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SCHEDULE++ PIPELINE&PORT Crude Oil Unloading and Pipeline Batch Transportation Scheduling for Oil Refinery

OR Soft Jänicke GmbH has specialized itself on the enhancement of ERP systems by implementation of APS (Advanced Planning and Scheduling) Add-ons. The application system SCHEDULE++ is the major APS tool used for this purpose.

PIPELINE&PORT is a SCHEDULE++ Industry Solution Package for the Scheduling of Crude Oil Delivery and Unloading at a Port, Multicomponent Batch Composition and Pipeline Batch Transportation Scheduling for Oil Refineries that receive their raw components via shared multi-purpose pipelines from multiple ports or companies that are operating those pipelines. It supports the management of the most vital part of the oil industry supply chain – the just-in-time delivery of crude oil components to the processing refineries.

Target Industries

Typical Scenarios:

- ◆ crude oil delivered at ports
- ◆ shared pipelines from ports to refineries with transportation time slots
- ◆ multicomponent batches transported in pipeline
- ◆ flexible, restricted tank storage on both ends of the pipeline
- ◆ tanks holding multicomponent mix with quality parameters
- ◆ time-phased raw component requirements with quality parameters for the refinery production

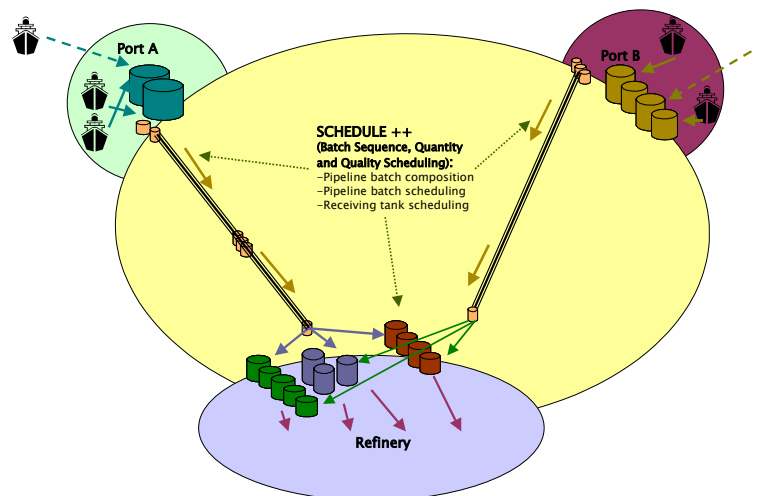
Typical Industries for these Scenarios:

- ◆ crude oil refinery
- ◆ pipeline operators

Integration

SCHEDULE++ is a powerful modern planning software for detailed scheduling, optimisation, forecasting and collaborative planning. In contrast to other APS systems SCHEDULE++ can be utilised as a real APS Add-on to ERP systems and does not require its own server, special administration and separate data storage.

Pipeline Batch Transportation Planning



APS und SCM Funktion

PIPELINE supports the composition of multicomponent transport batches based on quality and quantity requirements, detailed scheduling of pipeline transports and of the receiving tank farm at the refinery over a longer time range

- ◆ Advanced Planning and Scheduling. PORT is used to schedule the delivery of crude oil arrivals at multiple ports and the unloading to multicomponent tanks at the port
- ◆ Supply Chain Management

PIPELINE&PORT Modules

MULTIBATCH Model

Enhanced SCHEDULE++ data model

- ◆ throughput
- ◆ multicomponent batches
- ◆ mass and volume figures
- ◆ quality parameter calculation
- ◆ transport batch orders

PORT Editor

Port Editor interface for incoming crude oil tanker deliveries at multiple ports and distribution to port tanks

- ◆ tanker deliveries
 - ◆ tanker name
 - ◆ expected time of arrival
 - ◆ crude oil type
 - ◆ receiving port
 - ◆ quantity (mass and volume)
- ◆ delivery tank distributions
 - ◆ tank name
 - ◆ stock before delivery
 - ◆ distribution quantity
 - ◆ stock after delivery

MULTIBATCH Composition Editor

Batch Editor interface for composition of pipeline transport batches from multiple components available in port tanks

- ◆ batch header
 - ◆ batch number
 - ◆ quantity and throughput
 - ◆ scheduled transport start time
 - ◆ batch duration
 - ◆ batch recipe
- ◆ port tanks distributions
 - ◆ tank name
 - ◆ stock before batch
 - ◆ distribution percentage and quantity
 - ◆ crude oil type and percentage in tank

PIPELINE Config Package

User interface and procedures for the scheduling of the pipelines and tanks:

- ◆ port and refinery tank histograms
- ◆ pipeline Gantt chart
- ◆ browsers for batches, deliveries and refinery requirements

Port Editor Interface

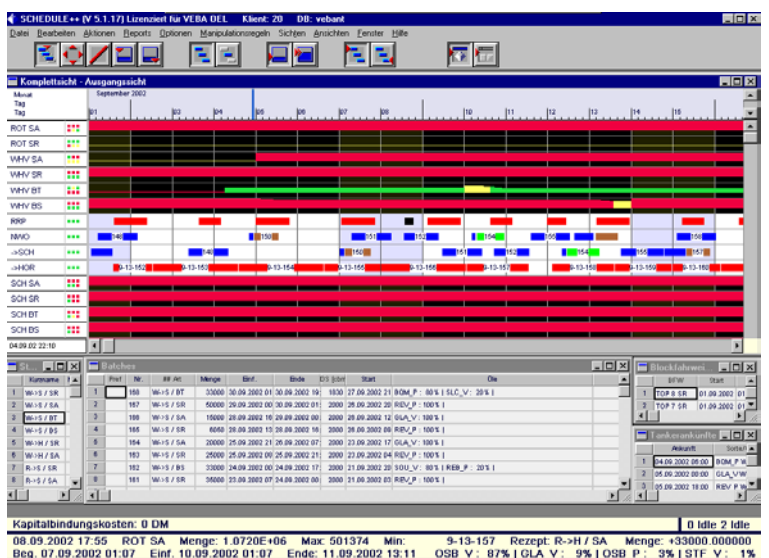
Tanker										Sorten			
S.L.	Name	Datum	Std	Sorte	Hafen	Menge/kt	menge/kcbh	A	Rest	Tank	Verf. Vor	Einf./kcbm	Verf. Nach
	Proteo	04.09.2002	06	SDM_P	WHV	69.7	72.9	0	0.0	BGS REV	43.6	0.0	43.6
	Kneck An	05.09.2002	00	GLA_V	WHV	49.9	60.0	0	0.0	BGS-MX	23.4	0.0	23.4
	Arendal	05.09.2002	18	REV_P	WHV	89.9	104.0	0	0.0	EPE-MX	40.5	0.0	40.5
	ex MOI	09.09.2002	00	ROS_V	ROT	35.0	42.2	0	0.0	REV_P WHV	29.4	104.0	-74.6
	TBN	10.09.2002	00	SLC_V	WHV	18.4	24.6	0	0.0				
	SearamblerKe	10.09.2002	00	REV_P	WHV	35.4	41.0	0	0.0				
	TBN	11.09.2002	00	REV_P	WHV	50.1	58.0	0	0.0				
	Sarpen	14.09.2002	00	SOU_V	WHV	83.7	91.6	0	0.0				
	TBN	14.09.2002	02	OSB_V	ROT	134.7	162.0	0	0.0				
	TBN	18.09.2002	02	REV_P	WHV	78.7	91.0	0	0.0				
	TBN	18.09.2002	03	REB_P	WHV	21.6	25.0	0	0.0				
	TBN	19.09.2002	08	OSB_P	ROT	83.2	100.0	0	0.0				
	TBN	25.09.2002	00	OSB_P	ROT	133.9	161.0	0	0.0				
	TBN	26.09.2002	00	REV_P	WHV	90.0	104.1	0	0.0				

Batch Editor Interface Pipeline and Tank Farm

BatchNr: 9-13: 156
 Menge: 33000.0 Durchsatz: 670.0 Beginn: 04.09.2002 23:52 Einfuhrzeit: 201.15.13
 Rezept: R->H / SA Nächste Tankerankunft: GLA_V WHV 05.09.2002

Tanks				Sorten								
Tank	Verfügbar (vor)	%	Anteil / verfügbar (nach)	FRT_V	GLA_V	HPL_V	OSB_P	OSB_V	REA_V	ROS_V	STF_V	
Tank F01 SA	6490.0	0.0	0.0 6490.0	44.0			3.2	2.7			0.1	
Tank F02 SA	120268.4	0.0	0.0 120268.4				41.2	0.2		0.5	8.2	
Tank F03 SA	64848.0	0.0	0.0 64848.0					17.1	13.7		19.1	
Tank F04 SA	80627.5	40.0	13200.0 67427.5				0.8	43.5			0.0	
Tank F05 SA	115024.1	20.0	6600.0 108424.1	4.5				43.0			0.5	
Tank F06 SA	14681.6	0.0	0.0 14681.6					0.3			30.6	
Tank F07 SA	16856.9	0.0	0.0 16856.9					16.2	14.3		0.7	
Tank F09 SA	91060.5	40.0	13200.0 77860.5	7.8				4.7	25.9		0.0	
Tank VEN SA	176032.0	0.0	0.0 176032.0	43.8				1.5	2.0		0.1	2.6
Rest	686889.0	0.0	0.0 652889.0	4.0				2.2	36.4		0.1	0.1

Scheduler Interface



Screenshots depict the implementation of SCHEDULE++ at the department "Crude Oil and Feedstock Provision" of BP Refining and Petrochemicals GmbH (this department was owned by VEBA Oel AG at the time of implementation) and are reproduced with kind permission of this department.