Deficiencies

1. Update Appendix D, Biological Assessment, to include all fish species listed under the Endangered Species Act that should be evaluated as to whether they may be in the area for the duration of the proposed project, including: Green Sturgeon, Southern DPS, *Acipenser medirostris*; Oceanic Whitetip Shark, *Carcharhinus longimanus*; Tidewater Goby, *Eucyclogobius newberryi*; Gulf Grouper, *Mycteroperca jordani*; Southern California Coast Steelhead DPS, *Oncorhynchus mykiss*; and Scalloped Hammerhead Shark, Eastern Pacific DPS, *Sphyrna lewini*.

   Section 3.2 – These fish species were added to Appendix D, Biological Assessment and includes the requested species listed above. None of the additional species are expected to occur within the Project area for any duration during the Project period. Due to the length of the response please refer to Attachment B, Biological Assessment Section 3.2 for added content. (see Attachment B)

2. Provide an accurate, short description of any recreational activities (e.g. sportfishing, scuba diving, sailing) within the affected area and potential consequences to these activities that may occur from the proposed project. The current project description states that "… recreational fishing operations are expected to be limited within the Project site as proposed activities will occur within an area that currently supports existing pipelines and platforms." Existing pipelines and platforms attract sport fishers, so this information needs additional documentation to ensure accuracy.

   Based on communications with Platform personnel, no regular scheduled recreational fishing or diving activities have been observed in the immediate proximity to either platform or along the supporting pipeline corridors. Whale watching, recreation party boat fishing vessels and dive vessels do transit the area between the mainland and the Channel Islands; however, these vessel transits will not be impacted by project related activities as all conductor removal work will be performed on the platform and there will only be a moderate increase in marine vessel activities.

3. Provide a brief description of future maricultural areas offshore Ventura County and how marine vessels will avoid conflict with this industry.

   Existing Mariculture Activities. A review of the BOEM OceanReports tool did not identify any aquaculture operations existing in proximity to the Platforms or proposed offshore transit routes (BOEM, https://marinecadastre.gov/oceanreports 2020). The closest identified sites are a shellfish area offshore of UCSB and another shellfish location approximately 10 miles offshore of Huntington Beach near the Platform Elly complex (which is past the proposed transportation route to the POLA/POLB). Additionally, there are no aquaculture activities on State Leased parcels identified on the California Department of Fish and Wildlife Marine BIOS database (CDFW, apps.wildlife.ca.gov/marine/ 2020).

   Proposed Mariculture Activities. NOAA's Coastal Aquaculture Siting and Sustainability (CASS) program is currently working with the Ventura Shellfish Enterprise regarding a significant proposal for twenty, 100-acre plots of aquaculture space for production of mussels. The CASS technical report published in September 2018 indicated that the proposed area of interest is located within federal waters offshore Ventura county within the Santa Barbara Channel, with the southernmost extent ending at Hueneme Canyon and Port Hueneme and inside of the established shipping lanes or areas of high vessel traffic. Additionally, suitability regarding existing oil and gas facilities and pipelines was included (Figure 13 of the CASS technical report) which indicated that pipeline corridors from the Santa Clara Unit would be considered incompatible siting areas for placement of the aquaculture facilities.

According to the aquaculture coordinator at NOAA (personal communication Nov. 25, 2020), VSE has since submitted permit applications to the Army Corps for 20, 100-acre sites located in Federal waters offshore of the City of Ventura (see Figure 1 below). Although it has not been approved yet, sentinel buoys have been placed at the four corners of the proposed area and center of the site to mark its location.

This proposed mariculture site is located northwest of the Platforms and outside of the proposed offshore transportation corridors for personnel or transport of cut material for recycling.

Project Contingencies. There are no existing or proposed aquaculture facilities present that would be in conflict with offshore vessel transportation from Platforms Grace and Gail to either Port Hueneme or the POLA/POLB or crew boat trips from Casitas Pier. Project vessels will utilize the existing vessel traffic separation scheme and established oil and gas (JOFLO) corridors to avoid conflicts with aquaculture and other offshore use.

4. Provide a copy of the most recent NPDES permit and the date in which it expires.

   Platform related discharges are conducted in accordance with the National Pollutant Discharge Elimination System (NPDES) General Permit for Offshore Oil and Gas Exploration, Development, and Production Operations for Southern California (Permit No. CAG 280000) that was granted continued permit coverage by the EPA in 2019. Maximum annual allowed produced water discharges under this permit for Platform Grace are 2,190,000 (barrel) bbl, and for Platform Gail are 4,380,000 bbl.

   Please see Attachment C for a copy of the NPDES permit. Please note that the permit expiration date is 2/28/19; however, renewal is currently in process at the EPA. Until approval, the EPA has indicated that the conditions of the existing expired permit continue in force until the new permit is issued. The applicable CFR can be found at: https://www.law.cornell.edu/cfr/text/40/122.6

5. Disclose baseline or other operational (NPDES permitted) discharge volumes and types going into the water concurrent with the proposed operations.

   Current Platform based discharges include: Domestic and sanitary waste, firewater and non-contact cooling water, and desalination unit discharge. These discharges do not exceed any of the allowable limits; NPDES records are available upon request.

6. Provide digital copies of the below references cited in the project description:

   a. Crystal Energy, 2006. Marine Biological Survey of SSP Area (Platform Grace) – Clearwater Port Project.

   b. Crystal Energy. 2006. Marine Biological Survey of Satellite Service Platform Area for the Clearwater Port Project. November 2006.

   The requested reports are the same report. The references have been corrected in the application documents. A copy of the report is attached. (Attachment D)

7. Provide additional description of the extent of the turbidity and discharge plumes expected from activities in the proposed Project. Detailed models are not necessarily required, but a well-reasoned discussion, perhaps based on research from analogous projects, should be presented. Because the proposed project is close to the Channel Islands National Marine Sanctuary (CINMS), it is important to determine whether dispersion plumes could flow into the CINMS and harm sanctuary resources.

   There is no data currently available on the specific nature or extent of the turbidity plume that will result from the extraction of the conductor from the seafloor and the subsequent jacking of the conductor to the platform deck. However, direct observations by platform personnel of similar activities in the Gulf of Mexico report that the minor plume that results from the conductor as it is pulled from the bottom sediments is rapidly dispersed by bottom water currents and typically not visible beyond the jacket footprint.

Turbidity resulting from the conductor movement through the water column is primarily a result of the marine growth removal and therefore similar to conditions observed during jacket cleaning. The image to the right provides an example of surface plume observed as a conductor is being pulled in the Gulf of Mexico. Due to the distance to sanctuary boundary, it is highly unlikely that turbidity plumes associated with project related activities will enter the CINMS or harm sanctuary resources.

8. Clarify the meaning of this sentence: "Turbidity in the water column will increase as the conductor is pulled to the surface, however; due to the 15-foot-deep cutting depth, this majority of cutting fluid will be buried beneath seafloor and disturbance is expected to be minimal. (3-35)". How will a fluid be buried?

   The turbidity referenced in the sentence is entrained sediment that currently surrounds the conductor. Once the conductor has been successfully cut and is pulled vertically, the suction within the native sediment will result in some suspension of this sediment. Any cutting-related fluid and cutting material that escapes when pulling the conductor up from this cut point is likely to be captured/intermixed into the surround sediment or will be discharged below the open conductor as it is lifted into the water column.

9. Provide an estimate (or provide a range) of the total volumes of all materials (including abrasive materials and grout) and cutting-related fluids that could discharge 15 feet below the mudline, or be left on the seabed as part of the proposed project, or be released into the water column.

   The estimated volume of material discharged into the surround sediment has been estimated as follows.

   The majority of the cuts will be 18-5/8" out to 24".
   Assuming 3.5 hours of actual cutting time, we calculate 550 lbs. of abrasive per hour of cutting time.

   3.5 hrs. X 550 lbs. = 1,925 lbs. of total abrasives used per conductor.

   10% - 15% of the abrasive will accumulate downhole below our tool before the cut will break through the outer drive pipe. We are therefore assuming 85% of the total cut time will be associated with the outer pipe cutting.

   1,925 lbs. of abrasive X 85% of the total cut time = 1,636 pounds of abrasive will be injected into the surrounding seafloor sediment.

   Please note that no grout will be released during the cutting of the conductor string. Grout will be extracted from the conductors during the onshore recycling efforts.

10. Provide a review of existing information regarding anthropogenic materials on the seabed within the project footprint, including marine debris, lost fishing gear, and anode sleds.

    The Platform Gail and Grace 2016 Level II surveys report are provided in Attachment E. This information summarizes the observed anthropogenic materials located around each platform.

11. In order to understand how the proposed project will affect fish habitat, provide, as a percentage, an estimate of the amount of hard substrate that will be eliminated from the underwater portions of the platform once the conductors are removed, and provide the details on how this estimate was calculated.

At Platform Gail, the conductors constitute 17% of the structure's total surface area. At Platform Grace, the conductors constitute of 26% of the structure's total surface area. Attachment F provides the calculation worksheet prepared by Thomas and Beers for the amount of surface area for the conductors and surrounding platform jacket as presented in our original submission.

12. For each platform, provide information on the frequency and extent of past marine growth removal efforts (also known as "cleaning") within the last ten years or so, the depth to which cleaning occurred, and an estimate of how much volume or weight of the removed marine growth was deposited onto the seabed during a cleaning event. Compare the amount (weight or volume) of marine growth proposed to be removed from conductors for this project to the average estimate (weight or volume) of the amount of marine growth deposited to the seabed during an average cleaning event.

The following information outlines the estimates and frequency of marine growth removal for each platform (occurring every 3-4 years).

Marine Growth Cleaning

FOR Gail – Routine cleaning program

- Jacket Surface area to -30 ft = 10,000 sq. ft.
- Conductor surface area to -30 ft = 5,000 sq. ft.
- Appurtenances surface area to -30 ft = 500 sq. ft.
- Total Surface area to -30 ft = 15,500 sq. ft.
- Average thickness during a cleaning = 6" (0.5 ft)
- Average coverage of members = 75%
- Volume of material removed = 5,813 cu. Ft.
- Weight of material removed (in air @ 60lbs/cu ft) = 349,000 lbs.
- In ten years, the amount removed will be three times that so 17,439 cu ft, or 1,047,000 lbs.

For Gail – conductor only - marine growth removal for pulling conductors

- Conductor surface area to -160 ft = 28,149 sq. ft.
- Average thickness during a cleaning = 3" (0.25 ft) (average drops by depth)
- Average coverage of members = 72%
- Volume of material removed = 5,000 cu. Ft.
- Average density of material removed = 60 lbs./cu ft.
- Weight of material removed (in air) = 300,000 lbs.

DIFFERENCE between a normal cleaning program and the cleaning of the conductors for removal is negligible and may be slightly less based on the above calculations (with associated assumptions).

For Grace– Routine cleaning program

- Jacket Surface area to -30ft = 12,000 sq. ft.
- Conductor surface area to -30 ft = 7,200 sq. ft.
- Appurtenances area to -30 ft = 600 sq. ft.
- Total Surface area to -30 ft = 19,800 sq. ft.
- Average thickness during a cleaning = 6" (0.5 ft)
- Average coverage of members = 70%
- Volume of material removed = 7,000 cu. ft.
- Average density of material removed = 60 lbs./cu. ft.

- Weight of material removed (in air) = 420,000 lbs.
- In ten years, the amount removed will be three times that so 21,000 cu. Ft., 1,260,000 lbs.

<u>For Grace – conductor only - marine growth removal for pulling conductors</u>

- Conductor surface area to -160 ft = 39,000 sq. ft.
- Average thickness during a cleaning = 3” (0.25 ft) (average drops by depth)
- Average coverage of members = 70%
- Volume of material removed = 6,800 cu. ft.
- Average density of material removed = 60 lbs./cu. ft.
- Weight of material removed (in air) = 408,000 lbs.

13. Provide a more thorough description of marine growth on each platform by adding some details presented in the below reference and those listed in the next point regarding non-native species:

a. Continental Shelf Associates. 2005. Survey of invertebrate and algal communities on offshore oil and gas platforms in southern California: Final report. US Department of the Interior, Minerals Management Service, Pacific OCS Region, Camarillo, CA. OCS Study MMS 2005-070.

Section 3.2.2 Marine Biological Resources has been reorganized and detail added to in Environmental Analysis to describe unique marine growth on each Project platform. These revisions are also provided below. (See Attachment G)

3.2.2 Marine Biological Resources

Platforms Grace and Gail are located within the Santa Barbara Channel. Biological resources and habitats in the vicinity of the Platforms and the Santa Barbara Channel have been documented by a number of recent studies. The findings of these studies relevant to biological resources within the Project area are summarized below. Additionally, please refer to Appendix D for the Project’s Federal Biological Assessment (BA) and Appendix E for the Essential Fish Habitat Assessment (EFHA).

A study conducted by Continental Shelf Associates (CSA, 2005) identified distinct biotic zones along the legs of selected platforms (Figure 3.2-1). Platform Gail and Grace were included in this study and the following is a summary of the findings.

A total of four to six distinct biotic zones were identified depending on the Platform’s depth. As Platform depth increased, the total number of biotic zones increased. Platform Grace, in approximately 318 feet of water, exhibited five zones, while Platform Gail at 739 feet, exhibited six biotic zones. The invertebrate communities along the Platform legs showed similar patterns including:

- *Mytilus was always present, therefore there was always a mussel zone whose vertical extent and lower boundary is variable;*
- *Barnacles were typically present above and/or below the mussel zone;*
- *Encrusters (i.e., sponges) were routinely present at depth, often in conjunction with various cnidarian species (i.e., Metridium, Corynactis, Paracyathus); and*
- *Beneath the intertidal, barnacle, and mussel zones, there was considerable variability in faunal composition depending on the Platform.*

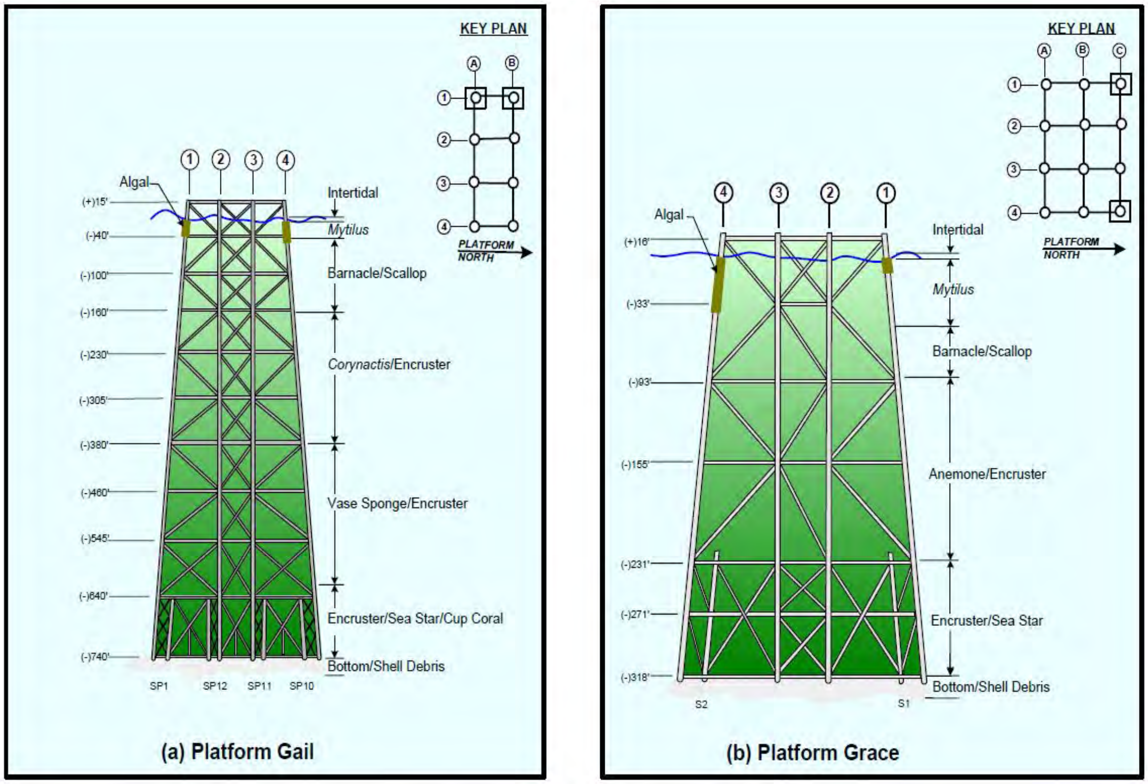


Figure 3.2-1. Biotic Zonation Patterns of (a) Platform Gail and (b) Platform Grace

Love et al. (1999, 2003, 2010, 2012, 2019) has conducted extensive studies of both the invertebrate and fish communities on OCS platforms and the following is a summary of those findings, as they relate to the Project Platforms. At the water's surface, the Platforms' jackets provide an artificial habitat that acts as infrastructure for the attachments of typical shallow, rocky reef invertebrate and fish species. Love et al. (2019) found that the white anemone, Metridium farcimen, was by far the most commonly observed cnidarian and comprises 97.6 percent of all invertebrates found on the Platform jackets. The gorgonian and soft corals (alcyonacean, Leptogorgia chilensis and the scleractinian, Lophelia pertusa), are the most commonly occurring corals near the surface and in midwater depths. Corals are usually found along the crossbeams where they are more protected from currents and swell, opposed to the shear vertical faces of the outer piling supports. Vase sponges are the most commonly found sponges along the Platform structures and are found in mid- to deep water ranges between 266 and 1,194 ft (81 and 365 m) (Love et al., 2019).

Fish densities can be variable between Platforms but tend to be lowest in the shallower depth strata, between 0 to 100 ft (0 to 30 m) and increase with depth. Midwater habitats serve as nursery grounds for a range of rockfish species including blue (Sebastes mystinus), squarespot (S. hopkinsi) and widow rockfish (S. entomelas) and bocaccio (S. paucispinis) (Love et al., 2012). In years with sufficient recruitment, young-of-the-year (YOY) rockfish can occur in substantial numbers around the surface and midwater depths. The Platforms' presence provides an opportunity for larval fish to settle out into a complex yet suitable habitat that provides refuge from predators and strong currents, as well as attracts a sufficient prey base. Other species that occur include nearshore reef species such as garibaldi (Hypsypops rubicundus), blacksmith (Chromis punctipinnis), cabezon (Scorpaenichthys marmoratus), sheephead (Semicossyphus pulcher), *and white and sharpnose perches (Morone americana and Phanerodon atripes, respectively) (Love et al., 2012).*

Platform bottoms vary greatly in fish assemblage composition, primarily due to differences in bottom depth; however, the bottom structures and benthic habitat are more commonly characterized by subadult and adult rockfish in contrast to the YOY fish that congregate near the midwater and surface water depths. It is hypothesized that some of the midwater YOY descend to the Platform bottoms or settle out directly from planktonic phase to the platform bottom where they mature (Love and Nishimoto, 2012).

The bottom of each Platform is comprised of vertical and horizontal supports; however, unlike the midwater structure, the bottom habitat contains both the structural elements and a seafloor that is covered with fallen marine fouling organisms. In some areas, the bottom crossbeam is undercut or covered over, provided a greater or lesser “cave-like” habitat that is not found in the midwaters. In addition, this deep-water habitat consists of random, small crevices and other refuge unique to the bottom habitats (Love and Nishimoto, 2012).

As the Platforms’ structures rise out of the softbottom habitats, they provide an artificial hardbottom habitat which provides attachment sites for sessile invertebrates such as mussels, corals, bryozoans, and sponges (Argonne National Laboratory, 2019). The seafloor around both Platform Grace and Gail is sedimentary, comprised of medium to fine grain sand and silts (MEC Analytical Systems, 2003, Fugro West, 2003 and 2005). The deep-water platform structure and surrounding seafloor support diverse populations of benthic invertebrate and fish species; however, existing conditions at each Platform differ slightly due to differences in water depth at each location. The softbottom benthic community surrounding the Platforms are comprised of polychaete worms, amphipod crustaceans, bivalve mollusks, and echinoderms. However, there are species specific differences and variations in species diversity that characterized the benthic communities within different water depths. The flora, fauna and habitats for each platform are presented below.

3.2.2.1 Platform Grace

Surface to Midwater Platform Habitats. The algal and invertebrate communities at the surface and midwater habitats on Platform Grace are dominated by mussel beds (Mytilus spp.), barnacles (Balanus spp.), anemones (Corynactis californica, Anthopleura elegantissima, Metridium senile) and filamentous red algae (Continental Shelf Associates, 2005). Throughout the water column, Platform Grace has well-defined mussel and coral cup anemone zones, abundant ophiuroids, a prominent barnacle community, and a broadly distributed anthozoan (anemone) community. Platform Grace is unique in that its mussel beds and anemone zones have no apparent overlap, with the mussel beds dominating the shallow water habitats (above 45 feet [13.7 meters]). Platform Grace also has a unique brown cup coral (Paracyathus) zone that extends from the lower portions of the coral cup anemone community to the sea floor (Continental Shelf Associates, 2005).

Fish communities at the surface and midwater habitats at Platform Grace serve as nursery grounds for a range of rockfish species as well as foraging habitat for adult rockfish and reef dwelling species. Love et al. (2010) reported that widow rockfish YOY and adults were the most numerous species of rockfish observed at Platform Grace. Other dominant species included squarespot rockfish, bocaccio YOY and adults, and blacksmith.

<u>Deep Water and Benthic Platform Habitats</u>. The seafloor under Platform Grace is almost flat with a gradual slope toward the south. Historic removal and deposition of fouling organisms on the seafloor has created mid- to low-relief habitat comprised primarily of fragments of mussel shells (Mytilus sp.). This habitat area under the Platform measures approximately 78,000 square feet (ft^2) (7,246 square meters [m^2]) on the northwest side of the Platform footprint and is approximately 13 ft (4 m) tall. This area has a volume of approximately 5,500 cubic yards (4,205 cubic meters) (MEC Analytical Systems, 2001 and 2003).

Platform Grace is located on the continental shelf transition zone where benthic infaunal communities are dominated by the spionid, capitellid, and chaetopterid polychaetes, tellinid bivalves, ostracods, and ophiuroid echinoderms (Gillett et al., 2013; Argonne National Laboratory, 2019). The Platform's legs and bottom conductor structures host primarily encrusting species, and deep water sea stars (Ophiothrix spiculata) from approximate depths of 230 to 318 feet (70.1 to 96.9 meters).

Fish species found in the deep-water habitat of the Platform's legs include widow, calico, vermillion, and halfbanded rockfish (S. entomelas, S. dalli, S. miniatus, and S. semicinctus, respectively). The sharpnose surfperch is also commonly observed within the deeper portion of Platform Grace. Throughout a six-year study at Platform Grace, Love et al. (2003) reported that two species, halfbanded rockfish and shiner surfperch (Cymatogaster aggregatta), accounted for 86.5 percent of the total fish observed on the seafloor shell talus area. YOY and juvenile boccaccio rockfish (S. paucispinis), a once depleted species that has subsequently recovered as a stock, were relatively abundant in the mid- and bottom-depth areas of Platform Grace during the 1999 and 2000 surveys (Love, et al., 2003). Fish species observed along the exposed seafloor habitat comprised of shell fragments and the soft sediment bottom include sanddabs (Citharichtys spp.), halfbanded rockfish, and other unidentified perch and juvenile rockfish (Crystal Energy, 2006).

3.2.2.2 Platform Gail

<u>Surface and Midwater Habitats</u>. The algal and invertebrate communities at the surface and midwater habitats on Platform Gail are comprised primarily of anemones (Corynactis californica, Metridium exilis, Metridium senile), filamentous red algae, spiny brittle stars (Ophiothrix spiculata), and mussel beds (Mytilus spp.). Platform Gail provides a unique dense community of Metrdium exilis at depths where there is usually a dominant cup coral community. In addition, there was also a distinct deep-water cockscomb coral (Desmophyllum dianthus) zone along the lower portions of the platform legs' structure (Continental Shelf Associates, 2005).

Fish communities at the surface and midwater habitats at Platform Gail are similar to other offshore platforms with the dominant fish species being YOY and adult life stages of squarespot rockfish and bocaccio (Love et al., 2010). Other dominant fish species recorded around the platform midwater structure included blacksmith, widow rockfish, and halfmoon.

<u>Deepwater and Benthic Platform Habitats</u>. The seafloor around Platform Gail is also primarily sedimentary; however, the shell fragments that have accumulated beneath the Platform are lower relief and smaller area than around Platform Grace. MEC Analytical (2003) estimated that there are four identifiable areas of low relief under Platform Gail which are approximately two to three feet tall, the largest of which measures 40 by 60 ft (12 to 18 m) at its base. The total volume of the four areas under Platform Gail was estimated to be less than 500 cubic yards.

Platform Gail is located in an upper slope, deep water benthic zone where the species diversity is limited and is primarily comprised of tellinid bivalves and the spionid polychaete (Gillett et al., 2013). The Platform's legs and deepest conductor structures host primarily encrusting species, deep water sea stars and cup corals from approximate depths of 630 to 739 feet (192 to 225 meters).

Platform Gail hosts a different suite of fish species around its deep-water habitat, including bocaccio, cowcod (Sebastes levis), another federally managed species experiencing a stock recovery, pinkrose (S. simulator), and greenblotched (S. rosenblatti) rockfishes. Love and Nishimoto (2012) reported that the assemblage of fish known to occupy the lower-relief shell fragment habitat is composed of 1) juvenile fishes of larger species and juveniles and adults of dwarf species that utilize small sheltering sites (i.e., juvenile cowcod and lingcod [Ophiodon elongatus], blackeye goby (Rhinogobiops nicholsii), and calico rockfish [S. dallii]), 2) ecotonal species that favor soft sea floor-low, hard-relief bottom (greenstriped [S. elongatus] and stripetail [S. saxicola] rockfishes), and 3) a few schooling taxa (notably halfbanded rockfish) that are habitat generalists.

14. Please describe the presence of non-native species that may form a part of the marine growth community on the platforms and whether this may have any negative environmental effects. References that may be helpful are listed below:

    a. Page, H.M., Simons, R. D., Zaleski, S.F., Miller, R.J., Dugan, J.E., Schroeder, D.M., Doheny, B., Goddard, J.H.R. 2019. Distribution and potential larval connectivity of the non-native *Watersipora* (Bryozoa) among harbors, offshore oil platforms, and natural reefs. Aquatic Invasions 14(4):615-637.

    b. Page, H.M., Dugan, J., Miller, R., Simons, R. and Viola, S., 2019. Understanding the role of offshore structures in managing potential Watersipora invasions. Camarillo, CA: US Department of the Interior, Bureau of Ocean Energy Management. OCS Study BOEM, 1, p.102.

    c. Viola, S.M., Page, H.M., Zaleski, S.F., Miller, R.J., Doheny, B., Dugan, J.E., Schroeder, D.M. and Schroeter, S.C., 2018. Anthropogenic disturbance facilitates a non- native species on offshore oil platforms. Journal of Applied Ecology, 55(4), pp.1583-1593.

    d. Simons, R.D., Page, H.M., Zaleski, S., Miller, R., Dugan, J.E., Schroeder, D.M. and Doheny, B., 2016. The effects of anthropogenic structures on habitat connectivity and the potential spread of non-native invertebrate species in the offshore environment. PloS one, 11(3), p.e0152261.

    e. Page, H.M., Dugan, J.E., Culver, C.S. and Hoesterey, J.C., 2006. Exotic invertebrate species on offshore oil platforms. Marine Ecology Progress Series, 325, pp.101-107.

Subsection 3.2.2.3 – Nonindigenous Aquatic Species has been added to Environmental Analysis

3.2.2.3 Nonindigenous Aquatic Species

Invasive and Nonindigenous Aquatic Species (NAS) have been reported to have a strong association and likelihood to occur on artificial structures and therefore has led to concerns regarding the role of offshore infrastructure as a potential dispersal source and connectivity to native habitats (Paige et al., 2019). NAS invertebrates, including the bryozaoan Watersipora *subatra (herein referred to as Watersipora), the anemone Diadumene sp. (found only on Platform Gail), and potentially the exotic caprellid amphipod Caprella mutica, have the potential to occur or are present on Platforms Gail and Grace (Page et al., 2006).*

A thoroughly studied NAS within the OCS platforms is the bryozoan Watersipora. At 20 percent vertical and horizontal coverage, Platform Gail has the highest percent cover of Watersipora among all surveyed offshore platforms. Watersipora is primarily found in shallow waters along the Platforms' conductors and jackets, especially in areas that are regularly cleaned and maintained; however, the abundance of percent cover of Watersipora reduces significantly on the Platforms' conductors below 59 feet (18 meters). Cleaning and maintenance allow NAS species' to regularly recolonize empty space and out-compete native sessile invertebrates (Viola et al., 2018).

The current NAS colonization of Project Platforms makes it unlikely that additional vessel traffic will introduce new species to the platforms. The Project platforms are known to retain the majority of larvae and removal of Project platform conductors is not anticipated to increase the spread of invasive species or affect the presence of invasive species on nearshore, natural reefs. In fact, the removal of the conductors may benefit the native invertebrate communities on the Project platforms and adjacent platforms Gilda and Gina. The removal of the biomass of NAS reduces the likelihood that Watersipora and other invasive invertebrates would continue to colonize on their host platform in the same densities. Specifically, the removal of the shallow portions of the conductors, where NAS density is highest, may reduce the ability of NAS to persist locally (BOEM, 2019). Additionally, Watersipora colonies are negatively buoyant and when dislodged from the platforms, the fragments drop to the seafloor (diver observations). Thus, conductor cleaning prior to removal is unlikely to provide a transmission pathway for the spread of Watersipora (Simmon et al., 2016).

Natural, long-distance dispersal of Watersipora is unlikely due to its short maximum planktonic larval duration (PLD) of 24 hours. Its short PLD reduces the likelihood that the planktonic larva would survive long enough to colonize unoccupied habitat. This is also true for other NAS taxa with short PLDs (Paige et al., 2019). Therefore, there is a low likelihood that larval dispersal from the Project Platforms through ocean currents and circulation (connectivity) alone could impact uncolonized, natural reefs.

Early connectivity studies suggested that offshore Platforms Gail, Grace as well as Gilda and Gina as a group display high connectivity between the four platforms and could potentially produce a much greater dispersal distances for invasive species than nearshore harbors due to the speed of prevailing deep water currents (Simmons et al., 2016); however, Paige et al., (2019) found little evidence of offshore platforms actually serving as intermediary sources of Watersipora (and presumably other invasive species) to the northern Channel Islands or nearshore natural reefs through natural connectivity alone. The only potential connectivity recorded from a platform to an island site was very weak connection between Platform Grace and a pier on the east end of Santa Cruz Island. In addition, modeling conducted by Simmon et al. (2016) found that platforms in groupings (i.e, Grace, Gail, Gina, and Gilda) share higher connectivity, due to their proximity to each other, and may retain larvae within the colonized platforms.

As outlined above, the primary pathway for the dispersal of NAS invertebrates, such as Watersipora, to and from offshore platforms appears to be transport by supply and/or crew boats that contain reproductive colonies on their hulls. Project vessels will only be traveling between *areas that are already occupied by NAS and therefore, vessel transit is not expected to increase the spread of NAS.*

15. Update *Figure 3.2-2. Marine Protected Areas Near the Project Sites* so that includes marine protected areas in Federal waters too, not just State waters.

    Padre has completed a search of the BOEM OceanReports tool (BOEM, https://marinecadastre.gov/oceanreports 2020) which indicates 25 protected areas within the Project vicinity. All of the areas identified are located along the mainland coast or on or within the Marine Protected Areas of the Channel Islands. We are unaware of any additional Marine Protected Areas within the Project footprint or transportation corridors.

Additional Comments

The responses below provide detail on how the Project materials have been revised to incorporate the BOEM and BSEE recommendations and provide consistency and clarification to the application.

Project Operations

1. Is the M/V Jackie C Crew boat currently running twice daily now? Will extra trips be needed? Not clear from the supporting text: *The Jackie C. currently makes routine runs twice daily to the Platforms in support of current operations. Project activities are currently estimated at 120 days in 2021 for Platform Grace and 240 days in 2023 for Platform Gail. During this time, twice daily crew boat trips from Carpinteria (Casitas) Pier to the Platforms using the Jackie C. will continue throughout Project.*

   The Jackie C is currently running twice daily and will continue to make two trips per day to each platform. The frequency of trip will therefore not change during conductor removal operations.

2. In anticipation of undertaking our NEPA analysis and ESA Section 7 consultation with NMFS, BOEM is requesting clarification about the duration of conductor cutting for the Santa Clara Unit in order to understand the potential impacts to marine protected species.

   a. The application received by BOEM describing conductor removal from platforms Grace and Gail describes two types of cutting tool, an abrasive cutting tool and a mechanical one.

   b. Can Chevron explain why their anticipated conductor cutting time is 7 hrs. vs 90 minutes? Does it have anything to do with the use of Sharpshot iron silicate vs garnet abrasives?

   c. Can Chevron clarify whether the 7 hrs. for abrasive, and 12-24 hrs. for mechanical, cutting durations are conservative estimates or whether they are based on averaged data from previous work? Can Chevron explain if a ‘buffer’ is included in the 7 hrs. for abrasive, and 12-24 hrs. for mechanical, cutting? Per the application, Sharpshot Iron silicate abrasive cutting is anticipated to take 7 hours per 24” conductor, and 12-24 hrs. for mechanical cutting.

   Both the Abrasive water jet severing and mechanical severing durations were provided as conservative average cut times. These times were based on executed projects in GOM along with contractor input. Actual cut durations will vary due to specific conductor – casing program and annulus grout, possibly requiring conductors to be recovered independent of drive pipe (multiple runs) as well as rework during operations due to failed cut(s) or tooling malfunctions are considered here.

The duration of 7hrs is an average severing time used for planning purposes, this duration takes into account scenarios where multiple cuts are required due to free casing strings or failed cuts identified after test pull. The 90 min duration may be achievable for single wall ~30" csgs / piles – the cutter rotation speeds are slowed down and make multiple passes when cutting multi string conductors.

Our contractor reports very little difference in cutting times between the Sharpshot iron silicate vs garnet abrasives in testing.

3. Is there a potential presence of iron sulfide in any of the piping or appurtenances removed in the conductor removal operations?

   Iron Sulfide is not anticipated to occur within project-related piping or appurtenances.

4. Please submit an SDS for grout and discuss how it will be recovered.

   Grout recovery will occur during the onshore recycling of the recovered conductors. This grout was injected between the drilling strings during the original drilling operations; new grout will not be added. A standard SDS does not exist for this grout.

5. Please submit an SDS for the abrasive materials rather than an MSDS.

   A Safety Data Sheet (SDS) was included within the application materials for the Sharpshot Iron Silicate Abrasive material (Appendix B of the original application). Please see Attachment H) for another copy.

Accidents

1. Please clarify if section 3.2.6 (3-31) are accidental scenarios and fall within the description and best practices described in pages 3-23 and 3-24: *Platform-based equipment will be utilized to perform the conductor cutting that requires small quantities of petroleum hydrocarbons including fuels, hydraulic fluids, and oils. Short-term use of this equipment during the conductor cutting Project has the potential for incidental spills, however measures outlined below and within each Platform's existing Hazardous Materials Management Plan (including, but not limited to use of secondary containment, best management practices for storage and fueling, and onsite spill response materials) would reduce the potential for spills to the marine environment.*

   The potential for incidental spills represents an accidental scenario. All project related activities are adequately addressed within the existing Platform related plans and procedures. Project related activities, equipment or materials are currently covered by routine and emergency related plans.

Air Quality

1. Will a permit from the South Coast Air Quality Management District be needed? Chevron documents a robust list of rules that must be observed for Ventura County APCD but omits some important SCAQMD rules. Please be aware Chevron and/or their agents must follow Rules 401 (visible emissions), Rules 404/405 (particulate matter emissions), and California Health & Safety Code Sections 41700 (nuisance) and 41701 (visible emissions).

   An air permit is not required from the South Coast Air Quality Management District as the Project only includes mobile sources. Regardless, setting information regarding applicable air quality regulation and SCAQMD thresholds was included within the air quality analysis provided within the supporting application materials in Section 3.2.1.4 (Los Angeles County

[POLB/South Coast AQMD] Rules and Regulations) and estimated air quality emissions presented in Table 3.2-3 (Estimated Criteria Pollutant Project Emissions).

2. Specify that the existing permit for Ventura County includes the vessels proposed for use during project operations. Please verify the additional emissions from equipment and vessel removal conductor trips related to this proposed project. From page 3-1: The SCU operates under existing Permit to Operate (PTO) Numbers 01493 for Platform Grace and 01494 for Platform Gail. The PTOs establish thresholds for allowable emissions associated with Platform operations (including decommissioning activities).

   During project related activities, up to 2 crew boats and one work boat (i.e. Clean Ocean, etc.) can be onsite at the same time under the current Title V permit. The emission calculations as provided in the original application are for conductor removal related activities.

Environmental Justice

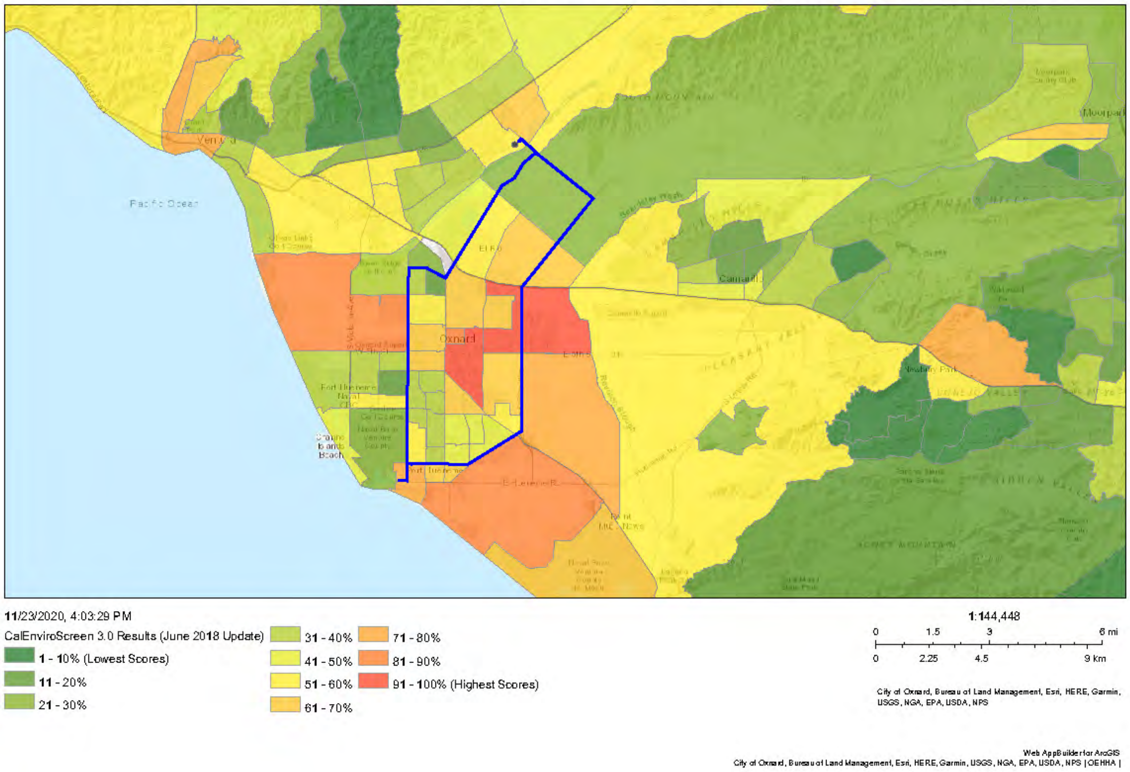
1. What are the deciding factors in the decision to transport the conductors to either Port Hueneme (and thence to Saticoy) or POLA/POLB?

   The final decision points regarding the selection of the port and recycling facilities used during the project will be based on the availability of facilities to handle project related vessel operations, capacity to handle volume of recycled materials and commercial terms at the time of the operations.

2. The EJ neighborhoods around the POLA and POLB are well-known. Has Chevron or its agents studied the EJ conditions around Standard Industries?

   The onshore disposal corridor from Port Hueneme to Standard Industries in Saticoy could be achieved in a number of roadway combinations. The two primary routes considered based on avoidance of known congested roadways during peak traffic conditions is represented by the blue lines overlaid onto the Figure below. According to California Office of Environmental Health Hazard Assessment (OEHHA 2020) California Communities Environmental Health Screening Tool (CalEnviroScreen) data (June 2018 Update), there are several neighborhoods located along the proposed trucking routes with an existing environmental burden above 60 percent. The highest-scoring areas (up to 98%) are primarily attributed to pesticides and groundwater/impaired water threats, combined with socioeconomic community components (such as high unemployment rates up to 92 percent reported by OEHHA in the red area) that could result in increased vulnerability with respect to environmental justice impacts. However, the western alternative route is located in proximity to areas of significantly lower environmental burden and could therefore be chosen as the preferred routing within the Project workplan in order to minimize these impacts to the greatest extent feasible.

CalEnviroScreen 3.0 Results (June 2018 Update)



3. Section 3.2.7 addresses truck traffic for the Saticoy option. Will there be any significant impacts when the material is processed at and leaves Standard Industries?

   Standard Industries is a private, 10-acre recycling facility. Standard Industries has an existing contract with Chevron and has indicated it has the capacity to receive and handle the anticipated volume of the conductor cutting materials in accordance with applicable permits or guidelines.

Historic and Cultural

1. On page 3-29 of the application, they reference previous surveys could use a little more information. Specifically, they reference a 2004/5 BOEM high resolution survey of the project area, but do not include a citation for that survey. They also reference a marine archaeological survey from 2006 at Platform Grace (Crystal Energy, 2006), but only include two bio surveys in the References section. Please provide full citations for these reports. Hard copies would be welcomed as our archives are difficult to assess presently.

   The high resolution survey was published by the U.S. Geological Survey in 2004. The reference has been added to the text and in the literature cited. Please see Attachment I, for hardcopy of the marine archaeological survey referenced (Crystal Energy, 2006).

Marine Mammals

1. Do/will all vessels have crew on watch to detect and avoid protected marine mammal species? This may currently be practiced but it is not mentioned in their application.

All project related crews will be provided the approved OCS operations training program which includes information regarding marine mammal species present in the project area. All vessel captains will also be provided copies of the procedures and reporting requirements when encountering marine wildlife during their vessel operations.

2. Please see the below links to using new mitigation technologies that were designed to alert mariners to the presence of whales in the Santa Barbara Channel to avoid vessel collisions. There are currently two initiatives currently in use: Whale Safe (https://whalesafe.com/whale-safe-tool/) and Whale ALERT (http://westcoast.whalealert.org/).

   Language added to Section 4.4 Vessel Traffic in BA and 3.2.2.7 in Environmental Analysis:

   Prior to transiting to and from POLB/POLA or Port Hueneme, the primary Project vessel will review the current whale presence rating within the Santa Barbara Channel shipping lanes using the online tools at Whalesafe.com. If the daily whale presence is reported to be above a medium rating within the transit corridor, then the vessel will transit at a reduced speed of 10 knots or less (11.5 mph or 18.5 km/h).

Marine and Coastal Birds

1. 3.2.2.4 Marine Birds starting on 3-12 edit several typos and cut and paste examples in bird section.

   Padre has reviewed Section 3.2.2.4 and cannot identify the typos or cut and paste examples that are referenced in the comment. Please provide specific examples.

2. Project lighting 3-23. Please clarify whether work vessels will be working at night with bright lights? Are the vessels just transporting materials? Are there work-related vessels that could introduce additional light on a regular basis in the project area? Please clarify whether the vessels (or the addition of lights on the platform) will increase night lighting on a consistent basis.

   The current platform lighting provides adequate visibility for night vessel operations, including loading and offloading of cargo and equipment. In addition, vessel(s) are equipped with lighting to increase visibility during back deck operations if needed.

Attachment A.
Memo From: Thomas and Beers, LLC. Platform Gail and Grace –
Conductor Removal Program Deck Load Review.

THOMAS & BEERS, LLC
ENGINEERING, ANALYSIS AND DESIGN

To: **David Beckmann, Chevron**

From: **Rick Beers, Thomas & Beers**

Date: **November 25, 2020**

Subject: **Platform Gail and Grace – Conductor Removal Program**
Deck Load Review

Project: **T&B Job #20-507B and #20-507C**

Per your request we have investigated the proposed deck loads for the conductor removal phase for both Platform Gail and Platform Grace. Results of the review confirm that both platforms will be adequate for the proposed conductor removal program. Attached in the following documents are drawings and the load studies verifying the program.

The following loads were considered in the conductor removal program:

- GSI Equipment (See Attached)
- OTS Equipment (See Attached)
- Weatherford Equipment (See Attached)
- Weatherford Pulling Rig
  - Weight = 230K
  - Pulling Capacity = 220K
  - Jacking Capacity = 600K
- Maximum conductor laydown is based on area and deck capacity
  - Anticipated Conductor Weight = 200 to 550 lb/ft
  - Conductors are 24" Diameter
  - Average Length 45' shown (40'-50' Range Expected)
  - Deck loading could vary from 100 to 275 psf – Single Stack
  - Deck loading could vary from 200 to 550 psf – Double Stack
- Platform Gail: Each conductor string removed is about 805 ft
- Platform Grace: Each conductor string removed is about 387 ft

Allowable deck capacities were developed from historical data for Gail and Grace along with expanded deck checks from previous drilling programs. Platform Gail deck capacities are based on the 2002 Venoco drilling program, and Platform Grace deck capacities are based on the 2006 return to production program. Deck capacities include both <u>local beam</u> capacities and <u>girder</u> total deck capacity. As shown in the attached layouts, each zone has the dual rating. For example, a

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Phone: (805) 652-0655

500/300 rating would note an allowable local beam capacity of 500 psf and a total girder capacity of 300 psf.

For the most part, the support equipment deck check is based on the local beam capacities. The total mass of this equipment is relatively light and spread out. For the key areas on Platform Gail, the local beam allowable capacities vary from 400 to 1200 psf, and the girder capacities range from 300 to 500 psf. Likewise, for working areas on Platform Grace, the local beam capacities of interest vary from 500 to 550 psf, and the girder capacities range from 300 to 400 psf.

As noted, the support equipment is relatively light and are tabulated in the attached spread sheet. Two deck pressures are calculated. 1) One for the direct pressure under the footprint. 2) Second for the average pressure for the footprint plus the open area around the equipment based on a typical 3' minimum clear area. Except for the HPU pump all equipment loads are well within the allowable range. The HPU pump has a 438 psf load on a small area and it drops considerable when accounting for the adjacent open space. You need to strategically place the HPU pump such that you cross as many beams as possible to limit vibration and spread out the load. This can be addressed in the final layout.

The conductors are quite heavy and take up large footprints on the deck. Because of this, conductor capacities are based on the girder capacities. The conductors are proposed to be stored on the pipe rack/upper deck for Platform Gail. This area has girder capacity of 300 psf. Assuming a maximum 550 lb/ft conductor and 2' diameter, the projected load would be 275 psf. Therefore, you will be limited to single stack of conductors. If the conductor weight come in below 300 lb/ft, you could consider some double stacking. As currently configured, Platform Gail can store 1800 linear feet of single stacked conductor sections for a total mass of 990K with 550 lb/ft conductors.

On Platform Grace, the conductors are proposed to be stored on the east upper deck. This area has girder capacity of 400 psf. Again, assuming a maximum 550 lb/ft conductor and 2' diameter, the projected load would be 275 psf. Therefore, you will be limited to single stack of conductors. If the conductor weight come in below 400 lb/ft, you could consider some double stacking. As currently configured, Platform Grace can store 945 linear feet of single stacked conductor sections for a total mass of 520K with 550 lb/ft conductors. If some of the support equipment can be moved down to the main deck (which will have plenty of open space), more conductors could be stored on the east deck.

Timber sleepers will be installed to distribute the conductor loads to the beams for both platforms. The timber plan will be developed to prevent overloading the smaller beams and to transfer the loads up to the girders. This plan will be established after the final layout is completed.

The Weatherford rig weighs 230K, has a 220K pulling capacity, and has a 600K jacking capacity. The maximum load case would be maximum jacking load + dead load = 830K assuming the pulling load and jacking load cannot work in tandem. Relative to a drill rig, this is a light drilling operation. Typical drill rigs that have been on Gail and Grace are in the range of 550K dead load, 600K hook load with 300K setback = 1400K. Consequently, the Weatherford rig on these platforms is well within proven loads. The only caveat would be if the Weatherford rig does not bear on all four trusses on Platform Grace. Then a skid truss check would be required to verify the two trusses supporting the rig. Platform Gail has two very strong skid rails and is more than adequate. The heaviest anticipated pull would be on Platform Gail which would be about 805ft x 550 lb/ft = 443K (+- for marine growth and buoyancy), thus a total load of 663K << 1400K. It is anticipated that the 550 lb/ft load is conservative.

A global platform mass study for seismic loads for this operation will not be required. The total mass for this conductor removal program is much less than the capacity of the platform and much less than past full drilling programs. The pulling unit is much smaller than a typical drill rig and the net operation is actually removing seismic mass of the conductors. Additionally, all of the main production tanks have be emptied and are out of service further reducing global mass.

Overall, the conductor removal program appears to be reasonable for both platforms. Additional detailing of the equipment layouts, laydown area with sleepers, and access/egress planning will be implemented as the equipment & operations are finalized.

Please call or email if you have questions or comments.

Regards,

RJ Beers jr

Rick Beers, PE

Gail Conductor Removal - Equipment Loads

OTS Equipment Spread

Qty	Description	Length (FT)	Width (FT)	Height (FT)	Actual Wt (LBS)	Direct Loading (PSF)	Effect Loading (PSF)	Comments
1	Control Cabin	12.00	8.00	9.50	18,960	198	115	
1	Spares Container	9.83	8.00	9.42	10,800	138	77	
2	High Pressure Water Pump	13.50	7.08	8.17	13,660	143	82	
1	Hydraulic Power Unit	5.42	2.83	4.75	1,760	115	36	
1	Tool Deployment Unit	7.75	3.67	8.42	1,540	55	21	
7*	Abrasive Container	9.83	8.00	8.50	19,400	247	137	
1	Hose Reel Unit	8.50	8.08	8.25	13,440	196	105	
2	Tool Basket	20.75	4.92	3.17	6,170	61	33	
1	Air Compressor	19.83	8.00	9.50	24,000	152	96	

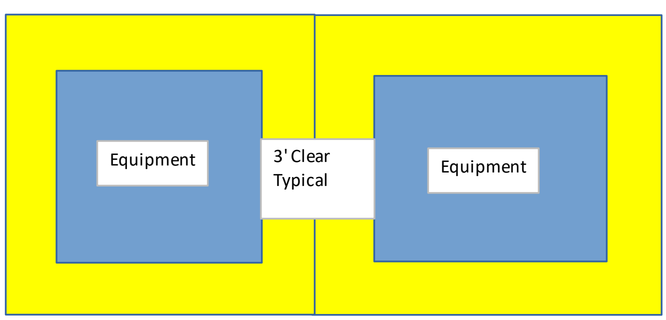
* Only 2 containers on the platform at a time. 5 are for transit/reload

GSI Equipment Spread

	Description	Length (FT)	Width (FT)	Height (FT)	Actual Wt (LBS)	Direct Loading (PSF)	Effect Loading (PSF)	Comments
1	36" DWS	7.50	5.00	2.67	1,500	40	18	w/ hyd. Clamp cut range 14"-36"
1	Hydraulic Power Unit	8.50	4.00	4.50	6,000	177	75	100hp 6k 20-21gpm
1	Dual Pin Drill	10.92	6.00	2.00	600	10	5	Drill range 3"-36"
1	Hydraulic Console	2.42	1.00	3.33	100	42	5	Console operates both tools
1	Tool Room	8.50	8.00	8.00	8,000	118	63	Contains all necessary tools and backup component for equip. package

Weatherford Equipment Spread

	Description	Length (FT)	Width (FT)	Height (FT)	Actual Wt (LBS)	Direct Loading (PSF)	Effect Loading (PSF)	Comments
1	Tool House	10.00	8.00		15,000	188	105	
1	Parts House	10.00	8.00		15,000	188	105	
1	HPU Engine Skid	15.00	8.00		22,500	188	114	Connect to pump
1	HPU Pump	6.00	8.00		21,000	438	212	Connect to engine
2	Air Compressor	6.00	6.00		4,000	112	49	(x2) two of these
1	Volume Tank	5.00	5.00		1,500	60	23	



L

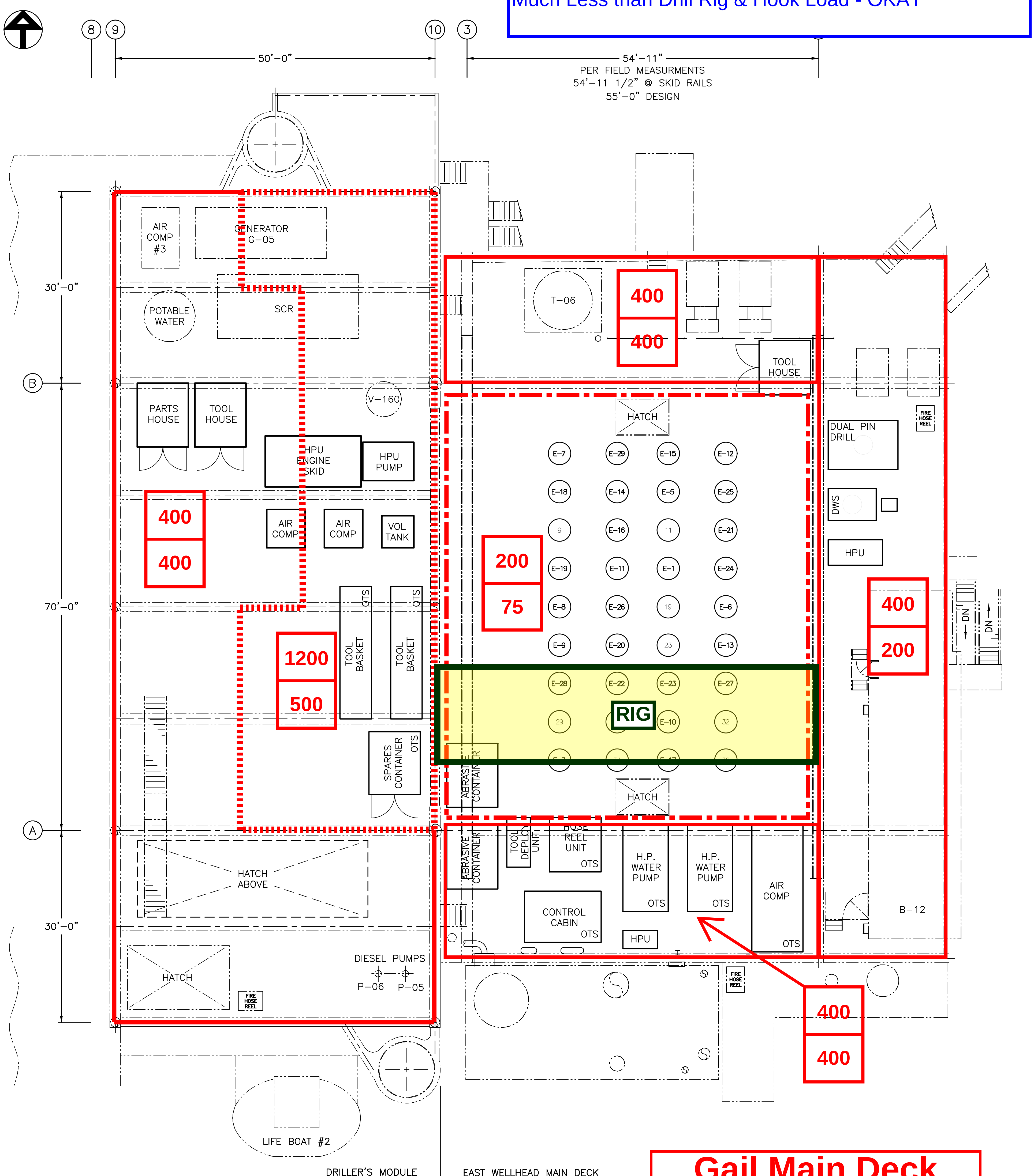
Assume most equipmenent has 3' clear minimum.
Direct Equipment psf = Wt/L*W

XXX	Local Allowable PSF
XXX	Girder/Global Allowable PSF

Conductor Removal Support Equipment
Gail conductor removal support equipment is relatively light as compared to a drilling program as Gail was designed for. All equipment is well with in the Allowable Load limits. See spreadsheet for details.

Caution: The load capacity on the actual well bay deck is limited. Only minimal loads permitted in this area.

Weatherford Rig
Weight = 230K
Pulling Capacity = 220K
Jacking Capacity = 600K
Much Less than Drill Rig & Hook Load - OKAY



Gail Main Deck

PLAN VIEW
SCALE: 1/8" = 1'–0"

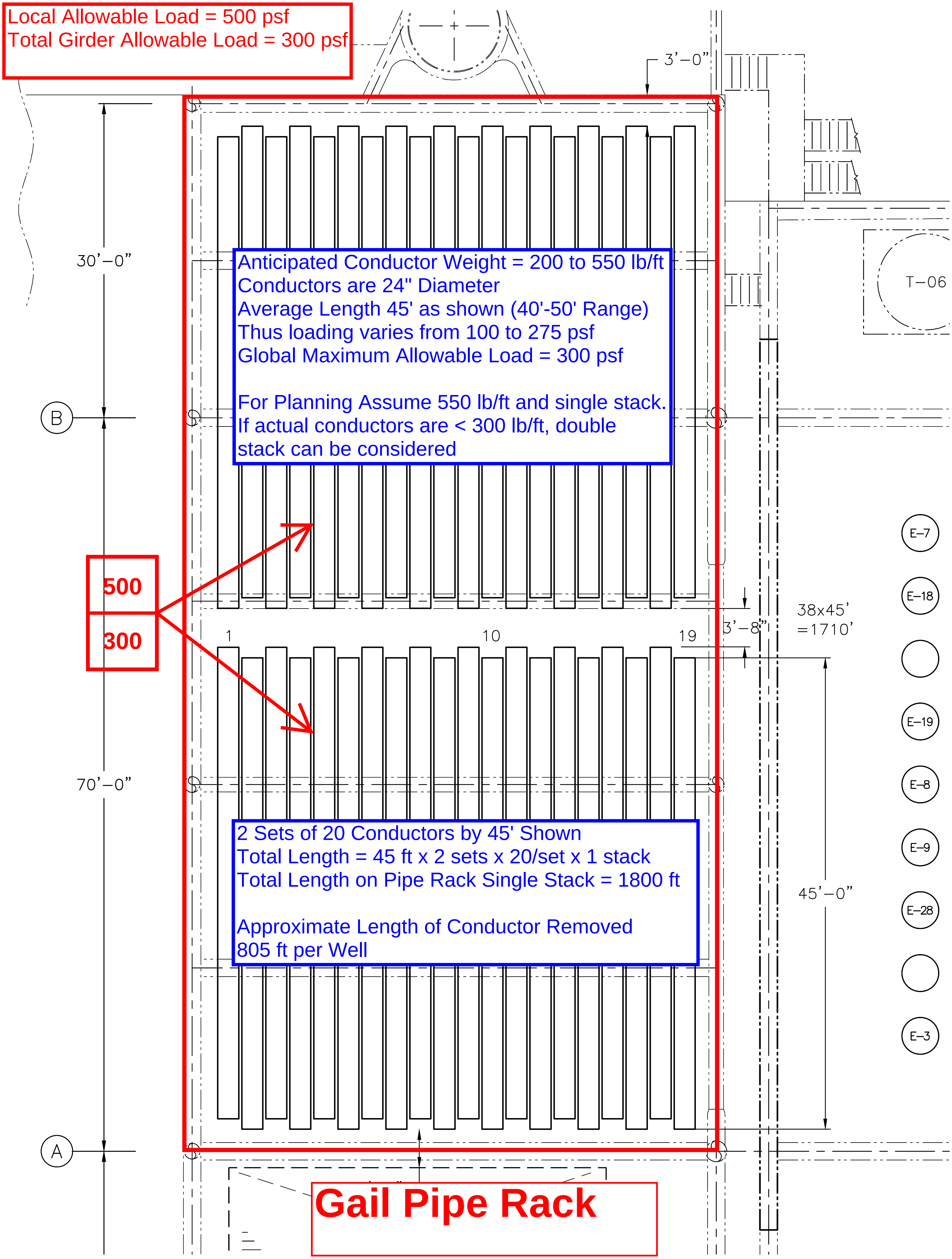
Rev	Date	Description	Rev By	Ckd By	App'd
A	11–09–20	ISSUED FOR REVIEW	RM	HL	RJB

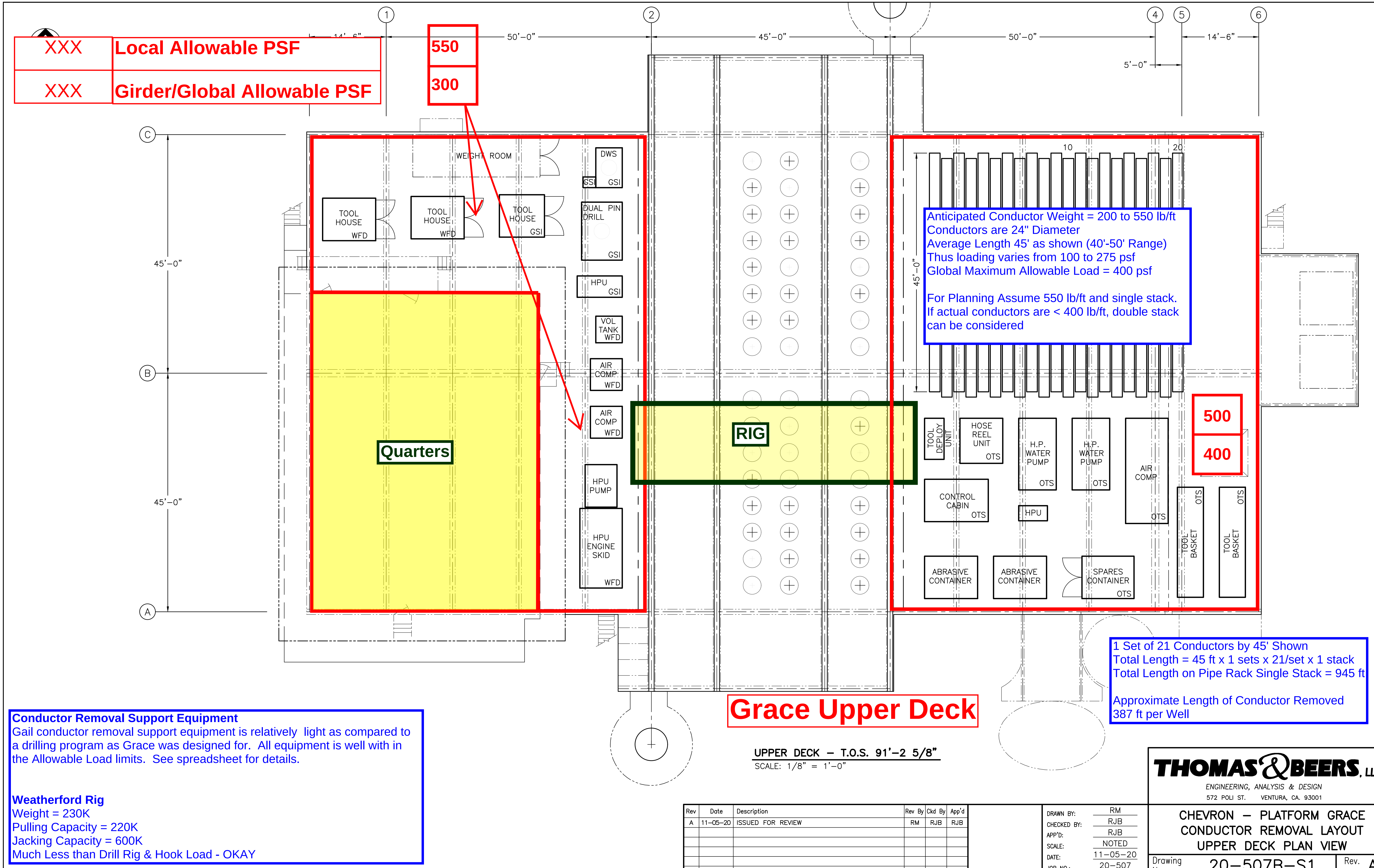
DRAWN BY:	RM
CHECKED BY:	HL
APP'D:	RJB
SCALE:	NOTED
DATE:	10–30–20
JOB NO.:	20–507

THOMAS & BEERS, LLC
ENGINEERING, ANALYSIS & DESIGN
572 POLI ST. VENTURA, CA. 93001

CHEVRON – PLATFORM GAIL
CONDUCTOR REMOVAL LAYOUT
EQUIPMENT PLAN VIEW

Drawing No. 20–507C–CR–S2 Rev. A


Local Allowable Load = 500 psf
Total Girder Allowable Load = 300 psf
3'–0"
30'–0"
T–06
Anticipated Conductor Weight = 200 to 550 lb/ft
Conductors are 24" Diameter
Average Length 45' as shown (40'-50' Range)
Thus loading varies from 100 to 275 psf
Global Maximum Allowable Load = 300 psf
For Planning Assume 550 lb/ft and single stack.
If actual conductors are < 300 lb/ft, double
stack can be considered
B
E–7
E–18
500
300
38x45'
=1710'
3'–8"
1
10
19
E–19
70'–0"
E–8
2 Sets of 20 Conductors by 45' Shown
Total Length = 45 ft x 2 sets x 20/set x 1 stack
Total Length on Pipe Rack Single Stack = 1800 ft
Approximate Length of Conductor Removed
805 ft per Well
E–9
45'–0"
E–28
E–3
A
Gail Pipe Rack



XXX Local Allowable PSF
XXX Girder/Global Allowable PSF
550
300
14'-6"
50'-0"
45'-0"
50'-0"
5'-0"
14'-6"
45'-0"
45'-0"
45'-0"
WEIGHT ROOM
DWS
GSI
GSI
TOOL HOUSE WFD
TOOL HOUSE WFD
TOOL HOUSE GSI
DUAL PIN DRILL GSI
HPU GSI
VOL TANK WFD
AIR COMP WFD
AIR COMP WFD
HPU PUMP
HPU ENGINE SKID WFD
Quarters
RIG
10
20
Anticipated Conductor Weight = 200 to 550 lb/ft
Conductors are 24" Diameter
Average Length 45' as shown (40'-50' Range)
Thus loading varies from 100 to 275 psf
Global Maximum Allowable Load = 400 psf
For Planning Assume 550 lb/ft and single stack.
If actual conductors are < 400 lb/ft, double stack can be considered
500
400
TOOL DEPLOY UNIT
HOSE REEL UNIT OTS
H.P. WATER PUMP OTS
H.P. WATER PUMP OTS
AIR COMP OTS
CONTROL CABIN OTS
HPU
ABRASIVE CONTAINER
ABRASIVE CONTAINER
SPARES CONTAINER OTS
TOOL BASKET OTS
TOOL BASKET OTS
1 Set of 21 Conductors by 45' Shown
Total Length = 45 ft x 1 sets x 21/set x 1 stack
Total Length on Pipe Rack Single Stack = 945 ft
Approximate Length of Conductor Removed
387 ft per Well
Grace Upper Deck
UPPER DECK – T.O.S. 91'-2 5/8"
SCALE: 1/8" = 1'-0"
Conductor Removal Support Equipment
Gail conductor removal support equipment is relatively light as compared to a drilling program as Grace was designed for. All equipment is well with in the Allowable Load limits. See spreadsheet for details.
Weatherford Rig
Weight = 230K
Pulling Capacity = 220K
Jacking Capacity = 600K
Much Less than Drill Rig & Hook Load - OKAY
Rev | Date | Description | Rev By | Ckd By | App'd
A | 11-05-20 | ISSUED FOR REVIEW | RM | RJB | RJB
DRAWN BY: RM
CHECKED BY: RJB
APP'D: RJB
SCALE: NOTED
DATE: 11-05-20
JOB NO.: 20-507
THOMAS & BEERS, LLC
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572 POLI ST. VENTURA, CA. 93001
CHEVRON – PLATFORM GRACE
CONDUCTOR REMOVAL LAYOUT
UPPER DECK PLAN VIEW
Drawing No. 20-507B-S1
Rev. A

Pulling and Jacking Unit – Heavy Duty (200/600)

The 200/600 Heavy Duty Pulling and Jacking Unit represent the Weatherford's state of the art system to address offshore intervention and well abandonment project needs. These systems have been designed to API 4F specifications and stamped accordingly. It utilizes innovative equipment, technologies and resources to safely and efficiently address the requirements and challenges associated with offshore operations. The design is mobile, has a small footprint, is lightweight compared to the pulling capacity of the hoisting equipment, and utilizes an innovative self-clamping skidding system to access multiple wells without the need to rig down any of the main system components. The pipe racking towers has an integrated gantry lifting system to handle and maneuver tubulars.

Pulling System

Pulling Capacity: 220,000 lbs
Pulling Stroke: 60 ft (nominal)
Max Operating Wind: 60 knots

The pulling system utilizes a single 30 ft. stroke hydraulic cylinder encapsulated within a telescoping mast. The hoisting cable system is connected to a load cell and rocker arm leveling system on one end and passes over a crown assembly. A swivel bail is utilized on the other end of the system with conventional links and an elevator. A power swivel is incorporated into the system for rotating tubulars.

Jacking System

Jacking Capacity: 600,000 lbs
Jacking Stroke: 5 ft

This system consists of a four cylinder jack with upper and lower split bowls and a false rotary jacking floor. The Jack is fully removable from the system to allow for quick repair / replacement if necessary.

Jacking Size: Up to 30" OD
(Up to 36" OD option available)

Racking System

Drill Pipe Size: up to 3-1/2 in. pipe
Length: up to 10,000 ft. pipe, Range 2
Weight: up to 160,000 lbs (80,000 lbs per side)

The Racking Towers are oriented on either side of the well and are joined by a gantry to help resist environmental loads and provide support during pipe handling. The gantry supports a trolley which can be used to assist the Derrickman in maneuvering tubulars into the storage position. Each row of pipe is contained with locking tabs. If necessary, provisions are included for racking a number of drill collars in the front of the Racking Tower (up to 4-3/4 in. OD).

Hydraulic Power Unit

Engine: 800 hp Cummins QSK-19
Hydraulic Capacity: 1,000 gallons
Diesel Capacity: 300 gallons (12 hour run time)
Pumps: 4 Pumps for Main Lifting System
Fluid: Enviro-Rite 46

The HPU system consists of an engine frame and pump frame which are coupled together on location with a removable driveshaft to minimize shipping weight and facilitate transport.

Riser and Main Beams

Beam Risers: 9 ft. high x 13 ft. wide
(10 ft. high x 13 ft. wide option available)
Main Beams: 54 ft. long x 51 in. high x 24 in. wide

Two Beam Risers are utilized to support the Main Beams and allow for clearance of the BOP stack. The Main Beams are positioned to provide a 5 ft. opening and allow clearance for the Annular. A Mezzanine Walkway traverses the outer sides of both Main Beams in order to allow easy access to mounting bolts for the above systems.

Power Swivel

Maximum Torque: 12,000 ft-lbs
Maximum Speed: 120 rpm

A Power Swivel can be supported by the pulling system and utilized for standard downhole operations including cutting, milling, reaming, washover and drilling.

Specification

Total Weight of Unit (w/o tubulars) on Platform Beams:	230,000 lbs
Total Weight on Main Beams:	145,000 lbs
Estimated Truck Loads to Transport:	16 each
Assembly / Disassembly Time:	72 hours
Hurricane Evacuation Time:	24 hours

GSI Equipment Spread

From: Beckmann, David <Beckmann@chevron.com>
Sent: Friday, October 30, 2020 12:30 PM
To: Eric Fontenot <efontenot@gulfstreamservices.com>
Cc: Scott Adams <scotta@gulfstreamservices.com>
Subject: equipment spread - weights and dimensions

Equipment for deck loading

Please populate for equipment anticipated on Grace Conductor removal operations – operational weight if this differs during operations such as fluid or solids tank etc.

I know I have requested emissions and other details – I'll be using this to get everything in one place!

Description	footprint	weight	Weight (operational)	comments
36" DWS	5ft w x 32" h x 7ft 6" l	1500#	1500#	w/ hyd. clamp cut range 14-36"
Hyd. Power Unit	4ft w x 4ft 6" h x 8ft 6" l	6000#	6000#	100hp 6k 20 -21 gpm
Dual Pin Drill	6ft w x 2ft h x 10ft 11" l	600#	600#	Drill Range 3" thru 36"
Hyd Console	1ft w x 3ft 4" h x 2ft 5" l	100#	100#	Console operates both tools
Tool Room	8ft w x 8ft h x 8ft 6" l	8000#	8000#	Contains all necessary tools and backup component for equipment package

On 10/30/20 10:44 AM, Beckmann, David wrote:

I just put below together for weatherford equip. do you have specifics on pulling unit from earlier discussions ?

I only have emissions specifications from the other contractors – just requested similar template for their equipment. Will send as soon as I get it from them!

Also – plan to use UWFHH-A9039-100 For SCU conductor removal support

Description	footprint	Weight (lbs)	Weight (operational)	comments
Tool house	10' x 8'	13,000	15,000	
Parts house	10' x 8'	13,000	15,000	
HPU engine skid	15' x 8'	22,500	22,500	Connect to pump
HPU Pump	6' x 8'	21,000	21,000	Connect to engine
Air comp	6' x 6'	4,000	4,000	(X2) two of these
Volume tank	5' x 5'	1,500	1,500	

David Beckmann
Decommissioning Engineer
CEMREC - Upstream Environmental Mgmt

100 Northpark Blvd
Covington, LA 70433
+1 985 246 0106

Weatherford Equipment Spread
Plus Rig

Offshore Technical Solutions
690 S. Hollywood Rd. Houma, LA 70360
T: 985-879-3212 • F: 985-879-3475
www.offshoretechnical.com

OTS Equipment Spread

Required Offshore Technical Solutions Equipment:

Qty	Description	Length	Width	Height	Actual Weight (LBS)
1	Control Cabin	12'	8'	9'6"	18,960
1	Spares Container	9'10"	8'	9'5"	10,800
2	High Pressure Water Pump	13'6"	7'1"	8'2"	13,660
1	Hydraulic Power Unit	5'5"	2'10"	4'9"	1,760
1	Tool Deployment Unit	7'9"	3'8"	8'5"	1,540
7	Abrasive Container	9'10"	8'	8'6"	19,400
1	Hose Reel Unit	8'6"	8'1"	8'3"	13,440
2	Tool Basket	20'9"	4'11"	3'2"	6,170
1	Air Compressor	19'10"	8'0"	9'6"	24,000

Only 2 containers on platform at a time. 5 are for transit/reload.

GAIL DRILL DECK ZONE CAPACITY STUDY FROM 2002

Appendix D:

Platform Gail
Deck Member Checks for Ancillary Drilling Loads
By
Thomas & Beers

THOMAS & BEERS

PROJECT VENOCO ENGINEER RB DATE 4/02
SUBJECT GAIL DRILLING FILE NO. 895 SHT. 01

LOCAL MEMBER CHECK FOR DRILLING EQUIP.

BASIC CAPACITIES OF DECK BEAMS

$M = \frac{wL^2}{8}$ SIMPLE SUPPORT

$M \sim \frac{wL^2}{10}$ MULTI SPAN $M \sim \frac{wL^2}{8}$ SKIP LOADS

$f_b = \frac{M}{S} < F_b = .66 F_y$

MATERIAL	F_y
C	50 ksi
E	36 ksi
F	36 ksi

SIMPLE SPAN A36

$f_b = \frac{M}{S} = \frac{wL^2/8}{S} < .66(36)$

$w = \frac{(P_{LL}+50)S_p}{1000}$

P_{LL} = LOAD (PSF) (LIVE LOAD)
S_p = BEAM SPACING (ft)
L = SPAN (ft)
S = SECTION MODULUS
50 ~ 50psf

$$\frac{\frac{(P_{LL}+50)S_p}{1000}\frac{L^2(12)}{(8)}}{S} < 23.76$$

THOMAS & BEERS

PROJECT VENOCO ENGINEER RB DATE 4/02

SUBJECT GAIL DRILLING FILE NO. 895 SHT. D2

CONT)

$$\frac{(P_{LL}+50)\,S_p\,L^2}{S} < 15{,}840$$

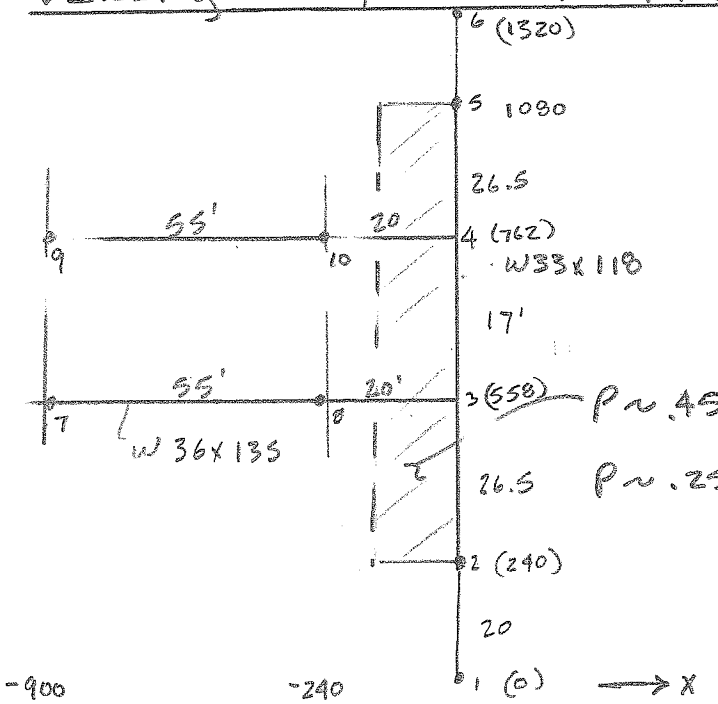
$$\underset{(psf)}{P_{LL}} < \frac{15840\,(S)}{L^2\,S_p} - 50$$

BEAM	(1) S (in³)	(2) L (ft)	(3) Sp (ft)	PLL (psf)	ZONE
W14X30	42	20'	3.75'	394 psf	EAST PERIMETER
W14X30	42	20'	3.33'	450 psf	EAST PERIMETER
W36X280	1030	55'	10'	489 psf	EAST (N) PERIM.
W33X118	359	26.4'	10'	765 psf	EAST (E) PERIM
(ROUGH → NEEDS 30 STUDY W/W36X135's)					
W14X34	48.6	26.4"	4.5'	195 psf	EAST WELL
W36X135	439	55'	22'	55 @ 50psf DL 75 @ 30 psf DL	EAST CENTER WELL
W16X40	64.7	17.5	2.5'	1289 psf	DRILL LOW
W14X22	29	17.5'	3.75	350 @ 50psf ~ 400 @ 30 psf + FIXITY	DRILL LOW
W36X300 GR50	1100	50	17.5	348 A36 483 GR50	DRILL LOW
W14X22	29	15	3.33	563 psf	DRILL LOW NORTH
W24X84	196	25	7.5	612 psf	DRILL LOW NORTH
W14X22	29	16.67	2.92	516 psf	DRILL HIGH
W24X76	176	17.5	16.67	496 psf	DRILL HIGH
W36X245	895	50	17.5	274 psf @50 ~ 300 psf @30	DRILL HIGH

THOMAS & BEERS

PROJECT: VENOCO	ENGINEER: RB	DATE: 4/02
SUBJECT: GAIL DRILLING	FILE NO. 895	SHT. D3

VERIFY 200 psf ON W33X118 EAST DECK



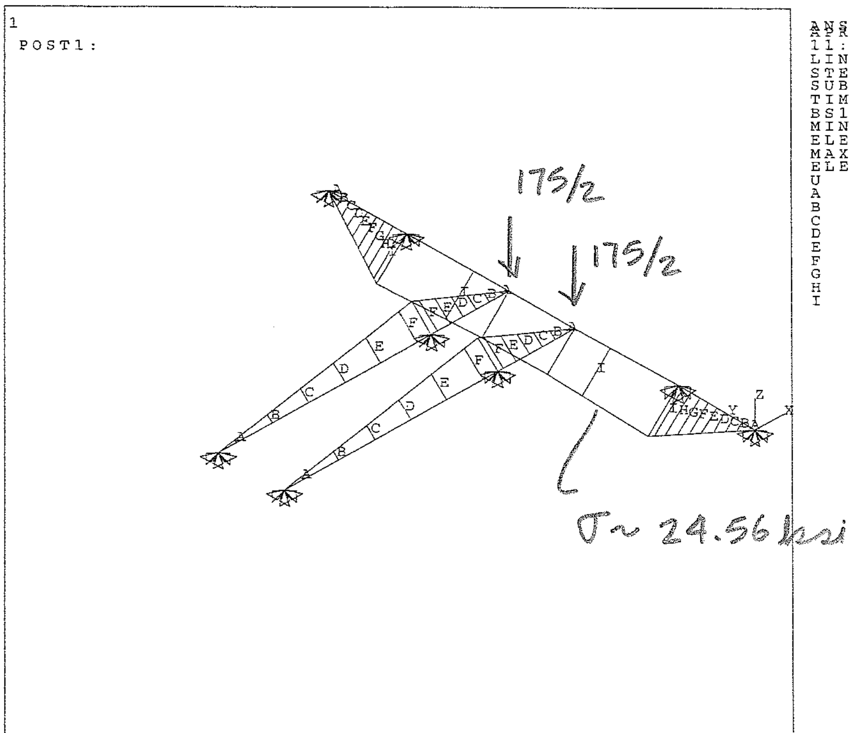
$P \sim .45(10)(70) = 315^K$ @ 400 psf

$P \sim .25(10)(70) = 175^K$ @ 200 psf

$\sigma \sim 44$ ksi @ 400 NG

$\sigma \sim 24$ ksi @ 200 OK

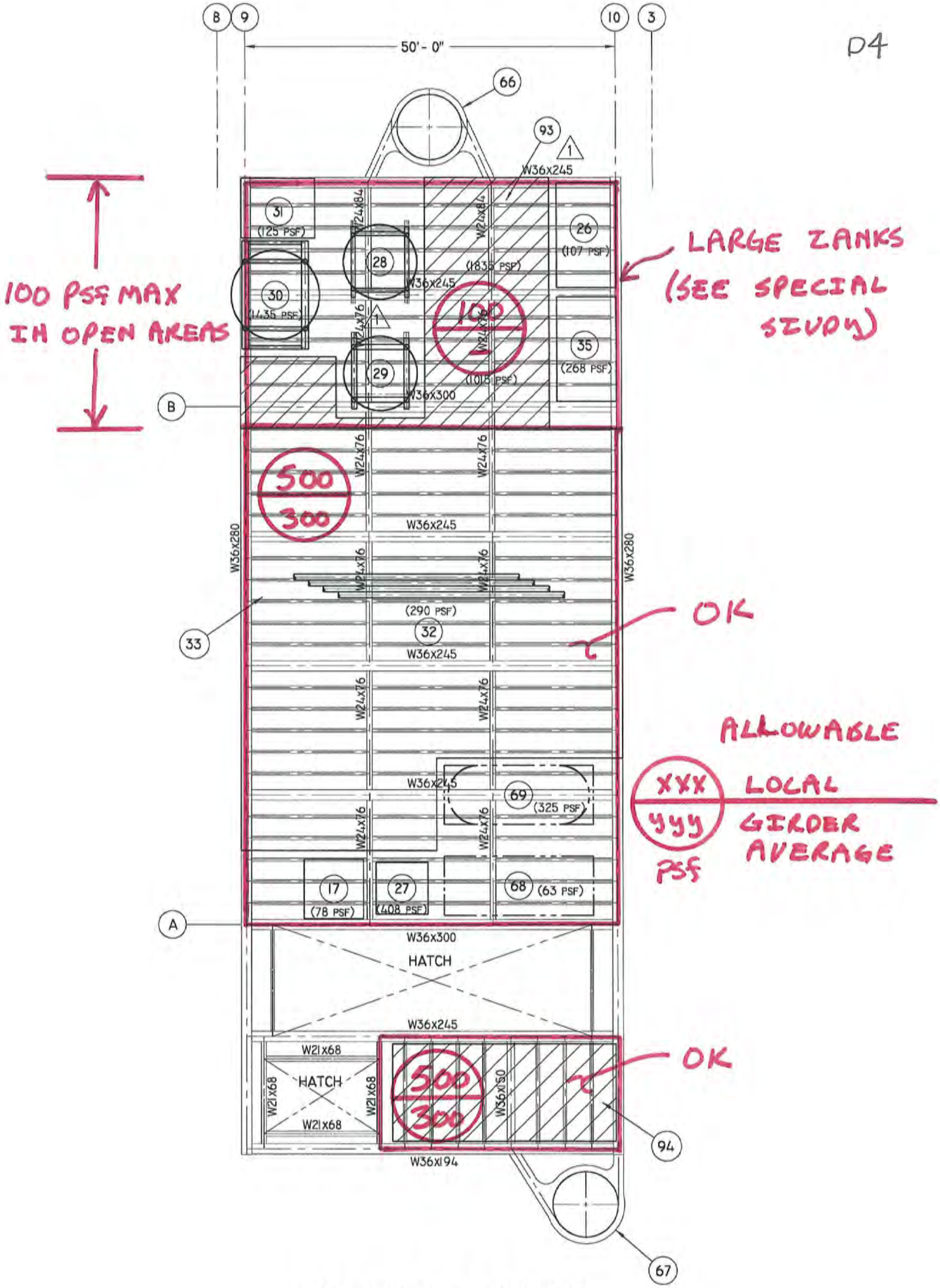
$\therefore$ W33 GOOD FOR 200 psf



Venoco Gail: Quick Check of W33x118 at East End of Drill Deck

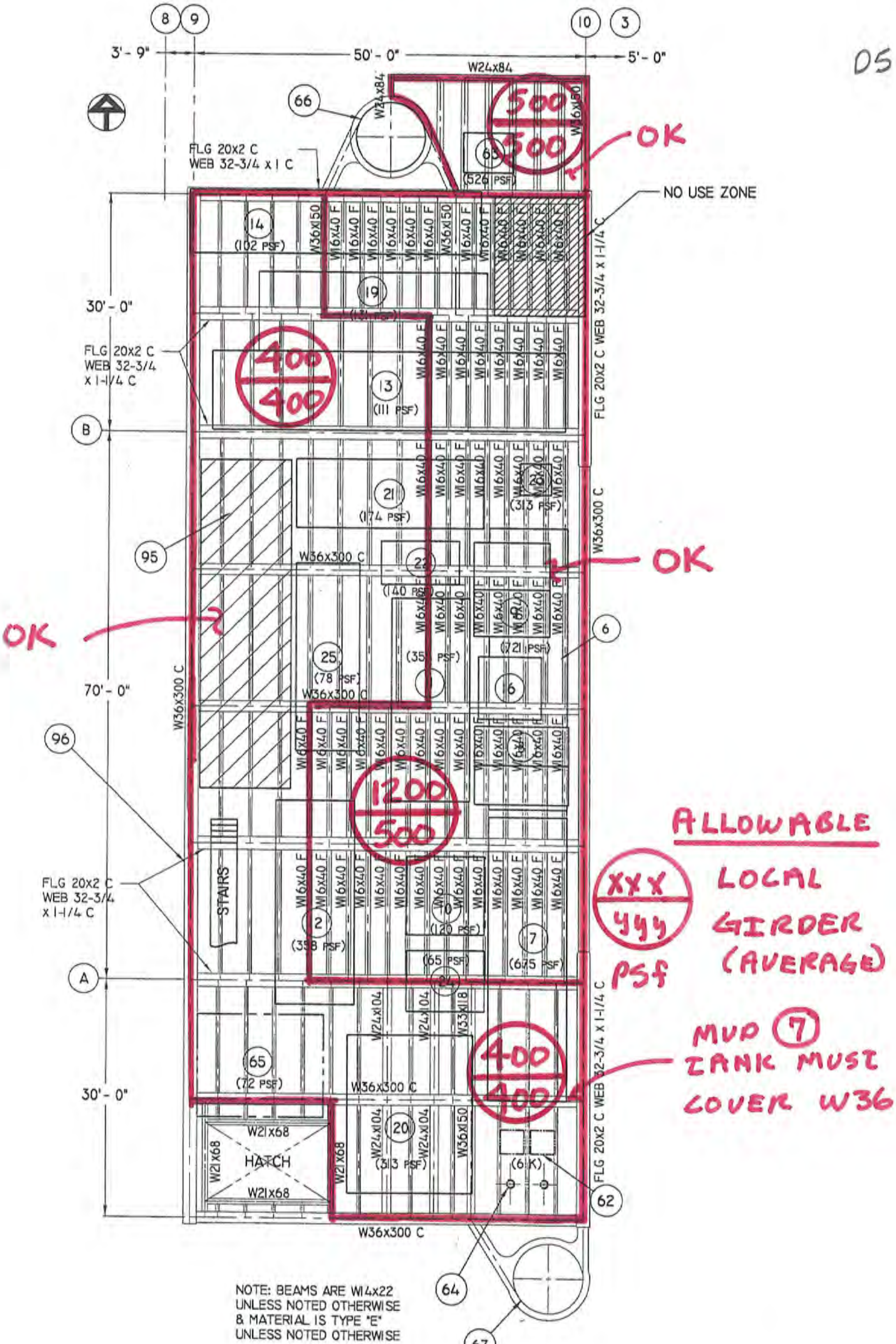
ANSYS 5.6
APR 25 2002
11:07:19
LINE STRESS
STEP=1
SUB =1
TIME=1
BS1MXI BS1MXJ
MIN =.822E-17
ELEM=9
MAX =26.008
ELEM=1
U
A =1.445
B =4.335
C =7.225
D =10.114
E =13.004
F =15.894
G =18.784
H =21.674
I =24.564

D4



PLATFORM GAIL ROOF FRAMING PLAN
T.O.S. = 104'- 6"
SCALE: 3/32"= 1'-0"

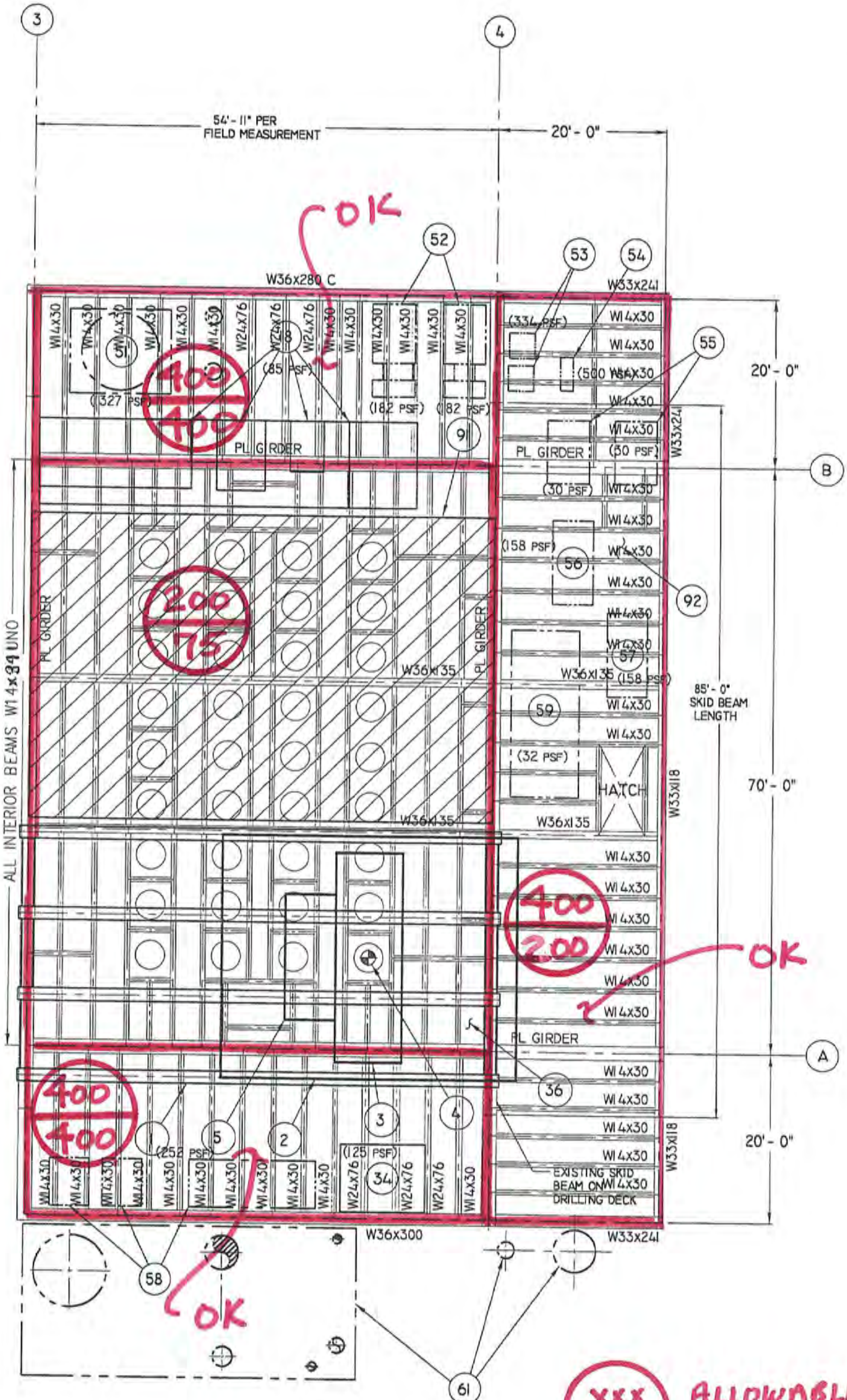
05



NOTE: BEAMS ARE W14x22
UNLESS NOTED OTHERWISE
& MATERIAL IS TYPE "E"
UNLESS NOTED OTHERWISE

PLATFORM GAIL FLOOR FRAMING PLAN
T.O.S. = 79'- 6 3/4"
SCALE: 3/32"= 1'-0"

06



PLATFORM GAIL MAIN DECK PLAN

T.O.S. = 76'- 6"

SCALE: 3/32"= 1'-0"

XXX / YYY	ALLOWABLE LOCAL
	ALLOWABLE GIRDER (AVERAGE)

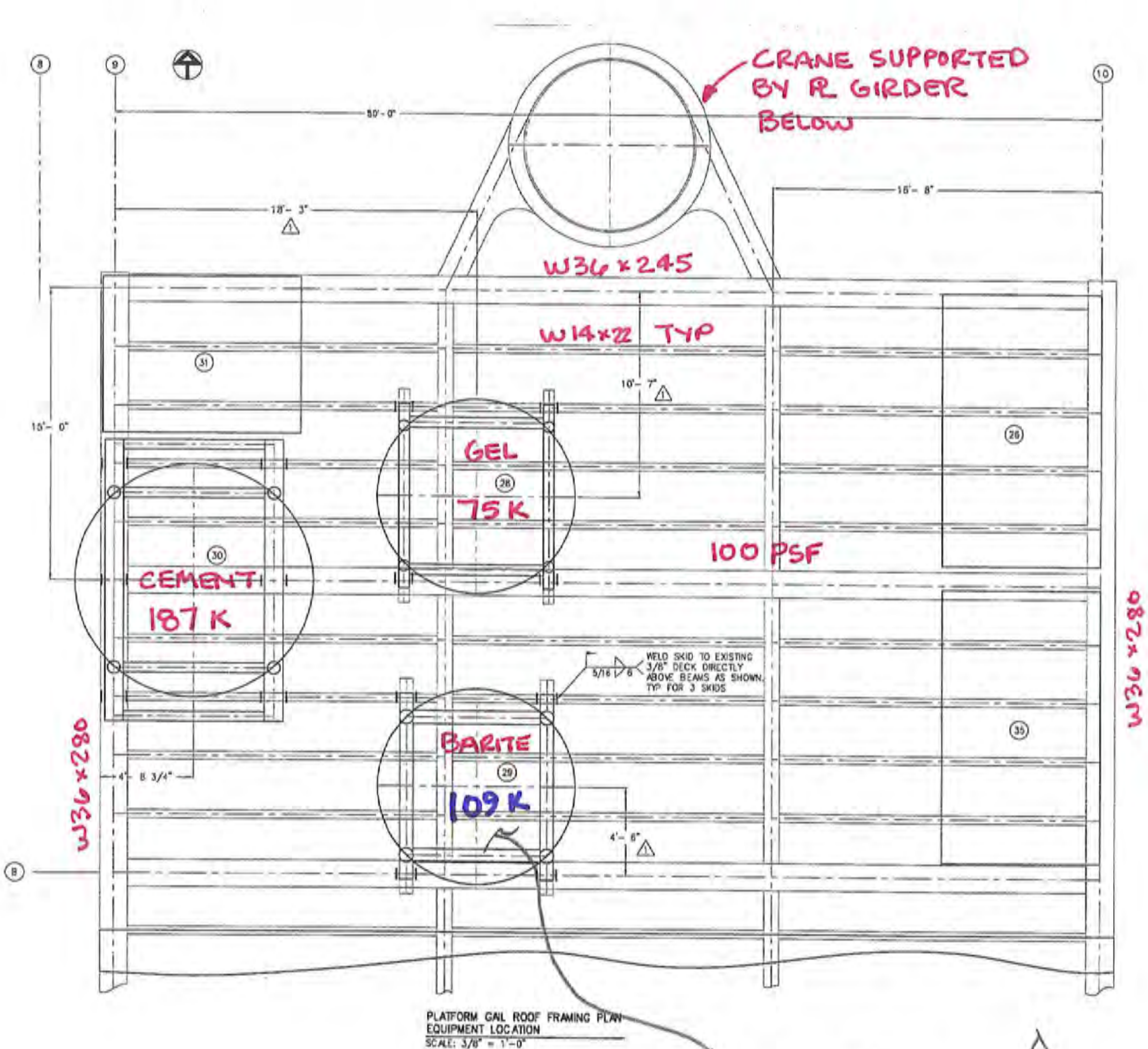
PSF

THOMAS & BEERS

PROJECT: VENOCO | ENGINEER: RB | DATE: 4/02

SUBJECT: GAIL DRILLING | FILE NO. 895 | SHT. D7

CEMENT GEL & BARITE TANKS



80% OF FULL

50×30' ZONE

FULL

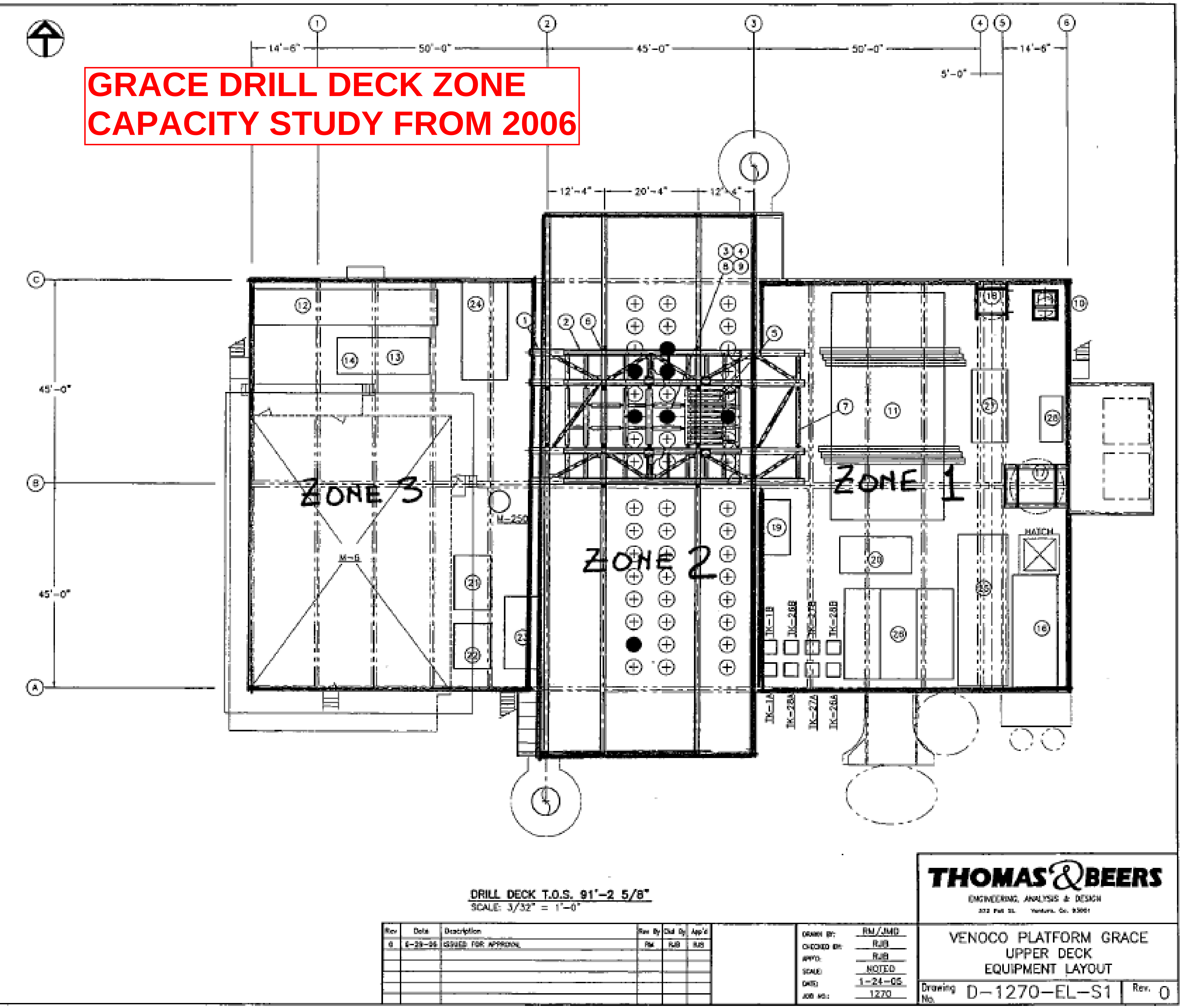
$W_{T,LL} = 187 + 136 + 75 + [50(30) - (8\times8) - (8\times8) - (14\times9)].1 = 522^K$

AVE LOAD ~ $\frac{522{,}000}{50(30)} = 348$ psf

DESIGN SPEC — 500 PSF ALLOWABLE ✓

LARGE LOCAL LOADS — CHECK W/MODEL

GRACE DRILL DECK ZONE CAPACITY STUDY FROM 2006



THOMAS & BEERS

PROJECT VENOCO - GRACE ENGINEER RB DATE 7/06
SUBJECT DECK BEAM CHECKS FILE NO. 1281 SHT. 01

UPPER DECK

GRACE DECK CHECKS ZONE 1 (ALLOWABLES)

W	SPACE	SPAN		ALLOWABLE LL. (APPROX)
W12x19	@ 3'	@ 14.5'	⇒	500 psf
W12x19	@ 3.1'	@ 13.33'	⇒	580 psf
W12x19	@ 3.0	@ 12.5'	⇒	690 psf

	SP	L		LL
W18x40	@ 6'-1"	@ 12.5	⇒	1000 psf +
W18x40	@ 9.8	@ 12.5	⇒	650 psf

	SP	L		LL
W36x150	@ 12.5	@ 45'	⇒	~350 w/o 3D EFFECTS OF W18x40 PIN/FIX
				~280 w/o "

w/3D EFFECTS ~400 psf

	SP	L		LL
W36x135	@ 45/2'	@ 25'	⇒	450 psf PIN-PIN
W36x230	@ 45'	@ 25'	⇒	425 psf PIN-PIN

ZONE 1 GOOD FOR 400 psf GIRDERS
500+ psf LOCALLY

THOMAS & BEERS

PROJECT VENOCO - PLATFORM GRACE	ENGINEER RB	DATE 7/06
SUBJECT DECK BEAM CHECKS	FILE NO. 1281	SHT. D 4

UPPER DECK

ZONE 2 ALLOWABLES

TRUSSES ONLY - CUSTOM

SPECIFICATION NO. E-3359
OCTOBER 15, 1976
SECTION NO. 2
PAGE 9

2.83 Drilling Substructure Skid Frame

Rig skid beams are designed for each drilling rig for the following loads:

Substructure load of 425 kips (including draw works, rotary table and mast) sub-base load of 100K, setback load of 333K kips and hook load of 600 kips + 300 kips hook impact, plus appropriate wind or earthquake resisting couples and shear. Loading distribution per Drawing GT-D-27758.

ITEM	DESIGN 1976 (FOR 2 RIGS)	2006 (1 RIG)
BASE	100K } 525K	115K } 515K
SUB STRUCTURE & MAST	425K	400K
HOOK	600	500
IMPACT	300	LOW
SET BACK	333K	300K

CONCLUSION: 1 RIG 2006 ≤ 1 RIG 1976 (DESIGNED FOR 2 RIGS)

ZONE 2: OKAY

THOMAS & BEERS

PROJECT VENOCO - PLATFORM GRACE	ENGINEER RB	DATE 7/06
SUBJECT DECK BEAM CHECKS	FILE NO. 1281	SHT. D 5

UPPER DECK

ZONE 3 ALLOWABLES

W12X19 @ $\frac{SP}{3.1}$ @ $\frac{L}{11.5}$ ⇒ 700 psf + (SEE ZONE 1)

W 18x40 @ 11.5 @ 12.5' ⇒ 550 psf

W 36 X 135 @ 12.5' @ 45' ⇒ 230 to 300 psf
P/P P/F
w/o W18 30 EFFECTS

ZONE 3 ⇒ 550 psf LOCAL
300 psf GIRDERS

CONCLUSION: ALL EQUIPMENT IN ZONE 3
WITHIN ALLOWABLE psf
SEE SPREADSHEET.

ZONE 3 OKAY (NEW EQUIPMENT)

Attachment B
Revised Biological Assessment

BIOLOGICAL ASSESSMENT

SANTA CLARA UNIT (PLATFORMS GRACE AND GAIL) CONDUCTOR CUTTING PROGRAM, OFFSHORE VENTURA COUNTY, CALIFORNIA

Project No. 2002-5111

Prepared for:

Chevron West Coast Decommissioning Program
3916 State Street, Suite 200
Santa Barbara, CA 93105

Prepared by:

Padre Associates, Inc.
1861 Knoll Drive
Ventura, California 93003

DECEMBER 2020

padre associates, inc.
ENGINEERS, GEOLOGISTS & ENVIRONMENTAL SCIENTISTS

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1.0 EXECUTIVE SUMMARY

The purpose of the Biological Assessment (BA) is to review the proposed Santa Clara Unit (Platforms Gail and Grace) Conductor Cutting Program (Project) in sufficient detail to determine to what extent the proposed action may affect any federally threatened, endangered or proposed species described in this document. This BA is prepared in accordance with legal requirements set forth under Section 7 of the Federal Endangered Species Act (FESA, 16 U.S.C. 1536(c)), and follows the standard established by the National Environmental Policy Act (NEPA) and FESA guidance.

The species considered in this document were based on information obtained from species list provided by National Marine Fisheries Service (NMFS), and the recorded U.S. Fish and Wildlife Service (USFWS) protected species within the Project area. The listed and proposed species are detailed in Table 3.0-1. Critical habitat has been designated for six of the 17 listed species included in this BA; however, there are no critical habitats within the Project area. Minimization and avoidance measures included in Section 5.0 (Applicant Proposed Mitigation Measures) will be initiated to ensure minimal impacts on marine species.

2.0 PROJECT DESCRIPTION

The following Biological Assessment (BA) has been prepared by Padre Associates, Inc. (Padre) on behalf of Chevron West Coast Decommissioning (Chevron WCD) for the Santa Clara Unit (Platforms Grace and Gail) Conductor Cutting Program (Project).

This BA was prepared per guidance within Section 7 of the Federal Endangered Species Act (FESA). Section 7 of the FESA requires that Federal agencies must consult with the United States Fish and Wildlife Service (USFWS) and/or the National Marine Fisheries Service (NMFS) that provide protection of Federally listed species and Federally designated Critical Habitats. The initial step in the consultation process is to acquire an official list of Federally Threatened and Endangered species that may occur in the proposed Project area, and/or may be affected by the proposed Project. A BA is required to be submitted prior to initiation of a consultation between Federal agencies when a listed species or Critical Habitat is present within the proposed action area where potentially impactful activities are proposed.

This BA provides information on the potential effects of the Project on Federally listed species and Federally designated Critical Habitat. Federally listed species discussed in this BA include species listed within the official species list provided by the NMFS on June 17, 2020 (NMFS, 2020) (Appendix A), information on listed species documented within the vicinity of the Project site based on a desktop review of Federal, State, and local resources/databases, and results of biological surveys conducted within the Project site.

2.1 PROPOSED ACTION

Chevron WCD proposes to remove the conductors at both Platforms Grace and Gail in accordance with BSEE requirements. The SCU facilities are located within Federal Outer Continental Shelf (OCS) waters and include Platforms Grace (OCS P-217) and Gail (OCS P-0205) (Figure 2.1-1). The Project proposes to cut the conductors 15 feet (ft) (4.5 meters [m]) below the seafloor and recover each conductor to the deck of the Platform. Prior to removal operations, the conductors will be cleaned of marine growth using divers with water jetting tools. In addition to diver operations, a water jetting ring will be attached to each conductor below the water line prior to jacking operations to continue removal of any attached marine growth on the lower sections of the conductor.

Abrasive material or mechanical cutting methods will be utilized to make the cuts from inside the conductor and through the outer casing(s). The abrasive material will be made up of Sharpshot© Iron Silicate Abrasives. The average initial conductor cut requires approximately 7 hours, or approximately 3,500 lbs. of material for abrasive material cutting methodology and twelve to twenty-four hours for the mechanical cutting methodology. Conductors will be recovered in multiple sections.

The cut conductor pipe will be pulled up to the Platform deck using a casing jack or hydraulic hoist and then placed onto the Platform staging area(s) to be cut into smaller segments utilizing a mechanical cutting tool. Topside cuts will require approximately 3 hours each once the conductors have been lifted from the seafloor.

The cut pipe will be stacked on the Platform deck and then transferred to the OSV *Adele Elise* or similar vessel for transport to SA Recycling in the Port of Long Beach (POLB) or brought to Port Hueneme for trucking to Standard Industries in Saticoy, Ventura County, California. Once all well conductors on Platform Grace are completed in 2021, the Platform equipment and support vessels will be demobilized and will return to complete well conductor removal activities on Platform Gail in 2023.

2.2 PROJECT SCHEDULE

The proposed activities, including mobilization and demobilization, are expected to take approximately 360 operational days to complete. Work at Platform Grace would take approximately 120 days (4 months), and removal at Platform Gail would take approximately 240 days (8 months). The conductor cutting and removal is targeted for at Platform Grace in the 3rd quarter of 2021, following completion of well Temporary Abandonment (TA) prior to final removal (anticipated to be completed by the 1st quarter of 2021) and all required environmental reviews and permitting. Conductor cutting and removal is targeted at Platform Gail in the 2nd through 3rd quarter of 2023, following completion of well TA and all required environmental reviews and permitting.

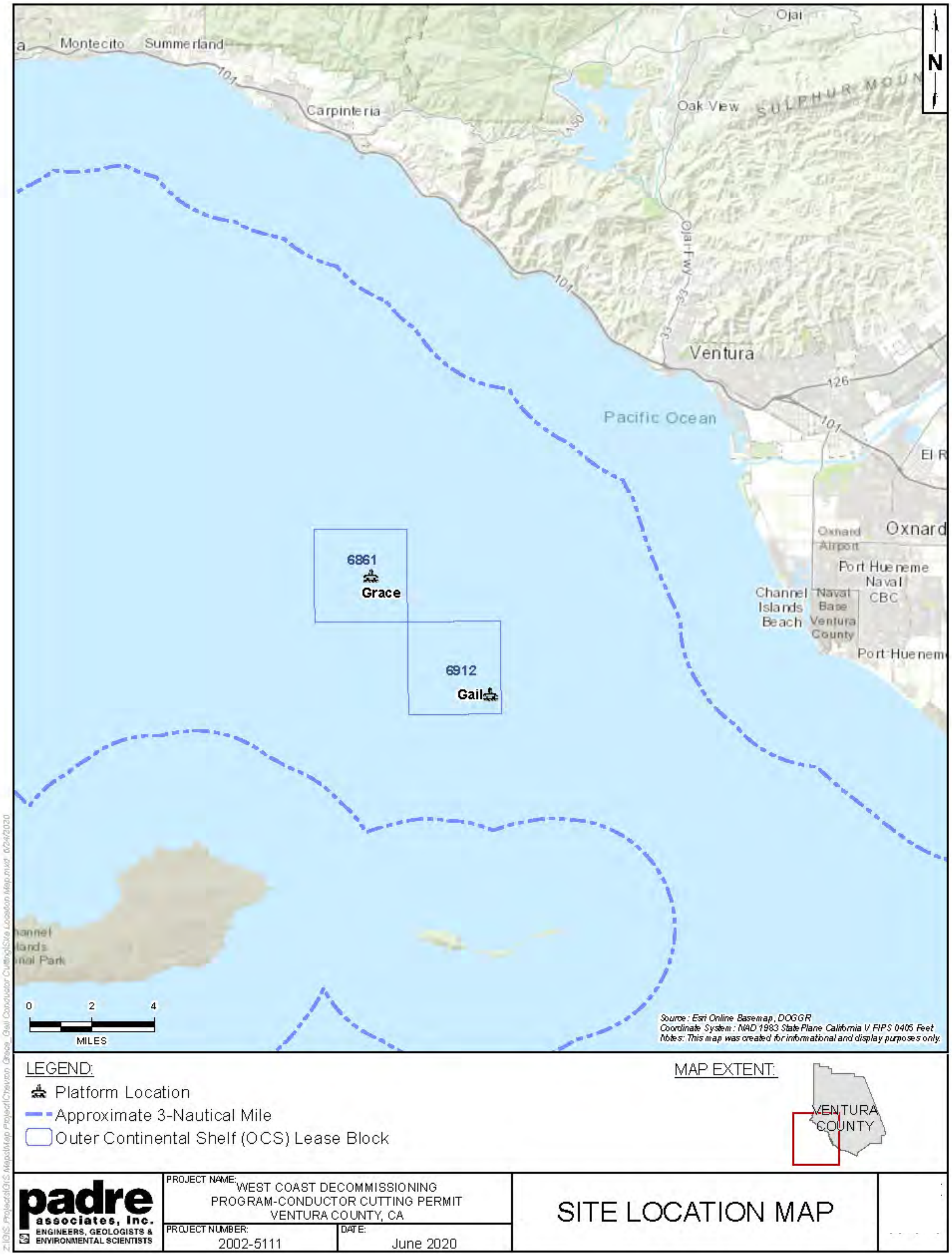

Figure 2.1-1 Project Location

3.0 SPECIES ACCOUNTS AND STATUS OF THE SPECIES IN THE ACTION AREA

Based on the species lists provided on the USFWS and NMFS websites and the known presence of threatened or endangered species in the area, an analysis of the range and habitat preferences of those species was conducted (USFWS, 2020; and NMFS, 2020) (Appendix C – NMFS Official Species List Correspondence; no threatened or endangered species list was generated when USFWS Information Planning and Consultation system [IPaC] was queried). Due to the over-water limits of the Project location and lack of terrestrial disturbance, the species descriptions in this section are confined to those listed species that have a potential to occur in the offshore Project area.

Table 3.0-1. Special Status and Protected Species Within or Near the Project Area and Their Likelihood of Occurrence within the Project Area

Common Name	Scientific Name	Status[1]	Likelihood to occur
INVERTEBRATES			
White abalone	*Haliotis sorenseni*	FE	Unlikely to Occur
Black abalone	*Haliotis cracherodii*	FE	Unlikely to Occur
FISH			
Green sturgeon – Southern DPS	*Acipenser medirostris*	FT	Unlikely to Occur
Oceanic whitetip shark	*Carcharhinus longimanus*	FE	Unlikely to Occur
Tidewater goby	*Eucyclogobius newberryi*	FT	Unlikely to Occur
Gulf grouper	*Mycteroperca jordani*	FE	Unlikely to Occur
Steelhead trout - Southern California Coast DPS	*Oncorhynchus mykiss*	FE	Unlikely to Occur
Scalloped hammerhead shark – Eastern Pacific DPS	*Sphyrna lewini*	FE	Unlikely to Occur
TURTLES			
Olive Ridley turtle	*Lepidochelys olivacea*	FT	Unlikely to Occur
Green turtle	*Chelonia mydas*	FT	Possible
Loggerhead turtle	*Caretta caretta*	FT	Possible
Leatherback turtle	*Dermochelys coriacea*	FE	Possible
BIRDS			
California least tern	*Sternula antillarum*	M, FP, FE, SE	Unlikely to Occur
Marbled murrelet	*Brachyramphus marmoratus*	M, FT, SE	Unlikely to Occur
Short-tailed albatross	*Phoebastria albatrus*	M, FE	Unlikely to Occur
MAMMALS			

Table 3.0-1. Special Status and Protected Species Within or Near the Project Area and Their Likelihood of Occurrence within the Project Area

Common Name	Scientific Name	Status[1]	Likelihood to occur
Cetaceans			
Blue whale	*Balaenoptera musculus*	FE	Possible
Fin whale	*Balaenoptera physalus*	FE	Possible
Humpback whale	*Megaptera novaeangliae*	FE	Possible
Northern right whale	*Eubalaena glacialis*	FE	Unlikely to Occur
Sei whale	*Balaenoptera borealis*	FE	Unlikely to Occur
Sperm whale	*Physeter macrocephalus*	FE	Possible
Killer whale	*Orcinus orca*	FE (Southern Resident Stock)	Unlikely to Occur
Pinnipeds			
Guadalupe fur seal	*Arctocephalus townsendi*	FT, ST	Possible

Status[1]
M = Protected under the federal Migratory Bird Treaty Act (MBTA)
FE = federally endangered SE = California State endangered FC= Federal Candidate for Listing
FT = federally threatened ST = California State threatened BCC = USFWS Bird of Conservation Concern

3.1 INVERTEBRATES

3.1.1 White Abalone (*Haliotis sorenseni*)

3.1.1.1 Status

Following the closure of the fishery for this species in 1996, the white abalone was listed as endangered in 2001. Critical habitat has not been designated (NMFS, 2018).

3.1.1.2 Range and Habitat

NMFS (2008) states that the white abalone is a deep-water mollusk, usually found in water depths from 80 to 200 ft (30 to 60 m), but can be found as shallow as 16 ft (5 m) and deep as 200 ft (60 m) making them the deepest occurring abalone species in California. White abalone are found in open low and high relief rock or boulder habitat that is interspersed with sand channels. Sand channels may be important for the movement and concentration of drift macroalgae and red algae, which white abalone are known to feed (NMFS, 2008). The historic range of white abalone extended from Point Conception, California to Punta Abreojos, Baja California. In the northern part of the California range, white abalone were reported as being more common along the mainland coast. In the middle portion of the California range, they were noted to occur more frequently at the offshore islands (especially San Clemente and Santa Catalina islands). At the southern end of the range in Baja California, white abalone were reported to occur more commonly along the mainland coast but were also found at a number of islands including Isla Cedros and Isla Natividad (NMFS, 2008).

3.1.1.3 Natural History

Because the white abalone broadcast spawns, relatively dense aggregations of adults are necessary for successful egg fertilization. Spawning in white abalone occurs in winter months, but sometimes extends into the spring. Eggs hatch within one day of fertilization, and after one or two weeks the free-swimming, larvae settle to the seafloor. White abalone grow to approximately 20 to 25 cm (5 to 8 in) in diameter (NMFS, 2008). Like all abalone, white abalone are herbivorous with the young feeding on diatoms and filamentous algae on the surface of the rock substrate. Adults depend on drift algae, especially deteriorating kelp. *Laminaria* spp. and *Macrocystis* spp. (brown algae) are believed to make up a large portion of the diet.

3.1.1.4 Population Trends

From 2002 to 2014, the abundance of white abalone is estimated to have declined by 76 percent. Population estimates contain a high degree of error, but the total estimated number of white abalone declined from 15,323 (±5,362) in 2002 to 3,375 (±1,396) in 2010 (NMFS, 2018).

3.1.2 Black Abalone (*Haliotis cracherodii*)

3.1.2.1 Status

The black abalone was listed as a federally endangered species in January 2009 and critical habitat was designated in November 2011 (NMFS, 2019). The closest segment of critical habitat for black abalone is the intertidal and subtidal habitats around Anacapa Island, approximately seven miles south of Platform Gail.

3.1.2.2 Range and Habitat

The black abalone is found in rocky intertidal and subtidal marine habitats from Point Arena to Bahia Tortugas, Mexico and it is rare north San Francisco, California. Black abalone generally inhabit coastal and offshore island intertidal habitats on exposed rocky shores where bedrock provides deep, protective crevices for shelter. Black abalone range vertically from the high intertidal zone to approximately 18-ft (6-m) water depth (NMFS, 2019).

3.1.2.3 Natural History

Adult black abalone prefer to feed on algae, both giant kelp (*Macrocystis sp.*) and feather-boa kelp (*Egregia menzisii*). It is believed that crustose coralline algae are an important component of juvenile settlement habitat, whereas drift macroalgae are important food resources for post-metamorphic juvenile and adult abalones (NMFS, 2019). Black abalone reach sexual maturity at a small size and fertilization is external within the water column. A one-inch abalone can spawn 10,000 eggs or more at a one time, while an eight-inch abalone spawn 11 million eggs. Fertilized eggs hatch into floating larvae that feed on plankton until their shells begin to form. When large enough, juvenile abalone will settle to the bottom, and they will further develop on rocky substrate when the habitat is suitable (Center for Biological Diversity, 2020).

3.1.2.4 Population Trends

The black abalone population along the California coast south of Monterey County, has been estimated to have declined as much as 95 percent (Argonne National Laboratory, 2019). Historical and ongoing threats include overfishing, habitat destruction, and more recently the disease of withering syndrome. Black abalone populations stabilized between 2011 to 2015; however, new abalone recruitment appears to be minimal in region (Argonne National Laboratory, 2019).

3.2 FISH

3.2.1 Green Sturgeon (*Acipenser medirostris*)

3.2.1.1 Status

Green sturgeon was listed as a federally threatened species in 2006 in the southern range or distinct population segment (DPS). It is also a California Department of Fish and Wildlife (CDFW) Species of Special Concern and a NMFS Species of Concern.

3.2.1.2 Range and Habitat

Green sturgeon is an anadromous species that inhabits nearshore marine waters from Mexico to the Bering Sea and enters bays and estuaries along the west coast of North America (Moyle et al. 1995). Juvenile green sturgeon have been collected in the San Francisco Bay up to the lower reaches of the Sacramento and San Joaquin rivers. Although the green sturgeon was historically found along the entire coast of California, studies suggest that the southern population of green sturgeon is primarily found to the north of the Sacramento River, and the NMFS has designated no critical habitat south of Monterey Bay (NMFS 2009, 2018g).

3.2.1.3 Natural History

Green sturgeon reach maturity around age 15 and can live to be 70 years old. Unlike salmon, they may spawn several times during their long lives, returning to their natal rivers every three to five years. Fish that spawn in the Sacramento, Feather, and Yuba River in California belong to the federally threatened southern DPS. During spawning runs, adult southern DPS fish enter San Francisco Bay between mid-February and early May and migrate rapidly up the Sacramento River. Spawning occurs in cool sections of the upper Sacramento River where there are deep, turbulent flows and clean, hard substrate. In the autumn, these post-spawn adults move back down the river and re-enter the ocean. After hatching, larvae and juveniles migrate downstream toward the Sacramento-San Joaquin Delta and estuary.

3.2.1.4 Population Trends

Harvest of adults likely resulted in direct declines in abundance and destruction of spawning and rearing habitats led to reduced population sizes and resilience. There are now regulations prohibiting harvest or take in effect. The most significant threats to green sturgeon likely relate to loss and inaccessibility of available spawning habitat which has contributed to the southern DPS' decline.

3.2.2 Oceanic Whitetip Shark (*Carcharhinus longimanus*)

3.2.2.1 Status

The oceanic whitetip shark was listed as a federally threatened species in January 2018. Critical habitat has not been designated for this species.

3.2.2.2 Range and Habitat

The oceanic whitetip shark is a pelagic species that is globally distributed and can be found in all ocean basins and epipelagic tropical and subtropical waters, along the edges of continental shelves, or around oceanic island in deep water. The oceanic whitetip shark appears to be thermally sensitive and exhibits a strong preference for the surface mixing layer in warm waters above 68 degrees Fahrenheit (20 degrees Celsius).

In terms of movement, the oceanic whitetip shark is considered to be a highly migratory species, with several satellite tracking studies measuring long distance movements. There is some evidence of site fidelity in the Atlantic Ocean; however, information on potential migratory corridors and seasonality in the eastern Pacific Ocean is lacking (NMFS, 2020).

3.2.2.3 Natural History

Similar to other carcharhinid species, the oceanic whitetip shark is viviparous (i.e., gives birth to live young) with placental embryonic development. Reproductive periodicity is thought to be biennial, with individuals giving birth on alternate years after a 10 to 12-month gestation period (NMFS, 2020). Litter sizes range from 1 to 14 (average of 6), and there is a positive correlation between female size and number of pups per litter, with larger sharks producing more offspring (NMFS, 2020).

3.2.2.4 Population Trends

Although oceanic whitetip sharks are not directly targeted by commercial fisheries, they are incidentally caught as bycatch in a number of fisheries throughout their range and are most susceptible to industrial longline fisheries. Oceanic whitetip sharks are also prevalent in the international fin trade, which has likely contributed to the significant declines of the species throughout its range.

3.2.3 Tidewater Goby (*Eucyclogobius newberryi*)

3.2.3.1 Status

Tidewater goby is a federally listed endangered fish and CDFW Species of Special Concern. Critical Habitat was designated for the species in February 2013 and is located in several lagoons and river mouths along the coast of California.

3.2.3.2 Range and Habitat

The species historically occurred in lagoons, estuaries, backwater marshes, and freshwater tributaries from approximately 3 miles (5 km) south of the California-Oregon border to 44 miles (71 km) north of the United States-Mexico border They occur in coastal streams that create deposition berms that dam the mouths of the estuaries for the majority of the year. Tidewater goby are not expected to occur around the deep water Platforms; however, they are reported to occur within several creeks and lagoons along the coastline adjacent to the vessels' traffic routes, including the Ventura River, the Santa Clara River mouth, J Street Drain south of Port Hueneme, Mugu lagoon at the mouth of Calleguas Creek, and Malibu Creek and lagoon. Critical Habitat for tidewater goby is present within the Ventura and Santa Clara Rivers.

3.2.3.3 Natural History

Tidewater gobies are small fish rarely exceeding 2.0 inches (5.1 centimeters) in length with life stages most commonly found in waters with low salinities of less than 10 to 12 parts per thousand (ppt); however, it has been collected in water as high as 63 ppt. Tidewater goby are short-lived species; the lifespan of most individuals appears to be about one year. The tidewater goby has been documented to spawn in every month of the year except December with peak reproduction in late May to July. The tidewater goby feeds mainly on macroinvertebrates such as mysid shrimp, ostracods, and other aquatic insects such as midge larvae. The eggs of the tidewater goby are laid in burrows excavated by the male fish. The male tidewater goby remains in the burrow to guard the eggs that are attached to the burrow ceiling and walls. The male individual rarely leaves the burrow, if ever, to feed until after the eggs hatch in 9 to 11 days.

USFWS provides primary constituent elements (PCE) which are habitat characteristics that are required to sustain the species' life-history processes. For tidewater gobies these PCEs include: (a) Persistent, shallow (in the range of approximately 0.3 to 6.6 feet (0.1 to 2 m), still-to-slow-moving, lagoons, estuaries, and coastal streams ranging in salinity from 0.5 ppt to about 12 ppt; (b) substrates (sand, silt, mud) suitable for the construction of burrows for reproduction; (c) submerged and emergent aquatic vegetation that provides protection from predators and high flow events or (d) the presence of a sandbars across the mouth of a lagoon or estuary during the late spring, summer, and fall that closes the lagoon or estuary to provide stable water conditions (USFWS, 2011). These PCEs do not occur within the Project area.

3.2.3.4 Population Trends

The tidewater goby is thought to have occurred in as many as 124 different locations during recent decades, but currently can be found in only about 96 of those historic locations, and only about 54 of those 124 populations are thought to be secure at this time. Rivers and streams within Santa Barbara, Ventura and Los Angeles counties (i.e, Mission Creek, Ventura River, Santa Clara River, Malibu Creek and lagoon) have recorded variable populations since the 1990's (CNDDB, 2020).

3.2.4 Gulf Grouper (*Mycteroperca jordani)*

3.2.4.1 Status

The gulf grouper was listed as a federally endangered species in October 2016. Critical habitat has not been designated for this species.

3.2.4.2 Range and Habitat

Gulf grouper are found throughout the Gulf of California and the subtropical eastern Pacific Ocean from La Jolla, California, to Mazatlán, Sinaloa, Mexico. They are naturally rare north of Bahia Magdalena in southern Baja California (NMFS, 2015). Young groupers inhabit shallow, coastal habitats, such as mangroves and estuaries. Adult gulf grouper are mainly found around rocky reefs, underwater mountains, and kelp beds. They inhabit waters 16 to 100 feet (5 to 30 meters) deep during the summer months.

3.2.4.3 Natural History

Gulf grouper live for up to 48 years. Female gulf grouper become sexually mature when they are 6 years old. Gulf grouper are also likely protogynous hermaphroditic, which means that they mature as females and later transition into males. Adult gulf grouper gather in large groups to reproduce once per year. They gather at reefs and underwater mountains and form spawning aggregations from April to June.

3.2.4.4 Population Trends

Due to the direct harvest of this species, their populations have declined to less than one percent of their historical levels (NMFS, 2015).

3.2.5 Steelhead - Southern California Coast DPS (*Oncorhynchus mykiss irideus)*

3.2.5.1 Status

Southern Steelhead is a federally listed endangered species. Steelhead have been divided into 15 evolutionary significant units (ESU) based on similarity in life history, location, and genetic markers. The southern California ESU was listed as endangered by the NMFS on October 17, 1997. Critical habitat was designated for the species in September 2005 and includes the South Coast (3315), Ventura River (4402), and Santa Clara-Calleguas (4403) Hydrologic Units which are along the mainland adjacent to the Project area.

3.2.5.2 Range and Habitat

Steelhead are an anadromous form of rainbow trout that reproduces in freshwater but spends much of its life cycle in the ocean, where increased prey density provides a greater growth rate and size. Southern California DPS steelhead are known to occupy rivers and creeks within Santa Barbara, Ventura and Los Angeles counties which are divided into biogeographic populations groups (BPGs) including the Conception Coast, Monte Arido Highlands, Santa Barbara Coast, and Santa Monica Mountains BPGs. The Ventura and Santa Clara Rivers, Rincon and Carpinteria Creeks are the nearest documented occurrence of Southern California steelhead to the Project area.

3.2.5.3 Natural History

Steelhead make spawning runs into rivers and small creeks flowing into the ocean. In general, adult steelhead return to rivers and creeks in the region from October to April. Spawning takes place in the rivers from December to April with most spawning activity occurring between January and March. Juvenile steelhead can spend up to seven years in freshwater before moving downstream as smolts from March to May (Busby et al., 1996). Steelhead can spend up to three years in saltwater before returning to freshwater to spawn (Barnhardt, 1986). Because juvenile steelhead remain in the creeks year-round, adequate flows, suitable water temperatures, and an abundant food supply are necessary throughout the year in order to sustain steelhead populations. The most critical period is in the summer and early fall when these conditions become limiting.

The ocean phase of steelhead has not been studied extensively, though marine migration studies of other species of *Oncorhynchus* have encountered only isolated specimens of *O. mykiss* and as a result it is believed that the species does not generally congregate in large schools like other Pacific salmon of the genus *Oncorhynchus* (NMFS, 2012). Consequently, the movement patterns of steelhead at sea are poorly understood. Some anadromous salmonids have been found in coastal waters relatively close to their natal rivers, while others may range widely in the North Pacific (NMFS, 2012).

3.2.5.4 Population Trends

Stocks have declined substantially from their historic numbers. Annual run data in southern California report small (less than 10 fish) but consistent annual runs of anadromous steelhead with resident steelhead trout potentially being necessary for the continued survival of the ESU (Williams et al., 2011).

3.2.6 Scalloped Hammerhead Shark - Eastern Pacific DPS (*Sphyrna lewini)*

3.2.6.1 Status

The scalloped hammerhead shark was listed as a federally endangered species in September 2014. Critical habitat has not been designated for this species.

3.2.6.2 Range and Habitat

Scalloped hammerhead sharks can be found in coastal warm temperate and tropical seas worldwide. They occur over continental and insular shelves, as well as adjacent deep waters, but are seldom found in waters cooler than 71 degrees Fahrenheit (22 degrees Celsius) (NMFS, 2015). NMFS found that there are no marine areas within the jurisdiction of the United States that meet the definition of critical habitat for the Eastern Pacific DPS (Argonne National Laboratory, 2019).

3.2.6.3 Natural History

Both juveniles and adult scalloped hammerhead sharks occur as solitary individuals, pairs, or in schools. The schooling behavior has been documented during summer migrations off the coast of South Africa as well as in permanent resident populations, like those in the East China Sea. The scalloped hammerhead shark is a high trophic-level predator and opportunistic feeder with a diet that includes a wide variety of teleosts, cephalopods, crustaceans, and rays (NMFS, 2015). Scalloped hammerhead sharks are viviparous (i.e., give birth to live young), with a gestation period of nine to 12 months, which may be followed by a one-year resting period (NMFS, 2014). Females attain maturity around 78 to 98 inches (200 to 250 centimeters) while males reach maturity at smaller sizes (range 50 to 78 inches [128 – 200 centimeters]; however, the age at maturity differs by region.

3.2.6.4 Population Trends

Systematic monitoring of population abundance does not exist for the Eastern Pacific DPS of the scalloped hammerhead. The most recent assessment described the global population as decreasing at a median of 76.9 to 97.3 percent, with the highest probability of greater than 80 percent reduction over three generation lengths (NMFS, 2019).

3.3 MARINE BIRDS

3.3.1 California Least Tern (*Sternula antillarum*)

3.3.1.1 Status

The California least tern was listed as a federally endangered species in 1970 (Frost, 2016). No critical habitat has been designated.

3.3.1.2 Range and Habitat

California least terns live along the coast from San Francisco to northern Baja California and migrate from the southern portion of their range to the north. Least terns begin arriving in southern California as early as March and depart following the fledging of the young in September or October (Frost, 2017). In Ventura County there are four breeding colonies of least terns: Ormond Beach, Hollywood Beach, Santa Clara River/McGrath State Beach and Point Mugu, which has the most recorded nesting pairs and successful fledglings in the County (Frost, 2017).

3.3.1.3 Natural History

This species nest in colonies and utilize the upper portions of open beaches or inshore flat sandy areas that are free of vegetation. The typical colony size is 25 pairs. Most least terns begin breeding in their third year, and mating begins in April or May. The nest consists of a simple scrape in the sand or shell fragments and typically there are two eggs in a clutch. Egg incubation and care for the young are accomplished by both parents. Least terns can re-nest up to two times if eggs or chicks are lost early in the breeding season. California least terns forage for small epipelagic fish (anchovy, atherinids, and shiner surfperch) primarily in near shore ocean waters and in shallow estuaries. Least terns dive to capture small fish and require clear water to locate their prey that is found in the upper water column in the nearshore ocean waters (Frost, 2017; USFWS, 2006).

3.3.1.4 Population Trends

The species' population has increased from 600 in 1973 to roughly 7,100 pairs in 2005. The number of California least tern sites has nearly doubled since the time of listing (USFWS, 2006).

3.3.2 Marbled murrelet (*Brachyramphus marmoratus*)

3.3.2.1 Status

The marbled murrelet was listed as a federally threatened species in 1992. It is also a California state-listed endangered species. Critical habitat was designated in 1996 North of Monterey, but none in the Project area (USFWS, 1997).

3.3.2.2 Range and Habitat

Historically, the marbled murrelet was common from Monterey, California to southern Oregon. This small sea bird spends most of its life in the nearshore marine environment, but nests and roosts inland in low-elevation old growth forests, or other forests with remnant large trees. Nesting generally occurs in the marine fog belt within 25 mi (40.2 km) of the coast in coast redwood, Douglas fir, western red cedar, western hemlock, and Sitka spruce. The species nests from Washington to central California (Monterey Bay area). This bird is rare in southern California and is only found in the non-breeding season (late fall, winter, and early spring) in Ventura County (USFWS, 1997).

3.3.2.3 Natural History

Marbled murrelets nest in old-growth forests, approximately 50 miles (80 kilometers) inland, characterized by large trees, a multistoried stand, and moderate to high canopy closure. Nesting season for this species is late March to late September; downy young, and fledged juveniles have been observed June to September. Activity in forest nesting areas is highest from mid-April through late July in California and Oregon. Clutch size is one and incubation lasts about 30 days. Murrelet's primarily feed in nearshore marine waters and their diet includes fishes (sandlance, capelin, herring, etc.), crustaceans (mysids, euphausiids), mollusks (USFWS, 1997).

3.3.2.4 Population Trends

Monitoring surveys conducted between 2000 and 2013 estimated 19,700 birds are present in the Northwest Forest Planning Area. Studies recorded linear declines in murrelet populations in the Washington nesting areas but found no evidence of declining populations in Oregon or California conservation areas (Falxa et al., 2016).

3.3.3 Short-tailed Albatross (*Diomedea albatrus*)

3.3.3.1 Status

The Short-tailed albatross was listed as a federally endangered species in 2000 (USFWS, 2008). No critical habitat has been designated.

3.3.3.2 Range and Habitat

As of 2008, 80 to 85 percent of the known breeding short-tailed albatross use a single colony, Tsubamezaki, on Torishima Island in Japan. The remaining population nests on other islands surrounding Japan. During the non-breeding season (July through October), short-tailed albatross range along the Pacific Rim from southern Japan to northern California, primarily along continental shelf margins (USFWS, 2008).

3.3.3.3 Natural History

Nests consist of a divot on the ground lined with sand and vegetation with eggs hatch in late December and January. The diet of this species is not well studied; however, research suggests at sea during the non-breeding season that squid, crustaceans, and fish are important prey (USFWS, 2008). Short-tailed albatross spend much of their time feeding along the continental shelf-break areas in water depths between 656 to 3,280 ft (200 to 1,000 m). The marine environment most heavily used by short-tailed albatross includes areas characterized by upwelling and high productivity, specifically along the northern edge of the Gulf of Alaska, along the Aleutian Island Chain, and along the Bering Sea shelf break; however, juvenile albatross have been recorded migrating to the northern coast of California (USFWS, 2008).

3.3.3.4 Population Trends

The worldwide estimate, including both Torishima and Minami-kojima breeding colonies, is 1,114 breeding adults and 1,292 subadult short-tailed albatross.

3.4 TURTLES

3.4.1 Green Turtle (*Chelonia mydas*)

3.4.1.1 Status

The East Pacific distinct population segment (DPS) was listed as Federally threatened on April 2016. Critical habitat has been designated for the species in Puerto Rico, but none in the Project area (NMFS, 2015a).

3.4.1.2 Range and Habitat

Green turtles occur worldwide and are generally found in tropical and subtropical waters along continental coasts and islands between 30 degrees North and 30 degrees South. In the eastern North Pacific, green turtles have been sighted from Baja California to southern Alaska, but most commonly occur south of San Diego (NMFS, 2015a). In Southern California, there are two known colonies near the warm water outfalls from power plants: In San Diego Bay and in Orange County near the San Gabriel River (Argonne National Laboratory, 2019).

3.4.1.3 Natural History

Green turtles can weigh 300 to 350 pounds (lbs) (135 to 160 kilograms [kg]) and are three feet (one meter) in length. They are herbivorous, feeding primarily on algae and sea grasses. Nesting season varies depending on location, but in the southeastern U.S., females generally nest in the summer between June and September; peak nesting occurs in June and July. The Project area is not within the breeding range of the green sea turtle; however, green turtles are often seen foraging in coastal waters during summer months. The green sea turtle is usually seen in El Nino years when ocean temperatures are warmer than normal (Argonne National Laboratory, 2019).

3.4.1.4 Population Trends

Recent minimum population estimates for green turtles indicate that at least 20,112 individuals are known to occur in the eastern Pacific (NMFS, 2015a).

3.4.2 Loggerhead Turtle (*Caretta caretta*)

3.4.2.1 Status

The loggerhead was first listed as endangered throughout its range on July 28, 1978. In September 2011, NMFS and USFWS listed nine DPS of loggerhead turtles under the FESA. At that time, the North Pacific loggerhead turtle DPS was Federally listed as an endangered species (NMFS, 2011). Critical habitat is designated along the U.S. east coast for the Northwest Atlantic Ocean DPS. No critical habitat has been designated for the North Pacific DPS (NMFS, 2011).

3.4.2.2 Range and Habitat

Loggerheads are circumglobal, occurring throughout the temperate and tropical regions of the Atlantic, Pacific, and Indian Oceans. Loggerheads are the most abundant species of sea turtle found in coastal waters. Within the North Pacific, loggerhead nesting has been documented only in Japan, although low level nesting may occur outside of Japan in areas surrounding the South China Sea. In the South Pacific, nesting beaches are restricted to eastern Australia and New Caledonia and, to a much lesser extent, Vanuatu and Tokelau (NMFS, 2011). Southern California is considered to be the northern limit of loggerhead turtle distribution in the eastern Pacific; however, loggerhead turtles have been stranded on beaches as far north as Alaska (NMFS 2011). In the U.S., nesting occurs only in Florida (NMFS, 2011). Sightings of loggerhead turtles tend to occur from July and September but can occur over most of the year during El Nino years when ocean temperature rise and the turtles are following pelagic red crabs, which are a preferred prey. The loggerhead turtles are primarily pelagic, but occasionally enters coastal bays, lagoons, salt marshes, estuaries creeks, and mouths of large rivers (Argonne National Laboratory, 2019).

3.4.2.3 Natural History

Loggerhead turtles primarily occur in subtropical to temperate waters and are generally found over the continental shelf. In the southeastern U.S., mating occurs in late March to early June and females lay eggs between late April and early September. Females can lay three to five nests during a single nesting season. Loggerhead sea turtles are primarily carnivorous, although they do consume some plant matter as well (NMFS and USFWS, 2008).

3.4.2.4 Population Trends

The north Pacific population of loggerhead turtles is declining (NMFS and USFWS, 2008).

3.4.3 Leatherback Turtle (*Dermochelys coriacea*)

3.4.3.1 Status

The leatherback turtle was listed as Federally endangered in 1970. NMFS designated critical habitat to provide protection for endangered leatherback sea turtles along the U.S. West Coast in January 2012 (NMFS, 2013). Critical habitat within California extends 16,910 square miles (43,798 square kilometers [sq. km.]) stretching from Point Arena to Point Arguello, east of the 9,842-ft (3,000-m) depth contour. The Project area is not located designated critical habitat for leatherback turtle.

3.4.3.2 Range and Habitat

Leatherback turtles are the most common sea turtle off the west coast of the U.S. Leatherback turtles have been sighted as far north as Alaska and as far south as Chile (NMFS, 2013) and their extensive latitudinal range is due to their ability to maintain warmer body temperatures in colder waters (NMFS, 2013). Off the U.S. west coast, leatherback turtles are most abundant from July to September; however, their presence off the U.S. west coast is “two pronged” with sightings occurring in northern California, Oregon, Washington, and southern California, with few sightings occurring along the intermediate (central California) coastline. Among foraging turtles tagged in coastal waters off California, the majority moved north and spent time in areas offshore of northern California and Oregon before moving towards the equatorial eastern Pacific, then eventually westward, presumably towards western Pacific Ocean nesting beaches (NMFS, 2013).

3.4.3.3 Natural History

The leatherback turtle can reach 2,000 lbs (900 kg) and get 6.5 ft (2 m) in length (Sea Turtle Conservancy, 2019). Their lifespan and age of sexual maturity are both unknown. Leatherback turtles are omnivores, but feed principally on soft prey items such as jellyfish and planktonic chordates (e.g., salps) (Sea Turtle Conservancy, 2019). The leatherback turtle lacks a hard shell, and instead has a thick, leathery carapace consisting of connective tissue covering dermal bones. Female leatherbacks lay clutches of approximately 100 eggs on sandy, tropical beaches. Females nest several times during a nesting season, typically at eight to 12-day intervals. The eggs will incubate for 60-65 days before hatching (Sea Turtle Conservancy, 2019).

3.4.3.4 Population Trends

Leatherback turtle populations are decreasing worldwide; however, survey data is limited at foreign nesting beaches in the western and eastern Pacific (NMFS, 2013).

3.4.4 Olive Ridley Turtle (*Lepidochelys olivacea*)

3.4.4.1 Status

In 1978, the breeding populations of the olive ridley turtle on the Pacific coast of Mexico were listed as Federally endangered while all other populations were listed as Federally threatened. No critical habitat has been designed for the species.

3.4.4.2 Range and Habitat

This species is considered to be the most common of the marine turtles and is distributed circumglobally; however, it is rare to see an olive ridley turtle along the California coast (NMFS, 2014; Argonne National Laboratory, 2019). Within the eastern Pacific Ocean, olive ridley turtles typically occur in tropical and subtropical waters, as far south as Peru and as far north as California, but occasionally have been documented as far north as Alaska (NMFS, 2014). The olive ridley is mainly a "pelagic" sea turtle, but has been known to inhabit coastal areas, including bays and estuaries.

3.4.4.3 Natural History

Olive ridley turtles weigh on average 100 lbs (45 kg) and are 22 to 31 in (55 to 80 cm) in length. Their lifespan is unknown, but they reach sexual maturity around 15 years. Vast numbers of turtles come ashore and nest in what is known as an "arribada" during which hundreds to thousands of females come ashore to lay their eggs. At many nesting beaches, the nesting density is so high that previously laid egg clutches are dug up by other females excavating the nest to lay their own eggs. Major nesting beaches are located on the Pacific coasts of Mexico and Costa Rica (NMFS, 2014).

3.4.4.4 Population Trends

At-sea abundance estimates appear to support an overall increase in the Endangered breeding colony populations on the Pacific coast of Mexico (NMFS, 2014).

3.5 MARINE MAMMALS (*MYSTICETI*)

3.5.1 Blue Whale (*Balaenoptera musculus*)

The blue whale was listed as Federally endangered throughout its range in 1970 under the Endangered Species Conservation Act (ESCA) of 1969 prior to the passage of the FESA in 1973. No critical habitat has been designated.

3.5.1.1 Range and Habitat

Blue whales are distributed worldwide in circumpolar and temperate waters, and although they are found in coastal waters, they are thought to occur generally offshore compared to other baleen whales (Allen et al., 2011). Like most baleen whales, they migrate between warmer water breeding and calving areas in winter and high latitude feeding grounds in the summer. Feeding grounds have been identified in coastal upwelling zones off the coast of California primarily within two patches near the Gulf of the Farallon's and at the western part of the Channel Islands (Allen et al., 2011). They migrate seasonally between summer and winter, but some evidence suggests that individuals remain in certain areas year-round. Offshore California, sightings are made seasonally between June and December in the Southern California Bight (Allen et al*.,* 2011). Blue whales are frequently observed in the Santa Barbara Channel and around offshore oil platforms.

3.5.1.2 Natural History

Blue whales on average are 75 to 80 ft (21 to 24 m) in length and weigh 100 to 150 tons (90,700 to 136,000 kg) making it the largest animal on Earth (Allen et al., 2011). Blue whales have no known social structure and can be seen traveling alone or in groups of 19 to 80 individuals. Blue whales feed primarily on euphausiid shrimp (krill).

3.5.1.3 Population Trends

The most recent estimates of the blue whale indicate that a minimum of 1,551 individuals are known to occur off the west coast (NMFS, 2018a).

3.5.2 Fin Whale (*Balaenoptera physalus*)

3.5.2.1 Status

The fin whale was listed as a Federally endangered species in 1973, but no critical habitat has been identified for this species to date.

3.5.2.2 Range and Habitat

Fin whales are found in deep, offshore waters of all major oceans, primarily in temperate to polar latitudes, and less commonly in the tropics. Fin whales are migratory, moving seasonally into and out of high latitude feeding areas and their wintering areas are not widely known (NMFS, 2017). They are mostly commonly seen feeding over the continental shelf in areas of high productivity. Peak abundances of fin whales in the Southern California Bight occur after periods of maximum upwelling, in summer and fall (Allen et. al., 2011).

3.5.2.3 Natural History

Fin whales are on average 59 ft (18 m) in length and weigh 50 to 70 tons (45,000 to 64,000 kg) (Allen et al., 2011). Little is known about the social and mating systems of fin whales. It is believed that males become sexually mature at six to ten years of age; and females at seven to 12 years of age. Physical maturity is attained at approximately 25 years for both sexes. Usually mating and birthing occurs in tropical and subtropical areas during midwinter. Fin whales feed on euphasiid shrimp, copepods, and small fish. Fin whales are usually found in groups of two to seven whales and are considered fast swimmers (NMFS, 2017a).

3.5.2.4 Population Trends

The most recent estimates of the fin whale population indicate that at least 8,127 individuals are known to occur off California, Oregon, and Washington (NMFS, 2017a).

3.5.3 Humpback Whale (*Megaptera novaeangliae*)

3.5.3.1 Status

The humpback whale was listed as Federally endangered in 1970. In September 2016, NMFS revised the FESA listing for the humpback whale to identify 14 DPS, list one as threatened, four as endangered, and identify nine others as not warranted for listing. The humpback whale Central America DPS is listed as Federally endangered and the Mexico DPS is listed as a Federally threatened population, both DPS feed offshore of Oregon (NMFS, 2018b). No critical habitat has been designated.

3.5.3.2 Range and Habitat

Humpback whales are distributed worldwide and travel great distance during their seasonal migration, the farthest migration of any animal. Humpback whales spend the winter and spring months offshore of Central America and Mexico for breeding and calving, and then migrate to their summer and fall range between California and southern British Columbia to feed (Allen et al., 2011). Although humpback whales typically travel over deep, oceanic waters during migration, their feeding and breeding habitats are in shallow, coastal waters over continental shelves. Cold and productive coastal waters characterize feeding grounds (NMFS, 2018b). In the North Pacific, the California/Oregon/Washington stock winters in coastal Central America and Mexico and migrates to areas ranging from the coast of California to southern British Columbia in summer/fall (NMFS, 2018b).

3.5.3.3 Natural History

Humpback whales are on average 42 ft (13 m) in length and weigh 25 to 40 tons (22,600 to 36,200 kg). Humpback whales are well known for their long pectoral fins, which can be up to 15 ft (4.6 m) long. These extensive fins give them increased maneuverability and they can be used to slow down or even go backwards. During the summer months, humpbacks spend the majority of their time feeding and building up fat stores that they will live off of during the winter. Humpbacks filter feed on tiny crustaceans (mostly krill), plankton, and small fish (Allen et al., 2011).

3.5.3.4 Population Trends

The most recent population estimates of humpback whales indicate that at least 1,876 individuals occur off California, Oregon, and Washington (NMFS, 2018b). This population appears to be increasing.

3.5.4 North Pacific Right Whale (*Eubalaena japonica*)

3.5.4.1 Status

The northern Pacific right whale was listed as federally endangered in 2008. In April 2008, NMFS designate critical habitat in the Gulf of Alaska and within the Bering Sea (NMFS, 2017d). The Project area is not within designated critical habitat.

3.5.4.2 Range and Habitat

Northern right whales inhabit the Pacific Ocean, particularly between 20- and 60-degrees North latitude. They primarily occur in coastal or shelf waters, although movements over deep waters are known. For much of the year, their distribution is strongly correlated to the distribution of their prey. During winter, right whales occur in lower latitudes and coastal waters where calving takes place. However, the whereabouts of much of the population during winter remains unknown. Right whales migrate to higher latitudes during spring and summer (NMFS, 2017b). Few sightings of right whales occur in the central North Pacific and Bering Sea. Sightings have been reported as far south as central Baja California in the eastern North Pacific, as far south as Hawaii in the central North Pacific, and as far north as the sub-Arctic waters of the Bering Sea and sea of Okhotsk in the summer. (NMFS, 2017b).

3.5.4.3 Natural History

North Pacific right whales weighs up to 70 tons (63,500 kg) and can be 45 to 55 ft (13.7 to 16.7 m) in length (NMFS, 2017b). They are slow swimmers, reaching top speeds of 8 kilometers per hour (5 miles per hour), and spend a lot of time on the surface. These characteristics may contribute to their high incidence in ship strikes (Allen et al., 2011). Females give birth to their first calf at an average age of nine to ten years. This species feeds from spring to fall, and also in winter in certain areas. The primary food sources are zooplankton, including copepods, euphausiids, and cyprids. Unlike other baleen whales, right whales are skimmers: they feed by removing prey from the water using baleen while moving with their mouth open through a patch of zooplankton (NMFS, 2017b).

3.5.4.4 Population Trends

Photographic recapture rate population estimates for this species remain low, with only 26 individuals being photographed. No long-term population trends have been determined at this time (NMFS, 2018d).

3.5.5 Sei Whale (*Balaenoptera borealis*)

3.5.5.1 Status

The sei whale was listed as an endangered species in 1973. No critical habitat has been designated for the species (NMFS, 2019c).

3.5.5.2 Range and Habitat

Sei whales occur throughout most temperate and subtropical oceans of the world. The northern Pacific stock rarely ventures above 55 degrees N latitude or south of California (Allen et al., 2011). Sei whales are associated with areas of strong upwelling and mixing, where copepod densities would be high. Sei whales are most common offshore southern California from May through October, peaking in July (Allen et al., 2011).

3.5.5.3 Natural History

Sei whales are up to 40 to 60 ft (12 to 18 m) in length and can weigh up to 100,000 lbs (45,000 kg). Sei whales are among the fastest of all the rorqual whales, reaching speeds of 35 miles per hour (mph) (56 kilometer per hours [km/h]). Like most baleen whales, they migrate between warmer waters used for breeding and calving in winter and high latitude feeding grounds where food is plentiful in the summer. The northern Pacific stock ranges almost exclusively in pelagic waters and rarely ventures into coastal waters (Allen et al., 2011; NMFS, 2019c). Sei whales tend to avoid ships, and therefore are rarely sighted (Allen et. al., 2011).

3.5.5.4 Population Trends

The most recent estimates of the sei whale northern Pacific stock population indicate that at least 374 individuals are known to occur off California, Oregon, and Washington (NMFS, 2019c).

3.6 MARINE MAMMALS (*ODONTECETI*)

3.6.1 Sperm Whale (*Physeter macrocephalus*)

3.6.1.1 Status

The sperm whale was listed as a federally endangered species in 1970 under the endangered Species Conservation Act of 1969. No critical habitat has been designated (NMFS, 2018e).

3.6.1.2 Range and Habitat

Sperm whales tend to inhabit areas with a water depth of 1,968 ft (600 m) or more and are uncommon in waters less than 984 ft (300 m) deep. Female sperm whales are generally found in deep waters (at least 3,280 ft [1,000 m]) of low latitudes (less than 40 degrees, except in the North Pacific where they are found as high as 50 degrees). These conditions generally correspond to sea surface temperatures greater than 59 degrees Fahrenheit (15 degrees Celsius), and while female sperm whales are sometimes seen near oceanic islands, they are typically far from land. Off California, sperm whales are present in offshore waters year-round, with peak abundance from April to mid-June and again from late August through November (Allen et al., 2011, NMFS, 2018e).

3.6.1.3 Natural History

Sperm whales are on average 36 to 53 ft (11 to 16 m) in length and weigh 50 tons (45,000 kg). Female sperm whales reach sexual maturity around 9 years of age when they are roughly 29 ft (9 m) long. One calf is produced every 5 years after a 14 to 16-month gestation period. Males reach physical maturity around 50 years and when they are 52 ft (16m) long. Sperm whales are the deepest divers of any marine mammals reaching depths of 1.2 mi (2 km) remaining under water for around one hour (Allen et. al., 2011). There are no known mating or birthing grounds, but both more than likely occur in lower latitudes between April and August (Allen et. al., 2011). Sperm whales feed on deep ocean water species of squid, octopus, and fish (NMFS, 2015b).

3.6.1.4 Population Trends

The most recent estimates indicate that at least 1,270 individuals are known to occur off California, Oregon, and Washington (NMFS, 2018e). Reported population numbers make the sperm whale population appear stable; however, population growth models range from negative to positive rates, so conclusions about whether the population has increased or decreased remain uncertain (NMFS, 2018e).

3.6.2 Killer Whale (*Orcinus orca*)

3.6.2.1 Status

Two potential designated stocks of killer whale have the potential to occur along the west coast of California, the West Coast transient and Southern Resident killer whale stocks. The West Coast transient killer whale stock is not designated as "depleted" under the MMPA or listed as threatened or endangered under the ESA. The Southern Resident stock experienced a population decline in the 1990's when NMFS listed the DPS as endangered under the ESA in November 2005.

3.6.2.2 Range and Habitat

Killer whales are found throughout the North Pacific. Along the west coast of North America, killer whales occur along the entire Alaskan coast, in British Columbia and Washington inland waterways, and along the outer coasts of Washington, Oregon, and California (NMFS, 2018f). Generally killer whales prefer colder and more productive water found at high latitudes; however, the Southern Resident killer whale population has been known to occur from central California to the Queen Charlotte Island's coast in British Columbia. The home ranges of the West Coast Transient whales also include the inland waters of Washington and may overlap with Southern Resident whales.

3.6.2.3 Natural History

Killer whales are the largest cetacean in the dolphin family. There are three identified ecotypes of killer whale: residents, transients, and offshore, although there can be considerable overlap in the geographic range. These ecotypes do not appear to interbreed. Differences between the ecotypes extend to their morphology, foraging ecology, and behavior. Southern resident whales are generally fish-eaters, while transient whales are often mammal-eaters (i.e., other small whales, seals and sea lions). Resident whales can be more vocal, especially when foraging or socializing, while transients are quiet hunters, presumably because their prey can hear within the frequency range of their vocalizations (NMFS, 2010).

3.6.2.4 Population Trends

The West Coast transient stock has seen rapid growth from the 1970's due to an increase in primary prey animals, harbor seals; however, population growth started slowing in the 1990's and has continued to slow in recent years. Given population estimates are based on photo identification of individuals and considering minimum estimates, no reliable estimate of trend is available (NMFS, 2018f).

The Southern Resident stock saw a peak number of whales in 1995, at 99 individuals, but the population size has declined at currently stands at 77 animals as of the 2017 census (NMFS, 2018f).

3.7 MARINE MAMMALS (PINNIPEDS)

3.7.1 Guadalupe Fur Seal (*Arctocephalus townsendi*)

3.7.1.1 Status

The Guadalupe fur seal was listed as a federally threatened species in 1985 due to the near extinction by commercial seal hunting in the 19th century. No critical habitat has been designated.

3.7.1.2 Range and Habitat

The Guadalupe fur seal range is from Guadalupe Island, Mexico north to the California Channel Islands, but individuals are occasionally sighted as far south as Tapachula near the Mexico-Guatemala border and as far north as Mendocino, California (Allen et al., 2011). As their numbers increase, Guadalupe fur seals are expanding their range and are regularly seen on San Miguel and San Nicolas Islands, and, occasionally, on the South Farallon Islands. During breeding season, they are found in coastal rocky habitats and caves. Little is known about their whereabouts during the non-breeding season (NMFS, 2017b). Presently, the species breed only on Isla de Guadalupe off the coast of Baja California, Mexico, however, since 2008, individual adult females, subadult males, and between one and three pups have been observed annually on San Miguel Island (NMFS, 2017b).

3.7.1.3 Natural History

Guadalupe fur seals are on average 4 to 8 ft (1.2 to 2.4 m) and weigh 110 to 375 lbs (50 to 170 kg), with highly dimorphic appearances (Allen et al., 2011). Guadalupe fur seals are solitary, non-social animals. Males are "polygamous" and may mate with up to 12 females during a single breeding season. Males form small territories that they defend by roaring or coughing. Breeding season is June through August. Females arriving in early June, and pups are born a few days after their arrival (NMFS, 2017b). Guadalupe fur seals feed mainly at night on squid, mackerel, and lantern fish by diving up to depths of 65 feet (20 m) (NMFS, 2017b).

3.7.1.4 Population Trends

Recent population estimates for the Guadalupe fur seal in Mexico is 15,830 individuals. Population estimates appear to show that the population is increasing (NOAA, 2017b).

4.0 IMPACT ASSESSMENT

This BA has been prepared to provide information to the Federal lead agencies, NMFS and the USFWS, to determine the potential to affect threatened or endangered species, based on one of three possible findings for each species potentially affected:

- No effect: the proposed action will not affect the listed species or critical habitat;
- Not likely to adversely affect: effects of the listed species are expected to be discountable (extremely unlikely to occur), insignificant (minimal impact without take), or beneficial; and
- Likely to adversely affect: adverse effect may occur as a direct or indirect result of the proposed action, and the effect is not discountable, insignificant or beneficial.

Potential impacts due to Project activities includes seafloor disturbance and loss of habitat structure during conductor removal, potential increase in underwater noise, potential vessel strikes, and degradation of water quality or seafloor habitats from the discharge of petroleum in the event of an accidental spill from Project vessels. Potential impacts are described below.

4.1 SEAFLOOR DISTURBANCE

The cutting and subsequent removal of conductors from each platform has the potential to create localized turbidity and affect nearby soft-bottomed seafloor habitat beneath the platform. These potential impacts include:

- The removal of marine growth prior to the conductor cutting;
- The increase in sediment suspension and potential subsurface discharge following cutting of the conductor with either abrasive or mechanical equipment; and
- The subsequent void and infill of the seafloor depression as the conductor is lifted from the seafloor.

Prior to removal, the external conductor surface will be cleaned of naturally occurring marine growth. As epibiota is detached from each conductor it will fall to the sea floor. For the duration of the Platforms' production operations, BSEE regulations required operations of offshore platforms to clear marine growth from shallow, submerged portions of the Platforms on a regular basis to reduce structure fatigue. Over time, this removed growth accumulates on the seafloor beneath the Platforms. The cleaning process is anticipated to result in some increased turbidity as these materials fall through the water column and again as it reaches the seafloor. The in suspended materials will rapidly disperse once the cleaning operation is completed. The resulting material added to the seafloor beneath the Platform is anticipated to contribute to benthic habitat that has been shown as a favored substrate for many juvenile rockfishes (Meyer-Gutbrod et al., 2019) and may contribute to a short-term increase in food availability within the water column.

During conductor cutting operations, there is the potential for the subsurface (15 feet below the mudline) discharge of cutting fluid (i.e., seawater, abrasive materials, steel cuttings) that may cause a short-term disturbance of the sediment around the conductor. As the conductor is pulled towards the surface, there is also the potential for minor amounts of cutting fluid to drift out of the cut site. These discharges will occur intermittently throughout the duration of the Project

(120 days at Platform Grace in 2021 and 240 days at Platform Gail in 2023). Turbidity in the water column will increase as the conductor is pulled to the surface, however; due to the 15-foot-deep cutting depth, this majority of cutting fluid will be buried beneath seafloor and disturbance is expected to be minimal.

Potential impacts could also occur as the conductors are pulled from the seafloor and expose the 15-foot-deep footprint of the cut conductor. As natural sediments move to fill the void, suspended sediments will create turbidity that would reduce water clarity and increase sediment deposition. This disturbance would also be localized and short-term, as water conditions and seafloor topography would be expected to return to natural conditions following Project completion.

Due to the exposed nature of the artificial hard substrate near the surface and lack of preferred food (kelp), protected invertebrate species are not expected to occur at the Project Platforms. There are no other threatened or endangered species that would be impacted by the potential seafloor disturbance; therefore, the impact is expected to have no effect.

4.2 LOSS OF HABITAT STRUCTURE

Chevron will remove 38 conductors from Platform Grace and 28 conductors from Platform Gail. Removal of the conductor pipes will reduce the surface area of artificial hard substrate by 26 percent for Platform Grace and 17 percent for Platform Gail. The removal of the conductors will result in a permanent decrease in available vertical structure and complexity of artificial habitat available within the water column. This reduction is only a small percentage of the existing structure present within the Platform jackets. The reduction in surface area and complexity has the potential to relocate the fish and invertebrate populations that utilize the area within the conductor footprint, to other areas within and around the platform structure.

There are no federally threatened or endangered fish species that have the potential to occur within the Project area. After conductor removal, the remaining platform structure and jacket is expected to continue to support invertebrate and fish habitat and the reduction in habitat is not anticipated to negatively affect the fish density or production; therefore, the loss of habitat is expected to have no effect on threatened or endangered species that feed on associated fish or invertebrate species.

4.3 NOISE AND LIGHT IMPACTS

4.3.1 Noise During Conductor Cutting

During conductor cutting there is the potential for an intermittent increase in underwater noise for approximately 120 days at Platform Grace in 2021 and 240 days at Platform Gail in 2023 with the highest potential noise source being at seafloor where the subsurface cutting noise may reverberate through the sedimentary substrate and the conductor string. Abrasive cutting techniques for the initial cut(s) are anticipated to take approximately seven hours per conductor. Mechanical cutting techniques are anticipated to take approximately 12 to 24 hours per conductor, depending on the number of internal strings of pipe that need to be cut. However, in comparison to the use of explosives, the proposed methodology utilizing Iron Silicate Abrasives and/or mechanical cutting methods within the conductors' interior, will significantly reduce the potential underwater noise levels associated with the Project.

Although there are no studies that evaluate noise associated with the use of subsurface abrasive cutting or internal mechanical methods, previous conductor cutting projects have utilized the noise characteristics of diamond wire cutting in conductor removal operations as a surrogate for the anticipated underwater noise levels (BOEM, 2020, Pangerc et al. 2017). BOEM (2020) cited the diamond wire abrasive cutting has an in-water sound source level of 154 decibels (dB) re 1 microPascal (μPa) at one meter from the sound source. This study determined that the noise generated from diamond wire cutting are not easily discernible above the background noise (i.e., vessel and operations noise). Noise generated during Project conductor cutting will be dampened by the 15-feet of sediments above the cut; therefore, received sound levels are expected to be lower than those created during in-water abrasive diamond wire cutting.

As such, noise levels are not expected to be of high enough energy to cause pathological or physiological effects; however, there is the potential for temporary behavioral changes in the form of avoidance of the Project area. Behavioral effects include changes in the distribution, migration, and reproduction behaviors of exposed animals.

Marine Mammals and Turtles. Marine mammals may behaviorally react to sound when exposed to anthropogenic noise. These behavioral reactions are often shown as: changing durations of surfacing and dives, number of blows per surfacing, or moving direction and/or speed; reduced/increased vocal activities; changing/cessation of certain behavioral activities (such as socializing or feeding); visible startle response or aggressive behavior (such as tail/fluke slapping or jaw clapping); avoidance of areas where noise sources are located; and/or flight responses (e.g., pinnipeds flushing into water from haul-outs or rookeries).

The biological significance of many of these behavioral disturbances is difficult to predict, especially if the detected disturbances appear minor. However, the consequences of behavioral modification could be expected to be biologically significant if the change affects growth, survival, and/or reproduction. Some of these significant behavioral modifications include:

- Drastic change in diving/surfacing patterns;
- Habitat abandonment due to loss of desirable acoustic environment; and,
- Cessation of feeding or social interaction.

While conductor cutting is in process the sound source will be continuous in nature and will not create dramatic increases in sound pressures as created by impulsive noise sources (i.e., pile driving). As discussed above, the noise created will attenuate through the sand and conductor walls before entering the water column which, by design is expected to reduce potential noise levels to below impact thresholds. Additionally, well conductor cutting events will occur intermittently at the platforms, and the overall spatial and temporal overlap with marine mammals and sea turtle species will be low during these activities; therefore, it is anticipated that noise associated with the proposed action will have negligible effects on marine mammal and sea turtle species (Argonne National Lab, 2019).

4.3.2 Project Lighting

The lighting required to conduct Project activities on a 24/7 schedule will be the same as the existing operations lighting on the Project Platforms. Adverse effects to migrating birds due to the lights on offshore platforms appear to be an infrequent occurrence (Johnson et al., 2011).

Interactions between the observed migrating birds and the Platforms appear to be due more to the general patterns of migration rather than platform location or design (Johnson et al., 2011).

The Project Platforms will continue to direct all lighting downward and toward the active working deck to reduce light pollution and any adverse effects to marine wildlife. The Platforms will also continue to follow all navigational safety requirements in accordance with the U.S. Coast Guard (USCG). The effects of lighting from Project activities are not likely to affect threatened or endangered species.

4.4 VESSEL TRAFFIC

The OSV *Adele Elise* is the primary vessel planned for use for this Project. The length is 225-feet with a maximum speed of 10.2 knots. A support vessel, the M/V *Jackie C.* will be utilized twice daily for supplies and transport of the crew. The *Jackie C.* currently makes routine runs twice daily to the Platforms in support of current operations. The *Jackie C.* is a 120-foot vessel with a maximum speed of 19 knots. Project activities are currently estimated at 120 days in 2021 for Platform Grace and 240 days in 2023 for Platform Gail. During this time, approximately 48 vessel trips total (16 trips or an average of 1 trip/week for Platform Grace and 32 trips or an average of 1 trip/week for Platform Gail) utilizing the *Adele Elise* will be made from the Platforms to the POLB or Port Hueneme, and the twice daily crew boat trips from Carpinteria (Casitas) Pier to the Platforms using the *Jackie C* will continue throughout the Project.

During these trips, Project vessels will utilize (or continue to utilize) the existing U.S. Coast Guard Traffic Separation Scheme (VTSS) and Joint Oil Fisheries Liaison Office (JOFLO) corridors within the Santa Barbara Channel. During Project-related transit, captains will remain at least 100 m away from all sighted whale species, and 50 m away from dolphins and sea turtles. Prior to transiting to and from POLB/POLA or Port Hueneme, the primary Project vessel will review the current whale presence rating within the Santa Barbara Channel shipping lanes using the online tools at Whalesafe.com. If the daily whale presence is reported to be above a medium rating within the transit corridor, then the vessel will transit at a reduced speed of 10 knots or less (11.5 mph or 18.5 km/h). Due to the small size of the proposed Project vessels, in combination with the use of established vessel traffic lanes, potential vessel strikes with marine wildlife are not likely to affect threatened or endangered species.

4.5 OIL SPILL POTENTIAL

Prior to the Project, as part of the well plug and abandonment program, each well will be plugged in accordance with BSEE regulations; therefore, there is no potential for hydrocarbon release from the Project Platforms' wells.

The unintentional release of petroleum into the marine environment from proposed Project activities is limited to Project vessels and equipment. A petroleum release could result in potential impacts to the marine biota, particularly avifauna and early life stage forms of fish and invertebrates, which are sensitive to those chemicals. Refined products (i.e., diesel, gasoline.) are more toxic than heavier crude or Bunker-type products, and the loss of a substantial amount of fuel or lubricating oil during survey operations could affect the water column, seafloor, intertidal habitats, and associated biota, resulting in their mortality or substantial injury, and in alteration of the existing habitat quality.

Although many marine organisms have created adaptive strategies to survive in their environment, when these marine organisms are introduced to oil, it adversely affects them physiologically. For example, physiological effects from oil spills on marine life could include the contamination of protective layers of fur or feathers, loss of buoyancy, and loss of locomotive capabilities. Direct lethal toxicity or sub-lethal irritation and temporary alteration of the chemical make-up of the ecosystem could also occur. The following text provides a brief summary of the potential impacts from exposure to oil spills.

4.5.1 Marine Invertebrates

Oil spill impacts on sensitive marine invertebrates, including the white and black abalone, would likely result from direct contact, ingestion of contaminated water and food (algae), and secondary impacts associated with response operations. Although abalone species are not expected to occur in the Project area, coastal areas in the Project region may provide habitat for protected abalone species (i.e., Anacapa Island). In the event of a spill related to the proposed Project activities, the oil could undergo some weathering before reaching the mainland or Channel Islands, which could limit toxicity; however, depending on the amount and the prevailing wind and currents, there is the potential that oil could compromise critical habitat areas for abalone outside of the Project area. Due to the small size of the proposed Project vessels, in combination with the use of established vessel traffic lanes, the potential release of fuel and its resulting impacts are not likely to affect threatened or endangered invertebrate species.

4.5.2 Turtles

Oil spills are not considered a high cause for mortality for sea turtles, although reports from the Gulf of Mexico Deepwater Horizon spill indicate a possible increase in strandings of oil impacted turtles. Since sea turtle species have been listed as threatened or endangered under the FESA, there is very little direct experimental evidence about the toxicity of oil to sea turtles. Sea turtles are negatively affected by oil at all life stages: eggs on the beach, post hatchings, young sea turtles in near shore habitats, migrating adults, and foraging grounds. Each life stage varies depending on the rate, severity, and effects of exposure.

Sea turtles are more vulnerable to oil impacts due to their biological and behavior characteristics including indiscriminate feeding in convergence zones, long pre-dive inhalations, and lack of avoidance behavior (Milton et al., 1984). A sea turtle's diving behavior puts individuals at risk because they inhale a large amount of air before diving and will resurface over time. During an oil spill, this would expose sea turtles to longer periods of both physical exposure and petroleum vapors, which can be the most harmful during an oil spill. Due to the small size of the proposed Project vessels, in combination with the use of established vessel traffic lanes, the potential release of fuel and its resulting impacts are not likely to affect threatened or endangered marine turtle species.

4.5.3 Marine Birds

Marine birds can be affected by direct contact with oil in three ways: (1) thermal effects due to external oiling of plumage; (2) toxic effects of ingested oil as adults; and (3) effects on eggs, chicks, and reproductive abilities.

The loss of waterproofing is the primary external effect of oil on marine birds and buoyancy can be lost if the oiling is severe. A main issue with oil on marine birds is the damage oil does to the arrangement of feathers, which is responsible of water repellency (Fabricius, 1959). Without water repellency, the water can go through the dense layers of feathers to the skin exposing the bird to cold water temperatures. To survive, the bird must metabolize fat, sugar, and eventually skeletal muscle proteins to maintain body heat. The cause of oiled bird deaths can be the result from exposure and loss of these energy reserves as well as the toxic effects of ingested oil (Schultz et al., 1983). The internal effect of oil on marine birds varies. Anemia can be the result of bleeding from inflamed intestinal walls. Oil passing into the trachea and bronchi could result in the development of pneumonia. A bird's liver, kidney, and pancreatic functions can be disturbed due to internal oil exposure. Ingested oil can inhibit a bird's mechanism for salt excretion that enables seabirds to obtain fresh water from salt water and could result in dehydration (Holmes and Cronshaw, 1975).

A bird's vulnerability to an oil spill depends on each individual species' behavioral and other attributes. Some of the more vulnerable species are alcids and sea ducks due to the large amount of time they spend on the ocean surface, the fact that they dive when disturbed, and their gregarious behavior. A bird's vulnerability depends on the season as well. For example, colonial seabirds are most vulnerable between early spring through autumn because they are tied to breeding colonies. There are no breeding colonies of protected bird species within the Project areas; therefore, impacts from oil to breeding bird colonies is not anticipated. Due to the small size of the proposed Project vessels, in combination with the use of established vessel traffic lanes, the potential release of fuel and its resulting impacts are not likely to affect threatened or endangered bird species.

4.5.4 Marine Mammals

The impact of direct contact with oil on the animal's skin varies by species. Cetaceans have no fur; therefore, they are not susceptible to the insulation effects of hypothermia in other mammals. However, external impacts to cetaceans from direct skin contract with oil could include: eye irritation, burns to mucous membranes of eyes and mouth, and increase vulnerability to infection.

Baleen whales skim the surface of water for feeding and are particularly vulnerable to ingesting oil and baleen fouling. Adult cetacean would most likely not suffer from oil fouling of their blowholes because they spout before inhalation, clearing the blowhole. Younger cetaceans are more vulnerable to inhale oil. Internal injury from oil is more likely for cetaceans due to oil. Oil inhaled could result in respiratory irritation, inflammation, emphysema, or pneumonia. Ingestion of oil could cause ulcers, bleeding, and disrupt digestive functions. Both inhalation and ingested chemicals could cause damage in the liver, kidney, lead to reproductive failure, death, or result in anemia and immune suppression.

4.5.4.1 Marine Mammals (Pinnipeds)

Pinnipeds that come in contact with oil could experience a wide range of adverse impacts including: thermoregulatory problems, disruption of respiratory functions, ingestions of oil as a result of grooming or eating contaminated food, external irritation (eyes), mechanical effects, sensory disruption, abnormal behavioral responses, and loss of food by avoidance of contaminated areas.

Guadalupe fur seals could experience thermoregulatory problems if they come into contact with oil (Geraci and Smith, 1976). Oil makes hair of a fur seal lose its insulating qualities. Once this happens, the animal's core body temperature may drop and increases its metabolism to prevent hypothermia. This could potentially be fatal to a distressed or diseased animal and highly stressful for a healthy animal (Engelhardt, 1983).

When pinnipeds are coated with viscous oil, it may cause problems in locomotion and breathing. Pinnipeds that are exposed to heavy coating from oil will experience swimming difficulties, which may lead to exhaustion (Engelhardt, 1983; Davis and Anderson, 1976), and possible suffocation from breathing orifices that are clogged. The viscosity of the oil is a major factor in determining the effects on pinnipeds. Severe eye irritation is caused by direct contact with oil but non-lethal (Engelhardt, 1983). Skin absorption, inhalation, and ingestion of oil while grooming are all possible pathways of ingestion. However, there have not been enough studies on the long-term effects of chronic exposure to oil on pinnipeds.

Project activities are not expected to have long-term, significant effects on open water habitat. Platform-specific oil spill contingency and response plans have been developed and will be used to direct the containment and recovery of any Project-related vessel spills that would have the potential to be accidentally released into the marine waters. In addition, onboard and supporting equipment and the procedures specified in the spill plan are expected to reduce the effects of accidentally discharged petroleum by facilitating rapid response and cleanup operations. The Project vessels will adhere to a zero-discharge policy. Refer to Section 5.1 for more information on applicant proposed mitigation measures. Due to the small size of the proposed Project vessels, in combination with the use of established vessel traffic lanes, the potential release of fuel and its resulting impacts are not likely to affect threatened or endangered marine mammal species.

5.0 MEASURES TO REDUCE POTENTIAL PROJECT RELATED IMPACTS

The proposed well conductor cutting and removal program has been designed to minimize the potential for adverse impacts to the surrounding marine environment. The Project will implement the following measures to ensure the potential for impacts are reduced to the extent feasible.

- Conductor cutting and removal activities will be conducted in accordance with Bureau of Safety and Environmental Enforcement (BSEE) Requirements (30 CFR Part 250.1710-1723) for decommissioning activities associated with the existing operational plans at Platforms Grace and Gail.
- As part of the well plug and abandonment program, the wellheads will have been removed and each well plugged in accordance with BSEE regulations prior to conductor cutting/removal activities.
- Conductor cutting and removal activities have been scheduled in one phase at each Platform to minimize Project timing and associated impacts.
- No anchoring has been proposed to minimize potential seafloor disturbance.
- Chevron has designed the Project to utilize internal conductor cutting methodologies to minimize potential noise impacts and potential discharges.
- Initial conductor cuts will be performed approximately 15 feet below mudline to minimize turbidity.
- Existing marine growth on the conductors will be cleared prior to conductor removal activities.
- Chevron will implement its existing agency-approved Oil Spill Contingency and Response Plans and Hazardous Materials Management Plans for both Platform Grace and Gail. These plans will be used to direct the containment and recovery of Project-related petroleum products in the event that they are accidentally released into the marine waters. Each Project vessel will have supporting spill kit equipment and will implement procedures specified in the spill plan to reduce the effects of accidentally discharged petroleum by facilitating rapid response and cleanup operations. The Project vessels will adhere to a zero-discharge policy.

6.0 CUMULATIVE EFFECTS

FESA Regulations at 50 CFR 402.14(g)(3)(4) require Federal agencies to “evaluate the effects of the action and cumulative effects on the listed species or critical habitat” and “formulate its biological opinion as to whether the action, taken together with cumulative effects, is likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat.”

According to the Endangered Species Consultation Handbook (USFWS and NMFS, 1998), cumulative effects include the effects of future State, local or private actions that are reasonably certain to occur in the action area considered in a biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to Section 7 of FESA. Indicators of effects “reasonably certain to occur” may include but are not limited to: approval of the action by State or local agencies or governments (e.g., permits, grants); indications by granting authorities that an action is imminent; assurances by project sponsors that an action will proceed; the obligation of venture capital; and/or initiation of contracts. Speculative non-Federal actions that may never be implemented are not factored into cumulative effects analyses. The following is a summary of the other marine projects conducted or proposed in the Project area.

6.1 COMPLETED PROJECTS

Freeport-McMoRan (Freeport) has submitted an application to the BSEE and BOEM for removal of conductors at Platforms Hermosa, Harvest, and Hidalgo. These activities include 62 well conductors on the Point Arguello facilities: Hidalgo (14), Harvest (19) and Hermosa (29). Removal occurred in two phases: the initial conductor casing cutting/proving and conductor casing extraction. Total duration expected for Phase 1 was 78 days and Phase 2 was expected to require 130 days for a total project duration of 208 days. The Freeport conductor removal project is ongoing but is anticipated to be completed prior to initiation of conductor cutting and removal activities at Platform Grace in 2021.

6.2 PROPOSED PROJECTS

There are no known proposed projects in the region that would contribute to the cumulative effects of the Project.

7.0 CONCLUSION AND DETERMINATION

Implementation of the conductor cutting and removal Project will involve potential impacts to marine species and habitats that could affect listed and/or proposed species in the Project area. A total of 17 listed marine species have been analyzed in this BA. Table 7.0-1 below provides an analysis of the potential Project effects on the following: habitat loss, mortality, harassment, loss of prey, loss of shelter/cover, loss of access to habitats, noise and light effects, habitat fragmentation, urbanization, increased predation, and critical habitat.

The proposed Project may affect, but is not likely to adversely affect the listed species for the following reasons:

- The Project would not involve temporary or permanent loss of critical habitat;
- The Project would be of limited size and geographic effect; and,
- The Project will include avoidance, minimization, and mitigation measures, as detailed in Section 5.0, to avoid and minimize potential adverse effects.

Table 7.0-1. Potential Effects Matrix for Protected Species

Species	Loss of Habitat[1]	Mortality[2]	Harassment[3]	Loss of Prey[4]	Loss of Cover[5]	Loss of Access[6]	Noise/Light[7]	Fragmentation[8]	Urbanization[9]	Predation[10]	Critical Habitat[11]	Effect Determination[12]
White abalone	a	a	a	a	a	a	a	a	a	a	a	a
Black abalone	a	a	a	a	a	a	a	a	a	a	a	a
California Least Tern	a	a	a	a	a	a	a	a	a	a	a	a
Marbled Murrelet	a	a	a	a	a	a	a	a	a	a	a	a
Short-tailed Albatross	a	a	a	a	a	a	a	a	a	a	a	a
Green Turtle	b	b	b	b	b	b	b, c	b	a	b	b	b
Loggerhead Turtle	b	b	b	b	b	b	b, c	b	a	b	b	b
Olive Ridley Turtle	a	a	a	a	a	a	a	a	a	a	a	a
Leatherback Turtle	b	b	b	b	b	b	b, c	b	a	b	b	b
Blue Whale	b	b	b	c	b	b	b, c	b	a	b	a	b
Fin Whale	b	b	b	c	b	b	b, c	b	a	b	a	b
Humpback Whale	b	b	b	c	b	b	b, c	b	a	b	a	b
Northern Pacific Right Whale	a	a	a	a	a	a	a	a	a	a	a	a
Sei Whale*	a	a	a	a	a	a	a	a	a	a	a	a
Sperm Whale	b	b	b	c	b	b	b, c	b	a	b	a	b
Killer Whale	a	a	a	a	a	a	a	a	a	a	a	a
Guadalupe Fur Seal	b	b	b	c	b	b	b, c	b	a	b	a	b

[1]Loss of Habitat Codes

a. Species not expected to occur in Project area.
b. No habitat will be temporarily or permanently lost.

[2]Mortality Codes

a. Species not expected to occur in Project area.
b. Oil spills or the release of other pollutants from the Project equipment or vessels is a low probability event based on the nature of the operation.

[3]Harassment

a. Species not expected to occur in Project area.
b. Minor increases in underwater noise are not expected to harass wildlife.

[4]Loss of Prey

a. Species not expected to occur in Project area.
b. Prey species do not occur in Project area.
c. No permanent loss of prey expected. Short-term displacement of prey from immediate area of operations could occur.

[5]Loss of Shelter/Cover

a. Species not expected to occur in Project area.
b. No temporary or permanent loss of shelter/cover will occur.

[6]Loss of Access

a. Species not expected to occur in Project area.
b. No temporary or permanent loss of access.

[7]Noise/Light Impacts

a. Species not expected to occur in Project area.
b. Minor increases in underwater noise are not expected to harass wildlife.
c. Platforms lighting would be consistent with existing operations lighting.

[8]Habitat Fragmentation

a. Species not expected to occur in Project area.
b. No temporary or permanent loss of habitat will occur. Consequently, no fragmentation.

[9]Urbanization

a. Not applicable

[10]Increased Predation

a. Species not expected to occur in Project area.
b. Project activities do not affect likelihood of species predation.

[11]Critical Habitat

a. No critical habitat designated for species.
b. Critical habitat designated for species, but none occurring in Project area.

[12]Effect Determination

a. No effect
b. May affect, but not likely to adversely affect
c. May affect and likely to adversely affect

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Attachment C
General NPDES Permit

General Permit No. CAG280000

AUTHORIZATION TO DISCHARGE UNDER THE
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
FOR OIL AND GAS EXPLORATION, DEVELOPMENT, AND PRODUCTION FACILITIES

In compliance with the provisions of the Clean Water Act, 33 U.S.C. 1251 et seq., ("the Act"), the following discharges are authorized in accordance with this general National Pollutant Discharge Elimination System ("NPDES") permit: Drilling Fluids and Cuttings (001), Produced Water (002), Well Treatment, Completion and Workover Fluids (003), Deck Drainage (004), Domestic and Sanitary Waste (005), Blowout Preventer Fluid (006), Desalination Unit Discharge (007), Fire Control System Water (008), Non-Contact Cooling Water (009), Ballast and Storage Displacement Water (010), Bilge Water (011), Boiler Blowdown (012), Test Fluids (013), Diatomaceous Earth Filter Media (014), Bulk Transfer Material Overflow (015), Uncontaminated water (016), Water Flooding Discharges (017), Laboratory Waste (018), Excess Cement Slurry (019), Muds, Cuttings and Cement at Sea Floor (020); Hydrotest Water (021); and H_2S Gas Processing Waste Water (022) from oil and gas exploration, development and production facilities to federal waters off Southern California as specified below.

These exploration, development and production facilities are classified in the Offshore Subcategory of the Oil and Gas Extraction Point Source Category, as defined in 40 CFR Part 435, Subpart A. Discharges shall be in accordance with effluent limitations, monitoring and reporting requirements, and other conditions set forth in Parts I through V herein. The discharge of pollutants not specifically set forth in this permit is not authorized.

This permit authorizes discharges from all exploratory facilities operating within the permit area and development and production facilities which are not new sources including the following: Platforms A, B, C, Edith, Ellen, Elly, Eureka, Gail, Gilda, Gina, Grace, Habitat, Harmony, Harvest, Henry, Heritage, Hermosa, Hillhouse, Hidalgo, Hogan, Hondo, Houchin, and Irene.

This permit shall become effective on March 1, 2014. This permit and the authorization to discharge shall expire at midnight, February 28, 2019.

Signed this 20th day of December, 2013

/s/

____

Jane Diamond
Director, Water Division
U.S. EPA, Region 9

I. REQUIREMENTS FOR NPDES PERMITS AND COVERAGE CONDITIONS

A. Permit Applicability and Coverage Conditions

1. Operations Covered. This permit establishes effluent limitations, prohibitions, reporting requirements, and other conditions on discharges from oil and gas facilities engaged in production, field exploration, developmental drilling, well completion, well treatment operations, well workover, and abandonment operations.

2. Location of Coverage. The permit coverage area consists of the following lease blocks (by OCS lease parcel number as maintained by the Bureau of Ocean Energy Management (BOEM) and described in BOEM's Status of Leases):

in waters west and northwest of Point Arguello,

P-0433	P-0437	P-0438	P-0440	P-0441	P-0444	P-0450	P-0451

in waters south and west of Pt. Conception,

P-0315	P-0316	P-0320	P-0322	P-0323A

in the Santa Barbara Channel from Pt. Conception to Goleta Pt.,

P-0180	P-0181	P-0182	P-0183	P-0187	P-0188	P-0189	P-0190
P-0191	P-0192	P-0193	P-0194	P-0195	P-0326	P-0329	P-0460
P-0461	P-0464						

in the Santa Barbara Channel from Santa Barbara to Ventura,

P-0166	P-0202	P-0203	P-0204	P-0205	P-0208	P-0209	P-0215
P-0216	P-0217	P-0234	P-0240	P-0241	P-0346		

in the San Pedro Channel between San Pedro and Laguna,

P-0296	P-0300	P-0301	P-0306

which are located in Federal waters off the Southern California coast, seaward of the outer boundary of the territorial seas. This permit does not authorize discharges from facilities discharging to or in territorial seas of California or from facilities defined as "coastal", "onshore", or "stripper" (see 40 CFR Part 435, Subparts C, D, and F). Land based facilities operating in support of activities on the covered lease blocks are considered part of the Offshore Subcategory and discharges to Federal waters from these facilities are authorized by this permit.

3. Facilities Covered. This permit covers development and production facilities including Platforms A, B, C, Edith, Ellen, Elly, Eureka, Gail, Gilda, Gina, Grace, Habitat, Harmony, Harvest, Henry, Heritage, Hermosa, Hillhouse, Hidalgo, Hogan, Hondo, Houchin, and Irene. The permit also covers exploration facilities discharging in the permit area. Facility coverage is not effective until Notices of Intent ("NOIs") are received as described below.

4. Modifications and Revocations. This permit may be modified or revoked at any time on the basis of any new data that was not available at the time of permit issuance if the new data would have justified the application of different permit conditions at the time of issuance. This includes any information indicating that cumulative effects on the environment are unacceptable. Such cumulative effects on the environment include unreasonable degradation of the marine environment due to continued discharges, in which case the Director, Water Division, Region 9 may determine that additional conditions are necessary to protect the marine environment or special aquatic sites. Permit modification will be conducted in accordance with 40 CFR Parts 122.62, 122.63 and 124.

5. Prohibitions. During the term of this general permit, operators are authorized to discharge under the general permit the enumerated waste streams subject to the restrictions set forth herein. This permit does not authorize the discharge of any waste streams, including spills and other unintentional or non-routine discharges of pollutants, that are not part of the normal operation of the facility, or any pollutants that are not ordinarily present in such waste streams.

6. Notification Requirements.

a. Coverage Under This Permit. For the development and production, and exploration facilities located on platforms listed above in Part I.A.3, written notification of intent to be covered under this permit shall be submitted no later than 30 days after the effective date of this permit. The Notice of Intent to be covered shall include the legal name and address of the operator, the lease block number assigned by the Department of the Interior, and the number and type of facilities located within the lease block.

For development and production facilities other than those listed above in Part I.A.3, the NOI shall include the above information and shall also include information to substantiate that the facility is not a new source, as defined in Part V of this permit. Initiation of discharges may not begin until EPA has reviewed the submitted information and notified the permittee in writing that this general permit is appropriate for the proposed operation, and the permittee has obtained all applicable approvals and certifications by BOEM, Bureau of Safety and Environmental Enforcement (BSEE) and the California Coastal Commission (CCC) of the development and production plan.

For exploratory operations conducted by exploration facilities not located on platforms listed above in Part I.A.3, the Notice of Intent shall be submitted at least 30 days prior to initiation of discharges. Initiation of discharges may not begin until EPA has reviewed the proposed operation and notified the permittee in writing that this general permit is appropriate for the proposed operation, and the permittee has obtained all applicable approvals and certifications by BOEM, BSEE and the CCC of the exploration plan.

b. Termination of Operations. Facility or lease block operators shall notify the Director in writing within 60 days after permanent termination of discharges from their facilities within the lease block.

c. Duty to Provide Notice of Intent for Continued Activity. If the permittee wishes to discharge under the authority of this permit after its expiration date, the permittee must submit a notice of intent to EPA to do so. The Notice of Intent shall be submitted at least 180 days before the expiration date of this permit, and shall include the information specified in Part I.A.6.a above. Timely receipt of a complete Notice of Intent by EPA shall qualify the Permittee for an administrative extension of its authorization to discharge under this permit pursuant to 5 U.S.C. Section 558(c), until a new permit is issued and becomes effective.

d. Submission of Requests to be Covered and Other Reports. Reports and notifications, including discharge monitoring reports and notifications of non-compliance required herein shall be submitted either to the following addresses, or electronically (EPA only) using NetDMR.

US EPA, Region 9
NPDES/DMR, ENF-4-1
75 Hawthorne Street
San Francisco, California 94105-3901
Phone: (415) 972-3507

Regional Supervisor
Bureau of Safety and Environmental Enforcement (BSEE)
770 Paseo Camarillo
Camarillo, CA 93010

Regional Supervisor
Office of Environment
Bureau of Ocean Energy Management (BOEM)
770 Paseo Camarillo, 2nd Floor
Camarillo, CA 93010
Attn: Chief, Environmental Analysis Section

Alison Dettmer, Manager
Energy & Ocean Resources Unit
California Coastal Commission
45 Fremont Street, Suite 2000
San Francisco, CA 94105-2219

B. Requiring an Individual Permit

1. The Director may require any Permittee discharging under the authority of this permit to apply for and obtain an individual NPDES permit. The following criteria (40 CFR Part 122.28(b)(3)), as well as other relevant considerations, may be used in making such determinations:

a. Whether the discharger is in compliance with the conditions of this general permit.

b. A change has occurred in the availability of demonstrated technology or practices for the control or abatement of pollutants applicable to the point source.

c. Effluent limitations guidelines are promulgated for point sources covered by the general permit.

d. A Water Quality Management plan containing requirements applicable to the point sources is approved.

e. Circumstances have changed since the time of the request to be covered so that the discharger is no longer appropriately controlled under the general permit, or either a temporary or permanent reduction or elimination of the authorized discharge is necessary.

f. The discharger(s) is a significant contributor of pollutants. In making this determination, the Director may consider the following factors:

(1) The location of the discharge with respect to waters of the United States;
(2) The size of the discharge;
(3) The quantity and nature of the pollutants discharged to waters of the United States; and
(4) Other relevant factors.

2. The Director may require any Permittee authorized by this permit to apply for an individual NPDES permit only if the Permittee has been notified in writing that an individual permit application is required.

3. Any Permittee authorized by this permit may request to be excluded from the coverage of this general permit by applying for an individual permit. The owner or operator shall submit an application together with the reasons supporting the request to the Director.

4. When an individual NPDES permit is issued to a Permittee otherwise subject to this general permit, the applicability of this general permit to that owner or operator is automatically terminated on the effective date of the individual permit.

II. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

A. Drilling Fluids and Cuttings (Discharge 001)

1. Effluent Limitations. The Permittee shall comply with the following effluent limitations and monitoring requirements.

Table 1 - Drilling Fluids and Cuttings[1] Effluent Limitations and Monitoring Requirements

Effluent Characteristic	Discharge Limitation	Measurement Frequency	Sample Type/Methods	Reported Values[5]
Total Discharge Volume	See note 2.	Daily	Estimate	Per well total
Toxicity of Drilling Fluids and Cuttings	MinimumLC50 of the SPP shall be 3% by volume	End-of-well (at least 80% of permitted well footage)[4]	Grab/Drilling Fluids Toxicity Test	96-hr LC50 Part II.A.2.d
Free Oil	No discharge	Weekly[7] & before bulk discharges	Grab/Static Sheen test Part II.A.2.b.	Number of days sheen observed
Oil-based fluids[3]	No discharge	--N/A--	--N/A--	--N/A--
Diesel oil content	No discharge	--N/A--	Part II.A.2.a.	--N/A--
Barite: Cadmium	3 mg/kg[6]	See II.A.2.c	Method 3050B followed by 6010B	mg/kg dry wt.
Barite: Mercury	1 mg/kg	See II.A.2.c	Method 7471A	mg/kg dry wt.
Chemical Inventory	--N/A--	Once per mud system	Part II.A.3.	--N/A--
Non-Aqueous Based Drilling Fluids and Associated Cuttings	No discharge	--N/A--	--N/A--	--N/A--

Notes:

1 All cuttings limitations except the "no free oil" requirements as determined by the Static Sheen Test are monitored by sampling and analysis of drilling fluid samples. Compliance with the drilling fluids limitation demonstrates compliance with the corresponding cuttings limitation.

2 The Permittee shall estimate and report the total discharge volume per well for drilling fluids and drill cuttings. The volumes for fluids and cuttings shall be reported separately. The Permittee shall also report the number of days of discharge of each drilling fluid system used.

3 The discharge of drilling muds which contain waste engine oil, cooling oil, gear oil, or lubricant which has previously been used for purposes other than borehole lubrication is prohibited. The discharge of cuttings generated using drilling fluids which contain mineral oil is prohibited except when the mineral oil is used as a carrier fluid (transporter fluid), lubricity additive, or pill.

4 Intermediate depth mud systems are also subject to the 30,000 ppm limit by testing or by using generic fluids; see "Use of generic drilling fluids." The "permitted well footage" refers to the well footage permitted by BSEE.

5 The permittees shall submit the Well DMR on the established DMR schedule (see Part III.C.). The Well DMR shall be submitted at the next scheduled DMR date at least 45 days after the completion of drilling activity. The Well DMR shall report all discharges for each well from a mobile drilling unit or all rig associated discharges listed in this table for platform mounted rigs. Copies of the toxicity test reports, barite certifications, and drilling fluids inventory information shall be included with the Well DMR.

6 The discharge limitation for cadmium in barite is 2 mg/kg for Platforms Harmony and Heritage.

7 The sampling frequency for the static sheen test shall be weekly. When drilling into a hydrocarbon bearing zone, sampling frequency shall be daily.

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2. Monitoring Requirements.

a. Diesel Oil. Compliance with the limitation on diesel oil shall be demonstrated through the Drilling Fluids Inventory.

b. Static Sheen Test. The Permittee shall perform the Static Sheen Test on separate samples of drilling fluids and cuttings. The test shall be conducted in accordance with "Approved Methodology; Laboratory Sheen Tests for the Offshore Subcategory, Oil and Gas Extraction

Industry," which is Appendix 1 to Subpart A of 40 CFR Part 435. If the static sheen test indicates the presence of free oil, discharge of the tested material shall cease; if subsequent tests do not indicate free oil, discharge may continue.

c. Mercury and Cadmium Content of Barite. Compliance shall be demonstrated by analysis of the stock barite or by certification based on supplier documentation. Results for total mercury and total cadmium shall be submitted in the DMR for the well. Analysis for cadmium shall be conducted using method 3050B followed by 6010B (EPA SW 846) and results expressed as mg/kg (dry weight) of barite. Analysis for mercury shall be conducted using method 7471A (EPA SW 846) and expressed as mg/kg (dry weight) of barite.

The Permittee may provide analysis of representative samples of stock barite once prior to drilling each well. If more than one well is drilled using the same stock supply, new analyses are not required for subsequent wells if no new supplies of barite have been received since the previous analyses. In this latter case, the DMR should state that no new barite was received since the last reported analyses.

Alternatively, operators may provide certification, as documented by the supplier(s), that the barite meets the above limits. The concentration of mercury and cadmium in stock barite shall be reported on the well DMR as documented by the supplier.

d. Toxicity Test for Drilling Fluids and Cuttings. The minimum 96 hour LC50 value, using the *Mysidopsis bahia,* for drilling fluids and cuttings discharged in compliance with this permit is 3% of the Suspended Particulate Phase ("SPP") by volume. The Permittee shall demonstrate compliance with this limit for both drilling fluids and cuttings by conducting and reporting the results of a drilling fluids bioassay for each mud system which is used and discharged except as provided in Part II.A.3 below. Drilling fluid samples for the bioassay shall be taken at the time that maximum well footage is reached for each mud system (defined as at least 80% of the actual permitted well footage at the time of discharge within each interval during the drilling of the well for which a separate mud system is used and discharged).

The bioassay procedure to be used is "Drilling Fluids Toxicity Test" (Appendix 2 to Subpart A of 40 CFR Part 435). Bioassay results shall be submitted with the Well DMR (see note 5, Section II.A.1.)

3. Drilling Fluids Systems and Inventories

a. Drilling Fluids Inventory and Reporting Requirements. The Permittee shall maintain a precise inventory of all drilling fluid constituents added downhole for each well. The composition of each mud system used and discharged by the Permittee shall be reported to EPA. Mud composition data shall be submitted to EPA with the Well DMR. The Permittee shall report the following for <u>each</u> mud system: 1) base (generic) drilling fluid type, 2) product name and total amount (volume or weight) of each constituent in discharged drilling fluid; 3) the total volumes of drilling fluids discharged; and 4) the number of days of discharge. The permittee shall also report the estimated maximum concentration of each constituent in the discharged drilling fluid, if no toxicity test is conducted on the drilling fluid system.

b. Use of Generic Drilling Fluids. With the exception of the drilling fluids system discharged when the well reaches its maximum footage, the toxicity requirement shall be met by a toxicity test as described above in Part II.A.2.d or by the demonstration by the Permittee that a discharged drilling fluid complies with the requirements of (1), (2) or (3) below:

(1) The drilling fluid is generic as defined in Part II.A.3.c below.

(2) The drilling fluid is generic (excluding generic mud #1) and all specialty additives included in the fluid satisfy either of the following conditions:

(a) When each additive is included at its maximum concentration in generic fluid #7 (lightly treated lignosulfonate mud), the 96 hour LC50 value of the resulting fluid exceeds 100,000 ppm for the suspended particulate phase; or

(b) Other toxicity data is available for the additive upon which EPA may reasonably conclude that (a) above would be satisfied.

(3) The drilling fluid is generic and contains additives used in quantities such that the resulting whole fluid may, based on toxicity data for similar whole fluids or toxicity data for the additives, be shown to comply with the overall toxicity limit of 30,000 ppm. The Permittee shall be responsible for providing this demonstration of compliance. The method in "Separate and Joint Toxicity to Rainbow Trout of Substances Used in Drilling Fluids for Oil Exploration" (Sprague and Logan, *Environmental Pollution*, Volume 19, No. 4, August, 1979) may be used to estimate joint toxicity.

c. Generic Drilling Fluids. Hematite or other weighting materials may be substituted for barite at the following maximum allowable concentrations.

Table 2 - Generic Drilling Fluids

Generic Mud Number	Maximum Allowable Concentration (pounds/barrel)
1. Seawater/Potassium/Polymer Mud	
KCl	50
Starch	12
Cellulose Polymer	5
XC Polymer	2
Drilled Solids	100
Caustic	3
2. Seawater/Lignosulfonate Mud	
Attapulgite or Bentonite	50

Lignosulfonate Lignite Caustic Barite Drilled Solids Soda Ash/Sodium Bicarbonate Cellulose Polymer Seawater	15 10 4 450 100 2 5 As Needed
3. Lime Mud Lime Bentonite Lignosulfonate Lignite Barite Caustic Drilled Solids Soda Ash/Sodium Bicarbonate Freshwater	 20 50 15 10 180 5 100 2 As Needed
4. Nondispersed Mud Bentonite Acrylic Polymer Barite Drilled Solids Freshwater	 15 2 180 70 As Needed
5. Spud Mud (slugged intermittently with seawater) Attapulgite or Bentonite Caustic Cellulose Polymer Drilled Solids Barite Soda Ash/Sodium Bicarbonate Lime Seawater	 50 3 2 100 50 2 2 As Needed
6. Seawater Gel Mud Attapulgite or Bentonite Caustic Cellulose Polymer Drilled Solids Barite Soda Ash/Sodium Bicarbonate Lime	 50 3 2 100 50 2 2

Seawater	As Needed
7. Lightly Treated Lignosulfonate Freshwater/Seawater Mud	
Bentonite	50
Barite	180
Caustic	3
lignosulfonate	6
Lignite	4
Cellulose Polymer	2
Drilling Solids	100
Soda Ash/Sodium Bicarbonate	2
Lime	2
Seawater to Freshwater Ratio	1:1
8. Lignosulfonate Freshwater Mud	
Bentonite	5
Barite	450
Caustic	5
Lignosulfonate	15
Lignite	10
Drilling Solids	100
Cellulose Polymer	2
Soda Ash/Sodium Bicarbonate	2
Lime	2
Seawater to Freshwater Ratio	As Needed

d. Notice of Final Mud Dump. The Permittee shall provide verbal notice to EPA (or other Federal Agency designated by EPA at a later date) at least 48 hours prior to the final mud dump upon completion of each well. Reports during normal business hours shall be provided to the CWA Compliance Office, Water Division, at telephone number 415-972-3507. Twenty-four hour reporting may be made at 1-800-300-2193.

e. Restrictions on the Use of Mineral Oils in Drilling Fluids. Mineral oil may be used only as a carrier fluid (transporter fluid), lubricity additive, or pill.

4. Maximum Allowable Annual Discharge Volumes for Drilling Fluids, Cuttings and Excess Cement.

Table 3 - Maximum Discharge Volumes for Drilling Fluids, Cuttings and Excess Cement Slurry

Facility	Maximum Annual Allowable Cuttings discharged, bbls	Maximum Annual Allowable Drilling Fluids discharged, bbls	Maximum Annual Allowable Excess Cement Slurry Discharged, bbls
A	30,000	105,000	3,000
B	30,000	105,000	3,000
C	30,000	105,000	3,000
Edith	90,000	105,000	6,500
Ellen	18,150	49,950	1,200
Eureka	13,350	36,650	1,200
Gail	28,700	49,500	2,000
Gilda	30,000	105,000	2,500
Gina	30,000	105,000	2,500
Grace	28,700	49,500	2,000
Habitat	30,000	105,000	2,500
Harmony	40,000	200,000	4,000
Harvest	25,000	80,000	2,000
Henry	30,000	105,000	3,000
Heritage	40,000	200,000	4,000
Hermosa	25,000	80,000	2,000
Hidalgo	25,000	80,000	2,000
Hillhouse	30,000	105,000	3,000
Hogan	34,000	118,000	3,300
Hondo	40,000	200,000	4,000
Houchin	34,000	118,000	3,300
Irene	30,000	105,000	2,500

B. Produced Water (Discharge 002)

1. Platform-Specific Effluent Limits and Monitoring Requirements. Platform-specific effluent limitations and monitoring requirements are set forth in Appendix B.

a. Permittees with platforms not listed in Appendix B, which may discharge produced water during the term of this permit, shall follow the procedures of Appendix D in conducting an analysis of the reasonable potential of the discharges to cause or contribute to exceedances of applicable marine water quality criteria.

b. Monitoring for Constituents of Concern. For all platforms with produced water discharges, the constituents listed in Appendix D (Table D-1) shall be sampled at least once during the last two years of the term of this permit, and the results shall be submitted on the DMR at least 180 days before this permit expires. For platforms with a platform specific monitoring requirement in Appendix B, the permittee may substitute the sampling results conducted in accordance with Appendix B for constituents listed in Appendix D.

c. Dilution Ratio Changes. The permittee shall calculate the quarterly dilution value each quarter and submit the results with the DMR. If the quarterly dilution value decreases relative to the value at the time of the permit issuance, this permit may be reopened and modified to include additional effluent limitations and monitoring requirements based on the reasonable potential for the exceedance of a water quality criterion found in Appendix D, Table D-1.

2. Chronic Whole Effluent Toxicity (WET) Requirements

a. Monitoring Frequency. The permittee shall conduct quarterly chronic toxicity tests on 24-hour composite effluent samples. Following four consecutive quarters of Pass test results for a given species, annual tests are required for that species. However, quarterly tests would again be required following any Fail test result from an annual test until four consecutive Pass results are again obtained after which annual tests would be required.

Once each calendar year, during a different quarter of the year from the previous years, the permittee shall split a 24-hour composite effluent sample and concurrently conduct three toxicity tests using a fish, an invertebrate, and an alga species (see below for specific species information).

Chronic toxicity test samples shall be collected for each point of discharge at the designated NPDES sampling station for the effluent (i.e., downstream from the last treatment process and any in-plant return flows where a representative effluent sample can be obtained). During years ***1, 2, 3, 4, and 5*** of the permit, a split of each sample shall be analyzed for all other monitored parameters at the minimum frequency of analysis specified by the effluent monitoring program.

b. Species and EPA WET Test Methods. Species and short-term EPA WET test methods for estimating chronic toxicity are found in "Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine

Organisms," EPA/600/R-95/136, August 1995. The permittee shall conduct the following chronic toxicity tests:

• Red abalone (*Haliotis rufescens*) larval development test

• Giant kelp, *Macrocystis pyrifera,* germination and germ-tube length tests

• Topsmelt, *Atherinops affinis,* larval survival and growth tests

c. Chronic WET Permit Triggers and Effluent Limits

This permit includes either a chronic WET permit trigger or an effluent limit which vary with the platform and the species as set forth in Table 4 below. The permit trigger and the effluent limit are both any one WET test (either biological endpoint of survival or sublethal) where a test result is Fail (during the reporting period) at the chronic in-stream waste concentration (IWC). For this discharge, the IWC is the percent effluent subsequent to dilution in the mixing zone as determined in Appendix A of the permit. A WET test result of Fail requires certain follow-up actions by the permittee as described below which are the same for both permit triggers and effluent limits. However, where an effluent limit is specified in Table 4, a Fail result is also a violation of this permit.

Table 4 - Chronic WET Permit Triggers and Effluent Limits

Platform	**Red abalone**	**Giant kelp**	**Topsmelt**
A	permit trigger	permit trigger	effluent limit
B	permit trigger	permit trigger	effluent limit
Edith	permit trigger	effluent limit	effluent limit
Elly	permit trigger	permit trigger	permit trigger
Gail	permit trigger	permit trigger	permit trigger
Gilda	permit trigger	permit trigger	permit trigger
Gina	permit trigger	permit trigger	effluent limit
Habitat	permit trigger	effluent limit	effluent limit
Harmony	permit trigger	permit trigger	permit trigger
Harvest	permit trigger	permit trigger	permit trigger
Hermosa	permit trigger	permit trigger	effluent limit
Hidalgo	permit trigger	effluent limit	permit trigger
Hillhouse	permit trigger	effluent limit	effluent limit
Hogan	permit trigger	effluent limit	effluent limit

To calculate either a Pass or Fail of the multiple-effluent concentration chronic toxicity test at the IWC, follow the instructions in Appendix A in the *National Pollutant Discharge Elimination System Test of Significant Toxicity Implementation Document* (EPA/833-R-10-003). A Pass result indicates no toxicity at the IWC, and a Fail result indicates toxicity at the IWC. The permittee shall report either a Pass or a Fail on the DMR form. If a result is reported as Fail, the permittee shall follow Part II.B.2.g (Reporting of Chronic Toxicity Monitoring Results) of this permit.

d. Quality Assurance.

1) Quality assurance measures, instructions, and other recommendations and requirements are in the EPA WET test methods referenced above.

2) This permit is subject to a determination of Pass or Fail from a multiple-effluent concentration chronic toxicity test at the IWC (for statistical flowchart and procedures, see *National Pollutant Discharge Elimination System Test of Significant Toxicity Implementation Document*, Appendix A, Figure A-1).

3) Control and dilution water will be standard laboratory water. If organisms are cultured in-house and the dilution water used is different from culture water, a second control, using culture water shall also be used.

4) If organisms are not cultured in-house, then concurrent testing with a reference toxicant shall be conducted. If organisms are cultured in-house, then monthly reference toxicant testing is sufficient. Reference toxicant tests and effluent toxicity tests shall be conducted using the same test conditions (e.g., same test duration).

5) If either the reference toxicant or effluent toxicity tests do not meet all test acceptability criteria in the EPA WET test methods manual, then the permittee shall resample and retest within 14 days.

6) Following Paragraph 10.2.6.2 of the freshwater EPA WET test methods manual, all chronic toxicity test results from the multi-concentration tests required by this permit shall be reviewed and reported according to EPA guidance on the evaluation of concentration-response relationships in *Method Guidance and Recommendations for Whole Effluent Toxicity (WET) Testing (40 CFR Part 136)* (EPA/821/B-00-004, 2000).

7) One initial composite sample may be used for all renewals for the chronic seven day topsmelt larval growth and survival test, only if safety or unexpected process shut down does not allow for multiple sample renewals. The Permittee shall attempt to collect the three sample renewals.

8) If the discharged effluent is chlorinated, then chlorine shall not be removed from the effluent sample before toxicity testing without written approval by the permitting authority.

e. Initial Investigation TRE Work Plan

Within 90 days of the permit effective date, the permittee shall prepare and submit to the U.S. EPA Director a copy of its Initial Investigation Toxicity Reduction Evaluation (TRE) Work Plan (1–2 pages) for review. This plan shall contain steps the permittee intends to follow if toxicity is measured above a chronic WET permit limit or trigger and should include the following, at minimum:

1) A description of the investigation and evaluation techniques that would be used to identify potential causes and sources of toxicity, effluent variability, and treatment system efficiency.

2) A description of methods for maximizing in-house treatment system efficiency, good housekeeping practices, and a list of all chemicals used in operations at the facility.

3) If a Toxicity Identification Evaluation (TIE) is necessary, an indication of who would conduct the TIEs (i.e., an in-house expert or outside contractor).

f. Accelerated Toxicity Testing and TRE/TIE Process

1) If a chronic WET permit limit or trigger is exceeded and the source of toxicity is known (e.g., a temporary plant upset), then the permittee shall conduct one additional toxicity test using the same species and EPA WET test method. This WET test shall begin within 14 days of receipt of WET test results exceeding a chronic WET permit limit or trigger. If the additional toxicity test does not exceed a chronic WET permit limit or trigger, then the permittee may return to their regular testing frequency.

2) If a chronic WET permit limit or trigger is exceeded and the source of toxicity is not known, then the permittee shall conduct six additional toxicity tests using the same species and EPA WET test method, approximately every two weeks, over a 12 week period. This testing shall begin within 14 days of receipt of WET test results exceeding a chronic WET permit limit or trigger. If none of the additional toxicity tests exceed a chronic WET permit limit or trigger, then the permittee may return to their regular testing frequency.

3) If one of the additional toxicity tests (in paragraphs f.1 or f.2 above) exceeds a chronic WET permit limit or trigger, then, within 14 days of receipt of this WET test result, the permittee shall initiate a TRE using as guidance, the EPA TRE manual, *Generalized Methodology for Conducting Industrial Toxicity Reduction Evaluations* (EPA/600/2-88/070, 1989). In conjunction, the permittee shall develop and implement a Detailed TRE Work Plan which shall contain the following: further actions undertaken by the permittee to investigate, identify, and correct the causes of toxicity; actions the permittee will take to mitigate the effects of the discharge and prevent the recurrence of toxicity; and a schedule for such actions.

4) The permittee may initiate a TIE as part of a TRE to identify the causes of toxicity using the same species and EPA WET test method and, as guidance, EPA WET TIE/TRE method manuals: *Toxicity Identification Evaluation: Characterization of Chronically Toxic Effluents, Phase I* (EPA/600/6-91/005F, 1992); *Methods for Aquatic Toxicity Identification Evaluations, Phase II Toxicity Identification Procedures for Samples Exhibiting Acute and Chronic Toxicity* (EPA/600/R-92/080, 1993); *Methods for Aquatic Toxicity Identification Evaluations, Phase III Toxicity Confirmation Procedures for Samples Exhibiting Acute and Chronic Toxicity* (EPA/600/R-92/081, 1993).

g. Reporting of Chronic Toxicity Monitoring Results

1). The permittee shall submit a full laboratory report as an attachment to the DMR for all toxicity testing for the month in which the toxicity test was conducted; the laboratory report shall contain the following: the toxicity test results, the dates of sample collection and initiation of each toxicity test; all results for effluent parameters monitored concurrently with the toxicity test(s); and progress reports on TIE/TRE investigations.

2) The permittee shall provide the actual test endpoint responses for the control (i.e., control mean) and IWC concentration (i.e., IWC mean) for each WET test conducted to make it easier for permit writers to find the necessary WET test results when determining WET RP.

3) The permittee shall notify the U.S. EPA Region 9 Director in writing within 14 days of exceedance of a chronic WET permit limit or trigger. The notification shall describe actions the permittee has taken or will take to investigate, identify, and correct the causes of toxicity; the status of actions required by this permit; and schedule for actions not yet completed; or reason(s) that no action has been taken.

h. Reopener. In accordance with 40 CFR Parts 122 and 124, this permit may be modified to include effluent limitations or permit conditions to address chronic toxicity in the effluent or receiving waterbody, as a result of the discharge; or to implement new, revised, or newly interpreted water quality standards applicable to chronic toxicity.

3. Commingled Waste Streams. If workover, completion, well treatment or test fluids are mixed with produced water, then all of the effluent limitations and monitoring requirements applied to produced water shall apply and supersede limits for the separate waste streams. Likewise, if deck drainage is commingled with produced water, then all of the effluent limitations and requirements applied to produced water shall apply (Part II.B) and supersede limits for the separate discharge of deck drainage. If other authorized discharges are mixed with produced water, then all of the effluent limitations and monitoring requirements applied to produced water shall apply and supersede limits for the separate waste streams. If deck drainage, work over, completion, well treatment or test fluids or other authorized discharges are commingled with produced water, "commingled" shall be reported on the DMRs for both produced water and the waste stream mixed with it.

4. Table 5 - Maximum Annual Allowable Produced Water Discharges

Facility	Maximum Annual Allowable Produced Water Discharged, bbls
A	13,140,000
B	16,425,000
C	13,140,000

Edith	3,285,000
Elly	10,950,000
Eureka	Included with Elly
Gail	4,380,000
Gilda/Gina	25,500,000
Grace	2,190,000
Habitat	1,642,500
Harmony, Heritage, Hondo	33,762,500[note 1]
Harvest	32,850,000
Henry	6,570,000
Hermosa	40,250,000
Hidalgo	18,250,000
Hillhouse	7,300,000
Hogan	13,900,000
Houchin	13,900,000
Irene	55,845,000

Notes:

1. Any produced water volumes discharged from Hondo and Heritage platforms shall reduce the volume discharge at Harmony platform by an equal amount. Currently all produced water from Hondo and Heritage platforms is discharged at Platform Harmony as part of the Santa Ynez Unit operations.

5. Effluent Limitations.

a. Effluent Limitations and Monitoring Requirements. The discharge of produced water shall comply with the following effluent limitations and monitoring requirements.

Table 6 -Produced Water Effluent Limitations and Monitoring Requirements

Effluent Characteristic	Discharge Limitation	Measurement Frequency	Sample Type/Method	Reported Values
Flow rate (BWD)	--N/A-	Daily	Estimate	Monthly average
Oil and Grease	29 mg/l monthly avg. 42 mg/l daily max.	Weekly Weekly	Grab/Composite Grab/Composite	The average of daily values for 30 consecutive days; the maximum for any one day.

b. Test Method for Oil and Grease. The test method for oil and grease is EPA Method 1664.

The term *maximum for any one day* as applied to BPT, BCT and BAT effluent limitations for oil and grease in produced water shall mean the maximum concentration allowed as measured by the average of four grab samples collected over a 24-hour period that are analysed separately. Alternatively, one grab sample may be taken instead of four samples. If only one grab sample is taken for any one week, it must meet the maximum for any one day limit. If four samples are taken for oil and grease over a 24-hour period, the maximum value for reporting purposes under Part III.A.2.a.i. of the permit is the average of the four samples rather than the maximum of the four samples. EPA may reopen and modify this permit to require four samples of oil and grease in produced water taken at equally spaced intervals over a 24-hour period.

6. Monitoring Requirements. Monitoring must be conducted according to test procedures approved under 40 CFR Part 136, unless other test procedures are specified here or elsewhere in this permit. Samples for monitoring produced water toxicity and specific chemicals other than oil and grease shall be collected after addition of any added substances, including seawater, that are added prior to discharge, and before the flow is split for multiple ports.

7. Flow Rate with Flow Augmentation. When seawater or other flow augmentation is added to the produced water prior to discharge, the total produced water flow, including the added materials, shall be used in determining the dilution.

C. Well Treatment, Completion and Workover Fluids (Discharge 003)

1. Effluent Limitations. The discharge of well treatment, completion and workover fluids shall comply with the following effluent limitations and monitoring requirements.

Table 7 - Effluent Limitations and Monitoring Requirements

Waste Type	Effluent Characteristic	Discharge Limitation	Measurement Frequency	Sample Type/Methods	Reported Values
All	Number of Jobs	--N/A--	Once/job[1]	Count	Type & total number of jobs
	Discharge volume (Bbls)	--N/A--	Once/job	Estimate	Discharge Volume per Job
	Free Oil	No discharge	Once/discharge	Grab/Static Sheen test	Number of times sheen observed
	Oil and grease	42 mg/l max daily 29 mg/l monthly avg.	Once/job	Grab	Max for any one day and the average of daily values for 30 consecutive days

[1] The type of job where discharge occurs (i.e., treatment, completion, workover, or any combination) shall be reported.

2. Commingled Waste streams. If well treatment, completion or workover fluids are commingled with produced water, then effluent limitations and monitoring requirements for well treatment, completion and workover fluids do not apply. Effluent limitations and monitoring requirements for produced water apply. In addition, for a commingled discharge, the discharge volume of produced water and the discharge volume of well treatment, completion and workover fluids shall both be reported.

3. Chemical Inventory. The Permittee shall maintain an inventory of the quantities and concentrations of the specific chemicals used to formulate well treatment, completion and workover fluids. If there is a discharge of these fluids, the chemical formulation, concentrations and discharge volumes of the fluids shall be submitted with the DMR. For discharges of well treatment, completion and workover fluids, the type of operation that generated the discharge fluids shall also be reported.

D. Deck Drainage (Discharges 004)

1. Effluent Limitations. The Permittee shall comply with the following effluent limitations and monitoring requirements.

Table 8 - Effluent Limitations and Monitoring Requirements

Effluent Characteristic	Discharge Limitation	Measurement Frequency	Sample Type/Method	Reported Values
Flow rate (bbl/d)	--N/A--	Monthly	Estimate	Monthly Avg.
Free Oil	No Discharge	Daily, during discharge	Visual/Sheen on receiving water	Number of days sheen observed

2. Commingled Waste streams. If deck drainage is commingled with produced water, then effluent limitations and monitoring requirements for deck drainage do not apply. Effluent limitations and monitoring requirements for produced water apply.

E. Domestic and Sanitary Wastes (Discharges 005)

1. Effluent Limitations. The Permittee shall comply with the following effluent limitations and monitoring requirements.

Table 9 - Effluent Limitations and Monitoring Requirements

Waste Type	Effluent Characteristic	Discharge Limitation	Measurement Frequency	Sample Type/Method	Reported Values
Sanitary	Flow Rate (bbl/d)	--N/A--	Monthly	Estimate	Monthly Average
Domestic	Flow Rate (bbl/d)	--N/A--	Monthly	Estimate	Monthly Average
Sanitary[1,2] (Facilities continuously manned by nine (9) or fewer persons or only inter-mittently manned by any number	Floating Solids[1]	No discharge	Daily	Observation[3]	Number of days solids observed

of persons)					
Sanitary[1,2] (Facilities continuously manned by ten (10) or more persons)	Total Residual Chlorine (TRC)	Minimum of 1 mg/l and main-tain ed as close to this concentra-tion as possible; maximum concentra-tion is 10 mg/l.	Monthly	Grab	Concentration in mg/l
Domestic[4]	Foam or Floating Solids	No Discharge	Daily	Observation[3]	Number of days foam or floating solids observed

1 In cases where sanitary and domestic wastes are mixed prior to discharge, and sampling of the sanitary waste component stream is infeasible, the discharge may be sampled after mixing. In such cases, the discharge limitations for sanitary wastes shall apply to the mixed waste stream.

2 Any facility which properly operates and maintains a marine sanitation device ("MSD") that was certified by the United States Coast Guard ("USCG") under Section 312 of the Act shall be deemed to be in compliance with permit limitations for sanitary wastes and the requirements for total residual chlorine do not apply. The MSD shall be inspected yearly for proper operations, and inspection results maintained with the permit records.

3 Monitoring by visual observation of the surface of the receiving water in the vicinity of the outfall(s) shall be conducted during daylight hours.

4 The discharge of food waste is prohibited within 12 nautical miles from the nearest land. Comminuted food waste able to pass through a 25 mm mesh screen may be discharged more than 12 miles from the nearest land.

F. Miscellaneous Discharges (Discharges 006-022)

1. Effluent Limitations. The discharge of blowout preventer fluid (006); desalination unit discharges (007); fire control system water (008): noncontact cooling water (009); ballast and storage displacement water (010); bilge water (011); boiler blowdown (012); test fluids (013);

diatomaceous earth filter media (014); bulk transfer material overflow (015); uncontaminated water (016); water flooding discharges (017); laboratory wastes (018); excess cement slurry (019); muds, cuttings & cement at sea floor (020); hydrotest water (021); and H_2S gas processing waste water (022) shall comply with the following effluent limitations and monitoring requirements.

Table 10 - Effluent Limitations and Monitoring Requirements

Waste Type	Effluent Characteristic	Discharge Limitation	Measurement Frequency	Sample Type/Method	Reported Values
Noncontact Cooling Water, Ballast and Storage Displacement Water, Bilge Water, Test Fluids, Excess Cement Slurry, Hydrotest Water, H_2S Gas Processing Waste Water	Flow Rate (bbl/d)	--N/A--	Monthly	Estimate	Monthly Average
Blowout Preventer, Excess Cement Slurry, Water flooding, Muds, Cuttings & Cement at Sea floor, Ballast and Storage Displacement Water, Bilge Water, Test Fluids, Diatomaceous Earth Filter media, Laboratory Wastes, Hydrotest Water, H_2S Gas Processing	Free Oil	No discharge	Once/discharge for discharges lasting < 24 hours Once/24 hours for discharges lasting >24 hours	Visual sheen on receiving water	Number of days sheen observed

Waste Water					
Hydrotest Water, Fire Control System Test Water, Non-contact Cooling Waters, Test Fluids, Water Flooding Discharges	Chemical Inventory	--N/A--	Monthly	See Part II.F.3	–N/A--
Fire Control System Test Water, Noncontact Cooling Water, Hydrotest Water	Chlorine	Monitor only. See II.F.4 below.		Grab	ug/l
Discharges 006-022	Floating Solids and Foam	No Discharge	Once/Day	Visual Observation During Daylight Hours	Number of Days Floating Solids or Foam Observed

2. Ballast and Storage Displacement Water (010) and Bilge Water (011). Ballast and storage displacement water and bilge water shall be processed through an oil-water separator prior to discharge.

3. Chemical Inventory. The Permittee shall maintain an inventory of the quantities and application rates (concentration) of chemicals (other than fresh or seawater) added to listed discharges. The inventory shall be submitted with the DMR.

4. Chlorine Reasonable Potential Monitoring. Permittees not listed in Appendix C that initiate the addition of chlorine to a wastestream shall monitor for chlorine at end-of-pipe and follow the procedures of Appendix D in conducting an analysis of the reasonable potential of the discharges to cause or contribute to exceedances of applicable marine water quality criteria. For reasonable potential determinations, water quality criteria for chlorine in seawater are 7.5 ug/l (criteria continuous concentration) and 13 ug/l (criteria maximum concentration).

G. Other Discharge Conditions and Limitations

1. Surfactants, Dispersants, and Detergents. The discharge of surfactants, dispersants, and detergents shall be minimized except as necessary to comply with the safety requirements of the Occupational Health and Safety Administration and BSEE. The discharge of dispersants to marine waters in response to oil or other hazardous spills is not authorized by this permit.

2. Other Toxic and Non-conventional Compounds. There shall be no discharge of diesel oil, halogenated phenol compounds, or chrome lignosulfonate.

3. Produced Sands. There shall be no discharge of produced sands.

4. Tracer Materials. Radioactive tracer concentration above the background in the parent, discharged waste stream shall be limited as given in 10 CFR 20 Appendix B, Table II, Column 2, Effluent Concentrations, Water.

5. Reopener Clause.

a. This permit shall be modified, or alternatively, revoked and reissued, to comply with any applicable effluent standard or limitation issued or approved under Sections 301(b)(2)(C) and (D), 304(b)(2), and 307(a)(2) of the Act, as amended, if the effluent standard, limitation or requirement so issued or approved:

1) Contains different conditions or is otherwise more stringent than any condition in the permit; or

2) Controls any pollutant or disposal method not addressed in the permit.

The permit as modified or reissued under this paragraph shall also contain any other requirements of the Act then applicable.

6. On-Line Oil and Grease Monitors.

For all permittees that may discharge produced water, within one year of the effective date of this permit, the permittee shall do either of the following:

a. Install on-line monitoring equipment along with operating procedures ensuring that the operator is provided with rapid information concerning potential noncompliance with the effluent limits in this permit for oil and grease in produced water as follows:

1) for platforms with an average daily produced water discharge greater than 100,000 gal/day in the year prior to the permit effective date, install equipment providing real-time information or with a brief lag time such as one hour, or

2) for platforms with an average daily produced water discharge less than or equal to 100,000 gal/day in the year prior to the permit effective date, install equipment providing real-time information or with a lag time such as four hours, or

b. Provide information to Region 9 demonstrating that the operator has already installed monitoring equipment along with operating procedures meeting the above objective in 6.a.

7. Garbage

The discharge of "garbage" (as defined in Part V) is prohibited. Exception: comminuted food waste (able to pass through a 25 mm mesh screen) may be discharged when 12 nautical miles or more from the nearest land.

8. Cooling Water Intake Structure (CWIS) Requirements

Within one year of the effective date of this permit, each permittee operating a production or development facility covered by this permit with a cooling water discharge shall submit a report with the information described below. (Alternatively, permittees may jointly submit the information; joint submittals shall constitute compliance for those permittees who participate in submitting the information jointly.)

a. description of current CWIS and existing measures to minimize entrainment/impingement;

b. assessment of the environmental impacts from entrainment/impingement given current practices; and

c. practicality of additional measures to reduce environmental impacts from entrainment/impingement.

This permit may be reopened and modified to include additional effluent limits or monitoring requirements depending on the information in the report described above.

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III. MONITORING, RECORDING AND REPORTING REQUIREMENTS

A. Monitoring Procedures (40 CFR Part 122.41(j)(4)). Monitoring must be conducted according to test procedures approved under 40 CFR Part 136, unless other test procedures have been specified in the permit.

1. Additional Monitoring Requirements. For effluent monitoring, the Permittee shall utilize an EPA-approved test procedure with a minimum level ("ML") which is lower than the effluent limitations. The Permittee must utilize a standard calibration where the lowest standard point is equal to or less than the concentration of the minimum level, ("ML"). In accordance with 40 CFR 122.45(c), effluent analyses for metals shall measure "total recoverable metal."

2. Additional Reporting Requirements. The permittee shall report the analytical results on Discharge Monitoring Report (DMR) forms (EPA Form 3320-1), or alternatively monitoring results may also be submitted via EPA's NetDMR system.

a. Report for maximum daily effluent limitation (or if no limitation applies but samples are collected during the monthly reporting period):

i. The maximum value of all analytical results, if the maximum value is greater than the ML; or

ii. No discharge/no data (not quantifiable) (NODI (Q)), if the maximum value of all analytical results is greater than or equal to the laboratory's MDL, but less than the ML; or

iii. NODI (B) (below detection level)), if the maximum value of all analytical results is less than the laboratory's MDL.

b. Report for average monthly effluent limitation (or if no limitation applies but samples are collected during the monthly reporting period):

i. As directed for maximum daily effluent limitation, if only one sample is collected during the monthly reporting period; or

ii. The average value of all analytical results where 0 (zero) is substituted for NODI (B) and the laboratory's MDL is substituted for NODI (Q), if more than one sample is collected during the monthly reporting period.

c. Report as an attachment to the DMR form for each value reported under paragraphs 2.a and 2.b:

1. The number or title of the approved analytical method, preparation procedure utilized by the laboratory, and MDL or ML of the analytical method for the pollutant available under 40 CFR 136;

2. The laboratory's MDL for the analytical method computed in accordance with Appendix B of 40 CFR 136, the standard deviation (S) from the laboratory's MDL study, and the number of replicate analyses (*n*) used to compute the laboratory's MDL; and

3. The lowest calibration standard (i.e., the ML, or lower value).

B. Representative Sampling (40 CFR Part 122.41(j)(1)). Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.

C. Reporting Monitoring Results (40 CFR 122.41). The Permittee shall summarize monitoring results each month on the DMR form (EPA No. 3320-1)(40 CFR Part 122.41(l)(4)). or alternatively monitoring results may also be submitted via EPA's NetDMR system. The Permittee shall submit reports quarterly, postmarked by the 28th day of the month following each quarter, as scheduled below. The Permittee shall sign and certify all DMRs and all other reports, in accordance with the requirements of Part IV.(k) of this permit ("Signatory Requirements").

Quarterly DMR Reporting Periods	Facilities
Jan-Mar, Apr-Jun, Jul-Sep, Oct-Dec	A, B, C, Harvest, Ellen, Elly, Eureka, Harmony
Feb-Apr, May-Jul, Aug-Oct, Nov-Jan	Henry, Hillhouse, Habitat, Irene, Hermosa, Grace, Heritage
Mar-May, Jun-Aug, Sep-Nov, Dec-Feb	Edith, Gilda, Gina, Hidalgo, Gail, Hogan, Hondo, Houchin

D. Additional Monitoring by Permittee (40 CFR Part 122.41(l)(4)(ii)). If the permittee monitors any pollutant more frequently than required by this permit, using test procedures approved under 40 CFR Part 136 or as specified in this permit, the permittee shall include the results of this monitoring in the calculation and reporting of the data submitted in the DMR.

E. Records Contents (40 CFR 122.41(j)(3)). All records of monitoring information shall include:

1. The date, exact place, and time of sampling or measurements;
2. The individual(s) who performed the sampling or measurements;
3. The date(s) analyses were performed;
4. The individual(s) who performed the analyses;
5. The analytical techniques or methods used; and
6. The results of such analyzes.

F. Retention of Records (40 CFR 122.41(j)(2)) The permittee shall retain records of all monitoring information, including, all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least 3 years from the date of the sample, measurement, report or application. This period may be extended by request of the Director at any time. Records retained by the permittee in accordance with this requirement shall be maintained at the offshore facility.

IV. STANDARD CONDITIONS

(a) *Duty to comply (40 CFR Part 122.41(a)).* The Permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Clean Water Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application.

(1) The permittee shall comply with effluent standards or prohibitions established under section 307(a) of the Clean Water Act for toxic pollutants and with standards for sewage sludge use or disposal established under section 405(d) of the CWA within the time provided in the regulations that establish these standards or prohibitions or standards for sewage sludge use or disposal, even if the permit has not yet been modified to incorporate the requirement.

(2) The Clean Water Act provides that any person who violates section 301, 302, 306, 307, 308, 318, or 405 of the Act, or any permit condition or limitation implementing any such sections in a permit issued under section 402, or any requirement imposed in a pretreatment program approved under section 402(a)(3) or 402(b)(8) of the Act, is subject to a civil penalty not to exceed $25,000 per day for each violation. The Clean Water Act provides that any person who *negligently* violates sections 301, 302, 306, 307, 308, 318, or 405 of the Act, or any condition or limitation implementing any of such sections in a permit issued under section 402 of the Act, or any requirement imposed in a pretreatment program approved under section 402(a)(3) or 402(b)(8) of the Act is subject to criminal penalties of $2,500 to $25,000 per day of violation, or imprisonment of not more than 1 year, or both. In the case of a second or subsequent conviction for a negligent violation, a person shall be subject to criminal penalties of not more than $50,000 per day of violation, or by imprisonment of not more than 2 years, or both. Any person who *knowingly* violates such sections, or such conditions or limitations is subject to criminal penalties of $5,000 to $50,000 per day of violation, or imprisonment for not more than 3 years, or both. In the case of a second or subsequent conviction for a knowing violation, a person shall be subject to criminal penalties of not more than $100,000 per day of violations, or imprisonment of not more than 6 years, or both. Any person who knowingly violates section 301, 302, 303, 306, 307, 308, 318 or 405 of the Act, or any permit condition or limitation implementing any of such sections in a permit issued under section 402 of the Act, and who knows at that time that he thereby places another person in imminent danger of death or serious bodily injury, shall, upon conviction be subject to a fine of not more than $250,000 or imprisonment of not more than 15 years, or both. In the case of a second or subsequent conviction for a knowing endangerment violation, a person shall be subject to a fine or not more than $500,000 or by imprisonment of not more than 30 years, or both. An organization, as defined in section 309(c)(3)(B)(iii) of the CWA, shall, upon conviction of violating the imminent danger provision, be subject to a fine of not more than $1,000,000 and can be fined up to $2,000,000 for second or subsequent convictions.

(3) Any person may be assessed an administrative penalty by the Administrator for violating section 301, 302, 306, 307, 308, 318, or 405 of this Act, or any permit condition or limitation implementing any such sections in a permit issued under section 402 of this Act. Administrative penalties for Class I violations are not to exceed $10,000 per violation, with the maximum amount of any Class I penalty assessed not to exceed $27,500. Penalties for Class II violations are not to exceed $10,000 per day for each day during which the violation continues, with the maximum amount of any Class II penalty not to exceed $137,500.

(b) *Duty to reapply (40 CFR Part 122.41(b)).* If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit.

(c) *Need to halt or reduce activity not a defense (40 CFR Part 122.41(c))*. It shall not be a defense for the permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

(d) *Duty to mitigate (40 CFR Part 122.41(d)).* The Permittee shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

(e) *Proper operation and maintenance (40 CFR Part 122.41(e)).* The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit.

(f) *Permit actions (40 CFR Part 122.41(f)).* This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a modification of planned change or anticipated noncompliance does not stay any permit condition.

(g) *Property rights (40 CFR Part 122.41(g)).* This permit does not convey any property rights of any sort, or any exclusive privilege.

(h) *Duty to provide information (40 CFR Part 122.41(h)).* The permittee shall furnish to the Director, within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. The permittee shall also furnish to the director upon request, copies of records required to be kept by this permit.

(i) *Inspection and entry(40 CFR Part 122.41(i)).* The permittee shall allow the Director, or an authorized representative (including an authorized contractor acting as a representative of the Administrator), upon presentation of credentials and other documents as may be required by law, to:

(1) Enter upon the permittee’s premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

(2) Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

(3) Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and

(4) Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the Clean Water Act, any substances or parameters at any location.

(j) *Monitoring and records (40 CFR Part 122.41(j)).* (See Section III above)

The Clean Water Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000, or by imprisonment for not more than 2 years, or both. If a conviction of a person is for a violation committed after a first conviction of such person under this paragraph, punishment is a fine of not more than $20,000 per day of violation, or by imprisonment of not more than 4 years, or both. (40 CFR Part 122.41(j)(5))

(k) *Signatory requirement (40 CFR Part 122.41(k)).*

(1) All applications, reports, or information submitted to the Director shall be signed and certified. (See 40 CFR Part 122.22)

(2) The CWA provides that any person who knowingly makes any false statement, representation, or certification in any record or other documents submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or non-compliance shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than 6 months per violation, or by both.

(l) Reporting requirements (40 CFR Part 122.41(l)).

(1) *Planned changes.* The permittee shall give notice to the Director as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when:

(i) The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in 40 CFR Part 122.29(b); or

(ii) The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are subject neither to effluent limitations in the permit, nor to notification requirements under 40 CFR Part 122.42(a)(1).

(iii) The alteration or addition results in a significant change in the permittee’s sludge use or disposal practices, and such alteration, addition, or change may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional use or disposal sites not reported during the permit application process or not reported pursuant to an approved land application plan;

(2) *Anticipated noncompliance.* The permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

(3) *Transfers.* This permit is not transferable to any person except after notice to the Director. The Director may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary under the Clean Water Act. (See 40 CFR Part 122.61; in some cases, modification or revocation and reissuance is mandatory.)

(4) *Monitoring reports.* (See Section III above) Calculations for all limitations which require averaging of measurements shall utilize an arithmetic mean unless otherwise specified by the Director in the permit. (40 CFR Part 122.41(l)(4)(iii))

(5) *Compliance schedules.* Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit shall be submitted no later than 14 days following each schedule date. (40 CFR Part 122.41(l)(5))

(6) *Twenty-four hour reporting.* (40 CFR Part 122.41(l)(6))

(i) The Permittee shall report any noncompliance which may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the permittee became aware of the circumstances. Twenty-four hour reporting may be made at 1-800-300-2193. A written submission shall be provided within 5 days of the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its causes; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

(ii) The following shall be included as information which must be reported within 24 hours under this paragraph.

(A) Any unanticipated bypass which exceeds any effluent limitation in the permit (See §122.41(g)).

(B) Any upset which exceeds any effluent limitation in the permit.

(C) Violation of a maximum daily discharge limitation for any of the pollutants listed by the Director in the permit to be reported within 24-hours. (See 40 CFR Part 122.44(g)).

(iii) The Director may waive the written report on a case-by-case basis for reports under 40 CFR Part 122.41(l)(6)(ii) if the oral report has been received within 24 hours.

(7) *Other noncompliance.* The permittee shall report all instances of noncompliance, not reported under 40 CFR Part 122.41(l)(4), (5), and (6), at the time monitoring reports are submitted. The report shall contain the information in 40 CFR Part 122.41(l)(6).

(8) *Other information.* Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Director, it shall promptly submit such facts or information.

(m) *Bypass (40 CFR Part 122.41(m)).*

(1) Definitions.

(i) *Bypass* means the intentional diversion of waste streams from any portion of a treatment facility.

(ii) *Severe property damage* means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

(2) *Bypass not exceeding limitations.* The Permittee may allow any bypass to occur that does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of 40 CFR Part 122.41(m)(3) and (m)(4).

(3) *Notice.*

(i) *Anticipated bypass.* If the Permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least 10 days before the date of the bypass.

(ii) *Unanticipated bypass.* The permittee shall submit notice of an unanticipated bypass as required in 40 CFR Part 122.41(l)(6) (24-hour notice).

(4) *Prohibition of bypass*.

(i) Bypass is prohibited, and the Director may take enforcement action against the permittee for a bypass, unless:

(A) Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

(B) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and

(C) The Permittee submitted notices as required under 40 CFR Part 122.41(m)(3).

(ii) The Director may approve an anticipated bypass, after considering its adverse effects, if the Director determines that it will meet the three conditions listed above in 40 CFR Part 122.41(m)(4)(i).

(n) *Upset (40 CFR Part 122.41(n)).*

(1) *Definition.* *Upset* means an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

(2) *Effect of an upset.* An upset constitutes an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the requirements of paragraph (n)(3) of this section are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

(3) *Conditions necessary for demonstration of an upset.* A permittee who wishes to establish the affirmative defense of upset shall demonstrate through properly signed, contemporaneous operating logs, or other relevant evidence that:

(i) An upset occurred and that the Permittee can identify the cause(s) of the upset;

(ii) The permitted facility was at the time being properly operated; and

(iii) The permittee submitted notice of the upset as required in 40 CFR Part 122.41 (l)(6)(ii)(B) (24-hour notice).

(iv) The permittee complied with any remedial measures required under 40 CFR Part 122.41(d).

(4) *Burden of proof.* In any enforcement proceeding the permittee seeking to establish the occurrence of an upset has the burden of proof.

V. DEFINITIONS

"Acute-to-chronic ratio" (ACR) is the ratio of the acute toxicity of an effluent or a toxicant to its chronic toxicity. It is used as a factor for estimating chronic toxicity on the basis of acute toxicity data, or for estimating acute toxicity on the basis of chronic toxicity data.

"Acute toxic unit (TU_a)" is a measure of acute toxicity. The number of acute toxic units in the effluent is calculated as 100/LC50, where the LC50 is measured in percent effluent.

"Average of daily values for 30 consecutive days" shall be the average of the daily values obtained during any 30 consecutive day period. (40 CFR Part 435.11)

"Average monthly discharge limitation" means the highest allowable average of "daily discharges" over a calendar month, calculated as the sum of all "daily discharges" measured during a calendar month divided by the number of "daily discharges" measured during that month.

"Average quarterly flow" means the average of the "monthly average" wastewater flows as reported on the previous quarter's DMR, based only on those months in which discharges occurred.

"Bbl/d" means barrels per day. One barrel equals 42 United States gallons at 60 degrees Fahrenheit.

"Chronic toxic unit" (TU_c) is the reciprocal of the effluent concentration that causes no observable effect on the test organisms by the end of the chronic exposure period (e.g., 100/NOEC).

"Chronic toxicity" is defined as a long-term test in which sublethal effects (e.g., reduced growth or reproduction) are usually measured in addition to lethality. Chronic toxicity is defined as TUc = 100/NOEC or TUc = 100/EC or IC. The IC and EC value should be the approximate equivalent of the NOEC calculated by hypothesis testing for each test method.

"Coefficient of variation" (CV) is a standard statistical measure of the relative variation of a distribution of set of data, defined as the standard deviation divided by the mean.

"Composite sample" means a collection of individual samples obtained at regular intervals, usually based upon time or flow volume. (Permit Writers Guide) The compositing period should be appropriate to ensure representative sampling of the discharge.

"Cooling water intake structure" means the total physical structure and any associated constructed waterways used to withdraw cooling water from waters of the United States. The cooling water intake structure extends from the point at which water is withdrawn from the surface water source up to, and including, but not limited to, the intake pumps.

“Daily discharge” means the discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

“Daily values” as applied to produced water effluent limitations shall refer to the daily measurements used to assess compliance with the maximum for any one day. (40 CFR Part 435.11)

“Deck drainage” shall refer to any waste resulting from deck washings, spillage, rainwater, and runoff from gutters and drains including drip pans and work areas within facilities subject to this subpart. Within the definition of deck drainage for the purpose of this subpart, the term rainwater for those facilities located on land is limited to that precipitation runoff that reasonably has the potential to come into contact with process wastewater. Runoff not included in the deck drainage definition would be subject to control as storm water under 40 CFR Part 122.26. For structures located over water, all runoff is included in the deck drainage definition. (40 CFR Part 435.11)

“Development facility” shall mean any fixed or mobile structure subject to this subpart that is engaged in the drilling of productive wells. (40 CFR Part 435.11)

“Diesel oil” shall refer to the grade of distillate fuel, as specified in the American Society for Testing and Materials Standard Specifications D975-81, that is typically used as the continuous phase in conventional oil-based drilling fluids. (40 CFR Part 435.11)

“Dilution ratio, D_m” is the value calculated in accordance with Appendix A - dilution expressed in parts seawater per part wastewater.

“Director” means the Director, Water Division of EPA, Region 9.

“Domestic wastes” shall refer to materials discharged from, sinks, showers, laundries, safety showers, eye-wash stations, hand-wash stations, fish-cleaning stations, and galleys located within facilities subject to this subpart. (40 CFR Part 435.11)

“Drill cuttings” shall refer to the particles generated by drilling into subsurface geologic formations and carried to the surface with the drilling fluid. (40 CFR 435.11)

“Drilling fluid” means the circulating fluid (mud) used in the rotary drilling of wells to clean and condition the hole and to counterbalance formation pressure. A water-based drilling fluid is the conventional drilling mud in which water is the continuous phase and the suspended medium for solids, whether or not oil is present. An oil based drilling fluid has diesel oil, mineral oil, or some other oil as its continuous phase with water as the dispersed phase.

“Effect concentration” (EC) is a point estimate of the toxicant concentration that would cause an observable adverse effect (such as death, immobilization, or serious incapacitation) in a given percentage of the test organisms.

"Entrainment" means the incorporation of all life stages of fish and shellfish with intake water flow entering and passing through a cooling water intake structure and into a cooling water system.

"Excess Cement Slurry" means excess mixed cement, including additives and wastes from equipment washdown after a cementing operation.

"Exploratory facility" shall mean any fixed or mobile structure subject to this subpart that is engaged in the drilling of wells to determine the nature of potential hydrocarbon reservoirs. (40 CFR Part 435.11)

"Garbage" means all kinds of food wastes, wastes generated in living areas on the facility, and operational waste, excluding fresh fish and parts thereof, generated during the normal operation of the facility and liable to be disposed of continuously or periodically, except dishwater, graywater, and those substances that are defined or listed in other Annexes to MARPOL 73/78.

"Grab" sample is a single sample collected at a particular time and place that represents the composition of the wastestream only at that time and place.

"Graywater" means drainage from dishwater, shower, laundry, bath, and washbasin drains and does not include drainage from toilets, urinals, hospitals, and cargo spaces.

"Impingement" means the entrapment of all life stages of fish and shellfish on the outer part of an intake structure or against a screening device during periods of intake water withdrawal.

"Inhibition concentration" (IC) is a point estimate of the toxicant concentration that would cause a given percent reduction in a non-quantal biological measurement (e.g., reproduction or growth) calculated from a continuous model (e.g., USEPA Interpolation Method).

"LC_{50}" means the concentration of effluent that is acutely toxic to 50 percent of the test organisms exposed.

"Lowest observed effect concentration" (LOEC) is the lowest concentration of toxicant to which organisms are exposed in a test, which causes adverse effects on the test organisms (i.e., where the values for the observed endpoints are statistically significant different from the control).

"Maintenance waste" means materials collected while maintaining and operating the facility, including, but not limited to, soot, machinery deposits, scraped painted, deck sweepings, wiping wastes, and rags.

"Maximum" as applied to BAT effluent limitations for drilling fluids and drill cuttings means the maximum concentration allowed as measured in any single sample of the barite for determination of cadmium and mercury content (40 CFR 435.11).

"Maximum daily discharge limitation" means the highest allowable "daily discharge."

"Method detection limit (MDL)" means the minimum concentration of an analyte that can be detected with 99% confidence that the analyte concentration is greater than zero as determined by a specific laboratory method listed in 40 CFR Part 136. The procedure for determination of a laboratory MDL is in 40 CFR Part 136, Appendix B.

"Minimum" as applied to BAT effluent limitations for drilling fluids and drill cuttings shall mean the minimum 96-hour LC50 value allowed as measured in any single sample of the discharged waste stream. The term minimum as applied to BPT and BCT effluent limitations and NSPS for sanitary wastes shall mean the minimum concentration value allowed as measured in any single sample of the discharged waste stream. (40 CFR 435.11)

"Minimum dilution limit" means the lowest dilution ratio for the wastestream to avoid reasonable potential to exceed water quality criteria set forth in Appendix D of this permit.

"Minimum level" (ML) is the concentration at which the entire analytical system must give a recognizable signal and acceptable calibration point. The ML is the concentration in a sample that is equivalent to the concentration of the lowest calibration standard analyzed by a specific analytical procedure, assuming that all of the method-specified sample weights, volumes, and processing steps have been followed (as defined in EPA's draft National Guidance for the Permitting, Monitoring, and Enforcement of Water Quality-Based Effluent Limitations Set Below Analytical Detection/Quantitative Levels, March 22, 1994). Promulgated method-specified MLs are contained in 40 CFR Part 136, Appendix A and must be utilized if available. If a promulgated method-specific ML is not available, then an interim ML shall be calculated. The interim ML is equal to 3.18 times the promulgated method-specific MDL rounded to the nearest multiple of 1, 2, 5, 10, 50 etc.

"Minimum significant difference" (MSD) is the magnitude of difference from control where the null hypothesis is rejected in a statistical test comparing a treatment with a control. MSD is based on the number of replicates, control performance and power of the test.

"Mixing zone" means the zone extending from the sea's surface to seabed and extending laterally to a distance of 100 meters in all directions from the discharge point or to the boundary of the zone of initial dilution as calculated by a plume model or other method approved by the Regional Administrator, whichever is larger (40 CFR 125.121(c)).

"mg/kg" means milligrams per kilogram.

"mg/l" means milligrams per liter.

"Monthly average" means the average of "daily discharges" over a monitoring month calculated as the sum of all "daily discharges" measured divided by the number of "daily discharges" measured during that month.

“M9IM” shall mean those offshore facilities continuously manned by nine (9) or fewer persons or only intermittently manned by any number of persons. (40 CFR 435.11)

“M10” shall mean those offshore facilities continuously manned by ten (10) or more persons. (40 CFR 435.11)

“New source” means any facility or activity of this subcategory that meets the definition of “new source” under 40 CFR Part 122.2 and meets the criteria for determination of new sources under 40 CFR 122.29(b) applied consistently with all of the following definitions:

(1) The term *water area* as used in the term “site” in 40 CFR 122.29 and 122.2 shall mean the water area and ocean floor beneath any exploratory, development, or production facility where such facility is conducting its exploratory, development or production activities.
(2) The term *significant site preparation work* as used in 40 CFR 122.29 shall mean the process of surveying, clearing or preparing an area of the ocean floor for the purpose of constructing or placing a development or production facility on or over the site. “New Source” does *not* include facilities covered by an existing NPDES permit immediately prior to the effective date of these guidelines pending EPA issuance of a new source NPDES permit. (40 CFR Part 435.11)

“No discharge of free oil” shall mean that waste streams may not be discharged when they would cause a film or sheen upon or a discoloration of the surface of the receiving water or fail the static sheen test defined in Appendix 1 to 40 CFR 435, Subpart A. (40 CFR 435.11)

“Non-aqueous based drilling fluid” is one in which the continuous phase is a water immiscible fluid such as an oleaginous material (e.g., mineral oil, enhanced mineral oil, paraffinic oil, or synthetic material such as olefins and vegetable esters).

“No observed effect concentration” (NOEC) is the highest concentration of toxicant to which organisms are exposed in a full life-cycle or partial life-cycle (short-term) tests, that causes no observable adverse effect on the test organisms (i.e., the highest concentration of toxicant at which the values for the observed responses are <u>not</u> statistically significant different from the controls). NOECs calculated by hypothesis testing are dependent upon the concentrations selected.

“Operational waste” means all cargo associated waste, maintenance waste, cargo residues, and ashes and clinkers from incinerators and coal burning boilers.

“Produced sands” shall refer to slurried particles used in hydraulic fracturing, the accumulated formation sands and scales particles generated during production. Produced sand also includes desander discharge from the produced water waste stream, and blowdown of the water phase from the production water treating system. (40 CFR Part 435.11)

“Produced water” shall refer to the water (brine) brought up from the hydrocarbon-bearing strata during the extraction of oil and gas, and can include formation water, injection water, and any chemicals added downhole or during the oil/water separation process. (40 CFR 435.11)

"Production facility" shall means any fixed or mobile structure subject to this subpart that is either engaged in well completion or used for active recovery of hydrocarbons from producing formations. (40 CFR 435.11)

"Quarterly dilution value" means the dilution ratio using the "average quarterly flow."

"Reference toxicant test" indicates the sensitivity of the organisms being used and the suitability of the test methodology. Reference toxicant data are part of routine QA/QC program to evaluate the performance of laboratory personnel and test organisms.

"Sanitary wastes" shall refer to human body waste discharged from toilets and urinals located within the facilities subject to this subpart. (40 CFR 435.11)

"Significant difference" is defined as statistically significant difference (e.g., 95% confidence level) in the means of two distributions of sampling results.

"Static sheen test" shall refer to the standard test procedures that has been developed for this industrial subcategory for the purpose of demonstrating compliance with the requirement of no discharge of free oil The methodology for performing the static sheen test is presented in Appendix 1 to 40 CFR 435, subpart A. (40 CFR 435.11)

"Test acceptability criteria" (TAC) For toxicity tests results to be acceptable for compliance, the effluent and the concurrent reference toxicant must meet specific criteria as defined in the test method (e.g., *Ceriodaphnia dubia* survival and reproduction test, the criteria are: the test must achieve at least 80% survival and average 15 young/female in the controls, and achieve a MSD of 20%).

"Toxicity" as applied to BAT effluent limitations for drilling fluids and drill cuttings shall refer to the bioassay test procedure presented in Appendix 2 of 40 CFR Part 435, subpart A. (40 CFR Part 435.11)

"Toxicity identification evaluation" (TIE) is a set of procedures to identify the specific chemical(s) responsible for effluent toxicity. TIEs are a subset of the TRE.

"Toxicity reduction evaluation" (TRE) is a site-specific study conducted in a stepwise process designed to identify the causative agents of effluent toxicity, isolate the sources of toxicity, evaluate the effectiveness of toxicity control options, and then confirm the reduction in effluent toxicity.

"Toxicity tests" are laboratory experiments which employ the use of standardized test organisms to measure the adverse effect (e.g., growth, survival or reproduction) of effluent or ambient waters.

"Well completion fluids" shall refer to salt solutions, weighted brines, polymers, and various additives used to prevent damage to the well bore during operations which prepare the drilled well for hydrocarbon production. (40 CFR Part 435.11)

"Well treatment fluids" shall refer to any fluid used to restore or improve productivity by chemically or physically altering hydrocarbon-bearing strata after a well has been drilled. (40 CFR Part 435.11)

"Whole effluent toxicity" (WET) is the total toxic effect of an effluent or receiving water measured directly with a toxicity test.

"Workover fluids" shall refer to salt solutions, weighted brines, polymers, or other specialty additives used in a producing well to allow for maintenance, repair or abandonment procedures. (40 CFR Part 435.11)

"96-hour LC50" shall refer to the concentration (parts per million) or percent of the suspended particulate phase (SPP) from a sample that is lethal to 50 percent of the test organism exposed to that concentration of the SPP after 96 hours of constant exposure. (40 CFR Part 435.11)

"µg/l" means micrograms per liter.

Appendix A-Dilution

A. Calculation of Effluent Concentration at the Point of Compliance

Effluent limitations for parameters identified in Appendices B and C shall be determined through the use of the following equation: $C_o = (C_e + D_mC_s)/(D_m + 1)$

where C_o = Concentration at the edge of the mixing zone,
C_e = the end-of-pipe effluent concentration,
C_s = the background seawater concentration (see Table 1), and
D_m = the dilution ratio expressed in parts seawater per part wastewater.

On the DMR required in Part III.C, the Permittee shall report post-dilution results (C_o) so as to be directly comparable to the limits specified in Appendices B and C. The end-of-pipe sampling results (C_e) and dilution ratio (D_m) shall be submitted as a supplement to the DMR.

Table 1. Seawater Background Concentrations (Cs)

Constituent	Cs (ug/l)
Arsenic	3
Copper	2
Mercury	0.0005

Silver	0.16
Zinc	8

For waste constituents not listed in Table 1, the seawater background concentration (C_s) is assumed to be 0 mg/l.

B. Calculation of Dilution

The dilution ratio at the point of compliance shall be determined by permittees using the model PLUMES (3rd Edition or later editions when available) with specific input conditions. Specific instructions follow below.

Permittees wishing to increase mixing may do so by using a diffuser or diffusers, adding sea water to the effluent, or installing multiple discharge ports.

Hydraulic considerations may indicate that flow rates from equal sized ports connected to a common vertical down-pipe will vary with depth. Permittees may adjust flows from individual ports by varying the port diameters. In this case, a "discharge volume" weighted average port diameter may be used in Parts 4 through 6, below, when determining the dilution ratio as long as the maximum and minimum port diameters are within 50 percent of each other. On the other hand, if ports of equal size are used, the average flow rate through a port may be used when determining the dilution ratio as long as the maximum and minimum port flow rates are within 20 percent of each other. Port sizes or port flow rates outside the range of these conditions shall have the dilution ratio calculated separately for each port and the lowest dilution ratio that is obtained shall be used to demonstrate compliance with the effluent limitations identified in Part II.B and II.F.

1. Determination of the Dilution Ratio Using PLUMES. The permittee shall use site specific values for the following discharge and ambient conditions:

a. Discharge Conditions. Effluent temperature at the port and salinity (which determine effluent density), discharge rate, decay coefficient, port diameter (for single port discharges or multiple port discharges that do not merge), diffuser configuration (port diameter and spacing, number of ports), and port orientation (dip angle and azimuth).

b. Ambient Conditions. Current speed (median value is acceptable), ambient density at the port, ambient density gradient

c. Typical Conditions. In lieu of using site specific ambient conditions, a permittee may utilize the following typical Southern California OCS ambient conditions in the model: current speed = 0.115 m/s, ambient density at discharge port = 1025.6 kg/m3, ambient density gradient = 0.01 kg/m3/m.

d. When sea water is added to produced water prior to discharge, the total produced water flow, including the added sea water, shall be used in determining the dilution ratio.

e. The permittee shall retain calculation sheets showing how the dilution ratio was determined.

2. Use of the PLUMES Model. The permittee shall use the "UM" module of the PLUMES model. Printed output listings (direct output to "prn") from PLUMES which are used to determine the critical dilution ratio shall be retained as part of the permittee's NPDES records. The dilution ratio is the value in the second column at the end of the output listing when the "far dis" field (see below) is set to the point of compliance. This is the dilution ratio determined according to the 4/3 power law. Settings of individual fields of the PLUMES input screen are discussed in the following paragraphs.

a. Configuration String. The permittee shall ensure that the configuration string shown near the bottom of the PLUMES input screen is set appropriately for the conditions being modeled. For example, if conditions are such that the plume direction will reverse near the discharge port, it is appropriate to set the configuration screen to read "ATNM2". If there is no such reversal, it is appropriate to retain the default configuration string "ATNO0".

b. "Linear" vs. "non-linear" mode. PLUMES may be run in linear mode (i.e., specifying ambient densities and effluent densities only) according to the results of the following test using Figure 1 of this Appendix. In Figure 1, compute (A) the absolute value of the difference (in practical salinity units) between the effluent salinity and the salinity at the effluent temperature for which the density is the same as the ambient density; compute (B) the absolute value of the effluent temperature minus the ambient temperature in degrees C. Linear mode can only be used when the ratio of A over B is greater than 0.5.

c. Far-field distance ("far dis" field). This should be set to 100 meters (i.e., the outer edge of the mixing zone).

d. Far-field increment ("far inc" field). This should be set so that an integer multiple equals 100. The value 20 is suggested.

e. Print frequency ("print frq" field). Normally the default value should be used here. In certain instances, the initial dilution ratio calculation may extend beyond 100 meters (this will be necessary to calculate dilution at the seaward boundary of the territorial seas of the State of California). In such cases the initial dilution ratio calculation will have to be interpolated to determine the critical dilution ratio at 100 meters. Setting "print frq" to a smaller value (say 10) will provide the necessary resolution.

f. Vertical angle ("ver angle" field). A port pointing straight down will have a vertical angle of -90. A port pointing straight up will have a vertical angle of 90. A horizontal port will have a vertical angle of zero.

g. Contraction Coefficient (“cont coef” field). For discharges from a straight pipe, the contraction coefficient shall be set to 1.0. For discharges from a port that is a sharp edged orifice for which the exit velocity based on the area of the orifice is greater than 0.5 m/s, the contraction coefficient shall be set to 0.61.

h. Far-field dissipation parameter (“far dif” field). This input variable should be set to 0.000462 [m^(2/3)]/s, a value appropriate for the California OCS.

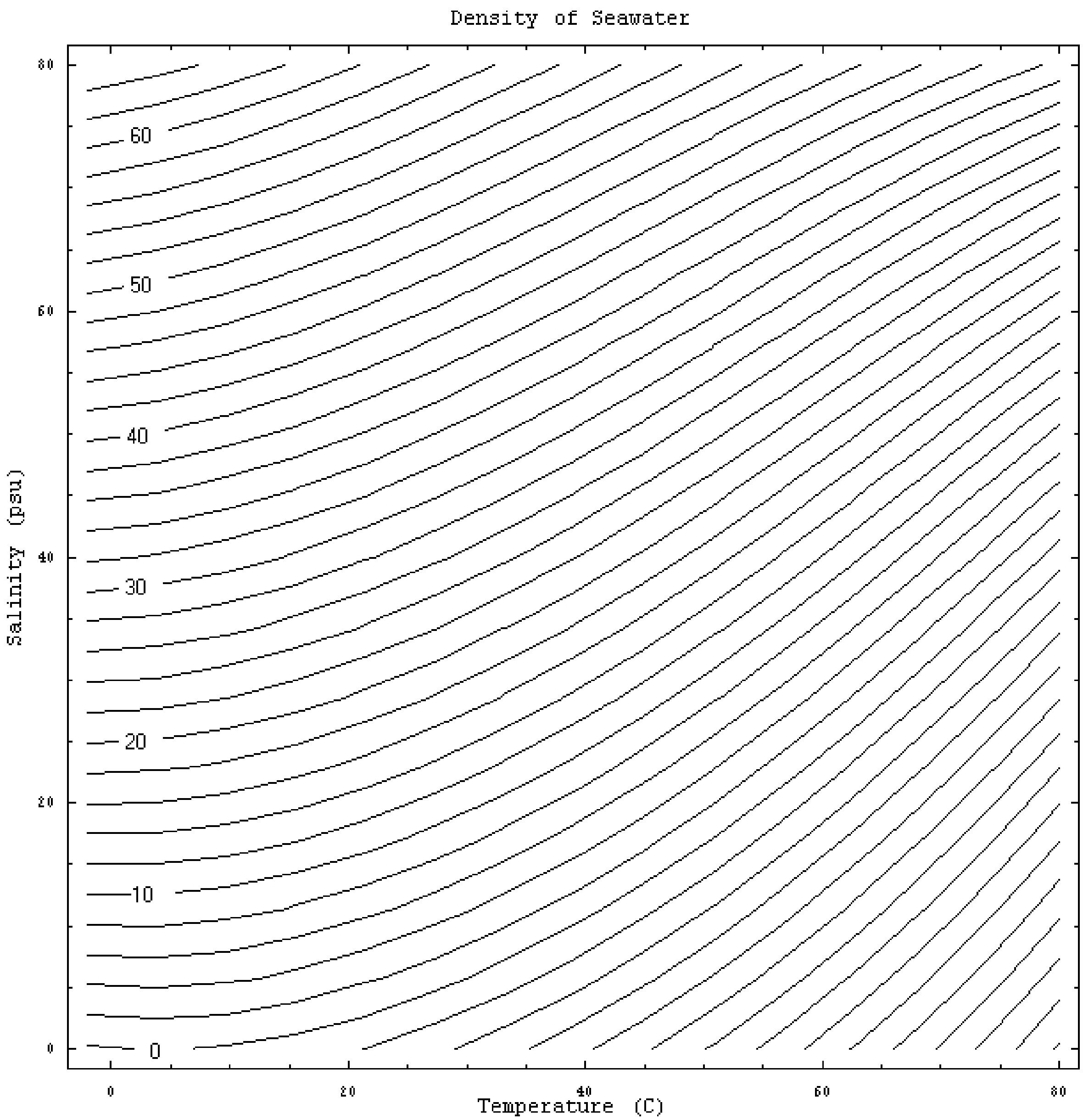
i. Far-field velocity (“far vel” field). This variable shall be set to the same value as used in the current profile (“current” fields in the lower left quadrant of the input screen).

j. Ambient density (“density” in the lower left quadrant of the input screen). In linear mode, these values should be set to provide the required linear density gradient and the required ambient density at the discharge port. In non-linear mode, these values will be calculated by PLUMES.

k. Ambient salinity and temperature (“salinity” and “temp” fields). In non-linear mode, these values are specified such that the required linear density gradient and the required ambient density at the discharge point are obtained.

For the analysis of horizontal diffusers with multiple ports or multiple discharge points spaced horizontally, the “#_ports” and “spacing” fields must be set appropriately. In case of parallel currents, where the velocity vector lies less than 20 degrees off the diffuser axis, a minimum value of 20 degrees should be specified. For example, a cross-current is specified by a horizontal angle of 90 degrees. A current flowing obliquely across the diffuser at 45 degrees would have a horizontal angle value of 45 degrees. This angle should be between 45 and 135 degrees.

Figure 1. Density (sigma-t) Contours



Appendix B - Platform Specific Requirements for Produced Water

The effluent limitations (where applicable) in the following tables are applicable following initial dilution in the mixing zone defined in Part V of the general permit. Compliance with the limits shall be calculated in accordance with Appendix A of the general permit. The monthly sample must comply with the more stringent of the maximum daily or monthly average effluent limit.

Table B-1 - Requirements for Platform A

Constituent	Maximum Daily Limit	Average Monthly Limit	Measurement Frequency	Sample Type	Reported Values
Copper			Once/year	Grab	Daily Max
Benzo (a) Pyrene			Once/year	Grab	Daily Max
Benzo (b) Fluoranthene			Once/year	Grab	Daily Max
Benzo (k) Fluoranthene			Once/year	Grab	Daily Max

Table B-2 - Requirements for Platform B

Constituent	Maximum Daily Limit	Average Monthly Limit	Measurement Frequency	Sample Type	Reported Values
Benzo (a) Pyrene			Once/year	Grab	Daily Max
Benzo (k) Fluoranthene			Once/year	Grab	Daily Max
Benzo (b) Fluoranthene			Once/year	Grab	Daily Max

Table B-3 - Requirements for Platform Edith

Constituent	Maximum Daily Limit	Average Monthly Limit	Measurement Frequency	Sample Type	Reported Values
Zinc			Once/year	Grab	Daily Max

Table B-4 - Requirements for Platform Elly

Constituent	Maximum Daily Limit	Average Monthly Limit	Measurement Frequency	Sample Type	Reported Values
Zinc			Once/year	Grab	Daily Max

Table B-5 - Requirements for Platform Gail

Constituent	Maximum Daily Limit	Average Monthly Limit	Measurement Frequency	Sample Type	Reported Values
Benzene			Once/year	Grab	Daily Max
Benzo (a) Pyrene			Once/year	Grab	Daily Max
Undissociated Sulfide	0.00579 mg/l	0.00167 mg/l	Once/month	Grab	Daily Max and Monthly Ave

Table B-6 - Requirements for Platform Gilda

Constituent	Maximum Daily Limit	Average Monthly Limit	Measurement Frequency	Sample Type	Reported Values
Copper			Once/year	Grab	Daily Max
Benzo (a) Anthracene			Once/year	Grab	Daily Max
Benzo (a) Pyrene			Once/year	Grab	Daily Max
Benzo (k) Fluoranthene			Once/year	Grab	Daily Max
Benzo (b) Fluoranthene			Once/year	Grab	Daily Max
Chrysene			Once/year	Grab	Daily Max

Dibenzo (a,h) Anthracene			Once/year	Grab	Daily Max
Undissociated Sulfide	0.00579 mg/l	0.00139 mg/l	Once/month	Grab	Daily Max and Monthly Ave

Table B-7 - Requirements for Platform Gina

Constituent	Maximum Daily Limit	Average Monthly Limit	Measurement Frequency	Sample Type	Reported Values
Ammonia			Once/year	Grab	Daily Max
Copper			Once/year	Grab	Daily Max
Benzo (a) Pyrene			Once/year	Grab	Daily Max
Benzo (k) Fluoranthene			Once/year	Grab	Daily Max
Benzo (b) Fluoranthene			Once/year	Grab	Daily Max

Table B-8 - Requirements for Platform Habitat

Constituent	Maximum Daily Limit	Average Monthly Limit	Measurement Frequency	Sample Type	Reported Values
Copper			Once/year	Grab	Daily Max
Benzene			Once/year	Grab	Daily Max
Benzo (a) Pyrene			Once/year	Grab	Daily Max
Benzo (k) Fluoranthene			Once/year	Grab	Daily Max
Benzo (b) Fluoranthene			Once/year	Grab	Daily Max
Dibenzo (a,h) Anthracene			Once/year	Grab	Daily Max

Undissociated Sulfide			Once/year	Grab	Daily Max

Table B-9 - Requirements for Platform Harmony

No requirements

Table B-10 - Requirements for Platform Harvest

Constituent	Maximum Daily Limit	Average Monthly Limit	Measurement Frequency	Sample Type	Reported Values
Ammonia			Once/year	Grab	Daily Max
Copper			Once/year	Grab	Daily Max
Benzene	0.022 mg/l	0.0059 mg/l	Once/month	Grab	Daily Max and Monthly Ave
Benzo (a) Anthracene			Once/year	Grab	Daily Max
Benzo (a) Pyrene			Once/year	Grab	Daily Max
Benzo (k) Fluoranthene			Once/year	Grab	Daily Max
Benzo (b) Fluoranthene			Once/year	Grab	Daily Max
Chrysene			Once/year	Grab	Daily Max
Dibenzo (a,h) Anthracene			Once/year	Grab	Daily Max
Undissociated Sulfide	0.00579 mg/l	0.00399 mg/l	Once/month	Grab	Daily Max and Monthly Ave

Table B-11 - Requirements for Platform Hermosa

Constituent	Maximum Daily Limit	Average Monthly Limit	Measurement Frequency	Sample Type	Reported Values
Copper			Once/year	Grab	Daily Max
Benzene			Once/year	Grab	Daily Max
Benzo (a) Anthracene			Once/year	Grab	Daily Max
Benzo (a) Pyrene			Once/year	Grab	Daily Max
Benzo (k) Fluoranthene			Once/year	Grab	Daily Max
Benzo (b) Fluoranthene			Once/year	Grab	Daily Max
Chrysene			Once/year	Grab	Daily Max
Dibenzo (a,h) Anthracene			Once/year	Grab	Daily Max
Undissociated Sulfide	0.00577 mg/l	0.0049 mg/l	Once/month	Grab	Daily Max and Monthly Ave

Table B-12 - Requirements for Platform Hidalgo

Constituent	Maximum Daily Limit	Average Monthly Limit	Measurement Frequency	Sample Type	Reported Values
Benzene			Once/year	Grab	Daily Max
Benzo (k) Fluoranthene			Once/year	Grab	Daily Max
Benzo (b) Fluoranthene			Once/year	Grab	Daily Max
Chrysene			Once/year	Grab	Daily Max
Undissociated Sulfide			Once/year	Grab	Daily Max

Table B-13 - Requirements for Platform Hillhouse

Constituent	Maximum Daily Limit	Average Monthly Limit	Measurement Frequency	Sample Type	Reported Values
Benzo (a) Anthracene			Once/year	Grab	Daily Max
Benzo (a) Pyrene			Once/year	Grab	Daily Max
Benzo (k) Fluoranthene			Once/year	Grab	Daily Max
Benzo (b) Fluoranthene			Once/year	Grab	Daily Max
Chrysene			Once/year	Grab	Daily Max
Dibenzo (a,h) Anthracene			Once/year	Grab	Daily Max

Table B-14 - Requirements for Platform Hogan

Constituent	Maximum Daily Limit	Average Monthly Limit	Measurement Frequency	Sample Type	Reported Values
Copper			Once/year	Grab	Daily Max
Hexavalent Chromium			Once/year	Grab	Daily Max
Benzene	0.0176 mg/l	0.0059 mg/l	Once/month	Grab	Daily Max and Monthly Ave
Benzo (a) Pyrene			Once/year	Grab	Daily Max
Benzo (k) Fluoranthene			Once/year	Grab	Daily Max
Benzo (b) Fluoranthene			Once/year	Grab	Daily Max
Dibenzo (a,h) Anthracene			Once/year	Grab	Daily Max

Appendix C - Platform Specific Requirements for Chlorine in Cooling Water and Fire Control System Test Water Discharges

The effluent limitations for chlorine in the following tables are applicable following initial dilution in the mixing zone defined in Part V of the general permit. Compliance with the limits shall be determined through the use of the following equation:

$$C_o = C_e / (1 + D_m)$$

Where C_o = the concentration at the edge of the mixing zone,
C_e = the end-of-pipe concentration prior to dilution, and
D_m = the dilution ratio expressed in parts seawater per part wastewater.

On the Discharge Monitoring Report (DMR) required by Part III.C of the general permit, the permittee shall report post-dilution results (C_o) so as to be directly comparable to the effluent limits in the tables. The end-of-pipe sampling result (C_e) and D_m shall be submitted as a supplement to the DMR.

Table C-1 – Effluent Limitations and Monitoring Requirements for Cooling Water

Platform	Maximum Daily Limit	Average Monthly Limit	Measurement Frequency	Sample Type	Reported Values
Ellen*	0.0104 mg/l	0.00583 mg/l	Once/quarter	Grab	Daily Max and Monthly Ave
Elly	0.0102 mg/l	0.00585 mg/l	Once/quarter	Grab	Daily Max and Monthly Ave
Eureka*	0.0102 mg/l	0.00585 mg/l	Once/quarter	Grab	Daily Max and Monthly Ave
Gail			Once/year	Grab	Daily Max and Monthly Ave
Grace			Once/year	Grab	Daily Max and Monthly Ave
Harvest	0.0104 mg/l	0.00583 mg/l	Once/quarter	Grab	Daily Max and Monthly Ave
Hermosa			Once/year	Grab	Daily Max and Monthly Ave
Hidalgo			Once/year	Grab	Daily Max and Monthly Ave
Irene	0.013 mg/l	0.00526 mg/l	Once/quarter	Grab	Daily Max and Monthly Ave

*For Platforms Ellen and Eureka, the permittee shall separately demonstrate compliance with these effluent limits for discharges of cooling water only and for cooling water mixed with excess chlorinated seawater. The permittee may sample cooling water or cooling water mixed with excess chlorinated seawater for the demonstration.

Table C-2 – Effluent Limitations and Monitoring Requirements for Fire Control System Test Water

Platform	Maximum Daily Limit	Average Monthly Limit	Measurement Frequency	Sample Type	Reported Values
Harvest	0.0123 mg/l	0.00560 mg/l	Once/quarter	Grab	Daily Max and Monthly Ave
Hermosa	0.000953 mg/l	0.00595 mg/l	Once/quarter	Grab	Daily Max and Monthly Ave
Hidalgo	0.0114 mg/l	0.00570 mg/l	Once/quarter	Grab	Daily Max and Monthly Ave

Appendix D – Reasonable Potential Procedures for Platforms Not Included in Appendix B or C

The following procedures are applicable to platforms (other than those platforms listed in Appendix B) which discharge produced water, and to platforms (other than those listed in Appendix C) which add chlorine to any discharges (e.g., cooling water or fire control system test water). For produced water discharges, the Permittee shall sample (as described below) for the constituents listed in Table D-1 to determine whether the discharge causes or has the reasonable potential to cause, or contribute to an excursion above the applicable marine water quality criteria. When chlorine is added to a discharge, the Permittee shall sample chlorine in the discharge (as described below) and conduct the same reasonable potential analysis as in the case of produced water; for chlorine, the marine water quality criteria to be met (post-dilution at the edge of the mixing zone) are 7.5 ug/l (criteria continuous concentration) and 13 ug/l (criteria maximum concentration).

Table D-1 - Water Quality Criteria (in ug/l) for Produced Water Reasonable Potential Determination

Constituent	Water Quality Criteria (ug/l)[1,2]
Ammonia	1300[3]/600
Arsenic	36/8
Cadmium	8.8/1
Copper	3.1/3
Cyanide	1/1
Lead	8.1/2
Manganese	100
Mercury	0.051/0.04
Nickel	8.2/5
Selenium	71/15
Silver	1.9/0.7
Zinc	81/20
Benzene	5.9
Benzo (a) Anthracene	0.018
Benzo (a) Pyrene	0.018
Chrysene	0.018
Benzo (k) Fluoranthene	0.018
Benzo (b) Fluoranthene	0.018

Dibenzo (a,h) Anthracene	0.018
Hexavalent Chromium[4]	50/2
Phenol	1,700,000
Toluene	15,000
Ethylbenzene	2,100
Naphthalene	not available
2,4-Dimethylphenol	850
Undissociated Sulfides[5]	5.79

[1] Where two numbers are given, the first number is the Federal criterion (EPA-822-R-02-047, November, 2002, or 68 Fed. Reg. 75507 (December 31, 2003)) and the second is the objective from the California Ocean Plan. For each such parameter, the applicable criterion is the one which proves to be more stringent based on the analysis required by Part II.B.1.c.1 of this permit. Where one number is given, it is the applicable criterion.

[2] Applicable after dilution at the edge of the 100 meter mixing zone (See Appendix A). A permittee may submit a request for a recalculated criterion based on site-specific studies and analyses that consider ambient factors and the nature of the discharge.

[3]Assumes an ambient ocean temperature of 15 ^oC, salinity of 30 g/kg and pH of 8.1. Effluent limitations developed for a specific platform may be based on an alternate criterion which considers platform-specific ocean conditions.

[4]Total chromium may be sampled as an alternative to hexavalent chromium in the reasonable potential analysis.

[5]Use EPA Method 376.1 (or equivalent method published in Standard Methods) to analyze for total (or dissolved) sulfide. Use procedure in method to calculate undissociated sulfide fraction. Report undissociated sulfide fraction based on the pH, temperature and salinity of both the end-of-pipe sample and ambient ocean conditions at the platform. Ambient ocean pH of 8.1 and salinity of 30 g/kg may be used. A permittee may request that this permit be modified to include a decay factor in making compliance determinations for undissociated sulfide at the edge of the mixing zone. Such a request shall be accompanied by the results of a study of the decay of undissociated sulfide in produced water discharged in southern California Federal waters. Upon receipt of the study by Region 9, this permit may be reopened and modified to include a decay factor in making compliance determinations for undissociated sulfide at the edge of the mixing zone.

a. The Permittee shall sample while discharge is occurring until 12 samples are taken. For continuous discharges in place on the effective date of the permit, the sampling frequency shall be once per month during the first year of the term of the permit. For intermittent dischargers, sampling shall be once/discharge until 12 samples are collected. For discharges initiated during the term of the permit, monthly sampling shall commence in the first quarter that the discharges begin. The samples will be taken as grab samples.

b. The reasonable potential analytical laboratory results and the quarterly dilution value shall be submitted with the DMR along with the information required in Part III.A.2 of this permit.

c. Reasonable Potential Analysis Submittal

1) The results of the produced water reasonable potential sampling for chemical constituents shall be analyzed using the procedures in the document entitled "Procedures for Reasonable Potential Evaluation in NPDES Permit No. CAG280000" and submitted to EPA in electronic spreadsheet format. The completed spread sheet for each discharge will be sent to EPA no later than one year and three months after the permit becomes effective; for platforms with intermittent discharges the spread sheet shall be submitted as soon as the necessary data have been collected. The submittal shall include a determination of the minimum dilution limit required for each discharge location to maintain no reasonable potential to exceed the Water Quality Criteria for any constituent listed in Table D-1 and for chlorine. For parameters with two criteria specified in Table D-1, the submittal shall be based on the more stringent of either: a) the Federal criterion, or b) the California Ocean Plan objective. In conducting the analysis for the metals in Table D-1 (As, Cd, Cu, Pb, Hg, Ni, Se, Ag, Zn and Cr^6), and for ammonia and cyanide, the California Ocean Plan 6-month medians shall be converted to 4-day averages using the procedure in the document entitled "Procedure for Comparing California Ocean Plan 6-Month Median and a 4-Day Average for NPDES Permit No. CAG280000", dated August 16, 2001.

2) Dilution ratios will be determined using the methods in Appendix A of the permit. The dilution calculation will be based on the produced water average quarterly flow.

d. Previously Collected Data. If results for the above listed constituents were previously collected and meet appropriate methods and detection limits, the previously collected data may be used to satisfy the reasonable potential sampling requirements (including metals sampled as composites).

e. Establishing Reasonable Potential

1) Evaluation. After EPA receives the reasonable potential sampling results (spreadsheets) from an operator, the information will be evaluated for the potential for the exceedance of a water quality criterion. Data for all criteria listed in Table D-1 shall be submitted at one time for the discharging platform.

2) Limitations After the Establishment of Reasonable Potential. The Permittee will be notified of the results of EPA's review of the reasonable potential spreadsheets submitted by the permittees. Platform specific limitations become effective the first quarter subsequent to permit modification to include such limitations. Any permit modifications will be conducted in accordance with procedures set forth at 40 CFR Part 124. Monitoring will continue on a quarterly basis for the remainder of the permit for those constituents with limits.

3) Dilution Ratio Changes Subsequent to the Data Gathering Phase. The permittee shall calculate the quarterly dilution value each quarter subsequent to the data gathering

phase. If the quarterly dilution value is less than the minimum dilution limit, this permit may be reopened and modified to include additional effluent limitations and monitoring requirements based on the reasonable potential for the exceedance of a water quality criterion.

f. Interim Produced Water Limits for Platform Irene. During the reasonable potential data gathering and evaluation phase of this permit, the numeric water quality limitations and monitoring requirements in Table D-2 below from the previous individual NPDES permit for Platform Irene (CA0110648) will be in effect for compliance and enforcement purposes. These effluent limitations are applicable following initial dilution in the mixing zone defined in Part V of the general permit. Compliance with the limits shall be calculated in accordance with Appendix A of the general permit.

Table D-2 - Produced Water Enforceable Limits During Reasonable Potential Sampling for Platform Irene

Constituent	Daily Max (mg/l)	Monitoring Frequency	Sample Type
Arsenic	0.032	Once/3 months	Composite
Cadmium	0.004	"	"
Total Chromium	0.008	"	"
Copper	0.012	"	"
Lead	0.008	"	"
Mercury	0.00016	"	"
Nickel	0.020	"	"
Selenium	0.060	"	"
Silver	0.0028	"	"
Zinc	0.080	"	"
Ammonia (expressed as N)	2.4	"	Discrete
Cyanides	0.004	"	"
Phenol	0.12	"	"
Naphthalene	0.0235	"	"
2,4 Demethylphenol	-	"	"
Benzene	0.0059	"	"
Toluene	0.05	"	"
Ethylbenzene	0.0043	"	"
Benzo(a) pyrene	0.003	"	"
Bis (2-ethylhexyl) phthalate	0.0035	"	"

Attachment D
Clearwater Port Marine Biological Survey Report

APPENDIX S.16

MARINE BIOLOGICAL SURVEY OF SSP AREA

CLEARWATER PORT PROJECT

November 2006

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ATTACHMENTS

APPENDIX S.16
ROV SEAFLOOR SURVEY REPORT

S.16.1 INTRODUCTION

Clearwater Port, LLC is proposing to construct Clearwater Port, an offshore Liquefied Natural Gas (LNG) receiving terminal and regasification facility located approximately 12.6 miles (20.3 km) off the coast of Ventura County, California. The project involves the installation of two parallel floating docks (berthing facilities) for mooring of LNG carriers, an LNG offloading and transfer system, the conversion of the existing Platform Grace into a regasification facility, installation of a new pipeline parallel to an existing offshore pipeline corridor to bring the gas to shore at an existing industrial facility, and delivery of gas into the existing Southern California Gas Company (SCGC) pipeline infrastructure via a series of new onshore pipelines. The basic offshore components of the project are as follows:

- An Offset Dual Berth (ODB) Satellite Service Platform (SSP) Floating docking system to be installed adjacent to Platform Grace;
- A carrier-to-platform cryogenic LNG transfer system utilizing an LNG unloading arm equipped with Emergency Release Coupling (ERC) safety systems;
- The conversion of Platform Grace to an LNG receiving and regasification facility; and
- A new 36-inch diameter natural gas pipeline to transport the vaporized natural gas from the platform to shore.

S.16.2 BACKGROUND

Several studies that characterize the existing seafloor features have been conducted along the coastline of Ventura County including the project area. As described within Sections 7.5 - Marine Biological Resources, 7.7 - Commercial Fisheries Resources, and in Appendix O.2 - Habitat Avoidance Plan, the seafloor at and around Platform Grace is sedimentary, comprised of medium to fine grain sand and silts. Areas of “coarse grain sediments” and “scattered rock” habitats are documented in historical and recent reports (Centaur Associates, 1984; Fugro West, 2003; and Fugro West, 2005) in two areas, one approximately 200 ft (61 m) south and the other 1,250 ft (381 m) southwest of the platform, respectively. Analysis of side scan sonar data from Fugro West’s 2005 survey indicates the seafloor around the platform generally consist of fine to coarse sediments, however an irregular-shaped area of “disturbed seafloor” consisting of finer and coarse-grained sediment extends from 300 ft (91 m) to the south to 1,800 ft (550 m) to the northeast of Platform Grace. Closer to the platform, analysis of the 2005 side scan sonar data indicate that a 600 ft long (183 m) area of seafloor debris (possibly the “shell mound”) extends to the northwest of Platform Grace (Fugro West 2005).

Typical of all offshore platforms in Santa Barbara Channel (SBC) and based on previously-completed side scan sonar and multibeam sonar surveys, a mound of shells appears to have been deposited onto the natural sedimentary seafloor under and immediately around the legs of Platform Grace (MEC Analytical Systems, 2003; Fugro West, 2005). Shell mounds are formed from drilling-related discharges and from the deposition of epibiota that had fallen from there attachment points on submerged portions of the platforms. The MEC study indicated that the shell mound under and to the northwest of Platform Grace was approximately 200 ft (81 m) wide by 390 ft (119 m) long and13 ft (4 m) high. Those dimensions suggest the total volume of the Grace shell mound to be approximately 5,500 yd^3 (4,205 m^3). The interpretation of Fugro West (2005) side scan sonar data tends to support those findings and suggests that the shell mound extends beyond the boundaries of the platform decks to the northwest.

Based on available information, the shell mound feature beneath Platform Grace appears to extend into the area proposed for the SSP, however no visual observations of the seafloor habitats or biota within that area have, to date, been completed. To provide site-specific information on the habitat type and associated biota within the SSP mooring area, an ROV video survey of that area was completed in May 2006. The objective of the survey was 1) to collect video data on the seafloor habitats and associated biota within the proposed SSP mooring area and 2) to "ground truth" the habitats that had been proscribed from interpretation of the 2005 side scan sonar data. A focus of the proposed survey was the collection of data that would allow delineation of the area of shell mound habitat and the characterization of epibiota and fish associated with that feature.

Data on the epibiota associated with Platform Grace is limited to casual observations made during fish-oriented surveys (i.e., Love et al., 2000; Love et al., 2003). Based on those observations and on the MBC (1987) characterization of epibiota associated with deep water platforms that community includes barnacles and mussels in the upper 25 to 30 ft (8 to 10 m) and two species of anemone (*Metridium* and *Corynactis*) characterizing the attached biota on the deeper sections of the platform.

Historical surveys of the shell mounds beneath southern California offshore platforms indicate that the macroepibiota community is dominated by seastars (i.e., *Pisaster, Asterina* [=*Patiria*], and *Pycnopodia*), sea cucumbers (*Parastichopus*), rock crabs (*Cancer* spp), and two anemone species (*Metridium* and *Corynactis*) (MBC, 1987). Observations of the shell mounds of Platform Hondo in 842 ft (257 m) found that the shell mound supported a substantial population of the spot prawn (*Pandalus platyceros*) and rock crabs. Densities of up to 40 spot prawns per square meter were recorded there (MBC, 1987).

Historical studies of SBC platform biota include Schroeder (1999) which reports the results of observations by SCUBA-equipped biologists completed in 1995 through 1997 in water depths of 128 ft (39 m) or less at Platform Grace and other platforms in the SBC. That study indicated that blacksmith (*Girella nigricans*) and halfmoon (*Medialuna californiensis*) dominated the shallow-water fish community at Platform Grace. Common pelagic species at Platform Grace included sardines (*Sardinops sagax*) and barracuda (*Sphyraena argentea*).

Love et al., (1999) recorded the fishes associated with the deeper-water portions of SBC platforms during observations from a submersible and indicated that rockfish dominated the midwater fish populations of all of seven platforms surveyed. Commonly observed rockfish at Platform Grace included unidentified young-of-the-year species, and juvenile and adult widow and chilipepper (*S. entomelas* and *S. goodei*, respectively). Pelagic species, including jack and Pacific mackerel (*Scomber japonicus* and *Trachurus symmetricus*, respectively), were the most common mid-water species observed during the two-year study. Commonly observed demersal (bottom-associated) fish at Platform Grace included halfbanded and widow rockfish (*S. semicinctus* and *S. entomelas*), and shiner surfperch (*Cymatogaster aggregatta*). The demersal fish community at Platform Grace had the highest mean density (number of fish per unit area) of any of the seven platforms studied. The high density was due to the large number of half-banded rockfish found at that location (Schroeder, 1999).

Love, et al., (2003) report the results of six years of diver and submersible observations (1996 through 2001) on the fish community associated platforms within southern California, including Platform Grace. Dominant species observed in the near-surface (to approximately -100 ft [31 m] water depth) fish community at Platform Grace included blacksmith (*G. nigricans*), and sardines (*S. sagax*). Dominant mid-depth fishes included juvenile widow rockfish (*S. entomelas*), while squarespot and blue rockfish (*S. hopkinsi* and *S. mystinus*), and unidentified species rockfish were also common within those water depths (Love, et al., 2003). That report also indicates that the near-bottom portion of the platform supported an ichthyofauna characterized by juvenile widow rockfish, and adult calico, vermillion, and halfbanded rockfish (*S. entomelas, S. dalli, S. miniatus,* and *S. semicinctus*, respectively); the sharpnose surfperch (*Phanerodon atripes*) was also common within the deeper portion of Platform Grace. Two species, halfbanded rockfish and shiner surfperch (*C. aggregatta*) accounted for 86.5% (5,184 of 5,992 individuals) of the total fish observed on the shell mound at Platform Grace during that six-year study. Young of the year and juvenile boccacio rockfish (*S. paucispinis*), a depleted species and one that is a candidate for listing under the federal Endangered Species Act, were relatively abundant in the mid- and bottom-depth areas of Platform Grace during the 1999 and 2000 surveys respectively (Love, et al., 2003).

As part of a Level II structured survey of the platform, Associated Pacific, Inc (2006) recorded the thickness and primary components of the marine growth on the submerged portions of the jacket from the "waterline" to a depth of 100 ft (33 m). That survey indicated that the upper 10 ft (3.3 m) supported attached epibiota up to 1.5 ft (0.5 m) thick and was comprised of mussels (*Mytilus* spp) and anemones (*Anthopleura* spp). Marine growth of the four primary jacket legs from -10 to -100 ft (-3.3 to -33 m) was substantially less than the near-surface area, ranging in thickness from 0.2 to 0.5 ft (<0.1 to 0.2 m) and consisting of "acorn barnacles", "rock scallops" and anemones (*Corynactis* and *Metridium*) (Associated Pacific, Inc., 2006).

S.16.3 ROV SURVEY SUMMARY

A video survey of the seafloor habitats within the 1.9 million ft^2 (0.17 million m^2) area of SBC immediately west of Platform Grace within the area proposed for the SSP mooring facility for the Clearwater Port project was completed over a two-day period in October 2006. The seafloor habitats observed within that area were:

- Exposed shell material (6% of the total area) immediately west and northwest of the platform;
- A transition area of shell debris and sediment that extended 490 ft (150 m) to the west and northwest of the exposed shell habitat and accounted for approximately 13 percent of the survey area; and
- The remaining 1.4 million ft^2 (0.13 million m^2) was fine sediments that characterized the western two-thirds (>600 ft [>183 m] west of the platform).

A total of 7.2 hours of video were recorded and that footage indicated that the exposed shell habitat supported the most diverse macroepibiota community of the three habitats observed. Within that habitat, seastars, anemones, and small gorgonian corals being most common. Commonly observed fish throughout the area included flatfish, including Dover sole (*Microstomus pacificus*) and sanddabs, halfbanded and unidentified juvenile rockfish, lingcod, pink surfperch, and short spine combfish. In addition to observations within the SSP mooring area, a limited amount of video was recorded by the ROV during its descent along the northwest jacket to the seafloor. Observations along that feature indicate that solitary and colonial anemones, and solitary coral characterize the attached epibiota in water depths of 200 ft (61 m) or greater and rockfish, including bocaccio (*Sebastes paucispinis*) were present to common in the deeper portions of the jacket.

S.16.4 METHODS AND EQUIPMENT

The following describes the equipment, methodology, and results of the ROV survey that was completed along pre-established transects within the SSP mooring area west of Platform Grace in October 2006.

The survey was completed over a two-day period (October 9 and 16, 2006) utilizing a SeaEye Falcon remotely operated vehicle (ROV) owned and operated by Haaland Diving, Inc. (HDI) of Santa Barbara, CA (Figure S.16-1). The ROV survey was supported by the MV *Danny C.* a 90 ft (27.4 m) work boat owned and operated by Castagnola Tug Service also of Santa Barbara. Navigation services, including vessel and ROV location data, pre- and post-plots of ROV survey corridors and fix locations, and the scanning sonar affixed to the ROV were provided by Fugro-West, Inc. of Ventura.

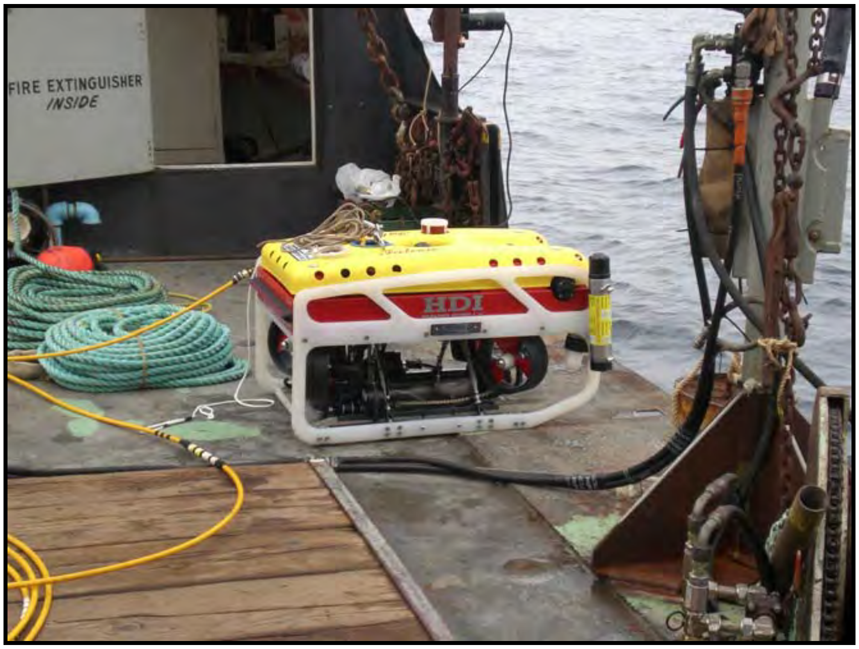

Figure S.16-1. HDI's SeaEye Remotely Operated Vehicle

Prior to initiating the field survey, the proposed transects were input to the navigation computer and, following mobilization of all equipment to Ventura Harbor, the survey commenced on October 6, 2006. A seafloor mosaic that was developed from the aforementioned 2005 side scan sonar survey was used to locate the "shell mound" and to orient the transect lines to assure coverage of the various seafloor habitats that had been identified from interpretation of those data. The east-west transects were evenly distributed within the proposed SSP area and extended west approximately 1,500 ft (457 m) from the western edge of Platform Grace; the 1,300 ft (396 m) long north-south transects were centered on the platform and crossed the east-west transects within the SSP mooring area (see Attachment S.16-1).

A second mobilization on October 16, 2006 was required when equipment failures curtailed the survey after approximately 1.5 hours on October 6^{th}. The October 6^{th} survey was conducted from a "fixed vessel" with the *Danny C.* tied off to Platform Grace; the survey on October 16^{th} was completed using "live boat" operations.

S.16.5 RESULTS

Weather during both survey days ranged from fog in the early morning to clear skies in the afternoon. Winds were light and variable, with maximum winds approximately 15 mph from the west. Seas were calm on October 6^{th}, and a two to four ft westerly swell and one to two ft wind chop was present during the late morning hours of October 16^{th}. Water clarity during both days was excellent; although slightly dark, the video camera could record with ambient light in water depths of over 300 ft (91 m).

During the two day survey, the ROV surveyed a total of 15,600 linear ft (4,755 m) of transects and recorded 7.2 hours of video. The viewing area ranged from approximately two to 15 ft (0.6 to 4.6 m) depending upon the ROV's distance above the seafloor, however based on an average view area of 10 ft (3.0 m), approximately 156,000 ft^2 (14,490 m^2) of seafloor within the SSP mooring area was observed. An edited and annotated, 6 minute-long DVD was produced from the over seven hours of video and is provided with this report. The time marks on the DVD that provides images of the habitat and biota discussed below are provided in parentheses immediately at the beginning of each subsection.

The north-south transects were purposefully concentrated near the platform in order to maximize the observations within the shell mound area. Attachment S.16-1 shows the ROV transects, lists and describes the series of "fix points" that were taken during the survey, and delineates the boundaries of the three primary seafloor habitats that were recorded. Detailed descriptions and video-stills of the habitats and biota observed are provided below.

S.16.5.1 Habitats and Biota

Platform Jacket Biota (0:20 to 0:35 on DVD). The limited observations along the northwest jacket leg during the 2006 ROV survey tend to support earlier observations of the epibiota and fish associated with that habitat. Figure S.16-2 shows powder puff anemones (*Metridium senile*), the smaller strawberry anemone (*Corynactis californica*), and solitary coral (cf *Paracyathus* sp) attached to the northwest jacket leg in approximately 200 ft (61 m) of water. Those anemones and rockfish, including juvenile bocaccio and unidentified red rockfish (Figure S.16-3) were present to common in water depths of 200 ft (61 m) or more.

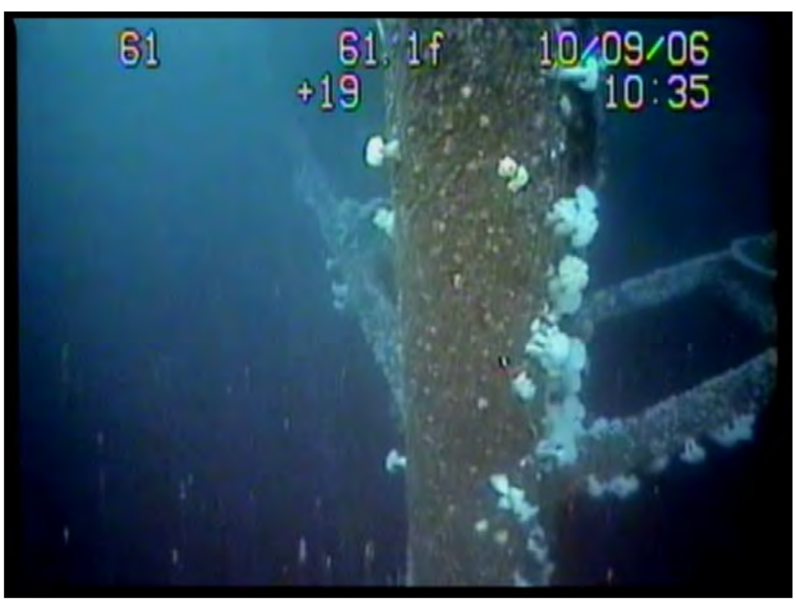

Figure S.16-2. Video Still of Epibiota on Northwest Jacket Leg (Depth Approximately 200 ft [61 m])

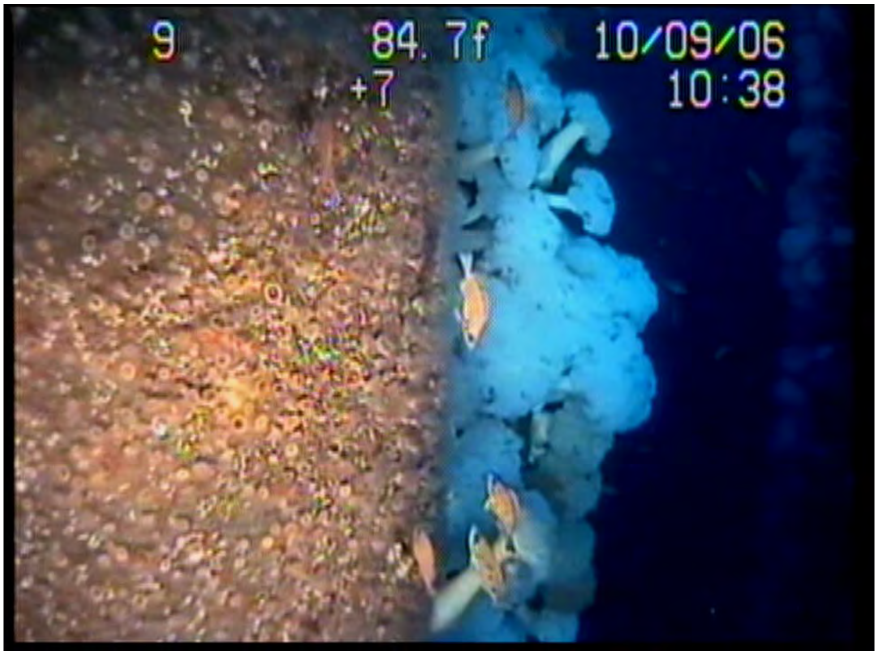

Figure S.16-3. Video Still of Anemones, Solitary Coral, and Rockfish (Bocaccio and Unidentified Species) on Northwest Jacket Leg (Depth Approximately 250 ft [76 m])

Exposed Shell Habitat and Biota (0:50 to 2:25 on DVD). Around the jacket leg and extending to the west and northwest of the platform, is a 94,600 ft^2 (8,788 m^2) area, delineated with a dark blue line in Attachment 1, of shell debris that is relatively free of sediment. That habitat supports a relatively diverse macroepibiota, and the shell debris is sufficiently exposed to provide attachment locations for epibiota including anemones and solitary and gorgonian corals (Figures S.16-4 and S.16-5). Commonly observed macroepibiota within the exposed shell habitat (defined for this report as the area with more than 50% exposed shell debris) included powder puff anemones, seastars (*Pisaster* spp, *Solaster* sp, Asterina miniata, and *Orthasterias koehleri*); and small gorgonian corals. Characteristic fish taxa within this habitat include sanddabs (*Citharichtys* spp), halfbanded rockfish (*S.* semicinctus), and unidentified surfperch and juvenile rockfish.

Although the near-bottom current within this area may differ from that further from the platform, it is assumed that the increased amount of exposed shells is a function of its proximity to the platform where debris would be expected to settle under prevailing conditions. Shell debris would be expected to be distributed further from the platform during periodic storm events when wind-driven waves and surface currents would be expected to dislodge the organisms attached to the platform jacket and transport them further to the west.

Figure S.16-4. Video Still of Shell Mound Habitat at Base of Northwest Jacket

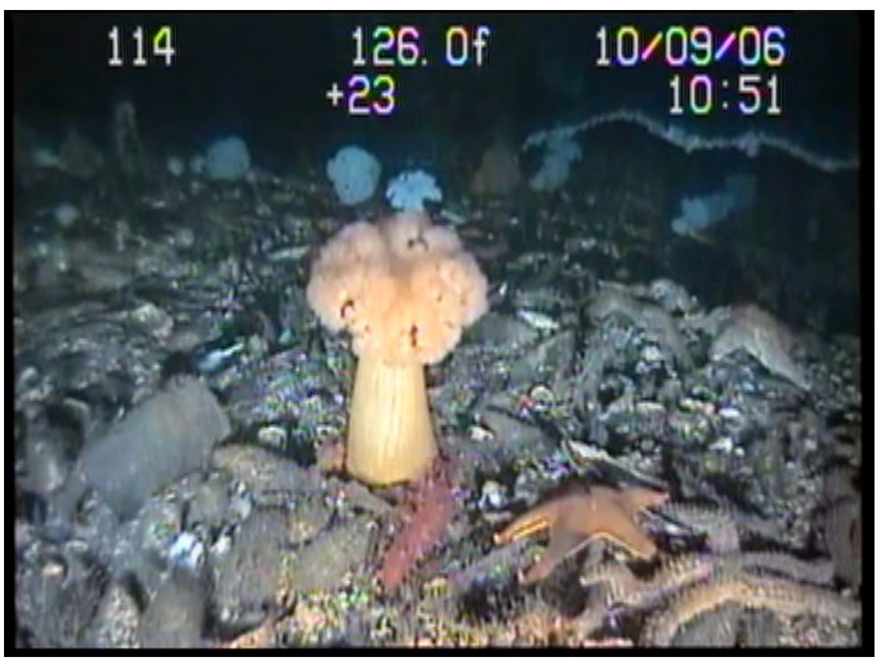

Figure S.16-5 Video Still of Shell Mound Habitat with Powder-Puff Anemones (*Metridium*), Sea Cucumbers (*Parastichopus*), and Sea Stars (*Asterina* and *Orthasterias*)

Transition Zone Habitat and Biota (2:34 to 4:55 on DVD)**.** As is depicted as the area within the broken blue line in Attachment 1, the transition zone (for this report defined as seafloor with at least 10% exposed shell material) is estimated to extend approximately 490 ft (150 m) to the west and northwest of the exposed shell habitat and covers an estimated 240,100 ft^2 (22,300 m^2). Figures S.16-6 and.S.16-7 show the seafloor and characteristic epibiota observed within the transition habitat.

That community consists of species found in both the natural sediment (see below) and exposed shell habitats. Characteristic sediment-associated taxa found in the transition habitat include an opisthobranch (*Berthella californica*), a seapen (*Stylatula elongata*), and the bat star (*A. miniata*). The powder puff anemone and seastars (*Solaster* and *Pisaster* spp), common on the shell material were also present in the transition area.

The fish community associated with the transition habitat was more diverse than that found in the sedimentary habitat and included rockfish with one of the more common being the halfbanded rockfish (*S. semicinctus*), short-spine combfish (*Zaniolepis frenata*), occasional pink perch (*Zalembius rosaceus*), and juvenile and subadult lingcod (*Ophiodon elongatus*).

Natural Seafloor Habitat and Biota (5:07 to 5:53 on DVD). Within the 1.9 million ft^2 (0.17 million m^2) rectangular survey area that extended approximately 1,500 ft (457 m) west and approximately 640 ft (195 m) north and south of the platform, natural sediment covered approximately 80% of that area (see Attachment 1). Figures S.16-8 and S.16-9 show the sedimentary habitat and associated macroepibiota that includes three species of seapens (*S. elongata, Acanthoptilum* sp, and *Ptilosarcus* sp), an opisthobranch seaslug (*B. californica*) and two seastars (*Pisaster* sp. and *A. miniata*). Sanddabs (*Citharicthys* sp.), short-spine combfish (*Z. frenata*), and pink perch (*Z. rosaceus*) were the most common fish observed within this habitat.

Figure S.16-6. Video Still of Transition Zone Habitat (10-20% Shell Material Exposed)

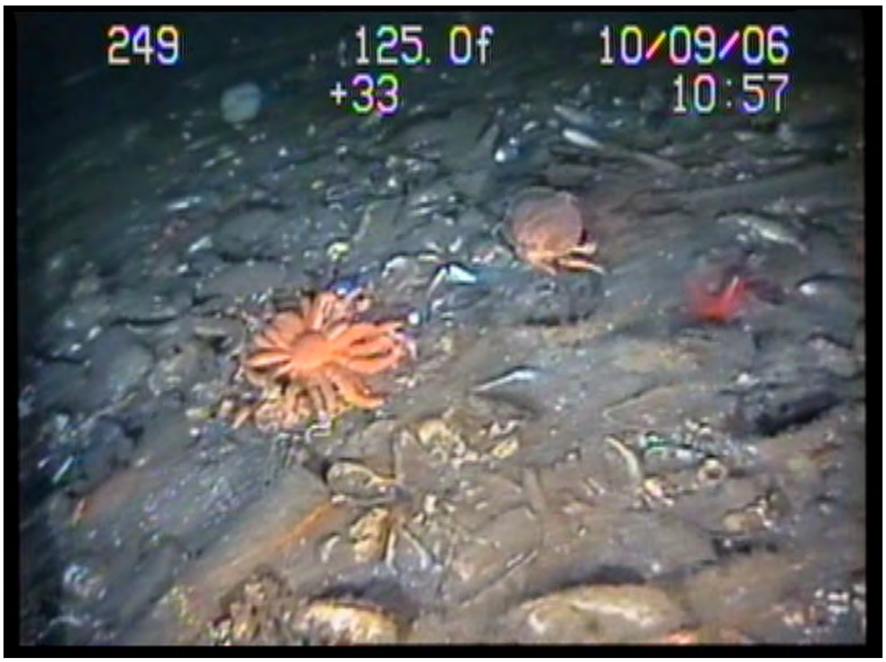

Figure S.16-7. Video Still of Transition Area (25-40% Shell Material Exposed) with Sun Star (*Solaster*) and Unidentified Crab (*Cancer* sp.)

Figure S.16-8 Video Still of Natural Sediment Seafloor with Sea Pens (*Stylatula* and *Acanthoptilum*)

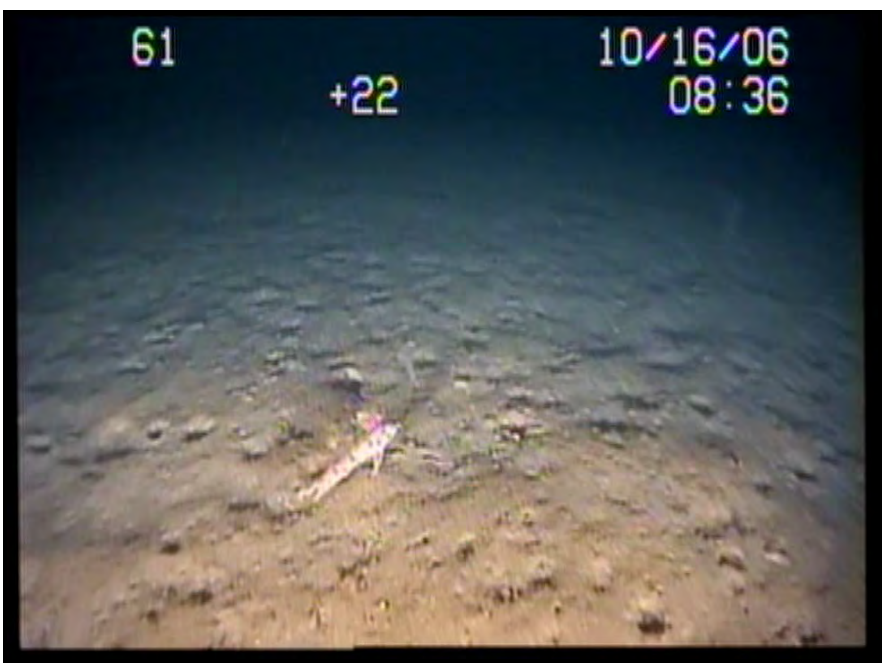

Figure S.16-9. Video Still of Natural Sediment Seafloor with Short-Spine Combfish (*Zaniolepis frenata*)

S.16.6 REFERENCES

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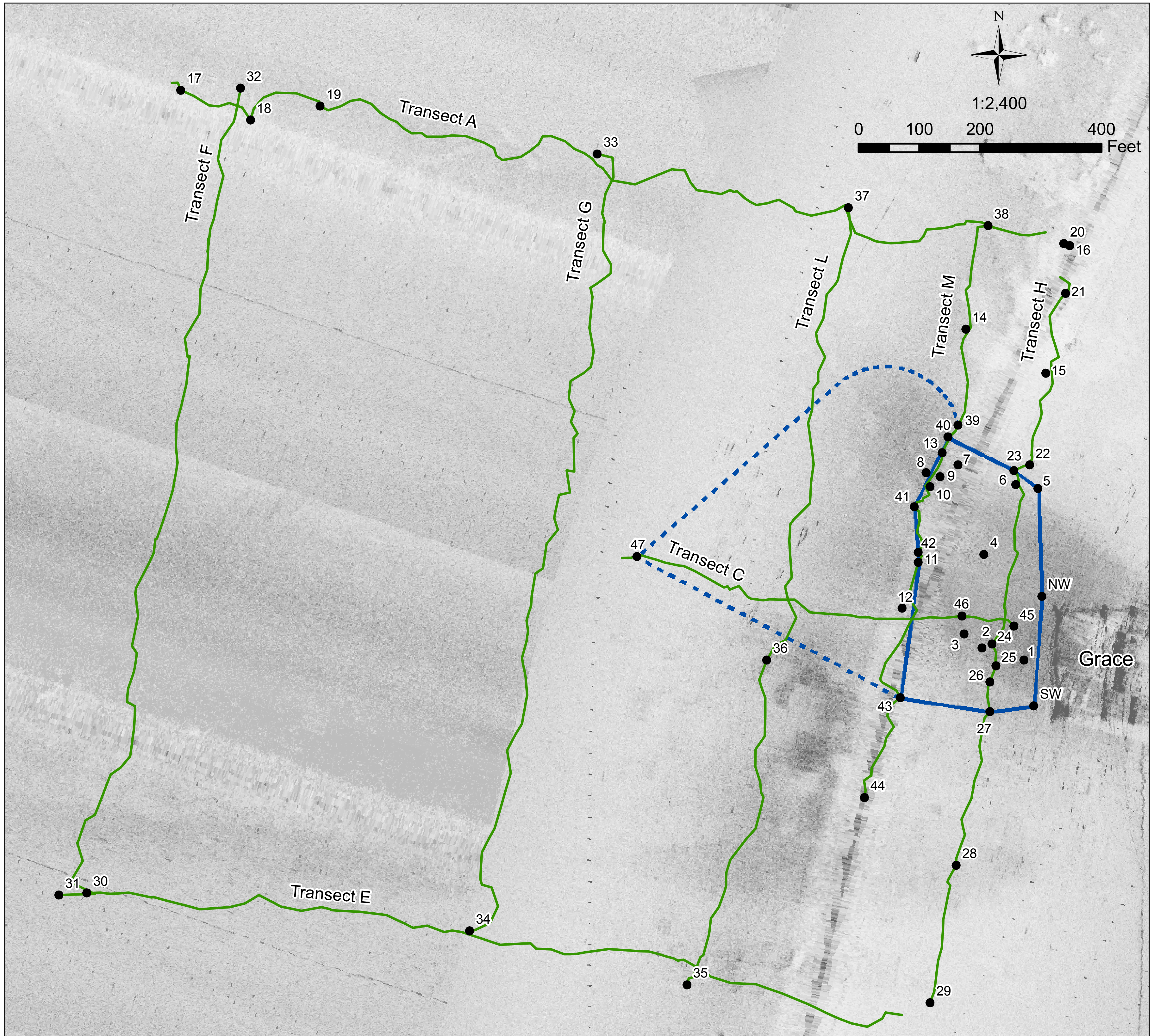

Legend

- Shell Mound Habitat (>50% Exposed Shell Material)
- Shell and Sediment Habitat (10 to 50% Exposed Shell Material)
- ROV Transect Routes
- 27 Fixes

FIX	DATE	TIME	NORTHING	EASTING	DESCRIPTION
NW	10/9/06	10:44:23	1891078.9	6117320.4	NW PLATFORM LEG
SW	10/9/06	10:53:00	1890898.4	6117307.3	SW PLATFORM LEG
1	10/9/06	10:56:29	1890973.9	6117290.9	POSITION FIX
2	10/9/06	10:57:49	1890993.6	6117222.0	POSITION FIX
3	10/9/06	10:59:26	1891016.6	6117192.5	POSITION FIX
4	10/9/06	11:03:27	1891147.8	6117225.3	TRANSITION SHELL TO SEDIMENT
5	10/9/06	11:08:07	1891256.1	6117313.9	NE EDGE SHELL MOUND
6	10/9/06	11:11:00	1891262.6	6117277.8	START NW PERIMETER
7	10/9/06	11:15:05	1891295.4	6117182.6	PERIMETER
8	10/9/06	11:17:38	1891282.3	6117130.2	SEDIMENT. NO SHELLS
9	10/9/06	11:18:46	1891275.7	6117153.1	SHELL PERIMETER
10	10/9/06	11:20:19	1891259.3	6117136.7	SEDIMENT
11	10/9/06	11:25:31	1891134.7	6117117.0	SHELL DEBRIS
12	10/9/06	11:27:43	1891059.2	6117090.8	SOUTH END OF TRANSECT I
13	10/9/06	11:33:42	1891315.1	6117156.4	TRANSECT I NORTH SEDIMENT
14	10/9/06	11:39:23	1891518.5	6117195.8	END OF TRANSECT I
15	10/9/06	11:44:12	1891446.3	6117327.0	POSITION FIX
16	10/9/06	11:49:42	1891656.3	6117366.4	END OF TRANSECT H NORTH
17	10/16/06	8:13:45	1891912.2	6115903.1	POSITION FIX
18	10/16/06	8:17:13	1891863.0	6116018.0	POSITION FIX
19	10/16/06	8:19:12	1891886.0	6116132.8	POSITION FIX
20	10/16/06	8:46:42	1891659.6	6117356.5	END TRANSECT A
21	10/16/06	8:48:29	1891577.6	6117359.8	BUOY DEBRIS
22	10/16/06	8:56:07	1891295.4	6117300.8	TIRE DEBRIS
23	10/16/06	8:56:45	1891285.6	6117274.5	NORTH EDGE OF SHELL MOUND
24	10/16/06	9:02:39	1891000.2	6117238.4	DEBRIS ELEMENT
25	10/16/06	9:03:27	1890964.1	6117245.0	SW EDGE OF SHELL MOUND
26	10/16/06	9:03:48	1890937.8	6117235.1	DEBRIS TIRE
27	10/16/06	9:04:27	1890888.6	6117235.1	DEBRIS
28	10/16/06	9:08:42	1890636.0	6117179.4	ALL SEDIMENT
29	10/16/06	9:13:04	1890409.6	6117136.7	END TRANSECT H START TRANSECT E
30	10/16/06	9:36:51	1890590.1	6115748.9	END TRANSECT E
31	10/16/06	9:42:43	1890586.8	6115703.0	START TRANSECT F
32	10/16/06	10:03:47	1891915.5	6116001.5	END TRANSECT F
33	10/16/06	10:14:30	1891807.2	6116588.8	START TRANSECT G
34	10/16/06	10:38:25	1890527.7	6116378.8	END TRANSECT G
35	10/16/06	10:48:19	1890439.1	6116736.5	START NEW TRANSECT L
36	10/16/06	10:56:41	1890973.9	6116867.7	DEBRIS FIELD
37	10/16/06	11:08:05	1891718.7	6117002.2	END NEW TRANSECT L
38	10/16/06	11:13:21	1891689.1	6117231.9	START TRANSECT M
39	10/16/06	11:20:53	1891361.0	6117182.6	DEBRIS FIELD VERTICAL PIPE
40	10/16/06	11:21:42	1891341.4	6117166.2	N EDGE OF SHELL MOUND
41	10/16/06	11:25:13	1891226.5	6117110.5	S EDGE OF SHELL MOUND
42	10/16/06	11:26:56	1891151.1	6117117.0	SHELL MOUND HABITAT
43	10/16/06	11:34:13	1890911.6	6117087.5	S EDGE OF SHELL MOUND
44	10/16/06	11:37:02	1890747.5	6117028.4	END TRANSECT M
45	10/16/06	11:41:37	1891029.7	6117274.5	START TRANSECT C
46	10/16/06	11:43:45	1891046.1	6117189.2	SEDIMENT/SHELLS
47	10/16/06	11:53:44	1891144.5	6116654.4	SEDIMENT HABITAT

NOTES: Geophysical data was collected within project area from November, 2005, to January, 2006 from various vessels.

Padre Associates, Inc.
Post-Plot and Seafloor Habitat Types
ROV Survey of Clearwater Port SSP Area
Platform Grace, October 2006

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Attachment E
Level 2 Survey Reports

Platform Gail 2016 Level II Survey

AQUEOS	Debris Survey	Job Number: VEN01-16-128 Date: 11/23/16 Inspection Level: II

Structure Name	Area	Block	Name	Operator
PLATFORM GAIL	SOCKEYE	OCS-P 0202	GAIL	VENOCO

Location				Debris Description	Est. Dimensions L	W	H	Damage Y/N	Removed Y/N	Contact Y/N	DVD No.	Photo No.
740	A3	HZ	A2	PIPE	5'	2"	2"	N	N	Y	ROV1	1
-460	B3	HD	A2	HAND RAIL	5'	3'	2"	N	N	Y	ROV1	4
-460	B2	HD	X1	FRAMEWORK	8'	3'	1"	N	N	Y	ROV1	5
-460	X1	HD	A2	GRATING	1'	1'	2"	N	N	Y	ROV1	6
-460	X1	HD	A2	ANGLE IRON	3'	4'	2"	N	N	Y	ROV1	7
-460	SPG4			GRATING	3'	6'	2"	N	N	Y	ROV1	10
-460	NCBF			PIPE	4'	2"	2"	N	N	Y	ROV2	15
-545	NCBF			GRATING	4'	6'	2"	N	N	Y	ROV2	18
-545	X1	HD	A2	GRATING	1'	3'	2"	N	N	Y	ROV2	27
-640	WCBF			HAND RAIL	15'	3'	2"	N	N	Y	ROV2	30
-640	A3	HD	X2	HAND RAIL	2'	3'	2"	N	N	Y	ROV2	31
-640	B2	HZ	B1	PIPE	4'	1"	1"	N	N	Y	ROV2	36
-460	X1	HD	A2	GRATING	2'	2'	2"	N	N	Y	ROV2	37
-460	SPG5	HD	X1	GRATING	2'	4'	2"	N	N	Y	ROV2	38
-460	SPG4	HD	X2	HAND RAIL	3'	6'	2"	N	N	Y	ROV2	39
-640	SECBF			PIPE	1'	12"	12"	N	N	Y	ROV3	46
-380	B1	HZ	A1	FLANGE	6"	6"	2"	N	N	Y	ROV3	47
-740	B1	HZ	A1	GRATING	4'	6'	2"	N	N	Y	ROV3	48
-740	A1 BRACE	HD	B1	GRATING	4'	4'	2"	N	N	Y	ROV3	49
-160	SCBF			HALF PIPE	2'	3'	2"	N	N	Y	ROV4	68
-160	B2			GRATING	2'	3'	2"	N	N	Y	ROV4	69
-230	B1	HZ	B2	GRATING	2'	3'	2"	N	N	Y	ROV4	85
-230	B1	HZ	B2	CABLE	10'	1"	1"	N	N	Y	ROV4	86

Comments:
1.
2.
3.
4.

Location Code					
Item	Leg 1	Depth 1	Dist. 1	Project Supervisor:	Jeff Kowalishen
	Leg 2	Depth 2	Dist. 2	Company Representative:	Steve Simpson
				Data Recorder:	ROV

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DIV-FM-021 Rev. 05/04/16

Debris Survey

AQUEOS

Job Number: VEN01-16-128
Date: 11/23/16
Inspection Level: II

Structure Name	Area	Block	Name	Operator
PLATFORM GAIL	SOCKEYE	OCS-P 0202	GAIL	VENOCO

Location				Debris Description	Est. Dimensions L	W	H	Damage Y/N	Removed Y/N	Contact Y/N	DVD No.	Photo No.
-230	SPG3			WIRE CABLE	6'	1"	1"	N	N	Y	ROV4	89
-230	SPG2			GRATING	6'	2'	2"	N	N	Y	ROV4	90
-380	A2	HZ	B2	GRATING	2'	4'	2"	N	N	Y	ROV4	105
-380	B1	HZ	B2	GRATING	4'	8'	2"	N	N	Y	ROV4	106
-380	SPG3	BRACE		HAND RAIL	4'	10'	2"	N	N	Y	ROV4	107
-380	SPG12			GRATING	3'	6'	2"	N	N	Y	ROV4	110
-380	X3	HZ	B3	GRATING	10'	6'	2"	N	N	Y	ROV6	115
-380	B4	HZ	B3	GRATING	4'	6"	2"	N	N	Y	ROV6	116
-380	B3	HD	X4	GRATING	4'	4'	2"	N	N	Y	ROV6	117
-380	NCBF			METAL STAND	2'	2'	5'	N	N	Y	ROV6	118
-380	NCBF			GRATING	3'	3'	2"	N	N	Y	ROV6	119
-380	SCBF			METAL FRAMING	4'	4'	2'	N	N	Y	ROV6	122
-737	B4	HZ	A4	LADDER	6'	2'	2"	N	N	Y	ROV6	123
-737	B4	HZ	A4	HAND RAIL	6'	3'	2"	N	N	Y	ROV6	124
-737	B1	HZ	B3	GRATING	6'	2'	2"	N	N	Y	ROV6	126
-737	B3	HZ	B2	GRATING	3'	12'	2"	N	N	Y	ROV7	127
-737	X2	HD	B3	METAL FRAMING	4'	4'	3'	N	N	Y	ROV7	129
-737	X2	HD	SP1	SCAFFOLDING	4'	2"	2"	N	N	Y	ROV7	132
-305	A3	HD	X2	GRATING	2'	3'	2"	N	N	Y	ROV7	156
-305	X2	HD	B3	HAND RAIL	3'	8'	2"	N	N	Y	ROV7	159
-305	B2	HZ	B3	GRATING	2'	3'	2"	N	N	Y	ROV7	162
-305	WCBF			HANDRAIL	3'	8'	2"	N	N	Y	ROV7	163

Comments:
1.
2.
3.
4.

Location Code					
Item	Leg 1	Depth 1	Dist. 1	Project Supervisor:	Jeff Kowalishen
	Leg 2	Depth 2	Dist. 2	Company Representative:	Steve Simpson
				Data Recorder:	ROV

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DIV-FM-021 Rev. 05/04/16

Grace 2016 Level II debris Survey

AQUEOS	Debris Survey	Job Number: VEN01-16-128 Date: 11/24/16 Inspection Level: II

Structure Name	Area	Block	Name	Operator
Platform Grace	Santa Clara	OCS-P 0217	Grace	Venoco

Location				Debris Description	Est. Dimensions L	W	H	Damage (Y/N)	Removed (Y/N)	Contact (Y/N)	DVD No.	Photo No.
-231	WCBF			GRATING	4'	2'	2"	N	N	Y	ROV3	ROV25
-271	A1.5	VDD	SP6	WIRE ROPE	50'	1/2"	1/2"	N	N	Y	ROV3	ROV26
-318	A1	HZ	A2	PIPE	10'	2"	2"	N	N	Y	ROV3	ROV27
-318	SP6	HD	B2	CABLE	50'	1"	1"	N	N	Y	ROV3	ROV28
-318	SP6	BRACE		CABLE	100'	1/2"	1/2"	N	N	Y	ROV3	ROV29
-318	B3	HZ	C3	PIPE	10'	1/2"	1/2"	N	N	Y	ROV3	ROV30
-318	SP5	HZ	A3	PIPE	20'	1'	1'	N	N	Y	ROV3	ROV31
-318	SP5	HZ	A3	LADDER	10'	2'	2"	N	N	Y	ROV3	ROV32
-310	J-TUBE	#3		METAL FRAME	5'	3'	1'	N	N	Y	ROV4	ROV76
-318	J-TUBE BELL	#7 MOUTH		PIPE/CABLE	20'	12"	12"	N	N	Y	ROV4	ROV80

Comments:
1.
2.
3.
4.

Location Code					
Item	Leg 1	Depth 1	Dist. 1	Project Supervisor:	Jeff Kowalishen
	Leg 2	Depth 2	Dist. 2	Company Representative:	Steve Simpson
				Data Recorder:	ROV

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AQUEOS

Debris Survey

Job Number: VEN01-16-128
Date: 11/24/16
Inspection Level: II

Structure Name	Area	Block	Name	Operator
PLATFORM GRACEW	SANTA CLARA	OCS-P 0217	GRACE	VENOCO

Location				Debris Description	Est. Dimensions L	W	H	Damage Y/N	Removed Y/N	Contact Y/N	DVD No	Photo No
-231	C1	LEG		HAWSER LINE	100'	3"	3"	N	N	Y	ROV1	ROV1
-318	SP2	HZ	C3	TIRES	3'	3'	1'	N	N	Y	ROV1	ROV4
-318	C3	LEG		HAWSER LINE	20'	3"	3"	N	N	Y	ROV1	ROV3
-295	C4	LEG		HAWSER LINE	50'	3"	3"	N	N	Y	ROV1	ROV5
-155	C3	VDD	C4	HANDRAIL	6'	3"	2"	N	N	Y	ROV1	ROV6
-93	C3	HZ	C4	TIRES	3'	3'	1'	N	N	Y	ROV1	ROV7
-155	B3	HZ	B4	HAWSER LINE	150'	3"	3"	N	N	Y	ROV2	ROV8
-231	C1	HZ	A1	HANDRAIL	15'	3"	2"	N	N	Y	ROV2	ROV9
-155	B1	HD	C2	TIRES	4'	4'	1'	N	N	Y	ROV2	ROV10
-155	B1	HD	C2	METAL BOX	2'	4'	2'	N	N	Y	ROV2	ROV11
-155	C3	HZ	B3	TIRE	4'	4'	1'	N	N	Y	ROV2	ROV12
-271	WCBF			PIPE	10'	2"	2"	N	N	Y	ROV2	ROV13
-231	MP	B4/C4		WIRE ROPE	10'	1/2"	1/2"	N	N	Y	ROV3	ROV14
-155	SPG3			PIPE	6'	4"	4"	N	N	Y	ROV3	ROV15
-155	SPG3			HANDRAIL	15'	3"	2"	N	N	Y	ROV3	ROV16
-155	WCBF			TIRE	3'	3'	1'	N	N	Y	ROV3	ROV17
-155	WCBF			GRATING	8'	4'	2"	N	N	Y	ROV3	ROV18
-231	ECBF			PIPE	6'	2"	2"	N	N	Y	ROV3	ROV19
-231	ECBF			STEEL	3'	5'	1'	N	N	Y	ROV3	ROV20
-231	ECBF			TIRE	2'	3'	1'	N	N	Y	ROV3	ROV21
-231	WCBF			PIPE	6'	3"	3"	N	N	Y	ROV3	ROV22
-231	WCBF			HANDRAIL	6'	3"	2"	N	N	Y	ROV3	ROV23
-231	WCBF			FRAMEWORK	4'	6'	2"	N	N	Y	ROV3	ROV24

Comments:
1.
2.
3.
4.

Location Code					
Item	Leg 1	Depth 1	Dist. 1	Project Supervisor:	Jeff Kowalishen
	Leg 2	Depth 2	Dist. 2	Company Representative:	Steve Simpson
				Data Recorder:	ROV

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DIV-FM-021 Rev. 05/04/16

Attachment F
Conductor Removal Surface Area Calculations

Platform Gail - Conductor Removal

Surface area of the Conductors and Jacket from MLLW to Mudline

Summary

Item	Surface Area (SQ. FT.)	
Jacket Legs	127,289	
Vertical Bracing	215,608	
Horizontal Bracing	238,540	
Conductor Framing	26,634	
Total Jacket Area	**608,071**	
Total Conductor Area	**130,188**	
Appurtenances	**30,404**	(5% of Jacket area for Disposal tube, elephant trunk, risers, boat landing, J-tubes)
Grand Total	**768,663**	
Conductors/Jacket	**21%**	
Conductors/Grand Total	**17%**	

Jacket Legs

Member	Description	Diameter (in)	Circumference (in)	Top Elevation (ft)	Bottom Elevation (ft)	Batter (deg)	Length (ft)	Surface Area (ft2)
Pile A-1	Corner leg, 2-way batter	66	207.3	0	-740.0	6.73	745.1	12,875.0
Pile B-1	Corner leg, 2-way batter	66	207.3	0	-737.0	6.73	742.1	12,822.8
Pile A-2	Middle leg, 1-way batter	67	210.5	0	-739.2	4.76	741.7	13,010.3
Pile B-2	Middle leg, 1-way batter	65	204.2	0	-736.2	4.76	738.7	12,570.7
Skirt Pile S1-A	Skirt pile row S1	77	241.9	-636.5	-739.8	6.73	104.0	2,095.8
Skirt Pile S1-B	Skirt pile row S1	77	241.9	-636.5	-736.9	6.73	101.1	2,038.0
Skirt Pile S2-A	Skirt pile row S2	77	241.9	-636.5	-739.0	4.76	102.9	2,073.4
Skirt Pile S2-B	Skirt pile row S2	77	241.9	-636.5	-736.4	4.76	100.3	2,021.1
Skirt Pile SA	Skirt pile SA	77	241.9	-636.5	-739.5	6.73	103.7	2,090.7
Skirt Pile SB	Skirt pile SB	77	241.9	-636.5	-737.3	6.73	101.5	2,046.7
							Subtotal (half of the platform)	63,644.5

Total Jacket Legs	127,289.0

Vertical Bracing

Elevation '1'

ID	Member	Diameter (in)	Circumference (in)	Horiz. Dim. (ft)	Vertical Dim. (ft)	Length (ft)	Surface Area (ft2)
1	28x .750	28	88.0	24.1	40.0	46.7	342.4
2	30x 1.00	30	94.2	45.0	60.0	75.0	589.0
3	30x 1.00	30	94.2	45.0	60.0	75.0	589.0
4	36x .875	36	113.1	55.8	70.0	89.5	843.9
5	36X .875	36	113.1	55.8	75.0	93.5	881.2
6	36X .875	36	113.1	68.3	75.0	101.5	956.3
7	36X .875	36	113.1	68.3	80.0	105.2	991.6
8	36X 1.00	36	113.1	82.1	85.0	118.2	1,113.7
9	32X 1.00	32	100.5	82.1	95.0	125.5	1,051.8
10	32X 1.00	32	100.5	90.0	95.0	130.9	1,096.3
11	28X .875	28	88.0	64.5	100.0	119.0	872.3
12	28X .875	28	88.0	72.8	100.0	123.7	906.6
13	22X .625	22	69.1	0.0	50.0	50.0	288.0
						subtotal for half of Elev 1	10,522.2

Total Elevation '1'	21,044.4
Elevation '4' = Elevation '1'	21,044.4

Elevation '2'

ID	Member	Diameter (in)	Circumference (in)	Horiz. Dim. (ft)	Vertical Dim. (ft)	Length (ft)	Surface Area (ft2)
1	28X .875	28	88.0	24.1	40.0	46.7	342.4
2	30X 1.00	30	94.2	45.0	60.0	75.0	589.0
3	30X .875	30	94.2	45.0	60.0	75.0	589.0
4	36X .875	36	113.1	55.8	70.0	89.5	843.9
5	36X .875	36	113.1	55.8	75.0	93.5	881.2
6	36X 1.00	36	113.1	68.3	75.0	101.5	956.3
7	36X 1.00	36	113.1	68.3	80.0	105.2	991.6
8	42X 1.00	42	131.9	82.1	85.0	118.2	1,299.3
9	42X 1.375	42	131.9	90.0	95.0	130.9	1,438.9
10	42X 1.375	42	131.9	82.1	95.0	125.5	1,380.5
11	30X .875	30	94.2	98.3	100.0	140.2	1,101.0
12	30X .875	30	94.2	90.0	100.0	134.5	1,056.6
13	28X .875	28	88.0	24.1	40.0	46.7	342.4
14	24X .750	24	75.4	40.0	60.0	72.1	453.1
15	26X 1.00	26	81.7	45.0	60.0	75.0	510.5
16	24X .750	24	75.4	45.0	60.0	75.0	471.2
17	24X .750	24	75.4	50.0	60.0	78.1	490.7
18	30X 1.00	30	94.2	50.0	70.0	86.0	675.6

	19	30X 1.00	30	94.2	55.8	70.0	89.5	703.2
	20	42X 1.00	42	131.9	55.8	75.0	93.5	1,028.1
	21	30X .750	30	94.2	62.1	75.0	97.4	764.7
	22	36X .875	36	113.1	62.1	75.0	97.4	917.6
	23	36X 1.00	36	113.1	68.3	75.0	101.5	956.3
	24	42X 1.00	42	131.9	68.3	80.0	105.2	1,156.9
	25	36X 1.00	36	113.1	75.0	80.0	109.7	1,033.5
	26	42X 1.00	42	131.9	75.0	85.0	113.4	1,246.4
	27	42X 1.00	42	131.9	82.1	85.0	118.2	1,299.3
	28	44X 1.50	44	138.2	82.1	95.0	125.5	1,446.2
	29	44X 1.50	44	138.2	90.0	95.0	130.9	1,507.4
	30	44X 1.375	44	138.2	90.0	100.0	134.5	1,549.7
	31	44X 1.625	44	138.2	98.3	100.0	140.2	1,614.9
	32	24X .625	24	75.4	52.9	0.0	52.9	332.5
	33	20X .625	20	62.8	59.0	0.0	59.0	308.7
	34	20X .625	20	62.8	65.2	0.0	65.2	341.4
	35	22X .750	22	69.1	71.7	0.0	71.7	412.8
	36	30X 1.25	30	94.2	78.5	0.0	78.5	616.9
	37	42X 1.25	42	131.9	86.0	0.0	86.0	946.1
	38	42X 1.25	42	131.9	94.1	0.0	94.1	1,035.0
							Total Elev 2	33,631.0

Elevation '3' = Elevation '2' 33,631.0

Total for Elev 1,2,3,4 109,350.7

Elevation 'A'

ID	Member	Diameter (in)	Circumference (in)	Horiz. Dim. (ft)	Vertical Dim. (ft)	Length (ft)	Surface Area (ft2)
1	26x .875	26	81.7	37.9	40.0	55.1	375.2
2	36x .875	36	113.1	65.0	60.0	88.5	833.7
3	30x 1.00	30	94.2	65.0	60.0	88.5	694.8
4	36X 1.25	36	113.1	75.8	70.0	103.2	972.7
5	36X .875	36	113.1	75.8	75.0	106.7	1,005.2
6	42X 1.00	42	131.9	88.3	75.0	115.9	1,274.1
7	42X 1.00	42	131.9	88.3	80.0	119.2	1,310.4
8	48X 1.25	48	150.8	102.1	85.0	132.8	1,669.3
9	30X 1.00	30	94.2	102.1	95.0	139.4	1,095.2
10	30X 1.00	30	94.2	110.0	95.0	145.3	1,141.5
11	32X 1.00	32	100.5	65.0	100.0	119.3	999.2
12	32X 1.00	32	100.5	73.0	100.0	123.8	1,037.2
13	24X .625	24	75.4	11.4	11.0	15.8	99.4
14	24X .625	24	75.4	30.0	29.0	41.7	262.2
15	24X .750	24	75.4	30.0	30.0	42.4	266.6
16	24X .750	24	75.4	30.0	30.0	42.4	266.6

17	24X .750	24	75.4	30.0	30.0	42.4	266.6
18	24X .750	24	75.4	30.0	30.0	42.4	266.6
19	24X .750	24	75.4	30.0	35.0	46.1	289.6
20	24X .750	24	75.4	30.0	35.0	46.1	289.6
21	26X .750	26	81.7	30.0	37.5	48.0	326.9
22	26X .750	26	81.7	30.0	37.5	48.0	326.9
23	22X .625	22	69.1	30.0	37.5	48.0	276.6
24	22X .625	22	69.1	30.0	37.5	48.0	276.6
25	24x .750	24	75.4	30.0	40.0	50.0	314.2
26	24x .750	24	75.4	30.0	40.0	50.0	314.2
27	24x .625	24	75.4	30.0	42.5	52.0	326.9
28	24x .625	24	75.4	30.0	42.5	52.0	326.9
29	30x .875	30	94.2	60.0	95.0	112.4	882.5
30	30x .875	30	94.2	60.0	95.0	112.4	882.5
31	28x .750	28	88.0	60.0	100.0	116.6	854.9
32	28x .750	28	88.0	60.0	100.0	116.6	854.9

subtotal for half of Elev A 20,379.5

Total for Elev A 40,758.91

Elev B = Elev A 40,758.91

Total for Elevations A,E 81,517.8

Skirt Pile Vertical Bracing

Elevation 'A1'

ID	Member	Diameter (in)	Circumference (in)	Horiz. Dim. (ft)	Vertical Dim. (ft)	Length (ft)	#	Surface Area (ft2)
1	30x 1.00	30	94.2	28.2	33.5	43.8	6	2,061.8
								2,061.8

Total Elev A1	2,061.8
# of Duplicate Elevations	4
Total A1,A4,B1,B4	**8,247.26**

Elevation 'S1'

ID	Member	Diameter (in)	Circumference (in)	Horiz. Dim. (ft)	Vertical Dim. (ft)	Length (ft)	#	Surface Area (ft2)
1	26x .750	26	81.7	84.5	97.3	128.9	2	1,754.2
2	26x .750	26	81.7	93.0	97.3	134.6	2	1,831.9
3	18x .500	18	56.5	22.0	25.0	33.3	4	627.7
4	18x .500	18	56.5	0.0	25.0	25.0	4	471.2
								4,685.1

Total Elev S1	4,685.1
Elev S4 = S1	4,685.1

Elevation 'S2'

ID	Member	Diameter (in)	Circumference (in)	Horiz. Dim. (ft)	Vertical Dim. (ft)	Length (ft)	#	Surface Area (ft2)
1	26x .750	26	81.7	84.5	96.0	127.9	2	1,741.4
2	26x .750	26	81.7	93.0	96.0	133.7	2	1,819.6
								3,561.0

Total Elev S2	3,561.0
Elev S3 = S2	3,561.0
Total S1,S2,S3,S4	**16,492.16**

Horizontal Bracing

Elevation -40

ID	Member	Diameter (in)	Circumference (in)	Horiz. Dim. (ft)	Vertical Dim. (ft)	Length (ft)	#	Surface Area (ft2)
1	30"	30	94.2	180.0	0.0	180.0	2	2,827.4
2	30"	30	94.2	80.0	0.0	80.0	2	1,256.6
3	36"	36	113.1	80.0	0.0	80.0	2	1,508.0
4	28"	28	88.0	60.0	80.0	100.0	2	1,466.1
5	20"	20	62.8	60.0	80.0	100.0	2	1,047.2
6	22x .625	22	69.1	0.0	50.0	50.0	1	288.0
7	26x .750	26	81.7	46.0	0.0	46.0	2	626.2
8	20"	20	62.8	10.5	0.0	10.5	12	659.7
9	14x .375	14	44.0	5.8	5.2	7.8	4	114.2
10	26x 1.50	26	81.7	60.0	0.0	60.0	2	816.8
11	26x .875	26	81.7	0.0	52.5	52.5	2	715.3
12	16x .500	16	50.3	13.1	12.2	17.9	4	300.7
13	20x .500	20	62.8	13.1	17.2	21.7	4	453.8
14	14x .375	14	44.0	12.2	13.7	18.4	2	134.8
15	14x .375	14	44.0	17.2	13.7	22.0	2	161.5
16	20x .625	20	62.8	0.0	13.7	13.7	12	862.6
17	14x .375	14	44.0	5.8	6.9	9.0	4	132.1
18	16x .500	16	50.3	9.2	0.0	9.2	4	153.6
								13,524.6

Elevation -100

ID	Member	Diameter (in)	Circumference (in)	Horiz. Dim. (ft)	Vertical Dim. (ft)	Length (ft)	#	Surface Area (ft2)
1	26"	26	81.7	65.0	0.0	65.0	4	1,769.8
2	20"	20	62.8	60.0	0.0	60.0	2	628.3
3	28"	28	88.0	0.0	90.0	90.0	2	1,319.5
4	42"	42	131.9	0.0	90.0	90.0	2	1,979.2
5	26X .875	26	81.7	65.0	90.0	111.0	2	1,511.4
6	30X 1.25	30	94.2	60.0	90.0	108.2	2	1,699.1
7	18X .562	18	56.5	0.0	70.0	70.0	1	329.9
8	18X .562	18	56.5	51.0	0.0	51.0	2	480.7
9	14X .375	14	44.0	0.0	9.7	9.7	8	283.4
10	14X .375	14	44.0	10.5	0.0	10.5	4	153.9
11	26X .750	26	81.7	0.0	52.4	52.4	2	713.0
12	24X 1.00	24	75.4	30.5	0.0	30.5	2	382.8
13	20X .625	20	62.8	25.5	26.2	36.6	2	382.8
14	24X .750	24	75.4	12.2	26.2	28.9	2	363.2
15	24X .750	24	75.4	12.2	18.8	22.4	2	282.0
16	20X .625	20	62.8	15.4	18.8	24.3	2	254.7
17	20X .625	20	62.8	25.5	18.8	31.7	2	331.8
18	22X .750	22	69.1	0.0	18.8	18.8	2	216.7
19	18x .438	18	56.5	19.3	0.0	19.3	2	182.2
20	16x .500	20	62.8	11.9	9.1	15.0	4	313.6
21	14x .375	14	44.0	0.0	9.7	9.7	6	212.6
22	18x .438	18	56.5	0.0	12.0	12.0	2	113.1
23	14x .375	14	44.0	10.5	0.0	10.5	2	77.0
								13,980.5

Elevation -160

ID	Member	Diameter (in)	Circumference (in)	Horiz. Dim. (ft)	Vertical Dim. (ft)	Length (ft)	#	Surface Area (ft2)
1	36"	36	113.1	70.0	0.0	70.0	4	2,638.9
2	20"	20	62.8	60.0	0.0	60.0	2	628.3
3	36"	36	113.1	0.0	100.0	100.0	2	1,885.0
4	48"	48	150.8	0.0	100.0	100.0	2	2,513.3
5	36x .750	36	113.1	70.0	50.0	86.0	2	1,621.5
6	36x 1.00	36	113.1	60.0	100.0	116.6	2	2,198.2
7	26x .750	26	81.7	45.3	0.0	45.3	4	1,234.2
8	16x .375	16	50.3	9.7	0.0	9.7	10	404.9
9	14x .375	14	44.0	12.0	0.0	12.0	4	175.9
10	20x .500	20	62.8	15.0	0.0	15.0	2	157.1
11	16x .500	16	50.3	10.0	0.0	10.0	4	167.6
12	28x .875	28	88.0	0.0	52.7	52.7	1	386.4
13	24x .750	24	75.4	0.0	52.7	52.7	1	331.2
14	28x .875	28	88.0	30.5	0.0	30.5	2	447.8
15	24x .750	24	75.4	12.1	26.4	29.0	2	364.7
16	28x .750	28	88.0	45.8	49.8	67.6	2	991.3
17	24x .750	24	75.4	12.1	23.6	26.6	2	334.0
18	24x .875	24	75.4	0.0	23.6	23.6	2	297.1
19	26x .625	26	81.7	22.9	23.6	32.9	2	447.9
20	24x .625	24	75.4	0.0	25.2	25.2	2	316.3
21	20x .500	20	62.8	10.0	0.0	10.0	10	523.6
22	16x .500	16	50.3	12.0	12.0	17.0	4	284.3
23	26x .625 (knee brace)	26	81.7	22.0	30.0	37.2	2	506.3
								18,855.8

Elevation -230

ID	Member	Diameter (in)	Circumference (in)	Horiz. Dim. (ft)	Vertical Dim. (ft)	Length (ft)	#	Surface Area (ft2)
1	36"	36	113.1	75.8	0.0	75.8	4	2,858.8
2	20"	20	62.8	60.0	0.0	60.0	2	628.3
3	36"	36	113.1	0.0	111.7	111.7	2	2,104.9
4	42"	42	131.9	0.0	111.7	111.7	2	2,455.7
5	36x .750	36	113.1	75.8	55.8	94.2	2	1,775.1
6	30x 1.00	30	94.2	60.0	55.8	82.0	4	2,574.8
7	26x .750	26	81.7	45.3	0.0	45.3	4	1,234.2
8	16x .375	16	50.3	9.7	0.0	9.7	10	404.9
9	14x .375	14	44.0	12.0	0.0	12.0	4	175.9
10	20x .500	20	62.8	15.0	0.0	15.0	2	157.1
11	16x .500	16	50.3	10.0	0.0	10.0	4	167.6
12	36x .750	36	113.1	0.0	52.4	52.4	2	987.2
13	24x .750	24	75.4	31.4	0.0	31.4	2	394.3
14	24x .750	24	75.4	11.8	29.6	31.9	2	401.0
15	24x .750	24	75.4	11.8	26.2	28.7	2	361.0
16	24x .625	24	75.4	31.4	29.6	43.2	2	542.4
17	28x .750	28	88.0	32.6	29.6	44.1	2	646.5
18	28x .750	28	88.0	32.6	26.2	41.9	2	613.6
19	36x .750	36	113.1	0.0	29.6	29.6	2	558.8
20	28x .750	28	88.0	0.0	40.2	40.2	2	588.9
21	24x .625	24	75.4	21.7	0.0	21.7	4	546.1
22	20x .500	20	62.8	10.0	0.0	10.0	12	628.3
23	26x .625 (knee brace)	26	81.7	22.0	30.0	37.2	2	506.3
								21,311.8

Elevation -305

ID	Member	Diameter (in)	Circumference (in)	Horiz. Dim. (ft)	Vertical Dim. (ft)	Length (ft)	#	Surface Area (ft2)
1	36"	36	113.1	82.1	0.0	82.1	4	3,094.5
2	20"	20	62.8	60.0	0.0	60.0	2	628.3
3	36"	36	113.1	0.0	124.2	124.2	2	2,340.5
4	42"	42	131.9	0.0	124.2	124.2	2	2,730.6
5	36x .875	36	113.1	82.1	62.1	102.9	2	1,939.9
6	28x .875	28	88.0	60.0	62.1	86.3	4	2,531.6
7	26x .750	26	81.7	45.3	0.0	45.3	8	2,468.4
8	16x .375	16	50.3	9.7	0.0	9.7	20	809.8
9	14x .375	14	44.0	12.0	0.0	12.0	8	351.9
10	20x .500	20	62.8	15.0	0.0	15.0	4	314.2
11	16x .500	16	50.3	10.0	0.0	10.0	8	335.1
12	24x .750	24	75.4	0.0	52.4	52.4	2	658.2
13	24x .750	24	75.4	44.9	0.0	44.9	2	564.7
14	14x .375	14	44.0	12.3	26.2	28.9	2	212.1
15	36x .875	36	113.1	82.1	62.1	102.9	2	1,939.9
16	26x .750	26	81.7	41.1	35.9	54.6	2	743.3
17	26x .625 (knee brace)	26	81.7	22.0	30.0	37.2	2	506.3
18	26x .625 (knee brace)	26	81.7	22.0	30.0	37.2	2	506.3
								22,675.6

Elevation -380

ID	Member	Diameter (in)	Circumference (in)	Horiz. Dim. (ft)	Vertical Dim. (ft)	Length (ft)	#	Surface Area (ft2)
1	36"	36	113.1	88.3	0.0	88.3	4	3,330.1
2	20"	20	62.8	60.0	0.0	60.0	2	628.3
3	36"	36	113.1	0.0	136.7	136.7	2	2,576.1
4	42"	42	131.9	0.0	136.7	136.7	2	3,005.5
5	36x .875	36	113.1	88.3	68.3	111.7	2	2,105.1
6	30x .875	30	94.2	60.0	68.3	90.9	4	2,856.9
7	26x .750	26	81.7	45.3	0.0	45.3	8	2,468.4
8	16x .375	16	50.3	9.7	0.0	9.7	20	809.8
9	14x .375	14	44.0	12.0	0.0	12.0	8	351.9
10	20x .500	20	62.8	15.0	0.0	15.0	4	314.2
11	16x .500	16	50.3	10.0	0.0	10.0	8	335.1
12	24x .750	24	75.4	0.0	56.4	56.4	2	709.2
13	30x .875	30	94.2	51.2	0.0	51.2	2	804.1
14	14x .375	14	44.0	12.3	26.2	28.9	2	212.1
15	36x .875	36	113.1	88.3	68.3	111.7	2	2,105.1
16	26x .750	26	81.7	41.1	41.9	58.7	2	799.4
17	26x .625 (knee brace)	26	81.7	22.0	30.0	37.2	2	506.3
18	26x .625 (knee brace)	26	81.7	22.0	30.0	37.2	2	506.3
								24,423.8

Elevation -460

ID	Member	Diameter (in)	Circumference (in)	Horiz. Dim. (ft)	Vertical Dim. (ft)	Length (ft)	#	Surface Area (ft2)
1	36"	36	113.1	95.0	0.0	95.0	4	3,581.4
2	20"	20	62.8	60.0	0.0	60.0	2	628.3
3	36"	36	113.1	0.0	150.0	150.0	2	2,827.4
4	48"	48	150.8	0.0	150.0	150.0	2	3,769.9
5	36x .875	36	113.1	95.0	75.0	121.0	2	2,281.5
6	30x .875	30	94.2	60.0	75.0	96.0	4	3,017.4
7	26x .750	26	81.7	45.3	0.0	45.3	8	2,468.4
8	16x .375	16	50.3	9.7	0.0	9.7	20	809.8
9	14x .375	14	44.0	12.0	0.0	12.0	8	351.9
10	20x .500	20	62.8	15.0	0.0	15.0	6	471.2
11	16x .500	16	50.3	10.0	0.0	10.0	10	418.9
12	24x .750	24	75.4	0.0	52.4	52.4	2	658.2
13	24x .750	24	75.4	57.9	0.0	57.9	2	727.0
14	14x .375	14	44.0	12.3	26.2	28.9	2	212.1
15	36x .875	36	113.1	95.0	75.0	121.0	2	2,281.5
16	26x .750	26	81.7	52.3	48.8	71.5	2	974.0
17	26x .625 (knee brace)	26	81.7	22.0	30.0	37.2	2	506.3
18	26x .625 (knee brace)	26	81.7	22.0	30.0	37.2	2	506.3
								26,491.6

Elevation -545

ID	Member	Diameter (in)	Circumference (in)	Horiz. Dim. (ft)	Vertical Dim. (ft)	Length (ft)	#	Surface Area (ft2)
1	36"	36	113.1	102.1	0.0	102.1	4	3,848.5
2	20"	20	62.8	60.0	0.0	60.0	2	628.3
3	42"	42	131.9	0.0	164.2	164.2	2	3,610.2
4	48"	48	150.8	0.0	164.2	164.2	2	4,126.0
5	42x 1.25	42	131.9	102.1	82.1	131.0	2	2,880.6
6	36x 1.00	36	113.1	60.0	82.1	101.7	4	3,833.0
7	26x .750	26	81.7	45.3	0.0	45.3	8	2,468.4
8	16x .375	16	50.3	9.7	0.0	9.7	20	809.8
9	14x .375	14	44.0	12.0	0.0	12.0	8	351.9
10	20x .500	20	62.8	15.0	0.0	15.0	6	471.2
11	16x .500	16	50.3	10.0	0.0	10.0	9	377.0
12	24x .750	24	75.4	0.0	52.4	52.4	2	658.2
13	24x .750	24	75.4	64.9	0.0	64.9	2	816.0
14	14x .375	14	44.0	12.3	26.2	28.9	2	212.1
15	36x .875	36	113.1	95.0	75.0	121.0	2	2,281.5
16	26x .750	26	81.7	52.3	48.8	71.5	2	974.0
17	26x .625 (knee brace)	26	81.7	22.0	30.0	37.2	2	506.3
18	26x .625 (knee brace)	26	81.7	22.0	30.0	37.2	2	506.3
								29,359.4

Elevation -640

ID	Member	Diameter (in)	Circumference (in)	Horiz. Dim. (ft)	Vertical Dim. (ft)	Length (ft)	#	Surface Area (ft2)
1	22"	22	69.1	65.0	0.0	65.0	4	1,497.5
2	20"	20	62.8	60.0	0.0	60.0	2	628.3
3	28"	28	88.0	0.0	169.7	169.7	4	4,974.9
4	48"	48	150.8	0.0	180.0	180.0	2	4,523.9
5	32"	32	100.5	0.0	129.0	129.0	2	2,161.4
6	24x .625	24	75.4	65.0	84.8	106.9	4	2,686.0
7	20x .625	20	62.8	19.5	28.3	34.3	6	1,079.1
8	20x .75	20	62.8	19.5	0.0	19.5	1	102.1
9	26"	26	81.7	19.5	5.2	20.2	2	274.6
10	36x 1.00	36	113.1	60.0	84.8	103.9	4	3,917.2
11	20x .625	20	62.8	19.5	31.9	37.4	4	782.4
12	26"	26	81.7	19.5	5.2	20.2	2	274.6
13	26x .875	26	81.7	65.0	84.8	106.9	2	1,454.9
14	26x .875	26	81.7	65.0	58.6	87.5	2	1,191.1
15	26x .875	26	81.7	0.0	52.5	52.5	2	715.3
15A	26x .875	26	81.7	64.5	0.0	64.5	2	878.1
16	14x .375	14	44.0	21.5	21.5	30.4	2	222.9
17	14x .375	14	44.0	13.1	12.3	18.0	4	263.9
18	26x .75	26	81.7	19.5	21.5	29.0	12	2,370.9
19	18x .438	18	56.5	19.5	20.3	28.2	4	531.0
20	24"	24	75.4	6.0	25.5	26.2	4	658.4
21	26"	26	81.7	25.5	5.2	26.0	4	708.4
								31,896.9

Elevation -740 Mudline

ID	Member	Diameter (in)	Circumference (in)	Horiz. Dim. (ft)	Vertical Dim. (ft)	Length (ft)	#	Surface Area (ft2)
1	30"	30	94.2	73.0	0.0	73.0	4	2,293.4
2	26"	26	81.7	60.0	0.0	60.0	2	816.8
3	42"	42	131.9	0.0	186.0	186.0	2	4,089.4
4	36"	36	113.1	0.0	186.0	186.0	2	3,505.2
5	48"	48	150.8	0.0	196.4	196.4	2	4,937.0
6	28x .750	28	88.0	73.0	93.0	118.2	4	3,466.6
7	24x .750	24	75.4	19.5	31.0	36.6	6	1,379.3
8	22x .625	22	69.1	19.5	0.0	19.5	1	112.3
9	26"	26	81.7	19.5	5.2	20.2	2	274.6
10	36x .875	36	113.1	60.0	98.2	115.1	4	4,339.0
11	24x .750	24	75.4	19.5	35.9	40.9	4	1,026.8
12	26"	26	81.7	19.5	5.2	20.2	2	274.6
13	28x .750	28	88.0	72.9	93.0	118.2	2	1,732.6
14	28x .750	28	88.0	72.6	71.8	102.1	2	1,497.3
15	26x .875	26	81.7	0.0	52.6	52.6	2	715.4
15A	26x .875	26	81.7	72.4	0.0	72.4	2	986.2
16	14x .375	14	44.0	26.3	26.3	37.2	2	272.4
17	14x .375	14	44.0	13.1	12.3	18.0	4	263.9
18	24x .625	24	75.4	19.5	24.3	31.1	12	2,346.2
19	24x .625	24	75.4	20.4	19.5	28.2	4	708.8
20	18"	18	56.5	6.0	25.4	26.1	4	492.3
21	18"	18	56.5	5.2	25.5	26.0	4	490.4
								36,020.7

Total Horizontal Bracing	**238,540.5**

Conductor Framing

Elevation -40

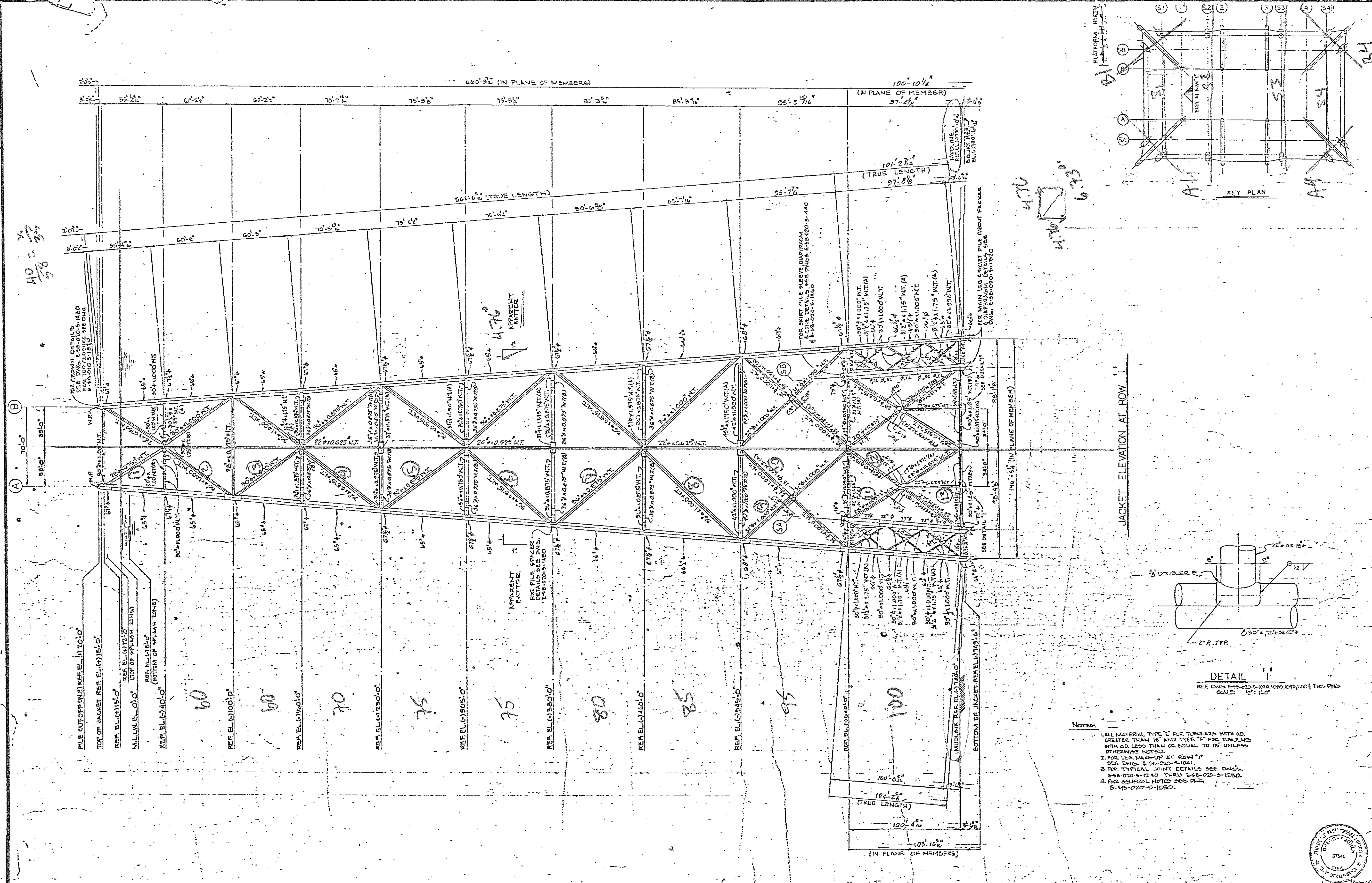
ID	Member	Diameter (in)	Circumference (in)	Horiz. Dim. (ft)	Vertical Dim. (ft)	Length (ft)	#	Surface Area (ft2)
1	26x .875	26	81.7	0.0	52.5	52.5	6	2,145.8
2	14x .375	14	44.0	2.5	0.0	2.5	63	577.3
3	26x .875	26	81.7	9.0	0.0	9.0	1	61.3
4	26x .875	26	81.7	0.0	5.0	5.0	1	34.0
							Total	2,818.4

# of Conductor Framing Elevations	9.00
Total Conductor Framing	25,365.6
Add 5% for conductor guides	1,268.28
Total Conductor Framing	**26,633.9**

Conductors

28 well slots have 24" dia. conductors installed

24" Conductor Circumference	75.4	in
Length	740	ft
# of Conductors	28	
Total Conductor Area	130,188	SF



NOTES:

1. ALL MATERIAL TYPE "E" FOR TUBULARS WITH O.D. GREATER THAN 18" AND TYPE "F" FOR TUBULARS WITH O.D. LESS THAN OR EQUAL TO 18" UNLESS OTHERWISE NOTED.
2. FOR LEG. MAKE-UP AT ROW "1" SEE DWG. E-SB-020-S-1041.
3. FOR TYPICAL JOINT DETAILS SEE DWGS. E-SB-020-S-1240 THRU E-SB-020-S-1250.
4. FOR GENERAL NOTES SEE DWG E-SB-020-S-1030.

0	APPROVED FOR CONSTRUCTION		2	AS BUILT	5-1-88	
1	CHANGED MEMBER SIZE					

Chevron U.S.A. Inc.
Western Region, Production Department

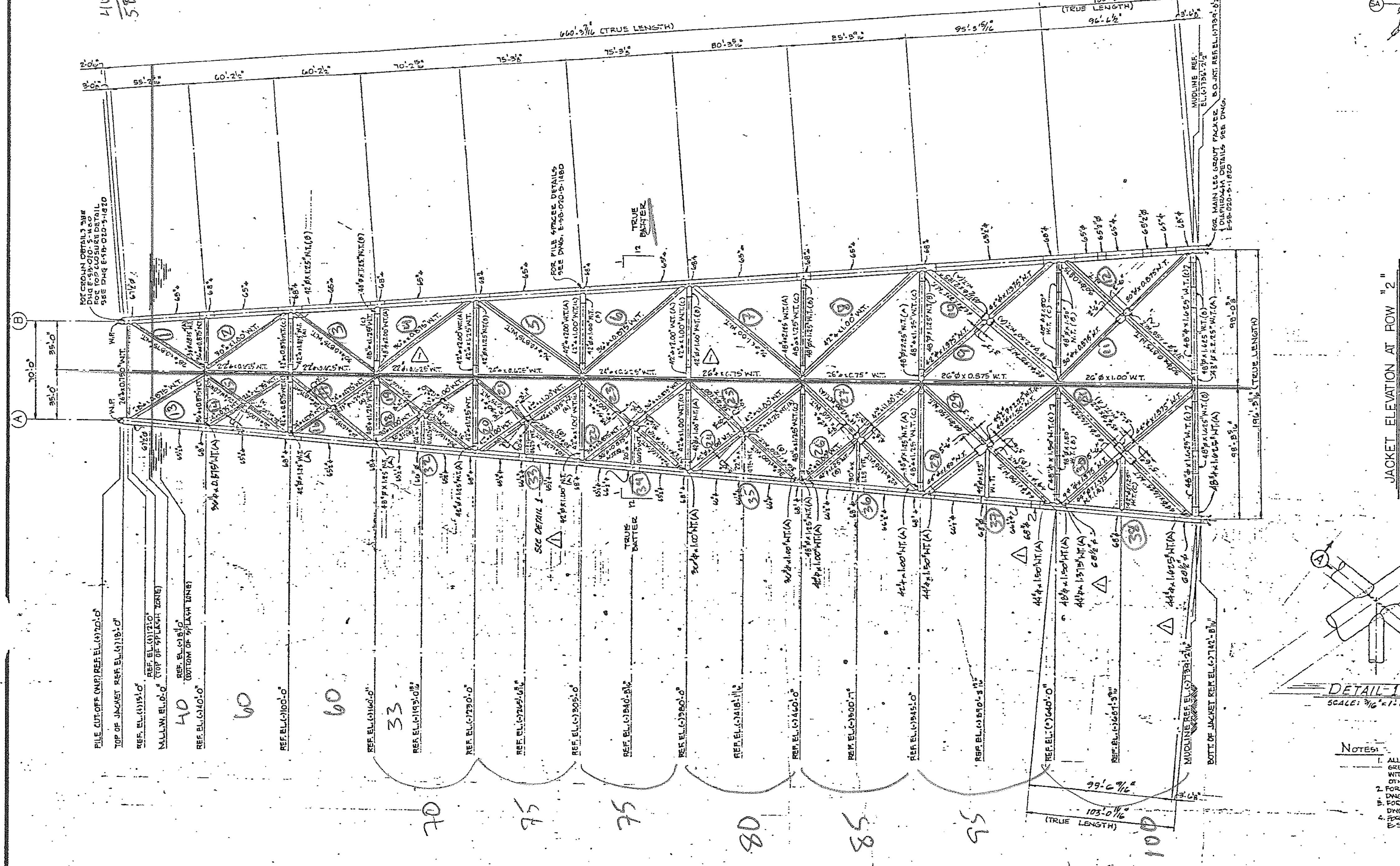
Draftsman: F.V. MONTOYA
Checked: JWK / J.V.V.

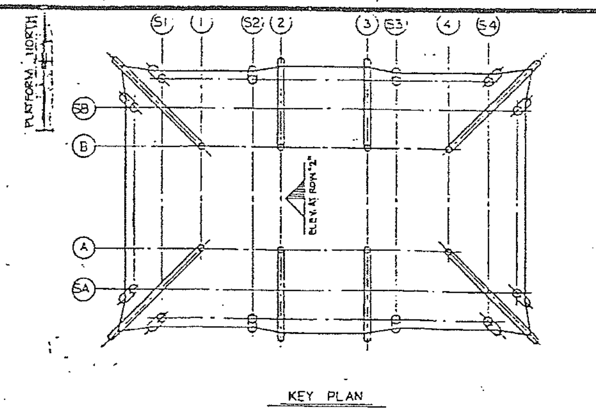
Brown & Root, Inc.
Job No JR-0106

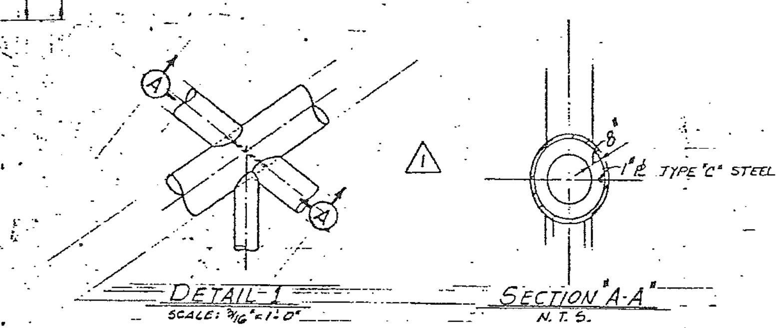
JACKET ELEVATION AT ROW "1"

DRILLING AND PRODUCTION PLATFORM GAIL
SOCKEYE FIELD SANTA CLARA UNIT
SANTA BARBARA CHANNEL, CALIFORNIA

SCALE: 1/32" = 1'-0"
REV 2
E-SB-020-S-1040







NOTES:

1. ALL MATERIAL TYPE "E" FOR TUBULARS WITH O.D. GREATER THAN 18" AND TYPE "F" FOR TUBULARS WITH O.D. LESS THAN OR EQUAL TO 18" UNLESS OTHERWISE NOTED.
2. FOR LEG MAKE-UP AT ROW "2", SEE DWG. E-SB-020-S-1051.
3. FOR TYPICAL JOINT DETAILS SEE DWG'S. E-SB-020-S-1240 THRU E-SB-020-S-1280.
4. FOR GENERAL NOTES SEE DWG. E-SB-020-S-1030.

0	APPROVED FOR CONSTRUCTION		
1	ADDED CANS, REVISED MEMBER SIZES, ADDED RING & DTL. 1		
2	AS-BUILT	5-1-88	

Chevron

Chevron U.S.A. Inc.
Western Region, Production Department

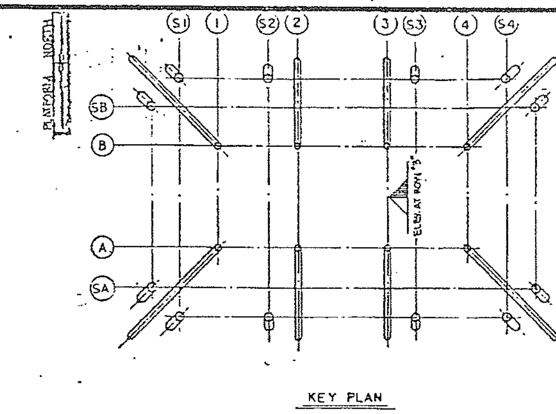
DRAFTSMAN F.V. MONTOYA
CHECKED JWK / J.V.V.

Brown & Root Inc.
Job No. JR-0106

JACKET ELEVATION AT ROW "2"

DRILLING AND PRODUCTION PLATFORM GAIL
SOCKEYE FIELD SANTA CLARA UNIT
SANTA BARBARA CHANNEL, CALIFORNIA

SCALE: 1/32"=1'-0"
REV. 2
E-SB-020-S-1050



Notes:

1. ALL MATERIAL TYPE "E" FOR TUBULARS WITH O.D. GREATER THAN 18" AND TYPE "F" FOR TUBULARS WITH O.D. LESS THAN OR EQUAL TO 18" UNLESS OTHERWISE NOTED.
2. FOR LEG MAKE-UP AT ROW "3", SEE DWG. E-SB-020-S-1061.
3. FOR TYPICAL JOINT DETAILS, SEE DWG'S. E-SB-020-S-1240 THRU E-SB-020-S-1250.
4. FOR GENERAL NOTES SEE DWG. E-SB-020-S-1030.

NO	REVISION	DATE	BY / CK	APPROVED
0	APPROVED FOR CONSTRUCTION	AUG 10, 84	CDH	
1	ADDED CANS, REVISED MEMBER SIZES, ADDED REF TO DTL. 1	OCT 11, 84		
2	AS BUILT	5-1-85	DLM	

Chevron

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Western Region, Production Department

DRAFTSMAN F.V. MONTOYA
CHECKER JWK / J.V.V.
DESIGN LEADER / GJ
PROJECT ENGINEER
CHEVRON DESIGN REP.
BROWN & ROOT PROJECT MANAGER
Chevron

Brown & Root, Inc.
Job No. JR-0106

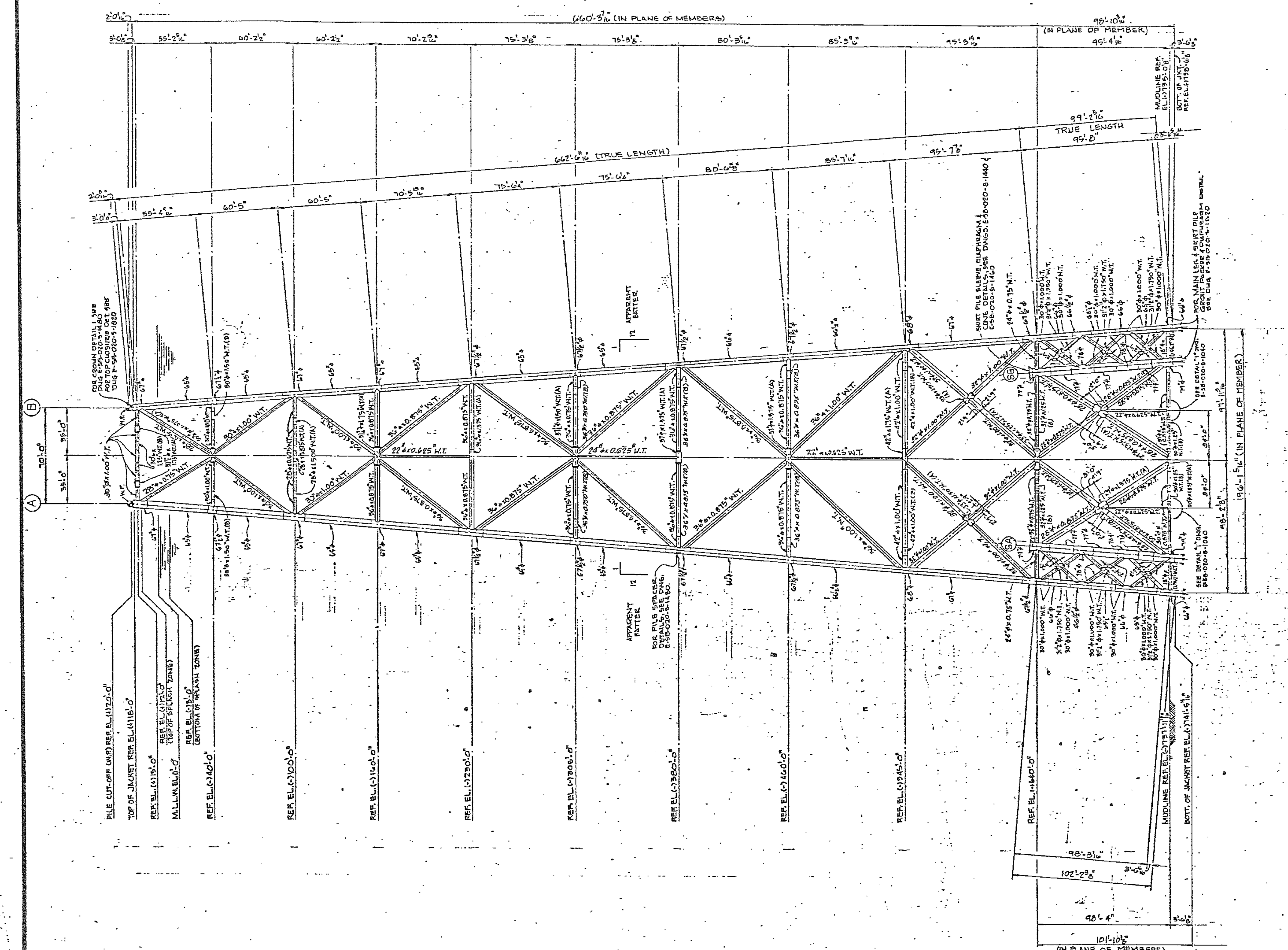
JACKET ELEVATION AT ROW "3"

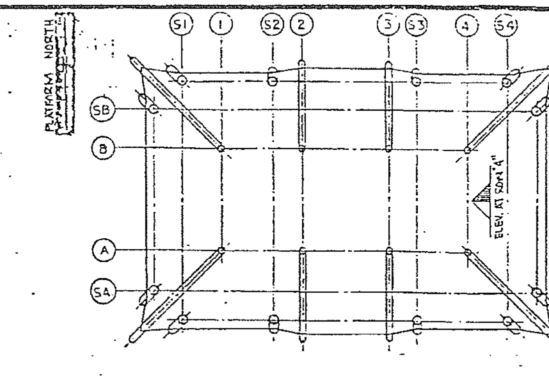
DRILLING AND PRODUCTION PLATFORM GAIL

SOCKEYE FIELD SANTA CLARA UNIT
SANTA BARBARA CHANNEL, CALIFORNIA

SCALE: 1/32" = 1'-0"
REV 2

E-SB-020-S-1060





KEY PLAN

NOTES:

1. ALL MATERIAL TYPE "E" FOR TUBULARS WITH O.D. GREATER THAN 18" AND TYPE "F" FOR TUBULARS WITH O.D. LESS THAN OR EQUAL TO 18" UNLESS OTHERWISE NOTED.
2. FOR LEG MAKE-UP AT ROW "4", SEE DWG. E-SB-020-S-1071.
3. FOR TYPICAL JOINT DETAILS SEE DWG'S E-SB-020-S-1240 THRU E-SB-020-S-1280.
4. FOR GENERAL NOTES SEE DWG E-SB-020-S-1030.

0	APPROVED FOR CONSTRUCTION	AUG.10,84	
1	REVISED MEMBER SIZES	OCT.12,84	
2	AS BUILT	5-1-88	DAH
NO.	REVISIONS	DATE	APPROVED

Chevron

Chevron U.S.A. Inc.
Western Region, Production Department

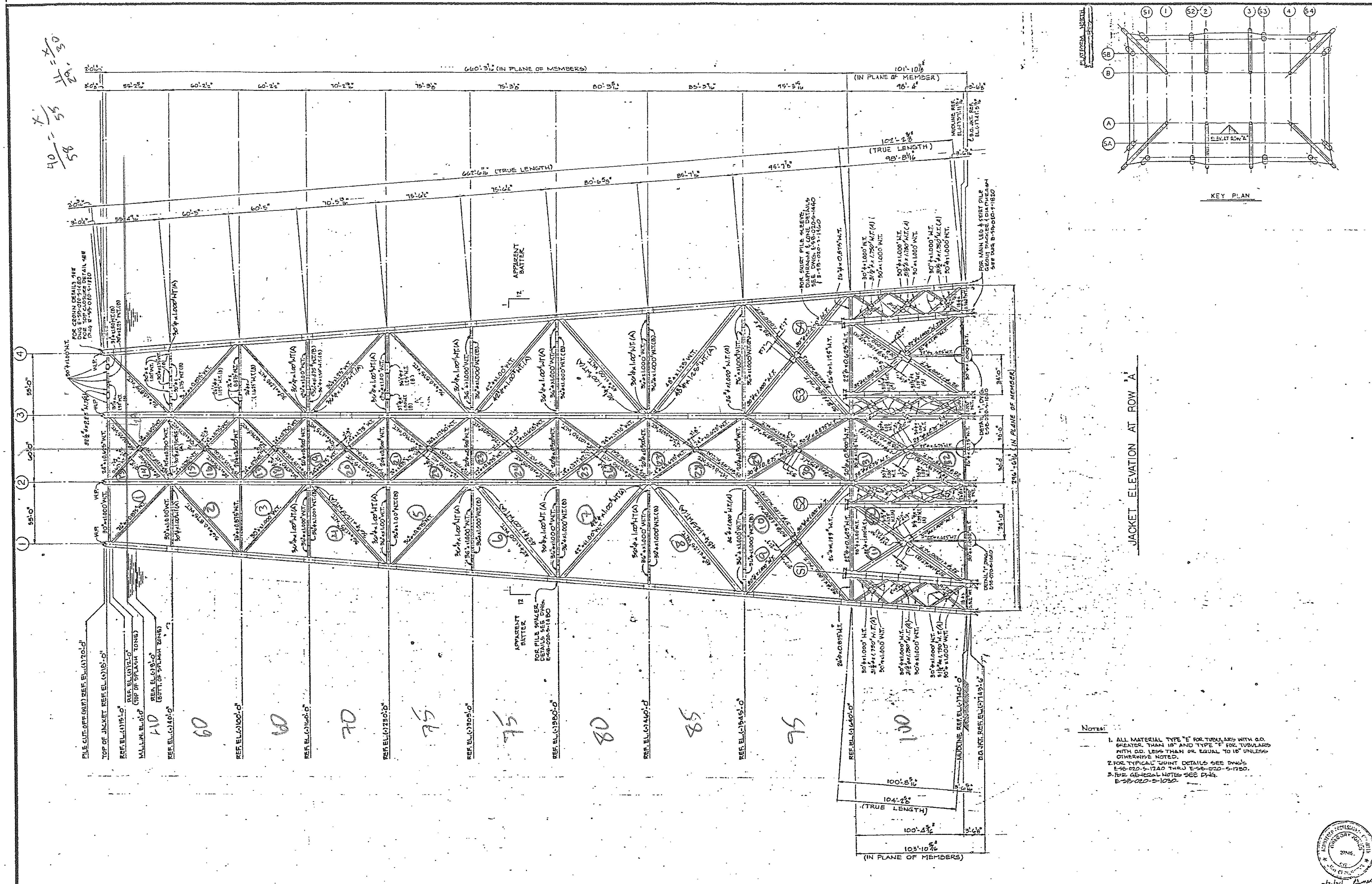
DRAFTSMAN F.V. MONTOYA
CHECKED JWK / J.V.V.
DESIGN LEADER / G.J.

Brown & Root, Inc.
Job No. JR-0106

JACKET ELEVATION AT ROW "4"

DRILLING AND PRODUCTION PLATFORM GAIL
SOCKEYE FIELD SANTA CLARA UNIT
SANTA BARBARA CHANNEL, CALIFORNIA

SCALE: 1/32"=1'-0"
REV 2
E-SB-020-S-1070



NOTES:

1. ALL MATERIAL TYPE "E" FOR TUBULARS WITH O.D. GREATER THAN 18" AND TYPE "F" FOR TUBULARS WITH O.D. LESS THAN OR EQUAL TO 18" UNLESS OTHERWISE NOTED.
2. FOR TYPICAL JOINT DETAILS SEE DWG'S E-SB-020-S-1240 THRU E-SB-020-S-1250.
3. FOR GENERAL NOTES SEE DWG. E-SB-020-S-1030.

0	APPROVED FOR CONSTRUCTION	AUG 10 84	
1	AS BUILT	5-1-86	DH

Chevron

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Western Region, Production Department

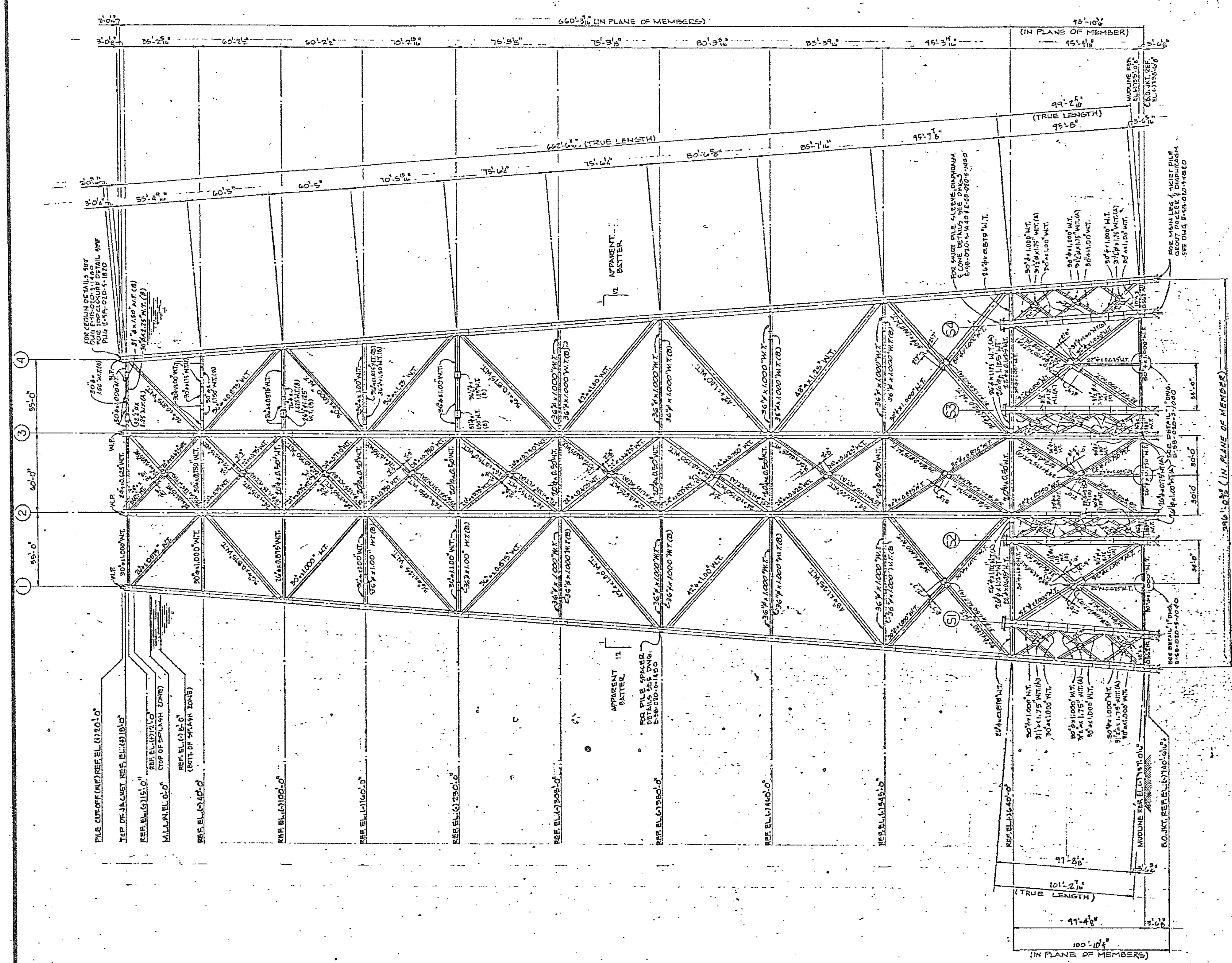
DRAFTSMAN F.V. MONTOYA
CHECKED JWK / J.V.V.

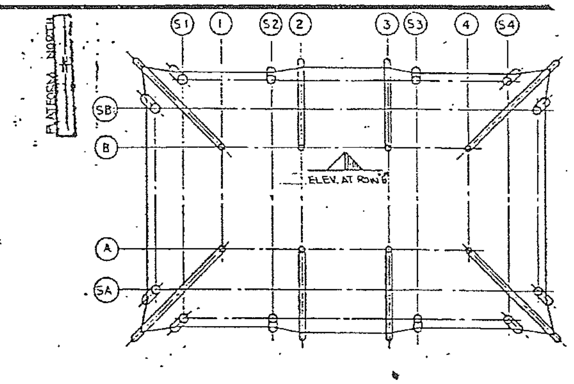
Brown & Root, Inc.
Job No. JR-0106

JACKET ELEVATION AT ROW "A"

DRILLING AND PRODUCTION PLATFORM GAIL
SOCKEYE FIELD SANTA CLARA UNIT
SANTA BARBARA CHANNEL, CALIFORNIA

SCALE: 1/32" = 1'-0"
REV 1
E-SB-020-S-1080





KEY PLAN

Notes:
1. ALL MATERIAL TYPE "E" FOR TUBULARS WITH O.D. GREATER THAN 16" AND TYPE "F" FOR TUBULARS WITH O.D. LESS THAN OR EQUAL TO 16" UNLESS OTHERWISE NOTED.
2. FOR TYPICAL JOINT DETAILS SEE DWG'S E-SB-020-S-1240 THRU E-SB-020-S-1280.
3. FOR GENERAL NOTES SEE DWG. E-SB-020-S-1030

No.	Revision	Date		No.	Revision	Date
0	APPROVED FOR CONSTRUCTION			1	AS BUILT	5-1-87

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Western Region, Production Department

DRAFTSMAN F.V. MONTOYA
CHECKED JWK / JWK

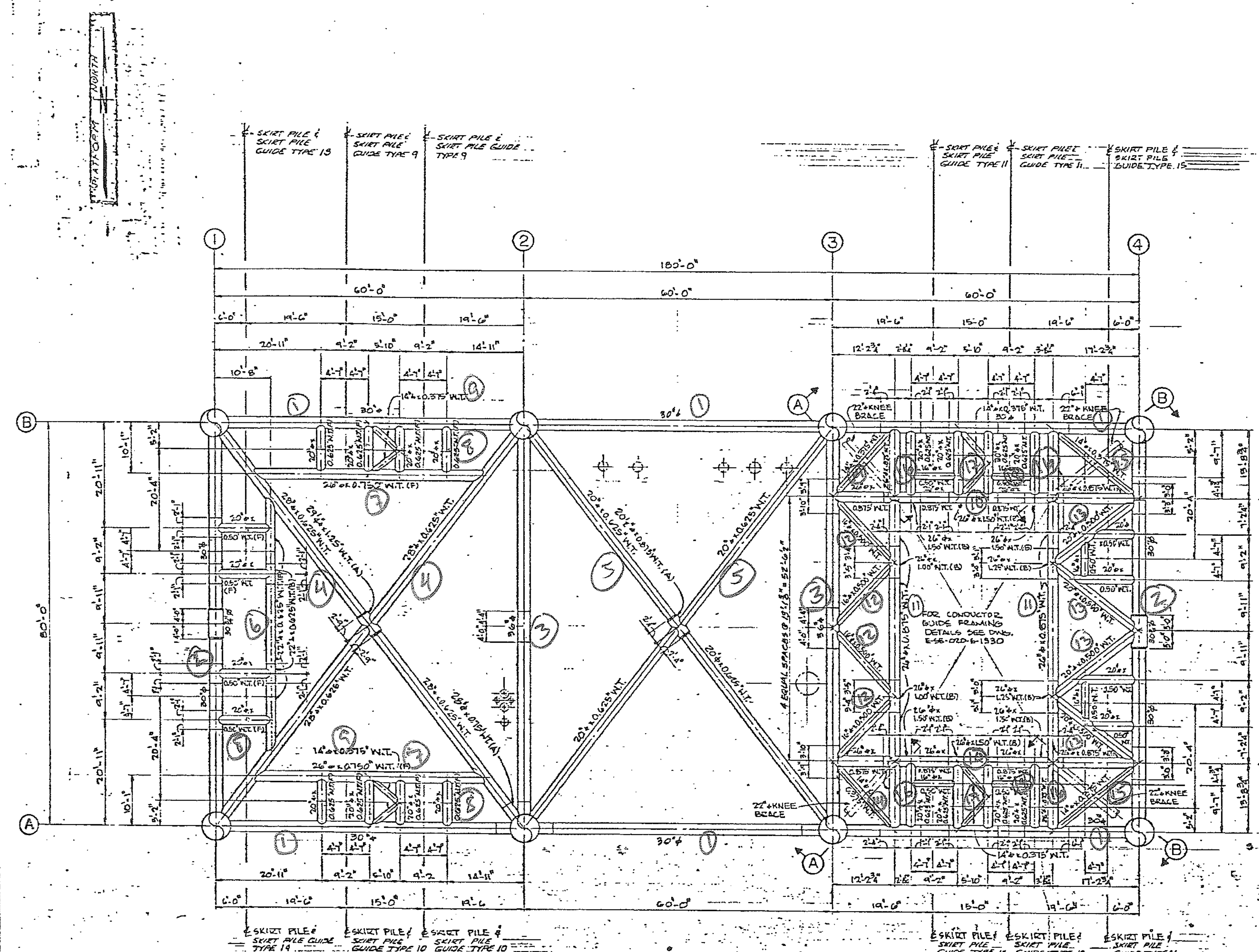
Brown & Root, Inc.
JOB NO. JR-0106

JACKET ELEVATION AT ROW "B"

DRILLING AND PRODUCTION PLATFORM GAIL
SOCKEYE FIELD SANTA CLARA UNIT
SANTA BARBARA CHANNEL, CALIFORNIA

SCALE: 1/32"=1'-0"

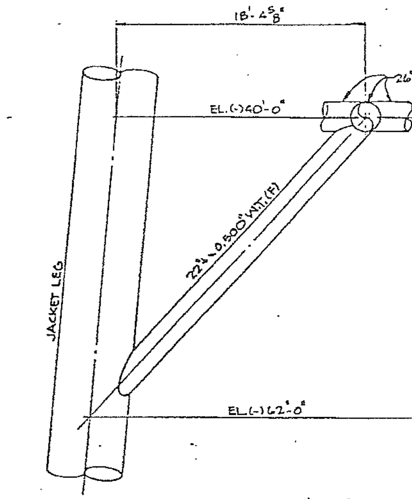
E-SB-020-S-1090



JACKET PLAN AT EL.(-)40'-0"

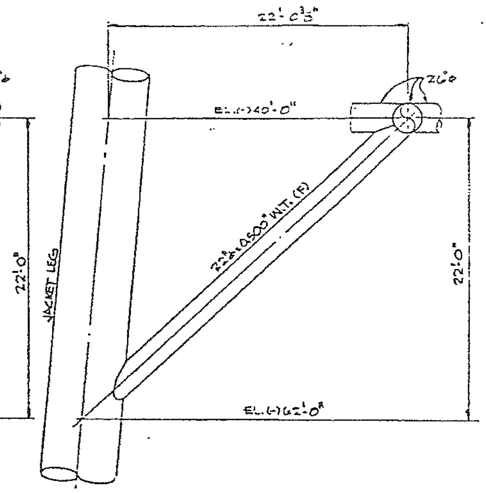
℄ OF PIPES AT EL.(-)40'-0" U.N.O.

SCALE: 3/32" = 1'-0"



SECTION A-A

SCALE: 3/16" = 1'-0"



SECTION B-B

SCALE: 3/16" = 1'-0"

NOTES:

1. ALL MATERIAL TYPE "E" FOR TUBULARS WITH O.D. GREATER THAN 18" AND TYPE "F" FOR TUBULARS WITH O.D. LESS THAN OR EQUAL TO 18" UNLESS OTHERWISE NOTED.
2. FOR SKIRT PILE GUIDE FRAMING DETAILS SEE DWG. E-SB-020-S-1410.
3. FOR GENERAL NOTES SEE DWG. E-SB-020-S-1030

NO	REVISION	DATE
0	APPROVED FOR CONSTRUCTION	AUG 10, 84
1	REVISED CAN SIZE & RELOCATED INSTRUMENT TUBE	OCT 11, 84
2	REMOVED INSTR. SUPPORTS	DEC 5, 84
3	AS BUILD	5-1-82

Chevron

Chevron U.S.A. Inc.
Western Region, Production Department

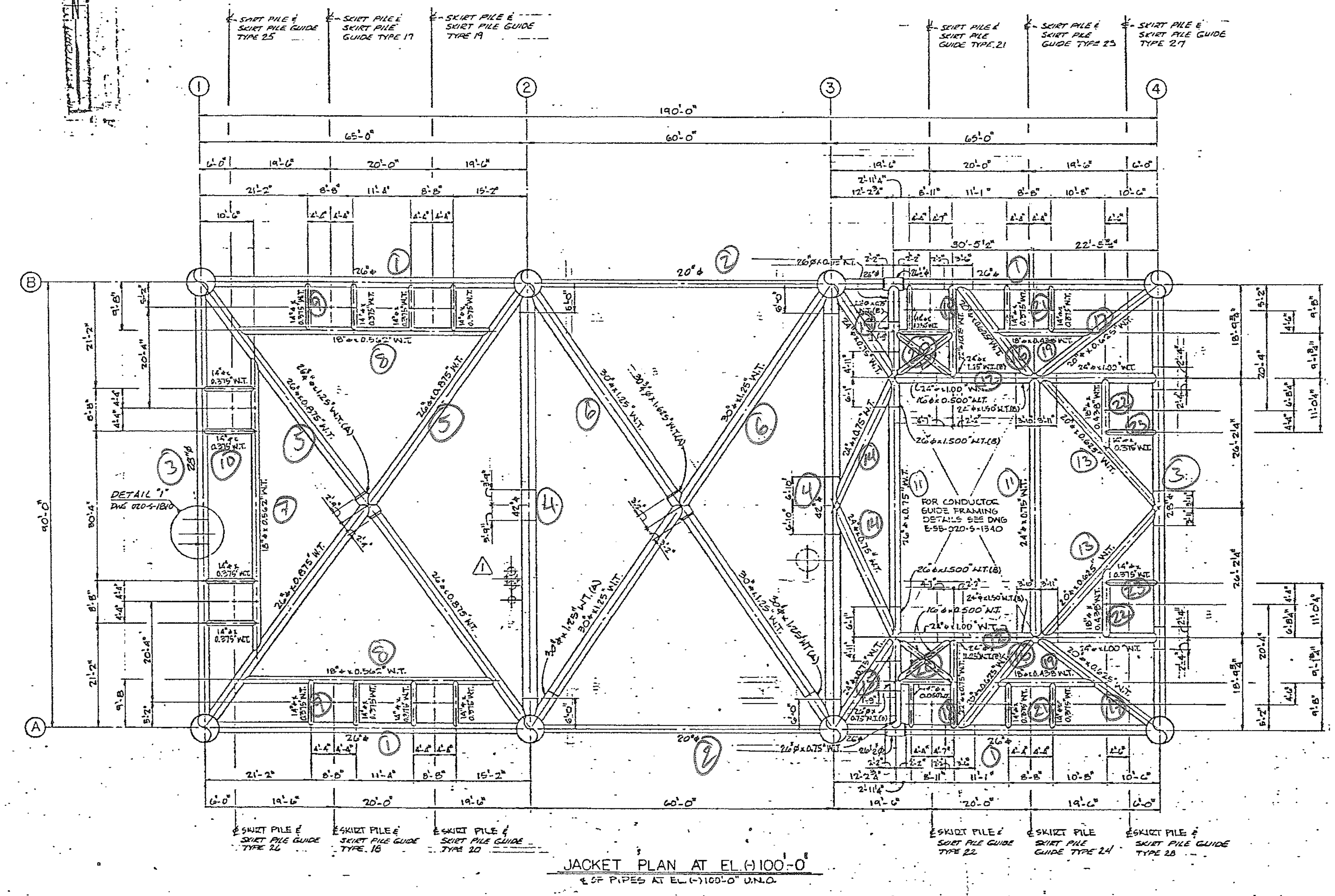
DRAFTSMAN F.V. MONTOYA
CHECKER JWK / J.V.V.

Brown & Root, Inc.
Job No. JR-0106

JACKET PLAN AT EL.(-)40'-0"

DRILLING AND PRODUCTION PLATFORM GAIL
SOCKEYE FIELD SANTA CLARA UNIT
SANTA BARBARA CHANNEL, CALIFORNIA

SCALE: AS NOTED
REV 3
E-SB-020-S-1130



Notes:

1. ALL MATERIAL TYPE "E" FOR TUBULARS WITH O.D. GREATER THAN 18" AND TYPE "F" FOR TUBULARS WITH O.D. LESS THAN OR EQUAL TO 18" UNLESS OTHERWISE NOTED.
2. FOR SKIRT PILE GUIDE FRAMING DETAILS, SEE DWG. E-SB-020-S-1420 & E-SB-020-S-1430.
3. FOR GENERAL NOTES SEE DWG. E-SB-020-S-1030.

No.	Revision	Date
0	APPROVED FOR CONSTRUCTION	
1	RELOCATED INSTRUMENT TUBE	
2	ADDED STRUCT. INSTR. SUPPORTS	
3	AS BUILT	5-1-58

Chevron U.S.A. Inc.
Western Region, Production Department

Draftsman: F.V. MONTOYA

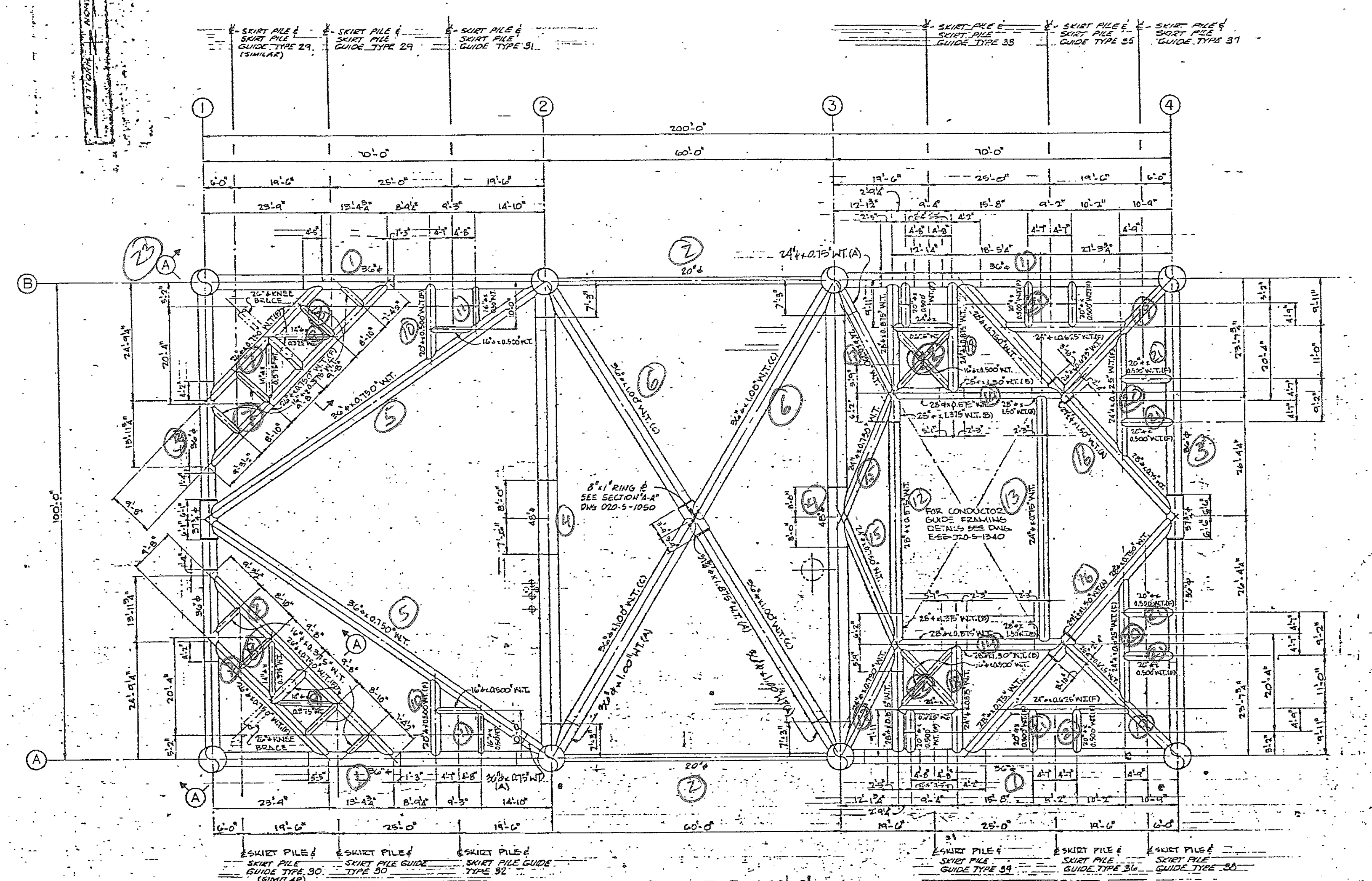
Brown & Root, Inc. Job No. JR-0106

JACKET PLAN AT EL.(-)100'-0"

DRILLING AND PRODUCTION PLATFORM GAIL
SOCKEYE FIELD SANTA CLARA UNIT
SANTA BARBARA CHANNEL, CALIFORNIA

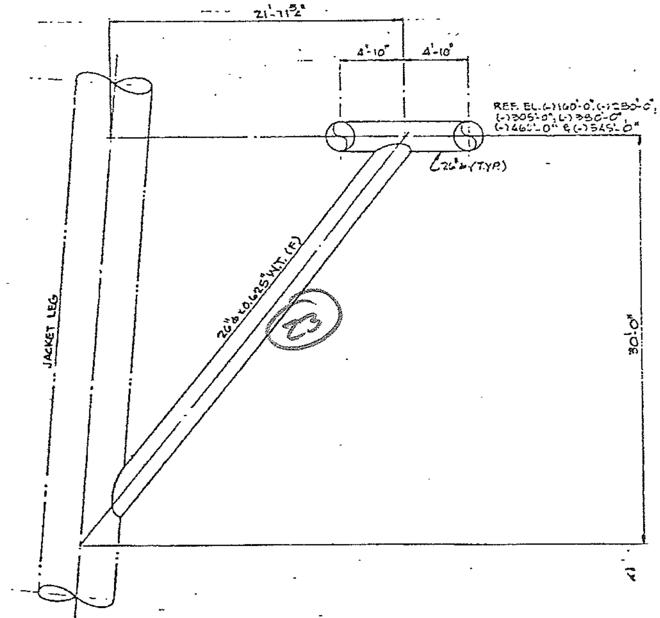
SCALE: 3/32"=1'-0" REV. 3

E-SB-020-S-1140



JACKET PLAN AT EL.(-)160'-0"

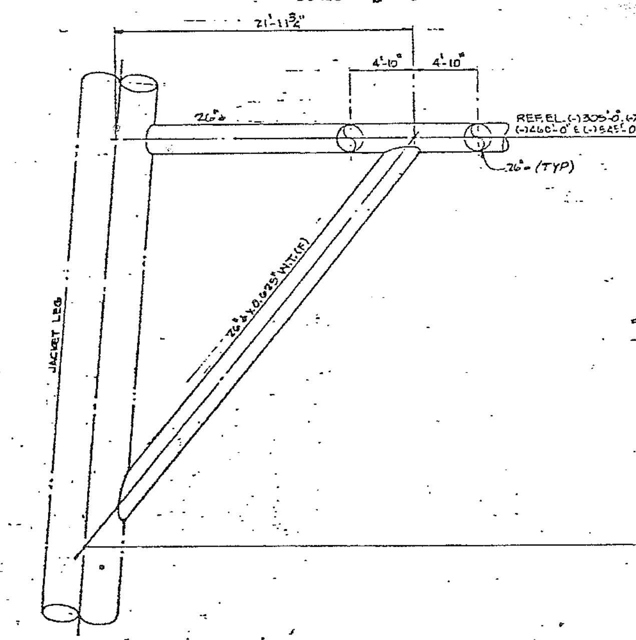
℄ OF PIPES AT EL.(-)160'-0" U.N.O.



SECTION "A-A"

REF. DWGS E-SB-020-S-1150 THRU 1200

SCALE: 3/32"=1'-0"



SECTION "B-B"

REF. DWGS E-SB-020-S-1150 THRU 1200

SCALE: 3/32"=1'-0"

NOTES:

1. ALL MATERIAL TYPE "E" FOR TUBULARS WITH O.D. GREATER THAN 18" AND TYPE "F" FOR TUBULARS WITH O.D. LESS THAN OR EQUAL TO 18" UNLESS OTHERWISE NOTED.
2. FOR SKIRT PILE GUIDE FRAMING DETAILS SEE DWG. E-SB-020-S-1430 & 1440.
3. FOR GENERAL NOTES SEE DWG. E-SB-020-S-1030.

0	APPROVED FOR CONSTRUCTION	AUG 10,84		
1	ADDED INTERNAL RING ℄, RELOCATED INSTRUMENT TUBS	DEC 0,84		
2	AS BUILT	5-1-88		

Chevron

Chevron U.S.A. Inc.
Western Region, Production Department

DRAFTSMAN F.V. MONTOYA
CHECKED JWK / JVV.

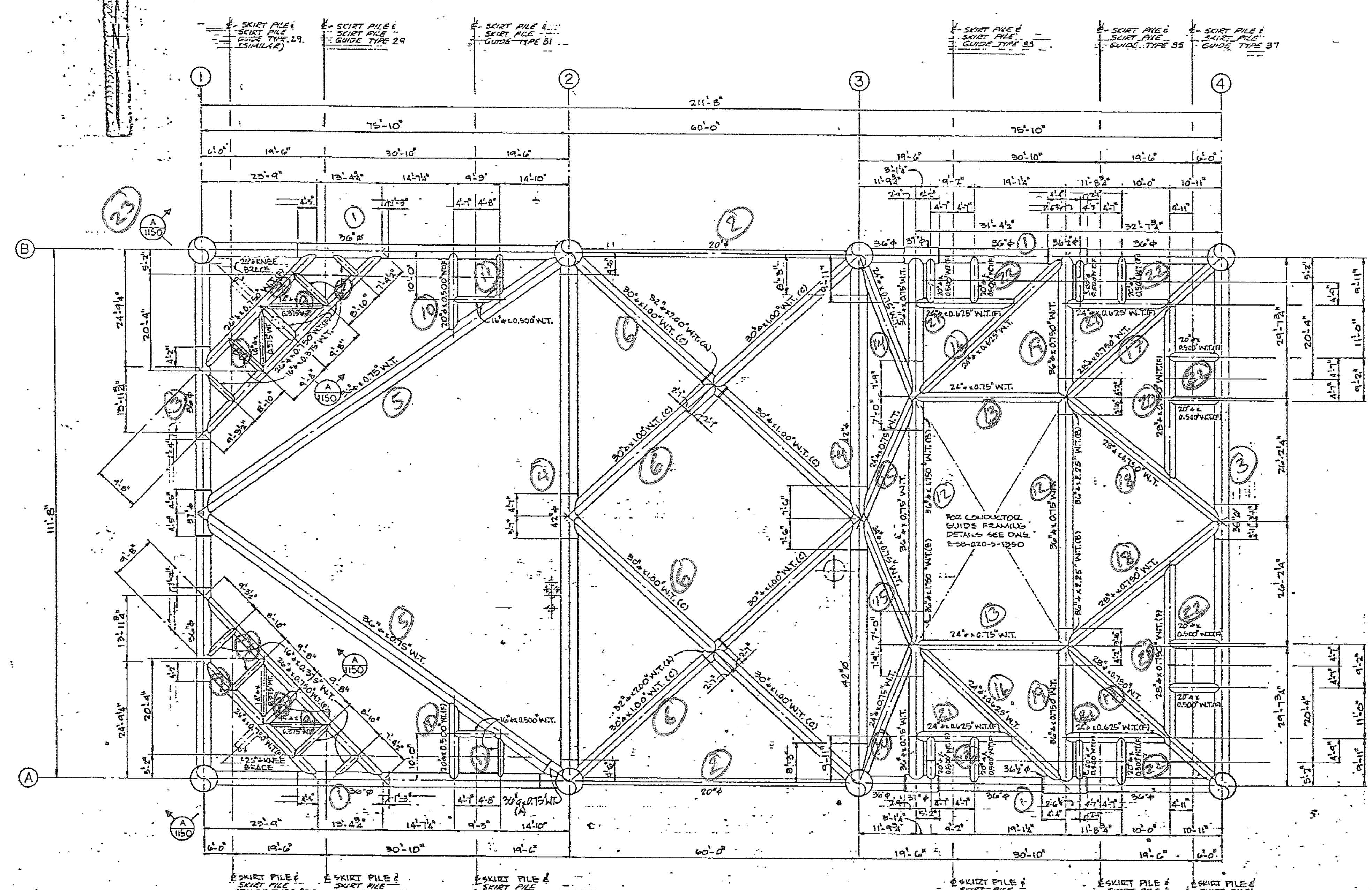
Brown & Root, Inc.
Job No. JR-0106

JACKET PLAN AT EL.(-)160'-0"

DRILLING AND PRODUCTION PLATFORM GAIL
SOCKEYE FIELD SANTA CLARA UNIT
SANTA BARBARA CHANNEL, CALIFORNIA

SCALE: 3/32" 1'-0" U.N. REV 2

E-SB-020-S-1150



JACKET PLAN AT EL.(-)230'-0"

℄ OF PIPES AT EL.(-)230'-0" U.N.O.

NOTES:

1. ALL MATERIAL TYPE "E" FOR TUBULARS WITH O.D. GREATER THAN 18" AND TYPE "F" FOR TUBULARS WITH O.D. LESS THAN OR EQUAL TO 18" UNLESS OTHERWISE NOTED.
2. FOR SKIRT PILE GUIDE FRAMING DETAILS, SEE DWG. E-SB-020-S-1450 & 1440.
3. FOR GENERAL NOTES SEE DWG. E-SB-020-S-1030.

GREGORY JONES 37546 CIVIL STATE OF CALIFORNIA

7/31/84

NO	REVISION	DATE	BY	APPROVED
0	APPROVED FOR CONSTRUCTION	AUG 1984		
1	RELOCATED INSTRUMENT TUBE	OCT.11, 84		
2	AS BUILD	5-1-88		

Chevron

Chevron U.S.A. Inc.
Western Region, Production Department

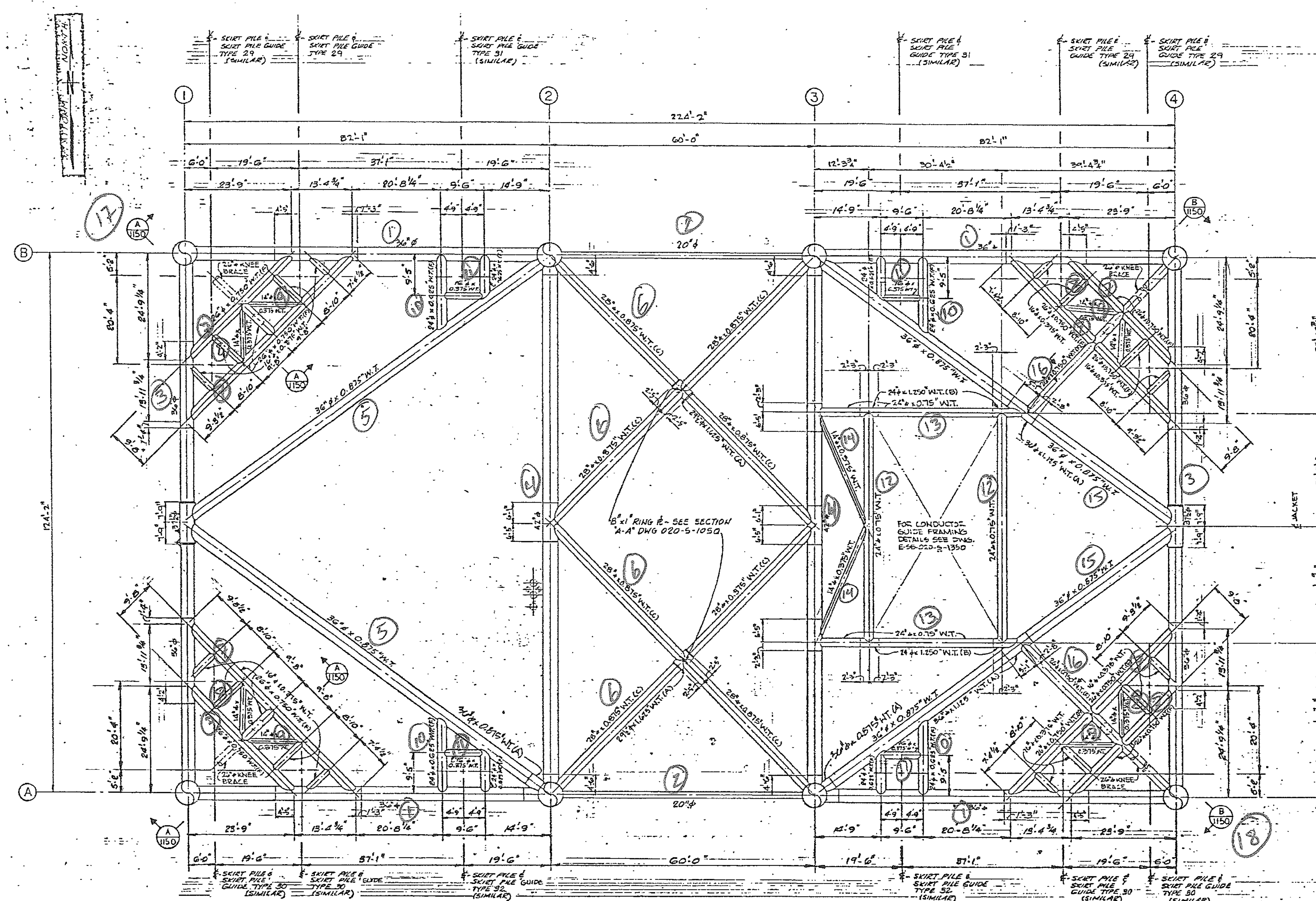
DRAFTSMAN F.V. MONTOYA
CHECKER JWK / J.V.V.
DESIGN LEADER
PROJECT ENGINEER
CHEVRON DESIGN REP
BROWN & ROOT PROJECT MANAGER

Brown & Root, Inc.
Job No. JR-0106

JACKET PLAN AT EL.(-)230'-0"

DRILLING AND PRODUCTION PLATFORM GAIL
SOCKEYE FIELD SANTA CLARA UNIT
SANTA BARBARA CHANNEL, CALIFORNIA

SCALE: 3/32"=1'-0"
REV 2
E-SB-020-S-1160



JACKET PLAN AT EL.(-)305'-0"

℄ OF PIPES AT EL.(-)305'-0" U.N.O.

NOTES:

1. ALL MATERIAL TYPE "E" FOR TUBULARS WITH O.D. GREATER THAN 18" AND TYPE "F" FOR TUBULARS WITH O.D. LESS THAN OR EQUAL TO 18" UNLESS OTHERWISE NOTED.
2. FOR SKIRT PILE GUIDE FRAMING DETAILS SEE DWG. E-SB-020-S-1830 & 1440
3. FOR GENERAL NOTES SEE DWG. E-SB-020-S-1030.

NO	REVISION	DATE	BY	APPROVED
0	APPROVED FOR CONSTRUCTION	AUG 1984		
1	ADDED INTERNAL RING, RELOCATED INSTRUMENT TUBE	OCT 31, 84		
2	AS BUILT	5-1-88	DM	

Chevron

Chevron U.S.A. Inc.
Western Region, Production Department

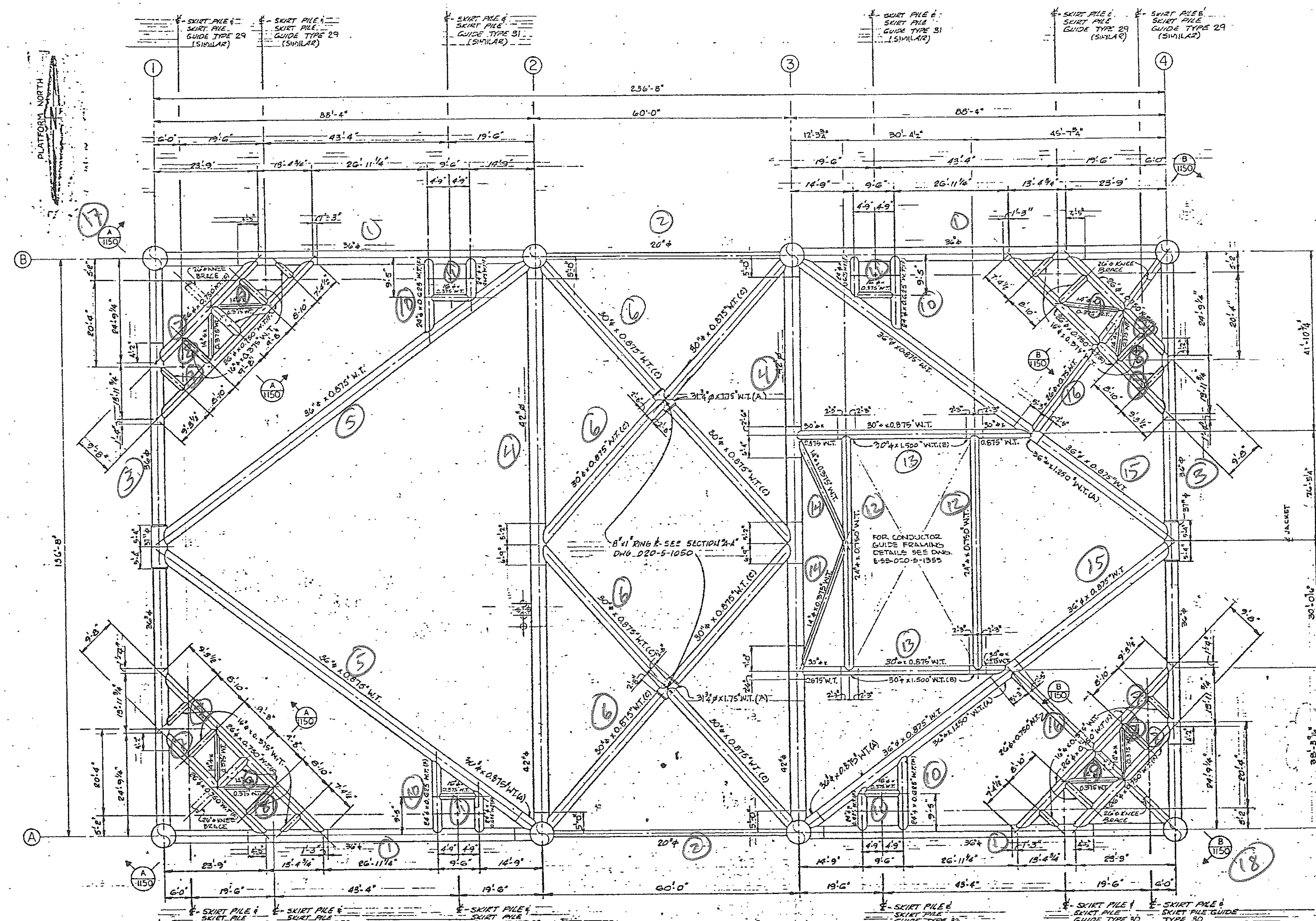
DRAFTSMAN F.V. MONTOYA
CHECKED JWK / J.V.V.

Brown & Root, Inc.
Job No. JR-0106

JACKET PLAN AT EL.(-)305'-0"

DRILLING AND PRODUCTION PLATFORM GAIL
SOCKEYE FIELD SANTA CLARA UNIT
SANTA BARBARA CHANNEL, CALIFORNIA

SCALE: 3/32"=1'-0"
REV 2
E-SB-020-S-1170



JACKET PLAN AT EL.(-)380'-0"

℄ OF PIPES AT EL.(-)380'-0" U.N.O.

Notes:

1. ALL MATERIAL TYPE "E" FOR TUBULARS WITH O.D. GREATER THAN 18" AND TYPE "F" FOR TUBULARS WITH O.D. LESS THAN OR EQUAL TO 18" UNLESS OTHERWISE NOTED.
2. FOR SKIRT PILE GUIDE FRAMING DETAILS SEE DWG. E-SB-020-S-1430 & 1440.
3. FOR GENERAL NOTES SEE DWG. E-SB-020-S-1030.

7/21/84

NO	REVISIONS	DATE
0	APPROVED FOR CONSTRUCTION	AUG.10,84
1	ADDED INTERNAL RING, RELOCATED INSTRUMENT TUBE	OCT.0,84
2	AS BUILT	5-1-85

Chevron

Chevron U.S.A. Inc.
Western Region, Production Department

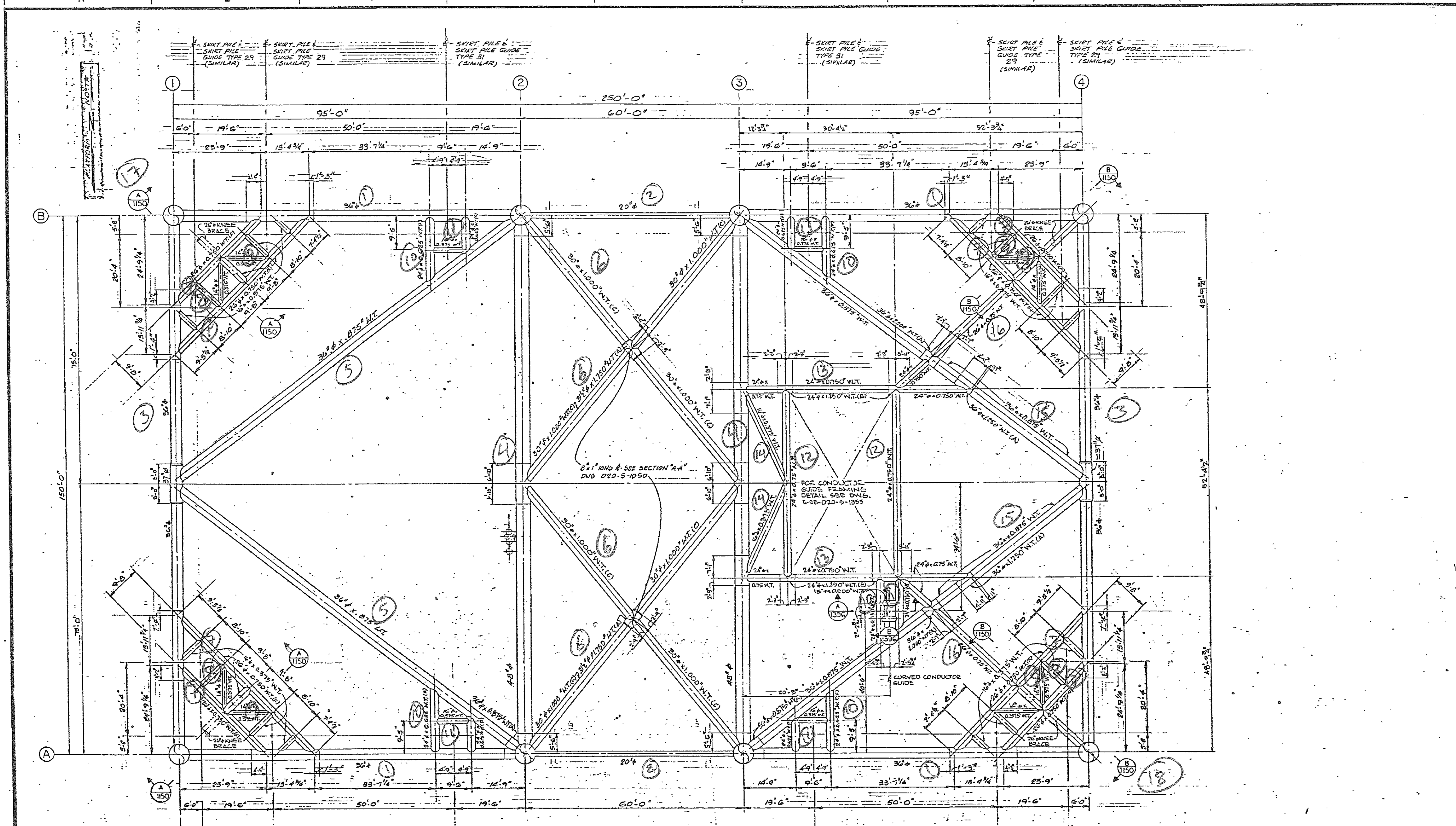
DRAFTSMAN L A White
CHECKED JWK / JVV
DESIGN LEADER RLC / GJ
PROJECT ENGINEER J A S / EDH

Brown & Root, Inc.
Job No. JR-0105

JACKET PLAN AT EL.(-)380'-0"

DRILLING AND PRODUCTION PLATFORM GAIL
SOCKEYE FIELD SANTA CLARA UNIT
SANTA BARBARA CHANNEL, CALIFORNIA

SCALE: 3/32" = 1'-0"
REV 1
E-SB-020-S-1180



JACKET PLAN AT EL.(-) 460'-0"

℄ OF PIPES AT EL (-) 460'-0"

NOTES:

1. ALL MATERIAL TYPE "E" FOR TUBULARS WITH O.D. GREATER THAN 18" AND TYPE "F" FOR TUBULARS WITH O.D. LESS THAN OR EQUAL TO 18" UNLESS OTHERWISE NOTED.
2. FOR SKIRT PILE GUIDE FRAMING DETAILS SEE DWG. E-SB-020-S-1430 & 1440.
3. FOR GENERAL NOTES SEE DWG. E-SB-020-S-1030.

7/31/84

NO	REVISION	DATE	BY	APPROVED
0	APPROVED FOR CONSTRUCTION	AUG.10.84		
1	ADDED INTERNAL RING ℄, RELOCATED INSTRUMENT TUBE	OCT.12.84		
2	AS BUILD	5-1-88		

Chevron

Chevron U.S.A. Inc.
Western Region, Production Department

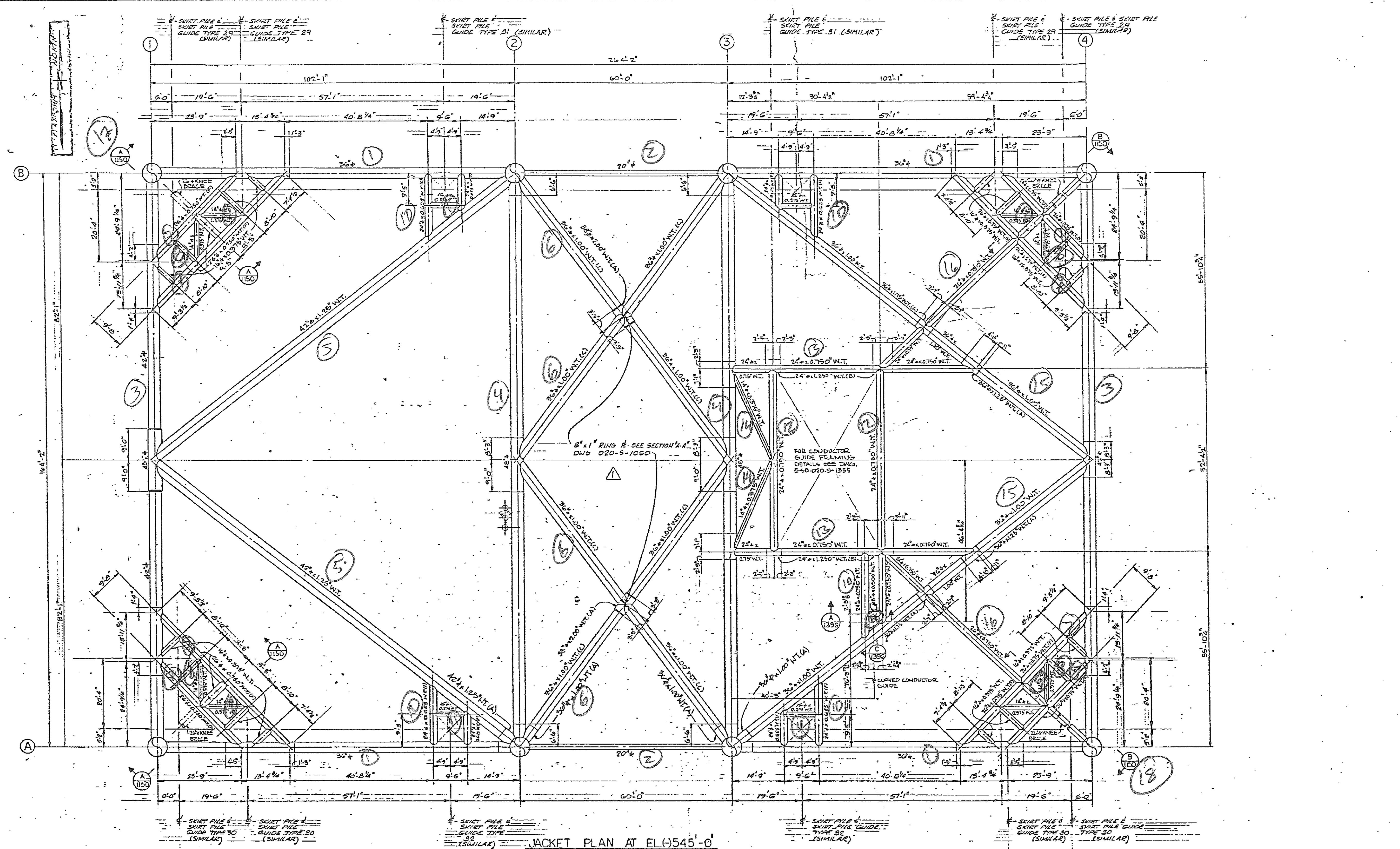
Brown & Root, Inc.
Job Nº JR-0105

JACKET PLAN AT EL.(-) 460'-0"

DRILLING AND PRODUCTION PLATFORM GAIL
SOCKEYE FIELD SANTA CLARA UNIT
SANTA BARBARA CHANNEL, CALIFORNIA

SCALE: 3/32" = 1'-0"
REV 2

E-SB-020-S-1190



JACKET PLAN AT EL.(-)545'-0"

℄ OF PIPES AT EL.(-)545'-0" U.O.N.

NOTES:

1. ALL MATERIAL TYPE "E" FOR TUBULARS WITH O.D. GREATER THAN 18" AND TYPE "F" FOR TUBULARS WITH O.D. LESS THAN OR EQUAL TO 18" UNLESS OTHERWISE NOTED.
2. FOR SKIRT PILE GUIDE FRAMING DETAILS SEE DWG. E-SB-020-S-1430 & 1440
3. FOR GENERAL NOTES SEE DWG. E-SB-020-S-1050.

NO	REVISIONS	DATE	
0	APPROVED FOR CONSTRUCTION	AUG.10,84	
1	ADDED INTERNAL RING ℄, RELOCATED INSTRUMENT TUBE	OCT.12,84	
2	AS BUILT	5-1-88	

Chevron U.S.A. Inc.
Western Region, Production Department

DRAFTSMAN E.V. MONTOYA
CHECKER JWK / JVV

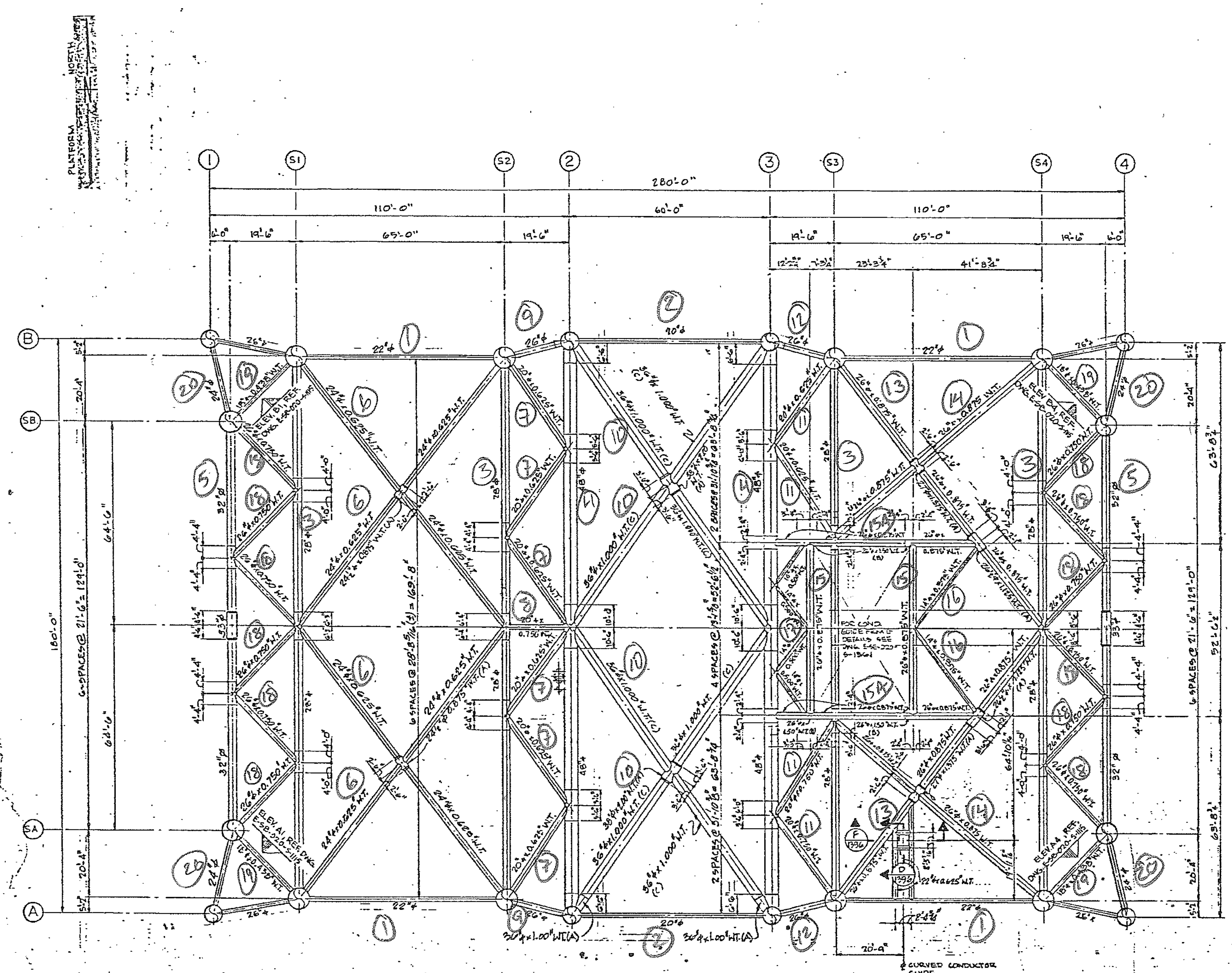
Brown & Root, Inc.
Job Nº JR-0106

JACKET PLAN AT EL.(-)545'-0"

DRILLING AND PRODUCTION PLATFORM GAIL
SOCKEYE FIELD SANTA CLARA UNIT
SANTA BARBARA CHANNEL, CALIFORNIA

SCALE: 3/32"=1'-0" REV 2

E-SB-020-S-1200



JACKET PLAN AT EL.(-)640'-0"

℄ OF PIPES AT EL.(-)640'-0" U.N.O.

Notes:

1. ALL MATERIAL TYPE "E" FOR TUBULARS WITH O.D. GREATER THAN 18" AND TYPE "F" FOR TUBULARS WITH O.D. LESS THAN OR EQUAL TO 18" UNLESS OTHERWISE NOTED.
2. FOR GENERAL NOTES SEE DWG. E-SB-020-S-1030.

No.	Revision	Date	By	Approved
0	APPROVED FOR CONSTRUCTION	AUG 10,84	CDH SAL	
1	RELOCATED INSTRUMENT TUBE			
2	AS BUILT	5-1-86	DJM	

Chevron

Chevron U.S.A. Inc.
Western Region, Production Department

DRAFTSMAN J.V.V.
CHECKER J. VAVOCK
DESIGN LEADER G JONES
PROJECT ENGINEER CDH
CHEVRON DESIGN REP SAL
BROWN & ROOT PROJECT MANAGER

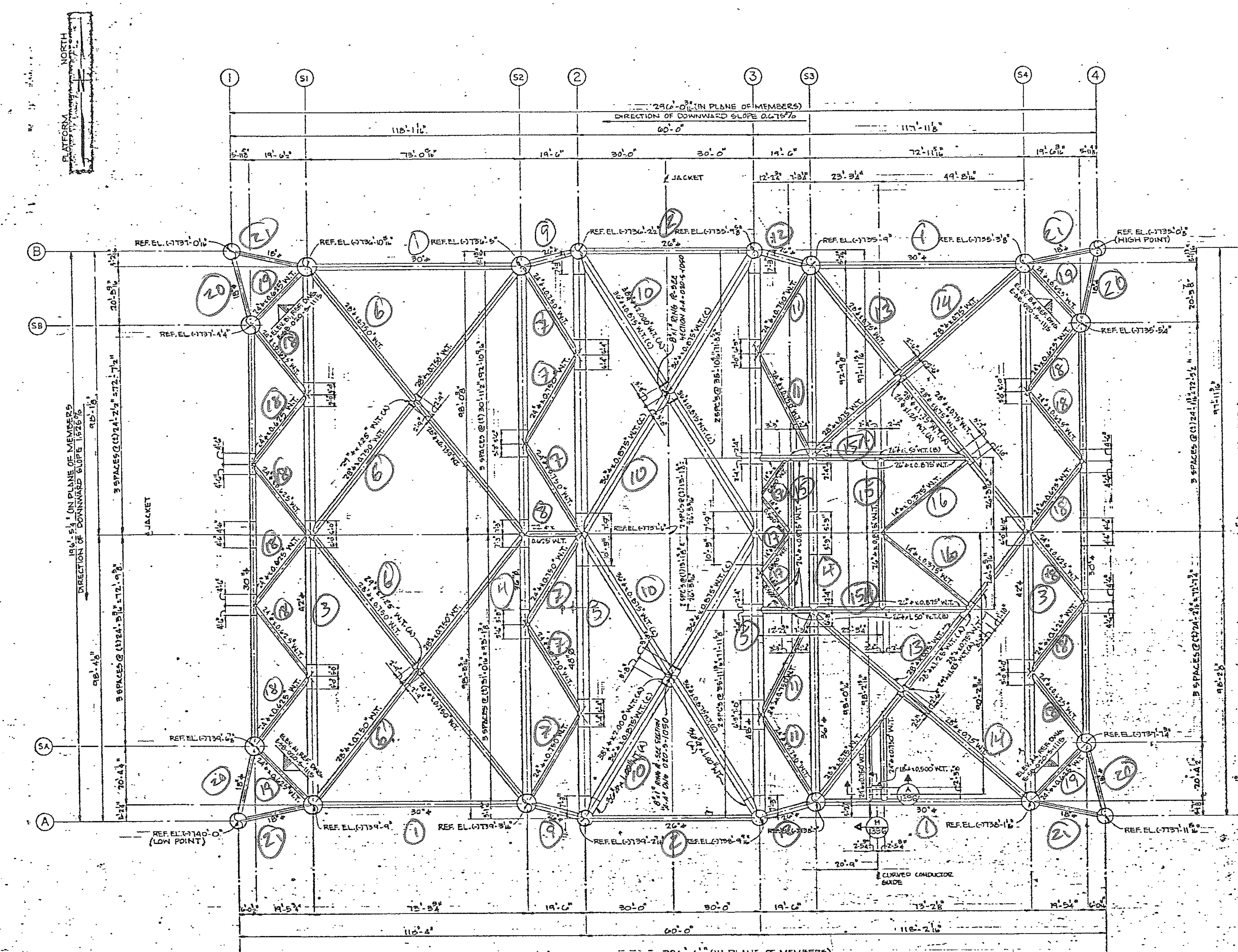
Brown & Root, Inc.
Job No. JR-0106

JACKET PLAN AT EL(-)640'-0"

DRILLING AND PRODUCTION PLATFORM GAIL
SOCKEYE FIELD SANTA CLARA UNIT
SANTA BARBARA CHANNEL, CALIFORNIA

SCALE: N.T.S.
REV 2
E-SB-020-S-1221

REGISTERED PROFESSIONAL ENGINEER GREGORY JONES 27346 CIVIL STATE OF CALIFORNIA
7/31/84



JACKET PLAN AT MUDLINE

℄ OF PIPES AT MUDLINE U.N.O.

NOTES:

1. ALL MATERIAL TYPE "E" FOR TUBULARS WITH O.D. GREATER THAN 18" AND TYPE "F" FOR TUBULARS WITH O.D. LESS THAN OR EQUAL TO 18" UNLESS OTHERWISE NOTED.
2. FOR COND. GUIDE FRM'G DETAILS SEE DWG. E-SB-020-S-1510.
3. ALL DIMENSIONS ARE IN THE PLANE OF MUDLINE AND PARALLEL TO THE JACKET CENTERLINE.
4. FOR GENERAL NOTES SEE DWG. E-SB-020-S-1030.

NO	REVISION	DATE	BY	CH	APPROVED
0	APPROVED FOR CONSTRUCTION	AUG 10, 84			
1	ADDED INTERNAL RING ℄ AND RELOCATED INSTRUMENT TUBE	OCT 13, 84			
2	AS BUILT	5-1-88	DAM		

Chevron

Chevron U.S.A. Inc.
Western Region, Production Department

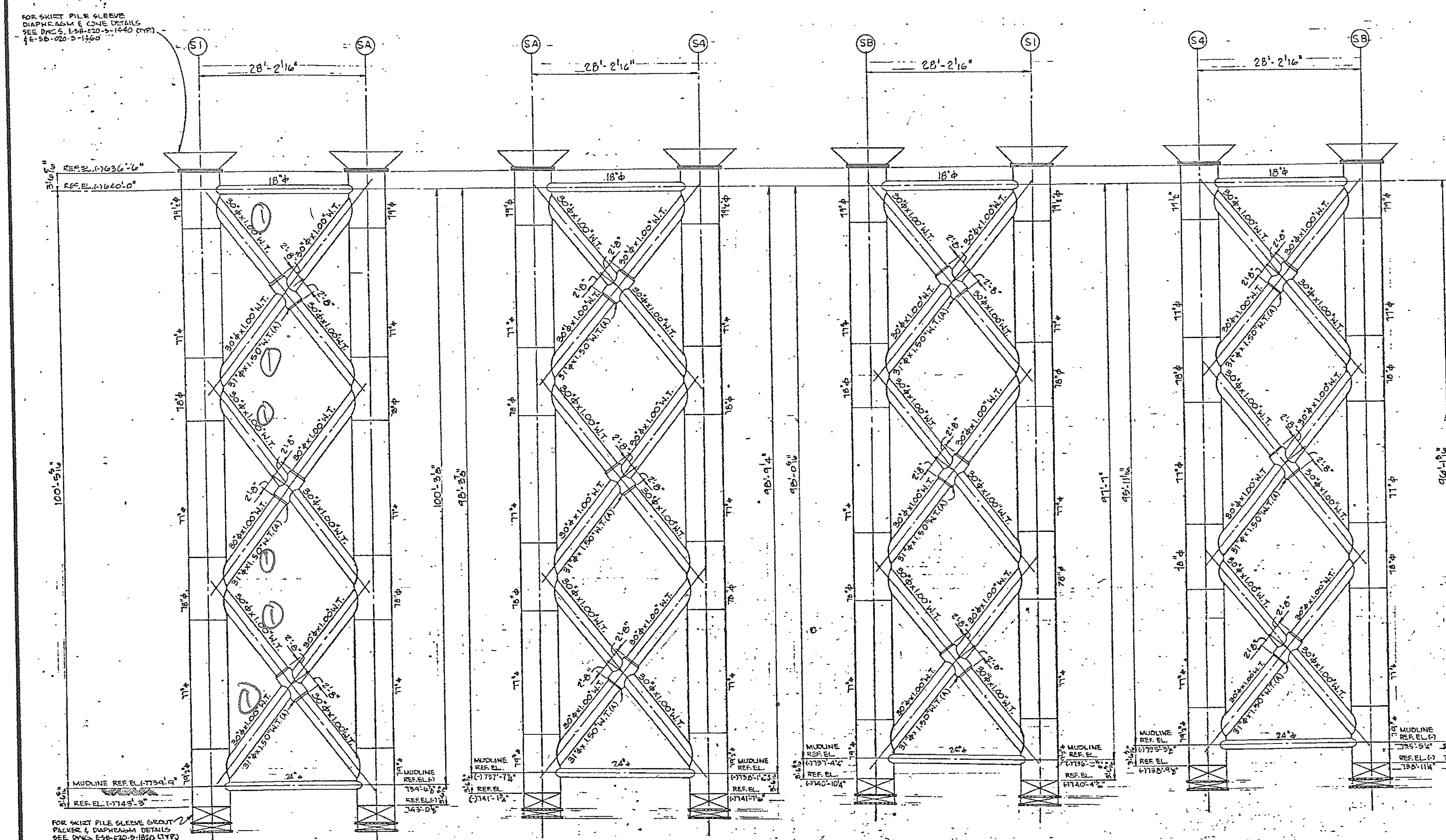
DRAFTSMAN F.V. MONTOYA
CHECKED JWK / J.V.Y.
DESIGN LEADER TLL / GJ

Brown & Root, Inc.
Job № JR-0106

JACKET PLAN AT MUDLINE

DRILLING AND PRODUCTION PLATFORM GAIL
SOCKEYE FIELD SANTA CLARA UNIT
SANTA BARBARA CHANNEL, CALIFORNIA

SCALE: 1/16" = 1'-0"
REV 2
E-SB-020-S-1230



ELEVATION A1
REF. DWG. E-SB-020-S-1221 & 1230

ELEVATION A4
REF. DWG. E-SB-020-S-1221 & 1230

ELEVATION B1
REF. DWG. E-SB-020-S-1221 & 1230

ELEVATION B4
REF. DWG. E-SB-020-S-1221 & 1230

A1 = A4 = B1 = B4

NOTES:
1. SEE JACKET LEG MAKE-UP AT ROW "1" DRAWING E-SB-020-S-1041.
2. SEE JACKET LEG MAKE-UP AT ROW "4" DRAWING E-SB-020-S-1071.
3. SEE SKIRT PILE SLEEVE MAKE-UP AT ROWS "S1" & "S4". DWG. NO. E-SB-020-S-1100
4. ALL MATERIAL TYPE "E" FOR TUBULARS WITH O.D. GREATER THAN 18" AND TYPE "F" FOR TUBULARS WITH O.D. LESS THAN OR EQUAL TO 18" UNLESS OTHERWISE NOTED.
5. FOR GENERAL NOTES SEE DWG. E-SB-020-S-1030.

7/31/89

0	APPROVED FOR CONSTRUCTION		
1	AS BUILT	5-1-8?	

Chevron

Chevron U.S.A. Inc.
Western Region, Production Department

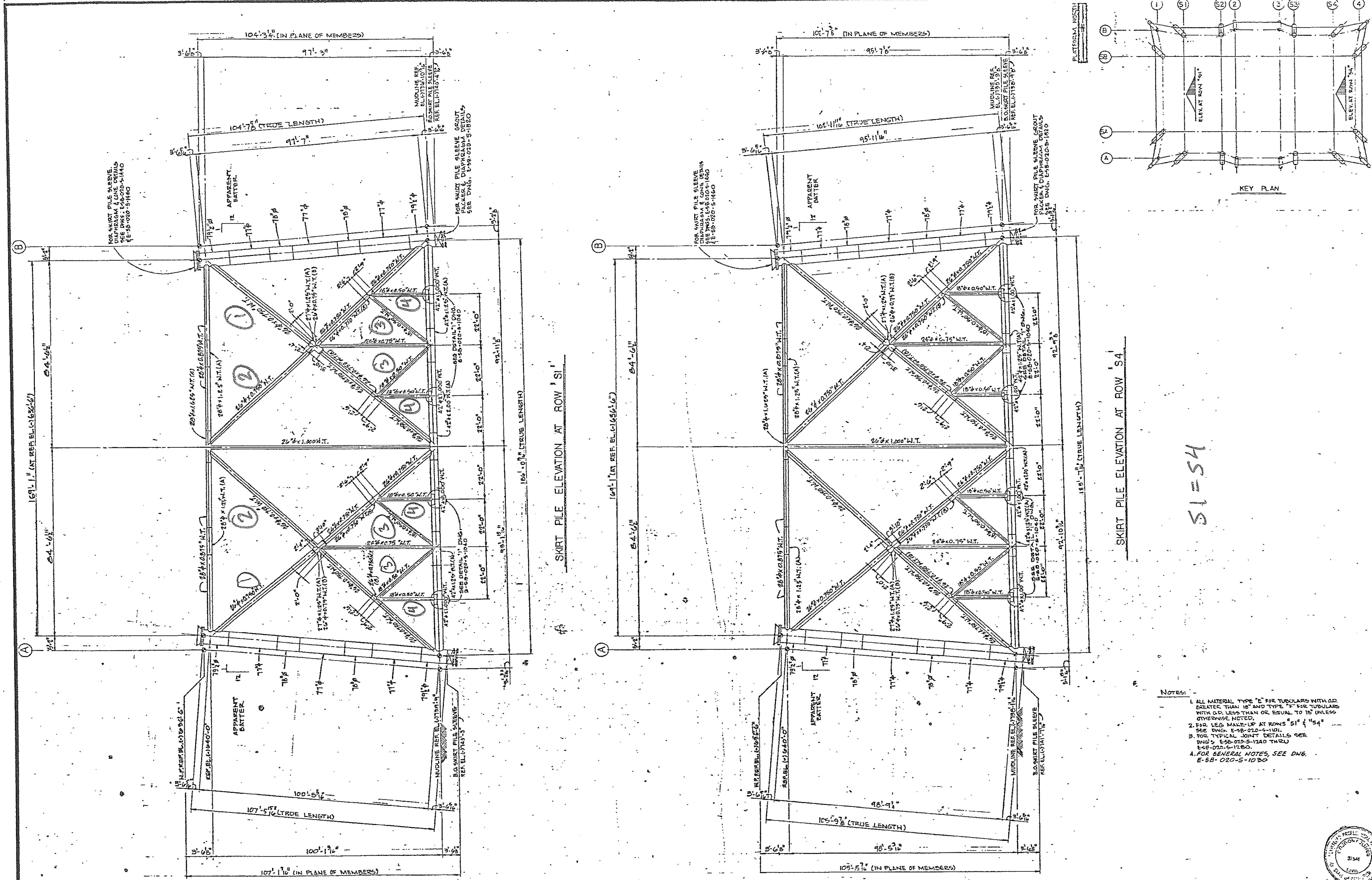
DRAFTSMAN F. V. MONTOYA
CHECKER JWK / J.V.V.

Brown & Root Inc.
Job No. JR-0106

ELEVATION AT SKIRT PILE SLEEVES

DRILLING AND PRODUCTION PLATFORM GAIL
SOCKEYE FIELD SANTA CLARA UNIT
SANTA BARBARA CHANNEL, CALIFORNIA

SCALE: 1/16" = 1'-0"
REV 1
E-SB-020-S-1115



Notes:

1. ALL MATERIAL TYPE "E" FOR TUBULARS WITH O.D. GREATER THAN 18" AND TYPE "F" FOR TUBULARS WITH O.D. LESS THAN OR EQUAL TO 18" UNLESS OTHERWISE NOTED.
2. FOR LEG MAKE-UP AT ROWS "S1" & "S4" SEE DWG. E-SB-020-S-1101.
3. FOR TYPICAL JOINT DETAILS SEE DWG'S E-SB-020-S-1240 THRU E-SB-020-S-1280.
4. FOR GENERAL NOTES, SEE DWG. E-SB-020-S-1030

0	APPROVED FOR CONSTRUCTION					1	AS BUILT	5-1-88			

Chevron

Chevron U.S.A. Inc.
Western Region, Production Department

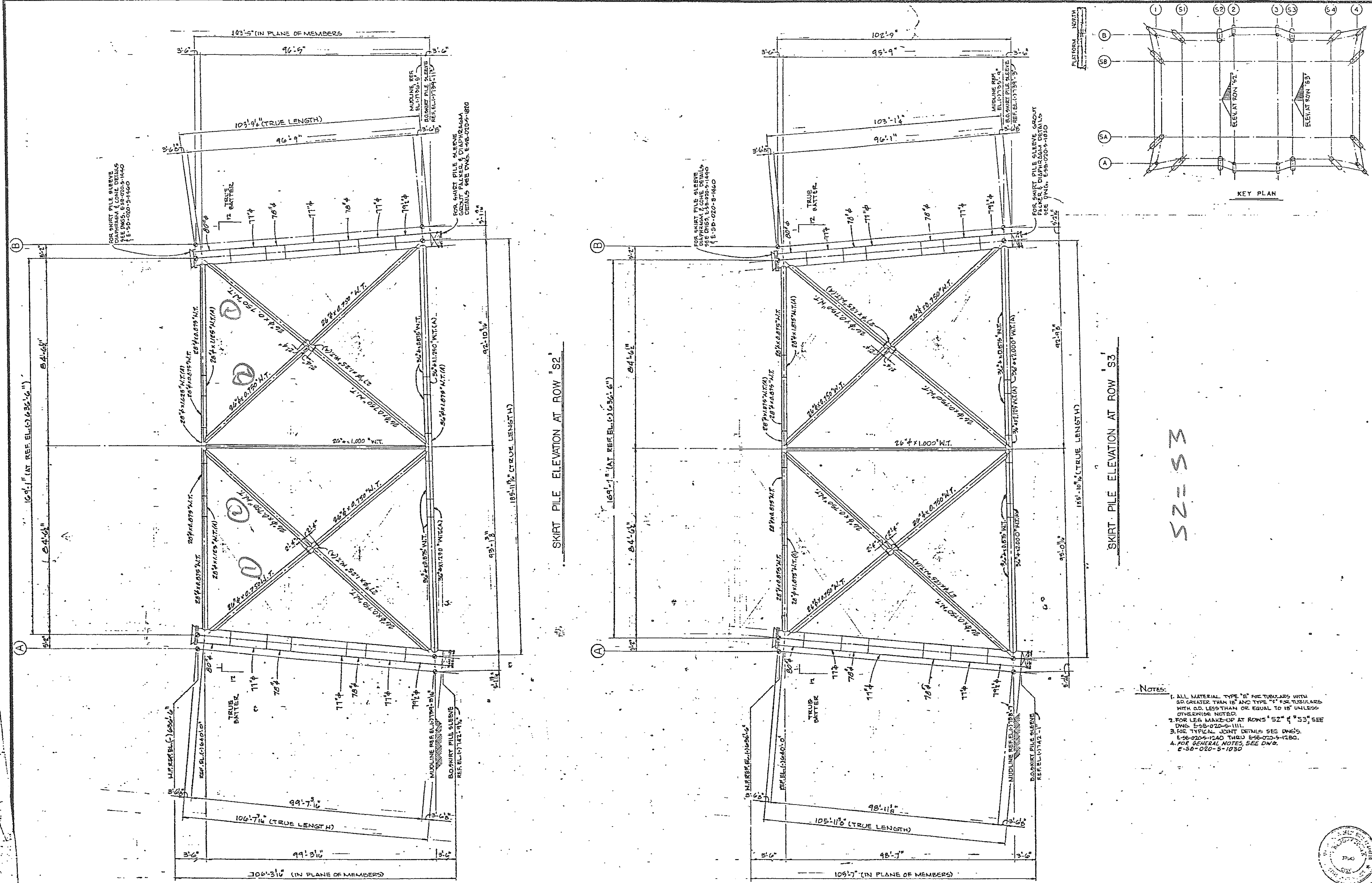
DRAFTSMAN F. V. MONTOYA
CHECKER JWK / J.V.K.
DESIGN LEADER RW / GJ
PROJECT ENGINEER JJS / EGK

Brown & Root, Inc.
Job No. JR-0106

SKIRT PILE ELEVATION AT ROWS "S1" & "S4"

DRILLING AND PRODUCTION PLATFORM GAIL
SOCKEYE FIELD SANTA CLARA UNIT
SANTA BARBARA CHANNEL, CALIFORNIA

SCALE: 1/16" = 1'-0"
REV 1
E-SB-020-S-1100



Notes:

1. ALL MATERIAL TYPE "E" FOR TUBULARS WITH O.D. GREATER THAN 18" AND TYPE "F" FOR TUBULARS WITH O.D. LESS THAN OR EQUAL TO 18" UNLESS OTHERWISE NOTED.
2. FOR LEG MAKE-UP AT ROWS "S2" & "S3", SEE DWG. E-SB-020-S-1111.
3. FOR TYPICAL JOINT DETAILS SEE DWG'S. E-SB-020-S-1240 THRU E-SB-020-S-1280.
4. FOR GENERAL NOTES, SEE DWG. E-SB-020-S-1030

0	APPROVED FOR CONSTRUCTION			
1	AS BUILT	5-1-84		

Chevron

Chevron U.S.A. Inc.
Western Region, Production Department

DRAFTSMAN F.V. MONTOYA
CHECKER JWK / J.V.V.
DESIGN LEADER RHH / GJ
PROJECT ENGINEER
CHEVRON DESIGN REP
Brown & Root PROJECT MANAGER

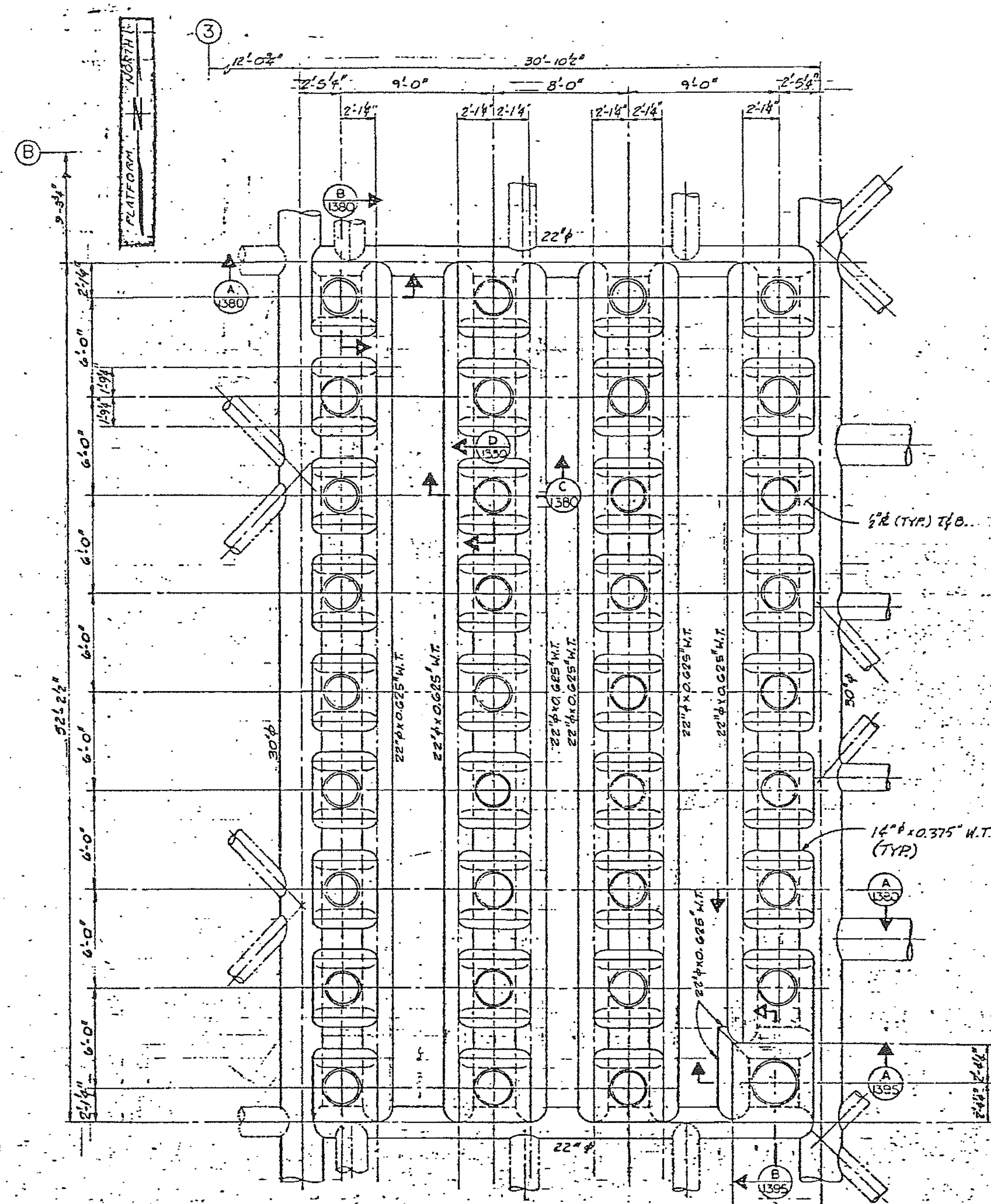
Brown & Root, Inc.
Job No. JR-0106

SKIRT PILE ELEVATION AT ROWS "S2" & "S3"

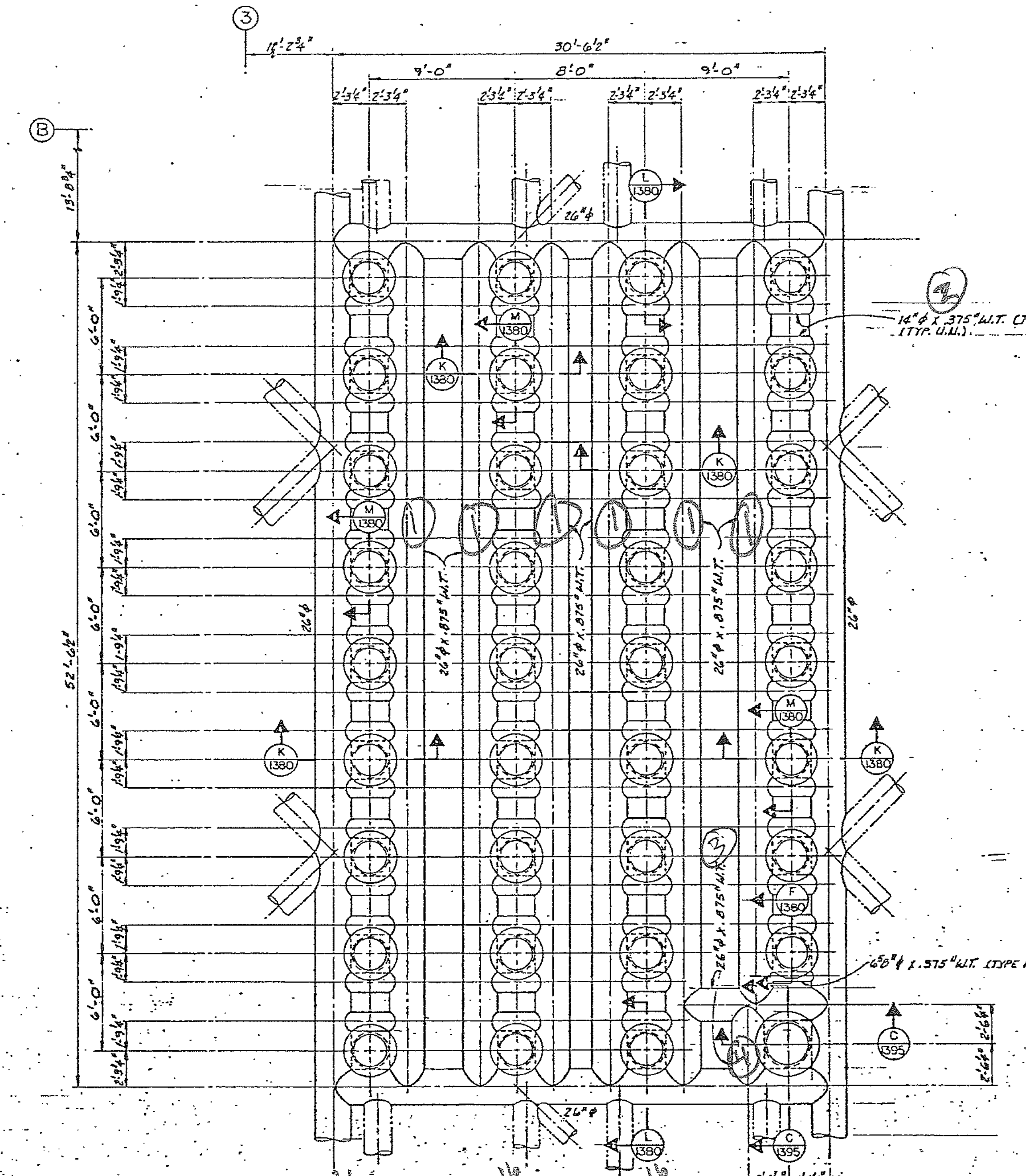
DRILLING AND PRODUCTION PLATFORM GAIL
SOCKEYE FIELD SANTA CLARA UNIT
SANTA BARBARA CHANNEL, CALIFORNIA

SCALE: 1/16" = 1'-0" | REV 1

E-SB-020-S-1110



PLAN
CONDUCTOR GUIDE FRAMING AT EL (+) 15'-0"



PLAN
CONDUCTOR GUIDE FRAMING AT EL (-) 40'-0"

NOTES:
1) ALL CONDUCTOR GUIDE FRAMING MATERIAL TO BE TYPE "E" UNLESS OTHERWISE NOTED.
2) FOR GENERAL NOTES SEE DWG. E-SB-020-S-1030.

0	APPROVED FOR CONSTRUCTION		
1	AS BUILT	5-1-86	DEH

Chevron

Chevron U.S.A. Inc.
Western Region, Production Department

DRAFTSMAN C. M. DAVIS JR.
CHECKER JWK / JUV
DESIGN LEADER PLW / GJ
PROJECT ENGINEER JHS / CDH

Brown & Root, Inc.
Job No. JR-0105

CONDUCTOR GUIDE FRAMING AT EL.(+)15'-0" & (-) 40'-0"

DRILLING AND PRODUCTION PLATFORM GAIL
SOCKEYE FIELD SANTA CLARA UNIT
SANTA BARBARA CHANNEL, CALIFORNIA

SCALE: ¼" = 1'-0"
REV 1
E-SB-020-S-1330

Platform Grace - Conductor Removal

Surface area of the Conductors and Jacket from MLLW to Mudline

Summary

Item	Surface Area (SQ. FT.)	
Jacket Legs	56,755	
Vertical Bracing	70,296	
Horizontal Bracing	56,925	
Conductor Framing	21,238	
Total Jacket Area	**205,215**	
Total Conductor Area	**76,925**	
Appurtenances	**10,261**	(5% of Jacket area for Disposal tube, elephant trunk, risers, boat landing, J-tubes)
Grand Total	**292,401**	
Conductors/Jacket	**37%**	
Conductors/Grand Total	**26%**	

Jacket Legs

Member	Description	Diameter (in)	Circumference (in)	Top Elevation (ft)	Bottom Elevation (ft)	Batter (deg)	Length (ft)	Surface Area (ft2)
Pile A-1	Corner leg, 2-way batter	47	147.7	0	-318	7.63	320.8	3,947.8
Pile C-1	Corner leg, 2-way batter	47	147.7	0	-318	7.63	320.8	3,947.8
Pile B-1	Middle leg	47	147.7	0	-318	5.64	319.5	3,931.9
Pile A-2	Outside leg	47	147.7	0	-318	5.15	319.3	3,928.7
Pile C-2	Outside leg (same as A-2)	47	147.7	0	-318	5.15	319.3	3,928.7
Pile B-2	Interior leg (no batter)	47	147.7	0	-318	0	318.0	3,912.9
Skirt Pile Elev 'A-1'	Skirt pile starting @ Elev -231	52	163.4	-231	-318	7.63	87.8	1,195.0
Skirt Pile Elev 'C-1'	Skirt pile starting @ Elev -231	52	163.4	-231	-318	7.63	87.8	1,195.0
Skirt Pile Elev '1-A'	Skirt pile starting @ Elev -231	52	163.4	-231	-318	7.63	87.8	1,195.0
Skirt Pile Elev '1-C'	Skirt pile starting @ Elev -231	52	163.4	-231	-318	7.63	87.8	1,195.0
							Subtotal (half of the platform)	28,377.6

Total Jacket Legs	56,755.2

Vertical Bracing

Elevation 'A'

ID	Member	Diameter (in)	Circumference (in)	Horiz. Dim. (ft)	Vertical Dim. (ft)	Length (ft)	Surface Area (ft2)
1	20x .500	20	62.8	33.7	33.0	47.1	246.9
2	20x .500	20	62.8	7.8	8.5	11.5	60.4
3	20x .500	20	62.8	22.5	24.5	33.3	174.2
4	26x .625	26	81.7	61.4	60.0	85.9	584.6
5	22x .500	22	69.1	22.5	30.0	37.5	216.0
6	26x .625	26	81.7	61.4	62.0	87.3	594.2
7	24x .500	24	75.4	22.5	31.0	38.3	240.7
8	30x .625	30	94.2	75.3	76.0	107.0	840.0
9	26x .625	26	81.7	22.5	38.0	44.2	300.6
10	26x .625	26	81.7	16.4	40.0	43.2	294.4
11	24x .500	24	75.4	15.8	47.0	49.6	311.5
12	20x .500	20	62.8	22.5	20.0	30.1	157.6
13	20x .500	20	62.8	22.5	20.0	30.1	157.6
14	20x .500	20	62.8	22.5	23.5	32.5	170.4
15	20x .500	20	62.8	22.5	23.5	32.5	170.4
16	32x .750	32	100.5	54.9	87.0	102.8	861.6
17	32x .750	32	100.5	63.6	87.0	107.7	902.7
						subtotal for half of Elev A	6,283.5

Total Elevation 'A'	12,567.1
Elevation 'C' = Elevation 'A'	12,567.1

Elevation 'B'

ID	Member	Diameter (in)	Circumference (in)	Horiz. Dim. (ft)	Vertical Dim. (ft)	Length (ft)	Surface Area (ft2)
1	20x .500	20	62.8	33.7	33.0	47.1	246.9
2	18x .375	18	56.5	7.8	8.5	11.5	54.4
3	18x .375	18	56.5	22.5	8.5	24.1	113.3
4	26x .625	26	81.7	61.4	60.0	85.9	584.6
5	20x .500	20	62.8	22.5	30.0	37.5	196.3
6	20x .500	20	62.8	22.5	30.0	37.5	196.3
7	26x .625	26	81.7	61.4	62.0	87.3	594.2
8	20x .500	20	62.8	22.5	31.0	38.3	200.6
9	20x .500	20	62.8	22.5	31.0	38.3	200.6
10	30x .625	30	94.2	75.3	76.0	107.0	840.0
11	20x .500	20	62.8	22.5	38.0	44.2	231.2
12	20x .500	20	62.8	22.5	38.0	44.2	231.2
13	30x .625	30	94.2	75.3	87.0	115.0	903.4
14	20x .500	20	62.8	22.5	20.0	30.1	157.6
15	20x .500	20	62.8	22.5	20.0	30.1	157.6
16	20x .500	20	62.8	22.5	23.5	32.5	170.4
17	20x .500	20	62.8	22.5	23.5	32.5	170.4

subtotal for half of Elev B 5,249.0

Total Elevation 'B' 10,498.0

Total for Elev A,B,C 35,632.2

Elevation '1'

ID	Member	Diameter (in)	Circumference (in)	Horiz. Dim. (ft)	Vertical Dim. (ft)	Length (ft)	Surface Area (ft2)
1	22x .500	22	69.1	30.3	33.0	44.8	258.1
2	26x .625	26	81.7	56.4	60.0	82.4	560.7
3	26x .625	26	81.7	56.4	62.0	83.8	570.7
4	32x .750	32	100.5	70.3	76.0	103.5	867.0
5	22x .500	22	69.1	16.8	40.0	43.4	249.9
6	30x .625	30	94.2	49.9	87.0	100.3	787.5
7	30x .625	30	94.2	58.6	87.0	104.9	823.6
8	22x .500	22	69.1	16.2	47.0	49.7	286.3
						subtotal for half of Elev 1	4,403.8

Total for Elev 1 8,807.67

Elev 4 = Elev 1 8,807.67

Elevation '2'

ID	Member	Diameter (in)	Circumference (in)	Horiz. Dim. (ft)	Vertical Dim. (ft)	Length (ft)	Surface Area (ft2)
1	22x .500	22	69.1	30.3	33.0	44.8	258.1
2	26x .625	26	81.7	56.5	60.0	82.4	560.8
3	26x .625	26	81.7	56.5	62.0	83.9	570.8
4	30x .625	30	94.2	70.3	76.0	103.5	812.8
5	20x .500	20	62.8	70.3	87.0	111.8	585.5
6	20x .500	20	62.8	78.9	87.0	117.5	615.1
7	14x .437	14	44.0	0.0	47.0	47.0	172.3
						Subtotal (half of Elev 2, w/o member 8 and 9)	3,575.4

Extra Members between A & B

ID	Member	Diameter (in)	Circumference (in)	Horiz. Dim. (ft)	Vertical Dim. (ft)	Length (ft)	Surface Area (ft2)
8	26x .625	26	81.7	62.7	62.0	88.1	600.0
9	30x .625	30	94.2	62.7	76.0	98.5	773.6
							1,373.5

Total for Elev 2 8,524.44

Elev 2 = Elev 3 8,524.44

Total for Elevations 1,2,3,4 34,664.2

Horizontal Bracing

Elevation -33

ID	Member	Diameter (in)	Circumference (in)	Horiz. Dim. (ft)	Vertical Dim. (ft)	Length (ft)	#	Surface Area (ft2)
1	18x .375 diagonal	18	56.5	55.4	50.4	75.0	4	1,413.0
2	18x .375 along A, B, C	18	56.5	45.0	0.0	45.0	3	636.2
3	18x .375 along 2, 3	18	56.5	50.4	0.0	50.4	4	950.9
4	12.75x .375 Section X-X	12.75	40.1	33.8	0.0	33.8	2	225.6
5	14x .437 Section X-X	14	44.0	51.2	0.0	51.2	2	375.3
6	14x .437 Section X-X	14	44.0	60.5	0.0	60.5	2	443.8
								4,044.8

Elevation -93

ID	Member	Diameter (in)	Circumference (in)	Horiz. Dim. (ft)	Vertical Dim. (ft)	Length (ft)	#	Surface Area (ft2)
1	18x .375 along 1,2,3,4	18	56.5	56.4	0.0	56.4	8	2,128.0
2	18x .375 along A,B,C	18	56.5	61.4	0.0	61.4	6	1,737.4
3	18x .375 interior along A,B,C	18	56.5	45.0	0.0	45.0	3	636.2
4	20x .500 diagonal	20	62.8	61.4	56.5	83.5	4	1,747.9
5	12.75x .375 Section X-X	12.75	40.1	38.1	0.0	38.1	2	254.4
								6,503.8

Elevation -155

ID	Member	Diameter (in)	Circumference (in)	Horiz. Dim. (ft)	Vertical Dim. (ft)	Length (ft)	#	Surface Area (ft2)
1	18x .375 along 1,4	18	56.5	62.7	0.0	62.7	4	1,180.9
2	18x .375 along A,B,C	18	56.5	67.7	0.0	67.7	6	1,912.8
3	18x .375 along A,B,C	18	56.5	45.0	0.0	45.0	3	636.2
4	28x .625 diagonal	28	88.0	62.7	67.7	92.2	4	2,703.6
5	30x .750	30	94.2	62.7	0.0	62.7	4	1,968.2
6	12.75x .375 along 1,4	12.75	40.1	56.3	0.0	56.3	4	751.0
7	12.75x .375 along A,C	12.75	40.1	50.6	0.0	50.6	4	675.9
								9,828.7

Elevation -231

ID	Member	Diameter (in)	Circumference (in)	Horiz. Dim. (ft)	Vertical Dim. (ft)	Length (ft)	#	Surface Area (ft2)
1	18x .375 at skirt piles	18	56.5	65.3	0.0	65.3	4	1,229.9
2	20x .500 interior	20	62.8	70.3	0.0	70.3	4	1,471.3
3	20x .500 interior	20	62.8	45.0	0.0	45.0	3	706.9
4	24x .500 diagonal	24	75.4	54.9	65.3	85.2	4	2,142.4
5	20x .500 along B	20	62.8	75.3	0.0	75.3	2	788.0
6	22x .500	22	69.1	54.9	5.0	55.1	4	1,269.0
7	18x .375	18	56.5	32.6	20.4	38.5	4	725.3
8	18x .375	18	56.5	17.2	15.4	23.1	4	435.5
9	18x .375	18	56.5	15.4	15.4	21.8	4	410.4
10	24x .500	24	75.4	5.0	20.4	21.0	4	527.8
11	20x .500	20	62.8	5.0	20.4	21.0	4	439.8
12	20x .500	20	62.8	5.0	49.9	50.1	4	1,049.4
								11,195.7

Elevation -271

ID	Member	Diameter (in)	Circumference (in)	Horiz. Dim. (ft)	Vertical Dim. (ft)	Length (ft)	#	Surface Area (ft2)
1	20x .500	20	62.8	5.0	53.9	54.1	4	1,132.8
2	20x .500	20	62.8	5.0	58.9	59.1	4	1,237.1
3	20x .500 along A,B,C between 2&3	20	62.8	45.0	0.0	45.0	3	706.9
4	20x .500 along 2,3	20	62.8	74.3	0.0	74.3	4	1,555.1
5	26x .625 diagonal	26	81.7	58.9	69.3	90.9	4	2,474.4
6	18x .375	18	56.5	15.4	15.4	21.8	4	410.4
7	20x .375	20	62.8	20.4	5.0	21.0	4	439.8
8	20x .375	20	62.8	20.4	5.0	21.0	4	439.8
								8,396.3

Elevation -318

ID	Member	Diameter (in)	Circumference (in)	Horiz. Dim. (ft)	Vertical Dim. (ft)	Length (ft)	#	Surface Area (ft2)
1	20x .500	20	62.8	73.9	0.0	73.9	4	1,548.8
2	26x .625 along 2&3	26	81.7	78.9	0.0	78.9	4	2,149.5
3	20x .500 between 2&3	20	62.8	45.0	0.0	45.0	3	706.9
4	28x .625 diagonal	28	88.0	63.6	73.9	97.5	4	2,859.0
5	26x .625 along B	26	81.7	63.6	0.0	63.6	2	865.2
6	12.75x .375	12.75	40.1	31.2	0.0	31.2	2	208.4
7	20x .500 Section B-B	20	62.8	20.0	30.0	36.1	4	755.1
8	26x .625	26	81.7	5.0	63.6	63.7	4	1,735.7
9	26x .625 along B	26	81.7	20.4	0.0	20.4	2	277.7
10	20x .500	20	62.8	20.4	40.0	44.9	4	940.4
11	18x .375	18	56.5	18.6	15.4	24.1	4	454.4
12	18x .375	18	56.5	15.4	15.4	21.8	4	410.4
13	26x .625	26	81.7	20.4	5.0	21.0	4	571.8
14	20x .500	20	62.8	5.0	20.4	21.0	4	439.8
15	20x .500	20	62.8	5.0	58.6	58.8	4	1,230.8
16	20x .500 Section D-D	20	62.8	20.4	30.0	36.3	2	379.9
17	18x .375 Section C-C	18	56.5	25.0	25.0	35.4	4	666.4
18	20x .500 Section A-A	20	62.8	20.0	30.0	36.1	4	755.1
								16,955.3

Total Horizontal Bracing	**56,924.6**

Conductor Framing

Elevation -33

ID	Member	Diameter (in)	Circumference (in)	Horiz. Dim. (ft)	Vertical Dim. (ft)	Length (ft)	#	Surface Area (ft2)
1	12.75x .375 diagonal	12.75	40.1	17.1	8.8	19.2	2	128.1
2	12.75x .375 diagonal	12.75	40.1	8.8	0.0	8.8	4	117.5
3	14x .500	14	44.0	45.0	0.0	45.0	2	329.9
4	12.75x .375 diagonal	12.75	40.1	17.1	15.0	22.7	2	151.6
5	8.625x .322	8.625	27.1	9.7	8.6	12.9	4	116.7
6	14x .500	14	44.0	0.0	28.5	28.5	6	626.7
7	8.625x .322	8.625	27.1	3.4	0.0	3.4	43	329.7
8	12.75x .437	12.75	40.1	17.3	0.0	17.3	2	115.5
9	12.75x .437	12.75	40.1	0.0	8.3	8.3	4	110.2
10	8.625x .322 corner stiffener	8.625	27.1	0.0	8.5	8.5	1	19.2
11	12.75x .437 corner stiffener	12.75	40.1	0.0	8.5	8.5	2	56.7
							Subtotal (half of platform)	2,101.9
							Total for Elevation -33	4,203.8

Elevation -93

ID	Member	Diameter (in)	Circumference (in)	Horiz. Dim. (ft)	Vertical Dim. (ft)	Length (ft)	#	Surface Area (ft2)
1	12.75x .375 diagonal	12.75	40.1	27.9	19.8	34.2	1	114.0
2	12.75x .375 diagonal	12.75	40.1	17.1	19.8	26.1	1	87.3
3	12.75x .375	12.75	40.1	45.0	0.0	45.0	2	300.4
4	8.625x .322	8.625	27.1	9.9	8.5	13.0	4	117.3
5	10.75x .365	10.75	33.8	17.4	13.4	21.9	2	123.5
6	10.75x .365	10.75	33.8	17.4	8.5	19.3	1	54.4
7	12.75x .322	12.75	40.1	17.4	8.5	19.3	1	64.6
8	10.75x .365	10.75	33.8	0.0	8.5	8.5	4	95.3
8A	12.75x .322	12.75	40.1	0.0	28.5	28.5	4	380.0
9	8.625x .322	8.625	27.1	3.4	0.0	3.4	43	329.7
10	8.625x .322 corner stiffeners	8.625	27.1	3.4	0.0	8.5	1	19.2
11	10.75x .365 corner stiffeners	8.625	27.1	3.4	0.0	8.5	4	76.8
							Subtotal (half of platform)	1,762.5
							Total for Elevation -93	3,525.0

Elevation -155

ID	Member	Diameter (in)	Circumference (in)	Horiz. Dim. (ft)	Vertical Dim. (ft)	Length (ft)	#	Surface Area (ft2)
1	12.75x .375 diagonal	12.75	40.1	26.0	26.0	36.7	1	122.6
2	12.75x .375 diagonal	12.75	40.1	19.0	26.0	32.2	1	107.4
3	12.75x .375	12.75	40.1	45.0	0.0	45.0	2	300.4
4	8.625x .322	8.625	27.1	9.9	8.5	13.0	4	117.3
5	10.75x .365	10.75	33.8	17.4	13.4	21.9	2	123.5
6	10.75x .365	10.75	33.8	17.4	8.5	19.3	1	54.4
7	12.75x .322	12.75	40.1	17.4	8.5	19.3	1	64.6
8	10.75x .365	10.75	33.8	0.0	8.5	8.5	4	95.3
8A	12.75x .322	12.75	40.1	0.0	28.5	28.5	6	570.0
9	8.625x .322	8.625	27.1	3.4	0.0	3.4	43	329.7
10	8.625x .322 corner stiffeners	8.625	27.1	3.4	0.0	8.5	1	19.2
11	10.75x .365 corner stiffeners	8.625	27.1	3.4	0.0	8.5	4	76.8
							Subtotal (half of platform)	1,981.2
							Total for Elevation -155	3,962.4

Elevation -231

ID	Member	Diameter (in)	Circumference (in)	Horiz. Dim. (ft)	Vertical Dim. (ft)	Length (ft)	#	Surface Area (ft2)
1	12.75x .375 diagonal	12.75	40.1	24.1	28.3	37.2	1	124.2
2	12.75x .375 diagonal	12.75	40.1	20.9	28.3	35.2	1	117.4
3	12.75x .375	12.75	40.1	45.0	0.0	45.0	3	450.6
4	8.625x .322	8.625	27.1	8.9	10.3	13.5	4	122.3
5	10.75x .365	10.75	33.8	17.4	11.7	21.0	2	118.0
6	10.75x .365	10.75	33.8	17.4	8.5	19.3	1	54.4
7	12.75x .322	12.75	40.1	17.4	8.5	19.3	1	64.6
8	10.75x .365	10.75	33.8	0.0	8.5	8.5	4	95.3
8A	12.75x .322	12.75	40.1	0.0	28.5	28.5	6	570.0
9	8.625x .322	8.625	27.1	3.4	0.0	3.4	43	329.7
10	10.75x .365 corner stiffeners	8.625	27.1	3.4	0.0	8.5	4	76.8
							Subtotal (half of platform)	2,123.3
							Total for Elevation -231	4,246.6

Elevation -271

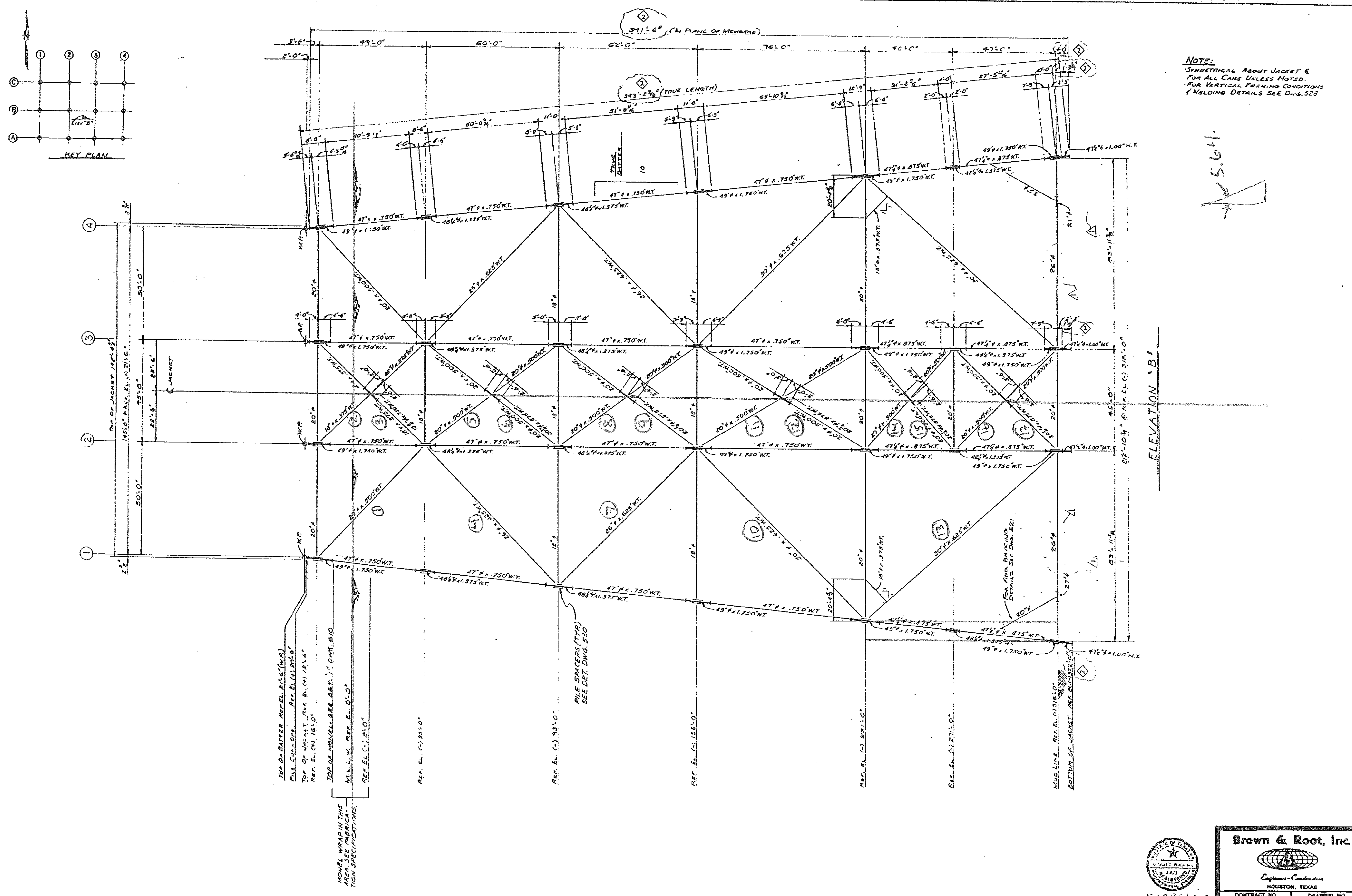
ID	Member	Diameter (in)	Circumference (in)	Horiz. Dim. (ft)	Vertical Dim. (ft)	Length (ft)	#	Surface Area (ft2)
1	12.75x .375 diagonal	12.75	40.1	24.1	32.3	40.3	1	134.6
2	12.75x .375 diagonal	12.75	40.1	20.9	32.3	38.5	1	128.4
3	12.75x .375	12.75	40.1	45.0	0.0	45.0	3	450.6
4	8.625x .322	8.625	27.1	8.9	10.3	13.5	4	122.3
5	10.75x .365	10.75	33.8	17.4	11.7	21.0	2	118.0
6	10.75x .365	10.75	33.8	17.4	8.5	19.3	1	54.4
7	12.75x .322	12.75	40.1	17.4	8.5	19.3	1	64.6
8	10.75x .365	10.75	33.8	0.0	8.5	8.5	4	95.3
8A	12.75x .322	12.75	40.1	0.0	28.5	28.5	6	570.0
9	8.625x .322	8.625	27.1	3.4	0.0	3.4	43	329.7
10	10.75x .365 corner stiffeners	8.625	27.1	3.4	0.0	8.5	4	76.8

Subtotal (half of platform)	2,144.7
Total for Elevation -271	4,289.4
Subtotal (all conductor framing)	20,227.13
Add 5% for conductor guides	1,011.36
Total Conductor Framing	**21,238.5**

Conductors

36 well slots have 24" dia. conductors installed, 2 slots have 30" dia. Conductors installed

24" Conductor Circumference	75.4	in
30" Conductor Circumference	94.2	in
Length	318	ft
# of Conductors	38	
Total Conductor Area	76,925	SF



NOTE:
- SYMMETRICAL ABOUT JACKET ℄ FOR ALL CANS UNLESS NOTED.
- FOR VERTICAL FRAMING CONDITIONS & WELDING DETAILS SEE DWG. 523

REFERENCE DRAWINGS	
JACKET PLAN @ EL (-) 271'-0"	E-SB-2520
TYPICAL JOINT DETAILS SHT. 1	528
JACKET TO PILE CONNECTION	530

REVISIONS	
② BOTTOM OF JACKET WAS REF. EL. (-) 324'-0" DECREASED DIMENSIONS TO SUIT. 6-16-78	
⓪ REV. 0 ISSUED FOR BIDS	
△1 REVISED MEMBER SIZES & BRACING AS NOTED (ISSUED FOR CONSTRUCTION)	

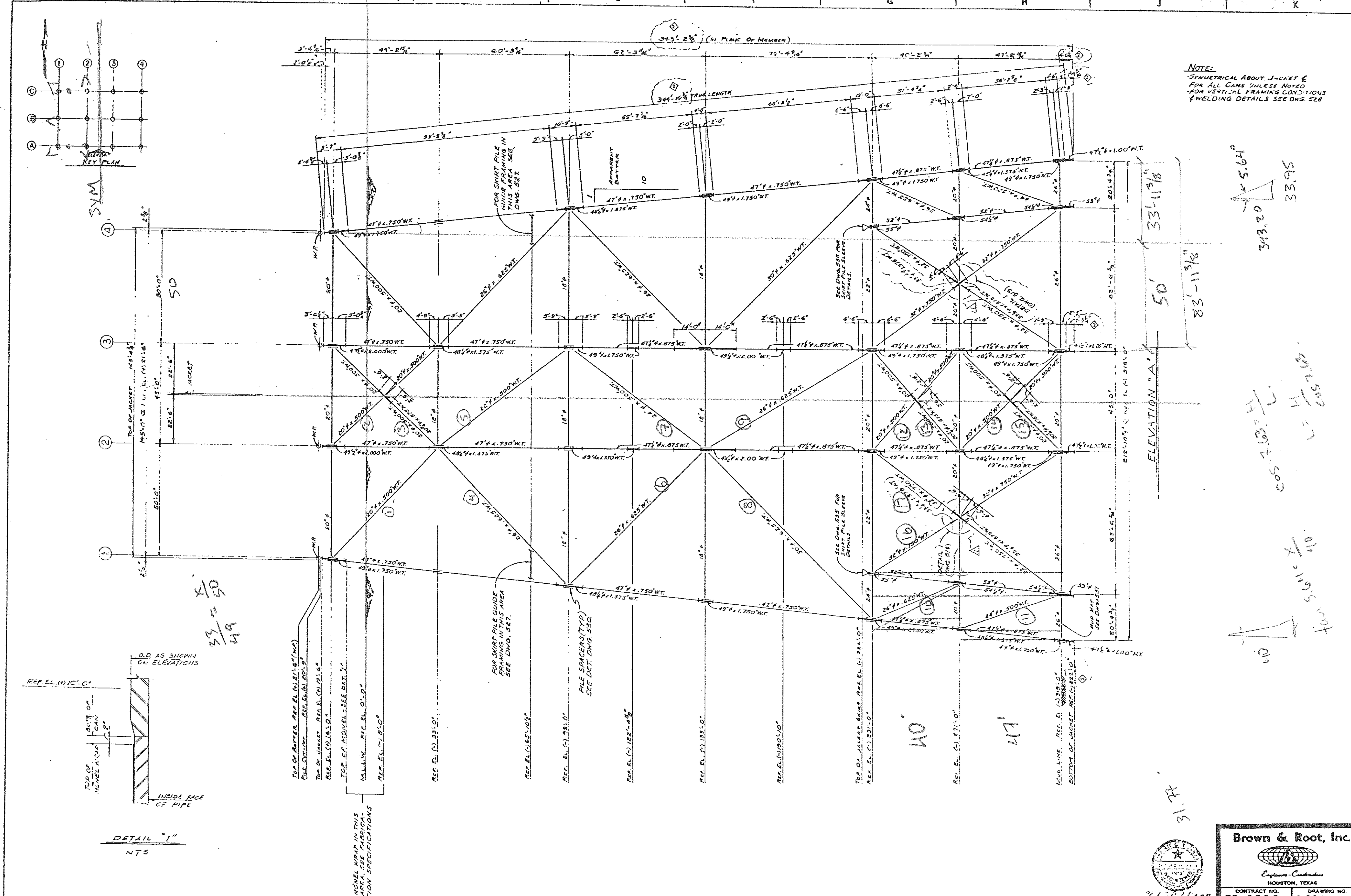
SCALE 1/16" = 1'-0"
DATE 03-03-77 DR. B.F. CK. CFO
DR. APPR. ENG. CDA
OPER. DEPT. APPROVED
ENG. DEPT.

Brown & Root, Inc.
Engineers - Constructors
HOUSTON, TEXAS
CONTRACT NO. ER-0389
DRAWING NO. S-684-12

Chevron U.S.A. Inc.
Western Region, Production Department

JACKET FRAMING
JACKET ELEVATION "B"
DRILLING PLATFORM
SANTA CLARA UNIT — PARCEL P-0217

M W.O. S.O. E-SB-2511-2



REFERENCE DRAWINGS

SKIRT PILE GUIDE FRAMING	E-SB-2527
JACKET TO PILE CONNECTION	530
MUD MAT DETAILS	531
SKIRT PILE SLEEVE DETAILS	535
TYPICAL JOINT DETAILS SHT 1	528

REVISIONS

2 BOTTOM OF JACKET WAS REF. EL (-) 324'-0". DECREASED DIMENSIONS TO SUIT. 6-16-78

0 REV. 0 ISSUED FOR BIDS

1 REV. "X" BRACING JOINTS @ (-) 271'-0" (ISSUED FOR CONSTRUCTION)

SCALE 1/16" = 1'-0"
DATE 03-04-77 DR. B.F.
DR. APPR.
ENG.
OPER. DEPT.
ENG. DEPT.
APPROVED

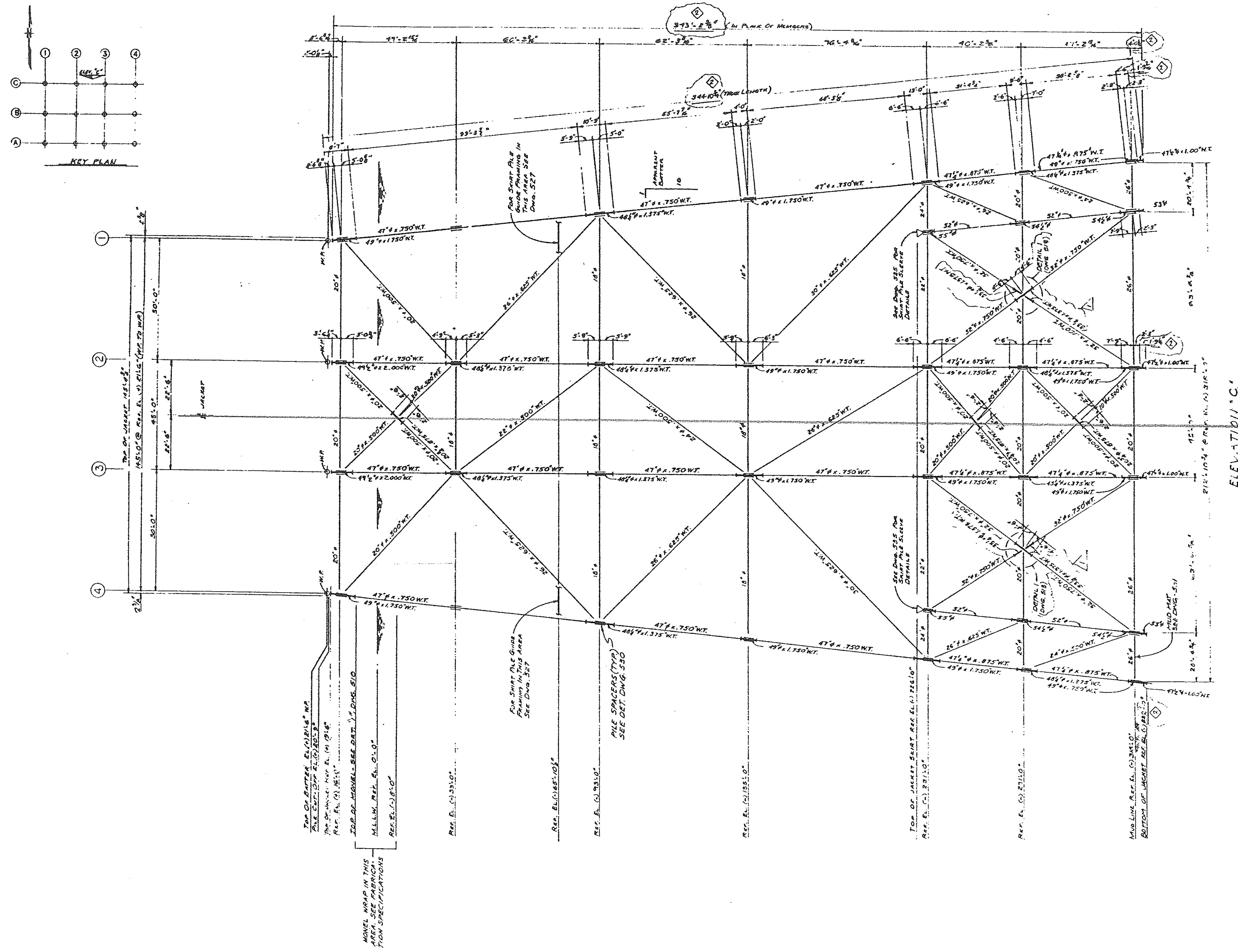
Chevron U.S.A. Inc.
Western Region, Production Department

Brown & Root, Inc.
Engineers - Constructors
HOUSTON, TEXAS

CONTRACT NO. ER-0389
DRAWING NO. S-654-11

JACKET FRAMING
JACKET ELEVATION "A"
DRILLING PLATFORM
SANTA CLARA UNIT — PARCEL P-C217

M W.O. S.O. E-SB-2510-2



NOTE:

- SYMMETRICAL ABOUT ℄ FOR ALL CANS UNLESS NOTED.
- FOR VERTICAL FRAMING CONDITIONS & WELDING DETAILS SEE DWG. 523

REFERENCE DRAWINGS

SKIRT PILE GUIDE FRAMING	E-SB-2527
JACKET TO PILE CONNECTION	530
MUD MAT DETAILS	531
SKIRT PILE SLEEVE DETAILS	535
TYPICAL JOINT DETAILS SHT. 1	528

REVISIONS

2	BOTTOM OF JACKET WAS REF EL.(-) 324'-0" DECREASED DIMENSIONS TO SUIT. 6-16-78	JCE	
0	REV. 0 ISSUED FOR BIDS		
1	REV "X" BRACING JOINTS @(-) 271'-0" (ISSUED FOR CONSTRUCTION)		COP 7-21-78

SCALE 1/16" = 1'-0"
DATE 03-02-77 DR. B.F. CK. CFC
DR. APPR. ENG. CJP
OPER. DEPT. APPROVED
ENG. DEPT.

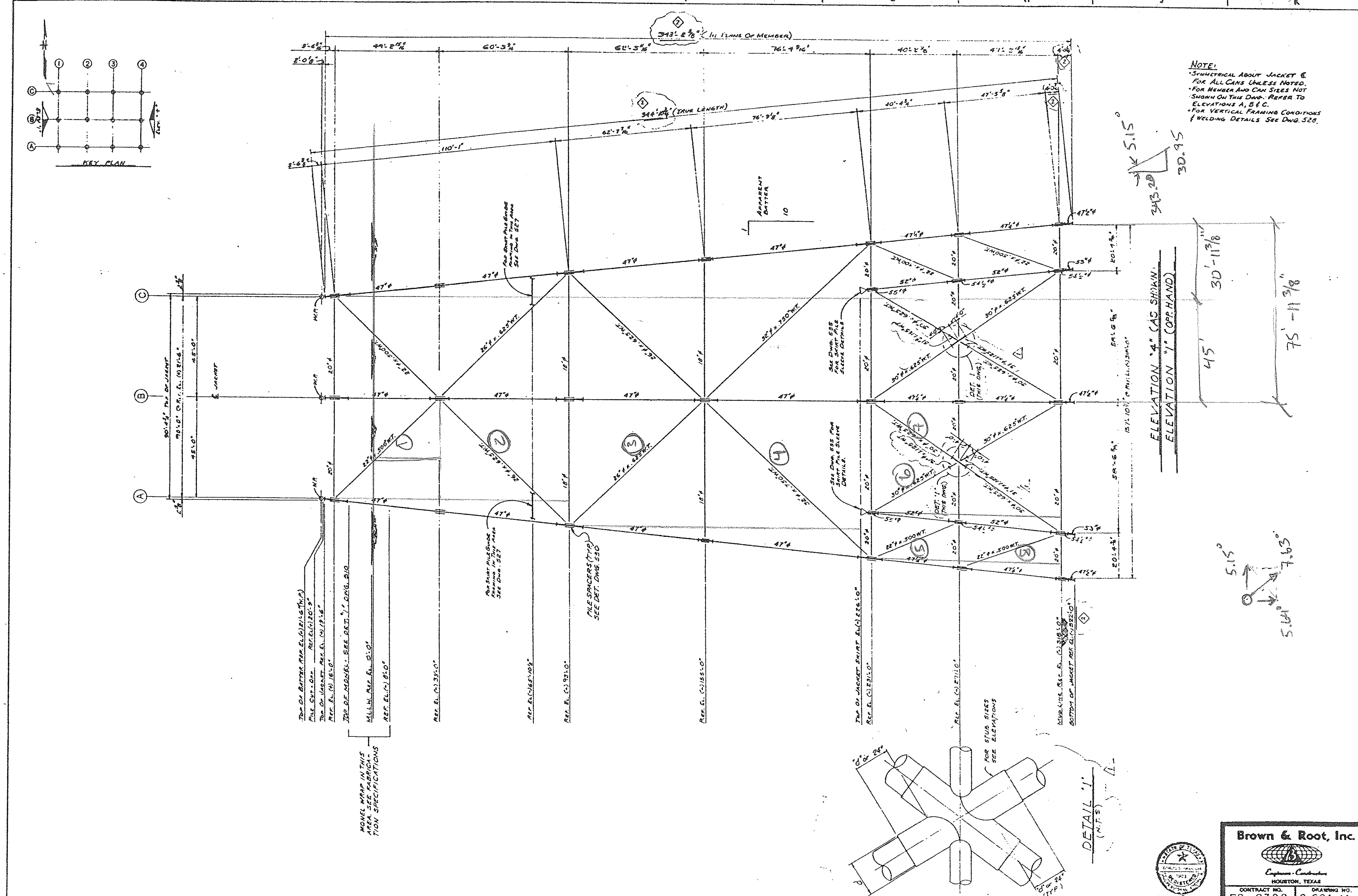
Chevron U.S.A. Inc.
Western Region, Production Department

Brown & Root, Inc.
Engineers - Constructors
HOUSTON, TEXAS

CONTRACT NO. ER-0389
DRAWING NO. S-684-13

JACKET FRAMING
JACKET ELEVATION "C"
DRILLING PLATFORM
SANTA CLARA UNIT — PARCEL P-0217

M W.O. S.O. E-SB-2512 - 2



Brown & Root, Inc.
Engineers - Constructors
HOUSTON, TEXAS

CONTRACT NO.	DRAWING NO.
ER-0389	S-684-14

REFERENCE DRAWINGS

SKIRT PILE GUIDE FRAMING	E-SB-2527
TYPICAL JOINT DETAILS SHT. 1	528
JACKET TO PILE CONNECTION	530
SKIRT PILE SLEEVE DETAILS	535

REVISIONS

2 BOTTOM OF JACKET WAS REF. EL. (-) 324'-0" DECREASED DIMENSIONS TO SUIT. 6-16-78

0 REV. 0 ISSUED FOR BIDS

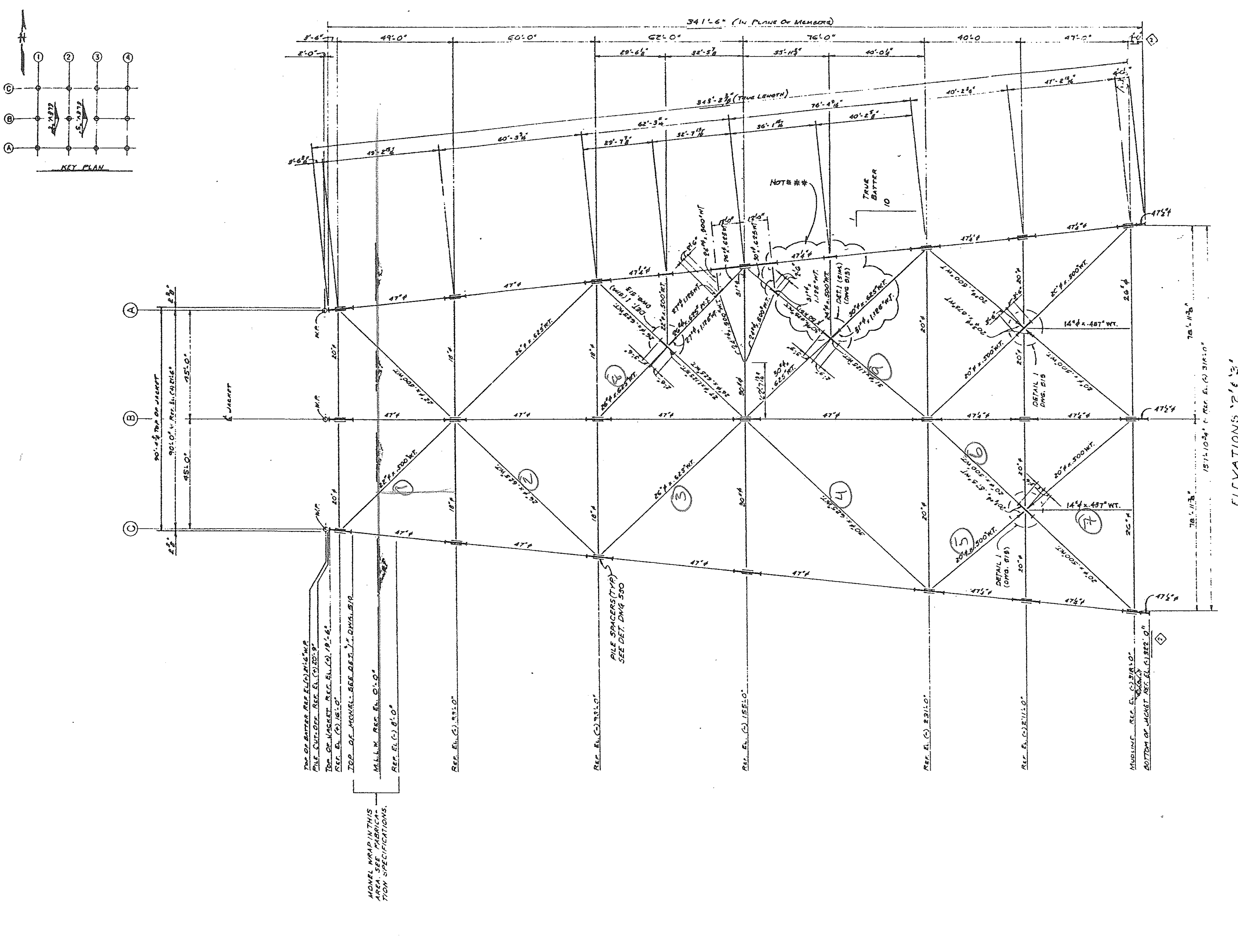
1 REV. "X" BRACING JOINTS @ 271'-0" (ISSUED FOR CONSTRUCTION)

SCALE 1/16" = 1'-0"
DATE 03-07-77 DR. B.F. CK. CFC
DR. APPR. ENG. CDP
OPER. DEPT. APPROVED
ENG. DEPT.

Chevron U.S.A. Inc.
Western Region, Production Department

JACKET FRAMING
JACKET ELEVATIONS "1" & "4"
DRILLING PLATFORM
SANTA CLARA UNIT — PARCEL P-0217

M W.O. S.O. E-SB-2513-2



NOTE:
- SYMMETRICAL ABOUT JACKET ℄ FOR ALL CANS UNLESS NOTED.
- FOR MEMBER AND CAN SIZES NOT SHOWN ON THIS DWG. REFER TO ELEVATIONS A, B/C.
- FOR VERTICAL FRAMING CONDITIONS & WELDING DETAILS SEE DWG 528

** FOR ADDITIONAL LAUNCH BRACING ADDED IN THIS AREA REFER TO I.H.I. (JACKET FABRICATOR) FINISHED DWG. FILE NO. 10.

REFERENCE DRAWINGS	
TYPICAL JOINT DETAILS SHT. 1	E-SB-2528
JACKET TO PILE CONNECTION	530

REVISIONS		
② BOTTOM OF JACKET WAS REF. EL. (-) 324'-0" DECREASED DIMENSIONS TO SUIT. 6-16-78	JCE	
③ REVISED AS BUILT 6-9-82	RFP	
△ REV. "X" BRACING JOINTS @ (-) 271'-0", @ (-) 122'-6 5/8" & (-) 190'-11 1/4". REV. MEMBER SIZES @ (-) 318'-0" (ISSUED FOR CONSTRUCTION)		COD 11-18-76

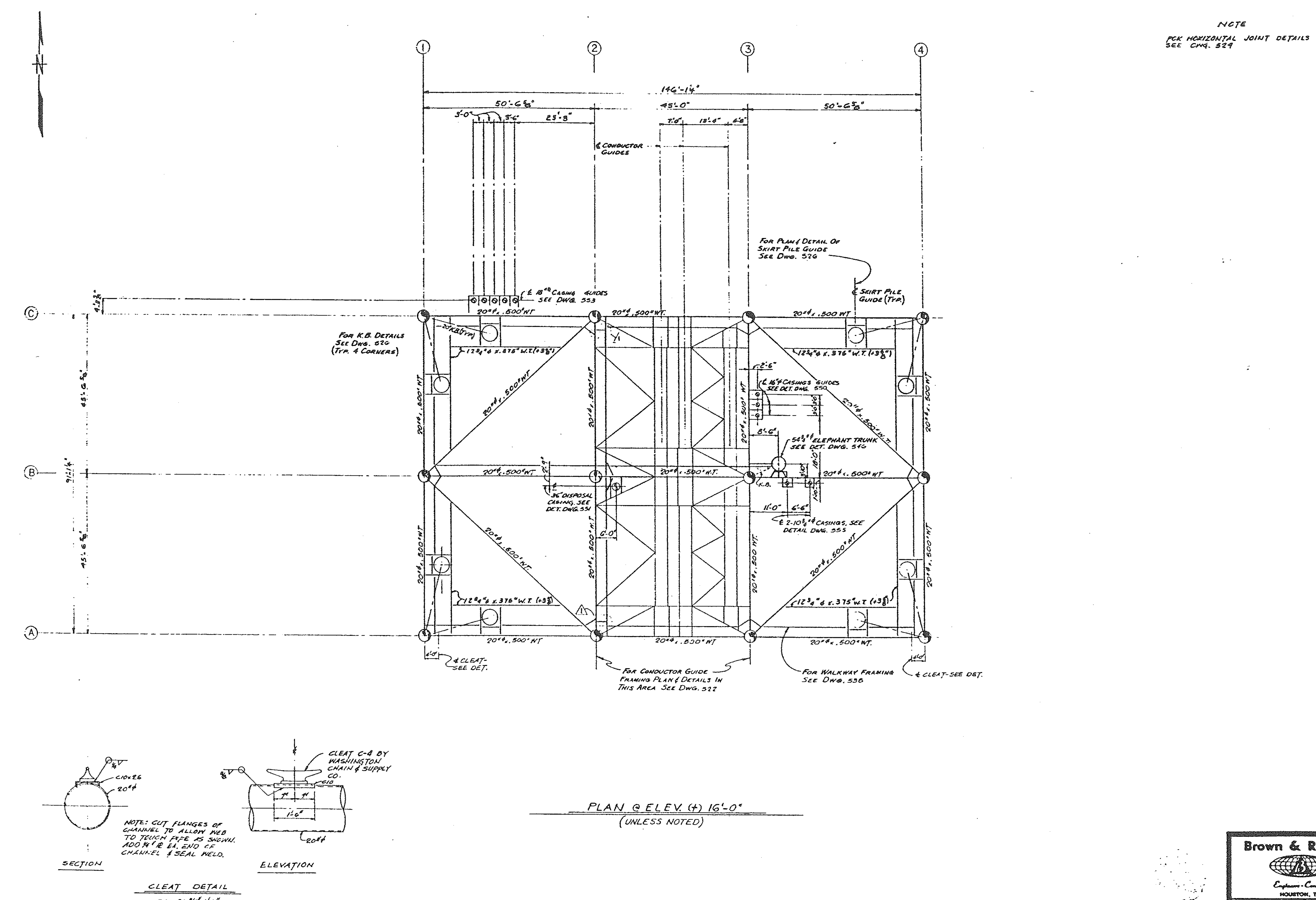
SCALE 1/16" = 1'-0"
DATE 03-01-77 DR. B.F. CK. CFO
DR. APPR. ENG. COP
OPER. DEPT. APPROVED
ENG. DEPT.

Brown & Root, Inc.
Engineers - Constructors
HOUSTON, TEXAS

CONTRACT NO. ER-0389
DRAWING NO. S-684-15

JACKET FRAMING
JACKET ELEVATIONS "2" & "3"
DRILLING PLATFORM
SANTA CLARA UNIT — PARCEL P-0217

M W.O. S.O. E-SB-2514-3



Brown & Root, Inc.
Engineers - Constructors
HOUSTON, TEXAS

CONTRACT NO.	DRAWING NO.
ER-0389	S-684-18

REFERENCE DRAWINGS

CONDUCTOR GUIDE FRAMING	E-SB-2522	DISPOSAL CASINGS	E-SB-2551
SKIRT PILE " "	526	SALT WATER PUMP CASINGS-SHT.1	553
TYP. JT. DETS. - SHT. 2	529	DRILL WATER CASINGS	555
JACKET WALKWAY	538		
TUBES 1 & 2 - DETS.	546		
POWER WATER CASING	550		

REVISIONS

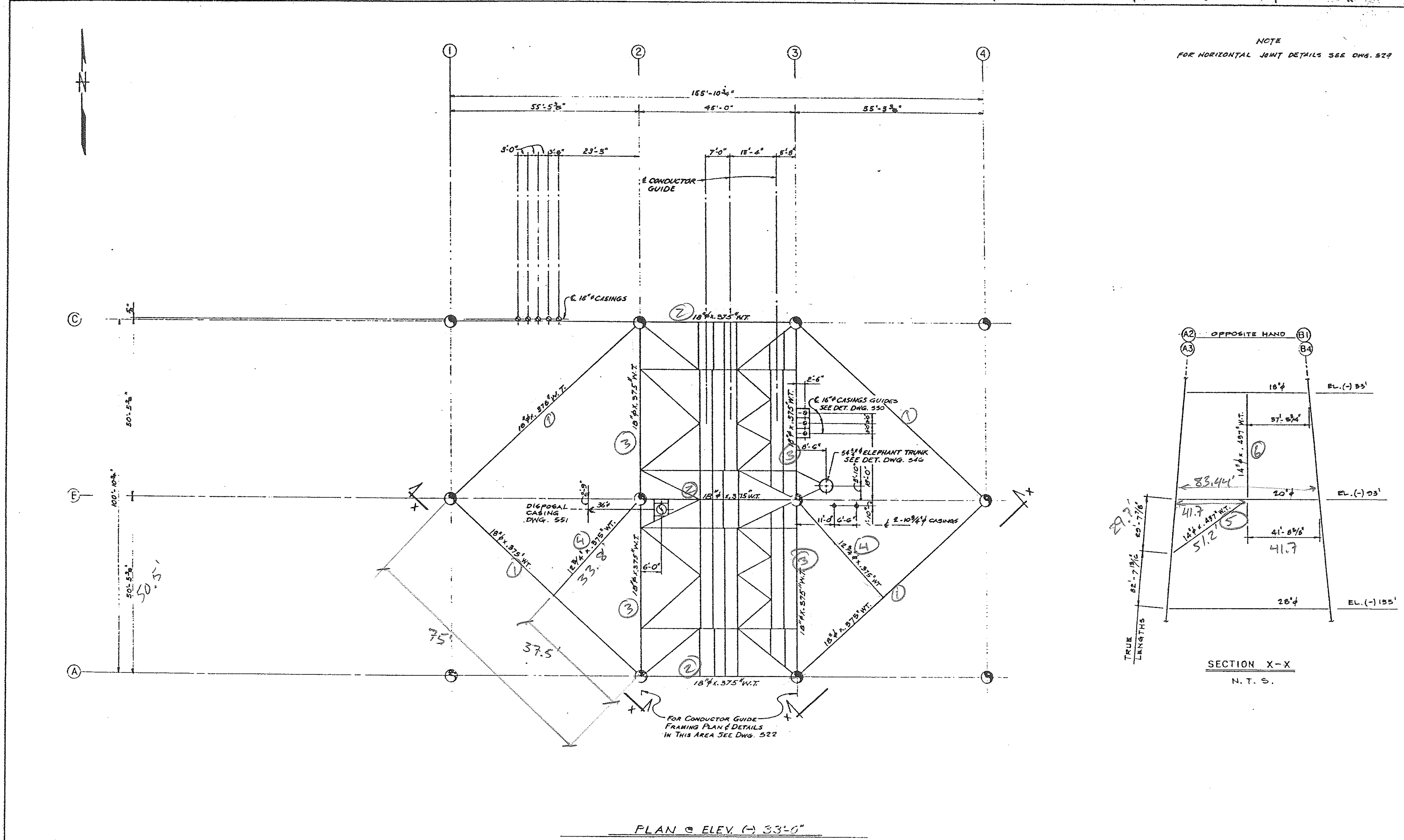
◇0	REV. 0 ISSUED FOR BIDS
△	ISSUED FOR CONSTRUCTION

SCALE 5/32" = 1'-0" (UN)
DATE 02-18-77 DR B.F. CK CFC
DR. APPR. ENG. CDP
OPER. DEPT. APPROVED
ENG. DEPT.

Chevron U.S.A. Inc.
Western Region, Production Department

JACKET FRAMING
JACKET PLAN AT EL. (+) 16'-0"
DRILLING PLATFORM
SANTA CLARA UNIT — PARCEL P-0217

M W.O. S.O. **E-SB-2515-1**



Brown & Root, Inc.
Engineers - Constructors
HOUSTON, TEXAS

CONTRACT NO. ER-0389
DRAWING NO. S-684-19

REFERENCE DRAWINGS

CONDUCTOR GUIDE FRAMING	E-SB-2522
SKIRT PILE " "	527
TYP. JT. DETS. SHT. 2	529
[illegible] TUBE " - DETS.	546
LOWER WATER CASINGS	550
DISPOSAL CASINGS	551

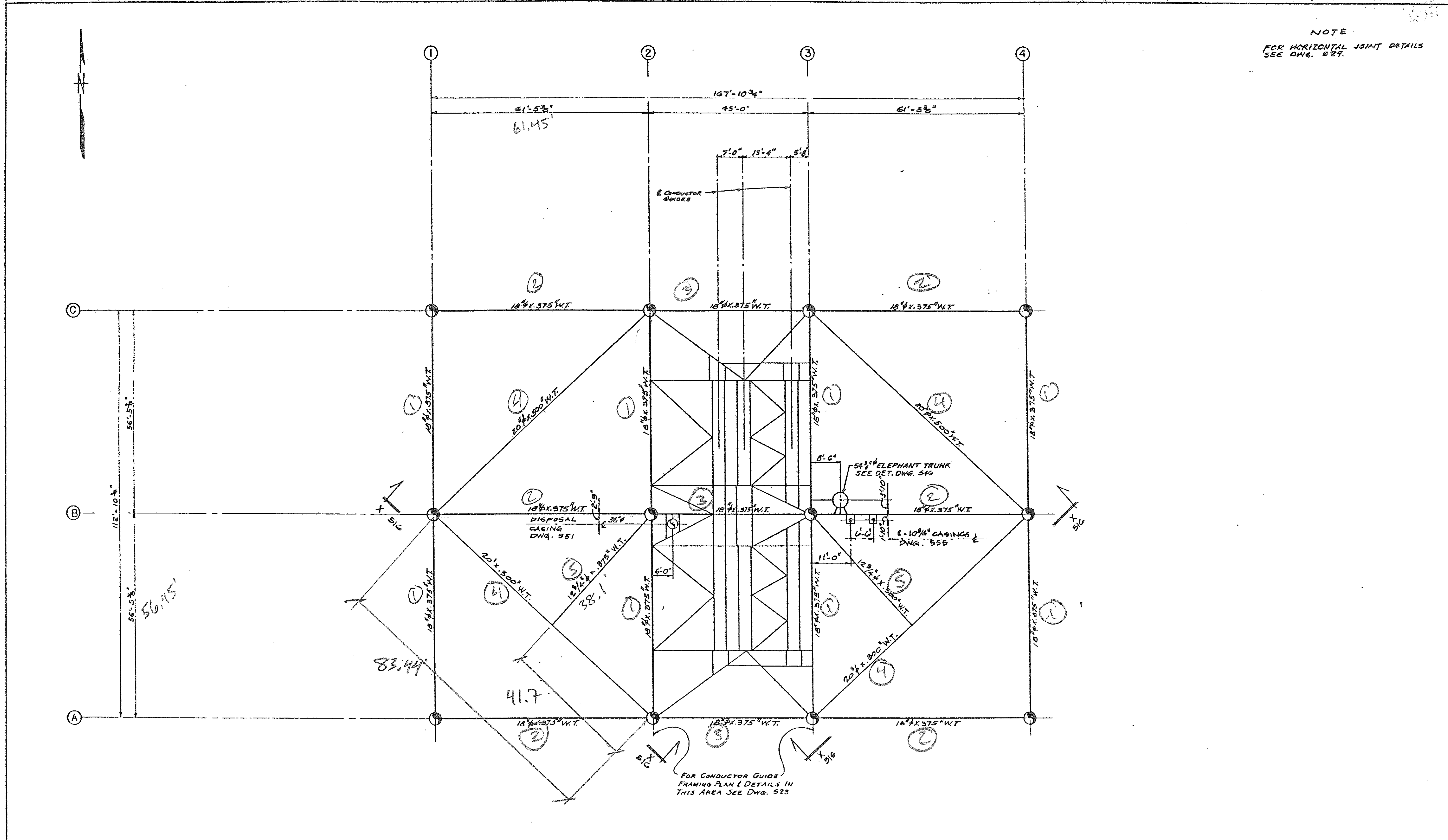
REVISIONS

2 REVISED AS BUILT. 6-9-82	
1 ISSUED FOR CONSTRUCTION	

SCALE 3/32" = 1'-0"
DATE 02-18-77 DR. B.F. CK. C.F.C.
DR. APPR. ENG. G.D.P.
OPER. DEPT. APPROVED
ENG. DEPT.

JACKET FRAMING
JACKET PLAN AT EL. (-) 33'-0"
DRILLING PLATFORM
SANTA CLARA UNIT — PARCEL P-0217

M W.O. S.O. E-SB-2516-2



PLAN @ ELEV. (-)93'-0"

Brown & Root, Inc.
Engineers - Constructors
HOUSTON, TEXAS

CONTRACT NO.	DRAWING NO.
ER-0389	S-684-20

JACKET FRAMING
JACKET PLAN AT EL (-) 93'-0"
DRILLING PLATFORM
SANTA CLARA UNIT — PARCEL P-0217

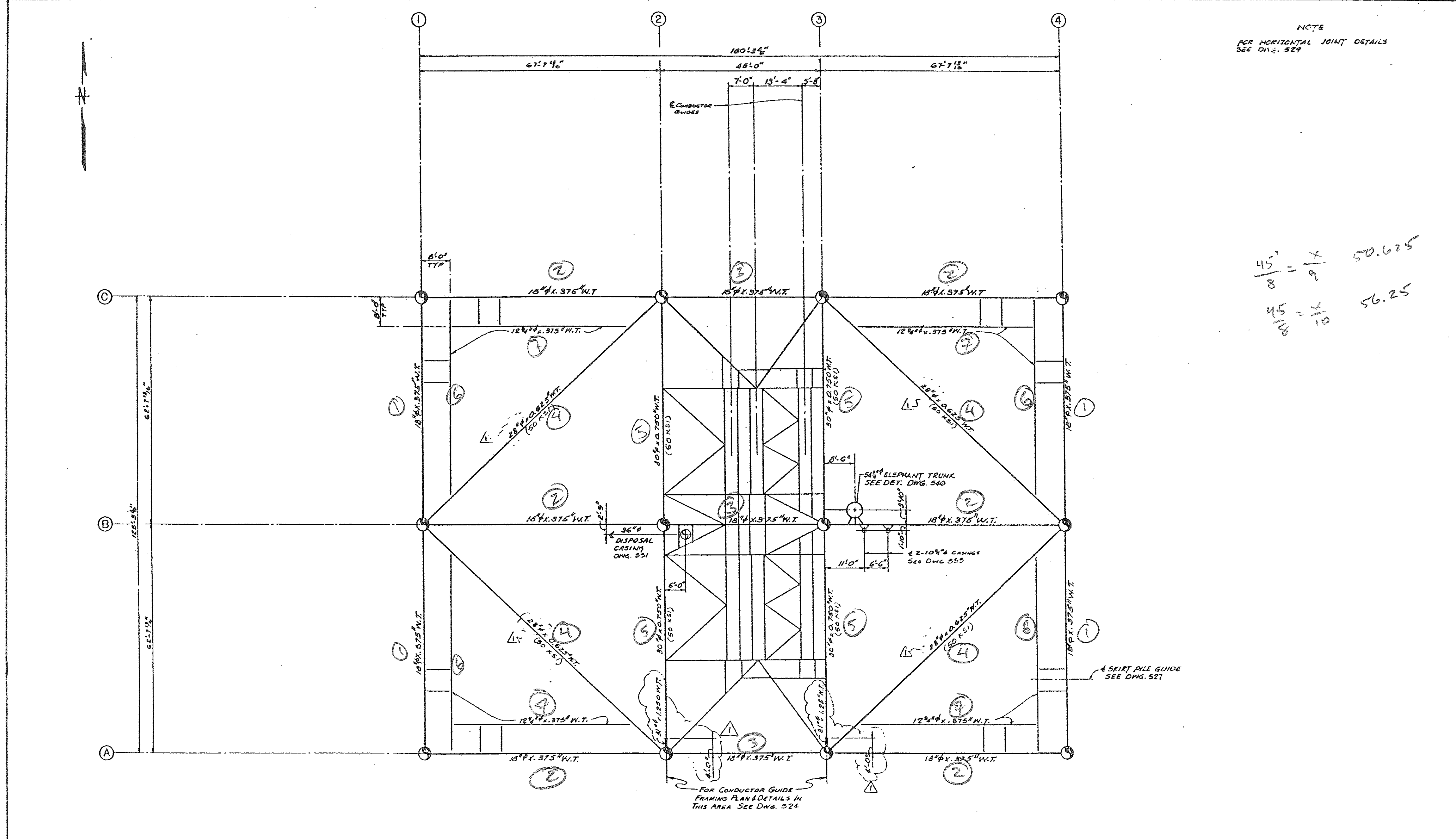
M W.O. S.O. E-SB-2517-1

REFERENCE DRAWINGS	
CONDUCTOR GUIDE FRAMING	E-SB-2523
TYP. JT. DETS. SHT. 2	529
ELEPHANT TRUNK DETS.	546
DISPOSAL CASINGS	551
DRILL WATER CASINGS	555

REVISIONS

2 REVISED AS BUILT 6-9-82	
△ ISSUED FOR CONSTRUCTION	

SCALE 3/32" = 1'-0"
DATE 02-18-77 DR. B.F. CK. CEC
DR. APPR. ENG. CEC
OPER. DEPT.
ENG. DEPT.
APPROVED



PLAN @ ELEV. (-) 155'-0"

REFERENCE DRAWINGS	
CONDUCTOR GUIDE FRAMING	E-SB-2524
SKIRT PILE " "	527
T?? ?.T. DETS. SHT. 2	529
? ? ?? ? -DETS.	546
DISPOSAL CASINGS	531
DRILL WATER CASINGS	555

REVISIONS	
0	REV. 0 ISSUED FOR BIDS
1	REV. PIPE DIA. AS NTD. (ISSUED FOR CONSTRUCTION)

SCALE 3/32" = 1'-0"
DATE 12-1-76 DR V.C. CK CFC
DR. APPR. ENG. CDI
OPER. DEPT. APPROVED
ENG. DEPT.

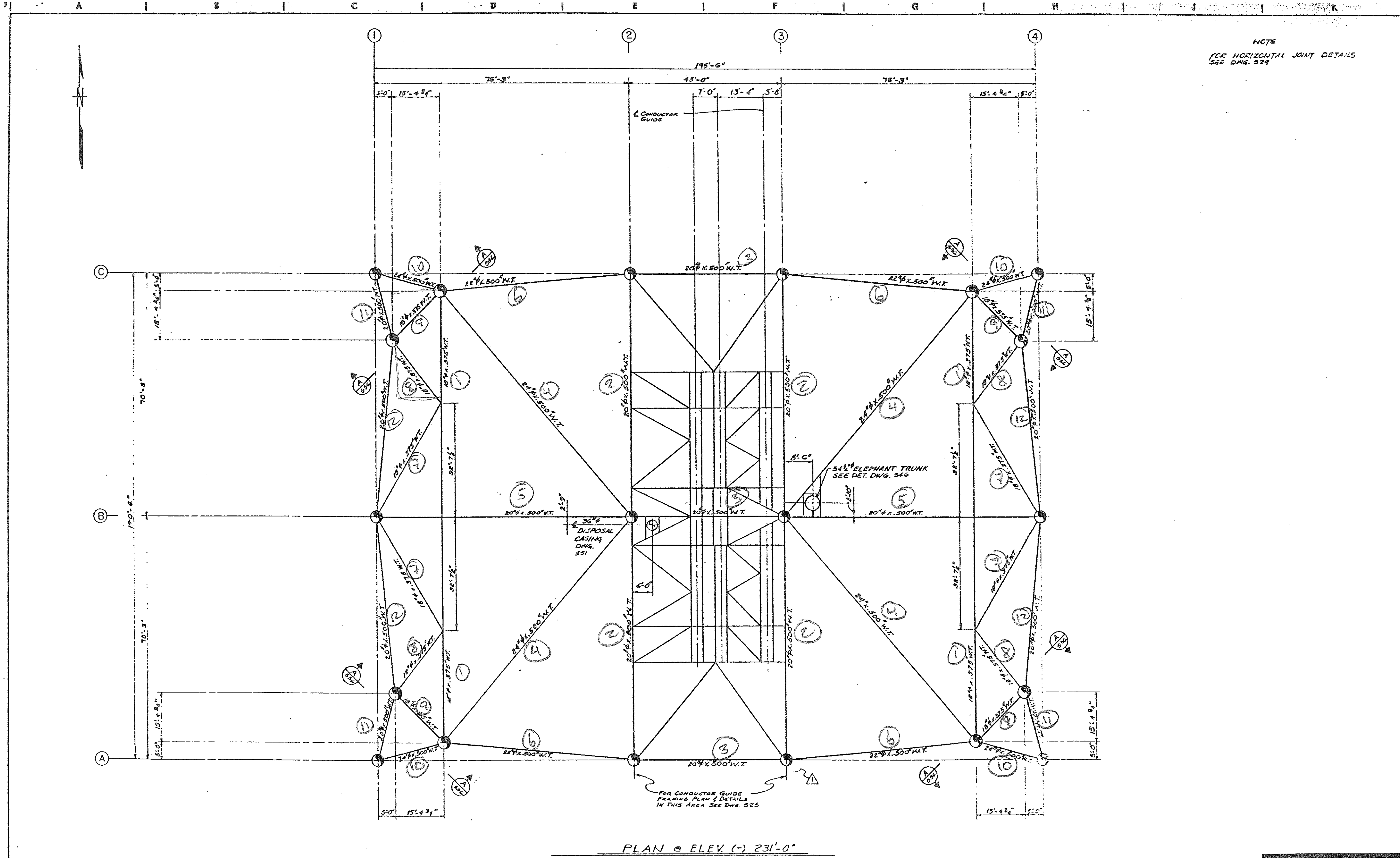
Chevron U.S.A. Inc.
Western Region, Production Department

Brown & Root, Inc.
Engineers - Constructors
HOUSTON, TEXAS

CONTRACT NO. ER-0389
DRAWING NO. S-684-21

JACKET FRAMING
JACKET PLAN AT EL. (-) 155'-0"
DRILLING PLATFORM
SANTA CLARA UNIT — PARCEL P-0217

M W.O. S.O. E-SB-2518-1



PLAN @ ELEV. (-) 231'-0"

Brown & Root, Inc.
Engineers - Constructors
HOUSTON, TEXAS

CONTRACT NO.	DRAWING NO.
ER-0389	S-684-22

REFERENCE DRAWINGS

CONDUCTOR GUIDE FRAMING	E-SB-2525
TYP. JT. DETS. SHT. 2	529
SKIRT PILE SLV. BRACING DETS.	530
TUBES 1 & 2 - DETS.	546
DISPOSAL CASINGS	551

REVISIONS

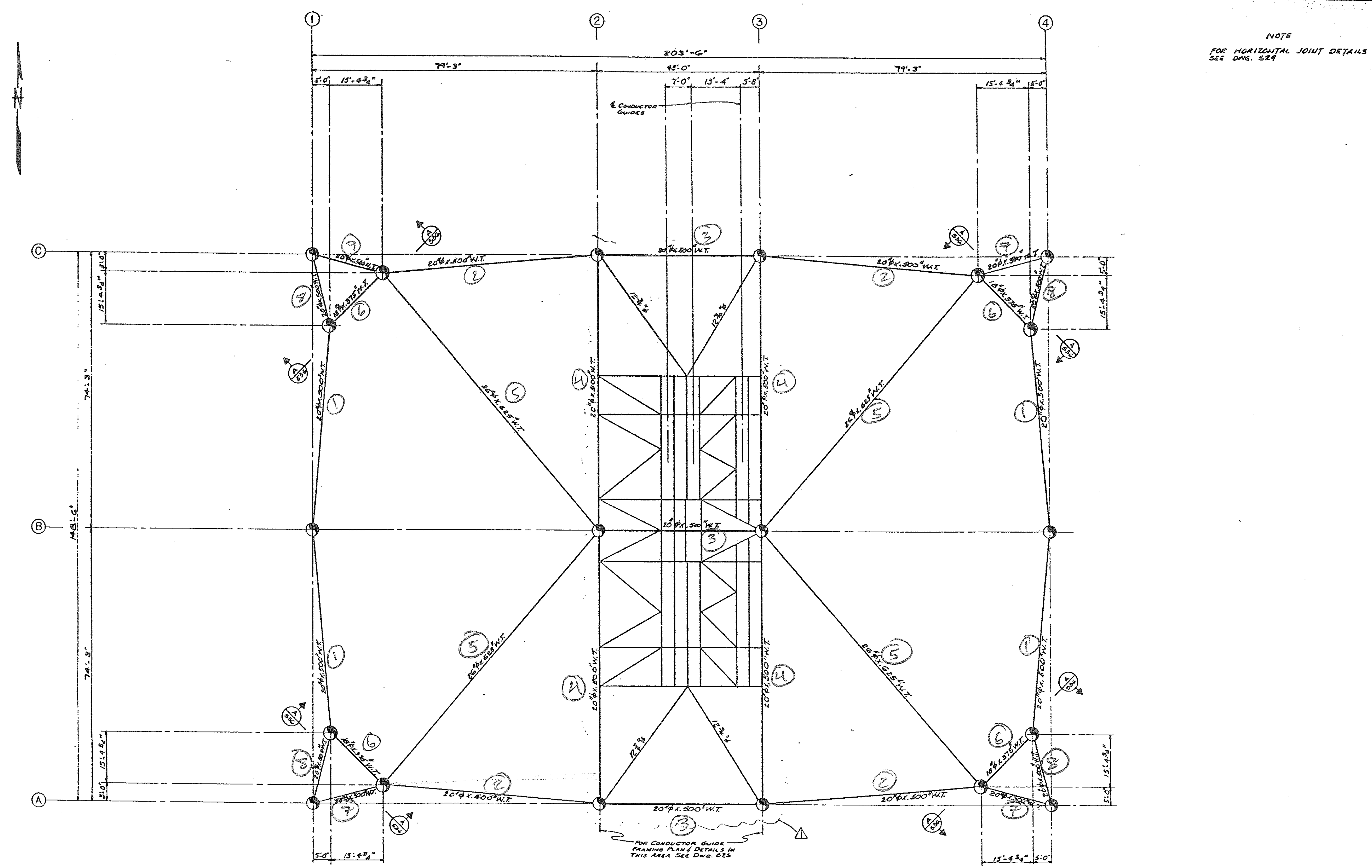
0	REV. 0 ISSUED FOR BIDS
1	GENERAL REVISION AS NOTED (ISSUED FOR CONSTRUCTION)

SCALE 3/32" = 1'-0"
DATE 02-14-77 DR. B.F. CK. CFC
DR. APPR. ENG. CBF
OPER. DEPT.
ENG. DEPT.
APPROVED

Chevron U.S.A. Inc.
Western Region, Production Department

JACKET FRAMING
JACKET PLAN AT EL. (-)231'-0"
DRILLING PLATFORM
SANTA CLARA UNIT — PARCEL P-0217

M W.O. S.O. E-SB-2519-1



PLAN @ ELEV. (-) 271'-0"

Brown & Root, Inc.
Engineers - Constructors
HOUSTON, TEXAS

CONTRACT NO.	DRAWING NO.
ER-0389	S-684-23

REFERENCE DRAWINGS

JACKET ELEV. "B"	E-SB-2511
CONDUCTOR GUIDE FRAMING	525
TYP. JT. DETS. SHT. 2	529
SKIRT PILE SLV. BRACING DETS.	534

REVISIONS

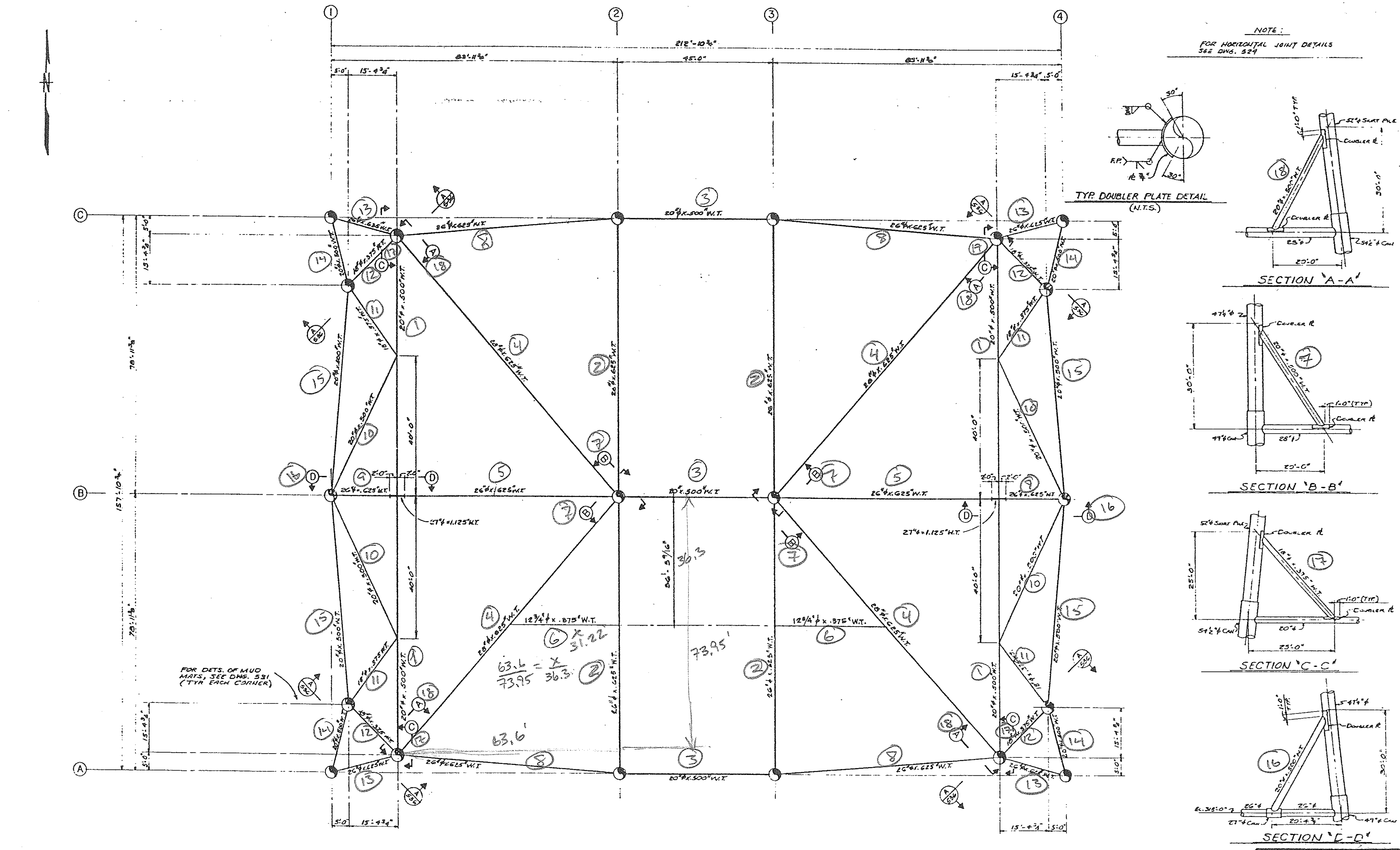
0	REV. 0 ISSUED FOR BIDS
1	GENERAL REVISION AS NOTED (ISSUED FOR CONSTRUCTION)

SCALE 3/32" = 1'-0"
DATE 12-10-77 DR. B.F. CK. CFC
DR. APPR. ENG. CBP
OPER. DEPT. APPROVED
ENG. DEPT.

Chevron U.S.A. Inc.
Western Region, Production Department

JACKET FRAMING
JACKET PLAN AT EL. (-) 271'-0"
DRILLING PLATFORM
SANTA CLARA UNIT — PARCEL P-0217

M W.O. S.O. E-SB-2520-1



PLAN @ ELEV. (-) 318'-0"

Brown & Root, Inc.
Engineers - Constructors
HOUSTON, TEXAS

CONTRACT NO. ER-0389 | DRAWING NO. S-684-24

REFERENCE DRAWINGS	
TYP. JT. DETS. SHT. 2	E-SB-2529
MUD MAT DETS.	531
SKIRT PILE SLV. - BRACING DETS.	536

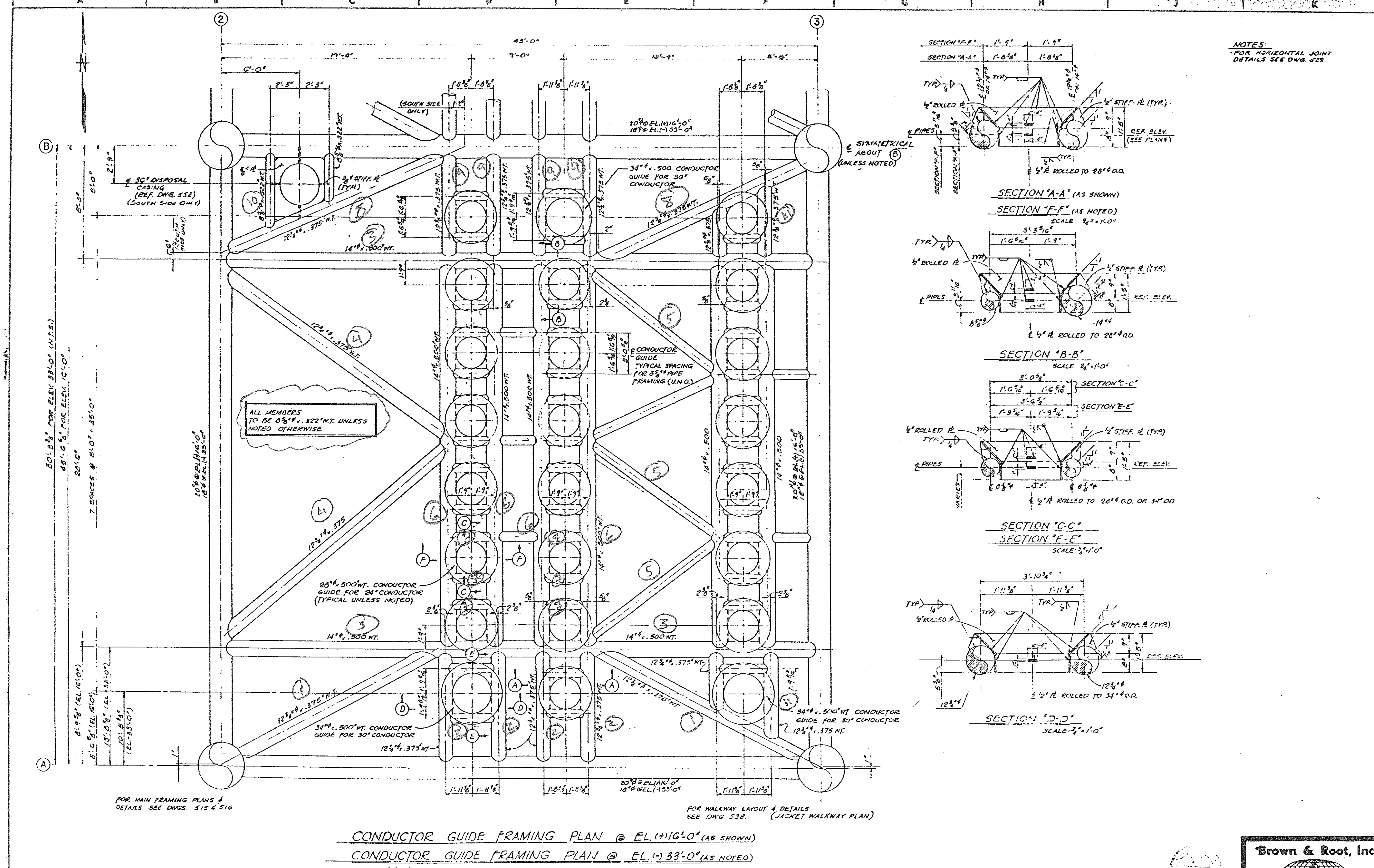
REVISIONS

2	REVISED AS BUILT	6.9.82
1	ADDED SECTIONS & DETAIL, REV. MEMBER SIZES AS NTD. (ISSUED FOR CONSTRUCTION)	

SCALE 3/32" = 1'-0"
DATE 02-10-77 DR. B.F. CK. CFC
DR. APPR. ENG.
OPER. DEPT. ENG. DEPT. APPROVED

JACKET FRAMING
JACKET PLAN AT EL. (-) 318'-0"
DRILLING PLATFORM
SANTA CLARA UNIT — PARCEL P-0217

M W.O. S.O. E-SB-2521-2



CONDUCTOR GUIDE FRAMING PLAN @ EL. (+)16'-0" (AS SHOWN)

CONDUCTOR GUIDE FRAMING PLAN @ EL. (-) 33'-0" (AS NOTED)

SCALE ⅜" = 1'-0"

Brown & Root, Inc.
Engineers - Constructors
HOUSTON, TEXAS

CONTRACT NO.	DRAWING NO.
ER-0389	S-684-25

REFERENCE DRAWINGS	
JACKET PLAN EL.(+) 16'-0"	E-SB-2515
JACKET PLAN EL.(-) 33'-0"	516
TYPICAL JOINT DETAILS SHT. 2	529
JACKET WALKWAY	538
DISPOSAL CASINGS DETAILS	552

REVISIONS

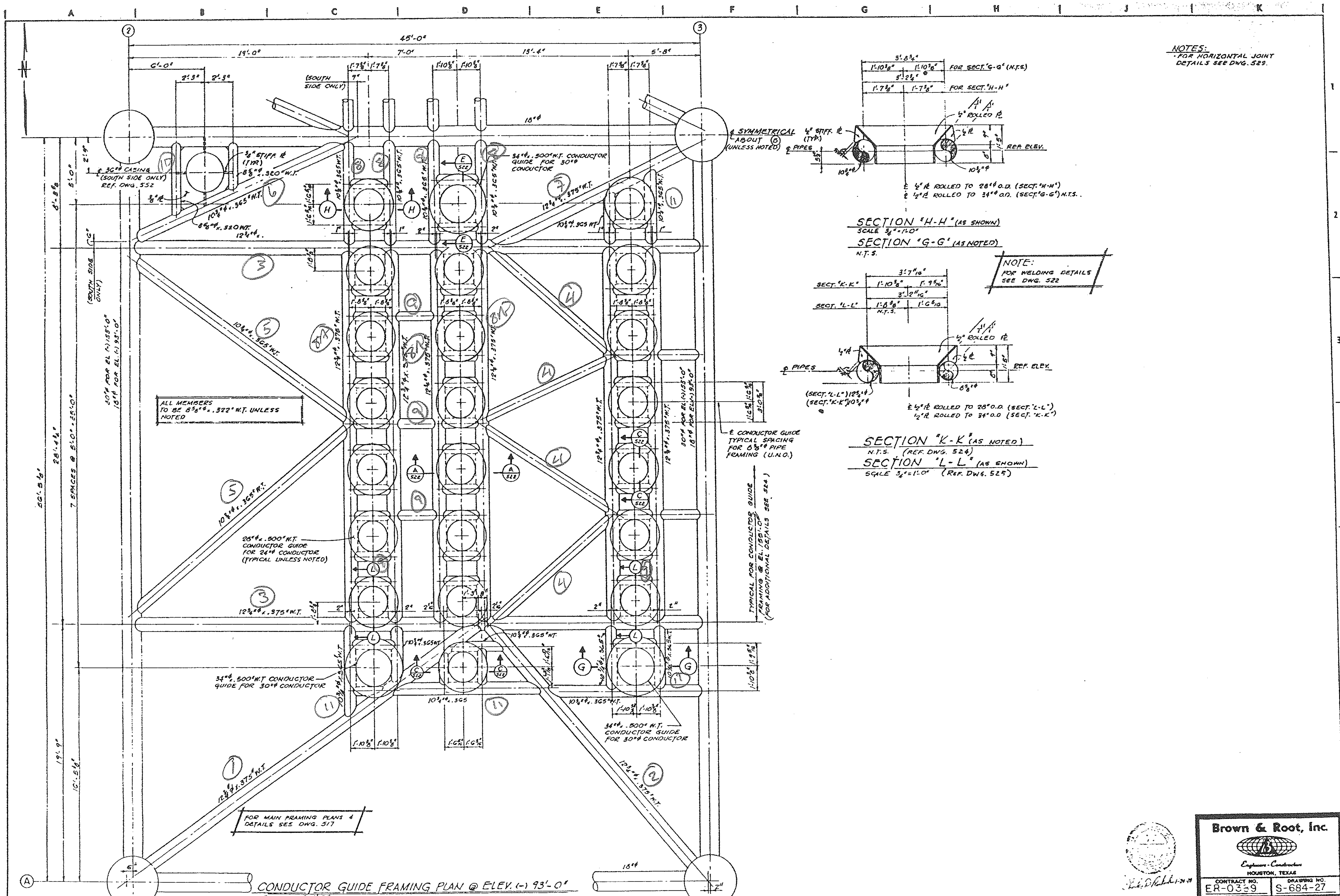
0	REV. 0 ISSUED FOR BIDS
△	ISSUED FOR CONSTRUCTION

SCALE AS NOTED
DATE 02-25-75 DR. CFC CK. LC.
DR. APPR. ENG.
OPER. DEPT. APPROVED
ENG. DEPT.

Chevron U.S.A. Inc.
Region, Production Department

JACKET FRAMING
CONDUCTOR GUIDE FRAMING @ EL.(+)16'-0" & (-)33'-0"
DRILLING PLATFORM
SANTA CLARA UNIT - PARCEL P-0217

M W.O. S.O. E-SB-2522-1



CONDUCTOR GUIDE FRAMING PLAN @ ELEV. (-) 93'-0"

SCALE 3/8" = 1'-0"

REFERENCE DRAWINGS

JACKET PLAN @ EL.(-)93'-0"	E-SB-2517
CONDUCTOR GUIDE FRAMING	522
CONDUCTOR GUIDE FRAMING	524
TYPICAL JOINT DETAILS	529
DISPOSAL CASING DETAILS	552

REVISIONS

0 REV. 0 ISSUED FOR BIDS

△ ISSUED FOR CONSTRUCTION

SCALE AS NOTED
DATE 03-10-77 DR CFC CK Y.C.
DR. APPR. ENG.
OPER. DEPT. APPROVED
ENG. DEPT.

Chevron U.S.A. Inc.
Region, Production Department

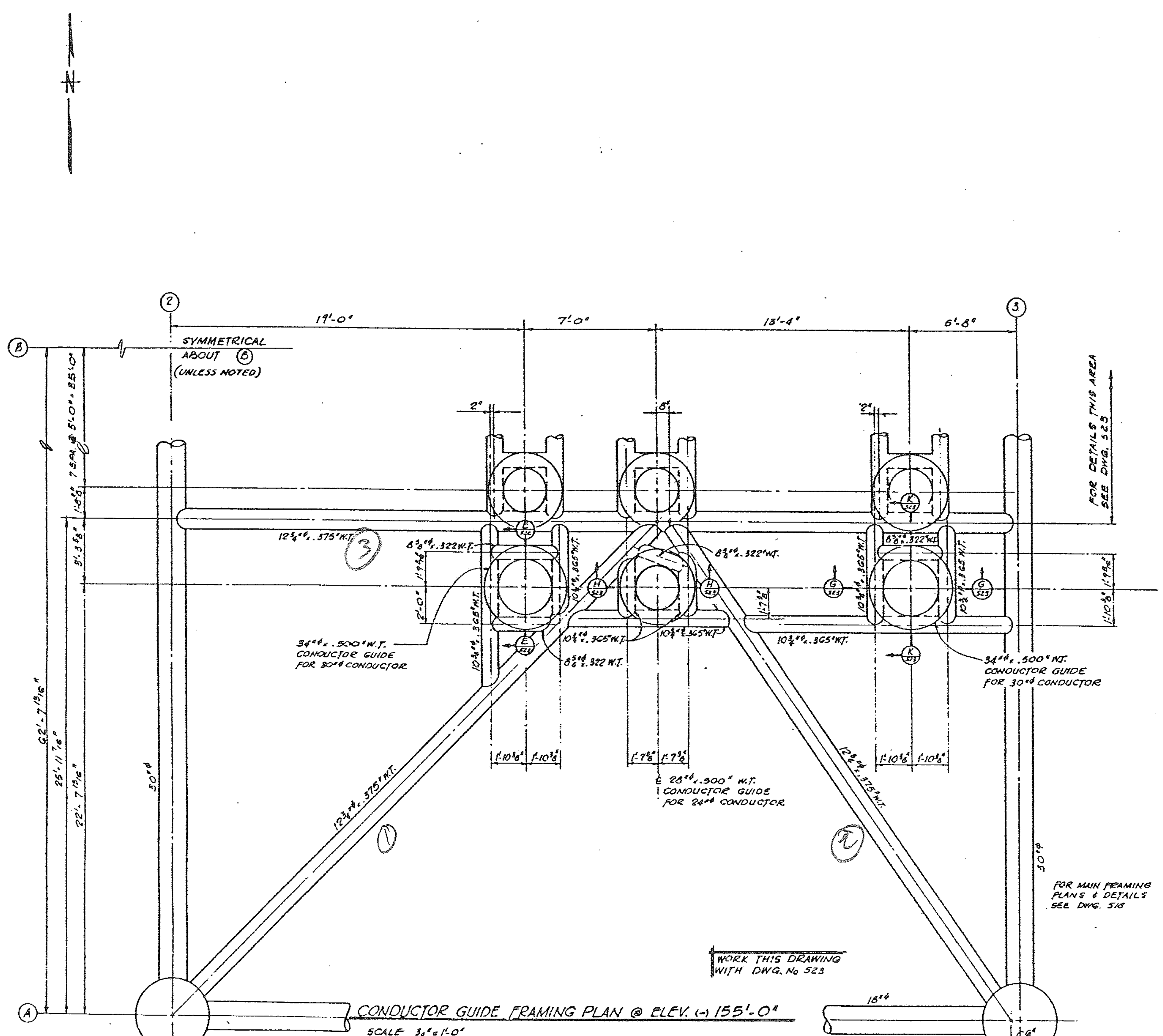
Brown & Root, Inc.
Engineers - Constructors
HOUSTON, TEXAS

CONTRACT NO. ER-0339 | DRAWING NO. S-684-27

JACKET FRAMING
CONDUCTOR GUIDE FRAMING AT ELEV (-) 93'-0"
DRILLING PLATFORM
SANTA CLARA UNIT - PARCEL P-0217

M W.O. S.O. E-SB-2523-1

NOTES:
- FOR HORIZONTAL JOINT DETAILS. SEE DWG. 523.



CONDUCTOR GUIDE FRAMING PLAN @ ELEV. (-) 155'-0"

SCALE 3/8" = 1'-0"

REFERENCE DRAWINGS

JACKET PLAN @ EL (-) 155'-0"	E-SB-2516
CONDUCTOR GUIDE FRAMING	523
TYPICAL JOINT DETAILS SHT 2	529
CONDUCTOR GUIDE FRAMING	522

REVISIONS

◇0 REV. 0 ISSUED FOR BIDS	
△ ISSUED FOR CONSTRUCTION	

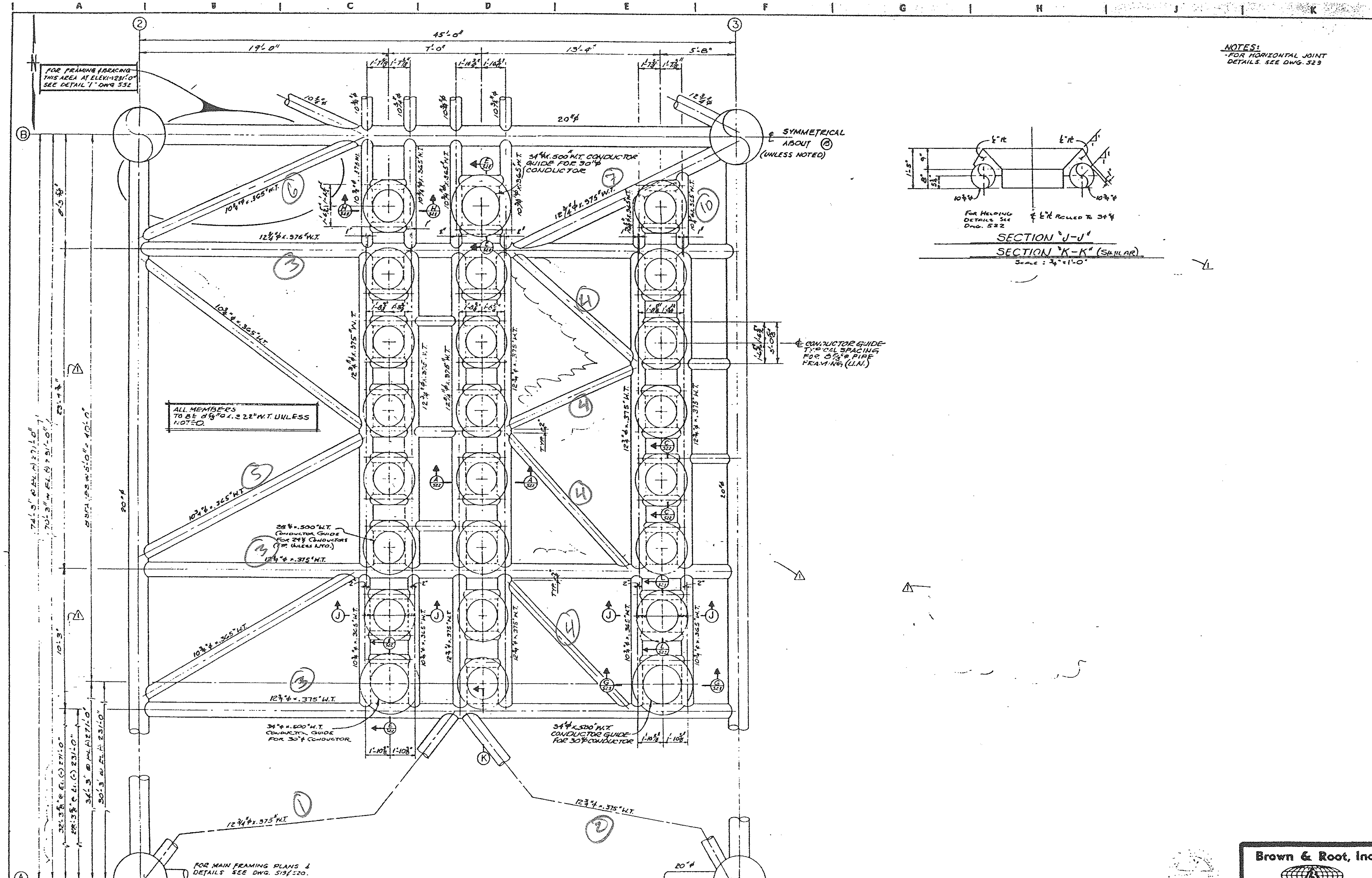
SCALE 3/8" = 1'-0" U.N.O.
DATE 3-25-77 DR CPC CK J.C.
DR. APPR. ENG. CDF
OPER. DEPT. APPROVED
ENG. DEPT.

Chevron U.S.A. Inc.
Region, Production Department

Brown & Root, Inc.
Engineers - Constructors
HOUSTON, TEXAS
CONTRACT NO. ER-0329
DRAWING NO. S-654-28

JACKET FRAMING
CONDUCTOR GUIDE FRAMING AT ELEV (-) 155'-0'
DRILLING PLATFORM
SANTA CLARA UNIT — PARCEL P-0217

M W.O. S.O. E-SB-2524-1



CONDUCTOR GUIDE FRAMING PLAN AT ELEV. (-) 231'-0" (AS NOTED)
CONDUCTOR GUIDE FRAMING PLAN AT ELEV. (-) 271'-0" (AS SHOWN)
SCALE: ⅜" = 1'-0"

REFERENCE DRAWINGS

JACKET PLAN & EL.(-) 231'-0"	E-SB-2519
JACKET PLAN & EL.(-) 271'-0"	520
CONDUCTOR GUIDE FRAMING	522
CONDUCTOR GUIDE FRAMING	523
TYPICAL JOINT DETAILS SHT. 2	529
DISPOSAL CASINGS DETAILS	552

REVISIONS

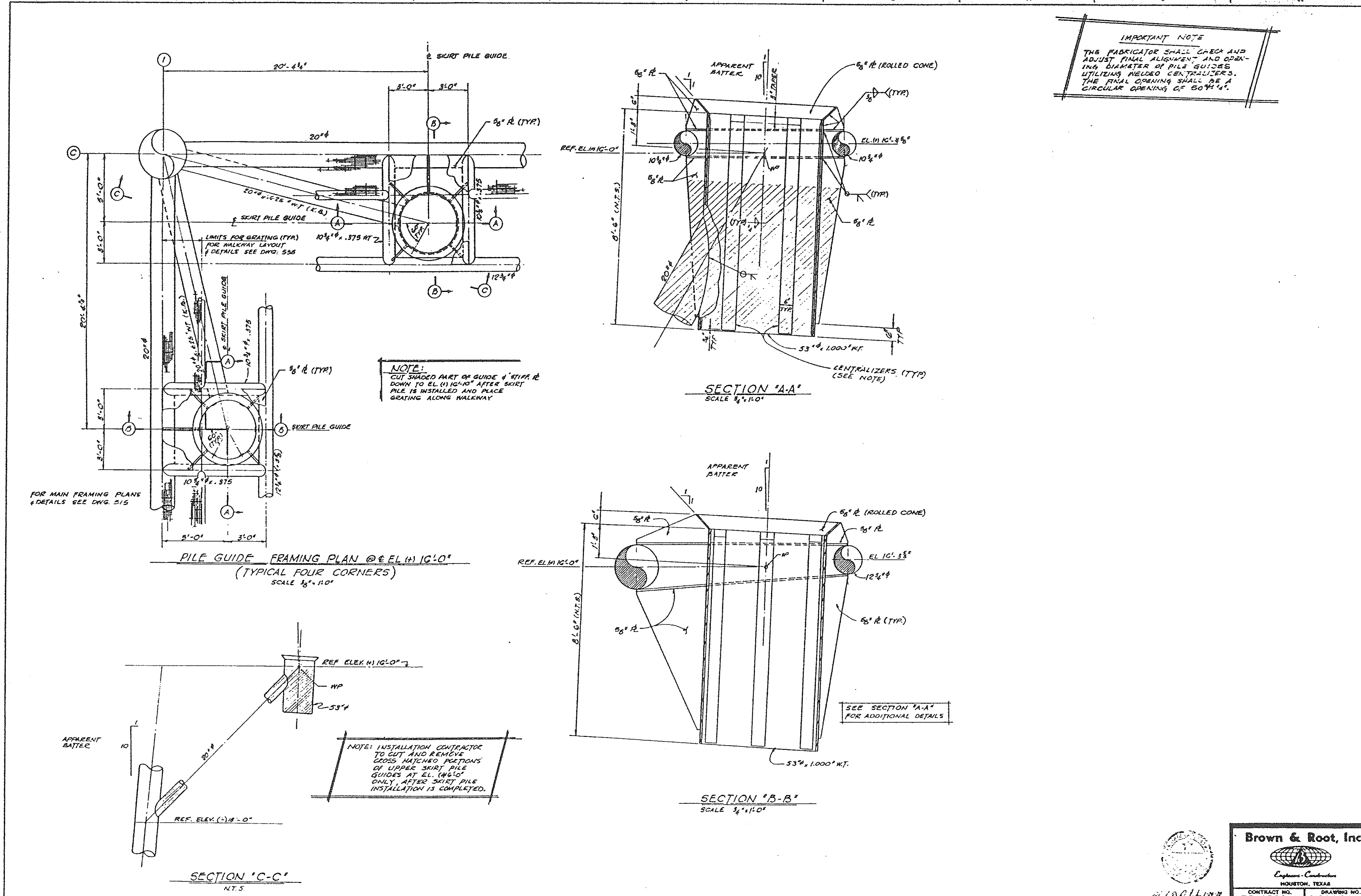
0	REV. 0 ISSUED FOR BIDS
1	GENERAL REVISION AS NOTED (ISSUED FOR CONSTRUCTION)

SCALE AS NOTED
DATE 3-7-77 DR R.T.G. CK C.F.C.
DR. APPR. ENG.
OPER. DEPT.
ENG. DEPT.
APPROVED

Brown & Root, Inc.
Engineers - Constructors
HOUSTON, TEXAS
CONTRACT NO. ER-0389
DRAWING NO. S-664-29

Chevron U.S.A. Inc.
Region, Production Department

JACKET FRAMING
CONDUCTOR GUIDE FRAMING PLAN @ EL-231'-0" & -271'-0"
DRILLING PLATFORM
SANTA CLARA UNIT — PARCEL P-0217
M W.O. S.O.
E-SB-2525-1



REFERENCE DRAWINGS	
JACKET PLAN & EL.+16'-0"	E-SB-2515
JACKET WALKWAY	558

REVISIONS	
0 REV. 0 ISSUED FOR BIDS	
1 ISSUED FOR CONSTRUCTION	

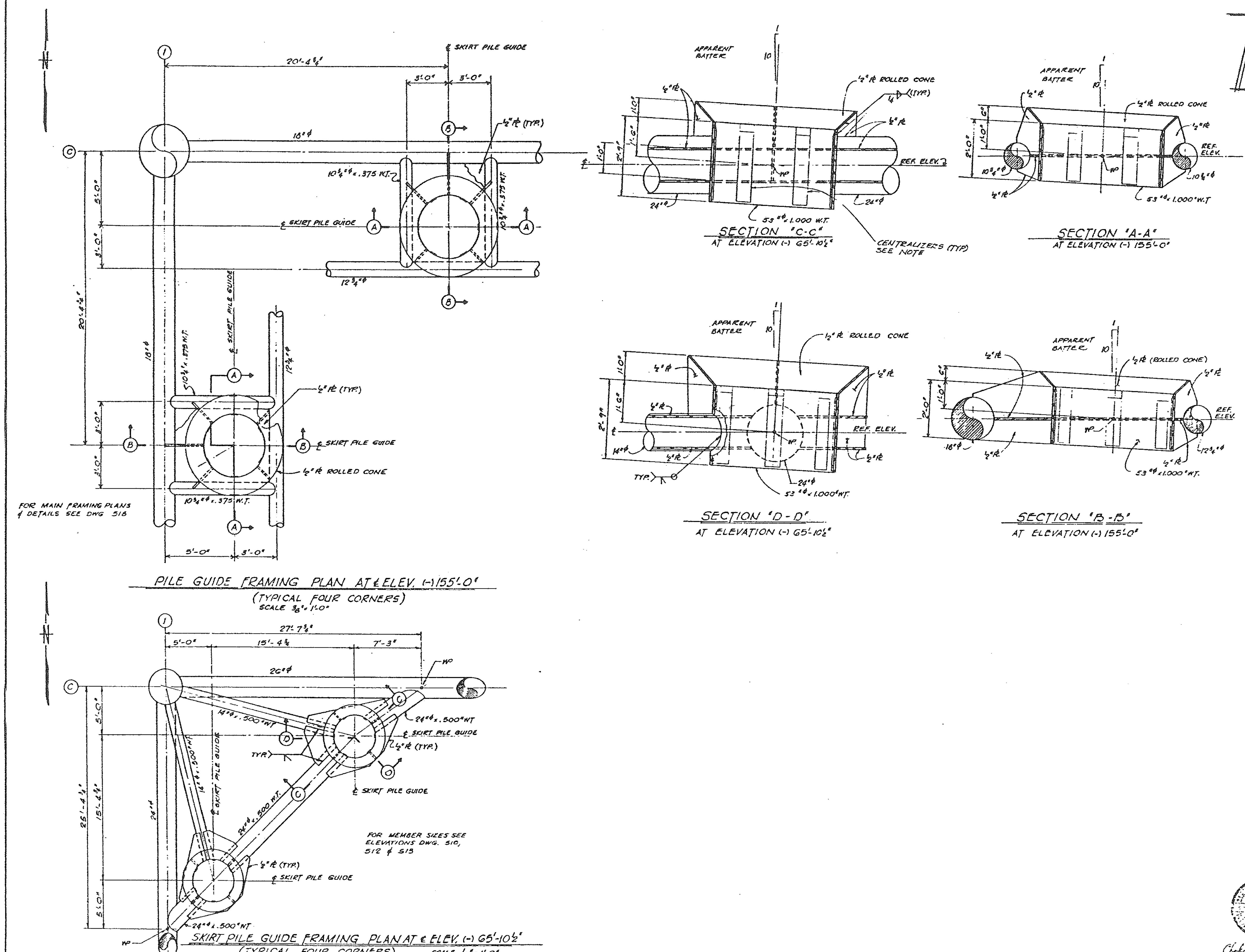
SCALE AS NOTED
DATE 03-11-77 DR CEC CK V.C.
ENG C.D.P.
OPER. DEPT. 75 5/16/73

Brown & Root, Inc.
Engineers - Constructors
HOUSTON, TEXAS
CONTRACT NO. ER-0389 DRAWING NO. S-684-36

Chevron U.S.A. Inc.
Western Region, Production Department

JACKET FRAMING
SKIRT PILE GUIDE FRAMING @ ELEV.(+) 16'-0"
DRILLING PLATFORM
SANTA CLARA UNIT - PARCEL P-0217

M W.O. S.O. E-SB-2526-1



IMPORTANT NOTE

THE FABRICATOR SHALL CHECK AND ADJUST FINAL ALIGNMENT AND OPENING DIAMETER OF PILE GUIDES UTILIZING WELDED CENTRALIZERS. THE FINAL OPENING SHALL BE A CIRCULAR OPENING OF 50"Φ ± ¼".

REFERENCE DRAWINGS	
JACKET ELEV. 'A'	E-SB-2510
" " 'C'	512
" " '1' & '4'	513
" PLAN @ EL. (-) 155'-0"	516

REVISIONS	
◇0 REV. 0 ISSUED FOR BIDS	
△ ISSUED FOR CONSTRUCTION	

SCALE ⅜" = 1'-0" U.N.O.
DATE 3-15-77 DR. CFC CK. Y.C.
DR. APPR. ENG. C.O.P.
OPER. DEPT.
ENG. DEPT.
APPROVED

Chevron U.S.A. Inc.
Region, Production Department

Brown & Root, Inc.
Engineers - Constructors
HOUSTON, TEXAS
CONTRACT NO. ER-0369
DRAWING NO. S-684-37

JACKET FRAMING
SKIRT PILE GUIDE FRAMING AT EL. (-) 65'-10½" & (-) 155'-0"
DRILLING PLATFORM
SANTA CLARA UNIT - PARCEL P-0217

M W.O. S.O. E-SB-2527-1

Attachment G
Revised Section 3.0 Environmental Analysis

3.0 ENVIRONMENTAL ANALYSIS

The following Sections provide environmental setting information for the proposed Project area, identifies potential environmental impacts from the proposed conductor cutting and removal activities, and includes measures that will be implemented as part of the Project to minimize these potential impacts. Resource areas that have the potential to be affected by the proposed conductor cutting activities include the following:

- Air Emissions
- Marine Biological Resources
- Commercial Fishing
- Cultural Resources
- Geology
- Hazardous Materials and Risk of Upset
- Offshore Transportation
- Water Quality

For the purposes of this analysis, the Project area includes Platforms Grace and Gail, as well as the offshore transportation routes from Carpinteria (Casitas) Pier to the offshore Project sites and from the Platforms to the POLB (Ventura to Los Angeles County) or Port Hueneme to Saticoy (Ventura County) for recycling/disposal of recovered materials. Potential impacts associated with the Project are addressed within Sections 3.2.1 through 3.2.8. As demonstrated within the assessment, any short-term impacts to environmental resources that would result from the conductor cutting activities are addressed through implementation of Project-specific as well as routine operational procedures. The only long-term impact is an incremental reduction of biological habitat from removal of the conductor pipes.

3.1 EXISTING ENVIRONMENTAL SETTING

Platforms Grace and Gail are located in Federal waters within the Santa Clara Unit (SCU) approximately 10-10.5 miles offshore Ventura County in the eastern portion of the Santa Barbara Channel (SBC). Water depths in the Project area range significantly from approximately 318 feet at Platform Grace to 719 feet at Platform Gail. In accordance with 40 CFR, part 55; the Platforms are located within the Ventura County Air Pollution Control District boundaries. The Platforms are located away from any State designated Marine Protected Areas (MPAs), as well as the Federally designated Channel Islands National Park and National Marine Sanctuary.

3.2 POTENTIAL IMPACTS OF CONDUCTOR CUTTING PROJECT

3.2.1 Air Quality and Greenhouse Gas Emissions

The offshore Platforms are located within the South-Central Coast Air Basin, which is under the jurisdiction of the Ventura County Air Pollution Control District (VCAPCD). The VCAPCD shares responsibility with the California Air Resources Board (CARB) for ensuring that all ambient air quality standards are attained within the County. The SCU operates under existing Permit to Operate (PTO) Numbers 01493 for Platform Grace and 01494 for Platform Gail. The PTOs establish thresholds for allowable emissions associated with Platform operations (including decommissioning activities).

If the POLB Recycling Alternative is chosen, recovered conductor pipe will be transported by vessel from the Platforms to the POLB, which is in Los Angeles County. Emissions during transit offshore Los Angeles County and within the POLB are within the jurisdiction of the South Coast Air Quality Management District (SCAQMD).

3.2.1.1 Air Quality Standards

Air quality standards are specific pollutant concentration thresholds that are used to protect public health and the public welfare. The USEPA has developed two sets of standards; one to provide an adequate margin of safety to protect human health, and the second to protect the public welfare from any known or anticipated adverse effects. At this time, SO_2 is the only pollutant for which the two standards differ. The California Air Resources Board (CARB) has developed air quality standards for California, which are generally lower in concentration (i.e., more stringent) than federal standards. California standards exist for O_3, CO, suspended PM_{10}, visibility, sulfates, lead, hydrogen sulfide, and vinyl chloride. Table 3.2-1 lists applicable ambient air quality standards.

Table 3.2-1. Ambient Air Quality Standards (State and Federal)

Pollutant	Averaging Time	California Standard	Federal Standard
Ozone (O_3)	1-Hour	0.09 ppm	--
Ozone (O_3)	8-Hour	0.070 ppm	0.070 ppm
Carbon Monoxide (CO)	1-Hour	20 ppm	35 ppm
Carbon Monoxide (CO)	8-Hour	9.0 ppm	9 ppm
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	0.030 ppm	0.053 ppm
Nitrogen Dioxide (NO_2)	1-Hour	0.18 ppm	100 ppb
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	--	0.030 ppm
Sulfur Dioxide (SO_2)	24-Hour	0.04 ppm	0.14 ppm
Sulfur Dioxide (SO_2)	3-Hour	--	0.5 ppm (secondary)
Sulfur Dioxide (SO_2)	1-Hour	0.25 ppm	75 ppb
Respirable Particulate Matter PM_{10}	Annual Geometric Mean	20 μg/m^3	--
Respirable Particulate Matter PM_{10}	24-Hour	50 μg/m^3	150 μg/m^3
Fine Particulate Matter $PM_{2.5}$	Annual Geometric Mean	12 μg/m^3	12.0 μg/m^3
Fine Particulate Matter $PM_{2.5}$	24-Hour	--	35 μg/m^3
Hydrogen Sulfide (H_2S)	1-Hour	0.03 ppm	--
Vinyl Chloride	24 Hour	0.01 ppm	--
Sulfates	24 Hour	25 μg/m^3	--
Lead	30 Day Average	1.5 μg/m^3	--
Lead	Calendar Quarter	--	1.5 μg/m^3

Pollutant	Averaging Time	California Standard	Federal Standard
Lead	Rolling 3-Month Average	--	0.15 μg/m^3
Visibility Reducing Particles	8-Hour	Extinction coefficient of 0.23 per kilometer - visibility of 10 miles or more due to particles when relative humidity is less than 70 percent.	--

Source: CARB 2020

Air Toxic Health Risks. Diesel fuel combustion in internal combustion engines produces exhaust containing a number of compounds that have been identified as toxic air contaminants (TACs) by CARB. In 1998, CARB identified diesel particulate matter (DPM) from diesel exhaust as a TAC. In 2000, CARB developed the Diesel Risk Reduction Plan to reduce PM and DPM emissions from diesel-fueled engines and vehicles to establish new emission standards, certification programs, and engine retrofit programs to control exhaust emissions from diesel engines and vehicles. CARB has the following diesel enforcement programs and regulations to reduce the smog-forming pollutant and TAC emissions and that may be applicable to the Project:

- Commercial Vehicle Idling. Diesel-fueled motor vehicles with a gross vehicle weight rating greater than 10,000 pounds are prohibited from idling the vehicle's primary engine for more than 5 minutes at any location.
- Heavy Duty Vehicle Inspection Program (HDVIP). The HDVIP program requires heavy-duty trucks and buses to be inspected for excessive smoke, tampering, and engine certification label compliance.
- Software Upgrade for Diesel Trucks. Requires owners of eligible 1993–1998 model year electronically controlled heavy-duty diesel engines to install low NO_x software at the time of an engine rebuild.
- Truck and Bus Regulation. This regulation requires that all trucks and buses be equipped with 2010 or newer model year engines to reduce PM, DPM and NO_x emissions. Starting in 2020, the California Department of Motor Vehicles will only register vehicles that comply with this regulation.
- Strategic Plan for Diesel Enforcement. Assembly Bill (AB) 233 also known as the Healthy Heart and Lung Act (HHLA) enacted in 2007, requires CARB to develop a strategic plan to enforce diesel emission control regulations. HHLA specifically requires CARB, every 3 years, to review existing diesel emission control regulations enforcement and anticipated enforcement needed to implement the Diesel Risk Reduction Plan. Based on that review, CARB is required to develop a Strategic Plan for consistent, comprehensive, and fair enforcement of these regulations. In 2008 CARB issued a notice of postponement for the first Strategic Plan's public review (CARB 2008). No future date for public review has been set and further review by CARB has been postponed (CARB 2020).

3.2.1.2 Commercial Harbor Craft Regulation

In November 2007, CARB approved a Commercial Harbor Craft Regulation to reduce emissions from diesel engines on commercial harbor craft vessels. The regulation requires the following:

- All commercial harbor craft owners and operators are required to fuel diesel engines with California ultralow sulfur diesel and install a non-resettable hour meter on each engine.
- All new commercial harbor craft engines are required to meet the USEPA marine or off-road emissions standard in effect at the time the vessel is acquired.
- All new replacement engines for all in-use harbor craft are required to meet the Tier 2 or Tier 3 marine or off-road standards in effect at the time the engine is acquired.
- Existing Tier 1 or earlier propulsion and auxiliary engines on in-use harbor craft are required to meet USEPA Tier 2 or Tier 3 standards in effect at the time of regulation compliance.

3.2.1.3 VCAPCD Rules and Regulations

The following VCAPCD rules and regulations are applicable to the Project:

- Rule 50 - Opacity: This rule sets the opacity standards for the discharge of visible air contaminants.
- Rule 51 – Nuisance: Rule 51 indicates that no air contaminants shall be discharged that would cause injury, detriment, nuisance or annoyance to any considerable number of persons or to the public or which endangers the comfort, repose, health or safety of any such persons or the public or which would cause injury or damage to business or property.
- Rule 55 – Fugitive Dust: This rule sets the requirements of fugitive dust generators. The provisions of this rule shall apply to any operation that would result in disturbed surface area, or a human-made condition capable of generating fugitive dust, including bulk material handling, earth-moving, construction, demolition, storage piles, unpaved roads, track-out, or off-field agricultural operations.
- Rule 62.7 – Asbestos Demolition and Renovation: This rule sets the requirements for any demolition and renovations activities.
- Rule 64 – Sulfur Content of Fuels: This rule sets the sulfur content requirements for gaseous and liquid fuels used in any combustion source. Ocean vessels are exempted.

Thresholds of Significance. The VCAPCD's 2003 Air Quality Assessment Guidelines include adopted significance thresholds for NOX and ROGs for long-term project (operational) emissions of 25 pounds (lbs) per day of NOx and ROGs (VCAPCD, 2003). The Project would be a short-term decommissioning project and would not have an operational phase; therefore, the thresholds of significance do not apply. However, a project that is inconsistent with the Air

Quality Management Plan is considered to have a significant cumulative adverse air quality impact (VCAPCD 2003).

3.2.1.4 Los Angeles County (POLB/South Coast AQMD) Rules and Regulations

Port of Los Angeles (POLA) No Net Increase Report (June 2005). The Port of Los Angeles/Port of Long Beach (POLA/POLB) complex is the fifth busiest container port in the world, and approximately 40 percent of all the nation's import cargo passes through these two ports (No Net Increase Task Force, 2005). Due to concern over the effects of air emissions on the public, and on the local communities of San Pedro and Wilmington, which are immediately adjacent to the POLA, the Los Angeles Board of Harbor Commissioners established a policy that there would be "no net increase in air emissions" from POLA activities over October 2001 levels.

SCAQMD AQMP (2016). The SCAQMD's AQMP proposed control measures are based on implementing all feasible control measures through the accelerated deployment of available cleaner technologies, best management practices, co-benefits from existing programs, and incentive measures (SCAQMD, 2017). The AQMP details emissions occurring in the SCAQMD during the base year 2012 and attainment demonstration years of 2019, 2022, 2023, 2025, and 2031. The future emission forecasts are based on demographic and economic growth projections provided by the SCAG. Even without any additional controls, VOC and NO_x emissions are expected to decrease due to existing regulations, such as controls on off-road equipment, new vehicle standards, and the Regional Clean Air Incentives Market (RECLAIM) programs (SCAQMD, 2017).

SCAQMD Rule 402 - Nuisance. This rule prohibits discharge of air contaminants or other material that cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public; or that endanger the comfort, repose, health, or safety of any such persons or the public; or that cause, or have a natural tendency to cause, injury or damage to business or property.

San Pedro Bay Ports Clean Air Action Plan (CAAP). The 2006 CAAP was created with the cooperation and participation of the SCAQMD, CARB and U.S. EPA. The goal of the 2006 CAAP was to improve air quality in the SCAB by adopting the CAAP. The 2006 CAPP was a sweeping plan aimed at significantly reducing the health risks posed by air pollution from port-related ships, trains, trucks, terminal equipment, and harbor craft (CAAP, 2017). The CAAP was updated in 2010 to provide near-term planning through 2014 and establishing long-term goals. Currently, a 2017 CAPP Update is in the draft process to provide even more strategies and emission-reduction targets to cut emissions from sources operating in and around the Ports, setting the Ports firmly on the path toward zero-emissions goods movement (CAPP, 2017).

POLB/POLA Vessel Speed Reduction (VSR) Program. The VSR program has been in place since 2001 under which vessels slow to 12 knots when they are within 20 nautical miles (nm) of Point Fermin. The POLA, EPA, CARB, SCAQMD, the Pacific Merchant Shipping Association (PMSA), and the Marine Exchange of Southern California signed a memorandum of understanding to voluntarily reduce the speed of ocean going vessels (OGV) to 12 knots or less within 20 nautical miles of Point Fermin. Reduction in speed demands less power on the main engine, which in turn reduces fuel usage and emissions. In 2008, the POLA adopted a VSR Incentive Program for OGVs and expanded the program out to 40 nautical miles from Point

Fermin. Compliance with the voluntary VSR program has steadily increased over the years since it was originally adopted.

Port of Long Beach (POLB) Green Port Policy. In November 2004, the Board of Harbor Commissioners (BHC) directed the POLB to develop a policy that would build on the existing Healthy Harbor program to encompass wide ranging environmental goals. In January 2005, the BHC adopted the Green Port Policy, which serves as a guide for decision making and established a framework for environmentally friendly Port operations. The goal of the air quality program element of the POLB Green Port Policy is to reduce harmful air emissions from Port activities (POLB, 2005).

SCAQMD Emissions Thresholds. Table 3.2-2 provides a summary of daily maximum emissions thresholds in the SCAQMD for construction activities:

Table 3.2-2. SCAQMD Daily Maximum Emissions Thresholds for Construction

SCAQMD Daily Maximum Emission Threshold	Pounds per Peak Day				
	NO_x	**ROG**	**PM_{10}**	**CO**	**SO_2**
	100	**75**	**150**	**550**	**150**

3.2.1.5 Estimated Project Emissions (Criteria Pollutants)

The Project is a temporary decommissioning project that does not have an operations phase. Estimated Project emissions for criteria pollutants are provided in Table 3.2-3 below. Within Ventura County for the Port of Long Beach Recycling Alternative, emissions within Ventura County in 2021 are estimated at 265.11 peak pounds of NOx/day/5.11 total tons of NOx for Platform Grace and 246.51 peak pounds of NOx/day/8.94 total tons of NOx for Platform Gail in 2023. Estimated emissions for the Port Hueneme to Saticoy Recycling Alternative in Ventura County are estimated at 206.56 peak pounds of NOx/day/4.16 total tons of NOx for Platform Grace and 189.86 peak pounds of NOx/day/7.11 total tons of NOx for Platform Gail in 2023. However, the VCAPCD only requires emissions for long-term projects to be below the 25 pounds/day threshold for any one pollutant (NO_x and ROG), therefore criteria pollutant emissions during construction are not applicable.

For the POLB Recycling Alternative, Project activities would generate 718.48 peak pounds of NOx/day within the SCAQMD boundaries total, however approximately 359.24 peak pounds/day of NOx would be generated in 2021 and 359.24 peak pounds/day of NOx in 2023.

All well abandonment operations, including conductor removals, are being conducted in accordance with the requirements of existing PTOs. The PTOs have been evaluated with respect to the proposed conductor cutting activities (see Table 3.2-3 and Appendix C for air quality emissions estimates). No modifications to the PTOs will be required to accommodate the conductor cutting Project.

Table 3.2-3. Estimated Criteria Pollutant Project Emissions

DISPOSAL OPTION	*Ventura County*					*Los Angeles County*				
	NO_X	**ROG**	**PM_{10}**	**SOx**	**CO**	**NO_X**	**ROG**	**PM_{10}**	**SOx**	**CO**
Port of Long Beach Recycling Alternative										
Platform Grace (Peak Day lbs)	265.11	43.18	27.31	0.33	151.92	359.24	45.33	43.62	0.21	158.24
Platform Gail (Peak Day lbs)	246.51	43.78	23.91	0.40	147.74	359.24	45.33	43.62	0.21	158.24
TOTAL	**511.62**	**86.96**	**51.22**	**0.74**	**299.66**	**718.48**	**90.67**	**87.24**	**0.43**	**316.47**
Platform Grace (Total Tons-2021)	5.11	0.93	0.46	0.01	3.58	5.75	0.73	0.70	0.00	2.53
Platform Gail (Total Tons-2023)	8.94	1.66	0.78	0.01	6.53	11.50	1.45	1.40	0.01	5.06
TOTAL	**14.05**	**2.58**	**1.25**	**0.02**	**10.11**	**17.24**	**2.18**	**2.09**	**0.01**	**7.60**
Port Hueneme to Saticoy Recycling Alternative										
Platform Grace (Peak Day lbs)	206.56	35.64	20.03	0.30	125.61	--	--	--	--	--
Platform Gail (Peak Day lbs)	189.86	36.55	16.95	0.38	122.53	--	--	--	--	--
TOTAL	**396.43**	**72.19**	**36.98**	**0.68**	**248.14**	--	--	--	--	--
Platform Grace (Total Tons-2021)	4.16	0.80	0.35	0.01	3.16	--	--	--	--	--
Platform Gail (Total Tons-2023)	7.11	1.43	0.56	0.01	5.72	--	--	--	--	--
TOTAL	**11.27**	**2.23**	**0.91**	**0.02**	**8.88**	--	--	--	--	--

Notes: Only one Recycling Alternative would be chosen. Work at Platform Grace would occur in 2021 and work at Platform Gail would occur in 2023.
See Appendix C and Project Description for Assumptions Re: Distance and Vessel Hours/Trips
Only the POLB Recycling Alternative requires vessel trips within SCAQMD

3.2.1.6 Greenhouse Gas Emissions

Various entities address Greenhouse Gas (GHG) emissions at the state and regional levels. For example, CARB's Climate Change Scoping Plan (2008) establishes GHG reduction strategies and goals for California's future, focusing on large contributors to state GHG emissions (e.g., power generation and transportation). Assembly Bill (AB) 32 establishes regulatory, reporting, and market mechanisms to achieve quantifiable reductions in GHG emissions and establishes a statewide GHG emissions cap. It requires that statewide GHG emissions be reduced to 1990 levels by 2020. In 2008 and 2014, CARB approved the Scoping Plan and the first update to the Scoping Plan, respectively. In 2016, the California Legislature passed Senate Bill (SB) 32, which established a 2030 GHG emissions reduction target of 40 percent below 1990 levels. In response to SB 32 and the companion legislation of AB 197, CARB approved the 2017 Scoping Plan Update: The Strategy for Achieving California's 2030 GHG Target in November 2017. The 2017 Scoping Plan draws from the previous plans to present strategies to reaching California's 2030 GHG reduction target.

Given the global nature of climate change resulting from GHG emissions, GHG emission impacts are inherently cumulative in nature. The determination whether a project's GHG emissions impacts are significant depends on whether emissions would be a cumulatively considerable contribution to the significant cumulative impact. At the local level, the VCAPCD and SCAQMD (applicable only to the POLB Recycling Alternative) are the agencies primarily responsible for air quality standards attainment as established by CARB and USEPA. However, the VCAPCD has not approved a GHG significance threshold for construction or operational emissions. The SCAQMD's interim operational emissions significance threshold is 10,000 metric tons of CO_2 equivalent per year ($MTCO_2e$/yr). For the purposes of this analysis, the SCAQMD's GHG Threshold was applied.

As shown in Table 3.2-4, based on the projected GHG emissions, offshore and onshore Project activities would emit approximately 960.20 tons of $MTCO_2e$/yr in Ventura and Los Angeles Counties combined for the POLB Recycling Alternative in 2021, and approximately 1,828.02 tons of $MTCO_2e$/yr in Ventura and Los Angeles Counties combined for the POLB Recycling Alternative in 2023. Total Project GHG emissions in Ventura County would be 1,751.81 $MTCO_2e$/yr and 1,036.41 $MTCO_2e$/yr in Los Angeles County.

For the Port Hueneme to Saticoy Recycling Alternative, estimated GHG emissions would be 559.81 $MTCO_2e$/yr in 2021 and 1,032.32 $MTCO_2e$/yr in 2023. Total Project GHG emissions would be 1,592.13 $MTCO_2e$/yr.

Both recycling alternatives are well below the SCAQMD threshold of 10,000 $MTCO_2e$/yr, especially given that conductor cutting and removal activities at Platform Grace would be conducted in 2021 and at Platform Gail in 2023.

Table 3.2-4. Estimated GHG Total Project Emissions

Disposal Option	*Ventura County*				*Los Angeles County*			
	CO2 (Tons/ Year)	N2O (Tons/ Year)	CH4 (Tons/ Year)	CO2e (Annual)	CO2 (Tons/ Year)	N2O (Tons/ Year)	CH4 (Tons/ Year)	CO2e (Annual)
Port of Long Beach Recycling Alternative								
Platform Grace (2021)	612.72	0.02	0.00	614.73	344.34	0.01	0.00	345.47
Platform Gail (2023)	1,133.35	0.05	0.01	1,137.08	688.68	0.03	0.01	690.94
TOTAL EMISSIONS	**1,746.07**	**0.07**	**0.01**	**1,751.81**	**1,033.01**	**0.04**	**0.01**	**1,036.41**
Port Hueneme to Saticoy Recycling Alternative								
Platform Grace (2021)	557.86	0.02	0.00	559.81	--	--	--	--
Platform Gail (2023)	1,028.74	0.04	0.01	1,032.32	--	--	--	--
TOTAL EMISSIONS	**1,586.60**	**0.06**	**0.01**	**1,592.13**	--	--	--	--

Although the Project would not result GHG emissions over the established SCAQMD threshold, the following measures have been incorporated into the Project design and will be implemented during Project during construction to minimize potential impacts from air emissions:

Measures to Reduce Potential Impacts:

- Conductor cutting and removal activities will be conducted in accordance with Bureau of Safety and Environmental Enforcement (BSEE) Requirements (30 CFR Part 250.1710-1723) for decommissioning activities associated with the existing operational plans at Platforms Grace and Gail.
- Conductor cutting and removal activities have been scheduled in one phase at each Platform to minimize Project timing and associated impacts.

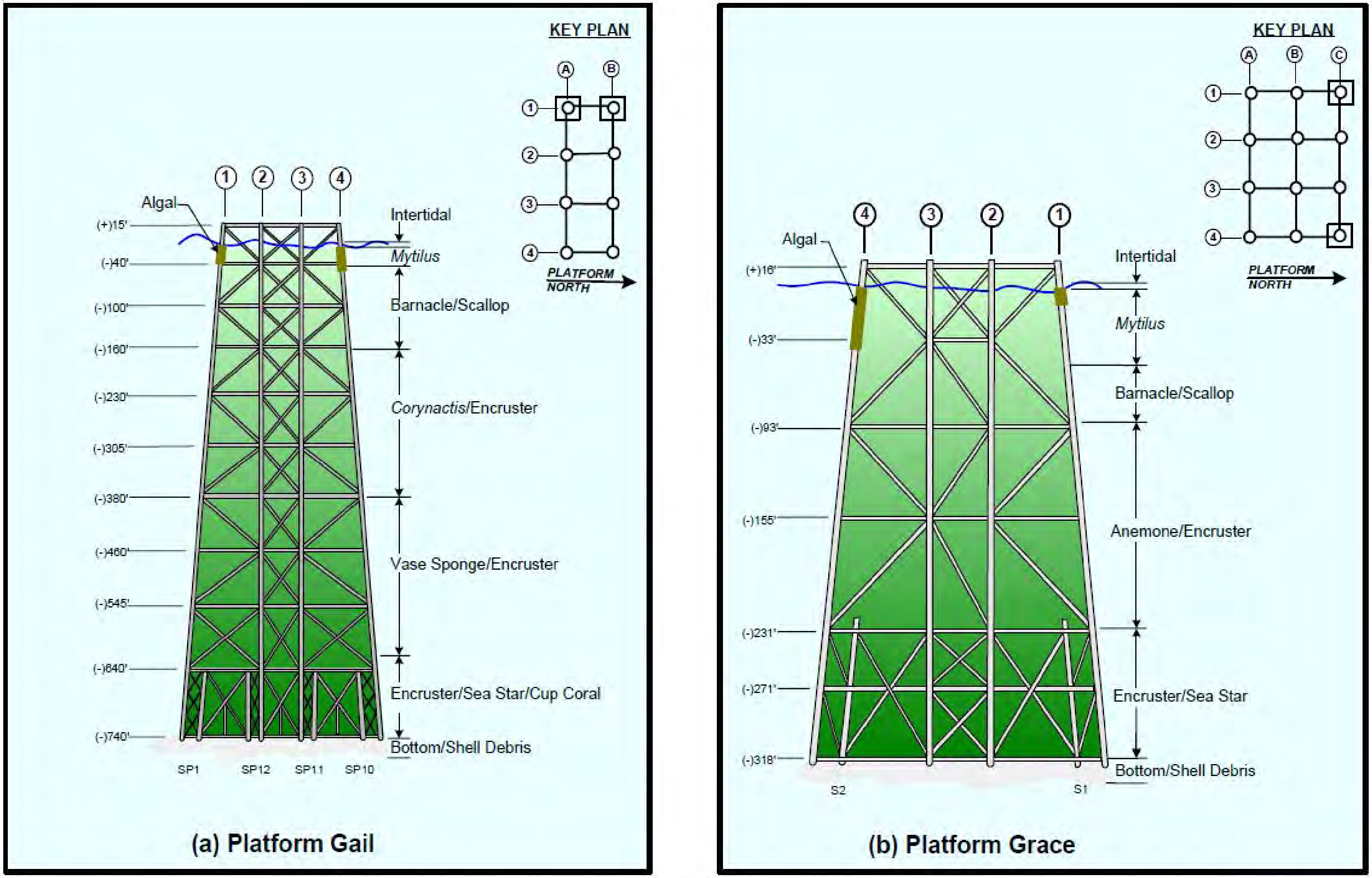
3.2.2 Marine Biological Resources

Platforms Grace and Gail are located within the Santa Barbara Channel. Biological resources and habitats in the vicinity of the Platforms and the Santa Barbara Channel have been documented by a number of recent studies. The findings of these studies relevant to biological resources within the Project area are summarized below. Additionally, please refer to Appendix D for the Project's Federal Biological Assessment (BA) and Appendix E for the Essential Fish Habitat Assessment (EFHA).

A study conducted by Continental Shelf Associates (CSA, 2005) identified distinct biotic zones along the legs of selected platforms (Figure 3.2-1). Platform Gail and Grace were included in this study and the following is a summary of the findings.

A total of four to six distinct biotic zones were identified depending on the Platform's depth. As Platform depth increased, the total number of biotic zones increased. Platform Grace, in approximately 318 feet of water, exhibited five zones, while Platform Gail at 739 feet, exhibited six biotic zones. The invertebrate communities along the Platform legs showed similar patterns including:

- *Mytilus* was always present, therefore there was always a mussel zone whose vertical extent and lower boundary was variable;
- Barnacles were typically present above and/or below the mussel zone;
- Encrusters (i.e, sponges) were routinely present at depth, often in conjunction with various cnidarian species (i.e., *Metridium, Corynactis, Paracyathus*); and
- Beneath the intertidal, barnacle, and mussel zones, there weas considerable variability in faunal composition depending on the Platform.



Source: CSA, 2005

Figure 3.2-1. Biotic Zonation Patterns of (a) Platform Gail and (b) Platform Grace

Love et al. (1999, 2003, 2010, 2012, 2019) has conducted extensive studies of both the invertebrate and fish communities on OCS platforms and the following is a summary of those findings, as they relate to the Project Platforms.

At the water's surface, the Platforms' jackets provide an artificial habitat that acts as infrastructure for the attachments of typical shallow, rocky reef invertebrate and fish species. Love et al. (2019) found that the white anemone, *Metridium farcimen,* was by far the most commonly observed cnidarian and comprises 97.6 percent of all invertebrates found on the Platform jackets. The gorgonian and soft corals (alcyonacean, *Leptogorgia chilensis* and the scleractinian, *Lophelia pertusa*), are the most commonly occurring corals near the surface and in midwater depths. Corals are usually found along the crossbeams where they are more protected from currents and swell, opposed to the shear vertical faces of the outer piling supports. Vase sponges are the most commonly found sponges along the Platform structures and are found in mid- to deep water ranges between 266 and 1,194 ft (81 and 365 m) (Love et al., 2019).

Fish densities can be variable between Platforms but tend to be lowest in the shallower depth strata, between 0 to 100 ft (0 to 30 m) and increase with depth. Midwater habitats serve as nursery grounds for a range of rockfish species including blue (*Sebastes mystinus*), squarespot (*S. hopkinsi*) and widow rockfish (*S. entomelas*) and bocaccio (*S. paucispinis*) (Love et al., 2012). In years with sufficient recruitment, young-of-the-year (YOY) rockfish can occur in substantial numbers around the surface and midwater depths. The Platforms' presence provides an opportunity for larval fish to settle out into a complex yet suitable habitat that provides refuge from predators and strong currents, as well as attracts a sufficient prey base. Other species that occur include nearshore reef species such as garibaldi (*Hypsypops rubicundus*), blacksmith (*Chromis punctipinnis*), cabezon (*Scorpaenichthys marmoratus*), sheephead (*Semicossyphus pulcher*), and white and sharpnose perches (*Morone americana* and *Phanerodon atripes,* respectively) (Love et al., 2012).

Platform bottoms vary greatly in fish assemblage composition, primarily due to differences in bottom depth; however, the bottom structures and benthic habitat are more commonly characterized by subadult and adult rockfish in contrast to the YOY fish that congregate near the midwater and surface water depths. It is hypothesized that some of the midwater YOY descend to the Platform bottoms or settle out directly from planktonic phase to the platform bottom where they mature (Love and Nishimoto, 2012).

The bottom of each Platform is comprised of vertical and horizontal supports; however, unlike the midwater structure, the bottom habitat contains both the structural elements and a seafloor that is covered with fallen marine fouling organisms. In some areas, the bottom crossbeam is undercut or covered over, provided a greater or lesser "cave-like" habitat that is not found in the midwaters. In addition, this deep-water habitat consists of random, small crevices and other refuge unique to the bottom habitats (Love and Nishimoto, 2012).

As the Platforms' structures rise out of the softbottom habitats, they provide an artificial hardbottom habitat which provides attachment sites for sessile invertebrates such as mussels, corals, bryozoans, and sponges (Argonne National Laboratory, 2019). The seafloor around both Platform Grace and Gail is sedimentary, comprised of medium to fine grain sand and silts (MEC Analytical Systems, 2003, Fugro West, 2003 and 2005). The deep-water platform structure and surrounding seafloor support diverse populations of benthic invertebrate and fish species; however, existing conditions at each Platform differ slightly due to differences in water depth at each location. The softbottom benthic community surrounding the Platforms are comprised of polychaete worms, amphipod crustaceans, bivalve mollusks, and echinoderms. However, there are species specific differences and variations in species diversity that characterized the benthic communities within different water depths. The unique flora, fauna and habitats for each platform are presented below.

3.2.2.1 Platform Grace

Surface to Midwater Platform Habitats. The algal and invertebrate communities at the surface and midwater habitats on Platform Grace are dominated by mussel beds (*Mytilus* spp.), barnacles (*Balanus* spp.), anemones (*Corynactis californica, Anthopleura elegantissima, Metridium senile*) and filamentous red algae (Continental Shelf Associates, 2005). Throughout the water column, Platform Grace has well-defined mussel and coral cup anemone zones, abundant ophiuroids, a prominent barnacle community, and a broadly distributed anthozoan (anemone) community. Platform Grace is unique in that its mussel beds and anemone zones have no apparent overlap, with the mussel beds dominating the shallow water habitats (above 45 feet [13.7 meters]). Platform Grace also has a unique brown cup coral (*Paracyathus*) zone that extends from the lower portions of the coral cup anemone community to the sea floor (Continental Shelf Associates, 2005).

Fish communities at the surface and midwater habitats at Platform Grace serve as nursery grounds for a range of rockfish species as well as foraging habitat for adult rockfish and reef dwelling species. Love et al. (2010) reported that widow rockfish YOY and adults were the most numerous species of rockfish observed at Platform Grace. Other dominant species included squarespot rockfish, bocaccio YOY and adults, and blacksmith.

Deep Water and Benthic Platform Habitats. The seafloor under Platform Grace is almost flat with a gradual slope toward the south. Historic removal and deposition of fouling organisms on the seafloor has created mid- to low-relief habitat comprised primarily of fragments of mussel shells (*Mytilus* sp.). This habitat area under the Platform measures approximately 78,000 square feet (ft^2) (7,246 square meters [m^2]) on the northwest side of the Platform footprint and is approximately 13 ft (4 m) tall. This area has a volume of approximately 5,500 cubic yards (4,205 cubic meters) (MEC Analytical Systems, 2001 and 2003).

Platform Grace is located on the continental shelf transition zone where benthic infaunal communities are dominated by the spionid, capitellid, and chaetopterid polychaetes, tellinid bivalves, ostracods, and ophiuroid echinoderms (Gillett et al., 2013; Argonne National Laboratory, 2019). The Platform's legs and bottom conductor structures host primarily encrusting species, and deep water sea stars (*Ophiothrix spiculata*) from approximate depths of 230 to 318 feet (70.1 to 96.9 meters).

Fish species found in the deep-water habitat of the Platform's legs include widow, calico, vermillion, and halfbanded rockfish (*S. entomelas*, *S. dalli*, *S. miniatus*, and *S. semicinctus*, respectively). The sharpnose surfperch is also commonly observed within the deeper portion of Platform Grace. Throughout a six-year study at Platform Grace, Love et al. (2003) reported that two species, halfbanded rockfish and shiner surfperch (*Cymatogaster aggregatta*), accounted for 86.5 percent of the total fish observed on the seafloor shell talus area. YOY and juvenile boccaccio rockfish (*S. paucispinis*), a once depleted species that has subsequently recovered as a stock, were relatively abundant in the mid- and bottom-depth areas of Platform Grace during the 1999 and 2000 surveys (Love, et al., 2003). Fish species observed along the exposed seafloor habitat comprised of shell fragments and the soft sediment bottom include sanddabs (*Citharichtys spp.*), halfbanded rockfish, and other unidentified perch and juvenile rockfish (Crystal Energy, 2006).

3.2.2.2 Platform Gail

Surface and Midwater Habitats. The algal and invertebrate communities at the surface and midwater habitats on Platform Gail are comprised primarily of anemones (*Corynactis californica, Metridium exilis, Metridium senile*), filamentous red algae, spiny brittle stars (*Ophiothrix spiculata)*, and mussel beds (*Mytilus* spp.). Platform Gail provides a unique dense community of *Metrdium exilis* at depths where there is usually a dominant cup coral community. In addition, there was also a distinct deep-water cockscomb coral (*Desmophyllum dianthus*) zone along the lower portions of the platform legs' structure (Continental Shelf Associates, 2005).

Fish communities at the surface and midwater habitats at Platform Gail are similar to other offshore platforms with the dominant fish species being YOY and adult life stages of squarespot rockfish and bococcio (Love et al., 2010). Other dominant fish species recorded around the platform midwater structure included blacksmith, widow rockfish, and halfmoon.

Deepwater and Benthic Platform Habitats. The seafloor around Platform Gail is also primarily sedimentary; however, the shell fragments that have accumulated beneath the Platform are lower relief and smaller area than around Platform Grace. MEC Analytical (2003) estimated that there are four identifiable areas of low relief under Platform Gail which are approximately two to three feet tall, the largest of which measures 40 by 60 ft (12 to 18 m) at its base. The total volume of the four areas under Platform Gail was estimated to be less than 500 cubic yards.

Platform Gail is located in an upper slope, deep water benthic zone where the species diversity is limited and is primarily comprised of tellinid bivalves and the spionid polychaete (Gillett et al., 2013). The Platform's legs and deepest conductor structures host primarily encrusting species, deep water sea stars and cup corals from approximate depths of 630 to 739 feet (192 to 225 meters).

Platform Gail hosts a different suite of fish species around its deep-water habitat, including bocaccio, cowcod (*Sebastes levis),* another federally managed species experiencing a stock recovery, pinkrose (*S. simulator*), and greenblotched (*S. rosenblatti*) rockfishes. Love and Nishimoto (2012) reported that the assemblage of fish known to occupy the lower-relief shell fragment habitat is composed of 1) juvenile fishes of larger species and juveniles and adults of dwarf species that utilize small sheltering sites (i.e., juvenile cowcod and lingcod [*Ophiodon elongatus*], blackeye goby (*Rhinogobiops nicholsii*), and calico rockfish [*S. dallii*]), 2) ecotonal species that favor soft sea floor-low, hard-relief bottom (greenstriped [*S. elongatus*] and stripetail [*S. saxicola*] rockfishes), and 3) a few schooling taxa (notably halfbanded rockfish) that are habitat generalists.

3.2.2.3 Nonindigenous Aquatic Species

Invasive and Nonindigenous Aquatic Species (NAS) have been reported to have a strong association and likelihood to occur on artificial structures and therefore has led to concerns regarding the role of offshore infrastructure as a potential dispersal source and connectivity to native habitats (Paige et al., 2019). NAS invertebrates, including the bryozaoan *Watersipora* *subatra* (herein referred to as *Watersipora*), the anemone *Diadumene* sp. (found only on Platform Gail), and potentially the exotic caprellid amphipod *Caprella mutica,* have the potential to occur or are present on Platforms Gail and Grace (Page et al., 2006).

A thoroughly studied NAS within the OCS platforms is the bryozoan *Watersipora*. At 20 percent vertical and horizontal coverage, Platform Gail has the highest percent cover of *Watersipora* among all surveyed offshore platforms. *Watersipora* is primarily found in shallow waters along the Platforms' conductors and jackets, especially in areas that are regularly cleaned and maintained; however, the abundance of percent cover of *Watersipora* reduces significantly on the Platforms' conductors below 59 feet (18 meters). Cleaning and maintenance allow NAS species' to regularly recolonize empty space and out-compete native sessile invertebrates (Viola et al., 2018).

The current NAS colonization of Project Platforms makes it unlikely that additional vessel traffic will introduce new species to the platforms. The Project platforms are known to retain the majority of larvae and removal of Project platform conductors is not anticipated to increase the spread of invasive species or effect the presence of invasive species on nearshore, natural reefs. In fact, the removal of the conductors may benefit the native invertebrate communities on the Project platforms and adjacent platforms Gilda and Gina. The removal of the biomass of NAS reduces the likelihood that *Watersipora* and other invasive invertebrates would continue to colonize on their host platform in the same densities. Specifically, the removal of the shallow portions of the conductors, where NAS density is highest, may reduce the ability of NAS to persist locally (BOEM, 2019). Additionally, *Watersipora* colonies are negatively buoyant and when dislodged from the platforms, the fragments drop to the seafloor (diver observations). Thus, conductor cleaning prior to removal is unlikely to provide a transmission pathway for the spread of *Watersipora* (Simmon et al., 2016).

The current NAS and *Watersipora* colonies present on Platform Grace and Gail most likely spread to the Platforms via reproductive colonies on supply and crew boat hulls traveling from the POLB/POLA, Port Hueneme, or other harbors that were already occupied by NAS. Natural, long-distance dispersal of *Watersipora* is unlikely due to its short maximum planktonic larval duration (PLD) of 24 hours. Its short PLD reduces the likelihood that the planktonic larva would survive long enough to colonize unoccupied habitat. This is also true for other NAS taxa with short PLDs (Paige et al., 2019). Therefore, there is a low likelihood that larval dispersal from the Project Platforms through ocean currents and circulation (connectivity) alone could impact uncolonized, natural reefs.

Early connectivity studies suggested that offshore platforms Gail, Grace as well as Gilda and Gina as a group display high connectivity between the four platforms and could potentially produce a much greater dispersal distances for invasive species than nearshore harbors due to the speed of prevailing deep water currents (Simmons et al., 2016); however, Paige et al., (2019) found little evidence of offshore platforms actually serving as intermediary sources of *Watersipora* (and presumably other invasive species) to the northern Channel Islands or nearshore natural reefs through natural connectivity alone. The only potential connectivity recorded from a platform to an island site was very weak connection between Platform Grace and a pier on the east end of Santa Cruz Island. In addition, modeling conducted by Simmon et al. (2016) found that platforms in groupings (i.e, Grace, Gail, Gina, and Gilda) share higher connectivity, due to their proximity to eachother, and may retain larvae within the colonized platforms.

As outlined above, the primary pathway for the dispersal of NAS invertebrates, such as *Watersipora,* to and from offshore platforms appears to be transport by supply and/or crew boats that contain reproductive colonies on their hulls. Project vessels will only be traveling between areas that are already occupied by NAS and therefore, vessel transit is not expected to increase the spread of NAS.

3.2.2.4 Essential Fish Habitat

The Project Platforms are located in an area where managed groundfish species, as well as foraging or migrating coastal pelagic species and highly migratory species are present. Federal regulations recognize three Habitat Areas of Particular Concern (HAPCs): Rock reefs, canopy kelps, and seagrass beds. The water depth and distance from shore preclude the presence of both canopy kelp and seagrass beds HAPCs in the area around the platforms. In addition, geophysical surveys have not identified any deep-water rocky reef habitats that would qualify as HAPC within the Project area.

Regardless, NMFS and BOEM (2019) recognize that oil and gas platforms may serve as an artificial structure that can enhance the survivorship of juvenile rockfish. While offshore platforms are not designated HAPC, surveys demonstrate that high concentrations of groundfish have been observed in association with these platforms. Studies have found that rockfish are the dominant group of fish around offshore platforms and can comprise between 83 and 89 percent of the total fish diversity (Love et al., 2010 and 2012). Within the midwater nurseries of offshore Platforms, densities of young rockfish have been found to be higher than around most natural reefs (Love et al., 2012). In addition, several species that were formerly listed by California Department of Fish and Wildlife (CDFW) (i.e., bocaccio and cowcod) are found in all life stages from the midwater to bottom of the Platforms' structures. Please refer to Appendix E (EFHA) for further details.

3.2.2.5 Marine Birds

Over 2.5 million seabirds may pass through or reside in the Southern California Bight at any one time. The population fluctuates seasonally because the region is located along the Pacific flyway, which is a major migratory route for all bird species that travel from the northwestern United States, Canada, and Alaska to southern California and Central America. A portion of the Pacific Flyway is located off the coast of California, but the exact location can vary depending on weather. Coastal and marine birds tend to fly at elevations between 100 and 200 feet (60.9 meters) above the ocean (Aspen, 2008).

Few species remain in the area throughout the year since most are non-breeding transients. There is a variety of marine bird species that inhabit or migrate through the open waters of the Project area. The highest at-sea densities are reported to occur near the Channel Islands in January and lowest in the southwest portion of the Southern California Bight (Argonne National Laboratory, 2019). Migrating birds are known to use offshore platforms for nighttime roosting; however, it appears that the birds' association with the structures has more to do with the availability of roosting habitat in open water than it does with the lighting on the platforms (Argonne National Laboratory, 2019).

Pelagic seabirds generally occur over deeper offshore waters of the Project area. Common pelagic species in the Project vicinity include the Northern fulmar (*Fulmarus glacialis*), sooty shearwater (*Ardenna grisea*), black-vented shearwater (*Puffinus opisthomelas)*, pink-footed shearwater (*P. creatopus*), leach's storm-petrel (*Oceanodroma leucorhoa*), brown pelican (*Pelecanus occidentalis*), cormorants (*Phalacrocorax* spp.), red phalarope (*Phalaropus fulicaria*), red-necked phalarope (*P. lobatus*), and the common murre (*Uria aalge*). Although pelagic species are generally present throughout the year, their abundance varies seasonally. For example, the sooty shearwater and pink-footed shearwaters are most abundant during summer months (Argonne National Laboratory, 2019). Other pelagic migratory species are most numerous from mid-April to early June and from mid-August to mid-October.

The Channel Islands provide nesting and feeding habitat for 99 percent of the breeding birds in Southern California and important wintering areas and rest-stops for shore birds. Several State and Federally listed special status birds utilize the Channel Island within the Project region for breeding, including the bald eagle (*Haliaeetus leucocephalus*), which was delisted in 2007, but is afforded protection under the Bald and Golden Eagle Protection Act. Prior to delisting, bald eagles were successfully introduced on several Channel Islands including Anacapa and Santa Cruz Islands, which are located between 7 and 10 miles (mi) (12 to 17 kilometers [km]), respectively, from Platform Gail (Argonne National Laboratory, 2019). In addition, the Channel Islands provide nesting habitat for approximately 20 seabird species in Southern California. Seabird species that can be found breeding on the Channel Islands in clue red-necked phalarope and Scripp's and/or Guadalupe Murrelets (*Synthliboramphus scrippsi* and/or *S. hypoleucus)* (Santa Cruz Island), Brandt's cormorant (*Phalacrocorax penicillatus*), pink-footed and sooty shearwater, and western gull (*Larus occidentalis*) (San Miguel Island), and brown pelican and Cassin's Auklet (*Ptychoramphus aleuticus)* (Anacapa Island) (Argonne National Laboratory, 2019).

The mainland coastal beaches, tidal marshes, and wetlands also provide nesting and foraging habitat for shorebirds, waders, and coastal raptors. Most shorebirds and waders inhabit tidal wetlands and rocky shorelines outside of the Project area. Shorebirds and waders that are known to breed along the Southern California coast include black oystercatcher (*Haematopus bachmani*), black-necked stilt (*Himantopus mexicanus*), American avocet (*Recurvirostra americana*), killdeer (*Charadrius melodus*), the federally threatened Western snowy plover (*Charadrius nivosus nivosus*), and the federally endangered California least tern (*Sterna antillarum browni*).

Western snowy plovers breed along the sandy beaches of the mainland and offshore Channel Islands between Marsh through September. The snowy plover is also a year-round resident of Santa Rosa Island and a summer resident Santa Cruz Island. California least terns establish nesting colonies on sandy soils with little vegetation as well, along the ocean, lagoons, and bays, where they forage by plunge-diving for small fish. Western snowy plover and California least terns both have established breeding colonies at Hollywood and Ormond Beaches, Oxnard, California, which are the closest nesting areas to the Project Platforms and approximately 10 mi (18 km) west of the Project area (Frost, 2017; USFWS, 2007).

Coastal raptors prey on fish, birds, and in some cases carrion (e.g., washed up carcasses of dead dolphins). Raptor species occurring along the coast include the bald eagle, peregrine falcon (*Falco peregrinus*), osprey (*Pandion haliaetus*), turkey vulture (*Cathartes aura*), Northern harrier (*Circus hudsonius*), and red-tailed hawk (*Buteo jamaicensis*) which are known to nest in the upland wooded, grassland or ruderal habitats adjacent to the coast.

Several bird species that have the potential to occur within the Project area have been afforded protected status by the State and/or Federal government due to declining populations and/or habitats. Table 3.2-5 lists the special-status marine bird species that have the potential to be present within the vicinity of the proposed activities.

Table 3.2-5. Special-Status Bird Species within Project Area

Common Name	Scientific Name	Status Code(s)[a]
Brant	*Branta bernicla*	BMC, SSC
Marbled murrelet	*Brachyramphus marmoratus*	FT, BMC, SE
Scripp's murrelet	*Synthliboramphus scrippsi*	BCC, BMC, ST
Guadalupe murrelet	*Synthliboramphus hypoleucus*	BCC, BMC, ST
Cassin's auklet	*Ptychoramphus aleuticus*	BCC, BMC, SSC
Rhinoceros auklet	*Cerorhinca monocerata*	WL
Tufted puffin	*Fratercula cirrhata*	SSC
California gull	*Larus californicus*	WL
California least tern	*Sternula antillarum browni*	FE, BMC, SE
Gull-billed tern	*Gelochelidon nilotica*	BCC, BMC, SSE
Elegant tern	*Thalasseus elegans*	WL
Black skimmer	*Rynchops niger*	BCC, BMC, SSC
Black-footed albatross	*Phoebastria nigripes*	BCC, BMC
Short-tailed albatross	*Phoebastria albatrus*	FE, BMC, SSC
Ashy storm-petrel	*Oceanodroma homochroa*	BCC, BMC, SSC
Black storm-petrel	*Oceanodroma melania*	SSC
Pink-footed shearwater	*Ardenna creatopus*	BCC, BMC
Black-vented shearwater	*Puffinus opisthomelas*	BCC, BMC
Double-crested cormorant	*Phalacrocorax auritus*	BMC, WL
Brown pelican	*Pelecanus occidentalis*	DL, FP

[a] Status codes: BCC = USFWS bird of conservation concern; BMC =USFWS bird of management concern, DL = delisted (formerly endangered); FE = federally endangered; FT = federally threatened; SE = state endangered; ST = state threatened; FP = state fully protected; SSC = CDFW species of special concern; WL = watch list

Source: Argonne National Laboratory, 2019

3.2.2.6 Marine Mammals

All marine mammals are protected under the 1972 Marine Mammal Protection Act (MMPA), and all sea turtles in U.S. waters are listed under the Federal Endangered Species Act (FESA). These laws are overseen by the National Marine Fisheries Service (NMFS). Baleen whales, toothed whales (including dolphins), sea lions (including the California sea lion [*Zalophus californianus]*), harbor seals (such as the Pacific harbor seal [*Phoca vitulina richardsi*]), fur seal (such as the federally endangered Guadalupe fur seal [*Arctocephalus townsendi*]) could occur in the Project area. California sea lions utilize the Platform loading decks as haul-out areas year-round. In addition, common dolphins (*Delphinus* sp.) are known to migrate through the Project area, sometimes daily, as they move between foraging grounds near the coast.

Disturbing, harassing, injuring, or killing a protected species is prohibited by the MMPA. Table 3.2-6 lists species and their estimated abundance that could be encountered by Project vessels transiting between Carpinteria, Port of Long Beach, and the Project sites. Table 3.2-7 details marine wildlife occurrences and distribution in southern California. Where seasonal differences occur, individuals may also be found within the area during the off-season and, depending on the species, the numbers of abundant animals present in their off-season may be greater than the numbers of less common animals in their on-season.

As mentioned above, California sealions frequently utilize platform loading decks as haul-outs, but there are no documented sea lion rookeries on the Project Platforms. As shown on Figure 3.2-2, California sea lions, Pacific harbor seals, northern elephant seals and northern fur seals are known to breed on the Channel Islands, primarily San Miguel Island which is located approximately 56 mi (91 km) from Platform Grace. In addition, there is a Pacific harbor seal rookery adjacent to the Casitas Pier, Carpinteria, California. This rookery is known to host approximately 100 to 150 seals annually and is located approximately 14 mi (23 km) north of Platform Grace (Carpinteria Seal Watch, 2020). There are no rookeries in the Project; however, Anacapa Island, approximately 8 mi (13 km) south west of Platform Gail hosts several Pacific harbor seal haul-outs and California sea lion rookeries.

Although rarely encountered, marine turtles occur within waters off the southern California coast, and could potentially occur within the Project area. The four listed sea turtles that may occur within the Project area include the endangered Leatherback turtle (*Dermochelys coriacea*) and Loggerhead turtle (*Caretta caretta*), and the threatened Green turtle (*Chelonia mydas*) and Olive Ridley turtle (*Lepidochelys olivacea*). Populations of marine turtles have been greatly reduced due to over harvesting and loss of nesting sites in coastal areas. Sea turtles breed at sea and the females return to their natal beaches to lay their eggs; however, sea turtles do not nest anywhere along the California coast. In Southern California, coastal power plants discharge warm water that attract and maintain two known colonies of green sea turtles: In San Diego Bay and in Orange County near the San Gabriel River (Argonne National Laboratory, 2019). Although several occurrences of sea turtles have been documented off the southern California coast, the likelihood of their occurrence in the Project site is considered low.

Figure 3.2-2. Pinniped Haul-Outs and Rookeries

Table 3.2-6. Marine Wildlife Species of the Central California Coast

Common Name *Scientific Name*	**Minimum Population Estimate (Stock)**	**Current Population Trend**
REPTILES		
Cryptodira*		
Green turtle *Chelonia mydas*	3,319 to 3,479 (Eastern Pacific Stock)	Increasing
Leatherback turtle *Dermochelys coriacea*	961 (Eastern Pacific)	Decreasing
Loggerhead turtle *Caretta caretta*	7,138 (California)	Decreasing
Olive Ridley turtle *Lepidochelys olivacea*	1.15 to 1.62 million (Eastern Tropical Pacific)	Increasing
MAMMALS		
Mysticeti		
Blue whale *Balaenoptera musculus*	1,551 (Eastern North Pacific)	Stable
California gray whale *Eschrichtius robustus*	25,849 (Eastern North Pacific)	Increasing
Fin whale *Balaenoptera physalus*	8,127 (California/Oregon/Washington)	Increasing
Humpback whale *Megaptera novaeangliae*	2,784 (California/Oregon/Washington)	Increasing
Minke whale *Balaenoptera acutorostrata*	369 (California/Oregon/Washington)	No long-term trend suggested
Northern Pacific right whale *Eubalaena japonica*	31 (Eastern North Pacific)	No long-term trend suggested
Sei whale *Balaenoptera borealis*	374 (Eastern North Pacific)	No long-term trend suggested
Odontoceti		
Baird's beaked whale *Berardius bairdii*	1,633 (California/Oregon/Washington)	No long-term trend suggested
Common bottlenose dolphin *Tursiops truncatus*	1,255 (California/Oregon/Washington Offshore)	No long-term trend suggested
	346 (California Coastal)	No long-term trend suggested
Cuvier's beaked whale *Ziphius cavirostris*	2,059 (California/Oregon/Washington)	Decreasing
Dall's porpoise *Phocoenoides dalli*	17,954 (California/Oregon/Washington)	Unable to determine
Dwarf sperm whale *Kogia sima*	Unknown (California/Oregon/Washington)	No long-term trend suggested
Killer whale *Orcinus orca*	77 (Eastern North Pacific Southern Resident)	Decreasing
	276 (Offshore California/Oregon/Washington)	Unable to determine
Long-beaked common dolphin *Delphinus capensis*	68,432 (CA)	Unable to determine
Mesoplodont beaked whales	1,967 (California/Oregon/Washington)	Decreasing

Common Name ***Scientific Name***	**Minimum Population Estimate (Stock)**	**Current Population Trend**
Northern right whale dolphin *Lissodelphis borealis*	18,608 (California/Oregon/Washington)	No long-term trend suggested
Pacific white-sided dolphin *Lagenorhynchus obliquidens*	21,195 (California/Oregon/Washington Northern and Southern)	No long-term trend suggested
Pygmy sperm whale *Kogia breviceps*	1,924 (California/Oregon/Washington)	No long-term trend suggested
Risso's dolphin *Grampus griseus*	4,817 (California/Oregon/Washington)	No long-term trend suggested
Short-beaked common dolphin *Delphinus delphis*	839,325 (California/Oregon/Washington)	Unable to determine
Short-finned pilot whale *Globicephala macrorhynchus*	466 (California/Oregon/Washington)	No long-term trend suggested
Sperm whale *Physeter macrocephalus*	1,270 (California/Oregon/Washington)	No long-term trend suggested
Striped dolphin *Stenella coeruleoalba*	24,782 (California/Oregon/Washington)	No long-term trend suggested
Pinnipedia		
California sea lion *Zalophus californianus*	233,515 (U.S.)	Increasing
Guadalupe fur seal *Arctocephalus townsendi*	15,830 (Mexico; Undetermined in California)	Increasing
Northern fur seal *Callorhinus ursinus*	7,524 (California)	Increasing
Pacific harbor seal *Phoca vitulina richardsi*	27,348 (California)	Increasing

Sources: National Marine Fisheries Service (NMFS) Stock Assessment Reports by Species 2016 through 2018

Notes:

* Estimates are based on number of current numbers of nesting females.

Table 3.2-7. Marine Wildlife Species within California and Periods of Occurrence

Family Common Name	Month of Occurrence [1]											
	J	F	M	A	M	J	J	A	S	O	N	D
Mysticeti												
California gray whale												
Blue whale (E)												
Fin whale (E)												
Humpback whale (E)												
Minke whale												
Sei whale (E)												
Northern right whale (E)												
Odontoceti												
Dall's porpoise												
Short-beaked common dolphin												
Long-beaked common dolphin												
Pacific white-sided dolphin												
Risso's dolphin												
Short-finned pilot whale												
Bottlenose dolphin												
Northern right whale dolphin												
Sperm whale (E)												
Dwarf sperm whale												
Pygmy sperm whale												
Baird's beaked whale												
Cuvier's beaked whale												
Mesoplodont beaked whales												
Killer whale (E)												
Pinnipedia												
Guadalupe fur seal (T)												
Northern fur seal												
California sea lion												
Northern elephant seal[4]												
Pacific harbor seal												

Rare with uniform distribution	Not expected to occur	More likely to occur due to seasonal distribution	Present Year Round

Notes:

(E) Federally listed endangered species.

(T) Federally listed threatened species.

(1) Where seasonal differences occur, individuals may also be found in the "off" season. Also, depending on the species, the numbers of abundant animals present in their "off" season may be greater than the numbers of less common animals in their "on" season.

(2) Rarely encountered, but may be present year-round. Greatest abundance during July through September.

(3) Only a small percent occur over continental shelf (except near San Miguel rookery, May-November).

(4) Common near land during winter breeding season and spring molting season.

3.2.2.7 Marine Protected Areas (MPAs)

The project area is located north of the Channel Islands National Park and Channel Island National Marine Sanctuary. Both the marine sanctuary and National Park provided extensive protections for marine and terrestrial habitats within there boundaries.

In addition, the California Marine Life Protection Act was established to protect the natural diversity and abundance of marine life and marine ecosystems in California. Three types of MPAs are designated (or recognized) in California: State Marine Reserves (SMRs), State Marine Parks, and State Marine Conservation Areas. Activities associated with the Project would be restricted to Platforms Grace and Gail as well as their respective offshore transportation corridors. As shown in Figure 3.2-3, the closest State MPA to the proposed activities is the Scorpion SMR located approximately 6.8 southwest of Platform Grace and the Anacapa Island SMR, which is located approximately 4.2 miles south of Platform Gail.

3.2.2.8 Impact Assessment

Potential impacts due to Project activities includes seafloor disturbance and loss of habitat structure during conductor removal, potential increase in underwater noise, potential vessel strikes, and degradation of water quality or seafloor habitats from the discharge of petroleum in the event of an accidental spill from Project vessels. Potential impacts are described below.

Seafloor Disturbance. The cutting and subsequent removal of conductors from each platform has the potential to create localized turbidity and affect nearby soft-bottomed seafloor habitat beneath the platform. These potential impacts include:

- The removal of marine growth prior to the conductor cutting;
- The increase in sediment suspension and potential subsurface discharge following cutting of the conductor with either abrasive or mechanical equipment; and
- The subsequent void and infill of the seafloor depression as the conductor is lifted from the seafloor.

Prior to removal, the external conductor surface will be cleaned of naturally occurring marine growth. As epibiota is detached from each conductor it will fall to the seafloor. For the duration of the Platforms' production operations, BSEE regulations required operations of offshore platforms to clear marine growth from shallow, submerged portions of the Platforms on a regular basis to reduce structure fatigue. Over time, this removed growth accumulates on the seafloor beneath the Platforms. The cleaning process is anticipated to result in some increased turbidity as these materials fall through the water column and again as it reaches the seafloor. The suspended materials will rapidly disperse once the cleaning operation is completed. The resulting material added to the seafloor beneath the Platform is anticipated to contribute to benthic habitat that has been shown as a favored substrate for many juvenile rockfishes (Meyer-Gutbrod et al., 2019) and may contribute to a short-term increase in food availability within the water column. Detached marine growth in the water column has the potential to attract secondary and tertiary consumers; however, marine growth removal will occur prior to conductor cutting activities and is not expected to negatively impact marine wildlife that maybe foraging or migrating in the Project area.

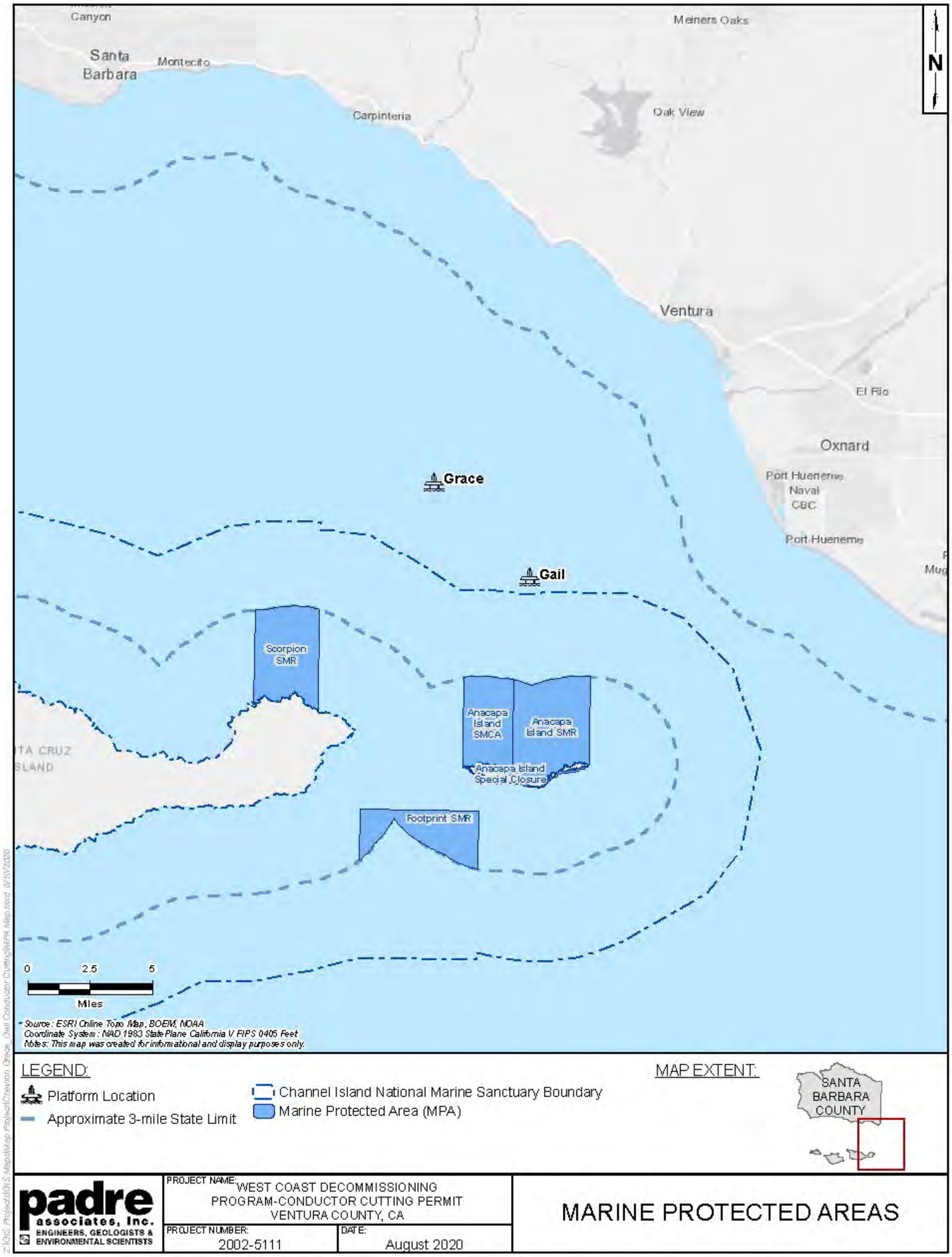


Figure 3.2-3. Marine Protected Areas Near the Project Sites

During conductor cutting operations, there is the potential for the subsurface (15 feet below the mudline) discharge of cutting fluid (i.e., seawater, abrasive materials, steel cuttings) that may cause a short-term disturbance of the sediment around the conductor. As the conductor is pulled towards the surface, there is also the potential for minor amounts of cutting fluid to drift out of the cut site. These discharges will occur intermittently throughout the duration of the Project (120 days at Platform Grace in 2021 and 240 days at Platform Gail in 2023). Turbidity in the water column will increase as the conductor is pulled to the surface, however; due to the 15-foot-deep cutting depth, this majority of cutting fluid will be buried beneath seafloor and disturbance is expected to be minimal.

Potential impacts could also occur as the conductors are pulled from the seafloor and expose the 15-foot-deep footprint of the cut conductor. As natural sediments move to fill the void, suspended sediments will create turbidity that would reduce water clarity and increase sediment deposition. This disturbance would also be localized and short-term, as water conditions and seafloor topography would be expected to return to natural conditions following Project completion. There are no recorded rocky reefs within the Project area; therefore, there will be no disturbance to these sensitive habitats. However, the seafloor disturbances described above have the potential to temporarily displace benthic invertebrate and fish species. Mobile invertebrates and fish species are expected to relocate away from the conductor footprint during cutting and removal activities. It is expected that a percentage of sessile species, such as deep-water anemones, polychaete worms, and bivalves, in the immediate conductor footprint would experience mortality once the conductor is pulled toward the surface. This impact will be very localized, and the area is expected to infill and recolonize with the benthic taxa following Project completion.

Loss of Habitat Structure. Chevron will remove 38 conductors from Platform Grace and 28 conductors from Platform Gail. Removal of the conductor pipes will reduce the surface area of artificial hard substrate by 26 percent for Platform Grace and 17 percent for Platform Gail. The reduction in surface area and complexity has the potential to relocate the fish and invertebrate populations that utilize the area within the conductor footprint to other areas within and around the platform structure.

The removal of the conductors will result in a permanent decrease in available vertical structure and complexity of artificial habitat available within the water column. This reduction is only a small percentage of the existing structure present within the Platform jackets. Removal of the conductors would not result in an adverse effect to regional populations of managed groundfish species.

Noise During Conductor Cutting. During conductor cutting there is the potential for an intermittent increase in underwater noise with the highest potential noise source being at seafloor where the subsurface cutting noise may reverberate through the sedimentary substrate and the conductor string. Abrasive cutting techniques for the initial cut(s) are anticipated to take approximately seven hours per conductor. Mechanical cutting techniques for initial cuts are anticipated to take approximately 12 to 24 hours per conductor, depending on the number of internal strings of pipe that need to be cut. However, in comparison to the use of explosives, the proposed methodology utilizing Iron Silicate Abrasives and/or mechanical cutting methods within the conductors' interior, will significantly reduce the potential underwater noise levels associated with the Project.

Although there are no studies that evaluate noise associated with the use of subsurface abrasive cutting or internal mechanical methods, previous conductor cutting projects have utilized the noise characteristics of diamond wire cutting in conductor removal operations as a surrogate for the anticipated underwater noise levels (BOEM, 2020, Pangerc et al. 2017). BOEM (2020) cited the diamond wire abrasive cutting has an in-water sound source level of 154 decibels (dB) re 1 microPascal (μPa) at one meter from the sound source. This study determined that the noise generated from diamond wire cutting are not easily discernible above the background noise (i.e., vessel and operations noise). Noise generated during Project conductor cutting will be dampened by the 15-feet of sediments above the cut; therefore, received sound levels are expected to be lower than those created during in-water abrasive diamond wire cutting.

As such, noise levels are not expected to be of high enough energy to cause pathological or physiological effects to marine wildlife; however, there is the potential for temporary behavioral changes in the form of avoidance of the deeper water within Project area. Behavioral effects include changes in the distribution, migration, and reproduction behaviors of exposed animals, but are only considered biological significant if the changes in behavior affect growth, survival, and/or reproduction.

Increase in noise levels are expected to be detectable near the seafloor, however, it is not expected the surface water noise levels would be affected by conductor cutting. Nosie levels at the surface will be similar to historic operating levels including vessel activity and general noise from on-going Platform operations. Wildlife that utilize the surface waters, specifically diving birds, dolphin species, and resident sea lions, are not expected to experience high noise levels or display any changes in behavior. Additionally, considering the intermittent nature of the well conductor cutting events at the platforms, as well as the overall reduced spatial and temporal overlap with large marine mammals and sea turtle species during these activities, it is anticipated that noise associated with the proposed action will have negligible effects on marine wildlife (Argonne National Lab, 2019).

Project Lighting. The lighting required to conduct Project activities on a 24/7 schedule will be the same as the existing operations lighting on the Project Platforms. Adverse effects to migrating birds due to the lights on offshore platforms appear to be an infrequent occurrence (Johnson et al., 2011). Interactions between the observed migrating birds and the Platforms appear to be due more to the general patterns of migration rather than platform location or design (Johnson et al., 2011).

The Project Platforms will continue to direct all lighting downward and toward the active working deck to reduce light pollution and any adverse effects to marine wildlife. The Platforms will also continue to follow all navigational safety requirements in accordance with the U.S. Coast Guard (USCG). The effects of lighting from Project activities are not likely to affect marine wildlife that occur in the area.

Vessel Traffic. The OSV *Adele Elise* is the primary vessel planned for use for this Project. The length is 225-feet with a maximum speed of 10.2 knots. A support vessel, the M/V *Jackie C.* will be utilized twice daily for supplies and transport of the crew. The *Jackie C.* currently makes routine runs twice daily to the Platforms in support of current operations. The *Jackie C.* is a 120-foot vessel with a maximum speed of 19 knots. Project activities are currently estimated at 120 days in 2021 for Platform Grace and 240 days in 2023 for Platform Gail. During this time, approximately 48 vessel trips total (16 trips or an average of 1 trip/week for Platform Grace and

32 trips or an average of 1 trip/week for Platform Gail) utilizing the *Adele Elise* will be made from the Platforms to the POLB or Port Hueneme, and the twice daily crew boat trips from Carpinteria (Casitas) Pier to the Platforms using the *Jackie C.* will continue throughout Project.

During these trips, Project vessels will utilize (or continue to utilize) the existing U.S. Coast Guard Traffic Separation Scheme (VTSS) and Joint Oil Fisheries Liaison Office (JOFLO) corridors within the Santa Barbara Channel. During Project-related transit, captains will remain at least 100 m away from all sighted whale species, and 50 m away from dolphins and sea turtles. Prior to transiting to and from POLB/POLA or Port Hueneme, the primary Project vessel will review the current whale presence rating within the Santa Barbara Channel shipping lanes using the online tools at Whalesafe.com. If the daily whale presence is reported to be above a medium rating within the transit corridor, then the vessel will transit at a reduced speed of 10 knots or less (11.5 mph or 18.5 km/h). Due to the small size of the proposed Project vessels, in combination with the use of established vessel traffic lanes, vessel strikes with marine wildlife are not expected to occur.

Oil Spill Potential. Prior to the Project, as part of the well plug and abandonment program, each well will be plugged in accordance with BSEE regulations; therefore, there is no potential for hydrocarbon release from the Project Platforms' wells.

The unintentional release of petroleum into the marine environment from proposed Project activities is limited to Project vessels and equipment. A petroleum release could result in potential impacts to the marine biota, particularly avifauna and early life stage forms of fish and invertebrates, which are sensitive to those chemicals. Refined products (i.e., diesel, gasoline.) are more toxic than heavier crude or Bunker-type products, and the loss of a substantial amount of fuel or lubricating oil during survey operations could affect the water column, seafloor, intertidal habitats, and associated biota, resulting in their mortality or substantial injury, and in alteration of the existing habitat quality.

Although many marine organisms have created adaptive strategies to survive in their environment, when these marine organisms are introduced to oil, it adversely affects them physiologically. For example, physiological effects from oil spills on marine life could include the contamination of protective layers of fur or feathers, loss of buoyancy, and loss of locomotive capabilities. Direct lethal toxicity or sub-lethal irritation and temporary alteration of the chemical make-up of the ecosystem could also occur.

Project activities are not expected to have long-term, significant effects on open water habitat. Platform-specific oil spill contingency and response plans have been developed and will be used to direct the containment and recovery of any Project-related vessel spills that would have the potential to be accidentally released into the marine waters. In addition, onboard and supporting equipment and the procedures specified in the spill plan are expected to reduce the effects of accidentally discharged petroleum by facilitating rapid response and cleanup operations. The Project vessels will adhere to a zero-discharge policy. Due to the small size of the proposed Project vessels, in combination with the use of established vessel traffic lanes, the potential release of fuel and its resulting impacts are not likely to affect marine wildlife.

The following measures have been incorporated into the Project design and will be implemented during Project during construction to minimize potential impacts to marine biological resources:

Measures to Reduce Potential Impacts:

- Conductor cutting and removal activities will be conducted in accordance with Bureau of Safety and Environmental Enforcement (BSEE) Requirements (30 CFR Part 250.1710-1723) for decommissioning activities associated with the existing operational plans at Platforms Grace and Gail.
- As part of the well plug and abandonment program, the wellheads will have been removed and each well plugged in accordance with BSEE regulations prior to conductor cutting/removal activities.
- Conductor cutting and removal activities have been scheduled in one phase at each Platform to minimize Project timing and associated impacts.
- No anchoring has been proposed to minimize potential seafloor disturbance.
- Chevron has designed the Project to utilize internal conductor cutting methodologies to minimize potential noise impacts and potential discharges.
- Initial conductor cuts will be performed approximately 15 feet below mudline to minimize turbidity.
- Existing marine growth on the conductors will be cleared prior to conductor removal activities.
- Chevron will implement its existing agency-approved Oil Spill Contingency and Response Plans and Hazardous Materials Management Plans for both Platform Grace and Gail. These plans will be used to direct the containment and recovery of Project-related petroleum products in the event that they are accidentally released into the marine waters. Each Project vessel will have supporting spill kit equipment and will implement procedures specified in the spill plan to reduce the effects of accidentally discharged petroleum by facilitating rapid response and cleanup operations. The Project vessels will adhere to a zero-discharge policy.

3.2.3 Commercial Fishing

The California Department of Fish and Wildlife (CDFW) maintains the fish block data that is generated by commercial catch records that are provided to the agency by fish buyers. The location of the catch is reported by fish block a grid system that has been established by CDFW. Platform Grace is located within Fish Block 665 and Platform Gail is located within Fish Block 684 (Figure 3.2-4).

As shown in Table 3.2-8, most fish caught within Fish Block 665 (Platform Grace) between 2015-2019 includes ridgeback prawn, market squid, white seabass, halibut, and crab. In Fish Block 684 (Platform Gail), most fish caught between 2015-2019 include market squid, mackerel, lobster, sea urchin and crab. Table 3.2-9 shows that Fish Block 665 has had between 28-47 commercial fishing vessels reporting catch from 2015-2019 and Fish Block 684 has had between 22-33 commercial fishing vessels reporting catch from 2015-2019.

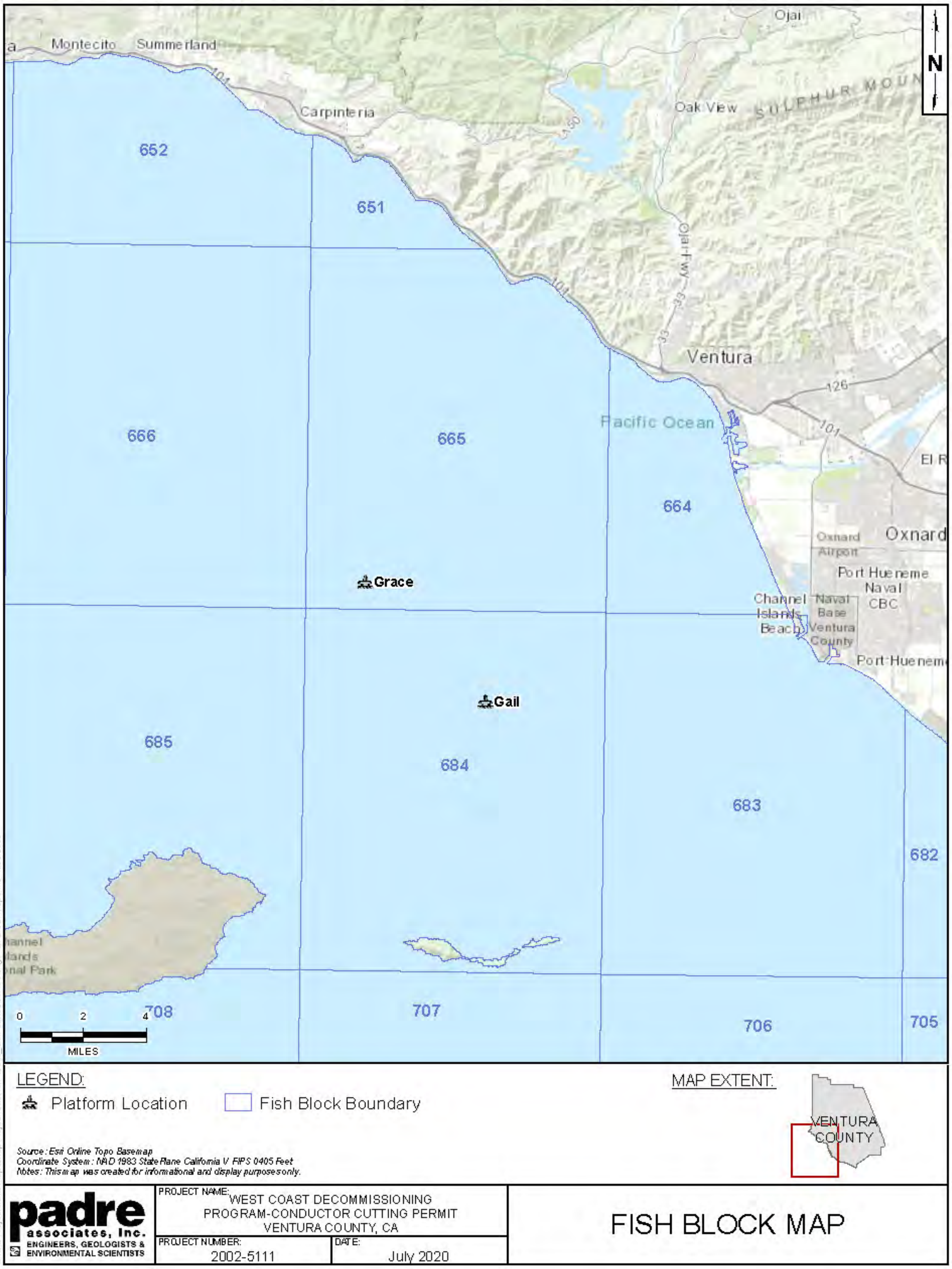


Figure 3.2-4. CDFW Fish Blocks at Platforms Grace and Gail

Table 3.2-8. Summary of Fish Block Catch Data (2015-2019) – Top 5 Species by Volume

Year	Fish Block	Species	Pounds	Value
2015	665	Prawn ridgeback	192,075	$474,125
		Squid market	82,693	$19,153
		Seabass white	65,067	$269,161
		Halibut California	35,815	$166,714
		Crab yellow rock	33,407	$3,183
	684	Squid market	83,192	$20,798
		Mackerel jack	55,529	$4,442
		Mackerel Pacific	41,893	$3,354
		Lobster California spiny	28,707	$607,426
		Crab yellow rock	8,436	$14,689
2016	665	Prawn ridgeback	49,865	$117,426
		Squid market	46,399	$23,887
		Seabass white	35,635	$145,013
		Halibut California	34,894	$168,228
		Crab yellow rock	32,310	$6,253
	684	Squid market	1,918,690	$959,337
		Lobster California spiny	24,209	$474,398
		Sea urchin red	6,615	$13,917
		Crab yellow rock	3,282	$5,744
		Sheephead California	1,695	$8,212
2017	665	Squid market	209,165	$104,533
		Prawn ridgeback	94,104	$219,591
		Crab yellow rock	44,399	$40,293
		Seabass white	44,032	$196,119
		Halibut California	39,211	$212,329
	684	Squid market	648,079	$324,040
		Lobster California spiny	24,408	$470,552
		Sea urchin red	10,333	$16,343
		Mackerel Pacific	5,220	$261
		Halibut California	1,878	$11,268
2018	665	Squid market	120,461	$60,319
		Crab yellow rock	63,516	$62,149
		Seabass white	54,638	$244,472
		Prawn ridgeback	41,040	$115,989
		Halibut California	33,681	$150,187
	684	Squid market	445,812	$222,133
		Ray bat	54,630	$27,315
		Lobster California spiny	24,685	$431,488
		Sea urchin red	2,982	$2,961
		Mackerel Pacific	1,958	$98
2019	665	Crab yellow rock	74,885	$96,677
		Halibut California	57,450	$290,019
		Squid market	30,367	$15,476
		Seabass white	29,541	$145,564
		Lobster California spiny	24,141	$327,651

Year	Fish Block	Species	Pounds	Value
	684	Squid market	232,377	$116,189
		Lobster California spiny	33,443	$454,820
		Sea urchin red	11,277	$10,842
		Halibut California	6,613	$42,520
		Sea cucumber warty	5,428	$12,428

Table 3.2-9. Number of Commercial Fishing Vessels Reporting Catch (2015-2019) within Fish Blocks

Year	Fish Block 665	Fish Block 684
2015	47	24
2016	28	33
2017	44	22
2018	32	24
2019	30	26

Commercial and recreational fishing operations are expected to be limited within the Project site as proposed activities will occur within an area that currently supports existing pipelines and platforms. Existing platform safety zones extend for 500 meters (1,640 feet) from the outer edges of Platforms Grace and Gail. Project activities would be centralized at each Platform during conductor cutting, removal, and loading and are not anticipated to preclude any additional area outside of the existing safety zones that would have the potential to impact commercial fishing operations.

Although no effect to commercial fishing is anticipated, the following procedures will be instituted to further reduce the possibility of negative effects on the commercial fishing industry and recreational fishing opportunity.

Measures to Reduce Potential Impacts:

- Conductor cutting and removal activities have been scheduled in one phase at each Platform to minimize Project timing and associated impacts.
- No anchoring has been proposed to minimize potential seafloor disturbance.
- Project vessels shall use established oil and gas and/or Joint Oil Fisheries Liaison Office corridors to the maximum extent feasible.
- At all times, Project vessels will operate using the highest level of navigational safety and in accordance with International and USCG regulations and guidelines.

3.2.4 Cultural Resources

Underwater archaeological resources are defined as submerged sites having some cultural affiliation. These can take the form of submerged prehistoric sites, isolated prehistoric artifacts; or can be submerged historic shipwrecks, or pieces of ship components, such as cannons or guns.

A high-resolution seafloor survey of the Project area was conducted by BOEM in 2004 and 2005 (USGS, 2004). As indicated in the survey results, approximately 98% of the mapped seafloor was noted to be covered in unconsolidated sandy mud. Additionally, Fugro conducted a geophysical survey for Platform Grace in 2006. This survey confirmed that the seafloor in the Project area is smooth and featureless except for the presence of sand ripples and a bedrock outcrop along the shelf break. The results of a marine archaeological survey within the Platform Grace Project area (Crystal Energy, 2006) indicate that there are no documented significant prehistoric or historic sites located within the proximity of the Platform. None of the small features identified within a 5-mile radius of the Platform were determined within the marine archaeological study as possessing sufficient horizontal extent or complexity to represent potentially significant cultural resources.

Although the 2006 Fugro survey did not include Platform Gail, this area was evaluated for cultural and archaeological resources prior to installation. As noted within the original Platform installation assessment (Westec, 1986), based on a review of a previous geotechnical survey conducted in 1981, there are no identifiable prehistoric cultural resources present in the area of the Platform or pipeline corridors. Smaller targets were identified as linear features such as cables, anchor drag marks, and existing pipeline and other low relief potential outcrop areas.

The OSV *Adele Elise* will be self-positioned during loading and prior to transport to the POLB or Port Hueneme. If necessary, the OSV *Adele Elise* and M/V *Jackie C* will moor at the mooring cans located at both Platforms while waiting for loading to commence. The only seafloor disturbance that would occur as part of the Project would be subsurface during the initial cuts at each conductor and localized turbidity that would occur while the conductor is being jacked to the surface. Since these disturbances are subsurface and highly localized, in addition to recent subsurface data indicating that cultural resources have not been identified within the Platform jacket areas; it is not anticipated that impacts to cultural resources would result from the proposed conductor cutting activities.

The following measures have been incorporated into the Project design and will be implemented during Project during construction to minimize potential impacts to cultural resources:

<u>Measures to Reduce Potential Impacts</u>

- Conductor cutting and removal activities have been scheduled in one phase at each Platform to minimize Project timing and associated impacts.
- No anchoring has been proposed to minimize potential seafloor disturbance.

3.2.5 Geology

Platforms Grace and Gail are located on the Ventura Shelf and lie within the offshore extension of California's Transverse Ranges Geomorphic Province. The geology of southern Ventura County is dominated by the Ventura Basin, a sedimentary trough that extends westward into the Santa Barbara Channel. The offshore Project area is situated on the Ventura Mainland Shelf, which with the Mugu Shelf to the south and separated by Hueneme Canyon, forms the offshore extension of the Oxnard Plain. The Ventura Mainland Shelf is underlain by a thick accumulation of fluvial and deltaic deposits.

Several geophysical surveys have been conducted within the past 20 years within the vicinity of the Platforms. The following information has been summarized based upon information provided within the following surveys:

- MMS, 2001. Multibeam Hydrographic Survey Around and Under Oil Platforms in the Santa Barbara Channel and Santa Maria Basin, California.
- MMS, 2003. FINAL REPORT - An Assessment and Physical Characterization of Shell Mounds Associated with Outer Continental Shelf Platforms Located in the Santa Barbara Channel and Santa Maria Basin, California.
- MMS, 2005. MMS FEASIBILITY STUDY FINAL REPORT – Sampling of Outer Continental Shelf Shell Mounds Associated with Platforms Located in the Santa Barbara Channel and Santa Maria Basin.
- Crystal Energy, 2006. Marine Biological Survey of SSP Area (Platform Grace) – Clearwater Port Project.

The results of these multibeam surveys indicate that the largest and most detectable seafloor shell talus areas are found under platforms that are located in shallow, flat bottom areas (<350' depth and <1% slope). Concentrations will be found under any platform with fouling organisms, but in deeper waters, currents tend to be stronger and the "fall time" of shells and muds is longer so that these materials are dispersed over a broader area. Platform age also may reflect the chemical characteristics of these areas because the types and quantities of drilling mud additives permitted for discharge by the regulatory agencies have changed over time.

Platform Grace. The seafloor at and around Platform Grace is sedimentary, comprised of medium to fine grain sand and silts. Areas of "coarse grain sediments" and "scattered rock" habitats are documented in historical and recent reports in two areas, one approximately 200 ft (61 m) south and the other 1,250 ft (381 m) southwest of the Platform, respectively. The seafloor around the platform gradually slopes down towards the south (estimated 0.38% bottom slope).

Historic removal and deposition of fouling organisms on the seafloor has created mid- to low-relief habitat comprised primarily of fragments of mussel shells (*Mytilus* sp.). This habitat area under the Platform's measures approximately 78,000 square feet (ft^2) (7,246 square meters [m^2]) on the northwest side of the Platform footprint and is approximately 13 ft (4 m) tall. The area has a volume of approximately 5,500 cubic yards.

Platform Gail. According to the 2001 MMS survey, the seafloor around Platform Gail has a 1.5% downward slope towards the south-southwest, but the platform appears to influence the bathymetry because several upslope contours (-738' to –741' MLLW) dip under the platform.

The seafloor around Platform Gail is also primarily sedimentary; however, the shell fragments that have accumulated beneath the Platform are lower relief and smaller area than around Platform Grace. MEC Analytical (2003) estimated that there are four identifiable areas of low relief habitat under Platform Gail which are approximately two to three feet tall, the largest of which measures 40 by 60 ft (12 to 18 m) at its base. The total volume of this area under Platform Gail was estimated to be less than 500 cubic yards.

The proposed conductor removal activities do not include any components that would have an effect on local or regional geology. Potential Project impacts are limited to very minor seafloor disturbance to sediments, which are anticipated to settle in a short period of time following completion of each conductor removal.

The following measure have been incorporated into the Project design and will be implemented during Project during construction to minimize potential impacts:

Measure to Reduce Potential Impacts

- No anchoring has been proposed to minimize seafloor disturbance.

3.2.6 Hazardous Materials and Risk of Upset

Regionally, offshore sediment quality was surveyed within the 2013 Southern California Bight Monitoring Program which found that about 94% of the assessed seafloor area was un-impacted, with 6% possibly impacted, and only 0.2% likely impacted (BOEM, 2019).

At the Project sites, the conductor cutting activities will not begin until after all wells on a Platform have been temporarily abandoned, per BSEE regulations, including an assessment of the wellhead and well bore to ensure there is no pressure in the well and all process tanks and vessels are flushed and purged. Therefore, no hazardous materials will remain in the well casing that would have the potential to interact with Project personnel or the environment. Other Platform-based equipment will be utilized to perform the conductor cutting that requires small quantities of petroleum hydrocarbons including fuels, hydraulic fluids, and oils. Short-term use of this equipment during the conductor cutting Project has the potential for incidental spills, however measures outlined below and within each Platform's existing Hazardous Materials Management Plan (including, but not limited to use of secondary containment, best management practices for storage and fueling, and onsite spill response materials) would reduce the potential for spills to the marine environment.

Operation of the OSV *Adele Elise* supporting the conductor removal activity would also involve the use of petroleum hydrocarbons, including small volumes of lubricating oils, hydraulic fluids, and waste oils. The incidental spillage of these materials could result in their release to the marine environment. However, the work vessel maintains its own Oil Spill Response Plan and will have spill containment and cleanup equipment on board in the event of a spill. If an oil spill to the ocean occurs from the vessel, Chevron will respond and assist the vessel in accordance with its agency-approved Oil Spill Response Plan for the SCU. Response procedures for an incident include mobilization of an onsite response team at the Platforms, and, if necessary, deployment of vessels from an offshore spill response organization (OSRO). Effects to the marine environment are not anticipated.

The following measures have been incorporated into the Project design and will be implemented during Project during construction to minimize potential impacts from the use and storage of hazardous materials:

Measures to Reduce Potential Impacts:

- Conductor cutting and removal activities will be conducted in accordance with Bureau of Safety and Environmental Enforcement (BSEE) Requirements (30 CFR Part 250.1710-1723) for decommissioning activities associated with the existing operational plans at Platforms Grace and Gail.
- As part of the well plug and abandonment program, the wellheads will have been removed and each well plugged in accordance with BSEE regulations prior to conductor cutting/removal activities.
- Conductor cutting and removal activities have been scheduled in one phase at each Platform to minimize Project timing and associated impacts.
- No anchoring has been proposed to minimize potential seafloor disturbance.
- Chevron has designed the Project to utilize internal conductor cutting methodologies to minimize potential noise impacts and potential discharges.
- Initial conductor cuts will be performed approximately 15 feet below mudline to minimize turbidity.
- Chevron will implement its existing agency-approved Oil Spill Contingency and Response Plans and Hazardous Materials Management Plans for both Platform Grace and Gail. These plans will be used to direct the containment and recovery of Project-related petroleum products in the event that they are accidentally released into the marine waters. Each Project vessel will have supporting spill kit equipment and will implement procedures specified in the spill plan to reduce the effects of accidentally discharged petroleum by facilitating rapid response and cleanup operations. The Project vessels will adhere to a zero-discharge policy.
- To reduce incidental fueling spills, Chevron shall refuel all vessels involved in the Project at existing onshore fueling facilities (e.g., ports/piers). There shall be no boat-to-boat fuel transfers.

3.2.7 Transportation

The existing offshore facilities consist of two platforms (Platforms Grace and Gail) located in Federal waters, between approximately 10-10.5 miles offshore. A Traffic Separation Scheme (TSS) manages vessel traffic in the Project region. The TSS is a voluntary route of separate opposing flows of vessel traffic with an additional empty safety lane. For smaller oil and gas industry vessels using the Santa Barbara Channel, the Joint Oil Fisheries Liaison Office (JOFLO) has also established transportation corridors directly from offshore platforms to the onshore ports, harbors and piers from which crew and supplies are conveyed.

The Santa Barbara Channel region is heavily transited by large commercial vessels traveling into and out of the POLA/POLB, which are two of the nation’s busiest ports. Thousands of cargo ships transit through the region each year. The 2013 total vessel count within the region had a high of 4,485 vessels (Channel Islands National Marine Sanctuary Advisory Council, 2016). In 2018/2019, Port Hueneme had approximately 1,815 vessels utilize the Port, primarily fishing and shallow draft vessels (Port Hueneme Harbor Safety Committee, 2019).

Onshore, if the Port Hueneme Recycling Alternative is chosen, trucks would need to transit from Port Hueneme northward on Victoria Avenue to Standard Industries in Saticoy. Victoria Avenue is a principal arterial roadway within the County, and averages approximately 55,000 (and up to 61,000) daily trips (VCRMA, 2007). If the alternative route is chosen, trucks would utilize Pleasant Valley Road to Rice Avenue. Rice Avenue is parallel to Victoria Avenue, and is a major collector and primary roadway within the County with an estimated traffic volume of up to approximately 42,000 trips per day (VCRMA, 2005). A study conducted in 2008 analyzed existing traffic conditions and areas of congestion caused by trucks traveling on local arterial roadways from Port Hueneme to Oxnard found that these two roadways experience some of the highest daily truck volumes and traffic within the area. A peak hour study indicated that the Victoria Avenue and Channel Islands Boulevard intersection does not operate at an acceptable level of service within the peak p.m. (typically within 4-6 p.m.) timeframe, and Rice Avenue at both the Gonzales Road intersection and U.S.-101 Southbound ramp intersection does not operate at an acceptable level of service during the a.m. peak hour (typically within 7-9 a.m.), and both peak hours; respectively (SCAG, 2008).

The Project includes conductor cutting, retrieval, and transport for recycling/disposal. These construction activities would include a minor increase in temporary offshore vessel traffic for approximately 360 days (120 days for Platform Grace in 2021 and 240 days for Platform Gail in 2023). During these timeframes, the existing *Jackie C.* crew boat currently servicing the Platforms will continue its existing schedule to run to the Platforms two times per day.

Approximately 48 additional trips will be required to transport recovered conductor material from the Platforms: 16 trips (averaging approximately 1 trip/week) for conductors from Platform Grace and 32 trips (averaging approximately 1 trip/week) for conductors from Platform Gail. Under the POLB (SA Recycling) Alternative, it is estimated that the OSV *Adele Elise* will take approximately 10 hours (one way) to transit 100 nm from Platform Grace or 90 nm from Platform Gail to SA Recycling (or equivalent) in the POLB. The conductor pipe will be offloaded at SA Recycling within the POLB for separation and recycling. No further transport would be required.

As an alternative to transport to and recycling within the POLB, the OSV *Adele Elise* could alternatively take the cut conductors to Port Hueneme for onshore transit to Standard Industries (or equivalent) in Ventura County, California. It anticipated that it would take approximately 3 hours (one way) to go 31 nm from Platform Grace or 21 nm from Platform Gail to Port Hueneme. Once offloaded in Port Hueneme, the conductors will be trucked to Standard Industries (or equivalent) located in Saticoy, Ventura County, California for recycling. Based on a maximum single truck weight of 44,000 lbs, it is estimated that approximately 375 truck trips total to Standard Industries (125 for Grace conductors and 250 for Gail conductors) would be required. The maximum truck trips would be 8-10 trips from Port Hueneme to Saticoy resulting from a weekly offload, depending on truck availability and loading/unloading speed. More than likely these trips would be spread over 2 days within the week timeframe. The anticipated transportation routes from Port Hueneme to Saticoy would be northward on Victoria Avenue and then eastward onto Vineyard Avenue to access the industrial area of Saticoy (Standard Industries). Alternative routing could be northwest on Pleasant Valley Road and northward Rice Avenue to avoid populated areas or peak traffic conditions.

As shown in Figures 2.2-7 and 2.2-8, Project vessels would be required to adhere to existing oil and gas industry vessel corridors (including TSS and JOFLO as appropriate) while traveling directly from offshore Project platforms to the onshore ports, harbors, and piers from which crew and supplies are conveyed. The crew boat will continue to utilize the JOFLO corridors established for its twice daily runs.

Onshore, the addition of 8-10 trips over 2 workdays within 16 weeks in 2021 and 32 weeks in 2023 is anticipated to result in a negligible increase in onshore traffic. However, since these roadways are already identified as areas of existing traffic congestion during peak hours; transport of conductor materials would be scheduled to avoid peak traffic periods (7-9 a.m. and 4-6 p.m.) to the extent feasible to avoid contributing to onshore traffic impacts.

Following completion of the Project, transportation conditions would return to pre-Project levels. No additional impacts to offshore or onshore transportation are anticipated as a result of the Project.

The following measures have been incorporated into the Project design and will be implemented during Project during construction to minimize potential impacts to offshore and onshore transportation:

<u>Measures to Reduce Potential Impacts:</u>

- Conductor cutting and removal activities have been scheduled in one phase at each Platform to minimize Project timing and associated impacts.
- Project vessels shall use established oil and gas and/or Joint Oil Fisheries Liaison Office corridors to the maximum extent feasible.
- If the Port Hueneme Recycling Alternative is utilized, transport of cut conductor materials would be scheduled to avoid peak traffic periods (7-9 a.m. and 4-6 p.m.) to the extent feasible to avoid contributing to onshore traffic impacts.

3.2.8 Water Quality

Offshore water quality is determined by several factors, including natural seawater properties such as transparency and turbidity, oxygen, nutrients, and trace metals. Water Quality within the Santa Barbara Channel is generally good due to relatively low population and lack of major industrial pollutant inputs. The 1994 Southern California Bight Pilot Project found water quality to be good overall throughout the Southern California Bight. More than 99% of the SCB met California Ocean Plan waste quality objectives for dissolved oxygen and clarity (BOEM, 2019).

Produced water from the Project is currently discharged in accordance with the National Pollutant Discharge Elimination System (NPDES) General Permit for Offshore Oil and Gas Exploration, Development, and Production Operations for Southern California (Permit No. CAG 280000) that was granted continued permit coverage by the EPA in 2019. Maximum annual allowed produced water discharges under this permit for Platform Grace is 2,190,000 (barrel) bbl, and for Platform Gail is 4,380,000 bbl.

Potential impacts to water quality would be limited to the resuspension of sediment material during conductor cutting, cleaning, and removal operations and potential discharges of hydrocarbons from Project vessels or equipment. Potential discharges from Project vessels and/or equipment is discussed further in Section 3.2.6 (Hazardous Materials and Risk of Upset) and Section 3.2.2 (Marine Biological Resources).

Localized seafloor sediments and compounds within the sediments would be temporarily disturbed during conductor preparation/cutting/retrieval, resulting in temporary increased turbidity within the immediate Project work areas. Prior to removal, the external conductor surface will be cleaned of naturally occurring marine growth. As epibiota is detached from each conductor it will fall to the sea floor. For the duration of the Platforms' production operations, BSEE regulations required operations of offshore platforms to clear marine growth from shallow, submerged portions of the Platforms on a regular basis to reduce structure fatigue. The cleaning process is anticipated to result in some increased turbidity as these materials fall through the water column and again as it reaches the seafloor. The suspended materials will rapidly disperse once the cleaning operation is completed.

During the initial phase of conductor cutting operations, there is the potential for the subsurface (15 feet below the mudline) discharge of cutting fluid (i.e., seawater, abrasive materials, steel cuttings) that may cause a short-term disturbance of the sediment around the conductor. As the conductor is pulled towards the surface, there is also the potential for minor amounts of cutting fluid to drift out of the cut site. These discharges will occur intermittently throughout the duration of the Project (120 days at Platform Grace in 2021 and 240 days at Platform Gail in 2023). Turbidity in the water column will increase as the conductor is pulled to the surface, however; due to the 15-foot-deep cutting depth, this majority of cutting fluid will be buried beneath seafloor and disturbance is expected to be minimal.

Potential impacts could also occur as the conductors are pulled from the seafloor and expose the 15-foot-deep footprint of the cut conductor. As natural sediments move to fill the void, suspended sediments will create turbidity that would reduce water clarity and increase sediment deposition. This disturbance would also be localized and short-term, as water conditions and seafloor topography would be expected to return to natural conditions following Project completion.

The following measures have been incorporated into the Project design and will be implemented during Project during construction to minimize potential impacts to water quality:

Measures to Reduce Potential Impacts:

- Conductor cutting and removal activities will be conducted in accordance with Bureau of Safety and Environmental Enforcement (BSEE) Requirements (30 CFR Part 250.1710-1723) for decommissioning activities associated with the existing operational plans at Platforms Grace and Gail.
- As part of the well plug and abandonment program, the wellheads will have been removed and each well plugged in accordance with BSEE regulations prior to conductor cutting/removal activities.
- Conductor cutting and removal activities have been scheduled in one phase at each Platform to minimize Project timing and associated impacts.

- No anchoring has been proposed to minimize potential seafloor disturbance.
- Chevron has designed the Project to utilize internal conductor cutting methodologies to minimize potential noise impacts and potential discharges.
- Initial conductor cuts will be performed approximately 15 feet below mudline to minimize turbidity.
- Existing marine growth on the conductors will be cleared prior to conductor removal activities.
- Chevron will implement its existing agency-approved Oil Spill Contingency and Response Plans and Hazardous Materials Management Plans for both Platform Grace and Gail. These plans will be used to direct the containment and recovery of Project-related petroleum products in the event that they are accidentally released into the marine waters. Each Project vessel will have supporting spill kit equipment and will implement procedures specified in the spill plan to reduce the effects of accidentally discharged petroleum by facilitating rapid response and cleanup operations. The Project vessels will adhere to a zero-discharge policy.
- To reduce incidental fueling spills, Chevron shall refuel all vessels involved in the Project at existing onshore fueling facilities (e.g., ports/piers). There shall be no boat-to-boat fuel transfers.

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Attachment H
SDS Sharpshot Abrasive

SAFETY DATA SHEET

Section 1. IDENTIFICATION

PRODUCT: SHARPSHOT® Iron Silicate Abrasives

Composition: Iron Silicate (Complex silicates and oxides of iron, silica, calcium, and aluminum)
Product Use: Abrasive air-blasting media

Manufacturer: Minerals Research, Inc.
4620 South Coach Drive
Tucson, Arizona 85714

Creation Date: 3/16
Revision Date:

For Additional Information, Contact:
Minerals Research, Inc.
(520) 748-9362 Phone
(520) 748-9364 Fax

Section 2: HAZARDS IDENTIFICATION

Proper precautions should be taken to avoid any health hazard. A health hazard may occur if limits for air contaminants exceed PEL limits as per 29 CFR 1910.1000. Proper engineering controls and ventilation should be used to prevent air contaminants from exceeding PEL limits. NIOSH-approved respirators should be used during all abrasive blasting operations. (See below for information on potentially hazardous elements)

Usual Route (s) of Entry: Inhalation of dust during handling or use
Medical Conditions Possibly Aggravated By Exposure: Chronic diseases or disorders of the respiratory system.

Please note that this product may contain the following chemical components in quantities less than 1% by weight. Under extreme conditions (e.g. sandblasting in a confined space without sufficient ventilation), OSHA PELs or ACGIH TLV's could be exceeded. In these situations, employee exposure monitoring should be performed to determine exposure levels.

Component	CAS #	Fed OSHA PEL (mg/m^3)	CA OSHA PEL (mg/m^3)	ACGIH TLV (mg/m^3)
Arsenic (As)	7440-38-2	0.01	0.01	0.01
Cadmium (Cd)	7440-43-9	0.2	0.2	0.01
Chromium (Cr)	7440-47-3	1	0.5	0.5
Cobalt (Co)	7440-48-4	0.1	0.02	0.02
Copper (Cu)	7440-50-8	1	0.1	1
Lead (Pb)	7439-92-11	0.05	0.05	0.05
Mercury (Hg)	7439-97-6	-	-	0.1 (skin)
Molybdenum (Mo)	7439-98-7	15	10 (inh); 3 (resp)	10 (inh); 3 (resp)

Selenium (Se)	7782-49-2	0.2	0.2	0.2
Vanadium (Vn)	1314-62-1	0.5 (resp)	0.05 (resp)	0.05 (resp)
Zinc (Zn)	1314-13-2	5 (resp)	5 (resp)	2 (resp)
Crystalline Silica (SiO_2)	480-86-07	14.2 (resp = 4.7)	0.3 (resp = 0.1)	0.05 (resp)

Section 3: COMPOSITION/INFORMATION ON INGREDIENTS

Composition: Iron Silicate (complex silicates and oxides of iron, silica, calcium, and aluminum)

Component	CAS #	Typical % Weight
Iron Oxide (Fe_2O_3)	1309-37-1	40-50
Silicates (amorph. SiO_2)	7440-21-3	35-45
Alpha-Alumina (Al_2O_3)	1344-28-1	5-10
Calcium oxide (CaO)	1305-78-8	3-8
Magnesium oxide (MgO)	1309-48-4	1-3
Potassium oxide (K_2O)	12136-45-7	<1

Please note that this product may contain the following chemical components in quantities less than 1% by weight.

Component	CAS #	Typical % Weight
Arsenic (As)	7440-38-2	<0.007
Barium (Ba)	7440-39-3	<0.005
Cadmium (Cd)	7440-43-9	<0.0008
Chromium (Cr)	7440-47-3	<0.0012
Cobalt (Co)	7440-48-4	<0.004
Copper (Cu)	7440-50-8	<0.18
Lead (Pb)	7439-92-11	<0.009
Molybdenum (Mo)	7439-98-7	<0.0005
Selenium (Se)	7782-49-2	<0.001
Vanadium (Vn)	1314-62-1	<0.003
Zinc (Zn)	1314-13-2	<1
Crystalline Silica (SiO_2)	480-86-07	<0.5

Footnotes:

(1) See last page for important additional terms and conditions including disclaimer of warranties.

(2) Concentration may vary somewhat between batches or lots. Where possible, a concentration range is indicated. Occasionally, however, levels may even fall outside of the typical concentration range.

Section 4: FIRST AID MEASURES

Eye Contact: Not anticipated to pose an acute or significant eye contact hazard. In the event of eye contact, flush eyes with generous amounts of water.

Skin Contact: Not anticipated to pose an acute or significant skin contact hazard. Wash with soap and water as needed to remove from skin

Inhalation: Not anticipated to pose an acute or significant inhalation hazard if proper work practices are employed to maintain dust exposure below OSHA PEL's. If overexposure occurs, remove individual to area with fresh air until symptoms cease.

Ingestion: Not considered to be an ingestion hazard.

Section 5: FIRE FIGHTING MEASURES

Flash Point:	NA	Lower Explosive Limit:	NA
Auto-ignition Temperature:	NA	Upper Explosive Limit:	NA
Fire Hazard:	NA	Explosion Hazard:	NA
Extinguishing Media:	NA	Special Fire Fighting Procedures:	NA
Unusual Fire and Explosion Hazards:	NA		

Section 6: ACCIDENTAL RELEASE MEASURES

Procedures to Follow if Material is Released or Spilled: Using appropriate personnel protective equipment, material should be swept or vacuumed or otherwise collected into appropriate containers.
Waste Disposal Method(s): Landfill disposal or other methods that are in accordance with local, state and federal regulations. MRI testing has shown that virgin (unused and uncontaminated) material does not exceed the Toxicity Characteristic Leaching Procedure (TCLP) hazardous waste limits per 40 CFR 261.3. Used or contaminated material should be tested in accordance with 40 CFR 262.11 or any applicable local or state regulations to determine if it is a hazardous waste and disposed of accordingly.

Section 7: HANDLING AND STORAGE

Handling Procedures: Use care to minimize airborne dust generation during handling, and use adequate ventilation and/or dust collection.

Storage: Keep product dry - store product indoors or cover completely to protect from moisture prior to use. Wet material will cause clumping and clogging of abrasive blasting equipment.

Section 8: EXPOSURE CONTROL/PERSONAL PROTECTION

Engineering Controls (Ventilation, etc.) : Ventilation should be sufficient to maintain dust levels below applicable exposure limit.
Work Practices (Handling and Storage, etc.): Avoid creating airborne dust during handling and use.
Eye Protection: Safety glasses, goggles or face shields are recommended during abrasive blasting or when dust levels are excessive.
Skin Protection: Gloves and long-sleeved clothing are recommended during abrasive blasting or when dust levels are excessive.
Respiratory Protection: When engineering controls are not sufficient to lower dust levels below the applicable exposure limit, use a NIOSH-approved respirator. NIOSH-approved respirators should be used during all abrasive blasting operations in accordance with 29 CFR 1910.134 (OSHA Respiratory Protection Program).

Component	CAS #	Typical % Weight	Fed OSHA PEL (mg/m^3)	CA OSHA PEL (mg/m^3)	ACGIH TLV (mg/m^3)
Iron Oxide (Fe_2O_3)	1309-37-1	40-50	10	5	5
Silicates (amorph. SiO_2)	7440-21-3	35-45	1.8	6 (resp = 3)	10
Alpha-Alumina (Al_2O_3)	1344-28-1	5-10	15 (resp =5)	10 (resp = 5)	1 (resp)
Calcium oxide (CaO)	1305-78-8	3-8	5	2	2
Magnesium oxide (MgO)	1309-48-4	1-3	15	10	10
Potassium oxide (K_2O)	12136-45-7	<1	15	10	10

Please note that this product may contain the following chemical components in quantities less than 1% by weight. Under certain conditions (e.g. sandblasting in a confined space without sufficient ventilation), OSHA PELs or ACGIH TLV's could be exceeded. In these situations, employee exposure monitoring should be performed to determine exposure levels.

Component	CAS #	Fed OSHA PEL (mg/m^3)	CA OSHA PEL (mg/m^3)	ACGIH TLV (mg/m^3)
Arsenic (As)	7440-38-2	0.01	0.01	0.01
Cadmium (Cd)	7440-43-9	0.2	0.2	0.01
Chromium (Cr)	7440-47-3	1	0.5	0.5
Cobalt (Co)	7440-48-4	0.1	0.02	0.02
Copper (Cu)	7440-50-8	1	0.1	1
Lead (Pb)	7439-92-11	0.05	0.05	0.05
Mercury (Hg)	7439-97-6	-	-	0.1 (skin)
Molybdenum (Mo)	7439-98-7	15	10 (inh); 3 (resp)	10 (inh); 3 (resp)
Selenium (Se)	7782-49-2	0.2	0.2	0.2
Vanadium (Vn)	1314-62-1	0.5 (resp)	0.05 (resp)	0.05 (resp)
Zinc (Zn)	1314-13-2	5 (resp)	5 (resp)	2 (resp)
Crystalline Silica (SiO_2)	480-86-07	14.2 (resp = 4.7)	0.3 (resp = 0.1)	0.05 (resp)

Footnotes:
(1) See last page for important additional terms and conditions including disclaimer of warranties.
(2) Concentration may vary somewhat between batches or lots. Where possible, a concentration range is indicated. Occasionally, however, levels may even fall outside of the typical concentration range.

Section 9: PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Granular	Bulk Density (loose):	110 - 120 lbs/ft^3
Specific Gravity:	3.4 - 3.6	pH:	NA
Appearance/ Odor:	Dull Black, Odorless	Vapor Pressure:	NA
Boiling Point:	NA	Vapor Density:	NA
Melting Point:	Over 2000º F	Evaporation Rate:	NA

Section 10: REACTIVITY DATA

Stability:	Stable
Incompatibilities (Materials to Avoid):	Strong mineral acids
Hazardous Thermal Decomposition Products:	None Expected
Polymerization:	Will not occur

Section 11: TOXICOLOGICAL INFORMATION

Proper precautions should be taken to avoid any health hazard. A health hazard may occur if limits for air contaminants exceed PEL limits as per 29 CFR 1910.1000. Proper engineering controls and ventilation should be used to prevent air contaminants from exceeding PEL limits. NIOSH-approved respirators should be used during all abrasive blasting operations. (See below for information on potentially hazardous elements)

Usual Route (s) of Entry:	Inhalation of dust during handling or use
Medical Conditions Possibly Aggravated By Exposure:	Chronic diseases or disorders of the respiratory system.

Iron silicate is not listed on the NTP, IARC, or OSHA list of carcinogens. However, please note that this product may contain chemical components that under certain conditions (e.g. sandblasting in a confined space without sufficient ventilation), could be released in concentrations that exceed OSHA PELs or ACGIH TLV's. In these situations, employee exposure monitoring should be performed to determine exposure levels.

Eye Contact:	Not anticipated to pose an acute or significant eye contact hazard. In the event of eye contact, flush eyes with generous amounts of water.
Skin Contact:	Not anticipated to pose an acute or significant skin contact hazard. Wash with soap and water as needed to remove from skin
Inhalation:	Not anticipated to pose an acute or significant inhalation hazard if proper work practices are employed to maintain dust exposure below OSHA PEL's. If overexposure occurs, remove individual to area with fresh air until symptoms cease.
Ingestion:	Not considered to be an ingestion hazard.

Section 12: ECOLOGICAL INFORMATION

Procedures to Follow if Material is Released or Spilled: Using appropriate personnel protective equipment, material should be shoveled, swept, vacuumed or otherwise collected into appropriate containers.

Landfill disposal or other methods that are in accordance with local, state and federal regulations. MRI testing as shown that virgin (unused and uncontaminated) material does not exceed the Toxicity Characteristic Leaching Procedure (TCLP) hazardous waste limits per 40 CFR 261.3. Used or contaminated material should be tested in accordance with 40 CFR 262.11 or any applicable local or state regulations to determine if it is a hazardous waste and disposed of accordingly.

Section 13: DISPOSAL CONSIDERATIONS

Landfill disposal or other methods that are in accordance with local, state and federal regulations. MRI testing as shown that virgin (unused and uncontaminated) material does not exceed the Toxicity Characteristic Leaching Procedure (TCLP) hazardous waste limits per 40 CFR 261.3. SHARPSHOT® iron silicate abrasives are listed as approved products on the US Navy's Qualified Products List QPL-22262. However, it should be noted that virgin SHARPSHOT® may exceed the soluble zinc limit of 50 mg/L as currently listed in MIL-A-22262 when tested in accordance with California's Title 22 STLC procedure. Used or contaminated material should be tested in accordance with 40 CFR 262.11 or any applicable local or state regulations to determine if it is a hazardous waste and disposed of accordingly.

Section 14: TRANSPORT INFORMATION

DOT

Not regulated as a hazardous material by DOT.

IATA

Not regulated as dangerous goods.

IMDG

Not regulated as dangerous goods.

TDG

Not regulated as dangerous goods.

Section 15: REGULATORY INFORMATION

See above

Section 16: OTHER INFORMATION

If material is being used for abrasive air blasting, proper protective clothing, eye protection and respiratory protection should be used in accordance with OSHA regulations. If air blasting is being performed in confined area, proper ventilation should be used in accordance with OSHA regulations.

NFPA Ratings:

Abbreviations:

NA = Not Applicable

DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES

We believe that Minerals Research, Inc.'s (MRI) SHARPSHOT® iron silicate products are not hazardous chemicals as defined by the U.S. Federal Occupational Safety and Health Hazard Communication Standard 29 CFR 1910.1200 (c). However, this should not be construed as a warranty that any MRI product is or is not a hazardous chemical under any applicable safety, or environmental statute, rule, or regulation. The use or application of any MRI product, whether or not used in conjunction with any other product, may result in the violation of safety or environmental statutes, rules or regulations as MRI has no control over how the MRI product is used, nor the possible contaminants that may exist on the surface to which it is applied. Therefore, there shall be no express or implied warranty that the spent MRI product conforms with applicable safety and/or environmental statutes, rules or regulation. All sales of this product are subject to MRI's standard terms and conditions of sale. Further, MRI makes no warranties as to any of its products, express or implied, including the Implied Warranty of Merchantability, any implied warranty of fitness for a particular purpose or any implied warranties otherwise arising from course of dealing or trade.

By acceptance of any MRI product, the buyer thereof agrees that MRI's liability for any claim for damages, including, but not limited to, remediation or cleanup costs shall not exceed the value of the goods provided.

This information and product are furnished on the condition that the person receiving them shall make his own determination as to the suitability of the product for his particular purpose and on the condition that he assume the risk of his use thereof, including any environmental restrictions or prohibitions that may apply.

SDS Creation Date: 03/16

Attachment I
Confidential Marine Cultural Resources Report

DRAFT

MARINE ARCHAEOLOGICAL SURVEY

PROPOSED CLEARWATER PORT DEVELOPMENT

OFFSHORE VENTURA COUNTY, CALIFORNIA

Prepared for:

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Houston, Texas 77056-2017

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May 25, 2006

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INTRODUCTION

Crystal Energy, LLC (Crystal) contracted Macfarlane Archaeological Consultants (MAC) to review and evaluate marine archaeological survey data collected as part of Fugro West, Inc. (Fugro) integrated geophysical and geotechnical investigation for the proposed Clearwater Port Development Project in eastern Santa Barbara Channel, offshore Ventura County, California.

The following details the results of the underwater remote sensing archaeological survey conducted in support of Crystal Energy, LLC's Clearwater Port Development project to receive, re-gasify, and transport liquefied natural gas (LNG) (Figure 1). Fugro West, Inc. (2006:ES-1) has summarized the project as follows:

> The Clearwater Port Project will convert the existing Platform Grace in the eastern Santa Barbara Channel to a receiving terminal and degasification facility. The offshore facility will include an adjacent satellite service platform (SSP) that will be held semi-taut with mooring lines to newly installed anchor piles. From Platform Grace, the gas will be transported about 12.6 miles eastward to landfall at Mandalay Beach. At the landfall, the pipeline will be installed via HDD borehole, and then continue to the proposed SCGS tie-in to the east of Saticoy at the Center Road Station

Fugro West, Inc. (2006) provided archaeological survey data for the project as part of their site characterization study. The objective of the archaeological survey is to identify and inventory cultural resources that may be present in the Study Area (Figure 1) through an examination of existing literature and site-specific geophysical survey data and to develop mitigation to minimize impacts to significant cultural resources should they occur in the study area.

Historical and cultural resources are defined as those areas of the marine environment that possess historical, cultural, archaeological or paleontological significance, including sites, structures, or objects significantly associated with, or representative of earlier people, cultures and human activities and events. Historical and cultural resources in the marine environment may generally be categorized into prehistoric sites and artifacts; inundated cities, harbors, and shore installations including light houses, wharves, historic landings; shipwrecks and downed aircraft remains.

Survey data analyzed in this evaluation included sidescan sonar and magnetometer. The sidescan sonar data was used to map unidentified seabed targets. The magnetometer data was used to map unidentified ferrous objects representing man-made debris or other features.

Available information detailing existing environmental, geological and cultural resource conditions has been integrated into the interpretation and analysis of site conditions and cultural resource evaluation presented herein. Previous survey reports reviewed for this investigation are listed under References and updated published data are listed in Fugro, 2005 and Fugro, 2006 (Plate 1-2).

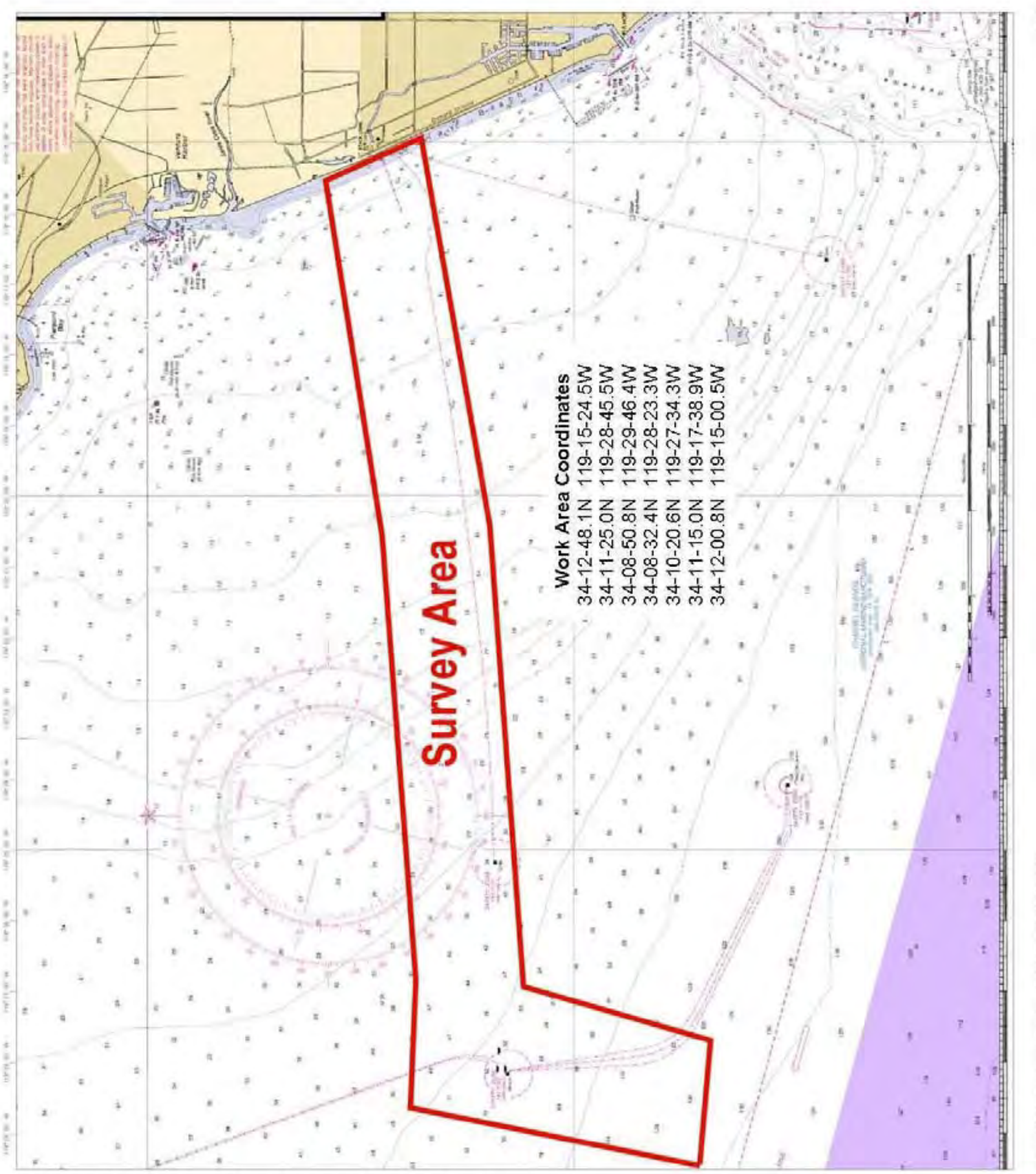

FIGURE 1. CLEARWATER PORT SURVEY AREA

The archaeological survey has been performed in accordance with current MMS guidelines Notice to Lessees (NTL) 98-05 dated 04 Aug 2005 for minimum requirements for archaeological survey and report requirements for offshore pipelines and platform sites and SLC archaeological survey guidelines as well as current professional ethics and research standards as outlined in or promulgated by Appendix C of the Airlie House Report (McGimsey and Davis, 1977) and policies of the Society for American Archaeology, Society for Historic Archaeology, Society for California Archaeology.

Specifically the NTL 98-05 state the purpose and objectives of the studies; 2) define the minimum areas to be surveyed and minimum survey line spacing; and 3) provide minimum requirements for the survey systems to be used.

The evaluation of potential marine cultural resources was conducted in accordance with the following regulations:

The California State Lands Commission (Commission) has jurisdiction over the state's tidal and submerged lands and administers the Shipwreck and Historic Maritime Resources Program (Public Resources Code sections 6309, 6313, and 6314). Cal. Code Regs. Title 2, Div. 3, section 2905; Title 14, Div. 6, section 15306. Public Resources Code section 6313(a) provides: "The title to all abandoned shipwrecks and all archaeological sites and historic resources on or in the tide and submerged lands of California is vested in the State. All abandoned shipwrecks, all submerged archaeological sites, and submerged historic resources of the State shall be in the custody and subject to the control of the commission for the benefit of the people of the State of California. The commission may transfer title, custody, or control to other state agencies or recognized scientific or educational organizations, institutions or individuals by appropriate legal conveyance."

The Minerals Management Service (MMS), under various Federal laws and regulations, ensures that regulated Outer Continental Shelf (OCS) activities do not adversely affect significant archaeological resources. The National Historic Preservation Act of 1966, as amended, (16 USC 470, P.L. 95-515) under section 106, requires Federal agencies to identify historic properties their actions could affect, determine whether or not there could be a harmful or adverse affect, and if so, to try to avoid or reduce the effect. The section also requires consultation with State historic preservation officers and tribal historic preservation officers.

Archaeological and Historic Preservation Act of 1974 (16 USC 469-469c, PL93-291) requires Federal agencies to notify the Secretary of the Interior when they find that any federally permitted activity or program may cause irreparable loss or destruction of significant scientific, prehistoric, historical, or archaeological data.

EXISTING CONDITIONS

Environmental Setting

For the purpose of the literature research the "project area" is defined as a 5-mile radius surrounding the proposed project facilities of Platform Grace and Pipeline route located in the Santa Barbara Channel offshore of Ventura County, California. For the purposes of the report, the "survey area" refers to the remote sensing surveyed portion of the project area. The following has been summarized from Fugro (2006:5-1, ES-2). Only that information pertinent to the archaeological analysis is summarized.

Bathymetry

Water depths were corrected to Mean Lower Low Water (MLLW) for the survey. Water depths were measured from about 20 feet near the proposed landfall out to about 318 feet at the Platform Grace location. Platform Grace lies 2000 feet from the shelfbreak, where water depths steeply descend to 2,300 feet (700m). There was no survey coverage from the 20-foot contour in the surf zone landward. At the Continental Shelfbreak to the south of Platform Grace, the survey extended down the Continental Slope to a maximum of approximately 790 feet about 12,500 feet southwest of the platform. Seafloor slopes were typically gentle on the Continental Shelf, with apparent slopes along the proposed pipeline route ranging from 0.4 percent to about 2.0 percent. Seaward of the shelfbreak, the slope steepens dramatically averaging about 7.5 percent and locally as high as 10 percent (Fugro West, Inc. 2006:ES-2).

The isobaths generally parallel the adjacent shoreline (north-northwest) to a water depth of 80 feet where they start to trend more westerly (Fugro, 2005:5-1). At the shelfbreak, the contours are oriented almost east-west, as they are influenced by the form and shape of sediment deposits on the Santa Clara and Ventura River Deltas.

The seafloor along the pipeline alignment (Maps A1-A4) slopes gently to the southwest from the landfall to Platform Grace. Natural seafloor slope within the survey corridor range from 0.1 percent in water depths of 50 to 75 feet and to 1.3 percent in 200 to 225 feet. From shoreline to a depth of 20 feet, although not surveyed, the estimated slope is 2 percent.

Platform Grace is situated in a relatively flat portion of the Ventura shelf where sea bed slopes are between 0.4 and 0.5 percent (Fugro, 2006:Plate 5-2). At the shelfbreak in water depth of 340 feet the seafloor slopes southwest at 7.5 percent to as high as 10 percent in the area surveyed.

Climate

The climate in the project area is considered mild. Intermittent fog and low clouds are characteristic of the climate in the coastal area, particularly during summer months and early fall. The U.S. Weather Bureau records for Port Hueneme 6 miles down coast from Ventura Harbor indicate an average annual temperature of 58.9 ºF ranging from an average low of 48.2 ºF to an average high of 69.7 ºF (USACE 1986, p. 10).

The period of predominant precipitation occurs from November through April and is generally associated with storms that travel eastward from the Pacific. Precipitation in the Ventura area varies from year to year, ranging from less than 6 inches to more than 27 inches.

Geomorphology and Geology

Platform Grace and the proposed LNG Clearwater Port terminal site and pipeline route are sited on the Ventura Shelf and lies within the offshore extension of California's Transverse Ranges Geomorphic Province (California Department of Conservation 2002, in Fugro 2006:4). Geologic structures trend generally east-west in contrast to the predominant northwest trend elsewhere in the State. The geology of southern Ventura County is dominated by the Ventura Basin, a sedimentary trough that extends westward into the Santa Barbara Channel. This basin has been down-warped during the past several tens of millions of years and has received a large amount of sedimentary deposits. These deposits consist predominantly of water-bearing silts and sands that are poorly consolidated and several hundred feet in depth. The sea has retreated from the eastern portion of the Ventura Basin forming the Oxnard Plain.

The Ventura Mainland Shelf extends along a northwest-southeast trending embayment of the Southern California coast between Oxnard and Santa Barbara. The shelf width reaches a maximum of 12.4 miles (20 km) off Carpinteria and narrows to less than 0.6 miles (1 kilometer) to the south at Hueneme Canyon. Over 309 square miles (800 square kilometers) of the shelf have a water depth of less than 100-feet (30 meters).

The project area is located at the westernmost edge of the Oxnard plain. The onshore portion of the study area is characterized by wide sandy beaches that extend from Point Mugu to the Ventura River. The primary source of sediments that mantle the Oxnard Plain has been the Santa Clara River. The mouth of the river is located immediately south of the Ventura Harbor; however, in the recent geologic past, the river has probably changed positions across the plain frequently in response to sediment deposition within its channel and immediately offshore.

The offshore project area is situated on the Ventura Mainland Shelf, which with the Mugu Shelf to the south and separated by Hueneme Canyon, forms the offshore extension of the Oxnard Plain. The Ventura Mainland Shelf is underlain by a thick accumulation of fluvial and deltaic deposits (Fugro 2006:2-5). The delta is the southeastern part of the Santa Barbara-Oxnard shelf that extends about 25 miles (40 km) from Santa Barbara to the Hueneme submarine canyon. Fugro (2006:2-5) indicates that much of the coarse bed load sediments are transported south to the Hueneme fan via the Hueneme submarine canyon with a significant portion of the fine, suspended load transported west to the Santa Barbara basin.

Further information on the annual discharge for the Santa Clara and Ventura River systems can be found in Fugro (2006:2-5, 2-6). During January 2005 the region experienced a series of storms that produced widespread flooding. The aerial extent of the resulting offshore sediment plume is presented in Fugro (2006:Plate 2-6). Evidence of debris transported to the continental shelf was seen in the sonar and sub bottom profile data collected during the geophysical survey. Massive debris deposits were left on the adjacent beaches and coast highway after the storm, and it can be assumed such deposits were also transported and deposited offshore (Fugro, 2006:Plate 2-7).

Holocene accumulation of sediment on the Ventura Mainland Shelf is cited as variable, ranging from 10 feet (3.3 meters) to 100 feet (33 meters) per thousand years (Fugro, 2006:2-6). These generally fine grain sediments have been deposited on the shelf during the past approximately 10,000 years, after sea level stabilized following the most recent post-glacial transgression. Of interest archaeologically is that the estimated average thickness of Holocene sediments along the proposed pipeline route is about 25 feet (8 meters). Buried relict channel(s) of the Santa Clara River and associated estuary deposits of Holocene and Pleistocene age are expected to occur within the survey area offshore.

The proposed pipeline landfall is located to the south of the Santa Clara River mouth, which is the largest sediment source in Southern California. Sediment is transported south by the current. Sediment transport offshore at the shelfbreak are more gravity driven processes.

Cultural Setting

A review of existing published and unpublished literature, manuscript, and archive information was conducted at the Central Coast Information Center, University of California, Santa Barbara and at the Ventura County Historical and Archaeological Societies. This search included information regarding prehistoric and historic sites and landmarks of local, State or National significance. A search of the inventories for the State Historic Property Data Files, National Register of Historic Places, National Register of Determined Eligible Properties, California Historical Landmarks, California Points of Interest, California OHP Archaeological Determinations of Eligibility, National Register of Historic Places and California State Landmarks (Department of Parks and Recreation, 1979) were also briefly reviewed as were previous studies completed by the Petroleum Industry, MMS, COE and other agencies for the harbor and immediate offshore area.

This research also included newspaper accounts and manuscript data that pertain to the history and maritime history (shipping and shipwrecks) of the project area. Site specific information on historic shipwrecks was compiled from several sources including the State Lands Commission and the Minerals Management Service in the form of a computerized list of nautical cultural resources (Pierson, 1978, 1980; Department of the Interior [DOI]; Bureau of Land Management [BLM]; Pacific Outer Continental Shelf Office [POCS] 1978; DOI, Minerals Management Service [MMS], 1987). Additional shipwreck locations were added to this listing from MAC's in-house computerized listing of significant nautical cultural resources offshore southern California. Additional historical information was obtained from the Ventura County Historic Society, National Ocean Survey (NOS) nautical charts, US Coast Guard, US Navy Port Hueneme, Records of the Command Historian, and City of Ventura Port District. The objective of this review was to identify and inventory known cultural resources in the project area. All site specific information on prehistoric site locations, shipwrecks and other maritime site localities was plotted on the archaeology survey maps and was used in conjunction with Petroleum Industry, geological and oceanographic information to generate expectations regarding the type of and potential for submerged cultural resources which may be present in the survey area. Also plotted were known Exploratory Well Sites and Core Holes (Table 1).

Prehistory

The project area lies in the western portion of the territory attributed to the Ventureño Chumash, a Hokan-speaking group of hunters and gatherers whose ancestors settled in the region as early as 9000 years ago and gradually evolved toward a degree of marine exploitation which may be unique in the Americas (Landberg 1965; Greenwood 1972).

Chumash territory is extensive, ranging along the California coast from Malibu in Los Angeles County northward to San Luis Obispo, westward to the coast range mountains, and includes the Northern Channel Islands of San Miguel, Santa Rosa, Santa Cruz and Anacapa.

With European contact and subsequent exploration, settlement and missionization, the Chumash population declined drastically, due to the disruption of existing behavioral and social systems and the introduction of deseases for which they had no natural immunities.

Most researchers agree that there has been a development of technology and social organization from simple to complex. Chumash culture appears to have been the development of over 9,000 years of occupation in the region which represents one of the most densely populated prehistoric regions in California.

The cultural and ethnohistoric background of the Chumash and their predecessors has been adequately described in the literature (Blackburn 1963; Brown 1967; Greenwood 1969, 1972; Harrison and Harrison 1966; Heizer 1978; Kroeber 1925; Landberg 1965; Olson 1930; Orr 1943, 1948; Rogers 1929; USDOI BLM 1979; and USDOI MMS 1987) and thus is only briefly outlined below.

Paleo-Indian Period

Although little evidence has survived in datable contexts, some researchers believe the first inhabitants of the region were of the Paleo-Indian (or Big Game Hunting) Cultural Tradition who followed migrating herds of Pleistocene megafauna into the area. Other postulate that they may possibly have followed the coastline in boats along the Pacific rim. The reduction in Pleistocene megafauna due to changing climatic conditions is generally cited as having resulted in the adaptation of subsistence technology to incorporate the procurement of smaller game and the collection and processing of more readily available vegetal resources. Kaldenberg (1976) has postulated, however, that this assumed shift in subsistence strategy was due to movement of interior hunters and gathers into the California region.

The possibility that these early sites may be located on the submerged portions of the Outer Continental Shelf is discussed in the offshore section below.

Early Period (9000-3000 Years Before Present [B.P.])

The lower limit of the Early Period is estimated at about 9,000 years B.P. based on dates obtained from sites at Diablo Canyon (Greenwood, 1972) and Surf (Horne, 1980). The Early Period was originally defined in the Santa Barbara Channel Region by Rogers

(1929) who termed it "Oak Grove", a name which continues in use today. Rogers based his definition of the period on artifact types and physical characteristics of midden soil, concluding that the millingstone (mano/metate) was its diagnostic feature. Assemblages typical of this period are also characterized by percussion-flaked core tools, hammerstones, and items such as discoidals, cogstones, and doughnut stones. Based on this assemblage, the subsistence system appears to have been primarily reliant on the gathering and processing of wild plants and seeds and accessible maritime resources, with hunting as a supplemental, seasonal or sporadic activity. Ornaments or tools of bone and shell are relatively rare in sites of this period.

Wallace (1955), utilizing data from coastal southern California, has described a regional Early Period, the Millingstone Horizon, in which Roger's "Oak Grove" was a local variant. The Early period also encompasses the Hunting (Rogers, 1929); Archaic, Early Mainland and Early Island (Olson, 1930); Intermediate Horizon (Wallace, 1955); Dune Dwellers (Orr, 1968); Encinitas and early Campbell Traditions (Warren, 1968); and Goleta and early El Capitan Phases (Harrison and Harrison, 1966).

As is stated above, most reconstructions of Early Period subsistence stress the dependence on terrestrial food resources (Wallace, 1955; 1978) and it is generally accepted that Early Period peoples were primarily plant food collectors and processors with hunting and fishing strategies developed to a lesser extent. Recently however, Early Period components at sites in Diablo Canyon and Surf referenced above show evidence of substantial maritime collecting between 9,000 and 7,000 years B.P. As data from these Early sites continues to increase, a better understanding of subsistence patterns should emerge.

The "Oak Grove" settlement pattern appears to consist of seasonal shifts from centralized habitation sites usually located on isolated knolls and oak-topped ridges in inland valleys and canyons, and on high sea terraces along the coast to smaller decentralized resource-specific campsites (Greenwood 1969).

Middle Period (c. 3000 Years B.P. - 1000 Years B.P.)

The Middle Period is poorly understood in the region. The period dates from approximately 3500-3000 Years B.P. to about 500 to 1000 Years B.P. depending on the author cited. Transition to the Middle Period is thought to have taken place about 3000 years ago when the hunting of large land animals (e.g., deer, elk and bear) and the exploitation of marine and riparian resources emerged as a focal economic activity. It was during this period that maritime fishing and sea mammal hunting also became important subsistence activities. While extensive exploitation of the nearshore fishery is evident in the Santa Barbara Channel region during the early Middle period, inland populations continued to rely on more terrestrial based resources (Clewlow, Pastron and Wells, 1978).

Although the use of many Early period artifacts (e.g., millingstones) and activities persisted during this period, shifts in both resource exploitation and settlement patterns led to new tool types indicative of the utilization of a more diverse resource base (Leonard 1971, p.119). Typical artifacts are small, pressure-flaked projectile points, increased quantities of bone tools, and greater reliance on the mortar and pestle for processing vegetal foods.

There is evidence that this shift in resource emphasis led to a more complex social base, an expanding trade network that included the Channel Islands, and the development of larger and more permanent settlements on the mainland coast (U.S. Bureau of Land Management 1978).

The Middle Period also encompasses the Middle Canaliño (Rogers 1929; Orr 1968), early Late Mainland (Olson 1930), late Intermediate Horizon (Wallace 1955), and late Campbell traditions (Warren 1968).

Late Period (1000 Years B.P.-1784)

The Late Period includes the time frame sometimes referred to as the Protohistoric or Ethnohistoric period (1542-1784). The Late Period is marked by an increase in population and a greater degree of specialized adaptations to local microenvironmental zones, and a more efficient utilization of local resources (U.S. Bureau of Land Management 1978). These include marine resources at coastal sites and seasonal utilization of acorns, deer, and grasses at inland sites. With the increase in population, the complexity of intersite interaction particularly between coastal and inland villages also increased (Clewlow, Pastron and Wells, 1978). At the time of Spanish occupation in the region, the settlement pattern consisted of centralized long-term occupation sites supported by secondary diversified, resource-specific, short-term campsites which were occupied seasonally. This settlement pattern is typified by large well-defined, named, nucleated villages, known as rancherias. Villages were typically situated near water sources, usually at the lower ends of valleys, with campsites located near streams, in rock shelters or on open slopes (Clewlow 1977). Clewlow (1977) has noted that due to their highly successive adaptation, the Chumash attained a level of socio-political complexity comparable to that of many agricultural peoples, indicating their subsistence pattern supported a high population density that lived in sizable, well-planned villages.

It was during this period that the Tomol plank canoe came into use, although travel to the Channel Islands by the use of a bark canoe or other water craft is assumed to predate the advent of the Tomol.

The Late Period encompasses the Late Canaliño (Rogers 1929; Orr 1968); Late Mainland and Late Island (Olson 1930); Late Prehistoric (Wallace 1955); and Chumash Traditions (Warren 1968).

History

The earliest documented European contact in Ventura County was the landing of Juan Rodriquez Cabrillo in 1542, although a significant Spanish presence was not established until the Portolá Expedition of 1769. The Portolá Expedition passed north of the project area. There is no evidence in the published accounts to indicate that the Portolá Expedition crossed the bank of the Santa Clara River in the vicinity of the project area (Horne 1980); however, Lopez (1978, in Horne 1980) has stated that Portolá encountered a large number of Rancherias, in particular *Kanaputegunon* (*Kanaputeknon*) and *'Iqsha*, presumably located at the mouth of the Santa Clara River.

In 1782, Father Junipero Serra dedicated Mission San Buenaventura. Shipping was infrequent during the Spanish colonial period and restricted in purpose to the transport of passengers and supplies to missions, garrisons and towns. In 1837, the Mexican government granted El Rio de Santa Clara o ha Colonia, now the Oxnard area, to a group of soldiers and in 1841, San Miguel was granted to R. Alivas and F. Larenzana. The San Miguel Grant was situated on the northern bank of the Santa Clara River. The Santa Clara grant became an agricultural region, a land use which has continued to the present day throughout Ventura County.

The town of San Buenaventura was first laid out by Don Jose Arnaz who then advertised in eastern papers for settlers to come to the Ventura area. C.C. Ryerson and family pass through San Buenaventura in 1850 and were the first Americans to camp at the mouth of the Ventura River (Storke 1891). The first post office was established at San Buenaventura in 1861. The 1848 survey was rejected by the board of supervisors for the town of San Buenaventura and the town was again surveyed in 1862 by Mssrs. Waterman, Vassault and Company who at that time owned ex-mission lands in the area. In 1863 incorporation of the town of San Buenaventura was accomplished based on the more recent survey. Rapid growth of the town began in 1866 when the Briggs tract was cut up and offered on the open market. Grain was first cultivated in 1867 at San Buenaventura and throughout the mid nineteenth century agriculture formed the basis of the area's economy. In 1872 the County of Ventura was created from part of Santa Barbara County. By the 1860's oil was discovered in the county and by 1900 the county had become an important area of petroleum production.

Shipping by coastal ships was the primary method by which agricultural products and goods were shipped in and out of the Channel cities until the turn of the century. Due to inhospitable shore conditions, disembarking freight and passengers by means of lighters, small vessels powered by rowers, sail or small steam engines, was difficult. The need for local wharves to facilitate shipping was recognized and wharves were subsequently built at Point Hueneme (1871) and Ventura (1872). Even though rail service between Los Angeles and Santa Barbara was available as early as 1887, heavy coastal passenger and freight shipping continued until after 1904, three years after the railway was extended to San Francisco (Wheeler and Kallman 1986, p. 36).

Offshore Archaeological Sites

The waters offshore Ventura County have a moderate probability for the occurrence of cultural resources (USBLM 1979, 1981). Offshore cultural resources that may potentially occur in this region include prehistoric sites and artifacts, historic shipwreck localities, downed aircraft and other maritime sites such as historic anchorages and/or wharves.

Paleogeography

The early and middle Pleistocene were times of folding and major tectonic activity in California. The late Pleistocene, by contrast, was dominated by erosional and depositional events related to sea level fluctuations responding to glacial and interglacial stages.

Sea level started falling about 30,000 B.P. from a level near or slightly below present sea level and continued falling until about 18,000 B.P. Sea level probably reached its lowest point at that time (about 394 ft. [120 m.] below present still stand), exposing several kilometers of the shelf and causing streams to cut valleys into the former coastal plain (Curray 1961; Nardin et al. 1981; Bloom et al. 1984; MMS 1987). MMS (1987, p. 38) indicates that late Pleistocene/Wisconsin sediments (30 to 18,000 B.P.) are probably preserved on the present-day continental shelf only below 394 ft. [120 m.] or as early fill in some of the submarine canyons, slope gullies or deep shelf river channels. Nearshore and onshore, these deposits may also be found at terrace deposits in the coastal dune complexes (Cooper 1967). Subsequent to late Pleistocene subaerial terrace development, broad river valleys were cut into the coastal lowland (MMS 1987, p. 40). Evidence suggests that locally, such subaerial exposure reached at least 295 ft. (90 m.) (Department of Water Resources 1972; Cooper 1967, in MMS 1987).

About 18,000 years ago, a period of warming caused ice sheets to melt and sea level began to rise. This rise in sea level has been termed the Holocene or Flandrian Transgression (Masters and Flemming 1983). Rising sea level (estimated at about 1 m every 100 years) flooded excavated river channels producing deep embayments and estuaries which caused streams to deposit sediments at the inland edge of the bays rather than seaward on the shelf. Waves subsequently destroyed exposed deposits of unconsolidated sediments, and as sea level continued to rise, eroding coastal beaches, estuaries and bays. Waves cut into underlying Tertiary bedrock leaving large marine platforms on the shelf. Also associated with sea level rise is the alluviation of major rivers that drain the adjacent coastal areas and reworking of earlier coastal deposits (MMS, 1987, p. 40).

Sea level continued to rise rapidly until 8,500 B.P. when it slowed to a rate of about 10-15 cm every 100 years (Inman 1983, in MMS 1987, p. 41). As a result, many small coastal estuaries and lagoons began to form from 8,500 to 5,000 B.P. (Lohmar et al 1980). This factor is significant to the Morro Bay area. As sea level rise continued more slowly the rate of sediment influx in the embayments was sufficient to offset the effect of continued sea level rise and resulting erosion. Sand bars began to block bay mouths forming tidal lagoons, and in some cases caused the inland extent of some embayments and subsequent lagoons to move seaward rather than inland for a protective barrier against erosional processes associated with sea level rise. The present stillstand, as mentioned above, was reached about 3,500 B.P.

Underwater Prehistoric Sites

Prehistoric sites consist of in-situ remains deposited during a period of lowered sea level prior to the Holocene or Flandrian Transgression. Such sites may be situated on relict submerged landforms either mantled with unconsolidated sediments or exposed on bedrock outcrops. Underwater prehistoric sites may also represent remains deposited subsequent to the Holocene Transgression, that are situated on the seafloor or within unconsolidated recent sediments. The latter remains are primarily isolated artifacts deposited as a result of random loss (e.g., cliff erosion, fishing and ceremonial activities).

Preservation of intact prehistoric resources along the California coast is considered unlikely due to the high energy nature of the shoreline environment. Preservation of such submerged sites may potentially occur, however, in association with protected environments (i.e., buried under alluvium or estuary silt, mud or peat prior to inundation, or where the erosive force of the sea may have been lessened by an intervening landform such as reefs or rocky headlands). Although the former conditions occur in the project area, to date no in-situ remains of intact prehistoric habitation sites have been reported in or near the project area. The probability of submerged prehistoric sites occurring in the project area except where burial under deltaic sediments has produced a more protective environment, therefore, is considered low.

There is a somewhat greater probability for the occurrence of isolated bottom-founded artifacts in the project area. Isolated artifacts have been documented in depths of less than 100 ft. (30 m.) in the western Santa Barbara Channel and southward to San Diego (Hudson 1976). The closest artifact locations to the project area are SBMNH-20 at San Buenaventura offshore *Shisolop* near the City of Ventura, and SBMNH-23, located north of Le Dreau Cove on Anacapa Island (Table 2).

Historic Maritime Sites

The project area has had a long maritime history ultimately resulting the use of the *Tomol* (sewn-plank canoe) or other water craft by the Chumash Indians. Four major Tomal villages are situated along the Ventura County coastline. They are *Kameh̲me'y*, *Mitsqanaqa'n*, and *Shisholop* situated on the Ventura River, *Wene'mu* located on Point Hueneme at the margin of a former lagoon which is now the Port Huememe entrance channel, and *Muwu* at Point Mugu. It was from *Shisholop* and *Wene'me* that the Chumash traveled the Santa Barbara Channel to *wah̲`il* on Santa Cruz and *Anyapah̲*, respectively (Hudson et l. 1978, p. 145).

Due to the fragile nature of Native American watercraft, in terms of construction methods and perishable materials used, it is unlikely that evidence of such vessels would be preserved in the offshore environment. Far more likely would be preservation of such craft in shoreline caves or buried within talus slopes of seaward facing cliffs.

Asian vessels also may have traveled California waters prior to the time of Spanish contact (Brooks 1875). Although considered unlikely, undocumented wrecks of disabled junks or other vessels may occur in the project area. To date, the only wreckage of junks in the project region has all been associated with historic nineteenth century whaling activities.

Historic nautical sites (shipwrecks) of European and American origin are expected to occur within or near the project area. This assumption is based on (1) the number of reported loss locations in the vicinity of the project area, and (2) the density of coastal traffic dating from the late Eighteenth Century (predominantly Manila Galleons). As shipping increased during the American Period, so did the frequency and number of reported shipwrecks. Historic shipwrecks in the vicinity of Ventura Harbor are not documented in the literature until 1870 and all post date Ventura Pier construction. Previous to wharf construction, the area near Ventura Pier had been used as a landing and this usage dates to Mission times. No shipwrecks dating to this earlier period, however, have been documented in the literature.

In general, the data base for both prehistoric and historic cultural resources offshore southern California is inadequate as most information concerning these resources has been extracted from secondary sources rather than located by systematic field surveys (USDOI BLM 1979; USDOI MMS 1987). Such secondary and sometimes tertiary sources include historic accounts describing the foundering of vessels rather than actual locations based on visual identification or the accounts of sport and commercial divers untrained in archaeology. Provenience for these resources, therefore, is unreliable and in the case of historic shipwrecks, locations may be accurate only to within 10 miles of the loss coordinates. Locally, accurate site identification has been provided by recent field surveys. These locations, however, represent only a fraction of the resources recorded offshore southern California.

Twenty-nine (29) historic shipwrecks and one downed jetliner are reported within a 5-mile radius of the survey area (BLM 1978; MMS 1987; NOAA Personal communication, 2006) (Table 3). Two (2) of the vessels have been evaluated as insignificant. Five (5) vessels and one downed jetliner have been evaluated as significant and 23 vessels as moderately significant. An additional eighteen (18) shipwrecks have been reported within 5-miles of the survey area which are of either recent origin or small size (less than 10-tons) (U.S.C.G. Merchant Vessel Registry 1950-1986) (Table 4). Five of these vessels were built before 1920. The significance of the vessels has not been evaluated.

Few of the reported shipwrecks have accurate coordinates; however, of the potential 48 vessels reported as lost within a 5-mile radius of the project area, 13 of the vessels and one downed jetliner (Figure 2) have been determined to be located outside of the survey area or area of potential effect (A.P.E.) either by association with an Historic Landing, Pier, Wharf, Harbor or Point of Land, or have accurate coordinates verified by field survey as outside of the A.P.E. and 3 vessels have been reported as removed or refloated. They include the following:

<u>Advance</u> [MMS 583]	<u>Arrow</u> [MV 231652]
<u>California</u> [MMS 60] Removed/Refloated	<u>Coos Bay</u> (MMS 78)
<u>Crimea</u> [MMS 603]	<u>Kalorama</u> [MMS 633]
<u>La Jenelle</u> [MMS 177]	<u>Marie</u> [MV253652]
<u>Portland</u> [MMS 257] Removed/Refloated	<u>WL Hardison</u> [MMS 677]
Unknown [MMS 474]	Unknown [MMS 503]
Unknown [MMS 504]Removed/Refloated	Unknown [MMS 505]
Unknown [MMS 506]	Alaska Air 261

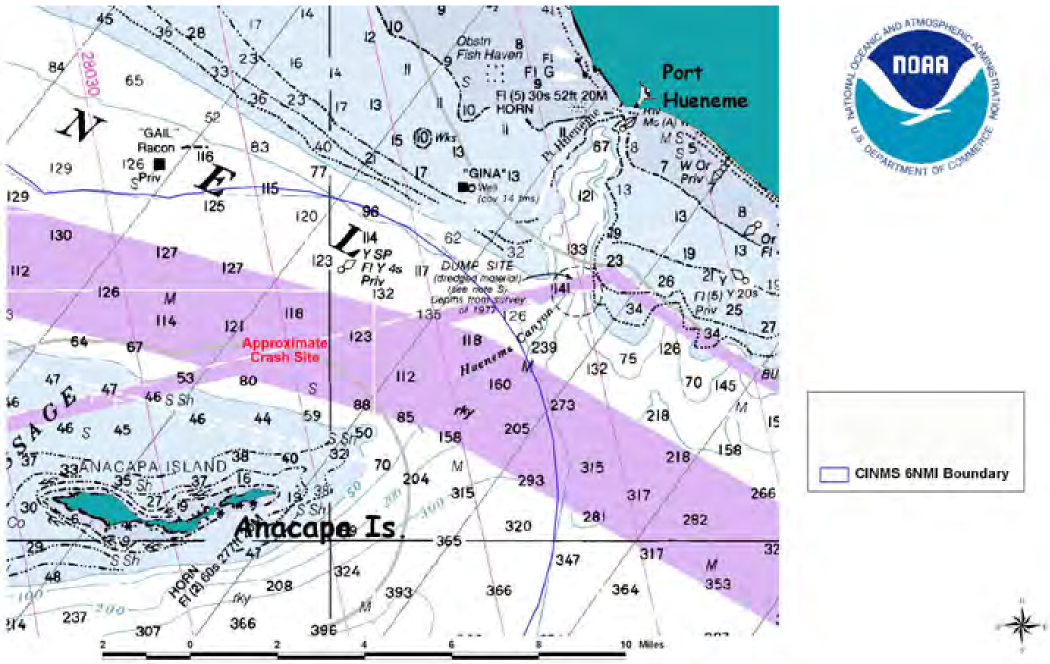

FIGURE 2. Downed Jetliner 261 Approximate Location

NOAA nautical chart for the area indicates the presence of a vessel south of the survey area in about 45 ft. of water. This vessel was identified as a kelp cutter (Dames & Moore 1980b).

Recent Shipwrecks and Other Debris

Numerous recent vessels have capsized or grounded at or in the vicinity of the entrance to Ventura Harbor and at the Santa Clara River mouth. Channel storms or human error have caused numerous shipwrecks or capsizings. At Ventura Harbor alone, from October 1977 through 1981, the Ventura Harbor Master reports losing two of their own rescue boats in attempting rescues at the harbor entrance as well as reporting 206 boats ran aground within or near the entrance, 68 sank, 68 capsized and 18 had collisions.

Storm generated waves and flooding of the Santa Clara and Ventura Rivers destroyed a large portion of the harbor taking out to sea or destroying 100 of the 295 boats in the harbor. Debris from these culturally insignificant vessels may be expected to occur in the landward portion of the project area. In addition debris and remains of vegetation have been deposited in the landward portion of the study area as documented in Fugro 2006.

It may be assumed that debris from the vessels not refloated or otherwise salvaged may be present in the survey area. The majority of such debris except for engines and drive shafts or commercial fishing gear will be non-ferromagnetic. Ferromagnetic objects are heavy and would tend to settle into the sandy bottom. Sedimentation in the survey area is extensive and thus little of this ferromagnetic debris would display significant above seafloor height. Such debris therefore may or may not be visible on sidescan sonar records. Other construction materials used in recent vessels such as fiberglass or wood would be extensively broken and scattered due to wave action. Much of this non-ferromagnetic debris would have washed to shore. In addition to debris resulting from shipwrecks and other boating accidents, debris may also be deposited accidentally by commercial and private vessels transiting in and out of the harbor daily.

Local Newspaper accounts identify recent losses not included in Tables 2 or 3. They may, however, account for debris located within the 5-mile radius of the project area.

- 20 ft sailboat, name unknown, capsized in the surf, at harbor entrance, January 1974 (Star Free Press, p. 4-1, 10-21-87).
- Trade Winds, 55 ft motor yacht, turned over in the waves off the Santa Clara River (Star Free Press, p. 4-1, 10-21-87).
- Sunset, 85 ft. commercial fishing boat, ran aground off McGrath State Beach while returning to port (September 22, 1973) (Star Free Press, p. 4-1, 10-21-87). The crew was rescued by helicopter and the boat broke up in the surf.
- Seven Leaguer (Star Free Press, p. 3, 11-29-47).
- Therapy, 27 ft. cabin cruiser, sunk at the harbor entrance (11-16-70).
- Patrol boat grounds and breaks up at Ventura Harbor entrance in attempt to rescue grounded sailboat (11-28-70). Both boat crews were rescued.

In January of 1977 three boats, including one sailboat grounded on the beach near Ventura Harbor (Wheeler and Kallman 1986, p. 131).

- Island Chief broke up in the waves near Ventura Harbor 3-9-84.
- Kelley Anne, sank in 40-ft near harbor entrance.
- El Capitan, 50 ft. fishing trawler collided with freighter in deep water six miles offshore of Ventura Harbor (December 23, 1981).

Historic Sites and Landmarks

The Ventura Wharf (Ventura County Landmark No. 20), built in the 1870's is a historic maritime site as well as County Landmark. It is located within a 5-mile radius of the survey area. Prior to 1870 the area had been used as a landing, and has a history of disastrous wave conditions from storms and earthquake generated tsunamis. After the earthquake of 1812, a tsunami hit the Ventura coastline. The Mission was built on higher ground above the original Mission due to the extreme height of waves some of which were reported to be 50 ft (Wheeler and Kallman 1986, p. 17). Wheeler and Kallman report that at least 12 large ships went aground at or near Ventura Wharf in the late 1800's and early 1900's. No information or reference for an additional six shipwrecks cited in Tables 2 and 3 could be found in the documentation available. There was no regularly used landing in the vicinity of the Santa Clara River/McGrath Lake area.

Ventura Harbor

The Ventura Port District was organized in 1952 under the Harbor and Navigation Code of the State of California. The harbor and jetties were built in 1970. Dredging for the harbor has been confined to the area north of the existing Union Oil Company pipeline which extends in a generally westerly direction from shore northwest of the survey area. No disturbance in the project area as a result of recent dredging, therefore, is expected to have occurred.

MARINE ARCHAEOLOGICAL SURVEY

Geophysical Data Acquisition

Fugro West, Inc. conducted the geophysical investigation portion of the marine archaeological survey in two separate field surveys, a seafloor mapping survey and a magnetometer survey.

The seafloor mapping survey documented and updated the sea bed conditions along the pipeline route and at the Platform Grace site. The survey was completed aboard the M/V Zephyr between November 15 and December 8, 2005. This survey resulted in a total of 277.7 statute line-miles (446.9 line-kilometers) of collected sidescan sonar data, 232.6 statute line-miles (374.3 line-kilometers) for the pipeline corridor and 45.1 statute line-miles (72.6 line-kilometers) at the Platform Grace site (see Fugro 2006:Plates 3-1 and 3-3).

A Magnetometer survey grid was created to document and locate ferrous objects on the seafloor such as existing pipelines, well heads or other debris. Line layout was dictated by the limitations of the magnetometer and the existence of known sea bed features (Fugro 2006:3-2). A series of lines parallel to the pipeline-route complemented by a set of tie lines to identify and located existing pipelines were layed out along with an additional series of lines for the Platform Grace site to locate existing pipelines and debris. The magnetometer survey was commenced aboard the M/V Zephyr January 6, 2006. The magnetometer sensor was deployed by a tow cable from the vessel's stern. Survey operations consisted of traversing the pre-plotted grid of survey lines while towing the marine magnetometer. A total of 171.9 statute line-miles (276.8 line-kilometers of magnetometer data were acquired.

Information on the DGPS and Starfix.Seis navigation positioning and other systems utilized and data collected during this survey can be found in Fugro (2006).

Once Fugro processed sidescan sonar data which included editing navigation and sonar image imformation and construction of a sonar mosaic for the pipeline route and Platform Grace site at the Fugro Chance, Inc. office in Lafayette, Louisiana. All individual sonar survey tracklines were reviewed and corrected for towfish altitude above the seafloor. The mosaic constructed from this data is analogous to an aerial photograph of the seafloor. The mosaic as well as individual corrected and uncorrected data files were reviewed by the archaeologist in the form of TIFF-formatted images. The corrected image allowed the archaeologist to obtain location information for each feature and to compare adjacent lines thereby eliminating water column anomalies, anchor scars, rock and bedrock, pipelines and platform facilities from the data set.

The magnetometer data and positioning information acquired during the magnetometer survey were processed at Fugro's Ventura, California office (Fugro 2006:3-7). Processing included removing magnetic anomalies associated with existing facilities (Platforms, pipelines, and mooring systems). The extensive influence of the existing facilities was anticipated to mask smaller anomalies that might be associated with individual small debris within its field range. To the extent possible the overshadowing influence of the existing platforms and pipelines were removed, the magnetic data were plotted and contoured in Trimble's TerraModel to located and identify the smaller isolated anomalies (Fugro 2006:3-8). The total magnetic field trace for each of the isolated anomalies could be examined to determine the magnetic signature type, amplitude and duration of the anomaly and a more exact location calculated for these anomalies. Fugro mapped the location of these anomalies with the TerraModel CAD system. The archaeologist was then able to crosscheck the interpreted anomaly locations with sidescan sonar imagery for potential target identification.

Data Reduction and Interpretative Procedures

Standard geophysical data reduction procedures were used in the interpretation of collected data. Procedures included the following:

- The type of cultural resources present (Tables 1-3, Plate 1), site conditions and the potential for preservation of cultural resources in the study area were identified based on the result of the literature survey and synthesis of available oceanographic, marine geological data, sedimentation history and field conditions;
- The location of zones of expected disturbance resulting from prior oil development, construction, dredging or other activities and locations of known shipwreck sites or other maritime resources were plotted;
- Geophysical data were systematically interpreted for potential anomalies indicative of cultural resource occurrence by comparison of interpretations to expected signatures;
- Seafloor features and magnetic anomalies are described in Tables 4 and 5 and plotted on the ship track map (Plate 1A); and,
- A list of anomalies indicative of possible cultural resource occurrence were developed (Tables 5 and 6).

Marine cultural resources interpretation procedures and expectations concerning signatures indicative of cultural resource occurrence were evaluated in terms of the most recent information available. Sidescan sonar records were analyzed in conjunction with magnetometer records for evidence of objects on the seafloor and other evidence of human activity or cultural resources. Due to bottom conditions expected, particularly sedimentation, the objects of search included all sidescan sonar targets (with or without acoustic shadow indicating projection into the water column) and seafloor topographic features such as depressions, rises, scour and anchor drag and trawl scars. Areas of seafloor change and/or areas of possible bedrock outcrop were also noted.

All such features, or clusters of such features, were described and plotted on the shiptrack map. Each potential anomaly was evaluated on its own merits, including a comparison of the signature to expected evidence of shipwreck remains. Analysis was based on interpretation of acoustic images. Using this remote sensing data, seafloor features appear as indirect representations that are not generally conclusive as to their origins. Selection of seafloor features as potential cultural resources depends on a range of acoustic image characteristics that might indicate possible cultural origin. Such characteristics may include the feature's shape, horizontal and vertical extent (size), aspect ratios (length, breadth, depth), angularity of feature edges, density or high acoustic reflectivity of the feature, and considerations of surrounding geology and/or uniform seafloor acoustic character.

Targets within the area of disturbance from prior oil development and production activities were carefully evaluated as to whether or not they represent evidence of that disturbance or evidence of site locations. All sidescan sonar data were analyzed in conjunction with magnetometer data.

Also included on shiptrack maps was site specific bathymetry. The area bathymetric contour map was compiled from fathometer data. In calculating water depth, corrections were made for the local velocity of sound in water, the submerged depth of the transducer, for tidal variations and for offset between the navigational antenna and the depth recorder transducer. Tidal variations were calculated based on the nearest station for which tide predictions are available. Corrections for local velocity of sound and vessel draft were made in the field by use of a measured line and resulting bar chart. Water depths were picked at location fix marks and at lows and highs between fix marks as appropriate for the proposed five foot contour interval and/or to show important seafloor features. During contouring, the interpreter used not only the fathometer records but also the side-scan sonar records to develop the correct trends of seafloor features.

All maps and/or plates containing sensitive site locations are included as part of a separate appendix of confidential information which may be removed prior to any public review. Onshore archaeological sites are presented in Appendix B (separate cover).

Data Quality

The data from the survey were of uniform good quality. Resolution was adequate to resolve targets greater than 1 ft. in height and thus considered adequate for cultural resources interpretation. Processed magnetometer data were of good quality.

The seafloor in the surveyed area was characterized by generally sandy sediment and was generally smooth and featureless. Bedrock was seen only in the deep water portion of the survey area southwest of Platform Grace.

Results

Fugro West, Inc. identified several zones of seafloor sediment types that were mapped from their textural characteristics identified from the sidescan sonar data. Inferred sediments types ranged from fine to coarse-grained, with an area of courser sediments with scattered seafloor rock near to the shelfbreak. Platform Grace appears to be surrounded by disturbed seabed from drill cuttings and related drilling activities. Numerous minor and subtle seafloor depressions were identified in the survey area, which might be attributable to either geologic or biologic processes. Several minor seabed targets inferred to represent man-made debris were mapped.

In the shoreward portion of the pipeline route, numerous shallow buried features were identified and interpreted to be debris deposited during the severe winter 2004/2005 flood events on the adjacent Santa Clara and Ventura Rivers. The debris was non-ferrous in origin; only sixteen magnetic anomalies were mapped in the survey area, including three attributed to abandoned exploration wells.

Site Identification

Inundated Prehistoric Site Locations

No prehistoric sites or isolated artifacts have been reported in the immediate survey area. Inundated prehistoric sites located in the project area are listed in Table 2.

Mapping of the Pleistocene/Holocene boundary, submerged relict environments and filled channels on the continental shelf is done for purposes of reconstructing the submerged subaerial topography in relation to possible prehistoric human occupation. Subsurface mapping and profiling of geological features was done as part of the Fugro (2006) report. Fugro (2006) mapped four subsurface horizons from seismic reflection data sets. Horizons 1 and 2 were mapped in the shallow subsurface underlying the proposed pipeline routes at depths below the seafloor ranging from 10 feet to about 16 feet (Horizon 1) and 0 feet to about 35 feet (Horizon 2). In the vicinity of Platform Grave, no shallow, continuous reflectors were recognized, and a deeper Horizon 3 was mapped at depths ranging from about 40 feet to 360 feet, dipping steeply southward. Southwest of the shelfbreak, Horizon 4 was mapped at the base of a chaotic sequence at depths of about 25 feet to 135 feet.

Fugro West, Inc. (2006:ES-2) identified a nearly vertical geological feature extending upward to about 27 feet below the seafloor overlain by undisturbed reflectors (sediments) located about 8.1 miles inshore from Platform Grace in about 95 feet of water. Fugro interprets this geological feature to be either a minor tear fault between major faults to the north and south of the alignment, a relic shoreline and associated very coarse-grained paleo-abrasion surface created during a sea level lowstand, buried fluvial deposits, and/or trapped shallow gas.

Fugro also identified a sequence of buried, chaotic reflectors interpreted to be mass movement deposits mapped beneath the Continental Slope extension of the survey area. These deposits, typically 50 feet in thickness, are buried by at least 30 to 50 feet of undisturbed sediments. The sequence is inferred to have been deposited in the Mid- to Late-Pleistocene, during low sea level stands, when the sediments were being deposited directly onto the shelfbreak and Continental Slope.

The relic shoreline and buried fluvial deposits may be interpreted as sensitive terrestrial landforms of late Pleistocene/Holocene age favorable for early prehistoric habitation. Sensitive areas would also include areas of buried relict estuarine deposit and along the edges of buried relict channel(s) associated with the Santa Clara River. Such features would be buried under a considerable depth of seafloor sediments at this location and would not be affected by the proposed project.

Seafloor Features and Magnetic Anomalies

The seafloor in the project area was found to be smooth and featureless except for the presence of sand ripples, seafloor depressions nearshore, and bedrock outcrop along the shelfbreak at the southwestern end of the survey area. Few dense, linear or complex features were observed in the survey records, and lack of such targets given the extensive number of recent vessels lost in the survey vicinity is assumed to be a factor of both active sedimentation which buries heavier debris and wave action which lifts light debris and transports fiberglass and wood elements of wreckage inshore.

Several small seafloor objects of unknown origin were mapped (Table 5). These objects were generally 1) less than 1 ft in height; 2) could be confirmed on adjacent lines; but 3) lacked any associated magnetic anomaly indicating man-made (i.e., ferromagnetic) origin. These features were interpreted as most likely being non-ferromagnetic debris associated with recent outer continental shelf activities, which may include fishing, petroleum industry development or operations, objects accidentally deposited by transiting pleasure, fishing or service vessels (jetsam), and/or debris deposited as the result of more recently lost vessels (flotsam). Such items generally lack cultural resource importance. None of the small features identified were evaluated as possessing sufficient horizontal extent or complexity to represent potentially significant cultural resources. Numerous water column anomalies were also present throughout the surveyed area. Water column anomalies were not mapped as part of this survey although their locations, especially in association with possible seafloor features, were noted.

Magnetic anomalies are presented in Table 6. Magnetic anomalies associated with seafloor features are representative of man-made objects. Depending on the size and complexity of the feature and the type, duration and magnitude of the magnetic signature, such features may be interpreted as ferromagnetic debris, remains of small craft, or shipwrecks, or may be associated with petroleum industry operations such as drilled wells or core holes. Magnetic anomalies with no associated seafloor feature are interpreted as unidentified. Such anomalies may represent buried ferromagnetic objects or may be geological in origin (e.g., anticlines, synclines, etc.).

Seafloor features and magnetic anomalies mapped were interpreted as follows:

- Possible Debris (Nos. 1, 3, 8, 11, 12, 14, 15, 16, 18, 19, 23, 24, 25, 26, 27, 28, 29, 30, 31)
- Coarser Grained Sediments or Debris (No. 10)
- Possible Debris or Small Boat

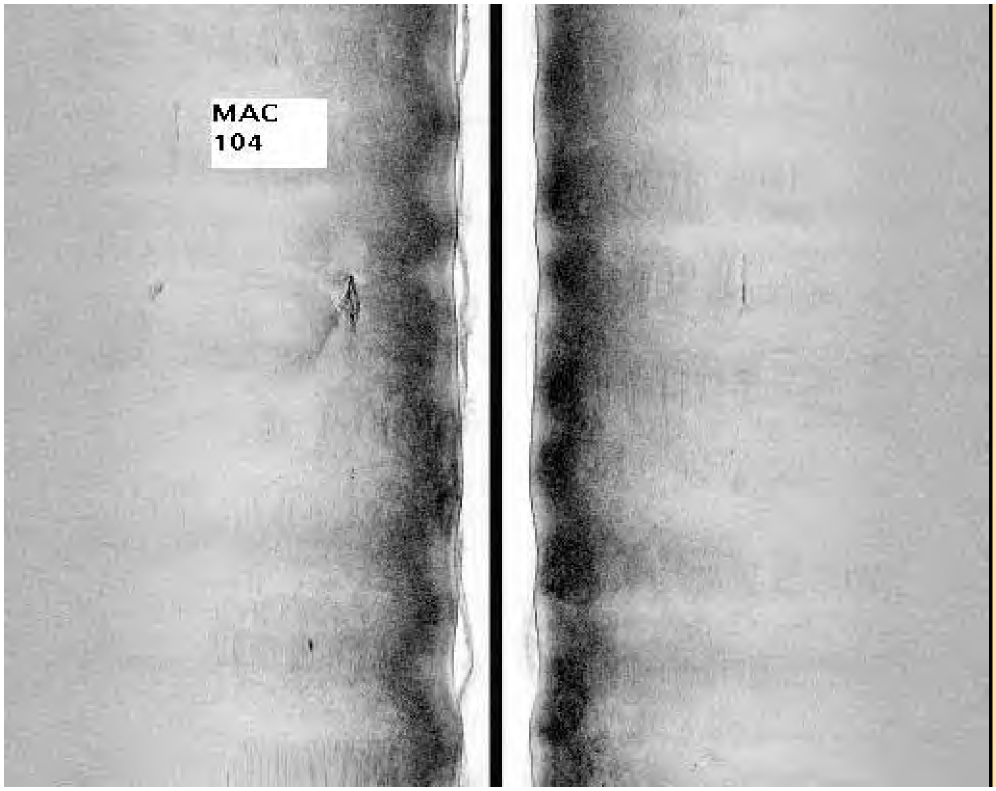

FIGURE 3. Sidescan Sonar Image of Feature 11 (Line 104)

No. 11 is a complex linear feature near a depression. It is 28.2 feet in length, 8.4 feet in breath, with a height of about 2.7 feet extending into the water column. It is interpreted as possible debris or a small boat.

- Crab Pots (Nos. 4, 5, 6, 7, 9, 20, 21, 32, 33). One location Feature 33 (M-3) occurs in association with a magnetic anomaly.

- Mooring System (No. 2)

- Wellhead (No. 34[M-4], 36[M-11], 37[M-14]). All three features occur in association with magnetic anomalies.

- Potential Cultural Resources

  Two features were mapped that had sufficient horizontal extent and/or complexity to be evaluated as potential cultural resources (shipwrecks). Only one of the features, however, is associated with a magnetic anomaly indicative of ferro-magnetic origin.

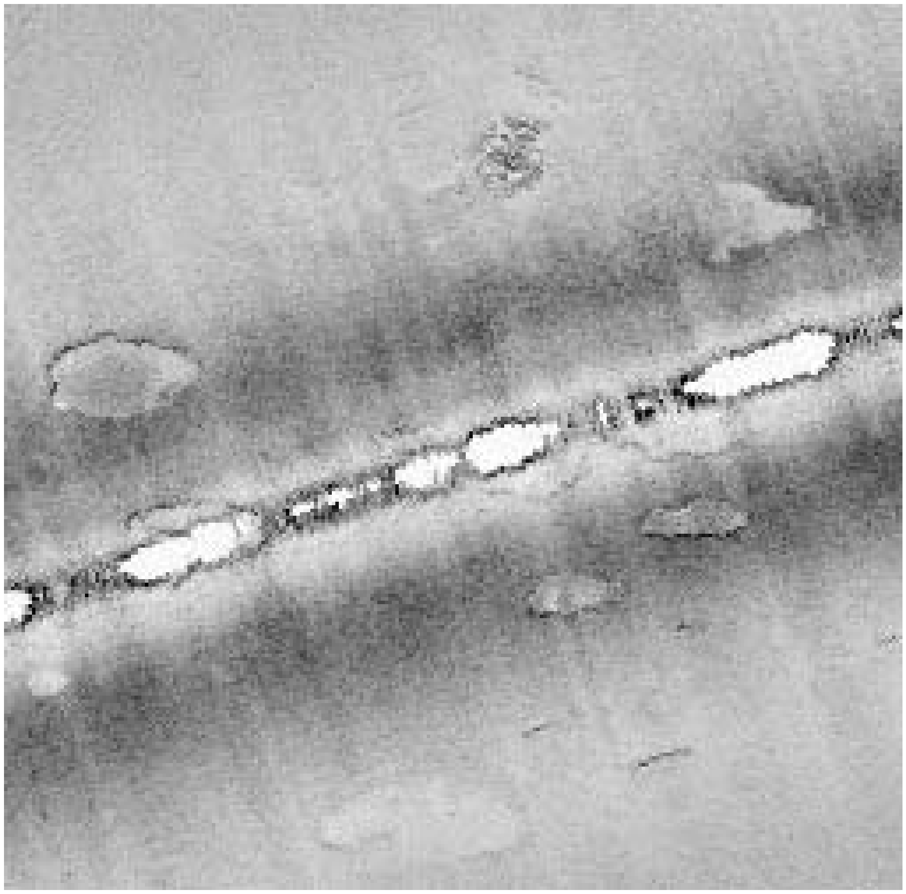

FIGURE 4. Sidescan Sonar Image of Feature No. 15 (Line 118)

Feature No. 15 is a complex feature with interior shadows indicating structure with possible height above the seafloor. Fugro (2006:Plate D-1g) interpreted this feature as possibly “bow-shaped”. There is no corresponding magnetic anomaly associated with this feature. It is 27.9 feet in length, 15.7 feet in breadth with projection into the water column of about 3 feet.

Feature No. 35 is a dense sublinear feature associated with a larger less dense sublinear feature extending from it in a depression. Its overall length is about 69 feet in length, 23 feet in breadth with projection into the water column of about 6.5 feet. There is a possible association of this feature with Magnetic Anomaly M-6 indicating ferromagnetic origin. This feature is interpreted as a possible shipwreck or large debris. The ferromagnetic anomaly, however, may be associated with any of the features shown above.

FIGURE 5. Sidescan Sonar Image Feature No. 35 (M-6) (Line 204)

In addition, 16 magnetic anomalies were documented during the survey.

- Pipeline: M-1, M-2
- Exploration Wellsites or Core Holes: M-4, M-7, M-9, M-10, M-11, M-12, M-13, M-14).
- Possibly buried ferromagnetic objects: M-18 and M-16.

CONCLUSIONS AND RECOMMENDATIONS

No documented significant prehistoric or historic sites are located within the survey area. Relic subaerial deposits considered sensitive for the occurrence of a prehistoric habitation are documented within the survey area

The California Division of Oil and Gas has confirmed that two wells (Shell Oil Company 54-8036 1 "State PRC 3314" and EXXON 64-5500 27 H8R) are located in PRC 3314. Table 1 lists additional wellsites and exploration core holes that were previously drilled in OCS P-0215 and OCS P-0216. As is always the case in areas of previous oil exploration and development, some small debris may be accidentally lost during construction or from service vessels in transit between shore and offshore facilities. This debris is identified as possible jetsam, that is, man-made materials which have been accidentally jettisoned from transiting vessels. In addition, the project area has transiting pleasure and fishing vessels from which debris (jetsam) may be accidentally deposited on the seafloor.

Vessels of historic importance reported lost in the project area are presented in Table 3. Vessels which constitute significant or moderately significant cultural resources are those vessels which generally are 1) greater than 10 tons; 2) associated with an historic event or personage; 3) loss of life; or 4) represent a historically significant or rare type of vessel in terms of construction, fittings or service. This definition has been expanded in recent years to include smaller vessels and those vessels which were built during World War II which have subsequently been refitted for peace time purposes such as fishing or pleasure but that retain significance due to the circumstances of their former service. More recently lost vessels have been reported in the project area that have not been evaluated. These vessels are listed in Table 4. In addition, several very recent shipwrecks have also been reported in the project area (beach areas south of the Santa Clara River) for which we have the name of the vessel. These vessels have little or no significance as cultural resources but their remains may occur within the survey area in the form of small debris.

Data reduction and interpretation resulted in a list of seafloor features and magnetic anomalies identified in the survey area which are presented in Tables 5 and 6. Of the 37 features identified, only 2 features (No. 15 and No. 35) were evaluated as having the potential to represent remains of a culturally important shipwreck. Feature 15 occurs in Area 1 (Pipeline Route). Feature 35 occurs in Area 2 (Pipeline Route).

The preferred mitigation for all cultural resources is avoidance. The features identified as having possible cultural importance should be avoided where possible during construction and operation of the proposed facilities and all associated anchoring activities. If impacts are unavoidable, potential cultural features within the survey area may require additional investigation prior to construction activities.

Data indicate that both Feature 15 and 35 are small discrete features that may be easily avoided during anchoring or other construction activities. Should avoidance not be possible, then a formal archaeological relocation, identification and evaluation survey should be conducted to determine the potential significance of feature. If suspected cultural features are determined to be significant, their eligibility for nomination to the National Register of Historic Places should be evaluated and State Historic Preservation Office approved mitigation of the resource should be conducted. All such efforts should be performed only after consultation with the appropriate jurisdictional agency with copies approved for public dissemination.

Given the potential for pipe installation to diverge from its intended path during construction for a variety of reasons, it is reasonable to avoid potential adverse impacts to potential cultural features by an appropriate safety margin. This safety margin should take into account the procedures used during pipeline or other installation and their effect on the surrounding seafloor. Requirements for additional investigations of the identified potential cultural features should be determined based on their distance from the final centerline and one the proposed type of pipe-placing technology or mooring systems utilized. If a highly controlled dynamic positioning system is utilized, additional investigations are recommended only for those features within 100m of the final centerline or mooring. All potential cultural features should be treated as unprotected archaeological sites, and their location should not be distributed in a manner that creates potential encroachment before they can be investigated.

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