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Authorization

	NAME	SIGNED
PREPARED	ML VAN STADEN (Senior Scientist: Radwaste)	
CHECKED	L HORDIJK (Waste Specialist: NLM)	
CHECKED	G SCHONKEN (Team Leader: Software Development)	
ACCEPTED	ES TSHABALALA (Acting Manager: PDO)	
ACCEPTED	ZP DLAMINI (Manager: Radwaste)	
APPROVED	TC AKORTIA (General Manager: NW)	

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Doc. No.:	NLM-SPE-00042
Rev. No.:	00
Page No.:	2 of 73

REQUIREMENT SPECIFICATION FOR WTS REWRITE

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Doc. No.:	NLM-SPE-00042
Rev. No.:	00
Page No.:	3 of 73

REQUIREMENT SPECIFICATION FOR WTS REWRITE

Contents:

No.	Description Page	
1.0	PURPOSE	4
2.0	DEFINITIONS AND ABBREVIATIONS	4
2.1	ABBREVIATIONS:	4
3.0	GENERAL OPERATIONAL OVERVIEW	4
4.0	CURRENT WTS SOFTWARE OVERVIEW	7
5.0	GENERAL REQUIREMENTS FOR REWRITE OF WTS	8
6.0	ADMINISTRATIVE	9
APPENDIX A: LLSW PRINTSCREENS		11
APPENDIX B: SPECIFIED OUTPUT FORMATS OF THE DIFFERENT REPORTS		73

Doc. No.:	NLM-SPE-00042
Rev. No.:	00
Page No.:	4 of 73

REQUIREMENT SPECIFICATION FOR WTS REWRITE

1.0 PURPOSE

The purpose of this document is mainly to supply screenshots (as a whole or in sections) for the existing Waste Tracking System (WTS) which could be used together with the current source code and specified requirements to rewrite the existing program. The WTS program/system is used to manage the Low Level Solid Waste (LLSW) of NeCSA and consists of various sub program modules.

The current system can no longer be maintained, compiled or deployed as most of the libraries as well as the IDE version are discontinued.

2.0 DEFINITIONS AND ABBREVIATIONS

2.1 ABBREVIATIONS:

WTS:	Waste Tracking System
LLSW:	Low Level Solid Waste
IDE:	Integrated Development Environment
BNFL:	British Nuclear Fuel Limited (Pty)
SDS:	Segmented Drum Scanner
VRF:	Volume Reduction Facility
IAEA:	International Atomic Energy Agency
WSRF:	Waste Segregation and Repacking Facility
PLC:	Programmable Logic Controller
MS-SQL:	Microsoft Structured Query Language
FTP:	File Transfer Protocol
BCR	Barcode Reader
DTC	Drum Transfer Certificate

3.0 GENERAL OPERATIONAL OVERVIEW

The WTS is used to track the movement and to specify the current position of each barcoded container with waste in terms of store, row number, block number and pallet height of every waste drum under the management of PDO. This tracking is started from the point where the drum is collected at the client's facility, through all the processes till the disposal of the drum. The BCR used for the tracking of the movement is currently a Motorola MM90 terminal (mobile 6 Operating System). The position of the drum is logged by the operator on the BCR before reading the barcode. The barcodes together with the position are then downloaded in the WTS by

Doc. No.:	NLM-SPE-00042
Rev. No.:	00
Page No.:	5 of 73

REQUIREMENT SPECIFICATION FOR WTS REWRITE

using the *Download Batch* and *Drum Move* menus (see Figure 1). A report can then be generated of the list of barcodes downloaded. For the *Download Batch* additional information is added to generate the DTC.

Other information of the drums which is also captured into a database include among others the drum type, the client, the content of the drum (description of waste and a top view photo) and the characterisation information. The user interface containing the modules through which the capturing is performed is shown in Figure 1. The *Drum View/Registration* module as shown in Figure 1 is the module that contains all the information of the drum.

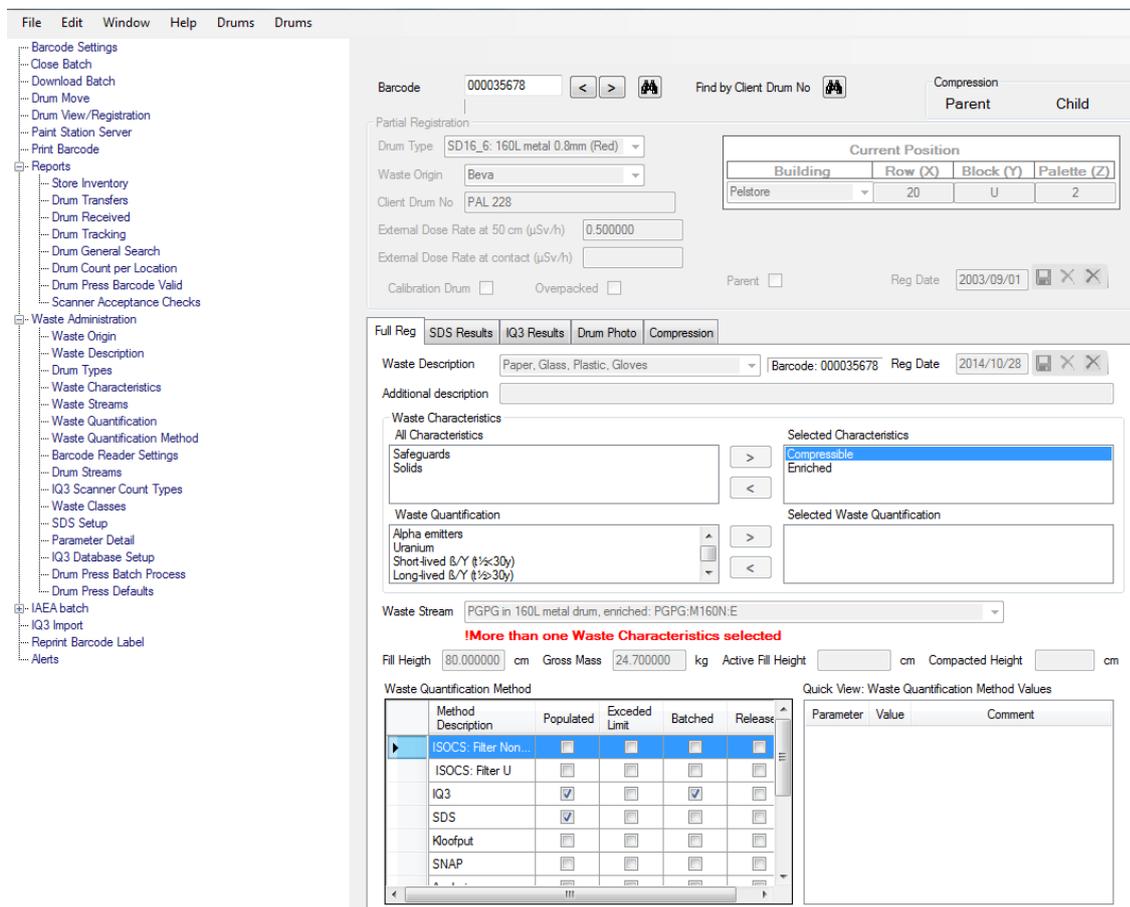


Figure 1: Print screen of Drum View/Registration module

As a security measure, specific sub modules and functions are allocated to specific user roles from the list of all the sub modules and functions in the WTS. Every user is given access to a specific user role.

Doc. No.:	NLM-SPE-00042
Rev. No.:	00
Page No.:	6 of 73

REQUIREMENT SPECIFICATION FOR WTS REWRITE

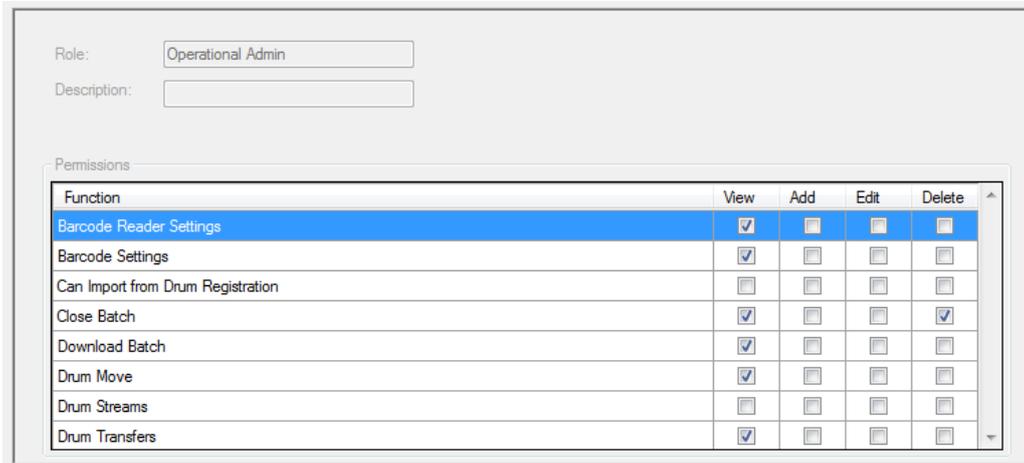


Figure 2: List of sub modules and functions as used in the WTS

The characterisation (identification and quantification of nuclides) of the drums are done by two gamma-ray scanners namely the BNFL SDS and the IQ3 scanners. The results produced from these two external facilities are logged respectively into each system’s database. To incorporate the characterisation results of drums into the WTS -

- The results from the IQ3 scanner are manually transferred/copied to the IQ3 backup database on the server through an administrator function (see Figure 3) from where the operator could import the data to the *IQ3 Results* tab through the *IQ3 Import* function (see Figure 1).

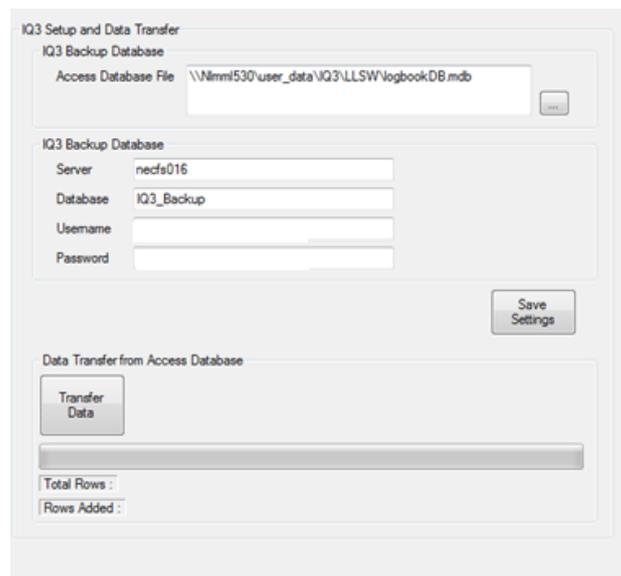


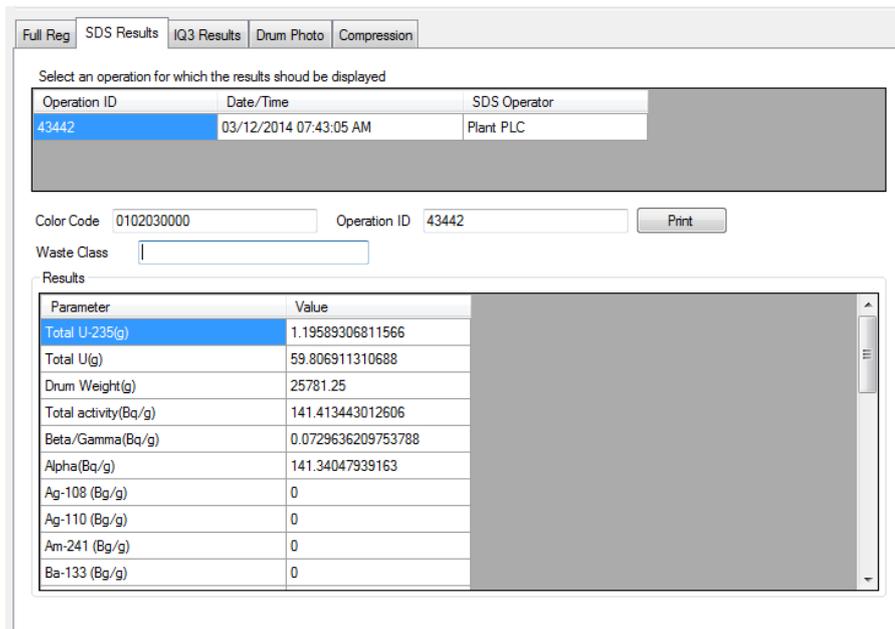
Figure 3: Print screen of the IQ3 Setup and Data Transfer function

- The results from the BNFL scanner are automatically copied (during the night) to the SDS backup database on the server. The measurement results of the BNFL SDS are not imported

Doc. No.:	NLM-SPE-00042
Rev. No.:	00
Page No.:	7 of 73

REQUIREMENT SPECIFICATION FOR WTS REWRITE

into the WTS database, but all the results of a drum are read from the SDS backup database and displayed in the *SDS Results* tab (see Figure 4) of the user interface of the WTS. Although the nuclide data is only read from the SDS backup database, the operation ID of the measurement and the waste class (as calculated from the SDS results) are automatically entered into the *DrumsTable* of the WTS directly after each successful measurement on the BNFL SDS.



Select an operation for which the results should be displayed

Operation ID	Date/Time	SDS Operator
43442	03/12/2014 07:43:05 AM	Plant PLC

Color Code: 0102030000 Operation ID: 43442

Waste Class:

Results

Parameter	Value
Total U-235(g)	1.19589306811566
Total U(g)	59.806911310688
Drum Weight(g)	25781.25
Total activity(Bq/g)	141.413443012606
Beta/Gamma(Bq/g)	0.0729636209753788
Alpha(Bq/g)	141.34047939163
Ag-108 (Bq/g)	0
Ag-110 (Bq/g)	0
Am-241 (Bq/g)	0
Ba-133 (Bq/g)	0

Figure 4: Print screen of displayed BNFL data

The final step in the conditioning process of a drum containing compressible waste is to compact it at the VRF into a small puck (defined in WTS as a child drum) and to pack about 5 pucks into a 200 litre drum (defined in WTS as a parent drum). Before a drum is compacted at the VRF, the barcode is read by the PLC and sent to the WTS where it is checked and validated against a list of requirements by the WTS to ensure that all the information of the drum is captured and that the characterisation results comply with requirements. The outcome of the validation is then sent back to the VRF as a code which indicates whether the drum complies or not to the VRF acceptance criteria.

4.0 CURRENT WTS SOFTWARE OVERVIEW

- The IDE is Microsoft Visual Studio 2010
- The system is written on a Windows based environment
- A One-Time and windows installer are used to create a deployment and version
- The coding solution is created and generated against the .Net3.5 and 4.0 platforms
- The system is heavily reliant on the Windows registry for the configuration of the system

Doc. No.:	NLM-SPE-00042
Rev. No.:	00
Page No.:	8 of 73

REQUIREMENT SPECIFICATION FOR WTS REWRITE

- Reports are created based on Crystal Reports 10.5
- The current system composes of various blocks:
 - The Necsys system (Necsys Common and frmMain modules) was written as a Framework for various sub-systems to be based on and run against. The sub-systems LLSW (WTS), MAP, MAPV3 and Pipestore are built on the Necsys Framework. The Necsys Framework used configuration to build the menus for the different sub-systems. The Necsys Framework also manages the user configuration, role and access through the security module. The roles and users are stored in the database.
 - Most of the views built are straight forward, but the Expression Builder is designed that the user can set up rules visually and each expression block has a specific purpose in the process flow (This is the most complex of the code structure)
 - Validation rules are implemented per view/field or the general rules can be found in the Validation Folder
 - Integration of operational processes (IQ3, DrumMove, DrumPress) are mostly process and database driven
 - The barcode reader integration (file sharing/upload) code is written to automatically sync and upload to the system and database. The barcode readers are an integral part of the system.
- Print screens (or sections thereof) for the current WTS are displayed in Appendix A. Although all the screens are listed, the corresponding notes and the tables as mentioned were only supplied as help for the system administrator of the WTS and are therefore not meant to be considered as the only source during the rewrite of the WTS.

5.0 GENERAL REQUIREMENTS FOR REWRITE OF WTS

- As most of the Servers and PCs are Windows based, the system should be a Microsoft based system
- Has to be compatible with 32 and 64 bit Operating systems
- As most PCs do have limitations on memory and browser version, an Intranet Web Base system is advisable where the front-end is light weight and doesn't contain any of the business logic. A web based installation also ensures that all operators are working on the same version.
- As most of the processing is calculations and rule based, most of the business logic and validations should be handled on the back-end server side.
- As the database contains sensitive and current data that is required for history, current and future calculations, the current database structure has to be used as is.
- MS SQL 2016, or later, to be used.
- All existing data must be migrated to the new database to ensure continuity.

Doc. No.:	NLM-SPE-00042
Rev. No.:	00
Page No.:	9 of 73

REQUIREMENT SPECIFICATION FOR WTS REWRITE

- User authentication must be based on user's Windows Active Directory account credentials. User access rights must be maintained via a relevant user interface within the system.
- All the reports must be migrated to either MS-SQL reporting Services or Crystal reports and users must be able to view these as either PDF or Excel files, as specified in Appendix B.
- All files, photos, images, scans and other documents must be saved to the database using a suitable format and user must be able to retrieve these easily.
- No external 3rd party add-ins, web services or any other external functionality to be used or included.
- The system should be able to:
 - Handle complicated calculations and alerts generated (notification push, such as SignalIR) as part of a configuration driven process. Some processes contain dynamic calculations according to input parameters
 - Handle security in terms of users, roles and role levels such as Add, Edit, View and Delete
 - Handle integration with sub-systems/internal 3rd parties:
 - BNFL SDS (system to characterised waste containers, sharing separate database to capture results)
 - IQ3 (system to characterise waste containers, sharing separate database to capture results),
 - Drum press (system and PLC retrieving and sending info to and from WTS)
 - Drum move (mostly database sharing or file driven)
 - Barcode readers. (used to record and download/upload waste drum positions)

The current Barcode readers and protocols used to interface with the WTS are old and need to be replaced with the rewriting of the WTS. Therefore, the recommendation of minimum requirements for suitable and available barcode readers, as well as the programming thereof (logging of the position of the container and the importing of the specified position into the WTS by using the *Drumload Batch* and *Drum Move* menus of the WTS -see paragraph 3) is also included in the scope of rewriting the WTS.

Please note that there are new functions to be added on this Barcode Reader for implementation of new processes as described in paragraph 5.5 of NLM-SPE-00038 (*Requirement Specification for WTS Upgrade to Include X-ray and WSRF Modules*)

Handle label printer for barcode printing

6.0 ADMINISTRATIVE

Doc. No.:	NLM-SPE-00042
Rev. No.:	00
Page No.:	10 of 73

REQUIREMENT SPECIFICATION FOR WTS REWRITE

- The contractor is required to assess the existing system. The existing system and the details specified in this document shall be regarded as the specification for the newly to be developed system.
- The source code (Visual C#) of the current WTS and of the current Motorola MM90 terminal barcode reader shall be made available to the contractor by NECSA. A test database (copy of current database containing minimum data) shall be made available to the contractor.
- The original as well as any previous upgrade user specifications shall also be supplied to the contractor.
- A declaration of secrecy must be signed by all potential suppliers before access to the source code as available and a test database of the current WTS system will be given.
- NECSA users will perform end-user testing and supplier shall be responsible for resolving all issues identified during end-user testing.
- A formal handover to NECSA's IT staff of all source code and other development outputs shall be included.
- All source code and development outputs of the upgraded system must be directly accessible and maintainable by NECSA after handover to NECSA.
- All source code and other development outputs of the migrated system shall become Necsa's intellectual property after handover.
- NECSA staff shall deploy the signed-off system to all client computers.
- NECSA shall be responsible for updating the content in all user manuals on the migrated system.
- If required, the supplier's developer can be provided with a work space at NECSA to be in close proximity with the WTS system administrator for faster resolution of queries, etc.
- Contractors must include in their quote a detailed breakdown of development milestones and which percentage each milestone contributes to the total order amount. These shall be as far as possible be based on Necsa verifiable outputs (e.g. completed modules/sub modules/functions).

APPENDIX A: LLSW PRINTSCREENS

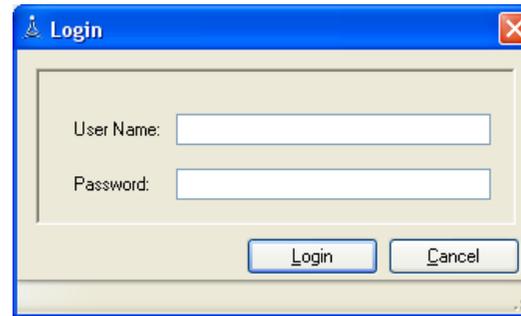
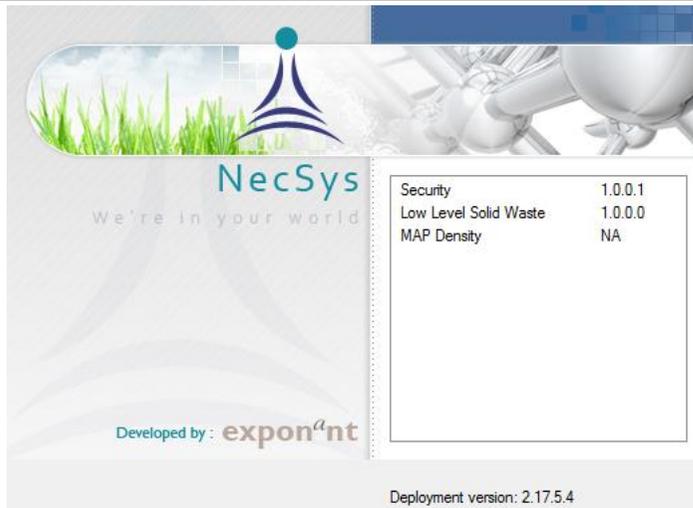
Contents

1	LLSW	14
1.1	LLSW BARCODE SETTING SCREEN	15
1.2	LLSW CLOSE BATCH SCREEN	16
1.3	LLSW DOWNLOAD BATCH SCREEN	17
1.3.1	Drum Move Secondary Screen1: Drum Move Report	18
1.4	LLSW DRUM MOVE SCREEN	19
1.4.1	Drum Move Screen: Drum Move Report	20
1.5	LLSW DRUM VIEW/REGISTRATION SCREEN	21
1.5.1	Drum View / Registration Screen: Full Reg Tab –Partial-Registration (Add New Drum)	23
1.5.2	Drum View / Registration Screen: Full Reg Tab – Full-Registration directly after Partial Registration (Add a new drum)	25
1.5.3	Drum View / Registration Screen: Full Reg Tab –Full-registration NOT directly after Partial Registration /Changes to already captured information (Edit Current Drum).....	27
1.5.4	Drum View / Registration Screen: Full Reg Tab –Capturing of Quantification Parameter Values (Edit Waste Quantification Method)	28
1.5.5	Drum View / Registration: SDS results	29
1.5.6	Drum View / Registration: IQ3 Results	30
1.5.7	Drum View / Registration: Photo	31
1.5.8	Drum View / Registration: Compression (Parent/Child).....	32
1.6	LLSW PAINT STATION SERVER SCREEN	36
1.7	LLSW PRINT BARCODE SCREEN	38
1.8	LLSW REPORTS: GENERAL FUNCTIONS INCORPORATED TO ALL REPORTS	39
1.9	LLSW REPORTS / STORE INVENTORY SCREEN	40
1.10	LLSW REPORTS / DRUM TRANSFERS SCREEN	41

1.11	LLSW REPORTS / DRUM RECEIVED SCREEN	42
1.12	LLSW REPORTS / DRUM TRACKING SCREEN	43
1.13	LLSW REPORTS / DRUM REGISTRATION SCREEN (DRUM GENERAL SEARCH)	44
1.14	LLSW REPORTS / DRUM COUNT PER LOCATION SCREEN	45
1.15	LLSW REPORTS / DRUM PRESS BARCODE VALID	46
1.16	LLSW REPORTS / SCANNER ACCEPTANCE CHECKS	47
1.17	LLSW WASTE ADMINISTRATION / WASTE ORIGIN SCREEN	48
1.18	LLSW WASTE ADMINISTRATION / WASTE DESCRIPTION SCREEN	49
1.19	LLSW WASTE ADMINISTRATION / DRUM TYPES SCREEN	50
1.20	LLSW WASTE ADMINISTRATION / WASTE CHARACTERISTICS SCREEN	51
1.21	LLSW WASTE ADMINISTRATION / WASTE STREAMS SCREEN:	52
1.22	LLSW WASTE ADMINISTRATION / WASTE QUANTIFICATION SCREEN	53
1.23	LLSW WASTE ADMINISTRATION / WASTE QUANTIFICATION METHODS SCREEN	54
1.24	LLSW WASTE ADMINISTRATION / BARCODE READER SETTINGS SCREEN	55
1.25	LLSW WASTE ADMINISTRATION / DRUM STREAMS SCREEN	56
1.26	LLSW WASTE ADMINISTRATION / IQ3 SCANNER COUNT TYPES SCREEN	57
1.27	LLSW WASTE ADMINISTRATION / WASTE CLASSES SCREEN	58
1.28	LLSW WASTE ADMINISTRATION / SDS SETUP SCREEN	59
1.29	LLSW WASTE ADMINISTRATION / PARAMETER DETAIL SCREEN	60
1.30	LLSW WASTE ADMINISTRATION / IQ3 DATABASE SETUP SCREEN	61
1.31	LLSW WASTE ADMINISTRATION / DRUM PRESS BATCH PROCESS SCREEN	62
1.32	LLSW WASTE ADMINISTRATION / DRUM PRESS DEFAULTS SCREEN	63
1.33	LLSW IAEA BATCH / IAEA BATCH UPDATE SCREEN	64

1.34	LLSW IAEA BATCH / ISOCS BATCH SCREEN	65
1.35	LLSW IQ3 IMPORT SCREEN	66
1.36	LLSW REPRINT BARCODE LABEL SCREEN	67
2	<i>LLSW SECURITY - GETTING STARTED</i>	68
2.1	LLSW PASSWORD MANAGEMENT	69
2.2	USER SET-UP (ASSIGNING OF APPLICATION AND ROLES)	70
2.3	SET-UP OF PERMISSIONS PER ROLE	71
2.4	LLSW LIST OF PERMISSION OPTIONS	72

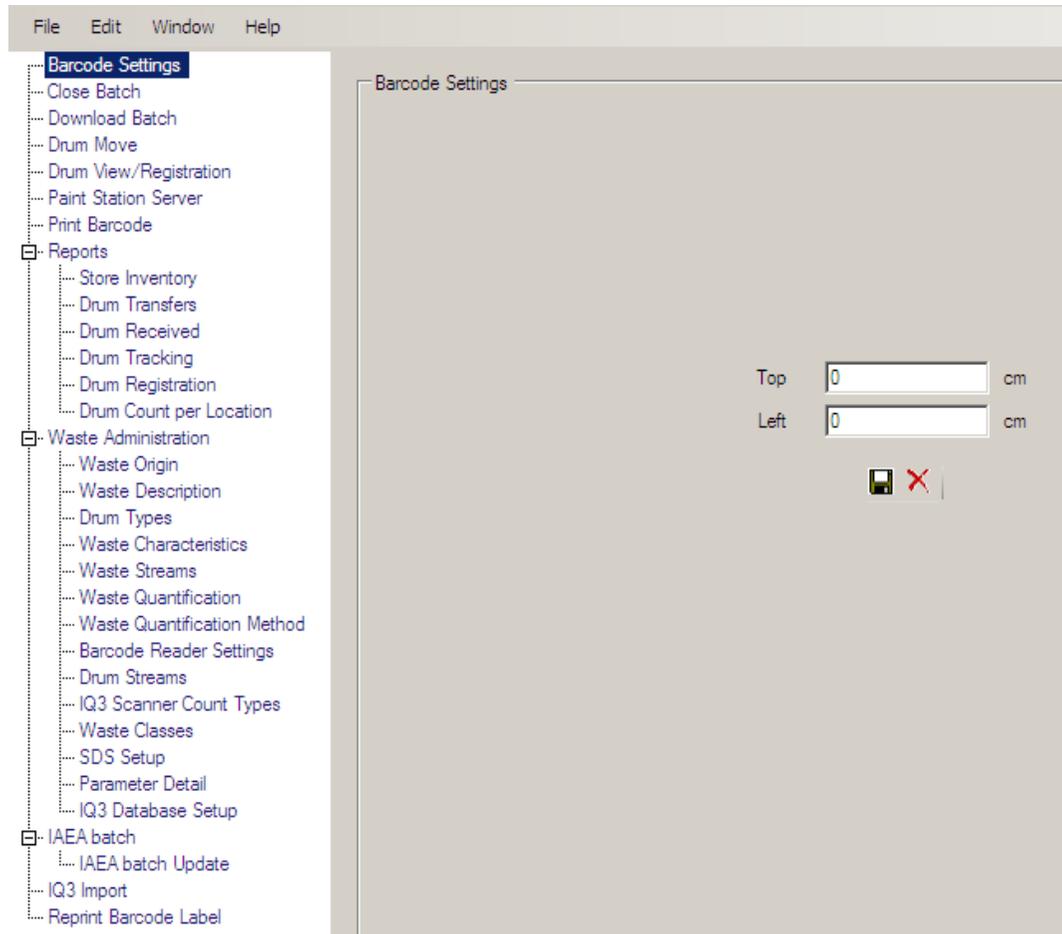
1 LLSW



- The Necsa Low Level Waste Program (LLSW) is a system that will track the drums, both the content and position.
- To use the LLSW application, user must be registered and given access to the necessary modules and features.
- Enter User Name and Password.
- When logged in, a menu defining the modules/sub-modules that the user has access to and the main window of the module that is highlighted will be displayed.
- If a new version of Necsys is available it will be downloaded automatically. However, the program will open with a blank screen. To activate the new version the user must go to File/Applications/Low Level Solid Waste. After activating the new version the program needs to be closed down and re-opened.

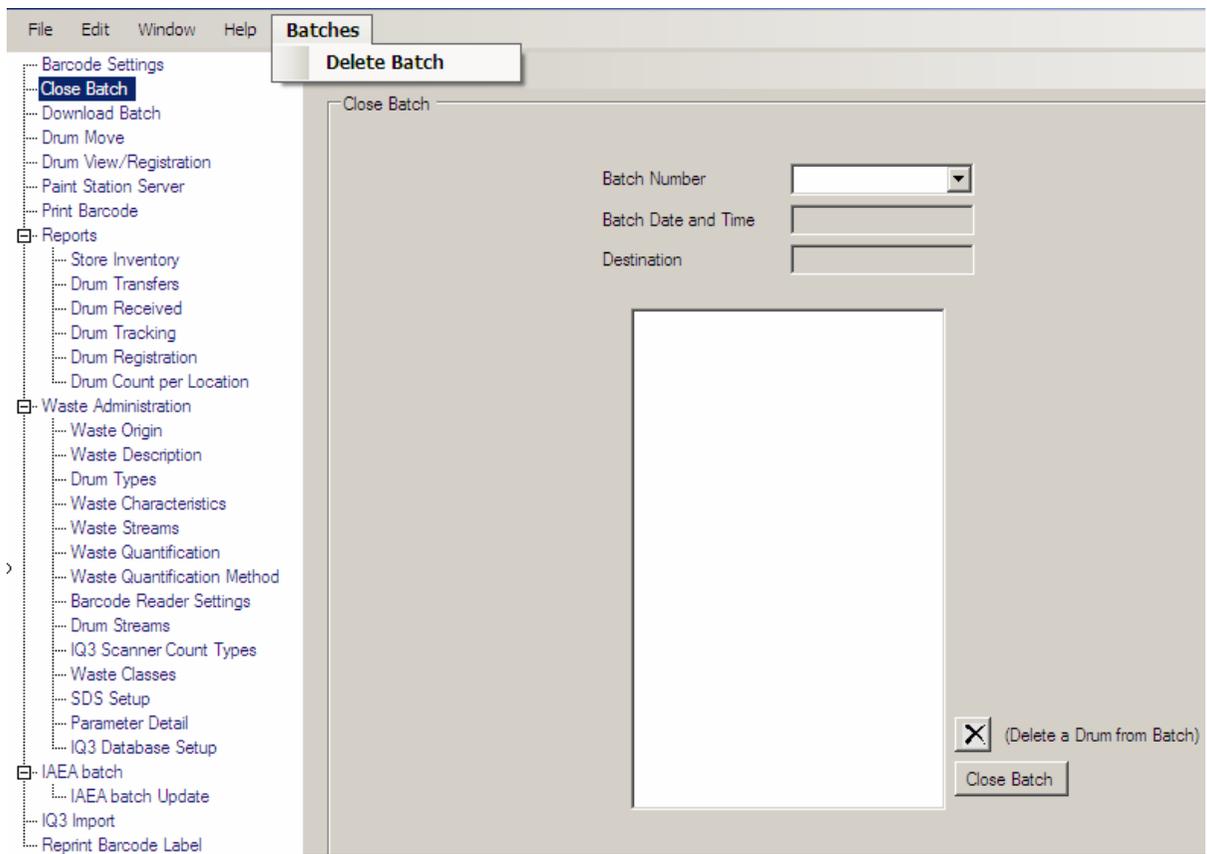


1.1 LLSW BARCODE SETTING SCREEN



- To set the position for the barcode on the application form for the waste
- The values for the barcode position is saved in the registry (values could therefore vary between different PCs)

1.2 LLSW CLOSE BATCH SCREEN



- To close the batch after the movement of the drums as specified on the Drum Transfer Certificate (created in Download Batch) is completed.
- Select the required Batch number from the drop down list.
- A list of the barcodes as on the Drum Transfer Certificate will be displayed
- To delete a batch – go to menu and select Delete Batch. This will remove the Batch totally from the LLSW database. However, the user who deleted the Batch will be logged.
- The Delete option will be only enabled for users that have access (security setting).
- To close batch – Select Close Batch button. This will set the Batch as processed and the BatchID will no longer appear in the list.
- To delete drum from batch – select drum, and then the X button. This will exclude the drum from the list of drums that will be closed during the batch close process.

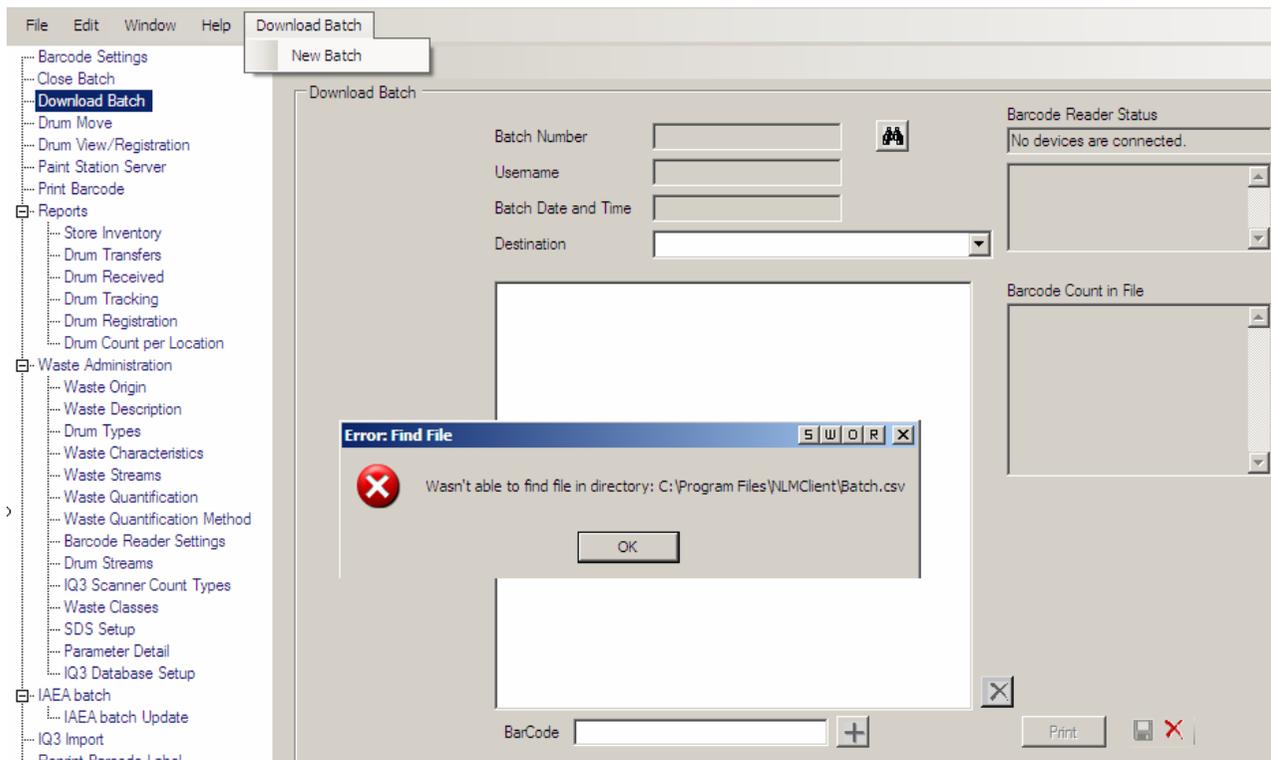
Deleted batches will be logged in *LLSW_Batches_Delete* table

dbo_LLSW_tblBatches_Delete		
BatchID	Delete_User	Delete_Date

Options for Permission Settings

FunctionName	View	Add	Edit	Delete	Comment
Close Batch	✓			✓	Delete: <i>Delete Batch</i> (Batches menu)

1.3 LLSW DOWNLOAD BATCH SCREEN



- To import a list of barcodes from the Barcode Reader (BCR) to create a Drum Transfer Certificate (DTC)
- The Batch.csv file (path specified in the Waste Administration / Barcode Reader Settings menu) downloaded from the BCR will be imported.
- If there is no Batch.csv file an error message will be displayed. Select New Batch from the Download Batch menu to try again, since, it may happen that the download process was not complete.
- Barcodes can be added manually to the imported list by typing in Barcode and select Add (+) button.
- Barcodes can be deleted from the Batch (Black X) or the Batch can be cancelled without saving or generating a BatchID (Red X)
- To generate a BatchID and DTC – specify the destination and Save the batch.
- The info is also stored for future viewing and printing at Reports / Drum Transfers or by using the search button (🔍) which will list all drums that are in an “open” batch (see also Reports/Drum Transfers)
- After Saving or Cancelling the Batch.csv file, it will be renamed automatically

1.3.1 Drum Move Secondary Screen1: Drum Move Report

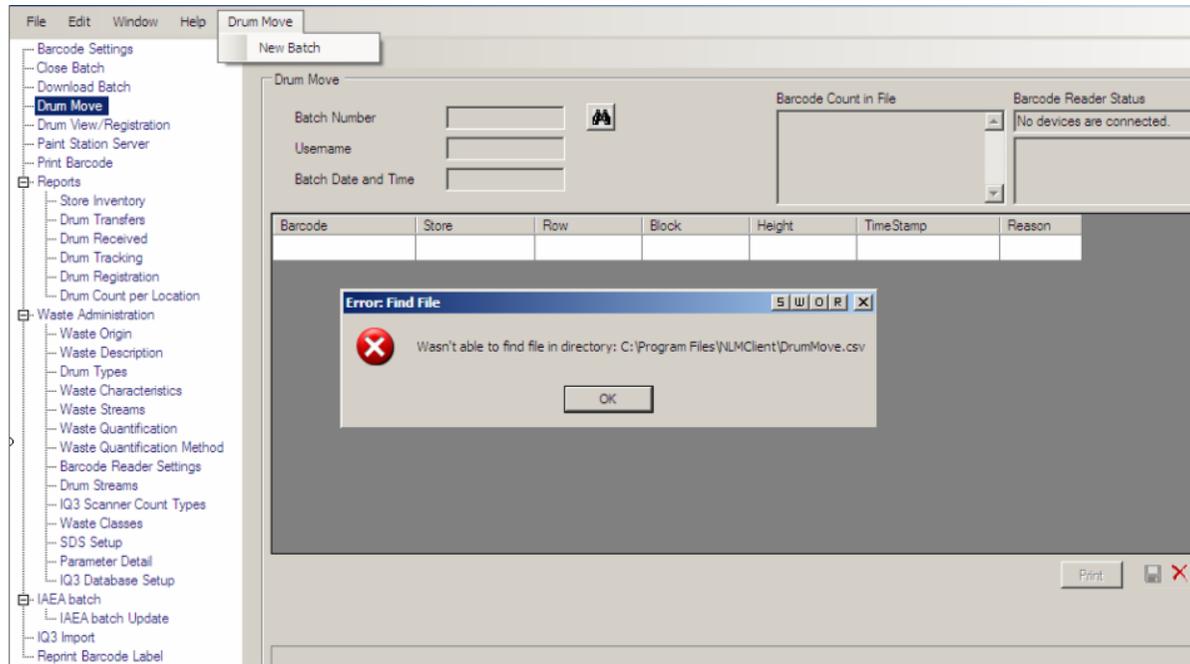
DRUM TRANSFER CERTIFICATE (COPY)

Batch ID: 26784 Drum Count 14
 Date: 2021/09/07 12:43:00PM
 Destination: HCC

Drum	Alias	Store	Waste Stream	Characteristics	Quantification	Desp	RCV
000081496	WSC-L-786	HCC	DPTEin Decay Dru	Isotopes	• Uranium: 28571 g • U235 Mass: 200g • Enrichment: 0.7%	<input type="checkbox"/>	<input type="checkbox"/>
Measurement Method: Default							
000084378	WSC-L-12/085	HCC		Isotopes	• Uranium: 28571 g • U235 Mass: 200g • Enrichment: 0.7%	<input type="checkbox"/>	<input type="checkbox"/>
Measurement Method: Default							
000084396	WSC-L-64	HCC	DPTEin Decay Dru	Isotopes	• Uranium: 28571 g • U235 Mass: 200g • Enrichment: 0.7%	<input type="checkbox"/>	<input type="checkbox"/>
Measurement Method: Default							
000084731	WSC-L-880	HCC	DPTEin Decay Dru	Isotopes	• Uranium: 28571 g • U235 Mass: 200g • Enrichment: 0.7%	<input type="checkbox"/>	<input type="checkbox"/>
Measurement Method: Default							

- The Quantification Method with results that is listed automatically on the DTC according to the following preference depending on which is already available –
 - 1) SDS
 - 2) IQ3
 - 3) Other
 - 4) Default
- Barcodes are listed from small to large

1.4 LLSW DRUM MOVE SCREEN



- Drum moves are logged in *LLSW_DrumMoves* table

dbo_LLSW_tblDrumMoves				
DrumMoveID	BatchID	BCRBatchID	DrumID	Des

- Invalid drum moves are logged in *LLSW_DrumMovesInvalid* table

dbo_LLSW_tblDrumMovesInvalid			
DrumMoveID	BatchID	BCRBatchID	Ba

- To Import a list of barcodes from the BCR to change the addresses of the drums after movement
- The DrumMove.csv file (path specified in the Waste Administration / Barcode Reader Settings menu) as downloaded from the BCR will be imported.
- If there is no DrumMove.csv file an error message will be displayed. Select New Batch from the Drum Move menu to try again, since it may happen that the download process was not complete.
- All invalid drum moves will be listed with the reason and will also not be saved as a drum movement but will be logged in the InvalidDrumMove LLSW table
- To generate a BatchID and a report – Save the Drum Move. (Reports will only be generated automatically if there were invalid drum moves)
- The info is also stored for future viewing and printing by using the search button (🔍)
- After Saving or Cancelling (Red X) the DrumMove.csv file will be renamed

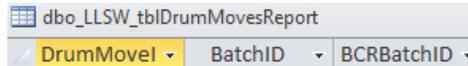
1.4.1 Drum Move Screen: Drum Move Report

Record of Drum Movements (17103) Loaded on 15/01/2013 5:48:59PM 2222-22-22 22:22

Drum Movement status report for Batch: 17103

Timestamp	Drum ID	Store	Row	Block	Height	Status
23/07/2012 3:31:00PM	999999207	PEL	999	A	1	SuccessfulCurrent position maximum
23/07/2012 3:31:00PM	999999202	PEL	999	A	2	Barcode not registered;
23/07/2012 3:31:00PM	999999209	PEL	999	A	1	Current position maximum exceeded;
23/07/2012 3:31:00PM	999999200	PEL	999	A	1	Successful
23/07/2012 3:31:00PM	999999203	PEL	999	A	1	Successful
23/07/2012 3:31:00PM	999999204	PEL	999	A	1	Successful
23/07/2012 3:31:00PM	999999205	PEL	999	A	1	Successful
23/07/2012 3:31:00PM	999999207	PEL	999	A	1	Successful
23/07/2012 3:31:00PM	999999201	PEL	999	A	2	Successful
23/07/2012 3:31:00PM	999999208	PEL	999	A	2	Successful
23/07/2012 3:31:00PM	999999208	PEL	999	A	2	Successful

Checked By: _____
 Name Signature Date



- Report results are logged in *LLSW_DrumMovesReport* table

- Possible Status that could be listed:
 1. Successful
 2. Current position maximum exceeded
 3. Barcode is already in batch
 4. Barcode not registered
 5. Barcode is already in batch; Current position maximum exceeded
- Possible Status that could be listed:

1.5 LLSW DRUM VIEW/REGISTRATION SCREEN

Method	Description	Populated	Exceeded Limit	Batched	Release
ISOCs	Fiber Non	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ISOCs	Fiber U	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IQ3		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SDS		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kloofput		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SNAP		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

dbo_LLSW_tbIDrums				
DrumID	Barcode	AccountIC	ClientDrumI	CurrentI

- Drum info in *LLSW_Drums* table
- Drum –Characteristic link : *LLSW_DrumCharacter* table

dbo_LLSW_tbIDrumCharacter		
WasteCharacterID	DrumID	Drum –Waste Quantification link : <i>LLSW_DrumQuantif</i> table

dbo_LLSW_tbIDrumQuantif		
DrumID	QuantifTypeID	QuantifVal

- Drum View/Registration is the main view from where the user can view all the relevant information of the Drums.
- Drums can be viewed (if already registered), added or edited with this screen depending on the options available. These options will be user specified.
- The following functions and information will be available for all users
 1. To look-up a barcode if only the client number is available
 2. Quantification Method used and the characterisation results
 3. The Full Reg , SDS Results, IQ3 Results, Photo and Compression tabs will be available for viewing to all users
- All the Save, Cancel and Delete options will be inactive for viewers (except when some options are specified to be active in security settings)
- Active Fill Height and Compacted Height will be populated automatically during the compaction process (VRF)
- For drums that are not standing in a numbered row, Block(Y) of the *Current Position* contains a special code (GEN, IQ3, VRF, RPK, CDR, etc.) to indicate that the drum is in a specified process area

LLSW Drum View/Registration Screen

continue

Barcode: 99999215 STATUS: DELETE

Find by Client Drum No

Partial Registration

Drum Type: SD16, 6, 160L, metal 0.8mm (Red)

Waste Origin: A Building

Client Drum No: 99999215

External Dose Rate at 50 cm (µSv/h): 1900.000000

External Dose Rate at contact (µSv/h)

Calibration Drum: Overpacked: Reg Date: 2011-05-27

Full Reg | SDS Results | IQ3 Results | Drum Photo

Waste Description: Sediment Barcode: 99999215 Reg Date: 2011-07-14

Additional description: DELETE: Mucky-DLT, test 15

Waste Characteristics

Waste Quantification

Waste Stream: Sediment in 100L metal drums, enriched, SCMT 30 160L E

Fill Height: 60.000000 cm Gross Mass: 35.000000 kg

Method Description	Populated	Exceeded Limit
ORIGEN	<input type="checkbox"/>	<input type="checkbox"/>
SAFARI	<input type="checkbox"/>	<input type="checkbox"/>
DrumScan	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>
Analysis	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
SNL	<input type="checkbox"/>	<input type="checkbox"/>

Drum Search

Client Drum No: 99999215

	Barcode	Drum ID	Client Drum No	Partial Reg Date	Full Reg Date
0	99999215	290388	99999215	07-06-2012 12:00:00	01-01-0001 12:00:00 AM
1	99999215	290387	99999215	07-06-2012 12:00:00	01-01-0001 12:00:00 AM
2	99999215	290389	99999215	12-06-2012 12:00:00	01-01-0001 12:00:00 AM
3	99999200	290362	MVS	20-04-2011 12:00:00	01-01-0001 12:00:00 AM
4	99999201	290364	MVS	21-04-2011 12:00:00	01-01-0001 12:00:00 AM
5	99999202	290366	MVS	21-04-2011 12:00:00	01-01-0001 12:00:00 AM

Detail Parameters for drum 99999215

User Parameters

Quantification

Method of quantification: Analysis

Parameter	Value	Comment	Unit of Measure	Limit
uranium	1.50E+001		B	10.00
Am-241	1.24E+003		B/g	0.00
repro	0.00E+000	NLM-RPT-12/010	report	0.00

- WQM results in *LLSW_DrumWasteQuantifParameterValue* table

```

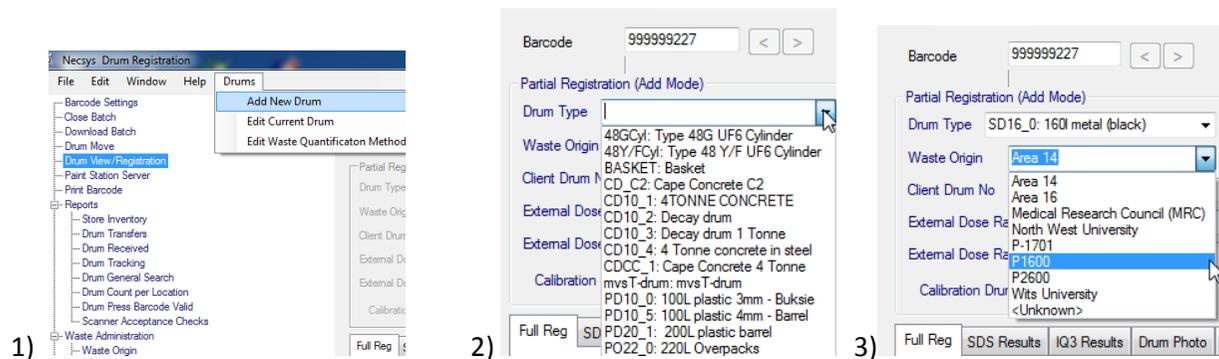
dbo.LLSW_tblDrumWasteQuantifParameterValue
DrumID QuantifMethodID WQMElementID WQMParameter
    
```

- The function to look-up a barcode if only the client number is available could be opened by using the search button (🔍) as indicated.
- Wild cards (*) could be used in the search process.
- The rows containing drums that are not fully registered will be coloured. The amount of rows displayed is limited to 1999.

- If any "delete status" is linked to the drum it will be displayed in the Status block (below the barcode) and in the Comment line

- The methods used to characterise the drum will be automatically ticked in the Waste Quantification Method (WQM) section as soon as results are available.
- Double clicking on the SDS and IQ3 methods will set the focus on the SDS and IQ3 tabs on the Drum Registration Screen.
- Clicking on the ticked WQM displays the results in the Quick value panel.
- Double clicking on the ticked WQM displays the detail screen containing the units and the limits. If the limit is exceeded it will be coloured red.

1.5.1 Drum View / Registration Screen: Full Reg Tab –Partial-Registration (Add New Drum)



1)

2)

3)

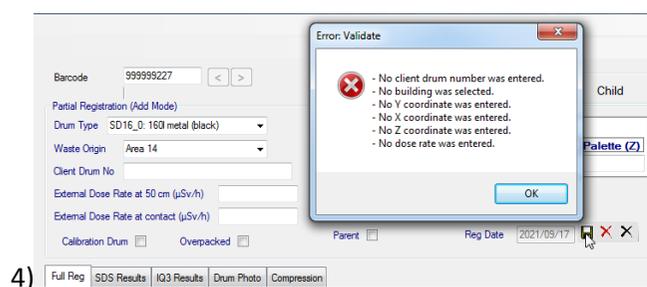
- Add new drum and Edit Current Drum enable Partial section for capturing information (*Full registration* section disabled)
- Saving the partial section, will enable the *Full Registration* section

To Add New Drum

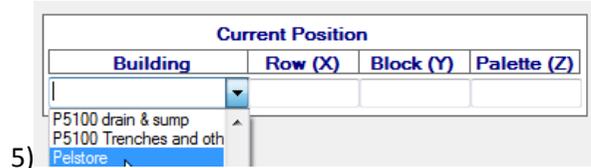
- 1) Go to Drums Menu and click Add New Drum
- 2) Enter barcode of new drum and choose drum type from dropdown menu (LLSW_tblDrumType)
- 3) Choose Waste Origin from dropdown menu (LLSW_tblOriginDrum)
- 4) Enter ClientDrum No, Dose Rate at 50 cm, at contact or at both

(Partial Registration needs to be fully completed before it can be saved; Calibration Drum, Overpacked, Parent are optional inputs where applicable)

- 5) Choose Building from dropdown menu (tblLocations)



4)



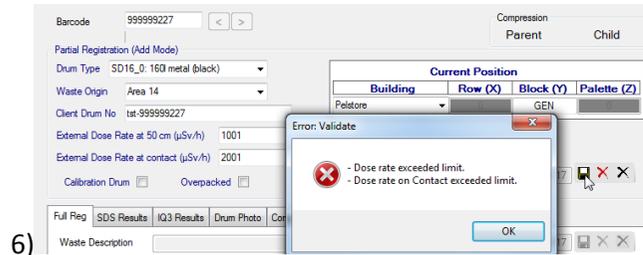
5)

Options for Permission Settings

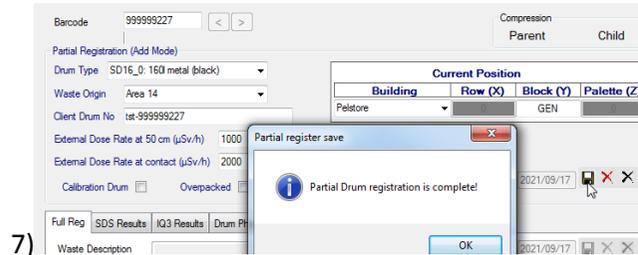
FunctionName	View	Add	Edit	Delete	Comment
Drum View/Registration	✓	✓	✓		Add: Enable <i>Add New Drum</i> (Drums menu) Edit: Enable <i>Edit Current Drum</i> (Drums menu)
Drum Registration Edit WQM	✓		✓		Edit: Enable <i>Edit Waste Quantification Method</i> (Drums menu)

Drum View / Registration Screen: Full Reg Tab – Partial-Registration (Add New Drum)

Continue



6)



7)

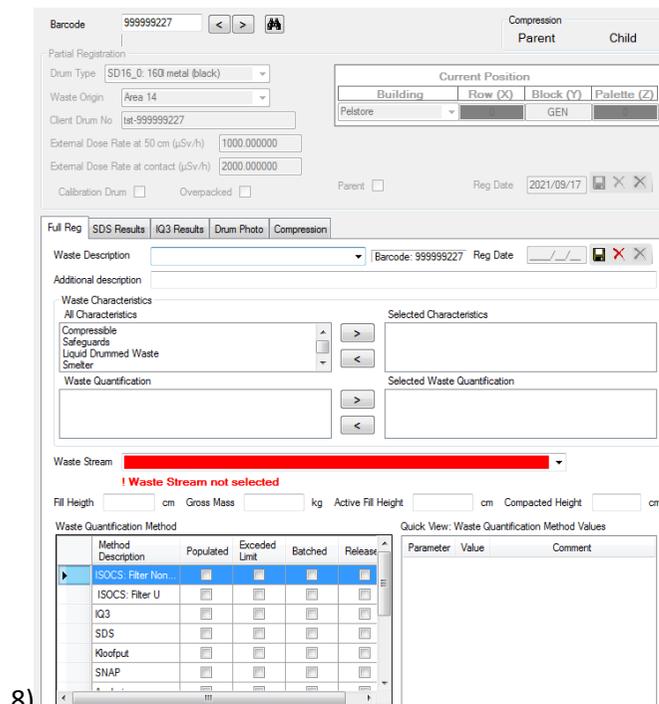
6) The following Dose Rate limits are applicable:

Dose Rate at 50 cm – 1000

Dose Rate at contact – 2000

7) Complete the Partial Registration process by saving the captured information

8) Full Registration screen now enabled and available for the capturing of the rest of the information

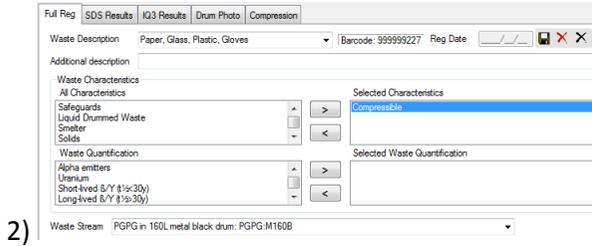


8)

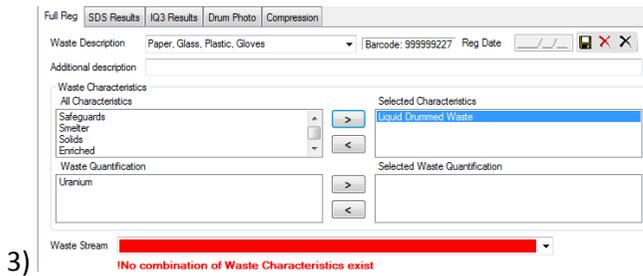
1.5.2 Drum View / Registration Screen: Full Reg Tab – Full-Registration directly after Partial Registration (Add a new drum)



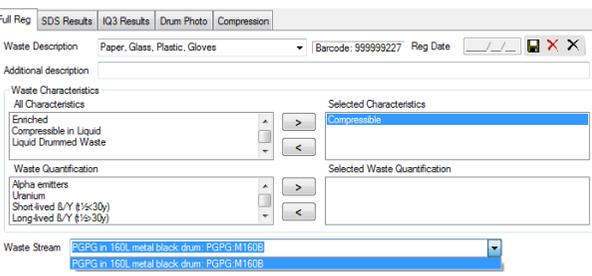
1)



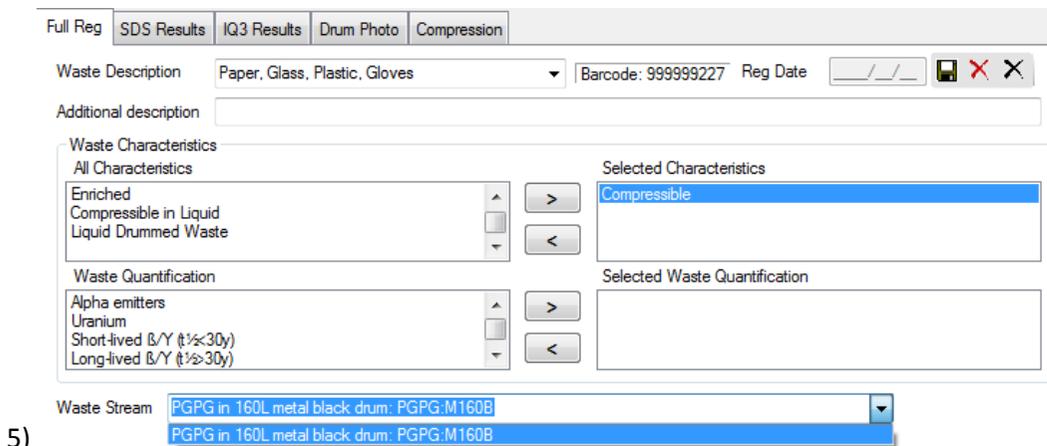
2)



3)



4)

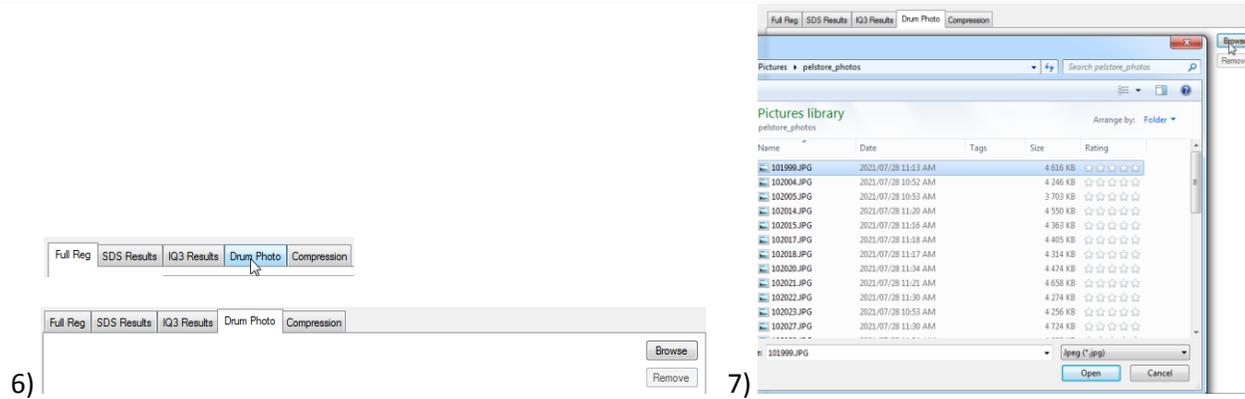


5)

- Full Registration can be performed directly after completion of the partial registration or at a later stage
- For Full Registration at a later stage the menu Edit Current Drum needs to be used

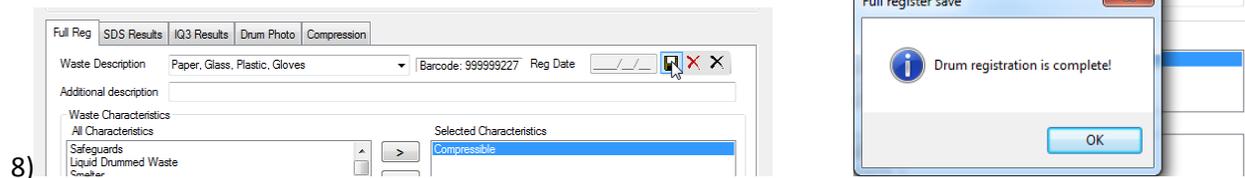
• **To Full Register a New Drum (directly after Partial Registration)**

- 1) Choose Waste Description from dropdown menu (*tblOriginDescription*)
- 2) Choose applicable Waste Characteristic from left block (*tblOriginCharacteristic*)
- 3) When choosing a non-applicable Waste Characteristic it could be reversed by moving it back to block on the left with the arrow
- 4) Choose applicable Waste Quantification from the left block (*LLSW_tblWasteQuantTypeWasteChar*)
- 5) Choose applicable Waste Stream from dropdown menu - if no Waste stream is displayed the selected parameter combination (DrumType, Waste Description and Waste Characteristics) is not valid or the combination is not yet registered by administrator (*LLSW_tblDrumCharDescStream*)



6)

7)



8)



9)

6) Photo can be added now to complete the Full Registration (or photo can also be added at a later stage through the *Edit Current Drum* menu)



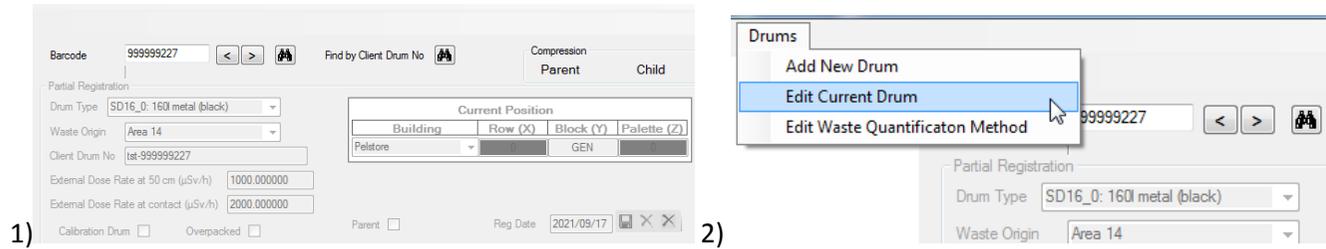
7) Browse for the photo to be imported and open the file

8) After importing the photo, go back to *Full Reg* tab to save the photo together with the other captured information



9) Full Registration will not be saved if one of the listed entries are missing

1.5.3 Drum View / Registration Screen: Full Reg Tab –Full-registration NOT directly after Partial Registration /Changes to already captured information (Edit Current Drum)

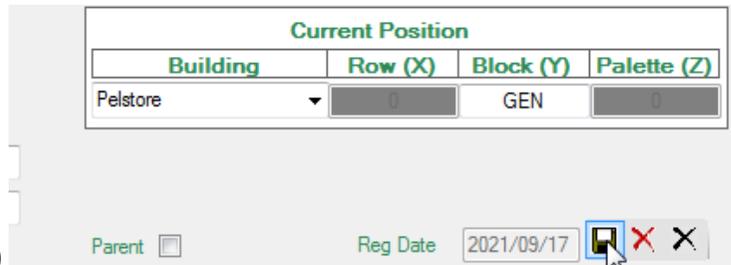


1)

- For Full Registration, to change some registered information already captured or to add the photo at a later stage the menu *Edit Current Drum* needs to be used

- **To Full Register a Partial Registered Drum (not directly after Partial Registration) or to change already captured information or to add the photo**

- 1) Enter barcode of drum that needs to be edited
- 2) Go to Drums Menu and click *Edit current Drum*
- 3) If no changes are needed on the *Partial Registration Section* – save the partial registration information
- 4) Supply the reason for editing the drum
- 5) Follow steps as described for full registration to change any data or to add photo

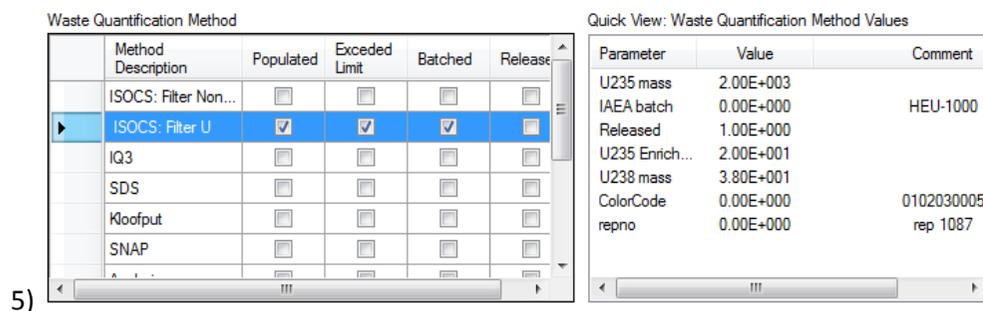
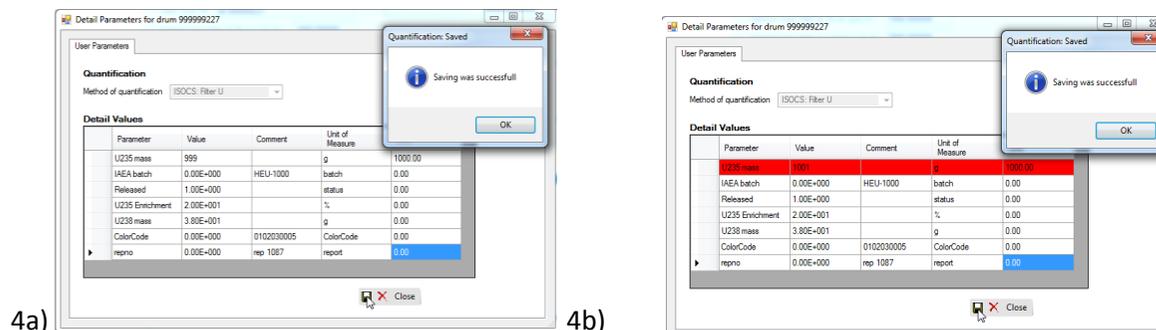
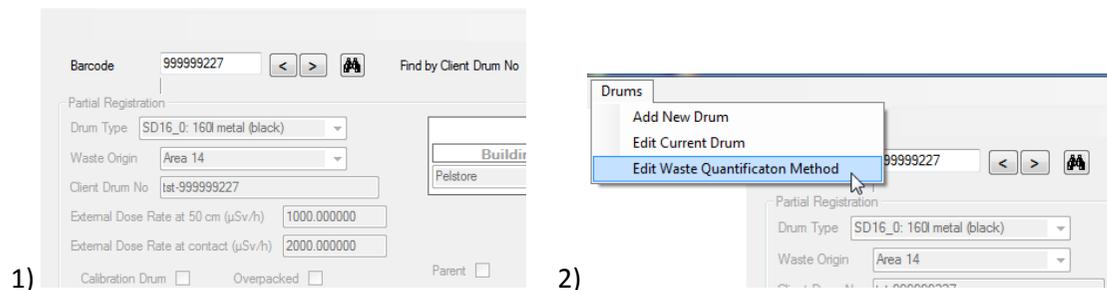


3)

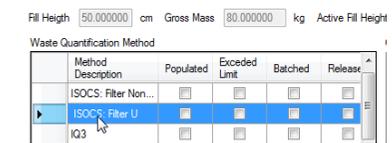


4)

1.5.4 Drum View / Registration Screen: Full Reg Tab –Capturing of Quantification Parameter Values (Edit Waste Quantification Method)



- To import measurement results for methods other than the SDS or IQ3 methods, the *Waste Quantification Method* section is used
- To import measurement results**
 - Enter barcode of drum to capture measurement results
 - Go to Drums Menu and click *Edit Waste Quantification Method* (to enable save button)
 - Double click on method for which the results need to be captured (to open capture screen)



- Enter and save results for the parameters as specified for specific method (values exceeding the limit will be coloured red)
- Waste quantification methods where results are captured are indicated with a tick in the *Populated* box. Where a limit is exceeded, it will be indicated by a tick in the *Exceeded Limit* box. Clicking on the method will show results in *Quick View* window; and double clicking will open the *Detail Parameters* window for more detail viewing or editing as applicable

1.5.5 Drum View / Registration: SDS results

Barcode: 000072546 Find by Client Drum No: Compression: Parent Child

Partial Registration

Drum Type: SD16_6: 160L metal 0.8mm (Red) Current Position: Building: Pelstore, Row (X): 249, Block (Y): K, Palette (Z): 3

Waste Origin: Beva(PBMR)

Client Drum No: B9-045

External Dose Rate at 50 cm (µSv/h): 1.000000

External Dose Rate at contact (µSv/h):

Calibration Drum: Overpacked: Parent: Reg Date: 2009/09/07

Full Reg | SDS Results | IQ3 Results | Drum Photo | Compression

Select an operation for which the results should be displayed

Operation ID	Date/Time	SDS Operator
30332	2012/01/10 06:57:18 PM	Plant PLC

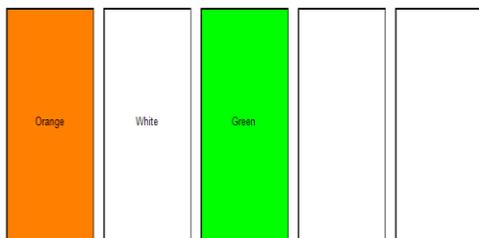
Color Code: 0102030000 Operation ID: 30332 Print

Waste Class:

Results

Parameter	Value
Total U-235(g)	0.990970050862325
Total U(g)	49.5586599869304
Drum Weight(g)	19921.875
Total activity(Bq/g)	151.629123594601
Beta/Gamma(Bq/g)	0.0607814522058824
Alpha(Bq/g)	151.568342142395
Ag-110 (Bq/g)	0
Am-241 (Bq/g)	0
Ba-133 (Bq/g)	0
Ce-144 (Bq/g)	0

000072546



- If the drum is already measured on the SDS, a list of the measurements will be displayed
- The results of a measurement can be displayed by selecting the OperationID in the top list.
- The colour code and OperationID (as calculated in the *Paint Station Server*, par 1.6, module) is displayed for the last measurement (highest OperationID)
- The colour code and the OperationID will be displayed as soon as these fields are populated in *LLSW_tblDrums* after measurement is verified successfully in Paint Station Server
- The results will only be displayed after the data on the SDS PC is successfully backed-up / transferred to the NLM server (set-up to do back-up automatically every night)
- If Paint Station Server was not open during measurements, it could happen that the results are displayed but not the Colour Code and the OperationID (back-up was performed before the Waste Class was determined)

1.5.6 Drum View / Registration: IQ3 Results

- The results for the IQ3 measurements can be entered manually or be imported by selecting the *Import* button to go to the *IQ3 Import* screen (access according to security settings)
- Activation of *Save* and *Import* buttons as specified per role (security permissions)
- Other conditions for *Save* button to be enabled:
 - 1) To enter a DTS number before the drum is measured - the *Report number* = 0 together with a populated *DTS Number* is needed
 - 2) Populating of all fields are compulsory excl. the following - IAEA batch, Released, DTS Number and Notes

Options for Permission Settings

FunctionName	View	Add	Edit	Delete	Comment
Can Import from Drum Registration	✓				View: Enable <i>Import</i> button on IQ3 tab
Can IQ3 Save (Drum Registration)	✓		✓		Edit: Enable <i>Save</i> button on IQ3 tab

1.5.7 Drum View / Registration: Photo

Barcode: 000072546

Partial Registration

Drum Type: SD16_6: 160L metal 0.8mm (Red)

Waste Origin: Beva

Client Drum No: B9-045

External Dose Rate at 50 cm (µSv/h): 1.000000

External Dose Rate at contact (µSv/h):

Calibration Drum: Overpacked:

Reg Date: 2009/09/07

Current Position			
Building	Row (X)	Block (Y)	Palette (Z)
Pelstore	249	K	3

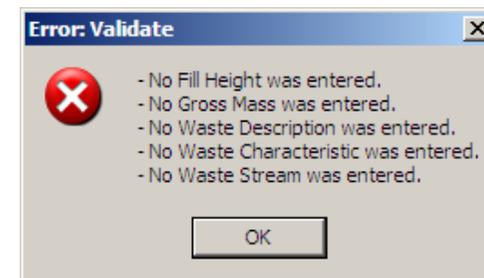
Full Reg | SDS Results | IQ3 Results | Drum Photo



Browse

Remove

- Full Registration can be performed directly after completion of the partial registration or at a later stage
- For Full Registration at a later stage the menu Edit Current Drum needs to be used
- Photos can be added/saved successfully (during full registration or at a later stage) on condition that all Full Registration parameters are available (for users who have permission to add or edit a drum)



- The photo can also be removed.
- When a photo is removed a reason has to be given which will be saved against the drum

1.5.8 Drum View / Registration: Compression (Parent/Child)

- Two possibilities available to add a child in a parent -
 - 1) Automatically at the VRF
 - 2) Manually for other processes (this option was added for future use and for processes not finalised-therefore not tested thoroughly)
- Barcodes that represent Parent or Child drums are accordingly indicated with a red cross (top left corner), together with a red cross on the *Compression* tab
 - For VRF as soon as a child drum is put into parent
 - For manual – parent with partial registration and child drum as soon as it is put into parent
- The scanned barcodes at VRF (parent and child) are validated in the WTS against the acceptance requirements for the VRF. For the parent there are 2 different barcode readers and the one to be used is dependant on the condition of the child (compacted drum or burst drum)
- Partial Registration of Parent-
 - 1) Requirement for VRF process—the description of the drum needs to contain the word “parent” (used during automatic default full registration). Parent checked box will be ticked automatically during the VRF process
 - 2) Requirement for manual process - the *Parent* checked box has to be ticked. This together with the applicable security permissions are needed to enable the manual input block on *Compression* tab

Options for Permission Settings

FunctionName	View	Add	Edit	Delete	Comment
Drum Parent Child	✓		✓	✓	Edit: Enable Manual Add Barcode to Parent section Enable <i>Add Drum to Parent</i> button Delete: Enable <i>Remove Drum from Parent</i> button

Drum View/ Registration: Compression (Parent/Child)

continue

Barcode: 000095155 Find by Client Drum No: Parent Child

Partial Registration
 Drum Type: SD20_9P: Parent 200 L metal drum
 Waste Origin: VRF
 Client Drum No: VRF-60
 External Dose Rate at 50 cm (µSv/h): 0.000000
 External Dose Rate at contact (µSv/h): 0.000000
 Calibration Drum Overpacked Parent Reg Date: 2017/06/19

Current Position
 Building: Pelstore Row (X): 317 Block (Y): C Palette (Z): 1

Full Reg | SDS Results | IQ3 Results | Drum Photo | **Compression**

Parent: 000095155 290490
 Total Drums: 2 Waste Weight: 86.000000 kg Tare Weight: 17.000000 kg Total Alpha: 101883922.787931 Bq

	Barcode	Drum ID	Mass	Compacted Height	Added On	Position
1	000020810	239204	54.000000	31.000000	2017/07/13 02:3...	1
2	000024715	243068	32.000000	19.000000	2017/07/13 02:4...	2

View Selected Child View Parent

- On the *Compression* tab (for VRF):
 - The barcode of the parent as well as the info of the child drums as displayed in the table is the data as sent from the VRF to the LLSW_Drums table
 - The Total Drums, Waste Weight and Total Alpha are automatically accumulated as the child drums are added
- The barcodes of the parent and the child drums are interlinkable
- On the *Full Reg* tab of the parent:
 - The full registration is completed automatically according to the applicable default template (depending on condition of child)
 - The Gross Mass and the Active Height (sum of compacted heights of child drums) are updated as the child drums are added in the parent
 - The final gross mass is the mass sent from the VRF after cementation of the parent drum
- On the *Full Reg* tab of the child
 - The current position on the partial registration section is automatically changed to CDR-0-CDR-0
 - The Compacted Height is populated with the value as sent from VRF

Barcode: 000095155 Find by Client Drum No: Parent Child

Partial Registration
 Drum Type: SD20_9P: Parent 200 L metal drum
 Waste Origin: VRF
 Client Drum No: VRF-60
 External Dose Rate at 50 cm (µSv/h): 0.000000
 External Dose Rate at contact (µSv/h): 0.000000
 Calibration Drum Overpacked Parent Reg Date: 2017/06/19

Current Position
 Building: Pelstore Row (X): 317 Block (Y): C Palette (Z): 1

Full Reg | SDS Results | IQ3 Results | Drum Photo | **Compression**

Waste Description: Compacted drum Barcode: 000095155 Reg Date: 2017/07/20

Additional description:

Waste Characteristics
 All Characteristics: > Selected Characteristics: Compacted Waste

Waste Quantification
 Uranium: > Selected Waste Quantification:

Waste Stream: Compacted Drums in 200L metal, Parent: CMPD.M200N

Fill Height: 84.000000 cm Gross Mass: 342.000000 kg Active Fill Height: 50.000000 cm Compacted Height: cm

Barcode: 000020810 Find by Client Drum No: Parent Child

Partial Registration
 Drum Type: SD16_6: 160L metal 0.8mm (Red)
 Waste Origin: U Facility
 Client Drum No: WR 15303
 External Dose Rate at 50 cm (µSv/h): 2.000000
 External Dose Rate at contact (µSv/h):
 Calibration Drum Overpacked Parent Reg Date: 2010/04/30

Current Position
 Building: CDR Row (X): CDR Block (Y): CDR Palette (Z): CDR

Full Reg | SDS Results | IQ3 Results | Drum Photo | **Compression**

Waste Description: Paper, Glass, Plastic, Gloves Barcode: 000020810 Reg Date: 2010/04/30

Additional description:

Waste Characteristics
 All Characteristics: > Selected Characteristics: Enriched

Waste Quantification
 Alpha emitters: > Selected Waste Quantification:
 Uranium Short-lived 6/Y (t=30y)
 Long-lived 6/Y (t=30y)

Waste Stream: PGP in 160L metal drum, enriched

Fill Height: 80.000000 cm Gross Mass: 54.000000 kg Active Fill Height: cm Compacted Height: 31.000000 cm

More than one Waste Characteristics selected

Barcode: 001020059

Partial Registration: Parent Child

Drum Type: SC99_3: Shipping Container

Waste Origin: Area 14

Client Drum No: 1

External Dose Rate at 50 cm (µSv/h): 0.000000

External Dose Rate at contact (µSv/h): 0.000000

Calibration Drum: Overpacked: Parent: Reg Date: 2021/07/17

Parent: 001020059 302543

Total Drums: 0 Waste Weight: 0 kg Tare Weight: 10000.00000 kg Total Alpha: 0 Bq

Error: Parent Barcode not fully registered, register first before adding child drums

Manual Add Barcode to Parent: ISO Manual Drum Press Barcode: 000999054 Compacted Height: 28 Position: 1

Add Drum to Parent Remove Drum from Parent

Barcode: 001020059

Partial Registration: Parent Child

Drum Type: SC99_3: Shipping Container

Waste Origin: Area 14

Client Drum No: 1

External Dose Rate at 50 cm (µSv/h): 0.000000

External Dose Rate at contact (µSv/h): 0.000000

Calibration Drum: Overpacked: Parent: Reg Date: 2021/07/17

Parent: 001020059 318355

Total Drums: 2 Waste Weight: 54.000000 kg Tare Weight: 10000.00000 kg Total Alpha: 500000.000000 Bq

Barcode	Drum ID	Mass	Compacted Height	Added On	Position
000999054	309453	54.000000	28.000000	2021/10/17 11:5...	1
000999053	309452	0	33	2021/10/17 12:2...	2

Drum update is complete!

Manual Add Barcode to Parent: ISO Manual Drum Press Barcode: 000999053 Compacted Height: 33 Position: 2

Add Drum to Parent Remove Drum from Parent

- To add a child drum manually, the parent needs to be fully registered
- On the *Compression* tab (for manual processes):
 - The Total Drums, Waste Weight and Total Alpha are automatically accumulated as the child drums are added
- The barcodes of the parent and the child drums are interlinkable
- On the *Full Reg* tab of the parent:
 - The final Fill Height, Gross Mass and the Active Height need to be updated manually as the child drums are added in the parent (or after the parent is finalised)
- On the *Full Reg* tab of the child
 - The current position on the partial registration section is automatically changed to X-0-CIS-0, with X the building as for the parent
 - The Compacted Height is populated with the value as manually entered when adding the child

Barcode: 001020059

Partial Registration: Parent Child

Drum Type: SC99_3: Shipping Container

Waste Origin: Area 14

Client Drum No: 1

External Dose Rate at 50 cm (µSv/h): 0.000000

External Dose Rate at contact (µSv/h): 0.000000

Calibration Drum: Overpacked: Parent: Reg Date: 2021/07/17

Parent: 001020059 ...

Total Drums: 2 Waste Weight: 107.000000 kg Tare Weight: 10000.00000 kg Total Alpha: 1000000.000000 Bq

Barcode	Drum ID	Mass	Compacted Height	Added On	Position
000999053	309452	53.000000	33.000000	2021/10/17 12:2...	2
000999054	309453	54.000000	28.000000	2021/10/17 11:5...	1

View Selected Child View Parent

Barcode: 000999054

Partial Registration: Parent

Drum Type: SD16_6: 160L metal 0.9mm (Red)

Waste Origin: U Facility

Client Drum No: 54

External Dose Rate at 50 cm (µSv/h): 0.000000

External Dose Rate at contact (µSv/h): 0.000000

Calibration Drum: Overpacked: Parent: Reg Date: 2017/06/15

Waste Description: Paper, Glass, Plastic, Gloves Barcode: 000999054 Reg Date: 2017/06/15

Additional description

Waste Characteristics: All Characteristics Selected Characteristics: Compressive

Waste Quantification: Selected Waste Quantification

Waste Stream: PGP in 160L drum

Fill Height: 50.000000 cm Gross Mass: 54.000000 kg Active Fill Height: cm Compacted Height: 28.000000 cm

Drum View/ Registration: Compression (Parent/Child)

continue

Barcode: 000095156 < > Find by Client Drum No Compression: **Parent** Child

Partial Registration

Drum Type: SD20_9P: Parent 200 L metal drum

Waste Origin: VRF

Client Drum No: VRF-59

External Dose Rate at 50 cm (µSv/h): 0.000000

External Dose Rate at contact (µSv/h): 0.000000

Calibration Drum Overpacked Parent Reg Date: 2017/06/19

Current Position			
Building	Row (X)	Block (Y)	Palette (Z)
Pelstore	317	C	1

Full Reg | SDS Results | IQ3 Results | Drum Photo | **Compression**

Import

Report Number: VRF-59 Report Date: 13 July 2017

Count Type: None Gross Mass: 104081 g

Correction: Transmission Density U235 <- MGAU & U238

U-Mass		U-Mass Uncertainty	
U-235	2.040100E+001 gram		%
U-238	9.099050E+002 gram		%

MGAU Abundance: 2.19409866937733 % Uncertainty: %

IAEA Batch: P Released

DTS Number: 0

Notes: Calc values for Parent, update

Save

- The *IQ3 Results* tab (for VRF) will be automatically populated and updated as the child drums are added in the parent drum
- The *Client Drum No* of the parent is used for the *Report Number*
- *Count Type* is set to None
- The *Gross Mass*, the *U-Mass* and the *MGAU Abundance* are calculated by using the results from all the child drums (as captured for each individual drum) contained in the parent
- The *IAEA Batch* is set as "P"

1.6 LLSW PAINT STATION SERVER SCREEN

The screenshot shows the 'Paint Station Server' application window. On the left is a tree view menu with categories like Barcode Settings, Reports, Waste Administration, and IAEA batch. The main area displays a log window with a table of operations:

Date	Description
2012/09/13 03:15:32 PM	Initialized Server
2012/09/13 03:16:32 PM	Last scan operation ID = 34123
2012/09/13 03:16:32 PM	Drum ID = 000078780
2012/09/13 03:16:32 PM	BNFL stream = 0
2012/09/13 03:16:32 PM	Finger Print IsotopeRes Isotope ID = Ag-110
2012/09/13 03:16:32 PM	AEC Stream = FCDL:M100M, Drum type=60
2012/09/13 03:16:32 PM	Validating Drum Stream
2012/09/13 03:16:32 PM	Searching for unidentified peaks
2012/09/13 03:16:32 PM	Verifying if calibration drum
2012/09/13 03:16:32 PM	Get Nuclide HalfLife Nuclide: Ag-110
2012/09/13 03:16:32 PM	Get Nuclide HalfLife: 0.683824
2012/09/13 03:16:32 PM	Paint code: 0102030000
2012/09/13 03:16:32 PM	Save paint code to Drums Table: 0102030000 Operation ID: 34123 WasteClass: LLW
2012/09/13 03:16:32 PM	Paint code Print: Print To Printer
2012/09/13 03:16:35 PM	Report Print out closed
2012/09/13 03:16:35 PM	Option to backup not selected, no backup was performed
2012/09/13 03:16:35 PM	Operation Complete
2012/09/13 03:56:00 PM	Last scan operation ID = 34124
2012/09/13 03:56:00 PM	Drum ID = 000078178
2012/09/13 03:56:00 PM	BNFL stream = 0
2012/09/13 03:56:00 PM	Finger Print IsotopeRes Isotope ID = Ag-110
2012/09/13 03:56:00 PM	AEC Stream = FCDL:M100M, Drum type=60
2012/09/13 03:56:00 PM	Validating Drum Stream
2012/09/13 03:56:00 PM	Searching for unidentified peaks
2012/09/13 03:56:00 PM	Verifying if calibration drum
2012/09/13 03:56:00 PM	Get Nuclide HalfLife Nuclide: Ag-110
2012/09/13 03:56:00 PM	Get Nuclide HalfLife: 0.683824
2012/09/13 03:56:00 PM	Paint code: 0102030000
2012/09/13 03:56:00 PM	Save paint code to Drums Table: 0102030000 Operation ID: 34124 WasteClass: LLW
2012/09/13 03:56:00 PM	Paint code Print: Print To Printer
2012/09/13 03:56:02 PM	Report Print out closed
2012/09/13 03:56:02 PM	Option to backup not selected, no backup was performed

At the bottom of the log window, there are controls: a dropdown menu set to 'Print To Screen', a 'Reprint Last' button, an empty text input field, and a 'Run Backup' checkbox.

- Determining of Waste Class (Colour code)
- Paint Station Server retrieves data from the SDS server and from the LLSW(WTS), determine the colour code (waste class) and write the Colour code, the Waste Class and the OperationID to *LLSW_tblDrums*
- The colour code can be printed directly to the printer (recommended) or to the screen from where the operator can print it.
- The back-up of the results from the SDS server to the NLM server is set-up to be done every night. The back-up can also be done after each measurement (not recommended if scanner is in automatic mode)
- If Paint Station Server was not open during measurements the Waste Class of a drum could be determined by entering the barcode and selecting the Reprint Last button – the barcode of the last measurement will be processed first and then the barcode as specified. For printing the colour code select the option *Print to Screen* to avoid duplicating the last measurement

LLSW Paint Station Server Screen

continue

Colour code	Waste Class											
<table border="1"> <tr><td>01</td><td>02</td><td>03</td><td>00</td><td>00</td></tr> <tr><td>X</td><td>X</td><td>X</td><td></td><td></td></tr> </table>	01	02	03	00	00	X	X	X			LLW	⇨ Conforming to criticality limit ⇨ long lived alfa act < 400 Bq/g ⇨ beta/gamma act < 4000 Bq/g
01	02	03	00	00								
X	X	X										
<table border="1"> <tr><td>01</td><td>02</td><td>03</td><td>00</td><td>05</td></tr> <tr><td>X</td><td>X</td><td>X</td><td></td><td>X</td></tr> </table>	01	02	03	00	05	X	X	X		X	Possible LLW	⇨ Conforming to criticality limit ⇨ 400 Bq/g < long lived alfa act < 4000 Bq/g ⇨ 4000 Bq/g < beta/gamma act < 40000 Bq/g
01	02	03	00	05								
X	X	X		X								
<table border="1"> <tr><td>00</td><td>00</td><td>00</td><td>04</td><td>05</td></tr> <tr><td></td><td></td><td></td><td>X</td><td>X</td></tr> </table>	00	00	00	04	05				X	X	ILW	⇨ Conforming to criticality limit ⇨ long lived alfa act > 4000 Bq/g ⇨ beta/gamma act > 40000 Bq/g
00	00	00	04	05								
			X	X								
<table border="1"> <tr><td>00</td><td>00</td><td>03</td><td>04</td><td>00</td></tr> <tr><td></td><td></td><td>X</td><td>X</td><td></td></tr> </table>	00	00	03	04	00			X	X		Possible Cleared Waste	SDS reported total α and β activity and U-235 mass to be 0 (best estimate values)
00	00	03	04	00								
		X	X									

Colour code	Operational actions needed										
<table border="1"> <tr><td>00</td><td>00</td><td>00</td><td>00</td><td>00</td></tr> <tr><td></td><td></td><td></td><td></td><td></td></tr> </table>	00	00	00	00	00						Not calibrated, unidentified peak
00	00	00	00	00							
<table border="1"> <tr><td>00</td><td>00</td><td>00</td><td>04</td><td>00</td></tr> <tr><td></td><td></td><td></td><td>X</td><td></td></tr> </table>	00	00	00	04	00				X		200L drum U235 content exceeds criticality (content to be split)
00	00	00	04	00							
			X								
<table border="1"> <tr><td>00</td><td>02</td><td>00</td><td>04</td><td>00</td></tr> <tr><td></td><td>X</td><td></td><td>X</td><td></td></tr> </table>	00	02	00	04	00		X		X		160/100L drum U235 content exceeds criticality (content to be split)
00	02	00	04	00							
	X		X								

- To allocate a waste class together with its colour code the following checks are performed against the decision tree as specified on the *Waste Classes* administration screen

1) Validate if the waste stream of the drum is linked to the *SDS Wastestream (LLSW_DrumStream)*

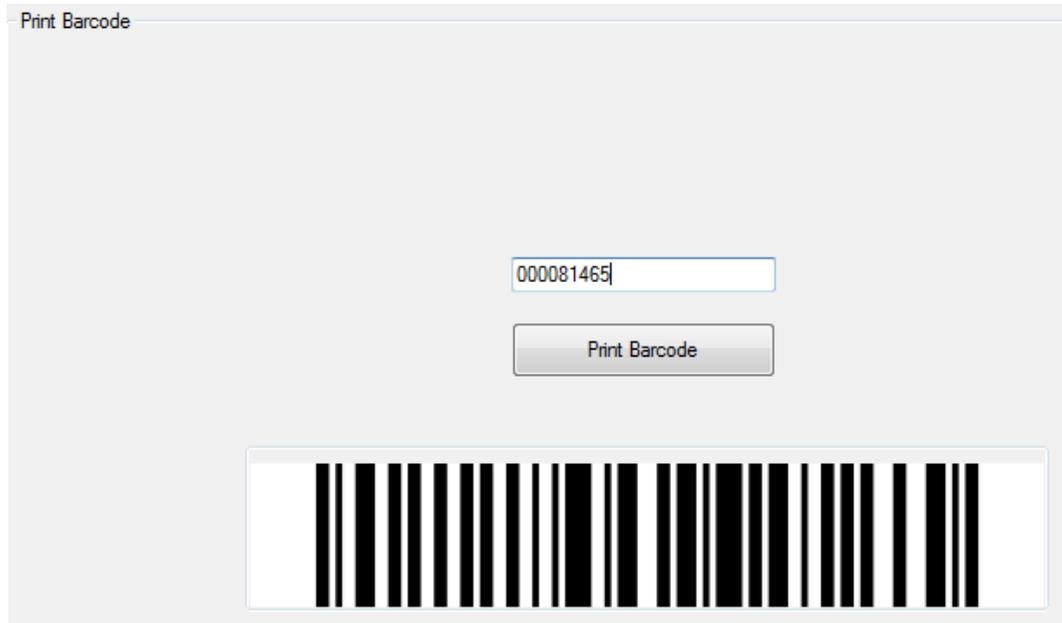
2) Validate if the SDS is calibrated (according to the *Waste Classes* screen) for the waste characteristics as listed for the drum

3) Validate that all the peaks above the specified Gamma Limit (*SDS Setup* screen) are identified. Peaks not identified are listed in the *Unidentified Peaks* table of the SDS database

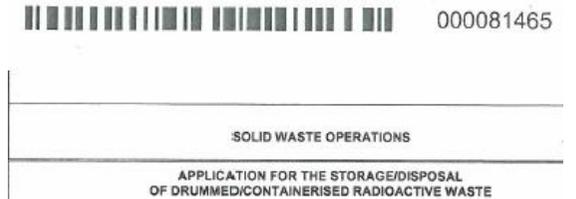
4) Validate the halflife of the measured nuclides (as specified in the *Parameter Detail* administration screen) against the halflife as specified in the *Waste Classes* screen

5) Validate if the U-235 mass and the Alpha is below the specified limits according to the *Waste Classes* screen

1.7 LLSW PRINT BARCODE SCREEN



- Print barcode on the waste application form



- Position specified in the Barcode Settings Screen – can be different from user to user

1.8 LLSW REPORTS: GENERAL FUNCTIONS INCORPORATED TO ALL REPORTS

	Batch ID	Barcode	Date Closed	Facility From	Facility To	Drum Type
▶	17091	000078408	1/9/2013 2:16 PM	BNFL Segmented Drum Scanner	Pelstore	100L metal 1mm -
	17075	000078759	12/19/2012 11:35 AM	BNFL Segmented Drum Scanner	Pelstore	100L metal 1mm -
	17075	000078770	12/19/2012 11:35 AM	BNFL Segmented Drum Scanner	Pelstore	100L metal 1mm -
	17091	000078809	1/9/2013 2:16 PM	BNFL Segmented Drum Scanner	Pelstore	100L metal 1mm -
	17090	000078822	1/9/2013 2:18 PM	BNFL Segmented Drum Scanner	Pelstore	100L metal 1mm -

Date Closed

= [▼] 10/01/2013 [▼]

✖ ✖ ✓

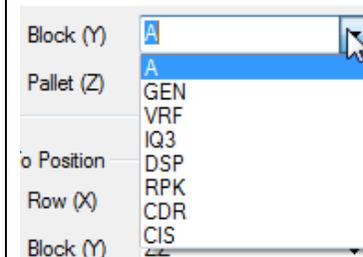
- A filter option per column is available by clicking right on the column heading
- All the data of the table can be selected by clicking on the left corner of the table
- By using the Copy button the selected data can be copied for further use.

	Batch ID	Barcode	Date Closed	Facility From	Facility To	Drum Type	Waste Stream
▶	17091	000078408	1/9/2013 2:16 PM	BNFL Segmented Drum Scanner	Pelstore	100L metal 1mm - Medical	Filter Candles in 100L metal Medical
	17075	000078759	12/19/2012 11:35 AM	BNFL Segmented Drum Scanner	Pelstore	100L metal 1mm - Medical	Filter Candles in 100L metal Medical
	17075	000078770	12/19/2012 11:35 AM	BNFL Segmented Drum Scanner	Pelstore	100L metal 1mm - Medical	Filter Candles in 100L metal Medical
	17091	000078809	1/9/2013 2:16 PM	BNFL Segmented Drum Scanner	Pelstore	100L metal 1mm - Medical	PGPG IN 100L Metal medical
	17090	000078822	1/9/2013 2:18 PM	BNFL Segmented Drum Scanner	Pelstore	100L metal 1mm - Medical	Filter candles in 100L metal Medical, SE
	17076	000078923	12/19/2012 11:37 AM	BNFL Segmented Drum Scanner	Pelstore	100L metal 1mm - Medical	Filter candles in 100L metal Medical, SE
	17091	000079679	1/9/2013 2:16 PM	BNFL Segmented Drum Scanner	Pelstore	100L metal 1mm - Medical	Filter candles in 100L metal Medical, SE
	17075	000079948	12/19/2012 11:35 AM	BNFL Segmented Drum Scanner	Pelstore	100L metal 1mm - Medical	PGPG IN 100L Metal medical
	17091	000079953	1/9/2013 2:16 PM	BNFL Segmented Drum Scanner	Pelstore	100L metal 1mm - Medical	Filter Candles in 100L metal Medical
	17091	000079955	1/9/2013 2:16 PM	BNFL Segmented Drum Scanner	Pelstore	100L metal 1mm - Medical	PGPG IN 100L Metal medical
	17091	000079956	1/9/2013 2:16 PM	BNFL Segmented Drum Scanner	Pelstore	100L metal 1mm - Medical	PGPG IN 100L Metal medical

1.9 LLSW REPORTS / STORE INVENTORY SCREEN

Barcode	CurrentX	CurrentY	CurrentZ
000017413	314	A	1
000016939	314	A	1
000016898	314	A	1
000016134	314	A	1
000018021	314	AA	1
000000905	314	AA	1
000017367	314	AA	1
000045216	314	B	1
000001702	314	B	1
000018252	314	B	1

- List the positions of the drums for a specified range.
- Select the required *Location* (applicable store).
- Enter the required Date. All drums that were on the specified date within the specified range will be displayed. If no date is entered – it will default to current date.
- The *From* and *To* positions have to be specified (default values are 1-A-1 and 999-ZZ-5 respectively)
- For the special Block(Y) codes (available in the dropdown) the row (X) and Pallet (Z) have to be specified as 0.



- The amount of drums in the range as specified is displayed as Row Count
- To print report – select Print button.
- To export to Excel – select Export – it will open Excel and enter all the data in the excel sheet – it is required from the user to save the file to applicable location.

1.10 LLSW REPORTS / DRUM TRANSFERS SCREEN

Batch Number

Batch Number

Username

Batch Date and Time

Destination

Drum List

Amount of drums

Barcode 

	BatchID	Barcode
*		

DRUM TRANSFER CERTIFICATE (COPY)

Batch ID: 15330 Drum Count 39
 Date: 2012/07/03 03:22:00PM
 Destination: Pelstore

Drum	Alias	Store	Waste Stream	Characteristics	Quantification	Desp	RCV
000001189	A74/56	BNFL Segmented Drum	PGPG in 160L drum	Compressi	• Uranium: 14.4 g • U235 Mass: 0.106 g • Enrichment: 0.829 %	<input type="checkbox"/>	<input type="checkbox"/>
Measurement Method: IQ3							
000017268	A21 0292	BNFL Segmented Drum	PGPG in 160L drum	Compressi	• Uranium: 237.26969875218 g • U235 Mass: 1.35826157772353 g	<input type="checkbox"/>	<input type="checkbox"/>
Measurement Method: SDS							

DRUM TRANSFER CERTIFICATE (COPY)

Batch ID: 15330 Drum Count 39
 Date: 2012/07/03 03:22:46PM
 Destination: Pelstore

Drum	Alias	Store	Waste Stream	Characteristics	Quantification	Desp	RCV
000001189	A74/56	Pelstore	PGPG in 160L drum	Compressi	• Uranium: 2.0880343641214 g • U235 Mass: 0.041752130965004 g • Enrichment: 2 %	<input type="checkbox"/>	<input type="checkbox"/>
Measurement Method: SDS							
000017268	A21 0292	Pelstore	PGPG in 160L drum	Compressi	• Uranium: 237.26969875218 g • U235 Mass: 1.36826157772353 g • Enrichment: 0.872492416666154 %	<input type="checkbox"/>	<input type="checkbox"/>
Measurement Method: SDS							

- Print Copies of Drum Transfer Certificates
- Select Batch Number, the information regarding the batch will be displayed (BatchIDs of both closed and open batches are listed in drop down).
- A copy of original Certificate can be generated by the “Print from Backup” button only available from batchID 15319)
- The “Print from Database” will generate a Certificate of the same drums as on the original Certificate but with current information including the results of the most preferable Quantification method
- Determine if a drum is still in an open batch by entering the barcode (9 digits) in the second section of the screen – any open BatchID for specified drum will be displayed. This same function is also available on the Drum Tracking Screen

1.11 LLSW REPORTS / DRUM RECEIVED SCREEN

Barcode Settings
 -- Close Batch
 -- Download Batch
 -- Drum Move
 -- Drum View/Registration
 -- Paint Station Server
 -- Print Barcode
 Reports
 -- Store Inventory
 -- Drum Transfers
 -- Drum Tracking
 -- Drum General Search
 -- Drum Count per Location
 -- Drum Press Barcode Valid
 -- Scanner Acceptance Checks
 Waste Administration
 -- IAEA batch
 -- IQ3 Import
 -- Reprint Barcode Label
 -- Nets

Drum Transfer Certificate closed between
 Date Range From: 2021/09/20 To: 2021/10/20
 Filter Facilities from P 3000 Clear Selection
 Facilities to Pelstore Clear Selection
 Find Clear Copy

Batch ID	Barcode	Date Closed	Facility From	Facility To	Drum Type	Waste Stream
26797	000102429	2021/09/27 12:12 PM	P 3000	Pelstore	160L metal 0.8mm (Red)	PGPG in 160L drum
26797	000102430	2021/09/27 12:12 PM	P 3000	Pelstore	160L metal 0.8mm (Red)	PGPG in 160L drum
26797	000102431	2021/09/27 12:12 PM	P 3000	Pelstore	160L metal 0.8mm (Red)	PGPG in 160L drum
26797	000102432	2021/09/27 12:12 PM	P 3000	Pelstore	160L metal 0.8mm (Red)	PGPG in 160L drum
26797	000102433	2021/09/27 12:12 PM	P 3000	Pelstore	160L metal 0.8mm (Red)	PGPG in 160L drum
26797	000102434	2021/09/27 12:12 PM	P 3000	Pelstore	160L metal 0.8mm (Red)	PGPG in 160L drum
26797	000102437	2021/09/27 12:12 PM	P 3000	Pelstore	160L metal 0.8mm (Red)	PGPG in 160L drum
26797	000102438	2021/09/27 12:12 PM	P 3000	Pelstore	160L metal 0.8mm (Red)	PGPG in 160L drum
26797	000102439	2021/09/27 12:12 PM	P 3000	Pelstore	160L metal 0.8mm (Red)	PGPG in 160L drum
26797	000102440	2021/09/27 12:12 PM	P 3000	Pelstore	160L metal 0.8mm (Red)	PGPG in 160L drum
26797	000102441	2021/09/27 12:12 PM	P 3000	Pelstore	160L metal 0.8mm (Red)	PGPG in 160L drum
26797	000102442	2021/09/27 12:12 PM	P 3000	Pelstore	160L metal 0.8mm (Red)	PGPG in 160L drum
26797	000102443	2021/09/27 12:12 PM	P 3000	Pelstore	160L metal 0.8mm (Red)	PGPG in 160L drum
26797	000102444	2021/09/27 12:12 PM	P 3000	Pelstore	160L metal 0.8mm (Red)	PGPG in 160L drum
26797	000102445	2021/09/27 12:12 PM	P 3000	Pelstore	160L metal 0.8mm (Red)	PGPG in 160L drum
26797	000102446	2021/09/27 12:12 PM	P 3000	Pelstore	160L metal 0.8mm (Red)	PGPG in 160L drum
26797	000102447	2021/09/27 12:12 PM	P 3000	Pelstore	160L metal 0.8mm (Red)	PGPG in 160L drum
26797	000102448	2021/09/27 12:12 PM	P 3000	Pelstore	160L metal 0.8mm (Red)	PGPG in 160L drum

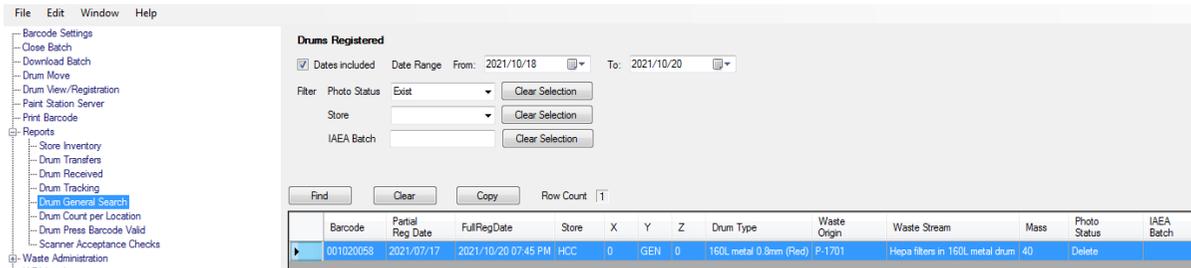
- List the drums that were received at PDO within specified dates
- The default date range is set to be a month
- Only drums of batches that are closed out during specified period will be listed
- Currently only drums with a position of "X"-0-GEN-0 (where X is the building) are listed. This is not a true reflection and needs to be corrected. (Note: All the drums on a DTC have a position of "X"-0-GEN-0)

1.12 LLSW REPORTS / DRUM TRACKING SCREEN

Barcode	Batch ID	Drum Move ID	Date Moved	Facility From	Facility To
000082456	15113	1008598	2012/05/21 11:47 AM	HCC	Pelstore
000082456	15229	1013862	2012/06/05 03:08 PM	Pelstore	Pelstore
000082456	20679	1304860	2015/02/13 02:57 PM	Pelstore	Pelstore
000082456	20903	1316656	2015/04/09 11:46 AM	Pelstore	Pelstore
000082456	23186	1443299	2016/05/17 02:24 PM	Pelstore	Pelstore
000082456	23240	1448960	2016/05/31 11:45 AM	Pelstore	Pelstore
000082456	25604	1566187	2018/06/11 02:49 PM	Pelstore	Pelstore
000082456	25625	1566929	2018/06/14 03:23 PM	Pelstore	Pelstore
000082456	25662	1567950	2018/07/02 02:36 PM	Pelstore	Pelstore
000082456	25673	1568897	2018/07/12 09:23 AM	Pelstore	BNFL Segmented
000082456	25936	1591909	2019/07/28 09:22 AM	BNFL Segmented Drum Scanner	Pelstore
000082456	26291	1593997	2019/08/03 12:42 PM	Pelstore	Pelstore

- Track the movement of a drum (batchID and Drum Move ID) by entering the barcode of the drum
- The first entry represents the partial registration of the drum – no batchID
- The Top half of the screen displays the BatchIDs (only closed batches) of Drum Moves
- Determine if a drum is still in an open batch by entering the barcode (9 digits) in the second section of the screen – any open BatchID for specified drum will be displayed.

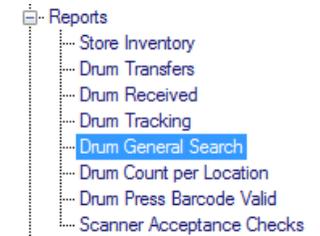
1.13 LLSW REPORTS / DRUM REGISTRATION SCREEN (DRUM GENERAL SEARCH)



Barcode	Partial RegDate	Full RegDate	Store	X	Y	Z	Drum Type	Waste Origin	Waste Stream	Mass	Photo Status	IAEA Batch
---------	-----------------	--------------	-------	---	---	---	-----------	--------------	--------------	------	--------------	------------

- Generate Report with general drum info
- Can be filtered in terms of the Full Registered date of the drums by checking the “Dates included” box and specify the date range

(Note: The report name “*Drum Registration*” was changed to “*Drum General Search*” during an upgrading)



1.14 LLSW REPORTS / DRUM COUNT PER LOCATION SCREEN

Location	Block (Y)	DrumCount
A building Dry Decon	On Position	2
A- West	On Position	3826
A-Building	On Position	33
Area 21	On Position	1482
B5 Parkinglot	On Position	4
Battery Rooms	On Position	3219
Building 2800	On Position	1
Bus Shed	On Position	2506
C 3	On Position	1
C 5	On Position	9
C Building	On Position	755
CDR	On Position	312

- Displays the amount of drums per location/building in terms of position –
 - that is On position (drums in rows with addresses)
 - Drums with special Block(Y) codes
- *Note: The displayed results list all the barcodes in the database, which includes test barcodes and possibly incorrectly captured barcodes*

1.15 LLSW REPORTS / DRUM PRESS BARCODE VALID

Barcode: Barcode List:

Location: Position on/Upto Date:

From Position: Row (X) 314, Block (Y) A, Pallet (Z) 1

To Position: Row (X) 314, Block (Y) aa, Pallet (Z) 1

Results	Barcode	Valid	Location	X	Y	Z	Mass	Total Alpha Activity	U235 Mass	Reason
0	000017413	<input type="checkbox"/>	Pelstore	314	A	1	59	15569873.33277	3.3041995972626	0101
1	000016939	<input type="checkbox"/>	Pelstore	314	A	1	0	0	0	0051
2	000016998	<input type="checkbox"/>	Pelstore	314	A	1	0	0	0	0051
3	000016134	<input type="checkbox"/>	Pelstore	314	A	1	29	17946794.7820298	4.35565995991185	0101
4	000018021	<input checked="" type="checkbox"/>	Pelstore	314	AA	1	68	47914826.7441215	11.260588120663	0150
5	000000905	<input type="checkbox"/>	Pelstore	314	AA	1	0	0	0	0051
6	000017367	<input checked="" type="checkbox"/>	Pelstore	314	AA	1	69	37691015.4378266	6.95318079092527	0150

Barcode: Barcode List:

Location: Position on/Upto Date:

From Position: Row (X) 1, Block (Y) A, Pallet (Z) 1

To Position: Row (X) 999, Block (Y) ZZ, Pallet (Z) 5

Results	Barcode	Valid	Location	X	Y	Z	Mass	Total Alpha Activity	U235 Mass	Reason
0	000045879	<input type="checkbox"/>	Pelstore	273	J	2	0	0	0	0021
1	000078948	<input type="checkbox"/>	Pelstore	10	G	2	0	0	0	0041
2	000024791	<input type="checkbox"/>	A- West	16	E	2	0	0	0	0041

- To manually validate the barcodes of drums to be compacted against VRF acceptance requirements
- The specified barcodes are validated against the VRF acceptance requirements.
- The validation results are indicated in the Valid and reason columns.
- Barcodes to validate can be specified through their position or by adding it manually to the barcode list

Reason codes used for validation of VRF acceptance requirements

Reason Code	Reason	Description
0021	Drum Invalid	No Photo
0022	Drum Invalid	Not Fully Registered
0041	Drum Invalid	Drum Type or Waste Description*
0051	Drum Invalid	Drum Weight
0052	Drum Invalid	Drum Weight Null
0061	Drum Invalid	No BNFL/ISOCS results
0071	Drum Invalid	Waste Class or AlphaActivity or U235 not Valid
0072	Drum Invalid	Color Code empty
0081	Drum Invalid	No IQ3 results
0091	Drum Invalid	IAEA Batch is Null
0092	Drum Invalid	IAEA Batch is blank
0101	Drum Invalid	IAEA Released = No
0102	Drum Invalid	IAEA Released blank
0131	Drum Invalid	Process Waste Origin NOT Drum Waste Origin
0140	Drum Valid	Process Waste Origin = Drum Waste Origin
0150	Drum Valid	Selected Batch process = drum batch
0151	Drum Invalid	Selected Batch process NOT drum batch

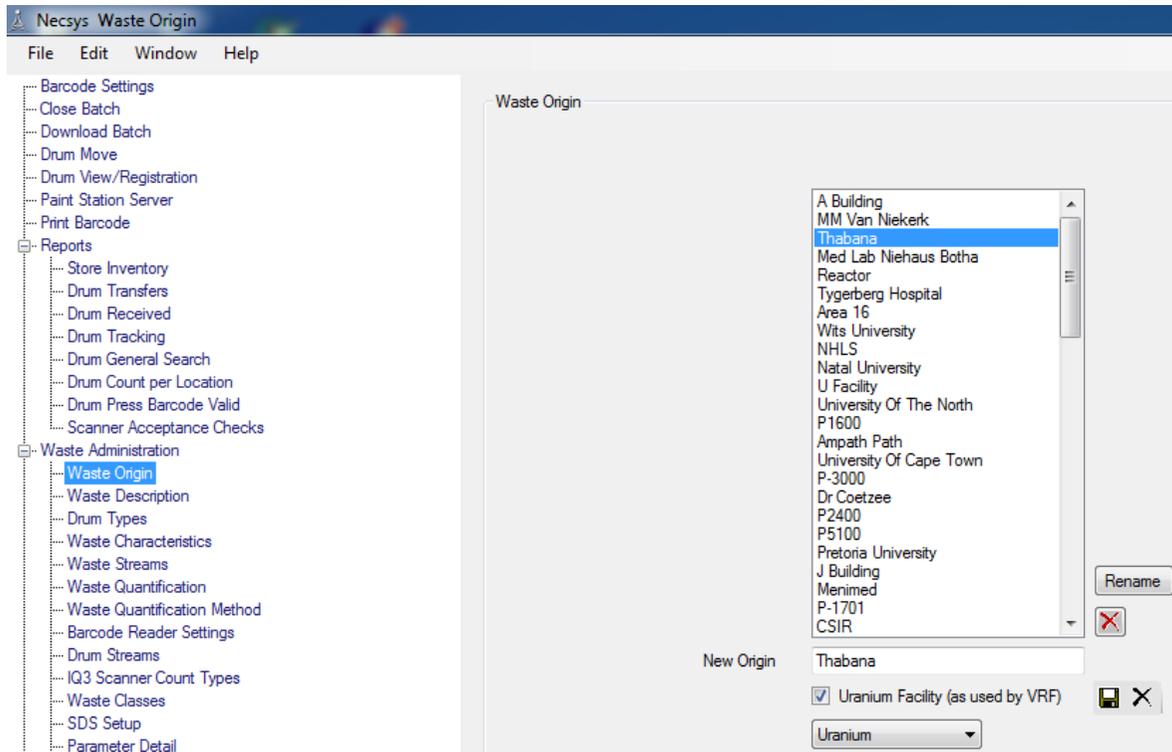
(Note: Before a drum is compacted at the VRF, the barcode is read by the PLC and sent to the WTS where it is checked and validated against a list of requirements by the WTS to ensure that all the information of the drum is captured and that the characterisation results comply with requirements. The outcome of the validation is then sent back to the VRF as a code which indicates whether the drum complies or not to the VRF acceptance requirements.)

1.16 LLSW REPORTS / SCANNER ACCEPTANCE CHECKS

	Barcode	Facility	Origin Type	IAEA Batch	Notes	Drum Type	Mass	Fill Height	Photo Status	Waste Character	Waste Stream
▶	000101994	P-1701	Non-Uranium	ZU-59	Zero	160L metal 0.8mm (Red)	34.600000	90.000000	Current	Compressi	PGPG in 160L drum
*											

- To check that all the full registration fields are populated as physically indicated on the drum and that the waste description corresponds with the photo

1.17 LLSW WASTE ADMINISTRATION / WASTE ORIGIN SCREEN



- Waste Origins in *WasteOrigin* table

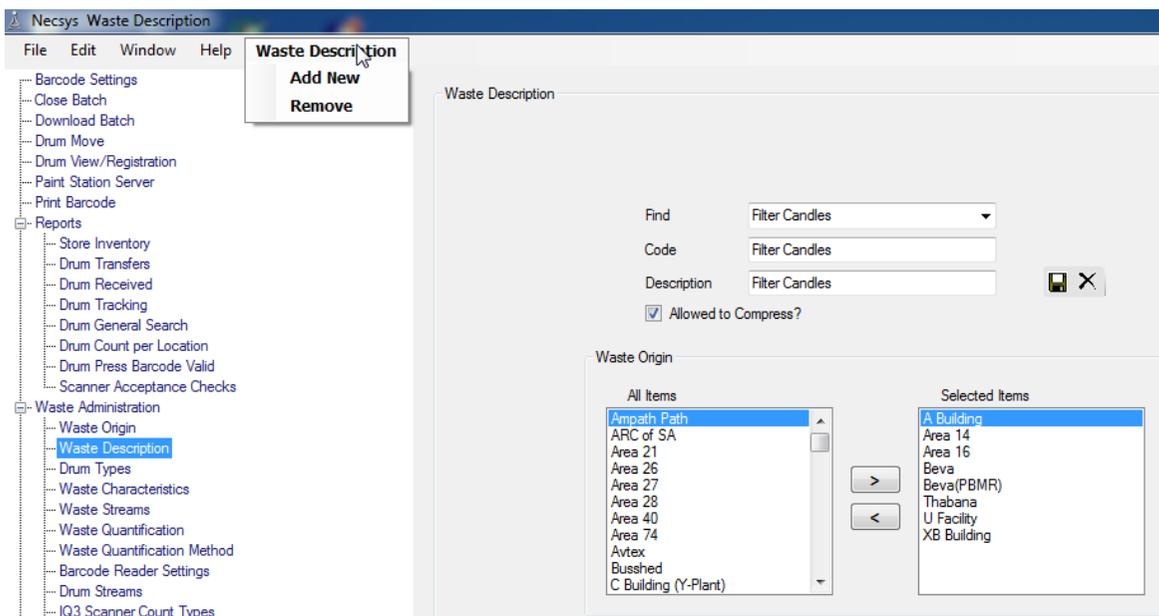
dbo_tblWasteOrigin			
WasteOriginID	WasteOriginDes	UFacility	FacilityType

- Manage the list of Waste Origins
- Waste Origins can be Added (+), Deleted (black X) or Renamed. It can only be deleted if not already in use



- For the Waste Origin to appear in the drop down list during Partial Registration of a drum , the Waste Origin must be linked to the drum type (*Drum Type* Screen - Waste Origin section)

1.18 LLSW WASTE ADMINISTRATION / WASTE DESCRIPTION SCREEN



- Waste Descriptions in tblWasteDescription table

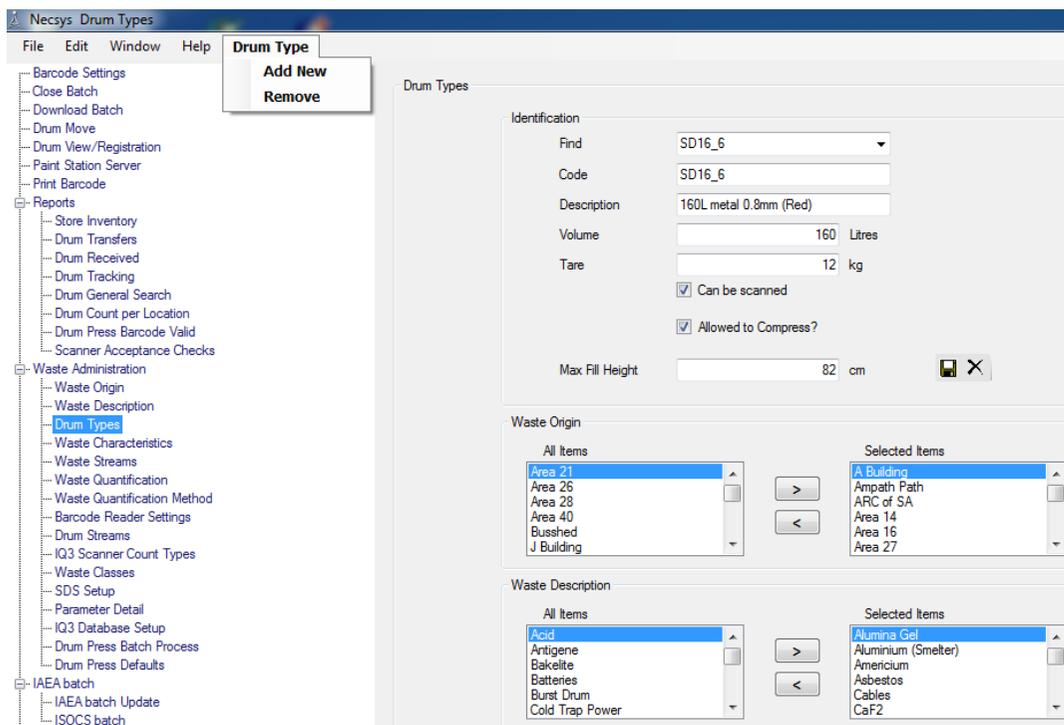
dbo_tblWasteDescription			
WasteDescID	WasteCode	WasteDesc	Compressib

- Waste Description – Waste Origin link in tblOriginDescription table

dbo_tblOriginDescription	
WasteOriginID	WasteDescID

- Manage the list of Waste Description and link different Waste Origins to a Waste Description
- Add a new Waste Description by selecting the Add New on the menu, enter the required info and save
- The description can be changed by – clicking on Description field, changing and saving.
- A Waste Description can be linked to Waste Origins at any time. The link can also be deleted (moving back to block “All Items”) but it is NOT recommended since it can have an impact on existing data.
- For the Waste Description to appear in the drop down list during Full Registration of a drum, the Waste Description must be linked to Waste Origin (and **both** the Waste Description and the Waste Origin must be linked to the drum type in the Drum Type Screen)
- Remove a Waste Description (and its links to the Waste Origins) by selecting the Remove option on the menu. If Waste Description is already in use with a drum configuration it will not be removed.

1.19 LLSW WASTE ADMINISTRATION / DRUM TYPES SCREEN



- Drum Type in *LLSW_DrumType* table

dbo_LLSW_tblDrumType		
DrumTypeID	DrumTypeCode	DrumTypeDescrip

- Drum Type – Waste Origin link in *LLSW_tblOriginDrum* table

dbo_LLSW_tblOriginDrum	
DrumTypeID	WasteOriginID

- Drum Type – WasteDescription link in *LLSW_tblDescriptionDrum* table

dbo_LLSW_tblDescriptionDrum	
DrumTypeID	WasteDescID

- Manage the list of Drum Types and link different Waste Origins and Waste Description to a Drum Type
- Drum info (Code, Description, Volume, Tare) can be viewed/ edited by selecting drum type from the drop down list. Waste origin and waste description links can be added at any time. The links can also be deleted (moving back to block “All Items”) but it is NOT recommended since it can have an impact on existing data.



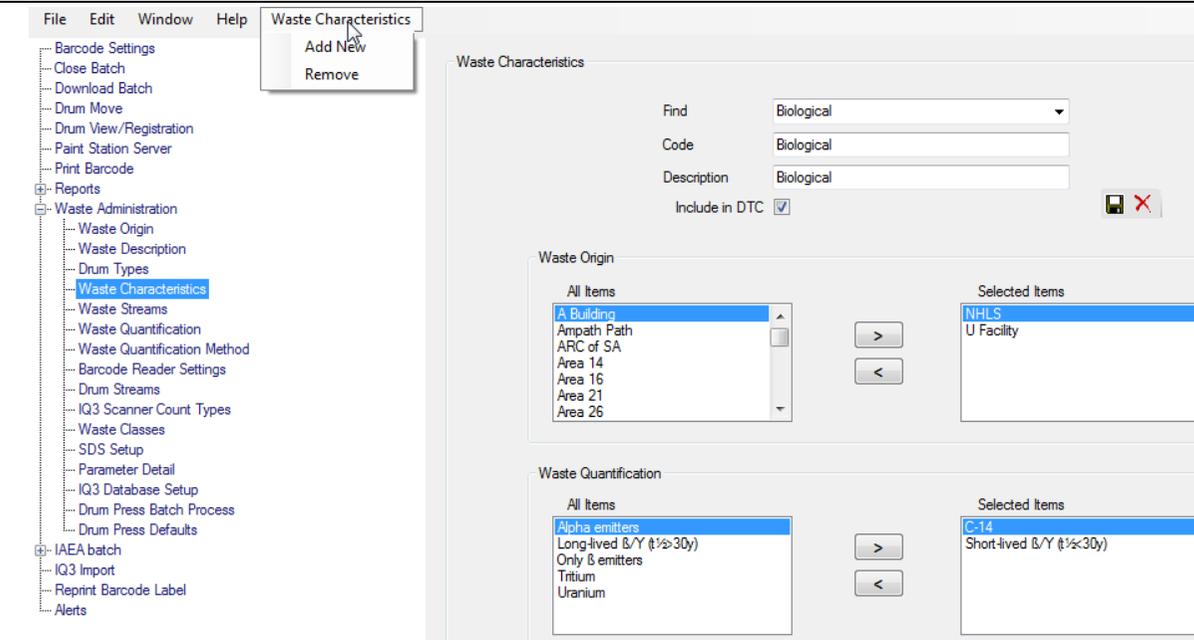
(where

Waste Origin was moving back)

- A new Drum Type can be added by selecting Add New on the menu, entering the required info and saving
- For the Waste Origin to appear in the drop down list during Partial Registration the Waste Origin must be listed in the selected items of the Waste Origin section.
- For the Waste Description to appear in the drop down list during Full Registration of a drum the Waste Description and Waste Origin must be linked to the drum type

Drum Type can be removed by selecting the Remove option on the menu. If it is already in use for a drum – it will not be removed.

1.20 LLSW WASTE ADMINISTRATION / WASTE CHARACTERISTICS SCREEN



- To manage the list of Waste Characteristics and to link Waste Origins and Waste Quantifications to the Waste Characteristics
- New Waste Characteristics can be added by selecting the *Add New* option on the menu, entering and saving the required info
- Waste Characteristics can be viewed/ edited by selecting it from the drop down list Waste origin and waste quantification links can be added at any time. The links can also be deleted (moving back to block “All Items” but it is NOT recommended since it can have an impact on existing data).
- Waste Characteristic can be removed by selecting the Remove option on the menu. If the Waste Characteristics is already in use for a drum – it will not be removed.

- Waste Characteristics in *WasteCharacteristics* table

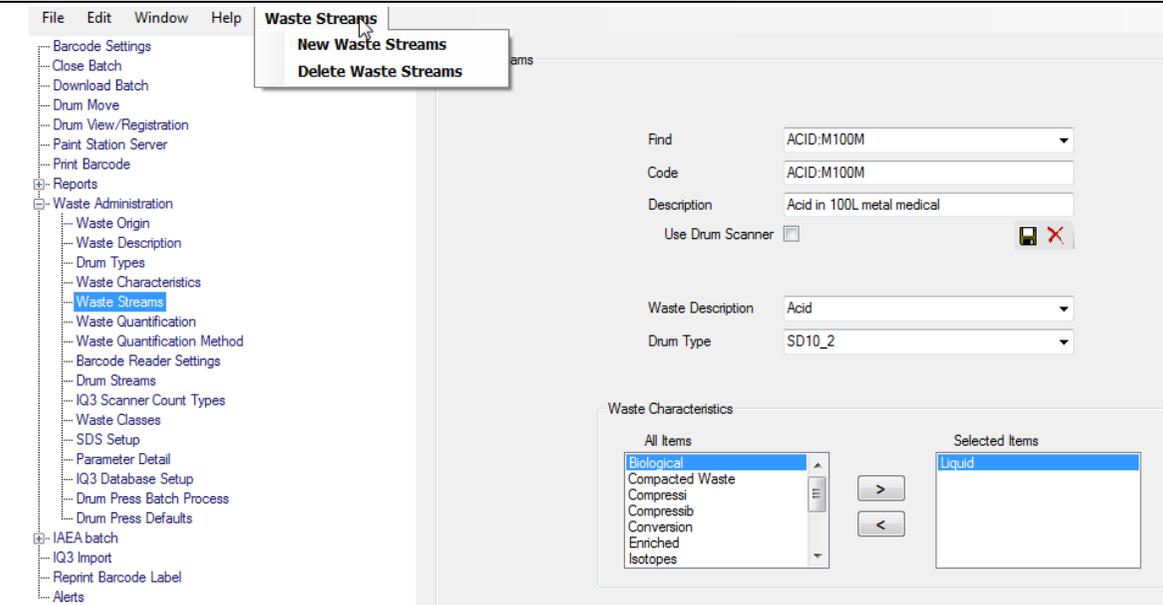
dbo_tblWasteCharacteristics		
WasteCharacterID	WasteCharacter	WasteChar

- Waste Characteristics – Waste Origin link in *OriginCharacteristics* table
- Waste Characteristics – Waste Quantification link in *LLSW_WasteQuantTypeWasteChar* table

dbo_tblOriginCharacteristic	
WasteOriginID	WasteCharacterID

dbo_LLSW_tblWasteQuantTypeWasteChar	
WasteCharacterID	QuantifTypeID

1.21 LLSW WASTE ADMINISTRATION / WASTE STREAMS SCREEN:



- To manage the list of Waste Streams and to link a Waste Description, Drum Type and Waste Characteristics to a Waste Stream
- New Waste Streams can be added by selecting the New Waste Stream option on the menu, entering the required info and saving
- A Waste Stream can be linked only to one Waste description and one Drum Type but to more Waste Characteristics
- Waste Streams can be viewed by selecting it from the drop down list, and. description can be edited
- Any changes (add or delete) to the links of an existing Waste Stream is NOT recommended since it can have an impact on existing data
- Waste Streams can be removed by selecting the Delete Waste Stream option on the menu. If the Waste Steam is already in use for a drum – it will not be removed.

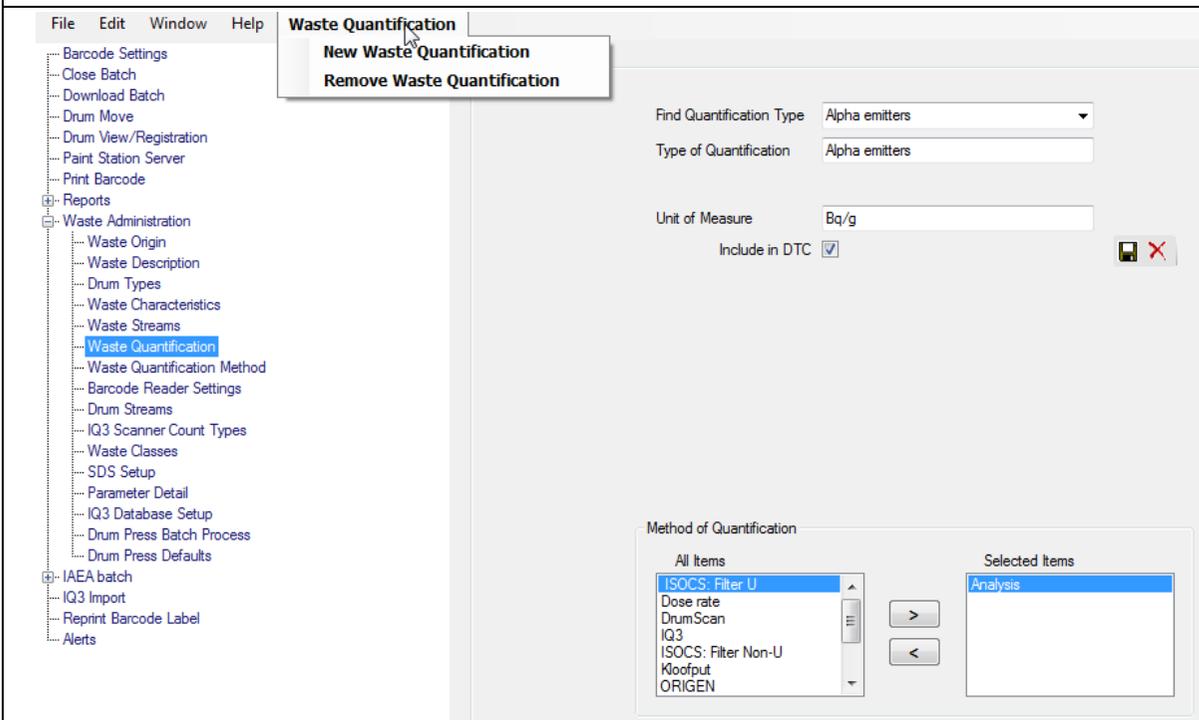
- Waste Streams in *LLSW_WasteStream* table

dbo_LLSW_tbIWasteStream		
WasteStreamID	WasteStreamCode	WasteSt

- Waste Stream-Waste Description-Drum Type-Waste Characteristics link in *LLSW_DrumCharDescStream* table

dbo_LLSW_tbIDrumCharDescStream			
DrumTypeID	WasteCharacterID	WasteStreamID	WasteDescID

1.22 LLSW WASTE ADMINISTRATION / WASTE QUANTIFICATION SCREEN

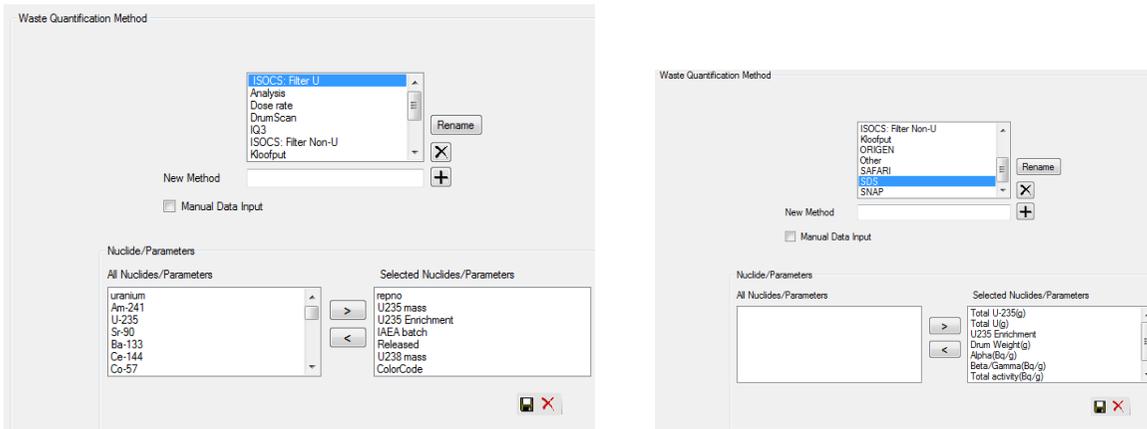


- To manage the list Waste Quantifications
- New Waste Quantifications can be added by selecting the New Waste Quantification option on the menu, entering the required info and saving
- Waste Quantifications can be viewed/ edited by selecting it from the drop down list. The Waste Quantification and Method of Quantification link is applicable to historical data and it is NOT recommended to make any changes since it can have an impact on existing data.
- Waste Quantifications can be removed by selecting the Remove option on the menu. If it is already in use for a drum – it will not be removed.
- Note: The need to specify the *Waste Quantification* and *Method of Quantification* link is no longer applicable

- Waste Quantification in *LLSW_WasteQuantificationType* table

dbo_LLSW_tblWasteQuantificationType		
QuantifTypeID	QuantifTypedesc	Quan

1.23 LLSW WASTE ADMINISTRATION / WASTE QUANTIFICATION METHODS SCREEN



- Waste Quantification Method in LLSW_ *WasteQuantifMethod* table

dbo_LLSW_tblWasteQuantifMethod	
QuantifMethodID	QuantifMethodDesc

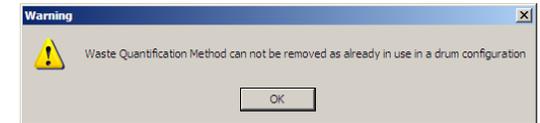
- Waste Quantification Method – Nuclide/Parameter link in LLSW_ *WasteQuantifMethodParameters* table

dbo_LLSW_tblWasteQuantifMethodParameters	
WQMElementID	QuantifMethodID

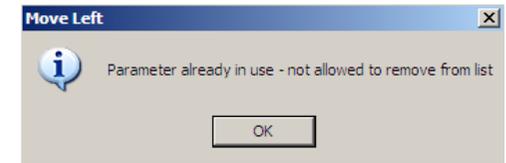
- Nuclide/Parameters in *tbl_Nuclides* table

dbo_tbl_Nuclides		
NuclideID	NuclideAbbrevi	HalfLife

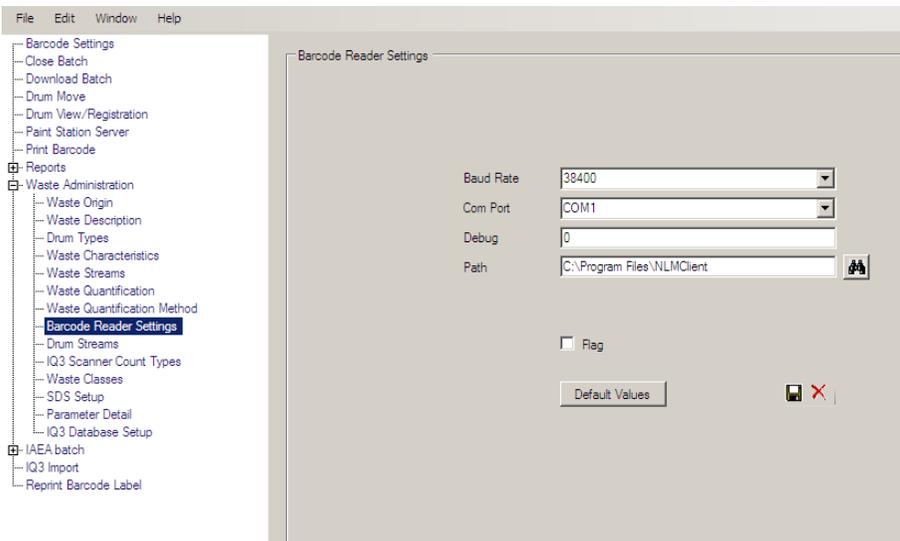
- To manage the list of Waste Quantification Methods and to link the nuclides/parameters applicable to method.
- For SDS and IQ3, the Selected Nuclides /Parameters are pre-defined by default (*Parameter Detail* Screen)
- Quantification Methods can be Added (+), Deleted (X) or Renamed. It can only be deleted if not already in use



- Waste Quantification Method and Nuclide/Parameter links can be added at any time. The links can also be deleted (moving back to the left “All” block) but it will not be allowed if it is already in use



1.24 LLSW WASTE ADMINISTRATION / BARCODE READER SETTINGS SCREEN



- To manage the connection between the barcode readers (BCR) and the PC (for downloading the Drum move and the Download Batch csv files from the BCR to PC) and to specify the location for downloading (LLSW is importing the files from this location).

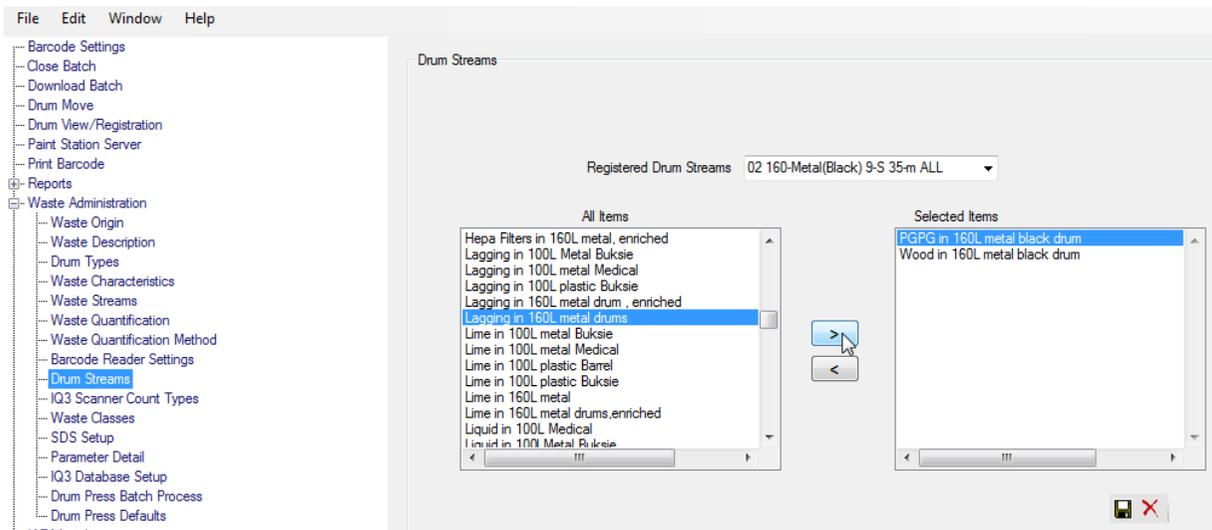
Old Barcode Readers –Phased out

- Enter the Baud Rate, Select available Com ports and enter Debug values.
- Select the Path by browsing where the files will be located and save the values.
- Selecting the Default Values button will set the Baud rate to 38400, Com Port to Com2, Debug value = no (0) and Path to where Necsys is installed.

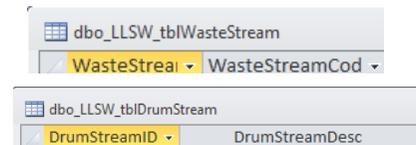
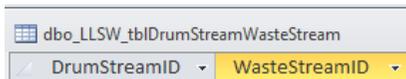
Current Barcode Readers (Motorola MM90 terminal)

- Select the Path by browsing where the files will be located and save the values.

1.25 LLSW WASTE ADMINISTRATION / DRUM STREAMS SCREEN

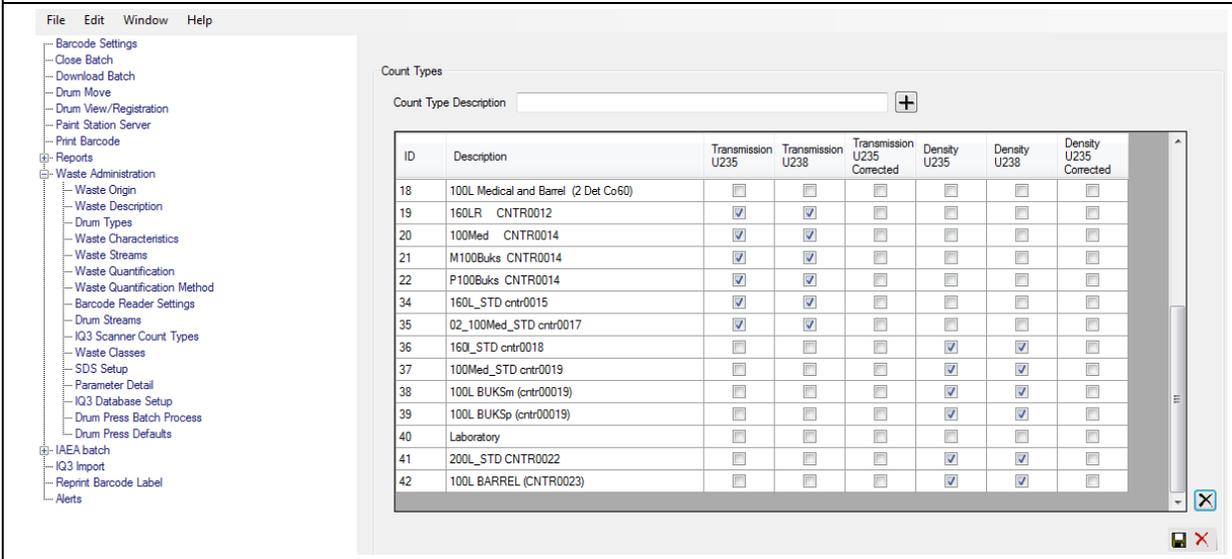


- Waste Streams in *LLSW_WasteStreams* table
- Drum Stream in *LLSW_DrumStream* table
- Drum Stream – Waste Stream link in *LLSW_DrumStreamWasteStream* table



- To manage the Waste Streams that can be characterised per specified Drum Stream
- Left block lists available defined waste streams
- Enter new Drum Streams directly into *DrumStream* table (as copied from SDS software – must be identical)
- Link Drum Stream to applicable waste streams by moving the waste stream from left to right
- These links are used during SDS measurement for Waste Class Determination (If link is not established Paint Station Server displays Error: Waste stream not valid)

1.26 LLSW WASTE ADMINISTRATION / IQ3 SCANNER COUNT TYPES SCREEN

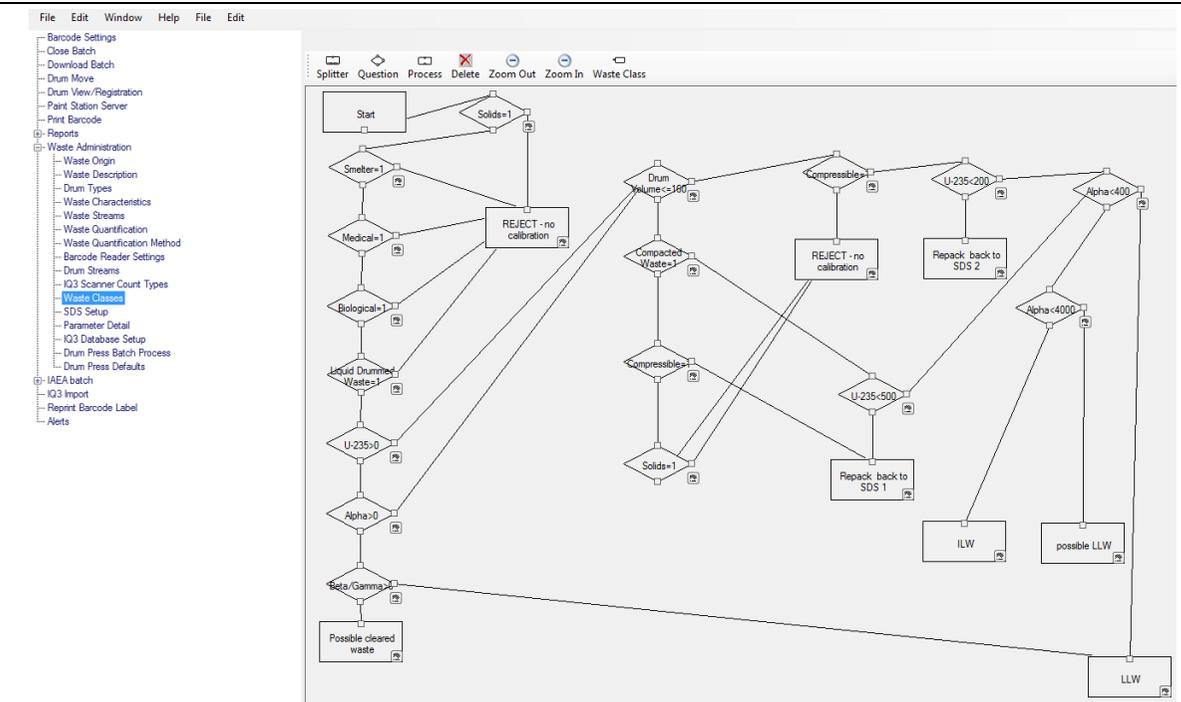


- Manage the list of count types and specify the default results to report for every count type
- Count types can be added (+) or deleted (black X). Deleting the Count type is NOT recommended since it can have an impact on existing data.
- Specified Count Types are displayed in drop down list on IQ3 Results Screen.

• IQ3 Scanner Count Types in *LLSW_IQ3Scanner_CountTypes* table

dbo_LLSW_tblIQ3Scanner_CountTypes			
CountTypeID	Dscr	TransmissionU235	Tra

1.27 LLSW WASTE ADMINISTRATION / WASTE CLASSES SCREEN



- To specify the requirements for determination of waste classes (colour codes)
- The paint Station Server uses this decision tree along with the drum data collected by the SDS scanner to determine Waste Class.

Tables that are involved by the expression builder (design and functional):

ExpressionID	ApplicationID	Name
--------------	---------------	------

ApplicationID	ApplicationName	ApplicationType
---------------	-----------------	-----------------

ObjectTypeID	Desc	ClassName
--------------	------	-----------

ObjectID	ExpressionID	ApplicationID
----------	--------------	---------------

ObjectID	PropertyName	PropertyValue
----------	--------------	---------------

LinkID	ExpressionID	ApplicationID
--------	--------------	---------------

ConnectionID	Direction	ObjectID
--------------	-----------	----------

ConnectionID	PropertyName	ObjectID
--------------	--------------	----------

1.28 LLSW WASTE ADMINISTRATION / SDS SETUP SCREEN

File Edit Window Help

Barcode Settings
Close Batch
Download Batch
Drum Move
Drum View/Registration
Paint Station Server
Print Barcode
Reports
Waste Administration
Waste Origin
Waste Description
Drum Types
Waste Characteristics
Waste Streams
Waste Quantification
Waste Quantification Method
Barcode Reader Settings
Drum Streams
IQ3 Scanner Count Types
Waste Classes
SDS Setup
Parameter Detail
IQ3 Database Setup
Drum Press Batch Process
Drum Press Defaults
IAEA batch
IQ3 Import
Reprint Barcode Label
Alerts

Segmented Drum Scanner Setup

Gamma Limit 120.000000 keV
PKUNCT Limit 20.000000 %

SDS Scanner Database
Server drumscan
Database drumscansql
UserName nlmsrserver
Password nlms3rv3r Test Connection

Target for gamma vision files
Path \\Nlmm1530\User_Data\Drumscan\GAMMAVI

Source for gamma vision files
Path \\drumscan\DrumScanData\Back
Path \\drumscan\DrumScanData\Scan
Path \\drumscan\DrumScanData\Stan

Backup Database
Server necfs016
Database SDS_Backup
Username errolt
Password pass Test Connection

- Set up the connection between the SDS Scanner Database (SDS PC) and the Paint Station Server as well as the connection to the NLM server for the back-up of the data from the SDS server to the NLM server
- Enter relevant setup values for each field and save values.
- The Backup Database is where the SDS results for each measured drum are stored. Back-up is performed automatically and new results are added to existing results in back-up database.
- Connection establishment can be tested by using the Test Connection buttons

- SDS Set-up in *LLSW_LowLevelSolidWasteConstants* table

dbo_LLSW_tblLowLevelSolidWasteConstants			
GammaLimit	PkunctLimit	SdsPath	S

1.29 LLSW WASTE ADMINISTRATION / PARAMETER DETAIL SCREEN

Parameter	Half Life	Unit of Measure	Limit
Ag-108	127.000000	Bq/g	0.00
Ag-110	0.683824	Bq/g	0.00
Am-241	432.200000	Bq/g	0.00
Ba-133	10.500000	Bq/g	0.00
Ba-140	0.035015	Bq/g	0.00
Ce-141	0.088982	Bq/g	0.00
Ce-144	0.778900	Bq/g	0.00
Co-56	0.211000	Bq/g	0.00
Co-57	0.742200	Bq/g	0.00
Co-58	0.160000	Bq/g	0.00

Nuclide ID:
 Nuclide:
 HalfLife: years
 Detail:
 Unit of Measure:
 Limit:

Drum Type: 16DL metal 0.8mm (Red)

Parameter	Unit of Measure	Limit
Total U-235(g)	g	200.00
Total U(g)	g	0.00
Drum Weight(g)		0.00
Total activity(Bq/g)		0.00
Beta/Gamma(Bq/g)		0.00
Alpha(Bq/g)	Bq/g	4000.00
IsotopeID(Bq/g)		0.00
U235 Enrichment		0.00

SDS Parameter:
 Unit of Measure:
 Limit:

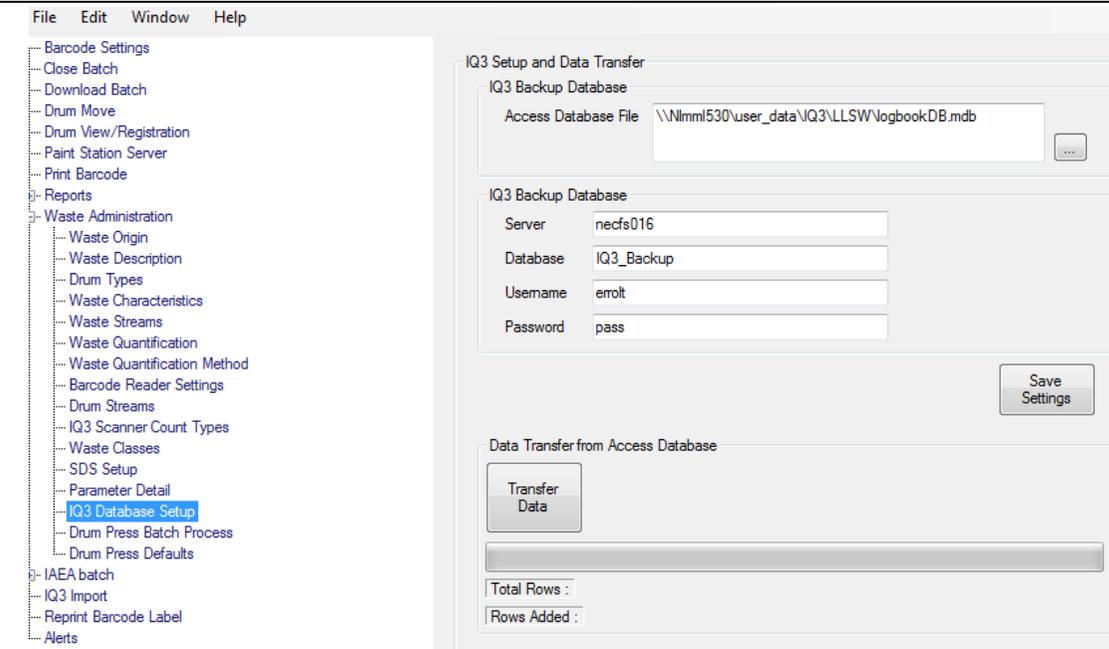
Nuclide / Parameters Details in *tblNuclides* table

- Nuclide / Parameters Detail section in *LLSW_tblNuclideDetails* table

dbo_tbl_Nuclides	NuclideID	NuclideAbb	HalfLife
dbo_LLSW_tblNuclideDetail	NuclideID	UnitofMeas	Limit

- To manage the nuclides/parameters list that are necessary to characterise the drum
- Nuclides can be added by entering and saving the required Nuclide information if no Nuclide ID is displayed (the input fields and Nuclide ID can be cleared by selecting the cancel (red X) button).
- Nuclides can be deleted by selecting the nuclide and the black X, but it will not be allowed if it is already used for a drum
- Nuclides can be edited (except for Nuclide name) by editing the input fields
- Editing Nuclide ID 33 (IAEA batch) and 34 (Released) is NOT recommended since it is also used in other procedures
- SDS and IQ3 Nuclide/Parameters are specified by default, however the Unit of Measure and limit can be edited
- All the nuclides represented by the IsotopeID in SDS Parameters list must be specified in the Nuclides list according to the nuclides in the *FingerprintIsotope* table in the SDS database
- The limits for SDS and IQ3 can be specified per drum type. With the default option *All*, the specified limits will apply to all drum types. The limits can then be changed per drum type

1.30 LLSW WASTE ADMINISTRATION / IQ3 DATABASE SETUP SCREEN

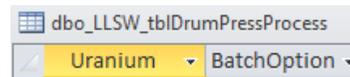
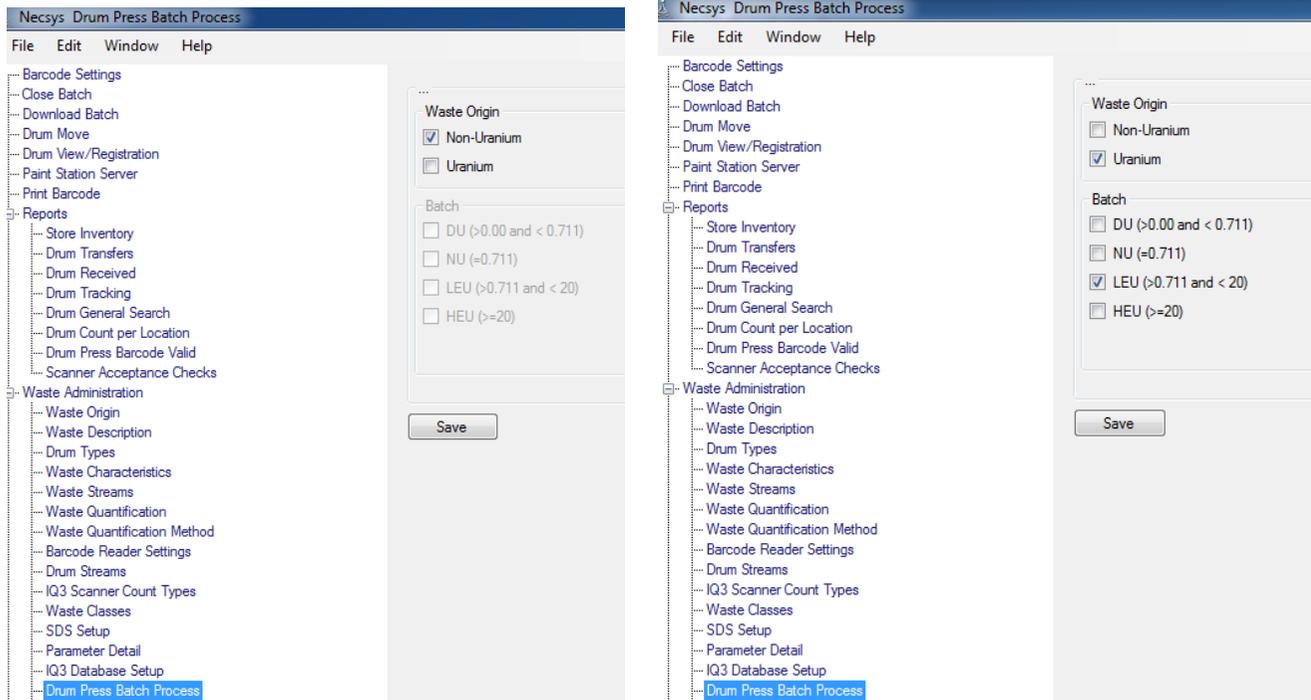


- IQ3 Database Setup in *LLSW_IQ3Setup* table

dbo_LLSW_tbIQ3Setup		
BackupData	BackupServ	BackupUse

- Establish the connection between the IQ3 PC and the NLM server for the transfer of the data to the back-up database
- Back-up is performed manually by using the Transfer Data button and the back-up database is replaced by the current version.

1.31 LLSW WASTE ADMINISTRATION / DRUM PRESS BATCH PROCESS SCREEN



- Drum Press Batch Process in *LLSW_DrumPressProcess* table

- To manage the campaign of drums to be pressed in terms of origin and IAEA batch as by IQ3 results (DU, NU, LEU, HEU)
- LEU, HEU, DU and NU child drums are not allowed to be mixed in a parent drum
- Drums containing no uranium (ZU batched) are allowed to be mixed with the other batched drums
- The drum origin (in terms of Non-Uranium or Uranium as specified on the *Waste Origin Administration* screen) will be validated against the checked box
- The Batch section is only enabled for Uranium Facilities (drums are IQ3 scanned)
- The IAEA batch (IQ3 Results) is validated against the checked *Batch*
- *Save* button is enabled by role permission (security setting)

Options for Permission Settings

FunctionName	View	Add	Edit	Delete	Comment
Drum Press Batch Process	✓		✓		Edit: Enable <i>Save</i> button

1.32 LLSW WASTE ADMINISTRATION / DRUM PRESS DEFAULTS SCREEN

- Drum Press Defaults in *LLSW_DrumPressDefaults* table

dbo_LLSW_tbIDrumPressDefaults		
DefaultsID	DefaultDesc	ClientDrumI

- To Full Register the parent drum automatically with the specified default parameters as soon as the first child is put into it.
- Three different Default screens can be specified depending on the type (a compacted drum, a drum that burst during compaction or a filter) of child.
- The default description needs therefore to start with the word Drum (for compacted drum), Waste (for a burst drum) or Filter (for a filter) as shown below.

Default Description	
Drum Press Defaults	Drum: Compacted drum in 200L Parent Waste: Burst Drum in 200L parent

- To specify the parent default parameters to be used for Full Registration, go to *Drum Press Defaults* on menu and click *Add New Defaults*
For acceptable combinations of Drum Type, Waste Origin, Waste Description, Characteristic and Waste Stream the relevant parameters need to be specified in the applicable Waste Administration screens

1.33 LLSW IAEA BATCH / IAEA BATCH UPDATE SCREEN

Location: PEL
 MGAU: = 0.00 >0.00 AND < 0.711 = 0.711 >0.711 AND < 20.0 >= 20.0 All

Row: 317
 From Block:
 To Block:
 Find

	Released	Drum ID	Barcode	Report No	U235 Mass	MGAU Abundance	IAEA Batch	Row (Destination X)	Block (Destination Y)	Palette (Destine)
1	<input checked="" type="checkbox"/>	309512	000095155	VRF-60	50.5109996795654	4.8021474540359	P	317	C	1
2	<input type="checkbox"/>	309513	000095156	VRF-59	20.401	2.19409866937733	P	317	C	1
3	<input type="checkbox"/>	309514	000095157	VRF-58	67.213	1.51171541201298	P	317	H	1
4	<input type="checkbox"/>	309515	000095158	VRF-56	9.97399979019165	1.70042644108672	P	317	H	1

Batch Number: LEU- Update

- To give drums (IQ3 characterised) a batch number (ZU, DU, NU, LEU, HEU) for IAEA inspection

Batch numbers are given per row



- User only to enter last part of Batch number. ZU, DU, NU, LEU or HEU is automatically populated according to MGAU choice
- Released status from IQ3 perspective of drum can also be updated, by checking the Released boxes individually (Change to include also the option to Select All and then to uncheck individually)
- The fixed part of the batch number (namely LEU, HEU, DU, NU) and the Released status are validated at the VRF before compaction.
- List can be selected and copied (if inspection beforehand is needed) by clicking left and then right at the corner
- For the MGAU All option, no update is possible (this selection is normally used for inspection purposes)

Location: PEL
 MGAU: = 0.00 >0.00 AND < 0.711 = 0.711 >0.711 AND < 20.0 >= 20.0 All

Row: 999
 From Block: a
 To Block: a
 Find

	Released	Drum ID	Barcode	Report No	U235 Mass	MGAU Abundance	IAEA Batch	Row (Destination X)	Block (Destination Y)	Palette (DestinationZ)
1	<input checked="" type="checkbox"/>	290445	99999204	VRF-6	132	5.1	P	999	A	1
2	<input checked="" type="checkbox"/>	290445	99999207	VRF-14	98	5.1	P	999	A	1
3	<input checked="" type="checkbox"/>	290446	99999208	VRF-20	215	5.1	P	999	A	2
4	<input checked="" type="checkbox"/>	290538	99999205	VRF-7	269	5.1	P	999	A	1

Batch Number: LEU- Update

Location: PEL
 MGAU: = 0.00 >0.00 AND < 0.711 = 0.711 >0.711 AND < 20.0 >= 20.0 All

Row: 264
 From Block: a
 To Block: b
 Find

	Released	Drum ID	Barcode	Report No	U235 Mass	MGAU Abundance	IAEA Batch	Row (Destination X)	Block (Destination Y)	Palette (DestinationZ)
1	<input checked="" type="checkbox"/>	219633	000000792							
2	<input checked="" type="checkbox"/>	219656	000000815							
3	<input type="checkbox"/>	236715	000018285							
4	<input type="checkbox"/>	237185	000018758	9622	0.291000008583069	0.847000002				

Batch Number: Update

1.34 LLSW IAEA BATCH / ISOCS BATCH SCREEN

- To give containers (eg. drums, bottles, filter boxes) which are not characterised with IQ3, but with a *ISOCS Waste Quantification Method*, a batch number (ZU, DU, NU, LEU, HEU) for IAEA inspection
- Screen was included for future use for process of which detail was not yet known - bugs not sorted

User Parameters

Quantification

Method of quantification

Detail Values

	Parameter	Value	Comment	Unit of Measure	Limit
	repro	0	tst1	report	0.00
	U235 mass	21		g	1000.00
	U235 Enrichment	45		%	0.00
	IAEA batch	0	HEU4tst1	batch	0.00
	Released	-1		status	0.00
	U238 mass	10		g	0.00
	ColorCode	0102030000		ColorCode	0.00

Close

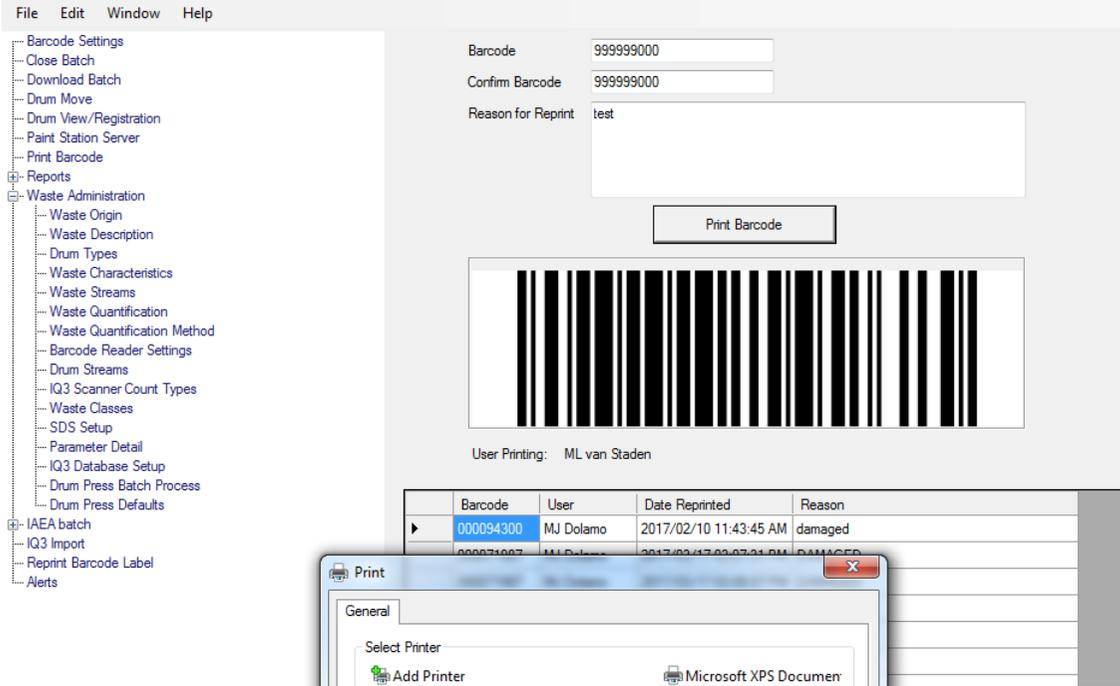
1.35 LLSW IQ3 IMPORT SCREEN

- Display the IQ3 results as in the IQ3 back-up database on the NLM server – for IQ3 Result input
- Not allowed to save data if the drum is already batched

dbo_LLSW_tbIDrumIQ3Results		
DrumID	ReportNo	ReportDate

- IQ3 Results in *LLSW_DrumIQ3Results* table

1.36 LLSW REPRINT BARCODE LABEL SCREEN



- Reprint an existing barcode (using a barcode printer) that could not be read by the barcode reader
- List of reprinted barcodes can be copied by selecting the data (click on top left corner) and use Ctrl-C

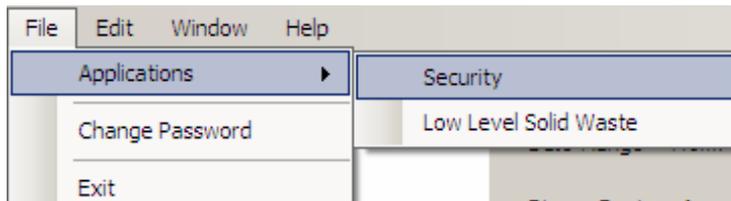
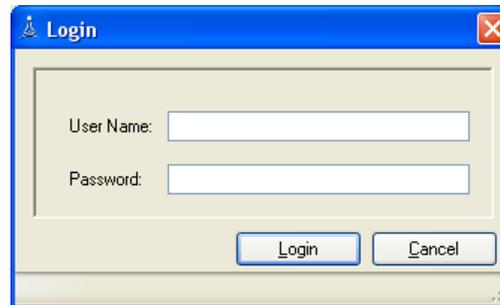
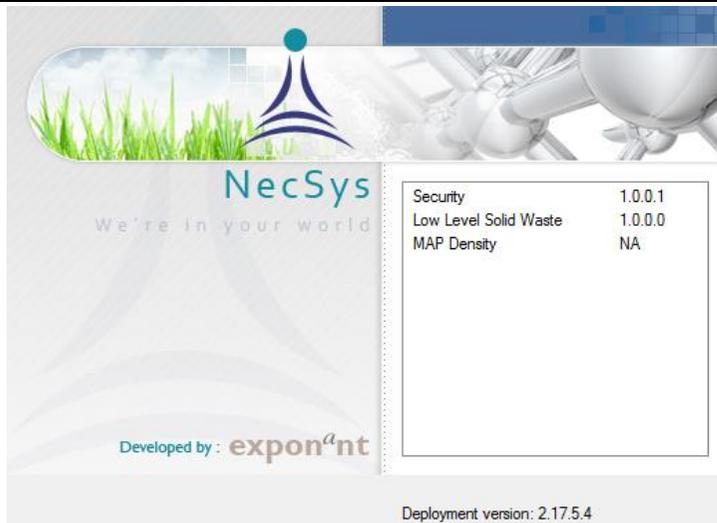
- Reprint Barcode Labels in *LLSW_DrumIQ3Results* table

dbo_LLSW_tblBarcode_Reprint		
Reprint_ID	Barcode	UserID

Options for Permission Settings

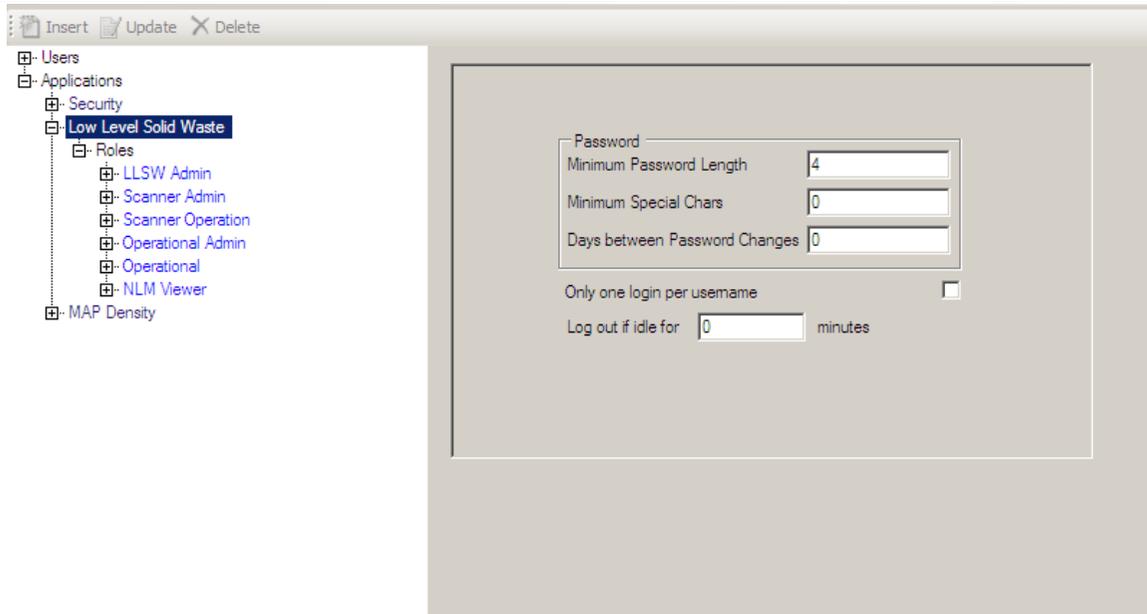
FunctionName	View	Add	Edit	Delete	Comment
Can Reprint Barcode	✓		✓		Edit: Enable <i>Print Barcode</i> button

2 LLSW SECURITY - GETTING STARTED



- The Necsa Low Level Waste Program (LLSW) is a system that will track both drum content and position.
- To use the Security application, you have to be registered and given access to the necessary module (File/Applications/Security will be enabled)
- Enter your User Name and Password.
- When logged in, a menu defining the modules/sub-modules that the user have access to and the main window of the module that is high-lighted will be displayed.
- If a new version is available it will be downloaded automatically. However the program will opened with a blank screen. To activate the new version the user has to go to File/Applications/Security. After activating the new version the program need to be closed down and opened again
- If the version is not displayed in the Necsys window the new version has to be activated

2.1 LLSW PASSWORD MANAGEMENT



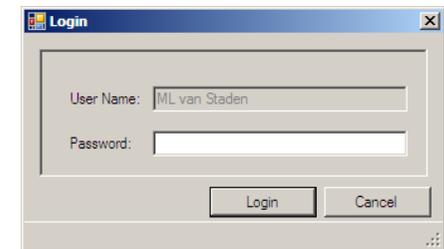
- Log in criteria in *Applications* table

dbo_tblApplications				
ApplicationID	ApplicationName	Application'	Application'	St

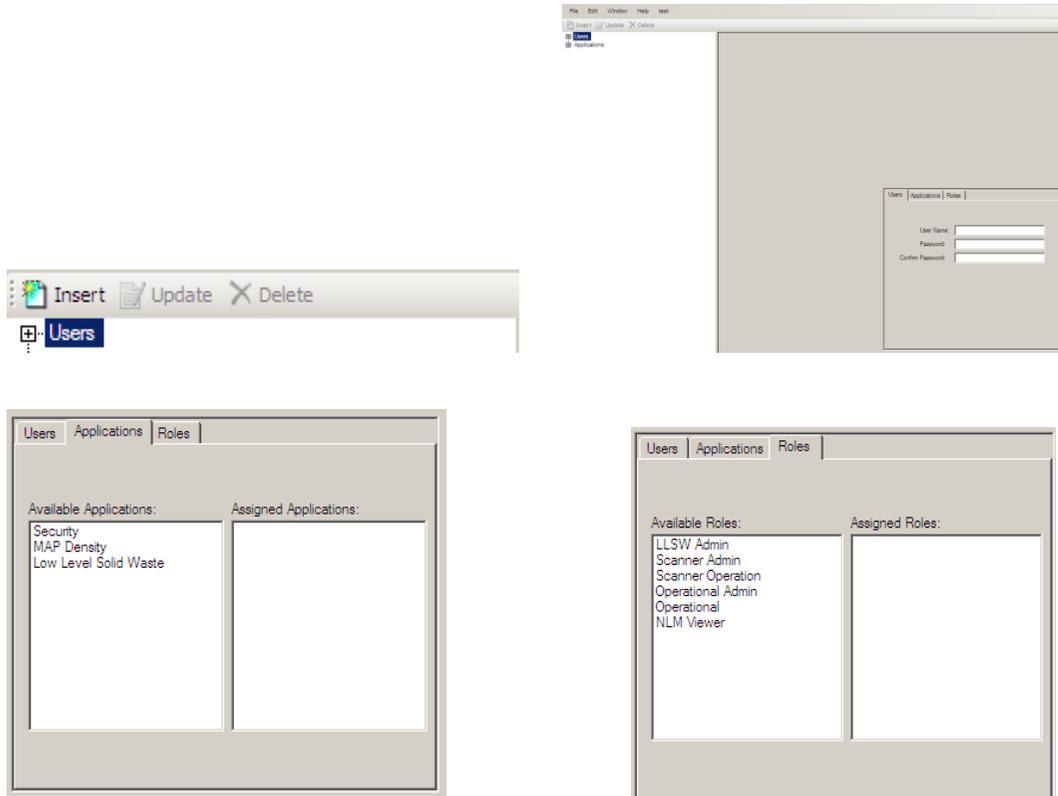
- Manage Passwords and logging-in criteria for the Low Level Solid Waste application
- Passwords will expire according to specified days between Password changes



- The system will log out a user after the specified idle time expired. (With idle time = 0 the system will not log out.)



2.2 USER SET-UP (ASSIGNING OF APPLICATION AND ROLES)



- Insert a new user by clicking on users to activate the Insert option – Enter user’s info and assign the applicable application and role to user
- Assign the application /role by clicking on the required application / role and drag it to the assigned block
- Update / Change an existing user by clicking on the user (expand the Users menu) to activate the Update option
- Passwords could be changed when required

- Users information in *Users* table

dbo.tblUsers			
UserID	UserName	Password	DefaultAp

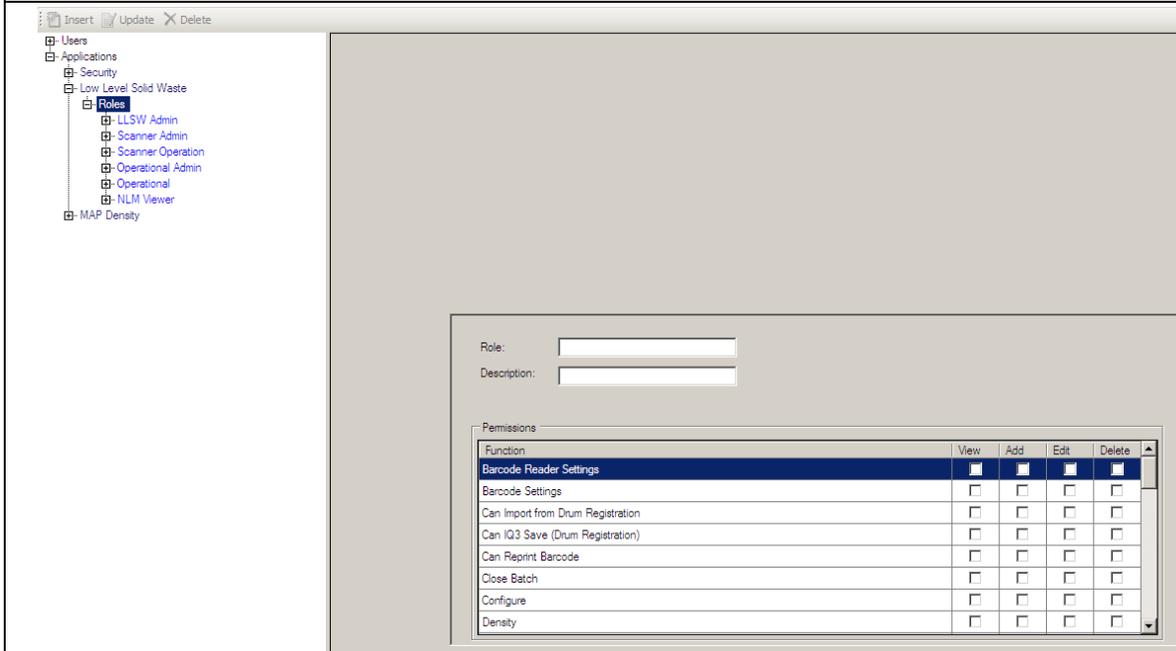
- User – Applications link in *InkUsersApplications* table

dbo.InkUsersApplications	
Application	UserID

- User – Role link in *InkUserRoles* table

dbo.InkUserRoles	
RoleID	UserID

2.3 SET-UP OF PERMISSIONS PER ROLE



- Insert a new role by clicking on Roles to activate the Insert option – Enter role and description
- Specify menu screens (and other functions as required) to be available for specific Role
- Check View for access to the screen / submenu / button
- Check Add; Edit; and/or delete to be functional on the submenu / button if available. Not by default implemented into screens – to be implemented on user requirement
- Click on role name in menu to activate the update and delete options

- Roles in *Roles* table

dbo_tblRoles			
RoleID	Application	RoleName	RoleDesc

- Roles – Permissions link in *Permissions* table

dbo_tblPermissions		
PermissionID	RoleID	FunctionName

2.4 LLSW LIST OF PERMISSION OPTIONS

Menu	FunctionName	View	Add	Edit	Delete	Comment
Barcode Settings	Barcode Settings	✓				
Close Batch	Close Batch	✓			✓	Delete: <i>Delete Batch</i> (Batches menu)
Download Batch	Download Batch	✓				
Drum Move	Drum Move	✓				
Drum View/Registration	Drum View/Registration	✓	✓	✓		Add: Enable <i>Add New Drum</i> (Drums menu) Edit: Enable <i>Edit Current Drum</i> (Drums menu)
	<i>Drum Registration Edit WQM</i>	✓		✓		Edit: Enable <i>Edit Waste Quantification Method</i> (Drums menu)
	<i>Can Import from Drum Registrat</i>	✓				View: Enable <i>Import</i> button on IQ3 tab
	<i>Can IQ3 Save (Drum Registrator</i>	✓			✓	Edit: Enable <i>Save</i> button on IQ3 tab
	<i>Drum Parent Child</i>	✓			✓	Edit: Enable <i>Manual Add Barcode to Parent</i> section Enable <i>Add Drum to Parent</i> button Delete: Enable <i>Remove Drum from Parent</i> button
Paint Station Server	Paint Station Server	✓				
Print Barcode	Print Barcode	✓				
Reports	Reports	✓				
Store Inventory	Store Inventory	✓				
Drum Transfers	Drum Transfers	✓				
Drum Received	Drum Received	✓				
Drum Tracking	Drum Tracking	✓				
Drum General Search	Drum General Search	✓				
Drum Count per Location	Drum Count per Location	✓				
Drum Press Barcode Valid	Drum Press Barcode Valid	✓				
Scanner Acceptance Checks	Scanner Acceptance Checks	✓				
Waste Administration	Waste Administration	✓				
Waste Origin	Waste Origin	✓				
Waste Description	Waste Description	✓				
Drum Types	Drum Types	✓				
Waste Characteristics	Waste Characteristics	✓				
Waste Streams	Waste Streams	✓				
Waste Quantification	Waste Quantification	✓				
Waste Quantification Method	Waste Quantification Method	✓				
Barcode Reader Settings	Barcode Reader Settings	✓				
Drum Streams	Drum Streams	✓				
IQ3 Scanner Count Types	IQ3 Scanner Count Types	✓				
Waste Classes	Waste Classes	✓				
SDS Setup	SDS Setup	✓				
Parameter Detail	Parameter Detail	✓				
IQ3 Database Setup	IQ3 Database Setup	✓				
Drum Press Batch Process	Drum Press Batch Process	✓		✓		Edit: Enable <i>Save</i> button
Drum Press Defaults	Drum Press Defaults	✓				
IAEA batch	IAEA batch	✓				
IAEA batch Update	IAEA batch Update	✓				
ISOCS Batch	ISOCS Batch	✓				
IQ3 Import	IQ3 Import	✓				
RePrint Barcode Label	RePrint Barcode Label	✓				
	<i>Can Reprint Barcode</i>	✓		✓		Edit: Enable <i>Print Barcode</i> button
Alerts	Alerts	✓				

- For LLSW Admin Role all permissions are checked (as indicated in the table)
- Special permissions as indicated in the Comment column are also discussed at the applicable screens

APPENDIX B: SPECIFIED OUTPUT FORMATS OF THE DIFFERENT REPORTS

REPORTS	FORMAT
Drum Move Report (generated from the <i>Drum Move</i> function)	PDF (Portable Document Format)
Drum Transfer Certificate (generated from the <i>Download Batch</i> function)	PDF (Portable Document Format)
Store Inventory	Excel
Drum Transfers	Excel
Drum Received	Excel
Drum Tracking	Excel
Drum General Search	Excel
Drum Count per Location	Excel
Drum Press Barcode Valid	Excel
Scanner Acceptance Checks	Excel