

U.S. Office of Personnel Management  
Division for Human Capital Leadership & Merit System Accountability  
Classification Appeals Programs

Philadelphia Field Services Group  
600 Arch Street, Room 3400  
Philadelphia, PA 19106-1596

**Job Grading Appeal Decision**  
**Under section 5346 of title 5, United States Code**

**Appellants:** [appellants' names]

**Agency classification:** Electronic Industrial Controls Mechanic  
WG-2606-11

**Organization:** Production Maintenance Section  
Production Manufacturing Division  
[name] Center  
[name] Naval Shipyard Detachment  
Department of the Navy  
[location]

**OPM decision:** Electronic Industrial Controls Mechanic  
WG-2606-11

**OPM decision number:** C-2606-11-02

/s/ Robert D. Hendler

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Robert D. Hendler  
Classification Appeals Officer

April 9, 2003

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Date

As provided in section S7-8 of the *Operating Manual: Federal Wage System* (FWS), this decision constitutes a certificate that is mandatory and binding on all administrative, certifying, payroll, disbursing, and accounting officials of the government. There is no right of further appeal. This decision is subject to discretionary review only under the conditions and time limits specified in section 532.705(f) of title 5, Code of Federal Regulations (address provided in the *Introduction to the Position Classification Standards*, appendix 4, section H).

**Decision sent to:**

[appellants' names and addresses]

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## **Introduction**

On August 23, 2002, the Philadelphia Oversight Division, now the Philadelphia Field Services Group, of the U.S. Office of Personnel Management (OPM) accepted a job grading appeal from [appellants' names]. [appellant's name] joined the appeal on March 5, 2003. The appellants occupy identical additional jobs currently graded as Electronic Industrial Controls Mechanic, WG-2606-11. They believe that their job should be a higher grade. The appellants work in the Production Maintenance Section, Production Manufacturing Division, [name] Center, [name] Naval Shipyard Detachment, Department of the Navy, [location]. We received the complete appeal administrative report on October 1, 2002. Security clearance procedures delayed our on-site review of the job until March 5, 2003. We accepted and decided this appeal under section 5346 of title 5, United States Code (U.S.C.).

The appellants state in their appeal letter that the Integrated Comprehensive Automated Manufacture of Propellers (ICAMP) system that they support is an integrated system covered by the 2610 occupation. They say that they are relied upon to provide suggestions, information, and guidance on all aspects of electrical and electronic design, installation, retrofitting, and maintenance of new and existing equipment. The appellants say that they provide quasi-professional managerial and engineering support to their activity because their first and second level supervisors and activity engineering support staff do not have electrical and electronics expertise.

## **General issues**

In their appeal letter, the appellants pointed to portions of their job description (JD) (Number [number]) saying that it shows that they are not typical Electronic Industrial Controls Mechanics. They said that the JD contains verbatim phrases from the 2610 Electronic Integrated Systems Mechanic job grading standard (JGS). During the March 5, 2003, on-site audit conducted with [appellants' names], the appellants disagreed with the analysis of their work conducted by their servicing human resources office. They pointed to the inequity of their job being graded at the same grade as mechanical trades employees when the appellants typically function as workers in charge (lead workers) of those other employees when troubleshooting machine malfunctions. The appellants implied that their work has become more complex due to the increasing computerization of electronic control systems.

Our job grading decisions must be based solely upon a comparison between the actual duties and responsibilities of the job and the appropriate JGS's (5 U.S.C. 5346). Other methods or factors of evaluation may not be used in the job grading process. These include comparing the appellants' job with other jobs that may or may not be graded correctly, e.g., the other grade 11 jobs at their activity.

All occupations change over a period of time, but the fundamental skills and knowledge and responsibility patterns generally remain stable. Careful application of the appropriate JGS to the appellants' work will consider any technological changes in the appellants' work and yield the correct grade for the job.

A JD is the official record of the major duties and responsibilities assigned to a position or job by an official with the authority to assign work. A job is the duties and responsibilities that make up the work performed by an employee. Job grading appeal regulations permit OPM to investigate or audit a job and decide an appeal on the basis of the actual duties and responsibilities currently assigned by management and performed by the employee. An OPM appeal decision grades a real operating job, and not simply the JD. Therefore, this decision is based on the work currently assigned to and performed by the appellant and sets aside any previous agency decision.

### **Job information**

The appellants troubleshoot, repair, and perform preventive maintenance inspections and modifications to electronic control systems and electrical circuits of computer numerical control (CNC) machine tools, molding and melting equipment, and other industrial plant equipment at their activity. The JD states that they occasionally install major electronic control systems that are new to the activity or perform major modifications to existing systems. The equipment includes five- and seven-axis CNC profilers, nine-axis computer controlled robotic optical measuring systems, induction furnaces, and a CNC water knife.

The most complex equipment includes the ICAMP system which consists of six subsystems. The Automated Propeller Optical Measurement System (APOMS) functions as the electronic measurement and inspection portion of the ICAMP. The Vision Processor receives vision module sensor data, sends it to the workstation computer and monitors, receives encoder data from the Motion Controller subsystem, reads and digitalizes temperature data, performs data processing, and communicates with the workstation computer (SUN Ultra-5) that serves as the APOMS System Controller. The Motion Controller generates linear axis motor signals, provides control signals to the rotary devices, provides system power to junction boxes, monitors robot limit switches, receives robot encoder signals, sends encoder signals to the Vision Processor, receives positioning data from the computer when in automatic mode, performs data processing, provides for manual control of the robot through a pendant workstation, and communicates with the workstation computer. The Multi-VERPA (Vertical Propeller Assembly) Controller receives and sends VERPA encoder signals and communicates with the workstation computer. The VERPA provides automatic and manual control for propeller rotation, supplies encoder information to the Multi-VERPA Controller, provides the means for mounting the propeller mandrel, controls pneumatic and hydraulic pump sequencing, and monitors oil and air flow to the pumps. The ICAMP Turntable Rotation Assembly enables the APOMS robot tower (Z axis) to revolve around the X-Y axes and enables the vision sensor to face any of the quadrants surrounding the robot. The System Controller (workstation computer) uses a Unix operating system and operates the software required to operate the APOMS equipment.

The APOMS inspection process is controlled by the systems software resident in the host SUN Ultra-5 computer. The operational software is menu based. Prior to an APOMS scan and inspection of a propeller, data pertaining to that propeller must be programmed into the system in what is called a Database Template. The measured and analysis data produced is stored in a new Inspection Database. Some operator interaction is required at certain points in the data acquisition sequence, such as when the propeller indexing machine needs to move. The operator is prompted to perform certain actions and the actions are verified by the system before

proceeding. The subsystems must maintain a constant “handshake.” A machine fault will produce an error message and the scanning process will stop.

The ICAMP is located next to SU-12 which is a seven-axis gantry profiler use to contour mill large propellers. Programming information is fed through the Intelligent Front End (IFE) to the Machine Management Control (MMC) which sends it to the CNC. The CNC controls SU-12 machine movement and positions and the Programmable Machine Control controls switches and lights and monitors faults. Machining program changes can be made by editing the program in the MMC. The ICAMP and SU-12 can be operated together. Programming information from the APOMS can be sent through the Ethernet to the IFE. When it reaches the MMC, the operator will be asked whether they wish to accept the programming change which will change the programming information for the SU-12.

In addition to the on-site audit with four of the appellants, we interviewed their second level supervisor, [name], on March 5, 2003. In deciding this appeal, we fully considered the audit and interview findings and all information of record furnished by the appellants and their agency at our request. We find that the JD of record contains the major duties and responsibilities assigned to and performed by the appellants and we incorporate it by reference into this decision.

### **Occupational code, title, and standard determination**

The agency allocated the job as Electronic Industrial Controls Mechanic, WG-2606. In their agency level appeal letter, the appellants requested that their job be graded as Industrial Electronics Systems Mechanic, WG-2610-12, or Industrial Electronic Controls Mechanic, WG-2606-12. They believed that they performed work found in both trades. They said that the 2610 Electronic Integrated Systems Mechanic JGS should be applied for grading because they service integrated systems that require the integration of all operable subsystems into functional integrated systems.

The 2606 JGS covers work involved in the installation, maintenance, troubleshooting, repair, and calibration of electronic controls, indicating, and recording systems used in industrial machinery and other equipment. The work requires knowledge of the practical application of electronics theories and circuits that are applicable to power, timing, motion control, indicating devices, and pulse and counting mechanisms, including special purpose digital computers (microprocessors) dedicated to control functions, as well as knowledge of industrial equipment operation and processes.

The 2610 JGS (1972), the 2606 JGS (1987), and the Introduction to the Electronic Equipment Installation and Maintenance Family 2600 (1981) must be read together. The 2606 JGS covers equipment and systems that use digital microprocessors which perform adaptive control functions. Adaptive control is a refinement of numerical control that adapts the metal cutting operation of a numerically controlled machine to the actual conditions of the cutting tool and stock, such as stock hardness variations, air gaps in the work piece, and dulling rate of the tool. Transducers on the machine detect spool deflection, vibration, and temperature and torque on the spindle. The signals from the transducer are analyzed by a special adaptive control program and corrections are made to the spindle speed and feed rate.

The 2606 JGS states that although these transducers are sensors feeding logic back to a logic unit, this does not meet the criteria for an electronic integrated system where the output of a number of sensor subsystems is integrated in a logic subsystem. The JGS further says that the transducer and microprocessor or the adaptive control unit do not compare at all in scope, operation, or complexity of theory and design to “a number of sensor subsystems” such as target tracking radar or gyro or inertial sensing unit which are part of an electronic integrated system.

The 2610 JGS’s further clarifies the definition of electronic integrated system within the meaning of the FWS job grading process. The JGS states that the output of a number of sensor subsystems is integrated into a logic subsystem and the resultant is used to modify the operation of the total system. For example, an autopilot system covered by the 2610 JGS would process sensor information and use it to change actuator operation and use continuous feedback to monitor and further modify system operation. The 2600 JGS further clarifies the distinction between electronic integrated systems and electronic systems that do not meet that level of complexity. An example is an autopilot system which detects minute error signals from a stable platform and amplifies them to drive aileron or elevator servos in which the amount of displacement of the control surface is proportional to the amount of the error signal.

The appellants state that the SU-12 and APOMS are separate systems each made up of a number of subsystems. They say that the two machines are an integrated system that are connected through the APOMS host SUN Ultra-5 computer to the activity Computer Aided Design system. The appellants support their rationale by saying that when the APOMS robot scans an object on the SU-12, it sends information to the IFE computer on the SU-12 to create a transformation file. They say that the file alters the program that the SU-12 will use to cut the object and that one system uses data obtained from the other.

The systems cited by the appellants are not electronic integrated systems within the meaning of the FWS. APOMS and SU-12 typically are not operated together. When they are operated together, program changes sent from APOMS do not automatically adjust SU-12 operations and feed back that information to APOMS in a continuous loop as would happen in an integrated system. Instead, the program changes sent through the IFE to the MMC must be accepted by the operator before they can change MMC files. The ICAMP and APOMS documentation provided by the appellants confirms a level of operator involvement not present in electronic integrated systems covered by the 2610 JGS. The SU-12 operates using the adaptive control functions described in the 2606 JGS. The ICAMP functions in an equivalent manner. Although each subsystem has its own logic controller, the subsystems do not affect or modify the operations of the other subsystems. ICAMP subsystem feedback is similar to that of the autopilot system described previously where signals from the vision sensor feed back through the system so that the robot arm continues to move in its programmed path over the propeller being scanned. Therefore, the appealed job is allocated as Electronic Industrial Controls Mechanic, WG-2606, and that JGS must be used for grade determination.

### **Grade determination**

The 2606 JGS uses four factors to determine grade level: *Skill and Knowledge*, *Responsibility*, *Physical Effort*, and, *Working Conditions*.

### *Skill and Knowledge*

The appellants' work meets the grade 11 level. Typical of that level, they must be skilled in interpreting technical documentation including electrical and electronic schematics, logic diagrams, and mechanical drawings in order to trace signal flow throughout the system while troubleshooting malfunctions of complex systems, such as CNC machining centers with adaptive control where the signal must be traced in digital logic through the central processor in electrical and mechanical form through the machining center to the tool in electrical and then digital form to the adaptive control microprocessor and then as a digital input to modify the commands from the central processor. As at the grade 11 level, the appellants must know the characteristic voltage, current, and signal shape of the input and output of a wide variety of microprocessors, integrated and discrete solid state circuits, and transistor applications in order to recognize indications of improper operation and differentiate them from temporary anomalies introduced by the testing itself.

The appellants stressed the increasing computerization of the machinery that they service and the need to understand files systems, communication protocols, serial/parallel interfaces, and other personal computer operations. During the on-site audit, the appellants pointed to the skills necessary to trace machine operating problems by using dedicated machine CRT's to trace data through the logic ladder to isolate system malfunctions. This skill and knowledge is covered in the JGS at the grade 11 level where mechanics must be skilled in the interpretation of installation and repair instructions which frequently describe only general applications for the various components rather than their interface with the other components of the specific system since the various components are often produced by many manufacturers with differing design philosophies, e.g., when new CNC control units are retrofitted onto older NC machines or controls are connected through customized interface devices to electrical, mechanical, pneumatic, or hydraulic controls of components which vary greatly in operating theories and operating tolerances as a result of differing age, purpose, and manufacturers' practices.

Equipment requiring the application of grade 11 level skill and knowledge typically uses special purpose dedicated computers to store operating parameters and initiate adjustments. As in the appellants' work situation, data conversion and processing units are integral features of electronic controls at this level. To troubleshoot these, employees use Boolean algebra to construct truth tables and logic equations for analysis of logic circuits and the ability to program simple test instructions on an input console to check out particular circuits or functions. The appellants use equivalent grade 11 level knowledge and skill in tracing errors through logic ladders. Typical of grade 11 work, the appellants must apply a thorough knowledge of logic circuits, of electronic amplification and control circuits, and of complex electrical, mechanical, hydraulic, and/or pneumatic systems. In addition, they must be well grounded in the industrial control processes to be accomplished by the equipment on which they work in order to properly test and coordinate the various portions of the system, e.g., understanding the machining processes in order to isolate potential program fault areas.

During the on-site audit, the appellants pointed to their functioning as "lead workers" because they typically are the first to be called to deal with equipment malfunctions and are assisted by production machinery mechanics when they troubleshoot system problems. The appellants stated that they are involved in major changes in equipment and the installation of new

equipment typical of the grade 12 level. They pointed to assisting in the electric/electronic overhaul of the SU-9 CNC profiler in 1993, including identifying problems and suggesting solutions prior to acceptance. They assisted in the installation of APOMS and the SU-12 in 1993-1994 and assisted the Ingersoll mechanical representatives approximately two years ago in their overhaul of the SU-12 spindle. The appellants described the APOMS as a one-of-a-kind prototype machine specially built for the activity. They anticipate involvement in planning for the overhaul of the SU-10 (five-axis CNC profiler) starting in September 2003. One of the appellants has attended meetings to discuss preferences regarding the selection of controllers and drives available on the market. The appellants described their independent efforts in 2002 to correct X axis oscillation on the five-axis SU-8 CNC profiler including rearranging and reconfiguring the feedback package, ordering and attaching an encoder and end shaft kit to the X axis motor, and changing Adjustable Machine Parameters to change the axis multiplier and divisor to deal with X axis oscillations. They pointed to the lack of documentation for systems, e.g., troubleshooting at a logic level to do board repairs and documenting those system changes for the APOMS. They say that the activity does not have any electrical or electronic engineers and that the mechanical engineering staff relies on them for technical input.

At the grade 12 level, work requires extensive theoretical and practical knowledge of operation, capabilities, and limitations of electronic control equipment and systems as well as skill in applying this knowledge to understand new or extensively modified systems in order to improvise alignment, repair, and operating procedures which will be efficient, complete, and compatible with available resources. This level of knowledge and skill is required to work on new systems of similar great complexity where the employee serves as "lead worker" on teams to install and put into operation major electronic control systems which are new to the activity or which are major modifications of existing systems so that there is little knowledge of the system problem areas and expertise in its repair. However, "lead worker" at the grade 12 level in the 2606 JGS refers to regularly leading other Electronic Industrial Controls Mechanics as part of a team approach to solving problems of grade 12 scope and complexity. Therefore, this aspect of grade 12 level work may not be credited to the appellants' job.

Grade 12 employees troubleshoot and repair new systems during the operational tests and improvise procedures to cope with unforeseen defects. They construct interface devices and modifications to the equipment from sketches and verbal instructions in order to refine the new system operations. The appellants do not perform this breadth and depth of trade design and fabrication. Instead, they identify commercially available components, e.g., locating and selecting a motor and drive with appropriate operating specifications and ordering and attaching an encoder and end shaft kit.

The grade 12 employee applies advanced electronic theory and frequent technological changes in systems. They must use ingenuity in the application of shop and trade practices to solve operating and repair problems and practical knowledge of electronic theory and design and ability to use theoretical concepts to devise solutions for operating or repair problems on one-of-a-kind systems in which novel engineering approaches have created unforeseen problems. While the APOMS is unique to the activity, a 1991 system cannot be construed as using new or novel engineering approaches in 2003. The grade 12 employee exercises skill in interpreting electronic, electrical, and mechanical drawings, specifications, and schematics of complete custom systems and skill in troubleshooting complex electronic systems characterized by



unusual circuit arrangements and theories and lack of developed documentation. Although proprietary technical documentation was not readily available to the activity when the original manufacturer held maintenance and repair contracts, this is not equivalent to the much more limited knowledge of system operations found at the grade 12 level. The record shows that the appellants are involved in equipment modification and upgrades. Typically one appellant is the primary activity contact point for any project. Based on the limited frequency with which each appellant is assigned this duty, this work also cannot be considered regular and recurring within the meaning of the FWS and would not control the evaluation of this factor or the grade of the appealed job. Therefore, this factor is credited at grade 11.

### *Responsibility*

The appellants' level of responsibility meets the grade 11 level where employees receive work assignments from the supervisor in the form of written work orders and inspection reports and oral instructions. They work in accordance with available drawings, technical orders, or specifications for the equipment serviced. Typical of more demanding grade 11 work, the appellants improvise changes to techniques and procedures to reach specified parameters when aging of components or modification of circuits have changed operating conditions, e.g., reintegrating the X axis on the SU-8 CNC profiler. As at this level, they are responsible for knowing and judging the impact of repairs; i.e., the effects that changes and adjustments will have on the related integral devices of the equipment serviced. They are also responsible for making further tests and alignments to ensure that the completed equipment is aligned and functioning properly.

As at the grade 11 level, the appellants plan their work and apply sound judgment in decisions which contribute toward greater operating life and efficient operations. They keep abreast of technological changes in the occupation. At the grade 11 level, technical advice is available on unusually difficult problems and completed work is spot checked for compliance with accepted trade practices and specifications. The appellants pointed to the fact that their supervisors have mechanical trades background and cannot provide advice and assistance. However, the record shows that the appellants are expected to obtain technical data from the original equipment manufacturer representatives. Typical of the grade 11 level, they use this information to solve equipment operating problems, e.g., contacting Ingersoll software engineers on machine issues.

At the grade 12 level, employees exercise significantly more judgment and independence in determining the methods and techniques required to solve unusually complex installation and repair problems, e.g., independently judge the need for modification of test devices or work sequences, and for special or nonstandard trade techniques. They develop and submit for approval changes to detailed schematics, drawings, and maintenance procedures for use by lower grade employees and provide guidance to lower grade employees on new electronics theories and applications and provide technical guidance and assistance to lower grade employees. They coordinate their efforts with technical and professional personnel on matters affecting installation or operating specifications and changes to equipment. The supervisor assigns work orally and through written instructions which outline the purpose of the work and possible approaches. Work is reviewed by occasional spot checks, review of documentation developed, and successful check out of the equipment. Because the appellants do not perform the full range of grade 12 maintenance, repair, and installation work as discussed previously, they do not deal with the

variety of issues and do not exercise the greater judgment and independent action on work found at the grade 12 level and do not provide guidance to lower grade employees typical of the grade 12 level. Therefore, this factor is credited at the grade 11 level.

*Working Conditions* and *Physical Effort* are the same at all grades level. Because they do not have grade level impact, and the appellants' work meets the levels described in the JGS, we will credit both factors as being met and will not address them further.

### **Decision**

The appealed job is properly graded as Electronic Industrial Controls Mechanic, WG-2606-11.