MICHAEL J. BRADY (SBN 40693)
1001 Marshall Street, Suite 500
Redwood City, CA 94063-2052
Telephone: (650) 364-8200
Facsimile: (650)780-1701
Email: mbrady(@rmkb.com

STUART M. FLASHMAN (SBN 148396)
Law Offices of Stuart M. Flashman
5626 Ocean View Drive
Oakland, CA 94618-1533
Tel/Fax: (510) 652-5373
Email: stu@stuflash.com

Attorney for Plaintiffs
JOHN TOS; AARON FUKUDA;
AND COUNTY OF KINGS

COUNTY IS EXEMPT FROM FILING FEES PER GOV. CODE SECTION 6103

SUPERIOR COURT OF THE STATE OF CALIFORNIA

COUNTY OF SACRAMENTO

JOHN TOS, et al.,

Plaintiffs,

v.

CALIFORNIA HIGH SPEED RAIL AUTHORITY, et al.,

Defendants.

CASE NO. 34-2011-00113919

SUPPLEMENTAL DECLARATION OF PAUL S. JONES

Trial Date: May 31, 2013

I, Paul S. Jones, declare as follows:

1. My academic credentials were presented in my first declaration. I will repeat only that part that is relevant to the testimony included in this declaration. I was responsible for the initial route selection study performed by the Spanish National Railway (RENFE) for the Madrid-Barcelona high speed rail service. There were two civil engineering teams reporting to me—one was of RENFE civil engineers and the other of civil engineers from Sir Alexander Gibbs and Partners, an English firm of outstanding reputation. The RENFE engineers did all of the basic civil engineering including route layout, surveying, calculating earth movements for cuts and fills, and structural design to cross rivers, creeks, roads, and other obstacles, drainage, and tunnels, of

which there were many. The RENFE engineers also conducted limited soil tests, which, among other things, uncovered a large gypsum deposit, which became a significant problem when the line was built. The Gibbs engineers checked all of the RENFE work and made a large number of individual investigations. Few problems emerged in the actual construction that were not already anticipated.

2. I was also responsible for the trainset selection for both the Spanish Madrid-Seville and Korean Seoul-Pusan routes. Although this work was done 20 years ago, I am thoroughly familiar with the design and performance characteristics of high speed train sets.

3. As part of my analysis of the California high-speed rail project, I relied upon detailed geological survey maps which I obtained from the USGS. In my experience, contour maps for complex geographical features such as the Tehachapi Mountains are an essential tool for understanding the technical challenges and requirements of designing high-speed routes.

4. I have personal knowledge of the facts stated herein, and, if sworn as a witness, would and could completely testify thereto.

5. Throughout its existence, the California High Speed Rail Authority (CHSRA) has been exceedingly reticent in sharing information about its designs, analyses, and activities with the general public. This policy has greatly frustrated efforts to objectively evaluate its work. Therefore, in this declaration, I am responding specifically to the declaration of Frank Vacca, which was recorded on April 11, 2013. Mr. Vacca asserts that the Los Angeles to San Francisco and San Francisco to San Jose travel times specified in Proposition 1A can be achieved and cites the results of simulations by Berkeley Simulation Software with their Rail Traffic controller to support his claim. Although Mr. Vacca included limited simulation data in his declaration, the information I relied on become available to me through Public Records Act requests. I describe these sources briefly below.

6. The most complete and informative work available for this declaration comes from a 2009 workshop conducted by Tony Daniels, who was then CHSRA's Program Manager, and by

Kent Riffey, the Chief Engineer.[1] This presentation was a carefully considered look at preliminary results of analysis of route, terrain, and the characteristics of available trainsets to meet the requirements of Proposition 1A. At that time, they were considering only a dedicated two track structure throughout the system. They included a preliminary operating plan, complete with schedules. Their conclusion was that the mandated travel times were feasible, but not easy. To my knowledge, CHSRA has not since regained that level of planning detail.

7. Since the first of this year, CHSRA has issued four memoranda that address travel times for the, now contemplated, blended system in which high speed trainsets share commuter rail tracks in both the San Francisco Peninsula and the San Bernardino corridor. These are dated January 13, February 5, February 7, and February 11.[2] The January 13 memorandum (Exh. B) was originated by staff and sent to Jeff Morales and Frank Vacca. The February 5 and 7 memoranda (Exh. C and D) were apparently internal memoranda. The fourth memorandum (Exh. E), dated February 11, was addressed by Frank Vacca to Jeff Morales.

8. The first three memoranda were all based on the same San Francisco-Los Angeles runs using Berkeley Simulation Systems software and dated March 23, 2012. The January 13 memorandum listed a dozen assumptions used in constructing the simulations. These included:

- Simulation runs may not reflect actual operating conditions. They are pure run times, with no impediments.
- No pad or allowance is made for variations in operational characteristics (These normally add 3 to 7 percent to the simulated times).

[1] "Board of Directors Project Implementation & Phasing Workshop" presented by Kent Riffey, Chief Engineer, and Tony Daniels, Program Director, August 6, 2009. The presentation video and slides are accessible at http://cahighspeedrail.ca.gov/Workarea/DownloadAsset.aspx?id=9241 and http://cahighspeedrail.ca.gov/WorkArea/DownloadAsset.aspx?id=6712 respectively. See also Exhibit A which includes the 3 relevant workshop presentation slides: *System Performance/Trip Times*, *Draft Timetable/Operating Pattern,* and *Operations Plan.*

[2] The four travel time memoranda are included as Exhibits B through E as follows:
Exhibit B: "Phase 1 Blended Travel Time Memorandum, January 13, 2013" internal memorandum;
Exhibit C: "Phase 1 Blended Travel Time Assessment, February 5, 2013" internal memorandum;
Exhibit D: "Phase 1 Blended Travel Time Assessment, February 7, 2013" internal memorandum;
Exhibit E: "Phase 1 Blended Travel Time, February 11, 2013" memorandum by Frank Vacca to Jeff Morales.

- Advanced train technology would allow trains to operate safely at 220 mph on sustained, steep grades. A speed reduction to 150 mph may be required as a safety issue.
- With mixed traffic (freight, conventional rail, express rail, and high speed rail) high speed rail can operate at 125 mph.
- Caltrain track will be upgraded to Track Class 6 (110 mph) or 7 (125 mph)as needed.
- Existing Caltrain infrastructure will be upgraded.
- Quad gates and vehicle arresting barriers will be installed in the Caltrain corridor as needed.
- Train speeds approaching the Transbay Terminal will be 25 mph.

9. Bases on these, and the other assumptions, the memo claimed that 30 minute travel times between San Francisco and San Jose could be achieved at 125 mph, but not 110 mph. Los Angeles to San Francisco travel times could be met with either San Francisco Peninsula speed.

10. The February 5 memorandum (Exh. C) dropped the 110 mph option on the Caltrain line. It also omitted the assumptions about schedule padding, and assumed Caltrain track improvements without specifying what those might be. This memorandum concluded that San Francisco to San Jose and Los Angeles to San Francisco travel times could be met.

11. The February 7 memorandum (Exh. D) introduced a new San Francisco-San Jose simulation dated February 8, 2013 which was run at 110 mph. The San Francisco-Los Angeles simulation continued to be the March 23, 2012 run, as it has in each version of the memorandum. This memorandum mixes two simulation speeds, using 110 mph on the Caltrain corridor for the San Francisco-San Jose simulation, and 125 mph for the same corridor on the San Francisco-Los Angeles simulation. The *speed* listed in the text of the February 7 memo was obtained from a San Francisco-San Jose simulation run at 110 mph, yet the *travel time* was obtained from a San Francisco-Los Angeles simulation run at 125 mph.

12. Additionally, none of the February memoranda identify the Transbay Terminal as the San Francisco terminus. If so, the speed reduction could be accommodated by using the existing Caltrain Terminus as 4th and King Streets as the San Francisco high speed rail terminus.

This violates the Proposition 1A requirement which clearly states that the San Francisco terminus must be the Transbay Terminal.

13. I offer this long discussion of this year's memoranda to illustrate that CHSRA was trying to produce the necessary travel time results without any real evidence. They provided no operating schedule that could translate the simulation results that describe a one time experiment with no real impedimenta, not a prospective travel experience by actual passengers, as is required by Proposition 1A. CHSRA apparently dropped the 125 mph speed on the San Francisco Peninsula because it required vehicle arresting barriers, which are clearly beyond Caltrain's financial means. Their entire strategy seems more aimed at pacifying legislators than ensuring compliance with Proposition 1A.

14. On the basis of the available information, it is not possible to make an accurate, objective, engineering assessment of the simulation support offered by CHSRA to support its claim that its high speed trains can travel non stop over the blended rail system between Los Angeles and San Francisco in two hours forty minutes. Any proper assessment requires essential data about the length, grade, and curvature of the track structure simulated. The Authority's consultant said that he/she used the route details taken from the environmental reports.[3] These reports are lacking in civil engineering descriptions of the route.

15. It is also necessary to know the technical characteristics of the trainsets that are being simulated, including power, weight, number of driving axles, traction motor size with torque and current at different speeds, weight on axles, and a curve of train resistance vs speed up to 220 mph. I understand that CHSRA used the latest version of the French AGV which is designed to achieve a maximum speed of 350 Kilometers per hour (km/h) [217 mph]. It is important to realize that the "state of the art" of trainset engineering is what has been done, not what might be done.

16. Without all of the above information, it is impossible to confirm or deny the results that have been given. However, there are many issues that I believe may have been overlooked.

[3] See Exhibit F, Bakersfield to Palmdale: Bakersfield-Tehachapi Map, by the HSRA.

Resolution of these issues casts great doubt on the ability of CHSRA to meet their mandated travel times using the blended system as contemplated. These include the following.

A. The January 13, 2013 memorandum (Exh. B) from CHSRA that accompanied the simulation results states that only pure run time[4] was calculated from simulated trainset performance over each segment of the route. The trainset was simulated to have exclusive use of the entire route without interference of any sort. No interference from Caltrain commuter trains on the San Francisco Peninsula was dealt with. The assumption was that there would be none. No pad, or adjustment, was made for operating uncertainties and unexpected delays. If high speed trainsets could maintain 110 mph throughout the San Francisco to San Jose run, the trip would require 28 minutes, including time required to accelerate from San Francisco and decelerate to San Jose. However, seven curves have been identified in the Caltrain track that will require speed reductions. One of these requires slowing to 72 mph and three to 79 to 85 mph. Allowing full clearance around the curves, these speed reductions would add 4 to 6 minutes to the travel time. With these slowing requirements, it would not be possible to meet the mandated 30 minute travel time.

B. Caltrain's simulation of blended operations on their lines require all trains, both high speed and conventional, to travel at the same speed in order to achieve and maintain the short headways between trains necessary to support the combined Caltrain and high speed rail requirements. Without installing bypass tracks for high speed trains, all trains would need to travel at a maximum speed of 79 mph. Caltrain has simulated several combinations of bypass tracks which would allow high-speed trains to bypass local trains in order to avoid delays. These bypass tracks are 8 to 18 miles in length for the different simulations. Furthermore, high speed trains are allowed to travel at 110 mph only on the bypass tracks, even for the 18 mile option, and would not allow the high speed trains to travel between San Francisco and San Jose in less than 35 minutes.

C. The simulation results that CHSRA provided in support of their travel time

[4] Pure run time assumes that there is no other traffic on the track structure and the train can travel as fast as possible without any impediments.

estimates indicate track speeds in excess of 150 mph on tracks that permit speeds up to 220 mph just 7.5 miles from the Los Angeles terminus. Although no information is given on the point at which blended operation begins in the Los Angeles basin, Metrolink tracks are available to San Bernardino. The quality of these tracks is not up to Track Class 6 allowing speeds of 110 mph. It is my understanding that blended operation is contemplated using MetroLink tracks entering the Los Angeles basin. Surely use of more than 7.5 miles of MetroLink tracks is intended.

D. On the train performance curves, a combination of grades and curves requires trainsets traversing the Coast Range via the Pacheco Pass to slow on several occasions to speeds between 150 and 200 mph. There is one reduction to 100 mph. Travel through the Central Valley is simulated at 220 mph without even speed reductions when passing through stations. This presents a very serious safety hazard. Statements have been made by CHSRA on many occasions that trains will not pass through stations at 220 mph. At the very least high speed transits of stations would require screening.

E. Transit of the Tehachapi Mountains poses serious problems. The simulation assumes a grade of 2.5 to 2.8 percent to ascend the north slope of the pass to the summit. The simulation results illustrate gradual slowing and not reaching 150 mph until the summit is reached. When one considers that at grades of this magnitude approximately half of the train's total tractive effort (or half of the power) is needed to ascend the grade, even the momentum of a 659 ton train traveling at 220 mph is highly unlikely to carry very far up the grade. Thus more time must be lost on this grade. Even more questions arise about the northern slope of the Tehachapis.

As I previously stated, I acquired US Geological Maps at 1:24,000 scale and a 40' contour interval. These maps clearly show the topography of the Tehachapis, the Union Pacific track and also Highway 58. This gives a good picture of everything that's going on there.

A careful examination of these topographical maps for the area identifies the elevation of the pass at Tehachapi as 4,018 feet above sea level. Near the base of the mountains at Bena, the elevation is 873 feet above sea level. The straight line distance between the two points is 15 miles. If one followed the shortest route, the uniform grade throughout the 15 mile

route would be 4 percent, too much to make any reasonable speed with a high speed train.

The Union Pacific tracks over the same route traverse some 24.6 miles, 64 percent more than the straight line distance. This rather tortuous route includes one complete 360 degree loop and numerous curves with 700 ft. radii requiring slowing to at least 20 mph. The grade on Highway 58, which travels up the same canyon, is 4 percent through much of the ascent. The only alignment that I have seen for the CHSRA shows a rail line weaving just slightly just north of Highway 58. It would have to cross the Union Pacific at least once. It is inconceivable that such a modest set of curves could manage that very rough terrain without a great many tunnels and large structures to span the irregular slopes. In seismic sensitive territory, that would constitute a major risk

F. Northbound, the trainsets are simulated to maintain 220 mph down the entire grade. This seems highly optimistic in view of the absence of operational data at this speed. The Authority itself has allowed that a reduction to 150 mph may be needed to safely get the trains down without excessive wheel slippage. Tony Daniels, in his presentation suggested that 140 mph would be a safer speed. The quality of existing regenerative braking as augmented by friction brakes, and the likelihood of wheel slip, make speeds down long, steep grades very hazardous. Before initiating high speed descent of the Tehachapi Pass, it will doubtless be necessary to secure Federal Railroad approval and perhaps CPUC approval. It may also be necessary to provide crash turn outs and other safety measures. To pass this problem off as a call for advances in train technology is hardly a solution. The "state of the art" in railroad technology as in other technical fields is what has been done, not what one thinks can be done.

G. The AGV train used in the simulations is undoubtedly the best, and likely the only, example of a train designed to operate at 220 mph. At present, this is the fastest train in the world, but its operating speeds do not exceed 199 mph. While 21 mph may seem like a small change, when one is pushing the limit of technology it is common to find grave problems in achieving the final increment of performance. This is particularly true when one is operating over steep grades and difficult terrain. While this design may be state of the art, experience is lagging behind.

17. The HSRA has not to my knowledge released any documents, simulations, operation plans or string diagrams which demonstrate that a two hour and forty minute *service* is possible.

18. China experienced the painful difference between *conceptual* run times and *safe* travel times. Following the July 2011 Wenzhou high-speed train crash, the Ministry of Railways (MOR) ordered planned maximum speeds to be reduced from 350 km/h [217 mph] to 300 km/h [186 mph]. This regulation remains in force today.

19. According to the International Railway Journal,

> The Wenzhou accident also led to a cut in the maximum speed on high-speed lines as China introduced a safety margin of at least 50km/h [31 mph] between the maximum design speed and the maximum operating speed. MOR has not given any indication that it is willing to increase the maximum speed above the current limit of 300km/h [186 mph]."[5]

20. Although it appears as though the speed reductions were in reaction to the Wenzhou crash and may not have been implemented otherwise, in fact the unsafe speeds were already a contentious issue. In June 2011, one month prior to the crash, a former director at the Ministry of Railways accused the (then recently) fired minister of running trains at 350 km/h [217 mph] at the expense of safety.

> "In a recent interview with the 21st Century Business Herald, Zhou Yimin, former Director of the Science and Technology Department at the Ministry of Railways, said maximum speeds of 350 kilometers per hour [217 mph] for bullet trains, later raised to 380 kph [236 mph], were fabricated at the recommendation of the former railways minister Liu Zhijun.
>
> Contracts between the Ministry of Railways and overseas suppliers cite the maximum speed of the trains at 300 kph [186 mph]. In the same interview, Zhou said Liu would have had the trains run at 350 kph [217 mph], at the expense of safety.
>
> …
>
> At the heart of the discussion right now is whether Liu should be held responsible for misleading the public.

[5] *China's high-speed programme back on track,* January 2013 issue of the International Railway Journal. http://www.railjournal.com/index.php/high-speed/chinas-high-speed-programme-back-on-track.html.

> Liu was removed from office in February [2011] and has since been under investigation on allegation of corruption. The railways ministry said it will proceed with railways construction in accordance with the country's economic and social development, backing away from the leapfrog high-speed railway expansion spearheaded under Liu's leadership.[6]

21. The CHSRA will have similar issues to resolve. What works on paper and with computer simulations may not prove safe with people onboard. What was promised to the voters via Prop 1A may not be *safely* achievable. The assumptions in Mr. Vacca's memorandum (Exh. E) indicate that the CHSRA has not yet resolved how to transition from "is it possible" to "is it safe."

22. In summary, the questions and observations raised above, particularly in light of the recent China experience, make it impossible for a knowledgeable, responsible engineer to accept the simulation results as any sort of representation of the passenger travel service that the CHSRA can provide between Los Angeles and San Francisco. A travel time of two hours and forty minutes between Los Angeles and San Francisco and a travel time between San Francisco and San Jose of thirty minutes as promised in Proposition 1A cannot be achieved with the present routes and designs. There *are* routes that could support travel in the prescribed times but CHSRA's route is not one of them. Furthermore, the blended system is not a workable compromise.

I declare under penalty of perjury pursuant to the laws of the State of California that the foregoing is true and correct.

Executed on this __ day of April , 2013, at Atherton, California.

/s/
PAUL S. JONES

[6] *Closer Look: The High-Speed Readiness Recoil.* Maximum speeds of 380 kilometers per hour [236 mph] have been put into question, after a former Ministry of Railways official cites speed limits of 300 kph [186 mph] on contracts for bullet trains. By staff reporter Li Hujun, June 23, 2011. http://english.caixin.com/2011-06-23/100272528.html.