THE CARBON SEQUESTRATION NEWSLETTER

http://www.netl.doe.gov/coalpower/sequestration/

February 2004

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Sequestration in the News

ABC News, "US Begins Work on CO2 Storage Project." Anadarko Petroleum Corp. will begin pumping CO2 into an oil reservoir in Wyoming's Salt Creek field starting Feb. 1, 2004. Over a 30 year project life, 25 million tons of injected CO2 are expected to remain sequestered underground. The CO2 is "anthropogenic." that is it is captured from Exxon-Mobil's natural gas plant at LaBarge and transported to the oil field via pipeline. "This week the Wyoming State Geological Survey released a map of about 50 oil fields in the state that would be candidates for carbon dioxide injection. The fields, which once held 8 billion barrels of oil, could yield 1.2 billion barrels with the assistance of CO₂, state officials said." January 22. http:// abcnews.go.com/wire/US/ap20040128_199.html. See also, "CO2 to be used to flush out Wyoming oil," Billings Gazette, BG, and "Innovative carbon dioxide storage project under way in Wyoming," Salt Lake Tribune, SLT

Oil & Gas Journal, "Geological Sequestration Opens Opportunities in the Permian Basin." Article highlights recent CO2 EOR activities of Occidental, Kinder Morgan, University of Texas Center for Energy and Economic Development (CEED), Society of Petroleum Engineers (SPE), and Ridgeway. "Incentives for sequestering anthropogenic CO2 could create the necessary elements for a dramatic increase in CO2 flooding in Permian basin reservoirs," says L. Stephen Melzer an oil industry consultant from Midland, TX. January 5, http://ogj.pennnet.com/Search/Showlssue.cfm?

tion=Search&ISSUE_NUM=&VOLUME_NUM=&ISSUE_DATE=05-Jan-2004

The Japan Times, "Is 'Burying' Carbon Dioxide the Cure for Global Warming?" Reports on a geologic sequestration field test at the Niigata Prefecture in Japan. The field test involves injecting 20 tons per day of liquefied carbon dioxide into saline formations over a period of 18 months. CO₂ injection began in July. "The project is designed to keep the annual rate of carbon dioxide leaking from the formations below 0.01 percent, so that the gas can be kept underground for nearly 10,000 years," said project leader, Shigeo Murai. Jan 4, http://www.japantimes.co.jp/cgi-bin/getarticle.pl5?nn20040104a5.htm

National Geographic, "The Case of the Missing Carbon." Provides an overview of the carbon cycle and human impacts on it. Full article mentions carbon sequestration as a possible option for net emissions reduction.

http://magma.nationalgeographic.com/ngm/0402/feature5/

The Financial Times, "The Case for Carbon Capture and Storage" Feature article outlines the progress of CO₂ capture and sequestration from a fringe "wacky" idea to an emissions mitigation option now being given serious consideration by mainstream entities. Discusses environmental concerns and cites a UK government report released last September that concluded "large-scale deployment of carbon dioxide capture and storage may be needed by 2020", if the UK is to meet its ambitious targets for CO₂ reductions. Science and Health section, January 23, http://search.ft.com/search/article.html? id=040123000359&query=carbon+capture&vsc_appld=totalSearch&s tate=Form

The Baltimore Sun, "Burial for carbon dioxide?" Highlights AEP's mountaineer CO₂ injection field test and discusses the pros and cons of CO₂ capture and storage. January 6, 2004, http://www.sunspot.net/news/nationworld/bal-te.journal06jan06,0,139423.column?coll=bal-nationworld-utility

Announcements

Last Call for Papers. Abstracts for the Third Annual Conference on Carbon Sequestration are due February 6, 2004. The conference will be held outside Washington, D.C. in Alexandria, VA from May 2-6, 2004, and covers all aspects of sequestration research, demonstration, and development. For further information, please visit http://www.carbonsg.com

DOE Extends Comment Deadline for Revisions to GHG Registry to February 17. The U.S. Department of Energy proposed revision of the General Guidelines for the Voluntary Reporting of Greenhouse Gases (1605b) Program may be found online at http://www.pi.energy.gov/enhancingGHGregistry/

Still Time to Respond to the NETL and NASA Solicitations, NETL's "Development of Technologies and Capabilities for Coal Energy Resources" Program Solicitation is due February 24, 2004 No. DE-PS26-04NT42023-0, http://www.netl.doe.gov/business/solicit/main.html#42023 For the NASA research solicitation that seeks proposals to "improve understanding of changes in the distribution and cycling of carbon among the active land, ocean, and atmospheric reservoirs" letters of intent are due on February 11, 2004, proposals due April 7, 2004 NRA-04-OES-01, http://www.spaceref.com/news/viewsr.html?pid=11345

Sequestration in the News, Cont'd

The Midewst Geologic Sequestration Consortium (MGWC, one of the Regional Partnerships recently awarded by DOE) has a website up and running. The page describe the goals and activities of the consortium and contains primer information on carbon sequestration. http://www.isgs.uiuc.edu/mgsc/

Science

Scientists mull out-of-the-box ideas for combating global climate change. Scientists from around the world gathered at MIT to discuss "macro-engineering" ideas for controlling the global climate. The technologies are divided into two categories (1) CO₂ capture and sequestration and (2) shading the earth from solar radiation. "Most of these macro-engineering options are not yet in the mainstream for climate policy, but the mere fact that they have been suggested, places an obligation on scientists from many disciplines to explore their feasibility and evaluate their consequences and wider implications," said Professor John Shepherd, a Director of the Tyndall Centre. "In the event of an unanticipated climatic catastrophe, we may need a rapid fix," said Ed Boyle of MIT, a co-organizer of the conference. "Scientists use creativity to fight global warming," The Boston Globe, January 20, 2004, Boston globe see also "Thought experiment on macro engineering to combat climate change," Environmental Data Interactive, UK http://www.edie.net/news/Archive/7912.cfm

Better Understanding of Black Carbon Enhances Carbon Cycle Modeling. There are two types of black carbon (1) graphitic black carbon, which was created as sedimentary rocks underwent metamorphism and (2) combustion-derived black carbon such as soot, charcoal. Both are highly persistent in the environment, unlike other types of carbon. A recently developed capability to differentiate between the two provides better insight into the kinetics of carbon cycling. "One type of carbon so resilient it skews carbon cycle calculations," Innovations-Report http://www.innovations-report.com/html/reports/ interdisciplinary_research/report-25061.html http:// www.eurekalert.org/pub_releases/2004-01/uow-oto012204.php

Geology

Enhanced Oil Recovery in Alberta. Describes EOR potential and challenges in Alberta. Enbridge Pipelines Inc. calculates that \$160 million will cover initial building of a new 400kilometer pipeline delivery grid to transport 4,000 tones of CO₂ per day. Injections of up to 11,500 tones per day of the clean gas would be needed to keep production going at three of the biggest and oldest Canadian oilfields: Swan Hills, Pembina and Taber. "Carbon emissions may raise well yields," Edmonton Journal (Alberta), January 20, 2004

Technology

Revolutionary Technology for CO2 Conversion. Robert R. Holcomb, M.D., Ph.D., an assistant professor at Vanderbilt University School of Medicine announced a revolutionary new technology, Electron Stream Carbon Dioxide Reduction (ESCO₂R) commonly called the Carbon Dioxide Converter. "The unique technology of the Carbon Dioxide Converter permanently splits the molecular structure of carbon dioxide into its basic elements - carbon and oxygen," said Dr. Holcomb. The technology performance has been verified by the engineering firm Black & Veatch Corporation. "Worldwide Solution to Global Warming," Scoop.co, January 30, 2004, http://www.scoop.co.nz/mason/stories/SC0401/S00065.htm.

Ocean

Ocean Fertilization Field Test Embarks. Researchers from the Alfred Wegener Institute for Polar and Marine Research in Germany set sail to dissolve an iron sulphate solution in a in a 150-200 square-kilometer patch of the Southern Ocean, near Antarctica, where currents may keep the iron within a limited area. The team will monitor phytoplankton growth from a helicopter for a period of eight to ten weeks. "Climate test sets sail," Nature, January 26, http://www.nature.com/ nsu/040119/040119-17.html see also, "Life: Dispatch: News from Nature, the international journal of science: Can dumping iron halt global warming" The Guardian (London), January 29.

Diatoms are a Significant CO2 Sink. Recent satellite measurements suggest that phytoplankton process nearly half of all the CO₂ removed from the atmosphere by photosynthesis. Of the many types of phytoplankton, diatoms are the most efficient CO₂ processors and the most prolific. A diatom doubles about once a day. François Morel, a Princeton University oceanographer and Allen Milligan, an oceanographer at Rutgers' Institute of Marine and Coastal Sciences have found that the silica in the diatom's shell chemically speeds that conversion of bicarbonate back into usable CO₂, and its complex shell maximizes surface area photosynthesis. "Gas Guzzlers," Smithsonian Magazine, February 2004, http:// www.smithsonianmag.si.edu/smithsonian/issues04/feb04/ phenomena.html

Terrestrial

Entergy's Terrestrial Sequestration Activities. Entergy's Grand Gulf Nuclear Station in Mississippi is Entergy's first site location to use intensive forest management to support carbon sequestration. The process began recently when Box Elder, Sweetgum, Dogwood and Elm trees were cut down in a field located at the north end of Grand Gulf's property, and 9,400 Cypress, Ash and Oak trees were planted in their place. In a few years, the 65-acre field will be home to thousands of carbon sequestering trees, which will be monitored in five years and then every 10 years thereafter by a carbon monitoring program that will measure how much carbon the forest is trapping. "Entergy's Grand Gulf Nuclear Station Supports Carbon Sequestration," PR Newswire, January 16, http://

Deforestation Emits More CO₂ than New Plantations Can Soak Up, in Some Areas. This model estimates changes in land-use and subsequent emissions over the next twenty years. The model shows that the greatest carbon emissions, using part of Panama as a case study, is from deforestation. Reducing deforestation would therefore be the most effective way to reduce carbon emissions, according to the authors. Under the current CDM framework, only credits arising from reforestation are allowed. Virginia H. Dale, et al. "Estimating baseline carbon emissions for the eastern Panama Canal watershed," *Mitigation and Adaptation Strategies for Global Change*, 8 (4, 2003) http://ipsapp008.kluweronline.com/content/getfile/5012/27/5/abstract.htm

Siberian Peatlands Older Than thought, Bigger Carbon Stores. UCLA researchers led a 22-member international team to the West Siberian Lowland to radiocarbon date the bogs (2,000 to 3,000 years older than previously thought). They may be partly attributable to the rise in atmospheric methane levels 9,000 to 11,500 years ago. *Science*. "Study: Siberian Bogs Big Player in Greenhouse Gas," see also "Study pinpointing origins of siberian peat bogs raises concerns," EurekAlert, http://www.eurekalert.org/pub_releases/2004-01/nsf-spo011504.php

Trading

The University of Oklahoma and Rolls-Royce North America joined the Chicago Climate Exchange. The Chicago Climate Exchange saw over 31,000 tonnes of CO₂ traded in December, 2003. On January 13, 21,000 tonnes of emissions credits were traded at \$0.95/t in a record trading day. http://www.chicagoclimatex.com/news/

A Global Greenhouse Gas Register was launched by the World Economic Forum to stimulate the disclosure and management by companies of their GHG emissions. Ten companies have joined. "Global greenhouse gas register launched," Point Carbon, Jan 23, http://www.pointcarbon.com/article.php? articleID=3125&categoryID=147

Australia halts emissions trading research," The Australian Greenhouse Office halted work on emissions trading, according to *The Age.* Jan 12, http://www.theage.com.au/articles/2004/01/11/1073769452480.html See also: http://www.abc.net.au/news/newsitems/s1023960.htm

Policy

Public Service Enterprise Group Inc. (PSEG) joins EPA's Climate Leaders. Company plans to cut its CO₂ emissions rate by 18 percent per kWh from 2000 levels by 2009. http://www.epa.gov/climateleaders/partners/pseg.html

US Industry Sees Tougher CO₂ Controls Coming. Article assesses the likelihood of government action and technological evolution related to the future of obligatory CO₂ reductions. "There is growing evidence that we should be concerned about global warming," says Ron Drewnowski, director of environmental strategy for PSEG. "We are a company that says the time to act is sooner rather than later." January 15, http://www.utilipoint.com/issuealert/article.asp?id=1976

UK Government Publishes Draft "National Allocation Plan" for GHG Emissions. The plan sets out how greenhouse gas emissions allowances will be allocated to the operators of UK installations in the first phase of the EU Emissions Trading Scheme from 2005 to 2007. Consultation on the draft closes on March 4. Plan can be downloaded at http://www.defra.gov.uk/corporate/consult/eu-etsnap/index.htm "UK power firms must find 16 MTCO₂ cuts under NAP," Point Carbon, Jan 21, http://www.pointcarbon.com/article.php? articleID=3119&categoryID=147 see also "Emissions trading 'will not kill off coal," *Utility Week*, January 23, 2004.

Lobbying for America's Policy on Climate Change: Energy Companies and Environmentalists. The program takes viewers to the UN conference in Milan for a behind-the-scenes look at forces at work shaping US's policy on climate change. "NOW with Bill Moyers," PBS, January 23, http://www.pbs.org/now/sched.html

ClimateVISION Website Launched. The Department of Energy launched a new website to enable the public and association member companies to track their progress in meeting their GHG-intensity reduction commitments under the Climate VI-SION program. http://www.climatevision.gov/

Permitting Carbon Sequestration Projects: California Test Case. Carbon sequestration projects in California may have to obtain a total of 15 permits (3 federal, 6 state, 6 local). Ed Vine of the California Institute for Energy Efficiency writes that the permitting process may impede sequestration technologies. "Regulatory Constraints to Carbon Sequestration in Terrestrial Ecosystems and Geologic Formations: A California Perspective," *Mitigation and Adaptation Strategies for Global Change*, 2004, Volume 9, Issue 1, http://ipsapp008.kluweronline.com/content/getfile/5012/30/3/abstract.htm

A New Criterion of Corporate Social Responsibility for Utilities? Assesses the recent development of shareholder movements aimed at forcing a more progressive utility corporate response to climate change, and what some companies are doing about it. The article covers the relevant activities of Entergy, Environmental Defense's Partnership for Climate Action; the World Wildlife Fund-U.S.'s PowerSwitch! group, DTE, American Electric Power, Cinergy, the FPL Group, PowerTree, and the Chicago Climate Exchange (CCX). "Climate Change: The Heat is On; From reporting to trading, utilities try to meet new expectations," *Public Utilities Fortnightly*, January 2004, http://www.pur.com/puf.cfm

Designing Energy Policy(s) to Address Energy Utilities' CO₂ Emissions. The Polluter Pays Principles (PPP) deals with externalities of electricity generation. Under it, companies can pass compliance costs onto end-users. This paper describes some of the economic efficiency, equity and ethics issues, and creates supply-demand models with implicit weighting of welfare gains. "Economics of Polluter Pays Principles for Mitigating Social Costs of Electricity: A Search for an Optimal Liability Share" European Journal of Law and Economics, vol. 17(1), January 2004. http://www.kluweronline.com/issn/0929-1261

Sequestration News Cont'd

Kyoto Forest Owners Association (KFOA) in New Zealand claims that the NZ Government's decision to trade carbon credits from their forests is theft. "New Zealand Kyoto credit conflict," *National Business Review*, December 30, http://www.pointcarbon.com/article.php?articleID=3032&categoryID=147

Events

January-May, 2004 regional workshops from the second phase of the UNEP project: Capacity Building for CDM, Egypt, Jordan, Morocco. Contact: Sami Kamel, sami.kamel@risoe.dk, for more information, visit http://www.cd4cdm.org

February 8-11, 2004, A GTI Conference & Exhibition, Natural Gas Technologies II, Phoenix, AZ. Cosponsored by the U.S. Department of Energy's National Energy Technology Laboratory's Strategic Center for Natural Gas Methane emissions detection, GHG management and CO₂ sequestration technologies. Contact: paul.reneau@gastechnology.org

March 23-24, 2004, **IQPC conference: European Emissions Trading 2004**, Brussels, Belgium. Contact: Mr Gareth Pearce, IQPC, Anchor House, 15-19 Britten Street, London SW3 3QL, UK, tel.: +44 20 7368 9333, fax: +44 20 7368 9303, http://www.iqpc.co.uk

March 15-16, 2004, Climate Change in New England and Eastern Canada: Impacts and Adaptation Responses, Boston, Massachusetts. Sponsored by the Conference of New England Governors and Eastern Canadian Premiers, the meeting will focus on the environmental and economic impacts of climate variability on natural resources in the northeast. http://www.negc.org.

March 22-23 2004, **IEA Bioenergy Task 38 (Greenhouse Gas Balances of Biomass and Bioenergy Systems)**, Rotorua, New Zealand. The conference is organized by the NZ Ministry for the Environment, NZ Climate Change Office, Force Consulting and IEA Bioenergy Task 38 and focuses on the role of carbon sequestration and bioenergy projects in national and international greenhouse-gas markets. Final date for conference registration is February 29. http://www.joanneum.at/iea-bioenergy-task38/workshop/announcement.pdf

March 28-April 1, 2004, **ACS Spring meeting**, Anaheim, CA. A special sequestration symposium, "Carbon Dioxide Capture and Sequestration". Contact: Mercedes Maroto-Valer mmm23@psu.edu or Dan Fauth Daniel.Fauth@netl.doe.gov. http://oasys.acs.org

April 13-15, 2004, **15th Annual Earth Technologies Forum**, Washington, DC. http://www.earthforum.com

Events

April 18-21, 2004, American Association of Petroleum Geologists meeting, CALL FOR PAPERS, Dallas, TX. AAPG has asked for sessions on critical scientific results relevant to the subject of the potential for geological CO₂ sequestration to impact the fossil fuel economy. Contact Nicholas Woodward and Susan Hovorka, Co Chairs, nick.woodward@science.doe.gov and susan.hovorka@beg.utexas.edu, CO₂ Sequestration Sessions (DEG) http://www.aapg.org/meetings/dallas04/index.html

April 20-21, 2004, **Point Carbon: Carbon Market Insights 2004**, Amsterdam, the Netherlands. Contact: Mrs. Marte Nordseth, tel: +47 907 71 668, e-mail: conference@pointcarbon.com, http://www.pointcarbon.com

April 25-30 2004, **EGU – 1st General Assembly**, Nice/France. Co-Sponsorship: CarboEurope. Please see http://www.copernicus.org/EGU/ga/egu04/abstract_submission.htm

May 2-6, 2004, CALL FOR PAPERS: Third Annual Conference on Carbon Sequestration, Alexandria, VA. Abstracts are due February 6, 2004. For further information, please visit http://www.carbonsq.com

May 5-7, 2004, **GHG Registries, Climate Policy and the Bottom Line**, San Diego, CA. Topics include: The Future of U.S. Climate Policy; Harmonization of GHG Policies, GHG Registries in the U.S. and beyond. Contact: Gwendy Donaker, California Climate Action Registry, tel.: +1(213)8916920, fax: +1(213) 6236716, e-mail: gwendy@climateregistry.org, http://www.climateregistry.org/EVENTS/Conference

May 10 -12, 2004, The Ocean in a High CO₂ World: An International Science Symposium, UNESCO, Paris, France. Papers from the symposium will be published in a special issue of the *Journal of Geophysical Research-Oceans*. http://ioc.unesco.org/iocweb/co2panel/HighOceanCO2.htm or contact Ed Urban (scor@jhu.edu) or Maria Hood (m.hood@unesco.org).

May 10-14, 2004 2nd World Conference and Technology Exhibition on Biomass for Energy, Industry and Climate Protection, Rome, Italy, http://www.conference-biomass.com/

May 12-14, 2004, **Critical Elements of International Climate Policy**, Hamburg Institute of International Economics, Germany. Covers ten years climate policy research at Hamburg Institute Baselines and additionality, validation and verification of CDM projects, LULUCF and the Kyoto Mechanisms, and the role of sinks. http://www.hwwa.de/climate.htm

September 5-9, 2004, 7th International Conference of Greenhouse Gas Control Technologies (GHGT-7) Organized by the University of Regina, Natural Resources Canada, and the IEA GHG R&D Programme. Vancouver, Canada. www.ghgt7.ca

November 2004, **Climate Change and Business**, Auckland, New Zealand. Seven partner organisations are putting together a conference on the business opportunities arising from climate change. For further information, see: http://www.climateandbusiness.com/

Recent Publications

Canadian Clean Coal Timing Challenges. A University of Alberta Centre for Applied Business Research in Energy and the Environment report reviews different types of clean coal technologies and their deployment potential. Cost and technology concerns may not be overcome within 15 years, according to the report. The Canadian federal government's promise to cap credits at \$15 per tonne of CO₂ may be cheaper than investing in clean coal technology, the report says. "Clean Coal Technologies: Can They Help Meet Alberta's Climate Change Commitments?" CABREE, January 14, http://www.bus.ualberta.ca/cabree/pr_Carlson.htm

Capturing Carbon and Conserving Biodiversity: The Market Approach. A set of essays edited by Ian Swingland of Kent University advocates commercial terrestrial sequestration with an appraisal of the potential problems. Several authors point out that, because tropical countries can secure the highest rates of biomass growth, so they can secure the highest rates of carbon sequestration. Sequestration becomes an economic good. Other chapters deal with measuring biomass assets in the developing world, the legal aspects of the Kyoto flexibility mechanisms, and various scientific aspects of forest and soil dynamics. ISBN 1 85383 950 7 and 951 5.

Carbon Sequestration, Timber, and Wildlife Objectives Model. Presents a new approach to assessing carbon sequestration in commercial forests at spatial scales relevant to forest managers. The approach combines carbon sequestration objectives with timber and non-timber management objectives. *Mitigation and Adaptation Strategies for Global Change*, 8 (4, 2003) http://ipsapp008.kluweronline.com/content/getfile/5012/27/7/abstract.htm

Energy Policy Journal. In this issue, 23 analysts from Asia and the Pacific, Europe and the US tackle the economic and social aspects of climate change and offer their views on economic and environmental implications of the US withdrawal from the Kyoto Protocol. *Energy Policy*, 32 (4, 2004).

Organisation for Economic Co-operation and Development and Agricultural Soil Sequestration. OECD in conjunction with Agriculture and Agri-Food Canada (AAFC) have released a new publication "Soil Organic Carbon and Agriculture: Developing Indicators for Policy Analysis", with particular emphasis on the role of agricultural soils in carbon sequestration. http://www.oecd.org/agr/env/indicators.htm Look under "What's New"" then click on OECD Expert Meeting on Soil Organic Carbon Indicators.

Legislative Activity

No legislative news this month.

This newsletter is produced by the National Energy Technology Laboratory and presents summaries of significant recent events related to carbon sequestration. If you'd like to join the e-mail distribution list, email majordomo@list-manager.netl.doe.gov with "subscribe sequestration" in the body of the message. We encourage you to pass this along to interested persons. Contact: Scott Klara, klara@netl.doe.gov.