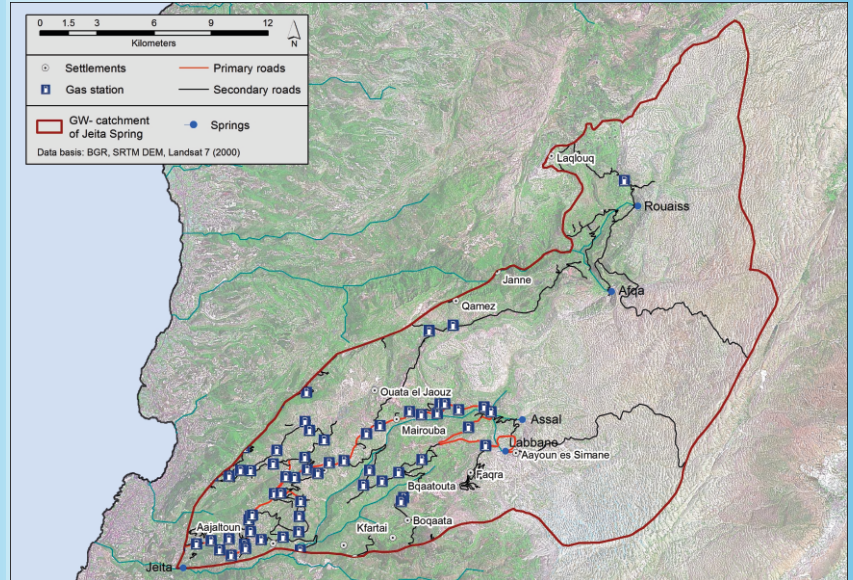


Hazards to Groundwater: Gas Stations

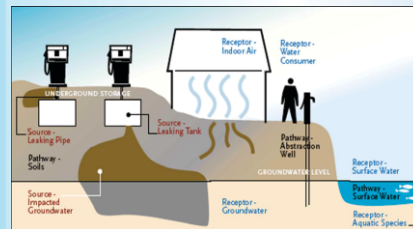
Protection of Jeita Spring

I. Introduction

- The GW catchment of Jeita spring (JSC) is subject to intense and uncontrolled urban development.
- High density of gas stations: 83 stations/100,000 inhabitants.
- The majority of stations is not in accordance to legal standards: risk of infiltrating petroleum is very high.
- Underground oil tanks and spills on the surface account for oil & other hazardous chemicals, such as benzene & methyl-tertiary-butyl ether (MBTE).
- Due to intensive karstification groundwater resources are extremely vulnerable to pollution.
- Risk of petroleum leakage into the aquifer results in a severe threat to the water consumer.



High density of gas stations exists mainly in the lower part of the JSC.



Contamination flow towards groundwater.



Lack of public health awareness.

II. Problem Statement

- Leaking storage tanks at gas stations are a major threat to GW.
- When reaching GW, petroleum contaminates large quantities of water. Petroleum contamination is neither monitored nor treated by Beirut & Mount Lebanon Water Establishment (WEBML).
- No laboratory in Lebanon is properly equipped to monitor such contamination.
- Petroleum products in water may not be detectable but can severely affect human health.
- Lack of proper liquid wastes drainage and collection/treatment systems;
- Waste disposal (solid & liquid) in the environment without previous treatment;
- Improper storage facilities (fuel and wastes);
- Ignorance of sound environmental management practices;
- Deficient drainage systems (improper design & lack of maintenance).



Production of single layer tanks.

Specific problems of gas stations:

- Gas stations do not comply with national standards (underground storage tanks [UST], pipelines and maintenance);
- Age: mostly > 15 years;
- Single layered tanks, instead of double-layer tanks;
- No proper leakage detection system;

Problems related to the governance system:

- Insufficient control by relevant entities due to lack of staff;
- Lack of technical knowledge and infrastructure;
- Construction of UST without governmental control;
- No inspections during operation;
- Many gas stations are operated without any permit.



Gas station in the catchment.



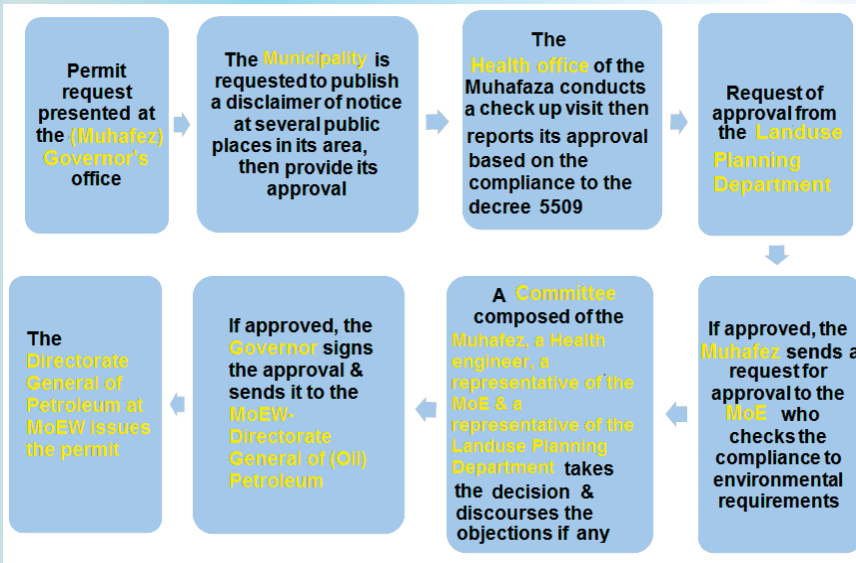
Improper closure of tank.



Hazards to Groundwater: Gas Stations

Protection of Jeita Spring

III. Permitting System



Phases of the gas stations permitting process.

- Complicated licensing process.
- Mainly based on unclear rudimentary urban planning considerations disregarding groundwater protection issues.
- Non-transparent decisions and evaluation criteria, involving too many parties.
- Non abidance to the municipal law no. 118 dated 30/6/1977 that gives the municipality a mandatory decisive role in the permitting process.
- Overlapping responsibilities between stakeholders.
- Lack of control on decisions.
- No requirement of Environmental Impact Assessment (EIA) prior to construction.

IV. Legal Framework

- Current guidelines on gas stations lack details regarding leakage alarm devices, leakage receptive devices & drainage; these should be included in an updated decree.
- Related laws miss enforcement decrees (e.g. environmental police), which should be empowered to impose penalties.
- Too many stakeholders involved in this sector with unclear definition of responsibilities, roles and duties.

V. Generated Wastes & Hazards

Waste generated by gas station	Hazardous Components
Antifreeze	Methanol, ethylene glycol
Battery acid	Sulfuric acid
Degreasers	Petroleum solvents, alcohols, glycoether, volatile organic compounds
Engine & radiator flushes	Chlorinated hydrocarbons, toluene, phenols
Hydraulic (brake) fluid	Ddichloroperchloroethylene
Motor oil, grease, lubes	Hydrocarbons, fluorocarbons
Gasoline (gasoline, diesel, petrol, kerosene etc.)	Hydrocarbons
Fuel	Hydrocarbons, Methyl Tert Butyl Ether, Heavy metals, etc.
Rustproofers	Hydrocarbons
Transmission fluid (automatic)	Hydrocarbons
Car wash detergent	Phenols, heavy metals
Car wax or polish	Petroleum distillates, xylene
Equipment from the replacement & decommissioning of tanks & pipe work	Hydrocarbons, fluorocarbons
Oily sludge from oil tank cleaning & oil/water separators	Hydrocarbons, fluorocarbons, heavy metals

VI. Prevention of Contamination

- New gas stations should not be allowed in areas of high GW vulnerability.
- A full EIA must be submitted before allocating the permit.
- Site design must include drainage systems, spill containment, incl. dispensing means.
- Conduction of environmental audit to assess the compliance of the existing gas stations with environmental

guidelines (storm water management, spill containment). Non-compliant stations must be closed following a fair compensation.

- A periodic inspection of release prevention & detection systems must be carried out by relevant entity.

Need for:

- Establishing public policies designed to the environ-

- mental planning;
- Improving rules & laws, related to the control and prevention of leakage & dispersion in fuel underground storage tanks;
- Raising awareness and knowledge of communities about problems and risks;
- Reinforce public policies, WEBML laboratories and research agencies, regarding gas stations.

