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September 5, 2011

Clerk of the Board
Air Resources Board
1001 I Street,
Sacramento, California 95814

Submitted Electronically

Subject: Comment on 15-Day Changes to the Regulation for In-Use Diesel Fueled Fleets

On behalf of the West Coast Chapter of the International Association of Foundation Drilling ("ADSC," formerly known as the Association of Drilled Shaft Contractors), Sierra Research is submitting the following comment to the proposed modified text of the In-Use Off-Road Diesel-Fueled Fleets.

Last October, prior to the December 17, 2011 public hearing on this rule, ADSC formally requested relief from staff with regarding two-engine foundation drill rigs, which would otherwise have been regulated under two separate fleet rules. The basis for our request was summarized in a letter dated October 18, 2010, which is attached and submitted as part of this comment letter. For the reasons specified therein, ADSC requested that two-engine foundation drilling rigs be regulated identically to two-engine water well drilling rigs, which were granted relief effective several months earlier.

Subsequent to ADSC's letter, staff acknowledged our request and committed to address the issue prior to the public hearing. Staff fulfilled that commitment by releasing "Attachment 'B'" as 15-day changes at the hearing. The "Attachment 'B'" changes not only removed the unusual distinction between water well and foundation drilling rigs, but expanded the requested relief to most other two-engine vehicles. Because suitable relief was proposed by staff, no written or oral testimony was made by ADSC to the Board on this issue at the hearing. As you are aware, the Board adopted the regulatory proposal and "Attachment 'B'" changes.

The current 15-day changes withdraw a significant portion of the relief that was granted over eight months ago in December. The proposed changes reinstate the unusual distinction between water well and foundation drilling rigs (which are oftentimes the very same vehicles), and allow continued use of uncertified deck engines on the former, while

banning them on the latter. By withdrawing a portion of the proposed relief through the 15-day change process, ADSC was ultimately denied the opportunity to address the Board directly on this issue at a public hearing. It is possible that the Board would have agreed with a request by ADSC and directed staff to remove the unfounded regulatory distinction concerning drilling rigs.

Staff provides the following brief basis for withdrawing a portion of the relief granted on December 17.

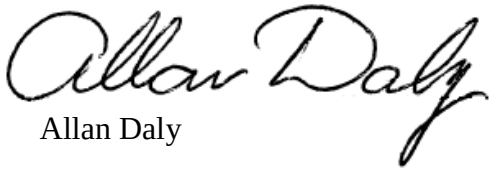
"Removing these engines from the Portable ATCM and allowing them to re-enter the state, or to return to full usage, would result in an increase in emissions from Tier 0 engines, and would result in emissions disbenefits throughout the State. Additionally, many fleets have already complied with the Tier 0 auxiliary engine ban, and would be at a competitive disadvantage if fleets with non-compliant Tier 0 engines were allowed to legally operate their two-engine vehicles with Tier 0 auxiliary engines within the State."

While we understand this rationale, we would note that among ADSC members, the so-called "Tier 0 ban" did not result in the retirement or sale of any drill rigs. As you are aware, the Portable ATCM and PERP regulations were modified to allow continued use of a limited number of Tier 0 engines through December 31, 2010—several weeks after the Board granted the "Attachment 'B'" relief. Second, the Tier 0 ban contained in the Portable ATCM requires a federal waiver of preemption pursuant to Section 209(e)(2) of the Clean Air Act. Unless and until the waiver is granted by U.S.EPA, the Portable ATCM, including its Tier 0 ban, is not enforceable by CARB.

In light of the above, ADSC respectfully requests that the original relief proposed in our October 18, 2010 letter be reinstated.

Feel free to contact me at (916) 273-9980 about this request or if additional information is required concerning the issues discussed herein.

Sincerely,



Allan Daly

Attachment: ADSC October 18, 2010 Request

cc: ADSC c/o Christie Rowan, Anderson Drilling

Attachment

ADSC October 18, 2010 Request Letter

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October 18, 2010

Mr. Erik White
Assistant Division Chief
Mobile Source Control Division
California Air Resources Board
1001 "I" Street
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Sacramento, CA 95812

Via Email

Subject: Request for Regulation of Two-Engine Foundation Drilling Rigs under the In-Use Off-Road Diesel Vehicle Regulation

On behalf of the West Coast Chapter of the International Association of Foundation Drilling ("ADSC," formerly known as the Association of Drilled Shaft Contractors), Sierra Research is formally submitting this request for minor modifications to the language to several of CARB's "in-use" rules. The requested rule text changes are shown in strikeout-underline format as Attachment A.

Introduction

The ADSC, founded in 1972, is a non-profit, international, professional trade association representing the drilled shaft, anchored earth retention, micropile, and other related civil construction/design industries. Its members include specialty subcontractors, design engineers in the private and public sectors, academicians, and manufacturers/suppliers. The West Coast Chapter of ADSC consists of 35 California contractor members, several contractor members in adjacent states that perform work in California, and numerous associate and technical members reliant on the California foundation drilling industry.

Specifically, ADSC is requesting that all two-engine drilling rigs (regardless of drilling purpose) be treated identically within the regulatory framework of CARB's "in-use" rules. At the January 2010 Board meeting, minor changes were made to the In-Use Off-Road Diesel Vehicle Rule (Off-Road Rule), On-Road Heavy-Duty Diesel Vehicles Rule (On-Road Rule), Statewide Portable Equipment Regulation Program (PERP), and Portable Diesel-Fueled Engines Air Toxic Control Measure (Portable ATCM). The

changes were requested by the California Groundwater Association (CGA) and sought regulation of "two-engine water well drilling rigs" in the identical manner as "two-engine cranes."

While ADSC does not question the need for the changes prompted by CGA's request, it does question the technical basis for providing differential treatment only to water well drilling contractors. As discussed herein, the foundation drilling industry faces the same regulatory challenges as the water well drilling industry, mobile crane industry, and other industries using two-engine vehicles. In many cases, foundation drillers operate exactly the same drill rigs as water well drillers, with the exception of the drilling tools.

ADSC believes that the January 2010 changes may have been limited to a single industry in an effort to limit the number of affected vehicles, thereby minimizing the presupposed emission increases. However, after reviewing the emissions analysis for the water well drill rig provisions (to the extent available), Sierra believes that broadening the changes to include all two-engine drilling rigs may not have a detrimental effect on statewide emissions from these vehicles. In fact, the proposed changes may actually result in emissions benefits, comparable to the findings in the staff's analysis of the amendments to the two-engine crane and sweeper rule, adopted in December 2008 (discussed in further detail below).

We believe that the emissions increases calculated in the recent water well drill rig amendments are erroneous because they assumed that, without the January 2010 changes, all uncertified (Tier 0) water well drilling rig deck engines would be instantly phased-out, pursuant to requirements in the Portable ATCM. Sierra believes that a complete Tier 0 phase-out will be possible only after a concerted enforcement effort by CARB and the air districts spanning several years. This unrealistically optimistic scenario was compared to the current (January 2010) disposition of the Off-Road Rule in which enforcement is suspended. As such, the emissions analysis assumed that upon adoption of the changes, water well drilling rig deck engines would not be subject to *any* performance standards whatsoever. In reality, there is a more-than-reasonable expectation that the Off-Road Rule will be enforced in the near future. When enforcement commences, water well drilling rig deck engines will be subject to NOx-based fleet average requirements through 2025, as opposed to PM-only standards within the Portable ATCM. Because the Off-Road Rule is now NOx-based, long-term emission benefits are probable for both NOx and PM.

Summary and History of the Issue

Subsequent to the adoption of the Off-Road Rule in July of 2007, CARB recognized the increased regulatory burden facing owners of two-engine vehicles in the framework of CARB's "in-use" or "fleet rules." Specifically, two engine vehicles have the potential to be regulated by multiple rules affecting each engine separately. For example, the carrier engine of a two-engine drilling rig may be subject to the On-Road Rule, while the deck engine of the same drilling rig is subject to the Portable ATCM. Adding to this burden is

the requirement to obtain and maintain a CARB PERP registration for operation of secondary engines in most areas of California. [1]

Two-Engine Cranes

In the amendments to the Off-Road Rule adopted by the Board on December 11, 2008, CARB introduced provisions granting increased flexibility to two-engine cranes. The flexibility consisted of exempting auxiliary or "upper" engines from the requirements of the Portable ATCM provided they were included in an owner's off-road fleet in the same manner as the carrier engine.

Additionally, for two-engine cranes only, the eligibility requirements of the PERP program were replaced by the requirements of the Off-Road Rule. The benefit of the added PERP flexibility was twofold. First, cranes with uncertified (Tier 0) upper engines would not be subject to phase-out on December 31, 2009 as required by the Portable ATCM. Second, unregistered crane upper engines would be eligible for PERP even though they may not be of the current emissions tier. It should be noted that restrictions for adding vehicles/engines contained within the Off-Road Rule will ultimately prevent owners from adding older (uncertified or lower-tiered) crane upper engines.

Within the rulemaking analysis, CARB recognized the following technical issues associated with two-engine cranes:[2]

- Infeasibility of replacing or retrofitting of crane engines;
- Necessity of manufacturer approval, technical support, and availability for modifications;
- Safety and design concerns;
- OSHA and Cal-OSHA re-certifications; and
- Costs.

CARB further performed an analysis of the emission impacts associated with the above changes (compared to retaining the then-existing regulatory framework). CARB estimated the inventory of two-engine cranes from the number of total "cranes" registered with the Department of Motor Vehicles (DMV) and the approximate fraction of all cranes that contain two engines, as provided by the crane owners' associations. Using this methodology, an inventory of 866 two-engine cranes was derived.

[1] The Statewide PERP is not strictly a regulatory requirement. Rather, it is a voluntary alternative to mandatory permits that would otherwise be required in most California air districts. The PERP was established to eliminate the need for owners to obtain separate permits in each jurisdiction. Initial air district permit fees can exceed $1,000 in certain air districts and require up to 210 days for processing. As a result, PERP registration is the only feasible permitting alternative and is therefore "functionally required" for companies whose operations are not geographically contained in a single air district.

[2] Staff Report: Initial Statement of Reasons for Proposed Rulemaking, Proposed Regulation for In-Use On-Road Diesel Vehicles, Technical Support Document, Appendix L, Requirements of Two-Engine Cranes, California Air Resources Board, October 2008.

With this inventory, CARB calculated the net emissions change of the proposal (i.e., regulating upper engines within the Off-Road Rule), compared to the then-existing regulations. Emission changes were calculated for both NOx (see Table 1 and Figure 1) and PM (Table 2 and Figure 2).

Table 1
Effect of Two-Engine Crane Provisions on NOx Emissions

Calendar Year	NOx Emissions (tons per day)		Projected Reductions	
	Baseline	With the Regulation	(tons per day)	Percent from Baseline
2010	6.0	6.2	-0.2	-3%
2014	5.0	4.7	0.3	6%
2017	4.1	3.2	0.9	22%
2020	3.3	2.0	1.3	38%
2023	2.9	1.8	1.0	36%

Figure 1
Effect of Two-Engine Crane Provisions on NOx Emissions

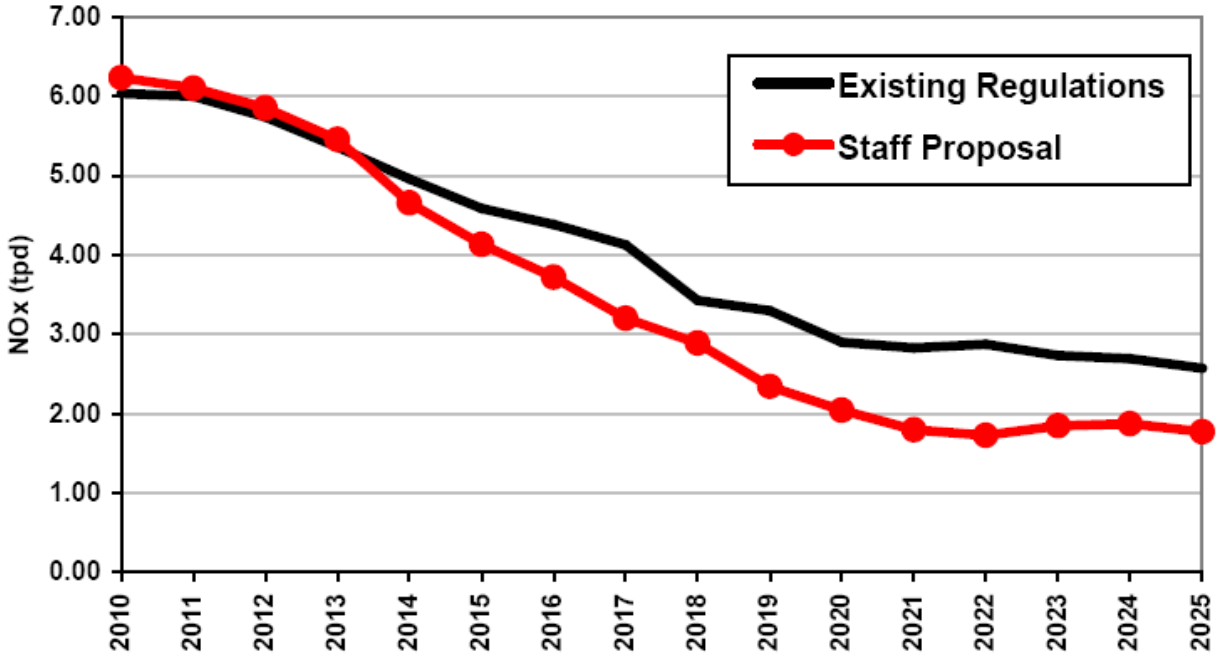
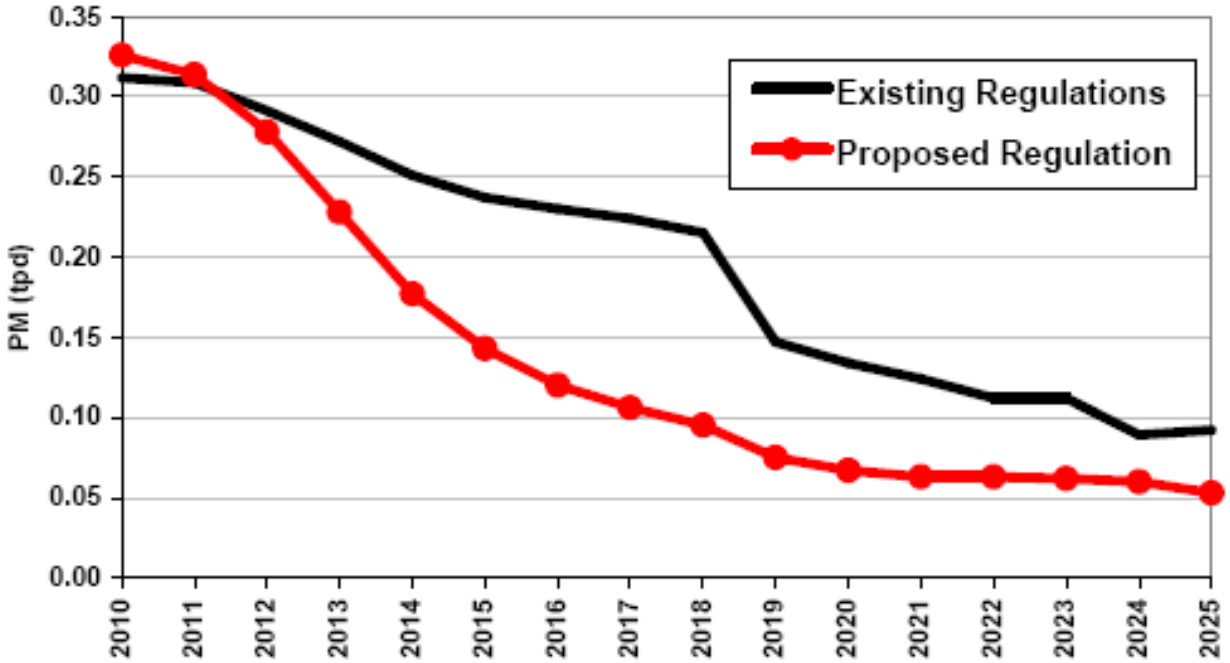


Table 2 Effect of Two-Engine Crane Provisions on PM Emissions				
Calendar Year	PM Emissions (tons per day)		Projected Reductions	
	Baseline	With the Regulation	(tons per day)	Percent from Baseline
2010	0.312	0.326	-0.013	-4%
2014	0.251	0.177	0.074	29%
2017	0.224	0.106	0.118	53%
2020	0.134	0.067	0.066	50%
2023	0.112	0.062	0.050	45%

Figure 2
Effect of Two-Engine Crane Provisions on PM Emissions



The result of the CARB analysis showed that regulating crane upper engines under the Off-Road Rule results in a small emissions increase in both NOx and PM during the initial years of the regulation (2010-2011), followed by a significant emissions benefit in all subsequent years of the regulation. In the final year analyzed, emissions from crane upper engines were 36% lower for NOx and 45% lower for PM compared to the then-existing regulations.

The emission benefits were mainly attributable to the fact that the Portable ATCM never required and still does not require NOx reductions and also previously exempted "lattice boom crane" engines (a subset of two-engine cranes) from emission standards until 2020. (The lattice boom crane exemption became unnecessary upon adoption of the two-engine crane provisions and was removed from the Portable ATCM.) In comparison, the Off-Road Rule contained both NOx and PM targets through 2025. It should be noted that CARB's analysis of the two-engine crane provisions was based on the regulations in place at the time. Both the Off-Road Rule and Portable ATCM have been subsequently amended to relax the emissions requirements, and the Off-Road Rule likely will be relaxed further at the December 2010 Board meeting. (One of the proposals for the Off-Road Rule is to delete the PM fleet target requirements.)

Two-Engine Sweepers

Within the same rulemaking, CARB created additional provisions for two-engine sweepers within the On-Road Rule. Specifically, both engines of two-engine sweepers would be subject to the On-Road Rule's emission standards in the same manner as two-engine cranes are within the Off-Road Rule. The secondary engines were exempted from the emission requirements of the Portable ATCM and the eligibility limitations of the PERP program provided they were included in a compliant on-road fleet.

Additional requirements were placed in the On-Road Rule for uncertified (Tier 0) secondary engines within sweepers. Until 2014, Tier 0 secondary engines were limited to 250 hours per year. Usage was further limited to 100 hours per year in 2014 and all future years. Also, two-engine sweepers were required to comply with the BACT PM schedule and install the highest level of verified Diesel emissions control system (VDECS) on the auxiliary engine of the sweeper at the time that the propulsion engine is required to meet the PM BACT, or when the vehicle is used to meet the requirements of BACT percentage limits or the fleet average.

Within the rulemaking analysis, CARB recognized the following technical issues associated with two-engine sweepers:[3]

- Air District PM_{10} certification requirements (e.g., SCAQMD Rule 1186);
- Infeasibility of repowers;
- Costs;
- Manufacturer non-support of repowered sweepers;
- Critical use of obsolete vehicles; and
- Air quality benefit of street sweepers.

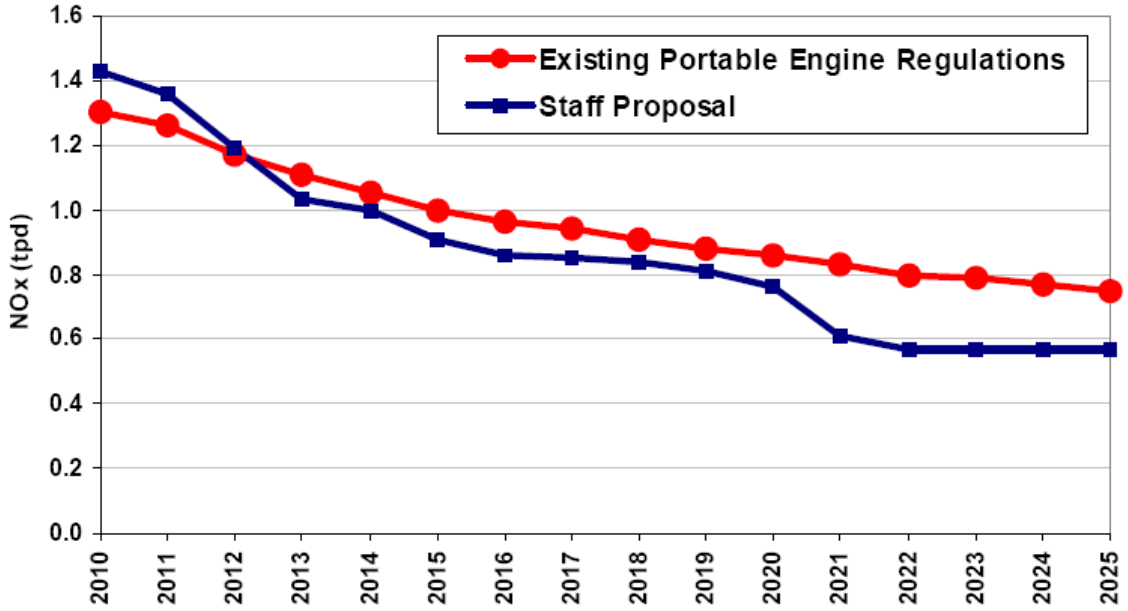
As with two-engine cranes, CARB performed an analysis of the emission impacts associated with the above changes (compared to retaining the then-existing regulatory

[3] Ibid., Appendix M.

framework). CARB estimated the inventory of two-engine street sweepers using survey data and other data, and determined that there are 1,250 two-engine street sweepers operating in California.

Emissions were determined using the On-Road Fleet Cost Model in conjunction with usage estimates for both the then-existing regulations and the proposed change. The result of this analysis is shown in Figure 3.

Figure 3
Effect of Two-Engine Sweeper Provisions on NOx Emissions



Following the same pattern as two-engine cranes, the decision to regulate two-engine sweepers within the On-Road Rule resulted in a slight increase in NOx emissions during the initial years of the regulation (2010-2012), followed by decreases in all future years. From Figure 3 above, Sierra estimates that the regulatory proposal reduced NOx emissions by 23%. This is mainly attributable to the lack of NOx standards within the Portable ATCM. CARB did not estimate the PM emissions change associated with the regulatory proposal.

Two-Engine Water Well Drill Rigs

At the January 28, 2010 Board meeting, CARB further amended the Off-Road Rule, On-Road Rule, Portable ATCM, and PERP to accommodate two-engine water well drill rigs. The primary purpose of the amendments was to allow for limited, continued use of

uncertified (Tier 0) engines throughout California until December 31, 2010. However, CARB also evaluated a request by the California Groundwater Association (CGA) to regulate two-engine water well drill rigs under the Off-Road Rule in same manner as two-engine cranes.

CARB accepted CGA's petition and agreed to limit the amendments so that they affected only "water well" drilling rigs, thereby excluding shaft and foundation drill rigs. Additionally, the term "water well drilling rig" was made contingent upon whether the equipment owner holds a specific water well drilling license issued by the California Department of Consumer Affairs. This definition, contained in the Off-road Rule is as follows:

> *"Two-Engine Water Well Drilling Rig" means a mobile diesel-powered drilling rig owned by a water well drilling contractor with a current, valid C-57 license issued by the Contractors State License Board of California and used exclusively to drill water wells….*[4]

Within the rulemaking analysis, CARB recognized the following technical issues associated with two-engine water well drilling rigs, and noted that they were similar to the issues facing two-engine cranes:[5]

- Cost;
- Infeasibility of repowers;
- Lack of incentive funding; and
- Current California drought conditions.

As with the other categories of two-engine vehicles, CARB performed an analysis of the emission impacts associated with the proposed amendments shown above (compared to retaining the then-existing regulatory framework). CARB estimated the inventory of uncertified two-engine water well drill rigs using PERP data, and determined that there are 80 uncertified water well drill rigs operating in California, with a cumulative horsepower of 15,100. CARB further noted that CGA's inventory estimate was 420 affected drill rigs totaling 79,200 HP, but dismissed these numbers as unverified.

The details of the emissions comparison are not disclosed in the rulemaking materials; however, CARB estimated emissions "delays" of 150 tons of NOx per year and 10 tons of PM_{10} per year, until the requirements of the Off-Road Rule take effect.[6] CARB performed the same comparison using the CGA equipment inventory and determined that the emission "delays" would be 800 tons per year of NOx and 60 tons per year of PM.

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[4] Off-Road Rule, 17 CCR § 2449(c)(60)
[5] Staff Report: Initial Statement of Reasons for the Proposed Amendments to the Regulations Applicable to Portable Diesel Engines and Diesel Engines used in Off-Road and On-Road Vehicles, December 10, 2009, p. iii.
[6] Ibid., p. viii

Sierra notes that the emissions analysis for the water well drilling rig amendments differs from that performed for the two-engine cranes and sweepers amendments. For the water well drilling rig amendments, staff analyzed the short-term "delay" in emission reductions associated with the proposal; whereas, for the two-engine cranes and sweepers amendments, staff analyzed the long-term emissions differential over the life of the regulations (through 2025). While delays in reductions are important to quantify, the former type of analysis is only a short term comparison of the existing regulations to the *suspended* version of the Off-Road Rule (i.e., no Off-Road Rule reductions whatsoever). To evaluate the full impact of the water well drilling rig amendments, staff should have continued the analysis through 2025 under the assumption that the Off-Road Rule was fully enforceable. When this was done for the two-engine cranes and sweepers, the initial delays in reductions (emissions increases) were eclipsed by accelerated reductions (emissions benefits) in the later years of the regulation, as shown in the above figures.

Due to its nature, portable equipment has posed a persistent challenge with regard to permitting and/or registration. Although CARB and the air districts have expended considerable effort to improve the registration rate through outreach, mandatory inspections, "reopening" of the PERP program, etc., unpermitted/unregistered engines are still being discovered throughout California. Unregistered engines (including two-engine drilling rigs) generally operate "below radar" and probably will not comply with the Tier 0 phase-out until they come under air district enforcement.

Some portable engines operate exclusively within the Bay Area Air Quality Management District (BAAQMD) and are generally not subject to any permitting (or alternative PERP registration) requirements at all. It is unclear how (or if) the Tier 0 phase-out has been achieved in the BAAQMD (which contains California's third, fourth, and eighth largest cities) with no enforcement via permits or registrations. By regulating all two-engine drilling rigs under the Off-Road Rule, CARB could ensure that emission reductions would ultimately be achieved from drilling rig deck engines. Alternatively, these reductions will be more difficult to achieve through the Portable ATCM and will require increased enforcement efforts over the years to come.

Also, it was improper to perform an emissions comparison using a scenario where the Off-Road Rule is not in effect. The Off-Road Rule is a long-term, in-use fleet rule that will be in effect over the next 15 years and beyond. Enforcement of the emission requirements of the rule is currently suspended for several reasons, including the lack of a waiver of preemption from the U.S. EPA pursuant to Section 209(e)(2) of the Clean Air Act (CAA). This section of the CAA requires that California obtain a waiver prior to enforcing in-use emission standards affecting nonroad (off-road) engines. Both the Portable ATCM and Off-Road Rule are subject to waiver approval, and CARB has requested authorization from U.S. EPA to enforce both regulations. As of the date of this analysis, neither waiver has been granted.

While there is considerable uncertainty regarding when EPA will issue the respective waivers, we believe that the regulatory analysis should be performed with the assumption

that both rules are fully enforceable and in effect, as ARB has done in the past. If the effects of the Off-Road Rule are factored into the analysis, it is possible that the water well drill rig proposal would have shown an emissions benefit in the same manner as the two-engine crane and two-engine sweeper amendments. Note, however, that these emissions benefits may not be realized until future years of the Off-Road Rule.

Also of note is that, in the Final Statement of Reasons, CARB states that the Board directed the staff to analyze the need for similar provisions relating to two-engine snow blowing equipment. To date, no regulatory changes concerning two-engine snow blowing equipment have been proposed.[7]

Industry Profile

Description of Two-Engine Foundation Drill Rigs

Two-engine foundation drilling rigs are a diverse class of equipment that provide vital specialty construction services, including drilled pile foundations, drilled shafts, and mircopiles. They are most often used for constructing roadways, bridges, retaining walls, buildings, structures, and large infrastructure projects. Two-engine drilling rigs may also be used in the mining and oil and gas industries. Many two-engine foundation drilling rigs are identical to water well drilling rigs except for the drilling tools and rods. Typically, water well drilling rigs drill a much deeper, narrower bore compared to foundation drill rigs (which may bore up to 30 feet in diameter). Many two-engine foundation drill rigs could be modified to perform water well drilling and vice versa; however, this rarely occurs due to different contractor licensing requirements, other regulatory requirements, and industry specialization.

The category of two-engine foundation drilling rigs includes off-road vehicles (such as crawler drilling rigs) and on-road (truck-mounted) drilling rigs. Two-engine drilling rigs also include a class of custom-engineered, purpose-built units that may be entirely unique. One particular unit (the only one of its kind, known as “Big Stan”), operates in three different configurations: as a five-axle on-road vehicle, as a fully tracked off-road vehicle, and as “half-track” vehicle with full tracks plus a single axle. In the case of another unit, a drilling attachment has been specially designed to attach to and work in conjunction with a crawler crane, shown in the Attachment B example of the unit dubbed “Shirley.”[8] It should be noted that “Shirley” is capable of operating in a four-engine configuration—two deck engines on the drilling attachment, a crane upper engine for hoisting the attachment, and a carrier engine for propelling the crawler crane.

[7] Final Statement of Reasons for Rulemaking Including Summary of Comments and Agency Responses, Public Hearing to Consider Amendments to the Regulations Applicable to Portable Diesel Engines and Diesel engines Used in Off-Road and On-Road Vehicles, Public Hearing Date: January 28, 2010, p. 15.

[8] It should be noted that “Shirley” has been deemed a two-engine crane for the purposes of PERP registration although it may also be considered a two-engine drill rig.

Examples of a crawler drilling rig, on-road drilling rig, half-track drilling rig (Big Stan), and a crane with a drilling attachment (Shirley in a three-engine configuration) are shown as Attachment B. All of these units have two (or more) engines.

Technical Issues with Repowers

If the requested changes are not adopted, individual drilling rigs with two engines remain subject to two in-use regulations (the Portable Diesel Engine ATCM plus either the Off-road or On-Highway In-Use Regulation). When two in-use regulations apply to the same drilling rig, the probability of a mandated retrofit or repower is doubled, along with the possibility that the retrofit or repower is infeasible. This introduces a situation where it may be feasible to repower only one of the engines, resulting in the loss of the drill rig, even though significant PM reductions were obtainable from that unit. As currently proposed, a single piece of equipment would be subject to two sets of standards, compliance deadlines, record keeping, and reporting, in addition to maintaining a district permit or PERP registration. The second or "upper engine" is subject to district permit programs/PERP registration in most areas and operation situations statewide (with some exceptions). This proposal will not exempt portable crane upper engines from district permit programs or PERP registration.

As previously discussed, many two-engine drilling rigs are custom engineered and purpose built. At the time these units were designed, it was not envisioned that either the carrier or deck engine of the drilling rig would require a wholesale engine replacement (i.e., repower) except with an identical replacement engine. As such, it is not feasible to repower some of these units due to lack of engine cabinet space, lack of chassis space (for carrier engines mounted to a specially-constructed chassis), and incompatible electronics and/or hydraulics controlling the drilling tools. In other cases, repowers are feasible, but require modifications that are not cost-effective—issues almost identical to those faced by two-engine cranes and two-engine water well drill rigs. And in still other cases, a repower or retrofit could impair operator visibility, destabilize the drilling rig, or cause other safety concerns. For these reasons, ADSC believes that two-engine drilling rigs should be included in the Off-Road Rule, which provides the flexibility that fleet owners need to modernize their fleets in the most cost effective manner.

Inventory of Two-Engine Foundation Drill Rigs

To assist CARB in evaluating the emissions impact of the requested changes, the number of two-engine foundation drilling rigs operating within California was estimated by ADSC. According to ADSC, approximately 75 percent of these units are owned by ADSC members. There are 35 ADSC members with office locations in California, and each member on average owns three, two-engine foundation drilling rigs. As a result, ADSC estimates that there are approximately 140, two-engine foundation drilling rigs operating in California.[9] Additionally, ADSC estimates that of all vehicles that may

[9] (35 * 3) / 0.75 = 140

commonly be referred to as "drilling rigs," approximately 20% are two-engine vehicles and 80% are single-engine vehicles.

The average size of the deck engines can vary greatly, ranging from less than 100 hp to over 400 hp (similar to the power range of crane upper engines). ADSC further estimates the average age of two-engine drilling rigs to be ten years.

Conclusion

As discussed above, two-engine drilling rigs face the same issues as other categories of two-engine vehicles granted flexibility by CARB. These units are vital to the state's construction industry and, in many cases, consist of one-of-a-kind specialty vehicles that cannot be replaced. While repowers are possible for some of these vehicles, there is a significant percentage of the fleet that cannot feasibly be modernized cost-effectively. A mandated repower of the deck engines may result in the forced decommissioning of a drilling rig worth upwards of $1 million. Regulating both engines in all two-engine drilling rigs under the Off-Road Rule is consistent with how CARB has handled other vehicles in similar circumstances (two-engine cranes, sweepers, and water well drilling rigs). Doing so reduces the excess burden of a single vehicle being subject to multiple fleet rules, and provides the owner with the flexibility to obtain emission reductions in the most cost-effective manner. Due to the relatively small inventory of two-engine foundation drilling rigs (estimated by ADSC to be 140), the emissions impact of the expected change is expected to be minor and may result in long-term emissions benefits, as was determined for two-engine cranes and sweepers.

Feel free to contact me at (916) 273-9980 about this request or if additional information is required concerning the issues discussed herein.

Sincerely,

Allan Daly

cc: ADSC c/o Christie Rowan, Anderson Drilling

Attachment A

Suggested Regulation Text Changes

Title 13, Article 4.5, Chapter 1, California Code of Regulations Section 2025

Regulation to Reduce Emissions of Diesel Particulate Matter, Oxides of Nitrogen and Other Criteria Pollutants, from In-Use Heavy-Duty Diesel-Fueled Vehicles

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(c) ***Exemptions***

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(14) Two-engine ~~water well~~ drilling rigs as defined in title 13, CCR, section 2449(c).

Title 13, Article 4.8, Chapter 9, California Code of Regulations, Sections 2449, 2449.1, 2449.2

Regulation for In-Use Off-Road Diesel Vehicles

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§ 2449 General Requirements for In-Use Off-Road Diesel-Fueled Fleets

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(b) ***Applicability***

… Unless they are workover rigs or two-engine cranes or two-engine ~~water well~~ drilling rigs, vehicles that were designed to be driven on-road, have on-road engines, and still meet the original manufacturer's on-road engine emission certification standard are considered on-road and are specifically excluded from this regulation, even if they have been modified so that they cannot be registered and driven safely on-road. …

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(c) ***Definitions***

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(60) ***"Two-Engine ~~Water Well~~ Drilling Rig"*** means a mobile diesel-powered drilling rig ~~owned by a water well drilling contractor with a current, valid C-57 license issued by the Contractors State License Board of California and used exclusively to drill water wells~~ with a drilling mechanism mounted on a specially constructed truck chassis or carrier; one engine provides motive power, and a secondary engine is used to power the drilling mechanism.

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(e) ***Special Provisions/Compliance Extensions***

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(16) ***Two-Engine ~~Water Well~~ Drilling Rigs*** – Both engines in a two-engine ~~water well~~ drilling rig are subject to this regulation. For purposes of the rounding provisions in section 2449.1(a)(2)(a)7, neither engine in the two-engine ~~water well~~ drilling rig is required to be turned over until the horsepower required to be turned over under section 2449.1(a)(2)(A) is at least half the sum of the maximum power of the primary and secondary engine in the two-engine ~~water well~~ drilling rig.

****

(g) ***Reporting***

****

(1) Initial reporting – …Notwithstanding the aforementioned reporting dates, the initial reporting date for two-engine ~~water well~~ drilling rigs is April 1, 2011. Reports must include the following information:

****

(B) Vehicle List – Vehicle serial number; (i.e., for workover rigs and two-engine cranes and two-engine ~~water well~~ drilling rigs, vehicle identification number);

****

§ 2449.2 Surplus Off-Road Opt-In for NOx (SOON) Program

****

(b) ***Applicability***

****

(2) Fleet Applicability

****

(C) Has a statewide fleet with maximum power greater than 20,000 horsepower (hp) excluding the hp from engines in two-engine cranes and the hp from single engine cranes formerly subject to the Cargo Handling Equipment Regulation and the hp from two-engine ~~water well~~ drilling rigs.

Title 13, Article 5, California Code of Regulations, Sections 2452, 2453, 2456, 2458, 2460, 2461, and 2462

Portable Engine and Equipment Registration

*****

§ 2452. Definitions.

*****

(zz) "**~~Water Well~~ Drilling Rig**" means the same as "Two-Engine ~~Water Well~~ Drilling Rig" defined in title 13, Cal. Code Regs., section 2449(c).

*****

§ 2453. Application Process.

*****

~~(g)(6) for owners of water well drilling rigs, a copy of a current, valid C-57 water well drilling contractors license;~~

*****

§ 2456. Engine Requirements.

*****

(i) Registered diesel engines used on a ~~water well~~ drilling rig shall comply with the applicable requirements in title 13, Cal. Code Regs., section 2449 and are otherwise exempt from further requirements of this section, except for subsection (f)(5).

§ 2458. Recordkeeping and Reporting.

*****

(l) Registered diesel engines used on a ~~water well~~ drilling rig shall comply with the applicable requirements in title 13, Cal. Code Regs., section 2449 and are otherwise exempt from the requirements of this section.

Title 17, California Code of Regulations, Sections 93116.1, 93116.2, 93116.3

Airborne Toxic Control Measure for Diesel Particulate Matter from Portable Engines Rated at 50 Horsepower and Greater

*****

§ 93116.1 Applicability.

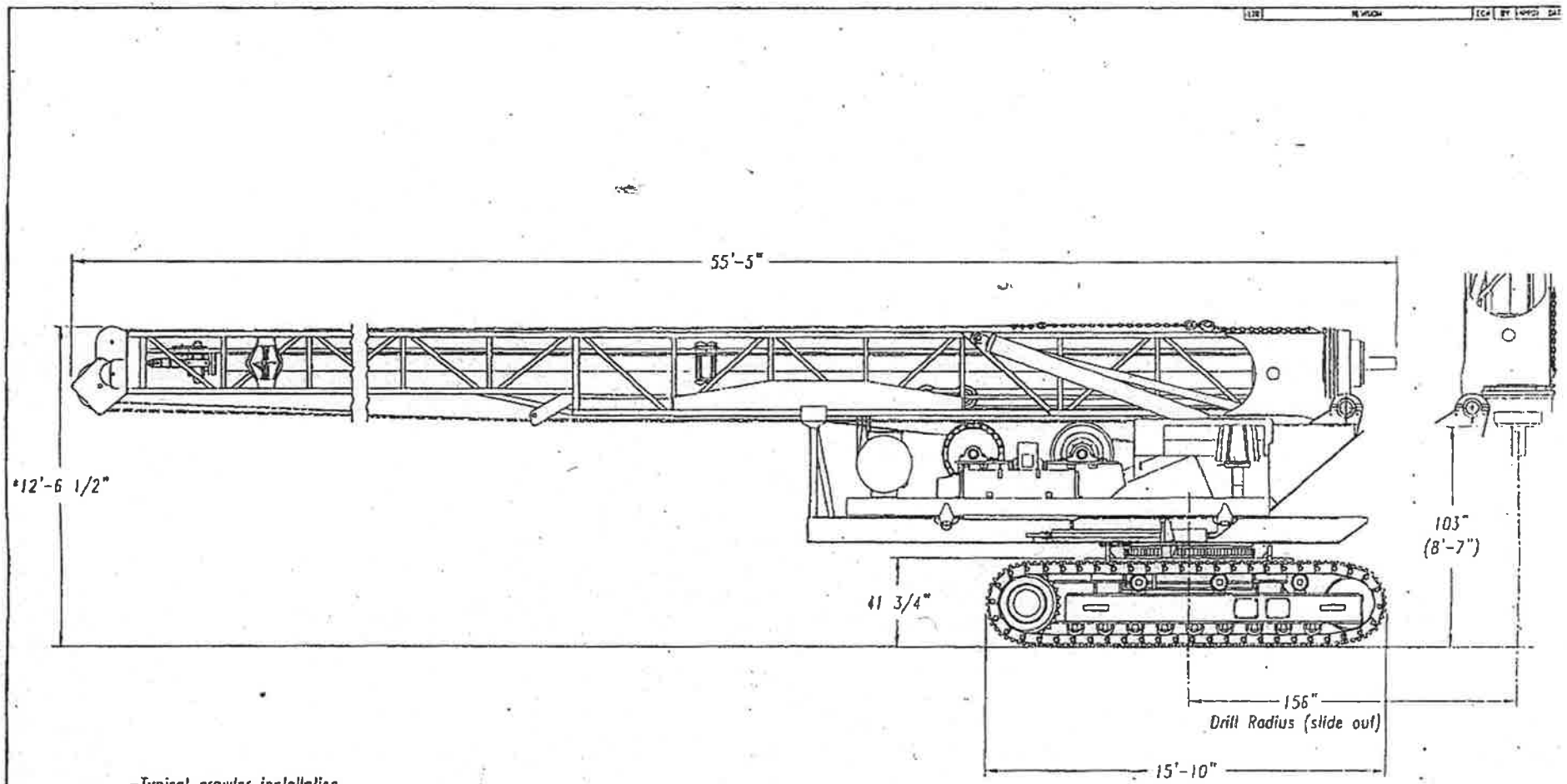
*****

(b)(10) Engines used exclusively on two-engine ~~water well~~ drilling rigs as defined in Title 13, Cal. Code Regs., section 2449(c) shall meet all applicable requirements in Title 13 of the California Code of Regulations commencing with section 2449.

Attachment B

Foundation Drilling Rig Examples

Watson Model 3100 CM
Standard 80' Drill Depth



-Typical crawler installation.
-Track toe to centerline of kelly bar, slide out, is 61".
-Drill radius, slide out, 156".
-Slide is 60".

*Based on 41 3/4" bearing-to-ground height.
Approximate Weight is 87,000#

INCORPORATED

CM STANDARD

3100

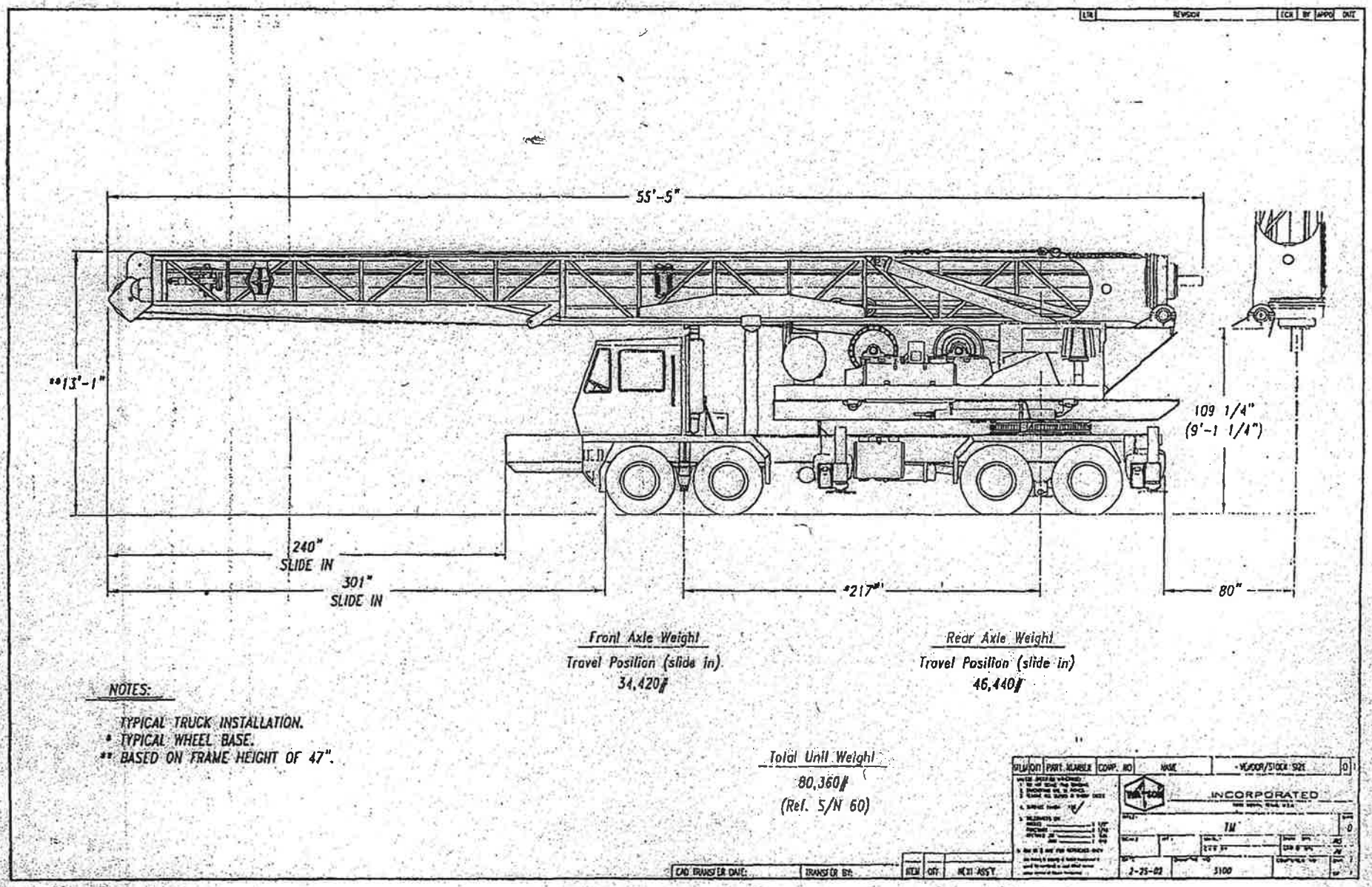
WATSON 2000 / 2500 / 3000 / 3100

Conventional Foundation Drill Rig

MAIN FEATURES:

Carrier:	Track Mount with retractable tracks
Undercarriage Footprint:	Length: 13 ft. – 16 ft (4.0 – 5.9M) Width 8 ft. (2.4M)
Operating Weight:	56,000 - 90,000 lbs
Torque:	56,000 - 113,000 lbf-ft (76 - 153 kN-m)
Depth:	60 ft. - 80 ft. (18 - 30M)
Max. Diameter:	54" – 96" (1.3 - 2.4M)
Optimal Diameter:	12" - 60" (300 mm – 1524 mm)
Material:	All
Crowd Pressure:	24,000 - 50,000 lbf. (107 – 223 kN)
Tower Height:	42 ft – 55.5 ft (up to 16.8 Meters)
Work Radius:	11 ft. to 15 ft. (minimum)

Watson Model 3100 TM
Standard 80' Drill Depth



Front Axle Weight
Travel Position (slide in)
34,420#

Rear Axle Weight
Travel Position (slide in)
46,440#

NOTES:

TYPICAL TRUCK INSTALLATION.
* TYPICAL WHEEL BASE.
** BASED ON FRAME HEIGHT OF 47".

Total Unit Weight
80,360#
(Ref. S/N 60)

INCORPORATED

3100

3-25-02

WATSON 2000 / 2500 / 3000 / 3100

Conventional Foundation Drill Rig

MAIN FEATURES:

Carrier:	Rubber Tire 4 - Axle
Undercarriage Footprint:	Length - 35 ft. (10.7M)
	Width 12 ft. (3.66M) (Jacks Extended)
Operating Weight:	47,000 - 94,000 lbs
Torque:	50,000 - 100,000 lbf-ft (68 - 136 kN-m)
Depth:	60 ft. - 100 ft. (18 - 30M)
Max. Diameter:	8 ft. (2.4M)
Optimal Diameter:	12" - 60" (300 mm – 1524 mm)
Material:	All
Crowd Pressure:	24,000 - 50,000 lbf. (107 - 223 kN)
Tower Height:	52 ft - 63 ft (up to 19.2 Meters)
Work Radius:	20 ft. to 22 ft. (minimum)

"Big Stan"

Foundation Drill Rig

MAIN FEATURES:

Carrier:	Five-Axel Truck, Full Track or Half-Track
Weight:	200,000 – 250,000 lbs
Torque:	+ 500,000 bft-ft (678 kNm)
Depth:	200 ft. (61 M)
Max. Diameter:	30 ft. (9144 mm)
Optimal Diameter:	48" - 156" (1220 mm – 3962 mm)
Material:	All
Crowd Pressure:	75,000 lbs.
Reach to Hole Ctr:	12 ft.
Tower Height:	90 ft.

DRILL RIG SPECIFICATIONS

CAPACITY
DIAMETER OF HOLE .....Maximum 30 feet
Double kelly depth 130 feet
Maximum hole depth 200 feet (Optional 3 kellys)

KELLY BAR SIZES
INNER KELLY.....75 feet x 10 inch hollow square, 9,479 lbs.
(8 inch square X 16 inch long drive foot)
OUTER KELLY.....73.5 feet X 13 inch hollow square 10,194 lbs.

KELLY BAR LINE PULL AND SPEEDS
INNER KELLY.....42,000 lbs. (160 feet per minute)
OUTER KELLY.....36,000 lbs. (75 feet per minute)
Free fall floate mode in/out of hole
70,000 lbs. down force

ROTARY TABLE
1st GEAR.....534,000 foot lbs. torque at 6.48 RPM
2nd GEAR..... 9.66 RPM
3rd GEAR.....12.89 RPM
4th GEAR.....19.21 RPM
5th GEAR.....25.95 RPM
6th GEAR.....38.68 RPM
REV. GEAR .....5.06 RPM
These specifications reflect machinery under load.
Rotary Table height above ground 14 feet
Hole diameter through center of Rotary Table 24 inches
Twin Pinion drives
Spiral bevel ring and pinion gears
Oil bath lubrication

POWER EQUIPMENT
ENGINE .....KTA 1150 Cummins 600 H.P., 6 cylinder
TRANSMISSION.....6061 Allison 6 speed
RIGHT ANGLE DRIVE.....Clark Model No. D75000 (Modified)
TIMING BELTS .....Twin 12 inch wide Unroyal
HYDRAULIC PUMPS.....Twin 120 GPM at 2,750 PSI

BOOM CYLINDER.....10 inch bore, 8 inch chrome rods, 18 foot stroke (Two)

SLIDE CYLINDER.....7 inch bore, 3 inch chrome rod, 9 foot stroke (one)

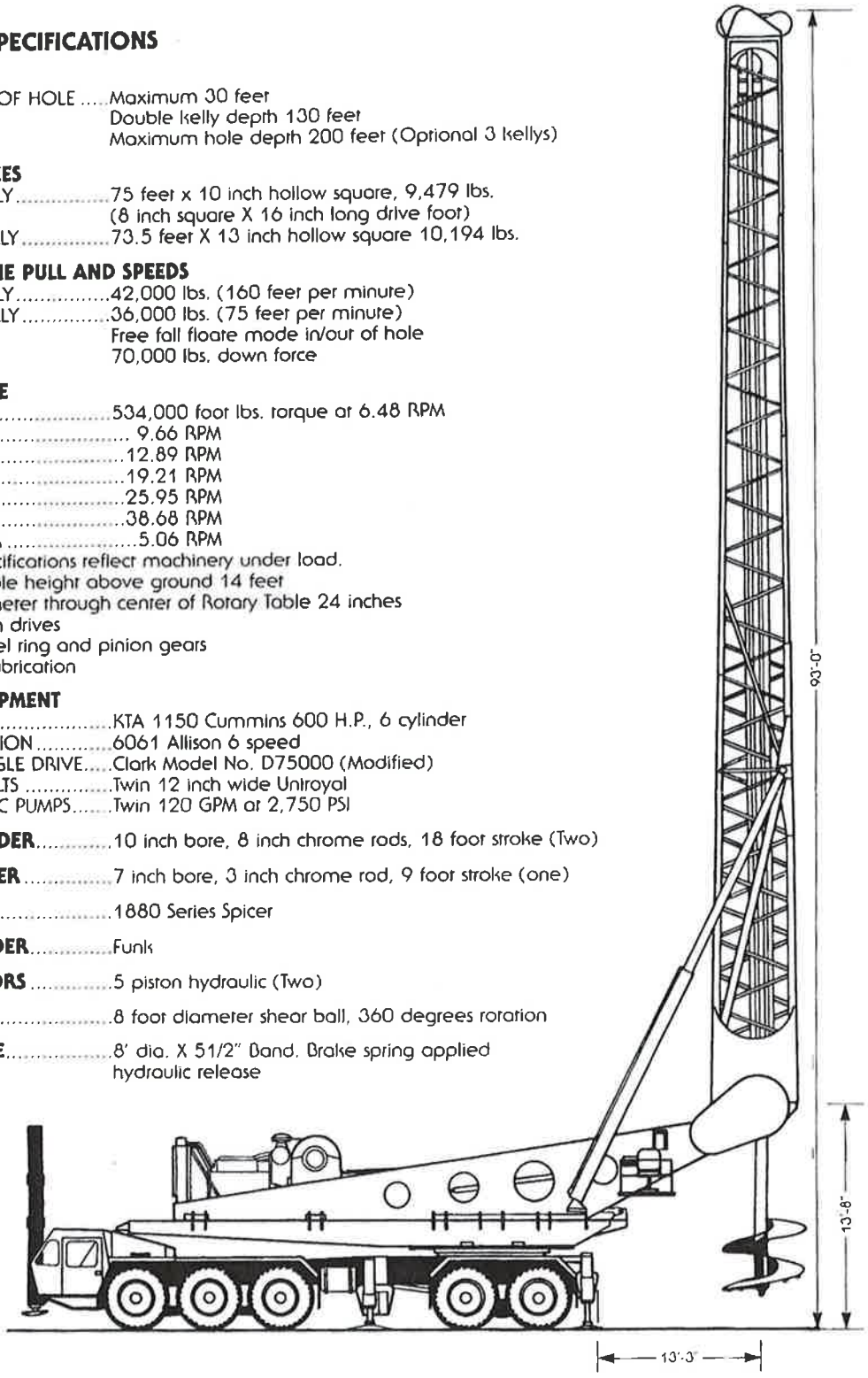
DRIVE LINES.....1880 Series Spicer

POWER DIVIDER.....Funk

SWING MOTORS.....5 piston hydraulic (Two)

SWING GEAR.....8 foot diameter shear ball, 360 degrees roration

SWING BRAKE.....8' dia. X 51/2" Band. Brake spring applied
hydraulic release



CARRIER SPECIFICATIONS

DIMENSIONS
LENGTH .....40 feet
WIDTH.....11 feet, 11½ inches
HEIGHT.....128 inches
WHEEL BASE.....246 inches

ENGINES
Cummins NTCC-350 350 H.P. at 2100 RPM
855 Cubic Inch Displacement

TRANSMISSIONS
MAIN.....Fuller Roadranger RTO-14608LL, 10 Forward/3 Reverse
AUXILIARY.....Eaton AT-1202, Two to One and Direct

AXLES
AXLES.....Three steering, two driving
REAR .....Clark BD71,000 Tandem Planetary Cap. 120,000 lbs.
FRONT .....Tridem FT-2200 Tubular Cap. 66,000 lbs.

TIRES
14:00 X 24 Michelin 28 Ply (Fourteen)

WHEELS
Spoke type steel, 10 hole bolt

FRAME
All welded 75,000 lbs. high test steel, trapezoidal double capped box construction

OUTRIGGER
REAR.....8 inch bore, 6 inch rods, 30 inch stroke, 16 foot spread (Two)
CENTER.....8 inch bore, 6 inch rods, 30 inch stroke, 30 foot double telescopic spread (Two)
FRONT.....6 inch bore, 3 inch rod, 72 inch stroke solid mounted in 12 inch square telescoping box section (one)

TOTAL WEIGHT
DRILL RIG AND CARRIER READY TO DRILL 180,000 lbs.

DRILL RIG SPECIFICATIONS

CAPACITY
DIAMETER OF HOLE .....Maximum 30 feet
Double kelly depth 130 feet
Maximum hole depth 200 feet (Optional 3 kellys)

KELLY BAR SIZES
INNER KELLY.....75 feet x 10 inch hollow square, 9,479 lbs.
(8 inch square X 16 inch long drive foot)
OUTER KELLY.....73.5 feet X 13 inch hollow square 10,194 lbs.

KELLY BAR LINE PULL AND SPEEDS
INNER KELLY.....42,000 lbs. (160 feet per minute)
OUTER KELLY.....36,000 lbs. (75 feet per minute)
Free fall floate mode in/out of hole
70,000 lbs. down force

ROTARY TABLE
1st GEAR.....534,000 foot lbs. torque at 6.48 RPM
2nd GEAR..... 9.66 RPM
3rd GEAR.....12.89 RPM
4th GEAR.....19.21 RPM
5th GEAR.....25.95 RPM
6th GEAR.....38.68 RPM
REV. GEAR.....5.06 RPM
These specifications reflect machinery under load.
Rotary Table height above ground 14 feet
Hole diameter through center of Rotary Table 24 inches
Twin Pinion drives
Spiral bevel ring and pinion gears
Oil bath lubrication

POWER EQUIPMENT
ENGINE.....KTA 1150 Cummins 600 H.P., 6 cylinder
TRANSMISSION.....6061 Allison 6 speed
RIGHT ANGLE DRIVE.....Clark Model No. D75000 (Modified)
TIMING BELTS .....Twin 12 inch wide Uniroyal
HYDRAULIC PUMPS.....Twin 120 GPM at 2,750 PSI

BOOM CYLINDER.....10 inch bore, 8 inch chrome rods, 18 foot stroke (Two)

SLIDE CYLINDER.....7 inch bore, 3 inch chrome rod, 9 foot stroke (one)

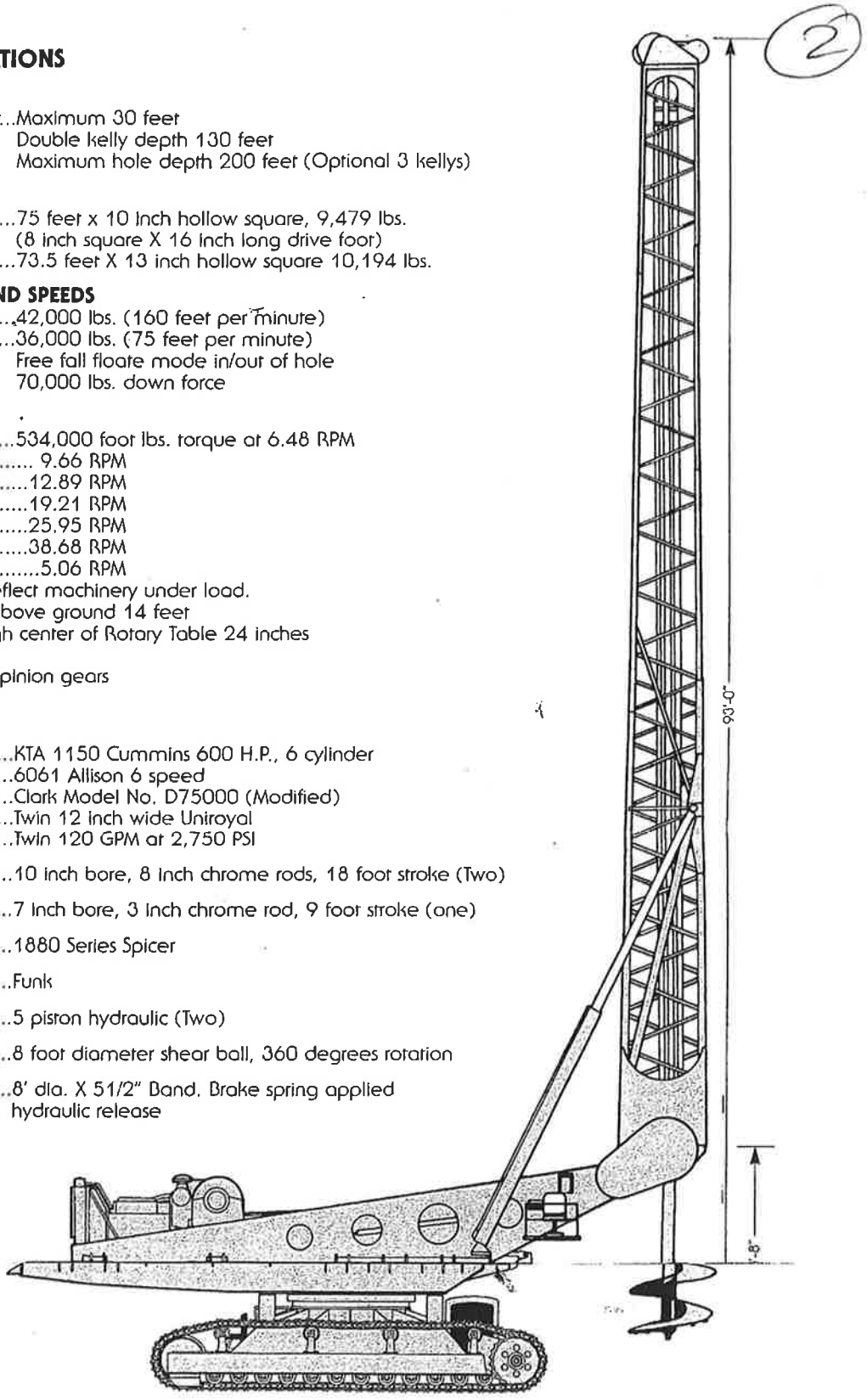
DRIVE LINES.....1880 Series Spicer

POWER DIVIDER.....Funk

SWING MOTORS.....5 piston hydraulic (Two)

SWING GEAR.....8 foot diameter shear ball, 360 degrees rotation

SWING BRAKE.....8' dia. X 51/2" Band. Brake spring applied hydraulic release



FULL TRACK

DIMENSIONS
LENGTH 26 feet, WIDTH 20 feet, HEIGHT 104 inches
WT. 142,000 lbs., TOTAL WT. 242,000 lbs.

ENGINE
Caterpillar 3406, 360 HP

TRANSMISSION
Full Hydrostatic Drive System

TRACK SYSTEM
Caterpillar 245-D9 System, 30 inch Street Pads
Lengthened 7' to 26' long

BRAKES
Fail Safe Spring Set, Hydraulic Release

TRANSPORT MODE
Quick Disconnect Track System, Car Body 11 feet,
11 inches wide, 63,000 lbs., 2 Tracks 38,000 lbs. ea.
Self Assembled, no assembly crane required.

GRADEABILITY
72%

SPEEDS
2 mph (max)

3

DRILL RIG SPECIFICATIONS

CAPACITY

DIAMETER OF HOLE .....Maximum 30 feet
Double kelly depth 130 feet
Maximum hole depth 200 feet (Optional 3 kellys)

KELLY BAR SIZES

INNER KELLY.....75 feet x 10 inch hollow square, 9,479 lbs.
(8 inch square X 16 inch long drive foot)
OUTER KELLY.....73.5 feet X 13 inch hollow square 10,194 lbs

KELLY BAR LINE PULL AND SPEEDS

INNER KELLY.....42,000 lbs. (160 feet per minute)
OUTER KELLY.....36,000 lbs. (75 feet per minute)
Free fall floate mode in/out of hole
70,000 lbs. down force

ROTARY TABLE

1st GEAR.....534,000 foot lbs. torque at 6.48 RPM
2nd GEAR..... 9.66 RPM
3rd GEAR.....12.89 RPM
4th GEAR.....19.21 RPM
5th GEAR.....25.95 RPM
6th GEAR.....38.68 RPM
REV. GEAR .....5.06 RPM
These specifications reflect machinery under load.
Rotary Table height above ground 14 feet
Hole diameter through center of Rotary Table 24 inches
Twin Pinion drives
Spiral bevel ring and pinion gears
Oil bath lubrication

POWER EQUIPMENT

ENGINE.....KTA 1150 Cummins 600 H.P., 6 cylinder
TRANSMISSION.....6061 Allison 6 speed
RIGHT ANGLE DRIVE.....Clark Model No. D75000 (Modified)
TIMING BELTS .....Twin 12 inch wide Uniroyal
HYDRAULIC PUMPS.....Twin 120 GPM at 2,750 PSI

BOOM CYLINDER.....10 inch bore, 8 inch chrome rods, 18 foot stroke (Two)

SLIDE CYLINDER.....7 inch bore, 3 inch chrome rod, 9 foot stroke (one)

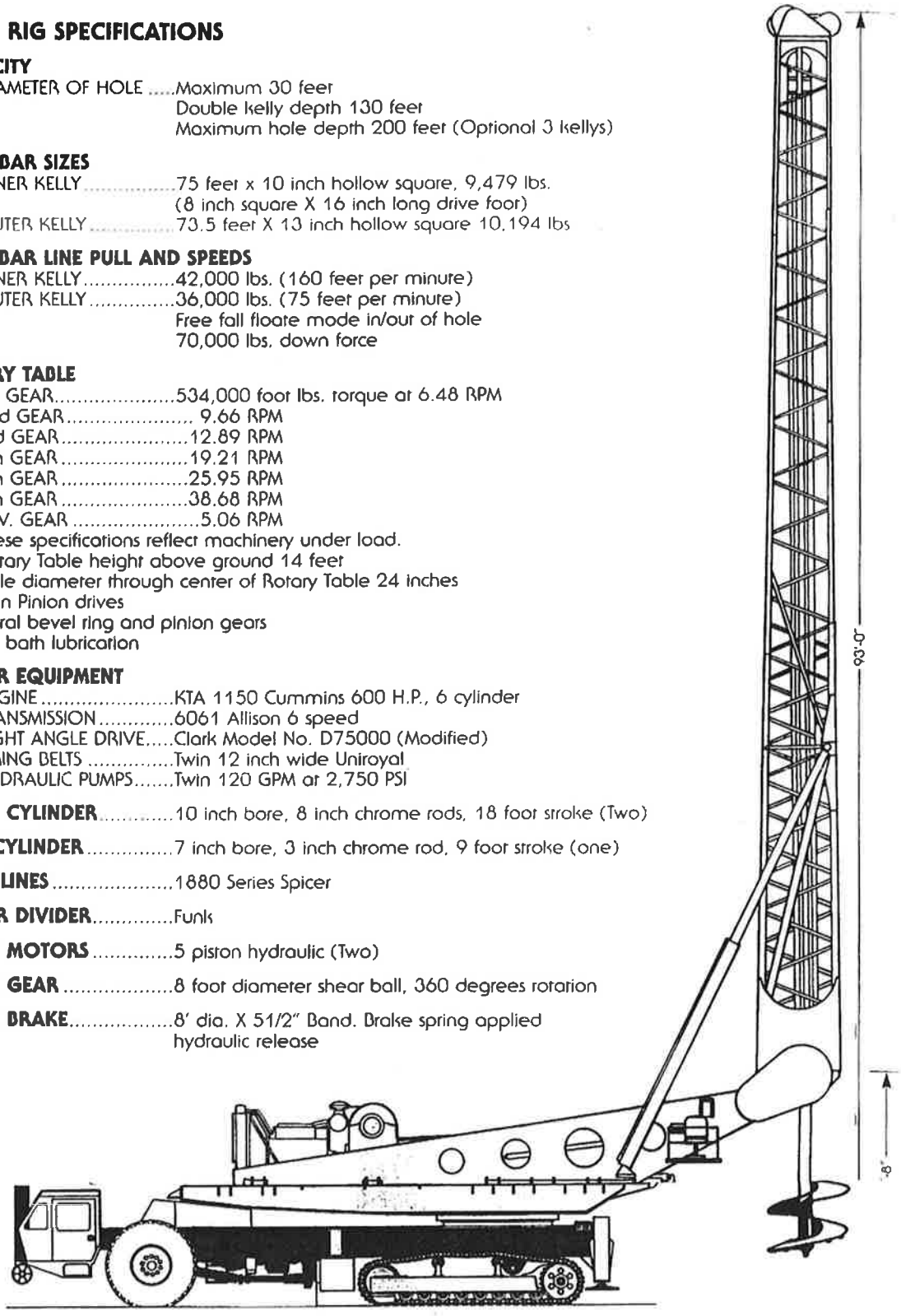
DRIVE LINES.....1880 Series Spicer

POWER DIVIDER.....Funk

SWING MOTORS.....5 piston hydraulic (Two)

SWING GEAR.....8 foot diameter shear ball, 360 degrees rotation

SWING BRAKE.....8' dia. X 51/2" Band. Brake spring applied
hydraulic release



HALF TRACK

DIMENSIONS
LENGTH 39 feet, WIDTH 11 feet, 11 inches
HEIGHT 120 inches, WT. 100,000 lbs.
TOTAL WT. 200,000 lbs.

ENGINE
Cummins NTC6, 350 HP

TRANSMISSION
Allison, HT750 DR, 5 speeds forward, 1 speed reverse.

TRACK SYSTEM
Caterpillar 235-D6 System, 24 inch Triple Grouser

BRAKES
Fail Safe Spring Set, Hydraulic Release

FRONT DRIVE SYSTEM
Rockwell PSC-1875, Tire Size 29 x 25
Oscillating Axle System

GRADEABILITY
90%

SPEEDS
7 mph (max)

"Shirley"

Crane Attachment

Designed and built by Anderson Manufacturing this crane attachment is powered by Twin 400hp Turbo diesel engines that are attached to two Allison 5-speed transmissions. Shirley is one of the largest and most powerful foundation drill rigs in the world.

MAIN FEATURES

CRANE SIZE:	200 - 225 ton
WEIGHT:	66,000lbs
TORQUE:	1,080,000 ft lbs.
DEPTH:	160 feet
MAX. DIAMETER:	30 ft.
OPTIMAL DIAMETER:	5 ft. - 13 ft.
MATERIAL:	Unlimited DOWN RESSURE: weight of drilling tool (8,000 lbs. To 30,000 lbs.) and Kelly bars (52,000 lbs.), plus optional weight collar system (up to 27,000 lbs.).
ACCESS WIDTH:	16 ft
REACH TO HOLE CTR:	35 ft.
WORK RADIUS:	40 ft. min

Watson 5000 "Reach"

Crane Attachment Drill Unit

Excellent for the installation of smaller diameter shafts where casing is required this special drill unit is a Watson 5000 with a modified carriage by Anderson Manufacturing.

MAIN FEATURES:

Crane Size:	13,000lbs
TORQUE:	100,000 ft lbs.
DEPTH:	120 feet
MAX. DIAMETER:	120"
OPTIMAL DIAMETER:	12" diam. to 60" diam.
MATERIAL:	Light to medium difficulty
DOWN PRESSURE:	Weight of tool and Kelly bar(s)
REACH TO HOLE CTR:	25 ft. with tool height capacity of 25 ft.
WORK RADIUS:	30 ft. minimum