A Risk Analysis Methodology and Perspective of Ammonia Transportation.

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There have been a number of concerns raised regarding the potential for catastrophic consequences related to the release of some of the large amounts of ammonia being transported into and through Haifa on a regular basis. Further, many parties claim there is a significant potential for these high consequences (injuries and fatalities). However, almost all of the arguments have been based solely on projected consequences, usually through the use of Acute Exposure Guidelines (AEGL). In order to appropriately understand the real impact, a complete risk assessment has to be undertaken and explored.

The Regional Environmental Center of Central Europe provides a definition of Hazard as the property of a substance or situation with the potential for creating damage. Risk is further defined as the likelihood of a specific effect within a specified period, and is properly the combination of probability and consequences. Risk is, however, much more complex than that, and requires a much more considered approach than just determining a downwind hazard. While consequences (usually actual predicted fatalities or injuries) is an important part of defining risk, there are additional parameters than cannot be ignored. Most risk analysis processes, consider risk as a function of the probability of an event (P), and the consequences associated with that event (C). [2] Often frequency of an event is substituted for the probability. In many low probability events, however, there are either limited or no statistics with which to formulate an appropriate quantitative model.

Of the possible risk analysis methodologies that might be used, the quantitative risk assessment (QRA) methodology was selected and utilized to analytically examine the different steps associated with five scenarios involving the import and distribution of ammonia, as well as providing a comparison of each of the proposed complete processes. Individual risks have been generated and will be presented, using previously generated ammonia plume descriptions using SCIPUFF coupled with published failure rate frequency data from the United Kingdom Health and Safety Executive..

An analysis of the key factors influencing the risk for each of the scenarios will be provided. The difficulties and challenges surrounding the development of a QRA involving several disparate intermodal methods, and combining them in a way to provide an accurate and realistic model of risk are also described.