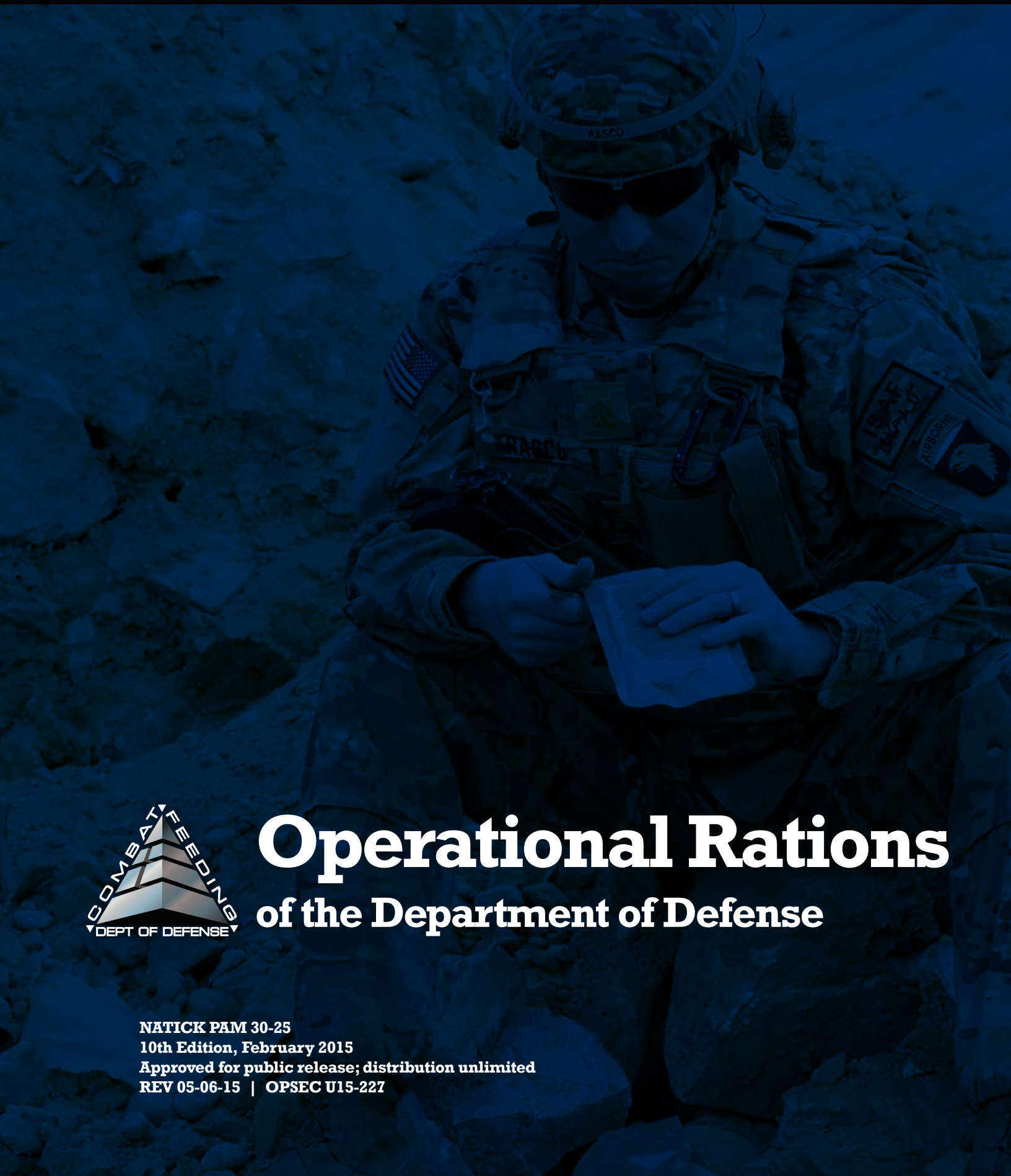
RDECOM

Combat Feeding Directorate



Operational Rations

of the Department of Defense

NATICK PAM 30-25
10th Edition, February 2015
Approved for public release; distribution unlimited
REV 05-06-15 | OPSEC U15-227

THE MISSION of the Department of Defense (DoD) Combat Feeding Research and Engineering Program is to sustain the Department of Defense's most decisive weapons platform — the individual Warfighter.

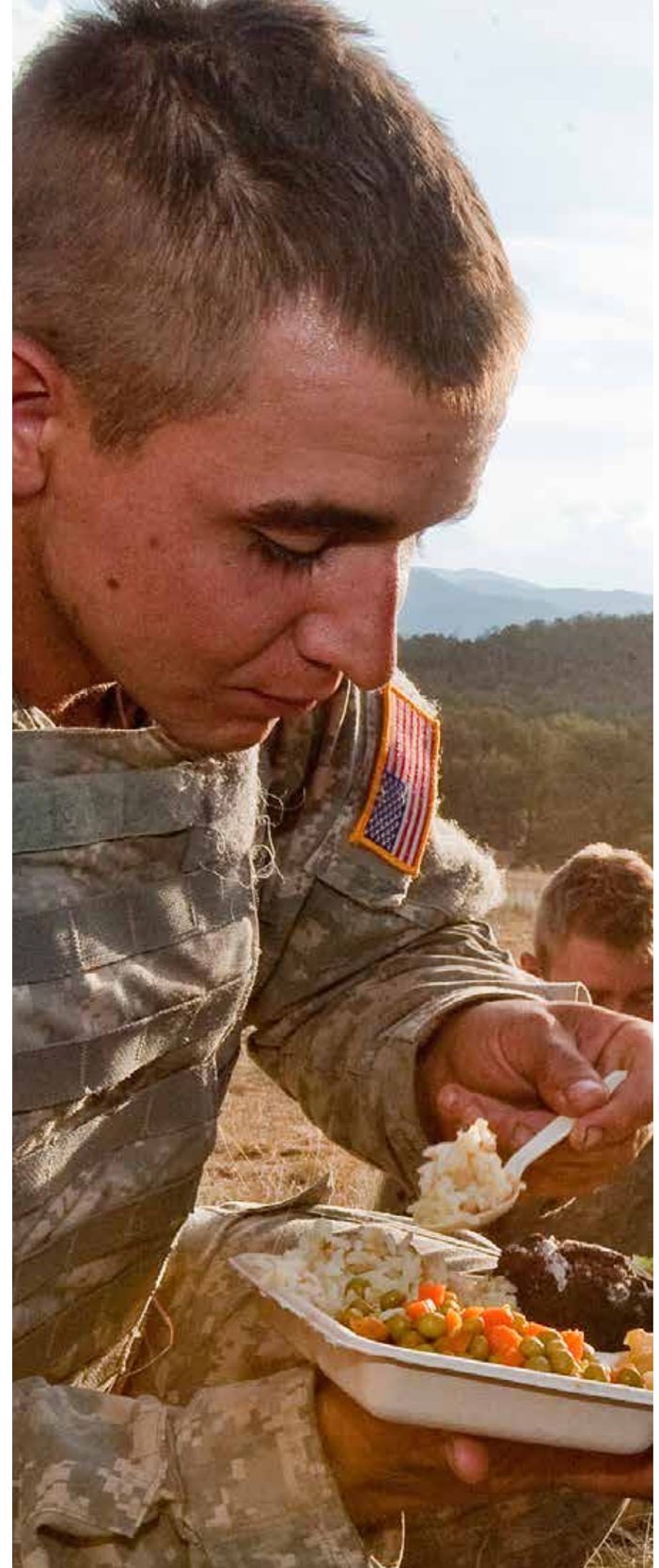
The contemporary operating environment requires state-of-the-art combat rations to provide for the nutritional needs of the Warfighter in a wide variety of situations, from peacekeeping to high-intensity combat and contingency operations. Under the auspices of the DoD, the U.S. Army Natick Soldier Research Development and Engineering Center (NSRDEC) Combat Feeding Directorate (CFD) and Defense Logistics Agency (DLA) - Troop Support employ a total life cycle approach in developing, testing, evaluating, procuring, fielding, and supporting all military rations. These rations are a vital contribution to the overall quality of life of the individual combatant.

CFD is responsible for the research, development, engineering, integration, and technical support for the entire family of combat rations. The program is driven by Warfighter recommendations and feedback that the CFD obtains from annual field tests of rations. CFD maintains strong partnerships with the commercial sector, other government agencies, and the Office of the Surgeon General (OTSG). In accordance with U.S. Army Regulation 40-25, Nutritional Standards and Education, the OTSG approves all menu changes. The Joint Services Operational Rations Forum (JSORF) meets annually to approve new rations and changes to components within rations. DLA-Troop Support is responsible for developing and implementing a master strategy for the integration of the U.S. food industry into the combat ration program, and the DLA-Troop Support Subsistence Directorate is also responsible for sustaining the logistical infrastructure to supply present and future customers with the highest quality combat rations in a timely manner and at an affordable price.

This book highlights the entire family of fielded combat rations. Rations are categorized into one of four platforms: Individual Rations, Assault Rations, Group Rations, and Special Purpose Rations. Each ration is described by its purpose, major characteristics, nutritional data, and preparation requirements.

The mission of the DoD Combat Feeding Program is to ensure that America's Warfighters are the best fed in the world. By investing in high risk/high payoff science and technology, and utilizing Continuous Product Improvement (CPI), CFD provides Warfighters with revolutionary combat feeding capabilities.

VISION: to continue to be the preeminent provider of Joint Service, Coalition, capability driven world-class combat feeding systems...



HISTORY OF COMBAT FEEDING 2

CONTINUOUS PRODUCT IMPROVEMENT 6

NUTRITION 10

INDIVIDUAL RATIONS:

Meal, Ready-to-Eat, Individual (MRE) 16

ASSAULT RATIONS:

Modular Operational Ration Enhancement (MORE) 26

First Strike Ration (FSR) 32

Meal, Cold Weather/Food Packet, Long Range Patrol (MCW/LRP) 34

GROUP RATIONS:

Unitized Group Ration (UGR) 36

UGR-Heat and Serve (H&S) 44

UGR-A Ration 46

UGR-M Ration 50

UGR-Express (UGR-E) 52

Navy Standard Core Menu (NSCM) 54

SPECIAL PURPOSE RATIONS:

Tube Foods 58

Meal, Religious, Kosher/Halal 61

Meal, Religious, Kosher for Passover 62

Food Packet, Survival, General Purpose 63

Food Packet, Survival, Abandon Ship 64

Food Packet, Survival, Aircraft, Life Raft 65

Ultra High Temperature (UHT) Milk 66

FREQUENTLY ASKED QUESTIONS 68

LIST OF ABBREVIATIONS 70

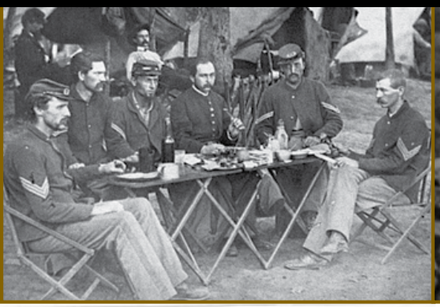
QUICK REFERENCE DATA 71

CONTACT INFORMATION 75

HISTORY OF RATIONS

TODAY'S OPERATIONAL RATIONS are truly a coming together of Warfighters' recommendations, military requirements, and leading edge food science and packaging technologies. A real appreciation of the high quality of today's combat rations can certainly be gained by taking a look at the transition of ration development from the early "meat and potato" subsistence of the Civil War through World Wars I and II to the technologically advanced, state-of-the-art advanced ration and packaging systems in the hands of Warfighters today. The initial packaged ration concepts of the 1950s have led directly to today's operational rations, such as the Meal, Ready-to-Eat (MRE), Unitized Group Ration (UGR), First Strike Ration (FSR), and UGR-Express (UGR-E).

A look at military rations through the years…



Revolutionary & Civil Wars

In 1775, the spirit of independence in America exploded into war. With George Washington as its leader, the Continental Army began its fight to secure and maintain freedom. During this time, the Soldier's nutritional health and diet were considered of little importance and not given much attention. But 1775 did mark the first step forward: the Second Continental Congress passed legislation to provide its Army with the first individual ration which contained the following:

- One pound of beef, 3/4 pounds of pork or one pound of salted fish per week.
- Three pints of peas or beans per week.
- One-half pint of rice or a pint of Indian Meal per week.
- One pint of milk per day.
- One pound of flour per day or hard bread, once a week.
- One quart of spruce beer or cider per day.

After the War of 1812, questions were raised about the Army's ability to provide for itself. So gardens were planted at Army posts to provide fresh vegetables, definitely a welcome and healthy variation to the diet of bread and beans.
As in earlier times, the soldier's basic ration was bread, meat, flour, potatoes, yeast, salt, pepper, coffee, and sugar. The flour was in the form of "hardtack," a mixture of flour and water soaked overnight and fried in grease.

World War One

In 1917 the United States entered what was to be known as World War I.

Because of the need to protect food from the threat of gas, spoilage and dampness, the Army fielded a Reserve Ration which included canned meat and bread, and instant coffee. These rations were issued every other day to cover a two day period.

As trench warfare began, hot food and drinking water were delivered to the troops in milk cans carried on a pole by two soldiers. This is the first time that hot meals were served on the front lines. The intensive fighting in the trenches, the constant existence of mud and the threat of contamination from gas attacks were the impetus for the development and fielding of the "Trench Ration." This ration was designed to feed 25 soldiers and weighed approximately 107 pounds. Still, the most popular items among the troops were the tobacco and the half pound of candy that they were issued every 10 days.

"Fatal experience has taught the people of America that a greater proportion of men have perished with sickness in our armies, then have fallen by the sword."

-Dr. Benjamin Rush

World War Two

In 1938, prototypes of "Ration, Combat, Individual" or "C Ration" were shown to the members of the General Staff.

The C Ration contained two units, the "M" unit, which consisted of eleven different meat and vegetable components, and the "B" unit, which consisted of bread, sugar, and coffee. The total weight of this individual ration was approximately seven pounds. Five of the eleven rations had beans in them: meat and beans, beans and franks, beans and pork, ham and lima beans ... etc. The C Ration became a staple of WWII. Today, this ration is still best remembered for its beans.

One of the most famous rations that came out of WWII was the K Ration. It was first requested by Army forces, who needed a ration that paratroopers could carry in their pockets. The components of the K Ration were the most nutritionally balanced of any ration available at the time.

The D Ration, also know as the D Bar, was the first survival ration developed during WWII. It contained three 4-ounce bars of a high density, high caloric chocolate. Colonel Paul Logan was the originator of the D Bar, and it was his theory that "an emergency ration should not be palatable for fear the men would consume the ration rather than carry it until an emergency arose."

Korean War

The C Ration was used extensively during the Korean War and was continually improved, with such advancements as the inclusion of shelf stable canned fruits, cakes and bread.

The Meal, Combat Individual, or "C-Rat" was designed to supply individual meals, rather than rations (one day supply of food). It was similar to the WWII C Ration and its post-war improvements, except the menu variety was expanded to 12 meals, and canned fruit or cake type dessert items were added.

"During my stay in Korea, we had the C-ration, an entire day's ration … issued one at a time … you can't put on a field jacket and stuff nine cans of food in it, plus ammunition, grenades, etc … 2 of every 3 were thrown away … I have no complaint about the food … you couldn't carry enough of it around with you …"

-Major "D", Infantry

Vietnam War

During this time, a requirement came from the Army for a new individual combat food packet. The new technologies of freeze drying and flexible packaging were incorporated into the Food Packet, Long Range Patrol, or "LRP". The LRP was issued in 1964 for Army use for troops in operations precluding resupply for periods of two to ten days. The main feature of the LRP was a precooked, freeze dried entree in a reconstitution package.

Both the MCI and LRP were used throughout the Vietnam War. The "trade value" of components in each of the rations was just one of the stories that would be told after the war. "I'll give you two cans of beans for that chocolate bar ...".

Development of the MRE

During the sixties and seventies, new discoveries in food technology and food processing continued to provide a new generation of rations. The retort pouch was without a doubt one of the foremost accomplishments achieved through the teamwork of DoD, industry and academia. It literally changed the shape of operational rations for the future. This packaging system represents one of the greatest scientific and engineering breakthrough in food packaging and processing.

At the same time U.S. Army Natick Research and Development Laboratories were working on rations for the astronauts, the Army approved a requirement for a new combat ration–a lightweight individual meal which did not require a rigid metallic can. Development of this ration turned out to be extremely challenging to the Army and the American food industry. Natick Labs placed priority on developing what became one of today's most familiar operational rations: the Meal, Ready to Eat, or MRE. The MRE represented the new thinking on flexible packaging–no more metal containers like the cans used in the MCI–and continued the theme of weight reduction. The MRE was type-classified in 1975 and went into full production in 1980.

Initial MRE specifications:

Meals/Case	12
Weight/Case	16
Weight/Meal	1.03
Calories/Meal	1215

CONTINUOUS PRODUCT IMPROVEMENT

IN ORDER to accomplish the mission of providing the highest quality rations to our Warfighters in the field, it is imperative that the development of new combat rations is fueled by the wants, needs, and ideas of Warfighters themselves.

After feedback was received from troops that served in Operation Desert Storm/Shield, CFD acknowledged the need to establish a CPI process that would ensure all operational rations meet the approval of Warfighters, first and foremost. New components are continually added and removed from the various menus in the family of combat rations. Any new component that is approved in field tests by Warfighters must also obtain JSORF and U.S. Army OTSG approval before entering procurement for inclusion in rations.

The CPI process is driven by the voice of the customer and meets military developmental and logistical constraints. Continuous product improvement produces increased variety, quality, user acceptance, consumption, and nutrition across the full spectrum of combat rations. The improvement projects also support optimal cognitive and physical performance in Warfighters. The process serves as a platform for transition of high risk/high payoff and novel science and technology processes, and packaging. The CPI process results in food technologies and packaging that ensure our Warfighters are the best fed in the world.

Combat Feeding

Research, development and testing to provide the best products for our Warfighters

Challenges & Solutions

Unique requirements drive the Combat Feeding mission: ensuring our Warfighters are provided healthy, high quality meals anywhere in the world. As the military draws down in size, individual Warfighters and small units will be forced to complete complex tasks with fewer available resources. The increased reliance on personal performance abilities requires investment in food science and equipment technologies that enable and improve combat effectiveness.

Performance Nutrition

Warfighters are subjected to intense physical and mental demands. Optimized, targeted nutrition can reduce muscle fatigue, decrease recovery time between mission, and improve cognitive function. Performance enhancers may be added to biologically tailored rations to advance physical and cognitive function, providing our Warfighters the decisive edge against the enemy.

Food Protection & Defense

Development of pathogen reduction technologies for ready-to-eat foods, novel food processing methods, and food service sanitation ensures Warfighter health. Hand held sensors with the capability to provide instant food borne pathogen and toxin detection will greatly reduce the risk of illness when Warfighters are required to consume locally sourced food.

Food Processing & Packaging

Potential global conflicts will require an improved ration. Advanced processing methods allow for fresher tasting food with higher nutritional value and extended shelf-life. It is imperative to provide Warfighters with highly acceptable products to increase consumption, resulting in optimized effectiveness.

Utilization of advanced processing methods requires new packaging materials. These materials must be able to withstand harsh conditions in dynamic global climates, be cost effective, and ensure food safety. Reducing packaging weight and volume will also decrease shipping costs, the amount Warfighters carry, thereby lessening fatigue while increasing agility and speed.

Logistics & Field Feeding Equipment

Modular, scalable and efficient appliances are critical to decreasing the logistical burden of field feeding. Advanced technology can reduce the reliance on fuel and water, along with reducing the generation of waste. On-demand, flameless heating technologies will improve small unit capabilities and reduce resupply requirements in remote locations.

Soldiers have unique nutritional requirements

Warfighters are routinely required to execute missions which demand peak physical conditioning in a variety of environmental extremes. For that reason, the nutritional recommendations for Warfighters are significantly different than those for civilians.

Military nutritional recommendations are established by AR 40-25—"Nutritional Standards and Education." This publication, also used by the USAF as AFI 44-141 and by the USN as BUMEDINST 10110.6, is published by the Surgeon General of the military services to guide garrison and operational feeding plans.

Nutrition is a key enabler for successful military operations. Properly planned and executed, good feeding practices in the field maintain and enhance operational performance and morale and significantly contribute to mission accomplishment. Military personnel who optimize their nutritional status will better endure the harsh environments encountered in today's battlefield.

A look at the unique nutritional needs of our Warfighters

Investigating gut bacteria to improve rations

Combat Feeding Directorate
Nutrition Spotlight

By Jane Benson, NSRDEC Public Affairs / NATICK, Mass. (July 31, 2014)

It takes guts to research Soldier nutrition and performance—or, more specifically, it takes gut bacteria.

Researchers at the U.S. Army Natick Soldier Research, Development and Engineering Center, or NSRDEC, are investigating gut bacteria and its effects on Soldier performance. Natick's research is in the early stages but could eventually be used to improve rations to help Soldiers combat the effects of stress and to improve their overall performance.

"What's really created this wave of interest (in gut bacteria) is the Human Microbiome Project," said Ken Racicot, a food technologist/nutritional biochemist in NSRDEC's Combat Feeding Directorate. "What came out of that is not only a lot of great research but also the tools—the tools to study in this area. There is a huge wave of interest, partly because the tools are now allowing us to study it better."

The Human Microbiome Project is a U.S. National Institutes of Health initiative. The goal of the project is to identify and characterize microorganisms, or bacteria, that reside in the human body in order to gain insights into human health and well-being. In terms of actual numbers, there are approximately 10 times the number of bacterial cells in the body as human cells, but the bacterial cells are much smaller than the human cells.

The gut microbiome, specifically, refers to the gut microbe system. Gut bacteria has an impact on the immune system and is also believed to play a role in obesity and several diseases, including diabetes. It may also affect cognitive and physical abilities. The type of gut bacteria a person has is determined at a very early age, but researchers believe that it may also be influenced and altered somewhat by diet or physical and emotional stress.

"We're at the early stages of this work," said Racicot. "We're doing basic research, and we're establishing in-vitro models to evaluate the influence of dietary input on the gut microbiome and how that can influence biological function—specifically, local inflammation and immune function. Our long-reaching goal, ultimately, is to be able to gain insight into dietary inputs that improve all of those functions and to develop combat rations in a way that can lead to those improvements."

Racicot is working with Steve Arcidiacono, a microbiologist, and Jason Soares, a research chemical engineer. Both Arcidiacono and Soares work for NSRDEC's Warfighter Directorate. The U.S. Army Research Institute of Environmental Medicine, or USARIEM, is also an important collaborator in the research.

"Soldiers are facing physiological, psychological, cognitive and physical stress," Soares said. "Anytime you are carrying a load, you are creating physical stress. Physical stress and mood have been linked to changes in gut microbiome. These studies are being done in the civilian sector, but there isn't really a lot of work being done for Soldiers, and that's where our work comes in. We think we have a great opportunity to tailor some of this work specifically toward the Soldier, because the Soldier is subject to a lot of different stresses than you and I are."

Racicot's focus is on the nutritional aspect of the work in terms of optimization of Soldier performance through diet and immune function.

Soares and Arcidiacono are focusing on the bio-fermentation aspect—essentially trying to mimic the action of the human colon.

"Steve and I are trying to create a model of the human gut where we can also look at other aspects that are connected to nutrition, but more in terms of human performance," said Soares. "So, external stresses specific to a Soldier, such as sleep deprivation. Or certain cognitive stresses that a Soldier will get that no one else will get. Those external stresses have been linked to changes in the gut microbiome. So what we're interested in is trying to develop a model where we can see some of those changes. Then we work with Ken and the Combat Feeding Directorate and see if through dietary intervention, if we can overcome that external stressor to reinstate the Soldier's original level of performance under that particular stress condition."

"Ultimately, the goal is to improve performance in multiple areas where performance can hopefully be improved by dietary additives," Arcidiacono said. "Perhaps, it will help Soldiers overcome stress or fatigue from load carriage or no sleep—those kind of things."

"So we're putting the bacteria in (the reactor), and working with Ken, we are also putting in the dietary inputs and seeing how that bacteria breaks down that dietary input," said Soares. "The samples then go to Ken and he analyzes them in the human cell lab. He can look at the immune function of that dietary input. And we can look at how the population changes because of that the dietary input. For instance, does the dietary input increase beneficial microbes or change the balance of the gut bacteria?"

"It's a good opportunity for us to really make an impact here," Arcidiacono said. "It's been great working with Combat Feeding, because they operate with that path to the Soldier, with transitions is mind."

Racicot initiated the collaboration with Soares and Arcidiacono. The three researchers share a special chemistry, a great enthusiasm for pointing out one another's unintentional puns, and an even greater enthusiasm for their work.

"Bacteria is my life," said Arcidiacono.

"Working in an emerging field is exciting," Racicot said, "It is fulfilling to be part of this early wave."

Warfighter Nutrition

Military leaders must ensure that all Warfighters know the importance of nutrition and how to implement sound practices in garrison and in the field.

Combat rations are designed to be used in a variety of environments. The Warfighter is responsible for consuming the right amount of energy for their environment and workload. Consuming three MREs each day, for example, will provide approximately 3900 calories, but that many calories may not be needed in all scenarios. The table on the right gives general energy recommendations based on workload.

MACRONUTRIENTS

Carbohydrates are the main energy source for the brain. Dietary fiber is a carbohydrate, and it ensures proper functioning of the digestive system. Simple carbohydrates are small and can be broken down quickly to provide a fast source of energy. Complex carbohydrates require enzymes to be broken down, so they provide an extended source of energy. Common sources of carbohydrates include grains, rice, pasta, sugar, and vegetables.

Fats tend to get a bad name, but are essential to the human body. While too much saturated fat is unhealthy, a diet rich in monoun-saturated and polyunsaturated fats can reduce cholesterol levels and risk of heart disease. They provide a source of energy, and also protect internal organs. Common sources of fat are meat, nuts, cheese, butter, and oils.

Protein is a nutrient that is needed by the human body for growth and maintenance. Amino acids, the building blocks of proteins, are used for building new tissue, including muscle, as well as repairing damaged tissues. Common sources of protein are meat, poultry, eggs, and cheese.

MICRONUTRIENTS

Unlike macronutrients, micronutrients are not a source of energy. Instead, they are responsible for executing a myriad of functions that take place every day inside the human body.

- Vitamin A helps eyes adjust to changes in light and keeps the eyes, skin, and mucous membranes moist.
- Vitamin B1 converts blood sugar into energy and is essential for nervous system, cardiovascular, and muscular function.
- Vitamin B2 works to process macronutrients into energy, and is needed for growth and red cell production. It also promotes healthy skin and good vision.
- Vitamin B6 helps brain function and the conversion of protein to energy.
- Vitamin B12 works to produce healthy blood cells and keep the central nervous system healthy.
- Vitamin C helps strengthen the immune system, heal wounds, prevent cell damage, promote healthy teeth and gums, and absorb iron.
- Vitamin D aids in the absorption of calcium, and supports muscle and nerve function.
- Niacin works to keep the digestive system functioning properly, and promotes healthy skin and nerves.
- Vitamin E is an antioxidant that neutralizes free radicals that can cause diseases, contributes to a healthy circulatory system and assists in the healing of wounds.
- Folic acid is needed for the production of healthy new blood cells.
- Calcium is important for building healthy bones and keeping bones strong throughout life.
- Zinc is an essential mineral with antioxidant properties that also helps speed up the healing process after an injury.

ACTIVITY LEVEL	EXAMPLE	ENERGY INTAKE (calories/day)
LIGHT	Garrison Operations	Men: 3000 Women: 2200
MODERATE	Traffic Control Point Guard	Men: 3250 Women: 2300
HEAVY	Dismounted Patrol, Field Assault	Men: 3950 Women: 2700
EXCEPTIONAL	High Altitude/ Extreme Cold Weather Operations	Men: 4600 Women: 3150

RATION COMPONENT FORTIFICATION

In order to increase their nutritional content, many ration components are fortified. Fortification maximizes the nutrition of ration components by adding or increasing important vitamins and minerals. Warfighters often 'field-strip' their operational rations, removing unwanted components to save weight. However, this risks sacrificing crucial nutrition. Fortification provides the additional edge to maximize performance. The x in the table below shows which vitamins and minerals have been added to each component. If rations are field stripped, these items should be consumed.

CFD continues to conduct research to assess the benefits and consequences of incorporating omega 3 fatty acids, antioxidants, phytonutrients, and fiber into rations.

To date, we have removed trans fatty acids from 11 components that are packed with individual rations platforms.

For more information, visit the Human Performance Resource Center on the web at ***humanperformanceresourcecenter.org***

COMPONENT	VITAMINS										MINERALS	
	A	B1	B2	B6	B12	C	D	Niacin	E	Folic Acid	Calcium	Zinc
Beverage Bases						×						
Orange Bev. Bases		×	×	×		×	×	×	×		×	
Cocoa Beverage	×	×		×								
Cheese Spread	×	×		×			x				x	
Peanut Butter	×	×		×		x						
Crackers											×	
Pudding							×				×	
Dairy Shake							×				×	
Snack Breads											×	
Fruits						×						
First Strike Bar		×	×	×	×	×	×	×	×	×		×

Individual Rations

Individual Rations are packaged, pre-cooked, shelf stable food items that provide the soldier a nutritionally balanced and complete individual meal. They are configured as individual meals, are ready to eat, and intended to be consumed on a basis of three meals per day when used exclusively. Individual operational rations are used whenever mission conditions dictate that group operational rations cannot be issued or prepared. These rations are designed to have a three year shelf life, support general purpose feeding requirements and offer variety and acceptability to serve the broad demographic profile of the military population.

Assault rations are mission specific individual rations intended to support unique military operations such as patrol or reconnaissance, high intensity combat operations, or specific environmental extremes including hot and cold weather and high altitude. These rations include restricted rations that are focused on reduced weight and cube. These rations are intended for shorter periods of use.

Individual packaged operational rations are designed for individual or small groups where the levels of activity, intensity of combat or unstable tactical situations preclude use of field kitchens. Such combat rations may be used exclusively in situations that clearly dictate their use in combat operations such as initial deployment, where the subsistence supply chain is not well established, in dispersed remote locations, in fighting positions or where other organized food service facilities are not possible.

Combat Feeding Directorate
Product Spotlight

MRE

A Lesson in Performance Nutrition

By Jeannette Kennedy, Combat Feeding Directorate and Cmdr. Connie Scott, Navy and Marine Corps Public Health Center

Warfighters eat them when they are deployed or in training. They are the Meals, Ready-to-Eat (MREs), and deployed service members have been relying on them for more than 30 years. MREs have come a long way since they first made their debut. Since research and development of the MRE began in 1959, the MRE has improved significantly, mainly due to feedback on satisfaction from warfighters, but also because of technological innovation, and improved understanding of performance-oriented nutrition and operational mission performance demands.

MREs today are designed to meet nutritional needs and satisfy our deployed warfighters' food preferences. The main goal of the food technologists at the Combat Feeding Directorate (CFD), tasked with developing and continuously improving MREs, is to maximize warfighter performance. New MREs are chosen based on three primary factors. First is warfighter feedback and acceptance. If an MRE doesn't get good feedback from service members, it gets cut. The CFD also uses feedback from service members to develop concepts for new flavors and food items.

The second factor is the nutritional content of those meals. All MREs need to meet the nutritional standards for operational rations, as determined by scientific evidence, and set forth by the Surgeon General (TSG), Department of the Army (DA). The Nutrition Standards for Operational Rations (NSORs) include requirements for numerous macronutrients, vitamins, and minerals, which act together to maintain health and achieve optimal performance. Those standards are designed to meet the increased nutritional needs and sustain optimal performance of service members in operational environments, be it combat or combat training (read: this means they are not ideal for date night). Each MRE provides approximately 1300 calories, composed of approximately 170 g of carbohydrates, 45 g of protein, and 50 g of fat for the energy needed to accomplish any mission. This balance of nutrients is necessary to ensure all the complex systems of the body are functioning properly.

The third factor is the shelf stability. The CFD tests MRE production items to ensure the nutritional content and sensory quality don't degrade too quickly, and continue to meet the performance-oriented nutrition needs of service members in the field over the entire shelf-life of the MRE. The minimum shelf-life of an MRE is a whopping 3 years at 80 degrees Fahrenheit, and 6 months at 100 degrees Fahrenheit. This shelf-life ensures that service members serving in remote areas can not only feed their hunger, but also get the nutrition they need to sustain peak performance, even if logistics prevent regular delivery of rations. If an MRE prototype passes all three criteria, CFD then presents its recommendations to the Joint Services Operational Ration Forum, for their decision on whether to give the approval for the new items.

Meeting the three criteria of an MRE is no easy task and requires leading-edge technology. For example, in order to meet the required shelf-life the food and its nutrients are preserved through leading-edge food science processing and packaging methods. The keys to maintaining nutritionally optimal rations and food safety over extended periods of time are to limit the food's exposure to light, oxygen, and moisture, all of which may deteriorate the food and its nutritional content. An example of these methods could be as simple as foil that creates a barrier to light and moisture. On the other hand, it could be as complex as a bakery item that includes an oxygen scavenger to minimize the impact oxygen might have on that bakery item, or a humectant which binds available water and keeps bakery products moist. Invariably, some degradation of the foods does occur over the shelf-life, but those degradations are taken into account to avoid nutritional deficiencies, maintain taste, and of course, maximize warfighter performance.

Improving the shelf-life of MREs is just one way food scientists at the CFD are using leading-edge technologies. CFD food scientists have been studying whether they can add performance-enhancing nutrition elements, like omega 3 fatty acids (a nutrient important for metabolism typically found in fish and some seed oils) into new MREs. The challenge with adding something like omega 3 fatty acids, is that over time you can get a fishy taste as the fatty acids in omega 3s break down. And no one wants to eat fishy chicken. However, the CFD scientists have figured out how to add it without that fishy taste! While this technology isn't being used yet (pending review of NSOR requirements), it could be the future of MREs and performance-oriented nutrition in the Services.

The CFD is also looking at ways to empower service members to take control of their nutritional needs, both at home and while deployed. They believe education is a key component of performance nutrition, and are currently striving to increase service members' awareness of the nutritional content of rations, and what service members actually need to consume to sustain peak-performance. One such way they are doing this is by collaborating with the DoD Nutrition Community and the U.S. Army Research Institute of Environmental Medicine, to update the nutrition education messages that accompany the MREs, and improve access to this information. In addition, CFD collaborated with the Human Performance Resource Center to develop a website that provides nutritional information at the component and menu level. The objective of the updates is to empower the warfighter to make appropriate performance-oriented nutrition choices. The nutrition education panels will soon focus on the role of nutrition to promote peak-performance and will also include nutritional needs information for when service members may be in extreme environments. These updated messages will be tested as early as the fall of this year.

INDIVIDUAL RATIONS:

MRE

Meal, Ready-to-Eat, Individual

PURPOSE

The Meal, Ready to Eat is the primary individual ration of the US Armed Forces. The balanced nutrition and low logistical burden of the MRE give America's Warfighters the ability to fight and win in any environment.

HISTORY

The MRE replaced the C-Ration in the early 1980s. Unlike previous ration concepts, each MRE is intended as a single meal. Based on feedback learned from annual field tests, the MRE has continuously improved in both form and function.

- Over 260 new ration items have been included since 1993.
- A Flameless Ration Heater (FRH) was introduced in 1993, allowing Warfighters to heat their meals without the need for bulky equipment or dangerous field expedients.
- Ergonomic beverage pouches allow Warfighters to mix and consume beverages more easily.

CHARACTERISTICS

- **Shelf Life:** Warfighters deserve food that is as appetizing in the field as it is in the factory. The MRE maintains its high quality for a guaranteed shelf life of 3 years at 80°F (27°C), or for 6 months at 100°F (38°C).
- **Logistics:** Durable packaging allows the MRE to be transported anywhere in the world. MREs can be safely airdropped by parachute, free-dropped from 100 feet, and subjected to rough handling and extreme temperature swings.

NUTRITIONAL DATA

The MRE satisfies the US Army OTSG strict requirements for nutrition in operational rations. Each MRE provides approximately 1300 calories, composed of 169 g of carbohydrates, 41 g of protein, and 50 g of fat for the energy needed to accomplish any mission.

CONTINUOUS IMPROVEMENT

Since 1993, potential improvements to the MRE have been tested by the Warfighters in realistic environments. Their input guides the development process and makes the MRE the best ration in the world. Nothing is added to the MRE without being approved by Warfighters in field testing.

CONTENTS

The MRE is issued in a durable tan plastic bag. Inside, each MRE provides an entrée, an assortment of sides and bakery items, beverage base powder, and an accessory pack that includes gum, tissue, a moist towelette, and seasoning. In addition, nearly all MREs include a FRH.

MRE 34 (2014)

MENU 1

Chili w/Beans, Corn Bread, Cheese Spread, Snack Bread, Ranger Bar, Carbohydrate Fortified Beverage, Ground Red Pepper

MENU 2

Shredded Barbeque Beef, Seasoned Black Beans, Pretzels, Jalapeno Cheese Spread, Tortilla, Nut Average, Carbohydrate Fortified Beverage, Barbeque Sauce

MENU 3

Chicken w/Noodles, Trans Fat Free Fudge Brownie, Cheese Spread, Plain Cracker, Nut Raisin Mix W/Choc Disks, Carbohydrate Electrolyte Beverage, Hot Sauce

MENU 4

Spaghetti w/Meat Sauce, Peanut Butter, Multigrain Snack Bread, Dried Fruit, Candy III, Carbohydrate Fortified Beverage, Jelly/Jam

MENU 5

Tomato & Feta Chicken, First Strike Bar, Jalapeno Cheese Spread, Vegetable Cracker, Dried Fruit, Candy II, Carbohydrate Electrolyte Beverage

MENU 6

Beef Taco Filling, Wet Pack Fruit, Filled Crackers, Peanut Butter, Tortilla, Jelly/Jam, Carbohydrate Electrolyte Beverage, Seasoning Blend

MENU 7

Beef Brisket, Garlic Mashed Potatoes, Cookie, Peanut Butter, Snack Bread, Jelly/Jam, Candy I, Cappuccino, Irish Cream, Butter Granules

MENU 8

Meatballs w/Marinara, Au Gratin Potatoes, First Strike Bar, Jalapeno Cheese Spread, Tortilla, Beef Snacks, Carbohydrate Fortified Beverage

MENU 9

Beef Stew, Nut Raisin Mix, Peanut Butter, Multigrain Snack Bread, Jelly/Jam, Pretzels, Chocolate Hazelnut Cocoa, Hot Sauce

MENU 10

Chili And Macaroni, Trans Fat Free Pound Cake, Jalapeno Cheese Spread, Plain Cracker, Candy III, Carbohydrate Electrolyte Beverage, Ground Red Pepper

MENU 11

Vegetarian Taco Pasta, Wet Pack Fruit, Cookie, Chunky Peanut Butter, Plain Cracker, Candy I, French Vanilla Cappuccino, Hot Sauce

MENU 12

Spicy Penne Pasta, Toaster Pastry, Chocolate Peanut Spread, Snack Bread, Instant Pudding, Pretzels, Carbohydrate Electrolyte Beverage, Hot Sauce

MENU 13

Cheese Tortellini, Wet Pack Fruit, First Strike Bar, Peanut Butter, Plain Cracker, Candy II, Carbohydrate Electrolyte Beverage, Hot Sauce

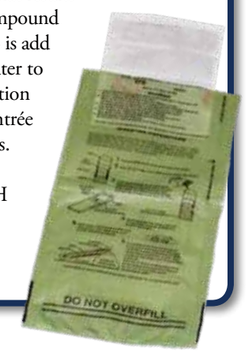
MENU 14

Ratatouille, Trans Fat Free Pound Cake, Peanut Butter, Plain Cracker, Dried Fruit, Trans Fat Free Dairyshake, Hot Sauce

MRE FOOD FACT:

What is an FRH?

Because of the importance of providing hot meals to Warfighters, a Flameless Ration Heater (FRH) has been included in most MRE menus since 1993. The idea behind the FRH is to produce heat using the oxidation of metal. In an FRH, heat is produced by an exothermic chemical reaction that results from exposing a magnesium-iron compound to water. All a Warfighter needs to do is add approximately 1 oz. (29.6 mL) of water to the FRH bag, and the chemical reaction raises the temperature of an MRE entrée by 100˚F (37.8˚C) in 10-15 minutes. The Hot Beverage Bags included in MREs can also be placed in the FRH in order to produce a hot drink!



MENU 15

Mexican Style Chicken Stew, Wet Pack Fruit, Filled Pretzels, Cheese Spread, Vegetable Cracker, Candy II, Carbohydrate Fortified Beverage, Ground Red Pepper

MENU 16

Boneless Pork Rib, Santa Fe Style Rice And Beans, Beef Snacks, Peanut Butter, Twin Pack Wheat Snack Bread, Jelly/Jam, Caffeine Mints, Carbohydrate Fortified Beverage, Barbeque Sauce

MENU 17

Maple Sausage, Maple Muffin Top, Cheese Spread, Plain Cracker, Nut Raisin Mix, Sugar Free Beverage Base, Orange w/Vitamin C, Table Syrup

MENU 18

Beef Ravioli In Meat Sauce, Bacon Cheese Spread, Snack Bread, Corn Nuts, Dried Fruit, Carbohydrate Fortified Beverage, Hot Sauce

MENU 19

Jalapeno Pepperjack Beef Patty, Cherry And Blueberry Cobbler, Cookie, Cheese Spread, Twin Pack Wheat Snack Bread, Ketchup, Mustard, Cocoa

MENU 20

Pork Sausage w/Gravy, Granola w/Fruit, Chocolate Banana Muffin Top, Cheese Spread, Plain Cracker, Carbohydrate Fortified Beverage

MENU 21

Lemon Pepper Tuna, Trans Fat Free Pound Cake, Fat Free Mayo, Tortilla, Nut Average, Baked Snack Cracker, Trans Fat Free Dairyshake, Seasoning Blend

MENU 22

Asian Sytle Beef Strips w/ Peppers, Fried Rice, Chunky Peanut Butter, Snack Bread, Jelly/Jam, Candy I, Cocoa

MENU 23

Chicken Pesto Pasta, Patriotic Cookie, Cheese Spread, Italian Bread Sticks, Filled Bakery, Carbohydrate Electrolyte Beverage, Ground Red Pepper

MENU 24

Southwest Beef And Black Beans, Spiced Apples, Toaster Pastry, Cheese Spread, Chipotle Tortilla, Turkey Snacks, Mocha Cappuccino

MRE FOOD FACT:

Kicking It Up A Notch

Introduced in 2011, the hot sauce pouch is lighter and more durable than the miniature bottle it replaces.

MRE 35 (2015)

MENU 1

Chili w/Beans, Corn Bread, Cheese Spread, Vegetable Cracker, Trans Fat Free Fudge Brownie, Carbohydrate Fortified Beverage

MENU 2

Shredded Barbeque Beef, Seasoned Black Beans, Toasted Corn Kernels, Jalapeno Cheese Spread, Tortilla, Carbohydrate Fortified Beverage, Barbeque Sauce

MENU 3

Chicken w/Noodles, Beef Snacks, Cheese Spread, Plain Cracker, Nut Raisin Mix, Candy I, Carbohydrate Fortified Beverage, Hot Sauce

MENU 4

Spaghetti w/Meat Sauce, Baked Snack Cracker, Peanut Butter, Multigrain Snack Bread, Dried Fruit, Cocoa, Jelly/Jam

MENU 5

Diced Chicken, First Strike Bar, Jalapeno Cheese Spread, Tortilla, Dried Fruit, Candy II, Carbohydrate Electrolyte Beverage, Buffalo Sauce

MENU 6

Beef Taco Filling, Spiced Apples, Instant Pudding, Peanut Butter, Tortilla, Jelly/Jam, Carbohydrate Electrolyte Beverage, Seasoning Blend

MENU 7

Beef Brisket, Garlic Mashed Potatoes, Cookie, Peanut Butter, Snack Bread, Jelly/Jam, Irish Cream Cappuccino

MENU 8

Meatballs w/Marinara, Au Gratin Potatoes, Trans Fat Free Pound Cake, Jalapeno Cheese Spread, Snack Bread, Beef Snacks, Carbohydrate Fortified Beverage

MENU 9

Beef Stew, Nut Raisin Mix W/ Choc Disks, Peanut Butter, Multigrain Snack Bread, Jelly/Jam, Pretzels, Carbohydrate Electrolyte Beverage, Hot Sauce

MENU 10

Chili And Macaroni, Trans Fat Free Pound Cake, Cheese Spread, Plain Cracker, Beef Snacks, Candy III, Carbohydrate Fortified Beverage, Ground Red Pepper

MENU 11

Vegetarian Taco Pasta, Wet Pack Fruit, Cookie, Chunky Peanut Butter, Plain Cracker, Nut Average, Candy I, French Vanilla Cappuccino, Hot Sauce, Chili Lime

MENU 12

Spicy Penne Pasta, First Strike Bar, Chocolate Peanut Spread, Snack Bread, Nut Raisin Mix, Carbohydrate Electrolyte Beverage, Hot Sauce

MENU 13

Cheese Tortellini, Instant Pudding, Peanut Butter, Plain Cracker, Candy II, Carbohydrate Electrolyte Beverage Base, Hot Sauce

MENU 14

Ratatouille, Wet Pack Fruit, Peanut Butter, Plain Cracker, Nut Raisin Mix, Trans Fat Free Dairyshake, Hot Sauce

MENU 15

Mexican Style Chicken Stew, Wet Pack Fruit, Filled Pretzels, Peanut Butter, Vegetable Cracker, Candy II, Chocolate Hazelnut Cocoa, Ground Red Pepper

MENU 16

Boneless Pork Rib, Santa Fe Style Rice And Beans, Ranger Bar, Peanut Butter, Twin Pack Wheat Snack Bread, Jelly/Jam, Cocoa, Barbeque Sauce

MENU 17

Maple Sausage, Maple Muffin Top, Cheese Spread, Plain Cracker, Nut Raisin Mix, Electrolyte Beverage Base, Table Syrup

MENU 18

Beef Ravioli In Meat Sauce, Toaster Pastry, Jalepeno Cheese Spread, Snack Bread, Dried Fruit, Beef Snacks, Carbohydrate Fortified Beverage, Hot Sauce

MENU 19

Jalapeno Pepperjack Beef Patty, Cherry And Blueberry Cobbler, Bacon Cheese Spread, Twin Pack Wheat Snack Bread, Nut Raisin Mix, Candy III, Carbohydrate Fortified Beverage, Ketchup/Mustard

MENU 20

Hash Brown Potatoes w/Bacon, Granola w/Fruit, Chocolate Banana Muffin Top, Cheese Spread, Plain Cracker, Beef Snacks, Sugar Free Beverage Base, Orange w/Vitamin C

MENU 21

Lemon Pepper Tuna, First Stirke Bar, Cheese Spread, Tortilla, Filled Crackers, Trans Fat Free Dairyshake, Fat Free Mayo

MENU 22

Asian Sytle Beef Strips w/ Peppers, Fried Rice, Cookie, Chunky Peanut Butter, Snack Bread, Jelly/Jam, Carbohydrate Fortified Beverage

MENU 23

Chicken Pesto Pasta, Patriotic Cookie, Cheese Spread, Italian Bread Sticks, Nut Average, Filled Bakery, Carbohydrate Electrolyte Beverage

MENU 24

Southwest Beef And Black Beans, Wet Pack Fruit, Trans Fat Free Pound Cake, Cheese Spread Chipotle Tortilla, Turkey Snacks, Mocha Cappuccino

MRE FOOD FACT:

Starting in 2014, each MRE menu appears in both English and French (the 2 NATO official languages) on the meal bag. Also, "Meal, Ready to Eat" will appear in both languages on the shipping container. The benefits that this change provides include: 1) sustaining and bolstering the international reputation of the MRE among coalition forces; 2) supporting interoperability and standardization objectives in joint alliance and coalition operations; 3) offering potential benefits for US ration assemblers as NATO Maintenance and Supply Agency expands DLA support to NATO customers.

MRE 36 (2016)

MENU 1

Chili W/ Beans, Trans Fat Free Corn Bread, Cheddar Cheese Spread, Trans Fat Free Crackers, Cheese Filled Snack Food, Carbohydrate Fortified Beverage Powder

MENU 2

Shredded Barbeque Beef, Seasoned Black Beans, Jalapeno Cheddar Cheese Spread, Trans Fat Free Tortillas, Infused and Dried Fruits, Carbohydrate Fortified Beverage Powder, Barbeque Sauce

MENU 3

Chicken w/Egg Noodles & Vegetables, Wet Pack Fruits, Peanut Butter, Trans Fat Free Cracker, Jelly/Jam, Candy, Carbohydrate Electrolyte Beverage Powder, Hot Sauce

MENU 4

Spaghetti w/ Beef and Sauce, Toaster Pastry, Peanut Butter, Trans Fat Free Multigrain Snack Bread, Infused and Dried Fruits, Fortified Cocoa Beverage Powder, Jelly/Jam

MENU 5

Chili and Macaroni, Trans Fat Free Pound Cake, Jalapeno Cheddar Cheese Spread, Trans Fat Free Crackers, Beef Snacks, Candy, Carbohydrate Electrolyte Beverage Powder, Crushed Red Pepper Spice

MENU 6

Beef Taco, Wet Pack Fruits, Cheddar Cheese Spread, Trans Fat Free Tortillas, Nuts and Raisins w/ Chocolate Discs, Carbohydrate Electrolyte Beverage Powder, Seasoning Blend Spice

MENU 7

Brisket Entrée, Au Gratin Potatoes, Trans Fat Free Cookies, Peanut Butter, Trans Fat Free Snack Bread, Jelly/Jam, Candy, Irish Cream Cappuccino Drink Mix

MENU 8

Meatballs in Marinara Sauce, Garlic Mashed Potatoes, Trans Fat Free Cookies, Jalapeno Cheddar Cheese Spread, Trans Fat Free Italian Bread Sticks, Beef Snacks, Carbohydrate Fortified Beverage Powder

MENU 9

Beef Stew, Fudge Brownie, Peanut Butter, Trans Fat Free Multigrain Snack Bread, Jelly/ Jam Pretzels, Carbohydrate Electrolyte Beverage Powder, Hot Sauce

MENU 10

Chicken Chunks, Trans Fat Free First Strike Bar, Cheddar Cheese Spread, Trans Fat Free Tortilla, Candy, Carbohydrate Fortified Beverage Powder, Hot Sauce, Buffalo Style

MENU 11

Veggie Crumbles w/ Pasta in Taco Style Sauce, Wet Pack Fruits, Trans Fat Free First Strike Bar, Chunky Peanut Butter, Trans Fat Free Crackers, Nuts, French Vanilla Cappuccino Drink Mix, Chili Lime Hot Sauce

MENU 12

Elbow Macaroni and Tomato Sauce, Cheese Spread, Trans Fat Free Snack Bread, Nuts and Raisins, Candy, Chocolate Protein Beverage Base, Hot Sauce

MENU 13

Cheese Tortellini in Tomato Sauce, Dessert Powder, Peanut Butter, Trans Fat Free Crackers, Nuts & Raisins, Carbohydrate Electrolyte Beverage Powder, Hot Sauce

MENU 14

Spinach Mushrooms & Cream Sauce Fettuccine, Trans Fat Free First Strike Bar, Peanut Butter, Trans Fat Free Crackers, Pretzels, Chocolate Protein Beverage Base, Hot Sauce

MENU 15

Maple Pork Sausage Patty, Trans Fat Free Maple Muffin Top, Peanut Butter, Trans Fat Free Crackers, Nuts, Table Syrup, Carbohydrate Electrolyte Beverage Powder

MENU 16

Rib Shaped BBQ Pork Patty, Santa Fe Style Rice and Beans, Trans Fat Free Ranger Bar, Peanut Butter, Trans Fat Free Wheat Snack Bread Twin Pack, Jelly/Jam, Carbohydrate Fortified Beverage Powder, BBQ Sauce

MENU 17

Mexican Style Chicken Stew, Wet Pack Fruits, Cheese Filled Snack Food, Jalapeno Cheddar Cheese Spread, Trans Fat Free Vegetable Crackers, Candy, Chocolate Hazelnut Cocoa Beverage Powder, Crushed Red Pepper Spice

MENU 18

Beef Ravioli in Meat Sauce, Trans Fat Free Muffin Top Chocolate Banana, Cheddar Cheese Spread, Trans Fat Free Wheat Snack Bread, Meat Snack, Carbohydrate Fortified Beverage Powder, Hot Sauce

MENU 19

Grilled Jalapeno Pepper Jack Beef Patty, Cherry Blueberry Cobbler, Trans Fat Free Cookies, Cheddar Cheese Spread, Bacon, Trans Fat Free Twin Pack Wheat Snack Bread, Nuts, Carbohydrate Fortified Beverage Powder, Ketchup/ Mustard

MENU 20

Hash Brown Potatoes W/ Bacon, Peppers, and Onions, Granola w/ Milk and Blueberry, Cheddar Cheese Spread, Trans Fat Free Crackers, Nuts & Raisins, Non-Nutr Swtnr Ornge Fortified Beverage Base

MENU 21

Lemon Pepper Tuna, Trans Fat Free Pound Cake, Chocolate Peanut Butter, Trans Fat Free Tortillas, Snack Food, Carbohydrate Fortified Beverage Powder, Fat Free Mayo

MENU 22

Asian Style Beef Strips w/ Vegetables, Fried Rice Chunky Peanut Butter, Trans Fat Free Snack Bread, Jelly/Jam, Candy, Chocolate Cocoa Bev Powder

MENU 23

Chicken Pesto Pasta, Filled Bakery Item, Trans Fat Free Patriotic Sugar Cookies, Cheddar Cheese Spread, Trans Fat Free Snack Bread, Carbohydrate Electrolyte Beverage Powder

MENU 24

Southwest Beef and Black Beans, Spiced Apples, Trans Fat Free Pound Cake, Cheddar Cheese Spread, Trans Fat Free Chipotle Tortillas, Meat Snack, Mocha Cappuccino Drink Mix

MRE 37 (2017)

IN:	OUT:
Pepperoni Pizza	Pork Rib
Chicken Burrito Bowl	Chicken Pesto Pasta
Honey Wheat Bagel Thin	Fried Rice
Recovery Trail Mix	Wheat Snack Bread Twin Pack
Teriyaki Meat Stick	Turkey Nugget
Increase Wet Pack Fruit, Pound Cake, and Cookie	Raisin Nut Mix
Reduce Cheese & PB to 1 oz	Fudge Brownie
	Ranger Bar

Modular Operational Ration Enhancement

Developed to deal with the demands of extreme environments

By Joseph Zanchi and Alexandra Foran, U.S. Army NSRDEC / NATICK, Mass. (March 10, 2014)

Warfighters in extreme, demanding operational environments need additional sustenance to complete their missions successfully — they simply need MORE.

In this case, MORE is the Modular Operational Ration Enhancement, developed by the U.S. Army Natick Soldier Research Development and Engineering Center's Combat Feeding Directorate as a direct result of requests from deployed warfighters.

"We received feedback from the field that some warfighters were losing weight and they needed extra calories," said Julie Smith, a Combat Feeding Directorate, or CFD, senior food technologist.

Smith, along with Jim Lecollier, chief of the Individual Rations Branch, Defense Logistics Agency Troop Support, worked with their respective teams from 2008 through 2013 to develop the MORE family of ration supplements specifically to meet this need.

MORE provides additional nutrition to warfighters operating in high-stress environments when their caloric requirements exceed those provided by their daily operational rations. MOREs are designed to augment the Meal, Ready-to-Eat, or MRE, First Strike Ration, or FSR, and Meal, Cold Weather/Long Range Patrol, as well as the family of Unitized Group Rations.

The MRE satisfies the Army surgeon general's strict requirements for nutrition in operational rations. Each MRE provides approximately 1,300 calories. An FSR, which replaces three MREs, has an average of 2,900 calories per ration. The MORE has an average of 1,110 calories per package.

Army Regulation 40-25, "Nutrition Standards and Education," a joint regulation of the surgeons general of the Army, Navy and Air Force, establishes nutritional standards, termed "military dietary reference intakes," for military feeding. Among these are nutritional standards for operational rations and restricted rations.

When warfighters conduct dismounted operations in challenging terrain, carrying more than 100 pounds of equipment up and down the mountains of Afghanistan with elevations as high as 12,000 feet, they can burn significantly more calories than when operating at sea level.

The MOREs are designed to provide the additional calories and nutrients to supplement their MREs or FSRs and give them the nutrition they need.

MORE, HOT AND COLD

Currently, there are two types of MOREs targeted for the different extremes of operational environments — high altitude and cold weather, and hot weather. Each type has three different varieties, for a total of six different MORE packs.

CFD collaborated with the U.S. Army Research Institute of Environmental Medicine to understand the unique nutritional needs of warfighters in these operational environments, said Smith.

"We reviewed literature and conducted focus groups to identify food preferences of warfighters when conducting missions in high altitude and cold weather, and hot weather environments."

Three MREs a day provide warfighters with a minimum of 3,600 calories, satisfying their nutritional needs for most missions.

"However, there are some instances during exceptionally heavy activity where warfighters will need between 4,500 and 6,000 calories per day," said Smith. MORE provides that additional nutritional "oomph," giving warfighters approximately 1,000 extra calories in a balance of carbohydrates, caffeine, electrolytes and vitamins for these operational environments.

The first MORE enhancement pack developed by CFD was the MORE — High Altitude/Cold Weather. At the time, military service representatives tasked CFD to develop an enhancement pack to counter weight loss and fatigue, and to improve the cognitive and physical performance of warfighters operating in the mountainous terrain of Afghanistan. Increased energy requirements during high-altitude operations, coupled with symptoms of acute mountain sickness, made this a challenging requirement to meet.

Acute mountain sickness, with symptoms including anoxia, headache, nausea and vomiting, is caused by reduced air pressure and lower oxygen levels at high altitudes. The faster you climb to a high altitude, the more likely you are to get acute mountain sickness.

"The MORE is designed to be high in carbohydrates to combat acute mountain sickness. Research has shown that consuming a diet high in carbohydrates can lower the symptoms," Smith said.

In hot weather environments, hydration is particularly important, which is why the MORE — Hot Weather includes two carbohydrate-and-electrolyte beverages. These two drinks are similar to sports drinks, providing not only pure energy in the form of carbohydrate, but also electrolytes such as potassium and sodium that warfighters sweat out. The electrolyte beverages are energy gels that come in mixed berry, orange and lemon-lime flavors. The carbohydrate beverages come in mixed berry, fruit punch and lemon-lime flavors.

MORE RESEARCH, TEST AND DESIGN

During the course of research and development on MORE, CFD conducted several focus groups and field evaluations. NSRDEC's Operational Forces Integration Group and the Consumer Research Team collected feedback and input. Small focus groups involved warfighters from the 10th Mountain Division's Light Fighter School at Fort Drum, NY, units that had deployed to Afghanistan and Army medical personnel.

Additional component selection and survey participation on the design selection, acceptability, convenience and benefit involved warfighters from the U.S. Army Mountain Warfare Training School at Camp Ethan Allen, Vt., and the Connecticut National Guard?'s 1st Battalion, 102nd Infantry Regiment Mountain Training Group.

CFD received an urgent-need request from the U.S. Army Special Operations Command in 2009 for 10,000 units of MORE — High Altitude/Cold Weather to support the increase in troops deployed to Afghanistan.

MORE — Hot Weather prototypes were field-tested with the 75th Ranger Regiment at the Pre-Ranger Course at Fort Benning, Ga. MORE prototypes were also provided to special operations forces during high-altitude training in Colorado; deployed units of Combined Joint Task Force 82 in Afghanistan; and to Engineer and National Guard Scout units at Bagram Airfield, Afghanistan, during Operation Enduring Freedom.

"We assessed results from individual ration field evaluations to identify ration components with the highest acceptability and consumption rates," said Smith. "Feedback from warfighters indicated they preferred ration components that were easy-to-consume, eat-on-the-go, snack-type foods, rather than meals that would require time to heat and prepare."

Each pack is calorically dense and weighs only three quarters of a pound. Packs are filled with popular items including caffeinated pudding, energy gels, carbohydrate-enhanced beverages, First Strike bars, nut mixes, crackers, caffeinated gum and Zapplesauce, which is applesauce fortified with maltodextrin, an energy-dense carbohydrate and a source of energy to help maintain physical performance.

"Zapplesauce and First Strike bars provide the warfighter with essential complex carbohydrate," said Smith. Each food item serves a specific purpose for the warfighter. As with other operational rations, the goal is for the warfighter to consume every item to meet appropriate caloric needs.

AWARD-WINNING WORK

For their work in developing MORE, Smith and Lecollier received the prestigious Col. Rohland A. Isker Award in 2013 for leading their respective teams in developing, transitioning, acquiring and fielding MORE. The award is an annual honor from the Research and Development Associates for Military Food and Packaging, better known as R&DA, to recognize civilian employees of the federal government or military personnel for outstanding contributions to national preparedness. Isker, a pioneer in Army food service research and development, founded R&DA in 1946.

"Our review board at R&DA felt the MORE project and the ultimate fielding of the ration supplement itself had the most beneficial impact on warfighters (Soldiers, Marines and special operators) of any recently introduced operational ration product," said John McNulty, executive director of R&DA.

"MORE met a very compelling need to introduce much-needed calories and other nutrients into the diets of these warfighters during particularly stressful situations on the battlefield during extreme weather conditions. It was a success story that worked and received very high accolades from the field," McNulty said.

MORE also provides warfighters with important enhancements to improve mental alertness and physical endurance and, like all CFD products, is "Warfighter Recommended, Warfighter Tested, and Warfighter Approved."

Combat Feeding Directorate

ASSAULT RATIONS:

Modular Operational Ration Enhancement (MORE)

The Modular Operational Ration Enhancement (MORE) was developed to augment daily operational rations with additional components tailored to particular environments. There are two types of MORE; one targets high altitude and cold weather while the other is intended for hot weather operations.

PURPOSE

Warfighters in extreme environments, such as cold weather, high altitude, or elevated temperature, require extra calories beyond the standard operational rations in order to combat weight loss and decreased physical and cognitive abilities. The MORE provides the correct amount of extra calories for these specific environmental scenarios with the right balance of fat, carbohydrate, and protein. By augmenting the MRE or FSR with additional calories and nutrients, the Warfighter is capable of performing at maximum capacity in extreme environments. The MORE is not a replacement to the MRE or FSR; it is a scientifically balanced addition that ensures peak performance in even the most austere battlefield locations.

TECHNOLOGY

MORE components are calorically dense and carry a balance of carbohydrates, caffeine, electrolytes, vitamins, antioxidants, and amino acids. The MORE includes food components that are essential to improving the mental and physical abilities of Warfighters in demanding, extreme conditions.

CHARACTERISTICS

- The MORE-High Altitude/Cold Weather and MORE-Hot Weather are composed of developmental and commercial items, including caffeinated pudding, energy gels, carbohydrate-enhanced beverages, First Strike bars, carbohydrate-dense nut mixes, crackers, caffeinated gum and Zapplesauce®. Drink powders are issued in easy-to-use pouches hour-glass pouches. The MORE has a shelf life of 2 years at 80°F.
- All components are lightweight, low cube, can be eaten on the move without preparation, and are easy to consume and digest. The MORE is lightweight and compact, providing only the enhancements most critical to maintaining Warfighter mental awareness and physical stamina.
- The MORE-High Altitude/Cold Weather and MORE-Hot Weather are currently available for procurement through DLA-Troop Support.

MORE – HIGH ALTITUDE/ COLD WEATHER

Weight Per Pack: 0.75 lbs/.34 kg

Procurement Data: 24/case

NSN: 8970-01-581-2505

PACK 1

Caffeinated chocolate pudding, Nut and fruit mix (Type I), Toaster pastry, Energy gel (wild berry), Cheese filled pretzels

Nutrition: 1160 cal, 162 g carb, 20 g pro, 48 g fat

PACK 2

First Strike bar (chocolate), Nut and fruit mix (Type II), Toasted corn kernels, Energy gel (lemon lime), Carbohydrate fortified beverage, Beef jerky, Caffeinated gum

Nutrition: 1340 cal, 194 g carb, 30 g pro, 49 g fat

PACK 3

Cracker, Cheddar potato bacon soup spread, Zapplesauce®, Baked snack cracker, Mini First Strike bar (mocha), Carbohydrate fortified beverage

Nutrition: 1130 cal, 164 g carb, 14 g pro, 46 g fat

MORE – HOT WEATHER

Weight Per Pack: 0.75 lbs/.34 kg

Procurement Data: 24/case

NSN: 8970-01-599-4327

PACK 1

Caffeinated chocolate pudding, Dried cranberries, Energy gel (mixed berry), Cheddar cheese filled pretzels, Carbohydrate electrolyte beverage (×2)

Nutrition: 1000 cal, 200 g carb, 7.5 g pro, 19 g fat

PACK 2

First Strike bar (chocolate), Zapplesauce®, Energy gel (lemon lime), Smoked almonds, Caffeinated gum (peppermint), Carbohydrate electrolyte beverage (×2)

Nutrition: 910 cal, 168 g carb, 7 g pro, 23 g fat

PACK 3

Mini First Strike bar (mocha w/caffeine), Cinnamon Zapplesauce®, Energy gel (orange), Nut and fruit mix (Type III), Toasted corn kernels, Carbohydrate electrolyte beverage (×2)

Nutrition: 1030 cal, 185 g carb, 10 g pro, 27 g fat

ASSAULT RATIONS:

FIRST STRIKE RATION® (FSR)

PURPOSE

The FSR is a compact, eat-on-the-move assault ration designed for high intensity combat operations. The FSR is substantially lighter and more compact than the Meal, Ready to Eat, enhancing Warfighter consumption, nutritional intake, and mobility.

HISTORY

The FSR was designed to improve tactical mobility by lightening the load of the joint Warfighter during combat operations. It was developed to meet the needs of Warfighters in Iraq and Afghanistan, particularly during multi-day operations without logistical support. The First Strike Ration® was fielded in 2008, and has been extensively tested in combat and received positive feedback.

TECHNOLOGY

The FSR utilizes advancements in food processing, preservation, nutrient delivery, and packaging technologies, including intermediate moisture formulations, glucose optimization, and novel packaging materials and configurations.

CHARACTERISTICS

- **Enhanced Mobility:** All components of this lightweight ration are familiar, eat-out-of-hand foods that require little or no preparation by the Warfighter. Innovative packaging technologies enable the beverages to be reconstituted and consumed directly from the drink pouch.
- **Shelf Life:** Warfighters deserve food that is as fresh tasting in the field as the day it was made. The FSR has a shelf life of 24 months at 80°F (27°C).
- **Nutrition:** The FSR provides 24 hour fuel for Warfighters on the move. Each menu provides an average of 2900 calories per day, nutritionally balanced with 14% protein, 34% fat, and 52% carbohydrate.
- **Logistics:** A single FSR provides a day's worth of subsistence at approximately 50% the weight and volume of 3 Meals, Ready to Eat. FSR is issued 9 menus per case.

CONTINOUS IMPROVEMENT

The FSR is nutritionally optimized for Warfighter performance. Like the entire family of combat rations, the FSR is part of a continuous product improvement program based on Warfighter feedback. In 2015, the FSR is expanding from 3 to 9 menus, including over 40 new items.

ASSAULT RATIONS: FSR MENUS

MENU 1

Filled French toast, Bacon cheddar pocket sandwich, Pepperoni pocket sandwich, Jalapeño cheese spread, Wheat snack bread (twin pack), Pretzel sticks, Mini First Strike bar (chocolate), Dessert bar (peanut butter), Sweet BBQ beef snack,Teriyaki beef snack, Cinnamon Zapplesauce®, Nut and fruit mix (Type III), Carbohydrate fortified beverage, Chocolate protein drink, Caffeinated gum (cinnamon), Sugar free beverage

MENU 2

Toaster pastry (brown sugar/cinnamon), Italian pocket sandwich, Chunk chicken, Tortillas, Peanut butter spread, Crackers, Mini First Strike bar (apple cinnamon), Dried cranberries, Dessert bar (mocha), Sweet BBQ beef snack, Teriyaki beef snack, Smoked almonds, Zapplesauce®, Carbohydrate fortified beverage (×2), Caffeinated gum (peppermint), BBQ sauce, Hot sauce, Sugar free beverage

MENU 3

Lemon poppyseed pound cake, BBQ beef pocket sandwich, Lemon pepper tuna, Tortillas, Cheese spread, Crackers, Mini First Strike bar (mocha), Mini First Strike bar (cran raspberry), Dessert bar (chocolate banana nut), Toasted corn kernels, Nut and fruit mix (Type III) , Zapplesauce®, Carbohydrate fortified beverage (×2), Caffeinated mints, Fat free mayonnaise, Hot sauce, Instant coffee, Non-dairy creamer, Sugar

MENU 4

Cinnamon bun, Mexican beef wrap, BBQ chicken breast, Dessert bar (peanut butter), Wheat snack bread (twin pack), Jalapeño cheese spread, Cranberry beef snack, Zapplesauce®, Mini First Strike bar (mocha), Energy gel (mixed berry), Cheddar filled pretzels, Raisins, Carbohydrate fortified beverage (×2), Caffeinated gum (cinnamon), Hot sauce, Instant coffee, Non-dairy creamer, Sugar

MENU 5

Toaster pastry (brown sugar/cinnamon), Filled French toast, BBQ chicken pocket sandwich, Mango chipotle salmon, Crackers, Peanut butter spread, Toasted corn kernels, Turkey snack, Nut and fruit mix (Type II), Mini First Strike bar (cranraspberry), Energy gel (mixed berry), Cinnamon Zapplesauce®, Carbohydrate fortified beverage, Chocolate protein drink, Caffeinated mints

MENU 6

Apple turnover, BBQ pork wrap, Garlic & herb chicken breast, Cheese spread, Plain bagel, Cranberry beef snack, Dried cranberries, Cheddar filled pretzels, Mini First Strike bar (apple cinnamon), Dessert bar (mocha), Caffeinated chocolate pudding, Hot sauce, Carbohydrate fortified beverage, Strawberry-banana dairy shake, Caffeinated gum (peppermint)

MENU 7

Blueberry turnover, Nacho beef stick pocket sandwich, Sweet & spicy tuna, Wheat snack break (twin pack), Hot & spicy baked cheddar crackers, Fat free mayonnaise, Nut and fruit mix (Type III), Turkey snack, Cheddar potato bacon spread, Crackers, Mini First Strike bar (chocolate), Mini First Strike bar (apple cinnamon), Zapplesauce®, Carbohydrate fortified beverage (×2), Caffeinated gum (cinnamon), Instant coffee, Non-dairy creamer, Sugar

MENU 8

BBQ chicken pocket sandwich, Albacore tuna, Filled French toast, Plain bagel, Cheddar filled crackers, Mini First Strike bar (mocha), Sweet BBQ beef snack, Teriyaki beef snack, Cinnamon Zapplesauce®, Nut and fruit mix (Type II), Chocolate banana nut dessert bar, Vanilla dairy shake, Carbohydrate fortified beverage, Caffeinated gum (peppermint), Fat free mayonnaise, Instant coffee, Non-dairy creamer, Sugar

MENU 9

Italian pocket sandwich, Garlic & herb chicken breast, Cinnamon bun, Tortillas, Cheddar potato bacon spread, Crackers, Mini First Strike bar (cranraspberry), Cranberry beef snack, Caffeinated chocolate pudding, Raisins, Toasted corn kernels, Carbohydrate fortified beverage, Vanilla dairy shake, Caffeinated mints, Sugar free beverage

NOTE: All beverages are powder

ASSAULT RATIONS:

Meal, Cold Weather/Food Packet, Long Range Patrol (MCW/LRP)

PURPOSE

The Meal, Cold Weather (MCW) and the Food Packet, Long Range Patrol (LRP) are designed to meet the unique requirements of the United States Marine Corps (USMC) and Army Special Operations Forces (SOF). These specialized forces require appropriate nutritional and operational characteristics for extreme cold environments, as well as a restricted calorie ration with a long shelf life that can be used during initial assault, special operations, and long-range reconnaissance missions.

HISTORY

MCW and LRP are descendants of the original Long Range Patrol ration, introduced during the Vietnam era. Both rations reentered production early in Operation Enduring Freedom, as Warfighters operating in extreme environments requested a ration that was lightweight, freeze-resistant, and energy-rich.

CHARACTERISTICS

- **Shelf Life:** The shelf life is a minimum of three years at 80°F (27°C) and six months at 100°F (38°C), but significantly extended shelf life for the entrée has been demonstrated in storage tests. The MCW is packed in a white meal bag and the LRP in a tan colored bag.
- **Logistics:** Each MCW/LRP weighs approximately 1 lb (.5 kg), with a volume of .04 ft^3 (10 dm^3). The ration is issued in cases of 12; each case weighs approximately 15 lbs (7 kg). Preparation requires 28-40 fl oz of potable water, as well as a heat source.

NUTRITIONAL DATA

Each ration provides an average of 1560 calories, composed of 52 g of protein, 58 g of fat and 221 g of carbohydrates. Three MCW's per day provides the minimum 4500 calories required for heavy exertion in extreme cold. Limits on protein and sodium help to reduce risk of dehydration in cold weather environments, and additional powdered beverages also encourage hydration. The LRP is a restricted calorie ration approved for use for up to 10 days, when 1 ration is issued per day.

CONTENTS

Both rations include dehydrated components, which reduces weight while mitigating the risk of frozen rations during cold weather operations. Other components include spreads, crackers, cookies, sports bars, nuts, candy, powdered beverages, accessory packet, and spoon. All powdered beverages are packaged in a drink pouch for ease of consumption.

CONTINUOUS IMPROVEMENT

The MCW/LRP is part of the Assault Special Purpose Ration Improvement Project. Although the ration is designed for the Joint Service requirements of the Marine Corps and SOF, it can be utilized by other services that require a ration for extreme cold environments or long-range missions. The MCW/LRP is continuously improved to remove less acceptable components and replace them with new highly acceptable Warfighter tested and approved components. In 2011, the Joint Services approved the use of tan colored packaging in place of white colored packaging for all MCW ration components.

- **Meal, Cold Weather Accessory Pack contains:** Coffee, cream, sugar, gum, toilet tissue, hand cleaner, hot sauce, and matches
- **Food Packet Long Range Patrol Accessory Pack contains:** Coffee, cream, sugar, iodized salt, gum, 2 toilet tissues, hand cleaner, hot sauce, and matches
- **Nut & Fruit Mix Type 1:** Nuts & raisins

  Nut & Fruit Mix Type 2: Nuts, raisins w/ pan-coated chocolate disks

  Nut & Fruit Mix Type 3: Nuts w/raw sunflower seeds and infused fruit
- **NOTE:** All beverages are powder and all entrées are freeze-dried

MCW/LRP

MENU 1

Spicy Oriental chicken w/rice, Fig bar, Dessert bar, Peanut butter spread, Dairy shake (TFF), Carbohydrate fortified beverage, Accessory pack, Spoon

MENU 2

Pasta w/chicken and asparagus, Nut & fruit mix (Type III), Dessert bar (mocha), Carbohydrate fortified beverage, Banana and strawberries (freeze dried), Accessory pack, Spoon

MENU 3

Chili macaroni w/beef, Toasted corn kernels, Crackers, Cheese spread, Pan coated chocolate disks, Cappuccino, Accessory pack, Spoon

MENU 4

Turkey tetrazzini, Dessert bar (mocha), Crackers, Cheese spread, Orange beverage, Cappuccino, Accessory pack, Spoon

MENU 5

Chicken and rice, Cheddar filled pretzels, Filled bakery (french toast), First Strike bar (Cranraspberry), Hazelnut cocoa, Accessory pack, Spoon

MENU 6

Seafood chowder, Ramen soup, Fudge brownie (TFF), Crackers, Carbohydrate fortified beverage, Accessory pack, Spoon

MENU 7

Beef stew, Pound cake, Toasted corn kernels, Smoked almonds, Carbohydrate fortified beverage, Accessory pack, Spoon

MENU 8

Spaghetti w/meat sauce, Ramen soup, Pan coated chocolate disks, Dairy shake (TFF), Sugar free fortified beverage, Bananas and strawberries (freeze dried), Accessory pack, Spoon

MENU 9

Rice and chicken Mexican style, Dessert bar (chocolate banana nut), Cornbread, Carbohydrate fortified beverage, Cranberries (dried), Accessory pack, Spoon

MENU 10

Eggs (scrambled w/cheese western style), Granola w/milk & blueberries, Toaster pastry, Maple muffin top, Nacho filled pretzels, Hazelnut cocoa, Sugar free beverage, Accessory pack, Spoon

MENU 11

Scrambled eggs w/bacon, Granola w/milk & bananas, Nut & fruit mix (Type II), Fig bar, Cocoa, Carbohydrate fortified beverage, Accessory pack, Spoon

MENU 12

Breakfast skillet, Rolled oats cereal, Ice cream sandwich, Tortilla, Cheese spread, Chocolate protein drink, Accessory pack, Spoon

GROUP RATIONS:

Group Rations feed more than one Warfighter at a time. These rations are nutritionally complete, unitized or pre-configured in grouped modules to support small or large group feeding in 18 or 50 person modules depending on the specific group ration type. The rations within the group platform service unique applications from remote self heating in small groups to a range of modular configurations and types that support different feeding scenarios based on mission, availability of field kitchens and other support equipment. These modules are intended to provided flexibility and facilitate and simplify the logistics of ordering, handling and preparation in the field.

Options for group feeding are fairly diverse by design and are also determined based on availability of equipment, personnel, rations, location, mission duration, tactical situation and other logistics considerations. The ability to conduct group feeding operations will vary based on the individual situation but are intended to provide maximum flexibility in meeting unit mission requirements. They generally require more stability on the battlefield due to the increased time and resources needed for their preparation. These options include consolidated or area feeding that may include large battalion or company sized configurations as well as extended feeding service to units within the area, as practicable. Remote feeding capability is generally accomplished by moving hot, cook prepared meals forward in insulated containers to locations that do not have an organic food service capability. Meals prepared forward or en-route is an additional option that may be exercised by use of specific equipment platforms and ration selections that support high mobility or heat-on-the-go applications.

Group Ration Equipment

Combat feeding helps Marines develop and procure Exepeditonary Field Kitchen

By Bob Reinert/USAG-Natick Public Affairs / NATICK, Mass. Feb. 25, 2014)

The Combat Feeding Directorate's Systems Equipment & Engineering Team has helped the Marines develop and procure the Expeditionary Field Kitchen, or EFK, which is designed to provide welcome hot food to as many as 750 forward-deployed warfighters within three hours, including cleanup.

"They love it," Paul Mandile said. "It's a significant morale booster for the Marines in the field. It gives them a hot meal capability that is significantly more mobile, durable and sustainable than their previous large-scale feeding platform."

The EFK, which comes in a two-sided, expandable 20-foot-long, by 8-foot-high, by 8-foot-wide ISO container mounted on the Marine Corps MCC20 trailer, can prepare and serve any of the Unitized Group Ration meals developed by CFD. It eliminates the need to transport hot food over long distances to remote locations.

"Marines are all about being expeditionary," Mandile said. "They truly do move. The EFK, complemented by the other combat field feeding systems in the Marine Corps, meets the Corps' operational field feeding and mobility requirements by land, sea, and air. Meeting all the Marine Corps expeditionary requirements presented a significant challenge to CFD. Military Field Kitchens, believe it or not, encompass a lot of different engineering disciplines."

The first production the EFK was delivered in late 2012 to the Marines, who aim to acquire 109 EFKs in total. Sixty-one have already been fielded to date.

"Each EFK is run by four personnel and a supervisor, and its appliances operate from JP-8 fuel," Mandile said. "There are seven burners and seven major appliances in the EFK. The EFK's appliance suite provides the Marine cooks with the flexibility to roast, bake, grill, boil, braise, poach, and stew food items.

The EFK program has been a cooperative effort between Natick's CFD, the Natick Contracting Division, Headquarters Marine Corps, and Product Manager Combat Support Equipment, or PdM-CSE, Marine Corps Systems Command. PdM-CSE has life-cycle management responsibilities for all Marine Corps Combat Field Feeding equipment and Shelter products, and they also provide guidance to Combat Feeding to ensure all research, development and engineering support efforts are fully coordinated.

"It's definitely a partnership," Mandile said. "I'm on the phone with the PdM-CSE's Product Manager and Marine user on a daily basis addressing production, logistical sustainment, and fielding support challenges. Combat Feeding has the lead engineering-support role for Marine Corps Field Food Service Equipment, and the Natick Contracting Division is managing EFK production contract. We're supporting PdM-CSE's fielding of these systems to Marines worldwide. It's truly a team effort."

As Mandile pointed out, the Marines aren't much for using base camps. They maneuver and fight.

"It's all about running and gunning in small units and moving," Mandile said.

The Marines, at some point, want an alternative energy, heat-on-the-move capability. With that in mind, the Marines have identified a field feeding goal of reducing or eliminating their dependence on fossil fuels, which ultimately equates to fewer combat logistic patrols and, as a result, fewer casualties. In addition to the EFK, CFD has several other ongoing research and development efforts to meet their expeditionary mission and reduce the need for fossil fuels and fuel resupply missions.

"Our mission is to provide them with cutting-edge (research and development) in the field food service equipment arena that gives the Marines an enhanced field feeding capability, better quality food, and a significant morale boost," said Mandile, "all while working to reduce cook burdens and the Marine Corps total life cycle costs."

GROUP RATIONS:

Unitized Group Ration (UGR)

The family of Unitized Group Rations provides high quality group meals to Warfighters in the field.

HISTORY

Prior to the introduction of the UGR system, group meals were assembled at the unit level for distribution to Warfighters in the field. Cooks had to order an average of 34 separate items for each meal, and could only hope that they arrived when needed. This significantly increased the logistical burden of field feeding. The Unitized Group Ration concept combines all the items necessary for field feeding into complete modules, allowing culinary specialists to focus on food preparation, not administration.

HOW IT WORKS

There are currently 4 rations in the UGR family:

- The **UGR-Heat and Serve** consists of precooked, shelf-stable food issued in lightweight polymeric trays.
- The **UGR-M** is the primary group ration of the Marine Corps, and contains dehydrated items to meet the Corps' expeditionary requirements.
- The **UGR-A** consists of both shelf-stable and perishable components. It delivers the highest-quality, most fresh-like field feeding available anywhere.
- The unique **UGR-Express** uses chemical heating technology to provide hot food anywhere on the planet, without the need for specialized field feeding equipment.

	UGR-H&S	UGR-A	UGR-M	UGR-E
Components:	Shelf-stable, ready-to-eat entrées, sides, and desserts Ready-to-use commercial products Disposable service items	Perishable/frozen entrées Ready-to-use and quick-to-prepare commercial products Disposable service items	Shelf stable ingredients Easy-to-prepare commercial products Disposable service items	Shelf-stable, ready-to-eat entrées, sides, and desserts Ready-to-use commercial products Disposable service items
Configuration:	Unitized into 3-box modules containing 50 meals	Unitized into 2 semi-perishable boxes and 1 frozen box. Each 3-box module contains 50 meals	Unitized into 3-box modules containing 50 meals	Unitized into 1 shelf-stable box containing 18 meals
Shelf Life:	18 months at 80°F (27°C)	3 month CONUS 9 months OCONUS at 80°F (semi-perishable box) and 0°F (frozen box)	18 months at 80°F (27°C)	18 months at 80°F (27°C)
Menu Variety:	17 (3 Brk, 14 Lun/Din)	21 (7 Brk, 14 Lun/Din)	19 (5 Brk, 14 Lun/Din)	13 (4 Brk, 8 Lun/Din, 1 Holiday)

FURTHER ENHANCEMENTS TO THE UGR

- All UGRs include seasonings such as salt, pepper, and hot sauce. UGR-H&S and UGR-A are issued with shelf-stable milk, and all rations are supplemented with bread and fresh fruits and vegetables as available.
- **Arctic Supplement:** Warfighters operating in cold environments may need additional calories and hydration. The Arctic Supplement meets this requirement with an additional 914 calories per Warfighter, per meal.

CONTINUOUS PRODUCT IMPROVEMENT

Like all military rations, the UGR family is constantly field-tested to increase variety, enhance acceptability, increase consumption, and improve nutritional intake.

Recent efforts include the development of a lightweight pouch to replace the ubiquitous #10 sized cylindrical metal can and a tremendous increase in the variety of ration items. In 2012, 12 items were approved for inclusion into future UGR menus. Current research is also focusing on including bio-based dining packets, bio-based serving utensils, and degradable trash bags to alleviate the environmental burden. Bio-based cutlery is a product that is molded with agricultural by-products (starches and fibers) from wheat, corn, or other crops instead of plastic resins. The bio-based cutlery performs the same as standard plastic cutlery; but is degradable and compostable. Their future use will benefit the farmer and the environment.

Additional CFD efforts include the development of an integrated database of UGR and field kitchen equipment is presently underway. This significant tool will facilitate rapid assessment of how potential UGR menu changes will impact the efficiency of the Services' current field kitchens by menu and across menus. It will further ensure interoperability and efficiency in both ration and kitchen designs and major upgrades, will provide the capability to assess alternate equipment items and determine equipment quantities based on requirements to cook/prepare menu items, will characterize ration packaging waste stream by type material and amount, and set planning factors for water requirements by menu item and total menu, determine number of batches/cycle time per batch by equipment item, and by planned sanitation time/labor/water requirements.

POLYMERIC TRAYS:

TECHNOLOGY:

The tray is made of polypropylene, together with:

- Ethylene Vinyl Alcohol (EVOH): a barrier layer to help maintain the quality of food contained within.
- A multi-layer, heat-sealable Lidding Material.
- An ovenable paperboard Baking Insert to accommodate the packaging of bakery items.
- A protective Fiberboard Sleeve to help prevent damage during shipping.

BENEFITS:

Utility: The polymeric tray can be opened easily with a knife. The steel traycan requires a special opener.

Safety: The opened polymeric tray leaves no sharp edges. The opened steel traycan leaves sharp edges, which are a hazard to military personnel.

Producibility: The military polymeric tray is a modified commercial item. The steel traycan is a military-unique item with limited commercial applications.

GROUP RATIONS:

UGR-H&S

Unitized Group Ration-Heat & Serve

PURPOSE

Aside from the UGR-E, the UGR-H&S is intended to be the first group ration available in theater, often utilized in combination with the MRE for daily feeding.

The UGR-H&S can be prepared on field kitchens without refrigeration capability. Like all Unitized Group Rations, the UGR-H&S simplifies the logistics chain by including everything needed to serve a group meal in a single NSN.

Each UGR-H&S module contains 50 servings of pre-cooked food, serving utensils, dining packets, trays, and trash bags.

CHARACTERISTICS

- **Polymeric Trays:** Each UGR-H&S menu contains an entrée, starch, vegetable, and dessert. These major components are precooked and packaged in lightweight, disposable polymeric trays. These sealed trays are durable enough to withstand the rigors of shipping through a combat zone and allow food to be heated with minimal preparation.
- **Shelf Life:** The UGR-H&S does not require refrigeration to maintain its quality. Each module is shelf stable for 18 months at 80°F (27°C).
- **Logistics:** Each 50-meal UGR-H&S module is issued in 3 rugged fiberboard boxes. One pallet contains 8 modules, for a total of 400 meals.
  - **Average weight:** 124.5 lbs (56.6 kg)/module
  - **Cube:** 5.25 ft^3 (148.7 dm^3)/module
- **Variety:** 17 different menus are available for the UGR-H&S. There are 3 breakfast varieties and 14 lunch/dinner menus.

NUTRITIONAL DATA

Including supplements of shelf-stable milk, bread, and other items, the average UGR-H&S menu provides 1450 calories per serving, including 10% protein (36 g), 35% fat (56 g), and 55% carbohydrates (199 g).

CONTINUOUS IMPROVEMENT

The UGR-Heat & Serve, like all other Unitized Group Rations, is continuously improved through field testing under realistic conditions with Warfighters throughout the military.

COMMENTS

The UGR-H&S is intended to provide between 40-60% of a Warfighter's daily nutrition intake in a deployed environment. It can be used in a "theater ration mix" in combination with other operational rations like the MRE, UGR-A, and UGR-E, or with other food sources that may be available such as dining facilities. UGR-H&S meals can be prepared on a wide variety of field feeding equipment, including the Mobile Kitchen Trailer, Containerized Kitchen, Assault Kitchen, Expeditionary Field Kitchen, Basic Expeditionary Airfield Resources, Tray Ration Heater System, and Single Pallet Expeditionary Kitchen. Visit hotchow.natick.army.mil for more information on these systems.

UGR-H&S MENU 2015

BREAKFAST

MENU #1

Eggs, Beef & Potatoes In Cream Gravy, Pork Sausage Links, Apple Cake W/Apple Topping, Blueberry Dessert, Instant Grits, Salsa, Grape Jelly, Hot Sauce, Grape Juice, Irish Cream Cappuccino, Coffee, Nondairy Creamer

MENU #2

Eggs, Bacon, Corned Beef Hash, Golden Harvest Cake, Apple-Cinnamon Oatmeal, Jalapeno Catsup, Strawberry Jam, Hot Sauce, Grape Juice, Cocoa, Coffee, Nondairy Creamer

MENU #3

Eggs, Beef & Potatoes In Cream Gravy, Bacon, Breakfast Cake W/Syrup, Apple Dessert, Instant Oatmeal, Catsup, Grape Jelly, Hot Sauce, Orange Juice, French Vanilla Cappuccino, Coffee, Nondairy Creamer

LUNCH/DINNER

MENU #1

Southwest Chicken Chili, Corn, White Rice, Red Velvet Cake, Fruit Cocktail, Peanut Butter/Grape Jelly, Hot Sauce, Lemonade, Coffee, Non Dairy Creamer

MENU #2

Spaghetti W/Meatballs, Green Beans, Yellow Cake With Chocolate Icing, Pears, Chocolate Pan Coated Disks, Hot Sauce, Iced Tea, Coffee, Sugar Free beverage

MENU #3

Beef Burgundy, Brown Rice, Peas And Carrots, Carrot Cake, Peaches, Hot Sauce, Orange Beverage, Coffee, Peanut Butter/Strawberry Jam

MENU #4

Beef Taco Filling, Pulled Pork, White Rice, Green Beans, Tortilla, Dulce De Leche Cake, Salsa, Chili Lime Hot Sauce, Jalapeno Cheese Spread, Grape Beverage, Coffee, Sugar Free beverage

MENU #5

Chicken Breast In Gravy, Wild Rice Pilaf, Mixed Vegetables, Cranberry White Chocolate Chip Cookie, Peaches, Cranberry Sauce, Hot Sauce, Iced Tea, Coffee, Nut Raisin Mix With Chocolate Disks

MENU #6

Meatballs And Pasta In Brown Gravy, Peas And Carrots, Yellow Cake With Chocolate Icing , Fruit Cocktail, Cran-Pomegranate, Sugar Free, Hot Sauce, Lemonade, Coffee, Non Dairy Creamer, Peanut Butter / Grape Jelly

MENU #7

Chili With Beans, White Rice, Carrots, Cornbread, Pears, Oatmeal Chocolate Chip Cookie, Chocolate Pan Coated Disks, Chili Lime Hot Sauce, Orange Beverage, Coffee

MENU #8

Turkey Cutlets, Sweet Potato & Coconut Casserole, Green Beans, Mashed Potatoes With Brown Gravy, Chocolate Chip Cookie with chocolate covered crunchy peanut butter candy pieces, Apple Dessert, Cranberry Sauce, Hot Sauce, Grape Beverage, Coffee, Sugar Free beverage, Peanut Butter/Strawberry Jam

MENU #9

Beef Roast W/Gravy, Mashed Potatoes W/Brown Gravy, Corn, Chocolate Cherry Cake With Cherry Fruit Topping, Pears, Hot Sauce, Beverage Base Iced Tea, Coffee, Peanut Butter/Grape Jelly

MENU #10

Pasta With Hot Italian Sausage, Mixed Vegetables, Pan Coated Peanut Butter Disks, Oatmeal Chocolate Chip Cookie, Fruit Cocktail, Lemonade, Hot Sauce, Coffee, Non Dairy Creamer, Sugar Free beverage

GROUP RATIONS:

UGR-A

Unitized Group Ration-A

PURPOSE

The UGR-A is designed to provide restaurant quality group meals to Warfighters in the field. It is the most highly accepted ration in the UGR family. The UGR-A is the only military operational ration that contains frozen food components. For that reason, it is based on a build-to-order assembly process that requires refrigerated/frozen storage and a field kitchen for preparation.

CHARACTERISTICS

Like the UGR-H&S, the UGR-A module is a self-contained menu designed to decrease inventory carrying costs and simplify the ordering, distribution, and logistical processes. There are 7 breakfast and 14 lunch/dinner menus available that are composed of semi-perishable and perishable food components. Once established at a base camp with refrigerators and freezers, cooks can transition to the UGR-A, which provides more variety and cost-effective high quality food to Warfighters. The UGR-A is ordered directly from the vendor and is assembled in three fiberboard cartons, two with semi-perishable foods stored at 80˚F (26.7˚C) and one with perishable foods stored at 0˚F (17.8˚C) (condiments, preparation instructions, serving utensils, and trash bags are also included in the cartons). The ration has a 15-day order ship time and a 3 month remaining shelf life within CONUS deliveries and a 45-day order ship time with a 9 month remaining shelf life for OCONUS deliveries. One UGR-A module serves up to 50 Warfighters, and one pallet contains 8 modules, or 400 meals.

- **Average Weight:** 87 lbs (39.5 kg)/module
- **Cube:** 5.25 ft^3 (148.7 dm^3)/module

NUTRITIONAL DATA

Including mandatory supplements (see product notes on menus), each meal provides an average of 1450 calories (14% protein, 32% fat, 54% carbohydrate).

PREPARATION REQUIREMENTS:

Trained food service personnel prepare the ration using organized field food service facilities.

COMMENTS

Like the UGR-H&S, it is designed to be used in a "theater ration mix" with individual rations and other types of group rations.

The UGR-A is part of the continuous product improvement program. Field tests are conducted annually, and menu revisions are made based on Warfighter recommendations and feedback.

BREAKFAST

MENU #1

Frozen: Chicken Sausage Patty, Meat Lovers Breakfast Wrap, Wholegrain Biscuit, Cinnamon Rolls Monkey Bites, Orange Juice

Shelf Stable: Reduced Cholesterol Boil in Bag Eggs, Jalapeños, Blueberry Pastry Crisps, French Vanilla Cappuccion (TFF), Coffee/Creamer, Hazelnut/French Vanilla Creamers, Grape Jelly, Chile Lime Hot Sauce, Golden Brown Maple Oatmeal, Ketchup, Salsa, Vegetable Oil

MENU #2

Frozen: Turkey Bacon, Chicken Breakfast Fillet, Flat Bottom Waffle, Mixed Berry Bar, Apple Juice

Shelf Stable: Reduced Cholesterol Boil in Bag Eggs, Biscuit Gravy (TFF), Shelf Stable Blueberry Muffins, Grits, Cocoa (TFF), Coffee/Creamer, Strawberry Jam, Hot Sauce, Butter Granules, Ketchup, Maple Syrup, Vegetable Oil

MENU #3

Frozen: Breakfast Steak, Peppers & Onions, Cheddar Cheese Omelet Pita, LFWG Danish - Apple/Raspberry, Orange Juice

Shelf Stable: Reduced Cholesterol Boil in Bag Eggs, French Toast Cookie (TFF), Hash Browns, Irish Cream Cappuccino (TFF), Coffee/Creamer, Hazelnut/French Vanilla Creamers, Grape Jelly, Hot Sauce, Apple Cinnamon Oatmeal, Ketchup, Steak Seasoning, Everything Sauce, Vegetable Oil

MENU #4

Frozen: Peppered Turkey Bacon, Steak, Egg, & Cheese Taquitos, Potato Pancake, Low Fat Coffee Cake, Grape Juice

Shelf Stable: Reduced Cholesterol Boil in Bag Eggs, Strawberry Pastry Crisps, Grits, Cocoa (TFF), Coffee/Creamer, Grape Jelly, Hot Sauce, Butter Granules, Ketchup, Vegetable Oil

MENU #5

Frozen: Beef Hash, Ranchero Beef Taquitos, Wholegrain Biscuit, Peanut Butter Jelly Graham, Orange Juice

Shelf Stable: Reduced Cholesterol Boil in Bag Eggs, Jalapeños, Whole Grain Brown Sugar Frosted Toaster Pastry, Hash Browns, Cocoa (TFF), Coffee/Creamer, Hazelnut/French Vanilla Creamers, Strawberry Jam, Hot Sauce, Jalapeño Ketchup , Vegetable Oil

MENU #6

Frozen: English Muffin Sandwich (Turkey Ham, Egg, & Cheese), Blueberry Filled Pancakes, Whole Wheat Donut Stick, Tropical Juice Blend

Shelf Stable: Reduced Cholesterol Boil in Bag Eggs, Peanut Butter Chocolate Bar, French Vanilla Cappuccion (TFF), Coffee/Creamer, Grape Jelly, Hot Sauce, Ketchup, Maple Syrup, Vegetable Oil

MENU #7

Frozen: Chicken Bacon, Brown & Serve Turkey Sausage Links, Wholegrain Biscuit, Mini Apple Filled Bagel, Grape Juice

Shelf Stable: Reduced Cholesterol Boil in Bag Eggs, Biscuit Gravy (TFF), Whole Grain Frosted Strawberry Toaster Pastry, Grits, Cocoa (TFF), Coffee/Creamer, Hazelnut/French Vanilla Creamers, Strawberry Jam, Hot Sauce, Butter Granules, Apple Cinnamon Oatmeal, Ketchup, Vegetable Oil

LUNCH / DINNER

MENU #1

Frozen: Pulled BBQ Pork/ Pulled BBQ Chicken, Sweet Butter Sauce, Plain and Jalapeno Cornbread

Shelf Stable: Corn, Green Beans, Applesauce, Lemon Lime Electrolyte beverage, Carrot Cake, Hot Sauce, Butter Granules

PB & Grape Jelly, Variety Pack Sugar Free Tea, Coffee/Creamer

MENU #2

Frozen: Lemongrass Chicken/ Beef Bulgogi, Whoopi Pie Cake

Shelf Stable: Carrots, Primavera Rice, Rice Krispie Treats, Peaches, Pink Lemonade, Hot Chile Sauce, Butter Granules, Variety Pack Sugar Free Beverages, Coffee/ Creamer, Hazelnut/French Vanilla Creamers

MENU #3

Frozen: Meat Loaf, Mexican Cheese Sauce for Macaroni, Dulce de Leche Cake

Shelf Stable: Peas & Carrots, Ultragrain Elbow Macaroni, Butterscotch Pudding, Orange Electrolyte beverage, Pan coated discs, Hot Sauce, Vegetable Seasoning, Butter Granules, PB & Strawberry Jam, Variety Pack Sugar Free Tea, Coffee/Creamer

MENU #4

Frozen: Roasted Chicken Quarters, Sweet Potatoes, Vanilla & Keylime Cheesecake

Shelf Stable: Italian Style Green Beans, Cornbread Stuffing, Herb & Butter Mashed Potatoes, Pan coated discs, Iced Tea, Cranberry Sauce, Hot Sauce, Chicken Gravy (TFF), Butter Granules, Sugar Free Lemon Lime Electrolyte Beverage, Coffee/Creamer, Hazelnut/French Vanilla Creamers

MENU #5

Frozen: Beef & Broccoli/ Sweet Fire Chicken, Egg Rolls w/Sweet & Sour Packets, Orange Creamsicle Cake

Shelf Stable: Carrots, Basmati Blend Rice, Pan coated discs, Pears, Mixed Berry Electrolyte beverage, Jalapeño Slices, Hot Chile Sauce, Soy Sauce, Butter Granules, PB& Apple Jelly, Variety Pack Sugar Free Beverages, Coffee/Creamer

MENU #6

Frozen: Shrimp Scampi/ Pasta Alfredo with Chicken, Salted Caramel Cake

Shelf Stable: Peas, Chocolate Chip Cookies, Mixed Fruit, Peach Iced Tea, Parmesan Cheese, Hot Sauce, Vegetable Seasoning, Butter Granules, Variety Pack Sugar Free Tea, Coffee/Creamer, Hazelnut/French Vanilla Creamers

MENU #7

Frozen: Grilled Steak, Peppers and Onions, Natural Potato Wedges, Red Velvet Cake

Shelf Stable: Corn, Sliced Mushrooms, Brown Gravy (TFF), Vanilla Pudding, Lemon Lime Electrolyte beverage, Vegetable Oil, Everything Sauce, Steak Seasoning, Butter Granules, PB & Blackberry Jam, Variety Pack Sugar Free Beverages, Coffee/Creamer

MENU #8

Frozen: BBQ Pork Ribs/ Fried Chicken, Seasoned Collard Greens, Strawberry Short Cakes

Frozen: Au Gratin Potatoes, Chicken Gravy (TFF), Applesauce, Grape Drink, Hot Sauce, Paprika, Butter Granules, Variety Pack Sugar Free Tea, Coffee/Creamer, Hazelnut/French Vanilla Creamers

MENU #9

Frozen: Meat Balls in Marinara Sauce, Pizza Roll, Almond Joy Bar Cake

Shelf Stable: Italian Style Green Beans, Ultragrain Spaghetti, Mixed Fruit, Fruit Punch Electrolyte beverage, Hot Sauce, Italian Seasoning, Vegetable Oil, Butter Granules, PB & Grape Jelly, Variety Pack Sugar Free Beverages, Coffee/Creamer

MENU #10

Frozen: Soft Taco Kit (Chicken and Beef), Tortillas, Rojo Sauce for Corn & Black Beans, Dulce de Leche Cheesecake Bites

Shelf Stable: Corn, Black Beans, Brown Rice w/Black Beans, Chocolate Chip Cookies, Chocolate Pudding, Peach Iced Tea, Chile Lime Hot Sauce, Jalapeño Slices, Butter Granules, Sugar Free Fruit Punch Electrolyte Beverage, Coffee/Creamer, Hazelnut/French Vanilla Creamers

MENU #11

Frozen: Sirloin Beef w/ Peppercorn Gravy/Buffalo Turkey Wing, Loaded Mashed Potatoes, S'mores Cake

Shelf Stable: Peas, Cherry Mixed Fruit, Mixed Berry Electrolyte beverage, Parmesan Cheese, Hot Sauce, Butter Granules, PB & Strawberry Jam, Variety Pack Sugar Free Tea, Coffee/Creamer

MENU #12

Frozen: Pot Roast, Broccoli, Rice, & Cheese Casserole, Ooey Gooey Choc Bar

Shelf Stable: Carrots, Pears, Iced Tea, Hot Sauce, Vegetable Seasoning, Butter Granules, Variety Pack Sugar Free Beverages, Coffee/Creamer, Hazelnut/French Vanilla Creamers

MENU #13

Frozen: Chicken Cordon Bleu, Creamed Spinach & Pasta, Pumpkin Spice Cake

Shelf Stable: Green Beans, Peaches, Lemonade, Hot Sauce, Vegetable Seasoning, Butter Granules, PB& Blackberry Jam, Variety Pack Sugar Free Tea, Coffee/Creamer

MENU #14

Frozen: Chicken Marsala/ Andouille Pasta & Cheese, Mini Cupcakes - Chocolate; Vanilla

Shelf Stable: Peas & Carrots, Steakhouse Red Mashed Potatoes, Vanilla Pudding, Fruit Punch Electrolyte beverage, Hot Sauce, Vegetable Seasoning, Butter Granules, Variety Pack Sugar Free Tea, Coffee/Creamer, Hazelnut/French Vanilla Creamers

GROUP RATIONS:

UGR-A Short Order

PURPOSE

The Unitized Group Ration - A Short Order (UGR-A, Short Order) is designed to provide Warfighters with high quality short order entrées in locations where a dining facility is not available. This creates increased universal acceptance by providing Warfighters with an alternative to the current center of the plate meals.

CHARACTERISTICS

The UGR-A Short Order consists of seven dinner options, and can be ordered alongside the standard UGR-A to offer the diner a choice of a mainline meal or a short order meal. Each UGR-A Short Order contains a complete balanced menu consisting of entrée, vegetable, beverage, and dessert options, along with condiments. Like the UGR-A, each module consists of three boxes, one perishable and two non-perishable, and can feed up to 50 Warfighters. This requires the UGR-A Short Order to be stored and prepared in the same way a standard UGR-A would be.

NUTRITIONAL DATA

Including mandatory supplements (see product notes on menus), each meal provides an average of 1450 calories (14% protein, 32% fat, 54% carbohydrate).

PREPARATION REQUIREMENTS

Trained food service personnel prepare the ration using organized field food service facilities.

COMMENTS

Seven short order dinner options are available for procurement. These menus can be ordered alongside the standard UGR-A dinners to offer the diner a choice of a mainline meal or a short order meal, and entrées include Philly steak hoagie, chicken nuggets, Italian sausage sub, beef enchiladas, chicken wings, pepperoni & cheese stromboli, and hamburger/hot dog.

MENU #1

Philly Steak Hoagie, Corn, Almond Cupcakes, Hot Sauce, Pears, Mixed Berry Carbohydrate Electrolyte Beverage, Coffee, Creamers

MENU #2

Grilled Cheese Sandwich, Chili, Brownie, Carrots, Hot Sauce, Coffee, Creamers, Mixed Fruit, Iced Tea, Honey Mustard, Ketchup, Barbecue Sauce

MENU #3

Italian Sausage Sub, Carrot Cake, Green Beans, Hot Sauce, Spicy Mustard, Chips, Chocolate Pudding, Mixed Berry Carbohydrate Electrolyte Beverage, Coffee, Creamers

MENU #4

Meatball Sub, Raspberry Cheesecake Bites, Coffee, Creamers, Hot Sauce, Peaches, Chips, Lemon Lime Carbohydrate Electrolyte Beverage, Picante/Salsa

MENU #5

Chicken Wings, Sweet Potato Fries, Oatmeal Raisin Cookie, Peas & Carrots, Honey Mustard, Ketchup, Barbecue Sauce, Hot Sauce, Vanilla Pudding, Pink Lemonade, Coffee, Creamers

MENU #6

Pizza, Dulce De Leche Cheesecake Bites, Italian Green Beans, Pan Coated Disks, Hot Sauce, Peach Iced Tea, Mixed Fruit, Coffee, Creamers

MENU #7

Grilled Hamburgers, Hot Dogs, Potato Wedge, Apple Pie, Baked Beans, Chili, Mustard, Relish, Salad Dressing, Ketchup, All Purpose Sauce, Butterscotch Pudding, Mixed Berry Carbohydrate Electrolyte Beverage, Coffee, Creamers

GROUP RATIONS:

UGR-M

Unitized Group Ration-M

PURPOSE

The UGR-M is used primarily by the Marine Corps. It is designed to meet requirements for providing Marines with high quality group rations that do not require refrigeration and are quick and easy to prepare. All ingredients in the ration are shelf stable, with an emphasis placed on including commercial products in all menus.

CHARACTERISTICS

The UGR-M consists of 5 breakfast and 14 lunch/dinner menus that incorporate a balance of dehydrated and commercial items. One module is unitized into three fiberboard cartons that contain all shelf stable ingredients, disposable serving trays, utensils, and trash bags. Each module provides 50 meals, and each pallet contains 8 modules, or 400 meals. Modules are assembled at government depots and have a shelf life of 18 months at 80˚F (26.7˚C).

- **Average weight:** 125 lbs (56.7 kg)/module
- **Cube:** 5.25 ft^3 (148.7 dm^3)/module

NUTRITIONAL DATA

Each meal provides an average of 1300 calories (15% protein, 30% fat, and 55% carbohydrate)

PREPARATION REQUIREMENTS

Trained food service personnel prepare the ration using organized field food service facilities.

COMMENTS

The UGR-M is part of the Continuous Product Improvement Program. Recent field tests resulted in incorporating the most highly acceptable items in previous menus into more of the current menus for production. These items included fruit cocktail, pancakes, peaches, cornbread, oatmeal cookies, sugar cookies, and brownies. New items introduced to the menus include scrambled eggs (dehydrated, BIB) and yellow cake with chocolate frosting. The least acceptable items were also identified in the field test and removed from the current menus. These items were: scrambled eggs (freeze dried, #10 can), cinnamon swirls, waffles, creamed chipped beef, pineapple, coffee cake with cinnamon crumb topping, walnut tea cake, and devil's fudge cake.

BREAKFAST:

MENU 1

Pork sausage links, Scrambled eggs (dehydrated, BIB), Hominy grits, Pancakes, Biscuits, Hash browns, Fruit cocktail, Grape beverage, Maple syrup, Cocoa beverage

MENU 2

Turkey sausage links, Scrambled eggs (dehydrated, BIB), Oatmeal, Hash browns, Biscuits, Peaches, Orange beverage, Pancakes, Maple syrup, French vanilla cappuccino

MENU 3

Bacon, Scrambled eggs (dehydrated, BIB) Grits, Pancakes, Rice, Fruit cocktail, Apple beverage, Maple syrup, Cocoa

MENU 4

Creamed sausage, Scrambled eggs (dehydrated, BIB), Farina, Pancakes, Biscuits, Hash browns, Pears, Orange beverage, Maple syrup, Worcestershire sauce, Irish crème cappuccino

MENU 5

Scrambled eggs (Western style, dehydrated, BIB), Hominy grits, Pancakes, Biscuits, Hash browns, Peaches, Grape beverage, Maple syrup, French vanilla cappuccino

LUNCH/DINNER:

MENU 1

Beef & gravy w/biscuit topping, Mashed potatoes, Mixed vegetables, Pears, Sugar cookies, Butter granules, Ketchup, Lemonade beverage

MENU 2

Creole chicken, Rice corn, Fruit cocktail, Cornbread, Oatmeal cookies, Butter granules, Ketchup, Grape beverage

MENU 3

Pork chops & gravy, Au gratin potatoes, Green beans, Applesauce, Biscuits, Brownies, Ketchup, Cherry beverage

MENU 4

Chicken a la King, Rice, Peas, Fruit cocktail, Biscuits, Yellow cake w/chocolate frosting, Butter granules, Ketchup, Lemonade beverage

MENU 5

Shrimp & ham jambalaya, Rice, Corn, Peaches, Cornbread, Brownies, Lemonade beverage

MENU 6

Shepard's pie (beef, potatoes, & corn), Carrots, Pears, Biscuits, Sugar cookies, Butter granules, Grape beverage

MENU 7

Mexican macaroni & chicken, Green beans, Peaches, Cornbread, Oatmeal cookies, Orange beverage

MENU 8

Baked chicken & rice, Mixed vegetables, Peaches, Biscuits, Brownies w/chocolate frosting, Ketchup, Orange beverage

MENU 9

Spaghetti w/meatballs, Corn, Applesauce, Biscuits, Yellow cake w/chocolate frosting, Cherry beverage

MENU 10

BBQ pork chops, Macaroni & cheese, Green beans, Pears, Biscuits, Chocolate cookies, Pears, Ketchup, Lemonade beverage

MENU 11

Chicken & bread stuffing, Mashed Potatoes, Carrots, Peaches, Biscuits, Oatmeal cookies, Butter granules, Ketchup, Grape beverage

MENU 12

Chili con carne, Rice, Corn, Fruit cocktail, Cornbread, Chocolate pudding, Grape beverage

MENU 13

Shrimp Creole, Rice, Peas, Pears, Cornbread, Apple crisp, Cherry beverage

MENU 14

White bean & chicken chili, Rice, Green beans, Peaches, Cornbread, Brownies, Grape beverage

PRODUCT NOTES:

- **Breakfast Menus** include salt, pepper, hot sauce, shortening, ketchup, peanut butter spread, jelly/jam, coffee, and nondairy creamer.
- **Lunch/Dinner Menus** include salt, pepper, hot sauce, peanut butter spread, jelly/jam, coffee, tea and nondairy creamer.
- **NOTE:** All beverages are powder

GROUP RATIONS:

UGR-E

Unitized Group Ration-Express

PURPOSE

The UGR-E provides a complete meal for 18 Warfighters in remote locations where group field feeding would not otherwise be possible. It is a compact module that does not require cooks or a field kitchen for preparation. With the simple pull of a tab, the UGR-E is ready to serve in 30-45 minutes.

One UGR-E module provides all of the items necessary for a complete meal to serve up to 18 Warfighters, including 4 trays of cooked food, drink pouches, snacks/candies, compartmented dining trays, seasoning, disposable eating and serving utensils, condiments, beverages, napkins, wet-naps, and trash bags.

KEY FEATURES

- **Self Heating:** The UGR-E heats itself with a safe chemical reaction similar to that in the MRE's Flameless Ration Heater. Heaters containing magnesium and iron powder come installed beneath each serving tray. After exposing the heaters with a pull tab, a second tab releases saline solution, activating an exothermic (heat-generating) reaction.
- **Shelf Life:** The UGR-E is shelf stable for 18 months at 80˚F (27˚C). This ensures a fresh, hot group meal to Warfighters in the most remote locations.
- **Logistics:** One pallet contains 18 UGR-E modules, with 3 layers of 6 modules per layer.
  - **Average Weight:** 43 lbs (20 kg)
  - **Cube:** 1.9 ft^3 (53.8 dm^3)
- **Variety:** 13 menus are currently available: 4 breakfast, 8 lunch/dinner, and a unique holiday meal

NUTRITIONAL DATA

Each meal provides an average of 1300 calories: 12% protein (39 g), 38% fat (55 g), 50% carbohydrate (179 g).

CONTINUOUS IMPROVEMENT

As with other UGRs, the UGR-E is a member of the continuous product improvement program. Survey data from Warfighters in the field is used to determine new menu items for increased acceptability. Future enhancements include a hot beverage box which uses the same heating technology as the UGR-E to provide a gallon of hot water.

The UGR-E currently utilizes a Type I heater, which requires Warfighters to insert the heaters underneath the polymeric trays. The Type II heater incorporates the magnesium-iron heater into the module, and a pull tab will expose all four heaters.

COMMENTS

The UGR-E is intended to supplement, not replace, other group rations like the UGR-H&S or the UGR-A. It provides the morale benefits of a group meal to Warfighters when the food service equipment and cooks are unavailable. More importantly, it keeps Warfighters safe by eliminating the need to provide hot food to remote units via ground transportation. The ultimate capability provided by the UGR-E is that it offers an alternative to individual meals as the sole source of subsistence in austere, remote locations.

GROUP RATIONS: UGR-E 2015 Menus

BREAKFAST:

MENU 1

Beef & potatoes in cream gravy, Ham slice, Biscuits, Raspberry swirls w/icing, Caramel apple bar, Blueberry granola, Orange juice

MENU 2

Eggs (BIB), Pork sausage links, Breakfast cake, Blueberry dessert, Mini First Strike bar (apple cinnamon), Banana granola, Grape juice

MENU 3

Beef & potatoes in cream gravy, Turkey sausage links, Golden harvest cake, Biscuits, Mini First Strike bar (cran-raspberry), Blueberry granola, Orange beverage

MENU 4

Eggs (BIB), Beef steaks au jus, Blueberry breakfast cake, Oatmeal (apple cinnamon), Mini First Strike bar (mocha w/caffeine), Banana granola, Grape juice

LUNCH/DINNER:

MENU 1

Pasta & sausage, Glazed carrots, Spice cake w/icing, Licorice candy, Butter granules, Italian seasoning, Dairy shake

MENU 2

Chicken breast in gravy, Corn, Sweet potato casserole, Vanilla cake w/strawberry fruit topping, Turkey jerky, Butter granules, Sweetened beverage

MENU 3

Burgundy beef stew, Green beans, White rice, Banana nut cake w/white icing, Butter granules, Vegetable seasoning, Pan coated chocolate disks, Instant vanilla pudding

MENU 4

Cuban garlic beef, Corn, Brown & wild rice, Red velvet cake w/white icing, Butter granules, Pan coated peanut butter disks, Dairy shake

MENU 5

Chicken stir fry, Carrots, Brown rice, Caramel chocolate chip cookies, Butter granules, Instant chocolate pudding, Sweetened beverage, Sugar free beverage

MENU 6

Spaghetti w/meatballs, Green beans, Lemon cake w/icing, Butter granules, Raisin nut mix w/pan coated chocolate disks, Italian seasoning, Dairy shake, Sugar free beverage

MENU 7

Pork carnitas, Corn & tomato casserole, Brown rice, Dulce de leche cake, Butter granules, Beef jerky, Instant vanilla pudding, Sugar free beverage

MENU 8

Chicken pot pie filling, Green beans, Poultry gravy, Chocolate cherry cake w/cherry fruit topping, Butter granules, Vegetable seasoning, Licorice candy, Dairy shake, Sugar free beverage

HOLIDAY MENU

Turkey slices w/gravy, Mashed potatoes w/chicken gravy, carrots, Cornbread w/sausage stuffing, Raisin nut mix w/ pan coated chocolate disks, Cranberry jelly, Poultry seasoning, , Sweetened beverage

PRODUCT NOTES:

- **Breakfast Menus** include ketchup, hot sauce, salt, pepper, coffee, creamers, shortening, paper trays, dining packets, cups, and trash bags.
- **Lunch/Dinner Menus** include hot sauce, salt, pepper, tea, coffee, creamers, paper trays, dining packets, cups, and trash bags.
- **NOTE:** All beverages are powder

Navy Standard Core Menu (NSCM)

PURPOSE

The Navy Standard Core Menu (NSCM) is designed to standardize food service throughout the Navy fleet while providing more variety and nutritious choices to Sailors. It meets the diverse tastes of US Navy sailors by offering old favorites like pizza and burgers along with more ethnic choices, like vegetable stir-fry and chicken fajitas. The NSCM facilitates a more streamlined procurement process and ensures consistency in product availability.

CHARACTERISTICS

The NSCM is based upon a 21 or 28 day cycle depending upon platform size and includes a different breakfast, lunch, and dinner menu for each day of the cycle. Menus are revised twice a year to incorporate new ingredients and recipes. Special theme meals are incorporated into the cycle, allowing for holiday and ethnic cuisine to be served and to allow flexibility for Sailors to plan "steel beach picnics," ice cream socials, and other similar events. In an effort to support healthier choices, every lunch/dinner menu includes an approved healthy choice entrée, starch, vegetable and dessert.

NUTRITIONAL DATA

Unlike the specific nutritional requirements applied to field feeding rations like the MRE and UGR, the concept of feeding onboard a ship is focused on balanced, healthy nutrition. The NSCM is based upon DoD 1338.10 Menu Planning Standards; Sailors are given choices of two entrées at each of their meals in addition to choices of starches, grains, vegetables, fruits, and desserts. The NSCM improves upon the nutrition of past menus by removing many fried items and replacing them with baked counterparts.

PREPARATION REQUIREMENTS

Most items on the NSCM require preparation by a culinary specialist. However, the NSCM employs a 60/40 ratio of scratch and prepared items in comparison to past menus, so the hours devoted to food preparation have been reduced.

COMMENTS

Prior to the NSCM, the Navy had to use approximately 2500 line items to ensure Sailors were provided variety and balanced nutrition in their daily meals. The standardization of menus across the Navy fleet now allows for under 700 line items to be used, guaranteeing optimal nutritional content for Sailors while reducing cargo requirements and streamlining catalogs to ensure worldwide availability and consistency of product. Financial management is also improved.

CFD supports the NSCM by performing advanced food research to provide product recommendations to maintain the highest quality of nutritious food products. Packaging studies are conducted in order to examine packing materials, waste stream and stowage requirements, equipment requirements, sensory evaluation and optimal product form. CFD continues to identify emerging food preparation techniques to reduce labor for shipboard feeding while maintaining high quality food service.

The NSCM supports The 21st Century Sailor and Marine Initiative to improve US military health by positively influencing the availability of healthful and appealing food choices.

SAMPLE MENU 1

BREAKFAST:

Hot hominy grits, Cereal (healthy & sweet varieties), Griddle fried eggs, Cooked eggs, Scrambled eggs, Omelet bar, Pancakes w/assorted toppings, Sausage biscuit sandwich, Creamed ground beef, Grilled O'Brien potatoes, Banana nut muffin, Pastry bar, Fruit bar, Yogurt (assorted flavors, low fat), Bread bar, Beverage bar

LUNCH:

Chicken gumbo, Southwestern shrimp linguine, Spicy Italian pork chops, Rosemary roasted potato wedges, Stewed tomatoes, Cauliflower, Chocolate chip brownies, Red gelatin, Salad bar, Cucumber & onion salad, Fruit bar, Toasted garlic bread, Bread bar, Ice cream bar, Beverage bar

DINNER:

Hatteras clam chowder, Creole macaroni w/ground turkey, Baked stuffed fish, Aztec rice, Broccoli parmesan, Italian vegetable medley, Chocolate chip brownies, Red gelatin, Salad bar, Fruit bar, Toasted garlic bread, Bread bar, Beverage bar

SAMPLE MENU 2

BREAKFAST:

Hot oatmeal, Cereal (healthy & sweet varieties), Griddle fried eggs, Cooked eggs, Scrambled eggs, Omelet bar, French toast w/assorted toppings, Oven fried bacon, Corned beef hash, Cheesy diced potatoes, Apple coffee cake, Pastry bar, Fruit bar, Yogurt (assorted flavors, low fat), Bread bar, Beverage bar

LUNCH:

Turkey rice soup, Hamburgers, Cheeseburgers, Veggie Burgers, Corn dogs, Potato steak fries, Assorted potato chips, Baked beans, French style green beans, Dutch apple pie, Hermits, Salad bar, Macaroni salad, Fruit bar, Bread bar, Ice cream bar, Beverage bar

DINNER:

Corn chowder, Chicken Alfredo, Roast pork, Roasted pepper potatoes, Boiled penne pasta, Honey dijon vegetables, Broccoli, Dutch apple pie, Hermits, Salad bar, Fruit bar, Toasted garlic bread, Bread bar, Beverage bar

SAMPLE MENU 3

BREAKFAST:

Hot oatmeal, Cereal (healthy & sweet varieties), Griddle fried eggs, Cooked eggs, Mexican egg bake, Omelet bar, French toast w/assorted toppings, Oven fried bacon, Sausage gravy w/biscuits, Cottage fried potatoes, Cinnamon crumb top muffins, Pastry bar, Fruit bar, Yogurt (asstorted flavors, low fat), Bread bar, Beverage bar

LUNCH:

Knickerbocker soup, Sandwich (bacon, lettuce & tomato), Turkey pot pie, Oven browned potatoes, Pasta, Asparagus, Carrots, Strawberry shortcake, Creamy rice pudding, Salad bar, Deviled potato salad, Fruit bar, Bread bar, Beverage bar

DINNER:

French onion soup, Shrimp scampi, Roast beef, Long grain & wild rice, Garlic cheese potatoes, Au jus gravy, Brussel sprouts, Corn on the cob, Strawberry shortcake, Creamy rice pudding, Salad bar, Fruit bar, Whole wheat rolls, Bread bar, Beverage bar

Special Purpose Rations

Special purpose rations are unique types of rations including tube foods for high altitude reconnaissance pilots, training, survival, special religious requirements, commercial products to augment industrial production surge, and specialty items and ehnancements.

Special purpose rations are designed to meet special unique requirements of users and/or enviroments.

The diverse mission requirements of the Warfighter result in operating in environments that may require emergency rations to ensure survival in the most harsh conditions on the planet. Therefore, CFD continuously strives to ensure our pilots and sailors have the correct nutritional balance to sustain themselves if forced to abandon ship or aircraft.

Our diverse population throughout the military consists of Warfighters with varied religious backgrounds, resutling in Kosher/Halal rations they can receive from the chaplains.

One of the most unique products produced within Combat Feeding is tube food, a specialized ration for pilots that fly at such high altitudes they cannot remove their helmet to eat.

These special purpose rations ensure our Warfighters are properly prepared to operate under any conditions possible throughout the world.

Combat Feeding Directorate
Product Spotlight

Tube foods keep U-2 pilots flying high

By Bob Reinert, USAG-Natick Public Affairs / NATICK, Mass. (January 18, 2013)

Imagine Key lime pie squirting out of a container roughly the size of a tooth-paste tube.

One group of high-flying consumers has given two thumbs up to the dessert choice. These discerning diners also think beef stew, truffle macaroni and cheese, chicken a la king, and, especially, home fries and bacon from a tube, are out of this world -- or at least in the upper atmosphere.

That's because they fly U-2 reconnaissance aircraft for the Air Force and its NASA research equivalent, the ER-2. Try chowing down while wearing a pressurized suit and helmet at the edge of space, and you'll soon discover why these elite pilots have come to regard the tube foods, produced only by the Department of Defense Combat Feeding Directorate at Natick Soldier Research, Development and Engineering Center, as the very height of culinary achievement.

"We've been making these for years and years," said Dan Nattress, a food technologist with Combat Feeding.

Combat Feeding has been supplying tube foods to U-2 pilots for five decades. For a community of only about 100 pilots, CFD supplies approximately 28,000 tubes annually of the food, which has a shelf life of three years at 80 degrees.

The silver containers attached to feeding probes insert through ports in their helmets and provide nourishment on flights that can last as long as 12 hours. That makes caffeine a popular ingredient among pilots.

"The aircraft itself is every difficult to fly, and it's actually very difficult to land," Nattress said. "They want to be very alert when they land. Fairly soon before they're landing, they'll open up a caffeinated product."

The tube food menu also needed a boost three years ago, when the Air Force asked CFD to bring its products into the 21st century.

"Things change," Nattress said. "In the 1970s, your expectations were different than what they are in the 2000s. We had no direct communication with the user prior to 2010."

To rectify that, Nattress and Deborah Haley, chef and physical science technician with CFD, visited Beale Air Force Base, Calif., from which the U-2s fly.

"Since then we've had a few pilots who have come here and walked through," said Nattress, "and they are just totally amazed at what we do to make these."

At Beale, Nattress and Haley got a taste of a pilot's life, even trying on the pressurized gear.

"Things are a lot more difficult," Haley said. "Once you're fully suited and under pressure and connected to oxygen, there's no movement inside the helmet, except when you breathe in and breathe out.

"So swallowing is a conscious effort. You have to actually think about that, because there's no air movement. It's a lot different sort of feeling to it."

Once pilots are fitted to the four-layer suits by a pair of technicians, they are then shoehorned into the U-2 cockpits, which actually do have heaters to warm the food.

"I mean, the suit itself is one thing, and you look inside the cockpit -- it is just very small," Nattress said. "It really gave us a much better idea of what they go through on a regular basis."

The Air Force asked CFD to produce four products identified by pilots -- Peach Melba, Beef Stroganoff, Key lime pie, and a breakfast item, which became bacon with hash browns. They were added to a revamped 15-item menu, all made with fresh ingredients ground to fit in the tubes.

"They didn't want us to completely revise all of the products, but we knew that there were things that we could do to improve them that wouldn't be major," Haley said. "We made some suggestions to develop layers of flavors, and that's my whole thing, is really developing layers of flavors in these tubes.

"So that was the thing just tweaking it and taking it (to) the next level," he continued. "Now the pilots are getting really excited about the food. It's so much better."

Certainly, Nattress and Haley have faced challenges and experienced a failure or two along the way. In the early stages of developing the now successful Peach Melba, Nattress recalled that it had a "dirty sock kind of taste."

Much the same as the pilots they serve, however, the CFD staff continues to push the envelope. In the near future, for example, chicken tortilla soup will find its way onto the menu.

"We're constantly thinking ahead," Haley said. "It takes a while to find just the right balance so that when it comes out of the tube, you've hit just the right flavor profile."

Haley said that she just wants people to know about the science and hard work that go into improving the quality of life for Air Force and NASA U-2 pilots.

"We're such a unique program," Haley said. "There's no one else doing what we're doing."

SPECIAL PURPOSE RATIONS:

Tube Foods

PURPOSE

The purpose of tube food is to feed U2 reconnaissance pilots in the U.S. Air Force (USAF) during missions that may last as long as 12 hours. The high altitude profile of these missions requires pilots to wear full pressure suits and helmets that cannot be removed, making it impossible for them to consume conventional rations. Tube food attaches directly to a feeding tube that extends through a receptacle on the helmet to the inside where the pilot is able to sip the food from the straw-like tube. The Combat Feeding Directorate is the sole supplier of tube foods to the USAF and has unique facilities and food processing equipment to produce a wide variety of these highly specialized, unique products. All tube foods provided to the USAF meet strict requirements for percentages of fat, protein, and carbohydrates while being flavorful and easy to consume and digest. These requirements result in a product that provides sustenance sufficient enough to enable pilots to perform exhausting physical and cognitive duties for periods up to 12 hours.

CHARACTERISTICS

Each tube contains approximately 4.75-5.0 oz (134-141 g) of product and has a shelf life of 3 years at 80˚F (27˚C) and 6 months at 100˚F (38˚C).

VARIETY

- **Entrées:** Beef & Gravy, Beef Stew, Beef Stroganoff, Hash Browns w/ Bacon, Chicken a la King, Truffle Mac and Cheese, Polenta w/ Cheese and Bacon
- **Fruits:** Applesauce, Peaches, Pears, Cinnamon Zapplesauce®
- **Puddings & Desserts:** Apple Pie, Apple Pie w/ Caffeine, Chocolate Pudding, Chocolate Pudding w/Caffeine, Peach Melba, Key Lime Pie

NUTRITIONAL DATA

Each tube provides 150-300 calories.

PREPARATION REQUIREMENTS

All tube foods are ready to eat. The pilot simply removes the cap to the tube food and connects it to the feeding tube in his/her helmet. The cockpit is equipped with a heater if the pilot wants warm food.

COMMENTS

The Air Force is interested in enhancing tube foods with nutritional supplements for increased endurance and optimal performance during extended or long mission objectives, as well as to provide additional short-term energy, which is particularly critical when landing an aircraft. Caffeinated chocolate pudding was successfully introduced in 2004 to enhance U2 Pilots' cognitive response and reduce fatigue and stress. Ongoing research and development is evaluating other methods of enhancing tube foods with nutrient supplementation and carbohydrate/electrolyte products.

Tube foods are often referred to as high-altitude rations, or "foods with altitude."

SPECIAL PURPOSE RATIONS:

Meal, Religious, Kosher/Halal

PURPOSE

The Meal, Religious, Kosher/Halal is utilized to serve those individuals in the military service who maintain a strict religious diet.

CHARACTERISTICS

Each meal consists of two components: (1) an entrée (pouch in box) certified and labeled as Glatt Kosher or Dhabiha Halal and a common accessory pack certified by both Kosher and Halal authorities. Kosher and Halal entrées, however, are never cased together; they are purchased separately from different companies. For each ration, entrées are delivered in a mixed case of 12 meals, and the accessory packs delivered in a separate carton of 12. Both the entrée case and the accessory pack case are then packed side-by-side in a master case. Minimum and maximum expected shelf life at delivery are three and 10 months, respectively. Complementary menu components are commercial items and include a beverage base (hot or cold), cereal, bakery items (bagel chips, granola bars, etc.), and fruit/nuts (raisins, peanuts, etc.). Accessory items include salt, pepper, sugar, spoon, toilet tissue, FRH, and a moist towelette.

NUTRITIONAL DATA

Each menu provides approximately 1200 calories (11-13% protein, 37-40% fat, and 48% carbohydrate).

PREPARATION REQUIREMENTS

The entire meal is ready-to-eat, except for the beverages, which need to be rehydrated. Although the entrée may be eaten cold when operationally necessary, it can also be heated by immersion in hot water while sealed in its individual package or by using the FRH provided in the accessory packet.

PRODUCT NOTES:

- Components & accessory items are packaged together and shipped in the same case with the entrées.
- Component/accessory items contain brand name items.

Meal, Religious, Kosher for Passover

PURPOSE

The purpose of this ration is to feed those individuals in the military service who maintain a Kosher for Passover diet by providing three meals per day for not more than eight days during their observance of Passover. Like the MRE, it is a totally self-contained meal combined in one single flexible meal bag.

CHARACTERISTICS

The ration provides individual meal bags for 12 meals. Each meal bag consists of an entrée, complementary food items, and accessory items (i.e., salt, sugar, spoon, matches, toilet tissue, moist towelette, and FRH, as applicable). Additionally, each case has a box of matzo crackers and a feedback survey. The entire food contents of each meal are certified Kosher for Passover. The minimum shelf life is nine months at 80°F (27°C) from the time components are assembled into the meal packet.

PRODUCT NOTES:

Menus are to be supplemented with one ounce of matzo crackers to meet minimum nutritional requirements per day.

NUTRITIONAL DATA

The contents of one meal bag provide a minimum of 1200 calories. The complete contents of each meal bag, supplemented with matzo crackers packed separately in the case, provides sufficient nutrition to adequately sustain a moderately active, healthy individual for one meal and contains 29-42% fat, 9-13% protein, and no less than 48% carbohydrate.

PREPARATION REQUIREMENTS

With the exception of beverages, all food components are ready-to-eat. The entrée may be warmed using an FRH as applicable by menu.

COMMENTS

The availability of this meal is limited to the months leading up to the Passover holiday time frame.

MENU 1

Beef stew, Dried fruit, Raisins, Nuts (e.g. walnut, almond), Jelly/jam, Cookies, Coffee, Tea, Sugar, Salt, Toilet tissue, Spoon, Moist towelette, Matches, FRH

MENU 2

Salmon, Dried fruit, Raisins, Nuts (e.g. walnut, almond), Jelly/jam, Cookies, Coffee, Tea, Sugar, Salt, Toilet tissue, Spoon, Moist towelette, Matches, FRH

MENU 3

Bone-in chicken, Dried fruit, Raisins, Nuts (e.g. walnut, almond), Jelly/jam, Cookies, Coffee, Tea, Sugar, Salt, Toilet tissue, Spoon, Moist towelette, Matches, FRH

RATION COMPONENTS:

- Cornflake bar (2)
- Shortbread bar (1)
- Wintergreen tablets (1)
- Granola bar (1)
- Chocolate chip bar (1)
- Soup & gravy base (1)
- Sweetened lemon tea (1)

Food Packet, Survival, General Purpose

PURPOSE

The Food Packet, Survival, General Purpose is used by the Services to sustain an individual in survival situations, including escape and evasion, under all environmental conditions, and when potable water is limited. Requested by the Air Force, it is typically stored in the survival kit on aircraft and is meant to provide basic sustenance for periods less than five consecutive days.

CHARACTERISTICS

The ration contains six compressed bars, two cereal bars, three cookie bars and a wintergreen glucose bar. The bars are vacuum-sealed in trilaminate foil pouches and packed in a water resistant, paperboard box. Sweetened lemon tea and soup broth powder are also included. The storage requirement for this ration is five years at 80°F (27°C) and one month at 140°F (60°C). There are 24 food packets per shipping container.

- Weight: 18.2 lbs (8 kg)/case; 11.4 oz (.3 kg)/packet
- Cube: 0.520 ft3 (20 dm3)/case; 24 in3 (.4 dm3)/packet

NUTRITIONAL DATA

Each packet provides 1435 calories (5% protein, 39% fat and 56% carbohydrate). In order to minimize metabolic water requirements less than 8% protein is an Air Force operational requirement. If the product is required to be used in a salt-water survival scenario the consumption of the soup broth is not recommended.

PREPARATION REQUIREMENTS

No preparation is required. The cereal bars can be broken into pieces and rehydrated with water if desired. Fourteen ounces (.4 liters) of water are required to reconstitute the lemon tea and the soup broth powder.

COMMENTS

The original Food Packet, Survival, General Purpose was type classified in 1961, replacing all other survival packets except those designed for space constraints and water limitation (Abandon Ship and Aircraft, Life Raft). This first packet was packaged in a tin-plated can. Limited procurement quantities contributed to the unavailability of the can and some of the original components. The product was redesigned and changes incorporated into the product in 1993. The improvements included a 42% increase in calories and greater component variety. The Food Packet, Survival, General Purpose has a verified five year shelf life.

SPECIAL PURPOSE RATIONS:

Food Packet, Survival, Abandon Ship

PURPOSE

The Food Packet, Survival, Abandon Ship is used by the Navy to sustain personnel who must abandon ship. It is positioned in lifesaving craft aboard larger ships.

CHARACTERISTICS

The packet contains dense commercial food bars that are required not to provoke thirst. The food bars are required to meet a minimum five year shelf life which is verified by a certificate of compliance from the manufacturer. There are a minimum of six equally shaped, individually wrapped bars per vacuum sealed laminated foil pouch. The food packet does not exceed 36.6 cubic inches (.6 cubic decimeters) or a weight of 20 ounces (.5 kg), which are the maximum measurements for the packet to fit in the storage areas of lifesaving craft.

- Weight: 48 lbs (22 kg)/case; 20 oz (.5 kg)/packet maximum
- Cube: 1.36 ft3(39 dm3)/case; 36.6 in3 (.6 dm3)/packet

NUTRITIONAL DATA

The food packet has a minimum of 2400 calories and 54% carbohydrate. The maximum protein content is 8% and the maximum salt content is .5%. Restriction of the protein and salt content are advantageous in minimizing the negative metabolic effects of short term fasting. This product is strictly a short term survival ration for three to five days. The food bars are compatible with potable water restrictions.

PREPARATION REQUIREMENTS

No preparation is necessary.

COMMENTS

Experiences with ocean disasters have shown that other supplies, such as lifesaving equipment and drinking water, were more critical to survival for the three to five day abandon ship scenario. Minimizing cube is essential if a food packet is included in the life craft cargo. The current packet is a commercial product first available in 1997. The Navy would prefer to have shelf life extended on this product to simplify the logistical restocking schedule. The previous version of the ration contained hard candy and chewing gum like the Food Packet, Survival, Aircraft, Life Raft (described on next page). Earlier versions contained starch jelly bars, candy coated chewing gum, mint tablets, matches and a cigarette pack.

SPECIAL PURPOSE RATIONS:

Food Packet, Survival, Aircraft, Life Raft

PURPOSE

The Food Packet, Survival, Aircraft, Life Raft is used by the Navy to sustain personnel that survive air crashes at sea. The packet, along with other essential equipment, is supplied in the emergency kits carried aboard naval aircraft.

CHARACTERISTICS

The packet contains either hard candy or candy coated chewing gum. The contents are overwrapped in a flexible interlocking closure laminated foil pouch. An instruction sheet is included in the food packet explaining that the food contained in the packet will be beneficial for a 24 hour period even when water supply is limited. The components are required to have a minimum shelf life of five years. The hard candy component has shown stability at extreme temperatures (three years at 100°F (38°C)) and 10 year acceptable quality at 80°F (27°C).

- **Weight:** 8 lbs (3.6 kg)/case; 3.5 oz (99 g)/packet
- **Cube:** .24 ft^3(6.8 dm^3)/case; 12 in^3 (.2 dm^3)/packet

NUTRITIONAL DATA

Each packet provides approximately 300 calories (100% carbohydrate). It is strictly a short-term survival food. The consumption of this ration will help to minimize the negative metabolic effects of short term fasting. The components are compatible with potable water restrictions.

COMMENTS

The Navy only requires small quantities of this product, and procurement is limited but purchased regularly. In 2011, Navy concurred with the use of an interlocking closure pouch instead of twine to reseal the contents within the pouch.

SPECIAL PURPOSE RATIONS:

Ultra High Temperature (UHT) Milk

PURPOSE

This item is used by the Armed Forces as a mandatory supplement and/or enhancement for operational ration feeding during operations which either do not have refrigeration capability or have limited capability. It is used in situations that do not permit resupply of perishable foods.

CHARACTERISTICS

Ultra High Temperature (UHT) Milk is fresh milk that has been heat processed using UHT technology. The UHT process ensures maximum retention of flavor and nutritional value. The aseptic processing and packaging system protects the product from microorganisms, air and light, which assures a long shelf life without refrigeration. The shelf life of UHT milk is 10 months (unopened) when stored at 80°F (27°C).

- **Weight:** 16.4 lbs (7.4 kg)/case
- **Cube:** 0.33 ft^3 (9.3 dm^3)/case

NUTRITIONAL DATA

The nutritional values per 8 oz. (236 mL) are:

- **Whole White:** 150 calories (30% fat, 40% carbo-hydrate, 30% protein)
- **Whole Chocolate:** 230 calories (21% fat, 58% carbohydrate, 21% protein)
- **Reduced Fat Chocolate 2% milk fat:** 170 calories (14% fat, 64% carbohydrate, 22% protein)
- **Reduced Fat Strawberry 2% milk fat:** 170 calories (13% fat, 66% carbohydrate, 21% protein)
- **Reduced Fat White 2% milk fat:** 120 calories (21% fat, 46% carbohydrate, 33% protein).

ULTRA HIGH TEMPERATURE (UHT) MILK

FREQUENTLY ASKED QUESTIONS

Who establishes the dietary and nutritional guidelines of operational rations?

These guidelines are established in accordance with U.S. Army Regulation 40-25, Nutritional Standards and Education, which defines nutritional standards, termed military dietary reference intakes (MDRI) for military feeding and nutritional standards for operational rations (NSORs).

Where can I purchase MREs?

DLA-Troop Support is the procuring agency for military rations. Their customer eligibility policy is as follows: "It is DLA-Troop Support policy NOT to sell rations to individuals, whether members of the Armed Services or civilians. The DoD regulations and DLA-Troop Support policy permit the sale of rations to the following: U.S. military organizations, federal government-funded activities, activities empowered to perform a federal-government-legislated function, a DoD sponsored non-appropriated fund instrumentality, a State Department sponsored employee commissary located outside the U. S., a foreign government when an authorized contractual relationship has been established, a federal government contractor, when the contract specifically provides for the purchase of stock fund items by the contractor and other entities when authorized by duly appointed officials. In some instances sales are only permitted to these entities if other conditions are met.

Commercial versions of MREs may be purchased from the Wornick Company, SOPAKCO, and AmeriQual.

Is the First Strike Ration (FSR) a replacement for the MRE?

No. The FSR is a restricted-use ration that provides fewer calories than an MRE. The menu components are designed to be compact, eat-on-the-move to be used during periods of highly intense, highly mobile combat operations.

Where can I find the ingredients list for each of the MREs?

The ingredients list is provided on each of the food labels of the operational ration.

How are rations/menus added or removed from MREs?

Each year new menus are developed in compliance with Office of the Surgeon General (OTSG) nutritional requirements for an entrée, starch, beverage, snack/candy, condiments, and accessory pack. Products are evaluated by trained sensory panelists and rated on a Quality Scale of 1 to 9 with 1 being extremely poor and 9 excellent. For a product to be accepted it must have a score of 6 or better. Acceptable candidate items are subsequently field tested with Warfighters and rated on a Hedonic Scale of 1 to 9 with 1 being dislike extremely to 9 being like extremely. Again 6 or better is the acceptable score. Questionnaires are also included to determine which items to add or delete from the current MRE. Once the scores are tabulated, the highest scoring items are recommended as replacement items of those receiving the lowest overall scores. Field tests are conducted approximately three years ahead of the ration procurement cycle. For example, testing performed in 2012 determines which items are included in 2015 procurements. This time allows for all approved field tested items to be put into long term storage to collect the 3-year shelf life data. To date, 261 new items have been approved and 64 items removed.

Are MREs allergen free?

No. Operational rations may contain ingredients that are allergens, potentially causing adverse health effects to Warfighters with severe food allergies. The eight major food allergens are milk, egg, soy, peanuts, tree nuts, fish, shellfish and wheat.

Many military rations contain gluten, a protein which is present in barley, rye, wheat and oats. In addition, food allergies may lead to under-consumption of operational rations and may cause potentially serious health risks including anaphylaxis that may trigger a series of symptoms affecting the respiratory system, gastrointestinal tract, skin, or cardiovascular system. These reactions can be mild to life threatening. The only way to prevent an allergic reaction to a particular food is to avoid it. The Food Allergen Labeling and Consumer Protection Act has required that since January 2006, all commercial and military ration manufacturers of packaged foods containing any of the eight major allergens list the allergens present in the food ingredient statement. In addition, manufacturers are encouraged to avoid/eliminate cross-contamination and to follow good manufacturing practices to help eliminate adverse allergic reactions in food components present in combat rations.

The labeling of allergen warnings on combat ration components is meant for consumer education but not to indicate the suitability of combat rations for deployed Warfighters with severe food allergies or food intolerances. Only a Warfighter's primary medical care provider is qualified to make determinations as to deployment status due to food allergies or food intolerance.

Are Kosher rations available for Warfighters observing Passover?

Yes. The availability of this meal is limited to the months leading up to the Passover holiday time frame and requirements/pre-orders submitted by the Services. The purpose of this ration is to feed those individuals in the Military Services who maintain a Kosher for Passover diet by providing three meals per day for not more than eight days during their observance of Passover. Like the MRE, it is a totally self contained meal combined in one single flexible meal bag. The complete contents of each meal bag, supplemented with Matzo crackers packed separately in the case, provide sufficient nutrition to adequately sustain a moderately active, healthy individual for one meal.

What about brand name products?

By law, the government is prevented from specifying brand name products. When purchasing ration components, DLA-Troop Support utilizes performance based contract requirements that are generic enough to allow any company with the appropriate capabilities to produce the product. Because of this, the origin of products or brand can vary from contract to contract as long as the product meets the performance based requirements.

Why aren't nutritional supplement products available in operational rations?

Nutritional supplement products are highly marketable and it is fast growing industry. CFD receives numerous requests from companies regarding ingredients and nutritional supplements that make health claims to improve physical and cognitive performance. We are continually researching functional food additives for potential inclusion in military rations. The research, data and validation of clinical trials must be reviewed thoroughly and approved by the DoD Nutrition Committee.

Why aren't energy drinks provided in operational rations?

The beverages included in operational rations are designed to promote hydration, be lightweight, low cube, and provide the Warfighter with additional carbohydrates and/or electrolytes. Popular liquid energy drinks are not included in operational rations because they do not meet the volume and weight restrictions. Many companies are referred to the Army Air Force Exchange Service (AAFES) to market their products and make them available to Warfighters.

What are the numbers on cases of MREs?

They are referred to as date-of-pack markings. Every case of MRE is required to have a lot number, the first four digits of which represent the day on which it was assembled. This date-of-pack is represented by a Julian date code. The first digit represents the year-of-pack, and the next three digits represent the day of that year. For example, the lot code 1010 would represent the date as January 10, 2011 (the 10th day of 2011). Lot code 1365 would represent December 31, 2011 (the 365th day of 2011). Usually the side panel of the case has both a date packed (in either an open date or a Julian date) and also has an inspection/test date (usually a month/year). This inspection test date is three years after the ration was assembled. At 80°F (27°C) storage, that would be the end of the product's shelf life. Rations are often inspected and their shelf life may be extended beyond the inspection test date, but that is done by trained U.S. Army veterinary food personnel inspecting the rations.

What are the orange circles on the cases of MREs?

The orange circles are called Time Temperature Indicator (TTI) Labels and are used to estimate whether the MRE has reached or exceeded its expected shelf life. The labels have an outer reference ring and an inner circle. The inner circle darkens with time, darkening more quickly as the temperature increases. TTIs are read by comparing the color of the center to the reference ring that surrounds it. Initially, each TTI has a "bulls-eye" appearance, with the center being much lighter than the dark reference ring. Over time, the center will darken until it exactly matches the reference ring, giving the appearance of a large solid circle on the TTI. Gross observation can be used to quickly determine whether the product has remaining shelf life (center lighter), has reached the end of its expected shelf life (center the same) or has exceeded its expected shelf life (center darker). To be sure MREs are still serviceable. they should be inspected by trained veterinary food inspectors or services preventive medicine personnel.

What is DoD doing about removing or reducing the trans fat content of operational rations?

CFD is well aware of the health issues relative to the use of trans fatty acids (TFAs) in commercial foods and military rations. Due to the rotation of MRE stocks and the shelf life requirement, any replacement of TFA products in military rations must be closely evaluated and tested. Because the reformulation of operational ration products could have a significant adverse impact on the shelf life of operational rations, shelf life studies need to be conducted to ensure that requirements are met. Once these criteria and other factors are met, the reformulated operational ration products/documentation will be transitioned to DLA-Troop Support for procurement.

Are MREs irradiated?

No. MREs are not irradiated but undergo a retorting process similar to commercial practices. Retorting is a thermo-stabilization process using a combination of time, temperature, and pressure in a "pressure cooker-like" apparatus. This process in concert with entrée quad-laminate packaging enables the MRE to have its extended shelf life and withstand the rigors of extreme military conditions during storage and transportation.

Why don't MREs contain dental hygiene products such as a toothbrush/tooth paste or floss?

Dental hygiene-type items have been considered and/or tested in the recent past for possible inclusion in the MRE accessory packet. However, it was decided that these types of non food items were better suited for inclusion in the Health and Comfort Packs that are available for purchase from DLA-Troop Support. These kits provide forward area troops the everyday necessities required for their health and comfort when the local Post Exchange system or stores are not available.

Does the CFD utilize "green" packaging?

CFD recognizes the environmental impact caused by ration waste, and is currently working on developing packaging that is bio-based and bio-degradable. Current initiatives include degradable trash bags, bio-based dining packets and serving utensils. Research is currently being conducted to improve the packaging, but due to stringent shelf life requirements, the current ration packaging is not bio-degradable. Technological advancements in polymers and nanotechnologies will hopefully provide less packaging and reduce the waste generated.

Is there a way to add dietary fiber to our rations?

All operational rations currently meet or exceed the Institute of Medicine Daily Reference Intakes (DRI) for dietary fiber. Current efforts within the Individual, Assault/Special Purpose and Group Ration Improvement Projects include increasing the number of highly acceptable whole grain and whole wheat components.

LIST OF ACRONYMS

AAFES....American Armed Forces Exchange Service

BIB.....Boil-in Bag

CFD ..... Combat Feeding Directorate

CHO ..... Carbohydrate

CONUS ..... Continental United States

CPI..... Continuous Product Improvement

DLA .....Defense Logistics Agency

DoD.....Department of Defense

DRI ..... Daily Reference Intake

FRH ..... Flameless Ration Heater

FSR .....First Strike Ration

GTMO .....Guantanamo Bay

GTW .....Go-to-War Ration

JSORF.....Joint Services Operational Rations Forum

LFWG..... Low Fat, Whole Grain

MCI ..... Meal, Combat, Individual

MDRI ..... Military Dietary Reference Intake

MORE ..... Modular Operational Ration Enhancement

MCW/LRP .....Meal, Cold Weather/ Food Packet, Long Range Patrol

MRE.....Meal, Ready to Eat

NATO .....North Atlantic Treaty Organization

NSN.....National Stock Number

NSCM .....Navy Standard Core Menu

NSRDEC..... Natick Soldier Research, Development and Engineering Center

OCONUS .....Outside Continental United States

ODS .....Operation Desert Storm

OEF .....Operation Enduring Freedom

OIF.....Operation Iraqi Freedom

OTSG.....Office of the Surgeon General

SOF ..... Special Operations Forces

TFA..... Trans Fatty Acids

TOTM .....Tailored Operational Training Meal

TTI ..... Time Temperature Indicator

UGR .....United Group Ration

UGR-A.....Unitized Group Ration A

UGR-M ..... Unitized Group Ration M

UGR-E.....Unitized Group Ration Express

UGR-H&S .....Unitized Group Ration Heat and Serve

UHT.....Ultra High Temperature

USAF .....United States Air Force

USMC .....United States Marine Corps

USN..... United States Navy

USSOCOM ..... United States Special Operations Command

QUICK REFERENCE DATA

RATION	NSN	PURPOSE	WEIGHT/ UNIT	VOLUME	NUTRITION
MRE	8970-00-149-1094	General Purpose	1.5 lbs (.68 kg)/meal	.08 ft^3 (2.27 dm^3)/meal	1300 Cal
FSR	8970-01-543-3458	Assault	2.5 lbs (1.14 kg)/ration	.11 ft^3 (3.1 dm^3)/ration	2900 Cal
MORE	Multiple	Nutritional Enhancement	.75 lbs (.34 kg)/pack	Varies	1100 Cal
MCW	8970-01-467-1753	Cold Weather	1 lbs (.45 kg)/meal	.04ft^3 (1.1 dm^3)/meal	1450 Cal
LRP	8970-01-467-1749	Assault	1 lbs (.45 kg)/meal	.04ft^3 (1.1 dm^3)/meal	1450 Cal
UGR-E	Multiple	Group, Self-Heating	43 lbs (19.5 kg)/module	1.9 ft^3 (53.8 dm^3)/module	1300 Cal
UGR-H&S	Multiple	Group	124.5 lbs (56.6 kg)/module	5.25 ft^3 (148.7 dm^3)/ module	1450 Cal
UGR-M	Multiple	Group	124.5 lbs (56.6 kg)/module	5.25 ft^3 (148.7 dm^3)/ module	1300 Cal
UGR-A	Multiple	Group (Perishable)	100 lbs (45.5 kg)/module	5.25 ft^3 (148.7 dm^3)/ module	1450 Cal
Arctic Supplement	8970-01-470-5075	Nutritional Enhancement	60 lbs (27.3 kg)/module	5 ft^3 (141.6 dm^3)/module	914 Cal
TOTM	Multiple	CONUS Training	1.66 lbs (.76 kg)/meal	.04 ft^3 (1.1 dm^3)/meal	1000 Cal
GTW	N/A	Special Purpose	Varies	Varies	1300 Cal
Survival, General Purpose	8970-00-082-5665	Special Purpose	.71 lbs (.32 kg)/packet	.01 ft^3 (.283 dm^3)/packet	1435 Cal
Survival, Abandon Ship	8970-01-434-3192	Special Purpose	1.25 lbs (.5 kg)/packet	.02 ft^3 (.566 dm^3)/packet	2400 Cal
Survival, Aircraft, Life Raft	8970-01-028-9406	Special Purpose	.22 lbs (.1 kg)/packet	.01 ft^3 (.2 dm^3)/packet	300 Cal
HDR	8970-01-375-0516	Humanitarian Relief	2.5 lbs (1.14 kg)/ration	.102 ft^3 (2.9 dm^3)/ration	2200 Cal
MARC	8970-01-499-7645	Religious Preference	1.7 lbs (.77 kg)/meal	.06 ft^3 (1.7 dm^3)/meal	700 Cal

CONTACT INFORMATION

WANT TO LEARN MORE?

If you would like more information about the DoD CFD and the products and programs described in this book, please visit our website. The website contains fact sheets on rations and emerging food technologies as well as field feeding equipment developed at the DoD CFD. You can also learn about our teams and unique facilities and view a historical presentation on rations.

hotchow.natick.army.mil

HAVE FEEDBACK ON RATIONS?

Please submit your comments, questions, and ideas to:

usarmy.natick.nsrdec.mbx.nati-amsrd-nsc-ad-b@mail.mil

You may also contact us at:

U.S. Army Natick Soldier RD&E Center
DoD Combat Feeding Directorate
Kansas Street Natick, MA
01760-5018

Commercial Phone: (508) 233-4670, DSN: 256-4670

NEED TO ORDER RATIONS?

Customers interested in ordering fielded rations described in this book should contact DLA-Troop Support as listed below. The website provides National Stock Numbers, pricing information, and a point of contact for each of the operational rations in this book.

Defense Logistics Agency - Troop Support
Directorate of Subsistence - Operational Rations
700 Robbins Avenue
Philadelphia, PA
19111-5092

Commercial Phone: (215) 737-2952

www.troopsupport.dla.mil/subs/rations/index.asp

U.S. Army Natick Soldier RD&E Center
DoD Combat Feeding Directorate
AMSRD-NSC-CF, Kansas Street
Natick, MA 01760-5018

Commercial Phone: 508.233.4670
DSN: 256.4670

hotchow.natick.army.mil