Hazards and Institutional Trustworthiness: Facing a Deficit of Trust

Todd R. La Porte, University of California, Berkeley Daniel S. Metlay, U.S. Nuclear Waste Technical Review Board Staff

How should public organizations respond to the current "crisis of trust?" Outlining a conception of institutional trustworthiness, this article explores the conditions that increase the difficulty of achieving it, suggests a basis for designing organizational relationships that recover it, and broaches the problem of assuring institutional constancy as a critical requirement. Institutional constancy will be considered in greater depth in a forthcoming issue.

We live in a time when institutions of all kinds are instruments of great power and are often the objects of deep suspicion. Not surprisingly, scholars and political commentators have noted that the public increasingly distrusts many of those organizations. Indeed, for some of them, the crisis of trust is especially acute, coloring and constraining virtually all their actions and choices. How might they respond not only to maintain but also to enhance the level of trust they are accorded?

The Problem of Trust

In proposing answers to that question, we draw heavily from a study commissioned by former Secretary of Energy James D. Watkins (SEAB, 1993). Recognizing that the Department of Energy (DOE) was one of the institutions facing a serious deficit of trust, Watkins established a task force to explore how the DOE might take steps to increase public trust and confidence in the agency's programs for managing commercially generated radioactive waste as well as the huge volume of radioactive and toxic wastes associated with the manufacture of nuclear weapons. (See gray box on page 343 for a description of those programs.) Watkins' successor, Hazel R. O'Leary, has continued to place building trust among her highest priorities (DOE, 1994).

In many respects, Watkins and O'Leary had to address issues common to most organizations. For example, how can trust be sustained when strong ideological and policy differences about the organization's central direction, mission, and goals divide key stakeholder groups from each other as well as from the agency itself? In other respects, however, maintaining (and recovering) trust in its radioactive waste management activities presents special and unavoidable challenges for the DOE.1

1. There is increasing hostility to current or future operations

based on learning about past agency practices.2

2. Operations are beneficial but hazardous in their design, that is, the work is intrinsically dangerous.

3. Hazards are likely to extend well after benefits have been gained.

4. Overall success or failure of the operations may not be well understood for perhaps three or four work generations.

5. There is reasonably rapid change in the technical aspects of the work, either in the core technologies or in information about the environment where they are deployed.

Of course, organizations other than the DOE confront many, if not all, of these same challenges. This article should, therefore, be of particular interest to those who manage or must deal with such agencies or firms.

Much of the work on trust carried out so far focuses on the relations between individuals in general social settings, between employees and managers in corporate life, between parties in economic exchanges, or between citizens and broad institutions of governance.3 Surprisingly little attention has been paid to the relationship of trust between citizens and stakeholders, on the one hand, and administrative agencies or firms, on the other. A serious analytical shortfall exists in our understanding of the bases for institutional trustworthiness and about the conditions that would reduce serious deficits in public trust and confidence—a situation akin to betrayal in individual relations.

Because of this analytic shortfall, terms such as trust and confidence, which are understood intuitively, elude crisp and precise definition. Thus they can be used with wonderful rhetorical ambiguity.4 The following notions provide the initial conceptual touchstone for our discussion here (SEAB, 1993; see also La Porte, 1994, Keller and La Porte, 1994):

· Trust is the belief that those with whom you interact will take your interests into account, even in situations where you are not in a position to recognize, evaluate, and/or thwart a potentially negative course of action by "those trusted."

Confidence exists when the party trusted is able to empathize with (know of) your interests, is competent to act on that knowledge, and will go to considerable lengths to keep its word.

Trustworthiness is a combination of trust and confidence.

So when we say that an organization has lost public trust and confidence, we mean that many members of the public and stakeholder groups believe that the organization (and its contractors) neither intends to take their interests into account nor would it have the competence/capability to act effectively even if it tried to do so.

The Roots of Distrust

There are undoubtedly many factors that lead citizens to with-

Yet, if an agency/firm cannot consistently perform in a

manner that does counter these perceptions and beliefs, deep

distrust will likely develop and persist.

draw their trust in an organization. But we believe that once the following perceptions and beliefs take hold and become widespread, an erosion of the public's trust in administrative agencies and firms almost inevitably will follow (La Porte, 1994).

Benefits and cost.

There is a mismatch in the distribution of benefits and the costs (in financial and social terms to self and/or future generations) associated with realizing the agency's/firm's mission.

The risks or hazards associated with significant program failure

appear very high and very long lasting.

Accuracy and speed of feedback

A relatively high level of technical, esoteric knowledge is required to operate the production system and/or evaluate its success, risk, and hazards.

There is a long time lag between taking an action and discovering its success or failure. This is especially a cause for concern when the evidence of failure is likely to be ambiguous and

The agency/firm withholds complete information about diffi-

culties and failures.

Capability of others to meet expectations

There is a decline in the competence of agency/firm members relative to the demands of the problems/processes central to effective operations.

There is a decline in an agency's/firm's operating reliability.

Motivation of others to understand and keep bargains

· Agency/firm managers or regulators are unable or unwilling to respect the views of vulnerable parties.

Agency/firm leaders are unable or unwilling to fulfill promises (contacts, agreements), to maintain consistent levels of promised operational performance or promised political sup-

port for high quality operations.

We recognize that it is very demanding and often quite costly to counter these perceptions. Some may even be impossible to overcome given the nature of the technical processes central to an agency's/firm's mission and function. Others are conditioned largely by the social or political history of the particular policy or industrial domain. Yet, if an agency/firm cannot consistently perform in a manner that does counter these perceptions and beliefs, deep distrust will likely develop and persist. In such a case, the political legitimacy of the organization may be threatened. Under those circumstances, in advanced industrial democracies at least, it may be difficult for such institutions to survive. (See SEAB, 1993 for an extended discussion.)

Being Worthy of Trust

General Conditions

What conditions prompt institutional trustworthiness?⁵ We suggest that to the extent the following general conditions obtain between parties, it will be possible to minimize the grounds for suspicion, to reduce the fear of injury, and to establish a basis for believing that another person/party is worthy of trust and confidence (SEAB, 1993; 22).⁶

- Parties have a reasonably high respect/regard for each other based on general familiarity and perceived high degree of mutual understanding and integrity.⁷
- 2. Parties possess the *competence to understand the problems others* face and the solutions advanced to address them.⁸
- 3. Parties have a reasonably equal part in defining the terms of their relationship.9
- 4. Parties maintain a positive history of relationships during which agreements have been kept, even in the face of apparently very demanding challenges, and they take seriously the implications of their actions for sustaining the relationship.
- 5. Parties are able to determine unambiguously the effects of their relationship on each other in a full and timely fashion.

Specific Actions

The task for leaders of agencies/firms is to identify measures

that, if well implemented, are likely to produce those general conditions. In complex institutional settings, that task will probably be difficult to accomplish. There may be competing organizational demands, resources may be limited, and internal opposition to change may have to be overcome.

Matters are further complicated by what has long been recognized as a fundamental quality of the psychology of trust. Paul Slovic (1993) described it in these terms:

Trust is fragile. It is typically created rather slowly, but it can be destroyed in an instant—by a single mishap or mistake. Thus, once trust is lost, it may take a long time to rebuild it to its former state. In some instances, lost trust may never be regained.... The fact that trust is easier to destroy than to create reflects certain fundamental mechanisms of human psychology that I shall call the "asymmetry principle." When it comes to winning trust, the playing field is not level. It is tilted toward distrust (emphasis added)(p. 677).

The implications of this "asymmetry principle" are profound. For organizations facing a serious deficit of trust, adding even genuine and sincere trust-evoking actions to the standard repertoire of behaviors is not likely to be very effective. Put differently, sustaining and recovering trust and confidence demands more than choosing actions from a menu—something from column A to go along with something from column B. Rather, to promote public trust and confidence, organizations need to develop entirely new behavioral recipes in which all choices hang together and reinforce each other like threads in a fabric. ¹⁰ Indeed, pursuit of a menu of separate actions versus creation of a recipe for integrated basic change is probably a proper standard for evaluating how commit-

The Department of Energy's Radioactive Waste Responsibilities

The Department of Energy's (DOE) radioactive waste responsibilities are broad and multifaceted. The agency is charged with cleaning up facilities and sites where nuclear weapons materials were produced starting in 1945. It is also obligated to treat, store, and dispose of a variety of waste streams.

The DOE's restoration efforts are carried out by the Office of Environmental Management (EM) and are largely concentrated at 16 locations across the country. EM has entered into legally enforceable agreements with state and federal regulators to remove radioactive and toxic pollutants from huge volumes of land and groundwater. It has also accepted strict schedules for decontaminating and decommissioning production plants and equipment.

The cleanup faces a number of serious challenges. Very preliminary estimates suggest that remediation could cost several hundred billion dollars. The exact price tag will depend on three unsettled factors: How "dirty" the production sites actually are? What cleanup technologies might be developed in the future? How "clean" is clean enough? Restoration will also take a long time. At some locations, the baseline program plan envisions activities that will not be completed for more than one hundred years.

EM also has primary responsibility for treat-

ing, storing, and disposing of many diffferent waste streams. These include uranium mill tailings, transuranic waste, mixed toxic and radioactive waste, various types of spent nuclear fuel, and both high- and low-level radioactive waste. The organization will have to concentrate these wastes at relatively few locations, stabilize the streams, construct and operate new facilities to store the material temporarily, and provide for its permanent disposal. These waste management efforts carry price tags that are just as uncertain and involve time horizons that are just as long as EM's restoration activities.

Some material that EM manages, along with spent fuel from commercial nuclear power plants, will eventually be disposed of in a deep underground repository. The search for a site for such a facility began 30 years ago. After several unsuccessful efforts, Congress permitted the DOE to investigate only one location, Yucca Mountain in Nevada. Within the DOE, the Office of Civilian Radioactive Waste Management (OCRWM) is responsible for determining whether that site is suitable and, if it is, for constructing and operating a repository.

Over the last 15 years, the cost of accepting, storing, transporting, and disposing waste underground has escalated and is now estimated to be approximately \$33 billion. Furthermore, the key

elements of repository development—site characterization, design, and performance assessment—have all proven more demanding than originally anticipated. Considerable political controversy was sparked by Congress' decision to focus on Yucca Mountain. Matters are further complicated because there are no established standards governing how well and how long waste must be isolated from the accessible environment. A recent study by the National Academy of Sciences recommended that the repository system perform adequately for as much as one million years.

Given the potential risks involved in managing radioactive waste and the numerous challenges presented to the DOE in doing so, it is not surprising that researchers (see note 1) have found that the agency enjoys little trust and confidence among the general public. Perhaps more significant is the finding that the DOE also enjoys little trust and confidence among those who deal with it on a regular basis (SEAB, 1993). Furthermore, two years after Secretary O'Leary embarked on a massive and personal campaign to increase trustworthiness, only marginal improvements were obtained (personal communication from SEAB). And those improvements were limited to EM. OCRWM's stakeholders remained just as suspicious as they had been in the past.

ted an agency/firm is to securing, maintaining, and recovering the

trust and confidence of its public.

Given the difficulty of identifying appropriate measures and fitting them together coherently, what practical guidance can we offer? Because conflict with citizens, intervenor groups, and sometimes the media are often clear signs of public mistrust, we begin with a discussion of external relationships and then turn to the matter of internal operations.¹¹

External Relationships

The central premise informing the design of measures to increase public trust and confidence by restructuring how the organization interacts with outsiders is (SEAB, 1993; 50):

When agencies/firms manage programs that could be seen as levying more potential harm than benefits upon citizens and communities, organizational leaders must give all groups of citizens and their representatives opportunities for involvement and must demonstrate fairness in negotiating the terms of their immediate relationship.

In so far as this is not or cannot be accomplished, the grounds for distrust remain.

More specifically, agencies/firms should make commitments to (SEAB, 1993; 50):12

 Involve stakeholder groups before key decisions are made through frequent contact, characterized by complete candor and by rapid and full response to questions.

2. Carry out agreements in a timely manner unless modified

through an open process established in advance.

 Reach out consistently and respectfully to state and community leaders and to the general public to inform, consult, and collaborate with them about the technical and operational aspects of agency/firm activities.

 Maintain a presence of very high agency/firm leaders, who make themselves visible and accessible to citizens at important field

sites.

 Integrate agency/firm personnel into the life of affected localities in a way that makes an unmistakable contribution to community affairs.

 Secure benefits for affected communities along with the resources that might be needed to detect and respond to unexpected costs arising from actions taken by the agency/firm.

Internal Operations

One might ask at the start, Why should any attention at all be paid to an agency's/firm's internal operations? Are not those operations only important for matters such as organizational efficiency? Would not a thorough reform of the way an organization goes about dealing with affected communities and other stakeholders be enough to recover public trust and confidence and allow good trustworthy administrative and technical work to go forward? Although a restructuring of external interactions is certainly necessary, it is not sufficient when several confounding conditions obtain. These are related, in part, to the nature of the technical work that is increasingly being undertaken and, in part, to a characteristic of our legal system.

There are a number of areas—radioactive waste disposal is only the most dramatic—where success or failure cannot be unequivocally determined for many years, far longer than the lifetimes of programs' managerial and technical leadership. This means that the quality of the decisions taken now or operations carried out in the near future cannot be fully judged on the basis of near-term feedback.

When this situation occurs, citizens who believe that they (or their children) could be at risk often come to a stark realization: In our legal system, there are few ways of holding decision makers accountable for actions, taken in the present, that cannot be discovered to be mistaken until well into the future. This circumstance often redirects the public's attention inward, to the quality of organizational knowledge, operations, and management, when an activity has a very long time horizon. And with that attention is likely to come heightened expectations for performance.¹³

We are thus led to the underlying premise for the design of

internal operations (SEAB, 1993; 55):

Tasks should be carried out in ways that, when the public gains access to programs via improvements in external relations, they discover activities within the organization that increase institutional trustworthiness rather than decrease it.

Put another way, maintenance and recovery of trust and confidence will only result if the more one understands about the agency/firm, the more reassured one becomes. This reverses the too-often repeated observation, "The more you know, the worse it seems."

To make their internal operations a source of reassurance, organizations should make commitments to (SEAB, 1993; 56):

- Maintain high professional and managerial competence and discipline that is continuously honed by rigorous training.
- Establish and meet reasonable performance measures and schedule milestones that are politically and technically realistic.
- Pursue options whose consequences can be most clearly demonstrated to broad segments of the public.
- 4. Reward honest self-assessment that encourages the agency/firm to identify, air, and resolve problems before they are discovered by outsiders.
- Develop tough internal processes that include stakeholders for reviewing and discovering potential and actual errors.
- 6. Institutionalize responsibility for protecting efforts to sustain public trust and confidence throughout the organization.

The Transaction Costs of Recovering Trust

To organizational leaders and managers also falls the job of translating the measures listed above into concrete initiatives that are relevant to their agencies/firms. As an indication of what might be involved, consider the case of the DOE's radioactive waste management programs. The task force appointed by Secretary Watkins advanced over 30 recommendations dealing with external relations and 40 others dealing with internal operations. The range and magnitude of those recommendations suggest that very high transaction costs may have to be borne to reduce public suspicion.¹⁴

The task force, for example, urged the DOE to adopt a variety

Every organizational action must be understood as

having a potential impact on an agency's/firm's

trustworthiness

of measures to expand external peer reviews of the technical design process, the conduct of experimental work, and the auditing of quality assurance programs. There were also suggestions on how to address in a credible manner plausible scientific arguments challenging the programs' technical plans. To signal the importance of public trust and confidence enhancing efforts, senior program officers were advised to conduct explicit assessments of the impact on trustworthiness of key policy options and major technical design changes. When options were chosen that might weaken trust for particular segments of the public, agency leaders were urged to publish explanations and plans for mitigating these effects. Finally, and perhaps most important, "to ensure that organizational dysfunctions are not responsible for operational problems that could lead to decreased institutional trustworthiness" (SEAB, 1993; 58), the agency was counselled about ways to improve processes of selfregulation and error discovery and correction.

It appears that, for organizations facing a serious deficit of trust and confidence, nothing less than a new culture of awareness is called for. Every organizational action must be understood as having a potential impact on an agency's/firm's trustworthiness. If this conclusion holds, then the familiar skills of program development, coordination, and execution that have traditionally been applied far from public view may be sorely tested and may not pass muster. Organizations may be forced to make new and heavy investments in time and other resources when actions have to be transparent. Because of the pragmatic implications of our arguments, the guidance we offer is very likely to be seen by current management teams as highly impractical and as being difficult, if not impossible, to institute. We sympathize with that reaction. But, in response, we note that some organizations have progressed well down the evolutionary path we trace. These included sections of the U.S. air traffic control system and the operational units of several nuclear power utilities (La Porte and Thomas, 1995).

The Question of Institutional Constancy

As if the arguments we have presented so far do not challenge organizational leaders enough, we need to address one other aspect of the quest for public trust and confidence that is particularly demanding and that may, in fact, often be beyond the capacity of agencies and firms to effect alone. We conclude this article with a brief comment on the growing and troubling question of assuring institutional constancy, the willingness of future decision makers to hold to the resolve—or perhaps the commitments—of present leaders and operating managers.¹⁵

An institution exhibits constancy when, year after year, it achieves outcomes it agreed in the past to pursue. For example, the Federal Aviation Administration's air traffic control operations, together with air carriers, have consistently achieved a high level of flight safety and traffic coordination in commercial aviation; the

nuclear navy has consistently achieved high levels of safety aboard nuclear submarines; and electrical utilities have achieved remarkably high levels of availability of electrical power. Great universities exhibit constancy in commitments to intellectual excellence generation after generation through producing very skilled undergraduates and professionals as well as through fostering path-breaking research.

At the heart of the question of institutional constancy is the age-old debate of how and when organizations should change their collective minds. We react quite differently to the phrase "uncompromising organizational dedication" than to the phrase "bureaucratic inertia." As a society, we demand consistent adherence to our wishes even as we rail against the stubborn refusal of organizations to alter their commitments to the wishes of others.

Overall, there is probably a bias towards change in this country and, perhaps, in other advanced industrial nations as well. Attention may be focused initially on locking an agency/firm into its commitments by employing political agreements, legislation, executive orders, and contracts. These devices also have elements that permit change, allow for cancellation, and give wiggle room for delay and avoidance of commitments. How can one rationally object to this? There is much to warrant rules that do not unduly constrain the future. Who knows what strange contingencies will arise? Thus, seeking to assure constancy of institutional behavior beyond the next several legislative terms or quarters in the "return to investment" cycle is quite rare.

Yet without some significant degree of institutional constancy, there is no reason to expect much improvement either in the skepticism of the public about the management of programs that could impose significant social costs or less public resistance to the deployment of new programs. So, to gain the requisite trust and confidence that relaxes constraints on organizational action, institutional leaders must assure the citizens and stakeholders that their successors will continue to be faithful to commitments and consistent in performance. And the organization itself must exhibit characteristics and qualities that demonstrate willingness and capability to do so into the indefinite future.

If an organization has had a long history of demonstrated commitment and capacity for repeatedly high performance even in the face of strong contrary pressures, its chances of winning or sustaining public confidence is enhanced. If, however, a new program has to be carried out by a newly established institution, such as the Tennessee Valley Authority in its early days, constancy may be hard to prove and thus the needed trust and confidence may be hard to secure. The extreme case is the institution whose history has earned it a reputation for inconstancy, expedient compromise, and weakened capacity (and sometimes arrogance). In such a case, the possibility of countering skepticism may be slim, and the costs of even trying to do so are likely to be great.

The challenge to attain constancy of institutional behavior over many generations is an extraordinary one in terms of (1) our limited analytical ability to predict the outcomes of institutional activities for those periods, (2) the challenge to devise means to reenforce or reward consistent behavior, and, as importantly, (3) the knowledge needed to design institutional relationships that preserve the quality of future action. Regrettably, the development of the knowledge base and the requisite analytical and institutional

design capacities seems a long way off.16

Todd R. La Porte is a professor of political science, University of California, Berkeley, and was the chairman of the Task Force on Radioactive Waste Management, Secretary of Energy Advisory Board, from which a good deal of this paper is drawn. He teaches public administration, organization theory, and technology and politics, with research interests in public policy and the dynamics of large, complex, technologically intensive (and hazardous) organizations.

Daniel S. Metlay is now a member of the senior professional staff of the Nuclear Waste Technical Review Board. Work for this

paper was conducted from 1991 to 1993 while he was the director of the Task Force on Radioactive Waste Management at the Department of Energy (DOE) and the principal author of the Task Force's report (SEAB, 1993). Prior to joining the DOE, he taught political science at Indiana University and the Massachusetts Institute of Technology. The views expressed in this paper do not necessarily represent the views of the Nuclear Waste Technical Review Board, a presidentially appointed independent federal agency charged by Congress with evaluating the scientific and technical validity of the DOE's radioactive waste disposal efforts.

Notes

This is a revision of a paper presented at the conference on Resource, Risk and Responsibility, Colorado School of Mines, Sonoma Mission Inn, Sonoma, California, December 4, 1994 and the Conference on Trust, Institute of Cognitive and Decision Sciences, University of Oregon, Eugene, Oregon, November 5, 1994.

- There is a rather extensive literature examining the question of trust in the Department of Energy. See, for example, Bella, Mosher, and Calvo (1988a, 1988b); Flynn, Burns, Mertz, and Slovic (1992); Kasperson, Golding, and Tuler (1992); Pijawka and Mushkatel (1992); Dunlap, Kraft, and Rosa (1993); Slovic, Flynn, and Layman (1991); Slovic (1993); and Flynn and Slovic (1993).
- 2. Some organizations, such as the air traffic control system, aircraft carriers, and nuclear power plants, perform much better than expected, given what we know about managing large public or industrial organizations (La Porte, 1996; La Porte and Consolini, 1991; and Roberts, 1989). These high reliability organizations have faced the challenges of securing trust for some time. Some exhibit the properties described herein.
- 3. See Earle and Cvetkowich (1995), Kramer and Tyler (1995), Dasgupta (1988), Shaprio (1987), Zucker (1986), and Zand (1972). For reviews of the literature, see Citrin (1993), Thomas (1993), and Fountain (1994).
- 4. The "trust" relationship has been discussed in terms of credibility, legitimacy, and opportunism. But there have been few attempts to relate those notions systematically to a concept of "public trust and confidence" (Thomas, 1993).
- 5. We are in effect proposing hypotheses derived inductively from listening carefully to those who felt betrayed and from an intensive analytical effort to understand trust relationships. Compare Barber (1983); Fountain (1994); Gambetta (1988); and Hardin (1994). See Luhmann (1979) for one of the few general theoretical explorations of the function trust plays as a means individuals employ to simplify social complexity. He argues that the more technically complex a system, the more individuals need/wish to trust the "system" in order to cope with the increased complexity of individual experience induced by the system.
- 6. We realize that there is no magic formula for developing organizational trust. Sometimes parties are at complete loggerheads or sometimes one

- party chooses to use distrust as a tactical weapon to advance its own ends. In those cases, there is probably nothing an agency/firm can do to gain trust. What we are proposing are steps that, if taken fully and with the appropriate spirit, will make the agency/firm worthy of the public's trust and confidence.
- 7. Understanding and integrity, while important for anticipating a trustworthy relationship, are not identical to it. That is, you can understand another person and have confidence in his/her integrity and still be uncertain about the degree to which he/she will take your interests into account.
- 8. These problems could be either technical and institutional.
- The less this is the case, the more it will be necessary to provide institutional opportunities for weaker parties to advance and press grievances—even those of minor significance.
- Imagine what would happen if one baked a cake with all the ingredients except the pinch of salt.
- 11. The guidance provided in this section may not seem particularly novel. In fact, we make no claim to have discovered something radically new. But, recall, these familiar prescriptions are not optional choices on a menu but integral components of a recipe. That distinction may cast a very different light upon them.
- 12. Only some of these actions may be needed if an agency/firm believes it has sufficient public trust and confidence and is only seeking to maintain it. The more the deficit of trust mounts, the more fully the organization needs to attend to the full range of external and internal conditions when it implements the various ingredients in the recipe. All of them are likely to be required if the organization is in deep deficit and is trying to recover public trust and confidence.
- 13. Those expectations will often increase further once citizens recognize that activities having a long-time constant of feedback are resistant to trial-anderror learning.
- 14. See also La Porte (1994).
- 15. Much of this section is drawn from Keller and La Porte (1994).
- 16. An initial framework for considering what it takes to assure institutional constancy will be the subject of an article by La Porte and Ann Keller that will appear in a future issue of this journal.

- Barber, B., 1983. The Logic and Limits of Trust. New Brunswick, NJ: Rutgers University Press.
- Bella, D.A., C.D. Mosher, and S.N. Calvo, 1988a. "Establishing Trust: Nuclear Waste Controversy." Journal of Professional Issues in Engineering, vol. 114, 40-50.
- _______, 1988b. "Technocracy and Trust: Nuclear Waste Controversy." Journal of Professional Issues in Engineering, vol. 114, 27-39.
- Citrin, J., 1993. "Political Trust and Risky Policy." In Secretary of Energy Advisory Board, Task Force on Radioactive Waste, Earning Public Trust and Confidence: Requisites for Managing Radioactive Waste. vol. 2, Washington, DC.
- Dasgupta, M., 1988. "Trust and Commodity." In D. Gambetta, ed., Trust: Making and Breaking Cooperative Relations. New York: Basil Blackwell, pp. 49-72.
- Department of Energy (DOE), 1994. Fueling a Competitive Economy: Strategic Plan. Washington, DC: U.S. Government Printing Office.
- Dunlap, R.E., M.E. Kraft, and E.A. Rosa, eds., 1993. Public Reactions to Nuclear Waste: Citizens' Views of Repository Siting. Durham, NC: Duke University Press.
- Earle, T.C. and G.T. Cvetkowich, 1995. Social Trust: Toward a Cosmopolitan Society. New York: Praeger.
- Flynn, J., W. Burns, C.K. Mertz, and P. Slovic, 1992. "Trust as a Determinant of Opposition to a High-Level Radioactive Waste Repository: Analysis of a Structural Model." *Risk Analysis*, vol. 12, 417-430.
- Flynn, J. and P. Slovic, 1993. "Nuclear Wastes and Public Trust." Forum for Applied Research and Public Policy, vol. 8, 92-101.
- Fountain, J., 1994. "Trust as a Basis for Interorganizational Forms." Paper presented at the Conference on Network Analysis and Innovations in Public Programs, University of Wisconsin, Madison.
- Gambetta, D., 1988. "Can We Trust Trust?" In D. Gambetta, ed., Trust: Making and Breaking Cooperative Relations. New York: Basil Blackwell, pp. 213-237.
- Hardin, R., 1994. "Trustworthiness." Paper presented at the Conference on Trust, University of Oregon, Eugene.
- Kasperson, R., D. Golding, and S. Tuler, 1992. "Social Distrust as a Factor in Siting Hazardous Facilities and Communicating Risks." Journal of Social Issues, vol. 48, 161-187.
- Keller, A. and T.R. La Porte, 1994. "Assuring Institutional Constancy: A Crucial Element of Public Trust and Confidence in Managing Hazards in the 21st Century." Paper presented at the Conference on Deciding for the Future: Problems of Hazardous Wastes and Inter-generational Equity, National Academy of Public Administration, Washington, DC.
- Kramer, R.M. and T.R. Tyler, eds., 1995. Trust in Organizations: Frontiers in Theory and Research. New York: Sage.
- La Porte, T.R., 1994. "Large Technical Systems, Institutional Surprise and

- Challenges to Political Legitimacy." In Hans-Ulrich Derlien, Uta Gerhardt, and Fritz Scharpf, eds., Systemrationalitat und Partialinteresse. (Systems Rationality and Partial Interests.) Baden-Baden: Nomos Verlagsgesellschaft, pp. 433-452. Slightly revised version published in Technology in Society, vol.. 16, 269-288.
- La Porte, T.R., 1996. "High Reliability Organizations: Unlikely, Demanding and at Risk." Journal of Contingencies and Crisis Management, forthcoming.
- La Porte, T.R. and P. Consolini, 1991. "Working in Practice but Not in Theory: Theoretical Challenges of High Reliability Organizations." Journal of Public Administration Research and Theory, vol. 1, 23-49.
- La Porte, T.R. and C.W. Thomas, 1995. "Regulatory Compliance and the Ethos of Quality Enhancement: Surprises in Nuclear Power Plant Operations." Journal of Public Administration Research and Theory, vol. 5, 111-139.
- Luhmann, N., 1979. Trust and Power. New York: Wiley. Eds. T. Burns and G. Poggi. Translated by H. Davis, J. Raffan, and K. Rooney. Original German edition: Vertrauen: Ein Mechanismus de Reduktion sozialer Komplexitaet. Stuttgart: Enke, 1973.
- Pijawka, K.D. and A.H. Mushkatel, 1992. "Public Opposition to the Siting of High-Level Nuclear Waste Repository: the Importance of Trust." Policy Studies Review, vol. 10, 180-194.
- Roberts, K.H., 1989. "New Challenges to Organizational Research: High Reliability Organizations." *Industrial Crisis Quarterly*, vol. 3, 111-125.
- Secretary of Energy Advisory Board (SEAB), 1993. Task Force on Radioactive Waste Management, Earning Public Trust and Confidence: Requisites for Managing Radioactive Waste. Washington, DC: U.S. Government Printing Office.
- Shaprio, S.P., 1987. "The Social Control of Impersonal Trust." American Journal of Sociology, vol. 93, 623-658.
- Slovic, P., 1993. "Perceived Risk, Trust and Democracy." Risk Analysis, vol. 13, 675-682.
- Slovic, P., J. Flynn, and M. Layman, 1991. "Perceived Risk, Trust and the Politics of Nuclear Waste." *Science*, vol. 254, 1603-1607.
- Thomas, C., 1993. "Public Trust in Organizations and Institutions: A Sociological Perspective." In Secretary of Energy Advisory Board, Task Force on Radioactive Waste Management, Earning Public Trust and Confidence: Requisites for Managing Radioactive Waste, vol. 2. Washington, DC: U.S. Government Printing Office.
- Zand, D.E., 1972. "Trust and Managerial Problem Solving." Administrative Science Quarterly, vol. 12, 229-239.
- Zucker, L.G., 1986. "Production of Trust: Institutional Sources of Economic Structure." In B. Staw and L. Cummings, eds., Research in Organizational Behavior. Greenwich, CT: JAI Press, pp. 1840-1920.