

**APPENDIX A Summary of JVOPS Lead Engineer Professional Credentials**

**Flemming Hvidbak** has 20 years of experience within the oil spill industry. He holds a B.S. in mechanical engineering and management along with a marine engineer education. He started his oil spill career with DESMI in 1984 and until 1997 he was in charge of the design of DESMI's range of oil spill equipment, among which especially the high viscosity off-loading pump DOP-250, the DESMI-250 and the DESMI-TERMINATOR vertical Archimedes' screw skimmers, and the DESMI Mini-Max center float skimmer have been distributed to the oil spill industry world wide. Up to 1991 he was furthermore DESMI Environmental's regional sales manager for North- and South America, and he established – on behalf of DESMI in Denmark – DESMI INC. in the US in 1991 and was its president for the first three years, supporting the US oil spill industry in the hectic years in the aftermath of Exxon Valdez and OPA 90. From 1993 he became the head of DESMI Environmental in Denmark.

In 1995 Flemming Hvidbak was the catalyst in the formation of Ro-clean DESMI, which is a joint venture between the environmental divisions of Roulunds (Ro-Clean) and DESMI (Desmi Environmental). From 1995 to 1997 he served as International Project Manager, responsible for DESMI's activities within the field of on-shore remediation of oil polluted land, especially pit-cleaning. In cooperation with an Ecuadorian company, joint-venture companies were formed in Panama, Ecuador, and Venezuela and he served as director in each of these companies.

In 1997 Flemming Hvidbak established his own consulting company, flemingCo environmental aps, and has since then primarily focused on solving problems related to the response to spills and incidents with emulsified fuel and other high density oils. His accomplishments as independent consultant up to 2004 have been:

- Lead Engineer for the Sixth Joint US and Canadian Coast Guards and Industry Viscous Oil Pumping System Testing (JVOPS 6), 2002-2004.
- External Technical Consultant to Bohai Environmental Service, Ltd., Tanggu, China, the largest oil spill response organization in China. A Tier 2 Oil Spill Response Center in Tanggu has been established and two satellite bases around the Bohai Sea are planned, 2003 – ?
- Design of a new vertical Positive Displacement Archimedes' Screw Pump range for LAMOR Corporation in Finland. The GT-A series incorporates pumps with flemingCo type built-in inlet side steam/hot water injection and capacities from 20 to 140 m<sup>3</sup>/h (88 to 616 USgpm) and a maximum pressure of 12 bar (174 psi), 2002-2003.
- Design of the new LAMOR LWS Weir Skimmer range for LAMOR Corporation in Finland, with capacities from 20 to 140 m<sup>3</sup>/h (88 to 616 USgpm), 2002-2003.
- Development and test of extreme viscosity pumping tools and techniques, based on inlet side steam/hot water injection flanges, which now are available from the respective pump manufacturers. Range up to above 3 million cSt. The new tools have been developed for:
  - DESMI DOP-250 and 160 pumps in 2001, including testing.
  - CCG GT-185 pump in 2002, including the design of a new high pressure/high temperature plate wheel and participation in testing with CCG on 2 million cSt bitumen in Ottawa.
  - LAMOR GT-A pump series in 2002

- CCG GT-260 pump in 2003, including the design of a new high pressure/high temperature plate wheel.
- Tank tests of mechanical feeder skimmers on cold bitumen in the 2 to 3 million cSt range, under contract with Bitor America Corporation.  
The tested skimmers are:
  - KLK and UNISEP Skimmers in 1999
  - ERE, AXIOM, and KLK 1999  
(tested in cooperation with the Canadian Coast Guard, SAIC, and Environment Canada)
  - DESMI Belt Skimmer in 2001
  - LAMOR Brush Belt Skimmer in 2002
- Determined, under contract with Bitor America Corporation, the Recommended Spill Response Equipment Packages for Orimulsion® Marine Terminals, 2000.
- Developed and successfully tested, under contract with Bitor America Corporation, new response equipment for rapid mechanical reflation of spilled Orimulsion®. Equipment which also may have potential for the reflation of sunken oil, 2000.
- Tested and verified, under contract with Bitor America Corporation, the potential of sonar for the underwater detection and monitoring of spilled Orimulsion® and other non-floating oils, 1999.
- Participation in the first USCG VOPS Workshop in Seattle, 1999.

Flemming Hvidbak has been active in oil spill clean-up operations, both off- and on-shore and has carried out oil spill response training courses in numerous countries in five continents. He has prepared a number of reports on viscous oil response equipment testing and has made numerous presentations at international oil spill conferences in USA, Canada, Europe, and the Far East.