

Screen Layouts and Workflow

For The DND Fire Marshall

WEB Air Quality Reporting System

(AQMS)

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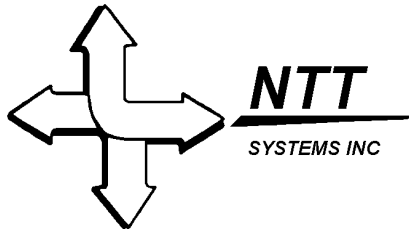
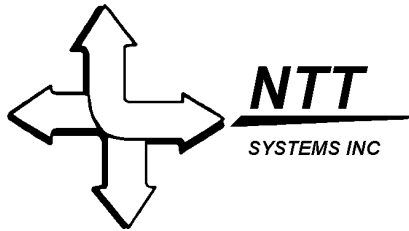


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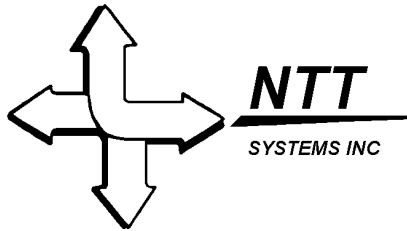


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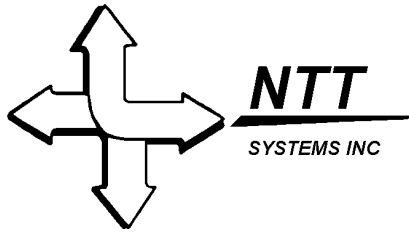
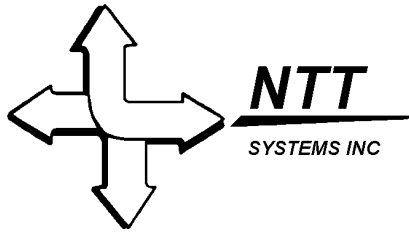
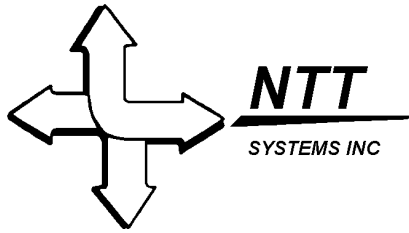


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1. Introduction

This document presents proposed screen layouts and workflow for the Fire Marshal's Web-based Air Quality Management System (AQMS).

Organization and function is based on the following considerations:

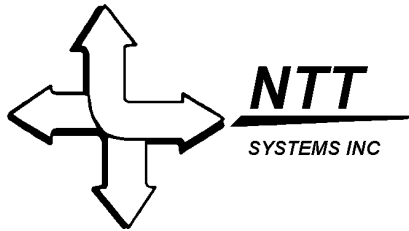
1. User Organization (Groups)

- The *Owner* is a single designated person who receives certain information that is automatically generated by the system. These messages relate to events, the implications of which, the Owner would be deemed responsible for, e.g., sample failure notices, compressors overdue for testing, etc.
- *Managers* are Fire Marshal personnel who have managerial control over the system and can reconfigure it to reflect organizational changes. Managers will have a superset of all other group privileges and have access to a variety of reports.
- *Fire Chiefs* are base fire chiefs and are responsible for ensuring that all compressors are tested according to schedule. Fire Chiefs are known by name, location and email address. They can move compressors between certain locations and manage login information for technicians at their base.
- *Technicians* are base personnel that can order test cylinders for compressors. They have login names and passwords.
- *Anonymous Users* are other base personnel with access to the system. Anonymous Users can review compressor information and analysis reports.
- *Maxxam* is the gas analysis company. They are responsible for sending sample kits on request, performing analysis, uploading sample reports, and providing cylinder tracking information.

The groups, *anonymous users* to *Owner* represents a hierarchy. A user at a given level can perform their own actions plus any of those assigned to lower groups. *Maxxam* is not considered to be a user. They are the source and destination of certain information created by or required by AQMS.

2. Communications

- *Firewall considerations.* The Fire Marshal's office and all bases are behind the DWAN firewall. Maxxam is outside the firewall.
- *Push/Pull.* Information will be pushed to relevant parties when the recipient can be determined and has a known email address. For example, sample reports can be pushed to Fire Chiefs because we know their email addresses and which compressors



they are responsible for. Sample results will have to be pulled (requested) by other base personnel (e.g., Wing Surgeons) since we do not know their email addresses.

3. Goals

- Provide timely notification
- Facilitate communication between Maxxam, NDHQ, and bases
- Support Web-based system maintenance and administration
- Unattended operation
- Good ergonomic design – make it easy to do the right thing

The following sections present the system from a work flow perspective. Each includes narrative and screen shot.

2. Common DND User Interactions

2.1 Getting Help

Comprehensive help is available online for all pages in the application. It is accessed by clicking on the *HELP* hyperlink that is displayed in the header and footer of each page. A help page explains the purpose of the page and describes each of the fields. Hyperlinks are identified and the consequences of clicking on them are discussed. Similarly, the events associated with submitting a form are detailed. Note that the contents of the help pages are tailored to the security level of the user. This is done so that low level users are not confused by descriptions of controls and fields that they can not see or access.

2.2 Logging On

In this regard, there are two classes of users, *Anonymous*, and *known*. Known users have login name and password. Internally, the name is associated with a *base*. Each known user belongs to a group and has the group's privileges.

Anonymous users log in to a base. They can not receive email notifications and have the privileges of the *Anonymous User* group.

There is no current way to use network resources to determine location from email address, and no common directory for user/password validation. Consequently the application will maintain its own log-in table. *Managers* will be able to set passwords and record email addresses. *Fire Chiefs* are responsible for assigning login names and passwords to *Technicians* that work under their direction.

AQMS is a bilingual system. When anyone comes to the AQMS site they are first presented with a language choice screen. Note that language preference can be switched at any point in the session.

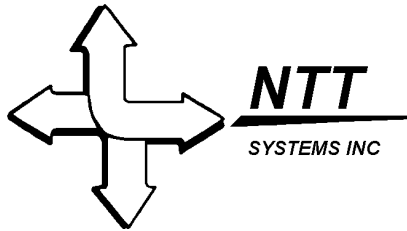


Figure 1 Initial Language Choice Screen

Once the language has been selected, the user will be automatically taken to the main splash screen.

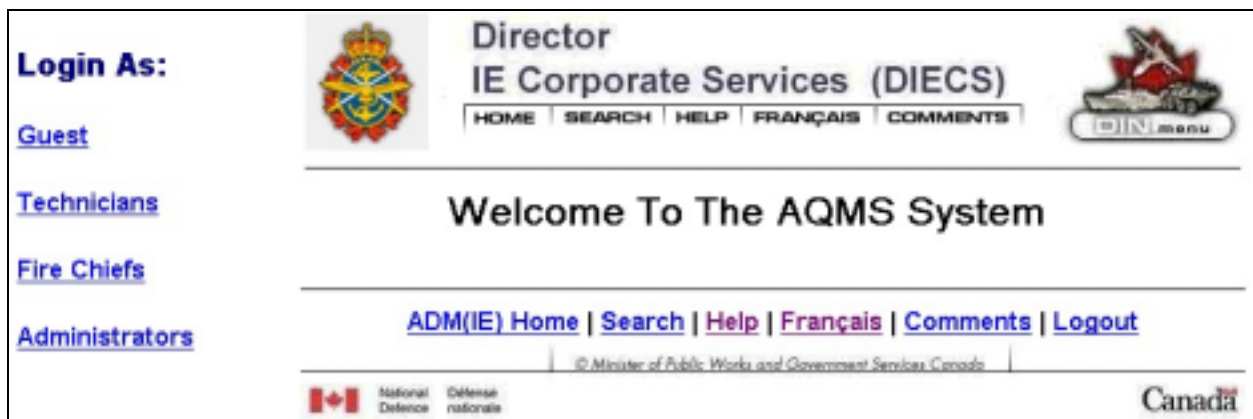


Figure 2 Splash Screen

This screen presents a welcome message (to be determined) and allows the user to continue based on their status. Separate login screens are provided for each group as follows (Note that the standard DIECS headers and footers accompany each screen and will not be included in further screen shots):

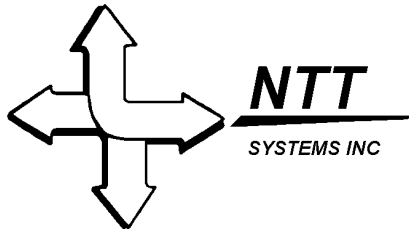
The form is titled "AQMS System Guest Login". It contains a label "Select Your Location:" followed by a dropdown menu with the text "Please select one" and a downward-pointing arrow. Below the dropdown menu is a "Go" button.

Figure 3 Guest Login

Guests simply select the location (base) that they are interested in.

The form is titled "AQMS System Technicians Login". It contains a label "Select Your Location:" followed by a dropdown menu with the text "Please select one" and a downward-pointing arrow. Below the dropdown menu are two text input fields: "Enter User ID:" and "Enter Password:". A "Go" button is located below the password field.

Figure 4 Technician Login

Technicians must select a location and then enter their login names and passwords. This allows ID's to be duplicated on different bases, thus making ID assignment easier for the *Fire Chiefs*.

The form is titled "AQMS System Fire Chiefs Login". It contains two text input fields: "Enter User ID:" and "Enter Password:". A "Go" button is located below the password field.

Figure 5 Fire Chief Login

Fire Chiefs enter their login names and passwords. Because they are known at the system level, their ID's are unique determine the location automatically.

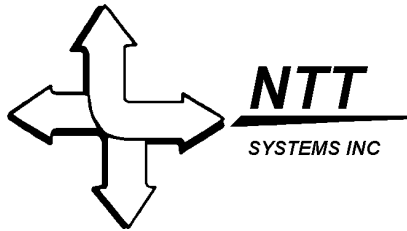
A screenshot of a web-based login form titled "AQMS System Administrators Login". The form is enclosed in a rectangular border. It contains two input fields: the first is labeled "Enter User ID:" and the second is labeled "Enter Password:". Below the password field is a small rectangular button with the text "Go" inside it.

Figure 6 Manager and Owner Login

This screen is used both by *Managers* and the system *Owner*. They are not associated with any specific location.

Anonymous Users, *Technicians*, and *Fire Chiefs* will be automatically taken to the Compressor Maintenance screen. Other known users will be directed to a more comprehensive menu.

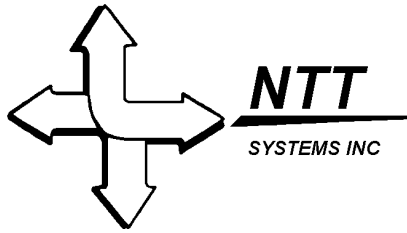
The remainder of this section presents the system as seen by non-administrators. Management functions are presented in Section 4.

2.3 Compressor Maintenance

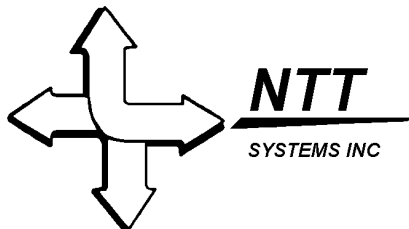
All users arriving at this screen will see information relating to their location (base). Note that *Managers* coming here will be acting on behalf of a location (base) or a command (eg., AIRCOM).

The Compressor Maintenance Screen allows any user to view the last analysis report or known user to order a sample cylinder for a compressor. Note the following:

1. These compressors are assigned to AIRCOM/BAGOTVILLE
2. *Compressor ID*, the first column, lists the DND compressor number. Members of groups *Fire Chief* and higher will see the IDs as hyperlinks. Clicking on a link will move to an editing form.
3. The *Order* column contains a check box beside each compressor for which a sample cylinder can be ordered. This column will not be visible to *Anonymous Users*.
4. *Unit* indicates the location of the compressor on the base.
5. *Status* indicates sampling status. Background colours are status indicators.
 - Red indicates overdue – the date is the date that the sample should have been taken.
 - Orange indicates cylinder has been ordered – the date is the cylinder ordering date.



- Light green indicates that Maxxam has shipped the cylinder – the date is Maxxam’s shipping date.
 - Dark green indicates Maxxam has received the sample for analysis – the date is the date received.
 - Yellow indicates sampling required within two weeks – the date is the latest allowed sample date.
 - White indicates sampling is not required for at least two weeks. – the date is the latest allowed sample date.
 1. Green text indicates the last sample Passed.
 2. Red text indicates the last sample Failed.
 3. Black text indicates there is no last sample.
6. *Serial #* and *Make* are identification data that can be validated on the actual unit.
7. *Last Report* indicates the date of the last analysis report that was received for the compressor
Anyone can click on this link to be taken to a page displaying the analysis results.



Command: AIRCOM Base Name: [BAGOTVILLE](#)

The following compressors are available at this location:

CompID	ORDER	Unit	Status	Serial #	Make	Last Report
6004		FIRHI	07-May-2001	112	ATLAS	
6002		FIRHI	07-May-2001	123	BAUER	
5131		FIRHI	09-May-2001	GE5151	BAUER	
574	<input type="checkbox"/>	FIRHI	14-Jun-2000	121290L	SPEEDAIR	14-Dec-1999
309	<input type="checkbox"/>	FIRHI	06-Mar-2001	30T427442	INGERSOLL	
223	<input type="checkbox"/>	FIRHI	06-Oct-2000	GE-5670	UNKNOWN	16-Jan-1998
219	<input type="checkbox"/>	FIRHI	11-Apr-2001	J0082V84A	INGERSOLL	10-Jun-1997
203	<input type="checkbox"/>	FIRHI	02-Jan-1998	GF 5670	BAUER	02-Jul-1997
237	<input type="checkbox"/>	WKSHOPI	26-Mar-2001	PR6072565CG92B	DOER	20-Dec-1999
225	<input type="checkbox"/>	WKSHOPI	07-Oct-1998	94-345	AIR SYSTEMS INT	03-Mar-1998
224	<input type="checkbox"/>	WKSHOPI	27-May-2001	0297255753T	RK MACHINERY	27-Nov-2000
221	<input type="checkbox"/>	WKSHOPI	17-Oct-1997	0297255753T	RK MACHINERY	17-Apr-1997
218	<input type="checkbox"/>	WKSHOPI	13-Jul-1998	32069LC	INGERSOLL RAND	13-Jan-1998

[Transfer In](#)

mm/dd/yy	mm/dd/yy	mm/dd/yy	mm/dd/yy
Sample Later - Pass	Sample Later - Failed	Sample Later - No Last Report	Sample Soon
mm/dd/yy	mm/dd/yy	mm/dd/yy	mm/dd/yy
Overdue as of above date	Cylinder ordered on above date	Cylinder shipped on above date	Cylinder received for analysis on above date

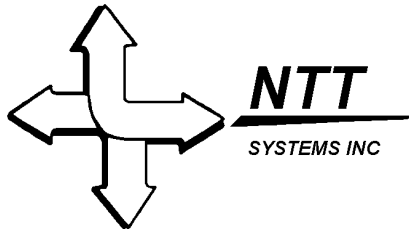
Figure 7 Compressor Maintenance Screen

Fire Chiefs and above will see the last line of the table *Transfer In*. This hyperlink allows the user to transfer a compressor from some other location to this location. This is discussed in Section 2.7.2.

2.4 Ordering Cylinders

Sample cylinders *can* be ordered for any compressors that do not already have cylinders allocated. Stated another way, cylinders *can not* be ordered for any compressor for which a cylinder has been ordered but no sample report has been received.

Known users can order cylinders. In our sample screen, the second column has a check box beside each compressor for which a cylinder can be ordered. To order cylinders, check the desired order boxes and click the *Order* button at the top of the column. This will take the user to the Order Cylinders Screen.



Order Cylinders

Command: AIRCOM Base Name: BAGOTVILLE

Cylinders will be ordered for the following compressors

CompID	Model	Serial #	Unit	Working Pressure	Cylinder Type
219	INGERSOLL	J0062V84A	FIRHI	100	L
203	BAUER	GF 5670	FIRHI	0	L
237	DOER	PR6072565CG92B	WKSHOPI	3500	H

Number of HIGH Pressure Cylinders: 1

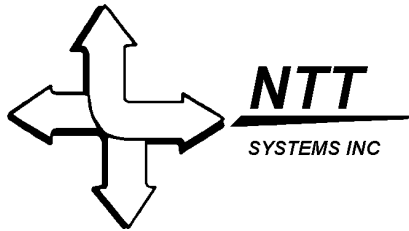
Number of LOW Pressure Cylinders: 2

DELIVER TO		ATTENTION	
Building:	Building #:	Name:	Tel #:
Admin	214	MCpl Jean-Louis Granv	416-231-0123 x123456

Figure 8 Order Cylinders Screen

All information in the upper table is extracted from compressor information in the database and can not be modified. In particular, the *Sample Cylinder Type* determines whether High or Low pressure cylinders are ordered. Information in the lower tables must be present for the order to be accepted. As a convenience, the system remembers the Building and Building # that were submitted with the last order that was placed on the base. The Name and Tel # are user's name and phone # respectively.

Clicking on the *ORDER NOW* button will display the Cylinder Confirmation screen. This can be printed for reference using the browser's *File|Print* menu choice. Clicking on the *OK* button will return the user to the Compressor Maintenance Screen.



Cylinder Confirmation

Command: AIRCOM Base Name: BAGOTVILLE

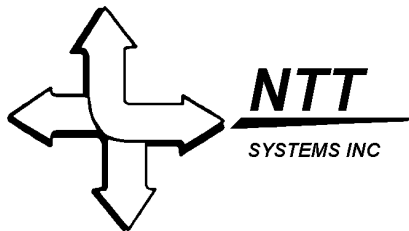
CYLINDERS ORDERED ON: 3/26/01

CompID	Make	Model	Serial #	Unit	Pressure
219	INGERSOLL	SSR-EP25	J0082V84A	FIRHI	L
203	BAUER	PN 408040-W8462-6EBL 7/01-DJ12	GF 5670	FIRHI	L
237	DOER	TYPE K CLASS B	PR6072565CG92B	WKSHOPI	H

DELIVER TO		ATTENTION	
Building: Admin	Building #: 214	Name: MCpl. Jean-Louis Granville	Tel #: 416-231-0123 x123456

Figure 9 Cylinder Confirmation Screen

Clicking on the OK button will return the user to the Compressor Maintenance screen as shown below. Note that the status colour for compressors 219, 203, and 237 has been changed to reflect that the cylinders have been ordered and that the Order check boxes have been removed.



Command: AIRCOM Base Name: BAGOTVILLE

The following compressors are available at this location:

CompID	ORDER	Unit	Status	Serial #	Make	Last Report
6004		FIRHI	07-May-2001	112	ATLAS	
6002		FIRHI	07-May-2001	123	BAUER	
5131		FIRHI	09-May-2001	GE5151	BAUER	
574	<input type="checkbox"/>	FIRHI	14-Jun-2000	121290L	SPEEDAIR	14-Dec-1999
309	<input type="checkbox"/>	FIRHI	06-Mar-2001	30T427442	INGERSOLL	
223	<input type="checkbox"/>	FIRHI	06-Oct-2000	GE-5670	UNKNOWN	16-Jan-1998
219		FIRHI	07-Jun-2001	J0082V84A	INGERSOLL	10-Jun-1997
203		FIRHI	07-Jun-2001	GF 5670	BAUER	02-Jul-1997
237		WKSHOPI	07-Jun-2001	PR6072565CG92B	DOER	20-Dec-1999
226	<input type="checkbox"/>	WKSHOPI	07-Oct-1999	94-345	AIR SYSTEMS INT	03-Mar-1998
224	<input type="checkbox"/>	WKSHOPI	27-May-2001	0297255753T	RK MACHINERY	27-Nov-2000
221	<input type="checkbox"/>	WKSHOPI	17-Oct-1997	0297255753T	RK MACHINERY	17-Apr-1997
218	<input type="checkbox"/>	WKSHOPI	13-Jul-1998	32069LC	INGERSOLL RAND	13-Jan-1998

Transfer In

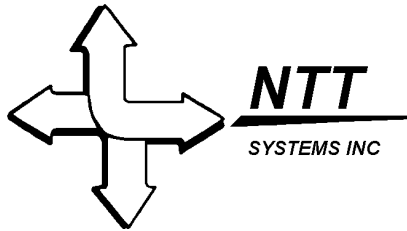
mm/dd/yy Sample Later - Pass	mm/dd/yy Sample Later - Failed	mm/dd/yy Sample Later - No Last Report	mm/dd/yy Sample Soon
mm/dd/yy Overdue as of above date	mm/dd/yy Cylinder ordered on above date	mm/dd/yy Cylinder shipped on above date	mm/dd/yy Cylinder received for analysis on above date

Figure 10 Updated Compressor Maintenance Screen

2.5 Cylinder Tracking

The cylinder tracking function only tracks events that are performed directly by the system or reported by Maxxam. These include the following:

1. Cylinder ordered by the system as the result of personnel following the Order Cylinder scenario (2.4 above).
2. Cylinder shipped and recorded by Maxxam.
3. Cylinder returned for analysis. Recorded by Maxxam.
4. Sample analysis report received and recorded by the system.



There may be cases where manual procedures circumvent the system or cause it to be out of sync with actual events. Consequently for (2) and (3) the system will believe that information received from Maxxam. (4) is logged when the system actually receives a report and this is accepted as fact.

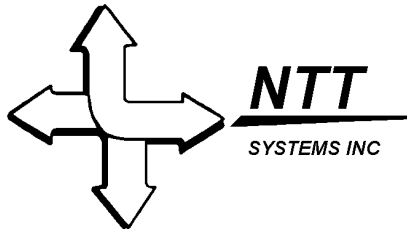
The only situation that causes a problem is if the system believes a cylinder has been ordered for a compressor and this is not the case (e.g., the order was cancelled by telephone). So long as the compressor status is no more advanced than *Cylinder Ordered*, it can be backed up as though no order was placed. This is discussed under Editing Compressor Information, (2.7 below).

2.6 Viewing Sample Reports

As noted in Section 2.3, the dates in the “Last Sample Date” column of the Compressor Maintenance Screen are hyperlinks. Each points to the report (previously *message*) for that compressor for that date. Clicking on the link will take any user to the Published Sample Report Screen. These reports are simple text documents that can be viewed in and printed from the browser.

Note the following:

1. The centre of the top frame identifies the compressor and the report date.
2. The navigation buttons will allow the user to scroll back and forward through the reports for the selected compressor.
3. Reports created by **AQMS** will be in both official languages. Older reports will be unilingual English.
4. The report can be printed from the browser.



Compressor Reports

CompID: 223 Base: BAGOTVILLE Make: GODFREY

<<< < > >>> Report: 4/4 Done

UNCLASSIFIED 7665-1

01 02 171447Z APR 00 RR RR UUUU RPP 732

NDHQ OTTAWA/CFFM 2-2/

3 ERE BAGOTVILLE/C POMPIER/

INFO 1 CAD WINNIPEG/CFM/

3 ERE BAGOTVILLE/CSM/

UNCLAS RPP 732

SIC NNN/LOJ

SUBJ: BREATHING AIR PURITY CHECK

REF: A. CARG Z180.1 M85

B. ANNEX A CB7 020 001/NG 001

C. MANN LAB FILE NO. MIL ADM5925

1. YOUR SAMPLE WAS ANALYZED WITH FOLLOWING RESULTS:

Figure 11 Sample Report

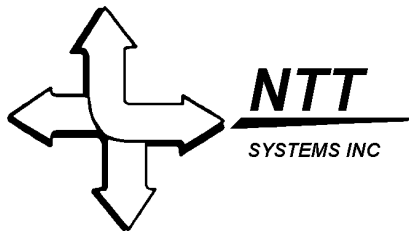
2.7 Editing Compressor Information

This section deals with editing information for an existing compressor at a particular site. Adding, moving, and retiring compressors is dealt with in Section 2.8.

Fire Chiefs can access compressor information through the COMPRESSOR MAINTENANCE SCREEN by clicking on an entry in the *Compressor ID* column. *Managers* will have access through this and other mechanisms. The information is edited on the Edit Compressor Screen.

Note the following:

1. Compressor ID and location (unit type) is provided in the title along with the base information.
2. Compressor manufacturer (*Make*) can be changed by selecting an option from a drop down box. The options can be changed through the system maintenance functions.
3. *Model* and *Serial #* can be edited by typing. No validation is performed.



4. *Year* is edited by typing with only the obvious edit rules.
5. The user can indicate that the unit is a *Compressor* or *Air Box*.
6. *Sample Pressure* indicates whether a high pressure or low pressure cylinder is required for sampling.
7. The date of the *Last Sample* is shown along with two links, S and R. Clicking on “S” will go to the Sample Data Screen and clicking on “R” will go to the Published Sample Report Screen (See Section 2.6). Each of these will allow the user to scroll through historical sample data and reports. The
8. The *Status* field indicates whether the last sample passed or failed.

Command: AIRCOM Base Name: BAGOTVILLE

CompressorID: 219 (FIRHI)

Last Sample 10-Jun-1997 FAIL
[S](#) [R](#)

Make	Model	Serial #	Year	Type	Working Pressure	Sample Pressure
INGERSOLL	SSR-EP25	J0062V84A	1987	Compressor <input type="checkbox"/> Air Box <input type="checkbox"/>	100	High <input type="checkbox"/> Low <input type="checkbox"/>

Cylinder Ordered:

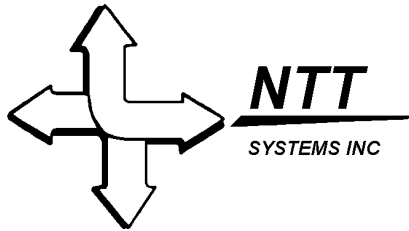
Figure 12 Edit Compressor Screen

The user can apply the updates by pressing the UPDATE button or ignore any possible changes by pressing the CANCEL button. *Fire Chiefs* will be taken back to the COMPRESSOR MAINTENANCE SCREEN. Other users will return to whatever screen they came here from.

The MOVE button takes the user to the Move Compressor Screen. *Fire Chiefs* can move compressors to locations on their base. *Managers* can move compressors to any location. See Section 2.8 below.

2.7.1 Altering Cylinder/Compressor Status

The Edit Compressor Screen provides access to the function that can make it appear that no cylinder has been ordered for a compressor. Clicking on the *NOT ORDERED* button will make it appear exactly as



though the cylinder was not ordered. Returning to the Compressor Maintenance Screen would show the compressor to be overdue for testing as before the order. The NOT ORDERED button is only displayed for a compressor if a cylinder has been ordered but not shipped by Maxxam. NOTE that this feature is provided to reflect the fact that the base cancelled the order. Clicking on the button does not exchange any information with Maxxam.

2.8 Adding, Moving and Retiring Compressors

Moving compressors is a tricky issue with respect to record keeping and responsibility. Notifications (sample reports and overdue notices) are sent to the *Fire Chief* at the base where the system believes the compressor to be. Also, the automatic handling of sample reports depends critically on being able to match compressor ID's against locations. Consequently the extent to which the system as a whole can run "unattended" is dependent on keeping track of compressor movements. Note that in the current system (both AIRQMS and GADS), the NDHQ Fire Marshal's office and DCIEM are the last to know that a compressor has been moved. They find out only when a sample report with apparently mismatched compressors and locations shows up.

The following screens and transactions are designed using the following premise:

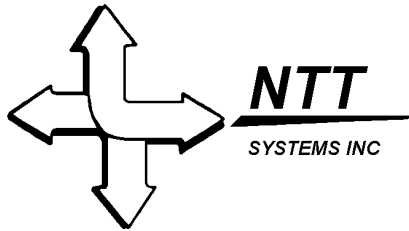
1. Only *Managers* can create a new compressor ID and assign it to its initial location.
2. Only *Managers* can retire a compressor. Retired compressors remain in the database for historical purposes but are not scheduled for sampling.
3. Only *Managers* can designate a compressor as being temporarily out of service, e.g., being sent back to stores. Out of service compressors are not scheduled for sampling.
4. *Fire Chiefs* and above can move compressors between unit types on their base.
5. *Fire Chiefs* and above can move an existing, not retired compressor from *any* location to their base. In this case, email notification is sent to the NDHQ office and, if it came from another base, that base's Fire Chief.

2.8.1 Adding a New Compressor

Managers can create new compressors by navigating to the Add New Compressor from the Manager's Menu Screen (See Section 4 below).

In order to complete the operation, the user must:

1. Fill in *Make, Model, Serial #, Year*, select either *Compressor* or *Air Box* and fill in the *working pressure* and *sample pressure (H/L)*.
2. Select a location, i.e., a known combination of *Base*, and *Type*,
3. Click on the *ADD Compressor* button.



When the form is initially presented, the *Make* and *Model* selectors contain all of the makes and models known to the database. Selecting a *Make* will repopulate the *Model* selector with known models for that particular make. The *Manager* must select one of the known models, but can add new makes.

Add New Compressor						
Make	Model	Serial #	Year	Type	Working Pressure	Sample Pressure
BAUER	CAPITANO	1082015d	1234	Compressor Air Box	100	High Low

Base: BAGDMILLE
 Type: WKSHOP1

Add Compressor
 CANCEL - No Change

Figure 13 Add Compressor

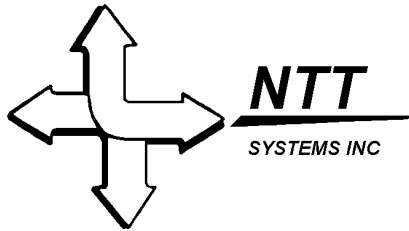
Similarly, when a *Base* is selected, only the unit types known to be at that base are presented.

Clicking on the *CANCEL* button will abort the operation and return the user to the Manager’s Menu Screen.

Clicking on *Add Compressor* will add the compressor to the database with an new compressor ID and return to the Manager’s Menu Screen.

2.8.2 Moving or Retiring a Compressor

Fire Chiefs can move compressors from any location to a unit type on their base. *Managers* can move compressors to any location and also mark them as out of service or retired. In either case, the function is activated from the Compressor Maintenance Screen by clicking on the TRANSFER IN button. This takes the user to the Search For Compressor To Move Screen.




Search For Compressor To Move

Command: AIRCOM Base Name:

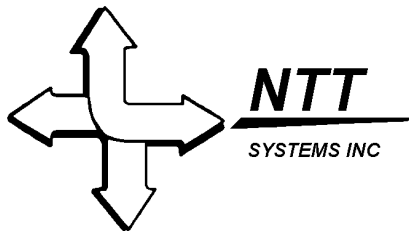
CompID: <input type="text"/>	Base: <input type="text"/>	Serial #: <input type="text"/>
<input type="button" value="MOVE Compressor"/>		<input type="button" value="Search"/>

Figure 14 Search For Compressor to Move

This screen allows the user to search for the compressor using Compressor ID or a combination of “base” and/or compressor serial number. If a compressor ID is known, it can be entered directly and the appropriate Move Compressor Screen will be displayed. If one or both of Base and Serial Number are entered, clicking the *Search* button will find matching compressors. If both are entered, the logical AND is used for the search. The search returns all compressors with serial numbers that match the entered value up to its full length. For example if the user enters “123” compressors with serial numbers 123, 1234, 123abc, etc., will be returned. These will be displayed under the search box shown below.

Note the  symbols at the top of each column. These will sort the list of compressors ascending or descending based on the selected column.

Once the correct compressor is identified, clicking on the compressor ID will advance to the Move Compressor Screen.



Search For Compressor To Move

Command: AIRCOM Base Name:

CompID: Base: Serial #:

CompID	Make	Model	Serial #	Year	Base
435	DEVILBISS	VAV-5062	32450JF		COMOX
437	WAYNE	TRV 5N	4218X1324		COMOX
455	INGERSOLL RAND	60H-SP	H1227 U 89C		COMOX
456	INGERSOLL RAND	G0H-SP	H1227V89C		COMOX
457	INGERSOLL RAND	G0HSP	H1229V89C		COMOX
458	INGERSOLL RAND	G0H-SP	111229V89C		COMOX
500	DOMNIC HUNTER	LP BAP-020	00587/03653		COMOX
501	DOMNIC HUNTER	LP BAP-020	01188/03774		COMOX
502	BAUER	KWA 20-15/10	222-2959	1977	COMOX
503	DOMNIC HUNTER	LP BAP-020	00386/03426		COMOX
506	BAUER	PN 408040	GE-5669	1987	COMOX
5108	KELLOGG	B-221-C	A-364335-C		COMOX
5230	DEVILBISS	445	422		COMOX
5281	BAUER	CAPITANO	GE5669		COMOX
5319	DEVILBISS		5404623		COMOX

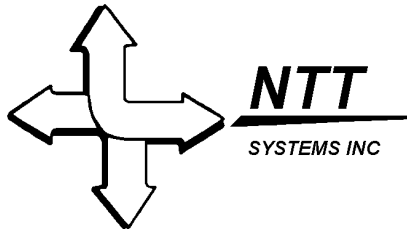
Figure 15 Compressor Search Results

Base *Fire Chiefs* can move any compressor from any location to a location on their base. They simply select one of the locations from the *Type* selector and then click on the *MOVE Compressor* button. Clicking *CANCEL – No Change* will return them to the standard Compressor Maintenance Screen. Note that only unit types that actually exist at the specific base will be presented as options.

Managers are able to move compressors to any location. The destination location is selected through drop down selectors as described in Section 2.8.1 above. The move is recorded when the user clicks the *Move Compressor* button.

The compressor can be retired or taken out of service by clicking the *RETIRE COMPRESSOR* or *OUT OF SERVICE* button instead. The entire operation can be aborted by clicking on the *CANCEL – No Change* button.

The *Manager’s* version of the Move Compressor is shown below. *Fire Chief’s* version does not offer selectable bases and does not have the *RETIRE* and *OUT OF SERVICE* buttons.



Command: AIRCOM Base Name:

Move This Compressor

CompID	Make	Model	Serial #	Year	Current Location		
435	DEVILBISS	VAV-5062	32450JF		MARCOM	COMOX	WKSHOPP

To New Location

Base:

Type:

Figure 16 Move Compressor Screen

2.9 Modifying Base and Technician Information

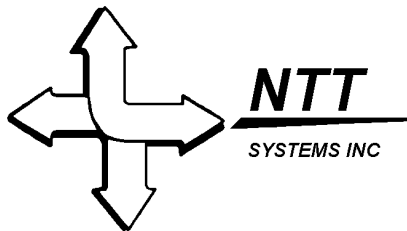
Note that the *Base Name* on the compressor maintenance screen is displayed as a hyperlink for *Fire Chiefs* and above. Clicking on this will take the user to the *Base Maintenance* screen. This allows for modification of:

1. *Fire Chief* information including name, email, phone and address.
2. *Technician* information including name, login and phone number.
3. *Unit Type* (location) information for units on base, including name and building number.

Fire Chief and *Technician* information is entered directly on the form. Clicking on the *Update* button in the upper window will update the information in the database.

Unit Types can be added to the base, and existing units can be deleted or modified. To add a unit, the user selects a name from the *Unit* list on the left side of the lower window, or if none are suitable, enters a new type in the *Enter* box. A building number must also be provided. The information is updated when the *Add* button is pressed. The new unit will then appear in the *Current Units* list in the lower right window.

A unit's building number can be changed by selecting the desired unit and updating the building information that is then displayed. The operation is completed by clicking on the *Update* button.



A unit can be deleted by selecting it in the *Current Units* list and clicking the *Delete* button. Note that the system will not allow a unit to be deleted if it is currently associated with a compressor. This information is available on the *Compressor Maintenance* screen.

Modify Base Information

Command: AIRCOM Base Name: BAGOTVILLE

FIRE CHIEF First Name: Last Name:
Rank: Phone: Fax:
Email:
Address 1:
Address 2:
Address 3:
City:
Province: Postal Code:

Technician1 First Name: Last Name:
Login: Phone:
Password:

Technician2 First Name: Last Name:
Login: Phone:
Password:

Add To AIRCOM/BAGOTVILLE

Unit:

Or Enter

Building Number:

Current Units

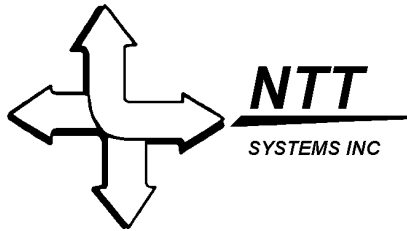
FIR#
WKSHOPI

Building Number:

Figure 17 Base Maintenance Screen

2.10 Review

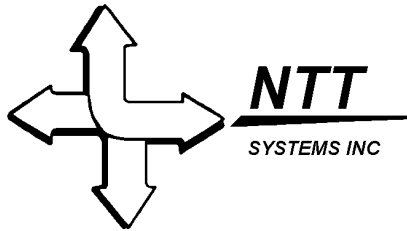
This section has presented the common interactions that DND users will initiate on AQMS. The main points are as follows:



1. There are four primary classes of users, *Anonymous*, *Technician*, *Fire Chief*, and *Manager*. They have increasing capabilities. *Anonymous* users sign on to a location and can get information. Technicians can order sample cylinders at their location. *Fire Chiefs* can additionally edit information for compressors at their location and move compressors to and within their location. All classes of user can review published sample reports and sample data for compressors at their location.
2. *Managers* can add new compressors, move them anywhere, and retire or temporarily remove them from service. *Managers* will be able to act on behalf of the base *Fire Chief*. In this way they can order cylinders and update cylinder information. Acting as though he was at a location simply filters the compressor list and makes it easier to select and specify correct information.
3. The reason that *Managers* and *Fire Chiefs* are not anonymous is because we retain name, email address, password, and possibly other contact information for them. Login validation is done within the context of system itself, i.e., it retains its own list of users and does not rely on NT or any other service for authentication. The next section deals with periodic and automated activities that the system performs. Some of these will notify known users of events such as the arrival of a new sample report. Notification will be by email, to the address in the login account file.

The following scenarios script some common interactions that users will have with the system:

1. A technician at Cold Lake goes to the AQMS site. S/he is presented with the LOGIN SCREEN. S/he select the Cold Lake location and is presented with the COMPRESSOR MAINTENANCE SCREEN. The display shows only the compressors at Cold Lake. One of the compressors is displayed in yellow, indicating that it is due for testing. S/he clicks on its check box under the ORDER field. This brings up the Order Cylinder Screen. S/he may leaves the suggested building name and number, and his own contact information, or change them totally if so desired. S/he hits the ORDER NOW button and is presented with the dated Cylinder Confirmation Screen that s/he can print. Clicking the OK button will return to the Compressor Maintenance Screen. The status field for the compressor now shows today's date in orange, indicating that the cylinder has been ordered.
2. The *Fire Chief* at Bagotville has received a compressor transferred from Gagetown. S/he logs into the system with his/her name and password and is forwarded to the COMPRESSOR MAINTENANCE SCREEN. S/he then clicks on the *Transfer In* link and is taken to the COMPRESSOR SEARCH SCREEN. S/he enters the compressor number and clicks *Move*. The MOVE COMPRESSOR SCREEN appears, displaying the compressor information and the indication that it was previously known to be at Gagetown. Verifying that s/he has selected the correct compressor he assigns it to FIRHI and clicks on the *Move Compressor* button. S/he is returned to the COMPRESSOR MAINTENANCE SCREEN and the new compressor is in the list. Finally, s/he clicks on the *Last Report Date* link and reviews the last sample analysis report that was filed when the compressor was at Gagetown.



3. The *Fire Chief* at Trenton receives a new compressor from stores. S/he calls the NDHQ office and provides make, model and serial number. Someone in the office logs in as a *Manager* and navigates to the ADD COMPRESSOR SCREEN. They enter the compressor information, (the system assigns a new *Compressor ID*), and set the location to Trenton. The Trenton *Fire Chief* logs in and sees the new compressor in his/her list. S/he clicks on its entry in the *Status* field and is taken to the CYLINDER TRACKING SCREEN where s/he clicks on the *Order Cylinder* button to take a sample before putting the compressor into service.

3. Automatic and Periodic Activities

3.1 Sample Related Activities

3.1.1 Current Mode of Operations

Currently base personnel call Maxxam when they want to order a cylinder. They provide the following information that Maxxam personnel transcribe to paper on the *GAS TESTING REQUEST FORM*:

- Date
- Order Taken By
- Address
 - Base (e.g., Bagotville)
 - City, Prov., PC, and most importantly, building number
 - Contact info (name and telephone)
- System Pressure
- # high pressure cylinders required
- # low pressure cylinders required

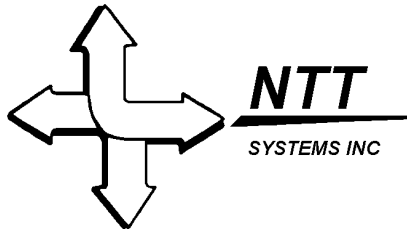
The order goes to shipping where cylinders are selected and packed and the CYLINDER ID's are recorded.

When the cylinders are shipped, one *MILITARY COMPRESSOR DATA SHEET* is included for each. This is a blank form that is filled in at the base and returned with the samples.

When a cylinder is returned to Maxxam, it is logged and the gas analysis is performed. Analysis results are returned by email (to DCIEM) or modem connection (Fire Marshal). Confirmation and additional information follows by fax.

The analysis results transmission can contain one or more records. Each result begins with the text "DCIEMREC" on the first line and terminates with "DCIEMEND" as the last line. There are a fixed number of lines in each record with one being dedicated to each datum (percent O2, Cylinder number, etc.).

DND is interested in tracking cylinder location and transit time. Each week Maxxam faxes a cylinder report formatted as follows:



Cylinder #	I(n) or O(ut)	DND Base	Date Out	Date Back	WayBill #
------------	---------------	----------	----------	-----------	-----------

The report is generated weekly from a database and includes all cylinders that left or arrived in the period.

3.1.2 Implications and Opportunities

The primary motivation for developing AQMS is to reduce the staffing required in NDHQ to manage the program. Consequently we are seeking the highest level of automation, and this relies almost completely on ensuring data quality. The current system relies on voice and transcription and it consequently will never produce the needed control over data.

We are proposing that all cylinder request, cylinder tracking, and sample reporting be conducted electronically via an FTP link between DND and Maxxam. Due to DND's firewall organization, this link will be operated (get and put) from DND to Maxxam. Maxxam will never autonomously transmit information to DND.

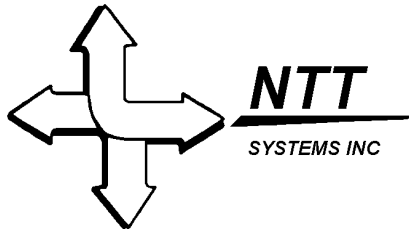
3.1.3 Communication with Maxxam

3.1.3.1 Cylinder Requests

A user, who is at some location (base), can request cylinders for one or more compressors at a time. DND will transmit this request to Maxxam as a single file. The proposed format is ASCII records as follows:

Line #	Content	3.1.3.2 Sample
1	Request Date	23-02-2001
2	OrderID	98
3	Command	AIRCOM
4	Base	DOWNSVIEW
5	UNIT	WRKSHP
6	Address 1	CFB Downsview
7	Address 2	1133 Sheppard Ave. W.,
8	Address 3	<who knows>
9	City	Toronto
10	Province	ON
11	Postal Code	M3X 2Z2
12	ATTN	Ken Jones^Building^Building #
13	Orig. Phone #	123-456-7890
14	Compr1 Info	H^214^BAUER^PN408040^GE5142^FIRHI^47
15	Compr2 Info	H^231^ATLAS^BBSO-COXX^912 534^FIRHI^47
16	Compr3 Info	L^218^AIR SYSTEMS^BB50-COAA^9485^WKSHOP^49

The file is fixed format to line 13. There will be one additional line for each cylinder requested in the order. This sample would request two high pressure cylinders for compressors 214 and 231 and one low pressure cylinder for compressor 218.



Lines 14 and on contain multiple fields per record. These are TAB DELIMITED (denoted as “^” in the example). The fields are:

1. Cylinder type (H/L)
2. DND compressor ID
3. Compressor manufacturer
4. Compressor model
5. Compressor Serial Number
6. Unit name on base
7. AQMS location ID

The data could be used to generate Maxxam’s internal *GAS TESTING REQUEST FORM*.

Currently Maxxam sends a blank *MILITARY COMPRESSOR DATA SHEET* back with each cylinder. In the proposed system the following fields will be filled in *automatically* from the order file:

1. Command
2. Base/Unit
3. Compressor ID
4. Compressor Make
5. Compressor Model
6. Compressor Serial Number

An additional field, AQMS Location ID, will be added and filled in from the AQMS location ID that accompanies each compressor.

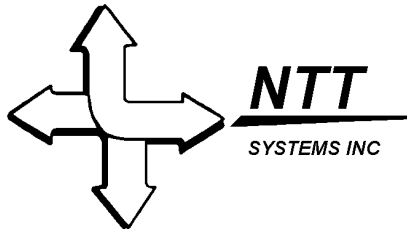
The AQMS system will connect to a FTP server made available by Maxxam and log in with a predefined user ID and password. An order file will be *put* to a designated directory whenever a DND user fills in a AQMS cylinder request. The file will be named ORD $nnnnn$.txt where $nnnnn$ is an increasing sequence modulus 100,000. It is up to Maxxam to remove these files from the upload directory as they are processed.

3.1.3.3 Cylinder Tracking

Maxxam can load a new cylinder tracking file into the upload directory of the FTP server at any time. The file will consist of ASCII tab delimited records using the layout described above. Dates will all be formatted DD-MMM-YYYY. AQMS may attempt to retrieve these files at any time. They will have file names of the form CYL*.txt. AQMS will be responsible for deleting these once they have been retrieved. Maxxam will ensure that the “DND Base” field matches exactly the base name provided in the cylinder order.

3.1.3.4 Sample Results

Sample results will continue more or less in their current format, that is, a bracketed set of information with one datum per line. The precise content will be determined. Maxxam can place sample result files



into the upload directory at any time. AQMS may attempt to retrieve them at any time and will be responsible for deleting them. Sample file names will be of the form SAM*.txt.

3.1.4 Server Actions

As indicated above, the server will FTP cylinder request information to Maxxam whenever a user makes a request. At this time it will attempt to transfer *all* requests files found in the request staging area. Normally only the current one will be found, but others may be there if the FTP link or Maxxam was not available when an earlier request was made.

After the attempt to transfer outgoing files, the server will attempt to fetch uploads (cylinder tracking and sample analysis files). Successful or not, it will then check the upload area and process any files that are found. This would include any files manually placed there, thus allowing for an alternate way of transferring information if the FTP link or Maxxam is not available.

A separate program, activated daily as an NT scheduled activity will also attempt to perform downloads and uploads as described above. This will ensure that information from Maxxam is retrieved at least once a day.

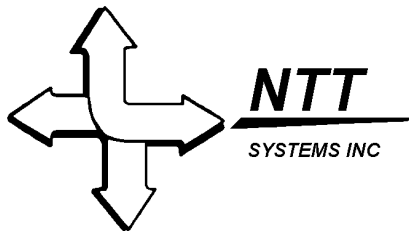
The system processes sample results that Maxxam sends and stores them in the database. It immediately creates and stores a formatted text report. This is sent as an email attachment to the AQMS *Owner* and the base *Fire Chief*.

NOTE: In both GADS and AIRQMS additional organizational units were notified including base surgeons, base command and possibly others. This was done through a messaging system that uses position (e.g., Trenton Wing Surgeon) as an address. The message would be received by whoever occupied that position at the time. Currently DND has no corresponding position related designation for email. Personal addresses are always used. So if Joe Smith is transferred, Joe.Smith@Trenton.dnd.ca is no longer the right place to send Wing Surgeon copies of Trenton's compressor reports. The Fire Marshal's office is not able to manage an extensive set of email addresses, especially when those on the list are not obligated to inform the office of relocations. Consequently the current requirements state that all of these other people fall into the class of Anonymous Users. They have to intentionally log into the system and view sample reports.

3.2 Compressor Related Activities

Law requires that each compressor be tested at least once every six months. AQMS decides that a compressor that hasn't been tested for six months less some *Manager*¹ specified time, say two weeks, is due for testing *soon*. Each night the system automatically checks for compressors that have crossed this boundary and sends email notifying the base *Fire Chief*. If it determines that a compressor has become overdue for testing and no cylinder has been ordered, it sends an email to the base *Fire Chief* and the AQMS *Owner*.

¹ This option will be accessible through some maintenance menu.
2001-06-22



Note that the *Fire Chief* will only receive, at most, one “test soon” and one “overdue” message for each compressor. Any compressor that has become overdue for testing will only be listed in one overdue message to the *Owner*.

4. Management Functions

Management functions are accessible from the Manager’s Menu Screen. They are grouped as follows:

1. Compressor Maintenance – Adding, moving and viewing compressors.
2. Viewing Reports – Viewing formatted, scheduled reports.
3. Viewing Lists – Viewing tabular lists constructed from predefined database queries.
4. Editing Location Information – Adding, deleting, moving commands, bases and units.
5. Managing Users – Adding and editing information relating to *known users*, i.e., *Fire Chiefs*, *Managers*, and the *Owner*. Managers can access the first function, while the last two functions can only be accessed by the *Owner*.



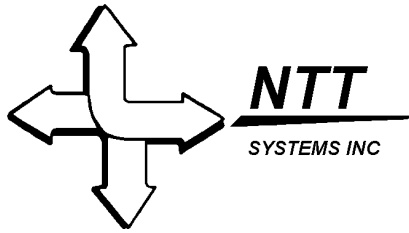
Figure 18 Top Level Manager’s Menu

The top of the screen contains drop down boxes that can be used to specify Command and/or Base. You can use these as filters for the various commands that are available via the menus below. Each group of commands can be referenced through a submenu that is presented when you click on the main link. For example, clicking on COMPRESSOR MAINTENANCE will display a menu with the choices *Compressors at Base*, *Add Compressor*, and *Modify Compressor Makes*. In this case, if you click on *Compressors at Base*, you will see information relating to the base you selected in the top part of the form. The VIEW LISTS submenu displays the same behaviour. If you specified AIRCOM for Command and left Base blank, all lists would display information for all bases in AIRCOM.

The following sections describe the functions that can be accessed from this page.

4.1 Compressor Maintenance

The submenu provides three options that allow the *Manager* to manipulate compressors and compressor information.



4.1.1 Compressors at Base

This takes the user to the Compressor Maintenance screen discussed in Section 2.3. If a base was selected on the top menu, only compressors at the base specified in the Base filter will be displayed. Otherwise, all compressors for all bases in the specified command will be listed. In addition to viewing compressor information the *Manager* will have access to all of the features available to the local *Fire Chief*, i.e., moving, transferring and editing as well as ordering sample cylinders.

4.1.2 Add New Compressor

This takes the user to the Add New Compressor Screen described in Section 2.8.1.

4.1.3 Manage Compressor Makes

The Manage Compressor Makes Screen allows the user to add and delete new makes of compressors. Note that no database of models-per-manufacturer is maintained. In practice, once a compressor make has been assigned to any new compressor, the make cannot be deleted. Clicking on the *List Where Used* button will provide a list of all compressors of the selected make.

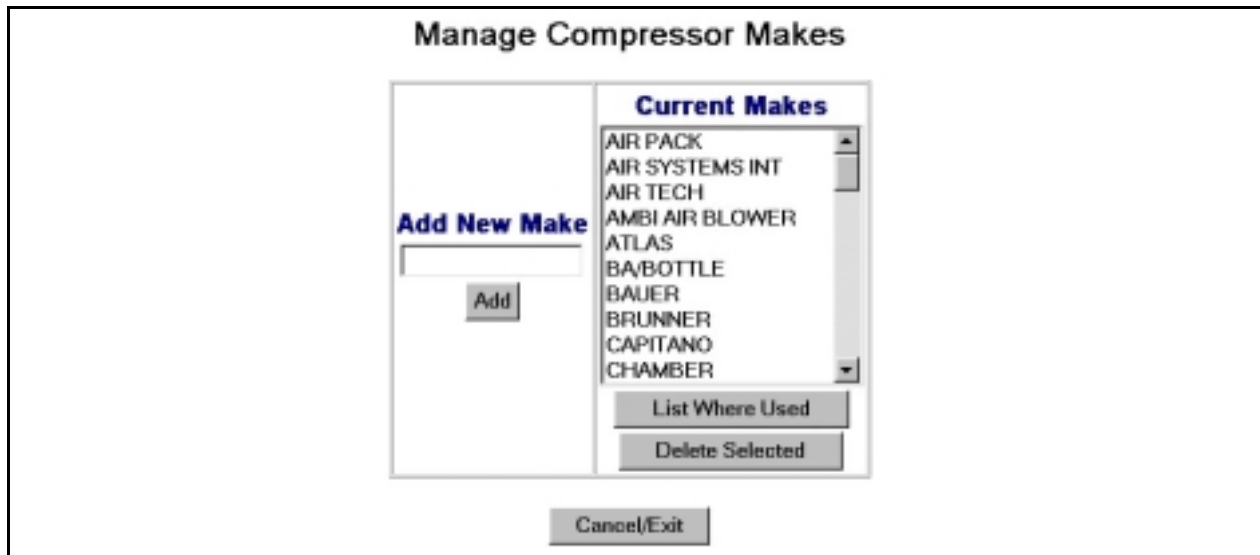
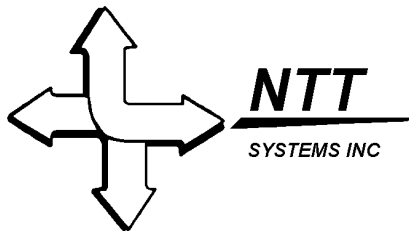


Figure 19 Manage Makes Screen

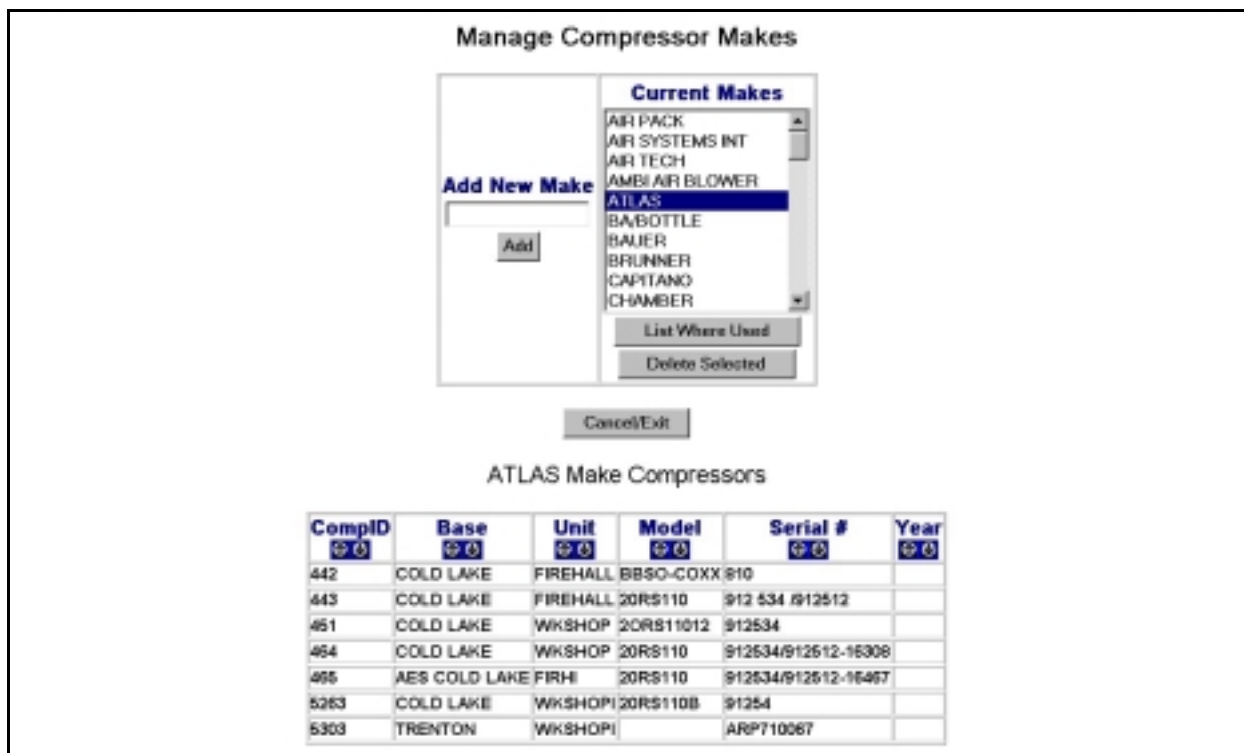
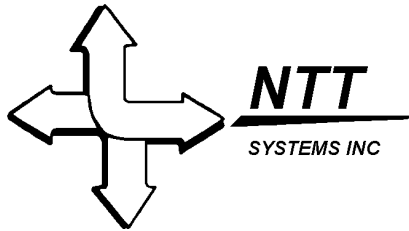


Figure 20 Compressor Make Where Used List



4.2 View Reports

This menu provides access to reports that are automatically prepared by the system.

Report On Compressors

CompID:

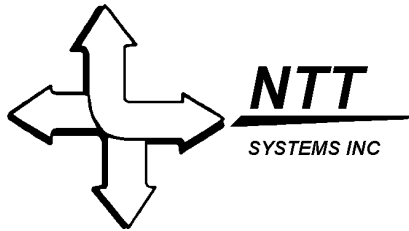
Or

From Start of	To End of
<input type="text" value="SEP"/> <input type="text" value="2000"/>	<input type="text" value="NOV"/> <input type="text" value="2000"/>

Base	CompID	Make	Serial #	Year	Last Report
↑ ↓	↑ ↓	↑ ↓	↑ ↓	↑ ↓	↑ ↓
COMOX 19 WING	452			0	11-Sep-2000
TRENTON	322			0	21-Nov-2000
TRENTON	325	BAUER	GE1330	0	27-Nov-2000
BAGOTVILLE	218	BAUER	GE 4283	0	27-Nov-2000
BAGOTVILLE	224	JORDAIR	901347	0	27-Nov-2000

Figure 21 Report On Compressors

There are two tables in the top of the above figure. Enter the exact compressor ID in the CompID input box of the left table and click on the Go button to view the reports if you know the compressor ID. If you wish to get a list of compressors with their related information, choose a start date under the From Start of selectors on the right table, and an end date under the To End of selectors, and then click on the Go button underneath, and you will be presented with a list of compressors as shown in the bottom half of the above figure. You may choose to view a particular report by clicking on its CompID. You will see the report on that compressor.



4.3 View Lists

This menu provides access to a collection of predefined queries that can be run at any time. Currently, only the Fire Chief Directory is implemented. Note the sort buttons over each column.

FireChief Directory						
Base	Last Name	First Name	Rank	Email	Phone	Fax
BAGOTVILLE	Smith	Joe	Sgt	joe.smith@bagottville.dnd.ca	111-222-3333	111-222-3344
CALGARY	Wonder	Steve	Major	s.wonder@dnd.ca	416-123-4567	416-123-4568

Cancel/Exit

Figure 22 Fire Chief Directory

Other lists will be added as the need is identified. Candidates include:

1. Failed sample reports
2. Compressors overdue for sampling
3. Cylinder Transit Times

4.4 Location Information

This menu allows *Managers* to modify information identifying Commands, Bases and Unit Locations at bases.

4.4.1 Modify Base Information

The Modify Base Information Screen allows users to add Bases to Commands, delete Bases, and move Bases between Commands.

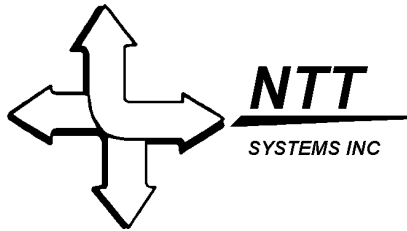
The "Manage Bases" screen is a web-based interface with three main panels. The left panel, titled "Add Base", contains a text input field, a "To Command" dropdown menu with "Please select one" as the current selection, and an "Add" button. The center panel, titled "All Bases", contains a scrollable list of base names: BOSNIA, CALGARY, CHATHAM, CHILLIWACK, COLD LAKE*, COLD LAKE AES, COMOX, COMOX 19 WING, DEBERT, and DUNDURN. Below the list are "Show Details" and "Delete Selected" buttons. The right panel, titled "Move Base", contains a non-editable text box, a "To Command" dropdown menu with "Please select one" as the current selection, and a "Move" button. At the bottom of the screen is a "CANCEL - No Change" button. A note at the bottom of the central panel states: "Bases marked with an * have no units associated with them. Only these can be deleted."

Figure 23 Manage Base Information

Note the following:

- 5 The *All Bases* selector will list all bases in all commands.
- 5 A Base cannot be deleted if any Unit is assigned to it.

To add a base, enter the base name in the *Add Base* text box, select a parent Command from the *To Command* drop down list and click the *Add* button.

To move a base, select it from the *All Bases* selector in the centre panel. The name will appear automatically in the non-editable *Move Base* text box in the right panel. Select the new parent Command from the *To Command* drop down in the right panel and click the *Move* button.

To delete a base, select it from the *All Bases* selector in the centre panel and click the *Delete Selected* button.

This form also provides access to the MODIFY BASE INFORMATION SCREEN discussed in Section 2.9. Select the desired base in the *All Bases* selector and click the *Show Details* button.

4.4.2 Manage Commands

The Manage Commands Screen allows *Managers* to add or delete Command names.

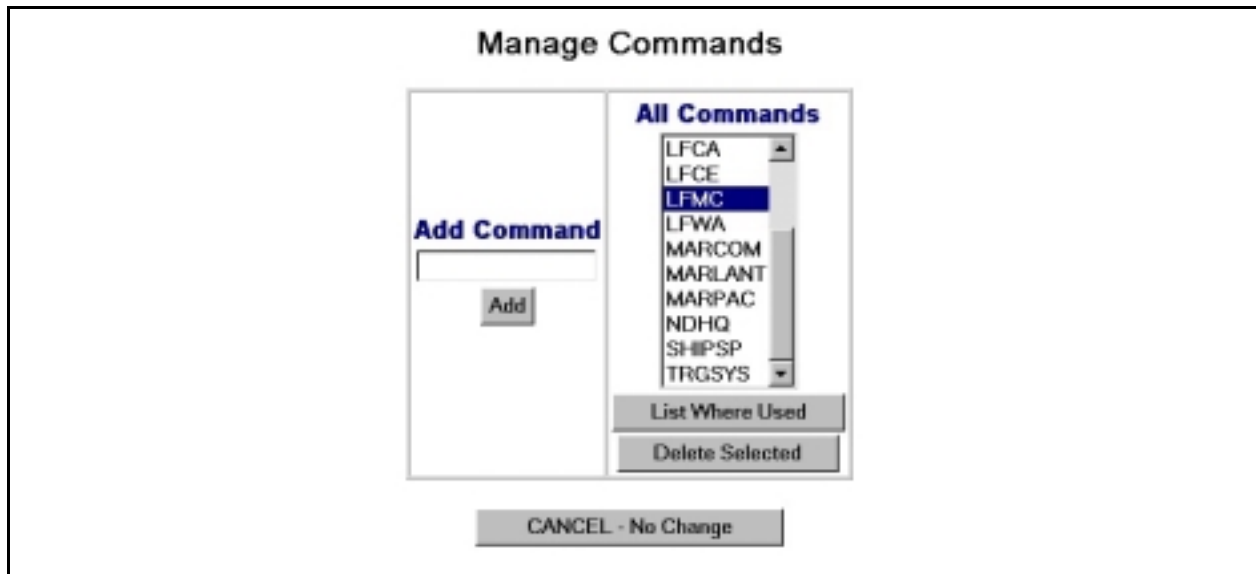
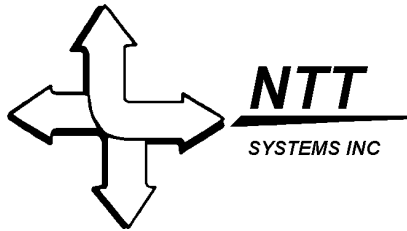


Figure 24 Manage Commands Screen

Note that a Command cannot be deleted if it has any Bases associated with it.

To add a new Command, enter the name in the *Add Command* text box in the left panel and click on the *Add* button.

To delete a Command, select it from the *All Commands* selector in the right panel and click the *Delete Selected* button.

You can get a list of all bases associated with a given Command by selecting it from the *All Commands* selector and clicking the *List Where Used* button in the right panel.

4.5 Known Users

These screens allow the *Owner* to pass ownership of the system to someone else and add and remove system *Managers*. The *Owner* and *Managers* can modify base *Fire Chief* information.

4.5.1 Modify Fire Chief

The Modify Fire Chief Information Screen allows the *Managers* to edit any information about the *Fire Chief* at the base selected by the base filter at the top of the form. The form would generally be used to change contact and login information when a new person is transferred into the base *Fire Chief* position. A base must be selected before selecting this menu item.

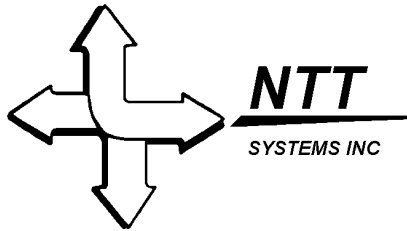
A screenshot of a web-based form titled "Modify Fire Chief Information". At the top, it displays "Command: CFE" and "Base Name: CALGARY". Below this is a form window with a title bar "FIRE CHIEF" and a dropdown menu for "Base Name" set to "CALGARY". The form contains several input fields: "First Name" (Steve), "Last Name" (Wonder), "Rank" (Major), "Phone" (416-123-4567), "Fax" (416-123-4568), "Email" (s.wonder@dnd.ca), "Login" (steve), and "Password" (wonder). There are "Update" and "Cancel/Exit" buttons at the bottom of the form.

Figure 25 Modify Fire Chief Information

To modify information, enter the appropriate text into the *First name*, *Last Name*, *Rank*, *Phone*, *Fax*, *Email*, *Login*, and *Password* fields. Only the last three fields are used internally by the system.

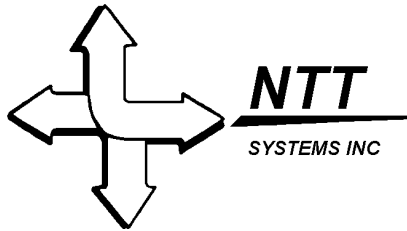
The *Email* field is important since all reports automatically sent to the *Fire Chief* go to this address.

The content of the *Login* and *Password* fields is needed by the *Fire Chief* to log into the system. They are used by the system to determine the user's base and for access to restricted *Fire Chief* functions. NOTE that we are not taking a strong view of security in this system. The *Managers* can see and set passwords for all known users and known users will receive this information from the *Managers* by some mechanism outside the system (e.g., telephone).

4.5.2 Add/Remove Manager

The Change Manager Screen allows the *Owner* to add and remove *Managers* from the system and modify *Manager* information. Since there will be a small number of system *Managers*, the list of *Managers* is provided along with the editing box.

The editing box allows the *Owner* to change (or add), *Manager* name, login and password information. It is inoperative until an action button is clicked in the *Manager* list below.



The screenshot shows a web interface for managing managers. At the top, there are three input fields labeled "Name:", "Login:", and "Password:". Below these is a button labeled "Select Action Below". In the center, there is a table with the following data:

Name	Login	Action Buttons
Bob Black	manager	Edit Delete
Dave Nicholes	dave	Edit Delete

Below the table is a button labeled "Add New Manager". At the bottom of the screen is a button labeled "Cancel/Exit".

Figure 26 Change Manager Information Screen

To delete a *Manager* simply click on the *Delete* button beside the *Manager* name.

To edit *Manager* information, click on the associated *Edit* button. The full set of information for the selected *Manager* will be copied to the editing box where it can be changed. The editing box's *Select Action Below* button will change to an *Update* button. Modify the information as desired and click on *Update*.

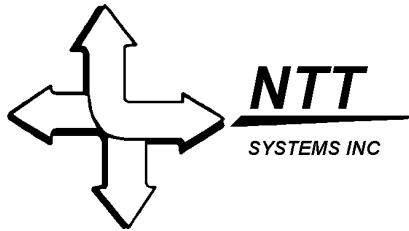
To add a new *Manager*, click on the *Add New Manager* button. The upper editing box will be blanked and the *Select Action Below* button will change to an *Add New Manager* button. Enter the information and click the *Add New Manager* button to complete the operation.

4.5.3 Change/Update Owner

The Change Owner Information allows the *Owner* to change their own identification and email information. This could be used to pass ownership of the system to another person, temporarily or permanently, or to simply redirect email.

5. Logging Out

The Logout link at the right side of the footer is for logging out of the session. Upon finishing your task, you may click on this link to log out. Clicking on this link will bring you back to the beginning, and you will need to login again to gain access to the system. For security reason, it's better to logout after you have finished using the system.



Change Owner

Name:	Real Owner
Email:	the.Owner@ndhq.ca
login:	owner
Password:	owner

Figure 27 Change Owner Information

NOTE: All sample reports and periodic reports are sent to the *Owner* at the specified email address. Also, the *Owner's* email address is used as the SENDER on all email sent by the system to others (e.g., *Fire Chiefs*). If a *Fire Chief's* email address is specified incorrectly or is changed by the local base IT operation, email sent to them will be rejected and returned to the email SENDER, i.e., the *Owner*. This is the only way that system administrators will know that the target *Fire Chief* did not receive their compressor sample reports.