**DOCUMENT E: TECHNICAL CHALLENGES AND WORK SUMMARY (EXHIBIT E)**

This document outlines the technical challenges and risks associated with the project undertaken for Tom Ronnkvist, specifically concerning the effort to migrate and maintain his welder controller system originally built on legacy hardware.

**1. Nature of Legacy Hardware** Tom’s original control system relies on:

* A vintage ISA-based industrial controller
* An IDE hard disk
* A legacy MS-DOS software suite and BIOS-dependent calls

All of these technologies are obsolete. ISA (Industry Standard Architecture) slots have been unsupported in mainstream hardware for over 20 years. IDE drives are also prone to failure and are increasingly rare.

**2. Hardware Integration Efforts** On **March 18, 2024**, we accepted Tom’s aged tower and began diagnosing the failing components. On **March 21, 2024**, we identified and replaced a malfunctioning ISA controller card (ordered with Tom’s approval and prepayment).

Due to the unique specifications and vintage nature, the ISA card was custom ordered with no guarantee of compatibility. This process involved precise physical installation, jumpers, port/IRQ conflict mitigation, and alignment with legacy BIOS configurations.

**3. Virtualization Attempt and USB-to-ISA Adapter** Given the instability and physical degradation of the original PC, and the failure to initialize the cards in his software on the “backup tower,” we attempted to virtualize the operating system:

* A USB-to-ISA adapter was purchased and configured
* The virtual machine environment was mapped to attempt BIOS-level operations through DOS emulation
* On **June 28, 2024**, Kyle requested precise IRQ and I/O port details via email

"However, the welder.exe program used in conjunction with mti.bat makes direct BIOS-level calls unsupported by modern virtual machines, making this approach non-viable without source code access."

This virtualization testing and adapter integration were performed **at no additional cost to Tom** as part of our good faith troubleshooting efforts. Tom may be confused by this adapter setup and wrongly interpreted this virtualization attempt as a separate "new computer" sale. **No charge was ever made for this component.**

**4. Manufacturer Dependency** A large portion of the failure in progress was due to the MTI software not recognizing the ISA cards under new hardware, even when original BIOS interrupts and port mappings were preserved.

We tested:

* Tom’s original hardware
* The “backup tower” we sourced for Tom
* The original ISA cards and the replacement ISA card
* The virtualization environment
* The USB-to-ISA interface

In each case, the software failed to recognize the cards, an issue outside our control and one that likely requires engineering support from MTI.

**5. Experimental Nature and Risk Disclosure** Throughout the project, Tom was made aware:

* This project was experimental
* The parts were non-returnable custom orders
* No warranty was expressed or implied under our Custom Order Hardware Policy
* The configuration involved deprecated standards with no modern support and no software vendor documentation

**Conclusion:** The project posed extreme technical barriers. Despite this, NPC performed extensive diagnostics, integration, and recovery work. We clearly documented the software incompatibility issues from MTI and delivered all that could reasonably be achieved given the constraints. Tom was fully informed throughout, and the record reflects our diligence and transparency.