

Estimating Workers Needed to Meet New EPA Rules in Appalachia

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EPA Methane Emissions Regulations

- Leak Detection and Repair
- Pneumatic Controllers
- Compressor Stations
- Compressors
 - Reciprocating (dry-seal)
 - Centrifugal (wet-seal)
- Storage Tanks

Meeting Compliance

- **Monitoring and Maintenance:**
 - Quarterly AVO** monitoring of wells and monthly monitoring of compressor stations for leaks. Repairs to follow based on need.
 - Compressor maintenance
 - Storage tank maintenance
- **Replacement/Abatement:**
 - Replace pneumatic controllers
 - Compressor replacement and abatement
 - Storage tank replacement and abatement

Number of Sites, by Type and State

State	Active Wells	Pneumatic Controllers*	Compressor Stations*	Processing Compressors*	Storage Tanks*
KY	16,558	16,740	182	1,170	403
OH	33,654	34,023	370	2,423	818
PA	83,800	84,721	922	6,033	2,037
WV	57,100	57,727	628	4,110	1,388
Total	191,112	193,211	2,102	13,736	4,646

*Estimated based on shares of active wells in relation to total number of active wells.

**Audible, visual, olfactory.

Calculating Workers Needed

Method Leverages Most Readily Available Information

- In the case of methane leak inspection, detection, and repair, the *number of hours of work to complete those tasks is used to derive the number of workers needed* to perform that work.
- In other methane emissions strategies (replacing pneumatic controllers, replacing compressors, adding flare systems to storage tanks, and decommissioning orphaned well sites) the known and cited *costs of installation or maintenance are divided by the assumed hourly cost of work, leading to the calculation of the number of worker hours* and thus the estimated number of workers.

Method Considers only Direct Workers

- Estimates *only* the number of *direct* workers doing the needed work using available information on hours of work and costs.
- Additional *indirect* workers would result from doing this work.

Estimate includes high and low estimates based on minimum needs (EPA regulations) or on maximum needs (fully addressing methane emissions).

Workers Needed to Meet EPA Regulations

Number of Jobs, by Type and Task

	Low Estimate	High Estimate
Monitoring and Maintenance		
Leak Inspection and Detection	1,336	1,336
Leak Repair	3,739	3,739
Compressor monitoring	60	60
Storage tanks maintenance	77	681

5,816 Ongoing Jobs

	Low Estimate	High Estimate
Replacement/Abatement		
Pneumatic controller replacement	7,290	7,290
Compressors	259	259
Storage Tanks	244	2,165

9,714 Temporary Jobs

Needed Workers by State

	Low Estimate	High Estimate
Kentucky	1,127	1,346
Ohio	2,290	2,735
Pennsylvania	5,703	6,810
West Virginia	3,886	4,640
Total	13,005	15,530

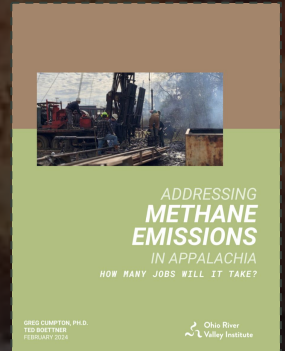
Conclusions

- **Jobs considered here require a relatively high level of skill and knowledge.**
- **A majority of jobs required to meet EPA regulations will involve replacing equipment or installing abatement measures.**
- **Skillsets involved in replacement and abatement tasks will be transferrable to future installation and management of new equipment.**
- **Job numbers reflect only direct workers engaged in the work, so undercount the total number of jobs needed to meet EPA regulations.**

Estimating Workers Needed to Decommission Oil & Gas Wells in Appalachia

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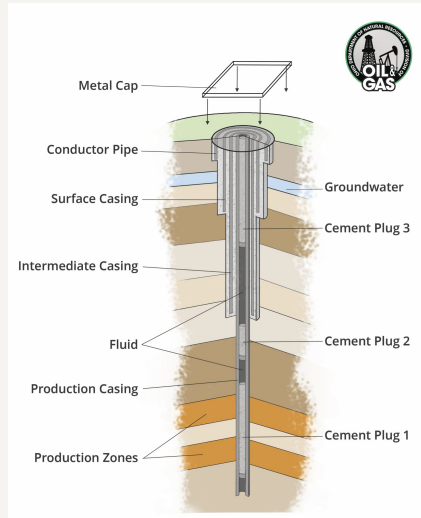
Methane Emissions

- **Unplugged Abandoned Wells** (2.2 million): 294,000 metric tons (CH₄) in 2021*
 - = 6 coal-fired power plants
- **Low-Producing (Marginal) Wells** (565,000): 4 million metric tons (CH₄)*
 - = 88 coal-fired power plants

Federal Funding for Decommissioning Oil and Gas Wells

- **Methane Reduction Infrastructure (IIJA):** \$4.7 billion to decommission or plug and abandon (P&A) orphaned wells.
- **Methane Emissions Reduction Program (IRA):** \$750 million to decommission low-producing marginal conventional wells.

Well Plugging Schematic



Estimated Federal Plugging Funds for Appalachia (in millions)

STATE	IIJA	MERP	Total
KY	\$174	\$26	\$200
OH	\$326	\$40	\$366
PA	\$401	\$89	\$490
WV	\$212	\$76	\$288
4-States	\$1,113	\$230	\$1,343



*SOURCE: US EPA GHGI (2023), EDF/NATURE COMMUNICATIONS (2022)

Workers Needed to Decommission Wells in Appalachia

Wells to Decommission in Appalachia

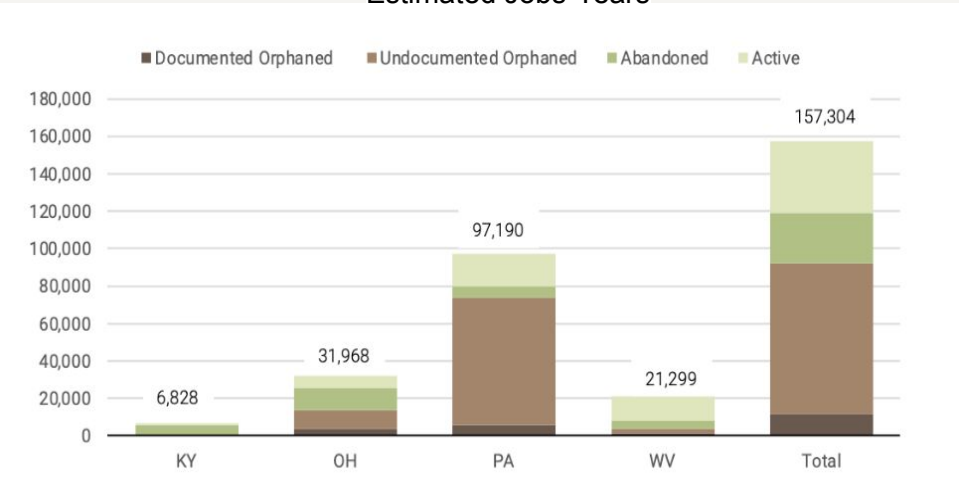
State	Documented Orphaned Wells	Undocumented Orphaned Wells*	Abandoned Wells**	Active Wells	Total Wells
KY	11,728	3,000	74,252	16,558	100,225
OH	19,662	51,371	58,842	33,654	159,356
PA	26,908	330,000	29,265	83,800	466,310
WV	6,309	9,000	19,238	57,100	89,934
Total	64,607	393,371	181,597	191,112	815,826

*Uses mid-point of undocumented orphaned well estimate **Includes inactive and shut-in

Estimated On-Site Workers Needed for Well Decommissioning

Two PA Contract Awards	Plugged Orphaned Wells	Cost Per Well	Labor Hours	Hours Per Plugged Orphaned Well	Direct Labor Wages	Job-Years Created	Job-Years Per Plugged Well	Spending Per Job-Year
\$2,693,548	38	\$70,833	10,114	266	\$561,577	5.1	0.13	\$532,637

Estimated Jobs-Years



Source: Author's analysis of data from TCF Upstream database, state decommissioning costs from oil and gas divisions in KY, OH, PA, and WV, and two well decommissioning contracts in Pennsylvania

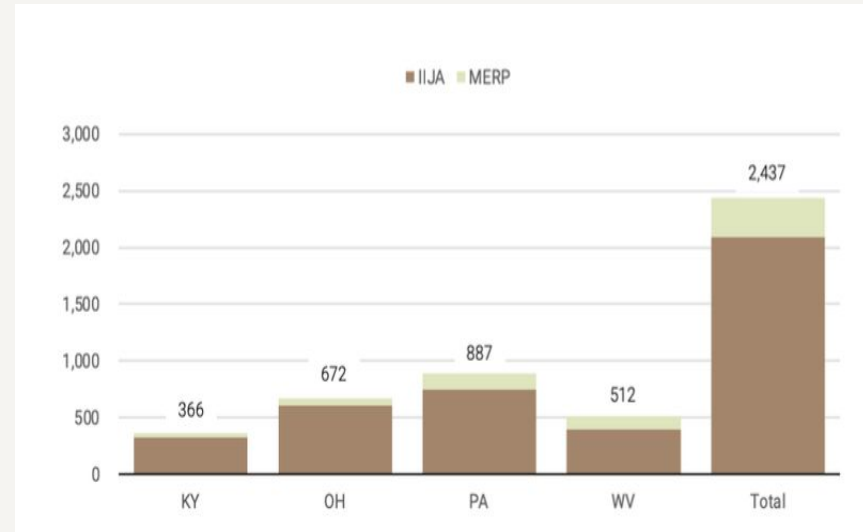


Workers Needed to Decommission Wells in Appalachia Using IJA and MERP Funding

Wells to Decommission: IJA & MERP

State	Orphaned Wells	Conventional Marginal Wells	Plugging Cost Per Orphaned Well	Orphaned Wells Plugged (IJA)	Marginal Wells Plugged (MERP)	Total Plugged Wells
KY	11,728	16,703	\$34,435	5,053	604	5,657
OH	19,662	25,885	\$102,041	3,195	314	3,508
PA	26,908	57,908	\$109,481	3,663	650	4,313
WV	6,309	49,201	\$123,738	1,713	491	2,205
Total	64,607	149,697	\$81,695 (avg)	13,624	2,059	15,683

Estimated Job-Years from IJA/MERP Funding to Decommission Wells



Source: Author's analysis of data from TCF Upstream database, state decommissioning costs from oil and gas divisions in KY, OH, PA, and WV, and two well decommissioning contracts in Pennsylvania



Total Job Creation of Decommissioning Wells in Appalachia

IIJA - Orphaned Well Grant Funds in Appalachia

STATE	IIJA - State Orphan Well Grants (Millions)
KY	\$174
OH	\$326
PA	\$401
WV	\$212
4-States	\$1,113

Estimated Job Creation (Direct, In-Direct, and Induced) from IIJA Well Decommissioning Using DOI Estimates

	FY 2022 Expenditures (Millions)	Total Jobs Supported	Jobs - Direct	Jobs - Secondary
Administrative	\$32.6	462.5	232.5	230.0
Project	\$527.4	6,311.4	2,216.3	4,095.1
Total State Initial Grants	\$560.0	6,773.9	2,448.8	4,325.1
Cost Per Job		\$82,670	\$228,683	\$129,477

STATE	IIJA - Total	IIJA - Direct	IIJA - Secondary	On-Site Jobs
KY	2,105	761	1,344	327
OH	3,943	1,426	2,518	612
PA	4,851	1,754	3,097	753
WV	2,564	927	1,637	398
TOTAL	13,463	4,867	8,596	2,090

Difference in job estimates



Creating a Union Methane Reduction Workforce in Appalachia

- IIJA orphaned wells grants and MERP grants require contractors to pay prevailing wages under the Davis-Bacon Related Acts (DBRA), while the EPA methane rules do not.
- Workforce Development and Unions
 - Commonwealth Workforce Transformation Program : Uses 3% of IIJA/IRA funds for an on-the-job training grant program to promote workplace and economic development. Grant provides \$40,000 per new employee and up to \$400,000 per project to private contractors that receive IRA/ IJJA funds. No concrete details yet.
 - California High Road Training Partnership: High Road Training Partnership launched an oil and gas well capping pilot initiative in Los Angeles and Kern Counties with \$14.3 million in funding. The funds can be for training apprentices and upskilling journeypersons on well-plugging projects. Last summer, California Legacy Well Services (a union contractor) received \$6.4 million to develop an apprenticeship program.
- Better State Procurement: Apprenticeship utilization requirements, PLAs, responsible bidder (no independent contractors), health/pension benefits, certificates of insurance, no unresolved violations, and require safety training and certifications.
- Offer a state or federal tax credit if you pay prevailing wage on methane reduction projects or utilize active apprenticeship and training program.

