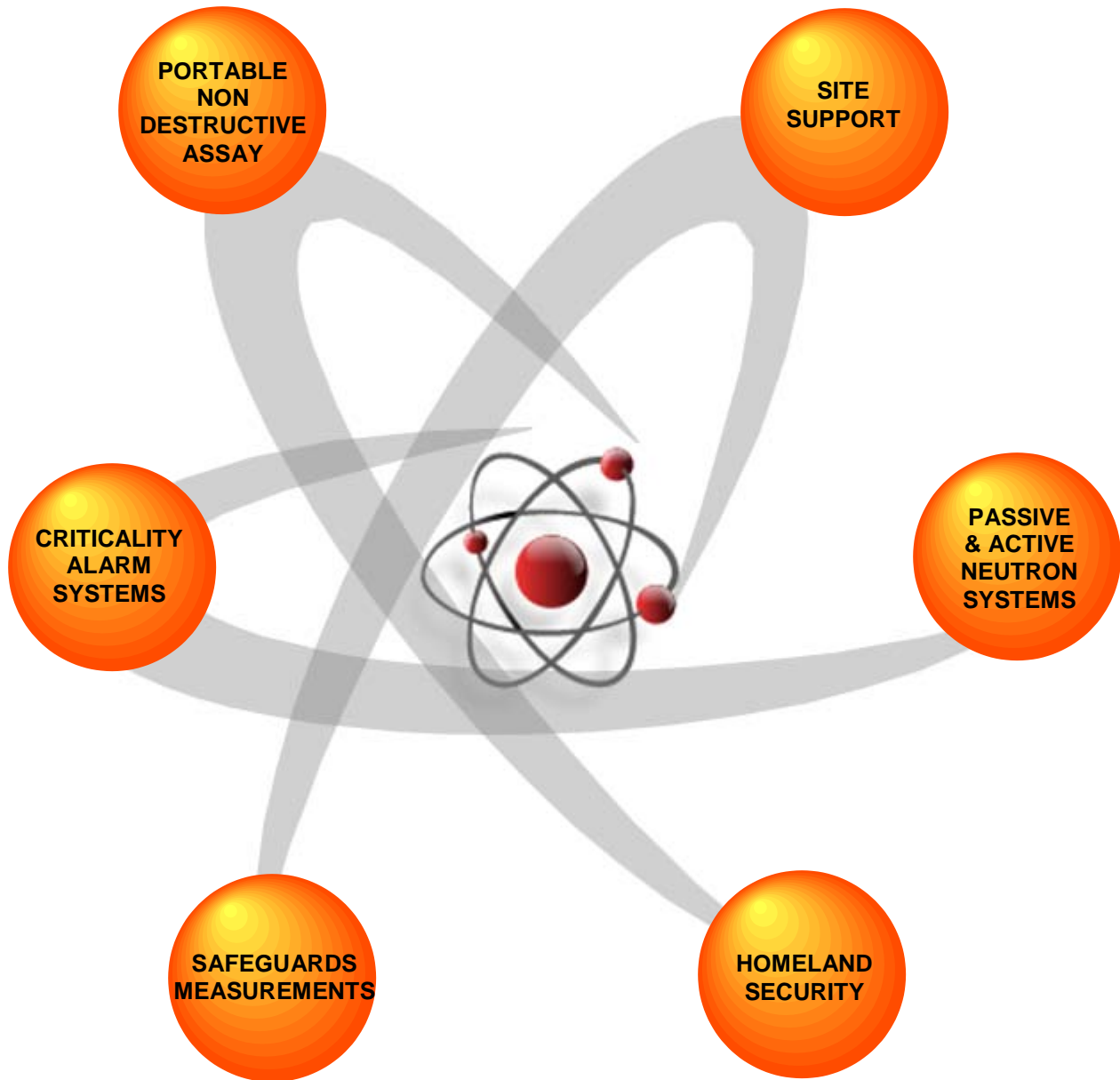


Pajarito Scientific Corporation

Statement of Qualifications





SYSTEMS / SERVICES / SOLUTIONS

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Revision 10, December 2011

PAJARITO SCIENTIFIC CORPORATION – STATEMENT OF QUALIFICATIONS

Greetings,


Thank you for your interest in Pajarito Scientific Corporation.

Pajarito Scientific Corporation (PSC) has been a part of the nuclear industry, by one name or another, for three decades. Throughout our ownership and nominal changes, we have established a group of amazingly talented individuals with a passion for technology and success. We are poised to provide critical support as our industry is shifting focus from remediation to reprocessing and nuclear energy generation, while domestically and internationally stressing the importance of nuclear security and safeguards.

PSC is an American-Owned Small Business, dedicated to the missions of the various entities throughout the world who are in one way or another driven by or engaged in the nuclear industry. We are excited about developing the next generation of products to support the world's needs and aiding in the management of the direction in which we head as a global community.

We, at Pajarito Scientific, look forward to working with you in the future.

Thank you,
David Heath

A handwritten signature in black ink, appearing to read "David Heath", with a stylized flourish at the end.

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Company History

Pajarito Scientific Corporation (PSC), formerly BNFL Instruments Inc. (BIL Solutions, Inc.), is now an American-Owned Small business. PSC remains a world leader in supporting international and domestic safeguards, commercial and government nuclear remediation, re-processing, criticality safety and energy generation.

Backed by 30 years of operating experience, the company's comprehensive range of proven standard and customized instruments, plant-integrated systems and contract measurement services provides safe, cost-effective solutions to every kind of nuclear materials assay and characterization need.



PSC was founded as a Los Alamos National Laboratory technology transfer company. British Nuclear Fuels Limited (BNFL, plc) purchased PSC in February 1995. This purchase allowed expansion and development of the business in order to capture a competitive market share. In November 1997, the name officially changed to BNFL Instruments, Inc., and in 2005 was rebranded as BIL Solutions, Inc.

In the spring of 2007, BIL Solutions, Inc. was purchased from BNFL by company president, David Heath and has returned to its original name: Pajarito Scientific Corporation.

PSC's headquarters are located in Santa Fe, New Mexico supported by our sales office in Atlanta, GA. PSC operates on many customer sites across the United States including Los Alamos, NM and Oak Ridge, TN. We also support the global nuclear industry with sales offices in the UK and China.



Capabilities

PSC employs specially trained professionals with extensive knowledge and expertise within the nuclear industry to design, build, fabricate, operate and maintain Non-destructive Assay (NDA) measurement instrumentation. These cover the major nuclear applications areas including: waste monitoring and certification, Transuranic (TRU) waste characterization, re-processing instruments, decommissioning, nuclear materials safeguards, process monitoring, control systems, spent fuel characterization and Homeland Security.

PSC also employs highly skilled engineers with a wide range of project management and operations experience who are adept at identifying operational needs and working with our scientists to develop highly technical products to meet those needs. These professionals are offered to our clients to manage projects and identify opportunities for efficiency.

Resources & Experience

To assist in achieving your goals in the most timely and cost-effective manner, PSC can provide teams of dedicated professionals who offer independent, technically sound direction and guidance to help meet your instrumentation, safeguards, characterization, operations and management needs. We enjoy relationships with national and private laboratories and fabrication facilities that allow us to develop highly specialized and custom products. Our staff has a wide range of experience working in the global nuclear market, including re-processing and waste management facilities in the USA, Belgium, Canada and Japan. Our unique perspective enables PSC to work with clients to develop “outside of the box” ideas for vastly improved efficiency and safety.

PAJARITO SCIENTIFIC CORPORATION – STATEMENT OF QUALIFICATIONS

PSC staff, service and support resources represent the “best of both worlds” – the stability and immediate access of an on-site resource with the flexibility of a specialist contractor. Our comprehensive capabilities and technologies can be tailored to match the specific needs of your project and provide maximum efficiency in project resourcing.

PSC provides a full service interdisciplinary approach to system development and delivery of services. Our technical disciplines include:

- Physics & Expert Data Analysis
- Nuclear Engineering
- Calculations & Modeling
- Software Development & Information Technology
- Mechanical Engineering & Design
- Electrical, Controls & Electronics Engineering
- Project Management
- Operations Support Engineering
- Environmental, Safety, Health & Quality Assurance

As needed, PSC can augment its core team with additional consultants, in fields such as international safeguards, Monte Carlo modeling (including MCNP), mathematical analysis, nuclear safety, shielding and seismic analysis.

Portable Non-Destructive Assay Services

PSC can deploy its highly trained Portable Non-Destructive Assay (PNDA) teams rapidly to a site to perform compliant characterization services. PSC's on-site surveying & measurement technology can be utilized for short term or project specific deployment at client sites. These systems provide rapid and cost effective characterization data without the capital expenditure for a single use item. PSC provides full technical and operational support, with personnel who have worked for many years within the operating infrastructure of nuclear facilities.



The PNDA service provides know-how and proven experience to solve characterization problems. Experienced operators and expert physics analysts perform work for our customers under PSC's approved, tried and tested program in full compliance with site procedures and regulatory requirements. Furthermore PSC can offer full program oversight services and we maintain an ISO 9001:2008 certified QA program.



The PNDA services teams utilize multiple detection techniques including gamma spectroscopy and neutron counting. Equipment available includes portable HPGe detection systems, scintillators and neutron slab counters. Gamma imaging equipment can be used to survey large areas in order to identify and characterize radiation hot spots. NIST-traceable radioactive sources are also available for calibration and daily QC checks. PSC has designed its own product range of flexible ruggedized mobile detector deployment platforms. The TechniCART™ is a powerful light-weight transport cart, and the UTV 600 provides an all-terrain Utility Vehicle with a vertical detector range of up to 11 feet from ground level.

Technical Support & Expert Review

PSC provides key technical support for non-destructive assay equipment. This includes commissioning, Material Control and Accountability (MC&A) certification, Waste Isolation Pilot Plant (WIPP)

PAJARITO SCIENTIFIC CORPORATION – STATEMENT OF QUALIFICATIONS

certification, extension of calibration, development of technical review criteria, development of operating procedures, and on-site personnel training. PSC physicists will analyze and review assay data and will resolve non-conforming assay data in a technically sound and regulatory defensible manner.

PSC has a very successful track record supporting regulatory audit defense. In addition to supplying technical support and expert review for current PSC equipment, we also maintain core competency and technical expertise in existing legacy systems and in systems developed by national laboratories and other commercial vendors. PSC's technical support and expert review services are flexible – on a full-time or an as-needed basis, on-site or remotely.

System Upgrades & Refurbishment



PSC's customer-focused, problem solving philosophy is applied to the upgrade of existing site systems, where we provide a cost effective alternative to the procurement and installation of new instruments. Our teams of specialized software engineers can use commercial off-the-shelf software to develop customized applications specific to your upgrade needs and our electronic engineers can assist in maintaining, upgrading, and replacing aging or obsolete components. PSC physicists can also expand the utility of your system, and assist in regulatory defense.

PSC also offers a full service of evaluating redundant radiation detection instrumentation and non-destructive assay equipment. Our experts are familiar with all electronics and parts, whether supplied by PSC or by other companies. It is recognized that aging systems often contain valuable components and resources, so if the entire system cannot be re-deployed, then recommendations can be made for re-use or recycling to help solve new characterization problems.

Operations & Site Support

PSC provides customer sites with a wide range of operational support personnel – from system operators to project and program managers. PSC has successfully assisted U.S. and international customers in commissioning instruments, including system operations, data review, and procedure maintenance for routine operations at multiple sites. PSC has a proven track record of involvement in all major operations – from critical nuclear safety case development and calibration operation procedures, to operator training and Operational Readiness Review (ORR) support. PSC staff is fully trained in nuclear facility operating protocols, including Conduct of Operations, radiation control, and monitoring program requirements.



Custom Software & Data Automation

PSC employs a team of highly-skilled, mathematically proficient software developers who can successfully address large data handling and data review automation projects under an ISO 9001:2008 and NQA-1 approved software development program. PSC has successfully developed customized applications that automatically conduct quality reviews, reduce resource requirements, and ensure consistency of implementation.

Facilities

PSC's headquarters are located in Santa Fe, New Mexico with satellite offices in Atlanta, GA, Oak Ridge, TN and Hanford, WA. The company is also supported overseas with sales offices in the UK and China.

As well as office space and conference room facilities, our New Mexico headquarters includes a state-of-the-art electronics workshop and an equipment manufacturing / testing "high-bay" workshop with a full complement of calibrated measurement and test equipment, power tools, welding station, workbenches and loading dock.



Research & Development

PSC's facilities can provide valuable support to R&D by offering specialist support personnel and technical expertise in the areas of software development, instrumentation and control systems, and physics analysis. We are experienced in the design and fabrication of specialty instruments, both commercially and in industrial partnerships with academia and national research institutes.

PSC has excellent infrastructure for development and testing of active and passive neutron systems as well as gamma detectors. Our state-of-the-art research laboratories include a passive / active neutron interrogation test rig to support multiple customer and teaming partner missions. This rig facilitates test-firing of neutron generators and performance evaluation of detectors and electronics in a high flux environment.

Design & Manufacturing

PSC utilizes a parametric design process using graphical design software so that three dimensional layout drawings can be constructed for customer review. PSC designers are able to complete 3D models and all drawings of a prototype very quickly ensuring fit and function of all components in the manufacturing process.



Custom shielding and collimation enclosures can be manufactured at our factory using an extensive inventory of materials including lead, steel, cadmium and high density polyethylene blocks and sheeting. PSC employees include trained and qualified technicians to support welding and sheet metal cutting for rapid fabrication and assembly at the workshop.

Radioactive Sources

PSC maintains a full Radiation Protection Program and Radioactive Materials License for procurement, storage and handling of radioactive sources. Additionally, PSC maintains a State of New Mexico Radiation Machine Operators License.

Our radioactive source inventory includes neutron emitting sources (Cf-252, Cm-244 and AmLi), uranium standards (from depleted to 5% U-235 enrichment) and gamma test sources (including Cs-137, Co-60, Am-241, Eu-152, Eu-154, Ba-133 etc). These sealed sources are maintained in a secure radioactive materials storage area which includes polyethylene and lead storage "pigs" for shielded storage of high activity sources.

PSC's rad-worker trained employees are highly experienced in all aspects of radiological operations including procurement, shipment, storage and handling of radioactive sources and radiation generating

PAJARITO SCIENTIFIC CORPORATION – STATEMENT OF QUALIFICATIONS

equipment (such as neutron generators). We implement and maintain internal procedures and an extensive training program to ensure rigorous standards of radiological safety.

Maintenance and Testing Equipment

PSC's factory is extensively outfitted with maintenance and test equipment to support our systems and services operations. A suite of radiation detectors is maintained including liquid nitrogen cooled High Purity Germanium (HPGe) detectors, a "compact design" mechanically cooled HPGe (Ortec Detective), NaI detectors and He-3 neutron detectors including polyethylene moderated slabs. A full suite of calibrated dosimetry equipment is also maintained on-site.

Our electronics lab is well equipped for assembly and testing with the latest advanced digital electronics including multichannel analyzers, advanced multiplicity shift register AMSR-150, counter/scalers, high voltage power supplies and oscilloscopes.

The PSC active neutron test rig provides a facility for routine maintenance, conditioning and testing of Deuterium-Tritium (D-T) neutron generators in support of the fleet of active neutron assay systems currently operating at US Department of Energy sites.

Training

The PSC Santa Fe headquarters have excellent facilities for training of PSC employees and our clients. The conferencing and workshop areas allow for an ideal combination of classroom training and "hands-on" experience with the latest radiation detection equipment. The office is located within easy reach of road and airline transportation links and is close to the US National Laboratories at Los Alamos and Sandia. The facilities were recently used to host a series of gamma spectroscopy training classes for Los Alamos in collaboration with ORTEC.

Mobile Characterization Services

Mobile Characterization Services (MCS) is a limited liability company formed in 1997 to provide a complete suite of services leading to the transportation and disposition of Transuranic (TRU) and Low Level Waste (LLW). The MCS team consists of three partners who are world-renowned in their particular area of expertise. Together the MCS partners and their subcontractors provide complete on-site characterization to prepare waste for transportation and ultimate disposal. MCS offers a cost-effective alternative to construction of a permanent facility via its contracted mobile services.



Quality Assurance

Quality Assurance and Integrated Safety Management Systems are indispensable parts of Pajarito Scientific Corporation's (PSC) operations. Quality and Safety is integrated into all operations of PSC and employees have taken ownership and understand their responsibilities.

PSC Quality Management System is applicable to the following disciplines:

<i>Design</i>	•	<i>Development</i>	•	<i>Procurement</i>	•	<i>Manufacturing</i>
<i>Management</i>	•	<i>Commissioning</i>	•	<i>Consultancy</i>	•	<i>Technical support</i>

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These disciplines are applicable to the following fields:

- Radiological measuring devices
- Radioactive waste
- Material assay equipment
- Derivation of nuclear fuel characteristics
- Nuclear plant process monitoring



The PSC Quality Management System has been certified to the ISO9001:2008 standard by Lloyd's Register Quality Assurance (LRQA) – click on the image (right) to download a copy of the certificate. This certification gives PSC an opportunity to increase value to our activities and to improve current and future performance. PSC views this certification as an emphasis on the encouragement of a natural progression towards improved organizational performance and enhanced customer satisfaction. LRQA have commented that: *"The highly-regulated nature of the company's work provides for a compliance culture and, with that, easy compliance with the requirements of ISO 9001."*



PSC has also successfully passed NQA-1 external audits by Fluor Hanford, Washington, Acquisition Verification Services (AVS), LVI Services (Oak Ridge, Tennessee), Energy Solutions (INEL, Idaho), Duke, Cogema Stone and Webster (Aiken, South Carolina) and Bechtel Jacobs (Oak Ridge, Tennessee).

PSC has achieved over sixteen (16) years without a lost time accident, representing a significant milestone of over one million man-hours worked. It is through the efforts of PSC's professional staff of engineers, physicists, managers, and technical and administrative support personnel that PSC has earned a reputation for customer satisfaction and timely delivery of services.

Project Experience

Advanced Mixed Waste Treatment Project (AMWTP), Idaho Falls, ID

PSC has provided non-destructive assay instruments used for criticality control and characterization at AMWTP in Idaho (managed by BBWI). We provide technical lead support for the WIPP certification process for the NDA equipment at AMWTP.



Retrieval Box Assay Systems (RBAS)

The RBAS, supplied by PSC, is a "turn key" measurement instrument for analyzing and identifying the presence of plutonium, uranium, americium and other isotopes in varying mass ratio concentrations in low, medium and high density waste matrices contained in wood and metal crates of specified sizes.

Packet Monitors

The three Sodium-Iodide Packet Assay Monitors (PAM) track and control the fissile content of small packets of material.

The PAM systems perform a low resolution passive gamma assay and calculate the Pu-239 Fissile Gram Equivalent (FGE) and total measurement uncertainty (TMU). The one Special Case Waste PAM (SCW PAM) system uses a portable package monitor in conjunction with a fully integrated high purity germanium gamma measurement for high accuracy characterization.



Waste Disposition

At AMWTP, PSC has a proven track record of solving challenging measurement problems including assay of sludge, soil, high activity waste, depleted / enriched uranium, heat source / weapons grade plutonium, fission products, transuranics and other exotic nuclides. To date, more than 100,000 drums have been measured at AMWTP.

PSC has been involved in the assay of over 75% of waste sentenced to WIPP.

PSC’s team of NDA professionals have developed innovative characterization techniques that have been applied within both the TRU and LLW programs. These include assay of LLW for disposal at Nevada Test Site (NTS) and the Energy Solutions facility in Clive, Utah. Characterization has been performed on hundreds of lead lined drums for identification of remote handled waste, and screening level classification of containers using historical data and field NDA measurements.

Rocky Flats Environmental Technology Site, CO

PSC worked closely with Kaiser-Hill at RFETS to support the successful aggressive site closure schedule in a number of capacities. Systems and services were provided to certify RFETS for the WIPP’s stringent Waste Acceptance Criteria.

PSC played a key role to support RFETS accelerated site closure.



RFETS IPAN Systems

The Multi-Purpose Crate Counter (MPCC) was deployed at Rocky Flats for the measurement of various size crates resulting from Decontamination & Decommissioning (D&D) activities. Many different waste streams were successfully assayed including combustibles, metals, glovebox parts, and mixed waste. The MPCC utilizes Imaging Passive Active Neutron (IPAN) technology.

The other IPAN system deployed on the site was the Passive Active Drum Counter (PADC), capable of measuring 55-gallon drums. The PADC’s robust calibration enabled measurement of a wide range of materials including combustibles, plastics, metals, glass, Pipe Over pack Components (POCs) containing residue materials, and other mixed material debris waste forms.

SuperHENC

PSC supported the innovative LANL-designed SuperHENC, a Super-High Efficiency Neutron Coincidence Counter for assay of Standard Waste Boxes (SWBs). PSC supplied the SuperHENC Gamma Energy Analysis System (SGEAS) isotopic measurement system to fulfill WIPP and RFETS MC&A certification criteria. The system successfully characterized several thousand SWBs and was also calibrated for drums.

In 2000-2001, the MPCC and SuperHENC became the first crate assay systems in the US DOE complex to attain certification for disposal of waste to WIPP against the same stringent performance criteria originally developed for drum assay.

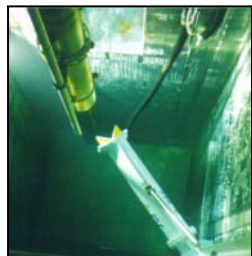
K-25 & ETPP East Tennessee Technology Park, TN

PSC supported the decontamination, decommissioning, and recycling of the 3-Building K-25 project at ETPP by providing gamma and neutron instrumentation for a variety of mixed waste, as well as expert technical support for Non-Destructive Assay equipment. PSC provided a passive



neutron counting system that assays large containers (SEALAND) for uranium by quantifying the neutron emissions originating from U-234 (α , n) reactions.

The Uranium Waste Monitor system was supplied for quantification of the Uranium content in metallic waste generated by the Gaseous Diffusion Plant (GDP). PSC currently supports Bechtel Jacobs Corporation at K-25 with Non-Destructive Assay Program Management and Subject Matter Experts.



Arkansas Nuclear One (ANO), Russellville, AR

PSC successfully completed burn-up measurements on several hundred fuel assemblies at the ANO nuclear power plant. High resolution gamma spectroscopy was performed underwater with a custom designed system. This campaign provided a useful demonstration of current burn-up measurement capabilities which can deliver significant cost savings in storage and transportation of spent nuclear fuel.

Fluor-Hanford, Richland, WA

PSC provided Hanford with measurement and characterization instrumentation equipment in the form of IPAN/GEA Box and Drum systems. In addition, our staff of experts supports Hanford's Nuclear Materials Safeguards, Non-Destructive Assay and National TRU program.

The Boxed Waste Assay System (BWAS) supplied by PSC (in 1995) combined active/passive neutron counting with hot-spot detection using NaI detectors for characterization of large crates up to 5' x 5' x 8'. HPGe detectors provided enhanced isotopic measurement capability.

The WRAP IPAN systems have operated reliably for over 12 years.

WRAP Drum IPAN Systems (A & B)

PSC supplied Hanford with two IPAN systems for their Waste Receiving and Processing (WRAP) Facility. These systems are identical IPAN units capable of measuring standard 55-gallon drums and 85-gallon drum over-packs. The IPAN systems were originally commissioned in the 1995-1996 timeframe at WRAP.

The systems have a wide dynamic range for measurement, from TRU/LLW sorting up to very high quantities (350 g) of Weapons Grade (WG) plutonium. The calibration of the system was also extended to perform assay on drums containing compacted LLW pucks and remote-handled sludge waste containing spent nuclear fuel debris.

SuperHENCs at WRAP and PFP

These two systems are combined SuperHENC neutron/HPGe gamma counters capable of measuring Standard Waste Boxes (SWBs) and 55-Gallon Drums. PSC constructed the entire content of both systems. The systems are designed to meet the WIPP Waste Acceptance Criteria. One system was deployed at WRAP, the other at PFP for safeguards. PSC supported all aspects of compliance with QA and regulatory requirements.



Washington Closure Hanford (WCH)

Starting in June of 2007, PSC has provided portable NDA services for Washington Closure Hanford at the DOE Hanford reservation. Complete gamma spectroscopy services, including instrumentation, are being provided by PSC to characterize items being decommissioned and decontaminated at several facilities. To date hundreds of items have been characterized at Hanford's 100 and 300 areas to measure a variety of items including glove boxes, filters, pipe arrays, ducts and tanks.

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PSC has also developed innovative characterization techniques at the highly contaminated building 324 B cell, and in-situ characterization of the building 327 dry fuel storage carousel. Two total neutron slab counters were supplied for a Burial Ground Waste Retrieval Project. These assay results are primarily used to guide and optimize D&D activities.

JNFL Japan Nuclear Fuel Limited, Rokkasho, Japan



PSC, in conjunction with LANL, supplied two Passive Neutron Systems to the Rokkasho Reprocessing Plant (RRP) for the measurement of radiological waste in crates up to 1.7m x 1.7m x 3.0m. Both systems utilize Add-A-Source matrix correction technique with a Cf-252 source. One system was installed and commissioned in a hot-cell with limited man access. Several inches of iron shielding were used to protect clusters of He-3 neutron detectors from the high gamma dose rate associated with reprocessing waste.

PSC has recently been contracted by JNFL to perform detailed design work for a fleet of advanced instrumentation at a new RRP waste processing facility.

Oak Ridge, TN

PSC was contracted by Mobile Characterization Services (MCS) to provide an IPAN system for WIPP TRU waste characterization at the Transuranic Waste Processing Center at Melton Valley, TN. The IPAN is installed in a trailer together with a gamma system supplied by an MCS partner.

**PSC supported
the first ORNL
shipment of
waste to WIPP.**

The waste streams incorporate a variety of materials including research laboratory waste, Mixed Oxide (MOX) fuel production and fuel cycle processes such as the High Flux Isotope Reactor. A multi-technique approach (neutron and gamma) was essential for the successful compliant measurement of this diverse waste. Many of the drums assayed contain intense gamma emitting isotopes that can interfere with the lower energy regions of the gamma spectrum (by Compton scattering). In November 2008, the first waste shipment was sent to WIPP, representing a major milestone toward environmental cleanup for the US DOE.

In 2010/11, PSC provided Portable NDA services at the Oak Ridge Y-12 complex in two separate facilities. The scope of work included equipment supply, operations and expert physics analysis.

Savannah River Site (SRS), Aiken, SC

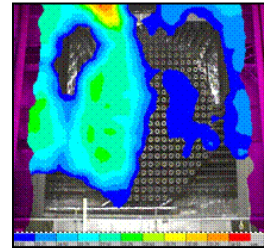
PSC supported the Central Characterization Project at SRS with an IPAN/GEA drum assay system supplied through Mobile Characterization Services. The system performed an active / passive neutron assay combined with a gamma isotopic measurement. Imaging is used to improve the accuracy of the neutron assay. This method has proven to be highly efficient and allows for accelerated removal of TRU waste to WIPP. PSC also provided expert physics analysis and review of Non-Destructive Assay data for TRU/LLW.

Bruce Power Company (BPCo) – Bruce Power Station

A RadScan™ 800 4pi Gamma Imaging System was provided to Bruce Power Company in Tiverton, Ontario, Canada. The RadScan™ 800 4pi Gamma Imaging System is used to reduce dose and exposure to BPCo personnel during planned and unplanned outages. PSC provided maintenance and operational training on the RadScan™ 800 4pi Gamma Imaging System to BPCo personnel.

Ontario Hydro – Pickering Unit A

PSC conducted several surveys for Ontario Hydro on its Pickering units. The accompanying picture shows a survey conducted at the Pickering Unit A, a CANDU Reactor Site outside of Toronto. The survey was accomplished remotely in just two hours with zero dose uptake. Conventional survey of the reactor vault face with hand held instrumentation typically took on the order of several days with technicians being switched out from dose uptake.



Portsmouth, OH - Portable NDA Services

PSC, in partnership with the S.M. Stoller Corporation, provided Non-Destructive Assay services for over four years at Portsmouth. The projects were so successful at accelerating shipments of a variety of wastes that the PSC scope of work was extended numerous times. Our expertise provided critical data to support future D&D activities. Portable far-field assay systems were supplied and operated by PSC at Portsmouth to measure a wide variety of items including drums, boxes, cans, bottles and HEPA filters. Thousands of items were sentenced to Nevada Test Site (NTS) based on PSC's characterization data.

PSC Portable NDA services have a "Best in Class" reputation.

CANDU Fuel Fabrication Supplier



Zircatec Precision Industries, Inc. (ZPI) required a criticality detection and alarm system due to changes in its facilities' operations. ZPI was upgrading its facility to process and fabricate Slightly Enriched Uranium (SEU) fuel for use in CANDU reactors. ZPI procured a CIDAS Mk X system and associated services from PSC.

In addition to the CIDAS Mk X, PSC and its subcontractors worked closely with ZPI to establish all its overall current and future requirements. A site survey and necessary detector placement calculations for the CIDAS Mk X installation were performed for ZPI. PSC and its subcontractors conducted consulting, training and commissioning activities on the CIDAS Mk X system which has been operational since 2003.

ZPI required more accurate waste monitoring and management of its waste streams and, as a result, procured a DrumScan Low Resolution Gamma Spectroscopy (LRGS) System. PSC and its subcontractors conducted consulting, training and commissioning activities on the DrumScan Mk II system for ZPI which has been operational since 2004.

National Enrichment Facility (NEF), Eunice, NM

PSC is supplying a CIDAS Mk X (Criticality Accident Alarm System) at the NEF in New Mexico. Components of the CIDAS system are built by a UK teaming partner, Babcock International Group. The CIDAS is a high reliability modular system that is well suited to both small and large facilities. NEF is a gas centrifuge uranium enrichment plant owned and operated by Louisiana Energy Services (LES), a subsidiary of URENCO. It is anticipated that at full capacity, the plant will produce sufficient enriched uranium for nuclear fuel to provide approximately 10% of America's electricity needs.



Los Alamos National Laboratory, NM

Portable NDA and other services at LANL

PSC has provided NDA expert services to the Low Level Waste Disposition group at LANL. Physics personnel assist with gamma spectroscopy using a combination of LANL developed software and commercial analysis tools. Waste measured to date includes drums, boxes, caustic tanks and other unique items critical to LANL's environmental programs management. Several TechniCART™ systems have been delivered to LANL to provide diverse assay capabilities.



In addition to NDA support, PSC has provided Resource Conservation & Recovery Act (RCRA) inspection personnel at the radioactive waste facility playing a crucial role in maintaining personnel safety and has performed troubleshooting and repair services for NDA instrumentation at LANL's Chemical and Metallurgy Research (CMR) facility.

Mobile Characterization Services (MCS) Operations

PSC has expert analysts and operator staff supporting the Transuranic Waste Program at LANL. NDA characterization is the responsibility of MCS. From mid 2006 to date, PSC staff has supported gamma spectroscopy operations screening Low Level/TRU 55- & 85-gallon drums. This operation is high throughput, processing up to 80 drums a day.

PSC supplied the first ever WIPP certified box assay systems.

LINC System

PSC sold and commissioned a Large Item Neutron Counter (LINC) in the late 1990s to LANL. The LINC is a passive neutron system designed to screen large boxes at the Decontamination Volume Reduction System (DVRS) for hot spots of neutron emitting radioactive material. Due to budget cuts the DVRS facility never reached full operation, so the LINC system instead was used for screening items in waste staging and storage areas. The LINC electronics were upgraded in the early 2000s and the system is currently being relocated at LANL for use on a new project.

IPAN™

PSC was founded as a Los Alamos National Laboratory technology transfer company. The business was originally based on the patented Passive/Active Neutron (PAN) technology, which the founders had assisted in developing at LANL. Features such as imaging capability and gamma ray energy analysis were added to expand the initial technology. These products established PSC and were successfully sold around the world.

PSC has recently developed a new Active / Passive Neutron assay system with advanced electronics and analysis algorithms called the Passive Active Neutron Differential Die-Away system (PANDDA™). This system incorporates new imaging software for accurate, high sensitivity assay of transuranic waste and low-level waste in drums and crates.

SuperHENC

PSC has successfully deployed new SuperHENC systems and refurbished the original SuperHENC system. These systems incorporate state-of-the-art hardware and software (developed at LANL) designed to minimize cosmic



ray interactions, resulting in a very low limit of detection. This enables Low-Level Waste (LLW) / Transuranic (TRU) segregation on large containers.

PeakDoctor CRADA

PSC has been working with LANL to develop PeakDoctor, a software application used to analyze gamma-ray spectroscopy data, under a Cooperative Research and Development Agreement (CRADA).

PSC benefits from a close working relationship with US National Labs.

PeakDoctor determines the energies and number of gamma rays emitted by a sample of unknown radioactive material. This is especially useful when dealing with radioactive waste, special nuclear material accountability, safeguards and homeland security. PSC intends to license the technology for commercialization when the CRADA is complete.

Babcock & Wilcox Highly Enriched Uranium Materials Facility (HEUMF)

PSC was awarded a contract to provide products and services to the HEUMF, a \$549 million high-security facility. The National Nuclear Security Administration (NNSA) announced the milestone had been reached on the Highly Enriched Uranium Materials Facility (HEUMF) located at the Y-12 National Security Complex. Construction on the reinforced concrete structure began in 2004. PSC equipment supports this state-of-the-art storehouse which will replace several aging facilities. The HEUMF project is the largest construction project under way at the Oak Ridge facility in more than 40 years.

Paducah Gaseous Diffusion Plant



PSC provided a complete portable NDA service for Paducah Remediation Services and EnergySolutions at the Gaseous Diffusion Plant in Kentucky between 2008 and 2009. The service included the provision of hardware, procedures, operators and physicists in support of a Legacy Waste Disposition Project. The scope of work comprised characterizing drums stored across the plant containing items as basic as PPE (personal protective equipment) to higher activity materials such as alumina trap mix and magnesium fluoride pellets. PSC employed portable High Resolution Gamma Spectroscopy (HRGS) assay using PSC's TechniCART™ platform. Hand-held sodium iodide (NaI) detectors also supplemented the measurements by rapidly locating hot spots. PSC played a major role in supporting the deadline of characterizing the legacy waste.

Products and Services

PSC has a philosophy of developing high quality characterization solutions to meet its client needs. A few examples of products and services that PSC can supply are provided below. A full list of products and services may be accessed at www.PajaritoScientific.com

Product	Technique	Benefits	Applications
CIDAS™ Mk X <i>Criticality Incident Detection and Alarm System.</i> 	Total Gamma.	Proven, highly reliable. Flexible modular system. Fast reaction time.	✓ Criticality safety ✓ Uranium plants ✓ SNM processing
PANDDA™ <i>Passive & Active Neutron Assay.</i> 	Passive Neutron Counting and Active Neutron Interrogation.	Low detection limit. Direct fissile measurement.	✓ Sentencing ✓ Process Monitor ✓ Fissile Control
SuperHENC <i>Passive Drum and Crate Assay.</i> 	Passive Neutron Coincidence Counting.	High sensitivity. Diverse waste types and large containers.	✓ Waste disposal ✓ LLW / TRU ✓ MC&A
SGEAS <i>Single-shot Gamma Energy Analysis</i> 	High Resolution Gamma Spectroscopy.	Absolute nuclide quantification and relative isotopics. Low & high density waste forms.	✓ D&D ✓ Power Plants ✓ ILW
TechniCART™ & Portable NDA <i>High Performance Portable Assay.</i> 	Various.	Accommodates many types of assay equipment. Rugged & portable.	✓ Screening ✓ Sentencing ✓ Safeguards
Neutron Slab Counter <i>High Efficiency Portable Counter.</i> 	Total Neutron Counting.	Rapid gram estimation. Indoor and outdoor operations.	✓ Hold up ✓ Go / No Go ✓ Screening
Spent Fuel Monitor <i>SNF Measurement and Verification.</i> 	Gamma (with Neutron Option).	Measures wide range of fuel types. Operationally proven.	✓ Burn-up Credit ✓ Safeguards ✓ Reprocessing

Technical Papers

PSC, in collaboration with its teaming partners and clients, has published numerous technical papers spanning three decades of research and development. The titles of a small selection of papers are presented below. Full texts of the papers may be accessed at www.PajaritoScientific.com

<p>Active / Passive Neutron Systems</p> <ul style="list-style-type: none"> ▪ J.T. Caldwell et. al, High Sensitivity Imaging Passive and Active Neutron (IPAN) Transuranic Assay System, 14th Annual ESARDA Meeting, Salamanca, Spain, May 1992. ▪ A. P. Simpson, M. J. Clapham, Non-Destructive Assay of Transuranic (TRU) Rad-Waste Sludges Using the Imaging Passive Active Neutron (IPAN) Technique, WM '05, Tucson, AZ, March 2005.
<p>Gamma-Ray Techniques</p> <ul style="list-style-type: none"> ▪ J.T. Santo, A.P. Simpson, S. Lonchar, Enhanced Spatial and Spectroscopic Resolution for First Responders, The DTRA Demonstration at Kirtland Air Force Base, Health Physics Society Mid Year Meeting, San Antonio, TX, Jan 2003. ▪ A. P. Simpson, M.J. Clapham, B. Swinson, In-situ Underwater Characterization of Radioactive Sludge, Waste Management, WM'08, Phoenix, AZ, Feb 2007.
<p>Transuranic / Low-Level Waste Characterization</p> <ul style="list-style-type: none"> ▪ A. P. Simpson, M. J. Clapham, J. Franco, J. Santo, H.O. Menlove, F.M Durel, Operational and Regulatory Performance of Waste Crate Assay Systems at RFETS, WM'03, Tucson, March 2003. ▪ K.M. Gruetzmacher, J.M. Veilleux, R.P. Lucero, J.V. Seamans, Jr., M.J. Clapham, Application of Spectral Summing to Suspect Low Level Debris Drums at Los Alamos National Laboratory, 51st Annual INMM Meeting, Baltimore, MD, July 2010.
<p>Nuclear Safeguards</p> <ul style="list-style-type: none"> ▪ H.O. Menlove, P.M. Rinard, M. Romero, J. Franco, K. Hiruta, S. Nasuno, Waste Crate Assay System: Assay Solutions for Very Large Remote Handled Crates, 8th NDA Waste Characterization Conference, Salt Lake City, UT, Nov 2000. ▪ A.P. Simpson, S. McElhaney, Fast Enrichment Screening for Safeguards Applications, Symposium on International Safeguards, Vienna, Austria, Nov 2010.
<p>Radiological Measurements & Survey Methods</p> <ul style="list-style-type: none"> ▪ J.T. Santo, M. Maul, R. Lucero, M. Clapham, Application of Remote Gamma Imaging Surveys at the Turkey Point PWR Reactor Facility, 47th Annual INMM Meeting, Nashville, TN, July 2006. ▪ A. P. Simpson, A 3-Dimensional Method for In-Situ Characterization of Buried Transuranic Waste using a Large Area Neutron Monitor, 48th Annual INMM Meeting, Tucson, AZ, July 2007.
<p>Spent Fuel Monitoring / Reprocessing</p> <ul style="list-style-type: none"> ▪ A. P. Simpson, M. Clapham, B. Swinson, B. Battle, Spent Fuel Measurements in Support of Burnup Credit, 47th Annual INMM Meeting, Nashville, TN, July 2006. ▪ B. Swinson, A. P. Simpson, M.J. Clapham, Advanced Non-Destructive Assay Systems and Special Instrument Requirements for Recycling Facilities, WM'08, Tucson, AZ, Feb 2007.

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