Recommended Best Practices for Orphan Well Plugging & Abandonment

Special Notes/Foreword

The Energy Workforce & Technology Council provides recommended best practices and guidelines for use by well plugging contractors, supporting service vendors, and state and federal regulators.

With recent passage of the bipartisan infrastructure bill, an unprecedented amount of funding will be made available to states and other agencies to address orphan wells throughout the U.S. This creates an incredible opportunity for states and members of the Council. Due to the rapid implementation and spending requirements needed, it also poses potential risk to human health and the environment (especially during start-up operations). As a result, the Council formed its Orphan Well Working Group to create a guidance document and with intent of preventing unwanted health, safety and environmental events, providing for the well-being of employers, employees and the general public (surface owners).

This paper is intended to serve merely as a summary of existing guidelines and documents in which interested parties can refer to for more information on various topics related to orphan well plugging and abandonment.

The Recommended Best Practice owes its existence to members of the Well Servicing Committee of the Energy Workforce & Technology Council. These members committed their time and effort to assist the industry in the prevention of unwanted health, safety, or environmental events, providing for the well-being of employers, employees and the general public.

The recommendations should only be used as guidelines to the extent that they do not conflict with law or regulation. All applicable governmental rules, regulations or restrictions now in effect or which may be promulgated in the future, supersede and control where applicable. Nothing in this manual shall be deemed to establish minimum or maximum standards or operating procedures for energy service operations, or to replace local, state or federal regulations. Nothing in this manual shall be deemed to establish industry recognition of a hazard for purposes of section 5(a)(1) of the Occupational Safety and Health Act. No suggested method, practice, precaution, or program in this manual shall be deemed to establish legal standards of conduct or a legal duty to perform.

The Recommended Best Practice cannot possibly cover all situations which may arise in operations and maintenance of energy servicing equipment or in the plugging of orphaned oil and gas well. The recommendations in this manual should be used only when appropriate and with modifications as necessary due to operating conditions, type of equipment and other variables. Employers and their employees should be alert to hazards and realize that changing conditions present exposures which are to be met with appropriate precautions.

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The Sections below are typical items recommended to be included in RFPs/RFQs for well plugging and abandonment projects and generally adhered to by seasoned well plugging contractors and associated service vendors.

It should be noted and stressed that it was the consensus opinion of the Orphan Well Group Subcommittee that the majority of the serious incidents experienced during well plugging and abandonment projects was a direct result of employees and customers falsely presuming that orphaned wells do not pose a risk to human health and the environment. The same precautions taken on active wells to mitigate the risk of uncontrolled release of gas and other fluids should be implemented on orphan well plugging and abandonment projects. To the public, a release from any well is unacceptable and puts a "black eye" on our entire industry.

Section 1: Safety Recommendations

1. **Rig, Wireline, Cementing & Associated Equipment Safety**. It is anticipated that site preparation (e.g., dozers), rigs (pole & derrick), cementing, wireline and other equipment will be required to plug and abandon orphaned wells. There are several existing guidance documents in existence to assist in ensuring the equipment is adequate and safe for use on orphan well plugging program. Some of the most pertinent include:
    a. AESC Recommended Safe Procedures & Guidelines for Oil & Gas Well Servicing, 6th Revision, 2017.
    b. Occupational Safety & Health for Oil & Gas Well Drilling & Servicing Operations, API Recommended Practice (RP) 54, 4th Edition, February 2019, https://www.api.org/-/media/Files/Publications/RP-54_e4.pdf
    c. Derricks & Masts: API Specifications 4F and 4G, Drilling & Well Servicing Structures.
    d. Wire Rope: Application, Care & Use of Wire Rope for Oilfield Service, API Recommended Practice 9B, 14th Edition, October 2015.
    e. Hoisting Tools, Hooks, Elevator Link (Bails), Elevators, & Related Equipment: API Specification 8A, API Recommended Practice 8B, & API Specification 8C.
    f. Wireline BOP/Lubricators: API Specification 6A Wellhead and Tree Equipment, 21st Edition, November 2019.
    g. Oilfield Explosives: API Recommended Practice 67 for Oilfield Explosives Safety, 3rd Edition, October 2019.
    h. Drilling and Well Servicing Equipment: API Specification 7K Sixth Edition December 2015.
    i. Well Control: API Recommended Practice 59 Well Control Operations, 2nd Edition, May 2006.
    j. H_2S: Oil and Gas Well Servicing and Workover Operations Involving Hydrogen Sulfide API Recommended Practice 68, 1st Edition, January 1998.

Section 2: Experience Recommendations

2. **Worker Experience & Training Recommendations**. One of the key components to safely and efficiently plugging orphan wells is directly correlated to the experience and training of the work crews. Our industry has adopted and developed several industry-specific training programs and policies to help ensure that our workforce is competent as well as aware of the hazards associated with oil and gas well operations. These include:
    a. General Industry Experience Expectations
        i. *Rig Operator - Minimum 2.5 years' experience in conventional well servicing/plugging
        ii. Lead Floor Hand/Power Tong Operator - Minimum 1 year experience
        iii. Derrick Hand - Minimum 2 years' experience
        iv. Floor Hand - New hire/SSE
        v. *Downhole supervisor - Minimum 2 years' experience
        vi. *Wireline supervisor - Minimum 2 years' experience
        vii. *Cementing supervisor - Minimum 2 years' experience
        viii. Truck Operator - Minimum 6 months' experience
        ix. Rig Supervisor - Minimum 5 years' experience in conventional well servicing/plugging
        x. HSE Oversight manager - 5-7 years' experience in oil and gas operations
    b. PEC Safeland / IADC RigPass /10-hour OSHA
    c. Other Recommended Training Courses
        i. First Aid/CPR
        ii. Confined Space Entry
        iii. H2S/Benzene Awareness
        iv. Well Control School
        v. Oilfield Explosives Safety course
        vi. NORM/TENORM Awareness and/or Surveyor Course
        vii. *DROPS Training
        viii. Excavation & Mobile Equipment Training (Telehandler/Earth Equipment)
        ix. US DOT / CDL Compliance Awareness Training

Section 3: QA/QC Recommendations

3. **Quality & Operational Controls.** One of the questions to ponder is: *What does a quality oil and gas well plugging project look like?* Beyond having no worker safety incidents, this may include:
    a. Purpose built and sized equipment: Using the right type of equipment will help reduce costs and increase efficiency. Rigs should be sized (pole or derrick) based upon the anticipated maximum pulling capacity (a.k.a. hook load) required to perform the plugging project and anticipated operational footprint (i.e., small well pads require small rigs).
    b. Quality of cement materials/plugs (to prevent the likelihood of leakage post plugging): Using the right cement type, ensuring proper mix/density, and plugs covering pay zones.

The Committee suggests requiring lab testing for the slurries that are to be pumped not only for documentation purposes, but to show pump time, additives (if any), and compressive strength development at a minimum. If more complex slurries are required, additional lab testing may be needed such as transition time.

c. Quality and Standardized Field Reports and Records Detailing Plugging Operations (Competent Data Acquisition) are needed to help ensure work is meeting project requirements as well as provide records to review should an issue occur in the future. The Committee suggests a post-job report to identify any lessons learned to also include projected days to complete vs actual, projected volumes vs actual, etc.
d. Minimization of the Waste Volumes Generated.
    i. For example, recovered crude oil is sold as a product, recovered tubulars/casings are recycled as scrap, etc**.** (NORM/TENORM considerations).
    ii. The ultimate destination and associated volumes/tons/bbls. should be determined prior to project kick-off and be tracked through project completion.
e. No environmental releases or spills.
    i. For example, develop a control of well policy and require certain well control equipment for orphan wells.
    ii. Installation and Maintenance of Erosion Control Devices (ECDs).
    iii. Consider installing well cellars around orphan wells to capture potential leaks.
    iv. Be Cautious when using Existing tanks - ensure that the collection vessel is adequate for reuse, has proper containment, and will not result in a release.
f. Decision Making Matrix / Subject Matter Experts (SMEs) When Encountering Unexpected Downhole and Other Conditions. In other words, pre-determine who makes the ultimate decision as to what to do next.
g. Surface Owner & Public Satisfaction: Communication with the public is an important consideration. Affected surface owners at minimum should be informed of schedule, anticipated activities/duration, and provided a point of contact to relay their concerns.
h. *Measured (quantifiable) reduction of methane emissions is a large part of the intention of the federal Orphan Well Plugging Program. A standard should be developed and submitted to involved parties to ensure this is being quantified accurately and consistent across the entire program.
i. *Local Township Permitting/Contractor Registration: Although it is anticipated that states will be issuing most of the required plugging approvals/permits, it should also be noted that some states, local townships, cities, etc. may have special permits, licenses, and fees which should also be procured prior to project start-up.
j. Wellbore Plugging and Abandonment, API Recommended Practice 65-3 1st Edition, June 2021. This newly released API document should serve as a key reference document for all involved parties to help ensure that orphan wells are properly plugged and abandoned.

Section 4: Insurance Minimum Recommendations

Below are some of the key insurance policies that Committee members typically see on well plugging and abandonment RFPs/RFQs and should be considered based on well specifics and other conditions.

1. Automobile
2. Commercial General Liability
3. Workers Compensation
4. Pollution Coverage
5. Umbrella Coverage
6. Well Control ("Blowout") Policy

Section 5: Policy Recommendations

Below are some key company and customer policies that Committee members typically see on well plugging and abandonment RFPs/RFQs and should be considered based on well specific and other conditions.

1. Short Service Employee (SSE): This policy is designed to help ensure a minimum level of worker experience is present on each rig or project location.
2. Emergency and Contingency Preparedness: It is critical that Emergency Response & Contingency Plans be designed, developed, and reviewed prior to project commencement.
3. Waste Management: A Waste Management Plan should be developed and reviewed prior to project commencement to ensure that all anticipated waste streams are properly disposed and recycled at appropriately licensed and approved facilities.
4. Journey Management: This policy is intended to minimize the impact to the public from well plugging and abandonment operations. For example, not moving a rig during hours of school bus operations.
5. Fatigue Management policies are created to mitigate the risks associated with worker fatigue/travel times and work hours/days.
6. Drug and Alcohol: Given the safety sensitive nature, it is absolutely a standard policy that no employees be permitted to work on rigs and well sites without participating in an effective drug and alcohol program.
7. Hot Work Policy: Given that natural gas and crude oil is present or has the potential to be present on orphan well locations, a hot work policy should be implemented to help mitigate the associated risk (especially if retiring tanks previously containing crude oil and other hydrocarbons).
8. Local Workforce Utilization: Wherever possible, the Committee recommends the recruitment and utilization of a local workforce to help in creating jobs in the communities in which the orphan wells are situated.
9. Prevailing Wages: Companies are required to ensure that payment of prevailing wages where applicable.