
Technical Oil Mission (TOM) Microfilm Reels – Background and New Developments

Steve LeViness

Syntroleum Corporation

Tony Stranges

Texas A&M University

Ed Koper

Sasol Technology

AIChE Meeting

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Syntroleum[™]

The US Technical Oil Mission

- **Outcome of discussions in the US Petroleum Administration for War (PAW) in 1943-1944**
 - Originated in the Technical Advisory Committee (TAC) of the Petroleum Industry War Council (PIWC)
 - Proposed sending scientific and engineering experts into enemy countries (mainly Germany and Japan) as soon as war conditions permitted
 - Members recruited from US oil and chemical companies, and the US government Bureau of Mines (BOM)
- **Worked in close cooperation with counterparts from the United Kingdom, the British Intelligence Objectives Subcommittee (BIOS)**
- **Teams sent to Germany as early as February 1945**
- **Most returned to previous employers by October 1945.**

TOM Subject Areas

- **Products & Test Methods (7)** - P.K. Kuhne, (Gulf Oil), Chairman.
- **Gasification & Carbonization of Solid Fuels (7)** - A.R. Powell (Koppers Co), Chairman.
- **Hydrogenation of Coal, Tar and Oil (9)**- L.L. Hirst (BOM), Chairman.
- **Hydrogenation Synthesis of Oil from Water Gas (FT) (11)** - I.H. Jones (Koppers Co.), Chairman.
- **Recovery and Separation Methods for Gases, Liquids, and Solids (8)** - M.M. Weir, Chairman.
- **Oil Shale Processes (3)** - W.W. Odell (BOM), Chairman.
- **Materials of Construction, Including Metallurgy (5)** - E. Voss (Humble Oil/Refining Co), Chairman.
- **By-Products from Hydrocarbons Produced in Synthetic Oil Processes (9)** - V. Haensel (Universal Oil Products Co.), Chairman.

Members of the TOM Teams

- J.G. Allen (Phillips)
- H.V. Atwell (Texas Co)
- E.L. Baldeschwieler (Standard Oil Dev)
- G.S. Bays, Jr. (Humble)
- Ernest Cotton (Gulf Oil)
- L.P. Evans (Socony-Vacuum)
- W.F. Faragher (Houdry)
- Donald S. Fraser (PAW)
- Vladimir Haensel (UOP)
- L.L. Hirst (BOM)
- W.A. Horne (Gulf)
- I.H. Jones (Koppers)
- J.P. Jones (Phillips)
- Paul K. Kuhne (Gulf)
- M.R. Mandolbaum (Kenyon & Kenyon, Lawyers)
- L.L. Newman (BOM)
- B.L. Mackusick (Pure Oil)
- Earl J. Opal (PAW)
- W.V. Odell (BOM)
- E.B. Peck (Standard Oil Dev)
- A.R. Powell (Koppers)
- Edward Rogers (BOM)
- Hans Schindler (Pure Oil)
- W.C. Schroeder (BOM)
- Guenther von Elbe (BOM)
- H.M. Weir (Consultant).

The British (BIOS) Teams were set up to Investigate Similar Topics

- Fischer-Tropsch group, 10 men.
- Lubricating Oil group, 4 men.
- Utilization and Performance, 5 men
- Carbonification and Gasification, 9 men
- Hydrogenation, 11 men.

TOM Activities

- **Entered “Targets of Opportunity” behind US/British Armies**
 - Production plants (refineries, synthetic fuels, chemicals)
 - Research Laboratories (especially Kaiser Wilhelm Institute)
 - Company headquarters (especially I. G. Farben and Ruhrchemie)
 - Included only territory held by US/British forces
- **Confiscated all relevant documentation**
 - Production Records
 - Plant diagrams and vessel drawings
 - Research notebooks/records
 - Technical and meeting/conference reports
- **Conducted interrogations of key scientific personnel**

TOM Activities (cont)

- **Shipped documents to London for processing under auspices of the Combined Intelligence Objectives Subcommittee (CIOS)**
 - Initial plans for extensive translating, indexing, and reporting overwhelmed by sheer volume of documents
 - Finally simply microfilmed documents “at random”
 - 141 reels produced in London
 - Operations shifted to US, where a further 164 reels produced.
- **Also included material collected by other agencies**
 - US Army Field Information Agency, Technical (FIAT)
 - US Naval Technical Mission to Europe
 - US Naval Technical Mission to Japan
 - US Strategic Bombing Survey
 - Reportedly little cooperation between each of these groups, or between them and TOM/BIOS/CIOS
- **All documents classified as secret until the war’s end**
 - Declassified in second half of 1945

Post-war Synthetic Fuels Activities in US

- **Technical information gained from TOM activities, combined with earlier and ongoing US government and corporation research, led to significant development/commercialization efforts**
- **Two Bureau of Mines Demonstration Plants in Louisiana, Mo**
 - Utilized direct contributions of German technical experts (operation “Paper Clip”)
 - 200 bbl/d direct coal liquefaction plant (Donath, Schapperts, Frese)
 - 50 bbl/d coal syngas Fischer-Tropsch synthesis plant (Pichler, Alberts)
- **One Commercial (8,000 bbl/d) Natural Gas to Liquids Plant**
 - Carthage-Hydrocol, Brownsville, Tx – later taken over by Stanolind
- **Mid-1950’s Collapse of oil prices after middle east discoveries ended commercialization effort – except in South Africa (Sasol)**
- **Interest in TOM materials largely vanished**

The German Document Retrieval Program

- **1970's oil embargo and subsequent price escalation revived interest in synthetic fuels – especially from coal**
- **German Document Retrieval Program initiated at Texas A&M University in 1975.**
- **Collected a very large quantity of information**
 - Complete TOM microfilm set
 - Hard copies of BIOS/CIOS/FIAT/etc reports and documents
 - Interviewed surviving German scientists and TOM team members
- **Began (again) indexing, abstracting and publishing results**
 - Completed 8,000 of 600,000 collected papers by late 1978
- **Project funding cut off in 1982**
 - Collecting more-or-less completed, processing only begun

Fischer-Tropsch.org Website

- **Created by Syntroleum and Tony Stranges in 2000 to collect and publish early FT documents in digital format**
- **Extensive current holdings**
 - Over 6000 worldwide patents
 - Over 600 government reports (BOM/DOE/BIOS/CIOS/TOM/etc.)
 - Approximately 8 gigabytes total material
- **Presently have relatively small number (ca. 40) of documents directly from the TOM microfilm reels**
 - Standard microfilm reader to print paper (hard) copy
 - Digital paper scanner to create electronic version
 - Image quality generally poor (too many steps removed from film)
 - Cost and manpower effort excessive
 - Largest hurdle locating documents of interest

Recent Developments

- **TOM microfilm reel efforts at an impasse in early 2002**
 - A great deal of relevant FT documentation present somewhere, but indexing/contents not very complete
 - Searching on Microfilm reader very labor intensive
 - Resulting digital images several generations removed from film
- **In mid 2002 Sasol inquired about the possibility of obtaining a set of the TOM microfilm reels**
 - Discussions regarding Fischer-Tropsch.org effort since 2000
 - Film copying relatively “easy”, but same problems remain
- **While investigating potential vendors for film copying, another alternative became apparent**

TOM Microfilm Enters the Digital Age

- **The last decade saw a huge improvement in digital imaging technologies**
 - A number of commercial vendors offer complete microfilm digitization services – generally for converting company and/or government archival records
- **A joint Sasol-Syntroleum-Texas A&M University program was initiated in late summer/early fall 2002**
 - Microfilm reels obtained from Texas A&M University Archives
 - Significant Sasol funding contribution
 - Syntroleum program management/coordination
 - Performed by experienced film-scanning vendor (GetImaging, OKC)
- **Complete set of digital images of the entire TOM microfilm collection received December, 2002**

The TOM Reel Digital Archive

- **Results consist of a staggering amount of information**
 - Final count approximately 296,000 individual images
 - Delivered on ca. 340 CD-ROMs (87.4 gigabytes total)
 - Simply inspecting results for job completeness/payment required almost 1 man-month
 - Raw images larger than original page size, typically somewhat “noisy”
- **Image quality generally very good, although some are poor**
 - Original war environment contributed to some poor originals
 - Some filming performed badly
 - Film is currently 55+ years old – some has degraded
 - Automated scanning offers multiple possibilities for errors
 - First pass approximately 70 out of 310 reels required additional inspection/rescanning efforts (240 good or very good)
 - Currently working to improve ca. 45-50 remaining reels.

TOM Reel Digital Archive (cont)

- **Substantial processing activities already completed**
 - **Collected internal indexes/tables of contents for 270 reels**
 - Currently collecting title pages for remaining reels
 - **Fully processed approximately 20 reels to date**
 - Cropped all images to original paper size
 - Cleaned up margins/noise (significantly reduces file size)
 - Recombined images into original documents
 - Web linked to text based (HTML) tables of contents
- **Efforts focused on Fischer-Tropsch related items and reels**
 - Initial estimates in range of 80,000 pages (very rough)
 - Unlikely that Syntroleum or Sasol will pursue processing non-FT related documents anytime soon

Digitized TOM Reels Now Available

- **Master Table of TOM reels posted on FT.org website**
 - Original reel designation and source
 - Number and approximate quality of images
 - Image (ca. 270) and text (20-30 so far) tables of contents
 - Reel number 1 posted in its entirety in 2 formats
 - Collection of individual images as received
 - Fully processed (cleaned and grouped) documents
- **Offering TOM documents for sale “by the reel”**
 - \$125.00 per reel “as is”
 - \$250.00 per reel fully processed (where available)
 - Substantial discount for multiple reels or entire set
 - Proceeds (if any) to support further processing

Future Plans

- **Program for translation, summary, and reporting of key German TOM documents**
 - Prof. Cal Bartholomew (BYU)
 - Sasol/Syntroleum funded
- **Investigating contents and/or availability of additional document/data sources**
 - FIAT reels included in TOM only small portion of total
 - > 1000 BIOS/CIOS/FIAT report hard copies at Texas A&M
 - Government records declassified in 1995 as part of Nazi War Crimes Disclosure Act
 - Microfilm and hard copies available through NARA
 - BOM Louisiana, Mo demonstration plant operations records

TOM Background References

(most available on Fischer-Tropsch.org)

- **The Story of the Technical Oil Mission**
 - By Albert E. Miller, 1945
- **The World War II German Synfuels Program**
 - By Kurt J. Irgolic, 1979
- **Fifty Years in Synthetic Fuels Information: Have We Lost a Strategic National Resource ?**
 - L. M. Roseberry, 1987
- **Germany's Synthetic Fuel Industry.**
 - Anthony Stranges, 2000
 - In *The Chemical Industry in the Twentieth Century*.
 - Ed. by John E. Lesch, Kluwer Academic Publishers