emergency plans are not detailed.
- In most of the reports, source of the accidents and risky areas not defined, the related accident scenarios were not described.
- Potential exposure pathways and receptors were not identified for emergencies. For example, chemical source, a mechanism of release, a

transport mechanism in the relevant environmental medium, a point of exposure and an exposure route.

3. *Use and Storage of Flammable, Explosive, Toxic and Hazardous Substances*

- Explosive risks are not well-defined and assess dangerous substance and chemicals that are used, handled, stored or disposed and which may be inadvertently or accidentally released to the environment under various conditions such as fugitive emissions and spill scenarios.

4. *Risk Analysis*

- Only mining facilities' EIA reports have separate sections for risk analysis.
- In general, the reports don't have needed general information on risk analysis.
- The earthquake risks and other natural disaster risks relatively well detailed.
- Quantitative or qualitative evaluation of the probability of project impact is not well established.

5. *The materials and chemicals that will be used in scope of the project*

- There was limited data on materials and chemicals that will be used in scope of the project.
- Only chemicals and substances associated with a project or facility were identified. Even, the information for the chemicals anticipated to be present in planned project is ignored.

6. *Dangerous and Risky Activities regarding public and environmental health and Precautions in construction and operation phase of the project*

- Although section title refers to the dangerous and risky activities, majority of the reports do not identify the major accident risks for public and environmental health.

- The main documentation was carried out for occupational health safety via declarations.
- There was no information for dangerous and risky Activities regarding environmental health
- Mining projects report includes environmental risk due to the activities.
- The reports admits probability of accidents without identifying their types, scale and potential consequences
- The precautions considers only construction phase risks
- Missing definition of the concept of risk and risk of accidents
- Weaknesses in evaluation of the probability of negative consequences of the project for humans and the environment
- Accidental release of dangerous materials released into the environment

In general, the EIA reports' sections which investigate the human and environmental impacts due to accidents are oriented to (small scale) occupational health and safety accidents and, therefore mitigation of these accidents. The reports do not take into accounts external safety and acute effects of potential major accidents risk on public and surrounding environment.

The major accident potential of the projects was not investigated in reports; the ones which include information did not consider vulnerability of residents or sensivity of the area.

In majority of the analyzed sections of the reports which are expected to refer the major accidents risk, gave details on precautions for occupational health and safety, consideration of major accidents only was confined to fire mitigation and emergency responses to small scale accidents.

Other important deficiency arises with the "declarations based responsibilities" such that project owners use the same language in reports: "the important requirements will be taken before the operation of the project".

In some of the reports even legal requirements are not described for major accident risks. Only one of the reports refers the Seveso requirements.

EIA projects activities which fall within the scope Seveso EIA Directive have no information about tier status whether they are Upper or Lower Tier or whether they have major accident prevention policy, safety reports etc.

As a significant deficiency, ***project impact area*** determination only takes into account long term environmental impacts, no major accidents risks are not defined as criteria.

The problems listed above primarily emerges as consequence of lack guidance documents that specifies concept of risk, risk of accidents and overlooked major accident perspective in Turkish By-Law on EIA. The By-Law on EIA and its guidance documents do not specifies concept of risk of major accidents explicitly.

In overall, review of the EIA reports' content pointed out gaps in integration of major accidents risk in the EIA procedure. The EIA reports primarily focus on continuous emissions only and give limited information on major accident hazard assessment. The reviewed reports have deficiencies in particular to the identification, description and assessment of significant effects of the potential major accidents.

6.4. Summary

While above regulations can be employed regarding industrial hazards, these tools are not equally relevant and applicable to the considerations of risk informed LUP.

The above mentioned LUP practices merely considers the accident scenarios which couple with release models for pressure, thermal radiation and toxic gases and end points and/or acceptance criteria to decide the appropriate distances either qualitatively and quantitatively.

CHAPTER 7

CONCLUSION

Major industrial accidents are uncontrolled events which result in deaths and leads to catastrophic consequences to property and the environment. Such kinds of accidents pose considerable challenges to sustainable development; in terms of environment, economy and societal impact. To address these challenges, industrialized (developed) and developing countries have to undertake important legal, technical and institutional reforms that will have economic, social and environmental impacts.

This thesis aimed to play a role as a benchmark analysis examines legal and technical aspects of LUP in the context of the Seveso II Directive in Turkey and illustrate the drawbacks.

The main uncertainties of this study come from the restrictions to accession to data such as full name, chemicals, and full addresses for Seveso establishments and limited access to the Committee Reports which includes HPZs decisions for Class I NSEs under By-Law on Permission for Opening and Operating of Working Place.

To sum up this study tried to answer below aspects:

- Profile of Seveso Establishments and their compliance
- Maintenance of appropriate safety distances around establishments via land-use and/or other relevant policies and
- Implementation procedures for risk informed LUP
- Effectiveness of procedures relating to obtaining technical advice for LUP decisions
- Consultation level between the different competent authorities and planning authorities

- Major industrial accidents risk in EIA reports

First, it assessed the general profile of Seveso establishments in terms of their number, industrial activity and location with the general compliance level to Seveso Directive. This gave a general picture of safety culture of Seveso establishments which directly affect future proposed risk informed LUP policy.

One of the important conclusions for Seveso establishments is that most of the hazardous industries coexist with densely populated areas in industrial towns where proper land use planning or zoning is absent. It may intensify major accident damages. Moreover, Seveso establishments located in large industrial complexes (OIZs) as well as areas where there is a high density of industrial operators creating a potential risk for domino effects. Seveso establishments locate near sensitive areas open to public (schools, major transport routes). The unplanned industrialization and high risk of earthquakes in the area is not taken into consideration.

These REC RIA study, inspections reports and satellite images provided a general picture of Turkish Seveso establishments' compliance to Seveso II Directive's requirements, particularly land-use planning, it can be said the general compliance level is very low.

Secondly, legal aspects and implementation levels were deeply analyzed with real life examples. The study identified weaknesses of the current regulatory framework of LUP practices and defined key challenges to be tackled to accomplish better integration of risk assessment in LUP.

An assessment of the Turkish situation identified many of the weaknesses. The main weakness is the absence of regulatory framework that explicitly corresponds to the LUP requirements of the Article 12 of the Seveso Directive. Additionally, definition and assignment of roles and responsibilities of current administrative structures is not clear.

Although, various permits and procedures exist; the risk concepts, approaches, models, and methods applied to risk assessment and risk management regarding LUP

of Seveso establishments are not clearly established and implemented. The procedural integration of risk assessment into the LUP process and the coordination with risk assessments under other consent procedures are the main drawbacks.

Moreover, the enforcement and effectiveness of current risk assessment regarding major accidents in different legislation is very low.

Local authorities who decide LUP decisions might not have scientific or technical background, with the problem how to deal with offsite risks and risk assessment studies submitted to them in terms of evaluation of contents, comment on their adequacy and interpret their results.

Lack of coordination in assessments and separate inspections, different views regarding results of examinations (one authority decision regarding LUP may not be accepted by another authority) causes conflicts between authorities. Moreover, it lowers the quality of performance and results varying from region to region. Without sharing information and deciding together on the key requirements of the Directive (i.e. risk assessment, land use planning, external emergency plans), officials, inspectors, and other civil servants are expected to have many difficulties while performing their tasks. The establishment of coordination mechanism links actors and policies.

Experience in MS demonstrates the usefulness of setting-up coordinated mechanisms for major accident management, involving different central and local public authorities and private stakeholders. It improves the communication between central authorities and local authorities responsible for land use planning practices [59].

EIA reports are felt to cover the concerns of major accident risks due to the establishments properly.

In Turkish case, elaboration of new legislative tool or modification of current ones, defining main terminology and responsibilities of all competent authorities regarding risk informed LUP is the **most essential step to be taken**.

The new framework must describe details for the type of '**technical advice'** which is necessary under Article 12.

The new regulations should concentrate on external safety and incorporate a set of preventive policies aims to minimize the consequences of accidents beyond border of the establishments. Public authorities have to consider the risk to third parties as determined by three variables [45]:

1. The possible accident scenarios;
2. The estimated probabilities (either qualitatively or quantitatively) of these scenarios;
3. The vulnerability and number of exposed objects.

Based on the current policy tools, regulations and procedures which are reviewed in previous chapter a series of conclusions are made for the establishment of risk informed LUP in Turkey. The recommendations aims to improve of risk informed system for LUP controls at Seveso sites and better transposition of the Article 12.

The following recommendations are found be the critical to solve drawbacks in present regulations and increase the compliance level of both competent and operators.

7.1. Conclusions

Scope Definition

To ensure that all Seveso establishments have safety zones around them, the scope of the HPZs requirements must be extended to presence of extended named and unnamed list of dangerous substances. The establishments which stores, uses or produces threshold quantity of dangerous substances defined in the annex I of the Directive must become under HPZs or fixed generic safety distances requirement. In short term, the Upper and Lower-tier Seveso establishments can be classified under the Class I NSEs and Class II NSEs respectively.

Vulnerable population-target classes

The Turkish legislation has limitations in LUP that distinguish between vulnerability of different objects such as housing areas, hospitals and schools etc.

Major hazard authorities and planning authorities should define vulnerability classes of society and take into account when they planning changes in land use close to existing major hazard establishments or when establishing new major hazard establishments near to residential areas like UK or Italian approaches. For example:

- planning of educational, health care, public and business facilities;
- planning of residential area and increasing population density in existing housing developments;
- planning of airports, ports, railway yards, rail or water transport links, increase in loading or transport facilities.

The establishment of vulnerability classes is vital for while undertaking a systematic risk assessment and exploiting the results for taking land use planning decision in an industrial area.

Consultation and Technical Advice

The information provided in major accident prevention policy and safety report of Seveso establishments should be used by planning and environmental authorities to assess the compatibility of LUP decisions before permitting operation license similar to the Italian approach.

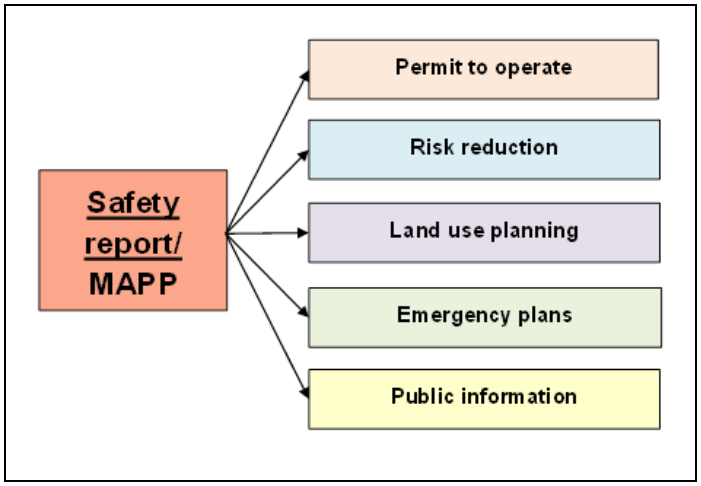


Figure 41 - Safety Reports/ MAPP

Similar to the UK case, consent advice must be granted by MoLSS after assessment of MAPP and safety reports or other relevant information. Following the consultation of MoLSS, local authorities with more information about the characteristics and magnitude of risks that may possibly affect the neighboring land, the authorities can decide more accurate and proportional HPZs and/or fixed safety distances.

Technical guidance with common terminology for risk informed LUP

The common terminology plays central role in assisting and facilitating the dialogue and solving the problem of misapplications of terms. This means gaining agreement on decision processes should take place in advance [25]. Hazard identification, risk analysis, risk assessment terms are mainly defined considering labor health and safety, they must be extended to cover off-site risks etc. Common language is essential for handling LUP risk assessment around major hazard sites by local authorities and operators who has to manage the decision-making process together.

This can be achieved through publication of guidance documents binding for different shareholders. In addition to present legislative tools, the subsequent guidance documents, either formal or advisory, should be produced which will be followed by central, local authorities and operators.

The guideline should include procedures and/or define for below items;

- Analytical model used to perform the risk analysis methods (such that scientific technique used to calculate the distance)
- Definitions of reference and worst case of scenarios for different categories of Seveso establishments
- Additional technical measure for existing situations,
- Recommendations for endpoints (heat radiation, toxic load for man & environment),

The good example of technical guidance is the Dutch approach which is described in CPR-18E: "Guidelines for Quantitative Risk Assessment, also called the Purple Book [18].

HSE's land use planning methodology is well described in PADHI guideline, local authorities use PADHI decision matrix who then either 'Advise Against' or 'Don't Advise Against' [41].

Risk Notion and Quantitative Assessment of Consequences

The EU experience and trends follow more probabilistic approaches to the events in the assessments. Turkish approach should also include main element of risk; probability. It could be either quantitatively or qualitatively in LUP practices. It is essential to assess as precisely as possible the effects of the substance and energy releases along with the risks in each case in relation to the distance from the point of release or the establishment, respectively [60].

According to the By-Law on Control of Major Accidents, the frequency of major accident cannot exceed $1x10^{-4}$/year at the in border of Seveso Establishment. However, the By-law does not define any risk based criteria for LUP and refer to the planning or other regulations such that allowable land use out of the establishment.

If Turkey follow risk oriented LUP approach, the risk of fatality of 10^{-6} per year for an individual of the public could be considered as a risk acceptance criteria as in certain EU countries. Moreover, subsequent principles and various specific criteria

are must be constructed for the risk oriented approach e.g. the consequence assessment of requires defined effect endpoints [25].

Table 32 - Recommendations

Topic	Recommendations
Generic Safety Distances	- Generic distance approach used for around flammable and explosive storage sites should be replaced by a case by case assessment of Upper-Tier Seveso establishments which are complex and bear high risks. - In short term, fixed safety distances approach could be used to for Lower-Tier establishments.
Health Protection Zones	- The standards-criteria and guidance should be designated for the determination of HPZs that all local authorities can follow up and decide HPZs.
Spatial Planning Regulations	- Responsibilities for planning authorities should be clearly defined in regulation regard to Article 12 of the Seveso II Directive. - All spatial planning documents prepared for the long-term should contain clear provisions for Seveso II establishments. - Extended description of areas designated for Seveso II establishments should be provided in the environmental plans.
EIA Recommendations	- The HPZs should be designated in the earlier step of EIA consent procedure, before operation. - Preparation of detailed guidance on how to perform major accident risk assessment in the framework of EIA is needed:

To overcome the above mentioned issues and perform recommendations (Table 32) the main effort should be given to establishment of regulatory policy and technical

framework and designation of detailed and specific risk criteria which will have both scientific and societal context.

This thesis recommends establishment of regulatory policy and technical framework for risk informed LUP either by modifying the current practices or initiating purely new framework. The recommendations established by this research can be used as benchmark for future modifications.

In summarize, to accomplish the proposed recommendations, comprehensive review of the system for LUP around major hazard sites must be the first step and the incorporation best practices defined and national risk criteria in LUP decision making is the second one taking into account particularities of Turkey.

This research contributes the first step. On the other hand, the thesis does not recommend any approach or risk criteria and methodology for Turkey which is out of the scope of the current study. The EU experience indicates that there are various approaches to risk criteria for the establishment of risk-informed LUP. Moreover, it had required comprehensive scientific and technical work to define these criteria to reach more comparable, consistent and transparent decisions. Each Member State had developed its own approach in LUP methodology, which directly depends on legal, social, cultural and geographical aspects [9].

Although, this research makes preliminary comments on the advantages/disadvantages of the different EU approaches for Turkey findings, the researchers who want to study further on risk informed LUP in Turkey should focus deeply on advantages/disadvantages of the different EU approaches for Turkey and/or propose risk assessment methodology and criteria in their studies by using the information provided in this study taking into account economic, environmental and social aspects impacts.

REFERENCES

1. Roeser, S., Hillerbrand, R., Sandin, P., & Peterson, M. (2012). Introduction to Risk Theory. In Handbook of Risk Theory (pp. 1-23). Springer Netherlands
2. Möller, N. (2012). The concepts of risk and safety. In Handbook of risk theory (pp. 55-85). Springer Netherlands.
3. Renn, O. (1992). Concepts of risk: a classification. In: Krimsky, S., & Golding, D. (1992). Social theories of risk (Vol. 58). Westport, CT: Praeger.
4. Christou, M . D., & Papadakis, G. A. (1998). Risk Assessment & Management in the Context of the Seveso II Directive (Vol. 6). Access Online via Elsevier.
5. EC, 1982, Council Directive 82/501/EEC of 24 June 1982 on the major accident hazard of certain industrial activities OJ No, L 230, 05/08/1982 P. 1 - 18
6. EC, 1996, Council Directive 96/82/EC of 9 December 1996 on the control of major-accident hazards involving dangerous substances, OJ No , L10, 14.01.1997 P. 13-33.
7. Chemical accidents (Seveso I, II and III) - prevention, preparedness and response. (2013). Retrieved from http://ec.europa.eu/environment/seveso/ Last accessed on 01/02/2014
8. Merad, M., & Dechy, N. (2010). Risk governance for sustainable territories: the French case and some challenges. Revista Catalana de Seguretat Pública. To be published.
9. Cladia Basta (2009) Risk, territory and society: challenge for a joint European regulation. Ph.D. thesis, Delft University of Technology
10. MoEU, 2010, By-Law on Control of Major Industrial Accidents OJ No, 27676, 18.8.2010
11. MoEU, 2012, Amendment to By-Law on Control of Major Industrial Accidents OJ No, 28370, 31.8.2012
12. MoLSS, 2013, By-Law on Prevention and Mitigation of Major Industrial Accidents OJ No, 28867, 30.12.2013

13. N. Arıkan, Y. Söyleriz, A. Erdevir, and M. Asma, (1999) Draft Regulation on Prevention of Major Industrial Accidents
14. Project fiche – IPA Decentralized National Programmes. (2012). Retrieved from http://ec.europa.eu/enlargement/pdf/turkey/ipa/2009/tr2009_032704-implementation_capacity_of_seveso_ii_directive_en.pdf Last accessed on 01/02/2014
15. Girgin, S. (2008). An Integrated Decision-Support System For Industrial Accidents (Doctoral Dissertation, Middle East Technical University).
16. Balamir, M. (2002). Painful steps of progress from crisis planning to contingency planning: Changes for disaster preparedness in Turkey. Journal of Contingencies and Crisis Management, 10(1), 39-49.
17. Bütünleşik Kentsel Gelişme Stratejisi ve Eylem Plani 2010-2023. (2010). Retrieved from http://www.kentges.gov.tr/_dosyalar/kentges_tr.pdf Last accessed on 01/02/2014
18. B.J.M Ale (2005), Living with Risk: a Management Question, Reliability Engineering and System Safety,No. 90, 196-205
19. De Marchi, B., Funtowicz, S., & Ravetz, J. (1996). Seveso: A paradoxical classic disaster. The Long Road to Recovery, 86-113.
20. EC, 2003, Council Directive 2003/105/EC of the European Parliament and of the Council of 16 December 2003 amending Council Directive 96/82/EC on the control of major-accident hazards involving dangerous substances OJ L 345, 31.12.2003, p. 97–105
21. EC, 2012, Directive 2012/18/EU of the European parliament and of the Council of 4 July 2012 on the control of major-accident hazards involving dangerous substances, amending and subsequently repealing Council Directive 96/82/EC, OJ, L197, 24.07.2012, 1-37
22. Christou, M. D., Struckl,M., & Biermann, T. (2006). Land Use Planning Guidelines in the context of Article 12 of the Seveso II Directive 96/82/EC as amended by Directive 105/2003/EC. European Commission, Joint Research Centre, Major Accident Hazards Bureau, Ispra.

23. Jelínek, R., Wood, M., & Christou, M. (2010). Industrial Installations in Europe Distributed in the SPIRS Database.
24. Christou, M. D., & Papadakis, G. A. (1998). Risk Assessment & Management in the Context of the Seveso II Directive (Vol. 6). Access Online via Elsevier.
25. Basta, C., Struckl, M., & Christou, M. (2008). Implementing ART. 12 of the Seveso II Directive: overview of roadmaps for land-use planning in selected member states EUR 23519EN. Luxembourg: office for Official publications of the European Communities.
26. Tugnoli, A., Gyenes, Z., Van Wijk, L., Christou, M., Spadoni, G., & Cozzani, V. (2013). Reference criteria for the identification of accident scenarios in the framework of land use planning. Journal of Loss Prevention in the Process Industries.
27. Rausand, M. (2011) Risk Assessment Process, in Risk Assessment, John Wiley & Sons, Inc., Hoboken, New Jersey.
28. Joint Research Centre (2005), Guidance on the Preparation of a Safety Report
29. Authority, C. C. (1999). Guidance on the Environmental Risk Assessment Aspects of COMAH Safety Reports.
30. Duijm, N. J., & Universitet, D. T. (2009). Acceptance Criteria in Denmark and the EU. Danish Environmental Protection Agency.
31. Christou, M., Gyenes, Z., & Struckl, M. (2011). Risk assessment in support to land-use planning in Europe: Towards more consistent decisions?. Journal of Loss Prevention in the Process Industries, 24(3), 219-226.
32. Salvi, O., & Gaston, D. (2004). Risk assessment and risk decision-making process related to hazardous installation in France. Journal of Risk Research, 7(6), 599-608.
33. Ministry of Ecology and Sustainable Developmen. (2013). Technological risk prevention plan (PPRT) acting together to control risks. Retrieved from http://www.paca.developpement-durable.gouv.fr/IMG/pdf/Plaquette_PPRT_english__cle07855c.pdf Last accessed on 01/02/2014

34. SFK/TAA-GS-1 ,Recommendations for separation distances between establishments under the Major accidents Ordinance and Areas requiring protection within the framework of Land-Use Planning - Implementation of § 50 Federal Pollution Protection Law (BImSchG), developed by the SFK/TAA Working Group "Land-Use Planning", http://www.kas-bmu.de/publikationen/sfk_gb/sfk-taa-gs-1k-en.pdf (short Version) Last accessed on 01/02/2014
35. Uth, H. (2007). Zoning for land use planning in Germany and Europe. Retrieved from http://www.envir.ee/orb.aw/class=file/action=preview/id=900323/LUP_Estonia_2007_10.pdf Last accessed on 01/02/2014
36. Robbert, P. (2011). Risk based external safety regulations in the Netherlands. Retrieved from http://www.seveso.se/Global/Seveso/konferenser/dokumentation/seveso_2011/Netherlands_sevesoconferencestockholm_nw.pdf Last accessed on 01/02/2014
37. HSE (2005), PADHI – HSE's land use planning methodology.
38. Frank, W., & Farquharson, J. (2009). Guidelines for Developing Quantitative Safety Risk Criteria. Center for Chemical Process Safety of the American Institute of Chemical Engineers, New York, 210.
39. HSE (2011). PADHI Methodology, Retrieved From http://www.hse.gov.uk/landuseplanning/padhi.pdf Last accessed on 01/02/2014
40. http://www.hsa.ie/eng/Your_Industry/Chemicals/Control_of_Major_Accident_Hazards/Land_Use_Planning/#sthash.oyyaNLqI.dpuf Last accessed on 01/02/2014
41. HSA. (2010). Policy & approach of the health & safety authority to comah risk-based land-use planning. Retrieved from http://www.hsa.ie/eng/Your_Industry/Chemicals/Control_of_Major_Accident_Hazards/Approach_to_LUP_under_Comah_Regs.pdf Last accessed on 01/02/2014
42. HSA. (2013). Land use planning. Retrieved from http://www.hsa.ie/eng/Your_Industry/Chemicals/Control_of_Major_Accident_Hazards/Land_Use_Planning/ Last accessed on 01/02/2014

43. Ministerial Decree of 9 May 2001, Requisiti minimi di sicurezza inmateria di pianificazione urbanistica e territoriale per le zone interessateda stabilimenti a rischio di incidente rilevante, Gazzetta Ufficiale dellaRepubblica Italiana, no. 138, Rome (I), 16.6.2001.
44. Carpignano, A., Pignatta, G., & Spaziante, G. (2001, September). Land use planning around Seveso-II installations: the Italian approach. In Proceedings of the European Conference on Safety and Reliability, MG, Torino (I) (p. 1763).
45. Cozzani, V., Bandini, R., Basta, C., & Christou, M. D. (2006). Application of land-use planning criteria for the control of major accident hazards: A case-study. Journal of hazardous materials, 136(2), 170-180.
46. Balamir, M. (2013). Obstacles in the adoption of international drr policies: The case of Turkey. Retrieved from http://www.preventionweb.net/english/hyogo/gar/2013/en/bgdocs/Balamir, 2012.pdf Last accessed on 01/02/2014
47. AFAD. (2013). Teknolojİk afetler rİsk azaltma ÇaliŞma grubu faalİyetlerİ. Retrieved from https://www.afad.gov.tr/TR/IcerikListele.aspx?ID=205 Last accessed on 01/02/2014
48. Heidebrink, I. Synthesis document on WP 2 "Continuity of risk management from workplace accident to major accident", 2005, SHAPE-RISK report http://shaperisk.jrc.it
49. C. Tarhan and D. Deniz, (2013). Sustainable Urban Planning And Risk Assessment Of Earthquakehazards In Turkey International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences, 29th Urban Data Management Symposium, 29 – 31 May, (2013, London, United Kingdom ,
50. Ercet, C., (2012). 'Strategic Plan' and 'Environment Plan' (Çevre Düzeni Plani) in Turkey in the Context of a Question: "Can'Environment Plan' be combined to 'Strategic Plan' in terms of Preparation and Practice to Get a New Planning Type that is'Strategic Spatial Planning,AESOP Conference 2012.
51. Kooijman, F., Ayalp, E., & Özgür, H. (2011). Support to further the implementation of local administration reform in Turkey phase II . Retrieved

from http://www.migm.gov.tr/en/publications/RepotonLandDevelopmentPlanningServicesin4PilotLocalAuthorities.pdf Last accessed on 01/02/2014

52. Steinberg, L. J., & Cruz, A. M. (2004). When natural and technological disasters collide: lessons from the Turkey earthquake of August 17, 1999. Natural Hazards Review, 5(3), 121-130.
53. Sales, J., Mushtaq, F., & Christou, M. D. (2007). Analysis of major accidents reported to the MARS database during the period 1994–2004.
54. T.C. Çevre ve Orman Bakanlığı, (2007). "Ülkemizde meydana gelen endüstriyel kazaların il bazında dağılımı"
55. MoLSS, (2005). Sıvılaştırılmış Petrol Gazı ve Akaryakıt Dolum Tesisleri, iş sağlığı ve güvenliği Proje Denetimi Değerlendirme Raporu Retrieved from http://www.csgb.gov.tr/csgbPortal/ShowProperty/WLP%20Repository/itkb/dosyalar/yayinlar/yayinlar2013/2005_05 Last accessed on 01/02/2014
56. MoLSS, (2005). Patlayıcı Madde Üretilen ve Depolanan İşyerlerinde İş Sağlığı ve Güvenliği Proje Denetimi Değerlendirme Raporu Retrieved from http://www.csgb.gov.tr/csgbPortal/ShowProperty/WLP%20Repository/itkb/dosyalar/yayinlar/yayinlar2013/2005_08 Last accessed on 01/02/2014
57. Alp, E., Eng, P., & Environmental, B. C. (1995, October). MIACC Risk Assessment Methodology For Municipalities and Industries. In Prevention Preparedness and Response to Major Industrial Accidents Involving Hazardous Substances (pp. 61-74). Canada. Major Industrial Accidents Council of Canada (MIACC).
58. Impact assessment study into possible options for amending the seveso ii directive. (2010). Retrieved from http://ec.europa.eu/environment/seveso/pdf/Seveso IA_Final report.pdf Last accessed on 01/02/2014
59. Gawlowski, M., Hailwood, M., Vela, I., & Schoenbucher, A. (2009). Deterministic and probabilistic estimation of appropriate distances: motivation

for considering the consequences for industrial sites. Chemical engineering & technology, 32(2), 182-198.

60. İstanbul Sanayi Odası. (2012). TÜrkiye'nİn 500 Büyük Sanayİ Kuruluşu - 2012. Retrieved from http://www.iso.org.tr/tr/web/besyuzbuyuk/turkiye-nin-500-buyuk-sanayi-kurulusu--iso-500-raporunun-sonuclari.html Last accessed on 01/02/2014
61. Ministry of Economy. (2013). Chemical industry in Turkey. Retrieved from http://www.tcp.gov.tr/english/sectors/sectoringpdf/chemical_industry.pdf Last accessed on 01/02/2014
62. Annual report 2012 . (2012). Retrieved from http://www.aksa.com/en-US/InvestorRelations/FinancalStatementsAndReports/Pages/AnnualReports.aspx Last accessed on 01/02/2014
63. Ministry of Economy. (2013). Pharmaceutical Industry. Retrieved from http://www.tcp.gov.tr/english/sectors/sectoringpdf/pharmaceuticals.pdf Last accessed on 01/02/2014
64. The Republic of Turkey Prime Ministry Investment Support and Promotion Agency. (2013). Food and beverage. Retrieved from http://www.invest.gov.tr/en-US/sectors/Pages/FoodAndBeverage.aspx Last accessed on 01/02/2014
65. Ministry of Economy. (2013). Building Glass Ceramic Industry in Turkey. Retrieved http://www.tcp.gov.tr/english/sectors/sectoringpdf/building_glass_ceramics.pdf

APPENDIX A

TURKISH INDUSTRY

Following section presents the most relevant sectors and establishments to Seveso II Directive by using list of Turkey's Top 500 Industrial Enterprises compiled by Istanbul Chamber of Industry, and storage of LPG and fuels sites.

It does not necessarily mean that these companies are under the scope of the Directive.

The logic behind the review of the list was that, the companies which took place in Top 500 industrial enterprises are the leader ones in their sectors. Therefore, they could represent the overall situation of the Turkish Industry which is expected to be under the scope of the Directive. However, it doesn't necessarily mean that the establishments are under the scope of the Directive.

Turkish Chemical Industry

The sector production includes petrochemicals, inorganic and organic chemicals, fertilizers, synthetic fibers, essential oils, cosmetics and personal care products. In addition, sector makes available basic and intermediate inputs to various industries as intermediate goods and raw materials (70 % of the total production of the sector). Rest of the production has been directly used by the consumers [61].

The industry employs nearly 200.000 people over six thousand companies manufacturing chemicals. The companies are mainly located in the following cities: Istanbul, Izmir, Kocaeli, Sakarya, Adana, Gaziantep and Ankara. The chemical industry is mainly located in coastal regions of Turkey due to the logistics [61].

Although, there are many enterprises in the list of Turkey's Top 500 Industrial Enterprises in 2011, the majority of existing chemical companies are small or medium size business [61]

Table 33 - Selected Chemical Companies in the list of Turkey's Top 500 Industrial Enterprises [61]

Name of Enterprise	Rank in 2011
PETKİM Petrokimya Holding A.Ş.	12
Aksa Akrilik Kimya San. A.Ş.*	28
Soda Sanayi A.Ş.	104
Türk Henkel Kimya Sanayi Ve Ticaret A.Ş.*	116
Akdeniz Kimya Sanayi Ve Ticaret A.Ş.	245
Ak-Kim Kimya Sanayi Ve Ticaret A.Ş.	333
Flokser Tekstil Sanayi Ve Tic. A.Ş*	349
Hayat Kimya	68
Koruma Klor Alkali San. ve Tic. A.Ş.	405
Dow Türkiye Kimya San. ve Tic. Ltd. Şti.	483
Eti Soda Üretim Pazarlama Nakliyat ve Elekt. Üretim San ve Tic. A.Ş.	219

* The satellites images of these companies are given

PETKİM Petrokimya Holding A.Ş. which is the only integrated petrochemical complex in Turkey that operates in Petkim-Aliağa complex in İzmir. In PETKİM's Aliağa complex, a wide range of petrochemicals, aromatics, ethylene glycol, phtallicanhydride, terephthalic acid, carbon black, synthetic rubber, acrylonitryl and caustic soda are produced. The total production of these petrochemicals meets about 30 % of domestic demand [62].

The textile sector is one of the well-developed sectors in Turkey. Polymer production related to textiles and the production of textile chemicals have also developed simultaneously with textile sector. Large plants for the production of polyamide, polyester and acrylic fibers have been built. Almost all synthetic fibers are produced by the private sector and synthetic fiber production is around 850000 tons/year [62].

Eti Soda A.Ş is the largest soda factory in the Middle East with a total capacity of 750.000 tons/year. In addition to light and dense soda ash, refined sodium bicarbonate and sodium silicate are produced at the Mersin plant [62].

Aksa Akrilik Kimya San. A.Ş is a leading fiber manufacturer in the world with an installed capacity of 308,000 tons/year, Aksa supplies the textile and industrial textile industries in more than 50 countries. The Company has a 14% global market share in acrylic fiber production [63].

Figure 42 - Aksa Akrilik and Ak-Kim Chemical Companies – Altınova/Yalova

Figure 43 - Türk Henkel and BASF Chemical Companies- Gebze/İstanbul

Figure 44 - Flokser Textile Company A.Ş Hadımköy/İstanbul

Fertilizer, Pharmaceutical and, Paints and Coatings companies can be categorized as sub-industries of the chemical sector and major companies in that sectors are investigated below.

Fertilizer production is concentrated in seven major companies: Tugsaş, Igsaş, Bagfas, Toros Gübre, Ege Gübre, Akdeniz Gübre and Gübre Fabrikalari, which are all private enterprises.

Table 34 - Fertilizer Companies in in the list of Turkey's Top 500 Industrial Enterprises

Name of Enterprise	Rank in 2011
İGSAŞ-İstanbul Gübre Sanayii A.Ş.	157
Gübre Fabrikaları T.A.Ş.	207
Gemlik Gübre Sanayii A.Ş.	232
BAGFAŞ Bandırma Gübre Fabrikaları A.Ş.	242
Toros Tarım San. ve Tic. A.Ş	57

Figure 45 - İstanbul Gübre Sanayii A.Ş. Fertilizer Company Körfez/Kocaeli

Figure 46 - Gübre Fabrikaları T.A.Ş. Fertilizer Company – Körfez/Kocaeli

Pharmaceutical companies are mainly located in the Marmara Region especially in provinces of Istanbul, Kocaeli and Tekirdağ. This is mainly due to the better infrastructure, ease of supply in packaging materials and technical personnel, telecommunication and transportation facilities and the existence of a high number of health institutions in the region. Turkish pharmaceutical companies manufacture a wide range of pharmaceutical products, mostly generic formulas [64].

Table 35 - Pharmaceutical Companies in in the list of ISO's Top 500 Industrial Enterprises

Name of Enterprise	Rank (2011)
Abdi İbrahim İlaç San. ve Tic. A.Ş.	113
Bilim İlaç San. ve Tic. A.Ş.	129
Bayer Türk Kimya Sanayi Ltd. Şti.	195
Deva Holding A.Ş.	218
Pfizer İlaçları Ltd. Şti.	278
Nobel İlaç San. ve Tic. A.Ş.	294
Santa Farma İlaç Sanayii A.Ş.	416
Koçak Farma İlaç ve Kimya Sanayi A.Ş.	435
Eczacıbaşı-Baxter Hastane Ürünleri San. ve Tic. A.Ş.	451

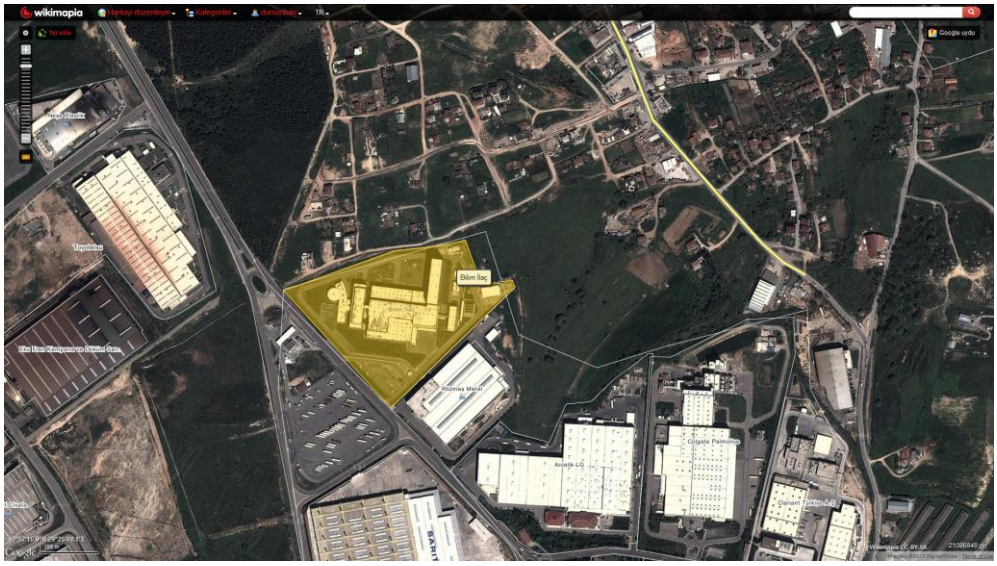


Figure 47 - Bilim İlaç Pharmaceutical Company Gebze/Kocaeli

Figure 48 - Pfizer Pharmaceutical Company Beşiktaş/İstanbul

The paints and coatings industry has become one of the most dynamic sectors of the Turkish chemical industry with the developments in Turkey's construction, automotive and marine industries: it produces about 800 000 tons/year of paints and coatings and is comprised of about 600 manufacturers, more than 20 of which are large-scale companies [62].

Table 36 - Companies in in the list of Turkey's Top 500 Industrial Enterprises

Name of Enterprise	**Rank in 2011**
Setaş Kimya Sanayi A.Ş.	373
Kayalar Kimya San. ve Tic. A.Ş.	324
Betek Boya ve Kimya Sanayi A.Ş.	124
DYO Boya Fabrikaları San. ve Tic. A.Ş.	190
Marshall Boya ve Vernik Sanayi A.Ş.	271
Polisan Boya San. ve Tic. A.Ş.	280
Kansai Altan Boya San. ve Tic. A.Ş.	329

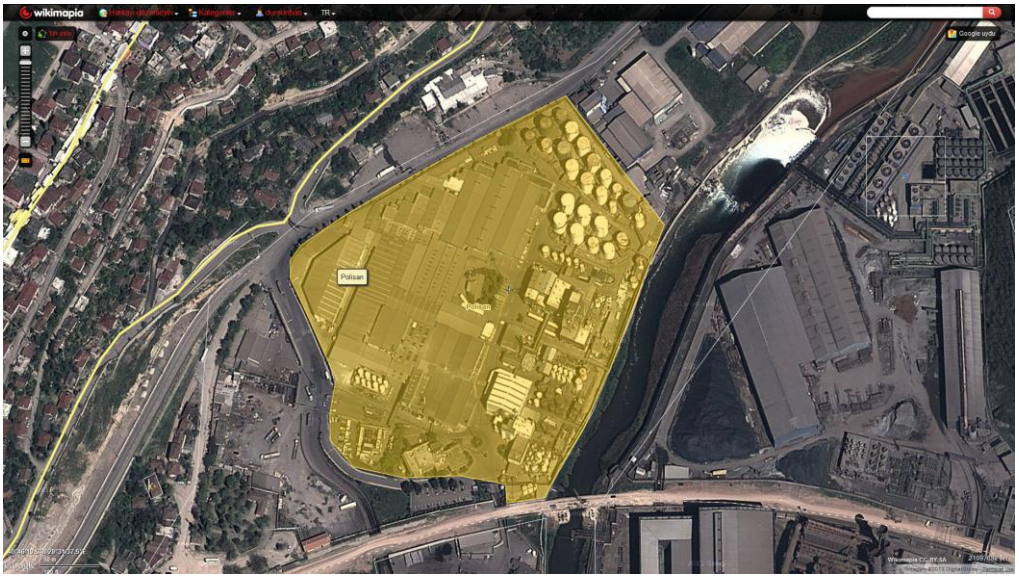


Figure 49 - Polisan Paint Company, Dilovası/Kocaeli

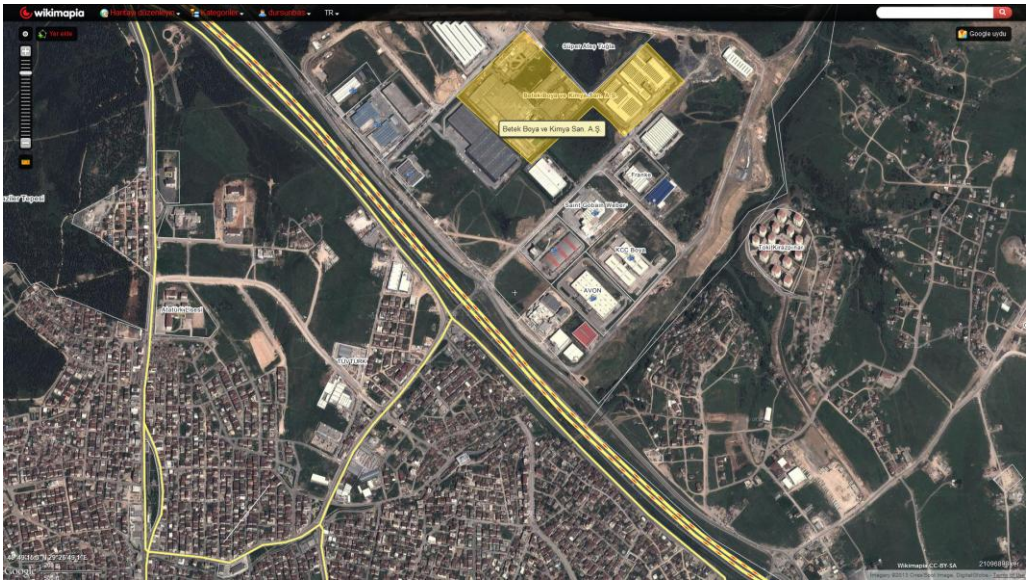


Figure 50 - Betek Boya Paint Company Dilovası/Kocaeli

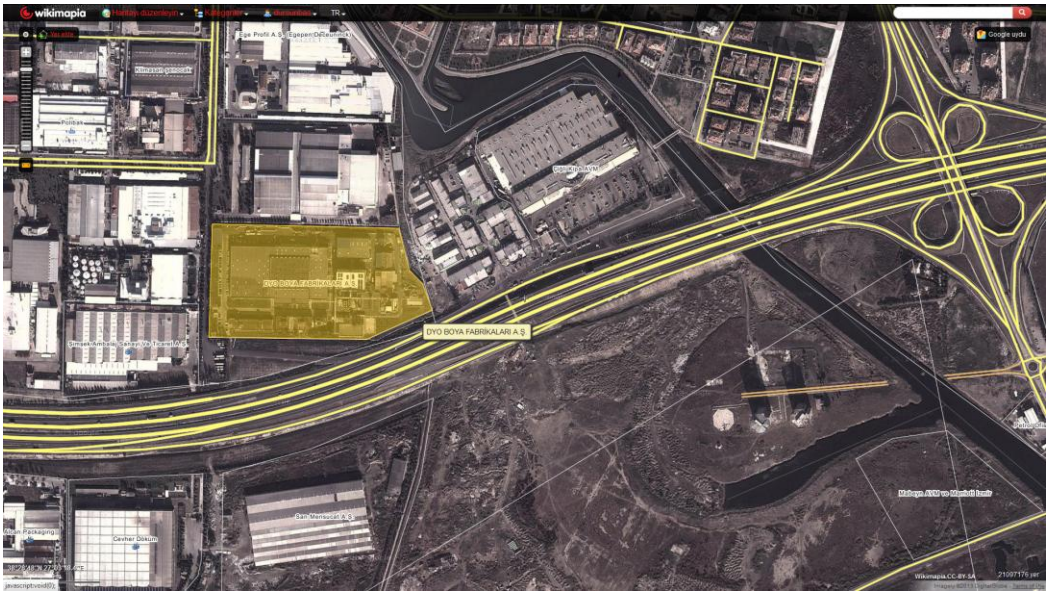


Figure 51 - Dyo Boya Paint Company Çiğili/İzmir

Manufacture of Food, Beverages and Tobacco processing

The food, beverage and tobacco industry also has the highest share in household consumption in Turkey, with 27 percent in 2010 [65].

Significant sub-sectors within the Turkish food and beverage industry include meat and meat products, baked products, dairy products, fruits and vegetables, oils, confectionery, alcoholic and non-alcoholic drinks, soft drinks, ready-made food and baby food [65].

Table 37 - Selected Manufacturers of Food, Beverages and Tobacco processing in Turkey's Top 500 Industrial Enterprises

Name of Enterprise	Rank (2011)
Unilever San. ve Tic. T.A.Ş.	18
Türkiye Şeker Fabrikaları A.Ş.	21
Coca-Cola İçecek A.Ş.	31
PHILSA Philip Morris Sabancı Sigara ve Tütüncülük San. ve Tic. A.Ş.	36
Oltan Gıda Mad. İhr. İth. ve Tic. Ltd. Şti.	48
Konya Şeker San. ve Tic. A.Ş.	49
BANVİT Bandırma Vitaminli Yem Sanayii A.Ş.	58
Ak Gıda San. ve Tic. A.Ş.	60
Çay İşletmeleri Genel Müdürlüğü	63
SÜTAŞ Süt Ürünleri A.Ş	67
Anadolu Efes Biracılık ve Malt Sanayii A.Ş.	71
Abalıoğlu Yem Soya ve Tekstil Sanayi A.Ş.	72
Eti Gıda San. ve Tic. A.Ş.	73
S.S. Trakya Yağlı Tohumlar Tarım Satış Kooperatifleri Birliği	76
C.P. Standart Gıda San. ve Tic. A.Ş.	80
Besler Gıda ve Kimya San. ve Tic. A.Ş.	83
Bunge Gıda San. ve Tic. A.Ş.	87
Keskinoğlu Tavukçuluk ve Damızlık İşletmeleri San. Tic. A.Ş.	92
Ülker Çikolata Sanayi A.Ş.	96
Şenpiliç Gıda Sanayi A.Ş.	98
Tat Konserve Sanayii A.Ş.	100
Erpiliç Entegre Tavukçuluk Üretim Pazarlama ve Tic. Ltd. Şti.	103
Kayseri Şeker Fabrikası A.Ş.	105
Pınar Süt Mamülleri Sanayii A.Ş.	106
BEYPİ Beypazarı Tarımsal Üretim Pazarlama San. ve Tic. A.Ş.	111
Küçükbay Yağ ve Deterjan Sanayi A.Ş.	117

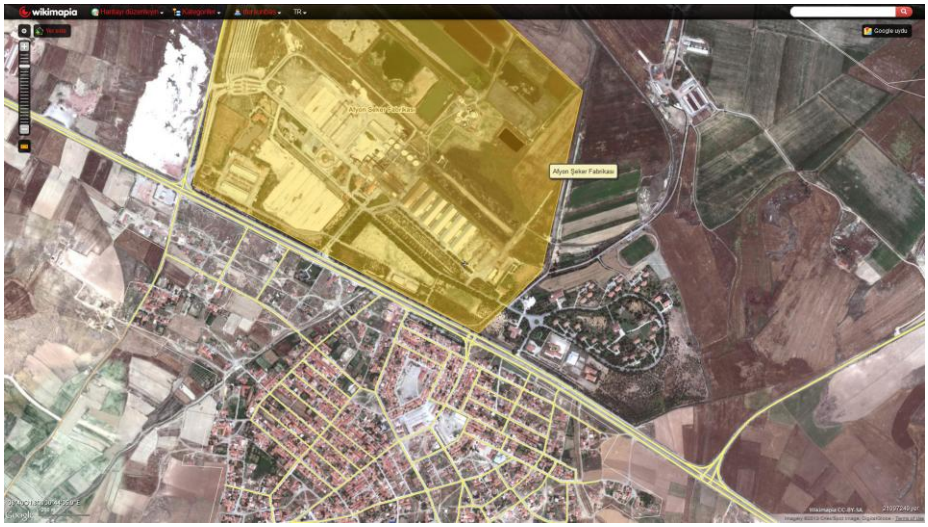


Figure 52 - Afyon Şeker Fabrikası

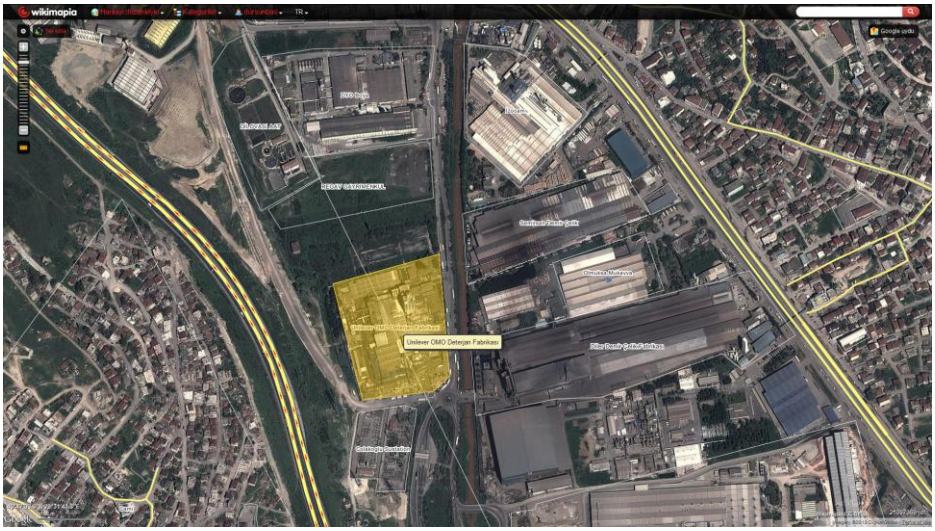


Figure 53 - Unilever – Dilovasi/Kocaeli

Figure 54 - Turhal Şeker Fabrikası Tuhal/Tokat

Manufacture of Cement, Glass, Ceramic and Soil Products

Manufacturer of Cement in the list of Turkey's Top 500 Industrial Enterprises are expected to use of natural gas for cement manufacturers and substances and preparation very toxic (i.e. hydrofluoric acid) manufacture of glass are the common dangerous substances under the scope of the Directive.

Table 38 - Cement Companies in in the list of Turkey's Top 500 Industrial Enterprises

Name of Enterprise Manufacture of Cement	**Rank (2011)**
Akçansa Çimento San. ve Tic. A.Ş.	66
ÇİMSA Çimento San. ve Tic. A.Ş.	84
Çimko Çimento ve Beton San. Tic. A.Ş.	160
Nuh Çimento Sanayi A.Ş.	166
Limak Çimento San. ve Tic. A.Ş.	167
Aşkale Çimento Sanayii T.A.Ş.	186
As Çimento San. ve Tic. A.Ş.	216
Nuh Beton A.Ş.	221
Limak Batı Çimento San. ve Tic. A.Ş.	234
Cimpor Yibitaş Çimento San. ve Tic. A.Ş.	239
Adana Çimento Sanayii T.A.Ş.	251
Çimentaş İzmir Çimento Fabrikası T.A.Ş.	277
BATIÇİM Batı Anadolu Çimento Sanayii A.Ş.	291
Mardin Çimento San. ve Tic. A.Ş.	308
Konya Çimento Sanayi A.Ş.	349
Ünye Çimento San. ve Tic. A.Ş.	367
KÇS Kahramanmaraş Çimento Beton Sanayi ve Madencilik İşletmeleri A.Ş.	381
Denizli Çimento Sanayii T.A.Ş.	415
Bursa Çimento Fabrikası A.Ş.	421

Turkey is rich in ceramic raw materials such as feldspar, clay, kaolin and quartz, and Turkish ceramic raw material reserves are large enough to satisfy the demand. Most Turkish firms have installed their own raw material preparation facilities within their facilities. At present "Türkiye Şişe ve Cam Fab. A.Ş. (Şişecam Group)" is a group of companies in the sector which accounts for approximately 90% of the annual production in glass producing companies.

Ceramic industry is one of the fastest growing sectors of building materials industry in Turkey. Eczacıbaşı (VitrA), Kale and Ege Seramik Groups are the leaders in the sector [66].

Ceramic industry is one of the fastest growing sectors of building materials industry in Turkey. Production of ceramic tiles (260 million square meters in 2011) and sanitary ware (220 thousand tons in 2011) meet s the domestic demand and provides a significant export capacity.

Table 39 - Manufacture of Glass, Ceramic and Soil Products Companies in the list of Turkey's Top 500 Industrial Enterprises

Name of Enterprise Manufacture of Glass, Ceramic and Soil Products	**Rank (2011)**
Trakya Cam Sanayii A.Ş.	90
Paşabahçe Cam San. ve Tic. A.Ş.	122
Kaleseramik Çanakkale Kalebodur Seramik Sanayi A.Ş.	146
Eczacıbaşı Yapı Gereçleri San. ve Tic. A.Ş.	152
Oyak Beton San. ve Tic. A.Ş.	252
Anadolu Cam Yenişehir Sanayi A.Ş.	257
Anadolu Cam Sanayii A.Ş.	193
Vitra Karo San. ve Tic. A.Ş.	213
Paşabahçe Eskişehir Cam San. ve Tic. A.Ş.	249
İzocam Tic. ve San. A.Ş.	282
Ege Seramik San. ve Tic. A.Ş.	399

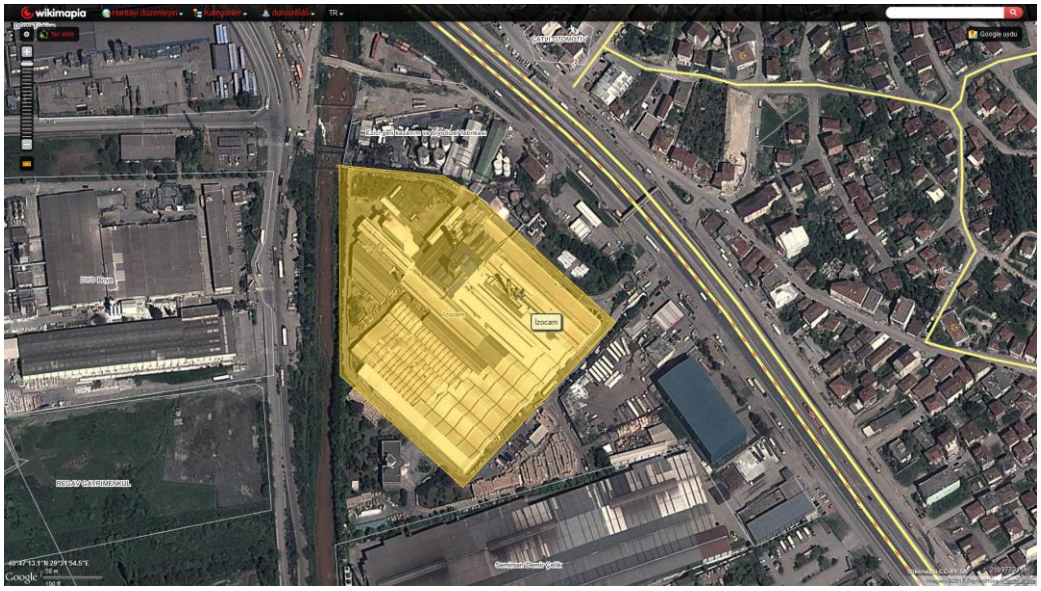


Figure 55 - İzocam Glass Manufacturing ,Dilovası/Kocaeli

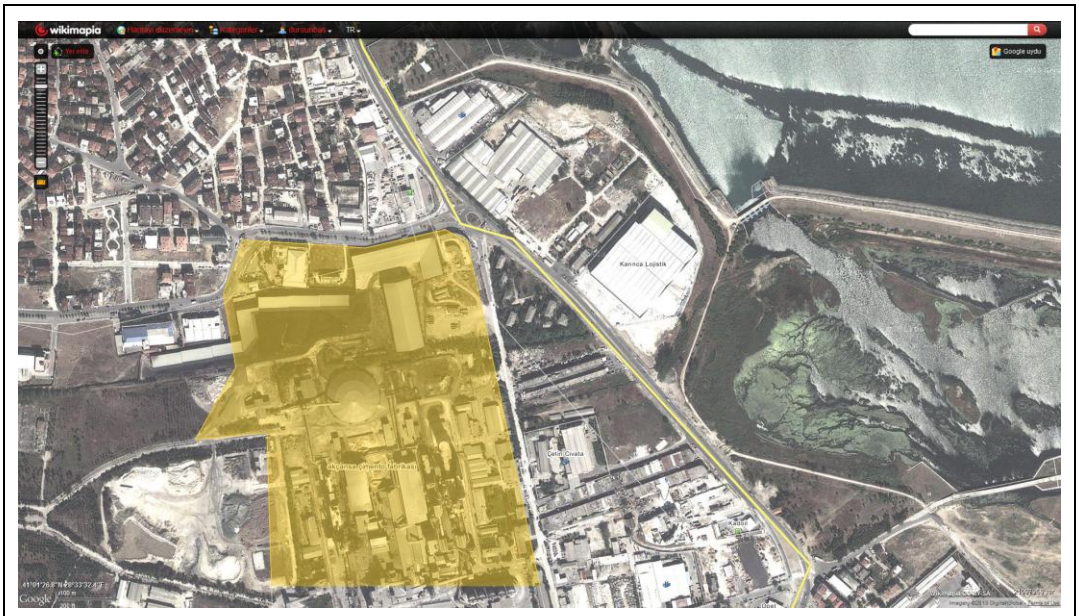


Figure 56 - Akçansa Cement Factory Büyükçekmece/İstanbul

Figure 57 - Çimsa Cement Manufacturing, Anadolu Glass Manufacturing , Paşabahçe Glass Manufacturing , Akdeniz/Mersin

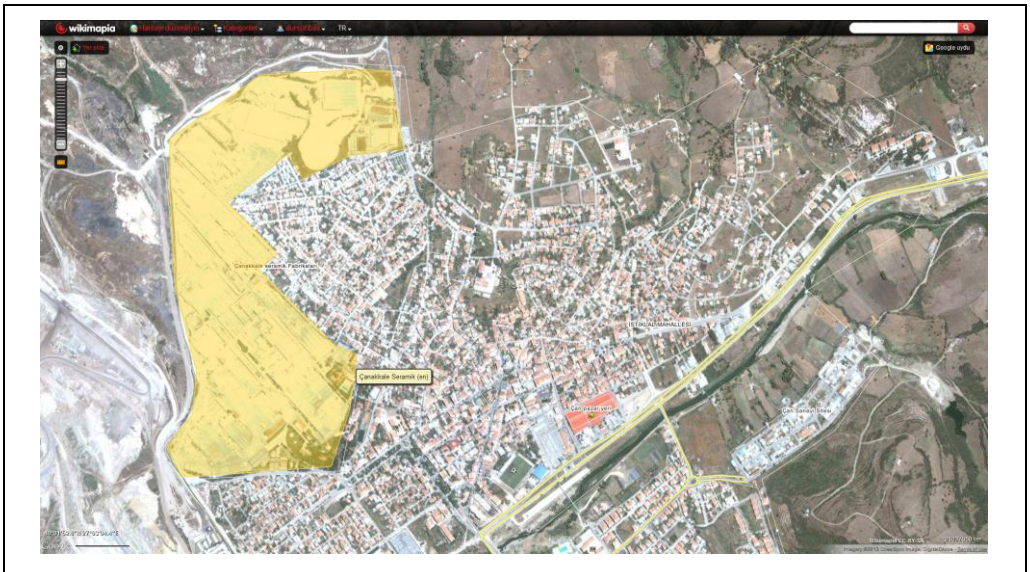


Figure 58 - Çannakale Ceramics Factories Çan/Çanakkale

Manufacturing of basic iron and steel, non-ferrous products metal products

Ferrous metals primarily consist of iron and varieties of steel. Turkey is predominantly a producer of long steel products which reached a production level of 21 million tons in 2009, constituting 82 percent of Turkish steel production [65].

Non-ferrous metals include mainly copper, aluminum, zinc, nickel, lead and tin, which are used to make alloys, castings, forgings, extrusions, wires, cables, pipes, etc., and used in a number of sectors such as agriculture, infrastructure facilities such

as power plants, automobiles, railways, telecommunications, building, construction and in engineering and chemical plants (Table 36).

These establishments are expected to use or storage dangerous substances:

- Substances and preparation which are very toxic as hydrofluoric acid, toxic as ammonia, oxidizing as sodium and potassium nitrate, extremely flammable as (propane, acetylene)
- Methanol, oxygen, and hydrogen

which are under the scope of the Directive.

Table 40 - Manufacturing of basic iron and steel, non-ferrous products metal products in the list of Turkey's Top 500 Industrial Enterprises

Name of Enterprise	**Rank (2011)**
Ereğli Demir ve Çelik Fabrikaları T.A.Ş.	7
İskenderun Demir ve Çelik A.Ş.	8
İçdaş Çelik Enerji Tersane ve Ulaşım Sanayi A.Ş.	9
Çolakoğlu Metalurji A.Ş.	14
Kroman Çelik Sanayii A.Ş.	19
Er-Bakır Elektrolitik Bakır Mamülleri A.Ş.	22
Borçelik Çelik San. Tic. A.Ş.	23
Tosçelik Profil ve Sac Endüstrisi A.Ş.	25
Diler Demir Çelik Endüstri ve Ticaret A.Ş.	32
KARDEMİR Karabük Demir Çelik San. ve Tic. A.Ş.	34
Kaptan Demir Çelik Endüstrisi ve Ticaret A.Ş.	37
Yolbulan Baştuğ Metalurji Sanayi A.Ş.	39
İzmir Demir Çelik Sanayi A.Ş.	41
Yazıcı Demir Çelik San. ve Turizm Tic. A.Ş.	43
Borusan Mannesmann Boru San. ve Tic. A.Ş.	44
Assan Alüminyum San. ve Tic. A.Ş.	51
Yücel Boru ve Profil Endüstrisi A.Ş.	55
Nursan Metalurji Endüstrisi A.Ş.	61
Ege Çelik Endüstrisi San. ve Tic. A.Ş.	62
Ekinciler Demir ve Çelik Sanayi A.Ş.	70

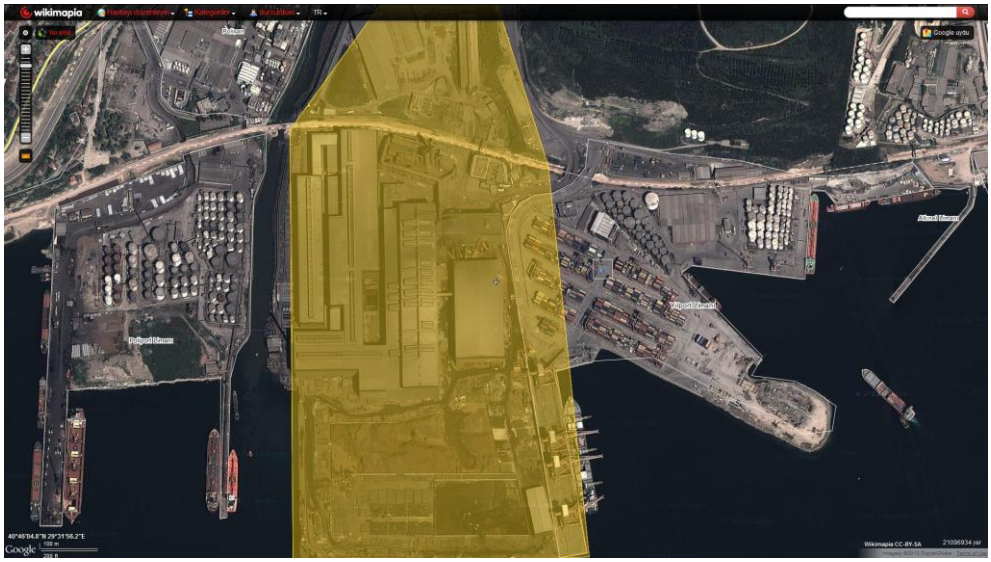


Figure 59 - Çolakoğlu Metallurgy Factory Dilovası/Kocaeli

Figure 60 - Kromsan Steel Manufacturing Factory Gebze/Kocaeli

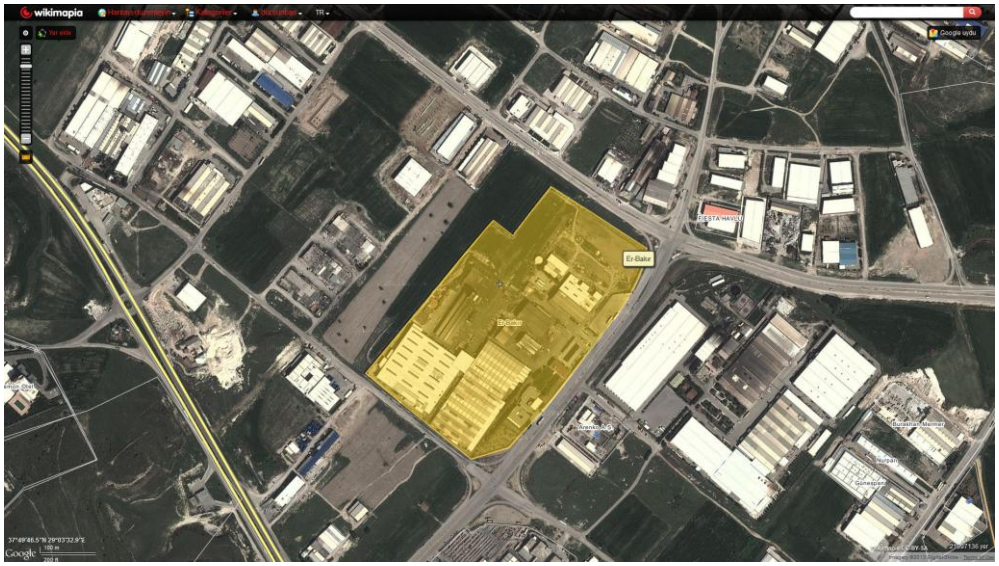


Figure 61 - Er-Bakır Copper Manufacturing Factory Denizli

Power Generation

Table 36 lists the top players in the power generation sector.

Table 41 Power Generation Companies in the list of Turkey's Top 500 Industrial Enterprises

Name of Enterprise	Rank (2011)
EÜAŞ Elektrik Üretim A.Ş. Genel Müdürlüğü	4
Eren Enerji Elektrik Üretim A.Ş.	50
Enerjisa Enerji Üretim A.Ş.	56
Soma Elektrik Üretim ve Ticaret A.Ş.	94
Aksa Enerji Üretim A.Ş.	97
Bis Enerji Elektrik Üretim A.Ş.	177
Camiş Elektrik Üretim A.Ş.	180
Park Termik Elektrik San. ve Tic. A.Ş	204
Akenerji Elektrik Üretim A.Ş.	247
Zorlu Enerji Elektrik Üretim A.Ş.	268
AES Entek Elektrik Üretimi A.Ş.	317
Modern Enerji Elektrik Üretim A.Ş.	408
Rasa Enerji Üretim A.Ş.	446

The relevance of the power generation establishments with Seveso II Directive can be attributed to presence of natural Gas at the sites above defined Annex I of the Directive.

Figure 62 - EÜAŞ Tunçbilek Power Plant Tavşanlı/Kütahya

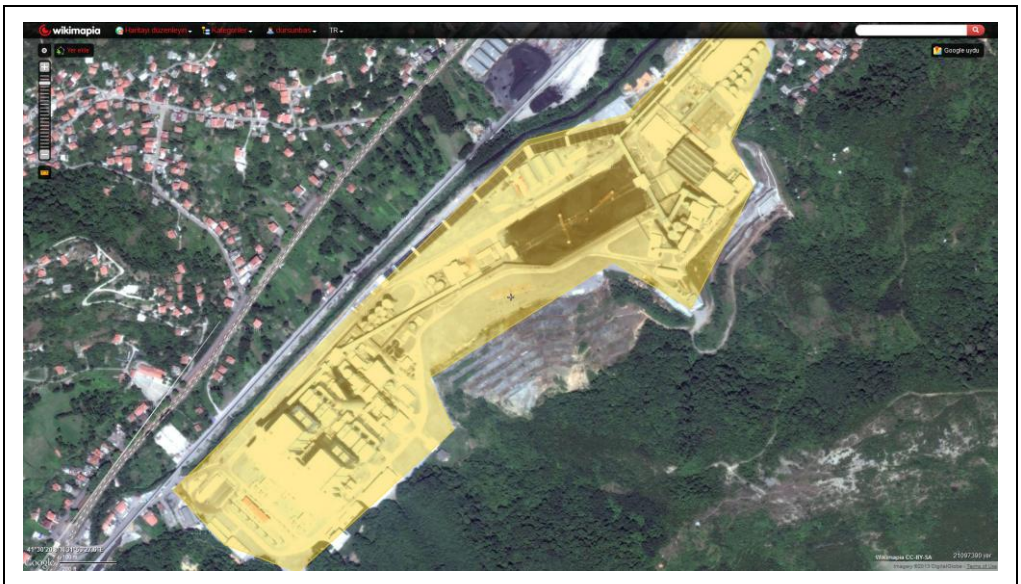


Figure 63 - Eren Enerji Power Plant Çatalağzı/Zonguldak

Figure 64 - Aksa ENERJİ Power Plant Tekkeköy/Samsun

Figure 65 - BOTAŞ LNG Storage Facilities, Marmara Ereğlisi/Tekirdağ

APPENDIX B

BY-LAW ON ORGANIZED INDUSTRIAL ZONES PLACE SELECTION REGULATION

Official Gazette Dated: January 17, 2008 / Numbered: 26759

The purpose of By-Law is to determine the principles regarding the place selection of organized industrial zones and covers the site selection survey and stages of organized industrial zones.

Definitions

Threshold Analysis: The analysis obtained by overlapping the information concerning the existing and potential planning works of institutions and organizations on 1/100,000 and/or 1/25,000 scaled topographic maps with the aim of determining the areas or alternative areas, where an OIZ may be established

Commission: The commission mentioned in Annex-1,

OIZ Preliminary Survey and Information Report: The report, which contains the general information related to the settlement unit where an OIZ is desired to be established, which specifies the justifications concerning the establishment of the OIZ, and the contents of which are determined by the Ministry,

Proposed Area: The area proposed in the place selection request by the real persons and legal entities, who wish to establish an OIZ,

Site Selection

Place selection works shall start after the place selection request is submitted to the Ministry together with the OIZ Information Report prepared by the real persons and legal entities, who wish to establish an OIZ, and accompanied with the positive opinion of the Governorship and following the evaluation to be realized by the Ministry in this respect.

(2) However, if the place selection request includes a proposed area, positive opinion of;

a) the special provincial administration, or

b) the relevant municipality, if it is within the boundaries or adjacent areas, shall be required for the subject area

Sections of the Survey

- The survey shall consist of the following sections.
- Introduction.
- Threshold analyses.
- Determination of alternative areas and entering of the boundaries.
- Characteristics of alternative areas.
- Conclusion and recommendations.
- References.
- Annexes.

Characteristics of alternative areas

- Locality,
- Distance from the city center and location in terms of direction,
- Other places of settlement located in the surroundings, their distances and locations in terms of direction,

Size,

- Connections to and distances from highways, airports, ports, and railways,
- Ownership status,
- Cadastral status,
- Whether or not located within the boundaries of municipality or adjacent areas,

Status according to the environmental layout plan, if any,

- Current land usage status,
- Current and planned status of the surrounding areas,
- Inclination and direction,

`

- Seismic belt located on,
- From where the water requirement can be met,
- From where the energy requirement can be met,
- Waste water or rain water discharge environment,
- Dominant wind direction,
- Whether or not it has the potential to develop and expand,
- Whether or not its surroundings are suitable for residential and sub-industry settlement,

- Location according to protected zones such as special environmental protection zones, conservation areas, national parks, wetlands, and natural monuments as well as areas that are required to be protected pursuant to international conventions, if any,

- Drainage status,
- Exposure to floods,
- Whether or not it has a previously determined geological problem,
- Location according to underground and surface drinking and utilization water sources, if any,
- Location according to solid waste storage areas, if any,
- Location according to existing or planned airports and military zones, military security and forbidden zones, if any, and according to airport barrier plan,
- Location according to water products reproduction and production fields,
- Natural resource potential.

APPENDIX C

REGULATION ON MEASURES TO BE TAKEN IN THE WORKPLACES AND WORKS DEALING WITH FLAMMABLE, EXPLOSIVE, DANGEROUS AND HAZARDOUS SUBSTANCES

The annexes of the Regulation (IV a, IV b, IV c, IV d and V) provides safety distances to residential areas, highway and railways for explosives and flammable liquids stored underground or above ground.

Annex IV.a of the Regulation lists the safety distances regarding explosives of Chlorate, Perchlorate, and explosive similar substances.

Table 42 - Annex IV a. of the Regulation

Amount of Explosives (kg)	Distance from Residential Areas	Distance from Residential Areas	Distance from Each Other
1	15	8	2
5	30	15	3
10	45	23	5
50	105	53	11
100	150	75	15
500	300	150	30
1000	450	225	45
5000	1050	525	105
10000	1500	750	150

Annex IV b. of the regulation lists the Distances regarding explosives of Dynamiter, Nitroglycerine, Nitrocellulose and similar explosive substances.

Table 43 - Annex IV b. of the Regulation

Amount of Explosives (kg)	Distance from Residential Areas	Distance from Residential Areas	Distance from Each Other
1	10	5	1
5	20	10	2
10	30	15	3
50	70	35	7
100	100	50	10
500	200	100	20
1000	300	150	30
500	700	350	70
1000	1000	500	100

`

Considering the structure of the installation construction, distances can be reduced by 50% for explosives which include dynamite, Nitroglycerin, Nitrocellulose and other similar explosive substances.

Annex IV c of the regulation lists the Distances regarding explosives of gunpowder including potassium nitrate and similar explosive substances.

Distances regarding explosives ([21])

Table 44 - Table IV c. of the Regulation

Amount of Explosives (kg)	Distance from Residential Areas	Distance from Residential Areas	Distance from Each Other
1	7	5	1
5	15	10	2
10	20	15	3
50	50	35	11
100	70	50	10
500	150	100	20
1000	200	150	30
5000	500	250	50
10000	700	350	70

Annex IV d of the Regulation lists the Distances regarding ammonium, liquid oxygen, liquid air ammonium, and similar explosive substances.

Table 45 - Table IV d. of the Regulation [22]

Amount of Explosives (kg)	Distance from Residential Areas	Distance from Residential Areas	Distance from Each Other
1	4	2	0
5	8	4	1
10	10	5	1
50	25	13	3
100	35	18	4
500	75	38	8
1000	100	50	10
5000	250	125	25
10000	350	175	35

[21] Considering the structure of the installation construction, distances can be reduced by 50% for gunpowder (black powder) which includes potassium nitrate and other similar explosive substances.
[22] Considering the structure of the installation construction, distances can be reduced by 50% for explosives which include ammonium, liquid oxygen, liquid air and other similar explosive substances.

Annex V d of the Regulation lists distances for Flammable Liquids and LPG.

Table 46 - Table V of a Regulation

Volume of Tank (m^3)	Distance from Residential Areas Distance from High Ways and Railways		Distance from Each Other
	Under-ground	Above-ground	
0 -1,5	0	3	0
0,5 - 3	3	3	1
3-10	5	7,5	1
10-120	10	15	1,5
120-250	15	20	1,5
250-600	-	22,5	Half of the tank radius
600-1200	-	25	Half of the tank radius
1200-5000	-	30	Half of the tank radius
5000-10000	-	40	Half of the tank radius

Although, this regulation provides for certain sector, it does not include any generic safety distances for toxic, oxidizing and dangerous for the environment categories.

APPENDIX D

BY-LAW ON BUILDINGS FIRE PROTECTION

Table 47 - Annex-9 Minimum LPG Safety distances for LPG Bottle storage outside of the building

Total stored LPG (kg)	Neighborhood parcel boundary (m)	Avenue, school, mosque, hospital and public places (m)
0 – 1250	0	3
1251 – 2700	3	6
2701 – 4500	6	12
4501 and more	8	15

Table 48 - Annex-10 Minimum LPG Safety distances for Bulk LPG storage in tanks

Volume of Tank m^3	Subsurface Tank m	Surface Tank* m	Distances between tanks
Less than 0.5	3	3	0
0.5- 3.0	3	3	1
3.1- 10	5	7.5	1
10.1- 50	7.5	10	1
50.1-120	10	15	1.5
120.1-250	15	23	Sum of the half of the radius of each tanks
250.1- 600	15	38	
600.1- 1200	15	61	
1200.1- 5000	15	91	
More than 5000	15	122	

*The distances to neighbor parcel boundary or main traffic roadways can be reduce by ¼ by the construction of fire-resistant protective concrete wall or similar material (1.5 m)

*Insulation of the tank with fire resistant material can reduce distances by ½

Inflammable and Flammable Liquids Storage

Table 49 - Annex-12/C Minimum Safety Distances for aboveground tanks established in open areas

Tank Volume (Lt)	Distances to the Neighborhood parcel boundary, traffic networks and railways (m)	Distance to the Administrative Building belongs to Establishment (m)	Distances between tanks (m)
Less than	1.5	1.5	
1001–3000	3.0	1.5	1
3.001–45.000	5.0	1.5	1
45.001–115.000	7.0	1.5	1.5
115.001–190.000	10.0	3.0	Sum of the half of the radius of each tanks
190.001- 375.000	15.0	5.0	
375.001–1.900.000	25.0	7,5	
1.900.001–3.750.000	30.0	10.0	
3.750.001- 7.550.000	40.0	15.0	
7.550.001– 11.375.000	50.0	17.5	
More than 11.375.001	55.0	20.0	

Table 50 - Annex-12/Ç Minimum Safety Distances for subsurface tanks

Tank Volume (Liter)	Distances to the Neighborhood parcel boundary, traffic networks and railways (m)	Distances between tanks (m)
< 500	*0*	*0*
500–3000	*3.0*	*1.0*
3.001–10.000	*5.0*	*1.0*
10.001–50.000	*7.5*	*1.0*
50.001–120.000	*10.0*	*1.5*
120.001- 250.000	*15.0*	Sum of the half of the radius of each tanks
250.001–600.000	15.0	
600.001–1.200.000	15.0	
1.200.001- 5.000.000	15.0	
5.000.000<	15.0	

Fueling Stations

Table 51 - Annex-13 Minimum Safety Distances Fueling Stations

	Neighborhood parcel boundary	*Roadway (Intratown Boundary)*	*Roadway (Intertown Parcel Boundary)*	*Public Places*	*Hospital and School Boundary*
Fuel Tanks	*7,5*	*5*	*15*	*25*	*50*

APPENDIX E

BY-LAW ON PERMISSION FOR OPENING AND OPERATING OF WORKING PLACE FOR NSES AT AIRPORTS OPEN TO THE CIVIL AIR TRANSPORT

Table 52 - Annex-I of By-Law

ANNEX-l - NON-UTILITY WORKPLACES

- Aviation Maintenance Repair and/or Modification Center,
- Technical Maintenance and/or Repair Units,
- Tire coating, repair, maintenance, painting and similar facilities,
- Natural gas, petrochemical and/or chemical product storage facilities,
- Pipelines transmitting petroleum, natural gas and chemicals (for transmission facilities with pipes that are longer than 10 km and that are smaller than 600 mm in diameter),
- Fuel sale, filling and storage facilities for aircrafts,
- All kinds of fuel and/or LPG stations for land vehicles,
- Facilities producing all kinds of foods and/or drinks, including cateringcorporations,
- Facilities packaging ready foods,
- Solid waste transfer stations, solid waste transit stations,
- All kind of scrap depots, solid waste storage facilities and enterprises engaged in production of raw and end products from domestic and industrial solid wastes (facilities collecting and accumulating metal, paper, cardboard, pet, plastic, glass scraps and wastes from source, taking them from depots and separating them according to their classes, pressing them for transport, storing pressed scraps separately and sending them to recycling corporations),
- Maintenance, service and/or washing stations for land vehicles,
- Cogeneration facilities established within the boundaries of airport.

APPENDIX F

REGULATION ON UNMONOPOLIZED EXPLOSIVE SUBSTANCES AND HUNTING EQUIPMENT AND SIMILAR ITEMS

Table 53 - Safety Distances defined under Regulation

(EK-1) Patlayıcı Madde İşyerlerinin ve Depolarının Çevreye Olan Güvenlik Uzaklıklarını Gösterir Çizelge

	Sıra	Bina ve Depolar		GÜVENLİK UZAKLIKLARI (METRE) (Q) - Toplam Patlayıcı Madde Miktarı (Kilogram)									
				2000	5000	10000	20000	30000	40000	50000	60000	70000	75000
ÇEVREYE	1	Patlayıcı madde üretilen ve depolanan her türlü tesislere ait depo ve işyeri binaları ile bağımsız patlayıcı madde depoları, demiryolu, karayolu, deniz, göl, ırmak, iskele ve limanlar	SÜTRESİZ	186	253	319	402	460	506	545	579	610	624
			SÜTRELİ	160	214	269	339	388	427	460	489	515	527
	2	Köy ve orman yolları, madenlere ait özel kara deniz veya su yolları	SÜTRESİZ	117	159	200	252	289	318	343	364	383	392
			SÜTRELİ	100	100	101	128	146	161	173	184	196	198
	3	Okul, hastane, mabet, kışla, cezaevi, tiyatro sinema, pazaryeri, resmi ve özel işyerleri sanayi, tarım ve telekominikasyon tesisleri havaalanları, konut, fırın, çarşı gibi insan topluluklarının bulunduğu bina ve yerler	SÜTRESİZ	280	380	478	603	690	759	818	869	915	936
			SÜTRELİ	270	270	330	415	475	523	564	599	631	645
BİRBİRLERİNE	4	Patlayıcı madde üretilen veya depolanan aynı işyeri sınırları içindeki bütün işyeri binalar ile patlayıcı madde depoları	SÜTRESİZ	30	41	52	65	75	82	88	94	99	101
			SÜTRELİ	21	29	37	46	53	58	63	67	90	72

* Sütresiz hafif yapılı depolar için çizelgede belirtilen sütreli uzaklıkların iki katı alınır.

NOT: A) Bu çerçevede yer almayan miktarlardaki patlayıcı madde depoları için en az güvenlik uzaklıkları 1. Sıra için 160, 2. Sıra için 100, 3. Sıra için ise 270 metre olması şartıyla aşağıdaki formüle göre hesaplanır.

	Sütresiz	SütreLİ
1. Sıra için	$D=14,8XQ^{1/3}$	$D=12,5XQ^{1/3}$
2. Sıra için	$D=9,3XQ^{1/3}$	$D=4,7XQ^{1/3}$
3. Sıra için	$D=22,2XQ^{1/3}$	$D=15,3XQ^{1/3}$
4. Sıra için	$D=2,4XQ^{1/3}$	$D=1,7XQ^{1/3}$

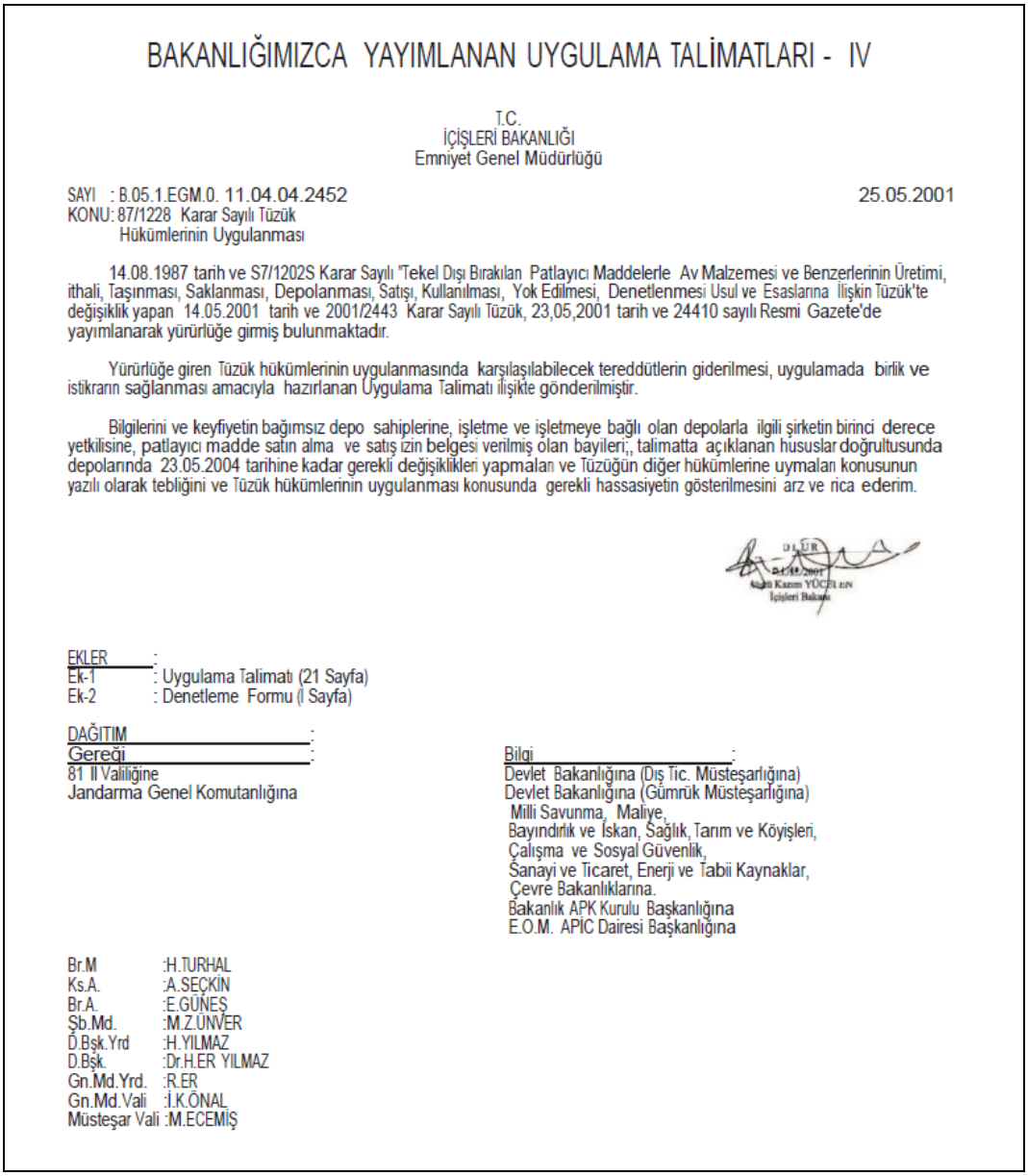
(D)= Güvenlik Uzaklıkları (metre)
(Q) = Toplam Patlayıcı Madde Miktarı (Kilogram)

B) Av malzemesi (barut hariç) depolanacak depolar için bu tablo ile belirtilmiş olan güvenlik uzaklıkları ve girişimci tarafından satın alınması, kiralanması ve muvafakatının alınması gereken uzaklıklar yarıya indirilir.

C) Yeraltı galeri tipi depolar için güvenlik uzaklıkları EK-6'da verilmiştir. (Üstü toprakla örtülü ve galeri tipi gömme deplardan "galeri tipi depolar hariç" mevcut gömme depoalrın üstünde bulunması gerekne toprak kalınlığı santimetre olarak hesaplanacak ve güvenlik uzaklıkları da "O" bendi doğrultusunda değerlendirilecektir)

D) Güvenlik uzaklıkları aynı kalmak koşuluyla depolardan itibaren, depo istihap haddine gre girişimci tarafından satın alınması, kiralanması veya muvafakatının alınması gereken uzaklıklar aşağıda gösterilmiştir.

		Toplam Patlayıcı Madde Miktarları (Ton)				
		2-75 Ton	76-100 Ton	101-150 Ton	151-200 Ton	201 Ton ve yukarısı
1. Sıra için	(Metre)	160	180	200	220	240
2. Sıra için		100	120	140	160	180
3. Sıra için		270	290	310	330	350



BAKANLIĞIMIZCA YAYIMLANAN UYGULAMA TALİMATLARI - IV

T.C.
İÇİŞLERİ BAKANLIĞI
Emniyet Genel Müdürlüğü

SAYI : B.05.1.EGM.0. 11.04.04.2452 25.05.2001
KONU: 87/1228 Karar Sayılı Tüzük
Hükümlerinin Uygulanması

14.08.1987 tarih ve S7/1202S Karar Sayılı "Tekel Dışı Bırakılan Patlayıcı Maddelerle Av Malzemesi ve Benzerlerinin Üretimi, ithali, Taşınması, Saklanması, Depolanması, Satışı, Kullanılması, Yok Edilmesi, Denetlenmesi Usul ve Esaslarına İlişkin Tüzük'te değişiklik yapan 14.05.2001 tarih ve 2001/2443 Karar Sayılı Tüzük, 23,05,2001 tarih ve 24410 sayılı Resmi Gazete'de yayımlanarak yürürlüğe girmiş bulunmaktadır.

Yürürlüğe giren Tüzük hükümlerinin uygulanmasında karşılaşılabilecek tereddütlerin giderilmesi, uygulamada birlik ve istikrarın sağlanması amacıyla hazırlanan Uygulama Talimatı ilişikte gönderilmiştir.

Bilgilerini ve keyfiyetin bağımsız depo sahiplerine, işletme ve işletmeye bağlı olan depolarla ilgili şirketin birinci derece yetkilisine, patlayıcı madde satın alma ve satış izin belgesi verilmiş olan bayileri;, talimatta açıklanan hususlar doğrultusunda depolarında 23.05.2004 tarihine kadar gerekli değişiklikleri yapmaları ve Tüzüğün diğer hükümlerine uymaları konusunun yazılı olarak tebliğini ve Tüzük hükümlerinin uygulanması konusunda gerekli hassasiyetin gösterilmesini arz ve rica ederim.

24/05/2001
Sadettin Kazım YÜCEL ZN
İçişleri Bakanı

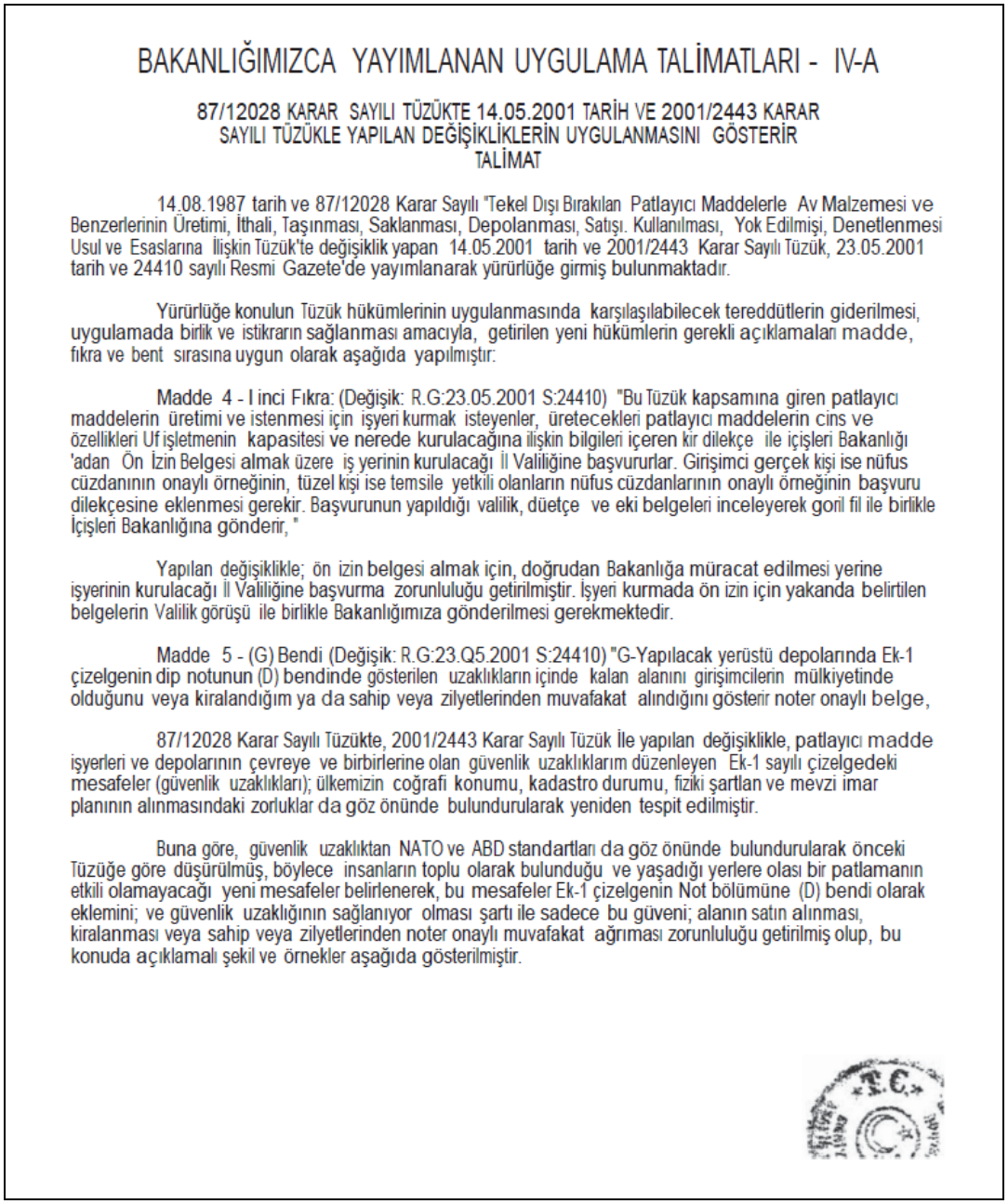
EKLER :
Ek-1 : Uygulama Talimatı (21 Sayfa)
Ek-2 : Denetleme Formu (l Sayfa)

DAĞITIM :
Gereği :
81 İl Valiliğine
Jandarma Genel Komutanlığına

Bilgi :
Devlet Bakanlığına (Dış Tic. Müsteşarlığına)
Devlet Bakanlığına (Gümrük Müsteşarlığına)
Milli Savunma, Maliye,
Bayındırlık ve İskan, Sağlık, Tarım ve Köyişleri,
Çalışma ve Sosyal Güvenlik,
Sanayi ve Ticaret, Enerji ve Tabii Kaynaklar,
Çevre Bakanlıklarına.
Bakanlık APK Kurulu Başkanlığına
E.O.M. APİC Dairesi Başkanlığına

Br.M :H.TURHAL
Ks.A. :A.SEÇKİN
Br.A. :E.GÜNEŞ
Şb.Md. :M.Z.ÜNVER
D.Bşk.Yrd :H.YILMAZ
D.Bşk. :Dr.H.ER YILMAZ
Gn.Md.Yrd. :R.ER
Gn.Md.Vali :İ.K.ÖNAL
Müsteşar Vali :M.ECEMİŞ

Figure 66 - Practice direction IV



BAKANLIĞIMIZCA YAYIMLANAN UYGULAMA TALİMATLARI - IV-A

87/12028 KARAR SAYILI TÜZÜKTE 14.05.2001 TARİH VE 2001/2443 KARAR SAYILI TÜZÜKLE YAPILAN DEĞİŞİKLİKLERİN UYGULANMASINI GÖSTERİR TALİMAT

14.08.1987 tarih ve 87/12028 Karar Sayılı "Tekel Dışı Bırakılan Patlayıcı Maddelerle Av Malzemesi ve Benzerlerinin Üretimi, İthali, Taşınması, Saklanması, Depolanması, Satışı. Kullanılması, Yok Edilmişi, Denetlenmesi Usul ve Esaslarına İlişkin Tüzük'te değişiklik yapan 14.05.2001 tarih ve 2001/2443 Karar Sayılı Tüzük, 23.05.2001 tarih ve 24410 sayılı Resmi Gazete'de yayımlanarak yürürlüğe girmiş bulunmaktadır.

Yürürlüğe konulun Tüzük hükümlerinin uygulanmasında karşılaşılabilecek tereddütlerin giderilmesi, uygulamada birlik ve istikrarın sağlanması amacıyla, getirilen yeni hükümlerin gerekli açıklamaları madde, fıkra ve bent sırasına uygun olarak aşağıda yapılmıştır:

Madde 4 - I inci Fıkra: (Değişik: R.G:23.05.2001 S:24410) "Bu Tüzük kapsamına giren patlayıcı maddelerin üretimi ve istenmesi için işyeri kurmak isteyenler, üretecekleri patlayıcı maddelerin cins ve özellikleri Uf işletmenin kapasitesi ve nerede kurulacağına ilişkin bilgileri içeren kir dilekçe ile içişleri Bakanlığı 'adan Ön İzin Belgesi almak üzere iş yerinin kurulacağı İl Valiliğine başvururlar. Girişimci gerçek kişi ise nüfus cüzdanının onaylı örneğinin, tüzel kişi ise temsile yetkili olanların nüfus cüzdanlarının onaylı örneğinin başvuru dilekçesine eklenmesi gerekir. Başvurunun yapıldığı valilik, düetçe ve eki belgeleri inceleyerek goril fil ile birlikle İçişleri Bakanlığına gönderir, "

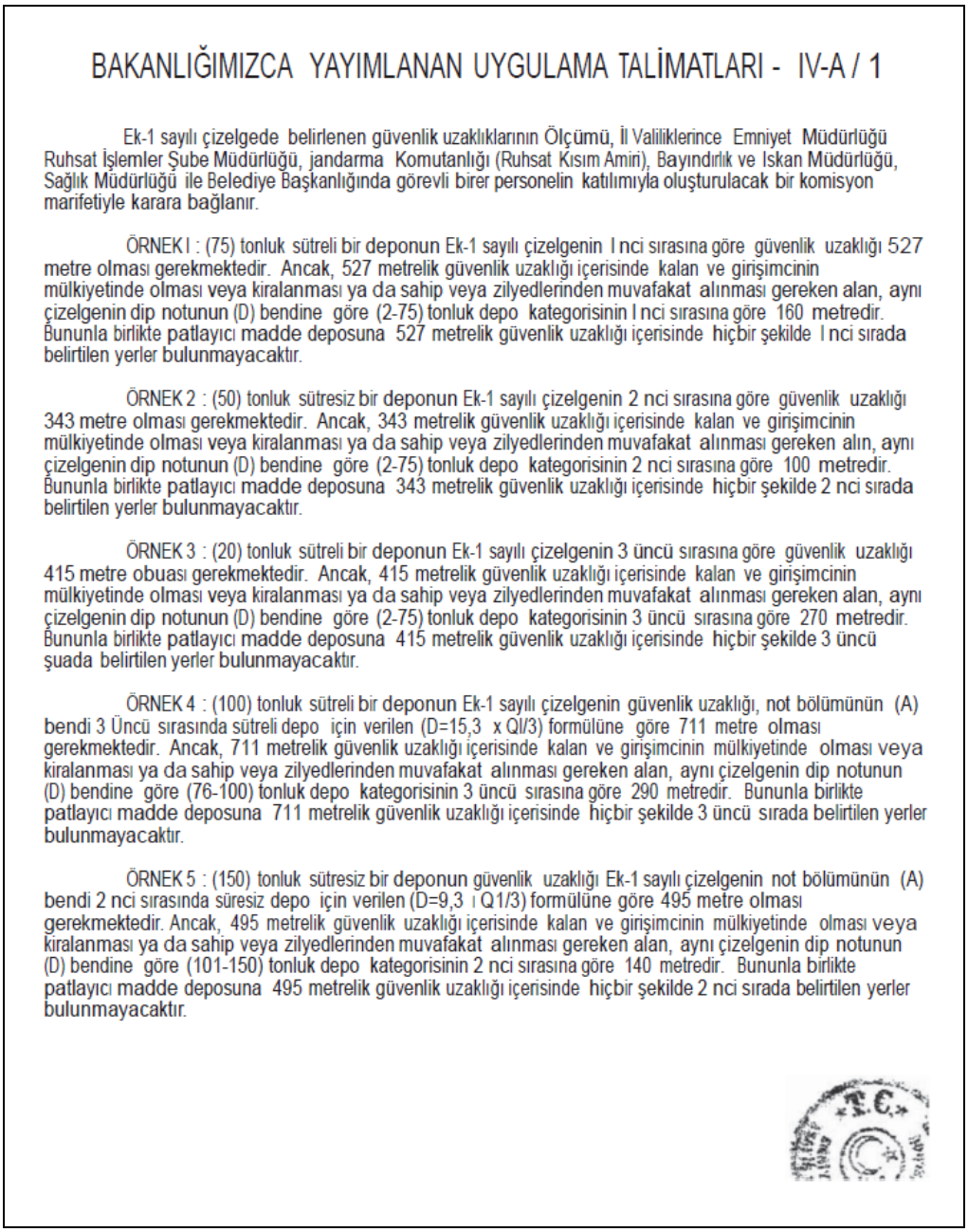
Yapılan değişiklikle; ön izin belgesi almak için, doğrudan Bakanlığa müracat edilmesi yerine işyerinin kurulacağı İl Valiliğine başvurma zorunluluğu getirilmiştir. İşyeri kurmada ön izin için yakanda belirtilen belgelerin Valilik görüşü ile birlikle Bakanlığımıza gönderilmesi gerekmektedir.

Madde 5 - (G) Bendi (Değişik: R.G:23.Q5.2001 S:24410) "G-Yapılacak yerüstü depolarında Ek-1 çizelgenin dip notunun (D) bendinde gösterilen uzaklıkların içinde kalan alanını girişimcilerin mülkiyetinde olduğunu veya kiralandığım ya da sahip veya zilyetlerinden muvafakat alındığını gösterir noter onaylı belge,

87/12028 Karar Sayılı Tüzükte, 2001/2443 Karar Sayılı Tüzük İle yapılan değişiklikle, patlayıcı madde işyerleri ve depolarının çevreye ve birbirlerine olan güvenlik uzaklıklarım düzenleyen Ek-1 sayılı çizelgedeki mesafeler (güvenlik uzaklıkları); ülkemizin coğrafi konumu, kadastro durumu, fiziki şartlan ve mevzi imar planının alınmasındaki zorluklar da göz önünde bulundurularak yeniden tespit edilmiştir.

Buna göre, güvenlik uzaklıktan NATO ve ABD standartları da göz önünde bulundurularak önceki Tüzüğe göre düşürülmüş, böylece insanların toplu olarak bulunduğu ve yaşadığı yerlere olası bir patlamanın etkili olamayacağı yeni mesafeler belirlenerek, bu mesafeler Ek-1 çizelgenin Not bölümüne (D) bendi olarak eklemini; ve güvenlik uzaklığının sağlanıyor olması şartı ile sadece bu güveni; alanın satın alınması, kiralanması veya sahip veya zilyetlerinden noter onaylı muvafakat ağrıması zorunluluğu getirilmiş olup, bu konuda açıklamalı şekil ve örnekler aşağıda gösterilmiştir.

Figure 67 - Practice direction IV-A



BAKANLIĞIMIZCA YAYIMLANAN UYGULAMA TALİMATLARI - IV-A / 1

Ek-1 sayılı çizelgede belirlenen güvenlik uzaklıklarının Ölçümü, İl Valiliklerince Emniyet Müdürlüğü Ruhsat İşlemler Şube Müdürlüğü, jandarma Komutanlığı (Ruhsat Kısım Amiri), Bayındırlık ve Iskan Müdürlüğü, Sağlık Müdürlüğü ile Belediye Başkanlığında görevli birer personelin katılımıyla oluşturulacak bir komisyon marifetiyle karara bağlanır.

ÖRNEK I : (75) tonluk sütreli bir deponun Ek-1 sayılı çizelgenin I nci sırasına göre güvenlik uzaklığı 527 metre olması gerekmektedir. Ancak, 527 metrelik güvenlik uzaklığı içerisinde kalan ve girişimcinin mülkiyetinde olması veya kiralanması ya da sahip veya zilyedlerinden muvafakat alınması gereken alan, aynı çizelgenin dip notunun (D) bendine göre (2-75) tonluk depo kategorisinin I nci sırasına göre 160 metredir. Bununla birlikte patlayıcı madde deposuna 527 metrelik güvenlik uzaklığı içerisinde hiçbir şekilde I nci sırada belirtilen yerler bulunmayacaktır.

ÖRNEK 2 : (50) tonluk sütresiz bir deponun Ek-1 sayılı çizelgenin 2 nci sırasına göre güvenlik uzaklığı 343 metre olması gerekmektedir. Ancak, 343 metrelik güvenlik uzaklığı içerisinde kalan ve girişimcinin mülkiyetinde olması veya kiralanması ya da sahip veya zilyedlerinden muvafakat alınması gereken alın, aynı çizelgenin dip notunun (D) bendine göre (2-75) tonluk depo kategorisinin 2 nci sırasına göre 100 metredir. Bununla birlikte patlayıcı madde deposuna 343 metrelik güvenlik uzaklığı içerisinde hiçbir şekilde 2 nci sırada belirtilen yerler bulunmayacaktır.

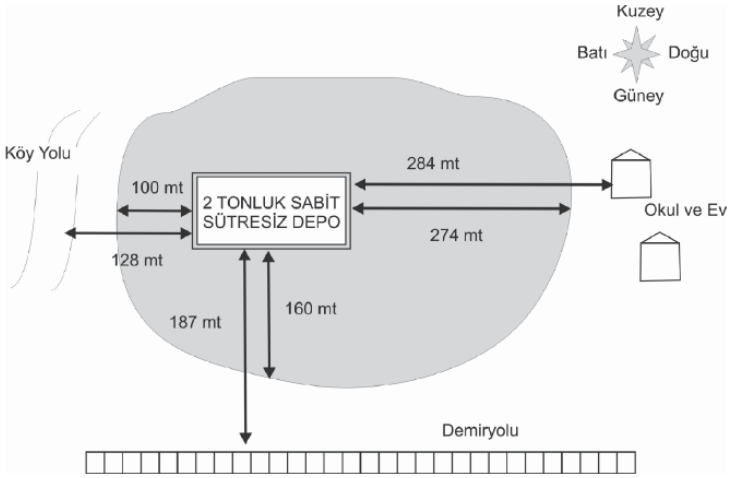
ÖRNEK 3 : (20) tonluk sütreli bir deponun Ek-1 sayılı çizelgenin 3 üncü sırasına göre güvenlik uzaklığı 415 metre obuası gerekmektedir. Ancak, 415 metrelik güvenlik uzaklığı içerisinde kalan ve girişimcinin mülkiyetinde olması veya kiralanması ya da sahip veya zilyedlerinden muvafakat alınması gereken alan, aynı çizelgenin dip notunun (D) bendine göre (2-75) tonluk depo kategorisinin 3 üncü sırasına göre 270 metredir. Bununla birlikte patlayıcı madde deposuna 415 metrelik güvenlik uzaklığı içerisinde hiçbir şekilde 3 üncü şuada belirtilen yerler bulunmayacaktır.

ÖRNEK 4 : (100) tonluk sütreli bir deponun Ek-1 sayılı çizelgenin güvenlik uzaklığı, not bölümünün (A) bendi 3 Üncü sırasında sütreli depo için verilen (D=15,3 x Ql/3) formülüne göre 711 metre olması gerekmektedir. Ancak, 711 metrelik güvenlik uzaklığı içerisinde kalan ve girişimcinin mülkiyetinde olması veya kiralanması ya da sahip veya zilyedlerinden muvafakat alınması gereken alan, aynı çizelgenin dip notunun (D) bendine göre (76-100) tonluk depo kategorisinin 3 üncü sırasına göre 290 metredir. Bununla birlikte patlayıcı madde deposuna 711 metrelik güvenlik uzaklığı içerisinde hiçbir şekilde 3 üncü sırada belirtilen yerler bulunmayacaktır.

ÖRNEK 5 : (150) tonluk sütresiz bir deponun güvenlik uzaklığı Ek-1 sayılı çizelgenin not bölümünün (A) bendi 2 nci sırasında süresiz depo için verilen (D=9,3 ı Q1/3) formülüne göre 495 metre olması gerekmektedir. Ancak, 495 metrelik güvenlik uzaklığı içerisinde kalan ve girişimcinin mülkiyetinde olması veya kiralanması ya da sahip veya zilyedlerinden muvafakat alınması gereken alan, aynı çizelgenin dip notunun (D) bendine göre (101-150) tonluk depo kategorisinin 2 nci sırasına göre 140 metredir. Bununla birlikte patlayıcı madde deposuna 495 metrelik güvenlik uzaklığı içerisinde hiçbir şekilde 2 nci sırada belirtilen yerler bulunmayacaktır.

Figure 68 - Practice direction IV-A/1

BAKANLIĞIMIZCA YAYIMLANAN UYGULAMA TALİMATLARI - IV-A / 2



Yukarıdaki şekilde gösterilen değerler Ek-1 çizelgenin her üç sırasını da kapsamaktadır

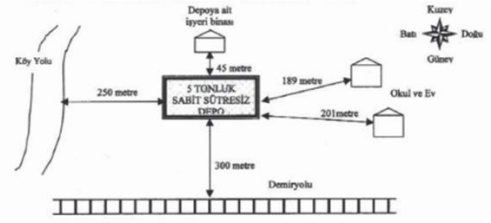
Figure 69 - Practice direction IV-A/2

BAKANLIĞIMIZCA YAYIMLANAN UYGULAMA TALİMATLARI - IV-A / 3

ŞEKİL 2 :

(5) ton kapasiteli sabit - sütresiz patlayıcı madde deposunun,

Batısında :250 metre mesafede köy yolu
Doğusunda :189 metre ve 201 metre mesafede okul ve ev
Kuzeyinde :45 metre mesafede depoya ait işyeri binası,
Güneyinde :300 metre mesafede demiryolu bulunduğu varsayıldığında,



* Batısındaki köy yolu için Ek-1 çizelgenin 2 nci sırasına göre; 5 tonluk sabit-sütresiz deponun kay yoluna (159) metre mesafede olması gerektiği, köy yoluna (250) metre mesafesi bulunan deponun bu haliyle Tüzüğün Ek-} sayılı çizelgesine uygun olduğu anlaşılmıştır

* Doğusunda okul ve ev bulun düğ l için 3 üncü sıraya göre; deponun okul ve eve (380) metre mesafede olması gerekmektedir. Ancak, deponun bu yönü itibariyle Tüzüğün Ek-1 sayılı çizelgesine uygun olmadığı anlaşılmıştır. Bu itibarla depo için (A) bendinin 3 üncü sırasındaki sütresiz depolara ait formülün uygulanması gerekmektedir. Burada mevcut güvenlik uzaklığı formüldeki yerine konularak depoda bu hali ile en çok kaç kilogram patlayıcı madde depolanabileceği aşağıda hesaplanmıştır.

D=22,2 x Q1/3 formülünde bilinen değerler yerine konularak gerekli matematiksel işlem yapıldığında;

189=22,2 x Q1/3
189/22,2=Q
8,51=Q1/3 (Q) değeri yalnız bırakılıp, eşittir bölümünün karşısındaki değerin Küpü alındığında

Q=(8,51)3
Q=617kg.

Burada depo istiap haddi belirlenirken dikkat edilecek husus,iki meskun mahal olması itibari ile en yakın olan meskun mahalin depoya olan güvenlik uzaklığının esas alınmasıdır.Formülün uygulanması neticesinde söz konusu depoda , meskun mahale olan uzaklığı nedeni ile depo kapasitesinin (5) ton yerinme en fazla 617" madde depolanabileceği hesaplanmıştır.

Figure 70 - Practice direction IV-A/3

APPENDIX G

CIRCULAR ON HEALTH PROTECTION ZONES REQUIRED FOR NSES WHICH HAVE NEGATIVE EFFECT ON PUBLIC AND ENVIRONMENTAL HEALTH

According to the interviews with government officials and mail responses, the obligations of Circular on Determination of HPZ around Non-Sanitary Establishment are not enforced. The Circular proposes template for the identification of HPZ in a qualitative approach; unfortunately, it is not enforced by competent authorities.

Table 54 - Health Protection Zone Table defined in Circular

Risk Coefficient	Health Protection Zone or Safety (Meter) ±%25
0,01-0,02<	40
0,02-0,04<	55
0,04-0,06<	70
0,06-0,08<	85
0,08-0,10<	100
0,10-0,12<	115
0,12-0,14<	130
0,14-0,16<	145
0,16-0,18<	160
0,18-0,20<	175
0,20-0,22<	190
0,22-0,24<	205
0,24-0,26<	220
0,26-0,28<	235
0,28-0,30<	250
0,30-0,32<	265
0,32-0,34<	280
0,34-0,36<	295
0,36-0,38<	310
0,38-0,50<	325

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APPENDIX H

EIA REPORTS LIST

Table 55 - Screened EIA Reports

Company	Project Type
Koza Altın Işletmeleri A.Ş.	Altın-Gümüş-Bakır Madeni Projesi Nihai ÇED Raporu
Akyildiz Nakliye Inş. Taah. Ve Tic. Ltd. Şti.	Krom Ocağı ve Cevher Zenginleştirme Tesisi (200902404 Sicil Nolu Ruhsat Sahasi)
Pelenkoğlu Madencilik San. Ve Tic. Ltd.Şti.	Kalker Ocağı Ve Kirma Eleme Tesisi Kapasite Artişi Çed Raporu
Start Akü Tşc. Ve San. Ltd. Şti.	Stasyoner Ve Traksşyoner Akü, Akü Yedek Parçalari Üretşmi
Şişecam Kimyasallar Grubu Soda Sanayii A.Ş.	Gürlü Endüstriyel Atik Düzenli Depolama Sahasi "Nihai Çed Raporu"
Arikan Mensucat Sanayi Ve Ticaret A.Ş.	Arikan Mensucat Sanayi Ve Ticaret A.Ş. Kumaş Örme, Iplik Ve Kumaş Boya, Baski Işlemi Tesisi
Venüs Havai Fişek Proteknik Oyuncak Kimya Organizasyon Tic. Ve San. Ltd.Şti.	Havai Fişek Ve Proteknik Imalati Kapasite Değişikliği Nihai Çed Raporu
Kaynarca Organize Sanayi Bölgesi Yönetim Kurulu Başkanliği	Kaynarca Mobilya Ihtisas Organize Sanayi Bölgesi Nihai Çed Raporu
Sanko Tekstil Işletmeleri San. Ve Tic. A.Ş./Gaziantep Makine Şubesi	Motorlu Taşit Üretim TesisiN(Iş Makineleri Üretimi)Kapasite Artişi
Argaz Lpg Dolum Tevzii Inş. San. Ve Tic. A.Ş.	Lpg Ve Akaryakit Depolama Ve Dolum Tesisi Kapasite Artişi Projesi
Etki Liman Işletmeleri Doğalgaz Ithalat Ve Tic. A.Ş.	Lng Depolama Ve GazlaştirmaN Terminali
Horizon Enerji Dağitim Ve Elektrik Üretim Liman Işletmeciliği A.Ş.	Ham Petrol Ve Petrol Türevleri Depolama Tesisi

Table 55 continued

Gübre Fabrikalari Türk A.Ş.	Gübre Fabrikalari Türk A.Ş.
Hayat Kimya San. A.Ş.	Hayat Kimya San. A.Ş.
Çinkom Çinko Kurşun Metal Ve Madencilik San. Tic. A.Ş	Aliağa Zenginleştirilmiş Çinko Oksit, Çinko Klinkeri Ve Maden Üretim Tesisi
Akünlü Ekolojik Yapi Elemanlari Ve Çevre Koruma San. Tic. Ltd. Şti.	Findik Kabuğu, Her Türlü Meyve Çekirdeği Ve Ömrünü Tamamlamiş Oto Lastikten Piroliz Yöntemi Ile Karbon, Aktif Karbon Elde Edilmesi Ve Ekolojik Duvar Ve Karbon Filtresi Üretimi
Manisa Belediyesi Evsel Atiksu Aritma Tesisi	Manisa Belediyesi Evsel Atiksu Aritma Tesisi
Deniz Grup Kimya Plastik Ambalaj Sanayi Ve Ticaret Ltd. Şti.	Solvent Geri Kazanim Tesisi
Işik Geri Dön. Bio Ener. San. Ltd. Şti.	ÖTL Geri Dönüşüm Tesisi
Aksa Enerji Üretim A.Ş.	Antalya Enerji Santrali Kapasite Arttirimi Nihai Çevresel Etki Değerlendirmesi Raporu
Akfen Enerji Üretim Ve Ticaret A.Ş.	Mersin Dgkçs Projesi
Koruma Klor Alkali San. Ve Tic. A.Ş.	Ilave Iskele Alani
Likit Kimya San. Ve Tic. A.Ş.	Kimyasal Madde Depolama Tesisi 4. Kapasite Artişi Projesi
Argaz Lpg Dolum Tevzii Inş. San. Ve Tic. A.Ş.	LPG Ve Akaryakit Depolama Ve Dolum Tesisi
T.C. Kirikkale Valiliği	Kirikkale Silah Ihtisas Organize Sanayi Bölgesi ÇED Raporu
Ng Kütahya Seramik Porselen Turizm A.Ş.	Seramik Karo Üretim Tesisi Kapasite Artışı Çed Raporu
Sütaş Süt Ürünleri A.Ş.	Tire Süt Ve Süt Ürünlerİ Üretşm Tesisi ÇED Raporu
Ebru Kümbetoglu	Mermer Ocagi Kapaste Artişi ÇED Raporu
Zeus Enerji San. Tic. Ltd. Şti.	Piroliz Yöntemş İle Ömrünü Tamamlamış lastiklerin Geri Kazanimi Ve Elektrik Üretşm Tesisi ÇED Raporu

APPENDIX I

MAIL INTERVIEWS

The e-mail interviews are carried out with municipalities, provincial directorates and OIZ directorates. The below questions are sent to authorities via e-mail.

1. What is the procedure for determination of HPZS?
2. Who are the members of Site Selection Committee?
3. What kind of criteria (if exist) are used for the determination of HPZs.
4. Is there any guidance document for the determination of HPZs?
5. Are accident scenarios considered for HPZs?
6. What are the names of the NSEs and their HPZs distances?

The following section presents the answers from the authorities. The answers are in Turkish and not translated to the English.

1. Trabzon-Arsin Organize Sanayi Bölgesi

Trabzon-Arsin Organize Sanayi Bölgesinde, Sağlık Koruma Bandı olarak, 12/4/2000 tarihli ve 4562 sayılı Organize Sanayi Bölgeleri Kanununun 27.maddesine dayanılarak hazırlanan Organize Sanayi Bölgeleri Uygulama Yönetmeliği Geri Çekme Mesafelerini Gösterir Tablodaki bilgiler kullanılmaktadır.

Organize Sanayi Bölgeleri Uygulama Yönetmeliği kapsamında tanımlanan parsellerde geri çekme mesafeleri ise, 15.06.1990 tarihinde onaylanan İmar Planında belirtildiği üzere dört taraftan da 10' ar metre çekilmek suretiyle uygulanmaktadır.

2. Amasya – Merzifon Organize Sanayi Bölgesi

Merzifon OSB sağlık koruma bandı Bütün adaların etrafında 10 m derinliğindedir.

OSB miz Onaylı İmar planları, 4562 Sayılı OSB Kanunu ve Uygulama Yönetmeliği yayınlanmadan yapıldığından, yapı yaklaşma sınırları (çekme mesafeleri) yönetmelik hükümlerine göre değil, plan hükümlerine göre uygulanmaktadır.

En yakın yapılaşma mesafesi öğrenilmek isteniyorsa; yapı yaklaşma sınırları komşu parsellerden 6 m. Yol cephesinde 10 m. Olarak uygulanmaktadır. Bu durumda iki farklı parseldeki yapılar arasındaki parsel sınırında enyakın yapı 12 m. Yol cephesinde ise 60 m. Mesafe bulunmaktadır.

OSB'nizde bulunan Gayrisihhî Müessese sayısı : ***33 adet***

OSB'nizde bulunan 1. ve 2. Sınıf Gayrisihhî Müessese sayısı : ***29 adet***

3. Sakarya 1. Organize sanayi bölgesi bölge müdürlüğü

Sağlık Koruma Bantları

102 ADA 10 PARSEL	***: 37.163,63 m2***
102 ADA 12 PARSEL	***: 8.458,44 m2***
107 ADA 10 PARSEL	***: 2.535,20 m2***
107 ADA 11 PARSEL	***: 21.334,09 m2***
108 ADA 13 PARSEL	***: 14.964,65 m2***

4. Isparta - Yalvaç OSB

Yalvaç OSB'nin kuruluşu eski de olsa daha yeni imar planı çizimi yapılmaktadır. Sizin yazınızda bahsettiğiniz yönetmelik ve mevzuatlar gereği imar planımız tamamlanarak Bakanlığın onayına sunulmuştur. Şu anda her hangi bir yatırım- iş yeri yapımı söz konusu değildir.

Bu plan da OSB çevresindeki sağlık koruma bantları planlanmış ve bakanlığın onayına sunulmuştur. bilgilerinize, saygılarımızla,

5. Antalya İl Özel İdaresi

1-Sağlik Koruma Bandi Belirlenirken, Nasil Bir Proedür İzlenmektedir?

2005/9207 sayılı İşyeri Açma ve Çalışma Ruhsatlarına İlişkin Yönetmeliğin 16'ıncı maddesinde Gayrisıhhi Müesseselerde sağlık koruma bandının nasıl düzenleneceği belirlenmiş olup, sağlık koruma bandı tesislerin çevre ve toplum sağlığına yapacağı zararlı etkiler ve kirletici unsurlar dikkate alınarak yönetmeliğin 15'İnci maddesinde belirlenen inceleme kurulları tarafından tespit edilmektedir.

2-İnceleme Kurulu Üyeleri Kimlerden Oluşmaktadır?

İnceleme Kurulu üyeleri 2005/9207 sayılı İşyeri Açma ve Çalışma Ruhsatlarına İlişkin Yönetmeliğin 15 nci maddesinde belirtilmiş olup, İl özel idarelerinde birinci sınıf gayrisıhhî müesseseleri inceleme kurulu, beş kişiden az olmamak üzere valinin veya görevlendireceği yetkilinin başkanlığında çevre, sağlık, hukuk, imar ve tarım birimleri görevlileri, sanayi ve ticaret il müdürlüğü temsilcisi, ilgili meslek odalarının temsilcileri ile tesisin özelliğine göre gerektiğinde vali tarafından belirlenecek diğer kuruluş temsilcilerinden oluşmaktadır.

3-Sağlik Koruma Bandi Mesafesi Belirlenirken Kullanilan Ölçütler Nelerdir?

Sağlık koruma bandı belirlenirken tesisin çevresinde yerleşim bulunup bulunmadığı dikkate alınmaktadır. Yerleşim varsa ikamet edenlerin sağlık ve istirahat durumlarına zarar verilmeyecek mesafe göz önünde bulundurulmaktadır.

4-Kullanmakta Olduğunuz Teknik Bir Düküman Var Midir?

Sağlık koruma bandı, Çevre ve Toplum Sağlığını Olumsuz Etkileyebilecek Gayrisıhhi Müesseselerin Etrafında Bırakılacak Sağlık Koruma Bandı Mesafesi Belirlenmesi Hakkında Yönerge kapsamında hesaplanmaktadır.

5-Kaza Senaryolari Dikkate Alinmaktamidir?

Kaza senaryoları dikkate alınmamaktadır.

6-İl Genelindeki Sağlik Koruma Bandi Zorunlu Tutulmuş Olan Gayrisihhi İşyerlerinin Mevcut Sağlik Koruma Bandi Mesafeleri Ve Bu İşyerlerinin Bilgileri?

İlimiz genelinde Antalya İl Özel İdaresince ruhsatlandırılmış 15 adet 1 nci sınıf Gayrisıhhi Müessese bulunmaktadır. Tesisin özelliğine göre ve konumuna göre 10 metre ile 50 metre arasında değişmektedir.

Bu işyerlerinin Yönetmelik eki-2 listesine göre sınıflandırması;

-Enerji Sanayisi =1 - Maden Sanayisi=2

-Kimya Sanayisi=2 - Petrokimya Sanayisi=2

-Gıda Sanayisi=7 -Atık Mad. Değer. Ortadan Kald. ile ilgili Sanayi= 1

6. Trabzon Belediyesi Zabıta Müdürlüğü ve Ruhsat Servisi

Türkiye'de Seveso II Direktifi kapsamında Arazi Kullanım Planlaması başlıklı yüksek lisans tezi kapsamında, tezdeki bulguların daha sağlıklı olması adına, aşağıda sıralanmış olan görevlerimizle ilgili sorularınıza gerekli cevaplar verilmiş ve aşağıya çıkarılmıştır.

- *Gıda ile ilgili olanlar dahil birinci sınıf gayri sıhhi müesseseleri ruhsatlandırmak. (5216 sayılı Kanunun 7/j md.)*
- *Akaryakıt, LPG ve CNG Otogaz istasyonlarına Plan Görüşü vermek, Avan Proje onayı yapmak ve ruhsat düzenlemek. (5393 sayılı Kanunun 80 md.)*
- *1. Sınıf Gayri Sıhhi Müesseselere Çalışma Ruhsatı vermek amacıyla kurulan İstanbul Büyükşehir Belediye Başkanlığı inceleme Kurulunun Sekretaryalık görevini yürütmek.*

1-Sağlık Koruma Bandı belirlenirken, nasıl bir prosedür izlenmektedir?

9207 sayılı İşyeri Açma ve Çalışma Ruhsatlarına İlişkin Yönetmelik kapsamında;

Sağlık koruma bandı

Madde 16- *Sanayi bölgesi, organize sanayi bölgesi ve endüstri bölgeleri ile bu bölgeler dışında kurulacak birinci sınıf gayrisıhhî müesseselerin etrafında, sağlık koruma bandı konulması mecburîdir. Sağlık koruma bandı mülkiyet sınırları dışında belirlenemez ve bu alan içinde mesken veya insan ikametine mahsus yapılaşmaya izin verilmez.*

(Mülga İkinci Fıkra: 19/3/2007 – 2007/11882 K.)

Sağlık koruma bandı, inceleme kurulları tarafından tesislerin çevre ve toplum sağlığına yapacağı zararlı etkiler ve kirletici unsurlar dikkate alınarak belirlenir. Sağlık koruma bandı, sanayi bölgesi sınırı esas alınarak tespit edilir. ÇED raporu düzenlenmesi gereken tesislerde bu rapordaki mesafeler esas alınır.

2-İnceleme Kurulu üyeleri kimlerden oluşmaktadır,

9207 sayılı İşyeri Açma ve Çalışma Ruhsatlarına İlişkin Yönetmelik kapsamında;

İnceleme kurulları

Madde 15- *İl özel idarelerinde birinci sınıf gayrisıhhî müesseseleri inceleme kurulu, beş kişiden az olmamak üzere valinin veya görevlendireceği yetkilinin başkanlığında çevre, sağlık, hukuk, imar ve tarım birimleri görevlileri, sanayi ve ticaret il müdürlüğü temsilcisi, ilgili meslek odalarının temsilcileri ile tesisin özelliğine göre gerektiğinde vali tarafından belirlenecek diğer kuruluş temsilcilerinden oluşur. (Mülga İkinci Fıkra: 19/3/2007 – 2007/11882 K.)*

Büyükşehir belediyelerinde birinci sınıf gayrisıhhî müesseseleri inceleme kurulu, beş kişiden az olmamak üzere büyükşehir belediye başkanı veya görevlendireceği yetkilinin başkanlığında çevre, sağlık, hukuk, imar ve küşat birimleri görevlileri, sanayi ve ticaret il müdürlüğü temsilcisi, ilgili meslek odalarının temsilcileri ile tesisin özelliğine göre belediye

başkanı tarafından belirlenecek diğer kuruluş temsilcilerinden oluşur.

Trabzon Belediyesi Zabıta Müdürlüğü ve Ruhsat Servisi

İl belediyelerinde birinci sınıf gayrisıhhî müesseseleri inceleme kurulu, üçüncü fıkrada belirtilen esasa göre oluşturulur. (Mülga Beşinci Fıkra: 19/3/2007 – 2007/11882 K.)
Kurulların oluşturulması sırasında yeterli teknik ve uzman elemana sahip olmayan belediyeler, kurulların oluşturulması için valilikten eleman görevlendirilmesini talep edebilir.(1)

1) 19/3/2007 tarihli ve 2007/11882 sayılı Bakanlar Kurulu Kararının eki Yönetmeliğin 5 inci maddesiyle bu fıkrada yer alan "valilik veya kaymakamlıktan" ibaresi "valilikten" olarak değiştirilmiş ve metne işlenmiştir.

Organize sanayi bölgelerinde inceleme kurulu oluşturulmaz. Tesisin özelliğine göre, ilave olarak bırakılacak sağlık koruma bandı, organize sanayi bölgesi yönetim kurulu kararı ile tespit edilir.

(Ek fıkra: 23/5/2011 – 2011/1900 K.) Çevresel Etki Değerlendirmesi Yönetmeliği hükümlerine göre ÇED olumlu kararı alınmış olan maden üretim faaliyetleri ile bu faaliyetlere dayalı olarak üretim yapılan geçici tesisler için inceleme kurulu oluşturulmaz

3-Sağlık Koruma Bandı mesafesi belirlenirken Kullanılan ölçütler nelerdir?

9207 sayılı İşyeri Açma ve Çalışma Ruhsatlarına İlişkin Yönetmelik kapsamında;
Madde:16 "….Sağlık koruma bandı, inceleme kurulları tarafından tesislerin çevre ve toplum sağlığına yapacağı zararlı etkiler ve kirletici unsurlar dikkate alınarak belirlenir. Sağlık koruma bandı, sanayi bölgesi sınırı esas alınarak tespit edilir. ÇED raporu düzenlenmesi gereken tesislerde bu rapordaki mesafeler esas alınır."

4-Kullanmakta olduğunuz teknik bir doküman var mıdır?

9207 sayılı İşyeri Açma ve Çalışma Ruhsatlarına İlişkin Yönetmelik kapsamında;
Tesislerin çevre ve toplum sağlığına yapacağı zararlı etkiler ve kirletici unsurlar dikkate alınarak belirlenerek raporlanır.

7. Kahramanmaraş Belediyesi Ruhsat ve Denetim Müdürlüğü

Sayın Dursun BAŞ, Ruhsat ve Denetim Müdürlüğü olarak yaptığımız işlemler; yetki alanımız içinde bulunan işyerlerinin ruhsatlandırması işlemlerini yapmak ve denetlemektir. İlgide kayıtlı dilekçenizde bahsedilen konuları sırasına göre değerlendirecek olursak;

1-(a)Sağlık Koruma Bandı: Bilindiği üzere işyeri açma ve çalışma ruhsatları 3572 sayılı kanun ve 2005/9207 sayılı işyeri açma ve çalışma ruhsatlarına ilişkin yönetmelik hükümleri çerçevesinde yapılmaktadır. 1. Sınıf Gayri Sıhhi Müesseselerin sağlık koruma bandı belirleme işlemleri yönetmeliğin 16. Maddesi kapsamında 15. Maddede belirtilen inceme kurulu tarafından belirlenerek yer seçimi ve tesisi kurma izni formuna işlenmektedir.

(b) İnceleme Kurulu Üyeleri: Belediye Başkanı veya yetkili Belediye Başkan Yardımcısı başkanlığında Ruhsat ve Denetim Müdürlüğü, Hukuk İşleri Müdürlüğü, İmar ve Şehircilik Müdürlüğü ile Bilim Sanayi ve Teknoloji İl Müdürlüğü, İl Çevre ve Orman Müdürlüğü, İl Gıda Tarım ve Hayvancılık Müdürlüğü, İl Sağlık Müdürlüğü, Ticaret ve Sanayi Odası Başkanlığından birer yetkili üyenin katılımı ile oluşturulan komisyondan oluşmaktadır.

2- Sağlık koruma bandı mesafesi belirleme kriterleri; inceleme kurulları tarafından tesislerin çevresinde bırakılacak koruma badı mesafeleri için standart bir rakam olmamakla birlikte, tesisin etrafına vereceği olası zararlı etkileri ve kirletici unsurları göz önde bulundurularak inceleme kurulu tarafından belirlenmektedir.

(a)Kullanılan teknik doküman ve kaza senaryoları; standart bir doküman kullanılmamakla birlikte aynı tür iş kolları için aynı kriterlere göre değerlendirilmektedir.

(b) Kaza senaryoları ise mutlaka işin tehlike-risk boyutu da ayrıca değerlendirilmektedir.

3- Sağlık koruma bandı zorunlu tutulan işyerleri ise; 1. Sınıf Gayri Sıhhi Müesseselerin tamamı ile Yanıcı Parlayıcı Patlayıcı özelliği bulunan diğer gayri sıhhi işyerleri (Petrol İstasyonları için TSE ye göre) için koruma bandı belirlenmekte ve imar durumlarına işlenmektedir.

Sonuç olarak; Sağlık koruma bandı uygulamaları daha önce Sağlık İl Müdürlüğü tarafından kurulan bir komisyon tarafından belirlenmekte iken, 2005/9207 sayılı İşyeri Aşma ve Çalışma Ruhsatlarına İlişkin Yönetmeliğin yürürlük tarihinden sonra ise bu görev yetkili idarelere (Belediyeler ve İl Özel İdareleri) devredilmiş fakat uygulamanın nasıl yapılacağı konusunda yetkili idareler yönelik bir çalışma yapılmamıştır. Sağlık Bakanlığınca 2011/6359 sayılı yönerge yayımlanmasına rağmen uygulaması konusunda yetkili idareye öneri olarak (sadece önerilmiştir) gönderilmiştir.

Mevcut uygulamalarımızda ÇET raporu olanların raporda belirtilen mesafelerini, diğerlerinde ise imar mevzuatınca belirlenen çekme mesafelerinden az olmamak üzere işletmenin özelliğine göre koruma bandı mesafeleri belirlenmektedir.

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8. İstanbul Büyükşehir Belediyesi

Sorularınızla ilgili açıklamalar aşağıda belirtilmiştir

9207 sayılı Yönetmeliğe göre birinci sınıf gayrisıhhi müesseselere yer seçimi ve tesis kurma izni verilirken Yönetmeliğin ekindeki Örnek 3- Birinci Sınıf Gayrisıhhî Müesseselere Ait Yer Seçimi ve Tesis Kurma Raporu Formu'nun 19. maddesine göre sağlık koruma mesafesinin aranması gerekmekte; işyeri açma ve çalışma ruhsatı verilirken de Örnek-4 Birinci Sınıf Gayrisıhhî Müesseselere Ait Açılma İzni Raporu Formu'nun 16. maddesi gereği sağlık koruma bandı mesafesinin uygun olup olmadığının incelenmesi gerekmektedir. Bu bağlamda ***birinci sınıf gayri sıhhi müesseseler yer seçimi tesis izni alma safhasında sağlık koruma bandı gerekliliklerini yerine getirmek zorundadır. Ancak tesis kurulduktan sonra, İlçe Belediye Başkanlığı'ndan alınmış iskan belgesi ve 9207 sayılı Yönetmelikte belirtilen işyeri açma ve çalışma ruhsatı için gerekli olan diğer belgelerle birlikte tarafımıza başvuran birinci sınıf gayrisıhhi müesseselerin ruhsat açısından değerlendirilme aşamasında, işyerinin sağlık koruma bandı oluşturması şartı aranmamaktadır.***

9207 sayılı Yönetmeliğin 23. maddesinin 7. fıkrasında "İkinci sınıf gayrisıhhî müesseselerden yakıcı, parlayıcı, patlayıcı ve tehlikeli maddelerle çalışılan işlerle oksijen LPG dolum ve depoları, bunlara ait dağıtım merkezleri, perakende satış yerleri, akaryakıt ile sıvılaştırılmış petrol gazı, sıvılaştırılmış doğal gaz ve sıkıştırılmış doğalgaz istasyonları ve benzeri yerlere müsaade verilmezden evvel civarında ikamet edenlerin sıhhat ve istirahatları üzerine gerek tesisatları ve gerekse vaziyetleri itibarıyla bir zarar vermeyeceğine kanaat oluşturulması için yetkili idarelerce inceleme yapılması zorunludur. Bu müesseselerin etrafında yetkili idareler tarafından belirlenecek mesafede sağlık koruma bandı bırakılması mecburidir." hükmü bulunmaktadır. ***Akaryakıt ve LPG istasyonlarının proje aşamasında istasyonların TSE'nin 12820 ve 11939 standartları ile Binaların Yangından Korunması Hakkında Yönetmelikte belirtilen emniyet mesafelerine uygun olarak kurulması gerekmektedir.****Sonuç olarak kurulu durumda bulunan, 9207 sayılı Yönetmelikte belirtilen belgeleri tamamlayarak tarafımıza başvuran işyerlerinden sağlık koruma bandı oluşturulması talep edilmemektedir.*

9. Kırıkkale İl Özel İdaresi

1- Sağlık Koruma Bandı Belirlenirken Nasıl Bir Prosedür İzlenmektedir?

*İşyeri Açma ve Çalışma Ruhsatları Yönetmeliğinin **"Sağlık koruma bandı**" başlıklı 16. Maddesine göre Sanayi bölgesi, organize sanayi bölgesi ve endüstri bölgeleri ile bu bölgeler dışında kurulacak birinci sınıf gayri sıhhi müesseselerin etrafında sağlık koruma bandı konulması mecburidir. Sağlık koruma bandı mülkiyet sınırları dışında belirlenemez ve bu alan içinde mesken ve insan ikametine mahsus yapılaşmaya izin verilemez. Sağlık koruma bandı, inceleme kurulları tarafından tesislerin çevre ve toplum sağlığına yapacağı zararlı etkiler ve kirletici unsurlar dikkate alınarak belirlenir. Sağlık koruma bandı , sanayi bölgesi sınırı esas alınarak tespit edilir. ÇED raporu düzenlenmesi gereken tesislerde bu rapordaki mesafeler esas alınır.*

2- İnceleme Kurulu Üyeleri Kimlerden Oluşmaktadır?

*İşyeri Açma ve Çalışma Ruhsatları Yönetmeliğinin **"İnceleme Kurulları**" Başlıklı 15. Maddesine göre İl özel İdarelerinde birinci sın ıf gayri sıhhi müesseseleri inceleme kurulu beş kişiden az olmamak üzere valinin veya görevlendireceği yetkilinin başkanlığında çevre, sağlık, hukuk, imar ve tarım birimleri görevlileri, sanayi ve ticaret il müdürlüğü temsilcisi, ilgili meslek odalarının temsilcileri ile tesisisin özelliğine göre gerektiğinde vali tarafından belirlenecek diğer kuruluş temsilcilerinden oluşur.*

3- Sağlık Koruma Bandı Belirlenirken Kullanılan Ölçütler Nelerdir?

Sağlık koruma bandı, sanayi bölgesi sınırı esas alınarak tespit edilir. ÇED raporu düzenlenmesi gereken tesislerde bu rapordaki mesafeler esas alınır.

4- KULLANMAKTA OLDUĞUNUZ TEKNİK BİR DOKÜMAN VAR MIDIR?

TSE 1446 LPG Depolama Tankları Asgari Emniyet Mesafeleri TSE1449 Sıvılaştırılmış Petrol Gazları LPG Doldurma ve Boşaltma Kuralları, TSE 11939 LPG İkmal istasyonlarındaki asgari emniyet Kuralları TSE 12882 Akaryakıt Satış ve Emniyet Kuralları, Parlayıcı Patlayıcı Tehlikeli ve Zararlı İşyerlerinde ve İşlerinde Alınacak Tedbirler Hakkında Tüzük

5- kaza senaryoları dikkate alınmakta mıdır?

Kanun ve Yönetmeliklere göre gerekli önlemler alınmaktadır.

6- İl Genelinde Sağlık Koruma Bandı Zorunlu Tutulmuş Olan Gayri Sıhhi İşyerlerinin Mevcut Sağlık Koruma Bandı Mesafeleri Ve Bu İşyerlerinin (Sayı Ve Ek-1 Sayılı Listelenmiş Kategori Bilgisi) Bilgileri?

1.Sınıf Gayri Sıhhi Müesseseler Ruhsatlandırılırken tamamında sağlık koruma bandı bırakılmaktadır

10. Adana İl Özel İdaresi

Başvurunuzda talep edilen bilgilerin 5302 sayılı İl Özel İdaresi Kanununun 7/g maddesi "Belediye sınırları dışındaki gayri sıhhî müesseseler ile umuma açık istirahat ve eğlence yerlerine ruhsat vermek ve denetlemek." hükmü ile ruhsatlandırma işlemlerinin İdaremiz yetkisinde olan gayrisıhhi müesseselere işyeri açma ve çalışma ruhsatı verilirken işyeri açma ve çalışma ruhsatlarının verilmesinde uygulanacak esas ve usulleri düzenleyen 9207 sayılı İşyeri Açma ve Çalışma Ruhsatlarına İlişkin Yönetmelik hükümleri arasında olduğu anlaşılmıştır. Birinci sınıf gayrisıhhî müesseseler için yer seçimi ve tesis kurma, deneme veya açılma izni amacıyla inceleme yapan inceleme kurulu üyeleri mezkur yönetmeliğin 15. maddesi "İl özel idarelerinde birinci sınıf gayrisıhhî müesseseleri inceleme kurulu, beş kişiden az olmamak üzere valinin veya görevlendireceği yetkilinin başkanlığında çevre, sağlık, hukuk, imar ve tarım birimleri görevlileri, sanayi ve ticaret il müdürlüğü temsilcisi, ilgili meslek odalarının temsilcileri ile tesisin özelliğine göre gerektiğinde vali tarafından belirlenecek diğer kuruluş temsilcilerinden oluşur." hükmü doğrultusunda oluşturularak sağlık koruma bandı mesafelerinin belirlenmesi gerekli olan işyerleri için aynı yönetmeliğin 16.maddesi "Sanayi bölgesi, organize sanayi bölgesi ve endüstri bölgeleri ile bu bölgeler dışında kurulacak birinci sınıf gayrisıhhî müesseselerin etrafında, sağlık koruma bandı konulması mecburîdir. Sağlık koruma bandı mülkiyet sınırları dışında belirlenemez ve bu alan içinde mesken veya insan ikametine mahsus yapılaşmaya izin verilmez. Sağlık koruma bandı, inceleme kurulları tarafından tesislerin çevre ve toplum sağlığına yapacağı zararlı etkiler ve kirletici unsurlar dikkate alınarak belirlenir. Sağlık koruma bandı, sanayi bölgesi sınırı esas alınarak tespit edilir. ÇED raporu düzenlenmesi gereken tesislerde bu rapordaki mesafeler esas alınır." 23. maddesi "İkinci sınıf gayrisıhhî müesseselerden yakıcı, parlayıcı, patlayıcı ve tehlikeli maddelerle çalışılan işlerle oksijen LPG dolum ve depoları, bunlara ait dağıtım merkezleri, perakende satış yerleri, akaryakıt ile sıvılaştırılmış petrol gazı, sıvılaştırılmış doğal gaz ve sıkıştırılmış doğalgaz istasyonları ve benzeri yerlere müsaade verilmezden evvel civarında ikamet edenlerin sıhhat ve istirahatleri üzerine gerek tesisatları ve gerekse vaziyetleri itibarıyla bir zarar vermeyeceğine kanaat oluşturulması için yetkili idarelerce inceleme yapılması zorunludur. Bu müesseselerin etrafında yetkili idareler tarafından belirlenecek mesafede sağlık koruma bandı bırakılması mecburidir. Söz konusu yerlerin üçüncü sınıf gayrisıhhî müessese olarak açılması durumunda sıhhî nezarete tabi tutulması yeterlidir." ve 26.maddesi "Bir gayrisıhhî müessesenin, öncelikle kendi türündeki işyerlerine mahsus sanayi bölgesinde kurulması esastır. Sanayi bölgesi içindeki gayrisıhhî müesseselerden, diğer tesislere zarar verebilecek olanlar için sanayi bölgesi içinde sağlık koruma bandı oluşturulması istenebilir." hükümleri doğrultusunda sağlık koruma bandı, inceleme kurulları tarafından tesislerin çevre ve toplum sağlığına yapacağı

zararlı etkiler ve kirletici unsurlar dikkate alınarak belirlenir.

11. İzmir İl Özel İdaresi

İlgi yazı ekli dilekçede sağlık koruma bandı mesafelerinin belirlenmesi ve inceleme kurulu üyelerinin kimlerden oluştuğu hakkında bilgi alınmak istendiği belirtilmiştir.

Bu hususta; İşyeri Açma ve Çalışma Ruhsatlarına İlişkin Yönetmeliğin 16.Madde'si" Sanayi Bölgesi, organize sanayi bölgesi ve endüstri bölgeleri ile bu bölgeler dışında kurulacak birinci sınıf gayrisıhhi müesseselerin etrafında, sağlık koruma bandı konulması mecburidir. Sağlık koruma bandı mülkiyet sınırları dışında belirlenemez ve bu alan içinde mesken ve ya insan ikametine mahsus yapılaşmaya izin verilmez. Sağlık koruma bandı, inceleme kurulları tarafından tesislerin çevre ve toplum sağlığına yapacağı zararlı etkiler ve kirletici unsurlar dikkate alınarak belirlenir. Sağlık koruma bandı, sanayi bölgesi sınırı esas alınarak tespit edilir. ÇED raporu düzenlenmesi gereken tesislerde bu rapordaki mesafeler esas alınır." hükmünü amirdir.

İnceleme kurulları ile ilgili olarak Yönetmeliğin 15. Madde'si birinci fıkrasında "İl Özel İdarelerine birinci sınıf gayrisıhhi müesseseleri inceleme kurulu, beş kişiden az olmamak üzere valinin veya görevlendireceği yetkilinin başkanlığında çevre, sağlık, hukuk, imar ve tarım birimleri görevlileri, sanayi ve ticaret il müdürlüğü temsilcisi, ilgili meslek odalarının temsilcileri ile tesisin özelliğine göre gerektiğinde vali tarafından belirlenecek kuruluş temsilcilerinden oluşur.", altıncı fıkrasında da "Çevresel Etki Değerlendirmesi Yönetmeliği hükümlerine göre ÇED olumlu kararı alınmış olan maden üretim faaliyetleri ile bu faaliyetlere dayalı olarak üretim yapılan geçici tesisler için inceleme kurulu oluşturulmaz." denilmektedir.

Bilgilerinize rica ederim.

12. Balıkesir İl Özel İdaresi

Sağlık koruma bandı 2005/9207 karar sayılı İşyeri Açma ve Çalışma Ruhsatlarına İlişkin Yönetmeliğin 16. Maddesinde "Sağlık koruma bandı, inceleme kurulları tarafından tesislerin çevre ve toplum sağlığına yapacağı zararlı etkiler ve kirletici unsurlar dikkate alınarak belirlenir." denilmektedir.

İnceleme kurulu adı geçen yönetmeliğin 15. Maddesinde "İl özel idarelerinde birinci sınıf gayrisıhhî müesseseleri inceleme kurulu, beş kişiden az olmamak üzere valinin veya görevlendireceği yetkilinin başkanlığında çevre, sağlık, hukuk, imar ve tarım birimleri görevlileri, sanayi ve ticaret il müdürlüğü temsilcisi, ilgili meslek odalarının temsilcileri ile tesisin özelliğine göre gerektiğinde vali tarafından belirlenecek diğer kuruluş temsilcilerinden oluşur." ibaresi doğrultusunda oluşturulmaktadır.

26.12.2008 tarih ve 27092 sayılı Resmi Gazetede yayınlanan Tehlikeli Maddelerin ve Müstahzarların Sınıflandırılması, Ambalajlanması ve Etiketlenmesi Hakkında Yönetmelik, 13.03.2005 tarih ve 25754 sayılı Resmi Gazetede yayınlanan Sıvılaştırılmış Petrol Gazları (LPG) Piyasası Kanunu ve Elektrik Piyasası Kanununda Değişiklik Yapılmasına Dair Kanun, TS 11939 Sıvılaştırılmış Petrol Gazları (LPG), TS 12820 Akaryakıt istasyonları Emniyet kuralları standardı, İkmal İstasyonu LPG Tank emniyet mesafeleri ve asgari emniyet mesafeleri, 2872 sayılı Çevre Kanunu, 12.08.2013 tarih ve 28733 sayılı Resmi Gazetede yayınlanan Kimyasal Maddelerle

Çalışmalarda Sağlık ve Güvenlik Önlemleri Hakkında Yönetmelik hükümleri ve ayrıca 6359 sayılı Çevre ve Toplum Sağlığını Olumsuz Etkileyebilecek Gayrisıhhi Müesseselerin Etrafında Bırakılacak Sağlık Koruma Bandı Mesafesi Hakkında Yönergesi doğrultusunda inceleme kurulunca sağlık koruma bandı mesafeleri belirlenir. Sağlık koruma bandı mesafesi İşyeri Açma ve Çalışma Ruhsatlarına İlişkin Yönetmeliğin Ek 2 Gayrisıhhi Müesseseler listesi A grubu Birinci Sınıf Gayrisıhhi Müesseseler için zorunludur.

13. Yalova İl Özel İdaresi

10.08.2005 tarih ve 2005/9207 Sayılı İşyeri Açma ve Çalışma Ruhsatlarına İlişkin Yönetmeliğin Sağlık Koruma Bandı başlıklı 16.Maddesinde " Sanayi bölgesi, organize sanayi bölgesi ve endüstri bölgeleri ile bu bölgeler dışında kurulacak birinci sınıf gayri sıhhi müesseselerin etrafında, sağlık koruma bandı konulması mecburidir. Sağlık Koruma Bandı mülkiyet sınırları dışında belirlenemez ve bu alan içinde mesken veya insan ikametine mahsus yapılaşmaya izin verilmez. ***Sağlık Koruma Bandı, inceleme kurulları tarafından tesislerin çevre ve toplum sağlığına yapacağı zararlı etkiler ve kirletici unsurlar dikkate alınarak belirlenir****.*

Sağlık Koruma Bandı, sanayi bölgesi sınırları esas alınarak tespit edilir. ÇED raporu düzenlenmesi gereken tesislerde bu rapordaki mesafeler esas alınır."Aynı şekilde, 10.08.2005 tarih ve 2005/9207 Sayılı İşyeri Açma ve Çalışma Ruhsatlarına İlişkin Yönetmeliğin, İkinci ve Üçüncü Sınıf Gayri Sıhhi Müesseseler ile ilgili 23.maddesinin 7.fıkrasında ise " ikinci sınıf gayri sıhhi müesseselerden yakıcı, parlayıcı ve tehlikeli maddelerle çalışan işlerle oksijen LPG dolum ve depoları, bunlara ait dağıtım merkezleri, perakende satış yerleri, akaryakıt ile sıvılaştırılmış petrol gazı, sıvılaştırılmış doğal gaz ve sıkıştırılmış doğalgaz istasyonları ve benzeri yerlere müsaade verilmezden evvel civarında ikamet edenlerin sıhhat ve istirahatleri üzerine gerek tesisatları ve gerekse vaziyetleri itibariyle bir zarar vermeyeceğine kanaat oluşturulması için yetkili idarelerce inceleme yapılması zorunludur. Bu müesseselerin etrafından yetkili idareler tarafından belirlenecek mesafede sağlık koruma bandı bırakılması mecburidir. Söz konusu yerlerin üçüncü sınıf gayrisıhhi müessese olarak açılması durumunda sıhhi nezarete tabi tutulması yeterlidir". denilmektedir.

Sağlık Koruma Bandı mesafesini belirlemekle mükellef olan İnceleme Kurulu üyeleri ise, 10.08.2005 tarih ve 2005/9207 Sayılı İşyeri Açma ve Çalışma Ruhsatlarına İlişkin Yönetmeliğin İnceleme Kurulları başlıklı 15.Maddesinin 1.fıkrasında " İl Özel İdarelerinde birinci sınıf gayri sıhhi inceleme kurulu, beş kişiden az olmamak üzere valinin veya görevlendireceği yetkilinin başkanlığında çevre, sağlık, hukuk, imar ve tarım birimleri görevlileri, sanayi ve ticaret il müdürlüğü temsilcisi, ilgili meslek odalarının temsilcileri ile tesisin özelliğine göre gerektiğinde vali tarafından belirlenecek diğer kuruluş temsilcilerinden oluşur" denilmektedir. İnceleme Kurulları tarafından Sağlık Koruma Bandı Mesafesini belirlenirken ilgili Kanun ve Yönetmeliklerin belirlediği kriterler baz alınmaktadır.

14. Bursa Belediyesi Ruhsat ve Denetim Müdürlüğü

Yürütmekte olduğunuz tez çalışması kapsamında kullanılmak üzere, İdaremizden talep edilen bilgilere ilişkin 121172 numaralı bilgi edinme başvurunuz incelemiştir.

10.08.2005 tarih ve 25902 sayılı Resmi Gazetede yayımlanarak Yürürlüğe giren İşyeri Açma ve Çalışma Ruhsatlarına İlişkin Yönetmeliğin 16'ıncı maddesinde tanımlanan sağlık koruma bandına ilişkin yürütülen iş ve işlemler hakkında bilgi talep edildiği görülmektedir.

Yönetmeliğin 16'ıncı maddesinin ikinci fıkrasında; "Sağlık koruma bandı, inceleme kurulları tarafından tesislerin çevre ve toplum sağlığına yapacağı zararlı etkiler ve kirletici unsurlar dikkate alınarak belirlenir. Sağlık koruma bandı, sanayi bölgesi sınırı esas alınarak tespit edilir. ÇED raporu düzenlenmesi gereken tesislerde bu rapordaki mesafeler esas alınır." denilmektedir.

Bu doğrultuda Yönetmeliğin 15'inci maddesinin birinci fıkrasında "İl özel idarelerinde birinci sınıf gayrisıhhî müesseseleri inceleme kurulu, beş kişiden az olmamak üzere valinin veya görevlendireceği yetkilinin başkanlığında çevre, sağlık, hukuk, imar ve tarım birimleri görevlileri, sanayi ve ticaret il müdürlüğü temsilcisi, ilgili meslek odalarının temsilcileri ile tesisin özelliğine göre gerektiğinde vali tarafından belirlenecek diğer kuruluş temsilcilerinden oluşur." hükmü doğrultusunda Çevre ve Şehircilik İl Müdürlüğü, Halk Sağlığı İl Müdürlüğü, Gıda Tarım ve Hayvancılık İl Müdürlüğü, Bilim Sanayi ve Teknoloji İl Müdürlüğü, İdaremiz Hukuk Müşavirliği, İdaremiz İmar ve Yapı İşleri Daire Başkanlığı yetkililerinden oluşan İnceleme Kurulu ile tesislerde inceleme yapılarak sağlık koruma bandı belirlenmektedir.

Sağlık koruma bandı belirlenmesine esas hâlihazırda bir mevzuat çalışması bulunmamakta olup, sağlık koruma bandının belirlenmesine ilişkin usul ve esaslar inceleme kurullarının yetkisine bırakılmıştır.

Sağlık koruma bandı belirlenirken, işyerinin dosyasında sunulan bilgi ve belgeler ile mahallinde yapılan inceleme neticesinde, işyerinin çevre ve toplum sağlığına yapacağı zararlı etkiler ve kirletici unsurlara ilişkin ölçüm ve gözlemler ile işyerinin prosesi ya da tesiste bulundurulacak hammadde, mamul madde, yardımcı madde ve atıkların türüne göre öncelikle varsa yasal düzenlemeler dikkate alınmaktadır.

Ancak, İnceleme Kurulunca sağlık koruma bandı belirlenirken işyerinin prosesi ya da tesiste bulundurulan hammadde, mamul madde, yardımcı madde ve atıkların türüne göre aşağıdaki mevzuatlardan yararlanılmaktadır.

Bursa Belediyesi Ruhsat ve Denetim Müdürlüğü

-19.12.2007 tarih ve 26735 sayılı R.G.de yayımlanarak yürürlüğe giren Binaların Yangından Korunması Hakkında Yönetmelik

-27/11/1973 tarihli ve 7/7551 sayılı Bakanlar Kurulu Kararı ile yürürlüğe konulan Parlayıcı, Patlayıcı, Tehlikeli ve Zararlı Maddelerle Çalışılan İşyerlerinde ve İşlerde Alınacak Tedbirler Hakkında Tüzük,

-26/12/2003 tarihli ve 25328 sayılı Resmi Gazetede yayımlanan Patlayıcı Ortamların Tehlikelerinden Çalışanların Korunması Hakkında Yönetmelik

-30.05.1998 tarih ve 23357 sayılı R.G.'de yayımlanarak yürürlüğe giren 98/16-17 sayılı Mecburi Standart Tebliği ile yürürlüğe konulan "TS 11939 Sıvılaştırılmış Petrol Gazları (LPG) – İkmal İstasyonu – Karayolu Taşıtları İçin Emniyet Kuralları Standardı"

-05.01.2011 tarih ve 27807 sayılı R.G. yayımlanarak yürürlüğe giren Ham Petrol ve Doğal Gaz Boru Hattı Tesislerinin Yapımı Ve İşletilmesine Dair Teknik Emniyet ve Çevre Yönetmeliği

Bunlarında dışında, tesislerin Emisyon ve Gürültü Ölçüm Raporlarına göre değerlendirme yapılarak, ölçüm sonuçlarına göre hazırlanan modelleme haritaları doğrultusunda tesislerin kirletici dağılımları ve çevresinde hassas yerleşim bölgesi bulunması ya da mevcut planlarda yerleşime izin verilmesi söz konusu olması halinde, buna göre değerlendirme yapılmaktadır. Ayrıca, sağlık koruma bandı belirlenirken, benzer tesislerde yapılan gözlemler ile gerçekleşmiş ya da gerçekleşmesi muhtemel kazalar ve bu kazaların etki alanları da gözetilmektedir.

İşyerlerine belirlenen sağlık koruma bandı mesafelerinin ilgili imar dairesince korunması, sağlık koruma bandı mesafeleri içerisinde mesken veya insan ikametine mahsus yapılaşmaya izin verilmemesi gerekmektedir.

Ayrıca tüm bu sağlık koruma bandı belirlenmesine ilişkin Sağlık Bakanlığınca yayımlanan 17.02.2011 tarih ve 6359 sayılı Çevre ve Toplum Sağlığını Olumsuz Etkileyebilecek Gayrisıhhi Müesseselerin Etrafında Bırakılacak Sağlık Koruma Bandı Mesafesinin Belirlenmesi Hakkında Yönerge bulunmaktadır. Söz konusu yönergeye göre mülkiyet sınırları kalmak koşuluyla herhangi bir tesis için yönergeye göre belirlenecek minimum sağlık koruma bandı mesafesi 40 metre (± %25) belirtilmektedir. Ancak, yönerge kapsamında değerlendirme yapılması durumunda ülkemizde faaliyet gösteren ya da gösterecek olan işyerlerine uygulanması mümkün olmadığından, İçişleri Bakanlığınca bu yönergeye uyulmasına ilişkin herhangi bir mevzuat yayımlanmamış olup sağlık koruma bandı belirleme yetkisi İnceleme Kurullarına bırakılmıştır.

15. Hatay İl Özel İdaresi

İdaremiz Birinci Sınıf Gayri Sıhhi Müessese komisyonunca sağlık koruma bandı belirlenirken aşağıdaki kriterlere göre işlem yapılmaktadır.

1-*İdaremiz Birinci Sınıf Gayri Sıhhi Müessese komisyonu çevre, sağlık, hukuk, imar ve tarım birimleri görevlileri, sanayi ve ticaret il müdürlüğü temsilcisi, ilgili meslek odalarının temsilcileri ile tesisin özelliğine göre gerektiğinde vali tarafından belirlenecek diğer kuruluş temsilcilerinden oluşturulmuştur.*

2- *Sağlık koruma bandı mülkiyet sınırları dışında bırakılmamaktadır.*

3- *Sağlık koruma bandı mesafesi içerisinde mesken veya insan ikametine mahsus yapılaşmaya izin verilmemektedir.*

4-*Sağlık koruma bandı, inceleme kurulları tarafından tesislerin çevre ve toplum sağlığına yapacağı zararlı etkiler ve kirletici unsurlar dikkate alınarak belirlenmektedir.*

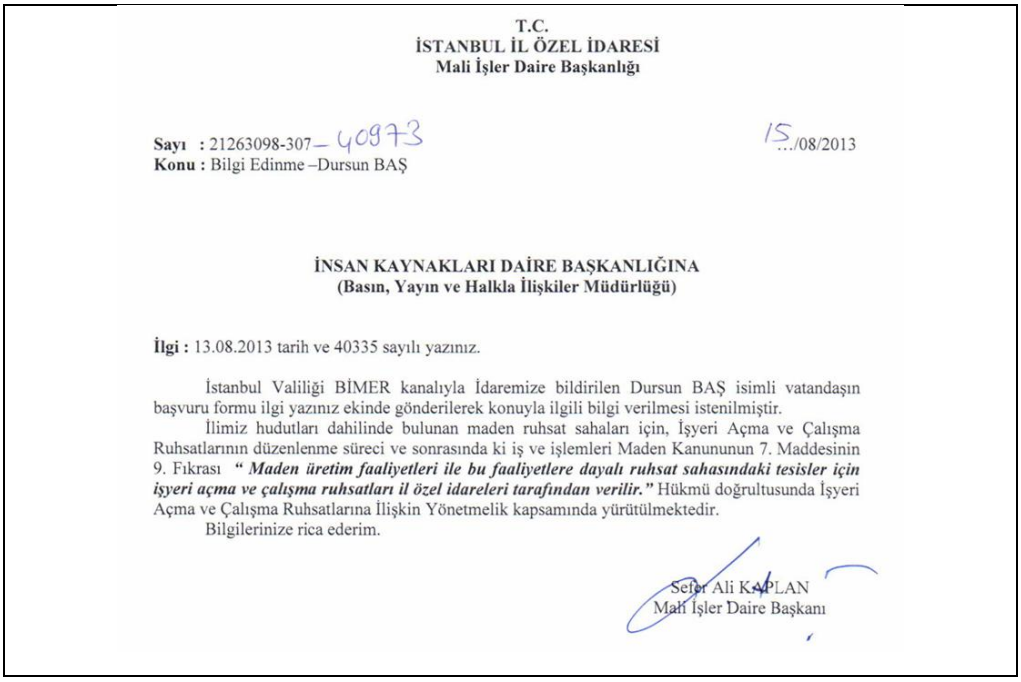
5-*Sağlık koruma bandı, sanayi bölgesi sınırı esas alınarak tespit edilmektedir.*

6-*ÇED raporu düzenlenmesi gereken tesislerde bu rapordaki mesafeler esas alınmaktadır.*

7-*İkinci sınıf gayrisıhhî müesseselerden yakıcı, parlayıcı, patlayıcı ve tehlikeli maddelerle çalışılan işlerle oksijen LPG dolum ve depoları, bunlara ait dağıtım merkezleri, perakende satış yerleri, akaryakıt ile sıvılaştırılmış petrol gazı, sıvılaştırılmış doğal gaz ve sıkıştırılmış doğalgaz istasyonları ve benzeri yerlere müsaade verilmezden evvel civarında ikamet edenlerin sıhhat ve istirahatleri üzerine gerek tesisatları ve gerekse vaziyetleri itibarıyla bir zarar vermeyeceğine kanaat oluşturulması için komisyonumuzca inceleme yapılmakta ve bu müesseselerin etrafında sağlık koruma bandı belirlenmektedir.*

8-*Sağlık koruma bandı mesafesi belirlenirken 09.09.2009 tarih ve 27344 sayılı Binaların Yangından korunması Hakkında yönetmelik ve yönetmelik ekindeki çizelgelerdeki mesafeler dikkate alınmaktadır.*

16. İstanbul İl Özel İdaresi



T.C.
İSTANBUL İL ÖZEL İDARESİ
Mali İşler Daire Başkanlığı

Sayı : 21263098-307– 40973 15.../08/2013
Konu : Bilgi Edinme –Dursun BAŞ

İNSAN KAYNAKLARI DAİRE BAŞKANLIĞINA
(Basın, Yayın ve Halkla İlişkiler Müdürlüğü)

İlgi : 13.08.2013 tarih ve 40335 sayılı yazınız.

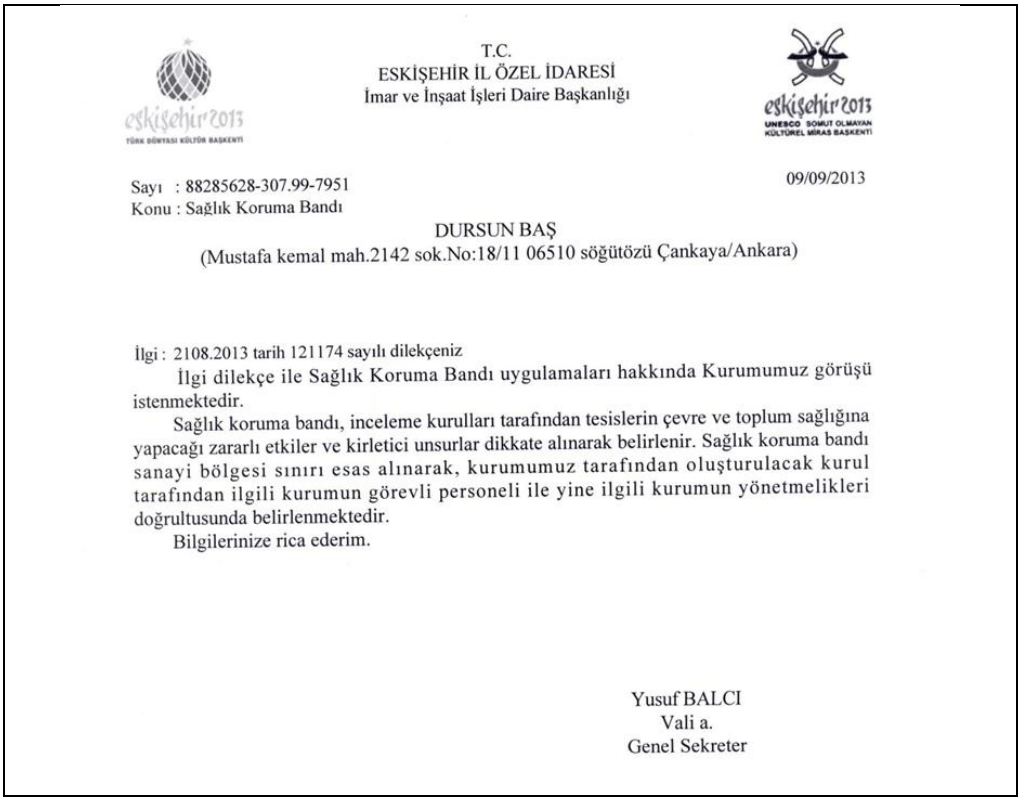
İstanbul Valiliği BİMER kanalıyla İdaremize bildirilen Dursun BAŞ isimli vatandaşın başvuru formu ilgi yazınız ekinde gönderilerek konuyla ilgili bilgi verilmesi istenilmiştir.

İlimiz hudutları dahilinde bulunan maden ruhsat sahaları için, İşyeri Açma ve Çalışma Ruhsatlarının düzenlenme süreci ve sonrasında ki iş ve işlemleri Maden Kanununun 7. Maddesinin 9. Fıkrası ***" Maden üretim faaliyetleri ile bu faaliyetlere dayalı ruhsat sahasındaki tesisler için işyeri açma ve çalışma ruhsatları il özel idareleri tarafından verilir."*** Hükmü doğrultusunda İşyeri Açma ve Çalışma Ruhsatlarına İlişkin Yönetmelik kapsamında yürütülmektedir.

Bilgilerinize rica ederim.

Sefer Ali KAPLAN
Mali İşler Daire Başkanı

17. Eskişehir İl Özel İdaresi



T.C.
ESKİŞEHİR İL ÖZEL İDARESİ
İmar ve İnşaat İşleri Daire Başkanlığı

Sayı : 88285628-307.99-7951
Konu : Sağlık Koruma Bandı

09/09/2013

DURSUN BAŞ
(Mustafa kemal mah.2142 sok.No:18/11 06510 söğütözü Çankaya/Ankara)

İlgi : 2108.2013 tarih 121174 sayılı dilekçeniz

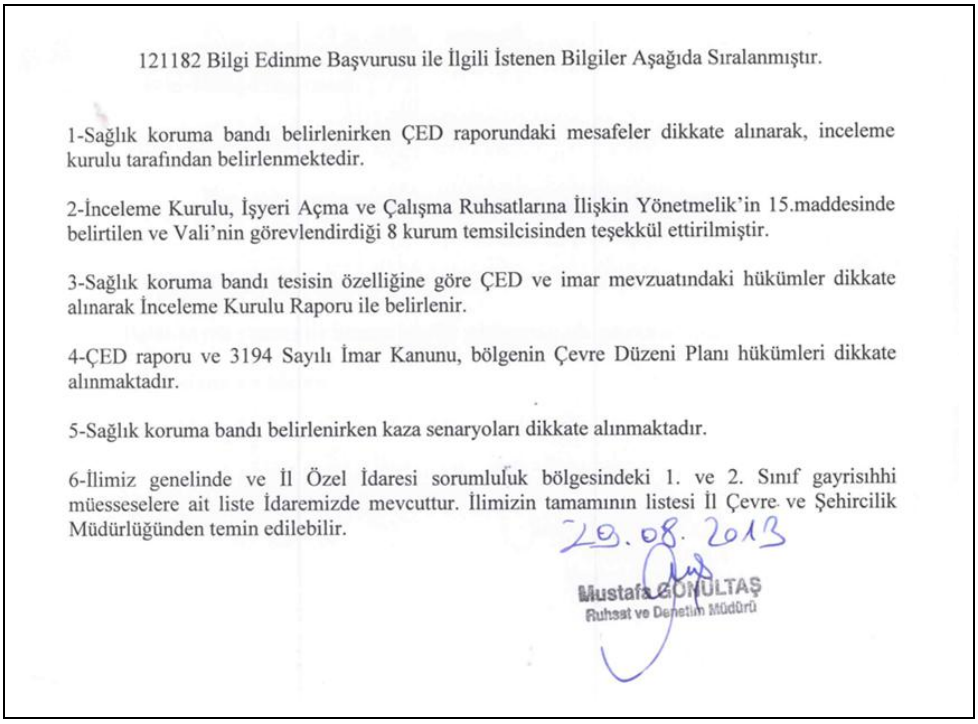
İlgi dilekçe ile Sağlık Koruma Bandı uygulamaları hakkında Kurumumuz görüşü istenmektedir.

Sağlık koruma bandı, inceleme kurulları tarafından tesislerin çevre ve toplum sağlığına yapacağı zararlı etkiler ve kirletici unsurlar dikkate alınarak belirlenir. Sağlık koruma bandı sanayi bölgesi sınırı esas alınarak, kurumumuz tarafından oluşturulacak kurul tarafından ilgili kurumun görevli personeli ile yine ilgili kurumun yönetmelikleri doğrultusunda belirlenmektedir.

Bilgilerinize rica ederim.

Yusuf BALCI
Vali a.
Genel Sekreter

18. Tekirdağ İl Özel İdaresi



121182 Bilgi Edinme Başvurusu ile İlgili İstenen Bilgiler Aşağıda Sıralanmıştır.

1-Sağlık koruma bandı belirlenirken ÇED raporundaki mesafeler dikkate alınarak, inceleme kurulu tarafından belirlenmektedir.

2-İnceleme Kurulu, İşyeri Açma ve Çalışma Ruhsatlarına İlişkin Yönetmelik'in 15.maddesinde belirtilen ve Vali'nin görevlendirdiği 8 kurum temsilcisinden teşekkül ettirilmiştir.

3-Sağlık koruma bandı tesisin özelliğine göre ÇED ve imar mevzuatındaki hükümler dikkate alınarak İnceleme Kurulu Raporu ile belirlenir.

4-ÇED raporu ve 3194 Sayılı İmar Kanunu, bölgenin Çevre Düzeni Planı hükümleri dikkate alınmaktadır.

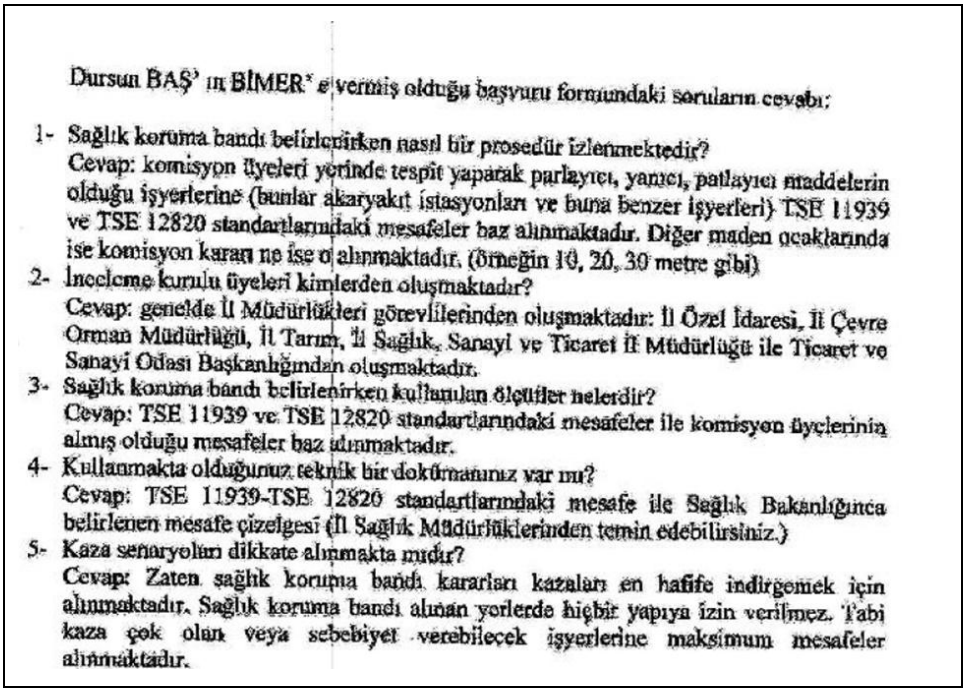
5-Sağlık koruma bandı belirlenirken kaza senaryoları dikkate alınmaktadır.

6-İlimiz genelinde ve İl Özel İdaresi sorumluluk bölgesindeki 1. ve 2. Sınıf gayrisıhhi müesseselere ait liste İdaremizde mevcuttur. İlimizin tamamının listesi İl Çevre ve Şehircilik Müdürlüğünden temin edilebilir.

20.08.2013

Mustafa GÖNÜLTAŞ
Ruhsat ve Denetim Müdürü

19. Kahramanmaraş İl Özel İdaresi



Dursun BAŞ' ın BİMER' e vermiş olduğu başvuru formundaki soruların cevabı:

1- Sağlık koruma bandı belirlenirken nasıl bir prosedür izlenmektedir?
Cevap: komisyon üyeleri yerinde tespit yaparak parlayıcı, yanıcı, patlayıcı maddelerin olduğu işyerlerine (bunlar akaryakıt istasyonları ve buna benzer işyerleri) TSE 11939 ve TSE 12820 standartlarındaki mesafeler baz alınmaktadır. Diğer maden ocaklarında ise komisyon kararı ne ise o alınmaktadır. (örneğin 10, 20, 30 metre gibi)

2- İnceleme kurulu üyeleri kimlerden oluşmaktadır?
Cevap: genelde İl Müdürlükleri görevlilerinden oluşmaktadır: İl Özel İdaresi, İl Çevre Orman Müdürlüğü, İl Tarım, İl Sağlık, Sanayi ve Ticaret İl Müdürlüğü ile Ticaret ve Sanayi Odası Başkanlığından oluşmaktadır.

3- Sağlık koruma bandı belirlenirken kullanılan ölçütler nelerdir?
Cevap: TSE 11939 ve TSE 12820 standartlarındaki mesafeler ile komisyon üyelerinin almış olduğu mesafeler baz alınmaktadır.

4- Kullanmakta olduğunuz teknik bir dokümanınız var mı?
Cevap: TSE 11939-TSE 12820 standartlarındaki mesafe ile Sağlık Bakanlığınca belirlenen mesafe çizelgesi (İl Sağlık Müdürlüklerinden temin edebilirsiniz.)

5- Kaza senaryoları dikkate alınmakta mıdır?
Cevap: Zaten sağlık koruma bandı kararları kazaları en hafife indirgemek için alınmaktadır. Sağlık koruma bandı alınan yerlerde hiçbir yapıya izin verilmez. Tabi kaza çok olan veya sebebiyet verebilecek işyerlerine maksimum mesafeler alınmaktadır.