

ET-DSP™

Electro-Thermal Dynamic Stripping Process

Statement of Qualifications



McMILLAN-McGEE CORP.

CREATORS
OF ET-DSP™

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1. Introduction

McMillan-McGee Corp. (Mc²) is pleased to present our Statement of Qualifications for review. Our services are offered to both the public and private sectors, from entities as large as federal government agencies to small businesses.

We are a solution-oriented company with a well-deserved reputation for implementing creative and comprehensive remedies for Electrical Resistive Heating (ERH) projects for the energy and environmental industries. Mc² is committed to providing reliable products and services that exceed customer expectations in a cost-effective manner. Mc² is uniquely positioned in the industry as the only manufacturer of specialty electrical heating equipment.



Figure 1 Mc² headquarters

2. About McMillan-McGee Corp.

McMillan-McGee Corp. is focused on providing ERH engineering, design, and products to our clients in the energy and environmental industries. We have operated continuously since 1991 and employ a Staff and Technical Board comprised of the worlds most **experienced** and foremost **authorities** on soil heating.

Mc² has demonstrated its reliability and expertise in a wide range of assignments. The high level of satisfaction communicated by our numerous returning clients evidences our performance and commitment to providing timely cost-effective electro-thermal solutions. Our headquarters is fully staffed and equipped to provide the North American marketplace with a full range of products and services that includes:

1. In-Situ Thermal Environmental Remediation Solutions;
2. Thermally-enhanced Heavy Oil Recovery;
3. Numerical Modeling, Simulation, and Electro-magnetic Laboratory Services;
4. Professional Engineering Services and Project Management;
5. Specialty Electrical and Mechanical Manufacturing;
6. Web page development and operations;
7. Design and Manufacturing of Power Control Electronics and Control Software; and
8. Thermal Well-bore Stimulation and Optimization Solutions.

3. Professional Accreditations

At the present time we have a full-time staff of 20 including Dr. Bruce McGee, a recognized world leader in the field of applied electro-magnetics and the industry's preeminent authority on electrical soil heating. We also employ professional engineers, professional geologists and hydrogeologists, environmental business specialists, project managers, electronic technologists, and certified electro-mechanical technicians. Some of our affiliations include:



Association of Professional Engineers, Geologists, and Geophysicists of Alberta (APEGGA)



Institute of Electrical and Electronics Engineers (IEEE)



University of Calgary Advisory Board



Association for Computing Machinery (ACM)



Pacific Institute for the Mathematical Sciences (sponsor)



Canadian Institute of Mining, Metallurgy, and Petroleum (Chairman - ERB Board)

4. General Capabilities

4.1. Energy

Mc² together with its sister company, E-T Energy, have developed a relationship to become the low-cost producer of bitumen in the Oil Sands of Northern Alberta. In response to growing environmental and cost concerns in the oil sands sector, E-T Energy was formed as a means to bring ET-DSP™ technology to the largest resource base in the world. An ET-DSP™ pilot test was completed in the Fall of 2007 that displayed exceptional cost and production metrics. The results of the test proved to be so encouraging that a \$20 million pilot expansion was approved by the Board of Directors of E-T Energy. Drilling has already commenced and an expanded field test is currently being operated in Fort McMurray, Alberta, Canada.

As the owner of ET-DSP™ technology the role of Mc² in this venture was to manufacture and operate all of the thermal treatment components at the site. A modular system of high-performance electrodes, power delivery systems, and water circulation systems was manufactured at Mc² headquarters in Calgary and installed at the site in Fort McMurray. Based on the success of the original pilot Mc² has been commissioned to manufacture all of the electrodes and a new fleet of power delivery systems for a 1,000-barrel per day expansion of the ET-DSP™ test at the site.



Figure 2 Site of the ET-DSP™ test facility in Fort McMurray, Alberta, Canada.



Figure 3 A frequent visitor during operations in Fort McMurray

4.2. In-Situ Thermal Remediation

Mc² has capitalized on its industry leading electromagnetic background to develop Electro-Thermal Dynamic Stripping Process (ET-DSP™). ET-DSP™ is an electrically resistive soil heating technology that uses three-phase power.

The power is regulated by sophisticated computer controllers that aid in bringing about timely and unparalleled uniformity of heating to the targeted volume of contaminated soil and groundwater through a flexible pattern of buried electrodes. The system has been engineered to outperform conventional technologies in heating the targeted formation. The inherent efficiencies of ET-DSP™ is realized in an overall reduction in project costs and operational duration.

The heating process begins as current is passed between electrodes and the subsurface temperature rises. Before the temperatures in the soil and groundwater reach the boiling point of water, the contaminants pass into the vapor phase (are volatilized) and are then removed using conventional extraction equipment. Continuing benefits of the thermal process include enhancements to bioremediation and natural attenuation. The end result is a process that can effectively reduce complete remediation time from several years to a few months, and meet regulatory closure criteria.



Figure 4 An ET-DSP™ thermal remediation project – the largest of its kind in the world.

4.3. Numerical Modeling, Simulation & Electro-magnetic Lab Services

Our numerical modeling capabilities are the most advanced and accurate in the industry. This simulation software allows us to optimize every aspect of a thermal remediation project and instills a high level of client confidence in our products and services. The process takes into account various elements such as subsurface soil lithology and resistivity, hydraulic conductivity and flow, hydrocarbon phase behaviour, ambient temperatures, and above and below grade structures to design the most **economical** and **efficient** in-situ thermal remediation system.

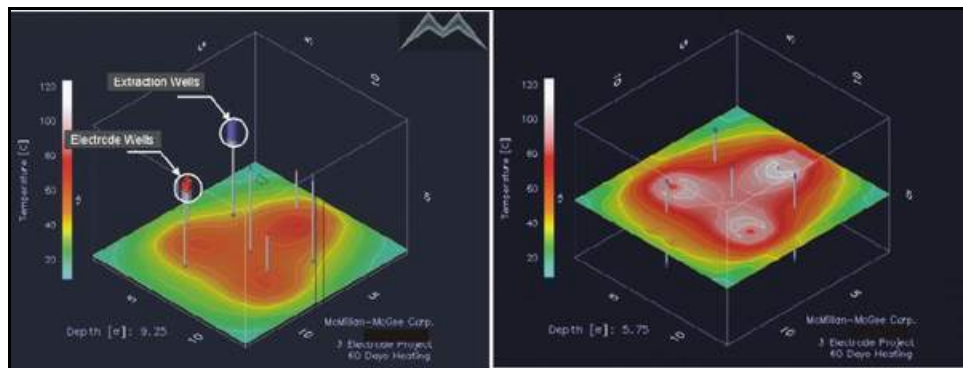


Figure 5 A numerical simulation of an ET-DSP™ process

Complementing these activities is our laboratory and design facility where bench-scale experiments of electro-thermal processes allow Mc² to pilot field conditions in a controlled environment. These testing procedures allow us to determine the static and dynamic electrical properties of samples, phase behavior during electro-thermal processes, volatility testing, and material flow and thermal properties. These results are then used to develop a solution customized to the specific needs of our individual clients. Strict adherence to Quality Management System principles ensures that all testing and experiments comply with industry standards or those that have been developed for the special needs of clients.

The Mc² electro-magnetics laboratory is capable of handling most sample types for testing including all types of soils, groundwater, and even synthetic fibers.



Figure 6 Mc²'s electro-magnetics and soil testing laboratory

4.4. Manufacturing

Mc² provides its clients with the most innovative and advanced electromagnetic solutions at the best possible price. As such, Mc² designs and manufactures all ET-DSP™ components in-house from our state of the art manufacturing complex. Our products are not available through any distributor specifically as a means to reduce end costs to the client and to retain control over their application. Some of the products that we manufacture include electrodes, power delivery systems, and specialty transformers for the environmental and energy industries. Mc² also has an in-house electronics laboratory where all of our printed circuit boards and power electronics are designed, produced and tested for optimum performance. In fact, Mc² is capable of manufacturing everything from heavy industrial equipment to the most sensitive of electronics for power control and data retrieval across the Internet.



Figure 7 Manufacturing and design capabilities at Mc²

4.5. Professional Engineering & Design

Mc² understands that meticulous, accurate, capable, and timely response to an organization's engineering requirements is essential to control health risks, environmental protection, guard against financial liabilities, and to maximize return on capital. Our engineering staff performs assessments that range in scope from reconnaissance level characterization to detailed studies/reports involving subsurface explorations and sampling. Some of the industries that have benefited from our professional engineering include energy (oil and gas), environmental, forestry, transportation, mining, medical, and defense.

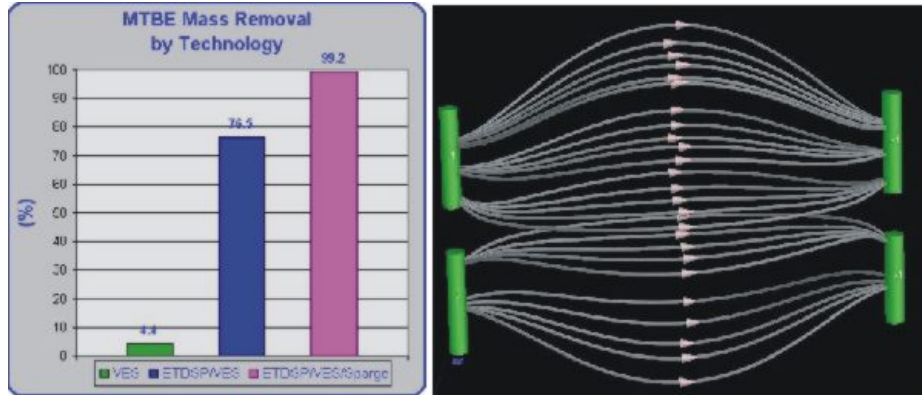


Figure 8 Mc²'s engineering services can help any client identify the most effective and efficient means of removing source zone contamination and optimizing system performance

4.6. Project Management & Operations

Mc² has worked as both a subcontractor and as the prime contractor on large projects and is committed to meeting project goals, schedules and budgets regardless of our role. We have experience in lump sum, time and materials, and performance-based contracts with our unique technology. We have performed both consultative and contractor roles on projects, depending on the needs of the client.

Mc² employs professional management personnel to oversee their involvement in every project, no matter the size. Backing up this management expertise is the most capable and well-trained team of electrical, electronic, and electro-magnetic technologists in the industry that is capable of installing and operating the most reliable and safe equipment to ensure all project goals are met in a timely and cost-effective manner.



Figure 9 A modular ET-DSP™ system operating at a DOE site in Florida.

4.7. Engineering Design & Manufacturing

Mc² has responded to customer demand for non-labor intensive products with electronic control for improved efficiencies and optimized performance. Consequently, we have developed the internet-enabled Time Distributed Control Module (TDCM) and an ingenious system of Inter-Phase Synchronization that greatly **exceeds** the performance of any conventional electrical heating system and reduces the need for costly on-site monitoring.

Mc² also manufactures real-time thermocouple and digital temperature monitoring systems and internet-based power monitoring and control systems. These elements have combined to make Mc² systems the preeminent provider of in-situ thermal remediation equipment and services in the industry.

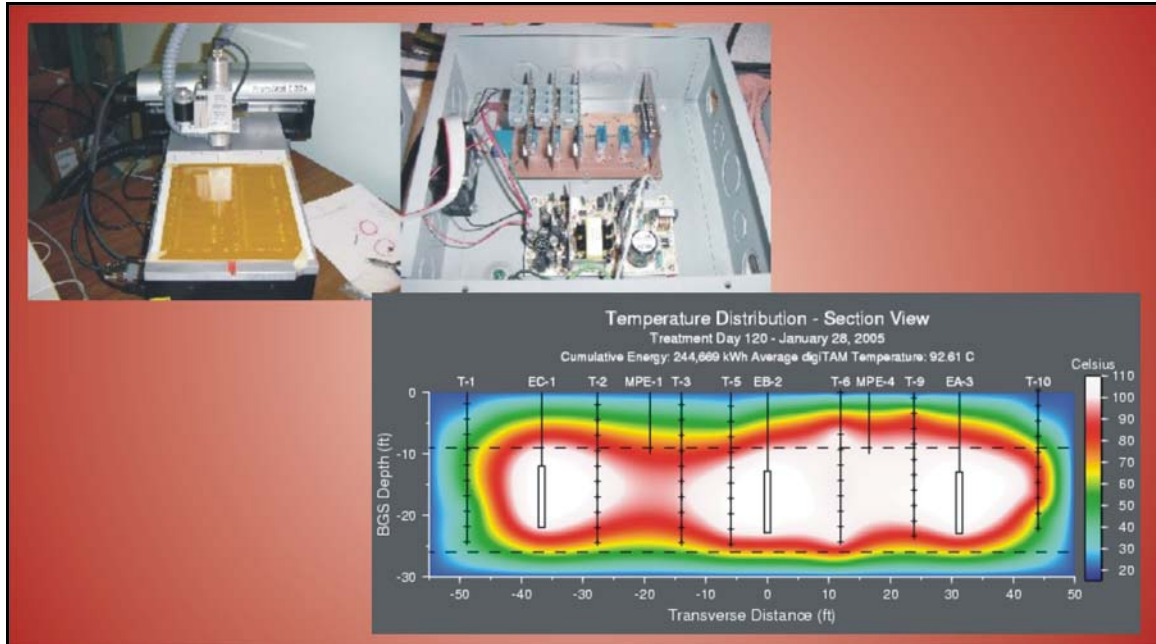


Figure 10 Mc²'s competitive advantage as a manufacturer has allowed us to provide value-added services to our clients.

4.8. Thermal Well-bore Stimulation & Flow Optimization

In addition to working in the environmental remediation business, Mc² provides solutions to the petroleum and energy industries to increase production by reduced viscosity through electromagnetic induction and thermal stimulation techniques. One such system uses electricity and geo-thermal principles to raise the ambient temperatures of a reservoir to increase the flow of fluids and increase production. Other applications include electro-thermal heating of pipelines, electrical heating of heavy oil reservoirs and oil sands, and associated ancillary functions.

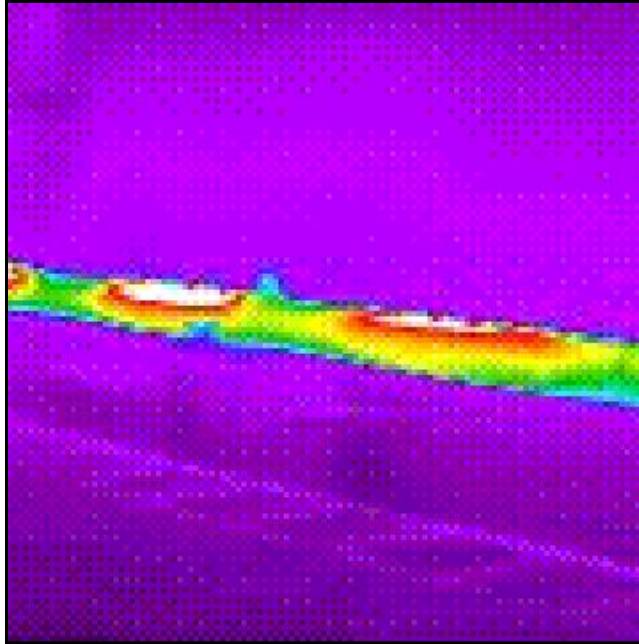


Figure 11 A thermal image showing the effects of electro-magnetic induction forces on a well casing

4.9. Web Page Design & On-line Database Management

Mc² pioneered the use of the Internet as a tool to keep their clients informed and to track progress on projects. Since that time, Mc² has maintained its leadership position by providing their clients with convenient, user-friendly and functional web pages. All aspects of the ET-DSP™ project can be monitored in real-time via a secure project web page that has been integrated to work seamlessly with the digiSource™ family of digital sensing technology.

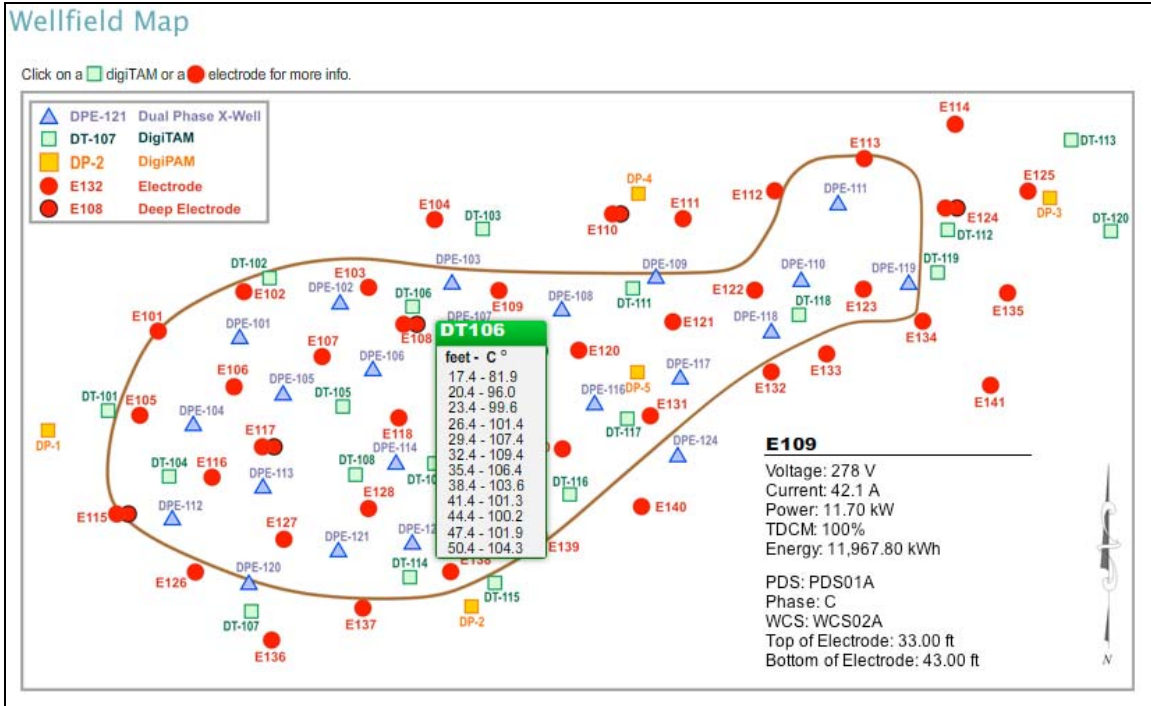


Figure 12 The interactive well-field layout at an operating ET-DSP™ project.

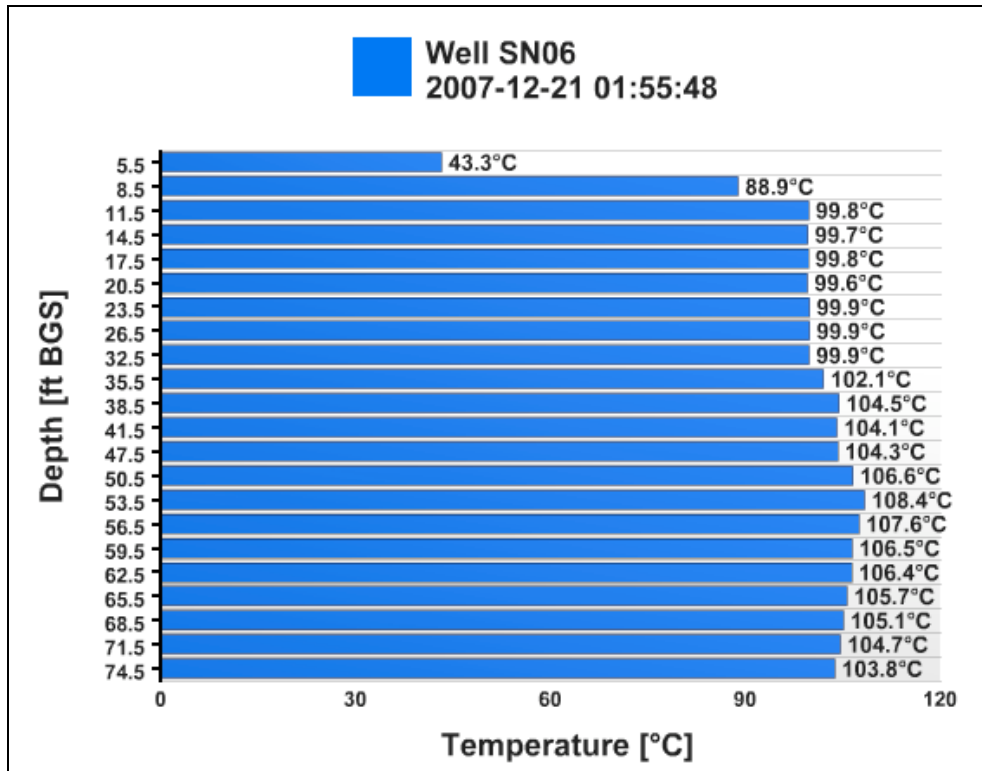


Figure 13 Screen shot of temperature data from an active project

5. Capabilities & Resources

Mc² stresses the importance of innovation, quality control, confidentiality, and ethics. The resources of the firm describe a thriving and stable organization that has operated continuously for the past 14 years.

The full-service engineering, design, and manufacturing capabilities of Mc² provides an advantage that our competitors do not possess. Engineering is performed in-house at our modeling and numerical analysis department with state of the art computer software for accuracy and client reliability.

The power electronics department is capable of designing and building customized software and products for ease of use and optimal efficiencies. The applied electro-magnetics laboratory is equipped to handle a wide range of samples for material testing and electrical profiling.

6. Equipment

Mc² has a comprehensive fleet of equipment for thermal recovery of heavy oil and has deployed more power delivery systems for environmental remediation than any of its competitors and also has a comprehensive inventory of equipment available to support its engineering, geological, electronic, design, and specialty manufacturing activities. A modular design to our Power Delivery Systems makes installation a virtual exercise in 'plug and play' and allows Mc² to respond to both large and small projects with relative ease.

A vast selection of specialty testing and sampling equipment is available for use by our trained technologists and a complete array of back-up mission-critical components is inventoried to ensure there are no project delays. This helps Mc² maintain an excellent equipment up-time that is often 100% on many projects. All equipment is subject to a rigorous maintenance, calibration, and cleaning procedure prior to each use. Additionally, we have developed and implemented rigorous calibration and maintenance schedules for long-term projects requiring intense equipment use.

7. Project List

A list of Mc²'s most recent completed projects can be made available upon request. Our clients are from the public and private sectors and include Fortune 500 companies along with the USEPA and DOE. For all projects LNAPL and/or DNAPL was present, and we achieved results that lead to regulatory closure. Note that for each project, Mc² performed resistivity testing on representative soil samples and a numerical model for establishing all well field and extraction parameters. These elements are critical in order to design the most effective heating and extraction solution, and determine the total life-cycle cost of the project.

8. Computer Resources & Databases

Mc² currently uses an extensive Local Area Network of Mac and IBM PC- compatible computer system to support scientific and engineering computation, numerical modeling and simulation, CADD systems, and interoffice communications. Additionally, our computer system is used to efficiently store, retrieve, manipulate, and manage our databases.

Our proprietary database and project tracking software allows the client secure access over the internet for real-time data retrieval on all relevant project information including temperature, current, voltage, power and process/flow information. The project tracking information and data acquisition modules, for example, allow our customers to make the most informed decisions possible to complete a project on time and on budget.

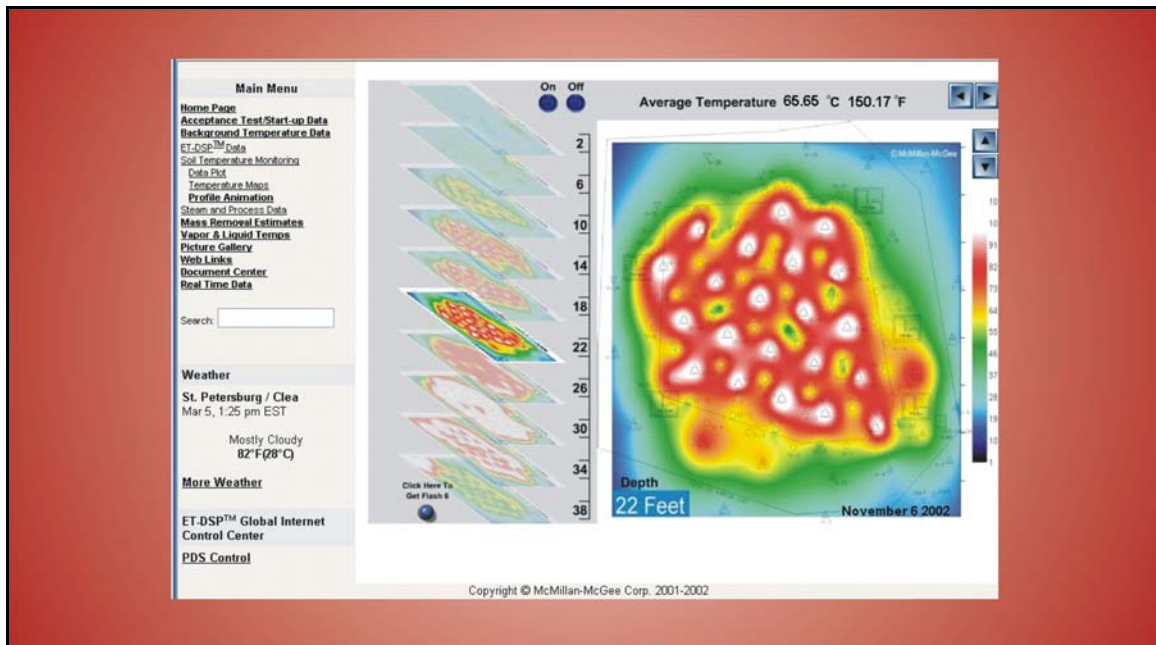


Figure 14 Mc²'s data acquisition and management systems are unmatched in the industry. All of our systems are fully internet enabled and web-ready for lower on-site monitoring costs and improved efficiency and response

9. Personnel

Mc² has developed specific expertise in applied electromagnetics, environmental remediation technology, flow optimization, electrical and mechanical specialty manufacturing, and related services.

This inventory of successfully completed projects ranges from preliminary site assessments and consultations to full-scale design, manufacture, and implementation of electromagnetic systems and services.

Because of this experience, we understand that our reputation and success are directly related to our technical staff. As such, we have assembled a multi disciplinary team of engineers, geologists, hydrogeologists, technologists, and technicians that is capable of addressing a wide range of client issues.

10. References

The table below lists clients and experts in the field that will attest to Mc²knowledge and experience with ERH projects.

Table 1 References & Contact information

Name	Role	Organization	Phone
Dacre Bush	Program Director	TN & Associates	805.295.9071
Montgomery Bennett, RG	Sr. Project Manager ATOFINA, Greensboro	Groundwater & Environmental Services, Inc.	804.343.0700
Brent Anderson, PE	Sr. Project Manager Cape Fear	WRS Infrastructure & Environment	813.684.4400
Dr. Kent Udell	Technical Advisor	University of California, Berkeley	510.642.2928
Dr. Fred Vermeulen	Technical Advisor	University of Alberta (ret.)	403.678.9288
Jim Cummings, PE	Technical Advisor, SITE Program	U.S. EPA	703.603.7197
Dr. Mike Basel	V.P. Technology	Haley & Aldrich	913.599.5802

11. Contact Information

McMillan-McGee Corp.
4895 – 35B Street SE
Calgary, AB T2B 3M9 Canada
Phone: 403.279.7948
Fax: 403.272.7201
Internet: www.mcmillan-mcgee.com

For additional information contact:

Brent Winder (Vice-President): 403.569.5103;
bwinder@mcmillan-mcgee.com

Dr. Bruce McGee (President): 403.569.5101; mcgee@mcmillan-mcgee.com

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Dr. Bruce McGee (President): 403.569.5101; mcgee@mcmillan-mcgee.com