REMEDIATION AND RESTORATION OF A HISTORIC BRINE SCAR – WHAT WENT WRONG?

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A significant problem associated with the exploration of petroleum is spillage of produced water or brine, because a high level of salt in brine can be fatal to plants and represents a potential source of contamination of surface waters. Accidental releases of brine due to human error or equipment failure are the two main factors that are currently responsible for brine contamination. However, surface discharge of brine was once common practice and has left a legacy of historic brine scars. Brine scar remediation and restoration presents us with a challenge on both the environmental and the economic front. Remediation of historic brine scars requires mobilization of the salt out of the root zone either vertically of laterally. If salt moves downward out of the root zone, but remains under the root zone, capillarity can result in the movement of salts vertically and recontamination of the upper parts of the soil column. This paper examines a remediation effort at a historic brine scar in Osage County, OK. The site was initially remediated in the summer of 2005 using hay and fertilizer (authors were not associated with this remediation effort). However, recontamination of remediated soil due to capillarity has been recently observed coupled with a loss of vegetation which initially had reappeared at the site. The site has been under investigation to determine the root cause of this recontamination. Our investigation suggests that a lack of drainage from the site, due to underlying clay and the site topography, have prevented the net loss of salt from the site. Therefore, this salt still presents a threat to the plant root zone. Potential solutions to this problem will also be addressed.