Hi... I’m Neffy...

I want to welcome you to CAMEO, a suite of software developed to assist both planners and responders before and during a hazardous materials incident.

This presentation will provide you the history, organization, elements of the software, as well as other important information...

So lets get started!
Index of Topics

**Topic 1:** The History of CAMEO

**Topic 2:** Who Uses CAMEO

**Topic 3:** What CAMEO Includes

**Topic 4:** What Each Component of CAMEO Suite Can Do – CAMEO Chemicals

**Topic 5:** What Each Component of CAMEO Suite Can Do – CAMEO\textit{fm}

**Topic 6:** What Each Component of CAMEO Suite Can Do – ALOHA

**Topic 7:** What Each Component of CAMEO Suite Can Do – MARPLOT

**Topic 8:** How You Can Use CAMEO

**Topic 9:** How to Get CAMEO Suite Software and Support

**Topic 10:** CAMEO Compatible Programs
So what exactly is CAMEO?

CAMEO® is a suite of software programs designed to help first responders and emergency planners access critical information quickly.
CAMEO Software Suite, usually simply called CAMEO®, is developed jointly by NOAA and EPA.

Originally developed as a tool to address data management requirements under the Emergency Planning and Community Right-to-Know Act (EPCRA), CAMEO provides solutions to a variety of emergency planning and response challenges.
So What exactly is CAMEO?

CAMEO is a suite of software that is made up of 4 programs:

1. **CAMEO.fm** (a database that holds any kind of information)
2. **CAMEO Chemicals** (a chemical information library)
3. **ALOHA** (an atmospheric dispersion modeling program)
4. **MARPLOT** (an mapping program)

These 4 separate programs reside on a user’s computer, much like Microsoft Word or Excel. Each program can operate alone, or the programs can work together.
But first, let’s go back to the beginning…

Interestingly, both the National Oceanic and Atmospheric Administration (NOAA) and the U.S. Environmental Protection Agency (EPA) were created in the same year, 1970.

NOAA was created to serve a national need "...for better protection of life and property from natural hazards...for a better understanding of the total environment...[and] for exploration and development leading to the intelligent use of our marine resources..." [President Nixon].

At the same time, EPA was created with the challenging goal of repairing damage already done to the environment and to establish guidelines to help Americans in making a cleaner and safer environment a reality.
Ok, so maybe we don’t have to go so far back.

Let’s try the year 1984.

The #1 song of the year was “When Doves Cry” by the artist Prince.

And the number #1 movie of the year was “Ghostbusters.”
By the mid-1980s, the National Oceanic and Atmospheric Administration (NOAA) HAZMAT program recognized information management as a key problem during a hazardous materials incident, often leading to significant delays or errors by first responders.

NOAA completed development of a computer program for chemical aerial dispersion modeling called “ALOHA” (version 4.0) in 1984 and issued it publicly in 1986.
In September 1986, the first release of CAMEO (Macintosh only) occurred, using Business Filevision software.

This first version was developed closely with input from Fire Departments, including the City of Seattle.
In 1987, the Chemical Emergency Preparedness and Prevention Office of EPA began partnering with NOAA, providing resources for the implementation and distribution of the program.

In the late 1980s, NOAA and EPA co-sponsored training sessions in Seattle and other locations for federal and state employees.
Beginning in 1988 and continuing until today, improvements and revisions have occurred on a regular basis.

- September 1988: the first release of the "joint" CAMEO that included planning as well as response information (facilities, mapping, etc.). This version used HyperCard on a Macintosh platform.
• 1989: The first CAMEO user conference in Seattle, WA, with over 600 attendees was conducted.

• 1990: CAMEO DOS, MARPLOT DOS was first introduced (remember the c:> prompt?).

• 1990: ALOHA 5 was distributed, which included the first heavy gas dispersion modeling.
1991: A CAMEO Conference was held in Washington, D.C. (the first Gulf War began during the middle of the conference). The National Safety Council worked with EPA and NOAA to distribute CAMEO-DOS.

Fall 1993: LandView was released by the U.S. Census Bureau for use with MARPLOT and Census Bureau TIGER files.
• 1995: CAMEO Windows and MARPLOT 3 (for Mac and Windows) was released at the CAMEO Conference conducted in Louisville, KY.

• 1997: EPA and NOAA provide CAMEO software to local officials, free of charge, to determine effectiveness.
• 1999: ALOHA 5.2.3 was officially permitted by the Department of Energy for use in Nuclear Consequence Analysis.

• 2001: CAMEO was redeveloped, using FileMaker software. This allowed for downloading the CAMEO suite for the first time.
• October 2004: The first CAMEO Companion was issued, providing CAMEO users a manual of assistance with the software.

• 2006: Fires and Explosions modeling capabilities were added to ALOHA for use by planners and responders.

• 2007: The web version of CAMEO chemical library was released. This allowed users to search for chemical information through the internet without having to download the software to their computer.
2009: Standalone version of CAMEO Chemicals (identical to web version released 2007) was released. This replaced the FileMaker module.

February 2015: MARPLOT 5.0 was issued with even more capabilities for planners and responders.
In Summary,

CAMEO was developed by the NOAA Office of Response and Restoration and continues to be funded and developed by NOAA and the EPA Office of Emergency Management.

CAMEO was developed because NOAA recognized the need to assist first responders with easily accessible and accurate response information before and during a chemical incident.

The U.S. Census Bureau and the U.S. Coast Guard have worked with EPA and NOAA to enhance CAMEO.
CAMEO was developed and primarily continues to be used by chemical emergency planners and responders.

In particular, CAMEO is widely used in responses by fire departments, and in planning by states, tribes, LEPCs, and industry.
Planning officials use CAMEO for planning purposes to maintain and retrieve information about the chemicals stored by facilities in communities.

If an incident does occur, locals can use CAMEO to review the risks posed to responders and community by tapping into the information in the chemical database provided in the software.
Hundreds of thousands of facilities, as well as state and local officials, use CAMEO components, including Tier II Submit, to report and maintain chemical information required under the provisions of the Emergency Planning and Community Right-to-Know Act (EPCRA).
CAMEO has been translated into multiple languages and introduced in over 50 countries by the United Nations Awareness and Preparedness for Emergencies at Local Level (APELL) Program.
The CAMEO software suite consists of four core programs: CAMEO Chemicals, CAMEOfm, ALOHA, and MARPLOT.

These applications can be used together or separately, but when they are used together, the programs interact seamlessly and information can be linked easily between them.

So what are the basic functions of CAMEO Chemicals, CAMEOfm, ALOHA, and MARPLOT?
CAMEO Chemicals

CAMEO Chemicals is a chemical information database and tool.

It Contains:

- A library of information on over 6,000 pure chemicals.
- A reactivity tool that predicts how different chemicals will react when mixed.
- Electronic versions of the *Emergency Response Guidebook* and the *U.S. Coast Guard CHRIS Manual*.
CAMEO Chemicals allows the user to search for chemicals in the CAMEO chemical database, print customized reports with response recommendations, and find out how chemicals would react if mixed.

This program is available as a website and as a downloadable program; however, only the downloadable version can share information with other programs in the CAMEO software suite.
CAMEOfm

CAMEOfm is a tool that allows users to manage any kind of information into a database. Think of it as an electronic filing cabinet.

Common kinds of information users frequently input into their CAMEOfm database include:

- Records for industrial facilities housing hazardous chemicals.
- Resources for everyday operations and emergency response.
- Important contacts.
CAMEO \textit{fm} includes several modules to assist with data management requirements under the Emergency Planning and Community Right-to-Know Act (EPCRA).

This program can also be used to navigate between ALOHA, MARPLOT, and the downloadable version of CAMEO Chemicals.
ALOHA

ALOHA is an atmospheric dispersion modeling program to estimate threat zones associated with hazardous chemical releases, including toxic gas clouds, fires, and explosions.

It allows users to enter information on a releasing chemical and will predict the extent, duration, and direction of the resulting aerial plume.
MARPLOT
MARPLOT is a mapping program, which allows the user to create a customized electronic map, which resides on the user’s computer.

MARPLOT includes streets/highways, aerial photos, topo maps, real-time weather radar, and census data.
In MARPLOT, users can easily add objects to maps, as well as view and edit data associated with those objects.

Some common things that MARPLOT users put on their maps include:
- chemical facilities
- transportation routes
- hospitals
- schools
- sensitive populations
- environmentally sensitive areas.
CAMEO users can model a chemical release in ALHOA, and view the footprint of aerial dispersion on the MARPLOT map. This is useful for estimating which areas are potentially affected by the release, and determining people and places that might be affected.

MARPLOT showing an ALOHA ammonia release model, schools, and municipal resources.
“Information such as ALOHA Threats Zones and other MARPLOT map objects may be transferred to Google Earth and ESRI ArcView files”
No internet? No problem!

Developers have continued to improve the software, while maintaining its ability to operate with no internet connection.

Because it can operate independently of an internet connection, CAMEO is the ultimate preparedness tool.
CAMEO’s ability to function without the internet allows users to employ the tool from anywhere including:

- Remote facilities
- Fire trucks
- Field vehicles
- Command posts
- Power and communication outage areas
You now have a general idea of the different components of the CAMEO Suite.

Now, let’s look at how the components can work together.

ALONE, WE CAN DO SO LITTLE. TOGETHER, WE CAN DO SO MUCH.
CAMEO Chemicals® is a chemical reference resource that resides on the CAMEO users desktop, and interoperates with the other components of CAMEO.

In addition to the desktop tool within CAMEO, NOAA also maintains an online version of CAMEO Chemicals at https://cameochemicals.noaa.gov/
CAMEO Chemicals®

Key Features of CAMEO Chemicals:

• **A Library** of chemical information on over 6,000 individual chemicals, including information from the *NIOSH Pocket Guide*.

• **A Reactivity Tool** that predicts chemical reactions and prints reaction reports.

• **Electronic Reference Materials** including the *Emergency Response Guidebook* (English, French, and Spanish versions) and the *U.S. Coast Guard CHRIS Manual*. The program also includes links to the *NIOSH Pocket Guide to Chemical Hazards*. 
The CAMEO Chemicals Library features information on thousands of individual chemicals.

Users can look up information on a chemical by typing the chemical name, CAS number, or UN/NA number into the search.
The Chemical Library searches and finds all records matching the search criteria... and the user can choose which record or “Datasheet” to view.
Each CAMEO Chemicals library record, or “Datasheet” displays the same consistent categories:

• Chemical Identifiers
• Hazards
• Response Recommendations
• Physical Properties
• Regulatory Information
• Alternate Chemical Names
CAMEO Chemicals features links to the ERG, the NIOSH Pocket Guide, and the USCG CHRIS Manual.

Each link opens both electronic documents to exactly the right page – no need to flip through the books looking for the correct page number!
The CAMEO Chemicals Reactivity Tool allows the user to combine multiple chemicals.
Cameo Chemicals then produces a reactivity report showing the resulting chemical reactions.

The reactivity report can be printed or saved electronically, as a file to share.
State inspectors received a report from a concerned citizen, describing an abandoned barn full of chemicals.

The reporting citizen was concerned, because children tended to play in the abandoned barn as they passed on their way home from school.
When state inspectors arrived, they found that the unsecured barn contained nearly 300 containers of various substances, including bags, bottles, drums, and buckets of different materials.

Many containers were only partially labeled. The inspectors used CAMEO Chemicals to help identify the materials in the barn.
Despite the poor condition of many of the labels and containers, inspectors were able to read the various UN and CAS identifiers on many of the containers to help determine the potential contents and segregate incompatible materials.

A few of the materials that CAMEO Chemicals helped identify included...
EXAMPLE: Ranch 66 Abandoned Chemicals

... ammonium nitrate ...

Search Results

UN/NA Number UN/NA 1942 matched 1 datasheet

1 - 1 of 1 results  < Prev  Next >  Page 1 of 1  Go to page:  [Go]

AMMONIUM NITRATE
A colorless crystalline solid. Soluble in water. Does not readily burn but will do so if contam...
DOT Hazard Label: Oxidizer PAC-3: 440 mg/m3
CAS Number: 6484-52-2
UN/NA Number: 1942

View Datasheet  Add to MyChemicals

1 - 1 of 1 results  < Prev  Next >  Page 1 of 1  Go to page:  [Go]
EXAMPLE:
Ranch 66 Abandoned Chemicals

...warfarin and sodium cyanide...
EXAMPLE:
Ranch 66 Abandoned Chemicals

... and kerosene.
When it came time to remove the abandoned chemicals, the inspectors used the reactivity tool to properly segregate the materials, so that no chemical reactions happened.
CAMEOfm® is the part of the software suite that allows the user to manage informational records.

Common kinds of information that users keep in CAMEOfm include:

- Contact names and phone numbers
- Tier II facility information
- Non Tier II facility information
- Hospital and medical community information
- Local schools, sensitive populations
- First Responder contacts/resources
- Disaster Response contacts
The CAMEOfm Home Screen serves as the main filing cabinet for information.

Each square on the CAMEOfm home screen allows the user to open a different drawer in the cabinet.
The top row of icons allows the user to open CAMEO Chemicals, ALOHA, MARPLOT, and the Help Section.
The 2\textsuperscript{nd} and 3\textsuperscript{rd} rows of icons allow the user to open cabinets that contain individual records.

Different cabinets are called “modules” in CAMEO\textit{fm}.
There are 8 different modules in CAMEOfm:

- Facilities
- Chemicals in Inventory
- Contacts
- Incidents
- Special Locations
- Routes
- Resources
- Screenings & Scenarios
The Facilities module is designed to hold records of facilities that house hazardous chemicals.

A Facility record will always contain fields for:

- Address
- ID and Regs
- Facility Phones
- State Fields
- Contacts
- Map Data
- Chemical Inventory
- Site Plan
- Checklist
- Notes
The Chemical Inventory Tab allows the user to see what chemicals are on site at the facility.

If the user clicks on the “Datasheet” button to the right of each entry, CAMEO Chemicals will automatically open up the data sheet for that chemical!
The Site Plan tab is a place to store any and all documents related to the facility. Any type of file can be stored here, including MS Word DOCs, PDFs, JPEGs/PNGs/GIFs - even audio and video files.
Here is an example of a site plan for an oil production facility, which shows tanks, fire walls, berms, and other structures on the site.
The Site Plan tab is a place to store any and all documents related to the facility.

Site plans can be elaborate Auto CAD drawings, simple hand sketches, photos, or anything else.
The Facility Phones tab provides emergency and non-emergency phone numbers.

The Map Data tab provides coordinates for the facility, and plots the facility on the user’s MARPLOT Map.
In areas which utilize Tier2Submit software for reporting, CAMEOFm makes managing Tier II reports easy.

CAMEO users can quickly import their electronic local Tier II data into their CAMEOFm.

A user can import hundreds (even thousands!) of Tier II facility records in about 60 seconds. CAMEO will even automatically map each facility in MARPLOT.
EXAMPLE:
Swiss County Emergency Management

Swiss County manages all Tier II reporting facilities in CAMEO.

Each year in May, the County Emergency Management Office requests electronic Tier II files (.t2s files) from the State.
EXAMPLE:
Swiss County Emergency Management

The County EM office uploads the electronic Tier II files into CAMEO... and then exports the updated Tier II information to the LEPC officers and county fire stations. Each fire station in Swiss County has CAMEO on at least 2 computers: a “Master” computer located in the fire house, and a laptop on each fire truck.
During the month of July, each fire station in Swiss County looks at the MARPLOT map and performs a “verification” of each Tier II facility in their respective jurisdictions.

Because Tier II records contain coordinates, all the Tier II facilities are automatically mapped in MARPLOT.
EXAMPLE:
Swiss County Emergency Management

The verification process:
Each fire station sends a firefighter or LEPC representative to perform a site visit at each Tier II facility in their fire district.

During the site visit, the inspector verifies the correct coordinates for the facility, confirms the chemicals on site, takes photographs, and creates a quick site map of the facility and chemical stores.
EXAMPLE:
Swiss County Emergency Management

Each fire station updates the Facility records on the “master station computer” with the additional site maps, photos, documents, or videos.

The updated Tier II facility records are then imported on to the fire truck laptops.
Finally, each station exports their updated facility records, and sends them back to the Swiss County Emergency Management office.

Swiss County now has updated records for each fire district, including verified physical location, chemical inventory, a site map with accessibility details, and photos.
One fire station even included a video showing how to turn off the valves for anhydrous ammonia at an ice cream factory in their district.
The Routes module is a “filing cabinet” designed to hold informational records on chemicals (or any items) in transit.

Common records stored in the Routes module include:

- Pipelines
- Rail Lines
- Highways / roads
- Waterways

The Routes module is especially good for managing:

- Commodity flow data
- Contact info of transporters
Like all CAMEOfm records, records in the Routes module can tie to an image on a map in MARPLOT...
EXAMPLE:
Viscosity County

Viscosity county is home to numerous oil production companies and pipelines. The county also includes several protected wetlands, as well as Native American-owned lands.

Seismic activity in the area had been recently increasing, and county commissioners agreed that the community needed an effective way to keep track of the pipelines within the county.
Viscosity County Fire Department had been successfully using CAMEO for several years, so officials agreed to utilize CAMEO to manage records for each pipeline.

They downloaded images of each pipeline within the county from the National Pipeline Mapping System into MARPLOT...
EXAMPLE:
Viscosity County

... and created a record in CAMEOfm for each pipeline.

MARPLOT map in satellite view showing pipelines in yellow

CAMEOfm record of a pipeline in the Routes module
Each CAMEO record included:

- Pipeline operator with emergency contact information
- Pipeline content
- Pipeline diameter
- Pipeline length within the county
- Pipeline depth below ground surface
EXAMPLE: Viscosity County

Planners and responders can view the pipelines in MARPLOT relative to county topography, wetlands, recreational water areas, public drinking water intakes, and sensitive populations.

Viscosity County is now better-prepared to plan for potential releases from the pipelines within the county.
Once a CAMEO user has created files in the Facilities or Routes modules...

...the Chemicals in Inventory module is ready to go!

CAMEOfm takes all the information from the chemical Inventory tab in the Facilities and Routes modules, and shuffles it into the Chemicals in Inventory module. This allows CAMEO users to search the records according to chemical name, rather than facility or route name.
The Chemicals in Inventory module allows planners and responders to see what kinds of chemicals are in the community.

- What chemicals are first responders most likely to encounter? And where?
- What chemicals should be the focus of our hazmat training?
- What kind of PPE should we stock for our responders?
- What kind of decon should our hospital be prepared for?
EXAMPLE: Big Country County

The Big Country County Emergency Manager wanted to know what chemicals were most prevalent in the community.

By searching the Chemicals in Inventory module, he determined that anhydrous ammonia was the most common hazardous material in the county, due to the numerous farming operations and dairies.
EXAMPLE: Big Country County

The Emergency Manager decided to make training and planning for anhydrous ammonia the first priority for his paid and volunteer firefighters.

Propane was the second most common hazardous material, followed by diesel and chlorine.
The Big Country Emergency Manager prioritized training, planning, personal protective equipment, and materials according to which hazardous chemicals were most likely to affect the community.
Special Locations are places that are helpful to emergency planners and responders.

The Special Locations module is a filing cabinet to store information on these special places of interest, such as:

- Schools
- Assisted Living Facilities
- Hospitals
- Prisons
- Sports Complexes / Stadiums
- Shopping Centers
- Golf Courses
- Amusement Parks
A Special Location record will always contain fields for:

- Address
- Population
- Phones
- Contacts
- Map Data
- Site Plan
- Notes

So users can track and map exactly where sensitive populations are in the area.
EXAMPLE:
Selenaville, TX Chlorine Release

Selenaville is a small town with a population of just over 400. A rail line runs through the town, about 2 miles west of the town center.

One Monday at 10:05 a.m., a rail car containing chlorine released an unknown amount of chlorine gas.
Next, the Fire Chief pulled up a list of all the special location records for the town, which included schools, assisted living facilities, churches, community centers, and hospitals.

EXEMPLARY: Selenaville, TX Chlorine Release

The LEPC immediately activated reverse 911.

MARPLOT map showing ALOHA plume model and CAMEOfm Special Locations
The department called the emergency contact number at each school to ensure they were activating their shelter in place procedures.

Within 8 minutes of the release report, all community schools were successfully sheltering in place.
The Resources module is a filing cabinet that manages both equipment and personnel.

- Police / Fire Stations
- Mutual Aid Agencies
- Federal Contacts
- State Contacts
- Specialists
- Tradesmen
- Supplies
- Equipment
Helpful resources might include:

**Police Departments:**
- Officers
- Squad Cars
- 4x4 vehicles
- Police Gear

**Fire Departments:**
- Stations
- Firefighters
- HAZWOPER Trained personnel
- Ladder Trucks
- Response Vehicles
- PPE
- Equipment

**Specialized Contractors:**
- Biologists
- Emergency Response Sampling
- Level A Teams
- Construction / Dirt Work
- Boom Suppliers

**Municipal Resources:**
- Excavation Equipment
- Municipal Works Personnel
- Equipment / Supplies
Helpful resources might include:

ICS Trained Personnel:
- IC
- PIO
- Logistics

Suppliers:
- Tents
- Boom
- Pumps
- Sand bags
- Radio Hams
- RV Rentals

Health:
- Poison Control Line
- County Health Dept.
- State Health Services
- Decon-capable Hospitals
- Pediatric Specialists
- Doctors
The Incidents Module is specially tailored to track information related to specific events.

The Incidents Module can help track:

- Both fixed facility and transportation incidents
- Spills, leaks, and other discharges
- Non-compliance issues
- Inspection Findings
- Hazmat route incident frequency
- Geographical trends of incidents
The goal of an Incident module record is to thoroughly document:

- **Who**
- **What**
- **When**
- **Where**
- **Why**
- **How**

... of any incident
Any kind of file can be stored in the Incidents Notes/Documents section:

- Photos
- Videos
- ICS forms
- Sampling results
- Air monitoring readings
- Calibration records
- List of resources used (disposable and not)
- Receipts for reimbursement
- Documentation from responding parties
Example:
Hadestown Tire Fire

A large pile of used tires caught fire at a tire recycling facility in Hadestown, OK.

The response began at the local level, but quickly grew to include nearby mutual aid fire departments, state and federal emergency responders, and contracted firefighting and environmental companies.
Unified Command included local, state, and federal incident commanders.

Response activities included:
- Extinguishing the fire
- Monitoring for responders and local population
- Air sampling
- Firewater retention and sampling
Once the fire was extinguished, and immediate threat to the local population was eliminated, Hadestown County used CAMEO to manage the incident documentation. . .

**Documentation**
If it isn’t documented, it didn’t happen

Sohail Sangi
The local Emergency Management office compiled all cost-related documents for responding agencies at the county level and saved them in the Notes/Documents section.

Items saved included responder timesheets, cost spreadsheets, and scanned receipts.
This made it easy for the county to apply for response-related reimbursement through EPA’s Local Government Reimbursement Program.

Example: Hadestown Tire Fire
The county also saved contact information for the state, federal, and contracted personnel who responded to the incident, so that it would be easy to contact them in the future.

All business cards collected during the response were compiled, photographed, and saved as jpeg files.
Other items saved as part of the Hadestown Tire Fire incident included:

- Paperwork from the state (showing non-compliance)
- Paperwork found in the office of the abandoned facility
- Video clips from local news
- Photos for enforcement case
- Air monitoring results
- Sampling results
- ICS forms
- EPA Pollution Reports (POLREPs)
The Screenings and Scenarios module is designed to hold records for planning and training purposes.

Users can create customized release scenarios based on facility and transportation records already in CAMEO fm.
The Screenings and Scenarios module can also be used for EPCRA hazards analysis.

The Screenings and Scenarios module automates the calculations as expressed in the EPA Guidance: *Technical Guidance for Hazards Analysis* (The “Green Book”). This module acts as a calculator that estimates the radius of a circular threat zone, based on conditions the user enters to describe an accidental chemical release.

---

**Technical Guidance for Hazards Analysis**

*Emergency Planning for Extremely Hazardous Substances*

U.S. Environmental Protection Agency  
Federal Emergency Management Agency  
U.S. Department of Transportation  
December 1987
Users can alter or view the hypothetical scenario in CAMEO fm.

... and the estimated release footprint and threat zone displays instantly in MARPLOT.
MARPLOT allows the players to view other items affecting the scenario, including special locations and U.S. Census population.
ALOHA® is an aerial dispersion modeling program and a component of CAMEO.

Areal Locations Of Hazardous Atmospheres
This CAMEO module allows users to enter information on a releasing chemical, and the program estimates the extent, duration, and direction of the resulting threat zone.

ALOHA can also be displayed on Google Earth or ESRI ARCView products.
As part of CAMEO, ALOHA can work alone. . .

. . . or can inter-operate with CAMEO\textit{fm} and MARPLOT.

It all depends on what the user wants to do.
Scenarios that ALOHA can model include:

- Toxic vapor cloud
- Flammable vapor cloud
- Vapor cloud explosion
- Thermal radiation
- BLEVEs
- Pool fires
- Jet fires
ALOHA guides the user through a series of questions...

What is the Chemical Name?

Topic 6: What Each Component of CAMEO Suite Can Do – ALOHA

ALOHA guides the user through a series of questions...

What is the Source of the Chemical release?

Direct?
Tank?
Puddle?
Gas pipeline?
What do you consider to be a health threat?

- Blast force?
- Flammable vapor cloud?
- Thermal radiation?
- Toxic vapor cloud?

What is your level of concern (LOC)?

- Blast area – psi
- Flammable area - % LEL
- Thermal radiation – kW/m²
- Toxic effects – ppm AEGLs, ERPGs, PACs
...and ALOHA models the threat zone according to the user’s answers.

- ALOHA thermal radiation threat zone
- ALOHA toxic vapor threat zone
- ALOHA blast area model
ALOHA will determine the threat zone for multiple action levels.

Users can even specify custom levels of concern, such as STELs or odor thresholds for toxic vapor clouds.
First responders were called to mitigate the release of liquid benzene leaking from an outdoor tank at ProboBlend, a lubricant manufacturing facility.
First responders used the facility Tier II information in CAMEOfm, the eyewitness account from the facility operator, and binoculars to confirm the tank size, content, and breach of the tank.

**EXAMPLE:**

ProboBlend Lubricants Benzene Release

**ALOHA user options to input tank type/size and amount of chemical in tank.**
EXAMPLE:
ProboBlend Lubricants Benzene Release

... then they modeled the toxic vapor cloud in ALOHA and displayed it on the MARPLOT map.

Toxic vapor cloud modeled in ALOHA, displayed on MARPLOT map.
EXAMPLE:
ProboBlend Lubricants Benzene Release

ALOHA showed first responders:
How long it would take the tank to empty...
EXAMPLE:
ProboBlend Lubricants Benzene Release

... provided a text summary of the release...

SOURCE STRENGTH:
Leak from hole in horizontal cylindrical tank
Flammable chemical escaping from tank (not burning)
Tank Diameter: 4 feet
Tank Length: 5.32 feet
Tank Volume: 500 gallons
Tank contains liquid
Internal Temperature: 80° F
Chemical Mass in Tank: 1.82 tons
Tank is 100% full
Circular Opening Diameter: 6 inches
Opening is 10 inches from tank bottom
Ground Type: Concrete
Ground Temperature: equal to ambient
Max Puddle Diameter: Unknown
Release Duration: 46 minutes
Max Average Sustained Release Rate: 77.1 pounds/min
(averaged over a minute or more)
Total Amount Released: 3,103 pounds
Note: The chemical escaped as a liquid and formed an evaporating puddle. The puddle spread to a diameter of 21.7 yards.

THREAT ZONE:
Model Run: Heavy Gas
Red: 33 yards --- (4000 ppm = AEGL-3 [60 min])
Note: Threat zone was not drawn because effects of near-field patchiness make dispersion predictions less reliable for short distances.
Orange: 92 yards --- (800 ppm = AEGL-2 [60 min])
Yellow: 524 yards --- (52 ppm = AEGL-1 [60 min])
EXAMPLE: ProboBlend Lubricants Benzene Release

... and estimated toxic concentrations at specific locations in the plume footprint.
Any model created in ALOHA can always be saved for future use.

This is useful in preparedness and planning activities, as well as training.
Many RMP reporters utilize RMP*Comp, a website and desktop program which helps chemical facilities that fall under the Risk Management Planning (RMP) rule complete their required off-site consequence analysis.

ALOHA can substitute or supplement RMP*Comp by providing the worst-case and alternate hazard analyses required under RMP rule.
The DoRite Chemical Company has several facilities which utilize Extremely Hazardous Substances (EHS).

DoRite’s Senior VP of Environmental Health and Safety decided that the company would use ALOHA in all Risk Management Planning for the company.
Each facility operator uses ALOHA to model for the worst case release scenario for all EHS chemicals at the facility.

Modeled releases in ALOHA, combined with local fence line populations mapped in MARPLOT, allow each facility to model customized worst-case scenarios, specific to each operation.
DoRight facility operators also regularly use ALOHA in release reporting under state law, and under federal laws such as EPCRA and CERCLA.

In the event of an accidental chemical release, the facility operator uses ALOHA to help estimate the amount released into the environment.
EXAMPLE:
DoRite Chemical Company
Risk Management Plan

The LEPC, SERC, and NRC are always grateful to have an initial report that includes an estimated amount of the release, rather than a report that just states “unknown amount.”

This allows the responders to address the needs of the facility and the public more quickly and effectively.
MARPLOT® is the mapping application within CAMEO.

**Mapping**

**Application for**

**Response,**

**Planning,** and

**Local**

**Operational**

**Tasks**
MARPLOT is an electronic map that resides on the CAMEO user’s computer desktop.

Users can view a variety of items already on the map when connected to an internet connection, and can label and customize the map.

MARPLOT is a geographic information system – a map that shows data - similar to Google Earth and ArcGIS.

Note: Unlike Google Earth and ArcView, MARPLOT allows map users to operate without Internet or Server access.
MARPLOT Ready-to-Use Features Include:

- Street maps
- Satellite imagery
- USGS Topo maps
- USGS Aerial photos
MARPLOT Ready-to-Use Features:

Use cursor to instantly view:
- Coordinates
- National Grid
- Elevations
- Street Addresses
MARPLOT Ready-to-Use Features:

- Navigational charts
- FEMA flood zones
- NOAA real-time weather radar

Maritime navigational chart web layer activated

FEMA flood zone web layer activated

NOAA real-time web layer activated
MARPLOT Tools
Drawing Tools Include:
• Lines and polygons
• Labels
• Grids
• Measuring tool
Use the Selection Tool to view census data within any area:
MARPLOT Tools
Create grids for systematic management

- Search and rescue
- Debris removal
- Code enforcement / maintenance schedules
As part of the CAMEO Suite of software, MARPLOT links directly to records in CAMEOfm and operates in conjunction with ALOHA.

MARPLOT map showing lighthouses, maritime navigational charts, and threat zone modeled in ALOHA.
CAMEO Suite is free, open-sourced software - that means anyone can use it for any purpose.

Although it was originally developed for emergency planners and responders, many private and public organizations use CAMEO for many different purposes...
EXAMPLE: DoRite Chemical Company

Remember our friends at DoRite Chemical Company? The don’t just use ALOHA and MARPLOT to model for their Risk Management Program reporting...
EXAMPLE: DoRite Chemical Company

They use CAMEO{$fm$} to manage their chemical inventories across different facilities...
EXAMPLE: DoRite Chemical Company

... to track PPE and training needs of their fire brigades. ...
EXAMPLE: DoRite Chemical Company

<table>
<thead>
<tr>
<th>MATERIAL RECORD</th>
<th>SHOP REPAIR ORDER (Construction Sheet)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PAGE</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

. . . keep track of facility maintenance . . .
EXAMPLE: DoRite Chemical Company

... and internal health and safety inspections ...
EXAMPLE: DoRite Chemical Company

... and even in hosting exercises with the locals!
Express365 is a chain of fuel/convenience stores, with over 250 locations throughout southern California, Arizona, and Nevada.

The Express365 Operations Manager learned about CAMEO during an LEPC meeting. She decided to use CAMEO.fm as a free tool to keep track of the various store locations.
Each store location was assigned its own CAMEO record.

Each record included emergency contact phone numbers for the Store Register and the Store Manager, as well as other operational information including underground fuel tanks, carwashes, and food service counters.
On March 28, 2014, a magnitude 5.1 earthquake occurred in the town of La Habra, CA.

The Operations Manager used CAMEO to quickly verify the status of each of the potentially affected Express365 locations...
She then decided to prioritize contacting the stores closest to the epicenter. . .

The Operations Manager opened up MARPLOT to view the locations of stores in the area. . .
and used the MARPLOT measuring/drawing tools to see how many stores fell within 30 miles of the earthquake epicenter.
EXAMPLE:
Express365 2014 Earthquake

She used the grid tool to systematically contact each store to verify its status, checking in 5-mile increments from the epicenter...
EXAMPLE:
Express365 2014 Earthquake

MARPLOT allowed her to generate a list of all stores within 30 miles of the epicenter, and to click on each mapped store and view it’s CAMEO fm record.
The Operations Manager was able to contact each store using CAMEOfm records, to make sure the employees were safe and to check the status of the facility.
Store Managers reported on the safety of the employees, whether or not the store sustained damage, the status of the underground tanks, and if the store had electricity.

Most managers were able to take photos with their cell phones, which the Operations Manager saved in each CAMEOfm record for insurance purposes.
EXAMPLE:
2013 Tornadoes in Moore, OK

On May 20, 2013, an EF5 tornado struck Moore, OK.

The tornado killed 24 people and injured 377.
EXAMPLE:
2013 Tornadoes in Moore, OK

It stayed on the ground for 39 minutes over a 17-mile path, and was estimated to be 1.3 miles wide at its peak.

The Oklahoma Department of Environmental Quality used the state’s extensive CAMEO database to respond . . .
EXAMPLE:
2013 Tornadoes in Moore, OK

ODEQ mapped tornado touchdown points as they were reported by storm chasers. . .
EXAMPLE:
2013 Tornadoes in Moore, OK

... and used the buffer tool to quickly measure and draw the 1.3 mile tornado path, based on the touchdown points.

MARPLOT map in street view, showing tornado swath, facilities, and special locations.
EXAMPLE: 2013 Tornadoes in Moore, OK

The tornado tracks were estimated in real time, allowing ODEQ to immediately calculate affected populations . . .

MARPLOT map in street view, showing tornado swath, facilities, and special locations.
EXAMPLE:
2013 Tornadoes in Moore, OK
... and instantly calculate damage costs based on parcel data stored in MARPLOT.

Estimated Damage: Over $200 Million

Excel spreadsheet generated by MARPLOT/CAMEOfm
EXAMPLE:

2013 Tornadoes in Moore, OK

MARPLOT also instantly generated a spreadsheet listing all registered safe rooms within the tornado swath. . .

. . . which expedited search and rescue.
EXAMPLE:
2013 Tornadoes in Moore, OK

Because ODEQ also stored reverse 911 information in MARPLOT, the program instantly generated a spreadsheet listing all residents with homes in the tornado path.
On 29 August 2005, Hurricane Katrina made landfall in Plaquemines Parish, Louisiana as a Category 3 storm.

Hurricane winds and widespread flooding wiped out numerous lines of communication throughout Louisiana and Mississippi, including telephone and internet capabilities.
EXAMPLE: Hurricane Katrina, Louisiana Gulf

Despite the lack of communication infrastructure, local fire departments in Louisiana, using CAMEO\textit{fm} and MARPLOT, were easily able to check on Tier II facilities, track search and rescue, and share/review local maps.
EXAMPLE: Hurricane Katrina, Louisiana Gulf

CAMEO not only helped local responders, but also enabled teams from across the county respond to the hurricane-affected communities.

Under the FEMA national plan, hazmat and medical teams from Maine and Rhode Island responded quickly to aid the hurricane-devastated communities...
EPA Region 1 worked with the State of Louisiana to provide each responding hazmat and medical team with Tier II in CAMEO.

Before deployment, each team was given CAMEO data that included MARPLOT maps of their assigned area, and Tier II facility CAMEO_fm records linked to MARPLOT.

This enabled teams to have area maps with Tier II facility locations and chemical inventories.
Hazmat teams from Maine and Rhode Island performed reconnaissance throughout their assigned areas, systematically checking for potential releases of hazardous chemicals.

All with no cell phone or internet connectivity, and with no bulky piles of paper documents.
EXAMPLE: Hurricane Katrina, Louisiana Gulf

The teams used MARPLOT to locate Tier II facilities and navigate within their assigned areas.

CAMEO\textsubscript{fm} allowed the teams to look at chemical inventories for each facility on the MARPLOT map, record observations, and report on the status of Tier II facilities.

CAMEO Chemicals allowed responders to look up information on over 6,000 chemicals (as opposed only the 40 chemicals offered in WISER).
Because CAMEO uses all open sourced software, the Maine and Rhode Island teams were able to easily share their items mapped in MARPLOT with anyone who needed the information, including LDEQ, EPA, FEMA, GOSEP, and the LA Dept. of Health and Hospitals.

Agencies using GIS software programs such as ArcGIS were able to quickly import and view the MARPLOT map objects. . .

. . . while other agencies simply used Google Earth to view the shared map objects.
EXAMPLE: Hurricane Katrina, Louisiana Gulf

When medical issues arose in various communities, hospital units looked in MARPLOT to see if any Tier II facilities in the area included chemicals which might correspond with the citizens’ symptoms.

CAMEO Chemicals also aided in correlating chemicals with symptoms, thanks to the First Aid section of each Datasheet.
In March of 2010, the state of Rhode Island experienced record flooding after receiving over 20 inches of rain in just 38 days.

Homes, businesses, and infrastructure were destroyed. Entire bridges and dams washed out along the Pawtuxet, Wood, and Pawcatuck rivers.
EXAMPLE: Rhode Island Floods, 2010

The Pawtuxet River crested at nearly 21 feet, more than 11 feet above flood stage. Swollen river ways and reservoirs posed a continuing threat to human health and property.

Emergency planners turned to CAMEO.fm and MARPLOT to aid in determining the impacts of reservoir release.
EXAMPLE: Rhode Island Floods, 2010

EPA Region 1 took all the data from the State of Rhode island, and imported into the CAMEO Facilities Module.

This created an individual record for each dam, which included the name of the dam, year of construction and materials, last inspection performed, and the amount of water behind it.
EXAMPLE: Rhode Island Floods, 2010

EPA mapped each dam in MARPLOT, and imported layers showing the 100 and 500 year flood plains.

This enabled planners to look at MARPLOT and see exactly where each dam was located, how much water was behind the dam, where released water would flow, and what communities would be affected.
One major benefit of CAMEO is that it can operate independently of the internet.

Because it is a program that resides on the user’s desktop (like Word or Excel), the CAMEO data and files are only visible to the user of the computer.

Unless the user wants to share the information. . .
A CAMEO user can quickly export any file in the program. The file can easily be emailed or transferred to another person, who can instantly import the file into their CAMEO program.

This allows agencies to manage and access sensitive information, without fear of that information being hacked or otherwise obtained by outside parties through an internet connection.
EXAMPLE: Sensitive Citizen Information

Some examples of sensitive information that users prefer to manage in CAMEO include:

- Data containing citizen phone numbers (safe room registries, reverse 911)
- CFATS Information
- RMP facility information
- Sex offender residence locations
CAMEO Suite is free and simple to download!

Visit [https://www.epa.gov/cameo](https://www.epa.gov/cameo)

EPA’s CAMEO website directs users to download and install:
- CAMEO Chemicals
- CAMEO fm
- ALOHA
- MARPLOT
- And links to additional resources...
EPA’s CAMEO website also includes many links to online resources including:

- The CAMEO Companion (instruction manual)
- ALOHA trainings and resources
- Certified CAMEO instructor contact information
Information on CAMEO can also be found on NOAA’s website at

http://response.restoration.noaa.gov/cameo

NOAA Resources Include:
ALOHA Guidance
http://response.restoration.noaa.gov/aloha
Level of Concern Guidance
http://response.restoration.noaa.gov/locs
CAMEO Compatible Programs

There are several programs that can be used with the CAMEO Software Suite.

These programs are *not* part of CAMEO, but are worth noting have been developed to work well with CAMEO.
Tier2Submit

Tier2 Submit is a reporting software program developed by EPA, which enables facilities to generate an electronic chemical inventory Tier II facility report. This software program is utilized by many states to manage Tier II reporting programs.

CAMEO is designed to work with data created in Tier2Submit. Any files created using Tier2Submit can be instantly imported into CAMEO, where they automatically populate the Facilities and Chemicals in Inventory modules, and MARPLOT.
Google earth is a geographic information system software program (GIS) developed by Google, which is widely utilized by the public.

**MARPLOT Compatibility**

Any map items created in MARPLOT (layers) are compatible with Google earth, and can be quickly and easily exported as kml and kmz files and shared with Google earth users.

This means that CAMEO users can share any map items with others who use Google earth.
**ArcGIS**

ArcGIS is a geographic information system software program developed by Esri, which is widely utilized by IT professionals in the private and public sectors.

**MARPLOT Compatibility**

Any map items (layers) created in MARPLOT are compatible with ArcMAP, and can be quickly and easily exported as shape files and shared with ArcGIS users.

This means that CAMEO users can share any map items with others who use ArcGIS.
Esri CAMEO Tools

CAMEO Tools is a plugin developed by Esri for ArcMAP users, which allows them to import CAMEO data. Now CAMEO users can share information with other individuals who use ArcGIS as their primary GIS platform.

ALOHA ArcMAP Import Tool:

The ALOHA ArcMAP Import Tool is a plugin developed by NOAA, which allows ALOHA threat zone predictions to display in ArcMAP. Now CAMEO users can share ALOHA models with ArcGIS users.

http://response.restoration.noaa.gov/aloha_arcmap
RMP*Comp and ALOHA can both be used to perform off-site impact hazard analysis required under RMP rule.

The RMP*Comp website and software are available at https://www.epa.gov/rmp

Guidance on using ALOHA for RMP hazard analysis is offered through the CAMEO resource “Ask Dr. ALOHA” at http://response.restoration.noaa.gov/oil-and-chemical-spills/chemical-spills/resources/ask-dr-aloha-rmp-and-epcra-hazard-analyses.html
So there it is… a system for first responders, local planners, and industry representatives to assist them in planning and preparedness activities for chemical incidents.

I hope this information will be useful to you and your organization.