

Risk Management REVIEW

Wharton

RISK MANAGEMENT
AND DECISION
PROCESSES CENTER
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The Near-Miss Project



James Phimister and Ulku Oktem explaining Phase II of Wharton's Near-Miss Project to participants.

As we head to press, the nation is captivated by the outcome of the presidential elections, and specifically, the direction Florida will cast its 25 electoral college votes. As the process unfolds, national attention focuses on an apparent electoral system flaw—a potentially confusing ballot layout in Palm Beach, Florida. Such a

seemingly innocuous flaw has reared into something of monumental proportions, and in turn has produced heated questions about the very foundations upon which our government is chosen.

As history unfolds, we observe that this electoral catastrophe was preceded by an electoral near-miss. Much of today's debate focuses on

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Risk Center on the World Wide Web

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<http://opim.wharton.upenn.edu/risk/>

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The Wharton School
University of Pennsylvania

NEEDED: Public Private Partnerships for Managing Catastrophic Risks

The importance of public-private partnerships for managing catastrophic risks is assuming new urgency in the light of recent natural disaster losses around the world and the concerns with worst-case scenarios from chemical and other technological accidents by the U.S. Environmental Protection Agency.



Howard C. Kunreuther

Natural catastrophes and man-made disasters claimed more than 105,000 lives across the globe in 1999, and resulted in total losses of around US\$100 billion. It is widely recognized that developing countries bear the majority of these costs, accounting for more than 95 percent of the deaths and two-thirds of the economic losses. Last year, the landslides in Venezuela alone caused around 50,000 fatalities, the Izmit (Turkey) earthquake 20,000 and the cyclone in Orissa (India) 15,000.

During the past year, The Wharton Risk Management and Decision Processes Center has undertaken a set of activities that addresses the need for developing market-based mechanisms coupled with public-sector involvement for reducing the losses from these catastrophic events. With respect to natural hazards, the Managing Catastrophic Risk Project (a joint effort with the Wharton Financial Institutions Center) has been examining how private insurance

coupled with other risk-transfer instruments can provide protection against the losses from future catastrophic disasters.

We have been particularly interested in ways that one can link these risk-transfer instruments with cost-effective mitigation measures for reducing

future losses. Consider a couple of specific examples: How can one convince residents in hurricane-prone areas in the United States to brace their roofs and strengthen their structures so they are likely to be spared severe damage from future storms? How can one design better buildings for residents of Turkey so these structures remain intact after the next severe earthquake?

The private sector can play a constructive role in encouraging these loss-reduction measures through reduced insurance premiums. A complementary measure is to provide bank loans tied to mortgages that spread the costs of the mitigation measure over a long time period. However, these actions are likely to be ineffective if individuals are not required to buy insurance and believe that these low-probability events "will not happen to me." In countries such as Turkey, there is not a well-developed insurance market and banks do not provide mortgages for homes. Furthermore, low-income

individuals are unlikely to adopt these measures because they live "from pay day to pay day."

For both these reasons it is necessary to have the involvement of the public sector to subsidize these activities and/or develop well-enforced building codes. These and other measures for reducing losses from catastrophic disasters will be discussed at the Wharton/World Bank Conference "Innovations in Managing Catastrophic Risks: How Can They Help the Poor?" Jan 9-10, 2001. (See page 8 of this newsletter for more details). This conference also reflects an interest by the Risk Center in undertaking more global activities in the area of catastrophic risk.

Turning to technological hazards, the Center has been concerned for some time with the role of market mechanisms such as insurance and third-party inspections for enforcing standards and regulations. Our most recent activities have revolved around the Clean Air Act Amendments of 1992 that required chemical and related companies to develop risk management plans for reducing future losses from disasters. As part of an EPA Cooperative Agreement with the Center, the Wharton group has participated in a set of pilot studies in Delaware and Pennsylvania to see how well private third-party inspections can be utilized to achieve these objectives.

The issue of sustainability has been a focal point for debate ever since the Brundtland Commission issued its report in 1987, which defined the concept as follows:

“Sustainable development is development that meets the needs and aspirations of the present without compromising the ability of future generations to meet their own needs and aspirations.”

In the intervening years, this concept has focused on the interplay between population growth, resource intensity and waste. From a business perspective, the last two issues have been especially important, and attention in the sustainable management literature has focused on better measurement and accountability for environmental impacts. The general thinking behind this move, as explored in a number of research initiatives in the Risk Center, has been to use the power of information to inform regulators, the public, and the world of the performance of companies as they attempt to balance the dictates of meeting their employee, customer and shareholder needs against the rather more ambiguous dictates of promoting sustainability. Armed with such information, stakeholders can exert pressure in the marketplace for products and for ideas that can influence companies to undertake appropriate and valued actions with respect to their effects on the environment.

A central feature of the emerging sense of “good practice” in this regard is that new “management systems” are required to achieve this balance.

The issue of new management systems did not arise solely from a concern with how to manage better the environmental impacts of industrial activity. Rather it arose from the recognition of the tremendous economic gains to quality and process management in the late 1980s and 1990s. By now, these gains and what companies have to do to reap them are relatively well understood. Concerning the magnitude of the stakes, Department of Commerce figures showed that total returns for Baldrige Award-winning companies in the period 1988 to 1996 were 362.3 percent, compared with 148.3 percent for the S&P 500. These results have been extended to other quality awards in the interim, with similar striking results in terms of the super-normal returns from excellence in product and process quality. Armed with this knowledge, and powered by changes in information technology, companies and industrial sectors have gone through a revolution in the past decade of restructuring that has led an economic boom unparalleled in modern history. At the center of this revolution



Paul R. Kleindorfer

have been changing ideas and concepts of effective management systems.

I believe the central issue arising from the host of experiments on effective management systems has been the importance of integration at the process level. Integration has several meanings here. First and

foremost is the definition of process capability and excellence in terms of all relevant impacts of the process, including quality, EH&S impacts and financial (e.g., cost and ROA) measures. Second is coupling knowledge and performance metrics at the process level with accountability systems and managerial attention. Third is the integration and networkability of processes across the extended supply chain. Taken together, these integration trends (some would say integration imperatives) have implied that areas such as risk management, EH&S monitoring and control, and maintenance, which were previously the purview of separate corporate functions, have now moved much closer to shared responsibility with process owners and managers. Rather than being an add-on of additional overlaid systems, the essential idea is to design an integrated, single system for process management.

Chemical Accident Risk Assessment Thesaurus (CARAT)

The Chemical Accident Risk Assessment Thesaurus (CARAT), which has been under development at the Risk Center for several years, is now finished.

The system was opened to the public on October 12, 2000. The project—to develop an improved tool for understanding international laws, regulations and guidelines pertaining to the risk assessment of chemical accidents at fixed facilities—was done at the request of the Organization for Economic Cooperation and Development (OECD). The Risk Center took the lead on this project under a Cooperative Agreement with EPA's Chemical Emergency Preparedness and Prevention Office (CEPPO).

CARAT has a number of valuable uses. Dr. Thomas Gell, Head of Risk & Environment Department of the Swedish Rescue Services Agency, explained, "Regulatory agencies can use CARAT™ to benchmark our regulations with similar regulations in other countries and as a 'test site' for regulatory development." Mr. Gerry Phillips, NovaChem, Canada, and a member of the CARAT Steering Committee, commented that multinational companies would find the CARAT useful in understanding the different requirements for risk assessment in different countries.



Albert J. Ignatowski
Wharton Risk Management and
Decision Processes Center

What made possible the opening of the CARAT was that fact that the system now contains a significant quantity of reviewed entries. In addition to a significant number of entries made earlier, a large number were made this past summer in a data input session in the Netherlands, in which participants from France,

South Korea, Japan, Poland, and the Netherlands added their countries' requirements for risk assessment.

In preparation for the public opening of the CARAT, the Steering Group met in Edmonton, Canada during the summer, to review the progress to date of entries in the CARAT and to develop plans for the ongoing viability of the system. Countries or participants represented at this meeting were Canada, Sweden, the Netherlands, the United Kingdom, the United States (EPA), a CARAT system consultant, a computer programming consultant, and the OECD Working Group Secretariat.

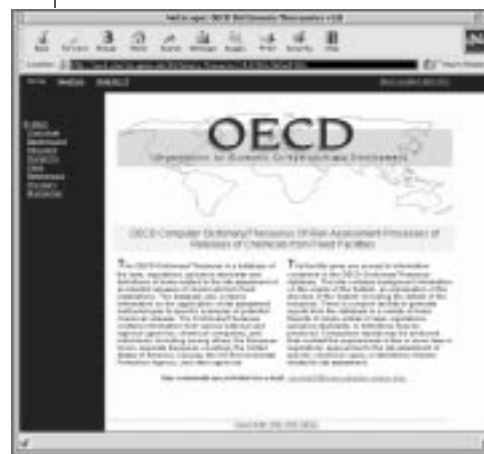
Among the important issues discussed and resolved were:

- Review of technical progress to date.
- Review of the status of entries into the CARAT.
- Mechanism for long-term management of the CARAT.

- Training of personnel for the continued loading of additional entries into the CARAT. Mechanism of funding to pay for data-entry training, maintenance and improvements needed for the CARAT.
- Identification of possible system improvements, enhancements, and methods to maintain technological parity.
- Addition of a checklist to be reviewed before entries can be finalized.
- Methods of advertising CARAT to the audience of probable interested users.

In each case, the Steering Committee developed a position; recommendations will be presented to the full Working Group on Chemical Accidents at their next meeting.

You may visit the CARAT web site at:
<http://www.oecd.org/ehs/carat/> ■



Home Page of the OECD Dictionary/Thesaurus

Play-back: It Started, It Continued, It Went Further, It Expanded...
My 15-Years' Relationship with the Center

It all **started** in July 1985 at the *International Conference on Transportation, Storage, and Disposal of Hazardous Materials* in Vienna, co-sponsored by the Center. I was invited to comment on Prof. W. Pfenningstorff's presentation on "The Role of Insurance in Risk Spreading and Risk Bearing." Meeting with a great number of experts in the environmental area created a stimulus for ideas on how to expand conventional limits in the transfer of risks by liability insurance. My year-long relationship with the Center was launched—though I did not know this yet!

It **continued** in May 1988 at the Wharton conference on *Risk Assessment and Risk Management Strategies for Hazardous Waste Storage and Disposal Problems*. The invitation to attend as a speaker initiated the search for a feasible way to transfer from the facility operator to the insurer, beyond the active life time of a disposal site, the problematic long-term, long-latency and long-tail risks attached to waste disposal. My presentation on "Insurability Issues Associated with Managing Existing Hazardous Waste Sites" sketched a solution embodied in a so-called Liability Life Policy for waste-disposal facilities. New



Jürg Spühler, Swiss Reinsurance Company, Zurich, has been one of the very valuable members of the Center's Advisory Committee for the last 15 years.

frontiers were soon thereafter really set: Swiss Re launched this concept, which combines traditional risk transfer elements with financial elements, enabling a long-term risk transfer far beyond what at that time was available on the world insurance market.

It **went further**: The manufacturing industry, still under the shock of the U.S. liability

crisis of the 1980s, was looking for stable environmental liability cover with a built-in incentive for precaution and loss prevention. Supported by discussions with the Center's leaders, Swiss Re's CEILIF (Chemical Environmental Impairment Liability Insurance Facility) policy was born in my mind in the early 90s and soon thereafter launched in the U.K.: a three-year term policy with renewal option and a built-in no-claims premium bonus system.

It **expanded** in the course of time in manifold ways: in workshops, seminars and discussions, foremost focusing on the low-frequency/high-impact phenomena that is continuously challenging the (re)insurers engaged in natural catastrophe risks and in environmental liability exposures.

The major and most critical events and developments faced

during the "play-back" period under review may be summarized as follows:

- An increasing number of natural catastrophes (hurricanes, earthquakes, floods) and man-made catastrophic events (Seveso, Bophal, Schweizerhalle, Tchernobyl) resulted in huge losses never before encountered, requiring the insurance industry to open the access to extremely high financial protection of prime quality.
- The lawmakers around the globe markedly increased the liability exposure of enterprises by enforcing extremely strict liability norms (with only minor exonerations, assumption of causality, joint and several liability) and by making them applicable for events having occurred long before the more severe legal norms came into force (retroactively of legal acts).
- Many courts considered the insurance industry as a kind of Fort Knox and followed a deep-pocket approach, resulting in unexpectedly huge claims for the insurance industry—for example, when the "innocent man in the street" was badly hurt by a deficient product causing bodily injury, or by a failure in medical treatment impairing his health.
- Formerly unknown risks emerged from the application of new technologies, untested materials

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Play-back: My 15-Years' Relationship with the Center

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and sophisticated products (plastics, fibres, nuclear material, enriched food for man and animals) and from the rapidly expanding electronic world, overthrowing many "good old principles" (world-wide-web, e-commerce, telecommunication), requiring the creation of new insurance covers.

- The many mergers in industry, commerce and service resulted in entrepreneurial giants of inexperienced dimensions and

created exposures that can be balanced only by innovative non-traditional risk transfer mechanisms.

During all these thrilling years, I had the privilege to represent Swiss Re in the **Center's Advisory Committee**, enabling me to build up a network of relations that functioned as a sensor for the disclosure of major issues in the areas of risk, risk management and risk transfer and as a platform for discovering where new frontiers will have to be set.

"My story" comes to an end now, as I will retire from my professional activities. But the story of the Center goes on, guided by today's and tomorrow's technical, social, economic and legal developments, changes and challenges. I wish the very best to all engaged in the Center's activities, and success in their valuable work.

— Jürg Spühler
*Swiss Reinsurance Company,
Zurich*

The Near-Miss Project

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19,000 Palm Beach voters whose ballots were discarded as a result of having two or more votes cast on a single ballot. Four years ago, roughly the same number of Palm Beach votes cast on similar ballots to those used this year, were discarded for the same reason. At that time, the discarded votes had no bearing on the election outcome and hence went unnoticed. If this system flaw had been recognized as a near-miss and appropriate measures taken, the predicament that we find ourselves in today could have been avoided.

Near-misses, of course, do not occur only in presidential elections but also in a broad range of business

activities, such as site management, supply-chain logistics and product quality assurance. Some of the most salient examples of near-misses are those that have resulted in human loss when a real accident occurred. Prior to the space-shuttle Challenger catastrophe, a number of near-misses had been observed, whereby O-rings showed signs of degradation with potential for failure. In another example, prior to the 1999 Paddington train crash catastrophe in London in which 31 people died, eight near-misses occurred at the same location, where trains had overrun a partially obscured signal. Similar examples can be cited across a wide range of

industries that include the chemical, pharmaceutical, automotive, airline and healthcare industries.

In recognition of the abundance of near-misses that occur in almost every discipline, the Wharton Risk Management and Decision Processes Center launched the Near-Miss Project in May 2000, with partial funding under a Cooperative Agreement from EPA's Chemical Emergency Preparedness and Prevention Office (CEPPO).

Phase I

In Phase I of the project, five Fortune 500 companies in the chemical and pharmaceutical industries allowed the Risk Center

to analyze corporate near-miss programs at site level. Phase I involved more than 100 interviews at 23 sites. The study demonstrated that there was considerable site-to-site variation in employee participation and success of near-miss programs, with no singular company possessing 'across-the-board' exemplary performance in near-miss management.

To understand the difficulties in managing near-miss programs, it is necessary to recognize that a near-miss must be processed successfully through the following six stages:

1. Identification
2. Disclosure
3. Disseminate to Decision Makers
4. Decision Making
5. Disseminate to Implementers
6. Resolution

In the first stage, a near-miss must be identified. In some industries, such as the airline industries, these are readily apparent. However, in other industries, such as chemicals and pharmaceuticals, many near-misses are not recognized and a systematic procedure for identifying them must be developed.

Once an individual recognizes a near-miss, he or she must then feel confident that disclosure of the incident is encouraged by the organization, and that punitive

action will not be forthcoming.

The individual must also know how to proceed with the near-miss information. After a near-miss is disclosed, the information must be directed to an investigating team, which attempts to determine "root causes" and identify solutions to prevent recurrence. The proposed solutions must then be disseminated to those who will implement the corrective actions in a timely fashion.

Based on this process decomposition, it is readily apparent why near-miss programs have limited success. If a 50 percent 'success rate' is attributed to each category (and this can be a generous assessment in many cases), the probability of each near-miss being fully resolved under 2 percent. This would suggest that nearly 98 percent of all near-misses are mismanaged to some degree. Sites that perform well in our study and have high program participation have systems that ensure that a near-miss is processed successfully through each stage.

Findings from Phase I of the Near-Miss Project, which highlight key factors in each category, are summarized in a Wharton Risk Management and Decision Processes Working Paper and may be downloaded from: <http://opim.wharton.upenn.edu/risk/wp/wplist00.html>.

Phase II

Building on the systems analysis approach of Phase I, Phase II of this project is now underway. This phase will focus on the following topics:

- Development of an intranet prototype near-miss management tool that will incorporate e-learning capability.
- Development of methods to incorporate statistical tools into safety metrics to help promote and analyze near-miss program and safety performance.
- Internal report publication of management review methods to analyze site near-miss programs based on communications, involvement, performance, and program design.
- Holding an invitational round-table for near-miss benchmarking and discussion of future directions for the project. ■

Organizations that want more detailed information or want to participate in the project should contact Ulku Oktem:

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World Bank/Wharton Conference on Innovations in Managing Catastrophic Risks: How Can They Help the Poor?

Beginning on the evening of January 8 through January 10, 2001, the World Bank will be hosting a conference on Innovations in Managing Catastrophic Risks in Washington, DC. The Conference is being organized by the ProVention Consortium and is co-sponsored by the Wharton Risk Management and Decision Processes Center and the World Bank. The ProVention Consortium, a global coalition of governments, international organizations, academic institutions, private sector and civil society organizations, was formed to reduce disaster risk in developing countries, and make disaster prevention and mitigation an integral part of development efforts. ProVention partners, which include the World Bank and the Wharton School, are actively exploring ways to empower developing countries to more effectively manage disaster risk.

The overall goal of this 2-day conference is to explore instruments for disaster risk transfer and their relevance for protecting the poor from disaster impacts. Presentations will examine the role that risk transfer mechanisms can play in promoting awareness and investment in disaster mitigation measures, and their potential effectiveness in insulating the poor from disaster impacts. Presenters will discuss both traditional and non-traditional mechanisms for transferring or

financing risk, and address the following questions: How can these instruments help developing country governments to reduce disaster risk? How can they directly help the poor to manage risk?

The conference will bring together leading academics, development practitioners, private sector leaders, and public policy experts to examine issues surrounding the management of catastrophic risk in emerging economies. Participants will also discuss how new developments in the field of disaster risk management have changed the way one thinks about natural disasters in both developed and developing countries. Discussion will examine the role that technology and modeling are playing in quantifying the risks associated with natural hazards and the role of new financial instruments in providing protection against catastrophic losses from a future hurricane, earthquake or other natural hazard. The event will also examine the role that mitigation and loss prevention can play as part of a hazard management strategy and how they can reduce the magnitude of future disaster losses.

The conference will focus on three key areas involved in developing an effective disaster risk management strategy: (i) *identifying* the hazards and risks one is facing; (ii) *reducing* those risks that

can be reduced by, for example, either avoiding the hazard or building structures that can withstand hazard impacts; and finally (iii) *transferring* the risks that cannot be eliminated or reduced through risk sharing mechanisms or risk financing mechanisms such as insurance. These three components are inter-related and mutually reinforcing. For example, the use of formal insurance mechanisms can provide incentives for investments in risk-reducing measures and the enforcement of building codes.

Recent developments provide the ingredients for rethinking the way both developed countries and emerging economies should deal with natural hazard risks. These developments include:

- An emergence of new capital market instruments, such as catastrophe bonds, for providing protection against catastrophic losses from these risks. Although the volume of business to date in these instruments is relatively small, they offer promise for protection in the future, in the developed countries as well as emerging economies.
- New advances in information technology (IT) and risk assessment offer an opportunity to estimate more accurately the chances and potential losses of future disasters. The development of faster and more powerful computers and improved data

on hazards, properties and people at risk enable one to examine extremely complex phenomena in ways that were impossible even five years ago. Catastrophe models with accompanying user-friendly software have been developed and marketed by private-sector firms. These developments have important implications for managing risks. For example, insurers and

reinsurers can more accurately estimate the premiums for providing protection against these risks and develop strategies for managing their portfolios so as to avoid sufficiently large losses that cause an unacceptable loss of surplus. Similarly, it is now feasible to set the terms of new capital market instruments based on the estimates from the catastrophe models.

- Mitigation measures promise to reduce losses from natural disasters and catastrophic accidents. In particular, there are many benefits that have traditionally not been considered as part of the standard benefit-cost analysis in evaluating the cost effectiveness of various mitigation measures. These benefits may make mitigation extremely attractive to all of the concerned parties. ■

Management Systems in the New Economy

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This trend is quite evident in the leveraging of quality and EH&S management. For example, the exponential growth in ISO 9000 certifications globally (now nearly 300,000) is closely correlated with ISO 14000 certifications (now over 12,000 globally). Companies and sectors that have seen large gains to quality from ISO 9000 certification process are seeing even greater gains from integration at the process level of environmental and quality metrics and management. Of course, this does not mean that the ISO systems are the “way to go” to achieve

integration, but research on these two ISO programs does underline the synergies between quality and environmental and safety systems, and the cost effectiveness of the integration theme.

Inter-organizational integration and networkability are becoming even more critical as core competencies for the new economy. Recent Center research by myself, Jim Schoonover and Ed Mahler on the process industries finds a growing consensus that garnering the promised returns from e-commerce in both the B2B and B2C areas will require the

internal process integration noted above and inter-organizational integration to assure seamless connectivity in the extended value network. While the central issue in the design of effective management systems remains coupling processes with outcomes, it is clear that the theme driving change in such systems is integration, both across managerial functions and across company boundaries.

— Paul R. Kleindorfer
Co-Director

Third-Party Auditors to Ensure Compliance with Environmental Regulations

When EPA proposed section 112(r) of the Clean Air Act to regulate facilities that use hazardous chemicals, many individuals and organizations wondered how such a Risk Management Plan would be enforced. EPA's Chemical Emergency Preparedness and Prevention Office (CEPPO) was aware of the problem and for this reason entered into a cooperative agreement with Wharton to investigate the use of market forces for ensuring compliance with the regulation. Since June 21, 1999 when the RMP rule became effective, the number of states requesting delegation for enforcement has been limited. The burden of enforcement has fallen increasingly upon EPA.

In its efforts to investigate market forces, Wharton became part of a task force with CEPPO, Delaware's Department of Natural Resources and Environmental Control (DNREC), and EPA's Region III. To determine if market forces can be used to ensure facilities regulated under the RMP rule



Richard C. Antoff, Delaware's Department of Natural Resources and Environmental Control (DNREC), reporting on the favorable use of third-party auditors in Delaware.

are in compliance, the task force conducted two pilot experiments and is involved in designing a third.

The first pilot experiment (Phase 1) was conducted in Delaware because under state law Delaware can provide the legal and operational characteristics necessary to select, train, use and evaluate third-party auditors for enforcing environmental regulations. To initiate the pilot study in Delaware, Wharton obtained recommendations for 50 third-party candidates from insurance companies, technical organizations, and nonprofit business assistance programs. DNREC selected eight candidates based on their individual certification by professional groups, their knowledge of OSHA's PSM and EPA's RMP, their audit experience, their geographical closeness to Delaware and their knowledge of the insurance industry. Following the selection of third-party auditors, DNREC conducted a two-day training session to prepare them for their audit visits and assigned them to four ammonia refrigeration facilities and four chlorine water treatment facilities that were all subject to the RMP rule.

After the third parties conducted their audits, DNREC visited each facility to evaluate the value of the work done. It found that most of the facilities audited by third-party auditors had good risk management programs in place and had filed good Risk Management Plans with EPA. DNREC also discovered that



Mikal D. M. Shabazz, EPA Region III, reporting positive results from the third-party pilot experiment conducted in Pennsylvania.

audited facilities had favorable opinions of third-party auditors and would be willing to use them were certain legal and financial benefits available.

The success of the experiment in Delaware encouraged EPA's Region III to conduct a similar experiment in Pennsylvania (Phase 2). The decision to carry out a pilot experiment in Pennsylvania was based on the fact that Pennsylvania does not have the same state regulatory requirements as in Delaware. Wharton was again able to have insurance companies, technical organizations, and nonprofit business assistance programs recommend third-party candidates. Region III selected eight auditors based on standards similar to those used in Delaware.

Region III trained the auditors and assigned them to four ammonia refrigeration facilities and nine chlorine water treatment facilities. After the third parties had finished their audits, Region III visited the facilities and found the same favorable

results that DNREC found in Delaware. Most of the facilities had good risk management programs in place and had filed good Risk Management Plans with EPA. Facilities also thought well of the third-party auditors and would use third-party auditors, rather than wait for state or federal agencies to audit them, were legal and financial benefits available to the facility.



James C. Belke, EPA's Chemical Emergency Preparedness and Prevention Office (CEPPO), addressing the possibility of revising the regulations associated with section 112(t) of the Clean Air Act to allow state and federal agencies to use third-party auditors.

The operational success of the pilot experiments in Delaware (Phase 1) and Pennsylvania (Phase 2) were discussed at Wharton on October 19 to determine what additional work must be done to promote the use of third parties for ensuring compliance (Phase 3). James C. Belke (CEPPO) discussed the agency's current efforts to modify the RMP regulation to permit the use of third-party auditors. Representatives from the insurance industry expressed interest in working with CEPPO and Wharton to develop the regulatory characteristics necessary to select, train, and evaluate third-party auditors. There was general agreement that the use of third-party auditors by federal and state agencies must have the characteristics necessary to appeal to the regulated facilities as well as to the legal, financial and public interests of the community.



David Barnes, Pennsylvania Department of Environmental Protection, listens as Marc Halpern, ECS, and Ruth Katz, AIG Environmental, express interest in working with CEPPO and Wharton to develop regulatory characteristics necessary to select, train and educate third party auditors.

The task force plans to hold a major Roundtable meeting at Wharton on January 26, 2001 to discuss the variables that must be considered if CEPPO promotes market forces in its modified environmental regulations to ensure regulatory compliance. ■

Wharton Faculty Develop New Book for Managers on Decision Making

An interdisciplinary team of Wharton faculty explores the topic of decision making in a new book for managers that will be published in the Spring of 2001. *Wharton on Decision Making* (edited by Steve Hoch and Howard Kunreuther with the coordination of Robert Gunther) provides insights on modern decision-making challenges—including using new

technologies such as e-mail and decision support systems and acting in environments of growing uncertainty and complexity. Researchers also examine subjects such as the impact of variety-seeking behavior on choices, integrating intuition into decisions, applying game theory, negotiations and how choices are made about insurance and health care that affect society.

The book draws upon Wharton's traditional strengths and pioneering research in decision sciences. It is designed to help managers understand the decision process and make better decisions.

Wharton on Decision Making is the third volume published by John Wiley & Sons in its series with the Wharton School. ■

Managing Catastrophic Risks

The Managing Catastrophic Risks research program held its Spring Advisory Board Meeting in Hamilton, Bermuda on May 15-16, 2000. Given the dramatic growth in size and expanded business dynamics of the Bermuda reinsurance markets, several members of our sponsoring group suggested that the research program would benefit from first-hand exposure to this important industry sector. With this in mind, the May 15-16 meeting was structured to include two specific panel discussions led by senior Bermuda-based executives. Some 18 representatives from Bermuda firms participated in the meeting, adding an informed perspective to the general dialogue.

The meeting began on Monday afternoon with an overview of the Wharton project, led by Peter Burns and including brief descriptions of research directions from selected Wharton faculty. The remainder of the afternoon was devoted to a panel presentation on the evolution of the Bermuda reinsurance market and a discussion of new service directions. The panel, moderated by Neil A. Doherty of Wharton, included: Larry Doyle, President of Annuity Life Re; Mary Hennessey, President of Overseas Partners; and Daniel Malloy, President & CEO of Stockton Re.

Bermuda presents a unique constellation of attributes that have supported the industry's growth,

including: stability; established infrastructure; a favorable regulatory environment; relative ease of company formation; income and corporate tax guarantee; and availability of other insurance capacity. Of the nearly 4,000 captive insurance companies in the world, some 1,500 are domiciled in Bermuda, eclipsing the second-highest concentration of 450 in Cayman.

Capacity in the Bermuda insurance market has grown significantly with the property CAT market, with some \$150 million, and the excess liability market, with \$375 million. Total premiums in the Bermuda market in 1998 were more than \$26 billion and capital surplus reached more than \$50 billion.

Franklin W. Nutter, President of the Reinsurance Association of America, led the dinner discussion. Looking over the intermediate future, Nutter sees continued surplus depletion in the reinsurance industry, with only modest growth in premiums. He challenged the group to consider whether problems in operating performance represent traditional cyclical behavior or perhaps are more a sign of systemic change. He argued that, due in part to the evolution of sophisticated



Neil A. Doherty, Wharton School, one of the many speakers who addressed the group in Bermuda on the subject of managing catastrophic risk.

scientific modeling capabilities, the gap between reinsurers and insurers is narrowing in terms of knowledge as well as underwriting skills. The lower demand from buyers conflicts with demands for growth by reinsurance owners, leading to more aggressive acquisition strategies to show growth. Nutter also outlined the role of the capital markets intruding into insurance markets. His position

is that for the more progressive reinsurers, this is less a threat than an opportunity to redefine themselves to incorporate capital market capabilities into their business models.

Tuesday morning began with the second of the Bermuda panel discussions, this time specifically focused on catastrophic risk. The panel, moderated by Wharton's J. David Cummins, included: George Rivas, COO of Tempest Re, who described Tempest Re's dynamic market model; Jim Stanard, CEO of Renaissance Re, who focused on the effective use of actuarial and catastrophe models in underwriting and managing risk; and David Malmquist from the Bermuda Biological Station for Research, who outlined the activities and research results from the Bermuda Biological Station for

Research “Risk Prediction Initiative” (RPI). This scientific partnership with industry was started in 1994 and incorporates approximately 100 scientists from nine countries, and 15 industry partners. Its goal is to create links between the climate science and insurance communities so that the science of climate forecasting is available, understandable, and usable by insurers.

The remainder of the Tuesday sessions highlighted on-going Wharton research initiatives. Howard Kunreuther and his

colleagues described their work in assessing the impact of mitigation, indemnity contracts and a parameterized index contract on a hypothetical insurance company in the face of hurricane and earthquake events. In the last session, Wharton’s Paul R. Kleindorfer and his colleagues discussed latest findings from their analysis of industry supply and demand factors in the residential market for catastrophe insurance, including the impact of regulation. ■

CORPORATE ASSOCIATES

The Corporate Associates program is a vital part of the Risk Center’s operation. Corporate Associates sit on the Center’s Advisory Committee, participate in round-table discussions and offer information and insight into the value, direction and timing of research projects. The Center currently receives approximately \$100,000 annually from Corporate Associate Members.

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NEEDED: Public Private Partnerships for Managing Catastrophic Risks

continued from page 2

This project, which requires cooperation between private industry, insurance companies, and state and federal regulatory agencies, shows considerable promise. The EPA’s Chemical Emergency Preparedness and Prevention Office (CEPPO) views these private-sector initiatives in a very positive light: the initiatives change CEPPO’s adversarial relationship with industry to one of a cooperative partner. See more on the directions that this Third Party project is headed on page 10 of this newsletter.

It is now becoming clearer to both the public and private sectors that, by working together rather than avoiding each other, they are much more likely to be successful in reducing future losses and aiding the recovery process should a natural or technological disaster occur. The crucial step is to provide appropriate incentives for both sides to cooperate. Fortunately, this appears to be happening today.

— Howard C. Kunreuther
Co-Director

BULLETIN BOARD

Advisory Committee Meeting

The Center will hold the semi-annual Advisory Committee meeting on Friday, December 15, in the Amado Recital Hall, Irvine Auditorium, on the campus of the University of Pennsylvania. The meeting will begin at 8:30 am and end at 3:30 pm.

The meeting will begin with a review of the Center's research initiatives, including an overview of the following:

- Cat Risk Project
- EPA Cooperative Agreement
- Other On-going Research
- Near-Miss Project
- Accident Epidemiology
- Third Party Audits

Over lunch, the Advisory Committee will break into small groups to discuss future research initiatives and opportunities that the Center has based on current activities. These discussions will center around three developments related to e-business and innovation in information that are transforming the economy: (1) Risk Management; (2) Risk Regulation; and (3) Risk Science. These small group discussions will help ground future Center research and relate it to the interests of participating corporate and government associates of the Center. These discussions may also suggest themes for the upcoming WRI/Wharton Impact Conference on "New Digital Technologies: Opportunities and Risks for Business and the



Anne Stamer, Danielle Beerhalter and Kate Fang, all members of the Center's staff, at a Center's Roundtable meeting

Environment" to take place in July 2001 (details of the July meeting will be presented at this December meeting).

The key challenge for all of the projects will be to link science with policy. At the same time, the Center will consider opportunities to expand its activities to other parts of the world, consistent with the globalization trend.

Philip Lewis, President of the Advisory Committee, will conclude the meeting, discussing Future Plans for the Center. ■

Comings and Goings

Kiwan Lee joined the Center in September as a Post Doctoral Research Fellow and has begun to work with Paul Kleindorfer on risk management projects: "Accident Epidemiology" and "Managing the Catastrophic Risks." Dr. Lee also conducts research on the electricity industry and is the author of "Backup and Supplemental Power Pricing Strategies and Public Policy Issues in the New Electricity Market."

Albert J. Ignatowski resigned as Senior Research Fellow in the Center after completing his research on the CARAT project. Dr. Ignatowski will pursue activities as President of HazCom Consulting and will collaborate with Dr. Michael J. Reale in the formation of the Beacon Training Group, LLC.

Paul Kleindorfer returned from a one year sabbatical in Europe as Visiting Scholar at the European Institute of Business Administration (INSEAD) in Fontainebleau and activities with the OECD in Paris. He remains involved in Center research on accident epidemiology and catastrophic risks.

Anne Stamer, long active on the Center's staff has left the Center to accept a position in another part of the Wharton School. Kate Fang has taken Anne's place; Theresa Convery has joined the Center to replace Kate as Administrative Assistant. Danielle Beerhalter, active in Center activities for the past three years, graduated from the University in May and accepted an editorial assignment with the Rohm and Haas Company in Philadelphia. ■

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