Status of Lift Systems for Polymetallic Nodule Mining

John E Halkyard

There has been a lot of development in the offshore industry related to risers and subsea technology since the early nodule mining research in the 1970s. Related technology includes deepwater top tensioned and steel catenary risers operating in large current, downhole submerged electrical submerged pumps operating at power ranges required for lifting of nodules and a plethora of new technology such as high performance marine connectors and pipe, subsea mud pumping, controls and umbilicals, all of which are enabling for the development of reliable deep sea mining systems. This paper will present of a review of the most important of these technologies and how they might be used for nodule recovery.

About the Author

John E. Halkyard began his career by leading the deep ocean mining system development effort for the Kennecott Consortium in the 1970's. Since then he has focused on the deepwater oil & gas industry. In the 1980's he formed his own consulting company and worked with Chevron to help develop a Tension Leg Platform design for Offshore California. He teamed with Ed Horton at Deep Oil Technology, Inc. (DOT) in 1988 were he helped develop and implement the first spar designs for deepwater drilling and production. He has been working on large spar designs for offshore drilling and production ever since. After the success of the spar and the acquisition of DOT, his employers have included Aker Maritime, CSO-Aker and finally Technip. He left Technip in 2007 and is now an independent consultant operating as John Halkyard & Associates in Houston, Texas. Currently he is serving as a Sr. Visiting Fellow at the National University of Singapore where he is teaching and doing research on floating structures, moorings and risers. This is his second appointment at NUS. He has also served as Visiting Fellow at the University of Western Australia, Centre for Oil & Gas and is a Visiting Professor at the Harbin Engineering University, Harbin, China.

Dr Halkyard received his B.S. in Engineering Science from Purdue University, and his M.S. and Sc.D. in Ocean Engineering from the Massachusetts Institute of Technology. He is a Fellow of ASME and a member of SNAME. He is a registered mechanical engineer in California.

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