ORA Laboratory Support for the CFSAN's Radiological Programs

In the area of analysis of radionuclides in foods, ORA and CFSAN have established and maintained a close working relationship and communication. ORA's analytical and method development capabilities in analyzing radionuclides in foods have been unique assets to the CFSAN's food safety monitoring programs. CFSAN's program contacts have been very helpful in providing guidance. Currently, ORA is responsible for laboratory analysis of the samples under the following two CFSAN's radiological programs:

- Radionuclides in Foods (PAC Code 04109C)
- Total Diet Study (TDS) (PAC Code 04839)

The Radionuclides in Foods program (PAC 04019C) dictates conducting routine analysis for the presence and levels of radionuclides in food samples collected domestically in the areas near nuclear power plants and import samples collected from countries most likely to have food products contaminated with radionuclides due to certain incidents.

The Total Diet Study program (PAC 04839) was designed for determining levels of various contaminants and nutrients in foods purchased throughout the U.S. and prepared as they would be consumed. One of the components of the program is to monitor for radioactive contamination of foods, which provides a basis for realistic evaluations of the Dietary intakes of the tested radionuclides by the U.S. population.

Technical expertise within the radionuclide program is further utilized by CBER and CDER in ORA's analytical laboratory capabilities and technical assistance in inspectional assignments for the radiopharmaceutical programs. Besides implementing the Agency's radiological programs as outlined in the ORA Work Plan, the radiological laboratory is also responsible for and undertaking the following programs:

- Department of the State/Embassy samples - Radiological analysis of samples collected from the US Embassies under MOU with the United States Department of the State
- Department of Energy samples - Split Battelle samples for radiological analysis under MOU with the Department of Energy.
- MOU with USDA/FSIS - Radionuclide analysis of USDA regulated products in case of emergency - USDA does not have any radiological capabilities or laboratories.
- Food Emergency Response Network (FERN) committee memberships and participation in committee assignments, National Coordination Group ((NCG) radiological subset of the ICLN)
- Establishing a FERN reference laboratory
- Fast screening methods development for Alpha-/beta-emitting Radionuclides
- Training programs for radiological component of FERN laboratories

components to assisting public health and medical effects resulting from hazards. Such tasks may include …; conducting field investigations, including collection and analysis of relevant samples; providing advice on protective actions related to direct human and animal exposures, and on indirect exposure through contaminated food, drugs, water supply, and other media; …"

- Per the Nuc/Rad Incident Annex Other Federal Resource Support/Recovery section, "While retaining overall technical lead, a coordinating agency may require support from a cooperating agency that has significant cleanup/recovery experience and capabilities". Also, "Upon request, the Federal government assists State, local, and tribal governments develop and execute recovery plans." And, "EPA has received adequate assurances from the other Federal agencies that they are committing the required resources, personnel, and funds for the duration of the Federal response."

- Per the Nuc/Rad Incident Annex Responsibilities section, "In conjunction with USDA, inspects production, processing, storage, and distribution facilities for human food and animal feeds that may be used in interstate commerce to ensure protection of the public health."

Given today's global economy nature, more and more foods are imported and therefore an incident of food contamination by radionuclides could be as a result of international trade besides the possibility of a terrorist act. This makes CFSAN's Radionuclides in Foods (PAC 04019C) program not only a necessity but also a call for expansion of the program in sample numbers because of the increasing amount of import foods. Furthermore, the Polonium (Po)-210 incident took place in the UK emphasized a need for including certain alpha-/beta-emitting radionuclides in the program. ORA has established FERN to prepare for events that could result in analyzing foods in surge capacity. The radiological component of the FERN has been implemented by WEAC via the ORA's FERN National Program Office (NPO). The ORA and CFSAN, with WEAC's analytical and method development capabilities will be fully capable of supporting food defense program in radiological arena.

The ORA laboratory at WEAC is accredited by the American Association for Laboratory Accreditation (A2LA) for radionuclide detection. A2LA assessors/auditors have visited WEAC twice since last May for the accreditation and both times the lead auditor spoke very highly of the competence, the efforts of the laboratory's analysts and the success of the laboratory. In the ORA radiological laboratory, there are seventeen high purity germanium gamma-ray detectors, most of them with heavy lead shields for fast screening/identifying gamma-ray emitting radionuclides, one ICP Mass Spectrometer especially configured for developing and conducting fast screening and analysis of alpha-emitting radionuclides in foods housed in a re-constructed clean room, two Internal Gas Proportional Spectrometers for alpha-/beta-emitting radionuclides identifications, three Liquid Scintillation Counting Spectrometers for developing and conducting fast screening gross alpha-/beta- emitting radionuclides, three alpha-Spectrometers for identification of alpha-emitting radionuclides, a laboratory room with drying oven, gas ovens and furnaces setup for ashing process for alpha-/beta-emitting radionuclides in

foods analysis and a whole-body counting room isolated with pre-World War II steel walls.

The recent alpha-emitting Po-210 incident took place in the U.K. demonstrated the urgent need for developing fast screening methods for alpha-/beta-emitting radionuclides in foods. Besides the laboratory's high throughput capability of gamma-ray analysis for radioactive contamination of foods, the laboratory's radiochemists have been developing methods for fast screening alpha-/beta-emitting radionuclides in foods. The Po-210 incident also sparked off widespread interest and demand on the analysis of Po-210. To assess laboratory readiness and proficiency, International Atomic Energy Agency (IAEA) organized a worldwide inter-laboratory comparison with emphasis on measurement accuracy and precision as well as the competence of averting false positive or negative result. WEAC voluntarily participated in this campaign and successfully passed all acceptance criteria. More importantly, FDA is the only US regulatory agency that took part in this IAEA Po-210 intercomparison. With experienced radionuclides analysts, the close communication and working relationship with CFSAN, the laboratory is fully prepared for radiological emergency and playing an important role in protecting the nation's food safety and enhancing the nation's food defense.

ORA Laboratory Support for CDRH Programs

Blueprint for Future CDRH/ORA Collaboration

ORA and CDRH have always maintained a strong working relationship in the areas of medical devices and radiation-emitting electronic products. As a result of the proposed reconfiguration of the ORA laboratories, CDRH has discussed, scrutinized, and projected current and future needs from the ORA laboratory system with the following blueprint for future collaboration between ORA and CDRH.

Over the years, ORA has provided the Agency with regulatory sample analyses, methods development and validation, foreign and domestic inspections, and national and international standards liaisons. Without unlimited FTE's, all of these endeavors must be superimposed on limited analytical staff. Success necessitates both internal and external communication and collaboration. Only through the synergy produced by the biotechnical staff interacting daily with the microbiologists, chemists, and engineers can our expectations of ORA's laboratory system be fulfilled. It is for this reason that CDRH requests that ORA commit a single physical laboratory site to the CDRH work plan and methods development goals.

Historically, CDRH has relied heavily on the regulatory expertise of ORA and anticipates both continuing and growing needs into the foreseeable future. The ORA scientists (engineers, physicists, microbiologists, biologists, and chemists) have worked closely with many CDRH offices such as the Office of Science and Engineering Laboratories (OSEL), Office of Communication, Education, and Radiological Programs (OCER), Office of Compliance (OC), and Office of Device Evaluation (ODE) to produce the needed regulatory analyses, failure analyses, test methodology, and inspection reports.

Many of the essential laboratory functions of ORA will be asked to continue in the transformed ORA structure, such as the surveillance sampling and evaluation of the first, most common, and patently most important line of medical defense -- fever thermometers, sphygmomanometers, and diagnostic X-rays. The products which protect our medical professionals and the general public from infectious materials, HIV and hepatitis B, such as medical gloves and condoms, will need persistent evaluation. Likewise, the need to evaluate products which have allegedly caused injury or death will continue. Historically, products such as liquid chemical sterilants and high level disinfectants, blood glucose monitors, dialysis equipment, infusion pumps, implanted nerve stimulators, and respirators have failed and have been evaluated by an ORA laboratory. Tomorrow, a very different set of products will fail and will need analysis to protect the public health. It is here, in the unpredictable future that the synergy of cross-disciplinary collaboration within a single ORA laboratory will lead to minimized risk through maximized regulatory compliance. For example, a problem with a self-monitoring blood glucose device may require the team efforts of an engineer to evaluate the unit's electronics, a microbiologist to handle and prepare the blood samples, and a chemist to analyze the product. Nanotechnology, a newer and diverse technology, links

the sciences of chemistry and microbiology with engineering. ORA is currently collaborating on a nanotechnology project with the Center titled, *Development of a Nanoparticle-Based Bio-Bar Code Amplification (BCA) Multiplex Assay for Rapid and Sensitive Detection of Multiple Pathogens*. Another common example of a product which crosses disciplines is the surgical instrument. For a full evaluation, it must be examined for the effectiveness of its sterilization by a microbiologist, the percentage of metal components needed to be stainless steel by a chemist, and the mechanical attributes which make it function by an engineer. Just as these disciplines of microbiology, chemistry, and engineering function together to assure the quality of a surgical instrument, so too must a diversely-trained ORA laboratory staff collaborate to assure the safety and effectiveness of novel and emerging products.

The limited resources of the foreseeable future necessitate that CDRH and ORA reduce, but not eliminate, efforts on low risk products such as televisions and microwave ovens. The hazards of x-ray emissions from cathode ray tube (CRT) televisions and video monitors have diminished due to careful regulatory oversight, a well-established and conscientious industry, and the increasing market for flat panel displays that do not pose a radiation hazard. A minimal, but risk-based and continued presence by FDA is needed in the television industry to ensure lasting compliance with radiation safety standards for as long as there is a market for CRT products. In contrast, problems continue to be found in the microwave oven industry where radiation safety is not always considered in manufacturing processes. A reduced, but well-focused, emphasis on product testing and inspection should continue, on a for-cause basis, for microwave oven products. ORA should continue to maintain the staff and equipment necessary to rapidly increase sample analysis for such low risk products, should problems be found in either new or established portions of the industry.

CDRH desires other radiological health programs to continue, such as the evaluation of X-ray machines and sunlamps. The methods currently being developed for the testing of diagnostic ultrasound create opportunity in a new product area, while maintaining expertise needed in ultrasound metrology. The main priority of CDRH programs is to ensure radiation safety and promote dose reduction technology and practices for medical diagnostic x-ray equipment. CDRH is shifting the focus of its programs from field testing of single units to inspection of manufacturer quality control testing programs in high-risk product areas. With the advent of portable, hand-held x-ray systems, it is anticipated that laboratory support, in forms of sample analysis or methods development, may increase for these products. ORA should maintain the capabilities to measure all forms of radiation and test a variety of products, particularly ionizing radiation and medical diagnostic equipment.

For several years, ORA has supplied product-expert engineer-analysts to conduct overseas inspections of laser, CRT-based video product, and microwave oven manufacturers. ORA should continue to plan and schedule these foreign electronic radiological product inspectional trips. ORA's product-expert engineer-analysts are intimately familiar with both radiological test instrumentation and procedures and have found and documented many serious, yet subtle, problems of test technique in the foreign

continued safety and effectiveness of medical and radiological devices and prepare for ongoing ORA and CDRH challenges.

WEAC's Unique Capabilities

- Unique Asset – Specialized Radionuclides Analysts

  Radionuclides analysis, especially the analysis of radionuclides in **foods**, is a very narrow scientific field. In this field, expertise and competence have mostly been acquired through training side-by-side with experienced, uniquely qualified analysts - there are no training courses or programs available elsewhere within the Agency, in academia or within the private sector which can replicate such highly specific training. Nationwide, even worldwide, the demand for experienced radionuclides analysts have been very strong. Within the field, it has been a known fact that organizations have budgets to acquire instruments and hire analysts but most of the time are unable to find experienced analysts to conduct radionuclides analysis. WEAC's radionuclides analysts have extensive (averaged over ten years) experience in analyzing and developing methods for fast screening, analyzing alpha-, beta-, and gamma-emitting radionuclides in foods. These radionuclides analysts are unique valuable asset to the FDA especially at the time when the nation is preparing and enhancing its food defense against the terrorist attack on the nation's food supply.

- Engineering Staff Unique Capabilities:

  Engineers at WEAC possess unique skills and multiple capabilities to cover a broad range of devices encompassing all engineering disciplines. These engineering staff attributes have been garnered as a result of prior industry and FDA experience in an array of activities and years of WEAC specialized training by seasoned WEAC staff. In addition to a clear understanding of FDA regulatory protocols concerning sample handling and other areas, engineering analyses performed by WEAC engineering require a rapid understanding of the particular application of the device, the specific technical issues being assessed and rapid development of specific analytical test methods within short timeframes.

  Due to the multidisciplined technical nature of devices analyzed at WEAC, WEAC engineering staff function as a cohesive analytical team, each engineer providing critical technical expertise to a particular analysis. Each analyst, in addition to possessing significant general engineering experience has specific

technical expertise in more than one engineering discipline including mechanical, electrical, electronic, chemical, tooling, polymer and plastic, radiation emitting arenas to name a few. All WEAC engineers are fully trained, experienced and proficient in the use of test instrumentation, hand, power, bench and machine shop tools and fully trained in all laboratory and machine shop safety procedures and protocols.

WEAC's engineers and scientists have been specifically trained and are fully experienced in analyzing, on a "for cause" basis, a wide range of higher risk medical devices including infusion pumps, apnea monitors, ventilators and respirators, diagnostic X-ray machines, defibrillators, electrophysiology catheters, bronchodilators and inhalers, pacemakers, electrode leads, electrocardiographs, and electrosurgical units. WEAC engineers and scientists have the training, ability, and experience to develop and validate test methods which will stand up under legal scrutiny.

In addition to its "for cause" analyses, WEAC participates in the surveillance program for imported medical devices and electronic products. WEAC engineers and scientist routinely analyze substantial numbers of imported medical device samples including medical gloves, condoms, clinical thermometers, syringes, optical lenses, blood pressure meters, needles, bandages, sutures, contact lenses, and surgical and dental instruments, self-monitoring blood glucose device test strips and meters, microwave ovens, computer monitors and receivers, mercury vapor lamps, and sun lamps.

WEAC's laboratory technical staff is also specially trained in investigations and provides technical inspectional assistance for foreign inspections of manufacturers of CDRH regulated products. WEAC analysts on the Foreign Inspection Cadre routinely conduct overseas inspections of laser product, microwave oven, television, and computer monitor establishments as part of the Office of Communication, Education, and Radiation Programs (OCER) enforcement efforts.

In addition to its "for cause" analyses, its routine testing, and its inspectional assistance, WEAC laboratories also analyze medical devices in support of the Office of Criminal Investigations in cases involving suspected fraudulent devices and devices linked to homicide investigations. WEAC technical staff have the

ability to focus on the precise issues and perform analyses which fully address the needs of the Office of Criminal Investigations in each particular case.

WEAC also has in house tooling and device design and fabrication capabilities, and supplies these items to other FDA laboratories.

WEAC provides scientific guidance on device analysis and sampling procedures to field laboratories and device investigators.

WEAC employees serve as FDA liaisons to various ASTM and ISO committees. Responsibilities include drafting new standards, reviewing proposed standards, participating in round robin studies to evaluate new methods, and representing the agency at the meetings.

- Radiological Laboratory

WEAC is the only FDA laboratory that has the capability of analyzing radionuclides in foods and the only laboratory has the legacy and real event experience in handling and analyzing **radionuclides contaminated foods** in surge capacity, e.g., Chernobyl and Three Mile Island incidents. With single story construction allowing realistic arrangement of instruments with heavy lead (Pb) shields, the laboratory is especially setup and equipped with the state-of-the-art instruments for analyzing radionuclides. There are seventeen high purity germanium gamma-ray detectors, most of them with heavy lead shields for fast screening/identifying gamma-ray emitting radionuclides, one ICP Mass Spectrometer especially configured for developing and conducting fast screening and analysis of alpha-emitting radionuclides in foods housed in a re-constructed clean room, two Internal Gas Proportional Spectrometers for alpha-/beta-emitting radionuclides identifications, three Liquid Scintillation Counting Spectrometers for developing and conducting fast screening gross alpha-/beta- emitting radionuclides, three alpha-Spectrometers for identification of alpha-emitting radionuclides, a laboratory room with drying oven, gas ovens and furnaces setup for ashing process for alpha-/beta-emitting radionuclides in foods analysis and a laboratory room, equipped with whole-body counting radionuclides spectrometer system, isolated with pre-World War II steel walls. The whole-body counting room is used for diagnosis if one is suspected of getting contaminated with radionuclides. The recent Polonium (Po)-210 incident took place in the UK stressed the relevance of the whole-body counting room. With its lead

radiochemists and on the job trained radionuclides analysts, WEAC is fully prepared for screening and identifying radionuclides in foods in surge capacity in case of radiological emergency.

- Engineering Laboratory

The laboratory is also specially configured for testing of medical devices in engineering arena.

- It contains Multiple electrical power, water and auxiliary systems and accessories
- The variety of devices tested is readily accommodated by the WEAC facility utilities and specialized distribution systems. These include single and three phase AC power systems with multiple voltage outlets, taps and receptacle types for powering devices of all voltage ratings including. The facility contains domestic and treated water systems and dispensing equipment. In addition, the facility contains a building compressed air system as well as various portable compressors and air/gas tanks to accommodate air flow testing of devices at a wide range of air pressures and flow rates. The building compressed air supply system is of sufficient capacity and is utilized for testing devices requiring specific high pressure and high flow rate compressed air supplies necessary in the performance of number of medical device analyses.
- Specialized construction safety and room testing features are utilized throughout WEAC. X-ray suites are fully protected with lead-lined walls. Darkrooms are utilized for sunlamp testing and X-ray processors. A fully sound-proofed room is utilized for all hearing aid and sound measurement testing. For test generated sound-attenuation purposes, a separate testing room is outfitted and utilized specifically to conduct air burst and other high sound decibel level producing tests. An isolated laser testing suite, with stable table is utilized for performing all laser testing. WEAC staff are trained and experienced in the specific testing conducted, all safety aspects associated with the tests performed as well as overseeing maintenance performed and design enhancements made to these areas.
- Additional safety devices and specialized equipment utilized in high voltage device test areas include the use of oversized wooden laboratory benches and insulated/rubber flooring as well as regulated power supplies and appropriate

circuit protection devices, electronic test device assembly, disassembly and soldering stations with complete anti-static protection devices.

Equally important is the fact that due to the nature of the various engineering analyses performed, WEAC staff are extremely well-versed in testing of devices requiring multiple utility connections and are adept at making the appropriate selections and device component connections for safe and efficient testing. Staff have a full working knowledge of the various electrical, plumbing and mechanical trades and building capabilities as they pertain to specific device testing requirements.

- Microbiological Capabilities
  - Medical Device Sterility Testing

    WEAC is the only FDA laboratory that conducts the analysis of medical devices for sterility. WEAC has an ISO Class 5 clean room. Unlike sterility testing of drug products, medical devices pose a greater challenge. There are a vast number of complex devices that require background knowledge to successfully test them for sterility. WEAC staff have many years of experience in the analysis of medical devices. This experience has also been important in the analysis of counterfeit devices.
  - Biological Indicators

    WEAC is the only FDA laboratory with the expertise and equipment to test biological indicators. WEAC has the capability to determine the efficacy of biological indicators used in the verification of ETO sterility processing. Equipment on hand includes an EO-BIER unit which is a highly specialized piece of equipment requiring a room specifically designed with safety features. The STERIS Joslyn BIER system is designed to provide reproducible reference environmental conditions for evaluating the resistance of microbial populations to sterilization.
  - Disinfectant Testing

    WEAC is one of two labs in ORA that are responsible for the analysis of liquid chemical sterilants / high level disinfectants. WEAC staff have many years of experience in testing of sporicidal efficacy. Additionally, WEAC has an ongoing collaborative agreement with the EPA for AOAC method modifications.

WEAC has experience in the biocidal efficacy testing of contact lens solutions. During a recent incidence involving the association of Fusarium with a contact lens solution it was the WEAC lab that was tasked with carrying out the analytical work.

- *In vitro* diagnostics

  WEAC staff have experience testing a wide range of antigen / antibody in-vitro diagnostic tests. Several notable areas are the *Toxoplasma gondii* IgM pilot study and the post market testing of non-treponemal serological test kits for the Office of Criminal Investigations (OCI). Instrumentation includes Molecular Devices Versa Max Tunable Microplate Reader, Molecular Devices Spectra Max Fluorescence Microplate Reader and protein purification and detection equipment.

  Furthermore, WEAC was the only FDA laboratory that participated in a recent CDC initiated ASTM round-robin study for improving the D6499 ELISA inhibition assay. This required the expertise of preparing the actual kit from its components.

- Filth / Microscopic examination

  WEAC is the only FDA lab with the experience and expertise to determine the presence of filth elements in medical devices. The laboratory has compound light microscopes (standard and inverted), a stereoscopic fluorescent microscope, and polarizing microscopes, some with camera/photographic accessories.

- Large sample handling and testing capabilities

  Due to the typically large sizes and weights of various samples which are analyzed at WEAC, particularly X-ray units and large screen television sets, the WEAC facility possesses numerous features and heavy lifting devices to accommodate large devices received for analysis.

  The laboratory and warehouse storage buildings are strategically placed on the property so that trucks and vehicles can safely access all loading areas. The buildings each have several loading bays with full overhead doors for entry and storage access, with appropriately pitched loading ramps and receiving areas to accommodate vehicles and trucks which may or may not have power lift gates. The facilities are all single story, slab on grade construction thus the building floor

weight bearing capacities are virtually limitless. This permits WEAC to receive and maneuver samples of any weight and size and to utilize many heavy test devices and instruments such as the Instron machine and optical comparator as well as machine shop equipment.

Heavy lifting equipment for moving and handling large samples include forklift, trolley chain hoist/monorail, pallet jacks, heavy lift tables and carts as well as machinery dollies and hand trucks. WEAC staff are fully trained and experienced on the use of these devices.

The facility also contains double door entries and wide access receiving areas and hallways. These features combined with single story construction permits safe large size sample movement between test locations without contending with inherent difficulties associated with multi-story movement within a multi-story facility.

- Machine shop and tools

  WEAC staff have the experience and skills in fabricating an array of test fixtures and devices and have access to WEAC's machine shop in order to perform these activities. Due to WEAC's single story building design and slab on grade construction, machine shop equipment is located on the same level and in close proximity to sample test areas, which permits staff to readily and efficiently access test fixture fabrication stock and machines needed in the course of testing. The machine shop contains many industrial grade machinery devices including lathes, drill presses, several table and band saws, hydraulic press, grinding wheels, belt and disc sanders and an array of bench and portable power and hand tools. WEAC analysts are trained and very adept at tool handling and standard machine shop practices and fully versed in all safety protocols.

- WEAC's Program Work
  - Program Not Captured in the Workplan
    - Radiological Food Emergency Response Network (FERN) program
      - Fast Screening Methods for Alpha-emitting Radionuclides

        Alpha-emitting radionuclides have very weak penetration capability and, if contained by even a paper container, cannot be detected by any available radiation screening instruments yet are very hazardous or deadly if inhaled or

ingested. The recent alpha-emitting Po-210 incident took place in the U.K. demonstrated the urgent need for developing fast screening methods for alpha-emitting radionuclides in foods. To support ORA's FERN program and enhance the nation's food defense in radiological arena, WEAC's radiochemists have been developing fast screening and identification methods for alpha-emitting radionuclides in foods. Fast screening methods for Po-210 in certain matrices have been developed. The method extension for fast screening Po-210 in different food matrices is in progress. Methods development for fast screening foods contaminated with other alpha-emitting radionuclides such as Am-241, U-234, U-235, U-238, Th-228, Th-230, Th- 232, Ra-228, Pu-238, Pu-239, Pu-240, which are believed to be readily accessible and most easily converted to a radiological dispersion device (RDD) or dirty bomb, is also in progress or in the development pipeline.

Radium

- Fast Screening Methods for Gross Alpha-/Beta-Emitting Radionuclides

  WEAC's radiochemists have also been developing fast screening and identification methods for gross alpha-/beta-emitting radionuclides in foods. Beta-emitting radionuclides also have weak penetration capability and are very difficult to be detected using conventional radiation screening devices. WEAC's radiochemists have gained success in developing methods for fast screening certain combinations of alpha-/beta-emitting radionuclides in certain food matrices. The method extension for different combinations of gross alpha-/beta-radionuclides in foods is also in progress.

- Gamma-ray Detection Method for Rapid Assay of Am-241 in Foods

  WEAC radiochemists are investigating even faster screening method for rapid assay of Am-241 contamination in foods using high purity Germanium well detector.

Given the difficult and complex nature of separation chemistry of the radionuclides in foods, the capability of designing and successfully conducting the methods development for fast screening and identification of radionuclides in **foods** differentiates WEAC from any other FERN radiological laboratories.

- Radiological FERN Proficiency Test (PT) and Surveillance programs

  WEAC is the only lead laboratory in radiological FERN. To support ORA's radiological FERN program, WEAC has been designing and developing surveillance and proficiency sampling programs for the radiological FERN.

WEAC has been implementing the PT program by designing and providing radiological Proficiency Test (PT) samples to all FERN radiological component laboratories, analyzing and summarizing these PT results.

- WEAC has been responsible for technical component of ORA's FERN radiological cooperative grant activities. WEAC is responsible for providing training, auditing and methods to the ORA FERN Cooperative Agreement Program (CAP) radiological laboratories
- FERN committee memberships and participation in committee assignments, National Coordination Group, (radiological subset of the ICLN)
- WEAC is responsible for training programs for radiological component of FERN laboratories

- Microbiological Method Development–FERN

  WEAC conducts research at the University of New Hampshire BSL-3 facility in support of ORA's Microbiological Food Emergency Response Network (FERN) program. WEAC's research has contributed to the development of a reliable selective/differential media for *Yersinia pestis* (Yp) and has advanced the Agency's mission of developing a method for the detection of Yesinia pestis in foods. Additionally, the lab participated in the *Yersinia pestis* collaborative study for the Pathatrix microbiological system. WEAC is the only participating FDA lab with several *Yersinia pestis* strains. This uniqueness permits a wider range of challenges to the systems being developed.

  The lab is currently preparing to conduct studies with *Francisella tularensis* for the food defense workgroup. The purpose is to assist in revising the current LRN confirmatory method for *F. tularensis.* In preparation for this, WEAC staff developed a modification to the Pathatrix system to prevent exposure from aerosolization. Specialized equipment includes the Pathatrix System and the Smart Cycler and Lightcycler real-time PCR systems

- Training/quarterly meetings with field radiation safety officers
- Coordinates/distributes the TLD (dosimeter) program
- Coordinates/issues/servicing of field pagers for radioactivity
- Coordinates/services/analyzes twice a year – Nickel 63 detectors for the ORA field laboratories
- Swipe testing of radiological contaminants for other ORA field laboratories

- Department of the State/Embassy samples - Radiological analysis of samples collected from the US Embassies under MOU with the United States Department of the State.
- Department of Energy samples - Split food samples collected by Battelle samples for radiological analysis under MOU with the Department of Energy.
- MOU with USDA/FSIS - Radionuclide analysis of USDA regulated products in case of emergency. USDA does not have any radiological capabilities or laboratories.
- New England Compact - Agreement with the New England States, WEAC would provide technical support and assist in the analysis of samples for radioactive contamination.
- Radionuclides analysis of foot patches, necklaces and bracelets
- OCI and medical examiner medical device samples

  Engineering analysis of medical device samples from FDA's Office of Criminal Investigations and other law enforcement entities for determining pertinent technical methodologies and analyses in support of OCI and other law enforcement activities including suspected fraudulent (Quack) devices, counterfeit devices, and products suspected in homicide and other major crime cases.
- Private laboratory reports, technical guidance, medical devices

  WEAC is responsible for reviewing private laboratory reports of imported samples and providing laboratory recommendations to ORA's District Offices for determining if entries should be allowed.
- Consumer Complaint Samples of Medical Devices

  WEAC engineering staff utilizes forensic engineering skills and have demonstrated ability to focus on specific product features and employing a risk-based approach to the analyses of products including those involved in significant product seizures and recalls.
- Test equipment/Instrumentation Fabrication

  WEAC engineering staff has experience in the design, fabrication, modification and repair of various test apparatus and instruments used within FDA labs and field entities. This year WEAC built multiple units of a device for investigators to use to screen for counterfeit products.
- Electro-optic Specialist (EOS) Activities

WEAC engineering staff provides EOS support for the Northeast region, including domestic inspections, collaboration with state and other entities.

- Program in the Workplan
  - PAC 04019C - Radionuclides in Foods (Domestic & Import)
    WEAC is the only laboratory conducts routine analysis of domestic and import foods for the presence and levels of radionuclides to support FDA's food safety monitoring efforts.
  - PAC 04839 – Total Diet Program, analysis of radionuclides in foods
    WEAC is only laboratory responsible for analysis of radionuclides portion of Total Diet Program samples.
  - PAC 82z002 – Condom Analysis (shared with PRL-SW)
    WEAC is one of the two FDA laboratories conducts analysis of condoms
  - PAC 82008 – Chromium analysis of surgical instruments
  - PAC 82845C – Disinfectants chemistry and microbiological analyses
  - PAC 03R845 - Food Defense Assignment
  - PAC 03R816 - Method validation, *Yersinia pestis*
  - PAC 04R816 - Method validation, radionuclides
  - PAC 81010 - Medical device analysis after problem is reported
  - PAC 82845C - Medical device analysis for samples subsequent to an inspection
  - PAC 82845S - Medical device inspections, sterility
  - PAC 82Z003 - Medical gloves analysis (shared with PRL-SW)
  - PAC 82Z800 - Center initiated assignments for medical devices
  - PAC 82R816 - Method validation, radiation producing devices
  - PAC 84R816 - Method validation, medical devices
  - PAC 86001 - Foreign inspections of laser products
  - PAC 86006 - Foreign inspections of microwave oven, television and related radiation-producing electronic products
  - PAC 86006A - Microwave ovens analysis
  - PAC 86006B - CRT-based televisions, computer monitors, and video products Analysis
  - PAC 86006D - Diagnostic X-ray machines and tubehead assemblies analysis
  - PAC 86006E - Sunlamps and high-intensity discharge lamps analysis
  - PAC 86008 - Assembly, calibration, and lab evaluation of dental-use dosimeters

WEAC Contributions to the FDA Mission

- **WEAC is a unique, A2LA-accredited FDA field laboratory that specializes in regulatory testing of foods for radionuclides and analyses of medical devices for safety and efficacy. No other FDA field laboratories have these capabilities.** Device analysis work at the WEAC facility involves chemical, microbiological, and engineering evaluations of medical devices and engineering analyses of radiation emitting products. This work supports programs under FDA's Center for Devices and Radiological Health (CDRH). WEAC is the primary field laboratory upon which CDRH relies for its analytical services. WEAC also supports programs under FDA Center for Food and Applied Nutrition (CFSAN) and FDA Center for Drug Safety and Evaluation (CDER). Analytical capabilities include chemical, microbiological, biological and radionuclide analyses.

- **WEAC's most valuable resource is its personnel.** Transfer of WEAC's program work to another location would not be easily accomplished. At the very least, the test program capability would be suspended indefinitely at a new distantly-located site until such time as personnel at the location train themselves on non-regulatory samples to at least a bare minimum level of competency in test methodology, instrumentation, and regulatory practices. (Attainment of laboratory accreditation in these unique test programs at a new locale would be even more daunting a proposition.) In many instances, however, expertise and competence has been acquired solely through training side-by-side with an experienced, uniquely qualified WEAC analyst – there are no training courses or programs available elsewhere within the Agency, in academia or within the private sector which can replicate such highly specific training. If the bulk of WEAC analysts were to decline the opportunity to transfer to a new locale, then their uniquely acquired and refined skill sets would be lost forever. **The testing program capability may have become so specialized and dependent upon unique analyst qualifications and skills, that the program will never be able to be resurrected, no matter how much money, personnel, and other resources were to be directed towards recovering this capability.**

- **WEAC's scope of accreditation under ISO/IEC 17025:2005 is unique for many of its test methodologies, most notably Radionuclides in Foods. This accreditation would simply not be transferable to another location without the associated movement of personnel competent in performing these analyses; it would likely be years before newly hired personnel could approach a similar level of competence and experience and the laboratory could even begin to explore the possibility of restarting the accreditation process.** Any loss and extended absence of accreditation in these specialty areas would likely be a liability in the event of any challenged or disputed analytical test results, especially since the remaining field laboratories would all be fully accredited in all other areas.

Other unique test methodologies under WEAC's scope include Sterility of Medical Devices, Disinfectants, Chromium in Medical Devices, and testing for the Tensile Strength of Condoms, Impact Resistance of Optical Lenses, testing of Blood Pressure Measurement Devices, testing for Radiation Emissions of Microwave Ovens and X-ray Machines, and testing of Electronic/Mercury-in-Glass Thermometers. The Scopes of Accreditation can also be viewed on A2LA website www.a2la.org using the search terms of Certificate number 2469.01 and 2469.02.

- **WEAC's Analytical Branch is the only FDA Field Laboratory with the capability of performing radioactivity analysis. Its programs include the determination of radionuclides in imported foods (post Chernobyl), the Total Diet Study (where the laboratory determines the extent of radioactivity within the American Diet and which provides critical baseline data for monitoring purposes), and the analysis of radiopharmaceuticals (for quality and potency).** Any attempt to relocate these programs without most of the personnel moving with the work would bring the programs to a halt for an extended time period, probably at least two years under the most optimal circumstances. Any further budgetary cutbacks or extended hiring freezes for the Agency during the time in which these programs were suspended could conceivably kill these programs for good and would permanently eliminate a major component of FDA's defense of the U.S. food supply.

- **WEAC's radionuclide section serves as lead Project Coordinators for the radiological component of the Food Emergency Response Network (FERN).** The FERN is a network of state and federal laboratories that are committed to analyzing food samples in the event of a biological, chemical, or radiological terrorist attack in this country. Surveillance and proficiency sampling programs for all areas have been developed. WEAC has distributed and evaluated three radiological proficiency studies to twenty-six FERN laboratories, developed and validated radiological analysis methods for regulatory sample analysis and counter-terrorism arena method validation studies, developed surveillance studies, hosted FERN Radiological Training Courses, and prepared the Food Safety and Security Project – Radiological Health Announcement/Cooperative agreement. WEAC is charged with FERN method validation studies, proficiency studies, recommendations for equipment, audits, and serves on several International Consortium Laboratory Network Committees.

  Realistically, none of the other FERN laboratories would be in a position to assume these responsibilities in the event of WEAC's demise, and the continued existence of the radiological component of the FERN would be in severe jeopardy. If such a scenario were to occur, the United States would be particularly vulnerable in the event of any accidental or terrorist incident involving radioactive contamination of the food supply.

- **The skill sets, experience, and training of WEAC's analysts, particularly those in the Radionuclide Section, are unique and would not be readily replaced.** The Radionuclide Section of the branch has a core group of seven analysts, a supervisor, and a radiation safety officer. Four of these employees are at the PhD level and they average better than fifteen years of experience. The training for radiochemists, in food and radiopharmaceutical analysis, is a lengthy process. Radiochemistry is not a science typically taught in colleges nor is the type of instrumentation which these analysts employ (gamma spectroscopy, beta spectroscopy, alpha spectroscopy, liquid scintillation, use of multi-channel analyzer systems, etc.). The training includes in-house training, on the job training working side by side with experienced analysts, and rigorous courses in radiation safety and health physics.

- **The instrumentation used to quantify radioactivity in food samples is sensitive, prone to damage in transport if extreme caution is not exercised, and would be extremely expensive to replace (on the order of $1.9 million). Fully qualified personnel would need to be readily available to oversee all phases of this transport, including an assessment of the condition, operation, and fitness for use of the instrumentation at the new site.** It would be overly optimistic to believe that such qualified personnel would remain at WEAC until the bitter end when the instrumentation is shipped out. A nightmare scenario, that is, however, a very real possibility, is that this instrumentation is damaged in transit, languishes at the new site for some time until newly hired, qualified personnel are brought on board at the new site, and only then is it discovered that the instrumentation is irreparably damaged (without the availability of the millions of dollars needed to replace it). Not only will FDA have lost this crucial capability, but it will have hired a number of specialized personnel who literally will have nothing to do, except perhaps to help devise the requisite excuses and rationalizations for the Office of the Inspector General and Congress.

- **Device analysis work at the WEAC facility involves chemical, microbiological, and engineering evaluations of medical devices and engineering analyses of radiation-emitting products. This work supports programs under FDA's Center for Devices and Radiological Health (CDRH). WEAC is the primary field laboratory upon which CDRH relies for its analytical services, and the demise of WEAC's program work would essentially leave CDRH without a source for dedicated field laboratory functions.**

- **With regard to analytical capabilities, the WEAC Engineering Branch has analyzed and maintains capability of analyzing a wide range of higher risk medical devices including infusion pumps, apnea monitors, ventilators and respirators, diagnostic X-ray machines, defibrillators, electrophysiology catheters, bronchodilators and inhalers, pacemakers, electrode leads, electrocardiographs, and electrosurgical units. Operational failure of any of these devices may lead to injury or death.** The Engineering Branch has responded to many requests over the years to analyze complaint samples of this

type to determine if there is a performance-based hazard within the device which could affect the public at large. As a prime example, WEAC's analytical test results confirming the presence of a "key bounce" design defect in a model of Alaris infusion pumps provided critical evidentiary support for a very recent seizure action of $1.8 million worth of these devices and is currently analyzing another Alaris infusion pump sample to assess whether the hazard has been properly remedied (http://intranet.ora.fda.gov/oe/enforcement06.htm#Cardinal%20Health%20303,%20d/b/a/Alaris%20Products). It is also worth noting that the WEAC Engineering Branch has been able to maintain and enhance this varied testing capability despite a relatively modest annual operating budget of about $50,000 for the branch and its 16 engineering analysts.

- **In addition to complaint analytical assignments from field investigators from anywhere within the nation, similar analytical requests have also emanated from the Office of Criminal Investigations personnel, state officials, medical examiners, private practitioners, and consumers.** WEAC frequently receives requests from OCI to conduct performance testing and/or electronic circuitry analyses of suspected fraudulent or "quack" medical devices or in some cases performance testing of medical devices that may impact upon homicide investigations. WEAC's Analytical and Engineering Branches recently conducted water leakage and air inflation testing of literally thousands of seized counterfeit condoms labeled as the "Trojan" brand to ascertain the potential risk to the general population. Other OCI samples have included the sterility analysis of counterfeit contact lenses and testing of the performance of a number of in vitro diagnostic test kits, namely self-monitoring blood glucose test strips and meters and a syphilis serological screening test. **WEAC's capability in this regard complements that of the Forensic Chemistry Center, and a number of medical device samples from OCI have in fact been analyzed at both laboratories.**

- **WEAC also provides assistance to CDRH in the surveillance of imported medical devices for safety and efficacy. The laboratory continues to analyze substantial numbers of imported medical device samples including medical gloves, condoms, clinical thermometers, syringes, optical lenses, blood pressure meters, needles, bandages, sutures, contact lenses, and surgical and dental instruments, self-monitoring blood glucose device test strips and meters.** High sample analysis violation rates have occurred for some of these devices. As an example, about 10% of the medical glove samples analyzed by WEAC in FY06 were found violative for leakage.

- **Regulatory analyses of various electronic products, including lasers, diagnostic x-ray machines, microwave ovens, ultrasound units, sunlamps, high-intensity discharge lamps, and televisions and computer monitors for spurious radiation emissions and performance characteristics are also uniquely performed within the WEAC Engineering Branch.** Recent sample

testing of x-ray machines has focused on potentially higher-risk units such as handheld portable units and high-dosage computed tomography units. Testing capability has been implemented at WEAC for potentially higher-risk radiation-emitting devices such as diagnostic ultrasound units. WEAC's radiation-emitting testing programs have contributed to recent enforcement actions such as an analysis of Dr-Ho muscle stimulators that provided support to two subsequent seizure actions of these devices with a total value of $3.7 million (http://intranet.ora.fda.gov/oe/enforcement06.htm#Fosdick%20Fulfillment%20Corp; http://intranet.ora.fda.gov/oe/enforcement06.htm#GRE%20Fulfillment,%20Inc). WEAC's analysis determined that these devices did not conform to an electrical safety performance standard and had serious labeling deficiencies.

- **All of these analyses (and in particular those in which a death or injury has precipitated the collection of a device sample sent to WEAC) must be able to withstand legal challenges from potentially impacted industry.** Analytical worksheet packages documenting all critical aspects of these analyses are subject to FOIA requests and must withstand the scrutiny of consumers, industry personnel, trade groups and public interest groups, and government officials. All ORA field laboratory analysts, including those at WEAC, are rigorously trained to observe strict sample handling requirements, must meet the highest standards for analyst competency and expertise, must be able to conduct scientifically defensible regulatory analyses within stipulated timeframes (or within an expedited timeframe when circumstances dictate), and must constantly devote vigilant attention to instrument calibration and maintenance. **This combination of expertise in a variety of highly specialized engineering, chemical, and microbiological test methodologies (a number of which were developed and formalized within WEAC) and rigorous attention to Agency regulatory requirements is unique to WEAC.**

  CDRH laboratories are almost exclusively devoted to non-regulatory, research studies which simply do not require the same level of demand for regulatory rigor. With the exception of the CDRH X-ray Calibration Laboratory's accreditation by NVLAP, none of CDRH's laboratories are presently accredited or have plans to seek accreditation. It would be unrealistic to assume that CDRH could serve as a stopgap laboratory for regulatory analyses of medical devices during an attempt to resurrect WEAC's programs at another locale or as a potential fallback laboratory if the attempt to resurrect these programs failed.

- **In addition to its analytical capabilities, WEAC provides a number of other critical services to the Agency.** WEAC has provided inspectional assistance to the New England District Office on many occasions and has a number of personnel on the Foreign Inspection Cadre. A number of analysts on the cadre have conducted overseas inspections of laser product, microwave oven, television, and computer monitor establishments. WEAC analysts are active in various standards consensus organizations such as ASTM and have played prominent

roles in the formulation, revision, and laboratory validation of standard test methods. **WEAC personnel have also demonstrated their expertise in devising and constructing test equipment for other FDA components. As an example, per a request from the Forensic Chemistry Center, Engineering Branch personnel are currently fabricating thirty alternative light source devices which will be used by field personnel to help detect counterfeit drug products.**

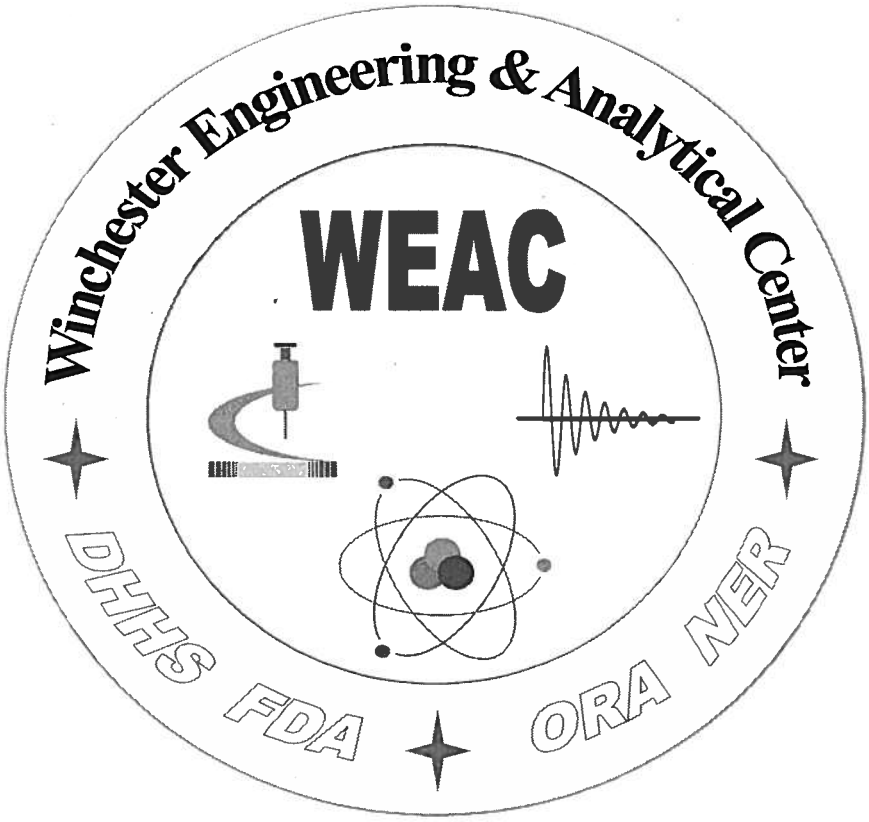
- **WEAC maintains a close collaborative relationship with a number of personnel in various CDRH and CFSAN Offices, and these working relationships and cooperation would likely not survive any large-scale turnover of personnel.** The Offices of Device Evaluation and Compliance consulted with WEAC regarding a potential rescinding of a 510(k) for a condom manufacturer. WEAC reviewed and commented upon condom testing data used by the firm to support its declaration of conformity to an ASTM standard. As a second example, WEAC has also been tasked by the Office of Compliance to devise a standard test method document (in conformance with Quality Management Systems practices) in preparation for modifying the FDA water leakage test method for condoms. The methodology utilized by FDA for this water leakage testing would change from the present hang-and-roll method to the hang-and-squeeze method adopted by ASTM. A third example of this close collaborative relationship is the refurbishing work being performed by personnel in the Office of Science and Engineering Laboratories on an automated air inflation tester for condoms. The originally inoperative unit was shipped to OSEL from WEAC, and after extensive refurbishing and software revision performed by OSEL, this unit has been brought to the verge of full utility. WEAC's capability to perform air inflation testing of condoms using an automated tester (as opposed to the presently utilized manual tester) will soon be restored as a result of OSEL's efforts.

- **WEAC analysts are actively engaged in a number of method development projects in support of the Agency's regulation of medical devices.** One prominent example is the current effort of a self-directed team of WEAC analysts to develop methods for assessing the durability of medical examination gloves and surgical gloves. These methods would seek to address degradation of the gloves occurring with actual clinical use, unlike the traditional water leakage testing of new, unused gloves performed by industry and the FDA. The team has successfully developed a mechanical stress test for examination gloves that is rapid, repeatable, tests the entire glove surface, inexpensive, easy to perform, and that creates defects in the test gloves at a similar rate to those described in the literature for actual clinical use. The ultimate goal of this project is the adoption of this method as an ASTM standard that could be used by industry and the FDA as a means of evaluating the barrier protection properties of medical examination gloves. Currently the team is in the process of developing a similar test methodology for surgical gloves. The goals for this proposed test methodology emulate those of the method developed for examination gloves.

- **Analytical research studies at WEAC have developed regulatory protocols for self-monitoring blood glucose devices, procedures and improved methods for the evaluation of herpes simplex virus and syphilis diagnostic test kits.** Collaborative studies have included an evaluation of several *Toxoplasma gondi* IGM serological test kits, efficacy of liquid chemical sterilants and high-level disinfectants through sporicidal activity test methods, improved methods for the measurement of antigenic natural rubber latex proteins found in latex gloves, and the quantitation of removable powder on medical gloves.

- **In summary, the WEAC laboratory is the sole accredited FDA laboratory capable of performing engineering, chemistry and microbiology analyses of medical devices and radioactivity analysis. WEAC has provided regulatory analyses and research development in support of CDRH device programs.** The laboratory analyzes samples and performs research that crosses disciplines and branches. Examples include glove research, condom research, self monitoring blood glucose device samples, surgical stainless steel samples, suture needle samples, quack devices, consumer complaints, etc. WEAC analysts participate in ASTM studies, EPA collaborative studies, AOAC collaborative studies and international inspections for radiopharmaceuticals and radiation emitting devices. The results of their efforts have led to peer review publications, ASTM standards, FDA Public Health Advisories, international studies, FERN methods, development of regulatory methods, improvements in existing methods, and violative products withheld from the market. **Virtually all of what WEAC does is unique and vital to the mission of the Agency and would be extremely difficult to establish in another laboratory.**

WINCHESTER ENGINEERING AND ANALYTICAL CENTER



109 Holton Street, Winchester, MA 01890

781-729-5700

Fax 781-729-3593

WINCHESTER ENGINEERING AND ANALYTICAL CENTER

ANALYTICAL SERVICES

The WEAC laboratories provide specialized analytical services in medical device and radionuclide analyses. The WEAC facility is FDA's only major laboratory installation to provide service in these two areas.

In July of 2006, WEAC was approved for accreditation by the American Association for Laboratory Accreditation (A2LA) to ISO/IEC 17025:2005 in the Biological and Mechanical fields of testing. The Scopes of Accreditation can be viewed on A2LA website www.a2la.org using the search terms of Certificate number 2469.01 and 2469.02. WEAC is accredited to perform the following test methods:

Biological tests

- Filth in Seafood, Listeria and Salmonella
- Sterility of Medical Devices
- Disinfectants
- Sensory Analysis
- Chromium in Medical Devices
- Radionuclides in Foods

Mechanical tests

- Defects in Gloves
- Defects in Condoms
- Tensile Strength of Condoms
- Impact Resistance of Optical Lenses
- Blood Pressure Measurement Devices
- Radiation Emissions of Microwave Ovens
- Performance of medical X-ray Machines
- Electronic/ Mercury-in-Glass Thermometers.

Device analysis work at the WEAC facility involves chemical, microbiological, and engineering evaluations of medical devices and engineering analyses of radiation emitting products. This work supports programs under FDA's Center for Devices and Radiological Health (CDRH). WEAC is the primary field laboratory upon which CDRH relies for its analytical services.

WEAC also supports programs under FDA Center for Food and Applied Nutrition (CFSAN) and FDA Center for Drug Safety and Evaluation (CDER). Analytical capabilities include chemical, microbiological, biological and radionuclide analyses.

PROGRAM CAPABILITES and SPECIALIZED EXPERTISE

As WEAC is the national servicing laboratory for medical device and radionuclide analyses, WEAC is an FDA specialized field facility. Specialized expertise in the analytical branch includes radionuclidic analysis of foods, in vitro diagnostic test kits, and microbiological (including sterility) analyses in medical devices. The analytical branch also performs organoleptic examination of seafood, trace metal analyses, microanalytical (filth) analyses, and

microbiological analysis of foods.

Specialized expertise in the engineering branch includes mechanical and electrical testing of medical devices varying in complexity from medical gloves, syringes and clinical thermometers to infusion pumps, hearing aids, ventilators and defibrillators. The Branch also specializes in the analyses of various diagnostic X-ray systems including mammographic, dental, and portable units, as well as higher dosage systems such as computed tomographic X-ray systems. The Engineering Branch also tests electronic products such as microwave ovens, computer monitors and receivers, mercury vapor lamps, and sun lamps for compliance with FDA mandated performance standards for radiation-emitting devices. The Branch is expanding its testing capability for products considered to be higher risk including diagnostic ultrasound devices.

WEAC provides health physics services to the FDA field force. These services include the dissemination of radiation monitors, radiation pagers to FDA investigators, calibration of survey equipment, and training and guidance for the completion of radioactive materials license applications.

WEAC analyzes a number of devices from the Office of Criminal Investigations including suspected fraudulent devices and devices linked to homicide investigations. WEAC has also analyzed critical care devices for various state and country medical examiners' offices as well as performed an array of device analyses for various federal, state and local law enforcement and regulatory agencies. Many of these devices have not been previously laboratory tested by FDA and require the development of test methods and the fabrication of test fixtures. Recent examples include:

Alaris® Infusion Pump
WEAC's analytical tests confirmed the presence of "key bounce" design defect in a model of Alaris Infusion pumps, and provided critical evidentiary support for a very recent seizure of $1.8 million worth of these devices.

http://intranet.ora.fda.gov/oe/enforcement06.htm#Cardinal%20Health%20303,%20d/b/a/Alaris%20Products

***Fusarium keratitis* Associated with Bausch & Lomb Renu with MoistureLoc**
WEAC assisted in the analytical investigation of a multi-state cluster of contact lens-associated *Fusarium keratitis*. Patients with confirmed cases of *Fusarium keratitis* had reported using various contact lens cleaning solutions including various types of ReNu products. The Agency was involved in testing the efficacy of ReNu MoistureLoc against *Fusarium keratitis*. The WEAC lab performed the ISO Stand Alone test on ten lots of product. All tests showed that the product was able to meet the labeled claims under laboratory test conditions. This effort assisted CDRH in their evaluation of the products biocidal claims as part of their comprehensive approach to determine the cause of the infections.

Counterfeit condoms
WEAC's Analytical and Engineering Branches recently conducted water leakage and air inflation testing of literally thousands of seized counterfeit condoms labeled as the "Trojan" brand to ascertain the potential risk to the general population.

Muscle stimulator sample analyses
WEAC's analysis of Dr-Ho muscle stimulators supported two subsequent seizure actions of these devices with a total value of $3.7 million. WEAC's analysis determined that these devices did not conform to an electrical safety performance standard and had serious labeling deficiencies.

http://intranet.ora.fda.gov/oe/enforcement06.htm#Fosdick%20Fulfillment%20Corp
http://intranet.ora.fda.gov/oe/enforcement06.htm#GRE%20Fulfillment,%20Inc.

Self Monitoring Blood Glucose Devices
WEAC assisted the OCI in an investigation/study of "shrink wrapped" Self Monitoring Blood Glucose Devices (Test Strips). The retail units of glucose test strips were being subjected to a process which involved heating cellophane like material "shrink wrapping" in order to combine various numbers of retail units into one package. The OCI investigators wanted to determine if the process was adversely affecting the performance of the glucose test strips. WEAC analysts in concert with a CDRH statistician evaluated the performance of "shrink wrapped" product compared to product that was not "shrink wrapped" and found that the process did not adversely affect the product.

TRUST Antigen Syphilis screening kit
Recently WEAC participated in the post market evaluation of an in-vitro diagnostic medical device that had recently obtained a 510k clearance for marketing. The device was designed as a screening diagnostic test for the presence of antibodies to *Treponema pallidum* (syphilis). In cooperation with the Centers for Disease Control and Prevention, Division of STD Prevention WEAC obtained the necessary reagents to evaluate the performance of this test kit used for the serological detection of syphilis. The results of the testing indicated that the performance of the product did not meet the CDC product specifications as claimed. The investigation is ongoing and a recent contact with OCI indicated that further testing may be done in the near future.

Cardiac and Blood Pressure Monitoring Devices

WEAC in collaboration with CDRH and OCI, performed analyses of several cardiac and blood pressure monitoring devices to determine equipment capabilities in connection with a case involving the alleged defrauding of federal insurance programs of more than ½ million dollars. Two defendants pleaded guilty to federal health care fraud charges as a result of this multi-agency effort which, in addition to FDA included the US Attorney's Office, OPM, DOD, DHHS, FBI and IRS. WEAC ascertained equipment performance characteristics in relation to various billing codes and the results of testing indicated that the equipment did not have the capability to perform certain functions purportedly billed by the defendants.

COLLABORATIVE ACTIVITIES

Collaborative studies investigating new methods, directed surveillance assignments evaluating products not traditionally found in the workplan, and effective execution of the workplan is accomplished through successful communications with the CDRH laboratories. WEAC also maintains a close liaison with the University of New Hampshire and Boston College providing ongoing research opportunities for the analysts resulting in publications.

WEAC provides scientific guidance on device analysis and sampling procedures to field laboratories and device investigators.

WEAC employees serve as FDA liaisons to various ASTM and ISO committees. Responsibilities include drafting new standards, reviewing proposed standards, participating in round robin studies to evaluate new methods, and representing the agency at the meetings.

A WEAC analyst has been selected as one of two ORA representatives on nation-wide CAFDAS committee (Committee for the Advancement of FDA Science).

For those complex and difficult medical device and radiopharmaceutical investigations, WEAC engineers, chemists, physicists, and microbiologists form an integral part of the team inspections.

Formatted: Font: (Default) Times New Roman, 12 pt

Formatted: Normal

Formatted: Font: (Default) Times New Roman, 12 pt

RECENT ACTIVITIES and ACCOMPLISHMENTS

Food Emergency Response Network (FERN) activities

WEAC's radionuclide section serves as lead Project Coordinators for the radiological component of the Food Emergency Response Network (FERN). The FERN is a network of state and federal laboratories that are committed to analyzing food samples in the event of a biological, chemical, or radiological terrorist attack in this country. Surveillance and proficiency sampling programs for all areas have been developed. WEAC has distributed and evaluated three radiological proficiency studies to twenty-six FERN laboratories, developed and validated radiological analysis methods for regulatory sample analysis and counter-terrorism arena method validation studies, developed surveillance studies, hosted FERN Radiological Training Courses, and prepared the Food Safety and Security Project – Radiological Health Announcement/Cooperative agreement. WEAC is charged with FERN method validation studies, proficiency studies, recommendations for equipment, audits, and serves on several International Consortium Laboratory Network Committees.

Radiological Activities

- Memorandum of Agreement with United States Department of Agriculture/FSIS for radionuclide analysis in food samples collected as part of an emergency related to an actual or threatened act of deliberate contamination of the food supply.

- Collaborates with the EPA Regional Laboratory in Chelmsford, MA, and the National Marine Fishery Service (NIMFS) laboratory in Gloucester, MA.

- Representative in the New England Radiological Health Committee, which forms the New England Compact. The WEAC laboratory would assist the New England states in the radionuclide analysis in food samples collected as part of an emergency.

Comment [lk1]: I'm not sure where this fits.

Microbiological Activities
WEAC is conducting counterterrorism food research at the University of New Hampshire's biocontainment level three laboratory. *Yersinia pestis*, the causative agent of plague, has emerged as a concern to the Food Emergency Response Network due to the possibility of a deliberate contamination of the US food supply via terrorist activity. In collaboration with CFSAN and other FDA and State labs, we are evaluating the Pathatrix Immunomagnetic Capture System. This rapid procedure will provide an isolation method to laboratories incapable of conducting animal bioassays thus increasing the number of laboratories capable of isolating and identifying *Yersinia pestis*.

Fabrication of Testing Devices for counterfeit drugs
WEAC in collaboration with FDA's Forensic Chemistry Center is currently fabricating handheld testing devices to be used by FDA field staff in the detection of counterfeit drugs.

EPA Interlaboratory Collaborative Study
WEAC participated in an EPA interlaboratory collaborative study to improve the AOAC Sporicidal Activity Test-Method 966.04 (AOAC SAT). The investigation generated comparative data necessary to proceed with the implementation of selected modifications to the AOAC SAT. A second interlaboratory collaborative study has been initiated. The purpose of the second study is to evaluate a quantitative sporicidal activity Three Step Method (TSM) according to the AOAC procedures for official method validation. These studies will help improve the methodology used to determine the performance of liquid chemical disinfectant.

Medical Glove Residual-Powder Collaborative Study
WEAC participated in the Enersol interlaboratory trial for removable powder on medical gloves. This study was on behalf of the ISO technical committee responsible for test methods in medical gloves (TC45/SC3/WG2). The technical committee has been working on a standard for the determination of residual powder on medical gloves. The trial involved methods for both powdered and powder-free gloves that are currently in ASTM D6124, Standard Test Method for Residual Powder on Medical Gloves. Data generated from the study was presented at the ISO TC45 annual meeting.

ASTM D11.40 ELISA Working Group Collaboration
WEAC participated in three round robin studies with the ASTM D11.40 ELISA Working Group. These studies involved evaluating revisions to the ASTM D6499 assay titled, Inhibition Standard Test Method for the Immunological Measurement of Antigenic Protein in Natural Rubber and its Products. The goal is to improve the quantitative measurement of antigenic natural rubber latex proteins found in latex medical gloves. Additional studies in this area are anticipated.

Toxoplasma gondii IgM Pilot Study
Participated in a *Toxoplasma gondii* IgM pilot study which evaluated six commercial *T. gondii* IgM detection kits. This was a joint venture among WEAC, CDRH, CDC and the Palo Alto Medical Foundation, Palo Alto, CA. The study resulted in a public health advisory on the limitations of *Toxoplasma* IgM Commercial Test Kits.

ASTM Synthetic Condom Round Robin
WEAC participated in a comprehensive evaluation of various test methods for synthetic

condoms. The study evaluated the following methods: thickness measurements, tensile testing using dumbbell and ring specimens, whole condom tensile testing, air burst testing, and modified air burst testing. The whole condom tensile test and the modified air burst test required the development of special fixtures for the test equipment. Results will be used to determine appropriate methods for the ASTM standard and to provide precision and bias statement for the various methods

ASTM Lubricant Compatibility Round Robin
WEAC participated in another ASTM round robin evaluating a new test method to evaluate the effect of various user added lubricants on latex gloves and condoms through tensile testing. WEAC was also involved in the development of the test protocol. Results of this round robin will be used to validate the proposed new method.

ASTM Testing of Sized Condoms Round Robin
WEAC has been actively participating in the development of a protocol to evaluate modifications to the condom water leak test and air burst test for sized condoms. The effectiveness of the proposed water volumes were evaluated at WEAC by measuring the static pressure generated in the condoms and comparing the pressures to that of a standard sized condom. Results of this round robin will be used to support changes to the ISO and ASTM condom standards.

Tensile Testing of Vinyl Gloves
WEAC conduct a center initiated short-term evaluation of the tensile properties of vinyl gloves. WEAC measured the tensile properties of twenty-one samples of vinyl gloves to provide CDRH and ASTM with a snapshot of the current state of the industry. This data was used to support a proposed increase to the ASTM standard for vinyl gloves.

METHOD DEVELOPMENT.

WEAC is actively involved in the development and validation of regulatory test methods. Some of the highlights include:

- Completed a method validation study, "Investigation of density effect of foods on radionuclides analysis using gamma spectroscopy." This novel method, using High Purity Germanium Detectors, is applicable for analyzing gamma activity for all food matrices.

- Developed a medical glove product test method and regulatory protocols for the female condom and synthetic condoms; WEAC now provides national testing capability in this area.

- Developed a regulatory protocol for the evaluation of self-monitoring blood glucose devices.

- Developed improved procedures for the detection of antibodies in human sera to Herpes Simplex Virus (HSV)-1 and HSV-2.by the Western blot technique.

Current FDA/ORA Method Validation Studies Projects in foods include the following:

- Determination of Plutonium (Pu) and Americium (Am) Radioactivity in Food Samples by Inductively Coupled Plasma Mass Spectrometry (ICP-MS) and Alpha Spectrometry
- Development of Liquid Scintillation Counting Method for Determination of Gross Alpha and Beta Radioactivity in Food and Its Packaging
- Development of Radiochemical Procedures for Determination of ^{89}Strontium (Sr) and ^{90}Sr in Food Using Sr-Specific Extraction Chromatography
- Rapid Screening Method for Polonium 210 in foods
- Development of real time PCR method for the rapid detection of Yersinia enterocolitica in green leafy vegetables
- Development of methods for identification of Yersinia pestis in produce and bottled water

Current Engineering Medical Device Method Development Projects

WEAC Engineering Branch analysts are actively engaged in a number of method development projects in support of the Agency's regulation of medical devices. Several prominent examples include:

- Development of methods for assessing the durability of medical examination gloves and surgical gloves. These methods would seek to address degradation of the gloves occurring with actual clinical use, unlike the traditional water leakage testing of new, unused gloves performed by industry and the FDA. The team has successfully developed a mechanical stress test for examination gloves that is rapid, repeatable, tests the entire glove surface, inexpensive, easy to perform, and that creates defects in the test gloves at a similar rate to those described in the literature for actual clinical use. The ultimate goal of this project is the adoption of this method as an ASTM standard that could be used by industry and the FDA as a means of evaluating the barrier protection properties of medical examination gloves. Currently the team is in the process of developing a similar test methodology for surgical gloves. The goals for this proposed test methodology emulate those of the method developed for examination gloves.

- Development of a method for evaluating the durability of surgical gloves. Clinical data shows that surgical gloves degrade with use, but there are no clear recommendations on the frequency at which they should be changed. The goals of this program will to be to assist FDA in the preparation of guidance documents and in the development of consensus standards for surgical gloves.

- Enhancement of WEAC Capabilities in Air Inflation Testing of Condoms. A draft compliance policy guide for condoms (CPG7124.21) proposes air burst testing to assure adequate condom strength to resist breakage during use. Current

manual testing is inadequate for evaluating the quantity of condoms required for quality testing. This enhancement will provide FDA with improved test capabilities and assist FDA in its participation in various standards organizations that utilize air burst testing in evaluating changes to national/international standards.

- Development of a Rapid Version of the Tampon Test Method Based on 21CFR801.430. This method is designed to enhance test efficiency, increase quantities of sample tampons analyzed and develop additional data with the goal of supporting changes to current tampon regulations. The method refines and reduces the amount of set up and calibrations required to perform tampon absorbency tests and will be proposed to CDRH for future revisions of 21CFR801.430.

- Development of a Standardized Test Methodology (Test Method) for Insulin Pumps. In support of FDA's mission to protect public health, WEAC has analyzed several types of insulin pumps, each having unique features. The goal of this method is to provide a standardized, streamlined test protocol to cover insulin pumps containing a variety of attributes. The enhance efficiencies and accuracies of the new method will enable more pumps to be analyzed and more data developed to further support FDA efforts in evaluating these devices.

FACILITY

The Winchester Engineering and Analytical Center (WEAC) laboratories are contained in a one-story structure owned by FDA located at 109 Holton Street, Winchester, Massachusetts. Auxiliary buildings include mobile trailers which abut the main building and are accessible from within the main building, a pilot building, two warehouses and solvent/hazardous waste storage buildings. WEAC also maintains a class 100 clean room for sterility testing of radiopharmaceuticals and medical devices.

WINCHESTER ENGINEERING AND ANALYTICAL CENTER

Winchester Engineering and Analytical Center Total by Organization/Series/Title (9/2006))			
Organization	#	Series	Title
(WEAC-HQ)	01	1301	Physical Scientist
	01	0318	Secretary (OA)
	01	1320	Chemist
	01	0690	Ind. Hygienist/Radiation Safety Officer
Subtotal (FED)	04		
Total by Organization/Series/Title			
Administrative Management Branch	#	Series	Title
	01	0342	Support Services Supervisor
	02	6901	Sample Custodian
Subtotal (FED)	03		
Total by Organization/Series/Title			
Analytical Branch	01	1301	Physical Scientist
	02	0401	Biologist
	08	0403	Microbiologist
	01	0403	Consultant (CON)
	01	0856	Electronics Technician
	02	1311	Physical Science Technician
	10	1320	Chemist
	01	3511	Laboratory Worker
Subtotal (FED)	25		
Subtotal (CON)	01		
Total by Organization/Series/Title			
Engineering Branch	#	Series	Title
	03	0801	General Engineer
	05	0830	Mechanical Engineer
	06	0855	Electronics Engineer
	01	0856	Electronics technician
	01	0858	Biomedical Engineer
	01	1301	Physical Scientist
	02	1310	Physicist
	01	1310	Consultant (CON)
Subtotal (FED)	19		
Subtotal (CON)	01		
Total (FED)	51		
Total (CON)	02		
Total	53		

WEAC Management

Mr. John Marzilli is the WEAC Center Director.

He is a native of Newton, Massachusetts and graduate of Northeastern University, where he received his Bachelor of Science Degree with Honors in Chemistry in 1975. While attending Northeastern University he participated in the university's Co-op Program at the FDA Boston District Laboratory from 1971-1975.

Subsequent to participating in Northeastern University's Co-op program in Chemistry, he was hired as an Analytical Chemist in the FDA Boston District Laboratory – a position he held from 1975 to 1986. In 1986, he was promoted to Scientific Coordinator and transferred to the Division of Field Science in FDA Headquarters, Rockville, Maryland. In October 1989, he accepted a position with FDA's Division of Federal-State Relations. In March 1993, Mr. Marzilli was selected to participate in the Executive Potential Program. This multi-agency program, under the direction of the U.S. Office of Personnel Management, provides training and developmental experiences to prepare individuals for executive positions in the federal government. In April 1994, he accepted a position as Deputy Director, Division of Field Science. As Deputy, he served as a focal point in all science functions of the ORA laboratories nationwide. In June 1995, Mr. Marzilli was appointed as the Director of FDA's Cincinnati District Office having responsibility for all agency activities within the states of Ohio and Kentucky. In August 1997, Mr. Marzilli was selected as the Director of FDA's New England District Office having responsibility for all agency activities within the New England states of Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island and Vermont. In January 2000, Mr. Marzilli was appointed by the Commissioner of Food and Drugs to the Office of Regulatory Affairs as the Deputy Associate Commissioner of Regulatory Affairs participating in the direction and coordination of agency compliance and regulatory science issues across the FDA field organization of nearly 4,000 employees nationwide. In January 2006, Mr. Marzilli accepted an appointment to the Office of Science and Health Coordination, serving as the Assistant Commissioner for Science Coordination. As the Assistant Commissioner for Science Coordination he provides executive leadership, advice and counsel to the Office of Science and Health Coordination on a variety of complex scientific and regulatory issues, policies and programs.

Laurence D. Coyne, Director, Engineering Branch, first joined the Food and Drug Administration in 1990 as a Materials Research Engineer in the Center for Devices and Radiological Health and conducted research and provided consultation to compliance and device evaluation personnel on failure mechanisms of polymeric implant materials. In February, 1994 he transferred to the Winchester Engineering and Analytical Center following his selection as supervisor of a medical device analysis section within WEAC's Engineering Branch. In December, 1996 he was promoted to the position of Engineering Branch Director. He is a member of ORA's Laboratory Directors' Advisory Group and has participated in FDA's Device Field Committee and the DFC's Radiation Health Subgroup. He received a B.S. in Chemical Engineering from Tufts University and a Ph.D. in Polymer Science and Engineering from the University of Massachusetts at Amherst and completed a two-year postdoctoral appointment at the National Institute of Standards and Technology prior to joining the FDA.

WINCHESTER ENGINEERING AND ANALYTICAL CENTER

Pamela Mackill, Director, Analytical Branch, started working for the Boston District Food and Drug Administration in 1978 as a Northeastern Cooperative Education chemistry student and received her B.S. degree in chemistry in 1980. She analyzed food and drug samples at the Boston District Laboratory and transferred to Winchester Engineering and Analytical Center in 1987. At WEAC, in 1990, she analyzed radioactivity in foods and pharmaceuticals in the Radionuclide Section, and in 1993 became the supervisor for the chemistry and radionuclide sections.

Today, she is the Analytical Branch Director for the Medical Device/Chemistry Section and Bioeffects Section. The Analytical Branch is engaged in radionuclide testing of foods, chemical and microbiological testing of medical devices, and microbiological and biological analyses in foods.

She is an active member of the Food Emergency Response Network (FERN), an editor for the Laboratory Manual Committee, Laboratory Directors' Advisory Guide Committee Member, and a Level 1 Analyst Certification Board Member.

Janet O'Shaughnessy began her career at WEAC in 1989 as a clerk typist and later an accounting technician. In 1996, she was promoted to Support Sections Supervisor and is currently acting Administrative Officer, responsible for personnel, budget, facility management and sample accountability.

Janet is married and has one daughter and two grandchildren.