

**MINNESOTA ARMY NATIONAL GUARD
SECRETARY OF THE ARMY ENVIRONMENTAL AWARDS FY14
SUSTAINABILITY—TEAM**

Introduction & Background

The Minnesota Army National Guard (MNARNG) has a presence in 63 communities throughout Minnesota, particularly at 53,000-acre Camp Ripley, a regional training facility for the military, federal, state, local and civilian communities. The MNARNG Sustainability Team manages environmental stewardship for Camp Ripley, which has long served as a showcase for the compatibility of environmental innovation and excellence with military training, as well as at the Arden Hills Army Training Site (AHATS), 63 armories, eight Field Maintenance Shops (FMS), and two Army Aviation Support Facilities (AASF). The MNARNG's 11,347 Soldiers provide war fighting, sustainment, homeland security, and emergency response support for the state and the nation. Maintaining and enhancing the MNARNG installation to the highest possible environmental standard is the Sustainability Team's goal.

The MNARNG recognizes that incorporating sustainability into its operations, acquisitions, and infrastructure will help reduce its resource demands while preserving current and future operational flexibility. With this in mind, the Sustainability Team works diligently to create a culture that recognizes sustainability as a guiding ethic measured not only in terms of financial benefit, but also in terms of preserving the mission capability, high quality of life, positive relationships with local communities, and options for the MNARNG's future. The Team's commitment to long-term sustainability directly supports the MNARNG's achievement of excellence in its Triple Bottom Line: Mission, Environment, & Community.

"We will use deliberate efforts to reduce energy consumption, effectively manage natural resources and minimize waste streams. This will ensure our ability to sustain our capabilities into the future and remain good stewards of our limited resources and the environment."

--Maj. Gen. Rick Nash, Minnesota National Guard adjutant general



In October of 2011, the Adjutant General of the Minnesota National Guard, Major General Nash, issued his vision for the next four years of the Minnesota National Guard through his Campaign Plan. Within this plan is a commitment to a sustainable infrastructure while achieving Net Zero goals by incorporating State and Federal Executive Orders, Legislation, Department of Defense Instructions and the Army Sustainability Campaign Plan. Through senior Leadership emphasis on continual improvement, the MNARNG is creating a culture that recognizes the value of sustainability measured not just in terms of financial benefits, but also in terms of maintaining mission capability, high quality of life, and positive relationships with local communities, and options for the Army's future.



To provide guidance for the implementation of the Campaign Plan the MNARNG launched the Sustainability Working Group (SWG). The Sustainability Team is comprised of the Construction Facilities Management Officer (CFMO), Deputy CFMO, Physical Plant Director, the Energy Manager, and several environmental staff. In addition to facilities and environmental staff, the team also comprises of planning and

operational staff as the needs arise. The SWG meets on a weekly basis to promote and track sustainability measures. Sustainability is recognized as a shared responsibility among all MNARNG soldiers and staff.



In FY13 the Team went above and beyond, completing the State Sustainability Action Plan and the Joint Sustainability Master Plan, which outline goals and strategies for achieving benchmark reductions in energy use, increasing recycling, promoting carpooling and transit programs, and eliminating waste streams. The Joint Sustainability Master Plan is the guiding document for the Team's activities. Sustainability goals are fully ingrained in MNARNG operations; the Adjutant General's Campaign Plan emphasizes sustainability projects as core to the MNARNG's mission, particularly areas related to energy conservation and use reduction, renewable energy production, green construction, and the Camp Ripley Army Compatible Use Buffer (ACUB).



The Team has also designed an "eMS and Sustainability" checklist to be utilized in the MNARNG Organizational Inspection Program (OIP). The OIP provides the Commander with specific compliance-orientated feedback on functional areas of programs within the command. The eMS and Sustainability checklist links targets and actions to everyday activities and ensures all facilities are operating according to these requirements. The OIP checklist is used by the inspection team during site visits and inspections; it's comprehensive checklist, which includes everything from training, awareness, energy use, waste stream elimination, etc., and helps the team and facility staff to identify areas of improvement and immediately correct any issues. The Team also maintains all conventional management plans (hazardous waste management, spill management, wellhead protection, etc.) with annual reviews and regular updates. The Team works primarily with the Minnesota Pollution Control Agency (MPCA), Minnesota Department of Health, and local regulators on compliance activities and keeps all licensing or permitting current for stormwater, underground storage tanks, hazardous waste, and National Pollution Discharge Elimination System.



Team members provide technical input to two State working groups focused on Energy and Sustainability. The long standing Minnesota Pollution Control Agencies, Interagency Pollution Prevent Advisory Team (IPPAT) is the leading group in sustainability and pollution prevention. The IPPAT is a group of representatives from state agencies committed to promoting and sharing common sustainable goals in building management and operations. The IPPAT meets four times a year to address the goals and targets outlined in the Governor's Executive Orders 11-12 and 11-13 and those amended by IPPAT. Two Team members sit on this advisory team to provide input and share lessons learned, taking an active role in assisting state regulators to enhance sustainability statewide. In FY13 the Minnesota Department of Commerce



The MNARNG Sustainability Team. Front: Marty Skoglund, Jay Brezinka, Brian Sanoski, Zac Alexander, Lynn Houle, Nancy Dietz, Mary Lee, & Scott Albers. Back: Ken Auer, Joe LaForce, Gary Nierengarten, Josh Pennington, Adam Thompson, Mark Anderson, Tim Notch, Jason Linkert, Mark Erickson, Patrick Neumann, John Maile, & Brian Dirks. (Not pictured: Lee Anderson & Craig Erickson.)

launched an Energy Efficiency Working Group focused on energy efficiency, energy savings performance contracting, renewable energy, and energy use intensity tracking. The Team provides members to sit on this working group, providing input and guidance on the EO.

Net Zero Energy and Renewable Energy Solutions: The MNARNG is implementing a comprehensive Energy program based on culture change, increased energy efficiency, and development of renewable and alternate sources of energy. The Team is in collaboration with the National Renewable Energy Laboratory (NREL), to help establish AHATS and Camp Ripley as Net Zero Installations.



Behavior and energy conservation measures are primary in pursuit of Net Zero energy. The Team has emphasized both infrastructure improvements and behavioral changes through *benchmarking*. The Team partnered with the MPCA to hire a Green Corp intern at Camp Ripley to educate facility managers on methods to reduce energy consumption. This effort is enhanced by benchmarking facilities within the State of Minnesota's buildings, benchmarks, and beyond (B3) program at all MNARNG facilities. The B3 program allows for energy use tracking at the facility level. All facility managers have access to this data, allowing them to compare their usage rates with historic use at the facility, as well as other armories across the state. To build on the Green Corp work accomplished in FY13 the Team issued An Energy Challenge, funded through the QRP program, was launched throughout the State of Minnesota. The goal for this project is to reduce energy intensity at each facility by 3% from the previous year through engagement and influencing behavior change. Team members visited every participating facility to build on the Green Corp training in energy reduction and monitoring techniques, provided each facility with a sustainability binder detailing best practices, awareness materials, posters and tracking documents. As part of this challenge, the facility that reduces its energy intensity by the largest percentage will receive \$10,000 for an energy upgrade to the facility. Quarterly newsletters are distributed to the participants and facility managers with results and tips targeting energy reduction



This year the Team worked with the Minnesota Department of Commerce to develop requests for proposals through the Guaranteed Energy Savings Program (GESP) which is an Energy Savings Performance Contract program administered by the State. The Team has completed a site specific request for proposal for Camp Ripley which covers an investment grade energy audit on nearly 1.1 million square feet of building space at Camp Ripley to further identify retrofitting and upgrade opportunities that will curtail the training site's energy use and \$1.5 million annual utility costs. In addition to the physical buildings the request also requires an evaluation of the entire exterior lighting system within cantonment and possible replacement with Light Emitting Diode (LED) fixtures and a dynamic lighting control system.



Solar Photovoltaic and Solar Thermal arrays were installed at AHATS, the first large-scale 40kW solar photovoltaic and solar thermal array has been an important demonstration of solar energy's potential for the MNARNG. The solar PV provides approximately 6.5% of the electrical needs for the 100,000 square foot maintenance facility. The solar thermal array is novel within the Army National Guard, and at AHATS, it provides pre-heating of water to help reduce the amount of natural gas needed to heat



water to the desired temperature. Solar hot water is also being installed at the new Education Center addition at Camp Ripley and at the new Stillwater Armory.

The Team started working with Minnesota Power, the electricity provider for Camp Ripley in FY 13 on exploring mutually beneficial partnerships. In FY14 the Minnesota National Guard and Minnesota Power signed a Memorandum of Understanding for a three phase energy project at Camp Ripley, with the first phase being the installation of a 10 Megawatt solar array. The signing of the MOU makes National Guard history as Camp Ripley will become the location of a 100 acre solar field which will be the largest installation in Minnesota and largest on a National Guard installation nationwide. The following phases of the project will encompass energy conservation measures and installation of backup power generation at Camp Ripley. This project will provide energy security for Camp Ripley by giving the installation the ability to be independent of the electrical grid in emergency situations.

“This solar project represents an important milestone for Minnesota. It’s not only a partnership between the National Guard and Duluth-based Minnesota Power, but it fundamentally demonstrates where we are in Minnesota in getting to a clean energy future.”

--Minnesota Commissioner of Commerce Mike Rothman



Biomass dual fuel power at Camp Ripley represents an innovation with the potential to completely transform the MNARNG’s energy footprint. The Team conducted a feasibility study in 2013 for construction of a biomass heating district for seven primary buildings on Camp Ripley. The plant would utilize an entirely renewable energy source: the tremendous amounts of wood chips and debris generated on post through the forest management and natural resources programs and would offset 91 percent of the buildings fossil fuel heating requirements. The Team has been pursuing grant funding and partnership with Minnesota Power to augment NGB funding of the project. The expanded plant design consists of three advanced woody biomass combustion units, thermal storage units, and associated distribution system which will replace 58 existing older, low efficiency and carbon gas polluting natural gas fired boilers. By using the biomass already harvested in the course of land management operations, the Team is also creating what is essentially a closed-loop power system that will reduce natural gas use (currently used for heating) by 42,300 cubic feet and reduce carbon emissions by approximately 2,220 metric tons.



Ground source heat pumps have a proven track record with the MNARNG. In FY11 the MNARNG installed a ground source heat pump for three troop billet structures at Camp Ripley. This adoption of geothermal energy has resulted in a 45% reduction in energy consumption for existing billeting areas. In FY13 and FY14 the MNARNG will expand on the ground source heat pump with new installations at the 70,000 square-foot addition to the Education Center and the 98,000 Training and Community Center (both on Camp Ripley) and at the new 62,500 square foot Readiness Center at AHATS.

The Team completed a **Wind Power** feasibility study at Camp Ripley over 2013 and 2014 using Sonic Detection and Ranging technology. While the results were not favorable the information will provide the Team guidance on future endeavors.

Net Zero Water, Conservation, and Protection: As part of net-zero goals, the Team has advised facility managers in water use reduction and has promoted water-

conserving upgrades throughout the installation; as a result, the MNARNG has reduced water usage by 26 percent—12 million gallons—based on a 2007 baseline and surpassed the 2 percent annual reduction goal. In addition to changes in habits, low flow water devices, leak detection/repair, and changes in irrigation practices have contributed to this reduction.



In 2013, the Team completed an update to the Camp Ripley Wellhead Protection Plan (WHPP). This is one of the first such updates completed in the state, establishing a model which could easily be adopted by small communities as a way to protect water sources. In addition to WHPP, the Team completed a comprehensive stormwater management plan for AHATS that will facilitate and enhance future decisions relative to construction stormwater permitting. In partnership with Argonne National Laboratory, which also assisted on data collection for the WHPP, the Team created a model of pre-development hydrology as a goal for AHATS. Through a combination of retention, filtration, and appropriate placement of stormwater management structures, the Team will be able to guide future construction to have virtually no impact on natural stormwater flows.

National Guard Bureau, along with MNARNG and the Sustainability Team conducted an assessment and implemented the Operational Range Assessment (ORA), completing phase 2 of this program last year. The Team collected 24-hour samples at the outflow points, successfully demonstrating that no munitions constituents of concern were leaving the training site. The study also determined that Camp Ripley's best management practices, such as backstop cleaning, avoidance of wetlands and rivers, and water monitoring, are models that should be adopted at other training sites.



Net Zero Waste, Waste Stream Elimination, and Material Management: In FY13 the team conducted a waste stream analysis with assistance from Central Lakes College internship program. The results of this audit have led to an RFP for a more comprehensive waste audit beginning next year. Currently, the Team is evaluating options for food waste composting and conducted a pilot project at Camp Ripley using a "liquid food digester" for organic waste in a dining facility. The team has also promoted behavioral changes to reduce waste; for instance, this year it installed water bottle fill stations throughout the state with awareness materials that discourage use of single-use plastic bottles. In FY 13, the Team implemented a hazardous material exchange program that has redirected 9,000 pounds of hazardous materials that would otherwise have been treated as hazardous waste. The Team began tracking material usage and need as part of normal site visits throughout the state, rather than simply picking up unused materials for disposal. Viable materials not needed by one facility are now re-routed to a facility that can use them, thereby averting costs of about \$20,000 in purchasing and disposal. A green procurement program is being developed to guide material purchase and reduce solid waste generation.



Recycling: A significant component of waste stream is recycled. The MNARNG set an ambitious goal to divert 50% of its waste from being sent to a landfill. With a recycling facility at Camp Ripley and facilities across the installation participating in recycling efforts, the MNARNG is currently exceeding that goal with a 55% diversion rate, and with plans to accomplish much more in the near future. The QRP recycles brass,



1SG Chad Turner is shown feeding recycled brass into the safety certification unit. Approximately 60 tons were treated and recycled in 2013. Ammunition Supply Point personnel assume responsibility for operating the unit.

cardboard, paper, fiberboard, steel, aluminum, plastic, glass, and more recently, bituminous and concrete. The bituminous and concrete are used throughout Camp Ripley to construct roads and parking lots. Electronic waste is diverted as well by finding organizations that can reuse working computer equipment. In FY13, about 1800 pounds of computer equipment was distributed through the state quartermaster to a local elementary school. Also contributing to the diversion rate and QRP revenue was 80 tons of small arms brass cartridge casings recycled in 2013, with an additional 80 tons sold thus far in FY14. In addition, the Team runs a diversion program for wood reuse and manages a

fuel wood program providing firewood from forestry activities on Camp Ripley to the families of deployed Soldiers.



Green Construction: The MNARNG and the Sustainability Team design all new and rehabilitated structures to a minimum of LEED Silver standards, and the integration of the Sustainability Team with master planning, facilities, and construction staff help to ensure that these standards are not only met but routinely exceeded. The recently completed Field Maintenance Shop on the Arden Hills Army Training Site has received a Gold rating under the Leadership in Energy and Environmental (LEED) green building design standards. The 107,500-square-foot facility was completed earlier this year and is one of the largest and most modern maintenance facilities in the country. This facility demonstrates a multifaceted approach that incorporates renewable energy technology, natural daylight harvesting and a unique water collection system that collects the rainwater from one half of the building, storing it in a 25,000-gallon underground cistern for reuse for site irrigation. Rainwater collected on the other half is stored in a 20,000-gallon underground concrete cistern and filtered for use in the vehicle wash bays. This facility marks the new benchmark for the MNNG on which we will endeavor to duplicate and exceed in future new construction projects.



Vehicle Management and Emissions Reduction: The Minnesota National Guard currently operates over 20 vanpools located in the Minneapolis/St Paul area. The Team has brought vanpooling awareness to the comparatively rural setting of Camp Ripley in FY13 & FY14. By utilizing the Transit Incentive Program, the Team was successful in starting the first Camp Ripley vanpool. The Team also hosted a “Made in Minnesota” electric vehicle demonstration. The intent was to bring awareness to Camp Ripley and AHATS on the potential for use of EV within cantonment areas, in lieu of fossil fuel vehicles. As a result of this demonstration, the MNARNG has two vehicles on order, one for Camp Ripley and the other use at AHATS.



Sustainability is explicitly built into the MNARNG’s Campaign Plan, the organization’s roadmap for achieving its mission in the short and long term; the Team’s activities are essential to the MNARNG’s future security and viability. Compliance support ensures



that training sites and facilities will not be impeded by regulatory issues. Training programs help Soldiers and staff to meet sustainability benchmarks and perform their jobs more safely and efficiently. Recycling, waste stream reduction and energy conservation all help to stretch the MNARNG's resources further and make the



organization more self-reliant and resilient. Several Sustainability Team members are significantly involved in the ACUB program, contributing to its great success in landowner, conservation organization, and government partnerships to achieve large



purchase and easement agreements. Last year, enough funds were secured to complete land deals permanently protecting 2,889 acres within the buffer zone. Sustainability Team member Marty Skoglund was selected to lead an ACUB Working Group for National Guard Bureau. The working group stands to serve the mission of not only the MNARNG, but many other Army National Guard installations facing encroachment issues. The first undertaking of the working group last year was to improve proposal techniques and make Army National Guard ACUB proposals more definitive from a funding perspective when being compared against other military services, rather than against each other.



The Sustainability Team actively shares its expertise with other military and environmental agencies, for example through the ACUB Working Group or the Interagency Pollution Prevention Advisory Team (IPPAT), which draws from agencies throughout the state to provide input on sustainability initiatives, targets, and goals. The



IPPAT also provides guidance to the Governor of Minnesota on the continual improvement of Executive Orders in relation to sustainable practices. This year, Team members attended the Smart Power Infrastructure Demonstration at Fort Carson to



share information on Net Zero strategies. Internally, the Team ensures program continuity through extensive training, plan integration, the eMS, and digital record-keeping and archive systems. The launch of the Energy Challenge this year has also helped to expand awareness of Sustainability activities and increase buy-in at the



individual facility and soldier levels. Team members visited every MNARNG facility to train managers in energy reduction and monitoring techniques, provide each facility with a binder detailing best practices and tracking documents, and provide onsite corrections.



The Team's partnerships with state agencies, local companies and the community further enhance the prestige of the MNARNG as an environmental leader. Over the past two years, Team members have been responsible for outreach projects beyond Sustainability alone, including youth, veterans, and disabled hunting programs; an



Adopt-a-Highway initiative in the name of MNARNG's environmental program; and publications of *The Steward*, a quarterly environmental newsletter. The Team also hosts an annual water festival for approximately 500 sixth graders in the Camp Ripley Area. In every aspect of its activities, the Sustainability Team prioritizes running a fully transparent program characterized by partnership and community engagement.