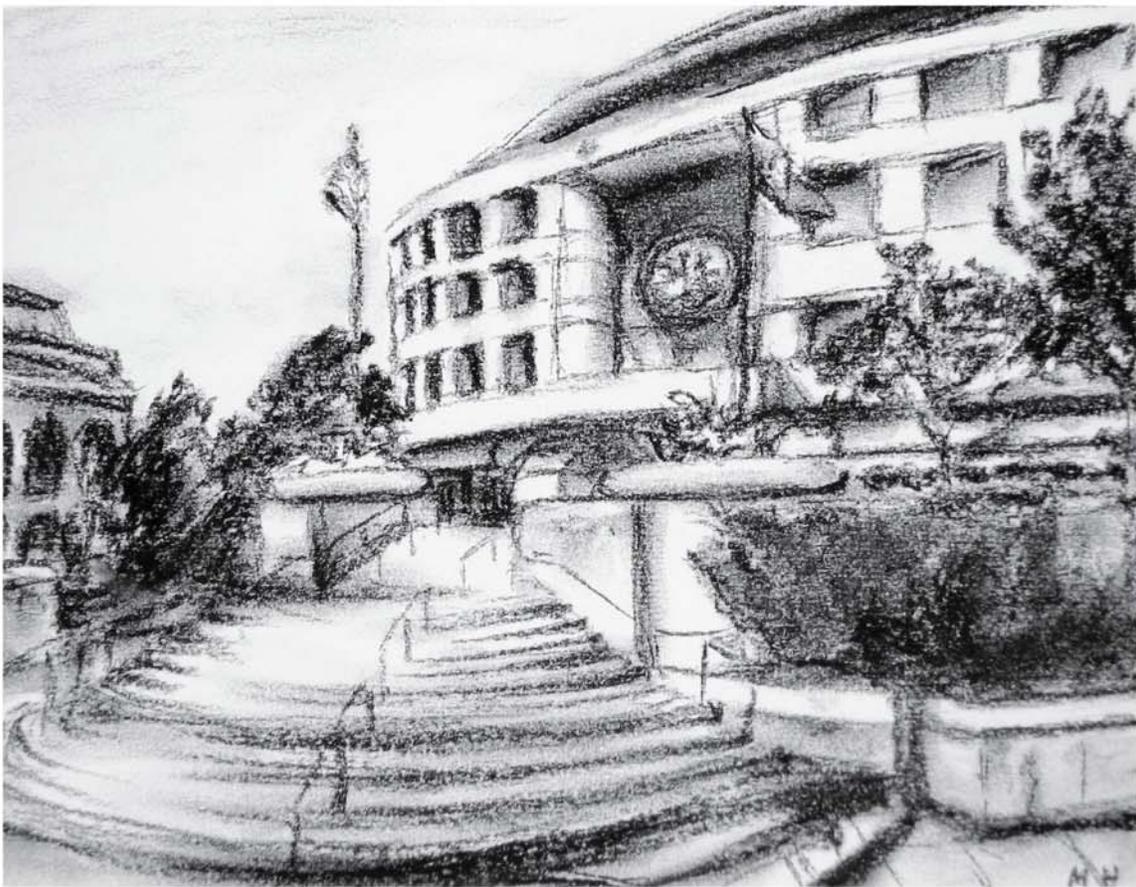




California Public Utilities Commission

Analysis of Senate Bill No. 53 Submission to the California Research Bureau



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Table of Contents

I.	Executive Summary	1
II.	Regulatory and Organizational Framework for Rail Safety in California	8
A.	Regulatory Framework	8
B.	CPUC Rail Safety Units.....	11
III.	Issue: Legal and Regulatory Hurdles.....	16
IV.	Issue: Insulation from External Pressure	18
V.	Issue: Conflict-Free Safety Mission.....	23
A.	Case Study: National Aeronautics and Space Administration.....	24
B.	Absence of Institutional Conflicts of Interest at the CPUC.....	26
VI.	Issue: Adequate Regulatory Authority	31
VII.	Issue: Effective Safety Oversight Depends on a Robust Safety Culture.....	35
VIII.	Conclusions and Recommendations.....	40
	Appendix A: Examples of Weak Enforcement	43
1.	Mine Safety and Health Administration	43
2.	Federal Motor Carrier Safety Administration.....	43
3.	Nuclear Regulatory Commission.....	43
	Appendix B: Examples of Organizational Conflicts of Interest	45
1.	National Aeronautics and Space Administration.....	45
2.	Federal Aviation Administration	53
3.	Federal Motor Carrier Safety Administration.....	55
4.	Department of Transportation and the National Transportation Safety Board.....	57
5.	Bureau of Mines/Mining Enforcement and Safety Administration/Mine Safety and Health Administration.....	58
6.	Atomic Energy Commission/Nuclear Regulatory Commission	60
7.	Department of Energy.....	61
8.	European Food Safety Regulation	63
	Appendix C: Components of Safety Culture.....	64
1.	Organizational Commitment.....	64

2.	Management Involvement	65
3.	Employee Empowerment.....	65
4.	Reward Systems.....	65
5.	Reporting Systems	66

I. Executive Summary

This paper is the California Public Utilities Commission's (CPUC) contribution to the California Research Bureau's (CRB) assignment in Senate Bill 53 (2008; Ducheny) to assess issues arising from a possible reorganization of the state government's role in the rail industry.



Safety is No Accident

The CPUC regulates the safety of the State's freight railroads, its inter-city and commuter railroads, its light rail transit systems, and its rail crossings. It has done so as an independent commission since 1911. "Safety" encompasses protection of the general public, rail employees, and the environment (e.g., prevention of hazardous materials releases). The CPUC also regulates the safety of the State's electric, natural gas and communications systems. It has been tasked with these responsibilities since 1912.

Senate Bill 53 requires the CRB to analyze the following:

- How to improve the efficiency, performance and stability of rail activities funded in part or in whole with state funds.
- The benefits and liabilities of establishing one accountable state commission or department responsible for the oversight, regulation, identification, and prioritization of rail transportation and safety programs and projects, including, but not limited to, rail grade crossings and separations, rail equipment procurement and passenger service, the provision of traditional passenger rail and high-speed rail service, and rail safety regulation and oversight.
- Issues the Legislature should consider if legislation is introduced to consolidate any, or all, of the functions, responsibilities, or activities of the five state agencies with jurisdiction over rail-related matters into one or more state agencies, commissions, or departments.

This submission addresses each of these items as follows.

Improvements in the efficiency, performance and stability of state rail activities:

The CPUC's rail programs focus only on the safety of the various rail operations in California. Its internal processes and external relationships provide for efficient, effective, stable and continuously improving rail safety oversight. The CPUC is the only rail safety regulatory agency in the nation that has the authority to make and enforce rules relative to the safety of all forms of rail transportation, including freight rail, inter-city rail, commuter rail, light rail transit and rail crossings. While the regulatory frameworks are distinct and different for each of these component parts of California's rail system, the CPUC takes a systems approach to safety, captures the synergies between its different regulatory units and their various inspective and investigative activities. CPUC continuously improves its performance in each area of its rail safety responsibilities. This is evidenced by the fact that the numbers of train accidents, rail crossings accidents, and trespassing accidents were lower than in 2008 than they were in 1997, in spite of significant increases in freight and passenger rail usage (see Figures 1 - 5).

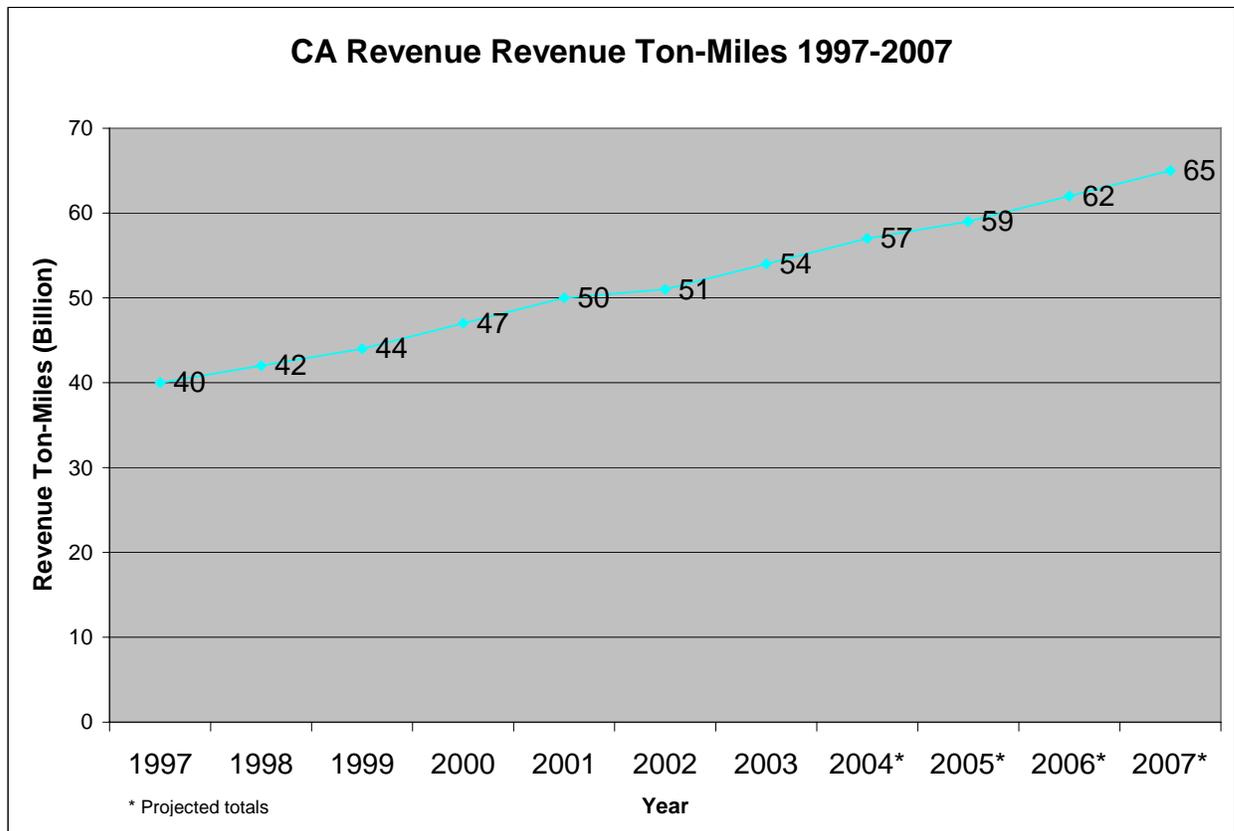


Figure 1 - California Revenue Ton-Miles 1997-2007

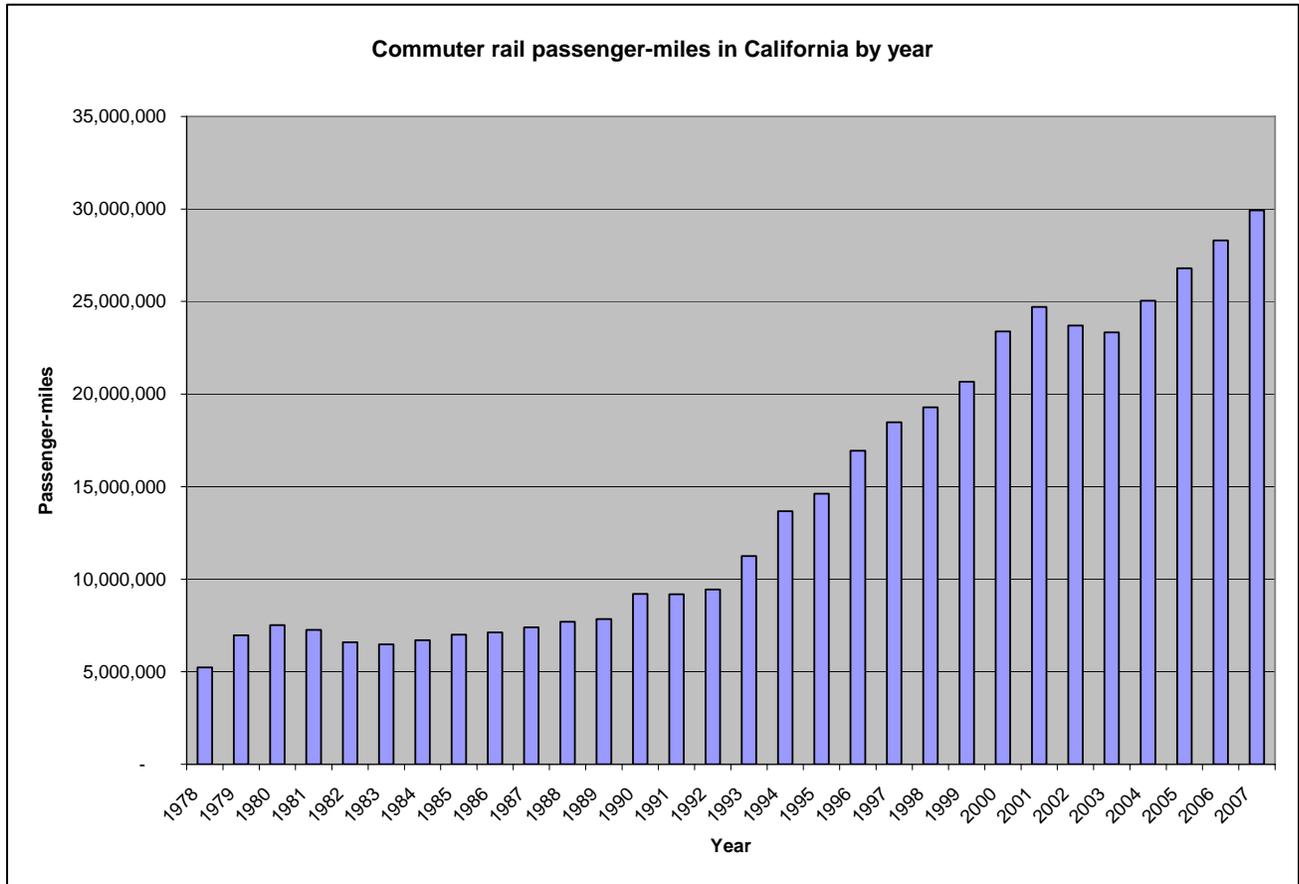


Figure 2 - Commuter Rail Passenger-Miles in California by Year

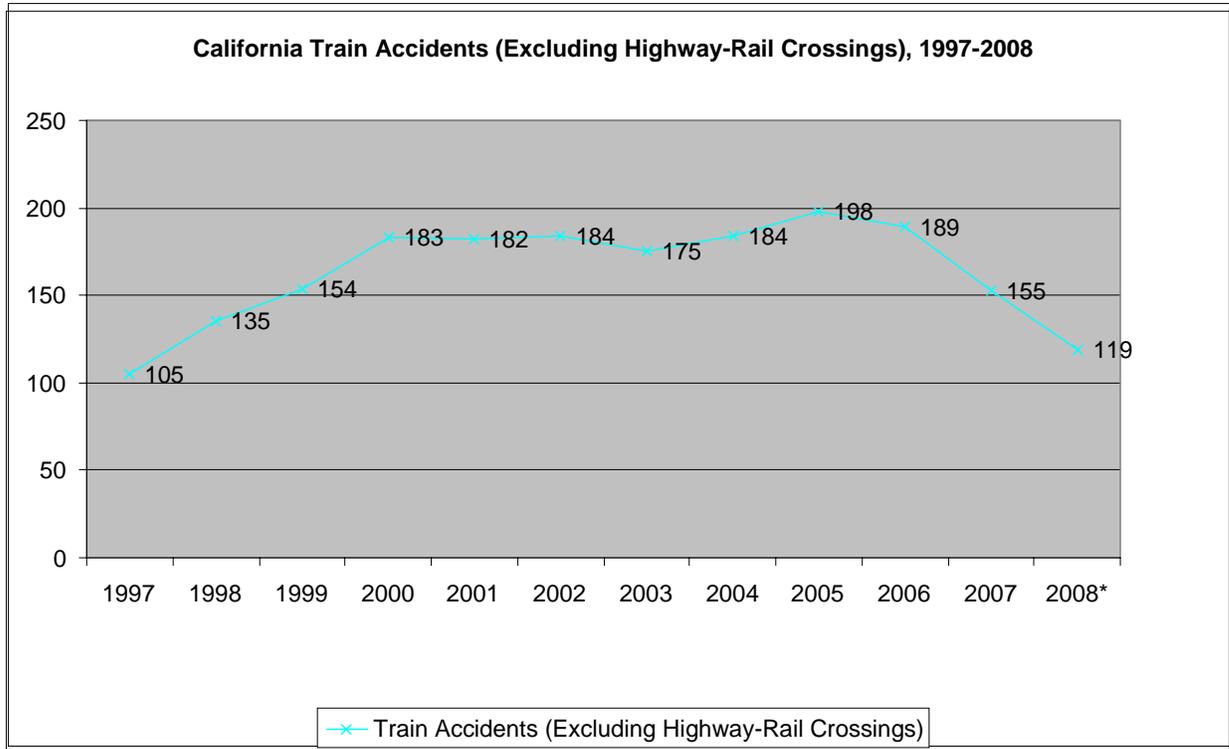


Figure 3 - California Train Accidents (Excluding Highway-Rail Crossings), 1997-2008

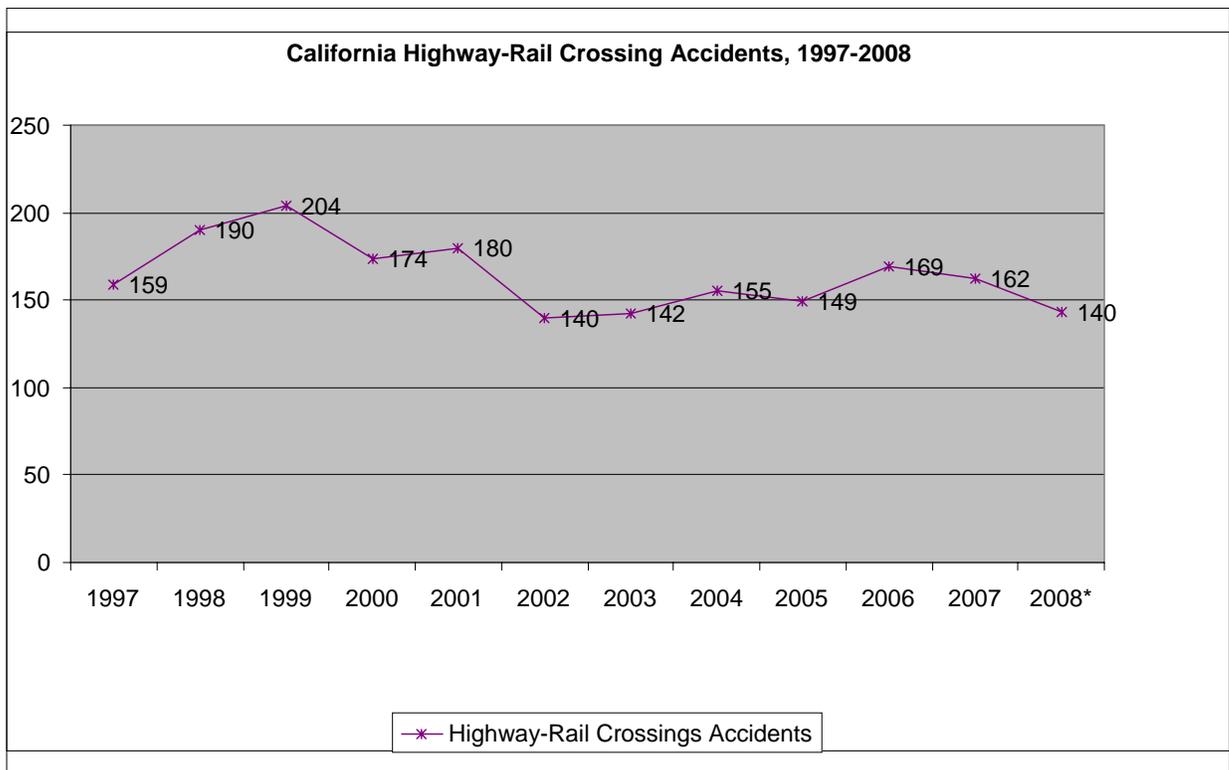


Figure 4 - California Highway-Rail Crossing Accidents, 1997-2008

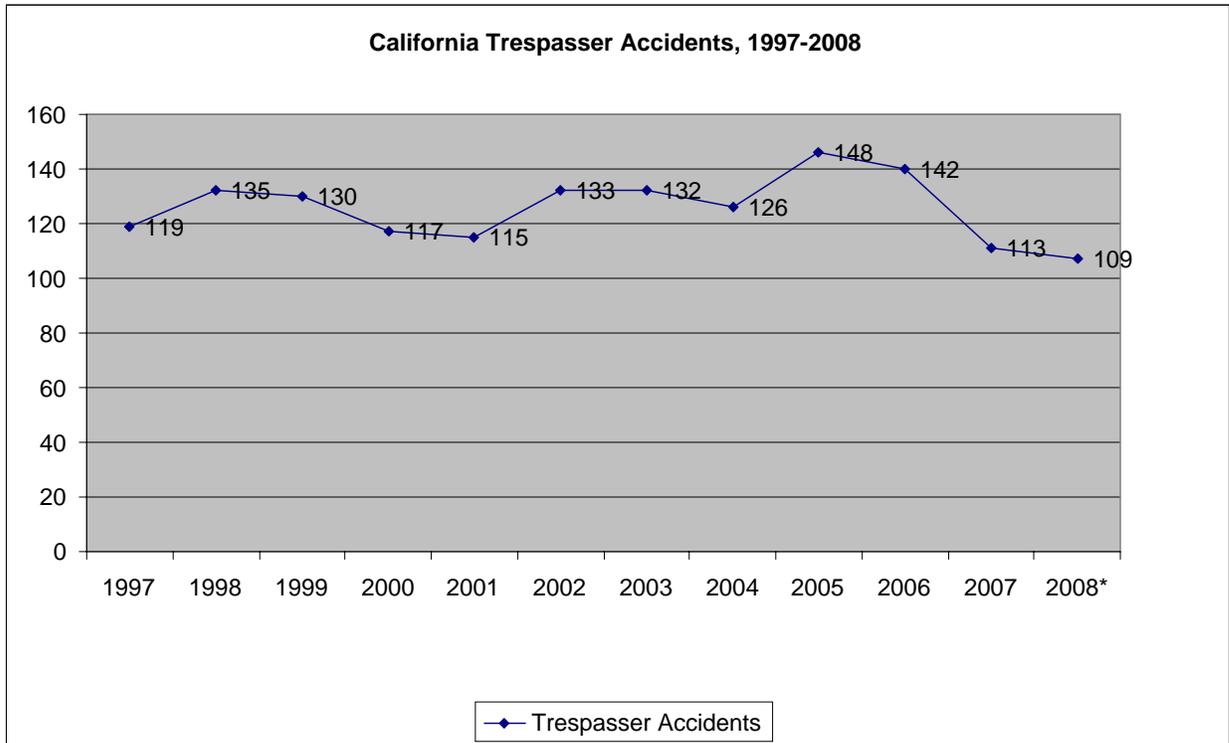


Figure 5 - California Trespasser Accidents, 1997-2008

Benefits and liabilities of establishing one state governmental unit responsible for a range of rail service and safety oversight functions:

It is imperative that rail safety oversight remain independent. While promotion, planning, financing, purchasing and operations might benefit from consolidation, safety oversight will not. This is not to say that safety oversight would not benefit from better coordination with those who perform rail system planning, and from better information sharing about rail system spending priorities, but these issues are best addressed through Director-level interagency committees that can institute and oversee interagency working groups. The interagency committees and working groups would be established and scheduled based on the specific needs of the program or project. A current working example is provided in this paper. Lessons learned in early 20th century rail safety reforms and by numerous safety agencies since that time clearly demonstrate that safety is best addressed by an independent decision-making body. Any necessary coordination

can be accomplished while maintaining that independence, without risking the disruption and predictable consequences of a more extensive reorganization of state government.

Issues the Legislature should consider regarding the consolidation of rail functions

This submission discusses the following issues:

- Legal and Regulatory Hurdles
- Insulation from External Pressure
- Conflict-Free Safety Mission
- Adequate Regulatory Authority
- Effective Safety Oversight Depends on a Robust Safety Culture



The benefits and liabilities of establishing one agency for both rail safety and rail service functions are addressed under each of these issue discussions.

A. Issue: Legal and Regulatory Hurdles

Various legislative proposals have envisioned consolidating state rail responsibilities in a single governmental entity. Transferring CPUC rail oversight duties to the Business, Transportation & Housing Agency or any other agency would require major alterations in California's governmental structure. The California Constitution grants the CPUC the authority to regulate passenger and freight rail and rail transit safety in the state. These constitutionally-conferred powers cannot be transferred to another entity without changes to the California Constitution. In addition, revisions would have to be made to a variety of sections in the state Codes to take authorities away from the CPUC and grant them to another agency. This topic is discussed in Section III.

B. Issue: Insulation From External Pressure

Many governmental safety oversight agencies have been criticized for being overly responsive to regulated industries or to politically-appointed officials who transmit

industry concerns. Agencies face great obstacles in carrying out their safety missions if they do not retain a degree of independence from external pressure. As an independent agency, the CPUC is much less susceptible to external pressure than an administrative agency. At the same time, the CPUC retains accountability through due process provisions, including parties' right to hearing, petition for rehearing, and appeal, as well as financial support for parties without the means to otherwise participate. This topic is addressed in Section IV.

C. Issue: Conflict-Free Safety Mission

Organizational conflict of interest is a crucial issue when considering the benefits and liabilities of establishing one state governmental unit to be responsible for the rail functions outlined by SB 53. There are inherent potential conflicts between the regulation of the safety of an organization's services, and the promotion and/or provision of those services, including planning, funding, design and development. Consequently, safety problems may be inadequately addressed, and the public may perceive that the agency does not take safety seriously. The CPUC does not have these or other institutional conflicts of interest. Its rail programs focus solely on safety, and the CPUC does not fund, promote, set service standards, schedule rail movements, or provide rail services. The regulation of other utilities does not conflict, overlap, or need coordination with its rail safety mission. This topic is discussed in Section V.

D. Issue: Adequate Regulatory Authority

It is advantageous for the safety oversight agency to have broad regulatory authority, such as that possessed by the CPUC. This topic is discussed in Section VI.

E. Issue: Effective Safety Oversight Depends on a Robust Safety Culture

Effective safety regulation depends on the presence of a strong safety culture in the oversight agency. Agencies with safety as their primary mission are more likely to have a strong safety culture than are agencies with competing missions, as would be created if

a single governmental unit were to take both rail safety and rail service responsibilities. An organization whose primary focus is safety likely will have different organizational and safety cultures than an organization devoted to the promotion or provision of services. The CPUC, with its railroad jurisdiction focused solely on safety, has developed an internal culture of safety and professionalism without distractions from competing demands such as service, scheduling, and promotion. The rail program's mission, goals, objectives, strategic planning, action plans, training, and professional development are all focused on safety. This topic is discussed in Section VII.

Suggestions how to improve the performance of rail activities are discussed in Section VIII, Conclusions and Recommendations.

II. Regulatory and Organizational Framework for Rail Safety in California

A. Regulatory Framework

The Southern Pacific Railroad was a powerful force in the state economy of the late 19th and early 20th centuries, and used its near-monopoly over the state railroad system in ways contrary to the public interest.¹ The California Constitution of 1879 created the California Railroad Commission, which was charged with the duty of ensuring that passenger and freight railroad rates were nondiscriminatory. However, this commission, whose three members were elected via Southern Pacific-dominated political machines, was controlled by Southern Pacific and had little power or inclination to curb that company's abuses. In addition, the state judicial and political systems were dominated by Southern Pacific. In reaction, and as part of a wave of progressive legislation that came into effect during this period, the Public Utilities Act of 1911 established a revamped Railroad Commission, with five Commissioners appointed by the Governor. Commissioners were barred from holding an official relation to or having a financial interest in a person or corporation subject to regulation by the Commission, as well as from certain other types of conflicts of interest; and Commissioners could only be

¹ For example, certain shippers were favored in rates over their business competitors, rebates were issued to favored customers, and some businesses and entire communities were denied rail-related privileges and facilities to which they were entitled. California Railroad Commission, "Regulation of Public Utilities - Review of the History of Regulation and the Methods Adopted by the Commission," 1922.

removed for incompetence, corruption or neglect of duty, subject to a two-thirds vote of the Legislature. The power of the Commission to set rates and counter discriminatory practices was increased, and its authority was expanded to include the regulation of other utilities besides railroads. Also at this time, the new Railroad Commission began active rail safety regulation prompted by industrial safety reform efforts during that era. In 1946, the Railroad Commission was renamed the California Public Utilities Commission.²

The current CPUC has five Commissioners, who are appointed by the Governor, with confirmation by the State Senate, to staggered six-year terms. The CPUC has broad powers to regulate privately-owned-and-operated natural gas, electric, communication, transportation and water companies in California. It grants operating authority, regulates service standards, sets rates, and monitors utility operations for safety, environmental stewardship, and the public interest.

Rail safety for both heavy rail and rail transit is regulated through a combination of state and federal authorities. The main federal agencies regulating the safety of railway systems are within the U.S. Department of Transportation. The Federal Railroad Administration (FRA) regulates heavy-rail freight and passenger systems, and the Federal Transit Administration (FTA) regulates light-rail transit systems. Regarding security, the federal Transportation Security Administration (TSA) regulates the security of heavy-rail passenger and freight systems, while the FTA has jurisdiction over the security of light-rail transit systems. The National Transportation Safety Board (NTSB) investigates rail accidents at its discretion.

State regulation of heavy-rail freight and passenger systems is largely preempted by federal regulation. However, the CPUC participates in the State Rail Safety Participation Program of the FRA. This program allows State inspectors act as agents of the FRA in the enforcement of federal regulations within California. The CPUC has adopted some

² Learn California.Org, "Progressive California, The Era of Progressive Reform: 1900-1920 ," <http://www.learncalifornia.org/doc.asp?id=1606>; California Constitution, Article XII, "Public Utilities;" CPUC General Order 26.

safety regulations addressing areas not covered by federal regulations, which it enforces exclusively. The FTA is primarily a funding agency and has only established minimum system safety and plan standards for rail transit agencies that receive FTA formula funds or grants for new projects. The FTA delegates safety and security oversight to state agencies. The CPUC is the designated state oversight agency in California, in accordance with the FTA's Final Rule, Title 49 CFR Part 659, effective May 5, 2007. The CPUC's safety and security oversight responsibility includes not only oversight of operations but also safety certification of new rail transit starts, extensions, and major projects.³ Additionally, under State statute, the CPUC has exclusive authority over the safety of approximately 9,000 public and 4,000 private highway-rail crossings in the state, including the location, terms and use of all crossings. The CPUC also participates in NTSB investigations.

Notably, among other state regulations, the CPUC promulgates and enforces employee safety regulations addressing the most prominent dangers to railroad operating employees. For example, CPUC General Orders 26-D and 118 require safe workspace and walkways for employees, such as brakemen and switchmen, working alongside railroad tracks and trains. Historically, workspace and walkway hazards have been a leading cause of railroad industry injuries.

The CPUC exercises its safety regulatory authority by issuing rules expressed in General Orders and Resolutions; by conducting inspections and investigations; and by undertaking administrative, civil, and/or criminal enforcement proceedings. Some CPUC personnel are entrusted with police powers, and are issued badges that allow them to enter railroad property and conduct investigations of regulated entities without advance notice.

Some of CPUC's oversight tools are constitutionally grounded. Article 12, Section 6 of the California Constitution states that "the commission may fix rates, establish rules, examine records, issue subpoenas, administer oaths, take testimony, punish for

³ The CPUC's rail security programs also operate pursuant to a memorandum of understanding with the California Office of Homeland Security.

contempt, and prescribe a uniform system of accounts for all public utilities subject to its jurisdiction.”

The CPUC’s rail safety workload has been increased by recent California and federal legislation, including the 2008 Federal Rail Safety Improvement Act (RSIA). For example, under Section 202 of the RSIA, by October 16, 2009, the Secretary of the U.S. Department of Transportation is to identify the 10 states that have had the most grade crossing collisions on average over the past three years and require those states to submit grade crossing safety plans. The plans must identify specific solutions for improving safety at crossings, including highway-rail grade crossing closures or grade separations,⁴ and must focus on crossings that have experienced multiple accidents or are at high risk for such accidents. California almost certainly will be among these 10 states.⁵

California’s rail safety programs are often viewed as models by other states and by federal rail agencies as well. For example, the FTA adopted California’s safety oversight process from the California model outlined in CPUC General Order 164-C, incorporating it into Title 49 CFR Part 659. This is now the standard of safety for rail transit operations nationwide.

B. CPUC Rail Safety Units

CPUC’s rail safety and security programs are housed in its Consumer Protection and Safety Division (CPSD) (Figure 6).

⁴ The term “grade separation” refers to roadway overpasses or underpasses of railroad tracks – the roadway and railroad are “separated.” This is in contrasted to “at-grade” crossings, where the roadway and railroad intersect - at the same level, i.e., “grade.”

⁵ According to FRA statistics, for the 4-year period January 2005 through December 2008, California had the third highest total (618) of highway-rail incidents out of the 50 states, behind Texas (1,186) and Illinois (653). The U.S. as a whole experienced 11,118 highway-rail incidents during that time. Federal Railroad Administration, Office of Safety Analysis, “Highway-Rail Incidents (By Calendar Year, Jan-Dec) At Public And Private Crossings,” Table 2.08, <http://safetydata.fra.dot.gov/officeofsafety/>. The U.S. as a whole experienced 11,118 highway-rail incidents during that time.

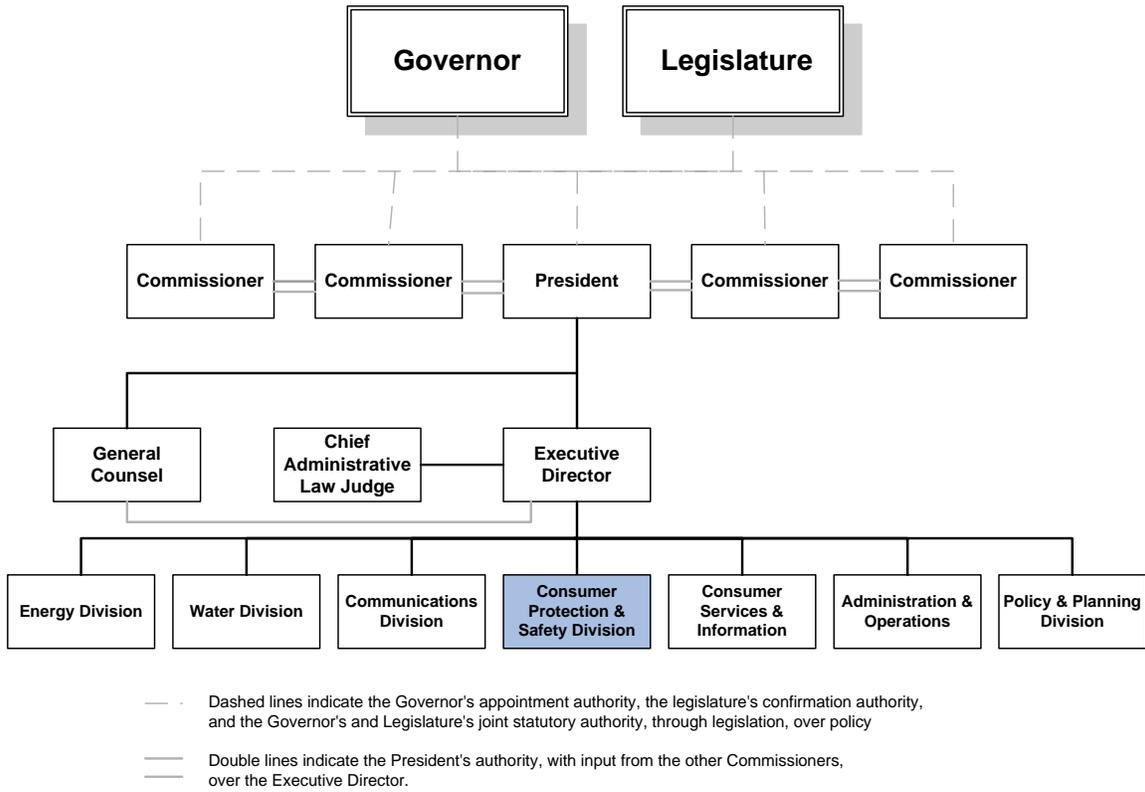


Figure 6 - CPUC Organizational Structure

The CPSD divides its rail safety programs into two branches, the Railroad Operations Safety Branch (ROSB) and the Rail Transit and Crossings Branch (RTCB). The RTCB further divides its programs into two sections, the Rail Transit Safety Section (RTSS) and the Rail Crossings Engineering Section (RCES) (Figure 7). ROSB, RTSS, and RCES are headquartered in San Francisco and have regional offices in Sacramento and in Los Angeles.

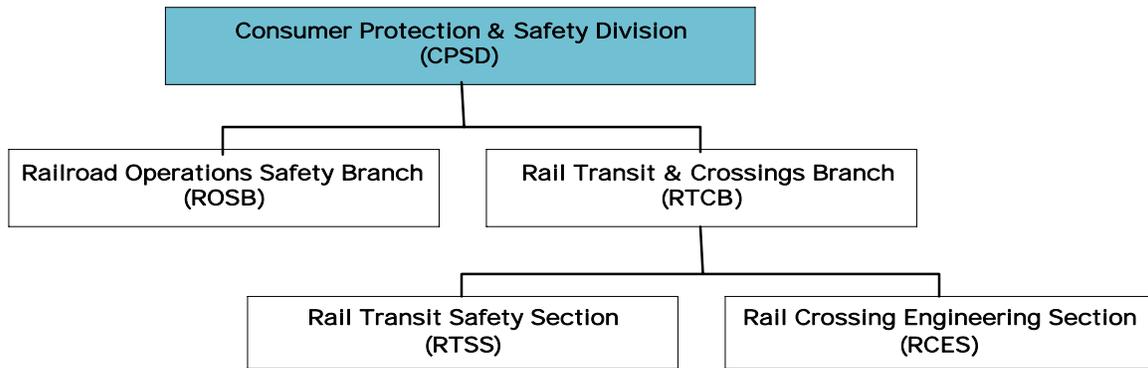
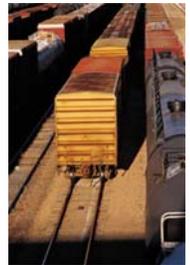


Figure 7 - CPSD Organizational Structure

Railroad Operations Safety Branch (ROSB). ROSB’s overall mission is to ensure that railroads in California comply with federal and state railroad safety regulations, and with Commission General Orders (GOs). GOs deal with safety issues not otherwise covered by these regulations. ROSB has safety oversight responsibility for 50 heavy-rail freight corporations, five heavy-rail passenger systems, and over 7,100 miles of heavy-rail track. ROSB inspectors conduct accident investigations, and conduct safety inspections in five areas: motive power and equipment, operating practices, track, hazardous materials, and signal and train control.



Rail Transit Safety Section (RTSS). RTSS provides safety oversight of rail fixed guideway systems, also referred to as Rail Transit Agencies (RTAs).⁶ RTSS inspectors conduct safety inspections in the areas of operations, track, and signal. RTSS manages the State Safety Oversight (SSO) Program for these RTAs.



The RTSS safety oversight program involves:

⁶ Currently, there are 12 such RTAs: Bay Area Rapid Transit District (BART), Los Angeles County Metropolitan Transportation Authority (LACMTA), San Francisco Municipal Railway (Muni), Santa Clara Valley Transportation Authority (SCVTA), Sacramento Regional Transit District (SRTD), San Diego Trolley, Inc. (SDTI), North County Transit District (NCTD) SPRINTER rail line, Angel’s Flight Railway Foundation (a funicular system in downtown Los Angeles), Port of Los Angeles Waterfront Red Car Line, San Francisco International Airport San Francisco Intermodal AirTrain System, Farmer’s Market Trolley, located in North Hollywood, and Americana on Brand trolley, located in Glendale.

- System safety and security program management and oversight of design and construction; oversight of operations and maintenance; safety certification of new projects and extensions to existing RTAs; and internal safety and security audits
- Review and approval of RTA submissions of System Safety Program Plans, System Safety Security Plans, Safety Certification Plans, accident investigation procedures, accident investigation reports, annual internal safety and security audit reports, and corrective action plans and schedules
- Reporting and investigating accidents
- Performing triennial on-site safety and security reviews
- Performing on-site inspections of infrastructure and records

RTSS also has the responsibility for final recommendations to the CPUC whether to approve final safety certification verification reports, prior to the initiation of service on new rail transit projects or extensions.

Rail Crossings Engineering Section (RCES). RCES provides safety oversight for the approximately 9,000 public crossings and 4,000 private crossings in the state, which includes the authority to determine crossing design, location, terms of installation, operation, maintenance, and warning devices. Over 10,000 of these crossings are at-grade, i.e., at locations where the track and roadway are at the same level, as opposed to being grade-separated. RCES crossings-related responsibilities include:



- Performing safety inspections of crossings
- Preparing recommendations to enhance safety at specific crossings
- Reviewing and processing applications for CPUC authority to construct new or to alter existing crossings
- Reviewing and responding to public complaints (e.g., rough or unsafe crossings, noise issues)
- Developing CPUC policies to enhance safety of all crossings in the state

- Reviewing environmental impact documents for potential project-related effects on the safety of crossings in or near the project area
- Participating in state and national committees that establish standards and recommend rule changes to improve crossing safety
- Analyzing new crossing safety technology
- Performing field reviews of crossings to update the crossing inventory database
- Administering and maintaining the CPUC Rail Crossing Inventory Database and the Commission's Rail Accidents Database
- Administering the Rail Transit and Crossings Branch's Filings Database

Other RCES responsibilities include:

- Participating in the Section 130 program, in which RCES identifies and evaluates public crossings that are candidates for federal funding to eliminate hazards at crossings, and submits detailed engineering recommendations to the California Department of Transportation (Caltrans), which then issues service contracts to railroads and local roadway agencies to implement the improvements.
- Administering the Section 190 program, which evaluates crossings nominated by local roadway agencies and prioritizes those crossings to establish a ranking of those most in need of grade separation. Ranked projects are then eligible for funds, allocated by Caltrans, to establish grade separations to replace the at-grade crossing.
- Evaluating all notices of the establishment or continuation of Quiet Zones, and providing written comments within 60 days. Quiet Zones are areas meeting certain criteria, designated by local governments, in which locomotives are not required to sound their horns on approaching crossings. The evaluation requires research and verification of data submitted under the rule, and the processing of applications to the CPUC for authority to alter the warning devices at such crossings.

Although these units are distinct within CPSD, they work together to capture synergies. For example, ROSB, RTSS, and RCES staff work together on crossing safety, each contributing from a different perspective. Staff from all three sections work together on

Operation Lifesaver,⁷ and help educate groups from the perspective of train and transit vehicle operators and highway vehicle operators. ROSB staff and RCES staff work together on enforcement and risk-analysis activities such as reporting “near-miss” incidents at crossings, video camera evidence at crossings, and any issues that may coincide, such as the implementation of “Quiet Zones” at crossings.⁸ ROSB staff participates in RTSS staff audits of light-rail transit properties by contributing technical inspection expertise as well as training resources. Many hazard analysis and hazard reduction problems require joint problem-solving by these three units, and their placement within one Division at the CPUC facilitates this synergistic effort.

III. Issue: Legal and Regulatory Hurdles

One of the issues to be analyzed under SB 53 are the benefits and liabilities of establishing what would be in effect a consolidation of all State rail responsibilities in a single governmental entity. SB 409 (2009; Ducheny) would create the Department of Railroads in Business, Transportation & Housing Agency (BT&H), which would transfer to that department responsibility for various state railroad programs currently administered by other agencies, including the rail crossings programs of CPUC. In theory, additional functions could also be transferred to such a Department in BT&H or a similar unit established in another agency.

Such a consolidation would have advantages in that the regulatory framework would be simplified. BT&H in particular has several existing responsibilities regarding railroads, including involvement in the administration of funding for three rail crossing-related

⁷ Operation Lifesaver is a non-profit, international continuing public education program first established in 1972 to end collisions, deaths and injuries at places where roadways cross train tracks, and on railroad rights-of-way. Operation Lifesaver programs are sponsored cooperatively by federal, state, and local government agencies; highway safety organizations, and the nation’s railroads.

⁸ A Quiet Zone is a railroad grade crossing at which, under most circumstances, trains are prohibited from sounding their horns, in order to decrease noise levels for nearby residential communities. Such zones can be established only when other safety measures compensate for the absence of the horns. Train crews are still permitted to sound horns within a Quiet Zone for safety reasons. The Federal Railroad Administration train horn rule provides localities nationwide with the opportunity to establish quiet zones. The federal rule pre-empts all applicable state laws. To qualify, communities wishing to establish quiet zones must equip proposed grade crossings with adequate safety measures to overcome the decrease in safety created by silencing the train horns. The additional safety measures must be constructed at the community’s own expense and must meet federal specifications. The federal rule also contains language which restricts the volume of train horns.

programs, as described in Section V.B. However, transferring CPUC rail oversight duties to BT&H or any other agency would require major alterations in California's governmental structure. The California Constitution grants the CPUC the authority to regulate passenger and freight rail and rail transit safety in the state, as these are operated by entities that fall under the constitutional definition of public utilities.⁹ Neither the Governor nor the Legislature can legally remove these constitutionally-granted functions: the CPUC's constitutionally-conferred powers of public utility regulation cannot be transferred to another entity without changes to the California Constitution, by amendment or possibly, revision.¹⁰ This would be a major undertaking.¹¹ In addition, revisions would have to be made to a variety of sections in the state Public Utilities, Government, and Streets and Highways Codes to take authorities away from the CPUC and grant them to another agency. For example, simply to go through the Public Utilities Code and select the sections that specifically apply to rail safety, and then to alter the Constitution to transfer that authority to a new agency, would be insufficient. These code sections, and the General Orders, Resolutions, and numerous CPUC formal orders or decisions, would consequently be extracted from the due-process infrastructure and protections by which they were crafted and executed. New administrative, legal, and

⁹ "By direct grant from the Constitution, the CPUC was empowered to prescribe uniform systems of accounts and fix rates for railroads "and other transportation companies", examine records, hear and determine complaints, issue subpoenas, and take testimony and punish for contempt...Legislative and judicial functions have been united in a single agency." Roderick B. Cassidy, *Public Utility Regulation in California, Commentary to the Public Utilities Code*, 1954, pp. 2-3. CPUC powers are derived from Article XII of the Constitution.

¹⁰ The California Legislative Counsel has determined that "[B]ecause the California Constitution confers the function of public utility regulation on the commission, the Governor is precluded from transferring the statutory and constitutional authority of the CPUC that relates to the regulation of public utilities to any other entity of state government pursuant to the Governor's statutory authority to reorganize state government." (Legislative Counsel Letter to Little Hoover Commission, June 20, 2005, p. 3.) Similarly, constitutionally-granted powers of the CPUC cannot be modified, curtailed, or abridged by legislation. (*People v. Western Air Lines, Inc.* (1954) 42 Cal. 2d 621,637, citing *Western Assn. etc. RR v. Railroad Com.* (1916) 173 Cal. 802, 804.

¹¹The amendment process may be initiated either by signature-gathering on a private petition for an initiative, or by a legislative proposal. To qualify a constitutional amendment through signature-gathering, a proponent must gather signatures equivalent to eight percent of the voters who voted in the last election for governor. Alternatively, the Legislature may propose constitutional amendments for adoption by a two-thirds vote of both houses. The amendment would require approval of a majority of voters to take effect. For revisions, the Legislature may, by a vote of two-thirds majority of both houses, propose a revision of the Constitution to the voters. The voters may then approve the revision by majority vote. Alternatively, the Legislature may, by a vote of two-thirds majority of both houses, submit to the voters the question of whether to call a constitutional convention. If the convention is called and the delegates adopt a proposed revision, it is then submitted to the voters for approval by majority vote. State of California, Office of the Attorney General, *Answer Brief in Response to Petition for Extraordinary Relief, Robin Taylor et al., Petitioners. v. The State of California et al., Respondents ;Dennis Hollingsworth et al., Intervenors*, S168066, December 19, 2008, pp. 9-10.

public participation organizational structures would have to be reconstructed in the new agency to avoid changing the due process inherently granted to the rail carriers when all these regulatory actions were originally crafted. A new decision-making body would need to be created that would replace the role of the independent Commissioners, and to the degree that this new body might differ from the current CPUC and its supporting infrastructure, the regulatory impact on the rail industry would be altered. Any alteration of the impact on the regulated rail systems would raise due process concerns, and could generate oppositional and disruptive litigation.

IV. Issue: Insulation from External Pressure

Many governmental safety oversight agencies have been criticized for being overly responsive to regulated industries or to politically-appointed officials who transmit industry concerns. For example, in a 2008 House of Representatives hearing, the Federal Aviation Administration was accused of ignoring airline safety violations. In particular, planes that did not meet safety criteria, such as failing to conform to inspection deadlines, were allowed to fly for extended periods of time. This was true even after management became aware of potential problems, e.g., in aircraft fuselages and rudder controls. FAA management was described as being overly close to airline management, and as reluctant to impose fines or other sanctions. FAA whistleblowers said that the agency viewed the airlines as its "customers," instead of as companies to be regulated. Some FAA inspectors stated that they felt their professional careers, and in some cases, even their personal safety, would be threatened if they performed their duties.¹² The Chairman of the committee stated that as long as the FAA views the airlines as customers, "that culture of safety will not take hold and is not going to permeate the organization."¹³

¹² U.S. House of Representatives, Committee on Transportation and Infrastructure, "Critical Lapses in FAA Safety Oversight of Airlines: Abuses of Regulatory 'Partnership Programs'," April 1, 2008, <http://transportation.house.gov/hearings/hearingDetail.aspx?NewsID=430>

¹³ CBS News, "FAA Whistleblower Says He Was Threatened," April 3, 2008, <http://www.cbsnews.com/stories/2008/04/03/travel/main3991452.shtml>. In a separate case, FAA was accused of pressuring its personnel to approve a new model of airplane prematurely, and of transferring employees who raised safety concerns that might have delayed the approval. New York Times, "F.A.A. Is Said to Have Rushed Plane's Approval," September 17, 2008.

Other examples of criticisms of agencies for perceived weak safety enforcement are given in Appendix A.

These examples, as well as the experience of the National Aeronautics and Space Administration and the other case studies presented in Appendix B, show the importance of agency insulation from external pressure. This insulation can be increased in several ways. These following measures are more easily accommodated by independent regulatory commissions, as opposed to BT&H and other administrative agencies:¹⁴

- Independence: When an agency has no layers of bureaucratic organization above it, it is immune to the pressures and larger policy goals of executive departments that threaten administrative agencies.
- Boards versus single heads: Governance by a commission insulates new agencies from political control by increasing the number of actors who must be influenced to change the direction of an agency, e.g., a board versus a single appointed official.
- Fixed terms: Appointees who serve for fixed terms are more insulated from political control, since they cannot be removed without cause, and have more independence than appointees who can be removed at any time.
- Specific qualifications: In most agencies, the elected official in charge can nominate any person of his/her choice to lead. However, this power is limited if the appointees must meet certain qualifications, e.g., to meet requirements of party-balancing (no more than a certain number of board members can be from one political party), or to meet requirements of experience or expertise.
- Separate funding: independent regulatory commissions are frequently insulated from the annual budget process because they are self-financed. This makes them less

¹⁴ Adapted from David E. Lewis, Presidents and the Politics of Agency Design (Stanford: Stanford University Press, 2003), pp. 46-48, 144.

susceptible to the pressures and large policy goals of executive departments that threaten administrative agencies.

As stated by one source, “Organizational structure is not neutral. The manner in which an agency or department is organized can have a major impact on policy outcomes.”¹⁵

Some structural arrangements allow more control by political actors than others do. Agencies like the independent regulatory commissions, for example, are insulated from political control by commission structures that dilute political accountability, party-balancing requirements that diminish the impact of changing administrations, and fixed terms for commissioners that limit the influence of any one administration on commission policy.¹⁶

At the same time, a balance must be struck between agency independence on the one hand, and on the other hand, responsiveness to elected officials. As important as safety concerns are, officials must balance these concerns with other, equally pressing needs. Governmental policies can be at cross-purposes when agencies are independent of central control. Also, industries have legitimate concerns about the costs of regulation. Lastly, organizational form alone is insufficient to guarantee that safety considerations will not be downgraded in favor of the promotion of industry.

The CPUC is adequately insulated from the external pressures described above. The California Constitution provides for the appointment of the CPUC’s five Commissioners by the Governor, with confirmation by the State Senate. Members are appointed for staggered 6-year terms. Individual legislators do not have authority over Commissioners’ decision-making. However, at the same time, the CPUC retains responsiveness to public officials by being governed by new laws. The Legislature as a whole must pass new legislation, which then must be signed by the Governor. These constitutional structures prevent undue influence from individual politicians by limiting legislative influence to the complete legislative process, including all legislators with one vote each, and with the Governor’s concurrence. Even so, while legislation may “confer additional authority and jurisdiction upon the commission,” and may establish the manner and scope of review of

¹⁵ Richard Waterman, Presidential Influence and the Administrative State (Knoxville: University of Tennessee Press, 1989), p. 40; cited in Lewis, *ibid.*, p. 6.

¹⁶ Lewis, *ibid.*, pp. 3-4.

commission action in the courts, it cannot modify, curtail, or abridge the constitutionally-granted powers of the CPUC.¹⁷

In addition to the many structural reforms that provide for Commissioner impartiality and freedom from undue influence, additional protections have been instituted during and since the initial reform era. As part of its Mission and Values, CPUC provides an open, fair, timely, and inclusive process, which also is transparent. For example, during the critical phase of CPUC deliberation leading up to a formal and public vote on any rate setting and adjudicatory matters, parties are prohibited from contacting any Commissioner. And at all times, since formal CPUC decisions are adopted with a minimum of three Commissioners' votes, no more than two Commissioners may meet for any reason, unless the meeting has been formally and publicly noticed in advance, including the agenda for any such meeting.

CPUC decisions must be based on a formal record where parties have the right to present testimony and to cross-examine witnesses. CPUC votes must take place in these formal meetings where any member of the public has the right to speak regarding issues related to any item on the agenda. Parties have the right to a hearing, to petition for rehearing, and to appeal CPUC decisions in court. Parties also have the right to file applications for formal CPUC action, and to petition to modify CPUC actions.

Any interested party may participate in formal proceedings, and may be compensated with public funds if they can show a financial need and are deemed to have contributed to the proceeding. The CPUC's Public Advisor's office provides procedural and advisory support to individuals who wish to participate in Commission proceedings, but who are unfamiliar with the CPUC's practices and procedures. The Public Advisor's office also assists eligible parties in procuring public funding for participation.

The CPUC has a variety of fact-finding tools it uses to inform its policy choices. It relies on evidentiary hearings when material issues of fact are in dispute, legislative-style hearings and workshops for policy considerations. Workshops supplement the formal decision-making process by providing an informal forum for the exchange of ideas and

¹⁷ California Constitution, Article XII, Section 5; *People v. Western Air Lines*, *ibid.*.

information, which is particularly useful in complex or contentious proceedings to establish fact and discover and define issues, to foster agreements and stipulations, and to work out ways to implement policy decisions made by the CPUC.

The Administrative Law Judge Division (ALJ) provides just, reasoned, efficient, and innovative resolution of complex matters in a manner that ensures due process and respects the dignity of all participants. The ALJ Division supports the decision-making process by receiving all formal filings, preparing and updating service lists, maintaining a database of all formal proceedings, ensuring that the CPUC's files are complete and accurate, and preparing and coordinating the agendas for the CPUC's bi-weekly decision-making meetings. The Division emphasizes the use of Alternative Dispute Resolution techniques, including mediation, early neutral evaluation, and settlements. By participating in voluntary alternative dispute resolution efforts, parties can reach creative solutions that both satisfy their interests and reduce litigation costs.

When disputes arise, and adjudication is necessary, a CPUC ALJ prepares a draft decision within 90 days after submission of the case, based on testimony and evidence submitted over the course of a proceeding, and serves it by mail or email on all parties. Parties then have 20 days to file comments. The ALJ replies to the comments and may revise the proposed decision based on them, and submits the proposed decision to the assigned commissioner for review. The assigned Commissioner then places it on the agenda for consideration and vote by all Commissioners at one of the twice-monthly public CPUC meetings. The Commissioners may adopt, modify, or reject any proposed decision and any Commissioner may offer an alternate decision for vote by all commissioners.

Federal rail safety policy is developed and implemented by the Federal Railroad Administration (FRA) and the Federal Transit Administration (FTA). The CPUC's independent voice has been effective in maintaining a strong focus on safety at the FRA and the FTA, by acting as a catalyst for change where necessary, and by being a highly-regarded and highly-valued state participating agency.

V. Issue: Conflict-Free Safety Mission

In considering the benefits and liabilities of establishing one state governmental unit to be responsible for the rail functions outlined by SB 53, which include both safety oversight and the provision of passenger rail and high speed rail service, a crucial issue to consider is organizational conflict of interest.

There are inherent potential conflicts between the regulation of the safety of an organization's services, and the promotion and/or provision of those services. Often, the core mission of an organization is seen as service promotion or provision, and the maintenance and expansion of the organization is seen as dependent on success in that mission. In general, tasks that are not defined as central to an agency's mission are often performed poorly or starved for resources.¹⁸ When safety regulation is combined with the functions of service promotion or provision within the same organization, the danger exists that the safety function will be less valued, and will be seen as impeding the organization in its core mission. Safety regulation can be perceived as taking resources away from its mission, slowing performance, or calling unwanted public attention to organizational deficiencies. As a result, safety problems may be inadequately addressed, and public perceptions can take hold that the agency does not take safety seriously.

In several cases, potential or actual problems of institutional conflicts of interest between safety on the one hand, and promotion or provision of services on the other, have led to the removal of safety responsibilities from an existing governmental agency or organizational unit within an agency, and the transfer of those responsibilities to another unit within the agency, or to a separate organization. In other cases, while the agencies involved have not been reorganized or organizational change has been minor, their safety records have been severely criticized, and their public credibility has suffered. Examples where conflicts between dual agency responsibilities for promotion of an industry and regulation of its safety have led to organizational change (or calls for such change by investigatory bodies) include the following:

¹⁸ James Q. Wilson, Bureaucracy: What Government Agencies Do And Why They Do It (Basic Books, 1989), p. 110.

- National Aeronautics and Space Administration
- Federal Aviation Administration
- Federal Highway Administration/Federal Motor Carrier Safety Administration
- Department of Transportation/National Transportation Safety Board
- Bureau of Mines/Mining Enforcement and Safety Administration/Mine Safety and Health Administration
- Atomic Energy Commission/Nuclear Regulatory Commission
- Department of Energy
- European Food Safety Agencies

The experience of the National Aeronautics and Space Administration (NASA) in two major accidents, the destruction of the *Challenger* and *Columbia* space shuttles, is summarized below. These events highlight the problems that can occur when organizational responsibility for safety within the agency is not sufficiently independent, and when safety considerations become subordinated to the promotion and administration of services, particularly the need to maintain tight scheduling of services. The NASA experience, and the experiences of the other agencies listed above, are presented in more detail in Appendix B.

A. Case Study: National Aeronautics and Space Administration

Challenger Accident

NASA was rebuked by the Presidential Commission on the Space Shuttle *Challenger* Accident (also referred to as the Rogers Commission after its chairman, former Secretary of State William P. Rogers), for its role in allowing the 1986 *Challenger* space shuttle launch to proceed. The mission ended in the destruction of the shuttle and the deaths of the seven astronauts aboard shortly after launching.

The Rogers Commission concluded that the management of Morton Thiokol, the manufacturer of the *Challenger* solid rocket booster system, recommended that the launch proceed, contrary to the views of Thiokol's engineers. This management decision was made in order to accommodate NASA, a major customer of Thiokol. NASA's safety program was strongly criticized by the Rogers Commission:

Organizational structures at [NASA Space Centers] Kennedy and Marshall have placed safety, reliability and quality assurance offices under the supervision of the very organizations and activities whose efforts they are to check.¹⁹

The commission report expressed surprise that NASA's safety staff was never mentioned in the testimony. The question of flight safety had been relegated so far into the background of NASA activity since Apollo that the agency's safety program was ignored...[failures] included a lack of problem reporting requirements, inadequate trend analysis, misrepresentation of criticality, and lack of safety program involvement in critical decisions. 'A properly staffed, supported and robust safety organization might well have avoided these faults and thus eliminated the communication failures.'...no independent, centralized, nor effective safety organization in NASA was monitoring problems.²⁰

The House Committee on Science and Technology held separate hearings in 1986 on the *Challenger* accident and concluded the following:

The committee believes that the pressure to push for an unrealistic number of flights continues to exist in some sectors of NASA and jeopardized the promotion of a "safety first" attitude throughout the shuttle program...Pressures within NASA to evolve from an R&D agency to a quasi-competitive business operation caused a realignment of priorities in the direction of productivity at the cost of safety.²¹

After the Rogers Commission report was issued, NASA made many of the organizational changes recommended by the Commission, including the establishment of an Office of Safety, Reliability, and Quality Assurance at its Headquarters. However, that office was not given the direct authority over all of NASA's safety operations, as the Rogers Commission had recommended. Rather, NASA human space flight centers each retained their own safety organization, reporting to the center directors.

Columbia Accident

Organizational change within NASA in the wake of *Challenger* was not sufficient to prevent another major accident. Seventeen years after the *Challenger* accident, the *Columbia* space shuttle disintegrated when entering the atmosphere on February 1, 2003, after a 16-day science mission, with the death of the seven astronauts aboard.

¹⁹ Rogers Commission Report, <http://science.ksc.nasa.gov/shuttle/missions/51-l/docs/rogers-commission/Chapter-7.txt> ["The Silent Safety Program"].

²⁰ Richard S. Lewis, *Challenger: The Final Voyage* (New York: Columbia University Press, 1988), p. 207.

²¹ Cited in Lewis, p. 233.

An investigatory body, the Columbia Accident Investigation Board (CAIB), was established. As with *Challenger*, factors that contributed to the *Columbia* accident included the organizational structure and culture of NASA, both of which undervalued safety concerns. The CAIB concluded:

...NASA's organizational culture had as much to do with this accident as [the physical cause of the accident] did. By examining safety history, organizational theory, best business practices, and current safety failures, the report notes that only significant structural changes to NASA's organizational culture will enable it to succeed... NASA's current organization does not provide effective checks and balances, does not have an independent safety program, and has not demonstrated the characteristics of a learning organization.²²

A separate study of the *Columbia* accident, which summarized the CAIB report and drew its own conclusions, stressed the importance of a NASA organizational culture in which safety concerns were subordinate to scheduling concerns, and the lack of a strong and independent safety organization within the agency.²³

B. Absence of Institutional Conflicts of Interest at the CPUC

The CPUC does not have the types of institutional conflicts of interest that were evident in the above NASA experience, and which would be present if the same agency was responsible for both rail service provision and safety oversight. The CPUC's rail programs focus solely on safety, and the CPUC has no role in the promotion or provision of rail services.

CPUC's regulation of other utilities, such as such as gas, electricity, water, and telecommunications, does not conflict with its rail safety mission. These other functions are housed in separate units within CPUC. Also, ROSB rail safety activities, such as inspections of heavy freight and inter-city passenger rail operations, are funded by user

²² Columbia Accident Investigation Board [CAIB] Report, http://caib.nasa.gov/news/report/pdf/vol1/full/caib_report_volume1.pdf, August 2003, p. 12.

²³ Yasin Aytekin and Nicholas Long, "A Managerial Approach to NASA's Cultural Changes: Open System Model," Master's Thesis, Naval Postgraduate School, Monterey, California, December 2007, <http://stinet.dtic.mil/cgi-bin/GetTRDoc?AD=ADA475773&Location=U2&doc=GetTRDoc.pdf>

fees assessed on rail companies. Other, non-rail safety CPUC units are not in a position to siphon off rail safety resources.

Rather than conflicting with rail responsibilities, the presence of units regulating other utilities benefits CPUC's rail safety mission. For example, CPUC General Order 95 regulates the installation, maintenance, and operation of the overhead electric wires that power transit and catenary systems. In accordance with this General Order, CPUC's Rail Transit and Crossing Branch (RTCB) conducts safety audits of municipal transit systems that use overhead wires. The CPUC's Utility Safety and Reliability Branch (USRB) regulates power generation, and USRB lends its expertise to the overhead wire inspections conducted by RTCB inspectors.

BT&H has several existing responsibilities regarding railroads, including involvement in the administration of funding for three rail crossing-related programs, as described below. However, in contrast to CPUC's focused mission of rail safety, BT&H in general, and Caltrans in particular, has a broad range of other responsibilities besides this limited rail involvement. Their main priority has been the state's highway system. It is unlikely that placing the responsibility for rail safety within BT&H would change that focus. Indeed, the reverse would be more likely: rail safety would become even more subordinate to highway concerns, and the State role in safety regulation would be diminished. Even considering rail alone, BT&H and Caltrans have other objectives besides safety, including development of a comprehensive rail passenger system and promoting rail passenger service. Government Code Section 14007.1(a) states:

There is in the Department of Transportation the Division of Rail, which is responsible for the development of a comprehensive rail passenger system and the preparation of the rail passenger development plan required pursuant to Section 14036.

Some of Caltrans' service promotion functions are described through a Caltrans link to an Amtrak website:

Since 1976, the California Department of Transportation (Caltrans) has been promoting intercity passenger rail service in California by augmenting Amtrak's basic system of interstate trains. Through Caltrans, the State of California provides capital

grants and support for station and track improvements, signaling, locomotives and cars, connecting Amtrak Thruway bus service, and operating assistance for the *Pacific Surfliner®*, *San Joaquin®* and *Capitol Corridor®*.²⁴

There is little overlap between current CPUC and BT&H/Caltrans rail responsibilities. Caltrans' rail division focuses on commuter rail planning in the state of California, while CPUC is charged with rail safety. As described earlier, there are inherent potential conflicts between the regulation of the safety of an organization's services, and the promotion and/or provision of those services.

Both Caltrans and CPUC are involved in decisions involving highway-rail grade crossings and grade separations. The two agencies jointly administer three funding programs: Federal Section 130 grade-crossing protection program, State Section 190 Grade Separation Program, and the State Automatic Grade Crossing Warning Device Maintenance Fund. However, there is no duplication in responsibilities between the agencies.

Federal Section 130 program

The Federal Section 130 program originated in the early 1970s and sets aside federal funds for the elimination of hazards at highway-rail crossings. The Federal Highway Administration (FHWA) is responsible for this program, but has delegated implementation responsibility to the states. These federal funds are directed to state departments of transportation. In California, that agency is Caltrans. In brief, the CPUC utilizes its technical and engineering skills to evaluate, prioritize, and recommend appropriate crossing improvements, while Caltrans funds these improvements, utilizing its contracting, oversight, and project delivery skills. The CPUC prioritizes crossing improvements based on safety and feasibility. Caltrans then uses the prioritization list to fund the projects with the federal dollars California receives for that purpose.

Under Title 23, United States Code, Section 130, each state is required to maintain a survey of all of its highways to identify those railroad crossings that may require grade separation, relocation, or protective devices (e.g., automatic crossing gates), and to

²⁴ http://amtrakcalifornia.com/rail/go/amtrak/about_us/index.cfm

establish and implement a schedule of projects for these purposes. The CPUC, with its statutorily-derived authority over rail crossings in California, maintains such a database of crossings, and conducts an annual evaluation of crossing data to identify crossings where safety can be improved.

CPUC engineers then organize field evaluations of such crossings with involved parties (railroad, roadway authority, Caltrans staff) to determine appropriate improvements. After obtaining concurrence from the involved parties on these improvements, staff develops final scopes of work for the crossing improvement projects.²⁵

The CPUC then forwards the project scopes of work and supporting documentation to the Caltrans Division of Rail, which programs and obligates the federal funds which it receives under the Section 130 program. Caltrans contracts directly with railroads and/or local roadway authorities for these entities to construct the recommended improvements. To further streamline the process, Caltrans and the CPUC are developing a Memorandum of Understanding between the two agencies which further defines and coordinates the two agencies' distinct roles, responsibilities, and authorities with regard to this program.

State Section 190 Grade Separation Program

California Streets & Highways Code, Section 190 requires that Caltrans set aside a minimum of \$15 million annually to fund grade separation projects. Section 190 funds are used to pay for grade separations at highway-rail crossings or for reconstructing existing grade separations. Usually, these funds do not cover the entire cost of these projects, which frequently exceed \$20 million. Every second year, the CPUC opens a formal proceeding to take nominations by city, county or state roadway authorities, separation of grade districts, and other governmental bodies for grade separation projects. The CPUC has conducted this process since the 1970s.

The CPUC prioritizes these grade separation proposals according to safety criteria that have been the subject of public hearings. A draft Section 190 Grade Separation Priority

²⁵ If there are conflicts or controversies among stakeholders, a CPUC Administrative Law Judge will open public hearings, and after all interested parties have been heard, will make a determination in the best interest of public safety. The hearing process is necessary in about five percent of the crossing applications.

List is developed and distributed to all involved parties. Hearings are held for the CPUC to receive comments or revisions, and the CPUC issues the final Priority List, which is good for two years.

Once the prioritization list is issued and the projects ranked, project proponents must then meet several Caltrans requirements to obtain an allocation of Section 190 funding. These include providing evidence of the following: that they have secured agreements with the railroad that owns the crossings at issue; received authority to construct the crossing from the CPUC; and obtained assurance from project proponents that they can fully fund the remaining portions of the projects, if any, not covered by Section 190 funds.

State Automatic Grade Crossing Warning Device Maintenance Fund

Railroads are responsible for maintaining automatic-grade crossing warning devices. However, crossing agreements between these parties typically require such maintenance costs be shared between railroads and local roadway authorities. The Automatic-Grade Crossing Warning Device Maintenance Fund Program is a state-funded program established by the Legislature in 1965 to pay the cities' and counties' share of the cost of maintaining highway-rail crossing automatic warning devices installed or upgraded after October 1, 1965. Public Utilities Code Section 1231.1 requires Caltrans to set aside in its annual budget a minimum allocation of \$1 million into the Grade Crossing Maintenance Fund Program for allocation to CPUC for the purpose of paying to the railroads the cities and counties share of maintaining these devices. The railroads perform required maintenance during a given calendar year, and then file a claim with the CPUC for reimbursement of the local government's share of the maintenance costs. CPUC verifies that the claims are valid, confirms the status of the crossing and its eligibility under the program, and forwards valid claims to Caltrans for payment. These claims are paid from the allocation made in the Caltrans budget for this purpose.

In administering this program, the CPUC and its open public process are utilized to set the maintenance cost levels for each type of automatic warning device; to annually recommend to the California Transportation Commission, which sets Caltrans budget, the appropriate funding level to fully fund the program; and to apportion maintenance costs

among local roadway authorities and railroads for specific crossings for which maintenance reimbursement is sought. The CPUC process allows any railroad or roadway agency opportunity to request CPUC review of the currently established maintenance cost levels (which were established by a previous formal CPUC proceeding), request review of apportionment levels, and to respond to CPUC recommendations for funding levels.

VI. Issue: Adequate Regulatory Authority

An alternative model for rail safety oversight besides the option of consolidating rail functions discussed above is provided by the National Transportation Safety Board (NTSB). Rail safety improvements are frequently driven by recommendations emanating from the NTSB, which is an independent federal accident investigation agency that in some ways is analogous to the CPUC. NTSB is charged with investigating every civil aviation accident in the United States and significant accidents in the other modes of transportation -- railroad, highway, marine and pipeline -- and issuing safety recommendations aimed at preventing future accidents. The Safety Board determines the probable cause of:

- all U.S. civil aviation accidents and certain public-use aircraft accidents;
- selected highway accidents;
- railroad accidents involving passenger trains or any train accident that results in at least one fatality or major property damage;
- major marine accidents and any marine accident involving a public and a nonpublic vessel;
- pipeline accidents involving a fatality or substantial property damage;
- releases of hazardous materials in all forms of transportation; and
- selected transportation accidents that involve problems of a recurring nature.

The NTSB was established in 1967. Although independent, it relied on the U.S. Department of Transportation (DOT) for funding and administrative support. In 1975, under the Independent Safety Board Act, all organizational ties to DOT were severed. The NTSB is not part of DOT, or affiliated with any of its modal agencies. The NTSB's

organizational structure is a direct federal parallel to the CPUC's state structure. The NTSB is an independent board composed of five Members who are nominated for five-year terms by the President and confirmed by the Senate.²⁶

With regard to most of its functions, including railroad accidents, NTSB has purely investigatory powers, and, while it can make recommendations, it has no authority to promulgate or enforce regulations, nor to fund or be directly involved in the operation of any mode of transportation.

The NTSB's structure, and its success in improving the safety of the nation's transportation systems, its natural gas systems, and its hazardous materials systems are strong testaments to the need for independence is safety regulatory oversight. At the same time, there are disadvantages in that agency's lack of regulatory powers. While it often has been praised for its investigatory skills, NTSB has no power to enforce its recommendations. In the view of many observers, this increases the independence of the agency. However, this lack of regulatory authority also means that some of its recommendations are not adopted. In order to ensure that safety is maintained, it is important for the safety agency to have the ability to translate its findings into regulations, and the ability to directly impose, or to initiate a process for imposing, penalties for non-compliance.

According to the NTSB, historically, federal transit agencies and rail transit agencies have implemented "over 80 percent" of its recommendations.²⁷ While, if true, this is a substantial figure, it still leaves almost a fifth of its recommendations not implemented. It is unknown what percentage of NTSB recommendations directed at heavy-rail agencies and companies, as opposed to rail transit agencies, have been adopted. The majority of the 32 NTSB Railroad Accident Reports and Highway Accident Reports adopted from 1999 through 2008 (17 out of 32 Reports, or 53%), reference responses to prior NTSB recommendations by the FRA, railroad companies, and other parties, which the NTSB characterized as not acceptable.

²⁶ "About the NTSB: History and Mission," http://www.nts.gov/Abt_NTSB/history.htm.

²⁷ GAO, "Rail Transit: Additional Federal Leadership Would Enhance FTA's State Safety Oversight Program," GAO-06-821, July 2006, pp. 22-23.

For example, a 2003 NTSB Railroad Accident Report stated the following:

For several years, the Safety Board has been a proponent of installing and using locomotive cab audio recorders to help determine the cause of accidents. Safety Recommendation R-97-9 was issued to the FRA as a result of the Safety Board's investigation of the collision between a Maryland rail commuter train and an Amtrak passenger train on February 16, 1996, near Silver Spring, Maryland:

R-97-9

Amend 49 *Code of Federal Regulations* Part 229 to require the recording of train crewmembers voice communications for exclusive use in accident investigations and with appropriate limitations on the public release of such recordings.

The recommendation, which is on the Safety Board's list of "Most Wanted" transportation safety improvements, was reiterated in the Board's report of a collision involving three Consolidated Rail Corporation freight trains near Bryan, Ohio, on January 17, 1999.

Based on the initial responses of the FRA, the Safety Board classified Safety Recommendation R-97-9 "Open - Unacceptable Response." On April 17, 2003, the Safety Board asked for an update on the status of the implementation of this recommendation. In a May 5, 2003, letter in response to the request for an update, the FRA, citing the absence of "a clear showing that safety benefits will outweigh the costs," stated that it "has reluctantly come to the conclusion that this recommendation should not be implemented at the present time."²⁸

Unless explicitly preempted by federal authority, the CPUC has the authority to adopt railroad safety regulations. Even in cases where the states are preempted from regulating a particular subject, such as locomotive and train brakes, the CPUC participates in federal rulemakings. In these rulemakings, the CPUC historically has not only ensured that California's interests are addressed, but has also provided additional expertise. For example, in the FRA rulemaking to address train braking deficiencies after two tragic run-away train accidents on the Cajon grade above and into San Bernardino, CPUC experts pressed for a braking performance standard that would better ensure train safety down steep mountain grades. While the rulemaking was critical to address the cause of the two Cajon grade accidents, it was equally important for other California mountain grades, such as over Donner Pass, through Dunsmuir along the Sacramento River, over the Cuesta grade above San Luis Obispo, and over the Tehachapi range above

²⁸ NTSB, "Collision of Two Burlington Northern Santa Fe Freight Trains Near Clarendon, Texas, May 28, 2002," RAR-03-01, adopted June 3, 2003, pp. 22-23 (footnotes omitted).

Bakersfield. In the federal rulemaking, CPUC experts presented operational expertise and engineering research in support of a performance standard. Frequently citing the CPUC's advocacy and substantive contributions, the FRA adopted a new and innovative train-braking performance standard.²⁹

In another example, following the 1991 Southern Pacific Railroad derailment and toxic spill into the Sacramento River that killed all river life for 40 miles, the CPUC investigated and ensured that safety standards were implemented to prevent recurrences. In this accident, the in-train forces (track-train dynamics) were so great that when the train passed through the sharpest curve on the line – the Cantara Loop, one of the sharpest railroad curves in the country – the locomotives pulled the freight cars in a straight line into the river. In its investigation, the CPUC determined that the railroad operating rules were inadequate to prevent the accident and that there were no federal regulations addressing track-train dynamics. The CPUC adopted as regulation, a settlement requiring the railroads to establish operating rules through an “industry best practices” methodology – an engineering research-based performance standard – and adopted a regulation requiring California railroads to comply with those rules. In its assessment of the state of railroad safety in the country at that time, the FRA referred to California's track-train dynamics regulatory work as leading the way for the country.³⁰

Another example is the CPUC's regulatory action following an accident in 2001 on the Angel's Flight funicular railway in Los Angeles.³¹ The accident resulted in one fatal and eight non-fatal injuries. The CPUC shut down the Angel's Flight operation until the joint NTSB - CPUC investigation was completed and the safety of the public could be ensured. The NTSB has no authority to require safety improvements – the CPUC does. To date, Angel's Flight has not yet made the significant safety improvements that are required, and the CPUC has therefore not allowed this railway to resume operations. In

²⁹ *Federal Register, Volume 66, pp. 4103 - 4152.*

³⁰ Federal Railroad Administration, U.S. Department of Transportation, *Forward through the 90s: Selected Issues in the Transportation by Rail of Hazardous Materials*, Report to Senate Committee on Commerce, Science, and Transportation and the House Committee on Energy and Commerce, September 6, 1994.

³¹ A *funicular railway*, or *funicular*, is a cable railway on a steep incline with counterbalanced cars simultaneously ascending and descending on parallel sets of rails. The Angel's Flight funicular railway originally operated from 1901 to 1969, moving passengers one city block between the commercial district at the bottom of Bunker Hill and the residential area at the top of the hill. After reconstruction beginning in 1993, it resumed operations in 1996. The Angel's Flight funicular extends 298 feet up a 33-percent grade.

the wake of the accident, the CPUC president directed staff to review the CPUC's General Order 164 and suggest improvements. Staff suggested significant improvements, the Commission adopted them, and the effort and the end product won praise from the NTSB. Moreover, the resulting General Order 164-D was adopted as the platform for the FTA's new national standard for rail transit system safety oversight.

VII. Issue: Effective Safety Oversight Depends on a Robust Safety Culture

The criticisms of agency performance described above demonstrate the importance of insulation from external pressure and the importance of the presence of a strong safety culture in a safety regulatory agency. Agencies with safety as their primary mission are more likely to have this culture than are agencies with competing missions, as would be created if a single governmental unit were to take on the rail safety and rail service responsibilities to be studied under SB 53.

In brief, *organizational culture* is the basic pattern of shared assumptions, values, and beliefs considered to be the correct way of thinking about and acting on problems and opportunities facing the organization. It is a powerful template that shapes what happens in the organization.³² *Safety culture* is a subset of organizational culture. Safety culture is the enduring value and priority placed on worker and public safety by everyone in every group at every level of an organization. It refers to the extent to which individuals and groups will commit to personal responsibility for safety, act to preserve, enhance and communicate safety concerns, strive to actively learn, adapt and modify (both individual and organizational) behavior based on lessons learned from mistakes, and be rewarded in a manner consistent with these values.³³ As discussed below, the importance of organizational culture and safety culture is particularly salient in explaining the problems

³² Steven McShane and Mary Ann Von Glinow, "Organizational Culture," *Organizational Behavior* (New York: McGraw-Hill Irwin, 2007), p. 253, cited in Yasin Aytakin and Nicholas Long, "A Managerial Approach to NASA's Cultural Changes: Open System Model," Master's Thesis, Naval Postgraduate School, Monterey, California, December 2007, <http://stinet.dtic.mil/cgi-bin/GetTRDoc?AD=ADA475773&Location=U2&doc=GetTRDoc.pdf>, p. 11.

³³ Douglas A. Wiegmann, Hui Zhang, Terry von Thaden, Gunjan Sharma, and Alyssa Mitchell, "A Synthesis of Safety Culture and Safety Climate Research," Technical Report ARL-02-3/FAA-02-2, Prepared for Federal Aviation Administration, Atlantic City International Airport, NJ, June 2002, p. 8.

that the National Aeronautics and Space Administration experienced in managing the space shuttle program.

Every organization has a culture, and many organizations have several.³⁴ An organization whose primary focus is safety likely will have a different organizational culture than one devoted to the promotion or provision of services. The mission of an organization plays an important role in the type of personnel it attracts, their motivations, and how they carry out their duties. For example, the U.S. Occupational Safety and Health Administration (OSHA) has attracted individuals disposed towards worker protection, which is congruent with the organizational mission of that agency:

Most OSHA officials either come from the occupational safety and health professions (safety engineering or industrial hygiene) or take courses in these fields after going to work for the agencies. Members of these professions share a body of knowledge. Like members of many professions, they also tend to share certain values or orientations which comprise a professional ideology. For occupational safety and health professionals, these are pro-protection values. They tend to believe that workers ought to be protected from hazards to life and limb and that larger reductions of risk are preferable to smaller reductions (without much consideration of cost).³⁵

Similarly, the U.S. Environmental Protection Agency has attracted committed environmentalists, whose motivations have shaped how that organization has pursued its goals.³⁶

Many government agencies have multiple, competing cultures. Some manage the competition well, while others do not. Generally, organizations in which two or more cultures struggle for supremacy will experience serious conflict. Different tasks will be done well only if given enough organizational autonomy so that distinctive, self-supporting cultures can develop and claim their share of resources.³⁷

³⁴ Wilson, *ibid.*, p. 109.

³⁵ Steven Kelman, "Occupational Safety and Health Administration," in James Q. Wilson, ed., The Politics of Regulation (New York: Basic Books, 1980), p. 250.

³⁶ Robert McMahon, The Environmental Protection Agency: Structuring Motivation in a Green Bureaucracy (Portland: Sussex Academic Press, 2006), p. 21.

³⁷ Wilson, Bureaucracy, pp. 101, 103, 105.

Organizational missions and resulting organizational structures on the one hand, and safety culture on the other, reinforce each other. Organizational structures facilitate or retard the development and maintenance of a strong safety culture. For its part, the safety culture of the organization will influence the deployment and effectiveness of an agency's safety management resources.³⁸

An effective organization should have the following five major components of safety culture:

- Organizational commitment
- Management involvement
- Employee empowerment
- Reward systems
- Reporting systems

These qualities are described in more detail in Appendix C.

The CPUC, through its Consumer Protection and Safety Division, has a top-to-bottom commitment to safety. The CPUC has no distracting missions. The CPUC's safety culture is grounded in the mission statements for CPSD's rail safety units, which articulate clear and unambiguous safety missions:

Rail Operations and Safety Branch mission statement:

Ensure California communities and railroad employees are protected from unsafe practices on freight and passenger railroads by promoting and enforcing rail safety rules, regulations and inspection efforts.

Rail Transit Safety Section mission statement:

Protect the California public and transit employees by ensuring that public rail transit guideway systems are designed, constructed, maintained, and operated safely and securely.

Rail Crossing Engineering Section mission statement:

³⁸ Rafiq M. Choudhry, Dongping Fang, and Sherif Mohamed, "The Nature Of Safety Culture: A Survey Of The State-Of-The-Art," *Safety Science*, v. 45, #10, December 2007, p. 1003.

Improve the safety of the public and rail employees by evaluating and recommending appropriate safety measures at highway-rail crossings.

CPUC rail safety staff consists of safety professionals with an enduring and complete focus only on safety. Personnel include rail industry safety experts in track, equipment, signal, operations, and hazardous materials; traffic engineers; mechanical engineers; electrical engineers; civil engineers; an industrial/organizational psychologist; policy/research analysts; a statistician; an economist; and attorneys. All of these experts are focused on one thing – safety. The rest of the CPUC, including its legal staff, administrative law judges, public advocacy and support staff, and the Commissioners themselves, support these missions without any other rail-related duties. The CPUC’s total focus on the rail industry is on safety.

The CPUC rail program organizational culture is a true safety culture. Safety culture is defined as an “enduring characteristic of an organization that is reflected in its consistent way of dealing with critical safety issues.”³⁹ This is manifested in safety oversight organizations through enduring proactive approaches, attitudes, and methods, rather than more transient reactive approaches. For example, the rail crossing priority list for Section 130 improvements is not based solely on accident history – reacting to *past* accidents. Safety professionals know that it would be futile to only remediate risk and hazard where accidents have already happened. Instead of simply reacting to a transient “perfect storm” of events at a particular location, many factors are included in formulas developed and validated to predict which crossings have the greatest likelihood of *future* accidents. These factors include such hazard data as vehicle and train traffic volumes, vehicle and train speeds, sight distances, current levels of crossing safety protection (e.g., warning devices), and other factors *including* accident history.⁴⁰

³⁹ Wiegmann et al., *ibid.*, p. 11.

⁴⁰ Scientifically validated statistical methods show that even if all crossings were identical in all respects, due to the random and infrequent nature of accident incidence, even within even a ten-year time period, a vast majority of crossings would have no accidents, a much smaller number of crossings would have one accident, very few would have two accidents, even fewer would have three accidents, and so forth. Under these conditions of complete randomness, some crossings would have as many as five accidents, even though there is no difference between crossings in the likelihood of an accident occurring. Thus, to identify the five-accident crossing as most in need of publicly funded improvements would be a misappropriation of funds. Esoteric statistical distributions, such a “zero-loaded Poisson distribution,” are used to explain this phenomenon and to validate prediction formulas. Utilizing these statistical methods, the most accurate

Another enduring quality of the CPUC's safety focus that defines its safety culture is its "systems approach" to safety. Through its professional training, CPUC staff learns to avoid the non-professional's tendency to terminate an accident-cause inquiry upon finding that someone's mistake *caused* an accident. Instead, staff has learned to review the entire system to find factors at any level which could have *prevented* the accident, including the conditions that may have allowed, or even caused, human error. Limiting accident investigation to a singular finding of human error provides little benefit for accident prevention. It is not uncommon for the remedy in such situations simply to be termination of the "responsible" employee.

CPUC staff strive to stay at the leading edge of safety professionalism by taking a complete "safety culture" perspective of the rail industries. Staff believes it can maximize the effectiveness of its rail safety effort by extending its review into all levels of the rail organizations, looking for evidence of beliefs, practices, attitudes, behaviors, and vigilance throughout the organization.

For example, staff is currently participating on a National Academy of Sciences Transportation Research Board panel to identify the underlying causes of transportation vehicle operator rule non-compliance. This panel's task is to develop a nationally and locally applicable resource that takes advantage of the best systems approaches in the transportation industry, including lessons learned in the aviation industry and otherwise available in the safety professional literature. One of the tasks for this research is to produce a "taxonomy" of rule non-compliance causes that can be used to identify responsibility throughout the system, not just with the proximate operator's actions.

Human performance literature, as well as the FAA's experience, point to many underlying causes of rule-noncompliance in the areas of, for example, training, practice, feasibility, fatigue, ergonomics, engineering, perceptions of the organization's safety priority, behavior modeling, social pressures, information overload, competing

formulas include all practical risk factors, such as train and motor vehicle traffic volumes, train and motor vehicle speeds, unique crossing characteristics such as sight-distance, the presence of heightened-risk traffic such as school buses and hazardous materials cargo, the existing crossing safety protection devices, *and* accident history.

incentives, apathy, and cognitive biases. With this systems safety and safety culture perspective, much more can be accomplished in pursuit of safe operations.

VIII. Conclusions and Recommendations

The CPUC's rail units are quality control entities comprised of experts in rail safety issues. The CPUC sets standards for and oversees the safety programs that are planned for and implemented by the private and investor owned companies who operate freight railroads; the regional and local public entities that operate inter-city rail, commuter rail and light rail transit operations; and the state, regional and local owners of streets and highways that intersect rail lines. CPUC staff understand the safety laws and rules that apply to each of these entities, inspect the entities in order to measure compliance with those safety laws and rules, investigate and determine the root causes and significant contributing factors of accidents, propose enforcement actions on violations of safety laws and rules, and propose improvements to rail safety laws and rules.

The CPUC does not have the sorts of institutional conflicts of interest that can impede its core mission of safety. Its rail programs focus solely on safety, and the CPUC does not fund, promote, set service standards, schedule rail movements, or provide rail services. The CPUC is keenly aware that, even when an agency has clearly-delineated safety responsibilities, and promotion and provision of services are not part of its duties, an appropriate organizational structure in itself will not produce adequate safety oversight. The agency structure must be joined by institutional commitments to safety, as expressed in the organization's organizational culture and safety culture. An organization whose primary focus is safety will likely have different organizational and safety cultures than an organization devoted to the promotion or provision of services.

The CPUC, with its railroad jurisdiction focused solely on safety, has developed an internal culture of safety and professionalism without distractions from competing demands such as service, scheduling, and promotion. The rail program's mission, goals, objectives, strategic planning, action plans, training, and professional development are all focused on safety.

The CPUC is accountable to the public, the Governor and the Legislature. It maintains its accountability through its due process provisions, including parties' rights to hearings, public meetings, workshops, petitions for rehearing, and appeals, as well as financial support for parties without the means to otherwise participate.

Clearly, safety impacts are the most important issue the Legislature must consider, when considering a reorganization of the existing rail governance structure.

The CPUC believes that as an alternative to an ambitious reorganization of state government, the collaboration being established in the Federal Section 130 Program (see Section IV.B, above) could be a model for effective inter-agency coordination and functioning. Areas needing ongoing coordination and joint planning could have standing interagency teams consisting of upper level managers, such as Division Directors, who have a structured, regularly scheduled meeting responsibility. Specific areas of responsibility could be connected by working groups that would match the need for coordination, timing and coordination. In the case of the Section 130 and 190 crossing issues, a working group consisting of middle managers effectively resolved the issues that had previously caused delays.

This concept of “matrix management” organizational structure has been used successfully and extensively in organizations where areas of responsibility are best addressed in separate and independent departments, but where coordination between departments is also important. Organizational research has affirmed the “best fit” of matrix management for these functions in such situations.⁴¹ This research underscores the benefits of defining roles, responsibilities, and boundaries, and establishing project- or program-based communication avenues tailored to the specific needs of each project and program, rather than searching for a way to satisfy specific needs through reorganization options that are inherently incompatible. In other words, we don't need to choose between an organizational structure that provides safety independence, and an organizational structure that provides efficient planning. Tailored communication and coordination

⁴¹ Cross-functional structures: A review and integration of matrix organizational and project management. Ford, Robert c and Randolph, W. Alan. (1997) *Journal of Management*, 18(2), 267 - 294.

processes can retain the best of both worlds: independent organizational decision-making structure and efficient planning.

Appendix A: Examples of Weak Enforcement

1. Mine Safety and Health Administration

The MSHA has been accused of lax enforcement of safety regulations by, among other groups, labor and Democratic members of Congress.⁴² In its investigation of the August 2007 Crandall Canyon Mine (Utah) accident, in which six miners and three rescuers lost their lives due to the collapse of the mine roof, the Department of Labor Office of the Inspector General concluded that MSHA was negligent in carrying out its responsibilities to protect the safety of miners, and that the lack of documentation to support the review and approval of the mine's roof control plan "prevented MSHA from showing that the process was free from undue influence by the mine operator."⁴³

2. Federal Motor Carrier Safety Administration

In a Senate Appropriations Committee report, the FMCSA was said to have "shown a pattern of undermining its safety mission by proposing weak regulations and failing to provide adequate oversight and enforcement of existing regulations."⁴⁴

3. Nuclear Regulatory Commission

⁴² E.g., AFL-CIO, "The State Of Workers' Safety And Health" (2008), http://www.aflcio.org/issues/safety/memorial/upload/_02.pdf; Committee on Education and Labor, Democratic Staff, "Background On The Activities Of The House Education And Labor Committee With Respect To Mine Safety And Health," <http://edlabor.house.gov/publications/20070907MineSafety.pdf>

⁴³ Department of Labor, Office of the Inspector General, "MSHA Could Not Show It Made The Right Decision In Approving The Roof Control Plan At Crandall Canyon Mine," Report Number 05-08-003-06-001, March 31, 2008, p.1.

⁴⁴ U.S. Senate, Appropriations Committee, Senate Report 110-418, "Transportation, Housing and Urban Development, and Related Agencies Appropriations Bill, 2009," "Federal Motor Carrier Safety Administration, Recommendations" http://www.thomas.gov/cgi-bin/cpquery/92?&sid=TSOPUuSIs&hd_count=94&xform_type=3&maxdocs=500&r_t=h&r_t=s&r_t=jc&refer=&r_n=sr418.110&db_id=110&item=92&sel=TOC_370087& Fleet Owner, "Senate report slams FMCSA," July 18, 2008.

Some Congressmen have accused the leadership of NRC of lax enforcement of safety standards for the nuclear power industry,⁴⁵ and the agency has been criticized for being too closely tied to that industry: “A purpose of the Energy Reorganization Act of 1974 was to divorce the newly created NRC from promotion of nuclear power. According to an NRC commissioner, ‘I still think it [the NRC] is fundamentally geared to trying to nurture a growing industry.’ We find that the NRC is so preoccupied with the licensing of plants that it has not given primary consideration to overall safety issues.”⁴⁶

⁴⁵ New York Times, “Committee Assails Nuclear Agency,” March 4, 1988.

⁴⁶ President's Commission on the Accident at Three Mile Island, Report of The President's Commission on the Accident at Three Mile Island, “G. The Nuclear Regulatory Commission,” October 1979, http://www.pddoc.com/tmi2/kemeny/nuclear_regulatory_commission2.htm.

Appendix B: Examples of Organizational Conflicts of Interest

1. National Aeronautics and Space Administration

Challenger Accident

NASA was rebuked by the Presidential Commission on the Space Shuttle Challenger Accident (usually referred to as the Rogers Commission after its chairman, former Secretary of State William P. Rogers), for its role in allowing the 1986 *Challenger* space shuttle launch to proceed, which culminated in the destruction of the shuttle and the deaths of the seven astronauts aboard shortly after launching.

The *Challenger* solid rocket booster system was constructed by the private firm Morton Thiokol. It was scheduled for launching from the Kennedy Space Center on January 28, 1986. A group of Thiokol engineers opposed the launch because of a forecast of unusually cold weather, which would be colder than that prevailing at any previous launch. The engineers contended that low temperature at the launch site would reduce the resilience of certain O-rings within the booster system, allowing hot gas to blow by the seals and penetrate the steel casing of the booster rocket, and recommended that the launch be delayed until warmer conditions were present. Without consulting higher-level NASA officials, NASA executives at the Marshall Space Flight Center protested this recommendation. After discussion with its engineers, Thiokol management overrode their objections and reversed the no-launch recommendation. As later reconstructed, the O-ring failure that the Thiokol engineers had feared took place, destroying the shuttle.⁴⁷

NASA managers were blamed for placing pressure on Thiokol to proceed on schedule.

“...the fact that pressure existed to get *Challenger* off the pad is indisputable. The

⁴⁷ Subsequent investigation revealed that the Thiokol engineers themselves did not fully understand aspects of the shuttle technology, including the O-ring seals, and that there were multiple causes of the *Challenger* failure beyond the ambient low temperature (e.g., the seals might have held had not unprecedented wind shear buffeted the vehicle, dislodging the O-rings). Diane Vaughan, *The Challenger Launch Decision* (Chicago: University of Chicago Press, 1997), p. 391. Vaughan and other analysts also point out the difficulty, or even impossibility, of guaranteeing safety in the operation of complex technological and managerial systems. *Ibid.*, p. 415-421. However, that analysis does not affect the overall conclusion (see text) that the organizational culture of NASA downgraded safety in favor of timely service provision.

obvious source was the 1986 launch schedule, which clearly had overextended the space agency's resources."⁴⁸ NASA managers were under pressure from Congress and the Administration to adhere to a reliable flight schedule with internationally competitive flight costs.⁴⁹ In addition, because delays of previous launches had been commented on critically by the media, NASA felt additional pressure to oversee a successful launch.⁵⁰ Also, NASA managers, cognizant that all space launches have elements of risk, had a good-faith belief, based on technical criteria, that this launch would not pose unacceptable risks to the astronauts on board. No NASA rules were violated by the decision to launch.⁵¹

Apart from sharing NASA's belief that the launch would not pose unacceptable risks, Thiokol management was susceptible to pressure from NASA to reverse the recommendation of its engineers because it did not want to alienate one of its primary sources of income. As recounted by a Thiokol engineer, after hearing the objections from the Marshall Space Flight Center, a Thiokol senior vice-president turned to another engineer and

asked him to take off his engineering hat and put on his management hat. From that point, management formulated the points to base their decision on. There was never one comment in favor, as I have said, of launch from any engineer or other nonmanagement person in the room...I felt personally that management was under a lot of pressure to launch and that they made a very tough decision, but I didn't agree with it.⁵²

The Rogers Commission concluded that Thiokol management recommended the launch contrary to the views of its engineers in order to accommodate a major customer.⁵³

The agency's safety program was criticized by the Rogers Commission:

⁴⁸ Richard S. Lewis, *Challenger: The Final Voyage* (New York: Columbia University Press, 1988), p. 122.

⁴⁹ Vaughan, *ibid.*, p. 390.

⁵⁰ *Ibid.*

⁵¹ Vaughan, *ibid.*, p. 336-339. While acknowledging the existence of scheduling pressure, Vaughan presents evidence that this pressure was not the primary cause of the launch decision.

⁵² Testimony of Roger Boisjoly before the Presidential Commission on the Space Shuttle *Challenger* Accident, cited in Lewis, *ibid.*, p. 117.

⁵³ Lewis, p. 121.

Organizational structures at Kennedy and Marshall have placed safety, reliability and quality assurance offices under the supervision of the very organizations and activities whose efforts they are to check.⁵⁴

The commission report expressed surprise that NASA's safety staff was never mentioned in the testimony. The question of flight safety had been relegated so far into the background of NASA activity since Apollo that the agency's safety program was ignored...[failures] included a lack of problem reporting requirements, inadequate trend analysis, misrepresentation of criticality, and lack of safety program involvement in critical decisions. 'A properly staffed, supported and robust safety organization might well have avoided these faults and thus eliminated the communication failures.'...no independent, centralized, nor effective safety organization in NASA was monitoring problems.⁵⁵

Among other recommendations, the Rogers Commission recommended that NASA establish an Office of Safety, Reliability and Quality Assurance, to be headed by an Associate administrator, reporting directly to the NASA Administrator. The Office would have direct authority for safety, reliability, and quality assurance throughout the agency. "The office should be assigned the work force to ensure adequate oversight of its functions and should be independent of other NASA functional and program responsibilities."⁵⁶

The House Committee on Science and Technology held separate hearings in 1986 on the *Challenger* accident, concluding that

The committee believes that the pressure to push for an unrealistic number of flights continues to exist in some sectors of NASA and jeopardized the promotion of a "safety first" attitude throughout the shuttle program...Pressures within NASA to evolve from an R&D agency to a quasi-competitive business operation caused a realignment of priorities in the direction of productivity at the cost of safety.⁵⁷

After the Rogers Commission report was issued, NASA made many of the organizational changes the Commission recommended, including the establishment of an Office of Safety, Reliability, and Quality Assurance at its Headquarters. However, that office was

⁵⁴ Rogers Commission Report, <http://science.ksc.nasa.gov/shuttle/missions/51-l/docs/rogers-commission/Chapter-7.txt> ["The Silent Safety Program"].

⁵⁵ Lewis, p. 207.

⁵⁶ The Presidential Commission on the Space Shuttle Challenger Accident Report [Rogers Report], <http://science.ksc.nasa.gov/shuttle/missions/51-l/docs/rogers-commission/recommendations.txt>, June 6, 1986.

⁵⁷ Cited in Lewis, p. 233.

not given the “direct authority” over all of NASA’s safety operations as the Rogers Commission had recommended. Rather, NASA human space flight centers each retained their own safety organization, reporting to the center directors.

Columbia Accident

Organization change within NASA in the wake of *Challenger* was not sufficient to prevent another major accident. Seventeen years after the *Challenger* accident, the *Columbia* space shuttle disintegrated when entering the atmosphere on February 1, 2003, after a 16-day science mission, with the death of the seven astronauts aboard.

An investigatory body, the Columbia Accident Investigation Board (CAIB), was established. As reconstructed by the CAIB, shortly after launch, a large piece of hand-crafted insulating foam came off an area where the shuttle attached to its external tank, and struck the leading edge of *Columbia’s* left wing. This event was not detected by the crew on board or seen by ground support teams until the next day. The foam strike resulted in a breach in that wing, which, upon re-entry of the vehicle into the Earth’s atmosphere, allowed superheated air to penetrate and begin to destroy the wing. Eventually, the vehicle went out of control and disintegrated.

As with *Challenger*, factors that contributed to the *Columbia* accident included the organizational structure and culture of NASA, both of which undervalued safety concerns. The CAIB concluded that

...NASA’s organizational culture had as much to do with this accident as foam did. By examining safety history, organizational theory, best business practices, and current safety failures, the report notes that only significant structural changes to NASA’s organizational culture will enable it to succeed... NASA’s current organization does not provide effective checks and balances, does not have an independent safety program, and has not demonstrated the characteristics of a learning organization.⁵⁸

Among other recommendations, the CAIB stated that

⁵⁸ Columbia Accident Investigation Board [CAIB] Report, http://caib.nasa.gov/news/report/pdf/vol1/full/caib_report_volume1.pdf, August 2003, p. 12.

NASA Headquarters Office of Safety and Mission Assurance should have direct line authority over the entire Space Shuttle Program safety organization and should be independently resourced.⁵⁹

A separate study of the *Columbia* accident, which summarized the CAIB report and drew its own conclusions, stressed the importance of a NASA organizational culture in which safety concerns were subordinate to scheduling concerns, and the lack of a strong and independent safety organization within the agency.⁶⁰

The *Columbia* period exemplifies the almost insoluble conflict between engineers and managers. The managerial mindset was to maintain tight flight schedules, decrease costs per flight, focus on the funding, and assure the smooth continuation of the program. The engineering mindset was to always lean in the direction of safety through testing and retesting...Clearly, managers overruling engineers and scientists in the divided tasking of the space agency confused and frustrated the previously dominant scientific culture...NASA dominant mindsets were in conflict, and the occupational cultures were not integrated resulting in disastrous decisions. The conflicts between a safety-first, and a schedule-first mindset contributed to the *Columbia* disaster.⁶¹

... management did not empower the Safety Office, including being reliant on the funding from the shuttle program they supported, instead of being independent. If the budget of the program was reduced, the safety group was likely to take as much of a cut as any other part of the program. Also, if the number of flights were reduced, the funds for flights would also be reduced or the program would be cancelled.⁶²

Finally, the structure of the organization was not aligned with the culture. More specifically, the safety culture was incongruent with how the organization was structured. NASA is a highly technical organization that performs work that is extremely dangerous. Therefore, safety should be the cornerstone of all operations. Unfortunately, the Rogers Commission and Columbia Accident Investigation Board found this not to be true. Both reports recommended that the Safety Office of the agency be independent of the research centers. The Safety Office should report directly and only to the NASA Administrator. The independence of the Safety Office would prevent any internal pressures that may influence results of investigation reports or recommendations to leadership. Therefore, we conclude that the bureaucratic structure and safety culture were in misalignment.⁶³

⁵⁹ Ibid., p. 193.

⁶⁰ Aytekin and Long, *ibid.*

⁶¹ Ibid., p. 96

⁶² Ibid., p. 102.

⁶³ Ibid., p. 115.

Following are passages further illustrating NASA's conflicts of interest in the *Challenger* and *Columbia* decision process:⁶⁴

The Rogers Commission and CAIB both placed significant blame for the *Challenger* and *Columbia* accidents on the culture that existed at NASA. This culture was influenced by a silent safety program, budgetary constraints, flight schedule pressures, and normalization of deviance and risk. The CAIB report suggested, "By the eve of the *Columbia* accident, institutional practices that were in effect at the time of the *Challenger* accident—such as inadequate concern over deviations from expected performance, a silent safety program, and schedule pressure—had returned to NASA" (CAIB, 2003, p. 101). (p. 84)

NASA began to outsource larger portions of projects, than it did during the Apollo project. Instead of concentrating on improving the safety and managerial factors that could negatively affect the space program's performance as recommended by various commissions, NASA tried to do more with less, developing a culture of doing things "faster, better, cheaper." (p. 84)

Although NASA believed that it had a safety program that was active, risk averse, and empowered to stop any operations if an employee felt there was a problem that compromised flight safety, unfortunately, the CAIB (2003) found no evidence of the safety office operating independently. This fact undermined the belief that NASA had a dedicated safety culture for safe operations in space. NASA's safety culture "has become reactive, complacent, and dominated by unjustified optimism. Overtime, slowly and unintentionally, independent checks and balances intended to increase safety have been eroded in favor of detailed processes that produce massive amounts of data and unwarranted consensus, but little effective communication" (CAIB, 2003, p. 180). (p. 85)

This lack of independence within the safety office was a recurring theme at NASA. At least four more reports outside of the Rogers Commission and CAIB aimed at analyzing NASA mentioned the safety center issue. The CAIB report insisted: "The Shuttle Independent Assessment Team and NASA Integrated Action Team findings mirror those presented by the Rogers Commission. The same communication problems persisted in the Space Shuttle Program at the time of the *Columbia* accident (CAIB, 2003 p. 179)." A US Senator from South Carolina, Ernest "Fritz" Hollings, stated at a Senate Commerce Committee hearing on the results of the CAIB's report on the *Columbia* accident, "There's no education in the second kick of a mule. I'm hearing the same things I listened to seventeen years ago" (Berger, 2003). (p. 85)

Beginning in the 1970s, NASA became a much more bureaucratic organization that had moved away from the "research-oriented" culture of Apollo, and organizational

⁶⁴ Source and page references: Yasin Aytakin and Nicholas Long, "A Managerial Approach to NASA's Cultural Changes: Open System Model," Master's Thesis, Naval Postgraduate School, Monterey, California, December 2007, <http://stinet.dtic.mil/cgi-bin/GetTRDoc?AD=ADA475773&Location=U2&doc=GetTRDoc.pdf>

power shifted from the core of researchers and engineers to the upper levels of management. After the *Challenger* disaster, the change appeared even more dramatic, and the CAIB reported this: “The Space Shuttle program had been built on compromises hammered out by the White House and NASA headquarters. As a result, NASA was transformed from a research and development agency to a more of a business, with schedules, production pressures, deadlines, and cost efficiency goals elevated to the level of technical innovation and safety goals” (CAIB, 2003, p. 199) (p. 95)

The *Columbia* period exemplifies the almost insoluble conflict between engineers and managers. The managerial mindset was to maintain tight flight schedules, decrease costs per flight, focus on the funding, and assure the smooth continuation of the program. The engineering mindset was to always lean in the direction of safety through testing and retesting...Clearly, managers overruling engineers and scientists in the divided tasking of the space agency confused and frustrated the previously dominant scientific culture...NASA dominant mindsets were in conflict, and the occupational cultures were not integrated resulting in disastrous decisions. The conflicts between a safety-first, and a schedule-first mindset contributed to the *Columbia* disaster. (p. 96)

The bureaucratic NASA structure contributed to the *Columbia* accident (CAIB, 2003). During the *Columbia* period, NASA partially made the structural changes that the Rogers Commission recommended, e.g., centralizing operations and safety controls. Although the agency initiated the recommended Headquarters Office of Safety, Reliability and Quality Assurance (Safety and Mission Assurance Office), it did not provide direct authority over all safety operations as recommended; rather, each center had its own safety group reporting to the center director (CAIB, 2003, p. 101). (p. 100)

According to the CAIB: “NASA did not adequately prepare for the consequences of adding organizational structure and process complexity in the transition to the Space Flight Operations Contract. The agency’s lack of a centralized clearinghouse for integration and safety further hindered safe operations” (2003, p. 187). The Safety Office was not structurally linked to shuttle program management during the *Columbia* accident. The CAIB further explained that: “Given that the entire Safety and Mission organization depends on the shuttle program for resources and simultaneously lacks the independent ability to conduct detailed analysis, cost and schedule pressures can easily and unintentionally influence safety deliberations. Structure and process places Shuttle safety programs in the unenviable position of having to choose between rubber-stamping engineering analysis, technical efforts, and Shuttle program decisions, or trying to carry the day during a committee meeting in which the other side almost always has more information and analytic capability (p. 187). (pp. 100-101)

... management did not empower the Safety Office, including being reliant on the funding from the shuttle program they supported, instead of being independent. If the budget of the program was reduced, the safety group was likely to take as much of a

cut as any other part of the program. Also, if the number of flights were reduced, the funds for flights would also be reduced or the program would be cancelled. (p. 102)

...The structural (financial) dependency of the safety office, competing priorities, and conflicting interests' of safety personnel (survival) eroded overall safety pushing the once dominant value to the sidelines. No single person was responsible for Shuttle mission safety, and the office did not provide an integrated organizational process for ensuring safety remained paramount. The CAIB (2003) called for the agency to make structural changes to improve the problematic safety structure by creating a centralized safety oversight. A new shuttle Safety Panel would report to the shuttle program manager. Also, an independent Office of Safety, Reliability and Quality Assurance would be established, headed by an associate NASA administrator, with independent funding and direct authority over all safety bodies throughout the agency. It would report to the NASA administrator, rather than program manager, thus keeping safety structurally separate from the part of NASA responsible for budget and operations efficiency. As a conclusion, the structural dependency of the Safety Office created financial dependency degrading the ability to intervene based on safety concerns. NASA structure therefore reinforced its "silent safety" culture, its normalization of deviances and risk, and its protocol of bowing to management when addressing safety concerns, i.e., a communications gap or misfit between managerial and engineering cultures. Possibly, although difficult to provide clear evidence, structural dependency might also lead to "cultural dependence" in terms of the Safety Office adopting the same mindset of program managers over time, thereby forfeiting their primary function. (p. 102-103)

Due to increasingly tight and decreasing financial resources, NASA adopted an extremely tight flight schedule to demonstrate its efficiency and cost reductions per flight to policy makers. Unfortunately, compressed schedules exacerbated safety problems. (p. 103)

Finally, the structure of the organization was not aligned with the culture. More specifically, the safety culture was incongruent with how the organization was structured. NASA is a highly technical organization that performs work that is extremely dangerous. Therefore, safety should be the cornerstone of all operations. Unfortunately, the Rogers Commission and Columbia Accident Investigation Board found this not to be true. Both reports recommended that the Safety Office of the agency be independent of the research centers. The Safety Office should report directly and only to the NASA Administrator. The independence of the Safety Office would prevent any internal pressures that may influence results of investigation reports or recommendations to leadership. Therefore, we conclude that the bureaucratic structure and safety culture were in misalignment. (p. 115)

NASA culture made a dynamic shift during *Columbia* period. There were two common themes that resonated among the cultural variables and system components; these themes were 1.) Pressures from a constrained resource environment and 2.) The lack of a safety culture. These two factors played a significant role in shaping the organizational culture of NASA. The key variables from the change in culture; "prove it is unsafe," normalization or risk, and declining flexibility greatly influenced the

misalignment of culture with task, people, resources, and structure. Therefore, we conclude these misalignments, which created performance gaps in NASA, contributed to the *Columbia* disaster. (p. 115)

2. Federal Aviation Administration

In a study of the Federal Aviation Administration's (FAA) role in regulating commercial space launches, the United States Government Accountability Office (GAO) addressed some of the problems of combining the functions of promotion with safety regulation within the same agency. As well as potential future problems, the GAO report also discussed past problems that led to removal of FAA's promotional responsibilities for commercial aviation, and cited the experience of another agency, the Federal Maritime Board, that was dissolved for similar reasons:

Several federal agencies regulate and support the commercial space launch industry. FAA oversees the safety of all commercial launches—both expendable and reusable launch vehicles from federal launch sites and spaceports—through its licensing, compliance monitoring, and safety inspection activities.

...Furthermore, FAA is responsible for promoting the industry, which the agency said it accomplishes by sponsoring an annual industry forecast conference, publishing industry studies, and conducting outreach to potential launch companies.⁶⁵

...FAA's Dual Role of Promotion and Safety May Pose a Challenge

FAA faces the potential challenge of overseeing the safety of commercial space launches while promoting the industry as the space tourism sector develops. According to our analysis, FAA's current promotional activities have not conflicted with its safety regulatory role; however, industry experts have noted that potential challenges may arise as the space tourism sector develops. FAA is mandated to regulate the commercial space transportation industry to protect public safety and property while encouraging, facilitating, and promoting commercial space launches.

... According to some experts, FAA's promotional activities have not conflicted with the agency's role as a safety regulator because the activities do not involve advocacy for the industry, nor do they increase demand in the industry.... However, as the commercial space launch industry matures, there is a greater risk that FAA's role as both the regulator and a promoter of the industry may pose a conflict of interest.

⁶⁵ United States Government Accountability Office, Commercial Space Launches: FAA Needs Continued Planning and Monitoring to Oversee the Safety of the Emerging Space Tourism Industry, Report to the Ranking Democratic Member, Committee on Transportation and Infrastructure, House of Representatives, October 2006, pp.11-12.

Experts told us, and we agree, that as the commercial space launch industry evolves, it may be necessary to separate FAA's regulatory and promotional activities. For example, one expert indicated that with the emergence of space tourism, FAA's dual role could pose a potential conflict of interest between creating an enabling business environment and not compromising safety with regard to the agency's determining when and if it would regulate crew and passenger safety on space launches.

Other experts cited Congress's removal of FAA's promotional responsibilities for commercial aviation in 1996 as evidence of the importance of maintaining FAA's focus on safety oversight. In response to the ValuJet accident of May 11, 1996, the DOT [Department of Transportation] Secretary asked Congress to restrict FAA's mandate to safety, eliminating its role in promoting the airline industry. According to the conference report that accompanied the legislative change, Congress withdrew FAA's promotional role in commercial aviation to address public perceptions that might exist that the promotion of air commerce by FAA could create a conflict with its safety regulatory mandate.

Congress also has withdrawn promotional responsibilities from other transportation entities. In 1961, the Federal Maritime Board was dissolved and its promotion and safety responsibilities were transferred to Commerce and the Federal Maritime Commission, respectively. In proposing the legislative change, the President stated that this change was made to eliminate the intermingling of regulatory and promotional functions that had diluted responsibility and led to serious inadequacies, particularly in the administration of regulatory functions.

Recognizing the potential conflict in the oversight of commercial space launches, Congress required DOT to report by December 2008, among other things, on whether the federal government should separate the promotion of human space flight from the regulation of such activity.⁶⁶

The GAO report concluded that

Because FAA is a regulatory agency, it is important that its statutory responsibility to promote the commercial space launch industry not interfere with its safety oversight of the industry. We have no evidence that FAA's promotional activities have conflicted thus far with its safety regulatory role, but conflicts could occur as the industry matures. For example, such conflicts may have occurred or appeared to occur when FAA was responsible for promoting as well as regulating the airline industry. Recognizing the potential conflict in the oversight of commercial space launches, Congress required DOT to report by December 2008 on whether the federal government should separate the promotion of human space flight from the regulation of such activity.

⁶⁶ Ibid., pp.30-32. Paragraph breaks added.

If DOT's 2008 commissioned report on the dual safety and promotion roles does not fully address the potential for a conflict of interest, Congress should revisit the granting of FAA's dual mandate for safety and promotion and decide whether the elimination of FAA's promotional role is necessary to alleviate the potential conflict.⁶⁷

3. Federal Motor Carrier Safety Administration

The Motor Carrier Safety Improvement Act of 1999 established the Federal Motor Carrier Safety Administration (FMCSA) within DOT. The mission of FMCSA is to prevent commercial motor vehicle-related fatalities and injuries through strong enforcement of safety regulations; targeting high-risk carriers and commercial motor vehicle drivers; improving safety information systems and commercial motor vehicle technologies; strengthening commercial motor vehicle equipment and operating standards; and increasing safety awareness.

Much of the impetus for the creation of this agency came from the perceived need to have safety regulation housed within an organization devoted to safety, without competing pressures to devote resources to other functions, while at the same time retaining a strong enforcement role. As stated in the House of Representatives Committee report on the proposed legislation to create the agency:

Since 1967, when the function was transferred to DOT from the Interstate Commerce Commission (ICC), the Federal Highway Administration (FHWA) has been responsible for administering the Federal motor carrier safety program. The FHWA is also responsible for overseeing the more than \$30 billion/year Federal-aid highway construction and maintenance program.

There has been considerable debate concerning the proper organizational placement of the motor carrier safety function. There are three basic proposals. The first option is to keep the function with the FHWA but to strengthen the organization by establishing one or more new leadership positions in the agency devoted exclusively to motor carrier safety. The second proposal is to transfer the whole motor carrier function to the National Highway Traffic Safety Administration (NHTSA). The final option proposed is to create a separate agency within the U.S. Department of Transportation.

⁶⁷ Ibid., p. 40.

The Committee carefully considered all three of these options, each of which had its strengths and weaknesses...

Strengthen motor carrier function within FHWA

... in testimony presented to the Subcommittee, the Department's Inspector General expressed concern that leaving responsibility for motor carrier safety within the FHWA makes it difficult for the program to receive the priority it merits. FHWA's mission has been primarily focused on highway infrastructure construction and maintenance, as the agency oversees the large Federal-aid highway program. This mission demands a significant amount of attention by FHWA managers, and the Inspector General believes that motor carrier safety often seems subordinate to this large infrastructure program.

Transfer motor carrier safety function to NHTSA

Another option considered was the transfer of the Office of Motor Carriers to NHTSA. NHTSA is the agency within the United States Department of Transportation responsible for automobile safety.

...The Inspector General...testified that moving OMC to the National Highway Traffic Safety Administration (NHTSA) may not be the answer. While NHTSA's primary mission is highway safety, it does not now have a sufficient enforcement role or adequate field office structure needed to effectively monitor the motor carrier industry.

There is also a concern that merging NHTSA and OMC would shift motor carrier resources to automobile safety issues currently under NHTSA's jurisdiction. The opposite situation, redirecting resources from auto safety to motor carrier safety, is also a concern for some stakeholders. NHTSA also has no experience in directing a large enforcement field staff.

Create a separate motor carrier administration

Creating a separate agency within the Department of Transportation is the final option that was considered. Creating such an agency to oversee motor carrier safety would mirror the organization of the remainder of the Department of Transportation, which generally has an Administration for each of the major modes of transportation. For example, there are Administrations established to oversee railroads, aviation, transit, pipelines, and ocean shipping. Even though the motor carrier industry is larger than any other mode of transportation, responsibility for motor carriers remains at the Federal Highway Administration.

...The Inspector General...testified that creating a separate agency was the option most likely to be in the long term interest of public safety.

Under the current organizational arrangement, motor carrier safety must compete for the attention of FHWA leadership and resources with the massive highway

infrastructure program, and, at times, motor carrier safety has not received the attention it deserves. At a time of enormous growth in the trucking industry, the Department has actually reduced the number of employees within the FHWA assigned to motor carrier functions and conducted fewer compliance reviews of carriers. This situation supports the option of creating an agency with a clear, preeminent safety mission, free of the need to compete with other missions of the Department of Transportation.

...The bill follows the model of the Federal Aviation Act of 1958, which established the Federal Aviation Administration to improve aviation safety. The bill directs the new National Motor Carrier Administration to consider the assignment and maintenance of safety as the highest priority, recognizing the clear intent, encouragement, and dedication of Congress to the furtherance of the highest degree of safety in motor carrier transportation.⁶⁸

4. Department of Transportation and the National Transportation Safety Board

The National Transportation Safety Board (NTSB) is an independent Federal agency charged by Congress with investigating every civil aviation accident in the United States and significant accidents in the other modes of transportation -- railroad, highway, marine and pipeline -- and issuing safety recommendations aimed at preventing future accidents.

The Safety Board determines the probable cause of:

- all U.S. civil aviation accidents and certain public-use aircraft accidents;
- selected highway accidents;
- railroad accidents involving passenger trains or any train accident that results in at least one fatality or major property damage;
- major marine accidents and any marine accident involving a public and a nonpublic vessel;
- pipeline accidents involving a fatality or substantial property damage;
- releases of hazardous materials in all forms of transportation; and
- selected transportation accidents that involve problems of a recurring nature.

The NTSB was established in 1967. Although independent, it relied on the U.S. Department of Transportation (DOT) for funding and administrative support. In 1975, under the Independent Safety Board Act, all organizational ties to DOT were severed. The NTSB is not part of DOT, or affiliated with any of its modal agencies. NTSB is

⁶⁸ House of Representatives, "Motor Carrier Safety Act, Report to Accompany H.R. 2679," 106th Congress, First Session, Report No. 106-333, September 24, 1999.

composed of five Members who are nominated for five-year terms by the President and confirmed by the Senate.⁶⁹

The rationale for the separation of NTSB from DOT was expressed by one source as follows:

With the passage of the Independent Safety Board Act of 1974, Congress made the NTSB completely independent outside the DOT because "no federal agency can properly perform such functions unless it is totally separate and independent from any other ... agency of the United States". Because the DOT is charged with both the regulation and the promotion of transportation in the United States, and accidents may suggest deficiencies in the system, the NTSB's independence is necessary for objective oversight.⁷⁰

With regard to most of its functions, including railroad accidents, NTSB has purely investigatory powers, and, while it can make recommendations, it has no authority to promulgate or enforce regulations, nor to fund or be directly involved in the operation of any mode of transportation. In the view of the above source, because of this,

Therefore, it [NTSB] has the ability to oversee the transportation system, conduct investigations, make recommendations from a totally objective viewpoint, and make recommendations for needed safety improvements.⁷¹

5. Bureau of Mines/Mining Enforcement and Safety Administration/Mine Safety and Health Administration

In 1973, the Secretary of the Interior, through administrative action, created the Mining Enforcement and Safety Administration (MESA) as a new agency within the Department of the Interior separate from the Bureau of Mines.

MESA assumed the safety and health enforcement functions formerly carried out by the Bureau to avoid any appearance of a conflict of interest between the enforcement

⁶⁹ "About the NTSB: History and Mission," http://www.nts.gov/Abt_NTSB/history.htm.

⁷⁰ Alexander T. Wells and Clarence C. Rodrigues, Commercial Aviation Safety, 4th edition (New York: McGraw Hill, 2003), pp. 52-53.

⁷¹ *Ibid.*, p. 53.

of mine safety and health standards and the Bureau's responsibilities for mineral resource development.⁷²

The Federal Mine Safety and Health Act (Mine Act) of 1977 transferred responsibility for carrying out mine safety regulation from the Department of the Interior to the Department of Labor. MESA was renamed the Mine Safety and Health Administration (MSHA), which was established in 1978. The Department of Labor was seen as a more appropriate agency to enforce such regulations, due in large part to the perceived conflict of interest if mine safety regulation continued to be administered by the Department of the Interior. As stated in the House of Representatives Committee report on the proposed legislation that would accomplish this transfer:

The committee [House of Representatives Committee on Education and Labor] felt...that consolidation of the mine safety laws and transfer of the Mining Enforcement and Safety Administration from the Department of the Interior was a big step [in the right direction]. The personnel who have been administering these laws for a number of years are now going to be under new supervision which will place greater emphasis on developing more specific standards and stringently enforcing them in order to solve the challenge of reducing the fatalities and injuries, especially in metal and nonmetal mines.

...This transfer has been strongly supported by President Carter in an effort to consolidate all major health and safety programs in the Department of Labor, which has traditionally been responsible for the welfare of the Nation's workforce.

...CONFLICT OF MISSIONS

Inherent conflicts of interest were established with the enactment of the Federal Metal and Nonmetallic Mine Safety Act passed in 1966 and the Federal Coal Mine Health and Safety Act of 1969. With those laws, the Department of the Interior was given guardianship over the lives and welfare of the men who were carrying out the primary purpose of the Department, that of finding efficient ways of meeting the ever-increasing need and demand in this country for production of scarce energy and mineral resources.

The Department has at times admitted its own difficulty in acknowledging the priority that should be given health and safety matters. After taking much blame for not issuing and enforcing standards that would have prevented the tragic loss of 91 miners in the Sunshine Silver Mine fire in Kellogg, Idaho in 1972, Interior established MESA as an independent administration for the sole purpose of protecting miner health and safety. To a certain extent, however, the division was illusory,

⁷² Mine Safety and Health Administration, "History of Mine Safety and Health Legislation," <http://www.msha.gov/mshainfo/mshainf2.htm>

because the responsibility remained under the same Assistant Secretary who has responsibility for other production-oriented matters relating to energy conservation, energy and mineral resources, and oil and gas activities. The committee is convinced that only removal of health and safety responsibilities from Interior can really solve the problem.⁷³

6. Atomic Energy Commission/Nuclear Regulatory Commission

The Atomic Energy Commission (AEC) was charged with controlling the development and manufacture of nuclear weapons, and overseeing the research and development of peaceful uses of nuclear energy. Conflicts between these functions and regulation of the safety of the nuclear industry led to widespread public criticism. The AEC was abolished, and its safety functions were moved to a new agency, the Nuclear Regulatory Commission (NRC). The AEC's promotional functions were moved to another new agency, the Energy Research and Development Administration (ERDA).⁷⁴ As described by the NRC:

Before the NRC was created, nuclear regulation was the responsibility of the AEC, which Congress first established in the Atomic Energy Act of 1946. Eight years later, Congress replaced that law with the Atomic Energy Act of 1954, which for the first time made the development of commercial nuclear power possible. The act assigned the AEC the functions of both encouraging the use of nuclear power and regulating its safety. The AEC's regulatory programs sought to ensure public health and safety from the hazards of nuclear power without imposing excessive requirements that would inhibit the growth of the industry. This was a difficult goal to achieve, especially in a new industry, and within a short time the AEC's programs stirred considerable controversy. An increasing number of critics during the 1960s charged that the AEC's regulations were insufficiently rigorous in several important areas, including radiation protection standards, reactor safety, plant siting, and environmental protection.

...By 1974, the AEC's regulatory programs had come under such strong attack that Congress decided to abolish the agency. Supporters and critics of nuclear power agreed that the promotional and regulatory duties of the AEC should be assigned to different agencies. The Energy Reorganization Act of 1974 created the Nuclear Regulatory Commission; it began operations on January 19, 1975.

⁷³ House of Representatives, "Report, Together with Minority Views, to accompany H.R. 4287," 95th Congress, First Session, Report No. 95-312, May 13, 1977.

⁷⁴ ERDA subsequently was abolished and its functions absorbed into the United States Department of Energy.

...Today, the NRC's regulatory activities are focused on reactor safety oversight and reactor license renewal of existing plants, materials safety oversight and materials licensing for a variety of purposes, and waste management of both high-level waste and low-level waste. In addition, the NRC is preparing to evaluate new applications for nuclear plants.⁷⁵

The conflicts of interest that led to the creation of NRC are further described by that agency as follows:

As the nuclear power debate continued, the AEC came under increasing attacks for its dual responsibilities for developing and regulating the technology. This became a major argument that nuclear critics cited in their indictments of the AEC; it was, said one, "like letting the fox guard the henhouse." The question of creating separate agencies to promote and to regulate the civilian uses of nuclear energy had arisen within a short time after passage of the 1954 Atomic Energy Act, but in the early stages of nuclear development it had seemed premature and unwarranted. It gained greater support as both the industry and antinuclear sentiment grew, and it took on greater urgency after the Arab oil embargo and the energy crisis of 1973-74. One of President Nixon's responses to the energy crisis was to ask Congress to create a new agency that could focus on, and presumably speed up, the licensing of nuclear plants. After much debate, Congress divided the AEC into the Energy Research and Development Administration and the Nuclear Regulatory Commission in legislation it passed in 1974. The Energy Reorganization Act, coupled with the 1954 Atomic Energy Act, constituted the statutory basis for the NRC.⁷⁶

7. Department of Energy

In some cases, where the responsibility for the regulation of safety has not been separated from a parent agency with promotional responsibilities, or not insulated from interference within that agency, there has been persistent criticism of potential conflicts of interest. This is particularly true regarding the U.S. Department of Energy (DOE) at its national scientific laboratories. One report stated:

The inherent conflict of interest between mission and self-regulation of safety at DOE, aggravated by a long legacy of secrecy, is at the root of many of the safety problems in the nuclear complex. External regulation would end that conflict by placing regulatory authority in bodies that are, . . . independent, impartial, and competent. It would improve public confidence in the safety of DOE operations by making them subject to the same kind of independent regulation that applies to other

⁷⁵ Nuclear Regulatory Commission, "Our History," <http://www.nrc.gov/about-nrc/history.html>.

⁷⁶ Nuclear Regulatory Commission, <http://www.nrc.gov/about-nrc/short-history.html#End>.

public and private operations. It would enable the public, States, and Tribes to have opportunities for effective involvement in the regulation of safety at DOE facilities-as they do with similar facilities in the private sector. Finally, only independent, external regulation can ensure the stable regulatory framework . . . that is required to ensure credibility. The Department has been unsuccessful in its attempts to achieve credibility under self-regulation and the level of frustration at the current regulatory regime remains high within the Department, its laboratories, and its contractors, just as the credibility of its safety efforts remains low in the world outside. We believe that external regulation is essential to earning the public confidence the Department seeks and needs to free itself to carry out its important national missions.⁷⁷

The GAO has issued several studies critical of arrangements within DOE, and has advocated regulation of safety at DOE facilities by external, non-DOE agencies. The following passage from GAO testimony before Congress cited international as well as U.S. experience:

Unlike other governmental, educational, and private sector research and development facilities in the United States, DOE's science laboratories are not regulated or licensed by external regulators, such as the Nuclear Regulatory Commission (NRC) or the Occupational Safety and Health Administration (OSHA), to help ensure safe operations. Instead, DOE and its predecessor agencies have, since 1946, been granted legislative authority to self-regulate nuclear and worker safety at all of their facilities, including the science laboratories.

... The potential benefits of external regulation have been widely reported. A 1996 DOE task force concluded that externally regulating DOE facilities would improve safety, eliminate the conflict of interest inherent in self regulation, achieve consistency with current domestic and international safety management practices, and gain credibility and public trust. [FN: Report of Department of Energy Working Group on External Regulation, DOE/US-0001, December 1996, p. 1-1.]

We found additional support for the benefits of external regulation by looking at comparable government-owned, contractor-operated science laboratories in foreign countries. Government and laboratory officials from Belgium, France, Switzerland, and the United Kingdom told us that external regulation is valuable and necessary to ensure safety and public credibility. None of these countries allow their government agencies to self-regulate nuclear and worker safety in civilian research facilities. Two countries, France and the United Kingdom, also use external regulators to oversee parts of their nuclear defense research and development establishment. The United

⁷⁷ U.S. Advisory Committee on External Regulation of Department of Energy Nuclear Safety, Improving Regulation of Safety at DOE Nuclear Facilities (Washington, DC: The Committee, 1995), Chapter I, p. 2, cited in Bert Chapman, "The Defense Nuclear Facilities Safety Board's First Decade," Journal of Government Information, Vol. 27, Issue 3, May-June 2000, pp. 345-383 [individual pages numbers not given in electronic source:
http://docs.lib.purdue.edu/cgi/viewcontent.cgi?article=1080&context=lib_research]

Kingdom, after transferring its two nuclear defense research facilities to private sector contractors, shifted much of the oversight of the facilities to external safety regulators within a 2-year period. British officials told us that the shift to external regulation not only increased safety and improved public credibility but also allowed workers greater freedom to voice their safety concerns.⁷⁸

Although a two-year pilot program of external oversight was established at some DOE laboratories in the late 1990s, this arrangement was not renewed after its expiration. Currently, DOE exercises oversight over its own facilities under various DOE Orders and regulations, especially 10 CFR 851, Worker Safety and Health Program.

8. European Food Safety Regulation

Various food safety problems in Europe, such as Mad Cow Disease, focused attention on the potential conflicts of interest created by the location of major food safety responsibilities in agricultural ministries. At both national and European-wide governmental levels, major institutional reforms sought to address this conflict by strengthening the independence of food safety authority within agricultural ministries, relocating food safety authority to health ministries, or creating an independent food safety agency. In the United Kingdom, for example, the Ministry of Agriculture, Fisheries, and Food had inherent conflicts of interest because of its dual responsibilities to regulate food safety and to promote food and agricultural business. The creation of the UK Food Safety Authority reduced those conflicts by removing responsibilities for business promotion.⁷⁹

⁷⁸ United States General Accounting Office, "Testimony Before the Subcommittee on Energy, Committee on Science, House of Representatives, Observations on Externally Regulating Nuclear and Worker Safety in DOE's Science Laboratories," Statement by (Ms.) Gary L. Jones, Director, Natural Resources and Environment, July 25, 2002.

⁷⁹ Christopher Ansell, "The Asymmetries of Governance," in What's the Beef? The Contested Governance of European Food Safety, edited by Christopher Ansell and David Vogel (Cambridge: The MIT Press), 2006, pp. 330, 336.

Appendix C: Components of Safety Culture

An effective organization should have the following five major components of safety culture:⁸⁰

- Organizational commitment
- Management involvement
- Employee empowerment
- Reward systems
- Reporting systems

1. Organizational Commitment

An organization's upper-level management has long been recognized as playing a critical role in promoting organizational safety culture. Organizational commitment to safety refers to the extent to which upper-level management identifies safety as a core value or guiding principle of the organization. An organization's commitment to safety is therefore reflected in the ability of its upper-level management to demonstrate an enduring, positive attitude toward safety, even in times of fiscal austerity, and to actively promote safety in a consistent manner across all levels within the organization. When upper-level management is committed to safety, it provides adequate resources and consistently supports the development and implementation of safety activities. An organization's commitment to safety is therefore ultimately reflected by the efforts put forth to ensure that every aspect of its operations, such as equipment, procedures, selection, training, and work schedules, are routinely evaluated and, if necessary, modified to improve safety.

⁸⁰ The following discussion is taken from Douglas A. Wiegmann, Hui Zhang, Terry von Thaden, Gunjan Sharma, and Alyssa Mitchell, "A Synthesis of Safety Culture and Safety Climate Research," Technical Report ARL-02-3/FAA-02-2, Prepared for Federal Aviation Administration, Atlantic City International Airport, NJ, June 2002, pp. 11-13.

2. Management Involvement

Through participation in the day to day operations, both upper- and middle-level management communicate to their employees an attitude of concern for safety that subsequently influences the degree to which employees comply with operating rules and with safe operating practices. Within the context of safety culture, “management involvement” refers to the extent to which both upper- and middle-level managers get personally involved in critical safety activities within the organization. Management involvement in safety, therefore, is reflected, by managers’ presence and contribution to safety seminars and training, their active oversight of safety critical operations, their ability to “stay in touch” with the risks involved in everyday operations and the extent to which there is good communications about safety issues, both up and down the organizational hierarchy

3. Employee Empowerment

Errors can originate at any level within an organization. However, frontline employees (e.g., pilots) often represent the last defense against such errors, thereby preventing accidents. Organizations with a “good” safety culture empower their employees and ensure that employees clearly understand their critical role in promoting safety. Specifically, empowerment refers to an individual’s perceptions or attitudes as a result of a delegation of authority or responsibility by upper-level management. An empowered attitude can lead to increased motivation to “make a difference,” to go beyond the call of duty for organizational safety and take responsibility for ensuring safe operations. Within the context of safety culture, employee empowerment means that employees have a substantial voice in safety decisions, have the leverage to initiate and achieve safety improvements, hold themselves and others accountable for their actions, and take pride in the safety record of their organization.

4. Reward Systems

One of the key components of an organization's safety culture is the manner in which both safe and unsafe behavior is evaluated and the consistency in which rewards or penalties are doled out according to these evaluations. A fair evaluation and reward system is needed to promote safe behavior and discourage or correct unsafe behavior. An organization's safety culture, therefore, is reflected by the extent to which it possesses an established system for reinforcing safe behaviors (e.g., through monetary incentives or public praise and recognition by management and peers), as well as systems that discourage or punish unnecessary risk taking and unsafe behaviors. However, an organization's safety culture is signified, not only by the existence of such reward systems, but also by the extent to which the reward systems are formally documented, consistently applied, and thoroughly explained and understood by all of its employees.

5. Reporting Systems

An effective and systematic reporting system is the keystone to identifying the weakness and vulnerability of safety management before an accident occurs. The willingness and ability of an organization to proactively learn and adapt its operations based on incidents and near misses before an accident occurs is critical to improving safety. Another important facet of a good reporting culture is the free and uninhibited reporting of safety issues that come to the attention of employees during the course of their daily activities. Therefore, it is important to ensure that employees will not experience reprisals or negative outcomes as a result of using the reporting system, as well as to have a structured feedback system to inform the employees that their suggestions or concerns have been reviewed and what kind of action will be taken to solve the problems. In summary, an organization with a good safety culture should have a formal reporting system in place and one that is actually used comfortably by employees. A good reporting system allows and encourages employee to report safety problems, and it also provides timely and valuable feedback to all employees.