







| Situation                      | Image   | Importance   |
|--------------------------------|---|--|
| 1 Between cement and casing    |    | Contact stresses; interface shrinkage; deteriorated bond                               |
| 2 Between cement and casing    |  | Contact stresses; interface shrinkage; deteriorated bond                               |
| 3 Through the cement           |  | Insufficient mixing; unfinished hydration; pore system; high permeability; degradation |
| 4 Through the casing           |  | Casing erosion (solid particle/slurry erosion)   |
| 5 Through fractures in cement  |  | Cracked cement   |
| 6 Between cement and formation |  | Contact stresses cement/rock, developed during cement slurry setting                   |

Table 4.1: Possible flow paths in a deteriorated well; note situations 3 and 5<sup>23</sup>