

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
9 December 2004 (09.12.2004)

PCT

(10) International Publication Number
WO 2004/106974 A3

(51) International Patent Classification⁷: G01V 1/28

HUH, Chun; 7510 Stonecliff Drive, Austin, TX 78731 (US). SUN, Tao; 2106 Westshore Drive, Missouri City, TX 77459 (US).

(21) International Application Number:
PCT/US2004/015896

(74) Agents: KATZ, Gary, P. et al.; ExxonMobil Upstream Research Company, P.O. Box 2189, Houston, TX 77252-2189 (US).

(22) International Filing Date: 20 May 2004 (20.05.2004)

(25) Filing Language: English

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(26) Publication Language: English

(30) Priority Data:
60/472,884 23 May 2003 (23.05.2003) US

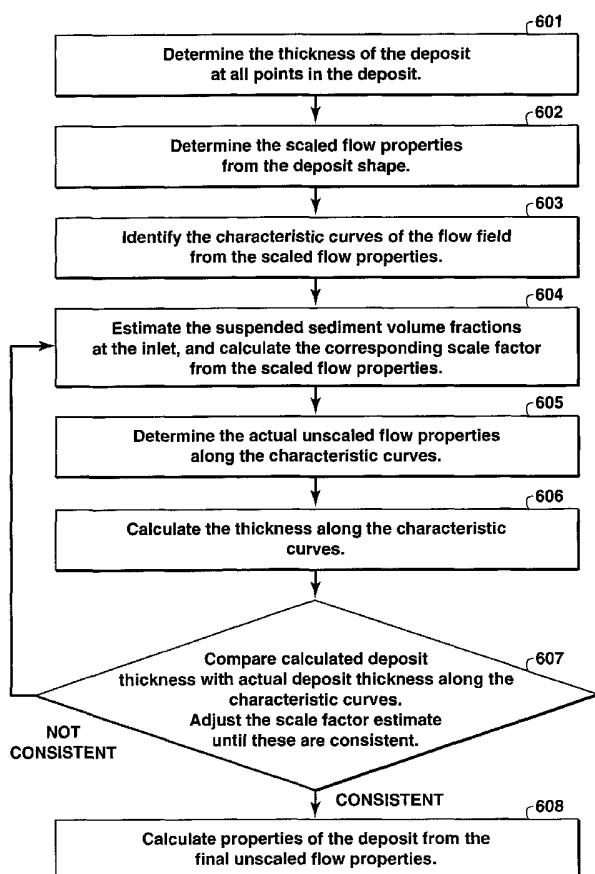
(71) Applicant: EXXONMOBIL UPSTREAM RESEARCH COMPANY [US/US]; P.O. Box 2189, Houston, TX 77252-2189 (US).

(72) Inventors: DEFFENBAUGH, Max; 14822 Flowerwood Drive, Houston, TX 77062 (US). VAN WAGONER, John, C.; 4115 Merrick Street, Houston, TX 77025 (US).

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,

[Continued on next page]

(54) Title: METHOD FOR PREDICTING GRAIN SIZE DISTRIBUTION FROM THE SHAPE OF A SEDIMENTARY BODY



(57) Abstract: The internal properties of a water-lain sediment body can be determined from the shape of the deposit. One method comprises solving equations relating the shape of a sediment body to the flow field that produced the body and using the flow field to solve for the sediment body properties in at least one point within the body. The flow field properties include flow velocity, suspended sediment volume fractions, deposition time, and flow height. The properties of the water-lain sediments include, in addition to the flow properties associated with deposition of the sediments, the thickness of the sediment body, the size of the body, the shape of the body, and the grain size distribution at points within the body.

WO 2004/106974 A3



ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(88) Date of publication of the international search report:
23 June 2005

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Published:

- *with international search report*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US04/15896

A. CLASSIFICATION OF SUBJECT MATTER		
IPC(7) : G01V 1/28 US CL : 702/2		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols) U.S. : 702/2, 14; 703/9, 10		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched NONE		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) EAST using (sediment\$ WITH flow WITH shape)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5,563,513 A (TASCI et al) 08 October 1996, see abstract.	1
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.		
* Special categories of cited documents:		
"A"	document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E"	earlier application or patent published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O"	document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P"	document published prior to the international filing date but later than the priority date claimed	
Date of the actual completion of the international search 03 August 2004 (03.08.2004)		Date of mailing of the international search report 28 APR 2005
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (703) 305-3230		Authorized officer Donald E. McElheny, Jr. <i>Sham S. Huppe</i> Telephone No. 571-272-1750

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US04/15896

Box III TEXT OF THE ABSTRACT (Continuation of Item 5 of the first sheet)

The technical features mentioned in the abstract do not include a reference sign between parentheses (PCT Rule 8.1(d)).

NEW ABSTRACT

The internal properties of a water-lain sediment body can be determined from the shape (401, 501) of the deposit. One method comprises solving equations relating the shape of a sediment to the flow field (603) that produced the body and using the flow field to solve for the sediment body properties (604) in at least one point within the body. The flow field properties include flow velocity, suspended sediment volume fractions, deposition time, and flow height. The properties of the water-lain sediments include, in addition to the flow properties associated with deposition of the sediments, the thickness of the sediment body, the size of the body, the shape of the body, and the grain size distribution at points within the body.