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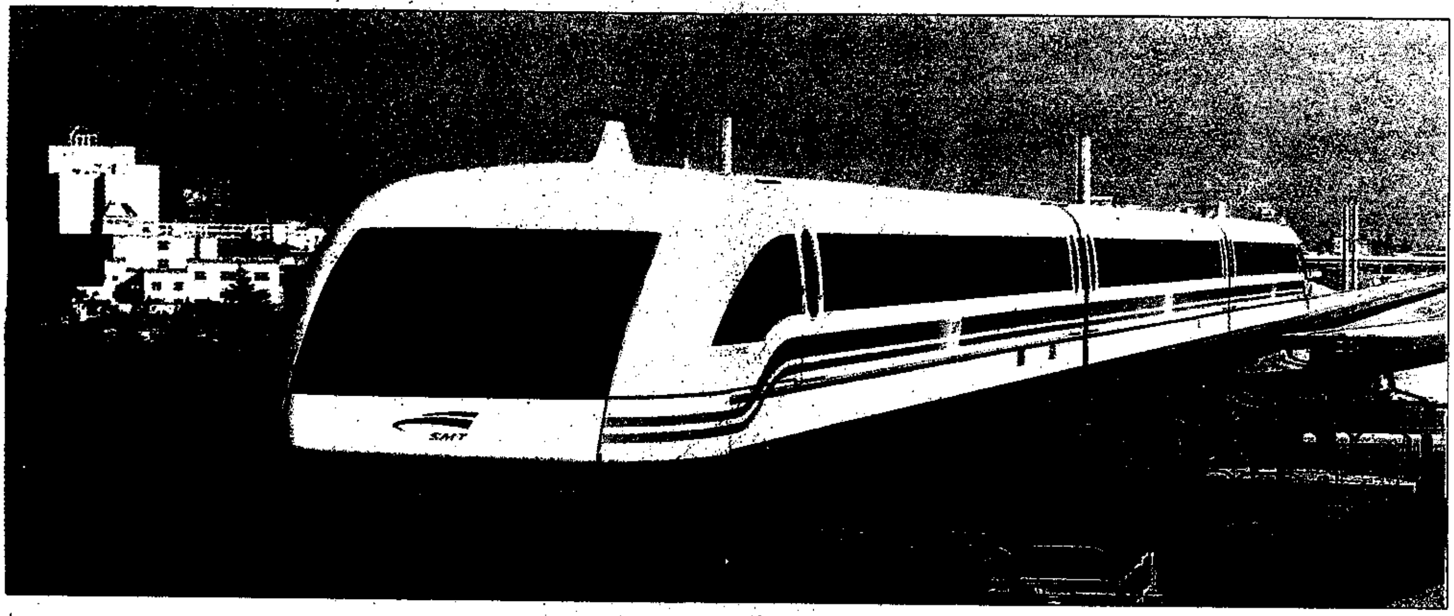

THE ASSOCIATED PRESS

A magnetic-levitation train runs along the track linking Shanghai's financial district and airport. The system may be lengthened.

China, Germany betting on off-track success

TECHNOLOGY: Trial run of magnetic-levitation train system passes test, but some have questions.

By Joseph Kahn
THE NEW YORK TIMES

Chinese Prime Minister Zhu Rongji, left, and German Chancellor Gerhard Schroeder take the first ride in the magnetic-levitation train Tuesday in Shanghai, China. Germany built the system.

SHANGHAI, China — China has awarded Germany a potentially lucrative contract to lengthen the world's first commercial magnetic-levitation rail system to cities surrounding Shanghai, Chancellor Gerhard Schroeder of Germany said Tuesday.

The announcement came after Schroeder and Prime Minister Zhu Rongji of China took a test ride on the new high-speed train, which is propelled by magnets and does not ride on wheels. The train reached its designated maximum speed of 266 miles an hour over the 19 miles between Shanghai's financial district and its main international airport, Chinese officials said.

While the levitation technology was pioneered by Germany, the Shanghai contract represents the first major public use of the train system, also being considered for high-speed travel over relatively short distances in the United States.

Siemens and ThyssenKrupp are the main German companies behind the Shanghai project.

On Tuesday, a beaming Schroeder, speaking to reporters after the trial run, said: "Three years ago the Shanghai track was only a dream. Today it is a reality."

Although the Chinese paid $1.3 billion to install the train on the run between the city's business district in Pudong and the new Pudong airport, it left open the question as to whether it considers magnetic levitation a viable technology for long-distance train travel.

Some analysts have argued that Shanghai, seeking to showcase its rapid development, spent heavily for a prestige project that does not provide superior service or levels of safety.

German officials said they hoped to pave the way for an extension of the Shanghai system while Zhu, a strong supporter of the technology, remains in office. He is expected to retire after the Chinese Parliament meets in March.

German and Chinese planners have discussed extending the train line south to Hangzhou and north to Nanjing. If completed on that scale, the elevated magnetic train lines would cover more than 180 miles and could be expected to cost more than $5 billion, although officials provided no specific estimates.

Tuesday's trial run was considered a crucial test for the train. Zhu rode on an early ver-

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sion of it two years ago and complained of feeling dizzy. This time, he stepped off the gleaming white-and-orange trains and pronounced himself satisfied.

He joked that he had not bought insurance for himself before boarding. "How do I know it's safe?" Zhu said. "Because it has no wheels and never touches the track. It will never derail."

He added that he expected magnetic-levitation technology would be used in other parts of China, but offered no details.

The fiercest competition is for a 775-mile line linking Shanghai and Beijing, which China estimates will cost $22 billion. The German consortium that built the train is one contender, as are Japanese companies offering a more conventional high-speed rail system.

ASSEMBLY TRANSPORTATION
DATE: 4/17/03 ROOM: 3143 EXHIBIT C 1-5
SUBMITTED BY: Danny Thompson

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MAGLEV Frequently Asked Questions

(Materials excerpted and adapted from the *Impacts of the Transrapid Magnetic Levitation Train on Human Health and the Environment*, Kilpatrick Stockton LLP, May 2000 included as Appendix C in the *Final Programmatic Environmental Impact Statement, Maglev Deployment Program*, Federal Railroad Administration, 2000; and California-Nevada Super Speed Train Commission)

1. When will construction start?

Not earlier than 2005.

2. What does the track look like?

The Maglev does not run on a conventional train track. It runs on a guideway. There are two types of guideways: at-grade and elevated. Figure 1 displays both configurations. The at-grade guideway rests on columns or braces that lift the guideway at least 4 feet from the ground and are set at least 9 feet apart. The elevated guideway rests on columns that can be as much as 65 feet high and 400 feet apart.

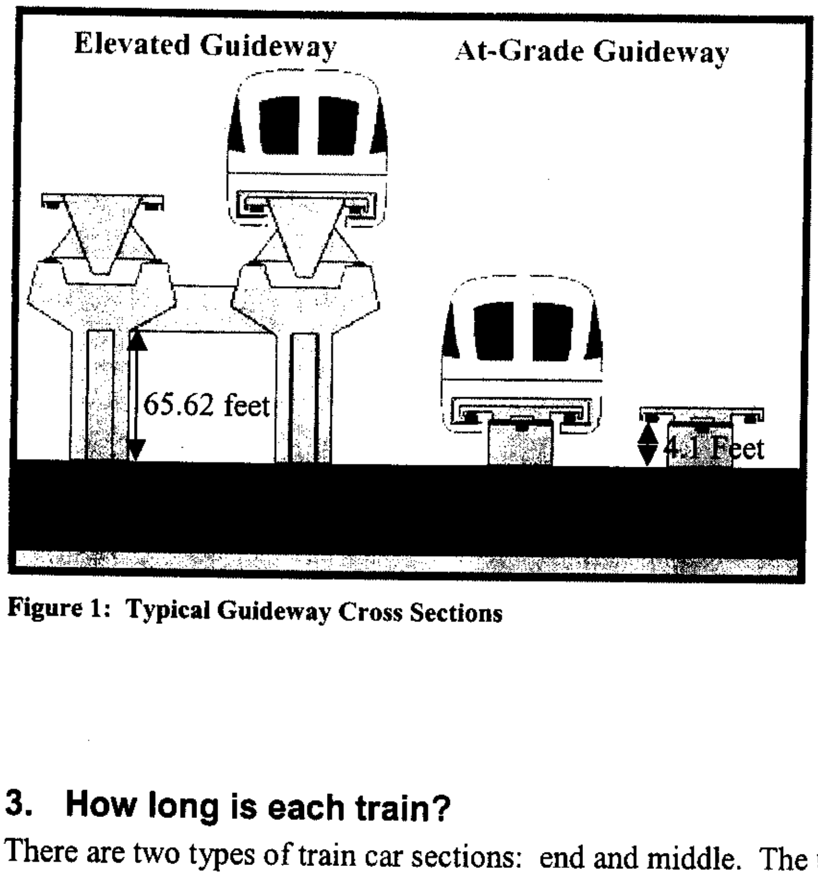

Figure 1: Typical Guideway Cross Sections

3. How long is each train?

There are two types of train car sections: end and middle. The train will be made up of two end sections and up to eight middle sections. Figure 2 displays the length of each type of car.

9. What, if any, are the health effects associated with the electromagnetic fields (EMF) that the Transrapid magnetic levitation train (Maglev) generates?

The low-energy magnetic fields associated with Maglev are highly complex and are unlike magnetic fields generated by other man-made devices. FRA and others have funded a considerable amount of research on whether these fields pose potential health risks to humans. Field and laboratory studies have concluded that there is no evidence of adverse biological effects.

10. How much noise does the Maglev make?

The noise measurements of the Maglev version 07 are less than those of every type of train tested including a normal freight train, a regional express train, an intercity train, and high-speed trains. Because most of the noise is caused by the flow of air around the front of the train and through the gap between the bottom of the vehicle and the top of the guideway, only at the highest speeds of 250 to 300 miles per hour and at relatively close distances to the most noise sensitive areas would Maglev noises have a "severe impact" on neighbors. Homes, schools, hotels, houses of worship, and parks could be protected from the noise by a combination of physical sound barriers, slowing the train in these areas, and routing the train away from such areas.

Further front-end redesign for the version 08 is expected to have made the train quieter still. Test results are expected in the near future.

11. Is it possible to feel the vibrations from passing trains?

Even though the Maglev does not touch the guideway, it can cause vibrations. The extent of these effects varies with the distance from the guideway. For instance, when the train is traveling at 250 miles per hour, vibrations are not noticeable beyond 200 feet from the guideway. At 155 miles per hour, the distance drops to 115 feet.

12. Wouldn't a train passing that quickly be startling to those nearby?

There is a "startle effect" under certain conditions, particularly for people close to the guideway. Startle effects are expected to be similar to those of low flying aircraft. Vehicle drivers on parallel roadways will have a view of enough of the corridor and enough distance from the guideway to ensure that the train will be seen before it is heard and, therefore, that they will not be startled. It is expected that people living and working near the guideway will become accustomed to the train's passing.

13. What effect would the system have on air quality?

There are several types of air quality effects:

- Particulates and emissions associated with the movements of construction equipment;
- Emissions associated with the stations and maintenance facilities;
- Reduction of emissions associated with vehicles now used to make Maglev trips; and

- The guideway is grade-separated from all other traffic, so collisions with other types of vehicles is not possible. See Figures 1 and 2 for the range of possible guideway configurations.
- The guideway can only operate in one direction, so a head-on collision with another Maglev train is not possible.
- The guideway is protected against the intrusion of obstacles into the vehicle's path by such protective measures as barriers.

15. What about an earthquake? Is the Maglev safe then?

Current seismic design standards will be incorporated to withstand seismic ground shaking that would result from a maximum creditable earthquake. The effectiveness of these measures had been demonstrated by similar structures in recent earthquakes in Japan and California. The train car is designed to be crashworthy in the event that it should be involved in a collision. The nose area of the train is reinforced, shaped to deflect most guideway obstructions aside, and has a crush zone to absorb larger collisions without subjecting the passengers to a dangerous situation. Disruption of guideway continuity would trigger the same safety mechanisms that are detailed in question #14 above.

16. What are the potential effects on habitat and human land use?

The Maglev guideway offers more flexibility than other surface transportation systems. The braces or columns supporting the guideway cover a small proportion of the ground underneath, so that habitat, wetlands, agricultural lands, floodways, and many land uses can continue with little or no disruption. See Figures 1 and 2 for the range of possible guideway configurations. Conventional trains are most efficient at grades of 2 percent or less. Maglev can climb 10 percent grades without degrading efficiency. This means a reduction in the amount of grading required.

Guideway configurations also allow for spanning roadways, conventional rail, floodplains, wetlands, habitats, agricultural lands, and developed areas to ensure that traffic, rivers, flood control facilities, sensitive lands, and many existing land uses can function normally. Combined with variable heights, curve radii achievable at the slower speeds planned for urbanized areas will allow the guideway to "thread" around elevated freeway interchanges and tall buildings, and away from sensitive land uses. One land acquisition strategy would acquire ten-foot-square pads for each of the columns and air rights for the guideway, leaving the remainder of the land under the guideway for existing and compatible uses.

The distances required to achieve the speeds that make this technology unique argue for stations that are relatively few and far between. Unlike highways that can promote urban sprawl along their entire length, Maglev stations can be used to attract concentrated residential and commercial development in much the same way that conventional commuter rail stations do. Stations proposed for Victorville, Ontario and Anaheim can be expected to function as part of the Southern California regional mass transportation system, particularly as they access intermodel transfer facilities. Connections with other forms of mass transportation at intermodal transfer facilities – Metrolink, express and

1998 - TEA 21 Legislation Includes $1 Billion for Maglev Project Implementation
February 29, 2000 - Environmental Assessment for Demonstration Segment – Primm to Las Vegas – Complete
June 30, 2000 - Project Description Complete

20. Where can I learn more?

There are several interesting documents on the web. The Programmatic Environmental Impact Statement for the FRA Maglev Deployment is at http://www.fra.dot.gov/s/env/maglev/MagPEIS.htm. Appendix C is *Impacts of the Transrapid Magnetic Levitation Train on Human Health and the Environment*, Kilpatrick Stockton LLP, May 2000, from which much of this material is drawn.