"Refining and Testing Joint Fact-Finding for Environmental Dispute Resolution: Ten Years of Success"

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Based on our own experience mediating complex, multi-party environmental policy and planning disputes, our research focuses on the application of specific mediation techniques and strategies to help stakeholders make wise and stable decisions despite their competing interests and values. Scott McCreary has a longstanding interest in methods to increase the effectiveness of science advising for environmental management. He is co-author of *Institutional Arrangements for Managing Coastal Resources* (1991) and contributed a chapter to the *Consensus Building Handbook* (1999). John Gamman is particularly interested in the implementation of environmental policy. He is the author of *Overcoming Obstacles to Environmental Policy Implementation* (1994). Together, the authors have also collectively published several articles on the application of mediation techniques to environmental policy making. Since completing their doctorates at MIT, the authors have designed and lead mediations of over 30 complex environmental policy issues and regularly teach courses in negotiation and mediation.

REFINING AND TESTING JOINT FACT-FINDING FOR ENVIRONMENTAL DISPUTE RESOLUTION: TEN YEARS OF SUCCESS

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For the past decade, we at CONCUR have been mediating complex environmental disputes and have used the technique of joint fact-finding as a cornerstone of our model of practice. In this paper, we present and reflect on this body of experience with the goal of better informing both our colleagues in the field and other potential users of alternative dispute resolution (ADR) about the elements and preconditions for successful use of joint fact-finding. We also aim to contribute actively to the current initiatives on "Best Practices."

INTRODUCTION

Resolving a complex public policy dispute requires that interested parties share an understanding of the technical dimensions of the problem they face. Whether the challenge is reducing pollution of the marine environment or cleaning up a toxic waste site, the very best scientific information must be collected and utilized. This paper highlights techniques used in CONCUR's professional practice to compile and pool relevant information and to "translate" it into a form that can be used by decision-makers and others to create the foundation for broad-based consensus. We call this set of procedures **joint fact-finding.**[3]

The balance of this working paper is organized into four sections. In the second section, we explain the key features of joint fact-finding and contrast this approach with two more traditional styles of science advising for public policy: the technical "blue ribbon panel" and the model of opposing scientific experts ("adversary science") common in administrative hearings and litigation. The third section presents three case studies of joint fact-finding based on our first-hand experience as facilitators and mediators. The cases are the TBT Dialogue, the New York Bight Initiative, and the CALFED Bay-Delta Program's Independent Review Panel on Agricultural Water Conservation Potential. The fourth section presents a framework for characterizing joint fact-finding processes and outcomes, looking across CONCUR's work in this area over the past ten years. Finally, the fifth section concludes by presenting advice for putting joint fact-finding into practice.

JOINT FACT-FINDING: A NEW WAY TO INTEGRATE SCIENCE AND DECISION-MAKING

Joint fact-finding rests on a few key ideas. The first is that rather than withholding information for strategic advantage, **the interested parties pool relevant information.** A second feature is that joint fact-finding involves **face-to-face dialogue between technical experts, decision-makers, and other key stakeholders**. Usually, a nonpartisan facilitator or

mediator assists in orchestrating this dialogue. Third, this process places considerable emphasis on "**translating**" **technical information**--text, graphics, videos, web-based information and oral presentations--into a form that is accessible to all participants in the dialogue. Another significant aspect of the process is that while joint fact-finding is geared to building consensus, it tries clearly to "**map**" **areas of scientific agreement and to narrow areas of disagreement and uncertainty**. A fifth idea is to **use a single negotiating text** to record the results of the joint fact-finding process. The concept of a single text, borrowed from the arena of international diplomacy, simply means that participants in negotiation use a single document to focus discussion, rather than arguing over competing versions of facts and recommendations. Usually this document is revised through several working drafts (and may be expanded into a full technical report, as was the case for the New York Bight Initiative project as described in Section III) and produces a tangible record that brings the joint fact-finding effort to closure.

Focussing on sharing of information and inclusion of key parties, joint fact-finding stands in contrast to two more traditional methods of bringing science to environmental decision making: "adversary science" and the "blue ribbon panel". Table 1 summarizes these differences.

Table 1: A Comparison of Three Models of Science Advising for Public Policy: "Adversary Science," the Blue Ribbon Panel and Joint Fact-Finding

	Blue Ribbon Panel	Adversary Science	Joint Fact-Finding
Host Auspices[11]	Scientific Organizations	Courts or Administrative Agencies	Neutral, credible organizations with strong access to the scientific community
Convenor	Senior Scientist	Judge or Hearing Officer	Scientist or research administrator teamed with a non-partisan facilitator
Participants	Scientific experts	Experts aligned with each side and guided by attorney	Experts as group are not aligned with parties, decision makers, other stakeholders
Methods of Introducing Information	Written reports and group discussion	Depositions and interrogatories, testimony, and cross-examination	Various oral briefings, memos, short reports, facilitated dialogue
Extent of Information Sharing	Information is shared mostly within the panel; often strong emphasis on peer-reviewed findings or academic research	Information is strategically withheld to bolster argument. Choice then is between two information packages.	Information is pooled; may be mix of peer reviewed and non-peer reviewed studies as well as other documents.
Technical Level of Discussions	Comparable to a scientific conference	Translated to language of decision-makers – judge, jury, legislator.	A strong effort is made to "translate" technical information and make it policy-relevant
Emphasis on Policy Implications	Moderate; may be more of a focus on methods	Strong emphasis	Strong emphasis
Level of Effort Devoted to Seeking Consensus	Strong effort to produce consensus; minority reports are sometimes issued	Seeking technical consensus is incidental to deciding the issue	Emphasis on clarifying areas of technical disagreement and uncertainty

[1] Auspices refers to the patronage, support, and guidance by an institution or supporter who lends their reputation to the process, usually to increase its legitimacy — for example, good science and neutrality — and accountability — for example, to the scientific community and key stakeholders.

Shortcomings of Blue Ribbon Panels: The Port of Oakland Case

Under the blue ribbon panel, scientists with expertise in a field gather to review relevant information and seek to generate consensus on the relevant science, or at least to summarize the current state of knowledge. The National Academy of Sciences, for example, routinely convenes expert panels to render advice on complex policy issues. Other organizations enlist the blue ribbon panel model when they convene separate citizens' advisory committees and technical advisory committees.

This model can yield valuable insights, but it suffers from several disadvantages as well. One problem is that when stakeholders – grass-roots interests and other resource users with a stake in a policy decision – are denied access to the deliberations of an expert panel, the panel may overlook valuable information or ask the wrong questions. Moreover, scientists, left to their own devices, may become bogged down in discussions over methods rather than focusing on the policy implications of their findings. Still another problem arises when those affected by a decision cannot observe or understand the deliberations of the scientists. Because they are excluded, do not understand the science, think the panel is using the wrong information or believe the panel is asking the wrong questions, these people may calling into question the legitimacy of the process. Distrusting or disbelieving the advice of the panel, they are unlikely to support the scientists' policy recommendations. For all these reasons, scientists working alone may not produce information that can be used by decision-makers.

A case study of an earlier effort to use a blue ribbon panel highlights some of the shortcomings of the blue ribbon panel model (McCreary, 1989a, McCreary, 1989b). In the late 1980s, a blue ribbon panel was convened to help select a suitable site for disposal of sediments dredged from the Port of Oakland, California. Two sites near San Francisco were actively considered. One, known as the 1-M site, was located just off of Pacifica, south of San Francisco. A second, known as the B-1 site, was located further south, off of the small fishing town of Half Moon Bay.

Having reached an impasse about which site to propose, senior staff of the lead agencies, the Corps of Engineers and the Environmental Protection Agency (EPA), decided to convene a Technical Review Panel (TRP). While the deliberations of this TRP represented a potentially useful supplement to the standard Environmental Impact Statement process, the standard methods and process of a blue ribbon panel used for TRP produced flawed results.

First, in some areas, the panel faced either significant information gaps or outdated information (i.e. ten-year-old fisheries data). Second, the meeting was closed to all but EPA and Army Corps panelists and selected resource agency staff. In fact, even one lead EPA staff member from the San Francisco region was excluded. Without adequate preparation and consultation with the excluded stakeholders, the panel had no opportunity to close

information gaps during its two-day existence. Accordingly, there were many issues that the panel did not resolve.

Third, although resource agency speakers may have attempted to advocate the fishermen's interests, they could not speak for fishermen directly. Consequently, since they were not party to the expert deliberations, Half Moon Bay interests lost an opportunity to be briefed on or inform the rationale behind the panel's conclusions. Fourth, the meeting was held very late in the decision-making process, literally days before the final document (a Supplemental Environmental Impact Statement) was released. Thus, panel members had no opportunity to recommend research that could have closed the data gaps they identified.

In hindsight, limiting the review to agency staff and existing agency data proved to be an undesirable, exclusionary strategy. Local interests had no way to introduce their more up-to-date fisheries information into the decision-making process. Partly as a result of this exclusionary protocol, local fishing interests were motivated to pursue a legal strategy to block the siting of the disposal site.

Shortcomings of the "Adversary Science" Model

Another model of science advising is one in which contending interests appeal to or contract experts to bolster their own positions. This leads to "adversary science", which is most clearly manifested in litigation's "battle of the expert witnesses" (Jasanoff, 1990, 1997), and may also occur in public hearings associated with setting standards or reviewing major projects. Wherever the venue, it is not uncommon for opposing counsel to attempt to undermine both the credibility of the other's expert witnesses and the data or conclusions they are putting forward. Often, this process does little to clarify the scientific issues at stake.

This system of adversary science has been evident in the United States in public policy debates over acid rain, the role of chloroflourocarbons in ozone depletion, and the effects of second hand tobacco smoke. In California, the lengthy Bay-Delta hearing process saw hydrologists aligned with agricultural water users and hydrologists and biologists aligned with environmental groups advance competing models to explain the consequences of reduced Delta outflow on the Estuary.

While competing models often cause scientific uncertainty, it is important to realize that sometimes scientists don't really disagree; they simply miscommunicate. For example, sometimes scientists use different words to explain the same phenomenon. In other cases, they use different starting assumptions, data sets, or methods of interpretation and presentation of their data. All of these variations can lead to apparent disagreement when in fact they are framing and answering different questions. Too often, lay decision-makers and citizens are left puzzled by the apparent inability of the scientific community to produce a consensus on areas within their expertise. At worst, disagreements among scientists may persuade lay people that science has no useful role to play in shaping policy.

Moreover, groups with fewer resources often cannot afford to hire expertise or may not have access to top-caliber scientists. In such a situation, even the presence of the most neutral scientists might not create legitimate policy advice, especially if a group of stakeholders do not feel that their view is directly represented in the scientific deliberations or that they have had the resources to reliably interpret and vet information and methods of analysis generated by the deliberations.

The Advantages of Joint Fact-Finding

Joint fact-finding anticipates and avoids the shortcomings inherent in the blue ribbon panel and adversary science models. Its fundamental premise is that supervised, direct interaction among scientists, decision makers, and other key stakeholders can bring forth innovative public policies which all interested parties can support. Unlike the blue ribbon panel or adversary science models, it seeks to include as many stakeholders as possible, thereby striving to create the broadest understanding of a problem while generating legitimacy to the results of the process.

The emphasis on inclusion in the joint fact-finding approach provides those stakeholders with less experience or education in the field with the technical understanding of the issues they will need to negotiate on more equal footing (Ehrmann and Stinson, 1999). In addition, it also ensures that the technical experts have the depth of understanding of the specific issues of a case as well as the direction necessary to contain and focus their work. Stakeholders should play an instrumental role in determining the types of questions to be addressed, to what depth and under what timeline (Adler et al., 2000). The stakeholders, with the help of a mediator should also guide the process of generating, compiling, analyzing and determining the ultimate use of the information gathered. By reviewing the findings and developing a solution together, the process encourages the development of options that are in general more appropriate, creative, as well as more durable as they are built on the input and buy-in of all interested and affected parties.

This approach can be employed in a day-long seminar or in a consensus-building project with a year-long scope. It can yield a short list outlining areas of agreement and disagreement or a technical document of several chapters. In some cases, the participants in the process formally ratify the results while in others a staff member or convening organization carries them forward.

There is also great adaptability regarding the selection of experts. In some cases, parties to a dispute may agree to pool their technical expertise, giving their specialists new terms of reference that move them away from "adversarial" science. Other times, parties might prefer to rely exclusively on neutral, non-aligned experts. There is also the potential to create a hybrid approach, where aligned experts opt to select mutually agreeable non-aligned outside specialists to work with them on joint fact-finding.

Regardless of the format, the goal is to marshal the most relevant, reliable information and analysis to create technically sound public policies, and to elevate the level of understanding of technical issues among responsible agencies and members of the public. In the remaining portions of this paper, we will present you with three examples of successful joint fact-finding drawn from our research and professional practice, and we will explain our methods for putting joint fact-finding into practice.

THREE EXAMPLES OF SUCCESSFUL JOINT FACT-FINDING PROCESSES

In order to relate the rationale and sequence of a joint fact-finding process to tangible projects, we present three "success stories." The subjects we address are: 1) "The TBT Dialogue: A Technical Consensus Helps Catalyze Policy Reform"; 2) "The New York Bight Initiative: Joint Fact-Finding Creates the Basis for Innovative Policy Options"; and 3) "CALFED Bay-Delta Program: Independent Review Panel Helps Break Impasse Over Agricultural Water Conservation Potential." These initiatives integrated an ongoing process of consensus-building with a joint fact-finding process. Their successes demonstrate the flexibility and versatility of the joint fact-finding approach.

TBT Dialogue: A Technical Consensus Helps Catalyze Policy Reform

A one-day dialogue hosted by the Bodega Marine Laboratory, a University of California facility, produced a consensus on risks to the marine environment posed by tributyl tin (TBT), a constituent of boat paint (McCreary, 1987). In this case, the objective of the meeting was to review the most up-to-date information about the risks of TBT to the marine environment and consider possible next steps. The format for the meeting consisted of three briefings by top researchers, a question-and-answer period, and a period devoted to crafting a consensus summary.

The meeting began with an introduction by Dr. Paul Siri, Assistant Director of the Bodega Marine Laboratory, who set the context for the meeting. Next, three leading scientists presented the findings of both peer-reviewed studies in the U.S. and Europe *and* their own ongoing research. Then, Scott McCreary, the facilitator, asked participants to imagine that they had ten minutes to present a compelling brief to the State Senate Environment Committee covering the current understanding of TBT and the need for future monitoring or research. Recognizing that legislators are not inclined to absorb lengthy scientific presentations, McCreary urged participants to come up with concise "one liners." He helped participants translate highlights of the day's discussions into two short lists: "Areas of Scientific Agreement" and "Areas of Scientific Disagreement or Uncertainty." Then he asked scientific panelists to offer one or two statements to which other participants responded. If an individual proposed a statement for the list of "Areas of Scientific Agreement" and another scientist challenged it, the statement went under "Areas of Disagreement and Uncertainty."

Next, McCreary asked participants to use "Areas of Disagreement and Uncertainty" to frame a research agenda. He posted a series of ideas and requested that the group rank the top five issues. Finally, he had participants turn their energy toward developing policy options. The group listed several alternative strategies, including a ban on TBT-based paints. The outcomes of the facilitated dialogue are displayed in Table 2.

Less than one month after the workshop, Dr. Siri met with a group of legislators from six western states and reviewed the findings line by line. The legislators agreed the issue was important and asked why the scientific community hadn't brought TBT to their attention sooner. The legislators then proceeded to pass three resolutions. One asked Congress to enact "an immediate ban on the use of TBT-based bottom paints or derivatives of organotin." Lawmakers went on to introduce specific statewide legislation that anticipated federal regulations by one full year.

Table 2: Outcomes of Facilitated Dialogue on the Effects of TBT in the Marine Environment[2]

Areas of Scientific Agreement	Areas of Scientific Disagreement and Uncertainty	Priority Research Agenda
· Fouling is a biological phenomenon; TBT is the most effective anti-foulant. · Alternate formulations of TBT paint have different levels of effectiveness. · Elevated TBT levels are documented in water and sediment of California marinas (10 to 1000 nano-grams (ng) per Liter (L)). · UK researchers recommend 20 ng/L or less as a target. · Mollusks appear to be the most TBT-sensitive phylogenic group. · Damage to bivalves has been documented in California waters. · Halting paint use in a French oyster fishery has resulted in the recovery of that fishery. · Maguire's work documents significant concentrations of TBT in the microlayer. · Pacific Coast Federation of Fisherman's Association (PCFFA) has supported a voluntary ban on paints containing TBT. · Higher release rates of TBT result in greater toxicity. · Existing California laboratories have the capability to do expanded TBT research	· The relation between exposure to and dose of TBT needs to be accurately assessed in the food chain. · It is not certain which compartment(s) — water, sediment, or biota — become(s) the ultimate TBT depot. · The overall impact of TBT on marina and estuarine ecosystems needs to be assessed: problems of causality vs. correlation. · TBT concentrations in biota (especially birds and mammals) need clarification. · Since the adequacy of EPA methods of gauging leach rates of paints has been questioned, new studies need to be done. · Paint-use data are needed. · "Standing crop" vs. persistence in sediment and water column needs to be assessed. Is there a "purging phenomenon"? · Analytical methods are needed to evaluate TBT levels in tissues, sediment and water. Inter-calibration studies are needed. · Human health risks need to be assessed—market has been documented to contain significant levels of TBT. · TBT impacts on freshwater systems.	· Assess impact on marina and estuarine ecosystems. · Abundance of dominant biota vs. TBT. · Analyze biomagnification in birds and mammals. · Examine socioeconomic consequences in the fishing industry (using oysters as a barometer) in Humboldt and Tomales Bay. · Develop and refine analytical methods

[2] University of California Bodega Marine Laboratory, 1987.

The New York Bight Initiative: Joint Fact-Finding Creates Basis for Innovative Policy Options

The New York Bight Initiative (McCreary, 1988, 1989a,b, 1999) used a much more in-depth process of joint fact-finding that was carried out under the auspices of the New York Academy of Sciences (NYAS). The NYAS, as the institutional home for the dialogue, has strong scientific credentials and a reputation for neutrality. The joint fact-finding focused on the question of how to better manage polychlorinated biphenyls (PCBs) in the waters, sediment, and biota of the estuarine and ocean system known as the Hudson/Raritan Estuary and the New York Bight. A portion of this system, the New York Bight Apex, has been described as "one of the most stressed marine ecosystems" in the United States. Although only one of many contaminants present in the Bight system, PCBs have been the focus of attention due to a variety of factors, including evidence showing their persistence in the environment, carcinogenicity *in animals, and health effects in humans.*

The NYAS's Science and Decision Making Policy Program hosted the Bight Initiative. Twenty-two groups participated, including ten agencies and twelve private organizations ranging from Clean Ocean Action to the Chemical Manufacturers Association. The core of the process was a series of ten mediated sessions convened monthly at the NYAS's Manhattan headquarters. Specialists in subjects such as cancer risk assessment, aquatic toxicology, and sedimentology were recruited from universities in the New York metropolitan area and from other institutions such as Woods Hole Oceanographic Institution and Texas A&M University. In all, over twenty scientists participated as panelists to the process. Typically, three to five technical experts were present at each meeting.

In the first three sessions, scientific panelists played several roles: they provided briefings on technical issues, prepared short memoranda based on selective literature searches, participated in question-and-answer sessions, and drafted portions of the final report. In one of the most productive sessions, several scientists prepared a PCB "budget" showing the movement of this chemical from the Upper Hudson River, down through the Lower River, and out into the adjacent ocean region. The budget was organized into inputs, reservoirs, and losses of PCBs in the system. Another key accomplishment during this session was developing consensus on working definitions of technical terms. These working definitions created a "common language" for all participants and helped non-technical negotiators participate on a more equal footing with scientists.

After three initial meetings devoted exclusively to fact-finding, participants in the Bight Initiative turned to the task of developing options for improving the management of PCBs. Here again, the technical experts played several roles. For instance, one engineer presented a status report on emerging technologies for decontamination, while an aquatic toxicologist prepared a seven-page memorandum on the effects of PCBs on marine invertebrates and vertebrates. Similarly, a scientist from the National Marine Fisheries Service presented his

views on improving the coordination of sampling and monitoring among the states of New York and New Jersey. Additionally, some panelists commented on the likelihood that various management options would succeed, and they helped to draft the language of the final recommendations.

The final meetings were devoted to hammering out consensus on the specific language of the text – a task that eventually required five successive drafts. The Bight Initiative generated a strong synthesis of scientific information. With the help of the Academy mediators, the negotiators prepared a concise summary of PCB sources, fates, effects on human health and biota, applicable regulations, and socioeconomic impacts[4].

The process of fact-finding and single-text negotiation produced an unusually high degree of consensus given the complexity of issues involved and the history of contentious relations among interest groups and agencies in the New York metropolitan area. Using the findings of the process, negotiators representing the full spectrum of interests with a stake in the use and management of the New York Bight reached consensus on twenty-six management recommendations, including strategies to: reduce overall levels of biologically available PCBs; improve source reduction; and sample environmental status and trends (New York-New Jersey Harbor Estuary Program, 1996). They also decided to investigate emerging decontamination technologies, and, finally, they agreed on an agenda for short-term and long-term research. In the end, representatives from eighteen of the participating organizations signed the report.[5]

CALFED Bay-Delta[3] Program: Independent Review Panel Helps Break Impasse Over Agricultural Water Conservation Potential

Our third example– drawn from our work with the ambitious CALFED Bay-Delta Program – demonstrates the potential for joint fact-finding to inject broadly supported, creative, and science-driven information and analysis into longstanding policy disputes.

Water-use is always near the top of California's public policy agenda. With the state's sprawling urban areas, farming interests and environmental advocates competing for already overtaxed water supplies, an acceptable solution has been elusive. A team of 16 federal and state agencies – known as the CALFED Bay-Delta Program – began working in 1995 to broker a deal to create a long-term solution for the Delta. In the summer of 1998, with a critical deadline approaching, CALFED asked CONCUR to help build agreement around one of the

[3] The Bay-Delta system is an intricate web of waterways created at the junction of San Francisco Bay, the Sacramento and San Joaquin Rivers, and the watershed that feeds them. The Bay-Delta is the largest estuary on the west coasts of North and South America, and home to many unique plants and animals including migratory birds and endangered fish. More than 22 million Californians rely on the Bay-Delta system for all or some of their drinking water, and water supplies from this region are critical to the productivity of the agriculture and high-tech industries.

thorniest and most heavily criticized elements of the Program: agricultural water use efficiency.

Building on its past work with CALFED, which included convening an expert panel to review the Ecosystem Restoration Program, CONCUR staff co-designed and facilitated the Independent Review Panel on Agricultural Water Conservation Potential. The Panel brought together five nationally recognized scientists who collectively provided the following expertise: on-farm and district conservation practices; hydrologic and hydraulic connections between the CALFED solution and problem areas; and aquatic ecology. It also included the involvement of in-state technical advisors aligned with various constituencies and interested stakeholders. Convened for two-and-a-half days in December 1998, the Panel had a significant, real-time impact on CALFED's approach to this issue and provided the foundation for growing stakeholder support.

Despite the relatively brief duration of the Panel deliberations themselves, the Panel brought an unusually rigorous level of analysis to its work. The Panel challenged CALFED staff and California's water managers to work through a detailed process to calculate the different types of agricultural water loss. Then, using the resulting analytic framework, the Panel urged that agricultural water managers move away from a more traditional Best Management Practices (BMP) strategy to an objective-driven, incentive-based approach. The Panel went on to identify a series of quantification and research needs, which it asserted could be carried out in concert with the development of the agricultural Water Use Efficiency Program (CONCUR and the CALFED Bay-Delta Program, 1999).

Drafted primarily by CONCUR but with contributions from and review by all panelists, the single text document, "Summary Report: Independent Review Panel on Agricultural Water Conservation Potential (December 14-16, 1998)" was well received by the water stakeholder community and became a key source for the ongoing deliberations of the 14-member Program Steering Committee. The Steering Committee, in turn, has been a critical sounding board in shaping an innovative agricultural Water Use Efficiency Program that can be supported by the diverse range of stakeholders and policy makers.

Based on CONCUR's involvement with this effort, it is our view that the Panel's success was linked to four key elements:

- **Thorough Preparation.** The pre-Panel process was extremely comprehensive – from drafting the initial terms of reference and developing recruitment criteria, to selecting the venue, briefing with influential stakeholders and supporting and involving important decision-makers. This last point is particularly important. From the outset, CONCUR staff coordinated closely with key policymakers to ensure that the results of the Panel's deliberations would be delivered in an appropriate time-frame and format to help shape CALFED's design of the Water Use Efficiency Program.

- **One-Day Scoping Session.** Based on last-minute requests from stakeholders, CALFED convened a one-day Scoping Session that was attended by panelists and interested stakeholders. This proved essential, providing an opportunity for stakeholders and panelists to: 1) better understand the purpose of the Panel's deliberations; 2) identify some of the key issues to be resolved; and 3) work together to reshape the questions posed to the Panel. Other opportunities for stakeholder involvement included: nominating technical advisors to contribute to the Panel's deliberations; providing names of possible Panel candidates; and participating in strategic planning teleconferences.

- **Real-Time Synthesis.** The Panel's deliberations were structured to provide several opportunities for – and layers of – real-time synthesis. After each question, Scott McCreary synthesized the Panel's deliberations, highlighting key points covered and conclusions reached. In our view, this synthesis was crucial in helping both the Panel and stakeholder observers recognize and incorporate lessons as they emerged. Additionally, after its public deliberations, the Panel met separately to further synthesize its discussions, crystallizing two days of deliberations into a single text of ten overarching recommendations. Shared with the public the following day – this set of recommendations was essential in helping summarize the value of the Panel's overall deliberations.

- **CALFED-CONCUR Team Work.** Undoubtedly, the smooth interactions between CALFED and CONCUR as co-convenors were essential in helping shape the Panel's successful deliberations. In every facet of the project – from strategic planning and logistics, to meeting facilitation and report preparation – CONCUR and CALFED WUE Program Manager Tom Gohring worked as a seamless team. Specific areas of cooperation included: 1) sharing and critiquing documents; 2) conducting strategic planning teleconferences – at times, on a daily basis – to ensure tasks were being identified, assigned and carried out; and 3) working collaboratively on both planning and facilitation. The team proved an excellent blend of process expertise and technical know-how.

LOOKING ACROSS TEN YEARS OF JOINT FACT-FINDING EFFORTS

Beginning with our involvement on the New York Bight project ten years ago, we at CONCUR have been striving to systematically refine and test our theories and models related to the resolution of science-intensive disputes.

In this section of the working paper, we look across the range of our involvement in past joint fact-finding efforts. Specially, the matrix on the following pages summarizes elements of joint fact-finding processes (Table 3) and outcomes (Table 4) related to 11 CONCUR projects over the past ten years.

Table 3: Process Attributes: A Preliminary Survey of CONCUR Projects Using Joint Fact-Finding

Process Attribute	New York Bight Initiative	Louisiana Comparative Risk Project	Independent Review Oil and Gas Exploration Ecuadorian Oriente	Lower American River Task Force	CALFED Ecosystem Recovery Plan Scientific Review	Crane Valley Federal Energy Regulatory Commission Negotiations	San Diego Emergency Storage	South Bay Copper Dialogue	Guadalupe River Flood Control Project	CALFED Water Use Efficiency Independent Review Panel	Guadalupe Oil Joint Fact-Finding Process
Convene Process Under Neutral Auspices	X		X								
Mediation Team Possesses Dual Expertise	X	X	X	X	X	X	X	X	X	X	X
Compile Roster of Candidate Experts	X				X			X	X		X
Establish and Apply Selection Criteria	X				X	X	X	X		X	X
Recruit Significant Expertise Beyond Policy Negotiators	X			X	X	X	X	X	X	X	X
Aim to Produce New Synthesis of Findings	X	X	X	X	X	X	X	X	X	X	X
Recruit Technical Experts to Assist Negotiators	X	X		X	X	X			X	X	X
Distinguish Goals of Joint Fact-Finding Process from Other Efforts	X	X	X	X	X	X	X	X	X	X	X
Some Tech Experts Also Serve as Negotiators	X	X		X		X	X	X	X		
Impose Standards for Inclusion of Information	X	X	X	X	X	X		X			X
Technical Experts Present Briefings	X	X	X	X	X	X		X	X	X	X
Mediators Coach Experts on Tech Presentations	X	X	X	X		X					X
Experts Evaluate Consequences of Policy Choices	X	X	X	X	X	X	X		X	X	X
Negotiators Debate Burden of Proof for Including Findings	X			X		X					X

Sources: CONCUR, 1992; CONCUR and CALFED Bay -Delta Program, 1999; Crane Valley Project Committee, 1997; CONCUR, 2001; Guadalupe River Flood Control Project, 1998; Louisiana Department of Environmental Quality, 1991; McCreary, 1987; McCreary , 1999; McCreary , 1995; New York-New Jersey Harbor Estuary Program, 1996.

Table 4: Outcome Attributes: A Preliminary Survey of CONCUR Projects Using Joint Fact-Finding

Outcome Attribute	New York Bight Initiative	Louisiana Comparative Risk Project	Independent Review Oil and Gas Exploration Ecuadorian Oriente	Lower American River Task Force	CALFED Ecosystem Recovery Plan Scientific Review	Crane Valley Federal Energy Regulatory Commission Negotiations	San Diego Emergency Storage	South Bay Copper Dialogue	Guada-lupe River Flood Control Project	CALFED Water Use Efficiency Independ-ent Review Panel	Guadalupe Oil Joint Fact-Finding Process
Joint Fact-Finding Produces New Synthesis of Information	X		X	X	X	X	X	X	X	X	X
Narrow Areas of Disagreement	X		X	X	X	X	X	X	X	X	X
Report a Range of Interpretations for Most Contentious Issues	X				X						X
Work Products Illustrate Cause and Effect Relationships	X				X					X	X
Findings Presented in Mix of Prose and Graphics	X		X	X	X		X		X	X	X
Single Text Document Produced	X	X	X		X	X	X	X	X	X	X
Single Text Document Includes Technical Findings	X	X			X	X	X	X	X	X	X
Single Text Document Ratified by Negotiators	X	X		X	X	X	X	X	X		X

Sources: CONCUR, 1992; CONCUR and CALFED Bay -Delta Program, 1999; Crane Valley Project Committee, 1997; CONCUR, 2001; Guadalupe River Flood Control Project, 1998; Louisiana Department of Environmental Quality, 1991a, 1991b; McCreary, 1987; McCreary , 1999; McCreary , 1995; New York-New Jersey Harbor Estuary Program, 1996.

Several observations stand out upon review of this initial summary. One is the striking extent to which the various joint fact-finding efforts rely on similar process actions or techniques. Among the techniques most commonly employed are:

- Assemble a mediation team with dual substantive and process expertise;
- Recruit independent scientific expertise beyond that possessed by policy negotiators;
- Aim to produce a new synthesis of findings;
- Explicitly distinguish the goals and structure of the joint fact finding process from other efforts;
- Coach technical experts in making the style of their presentations and contributions more accessible;
- Present policy choices to experts for their evaluation;
- Link fact finding with creation of a single text document.

A second observation revolves around whether neutral auspices are needed. Early on in our practice, we had expected that successful joint fact-finding necessitated convening the process under the auspices of a neutral. In fact, this has not proved necessary in most our work. In fact, we only used neutral auspices in the New York Bight case and in our independent review of oil and gas in the Ecuadorian Oriente (McCreary, 1995). We suspect that part of the reason is that the presence of a neutral mediator and/or organization can often reassure parties that deliberations will be credible enough that a neutral auspice is not required.

A third observation is that while a few core features of the joint fact-finding process are steadily consistent – holding face-to-face dialogues among scientists, summarizing the most up-to-date information, and recording and documenting deliberations – the package of details for each fact-finding process must be customized. One cannot assume, for example, that a completely new pool of scientists need be recruited for each case, or that negotiators will need to debate what burden of proof findings must meet to be included. Each fact-finding effort demands its own unique design.

A fourth and final observation focuses on consistencies in outcomes. In virtually all the joint fact-finding efforts convened by CONCUR, a handful of outcomes are repeatedly seen. These outcomes include:

- New synthesis of information
- Concise list clearly identifying areas of scientific disagreement
- Work products that illustrate cause and effect relationships
- Presentation of findings in accessible format using a mix of prose and graphics
- Technical findings incorporated in a single text document
- Ratified single text document

PUTTING JOINT FACT-FINDING INTO PRACTICE

Based on our reflections on the three case studies described above, we outline in this section the key steps in a joint fact-finding process. This list of steps is organized into three major phases: 1) start-up and preparation; 2) fact-finding process; and 3) translation of fact-finding results to the development of options.

We stress that the exact tasks under each step must be tailored to the needs of each specific project. Usually, the services of a professional mediator or mediation team are required to ensure that the fact-finding process works smoothly. We also recommend that a mediation team be employed that has dual expertise in both the process and substance of the issues under discussion. This typically requires that at least one member of the mediation team be trained in the relevant technical disciplines and that at least one member be trained in public policy analysis.

Start-Up and Preparation

One of the first tasks for the mediation team is to work with the convenor to design the broad outlines or strategy of the joint fact-finding initiative. This process involves, among other things: 1) addressing the duration of the joint fact-finding effort; 2) determining whether experts will be drawn from the parties to the dispute or solicited from neutral, outside organizations; and 3) designing the process so that interested stakeholders and policy makers can interact with the joint fact-finding effort. We stress again that joint fact-finding is a flexible approach that should be tailored to meet each situation's unique needs.

A second essential precondition for a successful fact-finding process is that a suitable institutional "home" be found. Such a home must have strong administrative capabilities, excellent access to the scientific community, and a neutral reputation with regard to the issues under debate.

Once these essential start-up tasks are completed, the mediation team and convenor should begin to create the conditions for an effective dialogue among scientists, decision makers, and other stakeholders. The mediation team, working with a representative of the host institution, would normally undertake the steps outlined below to set the stage for the joint fact-finding. In some cases, a steering committee drawn from the interested parties may assist as well.

- Identify the key decision makers and stakeholders.[6]
- Clearly frame the problem under investigation.
- Identify the expertise needed (including both disciplinary training and suitable credentials).
- Prepare a roster of candidate experts.
- Prepare a detailed draft of the terms of reference and scope for the investigation.
- Recruit the experts and finalize the terms of reference and scoping for the investigation.
- Prepare groundrules and set the agenda for the fact-finding process.[7]

Fact-Finding Process

The joint fact-finding process itself relies on a series of steps – conducted by the facilitation team and, at times, the co-convenor – to ensure the deliberations are coherent, relevant, transparent, and accurately recorded and summarized, including:

- Technical staff and mediator brief the panelists on their responsibilities; they may also provide guidance on how they would like to scientists to format their presentations.

- Scientists prepare presentation.
- Technical advisers deliver oral briefings with appropriate graphics.
- Facilitation team chairs question-and-answer session, summarizing key findings in real-time, immediately after each issue has been deliberated.
- Working group (a subset of the full group of negotiators) drafts and revises text to summarize key findings in a single text document.
- Facilitation team and working group package a single text document in an appropriate format (text and graphics).
- Facilitation team and convenor arrange for appropriate distribution of the document.
- Stakeholders ratify document.

Linking the Fact-Finding Process to the Development of Options and Securing a Final Agreement

The next set of steps will vary depending on the overall goals of the fact-finding effort. As stated earlier, a single, negotiated text speeds and focuses the fact-finding process. The single text frequently begins with an outline or memorandum. Often the mediation team serves as the "secretariat" for development of the document, taking responsibility for collating comments on the interim drafts and producing a revised draft for review of the negotiating terms. When complete, the single text captures the areas of agreement and strives to summarize divergent views accurately.

If the objective is simply to clarify technical uncertainty and package information in a useful form, as was the case with the TBT dialogue and the Louisiana Comparative Risk Project (Thompson et al, 1994), we suggest that the mediation team lead these steps working again in concert with the host institution:

- Prepare a final document.
- Link the findings to policy development – for example, by preparing a memo or delivering a briefing to a relevant policy-making body or agency.

If, on the other hand, the goal is to develop management options and secure an agreement, as was the case with the New York Bight Initiative, we recommend that the mediation team work with the parties to complete these tasks:

- Develop management options based on findings.
- Package a draft agreement for deliberation.
- Prepare a draft final document.
- Circulate the draft final document for the signatures of the participants, thus securing ratification.
- Translate informal agreements to binding agreements.

Of course, the level of effort needed to accomplish these tasks and the relative weight each one deserves will vary with the complexity of the issue under discussion.

CONCLUSION

CONCUR is committed to furthering our discipline's understanding and use of joint fact-finding. To that end, we believe that the three case studies we explored here, as well as the other cases synthesized in our summary matrix, represent a rich data set for better understanding how joint fact-finding functions in practice. We suggest that the framework presented in Table 3 for identifying and classifying the attributes of joint fact-finding is a strong starting foundation for developing more systematic tools for analyzing these important processes.

In our view, continued research in this area is essential. We believe that the joint fact-finding process we have outlined here, and successfully led in our professional practice, holds promise to help resolve a wide array of environmental policy issues. They might be used for site-specific issues (such as a proposed timber harvest plan, development near a sensitive wetland area, or a siting a landfill) or to assist setting regulatory standards (such as establishing targets for selenium or mercury in important bays and estuaries). Still another application of joint fact-finding is setting broad policy priorities and approaches, as demonstrated by the CALFED panel that deliberated on agricultural water conservation potential.

It is our further contention that joint fact-finding offers a flexible approach that can be adapted easily and successfully to meet the needs of each particular situation. Based on thorough preparation and proactive process design, a joint fact-finding effort can be structured to accommodate constraints and concerns ranging from timeline pressures to funding limitations. It can be shaped to involve parties' existing experts or draw on neutral third-party experts. It can take as little as a day or be structured to support long-term, ongoing deliberations. The crucial task, in our view, is to build a process that fosters the pooling and analysis of the best available technical information and then translates the results in forms that lead to productive public policy deliberations.

ENDNOTES

1. Scott McCreary and John Gamman are Principals of CONCUR, Inc.; Bennett Brooks is an Associate. We also acknowledge Cornelia Tietke, a former CONCUR Research Assistant, who contributed to an earlier paper on this topic, as well as Rebecca Bryson, a fellow at CONCUR, who critically reviewed the paper to prepare it for publication.
2. Auspices refers to the patronage, support, and guidance by an institution or supporter who lends their reputation to the process, usually to increase its legitimacy — for example, good science and neutrality — and accountability — for example, to the scientific community and key stakeholders.
3. Several other authors, notably Connie Ozawa and Lawrence Susskind (1985), Susskind and Jeffrey Cruikshank (1987), Ozawa (1990), and Harvey Brooks (1984) (no relation to B. Brooks), have provided commentary on joint fact-finding and science advising for policy. We acknowledge their valuable contributions in helping to develop these ideas.
4. This was one of several roles performed by the mediators in this case. Others included managing the flow of discussion, structuring the sequence of negotiating sessions, and recruiting panelists.
5. Although EDF and three chemical manufacturers declined to ratify the document, they expressed support for the overall effort and for the individual recommendations.
6. Depending on the overall objectives of the fact-finding process, this may require a thorough stakeholder analysis. Usually, this involves conducting a series of structured interviews with key parties, geared toward determining their backgrounds, interests in the dialogue, and needs for technical information.
7. Groundrules typically address such issues as: the total time allotted for the process and anticipated work products; the sequence in which issues are discussed; protocols about types of information that are presented (i.e. must be published in peer-reviewed journal or be presented directly by the principal investigator); rules to handle sharing of confidential or sensitive information; whether the document will be ratified as a single text; and the format for presentation and release of the final products.

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