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DEPARTMENT OF TRANSPORTATION

Federal Railroad Administration

[Docket No. FRA-2023-0066]

Program Approval: Georgia Central Railway, L.P. and Heart of Georgia Railroad, Inc.

AGENCY: Federal Railroad Administration (FRA), Department of Transportation (DOT).

ACTION: Notice of approval.

SUMMARY: FRA is issuing this notice to approve a petition from Georgia Central Railway, L.P. (GC) and Heart of Georgia Railroad, Inc. (HOG) (collectively, Petitioners), subsidiaries of Genesee and Wyoming (G&W), for a Test Program designed to test self-propelled, zero-emission, battery-electric rail vehicles and their associated computer and telemetry technology systems, and to evaluate the effectiveness of the system and new operational approaches to rail vehicle technology in the short-haul movement of containers. The approval grants limited, temporary suspension of certain FRA rules necessary to facilitate the conduct of the Test Program, including an exemption for certain safety appliance laws (collectively, Impacted FRA Safety Standards).

FOR FURTHER INFORMATION CONTACT: Matthew Brewer, Staff Director, FRA Engineering and Technology Division, Office of Railroad Safety at (509) 994-1978 or email: matthew.brewer@dot.gov; or Michael Masci, Senior Attorney Adviser, Office of the Chief Counsel, telephone: (202) 302-7117 or email: michael.masci@dot.gov.

SUPPLEMENTARY INFORMATION:

Background

Petitioners' submission (available in docket FRA-2023-0066 at *www.regulations.gov*) explains that the proposed Test Program involves a system of

novel, self-propelled, zero-emission, battery-electric rail vehicles and their associated computer and telemetry technology systems, manufactured by Parallel Systems, Inc. The vehicle concept consists of a single intermodal container carried by two autonomous rail vehicles (AVs). Each rail AV is propelled by a battery and traction motor and has the necessary sensors, radios, and computers to be independent. Through hand-held controls or via the dispatch center, the AVs receive instructions to move either individually (e.g., 2 AVs with one container) or with a group of AVs to operate in a platoon.[1] Petitioners note that following testing of the AVs' braking system and other components at a test site owned by MxV Rail, the Program, if approved, would take place in seven phases on a 160-mile segment of track in central Georgia,[2] to progressively test and aim to prove the technology and collect data to support the safety case.

Petitioners state that the goal of the technology is to provide smaller freight railroads an opportunity to meaningfully compete in the short-haul transportation of containers, and the technology would provide public benefits for the environment, the economy, the national highway system, and communities disproportionately impacted by highway movement of containers. Petitioners contend that "safety is an overriding focus of the proposed Program," and Petitioners have developed, and will adhere to, a Pilot Test Safety Plan (Safety Plan), Exhibit C of the submission, to ensure safety during testing. Petitioners explain the "Safety Plan includes protocols for hazard analysis, control, and verification of controls which will be reviewed by six technical working groups who will consider the risks associated with each phase and the necessary actions to mitigate each risk."

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[1] The AVs do not couple but rather receive commands to move together.

[2] *See* Petition Exhibit C, "Testing will take place between mileposts 503 and 577.8 on the [GC] and mileposts 577.8 and 663 on the [HOG], which are two Class III freight railroads that connect directly in Vidalia, GA."

Petitioners provide that the Program, detailed in Exhibit B of the submission, "is based on seven phases of tightly structured and closely monitored field testing." The Program would use the "results of testing performed during each phase" "to evaluate the safety of the proceeding phase." The Program would collect "data and service history" and then "evaluate changes in the design of the System, its components, and the relevant operating procedures in support of further testing before any proposed use of the System outside of the Program." The Program includes a structured sequence of test phases to "allow collection and evaluation of the operating data in progressively more complex operating conditions." Petitioners emphasize that the priority "of each phase of the Program is to assure safety of railroad employees, other persons and property, and the general public along the railroad lines that will be used for the Program."

Petitioners state that the Program is "designed to evaluate the effectiveness of the system and new operational approaches to rail vehicle technology in the short-haul movement of containers." As described in Exhibit B of the submission, the Program will gather "quantitative and qualitative data" in each phase and evaluate the reliability, compatibility, and cost of operation, along with a safety analysis. Additionally, phase-specific testing objectives are identified in the submission (e.g., to determine if conditions at the test track affect controllability of the vehicle, as well as identify any sources of variation between phases).

The testing is planned in seven phases, with defined success criteria that must be achieved prior to FRA approval to move to the next test phase:

- *Phase 1 - Verification of Vehicle Communications, Traction and Braking:* Criteria to move to the next phase include successful validation of all vehicle controls and validation of all field test procedures, communication, and safety protocols.
- *Phase 2 - Testing Over a Longer Distance and More Diverse Territory:* Criteria to move to the next phase include successful validation of all vehicle controls throughout

the longer distances and more diverse territory, control of the vehicle is fully validated, and confirmation of shunting at a grade crossing.

- *Phase 3 - Validation of Remote Capability of Vehicle with Direct Supervision:* Criteria to move to the next phase include successful validation of all vehicle controls over the broader environment, validation of remote monitoring and video links, including back-up when communications fail, and shunting validation over the territory.
- *Phase 4 - Testing and Data Gathering with Extended Remote Operations:* Criteria to move to the next phase include final validation of all vehicle controls, validation of remote monitoring and video links, including back-up when there is a communications failure, and shunting validation over the territory.
- *Phase 5 - Vehicle Upgrades to Enhance Reliability and Performance (based on previous phases):* Criteria to move to the next phase include re-validation of all vehicle controls, re-validation of remote monitoring and video links, including back-up when communications fail, and shunting re-validation over the territory with the upgraded vehicle.
- *Phase 6 - Concurrent Operations of Vehicle with Conventional Train Service:* Criteria to move to the next phase include all vehicle controls and functionality are reliable, intermixed operations are validated, remote monitoring and video links are reliable, and shunting is validated.
- *Phase 7 - Traverse Entire Route with Multiple Vehicles (Platooning):* At the completion of Phase 7, the vehicle controls and functionality will be reliable, intermixed operations validated, platooning operations validated, remote monitoring and video links reliable, and shunting validated.

FRA conducted a public hearing on March 12, 2024, to provide the public an opportunity to provide oral comment on the petition. Additionally, as explained in

Petitioners' submission, Petitioners have performed outreach to local, State, and federal government representatives, and local authorities in Georgia.

Evaluation of Petition

After review and analysis of Petitioners' submission and public comments, FRA approves temporary, limited suspension of compliance with Impacted FRA Safety Standards[3, 4] in connection with the Test Program, subject to certain conditions designed to ensure safety.[5]

FRA finds that the temporary, limited suspension of Impacted FRA Safety Standards is necessary to the conduct of the approved Test Program, which is specifically designed to test self-propelled, zero-emission, battery-electric rail vehicles and their associated computer and telemetry technology systems and evaluate the effectiveness of the system and new operational approaches to rail vehicle technology in the short-haul movement of containers. Many of the suspensions are necessary because the newly designed equipment does not have certain conventional mechanical elements to which the regulations apply. For example, the vehicle does not have a cab and does not couple to other equipment. Similarly, there is no need for hand holds, ladders, or other safety

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[3] 49 CFR part 218, Operating Practices: §§ 218.55 through 59.

49 CFR part 229, Locomotive Safety Standards: §§ 229.9(a)(3), 229.13, 229.15(a)(10), 229.29, 229.47, 229.53, 229.55(b), 229.71, 229.115(a) and (c), 229.117, 229.119, 229.127, 229.131(a), 229.137, 229.139, 229.141, 229.201 through 206, 229.301 through 319.

49 CFR part 231, Railroad Safety Appliance Standards: §§ 231.6(a), 231.6(d), 231.6(e).

49 CFR part 232, Brake System Safety Standards for Freight and Other Non-Passenger Trains and Equipment: §§ 232.103(f), (g), (j), (k), (l), (m), (n), (o), 232.205–212, 232.215, 232.303, 232.305, 232.503, 232.505.

49 CFR part 236 - Rules, Standards, and Instructions Governing the Installation, Inspection, Maintenance and Repair of Signal and Train Control Systems, Devices, and Appliances, § 236.913.

49 CFR parts 240 and 242 - Qualification and Certification of Engineers and Conductors: §§ 240.103 and 242.103.

49 U.S.C. 20302.

[4] In accordance with 49 U.S.C. 20306, FRA may exempt Petitioners from the statutory requirements in 49 U.S.C. 20302 based on evidence received and findings developed at a hearing demonstrating that the statutory requirements "preclude the development or implementation of more efficient railroad transportation equipment or other transportation innovations under existing law" or an "agreement between national railroad labor representatives and the developer of the new equipment or technology." *See* 49 U.S.C. 20306(a), (b)(2).

[5] Per 49 CFR 211.51.

appliances, because the vehicle is autonomous. FRA acknowledges the Petitioners have installed some safety appliances for use during maintenance and in the event of failure recovery of the vehicle. Suspension of the prohibition against tampering with safety devices is also necessary to perform the testing. For these tests, other safety mitigations are in place to ensure the safety of the employees and public.

Furthermore, FRA also finds that the scope and application of the suspensions, as applied to the Test Program, are limited to that necessary to conduct the Test Program. Each of the seven phases would take place in a limited, clearly defined area as described in the Test Program. Ultimately, the entire Test Program is limited to a 160-mile segment of track in central Georgia.

Finally, FRA's temporary, limited suspension of compliance with Impacted FRA Safety Standards is conditioned on the observance of the following conditions (incorporated here, as listed in FRA's decision letter dated January 15, 2025)[6] to ensure safety:

1. Petitioners must provide to FRA the projected scheduled testing for each phase outlined in their submission. FRA subject matter experts (SMEs) will use this information to plan and conduct site visits to monitor testing for compliance with the conditions outlined in this notice and for observation.

2. During each pilot phase readiness review, a multi-disciplinary team consisting of GC and HOG representatives (including operating and maintenance staff), Parallel Systems, and FRA, will review the results of each phase of testing and evaluate the readiness and safety of transitioning to the next test phase. Documentation must be provided at the completion of each phase to verify and validate that the criteria and metrics are met. Prior to Phase 1, GC and HOG representatives (including operating and maintenance staff), Parallel Systems, and FRA will hold a safety design review to discuss

[6] Conditions 1 through 23 are incorporated from FRA's decision letter.

in detail the specific safety features that are designed into the system to ensure safety, including brake system design, electrical storage/regenerative braking, and emergency stop procedures. Only upon FRA's written approval will Petitioners be able to continue with the next phase of testing.

3. The testing must be restricted to the territory and mileposts documented in the Petitioners' submission, in dark territory under track warrant control.

4. Only railroad or designated representatives trained and qualified on Federal safety rules[7] and railroad safety rules will operate the equipment.

5. All mechanical inspections must be performed by a qualified inspector.

6. All grade crossings must be flagged for all phases where crossings are present.

7. Equipment must be inspected daily prior to use and each control console must be equipped with a digital banner indicating the equipment is safe to operate, or if there is a defective component, the banner must indicate the defect and prevent operation until the defect is repaired. Each control console must also have an accurate speed display.

8. Each vehicle must have an appropriate direction of movement indicator light on the end of the vehicle that faces the direction of travel. The trailing end of the vehicle must have a rear end marker identifying the rear of the vehicle.

9. Each vehicle must be equipped with an operable audible warning device (bells/whistle/alarm) that sounds at the required decibel level (see 49 CFR 229.129(a)) prior to vehicle movement or over grade crossings.

10. Each vehicle must be equipped with a manual safety bus cut out switch located in a safe accessible position not on the ends of the vehicle, as well as having electronic remote safety stop capability on each control device as a first option to ensure personnel are out of harm's way when initiating an emergency stop.

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[7] 49 CFR parts 214, 218, 240, 242, and 243.

11. Documentation must include clear instructions on how to test, inspect, maintain, and operate the brake system and what to do in the event of a brake failure.

12. Documentation must clearly define procedures to ensure the vehicle does not move (roll back or forward) when initiating a movement, including performing a standing braking test.

13. Brake calibration/inspection/maintenance processes must be clearly outlined and adhered to for the duration of the test.

14. Communications loss criteria between the vehicle and operator must be documented on the FRA Form 6180.49A (blue card). Length of communications loss before an automatic brake application must be documented prior to operation.

15. Test Program must address electronic safety features during the handoff between traction and braking. The Program must identify failsafe stop/emergency procedures in the event of a failure, outlining the electronics logic on how to enforce an emergency stop when there is a fault.

16. Test Program must provide a complete description of the braking technology process, including how energy stored in the batteries is managed to prevent overcharge from regenerative braking.

17. Petitioners must provide emergency response training for all emergency responders who might be called to respond in the event of an emergency.

18. Although these vehicles do not couple, there must be a provision for a rescue coupler or alternate process to provide a safe way to move the vehicle in the event of a system failure or emergency.

19. Petitioners must produce and provide FRA with a monthly test report in a common electronic format reviewable by FRA (such as in an Excel file). The report will contain information pertaining to the test area to include vehicle identification, date of each test,

geographic (milepost) limits of the test, issues identified, anomalies and proposed solutions.

20. Prior to advancing beyond Phase 2 and in accordance with Condition 2, petitioners must provide FRA with specific documentation explaining how safety-critical products were developed, how the equipment is inspected, a concept of operations, maintenance schedule and a thorough testing plan indicating what constitutes a pass or fail. Petitioners must also describe how personnel working with safety-critical products will be trained to perform functions of the Program safely. Petitioners must provide FRA with an updated Railroad Safety Program Plan and Product Safety Plan and obtain FRA approval before any Phase 3 testing begins.

21. All personnel involved in the process outlined in this approval must be informed of the content and be aware of the conditions prior to participation in the process. Petitioners must make readily available at every test segment location a copy of the waiver decision letter and the test program and any amendments prior to participation in the test.

22. As this technology and operating approach does not involve a locomotive cab where facilities would normally be located, the Petitioners must make available lavatory facilities for operating and test crews.

23. End handholds and uncoupling levers are not applicable to this equipment because it does not couple. Based on evidence during the March 2024 hearing, FRA exempts Petitioners from the requirements of 49 U.S.C. 20302 for purposes of testing this new technology. The purpose of the statute is to protect employees who are between traditional rail equipment lacing air hoses and coupling equipment, but, because this novel equipment being tested does not couple or have air hoses, the risk has been engineered out.

Conclusion

This test program is approved. Based on the consideration and analysis of data gathered during the Program, or upon Petitioners' written request, FRA may modify or rescind the approval.

Issued in Washington, DC.

Kyle David Fields,

Chief Counsel.

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