

## **Report Summary**

### **The Subsurface-Water Rise and Emission of H<sub>2</sub>S**

H<sub>2</sub>S Hydrogen sulfide (or hydrogen sulphide) is a poisonous gas that is heavier than air. When H<sub>2</sub>S is emitted, it is found in deep areas. It has a strong and foul odor of rotten eggs. The gas is colorless and naturally exists in the environment. It may occur and emit when sulfide is dissolved by bacterial breakdown within wastes. It is obtained during the process of elicitation of groundwater.

The main reason for the occurrence of H<sub>2</sub>S in groundwater is the activities of sulfur reducing bacteria when isolated from air. These bacteria feed on sulfur as a source of energy hence formalizing H<sub>2</sub>S as a secondary outcome. Despite the fact that these bacteria do not cause diseases, they can impart taste and odor of the water.

The H<sub>2</sub>S emission in different areas of Kuwait is organically relevant to another phenomenon known as "The Subsurface Water Rise" in residential suburbs.

In light of SAB concern in environmental review process, an environmental audit program based on Subsurface water rise and H<sub>2</sub>S emission was implemented. The program aimed to reassure the assessment of the current situation and the extent of compliance given to the standards and stipulations related to eliminating gas emission and protecting the health and safety of the citizens and workers in such

locations. In addition to analyzing the assessment results of H<sub>2</sub>S concentration in the effected areas through the 2008 readings.

The inspection scope included the effected areas by the phenomenon of subsurface water rise and H<sub>2</sub>S emission in Sharq ( Ahmad Al-Jaber St.) and other State capital suburbs.

The report consisted of the following aspects:

Part one: H<sub>2</sub>S related risks

Part Two: Environmental stipulations to eliminate the concentration of H<sub>2</sub>S

Part Three: Evaluate the measurements conducted by different entities to eliminate the phenomenon

Part Four: outcomes of field visits

Part Five: Main conclusions and recommendations

A number of results was concluded with regard to the inspection goal:

1. The formed team under resolution No.186 of 2002 has not fully practiced its competence in line with its formation resolution which is to follow-up and eliminate H<sub>2</sub>S phenomenon, the team has not held any meetings since 2002.
2. H<sub>2</sub>S measurement results showed more rise in the gas concentration than the given standard during the inspection which could lead to critical health issues, as showed in the following diagram.
3. Lack of staff to perform inception in the related entities.

With accordance to SAB main conclusions, the following recommendations are issued:

1. The formed team to set environmental stipulations and precautionary measurements for eliminating H<sub>2</sub>S is to re-coordinate in order to review stipulations and determine the roles to be played by entities which would boost the inspection and eliminate the phenomenon. The Environment Public Authority should perform an effective role in the coordination process and follow-up between the members.
2. Giving immediate responses to the received complaints with regard to the effects of such phenomenon. In addition to the application of required solutions to overcome the problem through the interaction and coordination between the relevant entities via definite and clear work mechanism.
3. Spreading more environmental awareness especially among entities that conduct projects across H<sub>2</sub>S areas and emphasizing the importance of treating the groundwater.
4. Finding mechanism to force the investor to treat groundwater if high levels of dissolved sulfide is detected.