



ENGINEERING SERVICES

MSE Engineering Services and qualifications

*Our Product is a **Satisfied Customer***

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MSE: 30 YEARS OF EXPERIENCE

MSE Technology Applications, Inc. is a diversified engineering and technology solutions company providing a wide range of professional services to the government and private industry. We have three decades of professional service experience that includes thousands of successful project deliveries and technology innovations.

MSE is an engineering and technology testing company focused on providing engineering solutions to clients. Founded in 1974 to conduct research and development to assist the United States become less dependent on foreign sources of energy, we have years of experience providing a full range of engineering services to a variety of clientele.

In business for more than 30 years, we provide direct engineering services: mechanical, electrical, instrumentation and control, chemical, process, structural, construction management, geological, geotechnical investigation, modeling, subsurface exploration, feasibility studies, waste cleanup, supervisory control and data acquisition systems, and project management. Our current customers include government and commercial agencies and our projects include all engineering disciplines. For example, we treated radioactive and transuranic waste in Idaho for the Idaho National Laboratory; performed process engineering, evaluation, and testing for molten salt reactors designed to process TNT at the U.S. Army Defense Ammunition Center in OK; installed wastewater control systems in cities across MT; updated communications control systems in MI; evaluated structural stability of log cabins in MT; updated plant control systems in WA; installed municipal water control systems in MT; performed treatability studies in MN; provided structural designs for a Bio-Diesel Production Facility in WI; manufactured pump units for a Bio-Diesel Processing Facility; and designed and manufactured specialized equipment to handle ergonomics issues with military equipment aviation components and hardware.

Our corporate headquarters are in Butte, Montana, with additional offices located in Washington State, West Virginia, and Tennessee. We have projects completed or under way in more than 42 states across the U.S. and are certified as a small business.

Benefits We offer Customers:

- ✓ **30 Years of Direct, Engineering Solutions work** – *We understand the requirements of sampling and soil testing. Our team will hit the ground running and focus their attention on delivering added value.*
- ✓ **Full Analytical Laboratory** – *Fully accredited analytical laboratory and soils testing facilities.*
- ✓ **Established in 1974** – *Our procedures and infrastructure are mature and can quickly accommodate your needs.*
- ✓ **Key Certified Professionals Engineers in 23 states** – *We have the right people who understand the technical principles and solutions required*
- ✓ **Quality Management Program** - *We consistently and reliably deliver what we promise within a safe environment.*
- ✓ **Certified Project Management Professionals** – *Our project managers are trained in Project Management Institute (PMI) methods and can leverage experience to meet goals and deadlines*
- ✓ **DCAA-Audited & Approved** – *We have the corporate experience and proven success to manage large programs to meet customer needs.*

The MSE testing facility contains a complete analytical and soils laboratory.



ENGINEERING SERVICES

*An **engineer** is a skilled technical professional concerned with developing economical and safe solutions to practical problems by applying mathematics and scientific knowledge while considering technical constraints. **Engineering** is the creative application of scientific principles to design or develop structures, machines, apparatus, manufacturing processes, or works using them singly or in combination; with full cognizance of their design and the ability to forecast their behavior under specific operating conditions.*

From pioneering work in wind tunnel technology to site evaluations in Quam to mechanical design of ergonomic equipment, MSE has been synonymous with engineering excellence. On any given project, novel and puzzling situations can crop up. The ability to respond creatively to these challenges can be the difference in between project success or failure. We offer a comprehensive range of effective engineering solutions. For over three decades, our clients have come to depend on us for the high level of service that has become our corporate trademark. No matter the size or duration, MSE engineers deliver practical, cost-effective solutions.

From initial studies and site visits to final design and construction oversight, we have completed tens of millions of dollars of work directly related to engineering services. Our uniqueness lies in the ability to offer all the engineering services required for a successful project from electrical to mechanical to design to process to control. **We specialize in developing creative solutions.**

For your project, a multidisciplinary staff of engineering professionals works together using established control, project management, and budgeting systems. This diverse staff also allows us to respond rapidly and appropriately to customer requirements. Licensed professional engineers (PE)—we have PEs licensed in 23 states—led project efforts while Project Management Professionals (PMPs) monitor cost, schedule, and milestones.

Combine this engineering resource with a creative, internal support staff for drafting, surveying, laboratory, and document production and an advanced testing facility and you can see how MSE can be your one-stop shop for solutions.

Aerospace Engineering

Modern flight vehicles undergo severe conditions such as differences in atmospheric pressure and temperature, or heavy structural load applied upon vehicle components. Consequently, they are usually the products of various technologies including aerodynamics, avionics, materials science and propulsion. These technologies are collectively known as aerospace engineering. MSE

MSE Engineering Resources

Professional Engineers
Professional Geologists
Project Management Professionals
Aerospace Engineers
Biologists
Chemical Engineers
Chemists
Civil Engineers
Compliance Specialists
Economists
Electrical Engineers
Environmental Engineering
ES&H Specialists
Geochemists
Geologists
Geophysicists
Geotechnical Engineers.
Hydrogeologists
Instrumentation & Control Eng
Information Technology Specialists
Mechanical Engineers
Metallurgical Engineers
Microbiologists
Process Engineers
Project Managers
QA Specialists
Soil Scientists
Statisticians
Structural Engineers
Systems Engineers
Technical Communicators
Waste Management Specialists
Water Resources Engineers
Operations Specialists

MSE engineers are thoroughly familiar with government and commercial specifications and codes such as the Uniform Building Code (UBC), Uniform Fire Code (UFC), National Fire Protection Association (NFPA) Codes, Uniform Mechanical Code (UMC), National Electrical Code (NEC), and seismic design requirements.

engineers are well versed in a variety of the elements within aerospace engineering such as fluid mechanics, statics and dynamics (engineering mechanics), mathematics, electrotechnology, propulsion, control engineering, materials science, solid mechanics, and risk and reliability. We engineered, developed, constructed, and are testing an Ultrahigh-Pressure Test unit and facility to test and evaluate hypersonic-related materials, components, and systems to design and develop a successful mid-scale hypersonic wind tunnel.

Chemical Engineering

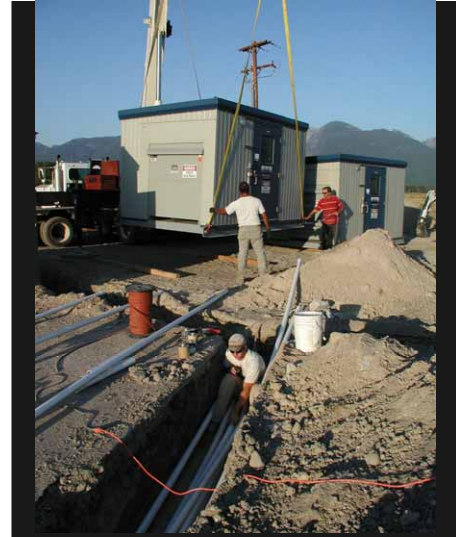
Chemical engineering deals with applying physical science (e.g. chemistry and physics) with mathematics to convert raw materials or chemicals into more useful or valuable forms; and pioneering valuable new materials and techniques. MSE chemical engineers are also involved with the design and maintenance of chemical processes for large-scale manufacture. We offer process engineering experience used extensively in research, development, and subsequent design phases on a variety of chemical process systems including systems for water treatment, waste water treatment, liquid waste disposal, solid waste disposal, and air pollution. We have advanced a system through the concept phase to the design phase and from the prototype phase to the full-scale working model stage.

Civil/Structural Engineering

One of the oldest engineering professions, civil engineering deals with the design, construction, and maintenance of the physical and naturally built environment, including works such as bridges, roads, canals, dams and buildings. A specialty within civil engineering, structural engineering deals with analyzing and designing of structures that support or resist loads economically.

MSE provides solid civil and structural engineering services specifically for the initial design and continuing engineering assistance needed by any manufacturing and mining facility and to support site preparation, foundation design, structural designs, and surveying needs for most general facility construction.

However, structural engineering experience and knowledge are only half the equation in today's high technology service market. To provide the best quality service, our engineers are also up to date with the latest software codes and standards paving the way to streamlined structural analysis and design. We use structural engineering software to give you the power to develop all types of foundation designs, and integrate the results within your 3D lateral and floor models; software for general frame, truss, and plate/shell structures; software to provide collaboration and improve workflow—in the right hands. Our engineers are fluent in various software projects to streamline all projects including RISA software, Descon, Ansys, Modeling Software with COSMOS, SolidWorks, and AISIWIN



Many projects require collaboration from engineers from different disciplines—mechanical, electrical, geotechnical, instrumentation and control—to make the work successful. MSE has engineers from all disciplines.



Electrical Engineering

Electrical engineering deals with the study and application of electricity, electronics, and electromagnetism, covering power, electronics, control systems, telecommunications, signal processing, and integrated circuits. MSE offers solid electrical engineering skills for all projects from detailed control systems to electrical modifications to historical buildings.

Environmental Engineering

Environmental engineers apply science and engineering principles to improve the environment (air, water, and/or land resources); to provide healthy water, air, and land for human habitation and for other organisms and to remediate polluted sites. For MSE projects this covers water and air pollution control, waste treatment, mining cleanup, and site closure projects. Since 1994, MSE has been the prime integration contractor for the Waste Minimization and Pollution Prevention Program for USACERL. The mission of the Program, now called the Facility Modernization and Sustainability Program, is to reduce environmental stewardship costs for U.S Army operations through innovative technologies and techniques. The program involved ~100 projects at 26 troop-based and munitions facilities in 21 states. Long-term cost savings were realized through reduced use of raw materials, energy efficiency, enhanced regulatory compliance, and improved waste management, disposal, and handling. Total cumulative cost savings to date resulting from the program totaled \$20 million.

MSE also managed an EPA mine waste technology program; its mission to develop, explore, test, prototype, and transfer technologies to clean up waste from both working and abandoned mines in the U.S.

Geological and Geophysical Engineering

Geological and geophysical engineering deals with the study of earth materials as part of the engineering design of facilities including roads, tunnels, buildings, and mines especially; the merging of earth sciences and engineering and materials science disciplines if you will. But, while it includes aspects of all, the field has specialization areas such as geotechnical—investigating existing subsurface conditions and materials; determining their physical/mechanical and chemical properties, assessing risks posed by site conditions; designing earthworks and structure foundations; and monitoring site conditions, earthwork and foundation construction. MSE has an entire Earth Science department that tackles geotechnical challenges almost daily and provides everything from site surveys to subsurface investigations to drilling to comprehensive remediation solutions.



MSE experienced professionals work in a safe manner and with access to a soils testing facility and fully certified analytical chemistry laboratory.



MSE engineers work on and off site, such as working on a control system or an underground power distribution construction site.



Geological /Geotechnical Resources

Our engineers have the knowledge; the MSE test facility has the resources they need for successful testing. On site, we offer a complete soils laboratory and an underground Verification Test Cell to test and evaluate new geophysical techniques and equipment. The verification test site resembles a small concrete basement, back filled with native soils from the site, and with a number of holes in the "floor" and "walls" to allow technicians to measure the accuracy of the given technologies. Boreholes and instrumentation complete the cell for non-intrusive verification technologies, including geophysical and soil gas sampling. The test cell alone is a unique capability that allows MSE to provide extra service to all customers.

Mechanical Engineering

MSE offers solid mechanical engineering skills from engineers who use mechanics and energy principles to design machines and support various design phases for almost all industrial plants and processes. We offer mechanical design principles throughout the design process to support initial site layout, basic design, and continuing engineering needs for most industries.

Metallurgy and Materials Engineering

Metallurgical engineers deal with materials science and study the physical and chemical behavior of metallic elements, their intermetallic compounds, and their mixtures, which are called alloys. From our testing facility, our engineers have the experience and metalworking resources for projects requiring the practical use of metals.

Program/Project Management

Project management involves planning, organizing and managing resources to bring about the successful completion of specific project goals and objectives. A primary challenge of project management is to achieve all the project goals and objectives while honoring the project constraints such as time, cost, schedule, and resources. In this area, MSE project managers and PMPs excel. Project managers follow an established, proven process to make each project a success; interacting as necessary with PMPs along the way to head off issues or problems.

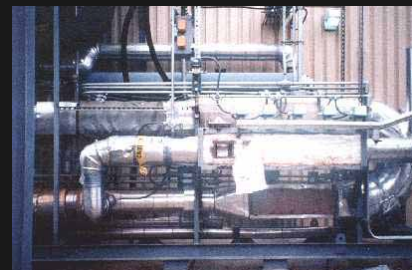
MSE manages large and small programs and projects—from multi million dollar projects researching wind tunnels and providing research, development, demonstration, testing and evaluation services to small site survey and electrical modification projects.

Construction Management

MSE offers engineering skills to develop construction documents



MSE houses a complete soils laboratory for geological testing.



MSE designed and fabricated and Experimental Russian Catalyst DeNOx System.



MSE Engineered, developed, constructed, and is testing an Ultrahigh-Pressure Test unit and facility to test and evaluate hypersonic-related materials, components, and systems to design and develop a successful mid-scale hypersonic wind tunnel.

and administer construction projects through startup and commissioning engineering tasks (turn key if necessary). Preconstruction, construction, administration, contract finalization, and startup and commissioning are the basic engineering principles used throughout the design process and continued throughout facility construction.

Instrumentation and Control (I&C) SCADA Systems and Services

Along with providing I&C engineering services, we offer a full range of Supervisory Control and Data Acquisition (SCADA) systems for control and monitoring. Our engineers have more than 35 years SCADA experience.

From our facility, qualified and experienced technicians build, assemble, test, and debug control and monitoring equipment and systems; from assembling the analog and digital circuit boards, to building the connection cables, to assembling the boards into a rack unit, to testing the boards and the units and to testing the complete system. Our facility houses a fabrication area, testing arena, and production area that includes power tools, drill presses, band saws, metal punches, bench grinders, power supplies (different voltages), pneumatic tools, and calipers.

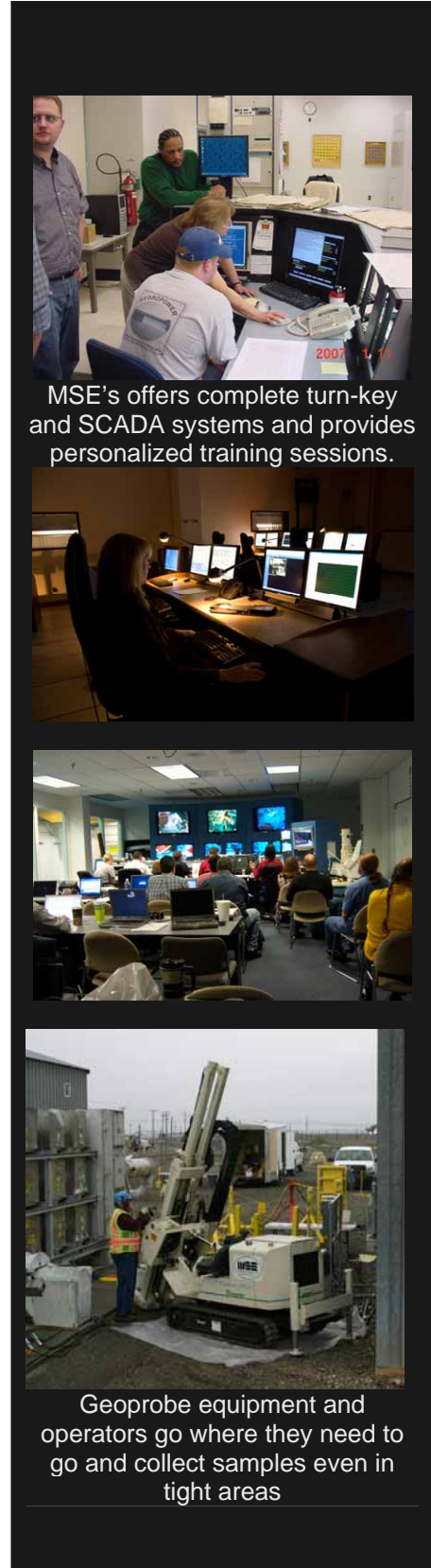
Geoprobe® Services

MSE owns and operates a direct push Geoprobe® Model 66DT track-mounted unit and uses the latest sample collection technology. We support

- Soil and groundwater characterizations
- Geotechnical investigations
- Work in radiation zones for High-level/Low-level radioactive waste investigations
- Drilling to depths of up to 100 feet (depending on subsurface formation)
- Discrete interval soil sampling
- Soil gas/vapor sampling
- Groundwater sampling and monitoring
- Setting monitoring wells up to 2-inch ID
- Setting pre-pack well screens and bentonite foam bridge quick seals
- Installing air sparging and soil vapor extraction (SVE) wells
- Grouting and remediation fluid injection

**Capabilities include
Can install and probe**

- Vertical pushes



MSE's offers complete turn-key and SCADA systems and provides personalized training sessions.

Geoprobe equipment and operators go where they need to go and collect samples even in tight areas

- Slanted pushes
- Horizontal pushes

Can operate unit

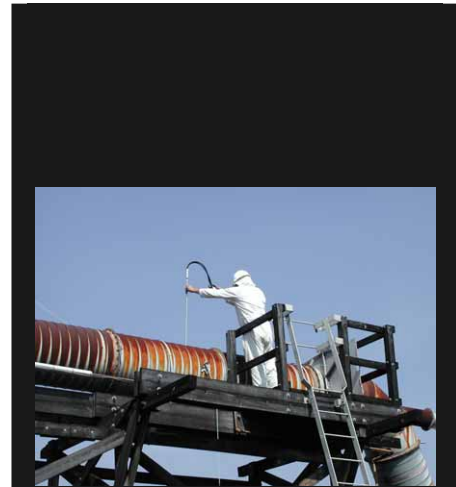
- Over rough terrain
- In relatively low load-bearing surfaces
- At location with limited accessibility
- Inside buildings with ceilings as low as 13’
- Inside buildings with entries as small as 7’-2” high and 4’ -1 inch wide

ADDITIONAL SPECIALTIES

Engineering experience takes on many forms as do the services we perform. Our experience working with the Department of Energy (DOE), Department of Defense, the Environmental Protection Agency (EPA), and commercial businesses allow us to offer customers a broad range of practical, on-the-ground work experience across a broad field. We have deployed and operated various site characterization and remedial systems at numerous DOE sites including Savannah River, Hanford, Idaho National Lab (INL), Brookhaven, Fernald, and Oak Ridge; installed and are currently operating hazardous waste incinerators at Hawthorne, Nevada, Talon, and West Virginia; consistently perform field investigations, site characterizations, and set up process systems at numerous government and private sites located all over the United States.

With a team of engineers working together we offer customers a variety of additional services:

- ◆ Characterization – historic review, identifying contaminants of concern and regulatory requirements, selecting characterization and survey technologies most applicable to the unique situation, performing characterization activities, and delivering professional reports based on defensible data.
- ◆ Decontamination – post characterization, identifying applicable decontamination processes, assembling processes, and deploying to the field. .
- ◆ Cost Analysis – identifying alternatives; comparing effectiveness, efficiency and costs; and providing recommendations based on the best bang for the buck
- ◆ Mock Ups – designing and building mock ups of real-life situations to test ideas and processes prior to field deployment. Especially suited for testing remotely operated processes, technologies and equipment
- ◆ Demonstration – demonstrating technologies, remote systems, prototypes, conditions, and equipment at our site or onsite to verify or test equipment.
- ◆ Evaluations – providing structural and sub-grade evaluations,



Technicians provide Velometer testing and welding inspection for various projects.



designing waste removal, building decontamination and waste treatment processes.

- ◆ Research – historic reviews, identifying similar situations, technological approaches employed and lessons learned; studying innovative technology reviews; analyzing technology performance and cost factors; and identifying applicable technologies and processes.
- ◆ Final reports – providing professional reports tailored to the project specific scope of work, typically detailing work performed, processes and technologies used, lessons learned, data summaries, and final results.

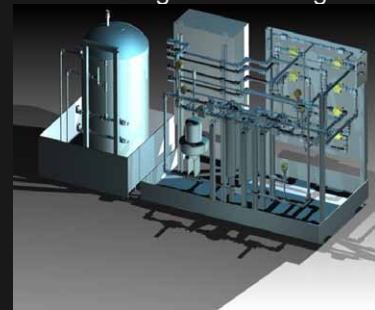
Computer Aided Drafting and Design Capabilities

MSE's in-house drafting capabilities include both CAD and hand drafting. We offer twelve CAD stations and design and drafting software that includes AutoCAD 2007, AutoCAD Mechanical, AutoCAD Mechanical Desktop, Inventor, Pro-Engineer, SolidWorks, Revit, ArcGIS, ANSYS, and RISA-3D, RadCad, Visual Analysis, Visual Design, Eagle Point, Carmel, Haestad: Flood Plain Hydrogeology and Watershed Modeling; Haestad: Water Surface Profiling and Flood Plain Analysis, and Haestad: Urban Stormwater and Detention Pond Design.

Our staff has experience providing modeling and design support in areas of assembly and detailing parts, for fabrication, and to solve complex relationships and analyze objects for finite analyses, stress, heat transfer, and cost estimating benefits, along with modeling of geo science discipline's in showing relationships i.e. stream flow, groundwater plume, and air monitoring. We also have direct, hands-on drafting skills and knowledge to visually illustrate or portray design configurations and arrangements through the creation of charts, graphs, renderings, slides, and multimedia animated presentations, and we can scan photos and drawings and convert them to digital format to combine with CAD drawings for output to different media. We can incorporate vector and raster format and create computer-animated drawings in CAD to show how objects will interrelate to existing features or how the final assembly will look and function.



MSE's offers complete in-house design and drafting facilities including 3D modeling



MSE TESTING FACILITY

MSE owns and operates the Mike Mansfield Advanced Test Center (MMATC) situated on 45-acres in Butte, Montana. This nationally known facility is a premier operation with equipment and systems available for testing components, equipment, and energy/material handling systems ranging from bench-scale apparatus through engineering-scale demonstrations and full-scale equipment development.



Figure 1. MSE Facility is Adaptable, Diverse, and Offers a Range of Services

MSE Geotechnical & Environmental Laboratory Capabilities

The MSE Laboratory (MSE Lab) has been performing analytical work for both public and private sector clients since 1978. Located near one of the nation’s largest Superfund sites, we routinely perform analyses of rock, soil, sediment, water, biological, solid, and hazardous waste samples. The MSE Lab has high-tech instrumentation, performs work under a rigorous quality assurance program, and possesses a willingness and flexibility to provide tailored services. We also follow a strict laboratory process for every sample that follows quality standards and ensures defensible results.

Our laboratory experience **includes rock, soil, sediment, water, biological, solid, and hazardous waste analyses.** The laboratory is equipped to perform all inorganic analyses and physical testing parameters on sample types including water, wastewater, soils, coal, tailings, ores, hazardous wastes, and airborne

pollutants. Technicians often work on projects that entail analysis of unusual, often difficult sample matrices, and require the development of specialized methods to assure accurate, defensible results. Because of our location to a Superfund site and various clients across the region, the MSE Lab also has experience analyzing Superfund samples and working under the Environmental Protection Agency (EPA) Contract Laboratory Program (CLP) requirements.

The MSE Lab features a 4,000 square foot certified analytical laboratory to perform drinking water analysis, wastewater analysis, metals analysis, general chemistry testing, organic analysis, soils analysis, and waste characterization. An adjoining 5,200 square foot resource recovery facility allows us to perform Geotechnical lab testing of soil, aggregate, and rock.

The MSE Lab maintains an internal data quality assurance/quality control (QA/QC) program that meets or exceeds criteria established by State agencies and the EPA.

Our Geotechnical testing capabilities range from simple soil index and permeability testing to sophisticated triaxial shear strength, hydraulic conductivity and one-dimensional consolidation-swell testing. Upon completion of laboratory analyses, results undergo an internal review and are reported to the client in both electronic and hard copy format. All analyzed samples are stored at the Laboratory at no cost for up to three months. We also dispose of non-hazardous analyzed samples at no cost to the client.

Resource Recovery Services

The Resource Recovery facilities are designed to accommodate laboratory, bench, and pilot-scale treatability studies. These facilities include electrical and piping for testing; influent and disposal tank; and plant support systems. Almost any kind of equipment can be brought into the resource recovery facility and tested for performance in a manner that will produce accurate and defensible data for our customers. Both facilities are equipped with a standard laboratory hood system for ventilation. In addition, the resource recovery facility has a large hood 10 feet high by 14 feet wide by 7 feet deep, designed in accordance with the National Fire Protection Association. The lab hood provides 125 fpm face velocity across the front opening of the hood, resulting in volumetric air exchange of 17,500 cfm, which provides 18 air exchanges in the hood per minute.

Open Space for Field Demonstrations

In addition to housed areas for testing, there is adequate open space to perform outdoor field demonstrations at MSE Test Facility, which is located on 53 acres. MSE has conducted several field demonstrations, for example, the Ultramicrobacteria (UMB) Biofilm Barrier project, ENPAR electromechanical tailings project, and an underground facility to test the accuracy of geophysical melts.

Our Geotechnical testing capabilities range from simple soil index testing to sophisticated triaxial shear strength testing.




Our resource recovery facility we can test a variety of materials including soil, aggregate, and rock



Resource Recovery Lab

SAFETY AND HEALTH POLICY

MSE has a proven, approved safety and health plan and an approved quality management plan. We are committed to providing the best quality service to our customers and making sure our workers go home safely every day. We believe that all accidents are preventable and consider no phase of operation or administration more important than health and safety. For all projects we provide and maintain safe and healthy working conditions and establish and insist on safe work practices at all times by all employees. Our policy is to meet our meet our safety and health responsibilities. We have a written policy available on request.



MSE is committed to ensuring safety is the highest priority at each and every level of our operation and for each project. We know worker safety is no accident--it takes training, vigilance, prevention, open communications, and a **safety first** commitment from top management. Our ultimate goal is an accident free work place and we work diligently at that goal.

EMR	
2010	0.87
2009	0.84
2008	0.86
2007	0.75
OSHA TRC/TIIR	
2010	2.4 (2)
2009	1.8 (2)
2008	1.5 (2)
2007	4.9 (7)
DART Rate	
2010	1.2
2009	0
2008	0
2007	0

Benefits MSE believes that essentially all serious injury to workers can be successfully prevented. Safety is a formal part of our corporate quality program. Our low EMR rate shows our commitment and translates into real world benefits such as elimination of unnecessary indirect costs; reduction of worker's compensation insurance premiums; personnel trained in workplace safety, confident in their safety training, and empowered to stop work in unsafe situations.