Humble Inquiry

The Practice of Joint Fact Finding as a Strategy
For Bringing Science, Policy and the Public Together [1]

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"Science is a way of not fooling yourself."- Richard Feyneman

Ideological and partisan rivals do have something in common - an exaggerated sense of their own righteousness."- Colbert King

"We cannot solve problems by using the same kind of thinking we used when we created them."- Albert Einstein

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I. Summary

"Joint Fact-Finding" is a promising emerging strategy for experts, decision makers, and key public stakeholders from opposing sides of an issue to work together to resolve or narrow factual disputes over important environment, energy, public health and social policy issues. The procedure requires that those who are affected by a decision also be involved in framing the research

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question(s) and identifying, generating, analyzing and interpreting the scientific and technical information that will be used to inform a decision or action.

JFF procedures are flexible but have six critical characteristics. (1) They involve multiple stakeholders who may have very different viewpoints; (2) they are collaborative and require people to work together; (3) they are structured, meaning, JFF processes and meetings are not left to chance but are well designed and highly focused dialogues; (4) they are inquiry based and require a robust exploration to understand the problem from all angles; (5) they are interest-based study processes and not forums for arguing political positions; and (6) they are integrative and multidisciplinary. They bring different types of knowledge, information and data to the table.

Sometimes JFF processes are organized as "stand-alone" processes. In other instances, they can be embedded as part of longer collaboration processes in working groups, roundtables or the work of special committees and commissions. Actual case experience, as described in this paper, suggest similarly organized JFF processes can be applied to many more conflicts in the U.S., Japan, and elsewhere.

II. A Sample of Common but Tough Problems

Imagine you are professionally or personally involved in any of the following problems. As you consider these scenarios, ask yourself this: "If it was your responsibility to find solutions, mitigate risks, or balance costs and benefits, how would you go about finding solutions using the best science and the best process to achieve the best outcome?"

A Public Health Problem. Four small manufacturing towns lie clustered around the confluence of two rivers. Generations of workers have made their livings from the local paper mills that are located close to the rivers. The economy of the area still depends on these industries. Recently, a television station nicknamed the area "Cancer Valley" suggesting that there is an epidemiological cancer cluster and that the culprit is the paper mills. The television station reported heart-breaking stories of sickness and death. Mill owners deny their plants are at fault but the families of lost loved ones are threatening legal action. Public health authorities have not been able to definitively connect the cancer cluster to air or water pollution but plan to continue their investigations. In the meantime, the issue is now receiving national attention.

An Environmental Problem. One of the largest estuarine eco-systems in another part of the country has, over many years, become polluted with nitrogen, phosphorous and solid particulate matter running off from agricultural and high-tech business operations. The once pristine watershed still supports many species of plants, fish, migrating birds, and other animals, some of which are endangered. This area is also a source of drinking water for a large nearby city. While everyone agrees the area must be cleaned up, there is considerable disagreement about what damages have taken place, what changes must be made, who should pay the costs, and how the process should proceed.

An Energy Problem. As a result of improved understandings of carbon risks, green house gas emissions and climate change, proposals are now surfacing to build a new generation of more efficient and safer nuclear energy plants. Advocates, including those from the nuclear energy industry, argue that new nuclear powered technologies will drive the cost of power down and reduce dependence on off-shore oil and gas. Industry believes waste byproducts can be reduced and more safely stockpiled and, with proper precautions, terrorism risks

can be minimized. Opponents believe power costs will not be substantially reduced, the risk of accidents remains high as does the threat of having nuclear materials fall into the hands of terrorists. Proponents and opponents are now waging fierce media and lobbying campaigns that they hope will be persuasive to government decision makers and regulators.

These three problems share a number of common features.

- As explained later, they all are based on true incidents.
- All three reduced the usual conflict pattern of dueling experts and conflicting studies.
- All three were highly political controversies that involved important public policy and regulatory debates.
- All three involved participants from government, industry and the civil sector.
- All three are good examples of the use of a facilitated cooperation process called Joint-Fact Finding, or "JFF."

The United States, as well as many other countries, faces no small shortage of public science-intensive controversies. To name but a few, recurring disputes are taking place regarding the planning and construction of new dams, the decommissioning of existing dams, the use of pesticides and fertilizers in production agriculture, increases in the development of genetically modified plants and animals, the development of new energy sources, the emission of greenhouse gases, the safety thresholds for exposure to chemicals of concern, the promulgation of general vaccination policies, the location of Level-3 and -4 Bio-safety Laboratories, the reform of health care laws, the use of off-road vehicles in environmentally sensitive areas, catch and by-catch limits for fishermen and many more.

On any given day, science-laden controversies occupy a considerable amount of time and energy on the pages of our media and in the minds of citizens, scientists, and decision-makers. This trend is likely to accelerate, not abate.

IV. The Science-Policy-Citizen "Interface"

Controversy is an inherent aspect of scientific and public debate. It is one of the ways science evolves and advances. Conflict is also a normal aspect of policy-making. It is one of the ways policies change and adjust to new circumstances and new information over time. In both realms, science and policy, people tend to create theories and hypotheses (or their equivalents), gather evidence, undertake analysis, formulate conclusions, press their best conclusions forward and then defend them from criticism.

All of this is normal in democratic societies. Even before Galileo's infamous fight with the Catholic Church, science and policy have been and remain irrevocably married to each other. They enjoy a largely symbiotic and mostly mutually beneficial relationship. But there are also times when it is not a comfortable marriage. Especially when high profile controversies erupt, the boundary line between science and policy is messy, blurred, fractious and noisy.

In the United States, this seems particularly true when there is little political common ground between left and right, conservatives and progressives, and Republicans and Democrats. Science becomes a sword or a shield behind which people pursue or defend their values. As financial, social and political stakes rise, scientific matters assume a certain political importance and both the science and the decision-making processes become adversarial, disputatious, and accusatory. Tensions escalate and otherwise staid science and policy debates become "wars."

Protagonists seek out new battlegrounds in the press, in regulatory and legislative forums, and in the courts.

The fissures, fractures and tensions between science and policy, however, also run deeper than any one issue. Many scientists charge that good scientific knowledge is often ignored or obscured by politicians and policymakers, or that the science that gets considered by government tends to be captured by industry. Politicians and policymakers, in turn, often assert that scientists speak in strange and arcane languages, argue with each other over obscure matters, and then claim inconclusiveness when put on the spot. Some scientists mistakenly believe that science should automatically lead directly to policy conclusions. Some policymakers mistakenly believe that science should be secondary to other economic or social value considerations. All argue that only their science is "sound" and that their opponents' science is flawed or biased.

For the last 35-years, The Keystone Center and others have labored to improve the nexus between science, policy, and collaboration. We view this as a Venn diagram and are constantly looking for creative ways to improve deliberations and find sweet spots where productive work can be accomplished. Keystone is not a think tank. It is a "think and do" tank. We are convinced that the majority of energy, health and environment issues we face today require new problem-solving practices. We believe that our traditional political approaches to decision-making are useful but are also increasingly insufficient to the escalating technical, social, and economic issues that arise when a community discovers a cancer cluster, a major water source is assumed to be in jeopardy, or when our energy economy faces painful choices.

The reality is this. Our most challenging problems, including those described by example at the beginning of this paper, are complex, costly, far reaching, and fast

moving. In the U.S., and perhaps in Japan and elsewhere, no one sector –- government, industry, or community – fully "owns" these problems or has the complete power and jurisdiction to solve them. No one group or person, however brilliant, is fully capable of routinely forcing everyone to adopt a solution. No one branch of science, no single intellectual discipline, and no one mental model can fully explain these problems. Most important, none of us can wall ourselves off from these problems and ignore them. The problems eventually intrude.

At Keystone, we are convinced that new strategies and techniques are needed, not as a wholesale replacement of time-tested science and policy-making methods, but as a complement to them. When the stakes are high, when emotions and tempers rise, when communication breaks down and the air is filled with angry accusations, we need to do something different. That is the moment when solving a tough problem must become a team sport, one in which people work together with less hubris and more humility. Moreover, these situations can almost always be anticipated which allows people of reasonable intelligence and reasonable good will to put strategies and techniques like JFF in place in advance of inevitable breakdowns.

IV. Spirals of Conflict

Conflict, said philosopher John Dewey, is ubiquitous. It is a gadfly to thought. It shifts our mental processes to observation, memory and analysis and it stimulates invention. Dewey was an optimist. The reverse is also true. As individuals and groups move from higher to lower levels of certainty, from comfort to discomfort, from a sense of security to a sense of risk, conflict can also become destructive. In societies that place a high value on social harmony, it is also disruptive and dangerous. Conflict that is out of control becomes dangerous.

The English language is filled with synonyms for conflict that capture the dual nature of conflict and that indicate different levels of intensity, involvement and complexity. We use words like "encounter," "controversy," "disagreement," "discord," "argument," or "altercation" to indicate milder forms of conflict. At the other end of the spectrum we talk about "brawls," "feuds," "fights," "donnybrooks," and "battles" to indicate its more severe forms. Although most of our connotations about conflict are negative, not all conflicts lead to actual disputes and not all disputes are bad. Conflict, as the Chinese illustrate in their kanji, is composed of both danger and opportunity.

Friedrich Glasl has described the potential archetypical trajectory of conflict when it is unchecked. [3] We have all witnessed this, either in disagreements between individuals, within or between families, within or between groups, or within and between nations. It is like a spiral, some phenomenon that seems to acquire a life of its own the more it accelerates. Glasl sees nine stages. Differences of opinion arise and positions harden. The issue expands and couples to other issues. Parties lose faith in words and move to actions. Alliances and coalitions form from different agendas. There is a loss of face and conflict actors maneuver to maintain it. There are threats, counter-threats and ultimatums. Turbulence increases as each side seeks to achieve its ends through limited blows to the other. Attacks intensify and eventually, each side seeks to annihilate the other. Left unbridled and unrestrained, Glasl calls this "together into the abyss." Both sides are mutually committed to each others' destruction.

Science-intensive conflicts of the types described in the three stories at the beginning are not immune from these patterns. In fact, science and decision-

[3] Glasl, Friedrich, *Konfliktmanagement: Ein Handbuch für.*Bern: Paul Haupt Verlag, 1997.

making policies that are contested or uncertain often exacerbate these patterns. That is why we need new strategies and practices that improve the odds of cooperatively anticipating, preventing, managing or resolving conflicts before they result in an unnecessary plunge into the abyss.

V. Specific Challenges

Most science-intensive disputes do not turn into pitched battles in which everyone goes over the cliff or into the abyss. Instead, and like many other conflicts, they come to closure through legal mechanisms or political structures. Engelhardt and Kaplan suggest that the sometimes long-running arc of scientific controversies ends in any of five ways:

1. *Through sound argument*. Overwhelming irrefutable evidence ends the debate.
2. *Through natural consensus*. Broad agreement is eventually reached.
3. *Through legal procedure*. Arguments are terminated by rule of law.
4. *Through natural death*. The argument becomes moot and the dispute goes away.
5. *Through negotiation*. The controversy is settled through an arranged and morally unobjectionable procedure. [4]

It is not unknown for scientists, decision-makers, and lawyers to create and enjoy robust careers from such controversies. Nor would we argue that long-running debates are not important to society and in many instances need to "run their course" rather than be short-circuited. Nonetheless, the human and financial costs of disputes such as the three described at the start of this paper can be

[4] Engelhardt Jr. and Kaplan *Scientific Controversies,* 1987.

substantial, especially for those who are perceived to be most at risk: the people and businesses of "cancer valley;" the millions of people whose sources of drinking water derive from the watershed; and the people and companies who may reside next to or near a proposed nuclear plant, or be investors in it.

JFF is part of a search for a better way of managing the inevitable conflicts that arise in the context of energy, environment and public health matters. When groups find themselves immersed in what we call "the science-policy-citizen interface," they are often trying to confront problems similar to those described at the top of this article. In this zone of affairs, different challenges arise that individually or collectively can bedevil attempts at cooperative solution seeking. Six of them seem especially important.

1. **Communication.** In conflict, scientists, decision-makers, and citizens seem to speak in different languages. Communication problems abound. Scientists often believe no one else but other scientists within their disciplines are capable of understanding what they have to say. Lay people often feel talked down to. Often as not, they are also angry when they sense their problems are being ignored or marginalized. Decision-makers, especially those in complex bureaucracies, are often constrained in what they can say for fear of unintended political or legal consequences. Scientists often feel misinterpreted and misunderstood.

   For scientists and decision-makers, these problems have led to two different models of communication in the face of rising controversies. We might call the first the "deficit" model. Here, scientists or decision-makers assume that their job is to educate lay people or the public about all the things they don't know. This often leads to long soliloquies in which

scientists talk at great length (with a flood of technical power points) and lay people fall asleep. [5]

The second model is the "listening" model. Here, at least in the U.S., lay people or the public do all the talking, sometimes with great agitation and much yelling and screaming, and the scientists either fall asleep or vow to withdraw to their laboratories and offices at the first available opportunity. Needed is a third "interactive" model, one in which lay people, scientists and decision-makers can engage with each other on more equal footing and in more productive ways.

2. **The Conflation of Science and Policy Questions.** When controversies over energy, natural resources, and public health erupt or escalate, questions of science and questions of policy seem to tangle together. In part, this is a function of advocacy and the prosecution of contending positions. People in conflict tend to hide their value preferences behind their supporting science. Likewise, everyone has cognitive biases towards information that favors their preferred outcomes. We tend to include information we like and screen out what we don't like.

   As science-intensive controversies and conflicts arise, it becomes increasingly important to separate questions that are technical in nature from questions that are, at core, about values and social choices. Questions such as how many parts per million cause cancer, which animals and plants are thriving or going extinct, or how much water, sewage, and electricity do we need to support a certain sized population are fundamentally technical in nature. They can be framed in scientific ways and lend themselves to empirical inquiry. Conversely, questions like how

[5] One writer has described the power point presentation as a "tool for mesmerizing chickens."

clean is clean enough for an air-shed, how pristine is pristine enough for a river, how many people in a place is too many, and which animals and plants do we like or not like are value choices. Technical and scientific studies can inform such decisions but will never answer them.

3. **Interdisciplinary Sense Making.** Most problems of the sort described in the cancer cluster, the watershed case, and the nuclear problem might, on first impression, be the province of a single scientific specialty. Cancer Valley might seemingly require a public health epidemiologist to make a determination of the facts. The estuarine issue might call for the judgments of an aquatic ecologist. Faced with the nuclear situation, we might turn to a physicist or nuclear engineer. However, the very act of defining the expertise needed limits the way a problem is framed.

   More often, different disciplines are needed if a problem is to be more comprehensively examined.[6] In one situation the needed expertise may be from the physical or life sciences. In another, economists, sociologists, planners, cultural experts, historians, or ethicists may be required. In academic circles, interdisciplinary cooperation is on the increase but there are still major resistances. Disciplines "think" in different ways and do not always talk well to each other, especially when they are examining the same phenomena. Though there are many exceptions, academic and financial rewards also tend to take place inside disciplines, not between them.

[6] In our work, we often try to use what we call a "PESTLE" framework. We intentionally ask ourselves which of the following knowledge sets are relevant to a particular controversy. PESTLE is shorthand for the political, economic, social, technical, legal or environmental data that may be needed for a given JFF process. Not all categories are implied for every situation and some may have greater bearing on a problem than others.

4. **Relevance and Salience.** The advent of vast amounts of public information and data on the internet and World Wide Web are proving to be both a blessing and a curse. On the one hand, individuals now have routine access to extraordinary amounts of technical and scientific information, published studies, peer reviews, and gray literatures that may not have been peer reviewed but that offer findings, insights and syntheses of other areas.

   The flip side of this availability is that some of what is on the web is wrong, wrongly quoted, or taken out of context. Equally troubling is the "fire hydrant" effect in which signals cannot ne discerned because of noise. With the sheer inflation of available information come the twin problems of relevance and salience. Salience is a question of prominence. Relevance describes how pertinent, connected or applicable something is. A particular study or data set may have high relevance and low salience. Conversely, it may be highly prominent but only secondarily relevant.

5. **Differential Risk.** In the citizen-science-decision-maker interface, different constituencies face different kinds of risk which can further complicate problem-solving discussions. Communities such as those in the alleged Cancer Valley, in and around the watershed, or adjacent to nuclear facilitates have a sense of immediate risk. As stakeholders or "rights" holders, they see their health and welfare in potential or actual jeopardy. Scientists come to the interface with a sense of reputational risk. Their science and professional status is on the line. Decision-makers carry political risks, both the risk of removal from office as well as the possibilities of isolation from colleagues in their own parties.

6. **Objectivity and Arrogance.** The notion that science, if done properly, is somehow "neutral" and therefore "objective" has been debunked repeatedly. Nonetheless, scientists persistently cling to the belief that by virtue of their training and discipline with the scientific method, they are superior in evaluating science-intensive problems. What ensues is perceived arrogance. Like the rest of us, scientists are human. They make mistakes in the form of false assumptions, methodological errors, or faulty conclusions. Scientists appear especially arrogant when they invoke some inherent authority to claim that "science" dictates their preferred views on a matter. Scientists tend to forget that their work only gives us a small picture of the state of the world, not what political or social course of action might be best. Scientists' preferences are not "science." They can, however, inform us about trade-offs, potential consequences, and possible scenarios. These will be valued if they are offered in the right way.

VI. Joint Fact Finding

JFF is one strategy that can be used when scientists, decision-makers, and citizens are caught up in unproductive spirals of conflict. JFF is a flexible practice that can be used to (1) prevent unnecessary disputes before they arise; (2) manage them when they emerge; or (3) resolve or streamline them when they are present. JFF is not a panacea and will not solve every problem. However and whenever it is employed correctly, it is a focused and effective way to grapple with differences of opinion over factual matters that are important to the health and vitality of a community or society.

Most simply defined, JFF is a cooperative inquisitive procedure that will improve the way relevant science is brought forward into controversial policy and regulatory discussions and, in some cases, to help resolve disputes. JFF is a

strategy for reducing unnecessary conflict, opening better lines of communication, and improving the science-policy interface.
Using a flexible set of procedures, and often organized by a trusted facilitator or moderator, JFF creates a special forum for disciplined inquiry, discussion and engagement. When JFF is applied, stakeholders with different viewpoints are convened to work together to define key factual questions and disagreements, design and implement data collection protocols, bring relevant data and information to the table, apply collective analysis and interpretation techniques, and prepare useful answers to some or all of the important scientific and technical questions that are at issue in a controversy.

In many ways, Joint Fact Finding is a specialized application of "Action Research," a rigorous self-study methodology that seeks to balance problem solving implemented in a collaborative context and with data-driven analysis or research to understand causes and potential future actions. Action research has been variously described as "Action Science," "Cooperative Inquiry," "Participatory Action Research," "Developmental Action Inquiry," and "Living Theory." 7

Both action research and JFF share traits in common. First, these processes involve multiple stakeholders, usually scientists, government officials, and citizens. Second, the processes are collaborative, that is, people are expected to work together as a condition of their participation. Third, processes and meetings are not left to chance. They are a strategic "dialogues by design" that are then tactically managed conversations that must combine discipline, participation, and productivity. Fourth, they are "inquiry based," meaning they frame robust and relevant questions that seek to understand the problem at hand by viewing it from all angles in an evidentiary way. Fifth they are "interest-based," meaning

[7] http://en.wikipedia.org/wiki/Action_research

they are not a forum for arguing policy positions but instead a "study" process to help develop a sound information base for problem solving. Last, they are integrative. These processes acknowledge the multidisciplinary nature of serious problems and seek to bring different types of expertise and data to the table.

Joint fact finding always seeks to balance good science with good process. By doing this, it aims to reduce unnecessary friction and conflict, achieve greater cooperation, lessen social, political, and scientific uncertainty, increase shared learning and understandings, and set the stage for collaborative leadership. Done well, it can reconcile disputed information, narrow the range of factual disputes, create trusted information, and yield new and shared insights.

VII. JFF Roadmaps

In general, the JFF process can be organized in two different ways. The first is what we call an "embedded" procedure in which joint fact finding is actually part of a longer or larger project that may aim for a fuller resolution of the policies, regulations, or standards that are ultimately at stake. The watershed problem, described in summary form at the beginning of this paper and described in greater detail in the next section is an example of an embedded process.

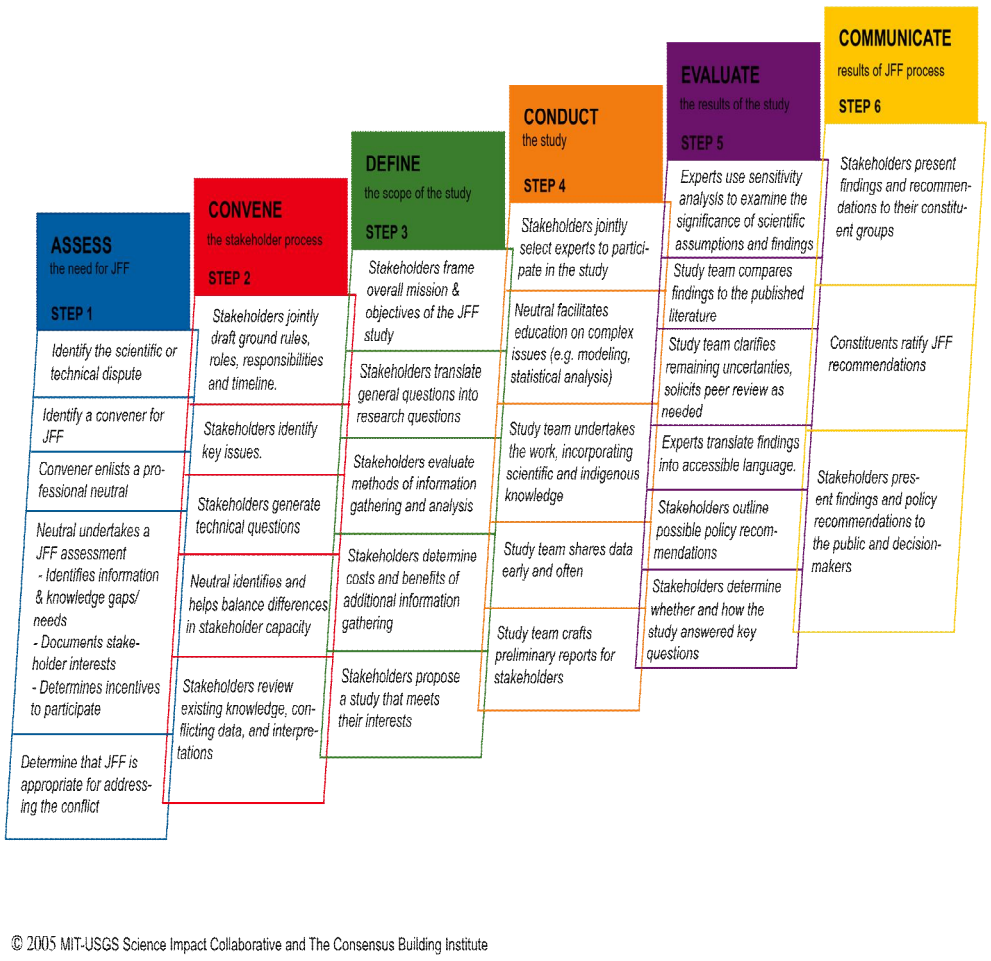
Embedded procedures are usually a part of longer collaboration processes which tend to follow a three phased trajectory: (I) project organization and start-up; (II) collaborative inquiry, dialogue and information exchange; and (III) problem solving and consensus building. Schematically, JFF is a component that usually takes place during the second phase as follows:

I. START-UP	II. COLLABORTIVE INQUIRY	III. PROBLEM SOLVING AND CONSENSUS BUILDING
1. Appraising the situation for possibilities.	5. Jointly identifying questions, assumptions, and procedures.	9. Making informed choices.
2. Organizing leadership, sponsorship, and the capacity to convene.	6. Bringing the best scientific, technical, cultural, legal, and economic information to the table.	10. Working with parties not at the table to ensure acceptability of proposed projects or solutions.
3. Gaining the participation of all affected stakeholders.	7. Discerning the underlying interests of all stakeholders.	11. Ratifying, memorializing, and preparing for implementation.
4. Designing the forum, establishing protocols, and forging working agreement on the issues to be considered.	8. Discovering, clarifying, or creating the greatest joint gains possible.	12. Developing implementation plans and ways to insure compliance with plans or agreements.

The two cases described in Chapter IX -- Field to Market and the Proposed Pebble Mine – are both additional examples of embedded JFF processes.

The second way JFF procedures are organized are as "stand alone" efforts. This pathway does not specifically aspire to reach a policy conclusion though the results may turn out to be influential towards such an end. Here, the process focuses strictly on reducing factual disagreements through jointly conceived research, data, and information gathering. The public alleged cancer cluster problem and the nuclear dialogue described in this paper are both examples of

stand alone JFF processes. Schematically, stand alone processes are often organized as follows: [8]



[8] Courtesy of the Consensus Building Institute.

Judgments as to which pathway is appropriate must be made in the context of the controversy that is being addressed. The success of either process is often dependent on the use of a trusted convener and facilitator to help organize a JFF process and to serve as its secretariat. Time is also not an intrinsic factor. It is situational. The public health problem took two years to complete. The watershed case took two days.

VIII. The Three Controversies Revisited – What Happened

1. A Public Health Problem – The Northern Oxford County Coalition

Northern Oxford County lies in the Northeastern United States in the state of Maine. The county is home to 15,000 people, 35% of whom are either directly or indirectly employed by a large paper mill. The paper mill went into operation in 1897 and had had a relatively positive history in the town that it supports. In 1994, fueled by a news program that labeled the area "Cancer Valley" and an application by the mill for a license to increase emissions, a dramatic conflict began to unfold. The Maine Department of Environmental Quality (DEQ) held a public hearing and 125 citizens came forward proclaiming that the mill and the DEQ were not doing enough to protect the public health of the valley. Supporters of the mills argued that measures had already been taken and that it wasn't clear that the manufacturing base of the community was at fault. Complicating matters was the fact that no scientific evidence existed that substantiated either side's claims.

The mill was in compliance with all state and federal air quality standards and had recently invested 50 million dollars to cut the level of pollutants coming from the smoke stacks. Since the situation did not call for regulatory actions, the DEQ decided to organize a joint fact-finding and consensus building process to try and conduct more civil discussions. The Northern Oxford County Coalition (NOCC) was born and the Environmental Protection Agency (EPA) gave the fledgling group $80,000 to fund studies and support their work.

The initial meetings were typified by participant's frustrations and anger as people could not agree on what the vision and focus of the group ought to be. Some could not believe that townspeople would turn their backs on a mill that had been the lifeblood of the community. They recalled that the air quality used to be much worse years ago and that clothes lines of laundry were commonly black with soot. Others spoke about the decreasing quality of their lives as well as friends and neighbors who had died of cancer and other health problems. These divisive issues were tearing apart a town where everyone knew each other and what side they were on.

The JFF Process

The initial meetings proved so unproductive and caustic that the DEQ hired an outside professional facilitation company. The Consensus Building Institute (CBI) began the process by identifying stakeholder groups and holding interviews with them to determine their interests. These groups were state and federal agencies, organized labor, environmental advocates, health professionals, small and large local businesses and concerned citizens. CBI laid out an initial set of ground rules intended to bring civility to the process. The rules allowed only one person at a time to speak and did not allow interruptions and personal attacks. Each representative was to speak for their stakeholder group as a whole

and proposed agreements needed to address the concerns of all stakeholder groups. When agreements were made they would be kept tentative until multiple issues were resolved. This allowed for value-trading between issues. The NOCC quickly adopted the ground rules without deliberation to move on toward "real issues."

The ground rules proved to be very important, yet after another year of meetings some members felt that they were not being enforced and that many were not participating due to a few vocal grandstanding members that were accusatory and offensive. The ground rules were revisited and a timeout rule was installed that shifted the responsibility to intervene from the facilitators to the participants.

This marked a dramatic shift in tone and participation as all participants gained the power to call a rule infraction. The group also decided to create a "disagreements list" that shelved issues that could not be resolved to a later time. This allowed the group to avoid getting bogged down in the sub-issues that arose. The revised rules were followed and enforced from within and were no longer imposed on the participants by outsiders.

Key Questions for JFF

The ground rules established a framework for communication, but the group still needed a defined purpose and mission. Viewpoints varied on what the goal should be and how to define the problem. Everyone did agree however that there was interest in seeing the valley's quality of life and health improved, regardless of why people felt it was diminished. The Coalition decided on the mission "to improve the quality of life in the valley by protecting and promoting public health and enhancing air quality."

As a first task the group decided to form a technical subcommittee to determine whether cancer rates were abnormally high in the county, and if they were, determine why. They ran into several stumbling blocks and challenges along the way. Nobody in the group had ever conducted a study or had a background in scientific method. The group decided to hire an epidemiologist, only to discover major undisclosed conflicts-of-interest just as the study progressed. The question itself was highly charged. The participants all had very specific biases and this made interpreting data very difficult. However, the group was fully committed to discovering the root causes behind deteriorating public health which helped them push through these difficult circumstances.

Successes, Challenges and Lessons Learned

After 8 months of fact-finding and comparing local, state and national cancer rates, the subcommittee could not agree on what constituted "concern" and how it should present the data. The numbers showed that cancer rates for men and woman within the county were elevated when compared to the rest of the state and the rest of the country. When a benchmark could not be agreed upon, the sub-committee had the study peer reviewed by three epidemiologists. All three came back with results that mirrored the group's own inconsistent views. Apparently the issue of how high rates needed to be to warrant "concern" was of national uncertainty within the scientific community.

The group now had an appreciation and better understanding of the issues that surrounded the study and the county's dilemma. They decided to include the range of differing viewpoints in the study and describe the complexities of the problem. In doing so, they were able to agree on action steps and present them to the rest of the Coalition including follow-up studies, public education programs

that encouraged healthier life-styles and cancer screening and detection programs. In the end, although full consensus was desired, only 9 out of the 10 agreed on the final language that was included in the report. The dissenting member attached a letter explaining his objections. After the cancer rates study was complete the Coalition formed other joint fact-finding sub-committees to examine and better understand air quality issues and radon in homes.

The final product of the Northern Oxford County Coalition was a 12-page newsletter that included all aspects of the groups work. It went out to 7,000 households. Although conclusive evidence was never found, the mill stopped using bleaching agents whose airborne by-products, some claimed, were causing negative health impacts. The remaining NOCC money was funneled into a new organization called the River Valley Healthy Communities Coalition which continues to raise public health and well-being within Oxford County.

Some of the key joint fact-finding lessons learned were:

- Involve the participants in the crafting of ground rules elicits buy-in.
- Spend time in the beginning selecting the right expert.
- A flexible game plan and schedule can help participants manage evolving and uncertain goals and stay within bracketed resources and time.
- It is often advantageous to have a combination of partisan and neutral participants involved in joint fact-finding.
- Having a neutral third party draft the initial text saves time over arguing the specific language of each sentence. If language is being contested, include the full range of viewpoints in the report.

2. An Environmental Problem - The California-Federal Agencies Bay Delta Program

The Sacramento San Joaquin Delta is the largest estuary on the western U.S. seaboard and the single largest source of water for California. It is the hub of a water infrastructure that distributes water to 23 million Californians as well as water for agriculture and the Central Valley high tech industry. The area is home to 500,000 people and 750 plant and animal species.

Because of its importance it has become a politically-charged battleground for environmental, agricultural and urban stakeholders that generate many problems but few agreed-upon solutions.

Due to urban, industrial and agricultural development in the area, the Sacramento San Joaquin Delta began to succumb to a series of water quality and quantity problems. Certain areas of the delta were falling below federal water quality standards due to low dissolved oxygen concentrations. Pesticides from orchards were impairing surface waters and harming aquatic species. Salinity and sediment levels were high enough during the summer months that farmers couldn't use the water to irrigate their lands. Moreover, evaporation from water transportation through open canals and reservoirs was causing supply and temperature problems. Finally, the basic hydrologic conditions had been altered so that fish, wildlife and plant habitats needed to be restored to healthy levels.

In early 1998, in response to these problems and stalemates, the state of California teamed up with federal agencies to form the CALFED Bay-Delta Program (CALFED). Their goal was, and still is, to improve water quality, increase water supply and the efficiency and flexibility of water suppliers, rehabilitate the levees and infrastructure, and restore the eco-system of the estuary.

The largest water users in the state of California are farmers and ranchers. As part of this process, CALFED aimed to reduce agricultural water use and increase efficiency, especially during periods of drought. In 1998, CALFED released the Agricultural Water Use Efficiency Program, a report outlining best management practices and specific conservation goals for the agricultural community. There was a great deal of disagreement and uncertainty surrounding how much water the agricultural community used, how much they could conserve and which mechanisms would be the most successful. This issue cut to the core of the agricultural community's survival. Water is the lifeblood of their industry and attempts to limit its use was vehemently opposed.

JFF Process and Products

In 1998, CALFED hired an independent facilitator to convene an Independent Review Panel on Agricultural Water Conservation Potential. The panel was tasked with reviewing, critiquing and providing recommendations to strengthen the technical assumptions and approach of the Agricultural Water Use Efficiency Program. The panel was also tasked with providing guidance on strategies for identifying Bay-Delta problems, structuring solutions, and quantifying potential benefits. Finally, the panel was asked to identify gaps in the data and research.

The independent panel was comprised of five nationally recognized scientists with expertise in agricultural conservation, irrigation science, plant physiology and agricultural economics. They were chosen due to their technical capability, neutrality, and their ability to work collaboratively. The panel was aided by a group of Stakeholder Technical Representatives who had expertise within the Bay-Delta system and who were called upon to provide clarification and information on specific issues and allowed to ask questions of the panelists at specified times during the process. This group was comprised of nine people,

three each from the agricultural and environmental communities and three from CALFED.

CALFED staff began the process by inviting the panelists, stakeholder groups and interested members of the public to a one-day scoping session to convey their rationale for assembling the panel and allow the participants the opportunity to provide input on the structure and focus of the panel. The panelists were also given an opportunity to provide guidance on the structure as well as identify information that they needed to ensure a productive dialogue. The agenda was to be structured around six questions that got to the core of the divisive Agricultural Water Use Efficiency Program.

Key Questions

Question 1 - Review the Agricultural Water Use Efficiency Program: Is the chosen methodology appropriate given the overall goal of the CALFED Agricultural Water Use Efficiency Program? Are the assumptions contained in the methodology appropriate? What additions and/or corrections are required to make the real water conservation estimates contained in the Agricultural Section appropriate and defensible for a programmatic-level analysis?

Question 2 - Identify Problems: CALFED staff is to provide the Panel with overviews of representative situations in the Bay-Delta problem area. Identify the Bay-Delta problems evident in these situations, with particular emphasis on timing, location and water quality. Which of these problems can be addressed through changes in agricultural water management? Choose three representative situations and analyze them in greater detail?

Question 3: Develop Objectives and Possible Solutions: Focusing specifically on

the three representative situations chosen for greater analysis, what are the possible solutions, with an emphasis on flow path?

Question 4 - Choose Preferred Solution & Quantify Benefits: For each of the objectives, choose a preferred solution. What is the preferred approach for quantifying the potential benefits? What are the measurable indicators of success (benefits) in accomplishing the objectives?

Question 5: Research & Data Needs: What additional data collection and research are required to adequately answer the above questions? What experiments would be useful to verify the hypothesis of cause and effect?

Question 6 - Assurances: What does CALFED have to do to ensure that the expected benefits are realized, and that they are in support of the CALFED solution?

Two months after the scoping session the panel was set for a brief but concentrated two and a half day joint fact finding process. The panel participated in the facilitated scientific review sessions and followed the structure of the questions as the agenda. They studied the eight representative situations that could be addressed through improved agricultural water conservation that were given to them by CALFED staff and chose three for deeper examination.

Successes, Challenges and Lessons Learned

On the evening of the second day the panelists met with the facilitators and synthesized their results. The key cross cutting themes and conclusions that they determined were to:

- Select and prioritize objectives. Given CALFED's varied aims, panelists stressed the importance of piecing together strategies that identify and satisfy the explicitly stated top priorities and optimize competing objectives, benefits and impacts.
- Focus on flow paths. The Panel emphasized the importance of using flow paths to understand Bay-Delta problems and devise solutions to meet CALFED objectives.
- Develop conceptual models to understand ecosystem demands and limitations.
- Choose cost-effective solutions for each individual situation and region.
- Build on earlier work. In its brief deliberations, the Panel identified numerous sources of beneficial research already undertaken or ongoing.
- Develop additional baseline data so the results of future efforts can be tracked, measured and assessed.

The morning of the third day the group delivered the results to the Stakeholder Technical Representatives and public. The facilitators published a detailed report of the group's findings a month later.

This effort led to a better understanding of the strengths and weaknesses of the Agricultural Water Use Efficiency Program and the framework on which to evaluate conservation measures. The panel agreed that the original estimate for potential agricultural conservation savings was reasonable but suggested a more robust and defensible methodology.

3. An Energy Problem – Keystone's Nuclear Power Joint Fact-Finding

Nuclear technology is reemerging as a power generation option in the face of concerns about climate change, energy demand growth, and the relative cost of competing technologies. Nuclear power has long been controversial; consequently, the debate about its reemergence requires a fresh assessment of the facts about the technology, its economics and regulatory oversight, and the risks and benefits of its expansion.

In 2006-2007, The Keystone Center assembled a group of 27 individuals with extensive experience and unique perspectives to develop a joint understanding of the "facts" and for an objective interpretation of the most credible information in areas where uncertainty persists. Participants represented diverse backgrounds and points of view—environmental and consumer advocates, the utility and nuclear power industry, non-governmental organizations, state regulators and former federal regulators, public policy analysts, and academics.

Key Questions for JFF

Participants in the Keystone Center's Nuclear Power Joint Fact-Finding dialogue consulted with a number of respected experts and conducted original analyses to answer questions they believed to be most important to an informed debate:

- Can we develop a reasonable range of expected costs to compare with other alternatives?
- How quickly can nuclear power be expanded to contribute to reducing worldwide greenhouse gas (GHG) emissions?
- What is the best way to manage nuclear waste?
- Can existing commercial nuclear facilities, as well as the next generation of nuclear reactors, be expected to operate safely and with adequate security safeguards in place?

- Should additional institutions or safeguards be put in place to prevent the proliferation of nuclear weapons derived from commercial fuel cycle activities?

JFF Process and Products

The Nuclear Power Joint Fact-Finding dialogue is a good example of a "stand-alone" JFF procedure. It was conducted in two phases. Phase I involved identifying and convening a steering group of 10 knowledgeable and thoughtful participants to develop a potential list of questions to be addressed in the JFF, to identify a list of potential experts, and to identify a list of potential other people to be interviewed for a broader cross-section of viewpoints. The steering committee made final decisions on plenary members and experts, based in part on the assessment report of the interviews.

In Phase II, Keystone held four plenary meetings with 27 participants and facilitated six workgroups. Through this process, the participants:

- Identified jointly-trusted resources and experts.
- Listened to presentations on nuclear technologies and operating characteristics.
- Formed workgroups to further investigate various topics, identify gaps in research, and identify areas of agreement on specific questions.
- Presented workgroup findings and began identification of areas of agreement and disagreement.
- Developed a final report based on jointly held findings and disseminated resulted (the report is available at www.keystone.org).

Throughout discussions, participants adhered to the following protocols:

- Discussions were "off the record" insofar as no one represented the participants' collective views or positions without the agreement of the group itself.
- Each person was expected to speak individually rather than on behalf of their organization, company, or agency, unless they explicitly indicated otherwise.
- All plenary members were encouraged in discussions to "explore without committing."
- Media was not invited; participants were permitted to talk in public about their interest in nuclear power and confirm that the dialogue is underway, but referred press to Keystone to talk about process. No substantive discussion of the work under consideration was provided to the media until it was agreed to by the group at large.

As documented in detail in the final report, participants reached agreement on several issues pertaining to cost, safety and security, waste, and proliferation. The report also documents areas where participants were unable to reach agreement, including the question of the likely expansion of nuclear power.

Successes, Challenges and Lessons Learned

During their debrief session for the dialogue, Keystone Center facilitators highlighted several successes. First, it was an achievement within the arena of the nuclear power debate to get this particular group of stakeholders together and *keep* them together through the process. Second, the process achieved a noticeable shift in how the stakeholders perceived each other and understood each other's interests in the issues. Third, the process advanced knowledge in

specific substantive areas. In general, the process was perceived as a first step of several needed for a more effective dialogue on nuclear power.

Many other valuable challenges and lessons-learned also emerged during the process. Five in particular are significant.

1. Although care was taken to balance stakeholder participation with regards to the positions represented on the issue, facilitators found that the level of participant expertise might have been better balanced with regards to the topic. While certain individuals had strong expertise in some areas, they lacked expertise in others, and while some participants were "expert" in topics such as government relations and lobbying, they were not technologically knowledgeable. The underlying question is: How "expert" should participants in a JFF process be? If the source of expertise in a JFF process is the actual participants (as opposed to outside experts), then there must be a balance with regard to the type of expertise that is represented within the participant group.

2. Outside expertise may be dismissed by participants who rely on their own expertise. In addition, rather than be neutral, outside experts may have strong positions on a subject, which may prompt participants to question their biases. Are outside experts always necessary for a JFF process? If outside experts are brought into the process, should they represent the middle-ground?

3. The agreed upon mission for this particular joint fact-finding process was to reach mutual agreement on substantive facts. As the process progressed, tension arose between those participants who suggested that the group make policy recommendations and those who wanted to

confine the work to fact-finding. In this case, changing the mission of the process would have alienated those participants who were decidedly against making policy recommendations. However, it is possible that facilitators of a JFF process might be flexible in allowing a shift from fact-finding to the generation of policy recommendations if it is clear that *all* participants are collectively willing to make that shift. To what extent is it necessary to remain within the "textbook" guidelines of a JFF if circumstances change during the process?

4. It was a challenge in this process to maintain the participants' time investment necessary for such a complex and involved project. A primary result of a lack of investment on the part of several participants was that the workgroup drafts became biased in favor of the perspectives of those who put the time into writing them. Given the complexity of the JFF process and the necessary dedication it requires, expectations of participants' role and time investment must be clearly articulated, and perhaps formally agreed to, at the outset of the project. Participants in a JFF should also be asked to formally appoint a dedicated and knowledgeable alternate who will participate at the workgroup-level and at meetings when the primary participant is not available to do so.

5. By its nature (i.e. the focus on fact-finding), the JFF process is inherently more complex and requires a greater attention to detail than a policy dialogue, which is more focused on ideas. As such, facilitators are challenged to achieve a working knowledge of the substantive details so that participants feel their knowledge is being handled with competence and that they are heard and understood throughout the process.

The issues raised above pose important questions for joint fact-finding processes in general and also emphasize the importance of good process in achieving good substantive results.

IX. Other Case Studies – Sustainable Agriculture and the Proposed Pebble Mine

1. Field to Market - The Keystone Alliance for Sustainable Agriculture.

This project, which continues, brings together a diverse group of grower organizations, agribusinesses, food and retail companies, conservation organizations, universities, and agencies to define and measure sustainability for commodity agriculture in the United States (e.g., corn, cotton, soybeans, wheat, and rice). The initiative currently involves more than 45 member organizations and is organized and facilitated by The Keystone Center. The Alliance began in 2006 in recognition of the need to address sustainability in a commodity agriculture context and in a way that helps define the collective goals of meeting production needs while reducing environmental and social footprints. The Alliance defines sustainable agriculture as production that:

- Increases productivity to meet the food and fiber needs of current generations and improves the ability of future generations to meet their needs.
- Reduces pressure on habitat and other land use demands by increasing productivity of affordable, accessible, quality crops on available acres.
- Increases the resource use efficiency of energy, water, fertilizer, soil and other agricultural inputs.

- Enhances water quality and other natural resources through thoughtful stewardship.
- Contributes to the economic vitality of agricultural communities.
- Protects the health and safety of our workers and consumers.

Key Questions for Joint Fact Finding

Field to Market seeks to provide methods and tools for measuring sustainability that are transparent, grounded in science, focused on outcomes, open to the full range of technology choices, and create opportunities for continuous improvement across the agricultural supply chain. To create these methodologies and tools, Field to Market members are engaged in joint-fact finding processes to identify key indicators of agricultural sustainability and appropriate scientific approaches for measuring them over time.

Key questions throughout Field to Market's joint fact-finding efforts include:

- What are the key environmental, economic, and social indicators of sustainability for commodity agriculture? What are the outcomes that we are trying to achieve?
- What are the trends over time with respect to these indicators? Are we getting better or worse?
- How can we credibly and quantifiably relate sustainability outcomes of interest back to the management decisions of individual growers?
- How can this information be used to promote continuous improvement at the farm level as well as at a broad scale?

To approach these overarching questions, Field to Market members have specifically tackled certain questions of data and analysis:

- How can we measure these key indicators or outcomes at various scales in a manner that is transparent, grounded in best available science, and focused on outcomes rather than practices?
- What data is publicly available to analyze trends in these outcomes at the national level, regional, farm, and field levels?
- What methodologies are appropriate for analyzing these data, given best available science?

The Joint Fact Finding Process and Products

To answer the questions above, Field to Market has engaged scientific expertise from within member organizations as well as from outside entities and has established numerous expert and stakeholder working groups to vet available data and methodologies.

As a first task, Field to Market identified key sustainability outcomes through a review of other efforts in indicator development and through a discussion of stakeholder interests and concerns. The Alliance identified three broad categories of indicators – environmental, social, and economic – as well as indicators within each category.

Next, the group attempted to answer the question, "What are the trends over time with respect to these key indicators?" Field to Market invited several organizations to offer approaches, and ultimately chose IHS/Global Insight to lead the group in its metrics development process. Focusing on a subset of environmental indicators for which data was more readily available, the group identified appropriate datasets (public data available through US Department of Agriculture surveys), an appropriate scope of analyses (within the "farmgate"), analytical approaches (developed in consultation with existing literature and

experts in the field), and standard mechanisms for reporting results (Field to Market chose to present results in terms of the inputs needed to produce a unit of output – e.g., the amount of energy required to produce a bushel of corn – as well as in terms of inputs per acre and total annual resource use across the industry).

A draft report was reviewed internally by all member organizations, was reviewed more closely by a team at the University of Arkansas (a participating organization), and was then reviewed by 17 external peer reviewers in academia, industry, and federal agencies. In 2009, Field to Market released its first Environmental Indicators Report for U.S. commodity agriculture, which evaluated national-scale metrics from 1987 to 2007 for land use, water use, energy use, soil loss, and climate impact, generating initial benchmarks for corn, soybean, cotton and wheat production.

Based on the report indicators, the Alliance also developed the "Fieldprint" Calculator, a free, confidential assessment tool available online to help farmers analyze their own natural resource management decisions and compare their operation to national and state averages. This tool helps translate indicators to the field level.

Field to Market is currently working on updates to the methodologies in the Environmental Indicators Report and the Fieldprint Calculator, developing methodologies for new indicators that analyze water quality, biodiversity and socio-economic impacts, and is developing methodologies for additional commodity crops. These efforts continue in a manner similar to that described for the first report: multiple working groups are engaged in analysis of existing data and potential methodologies; each of these working groups has consulted with external experts and entities for feedback on appropriate approaches.

Successes, Challenges and Lessons Learned

Throughout its work, Field to Market has noted several successes, challenges, and lessons learned that may apply more broadly to joint fact-finding processes:

Field to Market has found success in establishing work groups that leverage the various expertise and strengths of individual member organizations as well as staff within those organizations. For example, the "Key Measures" work group is comprised of technical experts from each organization, and in particular those that focus on relevant issues of sustainability measurements and life cycle analysis. In addition, the work group has created, as needed, subgroups with specific expertise in topical areas such as water quality, biodiversity, and socioeconomics.

By creating opportunities for member organizations to send appropriate staff to work group meetings, as well as a mechanism for reporting back to the general Steering Committee on the results and recommendations from these groups, the effort has facilitated information sharing and consensus-building among hundreds of expert participants. While there have been some challenges associated with this relatively open approach to participation (e.g., logistical and consensus-building challenges associated with continually integrating new members into existing work groups as well as the limitations of voluntary participation in work group efforts), the benefit of enhanced expertise and collaboration has ultimately resulted in more robust agreements and products.

Field to Market has also benefitted from consultation with numerous outside experts. The group has pursued outside input and assistance through several mechanisms, including contracts with several data analysis and technical service

providers, peer review processes involving experts from a variety of sectors, presentations of invited guests at meetings and teleconferences, and consultation via teleconference with small groups of outside experts. The group has also coordinated with similar efforts in life cycle assessment to share lessons learned and to stay current on continually evolving methodologies.

These approaches have presented challenges including the management of contracts and contractors, the need to identify contractors who can understand the principles of the group and work with its consensus-based approach, and the recognition and consideration of the biases of outside experts. However, there has also been significant benefit in having dedicated resources for the development of proofs of concept and draft approaches as well as external, unpaid input on the validity of these products.

While the group had considerable early success in narrowing the scope of the issues and indicators it wanted to address, attempts to further define some of the selected sustainability indicators have raised questions about what outcomes are meaningful, measurable, and within an individual farmer's ability to control. Discussions of biodiversity and socioeconomic indicators, for example, have raised important technical and value questions. The group also had numerous conversations regarding the appropriate scale of measurement for these indicators; while some lend themselves to aggregation and averaging, the linkage between farm-scale practices and outcomes and broad-scale outcomes has proven difficult to describe in some instances.

For example, the drivers of broad scale water quality include, but are not limited to, agriculture, and due to ecological interactions, the agricultural component of these impacts cannot be quantified or described in linear fashion. These challenges have emphasized the importance of clearly defining the scope of the

joint fact-finding process at its onset while also recognizing the difficulty in fully anticipating, *a priori*, the complexities that will be encountered within that defined scope.

Data availability and best available science have also presented limitations for the group in terms of what is currently measurable and with what degree of certainty. Thus, a potential result of a joint fact-finding exercise may be agreement on recommendations regarding current limitations and knowledge gaps.

Field to Market is an example of a dialogue that includes but is not limited to joint-fact finding. It is an "embedded" procedure, nested in a long and larger dialogue. The group has undertaken consensus-building around methodology and approaches to measurement of sustainability outcomes under the assumption that better measurement can lead to better management. While measurement approaches have been a significant focus of Field to Market's early efforts, many members emphasize the need to test the application of these tools for the promotion of sustainability actions. Although the goal of a "pure" joint fact-finding process is to reach agreement on substantive facts and technical questions, the Field to Market effort seeks to link these agreements to broader management and policy issues. Testing whether better science and measurement can indeed lead to better decision-making and better outcomes is a next step for the group that poses its own challenges and uncertainties.

A variety of related efforts on agricultural sustainability and measurement have evolved during the lifespan of Field to Market, and the group has made an effort to stay aware of and, in some cases, communicate and coordinate with these efforts. It can be a challenge to stay coordinated, to stay current, and to remain true to the objective of outcomes-based, science-driven metrics development in

the context of a rapidly evolving global dialogue driven by a variety of interests, timelines, and markets.

Field to Market plans to share its methodologies broadly in the hope that others working on frameworks for sustainability in agriculture can learn from the collaborative processes undertaken with a focus on science and outcomes, the methods that have been developed, and the lessons that have been learned with respect to the measurement of outcomes and the challenges of data availability, scientific uncertainty, scale, and definitions.

As various approaches to sustainability standards, life cycle analyses, environmental and ecosystem markets, and farmer planning and conservation programs continue to proliferate worldwide, Field to Market hopes to inform these efforts while continuing its own work in refining its approaches and testing their applicability to supply chain systems. Joint fact finding will be an ongoing and iterative component of these efforts.

2. The Proposed Pebble Mine

The Pebble Limited Partnership (PLP), a partnership between mining companies Northern Dynasty (Canada) and Anglo American (UK), is exploring the feasibility of developing a high volume, long-life copper and gold mine in southwestern Alaska. According to PLP, the project has the potential to "make a significant contribution to broad-based socio-economic development in Southwest Alaska." Yet the Pebble mine may pose significant risks to the region's environment, economy, and culture. The mineral deposit, the largest known deposit of its kind in the world, is located in the Bristol Bay watershed, home to the world's largest and last remaining sustainable commercial salmon fishery.

PLP has committed to exploring the potential development of the Pebble deposit in a "participative manner that enables all Alaskans and other relevant stakeholders to contribute to the debates around the project." To that end, PLP envisioned a structured stakeholder dialogue process that includes:

- Independent facilitation under the guidance of a multi-stakeholder steering group in which no one party can exercise veto control.
- Participation that is open to all interested and affected stakeholders.
- Participation from a broad range of perspectives.
- Joint Fact Finding/jointly supervised research according to agendas agreed by the dialogue participants as well as impartial experts.

In November 2007, The Keystone Center was approached by PLP to assess its interest in conducting an independent stakeholder assessment and dialogue feasibility study and, if appropriate, design a stakeholder dialogue to explore issues raised in the assessment.

The Keystone Center's assessment identified a broad range of issues related to the proposed Pebble Project including how people view the issues; what environmental, social and economic questions are of interest to people; and whether there may be an opportunity for stakeholders to engage in a dialogue with PLP, scientists, and with each other to explore those issues.

The prospect of a mine of the scale being considered is extremely controversial in Alaska and the Bristol Bay region. A significant majority of people and communities affiliated with the salmon fishery are strongly opposed to a mine. However, many people recognize that the Bristol Bay region as a whole is not benefiting from the fishery and acknowledge few other economic development

opportunities for people there. They also anticipate significant economic development opportunities for communities outside the Bristol Bay region and throughout the State.

Through interviews and additional research, the Keystone assessment team identified an array of issues associated with potential mine development including the following principal concerns:

Environmental Issues

- Downstream impacts – water quality and specific impacts to the salmon fishery throughout the mine's life cycle
- Mine footprint impacts – the scale and location of the mine footprint, particularly the tailings pond and associated dam
- Impacts from supporting infrastructure and new development, including; a 100-mile access road; seaport development and activity; increased activity at other ports; an energy source to support the mine; and new/increased development
- Air quality and noise impacts from mine operations

Economic and Social Issues

Potential Negative Impacts:

- Damage to Bristol Bay salmon fishery and associated economy and livelihoods
- Decline in tourism and recreation
- Loss of subsistence living and culture
- Boom and bust economy
- Higher costs for goods and services and increased dependency on a cash economy
- Increased public health problems and exposure to drugs and alcohol

Potential Positive Impacts:

- Better jobs requiring higher skill levels, funds for schools, better health care, and opportunities for leisure
- Benefits to locals from supporting services and infrastructure
- Incentives for individuals to remain in the region through economic opportunity and stability
- Cultural retention and resurgence as more Alaska Natives remain in or return to their communities

A broad consensus of stakeholders supported the idea of a dialogue of some sort to discuss the issues raised. Opponents, however, were generally skeptical of The Keystone Center's independence and objectivity in carrying out the dialogue since it was being funded by PLP. Among opponents, however, few were opposed to a dialogue and looked instead for assurances that it was fully independent, transparent, and objective.

Key Questions

As a result of the assessment, The Keystone Center determined that its proper role should be "to help stakeholders make better informed decisions about the choices before them." Those decisions exist within a regulatory context that is driven by the 2005 Bristol Bay Area Plan for State Lands, which allows mineral exploration and development on designated land *if* resource developers can demonstrate that environmental, social/cultural and economic values can be adequately protected. The 2005 plan, and its precursor, set in motion a regulatory process administered by state and federal agencies charged with permitting resource development projects. Components of the process include extensive

baseline environmental and socioeconomic studies, a mining proposal, and environmental impact and risk assessments.

Within this context, stakeholders expressed strong interest in a) evaluating the content, credibility, and sufficiency of the PLP's baseline studies; b) reviewing a mining proposal, its various components and impacts; and c) comparing the potential risks, benefits and tradeoffs of two essential choices – the no-mine alternative and the mining proposal.

Because the baseline environmental and socioeconomic studies had not been released, it was difficult to determine whether stakeholders would find the studies credible and sufficient, whether there would be a need for additional studies, and whether stakeholders would find the additional studies credible and sufficient. It was therefore necessary to anticipate a process for accommodating additional baseline studies if they were necessary and if stakeholders lacked trust in PLP to conduct the studies independently. The JFF process was recommended as a way forward given this uncertainty.

Keystone Dialogue and the Role of Joint Fact-finding

To accommodate stakeholder concerns, Keystone envisioned an integrated four-stage dialogue process involving a science advisory committee, independent science panels, a joint fact-finding process, and a project planning advisory. Three stages (a-c) are discussed below due to their direct relevance to joint fact-finding.

Stage 1 – Science Advisory Committee

The Keystone Center began the dialogue process by identifying and convening a Science Advisory Committee (SAC) to help organize and plan a series of independent science panels designed to a) explore the principles, practices, criteria and standards by which "responsible" mining plans and operations can be evaluated; b) evaluate PLP's baseline environmental and socioeconomic studies; and c) guide stakeholders through a discussion comparing the risks, benefits and tradeoffs of the choices they may face.

Five SAC members were selected to represent the key physical, biological, and socioeconomic components of the review process. SAC members are affiliated with academic institutions, independent government agencies, and science-based non-governmental organizations in Alaska and the U.S.

Stage 2 – Independent Science Panels

Keystone and the SAC are, at this writing, developing the independent science panels (ISPs) described above. An initial panel – Responsible Large-scale Mining: Global Perspectives – was held on December 3, 2011. Keystone and the SAC are planning a total of six topic-specific ISPs. Each panel will convene a two-three-day public event focused on a specific topic:

- Responsible Large-Scale Mining: Global Perspectives (12/3/2011)
- Geology and Geochemistry Baseline Studies
- Hydrology and Water Quality Baseline Studies
- Fish, Wildlife and Habitat Baseline Studies
- Social, Cultural, and Economic Baseline Studies
- Evaluating Choices – Comparing Mining and No-Mine Options

ISPs that are focused on evaluating PLP's baseline studies (bullets 2-5) will consider the content, credibility and sufficiency of the studies for the purpose of a) characterizing existing conditions, b) informing PLP's planning, risk assessment and decision-making processes, and c) establishing a baseline for monitoring. In so doing, the ISPs are also in a position to identify gaps and discrepancies in the studies and recommend additional research. This step sets the stage for a joint fact-finding process.

Stage 3 – Joint Fact Finding

The purpose of the joint fact-finding process (JFF) is to ensure that gaps or discrepancies in the baseline studies are addressed in ways that ensure the information is credible and sufficient in the eyes of stakeholders. Therefore, the ISPs may serve as the launching pad for additional studies. The Keystone dialogue envisions four possible scenarios for carrying out additional studies. Option #1 assumes that stakeholders fully trust Pebble's scientists to complete the study.

1. Pebble scientists carry out additional work independently.
2. Pebble scientists carry out additional work with stakeholder oversight.
3. Pebble and non-Pebble scientists collaborate on data collection and analysis.
4. Pebble and non-Pebble scientists co-identify independent scientists that all find credible.

The choice among these options, or variations on them, will depend on how stakeholders perceive Pebble's baseline studies as they are presented and reviewed in the ISPs. If baseline studies are generally perceived by stakeholders as being credible, panelists will likely recommend that Pebble scientists complete

additional studies, if warranted, with minimal stakeholder involvement and oversight. If, however, baseline studies are not perceived to be credible, added involvement and oversight in designing and carrying out new studies will likely be recommended.

Because of the controversy over the proposed Pebble mine, JFF procedures had to consider ways in which the process itself might be used as a delaying tactic. While it was not the intention to allow proponents of the mine to use the dialogue to pave the way for the mine, it was also not the intention to allow opponents to use the dialogue to block or delay the mine. To better ensure that the JFF process was not hijacked by either opponents or proponents, the following partial Terms of Reference were established:

Further study may be recommended by the ISP if, in its view:

1. The data and analysis presented by Pebble does not adequately satisfy the intended purposes of the environmental and socioeconomic baseline studies pursuant to *requirements of the National Environmental Policy Act (NEPA)*.
2. The data and analysis presented by Pebble does not provide sufficient information to answer relevant stakeholder questions about high priority/critical issues associated with existing environmental and socioeconomic conditions in the project area and that are *not requirements of NEPA*, but that PLP may consider undertaking to further characterize baseline conditions.
3. Relevant scientific questions, *not covered in #1 or #2*, are raised that may contribute to the overall knowledge of the subject area, but are not directly relevant to the baseline studies.

Additional studies recommended by the ISP must also:

1. Focus on better characterizing baseline environmental and socioeconomic conditions in the project area, rather than on assessing project design or potential impacts associated with a specific project scenario or hypothesis;
2. Focus on the Pebble Project site and area of potential influence, including areas potentially affected by project infrastructure, rather than on issues or conditions removed from the project's area of influence and;
3. Respect existing regulatory standards and procedures in Alaska and the US, and not attempt to challenge or undermine these requirements.

Additional terms of reference guide the protocol for how valid scientific questions are selected, prioritized and reported by the ISPs. The JFF process does not require PLP to comply with the recommendations of the ISP for additional baseline studies. It does, however, reveal potential vulnerabilities in the studies and suggests opportunities for filling gaps and reconciling discrepancies that may exist.

In summary, the JFF process that is embedded in the Keystone dialogue is a work in progress. The dialogue is expected to be completed in the spring of 2012, although JFF studies may go well into the future. The Keystone dialogue raises important questions for future JFF processes that involve industry clients operating in extremely controversial or sensitive settings. In the case of the Keystone dialogue, the mining company is following principles, practices, standards and criteria by which so-called 'responsible" mining proposals and mining operations are being evaluated worldwide. JFF is consistent with principles of transparency, third-party assurance, information sharing, collaboration, etc. However, the controversial nature of the proposed mine, and the reality that JFF studies would likely be funded by the mining company, poses challenges for the process.

X. Conclusion - Fears, Challenges and Opportunities

Joint Fact-Finding is a process for conducting scientific studies or reconciling existing studies in ways that better ensure the credibility and accuracy of the studies in the eyes of all stakeholders. JFF is recommended when parties can reasonably anticipate that their science will be challenged by stakeholders who may be opposed to or skeptical of the use of the science in controversial decision-making processes. JFF is an antidote to advocacy science – the selective use of science to support or oppose a controversial position or action.

Advocacy science ultimately leads to hard-fought debates that play out in legal and regulatory forums where expert witnesses testify to the "soundness" of their science and the obvious weaknesses in the opposition's science and/or their scientists. Most often, neither side trusts the other side to do credible and objective scientific inquiry. The result is usually deep skepticism about the accuracy of the science and whether data, analysis, and interpretation have been distorted to arrive at a pre-determined outcome. The unbiased public is left to conclude that "science" doesn't provide an answer.

The tendency towards advocacy science is the result of what psychologists refer to as *confirmation bias* – the search for or interpretation of information in a way that confirms one's preconceptions or beliefs. Confirmation bias is a cognitive process wherein people actively seek out and assign more weight to evidence that confirms their hypothesis, and ignore or discount evidence that could disconfirm the hypothesis.

JFF is a process wherein the parties work with scientists to jointly identify research questions, design and carry out scientific inquiry, and analyze and interpret data. How this occurs and the extent to which it occurs depends on the

level of trust between the parties. High trust means that stakeholders are generally comfortable with unilateral scientific inquiry and do not require participation in JFF. Low trust means that stakeholders are generally uncomfortable with unilateral scientific inquiry and may want greater involvement.

Current case experience demonstrates that Joint Fact Finding is a promising flexible addition to the array of strategies available for consultation, participation and resolution of contentious public issues. Because it is a flexible process that brings scientists, decision-makers and citizens into more positive interaction, it improves communication and reduces factual disagreement. However, barriers continue to exist to its widespread adoption.

First, parties caught up in spirals of conflict at the community, regional or national level may often be in too adversarial a frame of mind to utilize the procedure. In fact, angry parties may not be interested in pursuing "joint facts" until they have reached a point of political or financial impasse. Until then, they may only be interested in arguing their own facts. In any given instance, the use of a trusted intermediary or facilitator can help test the willingness of parties to come to the table.

Second, few institutional champions exist for JFF. Government agencies on a case by case basis are sometimes willing to serve as conveners, sponsors and funders but just as often are reluctant to have others step into the role they may believe they are legally mandated to perform. In some instances, government agencies believe they are doing JFF through their use of advisory panels or commissions. More often than not, they aren't.

Third, there is a mistaken belief that entering a JFF process will require compromise, something that many scientists, decision-makers, and citizens find distasteful. As we have shown, JFF is a search for contextually relevant and case

specific "usable" knowledge. It is less a negotiation process and more a self-study inquiry.

Though it must be shaped and particularized to the circumstances of each individual situation, we continue to believe JFF holds great possibility for reducing unnecessary friction and paving the way to greater discipline and effectiveness in challenging conflicts over energy, public health, environment and natural resource issues.

Annex-1

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