

OVERVIEW

New Millennium Nuclear Technologies (NMNT) has provided environmental engineering products and services to the DOE our client base since 1989. Not only do we offer site-specific products and services, we provide custom engineered, turnkey solutions as well.

The strength of NMNT is in the knowledge and experience of our professionals supported by our effective project and quality management systems. NMNT personnel have both the technical and business skills to satisfy the economic requirements of the client, regardless of project size or complexity, coupled with a wide range of experience, particularly in the environmental, mechanical, nuclear, and chemical disciplines.

NMNT executes projects consistent with the client's schedule and budget, while maintaining strict observance of safety, and all applicable federal, state and local codes and regulations. Our experience covers the entire nuclear spectrum from commercial nuclear power plants to naval dockyards and nuclear weapons facilities. We are DOE compliant for operations and safety and ISO 9001 Certified.

PRODUCTS

TruPro® Concrete Profiling Technology

TruPro® Technology is NMNT's patented system of portable concrete sampling and profiling tools. This specialized concrete profiling drilling technology has four major components: a drill with a specialized cutting and sampling head, drill bits, a sample collection unit and a vacuum pump.

Uses

Concrete or Bulk Material Sampling and Profiling: TruPro® Technology provides a superior approach to concrete or bulk material sampling and analysis to the traditional methods of concrete sampling using a coring machine.

The equipment in conjunction with portable radiometric instruments produces a profile of radiological or chemical contamination through the material being studied. The drill head is used under hammer action to penetrate hard surfaces. This causes the bulk material to be pulverized as the drill travels through the radioactive media efficiently transmitting a representative sample of bulk material to the sampling unit. The profiling equipment is designed to sequentially collect all material from the hole. The bulk material samples are continuously retrieved by use of a specially designed vacuumed sample retrieval unit that prevents cross contamination of the clean retrieved samples. No circulation medium is required with this profiling process; therefore, the only by-product from drilling is the sample.

Grouted TRU Waste Sampling and Characterization: TruPro® Technology can also be used to characterize grouted TRU waste for both RCRA and radionuclide constituents to ensure the safe storage, treatment and disposal of these wastes in accordance with regulatory requirements. The objective is to sample and radiochemically fingerprint the grouted radwaste drums and assess and measure all of the retrieved powdered samples for specific radionuclide activities of interest and chemical concentrations. Since portable sampling and characterization instrumentation is preferable, TruPro® technology lowers cost and result turnaround time and enhances sample quality.

Key Benefits

- Lower costs
- Fast turnaround time
- Reduced operator radiation exposure
- Enhanced sample quality

TruPro® Containment Technology

NMNT's TruPro® Containment Technology is based on NMNT's patented system of portable concrete sampling and profiling tools. This specialized and unique sealed facility sampling technology has four major components: a sampling head with a video camera, a multidirectional variable length sampling arm and mounting unit for the sampling head mechanism, a sample collection unit and a specialized engineered containment mechanism to receive and screen samples before packaging and shipment to a radioanalytical laboratory.

Uses

Sealed Facility Containment and Characterization: TruPro® Containment Technology was developed for sampling the concrete walls, floors and subsurface soils of a nuclear facility as a means of providing initial characterization of a sealed

facility. The equipment in conjunction with in situ radiometric instruments obtains samples from sealed facilities and maintains radiological containment of radiological or chemical contamination of the facility being sampled and characterized. The operation of the sampling equipment and approach produces representative samples and video footage while maintaining containment of the sealed facility. The technology allows increased numbers of samples to be collected safely from the sealed room to be decommissioned in accordance with existing consents, minimizing worker dose levels and reducing the waste volumes for disposal. This technical approach decreases costs and turnaround time while, at the same time, increases sample confidence.

Key Benefits

- Lower costs
- Maintains radiological containment
- Fast turnaround time
- Reduced operator radiation exposure
- Enhanced sample quality

Mobile Processing Modules

NMNT personnel's many years of experience working with radioactive materials has led them to develop a low cost means for the in situ treatment and disposal of LLRW. The NMNT system is contained in mobile processing modules that substantially reduce the volume of material requiring treatment, which, in turn, noticeably reduces costs.

Uses

The NMNT mobile processing modules can treat either dry materials containing LLRW, such as might be found when cleaning a contaminated nuclear site, or wet materials containing LLRW, such as tank bottoms or sludge pits. Wet LLRW materials are de-oiled using a chemical soil-washing module prior to the chemical dissolution steps.

The modules are designed to treat and dispose of LLRW at the site where the LLRW is generated and/or stored. The NMNT process dissolves the radionuclides into an aqueous solution and encapsulated in a minimal volume. Since the entire process involves on-site treatment, there is essentially no possibility of any accidental spill or leakage outside the contaminated site boundary. The process also eliminates high volume drumming, highway transportation, and long-term storage of LLRW. Thus, in situ treatment and disposal eliminates the various offsite liabilities. Public risk is low and the NMNT total remediation costs are comparable to hauling and off-site storage. The residual non-radioactive solid waste can be disposed of as non-hazardous waste or used as any other "clean" soil.

Key Benefits

- Lower costs
- Volume reduction
- No long-term storage
- In situ treatment and disposal eliminates offsite liabilities

Carbon Aerogel Capacitive Deionization Technology (CDI)

Capacitive Deionization (CDI) with carbon-aerogel electrodes is an efficient and economical new process for removing salt and impurities from water. In the process, water is passed between electrodes kept at a potential difference of about one volt; non-reducible and non-oxidizable ions are removed from the water by the imposed electrostatic field and held at the electrode surfaces. When the electrodes become saturated with salt, they are electrostatically "regenerated," releasing the salts into a concentrated purge stream.

Key Benefits

- Energy efficient
- Economical
- Stable in harsh chemical conditions



SERVICES

Technical Management Consulting

NMNT provides Technical Management Consulting services to nuclear companies worldwide. These services include:

- Project Risk Assessment;
- Permit Acquisition;
- Conformance with Regulations;
- Treatability Studies;
- Laboratory and Pilot Plant R&D;
- Conceptual Facility Formulation;
- Preliminary Design;
- Detailed Equipment Design and Specification;
- Construction Supervision;
- Commissioning;
- Process and Equipment Retrofitting; and
- Overall Project Management.

These services have enabled NMNT's clients to achieve significant breakthroughs in risk identification, quantification, elimination, control, mitigation, and operational and financial performance.

Radwaste Management & Decommissioning

NMNT's decommissioning & radioactive waste technology is at the cutting edge of characterization and decontamination technologies for the radioactive waste and nuclear industries backed by many years of experience and customer satisfaction. Experienced in the operation of characterization instrumentation in conjunction with decontamination, NMNT offers comprehensive equipment design, supply, installation, and commissioning and technical services for decommissioning and radioactive waste treatment. The NMNT disposal process virtually eliminates any off-lease liabilities by characterization, segregation and encapsulating on site.

NMNT specializes in establishing optimum process conditions for a wide variety of bulk materials over a broad range of controlled environments when effective decontamination and decommissioning processes need to be optimized for cost and schedule. NMNT personnel are experienced in the evaluation of options for bulk material treatment, including chemical stripping and filtration for the removal of particulate contamination, ion exchange, flocculation, chelating, co precipitation, and organic extraction for soluble contamination using re-circulating systems to minimize effluent arising. In addition, they have extensive experience in nuclear safety, estimating costs of dismantling versus maintenance costs, waste management costs, re-use of facilities, dependence on other facilities, licensing and availability of experienced staff.

Programs in radwaste treatment have included the following:

- Developing and improving processes to decontaminate solids and to clean up liquid effluents.
- Treating and immobilizing solid wastes in suitable matrices.
- Investigating the properties of radioactive waste streams from decommissioning operations.

Health Physics and Radiological Protection

NMNT offers the services of highly qualified health physics and radiological protection personnel who are competent in the wide spectrum of disciplines that bridge the fields between industrial operations and technology on one hand and the modern health science on the other. Health physics, or radiological health, is the area of environmental health engineering that deals with the protection of individuals and population groups against the harmful effects of ionizing and non-ionizing radiation.

The health physicist is responsible for safety aspects in the design of processes, equipment, and facilities utilizing radiation sources, so that radiation exposure to personnel will be minimized and will be within acceptable limits at all times.

The Health Physics services provided by NMNT are in the areas of:

NEW MILLENNIUM NUCLEAR TECHNOLOGIES CAPABILITIES STATEMENT

- 
- Operational health physics
 - Radiation protection advice
 - Containment, ventilation, and filtration advice.

Contaminated Land Assessment and Remediation

Land Assessment is done by collecting existing information concerning the site and its surroundings. The primary objectives of land assessment are to:

- identify potential sources of contamination
- determine whether or not sites pose a threat to human health and the environment differentiate impacted from non-impacted areas
- provide input to scoping and characterization sampling designs
- provide an assessment of the likelihood of contaminant migration
- identify additional potential radiation sites related to the site being investigated.

Land assessment typically consists of three phases:

- identification of a candidate site,
- preliminary investigation of the facility or site, and
- site visits or inspections.

Land remediation is followed by an evaluation of the site based on information collected during the land assessment.

NMNT's unique remediation system and approach uses an extraction process to leach cesium, actinides and transuranics from contaminated soils, concrete powders, and sludges with aqueous leaching solutions. The leachant is specifically matched with the substrate and the level of the contaminant.

The system decontaminates soluble ions or insoluble metal oxides/salts tightly bound to the material. The first stage is dry screening to remove the oversize materials. Wet particle size classification is the second stage and depending on the distribution of contaminant metal/radionuclide allowing sands and gravels to be cleaned from the soils fines requiring greater processing time. The leached metal/radionuclide component is organically extracted and regenerated by stripping the complexed contaminant with the aqueous stripping solution and running it through ion exchange columns under the appropriate conditions to recycle it. Major advantages of the leachant/extractant combination are site specificity and optimization, and the leachant and extractant are reusable.

Soil leaching neither increases nor decreases the soil volume; the soil is returned to the site and can be reused.

Air Emissions and Hazardous Wastes

NMNT personnel provide observations of hazardous waste Trial Burns and Risk Burns for regulatory authorities and for private industry; conduct workshops on Hazardous Waste Incinerator & Boiler/Industrial Furnace (BIF) Permitting, sampling and monitoring and quality assurance management and oversight at RCRA Incinerator & BIF Trial Burns.

NMNT personnel develop Trial Burn Plans & Quality Assurance Project Plans (QAPP) for Incinerators & BIFs, review Stack Sampling and Trial Burn Sampling and Analysis Procedures, and provide air dispersion modeling calculations for incinerators, boilers and industrial furnaces, and prepare permit applications for Air sources and hazardous waste combustion sources. These include:

- Trial Burn Plans & Quality Assurance Project Plans for Incinerators & BIFs.
- Quality Assurance Management at RCRA Incinerator & BIF Trial Burns.
- Writing Quality Assurance Reports for RCRA Incinerator & BIF Trial Burns.
- TSCA Incinerator, RCRA Incinerator & BIF Trial Burn Sampling and Analysis Procedures.
- Stack Sampling & Trial Burn Sampling and Analysis Procedures.
- Air Permitting (PSD, NSR & Operating Permits for Title V of CAA).
- Air Pollution Inspections & Environmental Audits (for Air & RCRA).
- CEM Monitoring plans (Title IV of new CAA) & CEM QA/QC Plans.