

## DAY 2: CONCURRENT PANEL SESSIONS (PANEL 4B)

# Environmental Issues

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### OVERVIEW

*Geraldine Knatz*

This panel is going to deal with a range of environmental issues—everything from air quality to water quality to dredging. As you know, the economy has been very good here in California, a fact that is quite obvious when you tour the ports of Long Beach and Los Angeles. In California, there has been increased pressure on the regulators by legislators, by environmental groups, and by the U.S. Environmental Protection Agency (EPA) for not doing enough in California to curb pollution and deal with environmental impacts. Just this week the EPA released an audit that reviewed the effectiveness of our state water quality control board and all the regional water quality control boards. The regulators got very poor marks. They are being told they are not aggressive enough, they are not setting strict enough standards, and they are lax in enforcement. In fact, this particular agency nearly brought construction of the Alameda corridor project to a grinding halt a few weeks back. The same thing is going on with our local air quality agency.

Those of us in the transportation industry are going to be facing more difficult challenges in getting our projects approved. Here at the port of Long Beach, we are going to be rebuilding the harbor from top to bottom over the next 10 years, which is going to be no small feat in today's environmental climate. The speakers are going to talk about what we in the transportation industry may face in the future.

### EMISSIONS AND NOISE STANDARDS

*Allan Hendrix*

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I am going to give you my bottom line first—my concluding recommendations.

- First, we have to deal with vehicle technology in terms of air quality emissions. When I say vehicle technology, I am talking about the full range of vehicles involved in goods movement. I am talking about trucks. I am talking about trains and planes—all of them need to have a lot of attention paid to emissions because they are all emitters.
- The same thing with noise, particularly on the truck side. We have to deal with technologies for reducing noise from trucks. It is also a major issue with rail lines

and California is unique in having an airport noise ordinance. I can tell you it is a big problem on the air side as well, although it is a fairly localized problem.

- Third is the water quality side, in particular the issues mentioned earlier with respect to the regional water quality control boards. My recommendation is that someone has to pay a lot of attention and do a lot of basic research in the causes and the remediation of water quality problems, particularly the storm- and non-storm-water discharges. We are engaged in a lot of rule making and a lot of control without very effective science behind it.

Three factors make goods movement a very important issue for California:

1. If you look at the map, we are the endpoint of a lot of intercontinental and transcontinental movements. We have major maritime ports. We have major airports and rail lines, and we have major highways that come into and go out of California. All are associated with a lot of goods movement.

2. We have a major border crossing with Mexico and the quantity of movement across that border, both goods and people, is really incredible and it is going to do nothing but increase. The infrastructure is very poor and the pressure for movement is very great.

3. California is a major market. We generate a lot that goes out of California, and we import even more into California, for in-state consumption or for distribution elsewhere in North America. California is home to just over 10 percent of the nation's population. Within the state, better than 90 percent of the state's population is in the urban areas; 60 percent is in southern California. That is about 6 percent of the national population in southern California, which generates a lot of end-user service. Goods coming into California do not always go out of California to the rest of the country. A lot of them stay here and that has implications for the air quality, the noise, and the water quality issues we will be talking about today.

I am going to talk in terms of two points: the ports of Los Angeles–Long Beach and the port of Oakland. I will talk about what happens because the ports are here instead of about the ports themselves. I want to talk about the landside connections with the ports.

I will talk first about the noise and water quality issues related to the ports of Los Angeles–Long Beach and the Alameda Corridor project. I am sure you have the impression that the Alameda Corridor is fundamentally a goods movement project to speed the flow of goods in and out of the port. However, it did not start out that way. It started out with the recognition that there was going to be a lot of goods movement in and out of the port. It was advantageous to handle a lot of that on trains and there

are 100-plus mi (161-plus km) of train lines that feed the ports. The volume of train traffic, albeit relatively low, caused a lot of problems on the surface transportation system by blocking cross streets and generating a lot of noise. The Alameda Corridor project was originally conceived as a mitigation measure, primarily for surface congestion. It started out as a rail and highway project and the highway component more or less dropped out, although the first demonstration projects did involve highway work. However, after the work was well under way, the rail component project became the driver, required the major money, and became the major service.

At the time the project was initiated, about 60 percent of the movement in and out of the ports was handled by truck and 40 percent was handled by rail. The concept behind the project is to increase the rail share to about 50 percent, which means the truck share will drop to about 50 percent. The quantity of freight going in and out of the ports is going to increase tremendously. Right now, at Long Beach, about 4 million 20-ft equivalent units are being processed. Assuming a 60-40 split, most of those containers are still moving by truck. Today, about 2.5 million containers go by truck and about 1.5 million go by rail. It is estimated the volume at Long Beach could reach 12 million 20 years from now. Assuming a 50-50 split, that would be 6 million by rail, a very significant increase of four times the volume today. That is what the project is supposed to do. But keep in mind that 6 million will be moving by truck, a three times increase over today's truck volume.

Highway 710 is kind of a case study facility. All that movement in and out of the port of Long Beach is now handled on 710. On the Los Angeles side, a lot of the volume is handled on 110, which is the Harbor Freeway. However, as always, the traffic really spreads out. The trucks are using the whole system. To focus a little bit on 710 as an example, today the current average daily volume of traffic is about 220,000 vehicles per day; 17.5 percent is trucks, which is a high percentage of trucks. That calculates to about 38,500 trucks a day on the Long Beach Freeway—trucks that carry about 2.5 million containers a year. Again, not all of those coming up that freeway are going down that freeway, but a lot of them are on that freeway. There is considerable drayage movement back and forth on 710.

Think ahead to the day when this port is generating 6 million boxes. Los Angeles is generating another 6 million boxes. If half of them are going by truck, that is a lot of additional boxes going on these freeways. Let's consider the noise impact of that traffic. Our data suggest that a truck acoustically is equivalent to 13 automobiles. If you do the math, 220,000 vehicles are on the freeway as average daily traffic and 17.5 percent of them are trucks; work it out and acoustically we have the equivalent of almost 700,000 vehicles a day, of which trucks are

over 70 percent. The noise on that freeway is really a truck problem and not an automobile problem. That is the bad news. You would think if the truck volumes are going to double or triple, the noise on that freeway is going to be a lot worse. Well, the fact is we know that if the truck volumes double, holding the automobile volumes constant, the increase in noise is 2 decibels, which is really below the threshold of perception. This has been scientifically measured with the decibel meter and there is not really going to be a problem with noise on the freeway even if the truck volumes double. If they triple, it goes up above the threshold, but it is still a fairly slight increase.

In California, as in other states, we have a lot of noise barriers that are intended to protect adjacent neighborhoods from truck noise. Our noise barriers are designed around trucks, which emit noise from two places—the tires and the exhaust stack. Everybody who does noise barriers deals with the tire noise, but they do not deal with the stack noise. In California, we do deal with the stack noise so that we have a higher barrier than other states have. It does block the truck noise so that, with the line of sight from a receptor 5 ft above the ground and 5 ft from the side of the building, you should be protected from the noise. Notwithstanding that, I worked in Los Angeles for 6 years and my greatest volume of mail and my greatest volume of telephone calls were complaints about truck noise on the freeways. I guarantee you that the noise barriers and the sound measurements I have mentioned do not solve the noise problems on freeways.

Roughly 50 percent of the goods coming in stay within a 500-mi radius of the port. That means the goods being driven around are being picked up or delivered locally. A lot of that trip is not on the freeway system. A lot of that trip is on the local road system. Although the speeds are not as high and the tire noise is not as great, there is the noise from the stack. You cannot effectively do noise barriers off the freeway system. This means noise from port-related traffic is going to continue to be a problem in the neighborhoods in the region—not so much on the freeways, but off the freeway system.

With respect to rail traffic, as the train volumes increase in southern California, the complaints about train noise are getting greater and greater. On the Alameda Corridor, about half the project is in a trench, which is an effective noise barrier and has reduced the complaints and the concerns about noise on that project. However, when you get out of the Alameda Corridor, out in the San Gabriel Valley where the traffic continues east via a major train corridor, the noise complaints, the cross-traffic complaints, and the safety complaints are accelerating dramatically and we are going to have to address those problems.

Water quality is not so much a port or a goods movement issue as a general issue. My thesis, notwithstanding what our friends from the Federal Highway Administration (FHWA) have told us, is that the kind of development that we are anticipating in the port is going to trigger a lot of new highway construction, new rail construction, and so forth. Storm-water and non-storm-water discharges are on the verge of becoming the cutting edge issue of the decade. Caltrans has been working with storm water pollution for about 5 years. Close to \$100 million has been spent studying and evaluating what we generate, what are the characteristics of our storm water discharges, and what we can do to remediate the pollution problem. The short answer is we do not have a clue about what we can do to remediate the storm water pollution problem short of, in effect, hooking up a full-blown sewer plant to the end of every pipe.

The water quality people insist they know how to deal with water quality. They know there are a few simple, cheap things that can be done like settling basins and filtering, but it does not work. We have spent millions of dollars in southern California trying to site some of those simple, cheap things, trying to make them work, and we have not met with very much success. The latest installment for Caltrans is really a culvert up in the northern part of California, totally unrelated to a port, unless you call Crescent City a port. The State Coastal Commission ordered us to remediate the discharge from that pipe to meet state standards. The state standards are based on the federal drinkable, swimmable, fishable standard, which essentially means drinking water standards.

I do not know how much experience you people have with trying to take something that comes out of a culvert and bringing it up to drinking water standards. For example, chloroform is a major issue and the only way you can do that is to sterilize the water with a chemical treatment and then clean the chemicals out of the sterilized water so that it meets the standards. This is very expensive. We estimated somewhere between \$2 and \$4 billion would be needed to put the necessary treatment stations on our pipes in southern California. If we spent that \$2.0 to \$4.0 billion in southern California, we would clean up about 2 percent of the total discharge that goes into the bay. We do not think it is cost-effective, but we are on a track that leads in that direction.

On the issue of air quality, I will use the port of Oakland as an example. A primary strategy for dealing with port expansion is, as they did in Los Angeles and as they plan to do in Oakland, to move the freight onto the rail system to reduce the drayage, to optimize the local transportation network. Oakland is becoming a world-class port. The way it works today, there is a lot of drayage from Oakland up to Richmond, where the boxes are put on trains up at Richmond. A joint intermodal terminal is being built on a former Department of Defense property

and it is intended to move the intermodal handling down onto the ports. There are local access roads to smooth out the traffic flow within the port and onto the freeway. There are improvements to the main gates to speed up the traffic, reduce the idling, and so forth, thereby yielding significant air quality benefits to this project by reducing the drayage and reducing the waiting time.

We have a similar problem with air quality as we have with water quality. There is a lot more science about air quality. When you talk about air quality, you are dealing with both emissions factors, which in California and nationally seem to change all the time. The existing emissions factors do not work. The air quality community is tweaking them all the time and every time they tweak, it changes the models. The air quality evaluation also depends on the transportation models, and the transportation models, as you get away from commuter-oriented traffic, 5 days a week home-to-work peak-hour traffic, the reliability gets lower and lower. When you get to goods movement, the models are pretty weak. As somebody mentioned yesterday, we tend to focus on passengers and if we have some benefits on the truck side, that is great. Because of that we do not know much about trucks in the sense of modeling and doing transportation models and that drives the unreliability on the side of air quality models.

We were told yesterday that trains are good for air quality. That is true, but trains are not clean. Trains are a long way from clean. In California, in our intercity passenger rail system, we are using clean engines. We put six "clean" locomotives on line, which are good and do reduce emissions. However, rail emissions in the southern California basin are a significant component of the pollution burden and a significant issue for the state as a whole.

Trucks are not clean. To give you an indication of how we approach diesel, we have classified diesel in California as a toxic material. Trains need to be cleaned up and trucks need to be cleaned up to address the air quality issues. I am not going to pretend to tell you what good that will do, because the air quality situation in California is so dynamic that we are just kicking into the particulate standards. For example, the bay area was in attainment and it was easy to demonstrate conformity; however, conformity in the transportation world says no matter what we do, or if we do all the projects in this plan, it will not cause the air quality to go below standard. The particulates and the effect of the particulates are going to be a particular problem in most areas of the state, including the bay area. Certainly here in southern California, they are going to be a major problem.

The air quality world is very dynamic. Right now we have a suit going on in Sacramento that, if it goes the way the plaintiffs want, will probably cause a tremendous problem around the state and particularly in Los Ange-

les, where it will mean a real world of hurt for attainment and for conformity.

That is just a summary of the issues here in California associated with air quality, noise, and water quality. I appreciate the chance to share them with you.

## PERMITTING PROGRESS

### *Carol Cutshall*

*Carol Cutshall is Director of the Bureau of Environment at the Wisconsin Department of Transportation, where she is responsible for approving all environmental documents prepared by the department. Her staff provides technical assistance in areas of cultural resources, archaeology, noise analysis, endangered species, water quality, wetlands, land use, and socioeconomic factors. She has overall responsibility for developing the department's environmental rules and for negotiating agreements with the state resource agencies. Cutshall also serves as Chair of the TRB Committee on Environmental Analysis and Transportation. She is active in the American Association of State Highway and Transportation Officials (AASHTO) Standing Committee on the Environment and a charter member of the American Institute of Certified Planners. She received her B.A. in resource management from Wisconsin's Stephens Point and an M.S. in urban regional planning from the University of Wisconsin at Madison.*

I am here to talk about the permitting process from a state department of transportation (DOT) perspective. What I am trying to show you today is the link between DOTs and the various ports and intermodal activities talked about over the past 2 days.

I think many of you in this room, particularly if you are the environmental expert at your port or have been working on these issues, are familiar with the problems associated with the permitting process. We know that every local unit of government has rules and regulations related to the environment. There are special regional groups that do that, along with state rules and regulations; of course, probably the origin of all of these things is some overall federal rule and regulation. A lot of them conflict with each other and the discussion on point and nonpoint, the National Pollutant Discharge Elimination System, indicates how we are getting into another morass. A lot of our rules and regulations, because they were put together over time, have tended to do that. Each one was developed to answer a specific question or problem that was raised. The net result is a hodgepodge of laws and regulations.

There is also duplication of effort where we, for example, do environmental impact statements and then we find that the cooperating agencies on that environmental impact assessment, such as the U.S. Army Corps of Engineers and the U.S. Coast Guard, require that we do a separate document for them. Although they write the separate document, we are the ones who provide them with the information. It is our view that, if you are a cooperating agency, you ought to be signing off on the original document and it ought to be satisfactory to meet your needs.

There is a lack of concurrent review. We often find, and many here may have found, that one agency wants to know exactly what is happening on a project before they will sign off on it. That means all the other agencies have to have made all their decisions and perhaps the lead agency has had to fine-tune it to the project level of design detail.

There is a lack of timely response. I am sure there are people in this audience who may have waited more than a year or two for their permits to be issued.

Another issue is inconsistent application in the field. Most of us have run into really helpful regulators we have been able to work with and solve problems and get a really good environmental result. Fifty miles away or in another district, another region, all of a sudden, even though you are within the same state, you are supervised by another federal group and those guys have a different perspective on the same issue. We have this problem; we are a large organization and we know it happens within our DOT. The goal of consistency is a good one.

Finally, we often lack a conflict resolution process. The world we live in is changing and there is no question that the public strongly supports the issues of health, safety, and the environment. They care a lot, especially if you talk about these issues in terms of sound bites, which is the way they usually hear about our projects. You hear things like, "This is going to destroy the environment. It is going to cause asthma in 1,200 children in your community and so forth." We have to find different and better ways of talking about our projects that strike the same chords for safety and economic development and quality of life. We have to be able to get smart and talk in their language and ensure it is not too complicated.

There is also increased public awareness of the permitting process and that an environmental review can be a way to stop projects. We got comments on a small project in western Wisconsin from a group of students in New Jersey. They sent us letters about this project in Wisconsin—evidence of the wide use of the Internet. They heard about what we were doing: "rape and pillage by the DOT out in western Wisconsin." We responded to that group and I hope we persuaded them that what we were doing was not as bad as they had been led to believe.

Finally, some organizations base their fund raising on stopping projects. Although I do not think that is something we can get around, I do think we can undermine their constituency and communicate and explain to the public, who are the dues-paying members of these larger organizations, to gain their support and credibility for our project.

I want to talk about one solution that has come up with which many of you may be familiar. In the Transportation Equity Act for the 21st Century, there is a section on environmental streamlining. If you recall the handout in your conference package, it summarizes U.S. DOT actions on recommendations made by the National Commission on Intermodal Transportation. U.S. DOT takes credit for streamlining the verbiage that is put into the report. That is not quite the way it happened, although U.S. DOT was called over to the Senate and asked who put in the streamlining proposal. Many of us, and probably some of you in this room, were actively involved in getting that legislation passed. Of course, it was watered down a great deal and had a lot of weasel words put into it that perhaps would allow it to not be as rigorously enforced as one might have hoped. It started off applying to all surface transportation; now, it applies only to highways and mass transit. Nonetheless, it was a start, so I cannot say we were too unhappy with that.

The major elements include a coordinated environmental review process to be developed by DOT. That means the agencies have to cooperate and their degree of willingness to see rapid review is sometimes a little different from ours. They recognize they are supposed to be conducting reviews concurrently, if they are able—again I mention those "weasel words." Reviews are completed within a cooperatively determined time period. At the federal level, they have decided this should be done locally through local contracts because it is too difficult to decide how long, on a national level, it ought to take.

It also includes a dispute resolution process, which, according to the legislation, is supposed to involve the U.S. DOT Secretary and offer some very short time lines for turnaround. The secretary would then be able to resolve these issues. FHWA has asked the U.S. Institute of Environmental Conflict Resolution to help them develop the conflict resolution process. I think we will see some good ideas come out of that, although I have talked to many FHWA employees who said it will never go to the secretary. We will have to wait and see.

There is also funding for resource agencies by the state DOT. This was one of the elements the environmental resource agencies were excited about and thought was a good thing. It was, in fact, the first thing on the action plan the federal agencies put together for guidance for the states—how we could transfer our funds over to them. If we do it in those cases in which we can get an expedited review, it will be worth our money. We are

onboard with that if we can get commitments to a faster and speedier review time.

The seven federal agencies—U.S. DOT, U.S. Department of the Interior, U.S. Army Corps of Engineers, EPA, U.S. Department of Commerce, U.S. Department of Agriculture, and the Advisory Council for Historic Preservation, which slows up a lot of historic projects for highways—signed a memorandum of agreement saying they would work together and encourage streamlining, good general principles. Then there is the Environmental Streamlining Action Plan that FHWA and the Federal Transit Administration have developed and posted on their website. I encourage you to look at that. The first draft did not even mention reducing time for concurrent reviews; however, the second draft does. They continue to work on it and have changed the format; I think it got better over time.

States have been invited to participate in regional and environmental summits that have been set up primarily by EPA with FHWA as a cosponsor. They have been meeting in a number of places to talk about how we can work together and streamline. In some parts of the country, it has been successful. In other parts of the country, the states have said “No. We would rather do it on our own.” For example, in Florida, they have said they are going to completely revise their environmental process and they are going to take about 5 years or whatever is necessary to do that. They have been meeting with all the federal agencies and they have thrown out their old process. They are starting anew. They are asking, “What is it in your rules that you really have to do?” Perhaps they will come up with something that will benefit the rest of us, although they have never said they are doing this for the country; they are doing it for Florida.

There are also going to be three streamlining discussion sessions sponsored by FHWA, with AASHTO, EPA, and the environmental groups also involved. They are going to bring in some congressional people as well and have about a half dozen people from state DOTs and the federal agencies and environmental groups that are going to talk about the barriers to streamlining. It will be cross-educational, the intent being to explain to the rest of us why the federal agencies really are having trouble doing some of these things. It will give us a forum to say why it is important and needs to be done and to impress on the congressional types the importance of the outcome. If we do not get streamlining in our environmental processes, we will not have the projects, and we will not be meeting any of the needs we have been talking about to enable us to do things faster and better.

What are the potential outcomes of all this? I do not think we are going to have a new process, but we will have relationship building and there definitely will be joint training. There will be improved processes and best practices. There is an effort funded by AASHTO that

looks at 50 best practices. There is going to be a real exchange of information on environmental best practices so that we can learn from Florida and others who are doing things well and pick up those practices without inventing them ourselves. We will have time lines at the project level, which is something we have already been doing, as well as project contracts among the various partners, which are also fairly common.

How will this affect those who are not from a state DOT? I think state DOTs can play a much larger role in partnerships, in projects like the Alameda Corridor and the portway in New Jersey. There also may be more large port development projects that could benefit from state DOT involvement. In addition, as regulatory agencies improve their response time to state DOTs, they will improve their response time to all their customers. We will begin to see overall improvements.

I want to focus for a moment on partnerships. We are at the beginning of a new era where we can really take advantage of a DOT partnership with the ports. We have not always worked that well together in the past and we can do a lot better. I want to mention some of the reasons I think we can do it:

- We are involved in a process that Congress expects to see become more efficient. Congress is going to be watching how our environmental process works and hopefully it will have spin-offs to other parts of the transportation development process.
- We have experience with a large number of complex projects and could be good partners for you. You know things and we know things. We each have relationships with our federal counterparts in the regulatory agencies and the state regulatory agencies.
- We have extensive experience with programmatic agreements or memorandums of agreement. For example, programmatic agreements cover things like endangered species. If you run into a certain type of endangered species, often we have a way of handling that particular incident. This could help you get through a number of routine things instead of the whole Section 7 coordination on endangered species.
- We have wetland mitigation banks. If you are involved in a project with us and we can put it under the rubric of public benefit, I think you can use our wetland mitigation banks.
- We have a history of working with the public and we are getting better at it. We know, based on past mistakes, how to get in early in a project, bring people in, talk to them all the way through the project, keep no secrets, be out there first telling the bad news, take credit for the good news, and try to explain the project in simple terms.
- Finally, working together we will have a lot of synergy and turn out better projects than we would otherwise.

Where do we go from here? I think there is going to be a need for more legislation. Congress is going to have to make it clear to the other regulatory agencies that there is a need for change. There will be other kinds of regulation along the streamlining avenue. We will continue to work on the concurrent review process and conflict resolution. Hopefully, we can send some of these projects up through that conflict resolution process, test it out, and see what happens. A number of us have projects sitting around that have not gone anywhere for 2 or 3 years that we would like to see moved into that process. We are willing to focus on intermodal solutions in partnerships. Together we can build better projects and protect the environment. Thank you.

## DREDGING ISSUES

*Thomas Wakeman III*

The environmental issues we are talking about are really value-based decisions that require careful consideration of the tradeoffs, particularly with respect to large infrastructure projects. I appreciate the things that Carol Cutshall has presented, and I am glad to hear that we are looking at dispute resolution techniques for going through what I consider our rather antiquated decision-making processes for dealing with environmental issues. Too often these issues are considered after a project has been designed and construction is ready to begin. Environmental issues as well as community and financial issues must be considered during the design process to avoid schedule delays and cost overruns and to optimize project benefits.

Back in 1970, I joined the U.S. Army Corps of Engineers as probably their only marine biologist. I was assigned to the San Francisco District because they expected that forthcoming federal regulations (the Federal Water Pollution Control Act Amendments of 1972 or Clean Water Act) would focus new attention on coastal regulatory issues and pollution in San Francisco Bay. I guess they thought a biologist might be helpful. The water legislation and other federal legislation, such as the National Environmental Policy Act and Clean Air Act, used strict command and control protocols with the EPA acting as a watchdog and their attorneys exercising oversight. At that time, it was probably appropriate to have lawyers guarding the environment, because the U.S. Army Corps of Engineers and industry in general did lots of construction projects without considering their environmental impacts or consequences.

Project engineering was very straightforward back in the 1950s, 1960s, and early 1970s. You drew your drawings, secured your financing, got your permits, did your

construction, and then, after the fact, evaluated the environmental or community tradeoffs—if you considered them at all. Today, the environmental, social, and financial tradeoffs are before us before we enter into a project, and they have to be dealt with up front because the public demands it. The analysis occurs during the project's preapplication meeting, where in the regulatory world the project is evaluated by federal and state agencies before it reaches the Public Notice stage. Resource and regulatory agency input is provided to project designers to help them avoid or minimize adverse water and air quality impacts. There are several new environmental concerns to consider including essential fish habitat, environmental justice, and induced development. For example, induced development potentially stemming from infrastructure and transportation projects is not a trivial matter—it is an issue in which courts are now finding on the side of the plaintiff. The environmental community is much more savvy than it was earlier; it has many more laws it can draw upon, whether they are federal, state, or even local public opinion. Unfortunately, I think a lot of suboptimum solutions are being chosen because they are the easy ones you can get through the system. Many project decisions are driven by public perception, which has little to do with good technology, science, or engineering. It has mainly to do with who has the best public presence and how good their sound bites are. To get optimal decisions, we have to balance the issues including addressing the environmental risks and the potential benefits. To illustrate this issue of balancing risks and benefits, I will talk about the dredging and dredged material disposal situation in New York Harbor.

For a long time, the environmental situation in New York Harbor was quiet because people did not appear to be concerned with the dredging and disposal of harbor sediments. Most people accepted that the harbor's water was contaminated and had been that way for centuries. Some controls to stem pollution began as early as the 17th century with collection of wastewater in New York City. However, it was not until 1886 that the first wastewater treatment plant was constructed. By the mid-1960s, the harbor's environment was significantly degraded. By 1972, the estuary was receiving nearly 2 million m<sup>3</sup> of raw sewage per day. Since the mid-1970s, pressure from the courts and the regulatory agencies has resulted in public and private investments in municipal and industrial water pollution controls and significant improvements in water quality. In fact, the water in the harbor complex was cleaner than it had been in six decades. There is no longer floating waste or odors of sewage. The sediment contaminant levels also declined as the largest generators of wastes were regulated. However, there is a large reservoir of contaminated sediment in the harbor, and the riverine flows annually discharge new contaminated sediments. The problem of disposing of contaminated sediments

from navigation channel dredging has threatened to close the harbor.

The port of New York and New Jersey has been a working harbor for over 300 years. It depends on dredging to maintain navigation. The mean depth of the harbor is naturally only about 18 ft. To compete in today's maritime industry, the port requires a minimum of 45 ft and tomorrow will need 50 ft to service the mega container ships. The harbor is fed freshwater through a fairly large watershed having four principal rivers: the Hudson, Raritan, Passaic, and Hackensack rivers. It has an even larger airshed, which is influenced by power and industrial plant discharges in the Midwest. We get between 2 and 3 million yd<sup>3</sup> of sediment a year. Most of it comes into the harbor during the winter rainfall period in the upper watershed and then during snowmelt runoff in spring. Maximum sedimentation occurs when the fresh water comes downstream and hits the salt water, and a combination of electrochemical properties and turbulence causes the sediments to flocculate and drop. Other things can enter the estuary during the wet season, including contaminants. Contaminants can be washed into the rivers and estuary from waterfront properties, surface streets, point sources, and cloud washout during precipitation.

For centuries, the overall dredging process has been that you first excavate, then transport, and finally dispose of the dredged material. With respect to the dredging itself, there are three types: navigational maintenance, new work, and environmental. Most of the time, maintenance activities follow construction of a new navigation channel or basin where fresh sediments can deposit. New construction can be for channels, coastal structures, or terminals and facilities. Environmental dredging is the excavation of contaminated sediments or hot spots. Hot spots often develop over long periods at the end of industrial or municipal discharge pipes or from maritime or waterfront spills. In contaminated harbors, such as New York, when you do maintenance dredging you also have to consider doing environmental dredging of the contaminated off-channel shoals. Otherwise, these areas will just continue to feed the channels sediment and maintenance material continues to be contaminated.

Two types of dredging equipment are used to conduct these activities in New York. In open water and near coastal areas, hopper dredges are typically used and work like an oceangoing vacuum cleaner. They have two pipes or drag arms that pull up the sediment, pump it into a central bin, and then cruise off to the disposal site. They are very useful in areas with high vessel traffic because they are mobile. Next to a berth or in a restricted waterway, we generally use a mechanical dredge of one nature or another. For example, there are bucket and backhoe types of mechanical plant, and selection depends

on the nature of the material to be dug. This equipment is used for removing soft clay, silts, sand, and rock. The material is transported to a disposal site in scows. Disposal is the final step. Historically, most dredged material has been taken out and dumped in open water locations in a river, bay, or ocean. The cost has ranged anywhere from \$0.25 per yd<sup>3</sup> in the Mississippi to \$3.00 per yd<sup>3</sup> in the San Francisco Bay. Disposal at the mud dump site in the New York Bight averaged about \$2.75 per yd<sup>3</sup> in the early 1990s. Over the years, in all areas of the country, the restrictions on disposal sites have grown because of environmental and community pressures. As the demand for dredging increases as harbors expand, new disposal sites will have to be found and, I might add, finding new disposal sites is not easy.

Since the 1800s, the New York Bight and surrounding area have been used for disposal of dredged materials and a variety of wastes including garbage, sewage sludge, and industrial wastes from the metropolitan region. Since 1973, dredged sediments have been ocean-discharged almost exclusively at the mud dump site, which was located about 6 mi off the New Jersey Coast. In 1992, EPA and the U.S. Army Corps of Engineers implemented new sediment testing procedures and most of the harbor's dredged material was deemed too contaminated for ocean disposal. The limited capacity of the ocean disposal site and public concerns about fish contamination led the federal government to close the site in September 1997 and to open a new site called the historic area remediation site (HARS). This site encompasses the former mud dump site and some other waste disposal sites that were used earlier. Sediments deemed suitable are used to remediate the site by capping the contaminated sediments.

HARS is limited only to the cleanest material or about 15 percent of what historically had been allowed to go to the ocean. So, what are we going to do with the rest of it? We have now determined it is too toxic to be put 6 mi off the coast, so where can it go? If we want it to come on land then we have to convince people we can put it in their backyard without risk. So, we said this is not going to fly and we stopped and rethought the whole thing. As a waste, no one wanted it, but if it were seen as a resource and used as a resource, we could probably find locations for it. For years, the least-cost environmentally acceptable option was the preferred disposal alternative for the U.S. Army Corps of Engineers, the port, and industry. To find something productive to do with the material instead of just dumping it was limited to several special circumstances, such as habitat construction or beach nourishment. Under this technique, called beneficial uses, the U.S. Army Corps of Engineers would consider another option if they could do it within the cost range of the open water discharge or if the local sponsor was willing to pay the difference for the beneficial use project.



Our first opportunity to find an alternative to the ocean was for a redeveloped marine terminal on Staten Island in 1995. It was a container terminal and needed to be dredged to remove about 120,000 yd<sup>3</sup>. The mud could not be placed in New York, so the port authority contracted with a firm in Connecticut who said they would take it. But when the attorney general of Connecticut figured out that the sediment was unsuitable for New York, he said it was not going to Connecticut. We then characterized the terminal's material as a recyclable for land filling. We got a letter from the governor of Utah saying that he would take it. It was sent to Utah at \$118 per yd<sup>3</sup>. Afterward we decided we were not going to do that anymore. Not only do you send the mud away, you send all your money too.

A different approach was to consider waterfront revitalization projects, which allows us to address both brownfield land use and contaminated sediment problems. We worked with a very aggressive Danish entrepreneur who was used to reclaiming landfills and brownfields in Europe. It took him 14 months to get his permit, and he established the fact that upland beneficial uses of our dredged material could be done. The project, construction of a \$400 million mall complex, turned a former municipal landfill in Elizabeth, New Jersey, into revenue-producing property. Since 1996, there has been a growth in the use of dredged material in waterfront brownfield redevelopment projects as fast land, site caps, and manufactured soil. Several developers have suggested various methods for beneficially using dredged material within the metropolitan region. One of the many concerns of real estate and private property developers is the expense of obtaining fill to bring project sites to grade, with the cost of fill ranging from about \$4 to \$20 per yd<sup>3</sup>. They thought clean or marginally contaminated dredged material could be used to finish grade and landscaping of brownfields. Since then, materials from several harbor projects have been beneficially used at upland sites in New Jersey.

Another potentially beneficial use is restoration of mines in Pennsylvania. Dredged material is used to stop acid mine drainage by mixing it with ash or cement to form a grout that cuts down the infiltration of rainwater. The dredged material fill also reduces the fall hazard from the high walls rimming these mines. There is more than 1 billion yd<sup>3</sup> of capacity in Pennsylvania that could benefit environmentally from being remediated with dredged material. To check this process, a demonstration project is under way to investigate the results from the placement of 500,000 yd<sup>3</sup> of New York–New Jersey material. The port authority is scheduled to send about 200,000 yd<sup>3</sup> there next month.

Studies of decontamination of harbor sediments were initiated under the Water Resources Development Act (WRDA) of 1992 and 1996. The purpose of the legislation

was to develop and construct a large-scale decontamination facility as part of a long-term solution to the region's dredged material handling problems. The objective of decontamination is to treat sediments to render them safe for productive or beneficial uses. Decontamination technologies utilize various processes to reduce, separate, immobilize, or detoxify contaminants. Dredged material treatment technologies fall into one of two basic categories: nonthermal and thermal technologies. Nonthermal technologies attempt to stabilize the contaminants to reduce mobility, exposure, and risk. Thermal technologies serve to destroy the contaminants. The WRDA project includes bench- and pilot-scale demonstrations of nonthermal and thermal approaches, toxicity identification evaluations, and public outreach. The costs of these decontamination processes vary but ranged from around \$60 to \$300 per yd<sup>3</sup>. About \$20 million has been spent on this project so far. We are talking about spending some more money, but as I said earlier, I do not believe this is a proper approach because if you do not have a place to put it when you finish decontaminating it, you are stuck with a big pile of mud.

The traditional approach of open water disposal of contaminated sediments does not meet the environmental goal of protecting aquatic health or the economic goal of materials recycling and beneficial use. Application of decontamination technologies followed by sediment disposal does not answer the challenge either. In fact, spending money to clean up sediments without systematically determining a productive end use for the processed material is itself wasteful. The Europeans have known for years that dredged material can have significant value if properly applied in a beneficial manner. Developing the right engineering, economic, environmental, and political conditions is needed to increase the percentage of dredged material used in a productive manner. With respect to considering these factors, implementing sediment-recycling demands an acceptable framework to guide characterization and treatment in order to render it suitable for a specific end use. The lack of a systematic means to guide decision making has limited the potential beneficial and product use applications of dredged material in this country.

We have proposed a process in the port authority that says you first characterize your material for its physical, chemical, and geotechnical properties. Then you look for a productive end use, and you select a treatment process that allows you to get a dredged material product that you can use. You have to choose to analyze and balance your needs, both dredging and beneficial use, and the costs of using an alternative strategy to disposal. It is a two-step process. You look at what resources you have and then you engineer your product to meet your needs. There are a variety of different types of dredged material—everything from sand, silt, and clays. As I said, there have

been some beneficial uses of dredged material but most of these were done when they were only slightly more expensive than the traditional ocean or aquatic disposal site, or they were on lands that were already available. So to do something productive, you have to look at your types of materials. It is very easy to find productive uses for sand, gravel, and rock. It is like the recycling business for office and household wastes.

I think this is really about our creating quality of life, and I think it is about how we determine what quality of life we want to have. This is not as much about dredging as it is about changing our whole attitude toward project design. Transportation infrastructure projects, including dredging and dredged materials handling, have the potential to provide not only transportation services but also environmental and community benefits. More than anything else, we should be thinking about ways to change from just minimizing environmental impacts to ways to find win-win opportunities, such as by changing dredged sediments into recyclables, creating productive uses, and generating new revenue streams. It has to be completely rethought, reengineered, and resold.

We expect to get certain returns out of our intermodal transportation projects, out of freight movement, out of commerce, and out of our economy. There are clearly benefits that our children and grandchildren are going to get. But they will also want to have the ability to go out and

actually stand by the water in the harbor, to eat the fish, to swim, and to enjoy things like that. I can understand that. We are anticipating that the demand for cargo moving through our port will quadruple by 2040. I have to say I have mixed feelings about it some days, because I know there is no free lunch and there are going to be tradeoffs for constructing a 21st century port at New York Harbor, including new 50-ft channels, terminals, intermodal connections, and more traffic. How do we do what is best so it is really a balanced national and regional benefit?

There have to be ways we can meet both economic and environment desires in our democratic society. Part of the answer is by doing it in an organized political fashion that develops a balanced sensible public policy around transportation infrastructure development. Right now I think awareness about the complexity of these issues and their need for attention is way down the list for most congressional members, state legislators, and political leaders. In fact, most elected officials do not want to hear about finding win-win solutions because they might have to pay more for it. They do not want to hear about greater cargo demands and more traffic through their town because they might not get public support and reelected. However, if we do not look for a long-term, balanced way of dealing with these overlapping and sometimes conflicting issues, we are going to continue to have suboptimal decisions for our environment, economy, and community. Thank you.