Applied Systems Ltd

USER GUIDE FOR THE MODULE ON ACCOUNTING FOR SMALL QUANTITIES OF THE AUTOMATED SYSTEM FOR ACCOUNTING AND CONTROL OF NUCLEAR MATERIALS «ATOMIC KEEPER»

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CONTENTS

SYMBOLS AND ABBREVIATIONS

Abbreviation (designation)	Deciphering (explanation)
NM A&C AS	Nuclear materials accounting and control automated system «Atomic Keeper»
NPP	Nuclear power plant
MBA	Material balance area
KMP	Key Measurement Point
IAEA	International Atomic Energy Agency
MBR	Material Balance Report
RP	Resposible person
ICR	ICR Inventory quantity change report
OS	Operational system
SW	Software
DBMS	Database management system
IU	Inventory unit
NM	Nuclear material
SQNM	Small quantity of nuclear material
ICR	Inventory Change Report
MBR	Material Balance Report
PIL	Physical Inventory Listing
PhI	Physical Inventory

1. GENERAL PROVISIONS

The User's Guide for the “Atomic Keeper” nuclear materials accounting and control automated system (hereinafter referred to as the “Guide”) contains step-by-step instructions and explanations on the main operations performed by a system user with the role of «Accountant». The main actions for a user with the Customizer role are described in section 2.4 of this document.

1.1. Scope of area

The Atomic Keeper v.2.0 automated NM accounting and control system (hereinafter referred to as NM A&C AS 2.0.) is designed to automate the procedures for accounting and controlling small quantities of nuclear materials, centralized storage and processing data while handling SQNM at NPPs, and generation of reporting and accounting documentation, as well as for providing reliable information about the location of SQNM on the territory of the NPP.

1.2. Main features and functions

NM A&C AS 2.0 provides the following main possibilities:

- collection, processing and storage of information about the properties and characteristics of SQNM used at the nuclear power plant;
- formation and maintenance of accounting and reporting documents;
- providing information about the current location and quantity of SQNM in their locations.

The main functions of NM A&C AS 2.0. comprise the following:

1) accounting the characteristics of each accounting unit, maintaining their history of change;
2) accounting the location of each accounting unit;
3) registration of operations, works and special procedures performed with accounting units;
4) registration of all relocations (movements) of accounting units;
5) formation of working documentation required by NPP specialists before, during or after the work with nuclear materials;
6) providing data on the amount of nuclear materials in all MBAs and KMPs;
7) formation of documentation on the presence of nuclear materials and accounting reports in the established form (ICR, PIL, MBR, ICR SQNM);
8) maintenance of accounting documents (main and auxiliary ledgers, registration cards, cartograms of nuclear materials placement);
9) provision of information for inspections and physical inventories conducted on the territory of the NPP;

10) verification of input (selected) data for compliance with validation criteria.

1.3. User’s skills

The user must know:

- this Guide;
- the operating systems of the Microsoft Windows family and Microsoft Office;
- the relevant terminology of this document;
- the terminology of the system of accounting and control of nuclear materials.

1.4. Prerequisites for working

Before starting working with the software, the administrator, in accordance with the Administrator's Guide, must install the appropriate software included in the delivery and if necessary, additional application software. (See the Administrator's Guide for the Automated Accounting and Control System for Nuclear Materials "Atomic Keeper" v.2.0. (hereinafter referred to as the Administrator's Guide)).

Make sure that the user's workstation has the Google Chrome browser (version 105 and higher) installed and the user has access to the software in accordance with his authority.

Required users are registered with NM A&C AS 2.0 according to the Administrator's Guide.

1.5. Preparing to work

To start working with NM A&C AS 2.0 it is necessary to fill in the necessary sections in the "References" module (the description of the module is given in clause 3.6). Only a user with the "Commissioner" role has the right to add, edit, delete data in directories. The steps for registering a user with the "Commissioner" role are given in the Administrator's Guide. To perform operations on editing the "References" module, you need to:

1. Login to NM A&C AS 2.0. with the role of «Commissioner».

2. Upon successful authorization of the user, the first tab of the "References" module will be displayed. Select the required Reference (with the possibility to edit) that you want to edit.

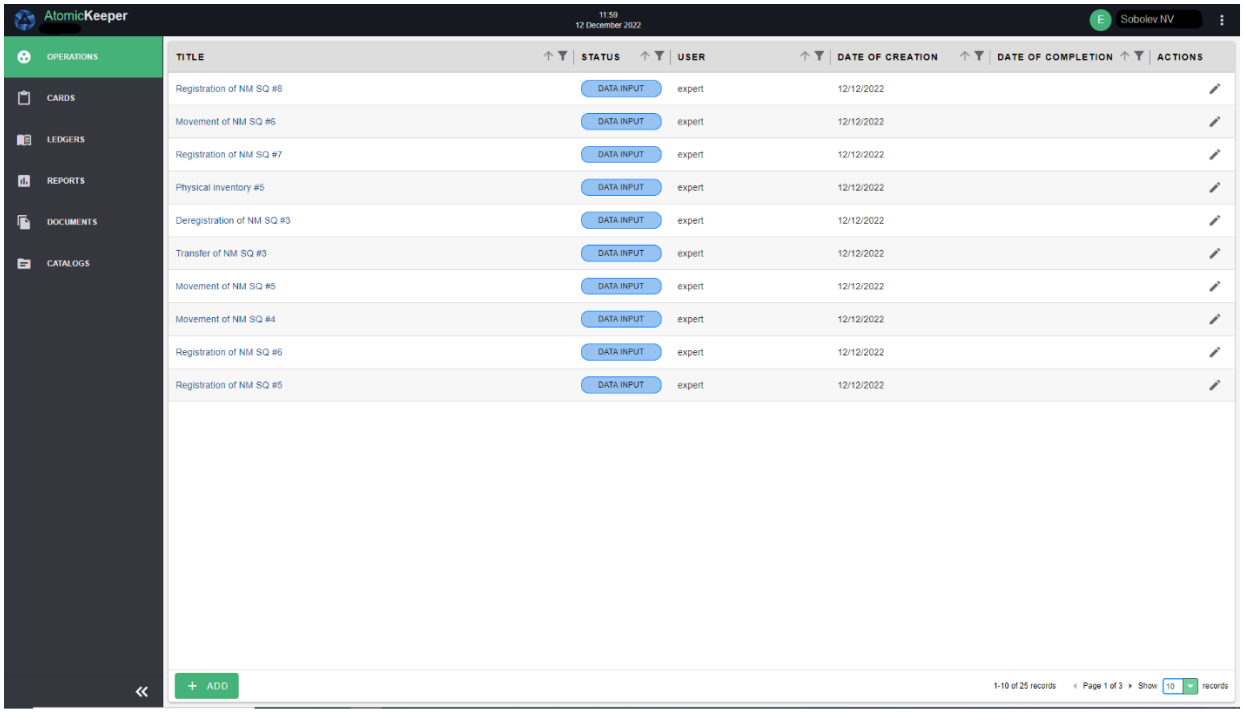
3. Make the necessary adjustments to the directories for the correct operation of the user with the Accountant role.

2. WORKING WITH ATOMIC KEEPER V.2.0

Open the URL of NM A&C AS 2.0.

Log in to NM A&C AS 2.0 using your personal login and password issued by the administrator. Upon initial login to NM A&C AS 2.0 the user is automatically prompted to change the password to their own.

Upon authentication with the Accountant role, open a page with a table of registered transactions.



At the bottom left part of the page there is a button to open/hide the main navigation menu (), which contains the following modules:

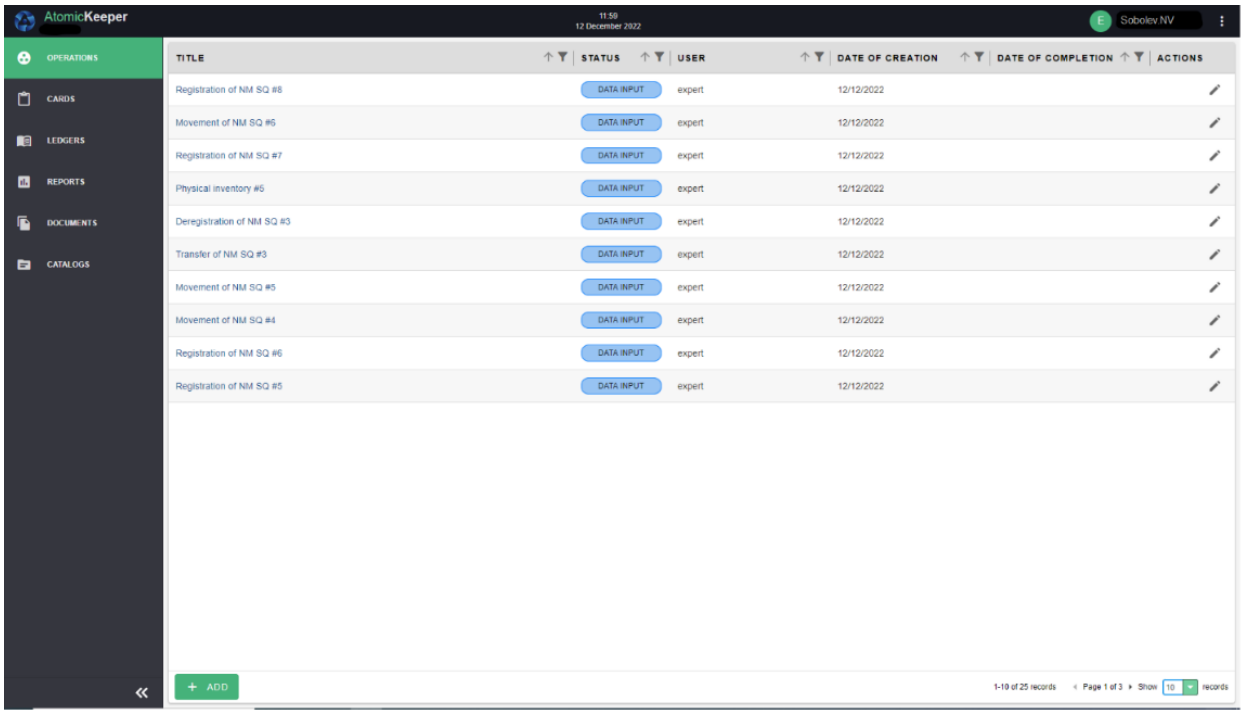
1) Module "Operations";
2) Module "Cards";
3) Module "Logs"
4) Module "Reports";
5) Module "Documents";
6) Module "References".

The bottom of the menu contains information about the name of the nuclear power plant using NM A&C AS 2.0 and installed version number.

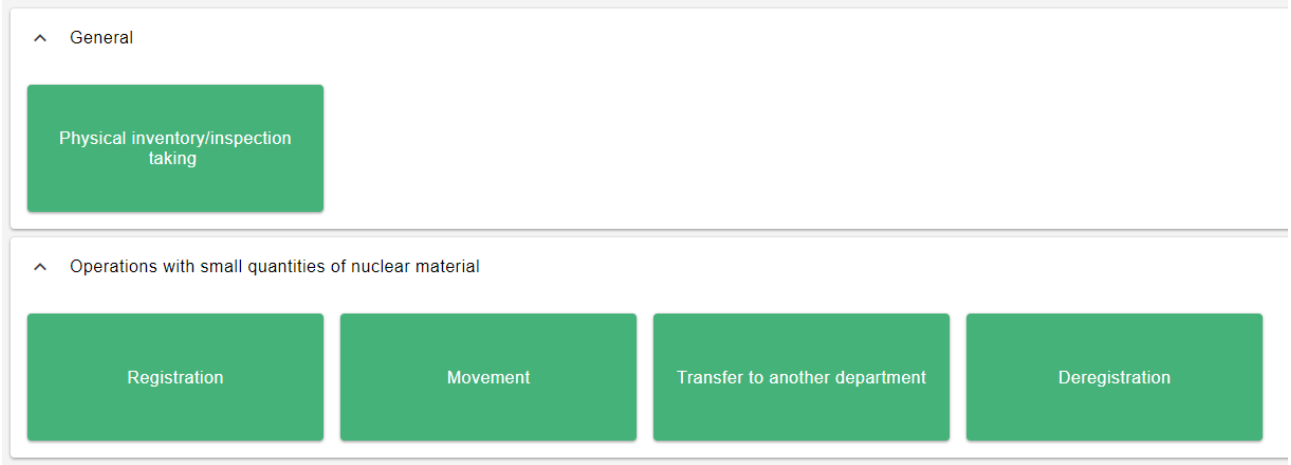
2.1. Working in the "Operations" module

Visually, the "Operations" module is a table with a list of all NM A&C AS 2.0 operations. The table supports sorting (from largest to smallest and vice versa)

and filtering of values (by one or more criteria). It is possible to scroll through the pages of the table and change the number of rows displayed on one page. A new operation supports two modes: viewing and editing. The transition to the editing of an operation occurs when you click on the button ⍁ in the column with this operation, and viewing is carried out by clicking on the name of the selected operation.



The registration of new operations is carried out using the button “+ Add”; after clicking on it, the user goes to the page of the functional part, where he selects the necessary operation.



Functionally, in the "Operations" module, the following set of operations can be performed (see the table):

Operation name	Description
General	
Conduct physical inventory/inspection.	Registration and entry of information about the PhI or inspection in the MBA containing small quantities of nuclear materials, such as the dates of the PhI /inspection, the composition of the inventory/inspection commission, as well as the performed checks of registered accounting units containing SQNM (hereinafter referred to as IU) during PhI /inspection.
Operations with small quantities	
Registration.	The operation involves the registration of small quantities of NM with the entry of data on IU, as well as on the initial location upon receipt. When adding isotopes, it is possible to select automatic conversion from activity to isotope mass and vice versa by setting the corresponding flag. When implementing the scenario of temporary deregistration of IU (recharging, verification), and then its subsequent registration with the same inventory number, there is a data recovery function that automatically fills in all the characteristics of small quantities of NM that were before its removal, with a preliminary warning that the inventory the IU number was already registered with NM A&C AS 2.0. If the IU is not deregistered, then registration with a duplicate number is prohibited.
Movement	The operation records the temporary movements of the IU within the perimeter of the nuclear power plant, indicating the initial and final location of the IU and the person who performed the movement. In the selection list of moved IUs, it is possible to select several entries by holding

	down the “Ctrl” button, as well as to search for the required IU in the corresponding line.
Transfer to another structural unit	This operation is used to change the permanent location of IU in a structural unit, when transferring IU to the balance of another structural unit, and when changing the responsible person in the unit where IU is registered (RP change). In the selection list of transmitted IUs, it is possible to select several entries by holding down the “Ctrl” button, as well as to search for the required IU in the corresponding line.
Deregistration	In this operation, the selected IU or selected IUs are deregistered. Several IUs are selected by holding down the Ctrl button. The implementation of the search for the required IU is carried out in the "Search" field.

The set of operations for a user depends on his/her group of rights set by the administrator.

Each operation with small quantities of nuclear materials consists of separate thematic stages, such as "General data", "Data", "Documents", "Completion of the operation".

The "General data" stage is intended for specifying general information about the operation (number, description).

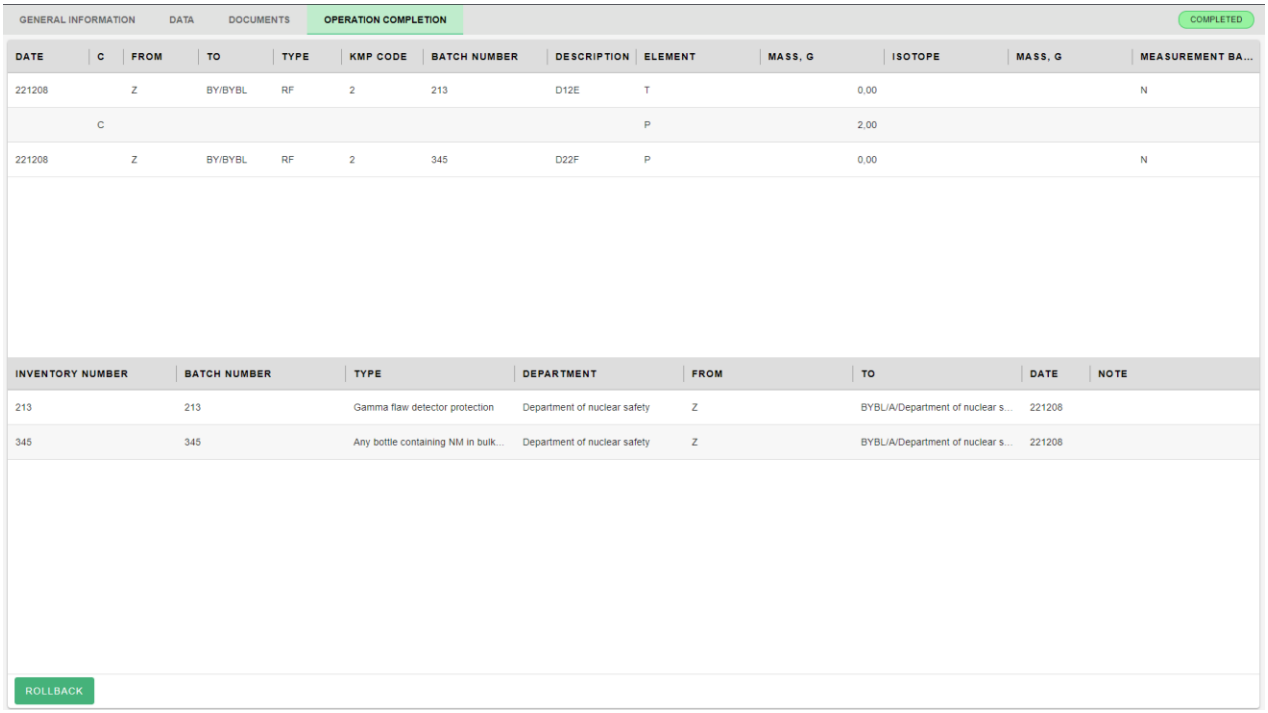
On the "Data" tab, one can add basic data to the selected operation using the "+ Add" button.

The "Documents" stage is intended for uploading documents related to the package of documents of the operation being performed.

The "Complete Operation" stage is informational and displays to the user the changes in NM A&C AS 2.0 that will be performed at the time the operation has been completed. Such a preliminary display of records allows the user to detect an error in the data in time and correct it before the operation is completed, that is, until the moment when the values in the database are overwritten.

In NM A&C AS 2.0 the function of editing the completed operation is implemented. The function is used to correct the data entered incorrectly during the operation. To edit (reset) an operation, open the operation in view mode, then go to the "Complete operation" tab and press the corresponding button in the lower left

part of the screen. When you press the button, the operation will switch to the "Data entry" status, which allows you to make changes to the entered data.



There are several limitations to this function:

1) The operation can be reset (edited) if it has the status "Completed".

2) If the data of the operation being reset does not affect the data of the operation performed later.

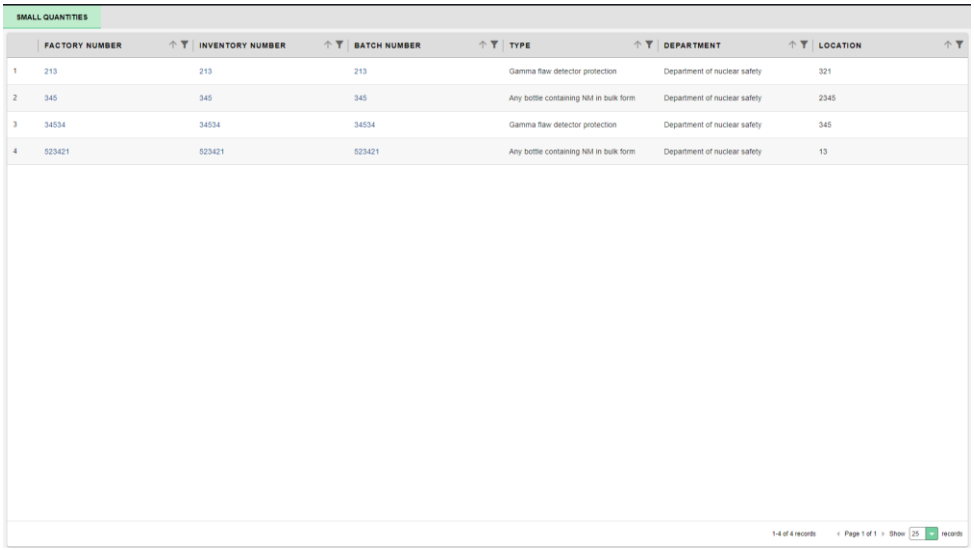
2.2. Handling cards

The "Cards" module is a set of registration cards registered in NM A&C AS 2.0 accounting units containing SQNM. The cards contain detailed information about the characteristics and parameters of IU, as well as a history of changes in these properties during use at a nuclear power plant. Providing reliable information about the state and properties of IUs throughout their life cycle is the main purpose of this module.

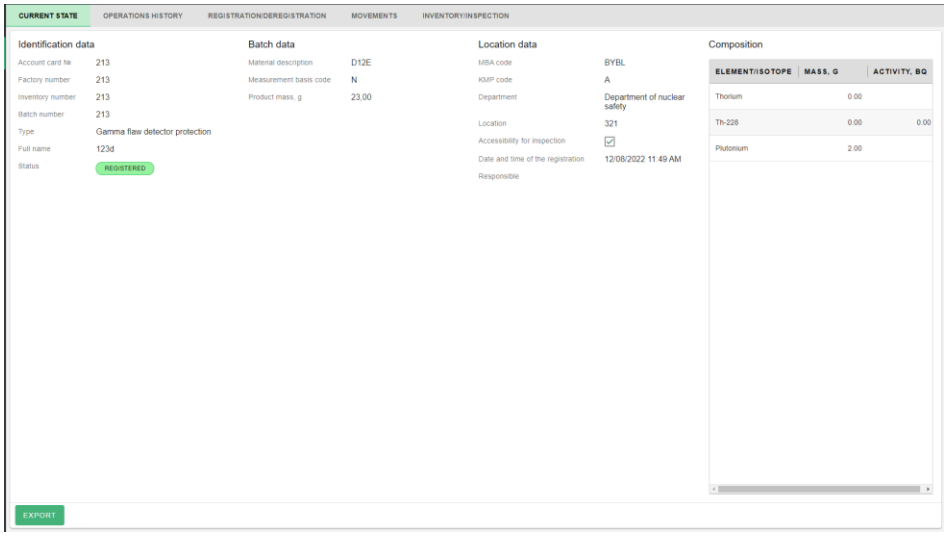
In NM A&C AS 2.0, the creation of an IU card, as well as the adding of new entries into the card, is carried out automatically. The cards of all IUs are permanently stored in NM A&C AS, deletion and editing of information in the cards is not possible.

Visually, the "Cards" module is a table with a list of IU cards. Tables with cards support sorting (from largest to smallest and vice versa) and filtering (by one or more criteria) of values. It is possible to scroll through the pages of the table and

change the number of rows displayed on one page. When you click on any of the IU numbers, the card opens for viewing.



The view of a card of a particular IU is a page divided into two parts. The thematic tabs "Current State", "Operations History ", "Incoming/Outgoing", "Movements", "Inventory/Inspection" are displayed in the upper part. At the bottom of the page is a text description with information corresponding to the selected tab. At the bottom of the screen there is an "Export" button to save the card in the format *.docx.

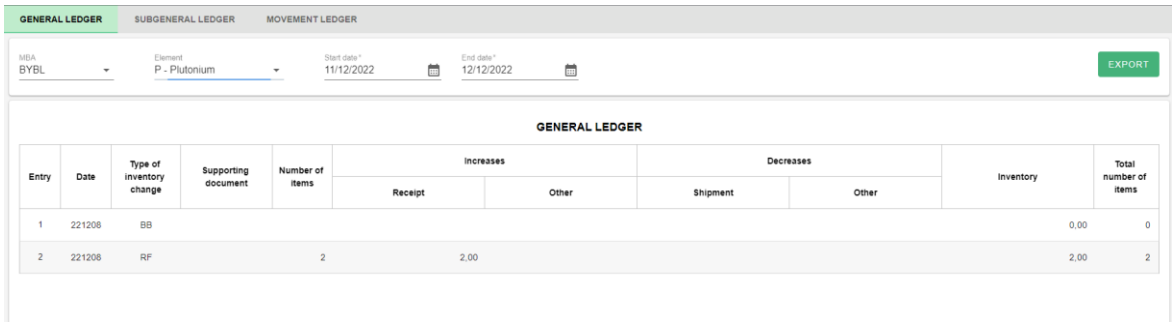


2.3. Working with the "Ledgers" module

The " Ledgers" module is represented by the following three types of ledgers: General Ledger, Subgeneral Ledger and Movement Ledger. Along with the IU record cards, the ledgers are the accounting documents of the nuclear power plant. They are designed to display up-to-date information on the amount of nuclear

materials, as well as on all changes in this amount over a certain period of time, broken down into material balance areas and the key measurement points of the amount or structural subdivisions.

The ledgers are designed to chronologically display important events for accounting and control at the level of the material balance area (MBA) - General Ledger, at the level of a key measurement point (KMP) - Subgeneral Ledger, at the level of a structural unit - Movement Ledger.



In the ledgers, new entries are added automatically as the user performs actions in NM A&C AS 2.0.

Data sources for ledgers are as follows:

1) operations in which an inventory change of NM occurs;
2) IU movement operations;
3) PIL reports.

The general ledger and subgeneral ledger maintain separate records for different elements (for uranium and plutonium). It is possible to choose a separate display of entries by structural divisions in the movement log.

Visually, the "Ledger" module is a page divided into two parts. The upper part provides switching between the general ledger, subgeneral ledger and movement ledger, and the lower part directly presents the entries (rows) of the active ledger in tabular form. You can view the records of one log at a time. The name of the active (open) ledger is highlighted in color.

The “Ledgers” module provides the following functionality:

- viewing ledger entries (with configuration of displayed information by means of filters);
- export of the ledger of interest (part of the ledger) to an .xlsx file in Russian or English (by clicking on the buttons of the same name).

2.4. Handling the Reporting Documentation module

The Reporting Documentation module is a set of reporting documents and corrective references to them based on international documents (IAEA code 10), as well as a possibility to add information about accounting reports sent to a regulatory body.

Visually, the Reporting Documentation module is a page divided into three parts. The upper part switches between individual types of reports (PIL, ICR, MBR, TR). The left part provides switching between MBA, the right part directly shows the rows with a report in tabular form. At the bottom, there is the tabdirectly showsport button intended to create a report depending on the selected type in the top tabs and the selected MBA.

In the column of the table "Actions", there are a number of controls (buttons):

CN – add a summary to the report;

CN – save the summary added to the report (FIX format);

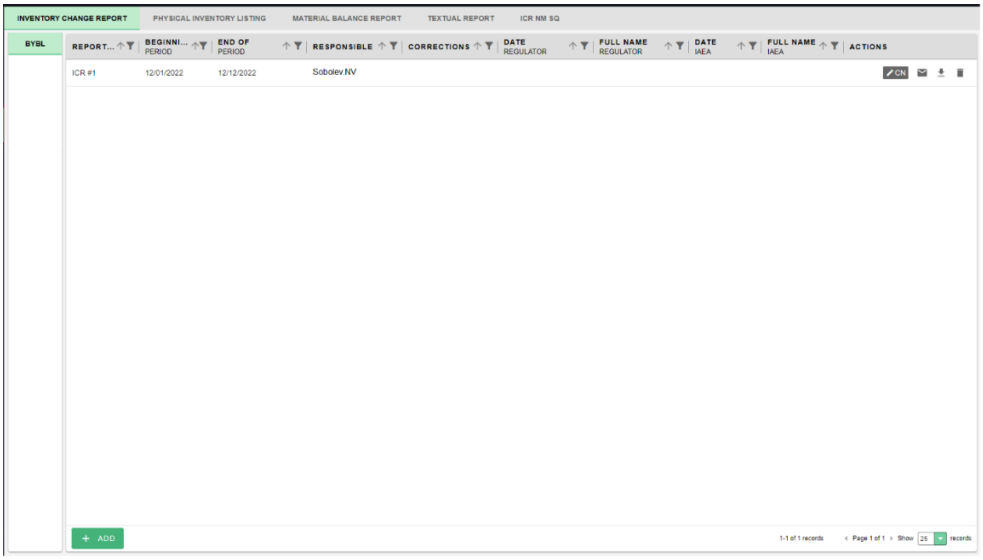
– enter information about sending the report;

– save the selected report;

– delete the created report (only available if the information about sending the report is not entered).

Simultaneous deletion of several reports is not supported, each report is deleted separately. Reports for which at least one field about sending to third-party organizations is filled in are not subject to deletion.

Tables with reports support sorting (from largest to smallest and vice versa) and filtering (by one or more criteria) of values. It is possible to scroll through the pages of the table and change the number of rows displayed on one page.



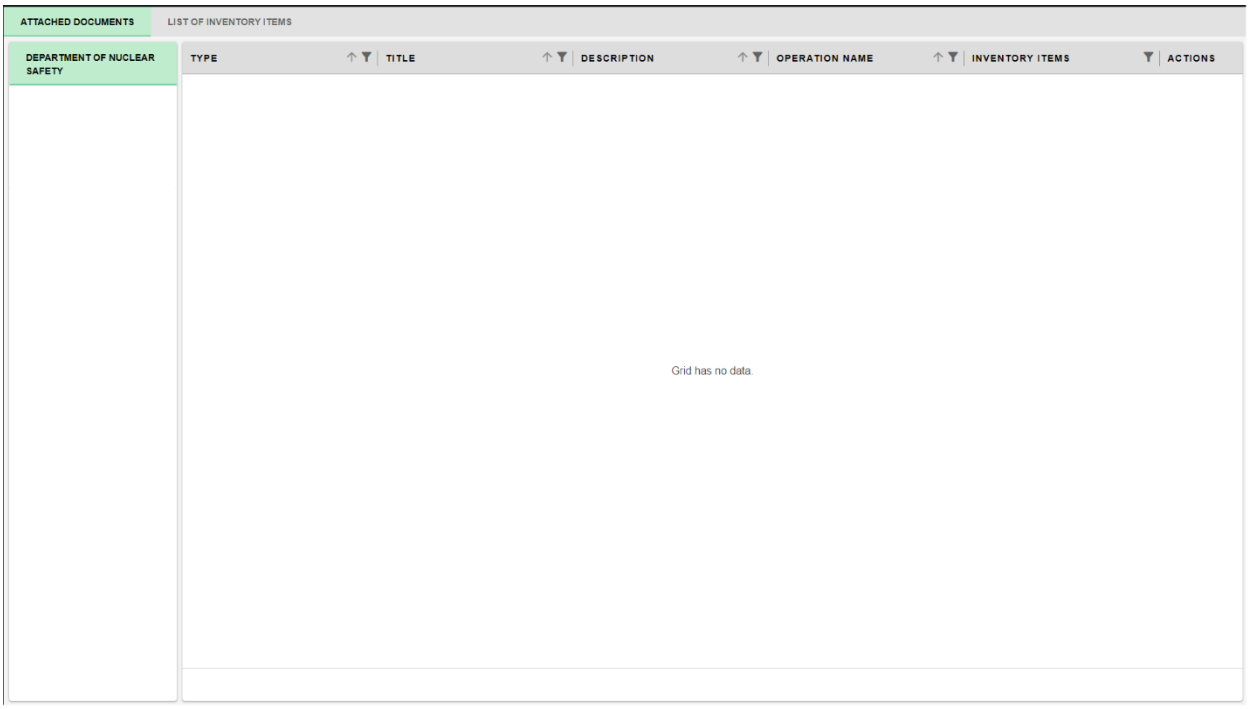
The Reporting Documentation module provides the following functionality:

- creation (generation) of reports;
- viewing a table with all reports of a given type;
- deleting a specific report;
- entering data on sending a report to third-party organizations;
- export of the report of interest to an .xlsx file in Russian or English.

Also, for some NPPs, the MBA uses its own type of reports on IUs containing small amounts of NM. This type of reports will be displayed as a separate tab on the module page "Reports".

2.5. Module Documents

The "Documents" module is designed to store all the documentation, which is attached by the user independently as a result of operations, and this module also implements the preparation of a list of the available amount of NM according to MBA (LII). The module provides the ability to sort and filter documents by Document Number, Document Type, Attached File Name, Date, as well as the download function.



The module is divided into the following tabs: "Attached Documents", "Cartograms", List of Inventory Items (LII).

On the "Attachments" tab, on the left, there is an additional sorting of documents by registered structural units. Documents support the sorting (from

largest to smallest and vice versa) and filtering (by one or more criteria) of values. It is possible to scroll through the pages of a table with documents and change the number of table rows displayed on one page.

In addition to the ability to view, filter and sort documents, the Documents module has a functional option for downloading a document. The user can download any document and view it by clicking the button  in the "Actions" column of the corresponding document.

2.6. Module "References"

The "References" module is a set of 33 thematic reference books (also referred to as “directories” or “references”), each of which contains data about certain information parameters and the codes assigned to them.

Visually, the "References" module is a page divided into two parts. On the left side, there is a list of all 33 directories in alphabetical order. You can view the entries of one Reference at a time. The name of the active (open) Reference is highlighted by color. In the right part, the records of the active Reference are presented directly in table form. All directories support sorting (from largest to smallest and vice versa) and filtering (by one or more criteria) of values. The ability to scroll through the pages of the table and change the number of table rows displayed on one page is supported.

Reference books perform two main functions: first, they store and display reference information (for example, a list of nuclear material isotope codes); secondly, based on the Reference entries, lists of predefined values *\u200b\u200bare* used in all other NM A&C AS 2.0 modules when entering data about a particular event and/or object. The latter allows the user not only to reduce the number of re-entering data, but also reduces the likelihood of errors.

For a user with the "Accountant" role, you can only view all directories.

3. EMERGENCY ACTIONS

The system must ensure correct handling of emergency situations caused by incorrect actions of the administrator, incorrect format, or invalid input data values. In these cases, the administrator should be given appropriate alarm messages, and then return to the working state that preceded the incorrect (invalid) command or incorrect data entry. Emergencies can occur both due to errors in software products and due to incorrect settings.

The main signs of an emergency are:

1. Absence of the required page on the screen.
2. Windows with messages about an emergency situation.
3. Windows with messages in English.
4. Errors related to the software.

3.1. Actions in case of non-compliance with the technological process conditions, including the case of long-term technical failures

After receiving an error message, you must follow the recommendations indicated in the message, if any, otherwise reload the page, check the network connection. If the error message recurs, please contact the Atomic Keeper developer. When contacting the developer, you must specify the course of action that led to the error, including providing the information entered into the system, if an error occurred while entering it, user action log data.

3.2. Actions to restore programs and / or data in case of the failure of magnetic storage media or detection of errors in data

If magnetic media fails or errors are found in the data, the system administrator must restore the files and data necessary for the correct operation of the system from the latest backup. If the administrator cannot resolve errors in the data, you should contact the Atomic Keeper developer. In this case, it is necessary to specify a list of data containing errors and the correct values of distorted attributes.

3.3. Actions in cases of detection of unauthorized data tampering

In case of detection of unauthorized interference with Atomic Keeper data, the system administrator must restore the files and data necessary for the correct operation of the system from the latest backup. You should also contact the developer of "Atomic Keeper" and describe the signs and the expected nature of the interference, as well as indicate the list of data subjected to interference.

3.4. Actions in other emergencies

If other emergencies occur while working with Atomic Keeper and it is impossible to eliminate them using the administration tools, the database management system or the operating system, you should contact the system developer. In this case, it is necessary to describe the signs of an emergency and the actions that were performed by the user immediately before the occurrence of an emergency. The main possible emergency situations and their solutions are described below.

Emergency situation	Possible loss of information	Method of fixing	Performer
Turn off hardware power	User unsaved data	Re-entering and saving information	User
Hardware failure (excluding hard drive)	User unsaved data	Re-entering and saving information	User
Server operating system failure	All information received by the System since the end of the last data backup.	Restoring data from backup	Administrator
Hard drive failure	All information received by the System since the end of the last data backup.	Restoring data from backup	Administrator
Failed to transfer data	Information transmitted	Resending data to the server	User
Missing page on the screen	User unsaved data	Page reload by the button "Update" in the Internet browser; return to the previous page and click again on the link to the required page	User
Emergency situation message windows	User unsaved data	Follow the instructions in the message, if any. If necessary, contact the administrator	User

Emergency situation	Possible loss of information	Method of fixing	Performer
Windows with messages in English	User unsaved data	Contact the administrator	User
Software related errors	All information received by the System since the end of the last data backup.	Restarting the relevant software, rebooting the server, restoring data from backups	Administrator