Some of the data sources that is readily available is shown below with their respective data sites.

- Chemical and Biological Information Analysis Center (CBIAC) <u>http://www.cbiac.apgea.army.mil/</u>
- Chemical Lists (commercial product) sample page is shown below. This would be similar to what CBNAIR should produce as an output.

Chemical Report for CAS Number 000050-00-0												
Chemical Nan	nes:											
Formaldehyde												
Formaldehyde (ga	8)											
romakenyde (soulaon)												
Formaldehyde 37% menthanol-mee												
Formaldehyde solutions fammable												
Formaldehyde, solutions, with not lass then 25% formaldehyde												
Formalin												
Formalin, see Formaldehyde solutions												
Formic aldehyde												
Regulatory Su	ummary:											
DOT Hazardo	Clean Air Act Haz. Air Pollutant						2 OSHA, IARC, NTP Carcinogen					
RCRA Hazard		☑ SOCMI Chemical						NFPA Haz. Material Ratings (3 chemicals)				
SARA Extrem		Ozone Depleting Chemical					E	S NIOSH Recommendations				
SARA Toxic F		PI PSM Highly Haz. Chemical						Marine Pollutants				
Clean Water A	Permissable Exposure Limits					E	State Lists					
(Note: If a list has more than one chemical, only data for the FIRST chemical is displayed. View electronically for all data.)												
DOT Hazardous Materials Data:												
Symbol:	mbol: Packagi				Quan	tity Limit	ations	Vessel Stowage				
Division #:	vision #: 3 Exceptions				Passeng	per 		Location: A				
I.D. #: Packing Group:	001198	Nonbulk:	203		Carno:	RANIC BL			Other: 40			
Label Code:	3	DUIK:	242		caigo.	60 L		1				
Special Prov.:	B1, T8											
Environmental Law Data:			Carcinogen Status:					NFPA Ratings:				
RCRA code: U122			OSHA Carcinogen? Yes					List 325M (Flammable Substances)				
CERCLA RQ:	CERCLA RQ: 100 pounds		IARC Rating: 2A					Haalth Hawards 3				
SARA TPQ:	500 pounds		NTP Rating:		2				Elementi	anu. J		
SARA Concentr.:	0.1%								Panthaba	ing. 4		
SARA Reporting									Freedowing /			
Threshold: Standard									opecial (of	men)		
Clean Air Act	NIO3H Recommendations:						List 49 (Hazardous Substances)					
SOCMI Chemical? Yes			NIOSH Standard: 77-126						Health Hazard: 3			
HAP CODE.	201		NIOSHVOSHA		//-///,00	122			Flammabil	ity: 2		
			Guidelines:	8	9-104				Reactivity:	0		
		ł	Clean Wate	- 4					Special (of	ther): -		
			(Data pot m		sted or on a	tata avaib	nin 1					
Accidental Relea	se Prevention:		(conta rior re	4000			ions.y					
Threshold Quantity: 15,000 pounds Process Safety Management:												
Basis for Listing:	b		Threshhold Quantity: 1000 pounds									
							ļ					
Permissable E	xposure Limit	posure Limits:		ppm TV	A mg/m	3 р	pm	STEL mg/m ³	ppm	Ceiling mg/m ³		
IDLH (in ppm):	20		OSHA	0.75	5 a	-	2/15	min				
Primary Hazard:	Not classified		NIOSH	0.01	16b				-	0.1b		
Carcinogen State	us: ACGIH(A2);NI	OSH;OSHA	ACGIH	-		-			-	0.3 c	0.37	
Skin Designation	Not classified		CANADA	-					-	2	2.4	
COMMENTS: SY Sensitizer	N - Formalin. a. OS	HA - See 29	CFR 1910.1048.	b. N	IIOSH - Lo	west feas	ible conce	entrat	ion. Value bas	ed on 15 mi	nutes. c. ACGIH	

Chemical Warfare Agents - <u>http://www.opcw.nl/chemhaz/cwagents.htm</u>

US Army Medical Institute for Chemical Defense - <u>http://chemdef.apgea.army.mil/</u>

Center for Disease Control - <u>http://www.cdc.gov/</u>

National Institutes of Health - <u>http://www.nih.gov/</u>

With the various databases that need to be access, I really don't think we have a choice but to have a relational database system. The design rules for a Normalized Relational Database can be summarized as follows:

- The tables in a database may only contain information specifically about the particular entity.
- Each table must have a unique *primary key* so that one occurrence of the entity can be distinguished from another. The primary key must be one of the columns in the row and may be composed of several columns.
- The order of the rows and the order of the columns within a row are unimportant because they can be viewed in any order desired.
- The intersection of a row and a column contains a piece of information, this intersection point is sometimes called an *attribute* An attribute cannot be subdivided [thus the term *atom*]; it is always entered and presented as a whole, but it may be formatted according to preference.
- All information in a particular column must be of the same nature, varying only in the way expected because of the particular row.
- No two columns in the same row may contain the same type of information; said another way: repeating fields are not allowed.
- Information in a particular column must be solely and completely dependent on the primary key of the given row. An exception is permitted in the case of a *foreign key* which contains the primary key of a row in another related table. In fact, "foreign keys" are the way tables are related to each other.

Tables can be related with each other and can be accessed as if they were a single combined table of many rows and many columns. There are three types of relationships a given table can have with another given table:

- One-to-one: There is a one for one correspondence between the rows in the first table with the rows in the second. Not terribly useful because the tables could be combined into one, but sometimes necessary for performance or security reasons.
- One-to-many: There is a single row in the first table that relates to many rows in the second table. This may be the most common type of relationship.
- Many-to-many: Each row in the first table can relate to zero or more rows in the second table and each row in the second table can relate to zero or more rows in the first table. While this relationship frequently exists, it is not directly supported by any database software known to me. All many-to-many relationships can be resolved into two one-to-many relationships using a *linking table* in the middle. One row in the first table can relate to many rows in the linking table. One row in the second table can relate to many rows in the linking table. One row in the second table can relate to many rows in the linkage table. Sometimes the linking table can contain information specific to the particular relationship the row in the first table has with the row in the second table.

Since the linking table just described was involved in relationships with two different tables, it follows that it is permitted for any table to be involved in many relationships. When all the tables and relationships have been defined, various networks of many related tables can be created and considered as one table with a *query*. A query can be thought of as a virtual table because it is something that looks like a single simple table to the application but in reality, it does not exist. The particular tables, rows, and columns as well as the order of the rows and columns in the query depend on the requirements of the application [John Murray 1997].

The advantages of a fully relational system are wide-ranging and real and would apply to CBNAIR:

- Unbeatable performance,
- Enormous benefits to users in capability and power,

- Truly scalable and distributable systems,
 Able to easily take advantage of new hardware technology,
 Flexibility for evolution of users' data,
- And, a solution for all types of data needs.

Reference: http://databases.about.com/