IDA_NEMO_NOR_09: Calculating IDA results

Version	1.2	
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Status	☐ Draft	☒ Final

Approval

Version	Date	Author	Summary of changes
1.0	8/03/2024	[redacted]	Agreed version
1.1	02/07/2024	[redacted]	- Added "Start time" according to the update in IDA_NEMO_NOR_08 due to the T5 parameter change - Replacing GCT with OBK GCT
1.2	03/09/2024	[redacted]	RFC: "Shortening of TIME LIMIT + increasing the GRACE TIME for Euphemia calculation" - Chapters 1.1, 2.3 - Table 1

Remarks

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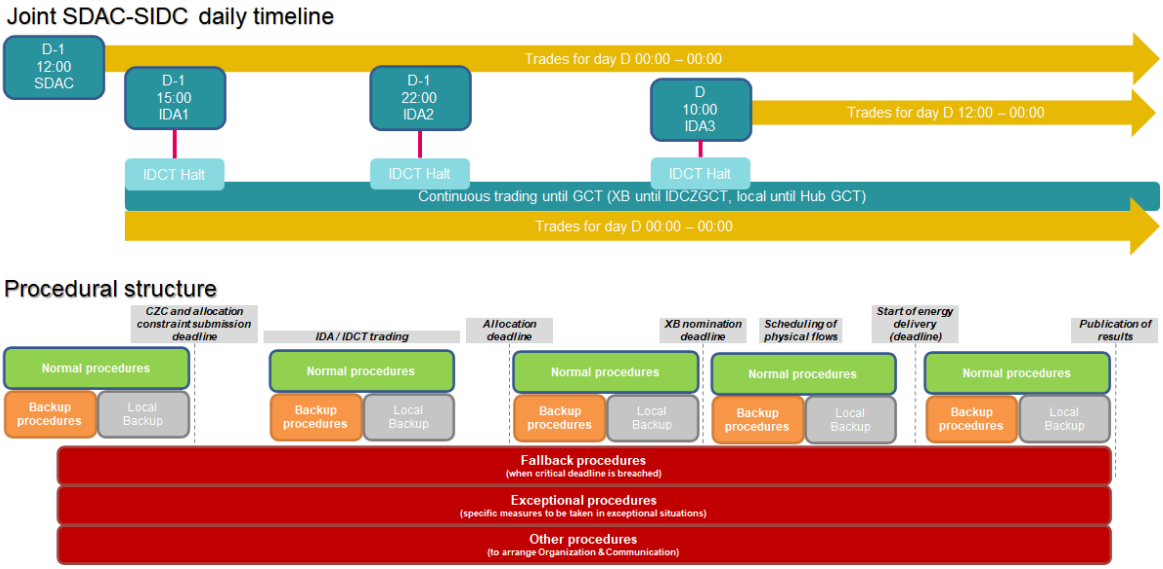
1. Introduction

This procedure describes the IDA coupling process, after the NEMO's submission of the aggregated order books until the IDA results has been calculated by the PMB.



1.1. Summary

This process can only be started after the Start Time and after all Network Data and Order Data have been received in the PMB (see *IDA_NEMO_NOR_07: Send IDA network data to PMB and Cross-check IDA network data* and *IDA_NEMO_NOR_08: Aggregate order books and send to PMB*). When the previous conditions are fulfilled, the Algorithm will validate the input data and then automatically start the Algorithm execution.

This procedure ends when the PMB indicates that the Market Coupling Results calculation has finished successfully.

The current Maximum **Limit** for running the Calculation process is set to **8 minutes (4 minutes of Time Limit, 3 minutes of Grace Time and additional 2x30 seconds are reserved for processing the input and output).** If no valid solution is found before the Time Limit is reached, the Calculation is extended automatically and the IDA Operators will refer to the *IDA_NEMO_BUP_09* procedure.

The running of the Market Coupling calculation process is mandatory for the IDA Coordinator and the IDA Backup Coordinator. If the IDA Coordinator cannot perform this task due to an exceptional situation, the IDA Backup Coordinator will take over the IDA Coordinator role and responsibilities.

It is possible to see in all PMBs the IDA Coordinator calculation sub-process.

The other PMB Operators may perform this task in case they want to run a parallel matching for internal use and verification purposes.

1.2. Governed / Regulated by

- All NEMO Intraday Operational Agreement

1.3. Tools and Communication protocols

[redacted]

1.4. Associated procedures

Preceding procedure:

- IDA_NEMO_NOR_08: Aggregate order books and send to PMB

Subsequent procedure:

- IDA_NEMO_NOR_10: Results sharing and receiving

Other associated procedures and rules:

- IDA_NEMO_NOR_07: Send IDA network data to PMB and Cross-check IDA network data
- IDA_NEMO_BUP_07: Send IDA network data to PMB and Cross-check IDA network data
- IDA_NEMO_BUP_08: Aggregate order books and send to PMB
- IDA_NEMO_BUP_09: Calculating IDA results
- SIDC_JOINT_FAL_01: Incident Management
- IDA_JOINT_EXC_03: Cancellation of scheduled IDAs

2. Procedure

2.1. Preconditions to start

The aggregated order books and network data has been received by PMB, and the PMB Gate Closure Time is reached.

2.2. General overview

Table 1 – Overview

Steps	Calculation	Start Time	Target time	Deadline
1	The Algorithm receives the input data.	ASAP after OBK GCT	OBK GCT + 00:06:00	OBK GCT + 00:06:00 + 9 minutes of additional time
2 a	Input data is read, stored and validated for calculation.		OBK GCT + 00:06:30	OBK GCT + 00:06:30 + 9 minutes of additional time
2 b	*Calculation starts. The Start Time is indicated in the calculation log.		OBK GCT + 00:06:30	OBK GCT + 00:06:30 + 9 minutes of additional time
3 a	Calculation ends successfully at latest when the Maximum Calculation Time Limit is reached and the calculation log displays the status “Completed”.		OBK GCT + 00:13:30	OBK GCT + 00:13:30 + 9 minutes of additional time
3 b	Preparing EUPHEMIA output		OBK GCT + 00:11:00	OBK GCT + 00:14:00 + 9 minutes of additional time

- * Remark: in case some party needs to send a higher version of Order Data after calculation starts the case 5 of IDA_NEMO_BUP_08 should be followed.

2.3. Process Clarification

This can be verified on the dashboard: the status of Calculation process becomes “Active” (PMBs that do not run the algorithm do not have this process in the dashboard).

1. The Algorithm input tables are populated with the most recent Network and Order Data received for each Virtual Broker. An input message command is sent to the Algorithm in order to start the calculation. The Algorithm starts with its own validations. This process could take up to 2 minutes.
2. The Algorithm starts the calculation and the notification screen displays the message “Algorithm has started the calculation”.

- The progress of the calculation is displayed in the section "Results calculation process", based on a heartbeat principle that is able to detect when the Algorithm has stopped. A warning message is shown in case of 30 seconds without a heartbeat.
- The Algorithm performs checks and validates the results and its components. When the input data have been validated by the algorithm, after the calculation, the algorithm will carry out validations on the output data of every candidate solution. The objective of these checks is to verify that the results fulfill the requirements, assuring that any later check (in line with the requirements and the specifications of both the algorithm and the database interface) that could be carried out on the output data by any external system (PMB, PMB Operators) will be successful.

3. A successful calculation ends by displaying one of the following valid termination codes:

- **OK QUALITY.**
  - (401) Algorithm termination: valid solution.
  - (402) Algorithm termination: valid solution but warning.
  - (441) Algorithm termination: valid solution but with fallback NEMO flow problem.
  - (442) Algorithm termination: valid solution but warning and with fallback NEMO flow problem
- **TECHNICAL QUALITY.**
  - (403) Algorithm termination: solution with mild tolerance problems
  - (443) Algorithm termination: solution with mild tolerance problems and with fallback NEMO flow problem.
- **GME LINES QUALITY.**
  - (404) Algorithm termination: solution with mild tolerance problems on LINE_PRICE_DIFF constraint in Merit Order bidding areas.
  - (444) Algorithm termination: solution with mild tolerance problems on LINE PRICE DIFF constraint in MeritOrder bidding areas and with fallback NEMO flow problem.

NOTE: If the Algorithm provides the codes 402 or 442 the IDA_NEMO_FAL_03 procedure will be followed.

However, the following termination codes will not be encountered at the end of the Calculation Time Limit of 4 minutes: 403, 404, 443 and 444 (Technical quality).

The codes above are considered as "Technical solutions" that are released only at the end of the Calculation Grace Time (e.g., 3 minutes after the end of the Time Limit, as defined in the actual version of SCF). If only technical solutions are found at the end of the Time Limit, the Calculation will be automatically extended and the IDA_NEMO_BUP_09 procedure should be followed.

The output of the calculation process is

1. the Market Coupling Results, which include the following components:
   - Prices;
   - Line Flow results;
   - Flow-based results;
   - Bidding areas results;
   - Line Sets results;

- Solution Summary: Block order/complex order/merit order results.

2. the NEMO flow calculation (or Inter NEMO flow calculation - INFC), which includes:
   - Flow results between Scheduling areas;
   - Flow results between Nemo Hub

Table 2 – Risk Cases associated to the normal process

#	Risk cases	Measures taken
1	The Coordinator PMB is down	SIDC_JOINT_FAL_01 IDA_NEMO_BUP_09 IDA_JOINT_EXC_03
2	Calculation cannot start because of an Algorithm technical issue	SIDC_JOINT_FAL_01 IDA_NEMO_BUP_09 IDA_JOINT_EXC_03
3	Calculation cannot start because the Algorithm indicates a problem in validating the input data.	SIDC_JOINT_FAL_01 IDA_NEMO_BUP_09 IDA_JOINT_EXC_03
4	Calculation needs to be manually stopped because of incorrect Order Data or Network Data	SIDC_JOINT_FAL_01 IDA_NEMO_BUP_06 IDA_NEMO_BUP_08 IDA_NEMO_BUP_09 IDA_JOINT_EXC_03
5	Calculation is still ongoing even if the Calculation Time Limit is exceeded	SIDC_JOINT_FAL_01 IDA_NEMO_BUP_09 IDA_JOINT_EXC_03
6	Calculation cannot proceed due to an Algorithm technical issue	SIDC_JOINT_FAL_01 IDA_NEMO_BUP_09 IDA_JOINT_EXC_03
7	Calculation is finished with an unexpected error	SIDC_JOINT_FAL_01 IDA_NEMO_BUP_09 IDA_JOINT_EXC_03
8	Calculation is finished successfully but the PMB calculation process remains Active	SIDC_JOINT_FAL_01 IDA_NEMO_BUP_09
9	Calculation step not set to Active even if all files are received and the PMB Target Time is reached	SIDC_JOINT_FAL_01

2.4. Final state

The procedure ends when IDA results are successfully calculated by the PMB.