Review of Challenges with Construction Safety Regulatory Framework within the U.S. Department of Energy

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Office of Environment, Health, Safety and Security

1. INTRODUCTION AND BACKGROUND

Several organizations within the U. S. Department of Energy (DOE or the Department) have expressed to the Office of Environment, Health, Safety and Security (EHSS) that limited bidder pools and increased construction costs impact their ability to maintain a construction portfolio necessary to support DOE's mission needs. During meetings held at DOE Headquarters on September 28 and November 7, 2023, leadership from Energy Facilities Contractor Group (EFCOG), National Nuclear Security Administration (NNSA) Field Elements, and prime contractors presented to EHSS their concerns regarding the confusion, additional cost, and inefficiencies associated with the perceived burden of complying with the requirements in 10 CFR Part 851, *Worker Safety and Health Program* (10 CFR 851). They face significant challenges when hiring construction contractors to perform work because construction contractors normally operate under the Occupational Safety and Health Administration's (OSHA) regulations, or an OSHA State Plan, and are not always familiar with the specific provisions of 10 CFR 851. The outcome of the meeting was a request that EHSS become a partner in finding a solution to the likely-complex challenge facing DOE sites with pending subcontractor construction projects.

The EHSS Office of Worker Safety and Health Policy (EHSS-11) undertook an effort to understand DOE's approach to construction projects and any associated challenges. This effort included interviewing federal and contractor employees familiar with DOE construction projects, identifying existing resources within DOE which provide requirements and guidance for construction safety, and seeking to understand the expectations for construction contractors working at DOE that may differ from their work elsewhere. This paper documents EHSS-11's understanding of the challenges associated with implementing DOE-specific safety and health expectations for construction projects. The goal is that this information and these perspectives will be used as a catalyst for discussion with the DOE community to develop actionable solutions.

The following terminology is used in this paper. *Prime contractor* means the contractor under contract with DOE. Prime contractors are often M&O contractors, but DOE has more than one contracting mechanism. A *construction contractor* is the main construction company hired to execute construction work. The plural of *construction contractors* is used to refer to the main construction company and their subcontractors. The colloquial term for a construction contractor is general contractor or GC. This paper is focused on construction projects, so the term *subcontractor* refers to lower tiered construction contractors hired by a GC.

2. CHALLENGES AND CONTRIBUTING FACTORS

DOE, including NNSA, has a significant number of current and planned construction efforts to support a diverse mission. Many of these projects are aimed at replacing aging facilities. Several NNSA sites have noted challenges with having a competitive pool of qualified GCs to bid on DOE construction projects and speculate this has resulted in increased costs, inefficiency, and lower quality of work performed. They have observed that DOE construction projects are less attractive to smaller business and have experienced fewer than expected bids for projects.

EHSS-11 conducted 16 interviews with DOE federal and contractor employees to gain a better understanding of the challenges and contributing factors to procuring and completing construction projects. Topics discussed were site roles and responsibilities related to construction work; the level of construction work at present and expected future construction; how construction projects are bid, contracted, and managed; DOE oversight (design to completion); challenges with implementing 10 CFR 851; and existing tools and processes that lead to successful construction management. The contributing factors detailed in the following sections are a synopsis of common themes based on interviewees' perspectives at their sites.

Lack of familiarity with DOE's Worker Safety and Health Regulation. Familiarity with 10 CFR 851 was identified by interviewees as a barrier to attracting well-qualified GCs. Interviewees stated that private sector construction companies have OSHA-compliant (Federal or State Plan) construction safety and health programs and are not familiar with 10 CFR 851 requirements. They hypothesized that mandating GC compliance with an unfamiliar regulation (i.e., 10 CFR 851) causes confusion, adds cost, and is a contributing factor for construction project bidders to drop out or increase their bids. For example, a written worker safety and health program (WSHP), additional safety and health standards (e.g., ACGIH TLVs, NFPA 70E), and DOE-specific functional area requirements (e.g., 10 CFR 851 Appendix A) are not directly prescribed by OSHA standards. GCs typically have a corporate safety and health program that has been developed for compliance with either federal or state OSHA regulations. Some individuals interviewed noted their site's practice is for the prime contractor to review a GC's corporate safety and health program and then take an active role in assisting the GC develop an addendum for local procedures and DOE-specific requirements, including those in 10 CFR 851.

Inflexible Worker Safety and Health Regulation. Interviewees suggested 10 CFR 851 is inflexible and does not allow sites to adopt alternative regulations. For example, several interviewees had participated in variance discussions to use and implement state OSHA standards, more recent incorporated by reference standards, and other applicable regulations not incorporated by 10 CFR 851. Individuals interviewed noted that the variance application process is time consuming and costly.

Oversight Structure. The robust oversight at DOE sites was identified by interviewees as the most significant contributing factor for the lack of bids for DOE construction projects. They surmised that there is not a substantial oversight presence outside of DOE to ensure that GCs are meeting worker safety and health regulatory requirements. Some interviewees reported subcontractors walking off the job due to the regular oversight.

Contract Requirements. Lack of skilled contract personnel, Federal Acquisition Regulation (FAR) requirements, and DOE-site-specific requirements were identified as contributing factors for lack of bids or increased costs to DOE construction projects. The FAR is the regulatory requirement for executive agencies, including DOE, to use in the acquisition of supplies and services with appropriated funds. Many Federal agencies have supplemental regulations to the FAR. For DOE, the supplemental regulation, Chapter 9 of Title 48 Code of Federal Regulations, is referred to as the DEAR (DOE Acquisition Regulation).

Several interviewees noted that potential bidders lack the skilled contract personnel needed to bid DOE construction projects. Additionally, company representatives involved in the bidding process may not be the same individuals that are responsible for job execution. Contract information may not be communicated clearly to the individuals performing the work, which leads to a lack of understanding of

DOE worker safety and health requirements. As a result, GCs perceive DOE requirements as additional and request additional compensation for compliance.

FAR (25.003) requires that all materials brought to a construction site for incorporation into a project must be of domestic origin. Several individuals noted that these "buy American" requirements are a potential source of inflation to bids for DOE construction projects due to the burden of compliance.

DOE-site specific requirements, such as training and credentialing, were an area identified to limit bids and increase overall construction costs. The skilled workforce of many construction companies consists of foreign nationals. Foreign nationals may be prohibited from construction work in secure areas of DOE facilities, which may limit a GC's ability to complete the projects. It was also noted that in one case a construction company modified their workforce to comply with the requirement, which resulted in substandard work results.

Qualified Prime Contractor Oversight. Several interviewees noted that prime contractors have challenges maintaining sufficient staff with the necessary skills to provide oversight of construction projects. This can lead to safety and health requirements not being included in construction contracts or insufficient communication with GCs about what the requirements entail. For example, the prime contractor reviews and accepts a GC's WSHP, construction project safety and health plan, and activity hazard analyses. An inexperienced or untrained prime contractor may mandate that GCs adopt their WSHP or they may not allow the GC to tailor their corporate safety program to the hazards of their scope of work. Changing their safety programs, or working to the prime contractor's WSHP, can be an extra burden for GCs.

Flow Down of WSH Requirements. GCs can perform the construction work themselves or subcontract all or some of the project. DOE requirements, including a WSHP and ISM system, must be flowed down to subcontractors at any tier. GCs review and accept their subcontractor WSHPs, construction safety and health plans, and activity hazard analyses. They also perform oversight of their employees and the work done by their subcontractors. The prime contractor doesn't hold the contract with lower tiered subcontractors and therefore has little influence on the content of these subcontractors' WSHPs, other than the ability to stop work in the event of an imminent danger. As a result, the prime contractor may fear negative repercussions for subcontractor safety violations. Because prime contractors, GCs, and their subcontractors may all have different WSHPs, or implement their programs in different fashions, it becomes difficult for the Field Element and construction managers to perform effective oversight. Gaps in worker training and noncompliant programs may go unrecognized until there is an event.

Qualified Federal Oversight. Several Interviewees reported that federal offices are experiencing high attrition which has led to not enough federal workers to cover the demand for construction project oversight and newer employees with limited knowledge of DOE policy. Many DOE sites are in undesirable geographic locations or high cost of living areas, which impacts their ability to recruit and retain qualified workers. In addition, oversight positions require workers to be onsite to observe work and these positions may not have desirable telework or remote work flexibilities.

Incorporated by Referenced Standards. DOE's worker safety and health regulation incorporates by reference several safety and health standards. Some interviewees noted that these standards are often more restrictive than a GC's current work practices and the additional controls required for compliance increase the cost of projects. An often-cited example was silica, which has a DOE required Threshold

Limit Value (TLV) that is more protective than the OSHA permissible exposure limit (PEL). Additionally, OSHA's construction silica standard allows compliance with a table that specifies exposure control methods for certain activities and equipment in lieu of exposure monitoring. DOE does not have a comparable table and construction projects must do exposure monitoring, which is often more costly and poses technical challenges. Other interviewees noted that 10 CFR 851's incorporated by reference standards are not the most up-to-date versions and GCs' safety and health programs may incorporate more recent standards. Although DOE allows more recent versions to be incorporated into worker safety and health programs, contractors must do an evaluation to ensure the more recent versions provide equal or greater worker protection. GCs may be unwilling to do the evaluation, or the evaluation may be costly.

3. REQUIREMENTS UNIQUE TO 10 CFR PART 851

DOE promulgated 10 CFR 851 to establish a framework for a worker protection program that reduces occupational injuries, illnesses, and accidents and promotes a safe and healthful workplace for DOE contractors and subcontractors who perform work in furtherance of DOE's unique and varied missions. Part 851 provides the foundation of worker safety and health requirements for construction activities primarily through incorporated OSHA standards and supplemented by DOE-specific requirements that address the risks associated with construction work. These activities include erection, installation, assembly, demolition, or fabrication activities involved to create a new facility or to alter, add to, rehabilitate, dismantle, or remove an existing facility. This section identifies notable safety and health requirements for DOE construction projects that may require extra effort on the part of contractors to implement. Interviewees suggested that 10 CFR 851 is unfamiliar to GCs which can result in inflated bids or GCs declining to bid.

Worker Safety and Health Program. Contractors, including construction contractors, perform work under an approved written Worker Safety and Health Program that includes applicable elements prescribed by 10 CFR 851 and addresses hazards within the contractor's scope of work. OSHA also requires employers to have programs to comply with OSHA standards (29 CFR 1926.20(b)), but only some programs are required to be documented and there is no requirement in OSHA's standards that a contractor's safety program must be approved by the hiring entity before the contractor starts work.

Construction Functional Area Requirements. GCs are required to prepare a project safety and health plan to implement the 10 CFR 851 Construction Safety functional area requirements. The GC must assign a qualified designated representative to be responsible for on-site implementation of the plan and provide a list of project activities for which hazard analyses are to be performed. The requirement for regular inspections by the designated representative mirrors OSHA's requirement in 29 CFR 1926.20(b)(2) for a similarly qualified person (competent person) to provide frequent and regular inspections.

Worker's rights at DOE construction sites are summarized on the DOE Job Safety and Health poster and other Department of Labor posters applicable to federal workplaces and government contracts (e.g., Davis-Bacon poster). 10 CFR 851.20(b)(7) provides employees the right to express safety and health concerns and Appendix A.1(c) provides for workers to report to the GC's designated representative hazards that were not previously identified or evaluated, and the GC is required to take action.

Activity Hazard Analysis. Pre-task planning is required to be approved by the construction manager (usually the prime contractor) for each definable construction activity on a DOE site prior to the start of work. This planning, called Activity Hazard Analysis (AHA), helps contractors identify and record potential hazards and appropriate steps to mitigate those hazards. Construction workers are required to be made aware of the content of AHAs before beginning work. OSHA recognizes AHA (called job hazard analysis in OSHA documentation) as a best practice and provides guidance to employers; however, an AHA is not prescribed by OSHA regulations.

Hierarchy of Controls. Evaluating the hierarchy of controls is a required activity hazard analysis step for determining which actions will best control workplace hazards. The prescribed hierarchy includes (1) Elimination or substitution of the hazards where feasible and appropriate; (2) Engineering controls where feasible and appropriate; (3) Work practices and administrative controls that limit worker exposures; and (4) Personal protective equipment. The OSHA construction standards do not directly mandate construction contractors implement the hierarchy of controls for all hazards; however, some OSHA standards incorporate the principles. For example, 29 CFR 1926.55, *gases, vapors, dusts, fumes, and mists*, requires administrative and engineering controls be implemented before requiring employees to wear respirators. Strict adherence to OSHA standards where hierarchy of control principles are not prescribed can lead to situations where employees may not be afforded the highest level of protection. An OSHA fall protection standard, 1926.502(h), allows construction contractors to use safety monitors under specific circumstances. A safety monitor is an administrative control. For DOE construction work, the expectation would be for construction contractors to consider eliminating the fall hazard or provide engineering controls for the fall hazard before relying on an administrative control or PPE. Another example is 1926.501(b)(1) which requires employees to be protected from falling by use of guardrail systems, safety net systems, or personal fall arrest systems. While OSHA does not prioritize guardrail systems over PPE in this standard, applying the hierarchy of controls during an activity hazard analysis ensures the most effective method for control is considered.

Stop Work. DOE contractors are required to have procedures for workers to stop work or decline to perform an assigned task because of a reasonable belief that the task poses an imminent risk of death, serious physical harm, or other hazard to workers. This worker right is also on the DOE Job Safety and Health poster. OSHA has similar provisions (29 CFR 1977.12), but OSHA regulations do not require employers to have procedures.

Industrial Hygiene Program. 10 CFR 851 Appendix A.6 Industrial Hygiene requires contractors, including construction contractors, to implement a comprehensive industrial hygiene program and specifies minimum elements to be included in the program: initial and periodic surveys and exposure monitoring, anticipation of health hazards when planning activities, and policies and procedures to mitigate identified health hazards including carcinogens. Implementation of the industrial hygiene functional area requirements could require that a GC employ or subcontract a professionally and technically qualified industrial hygienist to manage the program. No OSHA standard requires a comprehensive industrial hygiene program. OSHA 29 CFR 1926.55(b) requires employers to use a competent industrial hygienist or other technically qualified person to determine equipment and technical measures necessary to comply with the OSHA PELs for airborne contaminants.

Worker Exposures to Chemical Substances and Physical Agents. DOE contractors, including construction contractors, are required to ensure worker exposures are less than OSHA PELs and the

ACGIH TLVs when they are more protective than the PELs. Construction contractors outside of DOE may not be required to comply with the ACGIH TLVs. For construction projects, the most notable differences between TLVs and OSHA PELs include hexavalent chromium (welding), manganese (welding), isocyanates (carpet, paint, sealants), and crystalline silica (dust during construction activities).

ACGIH has also established TLVs for physical agents relevant to construction activities including noise, ergonomic hazards, and thermal stress. The TLV for noise is lower than the OSHA construction PEL prescribed by 29 CFR 1926.52. OSHA has not established PELs for thermal stress or ergonomic hazards at this time but can cite the General Duty Clause.

Electrical safety. The NFPA National Electric Code (NFPA 70) and Standard for Electrical Safety in the Workplace (NFPA 70E) are incorporated into 10 CFR 851. NFPA 70 is not unique to DOE and is legislated by local jurisdictions who require a specific edition to be used. NFPA 70 is also referenced in the International Building Code (2021).

The 10 CFR 851 incorporated by reference edition of NFPA 70E is 2015, which provides additional electrical safety-related work practices including, but not limited to, developing an electrical safety program, establishing an electrically safe work condition, electrical safety training, conducting an arc flash assessment, arc flash labels, and additional personal protective equipment requirements. OSHA's Subpart K, *Electrical,* is based on the 1979 edition of NFPA 70E. Although OSHA does not specifically require compliance with newer editions of NFPA 70E; an industry consensus standard may be evidence that a hazard is "recognized" and that there is a feasible means of correcting the hazard.

Occupational Medicine. Comprehensive occupational medicine services are required for workers who are enrolled in a medical or exposure monitoring program or who work on a DOE site for more than 30 days in a year. Construction contractors are required to obtain the services of an occupational medicine provider (OMP) and give the OMP access to information related to worksite hazards. The OMP determines the medical and health evaluations necessary for each worker (e.g., baseline, transfer, periodic, hazard-based, qualification-based, diagnostic, return to work, separation, and psychological capacity to perform work) and communicates the results back to the employer. The DOE requirements for occupational medicine are more comprehensive than OSHA requirements. For example, DOE requires contractors to notify their OMP of a work-related illness or injury, or a worker's absence due to any injury or illness lasting 5 or more consecutive days. DOE also expects construction contractors to provide the OMP the opportunity to be involved in worker safety and health team meetings and committees, provide input on employee counseling and health promotional programs, and access to the workplace for evaluation of job conditions and issues.

4. DISCUSSION

This section offers the collective perspective of SMEs within EHSS-11 based on information learned through interviews and extensive research. Although DOE's worker safety and health regulation is often cited as a barrier to having a competitive pool of qualified GCs to bid on DOE construction projects, we believe that the current worker safety and health regulation provides many flexibilities to ease administrative burden with construction projects at DOE sites. Field Elements and prime contractors unfamiliar with these flexibilities may be placing undue burden on subcontractors, including construction contractors.

DOE Approval of the WHSP. The 10 CFR 851 implementation guide identifies several methods in which contractors may obtain DOE approval for a subcontractor's (including construction contractor's) WSHP. A GC's WSHP may be included directly into the prime's WSHP, the prime can require the GC to prepare and submit a separate program that the prime approves and includes in its submission to DOE, or the prime can develop templates for different types of narrow-scope work that are pre-approved by DOE through the prime contractor's WSHP and require subcontractors to accept the relevant generic programs. Ultimately, the prime contractor's WSHP should describe the approach and process they use to flow down requirements to subcontractors, and the DOE Field Element is familiar with the selected approach because they reviewed and approved the prime's WSHP.

Prime contractors that require GCs to follow their WSHP may have significant challenges because the prime's WSHP is based on a scope of work that is significantly more complex and addresses additional hazards not commonly encountered in construction environments. Additionally, the prime most likely has capabilities that the GC does not. The EHSS-11 takeaway from construction-related discussions, including interviews, is that some prime contractors are including 10 CFR 851 and their full WSHP into the project acquisition documents and requiring the GC to prepare a construction project safety and health plan that meets those requirements. Prior DOE guidance recognized that mandating construction contractors comply with prime contractor WSHPs that go beyond the safety and health standards applicable to the construction contractor's scope of work will adversely affect project cost and schedule.

Prime contractors who proactively review GCs' corporate safety and health plans and assist in tailoring requirements based on the hazards of the GC's scope of work have noted fewer challenges with GCs meeting DOE requirements. Prime contractors can evaluate a GC's existing corporate safety and health program and assist in adding any additional elements needed so that the program is compliant with DOE requirements, including 10 CFR 851. This does require knowledgeable SMEs to review subcontractor programs and recognize requirements and terminology from different standards or methods can be used to meet DOE requirements. If the practices, means, methods, operations, or processes to ensure a safe and healthful workplace are the same as those required by 10 CFR 851, a variance is not required to implement those requirements. For example, an OSHA regulation (e.g., 29 CFR 1926) and a state regulation (e.g., Cal/OSHA) may have the same requirements, only cited differently.

Generic templates may be an effective method for construction subcontractors that have a narrow scope of work (e.g., electricians, painters, plumbers) to develop a WSHP that meets DOE part 851 yet is tailored to the subcontractor's scope of work and hazards. The prime contractor can develop DOE compliant templates, or a boilerplate, that can be added to contracts, negating the need for GCs and subcontractors to develop robust WSHPs on their own for narrow scope projects.

Requirements unique to 10 CFR 851. Contractors must develop a DOE approved WSHP that provides its workers a safe and healthful workplace in which hazards are abated, controlled, or otherwise mitigated to reasonably assure workers are adequately protected from recognized hazards. Along with the process-based elements of hazard identification, assessment, prevention, and abatement; the regulation prescribes compliance with OSHA regulations and certain safety and health standards applicable to DOE operations. The unique regulatory requirements applicable to DOE construction projects are summarized in section 3.

Documentation is a common requirement of 10 CFR 851 that is not always specified in OSHA regulations. Contractors must have a documented WSHP, documented AHAs, procedure for stop work,

written industrial hygiene program, comprehensive fire safety and emergency response program, and written construction project safety and health plan. To date, documentation has not been identified as a challenge for GCs working on DOE construction projects. Although documentation is not specified as a requirement in the noted OSHA regulations, having a written program is one way that a contractor could demonstrate their intent to meet requirements.

The ACGIH Threshold Limit Values are more stringent exposure limits than OSHA PELs for some common construction contaminants and hazards. A common assertion is that OSHA PELs are sufficiently protective of workers. Most of the existing OSHA PELs were adopted from the 1968 ACGIH TLVs. In 1989, OSHA published a significant amendment to its PELs, but that amendment was later retracted due to legal challenges. In their Annotated Tables "OSHA recognizes that many of its permissible exposure limits (PELs) are outdated and inadequate for ensuring protection of worker health." It is also important to note that DOE has incorporated the same standard that OSHA's PELs are based on, only 50 years more recent.

The most notable difference for DOE construction activities is the TLV for crystalline silica. The OSHA PEL is 50 $\mu g/m^3$ with an action level of 25 $\mu g/m^3$, whereas the DOE referenced TLV is 25 $\mu g/m^3$. To assist construction employers with compliance to the PEL, OSHA provides control methods (1926.1153 Table 1) that can be used for specific activities that generate silica. Contractors not working at DOE that implement Table 1 are not required to conduct air monitoring unless their task isn't in Table 1. The main challenge with meeting DOE silica requirements is most likely not the difference in exposure limit, but lack of a similar table. EHSS-11 published a policy clarification (D19-02-001, 08/22/2019) which states, "It is acceptable for contractors to develop a revised Table 1 by documenting exposure control methods that take into account the lower ACGIH TLV…" Prime contractors could assist GCs by providing a modified Table 1 as described. Should a prime contractor provide services to a GC, either IH surveys or access to the prime contractor's occupational medicine provider, these provisions would need to be documented in the contract.

A challenge for construction contractors could be documentation of their occupational medicine program and industrial hygiene program. Industrial hygiene surveys and occupational medicine services undertaken by a GC to meet OSHA requirements may not fully meet 10 CFR 851 requirements. New industrial hygiene sampling may be needed to demonstrate compliance with TLVs that are lower than OSHA PELs (e.g., cadmium, hexavalent chromium, manganese, noise) and for hazards that OSHA hasn't established OSHA PELs (e.g., isocyanates, ergonomics, heat). In some cases, sampling for a TLV requires a different type of sampling than is required for compliance with the PEL. Contractors who implement the hierarchy of controls proactively may negate the need for some IH surveys.

Variances. A variance is a flexibility provided by 10 CFR 851 that permits DOE contractors to depart from a DOE worker safety and health requirement by demonstrating an alternative method, condition, practice, operation, or process is as protective as the original requirement. Since the promulgation of 10 CFR 851 in 2006, DOE has issued 10 variances. The time and cost required to apply for a variance has been criticized because DOE variances have averaged 6 months to complete. The DOE variance process was developed to mirror the process required by OSHA, which also does not have an exemption or waiver process. By contrast, OSHA variances applications may take several years to fully adjudicate.

The DOE field element and the Cognizant Secretarial Officer (CSO) should both play an influential role in the variance process. Contractors should discuss the possibility of filing a variance application with

representatives of the field element and the CSO prior to making the request to gain early feedback on the sufficiency of the supporting material and the likelihood of the request being granted. Once a variance application is developed, the head of field element should perform a thorough review and evaluation of the package. The role of EHSS in the variance process is to provide support to the CSO by making a recommendation on the variance application. Several recent variance applications presented to EHSS did not meet the criteria in which DOE has authority to request a variance (i.e., the request was a waiver from a regulation) or insufficiently demonstrated that the alternative was as protective. One example is a preference by DOE sites in California to refer to their WSHP as an Injury and Illness Prevention Program (IIPP) which is the terminology used by CalOSHA. Many CalOSHA requirements align with 10 CFR 851. Complying with 10 CFR 851 requirements using the same methods, conditions, practices, operations, or processes while citing a standard not included in 10 CFR 851 is an acceptable option under the current Rule and does not require a variance.

In many cases, EHSS-11 has worked directly with the contractor to rebuild the variance package or contracted with an outside specialist to work with the contractor to develop the application. The opinion of EHSS-11 is that the pressure of the mission, unfamiliarity with DOE regulations and directives, and lack of specialized expertise at the field element level has led to inadequate evaluation of contractor variance requests. This has necessitated EHSS to perform site visits, contract outside consultants, and directly assist contractors with development of their variance packages. EHSS was traditionally viewed as a strictly independent reviewer of variance applications. However, the current philosophy is that involving EHSS in the earliest part of the variance review process can maximize efficiency, saving time and money.

A variance is not an exemption or waiver, and DOE currently does not have a process, other than Secretarial directed enforcement discretion, to provide relief for worker safety and health regulations. Contractors who cannot comply with requirements are subject to enforcement actions and may have to develop abatement plans. The complex nature of DOE's mission activities can create compliance challenges because regulations are applied for situations not considered during their promulgation.

Experienced Oversight Personnel. DOE field elements and contractors noted challenges with maintaining a qualified workforce. A consequence of this is that individuals in positions to develop, implement, or oversee a subcontractor's worker safety and health program may not be familiar with DOE's robust policies and procedures. DOE's acquisition guide offers the following insight regarding DOE construction contracting: "The complexity of the Department's construction program requires a high degree of coordination among contractors, especially when two or more contractors are performing construction at the same time and at the same DOE site. Both [DOE] contracting and program personnel need to be aware of the dynamics involved in these situations." Lack of knowledge on the part of DOE's workforce can lead to either not enough coordination and communication or communicating the wrong information.

DOE Orders place additional responsibilities on DOE and its prime contractors. DOE Order 413.3B assigns broad responsibility to the Integrated Project Team, led by the Federal Project Director, to "identify, define and manage to completion the project environmental, sustainability, safety, health, security, risk and QA requirements." DOE Order 440.1B assigns responsibilities to Federal Construction Project Managers. As part of their ISM System Description, Field Elements are required to develop, issue, and maintain their organizational functions, responsibilities, and accountabilities (FRA) which should include

functions for DOE construction projects. DOE O 440.1B also requires DOE to "use qualified worker protection staff to direct and manage the worker protection program" which includes construction safety. DOE's technical qualification program used to include a functional area qualification standard for "Construction Management", but it was archived. In the absence of a qualification standard, sites may be relying on SMEs with general safety and health expertise and construction project managers that lack DOE-specific qualification and experience.

Additionally, DOE Orders flow down requirements to prime contractors necessitating they also have qualified staff to facilitate and oversee construction work. A prime contractor employee may be the construction manager for construction projects, or they may hire a private company to serve this function. Prime contractors appoint construction managers to ensure GCs perform work according to their contracts. Therefore, they need trained and knowledgeable safety and health professionals, construction managers, project managers, and contracting officers to communicate expectations and monitor construction contractors throughout each phase of the project to verify expectations are met. Interviewees indicated that at least three prime contractors are standing up dedicated construction teams to manage construction projects and these teams include safety and health SMEs.

Staffing should be considered when construction projects are first planned. DOE organizations with pending construction work should consider if they have adequate federal staff who are trained and knowledgeable of DOE construction project management including oversight. It is important to recognize that it takes a long time for federal agencies to hire and train employees. In contrast, prime contractors and GCs may be able to ramp up their workforces quickly.

Directing Contractor Activities. DOE and the prime contractor need to establish methods for interacting and communicating with the GC and their subcontractors. The means and methods of interfacing need to be aligned before work begins and before contracts are signed. Communication protocols are vitally important because each player has limits to their sphere of influence. DOE G 440.1-1B, *Worker Safety and Health Program for DOE (Including the National Nuclear Security Administration) Federal and Contractor Employees*, includes additional recommendations for coordination. DOE holds the contract with the prime contractor but not with the GC or subcontractors, therefore DOE cannot direct the work of the GC or subcontractors. If a DOE representative observes issues with a construction project, they need to know who to speak with and how to intervene effectively. Similarly, the prime contractor holds the contract with the GC but not the GC's subcontractors. If a representative of the prime observes issues with subcontractors, they will need to know which GC representative to inform. While anyone has the right to stop work in the event of an imminent danger, established communication and coordination methods are needed to actually stop work. This is the reason procedures on how to stop work are required.

Additional DOE requirements. Oversight, security, and federal contracting requirements may be more significant barriers to having a highly qualified pool of contractors to bid on DOE construction projects than worker safety and health regulatory requirements.

The level of oversight at DOE sites is unique to DOE when compared to non-Federal construction projects. OSHA and their state partners have approximately 1 compliance officer for every 70,000 workers. DOE has several layers of oversight which a GC would be subject to, including field element SMEs, federal project director, federal construction project manager, prime contractor SMEs, designated construction manager, and the Office of Enterprise Assessments. Regulatory non-compliances may go

unnoticed or ignored in private construction projects; whereas DOE construction projects have a consistent oversight presence to ensure work is performed within contractual and regulatory requirements. This may give GCs the incorrect impression that DOE worker safety and health requirements are significantly more stringent.

Scaling back DOE and prime contractor oversight could have negative safety and health consequences for a construction project in addition to not meeting other contractual obligations for project management (e.g., cost, quality, and schedule). Infrequent or ineffective DOE and prime contractor oversight could delay recognition of poor performing construction contractors such that issues aren't recognized until after an accident. The solution to concerns about contractor resistance to oversight is better communication with contractors about the purpose of oversight. DOE and prime contractors need to establish clear ground rules up front regarding when and how oversight activities will occur. This can eliminate the "gotcha" mentality and promote positive and transparent interactions, leading to efficiencies in the completion of construction work.

DOE security requirements, including background checks, badging, gate access, briefings, and foreign national restrictions likely contribute to the increased cost of bids or willingness of construction companies to bid on job. Many DOE construction projects are in secure areas where access is restricted for foreign nationals. According to the Bureau of Labor Statistics, 1 in 4 construction industry workers are foreign born. Construction companies with a skilled workforce largely comprised of foreign-born workers may be reluctant to bid on construction projects.

GCs must navigate complex rules and regulations to bid on federal contracts. Construction companies who do not specialize in federal government contracts may not have the skills or resources needed to competitively bid on a construction project.

DOE Directives. DOE Orders have the potential to negatively impact DOE construction projects if they aren't correctly contracted, communicated, and coordinated amongst DOE, prime contractors, and construction contractors. Reporting, Integrated Safety Management, fire safety, and emergency notifications were not noted as contributing factors but add to the complexity of managing DOE construction projects.

DOE requires an employee concerns program, DOE Order 442.1B, which is applicable to prime contractors and subcontractors at all tiers. DOE has reporting and investigation requirements in separate Orders: DOE O 225.1B, *Accident Investigation*, DOE O 231.1B *ESH Reporting*, and DOE O 232.2A, *Occurrence Reporting and Processing of Operations Information (ORPS)*. Injury and Illness reporting is essentially the same as OSHA 29 CFR 1904 recordkeeping requirements, but DOE sites enter the pertinent information in the DOE CAIRS database. ORPS reports are unique to DOE and are entered into the DOE ORPS database. Both databases require authorized access. The prime contractor can report on behalf of GCs and subcontractors. Many federal agencies have accident investigation requirements. DOE accident investigations occur upon the request of the DOE site office.

DOE's policy is that "The Department will implement integrated safety management systems to systematically integrate safety into management and work practices at all levels in the planning and execution of work." (DOE P 450.4A) The ISM requirements for contractors are in DEAR 48 CFR 970.5223-1, which requires contractors and subcontractors to have a documented safety management system that describes how the contractor will accomplish work planning and execution safely. The DEAR clause

states “the Contractor shall include a clause substantially the same as this clause in subcontracts involving complex or hazardous work on site at a DOE-owned or -leased facility… Depending on the complexity and hazards associated with the work, the Contractor may choose not to require the subcontractor to submit a Safety Management System for the Contractor’s review and approval.” OSHA provides guidance for a safety and health program that is like the safety management system required by the DEAR clause. Workers compensation insurance providers also incentivize their subscribers to develop a safety program with elements similar to those in the DEAR clause. However, outside DOE the safety management system (program) is voluntary. GCs may not refer to their system as ISM, but a system or program can meet the requirements of DEAR regardless of what the GC calls it. NNSA has acknowledged ISM requirements for construction contractors and used SD 413.3-7 to communicate to their constituents that a safety management system aligned with OSHA 3886, *Recommended Practices for Safety and Health Programs*, is an acceptable method for construction contractors to meet DOE’s ISM. Construction is commonly understood to be high hazard, but it may be possible for prime contractors to leave this DEAR clause out of construction contracts.

DOE has additional directives for facility safety and emergency management. Fire protection measures in DOE O 421.1C, *Facility Safety*, apply to construction and construction contractors. The Order requires contractors to have a documented fire protection program approved by the DOE Head of Field Element that addresses design, operations, emergency response, fire analysis and assessments, wildland fire, etc. which is above and beyond the OSHA requirements discussed earlier. One component of the program is an integrated site-wide wildland fire management plan that complies with *Federal Wildland Fire Management Policy* and NFPA 1143, *Standard for Wildland Fire Management*. Because of the site-specific nature of these programs, it’s prudent for prime contractors to flow down their program to construction contractors.

Many DOE sites have unique emergency notification methods, such as emergency phone numbers other than 911 and facility specific alarms and warning systems. The prime contractor’s emergency protocols need to be flowed down to construction contractors. DOE O 151.1D, Comprehensive Emergency Management Program, applies to prime contractors and their subcontractors. This Order requires prime contractors to establish and maintain a documented emergency management program to address all types of emergencies. Workers must be trained to the site emergency reporting and response protocols.

5. RECOMMENDATIONS

The following recommendations are steps EHSS-11 can take to further understand construction project safety and health challenges and assist with solutions.

DOE Construction S&H Management Roundtables. Facilitate roundtable discussions to gather feedback on the perspectives outlined in this white paper. Personnel from key program offices, field elements, and contractor representatives will be invited to participate and provide their experiences and insights.

Construction Safety Technical Standard. Establish a working group of federal and contractor construction SMEs to revise DOE STD-1149, *Safety and Health Program for DOE Construction Projects.* The revised standard would provide additional tools to assist field element, prime contractor, and construction contractor SMEs in implementing DOE requirements for construction safety. Tools could include templates to assist in development of activity hazard analyses and construction safety and

health plans. The working group could also evaluate whether a table for specified control methods for materials containing crystalline silica could be incorporated into the standard.

Training and Outreach. Work with field element SMEs and DOE training partners (e.g., NTC, EFCOG, NIEHS, CPWR) to develop a DOE-specific training module that could assist potential GCs to understand DOE's construction safety and health environment, including requirements, expectations, and differences from non-federal construction projects. Training could also highlight that there are additional site-specific requirements that may be required.

DOE, through NTC, should reestablish the Technical Qualification Program Construction Management Functional Area Qualification (FAQ). EHSS-11 could work with the FAQ development team to incorporate worker safety and health aspects of construction management.

Resource Promotion. EHSS-11 will continue to promote awareness, online and in-person meetings, of available resources that can assist DOE federal and contractor SMEs responsible for construction project management. Resources include policy clarifications; written guides, standards, and handbooks; EHSS Energy Hub; and Worker Safety and Health WebEx presentations. A list of existing resources is listed in Appendix A. Examples of EHSS-11 resources include:

- Policy clarifications are intended to provide timely responses to questions submitted to the EHSS Worker Safety and Health Policy Clarification Portal. Any person within DOE can submit a request for policy clarification including federal, contractor, and subcontractor employees. The policy clarification portal also serves as a resource for researching responses to previously submitted requests. Policy clarifications represent the best available technical knowledge from EHSS-11 subject matter experts and are not binding upon DOE as official policy. Binding interpretive rulings can be requested through the DOE Office of General Counsel.
- EHSS supports the development of many guides, standards, and handbooks which are available to assist SMEs with program implementation. DOE G 440.1-1B, *Worker Safety and Health Program for DOE (including NNSA) Federal and Contractor Employees* addresses construction safety and health challenges.
- The recently developed Worker Safety and Health Policy Hub is intended to serve as a resource for worker safety and health policy information, tools, and resources in a user-friendly environment. The Hub provides contact information for EHSS-11 program leads, status of updates to technical standards and directives, calendar of events, and other relevant safety and health news.
- The Worker Safety and Health WebEx series is a bimonthly presentation of a relevant safety and health topic. Upcoming 2024 presentations relevant to construction safety are fall protection (Feb), amputation/machine guarding (Mar), electrical safety (May), accident investigation (Sep), and chemical safety (Nov). Participants are encouraged to ask questions and interact with presenters. Upon request, participants may also receive a certificate that can be applied toward continuing education for professional certifications.

Variance Process. Revise DOE O 440.1-1B guidance on the variance process to include early consultation with EHSS. The guide currently recommends early field element and CSO communication but does not include EHSS until later in the process. Early EHSS-11 involvement will ensure the most efficient use of resources because we can assist field elements and prime contractors with understanding DOE worker

safety and health regulatory requirements, provide subject matter and policy expertise, and expedite answers to questions and concerns.

Occupational Medicine Functional Area. Evaluate the Occupational Medicine Functional Area requirements in 10 CFR 851 and associated guidance to understand challenges DOE field elements and contractors are experiencing with flowing down requirements. Interviews and discussions didn't identify the Occupational Medicine Functional Area as a significant issue; however, the regulation may be confusing to subcontractors, including GCs.

Program Office Benchmarking of Construction Contracting. How contract documents frame and present DOE safety and health requirements to prospective construction contract bidders could have meaningful implications. Contracting and how requirements are flowed down does not seem to be consistent across program offices. EHSS-11 could participate in DOE program office led benchmarking of construction contracting, which would help DOE understand best practices, common knowledge gaps, oversight philosophies, and pervasive safety and health challenges. Benchmarking should include actual costs associated with additional DOE worker safety and health requirements. DOE could then develop targeted and actionable solutions to common challenges.

Benchmark with Other Federal Agencies. Many federal agencies impose safety and health requirements on construction subcontractors that are more stringent than OSHA. EHSS-11 could benchmark with other federal agencies on these issues, particularly the mechanisms used by other agencies to flow down requirements to construction contractors. Agencies could include the Department of Defense (including Army Corp of Engineers), National Aeronautics and Space Administration, and General Services Administration.

6. CONCLUSION

Some immediate solutions to DOE and prime contractor construction concerns are available in the form of existing DOE construction safety and health guidance found in DOE Guide 440.1-1B. This guidance recognizes that mandating construction contractors comply with prime contractor WSHPs that go beyond the safety and health standards applicable to the construction contractor's scope of work will adversely affect project cost and schedule. Instead, prime contractors can evaluate a GC's existing corporate safety and health program and assist in adding any additional elements needed so that the program is compliant with DOE requirements, including 10 CFR 851. Another option is for the prime contractor to develop generic program templates that when used by a GC would meet 10 CFR 851 requirements and the prime contractor's DOE approved WSHP. This may be an effective method for construction subcontractors that have a narrow scope of work (e.g., electricians, painters, plumbers) to develop a WSHP that meets DOE part 851 yet is tailored to the subcontractor's scope of work and hazards. Prime contractor developed templates, or a boilerplate, can be added to contracts, negating the need for GCs and subcontractors to develop robust WSHPs on their own for narrow scope projects.

Challenges with having a competitive pool of qualified GCs to bid on DOE construction projects will not be solved by removing worker safety and health requirements. DOE promulgated 10 CFR 851 in 2006 to "establish the framework for a worker protection program that will reduce or prevent occupational injuries, illnesses, and accidental losses" by providing workers with a safe and healthy workplace. The regulation includes "flexibility to tailor implementation to reflect activities and hazards associated with a

particular work environment" (10 CFR 851 Preamble). Construction work is a dangerous trade, and the industry is referred to as "high hazard" by OSHA (osha.gov/construction). While worker safety and health requirements can be perceived as an added burden to sites working to complete construction projects, DOE ultimately benefits by working with GCs who are knowledgeable of safety and health requirements and have well established safety and health programs. The benefits come in the form of efficiencies that arise when hazards are identified and corrected before they result in accidents and noncompliances. The alternative can be seen in recent DOE accidents which resulted in delays in project completion, poor worker morale, bad publicity, and increased public scrutiny.

Appendix A DOE CONSTRUCTION RESOURCES

10 CFR 851, Worker Safety and Health Program, Part-851

Preamble for 10 CFR 851 Worker Safety and Health Program, 851 Preamble

FAQs for 10 CFR 851 Workers Safety and Health Program (currently offline)

48 CFR 970.5223-1, Integration of environment, safety and health into work planning and execution (DEAR Clause), CFR-2010-title48-vol5-sec970-5223-1.pdf

DOE O 413.3B, Program and Project Management for the Acquisition of Capital Assets, directives.doe.gov

DOE P 226.2, Policy for Federal Oversight and Contractor Assurance Systems, directives.doe.gov

DOE O 226.1B Chg 1, Implementation of Department of Energy Oversight Policy, directives.doe.gov

EHSS-11 Policy Clarification Portal, worker-safety-and-health-policy-clarification-portal

Federal Acquisition Regulation (FAR), https://www.acquisition.gov/browse/index/far

DOE Acquisition Guide FY2024 Version 4, fy24_acquisition_guide

DOE Construction Safety Advisory Committee, construction safety advisory committee

EHSS-11 WebEx Series, www.energy.gov/ehss/wsh-webex-series

DOE STD-1149-2016, Safety and Health Program for DOE Construction Projects, standards.doe.gov

DOE STD-1180-2004, Construction Management Functional Area Qualification Standard, 1180-astd-2004

DOE O 440.1B Chg 4, Worker Protection Program for DOE (Including the National Nuclear Security Administration) Federal Employees, directives.doe.gov

DOE G 440.1-1B, Worker Safety and Health Program for DOE (Including the National Nuclear Security Administration) Federal and Contractor Employees, directives.doe.gov

DOE G 440.1-2 Construction Safety Management Guide for use with DOE Order 440.1 (cancelled), directives.doe.gov

DOE Operating Experience (OPEXShare) website, https://doeopexshare.doe.gov

Office of Enterprise Assessments, Safety Assessments, Enforcement Reports, and Training, office-enterprise-assessments

DOE Inspector General Reports, Office of Inspector General

DOE National Training Center, ntc.doe.gov

Computerized Accident Incident Reporting System (CAIRS), CAIRS

Occurrence Reporting and Processing System (ORPS), ORPS

The Center for Construction Research and Training (CPWR), www.cpwr.com

NNSA SD 413.3-7 Project Management for Non-Nuclear, Non-Complex Capital Assets Acquisition, directives.nnsa.doe.gov

Occupational Safety and Health Administration (OSHA) regulations and guidance. osha.gov