2019

Larry Boynton, Appellee/Cross-Appellant, v. Kennecott Utah Copper LLC, Appellant/Cross-Appellee, Phillips 66 Company, Conocophillips Company, Pacificorp, Cross-Appellees : Brief of Appellant

Utah Supreme Court

No. 20190259-SC

IN THE
SUPREME COURT OF THE STATE OF UTAH

LARRY BOYNTON,
Appellee/Cross-Appellant,
v.
KENNECOTT UTAH COPPER LLC,
Appellant/Cross-Appellee,

PHILLIPS 66 COMPANY, CONOCOPHILLIPS COMPANY, PACIFICORP,
Cross-Appellees.

BRIEF OF APPELLEE AND CROSS-APPELLANT

On appeal from the Third Judicial District Court, Salt Lake County,
Honorable Randall N. Skanchy, District Court No. 160902693

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Appellee/Cross-Appellant

Plaintiff Larry Boynton, individually and on behalf of the heirs of Barbara Boynton, represented by Troy L. Booher, Beth E. Kennedy, and Dick J. Baldwin of Zimmerman Booher and Richard I. Nemeroff and Barrett B. Naman of Nemeroff Law Firm

Cross-Appellees

Defendants Phillips 66 Company and ConocoPhillips Company, represented by Tracy H. Fowler, Stewart O. Peay, Kristen J. Overton and Kristen A. Baughman of Snell & Wilmer, L.L.P.

Defendant PacifiCorp, represented by Bret W. Reich, General Counsel, and Stephen K. Christiansen

Parties Below Not Parties to the Appeal

The following defendants named in the Amended Complaint have been dismissed: Industrial Supply Company, Inc.; Bechtel Corporation; CBS Corporation, f/k/a Viacom Inc., successor by merger to CBS Corporation, f/k/a Westinghouse Electric Corporation; Crane Co.; Fluor Enterprises, Inc.; Foster Wheeler Energy Corporation; General Electric Company; John Crane, Inc.; Riley Power, Inc., individually and as successor-in-interest to Babcock Borsig Power, Inc. and Riley Stoker Corporation, individually and as successor-in-interest to D.B. Riley; The Goodyear Tire & Rubber Company; United States Welding, Inc.

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Introduction

This appeal involves claims that three defendants—Kennecott, ConocoPhillips, and PacifiCorp—engaged in affirmative acts involving asbestos that eventually killed Larry Boynton's wife, Barbara. The companies used asbestos and created asbestos dust that settled onto Larry's clothes over a number of years, where Barbara repeatedly encountered it. The issue is whether the companies owed a duty to Barbara and, therefore, are eligible to be liable for harm they caused her.

Under this court's test for duty in *Jeffs*, the companies owed a duty to Barbara. Under *Jeffs*, a defendant owes a duty of care to a plaintiff for the defendant's affirmative conduct that creates a risk of injury to others, particularly where the injury is foreseeable. Here, all of the companies engaged in affirmative conduct that created a risk of injury to Barbara, and the danger of workers taking home toxins from the workplace was foreseeable at the time.

Kennecott engaged in affirmative conduct that created a danger to Barbara when its employees scraped asbestos insulation from overhead pipes, sawed replacement asbestos insulation, and swept asbestos dust at its smelter. ConocoPhillips engaged in affirmative conduct that created a danger to Barbara when its employees negligently removed asbestos insulation, let it fall to the ground, and then swept the dust into the air. And PacifiCorp engaged in affirmative acts that created a danger to Barbara when it required its contractor

to cut and install asbestos, and when it retained control over the method and means of installing the asbestos insulation and certain safety aspects of the project. Each of these affirmative acts resulted in asbestos dust settling onto Larry's clothes, where Barbara was exposed to it when she laundered his clothes.

The duty created by Kennecott's affirmative acts is not abrogated by foreseeability. Indeed, the danger of take-home exposure to family members was foreseeable in the 1960s and 1970s. In opposing the various motions for summary judgment, Larry presented evidence from Dr. Richard Lemen, a former U.S. Assistant Surgeon General and an expert in epidemiology, who opined that the dangers of take-home exposure were known for decades before 1964, the earliest relevant date here. Larry also presented evidence that, in the 1960s, trade organizations were warning about the dangers of asbestos dust—not just to workers, but also to the community. By 1972, the dangers of take-home exposure were so widely known that OSHA included it in its regulations.

In addition to the dangers of take-home exposure to asbestos dust being foreseeable by the 1960s, the companies also were better positioned than Barbara to prevent the harm and there is no conceivable public policy reason to shift the burden from the companies to Barbara. For all of these reasons, the companies owed a duty to spouses who were exposed to the asbestos dust.

Because the companies owed a duty to Barbara, this court should affirm the denial of Kennecott's motion for summary judgment and reverse the entry of summary judgment in favor of ConocoPhillips and PacifiCorp.

Statement of the Issues

Issue 1 – Kennecott: Whether the district court correctly ruled that Kennecott undertook affirmative acts—and thus owed a duty to Barbara—where Larry presented evidence that Kennecott's employees scraped, sawed and swept asbestos insulation, and mixed asbestos cement, causing asbestos dust to settle onto Larry's clothes where Barbara encountered it.

Preservation: This issue was preserved in Larry's opposition to Kennecott's motion for summary judgment. [R.4241-43,4248-60.]

Issue 2 - ConocoPhillips: Whether the district court erred in ruling that ConocoPhillips undertook no affirmative act—and thus could not owe a duty to Barbara—where Larry presented evidence (that must be viewed in the light most favorable to Larry) that ConocoPhillips' employees removed asbestos pipe insulation and swept asbestos insulation debris, causing asbestos dust to settle onto Larry's clothes where Barbara encountered it.

Preservation: This issue was preserved in Larry's opposition to ConocoPhillips' motion for summary judgment. [R.2685-86,2692-2704.]

Issue 3 - PacifiCorp: Whether the district court erred in ruling that PacifiCorp was neither directly nor vicariously liable for the acts of its

independent contractor—and thus could not owe a duty to Barbara—where Larry presented evidence (that must be viewed in the light most favorable to Larry) that PacifiCorp specifically required its contractor use asbestos insulation that caused Barbara's injury, and that PacifiCorp retained control over the means and methods for installing the asbestos insulation, as well as certain safety aspects of the project.

Preservation: This issue was preserved in Larry's opposition to PacifiCorp's motion for summary judgment. [R.3298-3301,3303-18.]

Standard of Review for All Three Issues: "The determination of whether a legal duty exists is a purely legal question that requires an examination of the legal relationships between the parties." *Herland v. Izatt*, 2015 UT 30, ¶ 9, 345 P.3d 661 (alteration and internal quotation marks omitted). This court reviews the grant of summary judgment for correctness and views the facts and all reasonable inferences in a light most favorable to the nonmoving party. *Id.*

Statement of the Case

This appeal is from the district court's ruling on various motions for summary judgment, where Larry was the nonmoving party. [R.5438-47.] Larry therefore recites the facts in the light most favorable to him. *Herland v. Izatt*, 2015 UT 30, ¶ 9, 345 P.3d 661.

Asbestos dust causes Barbara's death

Barbara Boynton died from mesothelioma as a result of her exposure to asbestos dust. [R.2684,2687,3294,3301,4238,4244,5438.] Barbara was exposed to asbestos dust when laundering her husband Larry's work clothes, which collected asbestos dust while he worked at numerous companies where their employees, or independent contractors on the premises, installed and removed asbestos insulation near him. [R.2685-87,2845,3298-3301,4241-43,5438-42.]

Larry wore his dusty clothes home where Barbara washed them every week. [R.2685-2687,3300,4242-43.] Before washing Larry's clothes, Barbara would shake them out—exposing her to the asbestos dust that had settled onto them. [R.2685-87,2845,3298-3301,4241-4243.] She breathed more asbestos dust when she swept the laundry room to clean up the asbestos dust. [R.2685-87,2845,3298-3301,4241-43,5195.]

This appeal involves three companies where Larry was exposed to asbestos dust and brought that dust home to Barbara—Kennecott, ConocoPhillips, and PacifiCorp.

Kennecott employees created asbestos dust

Larry worked at Kennecott twice, and both times Kennecott negligently exposed him to asbestos dust. From 1961 to 1964, Larry worked as an employee of Kennecott at its smelter. [R.4241,4961,5442.] He then returned from 1964 to 1966 to work as an electrician for an independent contractor at Kennecott's copper facility. [R.4242,4962,5442.]

During those years, Kennecott employees negligently removed and replaced asbestos insulation while Larry worked less than twenty feet away. [R.1237,4241-43,4961-62.] Specifically, Kennecott's employees scraped old asbestos insulation from overhead pipes, cut replacement asbestos insulation, and swept residual asbestos insulation that had fallen to the ground, all of which released asbestos dust into the air. [R.1237,4241-43,4961-62.] Larry also was exposed to asbestos dust when Kennecott employees mixed asbestos cement in his presence. [R.4242-43,4962.] All of these acts caused asbestos dust to settle onto Larry's clothes where Barbara later encountered it. [R.4243,4962-63.]

Kennecott never warned Larry of the hazards of asbestos, never instructed him not to wear his contaminated work clothes home, and never provided him with laundry services to prevent the asbestos from leaving its copper plant. [R.4243,4962.]

ConocoPhillips employees created asbestos dust

From 1976 to 1978, Larry worked as an electrician (an independent contractor) at ConocoPhillips' oil refinery. [R.2685,5439.] Larry's job was to run

conduit, pull and terminate electrical wire, and run heat tracing. [R.2686.] During those years, ConocoPhillips employees negligently removed and swept asbestos insulation debris while Larry worked less than twenty feet away, just as Kennecott's employees had done. [R.2685-86.]

Specifically, ConocoPhillips' employees removed asbestos pipe insulation and let it fall to the ground. [R.2686,4080.] The ConocoPhillips' employees then swept the residual insulation from the floor during cleanup. [R.2686,4080.] During removal and cleanup, ConocoPhillips' employees generated asbestos dust that reached Larry, who worked within twenty feet of the insulation workers. [R.2686,4080.]

ConocoPhillips never warned Larry of the hazards of asbestos, never monitored asbestos levels, never implemented any engineering controls to reduce his exposures, and never provided him with showers or laundry services to prevent the asbestos from leaving its oil refinery. [R.2686,4080-81.]

PacifiCorp's affirmative acts created asbestos dust in its facility

During 1973, Larry worked as an electrician (an independent contractor) at PacifiCorp's Huntington Canyon Power Station. [R.3300.] Larry's job was to run conduit, pull and terminate electrical wire, and run heat tracing. [R.3300.] While he worked nearby, other independent contractors negligently cut and installed asbestos materials. [R.3300.] The independent contractors who exposed Larry to the asbestos dust were not PacifiCorp employees but were employees of a

subcontractor, Mountain States Insulation. [R.3300] Nonetheless, PacifiCorp directed and retained control over their actions through its contract with Jelco-Jacobson, the general contractor. [R.3298-3301.]

The work was part of PacifiCorp's project to build its Huntington Canyon Power Station. [R.3298,5440-41.][1] In 1970, PacifiCorp hired an architect, Stearns-Rogers, to design and plan the power station. [R.3298.] The resulting plans called for asbestos insulation and asbestos insulating cement. [R.3298-99,3389-90.] The plans also specified the means and methods to install the asbestos insulation, the actions that caused the injury here. [R.3299,3392-99.]

Importantly, the plans allowed PacifiCorp—and only PacifiCorp—to change or substitute those asbestos-containing materials. [R.3298-99,3388,4142.] And the plans provided that PacifiCorp's choice of insulation (which contained asbestos) was final and no substitutions could be made without written agreement from PacifiCorp. [R.3298-99,3388,4142.] The plans were so detailed that they dictated the means and methods by which the insulation must be installed, and for mixing, storing, applying and using the asbestos products—choices that created the asbestos dust that caused Barbara's death. [R.3299,3392-99.]

[1] The entity that built the Huntington Canyon Power Station was actually Utah Power & Light. [R.3298,5440-41.] PacifiCorp is Utah Power & Light's successor-in-interest. [R.3298,5440.] Larry therefore attributes to PacifiCorp the actions of Utah Power & Light.

PacifiCorp then hired a general contractor to implement the design plans, including the use of asbestos materials. Not only did PacifiCorp retain control over the materials the contractor could use and the construction methods, PacifiCorp also took responsibility for – and controlled – testing and inspecting the materials and methods of the work. [R.3298-3300,3443.] PacifiCorp also maintained the right to order changes in the work, inspect, and reject the materials and workmanship. [R.3299,3429-31.]

Of particular relevance, PacifiCorp also retained control over certain safety aspects during construction. Specifically, PacifiCorp was responsible for directing the contractor to implement adequate dust control measures. [R.3300,3446.] The contract also provided that PacifiCorp could demand the contractor stop unsafe work practices. [R.3299,3436.] And while it was known that exposure to asbestos was a health hazard, and regulated by OSHA at that time, the contract did not include any special precautions to reduce or otherwise eliminate the hazards of installing the asbestos insulation that PacifiCorp specified. [R.3299-3300.]

Jelco-Jacobson was the general contractor PacifiCorp hired for the project. [R.3299.] Larry worked for Jelco-Jacobson as an independent contractor on the project in 1973. [R.3300.] Larry worked near other contractors who cut and installed the asbestos insulation as required by PacifiCorp's contract. [R.3300] In fact, Larry worked within twenty feet of the insulation installers while they used

a saw to cut the insulation, which generated asbestos dust that collected on Larry's clothes, where Barbara later encountered it. [R.3300-01.]

PacifiCorp never warned Larry of the hazards of asbestos, never monitored asbestos levels, never implemented any engineering controls to reduce his exposures, and never provided him with showers or laundry services. [R.3301.]

Larry brings an action against the companies that exposed Barbara to asbestos dust

After Barbara died from her exposure to asbestos dust, Larry brought an action against the companies responsible for her exposure to the toxin. [R.1-24,1234-1257.]

Against Kennecott, Larry alleged direct liability negligence claims, based on Barbara's secondary exposure to asbestos dust generated by Kennecott's employees—both while Larry was an employee and while Larry was an independent contractor at Kennecott. [R.1236-37,1250-53.]

Against ConocoPhillips, Larry alleged a direct liability negligence claim, based on Barbara's secondary exposure arising from the asbestos dust generated by ConocoPhillips' employees while he was an independent contractor on ConocoPhillips' premises. [R.1236-37,1250-53.]

And against PacifiCorp, Larry alleged direct and vicarious liability negligence claims, based on Barbara's secondary exposure to asbestos from PacifiCorp's decision to require the use of asbestos insulation in its facility, and

its retention of control over how the independent contractor was to install that insulation, which created asbestos dust. [R.1236-37,1250-53.]

Larry's complaint alleged that the affirmative acts of each company caused Barbara's injury. Specifically, he alleged that, at each of the companies, "[t]he activities of cutting, chipping, mixing, sanding, sawing, scraping and sweeping that occurred in association with the work performed by [Larry] and other workers working around [him] with asbestos-containing products exposed him to great quantities of asbestos," and also "expos[ed] his wife, Barbara Boynton, to great quantities of asbestos as she too came into contact with the asbestos-containing products carried home on [his] clothes." [R.1237.] His complaint repeatedly asserted that his injuries were caused by the companies' negligent use of asbestos. [R.1250-54.]

The complaint also alleged that, after exposing Larry to asbestos, the companies failed to warn Larry of the danger or to provide safe work practices to reduce the danger they had caused. [R.1237,1251,1253.]

The companies move for summary judgment

Each company filed a motion for summary judgment, arguing that it could not be liable for Barbara's death. [R.2235-47 (ConocoPhillips), 2349-73 (PacifiCorp), 4162-80 (Kennecott).] Specifically, each company argued that it owed Barbara no duty under the factors enumerated in *B.R. ex rel. Jeffs v. West*, 2012 UT 11, 275 P.3d 228. [R.2238-46 (ConocoPhillips), 2364-72 (PacifiCorp), 4167-

78 (Kennecott).] Under *Jeffs*, the general rule is that a defendant has a duty to a plaintiff when the defendant engages in affirmative conduct that creates a risk of harm to the plaintiff. *Jeffs*, 2012 UT 11, ¶ 5.

Applying *Jeffs*, each of the companies argued that Larry alleged only failures to act, not affirmative acts that could give rise to a duty. [R.2240-41 (ConocoPhillips), 2365-69 (PacifiCorp), 4168-70 (Kennecott).] PacifiCorp also argued that it was not liable for its general contractor who installed the asbestos materials because PacifiCorp did not retain control over the work. [R.2362-64.]

As to foreseeability, PacifiCorp and Kennecott argued that Barbara's injury was not foreseeable. [R.2369-70,4171-75.] Kennecott argued that the dangers of take-home asbestos exposure were not known until the OSHA regulations were enacted in 1972. [R.5014.] In contrast, ConocoPhillips asserted that foreseeability should not be part of the court's analysis. [R.2245-46.]

Larry presents evidence that the companies' affirmative acts foreseeably caused Barbara's harm

Larry opposed the motions and argued that the companies owed a duty to Barbara under *Jeffs*. [R.2683,2692-2706,3294,3309-18,4238,4248-61.] He highlighted the allegations of affirmative acts in his complaint—acts that create a presumption of a duty under Utah law. [R.2686-88,2692-95, 3298-3301,3303-12, 4242-43,4248-51.]

Larry also presented evidence that Barbara's injuries were foreseeable by the time he worked at each of the companies—at Kennecott from 1961 to 1966, at

PacifiCorp in 1973, and at ConocoPhillips from 1976 to 1978. Specifically, Larry presented evidence that the dangers of take-home exposure to asbestos were generally foreseeable by the time Larry worked at the companies. His evidence was undisputed. None of the companies presented any evidence suggesting that the dangers of take-home asbestos exposure were not generally foreseeable by the time Larry worked for them.

Dr. Lemen's affidavit - First, Larry presented an affidavit from Dr. Richard Lemen, a former U.S. Assistant Surgeon General and an expert in epidemiology. [R.2957-88 (attached as Addendum C).[2]] Dr. Lemen cited medical and scientific data and concluded that the dangers of asbestos, including the dangers of take-home exposure, were recognized by the time Larry worked at all three companies. [R.2960-88.]

Dr. Lemen was clear that there is no safe way to use asbestos. [R.2963,2970,2986.] As he put it, "[t]here is no safe level of asbestos exposure for any type of asbestos fiber." [R.2963 (footnote and internal quotation marks omitted).]

Next, Dr. Lemen explained that by the time Larry worked for each company, the dangers of asbestos were widely known. He stated that, "[b]y 1964,

[2] Larry attached an identical copy of Dr. Lemen's affidavit and chapter to each of his oppositions. [R.2687-88,2697,2956-88,3048-3191,3302,3313,3649-80,3740-3882,4244,4253,4640-71,4732-4873,4963-64,4972.] For convenience, when Larry cites the affidavit, he references only the first time the affidavit appears in the record.

there were more than 700 articles in the worldwide medical literature highlighting the health effects associated with asbestos exposure and its toxic nature. By 1964, all the major asbestos-related diseases, including asbestosis, lung cancer and mesothelioma, had been causally established through epidemiology and reported in the scientific literature." [R.2963 (footnotes omitted).] He concluded that "the health hazards of asbestos, including mesothelioma, were well established and widely known and accepted prior to [Larry's] employment as a laborer and then as an electrician." [R.2964.]

Finally, Dr. Lemen explained that the dangers of take-home exposure—for all kinds of toxic substances—have been known since the early twentieth century. He explained this in his expert report, as well as in his attached chapter from Dodson & Hammar's textbook *Asbestos: Risk Assessment, Epidemiology, and Health Effects* (2d ed.). [R.2974-79,3108-11.] Dr. Lemen cited and discussed several authorities published in the early 1900s warning that workers handling toxic materials should leave their clothing at work to avoid carrying the hazard home. [R.2974-79.] Dr. Lemen explained that the dangers of laundering contaminated clothing have been known for centuries, and were widely discussed throughout the first half of the twentieth century. [R.2979-82.]

For example, by 1937, a medico-safety survey conducted by the Chief Safety Inspector for Standard Oil entitled "Dust Producing Operations in the Production of Petroleum Products and Associated Activities" cautioned that

when performing work that could contaminate clothing, measures should be taken to avoid household contamination including special clothing lockers, a prohibition on taking work clothing home, and wash and change rooms. [R.2977.] And by 1943, the United States Public Health Service published a Manual of Industrial Hygiene and Medical Service in War Industries, which stressed "the importance of cleanliness so that the worker did not carry the workplace exposures out of the workplace." [R.2977-78,3108-09.]

Dr. Lemen set forth numerous other examples of this pervasive knowledge, and noted that "by 1943 documentation of the effects of these take-home and environmental contamination concerns were appearing much more frequently in the literature." [R.2978.] The medical and scientific literature and data set forth in Dr. Lemen's report, which are uncontroverted, provide strong support for his opinion that take-home exposures to industrial contaminants "were of major concern" and that it was "foreseeable that any toxic material, taken from the workplace, retained their toxic nature and could cause contamination and disease elsewhere simply through their presence." [R.2979.]

Warnings from trade organizations - Second—and confirming Dr. Lemen's conclusions—Larry presented evidence that various trade organizations were circulating materials warning of the dangers of take-home asbestos exposure by the time Larry worked for the companies.

For example, in 1960, the Industrial Hygiene Foundation (IHF) published an abstract showing asbestos contamination as far as 600 meters from the work site. [R.2981.] In 1963, the IHF published the results of autopsies of people who died from asbestos but were "not occupationally exposed to asbestos." [R.2981.] The IHF then "continued to report the dangers of community exposures to asbestos." [R.2981.] ConocoPhillips was a member of the IHF during those years. [R.2783-85.] And as a member of IHF, ConocoPhillips would have received and had access to all of IHF's publications. [R.2980-82.]

Similarly, a publication put out by the American Industrial Hygiene Association (AIHA) in 1962 discusses health hazards in the "building trades," and identifies measures to attempt to minimize asbestos exposures. [R.4614-19.] In 1964, the AIHA published an article that recognized the serious health hazards associated with exposures to asbestos-containing pipe-covering and thermal insulation. [R.4620-24.] Kennecott was a member of the AIHA during those years and would have received those warnings. [R.4564-66,4585-87,4596-97,4602-03.]

The National Safety Council (NSC) also disseminated information to its members warning of the toxicity of asbestos before Barbara's exposure. [R.2984-85.] PacifiCorp was a member of the NSC long before Barbara's exposure, and thus would have received these warnings. [R.3336-37,3638-42,3643-44,3646.]

Warnings from industrial hygienists – Finally—and further confirming Dr. Lemen's conclusions—Larry presented evidence that the hazards of asbestos

were widely known long before Larry worked for the companies. Specifically, ConocoPhillips' own industrial hygienist, Lucian Renes, testified that he first learned of the hazards of asbestos in 1939. [R.2874,2882,2889.] He then joined ConocoPhillips in 1953, long before Barbara's exposure. [R.2889.] By 1965, Mr. Renes was in charge of collecting information on the health hazards of asbestos insulating material and reporting that information to the American Petroleum Institute. [R.2905-2914.]

OSHA guidelines – In 1972, OSHA adopted regulations reflecting these widely-known dangers. The 1972 regulations dealt specifically with the dangers of asbestos dust traveling on clothing into homes. 37 Fed. Reg. 110 (June 7, 1972) (codified at 29 CFR § 1910.1001 (1974)). The regulations required employers to provide protective clothing, changing rooms, and laundry services to employees who were exposed to asbestos dust. *Id.* These regulations were in effect while Larry worked at PacifiCorp and ConocoPhillips. [R.5439-41.]

The court enters summary judgment in favor of ConocoPhillips and PacifiCorp

The court denied Kennecott's motion for summary judgment, recognizing that Kennecott's "affirmative act of specifying and using asbestos pipe insulation and its employee-insulators' affirmative acts of exposing" Larry to asbestos could give rise to a duty to Barbara. [R.5447.] Indeed, the court quoted Larry's complaint where he alleged that, at each company, "[t]he activities of cutting, chopping, mixing, sanding, sawing, scraping and sweeping that occurred in

association with the work performed" by the companies' employees near Larry exposed him to great quantities of asbestos. [R.5440 (alteration in original).]

Yet the court entered summary judgment in favor of ConocoPhillips, even though Larry alleged ConocoPhillips' employees undertook the same affirmative acts as Kennecott's employees. [R.5443-47.] The court ruled that Larry's claims against ConocoPhillips were based on omissions, not affirmative acts. [R.5444.]

Further compounding the problem, the court collapsed its analyses of ConocoPhillips' duty and PacifiCorp's duty into a single discussion, despite the different nature of the conduct giving rise to liability for each. [R.5443-47.] Indeed, Larry asserted a direct liability claim against ConocoPhillips, arguing that ConocoPhillips owed a duty to Barbara because its employees exposed Larry to asbestos dust. [R.2684-89,2692-95.] By contrast, Larry asserted direct and vicarious liability claims against PacifiCorp, arguing that PacifiCorp owed a duty to Barbara because it required the use of asbestos in its facility, and also controlled how its contractor installed the asbestos. [R.3295-3307,3309-12.]

The court, however, addressed the companies together and granted summary judgment to PacifiCorp for the same reasons as ConocoPhillips. [R.5443-46.] Although it is not clear from the order, the court mistakenly believed it was dispositive that Larry was an independent contractor at both locations. [R.5443-44.] And for both, the court relied on the retained-control doctrine (which applies only to vicarious liability claims and claims concerning control

over the entity who acts negligently), and ruled that Larry had not shown that either ConocoPhillips or PacifiCorp retained control over Larry's actions while he was working near the asbestos dust. [R.5444-45.] The court ruled that, because neither ConocoPhillips nor PacifiCorp required Larry to work near the asbestos at their facilities, neither of them had any involvement with the injury-causing aspects of his work. [R.5444-45.]

Confusingly, the court also addressed the *Jeffs* "minus factors"—factors that would eliminate a duty—even though it had already ruled that neither "plus factor" created the presumption of a duty. [R.5445-46.] As to foreseeability, the court ruled that "it would be a vast expansion of Utah Tort Law to find that, based on the relationships of the parties; an employer could foresee harm to the spouse of an employee of an independent contractor." [R.5445.]

As to the next factor, the court ruled that Larry was best suited to take reasonable precautions to avoid the injury. The court did not explain how Larry was better suited, but instead stated that imposing a duty on the companies "would impose an extraordinarily onerous and unworkable burden." [R.5446 (internal quotation marks omitted).] And as to the last factor, the court ruled that public policy weighs against imposing a duty on the companies: "[t]he pressure this expansion of the common law would put on the time and resources of courts, society, and businesses in general weighs against" imposing a duty on the companies. [R.5446.]

Summary of the Argument

The district court correctly ruled that Kennecott owed Barbara a duty because Kennecott engaged in affirmative conduct that caused asbestos dust to settle onto Larry's clothes where Barbara later encountered it. That affirmative conduct created a duty to Barbara under Utah law. And although the law recognizes exceptions to that general rule—so-called "minus factors"—none of them apply here, particularly because the dangers of take-home asbestos exposure were generally foreseeable to companies who chose to use asbestos.

Kennecott owed Barbara a duty because it engaged in affirmative conduct that created a danger to her, both while Larry was a Kennecott employee from 1961 to 1964 and while he was an independent contractor from 1964 to 1966. While Larry was a Kennecott employee, he was exposed to asbestos when its employees scraped asbestos insulation from overhead pipes, sawed replacement asbestos insulation and when Kennecott employees, including Larry himself, swept asbestos dust at its smelter. [R.1237,4241-43,4961-62.] And when Larry was an independent contractor at Kennecott, its employees negligently cut and installed asbestos insulation and mixed asbestos cement near him. [R.1237,4241-43,4961-62.] These affirmative acts are sufficient to create a duty to Barbara.

While an affirmative act generally gives rise to a duty, this court has articulated three "minus factors" that can weigh in favor of eliminating an otherwise existing duty. Those factors are "[i] the foreseeability or likelihood of injury; [ii] public policy as to which party can best bear the loss occasioned by the

injury; and [iii] other general policy considerations." *Jeffs*, 2012 UT 11, ¶¶ 5, 21 (citations and internal quotation marks omitted). None of those factors suggest that Kennecott's duty to Barbara should be eliminated here.

But while the district court correctly applied the law to Kennecott, it erred in ruling that ConocoPhillips owed no duty to Barbara. ConocoPhillips owed a duty to Barbara for the same reasons Kennecott owed a duty to her. Specifically, ConocoPhillips owed Barbara a duty because it engaged in affirmative conduct that created a danger to her while Larry was an independent contractor—an invitee—at ConocoPhillips from 1976 to 1978. [R.2685-89.]

During those years, ConocoPhillips employees negligently removed asbestos insulation with Larry less than twenty feet away, just as Kennecott's employees had done. [R.2686,4080.] They removed asbestos pipe insulation, just as Kennecott's employees had done, and let it fall to the ground, which created dust. [R.2686,4080.] And they swept the residual insulation from the floor, generating asbestos dust that reached Larry, who worked within twenty feet of the insulation workers—just as Kennecott's employees had done. [R.2686,4080.]

The court also erred in ruling that PacifiCorp owed Barbara no duty. PacifiCorp not only engaged in an affirmative act when it required Jelco-Jacobson to cut and install asbestos, it remained liable for the harm because it retained control over the method and means of installing the asbestos insulation and certain safety aspects of the project.

This court should affirm the district court's denial of Kennecott's motion for summary judgment, and vacate the district court's entry of summary judgment in favor of ConocoPhillips and PacifiCorp.

Argument

Each company owed a duty to Barbara for similar reasons—each engaged in affirmative conduct that increased the risk of foreseeable harm. And each company was better suited than Larry or Barbara to prevent Barbara's harm.

1. Kennecott Owed a Duty to Barbara

The district court correctly ruled that Kennecott owed Barbara a duty because Kennecott engaged in affirmative conduct that created asbestos dust which settled on Larry's clothes where Barbara later encountered it. That affirmative conduct created a duty to Barbara under Utah law. And although the law recognizes exceptions to that general rule—so-called "minus factors"—none of them apply here.

1.1 Kennecott Engaged in Affirmative Conduct When Its Employees Exposed Barbara to Asbestos

Kennecott owed Barbara a duty because it engaged in affirmative conduct that created a danger to her, both while Larry was a Kennecott employee from 1961 to 1964, and also while he was an independent contractor there from 1964 to 1966. While Larry was a Kennecott employee, he was exposed to asbestos when its employees scraped asbestos insulation from overhead pipes, sawed replacement asbestos insulation and when Kennecott employees, including Larry

himself, swept asbestos dust at its smelter. [R.1237,4141-43,4961-62.] And when Larry was an independent contractor at Kennecott, its employees negligently cut and installed asbestos insulation and mixed asbestos cement near him. [R.4242-43,4962.] That affirmative conduct is sufficient to create a duty to Barbara.

Under Utah law, a defendant owes a duty of care to a plaintiff when he engages in affirmative conduct that creates a risk of injury to others, particularly where the injury is foreseeable. *B.R. ex rel. Jeffs v. West*, 2012 UT 11, ¶¶ 5, 21, 275 P.3d 228. In *Jeffs*, this court announced a "general rule" that "we all have a duty to exercise care when engaging in affirmative conduct that creates a risk of physical harm to others." *Id.* ¶ 21. But an omission—the "failure to take positive steps to benefit others"—gives rise to a duty only if there is a special relationship between the parties. *Id.* ¶ 7.

Because affirmative acts give rise to a duty while omissions typically do not, the difference between the two is "critical" and "perhaps the most fundamental factor courts consider when evaluating duty." *Id.* As the court of appeals has explained, a "negligent affirmative act leaves the plaintiff positively worse off as a result of the wrongful act, whereas in cases of negligent omissions, the plaintiff's situation is unchanged; she is merely deprived of a protection which, had it been afforded her, would have benefitted her." *Faucheaux v. Provo City*, 2015 UT App 3, ¶ 16, 343 P.3d 288 (alterations and internal quotation marks omitted).

In some cases, the defendant engages in both kinds of conduct—an affirmative act that creates a danger, and then a subsequent omission in failing to alleviate the danger. But the defendant's affirmative conduct in creating the danger gives rise to a duty, regardless of whether he also engages in subsequent acts of omission which fail to alleviate the danger he created. *Jeffs*, 2012 UT 11, ¶ 10.

Indeed, this court has been clear, repeatedly, that the duty analysis focuses on who created the danger. The question is whether the defendant's affirmative conduct "has gone forward to such a stage that inaction would commonly result in an injury." *Herland v. Izatt*, 2015 UT 30, ¶ 35, 345 P.3d 661 (alteration and internal quotation marks omitted). Or put differently, the question is "whether the putative wrongdoer has advanced to such a point as to have launched a force or instrument of harm, or has stopped where inaction is at most a refusal to become an instrument for good." *Id.* (citation omitted).

Here, Larry presented evidence of Kennecott's affirmative conduct that created the danger to Barbara. Specifically, he presented evidence that while he was a Kennecott employee from 1961 to 1964, his co-workers negligently scraped asbestos insulation off of pipes and negligently cut and sawed new asbestos insulation. [R.4241-43,4961-62.] Both of these negligent acts created asbestos dust that settled onto Larry's clothes while he worked less than twenty feet away. [R.4241-43,4962-63.] Making matters worse, Kennecott required Larry to clean up

after his co-workers. [R.4241,4961.] When Larry swept the asbestos dust from the ground, even more dust settled onto his clothes where Barbara later encountered it. [R.4243,4962-63.]

Kennecott repeated several of these affirmative acts when Larry returned to Kennecott as an independent contractor from 1964 to 1966. During that time, Kennecott employees again negligently cut and sawed asbestos near him. [R.4242-43,4962.] The employees also mixed cement containing asbestos near him. [R.4242-43,4962.] All of these affirmative acts again created asbestos dust that settled onto Larry's clothes where Barbara later encountered it. [R.4242-43,4962-63.]

After creating the danger to Barbara, Kennecott engaged in subsequent negligent misconduct when it failed to even attempt to alleviate the danger it had created. Indeed, Kennecott never warned Larry of the dangers of asbestos, never instructed him not to wear his work clothes home, and never provided him with laundry services and showers to prevent the asbestos from leaving Kennecott's property. [R.4243,4962.] This misconduct left Barbara "positively worse off as a result." *Faucheaux,* 2015 UT App 3, ¶ 16.

The district court was therefore correct when it ruled that Kennecott's "affirmative act of specifying and using asbestos pipe insulation and its employee-insulators' affirmative acts of exposing" Larry to asbestos could give rise to a duty to Barbara. [R.5447.]

In Kennecott's opening brief, however, Kennecott argues that its negligent conduct consisted only of omissions, not affirmative acts that could give rise to a duty. (Op. Br. at 11-14.) Kennecott acknowledges Larry's allegations of its affirmative acts—choosing asbestos, then exposing Barbara to asbestos dust. (*Id.* at 12.) But Kennecott argues that Larry failed to allege that Kennecott undertook those affirmative acts negligently. (*Id.* at 8, 12.) Kennecott wrongly suggests that the court can therefore disregard those allegations. (*Id.* at 8, 12-14.)

Here, the question relevant to the duty analysis is whether there was an affirmative act that "launched a force or instrument of harm." *Herland*, 2015 UT 30, ¶ 35. This is distinct from the subsequent questions of breach and proximate cause, which are only relevant once a duty has been established. *E.g.*, *id.* ¶ 17.

Regardless, Kennecott is mistaken. Larry did allege that Kennecott undertook its affirmative conduct negligently. [R.1250-53.] Larry's cause of action was for negligence. [R.1252.] This is all that is required under Utah's notice-pleading standard to put Kennecott on notice that Larry was alleging that its conduct was negligent. Utah R. Civ. P. 8. Indeed, "[t]he plaintiff must only give the defendant fair notice of the nature and basis or grounds of the claim and a general indication of the type of litigation involved." *Canfield v. Layton City*, 2005 UT 60, ¶ 14, 122 P.3d 622 (internal quotation marks omitted).

Otherwise, Kennecott attempts to analogize its affirmative acts to those at issue in *Graves v. North Eastern Services, Inc.*, a case in which this court held that

the defendant owed no duty to the plaintiff because the plaintiff's core complaint targeted an omission, not an affirmative act. (Op. Br. at 11-12 (citing 2015 UT 28, 345 P.3d 619).) Kennecott asserts that Larry's core complaint is that Kennecott failed to alleviate the danger, not that Kennecott created the danger in the first place. (Op. Br. at 12-14.)

But Kennecott mischaracterizes Larry's allegations. Larry's core complaint is that Kennecott exposed Barbara to asbestos dust. The fact that Kennecott could have reduced (but did not) Barbara's exposure through warnings or laundry services does not change the nature of Larry's core complaint.

This explains why Kennecott's analogy to *Graves* is misplaced. In *Graves*, this court held that a defendant's affirmative acts can give rise to a duty of care only when those affirmative acts are what caused the plaintiff's injury. 2015 UT 28, ¶¶ 26-28. In *Graves*, this was important because the plaintiff's claim was based on an omission (negligent hiring), but the plaintiffs sought to impose a duty based on the defendant's other affirmative acts (enticing children to come onto the property). *Id.* ¶ 27. This court rejected the plaintiff's attempt and clarified that a duty can arise from a defendant's affirmative act only when the defendant's affirmative act caused the plaintiff's injury. *Id.* ¶ 29.

But here, Kennecott's duty arises from its affirmative acts because its affirmative acts are what caused Barbara's injury. Of course, Kennecott engaged in additional subsequent acts of misconduct when it failed to alleviate the danger

it created. But unlike in *Graves*, those acts of omission do not form the basis of Kennecott's duty. Indeed, by the time Kennecott failed to warn Larry of the danger it created, Kennecott's conduct "ha[d] advanced to such a point as to have launched a force or instrument of harm." *Herland*, 2015 UT 30, ¶ 35. Kennecott's failure to warn or protect Barbara might have alleviated the danger it created, but it does not form the basis for Kennecott's duty here.

Courts in other jurisdictions have reached the same conclusion. For example, in *Ramsey v. Georgia Southern University Advanced Development Center*, the Supreme Court of Delaware held that "[i]n take-home asbestos exposure cases, an employer engages in misfeasance when it causes an employee to work with asbestos products under conditions in which asbestos dust covers the clothes he wears at the workplace and has laundered at home." 189 A.3d 1255, 1285 (Del. 2018). Holding that the affirmative actions of the employer in that case caused the exposure, the court found the fact "[t]hat the exposure to both the employee and his spouse might have been limited by providing warnings and safe laundering instructions does not turn the employer's action into nonfeasance." *Id.* at 1285-86. Accordingly, "[t]he nonfeasance in this situation—the failure to warn—is culpable precisely because a duty to warn arose when the employer engaged in the misfeasance of exposing its employee to dangerous asbestos products." *Id.* at 1286 (citation omitted).

1.2 None of the "Minus Factors" Eliminate Kennecott's Duty

While an affirmative act generally gives rise to a duty, this court has articulated three "minus factors" that can weigh in favor of eliminating an otherwise existing duty. Those factors are "[i] the foreseeability or likelihood of injury; [ii] public policy as to which party can best bear the loss occasioned by the injury; and [iii] other general policy considerations." *Jeffs*, 2012 UT 11, ¶¶ 5, 21 (citations and internal quotation marks omitted). None of those factors suggest that Kennecott's duty to Barbara should be eliminated here.

1.2.1 Barbara's Injury Was Foreseeable

By the time Larry worked at Kennecott, the dangers of asbestos, and take-home exposure, were generally foreseeable. This "minus factor" therefore does not weigh in favor of eliminating the duty Kennecott owed to Barbara.

In a duty analysis, the foreseeability is "evaluated at a broad, categorical level." *Id.* ¶ 25. The court "does not question 'the specifics of the alleged tortious conduct' such as 'the specific mechanism of the harm'" and looks only at the general foreseeability of harm. *Id.* Any questions regarding the foreseeability of the "specific mechanism of injury" are reserved for a proximate cause analysis and have no bearing on the existence of a duty. *Id.* ¶ 26.

The question is "whether a category of cases includes individual cases in which the likelihood of some type of harm is sufficiently high that a reasonable person could anticipate a general risk of injury to others." *Id.* ¶ 27. The question relates to "the general relationship between the alleged tortfeasor and the victim

and the general foreseeability of harm. *Id.* ¶ 25 (internal quotation marks omitted).

Whether the particular defendant could have foreseen the harm he caused is therefore irrelevant to the duty analysis. *Herland*, 2015 UT 30, ¶ 17. That is instead a question of proximate cause, an issue to be decided by the factfinder at trial. *Id.*; *Jeffs*, 2012 UT 11, ¶ 28.

Determining the relevant category of cases is the first step in the foreseeability analysis. For example, in *Jeffs*, the plaintiffs alleged that a nurse negligently prescribed medication to their father, causing their father to kill their mother. *Jeffs*, 2012 UT 11, ¶ 3. This court held that the relevant category of cases "consist[ed] of healthcare providers negligently prescribing medications to patients who then injure third parties." *Id.* ¶ 27.

In *Mower v. Baird*, the plaintiff alleged that a therapist negligently provided therapy to a child, causing the child to make false sex abuse allegations against his father. 2018 UT 29, ¶¶ 2, 12, 422 P.3d 837. This court held that the relevant category of cases "include[d] treating therapists who carelessly provide therapy to a minor child patient for potential sex abuse in a manner that injures the nonpatient parent through false allegations or memories of sexual abuse." *Id.* ¶ 25.

In *Herland*, the plaintiff alleged that a gun owner negligently "allow[ed] her to have access to his loaded handgun when she was severely intoxicated."

2015 UT 30, ¶ 8 (internal quotation marks omitted). This court held that "[t]he relevant category of cases here consists of gun owners who are negligent in supplying their guns to others who then injure themselves or third parties." *Id.* ¶ 15.

And in *Scott v. Universal Sales, Inc.*, the plaintiff alleged that the county negligently operated a work-release program and allowed an inmate to attack her. 2015 UT 64, ¶¶ 5-11, 356 P.3d 1172. This court held that the relevant category was "the custodian of a potentially dangerous individual who places the individual in the community outside its direct physical control with minimal supervision." *Id.* ¶ 43.

Here, the relevant category of cases includes premises owners who expose those on their property to a known toxin, asbestos, which in turn causes injuries to individuals off the premises. For Kennecott, the relevant time period was from 1961 to 1966 when Larry worked on Kennecott's property. [R.5442.]

The dangers of take-home asbestos exposure were generally foreseeable at that time. Indeed, the only evidence presented to the district court on this point was from Larry. He presented evidence that by the 1960s, trade organizations were circulating articles and other warnings about the dangers of asbestos.

For example, in 1960, the Industrial Hygiene Foundation published an abstract showing asbestos contamination as far as 600 meters from work sites. [R.2981.] In 1963, the IHF published the results of autopsies of people who died

from asbestos but were "not occupationally exposed to asbestos." [R.2981.] The IHF then "continued to report the dangers of community exposures to asbestos." [R.2981.]

In 1962, the AIHA promulgated an edition of the *Industrial Hygiene Journal* that discusses health hazards in the "building trades," and identifies measures to attempt to minimize asbestos exposures. [R.4614-19.] In 1964, the AIHA recognized the consensus regarding the serious health hazards associated with exposures to asbestos-containing pipe-covering and thermal insulation. [R.4620-24.]

Larry also presented an affidavit from his expert, Dr. Richard Lemen, a former U.S. Assistant Surgeon General and an expert in epidemiology. [R.2957-88.] Dr. Lemen cited medical and scientific data and concluded that the dangers of asbestos, including the dangers of take-home exposure, were "well-recognized" by the time Larry worked at all three companies. [R.2974-88.]

Specifically, Dr. Lemen stated that, "[b]y 1964, there were more than 700 articles in the worldwide medical literature highlighting the health effects associated with asbestos exposure and its toxic nature. By 1964, all the major asbestos-related diseases, including asbestosis, lung cancer and mesothelioma, had been causally established through epidemiology and reported in the scientific literature." [R.2963 (footnotes omitted).] He concluded that "the health hazards of asbestos, including mesothelioma, were well established and widely

known and accepted prior to [Larry's] employment as a laborer and then as an electrician." [R.2964.]

Dr. Lemen also explained that the dangers of take-home exposure—for all kinds of toxic substances—have been known since the early twentieth century. [R.2974-79.] He cited and explained several authorities published in the early 1900s warning that workers handling toxic materials should leave their clothing at work to avoid carrying the hazard home. [R.2794-79.] And Dr. Lemen explained that the dangers of laundering contaminated clothing have been known for centuries. [R.2979-82.]

Neither Kennecott nor either of the other companies presented evidence to dispute or contradict Dr. Lemen's conclusions. The district court correctly accepted Larry's uncontroverted evidence that Barbara's injury was foreseeable.

But now—and although Kennecott presented no evidence below—Kennecott asserts that Dr. Lemen's conclusions cannot be trusted because Dr. Lemen relied on "the Newhouse Study," which was "conducted in London and was not capable of focusing solely on take-home exposure." (Op. Br. at 17.) In support, Kennecott cites *Georgia Pacific, LLC v. Farrar*, 69 A.3d 1028, 1036 (Md. Ct. App. 2013). But the *Farrar* opinion does not suggest that the Newhouse Study is not reliable. *Id.* at 1036-37. Instead, the *Farrar* opinion recognizes that, after learning of the findings in the Newhouse Study, a leading asbestos researcher

"advised that workers exposed to asbestos change their clothes before going home." *Id.* at 1037.

Perhaps more important, however, the *Farrar* opinion confirms that the court correctly accepted Larry's uncontroverted evidence. Indeed, the opinion discusses at length the evidence introduced by "experts from both sides" concerning when the dangers of take-home asbestos exposure became widely known. *Id.* at 1036-38. But here, there was no evidence to contradict Dr. Lemen's conclusions and thus no real evidentiary dispute.

Regardless, Dr. Lemen's opinion did not rely solely upon the Newhouse Study. [R.2974-79.] Kennecott's assertion therefore misses the point.

Otherwise, Kennecott asserts that the dangers of take-home asbestos exposure were not foreseeable until 1972 when the OSHA regulations were released. (Op. Br. at 17.) In support, Kennecott cites opinions from three courts that accepted 1972 as the year that take-home exposure became foreseeable.

But two of those courts reached that conclusion based on the insufficient evidence that the plaintiffs presented to them. Indeed, in *Fourteenth District*, the plaintiff's expert conceded that the dangers of take-home asbestos exposure were not widely known until 1965 – when Larry was still working as an independent contractor at Kennecott. *In re Certified Question from Fourteenth Dist. Court of Appeals of Texas*, 740 N.W.2d 206, 218 (Mich. 2007). Similarly, in *Martin*, the plaintiff presented treatises, but failed to include "any mention of dangers of

second-hand exposure to asbestos dust." *Martin v. Gen. Elec. Co.*, No. CIV. A. 02-201-DLB, 2007 WL 2682064, at *4 (E.D. Ky. Sept. 5, 2007).

In contrast, the *Farrar* court reached its conclusion based on the evidence presented by the defendant. Specifically, the defendant's expert testified that the dangers of take-home exposure were suspected in 1955, but were not yet widely known. *Farrar*, 69 A.3d 1028 at 1036.

None of those evidentiary problems exist here. Dr. Lemen was unequivocal that the dangers of asbestos, including the dangers of take-home exposure, were generally known by the time Larry worked at all three companies. [R.2974-88.] Nor did the companies introduce any evidence to refute his conclusions.

Courts in other jurisdictions, where an assessment of duty is based upon foreseeability as opposed to relationships, have similarly concluded that the risks of take-home asbestos exposures were foreseeable.

For example, in *Olivo v. Owens-Illinois, Inc.*, the New Jersey Supreme Court found a premises owner owed a duty of care to the spouse of an independent contractor who was exposed to asbestos in the household setting and developed mesothelioma. 895 A.2d 1143, 1149 (N.J. 2006). The court recognized foreseeability plays a "dual role" in the analysis of tort responsibility, and that it may be significant as to both duty, and whether the breach of that duty is the proximate cause of an injury. *Id.* at 1148. The considerations of fairness and

public policy come into play "[o]nce the ability to foresee harm to a particular individual has been established." *Id.*

In *Olivo*, the court reviewed evidence that the premises defendant, ExxonMobil, was aware by 1937 that exposure to asbestos could cause the disease asbestosis. *Id.* at 1149. It also discussed the general industrial hygiene principles that made the risk of harm foreseeable, noting that "[a]s early as 1916, industrial hygiene texts recommended that plant owners should provide workers with the opportunity to change in and out of work clothes to avoid bringing contaminants home on their clothes." *Id.* Finding the record devoid of any evidence that ExxonMobil implemented such measures, the court held that "[i]t requires no leap of imagination to presume that during the decades of the 1940's, 50's, 60's, and early 1980's when [the plaintiff's husband] worked as a welder and steamfitter either he or his spouse would be handling his clothes in the normal and expected process of laundering them so that the garments could be worn to work again." *Id.* Accordingly, the court held, it was foreseeable that whoever laundered that clothing would be exposed to asbestos dust that accumulated while the plaintiff's husband engaged in the tasks he was contracted to perform. *Id.*

The Louisiana Court of Appeals reached a similar conclusion in a take-home case involving exposures that occurred between 1945 and 1963. *Zimko v. Am. Cyanamid*, 905 So. 2d 465, 470, 472 (La. App. Ct. 2005). Holding that a "no

duty" defense is "seldom appropriate" where negligence claims are involved, the court rejected the premises owner's no duty argument and found it had a "general duty to act reasonably in view of the foreseeable risks of danger to household members of its employees resulting from exposure to asbestos fibers carried home on its employee's clothing, person, or personal effects." *Id.* at 482-83.

In *Ramsey,* the Delaware Supreme Court acknowledged the "ordinary reality" upon which take-home asbestos claims are based, observing that "if the conduct of manufacturers and employers causes asbestos to go home on employees' clothes without any warning or safe laundering instructions, it is foreseeable that people like [the plaintiff] will be injured." 189 A.3d at 1277. The court pointed out that if exposure to asbestos dust when handling asbestos products is foreseeable, "so too is exposure when completing the quotidian task of laundering a dusty uniform in preparation for another day of work." *Id.* at 1279-80. The court noted the obvious fact that a worker may not launder his own contaminated clothing, making family members in the worker's household the "most natural class of persons to be exposed to harmful asbestos dust." *Id.* at 1280. Thus, the plaintiff's claims for take-home asbestos exposures in that case were characterized as having been based "on a clearly foreseeable consequence of common, and necessary, human conduct." *Id.* at 1286.

Because Barbara's injury was foreseeable, this factor does not weigh in favor of eliminating Kennecott's duty to Barbara.

1.2.2 Kennecott Was Better Situated to Avoid the Injury

Kennecott was also in the better position to "bear the loss occasioned by the injury. *Jeffs*, 2012 UT 11, ¶ 29. This "minus factor" therefore also does not weigh in favor of eliminating the duty Kennecott owed to Barbara.

The analysis of which party is better positioned to bear the loss considers which party is "best situated to take reasonable precautions to avoid injury." *Id.* ¶ 30. This factor will typically cut against the imposition of a duty only where the plaintiff is in a "superior position of knowledge or control" to avoid the injury. *Id.* The question is which party "has control over the instrumentality" that creates the danger. *Mower*, 2018 UT 29, ¶ 29. The defendant is not in the best position to bear the loss if "he lacks the capacity that others have to avoid injury by taking reasonable precautions." *Jeffs*, 2012 UT 11, ¶ 30.

Kennecott was in the superior position of knowledge and control. Kennecott chose to use asbestos in its facility, despite the danger it posed. [R.4241-43,4961-62.] Kennecott also instructed its employees to cut and saw asbestos products while others worked nearby, including Larry. [R.4241-43,4961-62.] And Kennecott chose not to provide warnings, showers, changing rooms, or laundry services to alleviate the hazard it created. [R.4243,4962.]

Yet Kennecott argues that Larry was in a superior position of control because, in the end, Larry was the one who wore his asbestos-covered clothes home to Barbara. (Op. Br. at 21.) In support, Kennecott cites *In re New York City Asbestos Litigation*, 840 N.E.2d 115 (N.Y. 2005). But that opinion demonstrates that Kennecott was better suited to avoid Barbara's injury because Kennecott could have taken actions to alleviate the hazard it created.

In *In re New York City*, the plaintiff sued for injuries his wife sustained after she was exposed to asbestos dust that he brought home on his clothes. *Id.* at 116. Just like Kennecott, the company had chosen to expose its employees to asbestos dust. *Id.* But unlike Kennecott, the company also issued uniforms and a laundry service to keep the asbestos from traveling home. *Id.* at 116.

The plaintiff, however, chose to bring his dirty work clothes home for cleaning for "convenience." *Id.* (alteration omitted). The court held that the plaintiff—not the company—was therefore best suited to avoid the harm. *Id.* at 120. Even though the company could have required the plaintiff to use its uniforms and laundry services, the company was "entirely dependent upon [the plaintiff's] willingness to comply with and carry out such risk-reduction measures." *Id.* In other words, because the company supplied risk-reducing measures to the plaintiff, the plaintiff had the superior position of control over the potential harm. *Id.*

The same is not true here. Kennecott did not alert Larry to the danger Kennecott created, let alone provide any risk-reducing measures. Kennecott remained in the superior position of control over Barbara's harm.

Courts in other jurisdictions have similarly concluded that employers who expose their employees and invitees to asbestos dust remain "best suited to bear the loss" of the harm they cause if they provide no warnings or risk-reducing measures. For example, in *Satterfield v. Breeding Insulation Co.*, the Tennessee Supreme Court considered various public-policy factors bearing upon the scope of the duty, such as whether "the gravity of the harm outweigh[s] the burden that would be imposed if the defendant were required to engage in an alternative course of conduct that would have prevented the harm." 266 S.W.3d 347, 365 (Tenn. 2008).

The court observed that the magnitude of the risk of a debilitating and fatal illness like mesothelioma is great, while the measures to protect workers and their families from exposure to asbestos "appear to be feasible and efficacious without imposing prohibitive costs or burdens on [the defendant.]" *Id.* at 368. Because the defendant failed to demonstrate why precautions such as basic warnings, safe-handling instructions, coveralls, change-rooms, laundry services, or on-site bathhouses would have been unduly burdensome or prohibitively costly, the court found the public-policy factors weighed in favor of imposing a duty. *Id.* at 368-69, 374-75.

Likewise, in *Olivo v. Exxon Mobil Corp.*, a New Jersey appeals court analyzed the issue of who is best situated to prevent harm in a take-home asbestos case. 872 A.2d 814, 820 (N.J. Super. Ct. App. Div. 2005). Looking to whether the premises defendant, ExxonMobil, had the opportunity and ability to exercise care, the court found that Exxon was best situated to prevent the harm. *Id.* While "[a]sbestos-related diseases are very serious and often deadly," the premises defendant, on the other hand, "could have easily informed [the] plaintiff of the risks to his own health and the health of his wife and/or provided changing rooms so as to limit exposure to asbestos." *Id.* Because take-home asbestos cases present a scenario where the actions of the defendant are "relatively easily corrected" whereas the harm at issue is a fatal disease, the court found the imposition of a duty appropriate. *Id.* (internal quotation marks omitted).

Because Kennecott remained in a "superior position of knowledge or control" to avoid Barbara's injury, this factor does not weigh in favor of eliminating Kennecott's duty to her.

1.2.3 Public Policy Supports Kennecott's Duty to Barbara

Public policy considerations also support imposing a duty on companies who expose family members of their employees and invitees to asbestos dust. This "minus factor" therefore does not weigh in favor of eliminating the duty Kennecott owed to Barbara.

Kennecott argues that, as a matter of public policy, companies should not owe a duty to the family members that they harm because this would "open the flood gates to asbestos litigation" and liability "would essentially be infinite." (Op. Br. at 21 (internal quotation marks omitted).) Kennecott argues that the claims would not be limited to families because "there is no principled basis in the law upon which to distinguish the claim of a spouse with the claim of any other person potentially exposed to an employee's asbestos-covered clothing." (Op. Br. at 22 (internal quotation marks omitted).)

Kennecott is mistaken about the law. The principled basis in the law that distinguishes spouses and family members from other third parties is the principle of foreseeability. It is highly foreseeable that a person's household members, especially their spouse, would be exposed to toxins brought home on work clothing. It may well be less foreseeable that other third parties, who are outside the household, would be exposed to those toxins.

Kennecott is also mistaken about the facts. The pool of potential plaintiffs for take-home asbestos exposure cases is small. Indeed, according to the U.S. Centers for Disease Control, the number of deaths from mesothelioma in Utah during 2005, was fourteen. [R.4254,4953-54.] And in 1999, homemakers accounted for a mere 6.8% of mesothelioma deaths in the United States. [R.4254,4955-56.]

Indeed, courts in other jurisdictions have recognized that public policy supports imposing a duty on companies who expose spouses and families to asbestos dust. These courts have rejected the "specter of limitless liability associated with take-home asbestos claims." *Ramsey,* 189 A.3d at 1287 n.158.

For instance, the California Supreme Court recently disagreed with the notion that imposing a duty in take-home asbestos cases is tantamount to "limitless" liability. In *Kesner v. Superior Court*, the court rebuffed the defense policy argument, finding that liability for take-home exposures was by no means unlimited: "we have limited the duty to prevent take-home asbestos exposure to a discrete category, namely, members of a worker's household." 384 P.3d 283, 300 (Cal. 2016). Reasoning that even some individuals foreseeably exposed to asbestos would be unable to sue for damages under its holding in *Kesner*, the court concluded that defendants would certainly not face liability out of proportion to their own fault. *Id.* (citations omitted.)

The New Jersey Supreme Court likewise rejected concerns about "limitless liability" in a take-home asbestos case. In *Olivo v. Owens-Illinois, Inc.*, the court referred to defendant Exxon Mobil's fears of limitless exposure to liability as "overstated," finding that liability was being imposed based upon a showing of "the particularized foreseeability of harm to plaintiff's wife." 895 A.2d 1143, 1150 (N.J. 2006).

The Eleventh Circuit has similarly held that public-policy considerations weigh in favor of imposing a duty for take-home exposures to asbestos. In *Bobo v. Tennessee Valley Authority,* the court explained that, to the extent defendants violate their duties to avoid take-home exposures to asbestos, they would obviously face greater—though by no means limitless—liability for their actions:

> TVA argues that imposing a duty on employers like it to prevent take-home asbestos exposure will cause them to face greater liability. Assuming that employers violate their duties to minimize the risk of harm from take-home asbestos, they will face greater liability. But it is not "limitless" liability, as TVA asserts. The duty we recognize extends only to people whose harm is foreseeable, such as an employee's family members or others in the employee's household. In any event we do not think that the prospect of greater liability is necessarily negative. After all, imposing liability to deter acting, or failing to act, in a way that causes foreseeable harm is one of the functions of tort law.

855 F.3d 1294, 1306 (11th Cir. 2017) (citations omitted).

Notably, the courts that have been concerned with "limitless liability" have been concerned about hypothetical cases and hypothetical plaintiffs. Indeed, the Delaware Supreme Court reviewed those opinions in *Ramsey* and concluded that "[o]ther courts who conjured up the specter of limitless liability associated with take-home asbestos claims brought by persons other than an employee's spouse all did so in the context of cases brought by plaintiffs from the same household as the employee. In [those] cases, all the examples in the parentheticals involve imagined classes of plaintiffs, none of whom were before the courts doing the imagining." *Ramsey*, 189 A.3d at 1286 n.158 (citing seven opinions).

Public policy therefore does not weigh in favor of eliminating Kennecott's duty to Barbara.

2. ConocoPhillips Owed a Duty to Barbara

ConocoPhillips owed a duty to Barbara for the same reasons Kennecott owed a duty to her. Specifically, ConocoPhillips owed Barbara a duty because it engaged in affirmative conduct that created a danger to her while Larry was an independent contractor—an invitee—at ConocoPhillips from 1976 to 1978. [R.2685-89,2692-95.]

During those years, ConocoPhillips employees negligently removed asbestos insulation while Larry worked less than twenty feet away, just as Kennecott's employees had done. [R.2686.] They removed asbestos pipe insulation and let it fall to the ground, just as Kennecott's employees had done. [R.2686,4080.] And they swept the residual insulation from the floor, generating asbestos dust that reached Larry, who worked within twenty feet of the insulation workers—just as Kennecott's employees had done. [R.2686,4080.]

Yet the district court ruled that ConocoPhillips owed no duty to Barbara. [R.5443-47.] The court ruled that Larry's allegations against ConocoPhillips were "omissions related to failure to warn . . . rather than any alleged affirmative acts." [R.5444.] But Larry's allegations against ConocoPhillips were identical to his allegations against Kennecott—allegations that the court correctly understood

to be affirmative acts. [R.1237,5447.] It is unclear why the court reached the opposite conclusion with respect to ConocoPhillips.

Further compounding the problem, the court collapsed its analyses of ConocoPhillips' duty and PacifiCorp's duty into a single discussion. This led the court to analyze ConocoPhillips' duty under the retained-control doctrine, a doctrine that ConocoPhillips (correctly) did not argue below. [R.4077-93,5444-45.]

The retained control doctrine was never a basis for ConocoPhillips' liability because it was ConocoPhillips' own employees who exposed Larry to asbestos dust. [R.2686,4080.] The doctrine applies only to vicarious liability claims, not direct liability claims like Larry's claims against ConocoPhillips. *Magana v. Dave Roth Constr.*, 2009 UT 45, ¶ 37, 215 P.3d 143. The doctrine is an exception to the general rule that a principal is not liable for the acts of an independent contractor. *Id.* ¶ 23. Here, Larry alleged that ConocoPhillips is liable for the acts of its own employees, not the acts of any independent contractor. [R.2686,4080.] As to ConocoPhillips, the retained control doctrine is beside the point.

Confusingly, although the court had already ruled (incorrectly) that there was no affirmative act—and thus no presumptive duty—the court nonetheless addressed the "minus factors" under *Jeffs* factors that would eliminate a presumptive duty. As discussed above, the court erred in ruling that Larry's claims against ConocoPhillips arose out of omissions rather than affirmative acts.

ConocoPhillips engaged in the same affirmative conduct that forms the basis for Kennecott's duty. And for the same reasons that none of the "minus factors" serve to eliminate Kennecott's duty, none of them serve to eliminate ConocoPhillips' duty, either.

Foreseeability – Barbara's injury was foreseeable to ConocoPhillips. The relevant category of cases is the same as it was for Kennecott—it includes premises owners who expose their employees or independent contractors to industrial toxins which cause injuries to third parties who are off the premises. But for ConcoPhillips, the relevant time period was later—Larry worked on ConocoPhillips' property from 1976 to 1978. [R.5439.]

Barbara's injury was even more foreseeable to companies during those years than it was during the years applicable to Kennecott. Indeed, by 1976, the OSHA regulations had been in effect for more than four years. [R.2983-84.] The regulations confirmed what had been widely known for decades—that take-home exposure to asbestos posed a serious danger. [R.2974-84.]

Indeed, ConocoPhillips did not argue that her injury was not foreseeable. In its motion for summary judgment, ConocoPhillips asserted that "the issue of foreseeability[] is not determinative and is not necessary for the analysis." [R.2245.] And in its reply, ConocoPhillips asserted that foreseeability must be analyzed "at a broad, categorical level," something undisputed here. [R.4089.] Because these are the only two arguments that ConocoPhillips preserved, they

are the only two arguments that this court should consider on appeal. *E.g.*, *Kilpatrick v. Bullough Abatement, Inc.*, 2008 UT 82, ¶ 20, 199 P.3d 957.

Yet the district court ruled that Barbara's injury was not foreseeable because "it would be a vast expansion of Utah Tort Law to find that, based on the relationships of the parties; an employer could foresee harm to the spouse of an employee of an independent contractor." [R.5445.] The court's ruling contradicts its ruling concerning Kennecott's duty.

The court's ruling also contradicts Utah law. The rule that we owe a duty of care when engaging in affirmative conduct that creates a risk of harm to third parties is already Utah law—it is not an expansion of it. *B.R. ex rel. Jeffs v. West*, 2012 UT 11, ¶ 21, 275 P.3d 228. The court's analysis also conflicts with *Jeff's* explanation that, when an affirmative act has taken place, the relationship of the parties can be a "plus factor" but is not a prerequisite for a duty. *Id.* ¶¶ 5, 9. This factor does not weigh in favor of eliminating ConocoPhillips' duty to Barbara.

Better Situated to Avoid the Injury - As to the next factor, the court ruled that Larry was best suited to take reasonable precautions to avoid the injury. The court did not explain how Larry was better suited, but instead stated that imposing a duty on the companies "would impose an extraordinarily onerous and unworkable burden." [R.5446 (internal quotation marks omitted).]

Again, this ruling contradicts the court's ruling with respect to Kennecott's duty. ConocoPhillips was better situated than Larry to prevent Barbara's injury

for all the same reasons Kennecott was better situated than Larry to do so. Indeed, Larry had no knowledge that ConocoPhillips chose to have its employees install asbestos near him. This factor does not weigh in favor of eliminating ConocoPhillips' duty to Barbara.

Public Policy - Finally, the court ruled that public policy weighs against imposing a duty on the companies. [R.5446.] The court ruled that "[t]he pressure this expansion of the common law would put on the time and resources of courts, society, and businesses in general weighs against" imposing a duty on the companies. [R.5446.]

But again, this ruling contradicts the court's ruling with respect to Kennecott's duty. Public policy supports the duty that both companies owed to Barbara. This factor does not weigh in favor of eliminating ConocoPhillips' duty to Barbara.

ConocoPhillips is directly liable for Barbara's injury, just as Kennecott is liable. This court should vacate the entry of summary judgment in favor of ConocoPhillips.

3. PacifiCorp Owed a Duty to Barbara

PacifiCorp not only engaged in an affirmative act when it required Jelco-Jacobson to cut and install asbestos, it remained vicariously liable for the harm because it retained control over the method and means of Jelco-Jacobson's cutting and installation of the asbestos.

The district court erred in focusing on whether PacifiCorp retained control over Larry, not over Jelco-Jacobson. And the error was prejudicial because, with the proper focus, PacifiCorp retained control over Jelco-Jacobson and thereby remained vicariously liable for the harm caused by the cutting and installation of asbestos.

Under the retained-control doctrine, an employer can be liable for the acts of its independent contractor if the employer "actively participates" in the contractors' work. *Thompson v. Jess*, 1999 UT 22, ¶ 18, 979 P.2d 322. The doctrine is described in the Restatement (Second) of Torts:

> One who entrusts work to an independent contractor, but who retains the control of any part of the work, is subject to liability for physical harm to others for whose safety the employer owes a duty to exercise reasonable care, which is caused by his failure to exercise his control with reasonable care.

Restatement (Second) of Torts § 414 (1965).

This court in *Thompson* adopted section 414. *Id.* ¶¶ 16, 18. The court explained that an employer "actively participates" when it "exercise[s] affirmative control over the method or operative detail of the work," either by "direct management of the means and methods" of the independent contractor's work or by providing "specific equipment that caused the injury." *Id.* ¶ 20 (citations omitted).

With respect to when contract language satisfies the "active participation" test, there is no Utah case law directly on point. But other jurisdictions have

analyzed situations similar to this one under the section 414. Those cases reveal that the retention of any control, by contract, over the activity that caused the danger is sufficient to satisfy the retained-control doctrine.

For example, one court held that when a contract "does more than control the ends of [the independent contractor's] work, but . . . also controls the means [the independent contractor] employs in reaching those ends," the contract language constitutes "active participation" for purposes of the retained-control doctrine. *Avalos v. Pulte Home Corp.*, 474 F. Supp. 2d 961, 966 (N.D. Ill. 2007). In *Avalos*, the contract required the independent contractor to deliver certain materials *only* to a representative of the owner and *only* in the manner directed by the specifications provided. *Id.* That was enough to retain control.

Similarly, a Texas court has held that specifying in a contract the method of cutting down trees constituted retaining control such that the landowner was liable for harm caused by the independent contractor who cut the trees. *Kirby Forest Indus. v. Kirkland*, 772 S.W.2d 226, 229, 231 (Tex. Ct. App. 1989). Any specification of the method by contract satisfies section 414.

Other courts have held that it is enough to retain control where a contract does not specify the means, but instead states who is obligated to control workplace safety. *Smith v. United States*, 497 F.2d 500, 511-12, 514 (5th Cir. 1974) (general contractor retained control where prime contract specified that general would ensure subcontractors complied with safety requirements and none of the

subcontracts delegated that obligation to the subcontractors); *Gaytan v. Wal-Mart*, 853 N.W.2d 181, 193 (Neb. 2014) (same). Even authority to stop unsafe work can impose a duty under the retained-control doctrine. *Lewis v. N.J. Riebe Enters., Inc.*, 825 P.2d 5, 12-13 (Ariz. 1992).

Specifying which equipment must be used also satisfies the retained-control doctrine. For example, a franchisor "actively participated" in the means and method of work when its contract with its franchisee required the franchisee to purchase certain brands of equipment that caused an injury. *West v. Kentucky Fried Chicken Corp.*, 555 F. Supp. 991, 995 (D.N.H. 1983). What these cases reveal is that nearly any control will satisfy section 414.

Here, as a result of PacifiCorp's negligence and its retained control over Jelco-Jacobson and the project, it was nearly guaranteed asbestos dust would coat the area where Larry and many others worked.

First, PacifiCorp's contract mandated that asbestos insulation would be used and that no substitutions could be made without written agreement from PacifiCorp. [R.3298-99,3389,4142.] The contract also allowed PacifiCorp—and only PacifiCorp—to change or substitute asbestos-containing materials it required to be used. [R.3298-99,3388-89.]

Second, PacifiCorp retained control over where the asbestos insulation was to be cut, and also the means, methods and requirements of applying the asbestos insulation and asbestos insulating cement that harmed Barbara.

[R.3299,3392-3399.] Specifically, PacifiCorp's contract set out where Jelco-Jacobson was to cut and install asbestos insulation, where formed sections and staggered joints were required, and the amount and thickness of the asbestos insulation applied. [3299,3392-99.] The plans were so detailed that PacifiCorp dictated where cuts were to be made when asbestos insulation met flanges, as well as the method of insulating pipe bends, valves and fittings, the necessity of staggering longitudinal joints, the spacing measurement of wires used to secure the insulation sections and how asbestos insulating cement is to be applied and to what thickness—choices that created the asbestos dust that caused Barbara's death. [R.3299,3393-96.]

Fourth, PacifiCorp took responsibility for—and controlled—testing and inspecting to determine the suitability of materials and methods of the work. [R.3300,3443,4145.] And PacifiCorp maintained the right to order changes in the work, inspect and reject the materials and workmanship. [R.3299,3429-31,4144.] PacifiCorp also reserved the right to demand the contractor stop unsafe work practices. [R.3299,3436.]

And fifth, PacifiCorp was responsible for certain aspects of safety at the jobsite. Specifically, PacifiCorp was responsible for directing the contractor to implement adequate dust control measures. [R.3330,3446,4146.] And while it was known that exposure to asbestos was a health hazard and regulated by OSHA during the construction of the project, the contract did not include any special

precautions to reduce or otherwise eliminate the hazards of installing the asbestos insulation that PacifiCorp specified. [R.3299-3300.] Under the retained-control doctrine set forth in section 414, PacifiCorp retained control over the cutting and installation of asbestos, as well as safety in the area where Larry was exposed to asbestos that he took home, that harmed Barbara. PacifiCorp never warned Larry of the hazards of asbestos, never monitored asbestos levels, never implemented any engineering controls to reduce his exposures and never provided him with showers or laundry services. [R.3301,4146.] PacifiCorp is vicariously liable for the harm to Barbara.

This court should vacate the entry of summary judgment in favor of PacifiCorp.

Conclusion

For the reasons set forth above, each of the companies owed a duty to Barbara. This court should affirm the district court's denial of Kennecott's motion for summary judgment, and vacate the district court's entry of summary judgment in favor of ConocoPhillips and PacifiCorp.

DATED this 15th day of November, 2019.

ZIMMERMAN BOOHER

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Certificate of Compliance

I hereby certify that:

1. This brief complies with the word limits set forth in Utah R. App. P. 24A(g)(1) because this brief contains 12,198 words, excluding the parts of the brief exempted by Utah R. App. P. 24A(g)(2).

2. This brief complies with Utah R. App. P. 21(g) regarding public and non-public filings.

DATED this 15th day of November, 2019.

/s/ Troy L. Booher

Certificate of Service

This is to certify that on the 15th day of November, 2019, I caused two true and correct copies of the Brief of Appellee and Cross-Appellant to be served via first-class mail, postage prepaid, with a copy by email, on:

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Addendum A

IN THE DISTRICT COURT OF THE THIRD JUDICIAL DISTRICT

IN AND FOR SALT LAKE COUNTY, STATE OF UTAH

LARRY BOYNTON, Individually and on behalf of the Heirs of BARBARA BOYNTON, Plaintiff, vs. INDUSTRIAL SUPPLY COMPANY, INC., et. al., Defendants.	MEMORANDUM DECISION AND ORDER ON DEFENDANTS' MOTIONS FOR SUMMARY JUDGMENT AND STATEMENT OF DISCOVERY ISSUES Civil No. 160902693 Judge Randall N. Skanchy

The above-entitled matter came before the Court on January 25, 2019, for argument on Motions for Summary Judgment and Discovery Issues filed by Defendants Phillips 66 Company and ConocoPhillips Company (hereinafter ConocoPhillips), Utah Power and Light/PacifiCorp ("PacifiCorp") and Kennecott Utah Copper, LLC ("Kennecott") ("collectively Defendants"). At the hearing, the Court requested additional material from the parties, which was provided to the Court on January 29, 2019. The matter is now fully briefed and argued, and is ready for decision.

BACKGROUND

Plaintiff Larry Boynton ("Mr. Boynton") individually and on behalf of the heirs of Barbara Boynton ("Mrs. Boynton") (collectively "Boyntons") sued Defendants alleging that Mrs. Boynton developed mesothelioma from second-hand exposure to asbestos as a result of laundering Mr. Boynton's work clothes. At some period over Mr. Boynton's work life, he worked at each of the Defendants' work sites.

The issue as set forth in each of the parties' Motions for Summary Judgment involves whether the respective Defendant(s) owed a legal duty to Mrs. Boynton. Each of the Defendants' Motions is factually independent of the others, but the legal issues are the same, and involve the legal relationship of Mrs. Boynton to the respective Defendants. In summary, each Defendant argues that the analysis of the element of duty as enumerated in the case of *B.R. ex rel Jeffs v. West*, 275 P.3d 228 (Utah 2012) controls the decision in their respective cases and that no duty existed between them and Mrs. Boynton. The Boyntons counter that their claims for negligence are based not only on the Defendants' failure to warn of the danger of exposure to asbestos and failure to undertake safety precautions, as plead in the Information, but the active handling, cutting, chopping and sawing of materials with asbestos at the job site, and in some instances, the specification of parts that included asbestos. This decision will address each Defendant individually.

1. **ConocoPhillips**. ConocoPhillips alleges that Mr. Boynton worked as an electrician for L.E. Myers Electric, an independent contractor, at various times for ConocoPhillips. He was never a direct ConocoPhillips employee. From 1976 to 1978, Mr. Boynton spent two periods of time – one for four months and one for six months – working for L.E. Myers Electric at the Phillips Oil Refinery in Davis County, Utah. (Boynton Depo. pps/line 28:22 – 29:6) Mr. Boynton alleges that during this time, he was exposed to asbestos, which fibers were transported home on his clothing, allegedly resulting in Mrs. Boynton's exposure to the fibers when she did his laundry.

The operative paragraphs alleging liability against ConocoPhillips (as well as the other two defendants) arise from the Amended Complaint as follows:

(i) Paragraph 13: ". . . exposure to asbestos through her husband's work with and around asbestos containing products while working at. . . Phillips 66 Company" in Davis County between 1975 and 1978, and ". . . [t]he activities of cutting, chopping, mixing, sanding, sawing, scraping and sweeping that occurred in association with the work performed. . ."

(ii) Paragraph 55 details 3 subparagraphs of omissions and failures on the part of the Defendants to warn or take appropriate safety precautions to insure a safe work place.

Under these allegations, the Boyntons allege ConocoPhillips was negligent in exposing Mr. Boynton to the asbestos which was the alleged cause of Mrs. Boynton's mesothelioma.

ConocoPhillips contends that under the duty analysis set forth by the Utah Supreme Court in *B.R. ex rel. Jeffs v. West*, 2012 UT 11, ¶ 10, 275 P.3d 228, ConocoPhillips owed no duty of care to Mrs. Boynton because

- The claims are based on alleged omissions, which do not carry an inherent duty to a third-party;
- Mrs. Boynton did not have a legally significant "special relationship" that would otherwise impose a duty on ConocoPhillips;
- The Boyntons were in the best position to guard against any harm to them; and
- Public policy weighs heavily against imposing a duty for take home exposure to third parties because it would create a limitless number of potential plaintiffs and would overburden the Courts, society, and businesses.

2. **PacifiCorp.** In 1970 and 1972, PacifiCorp's predecessor in interest, Utah Power & Light Company ("UP&L"), hired independent contractors to design and build a new power

plant in Huntington, Utah. Mr. Boynton was a union electrician hired by the general contractor, Jelco-Jacobsen, to provide electrical work at the power plant. He likewise was never a direct employee of UP&L. The same operative allegations of paragraphs 13 and 55 detail the identical allegations of negligence against PacifiCorp. Paragraph 13 of the Amended Complaint alleges Mr. Boynton worked at UP&L's Huntington plant, as an employee of an independent contractor in 1973. (Boynton Depo. pps/line 21:11 – 23:1) PacifiCorp argues that the Utah Supreme Court has consistently held an employer of an independent contractor does not owe a duty of care to others for harm arising out of the contractor's work. The only exception to this rule is the "retained control" doctrine; if the principal employer interferes with the work to such a degree that the contractor is not free to perform the work in its own way, the party hiring the independent contractor may be found to have a duty of care to prevent harms arising from such interference.

PacifiCorp contends the undisputed material facts in this case demonstrate that UP&L did not provide any input, instruction, or supervision over Larry Boynton's work. Mr. Boynton testified that he was a trained union electrician who knew how to do his job and received direction from his general contractor, Jelco-Jacobsen. PacifiCorp alleges no UP&L representative told him what to do or where to work and never interfered with a Jelco-Jacobsen crew, or the crew of any subcontractor. Therefore, it is PacifiCorp's position the "retained control" exception does not apply and PacifiCorp alleges it is likewise entitled to summary judgment under this argument and the lack of duty argument as set forth above. *See Jeffs*, 2012 UT at ¶ 9. As Mr. Boynton's employer, PacifiCorp argues that it was the duty of Jelco-Jacobsen to comply with OSHA regulations, including OSHA regulations relating to asbestos. (Larry

Boynton Deposition ("Boynton Dep."), at 93:9-17) Mr. Boynton alleges Mrs. Boynton was harmed when she laundered his work clothes.

3. **Kennecott.** Kennecott argues it is entitled to summary judgment because it likewise owed no duty to Mrs. Boynton under the same duty argument made by ConocoPhillips and PacifiCorp. Paragraph 13 of the Amended Complaint indicated that Mr. Boynton worked, both as a direct employee at Kennecott from 1961 to 1964 and again from 1964 to 1966, on and off as an electrician working with Wasatch Electric (Boynton Depo. pps/line 14:09 – 14:11, 16:6 – 19). Mrs. Boynton was allegedly exposed to asbestos by laundering Mr. Boynton's work clothes. Specifically, Kennecott asserts that Mrs. Boynton was never present on Kennecott's premises, and her only alleged asbestos exposure was via contact with Mr. Boynton's work clothes.

The Boyntons argue that the negligence arises both from exposing Mr. Boynton to asbestos and the duties enumerated in the Amended Complaint, but also alleges that duty arose from affirmative acts of negligently specifying and using asbestos pipe insulation as materials in their facility and negligently exposing Mr. Boynton to it during his time at each facility when it was removed from their piping and swept during cleanup, along with the failures to warn and prevent contact with asbestos through reasonable and necessary safety protocols such as showers, change rooms, and/or laundry services.

RULING

In *Warren v. Asbestos Corp., Ltd.*, Judge Iwasaki denied premises liability Defendant United States Steel's ("USX") Motion for Summary Judgment on the issue of whether USX owed a duty of care to a mesothelioma victim who never entered its premises, but was exposed

to asbestos as a result of washing her father's work clothes. While the Boyntons ask the Court to apply the same reasoning to this case, *Warren* was a non-binding ruling, and since that decision, the case of B.*R. ex rel. Jeffs v. West,* 275 P.3d 228 (Utah 2012) was issued which sets forth a duty analysis not applied in *Warren.* Specifically, the Court in *Jeffs* listed 5 factors for determining whether a Defendant owes a duty to one that is injured:

1. Whether the Defendant's allegedly tortious conduct consists of an affirmative act or merely an omission, *e.g., Webb v. Univ. of Utah*, 2005 UT 80, ¶ 10, 125 P.3d 906;

2. The legal relationship of the parties, *Id.*;

3. The foreseeability or likelihood of injury, *e.g., AMS Salt Indus., Inc. v. Magnesium Corp. of Am.*, 942 P.2d 315, 321 (Utah 1997);

4. "Public policy as to which party can best bear the loss occasioned by the injury," *Normandeau v. Hanson Equip., Inc.*, 2009 UT 44, ¶ 19, 215 P.3d 152; and

5. "Other general policy considerations" *Jeffs*, 2012 UT ¶ 5.

4. **PhillipsConoco and PacifiCorp.** With respect to PhillipsConoco and PacifiCorp, the Boyntons argue that the "affirmative act of specifying and using asbestos pipe insulation" creates a legal duty to Mr. Boynton's wife. However, the claims and injury alleged must be linked to the affirmative act itself, and whether the affirmative act was done negligently. *Graves v. N. E. Servs., Inc.,* 2015 UT 28, ¶ 27, 345 P.3d 619, 625. In *Graves*, the Court found that while there were affirmative acts of enticing children onto the Defendants' property, the affirmative acts did not relate to the Plaintiff's claims and damages. *Id.* at ¶¶26-27. Rather, Plaintiff's claim related to the Defendants Company's failure to properly perform background checks or train and supervise its employee, which were omissions. *Id.* at ¶29. The Court reasoned that "affirmative

acts are a basis for imposing a duty in the performance of those acts, not for a broader duty to undertake additional measures" to protect the plaintiff. *Id.* Even though the Defendant had undertaken affirmative acts, and even though the acts were "plausibly connected to the assault," the Court held that there was no duty based on the affirmative acts because plaintiff's claims were "aimed at" Defendants' omissions, and not affirmative acts. *Id.* at ¶¶26, 29.

In the instant case, the Boyntons claims are omissions related to failure to warn, inform, and protect a third party from injury. The injury and damages complained of – the harm to Mrs. Boynton – are linked only to Defendants' omissions, rather than any alleged affirmative acts. Just as in *Graves*, Mr. Boynton's allegations center on ConocoPhillips and PacifiCorp's failures to take steps to protect others, in other words, the claims are solely "aimed at" Defendants' omissions. Like *Graves*, the Boyntons' claims are "aimed at" Defendants' omissions. The allegations themselves begin with the word "failure" in each of the charging allegations in paragraph 55 of the Amended Complaint. Accordingly, the first prong of *Jeffs* is premised on omissions, rather than acts.

Further, it is undisputed that Mr. Boynton was an independent contractor and not an employee of either PhillipsConoco or PacifiCorp. The injury-causing activity in this case was the exposure of Mr. Boynton to asbestos and the subsequent failure of the employer to insure warn and provide a safe place to work. It is likewise undisputed that ConocoPhillips and PacifiCorp did not supervise Mr. Boynton or instruct him in his work. It is further undisputed that ConocoPhillips and PacifiCorp did not oversee or interfere with the timing and location of Mr. Boynton's work, nor oversee or interfere with the work of the insulation subcontractor. In short, these Defendants had no involvement whatsoever with the injury causing aspect of the

work—the presence of Mr. Boynton near insulation workers that allegedly exposed his clothing to asbestos dust. *See Magana*, 2009 UT ¶ 31. These acts all fell outside of the scope of the injury-causing activity, and as a result, no duty attaches. See *Magana v. Dave Roth Construction,* 2009 UT 45, ¶ 31, 215 P.3d 143 ("the question of whether an employer actively participated is not simply whether an employer participated in an injury-causing activity, but whether the employer controlled the means and methods by which the injury-causing activity was performed.").

Secondly, there was no special relationship between these two Defendants and Mrs. Boynton. Rather, Mr. Boynton argues that a special relationship is not necessary under the second *Jeffs* factor because duty is established under the first *Jeffs* factor. However, as discussed above, this Court finds that there is no duty under the first *Jeffs* factor because the negligence alleged is based entirely on omissions.

With respect to foreseeability, in *Jeffs*, the Court explained that this factor, in a duty analysis, must look to foreseeability "at a broad, categorical level," and not based on the specific facts of each case. *Jeffs*, 2012 UT at ¶ 25. While the question of whether an employer could foresee harm to the spouse of an employee of an independent contractor has not been decided by Utah Courts, *Jeffs* indicates the correct approach is to look to the general foreseeability of harm based on the relationship between the parties. *Id.* Applied to this case and as discussed above, Mrs. Boynton does not dispute that there was a special relationship between the parties. Indeed, there was no relationship between the parties. As a result, it would be a vast expansion of Utah Tort Law to find that, based on the relationships of the parties; an employer could foresee harm to the spouse of an employee of an independent contractor. Accordingly, under *Jeffs*, the element

of foreseeability does not support a finding of duty in "take-home" exposure against Phillips 66 and PacifiCorp in the instant.

The fourth factor – which party can best bear the loss – "considers whether the defendant is best situated to take reasonable precautions to avoid injury." *Jeffs*, 2012 UT at ¶ 30. This factor also weighs against imposing a duty because "protecting every person with whom a business' employees and the employees of its independent contractors come into contact, or even with whom their clothes come into contact, would impose an extraordinarily onerous and unworkable burden." *In re Certified Question from Fourteenth Dist. Court of Appeals of Texas*, 479 Mich. 498, 516, 740 N.W.2d 206, 217 (2007). Here, the Defendants were not in the best position to protect every person with whom an employee of an independent contractor, and that employee's clothes, came in contact.

As for the fifth factor, public policy of imposing a duty in situations of take-home exposure, such weighs against imposing a duty on Defendants. Indeed, as other Courts have acknowledged, "without a limiting principle, liability for take-home exposure would essentially be infinite." *Gillen v. Boeing Co.*, 40 F. Supp. 3d 534, 540 (E.D. Pa. 2014). The pressure this expansion of the common law would put on the time and resources of courts, society, and businesses in general weighs against finding a company owes a duty to persons with whom the employees of its independent contractors come in contact.

In summary, Defendants ConocoPhillips and PacifiCorp did not interfere with the work of the general contractors and did not perform any affirmative acts which would result in the imposition of a duty on these to Mrs. Boynton. Defendants ConocoPhillips and PacifiCorp's Motion for Summary Judgment is granted.

5. **Kennecott.** With respect to Kennecott, viewing the facts in the light most favorable to Mrs. Boynton and drawing all reasonable inferences therefrom in her favor, affirmative act of specifying and using asbestos pipe insulation and its employee-insulators' affirmative acts of exposing Mr. Boynton, a direct employee of Kennecott, raises a disputed issue of material fact as to whether a legal duty extends to Mrs. Boynton.

In light of this decision, ConocoPhillips and PacifiCorps' Statement of Discovery Issues are moot. Mr. Boynton's Motion to Enlarge Time Period for Discovery is granted, and Kennecott's Statement of Discovery Issues is partially denied, but this Court limits the discovery to work at Kennecott's Garfield Smelter up to 1977. As to Kennecott, the reason for Boynton's delay was excusable as the Boyntons granted Kennecott three extensions of discovery totaling 87 days, and Kennecott ultimately served its final discovery responses on the last day of the discovery period. No trial date has yet been set and as such, no prejudice exists.

ORDER

Based upon the foregoing, **IT IS HEREBY ORDERED** that Defendants ConocoPhillips' and PacifiCorp's Motions for Summary Judgment are granted and their Statements of Discovery are rendered moot. Defendant Kennecott's Motion for Judgment and Statement of Discovery are, respectfully, denied except as limited above. No further form of order is needed on this motion.

DATED this 13 day of March 2019.

BY THE COURT:

Randall N. Skanchy
District Court Judge

CERTIFICATE OF SERVICE

I certify that I mailed/emailed a true and correct copy of the foregoing Memorandum Decision and Order on Defendants' Motions for Summary Judgment and Statement of Discovery Issues, to the following, this 13 day of March 2019:

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Addendum B

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IN THE THIRD JUDICIAL DISTRICT COURT

IN AND FOR SALT LAKE COUNTY, STATE OF UTAH

LARRY BOYNTON, Individually and on behalf of the Heirs of BARBARA BOYNTON, Plaintiff, v. INDUSTRIAL SUPPLY COMPANY, INC., et al. Defendants,	**AMENDED COMPLAINT AND JURY DEMANDED** Case No. 160902693 Judge Randall Skanchy

CIVIL ACTION COMPLAINT

PLAINTIFF, by and through his attorneys, the Nemeroff Law Firm, A Professional Corporation, hereby brings this Amended Civil Action Complaint, whereof the following is a statement:

JURISDICTION AND VENUE

1. This Court has personal jurisdiction over the Defendants because the Defendants are duly licensed to do business in the State of Utah and/or at all material times are or have been engaged in business in the State of Utah.

2. Each defendant identified on Exhibit A is amenable to suit in the State of Utah by reason of having sold, distributed, and/or installed the aforementioned asbestos-containing products in Utah or by reason of having placed the same into the stream of commerce for use in Utah, and by reason of having committed tortious acts against the Plaintiff in this state in addition to Defendants other general construction product business sales.

3. Venue is proper in Salt Lake County, Utah in that one or more Defendants maintain its principal office or principal place of business in Salt Lake County under Section 78-13-7, U.C.A., 1953.

BACKGROUND AND GENERAL ALLEGATIONS

4. Plaintiff, Larry Boynton, Individually and on behalf of the Heirs of Barbara Boynton, (hereinafter "Plaintiff"), is a citizens and resident of Salt Lake County in the State of Utah.

5. Plaintiff brings this action for monetary damages as a result of Barbara Boynton ("Decedent") contracting an incurable asbestos cancer that Mrs. Boynton was diagnosed with as a result of breathing asbestos dust. Decedent was diagnosed with Malignant Mesothelioma, a signal tumor for exposure to asbestos, on or about February 4, 2016, and died as a result of this disease on February 27, 2016.

6. Decedent married Larry Boynton on September 21, 1962. As the husband of the decedent, Plaintiff Larry Boynton is entitled to bring this action pursuant to Utah Code 78B-3-106.

7. The Decedent is survived by her husband and four children: Douglas Boynton, Steven Boynton, Robert Boynton and Justin Boynton. These persons are heirs of the decedent pursuant to Utah Code Ann. § 78B-3-105.

8. As a direct and proximate result of the delictual conduct of the Defendants, Larry Boynton, Douglas Boynton, Steven Boynton, Robert Boynton and Justin Boynton have all lost the love, affection, society, support, services, future earnings, funeral expenses, medical expenses, and experienced mental pain, suffering and distress as a result of the death of the decedent and all other damages due and, pursuant to Utah Code Ann. § 78B-3-106, assert this wrongful death action on behalf of all heirs of the decedent Barbara Boynton against the Defendants.

9. Pursuant to Utah Code Ann. § 78B-3-107, Plaintiff brings this survival action on behalf of all heirs of Plaintiff Barbara Boynton.

10. Plaintiff is a resident of the State of Utah and citizen of Utah.

11. Decedent Barbara Boynton resided in W. Valley City, Utah at the time of her death.

12. Barbara Boynton was exposed to injurious levels of asbestos from the household and/or secondary exposure from asbestos fibers brought home on the clothes and person of her husband, Larry Boynton, from approximately 1962 through 1980 as a result of his work as laborer and electrician at various industrial, commercial and residential facilities. While Decedent's husband used, handled, and/or was in the vicinity of others using or handling asbestos or asbestos-containing products at these facilities, dangerously high levels of asbestos fibers escaped into the

ambient air of the work place and contaminated his work clothes and subsequently the family home and Decedent.

13. Mrs. Boynton was exposed to asbestos through her husband's work with and around asbestos-containing products while working at locations including, but not limited to the following:

1961-1964: Kennecott Copper Corp. in Magna, UT

1965-1980: Kennecott Copper Corp. in Magna, UT

1965-1980: Geneva Steel Company – Vineyard, UT

1975-1980: PacifiCorp/Utah Power & Light – Hunter Power Plant

1973-1980: PacifiCorp/Utah Power & Light – Huntington Power Plant

1965-1980: National Lead Company – Tooele County, Utah

1975-1978: Phillips 66 Company – Davis County, Utah

The activities of cutting, chipping, mixing, sanding, sawing, scraping and sweeping that occurred in association with the work performed by Mr. Boynton and other workers working around Mr. Boynton with asbestos-containing products exposed him to great quantities of asbestos. These asbestos exposures continued as asbestos-containing dust accumulated on his work clothes and was transported to his cars and home exposing his wife, Barbara Boynton, to great quantities of asbestos as she too came in contact with the asbestos-containing products carried home on those clothes and deposited into her home and cars.

14. Asbestos dust released from construction and commercial and/or industrial equipment is generally invisible to the naked eye. During the time period that Mrs. Boynton was exposed to asbestos, the manufacturers of asbestos products failed to adequately warn of the lethal

hazards of breathing asbestos dust, often failing to issue any waning at all, despite the fact that these asbestos companies knew that breathing asbestos dust could be fatal. When the asbestos dust is breathed in, it can cause asbestos cancer decades later. The scientific and regulatory communities around the world are in unanimous agreement that all types of asbestos released from asbestos products, including chrysotile asbestos, cause cancer, and that there is no safe level of exposure to asbestos.

15. All of the named defendants listed on the attached list, which is incorporated by reference herein, are amenable to jurisdiction in the courts of Utah by virtue of their respective conduct of substantial and/or systematic business in Utah which subjects them to the jurisdiction of the Utah courts pursuant to the Utah Long-Arm Statute. Each defendant corporation does or in the past mined, manufactured, processed, imported, converted, compounded, supplied, installed, replaced, repaired, used, and/or retailed substantial amounts of asbestos and/or asbestos-containing products, materials, or equipment, which are or in the past were sold, distributed, and used in Utah. The plaintiff was exposed to various asbestos-containing products while working and/or living in locations including but not limited to Salt Lake City, Utah.

STRICT LIABILITY, NEGLIGENCE AND BREACH OF WARRANTY ALLEGATIONS AGAINST CAUSES OF ACTION AGAINST MANUFACTURER, EQUIPMENT, SELLER, DISTRIBUTOR, SUPPLIERS, AND CONTRACTOR DEFENDANTS

16. Plaintiff incorporates by reference the preceding paragraphs as if fully set forth herein.

17. At all material times, Defendants are or were miners, manufacturers, distributors, processors, importers, converters, compounders, and/or retailers of asbestos and/or asbestos-containing products, materials or equipment.

18. Each of the Defendants named in Exhibit A conducted business in the state of Utah, has produced, manufactured or distributed asbestos and/or asbestos products with the reasonable expectation that such products were so used or consumed, and/or has committed the tortuous acts set forth below.

19. The Defendants, acting through their agents, servants, and/or employees caused, and have caused in the past, certain asbestos and asbestos-containing materials, products or equipment to be placed in the stream of commerce with the result that said asbestos and asbestos-containing materials, products or equipment came into use by the Plaintiff and Decedent.

20. The dangers of breathing asbestos were first published in the medical literature in the 1890s. By the late 1950s, there were hundreds of medical articles highlighting the dangers of being around asbestos dust. Confidential corporate documents from the named defendant companies reveal that (a) the dangers of asbestos were well understood; (b) asbestos was cheaper to use in the products than replacement substances such as clay; (c) the product manufacturing industry actively fought governmental regulation and the banning of asbestos. To this day industry has been successful in their lobbying efforts to keep asbestos legal in the United States.

21. Throughout the course of his employment, Plaintiff worked with and/or was exposed to the asbestos and asbestos-containing materials, products or equipment mined, manufactured, processed, imported, converted, distributed, compounded, and/or sold by the Defendants. Investigation is ongoing, but upon information and belief, most of Decedent's exposure to asbestos occurred within the state of Utah.

22. During the course and scope of his employment, Larry Boynton was exposed to Defendants' asbestos and asbestos-containing materials, products or equipment. Mr. Boynton's work and the work activities of others around Mr. Boynton had the direct result of releasing into

the workplace atmosphere and onto Larry Boynton's clothing asbestos dust and fibers which were brought to Barbara Boynton's home and within Barbara Boynton's breathing zone, dangerous levels of asbestos dust and fibers. Consequently, Barbara Boynton was exposed to, and inhaled, said asbestos dust and fibers, sustaining injury to her lungs, culminating in development of mesothelioma.

23. Defendants, acting by and through its servants, agents and employees, duly authorized and acting within the scope and authority of their employment, had a duty to design, manufacture and sell products that were not unreasonably dangerous or defective and/or a duty to warn the Plaintiff and foreseeable users of said products of the dangers and defects which the Defendants created, knew, or, within the exercise of reasonable care, should have known.

24. Plaintiff worked with and around asbestos and/or asbestos-containing products, materials or equipment manufactured, processed, distributed, supplied and/or sold by Defendants during his employment at various locations including, but not limited to those identified in paragraph 13. Defendants knew or should have known that persons in the position of Plaintiff and Decedent would come into contact with and would work in close proximity to said products.

25. Decedent sustained injuries caused by no fault of her own and which could not be avoided through the use of his reasonable care largely because Defendants failed to warn of asbestos dangers or advise of safe work practices. Mrs. Boynton's development of an asbestos-related disease was directly and proximately caused by the negligence and carelessness of Defendants in that they manufactured, processed, sold, supplied or otherwise put said asbestos or asbestos-containing products, materials or equipment, into the market and into the stream of commerce, while they knew, or in the exercise of ordinary care should have known, that said

products were deleterious, poisonous, cancer-causing and/or inherently dangerous and harmful to Mrs. Boynton's body, lungs, respiratory system, skin, health, and general well-being. Further, defendants knew or in the exercise of reasonable care should have known that Plaintiff and Decedent would not know of such danger to her health.

26. The actions of the defendants described and alleged above were wrongful under Utah Products Liability Act in one or more of the following ways:

(a) Said asbestos-containing products were unreasonably defective in one or more of the following ways:

1. in that said products were and are unavoidably unsafe, and failed to carry proper, adequate and correct warnings about their asbestos dust hazards about which the defendants knew or should have known;

2. in that said products were and are unreasonably dangerous, in that they were and are dangerous to an extent beyond that which the ordinary worker or bystander in the position of the plaintiff would contemplate;

3. in that any warnings, information and/or safety instruction said products may have carried, were improper and inadequate in that they failed to apprise users and/or others, including the plaintiff, adequately and reasonably of the full hazards and dangers of coming in contact with said products, including the risk of cancer and death;

(b) The defendants knew or should have known that said asbestos-containing products were inherently dangerous to those who used them, yet the defendants failed to use reasonable and/or ordinary care in seeing to it that said products carried proper, adequate and correct warnings of the dangers of said products, and the exposure of the plaintiff and others like the plaintiff to these products was reasonably foreseeable to the defendants;

(c) The defendants breached warranties, either implied or expressed, in that these products were not fit and/or safe for their known and intended purposes and uses.

1. The Defendants impliedly warranted that said asbestos materials were of good and merchantable quality, safe, and fit for their intended use.

2. The implied warranty made by the Defendants that the asbestos and asbestos-containing materials, products, or equipment were of good and

merchantable quality and for the particular intended use was breached and that certain harmful, poisonous, and deleterious matter was given off into the atmosphere wherein the plaintiff carried out his duties while working with or in the vicinity of asbestos and asbestos-containing materials, products, or equipment.

3. As a direct and proximate result of the implied warranty of good and merchantable quality and fitness for the particular intended use, Mrs. Boynton developed an illness, to-wit: Malignant Mesothelioma.

27. Defendants, at the time of designing, manufacturing, distributing, selling, or otherwise placing asbestos and/or asbestos-containing products, materials or equipment into the stream of commerce, knew, or in the exercise of reasonable care, should have known about the insurable risks associated with their products. The products in question were defective at the time they left the control of the Defendants.

28. Defendants were negligent and breached their duty of due care to Plaintiff and Decedent by taking or failing to take the actions as previously alleged to avoid harm to the Plaintiff, Decedent and other foreseeable users, in light of the reasonably foreseeable and insurable dangers caused by the design, manufacture, sale, distribution of the asbestos and/or asbestos-containing products, materials or equipment at issue in the stream of commerce.

29. The hazards posed by exposure to asbestos and/or asbestos-containing products, materials or equipment and the resulting injuries and damages to Plaintiff were reasonably foreseeable, or should have been reasonably foreseen by Defendants.

30. As a direct and proximate result of the aforesaid negligent acts and/or omissions by the Defendants, Mrs. Boynton developed Malignant Mesothelioma, as a consequence of which, through no fault of her own, she was severely injured, disabled and damaged.

31. During, before, and after Plaintiff’s exposure to asbestos products manufactured, installed or otherwise used by Defendants, the Defendants falsely represented facts, including the dangers of asbestos exposure, to Plaintiff in the particulars alleged in the paragraphs above, while Defendants each had actual knowledge of said dangers of asbestos exposure to persons such as Plaintiff and Decedent, and while Defendants each knew of the falsity of their representations and/or made the representations in reckless disregard of their truth or falsity.

32. The foregoing representations were material conditions precedent to Plaintiff and Decedent's continued exposure to asbestos-containing products, and defendants each intended that Plaintiff act upon the representations by continuing his exposure to the asbestos products. Plaintiff and Decedent were ignorant of the falsity of Defendants' representations and rightfully relied upon the representations.

33. As a direct and proximate result of Plaintiff's reliance upon Defendants' false representations, plaintiff has suffered injury and damages hereinafter described.

34. The Defendants were all miners, manufacturers, sellers, users, distributors and/or suppliers of asbestos products and were engaged in the business of using, manufacturing or facilitating the manufacture of asbestos products, or representing themselves as manufacturers of asbestos products, or were professional vendors of asbestos or asbestos-containing products, which were expected to and did reach, including but not limited to, each of the locations where Larry Boynton and subsequently Barbara Boynton were exposed.

35. At all times material hereto, the Defendants knew or should have known of the harmful effects and/or harmful dangers of working with asbestos and/or asbestos-containing products, materials, or equipment and exposures to inhalable asbestos.

36. Defendants had a duty to warn individuals working at the Plaintiff's jobsites, including but not limited to Plaintiff, of the dangers associated with the use and/or inhalation of asbestos dust and fibers.

37. Despite Defendants' knowledge of the insurable harm and/or potential harm associated with the use and/or inhalation of dust and fibers from asbestos and/or asbestos-containing products, materials, or equipment, the Defendants failed to warn and/or inadequately warned Plaintiff of the dangers of asbestos and asbestos dust.

38. The products mined, manufactured, sold, distributed, supplied and/or used by these defendants were defective, unreasonably dangerous, insurable and unreasonably dangerous per se, to Plaintiff who was an intended and foreseeable user and bystander who was exposed to these products. These defects include, without limitation, the following:

(a) The mining, manufacture, sale, supply, distribution and use of products that are unreasonably dangerous, or unreasonably dangerous per se;

(b) The mining, manufacture, sale, supply, distribution and use of products that possess inherent and known properties that make them unreasonably dangerous by presenting high potential for causing serious injury, such as respiratory disease, cancer, and other health problems to the Plaintiff who would be foreseeably exposed to them in as a result of their intended use;

(c) The lack of warning or of sufficient warning of the hazards these products would present in the course of their normal foreseeable use or intended use;

(d) Failing to provide adequate cautions, warnings, and/or hazard statements and/or explanations with its products which should have been designed to provide to the Plaintiff knowledge about the hazards caused by exposure to their products and how to eliminate such hazards;

(e) Failing to provide adequate product inserts, informative brochures, employee training literature, posters, safety instructions and/or other written materials with their products which should have been designed to provide to the Plaintiff knowledge about the hazards caused by exposure to its products and how to eliminate such hazards;

(f) Failing to conduct on-site personnel training sessions with exposed workers which should have been designed to provide to the workers knowledge about the hazards caused by exposure to the products, and how to eliminate the hazards;

(g) Failing to adequately test and research their products as to the hazards created during their use and failed thereafter to provide the results of such tests and research to the intended or foreseeable users of exposed individuals such as Plaintiff and Decedent;

(h) Failing to inspect workplaces in which their products were being used to determine whether the products being used were deleterious to the health of exposed workers or individuals;

(i) Failure to inspect their products to assure sufficiency and adequacy of warnings and safety cautions;

(j) Failing to design, process and transport their products in a manner intended to minimize exposure during normal working conditions;

(k) Failure to properly design their products when the nature of the product did not require use of asbestos mineral or where alternate, equally suitable substances were readily available;

(l) Defects in the composition and construction of these products;

(m) Failing to specify and market their products on the express agreement that necessary engineering controls, work practices, and other industrial hygiene controls would be implemented in conjunction with use of the products after it was known or should have been known that adequate protective measures were not being implemented;

(n) Failing to recall their defective product or manufacture a reasonably safer alternative;

(o) Failure to properly package their products so that they could be safely transported, handled, stored or disposed of;

(p) Failing to take adequate precautions and industrial hygiene measures to protect Plaintiff and exposed workers when installing, repairing, or tearing out asbestos and/or asbestos-containing products, materials, or equipment including, but not limited to, providing protection from dust and fibers emanating from the installation, repair, and/or removal process; failing to use local ventilation; failing to provide warnings to Plaintiff and workers in the facilities at issue that exposure to dust and fibers from asbestos and/or asbestos-containing products, materials, or equipment was hazardous and carcinogenic; failing to adequately clean up debris

from the installation, repair and/or removal process; failing to use wet down procedures; and/or failing to take other appropriate safety and industrial hygiene measures;

(q) Otherwise failing to act reasonably under the totality of the circumstances.

39. Defendants manufactured, processed and/or sold asbestos and/or asbestos-containing products and materials, and these products were used by Plaintiff and others working around Plaintiff at Plaintiff's worksites. Thus, Defendants had a duty to warn individuals, including but not limited to the Plaintiff, of the dangers associated with the use and/or inhalation of dust and fibers from asbestos and/or asbestos-containing products, materials, or equipment.

40. Despite Defendants' knowledge of the insurable harm and/or potential harm associated with the use and/or inhalation of dust and fibers from asbestos and/or asbestos-containing products, materials, or equipment, the Defendants acted unreasonably in failing to provide adequate warnings and/or instructions as to the hazards associated with exposure to asbestos and/or asbestos-containing products, materials, or equipment.

41. At the time the asbestos and/or asbestos-containing products, materials, or equipment left Defendants' control without adequate warning or instruction, Defendants created an unreasonably dangerous condition that it knew or should have known would pose a substantial risk of harm to a reasonably foreseeable claimant, such as the Plaintiff and Decedent. In the alternative, after the asbestos-containing products left Defendants' control, Defendant became aware of or in the exercise of ordinary care should have known that their product posed a substantial risk of harm to a reasonably foreseeable user or bystander, such as the Plaintiff and Decedent, and failed to take reasonable steps to give adequate warning or instruction or to take any other reasonable action under the circumstances.

42. It was the continuing duty of the defendants to advise and warn purchasers, consumers, and users, and all prior purchasers, consumers, and users, of all dangers, characteristics, potentialities and/or defects discovered subsequent to their initial marketing or sale of said asbestos and asbestos products.

43. The defendants breached these duties by:

(a) failing to warn the plaintiff of the dangers, characteristics, and/or potentialities of the product or products when they knew or should have known that the exposure to the product(s) would cause disease and injury;

(b) failing to warn the plaintiff of the dangers to which the plaintiff was exposed when they knew or should have known of the dangers;

(c) failing to exercise reasonable care to warn the plaintiff of what would be safe, sufficient, and properly protective clothing, equipment, and appliances when working with, near or during exposure to asbestos and asbestos products;

(d) supplying asbestos or asbestos products that were packaged, bagged, boxed and/or supplied to the plaintiff in packaging, bagging, boxes or other containers that were inadequate and/or improper;

(e) supplying asbestos or asbestos products that were delivered to and reached the plaintiff without adequate or proper handling instructions, face masks and/or respirators;

(f) failing to test the asbestos and asbestos products in order to ascertain the extent of dangers involved upon exposure;

(g) failing to conduct such research that should have been conducted in the exercise of reasonable care in order to ascertain the dangers involved upon exposure;

(h) failing to remove the product or products from the market when the defendant corporations knew or should have known of the hazards of exposure to asbestos and asbestos products;

(i) failing upon discovery of the dangers, hazards, and potentialities of exposure to asbestos adequately to warn and apprise the plaintiff of the dangers, hazards, and potentialities discovered;

(j) generally using unreasonable, careless, and negligent conduct in the contracting for, mining, milling processing, manufacturing, designing, testing, assembling, fashioning, fabricating, packaging, supplying, distributing, delivering, marketing, and/or selling of their asbestos and asbestos products.

44. Defendants' failure to provide adequate warnings as to the hazards associated with exposure to asbestos and/or asbestos-containing products, materials, or equipment or to provide proper instructions on the use, handling, and storage of asbestos and/or asbestos-containing products, materials, or equipment caused Barbara Boynton to develop Malignant Mesothelioma as a consequence of which Plaintiff has been injured and damaged and claims damages of the Defendants in negligence and strict liability.

45. The defective conditions of Defendants' products and fault, as noted above, are a proximate cause of Plaintiff's injuries complained of herein.

46. As a result of the Defendants' failure to warn, the Plaintiffs suffered and will continue to suffer the following injuries and damages hereinafter alleged.

47. Plaintiff and others in his position worked in close proximity to the asbestos and asbestos-related materials used or manufactured by the Defendants, and the exposure and hazard to each of them, in Plaintiff's presence, as well as others in his position, was known, or in the exercise of reasonable care should have been anticipated by the Defendants.

48. The Defendants have known or should have known since at least 1929, and possibly as early as 1890, of medical and scientific data which clearly indicates that the products, asbestos and asbestos-containing products, were hazardous to the health and safety of the Plaintiff and others in the Plaintiff's position, and prompted by pecuniary motives, the Defendants, individually and collectively, ignored and failed to act upon said medical and scientific data and conspired to deprive the public, and particularly the users, of said medical and scientific data, depriving them,

therefore, of the opportunity of free choice as to whether or not to expose themselves to the asbestos products of said defendants. As a result, the Plaintiff has been severely damaged as is set forth below.

49. The Defendants fraudulently misrepresented or failed to disclose the dangers of asbestos exposure from 1929 through the 1970s, thus denying Plaintiff and Decedent the knowledge with which to take necessary safety precautions such as periodic x-rays and medical examinations, and avoiding further dust exposure. Specifically, Defendants' fraudulent conduct included the following acts and omissions:

(a) failure to warn prior users when the Defendants had knowledge of the need for monitoring due to prior exposure;

(b) failure to issue recall type letters to prior users;

(c) frustrating the publication of articles and literature from the 1930s through at least 1979;

(d) rejection by top management of advice of corporate officials to warn of the hazards of their asbestos products; such rejection being motivated by the possibility of adverse effects on sales and profits; and

(e) The intentional inadequacy of (and delay in the use of) the warnings on asbestos products.

50. The acts of the Defendants, and each of them, as hereinabove set forth were fraudulent and done with willful disregard of the safety of Plaintiff, Decedent and others similarly situated at a time when Defendants, had knowledge, or should have had knowledge of the dangerous effect of asbestos and asbestos-containing materials, products or equipment upon the body of human beings, including Plaintiff and others similarly situated, and even though forewarned by tests, standards, promulgations of rules and regulations, statutes, and ordinances

recognized by the Defendants and subscribed to by them, nevertheless placed into the stream of commerce, for their own profit, this dangerous asbestos material with full knowledge that it was being used and would be used in the future to the detriment of the health of Plaintiff, Decedent and others similarly situated, and Plaintiff is thereby entitled to punitive damages.

51. The acts of Defendants constituted fraudulent misrepresentation in that a false representation was made as a statement of fact, the statement was untrue and known to be so by its maker, the statement was made with the intent of inducing a reliance thereon, and the Plaintiff relied on the statement to his detriment. In the alternative, the acts of Defendants constituted fraudulent non-disclosure in that Defendants intentionally withheld information to induce individuals such as Plaintiff to continue to purchase or use their asbestos containing products. Defendants failed to disclose known facts with the intent or expectation to cause a mistake by another to exist or to continue, or in order to induce the latter to enter into a transaction.

52. Accordingly, as a result of the Defendants' conduct in which they acted in willful, wanton, gross negligence and in total disregard for the health and safety of the user or consumer, such as Plaintiff, Plaintiff therefore seeks exemplary and punitive damages against Defendants to punish the defendants for their actions, which were willful, wanton, gross, and in total disregard of the health and safety of the users and consumers of their products.

STRICT LIABILITY AND NEGLIGENCE OF PREMISES DEFENDANTS

53. Petitioner further alleges strict premise liability and negligence of defendants Kennecott Utah Copper LLC; PacificCorp; ConocoPhillips Company and Phillips 66 Company (hereinafter “Premises Defendants”) in failing to provide Decedent’s husband a safe place in which

to work free from the hazards of asbestos, which failure was a proximate cause of Plaintiff's injuries.

54. The premises within which Decedent's husband was exposed to asbestos such that Decedent was exposed to Larry Boynton's work clothes, as set forth in Paragraph 13, was owned by and in the custody of Premises Defendants and was unreasonably dangerous due to the presence and use of asbestos and asbestos-containing products with little or no precautions taken to minimize the risk of exposure and absolutely no warning of that risk. This unreasonably dangerous condition was a direct and proximate cause of Plaintiff's injuries set forth herein.

55. Premises Defendants negligently, recklessly, willfully and/or because of gross and wanton negligence, fault, or strict liability, failed to properly discharge its duties to Plaintiff in the following particulars:

a. failure to provide Plaintiff's husband with a safe place to work;

b. failure to provide Plaintiff's husband with adequate engineering or industrial hygiene measures to control the level of exposure to asbestos, including but not limited to local exhaust, general ventilation, respiratory protection, segregation of work involving asbestos, use of wet methods to reduce the release of asbestos into the ambient air, medical monitoring, air monitoring, and procedures to prevent the transportation of asbestos fibers home on Petitioner's father's clothing; and

c. failure to inform or warn Plaintiff's husband of the hazards of asbestos exposure.

56. During the course of Larry Boynton's work at the Premises Defendant's facilities the asbestos or asbestos-containing products to which contributed to Barbara Boynton's and Larry Boynton's exposures were within the care, custody and control of Premises Defendants. The longstanding use and presence of asbestos at the Premise Defendant's jobsite caused that asbestos to be incorporated into the premises and resulted in it becoming a permanent fixture therein. Therefore, the Premises Defendant is strictly liable for Plaintiff's injuries.

57. These specific acts of fault were a substantial contributing factor of Plaintiff's injuries.

NEGLIGENCE ACTION AGAINST PREMISES DEFENDANTS

58. Decedent was exposed to asbestos-containing products via secondary exposure from Premises Defendants. Barbara Boynton's exposure to asbestos products occurred without fault on her part. Plaintiff hereby alleges that Premise Defendants are liable for injuries, as alleged, arising out of the negligent conduct of Premises Defendants, as detailed herein, and, in failing to provide a safe place in which to work free from the dangers of respirable asbestos-containing dust.

59. As a direct and proximate contributing result of having inhaled, ingested or otherwise having been exposed to asbestos from Premises Defendants, Plaintiff and Decedent have received injuries, both physically and mentally, including, without limitation, all of the ramifications of malignant mesothelioma and mental anguish associated with that condition.

60. Premises Defendants negligently, recklessly, willfully and/or because of gross and wanton negligence or fault, failed to properly discharge their duties to the Plaintiff in the following:

a. failed to provide the Decedent's husband with a safe work environment;

b. failed to provide the Decedent's husband with safety equipment;

c. failed to provide the Decedent's husband with correct, adequate, or proper safety equipment;

d. recklessly and negligently failed to disclose, warn or reveal critical medical and safety information regarding asbestos hazards in general and with regard to those specific hazards at the work site;

e. recklessly concealed and negligently omitted to reveal critical medical and safety information regarding the safety and health risks associated with the asbestos and asbestos-containing products at the worksites;

f. failed to timely remove asbestos hazards from the work place;

g. failed to properly supervise or monitor the work areas for compliance with safety regulations;

h. failed to provide a safe and suitable means of eliminating the amount of asbestos dust in the air; and

i. failed to provide the necessary facilities, practices and procedures that would lessen or eliminate the transfer of asbestos from the workplace to the home on the clothing and/or person of Larry Boynton.

61. The above-described negligence, fault, and willful misconduct of these defendants were a proximate cause of the Plaintiff's injuries.

62. At all times throughout Larry Boynton's exposure to asbestos present and used within the premises of Premises Defendants, Premises Defendants knew that asbestos posed substantial health risks to those exposed to it, knew that there were specific engineering and industrial hygiene procedures which should have been employed to reduce exposures, knew that

those exposed to asbestos on the job could bring home asbestos on their clothes and thereby injuriously expose those in the household, yet Premises Defendants consciously and intentionally chose not to inform Larry Boynton or Barbara Boynton of this information or implement any meaningful safety precautions, all of which was a substantial contributing cause of Plaintiff's injuries.

LOSS OF CONSORTIUM

63. Plaintiff re-alleges and incorporates paragraphs 1 through 62 above as though restated and fully set forth herein.

64. Larry Boynton is the loving spouse of Barbara Boynton and was the spouse of Barbara Boynton at the time she was injured.

65. Pursuant to UTAH CODE ANNOTATED §30-2-11 (1953, as amended), Larry Boynton may maintain an action against Defendants for his losses caused by Defendants' negligence.

66. Larry Boynton is entitled to be compensated for all his losses resulting from Barbara Boynton's injuries and damages.

PUNITIVE DAMAGES

67. Plaintiff incorporates by reference the preceding paragraphs as if fully set forth herein.

68. As a result of the willful, wanton and gross misconduct and gross negligence of the Defendants as alleged herein, the Plaintiff seeks and requests punitive or exemplary damages. Defendants malicious and outrageous disregard for the safety of users of asbestos products, including but not limited to their intentional concealment of the dangers of asbestos that they knew of yet consciously refused to warn users of those dangers evidences a conscious indifference to the safety and health of users and bystanders of the products they profited from selling.

Defendants' internal documents reveal that they knew of the hazards of asbestos by at least the mid-1960s, yet Defendants concealed the hazards of asbestos from consumers and bystanders to maintain their bottom line. Plaintiffs' injuries are the result of Defendants willful and malicious or intentionally fraudulent conduct, or conduct that manifests a knowing and reckless indifference toward, and a disregard of, the rights of others. Defendants knew that a high degree of probability existed that Defendants' conduct would result in substantial harm, that Defendants' conduct is highly unreasonable or an extreme departure from ordinary care and that a high degree of danger was apparent due to Defendants' actions. Plaintiff therefore, for the sake of example and by way of punishing Defendants, seeks punitive damages, according to proof. Defendant's acts and omissions constitute misconduct that is grossly negligent, willful, wanton, malicious and/or outrageous.

69. As a result of the willful, wanton and gross misconduct and gross negligence of the Defendants as alleged herein, the Plaintiff seeks and requests statutory punitive damages and reasonable attorney's fees.

DAMAGES

70. Plaintiff incorporates by reference the preceding paragraphs as if fully set forth herein.

71. As a result of the Decedent's development of asbestos related malignant mesothelioma, a terminal asbestos cancer, Plaintiff has suffered and sustained very serious injuries.

72. Decedent further suffered great pain, disfigurement, physical impairment, extreme nervousness, and mental anguish as a direct result of the aforesaid injuries.

73. Plaintiff verily believes that Decedent's enjoyment of life was greatly impaired;

that she has suffered substantial lost wages and loss of earning capacity; and further, that her expected life span was greatly shortened.

74. Plaintiff alleges that as a result of the aforesaid illnesses, they have been forced to incur large amounts of medical expenses by way of doctor and drug bills.

75. Prior to the onset of her symptoms, Decedent was extremely active and participated in numerous hobbies and activities, and as a result of her illness, Barbara Boynton was prevented from engaging in some of said activities that were normal to her prior to developing her asbestos-related lung disease. Barbara Boynton was otherwise prevented from participating in and enjoying the benefits of a full and complete life.

76. Plaintiff lost the love, affection, society, support, services, future earnings, funeral expenses, medical expenses, and experienced mental pain, suffering and distress as a result of the death of the Decedent.

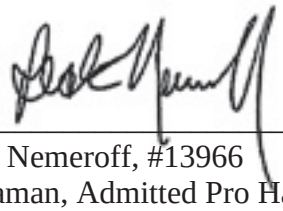
WHEREFORE, Plaintiff verily believes he is entitled to actual damages against the Defendants by reason of said negligence, strict liability, gross negligence, breach of warranty, fraudulent misrepresentation, fraudulent non-disclosure, failure to warn and other breaches of duty as alleged herein proximately caused by the fault of the Defendants, and claims lost wages, special damages, punitive and exemplary damages, including attorney's fees, statutory punitive damages and reasonable attorney's fees.

WHEREFORE, Plaintiff prays for judgment against all Defendants for actual damages, lost wages, special damages, punitive and exemplary damages, including attorney's fees, statutory and punitive damages and reasonable attorney's fees, in amounts to be determined by statute or by the trier of fact, plus the costs of this action.

PLAINTIFF REQUESTS TRIAL BY JURY ON ALL ISSUES SO TRIABLE.

Respectfully submitted,

THE NEMEROFF LAW FIRM
A PROFESSIONAL CORPORATION



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Attorney for Plaintiff

CERTIFICATE OF SERVICE

I hereby certify on the 23rd day of March, 2018, that a true and correct copy of this AMENDED CIVIL COMPLAINT was served on all counsel of record using the Court's electronic filing system and Defendants Phillips 66 Company and ConocoPhillips Company via Certified Mail, Return Receipt Requested, as indicated on Exhibit A attached.

/s/Barrett Naman
Barrett Naman

EXHIBIT A

DEFENDANT SERVICE LIST

THE FOLLOWING DEFENDANTS WILL BE SERVED THROUGH ITS REGISTERED AGENT OF SERVICE:

PHILLIPS 66 COMPANY (Premises Defendant)
c/o Corporation Service Company
15 West South Temple, Suite 1701
Salt Lake City, UT 84101

CONOCOPHILLIPS COMPANY (Premises Defendant)
c/o United States Corporation Company
15 West South Temple, Suite 1701
Salt Lake City, UT 84101

THE FOLLOWING DEFENDANTS WILL BE SERVED THROUGH THEIR COUNSEL OF RECORD:

INDUSTRIAL SUPPLY COMPANY, INC.
Jonathan L. Hawkins, Esquire
Morgan, Minnock, Rice & Miner, L.C.
136 South Main Street
Eighth Floor
Salt Lake City, UT 84101

BECHTEL CORPORATION
Jill L. Dunyon, Esquire
Lewis Hansen, Esquire
The Judge Building
Eight East Broadway, Suite 410
Salt Lake City, UT 84111-2239

CBS CORPORATION, a Delaware Corporation, f/k/a VIACOM INC., successor by merger to CBS CORPORATION, a Pennsylvania corporation, f/k/a WESTINGHOUSE ELECTRIC CORPORATION
Tracy H. Fowler, Esquire
Stewart O. Peay, Esquire
Elizabeth Brereton, Esquire
Snell & Wilmer, LLP

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FLUOR ENTERPRISES, INC.
Patricia W. Christensen (#0645)
PARR BROWN GEE & LOVELESS
101 South 200 East, Suite 700
Salt Lake City, Utah 84111

FOSTER WHEELER ENERGY CORPORATION
Mark J. Williams, Esquire
Alan Dunaway
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JOHN CRANE, INC.
Susan Black Dunn, Esquire
W. Lewis Black, Esquire
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Timothy Clark, Esquire
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PACIFICORP (Premises Defendant)
Jason L. Kennedy, Esquire
Jill M. Felkins, Esquire
Segal McCambridge Singer & Mahoney, Ltd.
233 South Wacker Drive
Suite 5500
Chicago, Illinois 60606

RILEY POWER, INC, individually and as successor-in-interest to BABCOCK BORSIG POWER, INC. and RILEY STOKER CORPORATION, Individually and as successor-in-interest to D.B. RILEY
Michael W. Homer, Esquire
Noah M. Hoagland, Esquire
Suitter Axland, PLLC
8 East Broadway, Suite 200
Salt Lake City, Utah 84111

THE GOODYEAR TIRE & RUBBER COMPANY
Scot A. Boyd, Esquire
Christensen & Jensen, P.C.
257 East 200 South
Suite 1100
Salt Lake City, UT 84111

UNITED STATES WELDING, INC.
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Addendum C

STATE OF GEORGIA

COUNTY OF CHEROKEE

AFFIDAVIT OF DR. RICHARD A. LEMEN

I.

Introduction

My name is Richard A. Lemen. I am competent to make this Affidavit as I am over the age of eighteen (18) years and am of sound mind. I am making this Affidavit based on my personal knowledge and the facts contained herein are true and correct. All opinions rendered in this Affidavit are based on a reasonable degree of medical and scientific probability.

II.

Qualifications

I am a former Assistant Surgeon General of the United States. Since retiring from the United States Public Health Service in 1996, I have been a Professor and private consultant engaged in issues involving the analysis of risks associated with occupational and environmental health, including asbestos. I have been a practicing epidemiologist for over forty years. I have a Bachelor of Arts degree from Central Methodist College (University) in Zoology and Chemistry; a Master's of Science degree in Public Health from the University of Missouri in epidemiology; and a Ph.D. in epidemiology from the University of Cincinnati, Kettering Laboratories of the School of Medicine, as outlined in my Curriculum Vitae (attached). From 1966 until September 1967, I was District Sanitarian for the Missouri Division of Health, and after being drafted, served from September 1967 to September 1969 in the U. S. Army as a Preventive Medicine Specialist in charge of the epidemiology section within the office of the U.S. Army at Fort Leonard in Wood, Missouri. In September 1970, I was commissioned as an Officer of the United States Public Health Service (USPHS). I was assigned to the Bureau of Occupational Safety and Health (BOSH), which in April 1971, through passage of the Occupational Safety and Health Act of 1970 by the U.S. Congress, became the National Institute for Occupational Safety and Health (NIOSH).

A major function of BOSH and NIOSH included conducting research on areas of occupational safety and health at work sites. My first assignments in the United States Public Health Service were studying the health status of workers exposed to asbestos and beryllium. Specific to asbestos and based on my education and training in epidemiology, industrial hygiene, toxicology, public health and worker safety, I evaluated workers at asbestos work sites throughout the United States. This resulted in NIOSH recommending its first standard, under the new Occupational Safety and Health Act of 1970, for the protection of workers exposed to asbestos to the Occupational Safety and Health Administration (OSHA).

In July 1974, I was promoted to branch chief of the Biometry Branch, which had the responsibility for conducting multiple retrospective cohort studies of workers exposed to different materials and substances, including asbestos. Throughout this period, I continued visiting multiple asbestos manufacturing plants and worksites throughout the United States to evaluate the effectiveness of workplace controls for their prevention of work-related disease and injury. Data obtained from those investigations resulted in my colleagues and I publishing various papers regarding the epidemiology and prevention of asbestos-related diseases among different worker populations. This continued work resulted in NIOSH publishing a newly revised recommended standard for asbestos in 1976, authored by Dr. John Dement and myself. This revised recommendation was the first U.S. Government document to recommend banning asbestos in U.S. workplaces and that the lowest reliable concentration of asbestos to be detected using the phase contrast microscope of 0.1 fibers per cc be used to measure the presence of asbestos in the workplace, which is the concentration for asbestos utilized by OSHA in their present asbestos standard.

In 1976, at the request of the International Agency for Research on Cancer (IARC), I authored their initial manuscript for the World Health Organizations (WHO) IARC Working Group on the Evaluation of Carcinogenic Risks of Chemicals in Man: Asbestos. This final monograph became the official policy statement of the World Health Organization Agency on cancer. The IARC's designation of asbestos as a carcinogen remains their current position today. This designation was reaffirmed by an IARC expert committee as reported in 2012.

In 1978, I was appointed by NIOSH as Assistant Chief of the Industry Wide Studies Branch where I provided administrative and scientific guidance for all toxicological, bio-statistical, epidemiological, industrial hygiene and medical analyses of ongoing industry-wide studies. Under my term of leadership, over 200 scientific articles were published.

In 1981, I was appointed Director of the Division of Standards Development and Technology Transfer, one of the then seven operating Divisions comprising NIOSH. During my tenure as Director, I represented the Institute multiple times in testimony before the United States Congress on issues of occupational health, including asbestos-related diseases. During this time, I was selected as the personnel representative of the Secretary of the Department of Health and Human Services (DHHS) to the Asbestos Hazards School Safety Task Force of the United States Department of Education and also as Chair of the DHHS Committee on Health Effects of Ingested Asbestos. I was also selected by the respective heads of OSHA and NIOSH to Chair the Joint OSHA/NIOSH Task Force Review of Occupational Exposure to Asbestos.

I was promoted to Assistant Director of NIOSH in 1988 in charge of the Institute's Washington D.C. office, and then in 1992 appointed Deputy Director of NIOSH, the highest non-political appointed position. From August 1993 through April 1994, I was selected as Acting Director of NIOSH and in March 1996, I retired from the United States Public Health Service at the rank of Rear Admiral with the title of Assistant Surgeon General of the United States. During my service with the USPHS, I was awarded the Distinguished Service Medal and the Meritorious Service Medal, the two highest honors bestowed by the USPHS on Commissioned Officers. I also received the Surgeon General's Exemplary Service Medal and several Commendation Medals, one of which was for my work on asbestos epidemiology between 1970 and 1980. I also was a recipient of the Alice Hamilton Science Award for Occupational Safety and Health, the highest science award of the National Institute for Occupational Safety and Health. I was also the first recipient of the James P. Keogh Award for Outstanding Service in Occupational Safety and Health presented by NIOSH.

Since my retirement, I have taught graduate level classes on environmental and occupational health issues, including asbestos as an Adjunct Professor in the Department of

Environmental Health (DEH) at the Rollins School of Public Health at Emory University in Atlanta, Georgia. In 2009, President Obama appointed me to the President's Advisory Board on Radiation and Worker Health, and I have served continuously on that Board since that time.

Throughout my career starting in 1970, I have participated in epidemiologic studies of asbestos-exposed workers and studied the world medical literature pertaining to occupational and non-occupational asbestos exposure and of the diseases inherent from such exposure, including the history and evolution of medical knowledge pertaining to asbestos-related conditions and their prevention. I have published multiple articles in the peer-reviewed, scientific and medical literature regarding asbestos. For further details on my qualifications, refer to my Curriculum Vitae [Exhibit A].

During my career, I have presented multiple papers throughout the United States and the world on occupational health issues including presentations on the epidemiology of asbestos-related diseases and its biological effects. Most recently in February 2014, I presented on asbestos to the German Cancer Congress in Berlin (31. Deutscher Krebskongress 2014) and then in November 2014, I was the keynote speaker for the first International Conference on Asbestos Awareness & Management in Melbourne, Australia at the request of the Australian government. On May 27, 2015, I was keynote speaker at the first European Asbestos Forum held in Amsterdam. Titles and dates of other presentations and publications are listed in my Curriculum Vitae.

III.

Basis of Opinions Rendered in this Affidavit

The basis for my opinions and the facts, data, and materials that I have considered are referenced in this Affidavit, my curriculum vitae (CV) [Exhibit A], the Lemen Chapter [Exhibit B], the Reliance Materials List [Exhibit C], and the depositions and documents cited herein.

A. What is Epidemiology and How Is It Applied to Occupational Health?

As an applied branch of science, *"epidemiology may be regarded simply as the study of disease and health in human populations."* [1] It is the study of the distribution and determinants of health related states and events in populations, and the application of this study to control of health problems.[2] *"Epidemiology and biostatistics together constitute the quantitative foundation for public health and clinical research."*[3] When applied to occupational health, epidemiology has a dual purpose of *"describing the distribution of deaths, accidents, illnesses, and their precursors in the various sections of the occupationally active population and of searching for the determinants of health, injury, and disease in the occupational environment"*[4]. This is also true when applying the epidemiologic methods to para-occupational as well as environmental environments.

As an epidemiologist, assigned throughout much of my career to the United States Public Health Service's National Institute for Occupational Safety and Health, my practice of epidemiology was directed by the principles of epidemiology as outlined above and in compliance with the Occupational Safety and Health Act of 1970 (Act)[5] to provide epidemiological evidence to *"improve safety and health of the employees."* In conducting these responsibilities, it was necessary to determine an array of the health and safety risks to workers, and not to overprotect, as suggested by some as the role of public health. As put forth in the Act, Section 3(8), a standard for protecting workers is both a rule of conduct for avoiding hazards in the workplace and a legally enforceable obligation governing conditions, practices and operations to assure a safe and healthful workplace. Further, judicial recognition of the Congressional intent for this Act is to have standards that address hazards, as identified by epidemiologist like myself, and as has been defined by the United States Supreme Court in their decision in Industrial Union Dept., A.F.L.-C.I.0 v. American Petroleum Institute, --U.S. - [8 OSHC 1586]48 U.S.L. Week 5022 (1980). In this case, the Court

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[1] Kleinbaum DG, Kupper LL, Morgenstern H, 1982. Epidemiologic Research. Principles and Quantitative Methods. Lifetime Learning Publications, A division of Wadsworth, Inc., Belmont, California.

[2] Last JM, 1983. **A Dictionary of Epidemiology.** Oxford Medical Publications. A Hand book sponsored by the IEA.

[3] Samet JM, Gordis L, 2000. **Encyclopedia of Epidemiologic Methods.** Eds. MH Gail & J Benichou. John Wiley & Sons, Ltd.: 378-386.

[4] Karvonen M, Mikheev MI (eds), 1986. **Epidemiology of Occupational Health.** WHO Regional Publications, European Series No. 20. World Health Organization.

[5] _____, 1970. **Occupational Safety and Health Act of 1970.** Public Law 91-596, 91st Congress, S. 2193, December 29, 1970.

essentially stated that 1) the standard must address a particular hazard existing in the workplace and 2) it must establish a measure against which the condition existing or the practices, means, methods, operations or processes used in a work place may be compared for an immediate determination of whether the work place is safe with respect to the hazard addressed by the standard. Thus, these set the framework of what an epidemiologist has as guidance when examining an occupational health issue, which is clearly not to *"err on the side of overprotection but to determine the safety of a workplace."*

B. What is Asbestos and How Does It Causes Disease?

To the mineralogist, asbestos is the generic name for a group of naturally occurring hydrated mineral silicates of the amphibole series or the fibrous form of the serpentine series (chrysotile) characterized by fibers or bundles of fine single crystal fibrils. Once these fibers have been released into the environment through commercial exploitation, they are virtually indestructible and remain in the environment unless removed and disposed of in such a manner they cannot re-enter the atmosphere. Asbestos fibers originate due to elongated crystalline growth within mineral deposits because of special conditions for chemical composition, nucleation, and fiber formation. These conditions must exist for long enough geological periods without disturbance to permit continuous growth of the silicate chains into fibrous structures.[6]

Health hazards from exposure to asbestos occur primarily from inhalation of asbestos dust, so airborne concentrations are often used as an indication of exposure. Asbestos-related diseases can occur at virtually all levels of exposure. Higher exposures result in higher risks and lower exposures result in lower risks of developing disease. At the current OSHA standard, the estimated risk of death is 3.4 per 1,000 at 0.1 fibers/cc over a working lifetime.[7] Even at this low limit it is clearly seen that the risk of death from cancer is not reduced to zero. *"There is no "safe" level of*

[6] Lemen RA, Dodson RF, 2012. Asbestos-Chapter 83. Patty's Toxicology, Sixth Edition, Volume 5, Ed. Eula Bingham and Barbara Cohrsen, John Wiley & Sons, Inc: 211-256.

[7] Lemen RA, 2011 Epidemiology of Asbestos-Related Diseases and the Knowledge That Led to What is Known Today – Ch. 5. In: Asbestos Risk Assessment, Epidemiology, and health Effects – Second Edition. Eds Ronald F. Dodson, Samuel P. Hammar. CRC Press Taylor & Francis Group, 131-268.

asbestos exposure for any type of asbestos fiber."[8] This continues to support what industry representatives reported in 1965, while attending the New York Academy of Sciences Conference on the Biological Effects of Asbestos that the only safe level of exposure to prevent asbestos-induced disease is zero.[9] All commercial forms of asbestos, including chrysotile, amosite, crocidolite, tremolite, actinolite, and anthophyllite are carcinogenic to humans.[10] By 1964, there were more than 700 articles in the worldwide medical literature highlighting the health effects associated with asbestos exposure and its toxic nature.[11] By 1964, all the major asbestos-related diseases, including asbestosis, lung cancer and mesothelioma, had been causally established through epidemiology and reported in the scientific literature.[12] In fact, because of the New York

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[8] OSHA, 2013. Asbestos - OSHA Quick Takes. Occupational Safety and Health Administration. United States Department of Labor. https://www.osha.gov/SLTC/asbestos/

[9] Commenting on the effectiveness of asbestos guidance concentrations John Wells of U.S. Rubber stated"... *there is no safe level. The safe level is nil and anything above the safe level represents certain risk."* S.A. Roach of the University of London stated that"*...5 million particles per cu. Ft., are simply standards, although I hope I did not use the word 'safe.' These are standards which are actually used, although they are not ever expressed as being safe standards."* Roach further went on to state that even if this was dropped to 2 million particles per cu. ft. that this would not necessarily be a *"perfectly safe level of dust"* (Wells J and Roach SA, 1965. Discussion. In: **Biological Effects of Asbestos.** Eds. IJ Selikoff, J Churg. Ann NY Acad Sci; 132(1): 335-336). It is interesting to note that a worker would not be able to see this concentration of dust in the ambient air and would not see any dust until a concentration of between 20 to 40 mppcf was reached (Hemeon, 1955. **Plant and Process Ventilation.** The Industrial Press, NY, NY). Warren Cook in 1942 said, *"In the case of the asbestos dust condition, our evaluation of the exposure should be based on the knowledge that the present toxic limit for asbestos is five million particles of dust per cubic foot of air. This is a very small concentration, so small in fact that the condition may look good even to a critical eye and still present an exposure greater than this low limit."* (Cook WA, 1942. The occupational disease hazard, Industrial Med; 11(4): 193-197). The 5-mppcf- guidance concentration remained in effect until the end of the 1960s. Cooper (1967) states the 5 mppcf recommendation for protection, from asbestos exposure, proposed by the ACGIH since 1946, rests on shakier evidence compared to other such recommendations (Cooper WC, 1967. Asbestos as a hazard to health. Arch Environ Health; 15, Sep: 285-290). **Exhibit ___**, memoranda dated June 24, 1970, from Charles G. Kramer, M.D., The Dow Chemical Company, enclosing summary of Mount Sinai Medical School conference. **Exhibit ___**, April 19, 1973, Environmental Health Report, Atmospheric Concentration of Asbestos Fibers while Cutting Transite at A-510, by R.L. Silverthorne.

[10] IARC Monographs on the Evaluation of Carcinogenic Risks to Humans. A review of human carcinogens, part C: Arsenic, metals, fibres, and dusts, vol. 100. Lyon, France: Published by the International Agency for Research on Cancer, World Health Organization. 2012. **Exhibit __**, February 3, 1971, Ecology-Pollution Aspects of Chlor-Alkali Plants: Asbestos and Health, Charles G. Kramer, M.D., The Dow Chemical Company.

[11] Ozonoff D, 1988. Failed Warnings: Asbestos-Related Disease and Industrial Medicine – Chapter 3. In: The Health And Safety Of Workers. Case Studies in the Politics of Professional Responsibility. Ed. Ronald Bayer, Oxford University Press: 139-217.

[12] Merewether ERA, Price CW. Report on the effects of asbestos dust on the lungs and dust suppression in the asbestos industry I. Occurrence of pulmonary fibrosis and other pulmonary affections in asbestos workers II. Processes giving rise to dust and methods for its suppression. London: H.M. Stationery Office, 1930; Merewether ERA. Annual Report of the Chief Inspector of Factories for the Year 1947. London: HMSO; 1949: 78; Doll R. Mortality from lung cancer in asbestos workers. Brit J Industr Med. 1955; 12: 81-86; Wagner et al. Diffuse pleural mesothelioma and asbestos exposure in the North Western Cape Province. Br J Ind Med, 1960; 17: 260; Mancuso TF, Coutler EJ. Methodology in industrial health studies. The cohort approach, with special reference to an asbestos company. Arch Environ Health.

Academy of Sciences meeting, the toxic nature of asbestos was widely reported to the public [Lemen, 2011].[13] Indeed, the health hazards of asbestos, including mesothelioma, were well established and widely known and accepted prior to Mr. Boynton's employment as a laborer and then as an electrician.

Because asbestos-related diseases are dose-response diseases, each exposure to asbestos has the potential to increase the overall risk of developing an asbestos-related disease. As reported by Brodkin and Rosenstock *"While it is likely that there is some exposure threshold, none has been demonstrated convincingly, such that individuals with low exposures or higher exposures of short duration (e.g., for a period of days to weeks) are not at risk. This pattern is probably different from the relation between exposure and asbestos-related malignancies, in which even low-level or brief exposures may confer at least some increased risk."*[14]

For more details regarding my opinions on general causation and the state of the art knowledge concerning asbestos, refer to the chapter I authored in Asbestos Risk Assessment, Epidemiology and Health Effects, Epidemiology of Asbestos-Related Diseases and the Knowledge That Led to What Is Known Today (hereinafter *"Lemen Chapter"*) attached and incorporated herein as Exhibit B.

C. Mesothelioma from Asbestos Exposure

There is no dispute that asbestos causes mesothelioma, and that the great majority of mesotheliomas are caused by asbestos.[15] Mesothelioma is generally detected after thirty to forty

1963; 6: 210; Selikoff IJ, Churg J, Hammond EC. Asbestos exposure and neoplasia. JAMA 1964; 188: 22.

[13] Lemen RA. Epidemiology of Asbestos-Related Diseases and the Knowledge That Led to What is Known Today – Ch. 5. In: Asbestos Risk Assessment, Epidemiology, and health Effects – Second Edition. Eds Ronald F. Dodson, Samuel P. Hammar. CRC Press Taylor & Francis Group, 2011: 131-268.

[14] Brodkin CA, Rosenstock L. Asbestosis and asbestos-related pleural disease, 19.8. In: Rosenstock L, Cullen Mr, Brodkin CA, Redlich CA, Textbook of Clinical Occupational and Environmental Medicine, second edition. Elsevier Saunders, 2005: 364-379.

[15] Checkoway, H., N. E. Pearce, and D. J. Crawford-Brown. Research methods in occupational epidemiology. New York, NY: Oxford University Press, 1989; Mullan, R. J., and L. I. Murthy. Occupational sentinel health events: An up- dated list for physicians recognition and public health surveillance. American Journal of Industrial Medicine 19:775–79. doi:10.1002/(ISSN)1097-0274, 1991; Steenland, K., C. Burnet, N. Lalich, E. Ward, and J. Hurrell. Dying for work: The magnitude of US mortality from selected causes of death associated with occupation. American Journal

years of development and is known as a *"sentinel tumor"* because of its almost exclusive association from exposure to asbestos.[16]

Mesothelioma originates from surface serosal cells of the pleural, peritoneal, and pericardial cavities,[17] with a median survival between seven to twelve months after diagnosis for its pleural form (MPM).[18] *"[H]ow asbestos causes or contributes to mesothelioma development is still an enigma"* as is reconciling the diverse theories about the carcinogenic actions of the asbestos fibers during the long latent period associated with mesotheliomas.[19]

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of Industrial Medicine 43:461–82. doi:10.1002/(ISSN)1097-0274, 2003; IARC Monographs on the Evaluation of Carcinogenic Risks to Humans. A review of human carcinogens, part C: Arsenic, metals, fibres, and dusts, vol. 100. Lyon, France: Published by the International Agency for Research on Cancer, World Health Organization, 2012; Lemen, R. Epidemic to pandemic: Asbestos in our world. In International day of asbestos victims—State of science—State of the world, 3–33. Marc Hindry, Paris, France: Andeva, Association Nationale de Défense des Victimes de l'Amiante, 2014; Lemen, R. A., and R. F. Dodson. Asbestos. In Patty's toxicology, 6th ed., ed. E. Bingham and B. Cohrssen, vol. 5, chap. 83. Hoboken, NJ: John Wiley & Sons, Inc., 2012; Collegium Ramazzini. Comments on the causation of malignant mesothelioma: Rebutting the false concept that recent exposures to asbestos do not contribute to causation of mesothelioma. Carpi, Italy. http://www.collegiumramazzini.org/download/18_EighteenthCRStatement (accessed October 14, 2015) 2015a; Collegium Ramazzini. The global health dimensions of asbestos and asbestos-related diseases. Collegium Ramazzini, Carpi, Italy, http://www.collegiumramazzini.org/download/18_EighteenthCRStatement (accessed October 14) 2015b; Krupoves, A., M. Camus, and L. De Guire. Incidence of malignant mesothelioma of the pleura in Québec and Canada from 1984 to 2007, and projections from 2008 to 2032. American Journal of Industrial Medicine 58:473–82. doi:10.1002/ajim.22442, 2015; Marinaccio, A., A. Binazzi, M. Bonafede, M. Corfiati, D. Di Marzio, A. Scarselli, M. Verardo, D. Mirabelli, V. Gennaro, C. Mensi, G. Schallemberg, E.Merler, C. Negro, A. Romanelli, E.Chellini, S. Silvestri,M. Cocchioni, C. Pascucci, F. Stracci, V. Ascoli, L. Trafficante, I. Angelillo, M. Musti, D. Cavone, G.Cauzillo, F. Tallarigo, R. Tumino, and M. Melis; ReNaM Working Group. Malignant mesothelioma due to nonoccupational asbestos exposure from the Italian national surveillance system (ReNaM): Epidemiology and public health issues. Occupational and Environmental Medicine 72:648–55. doi:10.1136/oemed-2014-102297, 2015; Markowitz, S. Asbestos-related lung cancer and malignant mesothelioma of the pleura: Selected current issues. Seminars in Respiratory and Critical Care Medicine 36:334–46. doi:10.1055/s-00000075, 2015; Wolff, H., T. Vehmas, P. Oksa, J. Rantanen, and H. Vainio. Consensus report: Asbestos, asbestosis, and cancer, the Helsinki criteria for diagnosis and attribution 2014: Recommendations. Scandinavian Journal of Work, Environment & Health 41:5–15. oi:10.5271/sjweh.3462, 2015.

[16] Mullan, R. J., and L. I. Murthy. Occupational sentinel health events: An up- dated list for physicians recognition and public health surveillance. American Journal of Industrial Medicine 19:775–79. doi:10.1002/(ISSN)1097-0274, 1991.

[17] Pass, H. I., N. Vogelzang, S. Hahn, and M. Carbone. Malignant pleural mesothelioma. Current Problems in Cancer28:93–174. doi:10.1016/j.currproblcancer.2004.04.001, 2004.

[18] Sekido, Y. Molecular biology of malignant mesothelioma. Environmental Health and Preventive Medicine 13:65–70. doi:10.1007/s12199-007-0015-8, 2008; Panou, V., M. Vyberg, U. M. Weinreich, C. Meristoudis, U. G. Falkmer, and O. D. Røe. The established and future biomarkers of malignant pleural mesothelioma. Cancer Treatment Reviews 41:486–95. doi:10.1016/j ctrv.2015.05. 001., 2015.

[19] Pass, H. I., N. Vogelzang, S. Hahn, and M. Carbone. Malignant pleural mesothelioma. Current Problems in Cancer28:93–174. doi:10.1016/j.currproblcancer.2004.04.001, 2004.

Like other human cancers, malignant mesothelioma most likely develops via a multi-step process, and not the malignant transformation of a mesothelial cell occurring soon after the initial asbestos exposure. Such an *"initial hit"* theory is unlikely, because mesothelioma has no detectable pre-invasive phase and is a rapidly growing tumor, which points to multiple gene alterations following associated genetic and epigenetic events.[20] Pass et al.[21] say smaller fibers are phagocytized and efficiently removed from the lung while larger fibers are not easily engulfed and can usually only be removed if solubilized. Amphiboles, unlike chrysotile, are not soluble and thus remain in the lung.

All the asbestos-related diseases are dose/intensity dependent to some degree. Most exposures are to mixed dusts that enhance asbestos effects. It is also thought that overloading of the respiratory system can retard clearance and thus increase particle effect.[22] Langer and Nolan state that mixtures of amphibole and chrysotile may be more potent as agents in the etiology of lung cancer and mesothelioma than just chrysotile alone.[23] However, in the case of mesothelioma, as contrasted with asbestosis, it appears that much smaller doses can produce the disease many years after exposure to asbestos. The first indications of this came from observations by Wagner et al. [1960], who described the potential exposures scenarios of thirty-three mesothelioma cases. In this case series, there were several who lived or worked near the mines with what could be considered as lower exposures from those of the miners and millers of asbestos.[24] Similar, observations were subsequently made by Newhouse and Thompson who evaluated mesothelioma

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[20] Pass, H. I., N. Vogelzang, S. Hahn, and M. Carbone. Malignant pleural mesothelioma. Current Problems in Cancer28:93–174. doi:10.1016/j.currproblcancer.2004.04.001, 2004; Sekido, Y. Molecular biology of malignant mesothelioma. Environmental Health and Preventive Medicine 13:65–70. doi:10.1007/s12199-007-0015-8, 2008.

[21] Pass, H. I., N. Vogelzang, S. Hahn, and M. Carbone. Malignant pleural mesothelioma. Current Problems in Cancer28:93–174. doi:10.1016/j.currproblcancer.2004.04.001, 2004.

[22] Aust, A. E., P. M. Cook, and R. F. Dodson. Morphological and chemical mechanisms of elongated mineral particle toxicities. Journal of Toxicology and Environmental Health, Part B 14:40–75. oi:10.1080/10937404.2011.556046, 2011.

[23] Langer, A. M., and R. P. Nolan. Fibre type and burden in parenchymal tissues of workers occupationally exposed to asbestos in the United States. In Non-occupational exposures to mineral fibres, ed. J. Bignon, J. Peto, and R. Saracci, 330–35. IARC Sci. Pub. no. 90. Lyon, France: International Agency for Research on Cancer, World Health Organization, 1989.

[24] Wagner, J. C., C. A. Sleggs, and P. Marchard. Diffuse pleural mesothelioma and asbestos exposure in the North Western Cape Province. British Journal of Industrial Medicine, 1960; 17: 260–71.

in the greater London area.[25] Low exposures have continuously been reported in the scientific literature as causative of mesothelioma.[26]

The question of which exposures contribute to an individual's mesothelioma cannot be answered through epidemiology alone. As Rothman and Greenland [2005] state "*... a cause of a disease event is an event, condition or characteristic that preceded the disease event and without which the disease event either would not have occurred at all or would not have occurred until some later time.*"[27] Epidemiology can tell us what happens in a population of people with similar characteristics, but it cannot tell us what happens within each individual of that population. Because mesothelioma is such a rare disease, its occurrence even in the highest asbestos exposed populations is generally less than 10%. This calls into question the role of dose alone as the cause. Other factors must come together within an individual who eventually develops mesothelioma. What these factors are is still a mystery. Tomatis et al. state that most environmental carcinogens only produce cancer in about 10% of the exposed individuals, similar to the rate for asbestos-induced mesothelioma. Tomatis et al. argue evidence of individual susceptibility as playing a critical role, however, this is contradictory at present.[28] Tomatis et al.[29] dispute Chiappino's[30]

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[25] Newhouse, M. L., and H. Thompson. Mesothelioma of pleura and peritoneum following exposure to asbestos in the London area. British Journal of Industrial Medicine, 1965; 22: 261–69.

[26] Hillerdal, G. Mesothelioma: Cases associated with non-occupational and low dose exposures. Occupational and Environmental Medicine 56:505–13. doi:10.1136/oem.56.8.505, 1999; Anderson, H. A., R. Lilis, S. M. Daum, A. S. Fischbein, and I. J. Selikoff. Household –contact asbestos neoplastic risk. In Occupational carcinogenesis, ed. U. Saffiotti and J. K. Wagoner, Annals of the New York Academy of Sciences 271, 1976: 311–23; National Institute for Occupational Safety and Health. Report to congress on workers' home contamination study conducted under The Workers' Family Protection Act (29 U.S.C. 671a). Cincinnati, Ohio: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, 1995; IARC Monographs on the Evaluation of Carcinogenic Risks to Humans. A review of human carcinogens, part C: Arsenic, metals, fibres, and dusts, vol. 100. Lyon, France: Published by the International Agency for Research on Cancer, World Health Organization, 2012.

[27] Rothman, K. J., and S. Greenland. Causation and causal inference in epidemiology. American Journal of Public Health 95 (Supp 1):S144–S150. doi:10.2105/AJPH.2004.059204, 2005.

[28] Tomatis, L., S. Cantoni, F. Carnevale, E. Merler, F. Mollo, P. Ricci, S. Silvestri, P. Vineis, and B. Terracini. The role of asbestos fiber dimensions in the prevention of mesothelioma. International Journal of Occupational and Environmental Health 13:64–69. doi:10.1179/oeh.2007.13.1.64, 2007.

[29] Tomatis, L., S. Cantoni, F. Carnevale, E. Merler, F. Mollo, P. Ricci, S. Silvestri, P. Vineis, and B. Terracini. The role of asbestos fiber dimensions in the prevention of mesothelioma. International Journal of Occupational and Environmental Health 13:64–69. doi:10.1179/oeh.2007.13.1.64, 2007.

[30] Chiappino, G. Mesothelioma: Il ruolo delle fibre ultrafine e conseguenti riflessi in campo preventive e mediclo legale. La Medicina del Lavoro, 2005; 96: 3–23 [in Italian].

suggestion that there is a *"trigger dose"* of asbestos that is short-lasting and irreversible for causation because *"Indeed, what is known about induction and growth of tumors strongly suggests that the progressive and irreversible development of the tumor cannot take place at the beginning of exposure or shortly thereafter. In fact, if models of time of reduplication of tumor cells-developed on the basis of studies carried out on this topic [31] (59-65) are applied, for instance, to the period elapsing between the beginning of the exposure and the clinical manifestation of a case of mesothelioma with a latency of >10 years, the tumor mass would reach paradoxical dimensions. Therefore, 'self-sufficiency' of the neoplastic process of the mesothelioma at the beginning of such a period of latency is hardly tenable."* Tomatis et al. conclude that if asbestos is a complete carcinogen, which is generally recognized to be the case, then it can both initiate and promote cancer. This would mean the persistence of exposure after the initial exposure could not be discounted or irrelevant.[32] Tomatis et al. cite Governa et al.[33] to show that in-vitro studies support the relevance of continuous inhalation of fibers in the etiology of mesothelioma.[34]

A statement by the Collegium Ramazzini (CR) concludes *"risk of malignant mesothelioma is related to cumulative exposure to asbestos in which all exposures – early as well as late – contribute to the totality of risk."*[35] In making this conclusion, the Collegium Ramazzini cites both the Second Italian Consensus Conference on Pleural Mesothelioma and the Third Italian Conference on Malignant Mesothelioma of the Pleura, which concluded that both intensity and duration of asbestos exposure are independent determinants of mesothelioma occurrence [Magnani

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[31] (59-65) refers to: Collins et al., 1956; Tannock, 1983; Flora & Vannucci, 1996; Cotran et al., 1999; Bregni et al., 2000.

[32] Tomatis, L., S. Cantoni, F. Carnevale, E. Merler, F. Mollo, P. Ricci, S. Silvestri, P. Vineis, and B. Terracini. The role of asbestos fiber dimensions in the prevention of mesothelioma. International Journal of Occupational and Environmental Health 13:64–69. doi:10.1179/oeh.2007.13.1.64, 2007.

[33] Governa, M., M. Amati, S. Fontana, I. Visona, G. C. Botta, F. Mollo, D. Bellis, and P. Bota. Role of iron in asbestosbody-induced oxidant radical generation. Journal of Toxicology and Environmental Health. Part A 58:279–87. doi:10.1080/009841099157241, 1999.

[34] Tomatis, L., S. Cantoni, F. Carnevale, E. Merler, F. Mollo, P. Ricci, S. Silvestri, P. Vineis, and B. Terracini. The role of asbestos fiber dimensions in the prevention of mesothelioma. International Journal of Occupational and Environmental Health 13:64–69. doi:10.1179/oeh.2007.13.1.64, 2007.

[35] Collegium Ramazzini. The global health dimensions of asbestos and asbestos-related diseases. Collegium Ramazzini, Carpi, Italy, http://www.collegiumramazzini.org/download/18_EighteenthCRStatement (accessed October 14), 2015.

et al., 2013; Magnani et al., 2015].[36]

The question is posed as to whether one fiber of asbestos can cause mesothelioma? This is a rather non-sensible question, because exposed individuals have thousands to millions of asbestos fibers in their lungs or other body areas[37], and exposures do not occur to just one fiber at a time; rather, each exposure involves thousands or millions of asbestos-containing fibers. Most fibers inhaled never get past the body's own defense mechanisms to even reach the lower respiratory system.[38] Epidemiology has shown that a person's risk of mesothelioma becomes greater as exposure to asbestos increase. However, as discussed earlier, even small exposures carry some risk for subsequent mesothelioma.

Obviously, each disease has an ultimate cause, and that ultimate cause may well be multiple factors coming together in the same individual in which the mesothelioma develops. Mesothelioma is a *"Sentinel Event"*, because there is most often an association with exposure to asbestos or some other elongated mineral particulate. Rudd et al.[39] conclude that it is clear the risk of mesothelioma increases in relation to the dose of asbestos, although it is not possible to identify the particular fiber or group of fibers involved in the genesis of a specific mesothelioma. Epidemiologically it is appropriate to regard all sources of asbestos exposure as increasing risk in the same way that all cigarettes smoked would be considered to have contributed to the risk of a lung cancer. In smoking-induced lung cancer just like mesothelioma, there is a latency period before overt disease, and the amount of toxins inhaled during that period determines the overall risk. Thus, as with cigarettes and lung cancer, the dose of asbestos over time determines the risk for asbestos-induced mesothelioma.

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[36] Magnani C et al. Pleural mesothelioma: epidemiological and public health issues. Report from the Second Italian Consensus Conference on Pleural Mesothelioma. Med Lav 2013; 104: 191-202; Magnani, C., C. Bianchi, E. Chellini, D. Consonni, B. Fubini,V. Gennaro, A. Marinaccio, M. Menegozzo, D. Mirabelli, E. Merler, F. Merletti, M. Musti, E. Oddone, A. Romanelli, B. Terracini, A. Zona, C. Zocchetti, M. Alessi, A. Baldassarre, I. Dianzani, M. Maule, C. Mensi, and S. Silvestri. III Italian consensus conference on malignant mesothelioma of the pleura. Epidemiology, public health and occupational medicine related issues. La Medicina del Lavoro,2015; 106: 325–32.

[37] Aust AE, Cook PM, Dodson RF. Morphological and chemical mechanisms of elongated mineral particle toxicities', Journal Tox Environ Health, Part B, 2011; 14, 1: 40-75.

[38] Newhouse, M., J. Sanchis, and J. Bienenstock. Lung defense mechanisms (first of two parts). New England Journal of Medicine, 1976, 295:990–98; Newhouse, M., J. Sanchis, and J. Bienenstock. Lung defense mechanisms (second of two parts). New England Journal of Medicine 295:1045–52, 1976.

[39] Rudd, R., J. Moore-Gillon, and M. Muers. Mesothelioma, letter to the editor. Thorax, 2002; 57:187.

Iwatsubo et al. in their case-control epidemiology study state, *"We observed a dose-response relation with cumulative exposure from both intermittent and continuous patterns of exposure."* This study further concludes: *"Our results indicate that mesothelioma cases occurred below a cumulative exposure of 5 f/ml-years and perhaps below 0.5 f/ml years."*[40] Rodelsperger et al. conclude: *"Our results confirm the previously reported observation of a distinct dose-response relationship, even at levels of cumulative exposure below 1 fiber year."*[41] This finding clearly is in support of the outcome of the French mesothelioma case-control study by Iwatsubo et al.[42] Sporn and Roggli[43] conclude: *"There is a linear dose-response relationship between the amount of asbestos to which an individual is exposed and the risk of developing mesothelioma. In addition, a threshold level of exposure below which mesothelioma will not occur has not yet been identified."* Battifora and McCaughey, of the Armed Forces Institute of Pathology, state: *"The incidence of diffuse malignant mesothelioma rises with increasing intensity and duration of exposure to asbestos; the dose-specific risk data is a linear relationship."*[44] Further, the U.S. Consumer Product Safety Commission *"... noted that in the scientific literature there is general agreement that there is no known threshold level below which exposure to respirable free-form asbestos would be considered safe."*[45]

Selikoff and Lee state: *"one would expect the onset of mesothelioma to occur earlier and*

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[40] Iwatsubo, Y., J. C. Pairon, C. Boutin, O. Menard, N. Massin, D. Caillaud, E. Orlowald, F. Galateau-Sallé, J. Bignon, and P. Brochard. Pleural mesothelioma: Dose-response relation at low levels of asbestos exposure in a French population-based case-control study. American Journal of Epidemiology, 1998; 148: 133–42.

[41] Rödelsperger, K., J. K-H, H. Pohlabeln, W. Römer, and H. J. Woitowitz. Asbestos and man-made vitreous fibers as risk factors for diffusemalignant mesothelioma: Results from a German hospital-based case-control study. American Journal of Industrial Medicine, 2001; 39:262–75.

[42] Iwatsubo, Y., J. C. Pairon, C. Boutin, O. Menard, N. Massin, D. Caillaud, E. Orlowald, F. Galateau-Sallé, J. Bignon, P. Brochard. 1998. Pleural mesothelioma: Dose-response relation at low levels of asbestos exposure in a French population-based case-control study. American Journal of Epidemiology, 1998; 148: 133–42.

[43] Sporn T. A., V. L. Roggli. Mesothelioma. In Pathology of asbestos-associated diseases, 2nd ed., Eds. V. l. Roggli, T. D. Oury, and T. A. Sporn, New York, NY Springer, 2004; 104–168.

[44] Battifora, H., and W. T. E. McCaughey. Tumours of the serosal membranes. In Atlas of tumor pathology, third series, fascicle, 15. Washington, DC: Universities Associated for Research & Education in Pathology, Inc., Armed Forces Institute Pathology, 1995.

[45] U.S. Consumer Product Safety Commission. Ban of consumer patching compounds containing respirable free-form asbestos. 16 CFR Ch. 11 §1304.5 (1-1-04 Ed) 1977: 380-383.

more frequently in those exposed to doses that are high but insufficient to incite serious competition from parenchymal fibrosis."[46] Churg and Green agree with the Selikoff and Lee prediction on how dose affects latency *"...as exposure level decreases, the latency period increases."*[47] In contrast, the III Italian Consensus Conference on Mesothelioma of the Pleura in 2015 conclude: *"under the expectation of a shorter latency for the most exposed, it is fallacious because its results do not depend on the relationship between exposure and disease, but on the time boundaries of the observation"* suggesting *"the average latency is unaffected."* However, this conclusion was not unanimous, because "Claudio Bianchi believes that an inverse relationship exists between intensity of asbestos exposure and length of the latency period."[48] Even though there may be some controversy about exposure's effect on latency, the Conference found general support *"...that duration and intensity are independent determinants of MM occurrence."*[49]

Bignon et al., after reviewing multiple studies, conclude: *"...that each exposure parameter contributed to some extent to the mesothelioma...."* These exposure parameters included probability of exposure, intensity, and frequency. These same authors conclude that when these three parameters and duration of exposure were fitted together and summed over an entire working life, the OR increased from 1.2 (95% CI 0.8-1.8) in the lowest exposure category to 8.7 (95% CI 4.1-18.5) in the highest.[50] Relying on Albin et al.,[51] Bignon et al. state that the cumulative exposure

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[46] Selikoff, I. J., and D. H. K. Lee. Asbestos and disease. New York, NY: Academic Press. 1978.

[47] Churg, A., and F. H. Y. Green. Pathology of occupational lung disease, 2nd ed. Baltimore, MD: Williams & Wilkins. 1998.

[48] Magnani, C., C. Bianchi, E. Chellini, D. Consonni, B. Fubini,V. Gennaro, A. Marinaccio, M. Menegozzo, D. Mirabelli, E. Merler, F. Merletti, M. Musti, E. Oddone, A. Romanelli, B. Terracini, A. Zona, C. Zocchetti, M. Alessi, A. Baldassarre, I. Dianzani, M. Maule, C. Mensi, and S. Silvestri. III Italian consensus conference on malignant mesothelioma of the pleura. Epidemiology, public health and occupational medicine related issues. La Medicina del Lavoro, 2015; 106: 325–32.

[49] Magnani, C., C. Bianchi, E. Chellini, D. Consonni, B. Fubini,V. Gennaro, A. Marinaccio, M. Menegozzo, D. Mirabelli, E. Merler, F. Merletti, M. Musti, E. Oddone, A. Romanelli, B. Terracini, A. Zona, C. Zocchetti, M. Alessi, A. Baldassarre, I. Dianzani, M. Maule, C. Mensi, and S. Silvestri. III Italian consensus conference on malignant mesothelioma of the pleura. Epidemiology, public health and occupational medicine related issues. La Medicina del Lavoro,2015; 106: 325–32.

[50] Bignon J, Y. Iwatsubo, F. Galateau-Salle, and A. J. Valleron. History and experience of mesothelioma in Europe. In Mesothelioma, ed. B. W.S. Robinson and A. P. Chahinian, 29–53. London, UK: Martin Dunitz Ltd., Taylor & Francis Group, 2002.

[51] Albin, M., K. Jakobsson, R. Atteweell, L. Johansson, and H. Welinder. Mortality and cancer morbidity in cohorts of asbestos cement workers and referents. British Journal of Industrial Medicine, 1990; 47: 602–10.

increased the RR by 1.9 for each f/mL-year among employees with 40 years or more exposure.[52] Newhouse et al. in their study among factory workers found the mesothelioma death rates increased according to both duration and severity of asbestos exposure,[53] while Raffn et al. found pleural mesothelioma increasing with the duration of exposure among subjects having 15 or more years of latency (SIR = 3.77 for less than 5 years of exposure versus an SIR = 13.56 for more than 5 years of exposure).[54] Peto et al., when looking at an insulator cohort from North America by using mathematical modeling, found the third or fourth power of time since first exposure were best compatible with a linear dose-response relationship.[55]

Bignon et al. found: *"These results suggest that each exposure parameter contribute to some extent to the mesothelioma, although the dose-response relationship seemed to be described best by the CEI."*[56] Additionally, the authors wrote that while *"very few studies have focused on the time-related pattern of occupational exposure as a significant factor in the occurrence of mesothelioma. Our study examined the temporal exposure pattern according to the frequency of exposure and the CEI. We observed a dose-response relationship with cumulative exposure for both intermittent and continuous pattern of exposure."* This study concluded: *"Our results suggested that intermittent exposure does not carry as high a risk as continuous exposures."*[57]

Peto et al. [2009] report: *"If this apparent synergistic interaction between early and later exposures is real, the conventional additive model proposed almost 30 years ago (Peto, 1978)*[58]

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[52] Bignon J, Y. Iwatsubo, F. Galateau-Salle, and A. J. Valleron. History and experience of mesothelioma in Europe. In Mesothelioma, ed. B. W.S. Robinson and A. P. Chahinian, 29–53. London, UK: Martin Dunitz Ltd., Taylor & Francis Group, 2002.

[53] Newhouse, M. L., G. Berry, and J. C. Wagner. Mortality of factory workers in east London 1933-80. British Journal of Industrial Medicine, 1985; 42: 4–11.

[54] Raffn, E., E. Lynge, K. Juel, and B. Korsgaard. Incidence of cancer and mortality among employees in the asbestos cement industry in Denmark. British Journal of Industrial Medicine, 1989; 46: 90–96.

[55] Peto, J., H. Seidman, and I. J. Selikoff. Mesothelioma mortality in asbestos workers: Implications for models of carcinogenesis and risk assessment. British Journal of Cancer, 1982; 45: 124–35.

[56] CEI = cumulative exposure index

[57] Bignon J, Y. Iwatsubo, F. Galateau-Salle, and A. J. Valleron. History and experience of mesothelioma in Europe. In Mesothelioma, ed. B. W.S. Robinson and A. P. Chahinian, 29–53. London, UK: Martin Dunitz Ltd., Taylor & Francis Group, 2002.

[58] Peto, J. The hygiene standard for chrysotile asbestos. Lancet, 1978; 311: 484–89.

on which risk assessments (HEI, 1991)[59] and recent predictions of mesothelioma incidence (Hodgson et al., 2005)[60] were based should be modified. Under this additive model most cases are caused by exposures at younger ages and the additional effect of later exposure is much less."[61]

Contrary to prevailing thought that latency, frequency, and intensity are the key factors in determining subsequent risk, La Vecchi and Boffetta argue that only latency is key and that mesothelioma risk is not influenced by later exposures in life.[62] However, their reasoning suffers from several key flaws, including a selective review of the literature with their conclusions not supported by the original results of the studies included in their review.[63] La Vecchi and Boffetta[64] also use SMRs for comparing studies which are not mutually standardized, making any comparisons questionable because using such SMRs may allow influence from a variety of other factors, including age, to bias the results. Their analysis also ignores differences or changes in exposure patterns, which are important. For example, asbestos exposures may have been substantially lower in later time periods for workers with long duration of exposure, i.e. after age 30. Additionally, by not accounting for exposure over time, they fail to address effects from cumulative exposures. Further, as noted by Terracini et al.,[65] by lumping together pleural and peritoneal cancers, they ignore the differences in both dose-effect and time-effect relationships of the two types of mesothelioma. Finally, the confidence intervals for all the RRs are so large that it calls into question their meaning. Though the CIs overlap in all the tables presented, the authors

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[59] Health Effects Institute. Asbestos in public and commercial buildings: A literature review and synthesis of current knowledge. Cambridge, MA: Health Effects Institute—Asbestos Research, 1991.

[60] Hodgson, J. T., D. M. Elvenny, A. J. Darnton, M. J. Price, and J. Peto. The expected burden of mesothelioma mortality in Great Britain from 2002 to 2050. British Journal of Cancer, 2005; 92: 587–93.

[61] Peto, J., C. Rake, C. Gilham, and J. Hatch. Occupational, domestic and environmental mesothelioma risks in Britain: A case-control study. Prepared by the Institute of Cancer Research and the London School of Hygiene and Tropical Medicine for the Health and Safety Executive, Health and Safety Executive, London, UK, 2009.

[62] La Vecchia, C., and P. Boffetta. Role of stopping exposure and recent exposure to asbestos in the risk of mesothelioma. European Journal of Cancer Prevention, 2011; 21:227–30.

[63] Terracini, B., D. Mirabelli, C. Magnani, D. Ferrante, F. Barone-Adesi, and M. Bertolotti. A critique to a review on the relationship between asbestos exposure and the risk of mesothelioma. Letter to the editor. European Journal of Cancer Prevention, 2014; 23: 492–94.

[64] La Vecchia, C., and P. Boffetta. Role of stopping exposure and recent exposure to asbestos in the risk of mesothelioma. European Journal of Cancer Prevention, 2011; 21:227–30.

[65] Terracini, B., D. Mirabelli, C. Magnani, D. Ferrante, F. Barone-Adesi, and M. Bertolotti. A critique to a review on the relationship between asbestos exposure and the risk of mesothelioma. Letter to the editor. European Journal of Cancer Prevention, 2014; 23: 492–94.

continue to interpret these relationships to fit their conclusion. The Collegium Ramazzini [2015], after reviewing the entirety of scientific data, conclude the *"risk of malignant mesothelioma is related to cumulative exposure to asbestos in which all exposures – early as well as late – contribute to the totality of risk."*[66]

D. Asbestos: Foreseeability of The Potential Disease Risk from Take-home Asbestos Exposures

Take-home asbestos on workers clothes, shoes, or hair can cause household exposures, as can proximate residential exposures to asbestos sources. Like any toxic substance, asbestos will increase the risk of disease no matter under which settings the exposures occur, be they occupational or non-occupational. The toxicity is not determined by asbestos' use but by its presence, its respirability, and the fibrous nature of the asbestos itself. If asbestos can be inhaled it has the potential to cause an increase in risk of disease in those individuals inhaling it. While case-reports and epidemiology studies describing disease from asbestos take-home exposures have only been reported or conducted over the last 50 some years the foreseeability of such risk have been anticipated much earlier.[67]

Occupational medicine and hygiene experts have not only anticipated take-home risks prior to their actual occurrence but have been warning of these risks and making recommendations to prevent their occurrence for many decades. Epidemiology studies describing disease in family members resulting from asbestos exposures taken home have only demonstrated and confirmed the failure to adhere to these earlier warnings. It should not have been a surprise that what epidemiologists have now confirmed among household members of asbestos exposed workers are of similar nature to the diseases experienced by the actual asbestos exposed workers themselves

[66] Collegium Ramazzini. Comments on the causation of malignant mesothelioma: Rebutting the false concept that recent exposures to asbestos do not contribute to causation of mesothelioma. Carpi, Italy. http://www.collegiumramazzini.org/download/18_EighteenthCRStatement (accessed October 14, 2015). 2015.

[67] Lemen RA, 2011 Epidemiology of Asbestos-Related Diseases and the Knowledge That Led to What is Known Today – Ch. 5. In: **Asbestos Risk Assessment, Epidemiology, and health Effects** – Second Edition. Eds Ronald F. Dodson, Samuel P. Hammar. CRC Press Taylor & Francis Group, 131-268; NIOSH, 1995. **Report to Congress on Workers' Home Contamination Study Conducted Under The Workers' Family Protection Act (29 U.S.C. 671a).** U.S. Department of Health and Human Services, Public Health Service, Centers For Disease Control And Prevention, National Institute for Occupational Safety and Health (NIOSH), Cincinnati, OH 45226, September. See sections on Asbestos p. 6-11; 45-46; 55; 62-63; 86-87; tables 2-6 (pp. 145-159).

and are clearly, as was foreseeable, a result of workers taking their asbestos laden clothing away from the workplace. Ramazzini, the father of modern occupational medicine, told of the ability of soiled clothes to carry disease risks when he wrote of Laundresses in 1713 *"I should add that when they wash bed-linen and underclothes stained with a thousand kinds of filth from persons . . . they inhale by the mouth and nose a mixture of harmful vapors of all sorts."*[68] He described how contaminated clothing could transmit a hazard, obtained at the direct source of exposure, to the downstream recipient, in this case the laundresses. In other words, his description fits into what epidemiologists describe as the basic chain of disease transmission starting from the source (agent of disease) through a vector (contaminated clothing) to the susceptible host (the laundress who developed disease). This causation model has been used for well over a hundred years to describe both infectious disease transmissions as well as those occurring from toxic materials. As early as 1897 Netolitzky, a physician, reporting on lung disease among textile workers also observed illness among their family members.[69]

In1913 it was suggested that street clothes should not be worn in the work area and that work clothes should be removed prior to leaving the factory, thus preventing industrial poisons from being carried away from the workplace and exposing non-workers to the industrial hazard.[70] Textbooks in occupational hygiene from around the turn of the last century described how toxic materials could leave the workplace and come into the home environment. *"The workman who goes home to a scanty meal, wearing clothing steeped in perspiration and the fumes, dust or solutions of toxic materials in which he has been working, and who sleeps in a close, dirty apartment in which he hangs his reeking clothes, carries much of his occupational hazard with him, if it be of toxic nature."*[71] In this same textbook, under a section titled Clothing as a Cause of Disease suggests, *"Dressing rooms should be provided where the clothing may be exchanged for the overalls."* In a 1916 textbook by Professor of Hygiene at The George Washington University and Chairman of the Industrial Hygiene Section of the American Public Health Association,

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[68]Ramazzini B, 1713. **Diseases of workers**. The Latin text of 1713 Revised, with translation and notes by Wilmer Cave Wright. The University of Chicago Press, Chicago, IL, 1940: 255.
[69]Netolitzky, a., 1897. Hygiene der Textilindustrie. Handbuch der Hygiene, Weyl, T., (ed), Vol. 8, Industrial Hygiene, Jena: G. Fischer Pub., pp. 1102-1103.
[70]See p. 248-249 in: Tolman, W.H. & Kendall, L.B., MCMXIII (1913). **SAFETY Methods For Preventing Occupational And Other Accidents And Disease**. Harper & Brothers Publishers, New York & London.
[71]Thompson WG, 1914. **The Occupational Diseases Their Causation, Symptoms Treatment and Prevention**. D. Appleton and Company, New York and London: 47.

George Kober and his colleague from the Massachusetts State Board of Health William Hanson wrote under Dressing-rooms, Lockers, Bath and Wash Rooms *"It is desirable, in all dusty occupations, that the workmen should take off all their street clothing before beginning work, and this is absolutely essential when the occupation involves exposure to poisonous dust. For this purpose suitable dressing rooms, provided with lockers for street suits and separate compartments for overalls, are necessary. Facilities for washing and bathing, brushes, soap and individual towels should be furnished. In most of the civilized countries statutory provision have been made for these sanitary requisites, in all establishments in with poisonous substances are manufactured or used, and the result has been most beneficial."*[72]

One of the most widely circulated textbooks on Dangerous Trades edited by Thomas Oliver, and continually updated to the present, first published in 1902 described just how dangerous bring home contaminated work clothing can be to the woman who simply washes that clothing just as Ramazzini had warned almost 200 years before. In France he describes, *"Saturnine poisoning"* from lead exposures to women *"who had simply washed the clothes of their husbands, who were workers in lead factories"*. He further describes how the *"White Lead Commission"* recommended the wearing of overalls when at work because the *"Commission ascertained the clothes of several of the female workers, which were often dust-laden became the bedclothes of the family at night. Lead dust is always a danger, so, too, may be the bespattered working clothes of house painter."* From this he describes a 36-year-old woman having contracted lead poisoning from simply attended her domestic duties, never working in a factory, but who had taken on two house painters as boarders, her brother and nephew, for whom she washed their clothing once a week. After careful investigation by a local college chemistry professor it was found that very large quantities of lead were found in the residue water after the clothing had been washed leading to the diagnosis of lead poisoning which after treatment and discontinuation of washing the contaminated clothing her health was gradually regained.[73] Kober and Hayhurst (1924) advised that street clothes should not be worn at work and that the employer at the

[72]Kober GM, Hanson WH, 1916. **Diseases of Occupation and Vocational Hygiene**. P. Blakiston's son & Co. Philadelphia: 443.
[73]Oliver T, 1902. **Dangerous Trades The Historical, Social, and Legal Aspects of Industrial Occupations As Affecting Health**, By A Number of Experts. John Murray, London: 369-370.

workplace furnish change rooms and washing facilities.[74]

The International Labour Office, in their Standard Code of Industrial Hygiene published in 1934 recommended *"In dusty trades, cloakrooms, wishing accommodations, and eventually douche-baths, separate from the workrooms, should be provided for the workers."* The Code also stated, *"Such smoke, fumes and gas should be rendered harmless prior to being passed into the outside air."*[75]

In 1937 a major industrial employer, Standard Oil, advised when doing work that could contaminate clothing that *"the outer clothing must be removed and placed in a locker used for this purpose only."* They also stated *"A conveniently located locker and wash room shall be designated for use of employees handling litharge. Separate lockers should be provided for street clothes, work clothes, and one for Unionalls worn when handling litharge. In plants where men are handling litharge throughout the shift, only two lockers need be provided. The floors of the locker rooms where the men change their dust covered Unionalls and the benches shall be thoroughly moistened before being cleaned."*[76]

In 1940, the German GUIDELINES FOR THE PREVENTION OF HEALTH HAZARDS FROM DUST IN ASBESTOS MANUFACTURING PLANTS specifically mentions that street garments must not be left in the working area and that the retained dust on working clothes must be removed at regular intervals.[77]

In 1943, the United States Public Health Service published in their MANUAL OF INDUSTRIAL HYGIENE AND MEDICAL SERVICE IN WAR INDUSTRIES the importance of cleanliness so that the worker did not carry the workplace exposures out of the workplace. The

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[74]Kober, G.M. & Hayhurst, E.R., 1924. **Industrial Health**, P. Blackiston' Son, Philadelphia, p. 24.
[75]ILO, 1934. **STANDARD CODE OF INDUSTRIAL HYGIENE**. International Labour Office, Geneva, R. S. King & Son, Ltd., London.
[76]Bonsib RS, 1937. Dust Producing Operations in the Production of Petroleum Products and Asociated Activities. Standard Oil Companhy, New York, New York. NIOSHTIC Control Number: NIOSH-00172655 and CCOHS Record Number: 133693.
[77]See GUIDELINES FOR THE PREVENTION OF HEALTH HAZARDS FROM DUST IN ASBESTOS MANUFACTURING PLANTS. Effective as of 1 August 1940. (See Bulletin for labor Practices in the Reich No. 29/1940, III 263.).

Manual was developed because of *"The unprecedented growth of industry and the rapid development of industrial facilities to meet the needs of the Nation at war demand a corresponding increase in industrial health practice."* In the Manual it stated that *"[I]t is highly necessary that workers have adequate washing facilities. This implies enough wash stands or showers and a sufficient quantity of hot water as well as cold. There should also be adequate time to enable thorough cleansing, change of clothes and dressing between the end of work and the time when transportation facilities are available. Many plants give too little time between the end of work and the bus home."* Further in the report *"The work clothes should be provided and laundered by the employer."* Also, *"[T]he employer should, without expense to the employees, furnish proper boots or shoes for the use of the employees while at work in such places."*[78]

Specifically, by 1943 documentation of the effects of these take-home and environmental contamination concerns were appearing much more frequently in the literature. Good & Pensky (1943) reported a few cases in workers' wives of eruptions resembling their husbands' from halowax acne (cable rash). The authors suspected the cases in the wives to have been the result of contact with work clothes and from laundering shirts and underwear.[79]

Historically, reports from widely available sources not only predicted but show how industrial hygienists and occupational medical specialists were warning and recommending to industry how take-home exposures cause disease in family members and suggesting ways the industry could institute prevention strategies, so these disease risks could be eliminated. Multiple texts, papers and studies provided examples of toxic material exposures arising in the home from toxic substances brought into the home through contaminated clothing, unwashed hair, shoes, and skin.

In 1936 Drinker and Hatch, two of the best known industrial hygienists of their time reported it has been known as well as shown for many years that the best method to control dust-

[78]See Gafafer, W. M. (ed.), 1943. **MANUAL OF INDUSTRIAL HYGIENE AND MEDICAL SERVICE IN WAR INDUSTRIES**. Division of Industrial Hygiene, national Institute of Health, United States Public Health Service, W. B. Saunders Company, Philadelphia and London, p. 168; 350-351.
[79]Good, C. K. & Pensky, N., 1943. Halowax Acne (*"Cable Rash"*) Cutaneous eruption in marine electricians due to certain chlorinated naphthalenes and diphenys. Arch Derm Syph, September, Vol. 48, No. 3, American Medical Association, 254.

related diseases, including those associated with exposure to asbestos, was to control the exposure to the dust containing the toxic material including the asbestos fibers at the source of exposure.[80] There was no secret that by containing the source of dust the likelihood of further contamination away from the source could be eliminated.

This whole discussion demonstrates concern for take-home exposures from the workplace and were of major concern as well as foreseeable that any toxic material, taken from the workplace, retained their toxic nature and could cause contamination and disease elsewhere simply through their presence. The prevention of take-home exposures was not something unique or that must wait for individual epidemiological confirmation for every toxic substance. The state-of-the-art scientific literature already told that toxic materials could be carried away from the workplace and cause disease. It was clear that it was the toxic nature of the substance, not just its use in the workplace, that was hazardous and that wherever it went its toxic properties would accompany it and cause harm.

E. Exposure from Laundering of Worker Clothing Contaminated with Asbestos

Much of the exposures to asbestos among family members can result from the laundering of worker clothing. As described as early as 1713 by Ramazzini, laundresses or those that wash clothing have been known for centuries to be at risk of a variety of diseases *". . . they inhale by the mouth and nose a mixture of harmful vapors of all sorts; . . ."*[81]

Concentrations of asbestos were recorded in workers homes who brought their work clothes home of 50 to >2000 ng/m^3 when compared to homes of non-asbestos workers of 32 to 65 ng/m^3.[82] Newhouse and Thompson reported 7 females among 76 mesothelioma patients who only had a history of washing the work clothes of their occupationally exposed husbands or family

[80]See Chapter X in: Drinker, P. & Hatch, T., 1936. **INDUSTRIAL DUST – Hygienic Significance, Measurement and Control**. McGraw-Hill Book Company, Inc., New York and London.
[81]Ramazzini B, 1713. **Diseases of Workers (De Morbis Artificum of 1713)**. Translated by Wilmer Cave Wright, Published under the auspices of the Library of the New York Academy of Medicine, Hafner Publishing Company, New York/London, 1964.
[82]Nicholson WJ. Tumour incidence after asbestos exposure in the USA: Cancer risk of the non-occupational population. VDI-Berichte Nr 475, Düsseldorf, 161-177.

members.[83] In the Newhouse and Thompson study 9 of the mesotheliomas did not have occupational exposures and a econdary analysis found their OR=16.75 (95% CI: 2.0-136.78).[84]

Vianna and Polan doing a case-control study of mesothelioma found 7 wives and 1 daughter's only exposures were to washing asbestos-contaminated work clothes. In the case-control study only one matched control had such a history.[85] Schneider et al. calculated the OR=8.0 (95% CI: 1.0-64.0).[86] Schneider et al. mentions two other reports where the family members developing mesothelioma had only exposure during washing their other family members work clothes contaminated with asbestos.[87] Roquin et al (1994) report two cases of family members with pleural mesothelioma. The first a 33-year-old man whose father worked with asbestos boards for 5 years and the work clothes were laundered at home. The second was a 76-year-old woman, who had laundered her husbands work clothing as he worked 32 years in and asbestos factory, developing the disease 18 years later.[88]

E. Corporate Knowledge of Take-home, Neighborhood, and Family Exposure To Asbestos.

The Industrial Hygiene Foundation (IHF), first called the Air Hygiene foundation (1936-1941), was founded by the Mellon Institute with membership consisting of a group of large industrial corporations. The IHF conducted medical and industrial hygiene surveys of various industries, including the asbestos industry. It also published proceedings of it's meeting and also the Industrial Hygiene Digest (IDH). The annual meeting was covered by various trade journals and news media like the Wall Street Journal & The New York Times, as well as wire services

[83]Newhouse ML, Thompson H, 1965. Mesothelioma of Pleura and peritoneum following exposure to asbestos in the London area. Br J Inudst Med, 22: 261-267.
[84]Schneider J, Straif K, Woitowitz H-J, 1996. Pleural mesothelioma and household asbestos exposure. Rev Environ Health, 11(1-2): 65-70.
[85]Vianna NJ, Polan AK, 1978. Non-occupational exposure to asbestos and malignant mesothelioma in females. Lancet, 20: 1061-1063.
[86]Schneider J, Straif K, Woitowitz H-J, 1996. Pleural mesothelioma and household asbestos exposure. Rev Environ Health, 11(1-2): 65-70.
[87]Schneider J, Straif K, Woitowitz H-J, 1996. Pleural mesothelioma and household asbestos exposure. Rev Environ Health, 11(1-2): 65-70.
[88]Roguin A, Ben-Shahar M, Ben-Dror G, Cohen I, Hazani E, 1994. Malignant mesothelioma in families of asbestos workers. Harefuah, June 15, 126(12): 702-704, 764.

like the Associated Press & United Press International.[89] Starting in April 1960 the IHD published an abstract showing asbestos contamination as far as 600 meters from the factory.[90] In July 1963 the IHD published an abstract of the results of some 500 consecutive autopsies in subjects 15 years of age or greater. The findings suggested environmental contamination to urban residents not occupationally exposed to asbestos and that this contamination in the community might be of etiological significance in mesothelioma.[91] Subsequently the IHD continued to report the dangers of community exposures to asbestos.[92] Any company that was a member of the Industrial Hygiene Foundation would have received these reports. In addition, Davis, Hardy, Loeb, Austin & Ives a New York City Law Firm sent, on March 3, 1969 the minutes of the Health & Safety Council/Asbestos Cement Products Association meeting of February 18, 1969 to several asbestos companies many who attended the Council meeting. In these minutes it was reported "*. . . that mesothelioma occurred among workers as well as among people who live near crocidolite workings (so-called 'Neighborhood cases').*"[93] Finally, Dr. Homan of the Bushy Run Research Center sent, on October 4, 1982, to Mr. Sicard, Union Carbide Corporation a copy of Dr. Selikoff's paper on Household Risks With Inorganic Fibers in which family contact asbestos disease is specifically discussed.[94]

It is clear that companies belonging to the Industrial Hygiene Foundation were given information that would have made them aware of the dangers of community exposures to

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[89] McMahon, J.F., 1939. Progress Report – Air hygiene foundation. Mellon Institute of industrial Research, March 11, University of Pittsburgh & Castleman, B.I., 1990. Asbestos: Medical and Legal Aspects. Third Edition, Prentice Hall law and business, Englewood Cliffs, NJ.

[90] See IHD, 1960. Industrial Health News, Vol. 24, No. 4, p. 19, April. 365. Tomic, A., 1958. Public Health and Hygienic Factors in the Region of an Asbestos Mine and Factory. Higijena (Belgrade), Vol. 10, pp. 273-286.

[91] See IHD, 1963. Industrial Health News, Vol. 27, No. 7, p. 21, July. Thomson, J.G., Kaschula, R.O.C., & MacDonaic, R.R., 1963. Asbestos as Modern Urban Hazard. S African Med J, Vol. 37, p. 77, Jan. 19.

[92] See IHD, 1967. Industrial Health News, Vol. 31, No. 9, p. 16, September. Cuthbert, J., 1967. Danger of Asbestos for General Population, Munch med Wochschr, Vol. 109, pp. 1369-1372; IHF, 1976. Abstracts, Volume II, 1965 – 1976, Pneumoconiosis Abstracts, IHD. Thompson, J.G. & Graves, W.M.Jr., 1966. Asbestos as an Urban Air contaminant. Arch pathol, Vol. 81, pp. 458-464, May (8/66); Thomson, J.G., 1965. Asbestos and the Urban Dweller. Ann NY Acad, Vol. 132, pp. 196-214, Dec. 31 (7/66); Tabershaw, I.R., 1968. Asbestos as an environmental Hazard. JOM, Vol. 10, pp. 32-37, Jan., (6/68); Gold, C., & Cuthbert, J., 1966. Asbestos - - A Hazard to the Community. Public Hlth (London), Vol. 80, pp. 261-270, September (6/68); & Langer, A.M., Selikoff, I.J. & Sastre, A., 1971. Chrysotile asbestos in the lungs of persons in New York City. Arch Environ Hlth, vol. 22, pp. 348-361, March (5/71).

[93] See Davies, Hardy, Loeb, Austin & Ives, March 3, 1969. Memorandum & Walls, 1969. Minutes of the Meeting of the Health & Safety Council/Asbestos Cement Products Association, February 18.

[94] See Homan, 1982. Letter to Mr. Sicard, Union Carbide Corporation, October, 4. Bushy run Research Center, R.D. 4, Mellon road, Export, PA 15632.

asbestos and disease potential. It is also clear the many of the major asbestos producing companies were also aware of the risks to community residents from non-occupational exposure to asbestos. Finally, some end-product users of asbestos were also alerted to the risk of household members from non-occupational exposure to asbestos.

F. Facts Concerning Mr. Larry Boynton's and his take-home exposures to Mrs. Barbara Boynton

Like many tradesmen, Larry Boynton worked at various work sites throughout his career. Larry Boynton was mainly an electrician for various electrical contractors from 1963 until his retirement in 2005. However, Larry Boynton's first employment history was at Kennecott Copper from 1961 through 1964 as a laborer. He then was employed by electrical contractors as an electrician and electrician helper starting at Kennecott Copper from approximately 1963 through the late 1960s over a period of approximately 2 to 3 years. In 1973 he worked for an electrical contractor at Huntington Canyon power plant for 5 to 6 months. Then between 1976 and 1978 he worked for an electrical contractor for about 10 months at the Phillips 66 refinery.[95]

Mr. Boynton claims his asbestos exposures started prior to his marriage to Barbara in 1962 and then continued up to about 1980.[96] All of Barbara Boynton's exposures to asbestos as claimed by Mr. Boynton resulted because *"I worked in construction my whole life, electrician, and I wore dirty clothes home that she laundered."*[97] Mrs. Barbara Boynton was diagnosed with mesothelioma approximately 6 to 8 months prior to her death on 28 February 2016. Mrs. Boynton was 71 years of age and had been married to Larry Boynton for 54 years at the time of her death.

Asbestos was known to be present at Kennecott through Kennecott records. Evidence of asbestos at Huntington Canyon power plant is contained in PacifiCorp discovery responses. These include asbestos abatement testing and records from the 2000s time period identifying thermal

[95] Deposition of Larry Boynton, June 19, 2018 in the Matter of Larry Boynton, individually and on behalf of the heirs of Barbara Boynton, Plaintiff, vs. Industrial Supply Company, Inc. et al., Defendants.
[96] Deposition of Larry Boynton, June 19, 2018 in the Matter of Larry Boynton, individually and on behalf of the heirs of Barbara Boynton, Plaintiff, vs. Industrial Supply Company, Inc. et al., Defendants.
[97] Deposition of Larry Boynton, June 19, 2018 in the Matter of Larry Boynton, individually and on behalf of the heirs of Barbara Boynton, Plaintiff, vs. Industrial Supply Company, Inc. et al., Defendants.

insulation products, gaskets, packing, floor covering, and other products.[98] Phillips 66 Company's discovery responses admit asbestos-containing pipe covering and gaskets were used in some areas of the facility prior to the 1970s.[99]

OSHA

OSHA's 1972 minimum requirements for compliance with the Federal regulations pertaining to asbestos required personal and environmental sampling within six months of the publication of section 1910.93a: *"Where asbestos fibers are released to be monitored in such a way as to determine whether every employee's exposure to asbestos fibers is below the limits prescribed..."* in the Act (8-hour T.W.A. of 2 fibers/cc and do not exceed ceiling concentrations in excess of 10 fibers/cc).[100] Thereafter, personal and environmental sampling. *"In no case shall the sampling be done at intervals greater than six months for employees whose exposure to asbestos may reasonably be foreseen to exceed the limits prescribed in paragraph (b) of this section."*[101]

When the permissible exposure limits are exceeded, a program of compliance, as outlined in the Act, was required, including: engineering controls, cation signs and labels, special clothing, change rooms, clothes lockers, laundering, and an appropriate respiratory program during the time period necessary to install engineering controls and work practices to reduce exposures below the limits.

Specific work practices and tools were also prohibited under the Act including hand-operated and power tools which may produce or release asbestos fibers in excess of the limits, unless provided with local exhaust ventilation; wet methods when asbestos is handled, mixed,

[98] PacifiCorp's Discovery Responses identified as asbestos identification documents PAC00013347-14062.
[99] Defendants Phillips 66 and ConocoPhillips Company responses to plaintiff's first set of interrogatories and requests for production of documents. Case No. 160902693 in the Matter of Larry Boynton, individually and on behalf of the heirs of Barbara Boynton, Plaintiff, vs. Industrial Supply Company, Inc. et al., Defendants.
[100] OSHA. Standard for exposure to asbestos dust. Federal Register 1972:37(110):11318-11322. Wednesday, June 7, 1972.
[101] Ibid

applied, removed, cut, or scored; and employees engaged in the removal of pipes, structures, or equipment covered or insulated with asbestos or in the removal of asbestos insulation or covering *"shall be provided with respiratory equipment... and with special clothing."*[102] Housekeeping, appropriate waste disposal, and record keeping were also requirements.

On July 1, 1976 OSHA lowered the 8-hour PEL to 2 fibers with a ceiling concentration at no time period in excess of 10 fibers and lengthened the recordkeeping requirements.[103]

Based on the literature, removal of insulation and gaskets without precautions can exceed the permissible exposure limits under OSHA.[104] As such, the engineering controls and other provisions outlined in OSHA would have been required. Based on my review of Mr. Larry Boynton's deposition testimony, there was no evidence that those requirements were met

When asbestos-containing insulation is removed without precautionary measures, such as wetting, the levels of exposure can exceed the permissible exposure limits of the OSHA regulations as well as the TLV of 5 mppcf.[105]

H. State of the Art

Throughout the 1900s, it was known how asbestos was toxic and how industries using asbestos were warned of its toxicity.[106] The dissemination of this information was addressed through various safety, professional, and trade organizations, including the Industrial Health

[102] OSHA. Standard for exposure to asbestos dust. Federal Register 1972:37(110):11318-11322. Wednesday, June 7, 1972.
[103] OSHA. Standard for exposure to asbestos. Federal Register 1976:41(55):11504-11505 & see OSHA. Standard for exposure to asbestos dust. Federal Register 1972:37(110):11318-11322. Wednesday, June 7, 1972.
[104] Lemen, R.A. Epidemiology of Asbestos-Related Diseases and the Knowledge That Led to What Is Known Today—Chapter 5. In Asbestos Risk Assessment, Epidemiology, and health Effects, 2nd ed.; Ronald, F.Dodson& Samuel, P.Hammar., Eds.; CRC Press Taylor & Francis Group: New York, NY, USA, 2011; pp. 131–268.
[105] See footnote 105. Balzer JL, Cooper WC. The Work Environment of Insulating Workers. *Am. Ind. Hyg. Assoc. J.* 1868 May-June; 29(3):222-7. Hoyle Depo, p. 166-168.
[106] Castleman, B.I. Asbestos Medical and Legal Aspects, 5th ed.; Aspen Publishers: Gainthersburg, MD, USA, 2005.

Foundation (IHF),[107] the National Safety Council (NSC), the American Chemical Society (ACS),[108] and the American Petroleum Institute (API).[109] Further, there were numerous State and Federal laws and regulations pertaining to asbestos toxicity.[110]

Mr. Boynton described a variety of situations where he was exposed to asbestos while he personally worked where others were performing activities that would expose the area to asbestos. The dangers of asbestos exposure to construction workers had been well recognized years before Mr. Boynton's first exposures to asbestos in 1962.[111]

IV.

Opinions

It is my opinion that it was known by 1930 that asbestos exposure caused death and the disease asbestosis;[112] by the late 1940s that asbestos also caused lung cancer; and that by early 1960s it was known that asbestos caused mesothelioma.[113]

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[107]Industrial Hygiene Digest, Volume 1-2, 1937-1938. References to Recent Literature number 83. Clinical Considerations on the Question of Industrial Cancer of Asbestos Workers. Industrial Hygiene Foundation, Pittsburgh, PA.

[108] ACS, 1929-1959. Chemical Abstracts. American Chemical Society Documents.

[109] Bonsib, RS, 1937. Dust Producing Operations in the Production of Petroleum Products and Associated Activities. Standard Oil Company, New York, NY. NIOSHTIC Control Number: NIOSH-00172655 and CCOHS Record Number: 133693.

[110] ____, 1951. Safety and Health Standards for Contractors performing Federal Supply Contracts under the Walsh-Healey Public Contracts Act. United States Department of Labor, April 24. OSHA, 1970, Occupational Safety and Health Act of 1970, Public Law 91-596, 91st Congress, S- 2193, December 29, 1970. Occupational Safety and Health Administration, Department of Labor, Occupational Safety and Health Standards, Standard for Exposure to Asbestos Dust, Federal Register, Vol. 36, No. 235, Title 29, Chapter XVII, Part 1910, December 7, 1971. Occupational Safety and Health Standards: Standard for Exposure to Asbestos Dust, Federal Register, Vol. 37, No. 110, Title 29, Chapter XVII, Part 1910, June 7, 1972. Occupational Safety and Health Administration, Department of Labor, Occupational Safety and Health Standards, Standard for Exposure to Asbestos Dust, Federal Register, Vol. 41, No. 55, Title 29, Chapter XVII, Part 1910, March 19, 1976.

[111] For example, see Eisenstadt, H.B., Wilson, F.W. November 1960. Primary Malignant Mesothelioma of the Pleura. The Journal Lancet, p. 511-514. Selikoff IJ, Churg J, Hammond EC. Asbestos Exposure and Neoplasia. JAMA 1964; 188: 22. For a more detailed discussion, see my Lemen Chapter (**Exhibit B**).

[112] A known sentinel disease of asbestos exposure. See: Mullan, R.J. and Murthy, L.M., Occupational sentinel health events: an up-dated list for physician recognition and public health surveillance, *Am J. Ind. Med.*, 19, 775-799, 1991; Lemen, R.A. Epidemiology of Asbestos-Related Diseases and the Knowledge That Led to What Is Known Today—Chapter 5. In Asbestos Risk Assessment, Epidemiology, and health Effects, 2nd ed.; Ronald F. Dodson & Samuel P. Hammar, Eds.; CRC Press Taylor & Francis Group: New York, NY, USA, 2011: 131–268.

[113] Ibid.

It is my opinion that exposure to asbestos can cause asbestos-related diseases including asbestosis, asbestos pleural diseases, lung cancer, and mesothelioma; that there is currently no level or concentration of asbestos exposure that can be identified which will assure no risk of asbestos-related disease in all individuals.[114]

It is my opinion that had the prevention methods suggested in 1930[115] been followed, the risk of developing asbestosis or any asbestos-related disease, including diseases later recognized including lung cancer, mesothelioma, or other cancers would have been significantly reduced or eliminated and that these measures included the use of dust reducing procedures, such as wetting, vacuuming, and ventilation; isolating workers away from potential asbestos-laden sources and environments; utilizing safety equipment, such as appropriate protective equipment and/or respirators; and enforcing a shower and change clothes policy.

It is my opinion that Mr. Boynton was exposed to both amphibole and chrysotile forms of asbestos. As discussed in this Affidavit, both forms of asbestos cause mesothelioma as recognized by multiple scientific research agencies, and public health and occupational health rganizations.[116]

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[114] IARC Monographs on the Evaluation of Carcinogenic Risks to Humans. 2012. A review of human carcinogens, part C: Arsenic, metals, fibres, and dusts, vol. 100, Lyon, France: Published by the International Agency for Research on Cancer, World Health Organization; Lemen, R.A. Epidemiology of Asbestos-Related Diseases and the Knowledge That Led to What Is Known Today—Chapter 5. In Asbestos Risk Assessment, Epidemiology, and health Effects, 2nd ed.; Ronald F. Dodson & Samuel P. Hammar, Eds.; CRC Press Taylor & Francis Group: New York, NY, USA, 2011: 131–268.

[115] Merewether, E.R.A. and Price, C.W., 1930. Report on the effects of asbestos dust on the lungs and dust suppression in the asbestos industry I. Occurrence of pulmonary fibrosis and other pulmonary affections in asbestos workers II. Processes giving rise to dust and methods for its suppression. London: H.M. Stationary Office.

[116] IARC, 2012. International Agency for Research on Cancer. IARC Monographs Volume 100C: Arsenic, Metals, Fibres and Dusts; A Review of Human Carcinogens. http://monographs.iarc.fr/ENG/Monographs/vol100C/mono100C.pdf; IPCS 2004-2012. Chrysotile. IPCS INCHEM, International Programme on Chemical Safety. Prepared in the context of cooperation between the International Programme on Chemical Safety and the European Commission; ICOH, 2013. ICOH Statement: Global Asbestos Ban and the Elimination of Asbestos-Related Diseases. International Commission on Occupational Health. http://www.icohweb.org/site_new/multimedia/news/pdf/ICOH%20Statement%20on%20global%20asbestos%20ban.pdf; WTO, 2001. European Communities-Measures Affecting Asbestos and Asbestos-Containing Products. AB-2000-11.World Trade Organization. 12 March. https://www.wto.org/english/tratop_e/dispu_e/135abr_e.pdf; WHO, 2014. Chrysotile Asbestos. World Health Organization. http://www.who.int/ipcs/assessment/public_health/chrysotile_asbestos_summary.pdf; Collegium Ramazzini, 2015. The Global Health Dimensions of Asbestos and Asbestos-Related Diseases. Castello di Bentivoglio, Via Saliceto, 3, 40010 Bentivoglio , Bologna, Italy; Royal Commission, 1984. Report of the Royal Commission on Matters of Health and Safety Arising from the Use of Asbestos in Ontario. Authors: Dupre JS, Mustard JF, Uffen

Multiple studies have shown mixtures of amphiboles and chrysotile to produce marked increases in disease.[117]

It is my opinion that Mr. Boynton's employers and worksites owners failed to warn him and failed to take effective prevention measures at his workplace for the control of asbestos. The employers and worksites owners failed to exercise reasonable, ordinary, and/or prudent care concerning health and safety regarding asbestos. Specifically, Mr. Boynton's employers and the premises where he worked failed to adequately test the work environment during Mr. Boynton's employment and failed to implement appropriate, adequate, and effective prevention measures at their worksites that would have protected Mr. Boynton from exposure to asbestos. These measures include wetting, vacuuming, and ventilation; isolating workers away from potential asbestos-laden sources and environments; utilizing safety equipment, such as appropriate protective equipment and/or respirators; and enforcing a shower and change clothes policy.

It is my opinion that household contacts, residing with persons having known exposure to asbestos, are at risk of asbestos-related diseases from non-occupational exposures to asbestos carried home by the exposed worker.[118]

RJ., Ontario Ministry of the Attorney General, Queen's Printer for Ontario , Toronto; IARC, 1977. IARC Monographs on the Evaluation of Carcinogenic Risk of Chemicals to Man- Asbestos. Vol. 14. International Agency for Research on Cancer, World Health Organization, Lyon, France, pp. 106; Helsinki Declaration, 2014. The Helsinki Declaration on Management and Elimination of Asbestos-Related Diseases. Adopted by the International Conference on Monitoring and Surveillance of Asbestos-Related Diseases, 10-13 February 2014, Finnish Institute of Occupational Health and International Commission on Occupational Health Espoo, Finland. http://www.ttl.fi/en/international/conferences/helsinki_asbestos_2014/Documents/20%20March%202014%20Final%20Signed%20Declaration%20for%20website.pdf.

[117] Patty's Toxicology, 2012. Sixth Edition, Volume 5, Chapter Eighty-Three. Asbestos, Richard A. Lemen & Ronald F. Dodson. Editors: Eula Bingham & Barbara Cohrssen. John Wiley & Sons, Inc.

[118] National Institute for Occupational Safety and Health. 1995. Report to congress on workers' home contamination study con-ducted under The Workers' Family Protection Act (29 U.S.C. 671a). Cincinnati, Ohio: U.S.Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health; Lemen, R.A. Epidemiology of Asbestos-Related Diseases and the Knowledge That Led to What Is Known Today—Chapter 5. In Asbestos Risk Assessment, Epidemiology, and health Effects, 2nd ed.; Ronald F. Dodson & Samuel P. Hammar, Eds.; CRC Press Taylor & Francis Group: New York, NY, USA, 2011: 131–268.

V.

Conclusions

Mr. Boynton worked in many workplaces where he was exposed to asbestos in such a manner that it allowed him to carry the asbestos fibers home on his work clothes where his wife Barbara was subsequently exposed. Had either his employers or worksites owners taken precautions, warned, and/or protected Mr. Boynton from exposures to asbestos, this risk to his wife Barbara for developing the asbestos-related disease mesothelioma would have been reduced or eliminated. It is clear from the medical and scientific data and testimony cited in this Affidavit that such knowledge of the dangers of asbestos were well-recognized during the time Mr. Boynton worked as a laborer and electrician between 1962 through 2005.

Further Affiant sayeth naught.

Richard A. Lemen, Ph.D., MSPH

Subscribed and sworn to me this 29 day of October, 2018.

Notary Public, State of Georgia

My commission expires: 06/04/21

MELANIE FORRESTER NOTARY PUBLIC CHEROKEE COUNTY EXPIRES GEORGIA June 4, 2021

Addendum D

VOLUME 2
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SECTION XI
INSULATION

1. SCOPE

A. The work to be performed under this Section includes providing complete and in place all insulation and accessories necessary for insulating piping and equipment in accordance with the contract documents. Procurement of materials shall be in accordance with Section, SPECIAL CONDITIONS, except as specified herein. The work includes:

a. Procuring, delivering and installing all materials, jacketing, and incidentals for thermally insulating all piping and tubing systems or portions thereof shown or specified to be insulated.

b. Procuring, delivering and installing all materials, lagging, jacketing and incidentals for thermally insulating equipment. This portion of the work includes: installing all such materials furnished by the manufacturers of the Steam Generating Unit (Combustion Engineering, Inc.) and Turbine Generating Unit (General Electric Co.), and other equipment, if any; and procuring, delivering and installing all other materials required to complete the thermal insulation of this equipment.

c. Procuring, delivering and installing all materials for weathertight flashing of piping, both insulated and uninsulated, where the piping passes through an exterior wall or weather enclosure.

d. Installing Southwestern Engineering Co., Inc.-furnished stainless steel lagging on the extraction steam piping at the condenser.

e. Procuring, delivering and applying sprayed on insulating materials as specified hereinafter.

B. Work Not Included The following items of related work will be performed by others and are excluded from the Contract.

Furnishing and delivering thermal insulating materials for Boiler Feedwater Pump, Turbines, Turbine Generating Unit, and Steam Generating Unit.

2. SUPPLEMENTS

The following supplements are included with and form a part of this specification:

A. Stearns-Roger Corp. Drawings and Standards

a. Drawings See SECTION V, SCOPE OF WORK, Article "SUPPLEMENTS".

b. Standards

No.	Date	Title
Std. DP30.1T (Page 1)	10/8/71	Pipe Insulation Thickness
Std. DP30.1T (Page 2)	10/8/71	Pipe Insulation - Expansion Joints for Vertical Lines

SECTION XI
INSULATION (CONTD)

2. SUPPLEMENTS (CONTD)

A. Stearns-Roger Corp. Drawings and Standards (Contd)

b. Standards (Contd)

No.	Date	Title
Std. DP30.1T (Page 3)	10/8/71	Insulation Layer Thicknesses for Heat Traced Lines Over 400°F

B. Manufacturer's Drawings and Standards The Contractor will be furnished all applicable manufacturer's drawings and instructions for thermally insulating the various pieces of equipment and components to be insulated under this section.

3. GENERAL REQUIREMENTS

A. Completion of Work Prior to Insulating Before applying any insulation, the Contractor shall determine and verify that the particular pipeline or equipment item has been completely installed, tested, heat traced if necessary, and is ready for the application of insulation.

B. Surface Preparation Before insulation is applied, the surfaces to be insulated shall be thoroughly cleaned of scale, dirt, or other foreign matter by use of wire brushes, scrapers or other devices as necessary to accomplish the work. All surfaces shall be dry when insulated.

C. Welding of Attachments Unless specifically called for herein or approved in writing for a specific location, field welding of items for attachment or support of insulation will not be permitted on any vessel bearing code stamping, or on any alloy piping or vessel. All field welding of insulation attachments shall be done by operators qualified in accordance with ASME Code, Section IX using proper procedures, materials and equipment. Where approved, welding of clips or anchors to code vessels shall be in accordance with the requirements of the ASME Code, Section VIII. Welding of nuts and other attachments to main steam piping, hot reheat steam piping, cold reheat steam piping and high pressure steam piping to Boiler Feed Pump Turbines will be performed by the piping fabricator before shipment to the field.

D. Recommendations of Manufacturer All applicable manufacturer's recommendations and instructions pertaining to the mixing, storing, applying and using of their products shall be complied with.

E. Terminal Points of Work Terminal points of insulating work to be performed will be located substantially where shown on the drawings and/or specified. It shall be the responsibility of the Contractor to ascertain the exact location of any point where his work starts, terminates, or connects to work installed by others, and to make minor adjustments in the length, line or grade of his work if necessary for proper and workmanlike connection thereto. Minor deviation in the location of such termianl points from the position shown on the drawings will not be considered cause for additional payment.

SECTION XI
INSULATION (CONTD)

3. GENERAL REQUIREMENTS (CONTD)

F. Changes and Substitutions The Contractor shall offer for the Owner's approval any changes in design of insulation which will facilitate the work or improve its reliability. Proposal of modification or substitution shall be made in writing and submitted in detail for the Owner's consideration, whose decision shall be considered final. In all cases of approved subsittution or modification, full responsibility for satisfactory work shall remain with the Contractor.

G. Temporary Removal of Installed Work

a. During the course of his work, the Contractor may find it necessary or of major advantage to remove and reinstall or replace certain floor grating or other items which have previously been installed by others. Prior to the removal of any such work, the Contractor shall schedule and program the work in a manner acceptable to the Owner.

b. Permission to remove any installed component or item shall not in any way relieve the Contractor of full responsibility for the safe and proper performance of his work, or for the protection of life and property. Where and as necessary for safety or weather protection, or when requested by the Owner, the Contractor shall provide and maintain acceptable temporary protective devices such as guard rails, walls, walkways, shores, braces, tarpaulins, flags, and lights until the removed items have been reinstalled or replaced to their original condition.

c. All costs of removing and reinstalling or replacing building or other components to permit or expedite the work of the Contractor shall be at the Contractor's expense.

H. Protection of Adjacent Surfaces Any fluid or plastic material such as paint, sizing, asphaltic compound, and plastic insulation which is applied, oversprayed, dropped, or otherwise permitted to get on any object or surface other than to which it is being applied, shall be removed at once, and the surfaces upon which it was present shall be cleaned as necessary to remove all traces of soiling.

I. Nameplates and Code Stamps All nameplates and code stamps shall be left exposed. Insulation shall be neatly beveled back and finished around these items.

4. MATERIALS

A. General

a. Insulation materials used shall meet or exceed the requirements specified herein. Any additional materials which may be required, but which are not described hereinafter, shall be suitable grades of their respective types, which have been approved for the particular use.

SECTION XI
INSULATION (CONTD)

4. MATERIALS (CONTD)

A. General (Contd)

b. Insulation materials to be furnished by the Contractor and which are specified herein by manufacturer and/or proprietary name, are so specified only for the purpose of establishing the type and standard of quality required, and is not intended to preclude the use of approved similar products of proven equal or superior thermal and physical qualities.

c. The Owner will be the sole judge of whether any proposed material or product is acceptable for a proposed use, or is an acceptable substitute for a material or product specified, and his decision in such matters shall be final.

d. After materials have been approved, no substitutions shall be made without written authorization of the Owner.

e. Insulation materials furnished by others for thermally insulating equipment or components shall, without any substitutions, be installed or applied in the locations designated by the manufacturer of the equipment or component.

B. Insulating, Support, and Finishing Materials

a. Calcium Silicate Insulation Preformed calcium silicate pipe insulation and preformed block insulation shall be hydrous calcium silicate combined with reinforcing mineral fibers, suitable for temperatures up to 1200 degrees F. The insulation shall meet the requirements of ASTM C533, with the additional requirement that the minimum density shall be 10 pounds per cubic foot. The material shall be any of the following:

Armstrong Cork Co. "LK"
Johns-Manville Co. "Thermobestos"
Owens-Illinois Glass Co. "Kaylo"
Pabco Products Co. "Cal Temp"

(1) Pipe Insulation Pipe insulation shall be furnished in standard 3-foot lengths, of hollow cylindrical shape split in half lengthwise.

(2) Block Insulation Blocks having rectangular cross-section shall be furnished for all flat surfaces, and may be furnished for cylindrical portions of equipment when the cylinder diameter is greater than 72 inches. Segmental blocks molded to fit the curved surface and having radially cut edges, shall be furnished for cylindrical surfaces having a diameter of 72 inches or less, excepting only that molded pipe insulation may be substituted for segmental blocks on cylindrical surfaces having diameters equivalent to standard pipes, and within the size range for which pipe insulation is available.

SECTION XI
INSULATION (CONTD)

4. MATERIALS (CONTD)

B. Insulating, Support, and Finishing Materials (Contd)

b. Mineral Wool Insulation

(1) Pipe Insulation Mineral wool pipe insulation shall be pre-formed, longitudinally split type with factory-applied fire-retardant vapor barrier jacket. Insulation thickness, exclusive of vapor barrier, shall be 3/8-inch. The insulation shall be Owens-Corning Fiberglas Heavy Density Sectional Pipe Insulation with Type FRJ Jacket with self-sealing lap.

(2) Blanket Insulation Blanket insulation shall be laminated spun mineral wool, having a nominal density of 8 pounds per cubic foot, and shall be Johns-Manville "Banroc".

(3) Board Insulation Board insulation shall be Owens-Corning Intermediate Service (I-S) semi-rigid glass fiber insulation.

c. Cellulose (Sprayed On) Insulation Sprayed on insulation shall be a cellulose fiber, non-combustible material with a nominal density of 3-1/2 pounds per cubic foot and shall be National Cellulose Corp., K-13, Type T, color "off white".

d. Duct Insulation

(1) Main Plant Main plant air handling unit and refrigeration unit discharge and return plenums glass fiber, 1-1/2 lb. per cu. ft. density, 1" thick having black vinyl coating on air side.

(2) Administration Building Ductwork without duct liner 2" thick 3/4 lb. per cu. ft. density blanket insulation with .002 aluminum foil facing one side, and with 2" tab on edge. Refrigerant piping insulation shall be Armaflex O/E.

e. Insulating Cement Insulating cement shall be Johns-Manville No. 450, composed predominantly of mineral wool and heat-resisting binder, and shall be suitable for operating temperatures up to 1200 degrees F.

f. Finishing Cement Finishing cement shall be Johns-Manville No. 302 composed of asbestos fiber and binding materials, which will produce a smooth, hard, durable surface of white or light gray color when applied over the thermal insulation to be finished.

g. Wire Mesh

(1) Poultry Netting Poultry netting shall be one-inch hexagonal mesh, woven of No. 20 AWG wire, galvanized after weaving. Poultry netting shall be furnished in standard size rolls of widths best suited for the job requirements.

SECTION XI
INSULATION (CONTD)

4. MATERIALS (CONTD)

B. Insulating, Support, and Finishing Materials (Contd)

g. Wire Mesh (Contd)

(2) Road Mesh Road mesh for installation on tops of ducts where it is possible to walk shall be 6" x 6" mesh No. 4 x No. 4 AWG welded wire mesh. Road mesh for installation in all other locations shall be 6" x 6" mesh No. 6 x No. 6 AWG welded wire mesh.

h. Tie Wire Tie wire for securing insulation shall be copper-clad annealed iron. For insulation diameters of 12 inches or smaller, wire shall be 16 gage minimum. For insulation diameters larger than 12 inches, wire shall be 14 gage minimum.

i. Bands Bands shall be of aluminum .020" thick and at least 1/2" wide, or shall be corrosion-protected iron or steel of adequate thickness and width to properly retain the insulation. Bands shall be provided with suitable end fastening devices.

j. Miscellaneous Fasteners The Contractor shall procure and install all support clamps, bolts, studs, nuts, straps, support rods, bands and similar fasteners as required to complete the insulation work. Fasteners shall conform to the requirements shown on the drawings and as recommended by the insulation manufacturer.

k. Canvas Canvas for jacketing shall be good quality, tight weave cotton duck weighing 8 ounces per square yard, furnished in 48-inch or greater roll widths.

l. Adhesive Adhesive for canvas shall be a water emulsion polyvinyl acetate type containing a fungicide, fire-retardant when dry, suitable for painting, and shall be Benjamin Foster "Lag Fas".

m. Aluminum Jacketing Aluminum jacketing shall be natural color, embossed finish, alloy AA5005, applied over a vapor barrier. Where specified, the vapor barrier shall be integral with the aluminum jacketing.

(1) Factory-Fabricated Aluminum Jacketing for Piping and Indoor Equipment In sizes commercially available for cylindrical surfaces, aluminum jacketing shall be an approved system, with embossed finish aluminum jacketing 0.016" thick minimum (except where 0.032" minimum thickness is specified herein or indicated on the drawings), integral vapor barrier, and interlocking lips capable of providing a water-tight seal along the entire longitudinal joint of the jacket. Preformed, matching aluminum straps shall be provided for installation over circumferential joints between jacket sections. Straps shall be either the self-locking type, or the type secured with a matching aluminum strap mechanically applied.

SECTION XI
INSULATION (CONTD)

4. MATERIALS (CONTD)

B. Insulating, Support, and Finishing Materials (Contd)

m. Aluminum Jacketing (Contd)

(1) Factory-Fabricated Aluminum Jacketing for Piping and Indoor Equipment (Contd)

Jacketing for elbows, sweeps and bends shall be of matching finish, of miter seal construction, with joints being sealed with a sealing compound.

(2) Field-Fabricated Aluminum Jacketing Where manufacturer's standard factory-fabricated aluminum jacketing is not available for surfaces requiring jacketing, field-fabricated aluminum jacketing shall be installed to provide a weatherproof jacketing. Sheet aluminum for fabricating jacketing for piping and indoor equipment shall be embossed finish, 0.016" thick minimum, except where 0.032" minimum thickness is indicated. Sheet aluminum for fabricating jacketing for outdoor ducts and equipment shall be embossed finish, 0.050" thick minimum unless otherwise noted.

n. Weatherproof Coating Compound Weatherproof coating compound for insulated surfaces shall be Johns-Manville "Insulkote" black, asbestos-filled asphaltic emulsion.

o. Aluminum Paint Aluminum paint shall be aluminum pigment utilizing an asphalt base vehicle, Valdura Asphalt Aluminum Paint.

p. Sheet Metal Screws Sheet metal screws for aluminum jacketing shall be of aluminum or stainless steel, binding head type, of size and length required for the particular use.

q. Aluminum Foil Aluminum foil shall be an approved commercial grade uncoated, bright finish wrapping foil, furnished in rolls of widths best suited for the use.

5. INSTALLATION OF MATERIALS

A. General

a. Except as otherwise specified or noted, all insulation for elevated temperature conditions shall be calcium silicate. Anti-sweat insulation shall be mineral wool.

b. The various application procedures and requirements set forth hereinafter shall govern the work to the extent applicable. Any work for which procedures are not specified, or any deviations from the specified procedures which may be permitted by the Owner, shall conform to best trade practices and shall produce an acceptable end result. When completed, the work shall be of uniformly neat and workmanlike appearance, with finished surfaces suitable for painting where required.

SECTION XI
INSULATION (CONTD)

5. INSTALLATION OF MATERIALS (CONTD)

A. General (Contd)

c. All insulation and jacketing shall be designed and installed to be capable of accommodating thermal expansion and contraction without damage or noticeable distortion, and shall remain free from hot spots, blisters, discoloration, or other evidence of faulty materials, design or workmanship.

d. Protective coverings and finishing cement applied to exterior surfaces of insulation shall be in addition to the specified insulation thickness, and shall not be counted as part of the specified insulation thickness.

B. Workmanship

a. Maintenance Access

(1) Insulation of pipe adjacent to bolted flanges shall be cut back sufficiently to permit removal of flange bolts without damage to the insulation, and insulation of flanges shall be extended beyond the cutback areas for a distance not less than the specified pipe insulation thickness.

(2) At all access openings, manholes, handholes, removable heads, equipment flanges, pipe flanges and similar maintenance points, both the insulation and jacketing shall be of a design permitting removal and replacement of suitable formed sections without disturbing adjacent insulation.

(3) Any such removable sections which are formed of plastic insulating material shall be adequately reinforced with poulty netting or such other corrosion resistant metal reinforcement as necessary to prevent breakage when handled with reasonable care during removal or replacement.

b. Insulating Valves, Piping Fittings, and Accessories

(1) Valves located in piping or on equipment which is to be insulated, shall have their bodies insulated up to their bonnets.

(2) All safety valve bodies shall be insulated up to their bonnets. A metal sleeve shall be provided through the safety valve insulation to provide access to the adjusting pin. Care shall be taken to insure that springs are kept free of insulation.

(3) Pipe bends, valves and fittings 4" and larger in lines designated to be insulated shall be insulated with sectional or block insulation of the same type and thickness as the pipe runs, cut to fit, tightly wired in place and finished with a filling and smoothing coat of finishing cement. Sectional covering shall be used if

SECTION XI
INSULATION (CONTD)

5. INSTALLATION OF MATERIALS (CONTD)

B. Workmanship (Contd)

b. Insulating Valves, Piping Fittings and Accessories (Contd)

(3) Continued

available in large enough diameter, otherwise block covering and cement shall be applied. On lines smaller than 4", insulation for bends, valves and fittings may be built up in layers of insulating cement.

(4) Where pipe clamps, hanger rods, instrument takeoffs and small piping not requiring insulation protrude through insulation, they shall be covered for an additional distance equal to, and to the thickness of, the adjacent insulation, and shall be tightly sealed, except at hanger rods. In outside locations, hanger protrusions shall be suitably shielded with metal flashing to deflect rain and snow and protect the insulation from moisture, yet permit movement of the hanger rod.

(5) All flanges in Insulation Schedule 6 through 10 shall be so insulated that the space between the paired flanges remains unfilled.

(6) When located indoors, traps, controllers other than control valves, and instruments together with tubing connected thereto; shall not be insulated, except for tubing connecting to fuel oil instruments, which shall be insulated and heat traced from the main line to the seal pots. Sample lines shall be insulated and/or heat traced where so indicated.

c. Expansion Joints Insulation on pipes or vessels subjected to a surface temperature of 600°F, or higher, shall incorporate expansion joints constructed in accordance with Standard DP30.1 attached to this section.

d. Pipe and Block Insulations

(1) Except where expansion joints are indicated or required, all molded pipe and block insulation shall be applied in a manner resulting in tightly butted joints. Longitudinal joints of all single layer insulation shall be staggered. In multiple layer applications, longitudinal joints shall be staggered by substantially one-half the segment or block width, and circumferential or block-end joints shall be staggered by the maximum possible amount consistent with the requirements for expansion joints or other similar considerations. Each layer of pipe or block insulation shall be secured in place by tightly drawn tie wires or bands, and shall have all voids filled with insulating cement prior to applying any succeeding layer of insulation, or any specified finish coating or metal jacketing.

SECTION XI
INSULATION (CONTD)

5. INSTALLATION OF MATERIALS (CONTD)

B. Workmanship (Contd)

d. Pipe and Block Insulations (Contd)

(2) Tie wires used for holding preformed insulation in place shall be spaced on maximum 9" centers, or such that any individual piece of insulation is retained by no less than two wires, whichever results in the closest spacing. Tie wires shall be drawn taut to embed them flush with the face of the insulation. Ends shall be firmly twisted, excess wire shall be cut off, and ends bent over and embedded in the insulation.

(3) Bands used for holding insulation on pipes or vessels shall be of suitable size for the use point, and spaced on maximun 12" centers. No individual piece of insulation may be retained by less than two bands. All bands shall be machine tightened and sealed while under tension.

e. Poultry Netting

(1) When applied over insulation as a base for finishing cement or other coating, poultry netting shall be fitted, formed, stretched and securely attached in a manner which results in a netting surface free of loose areas, bulges or projecting wire ends. Abutting sides of netting shall be laced with No. 16 tie wire, and cut ends or sides shall be interwoven, or laced to anchor devices with No. 16 tie wire.

(2) If used as a reinfocement in removable sections of insulation the poultry netting shall be cut, formed and fitted to suit the point of use.

f. Road Mesh Road mesh shall be installed on duct stiffeners, providing support for the insulation with uniform clearance between the duct surface and the supported insulation. Mesh sheets shall have edges butted and welded together on maximum 12 inch centers. The mesh shall be welded to duct stiffeners on approximately 24 inch centers. On top horizontal surfaces of ducts, insulation shall be applied and finished in such manner that enough slope is provided toward the edges to prevent accumulation of water in depressions or dents.

g. Insulating Cement

(1) Insulating cement shall be mixed in strict accordance with the manufacturer's directions, shall be applied by troweling or palming, and shall be reinforced when and as necessary to comply with best trade practice.

SECTION XI
INSULATION (CONTD)

5. INSTALLATION OF MATERIALS (CONTD)

B. Workmanship (Contd)

g. Insulating Cement (Contd)

(2) When used for pointing joints or filling voids in molded pipe or block insulation, it may be applied to the thickness of that layer of insulation being pointed or filled. When used for insulating small valves, and fittings, equipment, or specialty items, it shall be applied in successive layers of approximately 1/2 inch thickness. Each layer shall be dry before the succeeding layer is applied.

h. Finishing Cement

(1) Finishing cement shall be mixed in strict accordance with the manufacturer's directions, shall be applied in 1/4 inch maximum thickness layers by troweling or palming, and shall be reinforced when and as necessary to comply with best trade practice. Surfaces to be left unjacketed shall receive two coats of finishing cement to produce 1/2 inch total thickness. First layer shall be dry when second layer is applied. Second layer shall be tempered by adding 10% (by weight) of Portland cement to the insulating cement in order to produce a hard finish for the paint primer.

(2) Application of finishing cement will not be required where metal jacketing is to be applied over pipe or block insulation on straight runs of pipe, tank shells or equipment items; nor will it be required over fast drying cement which has been applied to metal mesh reinforcement on blanket insulation as a base for a weatherproof coating.

(3) Regardless of type jacketing or finish specified, finishing cement shall be used where and as necessary to provide a smooth surface or contour on insulation covering long radius pipe bends, valves, fittings, specialty items, curved tank heads, and similar items.

i. Metal Jacketing Metal jacketing shall be installed in a manner best suited to provide a weathertight seal and allow for thermal expansion of the pipe or equipment and its insulation. Jacketing shall not be installed over insulation which is not dry.

(1) Jacketing for vertical runs of piping shall be lapped upper over lower to shed water. Horizontal sections of pipe jacketing exposed to the weather shall have the longitudinal joint on the bottom. In interior locations, the longitudinal seam of jacketing shall be located such as to be least visible from nearby floors, platforms and walkways.

SECTION XI
INSULATION (CONTD)

5. INSTALLATION OF MATERIALS (CONTD)

B. Workmanship (Contd)

i. Metal Jacketing (Contd)

(2) Jacketing for long radius bends and elbows too large for manufactured aluminum elbow covers shall be accurately mitered sections of a uniform length to best fit the bend radius. Rounded or dished heads shall be jacketed by means of "orange peel" construction.

(3) Jacketing for flanges, ends of heat exchangers and similar areas shall be machine formed to the required contour, and shall be in the fewest practical number of pieces consistent with fabrication, assembly and removal requirements. Wherever metal jacketing is field formed around pipes or other surfaces, jacketing shall be in firm contact with the insulation, and remain free of sags, bulges or other distortions after attachments are installed. Wherever necessary to assure a snug fit, the sheet aluminum shall be machine rolled to suit the curvature of the insulation.

(4) All joints in metal jacketing shall be lapped a minimum of 2" in a direction to shed water. Circumferential laps over or adjacent to insulation expansion joints shall be no less than 3-1/2" and shall be free of attachment screws at any location which would restrict the necessary movement at the expansion joint.

(5) Fabricated aluminum jacketing shall be installed over a moisture barrier of Kraft paper or other moisture barrier material recommended by the manufacturer of the aluminum.

(6) Openings cut in the jacketing to fit around exposed metal components shall provide approximately 1/4" uniform clearance between the jacketing and exposed metal to prevent electrolytic action.

j. Weatherproof Coating

(1) Weatherproof coatings may be applied by troweling, palming or spraying as recommended by the manufacturer. When used on valves, fittings or other locations adjoining piping to be jacketed with metal, the weatherproof coating shall be applied over the pipe insulation for sufficient distance to provide at least 4" overlap by the pipe jacketing. If recommended by the manufacturer for proper bonding to the coated surface, a suitable primer shall be applied over the entire area prior to applying the weatherproof coating.

(2) When the insulation diameter on valves or fittings to be coated is 6" or greater, or when weatherproof coating is to be applied to insulation on tanks, vessels or equipment, poultry netting shall be applied over the finishing cement surface to reinforce the weatherproof coating. Any other reinforcement shall be provided in accordance with the coating manufacturer's recommendations.

SECTION XI
INSULATION (CONTD)

5. INSTALLATION OF MATERIALS (CONTD)

B. Workmanship (Contd)

j. Weatherproof Coating (Contd)

(3) The weatherproof coating shall be applied in one or more coats as recommended by the manufacturer for the product and application method being used. Regardless of number of coats or method of application, total thickness of the weatherproof coating when completely dry shall be approximately 1/8".

k. Protecting Bands Where insulated piping passes through grating or floor plate, the Contractor shall provide and install a 12" high 20 gage aluminum band to protect the insulation from damage.

l. Sprayed On Insulation Sprayed on insulation shall be applied over properly prepared surfaces all in accordance with the manufacturer's instructions. Final thickness shall be 1", minimum.

m. Canvas Jacketing

(1) Canvas jacketing shall be used in lieu of aluminum jacketing only in such specific instances as may be approved in writing by the Engineer.

(2) Canvas jacketing shall be accurately tailored to suit the surface with a minimum of overlaps and shall be applied free of wrinkles and loose spots. Seams shall be located where they will be least visible, shall have 2" overlaps, and shall be fully cemented.

(3) Canvas jacketing applied to insulation surfaces having operating temperatures below 150 degrees F shall be 8 ounce cotton duck saturated with adhesive and applied completely covering the insulation. After drying, the canvas shall be given a final brush coat of adhesive.

(4) Canvas jacketing applied in contact with any surface having an operating temperature higher than 150 degrees F shall be 2-ply commercial grade asbestos cloth weighting not less than 2-1/4 pounds per square yard. The adhesive shall be brushed on the surface. The asbestos cloth shall be applied as soon as the adhesive has dried sufficiently to insure proper tackiness for a smooth and firm bonding of the cloth. The outer surface of the cloth shall then receive a brush-applied coat of the adhesive to bond properly and size the finished covering.

n. Aluminum Painting Exposed surfaces of canvas jacketed insulation shall receive an aluminum paint finish of sufficient coats to match

SECTION XI
INSULATION (CONTD)

5. INSTALLATION OF MATERIALS (CONTD)

B. Workmanship (Contd)

n. Aluminum Painting (Contd)

appearance of adjacent aluminum surfaces. Before painting, such surfaces shall be prime coated as necessary to provide a smooth non-absorbent surface on which aluminum paint will adhere and dry without checking, peeling or leaving a dull finish.

6. PIPING, EQUIPMENT, AND COMPONENTS REQUIRING THERMAL INSULATION

A. General

a. Numbered piping lines requiring thermal insulation due to their operating temperatures are so noted on the Line Schedule. The configuration of lines 2-1/2" and larger are shown on the drawings. Numbered tubing lines will be shown on isometric drawings which will be furnished to the Contractor after award of contract. Suggested routing of 2" and smaller lines are shown on the drawings; the Contractor may, if approved by the Engineer, use other routings if they are an improvement over those shown on the drawings.

b. Piping and tubing lines, or portions thereof, requiring insulation for freeze-protection will be designated on the drawings in the field by the Engineer.

c. Equipment requiring thermal insulation is listed hereinafter.

B. Piping, Valves, Fittings and Accessories

a. Categories of Lines Requiring Insulation Pipe and tubing lines requiring insulation fall into the following categories;

(1) Lines requiring insulation due to their operating temperatures and which are NOT heat-traced.

(2) Lines requiring insulation due to their operating temperatures and which ARE heat-traced. Those lines having operating temperatures below 400°F shall be insulated in accordance with Standard DP30.1, Page 1, except a minimum of 2" thick insulation is required. Those lines having operating temperatures of 400°F or higher shall be insulated in accordance with Standard DP30.1T, Page 3.

(3) Lines which would otherwise require anti-sweat insulation or no insulation at all, but which are selected to be heat-traced. These lines shall have their heat-traced portions insulated with minimum of 2" insulation.

(4) Lines or portions thereof requiring insulation for personnel protection only. These lines shall be insulated in accordance with Schedule 1 of Standard DP30.1, Page 1.

SECTION XI
INSULATION (CONTD)

6. PIPING, EQUIPMENT, AND COMPONENTS REQUIRING THERMAL INSULATION (CONTD)

B. Piping, Valves, Fittings and Accessories (Contd)

a. Categories of Lines Requiring Insulation (Contd)

(5) Lines requiring anti-sweat insulation only per Standard DP30.1, Page 1.

b. Piping Insulation Thickness and Insulation Expansion Joint Schedule

(1) The Line Schedule drawings indicate insulation schedule numbers for all numbered pipe and tubing lines which are to be insulated due to their operating temperatures. These numbers correspond to the insulation schedule numbers shown on Standard DP30.1T, Pages 1 through 3 attached. In addition to establishing the total required insulation thickness for each line size of each class, these Standards also establish the types and spacing of expansion joints required and the number of insulation supporting studs per joint.

(2) Standard DP30.1T, Pages 1 and 2 establishes where the use of single or double layers of insulation is required, what Schedules require expansion joints, and the maximum joint spacing.

(3) Standard DP30.1T, Page 2, establishes the insulation supporting stud length and width of support clamps per insulation thickness.

(4) Standard DP30.1T, Page 3, establishes inner and outer layer thicknesses for double layer insulation required for heat-traced lines having operating temperatures above 400°F. Thicknesses of single layer insulation required for heat-traced lines having operating temperatures below 400°F shall be a minimum of 2" insulation or in accordance with Standard DP30.1, page 1.

(5) Insulation expansion joint details are covered on Standard DP30.1, page 2, included herewith. The detail sketches show expansion joints for vertical lines. Joints for horizontal lines are similar except insulation supports are not required.

c. Valves, Fittings and Accessories

(1) Valve bodies including bonnets, ells, tees, flanges and other fittings in lines designated to be insulated, shall be insulated to a total thickness including finishing cement which is equal to or greater than that specified for the pipe line in which installed.

(2) All insulation saddles and other components provided for support of insulated pipe shall have open spaces filled with insulation of a type suitable for the point of installation, except that tension springs on pipe hangers shall not be filled or have their movement restricted by insulation.

SECTION XI
INSULATION (CONTD)

6. PIPING, EQUIPMENT, AND COMPONENTS REQUIRING THERMAL INSULATION (CONTD)

B. Piping, Valves, Fittings and Accessories (Contd)

d. Insulation of Heat-Traced Lines Certain pipe and tubing lines, or portions thereof, shall be electrically heat-traced in accordance with SECTION, ELECTRICAL, for freeze-protection, and shall be insulated. The lines to be heat traced will be designated on the drawings or in the field by the Engineer. The Contractor shall coordinate this work with the installation of the heat tracing such that no delays occur in heat tracing those lines requiring application of a layer of insulation before heat tracing.

(1) The insulation shall be sized to fit the surface to which it is being applied, fitting snugly against the metal or underlying insulation surface, but shall not pinch or pressure the heating cables. The Contractor shall field channel the overlaying insulation in accordance with SECTION, ELECTRICAL as necessary to provide the necessary clearance. The layer of insulation underlying the heat cables shall not be channeled.

(2) Heat-traced lines subject to surface temperatures below 400°F will be heat traced with the cables in contact with the pipe, and will require a single layer of insulation minimum 2 inches thick and otherwise in accordance with Standard DP30.1. Heat-traced lines subject to surface temperatures of 400°F or higher will require double layer insulation in accordance with Standard DP30.1T, with the heat tracing cables installed between the inner and outer layers of insulation. The thickness of the inner layer of insulation shall be such as to protect the heat cables from exposure to temperatures of 400°F or higher.

(3) For both single layer and double layer insulated heat traced lines, aluminum foil shall be applied over the heat cables and the surfaces to which attached, before applying the outer layer of insulation. Lines having single layer insulation, and lines 3" and smaller having double layer insulation, require a single layer of foil. Lines 4" and larger having double layer insulation will require a double layer of foil.

(4) Valve bodies and fittings of heat-traced lines shall be insulated with the same materials and to the same thickness as the adjoining pipe. Joints shall be smoothed with finishing cement. When dry, the finishing cement shall be covered with poultry wire securely fastened and covered with Insulkote.

e. Personnel Protection Lines requiring insulation only for burn protection of personnel shall be insulated in accordance with Schedule 1 of Standard DP30.1 and the following. Insulation for personnel protection shall be applied around the portion of the pipe line length, or to those surfaces of equipment which are located within eight (8) feet above the tread surface of, or within four (4) feet horizontally beyond the side or end of any floor, platform, walkway, stair or ladder.

SECTION XI
INSULATION (CONTD)

6. PIPING, EQUIPMENT, AND COMPONENTS REQUIRING THERMAL INSULATION (CONTD)

B. Piping, Valves, Fittings and Accessories (Contd)

f. Anti-Sweat Insulation Lines indicated on the Line Schedule drawings to receive anti-sweat insulation shall receive a single layer application of the specified 3/8 inch thick mineral wool insulation with vapor barrier jacket, covered with aluminum jacketing.

C. Insulation of Equipment (Other Than Steam Generating Unit, Boiler Feed Pump Turbines and Turbine Generating Unit) The following listing of equipment requiring insulation hereunder (other than the Steam Generating Unit and Turbine Generating Unit) indicates the approximate metal temperatures of each item, and the minimum nominal insulation thickness required for each. Also included is the application of insulation furnished by the equipment manufacturer with his equipment but which is not installed on the equipment by the manufacturer. The Contractor shall install all such insulation regardless of whether the equipment is listed in this paragraph or not. All insulation shall be installed in accordance with the equipment manufacturer's recommendations, where applicable.

a. Indoor Equipment

Quan.	Description	Approx. Temp. °F	Min. Insulation Thick. - In.	Lagging Thick.-In.
1	Deaerator No. 2-4	340	2	0.032
1	Main Steam Jet Air Ejector No. 2	450	2-1/2	0.032
2	BFPT Steam Jet Air Ejector Nos. 2-1 & 2-2	450	2-1/2	0.032
1	Main Priming Ejector No. 2	450	2-1/2	0.032
2	BFPT Priming Ejectors Nos. 2-1 & 2-2	450	2-1/2	0.032
4	Steam Air Heater Drip Pumps Nos. 2-11, 2-12, 2-21 & 2-22	360	2	0.032
2	Steam Air Heater Drip Tanks Nos. 2-1 & 2-2	360	2	0.032
1	L.P. Heater No. 2-1	180	1-1/2	0.032
1	L.P. Heater No. 2-2	260	1-1/2	0.032
1	L.P. Heater No. 2-3	370	2	0.032
1	H.P. Heater No. 2-5	740	3-1/2	0.032
1	H.P. Heater No. 2-6	840	4	0.032
1	H.P. Heater No. 2-7	640	3	0.032
2	Boiler Feed Pump Drain Tanks Nos. 2-1 & 2-2	---	---	---
1	Steam Packing Exhauster No. 2	430	2-1/2	0.032
4	Demineralizer Vessels	33-70	3/8	0.032
2	Filters	33-70	3/8	0.032

SECTION XI
INSULATION (CONTD)

6. PIPING, EQUIPMENT, AND COMPONENTS REQUIRING THERMAL INSULATION (CONTD)

C. Insulation of Equipment (Other Than Steam Generating Unit, Boiler Feed Pump Turbines and Turbine Generating Unit) (Contd)

a. Indoor Equipment (Contd)

Quan.	Description	Approx. Temp. °F	Min. Insulation Thick.-In.	Lagging Thick.-In.
1	Vacuum Deaerator	33-70	3/8	0.032
1	L.P. Heater Drain Tank No. 2	180	1-1/2	0.032
1	Aux. Heating Boiler Storage Tank No. 2	180	1-1/2	0.032

b. Outdoor Equipment

Quan.	Description	Approx. Temp. °F	Min. Insulation Thick.-In.
2	Induced Draft Fans Nos. 2-1 & 2-2	265	2
2	Induced Draft Ducts (Fans to Stack)	265	2
1	Electrostatic Precipitor No. 2	265	2
2	Steam Air Heaters Nos. 2-1 & 2-2	600	3
	Precipitator Ductwork	265	2
	Ductwork from Steam Air Heaters to Air Preheater Air Inlet	600	3

D. Stainless Steel Lagging The Contractor shall install stainless steel lagging on that part of the extraction steam piping located inside the condenser neck and Low Pressure Feedwater Heater 2-1. Materials for this lagging will be furnished to the Contractor, and shall be installed in accordance with the condenser manufacturer's instructions.

E. Surfaces to Receive Sprayed on Insulation

a. Structural ceilings and under floor of within brick enclosed spaces as shown on the drawings and including:

Control Room and Adjacent Rooms
Logic Equipment Room
Results Laboratory, Results Laboratory Office and Storage Room
Cable Spreading Room
Switchgear Room
D.C. Equipment Room

SECTION XI
INSULATION (CONTD)

6. PIPING, EQUIPMENT, AND COMPONENTS REQUIRING THERMAL INSULATION (CONTD)

E. Surfaces to Receive Sprayed on Insulation (Contd)

a. Continued

Battery Room
Chemical Laboratory Office
Coal and Water Sample Rooms
First Aid Room
Shower, Locker, Janitor and Toilet Rooms

b. Interior siding, excluding fiberglass panels, enclosing Steam Generating Unit from ground floor to elevation 217.

c. Underside of roof panels as shown on the drawings including:

Transfer House No. 1 - Coal Handling System
Conveyor Gallery from Transfer House No. 1 to Main Plant - Coal Handling System
Coal Receiving Building
Ash Silo Enclosure

F. Surfaces to Receive Pourable Insulation The following surfaces shall receive pourable insulation, which shall be procured and installed by the Contractor.

a. Precipitator Roof: 4" thickness of Vermiculite

b. Bottom Ash Hopper - Ash Handling System: 9" thickness of H.K. Porter refractory

The above materials shall be installed as recommended by the equipment manufacturer and the refractory manufacturer. Pourable refractory in the Bottom Ash Hopper shall be placed monolithically without cold joint. The Contractor shall provide standby, spare conveying equipment while refractories are being poured, which is available for instant use should the regular pouring equipment break down during the pour.

G. Air Handling and Air Conditioning Ducts

a. Main Plant Main air handling unit and refrigeration type air cooling unit discharge and return plenums shall be internally insulated with glass fiber insulation. The insulation shall be adhesive-applied to the sheet metal prior to fabrication, and shall be reinforced with stick clips on 12" centers. Leading edges of insulation at fan discharge shall be buttered with mastic and reinforced with stick clips on 6" centers.

b. Administration Building All ductwork without duct liner shall be insulated. Insulation shall be wrapped on ducts with facing overlapping all joints at least 2 inches and held in place with outward clinching

SECTION XI
INSULATION (CONTD)

6. PIPING, EQUIPMENT, AND COMPONENTS REQUIRING THERMAL INSULATION (CONTD)

G. Air Handling and Air Conditioning Ducts (Contd)

b. Administration Building (Contd)

staples on 4 inch centers. On ducts over 30 inches in width, spot application of 3M EC-1128 adhesive shall be made, and the insulation secured on the underside with sheet metal screws and caps on not more than 18 inch centers. All joints and longitudinal seams, and sheet metal caps and screws shall be covered with 4 inch wide asbestos paper applied with wheat paste and vapor sealed with mastic.

Refrigerant piping insulation shall be applied in accordance with the manufacturer's recommendation.

7. THERMALLY INSULATING STEAM GENERATING AND TURBINE GENERATING UNITS

A. Steam Generating Unit

a. The Contractor shall furnish all labor, tools, equipment and supervision necessary to install all insulating materials other than refractory materials, and metal lagging and fasteners for a 3,300,000 lbs/hr Steam Generating Unit and accessories. The thermal insulating materials, including lagging will be furnished and delivered by others, except that the Contractor shall procure and deliver road mesh, clips, flashing and other items not furnished by the manufacturer of the unit as necessary to complete the thermal insulation. Installation of the insulating materials and lagging shall be accomplished by the Contractor's forces under the direction of the Steam Generating Unit manufacturer's field representative.

b. Insulating, Lagging and Casing Materials Furnished by Steam Generating Unit Manufacturer

(1) Plastic Refractories equal to 1" total thickness to enclose the unit
Furnace Roof
Furnace Deflection Arch
Extended Sides - Roof
Extended Sides - Floor
Back-Pass - Roof

SECTION XI
INSULATION (CONTD)

7. THERMALLY INSULATING STEAM GENERATING AND TURBINE GENERATING UNITS (CONTD)

A. Steam Generating Unit (Contd)

b. Insulating, Lagging and Casing Materials Furnished by Steam Generating Unit Manufacturer (Contd)

(2) Insulation, Casing and Lagging

LOCATION	Block			Segmented Blocked		Flat Alum. Lag. (in.)	Rib Alum. Lag. (oz.)	Rib Galv. Steel Casin (ga.)
	Min. Fiber Batt (in.)	Pourable Insul (in.)	Cal. Sil. (in.)	Cal. Sil. (in.)	Cal. Sil. (in.)			
FURNACE, EXT. SIDE, BACK-PASS								
ALL WALLS	4							22
ENCLOSURE:								
*Roof - Horizontal		9						-
*Roof - Vertical	5							22
X-Side - Horizontal		7						-
*X-Side - Vertical	4							22
Bottom - Horizontal	4							-
*Bottom - Vertical								
DUCTWORK:								
Economizer to Airheater	4						.032	
Airheater to Windbox	4						.032	
Hot Air to Mills	4						.032	
EQUIPMENT:								
Airheaters	4						.032	
Tubes, Pipes, etc:								
Drum shells and heads	4					.032		
Rad, R.H. Inlet Hdr. & Elem.			4			.032		
S.H. & R.H.O. Hdr. & Elem.	2	Special Blanket				-	-	-
Downtake Pipe, Pumps, etc.				1-1/2	2	.016		
Fuel Pipe				1-1/2		.016		
Pump Piping				1	1-1/2	.016		
Spray Pipe				2		.016		
Soot Blower Pipe				2		.016		
Misc. Pipe to C.E. Termination				2		.016		

*To be supported by 18 Ga. Corr. Aluminized Steel Roofing.

NOTE: Where applicable, insulation shall be applied against the plate.

c. This portion of the work does not include furnishing corrugated steel casing or furnishing and installing plastic refractory materials.

SECTION XI
INSULATION (CONTD)

7. THERMALLY INSULATING STEAM GENERATING AND TURBINE GENERATING UNITS (CONTD)

B. Turbine Generating Unit and Boiler Feed Pump Turbines The Contractor shall furnish all labor, tools, equipment and supervision necessary to install all thermal insulating materials and steel jacketing for a 410,000 KW, 3600 rpm, tandem-compound condensing turbine generating unit and boiler feed pump turbines. The thermal insulating materials and metal jacketing will be furnished and delivered by others. The Contractor shall procure and deliver all miscellaneous items not furnished by the manufacturer of the unit as necessary to complete the thermal insulation. Installation of insulation materials and jacketing shall be accomplished by the Contractor's forces under direction of the Turbine Generating Unit manufacturer's field representative.

DIVISION USAGE					
MM	P	PP	SH	FI	SP
	X				

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DP30.1T
Page 1

ISSUED 2/20/70
REVISED 10/8/71

PIPE INSULATION THICKNESS

SCHEDULE 1 SAME AS SCHEDULE 2 BUT ONLY WHERE REQUIRED FOR PERSONNEL PROTECTION

INSULATION SCHEDULE NO.	2	3	4	5	6	7	8	9	10
TEMP. °F / PIPE SIZE - O.D.	200/299	300/399	400/499	500/599	600/699	700/799	800/899	900/999	1000/1090
1½" & Under	1"	1½"	2"	2"	2½"	2½"	2½"	3"	3"
2" - 2 3/8"	1"	1½"	2"	2"	2½"	2½"	3"	3"	3"
2½" - 2 7/8"	1"	1½"	2"	2"	2½"	2½"	3"	3"	3½"
3" - 3½"	1"	1½"	2"	2"	2½"	3"	3"	3"	3½"
4" - 4½"	1"	1½"	2"	2½"	2½"	3"	3"	3½"	3½"
6" - 6 5/8"	1½"	2"	2"	2½"	3"	3"	3½"	3½"	4"
8" - 8 5/8"	1½"	2"	2"	2½"	3"	3½"	3½"	4"	4"
10" - 10 3/4"	1½"	2"	2½"	2½"	3"	3½"	4"	4"	4"
12" - 12 3/4"	1½"	2"	2½"	3"	3"	3½"	4"	4"	4½"
14"	1½"	2"	2½"	3"	3"	3½"	4"	4"	4½"
16"	1½"	2"	2½"	3"	3"	3½"	4"	4"	4½"
18"	1½"	2"	2½"	3"	3"	3½"	4"	4"	4½"
20"	1½"	2"	2½"	3"	3"	3½"	4"	4"	4½"
24" & Over	1½"	2"	2½"	3"	3"	3½"	4"	4½"	5"

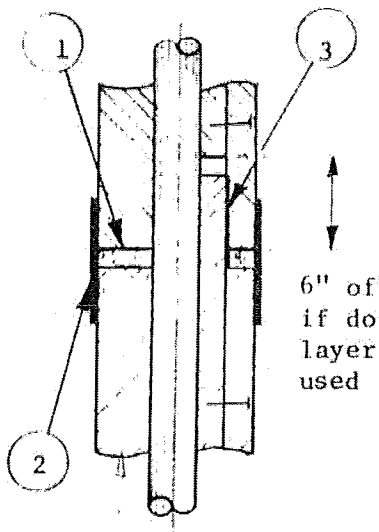
SCH #1 Not required on surfaces below 150°F.

SCH #11 3/8" insulation - anti-sweat insulation only.

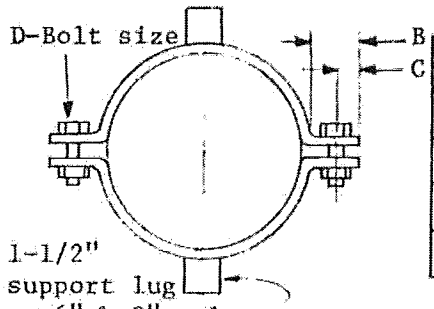
NOTE: Expansion joints are required in vertical lines over 600°F

See Std. DP30.1T Page 2 for details

DIVISION USAGE						Stearns-Roger CORPORATION Engineering Standard	DP30.1T Page 2
MM	P	PP	SH	FI	SP		
	X						
						PIPE INSULATION EXPANSION JOINTS FOR VERTICAL LINES	ISSUED 2/20/70 REVISED 10/8/71



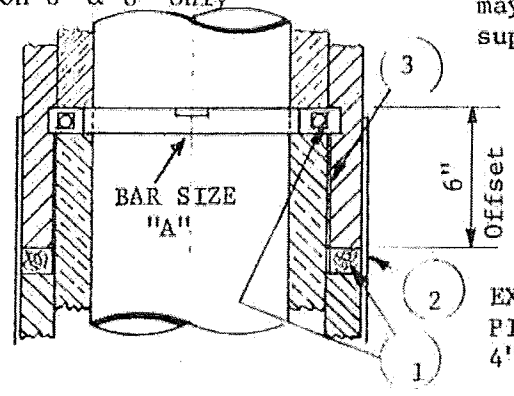
Single layer shown
EXPANSION JOINT FOR PIPE SIZES 2" & UNDER



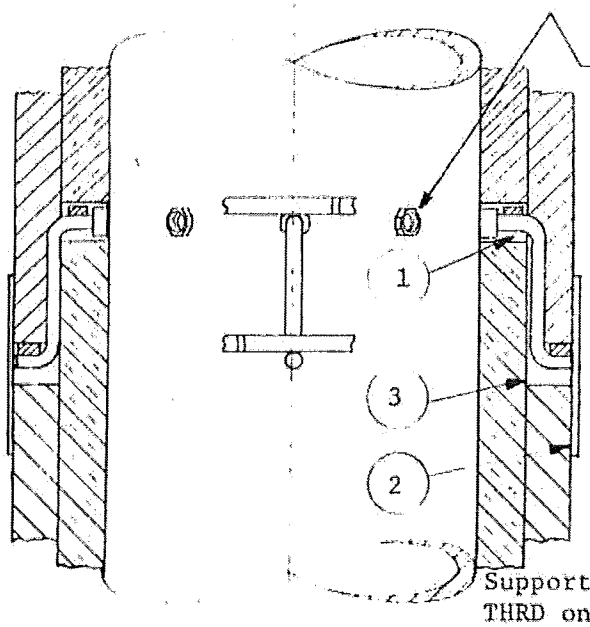
INSULATION SUPPORT CLAMP

Pipe Size	A	B	C	D
3"	1/4"x1"	2"	3/4"	1/2"
4"	1/4"x1"	2"	3/4"	1/2"
6"	3/8"x1-1/2"	2-1/4"	1"	5/8"
8"	3/8"x1-1/2"	2-1/4"	1"	5/8"

Grinnell type 212 clamp may be substituted with support lug added



EXPANSION JOINT FOR PIPE SIZES 2-1/2", 3", 4", 6" & 8"

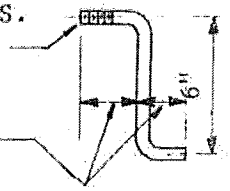


Ins. Sch.	5	6	7	8	9	10
Temp.	500/599	600/699	700/799	800/899	900/999	1000/1090
C/C Joint Vertical	18'1"	18'1"	15'1"	15'1"	12'1"	12'1"
Pipe Size	10", 12" & 14"			16" & Over		
No. of Nuts & Supp Rods	6 @ 60°			8 @ 45°		

Support rings 3/4" x 1/2" bar (2 halves) O.D. of ring 1/4" less than O.D. of insulation layer

Support rods 1/2"Ø M.S. THRD one end

To suit insulation layers



EXPANSION JOINT FOR PIPE SIZES 10" & LARGER

NOTES: (for all types)
① 1" to 1-1/2" space packed with mineral wool suitable for temp.
② 8" sheet metal band over joint if jacket is not req'd.
③ 6" sheet metal band to permit slippage between layers.

DIVISION USAGE					
MM	P	PP	SH	FI	SP
	X				

Stearns-Roger CORPORATION
Engineering Standard

ISSUED 10/8/7
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INSULATION LAYER THICKNESS FOR HEAT TRACED LINES OVER 400°F

INSULATION SCHEDULE NO.		4	5	6	7	8	9	10
TEMP. °F		400	500	600	700	800	900	1000
PIPE SIZE O.D.		499	599	699	799	899	999	1090
1 1/2" & Under	Inner Layer	1/2"	1"	1"	1-1/2"	1-1/2"	2"	2"
	Outer Layer	1-1/2"	1"	1-1/2"	1"	1"	1"	1"
2" - 2-3/8"	Inner Layer	1/2"	1"	1"	1-1/2"	1-1/2"	2"	2"
	Outer Layer	1-1/2"	1"	1-1/2"	1"	1-1/2"	1"	1"
2-1/2" - 2-7/8"	Inner Layer	1/2"	1"	1"	1-1/2"	1-1/2"	2"	2-1/2"
	Outer Layer	1-1/2"	1"	1-1/2"	1"	1-1/2"	1"	1"
3" - 3-1/2"	Inner Layer	1/2"	1"	1"	1-1/2"	1-1/2"	2"	2-1/2"
	Outer Layer	1-1/2"	1"	1-1/2"	1-1/2"	1-1/2"	1"	1"
4" - 4-1/2"	Inner Layer	1/2"	1"	1-1/2"	1-1/2"	2"	2"	2-1/2"
	Outer Layer	1-1/2"	1-1/2"	1"	1-1/2"	1"	1-1/2"	1"
6" - 6-5/8"	Inner Layer	1/2"	1"	1-1/2"	2"	2-1/2"	3"	3"
	Outer Layer	1-1/2"	1-1/2"	1-1/2"	1"	1"	1/2"	1"
8" - 8-5/8"	Inner Layer	1/2"	1"	1-1/2"	2"	2-1/2"	3"	3"
	Outer Layer	1-1/2"	1-1/2"	1-1/2"	1-1/2"	1"	1"	1"
10" - 10-3/4"	Inner Layer	1"	1-1/2"	1-1/2"	2-1/2"	2-1/2"	3"	3-1/2"
	Outer Layer	1-1/2"	1"	1-1/2"	1"	1"	1"	1/2"
12" - 12-3/4"	Inner Layer	1"	1-1/2"	2"	2-1/2"	3"	3"	3-1/2"
	Outer Layer	1-1/2"	1-1/2"	1"	1"	1"	1"	1"
14"	Inner Layer	1"	1-1/2"	2"	2-1/2"	3"	3"	3-1/2"
	Outer Layer	1-1/2"	1-1/2"	1"	1"	1"	1"	1"
16"	Inner Layer	1"	1-1/2"	2"	2-1/2"	3"	3"	3-1/2"
	Outer Layer	1-1/2"	1-1/2"	1"	1"	1"	1"	1"
18"	Inner Layer	1"	1-1/2"	2"	2-1/2"	3"	3"	3-1/2"
	Outer Layer	1-1/2"	1-1/2"	1"	1"	1"	1"	1"
20"	Inner Layer	1"	1-1/2"	2"	2-1/2"	3"	3"	3-1/2"
	Outer Layer	1-1/2"	1-1/2"	1"	1"	1"	1"	1"
24" & Over	Inner Layer	1"	1-1/2"	2"	2-1/2"	3"	3"	3-1/2"
	Outer Layer	1-1/2"	1-1/2"	1"	1"	1"	1-1/2"	1-1/2"

NOTE: Heat tracing of lines under 400°F use minimum of 2" insulation

Addendum E

Duplicated

MECH. ENG.

H #2 CONSTRUCTION CONTRACT

GENERAL CONTRACT
GC-1

NOVEMBER 1, 197

ORIGINAL

VOLUME 1

GENERAL CONTRACT

GC-1

for

CONSTRUCTION OF HUNTINGTON CANYON PLANT UNIT NO. 2

for

UTAH POWER & LIGHT COMPANY

SALT LAKE CITY, UTAH

Stearns-Roger
CORPORATION

PROJECT NO. 8-39050

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MECH. ENG.

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SECTION II
GENERAL CONDITIONS

MECH. ENG.

1. DEFINITIONS

A. The term "Engineer" shall mean Stearns-Roger Corporation.

B. The term "Owner" shall mean the Utah Power and Light Company.

C. The term "Contractor" shall mean the person or firm entering into this Contract to perform work for the Owner.

D. The term "Subcontractor" shall mean any person or firm contracting with the Contractor to perform work under this Contract for Contractor. Should the terms "Lower Tier Contracts" or "Lower Tier Contractor" appear in these Contract Documents, it shall be understood to mean "Subcontracts" or "Subcontractor".

E. The term "Work" shall mean the various obligations of the Contractor as set forth in the Contract Documents.

2. INDEPENDENT CONTRACTOR STATUS

A. The Contractor shall act as an independent contractor, maintaining complete control over and responsibility for its own men and operations.

B. No provision of this contract shall be construed to create any contractual relationship, nor any liability or obligation on the part of the Engineer to pay or be responsible for the payment of any monies to Contractor or any Subcontractor.

3. SUBCONTRACTORS

All subcontracts shall, before becoming effective, be submitted to and approved by the Owner. The Contractor will bind any Subcontractor to comply with and be governed by the provisions of Article "SUBCONTRACTS", of Section III, SPECIAL CONDITIONS, which are applicable to the work which such Subcontractor is to perform for Contractor.

4. SEPARATE CONTRACTS

The Owner reserves the right to award other contracts in connection with other portions of the project. The Contractor and any of his Subcontractors shall fully cooperate with such other contractors and carefully fit his own work to such additional work as may be directed by the Owner. The Contractor shall not commit or permit any act which will interfere with the performance of work by any other contractor.

5. WORKING RULES AND WAGE AGREEMENTS

A. Contractor and all Subcontractors shall abide by the appropriate wage agreements negotiated by the employer group having proprietary bargaining rights for the district in which the work is done. In the absence of any such agreements the Contractor shall adhere to those wage agreements of the various Building Trades which are in effect.

SECTION II
GENERAL CONDITIONS (CONTD)

5. WORKING RULES AND WAGE AGREEMENTS (CONTD)

B. The Contractor and all Subcontractors shall recognize and be bound by the National Joint Board (or any successor body) and its Procedural Rules pertaining to assignments of work and resolution of jurisdictional disputes.

6. PREMIUM TIME

Premium time planned by the Contractor or any of his proposed Subcontractors for work to be performed hereunder to meet the construction schedule, or which may be required to conform to local labor conditions, shall be included as a part of Bidder's Proposal.

7. ASSIGNMENT

This contract shall not be assigned, subcontracted or transferred in whole or in part, without the prior written approval of the Owner.

8. LAWS AND ORDINANCES

In the execution of the work the Contractor and Subcontractors shall comply with all prevailing and applicable laws, codes, and ordinances of the United States and of the State, County and Municipality wherein the project is located. The Contractor shall indemnify the Owner and the Engineer from all damages arising from violation of laws and ordinances of any kind by either himself or Subcontractors.

9. PERMITS, LICENSES, FEES AND NOTICES

A. The Contractor shall secure and pay for all permits, licenses and fees necessary and as required by law for the proper execution and completion of the work of this contract and shall give all necessary notices.

B. The Contractor shall give all notices and comply with all laws, codes, ordinances, rules, regulations and orders of any public authority bearing on the work. If the Contractor performs any work knowing it to be contrary to such laws, ordinances, rules and regulations and without notice to the Owner, the Contractor shall assume full responsibility therefor and shall bear all costs attributable thereto.

C. Costs of items specified in A., above, shall be chargeable to item "Contractor's Recoverable Costs" of Article COMPENSATION of Section IV.

10. LIENS

A. The Contractor shall at all times promptly pay for all labor used or employed in the work covered by this Contract. Requirements for Construction Payroll shall be as specified in Owner's supplement, "Organization and Procedure and Code of Accounts", which is furnished with and forms a part of this Contract.

SECTION II
GENERAL CONDITIONS (CONTD)

10. LIENS (CONTD)

B. The Contractor shall furnish the Owner with reasonable evidence that all labor for and on behalf of the Contractor has been paid in full. The Contractor shall, upon completion of the work, provide the Owner with affidavits to the effect that all such labor has been paid for in full.

C. The Contractor shall indemnify and save harmless the Owner and the Engineer of and from and against any and all claims, liens, demands, actions, suits and other proceedings by whomsoever made or brought in any manner based upon, occasioned by or attributable to, any work or services performed, by any person, firm or corporation whomsoever to, for, or on behalf of the Contractor or which would not have arisen or would not have been made or brought but for any such labor or services performed, to, for, or on behalf of the Contractor hereunder.

11. INDEMNIFICATION

The Contractor agrees to indemnify the Owner and the Engineer against and hold the Owner and Engineer harmless from any and all claims, liabilities, obligations and causes of action of whatsoever kind or nature for injury to or death of any person (including Owner's and Engineer's employees), and for damage to or destruction of property (including Owner's and Engineer's property), resulting from any and all acts or omissions of the Contractor, or any Subcontractor's employees in connection with the performance of the work covered by this contract. The Contractor agrees that the public liability and property damage insurance (including automobile public liability insurance and property damage insurance) which the Contractor is required to maintain pursuant to Article INSURANCE hereof shall cover the obligations set forth above.

12. INSURANCE

The Contractor (unless otherwise directed by the Owner) shall procure and maintain during the entire term of this contract the below described insurance coverage with Owner and Engineer as named insureds. Such insurance shall be carried with insurance companies satisfactory to the Owner. (Refer to Article BID REQUIREMENTS AND SUBMITTAL of the INSTRUCTIONS TO BIDDERS.) Each insurance policy shall contain a provision that coverages afforded shall not be cancelled until at least 15 days prior written notice has been given to the Owner and each insurance policy shall carry an endorsement providing waiver by the insurer of the right of subrogation against the Owner and Engineer. Any participating dividends which may accrue shall be payable to the Owner. The insurance coverage which the Contractor shall obtain and keep in force is as follows:

A. Insurance - Responsibility in Respect to Property of Owner

a. Damage to Materials and Work Under Construction To the extent of proceeds received by Contractor from Builder's Risk Insurance herein provided for, Contractor shall repair or replace without cost to Owner,

SECTION II
GENERAL CONDITIONS (CONTD)

12. INSURANCE (CONTD)

A. Insurance - Responsibility in Respect to Property of Owner (Contd)

a. Damage to Materials and Work Under Construction (Contd)

any loss or damage to the work performed under this Contract, and to materials purchased, supplied, or furnished by Owner, all prior to acceptance of the work, as provided in Article "FINAL ACCEPTANCE AND COMPLETION", hereinafter. Contractor shall be reimbursed its costs only, without fee for performing any such work, to the extent that such costs are not compensated for by insurance or otherwise, unless such costs are attributable to the negligence of any of Contractor's directors, officers, or employees having supervision or direction of the job as a whole. Contractor shall procure and maintain Broad Form Builder's Risk Insurance in the amount of $20,000,000.00 with deductible provision in the amount of Five Thousand Dollars ($5,000) to cover loss or damage to work performed under this Contract and loss or damage to materials and equipment at the site for installation hereunder, from point of receipt of said materials and equipment until acceptance by Owner of the work as provided in Article "FINAL ACCEPTANCE AND COMPLETION", hereinafter.

b. Damage to Property of Third Persons or to Property of Company Other Than Work Under This Contract Contractor shall procure and maintain Property Damage Insurance including coverage for liability arising out of operation of automobiles, with limits of $2,000,000 and with deductible provision in the amount of One Thousand Dollars ($1,000) for any accident in which the property of Owner (other than the work) or of third persons is damaged. Owner shall be named as an additional insured under this policy but only as respects liability arising from the operations of Contractor. In respect to the property of Owner (other than the work) Contractor's liability to Owner shall be limited to the proceeds of such insurance unless such liability is attributable to the negligence of any of Contractor's directors, officers or employees having supervision or direction of the job as a whole.

c. Injury to Persons Other Than Contractor's Employees Contractor shall procure and maintain Comprehensive Bodily Injury Liability Insurance including coverage for liability arising out of the operation of automobiles with limits of $1,000,000.00 for death of or injury to one person including Owner's and Engineer's employees, and $4,000,000.00 for death of or injury to more than one person, including Owner's employees, in any one accident. Owner and Engineer shall be named as an additional insureds under this policy, but only as respects liability arising from the operations of Contractor.

d. Injury to Contractor's Employees Contractor shall procure and maintain Workmen's Compensation Insurance in accordance with that required by law and Employer's Liability Insurance as deemed necessary by Contractor covering employees of Contractor engaged in the performance of work under this Contract.

SECTION II
GENERAL CONDITIONS (CONTD)

12. INSURANCE (CONTD)

A. Insurance - Responsibility in Respect to Property of Owner (Contd)

e. Damage to Construction and Automotive Equipment Contractor shall procure and maintain deductible form "All Risk" Contractor's Equipment Insurance, subject to $500 deductible each loss, with amounts under $500 reimbursable as job costs, covering physical damage to all Contractor's owned tools and construction and automotive equipment used by Contractor in performance of the work hereunder. It is understood there shall be no duplication of insurance premiums reimbursed to Contractor through rental rates.

f. Insurance - Right of Owner Procurement Should Contractor at any time neglect or refuse to provide insurance as specified above, the Owner shall have the right to procure the same. Insurance coverages and rates shall be subject to approval of Owner.

g. Additional Insurance Coverage Contractor shall, from time to time, review the insurance coverage provided for above and shall advise Owner of its considered judgment as to the sufficiency of such coverage and as to risks which may be uninsured.

h. Financial Compulsory Insurance In every case the insurance coverage shall amount to at least the limits stated above. However, where the Financial Compulsory Insurance Laws of the State of Utah requires higher limits, the Automobile Liability Insurance Policy shall provide coverage of at least those limits.

i. Subcontractor's Insurance Any Subcontractor shall be required by the Contractor, under the terms of any Subcontract, to obtain insurance of such types and for such amounts as Owner may direct Contractor to require of his Subcontractors. Said insurance, types, values and certificates thereof, will be identified to the Contractor by the Owner prior to Contractor's bidding and award of any Subcontract.

13. TAXES, UNEMPLOYMENT AND OTHER INSURANCE BENEFITS

A. Taxes The Owner will pay or reimburse vendors for all sales and use taxes on equipment, materials and personal property used or purchased for use in connection with the work. Contractor shall pay all occupational, business, excise or other taxes levied or imposed upon the Contractor, Contractor's business and the performance of the work under this Contract. The Contractor shall submit a certificate of payment attesting that all taxes specified herein have been paid by the Contractor. Contractor shall submit certificates of payment of such taxes as directed by the Owner.

B. Unemployment and Other Insurance Benefits The Contractor shall be reimbursed for unemployment and other insurance benefits as specified in item "Contractor's Recoverable Costs" of Article "COMPENSATION" of Section IV, Agreement.

SECTION II
GENERAL CONDITIONS (CONTD)

14. JOINT OCCUPANCY

The Owner shall have the right to enter into and occupy or use a portion of the work under this contract before completion and acceptance of the work as a whole. Such partial or joint occupancy or use before completion shall not be construed by Contractor as acceptance of the work by the Owner.

15. CHANGES BY THE OWNER

A. The Owner and/or Engineer, without invalidating the Contract, shall have the right by written supplement to order changes in the work consisting of additions, deletions or other revisions. Any such change shall become effective upon Owner's and/or Engineer's delivery to the Contractor of such written supplement and the Contractor shall proceed with the work resulting from the change.

B. Any claim by the Contractor for adjustment under this Article shall be submitted to the Owner and/or Engineer in writing within 30 days from the date such supplement is mailed or otherwise delivered to the Contractor. The Contractor's written claim shall include adjustment of manhours, and/or completion dates resulting from the change and shall be subject to the Owner's and/or Engineer's approval. The Contractor waives any claim for adjustment if such claim is not submitted to the Owner within the above period.

C. Nothing provided in this Article shall excuse the Contractor from proceeding with the prosecution of the work as changed.

D. All supplements hereto shall be subject to the terms of this Contract.

E. Except as provided in this Contract, charges for any extra manhours will not be allowed.

16. DELAYS AND TIME EXTENSIONS

A. The Contractor in determining his fee and manpower requirements to complete the work shall take into consideration the fact that delays may occur and it shall be understood that any dates contained herein are scheduled dates only which are generally dependent upon other contractors and equipment and material suppliers.

B. The Contractor shall (thru coordination with the Owner's field representative) be fully responsible for keeping informed of the actual project progress prior to and during the duration of the work and shall, where delays have occurred, make up lost time as necessary to maintain the construction schedule. Such lost time hours shall be chargeable within and to Contractor's total guaranteed manhours of Section III, SPECIAL CONDITIONS.

SECTION II
GENERAL CONDITIONS (CONTD)

16. DELAYS AND TIME EXTENSIONS (CONTD)

C. The Contractor shall not be entitled to any claim for additional manhours resulting from delays from any cause whatsoever. However, if such delay is caused by an act of God; fire; strike; boycott or other labor dispute; and acts of Government, its agencies or officers which could not have been reasonably foreseen and provided for, such delay may entitle the Contractor to an extension of time. All requests for an extension of time shall be submitted in accordance with Article "REQUEST FOR ADDITIONAL MANHOURS OR TIME BY CONTRACTOR", herein.

D. Any extension of time will depend upon the extent by which the delay effects the construction schedule and will only extend the scheduled dates for those items of work so delayed. Scheduled dates for other portions of the work not so delayed will remain unchanged.

17. REQUEST FOR ADDITIONAL MANHOURS OR TIME BY CONTRACTOR

A. If the Contractor wishes to request an increase or decrease in the total manhours of, or time required for, performance of the Contract, the Contractor shall give the Owner a written request therefor. This request shall be submitted before proceeding to execute the work, except in an emergency endangering life or property in which case the Contractor shall act, at his own discretion, to prevent threatened damage, injury or loss. The Owner will investigate the conditions of the Contractor's written request and if approved, an adjustment may be made and the contract modified by Change Order accordingly.

B. Any claim of the Contractor for adjustment hereunder will not be allowed unless he has submitted a request and the request has been authorized by Change Order.

18. DEFAULT AND TERMINATION OF CONTRACT

A. Default If the Contractor at any time during the performance of the Contract shall:

a. Become insolvent or make a general assignment for the benefit of its creditors, or

b. Have a petition of bankruptcy by or filed against Contractor or an attachment or execution levied upon any of Contractor's property used hereunder or have a receiver for Contractor's business appointed on account of the condition of such business or of insolvency, or

c. Have any legal proceedings taken against Contractor that in the opinion of Owner interferes with the diligent and efficient performance and satisfactory completion of the work, or

SECTION II
GENERAL CONDITIONS (CONTD)

18. DEFAULT AND TERMINATION OF CONTRACT (CONTD)

A. Continued

d. Fail, neglect or refuse to proceed with the work in a prompt, safe and diligent manner or to supply properly skilled workmen or procure materials, or

e. Fail, neglect or refuse to proceed according to and in full compliance with all the provisions and covenants of this Contract, then the Contractor shall be deemed in default and the Owner, without prejudice to any other right or remedy Owner may have, may give Contractor notice in writing setting forth the particulars of such default. Unless such default can and shall be corrected within ten (10) days from date of said notice, Owner, at Owner's option, may terminate this Contract.

B. Termination for Default In the event of such termination, Owner will be liable to Contractor only for:

a. Contractor's Recoverable Costs to date of termination including, without limitation, costs resulting from commitments, claims or obligations undertaken or incurred by Contractor in good faith in connection with the work;

b. A portion of Contractor's Fixed Fee corresponding to the percentage of work completed by Contractor.

C. Termination Other Than Default Owner may, at its absolute discretion, terminate the work at any time by giving written notice to Contractor, but where Contractor is not in default under this Contract, Owner will assume and become liable for all obligations, commitments and claims that Contractor may have theretofore, in good faith, undertaken or incurred in connection with said work and will reimburse Contractor for all expenditures made in accordance with item "Contractor's Recoverable Costs" of Article "COMPENSATION" of Section IV, and not previously reimbursed, plus a portion of Contractor's Fixed Fee corresponding to the proportion of work completed.

19. INSPECTION AND REJECTION

A. The Owner or its designee(s) reserves the right to perform such examination, inspection and tests of equipment, material and workmanship as it may desire to assure itself that the work meets all specified requirements.

B. The Contractor and all of his Subcontractors and suppliers shall permit unrestricted access to the Owner or its designee(s) for the purpose of conducting such examination, inspection and tests at any and all times and places where the work is in process of manufacture, fabrication, construction, assembly or erection; shall provide sufficient, safe and proper facilities such as ladders, scaffolds, openings, drop lights, etc., for such access and inspection; and shall make available any and all data which is relevant to the performance of this contract.

SECTION II
GENERAL CONDITIONS (CONTD)

19. INSPECTION AND REJECTION (CONTD)

C. If the specification, laws, ordinances or any public authority require any work to be specifically done, tested or approved, the Contractor shall give the Owner or its designee(s) sufficient advance notice of his readiness for inspection or test to permit the Owner or its designee(s) scheduling of all necessary personnel. If any work shall be covered up without approval or consent it shall, if required by the Owner, be uncovered at the Contractor's expense of manhours chargeable within and to Contractor's total guaranteed manhours of Section III, Table I, "SUMMARY OF MANHOURS".

D. Authorized inspectors for the Owner shall have authority to reject materials and workmanship which are defective or not in accordance with the specifications or drawings, and to require their correction. Any material or work which is rejected in writing by the authorized inspector due to stated defect or non-conformance with specified requirements, shall be satisfactorily corrected or replaced at once in accordance with the directions of the Owner. No other work connected to or dependent upon the rejected work shall be done until the rejected work has been corrected or replaced.

E. If the Contractor fails to proceed at once with the replacement of rejected material or the correction of defective workmanship the Owner may, by contract or otherwise, replace such material and correct such workmanship, deduct the cost of Owner expended manhours from the Contractor's guaranteed total manhours, and may also at the Owner's option terminate the right of the Contractor to proceed as provided in Article "DEFAULT AND TERMINATION OF CONTRACT".

F. Nothing contained in the above paragraphs shall in any way void, restrict or limit the right of the Owner to later conduct such performance tests as it may desire or its rights under any warranty or guarantee.

20. WORKMANSHIP

The Contractor warrants and agrees that all work covered by this contract shall be performed in a good and workmanlike manner, shall conform to the Contract Documents and with Article "LAWS AND ORDINANCES". Any work not so performed or not in conformity with the requirements specified shall be corrected by the Contractor at Owner's direction.

21. EQUIVALENTS

Where any equipment, material or item is specified by proprietary name or name of manufacturer, such name is used for the purposes of facilitating description and establishing a standard of quality desired and shall be deemed to be followed by the words "or approved equal" unless otherwise specified. The Engineer shall be the sole judge of whether any proposed

SECTION II
GENERAL CONDITIONS (CONTD)

21. EQUIVALENTS (CONTD)

equipment, material or item is an equivalent, and the Engineer's decision in such matters shall be final. The Contractor shall submit design data or other descriptive evidence substantiating equal quality or characteristics of proposed alternates or substitute materials to the Engineer for review and approval. Proposed alternates or substitutes shall not be procured, used or installed by the Contractor until formal approval in writing is received from the Engineer.

22. CONTRACTOR'S FIELD SUPERVISION

A. The Contractor shall furnish at the jobsite a competent field representative and any necessary assistants, all of which shall be satisfactory to the Owner.

B. The representative or his assistants shall not be replaced without the written consent of the Owner, unless they prove to be unsatisfactory to the Contractor and cease to be in the Contractor's employ.

C. The representative and any assistants shall be identified to the Owner by written notice from the Contractor. The written notice shall be given to the Owner 15 days before the representative or assistant is required at the site, and shall contain the following information:

a. The name, experience and employment record (for the last 5 years minimum) of the representative or superintendent who shall be in continuous charge of all field operations and who shall be authorized to negotiate and act for the Contractor in his absence.

b. The names, duties, experience and employment records (for the last 5 years minimum) of all supervisory assistants the Contractor expects to assign to this project.

D. The representative shall be fully authorized to represent and to act and negotiate for the Contractor in his absence, and all directions given to the representative by the Owner or Owner's designated representative shall be as binding as if given to the Contractor.

E. Should the assigned representative or assistant's performance be unsatisfactory or detrimental to the best interests of the Owner, the Owner will notify the Contractor in writing if such action is required, and five (5) days after receipt of written notice, the Contractor shall provide replacements. Failure of Contractor to perform within the specified requirements shall subject the contract to the provisions of Article "DEFAULT AND TERMINATION OF CONTRACT" herein.

SECTION II
GENERAL CONDITIONS (CONTD)

23. MEASUREMENTS AND FIELD VERIFICATION OF DIMENSIONS

The Contractor shall, as and to the extent necessary for proper accuracy and accomplishment of his work, verify all measurements in the field in accordance with the requirements of Section III, SPECIAL CONDITIONS, Article "SURVEYS AND LAYOUTS OF WORK".

24. DRAWINGS AND SPECIFICATIONS

A. The drawings and specifications, which form a part of the Contract Documents, are intended to supplement, but not necessarily duplicate, each other. Anything mentioned in the specifications and not shown on the drawings, or shown on the drawings and not mentioned in the specifications, shall be of like effect, as if shown or mentioned in both. In case of discrepancies in the figures, drawings or specifications, the matter shall be promptly submitted in writing to the Engineer and Owner, who will make a decision concerning the discrepancy in writing. Any adjustment by the Contractor without this determination shall be at the Contractor's own risk and expense.

B. If the Contractor, in the course of the work, finds any discrepancy between the drawings and the physical condition of the locality, or any errors or omissions in the drawings or specifications, it shall be the Contractor's duty to immediately inform the Engineer and Owner, in writing, and the Owner will promptly investigate the same. Any work done by the Contractor after such discovery and without written instructions from the Owner will be done at the Contractor's risk and expense.

C. The Contractor shall maintain a complete and up-to-date "as-built" set of drawings and specifications on the jobsite, and shall at all times give the Owner or its authorized representatives access thereto. Requirements for "as-built" drawings shall conform to Section III, SPECIAL CONDITIONS, Article "AS-BUILT DRAWINGS".

25. CONFIDENTIAL INFORMATION

All drawings, specifications, technical data and other information furnished to the Contractor either by the Engineer or by the Owner in connection with this Contract are and shall remain the property of the Engineer or the Owner, and may not be copied or otherwise reproduced or used in any way, except in connection with the work performed under this Contract, or disclosed to third parties or used in any manner detrimental to the interest of Engineer or the Owner. Contractor agrees to insert in any subcontract a restriction on the use of such information, data, drawings and specifications similar to that set forth in the preceding sentence.

26. REGULATION OF VISITORS, PHOTOGRAPHS AND PRESS RELEASES

Contractor shall not permit visitors on the premises, except with written approval of the Owner. Cameras shall not be permitted on, in, or around the project site and photographs of any kind shall not be taken without specific written approval of the Owner. The Contractor shall not make any verbal or written statement to any press or news media, relative to

SECTION II
GENERAL CONDITIONS (CONTD)

26. REGULATION OF VISITORS, PHOTOGRAPHS AND PRESS RELEASES (CONTD)

the work of this contract, the Engineer or Owner, without first obtaining specific written approval thereof from the Owner. Failure of Contractor to perform within the specified requirements shall subject the Contract to provisions of Article "DEFAULT AND TERMINATION OF CONTRACT" herein.

27. MAINTENANCE AND PROTECTION OF WORK AND PROPERTY

A. The Contractor shall do all field work in a manner causing the least possible obstruction or damage to public and private highways, roads, easements Federal, State and County properties; shall continuously maintain adequate protection of all of his own work from damage or loss; and shall protect all property of the Engineer, Owner or other Contractors from any unnecessary obstructions and any injury or loss attributable to his operations. He shall make good any such damage, injury or loss resulting from nonadherence to these requirements.

B. Throughout the progress of his work, the Contractor shall provide and maintain all passageways, guard fences, flags, lights and other protective measures required by statutes, ordinances, local regulations, and prevailing conditions or as requested or directed by the Owner.

28. TOOLS, PLANT AND EQUIPMENT

If, at any time during the progress of the work, tools, plant or equipment being utilized by the Contractor for field use appear to the Owner or Owner's designated representative to be unsafe, insufficient, inefficient, or inappropriate to secure the quality of work required or the proper rate of progress, the Owner may order the Contractor to increase their efficiency, to improve their character, to augment their number, or to request Contractor to purchase or rent additional tools, plant or equipment as the case may be, and the Contractor shall conform to such order; but failure of the Owner to demand such increases of efficiency, number or improvement shall not relieve the Contractor of his obligation to secure the quality of work and the rate of progress necessary to complete the work within the time required by the Contract Documents.

29. ACCIDENT REPORTS AND SAFETY

A. In case of accident on the project, an accident report shall be prepared by the Contractor in accordance with the Owner's procedures.

B. Safety equipment and safeguards suitable to the occupational hazards involved and conforming to the safety regulations on the project shall be furnished by the Contractor.

SECTION II
GENERAL CONDITIONS (CONTD)

29. ACCIDENT REPORTS AND SAFETY (CONTD)

C. The Contractor shall comply with all Federal, State, local and Owner's rules and regulations governing safety and the safe performance of the work, including, but not limited to, all applicable provisions of the Williams-Steiger Occupational Safety and Health Act of 1970.

D. The Contractor shall be directly responsible for its own safety program and first aid and medical service and/or facilities for its employees. (Ref. Article "FACILITIES PROVIDED BY CONTRACTOR" of Section III, SPECIAL CONDITIONS).

E. The Contractor agrees to indemnify and hold harmless Owner and Engineer from and against any and all claims, liabilities, obligations and causes of action of whatsoever kind or nature as a result of failure to comply with the above safety requirements.

F. The Owner may shut down work if, in the opinion of the Owner, the Contractor's work is being performed in a hazardous and dangerous manner, or Contractor's housekeeping and clean-up methods contribute to, or create, a hazardous or dangerous condition. Work shall not thereafter proceed until Contractor agrees to conduct the work in a safe manner.

30. CLEAN-UP

The Contractor shall at all times keep the premises free from accumulations of waste material or rubbish caused by its employees or work. At the completion of the work in each individual area, the Contractor shall remove all its rubbish from and about such area and all tools, scaffolding and surplus materials. The Contractor shall leave the area "Broom Clean" or its equivalent, unless otherwise specified. During the progress of the work the Contractor shall maintain each area reasonably clear and clean with a regular clean-up scheduled at a minimum of once a week or as otherwise directed by the Owner or the Engineer.

31. FINAL ACCEPTANCE AND COMPLETION

When Contractor deems the work finally completed, Contractor shall give the Owner notice thereof in writing. Within ten (10) days after receipt of such notice, the Owner will determine if the work has been completed in a satisfactory manner to Owner and, if so, will advise Contractor in writing of its final acceptance thereof. If the work is unsatisfactory to Owner, Owner will notify the Contractor of the defects and the Contractor shall repeat the procedure stated herein until the work has been satisfactorily completed and accepted.

32. GUARANTEE

A. If any defect in the material or equipment furnished by others and installed by Contractor appears within a period of one (1) year from the actual Date of Firm Operation, and such defect is attributable to Contractor's workmanship, the Contractor will be immediately notified, and Contractor shall

SECTION II
GENERAL CONDITIONS (CONTD)

32. GUARANTEE (CONTD)

thereupon correct, without delay and at Contractor's expense, the defect or defects by repairing or replacing the defective workmanship and/or material or equipment damaged thereby as directed by the Owner.

B. Removal and re-installation cost of the defective workmanship and the material and/or equipment damaged thereby and including connecting or attaching parts, material or equipment, shall be at Contractor's expense. In the event the Contractor corrects any defective workmanship or material or equipment as specified hereinbefore, then with respect to the same, the aforesaid guarantee period shall run for one (1) year from the date of completion of such re-installation or such workmanship correction and acceptance thereof, provided same is not unreasonably delayed by Owner.

C. Contractor guarantees and shall indemnify the Engineer against loss or damage arising from any such defects or damage caused by Contractor under the contract for such period as Engineer is liable under law or under the terms of the agreement between the Owner and Engineer.

33. BACKCHARGES

Procedures for handling of backcharges shall be as outlined in the Owner's "Organization and Procedure and Code Accounts Manual" which is furnished with and forms a part of the Contract Documents (Ref. Section V, Article SUPPLEMENTS). If said procedures are not adhered to by the Contractor, manhours chargeable as backcharges shall be absorbed back into the total guaranteed manhours by the Contractor.

34. REMOVAL OF PROPERTY FROM PLANTSITE

The Contractor or Subcontractors or any employee thereof shall not remove or attempt to remove any machinery, equipment, tools or materials of any nature (emergency ambulances excepted) from the confines of the Owner's plantsite without first obtaining such written authorization as may be required by the Owner.

SECTION III
SPECIAL CONDITIONS

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SECTION III
SPECIAL CONDITIONS

1. COMMENCEMENT, PROSECUTION AND COMPLETION OF WORK

The successful Bidder shall commence work under this Contract upon notification of award and shall schedule his operations such as to start field work on or about February 15, 1972, and to meet the Initial Turbine Roll Data of March 1, 1974, the Firm Operation of June 1, 1974, and other Contract scheduled completion dates as shown on Table VI, attached at the end of this section.

2. CONTROL AND APPROVAL

A. It is understood that Contractor shall function in cooperation with and be subject to the general direction and control of Owner's authorized officers or Owner's designated representatives and the terms, conditions and approvals required of and by the Owner and the Contract Documents. Contractor shall consult with Owner in advance of important decisions and Owner reserves the right, to the extent necessary in its judgment to protect its interests, to approve construction methods to be employed, the wages, hours and conditions of labor, the preparation and award of subcontracts, making of construction material purchases, routing of shipments, and all other matters pertaining thereto.

B. Should Owner impose a condition which in the Contractor's judgment materially affects manhours involved, an equitable adjustment to the maximum guaranteed manhours may be mutually agreed upon by the Owner and Contractor in accordance with the requirements of Articles, "CHANGES BY THE OWNER" and "REQUEST FOR ADDITIONAL MANHOURS OR TIME BY CONTRACTOR", of Section II, GENERAL CONDITIONS.

C. Owner will designate some member or members of its organization or other representatives, who will be familiar with the scope and progress of the work, and who will be the authorized medium of communication with Contractor in matters pertaining thereto and shall inform Contractor promptly of any methods employed or other features that do not meet with Owner's approval.

3. ENGINEER'S AUTHORITY

A. The Engineer will be a duly authorized representative of Owner, and will be sole judge of the technical meaning and intent of the drawings, details, contract documents, etc., and whenever a dispute arises, the Contractor shall abide by Engineer's decisions which shall be in writing and with the concurrence of the Owner.

B. The Owner, assisted by the Engineer, will be in charge of start-up of the completed facility. The Engineer will also determine if the work of this contract is proceeding in accordance with the contract documents and the requirements of SECTION III, INSPECTION AND REJECTION of SECTION II, GENERAL CONDITIONS. On the basis of his on-site observations as the Engineer, Engineer will keep the Owner informed of the progress of the work and will endeavor to guard the Owner against defects and deficiencies in the work of the Contractor.

SECTION III
SPECIAL CONDITIONS (CONTD)

4. CONSTRUCTION SCHEDULE

A. Forty-five (45) days after award of Contract and before start of field work, a detailed construction schedule shall be prepared by the Contractor, based upon overall Contract start and finish dates given under Article "COMMENCEMENT, PROSECUTION AND COMPLETION OF WORK", Table VI referenced therein, and various other dates as determined by the Owner and/or the Owner's field representative.

B. The schedule shall, as a minimum, include the following specific data for each activity:

a. Description of activity
b. Manpower required to complete activity
c. Duration of activity
d. Monthly manhour budget estimates for project

C. The schedule format shall be predicated on a Critical Path Method (CPM) with level of detail as directed by the Owner.

D. If after the preparation and approval of the schedule by both the Contractor and Owner, the Contractor desires to make any changes to the schedule, such changes, the reason therefor, and the impact on related construction, shall be submitted to the Owner, in writing, for approval. If the Owner considers these changes to be of a critical nature, the Owner reserves the right to schedule a review and re-evaluation meeting as provided under Article "DETERMINATION OF PROGRESS."

5. DETERMINATION OF PROGRESS

A. The Contractor shall submit weekly and monthly progress reports to the Owner and the Engineer, in accordance with the Owner's requirements.

B. If at any time during this Contract, when the actual progress, in the opinion of the Owner, is such that the Contract completion date will not be met, the Contractor shall agree to participate in a re-evaluation of the project.

C. If, as a result of the re-evaluation of the project, it is determined by the Owner that the Contract completion dates will not be met, the Owner retains the right to direct the Contractor to accelerate the construction program. It shall be the responsibility of the Contractor to initiate and comply with such corrective action as required or directed.

D. Premium time required of the Contractor as a result of re-evaluation of progress will not be accepted as a basis for additional manhours by the Owner.

6. FACILITIES AND SERVICES FURNISHED BY OWNER

A. Storage and Office Facilities Portions of the plant site Administration Warehouse, Shop Maintenance Building and certain related facilities will be available for use by the Contractor.

SECTION III
SPECIAL CONDITIONS (CONTD)

6. FACILITIES AND SERVICES FURNISHED BY OWNER (CONTD)

A. Storage and Office Facilities (Contd)

Additional storage areas will be assigned and designated by the Owner. Contractor shall have ascertained during his site visit the nature, size and condition of these office and storage areas which will be available for his use. All preparations (if required), maintenance and housekeeping of these areas shall be the responsibility of the Contractor.

B. Parking Areas The Owner will assign and designate storage and parking areas. Use of other areas for the above will not be permitted. Preparation, maintenance and housekeeping of these areas shall be the responsibility of the Contractor.

C. Construction Equipment and Tools

a. All construction equipment and tools will be provided by the Owner as specified hereinafter. Various units of construction equipment (rolling stock) and construction tools will be made available at the project site for the Contractor's use during the performance of the work of this Contract.

b. The nature, size and condition of this equipment and tools shall have been ascertained by the Contractor during his visit to the site or other locations where the equipment is stored. All other equipment and tools required by the Contractor shall be procured through the Owner or may be provided by the Owner to the Contractor on a rental basis in accordance with the requirements specified hereinafter in Article CONSTRUCTION EQUIPMENT AND TOOLS FURNISHED BY OWNER.

D. Sanitary Facilities Limited toilet facilities are available in the construction area for use by the Contractor.

E. Utilities All reasonable amounts of water and electricity will be available for use by the Contractor, without charge, from existing outlets within the plant area. The Contractor shall install and maintain all temporary piping, valves, fittings, electrical lines, transformers and equipment necessary for his utilization of these sources of power and water. Upon completion of their use by him for work of this contract, the Contractor shall remove these temporary utilities in a satisfactory manner from the construction area.

F. Services

a. Security Services The Owner will provide twenty-four (24) hour per day security service for the project site throughout the period of performance of the work of this contract. The security service function will be performed by others under separate contract to the Owner, and this function as such, will be considered by the Owner as chargeable

SECTION III
SPECIAL CONDITIONS (CONTD)

6. FACILITIES AND SERVICES FURNISHED BY OWNER (CONTD)

F. Services (Contd)

a. Security Services (Contd)

to the Contractor's total guaranteed manhours. Contractor shall be responsible for coordinating with the Owner and Owner's security service to establish Contractor's security needs as may be required for the performance of the work of this contract.

b. Testing, Inspection and Quality Control Agencies Throughout the period of this contract, testing and inspection which may be necessary or required to determine suitability and quality control of various types of work, methods of work, materials and related functions will be performed by others under separate contracts with the Owner. For example, all testing of earthwork and concrete materials will be performed by a commercial testing agency retained by the Owner. All similar testing, inspection and quality control functions including, but not limited to, welding inspection, testing of weld coupons, x-ray analysis of welds and verification of torque application and calibration of torque wrenches will also be included as part of these Owner-furnished services. These services will not be chargeable to or deductible from the Contractor's total guaranteed manhours. Contractor shall provide sufficient assistance and cooperation as may be requested by these testing agency personnel and shall permit such testing personnel unrestricted access to stockpiles of materials, areas of earthwork in progress, and all other related areas or locations requiring sampling, testing or inspection.

The Owner and Engineer shall have the option of waiving inspection, testing or any related quality control which may be required in the technical specifications, but any waiver thereof shall in no way relieve the Contractor from the responsibility of installing or providing materials and performing all work meeting the requirements of the Contract Documents.

7. FACILITIES PROVIDED BY THE CONTRACTOR

A. Temporary Buildings and Warehousing Other than specified in Article FACILITIES AND SERVICES FURNISHED BY OWNER, Paragraph A, the Contractor shall construct all temporary structures and warehouse facilities on the site as required, or as may be directed by the Owner, for the execution and supervision of the work, handling and storage of equipment and materials, housing of tools and related items, subject to approval of the Owner and located as the Owner may direct. All temporary buildings and warehousing facilities, except trailers which may be the property of the Contractor, shall become the property of the Owner at the completion of construction and shall remain in place except as otherwise directed by the Owner.

SECTION III
SPECIAL CONDITIONS (CONTD)

7. FACILITIES PROVIDED BY THE CONTRACTOR (CONTD)

B. Ambulance, First-Aid Facilities and Support Personnel The Contractor shall make available (by rental or other means as Owner may direct) during all hours of actual field construction work and activities of his own or his subcontractor forces, one (1) or more ambulances as the Owner may direct to serve emergency needs of the construction site. Ambulance(s) shall as a minimum be two-way radio equipped and shall have oxygen, resucitators and aspirators on board and shall meet all requirements for such vehicles as set forth by the Industrial Commission for the State of Utah or other governing agencies thereof. Ambulance(s) shall be made available at the project site a minimum of two (2) days prior to the commencement of any field work by the Contractor.

In addition to ambulance(s), Contractor shall establish on the project site, and prior to commencement of any field work by Contractor's forces, a first-aid facility which shall be stocked with first-aid supplies which, as a minimum, meet the requirements of Section 12 of the General Safety Orders of the Industrial Commission of the State of Utah.

Contractor shall provide personnel trained in emergency first-aid and the operation of ambulance equipment to man or staff the first-aid facility, and to drive the ambulance(s) as required in case of emergency. Contractor shall have provided sufficient manhours in Table I "SUMMARY OF MANHOURS" of SECTION III, SPECIAL CONDITIONS, to provide/perform these functions. All personnel associated with these functions shall be trained or certified proficient in first-aid and related emergency services as may be required by the governing agencies of the State of Utah.

8. IDENTIFICATION BADGES

A. Contractor shall provide identification badges for his employees and for employees of all subcontractors.

B. Identification badges shall show the Contractor's name and the employee's identification number. Specific design of badges will be subject to approval of Owner as Owner may direct.

C. Badges shall be worn, clearly visible to others, by employees at all times while on the plant site.

9. TRANSPORTATION FACILITIES

A. Use of Facilities The Contractor shall make his own investigations of all transportation facilities and the conditions existing within the locale of the project site.

B. Rail Transportation The project site is not served by rail. The closest rail facilities are located at Price and Wellington, Utah, both approximately 25 to 30 miles north of Huntington. Facilities at both locations are served by the Denver and Rio Grande Western Railroad.

SECTION III
SPECIAL CONDITIONS (CONTD)

9. TRANSPORTATION FACILITIES (CONTD)

C. Access to the Plant Site Primary access to the plant site is by Utah State Highway Number 31. The plant site is located on the south side of Highway 31, in an area known as Deer Creek Wash at a point approximately eight (8) miles northwest of Huntington, Emery County, Utah.

In addition to the highway access specified, the Owner will attempt to develop an additional haul route to the plant site. The successful Bidder (Contractor) shall have contacted the Owner during the bidding period and shall have ascertained the development status of any additional or Owner contemplated haul routes or roads. Contractor shall have included sufficient manhours in his bid to compensate for performing the work under this contract which may be affected by any such additional haul routes that Owner may or may not develop.

D. Load and Haulage Restrictions The Contractor shall, unless otherwise directed by the Owner, obtain all permits required to haul equipment and materials to the project site. The Contractor shall also be responsible for all shoring, bracing and reinforcing of bridges, culverts and similar structures which may be required in order to safely support the loads to be encountered by movement of all equipment and materials to the project site by whatever haul route(s) used. The foregoing shall be accomplished in accordance with, and receive the approval of, or be as directed by, the State of Utah Highway Commission and the Utah Highway Patrol, as applicable.

E. Allowances for Access to Plant Site The Owner assumes no responsibility for the condition or maintenance of any existing or future access roads that may be used by the Contractor for performing the work under this contract, and for traveling to and from the site of work. Except as otherwise provided in this contract, no additional manhours will be allowed to the Contractor for constructing any temporary roads or detours, or for improving, repairing, or maintaining any existing road or structure thereon or thereof that may be used by the Contractor for performing the work of this contract. Contractor's manhours for all work, limitations or factors specified in this Article affecting transportation and access to and egress from the site of the work shall have been included in the Contractor's Total Guaranteed Maximum Manhours of Table I of Section III, SPECIAL CONDITIONS.

10. EQUAL EMPLOYMENT OPPORTUNITY

Contractor agrees to comply with all applicable provisions of Executive Order No. 11246 of September 24, 1965, and with all applicable rules, regulations and orders of the Secretary of Labor as they may apply to Equal Employment Opportunity.

11. SHIPMENT

Truck shipments will be made to:

SECTION III
SPECIAL CONDITIONS (CONTD)

11. SHIPMENT (CONTD)

(Contractor's Name)
Huntington Canyon Plant, Utah
8 miles west of Huntington on State Highway No. 31

Unless otherwise excepted in the Contract, the Contractor shall be responsible for receiving, inspecting for shipping damage, filing of claims and unloading at the project site or at other locations specified on these Contract Documents, for all equipment and/or materials furnished to the Contractor by the Owner and that procured by Contractor through Owner's Purchasing Department.

12. PERFORMANCE BOND

A. The Contractor shall provide the Owner with a good and sufficient surety bond in the full amount of the contract calculated on the manhour guarantee and an assumed average hourly rate of $11.00 per manhour, which shall guarantee the faithful performance of all the covenants, stipulations and agreements of this Contract, the payment of all bills and obligations arising from the execution of this Contract, and guarantee the Work included under this Contract (as specified under Article GUARANTEE of the SECTION II, GENERAL CONDITIONS).

B. The provisions of the bond shall be complete and in full accordance with statutory requirements. The bond shall be executed with the proper sureties through a company licensed and qualified to operate in the State of Utah, and the Owner reserves the right to approve the Surety Company and the form of bond.

C. Changes to the Contract will call for consent of Surety and changes in the bond or additional bonds from new sureties, but the bond shall state that said changes to the Contract do not release the Surety under any bond previously provided.

D. If at any time during the continuance of this Contract the Surety on the bond becomes irresponsible, the Owner shall have the right to require additional and sufficient sureties which the Contractor shall provide to the satisfaction of the Owner within five (5) days after notice to do so. In default thereof, the Contract may be suspended and all payments or money due the Contractor withheld.

E. One (1) year after final acceptance of the work, the liability of the Contractor and the Surety under the performance bond shall be terminated.

13. DUST CONTROL

The Contractor shall institute and maintain, as directed by the Owner and/or Engineer, adequate dust control measures such as sprinkling, for all his work areas, haul routes, and parking areas. For the purposes of this contract, adequate dust control shall be considered as controlling generation of dust such that dust does not cause discomfort to personnel or impaired visibility.