

EVOLUTION OF PLATE TECTONICS OF THE NORTHEASTERN JUNGGAR BASIN AND ITS CONTROL OVER OIL AND GAS

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Abstract

The Junggar Basin is a large superimposed basin based on a Pre-Cambrian massif. Since the Cambrian, the plate tectonic evolution of the northeastern Junggar Basin can be divided into 4 periods as follows,

1. The passive continental margin phase (Pz_1);
2. The transform phase from passive continental margin to continental collision (D_1-C_1);
3. The collision foreland basin phase (C_2-P_1);
4. The downwarping inland phase (P_2-Q).

The evolution of plate tectonics controlled the development of the sedimentary basin. Corresponding to the plate tectonic history, the northeastern Junggar Basin consisted of a miogeoclinal prism ($E-C_1$), a collision foreland basin (C_2-P_1), and a downwarping basin (P_2-Q) etc.. They gave abundant organic material for the formation of petroleum.

The evolution of plate tectonics also controlled the geometric shape, the structure, the sedimentation and the thermal evolution of the basin, and so thus controlled the generation, migration and accumulation of oil and gas.

周口盆地两口探井首次试获油流

石油工业部河南石油勘探局, 最近在周口盆地的两口探井中, 首次在中生界下白垩统中试获油流; 同时, 在三口探井的上古生界石炭、二叠系中获良好天然气显示。

周12井位于沈丘凹陷的双楼田鼻状构造上, 完钻井深4100m。该井自1489m进入下白垩统, 2290m以下出现大套灰色泥岩夹砂岩, 至井底未钻穿。2490m开始见油气显示, 共有油斑、油迹细砂岩8层, 总厚30m。突出的特点是泥浆槽面油气显示好, 有5层槽面见大量油花和气泡, 其中有一层油斑细砂岩, 钻进中油花、气泡占槽面50—70%, 高潮时铺满槽面, 气测有明显异常。

针对良好油气显示层段, 及时进行了中途测试, 日产油3.86t。原油性质好, 比重0.86, 粘度9.06pa·s(50℃), 含胶质沥青质6.57%、蜡17.24%、硫0.11%, 凝固点29℃。现对该井正进行系统试油, 准备采取大型酸化压裂增产措施。

周10井位于沈丘凹陷的姜堤构造上, 完钻井深3368m。该井自2144m钻入下白垩统, 3038m钻入中、下侏罗统, 3274m钻入元古界花岗片麻岩。该井共有油气显示36层, 总厚75m, 其中三层于泥浆槽面见油花和气泡。完钻后对可疑油层进行试油, 日产油3L, 经初步酸化压裂后, 日产油32L, 累计产油1.64t。原油比重0.88, 粘度27.7pa·s(50℃), 含胶质沥青质22.5%、蜡10.7%, 凝固点23℃。

近期还在周7井、周13井和襄5井的石炭、二叠系发现良好天然气显示, 槽面见大量气泡, 气测有明显异常, 测试中获一定的天然气。经分析天然气比重0.5895, 含甲烷91.39%, 氮8.61%。

最近周12井、周10井试获油流, 三口探井获良好天然气显示, 是周口盆地普查勘探的重大发现, 对于深入进行油气资源评价和进一步选定重点勘探地区具有重要意义。

(徐世荣)