Standardized Regulatory Impact Assessment

Requirements For New, Replacement, Or Existing Pipelines Near Environmentally And Ecologically Sensitive Areas In The Coastal Zone
10/31/2018

I. Summary

All state agencies that propose major regulations must complete a Standardized Regulatory Impact Assessment (SRIA). This requirement is described in California Government Code Section 11346.36 and in Title 1 of the California Code of Regulations, sections 2000 through 2004. A regulation is considered a major regulation and subject to the SRIA requirements, where the estimated costs or benefits of the regulation will be more than $50 million in any given year following implementation of the proposed regulation.

The Office of the State Fire Marshal – Pipeline Safety Division (OSFM), within the California Department of Forestry and Fire Protection (CAL FIRE), analyzed the potential economic impact of the proposed regulatory Requirements For New, Replacement, Or Existing Pipelines Near Environmentally And Ecologically Sensitive Areas In The Coastal Zone (EESA Regulations). OSFM determined that the proposed regulations were major regulations because the estimated costs or benefits could exceed the $50 million total annual impact threshold.

This analysis uses cost estimates provided directly from industry, vendors, and suppliers of the pipeline industry, but when necessary, makes assumptions to ensure economic costs and benefits were captured to the maximum extent possible. A conservative cost estimate approach was taken in an attempt to avoid underestimating potential economic impacts. Where uncertainty existed as to whether costs would be incurred by the regulated community in complying with the proposed regulations, the assumption was made to include those costs in the analysis.

The proposed EESA Regulations were developed pursuant to the requirements of the authorizing legislation found in Assembly Bill 864 (AB 864) (Williams, Chapter 592 statutes of 2015), codified at California Government Code section 51013.1. The intent of AB 864 and the proposed regulations is to protect state waters and wildlife by reducing the amount of oil released in an oil spill through the installation of best available technology on pipelines near environmentally and ecologically sensitive areas in the Coastal Zone.[1] The proposed EESA Regulations will impose additional requirements on operators of existing hazardous liquid pipelines near environmentally and ecologically sensitive areas. Any new or replacement pipelines are also subject to the additional requirements. The requirements include the submission of a pipeline

[1] For purposes of the regulations, "oil" means hazardous liquid as defined in Section 195.2 of Title 49 of the Code of Federal Regulations: "Hazardous liquid means petroleum, petroleum products, anhydrous ammonia, or ethanol."

specific risk analysis that considers use of best available technology, implementation plans, testing and training requirements, and periodic review of previously submitted risk analyses. Operators are required to be in compliance with the proposed regulations within 30 months of enactment. This SRIA includes discussion of the need for the proposed regulations; a description of the baseline used to analyze the potential financial impacts; and a breakdown of the benefits, costs and economic impact on industry, the environment, and the public.

This SRIA discusses the potential benefits to California citizens, the environment, and industry by avoiding harm that might occur without the new regulations. By implementing the proposed regulations, a substantial reduction in risks, costs, and potential adverse impacts of releases from hazardous liquid pipelines will be realized. Additionally, an analysis of alternatives to the regulations and estimates of potential direct and indirect costs is discussed.

A. Statement Of Need

On May 19, 2015, a hazardous liquid pipeline in Santa Barbara County ruptured and released approximately 100,000 gallons of crude oil. Around 21,000 gallons ran down a ravine, under a freeway, and reached the Pacific Ocean near Refugio Beach. Once the spill entered the ocean the impacts spread over 25 miles of coastline and ocean. The harm realized from the release were sizeable in both economic and environmental terms. Had the pipeline been equipped with automatic shut off valves, remote controlled sectionalized block valves, or leak detection technology, the impact of the release would have been controlled and limited.

On June 26, 2015, the operator responsible for the spill estimated cleanup costs incurred up to that point in time approached $96 million. A recent estimate from the operator in December 2017 placed the total costs of cleanup, economic impacts, Natural Resource Damage Assessment (NRDA), and litigation closer to $335 million but are still being determined. The goal of AB 864 is to protect the State's vital natural resources through reducing the harm incurred in the event of a hazardous liquid pipeline release. The new regulatory requirements imposed on pipeline operators will address the need to reduce harm subsequent to a pipeline release, while reducing costs associated with cleanup, litigation, public health and the environment, and lost business revenue to coastal communities.

The OSFM's Pipeline Safety Division (PSD) exercises exclusive safety, regulatory, and enforcement authority over approximately 6,500 miles of intrastate hazardous liquid pipelines. The OSFM consists of engineers, analytical staff, and clerical support located in Northern, Central, and Southern California that inspect pipeline operators to ensure compliance with federal and State pipeline safety laws and regulations. The OSFM is

also responsible for the investigation of pipeline ruptures, fires, and accidents for cause and determination of probable violations of pipeline safety laws and regulations.

Prior to passage of AB 864 and the proposed EESA Regulations, with their specific emphasis on protection of environmentally and ecologically sensitive areas with a nexus to the Coastal Zone, the PSD inspected pipeline operator's Integrity Management Plans (IMP) for compliance with federal requirements on pipelines that could affect High Consequence Areas (HCA). HCAs are designated important resources, such as drinking water supplies, high population areas, and unusually sensitive ecological areas that include federally listed threatened and endangered species not limited to Coastal Zones, among others. The federal HCA requirements are similar to California EESAs and the proposed EESA Regulations, in that operators must evaluate pipelines that could affect EESAs through risk analysis and evaluate the quantity of release through implementation of best available technology on pipelines. The difference between HCAs and EESAs is the broader definition of EESAs, which includes State or federally-listed rare, threatened or endangered species, shoreline, habitat, terrestrial plants and animals to name a few. Simply stated, AB 864's inclusion of EESAs is an expansion of what operators are currently required to do under federally required HCAs, but focused on the ecological and economic impacts of a pipeline release that are distinct and unique to California.

It should be noted that the Refugio Beach pipeline was not subject to OSFM jurisdiction at the time of the release because it was classified as an interstate pipeline, not an intrastate pipeline. However, the pipeline failure served to highlight the possibility that existing federal regulations for HCAs were not sufficient to ensure the protection of California's uniquely situated environment. The proposed EESA Regulations represent a preemptive, thorough, risk-based approach to reducing harm to the environment should an intrastate pipeline suffer a release in California.

This SRIA includes broad consideration of economic impacts associated with the requirements of the proposed regulations. The table in Appendix A, shows the anticipated direct cost of $220 million resulting from compliance with AB 864 and the proposed EESA Regulations. AB 864 requires operators to achieve compliance within 30 months of enactment of the regulations. OSFM anticipates the majority of compliance costs will be incurred by operators in the first three years following adoption of the regulations. The costs incurred during that time frame are assumed to be construction and equipment purchase related costs, which are anticipated to be the largest expenses related to compliance for the majority of operators.

B. Background Information

Data gathered by OSFM indicates for reportable spills in California for years 2010 through 2016, there were 118 hazardous liquid spills subject to OSFM jurisdiction totaling 7,713 barrels released and total response costs of approximately $38 million. These costs do not include NRDAs or the Refugio Beach spill. Of those 118 spills, 40 occurred on pipelines in the Coastal Zone and therefore will likely be subject to the proposed EESA Regulations. A total of 2,883 barrels were released from those 40 Coastal Zone pipeline spills with a total response cost of almost $17 million.

The data shows that approximately 33% of spills amounting to 37% of the total barrels released in California occurred in the Coastal Zone area that AB 864 intends to address. The cost amounted to approximately 44% of total costs operators spent in response to spills. The data indicates that response costs are higher in the Coastal Zone though those spills represent a smaller total number and volume of product spilled. It should be noted that response costs are highly variable due to a multitude of factors including: spill size, product released, and location of spill. For example, the projected response and cleanup costs related to the Refugio Beach Spill are estimated at $335 million. When the effect to local businesses, petroleum industry, and tax revenues are included in spill costs the economic impacts expand exponentially as they are passed through the California economy.

The OSFM drafted the proposed regulations and identified potential increased costs of $220,000,000 million to operators for construction and equipment requirements associated with Risk Analysis and Implementation Plans, Leak Detection Systems, Automatic Shutoff Valves, Remote Control Valves, and Permitting. Under the current regulatory scheme operators already incur costs related to the above listed items as part of necessary pipeline operation and maintenance activities. These costs are incorporated in pipeline rates that pipeline operators pass on to shippers. The cost to operate a pipeline is variable and includes factors such as age of the pipeline, location, design, and product shipped. Data indicates that the cost to operate a pipeline can range from $37,000 to $175,000 per mile a year. If we use the high cost estimate and apply it to all 6,500 miles of hazardous liquid pipelines in California, operators incur annual operating costs of $1,137,500,000 (6,500 miles x $175,000). This cost estimate represents the baseline expense that operators in California would spend per year on operations even without the proposed regulatory change. As is discussed below, the OSFM estimates that only 604 miles of pipeline will be impacted by the proposed regulations. Assuming the 604 miles of pipeline incur the same operation and maintenance costs, operators incur $105,700,000 per year on pipelines that may be subject to the proposed regulations. This represents a smaller portion of the baseline

costs and accounts for roughly 10.7% of the overall operation and maintenance costs operators incur on a per mile basis per year under the current regulatory program.

As noted above and discussed in more detail below, the OSFM anticipates an increased cost of $220 for full implementation of the proposed regulations with $18.8 million incurred in year one and $100.5 million incurred in year two and then again in year three. Costs are expected to return to baseline costs in year four and beyond. Applying the cost increase to the 604 miles of pipeline estimated to be impacted by the proposed regulation represents a potential increased cost of 18%, 95%, and 95% in years one, two, and three (respectively) when compared to pre-regulatory implementation operation and maintenance costs of $105,7000,000 per year. After year three operation and maintenance costs should return to the pre-AB 864 level of $105,700,00 per year for the 604 miles of pipeline impacted by the proposed regulations. If operators share the anticipated costs proportionately across all 6,500 miles of pipeline in California, the increased costs are 1.6%, 8.8%, and 8.8% in years one, two, and three (respectively) over pre-regulatory implementation operation and maintenance baseline costs of $1,137,500,000.

Depending on how the costs are distributed, some operators may incur higher or lower costs based on unique pipeline factors. When comparing the proportional increase in costs to the baseline of all 6,500 miles of pipeline the data indicates a cost increase range of 1.6% to 8.8% for a three-year period following regulatory implementation. In many cases these increases can be absorbed through rate adjustments through the Public Utilities Commission, which allows an operator to apply for a rate increase every year of approximately 10%. Similarly, rate adjustments are allowed for cost impacts related to regulatory compliance, such as those proposed in AB 864. Many of the costs associated with operation and maintenance expenses will be in material, hardware, plants, and facilities infrastructure that can be depreciated overtime. This should lead to a further reduction in cost impacts to operators. In sum, where an operator incurs increased costs there are several avenues that afford recovery of those costs to continue operations and remain profitable.

C. Public Outreach and Input

The OSFM conducted several public workshops and meetings with stakeholders to discuss the regulatory objective and requirements of AB 864, solicit specific input on how to achieve the goals of AB 864, receive comments on potential economic impacts, as well as suggested alternative approaches to implementation. In June 2016, the OSFM presented the newly enacted legislation to operators and provided a summary of the requirements of AB 864. Following the June 2016 meeting, the OSFM convened a stakeholder working group comprised of industry, government, and non-governmental

organizations with expertise in hazardous liquid pipelines in California as a resource in drafting the proposed regulations. In January and February 2017, the OSFM conducted three public workshops, which were webcast and made available by teleconference. The proposed regulatory provisions were presented and opened to public comment at those workshops. The three workshops were held in Sacramento (January 5, 2017), Santa Barbara (February 2, 2017), and Huntington Beach (February 16, 2017). Information regarding these workshops and any associated materials are posted on the OSFM website and were distributed through a list of interested parties managed by the OSFM. Future updates will also be posted to the website.

In addition to the workshops, the AB 864 legislation directed the OSFM to consult with the Office of Spill Prevention and Response (OSPR) about potential impacts to state waters and wildlife in developing the proposed EESA Regulations. OSPR's expertise, input, and assistance has been instrumental in developing the proposed regulations. The OSFM also presented the draft proposed regulations to various State and federal agencies at two quarterly meetings hosted by the United States Environmental Protection Agency (July 12, 2016 and January 10, 2017).

Following the workshops, stakeholder meetings, and presentations, the OSFM considered, and where appropriate incorporated, comments in to the proposed EESA Regulations. The OSFM also solicited input from operators on economic impacts of the proposed regulations. Where additional information was needed, the OSFM gathered cost data from various resources engaged in pipeline operations.

II. Benefits

AB 864 and the proposed EESA Regulations are designed to reduce the amount of oil released in an oil spill to protect state waters and wildlife in the Coastal Zone. Through the implementation of the EESA Regulations, state waters and wildlife will be more effectively protected from the resultant harm of an oil spill when compared to existing law. There is no guarantee another spill will not occur. However, the proposed regulations should reduce the consequences of a release and corresponding negative environmental and economic impacts if a spill occurs.

In 2000, California's ocean economy comprised of natural resources found on the coast and in the coastal ocean represented approximately $42.9 billion of California's gross state product (GSP), estimated at $1.15 trillion, and provided approximately 408,000 jobs.[2] At that time, tourism and recreation provided approximately 76.8% and 58% of

[2] Kidlow, Judith and Colgan, Charles S., 2005. *California's Ocean Economy*. National Ocean Economics Program. The jobs numbers are conservative and did not include multiplier effects, with multipliers, the number of total jobs approaches 700,000 and wages reach $24 billion.

the ocean economies' portion of employment and GSP, respectively. Minerals, including oil and gas production, provided .2% employment and 1.9% of GSP for the ocean economy. Living resources, such as commercial fishing, provided 1.5% employment and 1.9% of GSP for the ocean economy. When the three sectors of the ocean economy described above are combined, they comprised 2.47% of California employment and 1.77% of California GSP for 2000. The proposed EESA Regulations and the corresponding reduction in consequences of a spill will better protect environmentally and ecologically sensitive areas, while simultaneously conferring an economic benefit on both the public and businesses that are a significant source of employment and GSP in California's coastal economic sectors.

A. Benefits to Individuals and the California Public

While the proposed EESA Regulations will not directly affect individuals, the anticipated reduction in the number and severity of spills will result in overall benefit of continued access to recreational resources that are often impacted following a spill. Resources impacted include beaches, marshes, rivers, habitat, plants, animals, and recreational fishing to name a few. Studies have shown that almost two-thirds of California's residents visit one of the State beaches at least once a year and found that the total number of days that residents went to the beach reached approximately 566.8 million days per year.[3] Individuals use coastal resources differently; beach day visits are only one example of economic effects coastal resources have on individuals in California. However, the value attached to beach day going activities in California is sizeable with estimates that such activities may exceed $5 billion annually.

Following the Refugio Beach spill, the Refugio and El Capitan State beaches were closed along with campgrounds at those locations. Other beaches in the Los Angeles area, including Manhattan Beach and Long Beach, were also closed. Offshore fishing in the Santa Barbara area covering 26 miles by 6 miles was also closed. In addition to the lost use of public access to the shore and fishing activities, more long-term resources were also affected, including the death of various birds and mammals.

The cost to the individuals that would have had access to these resources, and the use and enjoyment provided, is difficult to determine. However, these costs are often offset or quantified through NRDAs that attempt to evaluate compensatory restoration. Essentially, NRDAs serve as a tool in quantifying lost access to ecological resources and recreational uses by reducing them to a dollar amount. The costs associated with the Refugio Beach spill are still being determined, but when looking at historical costs attributed to oil spills that impacted recreational fishing and beaches, the lost uses are

[3] King, Phillip G. and Potepan, Michael, 1997. *The Economic Value of California's Beaches.* San Francisco State University: Public Research Institute.

not insignificant. For example, two prior spills along the California cost from the Cosco Busan and American Trader oil tankers resulted in lost trips to coastal resources amounting to $22.2 and $12.2 million, respectively.[4] All spills are different, but these examples serve as an illustration of the potential costs to individuals following a spill.

A reduction in spill frequency and size is significant when consideration is given to the economic benefits conferred to an individual or individual's access and use of California's coastal resources which range from economic, environmental and public safety benefits, tourism, and wildlife viewing. At a minimum, the proposed EESA Regulations act to reduce the economic cost of individual lost use by maintaining access to recreational resources.

B. Benefits to California Businesses

Hazardous liquid pipelines are an important part of California's economy. Statewide businesses depend on pipelines to supply refineries, deliver product to other pipelines for transportation throughout the State, and to provide a reliable source of fuel to our cars, trucks, and airplanes. The proposed EESA Regulations will benefit industry businesses, and indirectly benefit California businesses separate from the pipeline industry, by better ensuring pipelines are operated with a reduced severity of harm in the event of a spill.

The proposed regulations may benefit industry businesses by reducing the size of a spill. Large spills occur infrequently, however, when they do occur the costs can be significant as evidenced by the Refugio Beach spill. A reduction in the size of a spill should correlate to lower costs incurred by industry to clean-up, respond, and compensate for damages as a result of the spill. Likewise, a reduction in legal costs and additional regulatory requirements on pipelines that have experienced spills should result in lower costs to industry businesses in the long-term.

Pipelines are assets to industry, but only where they are operational and transporting product. For example, the pipeline responsible for the Refugio Beach spill has not been operational since May of 2015 following the spill. A pipeline that does not transport product is economically inefficient. Typically, pipelines that experience larger spill volumes remain inactive for longer periods of time when compared to pipelines that experience smaller spill volumes. The reduction in the size of a spill may lead to a shorter time frame of pipeline inactivity following a spill, thereby allowing operators to return a pipeline to service sooner and reducing lost revenue.

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[4] https://response.restoration.noaa.gov/about/media/how-do-we-measure-what-we-lose-when-oil-spill-harms-nature.html

Pipelines are interconnected throughout the State, often requiring multiple pipelines operated by multiple businesses to deliver product to an end destination. When one pipeline is offline due to a spill, the economic impacts ripple through the industry. Following the Refugio Beach spill, at least four other pipelines were rendered unusable because they could not ship product. The economic impacts are not limited to pipeline operators. The realm of economic impacts from the Refugio Beach spill also include five off-shore platforms, which cannot produce or deliver crude on-shore without access to one of the five pipelines that are not in service. The extent of the economic impact to one pipeline operator lead to the company declaring bankruptcy, abandonment of hazardous liquid pipelines throughout the State, and the abandonment of one off-shore platform. When a spill occurs on one pipeline, it influences the entire industry, including potential bankruptcy and lost jobs.

Indirectly, businesses benefit from reduced spill sizes. As noted above, a significant portion of GSP is derived from coastal resources and related activities. When those coastal resources are damaged or closed for any period of time, non-industry businesses, such as commercial fishing and travel and tourism, lose revenue as well. Businesses can submit claims to those responsible for spills to recoup lost revenue, but those claims may take years to settle. By reducing the size of a spill, the proposed EESA Regulations act to ensure the negative economic effects of a spill on non-industry businesses are lessened or removed.

C. Benefits to State and Local Government

State and local governments benefit from operational pipelines. For example, the California State Lands Commission generates money for State coffers through leases granted to off-shore oil production facilities. One operator off the coast of Santa Barbara generated approximately $160 million in State revenue since 1997.[5] Local government also receive fees from pipeline operators used to fund certain programs within their communities.

As previously discussed above, one operator declared bankruptcy following the shutdown of the pipeline responsible for the Refugio Beach spill. When that operator declared bankruptcy, it quitclaimed its off-shore lease to the California State Lands Commission, abandoned its oil platform, and no longer generated any fees for pipelines in Santa Barbara County because it could no longer produce or deliver oil in its pipelines. As a result, Santa Barbara County, among others, lost revenue used to fund schools and other programs. Furthermore, the California State Lands Commission will lose State revenue from the abandonment of the oil platform, and is also now faced with the responsibility of decommissioning the oil platform because the former operator

[5] http://www.slc.ca.gov/Info/SouthEllwood.html

cannot afford to do so. The estimated cost of decommissioning the assets of the bankrupt operator, including the oil platform, ranges from $40 to $120 million dollars and could take up to three years to complete. Whatever costs are not paid for through surety bonds are subject to recovery from the bankrupt operator, typically for pennies on the dollar.

By ensuring pipelines are operated safely and the size of potential spills reduced, pipelines will remain operational or shut down less frequently, leading to increased State and local revenue for important programs like schools. Additionally, by keeping pipelines operational the likelihood of bankruptcies and the State funding decommissioning costs is lessened.

III. Direct Costs

A. Direct Costs on Individuals

It is possible that the proposed regulations could contribute to a nominal increase in the price of refined products, such as gas, diesel, or aviation fuel. These costs are not direct cost to the regulated community, but considered pass-through costs, as the regulated community will likely pass these costs on to consumers through increased fuel prices over time. Any increase passed on to consumers would not be immediate and would likely take several years because the California Public Utilities Commission (CPUC) sets rates for pipeline operators. If an operator wishes to increase the cost to use its pipeline to transfer product, that operator would need to seek approval from the CPUC.[6] Then the operator would need to wait for current shipping contracts to expire before incorporating any CPUC approved increased shipping rate costs. Attempting to quantify these costs has not been undertaken in this analysis or in the estimates that incorporate RIMS II multipliers discussed in the Economic Impacts section below, but merited some discussion. For purposes of this analysis, refined product rates are considered static.

B. Direct Costs on California Businesses

The following discussion of direct costs includes estimates of costs imposed on approximately 40 pipeline operators and the roughly 457 pipelines that may be subject to the requirements of the proposed EESA Regulations. The OSFM estimates total direct costs on industry of approximately $220 million which can be amortized by the industry; thus, the realized costs on industry is estimated to be significantly less than the full cost of compliance when amortized consistent with generally accepted accounting principles. The OSFM used high estimates throughout the SRIA for estimating costs when multiple estimated costs were provided.

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[6] http://www.cpuc.ca.gov/General.aspx?id=7789

The OSFM drafted the proposed EESA Regulations after careful consideration of industry best practices and the purpose of AB 864. To identify industry best practices, the OSFM used recommended practices from the American Petroleum Institute (API), existing requirements found in the Code of Federal Regulations (CFR), at Title 49 Parts 190 through 195, solicited input from the public, industry, NGOs, State and local governments, industry experts, and consulted numerous engineering and scientific studies. With this significant body of information collected, the OSFM drafted the proposed regulations and identified the following requirements that will likely result in direct economic impacts to pipeline operators:

- Risk Analysis and Implementation Plans
- Leak Detection Systems
- Automatic Shutoff Valves
- Remote Control Valves, and
- Permitting.

The proposed EESA Regulations will be applicable to both new and existing pipelines. However, the majority of costs will be associated with bringing existing pipelines into compliance. Therefore, the direct costs estimated below are based off the potential impacts to an operator based on the retrofit of an existing pipeline. This analysis also includes an example of the direct costs incurred based on the costs and assumptions below as applied to a recently proposed pipeline replacement that is planning to be AB 864 compliant.

1. Risk Analysis and Implementation Plans

AB 864 requires operators to conduct a risk analysis that considers the use of Best Available Technology (BAT) on new and existing pipelines to reduce the amount of oil released in an oil spill to protect state waters and wildlife. Operators must also submit a plan to retrofit existing pipelines with BAT within 30 months of the enactment of the proposed regulations. The OSFM must assess the adequacy of an operator's risk analysis and the plan submitted to implement the use of BAT in the risk analysis. For purposes of this SRIA, the costs of the risk analysis and plan have been combined and are collectively referred to as risk analysis.

The focus of AB 864 is the reduction in the amount of oil released in an oil spill, however no set amount of reduction was specified. The Legislature understood that no single pipeline is the same across California, therefore the application of BAT on one pipeline may not correlate to a reduction in spill amount on another pipeline. Because no one pipeline is identical, each operator will need to submit an individual risk analysis

or analyses proposing various applications of BAT for the approximately 457 pipelines anticipated to fall within the universe of the proposed EESA Regulations.

The proposed regulations provide operators with detailed information that must be included in all risk analyses for the OSFM to properly conduct its assessment. Certain BAT must be considered, as it is specified by AB 864, but operators are granted flexibility in the approach, methods, and technologies considered in the submitted risk analysis with the ultimate purpose of reduction in the amount of oil released in an oil spill. An operator can demonstrate that an alternative technology not listed in AB 864 is BAT for a particular pipeline, and if the OSFM accepts the risk analysis as adequate, the operator can use the alternative BAT.

The OSFM will determine on a case-by-case basis whether the operator's risk analysis meets the requirement of reduced spill amount, whether the proposed BAT represents technology that provides the greatest degree of protection by limiting the quantity of release in the event of a spill with consideration to whether the processes are currently in use and could be purchased anywhere in the world, and consideration of the engineering feasibility of the technology proposed. By affording operators flexibility in meeting the requirements of AB 864, the proposed EESA Regulations also provide a flexible approach to compliance. However, the inherent need to conduct and evaluate individual risk analyses on myriad variables across different pipelines and pipeline operators creates cost projection difficulties. For example, some operators have stated that they will use in-house staff for drafting risk analyses, while other operators will contract out for this service.

For purposes of this assessment, the assumption was made that costs for in-house and contracting out risk analysis would be the same. While the costs may vary between in-house or contracting for a risk analysis, the assumption was necessary because cost estimate information could not be located, was too speculative to rely on, or was not made available to the OSFM. The flexibility afforded operators in conducting the risk analyses is anticipated to result in variations in the tools and associated costs used to develop the risk analysis. For example, the use of different modeling software across all risk analyses could vary widely with the needs of the operator. However, the risk analysis in the proposed EESA Regulations is similar to operator requirements under federal HCA regulations requiring risk analysis. This similarity represents possible cost savings in the form of using processes, tools, and evaluation methods already in place for federal regulatory requirements.

With those caveats in place, the OSFM estimated the cost of a risk analysis at between $15,000 and $25,000. The lower and higher numbers represent the differences that pipelines encounter in operations, with the low representing a relatively few number of

variables and complexity, while the higher number represents the inverse. Assuming that all 457 pipelines fall within the scope of the proposed regulations and require the more expensive analysis costs of $25,000, an estimated one time initial expense of $11,425,000 is anticipated to be incurred on risk analyses. The majority, if not all, of this cost will be incurred in the first year of the regulation. The OSFM assumed that, at a minimum, approximately 253 of the 457 pipelines that submit risk analysis will require some form of retrofit because they are either located directly in the Coastal Zone or are in such close proximity to an EESA in the Coastal Zone that some form of BAT will be required.

2. Use of Best Available Technology

AB 864 requires operators to consider the use and installation of BAT in their risk analysis. BAT is described in AB 864 as including, but not limited to, leak detection, automatic shutoff systems, and remote controlled sectionalized block valves. The draft regulations include further BAT to be considered such as Supervisory Control and Data Acquisition (SCADA) systems, Leak Detection Systems (LDS), Computational Pipeline Monitoring (CPM), and Emergency Flow Restriction Devices (EFRD). Other technologies or combinations of the listed technologies can be considered by operators and may be acceptable to the OSFM following review of the risk analysis. Regardless of the BAT eventually chosen, the BAT proposed for retrofit in a risk analysis should be looked at collectively for meeting the requirements of AB 864 and the proposed EESA Regulations.

For example, an LDS that quickly identifies a rupture may be less effective at achieving compliance with the proposed regulations if not accompanied by an automatic shutoff system or remote controlled sectionalized block valves that would allow for immediate action in response to a leak alarm. Likewise, an LDS that lacks sensitivity, does not operate under no-flow conditions, or where performance falls off under slack-line conditions may not be acceptable. It is anticipated that most pipelines will require a combination of BAT to meet the requirements of the proposed EESA Regulations.

The OSFM understands that some of the pipelines that will be required to comply with the proposed EESA Regulations will already be equipped with some form of leak detection or shutoff systems and related hardware for responding to and isolating leaks on a pipeline. Some of these technologies may or may not represent BAT. As discussed in more detail below, to fully account for potential cost impacts, the OSFM assumed that some pipelines would require the installation of BAT.

a. Leak Detection Systems and Technologies: LDS, CPM, and SCADA

Pipelines that could impact an HCA are currently required under federal regulations to consider how to reduce spill volume should a release occur. These pipelines are required to have LDS.[7] Many LDS technologies provide operators with feedback on whether there is a release occurring, which reduces response time to shut down a pipeline, thereby reducing the amount of a release. It is assumed that some of the pipelines subject to the proposed EESA Regulations will already have leak detection technology installed and may not incur additional LDS costs on existing pipelines. However, a discussion of the uses, purposes, and costs associated with LDS is provided below to provide a conservative approach to cost impacts. The OSFM assumed that approximately 127, or roughly 50%, of the 253 pipelines that will require BAT are likely to need new or retrofit LDS to meet proposed regulatory requirements.

A study conducted on LDS across the United States from January 2010 to July 2012 found that pipeline controllers or control rooms identified releases approximately 17% of the time following a release.[8] While CPM identified leaks in 20% of pipelines where a CPM system was functional at the time of the release. SCADA was the leak identifier in 28% of the releases where a SCADA was functional at the time of the release. One of the observations of the study found that procedures may have allowed alarms to be ignored or to re-start pumps or open a valve by controllers in several of the larger volume releases, thus increasing the size of the release. Large distances between block valves may have also contributed to the size of some releases. As the study indicates, the value of CPM and SCADA is in the percentage increase in identification of leaks in addition to leaks identified by controllers or control room personnel.

Leak detection systems and technologies are available in many different forms ranging from simple to very complex. It is important to note that an LDS has no effect on reducing the likelihood of a leak occurring, but is critical to responding to a leak quickly. LDS are systems, and like any system can be broken down to important parts. Here, the key parts of the system are technologies, procedures, and personnel. A weakness in one of these areas can have a significant impact on response times and spill reduction. This is why the proposed regulations include requirements for operators to develop procedures and training for personnel, beyond simply retrofitting a pipeline with BAT.

SCADA and LDS should not be confused as the same and are distinct technologies. Additionally, CPM is typically considered a part of LDS. For differentiation, the SCADA

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[7] For ease of reference, the term LDS is used in this SRIA to refer to SCADA, LDS, and CPM, unless otherwise specified.

[8] Kiefner and Associates, Final Report on Leak Detection Study, U.S. Department of Transportation – Pipeline and Hazardous Materials Safety Administration, December 10, 2012.

is about controlling the pipeline operating parameters in response to normal and abnormal operating situations. LDS is separate from SCADA in that it focuses on determining if there is an unintentional loss of fluid containment that requires remedial action. LDS may use SCADA instrumentation, but it is not necessary for all types of LDS to use SCADA. LDS are intended to detect leaks, ruptures, and small seeps, which means that different LDS are typically appropriate for an intended use. An LDS intended for rupture mitigation for example, need not be very sensitive, but should be very fast. Similarly, an LDS should provide information to assist with location of a release on a pipeline, not just that a release is occurring, so appropriate response action can be taken, such as the closure of valves, to isolate the ruptured section of pipeline.

The variety of leak detection technologies available is reflective of operator requirements in terms of sensitivity, accuracy, and reliability. Operators have a strong preference for leak detection that utilizes existing field equipment. This explains why most pipelines use pressure/flow monitoring and CPM, since the monitoring is already provided by the SCADA system and CPM is a relatively inexpensive addition to an existing metering infrastructure. At best, pressure/flow monitoring alone will catch large ruptures, while leak detection by CPM is limited by the accuracy of the metering and line fill uncertainties.

In some cases, currently installed LDS, CPM, or SCADA may not represent BAT for leak detection based on review of an operator's risk analysis. For example, CPM may be insufficient to detect leaks or ruptures quickly enough to respond to a release in a short period of time, or identify leak location, leading to additional product released to the environment that could have been reduced with the quicker notification achieved through the installation of additional sensors and hardware.

The OSFM assumed that approximately 127 pipelines would incur costs for retrofit or installation of leak detection technologies including LDS, CPM, and SCADA. An attempt was made to gather cost data associated with potential BAT leak detection technology. Unfortunately, this attempt proved exceptionally challenging, with vendors of systems reluctant to provide hardware and software costs for their leak detection systems. Costs are difficult for vendors to determine because there is often no way to accurately extrapolate costs to a pipeline without knowing its exact configuration, hence one of the reasons for the requirement of a risk analysis in the proposed regulations. Vendors also indicated that there are additional costs beyond initial purchase price, such as instrumentation and maintenance costs.[9]

[9] Some vendors indicated that maintenance costs may be included in purchase price of LDS.

What LDS cost data the OSFM did obtain is provided here and should be considered broad assumptions. Excluding costs for additional instrumentation and maintenance, installed and tuned software-based volume balance and pressure analysis systems are available for less than $200,000. Ultrasonic volume balance systems typically are more expensive and require vendor specific clamp-on flow meters ranging from $35,000 to $40,000 each. Real Time Transient Models (RTTM) run between $200,000 and $1,000,000 depending on pipeline configuration and complexity. External liquid-sensing and fiber optic cables are about $5 to $15 per foot installed, accompanying hardware and software is required for each cable segment and costs between $10,000 and $50,000. Costs for soil gas/tracer technologies are about $15 per probe with probes installed every 20 feet, and additional costs for installing field stations every 2 miles at $50,000, and a central computer with specialized software costing between $10,000 and $20,000. Acoustic emissions systems can be installed on a single pipeline segment of 200 to 300 feet for approximately $5,000 to $12,000, each additional segment requires a channel at an added cost of $3,000.

For purposes of this SRIA, the OSFM assumed that operators would install RTTM as the leak detection method for all pipeline retrofits. RTTM was selected because of its high sensitivity compared to other LDS available on the market today. RTTM uses software and pipeline sensors to predict the size and location of leaks by comparing measured data for a segment of pipeline with predicted modeled conditions. The more instruments that accurately transmit data into the model, the higher the accuracy of and confidence of the model. If there is a deviation in the model, an alarm is sent to a pipeline controller or automatic shutoff system. Some operators have concerns that high sensitivity of an LDS, like that found in the RTTM, may lead to additional false alarms or missed leaks, and the loss of a critical instrument could require a system to shutdown. However, the advantages RTTM provides over other LDS include its ability to model flow, pressure, and temperature of hazardous liquids, while also accounting for complex physical pipeline characteristics, including length, diameter, and thickness of a pipeline. Additionally, the model can take into account product characteristics such as density and viscosity. The model can also be configured to distinguish between instrument errors and leaks. High costs associated with RTTM also afford a conservative cost approach to potential economic impacts. Assuming all 127 pipelines were retrofit with RTTM LDS, and the pipelines were of a complex nature incurring the higher end $1,000,000 cost for procurement and installation, the total direct cost would be $127,000,000. These costs would be expected to be incurred in the second and third year of regulation implementation. Due to the unlikely possibility that one LDS would be selected to fit the needs of half the pipelines needing retrofit, this cost impact should be considered to be the upper limit of possible expenses incurred for LDS and in reality will fall much lower.

It should be noted that it is up to the pipeline operator to establish pipeline-specific performance standards and weigh the costs and benefits of an LDS in meeting the proposed regulatory requirements. For the most part, retrofitting a pipeline with leak detection system technology can be accomplished with relative ease. However, there are additional costs accompanying the retrofit, including purchasing equipment, hardware, permitting, installation, testing, and maintaining additional equipment. These issues are explored in more detail below.

b. Automatic Shutoff Systems and Automatic Shutoff Valves

AB 864 requires operators to retrofit existing pipelines with BAT including, but not limited to automatic shutoff systems or remote controlled block valves, or any combination of these technologies. During normal operations, a computer based LDS and/or SCADA system collects and processes feedback and control signals from pressure sensors, flow meters, and other mechanical and electrical devices located at various points along a pipeline. These real-time signals are used by the SCADA system and control room operators to maintain operations. In emergency situations, these signals are used to detect deviations that may indicate a leak or rupture. After detecting a deviation that exceeds established limits, an analysis is conducted to determine if the deviation is within acceptable system performance or if there is an indication of a system failure such as a leak or rupture. Depending on an operator's procedures, in the event of a system failure, the decision to close block valves and isolate a line segment may only occur after positive evidence of a leak or rupture is confirmed based on field observations. Other operators may already implement what is required by AB 864, which is the consideration of an automatic shutoff system: an automated system not dependent upon human interaction capable of shutting down a pipeline system.

An automatic shutoff system would include Automatic Shutoff Valves (ASV). ASVs are valves equipped with some form of valve closure mechanism connected to sensors that monitor specific operating parameters and initiate valve closure, without human intervention, when a feedback signal exceeds a specified limit or set point. A variety of valves can be equipped as ASVs, for purposes of the SRIA, full-port ball valves are assumed to be the valve used for estimating costs of retrofit because they present little restriction to flow and the passage of in-line-inspection tools. Flow and pressure sensors are generally located adjacent to ASVs to monitor pipeline operations. However, additional sensors may be required between valves to provide redundant feedback signals. These signals are monitored by the SCADA system and used to detect abnormal operating conditions. Similar sensors would also be needed if remote controlled block valves are installed, as discussed below. Automatic shutoff systems would consider some form of microprocessor based programmable logic controller to

detect deviations consistent with a leak or rupture and initiate valve closure. Depending on the pipeline profile and SCADA system in place, additional sensors may need to be installed for an ASV to function properly on a pipeline.

Operators will consider automatic shutoff systems in the risk analysis submitted to the OSFM if a pipeline could impact an EESA. Whether an ASV or Remote Controlled Block Valve (RCBV) is appropriate on a pipeline depends on a list of factors contained in the proposed EESA regulations. Some of the considerations include: swiftness of leak detection and pipeline shutdown capabilities, the type of commodity carried, the rate of potential leakage, the volume that can be released, topography of the pipeline profiled, proximity of nearest response personnel, and benefits expected by reducing the spill size.

The cost to install an ASV on a pipeline can range significantly and is affected by factors such as, pipe size, location, sensors, and operating pressure to name a few. Based on OSFM research and discussion with vendors and contractors, the hardware costs alone for a single full port ball valve equipped with an automatic pneumatic actuator ranges from approximately $6200 to $187,000 on a 6-inch pipeline up to a 42-inch pipeline, respectively. Discussions with operators indicate that labor costs for installation of an ASV would not likely go higher than $100,000 per valve. Recent studies have shown that operators estimate hardware and labor costs to install an ASV could range from $100,000 up to $1,000,000, with the high value being exceptionally rare.[10] While other studies provided operator estimations of ASV hardware and labor costs to install at a more conservative $35,000 to $500,000 per automatic valve installation.[11] Generally, these studies indicate increased labor costs with larger diameter pipes. Because of the varying estimates for hardware and labor, the OSFM is assuming a flat labor cost of $100,000 per valve installation. This assumption is based on the fact that the vast majority of hazardous liquid pipelines that will likely be subject to the proposed regulations fall at or under 12 inches in diameter, which falls under the larger diameter valves that would incur the general trend of higher labor costs, while still being inclusive of the high estimate provided by California operators. All cost estimates are based off of a 12-inch diameter pipeline.

The hardware costs of a 12-inch ASV ball valve is approximately $14,800 with an estimated installation cost of $100,000; each installed ASV will cost an operator an estimated $114,800. Any costs that an operator would incur purchasing and installing

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[10] Oak Ridge National Laboratory: Studies for the Requirements of Automatic and Remotely Controlled Shutoff Valves on Hazardous Liquids and Natural Gas Pipelines with Respect to Public and Environmental Safety, October 31, 2012. And informal discussions with operators.

[11] Government Accountability Office, Report to Congressional Committees, Pipeline Safety: Better Data and Guidance Needed to Improve Pipeline Operator Incident Response, January 2013, GAO-13-168.

an ASV are assumed to take place beginning in the second and third year of implementation of the proposed regulations. It is anticipated that 1.08 valves per pipeline mile will need to be installed based on the demonstration pipeline described below. Assuming that each of the 253 pipelines and 604 miles of pipeline that are expected to fall under the proposed regulations, a total of approximately 652 valves will need to be installed. If only ASVs are installed, the total direct cost including parts and labor to install only ASVs would be $74,849,600.

It is extremely unlikely that operators will only install RCBVs and will likely install a combination of ASVs and RCBVs. For purposes of this SRIA, the OSFM assumed that half of the valves installed would be ASV and the other half RCBV, therefore it is expected that operators may incur $37,424,800 in ASV retrofit costs to install 326 valves. These costs will likely be spread across the second and third year of the proposed regulations implementation.

c. Remote Controlled Block Valves

AB 864 requires operators to retrofit existing pipelines with BAT including, but not limited to automatic shutoff systems or remote controlled block valves, or any combination of these technologies. The full port ball valve used in the ASV section above is considered a block valve but could also be used as an RCBV depending on how the valve is operated. The difference between an ASV and an RCBV is described more fully below, but generally an RCBV must be activated by human interaction through a SCADA system, while an ASV operates without human interaction based on preset parameters.

There are a variety of valves that could be used as an RCBV, for example the proposed regulations include EFRDs which encompasses several types of flow restricting valves, including check valves. The term check valve means a valve that permits fluid to flow freely in one direction and contains a mechanism to automatically prevent flow in the other direction. An RCBV is any valve that is operated from a location remote from where the valve is installed and is usually operated by the SCADA system. The linkage between the pipeline control center and the RCBV may be by fiber optics, microwave, telephone line, or satellite. As mentioned above, these technologies and equipment are a key part of reducing the amount of product released following a spill. Once the leak detection technology on a pipeline identifies a leak, the automatic shutoff systems and operator activated RCBVs act to isolate a pipeline leak and reduce the volume of the release. Although RCBV closure swiftness is often effective in limiting the magnitude of potential consequences, no reduction in the probability of a release is conveyed. The direct costs assumed by the assessment will reflect the purchase and installation costs of an RCBV check valve.

Under current federal regulations for hazardous liquid pipelines, block valves must be installed at various locations, including but not limited to: on each side of a water crossing that is more than 100ft wide, on each side of a reservoir holding water for human consumption, at locations along a pipeline system that will minimize damage or pollution as appropriate for terrain in open country, offshore areas, or for populated areas. The proposed EESA Regulations are designed to work in a similar manner to federal HCA's but also seek to protect state waters and wildlife and environmentally and ecologically sensitive areas.

Most of the pipelines that will be subject to the requirements of the proposed regulations will likely already be equipped with some form of block valve, check valve, or EFRD. Some may be remotely controlled or manually operated, however for purposes of this SRIA, the OSFM is assuming that remotely controlled check valves will be installed on each of the 253 pipelines. In most cases, converting a manually operated check valve to an RCBV is relatively easy and can represent a significant cost savings. However, for cost projection purposes, the OSFM decided to estimate RCBV check valve costs assuming no manual check valves on a pipeline currently exist, or if check valves did exist, they would not be repurposed during a retrofit.

Labor costs of $100,000 were used again for installation of an RCBV on an existing pipeline. Check valves equipped with a pneumatic actuator cost approximately $4,900 to $188,000, with the lower number representing a 6-inch diameter pipe and the higher number representing a 42-inch diameter pipe. The check valve costs are consistently lower than a ball valve until the pipe diameter reaches the 20-inch threshold. As noted above, because the majority of the pipelines in California fall at or under the 12-inch diameter, the RCBV check valve costs will be assumed for 12-inch diameter pipes as well. The hardware costs of a 12-inch RCBV check valve is approximately $12,100 with an estimated installation cost of $100,000; each installed RCBV will cost an operator an estimated $112,100. Any costs that an operator would incur purchasing and installing an RCBV are assumed to take place beginning in the second and third year of implementation of the proposed regulations. It is anticipated that 1.08 valves per pipeline mile will need to be installed based on the demonstration pipeline described below. Assuming that each of the 253 pipelines and 604 miles of pipeline that are expected to fall under the proposed regulations, a total of approximately 652 valves will need to be installed. If only RCBVs are installed, the total direct cost including parts and labor to install only RCBVs would be $73,089,200.

It is extremely unlikely that operators will only install RCBVs and will likely install a combination of ASVs and RCBVs. For purposes of this SRIA the OSFM assumed that half of the valves installed would be ASV and the other half RCBV, therefore it is

expected that operators may incur $36,544,600 in RCBV retrofit costs to install 326 valves. These costs will likely be spread across the second and third year of implementation of the proposed regulations.

d. Construction Labor

Labor and construction costs to install valves has been included in ASV and RCBV cost estimates above. Retrofit installation per valve is expected to be $100,000 with an anticipated 652 valves needed to be installed. When the labor costs are broken down separately, the total direct cost for labor is anticipated to be $65,200,000 and is projected to be incurred in the second and third years of regulatory implementation. As will be shown below, separating the construction costs from the purchasing costs of ASV and RCBV produces a more accurate cost impact for the proposed regulation.

e. Permitting

Permitting costs to install ASV and RCBV are negligible because the pipelines are existing and are unlikely to require CEQA review or are exempt from the CEQA process. Discussions with local agency personnel revealed that any costs imposed on State or local agencies for permit review, where a permit is required, will likely be recoverable under a fee agreement between the agency and the operator. In most cases, a permit and/or fee may not be required or imposed unless the retrofit of an existing pipeline proposes a large amount of construction work or may incur environmental impacts. This determination would be made on a case-by-case basis. In the event a permit is required, permits must be reviewed by city or county permitting personnel which can cost up to $225 per hour. Smaller projects can take 50-100 hours of permit review, while larger projects can take at least 1000 hours (typically for construction of a new pipeline).

For purposes of conservative cost estimation, it was assumed that 50% of the valve retrofits would require a permit as a smaller project. With an anticipated 326 valve retrofits expected to need permits, and review taking the high estimate of 100 hours for review at $225 per hour, the total direct cost of permitting for operators is anticipated to be $7,335,000. These costs will largely be incurred in the first year of implementation.

3. Testing and Training

The proposed EESA Regulations include testing and training requirements for appropriate personnel and BAT installed and operated on pipelines following retrofit. Some LDS are extremely simple to understand, and others are very difficult. For example, the concepts of sensitivity and reliability for certain LDS, such as RTTM, are hard to explain and could require extensive training to master. An LDS that is

misunderstood or ignored by operators is useless. Likewise, testing of installed software and training on hardware is equally important. An ASV or RCBV that is not tested or where an operator fails to understand how they operate is equally useless.

Operators are required to develop testing and training procedures to ensure the BAT and the personnel involved in operating pipelines subject to these proposed regulations are properly educated on, and understand how to respond to abnormal pipeline conditions. Additionally, the LDS, ASV, RCBV, EFRD or other BAT must be tested based on the timelines specified in the proposed regulations to ensure the technologies are operating as intended. Testing should be of the entire system; therefore, both the technology and control room operators should be tested.

The testing and training requirements in the proposed regulations are similar to those already required under federal regulations but with an expanded scope to cover AB 864 regulatory requirements. The similarity to the federal requirements will result in significant cost savings to operators to the point where only a nominal direct cost will be incurred. Therefore, it is assumed that no additional costs will be incurred by operators in testing and training.

Maintenance costs could also be considered part of testing costs, but for purposes of this SRIA are assumed to not impact operators. This assumption is based on the fact that many operators rely on suppliers of their LDS, SCADA, and/or CPM vendor to provide necessary maintenance. Similar assumptions were made for field equipment, such as for valves and actuators, because vendors will typically provide maintenance on supplied equipment. Therefore, costs for maintenance should remain unchanged.

These assumptions appear to be corroborated by the review of a recently proposed pipeline replacement in California that will be discussed below. The pipeline operator proposes a pipeline that is intended to meet the EESA Regulation requirements, although not formally reviewed or accepted by the OSFM at this time, including the installation of additional valves. However, the operator determined that no additional employees would be needed to operate the proposed pipeline upon completion compared to historic operations.

4. Example of Direct Costs for Valves Using a Proposed Pipeline

Because no one pipeline is the same, it is difficult to identify what BAT will be chosen and how it will be applied to a particular pipeline. The application of BAT could affect the type and design of LDS, the number and type of valves installed, and the potential reduction in size of spill. To illustrate the generally anticipated direct costs to operators for valve retrofit, an example pipeline is used below as a demonstration. The pipeline is

for a proposed newly constructed pipeline, but the OSFM assumed retrofit costs would apply for purposes of this SRIA because the majority of pipelines will incur costs for retrofit, not new construction. The results are then extrapolated across California and have been used as the basis for the estimated number of valves per mile used in the anticipated direct costs assumed above.

In August 2017, Plains Pipeline, L.P. (Plains) submitted plans to potentially replace Line 901 and Line 903. Line 901 is the pipeline that caused the May 19, 2015 spill at Refugio Beach in Santa Barbara County. The materials submitted by Plains are being reviewed by Santa Barbara County for the proposed project and are only preliminary. However, the proposed project design and construction must conform to BAT requirements in adherence with the requirements of AB 864 and the proposed EESA Regulations, as well as all local, State, and federal requirements for pipeline design and construction if approved. In developing this direct cost example, the OSFM reviewed only the publicly available documents submitted by Plains to Santa Barbara County. This demonstration should not be construed as meeting the requirements of AB 864 and is merely an illustration of what is possible based on an individual pipeline operator's projection of BAT needed to meet the proposed EESA Regulations.

The proposed project will be the construction of an entirely new pipeline built within the existing easement of the current pipelines. Therefore, the pipeline profiles should be similar to the existing pipeline, providing an apples to apples comparison. The direct costs for constructing new pipelines and installing BAT is typically less than retrofitting existing pipelines. To account for this difference, the OSFM used the anticipated costs for retrofit of BAT across the proposed project and is assessing the costs based on an existing line being retrofitted. The proposed pipeline will be equipped with SCADA that will gather data on flow rate, temperature, and pressure. It also appears that fiber optic lines may be installed in addition to remote communication equipment, emergency battery systems, back-up generators, and/or solar panels. It is unclear what type of LDS the proposed pipeline will be equipped with, but following the assumptions above, it is assumed that RTTM will be chosen as the LDS incurring $1,000,000 in direct costs. The direct costs associated with ASV and RCBV are discussed in detail below.

According to maps and other materials submitted to Santa Barbara County, Line 901 and a portion of Line 903 fall within the coastal zone or are considered part of the Gaviota Coast totaling 16.6 miles.[12] As originally constructed, this section of pipeline

[12] There is a discrepancy between information identifying the proposed pipelines as only having 14.6 pipe line miles in California Coastal Zone and maps identifying the pipe line mileage as 16.6 miles for the Gaviota Coast. The OSFM elected to use the 16.6 mile measurement as it likely was more inclusive of potential pipeline mileage subject to the proposed regulations.

was equipped with 6 valves, which were likely a combination of check and RCBV valves. The proposed project now includes 18 valves for the same length of pipe and does not provide a description regarding the configuration or design of the 12 "new" valves. The proposed pipeline material includes the general description that all valves on the pipeline will be control valves and either motor operated valves or check valves. Motor operated valves can also be considered RCBV, therefore the OSFM has assumed that Plains proposed pipeline will use RCBV check valves.

Plains plans on reusing 6 existing valves which will provide cost savings. This approach is anticipated to be used by operators in achieving compliance with the proposed regulations, but for purposes of this example, the assumption will be made that all 18 valves will be new and will require installation costs commensurate with a pipeline retrofit. RCBV costs including installation, as described above, is approximately $112,100 per valve retrofit. The total direct cost to Plains in this example would be approximately $2,017,800 (18 x $112,100). This represents the lowest anticipated cost, as AB 864 requires the consideration of Automatic Shutoff Systems including ASVs. If Plains installed all ASVs, the cost climbs to roughly $2,066,400 (18 x $114,800). Either RCBV or ASV installation would also require an additional expenditure of $1,000,000 for an RTTM leak detection system. Though there is not much difference in total cost, pipeline valve costs would likely fall somewhere between the two projections since a combination of the two technologies would likely be used as opposed to a homogeneous approach.

Assuming the proposed pipeline project were found acceptable to the OSFM under the regulatory requirements, a number of interesting observations regarding valves can be made. By comparing the number of existing valves (6) to the number of anticipated valves (18) a rough estimate of ratios and valves per mile can be surmised. These estimates are what Plains projects will meet the requirements of AB 864 and the proposed regulations. This does not necessarily mean that Plains' projection will actually meet the requirements, since the OSFM has not reviewed all the proposed pipeline materials nor formally adopted the proposed EESA regulations. Looking at ratios first, the proposed pipeline represents a 3:1 ratio of proposed valves to existing valves; or a 2:1 ratio of new valves installed for every one existing valve. Alternatively, considering the number of proposed valves on a per-mile basis, it is anticipated that approximately 1.08 valves will be installed per-mile. Both the ratio and valves per-mile observations indicate that operators could incur significant costs solely for valve retrofit.

It should be kept in mind that the proposed Plains replacement project is not indicative of all pipelines in California, even if it is assumed the proposed replacement meets the requirements of the proposed regulations. For example, pipelines in urban

environments may not need as many valves. And in some cases, the valve per mile calculation assumed will not work for shorter length pipelines. However, an assumption had to be made to determine potential economic impacts in measurable terms that was not available without detailed risk analysis on all pipelines in California.

5. Total Predicted Direct Cost To California Operators

There is no one formula for extrapolating retrofit costs universally across California due to unique geographic and operational impacts and other factors without making assumptions. However, if the potential number of valves required per-mile on the proposed Plains line is extrapolated across California it is anticipated operators will need to install approximately 652 new valves. If only RCBVs are installed, operators will incur $73,089,200 in direct costs. If only ASVs are installed, operators will incur $74,849,600 in direct costs.[13] Actual direct costs will likely be lower than the high dollar value because operators may install a combination of valves and not solely rely on ASVs. The OSFM assumed that a combination of half ASV and half RCBV are expected to be used, which brings the total direct cost for ASV to $37,424,800 and for RCBV to $36,544,600. It is assumed that an additional $127,000,000 will be incurred for installation of RTTM leak detection systems across all pipelines. When including costs for risk analysis ($11,425,000) and permitting ($7,335,000) the total direct cost to California operators is estimated to be $219,729,400. The majority of these costs would likely be incurred in the second and third year of regulatory implementation.

IV. Economic Impacts

A. Baseline Information

The baseline information provides an understanding of the current standards that operators must follow. The baseline used for this analysis assumes that operators would continue to comply with federal and State requirements and continue business-as-usual (BAU), while complying with orders issued by the OSFM prior to the enactment of the proposed regulations, and carry out any compliance related matters as required absent the proposed regulations.

B. Methodology for Determining Economic Impacts

The OSFM gathered the direct costs to industry as described above and utilized the Regional Input-Output Modeling System II (RIMS II) to estimate indirect costs and economic impacts to the California economy. RIMS II is a computational general equilibrium model developed by the United States Bureau of Economic Analysis (BEA) that generates year-by-year estimates based on total regional effects of a policy or set

[13] A direct cost estimate based on the ratio of existing valves to the number of anticipated retrofit valves could not be produced because the OSFM does not track the number of valves on existing pipelines.

of policies.[14] The model is designed to be regionally specific and relies on a set of multipliers applied to output that occurs across affected industries delivered to final demand. RIMS II Type I multipliers were used in the analysis and assessment.[15] Primary and secondary industries that are expected to be affected by the proposed regulations and their corresponding North American Industry Classification System (NAICS) numbers are shown below:

Table 1: Primary and Secondary Industry NAICS Codes[16]

Regulatory Function	NAICS #	NAICS Industry
Risk Analysis	541330	Engineering Services
Leak Detection Systems	420000	Industrial Machinery and Equipment Merchant Wholesalers
Automatic Shutoff Valves	420000	Industrial Machinery and Equipment Merchant Wholesalers
Remote Control Block Valves	420000	Industrial Machinery and Equipment Merchant Wholesalers
Construction Labor	2332C0	Oil and Gas Pipeline and Related Structures Construction – Nonresidential Structures
Permitting	5416A0	Environmental and Other Technical Consulting Services

The RIMS II multipliers are industry-specific and include businesses located outside California. The estimated economic impact is likely affected by the geographic area used to develop the multipliers and applying California specific multipliers may result in higher or lower numbers.

C. Inputs of the Assessment

The cost of compliance with the proposed EESA Regulations will vary depending on the design, operation, and profile of characteristics of the 457 pipelines impacted by AB 864. The cost estimates take into consideration EESA location, protection of state waters and wildlife, the California Coastal Zone, pipeline location, pipeline proximity to EESAs, BAT, OSFM records, and institutional knowledge and experience. For example, there are 726 hazardous liquid pipelines that are jurisdictional to the OSFM in California totaling approximately 6,500 miles. Of the 457 pipelines impacted by the proposed regulations, roughly 253 pipelines are located in or near the Coastal Zone that could impact an EESA if a release occurs. Those 253 pipelines are anticipated to need some form of retrofit with BAT including LDS, ASV, or RCBV, as discussed above.

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[14] The BEA does not endorse any resulting estimates and/or conclusions reached in this economic analysis or the economic impact of a proposed change in an area.

[15] Multipliers account only for interindustry effects (direct and indirect) of a final-demand change. BEA RIMS II Guidelines, p. G-3.

[16] NAICS industry codes used from 2007 industry list.

Details regarding the specific pipeline profiles, current technologies utilized, and risks posed to EESAs will not be fully known until required risk analyses are submitted and reviewed by OSFM. Every attempt was made to account for the substantial variation in costs that the OSFM believes will be associated with bringing a pipeline into compliance with the proposed regulations.

In order to estimate the economic impacts associated with the proposed regulations, the OSFM created a list of likely risk evaluation tools, hardware (valves and components), testing, training, and reporting activities that would be necessary to comply with AB 864 and the proposed EESA Regulations. The OSFM developed the cost estimates from information provided by operators on the discussion draft regulations and surveyed all the operators in the State to solicit estimated costs for the potential requirements of the proposed regulations. The costs for hardware and systems were provided by industry suppliers, as were installation costs. The costs estimated by the operators and industry were reviewed and considered by the OSFM, which were then compared to other similarly situated economic impact studies conducted by State and federal agencies. An average of estimated costs was used for the purpose of these calculations. To capture a higher range of possible costs, this analysis presumes that operators will be retrofitting a pipeline with a diameter of 12 inches. Hardware costs (such as valves and equipment to operate valves) are anticipated to be a large expense for compliance with the proposed regulations, which are driven by pipeline diameter. The diameter of the pipeline was chosen because the majority of pipelines anticipated to fall under the proposed regulations are either 12 inches in diameter or less. This analysis assumes that all 253 pipelines in the Coastal Zone will require retrofit with ASVs or RCBVs or a combination of those technologies, though it is possible that some of these pipelines may already meet the requirements of AB 864 and the proposed regulations. Roughly half of the 253 pipelines were also assumed to need an LDS installed. These assumptions ensure that the cost estimates are inclusive of a higher range of potential expenses.

Compliance costs will be heavily impacted by the risk analysis operators are required to submit to the OSFM. The risk analysis must consider a variety of factors contained in the proposed regulations and operators must select a potential application of BAT, based on the risk analysis, to meet the statutory requirement of reducing the volume of a release in the event of a pipeline spill. This analysis assumes existing pipelines will be brought in to compliance within 30 months of formal adoption, consistent with the requirements in the AB 864 legislation.[17]

[17] This time frame could be shorter or longer during implementation. If a longer time frame is needed the operator must demonstrate a showing of good cause subject to review by the OSFM.

The cost estimates for the proposed regulations were calculated by multiplying the direct costs for regulatory requirements by the number of pipelines that are anticipated to be affected. When pipeline mileage served as a better assumed cost projection tool it was used. The analysis assumes that existing pipelines impacted by the regulations will be required to meet the compliance requirements regardless of when a pipeline was constructed or whether a pipeline may already be equipped with BAT. Because these pipelines were included in the cost estimates, it is likely that the results are an overestimate of the total cost of the regulations.

To estimate the economic impacts of the proposed EESA Regulations, the OSFM gathered the potential direct costs and applied those costs to a proposed pipeline example above. The costs were then extrapolated across all pipelines based on the number of new valves or valves per pipeline mile that will likely be needed to meet the requirements of the proposed EESA regulations as anticipated by a pipeline operator. As indicated above, the potential direct costs to California Businesses can be identified by the following categories:

1. Risk Analysis and Implementation Plans
2. Use of Best Available Technology
    a. Leak Detection Systems and Technologies: LDS, CPM, and SCADA
    b. Automatic Shutoff Systems and Automatic Shutoff Valves
    c. Remote Controlled Block Valves
    d. Construction Labor
    e. Permitting
3. Testing and Training
4. Example of Direct Costs for Valves Using a Proposed Pipeline

D. Assumptions and Limitations

Assumptions of the total economic impacts of changes to California businesses, gross state product, employment, personal income, and other economic variables are limited by the BEA RIMS II data. The RIMS II multipliers are industry specific and include businesses located outside California. The estimated impact is an approximation that may include the non-regional nature of the multipliers. If multipliers were regionally focused on businesses located solely in California, this analysis may have produced higher or lower numbers.

The economic impact measured through the RIMS II model does not produce a final demand number. Final demand is defined as purchases by customers outside the region; investment in new buildings, equipment, software, purchases by the government, and purchases by households. The use of RIMS II requires that expenses

be treated as investment spending due to a regulatory burden. However, the RIMS II model cannot measure the impact of a regulatory burden that changes the cost structure of the affected industry because RIMS II is a static model.

The benefits associated with the indirect impacts are measured by avoidance of risk to related harmful outcomes.

E. Indirect Costs

Indirect costs reflecting the total economic impact on output assessments per RIMS II data are shown in Appendix B (Economic Input to Output). These impacts are measurements of RIMS II data modeling that evaluates the potential economic impacts of the proposed regulations compared to the current regulatory scheme that does not include use of BAT and protection of EESAs. As the table indicates, an estimated economic impact to output of $306 million is projected.

The results of the indirect cost assessment is discussed below and represents the OSFM's attempt to account for the complex economic impacts that the proposed regulations will have on California. Hazardous liquid pipeline operator expenditures will have both primary and secondary economic impacts resulting in increased economic output across California. The regional output multipliers from RIMS II incorporate data about inter-industry relationships and estimate the diminishing returns of new rounds of spending within the region stemming from the economic activity. The proposed regulations will result in purchase of goods and services from businesses that support the regulated community. The anticipated expenses include valves and related hardware and software necessary to operate a hazardous liquid pipeline consistent with the proposed regulations. These expenses will work through the economy producing subsequent economic impacts as additional transactions take place throughout the regional economy.

F. Results of the Assessment

1. California Employment Impacts

The proposed EESA regulations are expected to result in additional jobs in employment sectors, such as construction, manufacturing, testing, and maintenance. Qualified and skilled pipeline construction jobs are expected to be in higher demand to conduct the appropriate retrofit of pipelines. The economic sector most likely to feel this impact is the oil and gas industry. Additional jobs will likely increase following the initial implementation of the proposed EESA Regulations. It is anticipated that some permanent jobs will be created for the continued operation, maintenance, and testing requirements of the proposed regulations. Appendix C (Employment Impact) provides estimates for the number of jobs created as a result of the anticipated costs incurred by the regulated community, with a total of 1885 estimated jobs created in the first three years of regulatory implementation.

2. Exports and Imports

It is anticipated that the proposed regulations will have little to no impact on the export and import of hazardous liquids in California following implementation. The proposed regulations will require pipelines to be retrofit with BAT, which may include taking a pipeline out of service while retrofit and appropriate testing is conducted before restarting the pipeline. However, the short-term disruptions are not anticipated to cause operators to import or export less hazardous liquids than under the current regulatory scheme.

Following the Refugio Beach release, crude oil shipments from the only pipelines in the Santa Barbara area capable of delivering product were ordered shut down until rigorous compliance actions were completed. Those pipelines have not returned to service. Some sources have cited the pipelines out of service status as a contributing factor behind the bankruptcy of one operator, Venoco, and the decommissioning of an associated oil platform. This scenario is highly unlikely to occur again, and industry is planning on continuing operations following the restart or replacement of the Plains pipelines located in Santa Barbara County. The existing platform leases and potential production revenues are too sizeable to abandon the sunk cost of fixed assets in pipelines while demand for oil remains consistent. For example, California's off-shore oil and gas production shipped an average of $26 billion per year in product as of 2000. In 2005, offshore oil production in California accounted for 36% of all oil production from State lands in California. Interestingly, in 2000 California only produced one-half of the crude oil that it consumed with the other half being imported from other states and countries via ship and rail. The demand for continued oil production in California is unlikely to be impacted by the proposed regulations and it is expected that exports and imports will remain constant due to the supply and demand needs of the State.

Additional benefits can be found in the proposed EESA Regulations' purpose, to reduce the size of a spill in the event of a release. The requirements proposed in the regulations would enhance the safety of intrastate pipelines operated in California. With the added protections, in the event of a future spill, disruptions to pipeline service could be minimized resulting in continued operations with less interruption. Moreover, the proposed regulations, had they been in place at the time of the Refugio Beach spill, could have saved an operator from filing bankruptcy and the decommissioning of an oil platform and the resulting loss of production and State and local revenue.

It should be noted that the proposed regulations are applicable to intrastate hazardous liquid pipelines. Interstate pipelines, pipelines that ship product across state and federal lands or waters, are regulated by the Federal Department of Transportation's - Pipeline

and Hazardous Materials Safety Administration (PHMSA). Because the proposed regulations do not impose requirements on interstate pipelines, the OSFM assumed that no impact to interstate pipeline imports and exports would result.

3. Creation or Elimination of Jobs

The proposed EESA Regulations will have an impact on the creation of jobs in California in the short and long term. Using the RIMS II modeling data, the proposed regulations should create an estimated 217 jobs in the first year, with increasing job creation in subsequent years as depicted in the table in Appendix C. Appendix C shows the number of jobs created from each NAICS specific industry code that was used to generate the estimated total number of 1885 jobs created over the first three years of implementation. It should be noted that RIMS II does not have the capability to determine whether the jobs created are full-time or part-time positions. Generally speaking, the oil industry is expected to see an initial increase in overall employment in year one with larger increases in the subsequent two years.

4. Impacts on Gross State Product

The proposed regulations will have a relatively minor impact on the gross state product (GSP). GSP includes the value of labor, depreciation, income taxes or government subsidies, and profit. The table in Appendix D shows the estimated annual impact of $191 million on the State's roughly $2.6 trillion GSP.[18] Hazardous liquid pipelines represent a small portion of the overall oil production industry in California. The majority of costs associated with the proposed regulations will be incurred in the first three years of implementation and the on-going costs are considered to be nominal and should have a negligible impact on GSP. The table was developed using RIMS II multipliers over the first three years of implementation from 2019 through 2021.

5. Creation and Elimination of Businesses

It is anticipated that the proposed regulations will not significantly impact the creation or elimination of businesses in California. Labor, hardware, and software required to meet compliance requirements in the proposed regulations is typically highly specialized and requires extensive training. Hazardous liquid pipeline construction and retrofit requires personnel to meet regulatory qualifications that could act as a barrier to entry for a new business. However, due to the anticipated increase in demand for qualified and personnel it is likely that some new businesses will enter the industry to support pipeline operators in achieving regulatory compliance.

Those businesses that are currently operating in California that employ the specialized personnel required may experience growth in overall business. Alternatively, some

[18] http://www.dof.ca.gov/Forecasting/Economics/Indicators/Gross_State_Product/

members of industry have indicated that where labor resources for retrofit are scarce, operators may turn to qualified individuals from out of State to install required BAT. Bringing business from out of State may not necessarily have a negative impact and could be beneficial because it creates more competition delivering economic efficiencies. In some cases, bringing in qualified personnel from out of State may be necessary to meet labor and timeline requirements associated with the proposed regulations.

While California Government Code section 11342.610 excludes "a petroleum producer, a natural gas producer, a refiner, or a pipeline" from evaluation consideration as a small business, the OSFM attempted to assess small business impacts. A survey was circulated to all pipeline operators in the State requesting data that would have assisted in evaluating impacts to all businesses, including small businesses. However, due to the minimal number of responses, no meaningful assessment of impact on small business could be determined through industry self-reporting. With the data found by the OSFM through alternative sources and research, it was determined that no alternative identified would lessen the economic impact, if any, on small businesses and still allow the OSFM to effectively implement the legislation.

6. Competitive Advantage or Disadvantage

It is unlikely that the proposed regulations will act as a disadvantage to industry in California because the intrastate hazardous liquid pipeline industry is captive. If an outside business wishes to enter the California market, it must comply with the regulatory requirements, placing industry on even footing. A small number of pipelines in California are classified as interstate pipelines and will not be impacted by the proposed regulations, which may place operators of those pipelines at a slight advantage. However, such an advantage is limited to situations where an interstate pipeline ships product directly out of State. Because many interstate pipelines distribute product through intrastate lines for processing and delivery, it is anticipated that interstate operators will absorb some costs for distribution through intrastate pipelines. These costs are expected to be short-term and may place California industry at an advantage as discussed more fully below.

The proposed regulations may act as an advantage for California industry if pipeline operators own interstate pipelines or operate intrastate pipelines in other states throughout the Country. Although it is only preliminary, PHMSA is in the process of drafting regulations required by statute to state that the Great Lakes, coastal beaches, and marine coastal waters are Unusually Sensitive Areas of ecological resources for

purposes of determining whether a pipeline is in an HCA.[19] The proposed EESA Regulations are similar to ecological HCAs, but include species unique to California. It is possible that the proposed PHMSA regulations will require similar evaluation of pipelines that could impact HCAs for interstate pipelines, which would also impact requirements on intrastate pipelines outside of California. California industry and operators would be uniquely situated to understand and implement more protective requirements and implement the PHMSA requirements more effectively than industry outside of California based on their prior regulatory implementation. Placing them at an advantage in the national pipeline transportation market.

7. Increase or Decrease of Investment in California

Discussions with stakeholders, industry, other agencies, and advocacy groups contributed to the proposed regulations. After consideration of this input, the draft regulations reflect a fair, enforceable, and effective approach to reducing spill size and a corresponding reduction in risks to hazardous liquid pipeline operators. An initial expense by operators will result in an increase in investment on hardware, equipment, and labor. Though the increase in investment will have a nominal impact on California's $2.6 trillion annual economy, there is no indication that the proposed regulations will negatively affect investment in California.

8. Incentives for Innovation

The proposed regulation is guided by one of the primary purposes of AB 864, using BAT to achieve spill volume reduction. BAT is broadly defined as technology that provides the greatest degree of protection by limiting the quantity of release in the event of a spill, taking into consideration whether the processes are currently in use and could be purchased anywhere in the world. The universe of possible applications of BAT is broad, which works in operators favor, as no single pipeline is the same and no single technology may be BAT for all applications. This flexibility affords operators and industry the opportunity to innovate and demonstrate combinations of technologies that will best achieve spill volume reduction. It is anticipated that operators will meet the BAT requirements through improving, modifying, supplementing, adapting, or retrofitting existing systems. However, in some cases technologies currently existing on pipelines may not represent BAT even if the foregoing efforts are taken by an operator. The flexibility in achieving compliance will act as a driver of innovation at implementation and going forward because the proposed regulations require operators to review installed and retrofit BAT every five years.

[19] https://www.regulations.gov/docket?D=PHMSA-2017-0094

9. Costs Avoided

The Refugio Beach incident demonstrates the size and impact an oil spill can have on costs to businesses, the public, and the environment. In purely economic terms pipeline spills in California's Coastal Zone have cost operators $17 million from 2010 to 2016 excluding NRDAs and the Refugio Beach spill. The Refugio Beach spill cleanup costs are still being determined but are estimated at $335 million. Incidents the size of the Refugio Beach spill are a rare occurrence, however it serves as a reminder that technologies and practices that have been historically used may not represent BAT today. The proposed regulations seek to reduce spill size and enhance protection of our environment which may require industry to incur additional compliance costs, but will similarly reduce harm resulting in savings to industry, businesses, and individual Californians. The reduction in harm can be considered the cost avoided.

For example, if Plains installed all ASVs and an RTTM leak detection system as assumed in the demonstration section above, the cost would be roughly $3 million. It is difficult to calculate the reduction in spill volume, and ASVs and LDS alone would not have prevented the spill, but it is presumed that a reduction in spill volume would have resulted nonetheless. It would only seem prudent to avoid $335 million in estimated costs by investing $3 million in a system designed to reduce spill volume. Additional costs avoided include bankrupt companies; supply disruption; litigation costs; environmental restoration costs; private claims; dedication of resources by State, federal, and local agencies; expenditure of tax payer funds; lost revenue to State and local coffers; and lost jobs, to name a few.

G. Summary and Results of the Economic Impact Assessment

The total direct costs for the first three years of implementation of the proposed regulations is $220 million and the total economic impact to output is roughly $306 million. It is estimated that an additional 1885 jobs will be created in the first three years with an impact of approximately $191 million to GSP during that same time frame.

The proposed EESA Regulation economic impact analysis was analyzed using conservative costs and any impacts projected should be viewed in the context of the assumptions used throughout this document. The costs represented here should be considered inclusive and may represent an upper bound of anticipated impacts. While these assumptions may affect the estimated impacts, they were necessary to complete the analysis.

If enacted, the proposed regulations may affect the creation or elimination of jobs within the State of California, will likely not affect the creation or elimination of existing businesses, will likely result in additional work for California businesses servicing the oil

industry, and will likely not affect the ability of California businesses to compete with businesses outside of the State.

V. Alternatives

A discussion of alternatives to the proposed regulations are addressed below. The alternatives further illustrate the economic impacts as a result of changes in the regulatory scheme. Associated benefits and disadvantages of the alternatives will also be discussed where relevant. The alternatives operate under the same business as usual assumption adopted above, assuming that industry would continue to comply with existing regulatory requirements absent the adoption of the proposed EESA Regulations. The OSFM solicited input from the public and stakeholders for alternative approaches to the draft regulations proposed at the public workshops. The input provided from the public workshops along with staff expertise and historical information were used to craft the following alternatives.

A. Alternative 1: Require Only Automatic Shutoff Valves

This alternative assumes that all 652 of the anticipated valves to be installed on hazardous liquid pipelines are required to install ASV to meet the BAT requirements of the proposed regulations. In contrast, the proposed regulations will allow operators to combine multiple forms of BAT to meet regulatory compliance, including the use of either or both ASV and remote control block valves.

1. Benefits

The goal of automatic shutoff valves is to provide timely automatic response to a potential pipeline release. In general, some operators already employ the use of automatic shutoff valves based on an existing risk analysis or preference in pipeline operations. Some ASVs can be programmed to automatically close in the event of abnormal pipeline operation, power outages, or where communications are lost with the control room. A pipeline equipped with ASVs would not require a pipeline operator to identify an abnormal operating condition and then respond by closing valves remotely or manually, resulting in a potential time savings and volume reduction in the event of a spill.

2. Costs

As discussed briefly above, the installation of ASV is more expensive than installing RCBV, although the difference is relatively small, amounting to an increase of $880,200 split evenly across the second and third year or regulatory implementation.

Alternative 1: Direct Costs Comparison

	2019	2020	2021
Alternative 1	$18,760,000	$100,924,800	$100,924,800
Proposed EESA Regulation	$18,760,000	$100,484,700	$100,484,700
Increased Cost Under Alternative 1	$0	$440,100	$440,100

3. Economic Impacts

Because the direct costs for this alternative are so small any impacts to final demand output, employment, or GSP would be negligible.

4. Reason For Rejecting

Even though Alternative 1 represents only a nominal increase in direct costs, it fails to address the possibility that all pipelines are different. Nor does it address the pipeline design factors that should be evaluated on a case-by-case basis in risk analyses. The risk analysis should be conducted, evaluated, and then appropriate BAT should be determined based on the unique characteristics of each pipeline. If the proposed regulations required only ASVs to be installed the flexibility needed to meet BAT requirements would be effectively frustrated.

Additional consideration should be given to the potential drawbacks of fully automatic systems. Automatic shutoff systems including ASVs, when improperly operated or maintained, have resulted in automatic shutoff of pipelines where no shutdown is warranted. In the best-case scenario, a pipeline is shut down and an operator incurs costs to check and then restart the line after confirming there are no leaks. However, other scenarios have occurred where ASVs are closed out of sequence with control parameters that caused pipeline ruptures. It is axiomatic that the purpose behind an ASV is to reduce spill volume yet in some rare instances can cause a pipeline rupture.

Requiring ASVs across all pipelines without consideration to the specific pipeline profile could be counterproductive from the risk-based approach utilized in the proposed EESA Regulations. Some representatives for valve wholesalers and LDS companies have indicated that issues with ASVs improperly closing are rarer than pipeline operators would indicate. However, a measured approach based on risk analyses and proper application of BAT affords the necessary flexibility to achieve compliance while considering the full range of advantages and disadvantages regarding valve options.

B. Alternative 2: Require All Pipelines To Use RTTM

Alternative 2 focuses on leak detection systems and requiring all 253 pipelines located in or near the coastal zone to be equipped with Real Time Transient Monitoring. This alternative is similar to one proposed from the public workshops, where it was

suggested that all pipelines in California, in addition to pipelines located in the coastal zone, be equipped with BAT. This more narrowly tailored alternative was examined instead of the proposed workshop alternative because requiring BAT on all pipelines in California appeared to be outside of the scope of AB 864.

1. Benefits

Compared to the proposed EESA Regulations, where only 127 pipelines in or near the coastal zone were assumed to need RTTM, Alternative 2 would ensure that all 253 pipelines in or near the coastal zone would be equipped with RTTM leak detection systems. It is unknown what type of existing leak detection systems are installed, if any, on pipelines in the coastal zone of California. No current requirement exists that a pipeline be equipped with leak detection systems, save for pipelines that could impact HCAs. Under this alternative, all pipelines in or near the coastal zone would have what is considered a highly effective and sensitive leak detection systems installed, and the installations would provide uniformity across industry.

2. Costs

As indicated in the table below the direct costs to industry under this alternative would be significantly higher than under the proposed EESA Regulations, requiring industry to incur an additional $126,500,000.

Alternative 2: Direct Costs Comparison For RTTM

	2019	2020	2021
Alternative 2	$0	$126,500,000	$126,500,000
Proposed EESA Regulation	$0	$63,500,000	$63,500,000
Increased Cost Under Alternative 2	$0	$63,000,000	$63,000,000

3. Economic Impacts

When the impacts from the additional direct cost increase for installing RTTM leak detection systems is applied to the corresponding RIMS II multipliers, an increase in output, jobs, and GSP occurs. The table below represents the increased economic impact of Alternative 2 compared to leak detection systems as assumed in the proposed regulations analyzed in the SRIA above and found in the Appendices below. This data represents the additional impacts separate from the potential impacts under the assumptions made for the proposed EESA Regulations on a per year basis.

Alternative 2: Increased Impact To Output, Jobs, And GSP

Impact	2019	2020	2021
Output	$0	$87,368,700	$87,368,700
Jobs	0	448	448
GSP	0	$57,298,500	$57,298,500

The Table below represents the potential economic impact based on the assumptions made under the proposed EESA Regulations on a per year basis.

Assumed Impact Under Proposed EESA Regulations: To Output, Jobs, And GSP

Impact	2019	2020	2021
Output	$0	$88,061,800	$88,061,800
Jobs	0	452	452
GSP	0	$57,753,250	$57,753,250

The table below represents the total impact to output, jobs, and GSP when the two immediately preceding tables are added together. The additional impacts of Alternative 2 are added to the impacts under the assumptions made for the proposed EESA Regulations on a per year basis.

Alternative 2: Total Impact To Output, Jobs, And GSP

Impact	2019	2020	2021
Output	$0	$175,430,500	$175,430,500
Jobs	0	900	900
GSP	0	$115,051,750	$115,051,750

The economic impacts from Alternative 2 would increase total output to $350,861,000, while adding 1800 jobs, and increasing GSP by $230,103,500. This data represents roughly a two-fold increase of the same data under the proposed EESA Regulations for leak detection systems that can be found in the appendices below.

4. Reason For Rejecting

Leak detection systems are an important component for monitoring pipeline operations and promptly detecting and responding to leaks or ruptures. However, requiring one specific form of leak detection, such as RTTM, may not represent BAT for all pipelines in the coastal zone. In some cases, pipelines may already be equipped with a LDS that would meet BAT requirements, or could easily achieve BAT standards through retrofit of existing systems. Additionally, shorter distance pipelines with a less complex pipeline profile may not need a system like RTTM because an alternative LDS could meet BAT requirements. Ultimately, the flexibility allowed in the AB 864 legislation is imperative to

researching, retrofitting, and/or installing technologies, including LDS, that meet BAT based on a pipeline by pipeline risk analysis approach. By mandating RTTM as a required form of technology, regardless of pipeline specific risks, the regulation could be counterproductive and be a poor application to specific pipelines.

VI. Fiscal Impacts

A. Local Government

Hazardous liquid pipeline safety laws are governed by State and Federal laws and regulations. It is not anticipated that the proposed EESA Regulations will have a fiscal impact on local government. In some instances, local governments may have to process permit applications for construction related to pipeline retrofits. However, as discussed above, any permit costs will likely be covered by pipeline operators.

B. CAL FIRE and OSFM

With the assistance of the Legislature and the Governor's office, CAL FIRE and the OSFM received funding for additional personnel and resources to meet the anticipated needs and increased responsibilities associated with AB 864.

C. Other State Agencies

It is anticipated that some indirect fiscal impacts to other State agencies may occur following implementation of the regulations. The proposed regulations do not impose requirements on other State agencies, but operators may utilize resources within other agencies to seek compliance, thereby incurring an indirect fiscal impact.

For example, the *California Public Utilities Commission* (CPUC) sets and adjusts tariff rates on pipeline operators. As was discussed briefly above, pipeline operators may seek to increase tariff rates to compensate for increased pipeline operating costs. For this to occur, operators must seek review and approval from the CPUC.

Additional impacts may affect the *Division of Occupational Safety and Health Administration* (Cal/OSHA), who may review construction and retrofit plans for worker safety.

The *Office of Oil Spill Prevention and Response* (OSPR) maintains and reviews spill response plans submitted by operators. Following retrofit, the spill response plans may need to be updated by operators and reviewed by OSPR. It is unclear if this will impact OSPR because spill response plans are already reviewed on a set schedule of a period of years, but an impact could be possible.

It is unknown what the size of a possible impact to CPUC, Cal/OSHA, or OSPR would be or how to quantify such impacts.

VII. Conclusion

This economic analysis should be viewed based on the assumptions used to develop the estimated impacts and the conservative approach to include costs that may not impact all operators. Such assumptions will affect estimates, but were necessary to complete the analysis while considering possible costs.

The OSFM has determined that the proposed regulations are the most cost-effective solution to meeting the requirements of AB 864. If enacted as drafted, the proposed regulations could affect the creation or elimination of jobs, while it is unlikely to see the creation or elimination of businesses in California. Existing businesses that service the oil and pipeline industries in California will likely see additional growth and the proposed regulations should not place California businesses at a disadvantage to compete with other states.

Appendix A: Direct Costs Associated With AB 864 And Proposed EESA Regulations

Cost Driver	2019	2020	2021
Risk Analysis	$11,425,000	$0	$0
Leak Detection Systems	$0	$63,500,000	$63,500,000
Automatic Shutoff Valves	$0	$2,412,400	$2,412,400
Remote Control Block Valves	$0	$1,972,300	$1,972,300
Construction Labor	$0	$32,600,000	$32,600,000
Permitting	$7,335,000	$0	$0
Totals	$18,760,000	$100,484,700	$100,484,700

Appendix B: Economic Impact To Output[20]

Cost Driver	2019	2020	2021
Risk Analysis	$17,805,863	$0	$0
Leak Detection Systems	$0	$88,061,800	$88,061,800
Automatic Shutoff Valves	$0	$3,345,516	$3,345,516
Remote Control Block Valves	$0	$2,735,186	$2,735,186
Construction Labor	$0	$44,665,260	$44,665,260
Permitting	$10,886,670	$0	$0
Totals	$28,692,533	$138,807,762	$138,807,762

[20] Each dollar entry represents the total change in output that occurs in all industries for each additional dollar of output delivered to final demand by the industry corresponding to the entry.

Appendix C: Employment Impact[21]

Cost Driver Impacting Jobs	2019 Jobs	2020 Jobs	2021 Jobs
Risk Analysis	108	0	0
Leak Detection Systems	0	452	452
Automatic Shutoff Valves	0	17	17
Remote Control Block Valves	0	14	14
Construction Labor	0	351	351
Permitting	109	0	0
Totals Per Year	217	834	834

[21] Each entry represents the total number of jobs created in all identified industries for each additional $1 million of output delivered to final demand by industry NAICS identifier. The number of jobs created represents both part-time and full-time positions, but cannot be separately identified by the RIMS II calculations.

Appendix D: Value Added (Gross State Product)[22]

Cost Driver	2019	2020	2021
Risk Analysis	$9,736,385	$0	$0
Leak Detection Systems	$0	$57,753,250	$57,753,250
Automatic Shutoff Valves	$0	$2,194,078	$2,194,078
Remote Control Block Valves	$0	$1,793,807	$1,793,807
Construction Labor	$0	$25,636,640	$25,636,640
Permitting	$6,583,896	$0	$0
Totals Per Year	$16,320,281	$87,377,775	$87,377,775

[22] Total value added per $1 change in final demand corresponds to the impact in Gross State Product (GSP) found in the table. Value added is comparable to regional measures of GDP or in this case GSP.