



**Sudan University of Science and Technology**  
**College of Petroleum Engineering and Technology**  
**Petroleum Engineering Department**

Graduation project submitted to College of Petroleum Engineering and  
Technology for partial requirement for B.Sc. degree in Petroleum  
Engineering

## **Chemical Huff and Puff Design**

**(Case Study, Bamboo Oil Field - Sudan)**

**تصميم طريقة (Huff and Puff) الكيميائية**

**(دراسة حالة، حقل بامبو النفطي – السودان)**

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September 2014

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لَا إِلَهَ إِلَّا اللَّهُ  
مُحَمَّدٌ رَسُولُهُ

﴿ قُلْ إِنَّ صَلَاتِي وَنُسُكِي وَمَحْيَايَ وَمَمَاتِي لِلَّهِ رَبِّ الْعَالَمِينَ ﴾

الأنعام: ١٦٢

Say, "Indeed, my prayer, my rites of sacrifice, my living and my dying are for Allah, Lord of the worlds. Holy Qur'an 6:162

# Dedication

*To our parents, brothers and sisters*

*Their words of inspiration and encouragement*

*in pursuit of excellence, still linger on.*

# Acknowledgment

We are glad to be your student millions thanks to you, as you gave us the strength to continue our work, and you become our guidance in that long way. Without your help our work won't see the light. Your inspiration, direction and funny humor you treat us with when we make stupid mistakes, for all that and more we appreciate everything, and every minute you spent in reading, revising and correcting our work.

Thank you

**Dr. TagwaAhmed Musa**

Some people work in the dark few people knowing them and their value. They are great asset and the humanity needs more of them. YOU are from them for helping us and waiting for nothing as reward. Without your technical help in CMG software, we won't be here today with this work.

Thank you

**Eng. HishamA wadAlseed Ali**

At last and not least we want to give our thanks to the college that raise us during those five years. We consider it as home land for us. And how much successful we are in the future, we will not forget from where our success starts.

Thank you

**College of Petroleum Engineering & Technology**

## **Abstract**

EOR methods are used extensively nowadays for increasing ultimate oil recovery and the effectiveness of each method depends on the characteristics of the reservoir.

The target of this study is to determine the optimum parameters for design surfactant concentration, and total volume of water injection.

The study started by collecting data from BB-23well which is located in main Bamboo oil field. Then the data introduced to CMG (computer modeling group) software. The study results shows that the optimum inject rate is 120 m<sup>3</sup>/day, the soaking period is 5 days ,the injection duration is 10 days ,the surfactant concentration is 0.1 and the total volume of injected fluid is 1200 m<sup>3</sup>.

### **Key Words:**

Reservoir Engineering, EOR, Huff and Puff, Surfactant, Bamboo, CMG.

# التجريد

طرق الاستخلاص المحسن تستخدم حاليا على نطاق واسع لزيادة الاستخلاص النفط وكفاءة كل طريقة تعتمد اعتمادا كليا على خواص المكن الخاضع لعملية التحسين .

الهدف من هذه الدراسة هو التحديد الأمثل لمتغيرات التصميم لعملية ( Huff and Puff)الكيميائية (chemical huff and puff) متضمنة فترة الحقن وزمن إغلاق البئر وتركيز الـ (surfactant) والحجم الكلي للماء المحقون.

الدراسة بدأت بجمع البيانات من البئر-23 الموجود في حقل بامبو الرئيسي ، بعد ذلك تم إدخال البيانات ومعالجتها عن طريق برنامج الـ(CMG) .

أخيرا تم التصميم بناء على اختيار أفضل السيناريوهات لكل متغير. أظهرت النتائج بأن أفضل معدل حقن هو 120 متر مكعب لكل يوم، بفترة نقع 5 أيام، وفترة حقن 10 أيام، ومعدل (surfactant) 0.1 ، وحجم محقون كلي للسائل 1200 متر مكعب.



# Contents

## **Chapter 1**

1.1.General Introduction .....	1
1.2. Problem Statement .....	5
1.3. Objectives of the Study .....	5
1.4. Introduction to the Case Study .....	5
1.5. Thesis out Lines .....	6

## **Chapter 2**

2.1. Literature Review .....	8
2.1.1. Overview of EOR history in Sudan .....	9
2.2. Enhance Oil Recovery .....	10
2.2.1 Chemical Enhanced Oil Recovery .....	11
2.2.1.1 Polymer Flooding .....	11
2.2.1.2. Surfactant Flooding .....	13
2.2.2. Thermal Recovery Process .....	15
2.2.2.1. Heat losses during steam injection .....	16
2.2.2.2. Steam injection .....	17
2.2.2.3. Cyclic steam stimulation .....	17
2.2.2.4. In-situ combustion .....	18
2.2.3. Miscible Fluid Displacement.....	18
2.2.3.1 Carbon Dioxide injection .....	19

2.3.1. Mobility Ratio .....	24
2.3.2. Capillary pressure .....	25
2.3.3. Water Fingering and Tonguing .....	25
2.3.4. Displacement and sweep efficiency .....	25
2.4. Economics .....	27
2.5. Screening Criteria .....	27

### **Chapter 3**

3.1 Introduction to CMG .....	30
3.2 Reservoir Description in CMG .....	30
3.3 STARS .....	32
3.4 Steps to Get Results .....	35
3.5 Result and Finishing .....	41

### **Chapter 4**

4.1. Introduction .....	43
4.2. Data required .....	43
4.2.1. Rock Properties .....	43
4.2.2. Fluid properties .....	44
4.2.3. Initial condition .....	45
4.3. Concentrations of Surfactant .....	45
4.4. Fluid Injection Rate .....	50
4.5. Fluid Injection Period .....	52
4.6. Soaking Period .....	54
4.7. Total volume injected .....	56

## **Chapter 5**

5.1. Conclusions ..... 58

5.2. Recommendations ..... 59

## List of Figures

### Chapter 1

Fig. 1.1: Oil Reserves Classification and EOR Target and Path ...	3
Fig.1.2. Improved Oil Recovery (IOR) Processes .....	6

### Chapter 2

Fig.2.1: EOR Processes .....	11
Fig. 2.2: Chemical EOR .....	13
Fig.2.3: The Process of Polymer Flooding .....	14
Fig.2.2: the Effect of the Polymer in Enhance the Sweep Efficiency .....	14
Fig.2.3: Schematic of Surface-Active Molecule .....	15
Fig.2.4: Surfactant Flooding Mechanism .....	17
Fig.2.5: Illustrate the Alkaline Flooding Process .....	18
Fig.2.6: Illustrate the Process of ASP .....	19
Fig. 2.3: Thermal EOR .....	21
Fig.2.7: Steam Flow in Cyclic and Steam Drive Project .....	21
Fig.2.8: Three Periods of Cyclic Steam Stimulation .....	23
Fig.1.6: Illustrate The Miscible EOR.....	24
Fig. 2.9: The Process of CO <sub>2</sub> Injection .....	25
Fig.2.10: Show The Process of Nitrogen Injection .....	27
Fig.2.11: Show (HC) Injection Process .....	28
Fig.2.12: Show (H <sub>2</sub> ) Injection Process .....	29

Fig.1.7: Show Both Vertical and Areal Sweep Efficiency .....	32
Fig.1.8: Methods of EOR According to Viscosity and Pressure .....	34
Fig.1.9: Method of EOR According to Viscosity and Permeability .....	34

### **Chapter 3**

Fig. 3.1: Selection of Process.....	42
Fig.3.2: Choosing of process .....	43
Fig.3.3: Process screen.....	43
Fig. 3.4: Flood model selection .....	44
Fig. 3.5: Select Options for flood model .....	44
Fig. 3.6: Component Selection .....	45
Fig. 3.7: Set Rock Fluid Regions .....	45
Fig. 3.8: Set Interfacial Tension Values .....	46
Fig.3.9: Set Adsorption Value.....	46
Fig. 3.10: Various Report type .....	47

### **Chapter 4**

Fig.4.1: Illustrate Launcher Main Window.....	45
Fig.4.2: builder – Reservoir Simulator Setting Window .....	52
Fig.4.3. BB-21_Inj in Well & Recurrent .....	53
Fig.4.4: Well Event Window .....	54
Fig.4.5: Validate With STARS button to start the simulation .....	55
Fig.4.7: How Fluid Injection Rate Can be Change In Well Event Window.....	57

Fig.4.8: Different Injection Rate and Their Effect on Cum. Water & Oil production .....	59
Fig.4.9: Different Injection Period and Their Effect on Cum. Water & Oil Production .....	61
Fig.4.10: How We Can Change Soaking Period In Well Event Window .....	62

## List of Tables

Table 4.1: Rock Properties For BB-21 Well .....	43
Table 4.2: Property of Water Phase .....	44
Table 4.3: Property of Oil Phase .....	45
Table 4.4: Initial Condition of Reservoir.....	45
Table 4.5: Iteration of Surfactant Concentration .....	48
Table 4.6: Different Surfactant Concentration and their Corresponding Cum. Oil & Water .....	49
Table 4.7: Cumulative Oil and Cumulative Water Produced for Each Injection Rate.....	51
Table 4.8: Iteration for Injected Period and the Optimum One Is Bolded .....	53
Table 4.9: Iteration for Soaking Period and the Optimum One is Bolded .....	55
Table5.1: Cumulative Oil Difference (%) between the optimum parameter & average.....	58
Table 5.2: Optimum parameter.....	58