

APPENDIX C JVOPS Workshop Planning Summary

The following has been listed in note form and summarizes the main topics that the JVOPS Workgroup has considered, discussed, and decided on each month throughout the preparation phase from March 2002 to December 2003. Major events and observations are likewise listed. Other major topics such as test oil, test tanks, chilling, test venue, etc. have been covered in detail in chapter 5 of the Final Report.

March 2002

Interspill 2002 / IMO R&D Forum, Brest, France: An informal workgroup was formed (M. Drieu, P. Nourse, J. Mackey, F. Hvidbak) and a different approach to the JVOPS testing came up with stringent viscosity control, a different oil-water separation concept, and a concept for limiting the amount of required test hose without compromising the amount of test runs.

May 2002

The Canadian Coast Guard expressed its interest in joining the project. The fifth VOPS workshop took place at Cenac Towing, Inc. in Louisiana. The facility in Houma had during that workshop proved very useful for testing and with the interest in the testing, as expressed by the facility owner, as well as the in kind services that could be provided to the project by the facility, it seemed that there now was an alternative to testing at OHMSETT.

June 19, 2002

The JVOPS Workgroup had its first telephone conference on the coming workshop. The JVOPS Lead Engineer was appointed and it was decided to have the Lead Engineer develop a new test strategy and test plan that would meet the combined requirements of the US and Canadian Coast Guards. It was also decided to go for the Cenac Towing Facility in Houma to host the workshop.

August 2002

Cenac Towing suggests to the project a Carbon Black product for testing. Product samples were analyzed at SAIC Canada. The analysis indicate this product may be suitable for USCG testing under Louisiana winter conditions if moderate cooling is applied, but will require significant cooling for CCG testing. Bitor cannot provide bitumen for testing. Clarified Slurry Oil analyzed (70,000 cP @ 15 C) and found in same range as Carbon Black. The Group continued the search for a suitable test product. Heavy Bunker C was found to require too much cooling to reach desired viscosities. Letter sent out to oil companies and bunker suppliers in the US and Canada in search of suitable test oil. Search for bitumen in Alberta, Canada for CCG test section.

September 2002

Bohai Oil Production Company, China was approached for possible supply of extremely viscous crude oil. Lamor signs up as interested in having a new PDAS pump development tested. Presently JVOPS Workshop scheduled for January 2003. River water in Houma to be used for water lubrication. Cannot use salt water due to contamination of oil and consequently added costs of disposal. Search started for suitable water lubrication pumps. All potential test oils have higher density than fresh water, which excludes indirect cooling of test product after use by dumping into cold water tank and then skim off for oil/water separation. Direct cooling on/in oil tanks only option. Lead Engineer presents to the group the first version of the Technical Approach Strategy (TAS). Review and adoption of the TAS would be decided at an on-site meeting at the Cenac facility and a poster presentation and soliciting support were sought at the Clean Gulf Conference, Galveston Texas. Decision on Slurry Oil for USCG testing. Bohai Oil Production Company agrees to supply oil to project for CCG test section at no cost. They will not handle shipping. Testing dates moved to March 2003.

October 2002

Continued work on making the required amount of test hose available as per the TAS requirements (Hydrasearch). Sources to be USCG and US Navy. LAMOR China offers to pay for shipping of Bohai oil. Still concerns about proposed slurry oil. Information on test equipment and data acquisition equipment starts coming in. Design of revised AWIF for comparison testing w. standard VOPS AWIF. Decision on high torque hydraulic motors on all USCG and CCG test pumps. Design of heating coils for DOP-250/GT-185. Decision on LAMOR and ERE skimmers for oil-water separation. Search for standard steam cleaners with large enough capacity to meet test requirements as to hot water injection rates.

November 2002

An on-site workgroup meeting took place in Houma, LA where the group also met with chiller and tank rental representatives. CCG and SAIC Canada conduct pre-testing with DOP-250 in Ottawa using 200,000 cSt bitumen for investigation on possible intake slippage. Slippage first occurred at 11 m³/h without inlet side steam/hot water injection while product flow and hydraulic flow were proportional up to 25 m³/h with inlet steam (Figure 3). The maximum capacity possible with the available power source was 25 m³/h. The workgroup decided that the offer of the viscous crude oil from Bohai Oil Production Company, China, must be declined due to logistic problems. Strain on getting substitute test oil from Canada. Identified sources for supplying the required test and holding tank infrastructure. Liquid N₂ considered as an alternative for oil cooling. First drawings of the swift hose add-on system (SHAS) are presented to the group.

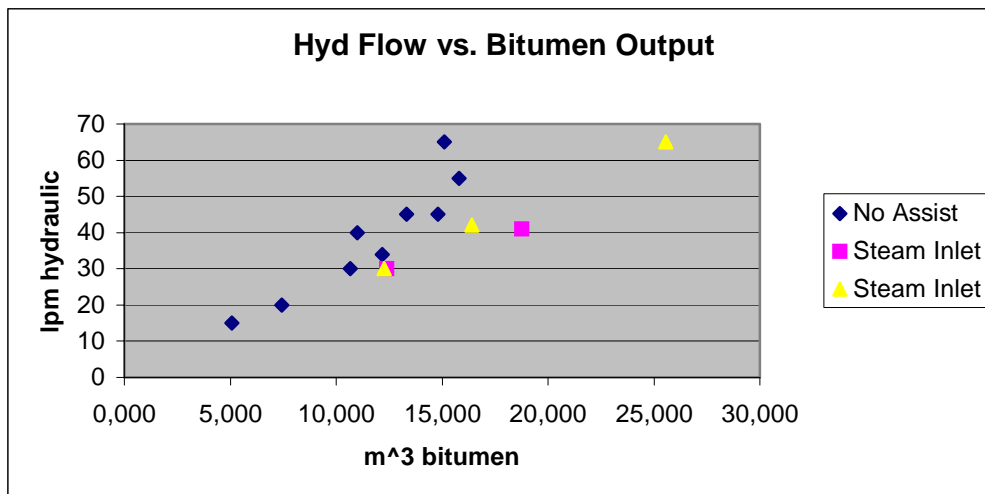


Figure 3 Inflow Slippage Test Results (Ottawa, November 2002)

December 2002

Funding issues discussed and search for external sponsors initiated. It appears that slurry oil cannot be expected to have the same viscosity characteristics from batch to batch. Design specifications of specialized test tanks in progress. Testing timeline prepared and under evaluation. LAMOR offers a brush belt skimmer for oil-water separation at no cost to the project. Continued search for heavy fuel oil of high enough viscosity failed. Two bitumen types found in Canada deemed not suitable. Received first cost proposal on chiller system for viscosity control: Astronomic.

January 2002

Lamor confirms in writing their participation with pumps. Framo still pending. Slurry oil ruled out. Discussion on using bitumen for all main tests, provided it does not prove too shear thinning, which will make it too easy to pump despite its high viscosity. Contacts to Syncrude, Canada as source for bitumen supply. Workshop rescheduled to April or May 2003, pending availability of suitable oil. Test tank construction time also critical. Night time testing being considered due to the rescheduling to warmer season conditions in Houma, and to reduce strain on oil chilling. OHMSETT being considered once again for testing during the summer season. Too many loose ends on funding and logistical coordination and delays with essential test infrastructure components (Water lubrication control stand and SHAS) cause decision to move workshop to fall 2003.

February 2003

CCG awards contract for construction of custom built test tanks. Costs proposals received from OHMSETT. Constant search for test oil source.

March 2003

Possibility of getting bitumen crude oil from Japan Canada Oil Sands (JCOS). Initial oil specs. seem promising. Costs would be about USD 25 / bbl plus rail and truck transportation. Samples to be received for analysis.

April 2003

Analysis of the JCOS bitumen crude oil completed: The viscosity-temperature relationship showed excellent compliance with the JVOPS test strategy requirements. The JCOS product seems shear thickening rather than shear thinning. Workgroup meeting took place in connection with IOSC 2003. Decision approved on acquiring 83 m³ / 500 bbl to be delivered in Houma. Funding for product obtained and acquisition procedure by Todd Mitchell, Navenco Marine, Canada initiated. Decision reached on rescheduling the test dates to November 2003 to allow for test oil delivery minimum 2 months prior to testing, and to accommodate delays of manufactured special components. Manufacturing drawings for the SHAS is well in progress after some unforeseen delays. Manufacturing drawings for the revised AWIF complete. Continue working on loose ends with data acquisition components. Decision on dedicated data acquisition meeting in connection with AMOP 2003 technical seminar June 2003.

May 2003

Test product transportation/environmental issues coming up. Problems machining revised AWIF in Williamsburg, move to contractor in Ohio. Final decisions on baffle arrangements to be installed in rental Baker back-up tank. Requests for re-confirmation of participation sent out to pump manufacturers. Confirmations received from Lamor and Framo.

June 2003

Data Acquisition (DA) meeting at AMOP clears up a lot of issues that could not be handled per phone or e-mail. Changes made to DA approach. TAS being modified to accommodate specifics on test oil, revised data acquisition, and changes to testing timeline to match the number of confirmed manufacturers. Test plan sent to workgroup for review. The specific JVOPS Workshop requirements to all participating pump systems as to connections, water line lengths, etc. are sent out.

July 2003

Main oil tanks (USCG backup baker, USCG and CCG test tanks) scheduled for delivery at test site early August to receive test oil. Continued concern about ability to chill the very viscous oil. Calculations are made on energy balance and chilling options being discussed. Test product presently expected to be delivered on site mid August. Preparations being made to send crews to set up tanks to receive oil. Their tasks include placement of mixing pumps, placement of oil temperature sensors, training of

facility personnel, and carry out hose cleaning test. Still awaiting info on possible delivery of 25 to 50 k cSt oil for AWIF comparison testing. SHAS construction complete.

August 2003

Test product delayed partly due to late contract award. Notice to participants sent out on testing first two weeks of November. Tank delivery moved to September. Test command structure in progress using the ICS format. Physical layout of test site being prepared.

September 2003

Pre-test setup week decided to be Sept 28 to Oct 4. Containers with equipment from strike teams and Navy/GPC being shipped. Test sheets sent to workgroup for review. Test product now scheduled for arrival first week of October. Participating pump manufacturers were again requested to provide detailed specs on their pump systems. Chilling system configuration for both oil and cold lube water in progress.

October 2003

Pre-test set-up week with crews from CCG and USCG, Navy/GPC, SAIC Canada, and Hyde Marine. Tanks placed according to revised layout. Protection berms under all oil tanks. Protective visqueen plastic sheeting placed on ground. Tarp shade covers over tanks for oil. Test oil (500 bbl) arrives during setup week and is now in baker tank and CCG test tank. Oil temperature at delivery about 71 °C / 160 °F. Oil temperatures being closely monitored from now on. Test cleaning of hose contaminated with test oil causes concern as to the ability to clean, or to the best clean hoses fast enough for re-use during testing. ERE skimmer in position on CCG test tank, and brackets made on Baker tank for Lamor skimmer. Local contractor found for general decontamination and for hose decon support. Workshop postponed to first two weeks of December due to concern about fast enough cool down of oil by ambient temps/bayou water and delays with essential testing equipment. SHAS suggested modified upon on-site personnel concern about placement of the heavy device. New and simpler by-pass valve based SHAS being suggested and decided for. Pre-test visit to Houma (PN, JM) for test of DOP-250 possible inflow slippage and to exercise drum fill flow control. As per this pre-test an average slippage of 6-8% may be expected when pumping without inlet side water lubrication. 3 weeks after delivery the test oil is close to required temperature for USCG tests. Valve SHAS design in progress. Delivered oil for 25 to 50 k cSt viscosity test section did not meet specs. and supplier must take it back. Rain water has entered oil tanks. Water stayed on surface, did not mix with oil. Was removed with suction pump by swift action by USCG Gulf Strike Team. Tarp covers on tanks and oil transfer bridge rearranged to avoid a repetition.

November 2003

Fabrication of hose ramps. CCG team on-site two weeks prior to setup week to construct platforms at test tanks, make chilling loops for outside tank wall cooling, initially with bayou water. Backup tank insulated. Changes made to test plan to accommodate final layout and method of chilling. The 25 to 50 k cSt test oil will be the standard test oil (JCOS) that has been heated in order to reach this viscosity range.

WL control stand ready and WL pumps acquired. Rental tanks for lube water, oily water, hose decon, and 200 bbl buffer tank delivered to site. All remaining major equipment and provisions are delivered to site.