

FINDING OF NO SIGNIFICANT IMPACT

Midwest Geological Sequestration Consortium Phase III Large-Scale Field Test

AGENCY: U.S. Department of Energy (DOE)

ACTION: Finding of No Significant Impact (FONSI)

SUMMARY: DOE has prepared an Environmental Assessment (EA), DOE/EA-1626, titled "Midwest Geological Sequestration Consortium (MGSC) Phase III Large-Scale Field Test," a proposed project in which the DOE would provide co-funding to inject underground and closely monitor the flow of approximately 1.1 million short tons (1.0 million metric tons) of supercritical carbon dioxide (CO₂) into the brine-bearing Mount Simon Formation over a period of three years. The injection would occur within the property boundaries of the Decatur Archer Daniels Midland (ADM) Complex, on the east side of the city of Decatur, Illinois, in Macon County. The project team would be led by the Illinois State Geological Survey (ISGS). The host site for the proposed project is owned by ADM. This field experiment is known as the MGSC Phase III Large-Scale Field Test Project. The proposed injection period for this Phase III Early Test is three years followed by three years of post-injection monitoring.

Under the Proposed Action, one injection well would be utilized to extend into the Mount Simon sandstone formation at an estimated depth between 5,000 and 6,000 feet (1.52 – 1.83 kilometers (km)). Injected CO₂ would be confined to the Mount Simon formation by the low permeability shale zones within the immediately overlying Eau Claire formation. Two observation wells would also be drilled and would be dedicated full-time to continuous monitoring of the formation response to the injected CO₂. CO₂ would be captured from ADM's current ethanol fermentation process, transported at atmospheric pressure to a compression-dehydration facility, transported under pressure from this facility to the injection well, and finally injected into a saline reservoir within the Mount Simon formation.

Based on the analyses documented in the Final EA, DOE has concluded that the MGSC Phase III Large-Scale Field Test Project would have no significant consequences to the human environment. Thus, DOE considers that the Proposed Action, providing cost-shared funding for the project, is not a major Federal action significantly affecting the quality of the human environment, within the meaning of the National Environmental Policy Act (NEPA) of 1969, 42 United States Code 4321, *et seq.* Therefore, in accordance with 10 CFR Part 1021.322, DOE has concluded that preparation of an Environmental Impact Statement is not required, and DOE is issuing this FONSI.

COPIES OF THE EA ARE AVAILABLE FROM:

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BACKGROUND: In one of many governmental efforts to address global climate change concerns, the Department of Energy (DOE) established the Carbon Sequestration Program in 1997 with the focus of conducting research and development activities to evaluate and develop carbon sequestration technologies. Carbon sequestration involves capturing and storing carbon dioxide (CO₂) emissions prior to release into the atmosphere as well as enhancing natural carbon uptake and storage processes. Geologic sequestration involves the permanent storage of CO₂ in deep unmineable coal seams, depleted oil and gas reservoirs, or saline (saltwater-filled) formations. Impermeable caprocks and/or geologic structural or stratigraphic traps retain the CO₂ in the formation similar to natural gas storage trapping mechanisms.

PUBLIC PARTICIPATION: On August 25, 2008, DOE released a Draft Environmental Assessment (EA) for review and comment. Public notices announcing the availability of the Draft EA were placed in the Herald & Review newspaper in Decatur, Illinois. Hardcopies of the Draft EA were made available in the Decatur Public Library in Decatur, Illinois. Following a 30-day review and comment period, no substantive comments were received. The Final EA was completed in October 2008.

DESCRIPTION OF THE PROPOSED ACTION: DOE is proposing to provide cost-shared funding for an \$84,274,927 project, including \$66,730,912 in federally funded cost-share, to demonstrate the ability of the Mount Simon Sandstone, a major regional saline reservoir in the Illinois Basin, to accept and retain approximately 1.1 million short tons (1 million metric tons) of CO₂ injected over a period of three years.

The project would include the construction of a surface facility, an approximately 3,000-foot (914.4 meters (m)) long pressurized pipeline, and 2,000 feet (609.6 m) of ductwork carrying uncompressed CO₂. The facility would contain CO₂ compression and dehydration equipment necessary to capture and condition CO₂ from the Archer Daniels Midland (ADM) ethanol production plant. The pipeline would deliver the CO₂ from the compression-dehydration facility to the injection well.

The pipeline that would transfer the CO₂ from the compression-dehydration facility to the CO₂ injection site would be 4-inch to 6-inch (10.16 centimeter (cm) to 15.24 cm) diameter schedule 40 or 80 steel pipe designed to meet standards for the temperature and pressure of the CO₂ stream. The pipeline would be installed primarily aboveground with a small portion installed underground near the injection well. The pipeline would follow as much as possible the current pipeline alleys at the Decatur ADM Complex.

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Reservoir modeling would incorporate data developed during the pre-injection site assessment period, data developed from the initial well drilled on the injection site, and data collected as injection proceeds. The Midwest Geological Sequestration Consortium (MGSC) would initially characterize the project site using orthogonal two-dimensional (2D) seismic lines to confirm the geological structure at the site and to test for any seismically resolvable faults that may exist. A well would then be drilled through the entire Mount Simon Sandstone to the underlying granitic basement, followed by extensive logging, core sampling, and fluid sampling to build a comprehensive site reservoir model. The model would enable the understanding of the injected CO₂ distribution and the potential reactivity of the CO₂ and CO₂-laden brine with the reservoir and the seals. The model would be expanded using a baseline three dimensional (3D) seismic survey and would help predict where additional geophysical surveys should be taken as CO₂ is injected. Installation of two monitoring and verification wells into the Mount Simon formation would result in similar operational activities as the CO₂ injection well.

The proposed project would continue to refine previously developed Monitoring, Mitigation, and Validation (MMV) techniques and incorporate new technologies to understand potential leakage pathways of the larger scale test, provide post-injection monitoring, and provide assurance that health and safety requirements are fully taken into account.

ENVIRONMENTAL CONSEQUENCES: The Final EA included analyses of the potential impacts of the proposed *MGSC Phase III Large-Scale Field Test Project* on the following elements of the human and natural environment: air quality; geology and soils; water resources; wetlands and floodplains; terrestrial vegetation; wildlife; land use and visual resources; socioeconomic resources; human health and safety; cultural resources; and waste management. No substantive adverse impacts were identified from analyzing the effects of the proposed project on the human and natural environment.

AIR QUALITY:

Short-term minor impacts to air quality would be expected with the implementation of the Proposed Action. Direct and indirect air emissions would not exceed applicability thresholds, be “regionally significant,” or contribute to a violation of any federal, state, or local air regulation. Air emissions would be limited to temporary diesel emissions from drilling equipment during well development and drilling of the observation and groundwater monitoring wells. A dehydration reboiler, which could generate limited air emissions, is the only expected source of air emissions during injection or monitoring operations. In summary, the project would not produce emissions that would impede the area’s conformity with the State Implementation Plan (SIP) under the Clean Air Act.

The State of Illinois takes into account the effects of all past, present, and reasonably foreseeable emissions during the development of the SIP. The State of Illinois accounts for all significant stationary, area, and mobile emission sources in the development of this plan. Estimated emissions generated by the Proposed Action would be minimal and would not be regionally significant. Therefore, the impacts to air quality from implementing the Proposed Action would not be expected to exceed the significance threshold established in the body of the EA.

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GEOLOGY AND SOILS:

The main potential negative effects of the Proposed Action (injection of approximately 1.1 million short tons (1 million metric tons) of CO₂ over three years) are identified in the following paragraphs with accompanying notations regarding their likelihood of occurrence.

Some long-term increase in the Mount Simon subsurface pressures due to CO₂ injection would be expected. However, there is no more than an imperceptible risk of inducing seismic events due to increased reservoir pressure. No geologic faults are known to exist in the area that would breach the overlying Eau Claire formation confinement seal. The presence of a confinement limiting fault would be readily detected during the 2D and 3D seismic investigations conducted prior to any CO₂ injection.

A sudden release of CO₂ to the surface would be considered unlikely from the injection well or deep monitoring wells. The injection well will be designed to meet stringent Underground Injection Control (UIC) permitting regulations and technology. Similar technology has been successfully and safely used in other Mount Simon industrial waste injection wells within the basin. The two Mount Simon monitoring wells will be equipped with a series of isolation packers and hydraulic ports to monitor not only injection in the Mount Simon, but also to monitor for any potential leakage to overlying formations. If it were to occur, such an event is unlikely to have a large impact on the soil resources surrounding the well. Effects would be very localized and readily remediated. The main risk to the soils would be if a sudden release occurred late in the project after substantial injection had occurred (in Year 3 for example). Under these circumstances, the injected CO₂ would have had time to interact with organic and mineral matter in the reservoir and potentially have dissolved organic compounds and other contaminants.

In related CO₂-enhanced oil recovery (EOR) experience when sudden releases have occurred, the main adverse outcome to soils around the wellhead has been due to well blowout. When this has occurred, it has been readily cleaned up by removal and replacement with new soil. There is no expectation of any crude oil in the reservoir at the ADM site; therefore, the possibility of this occurring here is remote.

Relatively slow leakage from the well bore due to casing and/or cement problems are likely to be detected ahead of time by the Mechanical Integrity Testing proposed in the UIC Permit application.

Relatively slow or extremely slow leakage from the injection zone through the seal and ultimately into the soils is an extremely unlikely event even on a time scale of hundreds of years.

Due to the highly unlikely nature of the above-described effects, the conclusion is that there would be no measurable leakage of CO₂ from the storage formation to the surface or into another area in the subsurface. ADM has no other projects planned for the area. Since there are no expected substantial impacts to geological and soil resources from the Proposed Action alternative, it should not substantially contribute to the cumulative impacts to these resources in the project area or its vicinity. Therefore, the impacts to geology and soils from implementing

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the Proposed Action would not be expected to exceed the significance threshold established in the body of the EA.

WATER RESOURCES:

Analysis of the environmental effects on water resources concludes that the project has limited potential to have negative effects on the availability and current uses of water resources and limited potential to cause impairment of water resources through construction and operation of the sequestration project. This is due to the monitoring and mitigation components in the proposed UIC permit, depth of injection compared to the water sources, prior experience with water resources in other wells, low use and production of water in the Proposed Action, and the anticipated effectiveness for each of the multiple confining layers. Therefore, the Proposed Action is expected to have low risk to water sources, and any impacts that did occur, however unlikely, are expected to have minimal impacts to water sources before successful remediation or mitigation occurred. ADM has no other projects planned for the area. Since there are no substantial impacts to water resources, the Proposed Action and the No-Action alternative do not substantially contribute to the cumulative impacts to these resources in the project area or its vicinity that would cause for the impacts to exceed the significance threshold established in the body of the EA.

WETLANDS AND FLOODPLAINS:

Leakage of CO₂ to the surface affecting wetlands and floodplains in a widespread area is very unlikely. Any impacts to wetlands and floodplains would be confined to the immediate project area and would not cause any regional impacts. Thus, impacts on wetlands and floodplains by the Proposed Action would not be expected to exceed the significance threshold established in the body of the EA. Currently, no floodplains or wetlands exist in the project area. Previous industrial development of the project area by ADM and recent agricultural practices may have resulted in impacts to any wetlands that may have occurred onsite at one time. Wetlands in the project area vicinity are subject to adverse effects from ongoing agricultural, residential, and industrial activities; these activities are likely to continue in the future. The proposed project would not pose any threats to wetlands or floodplains in the project area, aside from the unlikely possibility of leakage of CO₂ to the surface, which could have widespread consequences on wetlands and floodplains. However, given the larger impacts to wetlands and floodplains from past, present, and future activities, cumulative impacts contributed by the proposed project would be minimally adverse and are not expected to exceed the threshold of significance established in the body of the EA.

TERRESTRIAL VEGETATION:

Any changes to native vegetation would be limited to a small area and would not affect the viability of the resources. Full recovery would occur in a reasonable time, considering the size of the project and the affected resource's natural state. Therefore, impacts on terrestrial vegetation would not be expected to exceed the significance threshold established in the body of the EA. Vegetation in the ADM Phase III Test Site has been previously cleared for ADM industrial development and agricultural practices. These activities have involved removal, trampling, or

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destruction of vegetation and disturbance of ground cover. Any vegetation disturbance associated with the Proposed Action would occur in previously disturbed areas or areas devoid of any vegetation. It is also possible that the unlikely leakage of CO₂ to the surface could have more widespread consequences on vegetation. Overall, however, cumulative impacts from the proposed project when added to other past, present, and reasonably foreseeable future actions would be minimally adverse and are not expected to exceed the threshold of significance established in the body of the EA.

WILDLIFE:

Any impacts on wildlife from the Proposed Action would be limited to a small portion of the population and would not affect the viability of the resource. Full recovery would occur in a reasonable time, considering the size of the project and the affected species' natural state. Therefore, impacts on wildlife would not be expected to exceed the significance threshold established in the body of the EA. Wildlife and habitat in the project area have been, and continue to be, subject to disturbance and damage by ADM industrial development and agricultural practices. Habitat disturbance associated with new infrastructure as part of the Proposed Action would be limited, and wildlife displacement and disturbance would be temporary, lasting only for the duration of the construction, injection, and monitoring period. It is also possible that an unlikely leakage of CO₂ to the surface could have more widespread consequences on wildlife and habitat. U.S. Fish and Wildlife Service (USFWS) was consulted. Potential impacts to species of concern were analyzed in the EA including possible impacts of concern to USFWS. The online consultation process produced a "no effect" result from the Proposed Action. Cumulative impacts from the proposed project when added to other past, present, and reasonably foreseeable future actions would be minimally adverse and are not expected to exceed the threshold of significance established in the body of the EA.

LAND USE:

The effects of the Proposed Action are that land use impacts as a result of constructing a compression facility, pipelines, injection and monitoring wells, and well pads would be limited to a small area and would not noticeably alter any particular land use at the test site or in adjacent areas. The affected areas would fully recover in a reasonable time once the project is completed. Therefore, the impacts to land use from implementing the Proposed Action are not expected to exceed the significance threshold established in the body of the EA. No additional land use development is currently planned in the vicinity of the project outside of Decatur ADM Complex property. ADM has no major development planned beyond routine expansion of current plant facilities. This project would expand industrial development in a predominately industrial land use area, so cumulative impacts would be negligible with regard to most unplanned development that may occur in this area and should be considered compatible with the current industrial character of the project area.

SOCIOECONOMIC RESOURCES:

The Proposed Action would be in keeping with the industrial character existing in the project area and would not introduce any new or incompatible uses. The proposed well, compression-

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dehydration plant, and the associated pipeline would be located entirely within the existing Decatur ADM Complex boundaries. No additional land outside the existing footprint would be needed. As a result, no substantial impact would be associated with the potential to change the community character and setting, demographic composition, or housing availability beyond that already existing under ADM's current operation. Therefore, the impacts from implementing the Proposed Action are expected to be below the significance threshold established in the body of the EA. When considered in combination with ADM's current and proposed management of the existing site and the future site condition, the cumulative effects on the community character and setting, demographic composition, or housing availability would be expected to be minor and are not expected to exceed the threshold of significance established in the body of the EA.

Implementation of the Proposed Action would be expected to have only a minimal effect on the local economy, labor conditions, and the availability of production or consumer resources in the surrounding community. Permanent, longer term labor requirements for operation, monitoring, and maintenance of the proposed facility would not be expected to be substantial and could easily be accommodated by ADM's existing labor force.

Resource requirements for the project would not be expected to result in substantial changes in the provision of infrastructure and other services to local residents. The compression-dehydration facility is estimated to require an increased electrical demand of 5 to 6 megawatt over the three-year injection period. Since the ADM plant produces its own electricity, this increase would not impact industrial or residential users in the local area. Similarly, water and wastewater treatment requirements would not have a local impact. The proposed requirement for 220 barrels (9,240 gallons or approximately 35 kiloliters) of water is within existing capacity, and wastewater would be directed to the wastewater treatment facility or the water-reuse system that currently exists for the Decatur ADM Complex. No additional impact on supply or rate structure would be anticipated for local users in the surrounding community. Therefore, the impacts from implementing the Proposed Action are expected to be below the significance threshold established in the body of the EA. The introduction of the Proposed Action to other planned or reasonably foreseeable actions at the study site or in the surrounding area would be expected to have only a minor effect on the local economy.

The project would have minimal or no adverse impact on local employment or the availability and cost of local resources and services in the Decatur or larger Macon County economy. Therefore, it would not be expected to contribute to any cumulative effect. Some potential benefit would be derived from the small, but potential, additional labor requirement and from additional expenditures in the local economy associated with the Proposed Action. These benefits could be experienced without adverse consequences and would not alter the existing condition or contribute substantially to the cumulative effect.

The Proposed Action would not substantially alter existing traffic patterns, level of congestion, or road conditions in the immediate and surrounding area of the project area. Any temporary increases in traffic during the construction phase would not be sufficient to cause a substantial change in conditions during these periods. No activities occurring at the test site would be likely to disturb power or other utility transmission lines in the area. Therefore, the impacts from implementing the Proposed Action are expected to be below the significance threshold

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established in the body of the EA. Cumulative impacts would not be anticipated in association with the Proposed Action. There are no planned or reasonably foreseeable actions for the project area which when added to the effect of the Proposed Action would substantially change local road use or traffic patterns. There would be limited potential to alter or disturb power or other infrastructure services to the area as a result of the Proposed Action, but these potential impacts are not expected to exceed the threshold of significance established in the body of the EA.

The addition of the well, pipeline, and compression-dehydration facility to the existing Decatur ADM Complex would generate a negligible impact to recreational activities in the immediately surrounding area. No facilities exist in the immediate vicinity of the test site that might be disturbed by site activities. The Proposed Action would be in keeping with the existing industrial character of test site and does not alter the existing setting or interfere with the user experience of more remotely located facilities. Therefore, the impacts from implementing the Proposed Action are expected to be below the significance threshold. The addition of the Proposed Action to ongoing activities at the Decatur ADM Complex would have no substantial impact to the character, setting, or visitor experience associated with parks or other recreational opportunities in the immediately surrounding and larger Decatur communities.

Overall, it is not likely that the Proposed Action would change the visual landscape in a way that would be objectionable to local residents or frequent visitors. Thus, impacts on visual resources would not be expected to exceed the significance threshold. Visual quality at the test site has been predominantly altered by the past ADM industrial development. Agriculture, residential, and other ongoing industrial activities have also affected the visual quality of the surrounding area. Given the larger impacts to visual resources from past, present, and future activities, cumulative impacts added from the proposed project would be minimally adverse and are not expected to exceed the threshold of significance established in the body of the EA.

Because of the limited amount of noise from construction, drilling, or operations, and the distance to the nearest noise sensitive area, violations of neither the state nor the local noise regulations are expected. Special variances to the state or local noise ordinance, mitigation measures, or both would not likely be required. Overall, these effects would be considered minor. Therefore, the impacts from implementing the Proposed Action are expected to be below the significance threshold. The Proposed Action would introduce long-term incremental increases to the noise environment. However, these increases would be relatively small when compared to the existing conditions and would be considered minor and thus not substantially contribute to cumulative impacts to noise.

Minority and lower income groups are generally not present in the study area in substantially greater proportions than for the Decatur community as a whole and the larger Macon County area. Additionally, both direct and indirect effects to local populations, resources, and the character and setting of the local community would be anticipated to be minimal for all populations in the immediate study area and for the surrounding communities. Therefore, no disproportionately high or adverse impacts to minority or low-income communities would be expected. It would add only minimally to existing conditions in the project area and surrounding communities. As a result, any incremental impact would not be expected to be sufficient to exceed the significance threshold and would most likely be experienced evenly across all

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populations established in the body of the EA.

HUMAN HEALTH AND SAFETY:

Since CO₂ is neither explosive nor toxic, the main human health and safety risk is from a rapid release that displaces air, which can cause frostbite from contact or asphyxiation. Such a rapid release, e.g., from pipe failure or wellhead being removed, generally also causes dry ice formation. Since CO₂ will dilute to safe levels with proper ventilation, the largest potential risk is to the site workers and not the general public due to the remoteness of the site from major population centers allowing for adequate dispersion of the CO₂ and increases the available response time to any problems that might occur. Warning systems, proper safety gear, and ventilation will reduce impacts from the displaced air. ADM will also train workers on the safety procedures regarding the project.

With proper safety procedures, the impact to human health and safety should be minimal. With the low failure rate of CO₂ pipelines, proper siting, and the monitoring involved, the overall risk to human health and safety is not expected to exceed the significance threshold established in the body of the EA. Since CO₂ is not flammable, there is less of a risk to human health and safety from the Proposed Action in combination with any existing projects in the area. There are no planned projects in or near the project area. The cumulative impacts of existing activities in and around the project area do not represent a substantial risk to human health and safety with existing and upcoming mitigation and safety procedures in place, which means the cumulative impacts with implementing the Proposed Action are not expected to exceed the significance threshold established in the body of the EA.

CULTURAL RESOURCES:

The potential for impacts to cultural resources is the greatest during the construction phase. Discovery of previously unknown cultural resources can occur during construction activities in historically undisturbed areas. If cultural resources were discovered during construction, the construction would be stopped, and the relevant agencies consulted. If the cultural resources were found to be substantial, then the construction component would need to be relocated elsewhere or other acceptable mitigation performed as the State Historical Preservation Office (SHPO) and any relevant tribes or agencies dictate.

The SHPO has also stated that there are no historical properties that would be affected by the project. The project area has been previously disturbed. Consequently, since no cultural resources have been found yet, there would be less of a possibility for discovering cultural resources during the Proposed Action. Further, no Tribal concerns were voiced during the public comment period.

Since there is no surface sedimentary rock at the site, the risk to fossils (paleontological resources) that could be used for scientific/educational purposes is negligible. Due to distance to the nearest National Register of Historic Places (NRHP) site (3.5 miles or 5.7 kilometers (km)), there should be no substantial impacts to visual resources to any known eligible or existing NRHP sites.

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Impacts from implementing the Proposed Action are not expected to exceed the impact significance threshold for cultural resources established in the body of the EA. ADM has no other projects planned for the area. Since there has been substantial disturbance in the past, no planned future projects, and there are no substantial impacts to cultural resources from the Proposed Action, the Proposed Action does not substantially contribute to the cumulative impacts to cultural resources in the vicinity of the project area or in the project area. Since impacts to cultural resources are generally localized in nature, the Proposed Action is unlikely to contribute to impacts to cultural resources outside the vicinity of the project area, and those local impacts would not be expected to exceed the threshold of significance established in the body of the EA.

WASTE MANAGEMENT:

Based on the volumes of drill waste generated, it is not anticipated that there will be any drilling wastes that exceed the significance threshold established in the body of the EA. Waste lube oil, filters, and spent carbon generated from dehydration/compression/cooling and transportation processes would be handled according to applicable regulations and should not exceed the significance threshold established in the body of the EA. Other waste streams generated should not pose significant waste management problem as they would not be unique to the carbon sequestration process. Based on the anticipated volumes of domestic wastes to be generated and the approved disposal options available, the impacts from these waste streams should not exceed the significance threshold established in the body of the EA. No hazardous waste is to be generated. The low volume of formation brine used in geochemical sampling would be disposed of in accordance with applicable regulations. Therefore, impacts from waste management are not expected to exceed the significance threshold established in the body of the EA.

Potential cumulative impacts related to the drilling of the wells would include disposal of drilling mud and a minor quantity of produced water. Provided all regulatory requirements were met and wastes were disposed of through an approved waste receiver, the cumulative waste impacts, related to the drilling requirements of the Proposed Action, would not be expected to exceed the threshold of significance established in the body of the EA.

ALTERNATIVES CONSIDERED: DOE's role in the project is limited to deciding whether or not to co-fund the project; thus, the alternative actions considered were also limited. The alternatives considered in the Final EA consisted of (1) a No-Action Alternative, under which DOE would not provide cost-shared funding for the project and the MGSC would cease operations; and (2) co-fund the project.

FINDING: Based on the information and data contained in the Final EA, which analyzes the relevant environmental issues and concerns of stakeholders, DOE finds that no significant impact would result from implementing the proposed Federal action, to provide cost-shared funding for the design, construction, and operation of the MGSC Phase III Large-Scale Field Test Project.

This Finding of No Significant Impact (FONSI) is made pursuant to the National Environmental

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Policy Act (NEPA) of 1969 [42 U.S. Code 4321 *et seq.*]; the Council on Environmental Quality's Regulations for Implementing the Procedural Provisions of NEPA, Title 40 CFR, Part 1500-1508; and the DOE's NEPA Implementing Procedures, Title 10 CFR, Part 1021. The Proposed Action does not constitute a major Federal action that would significantly affect the quality of the human environment, within the meaning of NEPA. Therefore, an Environmental Impact Statement is not required, and DOE is issuing this FONSI.

ISSUED IN PITTSBURGH, PENNSYLVANIA, this 28 day of Nov. 2008.



Carl O. Bauer
Director
National Energy Technology Laboratory