Testing a full nuclear staffing taxonomy against Workforce Pell

Which of 61 occupations the instrument can reach, what the federal data can see, and what the published state lists cover.

A full nuclear staffing taxonomy covers 78 roles across 61 SOC occupations, spanning construction, manufacturing, operations, maintenance, engineering, radiation protection, and administration. Before any coverage claim, each occupation is classified by whether Workforce Pell can reach it at all:

A. Workforce Pell candidates with visible supply, 21 of 61 (34%). Short-program pathway plausible and federally visible supply exists. The instrument can reach these where a state approves them.

Welders, cutters, solderers, and brazers; First-line supervisors of construction trades and extraction workers; Heating, air conditioning, and refrigeration mechanics and installers; Electricians; Engineering technologists and technicians, except drafters (all other); Life, physical, and social science technicians (all other); Electrical and electronic engineering technologists and technicians; Electrical and electronics repairers, powerhouse, substation, and relay; Industrial machinery mechanics; Carpenters; Machinists; Chemical technicians; CNC Machinist (Nuclear Components); Plumbers, pipefitters, and steamfitters; Chemical plant and system operators; Operating engineers and other construction equipment operators; Security guards; Sheet metal workers; Construction and building inspectors; Hazardous materials removal workers; Nuclear power reactor operators.

B. Workforce Pell candidates with thin or no visible supply (under 100 completions), 5 of 61 (8%). Short-program pathway plausible, but the federally visible pipeline is near zero. Training happens in apprenticeships and employer programs IPEDS cannot see, or barely exists.

Boilermakers; Painters, construction and maintenance; Insulation workers, floor, ceiling, and wall; Power plant operators; Cement masons and concrete finishers.

C. No instructional-program mapping (invisible to Title IV by taxonomy), 8 of 61 (13%). The federal CIP taxonomy maps no instructional program to these occupations, so no Title IV program can be classified as producing them, regardless of state approvals.

Administrative/Clerical Staff; Document Control Specialist; Supply Chain/Warehouse; Concrete Worker/Laborer; Ironworker (Structural); Factory Assembly Technician; Fuel Handling Technician; Fuel Fabrication Worker.

D. Degree-track occupations (typical entry education bachelor's or above), 27 of 61 (44%). Typical entry education is a bachelor's degree or higher, so a 150-to-599-clock-hour program is not the credential these occupations require. A Workforce Pell certificate can still be a stackable first step, but the occupation itself sits beyond the instrument.

Nuclear engineers; Chemical engineers; Materials engineers; Civil engineers; Purchasing managers; Lawyers; Mechanical engineers; Health and safety engineers, except mining safety engineers and inspectors; Industrial engineers; Electrical engineers; Electronics engineers, except computer; Physicists; Environmental scientists and specialists, including health; Engineers (all other); Training and development specialists; Compliance officers; Public relations specialists; Career/technical education teachers, postsecondary; Network and computer systems administrators; Information security analysts; Business operations specialists (all other); Project management specialists; Cost estimators; Construction managers; Industrial production managers; Managers (all

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other); Industrial Safety Specialist.

Of the 61 occupations in the demand taxonomy, 21 are occupations Workforce Pell can plausibly reach. Four of those appear on all three machine-readable state lists held here; seven of the 61 appear on no held list. The degree-track classification describes the occupation's credential, not the student's path: a Workforce Pell certificate can still be a stackable first step toward a degree-track occupation, which is what the statute's stackability requirement is designed for. But the occupation itself is not fillable by the certificate, so degree-track rows are excluded from coverage claims.

Weighted by demand rather than count, the picture shifts. Using the taxonomy's 34 staffing-sourced roles (medium build scenario, shared-SOC duplicate figures removed), 81 percent of peak-construction FTE demand sits in occupations Workforce Pell can reach, 10 percent in the thin trades, and 9 percent in taxonomy-invisible occupations; at steady-state operations the reachable share is 55 percent, with 37 percent degree-track. The by-count split describes the taxonomy, the demand-weighted split describes the workforce, and construction demand concentrates heavily in the reachable trades. Weights use sourced staffing figures only, so estimate-tier roles are excluded, and the staffing model's lockstep phasing means construction trades carry the five-year snapshot and operations roles the fifteen-year one.

Typical entry education: BLS Employment Projections Table 5.4 (2023 National Employment Matrix). Completions: IPEDS 2023-24 sub-baccalaureate awards (certificates and associate degrees), joined through the NCES CIP2020-SOC2018 crosswalk. Checks show membership on the published Colorado (434), North Carolina (364), and Pennsylvania (19) occupation lists.

Occupation (SOC)	Typical entry education	Sub-bacc completions, US	CO 434	NC 364	PA 19
A Workforce Pell candidates with visible supply 21 of 61 **Short-program pathway plausible and federally visible supply exists. The instrument can reach these where a state approves them.**					
51-4121 Welders, cutters, solderers, and brazers Module Fabrication Welder; Nuclear Welder	High school diploma or equivalent	58,305		✓	✓
47-1011 First-line supervisors of construction trades and extraction workers Construction Superintendent; Craft Foreman	High school diploma or equivalent	48,244	✓	✓	
49-9021 Heating, air conditioning, and refrigeration mechanics and installers HVAC Technician	Postsecondary nondegree award	32,630	✓	✓	✓
47-2111 Electricians Electrician (Construction)	High school diploma or equivalent	30,349	✓	✓	✓
17-3029 Engineering technologists and technicians, except drafters, all other In-Service Inspector (ISI); NDT/NDE Technician	Associate's degree	17,010	✓	✓	
19-4099 Life, physical, and social science technicians, all other Radiation Protection Technician	Associate's degree	16,080	✓	✓	
17-3023 Electrical and electronic engineering technologists and technicians I&C; Technician	Associate's degree	12,729	✓	✓	
49-2095 Electrical and electronics repairers, powerhouse, substation, and relay Electrical Maintenance Technician	Postsecondary nondegree award	9,070	✓	✓	

Occupation (SOC)	Typical entry education	Sub-bacc completions, US	CO 434	NC 364	PA 19
49-9041 Industrial machinery mechanics Mechanical Maintenance Technician	High school diploma or equivalent	8,137	✓	✓	
47-2031 Carpenters Carpenter (Nuclear)	High school diploma or equivalent	5,356	✓	✓	✓
51-4041 Machinists Machinist/Millwright	High school diploma or equivalent	5,172	✓	✓	
19-4031 Chemical technicians Plant Chemistry Technician	Associate's degree	3,970	✓	✓	
51-4011 CNC Machinist (Nuclear Components) CNC Machinist (Nuclear Components)	High school diploma or equivalent	3,806		✓	✓
47-2152 Plumbers, pipefitters, and steamfitters Pipefitter/Steamfitter	High school diploma or equivalent	3,464	✓	✓	✓
51-8091 Chemical plant and system operators Enrichment/Conversion Technician	High school diploma or equivalent	2,877		✓	
47-2073 Operating engineers and other construction equipment operators Operating Engineer/Crane Operator	High school diploma or equivalent	1,131	✓	✓	
33-9032 Security guards Nuclear Security Officer	High school diploma or equivalent	453		✓	
47-2211 Sheet metal workers Sheet Metal Worker	High school diploma or equivalent	386	✓	✓	
47-4011 Construction and building inspectors QC Inspector	High school diploma or equivalent	312	✓	✓	
47-4041 Hazardous materials removal workers Decommissioning Specialist; Waste Management Technician	High school diploma or equivalent	129	✓	✓	
51-8011 Nuclear power reactor operators Reactor Operator (RO); Senior Reactor Operator (SRO)	High school diploma or equivalent	103		✓	
B Workforce Pell candidates with thin or no visible supply (under 100 completions) 5 of 61 **Short-program pathway plausible, but the federally visible pipeline is near zero. Training happens in apprenticeships and employer programs IPEDS cannot see, or barely exists.**					
47-2011 Boilermakers Boilermaker	High school diploma or equivalent	25		✓	
47-2141 Painters, construction and maintenance Painter/Coatings Specialist	No formal educational credential	28			
47-2131 Insulation workers, floor, ceiling, and wall Insulator	No formal educational credential	32			
51-8013 Power plant operators Non-Licensed Operator (NLO/AO)	High school diploma or equivalent	57	✓	✓	
47-2051 Cement masons and concrete finishers Cement Mason	No formal educational credential	70	✓	✓	
C No instructional-program mapping (invisible to Title IV by taxonomy) 8 of 61 **The federal CIP taxonomy maps no instructional program to these occupations, so no Title IV program can be classified as producing them, regardless of state approvals.**					
43-0000 Administrative/Clerical Staff Administrative/Clerical Staff	n/a (occupational group code)	—			

Occupation (SOC)	Typical entry education	Sub-bacc completions, US	CO 434	NC 364	PA 19
43-4199 Document Control Specialist Document Control Specialist	High school diploma or equivalent	—		✓	
43-5071 Supply Chain/Warehouse Supply Chain/Warehouse	High school diploma or equivalent	—			
47-2061 Concrete Worker/Laborer Concrete Worker/Laborer	No formal educational credential	—			
47-2171 Ironworker (Structural) Ironworker (Structural)	High school diploma or equivalent	—	✓	✓	
51-2099 Factory Assembly Technician Factory Assembly Technician	High school diploma or equivalent	—		✓	
51-8099 Fuel Handling Technician Fuel Handling Technician	High school diploma or equivalent	—		✓	
51-9199 Fuel Fabrication Worker Fuel Fabrication Worker	High school diploma or equivalent	—			
D Degree-track occupations (typical entry education bachelor's or above) 27 of 61 **Typical entry education is a bachelor's degree or higher, so a 150-to-599-clock-hour program is not the credential these occupations require. A Workforce Pell certificate can still be a stackable first step, but the occupation itself sits beyond the instrument.**					
17-2161 Nuclear engineers Licensing Engineer; Nuclear Criticality Safety Engineer; Nuclear Engineer; Nuclear Safety Analyst; Spent Fuel/Dry Cask Engineer	Bachelor's degree	31			
17-2041 Chemical engineers Chemical/Process Engineer	Bachelor's degree	58	✓		
17-2131 Materials engineers Materials/Metallurgical Engineer	Bachelor's degree	76	✓		
17-2051 Civil engineers Civil/Structural Engineer	Bachelor's degree	138	✓		
11-3061 Purchasing managers Procurement/Supply Chain Manager	Bachelor's degree	174	✓		
23-1011 Lawyers Nuclear Attorney/Counsel	Doctoral or professional degree	293	✓		
17-2141 Mechanical engineers Mechanical Engineer	Bachelor's degree	387	✓		
17-2111 Health and safety engineers, except mining safety engineers and inspectors Fire Protection Engineer	Bachelor's degree	437	✓		
17-2112 Industrial engineers Manufacturing Quality Engineer	Bachelor's degree	635	✓		
17-2071 Electrical engineers Electrical Engineer	Bachelor's degree	699	✓		
17-2072 Electronics engineers, except computer Instrumentation & Controls Engineer	Bachelor's degree	751	✓		
19-2012 Physicists Health Physicist; Reactor Physicist / Core Design	Doctoral or professional degree	1,557	✓		
19-2041 Environmental scientists and specialists, including health Environmental Specialist	Bachelor's degree	1,761	✓		

Occupation (SOC)	Typical entry education	Sub-bacc completions, US	CO 434	NC 364	PA 19
17-2199 Engineers, all other Simulator Engineer; Systems Engineer	Bachelor's degree	4,608	✓		
13-1151 Training and development specialists Technical Trainer	Bachelor's degree	5,844	✓		
13-1041 Compliance officers QA Auditor	Bachelor's degree	6,439	✓		
27-3031 Public relations specialists Community/Public Affairs	Bachelor's degree	6,798	✓		
25-1194 Career/technical education teachers, postsecondary Simulator Instructor	Bachelor's degree	28,324	✓		
15-1244 Network and computer systems administrators IT Infrastructure Specialist	Bachelor's degree	37,064	✓		
15-1212 Information security analysts Cybersecurity Specialist (Nuclear)	Bachelor's degree	58,610	✓		
13-1199 Business operations specialists, all other Emergency Preparedness Coordinator	Bachelor's degree	98,298	✓		
13-1082 Project management specialists Maintenance Planner/Scheduler; Scheduler	Bachelor's degree	121,806	✓		
13-1051 Cost estimators Cost Engineer/Estimator	Bachelor's degree	121,818	✓		
11-9021 Construction managers Construction Manager	Bachelor's degree	130,782	✓		
11-3051 Industrial production managers QA/QC Manager	Bachelor's degree	131,282	✓		
11-9199 Managers, all other Operations Manager; Project Controls Manager; Project Director; Regulatory Affairs Manager; Security Manager; Shift Supervisor/Shift Manager	Bachelor's degree	199,067	✓		
29-9011 Industrial Safety Specialist Industrial Safety Specialist	Bachelor's degree	—	✓		

Notes. Occupation rows carry the staffing-taxonomy role names beneath the federal occupation title. Three taxonomy SOC codes are older vintages recoded in the BLS 2023 National Employment Matrix (29-9011, 51-4011, 51-2099); education for these is taken from their successor codes, and 51-4011 (CNC machinist) is mapped to programs via its successor 51-9161, whose feeder CIPs (48.0503 Machine Shop Technology, 48.0510 CNC Machinist Technology) are established community-college programs with 3,806 completions. 43-0000 is an occupational group code, not a detailed occupation. Completions cannot be summed across rows: the CIP-SOC crosswalk is many-to-many, so one program's completions can appear under several occupations.

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